

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

MKS INSTRUMENTS, INC.
(EXACT NAME OF REGISTRANT AS SPECIFIED IN ITS CHARTER)

MASSACHUSETTS
(STATE OR OTHER JURISDICTION OF
INCORPORATION OR ORGANIZATION)

3823
(PRIMARY STANDARD INDUSTRIAL
CLASSIFICATION CODE NUMBER)

04-2277512
(I.R.S. EMPLOYER
IDENTIFICATION NUMBER)

SIX SHATTUCK ROAD
ANDOVER, MA 01810
(978) 975-2350
(ADDRESS, INCLUDING ZIP CODE, AND TELEPHONE NUMBER,
INCLUDING AREA CODE, OF REGISTRANT'S PRINCIPAL EXECUTIVE OFFICES)

JOHN R. BERTUCCI
CHAIRMAN, CHIEF EXECUTIVE OFFICER, AND PRESIDENT
MKS INSTRUMENTS, INC.
SIX SHATTUCK ROAD
ANDOVER, MA 01810
(978) 975-2350
(NAME, ADDRESS, INCLUDING ZIP CODE, AND TELEPHONE
NUMBER, INCLUDING AREA CODE, OF AGENT FOR SERVICE)

COPIES TO:

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APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: As soon as practicable after the effective date hereof.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. []

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. []

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. []

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. []

If delivery of the prospectus is expected to be made pursuant to Rule 434, please check the following box: []

CALCULATION OF REGISTRATION FEE

TITLE OF EACH CLASS OF SECURITIES TO BE REGISTERED	AMOUNT TO BE REGISTERED(1)	PROPOSED MAXIMUM AGGREGATE OFFERING PRICE	AMOUNT OF REGISTRATION FEE(2)
Common Stock, no par value per share.....	shares	\$100,000,000	\$27,800

(1) Includes shares which the underwriters have the option to purchase

from the company to cover over-allotments, if any. See "Underwriting."

- (2) Estimated solely for purposes of calculating the registration fee in accordance with Rule 457(o) under the Securities Act of 1933, as amended.

THE REGISTRANT HEREBY AMENDS THIS REGISTRATION STATEMENT ON SUCH DATE OR DATES AS MAY BE NECESSARY TO DELAY ITS EFFECTIVE DATE UNTIL THE REGISTRANT SHALL FILE A FURTHER AMENDMENT WHICH SPECIFICALLY STATES THAT THIS REGISTRATION STATEMENT SHALL THEREAFTER BECOME EFFECTIVE IN ACCORDANCE WITH SECTION 8(a) OF THE SECURITIES ACT OF 1933 OR UNTIL THE REGISTRATION STATEMENT SHALL BECOME EFFECTIVE ON SUCH DATE AS THE COMMISSION, ACTING PURSUANT TO SECTION 8(a), MAY DETERMINE.

The information contained in this prospectus is not complete and may be changed. The underwriters may not confirm sales of these securities until the registration statement filed with the Securities and Exchange Commission becomes effective. This prospectus is not an offer to sell these securities, and is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED JANUARY 28, 1999

SHARES

[MKS LOGO]

COMMON STOCK

MKS Instruments, Inc. ("MKS") is offering _____ shares of its common stock. This is MKS's initial public offering and no public market currently exists for its shares. We have applied for approval for quotation on the Nasdaq National Market under the symbol "MKSI" for the shares we are offering. We estimate that the initial public offering price will be between \$ _____ and \$ _____.

After the close of this initial public offering, John R. Bertucci, Chairman, Chief Executive Officer and President of MKS, and members of his family will own approximately _____ % of the outstanding common stock.

 INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. SEE "RISK FACTORS" BEGINNING ON PAGE 6.

	Per Share -----	Total -----
Public Offering Price	\$ _____	\$ _____
Discounts and Commissions to Underwriters	\$ _____	\$ _____
Proceeds to MKS	\$ _____	\$ _____

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

MKS has granted the underwriters a 30-day option to purchase up to an additional _____ shares of common stock to cover over-allotments. If the underwriters exercise this right in full, the Public Offering Price will total \$ _____, the Discounts and Commissions to Underwriters will total \$ _____ and the Proceeds to MKS will total \$ _____.

 NATIONS BANC MONTGOMERY SECURITIES LLC

DONALDSON, LUFKIN & JENRETTE

LEHMAN BROTHERS

The date of this prospectus is _____, 1999

[PICTURES]

MKS, MKS Instruments, Baratron and ORION are trademarks of MKS. This prospectus contains trademarks, service marks and trade names of companies and organizations other than MKS.

MKS INSTRUMENTS, INC.
 PROSPECTUS COVER
 JANUARY 28, 1999

INSIDE FRONT COVER (PG. 2):

This page is produced in four-color process. Amidst a dark background, the MKS logo appears at the top right of the page, and to the top left is the phrase "A wide range of products made using MKS Process Control Instruments." Two paragraphs describing the role MKS plays in complex advanced materials manufacturing processes, such as semiconductor, also appear on this page, and are as follows:

(first paragraph) "MKS Surrounds the Process. In semiconductor and other industries involving advanced materials processing, products such as semiconductor devices, CD ROMS, flat panel displays, and fiber optic cables are the result of complex manufacturing processes. These processes build up very thin layers of materials, step by step, through the interaction of specific gases and materials inside tightly controlled process chambers. Maintaining control of these complex steps throughout the entire manufacturing process is critical to performance and yield. (second paragraph) MKS Process Control Instruments are integrated into almost every step of gas-related processes--managing the flow rates of gases entering and exiting the process chamber, controlling the gas composition and pressure inside the chamber, analyzing and monitoring the composition of the gases, and isolating the gases from the outside environment."

In the center of the page is a photo montage, displaying images of semiconductor devices, flat panel displays, fiber optic cables, solar panels, magnetic and optical storage media and gas lasers. Each of these images has a text label adjacent to it.

INSIDE SPREAD (PGS. 3 AND 4):

These pages are produced in four-color process. The main focus of the spread is the illustration of a typical process chamber, with numerous MKS products surrounding the chamber. At the top of the illustration, centered across the two pages, is the title "MKS Instruments...Surrounding the Process." Each product is described in a brief paragraph, and the paragraphs appear on both sides of the illustration--left and right columns. The paragraphs are as follows:

DIRECT LIQUID INJECTION SUBSYSTEMS

For use in the delivery of a wide variety of new materials to the process chamber that cannot be delivered using conventional thermal-based mass flow controllers.

AUTOMATIC PRESSURE CONTROLLERS WITH INTEGRATED BARATRON(R) PRESSURE TRANSDUCERS

A compact, integrated measurement and control package for use in controlling upstream or downstream process chamber pressure.

ULTRACLEAN MASS FLOW CONTROLLERS

For the precise measurement and control of mass flow rates of inert or corrosive gases and vapors into the process chamber.

ULTRACLEAN MINI-BARATRON(R) PRESSURE TRANSDUCERS

For use in gas cabinets to feed ultra-pure gases to critical process systems.

PRESSURE CONTROL VALVES

To precisely control the flow of gases to a process chamber in a wide range of flow rates.

IN SITU FLOW VERIFIERS

For fast verification of mass flow controller accuracy and repeatability during a process.

DIGITAL COLD CATHODE IONIZATION AND CONVECTION VACUUM GAUGES

A variety of indirect pressure gauges for measuring very low chamber pressures and conveying information digitally to host computers.

ORION(R) PROCESS MONITORS AND RESIDUAL GAS ANALYZERS

For the analysis of the composition of background and process gases inside a process chamber.

PRESSURE SWITCHES

Provide protection of vacuum equipment and processes by signaling when atmospheric pressure has been reached.

BARATRON(R) PRESSURE MEASURING INSTRUMENTS

For the accurate measurement and control of a wide range of process pressures.

IN SITU DIAGNOSTICS ACCESS VALVE

Allows for accurate calibration and diagnostics of vacuum gauges and pressure transducers while directly mounted on the process chamber.

EXHAUST THROTTLE VALVES AND AUTOMATIC PRESSURE CONTROLLERS

For isolation and downstream control of process chamber pressures, and pressure control within the exhaust systems.

HIGH VACUUM VALVES

To isolate the process chamber from both the pumps and from atmosphere.

HEATED PUMPING LINES

For the reduction of contaminants in the vacuum pump and pump exhaust stream.

VAPOR SUBLIMATION TRAP

To collect by-products and particulates that could otherwise contaminate devices

in the process chambers and damage vacuum pumps.

Prices of products shown above range from \$400 to \$80,000.

The above graphic depicts a typical process chamber and surrounding equipment used in semiconductor manufacturing.

YOU SHOULD RELY ONLY ON THE INFORMATION CONTAINED IN THIS PROSPECTUS. WE HAVE NOT AUTHORIZED ANYONE TO PROVIDE YOU WITH INFORMATION DIFFERENT FROM THAT CONTAINED IN THIS PROSPECTUS. WE ARE OFFERING TO SELL, AND SEEKING OFFERS TO BUY, SHARES OF COMMON STOCK ONLY IN JURISDICTIONS WHERE OFFERS AND SALES ARE PERMITTED. THE INFORMATION CONTAINED IN THIS PROSPECTUS IS ACCURATE ONLY AS OF THE DATE OF THIS PROSPECTUS, REGARDLESS OF THE TIME OF DELIVERY OF THIS PROSPECTUS OR OF ANY SALE OF OUR COMMON STOCK. IN THIS PROSPECTUS, "MKS," "WE," "US" AND "OUR" REFER TO MKS INSTRUMENTS, INC. (UNLESS THE CONTEXT OTHERWISE REQUIRES).

UNTIL _____, 1999, ALL DEALERS THAT BUY, SELL OR TRADE OUR COMMON STOCK, WHETHER OR NOT PARTICIPATING IN THIS OFFERING, MAY BE REQUIRED TO DELIVER A PROSPECTUS. THIS REQUIREMENT IS IN ADDITION TO THE DEALERS' OBLIGATION TO DELIVER A PROSPECTUS WHEN ACTING AS UNDERWRITERS AND WITH RESPECT TO THEIR UNSOLD ALLOTMENTS OR SUBSCRIPTIONS.

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PROSPECTUS SUMMARY

This summary highlights information contained elsewhere in this prospectus. You should read this entire prospectus carefully. Unless otherwise indicated, all information contained in this prospectus assumes that the underwriters will not exercise their over-allotment option. This prospectus contains forward-looking statements, which involve risks and uncertainties. MKS's actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including those set forth under "Risk Factors" and elsewhere in this prospectus. All information contained in this prospectus reflects: (i) a 3-for-2 stock split of the common stock; and (ii) amendments to MKS's Articles of Organization to be effected prior to the effective date of this prospectus to: (a) increase the total number of authorized shares of common stock to 30,000,000; (b) authorize 2,000,000 shares of preferred stock; and (c) convert the shares of Class A common stock and Class B common stock into a single class of common stock.

MKS INSTRUMENTS, INC.

We are a leading worldwide developer, manufacturer and supplier of instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. We offer a comprehensive line of products which are used to manufacture, among other things:

- - semiconductors
- - flat panel displays
- - magnetic and optical storage devices and media, including:
 - compact disks
 - hard disk storage devices
 - magnetic devices for reading disk data
 - digital video disks
 - optical storage disks (laser readable disks)
- - solar cells which convert light into electrical current
- - fiber optic cables for telecommunications
- - optical coatings (such as eyeglass coatings)
- - coatings for architectural glass
- - hard coatings to minimize wear on cutting tools
- - diamond thin films

Our products include:

- - instruments used to measure, control and analyze:
 - gas pressure
 - gas flow
 - gas composition
- - vacuum technology products:
 - vacuum gauges
 - vacuum valves and components

The ability of semiconductor device manufacturers to offer integrated circuits with smaller geometries and greater functionality at higher speeds requires continuous improvements in semiconductor process equipment and process controls. Manufacturing a semiconductor, or a similar industrial product, requires hundreds of process steps, many of which involve the precise measurement and control of gases. In the fabrication of semiconductors, for example, these process steps take place within a process chamber. Specific gas mixtures at precisely controlled pressures are used in the process chamber to control the required process atmosphere and are used as a source of material to manufacture a semiconductor.

Given the complexity of the semiconductor manufacturing process, the value of the products manufactured and the significant cost of semiconductor manufacturing equipment and facilities, significant importance is placed upon:

- the amount of time that semiconductor manufacturing equipment is available for processing (or uptime)
- the ratio of acceptable output to total output (or yield)
- the aggregate output that can be processed per hour (or throughput)

The design and performance of instruments that control the pressure or flow of gases are becoming more critical to the semiconductor manufacturing process since they directly affect uptime, yield and throughput. In addition, the increasing sophistication of semiconductor devices requires an increase in the number of components and subsystems used in the design of semiconductor manufacturing process tools. To address manufacturing complexity, improve quality and reliability and ensure long-term service and support, semiconductor device manufacturers and semiconductor capital equipment manufacturers are increasingly seeking to reduce their supplier base and are, therefore, choosing to work with suppliers that provide a broad range of integrated, technologically advanced products backed by worldwide service and support.

We believe that we offer the widest range of pressure and vacuum measurement and control products serving the semiconductor industry. Our products measure pressures from as low as one trillionth of atmospheric pressure to as high as two hundred times atmospheric pressure. Our objective is to be the leading worldwide supplier of instruments and components used to measure, control and analyze gases in semiconductor and other advanced thin-film processing applications and to help semiconductor device manufacturers achieve improvements in their return on investment capital. Our strategy to accomplish this objective includes:

- extending our technology leadership
- continuing to broaden our comprehensive product offering
- building upon our close working relationships with customers
- expanding the application of our existing technologies to related markets
- leveraging our global infrastructure and world class manufacturing capabilities

For over 25 years, we have focused on satisfying the needs of semiconductor capital equipment manufacturers and semiconductor device manufacturers. As a result, we have established long-term relationships with many of our customers. We have over 4,000 active customers worldwide (all of which purchased products during 1998) including:

- semiconductor capital equipment manufacturers
- semiconductor device manufacturers
- industrial manufacturing companies
- university, government and industrial research laboratories

Our customers include Applied Materials, Inc., Lam Research Corporation, Tokyo Electron, Ltd., Air Products and Chemicals, Inc. and Motorola Inc. We sell our products primarily through our sales force which consists of 118 employees in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States.

MKS Instruments, Inc. is a Massachusetts corporation organized in June 1961. Our principal executive offices are located at Six Shattuck Road, Andover, MA 01810, and our telephone number is (978) 975-2350.

THE OFFERING

Common stock offered by MKS.....	shares
Common stock to be outstanding after this offering.....	shares
Use of proceeds.....	For distributions to current stockholders and general corporate purposes. See "Use of Proceeds" and "S Corporation and Termination of S Corporation Status."
Proposed Nasdaq National Market symbol.....	MKSI

The common stock to be outstanding after this offering is based on shares outstanding as of December 31, 1998 and excludes 2,132,575 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of \$5.19 per share. See "Capitalization" and Note 8 of Notes to Consolidated Financial Statements.

SUMMARY CONSOLIDATED FINANCIAL DATA

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As an S corporation, MKS has not been subject to federal, and certain state, income taxes. The pro forma net income reflects the provision for income taxes that would have been recorded had MKS been a C corporation, assuming an effective tax rate of 38.0%. As a result of terminating its S corporation status upon the closing of this offering, MKS will record a one-time non-cash credit to historical earnings for additional deferred taxes. If this credit to earnings had occurred at December 31, 1998, the amount would have been approximately \$3.9 million. This amount is expected to change through the closing of this offering and is excluded from pro forma net income. See Notes 2 and 9 of Notes to Consolidated Financial Statements.

Pro forma balance sheet data set forth below reflects the liability for the distribution of an estimated \$35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The pro forma net income per share and weighted average common shares outstanding which are set forth below reflect the effect of an assumed issuance of sufficient shares to fund this distribution as of January 1, 1998. The distribution will be made out of the proceeds of this offering. The actual amount to be distributed is expected to increase based upon taxable earnings for the period January 1, 1999 through the closing of this offering, subject to certain limitations. See "S Corporation and Termination of S Corporation Status." The pro forma as adjusted balance sheet data reflects the sale of shares of common stock at an assumed initial public offering price of \$ per share, after deducting the estimated underwriting discount and offering expenses payable by MKS.

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
STATEMENT OF INCOME DATA:					
Net sales.....	\$106,829	\$157,164	\$170,862	\$188,080	\$139,763
Gross profit.....	47,016	69,461	68,854	80,474	55,979
Income from operations.....	12,087	24,106	16,068	23,963	9,135
Net income.....	\$ 10,003	\$ 21,658	\$ 12,503	\$ 20,290	\$ 7,186
PRO FORMA STATEMENT OF INCOME DATA (1):					
Pro forma net income.....					\$ 5,044
Pro forma net income per share:					
Basic.....					\$ 0.25
Diluted.....					\$ 0.24
Pro forma weighted average common shares outstanding:					
Basic.....					20,166
Diluted.....					20,651

	DECEMBER 31, 1998		
	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
	(IN THOUSANDS)		
BALANCE SHEET DATA:			
Cash and cash equivalents.....	\$ 11,188	\$ 11,188	
Working capital (deficit).....	31,493	(4,433)	
Total assets.....	96,232	96,232	
Short-term obligations.....	12,819	12,819	
Long-term obligations, less current portion.....	13,786	13,786	
Stockholders' equity.....	54,826	18,900	

(1) Data is computed on the same basis as Note 2 of Notes to Consolidated Financial Statements.

RISK FACTORS

You should consider carefully the risks described below before you decide to buy our common stock. The risks and uncertainties described below are not the only ones facing us. Additional risks and uncertainties that we do not presently know about or that we currently believe are immaterial may also adversely impact our business operations. If any of the following risks actually occur, our business, financial condition or results of operations would likely suffer. In such case, the trading price of our common stock could fall, and you may lose all or part of the money you paid to buy our common stock.

This prospectus contains forward-looking statements that involve risks and uncertainties. These forward-looking statements are usually accompanied by words such as "believes," "anticipates," "plans," "expects" and similar expressions. Our actual results may differ materially from the results discussed in the forward-looking statements because of factors such as the Risk Factors discussed below.

OUR PERFORMANCE IS AFFECTED BY THE CYCLICALITY OF THE SEMICONDUCTOR INDUSTRY AND CAN BE ADVERSELY AFFECTED BY THE INSTABILITY OF ASIAN ECONOMIES

We estimate that approximately 60% of our sales during 1997 and 1998 were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and we expect that sales to such customers will continue to account for a substantial majority of our sales. Our business depends substantially upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors and other products utilizing semiconductors. Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment. For example, in 1996 and 1998 the semiconductor industry experienced a significant decline, which caused a number of our customers to reduce their orders. In addition, the financial markets in Asia, one of our principal international markets, have experienced significant turbulence. Our sales include both direct sales to the semiconductor industry in Asia, as well as to semiconductor capital equipment manufacturers that derive a significant portion of their revenue from sales to the Asian semiconductor industry. Turbulence in the Asian markets began to adversely affect the semiconductor device manufacturers and semiconductor capital equipment manufacturers in the fourth quarter of 1997 and continued to adversely affect them in 1998. We expect the turbulence in the Asian markets will continue to adversely affect sales of semiconductor capital equipment manufacturers for at least the first and second quarters of 1999. As a result, we currently expect that our net sales and net income for each of the first and second quarters of 1999 will be less than net sales and net income for the first and second quarters of 1998.

Our future sales also depend on the retrofitting, expansion and upgrade of existing semiconductor fabrication facilities and the construction of new, large semiconductor fabrication facilities. We cannot be certain that such retrofit, expansion, upgrade and construction will occur. We also cannot be certain that the current semiconductor downturn experienced in 1998 will not continue or that the level of our customer orders will not decline further. The current reduction in our orders, as well as any further decline in the level of orders as a result of the current or any future downturn or slowdown in the semiconductor industry, together with our inability to fully adjust expenses, would have a material adverse effect on our business, financial condition and results of operations.

OUR QUARTERLY RESULTS ARE LIKELY TO FLUCTUATE

We have experienced and expect to continue to experience significant fluctuations in our quarterly operating results. A substantial portion of our shipments occur shortly after an order is received. Due to the short time between receipt of orders and shipments, we operate with a low level of backlog. Accordingly, backlog at the beginning of each quarter will not be sufficient to meet our revenue expectations for that particular quarter. As a consequence of the just-in-time nature of shipments and the low level of backlog, a decrease in demand for our products from one or more customers could occur with limited advance notice and could have a material adverse effect on our results of operations in any particular period.

Our business, financial condition and results of operations are also affected by:

- - specific economic conditions in industries in which our customers operate
- - the timing of the receipt of orders from major customers
- - customer cancellations or shipment delays
- - price competition
- - disruption in sources of supply
- - seasonal variations of capital spending by customers
- - production capacity constraints
- - specific features requested by customers
- - exchange rate fluctuations
- - our or our competitors' introduction or announcement of new products
- - other factors, many of which are beyond our control

Our results of operations for a particular period would also be adversely affected if an anticipated significant order was not received in time to permit shipment during that period, as a portion of our operating expenses are fixed in nature and planned expenditures are based in part on anticipated orders. In addition, the need for continued expenditures for research and development would make it difficult to reduce expenses in a particular period if our sales goals for that period were not met. The inability to adjust spending quickly enough to compensate for any revenue shortfall would magnify the adverse impact of such revenue shortfall on our results of operations. For example, we were in the process of increasing production capacity when the semiconductor capital equipment market began to experience a significant downturn in 1996. This downturn had a material adverse effect on our operating results in the second half of 1996 and the first half of 1997. After an increase in business in the latter half of 1997, the market experienced another downturn in 1998, which had a material adverse effect on our 1998 operating results. As a result of the factors discussed above, it is likely that we will in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results will fall below the expectations of public market analysts or investors. In any such event, the price of our common stock could decline significantly.

WE HAVE A HIGH DEGREE OF CUSTOMER CONCENTRATION

While we sold products to more than 4,000 customers in 1998, our five largest customers in 1996, 1997 and 1998 accounted for approximately 26%, 32% and 24%, respectively, of our net sales. During 1998, one customer, Applied Materials, Inc., accounted for approximately 16% of our net sales. While we have entered into a purchase contract with Applied Materials, Inc. that expires in 2000 (unless extended by mutual agreement), none of our significant customers, including Applied Materials, Inc., has entered into an agreement requiring it to purchase any minimum quantity of our products. The demand for our products from our semiconductor capital equipment customers depends in part on orders received by them from their semiconductor device manufacturer customers.

We sell products primarily to semiconductor capital equipment manufacturers and, to a lesser extent, semiconductor device manufacturers. The number of our potential customers in our primary market is limited. The loss of a major customer or any reduction in orders by such customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on our business, financial condition and results of operations. Attempts to lessen the adverse effect of any such loss or reduction through the rapid addition of new customers could be difficult because prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. Our future success will continue to depend upon:

- our ability to maintain relationships with existing key customers
- our ability to attract new customers
- the success of our customers in creating demand for their capital equipment products which incorporate our products

OUR MARKETS ARE HIGHLY COMPETITIVE

The markets for our products are highly competitive. Although no one competitor competes with us across all product lines, our competitors could consolidate and/or form alliances to offer a broader array of products to compete against us. We currently encounter substantial competition in each of our product lines from a number of competitors, including:

- competitors with greater financial and other resources
- small competitors with well-established specific product niches
- customers who develop in-house products that serve the functions of and replace our products

In some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, for such products, our success will depend in part on our ability to have semiconductor device manufacturers specify that our products be used at their semiconductor fabrication facilities. In addition, we may encounter difficulties in changing established relationships of competitors with a large installed base of products at such semiconductor fabrication facilities. We cannot be sure that our competitors will not develop products that offer price or performance features superior to those of our products. To the extent that our products do not achieve performance or other advantages over products offered by our competitors, we are likely to experience increased price competition or loss of market share with respect to such products. We believe that the worldwide competitive pressures in our markets could result in a decline in the prices of our products in the future. Declines in the selling prices of our products, if not offset by reductions in the cost of producing such products and increases in unit volume sales or by sales of products with higher gross margins, could have a material adverse effect on our business, financial condition and results of operations.

OUR MARKETS ARE SUBJECT TO RAPID TECHNOLOGICAL CHANGES

Our success depends in part upon our ability to develop new products and product enhancements that keep pace with technological developments, achieve market acceptance and respond to evolving customer requirements. New product introductions may contribute to fluctuations in quarterly operating results, as customers may defer ordering products from our existing product lines or may purchase products from competitors. Any new product reliability or quality issue could result in reduced orders, higher manufacturing costs and additional service and warranty expense. Responding to rapid technological change and the need to develop and introduce new products to meet customers' needs and evolving industry standards will require us to make substantial investments in research and product development. Any failure by us to anticipate or respond adequately to technological developments and customer requirements or any significant delays in product development or introduction could result in a loss of competitiveness and could have a material adverse effect on our business, financial condition and results of operations. We cannot be certain that we will successfully develop and manufacture new products or that any product enhancements or new products developed by us will gain market acceptance.

The semiconductor manufacturing industry is currently undergoing an evolution from the manufacturing of 200mm wafers to 300mm wafers and from 0.25 micron to 0.18 micron line-widths. Semiconductor manufacturers are beginning to establish pilot production lines and specifications for the use of 300mm wafers and the production of less than 0.18 micron devices. We have developed, and are developing, new products and product enhancements to address the expected increasing demand for equipment capable of handling these new wafer sizes and line-widths. We have supplied pre-production equipment to be incorporated into semiconductor capital equipment manufacturers' 300mm pre-production semiconductor wafer process equipment, which is expected to be included in pilot production lines of semiconductor device manufacturers. We have also developed equipment that is being used by research laboratories for devices using less than 0.18 micron line-widths. However, we cannot be certain that our new products and enhancements will be designed into production lines by our customers. Our failure to develop products and

enhancements for general acceptance by our customers in a timely manner would have a material adverse effect on our business, financial condition and results of operations.

WE HAVE A NUMBER OF RISKS ASSOCIATED WITH THE YEAR 2000

Many currently installed computer systems include software and hardware products that are unable to distinguish 21st century dates from those in the 20th century. As a result, computer software and/or hardware used by many companies and governmental agencies may need to be upgraded to comply with Year 2000 requirements or risk system failure or miscalculations that result in disruptions to normal business activities. We have implemented a multi-phase Year 2000 project consisting of assessment and remediation, and testing following remediation. We have examined our internal computer software and hardware, our facilities and manufacturing equipment, third-party compliance and the compliance of our products. We have identified the following risks you should be aware of:

- we cannot be sure that any of our assessments, remediation programs or testing will identify and cure all of our Year 2000 compliance issues
- the entities on whom we rely for certain goods and services integral to our business may be unsuccessful in addressing all of their software and systems problems in order to operate without disruption in the year 2000 and beyond
- our customers or potential customers may be affected by Year 2000 issues that may, in part:
 - cause a reduction, delay or cancelation of customer orders
 - cause a delay in payments for products shipped
 - cause customers to expend significant resources on Year 2000 compliance matters, rather than investing in our products
- we have not developed a contingency plan related to the failure of our or a third-party's Year 2000 remediation efforts and may not be prepared for such an event

Further, while we have made efforts to notify our customers who have purchased potential non-compliant products, we cannot be sure that customers who purchased such products will not assert claims against us alleging that such products should have been Year 2000 compliant at the time of purchase, which could result in costly litigation and divert management's attention.

The occurrence of any of these risks or uncertainties could result in a material adverse effect on our business, financial condition and results of operations.

WE MAY HAVE DIFFICULTY EXPANDING INTO NEW MARKETS

We plan to build upon our experience in manufacturing and selling gas measurement, control and analysis products used by the semiconductor industry by designing and selling such products for applications in other industries which use production processes similar to those used in the semiconductor industry. Our future success will depend in part on our ability to:

- identify new applications for our products
- adapt our products for such applications
- market and sell such products to customers

We have limited experience selling our products in certain markets outside the semiconductor industry. We cannot be certain that we will be successful in the expansion of our business outside the semiconductor industry. Any failure by us to penetrate additional markets would limit our ability to reduce our vulnerability to downturns in the semiconductor industry and could have a material adverse effect on our business, financial condition and results of operations.

WE MAY HAVE DIFFICULTY EXPANDING OUR MANUFACTURING CAPACITY

During 1999, we plan to add manufacturing capacity to our Austin, Texas operations and further equip our cleanroom facilities in Andover and Methuen, Massachusetts. Our ability to increase sales of certain products depends in part upon our ability to expand our manufacturing capacity for such products in a timely manner. If we are unable to expand our manufacturing capacity on a timely basis or to manage such expansion effectively, our rate of growth and market share could be reduced and our business, financial condition and results of operations could be adversely affected. Because the semiconductor industry is subject to rapid demand shifts which are difficult to foresee, we may not be able to increase capacity quickly enough to respond to a rapid increase in demand in the semiconductor industry. Additionally, any capacity expansion will increase our fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, our business, financial condition and results of operations would likely be materially adversely affected.

WE FACE RISKS FROM INTERNATIONAL OPERATIONS AND SALES

We have manufacturing, sales and service facilities in Germany, Japan, Korea and the United Kingdom and sales and service facilities in France, The Netherlands, Singapore and Taiwan. In addition, we have established, through agents and representatives, sales and service facilities in Canada, China, India, Israel, and Italy.

International sales (which include sales by our foreign subsidiaries, but exclude direct export sales which were less than 10% of our total net sales) accounted for approximately 30.1%, 27.3% and 32.3% of net sales in 1996, 1997 and 1998, respectively. We anticipate that international sales will continue to account for a significant portion of our net sales. In addition, certain of our key domestic customers derive a significant portion of their revenues from sales in international markets. As a result, our operations are subject to risks inherent in international business activities, including, in particular:

- - economic conditions in each country
- - the overlap of different tax structures
- - management of a large organization spread over various countries
- - unexpected changes in regulatory requirements
- - compliance with a variety of foreign laws and regulations
- - longer accounts receivables payment cycles in certain countries
- - international sales subject to certain governmental restrictions and regulations including the Export Administration Act
- - import and export licensing requirements
- - trade restrictions
- - changes in tariff and freight rates
- - currency fluctuations

A number of these risks also apply to sales to semiconductor capital equipment manufacturers based in the United States that incorporate our products into systems delivered outside the United States. Additionally, we base the prices for products sold to and by our foreign subsidiaries on the currency of the country in which these products are sold. Therefore, our operating results attributable to these sales are exposed to fluctuations in the value of the United States dollar versus other currencies. While we enter into forward exchange contracts and local currency purchased options to reduce currency exposure arising from these sales and associated intercompany purchases of inventory, we cannot be certain that exchange rate fluctuations will not have an adverse effect on our business, financial condition and results of operations, or that we will not realize losses with respect to our hedging activities.

WE NEED TO RETAIN AND ATTRACT KEY PERSONNEL

Our success depends to a large extent upon the efforts and abilities of a number of key employees and officers. The loss of key employees or officers could have a material adverse effect on our business, financial condition and results of operations. We believe that our future success will depend in part on our

ability to attract and retain highly skilled technical, financial, managerial and marketing personnel. Competition for such personnel is intense, and we cannot be certain that we will be successful in attracting and retaining such personnel. We are the beneficiary of key-man life insurance policies on John R. Bertucci, Chairman, Chief Executive Officer and President, in the amount of \$7.2 million.

OUR SUCCESS DEPENDS ON PROTECTING OUR INTELLECTUAL PROPERTY

Although we seek to protect our intellectual property rights through patents, copyrights, trade secrets and other measures, we cannot be certain that:

- we will be able to protect our technology adequately
- competitors will not be able to develop similar technology independently
- any of our pending patent applications will be issued
- intellectual property laws will protect our intellectual property rights

Litigation may be necessary in order to enforce our patents, copyrights or other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition and results of operations.

In addition, we cannot be certain that any patent issued to us will not be challenged, invalidated or circumvented, that the rights granted thereunder will provide competitive advantages to us or that third parties may not assert that our products infringe patent, copyright or trade secrets of such parties. Furthermore, we cannot be sure that others will not independently develop similar products or duplicate our products.

YOU WILL HAVE A NUMBER OF MARKET RISKS TYPICALLY ASSOCIATED WITH INITIAL PUBLIC OFFERINGS

Prior to this offering, there has been no public market for our common stock and there can be no assurance that an active public market for the common stock will develop or continue after this offering. The initial public offering price will be determined by negotiation between MKS and the underwriters. Nevertheless, after this offering, you may not be able to resell your shares at or above the initial public offering price due to a number of factors, including:

- actual or anticipated fluctuations in our operating results
- changes in securities analysts' financial estimates
- changes in expectations as to our future financial performance
- announcements of new technological innovations and alliances by competitors
- the operating and stock price performance of our competitors and other comparable companies

In addition, the stock market has experienced extreme price and volume fluctuations which have particularly affected the market prices for many high technology companies. These broad market fluctuations may materially and adversely affect the market price of our common stock. You should read the "Underwriting" section of this prospectus for a more complete discussion of the factors that the underwriters and we will consider in determining the initial public offering price.

YOU WILL EXPERIENCE AN IMMEDIATE AND SUBSTANTIAL DILUTION

Purchasers of common stock in this offering will incur immediate and substantial dilution of \$ _____ in the pro forma net tangible book value per share of common stock from the assumed initial public offering price of \$ _____ per share.

AFTER THIS OFFERING A LIMITED NUMBER OF STOCKHOLDERS WILL HAVE CONTROLLING INTEREST IN MKS

Upon consummation of this offering, John R. Bertucci, Chairman, Chief Executive Officer and President of MKS, and members of his family will, in the aggregate, beneficially own approximately % of our outstanding common stock. As a result, these stockholders, acting together, will be able to take any of the following actions without the approval of our public stockholders:

- amend our Articles of Organization in certain respects or approve a merger, sale of assets or other major corporate transaction
- defeat any non-negotiated takeover attempt that may be beneficial to our public stockholders
- determine the amount and timing of dividends paid to themselves and to our public stockholders
- otherwise control our management and operations and the outcome of all matters submitted for a stockholder vote, including the election of directors

WE ARE SUBJECT TO ANTI-TAKEOVER PROVISIONS

Certain provisions of our Articles of Organization, our By-Laws and Massachusetts law could discourage potential acquisition proposals and could delay or prevent a change in control of MKS. Such provisions could diminish the opportunities for stockholders to participate in tender offers including tender offers at a price above the then current market value of the common stock. Such provisions may also inhibit increases in the market price of the common stock that could result from takeover attempts. For example, while we have no present plans to issue any preferred stock, the Board of Directors, without further stockholder approval, may issue preferred stock that could have the effect of delaying, deterring or preventing a change in control of MKS. The issuance of preferred stock could adversely affect the voting power of the holders of common stock including the loss of voting control to others. In addition, our By-Laws will provide for a classified Board of Directors consisting of three classes. This classified board could also have the effect of delaying, deterring or preventing a change in control of MKS.

FUTURE SALES OF SHARES COULD ADVERSELY AFFECT THE MARKET PRICE OF OUR COMMON STOCK

Sales of our common stock in the public market following this offering could adversely affect the market price of the common stock. All of the shares offered under this prospectus will be freely tradable in the open market. The remaining shares of common stock are subject to lock-up agreements with the underwriters. Persons subject to lock-up agreements have agreed not to sell shares of common stock for a period of 180 days after the date of this prospectus. Upon expiration of the lock-up agreements, shares of common stock will be eligible for sale in the public market, subject to the provisions of Rule 144 or 701 under the Securities Act of 1933. In addition, we intend to register approximately 4,535,000 shares of common stock issuable under our stock option and purchase plans upon the closing of this offering.

S CORPORATION AND TERMINATION OF S CORPORATION STATUS

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As a result, MKS currently pays no federal, and certain state, income tax, and all of the earnings of MKS are subject to federal, and certain state, income taxation directly at the stockholder level. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to corporate income taxation under Subchapter C of the Internal Revenue Code and applicable state income taxation law. Pro forma statement of income data set forth in this prospectus has been adjusted to include pro forma income tax provisions as if MKS had been a C corporation during the relevant periods.

In 1997 and 1998, MKS distributed \$12.4 million and \$6.2 million, respectively, of undistributed S corporation earnings to its stockholders. As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the "accumulated adjustments account," as defined in Section 1368(a)(1) of the Internal Revenue Code. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was estimated to be approximately \$35.9 million, and such balance is estimated to increase in the period from January 1, 1999 through the closing of this offering to approximately \$ million. The accumulated adjustments account is cumulatively equal to financial reporting income, adjusted for differences between the methods of accounting used for financial accounting and for federal income tax purposes from July 1, 1987 through the date of termination of MKS's S corporation status, that has not been previously distributed. Investors purchasing shares in this offering will not receive any portion of the distribution.

MKS expects to enter into a Tax Indemnification and S Corporation Distribution Agreement with its existing stockholders providing for, among other things, the indemnification of MKS by such stockholders for any federal and state income taxes (including interest) incurred by MKS if for any reason MKS is deemed to be treated as a C corporation during any period which it reported its taxable income as an S corporation. The tax indemnification obligation of the existing stockholders is limited to the amount of any reduction in their tax liability as a result of any such determination. This agreement also provides for the cross-indemnification by MKS of each existing stockholder for any losses or liabilities with respect to certain additional taxes (including interest and penalties) resulting from MKS's operations during the period in which it was an S corporation. The agreement further provides for the payment, with interest, by the existing stockholders or MKS, as the case may be, for the difference between the amount to be distributed and the actual amount of accumulated adjustments account on the day immediately preceding the closing of this offering. The actual amount of the accumulated adjustments account on the day prior to the closing of this offering cannot be determined until MKS calculates the amount of its taxable income for the year ending December 31, 1999. Purchasers of common stock in this offering will not be parties to the Tax Indemnification and S Corporation Distribution Agreement.

USE OF PROCEEDS

The net proceeds we will receive from the sale of the _____ shares of common stock offered by us are estimated to be \$ _____ (\$ _____ if the underwriters' over-allotment option is exercised in full), after deducting the estimated underwriting discount and offering expenses payable by us and assuming an initial public offering price of \$ _____ per share.

The principal purposes of this offering are:

- to increase our working capital and equity base
- to provide a public market for our common stock
- to facilitate future access by us to public equity markets

We will use approximately \$ _____ million of the net proceeds to pay current stockholders our undistributed S corporation earnings through the closing of this offering. The undistributed S corporation earnings were estimated to be approximately \$35.9 million (including approximately \$34.4 million representing the share of Mr. Bertucci and members of his family) at December 31, 1998, and are expected to increase from January 1, 1999 to the closing of this offering to approximately \$ _____ million. See "S Corporation and Termination of S Corporation Status." We expect to use the remainder of the net proceeds for general corporate purposes, including working capital, product development and capital expenditures.

A portion of the net proceeds after the S corporation distribution may also be used for the acquisition of businesses, products and technologies that are complementary to those of MKS. There are currently no active negotiations, commitments or agreements with respect to any acquisition. Pending such uses, we intend to invest the net proceeds from this offering in short-term, investment-grade, interest-bearing securities.

DIVIDEND POLICY

We currently intend, subject to our contractual obligations under the Tax Indemnification and S Corporation Distribution Agreement, to retain earnings for the continued development of our business. Restrictions or limitations on the payment of dividends may be imposed in the future under the terms of credit agreements or under other contractual provisions. In the absence of such restrictions or limitations, the payment of any dividends will be at the discretion of our Board of Directors.

CAPITALIZATION

The following table sets forth the capitalization of MKS (i) as of December 31, 1998, (ii) on a pro forma basis to reflect distributions and adjustments in connection with MKS's S corporation status and (iii) as adjusted to reflect the sale of shares of common stock by MKS at an assumed initial public offering price of \$ per share and the application of the net proceeds therefrom. See "Use of Proceeds."

The pro forma data reflects the liability for distribution of an estimated \$35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The actual amount to be distributed is expected to increase based upon taxable earnings for the period from January 1, 1999 through the closing of this offering, subject to certain limitations. See "S Corporation and Termination of S Corporation Status" and Notes 2 and 9 of Notes to Consolidated Financial Statements. The pro forma as adjusted numbers have been adjusted to reflect the issuance of shares of common stock at an assumed initial public offering price of \$ per share, after deducting the estimated underwriting discount and offering expenses payable by MKS. The remaining balance in retained earnings represents accumulated earnings prior to MKS's conversion from a C corporation to an S corporation in 1987, accumulated income in overseas subsidiaries and differences between book and tax accumulated income.

	DECEMBER 31, 1998		
	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
	-----	-----	-----
	(IN THOUSANDS, EXCEPT SHARE AND PER SHARE DATA)		
Long-term obligations, less current portion.....	\$13,786	\$13,786	\$
Stockholders' equity:.....			
Preferred stock, \$.01 par value; 2,000,000 shares authorized, no shares issued or outstanding.....	--	--	
Common stock, no par value; 30,000,000 shares authorized, 18,053,167 shares issued and outstanding (actual and pro forma); shares issued and outstanding (pro forma as adjusted)....	113	113	
Additional paid-in capital.....	48	48	
Retained earnings.....	52,479	16,553	
Accumulated other comprehensive income.....	2,186	2,186	
	-----	-----	-----
Total stockholders' equity.....	54,826	18,900	
	-----	-----	-----
Total capitalization.....	\$68,612	\$32,686	\$
	=====	=====	=====

The common stock to be outstanding after this offering is based on shares outstanding as of December 31, 1998 and excludes 2,132,575 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of \$5.19 per share. See Note 8 of Notes to Consolidated Financial Statements.

DILUTION

As of December 31, 1998, MKS had a net tangible book value of \$54,826,000, or \$3.04 per share of common stock. Without taking into account any changes in such net tangible book value subsequent to December 31, 1998, other than to give effect to the sale by MKS of _____ shares of common stock offered hereby at an assumed initial public offering price of \$ _____ per share (after deducting the estimated underwriting discount and offering expenses) and the application of the estimated net proceeds therefrom, including the distribution of an estimated \$35.9 million of cumulative undistributed S corporation taxable income for which stockholders have been or will be taxed, as of December 31, 1998, the pro forma net tangible book value of MKS as of December 31, 1998 would have been \$ _____, or \$ _____ per share. This represents an immediate increase in net tangible book value to existing stockholders attributable to new investors of \$ _____ per share and the immediate dilution of \$ _____ per share to new investors. The following table illustrates this per share dilution:

Assumed initial public offering price per share.....		\$
Net tangible book value per share at December 31, 1998....	\$	
Decrease per share attributable to the S corporation distribution.....		
Increase per share attributable to new investors.....		\$
Pro forma net tangible book value per share after this offering.....		\$
Dilution per share to new investors.....		=====

The following table sets forth, on a pro forma basis as of December 31, 1998, the number of shares of common stock purchased from MKS, the total consideration paid to MKS, and the average price paid per share by existing stockholders and by the new investors purchasing shares of common stock in this offering (before deducting the estimated underwriting discount and offering expenses), at an assumed initial public offering price of \$ _____ per share:

	SHARES PURCHASED		TOTAL CONSIDERATION		AVERAGE PRICE PER SHARE
	NUMBER	PERCENT	AMOUNT	PERCENT	
Existing stockholders.....	18,053,167	%	\$161,000	%	\$0.009
New investors.....	-----	-----	-----	-----	
Total.....	=====	100.0%	=====	100.0%	=====

As of December 31, 1998, there were options outstanding to purchase a total of 2,132,575 shares of common stock, at a weighted average exercise price of \$5.19 per share and 2,401,793 additional shares reserved for future grants of issuances under MKS's stock option and stock purchase plans. To the extent that any of these options are exercised, there will be further dilution to new investors.

SELECTED CONSOLIDATED FINANCIAL DATA

The following selected financial data as of December 31, 1997 and 1998 and for the years ended December 31, 1996, 1997 and 1998 have been derived from MKS's financial statements, included elsewhere in this prospectus, which have been audited by PricewaterhouseCoopers LLP, independent accountants, as indicated in their report. The selected financial data as of December 31, 1994, 1995 and 1996 and for the years ended December 31, 1994 and 1995 are derived from financial statements, which were also audited by PricewaterhouseCoopers LLP, not included herein. The data should be read in conjunction with the Consolidated Financial Statements, including the Notes thereto, and with "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this prospectus.

MKS has been treated as an S corporation under the applicable provisions of the Internal Revenue Code since July 1, 1987. As an S corporation, MKS has not been subject to federal, and certain state, income taxes. The pro forma net income set forth below reflects the provision for income taxes that would have been recorded had MKS been a C corporation, assuming an effective tax rate of 38.0%. As a result of terminating its S corporation status upon the closing of this offering, MKS will record a one-time non-cash credit to historical earnings for additional deferred taxes. If this credit to earnings had occurred at December 31, 1998, the amount would have been approximately \$3.9 million. This amount is expected to change through the closing of this offering and is excluded from pro forma net income. See Notes 2 and 9 of Notes to Consolidated Financial Statements. Pro forma balance sheet data reflects the liability for the distribution of an estimated \$35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The actual amount to be distributed is expected to increase based upon taxable earnings for the period January 1, 1999 through the closing of this offering, subject to certain limitations. Pro forma net income per share reflects the effect of an assumed issuance of sufficient shares to fund the distribution, as of January 1, 1998. See "S Corporation and Termination of S Corporation Status" and Note 2 of Notes to Consolidated Financial Statements.

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
STATEMENT OF INCOME DATA:					
Net sales.....	\$106,829	\$157,164	\$170,862	\$188,080	\$139,763
Cost of sales.....	59,813	87,703	102,008	107,606	83,784
Gross profit.....	47,016	69,461	68,854	80,474	55,979
Research and development.....	8,036	10,935	14,195	14,673	12,137
Selling, general and administrative.....	26,893	34,420	37,191	41,838	34,707
Restructuring.....	--	--	1,400	--	--
Income from operations.....	12,087	24,106	16,068	23,963	9,135
Interest expense, net.....	1,284	1,448	2,286	1,861	1,187
Other income (expense), net.....	--	--	(479)	166	187
Income before income taxes.....	10,803	22,658	13,303	22,268	8,135
Provision for income taxes.....	800	1,000	800	1,978	949
Net income.....	\$ 10,003	\$ 21,658	\$ 12,503	\$ 20,290	\$ 7,186

YEAR ENDED
DECEMBER 31,

1998

(IN THOUSANDS, EXCEPT
PER SHARE DATA)

PRO FORMA STATEMENT OF INCOME DATA (UNAUDITED):

Historical income before income taxes.....	\$8,135
Pro forma provision for income taxes.....	3,091

Pro forma net income.....	\$5,044
	=====
Pro forma net income per common share:	
Basic.....	\$ 0.25
	=====
Diluted.....	\$ 0.24
	=====

	DECEMBER 31,				DECEMBER 31, 1998	
	1994	1995	1996	1997	ACTUAL	PRO FORMA
	-----				-----	
	(IN THOUSANDS)					
BALANCE SHEET DATA:						
Cash and cash equivalents.....	\$ 4,059	\$ 3,650	\$ 3,815	\$ 2,511	\$ 11,188	\$ 11,188
Working capital (deficit).....	25,078	32,202	22,404	30,321	31,493	(4,433)
Total assets.....	72,320	104,511	95,000	106,536	96,232	96,232
Short-term obligations.....	9,246	15,192	16,124	13,852	12,819	12,819
Long-term obligations, less current portion.....	14,948	20,462	18,899	15,624	13,786	13,786
Stockholders' equity.....	37,272	48,392	45,498	52,848	54,826	18,900

MANAGEMENT'S DISCUSSION AND ANALYSIS OF
FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion contains forward-looking statements that involve risks and uncertainties. MKS's actual results could differ materially from those discussed in the forward-looking statements as a result of certain factors including those set forth under "Risk Factors" and elsewhere in this prospectus. The following discussion and analysis should be read in conjunction with "Selected Consolidated Financial Data" and the Consolidated Financial Statements and Notes thereto appearing elsewhere in this prospectus.

OVERVIEW

MKS was founded in 1961. MKS develops, manufactures and supplies instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. During 1997 and 1998, MKS estimates that approximately 60% of its net sales were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS expects that sales to such customers will continue to account for a substantial majority of its sales. MKS has more than 4,000 active customers worldwide (all of which purchased products during 1998), including semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies and university, government and industrial research laboratories. In 1996, 1997, and 1998, sales to MKS's top five customers accounted for approximately 26%, 32% and 24%, respectively, of MKS's net sales. During 1998, Applied Materials, Inc. accounted for approximately 16% of MKS's net sales. MKS typically enters into contracts with its semiconductor equipment manufacturer customers that provide for quantity discounts. MKS recognizes revenues, and accrues for anticipated returns and warranty costs, upon shipment.

In the third quarter of 1996, as a result of the downturn in the semiconductor industry, MKS recorded a restructuring charge of \$1.4 million. The charge was primarily related to a reduction of personnel and the closure of certain facilities and included the cost of severance, lease commitments and the write-off of leasehold improvements.

A significant portion of MKS's sales are to operations in international markets. International sales by MKS's foreign subsidiaries were 27.3% and 32.4% of net sales for 1997 and 1998, respectively. MKS does not classify export sales made directly by MKS as international sales. Such sales have generally been less than 10% of net sales. MKS currently uses, and plans to continue to use, forward exchange contracts and local currency purchased options to reduce currency exposure arising from foreign denominated sales associated with the intercompany purchases of inventory. Gains and losses on derivative financial instruments that qualify for hedge accounting are classified in cost of sales. Gains and losses on derivative financial instruments that do not qualify for hedge accounting are marked-to-market and recognized immediately in other income. See Note 3 to Notes to Consolidated Financial Statements.

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to federal, and certain state, income taxation as a C corporation. The pro forma net income reflects a pro forma effective tax rate of 38.0% to reflect federal and state income taxes which would have been payable for 1998 had MKS been taxed as a C corporation. See "S Corporation and Termination of S Corporation Status."

Results of Operations

The following table sets forth for the periods indicated the percentage of total net sales of certain line items included in MKS's consolidated statement of income data:

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
	-----	-----	-----
Net sales.....	100.0%	100.0%	100.0%
Cost of sales.....	59.7	57.2	59.9
	-----	-----	-----
Gross profit.....	40.3	42.8	40.1
Research and development.....	8.3	7.8	8.7
Selling, general and administrative.....	21.8	22.3	24.9
Restructuring.....	0.8	--	--
	-----	-----	-----
Income from operations.....	9.4	12.7	6.5
Interest expense, net.....	1.3	1.0	0.8
Other income (expense), net.....	(0.3)	0.1	0.1
	-----	-----	-----
Income before income taxes.....	7.8	11.8	5.8
Provision for income taxes.....	0.5	1.0	0.7
	-----	-----	-----
Net income.....	7.3%	10.8%	5.1%
	=====	=====	=====
Pro forma data:			
Historical income before income taxes.....			5.8%
Pro forma provision for income taxes.....			2.2

Pro forma net income.....			3.6%
			=====

YEAR ENDED 1998 COMPARED TO 1997

Net Sales. Net sales decreased 25.7% to \$139.8 million for 1998 from \$188.1 million for 1997. International net sales were approximately \$45.3 million in 1998 (32.4% of net sales) and \$51.4 million in 1997 (27.3% of net sales). The decrease in net sales was primarily due to decreased sales volume of MKS's existing products in the United States and in Asia caused by the 1998 downturn in the semiconductor capital equipment market.

Gross Profit. Gross profit as a percentage of net sales decreased to 40.1% for 1998 from 42.8% in 1997. The change was primarily due to manufacturing overhead costs being a higher percentage of net sales due to lower sales volume in 1998.

Research and Development. Research and development expenses decreased 17.3% to \$12.1 million (8.7% of net sales) for 1998 from \$14.7 million (7.8% of net sales) for 1997. The decrease was primarily due to reduced spending for development materials required for certain projects that were completed during 1998.

Selling, General and Administrative. Selling, general and administrative expenses decreased 17.0% to \$34.7 million (24.9% of net sales) for 1998 from \$41.8 million (22.3% of net sales) for 1997. The decrease was due primarily to a decrease of approximately \$4.2 million in compensation expense along with decreased selling related expenses.

Interest Expense, Net. Net interest expense decreased to \$1.2 million for 1998 from \$1.9 million for 1997 primarily due to lower debt outstanding during 1998.

Other Income (Expense), Net. Other income of \$0.2 million in 1998 primarily represents foreign exchange translation gains on intercompany payables of \$1.0 million offset by \$0.7 million for costs associated with MKS's planned initial public offering in early 1998 which was postponed. Other income of

\$0.2 million in 1997 represents gains of \$1.2 million from foreign exchange contracts that did not qualify for hedge accounting, offset by a foreign exchange translation loss on an intercompany payable.

Pro Forma Provision for Income Taxes. The pro forma provision for income taxes for 1998 reflects the estimated tax expense MKS would have incurred had it been subject to federal and state income taxes as a C corporation under the Internal Revenue Code. The pro forma provision reflects a pro forma tax rate of 38.0%, which differs from the federal statutory rate due primarily to the effects of state and foreign taxes and certain tax credits.

YEAR ENDED 1997 COMPARED TO 1996

Net Sales. Net sales increased 10.1% to \$188.1 million for 1997 from \$170.9 million for 1996. International net sales were approximately \$51.4 million in both 1997 (27.3% of net sales) and 1996 (30.1% of net sales). The increase in net sales was primarily due to increased sales volume of MKS's existing products in the United States.

Gross Profit. Gross profit as a percentage of net sales increased to 42.8% for 1997 from 40.3% for 1996. The change was due primarily to the reduction in fixed costs resulting from the restructuring effected in the third quarter of 1996 and the resulting increase in operational efficiencies.

Research and Development. Research and development expenses increased 3.4% to \$14.7 million (7.8% of net sales) for 1997 from \$14.2 million (8.3% of net sales) for 1996. The increase was primarily due to an increase in staffing throughout 1997 for certain development projects.

Selling, General and Administrative. Selling, general and administrative expenses increased 12.5% to \$41.8 million (22.2% of net sales) for 1997 from \$37.2 million (21.8% of net sales) for 1996. The increase was due primarily to increased compensation expense, including increased staffing levels.

Restructuring. In the third quarter of 1996, as a result of the downturn in the semiconductor industry, MKS recorded a restructuring charge of \$1.4 million. The charge included \$0.4 million of severance pay, \$0.7 million of lease commitments, and \$0.3 million for the write-off of leasehold improvements.

Interest Expense, Net. Net interest expense decreased to \$1.9 million for 1997 from \$2.3 million for 1996 primarily due to lower debt outstanding during 1997.

Other Income (Expense), Net. Other expense for 1996 and other income for 1997 reflect losses and gains of \$0.5 million and \$1.2 million, respectively, from foreign exchange contracts that did not qualify for hedge accounting, and a foreign exchange translation loss on an intercompany payable from MKS's Korean subsidiary of \$1.0 million related to the devaluation of the Korean won in the fourth quarter of 1997.

Selected Quarterly Operating Results

The following tables present unaudited consolidated financial information for the eight quarters ended December 31, 1998. In the opinion of management, this information has been presented on the same basis as the audited Consolidated Financial Statements appearing elsewhere in this Prospectus and all adjustments (consisting only of normal recurring adjustments) which management considers necessary for a fair presentation of the results of such periods have been included in the amounts stated below to present fairly the unaudited quarterly results when read in conjunction with MKS's Consolidated Financial Statements and Notes thereto. The results for any quarter are not necessarily indicative of future quarterly results of operations.

	QUARTER ENDED							
	MARCH 31, 1997	JUNE 30, 1997	SEPT. 30, 1997	DEC. 31, 1997	MARCH 31, 1998	JUNE 30, 1998	SEPT. 30, 1998	DEC. 31, 1998
	(IN THOUSANDS)							
STATEMENT OF INCOME DATA:								
Net sales.....	\$40,520	\$45,749	\$48,360	\$53,451	\$46,163	\$34,026	\$28,834	\$30,740
Cost of sales.....	24,277	26,413	27,766	29,150	26,757	20,265	18,140	18,622
Gross profit.....	16,243	19,336	20,594	24,301	19,406	13,761	10,694	12,118
Research and development.....	2,994	3,563	3,779	4,337	3,794	3,107	2,568	2,668
Selling, general and administrative.....	9,612	10,321	10,816	11,089	10,112	9,045	7,808	7,742
Income from operations.....	3,637	5,452	5,999	8,875	5,500	1,609	318	1,708
Interest expense, net.....	494	527	445	395	375	337	234	241
Other income (expense), net.....	275	(447)	632	(294)	(281)	123	77	268
Income before income taxes.....	3,418	4,478	6,186	8,186	4,844	1,395	161	1,735
Provision for income taxes.....	289	378	523	788	565	163	19	202
Net income.....	\$ 3,129	\$ 4,100	\$ 5,663	\$ 7,398	\$ 4,279	\$ 1,232	\$ 142	\$ 1,533

	QUARTER ENDED							
	MARCH 31, 1997	JUNE 30, 1997	SEPT. 30, 1997	DEC. 31, 1997	MARCH 31, 1998	JUNE 30, 1998	SEPT. 30, 1998	DEC. 31, 1998
PERCENTAGE OF NET SALES:								
Net sales.....	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of sales.....	59.9	57.7	57.4	54.5	58.0	59.6	62.9	60.6
Gross profit.....	40.1	42.3	42.6	45.5	42.0	40.4	37.1	39.4
Research and development.....	7.4	7.8	7.8	8.1	8.2	9.1	8.9	8.6
Selling, general and administrative.....	23.7	22.6	22.4	20.8	21.9	26.6	27.1	25.2
Income from operations.....	9.0	11.9	12.4	16.6	11.9	4.7	1.1	5.6
Interest expense, net.....	1.2	1.1	0.9	0.7	0.8	1.0	0.8	0.8
Other income (expense), net.....	0.6	(1.0)	1.3	(0.6)	(0.6)	0.4	0.3	0.8
Income before income taxes.....	8.4	9.8	12.8	15.3	10.5	4.1	0.6	5.6
Provision for income taxes.....	0.7	0.8	1.1	1.5	1.2	0.5	0.1	0.6
Net income.....	7.7%	9.0%	11.7%	13.8%	9.3%	3.6%	0.5%	5.0%

MKS's quarterly operating results have varied significantly and are likely to continue to vary significantly due to a number of factors including specific economic conditions in the industries in which MKS's customers operate, particularly the semiconductor industry; the timing of the receipt of orders from major customers; customer cancellations or shipment delays; price competition; disruption in sources of supply; seasonal variations of capital spending by customers; production capacity constraints; specific features requested by customers; exchange rate fluctuations; the introduction or announcement of new products by MKS or its competitors; and other factors, many of which are beyond MKS's control.

MKS's net sales have fluctuated over the past eight quarters primarily due to the decline in the semiconductor capital equipment market and the semiconductor device market in 1998 that adversely affected sales of MKS's products in each of the quarters of 1998. See "Risk Factors -- Our quarterly results are likely to fluctuate." MKS expects that the decline in worldwide semiconductor capital equipment orders in the second half of 1998 and the instability of the Asian markets will continue to adversely affect sales of semiconductor capital equipment manufacturers for at least the first and second quarters of 1999. As a result, MKS currently expects that its net sales and net income for each of the first

and second quarters of 1999 will be less than net sales and net income for the first and second quarters of 1998.

Gross profit as a percentage of net sales increased in each quarter of 1997 primarily as a result of fuller utilization of existing manufacturing capacity as a result of increased net sales. Gross profit as a percentage of net sales decreased in each of the first three quarters of 1998 as a result of manufacturing overhead costs becoming a higher percentage of net sales due to lower sales volume.

The increase in research and development expenses for the second, third and fourth quarters of 1997 was primarily due to increased staffing levels. The decrease in research and development expenses for the first, second, and third quarters of 1998 was primarily due to reduced spending for development materials required for certain projects that were completed during 1998.

Selling, general and administrative expenses increased in the second, third and fourth quarters of 1997 primarily due to increased compensation expense and the write-off of certain abandoned assets. The decrease in selling, general and administrative expenses in the first, second, and third quarters of 1998 was primarily due to a decrease in compensation expense along with other selling related expenses.

Other income primarily represents gains and losses on foreign exchange contracts and a foreign exchange translation loss on an intercompany payable from MKS's Korean subsidiary of \$1.0 million in the fourth quarter of 1997 related to the devaluation of the Korean won. Other expenses in the first quarter of 1998 include \$0.7 million for costs associated with MKS's planned initial public offering in early 1998 which was postponed.

LIQUIDITY AND CAPITAL RESOURCES

MKS has financed its operations and capital requirements through a combination of cash provided by operations, long-term real estate financing, capital lease financing and short-term lines of credit.

Operations provided cash of \$26.3 million, \$16.8 million and \$23.0 million for 1996, 1997 and 1998, respectively, primarily impacted in each period by net income, depreciation and changes in the levels of inventory and accounts receivable. Investing activities utilized cash of \$10.2 million, \$3.3 million and \$2.1 million in 1996, 1997 and 1998, respectively, primarily for the purchase of property and equipment in each period. Financing activities utilized cash of \$15.6 million, \$16.2 million and \$11.8 million in 1996, 1997 and 1998, respectively, primarily for stockholder distributions in each period. Cash flows from financing activities for each period were primarily from short-term and long-term borrowings.

Working capital was \$31.5 million as of December 31, 1998. MKS has a combined \$30.0 million line of credit with two banks, expiring December 31, 1999, all of which is available. MKS also has lines of credit through its foreign subsidiaries with several financial institutions totaling \$15.0 million at December 31, 1998. The total unused balance under these lines of credit was \$5.3 million at December 31, 1998. These lines generally expire and are renewed at six month intervals. In addition, MKS has outstanding term loans and mortgage loans from banks totaling \$12.0 million (net of the current portion) at December 31, 1998. See Notes 6 and 13 of Notes to Consolidated Financial Statements.

In 1997 and 1998, MKS distributed \$12.4 million and \$6.2 million, respectively, of undistributed S corporation earnings to its stockholders. As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the accumulated adjustments account. The accumulated adjustments account is cumulatively equal to financial reporting income, adjusted for differences between the methods of accounting used for financial accounting and for federal income tax purposes from July 1, 1987 through the date of termination of MKS's S corporation status, that has not been previously distributed. Investors purchasing shares in this offering will not receive any portion of the distribution. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was estimated to be approximately \$35.9 million, and such balance is estimated to increase in the period from January 1, 1999 through the closing of this offering to approximately \$ million.

MKS believes that the net proceeds from this offering, together with the cash anticipated to be generated from operations and funds available from existing credit facilities, will be sufficient to satisfy its estimated working capital and planned capital expenditure requirements through at least the next 12 months.

Effect of Currency Exchange Rates and Exchange Rate Risk Management.

A significant portion of MKS's business is conducted outside of the United States through its foreign subsidiaries. The foreign subsidiaries maintain their accounting records in their local currencies. Consequently, period to period comparability of results of operations is affected by fluctuations in exchange rates. MKS derives a significant portion of its cash flows from foreign denominated revenue. To the extent the dollar value of foreign denominated revenue is diminished as a result of a strengthening dollar, MKS's results of operations and cash flows could be adversely affected. To reduce the risks associated with foreign currency rate fluctuations, MKS has entered into forward exchange contracts and local currency purchased options on a continuing basis in amounts and timing consistent with the underlying currency exposures. Gains on forward exchange contracts and local currency purchased options, qualifying for hedge accounting, amounted to \$2.5 million, \$1.2 million and \$0.3 million for the years ended December 31, 1996, 1997 and 1998, respectively, and are classified in cost of sales. Losses of \$0.5 million, gains of \$1.2 million and losses of \$0.2 million on forward exchange contracts that did not qualify for hedge accounting were recognized in earnings for 1996, 1997 and 1998, respectively, and are classified in other income (expense), net. These amounts are net of a foreign exchange translation loss of \$1.0 million and a gain of \$1.0 million on intercompany payables from its subsidiaries in 1997 and 1998 respectively. Foreign exchange translation gains and losses from unhedged intercompany balances were not material in 1996. While MKS does not issue or hold derivative financial instruments for trading purposes, there can be no assurance that any losses realized on such instruments will be fully offset by gains on the underlying exposure. Prospectively, MKS plans to continue to use forward exchange contracts and local currency purchased options to seek to mitigate the impact of exchange rate fluctuations. See Notes 2 and 3 of Notes to Consolidated Financial Statements.

Market Risk and Sensitivity Analysis on Exchange Rate Risk Management

The potential fair value loss for a hypothetical 10% adverse change in forward currency exchange rates on MKS's forward exchange contracts at December 31, 1998 would be \$949,000. The potential loss was estimated by calculating the fair value of the forward exchange contracts at December 31, 1998 and comparing that with those calculated using the hypothetical forward currency exchange rates.

The value of the local currency purchased options at December 31, 1998 was immaterial. Any loss related to the local currency purchased options is limited to the unamortized premium of \$155,000 at December 31, 1998.

RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

See Note 2 of Notes to Consolidated Financial Statements for a discussion of the impact of recently issued accounting pronouncements.

YEAR 2000 COMPLIANCE

The Year 2000 problem stems from the fact that many currently installed computer systems include software and hardware products that are unable to distinguish 21st century dates from those in the 20th century. As a result, computer software and/or hardware used by many companies and governmental agencies may need to be upgraded to comply with Year 2000 requirements or risk system failure or miscalculations causing disruptions to normal business activities.

State of Readiness

MKS designed and began implementation of a multi-phase Year 2000 project which consists of: (i) assessment of the corporate systems and operations that could be affected by the Year 2000 problem, (ii) remediation of non-compliant systems and components, and (iii) testing of systems and components following remediation. MKS, under the guidance of its Information Technology Steering Committee, has focused its Year 2000 review on four areas: (a) internal computer software and hardware, (b) product compliance, (c) facilities and manufacturing equipment and (d) third-party compliance.

Internal Computer Software and Hardware. MKS uses information technology for its internal infrastructure, which consists of its main enterprise systems (the systems used, in part, for purchase orders, invoicing, shipping and accounting), individual workstations, including personal computers, and its network systems.

Because MKS's business and manufacturing systems, such as its main enterprise systems, are essential to its business, financial condition and results of operations, MKS began its assessment of these systems prior to its other non-critical information technology systems. MKS began its assessment in the fall of 1997, and in November 1997, MKS developed a remediation plan for all identified noncompliant business and manufacturing systems. This remediation plan was implemented in January 1998. By July 1998, MKS had installed new systems or upgraded existing systems. Based upon post-implementation testing and review, management believes that all business and manufacturing systems within its manufacturing operations are Year 2000 compliant.

One of MKS's international subsidiaries is currently undergoing conversion of its business systems in order to become Year 2000 compliant. Management believes that these systems will be operational by June 1999. This phase of the Year 2000 project is currently on schedule.

MKS's personal computer based systems were assessed in early 1998. MKS believes that all non-compliant hardware and software was identified by March 1998, at which time it made a list prioritizing databases to be remedied. Critical databases were identified and were scheduled for remediation prior to other databases. Remediation plans to convert the databases were initiated in November 1998. MKS anticipates that it will complete its critical and non-critical conversions by June 1999. This phase of the Year 2000 project is currently on schedule.

Product Compliance. Throughout 1998, MKS assessed and addressed the Year 2000 compliance of its products. This assessment resulted in the identification of MKS's products that were compliant and non-compliant. The substantial majority of MKS's products were deemed to be compliant.

The date related functions of all non-compliant products, other than certain residual gas analysis products, are believed by MKS to be non-critical in that such noncompliance would not affect the independent performance of the product; would not cause the MKS product to cease operating on any particular date; and independently would not pose a safety risk. MKS believes that Year 2000 problems associated with non-compliant residual gas analysis products will also be non-critical. However, these products contain components of other manufacturers and cannot be tested and therefore it is possible that such products could cause unanticipated performance problems. The non-compliant features of our other products primarily relate to non-essential functions such as date displays. MKS made available to its customers a list which describes Year 2000 readiness of its products. This phase of the Year 2000 project is currently on schedule.

Facilities and Manufacturing Equipment. Some aspects of MKS's facilities and manufacturing equipment may include embedded technology, such as microcontrollers. The Year 2000 problem could cause a system failure or miscalculation in such facilities or manufacturing equipment which could disrupt MKS's operations. Affected areas include security systems, elevator controls, voice mail and phone systems, clean room environmental controls, numerically controlled production machinery and computer based production equipment. MKS organized a team of experienced managers in November 1998 to assess the potential problems in these areas. An assessment of all facilities and manufacturing equipment was conducted through December 1998, and a remediation plan was developed in January 1999. MKS

anticipates completion of all corrective actions by June 1999 with testing and review of corrected items to occur in the summer of 1999. This phase of the Year 2000 project is currently on schedule.

Third-Party Compliance. MKS has relationships with third-parties including customers and vendors and suppliers of goods, services and computer interfaces. The failure of such persons to implement and execute Year 2000 compliance measures in a timely manner, if at all, could, among other things: (i) adversely affect MKS's ability to obtain components in a timely manner; (ii) cause a reduction in the quality of components obtained by MKS; (iii) cause a reduction, delay or cancellation of customer orders received by MKS or a delay in payments by its customers for products shipped; and/or (iv) result in the loss of services that would be necessary for MKS to operate in the normal course of business. MKS assessed which of these third-party goods, services and interfaces were critical to its operations and developed and mailed a standard survey to each third-party deemed critical in January 1998. By March 1998, MKS had reviewed most responses received. To date, the responses received indicate that the third-parties are either in the process of developing remediation plans, or are compliant. MKS anticipates further assessment to continue through March 1999 and plans to conduct reviews at that time. A remediation plan is expected to be in place by June 1999 with all critical third-parties achieving satisfactory compliance by August 1999. This phase of the Year 2000 project is currently on schedule.

Costs

MKS's costs to date associated with assessment, remediation and testing activities concerning the Year 2000 problem have been approximately \$1,500,000. MKS estimates that an additional \$1,000,000, the major portion of which will be capitalized and expensed over the life of the assets, will be required to complete the replacement or modification of its facilities, manufacturing equipment, computer software and products and to address the noncompliance of key third-parties. MKS has funded and will continue to fund these activities principally through cash provided by operations and existing leasing lines of credit. It is not possible for MKS to completely estimate the costs incurred in its remediation effort as many of its employees have focused and will continue to focus significant efforts in evaluating MKS's Year 2000 state of readiness and in remediating problems that have arisen, and will continue to arise, from such evaluation.

Contingency Plan

To date, MKS has not formulated contingency plans related to the failure of its or a third-party's Year 2000 remediation efforts. Contingency plans for the failure to implement compliance procedures have not been completed because it is the intent of MKS to complete all required modifications and to test modifications thoroughly prior to December 31, 1999. However, as discussed above, MKS is engaged in ongoing assessment, remediation and testing activities and the internal results as well as the responses received from third-parties will be taken into account in determining the nature and extent of any contingency plans if necessary.

BUSINESS

MKS is a leading worldwide developer, manufacturer and supplier of instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. MKS offers a comprehensive line of products which are used to manufacture, among other things:

- - semiconductors
- - flat panel displays
- - magnetic and optical storage devices and media, including:
 - compact disks
 - hard disk storage devices
 - magnetic devices for reading disk data
 - digital video disks
 - optical storage disks (laser readable disks)
- - solar cells which convert light into electrical current
- - fiber optic cables for telecommunications
- - optical coatings (such as eyeglass coatings)
- - coatings for architectural glass
- - hard coatings to minimize wear on cutting tools
- - diamond thin films

Our products include:

- - instruments used to measure, control and analyze:
 - gas pressure
 - gas flow
 - gas composition
- - vacuum technology products:
 - vacuum gauges
 - vacuum valves and components

For over 25 years, MKS has focused on satisfying the needs of semiconductor capital equipment manufacturers and semiconductor device manufacturers and has established long-term relationships with many of its customers. MKS has over 4,000 active customers worldwide (all of which purchased products during 1998) including:

- semiconductor capital equipment manufacturers
- semiconductor device manufacturers
- industrial manufacturing companies
- university, government and industrial research laboratories

MKS's customers include Applied Materials, Inc., Lam Research Corporation, Tokyo Electron, Ltd., Air Products and Chemicals, Inc. and Motorola Inc. MKS sells its products primarily through its sales force which consists of 118 employees in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States.

INDUSTRY BACKGROUND

In the past 40 years, significant advances in materials science and processing technologies have made possible the manufacture of products ranging from highly complex microprocessor chips to simple but effective airtight coatings for food packaging. In many materials processing applications, specific gas mixtures at precisely controlled pressures are used:

- to create and maintain the required process atmosphere
- as a source of materials to be deposited on a substrate (for example, a silicon wafer)
- to remove (or etch) materials from a substrate to form a circuit pattern

The largest commercial application employing materials science and processing technologies is the manufacture of semiconductors. Worldwide semiconductor sales have increased as the use of semiconduc-

tors has expanded beyond personal computers and computer systems to a wide array of additional applications such as telecommunications and data communications systems, automotive products, consumer goods, medical products and household appliances. In large part, this growth has been facilitated by the ability of semiconductor device manufacturers to produce increasingly fast, more complex, higher performance semiconductors while steadily reducing cost per function, power consumption requirements and size of these products to meet end-user and system designer requirements. These improvements in the ratio of price to performance have been enabled by advancements in semiconductor processing technologies, which have facilitated the ability to reduce circuit pattern sizes and subsequently increase the number of individual semiconductor circuits on a silicon wafer. These trends have driven the need for increasingly complex and sophisticated semiconductor device manufacturing processes, process equipment and process controls.

Semiconductor Manufacturing Process

The beginning of the semiconductor manufacturing process, or front-end wafer processing, requires hundreds of process steps involving the controlled application of materials on silicon wafers to form circuit patterns. These process steps take place within a process chamber, which provides a controlled environment for the fabrication of semiconductor devices. Most of the key front-end processes used in the production of semiconductors require precise automatic control of gas pressure, flow and composition in the process chamber.

To ensure the integrity and performance of the manufacturing process, semiconductor device manufacturers require sophisticated instruments that can provide precise automated control of all major process variables within the process chamber. The process steps required to produce circuit patterns involve the control of multiple gases flowing into the process chamber at specified intervals, and at controlled pressure and vacuum levels. In a typical process step, the process chamber is evacuated to a base pressure established by a vacuum pumping system and measured with vacuum gauges. Automatic shut-off valves are sequenced to protect pumps and process instruments from exposure to atmospheric pressure. Chamber leak integrity may be checked by gas analyzers scanning for the presence of undesirable atmospheric gases or water vapor. Mass flow controllers automatically control the flow rates of multiple gases into the process chamber. Simultaneously, the automatic pressure control system for the process chamber measures the pressure in the chamber and controls it at the desired level by electronically adjusting the position of a control valve located between the process chamber and the vacuum pump. Downstream of the process chamber, heated lines, particle traps, and vacuum valves and switches are used to prevent contamination of the process chamber as a result of the backstream of particles and exhaust gases back into the process chamber. This improves circuit quality, reduces maintenance and prolongs vacuum pump life.

The front-end process steps which involve gases include deposition, etch, strip, clean, ion implantation, rapid thermal processing and diffusion.

Deposition involves the formation of several layers of conducting, semiconducting and insulating thin films on the surface of a wafer or substrate. The two principal methods of film deposition are physical vapor deposition, which is used primarily to deposit conductive metal layers, and chemical vapor deposition, which is used primarily to deposit semiconducting and insulating thin films. In the physical vapor deposition process, wafers are typically placed in a process chamber where solid sources of film materials mounted in the chamber are vaporized onto the wafer surface at precisely controlled pressures and temperatures. In the chemical vapor deposition process, a specially designed gas or vaporized liquid material is introduced into a pressure and temperature controlled process chamber containing the wafers. The gases interact with the wafer surface to form a semiconducting or insulating layer. The pressure in the process chamber during the deposition process and the mixture of deposition gases must be precisely controlled to achieve uniform film thickness and composition.

The etching process creates the line-widths and other feature sizes which form the circuit patterns of integrated circuits. To produce specified line-widths, manufacturers typically employ plasma etching

techniques, which use gases that chemically react with unprotected portions of the wafer to create the thinly etched features that form the circuit patterns. The pressure in the etch chamber and the mixture of etchant gases must be precisely controlled to achieve the specified side wall angle and ratio of line-widths to depths. Stripping and cleaning are etching processes used to prepare the wafer surface for further processing steps.

In the ion implantation process, positively charged atoms (or ions) of certain materials are formed in minuscule quantities from gases introduced into a chamber on the implantation tool. The ions are generated in the chamber and are accelerated into the silicon wafer. The energy of acceleration implants the ion beneath the surface of the silicon, altering electrical characteristics of the silicon. The flow rates of the gases into the ion chamber and the pressure in the ion chamber must be precisely controlled to create and maintain the ion density required to achieve desired electrical characteristics.

Rapid thermal processing and diffusion typically involve raising the semiconductor wafer to elevated temperatures in order to modify the properties of a material or electronic circuit. These processes are often performed in a precisely controlled process gas or vacuum environment.

The pressures used in semiconductor manufacturing processes range from as low as one trillionth of atmospheric pressure to as high as two hundred times atmospheric pressure. The following table shows the wide range of pressures required for typical semiconductor manufacturing processes:

[PRESSURE RANGES OF TYPICAL SEMICONDUCTOR MANUFACTURING PROCESSES CHART]

[This table graphically depicts, using graybars, the gas pressure ranges, from one trillionth of atmospheric pressure (10⁻⁹ Torr) to two hundred times atmospheric pressure (152,000 Torr), used in various typical semiconductor manufacturing process steps, (Gas Distribution, Atmospheric Chemical Vapor Deposition, Sub-atmospheric Chemical Vapor Deposition, Low Pressure Chemical Vapor Deposition, Plasma Etching and Cleaning, Physical Vapor Deposition and Ion Implantation).]

Etching and deposition steps are repeated many times in the fabrication of a semiconductor circuit and require varying flow rates, pressures and gases. A typical process step uses from three to five different gases. The amount of time that the semiconductor processing tool is available for processing (or uptime), the ratio of acceptable circuits to total circuits processed (or yield), and the number of wafers that can be processed per hour (or throughput), depend in major part upon:

- precise repeatable measurement and control of the specific gas pressure, flow rates and composition
- the maintenance of the vacuum integrity of the process chamber
- the prevention of wafer contamination from particles entering the chamber

Pressure variations of as little as one one-hundred-thousandth of atmospheric pressure can change process yields significantly and errors in gas flow rates and composition may impair circuit performance. Atmospheric contamination and particle contamination can produce defects that significantly reduce wafer yields and the time required to remove contaminants reduces uptime and throughput. The speed of response and precision of the automatic control systems directly affects uptime, throughput of wafers and process yields.

Other Similar Industrial Manufacturing Processes

Many of the same processes of deposition, etch, strip, clean, ion implantation, rapid thermal processing and diffusion used to manufacture semiconductors are also used to manufacture: flat panel displays; magnetic and optical storage devices and media; solar cells; fiber optic cables for telecommunications; optical coatings; coatings for architectural glass; hard coatings to minimize wear on cutting tools; and diamond thin films.

Trends in Semiconductor Manufacturing

The ability of semiconductor device manufacturers to offer integrated circuits with smaller geometries and greater functionality at higher speeds requires continuous improvements in semiconductor process equipment and process controls. The transition to smaller circuit patterns, such as 0.18 micron and smaller line-widths, requires more process steps. It is also leading to the introduction of new materials such as copper for conductors and a whole new class of organic and inorganic materials for insulators (dielectrics). These in turn require new technologies for delivery of gases and vapors to the process chamber. In addition, the introduction of advanced processes such as high density plasma is leading to a need for lower pressures, which are more difficult to measure and control than higher pressures. These trends, along with increased wafer sizes, which result in higher circuit value per wafer, are leading to the need for increased sophistication of semiconductor processing equipment, a heightened emphasis on uptime, yield and throughput and the need for more precise process controls. As a result, the design and performance of instruments that control pressure or the flow of gases, or analyze the composition of gases, are becoming even more critical to the semiconductor manufacturing process.

To address the increasing complexity of semiconductor devices, semiconductor device manufacturers typically develop processes to create particular device features using specific manufacturing equipment. The process for each feature is then documented and may be subsequently replicated for use in multiple fabrication facilities around the world. The precision, repeatability and reliability of the measurement and control instrumentation used for each process is critical to providing uptime, high yield and throughput on manufacturing equipment at all facilities employing such processes. Semiconductor device manufacturers are placing increasing importance on uptime, yield, throughput and process consistency throughout their facilities to minimize:

- capital equipment expenditures
- facility construction costs
- overall ongoing operating costs

The increasing sophistication of semiconductor devices requires an increase in the number of components and subsystems used in the design of semiconductor manufacturing process tools. To reduce manufacturing complexity, improve quality and reliability and ensure long-term service and support, semiconductor capital equipment manufacturers and semiconductor device manufacturers are increasingly seeking to establish relationships with a smaller group of broad-based suppliers that meet their needs on a worldwide basis and provide:

- advanced technological capabilities to address the increasing complexities of the semiconductor manufacturing process
- instrument and component designs that ensure repeatable processes around the world
- value-added, integrated instruments and components

- a worldwide sales, service and support infrastructure

MKS SOLUTION AND STRATEGY

MKS's objective is to be the leading worldwide supplier of instruments and components used to measure, control and analyze gases in semiconductor and other advanced thin-film materials processing applications and to help semiconductor device manufacturers achieve improvements in their return on invested capital. The principal elements of MKS's solution and strategy to achieve this objective are set forth below:

Technology Leadership. MKS's products incorporate leading-edge technologies to control and monitor increasingly complex gas-related semiconductor manufacturing processes, thereby enhancing uptime, yield and throughput which can improve the investment return on capital equipment and facilities. The instruments and components in MKS's product offering provides the required capabilities through:

- high precision operation over the extreme and variable pressure ranges required for semiconductor processes
- precise, consistent and repeatable measurement and control performance that allows processes to be replicated in manufacturing facilities around the world
- advanced control technologies which enhance uptime, yield and throughput
- multiple, diverse and alternative technologies for controlling the flow rate and composition of gases and vapors needed for new classes of advanced materials for next generation semiconductor devices
- innovative vacuum technology subsystems that reduce atmospheric and particle contamination, thereby enhancing uptime, yield and throughput

MKS has 47 U.S. patents and 10 pending U.S. patent applications. MKS's products have continuously advanced as its customers' needs have evolved. MKS seeks to extend its technological leadership by applying its expertise in vacuum, pressure, flow and gas composition measurement control and analysis technologies to develop advanced products that meet the critical gas-related process requirements of semiconductor and advanced thin-film materials manufacturers. MKS has introduced technological innovations including corrosion-resistant pressure and vacuum sensors, automatic pressure and vacuum control systems, and compact single unit gas composition analyzers to replace bulky multi-component systems. MKS has developed, and continues to develop, new products to address emerging industry trends such as the transition from the use of 200mm wafers to 300mm wafers and the shrinking of integrated circuit line-widths from 0.25 micron to 0.18 micron and smaller. MKS has supplied pre-production equipment to be incorporated into semiconductor capital equipment manufacturers' 300mm pre-production semiconductor wafer process equipment, which is expected to be included in pilot production lines of device manufacturers. MKS has also developed equipment that is being used by research laboratories for semiconductor devices using less than 0.18 micron line-widths. In addition, MKS has developed, and continues to develop, materials delivery systems for new classes of materials, such as copper for conductors, titanium nitride for barriers and a class of organic and inorganic dielectric materials that are beginning to be used in small geometry manufacturing. MKS also has been a leader in making its products compatible with emerging digital network standards, such as DeviceNet, for enabling components used in semiconductor manufacturing processes to transmit self-diagnostic and other information on a digital host network while reducing system complexity and space requirements. MKS aligns its research and development program to the Semiconductor Industry Association Technology Roadmap (which identifies technological developments, as well as obstacles, required to produce future generations of semiconductor devices), to ensure that MKS maintains its leading-edge position and, through its association with leading universities to anticipate future semiconductor production needs three to seven years in advance.

Comprehensive Product Offering. MKS currently offers, and intends to continue to offer, the widest range of pressure and vacuum measurement and control products serving the semiconductor manufacturing

and similar industrial manufacturing industries. MKS offers a full line of products including a wide range of gas pressure, flow and composition analysis measurement and control instruments and vacuum gauges, valves and components. Since the development of its original Baratron laboratory-based instrument in 1961, MKS has continuously enhanced and expanded its product offerings in response to the evolving needs of its customers. For example, MKS recently introduced the Micro Baratron instrument, a significantly smaller version of its pressure measurement product, and a new low vapor pressure material delivery system. MKS plans to introduce new products throughout 1999, including a line of mass flow calibrators and process monitoring hardware and software for residual gas analysis. MKS plans to continue to expand its product lines through both internal development and acquisitions of complementary businesses, products and technologies. MKS's comprehensive product offering enables MKS to meet a broad range of customer needs and provide a single source of solutions for semiconductor device and semiconductor capital equipment manufacturers as they seek to consolidate their supplier relationships to a smaller select group.

MKS's products are designed to meet the increasingly complex needs of its customers. With the increasing sophistication of semiconductor capital equipment leading to an increasing number of components and subsystems in semiconductor manufacturing process tools, MKS delivers products that reduce equipment size and improve process performance. MKS's subsystem products combine several components into single integrated solutions. MKS's integrated solutions deliver higher performance at a lower cost than similar subsystems built from discrete components. Additionally, MKS's integrated solutions are easier to install and configure, further reducing the overall cost to the customer.

Close Working Relationships with Customers. MKS has focused on satisfying the needs of semiconductor device manufacturers and semiconductor capital equipment manufacturers for over 25 years and has established long-term relationships with many of its customers. MKS works with its customers at the pre-design and design stage to identify and respond to their requests for current and future generations of products. These close working relationships allow MKS to understand and address the cost and performance expectations of its customers. MKS plans to enhance its relationships with its major customers and identify opportunities to develop similar relationships with additional semiconductor capital equipment manufacturers and semiconductor device manufacturers.

Applications in Related Markets. MKS is leveraging its accumulated expertise in the semiconductor industry by developing products for applications that employ production processes similar to semiconductor fabrication processes in their reliance upon gases and vacuum-based production technologies. Applications served by MKS outside the semiconductor industry include vacuum freeze-drying of pharmaceuticals and foods, sterilization of medical appliances, and applications that involve advanced thin-film manufacturing such as flat panel displays, magnetic and optical storage media, solar cells, fiber optic cables and optical coatings. MKS plans to continue to identify and develop products that address advanced materials processing applications where gas management plays a critical role.

Global Infrastructure and World Class Manufacturing Capabilities. As semiconductor device manufacturers have become increasingly global, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to calibrate, repair, modify, upgrade and retrofit their equipment to improve process consistency, uptime, yield and throughput. To meet these market requirements, MKS maintains a global sales and support organization with 22 offices worldwide. MKS currently manufactures its products at nine facilities in the United States and abroad. MKS continues to devote significant resources to expand and maintain its worldwide production and service capabilities to meet the global demand for gas measurement, control and analysis instruments and vacuum technology components. MKS opened a sales and support facility in Singapore in 1998 and during the year ending December 31, 1999 plans to add manufacturing capabilities to its Austin, Texas facility and further equip its cleanroom facilities in Andover and Methuen, Massachusetts.

MKS believes that the ability to manufacture reliable instruments and components in a cost-effective manner is critical to meet the demanding just-in-time delivery requirements of semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS's worldwide production and

manufacturing facilities provide MKS with the ability to manufacture reliable gas measurement, control and analysis instruments and components in a timely and cost-effective manner. With a total of approximately 250,000 square feet of manufacturing capacity in five locations in the United States and four others in Germany, Japan, the United Kingdom and Korea, MKS has implemented world class practices in quality and delivery techniques. MKS's manufacturing facilities in the United States, the United Kingdom and Germany are ISO 9001 certified.

PRODUCTS

MKS offers a full line of instruments and components that are used to measure, control and analyze gases in semiconductor manufacturing and other advanced thin-film manufacturing processes. MKS supplies products in two principal areas:

- measurement and control instrumentation products for gas pressure, flow and composition analysis
- vacuum gauges, valves and components

These products are covered by 47 U.S. patents and 10 pending U.S. patent applications.

The following schematic shows where MKS products are used in a typical semiconductor manufacturing process.

[CHART]

1. Ultraclean Mini-Baratron Pressure Transducer and Local Display Module
2. Automatic Pressure Controller/ Regulator
3. Thermal Mass Flow Controller or Pressure-Based Mass Flow Controller
4. Gas Box Rate-of-Rise In-Situ Calibrator
5. Control and Shut-Off Valves
6. Direct Liquid Injection -- Controller
7. Direct Liquid Injection -- Micropump
8. Direct Liquid Injection -- Vaporizer
9. RGA Mass Spectrometer with Software
10. Baratron Pressure Switch
11. In-Situ Diagnostics Access Valve
12. Baratron Pressure Transducer
13. Automatic Downstream Valve Controller
14. Vacuum Foreline Virtual Wall
15. In-Line Valve
16. Convection Pirani Gauge
17. Throttle Valve
18. Cold Cathode High Vacuum Gauge or Hot Cathode High Vacuum Gauge
19. In-Line Trap
20. Foreline/Exhaust Line Heaters

Measurement and Control Instrumentation Products

MKS designs and manufactures a wide range of gas pressure, flow and composition analysis measurement and control instrumentation. Each product line consists of products which are designed for a variety of pressure, flow and composition ranges and accuracies.

Baratron Pressure Measurement Products. MKS's Baratron pressure measurement products are high precision, pressure measurement instruments. MKS has five Baratron product families that range from

high accuracy digital output instruments to simple electronic switches. These products are typically used to measure the pressure of the gases being distributed upstream of the process chambers, to measure process chamber pressures and to measure pressures between process chambers, vacuum pumps and exhaust lines. Baratron instruments measure pressures at ranges from two hundred times atmospheric pressure to one billionth of atmospheric pressure. MKS believes it offers the widest range of gas pressure measurement instruments in the semiconductor and advanced thin-film materials processing industries.

A key feature of Baratron instruments is the ability to measure pressure independent of gas composition, which is critical for precise pressure control of semiconductor processes that involve gas mixtures. In these processes, there is a need to control both pressure and gas mixture, but the pressure measurement instrument must measure only the pressure of the sum of the gases in the chamber, independent of gas composition. The Baratron instruments enable users to achieve a highly precise, accurate and repeatable measurement of gas pressure. Pressure measurement, independent of gas composition, is also useful in evacuation (removal of atmospheric gases) and backfilling (introduction of specific amounts of several gases) applications, such as fluorescent bulb manufacturing and gas laser fabrication.

The following table shows MKS's principal Baratron pressure measurement product lines:

BARATRON PRESSURE MEASUREMENT PRODUCTS

PRODUCT LINES	TYPICAL APPLICATIONS	DESCRIPTION	RANGES OF LIST PRICES
High precision, high accuracy pressure and vacuum measurement instruments	Chemical Vapor Deposition	Instruments with built-in temperature stabilization	\$2,900-\$6,400
	Physical Vapor Deposition	features, for high precision, high accuracy and high temperature operation	
	Etch, Strip, Clean Pressure Calibration		
General purpose pressure and vacuum measurement instruments	Chemical Vapor Deposition	Rugged instruments with and without built-in temperature stabilization	\$450-\$4,200
	Physical Vapor Deposition	features, for reliable, precise and accurate process measurement	
	Etch, Strip, Clean		
Ultra-clean high pressure and vacuum measurement instruments	Gas Distribution	Instruments with ultra-clean surfaces	\$550-\$1,050
	Chemical Vapor Deposition	exposed to gas, for precise, high purity applications	
	Etch		
General purpose "MINI" pressure and vacuum measurement instruments	Chemical Vapor Deposition	Small footprint instruments for precise, accurate, general purpose process measurement	\$650-\$1,400
	Etch, Strip, Clean		
Electronic pressure and vacuum switches	Physical Vapor Deposition	Economical, stable instrument providing "go/no-go" output for precise pressure trip-	\$350-\$750
	Chemical Vapor Deposition	points and alarms	
	Etch		

MKS's list prices for its Baratron measurement products vary depending upon precision, accuracy, pressure range, operating temperature range, stability and gas purity specifications.

Automatic Pressure Control Products. MKS's automatic pressure control products consist of analog and digital automatic pressure and vacuum control electronic instruments and valves. These products enable precise control of process pressure by electronically actuating valves which control the flow of gases in and out of the process chamber to minimize the difference between desired and actual pressure in the chamber. The electronic controllers vary from simple analog units with precise manual tuning capability to state-of-the-art self-tuning, digital signal processing controllers. The valve products vary from small gas inlet valves to large exhaust valves.

In most cases, MKS's Baratron pressure measurement instruments provide the pressure input to the automatic pressure control device. Together, these components create an integrated automatic pressure control system. MKS's pressure control products can also accept inputs from other measurement instruments, enabling the automatic control of gas input or exhaust based on parameters other than pressure.

PRESSURE AND VACUUM CONTROL PRODUCTS

PRODUCT LINES	TYPICAL APPLICATIONS	DESCRIPTION	RANGES OF LIST PRICES
Automatic throttle control valve controllers	Chemical Vapor Deposition Etch, Strip, Clean	Analog controllers, self-tuning digital controllers and displayless self-tuning controllers	\$800-\$2,650
Throttle control valves	Chemical Vapor Deposition Etch	Non-sealing and sealing valves; high speed sealing throttle control valves; automatic, microprocessor-based smart throttle control valves	\$1,400-\$8,800
Automatic solenoid control valve controllers	Chemical Vapor Deposition Etch Ion Implantation Backside Wafer Cooling	Stand-alone control electronics packages or integrated sensor, valve and control electronics packages	\$1,850-\$2,900
Solenoid control valves	Etch Ion Implantation Backside Wafer Cooling	Elastomer and all-metal-sealed solenoid control valves	\$450-\$1,500

MKS has recently introduced a line of integrated pressure controllers that combine the functions of its Baratron pressure measurement instrument, flow measurement instrument, control electronics and valve into a four-inch long instrument which can be placed directly on a gas line to control pressure downstream of the instrument while indicating the gas flow rate. This addresses the need for smaller components, saving valuable clean room space.

Flow Measurement and Control Products. MKS's flow measurement products include gas, vapor and liquid flow measurement products based upon thermal conductivity, pressure and direct liquid injection technologies. The flow control products combine the flow measuring device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. The products measure and automatically control the mass flow rate of gases and vapors into the process chamber. MKS's broad product lines include products that allow the precise, automatic flow control of inert or corrosive gases, the automatic control of low vapor pressure gases and heated liquid source materials, and the automatic control of delicate, advanced technology liquid sources and vaporized solid sources for next generation devices.

MKS's line of thermal-based mass flow controllers, which control gas flow based on the molecular weight of gases, includes all-metal-sealed designs and ultra-clean designs for semiconductor applications, and general purpose controllers for applications where all-metal-sealed construction is not required. MKS has also developed pressure-based mass flow controllers, based on Baratron pressure instrument measurement and control technology, which use flow restrictors in the gas line to transform pressure control into mass flow control.

FLOW MEASUREMENT AND CONTROL PRODUCTS

PRODUCT LINES	TYPICAL APPLICATIONS	DESCRIPTION	RANGES OF LIST PRICES
Direct liquid injection system	Chemical Vapor Deposition	Pumps and vaporizes liquid precursors for metals and dielectrics into process chamber	\$8,500-\$24,900
Gas box rate of rise calibrator	In-situ Calibration of Mass Flow Controllers	Measures pressure increase with time in a known volume	\$8,100-\$11,800
Pressure-based vapor delivery systems	Chemical Vapor Deposition	Measures and controls flow of low pressure vapors into chamber	\$4,900-\$12,400
Pressure-based mass flow controllers	Chemical Vapor Deposition Ion Implantation	Gas flow controller consisting of Baratron sensor, control valve, orifice and electronics	\$2,700
Ultra-clean, all-metal-sealed thermal mass flow controllers	Chemical Vapor Deposition Physical Vapor Deposition Etch	Gas flow controller consisting of sensor, control valve and electronics	\$1,400-\$9,500
General purpose elastomer-sealed mass flow controllers	Chemical Vapor Deposition Etch, Strip, Clean	Gas flow controller consisting of sensor, control valve and electronics	\$1,050-\$2,450

Certain new materials required for the next generation of semiconductor devices are difficult to control using traditional thermal mass flow technology. To control these new materials, MKS has designed a direct liquid injection subsystem which pumps a precise volume of liquid into a vaporizer, which in turn supplies a controlled flow of vapor into the process chamber. The direct liquid injection subsystem pump and vaporizer are presently used principally for research and development applications for next generation semiconductor device conductors, diffusion barriers and insulators, such as copper, titanium nitride and dielectric materials.

MKS's flow measurement products also include an in-situ calibration system which independently measures mass flow and compares this measurement to that of the process chamber mass flow controller. The demand for the MKS calibration system is driven by the increasingly stringent process control needs of the semiconductor industry and the need to reduce costly downtime resulting from stopping operations to address mass flow controller problems.

Gas Composition Analysis Instruments. MKS's gas analysis instruments are sold primarily to the semiconductor industry. The residual gas analysis product lines include a quadrupole (four rods) mass spectrometer (a device which separates gases based on molecular weight) sensor with built-in electronics

to analyze the composition of background and process gases in the process chamber. MKS's ORION process monitoring system is a sophisticated quadrupole mass spectrometer process analyzer for statistical process monitoring of manufacturing processes operating from very low pressures to atmospheric pressure. These instruments are provided both as portable laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems. The gas monitoring systems can indicate out-of-bounds conditions, such as the presence of undesirable atmospheric gases, water vapor or out-of-tolerance amounts of specific gases in the process chamber, enabling operators to diagnose and repair faulty equipment. MKS's gas sampling systems provide a turn-key solution for withdrawing gases from chambers at relatively high pressures for introduction into the low pressure gas analyzers. Next generation semiconductor manufacturing processes, with smaller circuit patterns and larger wafer sizes, are expected to require sophisticated gas analysis instruments and/or monitoring equipment to ensure tighter process control and earlier diagnosis of equipment malfunction.

Vacuum Technology Products

MKS designs and manufactures a wide variety of vacuum technology products, including vacuum gauges, vacuum valves and components.

Vacuum Gauging Products

MKS offers a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units. These vacuum gauges measure phenomena that are related to the level of pressure in the process chamber and downstream of the process chamber between the chamber and the pump. Unlike Baratron pressure measurement instruments, vacuum gauges do not measure pressure directly. These gauges are used to measure vacuum at pressures lower than those measurable with a Baratron pressure measurement instrument or to measure vacuum in the Baratron pressure measurement instrument range where less accuracy is required. MKS's indirect pressure gauges use thermal conductivity and ionization gauge technologies to measure pressure from atmospheric pressure to one trillionth of atmospheric pressure. MKS's Baratron pressure measurement instruments, together with its vacuum gauges, are capable of measuring the full range of pressures used in semiconductor and other thin-film manufacturing processes from two hundred times atmospheric pressure to one trillionth of atmospheric pressure.

