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OAK RIDGE NATIONAL LABORATORY

MARTIN MARIETTA

Maintenance Accountability, Jobs, and Inventory Control (MAJIC) Program

User's Manual

B. P. Adkisson

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

ORNL/TM-10817
(formerly ORNL/CF-87/263)

Instrumentation and Controls Division

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MAINTENANCE ACCOUNTABILITY, JOBS, AND INVENTORY CONTROL (MAJIC) PROGRAM

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B. P. Adkisson

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ABSTRACT

This document describes the operating procedures for the maintenance accountability, jobs, and inventory control (MAJIC) program for the Maintenance Management Department of the ORNL Instrumentation and Controls Division.

1. GENERAL INFORMATION

1.1 SCOPE

This document describes the Maintenance Management Department (MMD) data base program for maintenance accountability, jobs, and inventory control (MAJIC), a work order system developed in-house for the collection of data on work requests, work assignments, work report summaries, equipment records, and manpower and material control.

1.2 POLICY

Every member of the Maintenance Management Department is expected to support the MAJIC system and take actions as required to assure that data are collected, accurately and in a timely manner, to provide the highest possible degree of confidence and traceability of maintenance information.

1.3 OBJECTIVE

The objective of the MMD MAJIC system is to provide a method of data accumulation and a reporting system for cost control, quantifying performance measurements and improvements, and engineered time standards (as a tool for job planning). MAJIC also makes possible more accurate and reliable preventive maintenance and calibration performance measurements and reporting of equipment history as well as providing a basis for backlog, job status, and work performance reports. While MAJIC is utilized mainly by the Maintenance Management Department of the Instrumentation and Controls (I&C) Division, it is available as a service to other divisions.

1.4 PROCEDURES

The following information has been organized into an operating procedures manual for the I&C MMD MAJIC system, which is a computerized 1032 data base management system to be used for the following purposes:

Monitoring maintenance activities
Identifying material and labor costs
Documenting maintenance history
Identifying and controlling backlog
Measuring performance
Scheduling work
Controlling scheduled preventive maintenance and calibrations
Providing control of bench stock
Validating work orders and accounts

The interactive feature of the computerized MAJIC system is achieved through a DEC microVAX 2 computer accessed from data terminals at each supervisor location.

1.5 REQUIREMENTS

1. All work performed by the Maintenance Management Department is documented and entered into MAJIC using the I&C Work Request, UCN-14783.
2. All instruments serviced by the Maintenance Management Department are entered into MAJIC using the I&C Instrument Inventory form UCN-10598.
3. I&C calibration records are maintained on UCN-10600.
4. Employee time sheet information shall include name, employee number, month, date, hours worked, work order number, and work request number.
5. Supervisor will regularly review the status report, note changes, and make revisions to job control data.
6. The written Work Request will remain at the supervisor's location until the job is closed.

2. MMD MAJIC STEERING COMMITTEE

The Head of the Maintenance Management Department has the responsibility to appoint committees and assign management responsibilities as needed to assure continued data handling, programming, reporting, and other operational functions of the MAJIC system.

In order to assure the orderly and prudent continued growth of the MAJIC System, a Steering Committee is officially established. This committee will consist of the Job Control System Manager and three line staff members appointed by the Department Head. This committee will report to the Maintenance Management Department Head.

This committee is to be guided in its deliberations by the following objectives:

1. Ensure that the MAJIC System is capable of collecting and reporting all data needed to comply with DOE policies and procedures as summarized in the MMD Plan, ORNL/TM-10136.
2. Ensure that the system is constantly evaluated in the light of current shop and customer needs.
3. Actively seek contacts with similar maintenance organizations in order to share ideas and information to improve the system.
4. Periodically examine MAJIC records to verify the accuracy of data and compliance with I&C procedures.
5. Justify to the Department Head, in writing, all proposed major changes in hardware or software.
6. Prepare I&C an official status report in October of each year for presentation to the I&C Division Director.

3. INSTRUMENT INVENTORY PROCEDURES

3.1 INTRODUCTION

Instrument inventory procedures are designed to assist I&C Division personnel in providing necessary inventory and maintenance information for computerized data handling. The program is also designed to provide a written and retrievable calibration record of instruments.

3.2 INSTRUMENT IDENTIFICATION

Instruments requiring identification are typically categorized as follows:

1. Instruments requiring programmed recall for operational checks and/or recalibration.

    a. Measurement and test equipment as defined by QA-L-12-100.

    b. Instruments with required traceability to the National Bureau of Standards (NBS), for example, calibration and field standards.

    c. Instruments and equipment, other than those listed above, requiring a history of operational status or periodic operational check (e.g., radio communication equipment).

2. Instruments and other equipment for which I&C Division has administration responsibility and which require inventory control.

    a. Sensitive items such as cameras, binoculars, and tape recorders.

    b. Portable equipment whose location often changes (e.g., audiovisual equipment).

3.2.1 Identification Numbers and Labels

Instruments are identified with an identification (ID) number by attaching a bar-coded label (M number if labeled by MMD or X number if labeled by the ORNL Property Department).

Property Department labels will be used first and must be of the newer type with a bar code (Fig. 1). If the equipment does not have a bar-coded property number, identification is by M number (Fig. 2). All M number labels will be prenumbered to prevent duplication. Older property

Fig. 1. Sample Property Department label.

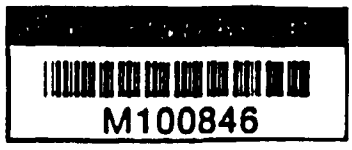


Fig. 2. Sample M number label.

numbers still attached should not be used as ID numbers. (Obsolete labels will not have a bar code.) If the instrument has an IC number, remove the IC number and affix a new M number. If it is not feasible to remove the IC number (possible damage to the instrument), affix the M number over the IC number (after recording the IC number for updating in the data base).

All instruments included in the instrument inventory will have a label that can be read with a bar code reader (with the exception of instruments that operate in harsh environments, have exceptional size, etc.). In such cases, the number will be engraved on the instrument or on an attached metal tag and the prenumbered label will be destroyed.

Some instruments with property numbers from other sites or instruments from private sources are brought to the Maintenance Management Department for service. These instruments should not be labeled and entered into the data base unless they are to become a permanent part of the inventory data base.

3.3 DATA ENTRY

It is the responsibility of the supervisor at the instrument's file point to attach the bar code label. In some cases the Property Department will have attached an identifying property number (bar coded) to the instrument. When this is the case, MMD does not label the instrument; however, in all cases the supervisor must process the necessary information for the instrument to be entered in the inventory data base.

The completed inventory form (Fig. 3) can be routed to the Job Control Office to have the information entered into MAJIC, or it can be entered interactively by the supervisor. The inventory form will be returned to the supervisor, who will dispose of the form or file it if necessary.

Print plainly and use all capital letters, one letter or number per column. Use O to indicate the letter O, and use Ø with a slash to indicate zero. Use a straight vertical line with small cross bars top and bottom (serifs) to write the letter I, and a plain straight vertical line to write the numeral 1.