MKS also manufactures a wide range of vacuum gauge instruments in which the associated electronics are packaged with the vacuum sensor, reducing panel space and installation cost. MKS offers both analog and digital versions of these vacuum gauge transducers.

Vacuum Valves and Components

MKS's vacuum valves are used on the gas lines between the process chamber and the pump downstream of the process chamber for chemical vapor deposition, physical vapor deposition, ion implantation and etch processes. MKS's vacuum components consist of fittings, flanges, traps and heated lines that are used downstream from the process chamber to provide leak free connections and to prevent condensable materials from depositing particles near or back into the chamber. The manufacture of small circuit patterns cannot tolerate contamination from atmospheric leaks or particles. MKS's vacuum components are designed to minimize such contamination and thus increase yields and uptimes.

VACUUM GAUGES, VALVES AND COMPONENT PRODUCTS

PRODUCT LINES	TYPICAL APPLICATIONS	DESCRIPTION	RANGES OF LIST PRICES
Cold cathode and hot filament vacuum gauges	Physical Vapor Deposition Ion Implantation Etch	Electronic gauges to measure pressure down to one trillionth of atmospheric pressure	\$600-\$6,200
Convection gauges	Physical Vapor Deposition Chemical Vapor Deposition Etch, Strip, Clean	Electronic gauges to measure from one atmosphere down to one millionth of atmospheric pressure	\$200-\$700
Right-angle and in-line shut-off valves	Physical Vapor Deposition Chemical Vapor Deposition Etch, Strip, Clean Ion Implantation	High vacuum rapid action poppet valves	\$250-\$4,500
Vacuum traps	Chemical Vapor Deposition Etch	Contaminant particle trap	\$1,800-\$4,600
Other vacuum components	Physical Vapor Deposition Chemical Vapor Deposition Etch Ion Implantation	Flanges, fittings and heated lines	\$50-\$3,050

MARKETS AND APPLICATIONS

MKS estimates that approximately 60% of its sales in 1998 were made to the semiconductor industry. MKS's products are also used in other markets and applications including the manufacture of, among other things:

- flat panel displays
- magnetic and optical storage devices and media, including:
 - compact disks
 - hard disk storage devices
 - magnetic devices for reading disk data
 - digital video disks
 - optical storage disks (laser readable disks)
- solar cells which convert light into electrical current
- fiber optic cables for telecommunications
- optical coatings (such as eyeglass coatings)
- coatings for architectural glass

- hard coatings to minimize wear on cutting tools
- diamond thin films

MKS sells its products primarily through its direct sales force which consists of 118 employees in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. This direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. The major markets for MKS's products include:

Semiconductor Manufacturing

MKS's products are sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS's products are used in the major front-end process technologies such as physical vapor deposition, chemical vapor deposition, etch and ion implantation and for process facility applications such as gas distribution, clean room (room in which semiconductor manufacturing takes place) pressure control and vacuum distribution. MKS anticipates that the semiconductor manufacturing market will continue to account for a substantial portion of its sales. While the semiconductor device manufacturing market is global, the major semiconductor capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Flat Panel Display Manufacturing

MKS's products are used in the manufacture of flat panel displays, which require the same or similar fabrication processes as semiconductor manufacturing. The dominant fabrication process is chemical vapor deposition, which uses the same or similar MKS products as chemical vapor deposition for semiconductor manufacturing. MKS sells its products both to flat panel original equipment manufacturers and to end-users in the flat panel display market. The transition to larger panel size and higher definition is driving the need for defect reduction which requires tighter process controls. The major manufacturers for flat panel displays and flat panel display equipment are concentrated in Japan.

Magnetic and Optical Storage Devices and Media

MKS's products are used in the manufacture of magnetic (data is stored and read magnetically) and optical (data is read using laser technology) storage media, compact disks, hard disks, data storage devices, and digital video or versatile disks, typically in physical vapor deposition applications. The transition to higher density storage capacity requires manufacturing processes incorporating tighter process controls. While storage media manufacturing is global, the major manufacturers are concentrated in Japan and the Asia-Pacific region and storage media capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Optical Fiber and Optical Coating

MKS's products are used in optical fiber and optical thin-film coating processes. MKS's products are sold both to coating equipment manufacturers and to manufacturers of products made using optical thin-film coating processes. Optical fibers used for data transmission are manufactured using chemical vapor deposition processes similar to those used in semiconductor manufacturing. The requirement for greater data transmission is driving the need for tighter control of optical fiber coating processes. Optical thin films for eyeglasses, solar panels and architectural glass are deposited using chemical vapor deposition or physical vapor deposition in processes similar to those used in semiconductor manufacturing. Optical fiber manufacturing and optical thin-film processing are concentrated in the United States, Japan and Europe.

Other Coating Markets

MKS's pressure and flow measurement and control instruments are also used in chemical vapor deposition and physical vapor deposition processes for the application of thin films to harden tool bit surfaces, in the production of diamond thin films, coatings for food container packaging and coatings for jewelry and ornaments. The major equipment and process providers are concentrated in the United States, Japan and Europe.

MKS estimates that the flat panel display, magnetic and optical storage media, optical fiber, optical coating markets and other coating markets combined, accounted for approximately 12% and 14% of net sales for 1997 and 1998, respectively.

Other Markets

MKS's pressure measurement and control instruments and vacuum components are used in plasma processes used to sterilize medical instruments, in vacuum freeze drying of pharmaceuticals, foods and beverages, and in vacuum processes involved in light bulb and gas laser manufacturing. MKS's products are also sold to government, university and industrial laboratories for vacuum applications involving research and development in materials science, physical chemistry and electronics materials. The major equipment and process providers and research laboratories are concentrated in the United States, Japan and Europe.

CUSTOMERS

MKS has more than 4,000 active customers worldwide (all of which purchased products during 1998), including semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies and university, government and industrial research laboratories. MKS's largest customers consist primarily of leading semiconductor capital equipment manufacturers and semiconductor device manufacturers, including Applied Materials, Inc., Lam Research Corporation, Tokyo Electron, Ltd., Air Products and Chemicals, Inc. and Motorola Inc. In 1996, 1997, and 1998, sales to MKS's top five customers accounted for approximately 26%, 32% and 24%, respectively, of MKS's net sales. During the same periods, international sales represented approximately 30.1%, 27.3% and 32.3% of total net sales, respectively. During 1998, Applied Materials, Inc. accounted for approximately 16% of MKS's net sales. Applied Materials, Inc. purchases products from MKS under the terms of an agreement, with no minimum purchase requirements, that expires in 2000.

SALES, MARKETING AND SUPPORT

MKS's worldwide sales, marketing and support organization is critical to its strategy of maintaining close relationships with semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS sells its products primarily through its direct sales force which consists of 118 employees in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. This direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. MKS maintains a marketing staff of 14 employees to identify customer requirements, assist in product planning and specifications and to focus on future trends in the semiconductor and other markets.

As semiconductor device manufacturers have become increasingly sensitive to the significant costs of system downtime, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to repair, modify, upgrade and retrofit their equipment to improve yields and adapt new materials or processes. To meet these market requirements, MKS maintains a worldwide sales and support organization with offices in 22 locations. Technical support is provided by applications engineers located at offices in Arizona, California, Colorado, Massachusetts, Oregon and Texas, as well as Canada, France, Germany, India, Israel, Italy, Japan, Korea, The Netherlands, Singapore, Taiwan and the United Kingdom. Repair and calibration services are provided at 14 service depots located worldwide. MKS provides warranties from one to three years, depending upon the type of product. In addition, MKS offers training programs for its customers in a wide range of vacuum and gas processing technologies.

MANUFACTURING

MKS believes that the ability to manufacture reliable gas management instruments and components in a cost-effective manner is critical to meeting the demanding requirements of semiconductor capital

equipment manufacturers and semiconductor device manufacturers. MKS monitors and analyzes product lead times, warranty data, process yields, supplier performance, field data on mean time between failures, inventory turns, repair response time and other indicators so that it may continuously improve its manufacturing processes. MKS has adopted a total quality management process. MKS's manufacturing facilities in the United States, the United Kingdom and Germany are ISO 9001 certified.

MKS is devoting significant financial and management resources to maintain and expand its worldwide production and service capabilities to meet the global demand for gas management instruments and components. MKS believes that the ability to manufacture reliable instruments and components in a cost-effective manner is critical to meet the demanding just-in-time delivery requirements of semiconductor capital equipment manufacturers and semiconductor device manufacturers. Due to the short time between the receipt of orders and shipments, MKS normally operates with a level of backlog that is not significant. MKS currently manufactures its products at nine facilities in the United States and abroad. MKS plans to add manufacturing capabilities in 1999 to its Austin, Texas facilities and further equip its cleanroom facilities in Andover and Methuen, Massachusetts.

MKS's principal manufacturing activities consist of precision assembly, test, calibration, welding and machining activities. MKS subcontracts a portion of its assembly, machining and printed circuit board assembly and testing. All other assembly, test and calibration functions are performed by MKS. Critical assembly activities are performed in cleanroom environments at MKS's facilities.

RESEARCH AND DEVELOPMENT

MKS's research and development efforts are directed toward developing and improving MKS's gas management instruments and components for semiconductor and advanced thin-film processing applications and identifying and developing products for new applications for which gas management plays a critical role. MKS has undertaken an initiative to involve its marketing, engineering, manufacturing and sales personnel in the concurrent development of new products in order to reduce the time to market for new products. MKS's employees also work closely with its customers' development personnel. These relationships help MKS identify and define future technical needs on which to focus its research and development efforts. In addition, MKS participates in SEMI/SEMATECH, a consortium of semiconductor equipment suppliers, to assist in product development and standardization of product technology, and it supports research at academic institutions targeted at advances in materials science and semiconductor process development.

As of December 31, 1998, MKS employed a research and development staff of 89 employees. In 1996, 1997 and 1998, MKS's research and development expenditures were approximately \$14.2 million, \$14.7 million and \$12.1 million, respectively, representing approximately 8.3%, 7.8% and 8.7% of net sales, respectively.

COMPETITION

The market for MKS's products is highly competitive. Principal competitive factors include historical customer relationships; product quality, performance and price; breadth of product line; manufacturing capabilities; and customer service and support. While MKS believes that it competes favorably with respect to these factors, there can be no assurance that it will continue to do so.

MKS encounters substantial competition in each of its product lines from a number of competitors, although no one competitor competes with MKS across all product lines. Certain of MKS's competitors have greater financial and other resources than MKS. In some cases, the competitors are smaller than MKS, but well-established in specific product niches. Millipore Corporation offers products that compete with MKS's pressure and flow products. Aera Corporation, STEC (Horiba Ltd.), and Unit Instruments, Inc., each offer products that compete with MKS's mass flow control products. NOR-CAL Products, Inc. and MDC Vacuum Products, Inc., each offer products that compete with MKS's vacuum components. Leybold-Inficon, Inc., offers products that compete with MKS's vacuum measuring and gas analysis products. Helix Technology Corporation offers products that compete with MKS's vacuum gauging

products. Spectra International LLC offers products that compete with MKS's gas analysis products. In some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, MKS's success depends in part on its ability to have semiconductor device manufacturers specify that its products be used at their fabrication facilities and MKS may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, MKS's competitors can be expected to continue to improve the design and performance of their products. There can be no assurance that competitors will not develop products that offer price or performance features superior to those of MKS's products.

PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

MKS relies on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect its proprietary rights. MKS has 47 U.S. patents and 10 pending U.S. patent applications. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time. While MKS believes that certain patents may be important for certain aspects of its business, MKS believes that its success depends more upon close customer contact, innovation, technological expertise, responsiveness and worldwide distribution.

MKS requires each of its employees, including its executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all proprietary information of MKS and to assign to MKS all inventions made while in the employ of MKS.

EMPLOYEES

As of December 31, 1998, MKS employed 821 persons, including 486 in manufacturing, 89 in research and development, 246 in marketing, sales, support and general and administrative activities. Management believes that MKS's ongoing success depends upon its continued ability to attract and retain highly skilled employees. None of MKS's employees is represented by a labor union or party to a collective bargaining agreement. MKS believes that its employee relations are good.

FACILITIES

MKS sells its products primarily through its direct sales force in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. The direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. MKS's corporate headquarters are located in Andover, Massachusetts. Manufacturing and other operations are conducted in a number of locations worldwide. MKS's minimum payments for leased real estate for the year ending December 31, 1999 are expected to be \$1,484,000. MKS believes that the current facilities along with the planned addition for 1999 will be adequate and suitable to meet its needs for the foreseeable future. The following table provides information concerning MKS's principal and certain other owned and leased facilities:

LOCATION	SQ. FT.	ACTIVITY	PRODUCTS MANUFACTURED	LEASE EXPIRES
Andover, Massachusetts	82,000	Headquarters, Manufacturing, Customer Support and Research & Development	Baratron pressure measurement products	(1)
Boulder, Colorado	86,000	Manufacturing, Customer Support, Service and Research & Development	Vacuum gauges, valves and components	(2)
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Pressure control and flow measurement and control products	(1)

LOCATION	SQ. FT.	ACTIVITY	PRODUCTS MANUFACTURED	LEASE EXPIRES
Lawrence, Massachusetts	40,000	Manufacturing	Baratron pressure measurement products	(1)
Tokyo, Japan	20,700	Manufacturing, Sales, Customer Support, Service and Research & Development	Mass flow measurement and control products	(3)
Santa Clara, California	15,600	Sales, Customer Support and Service	Not applicable	(4)*
Richardson, Texas	14,600	Manufacturing, Sales, Customer Support and Service	Subassemblies	8/31/01
Munich, Germany	14,100	Manufacturing, Sales, Customer Support, Service and Research & Development	Mass flow measurement and control products	(1)
Le Bourget, France	13,700	Sales, Customer Support and Service	Not applicable	(1)
Austin, Texas	8,200	Sales, Customer Support and Service	Not applicable	1/30/03
Seoul, Korea	4,760	Manufacturing, Sales, Customer Support and Service	Mass flow measurement and control products	5/30/00**
Manchester, U.K.	2,200	Manufacturing, Sales, Customer Support and Service	Mass flow measurement and control products	10/5/09
Singapore	2,050	Sales, Customer Support and Service	Not applicable	3/25/01
Taiwan	2,050	Sales, Customer Support and Service	Not applicable	12/31/01

(1) This facility is owned by MKS.

(2) MKS leases one facility which has 39,000 square feet of space and a lease term which expires 10/31/01 and owns a second and third facility with 28,000 and 19,000 square feet of space, respectively.

(3) MKS leases a facility which has 14,000 square feet of space and a lease term which expires 4/30/99 and owns another facility with 6,700 square feet of space.

(4) MKS leases one facility with 4,000 square feet of space on a month-to-month basis, a second facility of 4,000 square feet with a lease term which expires on 1/30/00 and a third facility of 2,600 square feet with a lease term which expires 6/30/99. MKS owns a fourth facility of 5,000 square feet.

* MKS has an option to extend its leases at this location for a period of 18 months.

** MKS has an option to extend this lease for a period of two years.

In addition to manufacturing and other operations conducted at the foregoing leased or owned facilities, MKS provides worldwide sales, customer support and services from various other leased facilities throughout the world not listed in the table above. See "Business -- Sales, Marketing and Support."

LEGAL PROCEEDINGS

MKS is not a party to any material legal proceedings.

MANAGEMENT

EXECUTIVE OFFICERS AND DIRECTORS

The executive officers and directors of MKS as of December 31, 1998 are as follows:

NAME ----	AGE ---	POSITION -----
John R. Bertucci.....	57	Chairman, Chief Executive Officer and President
Ronald C. Weigner.....	53	Vice President and Chief Financial Officer
John J. Sullivan.....	63	Executive Vice President of Technology
William D. Stewart.....	54	Corporate Vice President and General Manager, Vacuum Products
Joseph A. Maher, Jr.....	51	Corporate Vice President and General Manager, Measurement and Control Products
Leo Berlinghieri.....	45	Corporate Vice President, Customer Support Operations
Richard S. Chute(1).....	60	Director
Owen W. Robbins(2).....	69	Director
Robert J. Therrien.....	64	Director
Louis P. Valente(1)(2).....	68	Director

(1) Member of Compensation Committee.

(2) Member of Audit Committee.

Mr. Bertucci has served as President and a Director of MKS since 1974 and has been Chairman of the Board of Directors and Chief Executive Officer since November 1995. From 1970 to 1974, he was Vice President and General Manager. Mr. Bertucci has an M.S. in Industrial Administration and a B.S. in Metallurgical Engineering from Carnegie-Mellon University. Mr. Bertucci is also a director of Applied Science and Technology Corporation and Intellisense Corporation.

Mr. Weigner has served as Vice President and Chief Financial Officer of MKS since November 1995. From September 1993 until November 1995, he was Vice President and Corporate Controller and from 1980 to 1993 he was Corporate Controller. Mr. Weigner is a certified public accountant and has a B.S. in Business Administration from Boston University.

Mr. Sullivan has served as Executive Vice President of Technology of MKS since March 1995. From 1982 to March 1995, he was Vice President of Marketing, and from 1975 to 1982, he was Vice President of Sales and Marketing. Mr. Sullivan has an M.S. and a B.S. in Physics from Northeastern University.

Mr. Stewart has served as Corporate Vice President of MKS and General Manager of Vacuum Products since November 1997. From October 1986 to November 1997, he was President of HPS Vacuum Products group, which MKS acquired in October 1986. Mr. Stewart co-founded HPS in 1976. Mr. Stewart has an M.B.A. from Northwestern University and a B.S. in Business Administration from the University of Colorado. Mr. Stewart also serves on the board of directors of the Janus Fund.

Mr. Maher has served as Corporate Vice President of MKS and General Manager of Measurement and Control Products since November 1997. From March 1997 through November 1997, he served as Vice President of the Process Control Instrumentation Group. Mr. Maher was a Vice President of Lam Research Corporation from 1993 through 1996, and from 1980 through 1993, he was Executive Vice President of Drytek Corporation, which was purchased by Lam Research Corporation in 1993. Mr. Maher has a B.S. in Electrical Engineering from Northeastern University.

Mr. Berlinghieri has served as Corporate Vice President, Customer Support Operations of MKS since November 1995. From 1980 to November 1995, he served in various management positions at MKS, including Manufacturing Manager, Production & Inventory Control Manager, and Director of Customer

Support Operations. Mr. Berlinghieri is also Treasurer of the TQM-BASE Council, Inc., a non-profit quality management consortium comprised of Boston-area semiconductor capital equipment manufacturers.

Mr. Chute has served as a director of MKS since 1974. Mr. Chute has been a member of the law firm of Hill & Barlow, a professional corporation, since November 1971.

Mr. Robbins has served as a director of MKS since February 1996. Mr. Robbins was Executive Vice President of Teradyne, Inc., a manufacturer of electronic test systems and backplane connection systems used in the electronics and telecommunications industries from March 1992 to May 1997, and its Chief Financial Officer from February 1980 to May 1997. Mr. Robbins has served on the board of directors of Teradyne, Inc. since March 1992 and was its Vice Chairman from January 1996 to May 1997.

Mr. Therrien has served as a director of MKS since February 1996. Mr. Therrien has been President and Chief Executive Officer of Brooks Automation, Inc., a manufacturer of semiconductor processing equipment, since 1989.

Mr. Valente has served as a director of MKS since February 1996. Mr. Valente has been Chairman and Chief Executive Officer of Palomar Medical Technologies, Inc., a company which designs, manufactures and markets cosmetic lasers, since September 1997. He has been a director of Palomar Medical Technologies, Inc. since February 1997 and was its President and Chief Executive Officer from May 1997 to September 1997. Mr. Valente was a Senior Vice President of Acquisitions, Mergers and Investments of EG&G, Inc. from 1991 until July 1995. Mr. Valente is also a director of Micrion Corporation.

Executive officers of MKS are elected by the Board of Directors on an annual basis and serve until their successors are duly elected and qualified. There are no family relationships among any of the executive officers of MKS.

COMMITTEES OF THE BOARD OF DIRECTORS

The Compensation Committee consists of Messrs. Chute and Valente. The Compensation Committee reviews and evaluates the salaries, supplemental compensation and benefits of all officers of MKS, reviews general policy matters relating to compensation and benefits of employees of MKS and makes recommendations concerning these matters to the Board of Directors. The Compensation Committee also administers MKS's stock option and stock purchase plans. See "-- Stock Plans."

The Audit Committee consists of Messrs. Robbins and Valente. The Audit Committee reviews with MKS's independent auditor the scope and timing of its audit services, the auditor's report on MKS's financial statements following completion of its audit and MKS's policies and procedures with respect to internal accounting and financial controls. In addition, the Audit Committee will make annual recommendations to the Board of Directors for the appointment of independent auditors for the ensuing year.

DIRECTOR COMPENSATION

Directors of MKS are reimbursed for expenses incurred in connection with their attendance at Board of Directors and committee meetings. Directors who are not employees of MKS are paid an annual fee of \$10,000 and \$1,000 for each Board of Directors meeting they attend and \$500 for each committee meeting they attend which is not held on the same day as a Board of Directors meeting. Messrs. Chute, Robbins, Therrien and Valente, MKS's four non-employee directors, have each been granted options, under MKS's 1996 Director Stock Option Plan (under which no further grants will be made), to purchase 8,592 shares of common stock at a weighted average exercise price of \$4.81 per share.

COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION

The Compensation Committee is currently comprised of Messrs. Chute and Valente. No member of the Compensation Committee was at any time an employee of MKS. No executive officer of MKS serves

as a member of the Board of Directors or Compensation Committee of any other entity which has one or more executive officers serving as a member of MKS's Board of Directors or Compensation Committee.

EXECUTIVE COMPENSATION

The following table sets forth information with respect to the compensation of MKS's Chief Executive Officer and each of the four other most highly compensated executive officers for the year ended December 31, 1998 (the "Named Executive Officers").

SUMMARY COMPENSATION TABLE FOR 1998

NAME AND PRINCIPAL POSITION	ANNUAL COMPENSATION			LONG-TERM COMPENSATION AWARDS	ALL OTHER COMPENSATION (1)
	SALARY	BONUS	OTHER ANNUAL COMPENSATION	SECURITIES UNDERLYING OPTIONS (#)	
John R. Bertucci..... Chief Executive Officer and President	\$337,440	--	--	--	\$19,500
Ronald C. Weigner..... Vice President and Chief Financial Officer	164,257	--	--	60,000	9,740
Joseph A. Maher, Jr..... Corporate Vice President and General Manager, Measurement and Control Products	161,307	--	--	60,000	9,577
William D. Stewart..... Corporate Vice President and General Manager, Vacuum Products	173,893	--	--	60,000	10,059
Leo Berlinghieri..... Corporate Vice President, Customer Support Operations	152,559	--	--	60,000	3,121

(1) Includes a premium of \$4,264 paid on a life insurance policy and estimated payments of \$15,236 paid into a 401(k) plan for Mr. Bertucci, and estimated payments paid into a 401(k) plan for Messrs. Weigner, Maher, Stewart and Berlinghieri.

STOCK OPTION GRANTS

The following table contains information concerning the grants of options to purchase MKS's common stock made to each of the Named Executive Officers for the year ended December 31, 1998.

OPTION GRANTS IN 1998

NAME	INDIVIDUAL GRANTS				POTENTIAL REALIZABLE	
	NUMBER OF SECURITIES UNDERLYING OPTIONS GRANTED(1)	PERCENT OF TOTAL OPTIONS GRANTED TO EMPLOYEES IN FISCAL YEAR	EXERCISE OR BASE PRICE PER SHARE	EXPIRATION DATE	VALUE AT ASSUMED ANNUAL RATES OF STOCK PRICE APPRECIATION FOR OPTION TERM(2)	
					5%	10%
John R. Bertucci.....	--	--	--	--	--	--
Ronald C. Weigner.....	60,000	9.47%	\$6.67	7/9/08	\$251,684	\$637,816
Joseph A. Maher, Jr. ...	60,000	9.47	6.67	7/9/08	251,684	637,816
William D. Stewart.....	60,000	9.47	6.67	7/9/08	251,684	637,816
Leo Berlinghieri.....	60,000	9.47	6.67	7/9/08	251,684	637,816

(1) These options become exercisable 20% on the first anniversary of the date of grant and the remainder become exercisable on a quarterly basis over a four year period.

(2) Amounts represent hypothetical gains that could be achieved for the respective options if exercised at the end of the option term. These gains are based on assumed rates of stock price appreciation of 5% and 10% compounded annually from the date the respective options were granted to their expiration date. These numbers are calculated based on rules promulgated by the Securities and Exchange Commission and do not reflect MKS's estimate of future stock price growth. Actual gains, if any, on stock option exercises and common stock are dependent on the timing of such exercise and the future performance of the common stock.

OPTION EXERCISES AND HOLDINGS

The following table sets forth information concerning option exercises and option holdings for the fiscal year ended December 31, 1998 with respect to each of the Named Executive Officers.

AGGREGATED OPTION EXERCISES IN 1998
AND YEAR-END OPTION VALUES

NAME	NUMBER OF SHARES UNDERLYING UNEXERCISED OPTIONS AT YEAR-END		VALUE OF UNEXERCISED IN-THE-MONEY OPTIONS AT YEAR-END(1)	
	EXERCISABLE	UNEXERCISABLE	EXERCISABLE	UNEXERCISABLE
John R. Bertucci.....	--	--	--	--
Ronald C. Weigner.....	75,961	110,639		
Joseph A. Maher, Jr.	44,310	142,290		
William D. Stewart.....	75,961	110,639		
Leo Berlinghieri.....	75,961	110,639		

(1) Values are based on the difference between the fair market value of the underlying shares at December 31, 1998 (\$ per share) and the exercise price of each option listed (between \$4.43 and \$6.67 per share).

STOCK PLANS

1995 Stock Incentive Plan

MKS's Amended and Restated 1995 Stock Incentive Plan (the "1995 Stock Plan") provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, performance shares

and awards of restricted stock and unrestricted stock. An aggregate of 3,750,000 shares of common stock may be issued pursuant to the 1995 Stock Plan (subject to adjustment for certain changes in MKS's capitalization). No award may be made under the 1995 Stock Plan after November 30, 2005.

The 1995 Stock Plan is administered by the Board of Directors and the Compensation Committee. The Board of Directors has the authority to grant awards under the 1995 Stock Plan and to accelerate, waive or amend certain provisions of outstanding awards. The Board of Directors has authorized the Compensation Committee to administer certain aspects of the 1995 Stock Plan and has authorized the Chief Executive Officer of MKS to grant awards to non-executive officer employees. The maximum number of shares represented by such awards may not exceed 450,000 shares in the aggregate or 30,000 shares to any one employee.

Incentive Stock Options and Nonstatutory Options. Optionees receive the right to purchase a specified number of shares of common stock at some time in the future at an option price and subject to such terms and conditions as are specified at the time of the grant. Incentive stock options and options that the Board of Directors or Compensation Committee intends to qualify as performance-based compensation under Section 162(m) of the Internal Revenue Code may not be granted at an exercise price less than the fair market value of the common stock on the date of grant (or less than 110% of the fair market value in the case of incentive stock options granted to optionees holding 10% or more of the voting stock of MKS). All other options may be granted at an exercise price that may be less than, equal to or greater than the fair market value of the common stock on the date of grant.

Stock Appreciation Rights and Performance Shares. A stock appreciation right is based on the value of common stock and entitles the holder to receive consideration to the extent that the fair market value on the date of exercise of the shares of common stock underlying the right exceeds the fair market value of the underlying shares on the date the right was granted. A performance share award entitles the recipient to acquire shares of common stock upon the attainment of specified performance goals.

Restricted and Unrestricted Stock. Restricted stock awards entitle recipients to acquire shares of common stock, subject to the right of MKS to repurchase all or part of such shares at their purchase price from the recipient in the event that the conditions specified in the applicable stock award are not satisfied prior to the end of the applicable restriction period established for such award. MKS may also grant (or sell at a purchase price not less than 85% of the fair market value on the date of such sale) to participants shares of common stock free of any restrictions under the 1995 Stock Plan.

All of the employees, officers, directors, consultants and advisors of MKS and its subsidiaries who are expected to contribute to MKS's future growth and success are eligible to participate in the 1995 Stock Plan.

Section 162(m) of the Internal Revenue Code disallows a tax deduction to public companies for certain compensation in excess of \$1.0 million paid to a company's chief executive officer or to any of the four other most highly compensated executive officers. Certain compensation, including "performance-based compensation," is not included in compensation subject to the \$1.0 million limitation. The 1995 Stock Plan limits to 1,350,000 the maximum number of shares of common stock with respect to which awards may be granted to any employee in any calendar year. This limitation is intended to preserve the tax deductions to MKS that might otherwise be unavailable under Section 162(m) with respect to certain awards.

Prior to the date of this prospectus, MKS plans to grant options (to vest 20% after one year and 5% per quarter thereafter) to purchase approximately 350,000 shares of common stock to certain employees of MKS, at an exercise price equal to the initial public offering price.

1999 Employee Stock Purchase Plan

MKS's 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 450,000 shares of common stock to participating employees. MKS will make one or more offerings to employees to purchase common stock under the Purchase Plan. Offerings under the Purchase

Plan commence on June 1 and December 1 and terminate, respectively on November 30 and May 31. During each offering, the maximum number of shares which may be purchased by a participating employee is determined on the first day of this offering period under a formula whereby 85% of the market value of a share of common stock on the first day of this offering period is divided into an amount equal to 10% of the employee's annualized compensation (or such lower percentage as may be established by the Compensation Committee) for the immediately preceding six-month period. An employee may elect to have up to 10% deducted from his or her regular salary (or such lower percentage as may be established by the Compensation Committee) for this purpose. The price at which an employee's option is exercised is the lower of (i) 85% of the closing price of the common stock on the Nasdaq National Market on the day that this offering commences or (ii) 85% of the closing price on the day that this offering terminates.

The Purchase Plan is administered by the Board of Directors and the Compensation Committee. With certain exceptions, all eligible employees, including directors and officers, regularly employed by MKS for at least six months on the applicable offering commencement date are eligible to participate in the Purchase Plan. The Purchase Plan is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code.

1997 Director Stock Option Plan

MKS's 1997 Director Stock Option Plan (the "1997 Director Plan") authorizes the issuance of up to an aggregate of 300,000 shares of common stock. The 1997 Director Plan is administered by MKS's Board of Directors. Options are granted under the 1997 Director Plan only to directors of MKS who are not employees of MKS. Under the 1997 Director Plan, prior to the date of this prospectus each existing eligible director will receive an option to purchase 10,500 shares of common stock at an exercise price equal to the initial public offering price and future non-employee directors will receive an option to purchase 11,250 shares of common stock upon their initial election to the Board of Directors. Each initial option will vest over a three-year period in 12 equal quarterly installments following the date of grant. On the date of each annual meeting of the stockholders, options will be automatically granted to each eligible director who has been in office for at least six months prior to the date of the annual meeting of the stockholders. Each annual option will entitle the holder to purchase 6,000 shares of common stock. Each annual option will become exercisable on the day prior to the first annual meeting of stockholders following the date of grant (or if no such meeting is held within 13 months after the date of grant, on the 13-month anniversary of the date of grant). The exercise price of all options granted under the 1997 Director Plan is equal to the fair market value of the common stock on the date of grant. Options granted under the 1997 Director Plan terminate upon the earlier of three months after the optionee ceases to be a director of MKS or ten years after the grant date. In the event of a change in control of MKS, the vesting of all options then outstanding would be accelerated in full and any restrictions on exercising outstanding options would terminate.

The Company's 1996 Director Stock Option Plan, under which options have been granted to, and may still be exercised by, four non-employee directors of MKS, has been terminated. See "-- Director Compensation."

CERTAIN TRANSACTIONS

Mr. Chute, a director of MKS, MKS's clerk, and a co-trustee of certain of the Bertucci Family Trusts (see "Principal Stockholders") and Mr. Thomas H. Belknap, a co-trustee of certain of the Bertucci Family trusts, are attorneys at the law firm of Hill & Barlow, a professional corporation. Hill & Barlow has provided legal services to MKS during the calendar year ended December 31, 1998 for which it was compensated by MKS in the aggregate amount of \$183,000.

Mr. Stewart, Corporate Vice President and General Manager of Vacuum Products, is the general partner of Aspen Industrial Park Partnership ("Aspen"). On October 12, 1989, MKS entered into a lease with Aspen, which has been periodically extended, for certain facilities occupied by MKS's Vacuum Products group in Boulder, Colorado. MKS currently pays Aspen approximately \$350,000 annually to lease such facilities.

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As a result, MKS currently pays no federal, and certain state, income tax and all of the earnings of MKS are subject to federal, and certain state, income taxation directly at the stockholder level. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to corporate income taxation under Subchapter C of the Internal Revenue Code. In 1997 and 1998, MKS distributed \$12.4 million and \$6.2 million, respectively, of undistributed S corporation earnings to its stockholders. As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the accumulated adjustments account. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was approximately \$35.9 million and such balance is expected to increase in the period from January 1, 1999 through the closing of this offering. See "S Corporation And Termination of S Corporation Status."

PRINCIPAL STOCKHOLDERS

The following table sets forth certain information regarding beneficial ownership of MKS's common stock as of December 31, 1998, and as adjusted to reflect the sale of shares offered hereby, by (i) each of the directors of MKS, (ii) each of the Named Executive Officers, (iii) each person or entity known to MKS to own beneficially more than 5% of MKS's common stock and (iv) all directors and executive officers as a group. Except as indicated below, none of these entities has a relationship with MKS or, to the knowledge of MKS, any underwriters of this offering or their respective affiliates. Unless otherwise indicated, each person or entity named in the table has sole voting power and investment power (or shares such power with his or her spouse) with respect to all shares of capital stock listed as owned by such person or entity.

NAME OF BENEFICIAL OWNER -----	NUMBER SHARES BENEFICIALLY OWNED (1) -----	PERCENTAGE OF COMMON STOCK OUTSTANDING (1) (2) -----	
		BEFORE OFFERING -----	AFTER OFFERING -----
John R. Bertucci (3)	17,261,915	95.6%	%
Ronald C. Weigner (4)	82,291	*	
John J. Sullivan (5)	614,010	3.4	
Joseph A. Maher, Jr. (4)	44,310	*	
William D. Stewart (4)	82,291	*	
Leo Berlinghieri (4)	82,291	*	
Richard S. Chute (6)	2,766,852	15.3	
Owen W. Robbins (4)	8,027	*	
Robert J. Therrien (4)	8,027	*	
Louis P. Valente (4)	8,027	*	
Thomas H. Belknap (7)	2,331,902	12.9	
All executive officers and directors as a group	18,199,216	99.0%	%

* Less than 1% of outstanding common stock.

- (1) The number of shares beneficially owned by each stockholder is determined under rules promulgated by the Securities and Exchange Commission and the information is not necessarily indicative of beneficial ownership for any other purpose. Under such rules, beneficial ownership includes any shares as to which the individual has sole or shared voting power or investment power and also any shares which the individual has the right to acquire within 60 days of December 31, 1998 through the exercise of any stock option or other right. The inclusion herein of such shares, however, does not constitute an admission that the named stockholder is a direct or indirect beneficial owner of such shares.
- (2) Assumes no exercise of the underwriters' over-allotment option.
- (3) Includes 6,046,208 shares held directly by Mr. Bertucci, 6,124,980 shares held directly by Mr. Bertucci's wife, and 5,090,727 shares held by trusts (collectively, the "Bertucci Family Trusts") for which either Mr. or Mrs. Bertucci serves as a co-trustee.
- (4) Comprised solely of options exercisable within 60 days of December 31, 1998.
- (5) Includes 316,500 shares held in a grantor retained annuity trust.
- (6) Includes 2,758,825 shares held by certain of the Bertucci Family Trusts for which Mr. Chute serves as a co-trustee and 8,027 shares subject to options held by Mr. Chute exercisable within 60 days of December 31, 1998.
- (7) Represents shares held by certain of the Bertucci Family Trusts for which Mr. Belknap serves as a co-trustee.

DESCRIPTION OF CAPITAL STOCK

The authorized capital stock of MKS consists of 30,000,000 shares of common stock, no par value per share, and 2,000,000 shares of preferred stock, \$.01 par value per share, after giving effect to the amendment and restatement of MKS's Restated Articles of Organization which will be filed with the Secretary of State of The Commonwealth of Massachusetts prior to the closing of this offering.

COMMON STOCK

As of December 31, 1998, there were 18,053,167 shares of common stock outstanding and held of record by twenty-three stockholders, after giving effect to a 3-for-2 stock split to be effected prior to the effective date of this prospectus, of shares of Class A common stock and Class B common stock and the conversion of such shares into shares of common stock upon the closing of this offering.

Upon the closing of this offering, all holders of common stock shall be entitled to one vote for each share held on all matters submitted to a vote of stockholders and will not have cumulative voting rights. Accordingly, holders of a majority of the shares of common stock entitled to vote in any election of directors may elect all of the directors standing for election. Holders of common stock are entitled to receive ratably such dividends, if any, as may be declared by the Board of Directors out of funds legally available therefor, subject to any preferential dividend rights of any outstanding preferred stock. Upon the liquidation, dissolution or winding up of MKS, the holders of common stock are entitled to receive ratably the net assets of MKS available after the payment of all debts and other liabilities, subject to the prior rights of any outstanding preferred stock. Holders of the common stock have no preemptive, subscription, redemption or conversion rights. The outstanding shares of common stock are, and the shares offered by MKS in this offering made by this prospectus will be, when issued and paid for, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that MKS may designate and issue in the future. There are no shares of preferred stock outstanding.

PREFERRED STOCK

The Articles of Organization authorize the Board of Directors, subject to certain limitations prescribed by law, without further stockholder approval, from time to time to issue up to an aggregate of 2,000,000 shares of preferred stock in one or more series and to fix or alter the designations, preferences and rights, and any qualifications, limitations or restrictions thereof, of the shares of each such series, including the number of shares constituting any such series and the dividend rights, dividend rates, conversion rights, voting rights, terms of redemption (including sinking fund provisions), redemption price or prices and liquidation preferences thereof. The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of MKS. MKS has no present plans to issue any shares of preferred stock.

MASSACHUSETTS LAW AND CERTAIN PROVISIONS OF MKS'S RESTATED ARTICLES OF ORGANIZATION AND BY-LAWS

MKS intends to amend and restate its By-Laws prior to the closing of this offering. The By-Laws will include a provision excluding MKS from the applicability of Massachusetts General Laws Chapter 110D, entitled "Regulation of Control Share Acquisitions." In general, this statute provides that any stockholder of a corporation subject to this statute who acquires 20% or more of the outstanding voting stock of a corporation may not vote such stock unless the stockholders of the corporation so authorize. The Board of Directors will be able to amend the By-Laws at any time to subject MKS to this statute prospectively.

Massachusetts General Laws Chapter 156B, Section 50A generally requires that publicly-held Massachusetts corporations have a classified board of directors consisting of three classes as nearly equal in size as possible, unless the corporation elects to opt out of the statute's coverage. The By-Laws will contain provisions which give effect to Section 50A.

The By-Laws will require that nominations for the Board of Directors made by a stockholder of a planned nomination must be given not less than 30 and not more than 90 days prior to a scheduled meeting, provided that if less than 40 days' notice is given of the date of the meeting, a stockholder will have ten days within which to give such notice. The stockholder's notice of nomination must include particular information about the stockholder, the nominee and any beneficial owner on whose behalf the nomination is made. MKS may require any proposed nominee to provide such additional information as is reasonably required to determine the eligibility of the proposed nominee.

The By-Laws will also require that a stockholder seeking to have any business conducted at a meeting of stockholders give notice to MKS not less than 60 and not more than 90 days prior to the scheduled meeting, provided in certain circumstances that a ten-day notice rule applies. The notice from the stockholder will be required to describe the proposed business to be brought before the meeting and include information about the stockholder making the proposal, any beneficial owner on whose behalf the proposal is made, and any other stockholder known to be supporting the proposal. The By-Laws will require MKS to call a special stockholders meeting at the request of stockholders holding at least 40% of the voting power of MKS.

The Articles of Organization will provide that the directors and officers of MKS shall be indemnified by MKS to the fullest extent authorized by Massachusetts law, as it now exists or may in the future be amended, against all expenses and liabilities reasonably incurred in connection with service for or on behalf of MKS. In addition, the Articles of Organization will provide that the directors of MKS will not be personally liable for monetary damages to MKS for breaches of their fiduciary duty as directors, unless they violated their duty of loyalty to MKS or its stockholders, acted in bad faith, knowingly or intentionally violated the law (which could include securities laws), authorized illegal dividends or redemptions or derived an improper personal benefit from their action as directors.

The Articles of Organization will provide that any amendment to the Articles of Organization, the sale, lease or exchange of all or substantially all of MKS's property and assets, or the merger or consolidation of MKS into or with any corporation may be authorized by the approval of the holders of a majority of the shares of each class of stock entitled to vote thereon, rather than by two-thirds as otherwise provided by statute, provided that the transactions have been authorized by a majority of the members of the Board of Directors and the requirements of any other applicable provisions of the Articles of Organization have been met.

The Articles of Organization will contain a provision excluding MKS from the applicability of Massachusetts General Laws Chapter 110F, entitled "Business Combinations with Interested Shareholders." In general, Chapter 110F places limitations on a Massachusetts corporation's ability to engage in business combinations with certain stockholders for a period of three years, unless the corporation elects to opt out of the statute's coverage by including such a provision in its Articles of Organization.

TRANSFER AGENT AND REGISTRAR

The Transfer Agent and Registrar for the common stock is BankBoston, N.A.

SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for the securities of MKS. Upon completion of this offering, based upon the number of shares outstanding at December 31, 1998, there will be _____ shares of common stock of MKS outstanding (assuming no exercise of the underwriters' over-allotment option or options outstanding under MKS's stock option plans). Of these shares, the _____ shares sold in this offering will be freely tradable without restriction or further registration under the Securities Act, except that any shares purchased by "affiliates" of MKS, as that term is defined in Rule 144 under the Securities Act, may generally only be sold in compliance with the limitations of Rule 144 described below.

SALES OF RESTRICTED SHARES

The remaining _____ shares of common stock are deemed "restricted securities" under Rule 144 under the Securities Act. All of these shares are subject to 180-day lock-up agreements with the Representatives. Upon expiration of the lock-up agreements 180 days after the date of this prospectus, all such shares will be available for sale in the public market, subject to the provisions of Rule 144.

Stockholders who are parties to the lock-up agreement have agreed that for a period of 180 days after the date of this prospectus, they will not sell, offer, contract or grant any option to sell, pledge, transfer, establish an open put equivalent position or otherwise dispose of any shares of common stock, any options to purchase shares of common stock or any shares convertible into or exchangeable for shares of common stock, owned directly by such persons or with respect to which they have the power of disposition, without the prior written consent of NationsBanc Montgomery Securities LLC.

In general, Rule 144 as currently in effect, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, a stockholder, including an affiliate, who has beneficially owned his or her restricted securities for at least one year from the later of the date such securities were acquired from MKS or (if applicable) the date they were acquired from an affiliate is entitled to sell, within any three-month period, a number of such shares that does not exceed the greater of 1% of the then outstanding shares of common stock (_____ shares immediately after this offering) or the average weekly trading volume in the common stock during the four calendar weeks preceding the date on which notice of such sale was filed under Rule 144, provided certain requirements concerning availability of public information, manner of sale and notice of sale are satisfied. In addition, under Rule 144(k), if a period of at least two years has elapsed between the later of the date restricted securities were acquired from MKS or (if applicable) the date they were acquired from an affiliate of MKS, a stockholder who is not an affiliate of MKS at the time of sale and has not been an affiliate of MKS for at least three months prior to the sale is entitled to sell the shares immediately without compliance with the foregoing requirements under Rule 144.

Securities issued in reliance on Rule 701 (such as shares of common stock acquired pursuant to the exercise of certain options granted under MKS's stock plans) are also restricted and, beginning 90 days after the effective date of the registration statement of which this prospectus is a part, may be sold by stockholders other than affiliates of MKS subject only to the manner of sale provisions of Rule 144 and by affiliates under Rule 144 without compliance with its one-year holding period requirement.

OPTIONS

As of December 31, 1998 there were options outstanding to purchase an aggregate of 2,132,575 shares of MKS's common stock, of which options to purchase an aggregate of 804,701 shares were exercisable. Of these, _____ shares were subject to the lock-up agreements. MKS intends to file registration statements on Form S-8 under the Securities Act to register all shares of common stock issuable under each of the 1995 Stock Plan, Purchase Plan, the 1997 Director Plan and the 1996 Director Stock Option Plan promptly following the consummation of this offering. Shares issued pursuant to such plans shall be, after the effective date of the Form S-8 registration statements, eligible for resale in the public market without restriction, subject to Rule 144 limitations applicable to affiliates and the lock-up agreements noted above, if applicable.

UNDERWRITING

The underwriters named below, represented by NationsBanc Montgomery Securities LLC, Donaldson, Lufkin & Jenrette Securities Corporation and Lehman Brothers Inc. (the "Representatives"), have severally agreed, subject to the terms and conditions set forth in the underwriting agreement, to purchase from MKS the number of shares of common stock indicated below opposite their respective names at the initial public offering price less the underwriting discount set forth on the cover page of this prospectus. The underwriting agreement provides that the obligations of the underwriters are subject to certain terms and conditions precedent and that the underwriters are committed to purchase all of such shares, if any are purchased.

UNDERWRITER -----	NUMBER OF SHARES -----
NationsBanc Montgomery Securities LLC.....	
Donaldson, Lufkin & Jenrette Securities Corporation.....	
Lehman Brothers Inc.	

Total.....	=====

The Representatives have advised MKS that the underwriters initially propose to offer the common stock to the public on the terms set forth on the cover page of this prospectus. The underwriters may allow to selected dealers a concession of not more than \$ per share, and the underwriters may allow, and any other dealers may reallow, a concession of not more than \$ per share to certain other dealers. After the initial public offering, this offering price and other selling terms may be changed by the Representatives. The common stock is offered subject to receipt and acceptance by the underwriters and to certain other conditions, including the right to reject orders in whole or in part.

MKS has granted an option to the underwriters, exercisable during the 30-day period after the date of this prospectus, to purchase up to a maximum of additional shares of common stock to cover over-allotments, if any, at the same price per share as the initial shares to be purchased by the underwriters. To the extent the underwriters exercise this option, each of the underwriters will be committed, subject to certain conditions, to purchase such additional shares in approximately the same proportion as set forth in the above table. The underwriters may purchase such shares only to cover over-allotments made in connection with this offering.

All stockholders prior to this offering, as well as certain holders of options to purchase common stock, have entered into lock-up agreements whereby they have agreed not to directly or indirectly sell, offer, contract or grant any option to sell, pledge, transfer, establish an open put equivalent position or otherwise dispose of any rights with respect to any shares of common stock, any options or warrants to purchase common stock, or any securities convertible or exchangeable for common stock, owned directly by such holders or with respect to which they have the power of disposition for a period of 180 days after the period of this prospectus without the prior written consent of NationsBanc Montgomery Securities LLC which may, in its sole discretion and at any time without notice, release all or any portion of the securities subject to these lock-up agreements. In addition, MKS has agreed not to sell, offer to sell, contract to sell or otherwise sell or dispose of any shares of common stock or any rights to acquire common stock, other than pursuant to its stock plans or upon the exercise of outstanding options, for a period of 180 days after the date of this prospectus without the prior consent of NationsBanc Montgomery Securities LLC.

The underwriting agreement provides that MKS will indemnify the underwriters against certain liabilities, including civil liabilities, under the Securities Act, or will contribute to payments the underwriters may be required to make in respect thereof.

In connection with this offering, the underwriters may engage in transactions that stabilize, maintain or otherwise affect the price of the common stock, including over-allotment, stabilization, syndicate covering transactions and imposition of penalty bids. In an over-allotment, the underwriters would allot more shares of common stock to their customers in the aggregate than are available for purchase by the

underwriters under the underwriting agreement. Stabilizing means the placing of any bid, or the effecting of any purchase, for the purpose of pegging, fixing or maintaining the price of a security. In a syndicate covering transaction, the underwriters would place a bid or effect a purchase to reduce a short position created in connection with this offering. Pursuant to a penalty bid, NationsBanc Montgomery Securities LLC on behalf of the underwriters, would be able to reclaim a selling concession from an underwriter if shares of common stock originally sold by such underwriter are purchased in syndicate covering transactions. These transactions may result in the price of the common stock being higher than the price that might otherwise prevail in the open market. These transactions may be effected on the Nasdaq National Market, in the over-the-counter market or otherwise, and, if commenced, may be discontinued at any time.

The Representatives have informed MKS that they do not expect to make sales to accounts over which they exercise discretionary authority in excess of 5% of the number of shares of common stock offered hereby.

Prior to this offering, there has been no public market for the common stock of MKS. Consequently, the initial public offering price will be determined through negotiations among MKS and the Representatives. Among the factors to be considered in such negotiations are the history of, and prospects for, MKS and the industry in which it competes, an assessment of MKS's management, the present state of MKS's development, the prospects for future earnings of MKS, the prevailing market conditions at the time of this offering, market valuations of publicly traded companies that MKS and the Representatives believe to be comparable to MKS, and other factors deemed relevant.

LEGAL MATTERS

The validity of the common stock offered hereby will be passed upon for MKS by Hale and Dorr LLP, Boston, Massachusetts. Certain legal matters in connection with this offering will be passed upon for the underwriters by Ropes & Gray, Boston, Massachusetts.

EXPERTS

The consolidated balance sheets of MKS Instruments, Inc. at December 31, 1997 and 1998 and the consolidated statements of income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 1998 included in this prospectus have been included herein in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, given upon the authority of that firm as experts in accounting and auditing.

ADDITIONAL INFORMATION

MKS has filed with the Securities and Exchange Commission, a registration statement on Form S-1 under the Securities Act with respect to the common stock offered hereby. This prospectus, which constitutes part of the registration statement, does not contain all of the information set forth in the registration statement, certain parts of which are omitted in accordance with the rules and regulations of the Securities and Exchange Commission. For further information with respect to MKS and the common stock offered hereby, reference is made to the registration statement. Statements contained in this prospectus as to the contents of any contract or other document filed as an exhibit to the registration statement are not necessarily complete, and in each instance reference is made to the copy of such document filed as an exhibit to the registration statement, each such statement being qualified in all respects by such reference. The registration statement (and all amendments, exhibits and schedules thereto) may be inspected without charge at the principal office of the Securities and Exchange Commission in Washington, D.C. and copies of all or any part of which may be inspected and copied at the public reference facilities maintained by the Securities and Exchange Commission at 450 Fifth Street, N.W., Judiciary Plaza, Room 1024, Washington, D.C. 20549, and at the Securities and Exchange Commission's regional offices located at Citicorp Center, 500 West Madison Street, Suite 1400, Chicago, Illinois 60661-2511 and 7 World Trade Center, Suite 1300, New York, New York 10048. Copies of such material can also be obtained at prescribed rates by mail from the Public Reference Section of the Securities and Exchange Commission at 450 Fifth Street, N.W., Washington, D.C. 20549. In addition, the Securities and Exchange Commission maintains a website (<http://www.sec.gov>) that contains reports, proxy and information statements and other information regarding registrants that file electronically with the Securities and Exchange Commission.

MKS intends to distribute to its stockholders annual reports containing audited consolidated financial statements.

MKS INSTRUMENTS, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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This is the form of the report that we expect to issue upon the filing of an amendment to the Company's Articles of Organization effecting the 3-for-2 stock split of the Company's outstanding common stock, increase in the number of authorized shares of common stock and the authorization of preferred stock, as discussed in Note 8 of Notes to Consolidated Financial Statements.

PRICEWATERHOUSECOOPERS LLP

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Directors and Stockholders of
MKS Instruments, Inc.:

In our opinion, the accompanying consolidated balance sheets and related consolidated statements of income, stockholders' equity and cash flows present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 1997 and 1998 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 1998, in conformity with generally accepted accounting principles. These financial statements are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with generally accepted auditing standards which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed above.

Boston, Massachusetts
January 22, 1999, except for
Note 13 as to which the date
is January 28, 1999

MKS INSTRUMENTS, INC.

CONSOLIDATED BALANCE SHEETS
(IN THOUSANDS, EXCEPT SHARE DATA)

	DECEMBER 31, 1997	DECEMBER 31, 1998	
		ACTUAL	PRO FORMA
			(NOTE 2) (UNAUDITED)
ASSETS			
Current assets:			
Cash and cash equivalents.....	\$ 2,511	\$11,188	\$11,188
Marketable equity securities.....	614	538	538
Trade accounts receivable, net of allowance for doubtful accounts of \$610 and \$656 at December 31, 1997 and 1998, respectively.....	32,439	20,674	20,674
Inventories.....	29,963	24,464	24,464
Deferred tax asset.....	682	698	698
Other current assets.....	1,670	971	971
	-----	-----	-----
Total current assets.....	67,879	58,533	58,533
Property, plant and equipment, net.....	33,976	32,725	32,725
Other assets.....	4,681	4,974	4,974
	-----	-----	-----
Total assets.....	\$106,536	\$96,232	\$96,232
	=====	=====	=====
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Short-term borrowings.....	\$ 10,721	\$ 9,687	\$ 9,687
Current portion of long-term debt.....	2,070	2,058	2,058
Current portion of capital lease obligations.....	1,061	1,074	1,074
Accounts payable.....	7,433	3,677	3,677
Accrued compensation.....	7,501	3,985	3,985
Other accrued expenses.....	6,883	5,280	5,280
Income taxes payable.....	1,889	1,279	1,279
Distribution payable.....	--	--	35,926
	-----	-----	-----
Total current liabilities.....	37,558	27,040	62,966
Long-term debt.....	13,748	12,042	12,042
Long-term portion of capital lease obligations.....	1,876	1,744	1,744
Deferred tax liability.....	133	117	117
Other liabilities.....	373	463	463
Commitments and contingencies (Note 7)			
Stockholders' equity:			
Preferred Stock, \$0.01 par value; 2,000,000 shares authorized, no shares issued or outstanding.....	--	--	--
Common Stock, Class A, no par value; 11,250,000 shares authorized, 7,766,910 issued and outstanding.....	40	40	40
Common Stock, Class B (non voting) no par value; 18,750,000 shares authorized; 10,286,255 and 10,286,257 shares issued and outstanding at December 31, 1997 and 1998, respectively.....	73	73	73
Additional paid-in capital.....	48	48	48
Retained earnings.....	51,443	52,479	16,553
Accumulated other comprehensive income.....	1,244	2,186	2,186
	-----	-----	-----
Total stockholders' equity.....	52,848	54,826	18,900
	-----	-----	-----
Total liabilities and stockholders' equity.....	\$106,536	\$96,232	\$96,232
	=====	=====	=====

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF INCOME
(IN THOUSANDS, EXCEPT PER SHARE DATA)

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
Net sales.....	\$170,862	\$188,080	\$139,763
Cost of sales.....	102,008	107,606	83,784
Gross profit.....	68,854	80,474	55,979
Research and development.....	14,195	14,673	12,137
Selling, general and administrative.....	37,191	41,838	34,707
Restructuring.....	1,400	--	--
Income from operations.....	16,068	23,963	9,135
Interest expense.....	2,378	2,132	1,483
Interest income.....	92	271	296
Other income (expense), net.....	(479)	166	187
Income before income taxes.....	13,303	22,268	8,135
Provision for income taxes.....	800	1,978	949
Net income.....	\$ 12,503	\$ 20,290	\$ 7,186
Pro forma data (unaudited):			
Historical income before income taxes.....			\$ 8,135
Pro forma provision for income taxes.....			3,091
Pro forma net income.....			5,044
Pro forma net income per share:			
Basic.....			\$ 0.25
Diluted.....			\$ 0.24
Pro forma weighted average common shares outstanding:			
Basic.....			20,166
Diluted.....			20,651

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 1996, 1997 AND 1998
(IN THOUSANDS, EXCEPT SHARE DATA)

	COMMON STOCK						ADDITIONAL PAID-IN CAPITAL	RETAINED EARNINGS
	PREFERRED STOCK		CLASS A		CLASS B			
	SHARES	AMOUNT	SHARES	AMOUNT	SHARES	AMOUNT		
Balance at December 31, 1995.....			7,766,910	\$40	10,286,255	\$73	\$48	\$45,550
Distributions to stockholders.....								(14,500)
Comprehensive income:								
Net income.....								12,503
Other comprehensive income:								
Foreign currency translation adjustment.....								
Unrealized loss on investments.....								
Comprehensive income.....								
Balance at December 31, 1996.....			7,766,910	40	10,286,255	73	48	43,553
Distributions to stockholders.....								(12,400)
Comprehensive income:								
Net income.....								20,290
Other comprehensive income:								
Foreign currency translation adjustment.....								
Unrealized gain on investments.....								
Comprehensive income.....								
Balance at December 31, 1997.....			7,766,910	40	10,286,255	73	48	51,443
Distributions to stockholders.....								(6,150)
Issuance of common stock.....					2			
Comprehensive income:								
Net income.....								7,186
Other comprehensive income:								
Foreign currency translation adjustment.....								
Unrealized loss on investments.....								
Comprehensive income.....								
Balance at December 31, 1998.....			7,766,910	\$40	10,286,257	\$73	\$48	\$52,479

	ACCUMULATED OTHER COMPREHENSIVE INCOME	COMPREHENSIVE INCOME	TOTAL STOCKHOLDERS' EQUITY
Balance at December 31, 1995.....	\$2,681		\$ 48,392
Distributions to stockholders.....			(14,500)
Comprehensive income:			
Net income.....		\$12,503	12,503
Other comprehensive income:			
Foreign currency translation adjustment.....	(766)	(766)	(766)
Unrealized loss on investments.....	(131)	(131)	(131)
Comprehensive income.....		\$11,606	
Balance at December 31, 1996.....	1,784		45,498
Distributions to stockholders.....			(12,400)
Comprehensive income:			
Net income.....		20,290	20,290
Other comprehensive income:			
Foreign currency translation adjustment.....	(786)	(786)	(786)
Unrealized gain on investments.....	246	246	246
Comprehensive income.....		\$19,750	
Balance at December 31, 1997.....	1,244		52,848
Distributions to stockholders.....			(6,150)
Issuance of common stock.....			
Comprehensive income:			
Net income.....		7,186	7,186
Other comprehensive income:			
Foreign currency translation adjustment.....	992	992	992
Unrealized loss on investments.....	(50)	(50)	(50)
Comprehensive income.....		\$ 8,128	
Balance at December 31, 1998.....	\$2,186		\$ 54,826

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The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(IN THOUSANDS)

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
Cash flows from operating activities:			
Net income.....	\$ 12,503	\$ 20,290	\$ 7,186
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant, and equipment.....	5,920	5,712	6,242
Loss on disposal of property, plant and equipment....	--	552	48
Deferred taxes.....	(277)	(145)	(32)
Provision for doubtful accounts.....	(20)	258	253
Forward exchange contract loss (gain) realized.....	302	132	(1,211)
Stock option compensation.....	--	95	--
Changes in operating assets and liabilities:			
(Increase) decrease in trade accounts receivable.....	6,119	(12,509)	12,908
(Increase) decrease in inventories.....	4,145	(5,930)	6,479
(Increase) decrease in other current assets.....	3,239	(1,261)	554
Increase (decrease) in accrued compensation.....	(220)	2,386	(3,516)
Increase (decrease) in other accrued expenses.....	(1,520)	3,312	(1,602)
Increase (decrease) in accounts payable.....	(4,221)	2,638	(3,682)
Increase (decrease) in income taxes payable.....	331	1,283	(647)
Net cash provided by operating activities.....	26,301	16,813	22,980
Cash flows from investing activities:			
Purchases of property, plant and equipment.....	(9,417)	(3,269)	(3,137)
Proceeds from sale of property, plant and equipment.....	--	203	60
Increase in other assets.....	(443)	(123)	(270)
Cash received (used) to settle forward exchange contracts.....	(302)	(132)	1,211
Net cash used in investing activities.....	(10,162)	(3,321)	(2,136)
Cash flows from financing activities:			
Net (payments) borrowings on demand notes payable....	224	(1,875)	--
Proceeds from short-term borrowings.....	11,025	24,110	15,242
Payments on short-term borrowings.....	(9,628)	(22,938)	(17,569)
Proceeds from long-term debt.....	400	--	--
Principal payments on long-term debt.....	(2,093)	(2,217)	(2,057)
Cash distributions to stockholders.....	(14,500)	(12,400)	(6,150)
Principal payments under capital lease obligations...	(982)	(870)	(1,257)
Net cash used in financing activities.....	(15,554)	(16,190)	(11,791)
Effect of exchange rate changes on cash and cash equivalents.....	(420)	1,394	(376)
Increase (decrease) in cash and cash equivalents.....	165	(1,304)	8,677
Cash and cash equivalents at beginning of period.....	3,650	3,815	2,511
Cash and cash equivalents at end of period.....	\$ 3,815	\$ 2,511	\$ 11,188
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest.....	\$ 2,363	\$ 2,030	\$ 1,526
Income taxes.....	\$ 770	\$ 1,078	\$ 1,608
Noncash transactions during the period:			
Equipment acquired under capital leases.....	\$ 2,074	\$ 145	\$ 1,138

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

1. DESCRIPTION OF BUSINESS:

MKS Instruments, Inc. (the "Company") is a worldwide developer, manufacturer, and supplier of instruments and components that are used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. The Company's products include pressure and flow measurement and control instruments; vacuum gauges, valves and components; and gas analysis instruments. The Company is subject to risks common to companies in the semiconductor industry including, but not limited to, the highly cyclical nature of the semiconductor industry leading to recurring periods of over supply, development by the Company or its competitors of new technological innovations, dependence on key personnel and the protection of proprietary technology.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

BASIS OF PRESENTATION

The consolidated financial statements include the accounts of the Company and its subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation. The Company has reflected the approximately 77.5% owned foreign subsidiaries as wholly-owned subsidiaries pursuant to common control accounting. Upon the closing of this offering for which these financial statements are being prepared, the shares of the foreign subsidiaries owned directly by the ultimate stockholders will be contributed to the Company.

PRO FORMA BALANCE SHEET PRESENTATION (UNAUDITED)

The Company intends to distribute the balance of its accumulated and undistributed S corporation earnings from the proceeds of this offering for which this registration statement is being prepared. The unaudited pro forma balance sheet has been prepared assuming an estimated \$35,926,000 distribution was payable as of December 31, 1998. The remaining balance in retained earnings represents accumulated earnings prior to the Company converting from a C corporation to an S corporation in 1987, accumulated income in overseas subsidiaries and differences between book and tax accumulated income.

PRO FORMA NET INCOME PER SHARE (UNAUDITED)

Pro forma net income per share is based upon the weighted average number of common and common equivalent shares (using the treasury stock method) outstanding. Common equivalent shares are included in the per share calculations where the effect of their inclusion would be dilutive.

Historical net income has been adjusted for the pro forma provision for income taxes calculated assuming the Company was subject to income taxation as a C corporation, at a pro forma tax rate of 38.0%. In accordance with a regulation of the Securities and Exchange Commission, pro forma net income per share has been presented for the year ended December 31, 1998 to reflect the effect as of January 1, 1998 of the assumed issuance of that number of shares of common stock of the Company necessary to be sold at the mid-point of the estimated initial public offering price in order to fund the intended distribution in the amount of the accumulated and undistributed S corporation earnings.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

Historical net income per share is not presented as it is not meaningful based upon the Company's planned conversion from an S corporation to a C corporation upon the closing of this offering for which these financial statements are being prepared.

The following is a reconciliation of basic to diluted pro forma net income per share:

	FOR THE YEAR ENDED DECEMBER 31, 1998

Pro forma net income.....	\$ 5,044
	=====
Shares used in pro forma net income per common share -- basic.....	20,166
Effect of dilutive securities:	
Employee and director stock options.....	485

Shares used in pro forma net income per common share -- diluted.....	20,651
	=====
Pro forma net income per common share -- basic.....	\$ 0.25
	=====
Pro forma net income per common share -- diluted.....	\$ 0.24
	=====

FOREIGN EXCHANGE

The functional currency of the Company's foreign subsidiaries is the applicable local currency. For those subsidiaries, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Income and expense accounts are translated at the average exchange rates prevailing for the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders' equity.

REVENUE RECOGNITION

The Company recognizes revenue upon shipment. The Company accrues for anticipated returns and warranty costs upon shipment.

CASH AND CASH EQUIVALENTS

All highly liquid investments with an original maturity of three months or less at the date of purchase are considered to be cash equivalents. Cash equivalents consist of money market instruments.

INVESTMENTS

The appropriate classification of investments in debt and equity securities is determined at the time of purchase. Debt securities that the Company has both the intent and ability to hold to maturity are carried at amortized cost. Debt securities that the Company does not have the intent and ability to hold to maturity or equity securities are classified either as "available-for-sale" or as "trading" and are carried at fair value. Marketable equity securities are carried at fair value and classified either as available-for-sale or trading. Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity. Unrealized gains and losses on securities classified as trading are reported in earnings.

INVENTORIES

Inventories are stated at the lower of cost or market. Cost is determined on the first-in, first-out method.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are stated at cost. Equipment acquired under capital leases is recorded at the present value of the minimum lease payments required during the lease period. Expenditures for major renewals and betterments that extend the useful lives of property, plant and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is recognized in earnings.

Depreciation is provided on the straight-line method over the estimated useful lives of 20 years for buildings and three to five years for machinery and equipment. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the lease.

RESEARCH AND DEVELOPMENT

Research and development costs are expensed as incurred.

NEW ACCOUNTING PRONOUNCEMENTS

In March 1998, the American Institute of Certified Public Accountants issued Statement of Position (SOP) 98-1, "Accounting for the Costs of Software Developed or Obtained for Internal Use" which provides guidance on the accounting for the costs of software developed or obtained for internal use. SOP 98-1 is effective for fiscal years beginning after December 15, 1998. The Company does not expect the SOP 98-1 to have a material impact on its financial position or results of operations.

In June 1998, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards (SFAS) No. 133, "Accounting for Derivative Instruments and Hedging Activities." SFAS No. 133 requires that all derivative instruments be recorded on the balance sheet at their fair value. Changes in the fair value of derivatives are recorded each period in current earnings or other comprehensive income, depending on whether a derivative is designated as part of a hedge transaction and, if it is, the type of hedge transaction. The statement is effective for all fiscal quarters of all fiscal years beginning after June 15, 1999. The Company has not yet determined the impact that the adoption SFAS No. 133 will have on its financial position or results of operations.

USE OF ESTIMATES

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates.

RECLASSIFICATION OF PRIOR YEAR BALANCES

Certain reclassifications have been made to prior years' consolidated financial statements to conform to the current presentation.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

3. FINANCIAL INSTRUMENTS AND RISK MANAGEMENT:

FOREIGN EXCHANGE RISK MANAGEMENT

The Company uses forward exchange contracts and local currency purchased options in an effort to reduce its exposure to currency fluctuations on future U.S. dollar cash flows derived from foreign currency denominated sales associated with the intercompany purchases of inventory. The Company has entered into forward exchange contracts, and to a lesser extent, local currency purchased options to hedge a portion of its probable anticipated, but not firmly committed transactions. The Company has also used forward exchange contracts to hedge firm commitments. Market value gains and losses on forward exchange contracts are recognized immediately in earnings unless a firm commitment exists. Market value gains and premiums on local currency purchased options on probable anticipated transactions and market value gains and losses on forward exchange contracts hedging firm commitments are recognized when the hedged transaction occurs. These contracts, which relate primarily to Japanese and European currencies generally have terms of eighteen months or less. The Company does not hold or issue derivative financial instruments for trading purposes.

Realized and unrealized gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are recognized in earnings in the same period as the underlying hedged item. Realized and unrealized gains and losses on forward exchange contracts and local currency purchased option contracts that do not qualify for hedge accounting are recognized immediately in earnings. Forward exchange contracts receive hedge accounting on firmly committed transactions when they are designated as a hedge of the designated currency exposure and are highly effective in minimizing such exposure. Options receive hedge accounting on probable anticipated transactions when they are designated as a hedge of the currency exposure and are highly effective in minimizing such exposure. The cash flows resulting from forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in the statement of cash flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts and local currency purchased options that do not qualify for hedge accounting are classified in the statement of cash flows as investing activities.

Forward exchange contracts with notional amounts totaling none, \$9,800,000, and \$8,000,000 to exchange foreign currencies for U.S. dollars, were outstanding at December 31, 1996, 1997, and 1998, respectively. The forward exchange contracts with notional amounts outstanding at December 31, 1998 totaling \$8,000,000 do not qualify for hedge accounting and accordingly are marked to market and recognized immediately in earnings. Local currency purchased options with notional amounts totaling \$3,722,000, \$12,738,000, and \$10,221,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 1996, 1997, and 1998, respectively.

Foreign exchange losses of \$479,000, foreign exchange gains of \$1,166,000 and foreign exchange losses of \$168,000 on forward exchange contracts that did not qualify for hedge accounting were recognized in earnings during 1996, 1997 and 1998, respectively, and are classified in Other income (expense), net. Gains on forward exchange contracts that qualify for hedge accounting of \$978,000 were deferred and classified in other accrued expenses at December 31, 1996. Gains on local currency purchased options deferred at December 31, 1996 that qualify for hedge accounting of \$200,000 were deferred in other accrued expenses. Gains on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled \$2,476,000, \$1,178,000, and \$310,000 for the years ended December 31, 1996, 1997, and 1998, respectively.

The fair value of forward exchange contracts at December 31, 1998, determined by applying period end currency exchange rates to the notional contract amounts, amounted to a loss of \$349,000. The fair

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

values of local currency purchased options at December 31, 1997 and 1998 which were obtained through dealer quotes were immaterial.

The Company recorded a foreign exchange translation loss on intercompany payables of \$1,000,000 and a foreign exchange translation gain on intercompany payables of \$1,000,000 in Other income (expense), net in 1997 and 1998, respectively. Foreign exchange translation gains and losses from unhedged intercompany balances were not material in 1996.

The market risk exposure from forward exchange contracts is assessed in light of the underlying currency exposures and is controlled by the initiation of additional or offsetting foreign currency contracts. The market risk exposure from options is limited to the cost of such investments. Credit risk exposure from forward exchange contracts and local currency purchased options are minimized as these instruments are contracted with a major financial institution. The Company monitors the credit worthiness of this financial institution and full performance is anticipated.

INTEREST RATE RISK MANAGEMENT

The Company utilizes an interest rate swap to fix the interest rate on certain variable rate term loans in order to minimize the effect of changes in interest rates on earnings. In 1998, the Company entered into a four-year interest rate swap agreement with a major financial institution for the notional amount of \$10,528,000 equal to the term loans described in Note 6. Under the agreement, the Company pays a fixed rate of 5.85% on the notional amount and receives the London Interbank Offering Rate ("LIBOR"). The interest differential paid or received on the swap agreement is recognized as an adjustment to interest expense. At December 31, 1998, the fair value of this interest rate swap, which represents the amount the Company would receive or pay to terminate the agreement, is a net payable of \$151,000, based on dealer quotes.

The market risk exposure from the interest rate swap is assessed in light of the underlying interest rate exposures. Credit risk exposure from the swap is minimized as the agreement is with a major financial institution. The Company monitors the credit worthiness of this financial institution and full performance is anticipated.

CONCENTRATIONS OF CREDIT RISK

The Company's significant concentrations of credit risk consist principally of cash and cash equivalents and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including the bank it has borrowings with. Concentrations of credit risk with respect to trade accounts receivable are limited due to the large number of geographically dispersed customers. Credit is extended for all customers based on financial condition and collateral is not required.

FAIR VALUE OF FINANCIAL INSTRUMENTS

The fair value of the term loans, including the current portion, approximates its carrying value given its variable rate interest provisions. The fair value of mortgage notes is based on borrowing rates for similar instruments and approximates its carrying value. For all other balance sheet financial instruments, the carrying amount approximates fair value because of the short period to maturity of these instruments.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

4. INVENTORIES:

Inventories consist of the following:

	DECEMBER 31,	
	1997	1998
Raw material.....	\$ 9,981	\$ 7,544
Work in process.....	7,241	5,718
Finished goods.....	12,741	11,202
	-----	-----
	\$29,963	\$24,464
	=====	=====

5. PROPERTY, PLANT AND EQUIPMENT:

Property, plant and equipment consist of the following:

	DECEMBER 31,	
	1997	1998
Land.....	\$ 8,350	\$ 8,834
Buildings.....	26,241	26,020
Machinery and equipment.....	24,861	27,394
Furniture and fixtures.....	9,697	10,578
Leasehold improvements.....	882	1,814
	-----	-----
	70,031	74,640
Less: accumulated depreciation and amortization.....	36,055	41,915
	-----	-----
	\$33,976	\$32,725
	=====	=====

6. DEBT:

CREDIT AGREEMENTS AND SHORT-TERM BORROWINGS

In February 1996, the Company entered into loan agreements with two banks, which provide access to a revolving credit facility. These agreements have since been amended. The revolving credit facility, as amended, provides for uncollateralized borrowings up to \$30,000,000, which expires on December 31, 1999. Interest on borrowings is payable quarterly at either the banks' base rate or the LIBOR Rate, as defined in the agreement, at the Company's option. At December 31, 1997 and 1998, the Company had no borrowings under this revolving credit facility.

Additionally, certain of the Company's foreign subsidiaries have lines of credit and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 1998 of up to \$15,003,000, which generally expire and are renewed at six month intervals. At December 31, 1997 and 1998, total borrowings outstanding under these arrangements were \$10,721,000, and \$9,687,000, respectively, at interest rates ranging from 1.3% to 1.6%, and 1.3% to 1.7%, respectively. Foreign short-term borrowings are generally collateralized by certain trade accounts receivable and are guaranteed by a domestic bank.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

LONG-TERM DEBT

Long-term debt consists of the following:

	DECEMBER 31,	
	1997	1998
Term loans.....	\$12,194	\$10,528
Mortgage notes.....	3,624	3,572
Total long-term debt.....	15,818	14,100
Less: current portion.....	2,070	2,058
Long-term debt less current portion.....	\$13,748	\$12,042

On November 1, 1993, the Company entered into a term loan agreement with a bank, which provided for borrowings of \$10,000,000. Principal payments are payable in equal monthly installments of \$56,000 through October 1, 2000, with the remaining principal payment due on November 1, 2000. The loan is collateralized by certain land, buildings, and equipment. Interest is payable monthly at either the bank's base rate, at a rate based on the long-term funds rate, or at the LIBOR Rate, as defined in the agreement, at the Company's option.

On October 31, 1995, the Company also entered into a term loan agreement with the same bank, which provided additional uncollateralized borrowings of \$7,000,000. Principal payments are payable in equal monthly installments of \$83,000 through June 1, 2002, with the remaining principal payment due on June 30, 2002. Interest is payable monthly at either the bank's base rate or at the LIBOR Rate, as defined in the agreement, at the Company's option.

At December 31, 1997 and 1998, the interest rates in effect for the term loan borrowings were 6.975% and 7.131%, respectively.

The terms of the revolving credit facility and term loan agreements, as amended, contain, among other provisions, requirements for maintaining certain levels of tangible net worth and other financial ratios. The agreement also contains restrictions with respect to acquisitions. Under the most restrictive covenant, the operating cash flow to debt service ratio for a fiscal quarter shall not be less than 1.25 to 1.0. In the event of default of these covenants or restrictions, any obligation then outstanding under the loan agreement shall become payable upon demand by the bank. See Note 13 for subsequent event.

The Company has loans outstanding from various foreign banks in the form of mortgage notes at interest rates ranging from 2.0% to 6.2%. Principal and interest are payable in monthly installments through 2010. The loans are collateralized by mortgages on certain of the Company's foreign properties.

Aggregate maturities of long-term debt over the next five years are as follows:

YEAR ENDING DECEMBER 31,	AGGREGATE MATURITIES
1999.....	\$ 2,058
2000.....	7,343
2001.....	1,405
2002.....	1,329
2003.....	422
Thereafter.....	1,543

	\$14,100
	=====

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

7. LEASE COMMITMENTS:

The Company leases certain of its facilities and machinery and equipment under capital and operating leases expiring in various years through 2002 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled \$2,487,000, \$2,478,000, and \$2,388,000 for the years ended December 31, 1996, 1997, and 1998, respectively.

Minimum lease payments under operating and capital leases are as follows:

YEAR ENDING DECEMBER 31, -----	OPERATING LEASES		CAPITAL LEASES
	REAL ESTATE	EQUIPMENT	EQUIPMENT
-----	-----	-----	-----
1999.....	\$1,484	\$437	\$1,202
2000.....	882	251	974
2001.....	660	130	537
2002.....	153	36	333
2003.....	84	13	116
Thereafter.....	51	42	--
	-----	-----	-----
Total minimum lease payments.....	\$3,314	\$909	\$3,162
	=====	=====	=====
Less: amounts representing interest.....			344

Present value of minimum lease payments.....			2,818
Less: current portion.....			1,074

Long-term portion.....			\$1,744
			=====

8. STOCKHOLDERS' EQUITY:

COMMON STOCK

Prior to the effectiveness of a registration statement relating to the initial public offering of common stock of the Company, the Company will effect a 3-for-2 stock split, to be effected in the form of a stock dividend of its common stock, increase the number of authorized shares of common stock to 30,000,000 and authorize 2,000,000 shares of \$0.01 par value preferred stock. Accordingly, all share data has been restated to reflect the common stock split.

The Company has two classes of common stock. Stockholders of Class A common stock are entitled to voting rights with one vote for each share of common stock. Stockholders of Class B common stock are not entitled to voting rights.

Upon the closing of this offering for which this Registration Statement is being prepared each outstanding share of Class A and Class B common stock of the Company will be converted into an aggregate of 18,053,167 shares of common stock.

STOCK OPTION PLANS

On January 9, 1998, the stockholders of the Company approved the following: (i) an increase in the number of shares that may be granted under the 1995 Stock Incentive Plan to 3,750,000 shares of common stock; (ii) the adoption of the 1997 Director Stock Option Plan pursuant to which options may be granted to purchase up to an aggregate of 300,000 shares of common stock; (iii) the adoption of the 1997 Employee Stock Purchase Plan pursuant to which the Company may issue up to an aggregate of 450,000 shares of common stock; and (iv) that 3,750,000 shares, 300,000 shares, and 450,000 shares of

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

common stock be reserved for issuance under the 1995 Stock Incentive Plan, the 1997 Director Stock Option Plan, and the 1997 Employee Stock Purchase Plan, respectively.

The Company grants options to employees under the 1995 Stock Incentive Plan (the "Plan") and to directors under the 1996 Director Stock Option Plan (the "Director Plan").

At December 31, 1998 options to purchase 1,651,793 shares of the Company's common stock were reserved for issuance under the Plan. At December 31, 1998, under the Director Plan, options to purchase 28,932 shares of common stock were reserved for issuance. Stock options are granted at 100% of the fair value of the Company's common stock as determined by the Board of Directors on the date of grant. In reaching the determination of fair value at the time of each grant, the Board of Directors considered a range of factors, including the Company's current financial position, its recent revenues, results of operations and cash flows, its assessment of the Company's competitive position in its markets and prospects for the future, the status of the Company's product development and marketing efforts, current valuations for comparable companies and the illiquidity of an investment in the Company's common stock. Generally, stock options under the Plan vest 20% after one year and 5% per quarter thereafter, and expire 10 years after the grant date. Under the Director Plan, the options granted in 1996 vest over three years and options granted in 1997 and later vest at the earlier of (a) the next annual meeting, (b) 13 months from date of grant or (c) the effective date of an acquisition as defined in the Director Plan.

The following table presents the activity for options under the Plan.

	YEAR ENDED DECEMBER 31, 1996		YEAR ENDED DECEMBER 31, 1997		YEAR ENDED DECEMBER 31, 1998	
	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE
Outstanding -- beginning of period...	608,270	\$11.06	810,442	\$4.43	1,564,449	\$4.50
Granted.....	810,442	4.43	785,657	4.57	629,969	6.80
Exercised.....	--	--	--	--	(2)	4.43
Forfeited or Expired.....	(608,270)	11.06	(31,650)	4.43	(96,209)	4.43
Outstanding -- end of period.....	810,442	\$ 4.43	1,564,449	\$4.50	2,098,207	\$5.20
Exercisable at end of period.....	114,782	\$ 4.43	476,451	\$4.43	778,473	\$4.46

At December 31, 1998, Plan options included 1,436,588, 566,669, and 94,950 shares outstanding at exercise prices of \$4.43, \$6.67, and \$8.00 per share. The weighted average remaining contractual life of these options was 8.2 years.

During 1996, 27,128 options were granted at an exercise price of \$4.43 per share under the Director Plan and were outstanding at December 31, 1996. Of these options, 4,524 were exercisable at December 31, 1996. During 1997, options for 3,620 shares were granted under the Director Plan at an exercise price of \$4.43 per share. Of these options, 30,748 were outstanding with 13,564 exercisable at the \$4.43 per share price at December 31, 1997. During 1998, options for 3,620 shares were granted under the Director Plan at an exercise price of \$8.00 per share. Of these options, 34,368 were outstanding with 26,228 exercisable at the \$4.43 per share price at December 31, 1998.

The Company has adopted the disclosure-only provisions of Statement of Financial Accounting Standards No. 123 (SFAS No. 123), "Accounting for Stock-Based Compensation." The Company has chosen to continue to account for stock-based compensation using the intrinsic value method prescribed in Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" and related interpretations. Accordingly, compensation cost for stock options is measured as the excess, if any, of the

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
 (TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

fair value of the Company's stock at the date of grant over the amount an employee must pay to acquire the stock.

The disclosures required under SFAS No. 123 have been omitted as they are not meaningful based upon the Company's planned conversion from an S corporation to a C corporation upon the closing of this offering for which these financial statements are being prepared. Had the fair value based method prescribed in SFAS No. 123 been used to account for stock-based compensation cost, there would have been no change in pro forma net income and pro forma earnings per share from that reported.

9. INCOME TAXES:

The Company has elected to be taxed as an S corporation for federal and certain states income tax purposes and, as a result, is not subject to Federal taxation but is subject to state taxation on income in certain states. The stockholders are liable for individual Federal and certain state income taxes on their allocated portions of the Company's taxable income.

The components of income before income taxes and the historical related provision for income taxes consist of the following:

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
Income before income taxes:			
United States.....	\$11,953	\$21,858	\$6,169
Foreign.....	1,350	410	1,966
	-----	-----	-----
	13,303	22,268	8,135
Current taxes:			
State.....	285	1,331	197
Foreign.....	792	792	784
	-----	-----	-----
	1,077	2,123	981
Deferred taxes:			
State.....	(156)	(72)	(39)
Foreign.....	(121)	(73)	7
	-----	-----	-----
	(277)	(145)	(32)
Provision for income taxes.....	\$ 800	\$ 1,978	\$ 949
	=====	=====	=====

As the Company is not subject to Federal income taxes, a reconciliation of the effective tax rate to the Federal statutory rate is not meaningful.

At December 31, 1996, 1997, and 1998 the components of the deferred tax asset and deferred tax liability were as follows:

	DECEMBER 31,		
	1996	1997	1998
Deferred tax assets (liabilities):			
Inventories.....	\$234	\$344	\$265
Intercompany profits.....	160	214	152
Compensation.....	72	77	127
Investment booked under the equity method.....	(28)	(41)	(59)
Other.....	(34)	(45)	96
	-----	-----	-----
Total.....	\$404	\$549	\$581
	=====	=====	=====

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

10. EMPLOYEE BENEFIT PLANS:

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute from 1% up to 12% of their compensation. The Company, at its discretion, may provide a matching contribution which will generally match up to the first 2% of each participant's compensation, plus 25% of the next 4% of compensation. At the discretion of the Board of Directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions are generally paid annually, and were \$2,170,000 and \$2,500,000 for the years ended December 31, 1996 and 1997. Approximately \$1,400,000 has been accrued as the estimated Company contribution for the year ended December 31, 1998 and is included in accrued compensation.

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the Compensation Committee of the Board of Directors, based upon operating results and employee performance. Bonus expense to key employees was none, \$1,425,000, and none for the years ended December 31, 1996, 1997, and 1998, respectively.

11. RESTRUCTURING:

In 1996, the Company recorded a restructuring charge of \$1,400,000, primarily related to reduction of personnel and the closure of facilities in Phoenix, AZ and San Jose, CA. These charges include \$425,000 of severance pay, \$710,000 of lease commitments, and \$265,000 for the write-off of leasehold improvements. The facilities closure concluded during 1997. The remaining balance of approximately \$126,000 for lease commitments is included in Other accrued expenses in the accompanying balance sheet at December 31, 1998.

12. GEOGRAPHIC FINANCIAL INFORMATION AND SIGNIFICANT CUSTOMER:

See Note 1 for a brief description of the Company's business. The Company is organized around two similar product lines domestically and by geographic locations internationally and has three reportable segments: North America, Far East, and Europe. Net sales to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net sales. Income from operations consists of total net sales less operating expenses and does not include either interest income, interest expense or income taxes. The Company had one customer comprising 15%, 22% and 16% of net sales for the years ended December 31, 1996, 1997, and 1998, respectively. This data is presented in accordance with SFAS 131, "Disclosures About Segments of an Enterprise and Related Information," which the Company has retroactively adopted for all periods presented.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

	YEAR ENDED DECEMBER 31, 1998			
	NORTH AMERICA	FAR EAST	EUROPE	TOTAL
Net sales to unaffiliated customers...	\$ 95,607	\$23,902	\$20,254	\$139,763
Intersegment net sales.....	26,657	290	1,015	27,962
Depreciation and amortization.....	5,627	210	405	6,242
Income from operations.....	6,319	1,298	1,518	9,135
Identifiable assets.....	65,560	20,768	9,904	96,232
Capital expenditures.....	2,635	179	323	3,137
	YEAR ENDED DECEMBER 31, 1997			
Net sales to unaffiliated customers...	\$138,186	\$31,559	\$18,335	\$188,080
Intersegment net sales.....	35,429	225	749	36,403
Depreciation and amortization.....	5,096	259	357	5,712
Income from operations.....	22,847	886	230	23,963
Identifiable assets.....	77,302	19,906	9,328	106,536
Capital expenditures.....	2,899	128	242	3,269
	YEAR ENDED DECEMBER 31, 1996			
Net sales to unaffiliated customers...	\$121,061	\$31,066	\$18,735	\$170,862
Intersegment net sales.....	34,100	199	1,426	35,725
Depreciation and amortization.....	5,145	388	387	5,920
Income from operations.....	14,534	653	881	16,068
Identifiable assets.....	66,593	18,524	9,883	95,000
Capital expenditures.....	8,332	208	877	9,417

13. SUBSEQUENT EVENT:

On January 28, 1999, the Company amended its revolving credit facility and its term loan agreements described in Note 6. The amendments include revised quarterly cash flow to debt service ratios. The most restrictive covenant is the cash flow to debt service ratio of 1.25 to 1.0 in the fourth quarter of 1999 and thereafter.

INSIDE BACK COVER (PG.5):

The inside back cover graphically depicts MKS Instruments' message of being a worldwide provider of process control solutions. It is produced in four-color process. In the center of the page is a photo of the Earth, with the tag line "Providing Solutions Around the Process, Around the World" wrapping around the photo. The background of the page is dark, with the MKS logo appearing at the top right, knocking out to white. Photos of MKS products surround the photo of the Earth --above, below, left, and right--and include MKS Baratron Capacitance Manometers, a Throttling Poppet Valve, a Pressure Controller, Mass Flow Controllers, an In Situ Flow Verifier, a Direct Liquid Injection Subsystem, and a Residual Gas Analyzer.

SHARES

LOGO

COMMON STOCK

Prospectus
 , 1999

NationsBanc Montgomery Securities LLC

Donaldson, Lufkin & Jenrette

Lehman Brothers

Until , 1999 (25 days after the date of this prospectus), all
dealers effecting transactions in the common stock, whether or not participating
in this distribution, may be required to deliver a prospectus. This is in
addition to the obligation of dealers to deliver a prospectus when acting as
underwriters and with respect to their unsold allotments or subscriptions

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 13. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION.

Estimated expenses payable in connection with the sale of the common stock offered hereby are as follows:

SEC Registration Fee.....	\$27,800
NASD Filing Fee.....	\$10,500
Printing, Engraving and Mailing Expenses.....	\$ *
Nasdaq Listing Fee.....	\$95,000
Legal Fees and Expenses.....	\$ *
Accounting Fees and Expenses.....	\$ *
Blue Sky Fees and Expenses.....	\$ *
Transfer Agent and Registrar Fees.....	\$ *
Miscellaneous.....	\$ *

Total.....	\$ *
	=====

 The Company will bear all expenses shown above.

ITEM 14. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Section 67 of Chapter 156B of the Massachusetts General Laws provides that a corporation may indemnify its directors and officers to the extent specified in or authorized by (i) the articles of organization; (ii) a by-law adopted by the stockholders; or (iii) a vote adopted by the holders of a majority of the shares of stock entitled to vote on the election of directors. In all instances, the extent to which a corporation provides indemnification to its directors and officers under Section 67 is optional. In its Amended and Restated Articles of Organization (the "Articles of Organization"), the Registrant has elected to commit to provide indemnification to its directors and officers in specified circumstances. Generally, Article 6 of the Registrant's Articles of Organization provides that the Registrant shall indemnify directors and officers of the Registrant against liabilities and expenses arising out of legal proceedings brought against them by reason of their status as directors or officers or by reason of their agreeing to serve, at the request of the Registrant, as a director or officer with another organization. Under this provision, a director or officer of the Registrant shall be indemnified by the Registrant for all costs and expenses (including attorneys' fees), judgments, liabilities and amounts paid in settlement of such proceedings, even if he is not successful on the merits, if he acted in good faith in the reasonable belief that his action was in the best interests of the Registrant. The Board of Directors may authorize advancing litigation expenses to a director or officer at his request upon receipt of an undertaking by any such director or officer to repay such expenses if it is ultimately determined that he is not entitled to indemnification for such expenses.

Article 6 of the Registrant's Articles of Organization eliminates the personal liability of the Registrant's directors to the Registrant or its stockholders for monetary damages for breach of a director's fiduciary duty, except to the extent Chapter 156B of the Massachusetts General Laws prohibits the elimination or limitation of such liability.

The Underwriting Agreement, a form of which is filed at Exhibit 1.1 to this Registration Statement on Form S-1 (the "Underwriting Agreement"), provides that the underwriters are obligated under certain circumstances to indemnify directors, officers and controlling persons of the Registrant against certain liabilities, including liabilities under the Securities Act of 1933, as amended (the "Securities Act"). Reference is made to the form of Underwriting Agreement.

The Company has obtained directors and officers liability insurance for the benefit of its directors and certain of its officers.

ITEM 15. RECENT SALES OF UNREGISTERED SECURITIES.

In the three years preceding the filing of this Registration Statement, the Registrant sold 2 shares of its common stock for total proceeds of \$6.64. The registrant awarded options to purchase 837,570 shares of common stock at a weighted average exercise price of \$4.43 per share and 789,277 shares of common stock at a weighted average exercise price of \$4.57 per share, in 1996 and 1997, respectively.

In 1998, the registrant awarded options to purchase shares of common stock on the dates in the amounts, and at the exercise price set forth below:

DATE -----	NUMBER OF OPTIONS -----	EXERCISE PRICE PER SHARE -----
January 9, 1998.....	3,620	\$8.00
January 26, 1998.....	31,650	\$8.00
March 31, 1998.....	31,650	\$8.00
July 9, 1998.....	450,000	\$6.67
November 10, 1998.....	116,669	\$6.67

The grant of options were exempt from registration under the Securities Act by virtue of the provisions of Section 4(2) of the Securities Act or Rule 701 thereunder.

ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

(a) Exhibits:

EX. NO. -----	DESCRIPTION -----
1.1	Form of Underwriting Agreement
3.1	Restated Articles of Organization, as amended
*3.2	Form of Amended and Restated Articles of Organization
3.3	By-Laws, as amended
*3.4	Form of Amended and Restated By-Laws
4.1	Specimen certificate representing the common stock
*5.1	Opinion of Hale and Dorr LLP
10.1	Amended and Restated 1995 Stock Incentive Plan
10.2	1996 Amended and Restated 1996 Director Stock Option Plan
10.3	1997 Director Stock Option Plan
*10.4	1999 Employee Stock Purchase Plan
10.5	Amended and Restated Employment Agreement dated as of December 15, 1995 between Leo Berlinghieri and the Registrant
10.6	Amended and Restated Employment Agreement dated as of December 15, 1995 between John J. Sullivan and the Registrant
10.7	Amended and Restated Employment Agreement dated as of December 15, 1995 between Ronald C. Weigner and the Registrant
10.8	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant
*10.9	Loan Agreement dated as of October 31, 1995, as last amended January 28, 1999, by and between the First National Bank of Boston and the Registrant
10.10	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership and the Registrant
*10.11	Loan Agreement dated as of November 1, 1993, as last amended January 28, 1999 between the First National Bank of Boston and the Registrant

EX. NO.	DESCRIPTION
10.12	Lease dated as of September 21, 1995 by and between General American Life Insurance Company and the Registrant
*10.13	Loan Agreement dated as of February 23, 1996, as last amended January 28, 1999 between the BankBoston, N.A., Chemical Bank and the Registrant
10.14	Revolving Credit Note (\$8,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant
10.15	Revolving Credit Note (\$12,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant
10.16	Promissory Note dated as of August 1990 between Jefferson National Life Insurance Company and the Registrant
**10.17	Comprehensive Supplier Agreement #982812 dated October 23, 1998 by and between Applied Materials, Inc. and the Registrant
**10.18	Management Incentive Program
10.19	Lease dated as of December 21, 1989, as last amended December 1996, between Walpole Park South II Trust and the Registrant
10.20	Lease dated as of January 1, 1996 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floor 5)
10.21	Lease dated as of April 21, 1997 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floors 1 and 2)
10.22	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and Claire R. Bertucci and Richard S. Chute, Trustees of the John R. Bertucci Insurance Trust of January 10, 1986
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10.25	Employment Agreement dated March 7, 1997 between Joseph Maher and the Registrant
*10.26	Contribution Agreement
21.1	Subsidiaries of the Registrant
*23.1	Consent of Hale and Dorr LLP (contained in Exhibit 5.1)
23.2	Consent of PricewaterhouseCoopers LLP
24	Power of Attorney (included on Page II-4)
27	Financial Data Schedule

* To be filed by amendment.

** Confidential materials omitted and filed separately with the Securities and Exchange Commission.

(b) FINANCIAL STATEMENTS SCHEDULES

Report of Independent Accountants on Schedule II -- Valuation and Qualifying Accounts

Schedule II -- Valuation and Qualifying Accounts

ITEM 17. UNDERTAKINGS.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer and controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the questions whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of a registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offer therein, and this offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

The undersigned registrant hereby further undertakes to provide to the underwriters at the closing specified in the underwriting agreements, certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant has duly caused this Registration Statement (File No. 333-) to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Andover, Commonwealth of Massachusetts, on this day of January 28, 1999.

MKS INSTRUMENTS, INC.

By: /s/ JOHN R. BERTUCCI

 JOHN R. BERTUCCI
 CHAIRMAN OF THE BOARD OF DIRECTORS,
 PRESIDENT AND CHIEF EXECUTIVE
 OFFICER
 (PRINCIPAL EXECUTIVE OFFICER)

POWER OF ATTORNEY

KNOWN ALL MEN BY THESE PRESENTS that each individual whose signature appears below constitutes and appoints each of John R. Bertucci, Ronald C. Weigner and Mark G. Borden such person's true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for such person and in such person's name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement (or to any other registration statement for the same offering that is to be effective upon filing pursuant to Rule 462(b) under the Securities Act), and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting unto each said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as such person might or could do in person, hereby ratifying and confirming all that any said attorney-in-fact and agent, or any substitute or substitutes of any of them, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

SIGNATURES -----	TITLE -----	DATE ----
/s/ JOHN R. BERTUCCI ----- JOHN R. BERTUCCI	Chairman of the Board of Directors, President and Chief Executive Officer (Principal Executive Officer)	January 28, 1999
/s/ RONALD C. WEIGNER ----- RONALD C. WEIGNER	Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	January 28, 1999
/s/ RICHARD S. CHUTE ----- RICHARD S. CHUTE	Director	January 28, 1999
----- OWEN W. ROBBINS	Director	January , 1999
/s/ ROBERT J. THERRIEN ----- ROBERT J. THERRIEN	Director	January 28, 1999
/s/ LOUIS P. VALENTE ----- LOUIS P. VALENTE	Director	January 28, 1999

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Directors and Stockholders
of MKS Instruments, Inc.:

Our audits of the consolidated financial statements referred to in our report dated January 22, 1999, except for Note 13 as to which the date is January 28, 1999, of MKS Instruments, Inc. also included an audit of the consolidated financial statement schedule listed in Item 16(b) herein. In our opinion, this consolidated financial statement schedule presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements.

PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts
January 22, 1999

S-1

SCHEDULE II

MKS INSTRUMENTS, INC.

VALUATION AND QUALIFYING ACCOUNTS
(IN THOUSANDS)

	BALANCE AT BEGINNING OF PERIOD -----	PROVISION CHARGED TO EXPENSE -----	ACCOUNTS WRITTEN OFF -----	BALANCE AT END OF PERIOD -----
YEAR ENDED DECEMBER 31, 1996				
Allowance for Doubtful Accounts.....	\$542	(20)	40	\$482
YEAR ENDED DECEMBER 31, 1997				
Allowance for Doubtful Accounts.....	\$482	258	130	\$610
YEAR ENDED DECEMBER 31, 1998				
Allowance for Doubtful Accounts.....	\$610	253	207	\$656

EXHIBIT INDEX

EX. NO.	DESCRIPTION	SEQUENTIALLY NUMBERED PAGE
-----	-----	-----
1.1	Form of Underwriting Agreement	
3.1	Restated Articles of Organization, as amended	
*3.2	Form of Amended and Restated Articles of Organization	
3.3	By-Laws, as amended	
*3.4	Form of Amended and Restated By-Laws	
4.1	Specimen certificate representing the common stock	
*5.1	Opinion of Hale and Dorr LLP	
10.1	Amended and Restated 1995 Stock Incentive Plan	
10.2	1996 Amended and Restated 1996 Director Stock Option Plan	
10.3	1997 Director Stock Option Plan	
*10.4	1999 Employee Stock Purchase Plan	
10.5	Amended and Restated Employment Agreement dated as of December 15, 1995 between Leo Berlinghieri and the Registrant	
10.6	Amended and Restated Employment Agreement dated as of December 15, 1995 between John J. Sullivan and the Registrant	
10.7	Amended and Restated Employment Agreement dated as of December 15, 1995 between Ronald C. Weigner and the Registrant	
10.8	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant	
*10.9	Loan Agreement dated as of October 31, 1995, as last amended January 28, 1999, by and between the First National Bank of Boston and the Registrant	
10.10	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership and the Registrant	
*10.11	Loan Agreement dated as of November 1, 1993, as last amended January 28, 1999 between the First National Bank of Boston and the Registrant	
10.12	Lease dated as of September 21, 1995 by and between General American Life Insurance Company and the Registrant	
*10.13	Loan Agreement dated as of February 23, 1996, as last amended January 28, 1999 between the BankBoston, N.A., Chemical Bank and the Registrant	
10.14	Revolving Credit Note (\$8,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant	
10.15	Revolving Credit Note (\$12,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant	
10.16	Promissory Note dated as of August 1990 between Jefferson National Life Insurance Company and the Registrant	
**10.17	Comprehensive Supplier Agreement #982812 dated October 23, 1998 by and between Applied Materials, Inc. and the Registrant	
**10.18	Management Incentive Program	
10.19	Lease dated as of December 21, 1989, as last amended December 1996, between Walpole Park South II Trust and the Registrant	

SEQUENTIALLY
NUMBERED
PAGE

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* To be filed by amendment.

** Confidential materials omitted and filed separately with the Securities and Exchange Commission.

NATIONSBANC MONTGOMERY SECURITIES LLC
FORM UNDERWRITING AGREEMENT
Draft of January 27, 1999

_____ Shares

MKS Instruments, Inc.

Common Stock

Underwriting Agreement

dated [__]

_____ Shares
 MKS INSTRUMENTS, INC.
 Common Stock
 UNDERWRITING AGREEMENT

____, 1999

NATIONSBANC MONTGOMERY SECURITIES LLC
 DONALDSON, LUFKIN & JENRETTE SECURITIES CORPORATION
 LEHMAN BROTHERS INC.
 As Representatives of the several Underwriters
 c/o NATIONSBANC MONTGOMERY SECURITIES LLC
 600 Montgomery Street
 San Francisco, California 94111

Ladies and Gentlemen:

Introductory. MKS Instruments, Inc., a Massachusetts corporation (the "Company"), proposes to issue and sell to the several underwriters named in Schedule A (the "Underwriters") an aggregate of [] shares (the "Firm Common Shares") of its Common Stock, no par value per share (the "Common Stock"). In addition, the Company has granted to the Underwriters an option to purchase up to an additional [] shares (the "Optional Common Shares") of Common Stock, as provided in Section 2. The Firm Common Shares and, if and to the extent such option is exercised, the Optional Common Shares are collectively called the "Common Shares". NationsBanc Montgomery Securities LLC ("NMS"), Donaldson, Lufkin & Jenrette Securities Corporation and Lehman Brothers, Inc. have agreed to act as representatives of the several Underwriters (in such capacity, the "Representatives") in connection with the offering and sale of the Common Shares.

The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") a registration statement on Form S-1 (File No. 333-[]), which contains a form of prospectus to be used in connection with the public offering and sale of the Common Shares. Such registration statement, as amended, including the financial statements, exhibits and schedules thereto, in the form in which it was declared effective by the Commission under the Securities Act of 1933 and the rules and regulations promulgated thereunder (collectively, the "Securities Act"), including any information deemed to be a part thereof at the time of effectiveness pursuant to Rule 430A or Rule 434 under the Securities Act, is called the "Registration Statement". Any registration statement filed by the Company pursuant to Rule 462(b) under the Securities Act is called the "Rule 462(b) Registration Statement", and from and after the date and time of filing of the Rule 462(b) Registration Statement the term "Registration Statement" shall include the Rule 462(b) Registration Statement. Such prospectus, in the form first used by the Underwriters to confirm sales of the Common Shares, is called the "Prospectus"; provided, however, if the Company has, with the consent of NMS, elected to rely upon Rule 434 under the Securities Act, the term "Prospectus" shall mean the Company's prospectus subject

to completion (each, a "preliminary prospectus") dated [] (such preliminary prospectus is called the "Rule 434 preliminary prospectus"), together with the applicable term sheet (the "Term Sheet") prepared and filed by the Company with the Commission under Rules 434 and 424(b) under the Securities Act and all references in this Agreement to the date of the Prospectus shall mean the date of the Term Sheet. All references in this Agreement to the Registration Statement, the Rule 462(b) Registration Statement, a preliminary prospectus, the Prospectus or the Term Sheet, or any amendments or supplements to any of the foregoing, shall include any copy thereof filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval System ("EDGAR").

The Company hereby confirms its agreements with the Underwriters as follows:

Section 1. Representations and Warranties of the Company. The Company hereby represents, warrants and covenants to each Underwriter as follows:

(a) Compliance with Registration Requirements. The Registration Statement and any Rule 462(b) Registration Statement have been declared effective by the Commission under the Securities Act. The Company has complied to the Commission's satisfaction with all requests of the Commission for additional or supplemental information. No stop order suspending the effectiveness of the Registration Statement or any Rule 462(b) Registration Statement is in effect and no proceedings for such purpose have been instituted or are pending or, to the best knowledge of the Company, are contemplated or threatened by the Commission.

Each preliminary prospectus and the Prospectus when filed complied in all material respects with the Securities Act and, if filed by electronic transmission pursuant to EDGAR (except as may be permitted by Regulation S-T under the Securities Act), was identical to the copy thereof delivered to the Underwriters for use in connection with the offer and sale of the Common Shares. Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment thereto, at the time it became effective and at all subsequent times up to and including the Closing Date, complied and will comply in all material respects with the Securities Act and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The Prospectus, as amended or supplemented, as of its date and at all subsequent times up to and including the Closing Date, did not and will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the two immediately preceding sentences do not apply to statements in or omissions from the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment thereto, or the Prospectus, or any amendments or supplements thereto, made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by the Representatives expressly for use therein. There are no contracts or other documents required to be described in the Prospectus or to be filed as exhibits to the Registration Statement which have not been described or filed as required.

(b) Offering Materials Furnished to Underwriters. The Company has delivered to the Representatives one complete manually signed copy of the Registration Statement and of each consent and certificate of experts filed as a part thereof, and conformed copies of the Registration Statement (without exhibits) and preliminary prospectuses and the Prospectus, as amended or supplemented, in such quantities and at such places as the Representatives have reasonably requested for each of the Underwriters.

(c) Distribution of Offering Material By the Company. The Company has not distributed and will not distribute, prior to the later of the Second Closing Date (as defined below) and the completion of the Underwriters' distribution of the Common Shares, any offering material in connection with the offering and sale of the Common Shares other than a preliminary prospectus, the Prospectus or the Registration Statement.

(d) The Underwriting Agreement. This Agreement has been duly authorized, executed and delivered by, and is a valid and binding agreement of, the Company, enforceable in accordance with its terms, except as rights to indemnification hereunder may be limited by applicable law and except as the enforcement hereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting the rights and remedies of creditors or by general equitable principles.

(e) Authorization of the Common Shares. The Common Shares to be purchased by the Underwriters from the Company have been duly authorized for issuance and sale pursuant to this Agreement and, when issued and delivered by the Company pursuant to this Agreement, will be validly issued, fully paid and nonassessable.

(f) No Applicable Registration or Other Similar Rights. There are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by this Agreement, except for such rights as have been duly waived.

(g) No Material Adverse Change. Except as otherwise disclosed in the Prospectus, subsequent to the respective dates as of which information is given in the Prospectus: (i) there has been no material adverse change, or any development that could reasonably be expected to result in a material adverse change, in the condition, financial or otherwise, or in the earnings, business, operations or prospects, whether or not arising from transactions in the ordinary course of business, of the Company and its subsidiaries, considered as one entity (any such change is called a "Material Adverse Change"); (ii) the Company and its subsidiaries, considered as one entity, have not incurred any material liability or obligation, indirect, direct or contingent, not in the ordinary course of business nor entered into any material transaction or agreement not in the ordinary course of business; and (iii) there has been no dividend or distribution of any kind declared, paid or made by the Company or, except for dividends paid to the Company or other subsidiaries, any of its subsidiaries on any class of capital stock or repurchase or redemption by the Company or any of its subsidiaries of any class of capital stock.

(h) Independent Accountants. PricewaterhouseCoopers LLP, who have expressed their opinion with respect to the financial statements (which term as used in this Agreement includes the related notes thereto) filed with the Commission as a part of the Registration Statement and included in the Prospectus, are independent public or certified public accountants as required by the Securities Act.

(i) Preparation of the Financial Statements. The financial statements filed with the Commission as a part of the Registration Statement and included in the Prospectus present fairly the consolidated financial position of the Company and its subsidiaries as of and at the dates indicated and the results of their operations and cash flows for the periods specified. Such financial statements [and supporting schedules] have been prepared in conformity with generally accepted accounting principles applied on a consistent basis throughout the periods involved, except as may be expressly stated in the

related notes thereto. No other financial statements or supporting schedules are required to be included in the Registration Statement. The financial data set forth in the Prospectus under the captions "Prospectus Summary--Summary Selected Financial Data", "Selected Financial Data" and "Capitalization" fairly present the information set forth therein on a basis consistent with that of the audited financial statements contained in the Registration Statement.

(j) Incorporation and Good Standing of the Company and its Subsidiaries. Each of the Company and its subsidiaries has been duly incorporated and is validly existing as a corporation in good standing under the laws of the jurisdiction of its incorporation and has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and, in the case of the Company, to enter into and perform its obligations under this Agreement. Each of the Company and each subsidiary is duly qualified as a foreign corporation to transact business and is in good standing in each other jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change. All of the issued and outstanding capital stock of each subsidiary has been duly authorized and validly issued, is fully paid and nonassessable and is owned by the Company, directly or through subsidiaries, free and clear of any security interest, mortgage, pledge, lien, encumbrance or claim. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to the Registration Statement.

(k) Capitalization and Other Capital Stock Matters. After giving effect to the assumptions set forth in the Prospectus, (i) the authorized, issued and outstanding capital stock of the Company is as set forth in the Prospectus under the caption "Capitalization" (other than for subsequent issuances, if any, pursuant to employee benefit plans described in the Prospectus or upon exercise of outstanding options described in the Prospectus), (ii) the Common Stock (including the Common Shares) conforms in all material respects to the description thereof contained in the Prospectus. All of the issued and outstanding shares of Common Stock have been duly authorized and validly issued, are fully paid and nonassessable and have been issued in compliance with federal and state securities laws. None of the outstanding shares of Common Stock were issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. There are no authorized or outstanding options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any capital stock of the Company or any of its subsidiaries other than those accurately described in the Prospectus. The description of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted thereunder, set forth in the Prospectus accurately and fairly presents the information required to be shown with respect to such plans, arrangements, options and rights.

(l) Stock Exchange Listing. The Common Shares have been approved for listing on the Nasdaq National Market, subject only to official notice of issuance.

(m) Non-Contravention of Existing Instruments; No Further Authorizations or Approvals Required. Neither the Company nor any of its subsidiaries is in violation of its charter or by-laws or is in default (or, with the giving of notice or lapse of time, would be in default) ("Default") under any indenture, mortgage, loan or credit agreement, note, contract, franchise, lease or other instrument to which the Company or any of its subsidiaries is a party or by which it or any of them may be bound, or to which any of the property or assets of the Company or any of its subsidiaries is subject (each, an "Existing Instrument"), except for such Defaults as would not, individually or in the aggregate, result in

a Material Adverse Change. The Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Prospectus (i) have been duly authorized by all necessary corporate action and will not result in any violation of the provisions of the charter or by-laws of the Company or any subsidiary, (ii) will not conflict with or constitute a breach of, or Default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, or require the consent of any other part to, any Existing Instrument, except for such conflicts, breaches, Defaults, liens, charges or encumbrances as would not, individually or in the aggregate, result in a Material Adverse Change and (iii) will not result in any violation of any law, administrative regulation or administrative or court decree applicable to the Company or any subsidiary. No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental or regulatory authority or agency, is required for the Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Prospectus, except such as have been obtained or made by the Company and are in full force and effect under the Securities Act, applicable state securities or blue sky laws and from the National Association of Securities Dealers, Inc. (the "NASD").

(n) No Material Actions or Proceedings. There are no legal or governmental actions, suits or proceedings pending or, to the best of the Company's knowledge, threatened (i) against or affecting the Company or any of its subsidiaries, (ii) which has as the subject thereof any officer or director of, or property owned or leased by, the Company or any of its subsidiaries or (iii) relating to environmental or discrimination matters, where in any such case (A) there is a reasonable possibility that such action, suit or proceeding might be determined adversely to the Company or such subsidiary and (B) any such action, suit or proceeding, if so determined adversely, would reasonably be expected to result in a Material Adverse Change or adversely affect the consummation of the transactions contemplated by this Agreement. No material labor dispute with the employees of the Company or any of its subsidiaries exists or, to the best of the Company's knowledge, is threatened or imminent.

(o) Intellectual Property Rights. The Company and its subsidiaries own or possess sufficient trademarks, trade names, patent rights, copyrights, licenses, approvals, trade secrets and other similar rights (collectively, "Intellectual Property Rights") reasonably necessary to conduct their businesses as now conducted; and the expected expiration of any of such Intellectual Property Rights would not result in a Material Adverse Change. Neither the Company nor any of its subsidiaries has received any notice of infringement or conflict with asserted Intellectual Property Rights of others, which infringement or conflict, if the subject of an unfavorable decision, would result in a Material Adverse Change.

(p) All Necessary Permits, etc. The Company and each subsidiary possess such valid and current certificates, authorizations or permits issued by the appropriate state, federal or foreign regulatory agencies or bodies necessary to conduct their respective businesses (other than any the absence of which would not, singly or in the aggregate, result in a Material Adverse Change, and neither the Company nor any subsidiary has received any notice of proceedings relating to the revocation or modification of, or non-compliance with, any such certificate, authorization or permit which, singly or in the aggregate, if the subject of an unfavorable decision, ruling or finding, could result in a Material Adverse Change.

(q) Title to Properties. The Company and each of its subsidiaries has good and marketable title to all the properties and assets reflected as owned in the financial statements referred to in Section (i) above (or elsewhere in the Prospectus), in each case, except as disclosed in the Prospectus, free and clear of any security interests, mortgages, liens, encumbrances, equities, claims and other defects, except

such as do not materially and adversely affect the value of such property and do not materially interfere with the use made or proposed to be made of such property by the Company or such subsidiary. The real property, improvements, equipment and personal property held under lease by the Company or any subsidiary are held under valid and enforceable leases, with such exceptions as are not material and do not materially interfere with the use made or proposed to be made of such real property, improvements, equipment or personal property by the Company or such subsidiary.

(r) Tax Law Compliance. The Company and its subsidiaries have filed all necessary federal, state and foreign income and franchise tax returns or have properly requested extensions thereof and have paid all taxes required to be paid by any of them and, if due and payable, any related or similar assessment, fine or penalty levied against any of them except as may be being contested in good faith and by appropriate proceedings. The Company has made adequate charges, accruals and reserves in the applicable financial statements referred to in Section 1(i) above in respect of all federal, state and foreign income and franchise taxes for all periods as to which the tax liability of the Company or any of its subsidiaries has not been finally determined.

(s) Company Not an "Investment Company". The Company has been advised of the rules and requirements under the Investment Company Act of 1940, as amended (the "Investment Company Act"). The Company is not, and after receipt of payment for the Common Shares will not be, an "investment company" within the meaning of Investment Company Act and will conduct its business in a manner so that it will not become subject to the Investment Company Act.

(t) Insurance. Each of the Company and its subsidiaries are insured by recognized, financially sound and reputable institutions with policies in such amounts and with such deductibles and covering such risks as the Company has reasonably deemed adequate and customary for their businesses including, but not limited to, policies covering real and personal property owned or leased by the Company and its subsidiaries against theft, damage, destruction, and acts of vandalism. The Company has no reason to believe that it or any subsidiary will not be able (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that would not result in a Material Adverse Change. Neither of the Company nor any subsidiary has been denied any insurance coverage which it has sought or for which it has applied.

(u) No Price Stabilization or Manipulation. The Company has not taken and will not take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Common Stock to facilitate the sale or resale of the Common Shares.

(v) Related Party Transactions. There are no business relationships or related-party transactions involving the Company or any subsidiary or any other person required to be described in the Prospectus which have not been described as required.

(w) No Unlawful Contributions or Other Payments. Neither the Company nor any of its subsidiaries nor, to the best of the Company's knowledge, any employee or agent of the Company or any subsidiary, has made any contribution or other payment to any official of, or candidate for, any federal, state or foreign office in violation of any law or of the character required to be disclosed in the Prospectus.

Any certificate signed by an officer of the Company and delivered to the Representatives or to counsel for the Underwriters shall be deemed to be a representation and warranty by the Company to each Underwriter as to the matters set forth therein.

Section 2. Purchase, Sale and Delivery of the Common Shares.

The Firm Common Shares. The Company agrees to issue and sell to the several Underwriters the Firm Common Shares upon the terms herein set forth. On the basis of the representations, warranties and agreements herein contained, and upon the terms but subject to the conditions herein set forth, the Underwriters agree, severally and not jointly, to purchase from the Company the respective number of Firm Common Shares set forth opposite their names on Schedule A. The purchase price per Firm Common Share to be paid by the several Underwriters to the Company shall be \$[] per share.

The First Closing Date. Delivery of certificates for the Firm Common Shares to be purchased by the Underwriters and payment therefor shall be made at the offices of NMS, 600

Montgomery Street, San Francisco, California (or such other place as may be agreed to by the Company and the Representatives) at 6:00 a.m. San Francisco time, on [___], or such other time and date not later than 10:30 a.m. San Francisco time, on [___] as the Representatives shall designate by notice to the Company (the time and date of such closing are called the "First Closing Date"). The Company hereby acknowledges that circumstances under which the Representatives may provide notice to postpone the First Closing Date as originally scheduled include, but are in no way limited to, any determination by the Company or the Representatives to recirculate to the public copies of an amended or supplemented Prospectus or a delay as contemplated by the provisions of Section 10.

The Optional Common Shares; the Second Closing Date. In addition, on the basis of the representations, warranties and agreements herein contained, and upon the terms but subject to the conditions herein set forth, the Company hereby grants an option to the several Underwriters to purchase, severally and not jointly, up to an aggregate of [___] Optional Common Shares from the Company at the purchase price per share to be paid by the Underwriters for the Firm Common Shares. The option granted hereunder is for use by the Underwriters solely in covering any over-allotments in connection with the sale and distribution of the Firm Common Shares. The option granted hereunder may be exercised at any time (but not more than once) upon notice by the Representatives to the Company, which notice may be given at any time within 30 days from the date of this Agreement. Such notice shall set forth (i) the aggregate number of Optional Common Shares as to which the Underwriters are exercising the option, (ii) the names and denominations in which the certificates for the Optional Common Shares are to be registered and (iii) the time, date and place at which such certificates will be delivered (which time and date may be simultaneous with, but not earlier than, the First Closing Date; and in such case the term "First Closing Date" shall refer to the time and date of delivery of certificates for the Firm Common Shares and the Optional Common Shares). Such time and date of delivery, if subsequent to the First Closing Date, is called the "Second Closing Date" and shall be determined by the Representatives and shall not be earlier than three nor later than five full business days after delivery of such notice of exercise. If any Optional Common Shares are to be purchased, each Underwriter agrees, severally and not jointly, to purchase the number of Optional Common Shares (subject to such adjustments to eliminate fractional shares as the Representatives may determine) that bears the same proportion to the total number of Optional Common Shares to be purchased as the number of Firm Common Shares set forth on Schedule A opposite the name of such Underwriter bears to the total number of Firm Common Shares. The Representatives may cancel the option at any time prior to its expiration by giving written notice of such cancellation to the Company.

Public Offering of the Common Shares. The Representatives hereby advise the Company that the Underwriters intend to offer for sale to the public, as described in the Prospectus, their respective portions of the Common Shares as soon after this Agreement has been executed and the Registration Statement has been declared effective as the Representatives, in their sole judgment, have determined is advisable and practicable.

Payment for the Common Shares. Payment for the Common Shares shall be made at the First Closing Date (and, if applicable, at the Second Closing Date) by wire transfer of immediately available funds to the order of the Company.

It is understood that the Representatives have been authorized, for their own account and the accounts of the several Underwriters, to accept delivery of and receipt for, and make payment of the purchase price for, the Firm Common Shares and any Optional Common Shares the Underwriters have agreed to purchase. NMS, individually and not as the Representatives of the Underwriters, may (but

shall not be obligated to) make payment for any Common Shares to be purchased by any Underwriter whose funds shall not have been received by the Representatives by the First Closing Date or the Second Closing Date, as the case may be, for the account of such Underwriter, but any such payment shall not relieve such Underwriter from any of its obligations under this Agreement.

Delivery of the Common Shares. The Company shall deliver, or cause to be delivered, to the Representatives for the accounts of the several Underwriters certificates for the Firm Common Shares at the First Closing Date, against the irrevocable release of a wire transfer of immediately available funds for the amount of the purchase price therefor. The Company shall also deliver, or cause to be delivered, to the Representatives for the accounts of the several Underwriters, certificates for the Optional Common Shares the Underwriters have agreed to purchase at the First Closing Date or the Second Closing Date, as the case may be, against the irrevocable release of a wire transfer of immediately available funds for the amount of the purchase price therefor. The certificates for the Common Shares shall be in definitive form and registered in such names and denominations as the Representatives shall have requested at least two full business days prior to the First Closing Date (or the Second Closing Date, as the case may be) and shall be made available for inspection on the business day preceding the First Closing Date (or the Second Closing Date, as the case may be) at a location in New York City as the Representatives may designate. Time shall be of the essence, and delivery at the time and place specified in this Agreement is a further condition to the obligations of the Underwriters.

Delivery of Prospectus to the Underwriters. Not later than 12:00 p.m. on the second business day following the date the Common Shares are released by the Underwriters for sale to the public, the Company shall deliver or cause to be delivered copies of the Prospectus in such quantities and at such places as the Representatives shall request.

Section 3. Additional Covenants of the Company. The Company further covenants and agrees with each Underwriter as follows:

(a) Representatives' Review of Proposed Amendments and Supplements. During such period beginning on the date hereof and ending on the later of the First Closing Date or such date, as in the opinion of counsel for the Underwriters, the Prospectus is no longer required by law to be delivered in connection with sales by an Underwriter or dealer (the "Prospectus Delivery Period"), prior to amending or supplementing the Registration Statement (including any registration statement filed under Rule 462(b) under the Securities Act) or the Prospectus, the Company shall furnish to the Representatives for review a copy of each such proposed amendment or supplement, and the Company shall not file any such proposed amendment or supplement to which the Representatives reasonably object.

(b) Securities Act Compliance. After the date of this Agreement, the Company shall promptly advise the Representatives in writing (i) of the receipt of any comments of, or requests for additional or supplemental information from, the Commission, (ii) of the time and date of any filing of any post-effective amendment to the Registration Statement or any amendment or supplement to any preliminary prospectus or the Prospectus, (iii) of the time and date that any post-effective amendment to the Registration Statement becomes effective and (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto or of any order preventing or suspending the use of any preliminary prospectus or the Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Stock from any securities exchange upon which it is listed for trading or included or designated for quotation, or of

the threatening or initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time, the Company will use its best efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees that it shall comply with the provisions of Rules 424(b), 430A and 434, as applicable, under the Securities Act and will use its reasonable efforts to confirm that any filings made by the Company under such Rule 424(b) were received in a timely manner by the Commission.

(c) Amendments and Supplements to the Prospectus and Other Securities Act Matters. If, during the Prospectus Delivery Period, any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Prospectus in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, not misleading, or if in the opinion of the Representatives or counsel for the Underwriters it is otherwise necessary to amend or supplement the Prospectus to comply with law, the Company agrees to promptly prepare (subject to Section 3(a) hereof), file with the Commission and furnish at its own expense to the Underwriters and to dealers, amendments or supplements to the Prospectus so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus, as amended or supplemented, will comply with law.

(d) Copies of any Amendments and Supplements to the Prospectus. The Company agrees to furnish the Representatives, without charge, during the Prospectus Delivery Period, as many copies of the Prospectus and any amendments and supplements thereto as the Representatives may request.

(e) Blue Sky Compliance. The Company shall cooperate with the Representatives and counsel for the Underwriters to qualify or register the Common Shares for sale under (or obtain exemptions from the application of) the state securities or blue sky laws or Canadian provincial Securities laws of those jurisdictions designated by the Representatives, shall comply with such laws and shall continue such qualifications, registrations and exemptions in effect so long as required for the distribution of the Common Shares. The Company shall not be required to qualify as a foreign corporation or to take any action that would subject it to general service of process in any such jurisdiction where it is not presently qualified or where it would be subject to taxation as a foreign corporation. The Company will advise the Representatives promptly of the suspension of the qualification or registration of (or any such exemption relating to) the Common Shares for offering, sale or trading in any jurisdiction or any initiation or threat of any proceeding for any such purpose, and in the event of the issuance of any order suspending such qualification, registration or exemption, the Company shall use its best efforts to obtain the withdrawal thereof at the earliest possible moment.

(f) Use of Proceeds. The Company shall apply the net proceeds from the sale of the Common Shares sold by it in the manner described under the caption "Use of Proceeds" in the Prospectus.

(g) Transfer Agent. The Company shall engage and maintain, at its expense, a registrar and transfer agent for the Common Stock.

(h) Earnings Statement. As soon as practicable, the Company will make generally available to its security holders and to the Representatives an earnings statement (which need not be audited) covering the twelve-month period ending [] that satisfies the provisions of Section 11(a) of the Securities Act.

(i) Periodic Reporting Obligations. During the Prospectus Delivery Period the Company shall file, on a timely basis, with the Commission and the Nasdaq National Market all reports and documents required to be filed under the Exchange Act.

(j) Agreement Not To Offer or Sell Additional Securities During the period of 180 days following the date of the Prospectus, the Company will not, without the prior written consent of NMS (which consent may be withheld at the sole discretion of NMS), directly or indirectly, sell, offer, contract or grant any option to sell, pledge, transfer or establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Exchange Act, or otherwise dispose of or transfer, or announce the offering of, or file any registration statement under the Securities Act in respect of, any shares of Common Stock, options or warrants to acquire shares of the Common Stock or securities exchangeable or exercisable for or convertible into shares of Common Stock (other than as contemplated by this Agreement with respect to the Common Shares); provided, however, that the Company may issue shares of its Common Stock or options to purchase its Common Stock, or Common Stock upon exercise of options, pursuant to any stock option, stock bonus or other stock plan or arrangement described in the Prospectus, (ii) file one or more Registration Statements on Form S-8, and (iii) issue shares in connection with any acquisition if recipients agree in writing not to sell, offer, dispose of or otherwise transfer any such shares during such 180 day period without the prior written consent of NMS (which consent may be withheld at the sole discretion of the NMS).

(k) Future Reports to the Representatives. During the period of five years hereafter the Company will furnish to the Representatives at [600 Montgomery Street, San Francisco, CA 94111] [9 West 57th Street, New York, NY 10022] [Two International Place, Boston, MA 02110] Attention:[]: (i) as soon as practicable after the end of each fiscal year, copies of the Annual Report of the Company containing the balance sheet of the Company as of the close of such fiscal year and statements of income, stockholders' equity and cash flows for the year then ended and the opinion thereon of the Company's independent public or certified public accountants; (ii) as soon as practicable after the filing thereof, copies of each proxy statement, Annual Report on Form 10-K, Quarterly Report on Form 10-Q, Current Report on Form 8-K or other report filed by the Company with the Commission, the NASD or any securities exchange; and (iii) as soon as available, copies of any report or communication of the Company mailed generally to holders of its capital stock.

Section 4. Payment of Expenses. The Company agrees to pay all costs, fees and expenses incurred in connection with the performance of its obligations hereunder and in connection with the transactions contemplated hereby, including without limitation (i) all expenses incident to the issuance and delivery of the Common Shares (including all printing and engraving costs), (ii) all fees and expenses of the registrar and transfer agent of the Common Stock, (iii) all necessary issue, transfer and other stamp taxes in connection with the issuance and sale of the Common Shares to the Underwriters, (iv) all fees and expenses of the Company's counsel, independent public or certified public accountants and other advisors, (v) all costs and expenses incurred in connection with the preparation, printing, filing, shipping and distribution of the Registration Statement (including financial statements, exhibits, schedules, consents and certificates of experts), each preliminary prospectus and the Prospectus, and all amendments and supplements thereto, and this Agreement, (vi) all filing fees, attorneys' fees and expenses incurred by the Company or the Underwriters in connection with qualifying or registering (or obtaining exemptions from the qualification or registration of) all or any part of the Common Shares for offer and sale under the state securities or blue sky laws or the provincial securities laws of Canada, and, if requested by the Representatives, preparing and printing a "Blue Sky Survey" or memorandum, and any supplements thereto, advising the Underwriters of such qualifications, registrations and exemptions,

(vii) the filing fees incident to, and the reasonable fees and expenses of counsel for the Underwriters in connection with, the NASD's review and approval of the Underwriters' participation in the offering and distribution of the Common Shares, (viii) the fees and expenses associated with [listing] the Common Shares on the Nasdaq National Market, and (ix) all other fees, costs and expenses referred to in Item 13 of Part II of the Registration Statement. Except as provided in this Section 4, Section 6, Section 8 and Section 9 hereof, the Underwriters shall pay their own expenses, including the fees and disbursements of their counsel.

Section 5. Conditions of the Obligations of the Underwriters. The obligations of the several Underwriters to purchase and pay for the Common Shares as provided herein on the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date, shall be subject to the accuracy of the representations and warranties on the part of the Company set forth in Section 1 hereof as of the date hereof and as of the First Closing Date as though then made and, with respect to the Optional Common Shares, as of the Second Closing Date as though then made, to the timely performance by the Company of its covenants and other obligations hereunder, and to each of the following additional conditions:

(a) Accountants' Comfort Letter. On the date hereof, the Representatives shall have received from PricewaterhouseCoopers LLP, independent public or certified public accountants for the Company, a letter dated the date hereof addressed to the Underwriters, in form and substance satisfactory to the Representatives, containing statements and information of the type ordinarily included in accountant's "comfort letters" to underwriters, delivered according to Statement of Auditing Standards No. 72 (or any successor bulletin), with respect to the audited and unaudited financial statements and certain financial information contained in the Registration Statement and the Prospectus (and the Representatives shall have received an additional [] conformed copies of such accountants' letter for each of the several Underwriters).

(b) Compliance with Registration Requirements; No Stop Order; No Objection from NASD. For the period from and after effectiveness of this Agreement and prior to the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date:

(i) the Company shall have filed the Prospectus with the Commission (including the information required by Rule 430A under the Securities Act) in the manner and within the time period required by Rule 424(b) under the Securities Act; or the Company shall have filed a post-effective amendment to the Registration Statement containing the information required by such Rule 430A, and such post-effective amendment shall have become effective; or, if the Company elected to rely upon Rule 434 under the Securities Act and obtained the Representatives' consent thereto, the Company shall have filed a Term Sheet with the Commission in the manner and within the time period required by such Rule 424(b);

(ii) no stop order suspending the effectiveness of the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment to the Registration Statement, shall be in effect and no proceedings for such purpose shall have been instituted or threatened by the Commission; and

(iii) the NASD shall have raised no objection to the fairness and reasonableness of the underwriting terms and arrangements.

(c) No Material Adverse Change or Ratings Agency Change. For the period from and after the date of this Agreement and prior to the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date:

(i) in the judgment of the Representatives there shall not have occurred any Material Adverse Change; and

(ii) there shall not have occurred any downgrading, nor shall any notice have been given of any intended or potential downgrading or of any review for a possible change that does not indicate the direction of the possible change, in the rating accorded any securities of the Company or any of its subsidiaries by any "nationally recognized statistical rating organization" as such term is defined for purposes of Rule 436(g)(2) under the Securities Act.

(d) Opinion of Counsel for the Company. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Hale and Dorr, counsel for the Company, dated as of such Closing Date, reasonably satisfactory to the Representatives with respect to the matters set forth in Exhibit A-1 attached hereto. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Hill & Barlow, counsel for the Company, dated as of such Closing Date, reasonably satisfactory to the Representatives with respect to the matters set forth in Exhibit A-2 attached hereto. In each case, the Representatives shall have received an additional [] conformed copies of such counsel's legal opinions for each of the several Underwriters.

(e) Opinion of Counsel for the Underwriters. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Ropes & Gray, counsel for the Underwriters, dated as of such Closing Date, with respect to the matters set forth in paragraphs (i), (viii), (ix) and the next-to-last paragraph of Exhibit A (and the Representatives shall have received an additional [] conformed copies of such counsel's legal opinion for each of the several Underwriters).

(f) Officers' Certificate. On each of the First Closing Date and the Second Closing Date the Representatives shall have received a written certificate executed by the Chairman of the Board, Chief Executive Officer or President of the Company and the Chief Financial Officer or Chief Accounting Officer of the Company, dated as of such Closing Date, to the effect set forth in subsections (b)(ii) and (c)(ii) of this Section 5, and further to the effect that:

(i) for the period from and after the date of this Agreement and prior to such Closing Date, there has not occurred any Material Adverse Change;

(ii) the representations, warranties and covenants of the Company set forth in Section 1 of this Agreement are true and correct with the same force and effect as though expressly made on and as of such Closing Date; and

(iii) the Company has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to such Closing Date.

(g) Bring-down Comfort Letter. On each of the First Closing Date and the Second Closing Date the Representatives shall have received from PricewaterhouseCoopers LLP, independent public or certified public accountants for the Company, a letter dated such date, in form and substance satisfactory to the

Representatives, to the effect that they reaffirm the statements made in the letter furnished by them pursuant to subsection (a) of this Section 5, except that the specified date referred to therein for the carrying out of procedures shall be no more than three business days prior to the First Closing Date or Second Closing Date, as the case may be (and the Representatives shall have received an additional [] conformed copies of such accountants' letter for each of the several Underwriters).

(h) Lock-Up Agreement from Stockholders and Optionholders of the Company. On the date hereof, the Company shall have furnished to the Representatives an agreement in the form of Exhibit B hereto from those stockholders and optionholders of the Company as agreed among the Company and the Representatives, and such agreement shall be in full force and effect on each of the First Closing Date and the Second Closing Date.

(i) Additional Documents. On or before each of the First Closing Date and the Second Closing Date, the Representatives and counsel for the Underwriters shall have received such information, documents and opinions as they may reasonably require for the purposes of enabling them to pass upon the issuance and sale of the Common Shares as contemplated herein, or in order to evidence the accuracy of any of the representations and warranties, or the satisfaction of any of the conditions or agreements, herein contained.

If any condition specified in this Section 5 is not satisfied when and as required to be satisfied, this Agreement may be terminated by the Representatives by notice to the Company at any time on or prior to the First Closing Date and, with respect to the Optional Common Shares, at any time prior to the Second Closing Date, which termination shall be without liability on the part of any party to any other party, except that Section 4, Section 6, Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 6. Reimbursement of Underwriters' Expenses. If this Agreement is terminated by the Representatives pursuant to Section 5, Section 7, or Section 11 (iv) or 11(v), or if the sale to the Underwriters of the Common Shares on the First Closing Date is not consummated because of any refusal, inability or failure on the part of the Company to perform any agreement herein or to comply with any provision hereof, the Company agrees to reimburse the Representatives and the other Underwriters (or such Underwriters as have terminated this Agreement with respect to themselves), severally, upon demand for all out-of-pocket expenses that shall have been reasonably incurred by the Representatives and the Underwriters in connection with the proposed purchase and the offering and sale of the Common Shares, including but not limited to fees and disbursements of counsel, printing expenses, travel expenses, postage, facsimile and telephone charges.

Section 7. Effectiveness of this Agreement.

This Agreement shall not become effective until the later of (i) the execution of this Agreement by the parties hereto and (ii) notification by the Commission to the Company and the Representatives of the effectiveness of the Registration Statement under the Securities Act.

Prior to such effectiveness, this Agreement may be terminated by any party by notice to each of the other parties hereto, and any such termination shall be without liability on the part of (a) the Company to any Underwriter, except that the Company shall be obligated to reimburse the expenses of the Representatives and the Underwriters pursuant to Sections 4 and 6 hereof, (b) of any Underwriter to

the Company, or (c) of any party hereto to any other party except that the provisions of Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 8. Indemnification.

(a) Indemnification of the Underwriters. The Company agrees to indemnify and hold harmless each Underwriter, its officers and employees, and each person, if any, who controls any Underwriter within the meaning of the Securities Act and the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which such Underwriter or such controlling person may become subject, under the Securities Act, the Exchange Act or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of the Company), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based (i) upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430A or Rule 434 under the Securities Act, or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading; or (ii) upon any untrue statement or alleged untrue statement of a material fact contained in any preliminary prospectus or the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; or (iii) in whole or in part upon any inaccuracy in the representations and warranties of the Company contained herein; or (iv) in whole or in part upon any failure of the Company to perform its obligations hereunder or under law; or (v) any act or failure to act or any alleged act or failure to act by any Underwriter in connection with, or relating in any manner to, the Common Stock or the offering contemplated hereby, and which is included as part of or referred to in any loss, claim, damage, liability or action arising out of or based upon any matter covered by clause (i) or (ii) above, provided that the Company shall not be liable under this clause (v) to the extent that a court of competent jurisdiction shall have determined by a final judgment that such loss, claim, damage, liability or action resulted directly from any such acts or failures to act undertaken or omitted to be taken by such Underwriter through its bad faith or willful misconduct; and to reimburse each Underwriter and each such controlling person for any and all expenses (including the fees and disbursements of counsel chosen by NMSI) as such expenses are reasonably incurred by such Underwriter or such controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action; provided, however, that the foregoing indemnity agreement shall not apply to any loss, claim, damage, liability or expense to the extent, but only to the extent, arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Representatives expressly for use in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto); and provided, further, that with respect to any preliminary prospectus, the foregoing indemnity agreement shall not inure to the benefit of any Underwriter from whom the person asserting any loss, claim, damage, liability or expense purchased Common Shares, or any person controlling such Underwriter, if copies of the Prospectus were timely delivered to the Underwriter pursuant to Section 2 and a copy of the Prospectus (as then amended or supplemented if the Company shall have furnished any amendments or supplements thereto) was not sent or given by or on behalf of such Underwriter to such person, if required by law so to have been delivered, at or prior to the written confirmation of the sale of the Common Shares to such person, and if the Prospectus (as so amended or supplemented) would have cured the defect giving rise to such loss, claim,

damage, liability or expense. The indemnity agreement set forth in this Section 8(a) shall be in addition to any liabilities that the Company may otherwise have.

(b) Indemnification of the Company, its Directors and Officers. Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, each of its directors, each of its officers who signed the Registration Statement and each person, if any, who controls the Company within the meaning of the Securities Act or the Exchange Act, against any loss, claim, damage, liability or expense, as incurred, to which the Company, or any such director, officer or controlling person may become subject, under the Securities Act, the Exchange Act, or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of such Underwriter), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon any untrue or alleged untrue statement of a material fact contained in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto), or arises out of or is based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in the Registration Statement, any preliminary prospectus, the Prospectus (or any amendment or supplement thereto), in reliance upon and in conformity with written information furnished to the Company by the Representatives expressly for use therein; and to reimburse the Company, or any such director, officer or controlling person for any legal and other expense reasonably incurred by the Company, or any such director, officer or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action. The Company hereby acknowledges that the only information that the Underwriters have furnished to the Company expressly for use in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto) are the statements set forth (A) as the last [two] paragraphs on the inside front cover page of the Prospectus concerning stabilization [and passive market making] by the Underwriters and (B) in the table in the first paragraph and as the second paragraph [second and [] (1) paragraphs] under the caption "Underwriting" in the Prospectus; and the Underwriters confirm that such statements are correct. The indemnity agreement set forth in this Section 8(b) shall be in addition to any liabilities that each Underwriter may otherwise have.

(c) Notifications and Other Indemnification Procedures. Promptly after receipt by an indemnified party under this Section 8 of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against an indemnifying party under this Section 8, notify the indemnifying party in writing of the commencement thereof, but the omission so to notify the indemnifying party will not relieve it from any liability which it may have to any indemnified party for contribution or otherwise than under the indemnity agreement contained in this Section 8 or to the extent it is not prejudiced as a proximate result of such failure. In case any such action is brought against any indemnified party and such indemnified party seeks or intends to seek indemnity from an indemnifying party, the indemnifying party will be entitled to participate in, and, to the extent that it shall elect, jointly with all other indemnifying parties similarly notified, by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel reasonably satisfactory to such indemnified party; provided, however, if the defendants in any such action include both the indemnified party and the indemnifying party and the indemnified party shall have reasonably concluded that a conflict may arise between the positions of the indemnifying party and the indemnified party in conducting the defense of any such action or that there may be legal defenses available to it and/or other indemnified parties which are different from or

additional to those available to the indemnifying party, the indemnified party or parties shall have the right to select separate counsel to assume such legal defenses and to otherwise participate in the defense of such action on behalf of such indemnified party or parties. Upon receipt of notice from the indemnifying party to such indemnified party of such indemnifying party's election so to assume the defense of such action and approval by the indemnified party of counsel, the indemnifying party will not be liable to such indemnified party under this Section 8 for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof unless (i) the indemnified party shall have employed separate counsel in accordance with the proviso to the next preceding sentence (it being understood, however, that the indemnifying party shall not be liable for the expenses of more than one separate counsel (together with local counsel), approved by the indemnifying party (NMS in the case of Section 8(b) and Section 9), representing the indemnified parties who are parties to such action) or (ii) the indemnifying party shall not have employed counsel satisfactory to the indemnified party to represent the indemnified party within a reasonable time after notice of commencement of the action, in each of which cases the fees and expenses of counsel shall be at the expense of the indemnifying party.

(d) Settlements. The indemnifying party under this Section 8 shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party against any loss, claim, damage, liability or expense by reason of such settlement or judgment. Notwithstanding the foregoing sentence, if at any time an indemnified party shall have requested an indemnifying party to reimburse the indemnified party for fees and expenses of counsel as contemplated by Section 8(c) hereof, the indemnifying party agrees that it shall be liable for any settlement of any proceeding effected without its written consent if (i) such settlement is entered into more than 30 days after receipt by such indemnifying party of the aforesaid request and (ii) such indemnifying party shall not have reimbursed the indemnified party in accordance with such request prior to the date of such settlement. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement, compromise or consent to the entry of judgment in any pending or threatened action, suit or proceeding in respect of which any indemnified party is or could have been a party and indemnity was or could have been sought hereunder by such indemnified party, unless such settlement, compromise or consent includes an unconditional release of such indemnified party from all liability on claims that are the subject matter of such action, suit or proceeding.

Section 9. Contribution.

If the indemnification provided for in Section 8 is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party in respect of any losses, claims, damages, liabilities or expenses referred to therein, then each indemnifying party shall contribute to the aggregate amount paid or payable by such indemnified party, as incurred, as a result of any losses, claims, damages, liabilities or expenses referred to therein (i) in such proportion as is appropriate to reflect the relative benefits received by the Company, on the one hand, and the Underwriters, on the other hand, from the offering of the Common Shares pursuant to this Agreement or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company, on the one hand, and the Underwriters, on the other hand, in connection with the statements or omissions or inaccuracies in the representations and warranties herein which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company, on the one hand, and the Underwriters, on the other hand, in

connection with the offering of the Common Shares pursuant to this Agreement shall be deemed to be in the same respective proportions as the total net proceeds from the offering of the Common Shares pursuant to this Agreement (before deducting expenses) received by the Company, and the total underwriting discount received by the Underwriters, in each case as set forth on the front cover page of the Prospectus (or, if Rule 434 under the Securities Act is used, the corresponding location on the Term Sheet) bear to the aggregate initial public offering price of the Common Shares as set forth on such cover. The relative fault of the Company, on the one hand, and the Underwriters, on the other hand, shall be determined by reference to, among other things, whether any such untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact or any such inaccurate or alleged inaccurate representation or warranty relates to information supplied by the Company, on the one hand, or the Underwriters, on the other hand, and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in Section 8(c), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 8(c) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 9; provided, however, that no additional notice shall be required with respect to any action for which notice has been given under Section 8(c) for purposes of indemnification.

The Company and the Underwriters agree that it would not be just and equitable if contribution pursuant to this Section 9 were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to in this Section 9.

Notwithstanding the provisions of this Section 9, no Underwriter shall be required to contribute any amount in excess of the underwriting commissions received by such Underwriter in connection with the Common Shares underwritten by it and distributed to the public. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute pursuant to this Section 9 are several, and not joint, in proportion to their respective underwriting commitments as set forth opposite their names in Schedule A. For purposes of this Section 9, each officer and employee of an Underwriter and each person, if any, who controls an Underwriter within the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as such Underwriter, and each director of the Company, each officer of the Company who signed the Registration Statement, and each person, if any, who controls the Company with the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as the Company.

Section 10. Default of One or More of the Several Underwriters. If, on the First Closing Date or the Second Closing Date, as the case may be, any one or more of the several Underwriters shall fail or refuse to purchase Common Shares that it or they have agreed to purchase hereunder on such date, and the aggregate number of Common Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase does not exceed 10% of the aggregate number of the Common Shares to be purchased on such date, the other Underwriters shall be obligated, severally, in the proportions that the number of Firm Common Shares set forth opposite their respective names on Schedule A bears to the aggregate number of Firm Common Shares set forth opposite the names of all such non-defaulting

Underwriters, or in such other proportions as may be specified by the Representatives with the consent of the non-defaulting Underwriters, to purchase the Common Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase on such date. If, on the First Closing Date or the Second Closing Date, as the case may be, any one or more of the Underwriters shall fail or refuse to purchase Common Shares and the aggregate number of Common Shares with respect to which such default occurs exceeds 10% of the aggregate number of Common Shares to be purchased on such date, and arrangements satisfactory to the Representatives and the Company for the purchase of such Common Shares are not made within 48 hours after such default, this Agreement shall terminate without liability of any party to any other party except that the provisions of Section 4, Section 8 and Section 9 shall at all times be effective and shall survive such termination. In any such case either the Representatives or the Company shall have the right to postpone the First Closing Date or the Second Closing Date, as the case may be, but in no event for longer than seven days in order that the required changes, if any, to the Registration Statement and the Prospectus or any other documents or arrangements may be effected.

As used in this Agreement, the term "Underwriter" shall be deemed to include any person substituted for a defaulting Underwriter under this Section 10. Any action taken under this Section 10 shall not relieve any defaulting Underwriter from liability in respect of any default of such Underwriter under this Agreement.

Section 11. Termination of this Agreement. Prior to the First Closing Date this Agreement may be terminated by the Representatives by notice given to the Company if at any time (i) trading or quotation in any of the Company's securities shall have been suspended or limited by the Commission or by the Nasdaq Stock Market, or trading in securities generally on either the Nasdaq Stock Market or the New York Stock Exchange shall have been suspended or limited, or minimum or maximum prices shall have been generally established on any of such stock exchanges by the Commission or the NASD; (ii) a general banking moratorium shall have been declared by any of federal, New York or California authorities; (iii) there shall have occurred any outbreak or escalation of national or international hostilities or any crisis or calamity, or any change in the United States or international financial markets, or any substantial change or development involving a prospective substantial change in United States' or international political, financial or economic conditions, as in the judgment of the Representatives is material and adverse and makes it impracticable to market the Common Shares in the manner and on the terms described in the Prospectus or to enforce contracts for the sale of securities; (iv) in the judgment of the Representatives there shall have occurred any Material Adverse Change; or (v) the Company shall have sustained a loss by strike, fire, flood, earthquake, accident or other calamity of such character as in the judgment of the Representatives may interfere materially with the conduct of the business and operations of the Company regardless of whether or not such loss shall have been insured. Any termination pursuant to this Section 11 shall be without liability on the part of (a) the Company to any Underwriter, except that the Company shall be obligated to reimburse the expenses of the Representatives and the Underwriters pursuant to Sections 4 and 6 hereof, (b) any Underwriter to the Company, or (c) of any party hereto to any other party except that the provisions of Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 12. Representations and Indemnities to Survive Delivery. The respective indemnities, agreements, representations, warranties and other statements of the Company, of its officers and of the several Underwriters set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation made by or on behalf of any Underwriter or the Company or any of its or their partners, officers or directors or any controlling person, as the case may be, and will survive delivery of and payment for the Common Shares sold hereunder and any termination of this Agreement.

Section 13. All communications hereunder shall be in writing and shall be mailed, hand delivered or telecopied and confirmed to the parties hereto as follows:

If to the Representatives:

NationsBanc Montgomery Securities LLC
600 Montgomery Street
San Francisco, California 94111
Facsimile: 415-249-5558
Attention: Richard A. Smith

with copies to:

NationsBanc Montgomery Securities LLC
600 Montgomery Street
San Francisco, California 94111
Facsimile: (415) 249-5553
Attention: Jack G. Levin, Esq.

and

Ropes & Gray
One International Place
Boston, MA 02110
Facsimile: (617) 951-7050
Attention: David C. Chapin

If to the Company:

MKS Instruments, Inc.
Six Shattuck Road
Andover, MA 01810
Facsimile: (978) 975-2350
Attention: President

with a copy to:

Hale and Dorr
60 State Street
Boston, MA 02109
Facsimile: (617) 526-5000
Attention: Mark G. Borden

Section 14. Successors. This Agreement will inure to the benefit of and be binding upon the parties hereto, including any substitute Underwriters pursuant to Section 10 hereof, and to the benefit of the employees, officers and directors and controlling persons referred to in Section 8 and Section 9, and in each case their respective successors, and no other person will have any right or obligation hereunder.

The term "successors" shall not include any purchaser of the Common Shares as such from any of the Underwriters merely by reason of such purchase.

Section 15. Partial Unenforceability. The invalidity or unenforceability of any Section, paragraph or provision of this Agreement shall not affect the validity or enforceability of any other Section, paragraph or provision hereof. If any Section, paragraph or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

Section 16. (a) Governing Law Provisions. THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE INTERNAL LAWS OF THE STATE OF NEW YORK APPLICABLE TO AGREEMENTS MADE AND TO BE PERFORMED IN SUCH STATE.

Section 17. General Provisions. This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may be executed in two or more counterparts, each one of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. The Table of Contents and the Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

Each of the parties hereto acknowledges that it is a sophisticated business person who was adequately represented by counsel during negotiations regarding the provisions hereof, including, without limitation, the indemnification provisions of Section 8 and the contribution provisions of Section 9, and is fully informed regarding said provisions. Each of the parties hereto further acknowledges that the provisions of Sections 8 and 9 hereto fairly allocate the risks in light of the ability of the parties to investigate the Company, its affairs and its business in order to assure that adequate disclosure has been made in the Registration Statement, any preliminary prospectus and the Prospectus (and any amendments and supplements thereto), as required by the Securities Act and the Exchange Act.

If the foregoing is in accordance with your understanding of our agreement, kindly sign and return to the Company the enclosed copies hereof, whereupon this instrument, along with all counterparts hereof, shall become a binding agreement in accordance with its terms.

Very truly yours,

MKS INSTRUMENTS, INC.

By: _____
President

The foregoing Underwriting Agreement is hereby confirmed and accepted by the Representatives in San Francisco, California as of the date first above written.

NATIONSBANC MONTGOMERY SECURITIES LLC
DONALDSON, LUFKIN & JENRETTE SECURITIES CORPORATION
LEHMAN BROTHERS INC.

Acting as Representatives of the several Underwriters named in the attached
Schedule A.

By NATIONSBANC MONTGOMERY SECURITIES LLC

By: _____
Senior Managing Director

SCHEDULE A

Underwriters

Number of Firm Common Shares to be Purchased

NationsBanc Montgomery Securities LLC
Donaldson, Lufkin & Jenrette Securities Corporation
Lehman Brothers Inc.

EXHIBIT A-1

The final opinion in draft form should be attached as Exhibit A-1 at the time this Agreement is executed.

Opinion of counsel for the Company to be delivered pursuant to Section 5(d) of the Underwriting Agreement.

References to the Prospectus in this Exhibit A include any supplements thereto at the Closing Date.

(i) The Company is validly existing as a corporation in good standing under the laws of The Commonwealth of Massachusetts.

(ii) The authorized, issued and outstanding capital stock of the Company (including the Common Stock) conform to the descriptions thereof set forth [or incorporated by reference] in the Prospectus. All of the outstanding shares of Common Stock have been duly authorized and validly issued, are fully paid and nonassessable. The form of certificate used to evidence the Common Stock is in due and proper form and complies with all applicable requirements of the charter and by-laws of the Company and The Commonwealth of Massachusetts. The description of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted and exercised thereunder, set forth in the Prospectus accurately and fairly presents the information required to be shown with respect to such plans, arrangements, options and rights.

(iii) The Underwriting Agreement has been duly authorized, executed and delivered by the Company.

(iv) The Common Shares to be purchased by the Underwriters from the Company have been duly authorized for issuance and sale pursuant to the Underwriting Agreement and, when issued and delivered by the Company pursuant to the Underwriting Agreement against payment of the consideration set forth therein, will be validly issued, fully paid and nonassessable.

(v) Based upon the advice of the staff of the SEC, each of the Registration Statement and the Rule 462(b) Registration Statement, if any, has been declared effective by the Commission under the Securities Act. To the knowledge of such counsel, no stop order suspending the effectiveness of either of the Registration Statement or the Rule 462(b) Registration Statement, if any, has been issued under the Securities Act and no proceedings for such purpose have been instituted or are pending or are contemplated or threatened by the Commission. Any required filing of the Prospectus and any supplement thereto pursuant to Rule 424(b) under the Securities Act has been made in the manner and within the time period required by such Rule 424(b).

(vi) The Registration Statement, including any Rule 462(b) Registration Statement, the Prospectus, and each amendment or supplement to the Registration Statement and the Prospectus, as of their respective effective or issue dates (other than the financial statements and supporting schedules included therein or in exhibits to or excluded from the Registration Statement, as to which no opinion need be rendered) comply as to form in all material respects with the applicable requirements of the Securities Act.

(vii) The Common Shares have been approved for listing on the Nasdaq National Market.

(viii) The statements (i) in the Prospectus under the captions "Certain Transactions" and "Shares Eligible for Future Sale" and (ii) in Item 14 and Item 15 of the Registration Statement, insofar as such statements constitute matters of law, summaries of legal matters, the Company's charter or by-law provisions, documents or legal proceedings, or legal proceedings, has been reviewed by such counsel and accurately summarize, in all material respects, the matters referred to therein.

(ix) To the knowledge of such counsel, there are no legal or governmental actions, suits or proceedings pending or overtly threatened which are required to be disclosed in the Registration Statement, other than those disclosed therein.

(x) To the best knowledge of such counsel, there are no Existing Instruments required to be described or referred to in the Registration Statement or to be filed as exhibits thereto other than those described or referred to therein or filed or incorporated by reference as exhibits thereto; and the descriptions thereof and references thereto are correct in all material respects.

(xi) No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental authority or agency, is required for the Company's execution, delivery and performance of the Underwriting Agreement and consummation of the transactions contemplated thereby and by the Prospectus, except as required under the Securities Act, applicable state securities or blue sky laws and from the NASD.

(xii) The execution and delivery of the Underwriting Agreement by the Company and the performance by the Company of its obligations thereunder (other than performance by the Company of its obligations under the indemnification section of the Underwriting Agreement, as to which no opinion need be rendered) (i) have been duly authorized by all necessary corporate action on the part of the Company; (ii) will not result in any violation of the provisions of the charter or by-laws of the Company or any subsidiary; (iii) will not constitute a breach of, or Default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company pursuant to any Existing Instrument filed as an exhibit to the Registration Statement; or (iv) to the knowledge of such counsel, will not result in any violation of any law, administrative regulation or administrative or court decree applicable to the Company.

(xiii) The Company is not, and after receipt of payment for the Common Shares will not be, an "investment company" within the meaning of Investment Company Act.

In addition, such counsel shall state that they have participated in conferences with officers and other representatives of the Company, representatives of the independent public or certified public accountants for the Company and with representatives of the Underwriters at which the contents of the Registration Statement and the Prospectus, and any supplements or amendments thereto, and related matters were discussed and, although such counsel is not passing upon and does not assume any responsibility for the accuracy, completeness or fairness of the statements contained in the Registration Statement or the Prospectus (other than as specified above), and any supplements or amendments thereto, on the basis of the foregoing, nothing has come to their attention which would lead them to believe that either the Registration Statement or any amendments thereto, at the time the Registration Statement or such amendments became effective, contained an untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading or that the Prospectus, as of its date or at the First Closing Date or the Second Closing Date, as the case may be, contained an untrue statement

of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading (it being understood that such counsel need express no belief as to the financial statements or schedules or other financial or statistical data derived therefrom, included in the Registration Statement or the Prospectus or any amendments or supplements thereto).

In rendering such opinion, such counsel may rely (A) as to matters involving the application of laws of any jurisdiction other than the General Corporation Law of the State of Delaware, laws of the Commonwealth of Massachusetts or the federal law of the United States, to the extent they deem proper and specified in such opinion, upon the opinion (which shall be dated the First Closing Date or the Second Closing Date, as the case may be, shall be satisfactory in form and substance to the Underwriters, shall expressly state that the Underwriters may rely on such opinion as if it were addressed to them and shall be furnished to the Representatives) of other counsel of good standing whom they believe to be reliable and who are satisfactory to counsel for the Underwriters; provided, however, that such counsel shall further state that they believe that they and the Underwriters are justified in relying upon such opinion of other counsel, and (B) as to matters of fact, to the extent they deem proper, on certificates of responsible officers of the Company and public officials.

EXHIBIT A-2

The final opinion in draft form should be attached as Exhibit A-2 at the time this Agreement is executed.

Opinion of counsel for the Company to be delivered pursuant to Section 5(d) of the Underwriting Agreement.

References to the Prospectus in this Exhibit A include any supplements thereto at the Closing Date.

(xiv) The Company has been duly incorporated.

(xv) The Company has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and to enter into and perform its obligations under the Underwriting Agreement.

(xvi) The Company is duly qualified as a foreign corporation to transact business and is in good standing in each jurisdiction in which such qualification is required by reason of the ownership or leasing of property, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change.

(xvii) Each significant subsidiary incorporated in the United States (as defined in Rule 405 under the Securities Act) has been duly incorporated and is validly existing as a corporation in good standing under the laws of the jurisdiction of its incorporation, has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and, to the best knowledge of such counsel, is duly qualified as a foreign corporation to transact business and is in good standing in each jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change.

(xviii) All of the issued and outstanding capital stock of each such significant subsidiary incorporated in the United States has been duly authorized and validly issued, is fully paid and non-assessable and is owned by the Company, directly or through subsidiaries, to such counsel's knowledge, free and clear of any security interest, mortgage, pledge, lien, encumbrance or any pending or threatened claim.

(xix) No stockholder of the Company or any other person has any preemptive right, right of first refusal or other similar right to subscribe for or purchase securities of the Company arising (i) by operation of the charter or by-laws of the Company or (ii) to the best knowledge of such counsel, otherwise.

(xx) Except as disclosed in the Prospectus, to the knowledge of such counsel, there are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by the Underwriting Agreement, except for such rights as have been duly waived.

(xxi) To the knowledge of such counsel, the Company is not in violation of its charter or by-laws, except for such violations as would not, individually or in the aggregate, result in a Material Adverse Change.

In addition, such counsel shall state that they have participated in conferences with officers and other representatives of the Company, representatives of the independent public or certified public accountants for the Company and with representatives of the Underwriters at which the contents of the Registration Statement and the Prospectus, and any supplements or amendments thereto, and related matters were discussed and, although such counsel is not passing upon and does not assume any responsibility for the accuracy, completeness or fairness of the statements contained in the Registration Statement or the Prospectus (other than as specified above), and any supplements or amendments thereto, on the basis of the foregoing, nothing has come to their attention which would lead them to believe that either the Registration Statement or any amendments thereto, at the time the Registration Statement or such amendments became effective, contained an untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading or that the Prospectus, as of its date or at the First Closing Date or the Second Closing Date, as the case may be, contained an untrue statement of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading (it being understood that such counsel need express no belief as to the financial statements or schedules or other financial or statistical data derived therefrom, included [or incorporated by reference] in the Registration Statement or the Prospectus or any amendments or supplements thereto).

In rendering such opinion, such counsel may rely (A) as to matters involving the application of laws of any jurisdiction other than the General Corporation Law of the State of Delaware, laws of the Commonwealth of Massachusetts or the federal law of the United States, to the extent they deem proper and specified in such opinion, upon the opinion (which shall be dated the First Closing Date or the Second Closing Date, as the case may be, shall be satisfactory in form and substance to the Underwriters, shall expressly state that the Underwriters may rely on such opinion as if it were addressed to them and shall be furnished to the Representatives) of other counsel of good standing whom they believe to be reliable and who are satisfactory to counsel for the Underwriters; provided, however, that such counsel shall further state that they believe that they and the Underwriters are justified in relying upon such opinion of other counsel, and (B) as to matters of fact, to the extent they deem proper, on certificates of responsible officers of the Company and public officials.

NationsBanc Montgomery Securities, Inc.
Donaldson, Lufkin & Jenrette Securities Corporation
Paine Webber

As Representatives of the Several Underwriters
c/o NationsBanc Montgomery Securities, Inc.
600 Montgomery Street
San Francisco, California 94111

RE: MKS Instruments Inc. (the "Company")

Ladies & Gentlemen:

The undersigned is an owner of record or beneficially of certain shares of Common Stock of the Company ("Common Stock") or securities convertible into or exchangeable or exercisable for Common Stock. The Company proposes to carry out a public offering of Common Stock (the "Offering") for which you will act as the representatives of the underwriters. The undersigned recognizes that the Offering will be of benefit to the undersigned and will benefit the Company [by, among other things, raising additional capital for its operations]. The undersigned acknowledges that you and the other underwriters are relying on the representations and agreements of the undersigned contained in this letter in carrying out the Offering and in entering into underwriting arrangements with the Company with respect to the Offering.

In consideration of the foregoing, the undersigned hereby agrees that the undersigned will not, without the prior written consent of NMSI (which consent may be withheld in its sole discretion), directly or indirectly, sell, offer, contract or grant any option to sell (including without limitation any short sale), pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Securities Exchange Act of 1934, or otherwise dispose of any shares of Common Stock, options or warrants to acquire shares of Common Stock, or securities exchangeable or exercisable for or convertible into shares of Common Stock currently or hereafter owned either of record or beneficially (as defined in Rule 13d-3 under Securities Exchange Act of 1934, as amended) by the undersigned, or publicly announce the undersigned's intention to do any of the foregoing, for a period commencing on the date hereof and continuing through the close of trading on the date 180 days after the date of the Prospectus. The undersigned also agrees and consents to the entry of stop transfer instructions with the Company's transfer agent and registrar against the transfer of shares of Common Stock or securities convertible into or exchangeable or exercisable for Common Stock held by the undersigned except in compliance with the foregoing restrictions.

With respect to the Offering only, the undersigned waives any registration rights relating to registration under the Securities Act of any Common Stock owned either of record or beneficially by the undersigned, including any rights to receive notice of the Offering.

This agreement is irrevocable and will be binding on the undersigned and the respective successors, heirs, personal representatives, and assigns of the undersigned.

B-1

Printed Name of Holder

By:

Signature

Printed Name of Person Signing (and indicate capacity of person signing if signing as custodian, trustee, or on behalf of an entity)

LM

The Commonwealth of Massachusetts

EXHIBIT 3.1

Examiner

MICHAEL JOSEPH CONNOLLY
Secretary of State
ONE ASHBURTON PLACE, BOSTON, MASS. 02108

FEDERAL IDENTIFICATION No. 04-2277512

RESTATED ARTICLES OF ORGANIZATION

General Laws, Chapter 156B, Section 74

This certificate must be submitted to the Secretary of the Commonwealth within sixty days after the date of the vote of stockholders adopting the restated articles of organization. The fee for filing this certificate is prescribed by General Laws, Chapter 156B, Section 114. Make check payable to the Commonwealth of Massachusetts.

We, John R. Bertucci, President, and
Richard S. Chute, Clerk of

MKS Instruments, Inc.

(Name of Corporation)

located at 34 Third Avenue, Burlington, Massachusetts 01803

do hereby certify that the following restatement of the articles of organization of the corporation was duly adopted and authorized by unanimous written consent of all the Directors dated January 15, 1982.

1. The name by which the corporation shall be known is:

MKS Instruments, Inc.

2. The purposes for which the corporation is formed are as follows:

See Continuation Sheets 2A and 2B.

Note: If the space provided under any article or item on this form is insufficient, additions shall be set forth on separate 8 1/2 x 11 sheets of paper leaving a left hand margin of at least 1 inch for binding. Additions to more than one article may be continued on a single sheet so long as each article requiring each such addition is clearly indicated.

3. The total number of shares and the par value, if any, of each class of stock which the corporation is authorized to issue is as follows:

CLASS OF STOCK	WITHOUT PAR VALUE	WITH PAR VALUE	
	NUMBER OF SHARES	NUMBER OF SHARES	PAR VALUE
Preferred	None	None	None
Class A Common	10,000	None	None
Class B Common	10,000	None	None

- *4. If more than one class is authorized, a description of each of the different classes of stock with, if any, the preferences, voting powers, qualifications, special or relative rights or privileges as to each class thereof and any series now established:

See Continuation Sheet 4A.

- *5. The restrictions, if any, imposed by the articles of organization upon the transfer of shares of stock of any class are as follows:

See Continuation Sheets 5A, 5B, 5C and 5D.

- *6. Other lawful provisions, if any, for the conduct and regulation of the business and affairs of the corporation, for its voluntary dissolution, or for limiting, defining, or regulating the powers of the corporation, or of its directors or stockholders, or of any class of stockholders:

See Continuation Sheet 6A.

*If there are no such provisions state "None".

2. The purposes for which the corporation is formed are as follows:

To design, manufacture, sell, lease and license instruments of all kinds, including electromechanical, electronic and mechanical gauges for the measurement of pressure, temperature, acceleration, flow and level of liquids and gases; to design, manufacture, sell, lease and license control systems incorporating measuring devices, and control systems separate from measuring devices, for the control of production processes and operations of all kinds; to design, manufacture, sell, lease and license instrumentation for military use; to design, manufacture, sell, lease and license instrumentation for use in research laboratories, in industry, in educational institutions, for medical purposes and for use elsewhere and for other purposes; and in general to design, manufacture, sell, lease and license electro-mechanical, electronic and mechanical devices of all kinds.

To buy and sell at wholesale and retail, or otherwise, to manufacture, produce, adapt, repair, dispose of, export, import and in any other manner to deal in goods, wares, merchandise, articles and things of manufacture or otherwise of all materials, supplies and other articles and things necessary or convenient for use in connection with any of said businesses or any other business or any part thereof; and to manufacture, repair, purchase, sell, lease, dispose of and otherwise deal in machinery, tools, and appliances which are or may be used in connection with the purchase, sale, production, adaptation, repair, disposition of, export, import or other dealings in said goods, wares, merchandise, articles and things.

To purchase, lease or otherwise acquire as a going concern or otherwise all or any part of the franchises, rights, property, assets, business, good will or capital stock of any persons, firm, corporation, trust or association engaged in whole or in part in any business in which this corporation is empowered to engage, or in any other business; to pay for the same in whole or in part in cash, stock, bonds, notes, securities or other evidence of indebtedness of this corporation or in any other manner; to assume as part of the consideration or otherwise any and all debts, contracts or liabilities, matured or unmatured, fixed or contingent, of any such person, firm or corporation, trust or association; and to operate, manage, develop and generally to carry on the whole or any part of any such business under any name or names which it may select or designate.

To construct, lease, hire, purchase or otherwise acquire and hold or maintain, and to rebuild, enlarge, improve, furnish, equip, alter, operate and dispose of warehouses, factories, offices and other buildings, real estate, structures or parts thereof, and appliances for the preparation, manufacture, purchase, sale and distribution of goods, wares, merchandise, things, and articles of all kinds.

To acquire, hold, use, sell, assign, lease, grant licenses in respect of, mortgage, or otherwise dispose of franchises, letters patent of the United States or of any foreign country, patent rights, licenses and privileges, inventions, improvements and processes, systems, copyrights, trade-marks and trade names, relating to, or useful in connection with, any business of this corporation.

To buy or otherwise acquire, to sell, assign, pledge, or otherwise dispose of and deal in stocks, bonds, securities, notes and other obligations of any person, firm or corporation, including this corporation, organized for or engaged in similar or cognate purposes; also stocks, bonds, securities, notes, and other obligations of any person, firm, or corporation, including this corporation, which it may be found or deemed necessary, valuable, or convenient for this corporation to acquire and deal in, in pursuance or furtherance of or in connection with the businesses herein specified, or any other business.

To borrow money and contract indebtedness for all proper corporate purposes, to issue bonds, notes, and other evidences of indebtedness, to secure the same by pledge, mortgage, or lien on all or any part of the property of the corporation, tangible or intangible; and to assume or guarantee or secure in like manner or otherwise, the leases, contracts, or other obligations, fixed or contingent, or the payment of any dividends on any stock or shares or of the principal or interest on any bonds, notes, or other evidences of indebtedness of any person, firm, corporation, trust, or association in which this corporation has a financial interest.

To enter into, make, and perform contracts of every name, nature, and kind with any person, firm, association, or corporation which may be deemed valuable, expedient, or convenient for this corporation in pursuance of or in furtherance of or in connection with any of the objects of incorporation of this corporation or in connection with any of the businesses or purposes herein specified.

The enumeration of specific powers herein shall not be construed as limiting or restricting in any way the general powers herein set forth, but nothing herein contained shall be construed as authorizing the business of banking.

4. If more than one class is authorized, a description of each of the different classes of stock with, if any, the preferences, voting powers, qualifications, special or relative rights or privileges as to each class thereof and any series now established:

The holders of shares of Class B Common stock of the corporation shall not be entitled to vote for the election of Officers or Directors or with respect to any other aspect of the business of the corporation, or any matter or thing which may come or be brought before any meeting of the Stockholders of the corporation; and said Class B Common stock shall not be deemed to be a class of stock entitled to vote for any purpose whatsoever. In all other respects, however, the Class B Common stock and the Class A Common stock of the corporation, and the respective rights and preferences thereof shall be equal, and neither class shall have any priority over the other with respect to the payment of dividends or to distributions in liquidation.

5. The restrictions, if any, imposed by the articles of organization upon the transfer of shares of stock of any class are as follows:

Section 5. Restrictions. None of the corporation's stock, of any class, may be transferred except as hereinafter provided:

(a) Before making any proposed disposition of any of the corporation's stock, the holder of the stock shall give written notice to the Board of Directors specifying in detail the nature of the proposed disposition and its terms, the class and number of the shares involved, and the consideration for the proposed disposition, if any. Such notice shall constitute an offer by the holder to sell the shares involved to the corporation at their Agreed Value, as determined hereunder, or, if such proposed disposition is one for a pecuniary consideration less than the Agreed Value of the shares involved, such notice shall constitute an offer to sell the shares to the corporation for such proposed pecuniary consideration.

(b) Within thirty days after receipt of such notice, the Board of Directors shall give written notice to the offering holder stating whether the corporation accepts or rejects the holder's offer. If the offer is accepted, such notice by the corporation shall state the price to be paid for the shares and shall specify whether the corporation elects to pay a part of the purchase price by means of the corporation's note, as provided for in subsection (d) hereof. The offering holder of such shares shall deliver the shares to the corporation, suitably endorsed, within ten days after receipt of the corporation's notice of acceptance, and upon receipt of the shares, the corporation shall make payment therefor in the manner hereinafter provided.

If such offer is rejected by the corporation, the Directors shall transmit forthwith such offer to the record owners of the Class A Common Stock of the corporation who shall, subject to the provisions of this subsection (b), have the right to purchase the offered shares, in amounts proportionate to their respective holdings of said Class A Common stock, upon all of the same terms and conditions upon which the corporation might have purchased said offered shares, except that payment for offered shares shall be made in cash unless otherwise agreed upon between the parties. Each such owner to whom such shares are offered shall have the right within thirty (30) days of such offer to purchase the entire number of shares apportioned to him as above or to purchase none, and such acceptance shall be extended by written notice to the Board of Directors given within such time. If any owner of Class A Common stock shall

not accept such offer, the Board of Directors shall forthwith notify the remaining shareholders of Class A Common stock that they may purchase in proportion to their respective holdings of such stock the shares which such owner was entitled to purchase. Each such shareholder to whom such shares are offered shall have the right within ten (10) days of such offer to purchase the entire number of shares apportioned to him as above or to purchase none. Within three days after the expiration of said ten-day period the Board of Directors shall give written notice to the offering holder advising him in detail of the elections made with respect to the offered shares by the owners of the Class A Common stock. If the offer has been accepted with respect to all of the offered shares, then the offering holder of such shares shall deliver the same to the corporation, suitably endorsed, for the account of the accepting owners, within ten days after receipt of said last-mentioned notice from the Board of Directors and upon receipt of the shares by the corporation the accepting owners of the Class A Common stock shall make payment therefor in accordance with the terms of their respective acceptances.

If such offer is rejected by the corporation and if such offer to the holders of the Class A Common stock is rejected, in whole or in part, the offering shareholder, at any time within six months after receipt of any such notice of rejection, may effect the disposition of the shares which was set forth in such offering shareholder's notice to the Board.

(c) The Agreed Value of the stock of the corporation shall be such as may from time to time be determined by the unanimous agreement in writing of the holders of the corporation's Class A Common stock, such determination to be reviewed and either confirmed or adjusted at reasonable intervals. The Agreed Value of the Class B Common stock shall be ninety (90) percent of the Agreed Value of the Class A Common stock, to reflect the fact that the Class B Common stock is not entitled to vote.

The Agreed Value of the stock of the corporation shall be reviewed as herein provided at six-month intervals following the adoption of this by-law and at the expiration of any such six-month period, if no agreement is arrived at, any owner of stock may demand from the owners of Class A Common stock that an agreement be reached and in the absence of such agreement within ten days thereafter, such value shall be determined by an arbitrator appointed by the President, or by some other appropriate official, of the American Arbitration Association, upon written request for such appointment made by any owner of stock of the corporation. The decision of such arbitrator shall be binding upon the parties, and may be enforced by any court having jurisdiction, but each owner of stock of the corporation shall

be entitled to appear before such arbitrator, to be represented by counsel, and to present evidence. The expenses of arbitration, other than expenses for counsel and witnesses, shall be borne pro rata, according to the number of shares held, by the owners of the stock of the corporation.

(d) In the event the corporation shall elect to accept the offer of the holder of its stock, as herein provided, the corporation may pay the full purchase price for such stock in cash at the time of the delivery of the stock to the corporation or, at the corporation's sole election, it may pay said purchase price partly in cash and partly in the form of an unsecured note of the corporation. If the corporation shall make the latter election, then in such event the corporation shall pay at least one-third (1/3) of the purchase price for the stock at the time the stock is delivered to the corporation, and the corporation shall then deliver to the selling shareholder the note of the corporation for the unpaid balance of the purchase price for the stock, bearing interest at the rate of 6% per annum on the unpaid principal balance and payable in or within two years from its date.

(e) Each share of stock of the corporation is subject to the requirements and restrictions upon the transfer of such shares set forth in this Section 5, and the same shall constitute a contract of each shareholder with the corporation, shall be binding upon each shareholder and his heirs, assigns, executors, administrators, or other legal representatives and upon all other persons succeeding to or standing in the place of or holding under the shareholder, whether by act of the shareholder or by operation of law. These provisions shall not be discharged by any transfer of shares which may be made in compliance with the provisions hereof, but shall apply anew to such shares in the hands of the new holder thereof. These provisions shall not restrict the making of a bona fide pledge of any shares to secure an indebtedness, but shall apply fully with respect to any proposed transfer from the name of the shareholder pursuant to such pledge, whether upon foreclosure or otherwise and whether to the pledgee or to any other person. These provisions shall not restrict the transfer of shares, without consideration, to the transferor's spouse or to the transferor's issue or to the spouses or the transferor's issue, or any of them (or to a form of joint ownership between the transferor and the transferees described next above, or any of them, or to a trust for the sole benefit of the transferor and the transferees described next above or any of them), but shall apply fully with respect to any proposed disposition by any such transferee, except as provided in this and the preceding sentence.

Continuation Sheet 5D

(f) The determination of the Board of Directors under the provisions of this Section 5 shall be made by majority vote except that no waiver of the provisions of this Section 5 in the case of any proposed disposition of stock shall be granted by the vote of less than eighty (80) percent of the members of the Board of Directors. No Director shall be disqualified from voting on any matter arising under the provisions of this Section 5 by reason of such Director's ownership of stock of the corporation which might, directly or indirectly, be affected by such vote.

(g) In the event of any breach of any of the provisions of this Section 5 by any holder of any of the corporation's stock, none of the rights or privileges attaching to such stock (including, without limitation, voting rights and rights to dividends) may be exercised or enjoyed with respect to such stock by such holder or by any purported transferee from such holder while such breach shall continue, but nothing herein contained shall be deemed to preclude lawful action by the corporation to enforce the provisions of this Section 5.

6. Other lawful provisions, if any, for the conduct and regulation of the business and affairs of the corporation, for its voluntary dissolution, or for limiting, defining, or regulating the powers of the corporation, or of its directors or stockholders, or of any class of stockholders:

Pre-Emptive Rights. No stockholder shall, by reason of ownership of stock of the corporation, have any pre-emptive right to purchase unissued stock of the corporation, or to subscribe to stock of the corporation, or to purchase stock of the corporation previously issued and held in the treasury of the corporation, and, subject to the provisions of applicable law, the authorized and unissued stock of the corporation shall be issued to such person, firm, corporation or other legal entity, in such amounts, at such times, and for such consideration as a majority of the Board of Directors may from time to time determine.

*We further certify that the foregoing restated articles of organization effect no amendments to the articles of organization of the corporation as heretofore amended,

None

(*If there are no such amendments, state "None".)

Briefly describe amendments in space below:

None

IN WITNESS WHEREOF AND UNDER THE PENALTIES OF PERJURY, we have hereto signed our names this 15th day of January in the year 1982.

/s/ John R. Bertucci
----- President
John R. Bertucci

/s/ Richard S. Chute
----- Clerk
Richard S. Chute

THE COMMONWEALTH OF MASSACHUSETTS

RESTATED ARTICLES OF ORGANIZATION

(General Laws, Chapter 156B, Section 74)

I hereby approve the within restated articles of organization and, the filing fee in the amount of \$15.00 having been paid, said articles are deemed to have been filed with me this 19th day of January, 1982.

/s/ Michael Joseph Connolly

MICHAEL JOSEPH CONNOLLY
Secretary of State

TO BE FILLED IN BY CORPORATION
PHOTOCOPY OF RESTATED ARTICLES OF ORGANIZATION TO BE SENT

TO: Richard S. Chute, Esquire
Hill & Barlow
225 Franklin Street
Boston, Massachusetts 02110
Telephone 617/423-6200

Copy Mailed [SEAL OF WILLIAM FRANCIS GALVIN
SECRETARY OF THE COMMONWEALTH
DATED 2/20/96]

THE COMMONWEALTH OF MASSACHUSETTS

MICHAEL JOSEPH CONNOLLY
SECRETARY OF STATE
ONE ASHBURTON PLACE
BOSTON, MASS. 02108

FEDERAL IDENTIFICATION
NO. 04-2277512

CG

EXAMINER

ARTICLES OF
MERGER OF PARENT AND SUBSIDIARY CORPORATIONS
PURSUANT TO GENERAL LAWS, CHAPTER 156B, SECTION 82

The fee for filing this certificate is
prescribed by General Laws, Chapter 156B, Section 114.
Make check payable to the Commonwealth of Massachusetts.

We, John R. Bertucci and Richard S. Chute, President*/and Clerk*/ of
MKS Instruments, Inc. 042277512

name of corporation
organized under the laws of the Commonwealth of Massachusetts and herein called
the parent corporation, do hereby certify as follows:

1. That the subsidiary corporation(s) to be merged into the parent
corporations is as follows*:

Name	State of Organization	Date of Organization
MKS Disc, Inc. 046311363	Massachusetts	10/31/72

2. That the parent corporation owns at least ninety per cent of the outstanding
shares of each class of the stock of each subsidiary corporation to be merged
into the parent corporation.

3.

*Delete the inapplicable words. In case the parent corporation is organized
under the laws of a state other than Massachusetts these articles are to be
signed by officers having corresponding powers and duties.

4. That at a meeting of the directors of the parent corporation the following vote, pursuant to subsection (a) of General Laws, Chapter 156B, Section 82, was duly adopted:

VOTED: That MKS Disc, Inc., a Massachusetts corporation and a wholly-owned subsidiary corporation of the Corporation, be merged with and into the Corporation in accordance with the provisions of Section 82 of the Massachusetts Business Corporation Law, the effective date of the merger to be the date of filing of the Articles of Merger of Parent and Subsidiary Corporations with the State Secretary of the Commonwealth of Massachusetts; that the President and Clerk of the Corporation be and hereby are authorized in the name and on behalf of the Corporation to execute the Articles of Merger of Parent and Subsidiary Corporations attached hereto (the "Articles of Merger") and to file the Articles of Merger with the State Secretary of the Commonwealth of Massachusetts; and in furtherance thereof that the President, any Vice President, Treasurer, Clerk, and Assistant Clerk of the Corporation or any one or more of them be and hereby are authorized in the name and on behalf of the Corporation to execute and deliver any and all documents and instruments and to take any and all action as they or any one or more of them may deem necessary or appropriate to effectuate the merger of MKS Disc, Inc. with and into the Corporation.

5. The effective date of the merger as specified in the vote set out under Paragraph 4 is the date of filing of these articles of merger of parent and subsidiary corporations.

6.

IN WITNESS WHEREOF and under the penalties of perjury we have hereto signed our names this 15th day of December, 1986.

/s/ John R. Burtucci President*

/s/ Richard S. Chute Clerk*

*Delete the inapplicable words. In case the parent corporation is organized under the laws of a state other than Massachusetts these articles are to be signed by officers having corresponding powers and duties.

COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF MERGER OF PARENT AND SUBSIDIARY CORPORATIONS
(General Laws, Chapter 156B, Section 82)

I hereby approve the within articles of merger of parent and subsidiary corporations and, the filing fee in the amount of \$200.00 having been paid, said articles are deemed to have been filed with me this 15th day of December, 1986.

/s/ Michael J. Connolly

MICHAEL JOSEPH CONNOLLY
Secretary of State

TO BE FILLED IN BY CORPORATION
Photo Copy of Merger To Be Sent

TO: Richard S. Chute, Esquire

Hill & Barlow

225 Franklin Street

Boston, MA 02110

Telephone 617-423-6200

Copy Mailed [SEAL OF WILLIAM FRANCIS GALVIN
SECRETARY OF THE COMMONWEALTH
DATED 2/20/96]

THE COMMONWEALTH OF MASSACHUSETTS

MICHAEL JOSEPH CONNOLLY

FEDERAL IDENTIFICATION

Secretary of State

NO. 04-2277512

ONE ASHBURTON PLACE, BOSTON, MASS. 02108

ARTICLES OF AMENDMENT

GENERAL LAWS, CHAPTER 156B, SECTION 72

This certificate must be submitted to the Secretary of the Commonwealth within sixty days after the date of the vote of stockholders adopting the amendment. The fee for filing this certificate is prescribed by General Laws, Chapter 156B, Section 114. Make check payable to the Commonwealth of Massachusetts.

We, John R. Bertucci, President and
Richard S. Chute, Clerk of

MKS Instruments, Inc.

(Name of Corporation)

located at 34 Third Avenue, Burlington, Massachusetts 01803

- ----- do hereby certify that the following amendment to the restated
Name articles of organization of the corporation was duly adopted by
Approved written consent dated December 15, 1986, by vote of
2454 shares of Class A Common out of 2454 shares outstanding,
(Class of Stock)

CROSS OUT being all of each class outstanding and entitled to vote thereon. (2)
INAPPLICABLE
CLAUSE

C / /

P / /

M / /

- (1) For amendments adopted pursuant to Chapter 156B, Section 70.
- (2) For amendments adopted pursuant to Chapter 156B, Section 71.

4 Note: If the space provided under any Amendment or item on this form
is insufficient, additions shall be set forth on separate 8 1/2 - 11
- ----- sheets of paper leaving a left hand margin of at least 1 inch for
P.C. binding. Additions to more than one Amendment may be continued on a
single sheet so long as each Amendment requiring each such addition
is clearly indicated.

FOR INCREASE IN CAPITAL FILL IN THE FOLLOWING:

	(-----shares preferred)	with par value
	(-----shares common)	
The total amount of capital stock		:	
already authorized is	(-----shares preferred)	without par value
	(-----shares common)	
	(-----shares preferred)	with par value
	(-----shares common)	
The amount of additional capital		:	
stock authorized is	(-----shares preferred)	without par value
	(-----shares common)	

Voted: That the Restated Articles of Organization of the Corporation be and hereby are amended by deleting and striking in their entirety the restrictions upon the transfer of shares of stock contained in article 5. of the Restated Articles of Organization of the Corporation so that there are no restrictions imposed by the articles of organization of the Corporation upon the transfer of shares of stock of any class of the Corporation; that the President and Clerk of the Corporation be and hereby are authorized in the name and on behalf of the Corporation to execute Articles of Amendment to effectuate such amendment of the Restated Articles of Organization of the Corporation, a copy of which is attached hereto (the "Articles of Amendment"), and to file the Articles of Amendment with the State Secretary of the Commonwealth of Massachusetts; and in furtherance thereof that the President, any Vice President, Treasurer, Clerk, and Assistant Clerk of the Corporation or any one or more of them be and hereby are authorized in the name and on behalf of the Corporation to execute and deliver any and all documents and instruments and to take any and all action as they or any one or more of them may deem necessary or appropriate to effectuate such amendment of the Restated Articles of Organization of the Corporation.

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 156B, Section 6 of The General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

IN WITNESS WHEREOF AND UNDER THE PENALTIES OF PERJURY, we have hereto signed our names this 15th day of December, in the year 1986

/s/ John R. Bertucci President

John R. Bertucci

/s/ Richard S. Chute Clerk

Richard S. Chute

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT

(General Laws, Chapter 156B, Section 72)

I hereby approve the within articles of amendment
and, the filing fee in the amount of \$75.00
having been paid, said articles are deemed to have
been filed with me this 16th
day of December, 1986.

/s/ Michael Joseph Connolly

MICHAEL JOSEPH CONNOLLY
Secretary of State

TO BE FILLED IN BY CORPORATION
PHOTO COPY OF AMENDMENT TO BE SENT

TO: Richard S. Chute
Hill & Sarlow

225 Franklin Street

Boston, MA 02110

Telephone 617-423-6200

Copy Mailed

[STATE SEAL]

THE COMMONWEALTH OF MASSACHUSETTS
OFFICE OF THE MASSACHUSETTS SECRETARY OF STATE
MICHAEL JOSEPH CONNOLLY, Secretary
ONE ASHBURTON PLACE, BOSTON, MASS. 02180

FEDERAL IDENTIFICATION
NO. 04-2277512

EXAMINER

N/A

Name
Approved

C []
P []
M []

4

P.C.

ARTICLES OF AMENDMENT

General Laws, Chapter 156B, Section 72

This certificate must be submitted to the Secretary of the Commonwealth within sixty days after the date of the vote of stockholders adopting the amendment. The fee for filing this certificate is prescribed by General Laws, Chapter 156B, Section 114. Make check payable to the Commonwealth of Massachusetts.

We, John R. Bertucci, President and
Richard S. Chute, Clerk of

MKS Instruments, Inc.

(Name of Corporation)

located at Six Shattuck Road, Andover, Massachusetts 01810

do hereby certify that the following amendment to the restated articles of organization of the corporation was duly adopted by written consent dated January 8, 1987, by vote of

2454 shares of Class A Common out of 2454 shares outstanding,

(Class of Stock)

3250 shares of Class B Common out of 3250 shares outstanding,

(Class of Stock)

being all of each class outstanding and entitled to vote thereon and of each class of series of stock whose rights are adversely affected thereby:

- (1) for amendments adopted pursuant in Chapter 156B, Section 70.
- (2) for amendments adopted pursuant to Chapter 156B, Section 71.

Note: If the space provided under any Amendment or item on this form is insufficient, additions shall be set forth on separate 8 1/2 x 11 sheets of paper leaving a left hand margin of at least 1 inch for binding. Additions to more than one Amendment may be continued on a single sheet so long as each Amendment requiring each such addition is clearly indicated

TO CHANGE the number of shares and the par value, if any, of each class of stock within the corporation fill in the following:

The total presently authorized is:

KIND OF STOCK	NO PAR VALUE NUMBER OF SHARES	WITH PAR VALUE NUMBER OF SHARES	PAR VALUE
COMMON			
PREFERRED			

CHANGE the total to:

KIND OF STOCK	NO PAR VALUE NUMBER OF SHARES	WITH PAR VALUE NUMBER OF SHARES	PAR VALUE
COMMON			
PREFERRED			

VOTED: That the Restated Articles of Organization of the Corporation be and hereby are amended by adding the following provision to article 6 of the Restated Articles of Organization of the Corporation so that article 6 of the Restated Articles of Organization of the Corporation shall contain the following provision:

"A director of the corporation shall not be personally liable to the corporation or its stockholders for monetary damages for breach of fiduciary duty as a director notwithstanding any provision of law imposing such liability, except for liability (i) for any breach of the director's duty of loyalty to the corporation or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 61 or 62 of the Massachusetts Business Corporation Law, or (iv) for any transaction from which the director derived an improper personal benefit.

If the Massachusetts Business Corporation Law is amended, after approval by the stockholders of the corporation of this provision, to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the corporation shall be eliminated or limited to the fullest extent permitted by the Massachusetts Business Corporation Law, as so amended. Any amendment, repeal, or modification of this provision by the stockholders of the corporation shall not adversely affect any right or protection of a director of the corporation existing at the time of such amendment, repeal, or modification."

; that the President and Clerk of the Corporation be and hereby are authorized in the name and on behalf of the Corporation to execute Articles of Amendment to effectuate such amendment of the Restated Articles of Organization of the Corporation, a copy of which is attached hereto (the "Articles of Amendment"), and to file the Articles of Amendment with the State Secretary of the Commonwealth of Massachusetts; and in furtherance thereof that the President, any Vice President, Treasurer, Clerk, and Assistant Clerk of the Corporation or any one or more of them be and hereby are authorized in the name and on behalf of the Corporation to execute and deliver any and all documents and instruments and to take any and all action as they or any one or more of them may deem necessary or appropriate to effectuate such amendment of the Restated Articles of Organization of the Corporation.

The foregoing amendment will become effective when these articles of amendment are filed in accordance with Chapter 156B, Section 6 of The General Laws unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

IN WITNESS WHEREOF AND UNDER THE PENALTIES OF PERJURY, we have hereto signed our names this 9th day of February, in the year 1987.

/s/ John R. Bertucci President

John R. Bertucci

/s/ Richard S. Chute Clerk

Richard S. Chute

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT

(General Laws, Chapter 156B, Section 72)

I hereby approve the within articles of amendment and, the filing fee in the amount of \$75.00 having been paid, said articles are deemed to have been filed with me this 11th day of February, 1987.

/s/ Michael J. Connolly

MICHAEL JOSEPH CONNOLLY
Secretary of State

TO BE FILLED IN BY CORPORATION

PHOTO COPY OF AMENDMENT TO BE SENT

TO: Richard S. Chute, Esq.
Hill & Barlow

225 Franklin Street
Boston, MA 02110

Telephone (617) 423-6200

Copy Mailed

[SEAL OF WILLIAM FRANCIS GALVIN,
SECRETARY OF THE COMMONWEALTH
DATED 2/20/96]

The Commonwealth of Massachusetts
WILLIAM FRANCIS GALVIN
Secretary of the Commonwealth
ONE ASHBURTON PLACE
BOSTON, MASS. 02108

FEDERAL IDENTIFICATION NO. 004-2277512

ARTICLES OF
MERGER OF PARENT AND SUBSIDIARY CORPORATIONS
PURSUANT TO GENERAL LAWS, CHAPTER 156B, SECTION 82

The fee for filing this certificate is prescribed by
General Laws, Chapter 156B, Section 114.
Make check payable to the Commonwealth of Massachusetts.

* * * *

We, John R. Bertucci and Richard S. Chute, President* and Clerk* of
MKS Instruments, Inc.

name of corporation

organized under the laws of Massachusetts and herein called the parent
corporation, do hereby certify as follows:

1. That the subsidiary corporation(s) to be merged into the parent
corporations are/is as follows:

Name	State of Organization	Date of Organization
UTI Instruments Company	CA	09/26/73

2. That the parent corporation owns at least ninety per cent of the
outstanding shares of each class of the stock of each subsidiary corporation to
be merged into the parent corporation.

3. That in the case of each of the above-named corporations the laws of
the state of its organization, if other than Massachusetts, permit the merger
herein provided for and that all action required under the laws of each such
state in connection with this merger has been duly taken. (If all the
corporations are organized under the laws of Massachusetts and if General Laws,
Chapter 156B is applicable to them, then Paragraph 3 may be deleted.)

* Delete the inapplicable words. In case the parent corporation is organized
under the laws of a state other than Massachusetts these articles are to be
signed by officers having corresponding powers and duties.

4. That at a meeting of the directors of the parent corporation the following vote, pursuant to subsection (a) of General Laws, Chapter 156B, Section 82, was duly adopted:

VOTED: That the Corporation merge into itself UTI
----- Instruments Company, a California corporation,
 with the Corporation surviving the merger
 (the "Merger"), in accordance with the
 provisions of Section 82 of Chapter 156B of the
 Massachusetts General Laws.

FURTHER
VOTED: That the effective date of the Merger shall be
----- the date of filing of appropriate Articles of
 Merger with the Secretary of State of Massachusetts.

FURTHER
VOTED: That any officer of the Corporation, acting singly,
----- be and he hereby is, authorized and directed to
 take any further actions, and to execute and deliver
 any further documents and certificates, which may
 be necessary or appropriate to effectuate the Merger
 described herein.

5. The effective date of the merger as specified in the vote set out under Paragraph 4 is

IN WITNESS WHEREOF and under the penalties of perjury we have hereto signed our names this 17th day of November, 1995.

/s/ John R. Bertucci
----- President*
John R. Bertucci

/s/ Richard S. Chute
----- Clerk*
Richard S. Chute

* Delete the inapplicable words. In case the parent corporation is organized under the laws of a state other than Massachusetts these articles are to be signed by officers having corresponding powers and duties.

COMMONWEALTH OF MASSACHUSETTS
ARTICLES OF MERGER OF PARENT AND SUBSIDIARY CORPORATIONS
(General Laws, Chapter 156B, Section 82)

I hereby approve the within articles of merger of parent and subsidiary corporations and, the filing fee in the amount of \$250 having been paid, said articles are deemed to have been filed with me this 17th day of November, 1995.

/s/ William Francis Galvin
William Francis Galvin
Secretary of the Commonwealth

TO BE FILLED IN BY CORPORATION
Photo Copy of Merger To Be Sent

TO: Terrence W. Mahoney, Esq.
Hill & Barlow

One International Place

Boston, MA 02110

Telephone 617-428-3000

THE COMMONWEALTH OF MASSACHUSETTS
WILLIAM FRANCIS GALVIN
Secretary of the Commonwealth
One Ashburton Place, Boston, Massachusetts 02108-1512

ARTICLES OF AMENDMENT
(General Laws, Chapter 156B, Section 72)

We, John R. Bertucci, *President,

and Richard S. Chute, *Clerk,

of MKS Instruments, Inc.,

(Exact name of corporation)

located at Six Shattuck Road, Andover, MA 01810,

(Street address of corporation in Massachusetts)

certify that these Articles of Amendment affecting articles numbered: 3

3

(Number those articles 1, 2, 3, 4, 5 and/or 6 being amended)

of the Articles of Organization were duly adopted at a meeting held on
January 9, 1998 by vote of:

2,454 shares of Class A Common of 2,454 shares outstanding,

(type, class & series, if any)

3,250 shares of Class B Common of 3,250 shares outstanding,

(type, class & series, if any)

and

shares of of shares outstanding,

(type, class & series, if any)

(1)**being all and of each type, class or series of stock whose rights are
adversely affected thereby:

*Delete the inapplicable words. **Delete the inapplicable clause.

(1)For amendments adopted pursuant to Chapter 156B, Section 70.

(2)For amendments adopted pursuant to Chapter 156B, Section 71.

Note: If the space provided under any article or item on this form is
insufficient, additions shall be set forth on one side only of separate 8 1/2 x
11 sheets of paper with a left margin of at least 1 inch. Additions to more
than one article may be made on a single sheet so long as each article
requiring each addition is clearly indicated.

To change the number of shares and the par value (if any) of any type, class or series of stock which the corporation is authorized to issue, fill in the following:

The total presently authorized is:

WITHOUT PAR VALUE STOCKS			WITH PAR VALUE STOCKS		
TYPE	NUMBER OF SHARES		TYPE	NUMBER OF SHARES	PAR VALUE
Common:	Class A	10,000	Common:	None	None
	Class B	10,000		None	None
Preferred:	None		Preferred:	None	None

Change the total authorized to:

WITHOUT PAR VALUE STOCKS			WITH PAR VALUE STOCKS		
TYPE	NUMBER OF SHARES		TYPE	NUMBER OF SHARES	PAR VALUE
Common:	Class A	6,000,000	Common:	None	None
	Class B	10,000,000		None	None
Preferred:	None		Preferred:	None	None

VOTED: To amend the Restated Articles of Organization, as amended, to increase the authorized Class A Common Stock, no par value per share, of the Corporation from 10,000 shares to 6,000,000 shares and to increase the authorized Class B Common Stock, no par value per share of the Corporation from 10,000 shares to 10,000,000 shares, so that after the effective date of such amendment the total authorized capital stock of the Corporation shall consist of 6,000,000 shares of Class A Common Stock, no par value per share, and 10,000,000 shares of Class B Common Stock, no par value per share.

The foregoing amendment(s) will become effective when these Articles of Amendment are filed in accordance with General Laws, Chapter 156B, Section 6 unless these articles specify, in accordance with the vote adopting the amendment, a later effective date not more than thirty days after such filing, in which event the amendment will become effective on such later date.

Later effective date: _____.