I & C INSTRUMENT INVENTORY

☐ CHECK IF REVISION

Date 8-1-87

I.D. NO.	Description							
M100967	COMPUTER							
Mfr Code	Model No.					Classification Code		F. P.
IBM	5150 6721					CMB		K6
Purchase Order	Cost New	Year	Division	ST.	Cat.			
	2250	86	IC	1	A			
Serial No.	Service Designation							
8120X9432								
Maint. Document No.	ADP	OSR						
D-								
Range From	To	Units	CB Freq.	PM Freq.	Start Mo	Est. Hr.		
				6	10	1		
Bldg.	Room	Custodian						
3500	4	SMITH R						
Remarks								
Remarks CB/ PM								

(a) Ready to be entered by the Job Control Office.

I & C INSTRUMENT INVENTORY

☐ CHECK IF REVISION

Date 8/1/87

I.D. NO.	Description							
M100967	COMPUTER							
Mfr Code	Model No.					Classification Code		F. P.
IBM	5150 6721					CMB		K6
Purchase Order	Cost New	Year	Division	ST.	Cat.			
	2250	86	IC	1	A			
Serial No.	Service Designation							
8120X9432								
Maint. Document No.	ADP	OSR						
D-								
Range From	To	Units	CB Freq.	PM Freq.	Start Mo	Est. Hr.		
				6	10	1		
Bldg.	Room	Custodian						
3500	4	SMITH R						
Remarks								
Remarks CB/ PM								

(b) Terminal display of data as entered by supervisor.

Fig. 3. Completed instrument inventory form.

3.3.1 The Inventory Form

The following list describes how to fill out the data fields on the inventory form, and notes whether the information is required or optional.

Block Name	Field Length	Description
ID Number (REQUIRED)	7	Identifying number attached to the instrument such as M012345 or bar-coded property). This number is assigned when the instrument is installed or initially serviced by I&C personnel or by the Property Department.
Description (REQUIRED)	20	Description of instrument such as camera, computer, meter, valve, or terminal. Appendix A describes the correct way to list an instrument based on type and classification and includes the list of classification codes.
Mfgr. (REQUIRED)	4	Manufacturer of instrument. Manufacturer codes are listed alphabetically in Appendix B. If a manufacturer isn't listed in the appendix, or is unknown, code ZZ shall be used, and the name of the manufacturer shall be listed in the remarks block on the inventory form. The MAJIC Committee will review new additions to the manufacturer list and update the listing biannually.
Model (REQUIRED)	15	Instrument model number. (If not known, enter NONE).
Classification (REQUIRED)	8	This field provides a systematic way to categorize instruments based on their generic function using the classification codes listed in Appendix A. If a class code is not listed, code ZZ shall be used and the type of instrument shall be listed in the remarks block on the inventory form for periodic review by the MAJIC Committee.
File Point (REQUIRED)	2	File points identify the MMD supervisor having maintenance responsibility for an instrument, and allows flexibility for the supervisor to group instruments according to need. Because there are many ways to group instruments, MAJIC does not set forth specific guidelines on how a file point is to be used; however, any requests for file points must be brought before the MAJIC

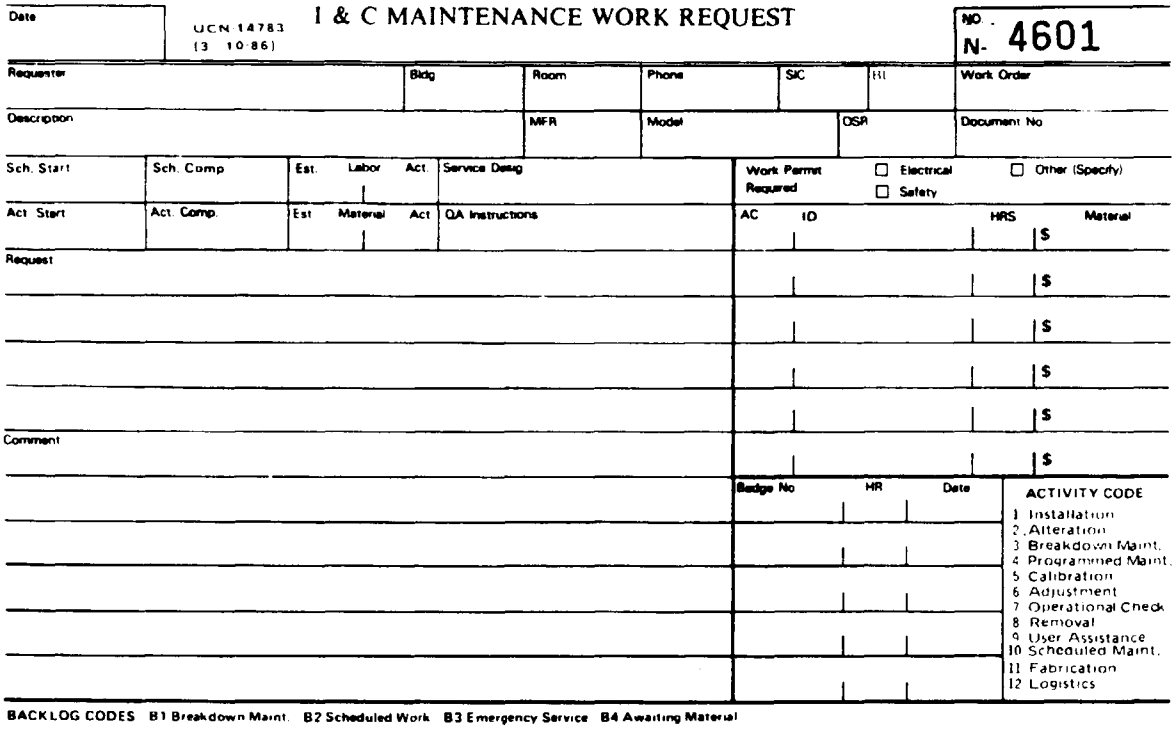
Committee for review and assignment. Appendix C is a list of the current file points, the person who manages them, and their contents.

Purchase Order (OPTIONAL)	8	Number of the purchase order on which the instruments was purchased.
Cost (OPTIONAL)	6	Cost of the instrument in dollars.
Year (REQUIRED)	4	Year the instrument was put in service.
Division (REQUIRED)	3	Division that purchased instrument. (Division codes are listed in Appendix D.)
Status below: (REQUIRED)	1	Present status of an instrument as defined

CODE	STATUS	
1	Active	(Instrument in service)
2	Spare	(Instrument out of service)
3	Salvaged	(Instrument disposed of)

Category (REQUIRED)	1	Classification of instrument in QA Manual QA-L-12-100.
Serial Number (OPTIONAL)	17	Serial number of instrument (to be listed if known).
Service Designation (OPTIONAL)	12	The service designation is provided primarily to indicate the position of the instrument in an instrumented control system. The use and coding of this block will be left up the individual supervisor to provide a workable system for his operation.
Document Number (OPTIONAL)	7	Number assigned to instrument manuals that have been put on Microfiche.
ADP Number (OPTIONAL)	10	Automatic Data Processing number for classification of instrument. Assigned by Computer and Telecommunications Division.
OSR Number (REQUIRED*)	10	Operational Safety Requirement number for classification of instruments in special systems. (*WHEN DEALING WITH IDENTIFIED OSRs, AN OSR INSTRUMENT MUST BE ON RECALL.)