SIGNED UNDER THE PENALTIES OF PERJURY, this 14th day of January, 1998,

/s/ John R. Bertucci, *President

/s/ Richard S. Chute, *Clerk

*Delete the inapplicable words.

THE COMMONWEALTH OF MASSACHUSETTS

ARTICLES OF AMENDMENT
(GENERAL LAWS, CHAPTER 156B, SECTION 72)

=====

I hereby approve the within Articles of Amendment and, the filing fee in the amount of \$15,980 having been paid, said articles are deemed to have been filed with me this 14th day of January 1998.

Effective date: January 14, 1998

WILLIAM FRANCIS GALVIN
Secretary of the Commonwealth

TO BE FILLED IN BY CORPORATION
PHOTOCOPY OF DOCUMENT TO BE SENT TO:

Richard N. Kimball, Esq.

Hale and Dorr LLP
60 State Street

Boston, MA 02109

Tel: (617) 526-6000

BY-LAWS
OF
MKS INSTRUMENTS, INC.

ARTICLE I

Name, Location, Corporate Seal, and Fiscal Year

Section 1. Name. The name of the corporation is MKS Instruments, Inc.

Section 2. Location. The principal office of the corporation in Massachusetts shall be located at the place set forth on the form of the articles of organization or on a certificate filed with the State Secretary. The Board of Directors may change the location of the principal office in Massachusetts and establish such other offices as it deems appropriate.

Section 3. Corporate Seal. The Board of Directors may adopt and alter the form of seal of the corporation.

Section 4. Fiscal Year. Except as otherwise determined from time to time by the Board of Directors, the fiscal year of the corporation shall in each year end on December 31.

ARTICLE II

Stockholders

Section 1. Annual Meeting. The annual meeting of stockholders shall be held within six months after the end of

each fiscal year of the corporation on a date to be fixed by the Board of Directors or the President (which date shall not be a legal holiday in the place where the meeting is to be held) at the time and place to be fixed by the Board of Directors or the President and stated in the notice of the meeting. The purposes for which the annual meeting is to be held, in addition to those prescribed by law, by the articles of organization or by these by-laws, may be specified by the Board of Directors or the President. If no annual meeting is held in accordance with the foregoing provisions, a special meeting may be held in lieu of the annual meeting, and any action taken at that special meeting shall have the same effect as if it had been taken at the annual meeting, and in such case all references in these by-laws to the annual meeting of stockholders shall be deemed to refer to such special meeting.

Section 2. Special Meetings. Special meetings of the stockholders may be called by the President or by the Board of Directors, who shall state the purposes for which the meeting is to be held. The Clerk, or, in the case of the death, absence, incapacity or refusal of the Clerk, any other officer, shall call a special meeting upon written application of one or more stockholders holding at least one-tenth part in interest of the capital stock entitled to vote at the meeting, which application shall state the time, place and purposes of the proposed meeting. If notice of a special meeting shall have been duly waived by every stockholder entitled to notice thereof, or by his attorney

thereunto duly authorized, such meeting shall be deemed to have been duly called at the request of the stockholders.

Section 3. Time and Place of Meetings. All meetings of stockholders shall be held at a suitable time at the principal office of the corporation or at such other suitable place within Massachusetts or, to the extent permitted by the articles of organization, elsewhere in the United States, as shall be selected by the President or the Board of Directors in the case of an annual meeting and, in the case of a special meeting, by the President, the Board of Directors or the applying stockholders calling such meeting.

Section 4. Notice of Meetings. A written notice of each meeting of stockholders containing the place, date and hour, and the purposes for which it is to be held, shall be given by the Clerk or, in the case of the death, absence, incapacity, or refusal of the Clerk, by any other officer, at least seven days before the date of the meeting, to each stockholder entitled to vote at the meeting and to each stockholder who is otherwise entitled by law or by the articles of organization or these by-laws to such notice, by leaving such notice with him or at his residence or usual place of business or by mailing it postage prepaid and addressed to each stockholder at his address as it shall appear in the stock and transfer records of the corporation. Notice of a meeting need not be given to a stockholder if a written waiver of notice, executed before or after the meeting by such stockholder or his attorney thereunto authorized, is filed with the records of the meeting.

Section 5. Quorum. The holder or holders of a majority in interest of all stock issued, outstanding, and entitled to vote at a meeting, present in person or represented by proxy, shall constitute a quorum, but the majority of a lesser interest so present may, from time to time, postpone to a new time or place any meeting and the postponed meeting may be held without further notice.

Section 6. Voting and Proxies. Each stockholder entitled to vote shall have one vote, to be exercised in person or by proxy, for each share of stock held by him, and a proportionate vote for a fractional share. When a quorum is present at any meeting the vote of the holders of a majority in interest of the stock represented which is entitled to vote and voting shall decide any matter properly brought before the meeting, except in the case of elections by stockholders, which shall be decided by a plurality of the votes cast by stockholders entitled to vote at the election, and except when a larger vote is required by law, the articles of organization or these by-laws. No vote need be taken by ballot unless so requested by any stockholder entitled to vote thereon. Proxies must be in writing and filed with the clerk of the meeting before being voted. The person named in a proxy may vote at any adjournment of the meeting for which the proxy was given, but the proxy shall terminate after final adjournment of the meeting. No proxy dated more than six months before the meeting named in it shall be valid. A proxy purporting to be executed by or on behalf of a stockholder shall be deemed valid unless challenged at or prior to its exercise and

the burden of proving invalidity shall rest on the challenger. A proxy with respect to stock held in the name of two or more persons shall be valid if executed by any one of them unless at or prior to the exercise of the proxy the corporation receives a specific notice to the contrary from any one of them. Inspectors of election, if any, shall be appointed by the Board of Directors or, in the absence of such appointment, by the officer presiding at any meeting of the stockholders.

Section 7. Action by Consent. Any action required or permitted to be taken by stockholders may be taken without a meeting if all stockholders entitled to vote on the matter consent in writing to the action and such written consents are filed with the records of the meetings of stockholders. Such consents shall be treated for all purposes as a vote at a meeting.

ARTICLE III

The Board of Directors

Section 1. Composition. The number of directors which shall constitute the whole Board of Directors shall be determined by vote of the stockholders or the Board of Directors, but shall consist of not less than three directors (except that whenever there shall be only two stockholders the number of directors shall be not less than two and whenever there shall be only one stockholder or prior to the issuance of any stock, there shall be at least one director). The number of directors may be decreased at any time and from time to time either by the stockholders or by a majority of the directors then in office, but only to

eliminate vacancies existing by reason of the death, resignation, removal or expiration of the term of one or more directors.

Section 2. Election and Term. The directors, except as provided in the preceding section and Section 12 of this Article, shall be elected at the annual meeting of the stockholders. The directors, except as provided in Section 13 of this Article, shall hold office until the next annual meeting and until their successors are chosen and qualified. No director need be a stockholder.

Section 3. Powers. The business of the corporation shall be managed by the Board of Directors, which shall have and may exercise all the powers of the corporation except those powers reserved to the stockholders by these by-laws, by law or by the articles of organization.

Section 4. Annual Meeting. The annual meeting of the Board of Directors shall be held immediately after and at the same place as the annual meeting of stockholders, or any special meeting held in lieu thereof, without the necessity of notice. If such meeting is not then held, or if a quorum is not present, the annual meeting of the Board of Directors shall be called in the manner hereinafter provided for special meetings.

Section 5. Regular Meetings. Regular meetings of the Board of Directors may be held at such times and places as shall from time to time be fixed by vote of the Board of Directors and no notice need be given of regular meetings held at times and places so fixed, provided, however, that any vote relating to the holding of regular meetings shall remain in force only until the

next annual meeting of the Board of Directors, and that if at any meeting of the Board of Directors, at which a vote is adopted fixing the times or place or places for any regular meetings any director is absent no meeting shall be held pursuant to such vote until either each such absent director has in writing or by telegram approved the vote or seven days have elapsed after a copy of such vote certified by the Clerk has been mailed, postage prepaid, addressed to each such absent director at his last known home or business address.

Section 6. Special Meetings. Special meetings of the Board of Directors may be called by the chairman of the Board of Directors, or the President, or by any two directors and shall be held at the time and place designated by the person or persons calling such meeting.

Section 7. Notices. The Clerk of the corporation or, in the case of his death, absence, incapacity, or refusal, any other officer, shall give notice of any special meeting to each director (i) by written notice delivered in person, or by telegram sent to his business or home address, at least twenty-four hours before such meeting or (ii) by written notice mailed to his last known business or home address at least seventy-two hours before such meeting. Notice of a meeting need not be given to any director if he executes a written waiver of notice before or after the meeting or if he attends the meeting without protesting either prior thereto or at its commencement the lack of notice to him. A notice or waiver of notice of a

meeting of the Board of Directors need not specify the purposes of the meeting.

Section 8. Quorum and Voting. A majority of the directors then in office shall constitute a quorum. If a quorum is not present, a majority of those present at a meeting may, from time to time, postpone to a new time or place any meeting and the postponed meeting may be held without further notice. If a quorum is present, a majority of the directors present and voting may take any action unless a different vote is required by law, the articles of organization or these by-laws.

Section 9. Action by Consent. Any action required or permitted to be taken at any meeting of the Board of Directors may be taken without a meeting if all of the directors consent to the action in writing and such consents are filed with the records of the meetings of the Board of Directors. Such consents shall be treated for all purposes as a vote at a meeting.

Section 10. Chairman of Board of Directors. The Board of Directors may elect from its own number a chairman. If a chairman has been elected, he shall preside at all meetings of the stockholders and of the Board of Directors at which he is present and shall have such other duties and powers as the Board of Directors may decide.

Section 11. Executive and Other Committees. The Board of Directors may elect from its own number an executive committee and any other committees, and may delegate to the committees any or all of its powers except the power to (a) change the principal office of the corporation; (b) amend the by-laws; (c) issue

stock; (d) establish and designate series of stock and fix and determine the relative rights and preferences of any series of stock; (e) elect officers required by law to be elected by the stockholders or directors and fill vacancies in any such offices; (f) change the number of the Board of Directors; (g) remove officers or directors from office; (h) authorize the payment of any dividend or distribution to stockholders; (i) authorize the reacquisition for value of stock of the corporation; or (j) authorize a merger. The Board of Directors may decide the manner in which any such committees shall conduct their business. The Board of Directors shall have power to rescind any action of any committee, but such rescission shall not be retroactive.

Section 12. Vacancies. Except as may be otherwise provided in the articles of organization, a vacancy in the Board of Directors may be filled by the Board of Directors by the election of a successor to hold office for the unexpired term of the director whose place is vacant and until his successor is chosen and qualified. Any vacancy in the Board of Directors may also be filled by the stockholders and the person so chosen shall displace any successor chosen by the Board of Directors.

Section 13. Removal. A director may be removed from office with or without cause by the stockholders, provided that the directors elected by a particular class of stockholders may be removed with or without cause only by the stockholders of such class. A director may be removed at any time for cause by the vote of a majority of the directors then in office. A director

may be removed for cause only after reasonable notice and opportunity to be heard before the body proposing to remove him.

Section 14. Resignation. Any director may at any time resign his office by delivering a written resignation to the Board of Directors, the President or the Clerk. Such resignation, unless a later time is specified therein, shall take effect upon receipt by the addressee or at the principal office of the corporation, and acceptance thereof shall not be necessary to make it effective.

ARTICLE IV

Officers

Section 1. Designation and Qualification. The officers of the corporation shall consist of a President, a Treasurer, a Clerk, and such other officers including one or more Vice Presidents, Assistant Treasurers and Assistant Clerks as the Board of Directors may elect. No officer need be a stockholder or a director. The Clerk shall be a resident of the Commonwealth of Massachusetts unless the corporation has a resident agent appointed to accept service of process. A person may hold more than one office at the same time provided that the President and Clerk may not be the same person except when there is only one stockholder. Any officer may be required by the Board of Directors to give bond for the faithful performance of his duties to the corporation in such amount and with such sureties as the Board of Directors may determine.

Section 2. Election and Term. The President, Treasurer and Clerk shall be elected annually by the Board of Directors at the

annual meeting of the Board of Directors and shall hold office until the next annual meeting of the Board of Directors and until their respective successors are chosen and qualified. All other officers may be elected by the Board of Directors at any time and shall hold office for such term as the Board of Directors determines.

Section 3. President. The President shall be the chief executive officer of the corporation, except as the Board of Directors may otherwise provide, and shall have general supervision and control of the business of the corporation subject to the direction of the Board of Directors. The President shall also have such other powers and duties as the Board of Directors may decide. It shall be his duty, and he shall have the power, to see that all orders and resolutions of the directors are carried into effect. In the absence of a chairman of the Board of Directors, the President shall preside at all meetings of the stockholders and at all meetings of the Board of Directors. Unless otherwise directed by the Board of Directors, the President may on behalf of the corporation vote or consent to any action with respect to or in connection with any interest that the corporation may hold or have in any other corporation or in any partnership, joint venture, association, trust, proprietorship, business entity or common undertaking whatsoever, and may appoint any other person or persons to act as proxy or attorney-in-fact for the corporation, with or without power of substitution. The Board of Directors may from time to time confer like powers upon any other officer.

Section 4. Vice President. The Vice President or Vice Presidents, if any, shall have such powers and perform such duties as may be assigned to them by the Board of Directors or the President. In the absence of the President or in the event of his inability to act, the Vice President, if any, or, if there is more than one Vice President, the First Vice President, or, if no First Vice President has been designated, the Vice President senior in office, shall have and may exercise all the powers and duties of the President.

Section 5. Treasurer and Assistant Treasurers. The Treasurer shall have, subject to the direction of the Board of Directors, general charge of the financial affairs of the corporation and shall keep full and accurate records thereof, which shall always be open to the inspection of the President or of any director. He shall render to the President or to the Board of Directors, whenever either may require it, a statement of the accounts of his transactions as Treasurer and of the financial condition of the corporation. The Treasurer shall perform such duties and have such powers additional to the foregoing as the directors may designate.

Any Assistant Treasurer shall have such powers and duties as the Board of Directors may decide.

Section 6. Clerk and Assistant Clerks. The Clerk shall record in books kept for that purpose all votes, consents, and the proceedings of all meetings of the stockholders and of the Board of Directors. Record books of stockholders' meetings shall be open at all reasonable times to the inspection of any

stockholder. The Clerk shall notify the stockholders and directors of all meetings in accordance with the by-laws.

In the absence of the Clerk from any meeting of the stockholders or from any meeting of the directors, the Assistant Clerk, if one be elected, or, if there be more than one, the one designated for the purpose by the directors, and otherwise a temporary clerk designated by the person presiding at the meeting, shall perform the duties of the Clerk.

Any Assistant Clerks shall have such other powers and duties as the Board of Directors may decide.

Section 7. Vacancies. A vacancy in any office may be filled by the Board of Directors by the election of a successor to hold office for the unexpired term of the officer whose place is vacant and until his successor is chosen and qualified.

Section 8. Removal. All officers may be removed from their respective offices with or without cause by vote of a majority of the directors then in office. An officer may be removed for cause only after a reasonable notice and opportunity to be heard before the Board of Directors.

Section 9. Resignation. Any officer may at any time resign his office by delivering a written resignation to the Board of Directors, the President or the Clerk. Such resignation, unless a later date is specified therein, shall take effect upon receipt by the addressee or at the principal office of the corporation, and acceptance thereof shall not be necessary to make it effective.

ARTICLE V

Capital Stock

Section 1. Certificates of Stock. Each stockholder shall be entitled to a certificate in the form approved by the Board of Directors stating the number, class, and designation of series, if any, of the shares held by him. Such certificate shall be signed by the President or a Vice President and by the Treasurer or an Assistant Treasurer. Such signatures may be facsimiles if the certificate is countersigned by a transfer agent, or by a registrar of transfers, other than a director, officer or employee of the corporation.

Every certificate for shares of stock subject to any restriction on transfer pursuant to the articles of organization, these by-laws, or any agreement to which the corporation is a party shall have the restriction noted conspicuously on the certificate and shall also set forth on the face or back either the full text of the restriction or a statement of the existence of such restriction and a statement that the corporation will furnish a copy to the holder of such certificate upon written request and without charge. If the corporation is authorized to issue more than one class or series of stock, every certificate issued shall set forth on its face or back either the full text of the preferences, voting powers, qualifications and special and relative rights of the shares of each class and series authorized to be issued or a statement of the existence of such preferences, powers, qualification and rights, and a statement that the

corporation will furnish a copy thereof to the holder of such certificate upon written request and without charge.

Section 2. Transfer. Shares of stock shall be transferred of record on the books of the corporation only upon the surrender to the corporation or its transfer agent of the certificate therefor properly endorsed for transfer (or accompanied by a written assignment and power of attorney properly executed for transfer), and only upon compliance with provisions, if any, respecting restrictions on transfer contained in the articles of organization, these by-laws or any agreement to which the corporation is a party. The corporation may require proof of the genuineness of the signature and the capacity of the party presenting the certificate for transfer.

Section 3. Interests Not Recognized. The corporation shall be entitled to treat the holder of record of any share or shares of stock as the holder in fact thereof and shall not be bound to recognize any other claim to or interest in such share or shares on the part of any other person except as may be otherwise expressly provided by law.

Section 4. Lost, Mutilated, or Destroyed Certificates. Subject to Section 8-405 of the Massachusetts Uniform Commercial Code, as amended from time to time, the Board of Directors may determine the conditions upon which a new certificate of stock may be issued in place of any certificate alleged to have been lost, mutilated or destroyed. It may, in its discretion, require the owner of a lost, mutilated or destroyed certificate, or his legal representative, to give a bond, with or without surety,

sufficient in its opinion to indemnify the corporation against any loss, claim or expense which may arise by reason of the issuance of a new certificate in place of such lost, mutilated or destroyed stock certificate.

Section 5. Transfer Agent and Registrar. The Board of Directors may appoint a transfer agent or a registrar, or both, and require all stock certificates to bear the signature or facsimile thereof of any such transfer agent or registrar. Unless the Board of Directors shall appoint a transfer agent, registrar or other officer or officers for the purpose, the Clerk shall be charged with the duty of keeping, or causing to be kept, accurate records of all stock outstanding, stock certificates issued, and stock transfers. Subject to any other rules which may be adopted from time to time by the Board of Directors, such records may be kept solely in the stock certificate books.

Section 6. Setting Record Date and Closing Transfer Records. The Board of Directors may fix in advance a time not more than sixty days before (i) the date of any meeting of the stockholders or (ii) the date for the payment of any dividend or the making of any distribution to stockholders or (iii) the last day on which the consent or dissent of stockholders may be effectively expressed for any purpose, as the record date for determining the stockholders having the right to notice of, and to vote at such meeting or any adjournment thereof, or the right to receive such dividend or distribution, or the right to give such consent or dissent. If a record date is fixed by the Board of Directors, only stockholders of record on such date shall have

such rights notwithstanding any transfer of stock on the records of the corporation after such date. Without fixing such record date, the Board of Directors may close the transfer records of the corporation for all or any part of such sixty-day period.

If no record date is fixed and the transfer books are not closed, then the record date for determining stockholders having the right to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, and the record date for determining stockholders for any other purpose shall be at the close of business on the date on which the Board of Directors acts with respect thereto.

Section 7. Issue of Stock. The Board of Directors may, from time to time, issue any of the authorized capital stock of the corporation for cash, property, services or expenses, or as a stock dividend, and on any terms permitted by law and the articles of organization. No stock shall be issued unless the cash, so far as due, or the property, services or expenses for which it was authorized to be issued, has been actually received or incurred by, or conveyed or rendered to, the corporation, or is in its possession as surplus.

ARTICLE VI

Inspection of Records

The original, or attested copies of the articles of organization, by-laws and records of all meetings of the incorporators and stockholders, and the stock and transfer records, which shall contain the names of all stockholders and

the record address and the amount of stock held by each, shall be kept in the Commonwealth of Massachusetts at the principal office of the corporation, or at an office of its transfer agent or of the Clerk or of its resident agent. Said copies and records need not all be kept in the same office. They shall be available at all reasonable times to the inspection of any stockholder for any proper purpose but not to secure a list of stockholders for the purpose of selling said list or copies thereof or of using the same for a purpose other than in the interest of the applicant, as a stockholder, relative to the affairs of the corporation.

ARTICLE VII

Checks, Notes, Drafts and Other Instruments

Checks, notes, drafts and other instruments for the payment of money drawn or endorsed in the name of the corporation may be signed by any officer or officers or person or persons authorized by the directors to sign the same. No officer or person shall sign any such instrument as aforesaid unless authorized by the directors to do so.

ARTICLE VIII

Amendments

These by-laws may at any time be amended by the stockholders, provided that notice of the substance of the proposed amendment is stated in the notice of any meeting at which action is to be taken on the amendment.

ARTICLE IX

Indemnification

Except as provided below, any director or officer of the corporation, and any person who serves at the request of the corporation as a director or officer of another organization or who serves at the request of the corporation in any capacity with respect to any employee benefit plan, shall be indemnified in full by the corporation against expenses, including attorneys' fees, and against the amount of any judgment, money decree, fine, or penalty, or against the amount of any settlement deemed reasonable by the Board of Directors, necessarily paid or incurred by such person in connection with or arising out of any claim made against such person, or any civil or criminal action, suit, or proceeding of whatever nature brought against such person or in which such person is made a party or in which such person is otherwise involved, by reason of being or having been a director or officer of the corporation or a director or officer of another organization at the request of the corporation or serving in any capacity with respect to any employee benefit plan at the request of the corporation. Such indemnification shall be provided although such person at the time of such claim, action, suit, or proceeding is no longer a director or officer of the corporation or of such other organization or no longer serves with respect to any such employee benefit plan.

No indemnification shall be provided for any person with respect to any matter as to which such person shall have been adjudicated in any proceeding not to have acted in good faith in

the reasonable belief that such person's action was in the best interests of the corporation or, to the extent that such matter relates to service with respect to an employee benefit plan, in the best interests of the participants or beneficiaries of such employee benefit plan. If such person has not been so adjudicated, such person shall be entitled to indemnification unless the Board of Directors decides that such person did not act in good faith in the reasonable belief that such person's action was in the best interests of the corporation or, to the extent that such matter relates to service with respect to an employee benefit plan, in the best interests of the participants or beneficiaries of such employee benefit plan. Expenses reasonably incurred in defending any claim, action, suit, or proceeding of the character described in the preceding paragraph may, if the Board of Directors so decides, be advanced by the corporation in advance of the final disposition of such claim, action, suit, or proceeding, upon receipt of an undertaking by the recipient to repay all such advances in the event such person is adjudicated in any proceeding not to have acted, or the Board of Directors decides that such person did not act, in good faith in the reasonable belief that such person's action was in the best interests of the corporation or, to the extent that such matter relates to service with respect to an employee benefit plan, in the best interests of the participants or beneficiaries of such employee benefit plan, which undertaking may be accepted without reference to the financial ability of such person to make repayment.

Any rights of indemnification hereunder shall not be exclusive, shall be in addition to any other right which a director or officer of the corporation and any person serving at the request of the corporation as a director or officer of another organization or in any capacity with respect to any employee benefit plan may have or obtain, and shall accrue to such person's estate.

Any agent or employee of or for the corporation may be indemnified in such manner as the Board of Directors decides.

[LOGO] MKS
INSTRUMENTS, INC.

NUMBER		SHARES
----- MKS -----	MKS INSTRUMENTS, INC.	----- -----
COMMON STOCK		

THIS CERTIFICATE IS TRANSFERABLE IN BOSTON, MA OR NEW YORK, NY
 INCORPORATED UNDER THE LAWS OF THE COMMONWEALTH OF MASSACHUSETTS
 SEE REVERSE FOR CERTAIN DEFINITIONS
 CUSIP 55306N 10 4

THIS CERTIFIES THAT

is the owner of

FULLY PAID AND NON-ASSESSABLE SHARES OF COMMON STOCK, NO PAR VALUE OF

===== MKS INSTRUMENTS, INC. =====
 transferable only the books of the Corporation by the holder hereof in person or by duly authorized attorney upon surrender of this Certificate properly endorsed. This Certificate and the shares represented hereby are issued under and subject to the laws of The Commonwealth of Massachusetts and to the Articles of Organization and By-laws of the Corporation, all as amended from time to time. This Certificate is not valid unless countersigned and registered by the Transfer Agent and Registrar.

IN WITNESS WHEREOF, the Corporation has caused this Certificate to be signed by the facsimile signatures of its duly authorized officers and a facsimile of its corporate seal to be hereunto affixed.

Dated:

/s/ William Donlan
TREASURER

[SEAL]

/s/ John R. Bertucci
PRESIDENT

COUNTERSIGNED AND REGISTERED:
BANKBOSTON, N.A.
TRANSFER AGENT AND REGISTRAR

BY

AUTHORIZED SIGNATURE

 AMERICAN BANK NOTE COMPANY DEC 10, 1997 fm
 3504 ATLANTIC AVENUE
 SUITE 12 053699fc
 LONG BEACH, CA 90807
 (562) 989-2333
 (FAX) (562) 426-7450 270-19x Proof X REV 3

MKS INSTRUMENTS, INC.

The Corporation has more than one class of stock authorized to be issued. The Corporation will furnish without charge to each stockholder upon written request, a copy of the full text of the preferences, voting powers, qualifications and special and relative rights of the shares of each class of stock (and any series thereof) authorized to be issued by the Corporation.

The following abbreviations, when used in the inscription on the face of this Certificate, shall be construed as though they were written out in full according to applicable laws or regulations:

TEN COM -- as tenants in common	UNIF GIFT MIN ACT --	_____ Guardian _____
TEN ENT -- as tenants by the entireties		(Cust) (Minor)
JT TEN -- as joint tenants with right of survivorship and not as tenants in common		under Uniform Gifts to Minors Act _____ (State)

Additional abbreviations may also be used though not in the above list.

For value received _____ hereby sell, assign and transfer unto

PLEASE INSERT SOCIAL SECURITY OR OTHER IDENTIFYING NUMBER OF ASSIGNEE

(PLEASE PRINT OR TYPEWRITE NAME AND ADDRESS, INCLUDING ZIP CODE OF ASSIGNEE)

----- Shares of the capital stock represented by the within Certificate, and do hereby irrevocably constitute and appoint

----- Attorney to transfer the said stock on the books of the within named Corporation with full power of substitution in the premises.

Dated _____

(Signature) _____

NOTICE: THE SIGNATURE TO THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE IN EVERY PARTICULAR, WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATEVER.

Signature Guaranteed: _____

ALL GUARANTEES MUST BE MADE BY A FINANCIAL INSTITUTION (SUCH AS A BANK OR BROKER) WHICH IS A PARTICIPANT IN THE SECURITIES TRANSFER AGENTS MEDALLION PROGRAM ("STAMP"), THE NEW YORK STOCK EXCHANGE, INC. MEDALLION SIGNATURE PROGRAM ("MSP") OR THE STOCK EXCHANGES MEDALLION PROGRAM ("SEMP") AND MUST NOT BE DATED. GUARANTEES BY A NOTARY PUBLIC ARE NOT ACCEPTABLE.

AMERICAN BANK NOTE COMPANY NOV 12, 1997 fm
3504 ATLANTIC AVENUE
SUITE 12
LONG BEACH, CA 90807 053699bk
(562) 989-2333
(FAX) (562) 426-7450 Proof X NEW

MKS INSTRUMENTS, INC.

AMENDED AND RESTATED 1995 STOCK INCENTIVE PLAN

1. PURPOSE

The purpose of this Amended and Restated 1995 Stock Incentive Plan (the "Plan") of MKS Instruments, Inc., a Massachusetts corporation (the "Company"), is to advance the interests of the Company's stockholders by enhancing the Company's ability to attract, retain and motivate persons who make (or are expected to make) important contributions to the Company by providing such persons with equity ownership opportunities and performance-based incentives and thereby better aligning the interests of such persons with those of the Company's stockholders. Except where the context otherwise requires, the term "Company" shall include any present or future subsidiary corporations of MKS Instruments, Inc. as defined in Section 424(f) of the Internal Revenue Code of 1986, as amended, and any regulations promulgated thereunder (the "Code").

2. ELIGIBILITY

All of the Company's employees, officers, directors, consultants and advisors are eligible to be granted options, restricted stock, or other stock-based awards (each, an "Award") under the Plan. Any person who has been granted an Award under the Plan shall be deemed a "Participant."

3. ADMINISTRATION, DELEGATION

(a) ADMINISTRATION BY BOARD OF DIRECTORS. The Plan will be administered by the Board of Directors of the Company (the "Board"). The Board shall have authority to grant Awards and to adopt, amend and repeal such administrative rules, guidelines and practices relating to the Plan as it shall deem advisable. The Board may correct any defect, supply any omission or reconcile any inconsistency in the Plan or any Award in the manner and to the extent it shall deem expedient to carry the Plan into effect and it shall be the sole and final judge of such expediency. All decisions by the Board shall be made in the Board's sole discretion and shall be final and binding on all persons having or claiming any interest in the Plan or in any Award. No director or person acting pursuant to the authority delegated by the Board shall be liable for any action or determination relating to or under the Plan made in good faith.

(b) DELEGATION TO EXECUTIVE OFFICERS. To the extent permitted by applicable law, the Board may delegate to one or more executive officers of the Company the power to make Awards and exercise such other powers under the Plan as the Board may determine, provided that the Board shall fix the maximum number of shares subject to Awards and the maximum number of shares for any one Participant to be made by such executive officers. The Chief Executive Officer of the Company may grant Awards to non-executive officer employees of the Company in amounts not to exceed 300,000 shares in the aggregate or 20,000 shares to any one employee.

(c) APPOINTMENT OF COMMITTEES. To the extent permitted by applicable law, the Board may delegate any or all of its powers under the Plan to one or more committees or subcommittees of the Board (a "Committee"). If and when the Common Stock (as defined below in Section 4(d)) is registered under the Securities Exchange Act of 1934 (the "Exchange Act"), the Board shall appoint one such Committee of not less than two members, each member of which shall be an "outside director" within the meaning of Section 162(m) of the Code and a "non-employee director" as defined in Rule 16b-3 promulgated under the Exchange Act." All references in the Plan to the "Board" shall mean the Board or a Committee of the Board or the executive officer referred to in Section 3(b) to the extent that the Board's powers or authority under the Plan have been delegated to such Committee or executive officer.

4. STOCK AVAILABLE FOR AWARDS

(a) NUMBER OF SHARES. Subject to adjustment under Section 4(c), Awards may be made under the Plan for up to 2,500,000 shares of Common Stock (as defined below in Section 4(d)). If any Award expires or is terminated, surrendered or canceled without having been fully exercised or is forfeited in whole or in part or results in any Common Stock not being issued, the unused Common Stock (as defined below in Section 4(d)) covered by such Award shall again be available for the grant of Awards under the Plan, subject, however, in the case of Incentive Stock Options (as hereinafter defined), to any limitation required under the Code. Shares issued under the Plan may consist in whole or in part of authorized but unissued shares or treasury shares. All share amounts set forth in this plan reflect the 2,110-for-1 stock split approved by the Board of Directors of the Company on December 31, 1997 (the "1997 Stock Split").

(b) PER-PARTICIPANT LIMIT. Subject to adjustment under Section 4(c), for Awards granted after the Common Stock (as defined below in Section 4(d)) is registered under the Exchange Act, the maximum number of shares with respect to which an Award may be granted to any Participant under the Plan shall be 900,000 per calendar year. The per-participant limit described in this Section 4(b) shall be construed and applied consistently with Section 162(m) of the Code.

(c) ADJUSTMENT TO COMMON STOCK. In the event, at any time after the 1997 Stock Split, of any stock split, stock, dividend, recapitalization, reorganization, merger, consolidation, combination, exchange of shares, liquidation, spin-off or other similar change in capitalization or event, or any distribution to holders of Common Stock (as defined below in Section 4(d)) other than a normal cash dividend, (i) the number and class of securities available under this Plan, (ii) the number and class of security and exercise price per share subject to each outstanding Option, (iii) the repurchase price per security subject to each outstanding Restricted Stock Award and (iv) the terms of each other outstanding stock-based Award shall be appropriately adjusted by the Company (or substituted Awards may be made, if applicable) to the extent the Board shall determine, in good faith, that such an adjustment (or substitution) is necessary and appropriate. If this Section 4(c) applies and Section 8(e)(1) also applies to any event, Section 8(e)(1) shall be applicable to such event and this Section 4(c) shall not be applicable.

(d) DEFINITION OF COMMON STOCK. "Common Stock" means (i) prior to the closing of the Company's initial public offering of common stock pursuant to an effective registration statement under the Securities Act of 1933 ("IPO"), the Class B Common Stock, no par value per share, of the Company, and (ii) from and after the closing of the IPO, the Common Stock, no par value per share, of the Company.

5. STOCK OPTIONS

(a) GENERAL. The Board may grant options to purchase Common Stock (each, an "Option") and determine the number of shares of Common Stock to be covered by each Option, the exercise price of each Option and the conditions and limitations applicable to the exercise of each Option, including conditions relating to applicable federal or state securities laws, as it considers necessary or advisable. An Option which is not intended to be an Incentive Stock Option (as hereinafter defined) shall be designated a "Nonstatutory Stock Option."

(b) INCENTIVE STOCK OPTIONS. An Option that the Board intends to be an "incentive stock option" as defined in Section 422 of the Code (an "Incentive Stock Option") shall only be granted to employees of the Company and shall be subject to and shall be construed consistently with the requirements of Section 422 of the Code. The Company shall have no liability to a Participant, or any other party, if an Option (or any part thereof) which is intended to be an Incentive Stock Option is not an Incentive Stock Option.

(c) EXERCISE PRICE. The Board shall establish the exercise price at the time each Option is granted and specify it in the applicable option agreement.

(d) DURATION OF OPTIONS. Each Option shall be exercisable at such times and subject to such terms and conditions as the Board may specify in the applicable

option agreement. No Option will be granted for a term in excess of 10 years.

(e) EXERCISE OF OPTION. Options may be exercised only by delivery to the Company of a written notice of exercise signed by the proper person together with payment in full as specified in Section 5(f) for the number of shares for which the Option is exercised.

(f) PAYMENT UPON EXERCISE. Common Stock purchased upon the exercise of an Option granted under the Plan shall be paid for as follows:

(i) in cash or by check, payable to the order of the Company;

(ii) except as the Board may otherwise provide in an Option Agreement, delivery of an irrevocable and unconditional undertaking by a creditworthy broker to deliver promptly to the Company sufficient funds to pay the exercise price, delivery by the Participant to the Company of a copy of irrevocable and unconditional instructions to a creditworthy broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price, or by delivery of shares of Common Stock owned by the Participant valued at the fair market value as determined by the Board in good faith ("Fair Market Value"), which Common Stock was owned by the Participant at least six months prior to such delivery;

(iii) to the extent permitted by the Board and explicitly provided in an Option Agreement (i) by delivery of a promissory note of the Participant to the Company on terms determined by the Board, or (ii) by payment of such other lawful consideration as the Board may determine; or

(iv) any combination of the above permitted forms of payment.

6. RESTRICTED STOCK

(a) GRANTS. The Board may grant Awards entitling recipients to acquire shares of Common Stock, subject to the right of the Company to repurchase all or part of such shares at their issue price or other stated or formula price (or to require forfeiture of such shares if issued at no cost) from the recipient in the event that conditions specified by the Board in the applicable Award are not satisfied prior to the end of the applicable restriction period or periods established by the Board for such Award (each, "Restricted Stock Award").

(b) TERMS AND CONDITIONS. The Board shall determine the terms and conditions of any such Restricted Stock Award, including the conditions for repurchase (or forfeiture) and the issue price, if any. Any stock certificates issued in respect of a Restricted Stock Award shall be registered in the name of the Participant and, unless otherwise determined by the Board, deposited by the Participant, together

with a stock power endorsed in blank, with the Company (or its designee). At the expiration of the applicable restriction periods, the Company (or such designee) shall deliver the certificates no longer subject to such restrictions to the Participant or if the Participant has died, to the beneficiary designated, in a manner determined by the Board, by a Participant to receive amounts due or exercise rights of the Participant in the event of the Participant's death (the "Designated Beneficiary"). In the absence of an effective designation by a Participant, Designated Beneficiary shall mean the Participant's estate.

7. OTHER STOCK-BASED AWARDS

The Board shall have the right to grant other Awards based upon the Common Stock, having such terms and conditions as the Board may determine including the grant of shares based upon certain conditions, the grant of securities convertible into Common Stock and the grant of stock appreciation rights.

8. GENERAL PROVISIONS APPLICABLE TO AWARDS

(a) TRANSFERABILITY OF AWARDS. Except as the Board may otherwise determine or provide in an Award, Awards shall not be sold, assigned, transferred, pledged or otherwise encumbered by the person to whom they are granted, either voluntarily or by operation of law, except by will or the laws of descent and distribution, and, during the life of the Participant, shall be exercisable only by the Participant. References to a Participant, to the extent relevant in the context, shall include references to authorized transferees.

(b) DOCUMENTATION. Each Award under the Plan shall be evidenced by a written instrument in such form as the Board shall determine. Each Award may contain terms and conditions in addition to those set forth in the Plan.

(c) BOARD DISCRETION. Except as otherwise provided by the Plan, each type of Award may be made alone or in addition or in relation to any other type of Award. The terms of each type of Award need not be identical, and the Board need not treat Participants uniformly.

(d) TERMINATION OF STATUS. The Board shall determine the effect on an Award of the disability, death, retirement, authorized leave of absence or other change in the employment or other status of a Participant and the extent to which, and the period during which, the Participant, the Participant's legal representative, conservator, guardian or Designated Beneficiary may exercise rights under the Award.

(e) ACQUISITION EVENTS

(1) CONSEQUENCES OF ACQUISITION EVENTS. Upon the occurrence of an Acquisition Event (as defined below), or the execution by the Company of any agreement with respect to an Acquisition Event, the Board shall take any one or more of the following actions with respect to then outstanding Awards: (i) provide that outstanding Options shall be assumed, or equivalent Options shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof), provided that any such Options substituted for Incentive Stock Options shall satisfy, in the determination of the Board, the requirements of Section 424(a) of the Code; (ii) if the acquisition or succeeding corporation refuses or is unable to assume outstanding Options or grant Options in substitution therefor pursuant to clause (i), upon written notice to the Participants, provide that all then unexercised Options will become exercisable in full as of a specified time (the "Acceleration Time") prior to the Acquisition Event and will terminate immediately prior to the consummation of such Acquisition Event, except to the extent exercised by the Participants between the Acceleration Time and the consummation of such Acquisition Event; (iii) in the event of an Acquisition Event under the terms of which holders of Common Stock will receive upon consummation thereof a cash payment for each share of Common Stock surrendered pursuant to such Acquisition Event (the "Acquisition Price"), provide that all outstanding Options shall terminate upon consummation of such Acquisition Event and each Participant shall receive, in exchange therefor, a cash payment equal to the amount (if any) by which (A) the Acquisition Price multiplied by the number of shares of Common Stock subject to such outstanding Options (whether or not then exercisable), exceeds (B) the aggregate exercise price of such Options; (iv) provide that all Restricted Stock Awards then outstanding shall become free of all restrictions prior to the consummation of the Acquisition Event; and (v) provide that any other stock-based Awards outstanding (A) shall become exercisable, realizable or vested in full, or shall be free of all conditions or restrictions, as applicable to each such Award, prior to the consummation of the Acquisition Event, or (B), if applicable, shall be assumed, or equivalent Awards shall be substituted, by the acquiring or succeeding corporation (or an affiliate thereof).

An "Acquisition Event" shall mean: (a) any merger or consolidation which results in the voting securities of the Company outstanding immediately prior thereto representing immediately thereafter (either by remaining outstanding or by being converted into voting securities of the surviving or acquiring entity) less than 50% of the combined voting power of the voting securities of the Company or such surviving or acquiring entity outstanding immediately after such merger or consolidation; (b) any sale of all or substantially all of the assets of the Company; or (c) the complete liquidation of the Company.

(2) ASSUMPTION OF OPTIONS UPON CERTAIN EVENTS. The Board may grant Awards under the Plan in substitution for stock and stock-based awards held by employees of another corporation who become employees of the Company as a result of a merger or consolidation of the employing corporation with the Company or the acquisition by the Company of property or stock of the employing corporation. The substitute Awards shall be granted on such terms and conditions as the Board considers appropriate in the circumstances.

(f) WITHHOLDING. Each Participant shall pay to the Company, or make provision satisfactory to the Board for payment of, any taxes required by law to be withheld in connection with Awards to such Participant no later than the date of the event creating the tax liability. The Board may allow Participants to satisfy such tax obligations in whole or in part in shares of Common Stock, including shares retained from the Award creating the tax obligation, valued at their Fair Market Value. The Company may, to the extent permitted by law, deduct any such tax obligations from any payment of any kind otherwise due to a Participant.

(g) AMENDMENT OF AWARD. The Board may amend, modify or terminate any outstanding Award, including but not limited to, substituting therefor another Award of the same or a different type, changing the date of exercise or realization, and converting an Incentive Stock Option to a Nonstatutory Stock Option, provided that the Participant's consent to such action shall be required unless the Board determines that the action, taking into account any related action, would not materially and adversely affect the Participant.

(h) CONDITIONS ON DELIVERY OF STOCK. The Company will not be obligated to deliver any shares of Common Stock pursuant to the Plan or to remove restrictions from shares previously delivered under the Plan until (i) all conditions of the Award have been met or removed to the satisfaction of the Company, (ii) in the opinion of the Company's counsel, all other legal matters in connection with the issuance and delivery of such shares have been satisfied, including any applicable securities laws and any applicable stock exchange or stock market rules and regulations, and (iii) the Participant has executed and delivered to the Company such representations or agreements as the Company may consider appropriate to satisfy the requirements of any applicable laws, rules or regulations.

(i) ACCELERATION. The Board may at any time provide that any Options shall become immediately exercisable in full or in part, that any Restricted Stock Awards shall be free of all restrictions or that any other stock-based Awards may become exercisable in full or in part or free of some or all restrictions or conditions, or otherwise realizable in full or in part, as the case may be.

9. MISCELLANEOUS

(a) NO RIGHT TO EMPLOYMENT OR OTHER STATUS. No person shall have any claim or right to be granted an Award, and the grant of an Award shall not be construed as giving a Participant the right to continued employment or any other relationship with the Company. The Company expressly reserves the right at any time to dismiss or otherwise terminate its relationship with a Participant free from any liability or claim under the Plan, except as expressly provided in the applicable Award.

(b) NO RIGHTS AS STOCKHOLDER. Subject to the provisions of the applicable Award, no Participant or Designated Beneficiary shall have any rights as a stockholder with respect to any shares of Common Stock to be distributed with respect to an Award until becoming the record holder of such shares.

(c) EFFECTIVE DATE AND TERM OF PLAN. The Plan shall become effective on the date on which it is adopted by the Board, but no Award granted to a Participant designated as subject to Section 162(m) by the Board shall become exercisable, vested or realizable, as applicable to such Award, unless and until the Plan has been approved by the Company's stockholders. No Awards shall be granted under the Plan after the completion of ten years from the earlier of (i) the date on which the Plan was adopted by the Board or (ii) the date the Plan was approved by the Company's stockholders, but Awards previously granted may extend beyond that date.

(d) AMENDMENT OF PLAN. The Board may amend, suspend or terminate the Plan or any portion thereof at any time, provided that no Award granted to a Participant designated as subject to Section 162(m) by the Board after the date of such amendment shall become exercisable, realizable or vested, as applicable to such Award (to the extent that such amendment to the Plan was required to grant such Award to a particular Participant), unless and until such amendment shall have been approved by the Company's stockholders.

(e) STOCKHOLDER APPROVAL. For purposes of this Plan, stockholder approval shall mean approval by a vote of the stockholders in accordance with the requirements of Section 162(m) of the Code.

(f) GOVERNING LAW. The provisions of the Plan and all Awards made hereunder shall be governed by and interpreted in accordance with the laws of The Commonwealth of Massachusetts, without regard to any applicable conflicts of law rules or provisions.

Adopted by the Board of Directors
on November 30, 1995

Adopted by the Stockholders on
May 17, 1996

Approved as Amended and Restated
by the Board of Directors on
December 31, 1997

Approved as Amended and Restated
by the Stockholders on January 9,
1998

MKS INSTRUMENTS, INC.

AMENDED AND RESTATED 1996 DIRECTOR STOCK OPTION PLAN

1. PURPOSE

The purpose of this Amended and Restated 1996 Director Stock Option Plan (the "Plan") of MKS Instruments, Inc., a Massachusetts corporation (the "Company"), is to encourage ownership in the Company by outside directors of the Company whose continued services are considered essential to the Company's future progress and to provide them with a further incentive to remain as directors of the Company.

2. ADMINISTRATION

The Board of Directors shall supervise and administer the Plan. Grants of stock options under the Plan and the amount and nature of the awards to be granted shall be automatic in accordance with Section 5. However, all questions of interpretation of the Plan or of any options issued under it shall be determined by the Board of Directors and such determination shall be final and binding upon all persons having an interest in the Plan.

3. PARTICIPATION IN THE PLAN

Directors of the Company who are not employees of the Company or any subsidiary of the Company shall be eligible to participate in the Plan.

4. STOCK SUBJECT TO THE PLAN

(a) The maximum number of shares which may be issued under the Plan shall be 20 shares of the Company's Class B Common Stock, no par value per share (the "Common Stock"). From and after the closing of the Company's initial public offering of Common Stock pursuant to an effective Registration Statement under the Securities Act of 1933, all references herein to "Common Stock" shall be deemed to be references to the Company's Common Stock, and all references to numbers of shares of Common Stock in the Plan and in outstanding options under the Plan shall be adjusted to reflect the rate at which outstanding shares of Class B Common Stock are exchanged for shares of Common Stock pursuant to the recapitalization effected in connection with such public offering.

(b) If any outstanding option under the Plan for any reason expires or is terminated without having been exercised in full, the shares allocable to the

unexercised portion of such option shall again become available for grant pursuant to the Plan.

(c) All options granted under the Plan shall be nonstatutory options not entitled to special tax treatment under Section 422 of the Internal Revenue Code of 1986, as amended to date and as it may be amended from time to time (the "Code").

5. TERMS, CONDITIONS AND FORM OF OPTIONS

Each option granted under the Plan shall be evidenced by a written agreement in such form as the Board of Directors shall from time to time approve, which agreements shall comply with and be subject to the following terms and conditions:

(a) OPTION GRANT DATES.

Options will be granted in accordance with the following:

(i) CURRENT OUTSIDE DIRECTORS. An option for 2.1429 shares shall automatically be granted to each non-employee director of the Company on the date of the original adoption of the Plan by the Board of Directors (the "Adoption Date").

(ii) FUTURE OUTSIDE DIRECTORS. An option for 2.1429 shares shall automatically be granted to each non-employee director elected to the Board of Directors after the Adoption Date upon his initial election to the Board.

(iii) ANNUAL GRANTS. An option for 0.2857 shares shall automatically be granted on the date of each annual meeting of stockholders of the Company (commencing with the annual meeting to be held in 1997) to each non-employee director of the Company, PROVIDED that he was elected to serve as a director of the Company at least six months prior to the date of such meeting.

(b) OPTION EXERCISE PRICE. The option exercise price per share for each option granted under the Plan shall equal (i) the last reported sales price per share of the Company's Common Stock on the Nasdaq National Market (or, if the Common Stock is traded on a national securities exchange on the date of grant, the reported closing sales price per share of the Common Stock on such exchange) on the date of grant (or if no such price is reported on such date such price as reported on the nearest preceding day) or (ii) if the Common Stock is not traded on the Nasdaq National Market or a national securities exchange, the fair market value per share on the date of grant as determined by the Board of Directors on such date. If at any time, in the good faith judgment of the Board of Directors, the Board of Directors

determines that the fair market value of the shares of the Company's Common Stock is less than the exercise price of any options granted under the Plan, it may change the exercise price of such options to the fair market value of the Common Stock on the date of such determination; provided that, similar exercise price adjustments (or replacement options are issued) with respect to options issued pursuant to the Company's other option plans.

(c) OPTIONS NON-TRANSFERABLE. Each option granted under the Plan by its terms shall not be transferable by the optionee otherwise than by will, or by the laws of descent and distribution, and shall be exercised during the lifetime of the optionee only by him. No option or interest therein may be transferred, assigned, pledged or hypothecated by the optionee during his lifetime, whether by operation of law or otherwise, or be made subject to execution, attachment or similar process.

(d) EXERCISE PERIOD. Each option granted pursuant to paragraphs (a) (i) and (ii) of this Section 5 shall become exercisable in twelve (12) equal quarterly installments following the date of grant. Each option granted pursuant to paragraph (a) (iii) of this Section 5 shall become fully exercisable on the day prior to the first annual meeting of stockholders of the Company following the date of grant (or if no such meeting is held within thirteen (13) months after the date of grant, on the thirteen-month anniversary of the date of grant).

(e) TERMINATION. Upon termination of an optionee's service as a director of the Company, each option held by him may be exercised during the three month period following such termination of service, as to the exercisable portion of such option as of the date of termination, PROVIDED that (i) no option may be exercised more than ten (10) years after the date of grant, and (ii) in the event an optionee ceases to serve as a director due to his death or disability (within the meaning of Section 22(e) (3) of the Code or any successor provision), each option may be exercised, within the period of 180 days following the date the optionee ceases to serve as a director, by the optionee or by the person to whom the option is transferred by will, by the laws of descent and distribution, or by written notice, as to the portion of the option that is exercisable on the date of death or disability and as to the additional portion that would have become exercisable on the next anniversary date of the date of grant of such option.

(f) EXERCISE PROCEDURE. Options may be exercised only by written notice to the Company at its principal office accompanied by (i) payment in cash of the full consideration for the shares as to which they are exercised or (ii) an irrevocable undertaking, in form and substance satisfactory to the Company, by a broker to deliver promptly to the Company sufficient funds to pay the exercise price or delivery of irrevocable instructions, in form and substance satisfactory to the Company, to a broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price.

(g) EXERCISE BY REPRESENTATIVE FOLLOWING DEATH OF DIRECTOR. An optionee, by written notice to the Company, may designate one or more persons (and from time to time change such designation), including his or her legal representative, who, by reason of the director's death, shall acquire the right to exercise all or a portion of the option. If the person or persons so designated wish to exercise any portion of the option, they must do so within the term of the option as provided herein. Any exercise by a representative shall be subject to the provisions of the Plan.

6. ASSIGNMENTS

The rights and benefits of participants under the Plan may not be assigned, whether voluntarily or by operation of law, except as provided in Section 5(g).

7. EFFECTIVE DATE

The Plan shall become effective immediately upon its adoption by the Board of Directors, but all grants of options shall be conditional upon the approval of the Plan by the stockholders of the Company within 12 months after adoption of the Plan by the Board of Directors.

8. LIMITATION OF RIGHTS

(a) NO RIGHT TO CONTINUE AS A DIRECTOR. Neither the Plan, nor the granting of an option nor any other action taken pursuant to the Plan, shall constitute or be evidence of any agreement or understanding, express or implied, that the Company will retain the optionee as a director for any period of time.

(b) NO STOCKHOLDERS' RIGHTS FOR OPTIONS. An optionee shall have no rights as a stockholder with respect to the shares covered by his options until the date of the issuance to him of a stock certificate therefor, and no adjustment will be made for dividends or other rights (except as provided in Section 9) for which the record date is prior to the date such certificate is issued.

9. CHANGES IN COMMON STOCK

(a) If the outstanding shares of Common Stock are increased, decreased or exchanged for a different number or kind of shares or other securities, or if additional shares or new or different shares or other securities are distributed with respect to such shares of Common Stock or other securities, through merger, consolidation, sale of all or substantially all of the assets of the Company, reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other distribution with respect to such shares of Common Stock, or

other securities, an appropriate and proportionate adjustment will be made in (i) the maximum number and kind of shares reserved for issuance under the Plan, (ii) the number and kind of shares or other securities subject to then outstanding options under the Plan and (iii) the price for each share subject to any then outstanding options under the Plan, without changing the aggregate purchase price as to which such options remain exercisable. No fractional shares will be issued under the Plan on account of any such adjustments.

(b) In the event of (i) a consolidation, merger or other reorganization in which all of the outstanding shares of Common Stock are exchanged for securities, cash or other property of any other corporation or business entity or (ii) any sale of all or substantially all of the Company's assets (in either event, an "Acquisition"), all options outstanding under the Plan immediately prior to the effective date of such Acquisition shall become automatically exercisable in full upon the effective date of such Acquisition.

10. AMENDMENT OF THE PLAN

The Board of Directors may suspend or discontinue the Plan or revise or amend it in any respect whatsoever; provided, however, that without approval of the stockholders of the Company no revision or amendment shall change the number of shares subject to the Plan (except as provided in Section 9).

11. NOTICE

Any written notice to the Company required by any of the provisions of the Plan shall be addressed to the Treasurer of the Company and shall become effective when it is received.

12. GOVERNING LAW

The Plan and all determinations made and actions taken pursuant hereto shall be governed by the laws of The Commonwealth of Massachusetts.

Adopted by the Board of Directors
and Stockholders on May 17, 1996

Approved as Amended and Restated by the
Board of Directors on December 31, 1997

Approved as Amended and Restated by the
Stockholders on January 9, 1998

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1. Share amounts set forth herein do not reflect the 2,110-for-1 stock split approved by the Board of Directors of the Company on December 31, 1997 (the "Split"), therefore, amounts reflected herein should be appropriately adjusted in accordance with Section 9 to reflect the Split.

MKS INSTRUMENTS, INC.

1997 DIRECTOR STOCK OPTION PLAN

1. PURPOSE

The purpose of this 1997 Director Stock Option Plan (the "Plan") of MKS Instruments, Inc., a Massachusetts corporation (the "Company"), is to encourage ownership in the Company by non-employee directors of the Company whose continued services are considered essential to the Company's future progress and to provide them with a further incentive to remain as directors of the Company.

2. ADMINISTRATION

The Board of Directors shall supervise and administer the Plan. Grants of stock options under the Plan and the amount and nature of the awards to be granted shall be automatic in accordance with Section 5. However, all questions of interpretation of the Plan or of any options issued under it shall be determined by the Board of Directors and such determination shall be final and binding upon all persons having an interest in the Plan.

3. PARTICIPATION IN THE PLAN

Directors of the Company who are not employees of the Company or any subsidiary of the Company shall be eligible to participate in the Plan.

4. STOCK SUBJECT TO THE PLAN

(a) DEFINITION OF COMMON STOCK. "Common Stock" means (i) prior to the closing of the Company's initial public offering of common stock pursuant to an effective registration statement under the Securities Act of 1933 ("IPO"), the Class B Common Stock, no par value per share, of the Company, and (ii) from and after the closing of the IPO, the Common Stock, no par value per share, of the Company.

(b) The maximum number of shares of the Company's Common Stock which may be issued under the Plan shall be 200,000 shares, subject to adjustment as provided in Section 7. All share amounts set forth in this Plan reflect the 2,110-for-1 stock split approved by the Board of Directors of the Company on December 31, 1997 (the "1997 Stock Split").

(c) If any outstanding option under the Plan for any reason expires or is terminated without having been exercised in full, the shares allocable to the unexercised portion of such option shall again become available for grant pursuant to the Plan.

(d) All options granted under the Plan shall be nonstatutory options not entitled to special tax treatment under Section 422 of the Internal Revenue Code of 1986, as amended to date and as it may be amended from time to time (the "Code").

5. TERMS, CONDITIONS AND FORM OF OPTIONS

Each option granted under the Plan shall be evidenced by a written agreement in such form as the Board of Directors shall from time to time approve, which agreements shall comply with and be subject to the following terms and conditions:

(a) OPTION GRANT DATES. Options shall automatically be granted to all eligible outside directors as follows:

(i) each person who is an eligible outside director on the date upon which the Company enters into an underwriting agreement for its first underwritten public offering of Common Stock (the "Public Offering Price") pursuant to an effective registration statement under the Securities Act of 1933, as amended, (the "Pricing Date"), shall be granted an option to purchase 7,000 shares of Common Stock at an exercise price equal to the Public Offering Price;

(ii) each person who first becomes an eligible outside director after the Pricing Date shall be granted an option to purchase 7,500 shares of Common Stock on the date of his or her initial election to the Board of Directors; and

(iii) each eligible outside director then in office on the date of each annual meeting of stockholders of the Company shall be granted an additional option to purchase 4,000 shares of Common Stock on the date of each such annual meeting of stockholders, PROVIDED that he was elected to serve as a director of the Company at least six months prior to the date of such meeting.

(b) OPTION EXERCISE PRICE. The option exercise price per share for each option granted under the Plan shall equal (i) the last reported sales price per share of the Company's Common Stock on the Nasdaq National Market (or, if the Common Stock is traded on a national securities exchange on the date of grant, the reported closing sales price per share of the Common Stock on such exchange) on the date of grant (or if no such price is reported on such date such price as reported on the nearest preceding day), (ii) if the Common Stock is not traded on the Nasdaq

National Market or a national securities exchange, the fair market value per share on the date of grant as determined by the Board of Directors or (iii) the average of the closing bid and asked prices in the over-the-counter market.

(c) TRANSFERABILITY OF OPTIONS. Except as the Board of Directors of the Company may otherwise determine or provide in a written agreement entered into in connection with the grant of an option under the Plan, options shall not be sold, assigned, transferred, pledged or otherwise encumbered by the Optionee, either voluntarily or by operation of law except by will or the laws of descent and distribution, and during the life of the optionee and shall be exercisable only by him. Reference to an optionee, to the extent relevant in the context, shall include references to authorized transferees.

(d) EXERCISE PERIOD. Except as the Board may otherwise determine or provide in a written agreement entered into in connection with the grant of an option under the Plan, each option granted pursuant to paragraphs (a) (i) and (ii) of this Section 5 shall become exercisable in twelve (12) equal quarterly installments following the date of grant. Each option granted pursuant to paragraph (a) (iii) of this Section 5 shall become fully exercisable on the day prior to the first annual meeting of stockholders of the Company following the date of grant (or if no such meeting is held within thirteen (13) months after the date of grant, on the thirteen-month anniversary of the date of grant).

(e) TERMINATION. Upon termination of an optionee's service as a director of the Company, each option held by him may be exercised during the three month period following such termination of service, as to the exercisable portion of such option as of the date of termination, PROVIDED that (i) no option may be exercised more than ten (10) years after the date of grant and (ii) in the event an optionee ceases to serve as a director due to his death or disability (within the meaning of Section 22(e) (3) of the Code or any successor provision), each option may be exercised, within the period of 180 days following the date the optionee ceases to serve as a director, by the optionee or by the person to whom the option is transferred by will, by the laws of descent and distribution, or by written notice, as to the portion of the option that is exercisable on the date of death or disability and as to the additional portion that would have become exercisable on the next anniversary date of the date of grant of such option.

(f) EXERCISE PROCEDURE. Options may be exercised only by written notice to the Company at its principal office accompanied by (i) payment in cash of the full consideration for the shares as to which they are exercised or (ii) an irrevocable undertaking, in form and substance satisfactory to the Company, by a broker to deliver promptly to the Company sufficient funds to pay the exercise price or delivery of irrevocable instructions, in form and substance satisfactory to the

Company, to a broker to deliver promptly to the Company cash or a check sufficient to pay the exercise price.

(g) EXERCISE BY REPRESENTATIVE FOLLOWING DEATH OF DIRECTOR. An optionee, by written notice to the Company, may designate one or more persons (and from time to time change such designation), including his or her legal representative, who, by reason of the director's death, shall acquire the right to exercise all or a portion of the option. If the person or persons so designated wish to exercise any portion of the option, they must do so within the term of the option as provided herein. Any exercise by a representative shall be subject to the provisions of the Plan.

6. LIMITATION OF RIGHTS

(a) NO RIGHT TO CONTINUE AS A DIRECTOR. Neither the Plan, nor the granting of an option nor any other action taken pursuant to the Plan, shall constitute or be evidence of any agreement or understanding, express or implied, that the Company will retain the optionee as a director for any period of time.

(b) NO STOCKHOLDERS' RIGHTS FOR OPTIONS. An optionee shall have no rights as a stockholder with respect to the shares covered by his options until the date of the issuance to him of a stock certificate therefor, and no adjustment will be made for dividends or other rights (except as provided in Section 7) for which the record date is prior to the date such certificate is issued.

7. CHANGES IN COMMON STOCK

(a) If, at any time after the 1997 Stock Split, the outstanding shares of Common Stock are increased, decreased or exchanged for a different number or kind of shares or other securities, or if additional shares or new or different shares or other securities are distributed with respect to such shares of Common Stock or other securities, through merger, consolidation, sale of all or substantially all of the assets of the Company, reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other distribution with respect to such shares of Common Stock, or other securities, an appropriate and proportionate adjustment will be made in (i) the maximum number and kind of shares reserved for issuance under the Plan, (ii) the number and kind of shares or other securities subject to then outstanding options under the Plan and (iii) the price for each share subject to any then outstanding options under the Plan, without changing the aggregate purchase price as to which such options remain exercisable. No fractional shares will be issued under the Plan on account of any such adjustments.

(b) In the event of (i) a consolidation, merger or other reorganization in which all of the outstanding shares of Common Stock are exchanged for securities, cash or other property of any other corporation or business entity or (ii) any sale of all or substantially all of the Company's assets (in either event, an "Acquisition"), all options outstanding under the Plan immediately prior to the effective date of such Acquisition shall become automatically exercisable in full upon the effective date of such Acquisition.

8. AMENDMENT OF THE PLAN

The Board of Directors may suspend or discontinue the Plan or revise or amend it in any respect whatsoever; provided, however, that without approval of the stockholders of the Company no revision or amendment shall change the number of shares subject to the Plan (except as provided in Section 7).

9. NOTICE

Any written notice to the Company required by any of the provisions of the Plan shall be addressed to the Chief Financial Officer of the Company and shall become effective when it is received.

10. GOVERNING LAW

The Plan and all determinations made and actions taken pursuant hereto shall be governed by the laws of The Commonwealth of Massachusetts.

Adopted by the Board of Directors
on December 31, 1997

Approved by the Stockholders
on January 9, 1998

AMENDED & RESTATED EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated December 15, 1995 (the "Employment Agreement") by and between MKS Instruments, Inc., a Massachusetts Corporation (the "Corporation"), and Leo Berlinghieri of Billerica, MA (the "Employee").

WHEREAS, the Corporation and the Employee entered into an Employment Agreement dated August 24, 1981 (the "Original Employment Agreement"); and

WHEREAS, the Corporation has adopted a new Management Incentive Program and the Employee desires to be eligible to participate in such Management Incentive Program; and

WHEREAS, the Corporation and the Employee desire to make certain other amendments to the Original Employment Agreement as more particularly set forth herein; and

WHEREAS, for convenience of reference, the Corporation and the Employee desire to amend and restate the Original Employment Agreement in its entirety:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, and for other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Corporation and the Employee hereby agree that the Original Employment Agreement is hereby amended and restated to read in its entirety as follows:

(1) TERM OF EMPLOYMENT: The Corporation hereby employs the Employee, and the Employee hereby accepts employment with the Corporation, for a period commencing as of December 15, 1995 and continuing from month to month thereafter until terminated as provided in this Section (1). Either the Corporation or the Employee may terminate the employment of the Employee under this Employment Agreement any time after December 15, 1995 by giving written notice to the other party stating or his election to terminate the employment of the Employee under this Employment Agreement. The employment of the Employee under this Employment Agreement shall terminate thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of the Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5).

(2) CAPACITY: The Employee shall serve in such capacity as may be assigned to him consistent with his training and experience for the term of employment under this Employment Agreement and shall have such authority as is delegated to him by the President of the Corporation, or his designee.

(3) EXTENT OF SERVICES: During the term of employment of the Employee under this Employment Agreement, the Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not engage in any other business activity, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Corporation.

(4) COMPENSATION: In consideration of the services to be rendered by the Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) BASE SALARY: A base salary at the rate of \$125,000 per year for the term of employment of the Employee under this Employment Agreement. The base salary shall be payable in equal weekly, biweekly, or bimonthly installments subject to usual withholding requirements. Base salary will be reviewed according to the established practices of the corporation. No overtime pay will be paid to the Employee by the Corporation.

(b) INCENTIVE: For each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the Employee shall be entitled to participate in a Management Incentive Program pursuant to the terms of which the Employee may receive compensation in addition to his base salary in an amount equal to a specified percentage of his base salary if the Corporation attains its consolidated financial goals during such calendar year of the Corporation. The Management Incentive Program, including the consolidated financial goals established by the Corporation for the calendar year and the formula to be used to determine the payment of amounts under the Management Incentive Program, will be communicated to the Employee in writing prior to the beginning of each calendar year of the Corporation. The first calendar year of the Corporation for purposes of the Management Incentive Program will commence on January 1, 1996 and end on December 31, 1996. If the term of employment of the Employee under this Employment Agreement shall include a portion of a calendar year of the Corporation commencing after January 1, 1996, the Corporation shall not pay the Employee, and the Employee shall not be entitled to receive, any amount under the Management Incentive Program.

If there shall be any disagreement between the Corporation and the Employee as to the calculation of the Management Incentive Bonus in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the decision of the independent Public Accounting firm of the Corporation as to the amount of the Management Incentive Bonus of the Corporation shall be conclusive and binding on the Corporation and the Employee. The Employee shall have no right to inspect any of the books, papers or records of the

Corporation, except that the Employee shall be entitled to inspect any certificate of such independent public accounting firm as to the calculation of the Management Incentive Bonus of the Corporation in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

Incentive payments shall be payable to the Employee on or before March 31 after the end of each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

(c) MKS INSTRUMENTS, INC. PROFIT SHARING AND RETIREMENT SAVINGS PLAN: The Employee shall be eligible to participate in the MKS Instruments, Inc. Profit Sharing and Retirement Savings Plan upon satisfaction of the conditions set forth therein

(d) VACATION: The Employee shall be entitled to an annual vacation leave of days at full pay during each calendar year during the term of employment of the Employee under this Employment Agreement, subject to the Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its necessary business.

(e) LIFE INSURANCE: The Corporation shall provide, and pay all of the premiums for, term life insurance for the Employee during the term of employment of the Employee under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(f) MEDICAL/DENTAL INSURANCE: The Corporation shall provide group medical/dental insurance for the Employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(g) OTHER BENEFITS: The Corporation shall provide other benefits for the employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(5) TERMINATION: The employment of the Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1)

(b) Upon the death of the Employee.

(c) At the election of the Corporation (i) if the Employee shall fail, or refuse, to perform the services required of him under this Employment

Agreement, or (ii) if the Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement, or (iii) for "cause", which term shall mean acts or actions detrimental to the best interests of the Corporation.

(6) PAYMENT UPON TERMINATION:

(a) If the employment of the Employee is terminated on the expiration of the period of employment as provided in Section (1), the Employee shall not be entitled to any compensation, and the Corporation shall have no obligation to pay the Employee any compensation, except as is provided in this Employment Agreement.

(b) If the employment of the Employee is terminated by death, the Corporation shall pay to the estate of the Employee the compensation which would otherwise be payable to the Employee at the end of the month in which his death occurs.

(c) In the event the employment of the Employee is terminated at the election of the Corporation pursuant to Section (5) (c) hereof, the Employee shall only be entitled to his base salary through the last day of actual employment or the date of termination, whichever is earlier.

(7) TRADE SECRETS: The Employee covenants and agrees that he will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or any one connected with the Corporation, and that such trade secrets and confidential information shall not be used by the Employee either on his own behalf or for the benefit of others or disclosed by the Employee to any one, except to the Corporation, during or after the term of employment of the Employee under this Employment Agreement. "Trade secrets of the Corporation" shall include, but not be limited to, Inventions, trade secrets, files, records, drawings, specifications, processes, lists of material, lists of customers, sales and marketing strategies, product development plans, financial information, and information on research and development.

(8) INVENTIONS AND PATENTS:

(a) The Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which the Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of employment of the Employee under this Employment Agreement, which

relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee after the employment of the Employee under this Employment Agreement is terminated if the Inventions were conceived by the Employee during the term of employment of the Employee under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee within six (6) months of the date of termination of the employment of the Employee under this Employment Agreement shall be conclusively presumed to have been conceived during the term of employment of the Employee under this Employment Agreement.

(b) The Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) The Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominees all the right, title and interest of the Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of the Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world.

(d) The Employee agrees that even though his employment is terminated under this Employment Agreement he will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections (8) (a) and (8) (c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any litigation which may arise in connection with the Inventions, provided, however, that should such services be rendered after termination of employment of the Employee under this

Employment Agreement, the Employee shall be paid reasonable compensation on a per diem basis.

(e) The Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) The Employee agrees that he will, upon leaving the employment of the Corporation, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and the Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) PROPERTY OF CORPORATION: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by the Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by the Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) NON-COMPETITION:

(a) In order to protect the good will of the Corporation and in order to protect the trade secrets of the Corporation referred to in Section (7) of this Employment Agreement, the Employee hereby agrees that during the term of employment of the Employee under this Employment Agreement, and during a period of one (1) year after termination of employment of the Employee under this Employment Agreement without regard to the cause of termination of employment and whether or not such termination of employment was caused by the Employee or by the Corporation, (i) the Employee shall not engage, either directly or indirectly, in any manner or capacity, in any business or activity which is competitive with any business or activity conducted by the Corporation; (ii) the Employee shall not work for or employ, directly or indirectly, or cause to be employed by another, any person who was an employee, officer or agent of the Corporation or of any of its subsidiaries at any time during a period of twelve (12) months prior to the termination of the employment of the Employee under this Employment Agreement nor shall the Employee form any partnership with, or establish any business venture in cooperation with, any such person which is competitive with any business or activity of the Corporation; (iii) the Employee shall not give, sell or lease any goods or services competitive with the goods or services of the Corporation or its subsidiaries to any person, partnership, corporation or other entity who purchased goods or

services from the Corporation or its subsidiaries within one (1) year before the termination of the employment of the Employee under this Employment Agreement; (iv) the Employee shall not have any financial interest, or participate as a director, officer, stockholder, partner, employee, consultant or otherwise, in any corporation, partnership or other entity which is competitive with any business or activity conducted by the Corporation.

(b) The Corporation and the Employee agree that the services of the Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by the Employee of any of his agreements under this Section (10) would damage the goodwill of the Corporation and cause the Corporation irreparable harm which could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of the Employment under this Section (1) may be enforced by the Corporation in equity by an injunction or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section (10) shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities, it shall be interpreted to extend only over the maximum period of time or range of activities as to which it may be enforceable.

(11) NOTICE: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to the Employee in writing for the purpose, and if to the Employee, shall be duly given if delivered to the Employee by hand or if sent to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of the Employee set forth under his name below or at such other address as the Employee may hereafter designate to the Corporation in writing for the purpose.

(12) ASSIGNMENT: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of the Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of the Employee.

(13) ENTIRE AGREEMENT AND SEVERABILITY:

(a) This Employment Agreement supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the

employment of the Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or anyone acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(14) GOVERNING LAW AND JURISDICTIONS: This Employment Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to contracts made and to be performed entirely within The Commonwealth of Massachusetts (without reference to conflict of laws principles). Any action or proceeding arising from or in connection with this Employment Agreement may be brought against the Employee in a court of record of The Commonwealth of Massachusetts, Middlesex County, or in the United States District Court for the District of Massachusetts, the Employee hereby consenting to the jurisdiction thereof over its person; and service of process may be made upon the Employee by mailing a copy of the summons and any complaint to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address to be used for the giving of notice to the Employee as provided in this Employment Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Employment Agreement as a sealed instrument in the Commonwealth of Massachusetts, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertucci, President

 John R. Bertucci, President
 Six Shattuck Road
 Andover, MA 01810

/s/ Leo Berlinghieri

Employee Signature

Leo Berlinghieri

Employee Name

Address:
15 Olney Street
Billerica, MA 01821

AMENDED & RESTATED EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated December 15, 1995 (the "Employment Agreement") by and between MKS Instruments Inc., a Massachusetts Corporation (the "Corporation"), and John J. Sullivan of Milton, MA (the "Employee").

WHEREAS, the Corporation and the Employee entered into an Employment Agreement dated April 3, 1982 (the "Original Employment Agreement"); and

WHEREAS, the Corporation has adopted a new Management Incentive Program and the Employee desires to be eligible to participate in such Management Incentive Program; and

WHEREAS, the Corporation and the Employee desire to make certain other amendments to the Original Employment Agreement as more particularly set forth herein; and

WHEREAS, for convenience of reference, the Corporation and the Employee desire to amend and restate the Original Employment Agreement in its entirety:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, and for other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Corporation and the Employee hereby agree that the Original Employment Agreement is hereby amended and restated to read in its entirety as follows:

(1) TERM OF EMPLOYMENT: The Corporation hereby employs the Employee, and the Employee hereby accepts employment with the Corporation, for a period commencing as of December 15, 1995 and continuing from month to month thereafter until terminated as provided in this Section (1). Either the Corporation or the Employee may terminate the employment of the Employee under this Employment Agreement at any time after December 15, 1995 by giving written notice to the other party stating or his election to terminate the employment of the Employee under this Employment Agreement. The employment of the Employee under this Employment Agreement shall terminate thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of the Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5).

(2) CAPACITY: The Employee shall serve in such capacity as may be assigned to him consistent with his training and experience for the term of employment under this Employment Agreement and shall have such authority as is delegated to him by the President of the Corporation, or his designee.

(3) EXTENT OF SERVICES: During the term of employment of the Employee under this Employment Agreement, the Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not engage in any other business activity, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Corporation.

(4) COMPENSATION: In consideration of the services to be rendered by the Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) BASE SALARY: A base salary at the rate of \$140,000 per year for the term of employment of the Employee under this Employment Agreement. The base salary shall be payable in equal weekly, biweekly, or bimonthly installments subject to usual withholding requirements. Base salary will be reviewed according to the established practices of the corporation. No overtime pay will be paid to the Employee by the Corporation.

(b) INCENTIVE: For each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the Employee shall be entitled to participate in a Management Incentive Program pursuant to the terms of which the Employee may receive compensation in addition to his base salary in an amount equal to a specified percentage of his base salary if the Corporation attains its consolidated financial goals during such calendar year of the Corporation. The Management Incentive Program, including the consolidated financial goals established by the Corporation for the calendar year and the formula to be used to determine the payment of amounts under the Management Incentive Program, will be communicated to the Employee in writing prior to the beginning of each calendar year of the Corporation. The first calendar year of the Corporation for purposes of the Management Incentive Program will commence on January 1, 1996 and end on December 31, 1996. If the term of employment of the Employee under this Employment Agreement shall include a portion of a calendar year of the Corporation commencing after January 1, 1996, the Corporation shall not pay the Employee, and the Employee shall not be entitled to receive, any amount under the Management Incentive Program.

If there shall be any disagreement between the Corporation and the Employee as to the calculation of the Management Incentive Bonus in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the decision of the independent Public Accounting firm of the Corporation as to the amount of the Management Incentive Bonus of the Corporation shall be conclusive and binding on the Corporation and the Employee. The Employee shall have no right to inspect any of the books, papers or records of the Corporation except that the Employee shall be entitled to inspect any certificate of

such independent public accounting firm as to the calculation of the Management Incentive Bonus of the Corporation in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

Incentive payments shall be payable to the Employee on or before March 31 after the end of each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

(c) MKS INSTRUMENTS, INC. PROFIT SHARING AND RETIREMENT SAVINGS PLAN: The Employee shall be eligible to participate in the MKS Instruments, Inc. Profit Sharing and Retirement Savings Plan upon satisfaction of the conditions set forth therein.

(d) VACATION: The Employee shall be entitled to an annual vacation leave of 20 days at full pay during each calendar year during the term of employment of the Employee under this Employment Agreement, subject to the Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its necessary business.

(e) LIFE INSURANCE: The Corporation shall provide, and pay all of the premiums for, term life insurance for the Employee during the term of employment of the Employee under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(f) MEDICAL/DENTAL INSURANCE: The Corporation shall provide group medical/dental insurance for the Employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(g) OTHER BENEFITS: The Corporation shall provide other benefits for the employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(5) TERMINATION: The employment of the Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of the Employee.

(c) At the election of the Corporation (i) if the Employee shall fail, or refuse, to perform the services required of him under this Employment Agreement, or (ii) if the Employee shall fail, or refuse, to perform the other covenants and

agreements required of him under this Employment Agreement, or (iii) for "cause," which term shall mean acts or actions detrimental to the best interests of the Corporation

(6) PAYMENT UPON TERMINATION:

(a) If the employment of the Employee is terminated on the expiration of the period of employment as provided in Section (1), the Employee shall not be entitled to any compensation, and the Corporation shall have no obligation to pay the Employee any compensation, except as is provided in this Employment Agreement.

(b) If the employment of the Employee is terminated by death, the Corporation shall pay to the estate of the Employee the compensation which would otherwise be payable to the employee at the end of the month in which his death occurs.

(c) In the event the employment of the Employee is terminated at the election of the Corporation pursuant to Section (5) (c) hereof, the Employee shall only be entitled to his base salary through the last day of actual employment or the date of termination, whichever is earlier.

(7) TRADE SECRETS: The Employee covenants and agrees that he will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or any one connected with the Corporation, and that such trade secrets and confidential information shall not be used by the Employee either on his own behalf or for the benefit of others or disclosed by the Employee to any one, except to the Corporation, during or after the term of employment of the Employee under this Employment Agreement. "Trade secrets of the Corporation" shall include, but not be limited to, inventions, trade secrets, files, records, drawings, specifications, processes, lists of material, lists of customers, sales and marketing strategies, product development plans, financial information, and information on research and development.

(8) INVENTIONS AND PATENTS:

(a) The Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which the Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of employment of the Employee under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including

development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee after the employment of the Employee under this Employment Agreement is terminated if the Inventions were conceived by the Employee during the term of employment of the Employee under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee within six (6) months of the date of termination of the employment of the Employee under this Employment Agreement shall be conclusively presumed to have been conceived during the term of employment of the Employee under this Employment Agreement.

(b) The Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) The Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominees all the right, title and interest of the Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of the Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world.

(d) The Employee agrees that even though his employment is terminated under this Employment Agreement he will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections (8) (a) and (8) (c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any litigation which may arise in connection with the Inventions, provided however, that should such services be rendered after termination of employment of the Employee under this

Employment Agreement, the Employee shall be paid reasonable compensation on a per diem basis.

(e) The Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) The Employee agrees that he will, upon leaving the employment of the Corporation, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and the Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures drawings prints, letters, notes or reports.

(9) PROPERTY OF CORPORATION: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by the Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by the Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) NON-COMPETITION:

(a) In order to protect the good will of the Corporation and in order to protect the trade secrets of the Corporation referred to in Section (7) of this Employment Agreement, the Employee hereby agrees that during the term of employment of the Employee under this Employment Agreement, and during a period of one (1) year after termination of employment of the Employee under this Employment Agreement without regard to the cause of termination of employment and whether or not such termination of employment was caused by the Employee or by the Corporation, (i) the Employee shall not engage, either directly or indirectly, in any manner or capacity, in any business or activity which is competitive with any business or activity conducted by the Corporation; (ii) the Employee shall not work for or employ, directly or indirectly, or cause to be employed by another, any person who was an employee officer or agent of the Corporation or of any of its subsidiaries at any time during a period of twelve (12) months prior to the termination of the employment of the Employee under this Employment Agreement nor shall the Employee form any partnership with, or establish any business venture in cooperation with, any such person which is competitive with any business or activity of the Corporation; (iii) the Employee shall not give sell or lease any goods or services competitive with the goods or services of the Corporation or its subsidiaries to any person, partnership, corporation or other entity who purchased goods or

services from the Corporation or its subsidiaries within one (1) year before the termination of the employment of the Employee under this Employment Agreement; (iv) the Employee shall not have any financial interest, or participate as a director, officer, stockholder, partner, employee, consultant or otherwise, in any corporation partnership or other entity which is competitive with any business or activity conducted by the Corporation.

(b) The Corporation and the Employee agree that the services of the Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by the Employee of any of his agreements under this Section (10) would damage the goodwill of the Corporation and cause the Corporation irreparable harm which could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of the Employee under this Section (10) may be enforced by the Corporation in equity by an injunction or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section (10) shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities, it shall be interpreted to extend only over the maximum period of time or range of activities as to which it may be enforceable.

(11) NOTICE: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to the Employee in writing for the purpose, and if to the Employee, shall be duly given if delivered to the Employee by hand or if sent to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of the Employee set forth under his name below or at such other address as the Employee may hereafter designate to the Corporation in writing for the purpose.

(12) ASSIGNMENT: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of the Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of the Employee.

(13) ENTIRE AGREEMENT AND SEVERABILITY:

(a) This Employment Agreement supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the

employment of the Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(14) GOVERNING LAW AND JURISDICTIONS: This Employment Agreement shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts applicable to contracts made and to be performed entirely within the Commonwealth of Massachusetts (without reference to conflict of laws principles). Any action or proceeding arising from or in connection with this Employment Agreement may be brought against the Employee in a court of record of the Commonwealth of Massachusetts, Middlesex County, or in the United States District Court for the District of Massachusetts, the Employee hereby consenting to the jurisdiction thereof over its person; and service of process may be made upon the Employee by mailing a copy of the summons and any complaint to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address to be used for the giving of notice to the Employee as provided in this Employment Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Employment Agreement as a sealed instrument in the Commonwealth of Massachusetts, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertucci, President

John R. Bertucci, President

Six Shattuck Road
Andover, MA 01810

/s/ John J. Sullivan

Employee Signature

John J. Sullivan

Employee Name

Address:

=====

AMENDED & RESTATED EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated December 15, 1995 (the "Employment Agreement") by and between MKS Instruments, Inc., a Massachusetts Corporation (the "Corporation"), and Ronald Weigner of Sudbury, MA (the "Employee").

WHEREAS, the Corporation and the Employee entered into an Employment Agreement dated October 7, 1981 (the "Original Employment Agreement"); and

WHEREAS, the Corporation has adopted a new Management Incentive Program and the Employee desires to be eligible to participate in such Management Incentive Program; and

WHEREAS, the Corporation and the Employee desire to make certain other amendments to the Original Employment Agreement as more particularly set forth herein; and

WHEREAS, for convenience of reference, the Corporation and the Employee desire to amend and restate the Original Employment Agreement in its entirety:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, and for other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Corporation and the Employee hereby agree that the Original Employment Agreement is hereby amended and restated to read in its entirety as follows:

(1) TERM OF EMPLOYMENT: The Corporation hereby employs the Employee, and the Employee hereby accepts employment with the Corporation, for a period commencing as of December 15, 1995 and continuing from month to month thereafter until terminated as provided in this Section (1). Either the Corporation or the Employee may terminate the employment of the Employee under this Employment Agreement at any time after December 15, 1995 by giving written notice to the other party stating its or his election to terminate the employment of the Employee under this Employment Agreement. The employment of the Employee under this Employment Agreement shall terminate thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of the Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5).

(2) CAPACITY: The Employee shall serve in such capacity as may be assigned to him consistent with his training and experience for the term of employment under this Employment Agreement and shall have such authority as is delegated to him by the President of the Corporation, or his designee.

(3) EXTENT OF SERVICES: During the term of employment of the Employee under this Employment Agreement, the Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not engage in any other business activity, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Corporation.

(4) COMPENSATION: In consideration of the services to be rendered by the Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) BASE SALARY: A base salary at the rate of \$155,000 per year for the term of employment of the Employee under this Employment Agreement. The base salary shall be payable in equal weekly, biweekly, or bimonthly installments subject to usual withholding requirements. Base salary will be reviewed according to the established practices of the corporation. No overtime pay will be paid to the Employee by the Corporation.

(b) INCENTIVE: For each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the Employee shall be entitled to participate in a Management Incentive Program pursuant to the terms of which the Employee may receive compensation in addition to his base salary in an amount equal to a specified percentage of his base salary if the Corporation attains its consolidated financial goals during such calendar year of the Corporation. The Management Incentive Program, including the consolidated financial goals established by the Corporation for the calendar year and the formula to be used to determine the payment of amounts under the Management Incentive Program, will be communicated to the Employee in writing prior to the beginning of each calendar year of the Corporation. The first calendar year of the Corporation for purposes of the Management Incentive Program will commence on January 1, 1996 and end on December 31, 1996. If the term of employment of the Employee under this Employment Agreement shall include a portion of a calendar year of the Corporation commencing after January 1, 1996, the Corporation shall not pay the Employee, and the Employee shall not be entitled to receive, any amount under the Management Incentive Program.

If there shall be any disagreement between the Corporation and the Employee as to the calculation of the Management Incentive Bonus in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the decision of the independent Public Accounting firm of the Corporation as to the amount of the Management Incentive Bonus of the Corporation shall be conclusive and binding on the Corporation and the Employee. The Employee shall have no right to inspect any of the books, papers or records of the Corporation, except that the Employee shall be entitled to inspect any certificate of

such independent public accounting firm as to the calculation of the Management Incentive Bonus of the Corporation in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

Incentive payments shall be payable to the Employee on or before March 31 after the end of each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

(c) MKS INSTRUMENTS, INC. PROFIT SHARING AND RETIREMENT SAVINGS PLAN: The Employee shall be eligible to participate in the MKS Instruments, Inc. Profit Sharing and Retirement Savings Plan upon satisfaction of the conditions set forth therein.

(d) VACATION: The Employee shall be entitled to an annual vacation leave of 20 days at full pay during each calendar year during the term of employment of the Employee under this Employment Agreement, subject to the Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its necessary business.

(e) LIFE INSURANCE: The Corporation shall provide, and pay all of the premiums for, term life insurance for the Employee during the term of employment of the Employee under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(f) MEDICAL/DENTAL INSURANCE: The Corporation shall provide group medical/dental insurance for the Employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(g) OTHER BENEFITS: The Corporation shall provide other benefits for the employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(5) TERMINATION: The employment of the Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of the Employee.

(c) At the election of the Corporation (i) if the Employee shall fail, or refuse, to perform the services required of him under this Employment Agreement, or (ii) if the Employee shall fail, or refuse, to perform the other covenants and

agreements required of him under this Employment Agreement, or (iii) for "cause," which term shall mean acts or actions detrimental to the best interests of the Corporation.

(6) PAYMENT UPON TERMINATION:

(a) If the employment of the Employee is terminated on the expiration of the period of employment as provided in Section (1), the Employee shall not be entitled to any compensation, and the Corporation shall have no obligation to pay the Employee any compensation, except as is provided in this Employment Agreement.

(b) If the employment of the Employee is terminated by death, the Corporation shall pay to the estate of the Employee the compensation which would otherwise be payable to the Employee at the end of the month in which his death occurs.

(c) In the event the employment of the Employee is terminated at the election of the Corporation pursuant to Section (5) (c) hereof, the Employee shall only be entitled to his base salary through the last day of actual employment or the date of termination, whichever is earlier.

(7) TRADE SECRETS: The Employee covenants and agrees that he will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or any one connected with the Corporation, and that such trade secrets and confidential information shall not be used by the Employee either on his own behalf or for the benefit of others or disclosed by the Employee to any one, except to the Corporation, during or after the term of employment of the Employee under this Employment Agreement. "Trade secrets of the Corporation" shall include, but not be limited to, Inventions, trade secrets, files, records, drawings, specifications, processes, lists of material, lists of customers, sales and marketing strategies, product development plans, financial information, and information on research and development.

(8) INVENTIONS AND PATENTS:

(a) The Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which the Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of employment of the Employee under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including

development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the employee after the employment of the Employee under this Employment Agreement is terminated if the Inventions were conceived by the Employee during the term of employment of the Employee under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee within six (6) months of the date of termination of the employment of the Employee under this Employment Agreement shall be conclusively presumed to have been conceived during the term of employment of the Employee under this Employment Agreement.

(b) The Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) The Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominees all the right, title and interest of the Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of the Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world.

(d) The Employee agrees that even though his employment is terminated under this Employment Agreement he will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections (8) (a) and (8) (c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any litigation which may arise in connection with the Inventions, provided, however, that should such services be rendered after termination of employment of the Employee under this

Employment Agreement, the Employee shall be paid reasonable compensation on a per diem basis.

(e) The Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) The Employee agrees that he will, upon leaving the employment of the Corporation, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and the Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) PROPERTY OF CORPORATION: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by the Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by the Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) NON-COMPETITION:

(a) In order to protect the good will of the Corporation and in order to protect the trade secrets of the Corporation referred to in Section (7) of this Employment Agreement, the Employee hereby agrees that during the term of employment of the Employee under this Employment Agreement, and during a period of one (1) year after termination of employment of the Employee under this Employment Agreement without regard to the cause of termination of employment and whether or not such termination of employment was caused by the Employee or by the Corporation, (i) the Employee shall not engage, either directly or indirectly, in any manner or capacity, in any business or activity which is competitive with any business or activity conducted by the Corporation; (ii) the Employee shall not work for or employ, directly or indirectly, or cause to be employed by another any person who was an employee, officer or agent of the Corporation or of any of its subsidiaries at any time during a period of twelve (12) months prior to the termination of the employment of the Employee under this Employment Agreement nor shall the Employee form any partnership with, or establish any business venture in cooperation with, any such person which is competitive with any business or activity of the Corporation; (iii) the Employee shall not give, sell or lease any goods or services competitive with the goods or services of the Corporation or its subsidiaries to any person, partnership, corporation or other entity who purchased goods or

services from the Corporation or its subsidiaries within one (1) year before the termination of the employment of the Employee under this Employment Agreement; (iv) the Employee all not have any financial interest, or participate as a director, officer, stockholder, partner, employee, consultant or otherwise, in any corporation, partnership or other entity which is competitive with any business or activity conducted by the Corporation.

(b) The Corporation and the Employee agree that the services of the Employee are of a personal, special unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by the Employee of any of his agreements under this Section (10) would damage the goodwill of the Corporation and cause the Corporation irreparable harm which could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of the Employee under this Section (10) may be enforced by the Corporation in equity by an injunction or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section (10) shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities, it shall be interpreted to extend only over the maximum period of time or range of activities as to which it may be enforceable.

(11) NOTICE: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the corporation set forth under its name below or at such other address as the Corporation may hereafter designate to the Employee in writing for the purpose, and if to the Employee, shall be duly given if delivered to the Employee by hand or if sent to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of the Employee set forth under his name below or at such other address as the Employee may hereafter designate to the Corporation in writing for the purpose.

(12) ASSIGNMENT: The rights and obligations of the Corporation under this Employment Agreement shall insure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of the Employee under this Employment Agreement shall insure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of the Employee.

(13) ENTIRE AGREEMENT AND SEVERABILITY:

(a) This Employment Agreement supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the

employment of the Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(14) GOVERNING LAW AND JURISDICTIONS: This Employment Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to contracts made and to be performed entirely within The Commonwealth of Massachusetts (without reference to conflict of laws principles). Any action or proceeding arising from or in connection with this Employment Agreement may be brought against the Employee in a court of record of The Commonwealth of Massachusetts, Middlesex County, or in the United States District Court for the District of Massachusetts, the Employee hereby consenting to the jurisdiction thereof over its person; and service of process may be made upon the Employee by mailing a copy of the summons and any complaint to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address to be used for the giving of notice to the Employee as provided in this Employment Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Employment Agreement as a sealed instrument in the Commonwealth of Massachusetts, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertucci, President

John R. Bertucci, President

Six Shattuck Road
Andover, MA 01810

/s/ Ronald Weigner

Employee Signature

Ronald Weigner
Employee Name

Address:

AMENDED & RESTATED EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated December 15, 1995 (the "Employment Agreement") by and between MKS Instruments, Inc., a Massachusetts Corporation (the "Corporation"), and William Stewart of Boulder, CO (the "Employee").

WHEREAS, the Corporation and the Employee entered into an Employment Agreement dated October 31, 1986 (the "Original Employment Agreement"); and

WHEREAS, the Corporation has adopted a new Management Incentive Program and the Employee desires to be eligible to participate in such Management Incentive Program; and

WHEREAS, the Corporation and the Employee desire to make certain other amendments to the Original Employment Agreement as more particularly set forth herein; and

WHEREAS, for convenience of reference, the Corporation and the Employee desire to amend and restate the Original Employment Agreement in its entirety:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, and for other good and valuable considerations, the receipt and sufficiency of which are hereby acknowledged, the Corporation and the Employee hereby agree that the Original Employment Agreement is hereby amended and restated to read in its entirety as follows:

(1) TERM OF EMPLOYMENT: The Corporation hereby employs the Employee, and the Employee hereby accepts employment with the Corporation, for a period commencing as of December 15, 1995 and continuing from month to month thereafter until terminated as provided in this Section (1). Either the Corporation or the Employee may terminate the employment of the Employee under this Employment Agreement at any time after December 15, 1995 by giving written notice to the other party stating its or his election to terminate the employment of the Employee under this Employment Agreement. The employment of the Employee under this Employment Agreement shall terminate thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of the Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5).

(2) CAPACITY: The Employee shall serve in such capacity as may be assigned to him consistent with his training and experience for the term of employment under this Employment Agreement and shall have such authority as is delegated to him by the President of the Corporation, or his designee.

(3) EXTENT OF SERVICES: During the term of employment of the Employee under this Employment Agreement, the Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not engage in any other business activity, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Corporation.

(4) COMPENSATION: In consideration of the services to be rendered by the Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) BASE SALARY: A base salary at the rate of \$170,000 per year for the term of employment of the Employee under this Employment Agreement. The base salary shall be payable in equal weekly, biweekly, or bimonthly installments subject to usual withholding requirements. Base salary will be reviewed according to the established practices of the corporation. No overtime pay will be paid to the Employee by the Corporation.

(b) INCENTIVE: For each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the Employee shall be entitled to participate in a Management Incentive Program pursuant to the terms of which the Employee may receive compensation in addition to his base salary in an amount equal to a specified percentage of his base salary if the Corporation attains its consolidated financial goals during such calendar year of the Corporation. The Management Incentive Program, including the consolidated financial goals established by the Corporation for the calendar year and the formula to be used to determine the payment of amounts under the Management Incentive Program, will be communicated to the Employee in writing prior to the beginning of each calendar year of the Corporation. The first calendar year of the Corporation for purposes of the Management Incentive Program will commence on January 1, 1996 and end on December 31, 1996. If the term of employment of the Employee under this Employment Agreement shall include a portion of a calendar year of the Corporation commencing after January 1, 1996, the Corporation shall not pay the Employee, and the Employee shall not be entitled to receive, any amount under the Management Incentive Program.

If there shall be any disagreement between the Corporation and the Employee as to the calculation of the Management Incentive Bonus in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the decision of the independent Public Accounting firm of the Corporation as to the amount of the Management Incentive Bonus of the Corporation shall be conclusive and binding on the Corporation and the Employee. The Employee shall have no right to inspect any of the books, papers or records of the Corporation, except that the Employee shall be entitled to inspect any certificate

of such independent public accounting firm as to the calculation of the Management Incentive Bonus of the Corporation in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

Incentive payments shall be payable to the Employee on or before March 31 after the end of each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

(c) MKS INSTRUMENTS, INC. PROFIT SHARING AND RETIREMENT SAVINGS PLAN: The Employee shall be eligible to participate in the MKS Instruments, Inc. Profit Sharing and Retirement Savings Plan upon satisfaction of the conditions set forth therein.

(d) VACATION: The Employee shall be entitled to an annual vacation leave of 20 days at pay during each calendar year during the term of employment of the Employee under this Employment Agreement in accordance with policy under plans of the Corporation applicable to the Employee, subject to the Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its necessary business.

(e) LIFE INSURANCE: The Corporation shall provide, and pay all of the premiums for, term life insurance for the Employee during the term of employment of the Employee under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(f) MEDICAL/DENTAL INSURANCE: The Corporation shall provide group medical/dental insurance for the Employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(g) OTHER BENEFITS: The Corporation shall provide other benefits for the employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(5) TERMINATION: The employment of the Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of the Employee.

(c) At the election of the Corporation (i) if the Employee shall fail, or refuse, to perform the services required of him under this Employment Agreement,

or (ii) if the Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement, or (iii) for "cause," which term shall mean acts or actions detrimental to the best interests of the Corporation.

(6) PAYMENT UPON TERMINATION:

(a) If the employment of the Employee is terminated on the expiration of the period of employment as provided in Section (1), the Employee shall not be entitled to any compensation, and the Corporation shall have no obligation to pay the Employee any compensation, except as is provided in this Employment Agreement.

(b) If the employment of the Employee is terminated by death, the Corporation shall pay to the estate of the Employee the compensation which would otherwise be payable to the Employee at the end of the month in which his death occurs.

(c) In the event the employment of the Employee is terminated at the election of the Corporation pursuant to Section (5) (c) hereof, the Employee shall only be entitled to his base salary through the last day of actual employment or the date of termination, whichever is earlier.

(7) TRADE SECRETS: The Employee covenants and agrees that he will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or any one connected with the Corporation, and that such trade secrets and confidential information shall not be used by the Employee either on his own behalf or for the benefit of others or disclosed by the Employee to any one, except to the Corporation, during or after the term of employment of the Employee under this Employment Agreement. "Trade secrets of the Corporation" shall include, but not be limited to, Inventions, trade secrets, files, records, drawings, specifications, processes, lists of material, lists of customers, sales and marketing strategies, product development plans, financial information, and information on research and development.

(8) INVENTIONS AND PATENTS:

(a) The Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable which the Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of employment of the Employee under this Employment Agreement, which

relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee after the employment of the Employee under this Employment Agreement is terminated if the Inventions were conceived by the Employee during the term of employment of the Employee under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee within six (6) months of the date of termination of the employment of the Employee under this Employment Agreement shall be conclusively presumed to have been conceived during the term of employment of the Employee under this Employment Agreement.

(b) The Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) The Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominees all the right, title and interest of the Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of the Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world.

(d) The Employee agrees that even though his employment is terminated under this Employment Agreement he will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections (8) (a) and (8) (c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any litigation which may arise in connection with the Inventions, provided, however, that should such services be rendered after termination of employment of the Employee under this

Employment Agreement, the Employee shall be paid reasonable compensation on a per diem basis.

(e) The Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) The Employee agrees that he will, upon leaving the employment of the Corporation, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and the Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) PROPERTY OF CORPORATION: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by the Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by the Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) NON-COMPETITION:

(a) In order to protect the good will of the Corporation and in order to protect the trade secrets of the Corporation referred to in Section (7) of this Employment Agreement, the Employee hereby agrees that during the term of employment of the Employee under this Employment Agreement, and during a period of one (1) year after termination of employment of the Employee under this Employment Agreement without regard to the cause of termination of employment and whether or not such termination of employment was caused by the Employee or by the Corporation, (i) the Employee shall not engage, either directly or indirectly, in any manner or capacity, in any business or activity which is competitive with any business or activity conducted by the Corporation; (ii) the Employee shall not work for or employ, directly or indirectly, or cause to be employed by another, any person who was an employee, officer or agent of the Corporation or of any of its subsidiaries at any time during a period of twelve (12) months prior to the termination of the employment of the Employee under this Employment Agreement nor shall the Employee form any partnership with or establish any business venture in cooperation with, any such person which is competitive with any business or activity of the Corporation; (iii) the Employee shall not give, sell or lease any goods or services competitive with the goods or services of the Corporation or its subsidiaries to any person, partnership, corporation or other entity who purchased goods or services

from the Corporation or its subsidiaries within one (1) year before the termination of the employment of the Employee under employment Agreement; (iv) the Employee shall not have any financial interest, or participate as a director, officer, stockholder, partner, employee, consultant or otherwise, in any corporation, partners or other entity which is competitive with any business or activity conducted by the Corporation.

(b) The Corporation and the Employee agree that the services of the Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by the Employee of any of his agreements under this Section (10) would damage the goodwill of the Corporation and cause the Corporation irreparable harm which could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of the Employee under this Section (10) may be enforced by the Corporation in equity by an injunction or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section (10) shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities, it shall be interpreted to extend only over the maximum period of time or range of activities as to which it may be enforceable.

(11) NOTICE: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to the Employee in writing for the purpose, and if to the Employee, shall be duly given if delivered to the Employee by hand or if sent to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of the Employee set forth under his name below or at such other address as the Employee may hereafter designate to the Corporation in writing for the purpose.

(12) ASSIGNMENT: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of the Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of the Employee.

(13) ENTIRE AGREEMENT AND SEVERABILITY:

(a) This Employment Agreement supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the

employment of the Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting one half of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(14) GOVERNING LAW AND JURISDICTIONS: This Employment Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to contracts made and to be performed entirely within The Commonwealth of Massachusetts (without reference to conflict of laws principles). Any action or proceeding arising from or in connection with this Employment Agreement may be brought against the Employee in a court of record of The Commonwealth of Massachusetts, Middlesex County, or in the United States District Court for the District of Massachusetts, the Employee hereby consenting to the jurisdiction thereof over its person; and service of process may be made upon the Employee by mailing a copy of the summons and any complaint to the Employee by registered or certified mail, postage prepaid, return receipt requested, at the address to be used for the giving of notice to the Employee as provided in this Employment Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Employment Agreement as a sealed instrument in the Commonwealth of Massachusetts, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertucci, President

John R. Bertucci, President

Six Shattuck Road
Andover, MA 01810

/s/ William Stewart

Employee Signature

William Stewart

Employee Name

Address:

LEASE AGREEMENT

1. PARTIES. This Lease, dated for reference purposes only, October 12, 1989, is made by and between ASPEN INDUSTRIAL PARK PARTNERSHIP, a Colorado limited partnership, (herein called "Landlord") and HPS, DIVISION OF MKS INDUSTRIES, INC. (herein called "Tenant").

2. PREMISES. Landlord does hereby lease unto Tenant the following described premises containing approximately 39,032 square feet measured to the outside of the exterior walls, including overhangs, canopies and loading docks, and to approximately one-half the thickness of common walls; commonly known as 5330 Sterling Drive, in the City of Boulder, County of Boulder, State of Colorado; as shown on the plans attached hereto as Exhibit "A".

Said Lease is subject to the terms, covenants and conditions herein set forth and the Tenant covenants as a material part of the consideration for this Lease to keep and perform each and all of said terms, covenants and conditions by it to be kept and performed and that this Lease is made upon the conditions of said performance.

3. TERM. The terms of this Lease shall be for five (5) years, commencing on November 1, 1989.

4. POSSESSION.

a. If the Landlord, for any reason whatsoever, cannot deliver possession of the said Premises to the Tenant at the commencement of the term hereof, this Lease shall not be void or voidable, nor shall Landlord be liable to Tenant for any loss or damage resulting therefrom, nor shall the expiration date of the above term be in any way extended, but in that event, all rent shall be abated during the period between the commencement of said term and the time when Landlord delivers possession.

b. In the event that Landlord shall permit Tenant to occupy the Premises prior to the commencement date of the term, such occupancy shall be subject to all the provisions of this Lease. Said early possession shall not advance the termination date hereinabove provided.

5. RENT. The Tenant shall pay for the full five (5) year term of this Lease, a reserve minimum rent of One Million Five Hundred Fifty-Four Thousand One Hundred Ninety-Seven Dollars (\$1,554,197.00). The total minimum reserve rent shall be payable as follows:

a. The Tenant covenants and agrees to pay minimum rent for the Leased Premises for the first Lease Year of Two Hundred Ninety-Two Thousand Seven Hundred Forty Dollars (\$292,740.00), which amount shall be payable in equal monthly installments of Twenty-Four Thousand Three Hundred Ninety-Five Dollars

(\$24,395.00) per month; for the second Lease Year, the sum of Three Hundred One Thousand Five Hundred Twenty-Two Dollars (\$301,522.00), payable in equal monthly installments of Twenty- Five Thousand One Hundred Twenty-Six and 83/100ths Dollars per month (\$25,126.83); for the third Lease Year, the sum of Three Hundred Ten Thousand Five Hundred Sixty-Eight Dollars (\$310,568.00) payable in equal monthly installments of Twenty- Five Thousand Eight Hundred Eighty and 67/100ths Dollars (\$25,880.67) per month; for the fourth Lease Year, the sum of Three Hundred Nineteen Thousand Eight Hundred Eighty-Five Dollars (\$319,885.00), payable in equal monthly installments of Twenty- Six Thousand Six Hundred Fifty-Seven and 08/100ths Dollars (\$26,657.08); and for the fifth Lease Year, the sum of Three Hundred Twenty-Nine Thousand Four Hundred Eighty Two Dollars (\$329,482.00), payable in equal monthly installments of Twenty- Seven Thousand Four Hundred Fifty Six and 83/100ths Dollars (\$27,456.83) per month.

b. All minimum rent payable hereunder shall be paid without setoff or deduction, in advance, on or before the first day of each month during the term of this Lease at the address of the Landlord first written above, or such other address or addresses as Landlord may hereafter determine by notice to the Tenant.

c. Rent for any period during the term hereof which is for less than one (1) month shall be a prorated portion of the monthly installment herein, based on a thirty (30) day month.

6. SECURITY DEPOSIT. Tenant shall deposit with Landlord the sum of None upon commencement of the term of this Lease. Said sum shall be held by Landlord as security for the faithful performance by Tenant of all the terms, covenants, and conditions of this Lease to be kept and performed by Tenant during the term hereof. If Tenant defaults with respect to any provision of this Lease, including, but not limited to the provisions relating to the payment of rent, Landlord may (but shall not be required to) use, apply or retain rent or any other sum in default or for the payment of any amount of Tenant's default. If any portion of said deposit is so used or applied, Tenant shall within five days after written demand therefor, deposit cash with Landlord in an amount sufficient to restore the security deposit to its original amount and Tenant's failure to do so shall be a material breach of this Lease. Landlord shall not be required to keep this security deposit separate from its general funds, and Tenant shall not be entitled to interest on such deposit. If Tenant shall fully and faithfully perform every provision of this Lease to be performed by it, the security deposit or any balance thereof shall be [illegible] to Tenant (or, at Landlord's option, to the last assignee of Tenant's interest hereunder) at the expiration of the Lease term. In the event of termination of Landlord's interest in this Lease, Landlord shall transfer said deposit to Landlord's successor in interest.

7. OPERATING EXPENSE ADJUSTMENTS. For the purposes of this Article, the term Direct Expenses is defined as follows:

All direct costs of operation and maintenance, as determined by standard practices, and shall include the following costs by way of illustration, but not be limited to: real property taxes and assessments; rent taxes, gross receipt taxes, (whether assessed against the Landlord or assessed against the Tenant and collected by the Landlord, or both); water and sewer charges; Insurance premiums; utilities; janitorial services; labor; window cleaning; costs incurred in the management of the Building, if any; air conditioning and heating; elevator maintenance; supplies; materials, equipment; and tools; including maintenance, costs, and upkeep of all common areas, and all building repairs except repair of structural defects ("Direct Expenses" shall not include depreciation on the Building of which the Premises are a part or equipment therein, loan payments, executive salaries or real estate brokers' commissions.)

Tenant shall pay one hundred percent (100%) of Direct Expenses paid or incurred by the Landlord for the operation or maintenance of the Building of which the Premises are a part.

Even though the term has expired and Tenant has vacated the Premises, when the final determination is made of Tenant's share of Direct Expenses for the year in which this Lease terminates, Tenant shall immediately pay any increase due over the estimated expenses paid and conversely any overpayment made in the event of said expenses decrease shall be immediately rebated by Landlord to Tenant.

8. USE. Tenant shall use the Premises for office-warehouse and/or manufacturing purposes, and shall not use or permit the Premises to be used for any other purpose without the prior written consent of Landlord.

Tenant shall not do or permit anything to be done in or about the Premises nor bring or keep anything herein which will in any way increase the existing rate or affect any fire or other insurance upon the Building or any of its contents, or cause cancellation of any insurance policy covering said Building or any part thereof or any of its contents. Tenant shall not do or permit anything to be done in or about the Premises which will in any way obstruct or interfere with the rights of other tenants or occupants of the building or injure or annoy them or use or allow the Premises to be used for any improper, immoral, unlawful or objectionable purpose, nor shall Tenant cause, maintain or permit any nuisance in, on or about the Premises. Tenant shall not commit or suffer to be committed any waste in or upon the Premises.

9. COMPLIANCE WITH LAW. Tenant shall not use the Premises or permit anything to be done in or about the Premises which will in any way conflict with any law, statute, ordinance or governmental rule or regulation now in force or which may

hereafter be enacted or promulgated. Tenant shall, at its sole costs and expense, promptly comply with all laws, statutes, ordinances and governmental rules, regulations or requirements now in force or which may hereafter be in force, and with the requirements of any board of fire insurance underwriters or other similar bodies now or hereafter constituted, relating to, or affecting the condition, use or occupancy of the Premises, excluding structural changes not related to or affected by Tenant's improvements or acts. The judgment against Tenant, whether the Landlord be a party thereto or not, that tenant has violated any law, statute, ordinance or governmental rule, regulation or requirement, shall be conclusive of that fact as between the Landlord and Tenant.

10. ALTERATIONS AND ADDITIONS. Tenant shall not make or suffer to be made any alterations, additions or improvements to or of the Premises or any part thereof without the consent of Landlord first had and obtained, and any alterations, additions or improvements to or of said Premises, including, but not limited to, wall covering, paneling and built-in cabinet work, but excepting movable furniture and trade fixtures, shall on the expiration of the term become a part of the realty and belong to the Landlord and shall be surrendered with the Premises. In the event Landlord consents to the making of any alterations, additions or improvements to the Premises by Tenant, the same shall be made by Tenant at Tenant's sole cost and expense, and a contractor or person selected by Tenant to make the same must first be approved by the Landlord. Upon the expiration or earlier termination of the term hereof, Tenant shall, prior to the written demand by the Landlord, given at least thirty (30) days prior to the end of the term, at Tenant's sole cost and expense, forthwith and with all due diligence, remove any alterations, additions, or improvements made which have been designated by the Landlord to be removed, and repair any damage to the Premises caused by such removal.

11. REPAIRS.

a. By taking possession of the Premises, Tenant shall be deemed to have accepted the Premises as being in good, sanitary order, condition and repair. Tenant shall, at Tenant's sole cost and expense, keep the Premises and every part thereof in good condition and repair, damage thereto from causes beyond the reasonable control of Tenant and ordinary wear and tear excepted. Tenant shall upon the expiration or sooner termination of this Lease hereof surrender the Premises to the Landlord in good condition, ordinary wear and tear and damage from causes beyond the reasonable control of Tenant excepted. Except as specifically provided in an addendum, if any, to this Lease, Landlord shall have no obligation whatsoever to alter, remodel, improve, repair, decorate or paint the Premises or any part thereof, and the parties hereto affirm that Landlord has made no representations to Tenant respecting the condition of the Premises or the Building except as specifically herein set forth.

12. LIENS. Tenant shall keep the Premises and property in which the Premises are situated free from any liens out of any work performed, materials furnished or obligations incurred by Tenant. Landlord may require, at Landlord's sole option, that Tenant shall provide to Landlord, at Tenant's sole cost and expense, a lien and completion bond in an amount equal to one and one-half (1 1/2) times any and all estimated cost of improvements, additions, or alterations in the Premises, to insure Landlord against any liability for mechanics' and materialmen's liens and to insure completion of the work.

13. ASSIGNMENT AND SUBLETTING. Tenant shall not either voluntarily or by operation of law, assign, transfer, mortgage, pledge, hypothecate or encumber this Lease or any interest therein, and shall not sublet the said Premises or any part thereof, or any right or privilege appurtenant thereto, or suffer any other person (the employees, agents, servants and invitees of Tenant excepted) to occupy or use the said Premises, or any portion thereof, without the written consent of Landlord first had and obtained, which consent shall not be unreasonably withheld, and a consent to one assignment, subletting, occupation or use by any other person shall not be deemed to be a consent to any subsequent assignment, subletting, occupation or use by another person. Any such assignment or subletting without such consent shall be void, and shall, at the option of the Landlord, constitute a default under this Lease.

14. HOLD HARMLESS. Tenant shall identify and hold harmless Landlord against and from any and all claims arising from Tenant's use of the Premises for the conduct of its business or from any activity, work, or other thing done, permitted or suffered by the Tenant in or about the Building, and shall further indemnify and hold harmless Landlord against and from any and all claims arising from any breach or default in the performance of any obligations on Tenant's part to be performed under the terms of this lease, or arising from any act or negligence of the Tenant, or any officer, agent, employee, guest, or invitee of Tenant, and from all and against all cost, attorney's fees, expenses and liabilities incurred in or about any such claim or action or proceeding brought against Landlord by reason of any such claim, Tenant, upon notice from Landlord shall defend the same at Tenant's expense by counsel reasonably satisfactory to Landlord. Tenant as a material part of the consideration to Landlord hereby assumes all risk of damage to property or injury to persons, in, upon or about the Premises, from any cause other than Landlord's negligence, and Tenant hereby waives all claims in respect thereof against Landlord.

Landlord or its agents shall not be liable for any damage to property entrusted to employees of the Building, nor for loss or damage to any property by theft or otherwise, nor for any injury to or damage to persons or property resulting from fire, explosion, falling plaster, steam, gas, electricity, water or rain which may leak from any part of the Building or from the pipes, appliances or plumbing works therein or from the roof, street or subsurface or from any other place resulting from dampness or any other cause whatsoever, unless caused by or due to the negligence of

Landlord, its agents, servants or employees. Landlord or its agents shall not be liable for interference with the light or incorporeal hereditaments, loss of business by Tenant, nor shall Landlord be liable for any latent defects in the Premises or in the Building. Tenant shall give prompt notice to Landlord in cause of fire or accidents in the Premises or in the Building or of defects therein or in the fixtures or equipment.

15. SUBROGATION. As long as their respective Insurers so permit, Landlord and Tenant hereby mutually waive their respective rights of recovery against each other for any loss insured by fire, extended coverage and other property insurance policies existing for the benefit of the respective parties. Each party shall obtain any special endorsements, if required by their insurer to evidence compliance with the aforementioned waiver.

16. INSURANCE. Tenant shall not install any electrical equipment that overloads the wiring panels, etc. in the leased premises. Tenant shall make at his own expense whatever changes are necessary to relieve any overload condition and to comply with the requirements of the insurance Underwriters or the governmental authorities having jurisdiction. Tenant agrees to carry general liability insurance in the minimum total amount or amounts of Five Hundred Thousand Dollars (\$500,000.00), for each occurrence of bodily injury and One Hundred Thousand Dollars (\$100,000.00) property damage. Tenant shall supply to Landlord certificates of insurance showing the liability insurance coverage, and throughout the term hereof, certificates of renewals of such policies. Said certificate shall provide that the insurer shall have given Landlord ten (10) days written notice prior to cancellation of said policy. In the event Tenant fails to secure such insurance or to give evidence to Landlord of such insurance by depositing with Landlord certificates as above provided, Landlord may purchase such insurance in Tenant's name and charge Tenant the premiums therefor. Building insurance for damage caused by fire and all other perils is the responsibility of the Landlord. Premiums for such coverage shall be paid by the Landlord. Said insurance policy will add MKS Instruments, Inc. as an additional insured.

17. PROPERTY TAXES. Tenant shall pay, or cause to be paid, before delinquency, any and all taxes levied or assessed and which become payable during the term thereof upon all Tenant's leasehold improvements, equipment, furniture, fixtures and personal property located in the premises; except that which has been paid for by Landlord, and is the standard of the Building. In the event any or all of Tenant's leasehold improvements, equipment, furniture, fixtures and personal property shall be assessed and taxed with the building. Tenant shall pay to Landlord its share of such taxes within ten (10) days after delivery to Tenant by Landlord of a statement in writing setting forth the amount of such taxes applicable to Tenant's property.

18. RULES AND REGULATIONS. Tenant shall faithfully observe and comply with the rules and regulations that Landlord shall from time to time promulgate.

Landlord reserves the right from time to time to make all reasonable modifications to said rules. The additions and modifications to those rules shall be binding upon Tenant upon delivery of a copy of them to Tenant. Landlord shall not be responsible to Tenant for the nonperformance of any said rules by any other tenants or occupants.

19. HOLDING OVER. If Tenant remains in possession of the Premises or any part after the expiration of the term hereof, with the express written consent of Landlord, such occupancy shall be a tenancy from month-to-month at a rental in the amount of the last monthly rental, plus all other charges payable hereunder, and upon all terms hereof applicable to a month-to-month tenancy.

20. ENTRY BY LANDLORD. Landlord reserves and shall at any and all times have the right to enter the Premises, inspect the same, supply janitorial service and any other service to be provided by Landlord to Tenant hereunder, to submit said Premises and responsibility, and to alter, improve or repair the Premises and any portion of the Building of which the Premises are a part that Landlord may deem necessary or desirable, without abatement of rent and may for that purpose erect scaffolding and other necessary structures where reasonably required by the character of the work to be performed, always providing that the entrance to the Premises shall not be blocked thereby, and further providing that the business of the Tenant shall not be interfered with unreasonably. Tenant hereby waives any claim for damages or for any injury or inconvenience to interference with Tenant's business, any loss of occupancy or quiet enjoyment of the Premises, and any other loss occasioned thereby. For each of the aforesaid purposes, Landlord shall at all times have and retain a key with which to unlock all of the doors in, upon and about the Premises, excluding Tenant's vaults, safes, and files, and Landlord shall have the right to use any and all means which Landlord may deem proper to open said doors in an emergency, in order to obtain entry to the Premises without liability to Tenant except for any failure to exercise due care for Tenant's property. Any entry to the Premises obtained by Landlord by any of said means, or otherwise shall not under any circumstances be construed or deemed to be a forcible or unlawful entry into, or a detainer of, the Premises, or an eviction of Tenant from the Premises or any portion thereof.

21. RECONSTRUCTION. In the event the Premises or the Building of which the Premises are a part are damaged by fire or other perils covered by extended coverage insurance, Landlord agrees to forthwith repair the same; and this Lease shall remain in full force and effect, except that the Tenant shall be entitled to a proportionate reduction of the rent while such repairs are being made, such proportionate reduction to be based upon the extent to which the making of such repairs shall materially interfere with the business carried on by the Tenant in the Premises. If the damage is due to the fault or neglect of Tenant or its employees, there shall be no abatement of rent.

In the event the Premises or the Building of which the Premises are a part are damaged as a result of any cause other than the perils covered by fire and extended coverage insurance, then Landlord shall forthwith repair the same, provided the extent of the destruction be less than ten percent (10%) of the then full replacement cost of the Premises or the Building of which the Premises are a part. In the event the destruction of the Premises or the Building is to an extent greater than ten percent (10%) of the then full replacement cost, then Landlord shall have the option: (1) to repair or restore such damage, this Lease continuing in full force and effect, but the rest to be proportionately reduced as hereinabove in this Article provided; or (2) give notice to Tenant at any time within sixty (60) days after such damage terminating this Lease as of the date specified in such notice, which date shall be no less than thirty (30) and no more than sixty (60) days after the giving of such notice. In the event of such notice, this Lease shall expire and all interest of the Tenant in the Premises shall terminate on the date so specified in such notice and the Rent, reduced by a proportionate amount, based upon the extent, if any, to which such damage materially interfered with the business carried on by the Tenant in the Premises, shall be paid up to date of said such termination.

Notwithstanding anything to the contrary contained in this Article, Landlord shall not have any obligation whatsoever to repair, reconstruct or restore the Premises when the damage resulting from any casualty covered under this Article occurs during the last twelve (12) months of the term of this Lease or any extension thereof.

Landlord shall not be required to repair any injury or damage by fire or other cause, or to make any repairs or replacements of any panels, decoration, office fixtures, railings, floor coverings, partitions, or any other property installed in the Premises by Tenant.

The Tenant shall not be entitled to any compensation or damages from Landlord for loss of the use of the whole any part of the Premises, Tenant's personal property or any inconvenience or annoyance occasioned by such damage, repair, reconstruction or restoration.

22. DEFAULT. The occurrence of any one or more of the following events shall constitute a default and breach of this Lease by Tenant.

a. The vacating or abandonment of the Premises by Tenant.

b. The failure by Tenant to make any payment of rent or any other payment required to be made by Tenant hereunder, as and when due, where such failure shall continue for a period of three (3) days after written notice thereof by Landlord to Tenant.

c. The failure by tenant to observe any of the covenants, conditions or provisions of this Lease to be observed or performed by the Tenant, other than as described in Article 23.b above, where such failure shall continue for a period of thirty (30) days after written notice thereof by Landlord to Tenant; provided, however, that if the nature of Tenant's default is such that more than thirty (30) days are reasonably required for its cure, then Tenant shall not be deemed to be in default if Tenant commences such cure within said thirty (30) day period and thereafter diligently prosecutes such cure to completion.

d. The making by Tenant of any general assignment or general arrangements for the benefit of creditors; or the filing by or against Tenant of a petition to have Tenant adjudged a bankrupt, or a petition or reorganization or arrangement under any law relating to bankruptcy (unless, in the case of a petition filed against Tenant, the same is dismissed within sixty [60] days); or the appointment of a trustee or a receiver to take possession of substantially all of Tenant's assets located at the Premises or of Tenant's interest in this Lease, where possession is not restored to Tenant within thirty (30) days; or the attachment, execution or other judicial seizure of substantially all of Tenant's assets located at the Premises or of Tenant's interest in this Lease, where such seizure is not discharged in thirty (30) days.

23. REMEDIES IN DEFAULT. In the event of any such material default or breach by Tenant, Landlord may at any time thereafter, with or without notice or demand, and without limiting Landlord in the exercise of a right or remedy which Landlord may have by reason of such default or breach:

a. Terminate Tenant's right to possession of the Premises by any lawful means, in which case this Lease shall terminate and Tenant shall immediately surrender possession of the Premises to Landlord. In such event Landlord shall be entitled to recover from Tenant all damages incurred by Landlord by reason of Tenant's default including, but not limited to, the cost of recovering possession of the Premises; expenses of reletting, including necessary renovation and alteration of the Premises, reasonable attorney's fees, any real estate commission actually paid; the worth at the time of award by the court having jurisdiction thereof of the amount by which the unpaid rent for the balance of the term after the time of such award exceeds the amount of such rental loss for the same period that Tenant proves could be reasonably avoided; that portion of the leasing commission paid by Landlord and applicable to the unexpired term of this Lease. Unpaid installments of rent or other sums shall bear interest from the due date at the rate of twenty percent (20%) per annum. In the event Tenant shall have abandoned the Premises, Landlord shall have the option of (a) taking possession of the Premises and recovering from Tenant the amount specified in this paragraph, or (b) proceeding under the provisions of the following Article 23.b.

b. Maintain Tenant's right to possession, in which case this Lease shall continue in effect whether or not Tenant shall have abandoned the Premises. In such event, Landlord shall be entitled to enforce all of Landlord's rights and remedies under this Lease, including the right to recover the rent as it becomes due hereunder.

c. Pursue any other remedy now or hereafter available to Landlord under the laws or judicial decision of the State in which the Premises are located.

24. EMINENT DOMAIN. If more than twenty-five percent (25%) of the Premises shall be taken or appropriated by any public or quasi-public authority under the power of eminent domain, either party hereto shall have the right, at its option, to terminate this Lease, and Landlord shall be entitled to any and all income, rent, award, or any interest therein whatsoever which may be paid or made in connection with such public or quasi-public use or purpose, and Tenant shall have no claim against Landlord for the value of any unexpired term of this Lease. If either less than or more than twenty-five percent (25%) of the Premises is taken, and neither party elects to terminate as herein provided, the rental thereafter to be paid shall be equitable reduced. If any part of the Building other than the Premises may be so taken or apportioned, Landlord shall have the right, at its option to terminate this Lease and shall be entitled to the entire award as above provided.

25. ESTOPPEL CERTIFICATE. Tenant shall at any time and from time to time upon not less than ten (10) days' prior written notice from Landlord, execute, acknowledge, and deliver to Landlord a statement in writing, (a) certifying that this Lease is unmodified and full force and effect (or, if modified, stating the nature of such modification and certifying that this Lease as so modified, is in full force and effect), and the date to which the rental and other charges are paid in advance, if any, and (b) acknowledging that there are not, to Tenant's knowledge, any uncured defaults on the part of the Landlord hereunder, or specifying such defaults if any are claimed. Any such statement may be relied upon by any prospective purchaser or encumbrancer of all or any portion of the real property of which the Premises are a part. The failure of Tenant to timely deliver such statement, or a statement specifically setting forth any items which would be exceptions from such certification, shall be conclusive evidence that Tenant has certified to the matters set forth herein.

26. AUTHORITY OF PARTIES.

a. Corporate Authority. If Tenant is a corporation, each individual executing this Lease on behalf of said corporation represents and warrants that he is duly authorized to execute and deliver this Lease on behalf of the corporation, in accordance with a duly adopted resolution of the board of directors of said corporation or in accordance with the by-laws of said corporation, and that this Lease is binding upon said corporation in accordance with its terms.

b. Limited Partnerships. If the Landlord herein is a limited partnership, it is understood and agreed that any claims by Tenant on Landlord shall be limited to the assets of the limited partnership, and furthermore, Tenant expressly waives any and all rights to proceed against the individual partners or the officers, directors or shareholders of any corporate partner, except to the extent of their interest in said limited partnership.

27. GENERAL PROVISIONS.

a. Plats and Riders. Clauses, plats and riders, if any, signed by the Landlord and the Tenant endorsed on or affixed to this Lease are a part hereof.

b. Waiver. The waiver by Landlord of any term, covenant, or condition herein contained shall not be deemed to be a waiver of such term, covenant or condition or any subsequent breach of the same or any other term, covenant or condition herein contained. The subsequent acceptance of rent hereunder by Landlord shall not be deemed to be a waiver of any preceding breach by Tenant of any term, covenant or condition of this Lease, other than the failure of the Tenant to pay the particular rental so accepted, regardless of Landlord's knowledge of such preceding breach at the time of the acceptance of such rent.

c. Notices. All notices and demands which may or are to be required or permitted to be given by either party to the other hereunder shall be in writing. All notices and demands by the Landlord to the Tenant shall be sent by United States Mail, postage prepaid, addressed to the Tenant at the Premises, or to such other place as Tenant may from time to time designate in a notice to the Landlord. All notices and demands by the Tenant to the Landlord shall be sent by United States Mail, postage prepaid, addressed to the Landlord at the Office of the Building, or to such other person or place as the Landlord may from time to time designate in a notice to the Tenant.

d. Joint Obligation. If there be more than one Tenant, the obligations hereunder imposed upon Tenants shall be joint and several.

e. Marginal Headings. The original headings and Article titles to the Articles of this Lease are not a part of this Lease and shall have no effect upon the construction or interpretation of any part hereof.

f. Time. Time is of the essence of this Lease and each and all of its provisions in which performance is a factor.

g. Recordation. Neither the Landlord nor Tenant shall record this Lease or a short form memorandum hereof without the prior written consent of the other party.

h. Quiet Possession. Upon Tenant paying the rent reserved hereunder and observing and performing all of the covenants, conditions and provisions on Tenant's part to be observed and performed hereunder, Tenant shall have quiet possession of the Premises for the entire term hereof, subject to all the provisions of this Lease.

i. Late Charges. Tenant hereby acknowledges that late payment by Tenant to Landlord of rent or other sums due hereunder will cause Landlord to incur costs not contemplated by this Lease, the exact amount of which will be extremely difficult to ascertain. Such costs include, but are not limited to, processing and accounting charges, and late charges which may be imposed upon Landlord by terms of any mortgage or trust deed covering the Premises. Accordingly, if any installment of rent or of a sum due from Tenant shall not be received by Landlord or Landlord's designee within ten (10) days after written notice that said amount is past due, then Tenant shall pay to Landlord a late charge equal to ten percent (10%) of such overdue amount. The parties hereby agree that such late charges represent a fair and reasonable estimate of the cost that Landlord will incur by reason of the late payment by Tenant. Acceptance of such late charges by the Landlord shall, in no event, constitute a waiver of Tenant's default with respect to such overdue amount, nor prevent Landlord from exercising any of the other rights and remedies granted hereunder.

j. Prior Agreements. This Lease contains all of the agreements of the parties hereto with respect to any matter covered or mentioned in this Lease, and no prior agreements or understanding pertaining to any such matters shall be effective for any purpose. No provision of this may be amended or added to except by an agreement in writing signed by the parties hereto or their respective successors in interest. This Lease shall not be effective or binding on any party until fully executed by both parties hereto.

k. Attorney's Fees. In the event of any action or proceeding brought by either party against the other under this Lease, the prevailing party shall be entitled to recover all costs and expenses including the fees of its attorney in such action or proceeding in such amount as the court may adjudge reasonable as attorney's fees.

l. Sales of Premises by Landlord. In the event of any sale of the building, Landlord shall be and is hereby entirely freed and relieved of, all liability under any and all of its covenants and obligations contained in or derived from this Lease arising out of any act, occurrence or omission occurring after the consummation of such sale; and the purchaser, at such sale or any subsequent sale of the Premises shall be deemed, without any further agreement between the parties or their successors in interest or between the parties and any such purchaser, to have assumed and agreed to carry out any and all of the covenants and obligations of the Landlord under this Lease.

m. Subordination Attornment. Upon request of the Landlord, Tenant will, in writing, subordinate its rights hereunder to the lien of any first mortgage or first deed of trust to any bank, insurance company or other lending institution, now or hereafter in force against the land and Building of which the Premises are a part, and upon any building hereafter placed upon the land of which the Premises are a part, and to all advances made or hereafter to be made upon the security thereof.

In the event any proceedings are brought for foreclosure or in the event of the exercises of the power of sale under any mortgage or deed of trust made by the Landlord covering the Premises, the Tenant shall attorn to the purchaser upon any such foreclosure of sale and recognize such purchases as the Landlord under this Lease.

The provisions of this Article to the contrary notwithstanding, and so long as Tenant is not in default hereunder, this Lease shall remain in full force and effect for the full term hereof.

n. Name. Tenant shall not use the name of the Building or of the development in which the Building is situated for any purpose other than as an address of the business to be conducted by the Tenant in the Premises.

o. Separability. Any provision of the Lease which shall prove to be invalid, void or illegal shall in no way affect, impair or invalidate any other provision hereof and such other provision shall remain in full force and effect.

p. Cumulative Remedies. No remedy or election hereunder shall be deemed exclusive but shall, wherever possible, be cumulative with all other remedies at law or in equity.

q. Choice of Law. This Lease shall be governed by the laws of the State in which the Premises are located.

r. Signs and Auctions. Tenant shall not place any sign upon the Premises or Building or conduct any auction thereon without Landlord's prior written consent.

28. BROKERS. Tenant warrants that it has had no dealings with any real estate brokers or agents in connection with the negotiation of this Lease, and it knows or no other real estate broker or agent who is entitled to a commission in connection with this Lease.

29. LIEN OF LANDLORD. Tenant hereby grants to the Landlord a lien upon all the furniture, fixtures, equipment, or other property belonging to the Tenant located on or within the leased premises at any time during the Lease term, to secure the

performance of the Tenant's obligations under this Lease, said lien to be prior to any other lien on such property except a lien in favor of the seller of such property to secure the unpaid purchase price thereof. This Landlord's lien may be foreclosed in the same manner as a security agreement, and the filing of this Lease or a memorandum thereof, or a financing statement in the security interest records of Boulder County, Colorado, shall constitute full lawful notice of this lien. If the Landlord also has a lien on such property, or any portion thereof, by virtue of any other instrument, or by operation of law, the lien under this Lease shall be in addition thereto, and the Landlord shall have alternate remedies at his option.

The parties hereto have executed this Lease at the place and on the dates specified immediately adjacent to their respective signatures.

If this Lease has been filled in, it has been prepared for submission to your attorney for his approval. No representation or recommendation is made by the real estate broker or its agents or employees as to the legal sufficiency, legal effect, or tax consequences of this Lease, or the transactions relating thereto.

LANDLORD:

ASPEN INDUSTRIAL PARK
PARTNERSHIP, a Colorado
limited partnership

TENANT:

MKS INSTRUMENTS, INC.

By: /s/ William D. Stewart III

William D. Stewart III,
General Partner

By: /s/ Robert F. O'Brien

Robert F. O'Brien
Treasurer

EXHIBIT "A"

Lots 2 and 3, Aspen Industrial Park, A subdivision in the City and County of Boulder, State of Colorado.

THIS LEASE EXTENSION AGREEMENT is between Aspen Industrial Park Partnership, a Colorado limited partnership ("Landlord") and HPS, DIVISION OF MKS INDUSTRIES, INC. ("Tenant").

30. Premises

a. Lease Agreement. Landlord and Tenant entered into a lease agreement for Lots 2 and 3, Aspen Industrial Park, a subdivision in the City and County of Boulder, State of Colorado, commonly known as 5330 Sterling Drive, Boulder, Colorado, dated October 12, 1989 for a term of five years commencing on November 1, 1989 (the "Lease Agreement").

b. Term of Lease. Landlord and Tenant desire to extend the Lease Agreement on the same terms and conditions for a period of four (4) additional years commencing on November 1, 1994 (the "Extended Term") and to agree on the rent for the period of the Extended Term.

31. Extended Term and Rent

a. Lease Extension. Landlord and Tenant hereby agree to extend the Lease Agreement for a period of four years commencing November 1, 1994 under all of the same terms and conditions as set forth in the Lease Agreement except for the rent adjustment set forth in paragraph 2.2 below.

b. Minimum Rent. The minimum rent for the full four-year Extended Term of the Lease Agreement shall be One Million Three Hundred Sixty-Six Thousand One Hundred Nineteen and 84/100 Dollars (\$1,366,119.84) payable in equal monthly installments of Twenty-Eight Thousand Four Hundred Sixty and 83/100 Dollars (\$28,460.83).

32. Confirmation of Lease Agreement

a. Except as specifically modified in Article II above, Landlord and Tenant hereby ratify and confirm all of the terms and conditions of the Lease Agreement and agree that all such terms and conditions shall be in full force and effect in their entirety during the Extended Term.

Dated this 14th day of October, 1994

LANDLORD:

TENANT:

ASPEN INDUSTRIAL PARK PARTNERSHIP,
a Colorado limited partnership

MKS INSTRUMENTS, INC.

By: /s/ William D. Stewart III

By: /s/ Robert F. O'Brien

William D. Stewart, III
General Partner

Robert F. O'Brien
Treasurer

LEASE EXTENSION AGREEMENT

THIS LEASE EXTENSION AGREEMENT (this "Extension") is between ASPEN INDUSTRIAL PARK PARTNERSHIP, LLLP, a Colorado limited liability limited partnership ("Landlord"), and MKS INSTRUMENTS, INC. ("Tenant").

RECITALS

- A. Landlord and Tenant entered into a lease agreement for Lots 2 and 3, Aspen Industrial Park, a subdivision in the City and County of Boulder, State of Colorado, commonly known as 5330 Sterling Drive, Boulder, Colorado, dated October 12, 1989, for a term of five years commencing on November 1, 1989 (the "Lease Agreement"). Landlord and Tenant entered into a lease extension agreement extending the terms and conditions of the Lease Agreement for an additional four years commencing on November 1, 1994 (the "First Extension").
- B. Landlord and Tenant desire to again extend the Lease Agreement, as amended by the First Extension, on the same terms and conditions except as set forth below, for a period of three additional years commencing on November 1, 1998 (the "Extended Term"), and to agree on the rent for the period of the Extended Term as set forth below.

AMENDMENTS

- 1. Term. Landlord and Tenant hereby agree to extend the term of the Lease Agreement for a period of three years commencing November 1, 1998 under the terms and conditions set forth in the Lease Agreement except for the additional amendments set forth below.
- 2. Minimum Rent. The minimum rent for the full three-year Extended Term of the Lease Agreement shall be \$1,102,653.96 payable in monthly installments as set forth below:

Period -----	Annual Rent Per Sq. Ft. -----	Monthly Rent -----	Annual Rent -----
Nov. 1, 1998 through Oct. 31, 1999	\$8.75/ft.2	\$28,460.83	\$341,529.96
Nov. 1, 1999 through Oct. 31, 2000	\$9.50/ft.2	\$30,900.33	\$370,803.96
Nov. 1, 2000 through Oct. 31, 2001	\$10.00/ft.2	\$32,526.67	\$390,320.04
Total			\$1,102,653.96

- 3. Landlord Conversion of Entity. Tenant hereby acknowledges that Landlord has converted from a limited partnership to a limited liability limited partnership.

4. Exhibit A. Exhibit A, which sets forth the legal description of the real property on which the premises are located, is hereby deleted and replaced with the following:

Lot 2, Aspen Industrial Park, A subdivision in the City and County of Boulder, State of Colorado.

5. Estoppel. Tenant hereby agrees at any time and from time to time upon not less than ten days prior written request by Landlord, to execute, acknowledge, and deliver to Landlord an estoppel affidavit in form acceptable to Landlord and the holder of any existing or contemplated mortgage or deed of trust encumbering the premises. Tenant's failure to deliver such statement within such time shall be conclusive upon Tenant that (A) the Lease is in full force and effect, without modification except as may be represented by Landlord; (B) there are no uncured defaults in Landlord's performance; and (C) not more than one month's rent has been paid in advance. Further, upon request, Tenant shall supply to Landlord a corporate resolution certifying that the party signing such a statement on behalf of Tenant is properly authorized to do so. Tenant agrees to provide Landlord within ten business days of Landlord's request, Tenant's most recently completed financial statements and such other financial information as reasonably requested by Landlord in order to verify Tenant's financial condition to satisfy requirements of Landlord's existing or contemplated lender or mortgagee.
6. Amendments and Binding Effect. This Extension may be modified only by an agreement in writing signed by the parties hereto. This Extension will inure to the benefit and be binding upon the parties hereto and their respective successors and permitted assigns.

CONFIRMATION OF LEASE AGREEMENT

Except as specifically modified above, Landlord and Tenant hereby ratify and confirm all of the terms and conditions of the Lease Agreement and agree that all such terms and conditions shall be in full force and effect in their entirety during the Extended Term.

Dated this 1st day of Nov, 1998.

LANDLORD:

ASPEN INDUSTRIAL PARK PARTNERSHIP, LLLP,
a Colorado limited liability limited partnership

By: /s/ William D. Stewart, III
William D. Stewart, III
General Partner

TENANT:

MKS INSTRUMENTS, INC.
a Massachusetts corporation

By: /s/ Ron Weigner
Ron Weigner
Title: VP & CFO

STANDARD FORM OF INDUSTRIAL LEASE
(SEMI-GROSS)

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STANDARD FORM OF INDUSTRIAL LEASE
(SEMI-GROSS)

THIS LEASE, made this 21st day of September, 1995, by and between GENERAL AMERICAN LIFE INSURANCE COMPANY, a Missouri corporation (hereinafter "Landlord"), and MKS INSTRUMENTS, INC. (hereinafter "Tenant").

ARTICLE I. DEFINITIONS.

1.1 Address of Landlord: One Lincoln Centre, Suite 567, 5400 LBJ Freeway, Dallas, Texas 75240.

1.2 Address of Tenant: Six Shattuck Road, Andover, MA 01810.

1.3 Base Rent: See Paragraph No. 1 of Lease Rider Number One.

1.4 Base Year: *See Paragraph 2 of Lease Rider Number One.

1.5 Building/s: The Building/s in which the Premises is located. The specific Building in which the Premises is located contains 54,301 square feet. The total square footage of all the Buildings in the Center is 124,187 square feet.

1.6 Center: The land, improvements and appurtenances depicted on Exhibit B attached hereto and commonly referred to as: ARAPAHO GROVE BUSINESS PARK and located at 789 Grove Road, Suite 111, Richardson, Texas.

1.7 Common Area: The term "Common Area" means all the areas of the Center designed for the common use and benefit of the Landlord and all of the tenants, their employees, agents, customers and invitees. The Common Area includes, but not by way of limitation, parking lots, truck courts, landscaped and vacant areas, driveways, rail spurs, walks and curbs and facilities appurtenant to each as such areas may exist from time to time.

1.8 Lease Term: The lease term shall commence on September 1, 1995 and run for three (3) years, and 0 months, expiring on August 31, 1998.

1.9 Permitted Use of the Premises: light electronic assembly and associated activities.

1.10 Premises: 14,627 square feet of space in the Center located as outlined on Exhibit B attached hereto, and addressed as: 789 Grove Road, Suite 111, Richardson, Texas.

1.11 Rent: All sums, monies or payments required to be paid by Tenant to Landlord pursuant to this Lease, including Base Rent and Additional Rent.

1.12 Additional Rent: All sums, monies or payments required to be paid by Tenant to landlord pursuant to this Lease other than Base Rent.

1.13 Security Deposit: \$3,117.00

1.14 Tenant's Allocated Share: The percentage figure determined by dividing the number of square feet in the Premises by the number of square feet in the Building that is then leased to Tenant and to other tenants.

1.15 Tenant's Proportionate Share: The percentage figure determined by dividing the number of square feet in the Premises by the total number of square feet in all the buildings (this paragraph is applicable when the Center contains more than one Building), which percentage figure is: 11.78%.

1.16 Tenant's Prorata Share: The percentage figure determined by dividing the number of square feet in the Premises by the number of square feet in the specific Building in which the Premises is located, which percentage figure is: 26.94%.

ARTICLE II. THE DEMISED PREMISES.

2.1 Lease of the Premises. In consideration of the Rents, covenants, agreements and conditions hereinafter provided to be paid, kept, performed and observed, the Landlord leases to the Tenant and the Tenant hereby hires from the Landlord the Premises, upon all the terms and conditions set forth in this Lease.

2.2 Use of Common Area. Landlord grants the Tenant the nonexclusive revocable use of the Common Area by tenant, Tenant's employees, agents, customers and invitees, under all the terms and conditions hereof, which use shall be subject at all times to such reasonable, uniform and non-discriminatory rules and regulations as may from time to time be established.

2.3 Quiet Enjoyment. Landlord covenants that the Tenant, on paying the Rent herein provided and keeping, performing and observing the covenants, agreements and conditions herein required of the Tenant, shall peaceably and quietly hold and enjoy the Premises for the Lease Term, subject, however, to the terms and conditions of this Lease.

2.4 Reservations by Landlord. Landlord excepts and reserves from the Premises the roof and exterior walls of the Building/s, and further reserves the right to place, install, maintain, carry through, repair and replace such utility lines, air ducts, pipes, wires, appliances, tunneling and the like in, over, through and upon the Premises as may be reasonably necessary or advisable for the servicing of the Premises or any other

portions of the Center. Landlord further reserves the right, at any time, and from time to time to: (i) make alterations, changes and additions to the Building/s and other improvements in the Center; (ii) add additional areas to the Center and/or to exclude areas therefrom; (iii) construct additional buildings and other improvements in the Center; (iv) remove or relocate the whole or any part of any building or other improvement in the Center; and (v) relocate any other tenant in the Center. It is further understood that the existing layout of the buildings, walks, roadways, parking areas, entrances, exits, and other improvements shall not be deemed to be a warranty, representation or agreement on the part of the Landlord that the Center will remain exactly as presently built, it being understood and agreed that Landlord may change the number, dimensions and locations of the walks, buildings and parking spaces as Landlord shall deem proper.

ARTICLE III. TERM OF THE LEASE.

3.1 Term. Tenant shall have and hold the Premises for and during the Lease Term subject to the payment of the Rent and the full and timely performance by Tenant of all the covenants and conditions set forth in this Lease.

3.2 Tender of Possession. Landlord shall use its best efforts to tender possession of the Premises to Tenant at the commencement of the Lease Term. Landlord shall not be subject to any liability for any failure to tender possession of the Premises to Tenant, provided that such failure occurred as a consequence of any circumstance or cause beyond Landlord's reasonable control, including but not limited to any Act of God or the failure of a prior tenant to vacate all or any portion of the Premises.

3.3 Holding Over. In the event of a holding over by Tenant or any of its successors in interest after expiration or termination of this Lease without the consent in writing of the Landlord, Tenant shall be deemed a Tenant at sufferance and shall pay as liquidated damages, double Rent for the entire holdover period and all attorney's fees and expenses incurred by Landlord in enforcing its rights hereunder. Any holding over with the consent of Landlord shall constitute Tenant a month-to-month tenant upon and subject to all the terms, covenants and conditions of this Lease. *See paragraph 3 of Lease Rider Number One.

ARTICLE IV. RENT.

4.1 Base Rent. Tenant covenants to pay without notice, deduction, set-off or abatement to Landlord the Base Rent in lawful money of the United States in equal consecutive monthly installments in advance on the first day of each month during the Lease Term. Base Rent for any partial month shall be prorated on a per diem basis. Base Rent shall be payable to Landlord at Landlord's Address or such other place as Landlord may designate from time to time in writing. Tenant shall pay the first full month's Base Rent upon execution of this Lease.

4.2 Additional Rent. Tenant covenants to pay without notice, deduction, set-off or abatement to Landlord the Additional Rent in lawful money of the United States in equal consecutive monthly installments in advance on the first day of each month during the Lease Term. Additional Rent for any partial month shall be prorated on a per diem basis. Additional Rent shall be payable to Landlord at Landlord's Address or such other place as Landlord may designate in writing. In order to provide for current payments of Additional Rent, Tenant agrees to pay an amount of Additional Rent reasonably estimated by Landlord from time to time commencing on the first day of the month following the month in which Landlord notifies Tenant of the amount of such Additional Rent. If, as finally determined, the amount of Additional Rent owing by Tenant shall be greater than or less than the aggregate of all installments so paid to Landlord for each calendar year, the Tenant shall pay to Landlord the amount of such underpayment, or Landlord shall credit Tenant for the amount of such overpayment, as the case may be. It is the intention hereunder to estimate the amount of Additional Rent for each calendar year and then to adjust such estimate in the following year based on the actual amount of Additional Rent owing. The obligation of Tenant with respect to the payment of Additional Rent shall survive the termination of this Lease. Any payment, refund or credit made pursuant to this paragraph shall be made without prejudice to any right of Tenant to dispute the amount of Additional Rent owing, or the right of Landlord to correct any items as billed pursuant to the provisions hereof. Within 30 days of the date Landlord notifies Tenant of the amount of Additional Rent owing, Tenant or its authorized agent shall have the right to inspect the books of Landlord during the business hours of Landlord at such location that Landlord may specify, for the purpose of verifying such amount. Unless Tenant asserts specific errors within such 30 days, such notification by Landlord shall be deemed to be correct. No decrease in Additional Rent shall reduce Tenant's liability hereunder below the amount of Base Rent payable hereunder.

4.2(a) Utilities and Services. Landlord shall not be liable for any interruption or failure whatsoever in utility services. Tenant shall contract in its own name and pay for all charges for electricity, gas, fuel, telephone, and any other services or utilities used in, servicing or assessed against the Premises, unless otherwise herein expressly provided. Additionally, and if the Building is master metered for water, sewer and exterior lighting, Tenant agrees to pay to Landlord as Additional Rent Tenant's Prorata Share of the cost of such utilities for the Building. Additionally, and as containerized rubbish collection bins will be provided to the Building, Tenant agrees to pay to Landlord as Additional Rent, Tenant's Allocated Share of the service cost of such bins (unless Landlord, exercising reasonable discretion, should determine that Tenant's actual use thereof is greater than such Tenant's Allocated Share therefore, in which case an equitable adjustment shall be made). Landlord may, however, require Tenant to contract for his own rubbish collection, in the event Tenant's needs for such containers

constitute excessive demand on common containers. In such event, Tenant shall contract with the same provider as the Center's common bins.

4.2(b) Insurance. Tenant shall pay to Landlord as Additional Rent Tenant's Prorata Share (or, Tenant's Proportionate Share in the event there is more than one Building in the Center) of any increase in the cost of the premium for the fire and extended coverage insurance that Landlord maintains hereunder over the premium paid by Landlord for the Base Year. Tenant shall pay any increase in the cost of fire and extended coverage insurance caused by Tenant's use or activities on or about the Premises.

4.2(c) Real Estate Taxes. Tenant shall pay to Landlord as Additional Rent Tenant's Prorata Share (or, Tenant's Proportionate Share in the event there is more than one Building in the Center) of any increases in Landlord's Real Estate Taxes over Real Estate Taxes for the Base Year levied against the Center. "Real Estate Taxes" shall mean: (a) all ad valorem Real Estate Taxes on the Center (adjusted after protest or litigation, if any) for any part of the term of this Lease, exclusive of penalties; (b) any taxes which shall be levied in lieu of any such ad valorem Real Estate Taxes; (c) any special assessments for benefits on or to the Center paid in annual installments by Landlord; (d) occupational taxes or excise taxes levied on rentals derived from the operation of the property or the privilege of leasing property; (e) any private subdivision assessment made against the Center; and (f) the expense of protesting, negotiating or contesting the amount or validity of any such taxes, charges or assessments, such expense to be applicable to the period of the item contested, protested or negotiated.

If the Lease Term shall end during a tax year ("tax year" shall mean the annual period for which Real Estate Taxes are assessed and levied) of which only part is included in the Lease Term, the amount of such Additional Rent shall be prorated on a per diem basis and shall be paid on or before the last day of the Lease Term. If the Lease Term ends in any tax year before the amount to be payable by Tenant has been determined under the provisions of this Section, an amount payable for the portion of the Lease Term during the tax year shall be reasonably estimated by Landlord and the estimated amount shall be promptly paid by Tenant. As soon as the amount properly payable by Tenant for the partial period has finally been determined, the amount shall be adjusted between Landlord and Tenant. Tenant shall be liable for all taxes levied against personal property and trade fixtures placed by Tenant in the Premises.

4.2(d) HVAC Maintenance. Tenant shall pay to Landlord as Additional Rent Tenant's Allocated Share of Landlord's cost and expense of the maintenance service agreements to the heating, ventilating and air conditioning equipment and controls servicing the Premises. Tenant shall pay all expenses incurred to

repair the heating, ventilating and air conditioning equipment servicing the Premises. *See Paragraph 4 of Lease Rider Number One.

4.2(e) Common Area Expenses. Tenant will pay to Landlord as Additional Rent Tenant's Prorata Share (or, Tenant's Proportionate Share in the event there is more than one Building in the Center) of the Common Area Operating Cost. *See Paragraph 5 of Lease Rider Number One.

"Common Area Operating Cost" means the Landlord's total cost and expense incurred in owning, operating, maintaining and repairing the Common Area, including but without limitation by enumeration, costs for all electricity, gas, water, sewer or fuel used in connection with the operation, maintenance and repair of the Common Area; the amount paid for all electricity furnished to the Common Area to light the parking lots or for any other purpose; the amount paid for all labor and/or wages and other payments including costs to Landlord of workmen's compensation and disability insurance, payroll taxes, welfare and fringe benefits made to janitors, employees, contractors and subcontractors of the Landlord involved in the operation and maintenance of the Common Area; managerial, administrative and telephone expenses related to operation and maintenance of the Common Area; the total charges of any independent contractors employed in the care, operation, repair, maintenance, cleaning, snow removal, salting and landscaping of the Common Area; the amount paid for all supplies, tools, replacement parts of components, equipment and necessities which are occasioned by everyday wear and tear of the Common Area; the amount paid for premiums for all insurance required from time to time by Landlord or Landlord's mortgagees; the costs of machinery and equipment purchased or leased by Landlord to perform its Common Area maintenance obligations; and property management fees not to exceed five percent (5%) of the gross income of the Center. To the extent that Landlord elects to provide services which are not separately metered or directly billed to the tenant, such as water, sewer and trash hauling, the costs of such services shall be included in Common Area Operating Cost. Common Area Operating Cost shall not, however, include interest on debt, capital retirement of debt, depreciation, costs properly chargeable to the capital account, except for capital expenditures which reduce other operating expenses or such capital expenditures that are required by changes in any governmental law or regulation in which case such expenditures, plus interest on the unamortized principal investment at ten (10%) percent per annum, shall be amortized over the life of the improvements, and such costs shall be directly chargeable by the Landlord to Tenant in the Tenant's Prorata Share (or, Tenant's Proportionate Share in the event there is more than one Building in the Center).

4.2(f) Rent on Sales Taxes. Tenant shall pay to Landlord as Additional Rent any Sales or Rent Taxes, however named or designated, levied on any form of Rent or Additional Rent.

4.3 Late Payment. Tenant's failure to make any rental payment or other payment required of Tenant hereunder within three (3) days of the due date therefor shall automatically result in the imposition of a service charge for such late payment in the amount of ten (10%) percent of such payment, without notice. *See Paragraph 6 of Lease Rider Number One.

4.4 Security Deposit. Tenant herewith deposits with Landlord the Security Deposit as security for the performance by Tenant of every covenant and condition of this Lease. Said Security Deposit may be mingled with other funds of Landlord and shall bear no interest. If Tenant shall default with respect to any covenant or condition of this Lease, Landlord may apply the whole or any part of such Security Deposit to the payment of any sum in default, including Rent and Additional Rent, or any sum which Landlord may be required to spend by reason of Tenant's default. This includes, but is not limited to, applying the Security Deposit first to any restoration, relamping, repairs and/or cleanup costs necessary over and above normal wear and tear of the vacated space. Should Landlord so apply the Security Deposit or any portion thereof during the Lease Term, Tenant shall promptly reimburse Landlord for same. It is understood that the Security Deposit is not to be considered as the last month's rent. Should Tenant comply with all of the covenants and conditions of this Lease, the Security Deposit or any balance thereof shall be returned to Tenant within 30 days of the expiration of the Lease Term.

ARTICLE V. LANDLORD'S RIGHTS AND OBLIGATIONS.

5.1 Maintenance by Landlord. During the Lease Term, Landlord shall operate and maintain the Common Area and shall keep and maintain the roof, exterior walls (excluding doors, glass or plate glass), gutters and downspouts of the Building/s in good condition and repair. Landlord shall be under no obligation and shall not be liable for any failure to make repairs that are Landlord's responsibility herein until and unless Tenant notifies Landlord in writing of the necessity therefor, in which event Landlord shall have a reasonable time thereafter to make such repairs. Landlord reserves the right to the exclusive use of the roof and exterior walls of the Building/s which Landlord is so obligated to maintain and repair. Landlord shall enter into a service contract on the Building for the heating, ventilation and air conditioning equipment for periodic inspection and service of such equipment, and Tenant shall reimburse Landlord pursuant to the provisions hereof. If any portion of the Center which Landlord is obligated to maintain or repair is damaged by the negligence of Tenant, its agents, employees or invitees, then repairs necessitated by such damage shall be paid for by Tenant. *See Paragraph 7 of Lease Rider Number One.

5.2 Mortgage and Transfer: Estoppel Certificates. Landlord shall have the right to transfer, mortgage, pledge or otherwise encumber, assign and convey, in whole or in part, the Center, the Building/s, this Lease, and all or any part of the rights now or

thereafter existing therein and all Rents and amounts payable to Landlord under the provisions hereof. In the event of any such transfer or transfers, Landlord herein named (and in case of any subsequent transfer, the then transferor) shall be automatically freed and relieved from and after the date of such transfer of all personal liability as respects the performance of any covenants or agreements on the part of Landlord contained in this Lease thereafter to be performed. Nothing herein contained shall limit or restrict any such rights, and the rights of the Tenant under this Lease shall be subject and subordinate to all instruments executed and to be executed in connection with the exercise of any such rights, including, but not limited to, the lien of any mortgage, deed of trust, or security agreement now or hereafter placed upon Landlord's interest in the Premises. This paragraph shall be self-operative. However, Tenant covenants and agrees to execute and deliver upon demand such further instruments subordinating this Lease to the lien, of any such mortgage, deed of trust or security agreement as shall be requested by Landlord and/or mortgagee or proposed mortgagee or holder of any security agreement and hereby irrevocably appoints Landlord as its agent and attorney-in-fact to execute and deliver any such instrument for and in the name of Tenant. Tenant shall, within ten (10) days after written request of Landlord, execute, acknowledge, and deliver to Landlord or to Landlord's mortgagee, proposed mortgagee, Land Lessor or proposed purchaser of the Center or any part thereof, any estoppel certificates requested by Landlord from time to time, which estoppel certificates shall show whether the lease is in full force and effect and whether any changes may have been made to the original lease; whether the term of the lease has commenced and full rental is accruing; whether there are any defaults by Landlord and, if so, the nature of such defaults; whether possession has been assumed and all improvements to be provided by Landlord have been completed; and whether rent has been paid more than thirty (30) days in advance and that there are no liens, charges, or offsets against rental due or to become due and that the address shown on such estoppel is accurate.

5.3 Landlord's Inability to Perform. If, by reason of: inability to obtain and utilize labor, materials or supplies; circumstances directly or indirectly the results of a state of war or national or local emergency; any laws, rules, orders, regulations or requirements of any governmental authority now or hereafter in force; strikes or riots; accident in, damage to or the making of repairs, replacements, or improvements to, the Premises or any of the equipment thereof; or by reason of any other cause beyond the reasonable control of the Landlord including "Acts of God," Landlord shall be unable to perform or shall be delayed in the performance of any covenant to supply any service, such nonperformance or delay in performance shall not render Landlord liable in any respect for damages to either person or property, constitute a total or partial eviction, constructive or otherwise, work an abatement of rent or relieve Tenant from the fulfillment of any covenant or agreement contained in this Lease.

5.4 Rights of Landlord. Landlord may enter upon the Premises for the purpose of exercising any or all of the rights hereby reserved without being deemed guilty of an

eviction or disturbance of Tenant's use or possession and without being liable in any manner to Tenant. The reservation of these rights by Landlord shall not render Landlord liable for not performing any of the matters specified herein.

5.4(a) Name of Center. To change the name of the Building/s or the Center without notice or liability of the Landlord to Tenant;

5.4(b) Redecorate. During the last ninety (90) days of the Lease Term or any renewal or extension thereof, if during or prior to that time the Tenant has vacated the Premises, to decorate, remodel, repair, alter or otherwise prepare the Premises for reoccupancy; *See Paragraph 8 of Lease Rider Number One.

5.4(c) Re-Lease. To exhibit the Premises to others and to display "For Lease" signs on the Premises during the last one hundred eighty (180) days of the Lease Term or any renewal or extension thereof;

5.4(d) Vehicles. To remove abandoned or unlicensed vehicles and vehicles that are unreasonably interfering with the use of the parking lot by others, and to charge the responsible tenant for the expense of removing said vehicles;

5.4(e) Preservation of Center. To take any and all measures, including making inspection, repairs, alterations, additions and improvements to the Premises or to the Center as may be necessary or desirable for the safety, protection or preservation of the Premises or the Center or the Landlord's interests, or as may be necessary or desirable in the operation of the Premises or the Center.

ARTICLE VI. TENANT'S RIGHTS AND OBLIGATIONS.

6.1 Acceptance of Premises. Landlord will complete the Premises in accordance with Exhibit C, if attached hereto. Tenant acknowledges that it will examine the Premises before taking possession hereunder. Unless Tenant furnishes Landlord with a notice in writing specifying any defect in the construction or condition of the Premises within ten (10) days after taking possession, such taking of possession shall be conclusive evidence as against Tenant that at the time thereof the Premises were in good order and satisfactory condition.

6.2 Alterations and Additions. Tenant shall not make any alterations, improvements, or additions to the Premises without the prior written consent and approval of plans therefor by Landlord. Alterations, improvements or additions made by either of the parties upon the Premises, except moveable furniture and equipment placed in the Premises at the expense of Tenant, shall be the property of Landlord and shall remain upon and be surrendered with the Premises as a part thereof at the termination of this Lease, without disturbance, molestation, injury or damage unless Landlord elects to require Tenant to remove such alterations or improvements from the Premises at the

expiration of this Lease. In the event damage shall be caused by moving said furniture and equipment in or out of the Premises, said damage shall be repaired at the cost of Tenant. *See Paragraph 9 of Lease Rider Number One.

6.3 Assignment and Subletting. Tenant shall not assign or hypothecate this Lease or sublet all or any part of the Premises without the prior written consent of Landlord. If Tenant wishes to assign or sublet the Premises, it shall give notice in writing (by certified mail or by personal delivery) of such intention to Landlord and, thereupon, Landlord shall, within thirty (30) days of receipt of such notice, have the right to unilaterally terminate this Lease or to approve said subletting by written notice to Tenant. If no notice is given by Landlord, Landlord will be deemed to have elected to approve the assignment or subletting. If the assignment or subletting is approved and rents under the sublease are greater than the rents provided for herein, then Landlord shall have the further option either (a) to convert the sublease into a prime Lease and receive all of the rents, in which case Tenant will be relieved of further liability hereunder and under the proposed sublease, or (b) to require Tenant to remain liable under this Lease, in which event Tenant shall be entitled to retain such excess rents. If the assignment or subletting is approved and rents under the sublease are less than the rents provided for herein, Tenant shall remain liable under all the covenants and conditions of this Lease. Landlord may withhold its consent to any proposed assignee or subtenant which in Landlord's judgment (a) would conflict with the tenancy, use or business of any other tenant or the tenant mix of the Center, (b) has a net worth and/or credit history inferior to that of Tenant, or (c) is currently a tenant or negotiating for space in the Center.

6.4 Locks. No additional locks or similar devices shall be attached to any door or window without Landlord's prior written consent. No keys for any door other than those provided by the Landlord shall be made. If more than two keys for one lock are desired, the Landlord will provide the same upon payment by the Tenant. All keys must be returned to the Landlord at the expiration or termination of the lease. *See Paragraph 10 of Lease Rider Number One.

6.5 Maintenance by Tenant. Tenant shall be responsible for all maintenance and repair to the Premises of whatsoever kind or nature that is not herein set forth specifically as the obligation of Landlord. Tenant shall take good care of the Premises and fixtures, and keep them in good repair free from filth, overloading, danger of fire or any pest or nuisance, repair any damage or breakage done by Tenant or Tenant's agents, employees or invitees, including damage done to the Building/s by Tenant's equipment or installations. Tenant shall be responsible for the repair and replacement of all glass and plate glass on the Premises. In the event Tenant fails to maintain the Premises as provided for herein Landlord shall have the right, but not the obligation, to perform such maintenance as is required of Tenant in which event Tenant shall reimburse Landlord for its costs in providing such maintenance or repairs together with a ten (10%) percent charge for Landlord's overhead and Tenant shall promptly reimburse Landlord for the amount so billed to Tenant by Landlord.

6.6 Mechanic's Liens. Tenant will not permit any mechanic's liens, or other liens, to be placed upon the Premises, the Building/s or the Center during the Lease Term or any extension or renewal thereof, and in case of the filing of any such lien, Tenant will promptly pay same. Tenant agrees to pay all legal fees that might be incurred by Landlord because of any mechanic's liens being placed upon the Premises, as a result of Tenant's actions.

6.7 Redelivery of Premises. No later than the last day of the Lease Term, Tenant will remove all Tenant's personal property and repair all injury done by or in connection with installation or removal of such property and surrender the Premises broom clean (together with all keys to the Premises) in as good a condition as they were in at the beginning of the Lease Term, reasonable wear and tear excepted.

6.8 Signs and Advertisements. Tenant shall not put upon nor permit to be put upon any part of the Premises, the Building/s or the Center, any signs, billboards or advertisements whatever in any location or any form without the prior written consent of Landlord. A charge of \$50.00 per day per sign, billboard or advertisement will be assessed against Tenant if Tenant fails to obtain the written consent of Landlord prior to placing any such signs.

6.9 Use of Common Areas. Tenant shall not use any part of the Center exterior to the Premises for outside storage. No trash, crates, pallets, or refuse shall be permitted anywhere on the Center outside of the Building/s by Tenant except in enclosed metal containers to be located as directed by Landlord. Tenant shall not park any trucks or trailers, loaded or empty, except in front of the loading areas.

6.10 Use of Premises. The Premises hereby leased shall be used by the Tenant only for the Permitted Use of the Premises and for no other purposes. Tenant shall, at Tenant's expense, comply promptly with all applicable statutes, ordinances, rules, regulations, orders and requirements in effect during the term or any part of the term hereof regulating the use by Tenant of the Premises. Tenant shall not use or permit the use of the Premises in any manner that will tend to create waste or a nuisance, or will tend to unreasonably disturb such other tenants in the Center. Tenant, its employees and all persons visiting or doing business with the Tenant in the Premises shall be bound by and shall observe the Rules and Regulations attached to this Lease, as Exhibit A, and such further and other reasonable rules and regulations made hereafter by the Landlord relating to the Center or the Premises of which notice in writing shall be given to the Tenant and all such rules and regulations shall be deemed to be incorporated into and form a part of this Lease.

6.11 Hazardous Substances. Tenant shall not cause or permit to be released (whether by way of uncapping, pouring, spilling, spraying, spreading, attaching, or otherwise) into or onto the Premises, or the Building/s, or the Center, or the Common Areas (including

the ground and ground water thereunder and the sewer and drainage systems therein) any hazardous substances (as defined or established from time to time by applicable local, state or federal law). Tenant shall immediately notify Landlord if any such release occurs, and, as to any such release that has been caused or permitted by Tenant: (I) Tenant shall immediately and entirely remove such released hazardous substance, and in a manner fully in compliance with all laws pertaining to the removal and storage or deposit thereof; and (11) Tenant hereby agrees to hold Landlord harmless of and from any liability, public or private, resulting to Landlord as a result of such release. Further, Tenant shall, upon Landlord's demand and at Tenant's sole expense, demonstrate to Landlord (through such tests, professional inspections, sampling or otherwise as is, in Landlord's sole judgment, sufficient for the purpose) that Tenant has not caused or permitted any such release of hazardous substances.

ARTICLE VII. INSURANCE.

7.1 Liability Insurance. Tenant covenants and agrees to maintain on the Premises at all times during the Lease Term, or any extension or renewal thereof, a policy or policies of comprehensive public liability and property damage insurance with not less than \$1,000,000.00 combined single limit for both bodily injury and property damage.

7.2 Fire and Extended Coverage Insurance. Landlord shall, throughout the Lease Term, or any extension or renewal thereof, maintain fire and extended coverage (FEC) insurance on the property owned by Landlord located on the Center in such amounts and with such deductibles as Landlord shall determine. Landlord shall not in any way or manner insure any property of Tenant or any property that may be in the Premises not owned by Landlord. Tenant shall comply with all insurance regulations so that the lowest fire, lightning, explosion, extended coverage and liability insurance rates may be obtained; and nothing shall be done or kept in or on the Premises by Tenant which will cause an increase in the premium for any such insurance on the Premises or on any Building/s of which the Premises are a part or on any contents located therein, over the rate usually obtained for the proper use of the Premises permitted by this Lease or which will cause cancellation of any such insurance.

7.3 Indemnification of Landlord. Tenant shall indemnify Landlord and save Landlord harmless from and against any and all loss (including loss of rentals payable by Tenant or other tenants) and against all claims, actions, damages, liability and expenses in connection with loss of life, bodily and, personal injury or damage to property arising from any occurrence in, upon or at the Premises or any part thereof, or occasioned wholly or in part by any act or omission of Tenant, or by anyone permitted to be on the Premises by Tenant. Tenant assumes all risk of and Landlord shall not be liable for injury to person or damage to property resulting from the conditions of the Premises or from the bursting or leaking of any and all pipes, utility lines, connections, or air conditioning or heating equipment in, on or about the Premises, or from water, rain or snow which may leak into, issue or flow from any part of the Building/s. Tenant

agrees, at all times, to indemnify and hold Landlord harmless against all actions, claims, demands, costs, damages or expenses of any kind which may be brought or made against Landlord or which Landlord may pay or incur by reason of Tenant's occupancy of the Premises or its negligent performance of or failure to perform any of its obligations under this Lease. In case Landlord shall, without fault on its part, be made a party to any litigation commenced by or against Tenant, then Tenant shall protect and hold Landlord harmless and shall pay all costs, expenses and reasonable attorney's fees incurred or paid by Landlord in connection with such litigation. *See Paragraph 11 of Lease Rider Number One.

ARTICLE VIII. EMINENT DOMAIN AND DAMAGE OR DESTRUCTION.

8.1 Eminent Domain. In the event that title to the whole or a substantial part of the Premises shall be lawfully condemned or taken in any manner for any public or quasi-public use, this lease and the term and estate hereby granted shall forthwith cease and terminate as of the date of vesting of title and Landlord shall be entitled to receive the entire award, Tenant hereby assigning to Landlord the Tenant's interest therein, if any. However, nothing herein shall be deemed to give Landlord any interest in or to require Tenant to assign to Landlord any award made to Tenant for the taking of personal property or fixtures belonging to Tenant or for the interruption of or damage to Tenant's business or for Tenant's moving expenses. A sale to a public or quasi-public authority under threat of condemnation shall constitute a taking by eminent domain.

In the event that title to a part of the building/s other than the Premises shall be so condemned or taken, Landlord may terminate this lease and the term and estate hereby granted by notifying Tenant of such termination within sixty (60) days following the date of vesting of title, and this lease and the term and estate hereby granted shall expire on the date specified in the notice of termination, not less than sixty (60) days after the giving of such notice, as fully and completely as if such date were the date herein set for the expiration of the Lease Term, and the Rent hereunder shall be apportioned as of such date. In the event of any condemnation or taking of any portion of the parking area of the Center, which does not result in a reduction of the parking area by more than twenty percent (20%) the terms of this lease shall continue in full force and effect. If more than twenty percent (20%) of the parking area is taken, either party shall have the right to terminate this lease upon giving written notice to the other party within thirty (30) days of such taking.

8.2 Damage or Destruction. If the Premises, the Building/s or the Center or any part thereof is damaged by fire or other casualty, cause or condition whatsoever and Landlord shall determine not to restore said Premises, Building/s or Center, Landlord may, by written notice to Tenant given within sixty (60) days after such damage, terminate this Lease. Such termination shall become effective as of the date of the damage. If this Lease is not terminated as above provided and if the Premises are made partially or wholly untenable, Landlord, at its expense, shall restore the same with

reasonable promptness to the condition in which Landlord furnished the Premises to Tenant at the commencement of the Lease Term as to those items that were provided to the Premises at Landlord's expense without any reimbursement by Tenant. Landlord shall be under no obligation to restore any alteration, improvements or additions to the Premises made by Tenant or paid for by Tenant, including, but not limited to, any of the initial tenant finish done or paid for by Tenant or any subsequent changes, alterations or additions made by Tenant or reimbursed by Tenant. *See Paragraph 12 of Lease Rider Number One.

If, as a result of fire or other casualty, cause or condition whatsoever the Premises are made partially or wholly untenable and, if Landlord has not given the sixty (60) day notice above provided for and fails within one hundred twenty (120) days after such damage occurs to eliminate substantial interference with Tenant's use of said Premises or substantially to restore said Premises, Tenant may terminate this Lease after the end of said one hundred twenty (120) days, effective as of the date such damage occurs, by notice to Landlord given not later than ten (10) days after expiration of said one hundred twenty (120) day period. If the Premises are rendered totally untenable but this Lease is not terminated, all rent shall abate from the date of the fire or other relevant cause or condition until the Premises are ready for occupancy and reasonably accessible to Tenant. If a portion of the Premises is untenable, rent shall be prorated on a per diem basis and apportioned in accordance with the portion of the Premises which is usable by the Tenant until the damaged part is ready for the Tenant's occupancy. In all cases, due allowance shall be made for reasonable delay caused by adjustment of insurance loss, strikes, labor difficulties or any cause beyond Landlord's reasonable control. For the purposes of this Lease, said Premises shall be considered tenantable so long as and to the extent that the Premises are occupied. In any event, Tenant shall be responsible for the removal, or restoration, when applicable, of all its damaged property and debris from the Premises, upon request by Landlord or else Tenant must reimburse Landlord for the cost of removal.

ARTICLE IX. DEFAULT AND REMEDIES.

9.1 Events of Default. The occurrence of any one or more of the following events shall constitute a Default and a material breach of this Lease by Tenant:

9.1(a) Nonpayment. Failure of Tenant to pay any installment of Rent or other sum payable to Landlord hereunder on the date that same is due and such failure shall continue for a period of five (5) days; or *See Paragraph 13 of Lease Rider Number One.

9.1(b) Noncompliance. Failure of Tenant to comply with any term, condition or covenant of this Lease, other than the payment of Rent or other sum of money, and such failure shall not be cured within ten (10) days after written notice thereof has been delivered by Landlord to Tenant; or

9.1(c) Insolvency or Transfer. Insolvency, the making of a transfer in fraud of creditors or the making of an assignment for the benefit of creditors by Tenant or any guarantor of Tenant's obligation; or

9.1(d) Bankruptcy. The filing by or against Tenant or any guarantor of Tenant's obligations hereunder of a petition in bankruptcy or for liquidation, or adjudication as a bankrupt or insolvent in proceedings filed by or against Tenant or such guarantor; or

9.1(e) Receiver. Appointment of receiver or trustee for all or substantially all of the assets of Tenant or any guarantor of Tenant's obligations hereunder; or

9.1(f) Abandonment. Abandonment by Tenant of any substantial portion of the Premises or cessation of use of the Premises for the purpose leased. *See Paragraph 14 of Lease Rider Number One.

9.2 Remedies. In the event of the occurrence of any Default, Landlord shall have the right, without further notice to or demand upon Tenant and without being liable to Tenant for any damages or to any prosecution therefor, to do any and all of the following:

9.2(a) Repossession and Sale. Re-enter and take exclusive possession of the Premises with or without force or legal process, refuse to allow Tenant to enter the same or have possession thereof, change the locks on the doors to the Premises, take possession of any furniture or fixtures or other property in or upon the Premises (Tenant hereby waiving the benefit of all exemptions by law), sell the same at public or private sale without notice and apply the proceeds thereof to the costs of sale, payment of damages and payment of all sums owing under this Lease; and/or

9.2(b) Releasing. Relet the Premises as agent of Tenant for the balance of the term of this Lease or for a shorter or longer term and receive the rents therefor, applying them first to the payment of the expense of such reletting and, second, to the payment of damages suffered to the Premises, and third to all sums due and to become due under this Lease, Tenant remaining liable for and hereby agreeing to pay Landlord any deficiency; and/or

9.2(c) Cancellation. Cancel and terminate the remaining term of this Lease, and re-enter and take possession of the Premises free of this Lease. Thereafter this Lease shall be null and void and the Rent in such case shall be apportioned and paid on and up to the date of such entry. Thereafter both parties shall be released and relieved from and of any and all obligations thereafter to accrue hereunder.

Tenant shall be liable for all loss and damage resulting from such breach or default; and/or

9.2(d) Anticipatory Breach. Treat such default as an anticipatory breach of this Lease and, as liquidated damages for such default, be entitled to the difference, if any, between the sum which, at the time of such termination for anticipatory breach represents the then present worth (computed at ten percent (10%) per year) of the excess aggregate rents and additional rents payable hereunder that would have accrued over the balance of the Lease Term (including renewals) had such term not been prematurely terminated, over the aggregate market rental value of the Premises over the term (including renewals) that the Lease would have run had it not been prematurely terminated; and/or

9.2(e) Attorney's Fees. Recover from Tenant, Landlord's attorney's fees incurred in enforcing its rights hereunder.

9.3 Remedies Cumulative. All rights and remedies expressly provided in this Lease for Landlord's protection shall be cumulative as to each other and of any other rights and remedies provided hereunder or by law.

9.4 No Waiver. A waiver by Landlord of a breach or default by Tenant under the terms and conditions of this Lease shall not be construed to be a waiver of any subsequent breach or default or of any other or the same term or condition of this Lease, and the failure of Landlord to assert any breach or to declare a default by Tenant shall not be construed to constitute a waiver thereof so long as such breach or default continues unremedied.

ARTICLE X. MISCELLANEOUS.

10.1 Bankruptcy or Assignment to Trustee. Neither this Lease nor any interest therein nor any estate hereby created shall pass to any trustee or receiver in bankruptcy or to any other receiver or assignee for the benefit of creditors or otherwise by operation of law during the term of this Lease or any renewal thereof.

10.2 Brokers. Except as may be expressly set forth to the contrary in the Rider, each party represents to the other that no person, firm, corporation, or other entity is entitled to any brokerage commission or finder's fee on account of the execution, delivery, and consummation of this Lease. Tenant hereby agrees to indemnify Landlord and to hold Landlord free and harmless of and from any and all claims, losses, damages, costs and expenses of whatsoever nature, including attorneys' fees and costs of litigation arising from or relating to any brokerage commissions or finder's fees incurred by Tenant in connection with this Lease. *See Paragraph 15 of Lease Rider Number One.

10.3 Captions. The captions used throughout this Lease are for convenience and reference only and shall in no way be held to explain, modify, amplify, or aid in the interpretation, construction or meaning of any provisions in this Lease.

10.4 Certificates of Occupancy. Tenant may, prior to the commencement of the Lease Term, apply for a certificate of occupancy to be issued by the municipality in which the Premises are located, but this Lease shall not be contingent on issuance thereof.

10.5 Entire Agreement. This Lease including its Exhibits and Rider, if any, contains the entire agreement between the parties and no modification of this Lease shall be binding upon the parties unless evidenced by an agreement in writing signed by Landlord and Tenant after the date hereof.

10.6 Joint and Several Liability of Multiple Tenants. If there be more than one Tenant named herein, the provisions of this Lease shall be applicable to and binding upon such Tenants jointly and severally.

10.7 Notices. Except as otherwise herein provided, whenever by the terms of this Lease notice shall or may be given either to Landlord or, to Tenant, such notice shall be in writing and shall be deemed to have been properly delivered if sent by certified mail, return receipt requested, postage prepaid, to Landlord at Landlord's Address and to Tenant at the Premises, or to such other place as Landlord or Tenant may designate in writing. The date of mailing shall be deemed the date of delivery.

10.8 Partial Invalidity. If any term, covenant, condition or provision of this Lease or the application thereof to any person or circumstances shall, to any extent be invalid, unenforceable or violate a party's legal rights, then such term, covenant, condition or provision shall be deemed to be null and void and unenforceable. however, all other provisions of this Lease, or the application of such term or provision to persons or circumstances other than those which are held invalid, unenforceable or violative of legal rights, shall not be affected thereby. and each and every other term, condition, covenant and provision of this Lease shall be valid and be enforced to the fullest extent permitted by law.

10.9 Recording. This Lease shall not be recorded by either party without the written consent of the other.

10.10 Successors. The agreements' covenants and conditions of this Lease shall be binding upon and inure to the benefit of the heirs, legal representatives, successors and assigns of each of the parties hereto, except that no assignment, encumbrance or subletting by Tenant unless permitted by the provisions of this Lease, without the written consent of Landlord shall vest any right in the assignee, encumbrance or sublessee of Tenant.

10.11 Use of the Singular; Gender. The terms "Landlord" and "Tenant," and pronouns representing the same, wherever used herein shall include the plural as well as the singular, the feminine as well as the masculine.

10.12 Rider. A Rider consisting of 3 pages, with paragraphs numbered 1 through 20 consecutively, is attached hereto and made a part hereof.

IN WITNESS WHEREOF, the parties have executed this Lease as of the date hereinabove stated.

LANDLORD:

GENERAL AMERICAN LIFE INSURANCE
COMPANY, a Missouri Corporation

By: /s/ Robert B. St. Ayr

TENANT:

MKS INSTRUMENTS, INC.

By: /s/ Robert F. O'Brien

Robert T. O'Brien, Treasurer

By: _____

By: _____

EXHIBIT A

RULES AND REGULATIONS

1. Signs. Tenant shall not inscribe any inscription or post, place, or in any manner display any sign, notice, picture, placard or advertising matter whatsoever anywhere in or about Premises at places visible (either directly or indirectly as an outline or shadow on a glass pane) from anywhere outside of the Premises or from public and common areas within Premises without first obtaining Landlord's written consent thereto and Landlord shall specify the color, size, style and material to be used. *See Paragraph 19 of Lease Rider Number One.
2. Showcases. No showcase shall be placed in front of or in the lobbies or corridors of the Premises and Landlord reserves the right to remove all showcases so placed and all signs other than those above provided for, without notice and at the expense of the tenant responsible. See Paragraph 19 of Lease Rider Number One.
3. Installation of Signs. All exterior and interior signs must be installed by Landlord or someone designated by Landlord and the actual cost thereof shall be paid by Tenant and all such signs are so placed at the risk of Tenant.
4. Telephone Connections. If Tenant desires telegraphic, cable television, or telephone connections, Landlord will direct electricians where the wires are to be introduced and without such direction no boring or cutting for wires shall be permitted.
5. Submission of Plans. Tenant shall submit to Landlord for Landlord's approval, a copy of its construction and equipment layout plan prior to commencement of construction. In the event that Tenant is unable to obtain Landlord's approval for said plans and layout, this Lease shall at Tenant's sole option be deemed null and void and any amounts paid by Tenant to Landlord pursuant to this lease shall be reimbursed to Tenant without offset. *See Paragraph 19 of Lease Rider Number One.
6. No Nuisances. Tenant shall not do or permit anything to be done in the Premises which will be dangerous to life, or limb, or which will tend to create a nuisance or injure the reputation of the Building/s. Tenant shall not use burning fluid, camphine, alcohol, kerosene, or anything else in order to light or heat the Premises except steam, gas or electricity. Tenant shall not bring into the Premises or keep therein any heating or lighting apparatus other than that provided by Landlord; or install any air conditioning or air cooling apparatus without the written consent of Landlord; or in any way injure, modify, or tamper with any of such apparatus in any manner or in any manner in violation of the regulations of the

Fire Department, or with any insurance policy upon said Buildings or any part thereof. Tenant shall not do or permit to be done in the Premises any activity in conflict with any of the laws, rules or regulations of any governmental agency or municipality having jurisdiction, or use the Premises for an illegal or immoral purpose. No beer, wine or intoxicating liquor shall be sold on or about the Premises without the written consent of Landlord in each instance.

7. Passageways. The sidewalk, passages, lobbies, corridors, elevators and stairways shall not be obstructed by Tenant; or used except for ingress and egress from and to the Premises. The doors, skylights, windows and transoms that reflect or admit light into passageways or into any place in said Buildings, shall not be covered or obstructed by Tenant.
8. Water Closets. The water closets and other apparatus shall not be used for any purpose other than those for which they were constructed, and no sweepings, rubbish, rags or other substances shall be thrown therein. Any damage resulting to them from misuse shall be borne by the tenant who shall cause it.
9. No Defacing or Offensive Business. Tenant and its employees and guests are not to injure or deface the Buildings nor the woodwork, nor the walls of the Premises, nor to carry on upon the premises any noisome, noxious, noisy or offensive business nor conduct an auction therein, nor interfere in any way with other tenants or those having business with them.
10. No Lodging. No room or rooms on or about the Premises shall be occupied or used as sleeping or lodging apartments.
11. Lock all Doors. Tenant shall, when leaving Premises at close of business, or unoccupied at any time, lock all doors and windows and for any default or carelessness in this respect shall make good all injury sustained by other tenants and by Landlord or by either of them, for damages resulting from such default or carelessness.
12. No Animals. No animal or bird shall be allowed in any part of the Premises or Buildings without the consent of Landlord.
13. No Accumulation of Rubbish. Tenant shall not accumulate or store on or about the Premises any waste paper, discarded records, paper files, sweepings, rags, rubbish or other combustible matter other than the normal accumulation needed to conduct the Permitted Use of the Premises. Nothing shall be thrown by Tenant, its employees or guests, out of the windows or doors or down the passages or skylights or over balcony rails of the Buildings or in the parking areas.

14. Exclusion of Peace Disturbers. Landlord reserves the right to exclude from the Premises or Buildings all drunken persons, idlers, diseased persons, peddlers, solicitors, persons of a general character or conduct so as to create a disturbance, and persons entering in crowds or in such unusual numbers as to cause inconvenience to tenants of the Buildings.
15. Changes to Rules. Landlord reserves the right to change these rules and to make such other and further reasonable rules and regulations either as it affects one or all tenants as in its judgment may from time to time be needed for the safety, care and cleanliness of the Center, for the preservation of good order therein or for any other cause. When such changes are made such modified or new rules shall be deemed a part hereof with the same effect as if written herein, when a copy shall have been delivered to Tenant or left with some person in charge of the Premises.
16. No Live Christmas Trees. No live or fresh cut Christmas Trees are permitted on or about the Premises.
17. No Picnics. No outside picnics or barbecue's are permitted without the prior written consent of Landlord.
18. No Outside Storage. No outside storage of any material is permitted.
19. Smoking Policy. Though Landlord encourages no smoking at the property within the leased premises, beginning July 1, 1995 forward, Tenant, Tenant's employees and agents's outdoor smoking shall be limited to behind the building in which Tenant occupies space. Tenant shall be responsible for maintaining the area and Landlord shall bill Tenant directly for any needed clean-up costs resulting from any smoking debris which litters the property. Violations of the smoking area rules will be handled by Landlord and/or the City of Richardson. *See Paragraph 19 of Lease Rider Number One.

Tenant, Tenant's employees and Tenant's customers shall not congregate in front of buildings except areas in front of Tenant's leased premises.

LEASE RIDER
 NUMBER ONE
 BY AND BETWEEN
 GENERAL AMERICAN LIFE INSURANCE COMPANY
 AND
 MKS INSTRUMENTS, INC.

1. 1.3 Base Rent.
 Years 1 - 3 \$5,485.13 per month
2. 1.4 Base Year. - Delete the sentence and replace with "The base year for this lease agreement is 1994".
3. 3.3 Holding Over. - On line 4 change "double Rent" to "monthly rent equivalent to one hundred twenty-five percent (125%) of the Base Rent".
4. 4.2(d) HVAC Maintenance. - Delete this paragraph and replace with the following: "Tenant shall be responsible for maintaining the heating/ventilation/air-conditioning systems throughout the term of the Lease. Upon termination of the Lease Agreement, Tenant shall deliver the equipment back to Landlord in the same condition as it was received, reasonable wear and tear accepted."
5. 4.2(e) Common Area Expenses. - At the end of the first paragraph add the following: "Additional rent due from this paragraph is estimated to be \$597.27 per month. Tenant shall deposit an additional \$597.27 per month during the term of the lease. At the end of each calendar year, if Tenant has deposited an excess amount, Landlord will credit any overage. If at the end of any calendar year Tenant has not deposited their pro rata portion in full, Tenant will be billed for any deficit."
6. 4.3 Late Payment. - On line 2 change "three (3)" to "ten (10)".
7. 5.1 Maintenance by Landlord. - On line one, top of page six, after the word "roof", insert "except as herein provided".

On line two, top of page six, after the word "repair.", delete the following: "Landlord shall enter into a service contract on the Building for the Heating, ventilation and air conditioning equipment for periodic inspection

and service of such equipment and Tenant shall reimburse Landlord pursuant to the provisions hereof."

8. 5.4(b) Redecorate. - Strike entire paragraph.
9. 6.2 Alterations and Additions. - On line 2 after "Premises" add "except as herein provided".
10. 6.4 Locks. - Strike entire paragraph.
11. 7.3 Indemnification of Landlord. - On line 2, after "loss", delete "(including loss of rentals payable by Tenant or other tenants)".
- On line 7, before "Premises" add "demised".
- On line 9, before "property" add "personal" and before "Premises" add "demised".
- On line 13, after "Building/s" add ", unless such damage or injury is a direct result of Landlord's gross negligence, willful act or failure to act".
- On line 16, delete "its" and replace with "Tenant's".
- At the end of the paragraph, add the following: "Notwithstanding anything contained in this Paragraph 7.3 to the contrary, Tenant shall not indemnify and hold Landlord harmless from any losses, claims, actions, damages, liabilities or expenses that are caused by or arise out of Landlord's gross negligence, willful acts or failure to act, or that is caused by conditions in the Demised Premises or the Building that has not been caused by Tenant and that Landlord has the obligation and duty to maintain, repair or replace."
12. 8.2 Damage or Destruction. - On line five of the first paragraph delete "sixty (60)" add "thirty (30)".
- Make the following changes in the second paragraph: On line 3, delete "sixty (60)" add "thirty (30)"; on line 4, delete "one hundred twenty (120)" add "ninety (90)"; on line 7, delete "one hundred twenty (120)" add "ninety (90)"; and on line 9, delete "one hundred twenty (120)" add "ninety (90)".
13. 9.1(a) Nonpayment. - On line 4, delete "five (5) days" add "ten (10) days after written notice from Landlord".
14. 9.1(f) Abandonment. - Delete this paragraph.

15. 10.2 Brokers. - Delete this paragraph and add "Each party represents that Firman Cook of Firman Cook, REALTORS(R) and Bill Bexley of Fults Companies/ONCOR International, are entitled to a brokerage commission on account of the execution, delivery and consummation of this Lease."
16. Tenant shall be responsible for causing the demised premises to at all times be in compliance with the terms of the Americans with Disabilities Act of 1990 (the "ADA"), including, without limitation of any improvements, additions or alterations to the demised premises. Furthermore, Tenant shall at all times operate the demised premises and its business thereon in a manner which causes the demised premises to comply with ADA. Landlord hereby reserves the right to hereafter modify, from time to time, policies, practices, rules and procedures applicable to the demised premises, to the extent necessary to comply with the ADA.
17. Waiver of Subrogation. - Each party hereto waives any and every claim which arises or may arise in its favor and against the other party hereto during the term of this Lease or any renewal or extension thereof for any and all loss of, or damage to, any of its property located within or upon, or constituting a part of, the Premises leased to Tenant hereunder, which loss or damage is covered by valid and collectible fire and extended coverage recoverable under said insurance policies. Such mutual waivers shall be in addition to, and not in limitation or derogation of, any other waiver or release contained in this Lease with respect to any loss of, or damage to, property of the parties hereto. Inasmuch as the above mutual waivers will preclude the assignment of any aforesaid claim by way of subrogation (or otherwise) to an insurance company (or to any other person), each party hereby agrees immediately to give to each insurance company which has issued to it policies of fire and extended coverage insurance, written notice of the terms of said mutual waivers, and to have said insurance policies properly endorsed, if necessary, to prevent the invalidation of said insurance coverages by reasons of said waivers.
18. Parking. - Parking for Tenant's customers, employees, and agents shall be limited to directly in front of the Premises. Overflow parking shall be limited to the open parking area between the 777 Grove Road and 783 Grove Road buildings and the north end of the 783 Grove Road building (See Exhibit "B"). Any violation of this parking limitation shall allow Landlord to have such vehicle towed with no recourse to Landlord.

EXHIBIT A:

19. 1. Signs. - On line 1 between "not" and "inscribe", insert "except as herein permitted".

2. Showcases. - On Line 1, delete "in front of or in the lobbies or corridors of the Premises" add "outside of the confines of the demised Premises".
5. Submission of Plans. - At the end of this paragraph add the following: "If the plans are not approved by Landlord within three (3) business days after submission by Tenant to Landlord, said plans shall automatically be deemed to be approved by Landlord."
19. Smoking Policy. - Outdoor smoking breaks shall be in accordance with Rules and Regulations Item No. 19.
20. Tenant's security deposit in the amount of \$3,117 for lease dated August 10, 1989 for 789 Grove Rd #111, Richardson, Texas shall be transferred to this new lease.

REVOLVING CREDIT NOTE

\$8,000,000

Boston, Massachusetts

February 23, 1996

FOR VALUE RECEIVED, MKS INSTRUMENTS, INC., a Massachusetts corporation having its principal place of business located in Andover, Massachusetts (the "Borrower"), hereby promises to pay to the order of CHEMICAL BANK (the "Lender"), in its individual capacity, at the office of THE FIRST NATIONAL BANK OF BOSTON, as agent for the Lender (the "Agent"), located at 100 Federal Street, Boston, Massachusetts (or at such other place or places as the Agent may designate in writing) at the times set forth in the Loan Agreement dated as of February 23, 1996 among the Borrower, the financial institutions party thereto (collectively, the "Lenders") and the Agent (the "Agreement" -- all capitalized terms not otherwise defined herein shall have the respective meanings set forth in the Agreement), in lawful money of the United States of America, in immediately available funds, the principal amount of EIGHT MILLION DOLLARS (\$8,000,000) or, if less than such principal amount, the aggregate unpaid principal amount of all Advances made by the Lender to the Borrower pursuant to the Agreement, on the Revolver Termination Date or such earlier date as may be required pursuant to the terms of the Agreement, and to pay interest from the date hereof on the unpaid principal amount hereof, in like money, at said office, on the dates and at the rates provided in the Agreement. All or any portion of the principal amount of Advances may be prepaid as provided in the Agreement.

If payment of all sums due hereunder is accelerated under the terms of the Agreement or under the terms of the other Loan Documents executed in connection with the Agreement, the then remaining principal amount and accrued but unpaid interest shall bear interest, which shall be payable on demand, at the rate per annum set forth in Section 2.4.2 of the Agreement. Further, in the event of such acceleration, this Revolving Credit Note shall become immediately due and payable, without presentation, demand, protest or notice of any kind, all of which are hereby waived by the Borrower.

In the event this Revolving Credit Note is not paid when due at any stated or accelerated maturity, the Borrower agrees to pay, in addition to the principal and interest, all costs of collection, including reasonable attorneys' fees, and interest thereon at the rates set forth above.

Interest hereunder shall be computed as provided in the Agreement.

This Revolving Credit Note is one of the Revolving Credit Notes in the aggregate principal amount of \$20,000,000 referred to in the Agreement and is issued

pursuant to and entitled to the benefits of the Agreement to which reference is hereby made for a more complete statement of the terms and conditions upon which the Advances evidenced hereby were or are made and are to be repaid. This Revolving Credit Note is subject to certain restrictions on transfer or assignment as provided in the Agreement.

No delay or omission on the part of the Lender in exercising any right hereunder shall operate as a waiver of such right or of any other right of the Lender, nor shall any delay, omission or waiver on any one occasion be deemed a bar to or waiver of the same or any other right on any future occasion. Every maker, endorser and guarantor of this Revolving Credit Note or the obligations represented hereby waives presentment, demand, notice, protest and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Revolving Credit Note, assents to any extension or postponement of the time of payment or any other indulgence, to any substitution, exchange or release of collateral and to the addition or release of any other party or person primarily or secondarily liable.

IN WITNESS WHEREOF, the Borrower has caused this Revolving Credit Note to be made, executed and delivered by its duly authorized representative under seal as of the date and year first above written.

MKS INSTRUMENTS, INC.

WITNESS:

/s/ Richard S. Chute

By: /s/ Robert F. O'Brien

Name: Robert F. O'Brien

Title: Treasurer

REVOLVING CREDIT NOTE

\$12,000,000

Boston, Massachusetts

February 23, 1996

FOR VALUE RECEIVED, MKS INSTRUMENTS, INC., a Massachusetts corporation having its principal place of business located in Andover, Massachusetts (the "Borrower"), hereby promises to pay to the order of THE FIRST NATIONAL BANK OF BOSTON (the "Lender"), in its individual capacity, at the office of THE FIRST NATIONAL BANK OF BOSTON, as agent for the Lender (the "Agent"), located at 100 Federal Street, Boston, Massachusetts (or at such other place or places as the Agent may designate in writing) at the times set forth in the Loan Agreement dated as of February 23, 1996 among the Borrower, the financial institutions party thereto (collectively, the "Lenders") and the Agent (the "Agreement" -- all capitalized terms not otherwise defined herein shall have the respective meanings set forth in the Agreement), in lawful money of the United States of America, in immediately available funds, the principal amount of TWELVE MILLION DOLLARS (\$12,000,000) or, if less than such principal amount, the aggregate unpaid principal amount of all Advances made by the Lender to the Borrower pursuant to the Agreement, on the Revolver Termination Date or such earlier date as may be required pursuant to the terms of the Agreement, and to pay interest from the date hereof on the unpaid principal amount hereof, in like money, at said office, on the dates and at the rates provided in the Agreement. All or any portion of the principal amount of Advances may be prepaid as provided in the Agreement.

If payment of all sums due hereunder is accelerated under the terms of the Agreement or under the terms of the other Loan Documents executed in connection with the Agreement, the then remaining principal amount and accrued but unpaid interest shall bear interest, which shall be payable on demand, at the rate per annum set forth in Section 2.4.2 of the Agreement. Further, in the event of such acceleration, this Revolving Credit Note shall become immediately due and payable, without presentation, demand, protest or notice of any kind, all of which are hereby waived by the Borrower.

In the event this Revolving Credit Note is not paid when due at any stated or accelerated maturity, the Borrower agrees to pay, in addition to the principal and interest, all costs of collection, including reasonable attorneys' fees, and interest thereon at the rates set forth above.

Interest hereunder shall be computed as provided in the Agreement.

This Revolving Credit Note is one of the Revolving Credit Notes in the aggregate principal amount of \$20,000,000 referred to in the Agreement and is issued pursuant to and entitled to the benefits of the Agreement to which reference is

hereby made for a more complete statement of the terms and conditions upon which the Advances evidenced hereby were or are made and are to be repaid. This Revolving Credit Note is subject to certain restrictions on transfer or assignment as provided in the Agreement.

No delay or omission on the part of the Lender in exercising any right hereunder shall operate as a waiver of such right or of any other right of the Lender, nor shall any delay, omission or waiver on any one occasion be deemed a bar to or waiver of the same or any other right on any future occasion. Every maker, endorser and guarantor of this Revolving Credit Note or the obligations represented hereby waives presentment, demand, notice, protest and all other demands and notices in connection with the delivery, acceptance, performance, default or enforcement of this Revolving Credit Note, assents to any extension or postponement of the time of payment or any other indulgence, to any substitution, exchange or release of collateral and to the addition or release of any other party or person primarily or secondarily liable.

IN WITNESS WHEREOF, the Borrower has caused this Revolving Credit Note to be made, executed and delivered by its duly authorized representative under seal as of the date and year first above written.