Range From (OPTIONAL)	4	Start of specification range of instrument.
Range To (OPTIONAL)	4	End of specification range of instrument.
Units (OPTIONAL)	4	This field may be used to specify ohms, amps, volts, or other such units.
CB Frequency (REQUIRED*)	2	Calibration recall frequency in months (1 to 99). (*REQUIRED IF INSTRUMENT ON RECALL.) Entering a number (01 through 99) establishes the calibration recall frequency in months. The first calibration recall will occur when the specified number of months has elapsed following the start date entered the Start Month data block (e.g., entering 12 would tell the program to recall the instrument for service every 12 months). When the designated calibration is performed and activity code 5 is entered in the activity code (AC) field on the I&C Maintenance Work Request (Fig. 4), the date of the next recall will be calculated from the date in the Actual Completion Date (Act. Comp.) block on the I&C Maintenance Work Request. A special activity code (55) has been designated to permit recall of selected instruments by fixed calendar dates rather than number of months. Once the calibration schedule has been established, entering activity code 55 in the AC field on the I&C Maintenance Work Request will cause the next recall to be calculated from the previous recall date, rather than from the Act. Comp. date on the I&c Maintenance Work Request.
PM Frequency (REQUIRED*)	2	Programmed maintenance frequency. (*REQUIRED IF INSTRUMENT ON RECALL.) Entering a number (01 through 99) will establish programmed maintenance recall frequency in months. The first programmed maintenance recall will occur when the specified number of months has elapsed following the date in the Start Month data block (e.g., entering 6 would tell the program to recall the instrument for service every 6 months). When the designated programmed maintenance is performed and activity code 4 is entered in the AC field on the Maintenance Work Request, the date of the next recall will be calculated from the date



Date

UCN-14783 (3 10-86)

I & C MAINTENANCE WORK REQUEST

NO. N- 4601

Requester | Bldg | Room | Phone | SIC | RI | Work Order

Description | MFR | Model | OSR | Document No

Sch. Start | Sch. Comp | Est. Labor Act. | Service Desig | Work Permit Required ☐ Electrical ☐ Safety ☐ Other (Specify)

Act. Start | Act. Comp. | Est. Material Act. | QA Instructions | AC | ID | HRS | Material

Request

Comment

Badge No | HR | Date

ACTIVITY CODE
1 Installation
2 Alteration
3 Breakdown Maint.
4 Programmed Maint.
5 Calibration
6 Adjustment
7 Operational Check
8 Removal
9 User Assistance
10 Scheduled Maint.
11 Fabrication
12 Logistics

BACKLOG CODES B1 Breakdown Maint. B2 Scheduled Work B3 Emergency Service B4 Awaiting Material

Fig. 4. Blank I&C maintenance work request form.

in the Act. Comp. block of the Maintenance Work Request.

A special activity code (44) has been designated to permit recall of selected instruments by fixed calendar dates. Once the programmed maintenance schedule has been established, entering activity 44 in the AC field on the Maintenance Work Request will cause the next recall to be calculated from the previous recall date, rather than from the Act. Comp. date on the Maintenance Work Request.

Start Month (REQUIRED*)	2	Month (1 to 12) that recall is to begin (e.g., entering a 4 in this block would tell the program to start the recall for this instrument in April). (*REQUIRED IF INSTRUMENT IS ON RECALL.)
Estimated Used Hours ON (REQUIRED*)	2	Estimated hours for PM or Calibration (0 to 99). for time standards. (*REQUIRED IF INSTRUMENT IS RECALL.)
Building (REQUIRED)	5	Location of instrument.
Room (REQUIRED)	4	Location of instrument in building.

Custodian (REQUIRED)	14	Custodian of instrument when entered into data base.
Remarks use Inventory (OPTIONAL)	29	Special remarks on the instrument, for optional by the supervisor.
Remarks PM,CAL (OPTIONAL)	29	Information and procedures for programmed maintenance and calibration (information in this on block is preprinted work requests).

3.3.2. Change of Inventory Information

The I&C instrument inventory form is also used to change or eliminate inventory information in the computer data base. In addition to the changed information listed on this form, the form must also have the ID number, file point, and SIC so that the data entry clerks can route the form back to the proper supervisor.

Any new information in a given data group entered into the computer will automatically replace the previous information. To eliminate information but not insert any new information, draw a horizontal line in the data group.

It is the responsibility of the supervisor of the identified instrument's file point to keep the inventory list current by revising data as required.

4. PROGRAMMED INSTRUMENT MAINTENANCE AND CALIBRATION

The computer will generate a preprinted Work Request (Fig. 4) for instruments designated for programmed maintenance and/or calibration at fixed intervals. The file point supervisor will then use these forms in the manner described above.

When instruments are calibrated, the shop performing the calibration will retain the information in its file on the I&C Calibration Record (UCN-10600) shown in Fig. 5. The calibration form does not contain information that need be entered into the Inventory.

For each instrument calibrated, the following information is to be entered on the left side:

1. Instrument identification number
2. Date of calibration
3. Service personnel badge number
4. Procedure number used
5. Next calibration date
6. Accuracy when calibrated
7. Reference identification number(s).

Calibration data are to be entered in the columns of the right portion, with appropriate headings and the units.

When calibration is performed, the data will be recorded on the I&C Calibration Record, which is to be filed at the calibrator's file point. When the calibration data cannot be entered on this form, all other pertinent information will be filled out, with a note across the data blanks indicating where the actual calibration data are filed. (The back side of the form contains spaces for addition data or comments.) Activity code 5 must be indicated on the Work Request for the recall program to be updated and for the instrument inventory data base.