MKS INSTRUMENTS, INC.

WITNESS:

/s/ Richard S. Chute

By: /s/ Robert F. O'Brien

Name: Robert F. O'Brien

Title: Treasurer

PROMISSORY NOTE

\$475,000.00

August __, 1990
Denver, Colorado

FOR VALUE RECEIVED, the undersigned, M.K.S. Instruments, Inc., a Massachusetts Corporation, hereinafter collectively referred to as "Maker," whose address is 6 Shattuck Road, Andover, Massachusetts 01810, promises to pay to the order of Jefferson National Life Insurance Company, an Indiana corporation and/or Its Assigns (hereinafter referred to as "Holder," which term shall include any subsequent holder of this Note), at its office at One Virginia Ave., Indianapolis, Indiana 46204-3655 (or at such other place as Holder shall designate in writing) in lawful money of the United States of America, the principal sum of FOUR HUNDRED SEVENTY-FIVE THOUSAND AND NO/100 DOLLARS (\$475,000.00), with interest thereon from the date hereof as hereinafter set forth.

1. General Definitions. As used herein the following terms shall have the indicated meanings (definitions appear in alphabetical order and defined terms used within definitions are defined in the appropriate alphabetical place in this Paragraph 1):

(a) Deed Of Trust: The Deed of Trust dated of even date herewith, from M.K.S. Instruments Inc., a Massachusetts corporation, as Grantor, to the Public Trustee of the County of Boulder, Colorado, as Trustee, for the use and benefit of Holder, as Beneficiary, encumbering the Property and securing this Note.

(b) Default Rate: The interest rate equal to eighteen percent (18%) per annum.

(c) Maturity Date: September 1, 2000, unless such maturity date is sooner accelerated upon the occurrence of an event of default hereunder or under any of the other Loan Documents.

(d) Interest Rate: The interest rate shall be fixed at the rate of ten and three quarters percent (10.75%) per annum during the entire ten (10) year term of the loan.

(e) Loan Documents: Collectively, this Note, the Deed of Trust and all other documents and instruments executed by or on behalf of Maker, or either of them, evidencing, securing or relating to the loan evidenced by this Note, as the same may be amended from time to time.

(f) Loan Term: The period of time commencing on the date hereof and terminating on the Maturity Date.

(g) Outstanding Principal Balance: The principal amounts from time to time outstanding under this Note during the Loan Term.

(h) Property: The Real Estate together with all fixtures, equipment and machinery now or hereafter owned by Grantor and actually or constructively attached to the subject property, all present and future leases and rents in respect thereof, and as otherwise included in the definition of "Property" in the Deed of Trust, but not including any business assets of any tenant or of the Maker.

(i) Real Estate: The real property located in the County of Boulder, State of Colorado, encumbered by the Deed of Trust and more particularly described therein.

2. Terms of Loan.

(a) Interest Rate: Commencing on the date hereof and continuing until the Maturity Date, interest shall accrue on the Outstanding Principal Balance at a rate per annum equal to the Interest Rate.

(b) Installments of Principal and Interest: Commencing on October 1, 1990, and continuing thereafter on the first day of each calendar month thereafter through August 1, 2000, Maker shall make equal monthly installments of principal and interest (based on a 20 year amortization) on the amount of Four Thousand Eight Hundred Twenty-Three and no/100 dollars (\$4,823.00). On the Maturity Date of September 1, 2000, Maker shall pay Holder all remaining sums of principal and interest and other sums due under the Promissory Note and Deed of Trust. If not otherwise accelerated, the Note shall be due and payable in full on September 1, 2000.

(c) Payment -- Maturity: If not sooner paid in accordance with the terms of this Note, the entire Outstanding Principal Balance, plus any accrued but unpaid interest thereon and all the sums due hereunder, shall be due and payable, in full, on the Maturity Date.

(d) Prepayment: Upon thirty (30) days' notice, the loan may be prepaid in full during the first five (5) years of the loan term at a prepayment charge equalling ten and three-quarters percent (10.75%) of the principal balance. Commencing with the sixth (6th) year of the loan term, the entire loan can be prepaid at a charge of fifty percent (50%) of the then interest rate being charged on the Note. (For example, if the loan balance is \$400,000.00, and the Borrower wishes to prepay in full during the sixth year of the loan term, a prepayment of the \$400,000.00 would result in a prepayment penalty of 50% of 10.75% multiplied by \$400,000.00 or \$21,500.00). Thereafter, the prepayment penalty rate will be forty percent (40%) of the interest rate during the seventh (7th) year of the loan term; thirty percent (30%) of

the interest rate during the eighth (8th) year of the loan term; twenty percent (20%) of the interest rate during the ninth (9th) year of the loan term; and, ten percent (10%) of the interest rate during the tenth year of the loan term. Any prepayment penalty charge shall also apply if the Holder accelerates payment following a default or any involuntary prepayment with the exception of a full or partial condemnation.

(e) Application of Payments: All payments on this Note shall be made in immediately available funds received in Holder's office on the date due. During the Loan Term, all payments on this Note shall be applied first to the repayment of any sums advanced by Holder for the payment of taxes, assessments, insurance premiums, late charges or other charges against the Property (together with interest thereon from the date of advance until paid at the Default Rate), then to the payment of accrued and unpaid interest on the Outstanding Principal Balance and then to the reduction of the Outstanding Principal Balance.

3. Other Terms and Conditions.

(a) Default Rate: Upon the declaration of default by Holder and written notice to Make, then and in such event the entire Outstanding Principal Balance shall bear interest at the Default Rate from the date of default until the default is cured, or, if the default is not cured, then until the outstanding Principal Balance, accrued interest, attorney's fees and costs are paid in full. In the event of Maker's failure to pay the Outstanding Principal Balance, together with any accrued but unpaid interest thereon and all other sums due hereunder upon the maturity hereof (by acceleration or otherwise), same shall bear interest at the Default Rate from the date due until the default is cured and if the default is not cured, then until the outstanding Principal Balance, accrued interest, attorney's fees and costs are paid in full.

(b) Late Charge: In the event that Maker fails to pay any installment due hereunder or any portion thereof within ten (10) days after the due date thereof, Maker agrees to pay a late charge equal to five percent (5%) of the overdue amount. Maker acknowledges that it would be extremely difficult or impracticable to determine Holder's actual damages resulting from any late payment and this late charge is a reasonable estimate of those damages.

(c) Default: Time is of the essence hereof. Upon the occurrence of any of the following events of default, the payment of all principal, interest and any other sums due in accordance with the terms of this Note shall, at the option of Holder, be accelerated and such principal, interest and other sums shall be immediately due and payable upon demand of Holder by written notice to Maker, wherein Maker shall have a ten (10) day period from receipt of written notice of default to cure any monetary default, and Holder shall have the option to foreclose or to require foreclosure of any or all liens securing the payment hereof:

(1) Default in the payment within ten (10) days after receipt of written notice of default of any monthly installment due hereunder, or any part thereof, or failure to pay the entire Outstanding Principal Balance, together with any accrued but unpaid interest thereon and all other sums due hereunder upon the maturity hereof (whether by acceleration or otherwise);

(2) Breach or violation by Maker of any other agreement or covenant contained herein unless cured within twenty (20) days after receipt of written notice thereof from Holder to Maker;

(3) Default by Maker under the Deed of Trust or under any of the other Loan Documents (unless cured within any applicable grace period).

(d) Character of the Loan: Maker certifies that the loan evidenced by this Note is obtained for business or commercial purposes and that the proceeds thereof will not be used primarily for personal, family, household or agricultural purposes. It is expressly understood that this Note is non-revolving and, therefore, that the total disbursements made to or for the benefit of Maker in accordance with the provisions of this Note shall not, in the aggregate, exceed \$475,000.00.

(e) Security: The payment and performance of this Note is secured in part by the Deed of Trust.

(f) Corporate Liability: Holder shall have full recourse against Maker, and Maker shall be liable for payment of any and all sums evidenced hereby and/or secured by the Deed of Trust and/or the other Loan Documents, and for the performance of all of the covenants, duties and obligations arising under this Note, the Deed of Trust and the other Loan Documents.

(g) Governing Law: As an additional consideration for the extension of credit, each maker, endorser, cosigner and guarantor of this Note understands and agrees that the loan evidenced by this Note is made in the State of Colorado and the provisions hereof will be construed in accordance with the laws of the State of Colorado; and such parties further agree that in the event of default, this Note may be enforced in any court of competent jurisdiction in the State of Colorado, and they do hereby submit to the jurisdiction of such court regardless of their residence or where this Note or any endorsement hereof may be executed.

(h) Remedies Cumulative; Waiver: The remedies of Holder, as provided herein or in any of the other Loan Documents, shall be cumulative and concurrent, and may be pursued singularly, successively or together, at the sole discretion of Holder, and may be exercised as often as occasion therefor shall arise. No act of omission or commission of Holder, including specifically any failure to exercise any right, remedy or recourse shall be deemed to be a waiver or release of

the same; such waiver or release to be affected only through a written document executed by Holder and then only to the extent specifically recited therein. A waiver or release with reference to any one event shall not be construed as continuing, as a bar to, or as a waiver or release of, any subsequent right, remedy or recourse as to a subsequent event.

(i) Notice: Any notice, request, demand or other communication required or permitted hereunder or required by law shall be in writing and shall be effective upon delivery of the same in person to the intended addressee, or 1 day after deposit of the same with a responsible overnight courier service (such as Federal Express) for delivery to the intended addressee or 3 days after deposit of the same in the United States mail, postage prepaid, certified or registered mail, return receipt requested, sent to the intended addressee at the address shown on the first page of this Note, or to such different address as the intended addressee shall have designated by written notice sent in accordance herewith and actually received by the other party at least ten (10) days in advance of the date upon which such change of address shall be effective.

(j) Miscellaneous Provisions:

(1) Every maker, endorser, cosigner and guarantor of this Note expressly grants to Holder the right to release or to agree not to sue any other person, or to suspend the right to enforce this Note against such other person or to otherwise discharge such person; and each such maker, endorser, cosigner and guarantor agrees that the exercise of such rights by Holder will have no effect on the liability of any other person, primarily or secondarily liable hereunder. Each maker, endorser, cosigner and guarantor of this Note waives demand for payment, presentment for payment, protest, notice of protest, notice of dishonor, notice of nonpayment, notice of acceleration of maturity, diligence in taking any action to collect sums owing hereunder and all duty or obligation of Holder to effect, protect, perfect, retain or enforce any security for the payment of this Note or to proceed against any collateral before otherwise enforcing this Note.

(2) This Note and each payment of principal and interest hereunder shall be paid when due without deduction or setoff of any kind or nature or for any costs whatsoever.

(3) Maker agrees to reimburse Holder for all costs, including, without limitation, attorneys' fees, incurred to collect this Note if this Note is not paid when due. Maker agrees that Holder may from time to time extend the maturity of this Note or the time any payment is due under this Note and may accept further security or release security for the payment of this Note, without in any way affecting any obligations of Maker to Holder.

(4) Maker hereby expressly warrants and represents that there is not as of the date hereof any contract, agreement or understanding, written or oral, between Maker and any person or entity whatsoever which in any manner limits or affects the liability of Maker hereunder, nor shall Maker enter into any such contract, agreement or understanding prior to the payment in full of the principal indebtedness evidenced by this Note.

(5) If any provision hereof or of any of the other Loan Documents is, for any reason and to any extent, invalid or unenforceable, then neither the remainder of the document in which such provision is contained, nor the application of the provision to other persons, entities or circumstances, nor any other document referred to herein, shall be affected thereby, but instead shall be enforceable to the maximum extent permitted by law.

(6) This Note shall be a joint and several obligation of each Maker and of all endorsers, cosigners and guarantors hereof and shall be binding upon them and, subject to the restriction with respect to assumption of this Note referenced herein, their heirs, representatives, successors and assigns.

(7) All fees, charges or other sums paid by Maker to Holder, whether pursuant to the terms of this Note or otherwise, with respect to the loan evidenced by this Note or with respect to the Deed of Trust or any of the other Loan Documents which, under the laws of the State of Colorado, may be deemed to be in the nature of interest, shall, for the purpose of any law of the State of Colorado which may limit the maximum rate of interest to be charged with respect to the loan evidenced by this Note, be payable by Maker as and shall be deemed to be additional interest and, for such purposes only, the agreed upon and contracted rate of interest as calculated above shall be deemed to be increased to reflect the payment of such fees, charges and other sums as interest, which rate of interest Maker hereby agrees to pay.

(8) This Note may not be terminated or amended orally, but only by a termination or amendment in writing signed by Holder and Maker.

(9) When the context and construction so require, all words used in the singular herein shall be deemed to have been used in the plural and the masculine shall include the feminine and neuter and vice versa. The word "person" as used herein shall include any individual, company, firm, association, partnership, corporation, trust or other legal entity of any kind whatsoever.

(10) The headings of the paragraphs and sections of this Note are for convenience of reference only, are not to be considered a part hereof and shall not limit or otherwise affect any of the terms hereof.

IN WITNESS WHEREOF, Maker has executed this Promissory Note as of the day and year first above written.

MAKER: M.K.S. Instruments Inc.,
a Massachusetts Corp.

By: /s/ Robert F. O'Brien

Robert F. O'Brien, Treasurer

STATE OF)
) SS.
COUNTY OF)

The foregoing instrument was acknowledged before me, in the County of _____, State of _____, this _____ day of _____, 1990, by Robert F. O'Brien, Treasurer, of M.K.S. Instruments Inc., a Massachusetts Corp.

WITNESS my hand and official seal.

My commission expires:

Notary Public

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

COMPREHENSIVE SUPPLIER AGREEMENT #982812

This Agreement dated October 23, 1998 is by and between Applied Materials, Inc., ("Applied"), a Delaware corporation, having its place of business in Santa Clara, California and Austin, Texas and MKS Instruments, (MKS), a Massachusetts corporation, having its place of business in Andover, Massachusetts.

The parties agree as follows:

Definitions

The following capitalized terms will have the following meanings:

A. "Applied" means Applied Materials, Inc., including all of its domestic and international divisions and subsidiaries.

B. MKS means MKS Instruments, including all of its divisions and subsidiaries (except HPS).

C "Item" or "items" means the good(s) or service(s) that MKS is to provide to Applied under this Agreement, including all Applied Materials purchase orders and related agreements that are governed by this CSA, as specified from time to time by Applied and set forth in Attachment 1 and any amendments to Attachment 1.

D. "Applied's Standard Terms and Conditions of Purchase" means the terms and conditions contained in Exhibit 1 to this Agreement.

E. "Additional Provisions" means all requirements contained in this Comprehensive Supplier Agreement.

F. "Agreement" means this Comprehensive Supplier Agreement and/or the Applied's Purchase Order, and other Exhibits or Attachments to the Comprehensive Supplier Agreement and/or Purchase Order together with any Nondisclosure Agreement defined below as "NDA".

G. "Comprehensive Supplier Agreement" means the Comprehensive Supplier Agreement No. 982812, including Exhibit 1, the Applied Terms and Conditions of Purchase.

H. "NDA" means any and all Nondisclosure Agreement(s) between Applied and MKS and any specific Nondisclosure Agreement that may be attached to this Agreement.

I. "Will" or "shall" have the same meaning and are used to convey an affirmative duty or obligation (i.e., a requirement).

J. "Release," or "release" means individual purchase orders, spot buys, pick cards or other orders for items issued by Applied to MKS under this Agreement

K. "Proprietary Information" means the Proprietary Information, as that term is defined by the NDA, of Applied.

L. "Confidential Information" means the Confidential Information, as that term is defined by the NDA, of Applied.

1. SCOPE

1.1 INTENTION/DESCRIPTION OF COMPREHENSIVE SUPPLIER AGREEMENT PRINCIPLES

This Comprehensive Supplier Agreement ("CSA") serves as a tool to manage the items Applied purchases from MKS as well as sub-assemblies MKS processes for Applied. Attachment 1 lists the items covered by this Agreement. Any modifications to this document will include a current list of the items covered by this CSA.

This Agreement defines the relationship and requirements between Applied and MKS to ensure a consistent supply of material that meets Applied's specifications. Decisions regarding future purchases from MKS will be based upon MKS' performance under this CSA as stated in Section 6, and their achievement toward Applied's business objectives, e.g. Hoshin goals.

1.2 MKS DETAILS

MKS Instruments Account Manager: John Kranik
Six Shattuck Road Sales Manager: Jeff Peters:
Andover, MA 01810 Customer Service Representative: Barbara Guthrie
Phone: (978)975-2350 Engineering Manager: Joe Maher
Fax: (978)975-0093

1.3 ENTIRE AGREEMENT

This CSA, including the Applied Standard Terms and Conditions of Purchase (Exhibit 1) and any other Exhibits or Attachments which are incorporated by reference into this CSA, together with any NDA sets forth the entire understanding and agreement of the parties as to the subject matter of this CSA and supersedes all prior agreements, understandings, negotiations and discussions between the parties as to the subject matter. No amendment to or modification of this CSA will be binding unless in writing and signed by a duly authorized representative of both parties. In the event of any conflict between the terms of the CSA and the terms of the Exhibits and Attachments, the order of precedence shall be given first to the CSA, followed by the Applied Standard Terms and Conditions of Purchase, drawings, specifications or other technical documents.

The following lists all of the Exhibits and Attachments referenced in this agreement:

Exhibit/Attachment	Revision	Release Date
Exhibit 1	no revision	10/23/98
Attachment 1	A	10/23/98
Attachment 2	no revision	10/15/97
Attachment 3	no revision	
Attachment 4	no revision	any example - will be in contract

Exhibit/Attachment	Revision	Release Date
Attachment 5	A	4/27/98
Attachment 6	K	6/15/98
Attachment 7	no revision	
Attachment 8	n/a	
Attachment 9	n/a	
Attachment 10	no revision	
Attachment 11	no revision	
Attachment 12	no revision	
Attachment 13	no revision	
Attachment 14	n/a	
Attachment 15	n/a	
Attachment 16	no revision	
Attachment 17	no revision	8/27/98

1.4 ITEMS COVERED

In general, all Items supplied to Applied by MKS will be covered by this agreement. The list of Items covered by this CSA is shown in Attachment 1. New Items may be added to Attachment 1 upon mutual agreement between Applied and MKS. Items may be removed by Applied from Attachment 1 from time to time in accordance with this Agreement. MKS may recommend or Applied may implement removal for the following reasons without limitations:

- a. Specification changes that MKS is unable to comply with
- b. Quality or delivery default
- c. Obsolete Items
- d. Outsourcing of the parent assembly

1.5 DURATION OF AGREEMENT

This Agreement commences on and as of the date of the latter of the two signatures shown in Section 9, Effective Date, when each party has executed and delivered one or more counterparts of this CSA to the other (the "Effective Date") and will remain in effect through October 23, 2000 (the "Initial Term"). Provided that MKS has complied with all contract requirements and

specifically those requirements identified in section 6.0 (Performance Management), both parties may mutually agree to expand the term of the agreement up to 24 months from the conclusion of the initial term. Any extension of this agreement will be subject to all terms and conditions of this agreement.

1.6 RESPONSIBILITIES

1.6.1 Applied Responsibilities

Applied agrees to:

- Provide demand signals to MKS as defined in section 2.5.1;
- Provide updated twenty-six week rolling forecasts to MKS;
- Measure inventory levels and scoring compliance to days-of-supply metric as stated in Section 6;
- Receive and inspect Items from MKS and measuring quality for quality metric as stated in Section 6;
- Notify MKS of any discrepancies;
- Provide suggestions on how MKS can improve its operation of this agreement;
- Make recommendations as to how MKS might reduce costs and improve the quality of Items purchased from MKS;
- Respond to any of MKS' inquiries;
- Identify, in conjunction with MKS, possible solutions to resolve any exceptions that might arise;
- Write and record action plans to resolve exceptions;
- Provide MKS with MKS performance reports;
- Meet with MKS quarterly to review its performance;

1.6.2 MKS Responsibilities

MKS agrees to fully perform all requirements of this Agreement MKS obligations include but are not limited to:

- Produce high quality and high reliability Items;
- Deliver Items on time to Applied;
- Respond in a timely manner to any of Applied's inquiries and requests;
- Continuously improve MKS' operations to better serve Applied's needs and support Applied's business objectives, e.g. Hoshin goals;
- Work with Applied to improve operation of this agreement;
- Work with Applied to reduce costs and improve the quality for all Items MKS produces for Applied;
- Review regularly the updated forecasts to adjust MKS operation for changes in Applied's plans;
- Work with Applied to resolve any exceptions that may arise;
- Complete any tasks assigned to resolve exceptions on time;
- Meet with Applied quarterly to review performance;
- Monitor and report to Applied the finished goods inventory levels of the Items listed in Attachment 1 of this Agreement.

2. LOGISTICS FRAMEWORK

2.1 OPERATION OF CSA

2.1.1 Operating calendar & holidays

This CSA operates by Applied fiscal year calendar, shown in Attachment 2. Recognized holidays are those holidays shown on Applied fiscal year calendar. Should any discrepancies between the operating calendars of Applied and MKS arise, MKS must make provisions so that Applied's operations are unaffected.

2.1.2 Flowchart of day to day operations (Reserved)

2.1.3 Forecasts

MKS' production of Items will be guided by Applied's most current 26 week rolling forecast, as provided by Applied to MKS on a weekly basis ("Applied's Forecast"). MKS will plan, manufacture, and stock inventory to meet Applied's forecast. MKS will keep each of Applied's forecasts for audit purposes for a minimum of six (6) months and may be asked to present this document for verification of authorized inventory levels. Applied's forecast is Proprietary Information to be used only by MKS to meet its obligations to Applied under this Agreement.

2.1.4 Releases

Applied may require a part or Items on an accelerated basis, either in addition to or in place of Items forecast for release or scheduled for delivery at a later date. If feasible, as determined by Applied and MKS, such Items will be provided by MKS to meet Applied's requirements. Unless otherwise agreed to by Applied, such accelerated deliveries will not affect the delivery schedule of any Items currently allocated for forecast requirements. Lead times for each accelerated release will be agreed upon by both parties. If MKS and Applied are unable to agree on delivery schedule or other terms affecting Items for accelerated delivery, Applied shall have the right to purchase or procure affected Items from other persons, without obligation to MKS.

2.1.5 Delivery Guidelines

2.1.5.1 General Delivery

MKS will exercise all efforts to meet Applied's delivery requirements on time. Shipments to Applied by MKS will be delivered in the right quantities ordered by Applied.

For part orders issued via a separate purchase order form ("Spot Buy"), deliveries will be accepted on the requested date or up to 2 days before the requested date. For Spot Buy purchases for spares, deliveries will be accepted on the requested date or up to two days before the requested date.

2.1.6 Replenishment Approach

MKS will be expected to supply Items using one or more of the following replenishment approaches:

- Bus Route
- Spot Buy

The replenishment methodology to be used for a particular Items are defined on Attachment 1. Specific delivery mechanics are outlined on Attachment 3.

2.1.7 Electronic Commerce

MKS is required to communicate with Applied using EDI ANSI X.12 standards and encouraged to use either GELS or EDICT software.

2.1.8 Changes to Logistics

Applied may on occasion change any aspect of any logistics requirement. Applied will expect MKS to accommodate these changes to the best of its ability. MKS will be given at least three weeks notification prior to the change being implemented. Applied will then consider all claims for pricing adjustment due to the change in the logistics framework if made within the three week notification period.

2.2 SERVICE LEVELS

2.2.1 Inventory Levels

MKS, if involved in supporting lean manufacturing, is expected to have Finished Goods Inventory ("FGI") of the Items on Attachment 1 in order to manage demand fluctuations. MKS will maintain a minimum FGI of 4 weeks and a maximum of 6 weeks of each Item, for each Item identified in Attachment 1 as requiring FGI, to meet Applied's needs based on the most recent rolling forecast (see Attachment 4 for example of forecast). After MKS exhibits ability to decrease cycle times, both parties will agree to lower FGI requirements.

MKS may present a claim for "non-purchase" for payment of inventory manufactured in response to a valid Applied purchase order, or an authorized demand signal, as explained in Section 2.5.1, if Applied has not taken delivery of the FGI within 6 months from date of manufacture. This claim must be made within thirty (30) days from the end of the 6 months time frame. Applied is not responsible for payment to MKS for FGI built without a valid Applied purchase order, an authorized demand signal (as explained in Section 2.5.1), or Applied's Forecast (as explained in Section 2.1.3).

Applied will not hold any financial responsibility for FGI consisting of "off-the-shelf" Items that MKS is able to sell to other customers.

2.2.1.1 WIP Tracking

MKS is expected to monitor, track, and report their Work-In-Process ("WIP") inventory (dollars). In the future, Applied will implement regular reporting mechanisms which MKS will be expected to participate in.

2.2.1.2 Excess and Obsolete Items

Applied will not be responsible for excess and obsolete parts other than to the amounts specified above in Section 2.2.1, and in any event MKS must make all efforts to mitigate claims for "non-purchase".

In the event that MKS desires to submit a claim for reimbursement of costs associated with obsolete Applied unique build-to-print parts, MKS shall submit its claim to Applied's authorized purchasing representative within 90 days from the date Applied designated the part as obsolete. MKS' claim proposal shall be submitted in accordance with Section 26, Termination for Convenience, of Applied's Standard Terms and Conditions of Purchase.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

MKS agrees to physically dispose of the excess and obsolete parts as directed by Applied's authorized purchasing representative. Parts that are to be delivered to Applied's facilities must be delivered in accordance with the requirements of this Agreement and/or any supplemental instructions provided by Applied's authorized purchasing representative. With regard to Applied unique build-to-print parts, in lieu of delivery to Applied, Applied may elect to request MKS to destroy or otherwise scrap these parts such that these parts are non-functional MKS agrees to destroy or otherwise scrap these parts in a manner that is satisfactory to Applied and to provide Applied with a certification of destruction and/or evidence that the parts have been properly disposed of.

2.2.2 Response Requirements

Responses to the following types of inquiries are expected within the time periods in the tables below.

2.2.2.1 MKS Response Time

Inquiry Type	MKS Response Time	MKS Contact
Lead-time	1 business day	Master Planner
Technical	1 business day	Manufacturing Engineer
Quotations	1 business day	Customer Service Representative
Quality	1 business day	Quality Engineer
Price/invoice	1 business day	Customer Service Representative
Component failure & field safety	3 hours	Quality Engineer
Product Problems	1 business day	Account Manager

2.2.2.2 Applied Response Time

Inquiry Type	MKS Response Time	MKS Contact
Lead-time	1 business day	MKS Account Team Lead/Member
Technical	1 business day	MKS Account Team Lead/Member
Quality	1 business day	MKS Account Team Lead/Member
Price/invoice	1 business day	MKS Account Team Lead/Member

2.2.3 Flexibility Requirements

MKS is expected to perform regular capacity planning and to demonstrate reasonable upside/downside manufacturing flexibility in case of demand volume changes at Applied. For Bus Route Items, MKS shall be capable of manufacturing to unplanned sustained increases/decreases in demand above/below Applied's forecast as defined below. For Spot Buy Items, MKS allows the following increases/decreases to Purchase Order Quantities above/below the quantities originally requested:

Weeks until Delivery Date	[**]	[**]	[**]	[**]	[**]
Flexibility +/-	[**]	[**]	[**]	[**]	[**]

2.2.4 On-site support requirements

As determined by Applied, MKS may be asked to provide logistics, quality engineering, and new product development support on-site at Applied's facilities. At the appropriate juncture, Applied will require MKS to execute the On-site Representative Agreement prior to issuing a building badge to MKS' representatives.

2.2.5 Global Support

For the Items listed in Attachment 1, and all other Items that MKS provides to Applied, MKS will provide support globally for Applied and Applied's customers.

Technical assistance and product support services shall be provided at no additional charge during normal business hours. MKS must have an established and deployed global service capability. The required support services must be available globally, however, MKS may utilize a MKS distributor, or other -fled entity designated by MKS to meet this requirement MKS is expected to use best efforts to provide a resolution to requests for assistance.

2.2.6 Turn-around time for Repairs

MKS will supply Applied with repair Items under warranty within [**] business days from receipt of product. The [**] day cycle is not guaranteed if Applied ships repair Items in unreasonable batch sizes. MKS will supply Applied with repair Items not under warranty within [**] business days from receipt of product.

2.3 INFORMATION

2.3.1 Applied Planning Systems

MKS may be given electronic access to Applied's planning data. This access, if granted, should only be used to facilitate production and delivery of Items to support Applied's requirements. MKS' access to, and utilization of, Applied's planning data is subject to the confidentiality terms of this Agreement and any NDA.

2.3.3 Applied New Product Plans

MKS will on occasion and at Applied's discretion, be invited to forums in which Applied's new product plans are shared. Any Applied new product plans provided to MKS is subject to the confidentiality provisions of this Agreement and any NDA.

2.4 PACKAGING AND TRANSPORTATION

2.4.1 Packaging and Shipment

MKS will have all Items packaged "ready for use" in accordance with Applied's packaging specification (Attachment 6). MKS will mark and identify every item in compliance with Applied's part identification specifications and requirements (reference Attachment 6).

2.4.2 Bar Coding

All shipments should be bar coded to Applied's specifications (Attachment 5).

2.4.3 Transportation Mode

Items will be transported, FOB Origin, Freight Collect in accordance with Attachment A of Applied's Corporate Transportation Routing Guide which is provided in Attachment 7.

2.5

PAYMENT

2.5.1 Demand Signal

BUS ROUTE

Each day by 10:00 a.m., Applied sends via EDI transmission an order sheet to MS containing Applied's material requirements information. This information is organized at the part-number level and represents Applied's daily purchase from MKS. This EDI transmission constitutes an authorized demand signal.

SPOT BUY

As needed, Applied sends via fax an order sheet to MKS containing Applied's material requirements information. This information is organized at the part number level and represents an Applied purchase from MKS. This fax constitutes an authorized demand signal.

2.5.2 Invoices

Invoices shall contain the following information: purchase order number, item number, description of goods, sizes, quantities, unit prices, and extended totals in addition to any other information requested. Applied's payment of invoice does not represent unconditional acceptance of items and will be subject to adjustment for errors, shortages, or defects. Applied may at any time set off any amount owed by Applied to MKS against any amount owed by MKS or any of its affiliated companies to Applied.

All invoices must be sent directly to Accounts Payable in Austin:

Accounts Payable
Applied Materials
9700 US Highway 290 East M/S 4500
Austin, TX 78724-1199

2.5.3 Cash Discounts

Payment will be made net thirty (30) days from receipt of:

- a. invoice, in form and substance acceptable to Applied, or
- b. delivery and acceptance of the invoiced Item(s), whichever is later.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

If payment is made within ten (10) days of the later of either (a) or (b) above, Applied may [**] from the invoice total as a prompt payment discount.

2.6 DISASTER RECOVERY PLAN

MKS is expected to develop and provide to Applied, upon request, reasonable information describing (provide evidence of a disaster recovery plan that includes emergency back up capacity and appropriate record protection and recovery. Furthermore, MKS represents that its information systems are year 2000 compatible and hereby grants Applied the right to verify MKS' internal processes for ensuring compliance with this provision. MKS agrees to include this same requirement in its purchase orders to its supply base and to provide reasonable efforts to verify its supply base is compliant with the requirements herein.

2.7 MANAGING EXCEPTIONS

2.7.1 Identifying constraints

MKS is responsible for anticipating inability to perform its obligations and limitations on manufacturing, delivery and other performance to meeting CSA objectives, informing Applied when those constraints occur, and initiating action plans to resolve the Constraints might typically include, but not be limited to:

- a. Consumption over forecast
- b. Consumption under forecast
- c. Quality problems
- d. Capacity/production problems
- e. Secondary supplier supply-chain management problems
- f. Other business issues

2.7.2 Process for Exceptions

Applied will work with MKS to determine the impact of an exception and approve and execute or disapprove the action plans in accordance with Section 24, Changes, of Applied's Standard Terms and Conditions of Purchase. MKS will notify the MKS Account Team Lead as soon as exceptions are identified.

3. QUALITY FRAMEWORK

3.1 SUPPLIER NON-CONFORMANCES AND CORRECTIVE ACTION

MKS' quality must meet all applicable Applied specifications as stated elsewhere in the Agreement (including all technical specifications and detailed drawings). MKS is required to replace or repair defective Items at MKS' expense in a timely manner. MKS are required to use the most expeditious manner possible to affect the corrections including the use of overnight delivery

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

services for shipment of Items; at Applied's request, in certain circumstances, MKS may be asked to provide new Items in lieu of repairing a part to ensure immediate corrective action.

MKS will be notified of defects with a corrective action form, Attachment 10, to which they are expected to respond appropriately. A corrective action process to resolve non-conformances will be documented and used. In addition, MKS will participate in continuous improvement plans and programs as defined by Applied and MKS.

Should MKS fail to conform to the specifications established in this Agreement, Applied may purchase comparable items in the open market as necessary to meet its requirements. Applied may at its option charge MKS with any reasonable cost differential between the contract price and the price paid in the open market. This cost may include premium costs for expedited delivery, administrative costs incurred to process replacement purchase orders.

3.2 APPLIED NON-CONFORMANCES AND CORRECTIVE ACTION

Applied will return Items at Applied's expense that do not conform to Applied's requirements due to Applied errors. These Items will be returned for potential rework. Applied and MKS will agree in advance on "standard" repair costs (labor, Items and freight) on items not covered under warranty; the standard repair costs will be identified in the Items list (Attachment 1B).

To the extent that a "standard" repair cost has not been established, MKS will assess rework costs and timing and inform Applied before work is performed. The parties agree that MKS will inform Applied if the total price charged for repairing a part will exceed 40% of the current purchase price stated in Attachment 1.

MKS agrees to repair and return all Items within [**] business days from receipt of damaged Item. Applied shall have the right to designate certain Items for "Same Day" or "24 Hour" repair turnaround. Any premium charges for "Same Day" or "24 Hour" repair turnaround will not exceed [**] per Item.

Prior to return of repaired items to Applied, MKS will mark Items with Applied's part number, serial number, RMA number, purchase order number, range and gas (ff applicable). Applied shall bear the risk of loss or damage during transit of Items whether or not the Items meets warranty requirements.

In addition, as stated below in the quality assurance section, a corrective action process to resolve non-conformance(s) will be documented and used.

3.3 QUALITY ASSURANCE

All Items purchased under this CSA will be subject to inspection and test by Applied at appropriate time and place, including the period of manufacture and anytime prior to final acceptance. If inspection or test is made by Applied on MKS' premises, MKS will provide all reasonable facilities and assistance for the safety and convenience of Applied's inspectors at no charge to Applied. No preliminary inspection or test shall constitute acceptance. Records of all inspection work shall be kept complete and available to Applied during the performance of this order and for such further period as Applied may determine.

Certificate of Conformance (COC): MKS agrees to certify that Items have passed all production acceptance tests and configuration requirements and provide a "Certificate of Conformance" (see Attachment 16) and a Calibration Data Report that will be included with each product during shipment.

With regard to repair services, MKS shall maintain documentation evidencing that all test inspections have been performed. The documentation shall indicate the nature and number of observations made, the quantities approved and rejected as well as the nature of the corrective action take MKS' service centers shall be responsible for submitting this data for Applied's review of the delivery summaries. The data shall be submitted monthly not later than five days after the close of each of Applied's fiscal months to Applied's Contract Specialist and Applied's IBSS Repairs Purchasing Group.

At Applied's request, MKS will provide a certificate and/or a copy of the final inspection records showing compliance to applicable specifications, contract requirements and any other required documents stipulated in Applied's repair authorization. MKS also agrees to provide Applied with copies of its current procedures relative to repairs, range change and warranty repairs.

Through MKS' internal Quality Service organization, MKS will track and maintain its internal manufacturing reject rate by percentage of assemblies, and/or part per million ("TPM"). Trend reporting and corrective actions shall be furnished to Applied as requested by Applied Purchasing or Quality representatives. MKS will provide quality data in the format, as shown in Attachment 11, and as received by Applied MKS may also be required to provide reasonable additional data to support qualification and certification programs.

3.4 WARRANTY

MKS warrants that all Items delivered to Applied will be free from defects in workmanship, material, and manufacture; will comply with the requirements of this Agreement, and, where design is MKS' responsibility, will be free from defects in design. All services will be performed in a competent, professional and workmanlike manner, free from defects and in accordance with best professional practices or the like. MKS FURTHER WARRANTS ALL ITEMS PURCHASED OR REPAIRED WILL BE OF MERCHANTABLE QUALITY AND WILL BE FIT AND SUITABLE FOR THE PURPOSE INTENDED BY APPLIED. THESE WARRANTIES ARE IN ADDITION TO ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, AND WILL SURVIVE ANY DELIVERY, INSPECTION, ACCEPTANCE, OR PAYMENT BY APPLIED. If any Items delivered by MKS do not meet the warranties specified herein or otherwise applicable, Applied may, at its option:

- (i) require MKS to correct at no cost to Applied any defective or non-conforming Items by repair or replacement, or
- (ii) return such defective or non-conforming Item at MKS' expense to MKS and recover from MKS the order price thereof, or
- (iii) correct the defective or non-conforming Item itself or through a mutually approved third party and charge MKS with the cost of such correction
- (iv) cancel the balance of the undelivered non-conforming Item and/or this CSA in accordance with Section 25, Termination for Default, of Applied's standard Terms and Conditions of Purchase.

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All warranties will run to Applied and to its customers. Applied's approval of MKS' material or design will not relieve MKS of the warranties established in this agreement. In addition, if Applied waives any drawing or specification requirement for one or more of the goods, it will not constitute a waiver of all requirements for the remaining goods to be delivered unless stated by Applied in writing.

3.5 OTHER QUALITY PROGRAMS

3.5.1 MKS' Quality System

MKS' quality system must be in compliance with ISO 9000. If MKS is not currently ISO 9000 certified, MKS must provide their documented plans to achieve certification with a tune that is mutually agreeable to both parties. MKS also agrees to participate in the SSQA development and implementation plan.

3.5.2 MKS' Process Quality

Applied Materials requirements and workmanship standards shall be integrated into MKS' processes and identified accordingly. MKS shall identify the critical processes effecting the product quality and develop a validated list of the critical processes by discussing with Applied Materials. All data generated as a result of the critical manufacturing processes shall be collected, processed and used for process control and continuous improvement Evidence of process control of critical processes is a requirement and the presence of control charts and statistical process control is required. Processes not exhibiting a Cpk of 1.33 will require a formal corrective action plan to achieve the required process control. The critical manufacturing processes on pressure transducers, flow products and electronic products are:

- [**]
- [**]
- [**]
- [**]
- [**]

3.5.3 Part quality containment and corrective action

When Applied Materials identifies a product non-conformance on a piece part and requests MKS to implement containment action on the part failure, MKS shall respond within [**] with a documented containment plan and shall have implemented the plan. MKS shall provide follow up to this containment plan with a closed loop corrective action identifying the root cause, a permanent fix and tune line to implement the corrective action. Applied Materials may perform a follow up audit to verify the effective implementation of the corrective action and approve the closure of the corrective action.

Applied Materials may develop or request MKS to develop Inspection Standard Sheets on identified part numbers for deployment in MKS' operation. ISS's will be deployed in final

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inspection, completed and records maintained as part of MKS' quality system. Template will be provided by Applied Materials supplier quality organization.

3.5.4 MKS Audits

Applied Materials will conduct the following audits, as required, to ensure a high level of quality of parts and assemblies purchased from MKS.

3.5.4.1 Source Inspection

Applied Materials may conduct source inspection at MKS' site at any time. Performance of source inspection does not waive MKS responsibility for any defects that might subsequently be identified by Applied Materials or its customers.

3.5.4.2 Piece part audits

Piece part audits may be performed at MKS' site or at Applied Materials. MKS shall identify the failure and respond commitment to contain the part failure within in [**] from notification. MKS shall also perform the root cause analysis of the failure for containment and corrective action. MKS shall agree to inform Applied Materials about the root cause, corrective action, its implementation plan and schedule within in the time period agreed upon.

3.5.4.3 Process audits

When a systemic failure trend is observed in the piece part or assembly supplied, Applied Materials or MKS shall identify the process which are causing the failure and audit the processes at MKS' site. Any deficiencies or opportunities for improvements identified from the audit will be discussed with MKS and a closed loop corrective action will be established, specifying the correction action required with a specified timeline for implementation. MKS shall agree to work on the corrective action and provide closure to all deficiencies within the time period agreed upon.

3.5.4.4 System assessment

Applied Materials, at any time may decide to perform a quality system audit at MKS' site. Any deficiencies or opportunities for improvements identified from the audit will be discussed with MKS and a closed loop corrective action will be established, specifying the corrective action required with a specified timeline for implementation. MKS shall agree to work on the corrective action and provide closure to all deficiencies within the time period agreed upon.

3.5.5 MKS' control over their subcontractors

MKS shall demonstrate control over the selection of subtier suppliers and maintain a controlled Approved Suppliers List that is supported by on site audits and completed corrective actions prior to selection and periodically to ensure the highest quality of procured parts and assemblies. MKS is required to provide Applied Materials with a quality plan for

the selection, control and maintenance of subtier suppliers and will include periodic testing performed by MKS to ensure compliance to Applied Materials specifications. Quality records of MKS' subtier suppliers shall be made available, upon request, to Applied Materials for review.

3.5.6 MKS communication

MKS agrees to send a report on their quality performance on either a weekly or monthly basis the frequency and content of which is to be mutually agreed to between the quality engineering representatives from each party. Applied's quality engineer may schedule a periodic meeting with the MKS representative managing the quality to discuss the contents of MKS' quality report, parts containment, closed loop corrective action, audit findings or any other issues related to quality. MKS agrees to develop, with the help and approval of Applied Materials, a pro-active quality road map to improve their part quality to meet the Applied Materials quality goals. And the status of the effectiveness of the implementation plan will be monitored by MKS and reviewed with Applied Materials on a periodic basis.

3.5.7 Formal Quality Plan

A formal quality plan will be developed jointly by MKS and Applied Materials and will contain part and process specific requirements identified to ensure the manufacture of high quality parts. MKS will conform to all requirements of the plan. Periodic assessments of the quality plan will be performed by the Applied supplier quality engineer to ensure conformance to all requirements. The completed plan will be an attachment to this contract.

3.5.8 Pro-active Action Plans

MKS is advised to work with Applied Materials in a pro-active way on the following.

1. Work with the Quality Engineers on the manufacturing floor to receive the DMR parts as soon as possible.
2. Work with the WMO/PBG buyers in reversing the PPMs from MKS fault to Applied Materials' fault in applicable cases.

4. PRICING FRAMEWORK

4.1 PRICING BY PART NUMBER

The pricing for the Items are shown in Attachments 1A (part numbers) and 1B (service and repair). Any modifications to these must be made in accordance with Section 7 of this Agreement. MKS commits to on-going cost improvement during the period of this Agreement in accordance with Section 6.

At the time of the Agreement Effective Date, the remaining balance of undelivered items on all open purchase orders will be revised to the agreement price.

Specific circumstances may result in a review of the agreement terms, including prices. These include, but are not limited to:

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- a. Volume increases resulting in an increase in agreement value of over [**] (subsequent to completion of negotiations on the existing prices);
- b. Addition of Items to the agreement increasing the value of the Agreement over [**]
- c. Cost reductions(savings over and above those committed in the MKS performance plan.;
- d. Price reductions in accordance with Section 6, [**], of Applied's standard Terms and Conditions of Purchase.

4.2 COOPERATIVE PRICING MODELS/FORMULAS

SEE ATTACHMENT 1

4.3 VOLUME

MKS will be provided a range of potential volume that may be purchased. Applied does not commit to buy a specific volume of a part number from a MKS. Applied does not limit its ability to buy the same part number from multiple sources.

4.4 EXPORT PRICING

MKS should quote Applied in unit prices based upon delivery FCA Free carrier. MKS is expected to prepare the export paperwork and be the exporter of record. MKS must utilize Applied's preferred carriers to arrange the export of the goods. Applied will pay the freight charges based on Applied's rates with its preferred carriers. Applied will be responsible for importing the goods into the destination country.

4.5 CURRENCY

All prices are quoted in US dollars; prices for foreign manufactured Items will not be adjusted to reflect changes in the exchange rate. MKS is encouraged to obtain any necessary currency exchange protection it deems appropriate.

Notwithstanding the agreement to quote product in U.S. Dollars, the parties agree that any Applied entity operating in the same country as MKS's manufacturing plant or sales and service depots may issue orders for MKS's products using the local currency for the purposes of effecting payment. The prices will be converted to local currency as follows:

PARTS MANUFACTURED EXCLUSIVELY OUTSIDE OF THE UNITED STATES:

The U.S. Dollar prices in Attachment 1 will be converted to local currency, on a quarterly basis, using the official exchange rate listed in Bloomberg(TM) or Olsen(TM) publications. The exchange rate shall be the mid point between the bid and ask price listed at the close of the following days: January 2nd, April 1st, July 1st, October 1st.

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PARTS MANUFACTURED EXCLUSIVELY WITHIN THE UNITED STATES:

The various packaging, shipping, export and import costs associated with parts manufactured exclusively within the United States and offered for sale outside the United States will be paid by MKS as part of its normal operating expenses. In consideration for said costs, Applied agrees that MKS may increase the U.S. Dollar prices in Attachment 1 by not more than [**] prior to converting the U.S. price to the local currency price using the official exchange rate listed in Bloomberg(TM) or OIsen(TM) publications. The exchange rate shall be the mid point between the bid and ask price listed at the close of the following days: January 2nd, April 1st, July 1st, October 1st.

4.6 PROTOTYPES

MKS is committed to price all Items consistent with contract prices.

MKS agrees to provide prototype Items priced considering the total value of Applied's business with MKS. This may be accomplished in several ways, including:

- a. a specific number of prototype Items may be provided free of charge
- b. Items may be priced at production levels

4.7 ADVANCES FOR RAW MATERIALS

Applied does not provide advance payments for the purchase of raw materials.

5. TECHNICAL FRAMEWORK

5.1 ENGINEERING CHANGE ORDERS

Applied may change its drawings, design, and specifications at any time in accordance with Section 25, Changes, of Applied's Standard Terms and Conditions of Purchase. Applied Supplier Engineer will review with MKS all proposed Engineering Change Orders (ECO's) that impact the form, fit, or function of Items. Applied will, in writing, provide approved ECO's (refer to Attachment 12) and state the effective dates of all changes. Unless otherwise notified, Applied Receiving Inspection will inspect to the latest revision in effect at the time of receipt

MKS may request engineering changes via a MKS Problem Sheet (refer to Attachment 13). This form should be submitted to Applied Supplier Engineer. Changes shall not be implemented by MKS until written permission to proceed is given by Applied's authorized purchasing representative and the agreement is modified accordingly. Applied will consider claims for adjustment in the terms of this Agreement if made before the implementation of the changes.

5.2 TOOLING

Unless otherwise agreed to in writing, special dies, tools, patterns and drawings used in the manufacture of Items shall be furnished by and at the expense of, MKS.

5.3 DESIGN CHANGES AND RESOLUTION

For the term of this Agreement, MKS will not make changes to the design of any part that may alter form, fit, function or a significant manufacturing process without a documented engineering change request and prior written approval from Applied's authorized purchasing representative and the agreement is modified accordingly.

If Applied's design changes impact the pricing, delivery, lead-time, or other terms and conditions of this Agreement, and agreement upon alternate terms cannot be reached with MKS, then Applied may remove the subject Items from this Agreement without affecting the remaining Items.

5.4 PROCESS CHANGES AND RESOLUTION

MKS is expected to inform Applied of process and MKS changes to include changes in specifications, manufacturing locations, even when specifications are met. MKS must receive written approval in writing from Applied before implementing changes. MKS must use the specified Applied "approved" list of secondary process suppliers, where designated. The use of Applied approved secondary process suppliers does not relieve MKS of the responsibility for management of the subtier supplier and for ensuring the quality of parts received.

5.5 SUBCONTRACTING

MKS shall not subcontract for completed or substantially completed components and processes supplied to Applied without prior written approval of Applied. MKS will ensure that all subcontractors to MKS that have access (directly or indirectly) to Applied specifications must be covered by a NDA that is similar in form and substance to Applied's NDA.

5.6 FIRST ARTICLES

A new Item, Item with revised drawings, or other changes as delineated above, must have a first article evaluated and accepted by Applied (a "First Article"). An Item will not be authorized for deliveries until acceptance of the First Article by Applied. MKS will maintain First Article qualifications/evidence data file with content as defined by Applied for the specific part. First Article data is to be made available to Applied upon request and shall be retained by MKS during the performance of this Agreement or subsequent agreements.

5.7 OUTSOURCING

Applied may at its discretion elect to outsource an assembly or module to a third party ("Subassembler") and if the selected assembly or module includes any Item under this CSA (an "affected Item"), Applied will advise MKS of the Subassembler, unless precluded from doing so by confidentiality or other requirements. MKS understands that the selection and responsibility for sourcing any affected Items will generally be the responsibility of the Subassembler. If MKS is not selected as the source for an affected Item, any affected items or applicable quantities of affected Items may, at Applied's discretion, be removed from this Agreement.

5.8 PRODUCT SUPPORT

MKS agrees to provide Items, and technical and service support to Applied for all of the Items for a minimum of ten years from the date of final shipment of a part to Applied.

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Alternatively, the parties may agree to establish a product support period less than ten years provided that MKS agrees to grant to Applied a non-exclusive license to make, have made, use, sell, and support the Items in a form and on terms acceptable to Applied.

5.9 COMMODITY SPECIFIC ISSUES

Reserved

5.10 TECHNOLOGY ROADMAP

Reserved

6. PERFORMANCE MANAGEMENT

6.1 SUPPLIER PERFORMANCE PLAN

As part of this Comprehensive Supplier Agreement, Applied and MKS agree to jointly develop a Supplier Performance Plan. Attachment 15 outlines the performance plan.

6.2 SUPPLIER PERFORMANCE MANAGEMENT

6.2.1 Metrics and Targets

MKS agrees to target the operational performance targets defined below. Performance targets for FY2000 are listed. Intermediate performance targets are established in the Supplier Performance Management Plan. The following defines how Applied and MKS will measure performance metrics:

Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Quality ppm	Number of quality discrepancies detected prior to shipping a completed system to an end customer, expressed as parts per million	Quantity of parts with recorded DMR occurrences provided by the supplier over the prior 13-week period, divided by the total quantity of parts received from that supplier over the same period, multiplied by 1 million	[**]	[**]
Supplier Fault DMRs	Number of DMR transactions for part quality discrepancies detected in-house prior to system installation in the field	Number of DMR occurrences recorded against the supplier accumulated over the prior 13-week period	[**]	[**]

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Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Late Delivery ppm	Number of parts delivered later than the agreed upon commit date	Quantity of parts received one day or more after the commit date, accumulated for each supplier over a rolling 13-week period, divided by the total quantity of parts received over the same period, multiplied by 1 million	[**]	[**]
Early Delivery ppm	Number of parts received three or more days before the commit date	Quantity of parts received three or more days before the commit date, accumulated over a rolling 13-week period, divided by the total quantity of parts received over the same period, multiplied by 1	[**]	[**]
Average Lead Time of Production Parts (Order Fulfillment Cycle Time)				
Source Cycle Time (supplier reported)	Average of the total times, from placement of an order through receipt at Applied Materials, of parts supplied to volume production (including transportation time)	The average of the number of days between order date and receipt date for all production parts recorded for the supplier, based on Austin volume production activity.	[**]	[**]
Make Cycle Time (supplier reported)	Total cycle time to source all materials required to produce an order, based on contracted parts supplied to volume production	Elapsed time, as determined through process audits and supplier self-assessments	[**]	[**]

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Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Cost Reduction	Total production time required to fulfill an order, including manufacturing order release and build time, based on contracted parts supplied to volume production	Elapsed time, as determined through process audits and supplier self-assessments	[**]	[**]
	Percentage difference between the average unit price paid for materials in the prior year and price paid in the current year	Calculated for each contract by the SAT, using the method accepted by the SMO commodity group (see Attachment 17)	[**]	[**]

7. AMENDMENTS AND MODIFICATIONS

This CSA may be revised by the mutual consent of Applied and MKS. Revisions to this CSA must be in writing, signed by both Applied and MKS duly authorized representatives, traced by revision numbers and attached to this original agreement. A change to one attachment of this agreement will constitute a revision level change. The master copy of this CSA and any revisions are to be maintained by Applied.

Updates to Section 2.2, Service levels, and changes may be communicated via memos sent by mail, fax or e-mail.

8. GLOSSARY

TBD

9. ACCEPTANCE

Accepted:

/s/ Michael Berkaw

 Applied Materials, Inc.
 Michael Berkaw
 Contract Specialist
 Chemical Delivery SMO

/s/ Leo Berlinghieri

 MKS
 Leo Berlinghieri
 VP of Customer Service
 MKS Instruments

Date: 10/22/98

10/22/98

APPLIED MATERIALS TERMS AND CONDITIONS OF PURCHASE

1 Acceptance

The terms and conditions stated in these Applied Materials Standard Terms and Conditions of Purchase become the agreement between the parties covering the purchase of the goods or services (collectively referred to as "Items") ordered in the Purchase Agreement/Comprehensive Supplier Agreement/Basic Supplier Agreement of which these Terms and Conditions are a part when this Agreement is accepted by acknowledgment or commencement of performance. This Agreement can be accepted only in these terms and conditions. Additional or different terms proposed by Supplier will not be applicable unless accepted in writing by the Buyer. No change, modification, or revision of this Agreement will be effective unless in writing and signed by duly authorized representative of Buyer.

2. Confidential and Proprietary Information

Supplier will observe and is bound by the terms and conditions of any and all Non-Disclosure Agreements (NDAs) executed by Supplier with or for the benefit of Buyer, whether now or hereafter in effect. In addition, all schematics, drawings, specifications and manuals, and all other technical and business information provided to Supplier by Buyer during the term of, or in connection with the negotiation, performance or enforcement of this Agreement shall be deemed included in the definition (subject to any applicable exclusions therefrom) of "Proprietary Information" for purposes of this Agreement.

Supplier may use Buyer's Proprietary Information only for the purpose of providing Items, parts or components of Items or services to Buyer. Supplier will not discuss and further will not use any of Buyer's Proprietary Information, directly or indirectly, for any other purpose including, without limitation, (a) developing, designing, manufacturing, refurbishing, selling or offering for sale parts or components of Items or parts, or providing services, for or to any party other than Buyer, and (b) assisting any third party, in any manner, to perform any of the activities described herein. All Proprietary Information shall (a) be clearly marked by Supplier as Buyer's property and segregated when not in use, and (b) be returned to Buyer promptly upon request.

Supplier acknowledges and agrees that Buyer would suffer irreparable harm for which monetary damages would be an inadequate remedy if Supplier were to breach its obligations under this provision. Supplier further acknowledges and agrees that equitable relief, including injunctive relief, would be appropriate to protect Buyer's rights and interests if such a breach were to arise, or threatened, or were asserted.

Supplier will use reasonable efforts to notify Buyer of any third party requests to engage in any of the activities prohibited by this Article.

3. Intellectual Property

Nothing in this Agreement shall be deemed to grant to Supplier any license or other right under any of Buyer's intellectual property (including, without limitation, Buyer's patents, copyrights, trade and service marks, trade secrets, and Proprietary Information) for Supplier's own benefit or to provide or offer Items to any party other than Buyer.

All Items supplied by Supplier and the sale of Items by Supplier and, as applicable, use thereof by Buyer or its subsequent purchasers or transferees will be free from liability for or claim by any persons of royalties, patent rights, copyright, trademark, mechanics' liens or other encumbrances, and trade secrets or confidential or proprietary intellectual property rights (collectively "rights" and "encumbrances"), and Supplier shall defend, indemnify and hold harmless Buyer against all claims, demands, costs and actions for actual or alleged infringements of patent, copyright, trademark or trade secret rights or other rights and encumbrances in the use, sale or re-sale of any Item which are valid at the time of or after the effective date of this Agreement; except to the extent that the infringement was unavoidably caused by Supplier's compliance with a detailed design furnished and required by Buyer or by Buyer's non-compliance with Supplier's prior written advice or warning of a possible and likely infringement

At the request of Buyer, Supplier will provide to Buyer the most current and complete specifications and drawings (the "Drawings") for each Item manufactured or produced for Buyer that is based on Buyer's design or Drawings showing the complete specifications and design for the Item as manufactured or produced by Supplier. All Drawings are the sole property of Buyer.

Upon termination of this Agreement, Supplier will return all Applied Proprietary Information and documentation to Buyer. Notwithstanding this requirement, Supplier may request Buyer approval to destroy any Proprietary Information of Buyer that has become obsolete or outdated (e.g., financial projections, forecasts, et cetera); provided that Supplier certifies to Buyer the destruction of such Proprietary Information.

4. Patent License

Supplier, as part consideration for this Agreement and without further cost to Buyer, hereby grants to Buyer an irrevocable, non-exclusive, paid-up world-wide right and license to make, have made, use, and sell any inventions derivative works, improvements, enhancements, or intellectual property (the "Inventions") made by or for Supplier in the performance of this Agreement. Supplier shall cause any employee, consultant, contractor or other persons who provides work for hire to Supplier to assign to Supplier for licensing as above of any such inventions. In addition, Buyer shall be entitled to license Buyer's customers to use such inventions during the operation of Buyer's products.

5. Press Releases/Public Disclosure Not Authorized

Supplier will not, without the prior written approval of Buyer, issue any press releases, advertising, publicity, public statements or in any way engage in any other form of public disclosure that indicates the terms of this Agreement, Buyer's relationship with Supplier or implies any endorsement by Buyer of Supplier or Supplier's products or services. Supplier further agrees not to use, without the prior written consent of Buyer, the name or trademarks (including, but not limited to Buyer's corporate symbol). Any requests under this Section must be made in writing and submitted to the parties designated by Buyer for the review and authorization of such matters.

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6. [**]

Supplier does not presently sell or offer any Item that is similar in form, fit or function to any Item to any third party for prices and terms and conditions of sale (including, without limitation, warranties, services or other benefits) (collectively, "Benefits") [**] to Buyer in this Agreement. If during the term of this Agreement, [**] for any Item than those available to Buyer under this Agreement (a "Third Party Arrangement"), Supplier will notify Buyer [**], Supplier will notify Buyer [**] and this Agreement will be deemed [**]. However, Buyer, at its option, may [**]. If any [**], Supplier will [**] that Buyer [**] from the effective date [**] shall be [**] of the effective date [**]. In no event shall Supplier quote prices to Buyer that would be unlawfully discriminatory under any applicable law.

7. Duty Drawback

Supplier will provide Buyer with U.S. Customs entry data, including information and receipts for duties paid directly or indirectly on all Items that are either imported or contain imported parts or components, that Buyer determines is necessary for Buyer to qualify for duty drawback ("Duty Drawback Information"). This data will be provided to Buyer within fifteen (15) days after each calendar quarter (or fiscal year quarter of Buyer, and be accompanied by a completed Certificate of Delivery of Imported Merchandise or Certificate of Manufacture and Delivery of Imported Merchandise (Customs Form 331) as promulgated pursuant to 19 CFR 191.

8. ODC Elimination

In the event Supplier's goods are manufactured with or contain Class I ODCs as defined under Section 602 of the Federal Clean Air Act (42 USE Section 7671 a) and implementing regulations, or if Supplier suspects that such a condition exists, Supplier shall notify Buyer prior to performing any work against this Agreement. Buyer reserves the right to: (a) terminate all Agreements for such goods without penalties, (b) to return any and all goods delivered which are found to contain or have been manufactured with Class I ODCs, or (c) to terminate any outstanding Agreements for such goods without penalties. Supplier shall reimburse Buyer all monies paid to Supplier and all additional costs incurred by Buyer in purchasing and returning such goods.

9. Compliance With Laws

Supplier warrants that no law, rule, or ordinance of the United States, a state, any other governmental agency, or that of any country has been violated in supplying the goods or services ordered herein.

10. Equal Employment Opportunity

Supplier represents and warrants that it is in compliance with Executive Agreement 11246, any amending or supplementing Executive Agreements, and implementing regulations unless exempted.

11. Applicable Law, Consent to Jurisdiction, Venue

This Agreement shall be governed by, be subject to, and be construed in accordance with the internal laws of the State of California, excluding conflicts of law rules. The parties agree that any suit arising out of this Agreement, for any claim or cause of action, whether in contract, in tort, statutory, at law or in equity, shall exclusively be brought in the United States District Court for the Northern District of California or in the Superior or Municipal Courts of Santa Clara County, California, or in the United States District Court for the Western District of Texas, Austin Division, or the Texas State District Courts of Travis County, Texas, provided that such court has jurisdiction over the subject matter of the action. Each party agrees that each of the named courts shall have personal jurisdiction over it and consents to such jurisdiction. Supplier further agrees that venue of any suit arising out of this Agreement is proper and appropriate in any of the courts identified above; Supplier consents to such venue therein as Buyer selects and to any transfer of venue that Buyer may seek to any of such courts, without respect to the initial forum.

With respect to transactions to which the 1980 United Nations Convention of Contracts for the International Sale of Goods would otherwise apply, the rights and obligations of the parties under the Agreement, including these terms and conditions, shall not be governed by the provisions of the 1980 United Nations Convention of Contracts for the International Sale of Goods; instead applicable laws of the State of California, including the Uniform Commercial Code as adopted therein (but exclusive of such 1980 United Nations Convention) shall govern.

12. Notice of Labor Disputes

Whenever an actual or potential labor dispute, or any government embargoes, regulatory or tribunal proceedings relating thereto is delaying or threatens to delay the timely performance of this Agreement, Supplier will immediately notify Buyer of such dispute and furnish all relevant details regardless of whether said dispute arose directly, or indirectly, as a result of an actual or potential dispute within the Supplier's subtier supply base or its own operations.

13. Taxes

Unless otherwise specified, the agreed prices include all applicable federal, state, and local taxes. All such taxes shall be stated separately on Supplier's invoice.

14. Responsibility for Goods; Risk of Loss

Notwithstanding any prior inspections, Supplier shall bear all risks of loss, damage, or destruction to the Items called for hereunder until final acceptance by Buyer at Buyer's facility(s) delivery destination specified in the Agreement, which risk of loss shall not be altered by statement of any at F.O.B. point here. These Supplier responsibilities remain with respect to any Items rejected by Buyer provided, however, that in either case, Buyer shall be responsible for any loss occasioned by the gross negligence of its employees acting within the scope of their employment. Items are not accepted by reason of any preliminary inspection or test, at any location.

15. Insurance

A. Supplier shall maintain (i) comprehensive general liability insurance covering bodily injury, property damage, contractual liability, products liability and completed operations, (ii) Workers Compensation and employer's liability insurance, and (iii) auto

insurance, in such amounts as are necessary to insure against the risks to Supplier's operations.

- B. Minimally, Supplier will obtain and keep in force, insurance of the types and in the amounts set forth below:

Insurance -----	Minimum Limits of Liability -----
Worker's Compensation	Statutory
Employer's Liability	\$1,000,000
Automobile Liability	\$1,000,000 per occurrence
Comprehensive General Liability (including Products Liability)	\$1,000,000 per occurrence
Umbrella/Excess Liability	\$1,000,000 per occurrence

All policies must be primary and non-contributing, and shall include Buyer as an additional insured. Supplier also waives all rights of subrogation. Supplier will also require and verify that each of its subcontractors carry at least the same insurance coverage and minimum limits or insurance as Supplier carries under this Agreement. Supplier shall notify Buyer at least thirty (30) days prior to the cancellation of or implementation of any material change in the foregoing policy coverage that would affect the Buyer's interests. Upon request, Supplier shall furnish to Buyer as evidence of insurance a certificate of insurance stating that the coverage would not be canceled or materially altered without thirty (30) days prior notice to the Buyer.

16. Change of Control

Supplier will notify Buyer immediately of any change of control or change (including any change in person or persons with power to direct or cause the direction of management or policies of Seller) or any change (35% or more) in the ownership of Supplier, or of any materially adverse change in Supplier's financial condition or in the operation of Supplier's business, including, but not limited to, Supplier's net worth, assets, production capacity, properties, obligations or liabilities (fixed or contingent) (collectively, a "change of control").

17. Assignments

- A. No right or obligation under this Agreement shall be assigned by Supplier without the prior written consent of Buyer, and any purported assignment without such consent shall be void.
- B. Buyer may assign this Agreement in whole or part at any time if such assignment is considered necessary by Buyer in connection with a sale of Buyer's assets, or a transfer of any of its contracts or obligations under such contracts, or a transfer to a third party of manufacturing activities previously conducted by Buyer.

18. Gratuities

Supplier warrants that it has not offered or given and will not offer or give any gratuity to induce this or any other agreement. Upon Buyer's written request, an officer of Supplier shall certify in writing that Supplier has complied with and continues to comply with this Section. Any breach of this warranty shall be a material breach of each and every agreement and contract between Buyer and Supplier.

19. Insolvency

The insolvency of Supplier, the filing of a voluntary or involuntary petition for relief by or against Supplier under any bankruptcy, insolvency or like law, or the making of an assignment for the benefit of creditors, by Supplier, shall be a material breach hereof and default.

20. Waiver

In the event Buyer fails to insist on performance of any of the terms and conditions, or fails to exercise any of its rights or privileges hereunder, such failure shall not constitute a waiver of such terms, conditions, rights or privileges.

21. Disclaimer and Limitation of Liability

In no event shall Buyer be liable for any special, indirect, incidental, consequential, or contingent damages (the foregoing being collectively called "Damages"), whether or not Buyer has been advised of the possibility of such damages, for any reason. Buyer excludes and Supplier waives any liability of Buyer for any "Damages", as so defined.

22. Indemnity by Supplier

Supplier shall defend, indemnify and hold harmless Buyer from and against, and shall solely and exclusively bear and pay, any and all claims, suits, losses, penalties, damages (whether actual, punitive, consequential or otherwise) and all liabilities and the associated costs and expenses (including attorney's fees, expert's fees, and costs of investigation (all of the foregoing being collectively called "Indemnified Liabilities"), caused in whole or in part by Supplier's breach of any term or provision of this Agreement, or in whole or in any part by any negligent, grossly negligent or intentional acts, errors or omissions by Supplier, its employees, officers, agents or representatives in the performance of this Agreement or that are for, that are in the nature of, or that arise under, strict liability or products liability with respect to or in connection with the Items. The indemnity by Supplier in favor of Buyer shall extend to Buyer, its officers, directors, agents, and representatives and shall include and is intended to include Indemnified Liabilities which arise from or are caused by, in whole or in part, the concurrent negligence, including negligence or gross negligence of Supplier but shall not extend to Indemnified Liabilities to the extent such are caused by the negligence or willful misconduct of Buyer. Supplier assumes no liability under this warranty for system failures, personal injury or property damage resulting from improper operation, improper maintenance, abuse or modifications from the original product specifications or configuration on the part of Buyer, its customers, agents and other third parties.

23. Force Majeure

A failure by either party to perform due to causes beyond the control and without the fault or negligence of the party is deemed excusable during the period in which the cause of the failure persists. Such causes may include, but not be limited to, acts of God or the public

enemy, acts of the Government in either sovereign or contractual capacity, fires, floods, epidemics, strikes, freight embargoes and unusually severe weather. If the failure to perform is caused by the default of a subcontractor, and such default arises out of causes beyond the control of both the Supplier and subcontractor, and without the fault or negligence of either of them, the Supplier will not be liable for any excess cost for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Supplier to meet the required delivery releases. When Supplier becomes aware of any potential force majeure condition as described in this Agreement, Supplier shall immediately notify Buyer of the condition and provide relevant details.

24. Changes

Buyer may at anytime, by a written order and without notice to sureties or assignees, suspend performance hereunder, increase or decrease the Agreement quantities, or make changes within the general scope of this Agreement in any one or more of the following:

- (a) applicable drawings, designs, or specification;
- (b) method of shipment or packing, and/or;
- (c) place and date of delivery;
- (d) place and date of inspection or acceptance.

If any such change causes an increase or decrease in the cost of or time required for performance of the Agreement, an equitable adjustment shall be made in the Agreement price or delivery schedule, or both, and the Agreement shall be modified in writing accordingly. No claim by Supplier for adjustment hereunder shall be valid unless asserted within thirty (30) days from the date of receipt by Supplier of the notification of change, provided, however, that such period may be extended upon the written approval of Buyer. However, nothing in this clause shall excuse Supplier from proceeding with the Agreement as changed or amended.

25. Termination for Default

- (a) Buyer may, by notice, terminate this Agreement in whole or in part (i) if Supplier fails to deliver goods or services on agreed delivery schedules or any installments thereof strictly within the time specified; (ii) if Supplier fails to replace or correct defective goods or services; (iii) if Supplier fails to comply strictly with any provision of, or repudiates this agreement, or (iv) Supplier defaults under, or any event or condition stated to be a default occurs under, any provision of the Agreement, including these Applied Materials Standard Terms and Conditions of Purchase.
- (b) In the event of termination pursuant to this Section:
 - (i) Supplier shall continue to supply any portion of the Items contracted for under this Agreement that are not terminated;
 - (ii) Supplier shall be liable for additional costs, if any, for the purchase of such similar goods and services to cover such default;
 - (iii) At Buyer's request Supplier will transfer title and deliver to Buyer (1) any completed goods, (2) any partially completed goods and (3) all unique

materials. Prices for partially completed goods and unique materials so accepted shall be negotiated. However, such prices shall not exceed the Agreement price per item.

- (c) Buyer's rights and remedies herein or otherwise stated in this Agreement, any Purchase Order, Comprehensive Supplier Agreement or Basic Supplier Agreement are in addition to and shall not limit or preclude resort to any other rights and remedies provided by law or in equity. Termination under this Agreement shall constitute "cancellation" under the Uniform Commercial Code.

26. Termination for convenience

- (a) Buyer may terminate, for convenience, work under this Agreement in whole or in part, at any time by written or electronic notice. Upon any such termination Supplier shall, to the extent and at the time specified by Buyer, stop all work on this Agreement, place no further orders hereunder, terminate work outstanding hereunder, assign to Buyer all Supplier's interests under terminated subcontracts and Agreements, settle all claims thereunder after obtaining Buyer's approval, protect all property in which Buyer has or may acquire an interest, and transfer title and make delivery to Buyer of all Items, materials, work in process, or other things held or acquired by Supplier in connection with the terminated portion of this Agreement. Supplier shall proceed promptly to comply with Buyer's directions respecting each of the foregoing without awaiting settlement or payment of its termination claim.
- (b) Within six (6) months from such termination, Supplier may submit to Buyer its written claim for termination charges, in the form and with supporting data and detail prescribed by Buyer. Failure to submit such claim within the prescribed time frame and with such items shall constitute a waiver of all claims and a release of all Buyer's liability arising out of such termination.
- (c) The parties may agree upon the amount to be paid Supplier for such termination. If they fail to agree, Buyer shall pay Supplier the amount due for Items delivered prior to termination and in addition thereto but without duplication, shall pay the following amounts:
- (i) The contract price for all Items completed in accordance with this Agreement and not previously paid for;
- (ii) The actual costs for work in process incurred by Supplier which are properly allocable or apportionable under Generally Accepted Accounting Principles (GAAP) to the terminated portion of this Agreement and a sum constituting a fair and reasonable profit on such costs. The Supplier agrees to keep true, complete, and accurate records in compliance with GAAP for the purpose of determining allocability of Suppliers costs under this agreement. Such records shall contain sufficient detail to permit a determination of the accuracy of the costs; Independent nationally recognized accountants (the "Auditor") designated by Buyer and reasonably acceptable to Supplier shall have the right, at Buyer's expense and upon reasonable notice, to conduct audits of all of the relevant books and records of Supplier in order to determine the accuracy and allocability of costs submitted by Supplier to Buyer under this provision.

- (iii) The reasonable costs of Supplier in making settlement hereunder and in protecting Items to which Buyer has or may acquire an interest.
- (d) Payments made under subparagraphs (c) (i) and (c) (ii) shall not exceed the aggregate price specified in this Agreement, less payment otherwise made or to be made. Buyer shall have no obligation to pay for Items lost, damaged, stolen or destroyed prior to delivery to Buyer.
- (e) The foregoing paragraphs (a) to (d) inclusive, shall be applicable only to a termination for Buyer's convenience and shall not affect or impair any right of Buyer to terminate this Agreement for Supplier's default in the performance hereof.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

ATTACHMENT 1A
FIXED PRICING

PART NO -----	PART DESCRIPTION -----	UNIT PRICE -----
0010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	\$ [**]
0010-13150	ASSY, IHC CAMBER D \$ SHC (20SCCM)	\$ [**]
0010-13152	ASSY, IHC CHAMBERD D & SHC (50 SCCM)	\$ [**]
0010-35404	IHC ASSY, 5200 MCV D CENTURA	\$ [**]
0010-35650	ASSY, INDEPENDENT HELIUM CONTROL	\$ [**]
0010-40240	IHC ASSY, 5300 W/RSTR	\$ [**]
0010-76952	ASSY, IHC CHAMBER A, B, AND C, (50 SCCM)	\$ [**]
0190-18037	ASSEMBLY, DUAL IHC	\$ [**]
0224-01921	XDCR, MKS, 0-100 PSI 1/4FVCR 12-32VDC 15P-D 5RA	\$ [**]
0224-42759	XDUCER, PRESSUER -MKS 850 5RA G223	\$ [**]
0225-10104	1 TORR VCR MONOMETER	\$ [**]
0225-10105	100 TR VCR MONOMETER	\$ [**]
0225-33295	XDCR, PRESS 0-10TORR, 1/2 VCR	\$ [**]
0226-09052	45D BARATRON W/VCR FTG, 10 TORR 10948-1	\$ [**]
0226-10754	EXDCR PRESSURE 0-10TORR, 1/2 VCR 0222-	\$ [**]
0226-40111	TRANSDUCER, THRU TUBE, MKS TYPE 852, F-F, BENDIX	\$ [**]
0226-41024	CABLE METER XDCR 0-100PSI 15PIN-D 27IN.L	\$ [**]
0226-41187	XDCR PRESS 0-100 PSIG 1/4 VCR F/F 13-32VDC 10RA	\$ [**]
0226-41188	METER XDCR 3-1/2 LCD 0-100 PSIG 13-32VDC 15 PIN-D	\$ [**]
05-88029-00	CABLE SHLD W/RT ANG CON	\$ [**]

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ATTACHMENT 1A
FIXED PRICING

PART NO -----	PART DESCRIPTION -----	UNIT PRICE -----
0620-01022	CABLE ASSY 12 COND 22AWG SHIELDED MUTLI-COLOR	\$ [**]
0620-02563	CABLE ASSY SENSOR HEAD - BARATRON	\$ [**]
0690-01954	BRKT SENSOR HEAD MTG	\$ [**]
1040-01092	METER XDCR 3-1/2LCD 0-60PSI 12-32VCD 15PIN-D	\$ [**]
1350-01005	XDCR PRESS 1TORR 8VCO-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01011	XDCR PRESS 0-10 TORR VCO D CONNECTOR	\$ [**]
1350-01016	XDCR PRESS 10TORR 8VCO-F +/-15VDC @ 250 MA 45C	\$ [**]
1350-01019	XDCR PRESS 0-10TORR 8 VCR WIRE STRIP CONN SP	\$ [**]
1350-01021	XDCR PRESS 100MTORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01025	XDCR PRESS 100TORR 8VCR-F +/-14VDC @ 250MA 45C	\$ [**]
1350-01035	XDCR PRESS 0-100 TORR VCR D CONN	\$ [**]
1350-01036	XDCR PRESS 0-1 TORR VCR D CONNECTOR	\$ [**]
1350-01045	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01051	XDCR PRESS BARATRON, HEATED 10 TORR	\$ [**]
1350-01052	XDCR PRESS BARATRON, HEATED 100 TORR	\$ [**]
1350-01055	XDCR PRESS 10 TORR CAJON 8 VCR FEMALE FTG .12%	\$ [**]
1350-01072	XDCR PRESS 1000TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]

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ATTACHMENT 1A
FIXED PRICING

PART NO -----	PART DESCRIPTION -----	UNIT PRICE -----
1350-01075	XDCR PRESS 0-100TORR SHRT 8FVCR TERM-STRIP +/-15V	\$ [**]
1350-01078	XDCR PRESS 0-250PSIA 1/4VCR-M/M 0-10VDC 6'PIGTAIL	\$ [**]
1350-01079	XDCR PRESS 2TORR 8VCR-F +/-15VDC @ 250MA 45DED-C	\$ [**]
1350-01083	XDCRPRESS 0-60PSIA 1/4VCR-M 12-32VDC 50DEGC 10RA	\$ [**]
1350-01086	XDCR PRESS 0-1000TORR 1/4VCR-M 12-32VDC 50C 10RA	\$ [**]
1350-01089	XDCR PRESS 100MTORR 1/8FVCR .25%ACC 100C 15-PDSUB	\$ [**]
1350-01092	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45DEG-C 15P-DSUB	\$ [**]
1350-01098	XDCR PRESS 1TOR 1/2FVCR .25%ACC 100C 150-DSUB	\$ [**]
1350-01101	XDCR PRESS 2-100TORR 1/2VCR-F .5%ACC +/-15VDC	\$ [**]
1350-01102	XDCR PRESS 10TORR 8FVCR DCONN +/-15VDC@35MA .93"L	\$ [**]
1350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2"VCO	\$ [**]
1350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	\$ [**]
1400-01217	SNSR HEAD 1 TORR 1/4VCR W/ THERMAL BLANKER	\$ [**]
3030-01050	MFC 1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	\$ [**]

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ATTACHMENT 1A

FIXED PRICING

PART NO -----	PART DESCRIPTION -----	UNIT PRICE -----
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9P-DSUB SST	\$ [**]
3870-01463	VALVE EXHAUST THROTTLE 1 3/8IDXKF40 W/KEMREZ ORING	\$ [**]
3870-02311	VALVE BUTTERFLY THROTTLE W/KF 40 FLANGE	\$ [**]

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ATTACHMENT 1A
AUSTIN BUSROUTE

PARTNO	PARTDESC	UNITPRICE
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0010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	\$ [**]
0010-13150	ASSY, IHC CHAMBER D \$ SHC (20SCCM)	\$ [**]
0010-13152	ASSY, IHC CHAMBER D & SHC (50SCCM)	\$ [**]
0010-35404	IHC ASSY, 5200 MCVD CENTURA	\$ [**]
0010-35650	ASSY, INDEPENDENT HELIUM CONTROL	\$ [**]
0010-37643	ASSY, INDEPENDENT HELIUM CONTROL, DPS WOUT/FILTER	\$ [**]
0010-40240	ICH ASSY, 5300 W/RSTR	\$ [**]
0010-76952	ASSY, IHC CHAMBER A, B, AND C, (50 SCCM)	\$ [**]
0190-18037	ASSEMBLY, DUAL IHC	\$ [**]
0620-02211	CABLE ASSY TRANSDUCER 27"LG 15P-D CONN	\$ [**]
1040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13032VDC 15PIN-D	\$ [**]
1350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTION	\$ [**]
1350-01025	XDCR PRESS 100TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01026	XDCR PRESS 1TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01027	XDCR PRESS 0-1000 TORR W/FEM #8 VCO D CONN	\$ [**]
1350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	\$ [**]
1350-01039	XDCR 0-10 TORR CAP MANO 1/2 VCR D-CONN	\$ [**]
1350-01045	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	\$ [**]

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ATTACHMENT 1A
AUSTIN BUSROUTE

PARTNO -----	PARTDESC -----	UNITPRICE -----
1350-01091	XDCR PRESS 100TORR 1/2FVCR .12%ACC 45C 15P-DSUB	\$ [**]
1350-01110	XDCR PRESSURE 100TORR 1/2FVCR 15P-DSUB W/OVERPRES	\$ [**]
1350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2" VCO	\$ [**]
1350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	\$ [**]
1350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13-32VDC 10RA	\$ [**]
1350-01138	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	\$ [**]
1350-01141	XDCR PRESS 0-100TORR 0-10VDC OUT 1/4VCR 1% 9PD	\$ [**]
1350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	\$ [**]
1350-01212	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45C HORIZ 15P-D	\$ [**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	\$ [**]
3030-02284	MFC 1159 2SLM AR 1/4VCR VITON N/C 15P-DSUB SST	\$ [**]
3870-02373	VALVE EXH THROT 1-3/9ID X KF40 W/CHMRZ ORING 15P-D	\$ [**]
3920-01278	CNTRL PRESS 640 SER 10T 1/4VCR VITON CAJON MALE	\$ [**]

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ATTACHMENT 1A
SANTA CLARA BUSROUTE

PARTNO -----	PARTDESC -----	UNITPRICE -----
0010-37643	ASSY, INDEPENDENT HELIUM CONTROL, DPS WOUT/FILTER	\$ [**]
0620-02211	CABLE ASSY TRANSDUCER 27" LG 15P-D CONN	\$ [**]
0720-03620	CONN ADPTR 15P-D TO 9P-HEX 1FT CABLE	\$ [**]
1040-01012	METER SENSOR 0-10VDC 50/60HZMULTI-RANGE	\$ [**]
1040-01092	METER XDCR 3-1/2LCD 0-60PSI 12-32VDC 15PIN-D	\$ [**]
1040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13-32VDC 15PIN-D	\$ [**]
1270-01803	SW PRESS FLOWTHRU -25TORR GUAGE SP 1/4MVCR 9P-D	\$ [**]
1350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTOR	\$ [**]
1350-01026	XDCR PRESS 1TORR 8VCR-F +/-15VDC @ 250MA 45C	\$ [**]
1350-01027	SDCR PRESS 0-1000 TORR W/FEM #8VCO D CONN	\$ [**]
1350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	\$ [**]
1350-01035	XDCR PRESS 0-100 TORR VCR D CONN	\$ [**]
1350-01039	XDCR 0-10 TORR CAP MANO 1/2 VCR D-CONNN	\$ [**]
1350-01054	XDCR PRESS 1000MMHG 1/8FVCR .12%ACC 45C W/SET-PT	\$ [**]
1350-01055	XDCR PRESS 10 TORR CAJON 8 VCR FEMALE FTG .12%	\$ [**]
1350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	\$ [**]
1350-01068	XDCR PRESS 1--,TPRR 45C 15VDC 9VCR FE, FTG HORIZT	\$ [**]

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ATTACHMENT 1A
SANTA CLARA BUSROUTE

PARTNO -----	PARTDESC -----	UNITPRICE -----
1350-01090	XDCR PRESS 10TORR 1/8FVCR .25%ACC 100C 15P-DSUB	\$ [**]
1350-01093	XDCR PRESS 1000TORR 1/4FVCR +/-12-32V 0-10VDC 9PD	\$ [**]
1350-01096	XDCR PRESS 10TORR 1/4VCR-F +/-14VDC 15P-D SET-PT	\$ [**]
1350-01097	XDCR PRESS 10-100TORR 1/4VCR-F +/-15VDC 15P-D	\$ [**]
1350-01103	XDCR PRESS 0-60PSIA 1/4VCR-F/F 15D 12-32VDC 10RA	\$ [**]
1350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	\$ [**]
1350-01131	XDCRPRESS 1000 TORR 1/4VCR 1% 9PIN DSUB	\$ [**]
1350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13032VDC 10RA	\$ [**]
1350-0113893	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	\$ [**]
1350-01140	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 35MA 50C	\$ [**]
1350-01163	XDCR PRESS 10-100 TORR 1/4VCR-F +/-15VDC	\$ [**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	\$ [**]
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9P-DSUB SST	\$ [**]
3870-01470	VALVE THROTTLE TVC 100MM SMART NW50 W/CNTRL HITEMP	\$ [**]
3870-01512	VALVE THROTTLE TVC 50MM SMART NW50 W/CNTRL HI-TEMP	\$ [**]

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ATTACHMENT 1A
SANTA CLARA BUSROUTE

PARTNO -----	PARTDESC -----	UNITPRICE -----
3870-01817	VALVE EXH THRTL NW160 8.9PDX5.879ID 2CTR-BORE-HOL	\$ [**]
3920-01278	CNTRL PRESS 640 SER 107 1/4VCR VITON CAJON MALE	\$ [**]

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Securities and Exchange Commission. Asterisks denote omissions.

ATTACHMENT 1B

SERVICE AND REPAIR

AMAT PARTNO	ITEM DESCRIPTION	MKS PARTNO	CAL PRICE	REBUILD PRICE
010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	121002-G1	[**]	[**]
010-13150	ASSY, IHC CHAMBER D \$ SHC (20SCCM)	121002-G2	[**]	[**]
01110-13152	ASSY, IHC CHAMBER D & SHC (50 SCCM)	1210-02-G4	[**]	[**]
010-35404	IHC ASSY, 5200 MCVD CENTURA	202407	[**]	[**]
010-35650	ASSY, INDEPENDENT HELIUM CONTROL	202258	[**]	[**]
010-37643	ASSY, INDEPENDENT HELIUM CONTROL, DPS WOUT/FILTER	120657-G2	[**]	[**]
010-40240	IHC ASSY, 5300 W/RSTR	190094-G1	[**]	[**]
010-76952	ASSY, IHC CHAMBER A, B, AND C 50 SCCM)	121002-G3	[**]	[**]
190-18037	ASSEMBLY, DUAL IHC	202406	[**]	[**]
224-01921	XDCR, MKS, 0-100 PSI 1/4FVCR 12-32VDC 15P-5RA	852B-13384	[**]	[**]
224-42759	XDUCER, PRESSURE -MKS 850 5RA G223	850A-12951	[**]	[**]
225-10104	1 TORR VCR MONOMETER	127A-00001B	[**]	[**]
225-10105	100 TR VCR MONOMETER	127A-00100B	[**]	[**]
225-33295	XDCR, PRESS 0-10TO44,1/2VCR	122BA-00010BB	[**]	[**]
226-09052	45D BARATRON W/VCR FTG, 10 TORR 10948-1	127BA-00010BB	[**]	[**]
226-10754	EXDCR PRESSURE 0-10TORR, 1/2VC 0222-	127A-11356	[**]	[**]
226-40111	TRANSDUCER, THRU TUBE, MKS TYPE 852, F-F, BENDIX	852B61PCJ4GH	[**]	[**]
226-41024	CABLE METER XDCR 0-100PSI 15PIN-D27IN.L	CB852-5-2.5	[**]	[**]

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

226-41187	XDCR PRESS 0-100 PSIG 1/4 VCR F/F 13-32VDC 10RA	842B12PCJ2GC	[**]	[**]
226-41188	METER XDCR 3-1/2 LCD 0-100 PSIG 13-32VDC 15 PIN-D	LDM-A12PB2CC1	[**]	[**]
6-88029-00	CABLE SHLD W/RT ANG CON	CB036-11075	[**]	[**]
620-01022	CABLE ASSY 12 COND 22AWG SHIELDED MULTI-COLOR	CB036-11016	[**]	[**]
620-02211	CABLE ASSY TRANSDUCER 27"LG 15P-D CONN	CB852-5-2.5	[**]	[**]
620-02563	CABLE ASSY SENSOR HEAD - BARATRON	CB036-11016	[**]	[**]
690-01954	BRKT SENSOR HEAD MTG		[**]	[**]
720-03620	CONN ADPTR 15P-D TO 9P-HEX 1FT CABLE	CB6551-31-1	[**]	[**]
040-01012	METER SENSOR 0-10VDC 50/60HZMULTI-RANGE	170M-6C	[**]	[**]
040-01092	METER XDCR 3-1/2CD 0-60PSI 12-32VDC 15PIN-D	LDM-A61PA2CC1	[**]	[**]
040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13-32VDC 15PIN-D	LDM-A12PA2CC1	[**]	[**]
270-01803	SW PRESS FLOWTHRU -25 TORR GAUGE SP 1/4MVCR 9P-D	42A13DCH2AA025	[**]	[**]
350-01005	XDCR PRESS 1TORR 8VCO-F +/-15VDC @ 250MA 45C	127A-00001E	[**]	[**]
350-01011	XDCR PRESS 0-10 TORR VCO D CONNECTOR	122BA-00010EB	[**]	[**]
350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTOR	122BA-0010EB	[**]	[**]
350-01016	XDCR PRESS 10TORR 8VCO-F +/-15VDC @ 250MA 45C	127AA-00010E	[**]	[**]
350-01019	XDCR PRESS 0-10 TORR 8 VCR WIRE STRIP CONN SP	122A-116063	[**]	[**]
350-01021	XDCR PRESS 100MTORR 8VCR-F +/-15VDC @ 250MA 45C	127AA-000.1B	[**]	[**]
350-01025	XDCR PRESS 100TORR 8VCR-F +/-15VDC @ 250MA 45C	127A-00100B	[**]	[**]

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

350-01026	XDCR PRESS 1TORR 8VCR-F +/- 15VDC @ 250MA 45C	127A-00001B	[**]	[**]
350-01027	XDCR PRESS 0-1000 TORR W/FEM #8 VCO D CONN	122BA-0100EB	[**]	[**]
350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	124AA010000BB	[**]	[**]
350-01035	XDCR PRESS 0-100 TORR VCR D CONN	122BA-00100BB	[**]	[**]
350-01036	XDCR PRESS 0-1 TORR VCR D CONNECTOR	122BA-00001BB	[**]	[**]
350-01039	XDCR 0-10 TORR CAP MANO1/2VCR D-CONN	122B-11411	[**]	[**]
350-01045	XDCR PRESS 10TORR 8VCR-F +/-15 VDC @ 250MA 45C	127A-00010B	[**]	[**]
350-01051	XDCR PRESS BARATRON, HEATED 10 TORR	621C11TBFHC	[**]	[**]
350-01052	XDCR PRESS BARATRON, HEATED 1000 TORR	621C13TBFH	[**]	[**]
350-01054	XDCR PRESS 1000MMHG 1/8FVCR.12%ACC 45C W/SET-PT	624A13TBC	[**]	[**]
350-01055	XDCR 10 TORR CAJON 8 VCR FEMALE FTC.12%	627A11TBC	[**]	[**]
350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	627A.1TBD	[**]	[**]
350-01068	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG HORIZT	627A-11985	[**]	[**]
350-01072	XDCR PRESS 100TORR 8VCR-F +/-15VDC @ 250MA 45C	127AA-0100B	[**]	[**]
350-01075	XDCR PRESS 0-100TORR SHRT 8FVCR TERM-STRIP +/-15V	122A-11064	[**]	[**]
350-01078	XDCR PRESS 0-250PSIA 1/4VCR-M/M 0-10VDC 6"PIGTAIL		[**]	[**]
350-01079	XDCR PRESS 2TORR 8VCR-F +/-15VDC @ 250MA 45DED-C	127AA-00002B	[**]	[**]
350-01083	XDCR PRESS 0-60PSIA 1/4VCR-M 12-32VDC 50DECG 10RA	852B61PCA2NC	[**]	[**]
350-01086	XDCR PRESS 0-1000TORR 1/4 VCR-M12-32VDC 50C 10RA	852BA13TCA2NC	[**]	[**]

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Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

350-01089	XDCR PRESS 100MTORR 1/8FVCR .25%ACC 100C 15P-DSUB	628A.1TBE	[**]	[**]
350-01090	XDCR PRESS 10TORR 1/8FVCR .25%ACC 100C 15P-DSUB	628A12TBC	[**]	[**]
350-01091	XDCR PRESS 100TORR 1/2FVCR .12%ACC 45C 15P-DSUB	627A12TBC	[**]	[**]
350-01092	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45DEG-C 15P-DSUB	627A01TBC	[**]	[**]
350-01093	XDCR PRESS 1000TORR 1/4FVCR +/-12-32V 0-10VDC 9PD	751A-12772	[**]	[**]
350-01096	XDCR PRESS 10TORR 1/4VCR-F +/-15VDC 15P-D SET-PT	R750B11TCD2GC	[**]	[**]
350-01097	XDCR PRESS 10-100TORR 1/RVCR-F +/-15VDC 15P-D	CV7527A-01	[**]	[**]
350-01098	XDCR PRESS 1TOR 1/2FVCR .25%ACC 100C 15P-DSUB	628A01TBE	[**]	[**]
350-01101	XDCR PRESS 2-100TORR 1/2VCR-F .5%ACC +/-15VDC	124AA-00100BB	[**]	[**]
350-01102	XDCR PRESS 10TORR 8FVCR DCONN +/-15VDC@35MA .93"L	122B-12773	[**]	[**]
350-01103	XDCR PRESS 0-60PSIA 1/4VCR-F/F 15D 12-32VDC 15RA	852B61PCJ2GC	[**]	[**]
350-01110	XDCR PRESSURE 100TORR 1/2FVCR 15P-DSUB W/OVERPRE	624A-13092	[**]	[**]
350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2"VCO	627A-13267	[**]	[**]
350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	628A-13114	[**]	[**]
350-01131	XDCRPRESS 1000 TORR 1/4VCR 1% SPIN DSUB	750B13TCD2GA	[**]	[**]
350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13-32VDC 10RA	852B12TCJ2GC	[**]	[**]
350-01138	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	625A-13127	[**]	[**]
350-01140	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 35MA 50C	626A11TBE	[**]	[**]

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

350-01141	XDCR PRESS 0-100TORR 0-10VDC OUT 1/4VCR 1% 9PD	750B12TCD2GA	[**]	[**]
350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	127A-13608	[**]	[**]
350-01163	XDCR PRESS 10-100 TORR 1/4VCR-F +/-15VDC	CV7627A-05	[**]	[**]
350-01212	XDCR PRESS 1TORR 1/2FVCR .125ACC 45C HORIZ 15P-D	627A-14974	[**]	[**]
400-01217	SNSR HEAD 1 TORR 1/4VCR W/THERMAL BLANKER		[**]	[**]
3030-01050	MFC 1159 50SCMM HE 1/4VCR VITON N/C 15P-DSUB SST	1159B-00059SV-S	[**]	[**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15[-DSUB SST	1159B-00050RV-sp	[**]	[**]
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9[-DSUB SST	1159B-00020RV-S	[**]	[**]
3030-02284	MFC 1159 2SLM AR 1/4VCR VITON N/C 15P-DSUB SST	1159B-02000RV-S	[**]	[**]
3870-01463	VALVE EXHAUST THROTTLE 1 3/8DXKF40 W/KEMREZ ORING	253B-11203	[**]	[**]
3870-01470	VALVE THROTTLE TVC 100MM SMART NW50 W/CINTRL HITEM	153C-1-100-2	[**]	[**]
3870-01512	VALVE THROTTLE TVC 50MM SMART NW50 W/CNTRL HI-TEM	153C-2-50--2	[**]	[**]
3870-01817	VALVE EXH THRTL NW160 8.9ODX5.87691D 2CTR-BORE-HOL	653B-13071	[**]	[**]
3870-02311	VALVE BUTTERFLY THROTTLE W/KF 40 FLANGE	253B-02311	[**]	[**]
3870-02373	VALVE EXH THROT 1-3/81D X KF40 W/CHMRZ ORIGN 15P-D	253B-11203	[**]	[**]
3920-01278	CNTRL PRESS 640 SER 10T 1/4VCR VITON CAJON MALE	640A12TW1V12-S	[**]	[**]

ATTACHMENT 2

APPLIED MATERIALS, Inc.

CORPORATE FISCAL CALENDAR 1998

WK	M	T	W	T	F	S	S	WK	M	T	W	T	F	S	S	WK
1ST QUARTER								3RD QUARTER								
NOVEMBER								MAY								
1	27	28	29	30	31	1	2	27	28	29	30	1	2	3	27	
2	3	4	5	6	7	8	9	4	5	6	7	8	9	10	28	
3	10	11	12	13	14	15	16	11	12	13	14	15	16	17	29	
4	17	18	19	20	21	22	23	18	19	20	21	22	23	24	30	
5	24	25	26	[27]	[28]	29	30	JUNE								
DECEMBER								JUNE								
6	1	2	3	4	5	6	7	[25]	26	27	28	29	30	31	31	
7	8	9	10	11	12	13	14	1	2	3	4	5	6	7	32	
8	15	16	17	18	19	20	21	8	9	10	11	12	13	14	33	
9	22	23	24	[25]	/26/	27	28	15	16	17	18	19	20	21	34	
JANUARY								JULY								
10	/29/	/30/	/31/	[1]	/2/	3	4	22	23	24	25	26	27	28	35	
11	5	6	7	8	9	10	11	29	30	1	2	[3]	4	5	36	
12	12	13	14	15	16	17	18	6	7	8	9	10	11	12	37	
13	19	20	21	22	23	24	25	13	14	15	16	17	18	19	38	
2ND QUARTER								4TH QUARTER								
FEBRUARY								AUGUST								
14	26	27	28	29	30	31	1	27	28	29	30	31	1	2	40	
15	2	3	4	5	6	7	8	3	4	5	6	7	8	9	41	
16	9	10	11	12	13	14	15	10	11	12	13	14	15	16	42	
17	[16]	17	18	19	20	21	22	17	18	19	20	21	22	23	43	
MARCH								SEPTEMBER								
18	23	24	25	26	27	28	1	24	25	26	27	28	29	30	44	
19	2	3	4	5	6	7	8	31	1	2	3	4	5	6	45	
20	9	10	11	12	13	14	15	[7]	8	9	10	11	12	13	46	
21	16	17	18	19	20	21	22	14	15	16	17	18	19	20	47	
APRIL								OCTOBER								
22	23	24	25	26	27	28	29	21	22	23	24	25	26	27	48	
23	30	31	1	2	3	4	5	28	29	30	1	2	3	4	49	
24	6	7	8	9	10	11	12	5	6	7	8	9	10	11	50	
25	13	14	15	16	17	18	19	12	13	14	15	16	17	18	51	
26	20	21	22	23	24	25	26	19	20	21	22	23	24	25	52	

[] = HOLIDAYS
(US ONLY)

/ / = SHUTDOWN
(US ONLY)

| | = HOLIDAYS
(AMJ ONLY)

APPLIED MATERIALS CONFIDENTIAL

ATTACHMENT 3

DELIVERY MECHANICS

TYPE 1 PURCHASE ORDER (P.O) RELEASE

Releases against this Agreement will be made by issuing purchase orders. Delivery dates shall refer to dates of receipt at Buyer's facility. Seller will not deliver items more than five (5) calendar days in advance of Buyer's required delivery dates without prior approval.