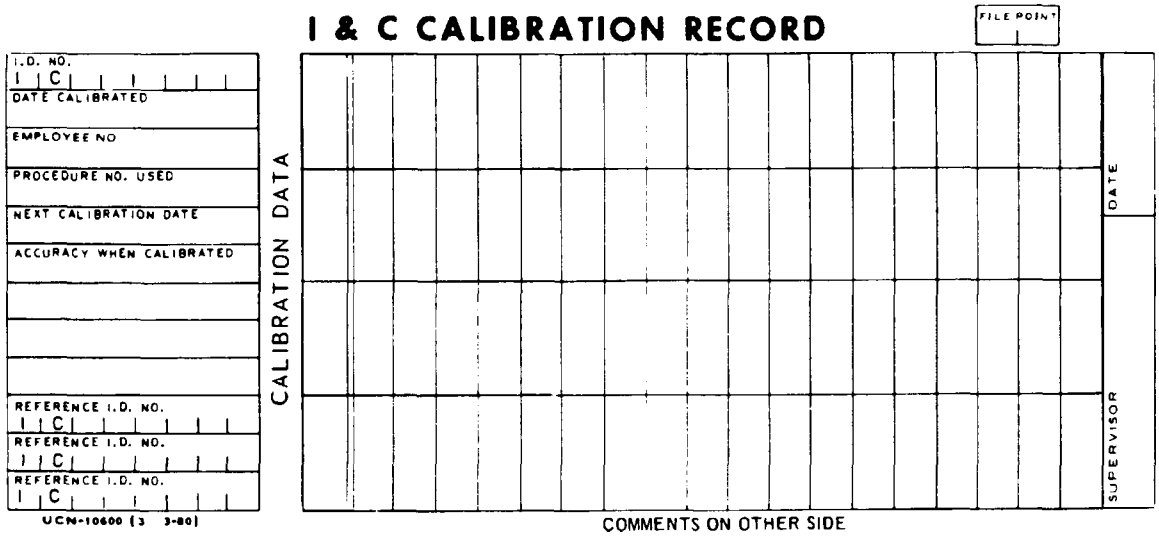


Fig. 5. Front side of I&C calibration record card.

5. JOB CONTROL

5.1 INTRODUCTION

Job control is based on collecting good information from the work area, organized in a systematic manner to enable rapid recall and summarization. The following attributes are used both in the data base and on the Work Request. Some of these represent required data, while other attributes are optional and are left to the discretion of the supervisor in charge (SIC).

5.2 THE I&C WORK REQUEST FORM

A work request shall be generated upon request for service to the I&C MMD. Initial information required on the work request is listed below and shown in Fig. 6.

FIELD Name	FIELD Length	Description
DATE: customer	10	Date request for service received from
JOB NUMBER:	5	Job number preassigned on work requests.
REQUESTOR:	14	Person requesting service (entered on work request as last name then first initial with no punctuation (e.g., Smith R).
BUILDING:	5	Location where service is to be performed
ROOM: performed	5	Room number where service is to be
PHONE:	6	Phone number of requestor (also used to select appraisals and aid technicians in completing work).
SIC:	3	MMD supervisor in charge.
BL:	2	Backlog codes (categorizes jobs).

Date: 7/1/87 | UCN-14783 (3 10-86) | I & C MAINTENANCE WORK REQUEST | NO. N- 4601

Requester	Bldg.	Room	Phone	SIC	BL	Work Order
Jones, R.	1000	101	4-7411	401	B1	G7674DAA

Description	MFR	Model	OSR	Document No.
Computer				

Sch. Start	Sch. Comp.	Est. Labor Act.	Service Desig	Work Permit Required	Electrical	Safety	Other (Specify)
7/2/87	7/3/87	6					

Act. Start	Act. Comp.	Est Material Act	QA Instructions	AC	ID	HRS	Material
							$

Request: Will not transmit

Comment

Badge No.	HR	Date

ACTIVITY CODE
1 Installation
2 Alteration
3 Breakdown Maint.
4 Programmed Maint.
5 Calibration
6 Adjustment
7 Operational Check
8 Removal
9 User Assistance
10 Scheduled Maint.
11 Fabrication
12 Logistics

BACKLOG CODES: B1 Breakdown Maint. B2 Scheduled Work B3 Emergency Service B4 Awaiting Material

Fig. 6. Initial job entry on I&C maintenance work request.

BACKLOG CODES:

B1 - Breakdown Maintenance		Work required to repair failed equipment.
B2 - Scheduled Work		Work scheduled for completion in a timely manner with respect to facility operations or other factors.
B3 - Emergency Maintenance		Work required immediately for health, safety, security, or programmatic needs, protection of data, or reduction of downtime.
B4 - Awaiting Material		Work to be completed when parts are received, either from in-plant stores or outside vendors.
WORK ORDER:	8	Work order or account number (must be valid to charge time to the job).
DESCRIPTION:	20	Description of instrument or service (should be a generic listing of instrument

		or service and not try to describe the whole job).
MFR:	4	Manufacturer of instrument (not used interactively; preprinted on PM/CAL forms).
MODEL:	12	Model number of instrument (not used interactively; preprinted on PM/CAL forms).
OSR:	10	Operational Safety Requirement ID No. (not used interactively; preprinted on PM/CAL forms).
DOCUMENT NO:	6	Document number of manuals in microfiche library (not used interactively).
SCH START:	10	Scheduled start date for service.
SCH COMP:	10	Scheduled completion date for service.
EST LABOR:	3	Estimated labor (hours) to complete the job.
EST MATERIAL:	3	Estimated material cost.
REQUEST:	200	Request of work to be performed (should be a brief but specific description of work).

Additional fields such as "Service Designation," and "QA instructions" are to be used at the discretion of the responsible supervisor. The detail to which such data is recorded is left to the discretion of the supervisor.

The Work Request is made up of an original and two copies. The original work request goes to the JCS Office for entry into the data base, or can be entered by the field shop. The yellow copy is provided to the person performing the work, and the blue copy is reserved for use by other Maintenance personnel where applicable. The person performing the work records the following on the Work Request:

ACT. START	10	Actual start date of service
ACT. COMP:	10	Actual completion date of service
ACT. MATERIAL;	3	Actual material cost per ID number
ACT. LABOR:	3	Actual labor charged to job (not used interactively; automatically updated by program).

COMMENT:	200	Comments on work performed or parts replaced (be brief and specific)
AC:	2	Activity code to describe the type of maintenance effort.

ACTIVITY CODES:

1.	Installation	Instrument put in service
2.	Alteration	Change to the instrument
3.	Breakdown Maint.	Instrument not functioning properly
4.	Programmed Maint.	Instrument serviced for preventive maintenance
5.	Calibration	Instrument serviced for calibration
6.	Adjustment	Adjustment to instrument
7.	Operational Check	Test of instrument
8.	Removal	Instrument removed from service
9.	User Assistance	Assisting customer
10.	Scheduled Work	Work not of critical nature
11.	Fabrication	Construction or model building
12.	Logistics	Maintenance effort not directly related to instrument repair

ID:	7	Identification number of instrument (use bar-coded property number when available, otherwise use bar-coded M number).
HRS:	3	Hours charged to the instrument (can be different than hours charged to the overall job).
$ MATERIAL:	4	Cost of material used per ID number
BADGE NO.:	3	Badge number of employee performing service
HR:	3	Hours charged to the work request (also entered on employee's time record).
DATE:	10	Month, day, and year hours are charged to the work request (should be the same date employee lists on time sheet).

The JCS Office updates the data base and returns the yellow copy of the Work Request to the supervisor, who retains it until the job is closed.

NOTE: When a job entered by a JCS operator is invalid, the operator will enter "BAD" in the work order field to tell the applicable SIC that the work order is not on file and adjustments must be made. On the status report printout the word "BAD" will appear in the work order field to signify that the job was entered without a valid work order and must be corrected before time can be charged to the job.

5.3 ID NUMBER PROCEDURE

To maintain a complete and accurate inventory and historical file, ID numbers must be identified on as many jobs (Work Requests) as practical. The number of jobs completed without an ID number should be very small, thus ensuring the integrity of the MAJIC system. The use of the ID numbers allows MMD management and supervisors to monitor the number and types of activity performed on an instrument. When a job is completed, the ID number of the instrument is listed on the Work Request and the inventory is checked (electronically) to make sure the instrument is on file. If it is not on file, an error list is generated, listing the job number and ID number used. Some of the more common reasons for instruments not found in inventory are

1. Instrument not entered into inventory (initial entry).
2. Instrument is in inventory, but the wrong ID number is used to identify the instrument. For example:

    1. Listing old IC number instead of bar-coded "X" number.
    2. Listing old "X" number instead of bar-coded "X" number.

When practical, the IC number should be removed from the instrument to reduce the chance of listing the wrong number. (It is not advisable to remove the metal tagged X number because it is glued to the instrument and its removal could deface the equipment.)

The procedures to correct error listings are as follows:

1. If an error occurred because the instrument wasn't listed in the inventory, enter the information necessary to list the instrument in inventory (on a form or interactively).

2. If an error occurred because the wrong ID number was used, determine the correct bar code X number or M number and update the Work Request by entering the correct ID number. (NOTE: Job control personnel can help the supervisor find the correct ID number.)

The ID numbers are assigned to new inventory items each Friday night, and an error list is generated after the update. After corrections are made to the instrument inventory or the work requests, the next update will reflect the corrections and remove the listings from the error list.

Each supervisor should give identification numbers to certain types of work or services that are not necessarily tied to an instrument but that should be tracked. Customer assistance and work for other locations using different Numbering systems are examples of the types of activities that should be given a special M number. However, these types of ID numbers should not be used as a catch-all when the ID number of an instrument isn't listed on the Work Request.

6. REPORTS

6.1 DATA STORAGE AND RETRIEVAL

Work request information is maintained in a data base (supervisor's work space) for a minimum of 35 days. This time period is sufficient to allow the data to be reviewed and manipulated for reporting purposes and to generate the desired statistical information. At the end of 35 days, the supervisor has the option of deleting a Work Request from his dedicated work space. This action is termed "Closing a Work Request." After a Work Request has been closed, the information is deleted from the supervisor's work space and stored in a data base for an additional period of time. Historical data are stored to provide a means of retrieving data for statistical forecasting over long periods of time. Retrieval of Work Request information in the form of interactive computer output will be discussed later as part of the computer operating procedure.

6.2 STATUS REPORTS

Status reports are generated by the Job Control System at the request of the supervisor, who should use it to monitor job elements such as backlog, scheduling, and cost. The status report is designed to provide the supervisor with timely information on which to base decisions pertaining to work activities. The status report is obtained by accessing the computer and executing a program entitled "REP." (Details and examples of computer operation will be addressed later in greater detail.)

6.3 INSTRUMENT INVENTORY REPORTS

The instrument inventory report request form (Fig. 7) allows the requestor to select from several data fields as well as from a variety of report formats designed by requestors. To generate a print format, the requestor informs the system manager of the report headings needed and they are stored in a data base for recall by any requestor on an as-needed basis. The report program allows maximum flexibility in selecting, sorting, and printing data.

To fill out the form, enter under Selection Field the data needed in each field. After the data needed have been selected, select the sort order needed. Next a print format is chosen. Examples of the available print formats are listed in an on-screen menu for viewing, and are included in Appendix E. Depending on the number of headings in the individual print formats, the requestor has a choice of either 80-column or 132-column print. The completed forms should be forwarded to the Job Control Office for processing.

I & C SELECTED INSTRUMENT REPORT REQUEST

Date	1- Print Inventory _____	2- Maintenance History _____	3- Maintenance Summary _____

SELECTION FIELD(S)	SORT ORDER	
_____	ID NUMBER	_____
_____	FILE POINT/SIC	_____
_____	MANUFACTURER	_____
_____	MODEL	_____
_____	CLASS. CODE	_____
_____	SERVICE DESIGN.	_____
_____	CUSTODIAN	_____
_____	BUILDING	_____
_____	ROOM	_____
_____	DIVISION	_____
_____	STATUS	_____
_____	CATEGORY	_____
	Print Format?	_____

UCN-11773
(3 7-87)
*U.S. GPO: 1987—748-184/60043

Fig. 7. I&C selected instrument report request form.

6.4 TIME REPORTS

Labor hours are recorded on both the Work Request (Fig. 8) and the Time Report (Fig. 9). Each individual's badge number labor hours are recorded on the Work Request, and the work order and job number are recorded on the individual's time report. The Job Control System allows weekly time information to be entered from the Work Request or during review of the Time Report. Time is automatically entered on the work request when input for the employee through I&C internal time entries. Time information is stored in a data base and made available for final review by the JCS operators before entry into the I&C Division Internal Timekeeping System.

Date: 7/1/87 | UCN-14783 (3 10-86)

I & C MAINTENANCE WORK REQUEST

NO. N- 4601

Requester	Bldg.	Room	Phone	SIC	BL	Work Order
Jones, R.	1000	101	4-7411	401	B1	G7674DAA

Description	MFR	Model	OSR	Document No.
Computer				

Sch. Start	Sch. Comp.	Est. Labor	Act.	Service Desig.	Work Permit Required	☐ Electrical ☐ Safety	☐ Other (Specify)
7/2/87	7/3/87	6					

Act. Start	Act. Comp.	Est Material	Act.	QA Instructions	AC	ID	HRS	Material
7/2/87	7/2/87				3	X184600	4	$

Request: Will not transmit

Comment: Replaced SN7400N on main logic board tested

Badge No.	HR	Date
84162	4	7/3/87

ACTIVITY CODE
1 Installation
2 Alteration
3 Breakdown Maint.
4 Programmed Maint.
5 Calibration
6 Adjustment
7 Operational Check
8 Removal
9 User Assistance
10 Scheduled Maint.
11 Fabrication
12 Logistics

BACKLOG CODES: B1 Breakdown Maint. B2 Scheduled Work B3 Emergency Service B4 Awaiting Material

Fig. 8. I&C maintenance work request properly filled out for completed job.

TIME REPORT

PAT WILKERSON
D. A. MILLER, ADMIN. SUPPORT

704-4

KELLER, D. N. | 015699 W | MAY | 1987

W.O. NUMBER	CHARGE
3070150000	VACATION
3070160000	PERSONAL
3070170000	SICK LEAVE
3070180000	HOLIDAY
A40680-BB	
A40680-BB	
G69790-AA	DEC CONTRACTS
A40680-BB	
G69790-AA	DEC CONTRACTS
A40680-BB	
G69790-AA	DEC CONTRACTS
A40680-BB	

Fig. 9. Time report.