TYPE 5 JUST-IN-TIME/BUS ROUTE MECHANICS

- A. This Agreement authorizes Seller to create and maintain inventory, subject to the terms of this Agreement, for the Bus Route Program in accordance to and subject to Article 5 of the Master Purchase Order and Sales Agreement. Items to be included in the Bus Route Program are found in Attachment 1 of the Master Purchase Order and Sales Agreement.
- B. Buyer will notify Seller of requirements via facsimile or EDI transmission. (Requirements may be released twice a day, seven days week, no later than 6:00 a.m. and 3:00 p.m.).
- C. Seller will attach all "pick cards" to the requested material prior to shipment for easy identification by Buyer.
- D. Seller shall have all items ready for pick up by Buyer's truck within three hours of receipt of requirements. Or. Seller can deliver parts to Buyer by 9:00 a.m. for morning requirements and 6:00 p.m. for afternoon requirements.
- E. If the "pick card" requirement cannot be filled, Seller shall return to Buyer the pick card indicating a back order.
- F. For back ordered items Seller will receive a new "pick card" the following day which will have "Back Order" written on it. The Seller should attach the material to this "pick card" with a red dot which identifies the item as a filled back order to the Buyer.
- G. Seller will be paid based on Buyer's CMR Transaction Summary, and in accordance with the following, depending on Buyer's Bus Route location:
- For Austin, Texas Bus Route:
- THE END DATE OF EACH TRANSACTION WEEK WILL BE USED AS THE INVOICE NUMBER FOR PAYMENT OF AUSTIN BUS ROUTE INVOICES, I.E. FRIDAY, APRIL 1, 1995 WOULD BE INVOICE #040195A.
- For Santa Clara, California Bus Route:
- THE PRINT DATE OF THE CMR TRANSACTION SUMMARY DOCUMENT WILL BE USED AS THE INVOICE NUMBER FOR PAYMENT OF SANTA CLARA BUS ROUTE INVOICES, I.E. FRIDAY, APRIL 1, 1995 WOULD BE INVOICE #040195A.
- H. Seller will maintain records of all Items shipped to Buyer to verify against Buyer's weekly accumulated usage report which will be faxed to Seller each Monday morning.
- I. Buyer will make changes (quantity/price) to the transaction summary of discrepancies that occur and are validated. These changes/adjustments will be reflected on the transaction summary the following week for payment.
1. If discrepancies in pricing or quantity are found, SELLER will modify the report accordingly, and fax the corrected copy to BUYER/PLANNER.
 2. If no discrepancies are found, no further action is required by SELLER, and payment will be made accordingly.
- J. Buyer shall make payment to Seller in accordance with the terms established in this agreement.

Attachment 4

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY
WITH THE SECURITIES AND EXCHANGE COMMISSION

Attachment 5

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY
WITH THE SECURITIES AND EXCHANGE COMMISSION

Attachment 6

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY
WITH THE SECURITIES AND EXCHANGE COMMISSION

Attachment 7

APPLIED MATERIALS CORPORATE ROUTING GUIDE ATTACHMENT A

TRANSPORTATION AND SHIPPING REQUIREMENTS

Applied Materials Corporate Traffic Department has established excellent pricing and service programs with various transportation carriers. Using these approved carrier programs, when Applied Materials is responsible for the freight charges, will contribute to our freight cost reduction goals while continuing to provide a high level of customer satisfaction. Everyone has a responsibility to control and reduce unnecessary expenses.

Requirements for transportation and shipping are as follows:

- - All freight collect shipments to Applied Materials must be routed via the appropriate Applied Materials approved carrier, see general routing instructions within the United States.
- - An Applied Materials department of division number must be referenced on the carrier documentation.
- - All shipments consigned to a third party at the direction of Applied Materials and Applied Materials is paying the freight charges must be routed by an approved Applied Materials carrier. All shipping documentation must indicate billing to third party (Applied Materials).
- - For freight routed prepaid by third party, FOB origin, the third party will assume all risk in transit when approved Applied Materials carrier is used.
- - Materials must be suitable packaged to withstand normal freight handling and movement while in transit.
- - Multiple order shipping by the same carrier and service level, on the same day, must be consolidated into one shipment on one carrier document.
- - Material for each purchase order must be packaged separately with it's own packing list.
- - Packing lists must be attached to the outside surface of the package and visible from any position (do not hide from view if multiple packages are pelletized).
- - When consolidating multiple purchase orders in one overpack carton, all inside orders must be attached to the overpack carton. Overpack carton must be clearly label to indicate multiple orders are packed inside. Each carton within the overpack must be clearly labeled.

Attachment 7

- - DO NOT DECLARE VALUE or request insurance on any freight collect shipment or third party shipments where Applied Materials is paying the freight charges unless specifically authorized.
- - Materials must be shipped in time to meet the due date shown on the purchase order. Materials will not be accepted/received earlier than three (3) days of the due date, unless specifically authorized. Materials shipped earlier will be refused and possibly returned at your expense.
- - Only use air freight at the requested level of service when specifically instructed and authorized in writing by Applied Materials.
- - Suppliers must specifically state or indicate Emergency/Overnight service on the airbill or truck bill of lading to ensure expedited delivery, and only when instructed and authorized in writing by Applied Materials.
- - All shipping documents and package address labels must reference the complete purchase order number(s) for the material included in the package(s) and shipment. When freight codes are provided they must also show on all documents.
- - Any question concerning third party billing or carrier recommendations anywhere within the United States should be addressed to Corporate Traffic Operations:

Santa Clara, California

(408) 235-6053

Outside Santa Clara, California

Toll Free 1-888-TOO-SHIP
(1-888-866-7447)

ATTACHMENT 7

APPLIED MATERIALS - ROUTING GUIDE

GENERAL ROUTING INSTRUCTIONS WITHIN THE US

COMMON CARRIER (LTL) TRANSPORTATION UP TO 7,500 LBS.

WEIGHT	AMAT LOCATION OR SERVICE AREA	CARRIER
1-100 lbs.	All points.	Federal Express - Express Saver
Over 100 lbs.	All interstate shipments.	CF Motor Freight
Over 100 lbs.	Intrastate AZ, CA, & OR	Viking Freight System
Over 100 lbs.	Intrastate Tx, except Augtin & Dallas area	Federal Express - Express Saver Freight
1-50 lbs.	Austin & Dallas area	Sonic Air
Over 50 lbs.		Federal Express - Express Saver
Over 100 lbs.	Intrastate MA, NY, & PA	Federal Express - Express Saver Freight

Please provide 48 hour advance notice when your shipment is over 7,500 lbs., or on shipments that require special equipment. This will enable sufficient time to schedule the carrier that will provide the most economical and timely service. Contact Corporate Traffic 1-888-TOO-SHIP (866-7447).

HIGH VALUE PRODUCTS, AIR RIDE OR PADDED VAN SERVICE

TWI Mayflower Call traffic (408) 235-6053, for scheduling and transit time details.

NEXT FLIGHT OUT, MESSENGER, AND/OR COURIER SERVICE WITHIN THE US

All weights Sonic Air call the local office, if no local office call 1-800-528-6070

AIR FREIGHT WITHIN THE US

WEIGHT	SERVICE	CARRIER
1 - 70 lbs.	Priority Overnight - 10:30 AM Next Day Priority Overnight - 3:00 PM Next Day Economy Service - 4:30 PM Second Day	Federal Express
Over 70 lbs.	Priority Overnight - 10:30 AM Next Day Standard Overnight - 4:00 PM Next Day Two Day - 4:00 PM Second Day Deferred Air - 3-5 day delivery	Eagle USA Air Freight

GENERAL ROUTING INSTRUCTIONS FOR ALL INTERNATIONAL LOCATIONS

WEIGHT	SERVICE	CARRIER
1 - 50 Kgs.	Regular Air	Federal Express
All Weights	Next Flight Out or Courier Service	Schencker International*
Over 50 Kgs.	Regular Air or Consolidation	

* Shipments over 50 Kgs. to or from Japan must be routed via Nippon Express.

ATTACHMENT 7

TRANSIT TIMES FOR U.S. CARRIERS

SELECT CARRIER BY REFERRING TO GUIDANCE PROVIDED ON PAGE ONE. USE TABLE BELOW TO ENSURE TRANSIT TIME OF SERVICE MEETS DELIVERY REQUIREMENTS.

US TIMETABLE	SHIPMENT SIZE	SAME-DAY	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS	6 DAYS
Sonocair Courier Next Flight Out	All - see f.	Nationwide	Nationwide					
Sonocair Ground Courier Local	All - see e.	50 miles of AMAT Sites						
Federal Express Express Saver	1-100 lbs, see d.		Up to 350 miles of origin	350 to 1,000 miles of origin	Over 1,000 miles of origin			
Federal Express Express Saver Freight	Over 151 lbs., see d.		Up to 350 miles of origin	350 to 1,000 miles of origin	Over 1,000 miles of origin			Federal Express Express Saver Service commitment by 4:30 PM or by close of business.
Viking Freight Sys. Between CA, AZ, OR.	Over 100 lbs.		All points in CA ex Calexico. Reno, NV	CA to metro areas in AZ, NV, OR, Denver, CO	Colorado Springs, CO			
CF Motor Freight Between Santa Clara and States	Over 100 lbs.				AZ, ID, NV, OR, WA	CO, MT, NM, UT	IL, IN, KS, KY, LA, MI, MN, MO, ND, NE, OH, OK, SD, TN, WI, WY	DC, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, PA, RI, SC, TX, VA, VT, WV
CF Motor Freight between Austin and States	Over 100 lbs.				AR, LA, NM, OK	AL, CO, FL, GA, IA, IL, IN, KS, KY, MI, MS, NC, SC, UT, WI, WY	AZ, CT, DC, DE, ID, MA, MD, ME, MN, MO, MT, ND, NE, NH, NJ, NV, NY, OH, OR, PA, RI, SD, TN, VA, VT, WA, WV	

- a. General guidelines call 1-888-TOSHIP for additional information.
- b. Viking Freight Systems use for all intrastate California LTL. Can be used for Western States Listed.
- c. Express Saver Freight Program should be used for all appropriate non-local intra Texas shipments.
- d. Express Saver program should be used for appropriate packages under 100 lbs.
- e. Sonic Ground Courier Service can be used for sameday shipments in local area of AMAT sites in Santa Clara, Milpitas, Austin, Dallas, Phoenix, and Boston.
- f. Next Flight Out service is used for extremely urgent shipments. Check with carrier for delivery commitment. Consider Federal Express or Eagle if commitment is after 10:30 AM next day.

Attachment 8

Intentionally Omitted

Attachment 9
Intentionally Omitted

ATTACHMENT 10

Applied Materials Incorporated

PRELIMINARY QNRR FORM

SUPPLIER NAME: _____ DATE: _____

P/N: _____ SQE: _____

=====
QNRR Number: _____

=====
Levels: Please check one
See Page 3 of 3 for level descriptions
1. Critical []
2. Major []
3. Minor []
=====

Brief Description:

* This QNR requires corrective action (CA). Please return this form with signature to within _____ working days.

1. CA Approved: [];
Applied Materials must sign page 2 of 3 to confirm approval.

2. CA Disapproved: [];
Explain below

Applied Materials Explain Briefly:

* Applied Materials to review CA and Approve or Disapprove based on fact. Applied Materials must inform supplier by returning this form with status checked and explained within fourteen working days.

=====

=====

CA to correct Discrepancy: Explain

=====

Preventative Measures Described:

=====

Scheduled Completion Date:

Supplier Signature:

Applied Materials Approval Signature:

=====

ATTACHMENT 10

Applied Materials Incorporated

LEVELS OF CORRECTIVE ACTION

LEVEL -----	NATURE -----
1. CRITICAL	HAZARDOUS TO HUMAN SAFETY; OR VITAL TO FUNCTIONALITY OF END PRODUCT THUS NON-CONFORMANCE IN MEETING THE REQUIRED SPECIFICATIONS AND CONTRACTUAL AGREEMENTS. EXAMPLES: IMPROPER HEAT TREATMENT OF CERAMIC MECHANICAL MOTOR MECHANISM, INOPERATIVE BRAKING SYSTEM, EXPLOSIVE COMPONENTS, ETC.
2. MAJOR	A NON-CONFORMANCE RELATED TO THE REQUIRED FUNCTIONALITY SPECIFICATIONS AND/OR NON-CONFORMANCE TO CONTRACTUAL AGREEMENTS. EXAMPLES: CHEMICAL REACTION (RUST), INOPERATIVE MECHANISM, PCBAS.
3. MINOR	A NON-CONFORMANCE TO THE FUNCTIONALITY OF PARTS/MECHANISMS WHICH ARE NOT SHOW STOPPERS. EXAMPLES: CHEMICAL REACTION (RUST), DENTS, SCRATCHES, LOOSE HINGE.

 Applied Materials ENGINEERING CHANGE NOTICE ECN No.
 COMMODITY: -----

 MODEL No. CHARGE No. CONTRACT No. PROGRAM NAME Sheet 1 of

 ECN CLASS

 DATA ENTRY REQUIRED REASON FOR CHANGE ECP No. Requester TYPE I [] II [] RCD []

 Doc [] Bom [] Part [] Routine Incorporate

 DATA ENTRY REQUIRED Customer Approval Date Urgent Changes by

 Doc [] Bom [] Part [] Emergency

 Parts Disposition Codes

DOCUMENT(S) AFFECTED	PART(S) AFFECTED	1.	Use part as is (no action)
		2.	Rework part/build to change
		3.	Scrap part (do not use)
		4.	See special instruction

 Change Effectivity (S/N, Qty, Dates)

Document Number	Current Rev	New Rev	L/U Rev	TITLE	Part Number	FP/RR	OPEN (OP)	Comp (CP)	Closed (CL)
-----------------	-------------	---------	---------	-------	-------------	-------	-----------	-----------	-------------

						Not Started	In Kitting	10 Mfg.	In Stock	Shipped
--	--	--	--	--	--	-------------	------------	---------	----------	---------

=====

DESCRIPTION OF CHANGE

 Project Engineer Date Mfg. Engineer Date Production Control Date ECN Checked by Date

REQUIRED

 Incorporated by Date

APPROVALS

 Quality Engineer Date Configuration Date Program Manager Date

 Incorporation ck'd by Date

ATTACHMENT 13

APPLIED MATERIALS

SUPPLIER PROBLEM SHEET 95-0957

Date Vendor Originator Telephone No.

Part Number Part Description

Contract/Spot Buy (circle one) Purchase Order No.

PROBLEM

APPLIED ACTION

PROBLEM NAME DATE RETURN
WILL BE RESPONSE TO
RESOLVED ORIGINATOR
BY: WITHIN 24
HOURS

Attachment 14
Intentionally Omitted

Attachment 15
Intentionally Omitted

Attachment 16

CERTIFICATE OF CONFORMANCE

"I certify that on _____ the _____ furnished the supplies or services called for under the Applied Materials' Purchase Contract Number _____ via _____ on _____ in accordance with all applicable requirements. I further certify that the supplies or services are of the quality specified and conform in all respects with the contract requirements, including specifications, drawings, preservation, packaging, packing, marking requirements and physical item identification (part number), and are in the quantity shown on this or on the attached acceptance document."

Date of Execution:

Signature:

Name & Title:

Instructions:

The _____ signed certificate shall be attached to or included on the top copy of the inspection or receiving report provided to Applied Materials at the time of delivery. In addition, a copy of the signed completed certificate shall also be maintained at the _____ facility and will be made available to Applied Materials' representatives upon request.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Attachment 17

[**] CALCULATION

[**]

NONDISCLOSURE AGREEMENT
Applied Materials, Inc.

APPLIED MATERIALS, INC., a Delaware corporation (including its subsidiaries, "Applied"), having its principal offices in Santa Clara, California and MKS Instruments, Inc., a Massachusetts corporation, ("Recipient") having its principal offices in Andover, Massachusetts, hereby agree as follows:

I. IDENTIFICATION OF CONFIDENTIAL INFORMATION

A. Applied may disclose to Recipient the following types of information: SEE ATTACHMENT 1.

B. The information described in A. above shall be deemed "Confidential Information" if:

(1) in the case of a written disclosure, Applied affixes to the document an appropriate legend, such as "Proprietary" or "Confidential", and

(2) in the case of an oral or visual disclosure, Applied makes a contemporaneous oral statement or delivers to Recipient a written statement within thirty (30) days to the effect that such disclosure is confidential or the like.

C. "Confidential Information" does not include information that:

(1) becomes a matter of public knowledge through no fault of Recipient, (2) is rightfully received by Recipient from a third party without restriction on disclosure, (3) is independently developed by Recipient without the use of Applied's Confidential Information or (4) is in the possession of Recipient prior to its disclosure by Applied.

D. Each party's Nondisclosure Agreement ("NDA") Coordinator serve as the principal contact for the disclosure or receipt of Confidential Information. Applied's NDA Coordinator will be MICHAEL BERKLAW and Recipient's NDA Coordinator will be LEO BERLINGHIERI.

II. USE OF CONFIDENTIAL INFORMATION

Recipient shall use the Confidential Information only for the purpose of (1) determining whether to enter into a transaction with Applied, (2) purchasing or using products or services supplied by Applied or (3) providing products or services to Applied. Absent a written agreement to the contrary, all information generated or derived by Recipient in connection with any such transaction or provisions of goods or services shall be deemed Confidential Information for purposes of this Agreement.

III. RESPONSIBILITIES OF RECIPIENT

A. Recipient agrees (1) to disclose Confidential Information only to those of its employees who have a need to know such information, are informed of its confidential nature and agree to comply with this Agreement, (2) not to disclose Confidential Information to any third party, except pursuant to a lawful judicial, administrative or governmental order after providing Applied an opportunity to avoid or limit such disclosure, (3) to protect the Confidential Information with at least the degree of care with which it protects its own confidential information, but in no case with less than a reasonable degree of care and (4) to notify Applied promptly of any breach of this Agreement.

B. Within thirty (30) days of a written request by Applied, Recipient shall (1) destroy or return to Applied all documents received from Applied that contain Confidential Information, all documents it may have created that reveal or are based on any Confidential Information, and all copies of the foregoing (except for one copy which may be kept by Recipient's legal department or outside attorneys for archival purposes only), and (2) deliver to Applied a certificate stating that Recipient has complied with such requests.

IV. DISCLOSURE PERIOD AND CONFIDENTIALITY PERIOD

A. The period during which Applied may disclose Confidential Information under this Agreement shall begin on the date of the first disclosure of Confidential Information (which may be prior to the date of this Agreement) and shall end on _____ (if no date is specified, the period shall end three (3) years from the date this Agreement was signed). Either party may terminate the Agreement by giving the other party ten (10) days' written notice.

B. The obligations set forth in Articles II and III shall (1) termination five (5) years from the date of this Agreement and (2) survive the termination or expiration of this Agreement.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

EXHIBIT 10.18

PERSONAL & CONFIDENTIAL
MEMORANDUM

TO:
FROM: George Manning
DATE:
SUBJECT: 1999 Management Incentive Program

The amount of bonus you may be eligible to earn under the Management Incentive Program in 1999 will be dependent on the consolidated net income achieved by the Corporation for calendar year 1999. Consolidated net income means the consolidated net profits of the Corporation and its subsidiaries after payment by the Corporation of bonuses to all employees of the Corporation, contributions by the Corporation to the Retirement Plan on behalf of all employees of the corporation (in the United States who are eligible to participate in the Retirement Plan), and before payment by the Corporation of all income taxes.

If our consolidated net income for 1999 ends up less than *****, you will not earn a bonus. If the consolidated net income is ***** or greater, you will earn a bonus in the amount shown on the attached table. However, in no event can your bonus exceed 200% of your targeted bonus for 1999.

In order to receive a payout under this Plan, we must be successful in keeping ***** and maintaining tight controls over our spending. In addition, our 1999 net sales must meet or exceed ***** net sales. For example, if our annual net sales for 1999 were approximately equal to our annual net sales for 1998, you could receive approximately 10% of your targeted bonus amount. If we were able to grow our net 1999 sales to approximately *** more than our net 1998 sales, you could receive approximately 50% of your targeted bonus amount. And at *** growth over last year, with good cost control measures in place, you could expect to receive your full targeted bonus amount. The consolidated net income objectives are based on current financial conditions. Significant changes in those conditions could cause our net income objectives to be appropriately revised based on new circumstances.

In order to participate in this management Incentive Program, you must be actively employed by MKS Instruments, Inc. as of December 31, 1999.

THIS INFORMATION IS EXTREMELY CONFIDENTIAL AND SHOULD BE TREATED AS SUCH. YOU SHOULD NOT DIVULGE THIS INFORMATION INSIDE OR OUTSIDE OF MKS INSTRUMENTS, INC.

GM: 99-4200:jg
Attachments

logo

Six Shattuck Road, Andover, MA 01810
Telephone (978) 975-2350 Fax (978) 975-3756

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION. ASTERISKS DENOTE OMISSIONS.
PERSONAL & CONFIDENTIAL

1999 MANAGEMENT INCENTIVE PROGRAM
CALENDAR YEAR 1999 CONSOLIDATED NET PROFIT TABLE
(JANUARY 1 - DECEMBER 31, 1999)

YOUR TARGET BONUS IS 40% OF YOUR 1999 BASE COMPENSATION, WHICH WILL BE FULLY ACHIEVED IF CONSOLIDATED NET INCOME BEFORE TAXES REACHES *****. AT ***** CONSOLIDATED NET INCOME BEFORE TAXES, YOU WOULD RECEIVE 200% OF YOUR TARGET BONUS, WHICH WOULD BE 80% OF YOUR 1999 BASE COMPENSATION.

Consolidated Net Income %*	Percent of Target Bonus Earned
-----	-----
< \$*****	0%
\$*****	10%
\$*****	25%
\$*****	35%
\$*****	50%
\$*****	65%
\$*****	75%
\$*****	90%
\$*****	100%
\$*****	125%
\$*****	150%
\$*****	175%
>\$*****	200%

*Consolidated net income worldwide, before taxes.

THIS INFORMATION IS EXTREMELY CONFIDENTIAL AND SHOULD BE TREATED AS SUCH. YOU SHOULD NOT DIVULGE THIS INFORMATION INSIDE OR OUTSIDE OF MKS INSTRUMENTS, INC.

THIS INDENTURE OF LEASE, made and entered into this 21st day of December, 1989 by and between DONNELL W. MURPHY as he is Trustee of WALPOLE PARK SOUTH (II) Trust under a Declaration of Trust dated August 10, 1988 filed with the Norfolk Registry District of the Land Court as Document No. 554329 (hereinafter referred to as "LESSOR"); and, NGS ASSOCIATES, INC., a Massachusetts corporation having its principal office in Canton, Massachusetts, (hereinafter referred to as "LESSEE").

WITNESSETH

That LESSOR, for and in consideration of the rent and all other charges and payments hereinafter reserved and payable by LESSEE, and in consideration of the covenants, agreements, terms provisions and conditions to be kept and performed hereunder by LESSEE, does hereby demise and lease to LESSEE, and LESSEE does hereby hire and take from LESSOR the premises hereinafter mentioned and described, subject to the covenants, agreements, terms, provisions and conditions of this Lease for the term hereinafter stated:

1. DESCRIPTION OF DEMISED PREMISES

The space, consisting of 5,021 square feet, substantially as outlined in yellow on the plan annexed hereto as Exhibit 1 (hereinafter "PREMISES"), located in the building known in the numbering as 24 WALPOLE PARK SOUTH, Walpole, Massachusetts (hereinafter "BUILDING"). The Lease includes the LESSEE'S right to use, the parking facilities of the Building for the parking of automobiles of employees, customers, invitees, or licensees of LESSEE in common with other tenants in the Building.

2. TERM OF LEASE

2.1 DEFINITIONS: As used in this Lease, the words "TERM COMMENCEMENT DATE" is the date on which the Premises are ready for

LESSEE'S occupancy (as defined in Section 3.2 hereof) and as set forth in Exhibit 2 hereof.

2.2 HABENDUM: TO HAVE AND TO HOLD the Premises for a term of years commencing on Term Commencement Date and ending on the Termination Date as stated in Exhibit 2 or on such earlier date upon which said term may expire or be terminated pursuant to any of the conditions or other provisions of this Lease, or pursuant to law (which date for the termination of the term hereof is hereinafter referred to as TERMINATION DATE"), or any later date to which the term of this Lease may become extended pursuant to the provisions of Section 28 of the Addenda hereto annexed (if the term of this Lease becomes extended, the expression "term" as used in this Lease shall be deemed to include such extended term).

2.3 DECLARATION FIXING TERM COMMENCEMENT DATE: As expeditiously as possible after the Term Commencement Date, the LESSEE agrees upon request of the LESSOR, to join in the execution, in recordable form, of a written declaration in which shall be stated such Term Commencement Date and (if need be) the Termination Date. If this Lease is terminated before the term expires, then upon LESSOR'S request the parties shall execute, acknowledge, and deliver an instrument acknowledging such fact and the date of termination of this Lease.

3. CONSTRUCTION - READINESS FOR OCCUPANCY

3.1 COMPLETION DATE: Subject to delays due to causes beyond the reasonable control of the LESSOR, or by action or inaction of LESSEE, LESSOR shall use reasonable speed and diligence in the construction of the Premises and shall use his best efforts to have the Premises ready for LESSEE'S occupancy on or before the Term Commencement Date, but nothing herein contained shall be construed to create any liability on the part of the LESSOR for his failure, due to any cause whatsoever, to have the Premises ready for occupancy on said date. If the Term Commencement Date shall not have occurred on or before March 1, 1990, for any reason, except failure on the part of the LESSEE to perform any of its obligations hereunder, LESSEE may give LESSOR a thirty (30) day written notice of termination (sent by registered or certified mail, return receipt requested), and unless the Term Commencement Date shall have occurred within thirty (30) days from the date of receipt of such notice, the obligations to the parties hereto shall cease and terminate as of the thirtieth (30th) day next following receipt of such notice.

3.2 WHEN PREMISES DEEMED READY: The Premises shall be conclusively deemed ready for LESSEE'S occupancy as soon as the initial installations to be done by LESSOR referred to in Exhibit 3 ("Building Standard Work") annexed hereto and made a part hereof (hereinafter referred to as "BUILDING STANDARD WORK") in the Premises have been substantially completed by LESSOR insofar as is practicable in view of delays or defaults, if any, of LESSOR or his contractors, and the

facilities specified in Exhibit 3 are substantially available to LESSEE, in accordance with the obligations assumed by LESSOR hereunder. The Premises shall be not deemed to be unready for LESSEE'S occupancy or incomplete if only minor insubstantial details of construction or mechanical adjustments remain to be done in the Premises, or any part thereof (provided that LESSOR shall diligently continue to complete all work required of him hereunder), or if the delay in the availability of the Premises for occupancy is (i) due to special work, changes, alterations, or additions required or made by LESSEE in the layout or finish or the Premises or any part thereof other than as specified under Building Standard Work (provided that LESSOR shall diligently continue to complete all work required of him hereunder); or, (ii) caused in whole or in part by delay and/or default on the part of LESSEE or its contractors.

3.3 PREPARATION OF PREMISES: Except as is otherwise herein provided or as may be otherwise approved by the LESSOR, all work necessary to prepare the Premises for LESSEE'S occupancy, including work to be performed at LESSEE'S expense, shall be performed by contractors employed by LESSOR and all materials and workmanship shall be in accordance with Building Standard Work. The term "preparation of the Premises for LESSEE'S occupancy" shall include not only work done within the Premises, but also related work out-side the Premises such as, but not limited to, the installation of additional air conditioning equipment and facilities to serve the Premises and additional risers, feeders, and wiring or other electrical equipment to serve the Premises. If any work, including, but not by way of limitation, installation of built-in equipment by the manufacturer or distributor thereof, shall be performed by contractors not employed by LESSOR, LESSEE shall take all reasonable measures to the end that such contractors shall cooperate in all ways with LESSOR'S contractors and shall not conflict in any other way with the performance of such work.

3.4 CONCLUSIVENESS OF LESSOR'S PERFORMANCE: LESSEE shall be conclusively deemed to have agreed that LESSOR has performed all of his obligations hereunder, unless not later than the end of the second calendar month next beginning after the Term Commencement Date, LESSEE shall give LESSOR written notice specifying the respects in which LESSOR has not performed any such obligation. There shall be excluded from the scope of this section those omissions or defects which could not reasonably have become apparent to LESSEE within the time specified and those will be deemed to have been corrected unless LESSEE shall have notified LESSOR thereof not later than the end of the sixth calendar month next beginning after the Term Commencement Date.

4. USE OF PREMISES

4.1 IN GENERAL: LESSEE shall use and occupy the Premises only for the purpose of conducting the use set forth in Exhibit 2 hereof and for no other purpose.

LESSEE shall not use, or suffer or permit the use of, or suffer or permit anything to be done in or anything to be brought into or kept in the Premises or any part thereof (i) which would violate any of the covenants, agreements, terms, provisions, and conditions of this Lease; (ii) for any unlawful purpose or in any unlawful manner; or, impair or interfere with or tend to impair or interfere with any of the Building services or the proper and economic heating, air conditioning, or other servicing of the Building or Premises, or with the use of any of the other areas of the Building by, or occasion discomfort, inconvenience, or annoyance to, any of the other tenants or occupants of the Building. LESSEE shall not install any electrical or other equipment of any kind which, in the reasonable judgement of LESSOR, might cause any such impairment, interference, discomfort, inconvenience, or annoyance. The installation and/or use of business office machines normally incident to the type and size of LESSEE'S business operations in the Premises shall not be deemed forbidden by this Article 4.

4.2 SPECIFIC RESTRICTIONS:

(a) No part of the Premises shall be used for any of the following purposes:-

- (1) As a facility for the use, generation, treatment, storage or disposal of hazardous materials, (as any one or more of such terms are defined by General Laws, Chapter 21C; General Laws Chapter 21E; Comprehensive Environmental Response Act; Compensation and Recovery Act, 42 USC section 9601 et seq; the Resource Conservation and Recovery Act of 1976, 42 USC section 6901, et seq; or, any of the rules and regulations promulgated under the aforesaid), except for the use, generation, treatment, or storage of those hazardous materials as to which LESSOR has given his prior approval, and then only to the extent that such materials are licensed and approved in accordance with all applicable laws and regulations of all governmental authorities having jurisdiction thereof.
- (2) Any industrial use which discharges processed waste water on site.
- (3) Subsurface disposal of liquid or likable waste.
- (4) Storage of petroleum or other refined petroleum products except within those portions of the premises which will be heated, or in vaulted tanks equipped with monitoring systems.

- (5) Manufacture and/or the tanning of leather, but this prohibition shall not exclude the manufacture of products made from leather.
- (6) Dry cleaning establishment.
- (7) Manufacture or processing of paper from pulp.
- (8) Manufacture of plastic from raw materials, but this prohibition shall not exclude the manufacture of any type of product made from plastic material.
- (9) Steel mill or foundry.
- (10) Manufacture of abrasives.
- (11) Dyeing of textiles.

(b) No part of the Premises shall involve as a principal use any of the following:-

- (1) Processing, manufacture, or storage of chemicals.
- (2) Printing of textiles.
- (3) A laboratory which tests or analyzes biological or chemical materials which are provided by others.
- (4) Electroplating of products.
- (5) Use of any volatile organic compound in any industry devoted to the manufacture of electronic components unless the following conditions are observed:
 - (i) In order to minimize spillage or leakage during the process of loading or unloading, all loading/unloading areas of any building in which the same shall be used, shall be roofed, and the ground area immediately below the same pitched to and provided with an in-ground holding tank, constructed of material sufficient to contain any spill or leak of any volatile organic compound.
 - (ii) No volatile organic compound shall be stored in any room or area of any building where any sink or open drain is located.

4.3 SEWER USE DISCHARGE PERMIT: LESSEE understands that sanitary sewerage from the Building will discharge into the Town of Walpole, MA sewer system which is a tributary to that owned and/or controlled by the Massachusetts Water Resources Authority ("MWRA"). The LESSEE further understands that discharge of such sewerage is generally regulated under 360 CMR 10.000 and that the LESSEE may be considered to be "user" thereunder. If, because of the LESSEE'S use of the premises, it discharges or will discharge "industrial wastes" (as defined in 360 CMR 10.004) into the said sewer system, the LESSEE shall make prompt application to the MWRA for a Sewer Use Discharge Permit so as to permit such discharge and agrees to hold and save the LESSOR harmless and indemnified for any claim, demand, or penalty asserted by the MWRA or others with respect to such sewer discharge.

5. RENT

The LESSEE shall pay to the LESSOR, during the term of this Lease, the yearly rent as stated in Exhibit 2 (hereinafter referred to as "YEARLY RENT"), payable in equal monthly installments, as stated in said Exhibit 2, in advance, on the first day of each month for and in respect of such month and at such rate for such further time as LESSEE shall hold the Premises or any part thereof. The rent reserved and covenanted to be paid under this Lease shall commence on the Term Commencement Date. If, by reason of any provisions of this Lease, the rent reserved hereunder shall commence on any day other than the first day of a calendar month, the rent for such calendar month shall be prorated. The rent shall be payable at the office of LESSOR or such place as LESSOR may designate, without any setoff or deduction whatsoever.

6. UTILITIES

6.1 FACILITIES: LESSOR will supply or cause to be supplied to the Premises, at no cost to LESSEE, at or prior to the Term Commencement Date, all facilities for water (hot and cold); heating, ventilation, and air conditioning; sprinkler; electricity; and sewer services required for LESSEE'S intended use of the Premises (all as set forth and described in Building Standard Work annexed hereto as Exhibit 3), and where feasible such utilities and services shall be separately metered.

6.2 ADDITIONS TO ELECTRICAL SYSTEM: If LESSEE shall require electric current or facilities for use in the premises in excess of what is provided in Exhibit 3 hereof, LESSOR, upon written request and at the sole cost and expense of LESSEE, will furnish and install such additional wire, conduits, feeders, switchboards, and appurtenances as reasonably may be required to supply such additional requirements of LESSEE if current therefore be available to LESSOR, provided that the same shall be permitted by applicable laws and insurance regulations, and shall not cause permanent damage or injury to the Building or the Premises, or cause or create a dangerous or hazardous condition, or entail excessive or unreasonable

alterations or repairs, or interfere with or disturb other tenants or occupants of the Building. LESSEE agrees that it will not make any material alteration or material addition to the electrical equipment and/or appliances in the Premises without the prior written consent of LESSOR in each instance first obtained.

6.3 PAYMENT OF CHARGES: LESSEE shall pay when due all charges for water, gas, sewer, electricity, heating fuels, power, and any other services supplied to it at the Premises directly to the utility company, supplier, or provider providing the same.

7. COMMON AREAS

7.1 RIGHT TO USE: LESSOR grants to LESSEE in common with other tenants within the Building, and their agents, employees, licensees, customers, and persons doing work for or business with them, the right to use the common areas (hereinafter referred to as "COMMON AREAS") consisting of the parking areas, roadways, pathways, sidewalks, entrances, and exits designated by LESSOR for common use of the Building, subject to the terms and conditions of this Lease.

7.2 MAINTENANCE OF COMMON AREAS: The LESSOR or his managing agent shall maintain the Common Areas and, in connection therewith, shall have the right to incur, in his sole discretion, such reasonable expenses as may be required (i) to maintain and keep in good repair (including the making of any necessary replacements) all portions of the Common Areas; (ii) to keep the Common Areas reasonably free from accumulated snow, ice, and refuse, and open for use and fully lighted during all business hours.

7.3 CONTROL OF COMMON AREAS: The Common Areas shall be subject to the exclusive control and management of LESSOR and LESSOR shall have the right to establish, modify, change, and enforce reasonable rules and regulations with respect to the Common Areas and LESSEE agrees to abide by and conform with such rules and regulations. LESSEE agrees that it and its employees will park their trucks, delivery vehicles and automobiles only in such of the parking areas as LESSOR may from time to time designate for that purpose. LESSOR shall have the right to close any part of the Common Areas for such time as may be necessary to clean and repair the same, and to close any part of the parking area for such time as LESSOR deems necessary in order to discourage noncustomer parking and to do other things in the parking areas as LESSOR in her discretion deems reasonable and necessary for the benefit of the Building.

8. ADDITIONAL RENT

8.1 DEFINITIONS: As used in this Article 8, the words and terms which follow mean and include the following:

(a) "LESSEE'S PROPORTIONATE SHARE" shall mean a fraction having as numerator the Rentable Area and having as denominator the Building Rentable Area as stated in Exhibit 2.

(b) "TAXES" shall mean the real estate taxes and assessments imposed upon the Building and any and all other taxes, levies, betterments, assessments, and charges arising from the ownership and/or the operation of said Building which are or shall be imposed by national, state, municipal or other authorities, and which are or may become a lien upon the Building. If, due to a future change in the method of taxation, any franchise, income, or profit tax shall be levied against LESSOR in substitution for or in lieu of any tax which would otherwise constitute a real estate tax, such franchise, income, or profit tax shall be deemed to constitute "taxes" for the purpose hereof. The word "Taxes" shall exclude any special assessments which are imposed for benefits rendered to the Building such as a sidewalk assessment, regardless of how labeled or identified.

(c) "TAX YEAR" shall mean the twelve (12) month period commencing on July 1 immediately preceding the Term Commencement Date, and each twelve (12) month period commencing on an anniversary of said date during the term of this Lease.

(d) "OPERATING COSTS" shall mean all reasonable costs incurred and expenditures of whatever nature made by the LESSOR in the operation and management, repair, and maintenance of the Building; related equipment, facilities, and appurtenances; as well as maintenance of all exterior portions of the Building, and including, not limited to, the following:

Taxes:

Federal Social Security, Unemployment and Old Age Taxes and contributions, and Massachusetts Unemployment taxes and contributions accruing to and paid by the LESSOR on account of all employees of the LESSOR who are employed in, about, or on account of the Building, except that taxes levied upon the net income of the LESSOR, and taxes withheld from employees, and Taxes shall not be included herein.

Water:

All charges and rates connected with water supplied to the Building and related sewer use charges, to the extent such charges and rates are paid for by LESSOR.

Supplies and Materials:

All supplies and materials used in the operation and maintenance of the Building, Common Areas, and surrounding areaways.

Wages:

Wage and cost of all employee benefits of all employees of the LESSOR who are employed in, about or on account of the Building.

Maintenance:

The cost of all outside contractors and all, maintenance and service agreements with respect to the Building, Common Areas, and surrounding areaways; maintenance, repairs, and replacement of equipment used for servicing.

Electricity:

The cost of all electric current for the operation of any machine, appliance, or device used in connection with the operation of the Building, including the cost of electric current for exterior public lights.

Insurance, etc.:

Fire and extended coverage, casualty, liability, and such other insurance as may be required by any lending institution in connection with the Building and the Common Areas, and all other expenses customarily incurred in connection with the operation and maintenance of first-class buildings in the Metropolitan Boston area.

Management:

All fees and costs incurred in respect of the management of the Building.

"Operating Costs" shall include only reasonable and bona fide expenses actually incurred by LESSOR and shall not include any of the following: executive salaries; charges, which under this Lease, would be chargeable to a specific tenant of the Building; leasing commissions; interest; depreciation; or other expenses relating to ownership as distinguished from the operation and/or management of the Building.

(e) "COMPUTATION YEAR" shall mean the twelve (12) month period beginning on the date of January 1 immediately prior to the Term Commencement Date and each twelve (12) month period commencing on an anniversary of said date during the term of this Lease. If the Term Commencement

Date or the Termination Date occurs during a Computation Year, the LESSEE shall be liable for only a portion of the Operating Costs in respect to such Computation Year, represented by a fraction, the numerator of which shall be the number of days of the herein term which falls within the Computation Year, and the denominator of which shall be three hundred and sixty-five (365).

(f) "TAX STATEMENT" and "OPERATING COST STATEMENT" shall mean a statement in writing signed by LESSOR, setting forth the amounts payable by LESSEE for a specified Tax or Computation Year, respectively, pursuant to this Section 8.

8.2 PAYMENT OF TAXES BY LESSEE:

(a) In each Tax Year, the LESSEE shall pay to LESSOR, LESSEE'S Proportional Share of Taxes in the manner as hereinafter set forth.

(b) Estimated payments on account of LESSEE'S Proportionate Share of Taxes, (as reasonably estimated by the LESSOR) shall be made monthly by the LESSEE and at the time and in the fashion provided in this Lease for the payment of Yearly Rent. Such monthly payment shall be sufficient to provide LESSOR by the end of each Tax Year with a sum equal to LESSEE'S Proportionate Share of Taxes for such Tax Year. Promptly after the receipt of the Tax bill, LESSOR shall provide LESSEE with a Tax Statement. If the total of the estimated payments theretofore made by LESSEE for the Tax Year exceed the required payments on account thereof for such year, LESSOR shall credit the amount of overpayment against subsequent obligations of LESSEE on account of Taxes (or refund such overpayment if the Term of this Lease has ended and LESSEE has no further obligations to LESSOR); but, if the aggregate of the monthly payments made by the LESSEE for such Tax Year are less than the LESSEE'S Proportionate Share of Taxes, LESSEE shall pay the balance of said amount to LESSOR within thirty (30) days after being so advised by LESSOR. LESSOR shall have the same rights and remedies for non-payment by LESSEE of any payments due on account of such Taxes as LESSOR has under this Lease for failure of LESSEE to pay Rent.

(c) If the Term Commencement Date or the Termination Date occurs during a Tax Year, the LESSEE shall be liable for only that portion of Taxes in respect of such Tax Year represented by a fraction, the numerator of which shall be the number of days of the herein term which falls within the Tax Year, and the denominator of which shall be three hundred sixty-five (365). In the event the first day of the Tax Year should be changed after the Term Commencement Date to a day other than July 1 so as to change the twelve (12) month period comprising the Tax year, in determining Taxes due from the LESSEE hereunder with respect to Taxes payable for the period between July 1 and such changed first day of the Tax Year, such amount of Taxes shall be multiplied by a fraction, the numerator of which shall

be the number of days elapsing during such period, and the denominator of which shall be three hundred sixty-five (365).

8.3 PAYMENT OF OPERATING COSTS BY LESSEE:

(a) In each Computation Year, the LESSEE shall pay to LESSOR, LESSEE'S Proportionate Share of Operating Costs in the manner as hereinafter set forth.

(b) Estimated payments by LESSEE on account of LESSEE'S Proportionate Share of Operating Costs shall be made monthly by the LESSEE and at the time and in the fashion provided in this Lease for the payment of Yearly Rent. Such monthly payment (to be reasonably estimated by the LESSOR) shall be sufficient to provide LESSOR by the end of each Computation Year with a sum equal to LESSEE'S Proportionate Share of Operating Costs pursuant to subparagraph (a) hereof for such Computation Year. Promptly after the end of each Computation Year, LESSOR shall submit to LESSEE a reasonably detailed Operating Cost Statement for such year. If the estimated payments theretofore made for such Computation Year by LESSEE exceed LESSEE'S required payment on account thereof for such year, according to such statement, LESSOR shall credit the amount of overpayment against subsequent obligations of LESSEE with respect to Operating Costs (or refund such overpayment if the Term of this Lease has ended and LESSEE has no further obligation to LESSOR); but, if the aggregate of the monthly payments made for such Computation Year are less than the LESSEE'S Proportionate Share of Operating Costs, LESSEE shall pay the balance of said amount to LESSOR within thirty (30) days after being so advised by LESSOR. LESSOR shall have the same rights and remedies for the nonpayment by LESSEE of any payments due on account of Operating Costs as LESSOR has hereunder for the failure of LESSEE to pay Rent.

9. CHANGES OR ALTERATIONS BY LESSOR

LESSOR reserves the right at any time and from time to time, without the same constituting an actual or constructive eviction, and without incurring any liability to LESSEE therefor, or otherwise affecting LESSEE'S obligations under this Lease, to make such changes, alterations, additions, improvements, repairs, or replacements in or to the Building (including the Premises) and the fixtures and equipment thereof, as well as in or to the outside areas, and entrances, thereof, as he may deem necessary or desirable, provided, however, that there be no unreasonable obstruction of the right of, access to, or unreasonable interference with, the use and enjoyment of the Premises by LESSEE. Nothing contained in this Section 9 shall be deemed to relieve LESSEE of any duty, obligation, or liability of LESSEE with respect to making any repair, replacement, or improvement, or complying with any law, order, or requirement of any government or other authority.

10. FIXTURES, EQUIPMENT, AND IMPROVEMENTS -- REMOVAL BY LESSEE

All fixtures, equipment, improvements, and appurtenances attached to or built into the Premises prior to or during the term, whether by LESSOR at his expense or at the expense of LESSEE (either or both), or by LESSEE, shall be and remain part of the premises and shall not be removed by LESSEE at the end of the term unless otherwise expressly provided in this Lease. Where not built into the Premises, and if furnished and installed by and at the sole expense of LESSEE, all removable electric fixtures, carpets, drinking or tap water facilities, furniture, or trade fixtures, or business equipment shall not be deemed to be included if such fixtures, equipment, improvements, and appurtenances, and may be, and upon the request of LESSOR will be, removed by LESSEE upon the condition that such removal shall not materially damage the premises or the Building, and that the cost of repairing any damage to the premises or the Building arising from such removal shall be paid by LESSEE; provided however, that any such items as toward which LESSOR shall have granted any allowance or credit to LESSEE shall be deemed not to have been furnished and installed in the Premises by or at the sole expense of LESSEE.

11. ALTERATIONS AND IMPROVEMENTS BY LESSEE AFTER TERM COMMENCEMENT DATE

LESSEE shall make no structural alterations, decorations, installations, removals, additions, or improvements in or to the Premises after the Term Commencement Date without LESSOR'S prior written consent and then only by contractors or mechanics engaged on LESSEE'S behalf, by LESSOR. No such installations or work shall be undertaken or begun by LESSEE until LESSOR has approved written plans and specifications therefor, and no amendments or additions to such plans and specifications shall be made without the prior written consent of LESSOR. Any such work, alterations, decorations, installations, removals, additions, and improvements shall be done at LESSEE'S sole expense and at such times and in such manner as LESSOR may from time to time designate. If LESSEE shall make any alterations, decorations, installations, removals, additions, or improvements, then LESSOR may require the LESSEE at the expiration of this Lease to restore the Premises to substantially the same condition as existed on the Term Commencement Date. LESSOR'S consents and approvals called for in this Section 11 shall in no instance be unreasonably withheld or delayed.

12. REPAIRS TO PREMISES

12.1 REPAIRS BY LESSEE: LESSEE shall keep all and singular the Premises in such repair, order, and condition as the same are in on the Term Commencement Date or may be put in during the term hereof, reasonable use and wearing thereof and damage by fire or by casualty insured against only excepted. LESSEE shall make, as and when needed as a result of misuse by, or neglect or improper conduct

of, LESSEE or LESSEE'S servants, employees, agents, or licensees, or otherwise, all repairs in and about the Premises necessary to preserve them in such repair, order, and condition, which repairs shall be in quality and class equal to the original work. LESSOR may elect, at the expense of LESSEE, to make any such repairs or repair any damage or injury to the Building or the Premises caused by moving property of LESSEE in and out of the Building, or by installation or removal of furniture or other property, or by misuse by, or neglect, or improper conduct of LESSEE or LESSEE'S servants, employees, agents, or licensees outside the Premises but affecting LESSEE'S use and enjoyment of the Premises, excluding any repairs required to be made in or damage in the Premises by the LESSOR, as set forth in section 12.2 hereof.

12.2 REPAIRS BY LESSOR: All repairs required in the Premises occasioned by action of the elements or by matters ordinarily covered by LESSOR'S fire and extended coverage insurance, but excluding repairs becoming necessary as the result of misuse or negligence on the part of LESSEE or LESSEE'S employees, agents, or licensees, shall be made by and at the expense of LESSOR. LESSOR agrees to keep in good order, condition, and repair, including replacements thereof as and when necessary (i) the structural elements of the Premises which includes all footings, foundations, floor slabs, columns, girders, mullions, loadbearing exterior walls; and, (ii) the roofing system of the Premises which includes support members, membrane assembly, flashings, roof insulation assembly, hatches, sleeves, vents, and brackets.

13. INSURANCE, INDEMNIFICATION, EXONERATION AND EXCULPATION

13.1 PUBLIC LIABILITY INSURANCE: LESSEE shall procure, keep in force, and pay for comprehensive public liability insurance (hereinafter referred to as "LIABILITY INSURANCE") indemnifying LESSOR and LESSEE against all claims and demands for injury to or death of persons or damage to property which may be claimed to have occurred upon the Premises, or in or about the common areas of the Building which arise out of the LESSEE'S use and occupancy of the Premises, in amounts which shall be in a combined single limit for bodily injury or death and for property damage ("Broad Form" endorsement, so-called), in a sum of not less than ONE MILLION DOLLARS (\$1,000,000) DOLLARS.

13.2 HAZARD INSURANCE: During the term of this lease, LESSOR shall keep the Building including any improvements which may be made by LESSOR in the Premises including, but not limited to, painting, light fixtures, floor covering, and partitions, if installed by LESSOR, to the extent that the same are customarily insurable as part of the realty and may be covered by LESSOR'S insurance, insured against loss or damage by fire and any of the casualties included in the broadest standard form obtainable of extended coverage or supplementary contract endorsements.

13.3 CERTIFICATE OF INSURANCE: All such insurance shall be effected with insurers authorized to do business in Massachusetts under valid and enforceable policies. The Liability Insurance shall name LESSOR and LESSEE as the insureds, as their respective interests appear, and shall provide that it shall not be cancelled without at least thirty (30) days prior written notice to each insured named therein. Not less than fifteen (15) days prior to the expiration date of each expiring policy of Liability Insurance, original copies of such policies issued by the respective insurers, or certificates of such policies setting forth in full the provisions thereof and issued by such insurers, together with evidence satisfactory to LESSOR of payment of all premiums for such policies, shall be delivered by LESSEE to LESSOR and certificates as aforesaid of such policies shall upon request of LESSOR be delivered by LESSEE to the holder of any mortgage affecting the Building. LESSEE may provide Liability Insurance as an endorsement to any of its blanket policies.

13.4 GENERAL: LESSEE will save LESSOR harmless, and will exonerate and indemnify LESSOR from and against any and all claims, liabilities, or penalties asserted by or on behalf of any person, firm, corporation, or public authority;

(a) On account of, or based upon any injury to person, or loss of or damage to property, sustained or occurring on the Premises on account of, or based upon, the act, omission, fault, negligence, or misconduct of the LESSEE, its employees, agents, and invitees.

(b) On account of, or based upon any injury to person, or loss of or damage to property, sustained or occurring elsewhere (other than on the Premises), in or about the Building, and, in particular and without limiting the generality of the foregoing, in or about the Common Areas, surrounding areaways, roof, or other appurtenances and facilities used in connection with the Building or Premises, arising out of the use or occupancy of the Premises by the LESSEE or by any person claiming by, through, or under LESSEE, on account of or based upon the act, omission, fault, negligence, or misconduct of all such persons other than LESSOR and those for whose conduct the LESSOR is legally responsible.

(c) On account of or based upon (including monies due on account of) any work or thing whatsoever done by the LESSEE, its employees, agents, and invitees (other than by LESSOR or his contractors, or agents or employees of either) on the Premises during the term of this Lease and during the period of time, if any, prior to the Term Commencement Date that LESSEE may have been given access to and used the Premises; and, in respect to any of the matters set forth in subsections (a) and (b) hereof, from and against all cost expenses (including reasonable attorney's fees) and liabilities incurred in or in connection with any such claim, or any action, or proceeding brought thereon; and in case any action or proceeding by brought against LESSOR by reason of such claim, LESSEE, upon notice from LESSOR shall, at LESSEE'S expense, resist or defend such action or proceeding and employ such

counsel therefore reasonably satisfactory to LESSOR, it. being agreed that such counsel as may act for insurance underwriters of LESSEE engaged in such defense, shall be deemed satisfactory. Nothing in this Lease shall be construed to require LESSEE to indemnify LESSOR against the consequences of any act, omission, fault, negligence, or misconduct of LESSOR or those for whose conduct LESSOR is legally responsible, and the LESSOR shall indemnify the LESSEE for or in respect of such conduct.

13.5 PROPERTY OF LESSEE: In addition to and not in limitation of the foregoing, LESSEE covenants and agrees that all merchandise, furniture, fixtures, and property of every kind, nature, and description which may be in or upon the Premises or Building, or on the Common Areas, surrounding areaways, or approaches adjacent thereto, during the term hereof, shall be at the sole risk and hazard of LESSEE, and that if the whole or any part thereof shall be damaged, destroyed, stolen, or removed due to any cause or reason whatsoever, no part of said damage or loss shall be charged to or borne by LESSOR.

13.6 BURSTING OF PIPES, ETC.: LESSOR shall not be liable for any injury or damage to persons or property resulting from fire, explosion, falling plaster, steam, gas, electricity, electrical disturbance, water, rain, or snow leaks from any part of the Premises or the Building or from the pipes, appliances, or plumbing works or from the roof, street, or sub-surface, or from any other place by dampness or by any other cause of whatever nature; nor shall LESSOR or his agents be liable for any such damage caused by other tenants or persons in the Building or caused by operations in construction of any private, public, or quasi-public work; nor shall LESSOR be liable for any latent defect in the Premises or in the Building.

13.7 REPAIRS AND ALTERATIONS: There shall be no allowance to LESSEE for diminution of rental value of the Premises and no liability on the part of LESSOR by reason of inconvenience, annoyance, or injury to LESSEE arising from any repairs, alterations, additions, replacements, or improvements made by LESSOR, LESSEE, or others in any portion of the Building or Premises, or in or to the fixtures, appurtenances, or equipment thereof, or for failure of LESSOR or others to make any repairs, alterations, additions, or improvements in or to any portion of the Building or to the Premises, or in or to the fixtures, appurtenances, or equipment thereof.

14. ASSIGNMENT AND SUBLETTING

14.1 PROHIBITION: LESSEE covenants and agrees that neither this Lease nor the term and estate hereby granted, nor any interest herein or therein, will be assigned, mortgaged, pledged, encumbered, or otherwise transferred (including without limitation, transfers by operation of law) and that neither the Premises nor any part thereof will be encumbered in any manner by reason of any act or omission on the part of LESSEE, or used or occupied or permitted to be used or occupied by

anyone other than LESSEE, or be sublet (which term without limitation, shall include granting of concessions, licenses, and the like) in whole or in part, without, in each instance, having first received the express written consent of LESSOR which shall not be unreasonably withheld or delayed, except that no such consent shall be required for an assignment or sublease to LESSEE'S affiliates. It shall be a condition of the validity of any assignment (whether the LESSOR'S written consent is required or not, as aforesaid) that the assignee agrees directly with LESSOR, by written instrument in form satisfactory to LESSOR, to be bound by all the obligations of LESSEE hereunder including, without limitation, the covenant against further assignment and subletting. No assignment or subletting shall relieve LESSEE from its obligations hereunder and LESSEE shall remain fully and primarily liable therefor.

14.2 NO WAIVER: If this Lease be assigned, or if the Premises or any part thereof be sublet or occupied by anyone other than LESSEE, LESSOR may, at any time and from time to time, collect rent and other charges from the assignee, subtenant, or occupant, and apply the net amount collected to the rent and other charges herein reserved, but no such assignment, subletting, occupancy, or collection shall be deemed a waiver of this covenant, or the acceptance of the assignee, subtenant, or occupant as a tenant or the release of LESSEE from the further performance by LESSEE of its obligations hereunder. The consent by LESSOR to an assignment or subletting shall in no way be construed to relieve LESSEE or any successor from obtaining the express consent in writing of LESSOR to any further assignment of this Lease or subletting of all or a portion of the Premises.

15. MISCELLANEOUS COVENANTS

LESSEE covenants and agrees as follows:

15.1 ACCESS TO PREMISES: LESSEE shall (i) permit LESSOR to erect, use, and maintain pipes, ducts, and conduits in and through the Premises, provided the same do not materially reduce the floor area or materially or adversely affect the LESSEE'S use of the same; (ii) permit the LESSOR, any mortgagee of the Building and its representatives, and any authorized representative of the Walpole Board of Health to have free and unrestricted access to and to enter upon the Premises at all reasonable hours for the purpose of inspection, or for making repairs, replacements, or improvements in or to the Building, or the equipment thereof (including without limitation, sanitary, electrical, or other systems), or to determine compliance with all laws, orders, and requirements of governmental or other authority, or exercising any right reserved to LESSOR under this Lease (including the right during the progress of any such repairs, replacements, or improvements, or while performing work and furnishing materials in connection with compliance with any such laws, orders, or requirements, to take upon or through or to keep and store within the Premises all necessary materials, tools, and equipment); and, (iii) permit LESSOR, at reasonable times, to show the Premises during ordinary business hours to any mortgagee,

prospective lessee, prospective purchaser, prospective mortgagee, or prospective assignee of any mortgage of the Building, and during the period of twelve (12) months next preceding the Termination Date to any person contemplating the leasing of the Premises or any part thereof. If LESSEE shall not be personally present to open and permit entry into the Premises at any time when for any reason an entry therein shall be necessary or permissible, LESSOR or LESSOR'S agents may, in an emergency situation, enter the same by a master key, or may forcibly enter the same, without rendering LESSOR or such agents liable therefor (if during such entry LESSOR or LESSOR'S agents shall accord reasonable care to LESSEE'S property), and without in any manner affecting the obligations and covenants of this Lease. The rights provided for in subsections (i), (ii) and (iii) hereof shall be exercised upon reasonable notice (telephonic or otherwise) if the same is practicable, and with minimum practicable interference with the conduct of the LESSEE'S business in the Premises.

15.2 ACCIDENTS TO SANITARY AND OTHER SYSTEMS: LESSEE shall give to LESSOR prompt notice of any fire or accident occurring in the Premises, and of any damage to, or defective condition in, any part of the Premises' sanitary, electrical, heating, or other systems located in or passing through the Premises, but if the damage or defective condition was caused by LESSEE or by the employees, licensees, or invitees of LESSEE, the cost to remedy the same shall be paid by LESSEE. LESSEE shall not be entitled to claim any eviction from the Premises or any damages arising from any such damage or defect unless the same shall have been occasioned by the negligence of LESSOR, his agents, servants, or employees, and in case of a claim of eviction, unless such damage or defective condition shall have rendered the Premises untenable and the Premises shall not have been made tenantable by LESSOR within a commercially reasonable period of time.

15.3 SIGNS: No signs may be installed on or in any window of the Premises by LESSEE. No other signs shall be permitted in or about the Premises or Building Without the written approval of the LESSOR which approval shall not be unreasonably withheld or delayed. Said exterior sign shall in all events conform to the requirements of Exhibit 4 hereof.

15.4 INFLAMMABLE - ODORS: LESSEE shall not bring or permit to be brought or kept in or on the Premises or elsewhere in the Building, any flammable, combustible, or explosive fluids, material, chemical substances, or cause or permit and odors of cooking or other processes, or any unusual or other objectionable odors to emanate from or permeate the Premises.

15.5 REQUIREMENTS OF LAW - FINES AND PENALTIES: LESSEE at its sole expense shall comply with all laws, rules, orders and regulations of federal, state, county, and municipal authorities and with any direction of any public officer or officers, pursuant to law, which shall impose any duty upon LESSOR or LESSEE

arising out of LESSEE'S use or occupancy of the Premises. LESSEE shall reimburse and compensate LESSOR for all expenditures made by, or damages or fines sustained or incurred by LESSOR, due to nonperformance or noncompliance with, or breach or failure to observe any term, covenant, or condition of this Lease upon LESSEE'S part to be kept, observed, performed, or complied with.

15.6 LESSEE'S ACTS - EFFECT ON INSURANCE: LESSEE shall not do or permit to be done any act or thing upon the Premises nor elsewhere in the Building which will invalidate or be in conflict with any insurance policies covering the Building and the fixtures and property therein; and shall not do, or permit to be done, any act or thing upon the Premises or Building which shall or might subject LESSOR to any liability or responsibility for injury to any person or persons or to property by reason of any business or operation being carried on upon said Premises, or for any other reason. LESSEE at its own expense shall comply with all rules, orders, regulations, or requirements of the Board of Fire Underwriters, or any other similar body having jurisdiction, and shall not (i) do, or permit anything to be done, in or upon the Premises, or bring or keep anything therein, except as now or hereafter permitted by the Fire Department, Board of Fire Underwriters, any fire insurance rating organization, or other authority having jurisdiction, and then only in such quantity and manner of storage as will not increase the rate for any insurance applicable to the Building; or, (ii) use the Premises in a manner which shall increase such insurance rates on the Building or on property located therein, over that applicable at the commencement of this Lease. If by reason of failure of LESSEE to comply with the provisions hereof, the insurance rate applicable to any policy of insurance shall at any time thereafter be higher than it otherwise would be, then LESSEE shall reimburse LESSOR for that part of any insurance premiums thereafter paid by LESSOR, which shall have been charged because of such failure by LESSEE.

Under Sections 15.5 and 15.6 hereof, there shall be no duty on LESSEE to make any structural change or to make any other change in the Premises unless required because of the manner in which LESSEE shall be using the Premises.

16. DAMAGE BY FIRE OR OTHER CASUALTY

If the Premises or any part thereof shall be damaged by fire or other casualty, LESSOR shall proceed with reasonable diligence, and at the expense of LESSOR (but only to the extent of insurance proceeds made available to LESSOR by any mortgagee of the Building), to repair or cause to be repaired such damage; provided, however, in respect of such alterations, decorations, additions, and improvements originally made or installed by LESSEE at LESSEE'S expense as shall have been damaged by such fire or other casualty, and which (in the judgment of LESSOR) can more effectively be repaired as an integral part of the repair work in the Premises, that the repairs to such LESSEE'S alterations, decorations, additions, and improvements shall be performed by LESSOR but at LESSEE'S expense. All repairs to and replacements

of property which LESSEE is entitled to remove as in Article 10 provided, shall be made by at the expense of LESSEE. If the Premises or any part thereof shall have been rendered unfit for use and occupation hereunder by reason of such damage, the Yearly Rent or a just and proportionate part thereof according to the nature and extent to which the Premises shall have been so rendered unfit, shall be suspended or abated from the date of the occurrence of such casualty until the Premises (except as to the property which is to be repaired by or at the expense of LESSEE) shall have been restored as nearly as practicably may be to the condition in which they were immediately prior to such fire or other casualty; provided, however, that if LESSOR or any mortgagee of the Building shall be unable to collect the insurance proceeds (including any rent insurance proceeds) applicable to such damage because of some action or inaction on the part of LESSEE, or the employees, licensees, or invitees of LESSEE, the cost of repairing such damage shall be paid by LESSEE and there shall be no abatement of rent. LESSOR shall not be liable for delays in the making of any such repairs which are due to government regulations, casualties, strikes, unavailability of labor and materials, and other causes beyond the reasonable control of LESSOR, nor shall LESSOR be liable for any inconvenience or annoyance to LESSEE or injury to the business of LESSEE resulting from delays in repairing such damage. If (i) the Premises are so damaged by such fire or other casualty at any time during the last twelve (12) months of the term hereof that the cost to repair such damage (as reasonably estimated by the LESSOR) is likely to exceed one-third of the total Yearly Rent for the period from the estimated date of restoration until the Termination Date; or (ii) the Building (whether or not including any portion of the Premises) is so damaged by such fire or other casualty that substantial alteration or reconstruction of the Building shall in LESSORS judgement be required, then and in either of such events, this Lease and the term hereof may be terminated at the election of LESSOR by a notice in writing of his election so to terminate which shall be given by LESSOR to LESSEE within sixty (60) days following such fire or other casualty, the effective termination date of which shall be not less than thirty (30) days after the date on which such termination notice is received by LESSEE. If the Premises are damaged by fire or other casualty, and are not substantially restored to its original condition within a period of sixty (60) days therefrom, the LESSEE may, by notice in writing to LESSOR cancel and terminate this Lease on account thereof. In the event of any such termination, this Lease and the term hereof shall expire as of such effective termination date as though that were the Termination Date as stated in Exhibit 2, and the Yearly Rent shall be apportioned as of such date; and, if the Premises or any part thereof shall have been rendered unfit for use and occupation by reason of such damage, the Yearly Rent for the period from the date of occurrence of such fire or other casualty to the effective termination date, or a just and proportionate part thereof, according to the nature and extent to which the Premises shall have been so rendered unfit, shall be abated. Any abatement of rent pursuant to this section, whether total or partial, shall extend to all rent items called for by this Lease whether "yearly" or otherwise.

17. WAIVER OF SUBROGATION RIGHTS

The LESSOR discharges and releases the LESSEE, his agents or employees, to the extent of the LESSOR'S insurance coverage, for and on account of any and all claims and liabilities arising out of any loss or damage during the term hereof, or any extension thereof, to any property of the LESSOR caused by fire and such risks as are customarily comprehended by the term "extended coverage" in endorsements to fire insurance policies; and (ii) such other risks as are covered by insurance which the LESSOR may desire to procure.

The LESSEE discharges and releases the LESSOR, his agents or employees, to the extent of LESSEE'S insurance coverage for and on account of any and all claims and liabilities arising out of any loss or damage during the term hereof, or any extension hereof, to any property of the LESSEE caused by (i) fire and such risks as are comprehended by the term "extended coverage" in endorsements to fire insurance policies; and (ii) such other risks as are covered by insurance which the LESSEE may desire to procure.

In consideration of the foregoing, each of the parties hereto agrees with the other party (i) that such insurance as may be in effect during the term of this Lease, or any extensions thereof, shall include a clause or endorsement which provides in substance that the insurance company waives any right or subrogation which it might otherwise have against the LESSOR or the LESSEE, as the case may be; and, (ii) upon demand of the other party for any extra premium costs, if any, incurred in obtaining such clause or endorsement.

Upon demand in writing made by either party hereto, the other party agrees to furnish to it a statement of the amount and type of such insurance coverage and the names of the insurance companies and to request its insurance companies to give notice to such other party of any cancellation or discontinuance of any part of such coverage.

18. CONDEMNATION -- EMINENT DOMAIN

In the event that the Premises or any part thereof, or the whole or any part of the Building (including within such term the Common Areas thereof shall be taken or appropriated by eminent domain or shall be condemned for any public or quasi-public use, or (by virtue of any such taking, appropriation, or condemnation) shall suffer any damage (direct, indirect, or consequential) for which LESSOR or LESSEE shall be entitled to compensation, then (and in any such event) this Lease and the term hereof may be terminated at the election of LESSOR or LESSEE by a notice in writing of his or its election so to terminate which shall be given to the other party within sixty (60) days following the date on which LESSOR shall have received notice of such taking, appropriation, or condemnation.

Upon the giving of any such notice of termination (either by LESSOR or LESSEE) this Lease and the term hereof shall terminate on or retroactively as of the date on which LESSEE shall be required to vacate any part of the Premises, or shall be deprived of a substantial part of the means of access thereto; provided, however, that LESSOR may in LESSOR'S notice elect to terminate this Lease and the term hereof retroactively as of the date on which such taking, appropriation, or condemnation became legally effective. In the event of any such termination, this Lease and the term hereof shall expire as of such effective termination date and the Yearly Rent shall be apportioned as of such date: If neither party (having the right so to do) elects to so terminate, LESSOR will, with reasonable diligence and at LESSOR'S expense, restore the remainder of the Premises, or the remainder of the means of access thereto, as nearly as practicably may be to the same condition as obtained prior to such taking, appropriation, or condemnation, in which event (i) the Rentable Area and Yearly Rent, according to the nature and extent of the taking, appropriation, or condemnation, and the resulting permanent injury to the Premises, or the means of access thereto, shall be permanently abated; and, (ii) a just proportion of the remainder of the Yearly Rent, according to the nature and extent of the taking, appropriation, or condemnation and the resultant injury sustained by the Premises or the means of access thereto, shall be abated until what remains of the Premises or the means of access thereto, shall have been restored as full as may be for permanent use and occupation by LESSEE hereunder. There is expressly reserved to LESSOR all rights to compensation and damages created, accrued, or accruing by reason of any such taking, appropriation or condemnation, in implementation and confirmation of which LESSEE does hereby acknowledge that LESSOR shall be entitled to receive all such compensation and damages, grants to LESSOR all and whatever rights (if any) LESSEE may have to such compensation and damages, and agrees to execute and deliver all and whatever further instruments of assignment as LESSOR may from time to time request.

If part of the Building but not any part of the Premises, or if any part of the Common Areas of the Building shall be taken or appropriated by eminent domain or condemned for any public or quasi-public use, LESSOR'S right to terminate this Lease pursuant to this Section may be exercised only if LESSOR shall reasonably determine that the continued operation of the Building or what may remain thereof would not be economically feasible.

Upon the giving of any notice of termination under this Section 18, whether by LESSOR or LESSEE, the term of this Lease shall end upon LESSEE'S vacating the Premises pursuant to the notice, unless the term be sooner ended as a matter of law as a consequence of the taking, appropriation, or condemnation.

19. LESSEE'S DEFAULT

19.1 EVENTS OF DEFAULT: If at any time subsequent to the date of this Lease any one or more of the following events (hereinafter referred to as a "DEFAULT OF LESSEE") shall occur:

(a) LESSEE shall fail to pay the rent or other charges hereunder when due, and such failure shall continue for a period of seven (7) days after receipt of notice from LESSOR (receipt shall be presumed within a three day period after the same is posted in the U.S. Mail postage prepaid); provided however, that if such failure shall occur more than once during each Computation Year, no written notice from the LESSOR shall be required, and the LESSEE shall be in default hereunder, if its failure shall continue for a period of seven (7) days after the payment of rent or other charges hereunder shall become due.

(b) LESSEE shall neglect or fail to perform or observe any other covenant herein contained on LESSEE'S part to be performed or observed, and LESSEE shall fail to remedy the same within thirty (30) days after written notice from LESSOR, specifying such neglect or failure, or if such failure is of such a nature that LESSEE cannot reasonably remedy the same within such thirty (30) day period, LESSEE shall fail to promptly commence to remedy the same and shall prosecute such remedy to completion with due diligence and continuity; or,

(c) LESSEE'S leasehold in the Premises shall be taken on execution or by other process of law directed against LESSEE; or,

(d) LESSEE shall make an assignment for the benefit of creditors; or shall file a voluntary petition in bankruptcy; or shall be adjudicated bankrupt or insolvent; or shall file any petition or answer seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief for itself under any present or future Federal, State, or other statute, law, or regulation for the relief of debtors; or shall seek or consent to, or acquiesce in, the appointment of any trustee, receiver, or liquidator of LESSEE or of all or any substantial part of its properties; or shall admit in writing its inability to pay its debts generally as they become due; or,

(e) A petition shall be filed against LESSEE in bankruptcy or under any other law seeking any reorganization, arrangement, composition, readjustment, liquidation, dissolution, or similar relief under any present or future Federal, State or other statute, law or regulation and shall remain undismissed or unstayed for an aggregate period of sixty (60) days (whether or not consecutive); or, if any debtor in possession (whether or not LESSEE), trustee, receiver, or liquidator of LESSEE of all or any substantial part of its properties shall be appointed without the consent of acquiescence of LESSOR and such appointment shall remain unvacated or unstayed

for an aggregate period of sixty (60) days (whether or not consecutive), then in any such case (i) if such Default of LESSEE shall occur prior to the Term Commencement Date, this Lease shall ipso facto, and without further act on the part of LESSOR, terminate; and, (ii) if such Default of LESSEE shall occur after the Term Commencement Date, LESSOR may terminate this lease by notice to LESSEE specifying a date not less than ten (10) days after the giving of such notice, on which this Lease shall terminate and this Lease shall come to an end on the date specified therein as fully and completely as if such date were the date herein originally fixed for the expiration of the term of this Lease (LESSEE hereby waiving any rights of redemption under present or future laws), and LESSEE will then quit and surrender the Premises to LESSOR, but LESSEE shall remain liable as hereinafter provided.

19.2 RE-ENTRY BY LESSOR: If this Lease shall have been terminated as provided in this Section, or if any execution shall be issued against LESSEE or any of LESSEE'S property whereupon the Premises shall be taken or occupied by someone other than LESSEE, then LESSOR may, without notice, re-enter the Premises, either by force, summary proceedings, ejectment, or otherwise, and remove and dispose LESSEE and all other persons and any and all property from the same as if this Lease had not been made.

19.3 DAMAGES DUE: In case of any such termination, the rent reserved hereunder shall thereupon become due and be paid up to the time of such termination together with any expenses LESSOR may incur for attorney's fees, brokerage commissions, or expenses with respect to putting the Premises in good order and for preparing the same for reletting. In addition, if such termination occurs during the initial term of this Lease, there shall become due from the LESSEE to the LESSOR an amount which shall be equal to the unamortized portion of the total cost to the LESSOR of furnishing and providing the Building Standard Work in and to the Premises, measured from the date of such termination to the date originally fixed in this Lease as the Termination Date, as if such cost was fully amortized over the initial term of this Lease.

19.4 LIQUIDATED DAMAGES: In case of any such termination, LESSEE shall also pay LESSOR as liquidated damages for the failure of LESSEE to observe and perform the covenants herein contained to be performed by LESSEE, any deficiency between the rent reserved hereunder and/or covenanted to be paid and the net amount, if any, of the damages collected under Section 19.3 and the rents collected on account of the lease or leases of the Premises for each month of the period which would otherwise have constituted the balance of the term of this Lease. In computing such liquidated damages there shall be added to such deficiency such expenses as LESSOR may incur in connection with reletting such as legal expenses, brokerage, advertising, and for keeping the Premises in good order and for preparing the same for reletting. Any such liquidated damages shall be paid in monthly installments by LESSEE on the first day of each month, and any suit brought to

collect the amount of the deficiency for any month shall not prejudice in any way the rights of LESSOR to collect the deficiency for any subsequent month by similar proceedings. In no event shall LESSEE be entitled to receive the excess, if any, of such net rents collected over the sums payable by any LESSEE of the Premises to LESSOR hereunder. LESSOR, upon termination or at any time hereafter, shall have the right, in lieu of collecting liquidated damages in installments as above provided, to recover from LESSEE liquidated damages payable on demand equal to the excess of the rent which would have been payable from the date of such demand to the end of the period which would otherwise have constituted the balance of the term of this Lease, over the then fair market rental value of the Premises for the same period. For this purpose, in computing the amount of rent, the amounts to be included for Operating Costs and other amounts required by this Lease to be paid by LESSEE shall be deemed, for each month, to be equal to the amount of the item for the twelve (12) months preceeding the date of demand.

19.5 LESSOR'S RIGHTS: In case of any default by LESSEE, reentry, expiration, or dispossession by summary proceedings, or otherwise, LESSOR may (i) re-let the Premises or any part or parts thereof, either in the name of LESSOR or otherwise, for a term or terms which may at LESSOR'S option be equal to or less than or exceed the period which would otherwise have constituted the balance of the term of this Lease and may grant concessions or free rent to the extent that LESSOR in his discretion deems advisable and necessary to re-let the same; and, (ii) may make such reasonable alterations, repairs, and decorations in the Premises as LESSOR in his sole judgement considers advisable and necessary for the purpose of reletting the Premises, and the making of such alterations, repairs, and decorations shall not operate or be construed to release LESSEE from liability hereunder as aforesaid. LESSOR shall in no event be liable in any way whatsoever for failure to re-let the Premises, or, in the event that the Premises are re-let, for failure to collect the rent under such reletting. LESSEE hereby expressly waives any and all rights of redemption granted by or under any present or future laws in the event of LESSEE being evicted or dispossessed, or in the event of LESSOR obtaining possession of the Premises, by reason of the violation of the LESSEE of any of the covenants and conditions of this Lease.

19.6 REMEDIES NON-EXCLUSIVE: The specified remedies to which LESSOR may resort hereunder are not intended to be exclusive of any remedies or means of redress to which LESSOR may at any time be lawfully entitled and LESSOR may invoke any remedy (including the remedy of specific performance) allowed at law or in equity as if specific remedies were not herein provided for.

20. LESSOR'S DEFAULT

LESSOR shall in no event be in default in the performance of any of LESSOR'S obligations hereunder unless and until LESSOR shall have failed to perform such

obligations within thirty (30) days, or such additional time as is reasonably required to correct any such default, after written notice by LESSEE to LESSOR specifying wherein LESSOR has failed to perform any such obligation.

21. ENTIRE AGREEMENT; WAIVER; SURRENDER

21.1 ENTIRE AGREEMENT: This Lease, the Exhibits hereto annexed, and the Addenda hereto annexed (if any) are made a part hereof, and contain the entire and only agreement between the parties and any and all statements and representations, written and oral, including previous correspondence and agreements between the parties hereto, are merged herein. LESSEE acknowledges that all representations and statements upon which it relied in executing this Lease are contained herein, and that the LESSEE in no way relied upon any other statements or representations, written or oral. Any executory agreement hereafter made shall be ineffective to change, modify, discharge, or effect an abandonment of this Lease in whole or in part unless such executory agreement is in writing and signed by the party against whom the enforcement of the change, modification, discharge, or abandonment is sought.

21.2 WAIVER BY LESSOR: The failure of LESSOR to seek redress for violation, or insist upon the strict performance of any covenant or condition of this Lease, or any of the rules and regulations promulgated by the LESSOR shall not prevent a subsequent act, which would have originally constituted a violation, from having all the force and effect of an original violation. The receipt by LESSOR of rent with knowledge of the breach of any covenant of this Lease shall not be deemed a waiver of such breach. The failure of LESSOR to enforce any of his rules and regulations against LESSEE and/or any other tenant in the Building shall not be deemed a waiver of any such rules and regulations. No provisions of this Lease shall be deemed to have been waived by LESSOR unless such waiver be in writing signed by LESSOR. No payment by LESSEE or receipt by LESSOR of a lesser amount than the monthly rent herein stipulated shall be deemed to be other than on account of the stipulated rent, nor shall any endorsement or statement on any check or any letter accompanying any check or payment as rent be deemed an accord and satisfaction, and LESSOR may accept such check or payment without prejudice to LESSOR'S right to recover the balance of such rent or pursue any other remedy in this provided.

21.3 SURRENDER: No act or thing done by LESSOR during the term hereby demised shall be deemed an acceptance of a surrender of the Premises, and no agreement to accept such surrender shall be valid, unless in writing signed by the LESSOR. No employee or agent of LESSOR shall have any power to accept the keys to the Premises prior to the termination of this Lease.

22. INABILITY TO PERFORM

Except as provided in Sections 3.1 and 3.2 hereof, this Lease and the obligations of LESSEE to pay rent hereunder and perform all of the other covenants, agreements, terms, provisions, and conditions hereunder on the part of LESSEE to be performed, shall in no way be affected, impaired, or excused because LESSOR is unable to fulfill any of his obligations under this Lease; or is unable to supply or is delayed in supplying any service expressly or impliedly to be supplied; or is unable to make, or is delayed in making, any repairs, replacements, additions, alterations, improvements, or decorations; or is unable to supply or is delayed in supplying any equipment or fixtures if LESSOR is prevented or is delayed from so doing by reason of strikes or labor troubles, or any other similar or dissimilar cause whatsoever beyond LESSOR'S reasonable control, including but not limited to governmental preemption in connection with a national emergency; or by reason by any rule, order, or regulation of governmental agency; or by reason of the conditions of supply and demand which have been or are affected by war, hostilities, or other similar or dissimilar emergency. In each such instance of inability of LESSOR to perform, LESSOR shall exercise reasonable diligence to eliminate the cause of such inability to perform.

23. BILLS AND NOTICES

Any notice, consent, request, bill, demand, or statement hereunder by either party to the other party shall be in writing and shall be deemed to have been duly given when either delivered personally or mailed addressed to LESSOR at his address as set forth in Exhibit 2 hereof and to LESSEE at the Premises, or if any address for notices shall have been duly changed as hereinafter provided, to the party at such changed address. Either party may at any time change the address for such notices, consents, request, bills, demands, or statements by delivering or mailing, as aforesaid, to the party entitled thereto, a notice stating the change and setting forth the changed address.

24. PARTIES BOUND - SEISEN OF TITLE

The covenants, agreements, terms, provisions, and conditions of this Lease shall bind and benefit the successors and assigns of the parties hereto with the same effect as if mentioned in each instance where a party hereto is named or referred to, except that no violation of the provisions of Article 14 hereof shall operate to vest any rights in any successor or assignee of LESSEE, and that the provisions of this Article 24 shall not be construed as modifying Article 19 hereof. The words "LESSOR" and "LESSEE" as used herein shall be construed in each and every covenant and clause in this Lease, unless repugnant to the context thereof, to refer to the person or persons first named above and their respective representatives, successors, and assigns, and those claiming by, through, or under any of them.

If in connection with or as a consequence of the sale, transfer, or other disposition of the Building, LESSOR ceases to be the owner of the reversionary interest in the same, LESSOR shall be entirely freed and relieved from the performance and observance thereafter of all covenants and obligations hereunder on the part of LESSOR to be performed and observed, it being understood and agreed in such event (and it shall be deemed and construed as a covenant running with the land) that the person succeeding to LESSOR'S ownership of said reversionary interest shall thereupon and thereafter assume, perform, and observe, any and all such covenants and obligations of LESSOR.

25. SUBORDINATION AND LESSEE'S ESTOPPEL CERTIFICATE

25.1 SUBORDINATION OF LEASE: LESSEE agrees that, at the election of the LESSOR, this Lease shall be subject and subordinate to the lien of any one or more mortgages which may be now or hereafter be placed on, encumber, or affect the Building and to all renewals, modifications, consolidations, and replacements thereof. When requested to do so by LESSOR, LESSEE agrees to execute, acknowledge, and deliver to the LESSOR an instrument (hereinafter referred to as "SUBORDINATION AGREEMENT") in form and substance reasonably satisfactory to the LESSOR, and in proper form for recording, wherein LESSEE agrees to and does subordinate this Lease to the lien of any one or more mortgages above mentioned, and to all renewals, modifications, consolidations, replacements, and extensions of the same, and to attorn to and recognized such mortgage(s) thereunder, and to any person claiming by, through, or under such mortgage(s).

25.2 LESSEE'S ESTOPPEL CERTIFICATE: LESSEE shall at any time, and from time to time, on not less than seven (7) days' prior written notice from LESSOR, execute, acknowledge, and deliver to LESSOR a statement in writing addressed to LESSOR (or to any mortgagee or prospective mortgagee of the Building) certifying that this Lease is unmodified and is in full force and effect, or if there have been modifications, the dates that this Lease is in full force and effect as modified, setting forth the modifications; stating the dates to which the rent and other charges under this Lease have been paid; and, whether or not to the best of its knowledge, there exists any default in the performance of any covenant, agreement, term, provision, or condition of this Lease, and if so, specifying each such default of which it has knowledge. It is intended that any such statement delivered pursuant hereto may be relied on by LESSOR and by any such mortgagee or prospective mortgagee affecting the Building.

25.3 NEGLECT OR FAILURE OF LESSEE: In the event that LESSEE shall neglect or shall refuse to comply with its obligations as set forth in Sections 25.1 and 25.2, or shall neglect or refuse to execute a Subordination Agreement and/or Estoppel Certificate within a ten (10) day period after LESSOR's written request therefor, LESSEE hereby irrevocably appoints LESSOR as its attorney-in-fact with full power

and authority to execute and deliver such instrument or instruments or and in the name of LESSEE, or LESSOR may treat such neglect or failure on the part of the LESSEE as Default of LESSEE within the meaning of Section 19.1 of this Lease.

26. QUIET ENJOYMENT

LESSEE, subject to the terms and provisions of this Lease, on payment of the rent and other charges and upon observing, keeping, and performing all of the other terms and provisions of this Lease on LESSEE'S part to be observed, kept, and performed, shall lawfully, peaceably, and quietly have, hold, and occupy and enjoy the Premises during the term hereof, without hindrance or ejection by any persons lawfully claiming under LESSOR to have title to the Premises superior to LESSEE. The foregoing covenant of quiet enjoyment is in lieu of any other covenant, express or implied.

27. MISCELLANEOUS

27.1 SEPARABILITY: If any provision of this Lease or portion of such provision or the application thereof to any person or circumstance is for any reason held invalid or unenforceable, the remainder of the Lease (or the remainder of such provision) and the application thereof to other persons or circumstances shall not be affected thereby.

27.2 CAPTIONS AND VARIATIONS IN PRONOUNS: The captions in each article, section, and subsection in this Lease are inserted only as a matter of convenience and for reference, and in no way define, limit, or describe, the scope of this Lease or the intent of any provision thereof. All pronouns and any variation thereof shall be deemed to refer to the masculine, feminine, neuter, singular or plural, as the identity of the party or parties, or their representatives, heirs, successors and assigns, may require.

27.3 INCORPORATION OF EXHIBITS AND ADDENDA: Exhibits 1, 2, 3, and 4 and the Addenda hereto annexed (if any) and initialled by the parties hereto are expressly made a part of this Lease.

27.4 GOVERNING LAW: This Lease is made pursuant to, and shall be governed by and construed in accordance with, the laws of the Commonwealth of Massachusetts.

27.5 NONRECOURSE: Neither the trustee of the LESSOR Trust nor any of the beneficiaries thereof, or their respective heirs, successors, or assigns shall be personally liable for the performance or observance of any covenant or condition herein contained, or for the payment of any claim or judgement under this Lease, and no recourse shall be had against any such person for such performance, observance,

or payment. LESSEE agrees to look solely to the equity of the LESSOR in the Building for the satisfaction of any LESSEE'S claims under this Lease.

IN WITNESS WHEREOF, the parties hereto have executed this Indenture of Lease in duplicate original as a sealed instrument on the day and year first above set forth.

ATTEST LESSOR:
WALPOLE PARK SOUTH (II) TRUST
By:

[illegible] /s/ Donnell W. Murphy

DONNELL W. MURPHY
Trustee as aforesaid

Witness

LESSEE:
NGS ASSOCIATES, INC.
By:

[illegible] /s/ Nicholas G. Sanuote

Its President
Hereunto Duly Authorized

Secretary

EXHIBIT 1
PLAN OF PREMISES

EXHIBIT 2
REFERENCE DATA

DATE OF EXECUTION OF LEASE: December 21, 1989

LESSEE NGS ASSOCIATES, INC.

ARTICLE 1

PREMISES: Tenant space 2B in the Premises numbered as 24 Walpole Park South, Walpole, MA, substantially as shown upon plan hereto annexed as Exhibit 1.

ARTICLE 2

(a) TERM COMMENCEMENT DATE: March 1, 1990

(b) TERMINATION DATE: February 28, 1995

ARTICLE 4

USE OF PREMISES: For warehousing and sale of LESSEE'S products, and any other lawful use, and offices incidental thereto. No retail sales shall be permitted to be conducted from the Premises.

ARTICLE 5

RENT: Rent shall be paid at the times and in the amounts as set forth in Schedule A to this Exhibit 2. As set forth in Exhibit 2, payment of rent shall commence on the first day of the fourth month next following the Term Commencement Date. Notwithstanding the foregoing, the LESSEE shall, as of the Term Commencement Date, be liable for its periodic payment of LESSEE'S Proportionate Share of Taxes and LESSEE'S Proportionate Share of Operating Costs, as provided in this Lease.

ARTICLE 7

PARKING SPACES ALLOCATED TO LESSEE: Nine (9) Spaces

ARTICLE 8

(a) RENTABLE AREA: 5,021 (+)/(-) square feet

(b) BUILDING RENTABLE AREA: 95,567 (+)/(-) square feet

(c) LESSEE'S PROPORTIONATE SHARE: 5.3%

ARTICLE 23

ADDRESSES OF PARTIES:

to LESSOR:

Walpole Park South (II) Trust
147 Morgan Drive
Norwood, MA 02062

to LESSEE (prior to occupancy of Premises)

110 Shawmut Road
Canton, MA 02021

(after occupancy of Premises)

24 Walpole Park South
Walpole, MA 02081

EXHIBIT 2
SCHEDULE A

RENT SCHEDULE

	DUE DATE	RENTABLE SF	RENTAL RATE	PAYMENT
March	1, 1990	5,021 sf	\$ /sf	\$
April	1, 1990	5,021 sf	\$ /sf	\$
May	1, 1990	5,021 sf	\$ /sf	\$
June	1, 1990	5,021 sf	\$6.50/sf	\$2,720
July	1, 1990	5,021 sf	\$6.50/sf	\$2,720
August	1, 1990	5,021 sf	\$6.50/sf	\$2,720
September	1, 1990	5,021 sf	\$6.50/sf	\$2,720
October	1, 1990	5,021 sf	\$6.50/sf	\$2,720
November	1, 1990	5,021 sf	\$6.50/sf	\$2,720
December	1, 1990	5,021 sf	\$6.50/sf	\$2,720
January	1, 1991	5,021 sf	\$6.50/sf	\$2,720
February	1, 1991	5,021	\$6.50/sf	\$2,720
Effective Rent Yr	1		\$4.88/sf	\$2,720
March	1, 1991	5,021 sf	\$6.50/sf	\$2,720
April	1, 1991	5,021 sf	\$6.50/sf	\$2,720
May	1, 1991	5,021 sf	\$6.50/sf	\$2,720
June	1, 1991	5,021 sf	\$6.50/sf	\$2,720
July	1, 1991	5,021 sf	\$6.50/sf	\$2,720
August	1, 1991	5,021 sf	\$6.50/sf	\$2,720
September	1, 1991	5,021 sf	\$6.50/sf	\$2,720
October	1, 1991	5,021 sf	\$6.50/sf	\$2,720
November	1, 1991	5,021 sf	\$6.50/sf	\$2,720
December	1, 1991	5,021 sf	\$6.50/sf	\$2,720
January	1, 1992	5,021 sf	\$6.50/sf	\$2,720
February	1, 1992	5,021 sf	\$6.50/sf	\$2,720
Effective Rent Yr	2		\$6.50/sf	\$2,720

	DUE DATE	RENTABLE SF	RENTAL RATE	PAYMENT
March	1, 1992	5,021 sf	\$6.50/sf	\$2,720
April	1, 1992	5,021 sf	\$6.50/sf	\$2,720
May	1, 1992	5,021 sf	\$6.50/sf	\$2,720
June	1, 1992	5,021 sf	\$6.50/sf	\$2,720
July	1, 1992	5,021 sf	\$6.50/sf	\$2,720
August	1, 1992	5,021 sf	\$6.50/sf	\$2,720
September	1, 1992	5,021 sf	\$6.50/sf	\$2,720
October	1, 1992	5,021 sf	\$6.50/sf	\$2,720
November	1, 1992	5,021 sf	\$6.50/sf	\$2,720
December	1, 1992	5,021 sf	\$6.50/sf	\$2,720
January	1, 1993	5,021 sf	\$6.50/sf	\$2,720
February	1, 1993	5,021 sf	\$6.50/sf	\$2,720
Effective Rent Yr	3		\$6.50/sf	\$2,720
March	1, 1993	5,021 sf	\$6.50/sf	\$2,720
April	1, 1993	5,021 sf	\$6.50/sf	\$2,720
May	1, 1993	5,021 sf	\$6.50/sf	\$2,720
June	1, 1993	5,021 sf	\$6.50/sf	\$2,720
July	1, 1993	5,021 sf	\$6.50/sf	\$2,720
August	1, 1993	5,021 sf	\$6.50/sf	\$2,720
September	1, 1993	5,021 sf	\$6.50/sf	\$2,720
October	1, 1993	5,021 sf	\$6.50/sf	\$2,720
November	1, 1993	5,021 sf	\$6.50/sf	\$2,720
December	1, 1993	5,021 sf	\$6.50/sf	\$2,720
January	1, 1994	5,021 sf	\$6.50/sf	\$2,720
February	1, 1994	5,021 sf	\$6.50/sf	\$2,720
Effective Rent Yr	4		\$6.50/sf	\$2,720
March	1, 1994	5,021 sf	\$6.50/sf	\$2,720
April	1, 1994	5,021 sf	\$6.50/sf	\$2,720
May	1, 1994	5,021 sf	\$6.50/sf	\$2,720

	DUE DATE	RENTABLE SF	RENTAL RATE	PAYMENT
June	1, 1994	5,021 sf	\$6.50/sf	\$2,720
July	1, 1994	5,021 sf	\$6.50/sf	\$2,720
August	1, 1994	5,021 sf	\$6.50/sf	\$2,720
September	1, 1994	5,021 sf	\$6.50/sf	\$2,720
October	1, 1994	5,021 sf	\$6.50/sf	\$2,720
November	1, 1994	5,021 sf	\$6.50/sf	\$2,720
December	1, 1994	5,021 sf	\$6.50/sf	\$2,720
January	1, 1995	5,021 sf	\$6.50/sf	\$2,720
February	1, 1995	5,021 sf	\$6.50/sf	\$2,720
Effective Rent Yr	5		\$6.50/sf	\$2,720
EFFECTIVE RENT:	5.00 YEAR LEASE		\$6.18/sf	\$2,584

A)

EXHIBIT 3

BUILDING STANDARD WORK

- NOTES
1. This "Scope of Work" is intended to outline the improvements to accommodate the Lessee's tenancy within the "Tenant Space".
 2. Unless otherwise noted the following items are not included:
 - A) The floor, walls, superstructure, roof and mechanical systems do not include any provisions for Lessee's machinery, equipment or the installation of same.
 - B) Security, Public Address, or Telephone Systems.
 - C) Computer Power or Data Wiring.
 3. Note the attached "Schedule (A)" for "Lessee's Quantities" included within the "Scope of Work".
 4. The Lessor or his nominee agree to perform the items noted within the "Scope of Work" substantially in accordance with the following information and for the "Rent" noted in Section (I).

HEIGHT		Overall: 21' - 4"	Maximum: top of concrete floor to top of Steel.
	Office	Clear: 9' - 0"	Minimum: top of concrete floor to underside of Acoustical Ceiling.
	Warehouse	Clear: 18' - 0"	Minimum: top of concrete floor to underside of Steel

TENANT SPACE	Office	Office Toilet Office Toilet Lunch Private Offices Conference Room Lab Reception	(Mens Office Toilet) (Womens Office Toilet)
		The balance of the area is open office	

Warehouse The balance of the area is open warehouse.

Standard Tenant Improvements

CONCRETE etc.

111. 4" non structural concrete floor on grade.
- 111.a. 3000 psi concrete.
- 111.b. 6"x6"/#10/#10 welded wire mesh reinforcing.
- 111.c Control joints designed to reduce cracking.

Rear Entrance

120. Precast concrete stairs and rail.

GLASS etc.

Front Entrance

306. Exterior front windows, door and sidelight.

METAL STUD WALLS

Office

- 355.a. Face Wall (Interior)
- One layer of 1/2" gypsum board applied to the inside face of the front exterior wall, taped and sanded to the ceiling plus 6".

Warehouse

- 355.b. Face Wall (Interior)
- One layer of 1/2" gypsum board applied to the inside face of the front exterior wall, taped and sanded to the underside of steel.

Office

- 360.a. Demising (Office/Warehouse) (Rated) Wall

Warehouse

- 360.b. Demising (Tenant) (Rated) Wall
- Framing 16" o.c., sound dampening insulation, two layers per face of 5/8" firecode gypsum board, taped and sanded to the underside of the metal deck.

Office

- 364.a. Standard (Bathrooms) (Non Rated) Wall
- Framing 16" o.c. to the underside of the metal deck or barjoint, one layer per face of 1/2" gypsum board, taped and sanded to the underside of the ceiling plus 6".

DOORS and FRAMES etc.	Rear Entrance	373.a.	Metal Door	(Non Rated)	Pressed metal frame, hollow metal door, 1 1/2 pair of butts, lock set, closer, threshold and weather-stripping.
		373.c	Metal Door	(Rated)	Pressed metal frame, hollow metal door, 1 1/2 pair of butts, lock set, and closer.
		373.e.	Hardboard Door	(Rated)	Pressed metal frame, hardboard door, 1 1/2 pair of butts, pass set, & bumper.
FINISHES	Office	401.	Ceiling:	White painted aluminum grid, 2' x 4' acoustical tiles.	
		404.	Doors:	Painted.	
	Office Toilet	406.	Floors:	Vinyl Composite Tile.	
	Kitchen & Lab				
	Office	408.	Floors:	Carpet () Glued directly to the floor. () Allow \$12.00 per s.y. installed with tax for selection made from options provided by Lessor.	
	Warehouse	409.	Floors:	Concrete Sealer.	
	Office	410.	Walls:	Two coats of flat latex wall paint.	
	Office	413.	Base:	4" vinyl cove base.	
	Toilets	415.	Toilet paper holder, paper towel & soap dispensers, and mirrors.		
	Office Toilet	416.	Vanity cabinets and counters.		
	Office	418.	Louvre drapes for each exterior window.		
PLUMBING	Office Toilet	500.a.	Men:	Water closet, vanity sink & faucet.	
	Office Toilet	500.b.	Women:	Water closet, vanity sink & faucet.	
ELECTRIC		552.	Service:	200 amp 120/208 volt panel board, located at column line C, with circuit breakers and electric meter.	

	Office	557.a.	Lights: Lighting level of 75 fc using 2 x 4, 4 tube recessed fluorescent fixture.
	Warehouse	557.c.	Lights: Lighting level of 35 fc using 8', 2 tube strip fluorescent fixture.
		557.g.	Lights: Emergency lights and battery pack.
		557.h.	Lights: Exit signs.
	Office	559.a.	Switches: Single pole wall switch & plate. Direct from panel board.
	Warehouse		Direct from panel board.
	Office	559.d.	Outlets: 110 volt duplex wall outlet.
		560.a.	Fire alarm horns and lights.
		560.b.	Fire alarm pull stations.
FIRE SPRINKLER		600.a.	Group 2 standard hazard calculated wet system having one head per 120 s.f. of floor area.
	Office	603.	Drops with Heads
	Warehouse	604.	Heads
HEATING and COOLING	Office	650.a.	Heating and Cooling System 1. Gas heat and electric cooled roof top unit. 2. One thermostat per roof top unit. 3. Air distributed via a ducted system from the roof top unit and returned via the ceiling space plenum. 4. The system will maintain a: Heating temperature of 68 degrees when the outside temperature is 0 degrees. Cooling temperature is 90 degrees or a 15 degree differential between the inside & outside temperature.
	Warehouse	650.b.	Heating System 1. Gas fired suspended unit heaters. 2. One thermostat per each heater 3. Air distributed directly from unit heaters. 4. The system will maintain a: Heating temperature of 55 degrees when the outside temperature is 0 degrees.
MISCELLANEOUS		702.a.	Overhead door, 8'- 0" X 8' - 0".
		702.b.	Dock seal and rubber dock bumpers.
GENERAL CONDITIONS		1158.	Exterior sign with Lessee's name installed over the front and rear entrances.