7. COMPUTER OPERATING PROCEDURE

7.1 ESTABLISHING CONNECTION

The data communications link must be clear to send and receive before communications can be established. Normally this will be accomplished by the PCD (port contention device) at the computer location; however, if the terminal has been used recently, the PCD may still be connected and require a "break" before communications can be established.

Understanding the different levels of operation will be beneficial to effective computer operations. Following is a brief summary of these levels of operation:

LOCAL — The PC may operate local programs. These may consist of shell programs, resident programs on a system of directories and sub-directories, or floppy disks. Terminals may be operated in the typing mode.

PCD — The port contention device (PCD) allows access to the computers in the I&C and the C&TD networks. Most use will concentrate on the microVAX computer (System 7), the Vax computer (System 6), and the C&TD PCD (127), which allows access to the PDP-10 computer (System 1) and the F&M system (System 30).

LOGIN — After reaching the appropriate system, a short period of time will be allowed to perform the login procedures. If login is not completed, the system will disconnect automatically.

MONITOR — At this level, system programs may be run and files created and stored. DIR, MAIL, EDT and S1032 are some of the programs that can be run. Special programs such as MAJ (MAJIC) and REP (Reports) can be made to run from this level.

PROGRAM — In this level a program is in progress, and responses and input are done with program commands. Within programs, other areas and programs may be utilized or referenced, depending on the way in which the master program is written.

7.2 STEP-BY-STEP INSTRUCTIONS

The following describes step-by-step operation of the MAJIC Program and the associated REPORTS Program for producing reports.

NOTE: This is an interactive program, listing on-screen commands and options; therefore, some commands and options are not listed below.

To connect to the computer, use the carriage return (<CR>) on the keyboard.

COMPUTER RESPONSES	USER RESPONSES
SELECT SYSTEM:	7 (MICROVAX 2) 127 (DEC 10)
USERNAME:	User ID
PASSWORD:	User Password
PROMPT $	MAJ (Opens program for input or review) REP (Opens program for reports)

The following sections list the various menus the MAJIC Program uses to process data. Follow the instructions in the menus by typing the number corresponding to the action you need, then enter the data according to the on-screen instructions. The forms used on-screen to enter data are identical to the forms used to record data.

(MAJ MENU)

1 - MAINS (INVENTORY)
2 - JOB CONTROL
3 - PARTS
4 - EXIT (TEMPORARILY)
5 - QUIT

When the inventory form is displayed, the cursor will be in the "ID NO." field. Enter the ID number that needs to be entered or reviewed. If data have been stored previously for that ID number, it will appear on the screen; if not, the cursor will move to the description block, waiting for new inventory data to be entered. The top two lines must be completed for the information to be stored in the data base. To move the cursor through the data fields, use either the TAB key or the carriage return (<CR>) key to go forward. To backtrack through the form use the BACKSPACE key. To exit the form, the ID block must be blank, then press the ENTER key.

(JOB CONTROL MENU)

1 - UPDATE WORK REQUEST
2 - UPDATE INTERNAL TIME
3 - UPDATE PERSONNEL FILE
4 - REVIEW JOB NUMBER
5 - CLOSE WORK REQUEST
<CR> - RETURN TO MAIN MENU

When the Work Request form is displayed, the cursor will be in the "JOB NO." field. When the job number is entered, the program searches the data base to see if the job is on file. If it is, the data already

entered will be displayed and revisions can be made. If not, the cursor goes to the "WO" field, waiting for the work order number to be entered, indicating that this is a new job. If the work order is good, the cursor goes to the date block; if the program cannot find the work order number, an instruction set will appear at the bottom of the screen, listing several options the supervisor can take to complete job entry. From this point, pressing the ENTER key will cause the program to exit the form. The <CR> and the TAB key will move the cursor from one field to another. When the form is completed, press the ENTER key to tell the program to accept the data. To exit the form, press ENTER while the cursor is in the blank "JOB NO." field.

If there is a need to abort a job, it must be done before a date is entered in the date block; otherwise the program views the job as valid and will not let you exit the program until the BL and SIC BLOCKS have data in them. If there is a need to erase the job (typing in the wrong job number), the system manager will have to remove it from the active file so the number can be used at a later date.

UPDATE INTERNAL TIME MENU

1 - CLOCK BY TIME SHEET
2 - CLOCK BY EMPLOYEE NUMBER
3 - PRINT TIME CHARGES
<CR> - RETURN TO ACTION LEVEL

Entering a date within the work week will allow time to be collected for that week. If the end of the month comes before the end of the week, then enter the end of month date. Time previously entered from the Work Request will be displayed on the form. When time is entered, the job number can be used without the work order number; then type in hours and date (the entry will not be accepted without hours, date, and job number or work order number being entered).

Use the ENTER key only after you have made all necessary entries. When you use the ENTER key, a message will appear at the bottom of the screen. The total time will not be displayed until a review is made. Follow the instructions on the screen to go to next employee or to exit the form.

Entering time for an individual employee is exactly the same as entering time for a SIC time sheet. This method of time entry relieves the supervisor of searching his entire list of employees just to enter time for one person, and allows the supervisor flexibility on how time can be entered for his area.

(UPDATE PERSONNEL FILE MENU)

1 - ADD NEW EMPLOYEE
2 - REVISE EMPLOYEE RECORD
3 - DELETE EMPLOYEE FROM FILE
4 - LIST PERSONNEL
<CR> - RETURN TO ACTION LEVEL

From this menu a supervisor can add a newly hired employee or a transfer to his area, or remove someone from his area by following the questions asked by the program.

REVIEW A JOB NUMBER

The work request form will appear with the cursor in the job number field. Typing in the job number and pressing ENTER will cause the data to be input in the field if the job number is on file. If the data do not appear, the system will display "Job No. not on file."

In the review format data can only be viewed. The Update Work Request command should be used to change data.

CLOSE WORK REQUEST MENU

1 - INDIVIDUAL JOB NUMBERS
2 - ALL JOBS COMPLETED FOR AT LEAST 35 DAYS
<CR> - RETURN TO ACTION LEVEL

After a job has been closed, it is removed from the active data file and data cannot be changed except by the System Manager. The job must be at least 35 days old before the program will remove it from the active files.

(PARTS MENU)

1 - FIND/CHANGE PARTS
2 - FIND/PRINT PARTS
<CR> - RETURN TO MAIN MENU

```
        PART NUMBER:
       PRODUCT CODE:
  MANUFACTURER CODE:
    STORE STOCK NO.:
      STOCK POINT 0:
      STOCK POINT 1:
      STOCK POINT 2:
      STOCK POINT 3:
      STOCK POINT 5:
        DESCRIPTION:
          UNIT COST:
```

DEPT. STOCK POINT A:
DEPT. STOCK POINT B:
DEPT. STOCK POINT C:
(Type a PART NUMBER and/or press ENTER)

PRINT SELECT?

1 - SELECT BY SHOP
2 - SELECT BY CODE
3 - SELECT BY MFGR
<CR> - PARTS ACTION

Parts can be located interactively on the terminal by entering the appropriate information, or by referring to a printout of the complete parts inventory to find information on parts.

EXIT (TEMPORARILY)

Returns to monitor level but doesn't exit the MAJ Program.

QUIT

Exits the program and returns to monitor level.

REPORTS

This program will contain all computer-generated reports that may be accessed by users. It is expected that this area will continue to expand rapidly as the needs for special reports and cross references are recognized.

The following reports are currently available:

1 - STATUS
2 - WORK ORDER - JOB NUMBER CROSS REFERENCE
3 - ID NUMBER - JOB NUMBER CROSS REFERENCE
4 - MAINTENANCE HISTORY
5 - PRINT INVENTORY
6 - OSR
7 - QUIT

(STATUS MENU)

1 - ALL JOBS
2 - JOBS WITH NO COMPLETION DATE
3 - PM - CAL JOBS ONLY (NO COMPLETION DATE)
<CR> - PREVIOUS MENU

WORK ORDER - JOB NUMBER CROSS REFERENCE

This report allows a supervisor to enter a work order number or an account number to track the number of jobs, types of jobs, number of hours charged to the work order, and completion dates for the particular work order or account number entered into the system.

ID NUMBER - JOB NUMBER CROSS REFERENCE

This report allows a supervisor to track the number of times a particular instrument has been serviced. It will list several items from the Work Request, summarizing the activity for the dates the report scans.

MAINTENANCE HISTORY

1 - INDIVIDUAL ID NUMBER
2 - INDIVIDUAL FILE POINT
<CR> - PREVIOUS MENU

This report lists the number of times an instrument has been serviced, type of activity, hours charged, and description of service. This can be listed for each individual ID number or for the whole SIC file point.

OSR (OPERATIONAL SAFETY REQUIREMENT)

This report will list the instruments that are identified with a particular OSR, indicating the present status of an instrument relative to the requirements of that particular OSR.

(PRINT INVENTORY MENU)

1 - VIEW ALL QUEUED REPORTS
2 - REVIEW SINGLE QUEUED REPORT
3 - DELETE A QUEUED REPORT
4 - HELP NOTES
5 - LIST PRINT FORMATS
6 - QUIT INVENTORY REPORTS
<CR> - RUN A REPORT

THE REPORT FORM IS AS FOLLOWS:

SELECTION FIELDS SORT ORDER

_____ID NUMBER_____
_____FILE POINT/SIC_____
_____MANUFACTURER_____
_____MODEL_____
_____CLASSIFICATION CODE_____
_____SERVICE DESIGNATION_____
_____CUSTODIAN_____
_____BUILDING_____
_____ROOM_____
_____DIVISION_____
_____STATUS_____
_____CATEGORY_____

WHICH PRINT FORMAT?

(SELECT FIELDS ON LEFT - SORT FIELDS ON RIGHT)

To generate a report, start with the left-hand column and type in the data that correspond to that field. Continue on to the right-hand side and type the order you wish the printout sorted. Type a 1, 2, or 3 in the order you want the fields sorted. If no sort order is indicated, the program default sorts by ID number.

Choose the print format in which you want your report and type that number after WHICH PRINT FORMAT?. A list of print formats is available on-screen or in the MAJIC Manual (Appendix E).

To move the cursor through the form, use TAB or <CR>. To have the program select the data you entered, use the ENTER key.

APPENDIX A

Instrument Classification Codes

NAME	MOD1	MOD2	CODE
ACCELEROMETER			TDD
ACCESSORY	MEASURING	"D"_RING	MAG
ACCESSORY	MEASURING	CAPACITOR	MAA
ACCESSORY	MEASURING	FREEZE_POINT	MAH
ACCESSORY	MEASURING	INDUCTOR	MAE
ACCESSORY	MEASURING	LAMP_RIBBON	MAI
ACCESSORY	MEASURING	PYROMETER	MAJ
ACCESSORY	MEASURING	RESISTOR	MAB
ACCESSORY	MEASURING	SHUNT	MAC
ACCESSORY	MEASURING	STANDARD_CELL	MAF
ACCESSORY	MEASURING	TRANSFORMER	MAD
ALARM	INDIVIDUAL		ALB
ALARM	MULTIPOINT		ALC
ALARM	SYSTEM		ALA
AMPLIFIER	AUDIO		AMF
AMPLIFIER	BIASED		AMJ
AMPLIFIER	BUFFER		AMH
AMPLIFIER	DC		AME
AMPLIFIER	DIFFERENTIAL		AMC
AMPLIFIER	LINEAR		AMA
AMPLIFIER	LOG		AMB
AMPLIFIER	MAGNETIC		AMI
AMPLIFIER	OPERATIONAL		AMD
AMPLIFIER	VIDEO		AMG
ANALYZER	AUTO	TITRATOR	ACH
ANALYZER	CARBON		ACK
ANALYZER	CHLORINE		ACU
ANALYZER	CHROMATOGRAPH		ACI
ANALYZER	CHROMOPOT		ACR
ANALYZER	COLORIMETER		ACG
ANALYZER	CONDUCTIVITY		ACN
ANALYZER	COULOMETER		ACO
ANALYZER	DENSITOMETER		ACF
ANALYZER	DISTORTION	ELECTRONIC	AEB
ANALYZER	FLAME	PHOTOMETER	ACC
ANALYZER	FLOURPHOTOMETER		ACB
ANALYZER	FOURIER	ELECTRONIC	AEE
ANALYZER	GAS		ACV
ANALYZER	INFRARED		ACE
ANALYZER	MOISTURE		ACL
ANALYZER	PH	METER	ACJ
ANALYZER	POLAROGRAPH		ACM
ANALYZER	POTENTIOSTAT		ACS
ANALYZER	PULSE_HEIGHT	COMPUTER_BASED	APC
ANALYZER	PULSE_HEIGHT	MULTI_CHANNEL	APB
ANALYZER	PULSE_HEIGHT	SINGLE_CHANNEL	APA
ANALYZER	SIGNAL	DIGITAL	AED
ANALYZER	SOLIDS		ACT
ANALYZER	SPECTROPHOTOMET		ACA
ANALYZER	SPECTRUM	ELECTRONIC	AEC
ANALYZER	ULTRAVIOLET		ACD
ANALYZER	WAVE	ELECTRONIC	AEA
ANALYZER	X-RAY	DIFFRACTION	ACP
ANNUNCIATOR			ALD
ARITHMETIC	MANIPULATOR	ADDER	ARA
ARITHMETIC	MANIPULATOR	AUCTIONEERING	ARK
ARITHMETIC	MANIPULATOR	AVERAGING	ARJ