1428. Architectural service; one design & revision.

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 Non Standard Tenant Improvements
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ROOF		250.a.	Cut & patch for roof top units
GLASS & GLAZ	Reception	300.	Slider with louver drapes.
PLUMBING	Kitchen	500.	Kitchen sink, faucer and disposal.
		500.	Water connected for coffee maker.
ELECTRIC		555.	Power wire roof top unit.
MISCELLANEOUS		700.	Labor & material for adds to "Scope of Work".
		711.	Kitchen cabinets and counters.
ENCLOSURES			Title Page
			Section (I) Summation
			Section (II) Scope of Work
			Schedule (A) Lessee's Quantities
			Schedule (B) Rent Schedule
			Key Plan Of Premises
			Lessee's Floor Plan

 PROPOSAL TO LEASE
 SCOPE OF WORK
 SCHEDULE (A) PAGE (1)

LESSEE
 QUANTITY

Walpole Park South II Trust N.G.S. Associates, Inc. Tenant Space Number: WPS2-2B Proposal Number: WPS2-03NGSASS.(2) Tenant Number: WPS2-(N/A) November 21, 1989				STANDARD IMPROVEMENTS	OFFICE: Rentable Area ----- 50% WAREHOUSE: Rentable Area ----- 50% TOTAL: Rentable Area	2,500 sf ----- 2,521 sf ----- 5,021 sf
111	CONCRETE etc	Floors	On Grade			5,021 sf
120 a)		Stairs	Pre Case Stair & Rail		Rear Entrance	1 ea
306	GLASS etc	Door & Windows			Front Entrance	1 ea
355 a)	METAL STUD WALLS	Face Wall	Interior			40 lf
355 b)		Face Wall	Interior			0 lf
360 a)		Demising Wall	Office/Ware		Rated	40 lf
360 b)		Demising Wall	Tenant		Rated	250 lf
364 a)		Standard Wall			Non Rated	192 lf
373 a)	DOORS & FRAMES etc	Metal Door		Non Rated	Rear Entrance	1 ea
373 c)		Metal Door		Rated	Interior	1 ea
373 e)		Hardboard Door		Non Rated	Interior	8 ea
401	FINISHES	Ceilings	Acoustical 2 x 6 Tile			2,500 sf
404		Doors	Paint			10 ea
406		Floor	Vinyl Composite Tile			1,160 sf
408		Floor	Carpet			164 sy
410		Walls	Paint	Office Walls		6,159 sf
413		Base	Vinyl Cove	Office Walls		628 lf
515		Accessories				2 ea
416		Vanities	Lavanette			2 ea
418		Windows	Louvre Drapes			3 ea
500	PLUMBING	Toilet Rooms	Plumbing Fixtures			4 ea
552	ELECTRIC	Service & Meters				1 ea
557 a)		Light Fixtures	2' x 4' Recessed			35 ea
557 b)		Light Fixtures	8' Strips			6 ea
557 c)		Light Fixtures	Emergency	Lights		3 ea
557 d)		Light Fixtures		Battery Packs		1 ea
557 e)		Light Fixtures	Exit Signs			3 ea
559 a)		Switches	Single Pole	Wall Mounted Switch		16 ea
559 b)		Outlets	110 Volt	Wall Mounted Duplex Outlet		38 ea
560 a)		Fire Alarm	Horn & Lights			1 ea
560 b)		Fire Alarm	Full Stations			2 ea
603	FIRE SPRINKLER	Drops With Heads	Dropped Ceiling Area			25 ea
604		Heads	Exposed Ceiling Area			38 ea
650 a)	HEATING & COOLING	Heating & Cooling	Roof Top Units			2,500 sf
650 b)		Heating	Unit Heaters			4,521 sf
702	MISCELLANEOUS	Overhead Doors	Seals	Rubber Bumpers		1 ea
1158	GENERAL CONDITIONS	Signs	Tenant Neat	Exterior	Front & Rear	1 pr
250	ROOF	Cut & Patch	Roof Top Units			1 ea

300	GLASS & GLAZING	Reception	Slider W/ Louver Blinds	12 sf
500 a)	PLUMBING	Kitchen	Kitchen Sink, Disposal & Faucet	1 ea
500 b)		Kitchen	Water Connection for Coffee Maker	1 ea
555	ELECTRIC	Power Wire	Roof Top Unit	1 ea
700 a)	MISCELLANEOUS	Labor & Material	For Additional Tenant Improvements	5,021 sf
711		Kitchen	Cabinets & Counters	6 lf

EXHIBIT 4

SIGN SPECIFICATIONS

This sign specification is written to create and maintain standards of uniformity for all businesses in Walpole Park South (II). Tenants must conform with these specifications, and any variations must be approved of by the Landlord.

- A. BUILDING SIGNS - One (1) non-illuminated 4'0" X 5'0" will be allowed for each tenant for identification purposes. The sign shall be manufactured with a 1 1/2" X 2 1/2" extruded aluminum retainer forming frame around changeable .063 aluminum face. Face and frame will be rust to match trim on building. All lettering must be Rockwell Bold. The sign shall be mounted and centered over entrance door.

One (1) non-illuminated 1' 6" X 4' 0" will be allowed for tenant identification above the loading dock doors in the rear of the Building. The sign will be manufactured of 0.40 aluminum with a 1" aluminum tube frame. Face will be rust background with white copy. All lettering must be Rockwell Bold.

- B. WINDOW SIGNS - Nothing is to appear in/or on the windows without the LESSOR's approval before installation.

OTHER SIGNS - No other signs, temporary or permanent, are allowed without written approval of the LESSOR.

28. LESSEE'S OPTION TO EXTEND LEASE TERM

28.1 OPTION GRANTED: At the expiration of the initial term of this Lease, and if this Lease shall then be in full force and effect, and the LESSEE shall have fully performed or observed all of the terms, covenants, and conditions on its part to be performed or observed hereunder, the LESSEE shall have the option to extend the term of the Lease, upon the same terms, covenants and conditions, (except for rent as hereinbelow referred to as "EXTENDED TERM"). The option herein granted shall be exercised by the LESSEE by giving written notice to the LESSOR, not less than three (3) months and no more than six (6) months prior to the expiration of the initial Lease Term.

28.2 RENT DURING EXTENDED TERM: The Yearly Rent payable by the LESSEE during the Extended Term shall be the greater of the following: (1) the rate per annum payable at the end of the initial Lease term; or, (2) a sum equal to what would be considered as the fair market rental for the Premises, based upon the use of the same as first class office and warehouse space located in the rental community between Route 1 and Route 128 as of the date of commencement of the Extended Term, under similar terms and conditions as contained in this Lease, but requiring no investment by LESSOR for improvements, renovations, repairs, etc. (hereinafter referred to as "MARKET RENT"). If the parties cannot agree as to the Market Rent, the Market Rent shall be determined by two (2) appraisers who are members of the American Institute of Real Estate Appraisers to be appointed and paid for by each of the parties. If such appraisers cannot agree on the Market Rent, they shall together promptly select a third appraiser who shall also be a member of the American Institute of Real Estate Appraisers and whose fee shall be shared by each of the parties hereto. A written determination as to the Market Rent signed by any two (2) of the appraisers so chosen shall be final and binding on the parties hereto. The Yearly Rent payable by the LESSEE during the Extended Term shall be paid in addition thereto, the LESSEE shall pay all other charges, such as, but not limited to, Taxes and Operating Costs as set forth in this Lease.

EXHIBIT 2
REFERENCE DATA

DATE OF EXECUTION OF LEASE: December 21, 1989

DATE OF EXECUTION OF THIS FIRST AMENDMENT: March , 1994

LESSEE: NGS DIVISION/MKS INSTRUMENTS, INC.,

ARTICLE 1 DESCRIPTION OF DEMISED PREMISES

- (a) Initial Premises: 5,021+ square feet of space ("INITIAL SPACE") consisting of 2,500+/- of office space and 2,521+/- of warehouse space located in the building numbered 24 Walpole Park South, Walpole, Massachusetts, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Initial Space A".
- (b) Additional Space: "B" Commencing on May 1, 1992 the LESSEE shall take and lease from the LESSOR an additional 5,021+/- square feet of space ("ADDITIONAL SPACE") consisting of 500+/- square feet of office space and 4,521+/- of warehouse space located contiguous to the Initial Space, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Additional Space B".
- (b) Additional Space: "C" Commencing on March 1, 1994 the LESSEE shall take and lease from the LESSOR an additional 10,042+/- square feet of space ("ADDITIONAL SPACE") consisting of 1,250+/- square feet of office space and 8,792+/- of warehouse space located contiguous to the Initial Space, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Additional Space C".

ARTICLE 2

- 2.1 TERM COMMENCEMENT DATE: as to the Initial Space "A"
March 1, 1990
- TERM COMMENCEMENT DATE: as to the Additional Space "B"
May 1, 1992
- TERM COMMENCEMENT DATE: as to the Additional Space "C"
March 1, 1994

2.2 TERMINATION DATE: March 31, 1997

to the same Exhibit 3A as annexed hereto, such Exhibit 3A being applicable to the Additional Space (as defined in said Exhibit 2).

Except as above provided, The Lease shall be otherwise deemed to be unamended and unmodified.

IN WITNESS WHEREOF, the parties have hereto executed this FIRST AMENDED in duplicate original as a sealed instrument on this 15th day of March 1994.

LESSOR:

/s/ Janie A. Young

WITNESS

/s/ Donnell W. Murphy

DONNELL W. MURPHY
Trustee as aforesaid

ATTEST:

LESSEE:
NGS DIVISION/MKS INSTRUMENTS, INC.
BY:

/s/ Janet Giddings

SECRETARY/CLERK

/s/ Robert F. O'Brien

ITS TREASURER
hereunto duly authorized

DATE: 03/15/94 TENANT : NGS DIVISION/MKS INSTRUMENTS, INC.

RENT PAYMENT SCHEDULE

DUE DATE	RENTABLE SQ. FT.			RENTABLE SQ. FT.	RENTAL RATE			RENTAL PAYMENT
	Space A	Space B	Space C		Space A	Space B	Space C	
January 1, 1994	5,021	5,021	10,042	20,084	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
February 1, 1994	5,021	5,021	10,042	20,084	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
March 1, 1994	5,021	5,021	10,042	20,084	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
April 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
May 1 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
June 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
July 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
August 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
September 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
October 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
November 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
December 1, 1994	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
CALENDAR YEAR 1								
January 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
February 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
March 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
April 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
May 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
June 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
July 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
August 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
September 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
October 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
November 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
December 1, 1995	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
CALENDAR YEAR 2								
January 1, 1996	5,021	5,021	10,042	20,084	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8,368.33
February 1, 1996	5,021	5,021	10,042	20,084	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8,368.33
March 1, 1996	5,021	5,021	10,042	20,084	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8,368.33

RENT PAYMENT SCHEDULE

DUE DATE	RENTABLE SQ. FT.			RENTABLE SQ. FT.	RENTAL RATE			RENTAL PAYMENT
	Space A	Space B	Space C		Space A	Space B	Space C	
April 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
May 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
June 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
July 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
August 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
September 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
October 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
November 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33
December 1, 1996	5,021	5,021	10,042	20,084	\$ 5.00	\$ 5.00	\$ 5.00	\$ 8,368.33

CALENDAR YEAR 3								
January 1, 1997	5,021	5,021	10,042	20,084	\$ 8.00	\$ 5.00	\$ 5.00	\$ 8,368.33
February 1, 1997	5,021	5,021	10,042	20,084	\$ 8.00	\$ 5.00	\$ 5.00	\$ 8,368.33
March 1, 1997	5,021	5,021	10,042	20,084	\$ 8.00	\$ 5.00	\$ 5.00	\$ 8,368.33
April 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
May 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
June 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
July 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
August 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
September 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
October 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
November 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
December 1, 1997	0	0	0	0	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00

CALENDAR YEAR 4								

FIRST AMENDMENT

This is the FIRST AMENDMENT made to a certain Indenture of Lease ("THE LEASE") made by and between Donnell W. Murphy, Trustee of Walpole Park South (II) Trust ("LESSOR"), as landlord; and NGS Division/MKS Instruments, Inc., a Massachusetts corporation ("THE LESSEE"), as tenant dated December 21, 1989. The Lease concerns certain premises leased by the LESSEE from the LESSOR at 24 Walpole Park South Drive, Walpole, MA.

In consideration hereof, the LESSOR and the LESSEE do hereby modify The Lease as follows:

29. EXHIBIT 1 ("Plan of Premises") as annexed to The Lease is stricken and there is substituted in place thereof Exhibit 1 as annexed hereto.
30. EXHIBIT 2 ("Reference Data") as annexed to The Lease is stricken and there is substituted in place thereof Exhibit 2 as annexed hereto.
31. EXHIBIT 3 ("Building Standard Work") as annexed to The Lease is amended by identifying the same as being applicable to the Initial Space (as defined in Exhibit 2 hereto annexed); and further by adding to the same Exhibit 3A as annexed hereto, such Exhibit 3A being applicable to the Additional Space (as defined in said Exhibit 2).

Except as above provided, The Lease shall be otherwise deemed to be unamended and unmodified.

IN WITNESS WHEREOF, the parties have hereto executed this FIRST AMENDMENT in duplicate original as a sealed instrument on this 19th day of November, 1993.

LESSOR:

/s/ Gary Kybell

WITNESS

/s/ Donnell W. Murphy

DONNELL W. MURPHY
Trustee as aforesaid

ATTEST:

LESSEE:
NGS DIVISION/MKS INSTRUMENTS, INC.
BY:

/s/ Janet C. Giddings

WITNESS

/s/ Robert F. O'Brien

Its Treasurer
hereunto duly authorized

DATE: 10/15/93 TENANT : NGS DIVISION/MKS INSTRUMENTS, INC.

DUE DATE	RENTABLE SQ. FT.			RENT PAYMENT RENTABLE SQ. FT.	SCHEDULE RENTAL RATE			RENTAL PAY- MENT
	Space A	Space B	Space C		Space A	Space B	Space C	
January 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
February 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
March 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
April 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
May 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
June 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
July 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
August 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
September 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
October 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
November 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
December 1, 1993	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
CALENDAR YEAR 1								
January 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
February 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
March 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
April 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
May 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
June 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
July 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
August 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
September 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
October 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
November 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
December 1, 1994	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
CALENDAR YEAR 2								
January 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64
February 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	6.50	5.58	5.00	9,238.64

DUE DATE	RENTABLE SQ. FT.			RENT PAYMENT RENTABLE SQ. FT.	SCHEDULE RENTAL RATE			RENTAL PAY- MENT
	Space A	Space B	Space C		Space A	Space B	Space C	
March 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	5.00	0.00
April 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
May 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
June 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
July 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
August 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
September 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
October 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
November 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
December 1, 1995	5,021.00	5,021.00	10,042.00	20,084.00	0.00	0.00	0.00	0.00
CALENDAR YEAR 3								

EXHIBIT 2

REFERENCE DATA

DATE OF EXECUTION OF LEASE: December 21, 1989

DATE OF EXECUTION OF THIS FIRST AMENDMENT: October , 1993

LESSEE: NGS DIVISION/MKS INSTRUMENTS, INC.,

ARTICLE 1 DESCRIPTION OF DEMISED PREMISES

- (a) Initial Premises: 5,021 (+/-) square feet of space ("INITIAL SPACE") consisting of 2,500 (+/-) of office space and 2,521 (+/-) of warehouse space located in the building numbered 24 Walpole Park South, Walpole, Massachusetts, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Initial Space A".
- (b) Additional Space: "B" Commencing on May 1, 1992 the LESSEE shall take and lease from the LESSOR an additional 5,021 (+/-) square feet of space ("ADDITIONAL SPACE") consisting of 500 (+/-) square feet of office space and 4,521 (+/-) of warehouse space located contiguous to the Initial Space, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Additional Space B".
- (b) Additional Space: "C" Commencing on March 1, 1994 the LESSEE shall take and lease from the LESSOR an additional 10,042 (+/-) square feet of space ("ADDITIONAL SPACE") consisting of 1,250 (+/-) square feet of office space and 8,792 (+/-) of warehouse space located contiguous to the Initial Space, as shown on the space plan hereto annexed as Exhibit 1, outlined in yellow, and being identified thereon as "Additional Space C".

ARTICLE 2

- 2.1 TERM COMMENCEMENT DATE: as to the Initial Space "A" March 1, 1990
- TERM COMMENCEMENT DATE: as to the Additional Space "B" May 1, 1992
- TERM COMMENCEMENT DATE: as to the Additional Space "C" March 1, 1994
- 2.2 TERMINATION DATE: February 28, 1995

ARTICLE 4

USE OF PREMISES: For office and warehousing space of LESSEE'S products, and any other lawful use. No retail sales shall be permitted to be conducted from the premises.

ARTICLE 5 - RENT

Rent for the Initial Space and the Additional Space shall be paid to LESSOR in accordance with the attached Exhibit 2A-Schedule B

ARTICLE 7 - PARKING SPACES ALLOCATED TO LESSEE:

Twenty Six (30) spaces

ARTICLE 8.1(a) - RENTABLE AREA

INITIAL SPACE: "A"	5,021 + square feet
	-
ADDITIONAL SPACE: "B"	5,021 + square feet
	-
ADDITIONAL SPACE: "C"	10,042 + square feet

TOTAL	20,084 + square feet
	-

BUILDING RENTABLE AREA: 95,567+ square feet

LESSEE'S PROPORTIONATE SHARE:

For Initial Space	5.25%
For Initial Space & Additional Spaces	21.00%

ARTICLE 23 - ADDRESSES OF PARTIES:

LESSOR: P.O. Box 123
7 West Street
Walpole, Massachusetts 02081

LESSEE: 25 Walpole Park South
Walpole, Massachusetts 02081

EXHIBIT 3A

BUILDING STANDARD WORK
APPLICABLE TO ADDITIONAL SPACE

The interior development to the Additional Space shall be substantially in accordance with the plan/sketch hereto annexed which indicates an approximate 12%/88% office-warehouse use.

SECTION (II) SCOPE OF WORK

- NOTES
1. This "Scope of Work" is intended to outline the improvements to accommodate the Lessee's tenancy within the "Tenant Space".
 2. Unless otherwise noted the following items are not included:
 - A) The floor, walls, superstructure, roof and mechanical systems do not include any provisions for Lessee's machinery, equipment or the installation of same.
 - B) Security, Public Address, or Telephone Systems.
 - C) Computer Power or Data Wiring.
 3. Note the attached "Schedule (A)" for "Lessee's Quantities" included within the "Scope of Work".
 4. The Lessor or his nominee agree to perform the items noted within the "Scope of Work" substantially in accordance with the following information and for the "Rent" noted in Section (I).

HEIGHT	Overall:	21' - 4" Maximum: top of concrete floor to top of Steel.
Office	Clear:	9' - 0" Minimum: top of concrete floor to underside of Acoustical Ceiling.
Warehouse	Clear:	18' - 0" Minimum: top of concrete floor to underside of Steel.

TENANT SPACE Office 1- 10x10 Private Office

 * 7 WEST STREET * WALPOLE, MA * 02081 * (508) 668-1200 * FAX (508) 668-1201 *

- 1- 12x13 Private Office
- 1- 10x12 Kitchen Area
- 1- Mens Rooms
- 1- Ladies Room

Warehouse The balance of the area is open warehouse.

Standard Tenant Improvements

- | | | | |
|------------------|----------------|--------|--|
| CONCRETE etc. | | 111. | 4" non structural concrete floor on grade. |
| | | 111.a | 3000 psi concrete. |
| | | 111.b. | 6"x6"/#10/#10 welded wire mesh reinforcing. |
| | | 111.c | Control joints designed to reduce cracking. |
| | Rear Entrance | 120. | Precast concrete stairs and rail. |
| GLASS etc. | Front Entrance | 306. | Exterior front windows, door and sidelight. |
| METAL STUD WALLS | Office | 355.a. | Face Wall (Interior)
One layer of 1/2" gypsum board applied to the inside face of the front exterior wall, taped and sanded to the ceiling plus 6". |
| | Warehouse | 355.b | Face Wall (Interior) One layer of 1/2" gypsum board applied to the inside face of the front exterior wall, taped and sanded to the underside of steel. |
| | Warehouse | 360.a | Demising Wall (Ware) (Rated) |

 * 7 WEST STREET * WALPOLE, MA * 02081 * (508) 668-1200 * FAX (508) 668-1201 *

	Warehouse	360.b.	Demising Wall (Tenant) (Rated) Framing 16" o.c., sound dampening insulation, two layers per face of 5/8" firecode gypsum board, taped and sanded to the underside of the metal deck.
	Office	364.a.	Standard Wall (Bathrooms) (Non Rated) Framing 16" o.c. to the underside of the metal deck or barjoint, one layer per face of 1/2" gypsum board, taped and sanded to the underside of the ceiling plus 6".
DOORS and	Rear Entrance	373.a.	Metal Door (Non Rated) Pressed metal frame, hollow metal door, 1 1/2 pair of butts, lock set, closer, threshold and weather- stripping.
		373.c	Metal Door (Rated) Pressed metal frame, hollow metal door, 1 1/2 pair of butts, lock set, and closer.
		373.e.	Hardboard Door (Rated) Pressed metal frame, hardboard door, 1 1/2 pair of butts, pass set, & bumper.
FINISHES	Office	401.	Ceiling: White painted aluminum grid, 2' x 4' acoustical tiles.
		404.	Doors: Painted.
	Toilets	406.	Floors: Vinyl Composite Tile.
	Office	408.	Floors: Carpet () Glued directly to the floor.

			() Allow \$11.50 per s.y. installed with tax for selection made from options provided by Lessor.
	Warehouse	409.	Floors: Concrete Sealer.
		410.	Walls: Two coats of flat latex wall paint.
	Toilets	413.	Base: 4" vinyl cove base.
		415.	Toilet paper holder, paper towel & soap dispensers, and mirrors.
	Toilets	416.	Vanity cabinets and counters.
	Office	418.	Louvre drapes for each exterior window.
PLUMBING	Office Toilet	500.a. Men:	Water closet, vanity sink & faucet.
	Office Toilet	500.b. Women:	Water closet (1), vanity sink (1) & faucet (1), with floor drain and hose bib.
ELECTRIC		552.	Service: 125 amp 120/208 volt panel board, located at column line C, with circuit breakers and electric meter.
	Office	557.a.	Lights: Lighting level of 75 fc using 2 x 4, 4 tube recessed fluorescent fixture.
	Warehouse	557.c.	Lights: Lighting level of 35 fc using 8', 2 tube strip fluorescent fixture.
		557.g.	Lights: Emergency lights and battery pack.

		557.h.	Lights:	Exit signs.
	Office	559.a.	Switches:	Single pole wall switch & plate.
	Warehouse			Direct from panel board.
	Office	559.d.	Outlets:	110 volt duplex wall outlet.
		560.a.	Fire alarm	horns and lights.
		560.b.	Fire alarm	pull stations.
		560.c.	Fire alarm	smoke detectors.
FIRE SPRINKLER		600.a.	Group 2 standard hazard	calculated wet system having one head per 120 s.f. of floor area.
	Office	603.	Drops with	Heads
	Warehouse	604.	Heads	
HEATING and	Office	650.a.	Heating and Cooling System	
			1.	Gas heat and electric cooled roof top unit.
			2.	One thermostat per roof top unit.
			3.	Air distributed via a ducted system from the roof top unit and returned via the ceiling space plenum.
			4.	The system will maintain a: Heating temperature of 68 degrees when the outside temperature is 0 degrees. Cooling temperature of 75 degrees when the outside temperature is 90 degrees or a 15 degree differential between the inside & outside temperature.

	Warehouse	650.b.	Heating System 1. Gas fired suspended unit heaters. 2. One thermostat per each heater 3. Air distributed directly from unit heaters. 4. The system will maintain a: Heating temperature of 55 degrees when the outside temperature is 0 degrees.
MISCELLANEOUS	Warehouse	702.a.	2- Overhead door, 8' - 0" X 8' - 0".
	Warehouse	702.b.	2- Dock seal and rubber dock bumpers.
GENERAL CONDITIONS		1158.	Exterior sign with Lessee's name installed over the front and rear entrances.
		1428.	Architectural service; one design & revision.

Non Standard Tenant Improvements

SPRINKLER		600.	Relocate existing office area heads, back to exposed ceiling area.
MISCELLANEOUS		700.	Labor & material for adds to "Scope of Work"

ENCLOSERS

Title Page
Section (I) Summation
Section (II) Scope of Work
Key Plan of Premises
Lessee's Floor Plan

SECOND AMENDMENT

This is the SECOND AMENDMENT made to a certain Indenture of Lease ("THE LEASE") made by and between Donnell W. Murphy, Trustee of Walpole Park South (II) Trust ("LESSOR"), as landlord; and NGS Division/MKS Instruments, Inc. a Massachusetts corporation ("THE LESSEE"), as tenant dated December 21, 1989. The Lease concerns certain premises leased by the LESSEE from the LESSOR at 24 Walpole Park South Drive, Walpole, MA 02081.

In consideration hereof, the LESSOR and the LESSEE do hereby modify The Lease as follows:

1. EXHIBIT 2 ("Reference Data") Article 2.2 as annexed to The Lease, the data shall be stricken and is substituted in place thereof the following Date: March 31, 1998.

2. EXHIBIT 2A ("Rental Payment Schedule") as annexed to The Lease is stricken and there is substituted in place thereof Exhibit 2A as annexed hereto. Except as above provided, The Lease shall be otherwise deemed to be unamended and unmodified.

IN WITNESS WHEREOF, the parties have hereto executed this SECOND AMENDMENT in duplicate original as a sealed instrument on this day of December 1996.

LESSOR

/s/ John D. Murphy

/s/ Donnell W. Murphy (Trustee)

WITNESS

DONNELL W. MURPHY
Trustee as aforesaid

ATTEST:

LESSEE:
NGS DIVISION/MKS INSTRUMENTS, INC.
BY:

/s/ Brian J. Murray

/s/ Robert F. O'Brien

WITNESS

Its Treasurer
hereunto duly authorized

7) TENANT will have NINE (9) PARKING SPACES located on site.

Accepted by the LESSOR:

WALPOLE PARK SOUTH II TRUST

DONNELL MURPHY

/s/ Donnell W. Murphy

(Signature)

PROPERTY MANAGER/TRUSTEE

April 2, 1992

Accepted by the TENANT:

NGS DIVISION/MKS
INSTRUMENTS INC.

(Name)

/s/ N. G. Sanuote

(Signature)

President

(Title)

April 2, 1992

BUILDING RENOVATIONS ETC.

SCOPE OF WORK
SCHEDULE (A) PAGE (1)

Lessee Quantity	Lessor Allows	Adjustment	FNC To Lessee
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				Lessee Quantity	Lessor Allows	Adjustment	FNC To Lessee	
First Norwood Corporation NGS Division/MKS Instruments, Inc. Tenant Space Number: WPS2-2A Proposal Number: WPS2-D3NGSASS. (6) Tenant Number: WPS2-(N/A) April 6, 1992				OFFICE: Rentable Area	3,750 sf	500 sf	3,250 sf	
STANDARD IMPROVEMENTS				75%	10%	65%		
				WAREHOUSE: Rentable Area	1,271 sf 25%	4,521 sf 90%	-3,250 sf -65%	
				TOTAL: Rentable Area	5,021 sf	5,021 sf	0 sf	
111 CONCRETE etc 120	Floors on Grade Pre Cast Stair	Interior Exterior		5,021 sf 1 ea	5,021 sf 1 ea	0 sf 0 ea	0	
306 GLASS etc	Doors & Windows	Exterior		1 ea	1 ea	0 ea	0	
355 a) METAL STUD WALLS 355 b) 360 a) 360 b) 364	Face Wall Face Wall Demising Wall Demising Wall Standard Wall	Interior Interior Interior Interior Interior		40 lf 0 lf 40 lf 250 lf 210 lf	20 lf 0 lf 0 lf 250 lf 44 lf	20 lf 0 lf 40 lf 0 lf 166 lf	11,041	
373 a) DOORS & FRAMES etc 373 b) 373 c)	Metal Door Metal Door Hardboard Door	Exterior Interior Interior	Non Rated Rated Non Rated	1 ea 3 ea 8 ea	1 ea 1 ea 2 ea	0 ea 2 ea 6 ea	2,717	
401 FINISHES 404 406 408 410 413 415 416 418	Ceiling Doors Floor Floor Walls Base Accessories Vanities Windows	Accoustical 2 x 4 Tile Paint Vinyl Composite Tile Carpet Paint Vinyl Core Layananette Louvre Drapes		3,750 sf 12 ea 2,232 sf 186 sy 7,059 sf 728 lf 2 ea 2 ea 3 ea	0 sf 0 ea 72 sf 0 sy 0 sf 0 lf 2 ea 2 ea 3 ea	3,750 sf 12 ea 2,160 sf 186 sy 7,059 sf 728 lf 0 ea 0 ea 0 ea	16,257	
500 PLUMBING	Toilet Rooms	Plumbing Fixtures		4 ea	4 ea	0 ea	0	
550 ELECTRIC 557 a) 557 b) 557 c) 557 d) 557 e) 559 a) 559 b) 560 a) 560 b)	Service & Meters Light Fixtures Light Fixtures Light Fixtures Light Fixtures Light Fixtures Switches Outlets Fire Alarm Fire Alarm	2' x 4' Recessed 8' Strips Emergency Lights Bat Packs Exit Signs Single Pole Switch 110 Volt Duplex Horn & Lights Pull Stations		1 ea 47 ea 3 ea 3 ea 1 ea 4 ea 17 ea 27 ea 1 ea 2 ea	1 ea 3 ea 3 ea 1 ea 2 ea 4 ea 5 ea 1 ea 2 ea	0 ea 44 ea 0 ea 0 ea 2 es 13 ea 22 ea 0 ea 0 ea	5,400	
603 FIRE SPRINKLER 604	Drops With Heads Heads	Dropped Ceiling Area Exposed Ceiling Area		31 ea 38 ea	4 ea 38 ea	27 ea 0 ea	2,024	
650 a) HEATING & COOLING 650 b)	Heating & Cooling Heating	Roof Top Units Unit Headers		3,750 sf 4,521 sf	1,000 sf 4,521 sf	2,750 sf 0 sf	14,375	
702 MISCELLANEOUS	Overhead Doors	Seal & Bumper	Exterior	1 ea	1 ea	0 ea	0	
1158 GENERAL CONDITIONS 1428	Signs Architect	Tenant Name	Exterior	0 pr 0 ea	0 pr 0 ea	0 pr 0 ea		

PROPOSAL TO LEASE
SCHEDULE (A) PAGE (2)

NON
STANDARD
IMPROVEMENTS

Proposal Number: WPS2-03NGSASS. (6)
Tenant Number: WPS2 (N/A)

Lessee Lessor
Quantity Allows

Adjust- FNC to
ment Lessee

250 a) ROOF	Cut & Patch	RTU	Lab	1 ea	(None) ea	1 ea	1,122
250 b)	Cut & Patch	RTU Gas & Elec P. Pocket	Lab	2 ea	(None) ea	2 ea	
250 c)	Cut & Patch	Unit Heater	Ware	1 ea	(None) ea	1 ea	
250 d)	Cut & Patch	Unit Heater Exist Pent	Lab	1 ea	(None) ea	1 ea	
500 a) PLUMBING	Unit Heater	Relocate	Ware	1 ls	(None) ls	1 ls	2,531
500 b)	Unit Heater	Gas Piping	Ware	35 lf	(None) lf	35 lf	
500 c)	Roof Top Unit	Gas Piping	Lab	35 lf	(None) lf	35 lf	
500 d)	Water Heater	Relocate	Offices	1 ls	(None) ls	1 ls	
555 a) ELECTRIC	Power Wire	Roof Top Unit	Lab	1 ea	(None) ea	1 ea	2,404
555 b)	Power Wire	Unit Heater	Ware	1 ea	(None) ea	1 ea	
555 c)	Power Wire	Water Heater	Office	1 ea	(None) ea	1 ea	
555 d)	Re-Work/Relocate	Existing Etc.	Offs/Lab/Ware	1 ls	(None) ls	1 ls	
555 e)	Misc.		Offs/Lab/Ware	1 ls	(None) ls	1 ls	
559	Outlets	20 And, 2/Circuit	Lab	20 ea	(None) ea	20 ea	
700 MISCELLANEOUS	Demolition	Existing Office/Ware Wall	Offices/Ware	42 lf	(None) lf	42 lf	966
1100 GENERAL CONDITIONS	Labor & Material	Tenant Improvements		5,021 sf	(None) sf	5,021 sf	2,768
1100	Labor & Material			5,021 sf	(None) sf	5,021 sf	
1150	Building Permit			1 ls	(None) sf	1 ls	
1155	Dumpster			1 ea	(None) ea	1 ea	
	Cleaning	Construction & Finel		5,021 sf	(None) sf	5,021 sf	
TOTAL COST OF CONSTRUCTION (DUE UPON COMPLETION)						\$61,602	\$61,602

[1]
Lease Agreement
MKS Japan Co., Ltd.

Harmonize Building
Fifth Floor

MIFUJI

[2]
Lease Agreement (Offices in Building)
Lessor: Mifuji Kanzai K.K.
Lessee: MKS Japan Co., Inc.

The aforementioned Lessor and Lessee conclude this lease agreement according to the terms and conditions set forth below.

Paragraph 1 (Leased Property)
Lessor leases to Lessee, and Lessee leases from Lessor the property indicated below.

Address of Property: 5-17-13, Narita-higashi, Suginami-ku, Tokyo
Structure and Scale the Building: Steel-framed reinforced concrete structure with roof, with one underground floor and eight above ground floors.

Name: Harmonize Building

Leased area:

Fifth floor: 324.5 square meters (98.3 tsubo)

Paragraph 2 (Purpose of Use)

Lessee shall use the leased property as an office, and shall not use it for any other purpose.

Paragraph 3 (Term of Lease)

The term of the lease is established as set forth below.

A two (2) year period from January 1, 1996 to December 31, 1997 shall be established as the term of the lease.

However, if within at least 6 months but no more than 1 year from the date the term of the lease expires, either party indicates to the other party in writing a desire to renew the lease, this lease can be renewed upon the mutual consent of both parties. At the time of the renewal, Lessee shall pay Lessor one month's rent as a renewal fee.

Paragraph 4 (Rent)

1. Total Monthly Rent: 4,729,997 yen (including 5% consumption tax of 225,237 yen)

(1) Rent:

Fifth floor: 1,336,490 yen (including 5% consumption tax of 38,930 yen)

(2) Fee for Shared Services

Fifth floor: 324,000 yen (including 5% consumer tax of 23,380 yen)

Second floor: 531,877 yen (including 5% consumer tax of 9,440 yen)

[3]

2. By the end of every month Lessee shall pay the following month's rent by transferring funds to a bank account designated by Lessor, and Lessee shall be responsible for paying the fees for transferring funds.

3. If the term of the lease ends before the end of a month or if the rent is increased or decreased for any other reason, the rent shall be calculated on a per diem basis based on the number of days in that month.

Paragraph 5 (Adjustments to Rent)

The rent in this contract shall be reviewed every two (2) years from the commencement of the lease, and adjustments thereto carried out upon the mutual consent of both parties.

However, if as a result of changes in prices, increases in taxes or other public charges, or changes in other economic conditions, etc., the rent has become unreasonable, Lessor can adjust the rent even before the term of the lease has expired upon the consent of Lessee.

Paragraph 6 (Security Deposit)

1. As security to ensure that Lessee fulfills its obligations as set forth in the terms of this contract, Lessee shall provide 9,830,000 yen, an amount equivalent to ten (10) months rent, to Lessor at the time this contract is signed.

2. When Lessee has failed to pay the rent on time, has caused damages or has failed to fulfill any other of its obligations as set forth in the terms of this contract, upon notification thereof, Lessor is entitled to appropriate all or some of the deposit to pay for such.

3. Lessee shall not be entitled to claim that the possession of the security deposit as established in this contract offsets any monetary obligation Lessee is responsible for paying to Lessor.

4. In the case of Paragraph 6, Section 2 above, within a week after receiving the notification of appropriation, Lessee must supply the amount necessary to restore the security deposit to the amount prior to the appropriation.

5. Lessee shall not transfer claim to the security deposit to a third party, nor offer such for use as collateral.

Paragraph 7 (Return of the Security Deposit)

When the contract has terminated due to the expiration of the term thereof, Lessor shall return the deposit to Lessee within one month after Lessor has confirmed that Lessee has returned the leased property to its original condition, has completely vacated the premises, and has completed dismantling and removal operations.

Paragraph 8 (Termination of Lease Before Expiration)

If this contract is terminated before it expires due to circumstances of Lessee, or if it is terminated for reasons that are the fault of Lessee, an amount equivalent to 10% of the total in Paragraph 6, Section 1 above shall be paid as compensation.

Paragraph 9 (Category of Project)

None

Paragraph 10 (Responsibility for Expenses)

Lessee shall be responsible for expenses produced as a result of the daily work carried out within the area contracted for use by Lessee, such as the fees for use of utilities such as electricity, water, gas.

[4]

Paragraph 11 (Late Payment Penalty)

When Lessee is late in paying obligations set forth in this contract, upon notification thereof by Lessor, Lessee shall pay a late payment penalty based on a per annum rate of 14.6%.

Paragraph 12 (Matters to be Reported)

When matters pertaining to any of the following occurs, Lessee must promptly submit a written report of the gist thereof to Lessor.

1. When there has been a significant change with regard to the representative of the company or any other item pertaining to the commercial registration of the company.
2. When a merger, etc., has occurred.
3. When there has been a change in the type of business.

Paragraph 13 (Items Requiring Approval)

If Lessee is to perform any of the following, Lessee must submit a written report of the intentions thereof to Lessor and receive Lessor's approval before carrying out such actions.

1. When Lessee desires to modify or establish new fixtures, furniture, designs or room dividers, etc., of the leased property.
2. When Lessee desires to modify or expand existing equipment which was previously installed by Lessor on the leased property.
3. When Lessee desires to install new auxiliary equipment.
4. When Lessee desires to establish a display such as a signboard, bulletin board, sign, billboard or the like.

However, this restriction shall not apply to cases in which the leased property is not modified or to acts approved by Lessor prior to the contract.

Paragraph 14 (Prohibited Items)

Lessee is prohibited from carrying out any of the following.

1. Regardless of pretext, any act to transfer the rights in this contract, such as the rights to use, lease, or conduct business on the leased property, etc., to a third party, or to use such as collateral.
2. Any act to sub-lease to a third party or let others use or manage part or all of the leased property.
3. Any change to the purpose of use of the leased property.
4. Any act to display the company name, or post a sign, etc., in a location or using a method other than that which has been designated by Lessor, or any other act to display the name of a third party.
5. Any act that is detrimental to the maintenance and upkeep of the building or any act which cause damage to the building.
6. Any act that disturbs the neighbors.

Paragraph 15 (Responsibility for Repair Expenses)

1. Lessor shall carry out repairs necessary for the maintenance and upkeep of the building itself and its attachments.
2. Lessee shall be responsible for carrying out repairs and replacements on the leased property including those relating to the walls, ceilings, floors, windows, light fixtures and other electrical equipment, gas equipment, water equipment and all such equipment and facilities used daily by Lessee, as well as to all equipment and facilities directly used by clients and visitors of Lessee.
3. If Lessee discovers in the building owned by Lessor that a repair is needed in the area leased by Lessee, Lessee has the obligation to notify Lessor immediately, and even if Lessee is responsible for the repair expenses, repairs shall always be carried out upon consent of Lessor.

[5]

Paragraph 16 (Obligation to Notify)

Lessee must notify Lessor promptly when measures required for maintaining the building must be carried out.

Paragraph 17 (Obligation to Take Necessary Precautions)

Lessee must take the precautions necessary of a good manager when using the leased property.

Paragraph 18 (Entering the Premises for Inspections)

1. Lessor or a party designated by Lessor shall be allowed to enter and inspect the leased property after notifying Lessee, in order to check on the maintenance and upkeep of the building, as well as its sanitation, security and fire prevention status, or for any other reason required for managing the building; Lessor may request that Lessee take appropriate actions or Lessor itself can take any action necessary.

2. In the above case, before entering and inspecting the premises, Lessor shall provide Lessee with notification to that effect, however, this restriction shall not apply in the case of an emergency.

Paragraph 19 (Exemptions)

1. When damages have occurred as a result of a disaster such as an earthquake, fire, or flood, etc., if the Lessee suffers damages originating from or relating to the building equipment and facilities such as those for electricity, gas, water, or the cooling and heating system, etc., despite the Lessor, as landlord and owner of the building, having taken proper care with regard to the maintenance and management thereof, Lessor shall in no way be held responsible for such damage.

2. Lessor shall not be held responsible when services are interrupted, partially suspended, or the use of the leased property is partially restricted due to inspection, maintenance, repair, or renovation work on the building carried out by Lessor.

Paragraph 20 (Compensation for Damages)

When Lessee, an agent, employee, independent contractor, or any other party related to Lessee, has either intentionally or accidentally damaged or harmed Lessor or a third party, Lessee shall be responsible for providing compensation for the entire amount suffered as a result of such damage.

Paragraph 21 (Taxes and Other Public Charges)

1. Lessor shall be responsible for paying taxes and other public charges on the building stipulated in this contract.

2. When Lessee has installed a sign, billboard or other equipment etc., or has carried out an installation categorized as being a project that is the responsibility of the Lessee, Lessee shall be responsible for paying taxes or other public charges imposed as a result thereof including real estate acquisition taxes and taxes on fixed assets, etc.

Paragraph 22 (Destruction and Damage of Building)

1. If as a result of a natural disaster, earthquake, or other reason for which neither Lessor nor Lessee is responsible, all or a part of the leased property is destroyed or damaged, Lessor and Lessee shall consult with each other with regard to how to handle the situation after this contract.

2. When all or part of the leased property has been lost or damaged, and it is acknowledged that it would be impossible or extremely difficult to continue this contract, this contract shall be terminated as of that point in time at which the loss or damage occurred.

In this case, the security deposit shall be refunded in accordance with Paragraph 7, Section 1.

[6]

Paragraph 23 (Petition to Terminate Contract Prior to Expiration of Lease)

If Lessee desires to terminate this contract before the lease has expired, six (6) months prior to the expiration of the lease, Lessee must submit in writing to the other party the reasons for terminating the contract.

Paragraph 24 (Termination of the Contract)

When any of the following has occurred, Lessor can terminate this contract without providing prior notification to Lessee, and if Lessor has suffered damages, Lessor can demand compensation for those damages from Lessee.

1. When Lessee has failed to pay rent or other obligations for two (2) months or more.
2. When Lessee has violated this contract or any of the attachments hereto.
3. When Lessee has violated a provision under Paragraph 12.
4. When a foreclosure, compulsory execution, bankruptcy, composition proceedings, or consolidation, reorganization or dissolution of the corporation has occurred.

Paragraph 25 (Obligation to Dismantle, Remove from and Vacate the Premises)

1. If this contract is terminated before it expires due to circumstances of Lessee, or is terminated because the term of the lease agreement has expired, Lessee shall, at the expense of the Lessee, promptly return the leased property to its original condition, and shall completely vacate the premises by the date designated by Lessor.
2. In the preceding case, when vacating the premises Lessee shall not leave any fixtures, equipment, devices, furnishings or any other object in the leased property.

However, upon the consent of the Lessor, objects may remain on the premises without remuneration.

3. In the case of Section 1 above, if Lessee does not vacate the leased property promptly before the date designated by Lessor, from the day after the expiration date of this contract up until the date by which the premises have been completely vacated, Lessee shall pay compensation to Lessor which is double the amount of the regular rent and shall also pay an appropriate amount to cover expenses; and if Lessor sustains damages as a result of the delay in Lessee's vacating of the premises, Lessee shall also pay compensation to Lessor for such damages.

4. In the preceding case, if Lessee does not promptly complete dismantling and removal, Lessor shall take measures for dismantling and removal at the expense of Lessee, and Lessee shall not object to this action.

5. In the preceding case, Lessee shall pay compensation to Lessor which is double the amount of the regular rent and shall also pay an appropriate amount to cover expenses; and if Lessor sustains damages as a result of the delay in Lessee's dismantling and removing property from the premises, Lessee shall also pay compensation to Lessor for such damages.

Paragraph 26 (Demands for Purchasing Installations, etc.)

Lessee can for no reason demand any reimbursement to cover expenses incurred when vacating the leased property or dismantling and removing property therefrom, nor can the Lessee demand a refund to cover the necessary costs associated with expenditures on fixtures and equipment and expenditures benefiting Lessor, nor demand moving expenses, dispossession expenses, or concession money, etc. Also, Lessee can not demand that Lessor purchase any installations, fixtures, decorations, or equipment, etc., that have been established in the leased property at the Lessee's own expense.

[7]

Paragraph 27 (Drafting of Notarized Document)

For the purpose of making the content of this contract explicit, when requested by either Lessor or Lessee, this contract can at any time be handed over to a Notary Public and a notarized document drafted.

Paragraph 28 (Court of Jurisdiction)

Should a dispute arise with regard to the rights and responsibilities relating to this contract, the Tokyo District Court shall be the court of jurisdiction.

Paragraph 29 (Special Clauses)

1. This contract shall be notarized.
2. Only rent between January 1, 1996 and March 31, 1996 shall be excused.
3. Fees for shared services shall be paid from January 1, 1996 on.

Paragraph 30 (Other items)

Lessor and Lessee shall carry out the terms of this contract honestly. If questions should arise concerning items not laid out in this contract, or if doubt should arise with regard to the interpretation of an item in this contract, both parties shall deliberate on the matter with sincerity and honesty and endeavor to resolve any differences in accordance with civil and other laws and regulations, and commercial customs.

As proof of this lease agreement, two copies thereof shall be made and signed and sealed by both Lessor and Lessee, with one copy to remain in the possession of each signatory.

January 1, 1996

Lessor

Address: 5-17-13, Narita-higashi, Suginami-ku, Tokyo

Name: Mifuji Kanzai K.K.

C.E.O.: Yuichiro Sato [Seal]

Lessee

1-20-32, Miyamae, Suginami-ku, Tokyo

Name: MKS Japan Inc.

C.E.O.: Kiyoshi Hoshino [Seal]

[8]

Mifuji Group K.K.

1-9-2, Asagaya-kita,

Mifuji Building

Suginami-ku, Tokyo

Tel: 03-3336-3141 (Main)

Fax: 03-3336-3418

[The Legal Translating Service Letterhead]

Certification of Translation

COMMONWEALTH OF MASSACHUSETTS

COUNTY OF MIDDLESEX

On this day of November 13, 1997

Gregory J. Krauth

of the Legal Translating Service, a division of Linguistic Systems, Inc., 130 Bishop Richard Allen Drive, Cambridge, Massachusetts 02139, being duly sworn, declared the attached translation to have been made faithfully of his own knowledge by himself and that the attached translation is a true and correct English version of the original document, to the best of his knowledge and belief.

His qualifications as translator include familiarity with English as a native language and with Japanese as an acquired language, and with said languages as languages of instruction and use for more than 10 years, and that he received a Master's degree from Indiana University and that he is employed as a freelance translator by Linguistic Systems, Inc.

My commission expires March 16, 2001

/s/ Hugh McAden Oechler

Hugh McAden Oechler
Notary Public

[1]
Lease Agreement

MKS Japan Co., Ltd.

Harmonize Building
First and Second Floors

MIFUJI

[2]
Lease Agreement (Offices in Building)
Lessor: Mifuji Kanzai K.K.
Lessee: MKS Japan Co., Inc.

The aforementioned Lessor and Lessee conclude this lease agreement according to the terms and conditions set forth below.

Paragraph 1 (Leased Property)
Lessor leases to Lessee, and Lessee leases from Lessor the property indicated below.

Address of Property: 5-17-13, Narita-higashi, Suginami-ku, Tokyo
Structure and Scale the Building: Steel-framed reinforced concrete structure with roof, with one underground floor and eight above ground floors.

Name: Harmonize Building

Leased area:

First floor: 467.6 square meters (141.7 tsubo)
Second floor: 506.5 square meters (153.5 tsubo)

Paragraph 2 (Purpose of Use)

Lessee shall use the leased property as an office, and shall not use it for any other purpose.

Paragraph 3 (Term of Lease)

The term of the lease is established as set forth below.

A two (2) year period from May 1, 1997 to April 30, 1999 shall be established as the term of the lease.

However, if within at least 6 months but no more than 1 year from the date the term of the lease expires, either party indicates to the other party in writing a desire to renew the lease, this lease can be renewed upon the mutual consent of both parties. At the time of the renewal, Lessee shall pay Lessor one month's rent as a renewal fee.

Paragraph 4 (Rent)

1. Total Monthly Rent: 4,729,997 yen (including 5% consumption tax of 225,237 yen)

(1) Rent:

First floor: 1,934,205 yen (including 5% consumption tax of 92,105 yen)
Second floor: 1,772,925 yen (including 5% consumption tax of 84,425 yen)

(2) Fee for Shared Services

First floor: 490,990 yen (including 5% consumer tax of 23,380 yen)
Second floor: 531,877 yen (including 5% consumer tax of 25,327 yen)

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2. By the end of every month Lessee shall pay the following month's rent by transferring funds to a bank account designated by Lessor, and Lessee shall be responsible for paying the fees for transferring funds.

3. If the term of the lease ends before the end of a month or if the rent is increased or decreased for any other reason, the rent shall be calculated on a per diem basis based on the number of days in that month.

Paragraph 5 (Adjustments to Rent)

The rent in this contract shall be reviewed every two (2) years from the commencement of the lease, and adjustments thereto carried out upon the mutual consent of both parties.

However, if as a result of changes in prices, increases in taxes or other public charges, or changes in other economic conditions, etc., the rent has become unreasonable, Lessor can adjust the rent even before the term of the lease has expired upon the consent of Lessee.

Paragraph 6 (Security Deposit)

1. As security to ensure that Lessee fulfills its obligations as set forth in the terms of this contract, Lessee shall provide 35,306,000 yen, an amount equivalent to ten (10) months rent, to Lessor at the time this contract is signed.

2. When Lessee has failed to pay the rent on time, has caused damages or has failed to fulfill any other of its obligations as set forth in the terms of this contract, upon notification thereof, Lessor is entitled to appropriate all or some of the deposit to pay for such.

3. Lessee shall not be entitled to claim that the possession of the security deposit as established in this contract offsets any monetary obligation Lessee is responsible for paying to Lessor.

4. In the case of Paragraph 6, Section 2 above, within a week after receiving the notification of appropriation, Lessee must supply the amount necessary to restore the security deposit to the amount prior to the appropriation.

5. Lessee shall not transfer claim to the security deposit to a third party, nor offer such for use as collateral.

Paragraph 7 (Return of the Security Deposit)

When the contract has terminated due to the expiration of the term thereof, Lessor shall return the deposit to Lessee within one month after Lessor has confirmed that Lessee has returned the leased property to its original condition, has completely vacated the premises, and has completed dismantling and removal operations.

Paragraph 8 (Termination of Lease Before Expiration)

If this contract is terminated before it expires due to circumstances of Lessee, or if it is terminated for reasons that are the fault of Lessee, an amount equivalent to 10% of the total in Paragraph 6, Section 1 above shall be paid as compensation.

Paragraph 9 (Category of Project)

None

Paragraph 10 (Responsibility for Expenses)

Lessee shall be responsible for expenses produced as a result of the daily work carried out within the area contracted for use by Lessee, such as the fees for use of utilities such as electricity, water, gas.

[4]

Paragraph 11 (Late Payment Penalty)

When Lessee is late in paying obligations set forth in this contract, upon notification thereof by Lessor, Lessee shall pay a late payment penalty based on a per annum rate of 14.6%.

Paragraph 12 (Matters to be Reported)

When matters pertaining to any of the following occurs, Lessee must promptly submit a written report of the gist thereof to Lessor.

1. When there has been a significant change with regard to the representative of the company or any other item pertaining to the commercial registration of the company.
2. When a merger, etc., has occurred.
3. When there has been a change in the type of business.

Paragraph 13 (Items Requiring Approval)

If Lessee is to perform any of the following, Lessee must submit a written report of the intentions thereof to Lessor and receive Lessor's approval before carrying out such actions.

1. When Lessee desires to modify or establish new fixtures, furniture, designs or room dividers, etc., of the leased property.
2. When Lessee desires to modify or expand existing equipment which was previously installed by Lessor on the leased property.
3. When Lessee desires to install new auxiliary equipment.
4. When Lessee desires to establish a display such as a signboard, bulletin board, sign, billboard or the like.

However, this restriction shall not apply to cases in which the leased property is not modified or to acts approved by Lessor prior to the contract.

Paragraph 14 (Prohibited Items)

Lessee is prohibited from carrying out any of the following.

1. Regardless of pretext, any act to transfer the rights in this contract, such as the rights to use, lease, or conduct business on the leased property, etc., to a third party, or to use such as collateral.
2. Any act to sub-lease to a third party or let others use or manage part or all of the leased property.
3. Any change to the purpose of use of the leased property.
4. Any act to display the company name, or post a sign, etc., in a location or using a method other than that which has been designated by Lessor, or any other act to display the name of a third party.
5. Any act that is detrimental to the maintenance and upkeep of the building or any act which cause damage to the building.
6. Any act that disturbs the neighbors.

Paragraph 15 (Responsibility for Repair Expenses)

1. Lessor shall carry out repairs necessary for the maintenance and upkeep of the building itself and its attachments.
2. Lessee shall be responsible for carrying out repairs and replacements on the leased property including those relating to the walls, ceilings, floors, windows, light fixtures and other electrical equipment, gas equipment, water equipment and all such equipment and facilities used daily by Lessee, as well as to all equipment and facilities directly used by clients and visitors of Lessee.
3. If Lessee discovers in the building owned by Lessor that a repair is needed in the area leased by Lessee, Lessee has the obligation to notify Lessor immediately, and even if Lessee is responsible for the repair expenses, repairs shall always be carried out upon consent of Lessor.

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Paragraph 16 (Obligation to Notify)

Lessee must notify Lessor promptly when measures required for maintaining the building must be carried out.

Paragraph 17 (Obligation to Take Necessary Precautions)

Lessee must take the precautions necessary of a good manager when using the leased property.

Paragraph 18 (Entering the Premises for Inspections)

1. Lessor or a party designated by Lessor shall be allowed to enter and inspect the leased property after notifying Lessee, in order to check on the maintenance and upkeep of the building, as well as its sanitation, security and fire prevention status, or for any other reason required for managing the building; Lessor may request that Lessee take appropriate actions or Lessor itself can take any action necessary.

2. In the above case, before entering and inspecting the premises, Lessor shall provide Lessee with notification to that effect, however, this restriction shall not apply in the case of an emergency.

Paragraph 19 (Exemptions)

1. When damages have occurred as a result of a disaster such as an earthquake, fire, or flood, etc., if the Lessee suffers damages originating from or relating to the building equipment and facilities such as those for electricity, gas, water, or the cooling and heating system, etc., despite the Lessor, as landlord and owner of the building, having taken proper care with regard to the maintenance and management thereof, Lessor shall in no way be held responsible for such damage.

2. Lessor shall not be held responsible when services are interrupted, partially suspended, or the use of the leased property is partially restricted due to inspection, maintenance, repair, or renovation work on the building carried out by Lessor.

Paragraph 20 (Compensation for Damages)

When Lessee, an agent, employee, independent contractor, or any other party related to Lessee, has either intentionally or accidentally damaged or harmed Lessor or a third party, Lessee shall be responsible for providing compensation for the entire amount suffered as a result of such damage.

Paragraph 21 (Taxes and Other Public Charges)

1. Lessor shall be responsible for paying taxes and other public charges on the building stipulated in this contract.

2. When Lessee has installed a sign, billboard or other equipment etc., or has carried out an installation categorized as being a project that is the responsibility of the Lessee, Lessee shall be responsible for paying taxes or other public charges imposed as a result thereof including real estate acquisition taxes and taxes on fixed assets, etc.

Paragraph 22 (Destruction and Damage of Building)

1. If as a result of a natural disaster, earthquake, or other reason for which neither Lessor nor Lessee is responsible, all or a part of the leased property is destroyed or damaged, Lessor and Lessee shall consult with each other with regard to how to handle the situation after this contract.

2. When all or part of the leased property has been lost or damaged, and it is acknowledged that it would be impossible or extremely difficult to continue this contract, this contract shall be terminated as of that point in time at which the loss or damage occurred.

In this case, the security deposit shall be refunded in accordance with Paragraph 7, Section 1.

[6]

Paragraph 23 (Petition to Terminate Contract Prior to Expiration of Lease)

If Lessee desires to terminate this contract before the lease has expired, six (6) months prior to the expiration of the lease, Lessee must submit in writing to the other party the reasons for terminating the contract.

Paragraph 24 (Termination of the Contract)

When any of the following has occurred, Lessor can terminate this contract without providing prior notification to Lessee, and if Lessor has suffered damages, Lessor can demand compensation for those damages from Lessee.

1. When Lessee has failed to pay rent or other obligations for two (2) months or more.
2. When Lessee has violated this contract or any of the attachments hereto.
3. When Lessee has violated a provision under Paragraph 12.
4. When a foreclosure, compulsory execution, bankruptcy, composition proceedings, or consolidation, reorganization or dissolution of the corporation has occurred.

Paragraph 25 (Obligation to Dismantle, Remove from and Vacate the Premises)

1. If this contract is terminated before it expires due to circumstances of Lessee, or is terminated because the term of the lease agreement has expired, Lessee shall, at the expense of the Lessee, promptly return the leased property to its original condition, and shall completely vacate the premises by the date designated by Lessor.
2. In the preceding case, when vacating the premises Lessee shall not leave any fixtures, equipment, devices, furnishings or any other object in the leased property.

However, upon the consent of the Lessor, objects may remain on the premises without remuneration.

3. In the case of Section 1 above, if Lessee does not vacate the leased property promptly before the date designated by Lessor, from the day after the expiration date of this contract up until the date by which the premises have been completely vacated, Lessee shall pay compensation to Lessor which is double the amount of the regular rent and shall also pay an appropriate amount to cover expenses; and if Lessor sustains damages as a result of the delay in Lessee's vacating of the premises, Lessee shall also pay compensation to Lessor for such damages.

4. In the preceding case, if Lessee does not promptly complete dismantling and removal, Lessor shall take measures for dismantling and removal at the expense of Lessee, and Lessee shall not object to this action.

5. In the preceding case, Lessee shall pay compensation to Lessor which is double the amount of the regular rent and shall also pay an appropriate amount to cover expenses; and if Lessor sustains damages as a result of the delay in Lessee's dismantling and removing property from the premises, Lessee shall also pay compensation to Lessor for such damages.

Paragraph 26 (Demands for Purchasing Installations, etc.)

Lessee can for no reason demand any reimbursement to cover expenses incurred when vacating the leased property or dismantling and removing property therefrom, nor can the Lessee demand a refund to cover the necessary costs associated with expenditures on fixtures and equipment and expenditures benefiting Lessor, nor demand moving expenses, dispossession expenses, or concession money, etc. Also, Lessee can not demand that Lessor purchase any installations, fixtures, decorations, or equipment ,etc., that have been established in the leased property at the Lessee's own expense.

Paragraph 27 (Drafting of Notarized Document)

For the purpose of making the content of this contract explicit, when requested by either Lessor or Lessee, this contract can at any time be handed over to a Notary Public and a notarized document drafted.

Paragraph 28 (Court of Jurisdiction)

Should a dispute arise with regard to the rights and responsibilities relating to this contract, the Tokyo District Court shall be the court of jurisdiction.

Paragraph 29 (Special Clauses)

1. Lessor gives permission to Lessee to exhibit merchandise and equipment of the work site in the leased rooms.
2. Use of storage room(s) and closet(s) not included in the leased rooms shall be allowed during the term of the lease.

Paragraph 30 (Other items)

Lessor and Lessee shall carry out the terms of this contract honestly. If questions should arise concerning items not laid out in this contract, or if doubt should arise with regard to the interpretation of an item in this contract, both parties shall deliberate on the matter with sincerity and honesty and endeavor to resolve any differences in accordance with civil laws, other laws and regulations, and commercial customs.

As proof of this lease agreement, two copies thereof shall be made, signed and sealed by both Lessor and Lessee, with one copy to remain in the possession of each signatory.

April 21, 1997

Lessor

Address: 5-17-13, Narita-higashi, Suginami-ku, Tokyo
Name: Mifuji Kanzai K.K.
C.E.O.: Yuichiro Sato [Seal]

Lessee

1-20-32, Miyamae, Suginami-ku, Tokyo
Name: MKS Japan Inc.
C.E.O.: Kiyoshi Hoshino [Seal]

1-20-32 Miyamae, Suginami-ku, Tokyo
Name: MKS Japan Inc.
C.E.O.: John R. Bertucci [Seal]

[8]

Agreement

As proof of the agreement relating to the lease of the 1st and 2nd floors (offices in the building) of the Harmonize Building, two copies shall be made thereof, and each shall be signed and sealed by both Lessor and Lessee, with one copy to remain in the possession of each signatory.

Items of the Agreement:

1. At that point in time when the rent has been adjusted when the lease agreement is renewed, we agree that the amount of the security deposit shall be increased or decreased based on the difference with the previous rent.

2. Six (6) months before the term of the lease agreement has expired, both the Lessor and the Lessee shall indicate their intentions to the other party in writing. Also, if the indication of the intentions of either party is accidentally delayed, both Lessor and Lessee shall handle this matter with sincerity and honesty.

April 21, 1997

Lessor

Address: 5-17-13 Narita-higashi, Suginami-ku, Tokyo
Name: Mifuji Kanzai K.K.
C.E.O.: Yuichiro Sato [Seal]

Lessee

1-20-32 Miyamae, Suginami-ku, Tokyo
Name: MKS Japan Inc.
C.E.O.: Kiyoshi Hoshino [Seal]

[9]

Security Deposit Receipt
[Revenue stamp]

To: MKS Japan Inc.

We hereby accept payment and shall retain throughout the term of the lease 35,306,000 yen as a security deposit as set forth in the lease agreement for leasing the 1st and 2nd floors of the Harmonize Building.

April 21, 1997

Lessor
Mifuji Kanzai K.K.
C.E.O.: Yuichiro Sato

[10]
Mifuji Group K.K.
Mifuji Kanzai K.K.

5-17-13 Narita-higashi,
Suginami-ku, Tokyo, 116
Harmonize Building 8F
Tel: 03-3393-6661 (Main)
Fax: 03-3393-6660
Governor of Tokyo (7): #30401: Corporation/Member of Tokyo Association of Real Estate Agents, Suginami Branch

CERTIFICATION OF TRANSLATION

COMMONWEALTH OF MASSACHUSETTS
COUNTY OF MIDDLESEX
On this day of November 13, 1997

Gregory J. Krauth

of the Legal Translating Service, a division of Linguistic Systems, Inc., 130 Bishop Richard Allen Drive, Cambridge, Massachusetts 02139, being duly sworn, declared the attached translation to have been made faithfully of his own knowledge by himself and that the attached translation is a true and correct English version of the original document, to the best of his knowledge and belief.

His qualifications as translator include familiarity with English as a native language and with Japanese as an acquired language, and with said languages as languages of instruction and use for more than 10 years, and that he received a Master's degree from Indiana University and that he is employed as a freelance translator by Linguistic Systems, Inc.

My commission expires March 16, 2001

/s/ Hugh McAden Oechler
Hugh McAden Oechler
Notary Public

SPLIT-DOLLAR AGREEMENT

AGREEMENT dated as of September 12, 1991 (the "Agreement") by and among MKS Instruments, Inc., a Massachusetts corporation (the "Corporation"), John R. Bertucci of Lexington, Massachusetts (the "Employee"), and Claire R. Bertucci of Lexington, Massachusetts and Richard S. Chute of Cambridge, Massachusetts, as Trustees of the John R. Bertucci Insurance Trust of January 10, 1986 (the "Owner").

WHEREAS, the Employee is employed by the Corporation; and

WHEREAS, the Employee wishes to provide life insurance protection for his family in the event of his death under a policy of life insurance insuring his life and the life of Claire R. Bertucci (the "Policy") which is described in Exhibit A hereto (and by this reference is hereby made subject to this Agreement) issued by Pacific Mutual Life Insurance Company (the "Insurer"); and

WHEREAS, the Corporation is willing to pay the premiums due on the Policy as an additional employment benefit for the Employee on the terms and conditions hereinafter set forth; and

WHEREAS, the Owner is the owner of the Policy and, as such, possesses all incidents of ownership in and to the Policy; and

WHEREAS, the Corporation wishes to have the Policy collaterally assigned to it by the Owner in order to secure the repayment of the amounts which the Corporation will pay toward the premiums on the Policy; and

WHEREAS, the parties hereto intend that by such collateral assignment the Corporation shall receive only the right to such repayment with the Owner retaining all other ownership rights in and to the Policy:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein and for other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto hereby agree as follows:

(1). Purchase of Policy: The Owner will, contemporaneously with the execution hereof, purchase the Policy from the Insurer in the total face amount of \$5,000,000. The parties hereto agree that they will take all necessary action to cause the Insurer to issue the Policy and shall take any further action which may be necessary to cause the Policy to conform to the provisions of this Agreement. The parties hereto agree that the Policy shall be subject to the terms and conditions of this Agreement and of the collateral assignment filed with the Insurer relating to the Policy.

(2). Ownership of Policy:

(a). The Owner shall be the sole and absolute owner of the Policy and may exercise all ownership rights granted to the owner thereof by the terms of the Policy, except as may otherwise be provided herein.

(b). It is the intention of the parties to this Agreement and to the collateral assignment referred to herein that the Owner shall retain all rights which the Policy grants to the owner thereof and that the sole right of the Corporation hereunder shall be to be repaid the amounts which it has paid toward the premiums of the Policy. Specifically, but without limitation, the Corporation shall neither have nor exercise any right as collateral assignee of the Policy which could in any way

defeat or impair the right of the Owner to receive the cash surrender value or the death proceeds of the Policy in excess of the amount due the Corporation hereunder.

(3). Payment of Premiums: Except as otherwise provided herein, on or before the due date of each Policy premium, or within the grace period provided therein, the Corporation shall pay the full amount of the premium to the Insurer, and shall, upon request, promptly furnish the Employee evidence of timely payment of such premium. The Corporation shall annually furnish the Employee a statement of the amount of income reportable by the Employee for federal and state income tax purposes as a result of the insurance protection provided the Owner as the beneficiary of the Policy.

(4). Collateral Assignment: To secure the repayment to the Corporation of the amount of the premiums on the Policy paid by the Corporation under the terms of this Agreement, the Owner has, contemporaneously with the execution hereof, assigned the Policy to the Corporation as collateral under the form used by the Insurer for such assignments, which collateral assignment specifically provides that the sole right of the Corporation thereunder is to be repaid the amounts it has paid toward the premiums on the Policy. Such repayment shall be made from the cash surrender value of the Policy (as defined therein) if this Agreement is terminated or if the Owner surrenders or cancels the Policy or from the death proceeds of the Policy, if any, if the Employee or any other insured should die while the Policy and this Agreement remain in force. In no event shall the Corporation have any right to borrow against or make withdrawals from the Policy or to surrender or cancel the

Policy or to take any other action which would impair or defeat the rights of the Owner in and to the Policy. The collateral assignment of the Policy to the Corporation hereunder shall not be terminated, altered, or amended by the Owner while this Agreement is in effect. The parties hereto agree to take all action necessary to cause such collateral assignment to conform to the provisions of this Agreement.

(5). Limitations on Rights of Owner in and to Policy:

(a). The Owner shall take no action with respect to the Policy which would in any way compromise or jeopardize the right of the Corporation to be repaid the amounts it has paid toward the premiums on the Policy while this Agreement is in effect.

(b). The Owner may pledge or assign the Policy, subject to the terms and conditions of this Agreement, in order to secure a loan from the Insurer or from a third party, in an amount which shall not exceed the cash surrender value of the Policy (as defined therein) as of the date to which premiums have been paid, less the amount paid toward the premiums on the Policy by the Corporation. Interest charges on such loan shall be the responsibility of and be paid by the Owner. For any Policy year in which the Owner borrows hereunder, the Corporation shall be correspondingly relieved of its obligation to pay any amounts toward premiums for such Policy year to the extent of such borrowing.

(c). The Owner shall have the sole right to surrender or cancel the Policy and to receive the full cash surrender value of the Policy directly from the Insurer. Upon the surrender or cancellation of the Policy, the Corporation shall have

the unqualified right to receive a portion of the cash surrender value equal to the total amount of the premiums paid by the Corporation under the terms of this Agreement. Immediately upon receipt of the cash value of the Policy from the Insurer, the Owner shall pay to the Corporation the portion of such cash value to which the Corporation is entitled under the terms of this Agreement and shall retain the balance, if any. Upon such receipt and payment this Agreement shall thereupon terminate.

(6). Collection of Death Proceeds:

(a). Upon the death of the second to die of the Employee and Claire R. Bertucci, the Corporation and the Owner shall cooperate to take whatever action is necessary to collect the death benefit, if any, provided under the Policy, and when such death benefit, if any, has been collected and paid as provided herein, this Agreement shall thereupon terminate.

(b). Upon the death of the second to die of the Employee and Claire R. Bertucci, the Corporation shall have the unqualified right to receive a portion of such death benefit, if any, equal to the total amount of the premiums paid by the Corporation under the terms of this Agreement; provided, however, that, if the Owner shall deem it to be in the best interests of the Owner as evidenced by the written consent of the Owner, the Owner may, upon the death of the first to die of the Employee and Claire R. Bertucci, repay the Corporation the total amount of the premiums paid by the Corporation under the terms of this Agreement. The balance of the death benefit provided under the Policy, if any, shall be paid directly to the

Owner in the manner and in the amount or amounts provided in the beneficiary designation provision of the Policy. In no event shall the amount payable to the Corporation hereunder exceed the proceeds of the Policy payable at the death of the second to die of the Employee and Claire R. Bertucci. No amount shall be paid from such death benefit to the Owner until the full amount due the Corporation hereunder has been paid. The parties hereto agree that the beneficiary designation provision of the Policy shall conform to the provisions hereof.

(c). Notwithstanding any provision hereof to the contrary, in the event that, for any reason whatsoever, no death benefit is payable under the Policy upon the death of the second to die of the Employee and Claire R. Bertucci and in lieu thereof the Insurer refunds all or any part of the premiums paid for the Policy, the Corporation and the Owner shall have the unqualified right to share such premiums based on their respective cumulative contributions thereto.

(7). Termination of Agreement During Lifetime of Employee:

(a). This Agreement shall terminate during the lifetime of the Employee without notice upon the occurrence of any of the following events: (a) total cessation of the business of the Corporation; or (b) the bankruptcy, receivership, or dissolution of the Corporation.

(b). In addition, the Owner may terminate this Agreement, while no premium under the Policy is overdue, by written notice to the other parties hereto. Such termination shall be effective as of the date of such written notice.

(8). Disposition of Policy on Termination of Agreement During Lifetime of Employee:

(a). For sixty (60) days after the date of the termination of this Agreement during the lifetime of the Employee, the Owner shall have the option of obtaining the release of the collateral assignment of the Policy to the Corporation. To obtain such release, the Owner shall repay to the Corporation the total amount of the premium payments made by the Corporation under the terms of this Agreement. Upon receipt of such amount, the Corporation shall release the collateral assignment of the Policy by the execution and delivery of an appropriate instrument of release.

(b). If the Owner fails to exercise such option described in Section (8) (a) above within such sixty (60) day period, then, at the request of the Corporation, the Owner shall execute any document or documents required by the Insurer to transfer the interest of the Owner in the Policy to the Corporation. Alternatively, the Corporation may enforce its right to be repaid the amount of the premiums on the Policy paid by it from the cash surrender value of the Policy under the collateral assignment of the Policy; provided, however, that, in the event the cash surrender value of the Policy exceeds the amount due the Corporation, such excess shall be paid to the Owner. Thereafter, neither the Owner nor its successors or assigns shall have any further interest in and to the Policy either under the terms thereof or under this Agreement.

(9). Insurer Not a Party: The Insurer shall be fully discharged from its obligations under the Policy by payment of the Policy death benefit to the beneficiary

or beneficiaries named in the Policy, subject to the terms and conditions of the Policy. In no event shall the Insurer be considered a party to this Agreement or any modification or amendment hereof. No provision of this Agreement, nor of any modification or amendment hereof, shall in any way be construed as enlarging, changing, varying, or in any other way affecting the obligations of the Insurer as expressly provided in the Policy, except insofar as the provisions hereof are made a part of the Policy by the collateral assignment executed by the Owner and filed with the Insurer in connection herewith.

(10). Named Fiduciary; Determination of Benefits; Claims Procedure and Administration:

(a). The Corporation is hereby designated as the named fiduciary under this Agreement. The Corporation, as the named fiduciary under this Agreement, shall have authority to control and manage the operation and administration of this Agreement, and the Corporation shall be responsible for establishing and carrying out a funding policy and method consistent with the objectives of this Agreement.

(b). (1) Claim. A person who believes that he or she is being denied a benefit to which he or she is entitled under this Agreement (a "Claimant") may file a written request for such benefit with the Corporation setting forth his or her claim. The request must be addressed to the President of the Corporation at its principal place of business.

(2) Claim Decision. Upon receipt of a claim, the Corporation shall advise the Claimant in writing that a reply will be forthcoming within ninety (90) days and shall deliver such reply within such ninety (90) day period. The Corporation may, however, extend the reply period for an additional ninety (90) days for reasonable cause. If the claim is denied in whole or in part, the Corporation shall adopt a written opinion, using language calculated to be understood by the Claimant, setting forth: (a) the specific reason or reasons for such denial; (b) the specific reference to pertinent provisions of this Agreement on which such denial is based; (c) a description of any additional material or information necessary for the Claimant to perfect his or her claim and an explanation why such material or such information is necessary; (d) appropriate information as to the steps to be taken if the Claimant wishes to submit the claim for review; and (e) the time limits for requesting a review under Subsection (3) of this Section and for review under Subsection (4) of this Section.

(3) Request for Review. Within sixty (60) days after the receipt by the Claimant of the written opinion described above, the Claimant may request in writing that the Clerk of the Corporation review the determination of the Corporation. Such request shall be addressed to the Clerk of the Corporation at its principal place of business. The Claimant or his or her duly authorized representative may, but need not, review the pertinent documents and submit issues and comments in writing for consideration by the Clerk of the Corporation. If the Claimant does not request a review by the Clerk of the Corporation of the

determination by the Corporation within such sixty (60) day period, the Claimant shall be barred and estopped from challenging the determination of the Corporation.

(4) Review of Decision. Within sixty (60) days after the Clerk's receipt of a request for review, he or she will review the determination of the Corporation. After considering all materials presented by the Claimant, the Clerk will render a written opinion, written in a manner calculated to be understood by the Claimant, setting forth the specific reasons for the decision and containing specific references to the pertinent provisions of this Agreement on which the decision is based. If special circumstances require that the sixty (60) day time period be extended, the Clerk will so notify the Claimant and will render the decision as soon as possible, but no later than one hundred twenty (120) days after receipt of the request for review.

(11). Amendment: This Agreement may not be amended, altered, or modified, except by a written instrument signed by all of the parties hereto, or their respective successors or assigns, and may not be otherwise terminated, except as provided herein.

(12). Binding Effect: This Agreement shall be binding upon, and inure to the benefit of, the parties hereto and their respective successors, assigns, heirs, executors, administrators, and beneficiaries.

(13). Notice: Any notice, consent, or demand required or permitted to be given under the provisions of this Agreement shall be in writing, and shall be signed by the party giving or making the same. If such notice, consent, or demand is mailed

to a party hereto, it shall be sent by United States certified mail, postage prepaid, return receipt requested, addressed to such party's last known address as shown on the records of the Corporation. The date of such mailing shall be deemed the date of the notice, consent, or demand.

(14). Governing Law: This Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to a contract made and to be performed solely within The Commonwealth of Massachusetts.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as an instrument under seal, all as of the day, month, and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Ronald C. Weigner

Ronald C. Weigner, Controller

/s/ John R. Bertucci

John R. Bertucci

JOHN R. BERTUCCI INSURANCE
TRUST OF JANUARY 10, 1986

By: /s/ Claire R. Bertucci

Claire R. Bertucci, as Trustee
and not individually

By: /s/ Richard S. Chute

Richard S. Chute, as Trustee
and not individually

EXHIBIT A

The following described life insurance policy is subject to the Split-Dollar Agreement to which this Exhibit A is attached:

Insurer: Pacific Mutual Life Insurance Company

Insured: John R. Bertucci and Claire R. Bertucci

Owner: Claire R. Bertucci and Richard S. Chute as Trustees of the John R. Bertucci Insurance Trust of January 10, 1986

Policy Number: 1A2246049

Face Amount: \$5,000,000

Date of Issue: September 1, 1991

SPLIT-DOLLAR AGREEMENT

AGREEMENT dated as of September 12, 1991 (the "Agreement") by and among MKS Instruments, Inc., a Massachusetts corporation (the "Corporation"), John R. Bertucci of Lexington, Massachusetts (the "Employee"), and John R. Bertucci of Lexington, Massachusetts and Thomas H. Belknap of Hamilton, Massachusetts, as Trustees of the Claire R. Bertucci Insurance Trust of January 10, 1986 (the "Owner").

WHEREAS, the Employee is employed by the Corporation; and

WHEREAS, the Employee wishes to provide life insurance protection for his family in the event of his death under a policy of life insurance insuring his life and the life of Claire R. Bertucci (the "Policy") which is described in Exhibit A hereto (and by this reference is hereby made subject to this Agreement) issued by Pacific Mutual Life Insurance Company (the "Insurer"); and

WHEREAS, the Corporation is willing to pay the premiums due on the Policy as an additional employment benefit for the Employee on the terms and conditions hereinafter set forth; and

WHEREAS, the Owner is the owner of the Policy and, as such, possesses all incidents of ownership in and to the Policy; and

WHEREAS, the Corporation wishes to have the Policy collaterally assigned to it by the Owner in order to secure the repayment of the amounts which the Corporation will pay toward the premiums on the Policy; and

WHEREAS, the parties hereto intend that by such collateral assignment the Corporation shall receive only the right to such repayment with the Owner retaining all other ownership rights in and to the Policy:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein and for other valuable consideration, the receipt of which is hereby acknowledged, the parties hereto hereby agree as follows:

(1). Purchase of Policy: The Owner will, contemporaneously with the execution hereof, purchase the Policy from the Insurer in the total face amount of \$5,000,000. The parties hereto agree that they will take all necessary action to cause the Insurer to issue the Policy and shall take any further action which may be necessary to cause the Policy to conform to the provisions of this Agreement. The parties hereto agree that the Policy shall be subject to the terms and conditions of this Agreement and of the collateral assignment filed with the Insurer relating to the Policy.

(2). Ownership of Policy:

(a). The Owner shall be the sole and absolute owner of the Policy and may exercise all ownership rights granted to the owner thereof by the terms of the Policy, except as may otherwise be provided herein.

(b). It is the intention of the parties to this Agreement and to the collateral assignment referred to herein that the Owner shall retain all rights which the Policy grants to the owner thereof and that the sole right of the Corporation hereunder shall be to be repaid the amounts which it has paid toward the premiums of the Policy. Specifically, but without limitation, the Corporation shall neither have nor exercise any right as collateral assignee of the Policy which could in any way

defeat or impair the right of the Owner to receive the cash surrender value or the death proceeds of the Policy in excess of the amount due the Corporation hereunder.

(3). Payment of Premiums: Except as otherwise provided herein, on or before the due date of each Policy premium, or within the grace period provided therein, the Corporation shall pay the full amount of the premium to the Insurer, and shall, upon request, promptly furnish the Employee evidence of timely payment of such premium. The Corporation shall annually furnish the Employee a statement of the amount of income reportable by the Employee for federal and state income tax purposes as a result of the insurance protection provided the Owner as the beneficiary of the Policy.

(4). Collateral Assignment: To secure the repayment to the Corporation of the amount of the premiums on the Policy paid by the Corporation under the terms of this Agreement, the Owner has, contemporaneously with the execution hereof, assigned the Policy to the Corporation as collateral, which collateral assignment specifically provides that the sole right of the Corporation thereunder is to be repaid the amounts it has paid toward the premiums on the Policy. Such repayment shall be made from the cash surrender value of the Policy (as defined therein) if this Agreement is terminated or if the Owner surrenders or cancels the Policy or from the death proceeds of the Policy, if any, if the Employee or any other insured should die while the Policy and this Agreement remain in force. In no event shall the Corporation have any right to borrow against or make withdrawals from the Policy or to surrender or cancel the Policy or to take any other action which would impair

or defeat the rights of the Owner in and to the Policy. The collateral assignment of the Policy to the Corporation hereunder shall not be terminated, altered, or amended by the Owner while this Agreement is in effect. The parties hereto agree to take all action necessary to cause such collateral assignment to conform to the provisions of this Agreement.

(5). Limitations on Rights of Owner in and to Policy:

(a). The Owner shall take no action with respect to the Policy which would in any way compromise or jeopardize the right of the Corporation to be repaid the amounts it has paid toward the premiums on the Policy while this Agreement is in effect.

(b). The Owner may pledge or assign the Policy, subject to the terms and conditions of this Agreement, in order to secure a loan from the Insurer or from a third party, in an amount which shall not exceed the cash surrender value of the Policy (as defined therein) as of the date to which premiums have been paid, less the amount paid toward the premiums on the Policy by the Corporation. Interest charges on such loan shall be the responsibility of and be paid by the Owner. For any Policy year in which the Owner borrows hereunder, the Corporation shall be correspondingly relieved of its obligation to pay any amounts toward premiums for such Policy year to the extent of such borrowing.

(c). The Owner shall have the sole right to surrender or cancel the Policy and to receive the full cash surrender value of the Policy directly from the Insurer. Upon the surrender or cancellation of the Policy, the Corporation shall have

the unqualified right to receive a portion of the cash surrender value equal to the total amount of the premiums paid by the Corporation under the terms of this Agreement. Immediately upon receipt of the cash value of the Policy from the Insurer, the Owner shall pay to the Corporation the portion of such cash value to which the Corporation is entitled under the terms of this Agreement and shall retain the balance, if any. Upon such receipt and payment this Agreement shall thereupon terminate.

(6). Collection of Death Proceeds:

(a). Upon the death of the second to die of the Employee and Claire R. Bertucci, the Corporation and the Owner shall cooperate to take whatever action is necessary to collect the death benefit, if any, provided under the Policy, and when such death benefit, if any, has been collected and paid as provided herein, this Agreement shall thereupon terminate.

(b). Upon the death of the second to die of the Employee and Claire R. Bertucci, the Corporation shall have the unqualified right to receive a portion of such death benefit, if any, equal to the total amount of the premiums paid by the Corporation under the terms of this Agreement; provided, however, that, if the Owner shall deem it to be in the best interests of the Owner as evidenced by the written consent of the Owner, the Owner may, upon the death of the first to die of the Employee and Claire R. Bertucci, repay the Corporation the total amount of the premiums paid by the Corporation under the terms of this Agreement. The balance of the death benefit provided under the Policy, if any, shall be paid directly to the

Owner in the manner and in the amount or amounts provided in the beneficiary designation provision of the Policy. In no event shall the amount payable to the Corporation hereunder exceed the proceeds of the Policy payable at the death of the second to die of the Employee and Claire R. Bertucci. No amount shall be paid from such death benefit to the Owner until the full amount due the Corporation hereunder has been paid. The parties hereto agree that the beneficiary designation provision of the Policy shall conform to the provisions hereof.

(c). Notwithstanding any provision hereof to the contrary, in the event that, for any reason whatsoever, no death benefit is payable under the Policy upon the death of the second to die of the Employee and Claire R. Bertucci and in lieu thereof the Insurer refunds all or any part of the premiums paid for the Policy, the Corporation and the Owner shall have the unqualified right to share such premiums based on their respective cumulative contributions thereto.

(7). Termination of Agreement During Lifetime of Employee:

(a). This Agreement shall terminate during the lifetime of the Employee without notice upon the occurrence of any of the following events: (a) total cessation of the business of the Corporation; or (b) the bankruptcy, receivership, or dissolution of the Corporation.

(b). In addition, the Owner may terminate this Agreement, while no premium under the Policy is overdue, by written notice to the other parties hereto. Such termination shall be effective as of the date of such written notice.

(8). Disposition of Policy on Termination of Agreement During Lifetime of Employee:

(a). For sixty (60) days after the date of the termination of this Agreement during the lifetime of the Employee, the Owner shall have the option of obtaining the release of the collateral assignment of the Policy to the Corporation. To obtain such release, the Owner shall repay to the Corporation the total amount of the premium payments made by the Corporation under the terms of this Agreement. Upon receipt of such amount, the Corporation shall release the collateral assignment of the Policy by the execution and delivery of an appropriate instrument of release.

(b). If the Owner fails to exercise such option described in Section (8) (a) above within such sixty (60) day period, then, at the request of the Corporation, the Owner shall execute any document or documents required by the Insurer to transfer the interest of the Owner in the Policy to the Corporation. Alternatively, the Corporation may enforce its right to be repaid the amount of the premiums on the Policy paid by it from the cash surrender value of the Policy under the collateral assignment of the Policy; provided, however, that, in the event the cash surrender value of the Policy exceeds the amount due the Corporation, such excess shall be paid to the Owner. Thereafter, neither the Owner nor its successors or assigns shall have any further interest in and to the Policy either under the terms thereof or under this Agreement.

(9). Insurer Not a Party: The Insurer shall be fully discharged from its obligations under the Policy by payment of the Policy death benefit to the beneficiary

or beneficiaries named in the Policy, subject to the terms and conditions of the Policy. In no event shall the Insurer be considered a party to this Agreement or any modification or amendment hereof. No provision of this Agreement, nor of any modification or amendment hereof, shall in any way be construed as enlarging, changing, varying, or in any other way affecting the obligations of the Insurer as expressly provided in the Policy, except insofar as the provisions hereof are made a part of the Policy by the collateral assignment executed by the Owner and filed with the Insurer in connection herewith.

(10). Named Fiduciary; Determination of Benefits; Claims Procedure and Administration:

(a). The Corporation is hereby designated as the named fiduciary under this Agreement. The Corporation, as the named fiduciary under this Agreement, shall have authority to control and manage the operation and administration of this Agreement, and the Corporation shall be responsible for establishing and carrying out a funding policy and method consistent with the objectives of this Agreement.

(b). (1) Claim. A person who believes that he or she is being denied a benefit to which he or she is entitled under this Agreement (a "Claimant") may file a written request for such benefit with the Corporation setting forth his or her claim. The request must be addressed to the President of the Corporation at its principal place of business.

(2) Claim Decision. Upon receipt of a claim, the Corporation shall advise the Claimant in writing that a reply will be forthcoming within ninety (90) days and shall deliver such reply within such ninety (90) day period. The Corporation may, however, extend the reply period for an additional ninety (90) days for reasonable cause. If the claim is denied in whole or in part, the Corporation shall adopt a written opinion, using language calculated to be understood by the Claimant, setting forth: (a) the specific reason or reasons for such denial; (b) the specific reference to pertinent provisions of this Agreement on which such denial is based; (c) a description of any additional material or information necessary for the Claimant to perfect his or her claim and an explanation why such material or such information is necessary; (d) appropriate information as to the steps to be taken if the Claimant wishes to submit the claim for review; and (e) the time limits for requesting a review under Subsection (3) of this Section and for review under Subsection (4) of this Section.

(3) Request for Review. Within sixty (60) days after the receipt by the Claimant of the written opinion described above, the Claimant may request in writing that the Clerk of the Corporation review the determination of the Corporation. Such request shall be addressed to the Clerk of the Corporation at its principal place of business. The Claimant or his or her duly authorized representative may, but need not, review the pertinent documents and submit issues and comments in writing for consideration by the Clerk of the Corporation. If the Claimant does not request a review by the Clerk of the Corporation of the

determination by the Corporation within such sixty (60) day period, the Claimant shall be barred and estopped from challenging the determination of the Corporation.

(4) Review of Decision. Within sixty (60) days after the Clerk's receipt of a request for review, he or she will review the determination of the Corporation. After considering all materials presented by the Claimant, the Clerk will render a written opinion, written in a manner calculated to be understood by the Claimant, setting forth the specific reasons for the decision and containing specific references to the pertinent provisions of this Agreement on which the decision is based. If special circumstances require that the sixty (60) day time period be extended, the Clerk will so notify the Claimant and will render the decision as soon as possible, but no later than one hundred twenty (120) days after receipt of the request for review.

(11). Amendment: This Agreement may not be amended, altered, or modified, except by a written instrument signed by all of the parties hereto, or their respective successors or assigns, and may not be otherwise terminated, except as provided herein.

(12). Binding Effect: This Agreement shall be binding upon, and inure to the benefit of, the parties hereto and their respective successors, assigns, heirs, executors, administrators, and beneficiaries.

(13). Notice: Any notice, consent, or demand required or permitted to be given under the provisions of this Agreement shall be in writing, and shall be signed by the party giving or making the same. If such notice, consent, or demand is mailed

to a party hereto, it shall be sent by United States certified mail, postage prepaid, return receipt requested, addressed to such party's last known address as shown on the records of the Corporation. The date of such mailing shall be deemed the date of the notice, consent, or demand.

(14). Governing Law: This Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to a contract made and to be performed solely within The Commonwealth of Massachusetts.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as an instrument under seal, all as of the day, month, and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Ronald C. Weigner

Ronald C. Weigner, Controller

/s/ John R. Bertucci

John R. Bertucci

CLAIRE R. BERTUCCI INSURANCE
TRUST OF JANUARY 10, 1986

By: /s/ John R. Bertucci

John R. Bertucci, as Trustee
and not individually

By: /s/ Thomas H. Belknap

Thomas H. Belknap, as Trustee
and not individually

EXHIBIT A

The following described life insurance policy is subject to the Split-Dollar Agreement to which this Exhibit A is attached:

Insurer: Pacific Mutual Life Insurance Company

Insured: John R. Bertucci and Claire R. Bertucci

Owner: John R. Bertucci and Thomas H. Belknap as Trustees of the Claire R. Bertucci Insurance Trust of January 10, 1986

Policy Number: 1A22406290

Face Amount: \$5,000,000

Date of Issue: September 1, 1991

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated March 7, 1997 ("Employment Agreement") by and between MKS Instruments, Inc., a Massachusetts Corporation (the "Corporation"), and Joseph Maher of Wenham, MA (the "Employee").

WHEREAS, the Corporation and the Employee desire to provide for the employment of the Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and the Employee hereby agree as follows:

(1) Term of Employment: The Corporation hereby employs the Employee, and the Employee hereby accepts employment with the Corporation, for a period commencing as of March 3, 1997 and continuing from month to month thereafter until terminated as provided in this Section (1). Either the Corporation or the Employee may terminate the employment of the Employee under this Employment Agreement at any time after March 3, 1997 by giving written notice to the other party stating its or his election to terminate the employment of the Employee under this Employment Agreement. The employment of the Employee under this Employee Agreement shall terminate thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of the Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5).

(2) Capacity: The Employee shall serve in such capacity as may be assigned to him consistent with his training and experience for the term of employment under this Employment Agreement and shall have such authority as is delegated to him by the President of the Corporation, or his designee.

(3) Extent of Services: During the term of employment of the Employee under this Employment Agreement, the Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not engage in any other business activity, which interferes in any way with the Employee performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Corporation.

(4) Compensation: In consideration of the services to be rendered by the Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) Base Salary: A base salary at the rate of one hundred fifty-five thousand dollars (\$155,000) per year for the term of employment of the Employee under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the established practices of the company. No overtime pay will be paid to the Employee by the Corporation.

(b) Incentive: For each calendar year of the corporation during the term of employment of the Employee under this Employment Agreement, the Employee shall be entitled to participate in a Management Incentive Program pursuant to the terms of which the Employee may receive compensation in addition to his base salary if the Corporation attains its consolidated financial goals during such calendar year of the Corporation. The Management Incentive Program, including the consolidated financial goals established by the Corporation for the calendar year and the formula to be used to determine the payment of amounts under the Management Incentive Program, will be communicated to the Employee in writing prior to the beginning of each calendar year of the Corporation.

If there shall be any disagreement between the Corporation and the Employee as to the calculation of the Management Incentive Bonus in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement, the decision of the independent Public Accounting firm of the corporation as to the amount of the Management Incentive Bonus of the Corporation shall be conclusive

and binding on the corporation and the Employee. The Employee shall have no right to inspect any of the books, papers or records of the Corporation, except that the Employee shall be entitled to inspect any certificate of such independent public accounting firm as to the calculation of the Management Incentive Bonus of the Corporation in any calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

Incentive payments shall be payable to the Employee on or before March 31 after the end of each calendar year of the Corporation during the term of employment of the Employee under this Employment Agreement.

The Employee will not receive any payment under the Management Incentive Program for any calendar year in which the Employee is not actively employed on the last day of that calendar year.

(c) MKS Instruments Profit Sharing and Retirement

Savings Plan: The Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments Profit Sharing and Retirement Savings Plan of the Corporation.

(d) Vacation: The Employee shall be entitled to an annual vacation leave of 20 days at full pay during each year of this Employment Agreement, subject to the Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its necessary business.

(e) Life Insurance: The Corporation shall provide, and pay all of the premiums for, term life insurance for the Employee during the term of employment of the Employee under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(f) Medical/Dental Insurance: The Corporation shall provide group medical/dental insurance for the Employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(g) Other Benefits: The Corporation shall provide other benefits for the employee under the Plans of the Corporation applicable to the Employee during the term of employment of the Employee under this Employment Agreement.

(5) Termination: The employment of the Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of the Employee.

(c) At the election of the Corporation (i) if the Employee shall fail, or refuse, to perform the services required of him under this Employment Agreement, or (ii) if the Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement, or (iii) for "cause", which term shall mean acts or actions detrimental to the best interests of the Corporation.

(6) Payment Upon Termination:

(a) If the employment of the Employee is terminated on the expiration of the period of employment as provided in Section (1), the Employee shall not be entitled to any compensation, and the Corporation shall have no obligation to pay the Employee any compensation, except as is provided in this Employment Agreement.

(b) If the employment of the Employee is terminated by death, the Corporation shall pay to the estate of the Employee the compensation which would otherwise be payable to the Employee at the end of the month in which his death occurs.

(c) In the event the employment of the Employee is terminated at the election of the Corporation pursuant to Section (5)(c) hereof, the Employee shall only be

entitled to his base salary through the last day of actual employment or the date of termination, whichever is earlier.

(7) Trade Secrets: The Employee covenants and agrees that he will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or any one connected with the Corporation, and that such trade secrets and confidential information shall not be used by the Employee either on his own behalf or for the benefit of others or disclosed by the Employee to any one, except to the Corporation, during or after the term of employment of the Employee under this Employment Agreement.

(8) Inventions and Patents:

(a) The Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which the Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of employment of the Employee under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee after the employment of the Employee under this Employment Agreement is terminated if the Inventions were conceived by the Employee during the term of employment of the Employee under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by the Employee within six (6) months of the date of termination

of the employment of the Employee under this Employment Agreement shall be conclusively presumed to have been conceived during the term of employment of the Employee under this Employment Agreement.

(b) The Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) The Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of the Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of the Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with the exclusive rights to make, use, license and sell them throughout the world.

(d) The Employee agrees that even though his employment is terminated under this Employment Agreement he will, at any time such termination of employment, carry out and perform all of the agreements of Subsections (8) (a) and (8) (c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any litigation which may arise in connection with the Inventions, provided, however, that should such services be rendered after termination of employment of the Employee under this Employment Agreement, the Employee shall be paid reasonable compensation on a per diem basis.

(e) The Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) The Employee agrees that he will, upon leaving the employment of the Corporation, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and the Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by the Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by the Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Non-Competition:

(a) During the term of employment of the Employee under this Employment Agreement, and during a period of one (1) year after termination of employment of the Employee under this Employment Agreement without regard to the cause of termination of employment and whether or not such termination of employment was caused by the Employee or by the Corporation, (i) the Employee shall not engage, either directly or indirectly, in any manner or capacity, in any business or activity which is competitive with any business or activity conducted by the Corporation in the Residual Gas Analysis market; (ii) the Employee shall not work for or employ, directly or indirectly, or cause to be employed by another, any person who was an employee, officer or agent of the Corporation or of any of its subsidiaries at any time during a period of twelve (12) months

prior to the termination of the employment of the Employee under this Employment Agreement nor shall the Employee form any partnership with, or establish any business venture in cooperation with, any such person which is competitive with any business or activity of the Corporation; (iii) the Employee shall not give, sell or lease any goods or services competitive with the goods or services of the Corporation or its subsidiaries to any person, partnership, corporation or other entity who purchased goods or services from the Corporation or its subsidiaries within one (1) year before the termination of the employment of the Employee under this Employment Agreement; (iv) the Employee shall not have any financial interest, or participate as a director, officer, stockholder, partner, employee, consultant or otherwise, in any corporation, partnership or other entity which is competitive with any business or activity conducted by the Corporation.

(b) The Corporation and the Employee agree that the services of the Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by the Employee of any of his agreements under this Section (10) would damage the goodwill of the Corporation and cause the Corporation irreparable harm which could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of the Employee under this Section (10) may be enforced by the Corporation in equity by an injunction or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section (10) shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities, it shall be interpreted to extend only over the maximum period of time or range of activities as to which it may be enforceable.

(11) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to the Employee in writing for the purpose, and if to the Employee, shall be duly given if delivered to the Employee by hand or if sent to the

Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of the Employee set forth under his name below or at such other address as the Employee may hereafter designate to the Corporation in writing for the purpose.

(12) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of the Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of the Employee.

(13) Entire Agreement and Severability:

(a) This Employment Agreement and the MKS offer of employment letter dated 1/28/97 (Attachment A) supersedes any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of the Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of the Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(14) Governing Law: This Employment Agreement shall be governed by, and construed in accordance with, the laws of The Commonwealth of Massachusetts applicable to contracts made and to be performed entirely within The Commonwealth of Massachusetts.

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertin

President

6 Shattuck Road
Andover, MA 01810

/s/ Joseph Maher Legal Signature

John Maher

Address:
3 Virginia Pl.
Wenham, MA 01984

MKS International, Inc.
MKS Instruments Deutschland GmbH
MKS Instruments France S.A.
MKS Instruments Canada Ltd.
MKS Instruments, U.K. Limited
MKS East, Inc.
MKS Japan, Inc.
MKS Korea Co., Ltd.
MKS FSC, Inc.

CONSENT OF INDEPENDENT ACCOUNTANTS

We consent to the inclusion in this registration statement on Form S-1 (File No. 333-) of our report dated January 22, 1999, except for Note 13, as to which the date of January 28, 1999, on our audit of the consolidated financial statements and our report dated January 22, 1999 on our audit of the financial statement schedule of MKS Instruments, Inc. We also consent to the reference to our firm under the caption "Experts" and "Selected Consolidated Financial Data."

PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts
January 28, 1999

12-MOS
DEC-31-1998
JAN-01-1998
DEC-31-1998
11,188
538
20,674
656
24,464
58,533
74,640
41,915
96,232
27,040
13,786
0
0
113
54,713
96,232
139,763
139,763
83,784
83,784
46,361
253
1,483
8,135
949
7,186
0
0
0
7,186
0.25
0.24