ARITHMETIC	MANIPULATOR	DIFFERENTIATOR	ARF
ARITHMETIC	MANIPULATOR	DIVIDER	ARD
ARITHMETIC	MANIPULATOR	INTEGRATOR	ARE
ARITHMETIC	MANIPULATOR	MULTIFUNCTION	ARG
ARITHMETIC	MANIPULATOR	MULTIPLIER	ARC
ARITHMETIC	MANIPULATOR	SQUARE ROOT	ARH
ARITHMETIC	MANIPULATOR	SUBTRACTOR	ARB
BALANCE	ELECTRONIC	DIGITAL	MSE
BALANCE	MECHANICAL		MSF
BATH	WATER		MSA
BRIDGE	CAPACITANCE		BRB
BRIDGE	FORCE		BRC
BRIDGE	IMPEDANCE		BRD
BRIDGE	INDUCTANCE		BRG
BRIDGE	MULTIFUNCTION		BRE
BRIDGE	RESISTANCE		BRA
BRIDGE	THERMOCOUPLE		BRF
CALCULATOR	DESK		CLA
CALCULATOR	POCKET		CLB
CALORIMETER			MSC
CAMAC	ADAPTER		NCH
CAMAC	AMPLIFIER		NCA
CAMAC	CONTROLLER	CRATE	NCC
CAMAC	CONVERTER	ADC/DAC/TDC	NCB
CAMAC	DRIVER		NCD
CAMAC	ENCODER		NCE
CAMAC	GATE		NCG
CAMAC	INPUT/OUTPUT	I/O	NCI
CAMAC	INTERFACE		NCF
CAMAC	MEMORY	COMPUTER	NCM
CAMAC	MISC	OTHER	NCZ
CAMAC	SCALER	COUNTER	NCS
CAMAC	TEST		NCT
CAMERA	FILM	MOVIE	CAB
CAMERA	FILM	STILL	CAA
CAMERA	TV		CAC
CENTRIFUGE			MSB
CHANGER	SAMPLE		MSD
CLEANER	ULTRASONIC		MSG
CLOCK	TIMER	TIME_OF_DAY	STD
COMPARATOR	DUAL_TRIP		COB
COMPARATOR	SINGLE_TRIP		COA
COMPUTER	ANALOG		CMA
COMPUTER	KEYBOARD		CMK
COMPUTER	MAXI		CMD
COMPUTER	MEMORY	RAM	CMM
COMPUTER	MICRO		CME
COMPUTER	MINI		CMC
COMPUTER	PERSONAL		CMB
COMPUTER	PNEUMATIC		CMP
CONTROLLER	CURRENT	CAT	CNB
CONTROLLER	EMF	DAT	CNA
CONTROLLER	GAS_BULB		CNE
CONTROLLER	LINE	CONDITIONER	CNI
CONTROLLER	MOTOR		CNF
CONTROLLER	PNEUMATIC		CNC
CONTROLLER	POSITION	PAT	CND
CONTROLLER	PROGRAMMABLE	PLC	CNH
CONTROLLER	TEMPERATURE		CNG
CONVERTER	ANALOG/DIGITAL	ADC	CVD

CONVERTER	DIGITAL/ANALOG	DAC	CVE
CONVERTER	ELECTRICAL		CVA
CONVERTER	VOLTS/FREQ		CVV
COUNTER	ALPHA		CUE
COUNTER	BETA/GAMMA		CUG
COUNTER	EVENTS	PER_UNIT_TIME	CUA
COUNTER	FREQUENCY	MEASUREMENT	CUB
COUNTER	INTERVAL	TIME	CUF
COUNTER	LO_BETA		CUD
COUNTER	X-RAY		CUC
DEMODULATOR			MSH
DETECTOR	GAS		DTG
DETECTOR	LEAK		DTB
DETECTOR	PERSONNEL		DTE
DETECTOR	RADIATION	ALPHA	DTA
DETECTOR	RADIATION	BETA/GAMMA	DTH
DETECTOR	RADIATION	GAMMA	DTI
DETECTOR	RADIATION	NEUTRON	DTJ
DETECTOR	SMOKE		DTC
DETECTOR	TEMPERATURE		DTD
DISK	CARTRIDGE		DDC
DISK	FIXED_HEAD		DDX
DISK	FLOPPY		DDF
DISK	WINCHESTER		DDW
ELECTROFINISHER			MSI
ELECTROMETER	MOSFET		ELB
ELECTROMETER	REED	VIBRATING	ELA
FURNACE	INDUCTION	RF	FUI
FURNACE	RESISTANCE	HEATER	FUR
GAUGE	PRESSURE	COMPOUND	IDG
GAUGE	PRESSURE	DIFFERENTIAL	IDF
GENERATOR	FUNCTION		GNE
GENERATOR	MULTIPURPOSE		GNC
GENERATOR	NOISE	RANDOM	GNJ
GENERATOR	PULSE		GND
GENERATOR	RAMP		GNL
GENERATOR	SINE_WAVE		GNA
GENERATOR	SQUARE_WAVE		GNB
GENERATOR	SWEEP		GNG
GENERATOR	TIME_MARK		GNH
GENERATOR	TV	SPECIAL_EFFECTS	GNI
GENERATOR	TV_SYNC		GNF
INDICATOR	DIGITAL		IDJ
INDICATOR	ELECTRICAL		IDI
INDICATOR	FLOW		IDA
INDICATOR	LEVEL		IDB
INDICATOR	PRESSURE		IDC
INDICATOR	PRESSURE	COMPOUND	IDG
INDICATOR	PRESSURE	DIFFERENTIAL	IDF
INDICATOR	SPEED	VELOCITY	IDE
INDICATOR	TEMPERATURE		IDD
INDICATOR	VACUUM		IDH
INTERCOM	MASTER		INB
INTERCOM	MULTISTATION		INA
INTERCOM	SLAVE		INC
INTERCOM	WIRELESS		IND
ISOLATOR	OPTICAL		MSJ
LASER			MSK
LASER	EXCITER		MSL
LENS	CAMERA	FILM	LNC

LENS	CAMERA	TV	LNV
LENS	PROJECTOR	FILM_STRIP	LNF
LENS	PROJECTOR	MOVIE	LNM
LENS	PROJECTOR	OPAQUE	LNO
LENS	PROJECTOR	SLIDE	LNS
LENS	PROJECTOR	TRANSPARENCY	LNT
LOGGER	DATA	ANALOG	REG
LOGGER	DATA	DIGITAL	REF
METER	AMMETER		MTA
METER	FLOW	MAGNETIC	MTG
METER	FLUXMETER		MTF
METER	FREQUENCY		MTI
METER	GALVANOMETER		MTR
METER	LIGHT		MTJ
METER	MULTIMETER	VOM	MTD
METER	OHMMETER		MTC
METER	PHASEMETER		MTE
METER	POWER	RF	MTH
METER	RMS		MTM
METER	SOUND		MTN
METER	VIBRATION		MTO
METER	VOLTMETER		MTB
METER	VTVM		MTV
METER	WATTMETER		MTG
MICROPHONE	WIRED		MIB
MICROPHONE	WIRELESS		MIA
MIXER	AUDIO		MXA
MIXER	MICROWAVE		MXD
MIXER	RF		MXC
MIXER	VIDEO		MXB
MODEM			TED
MONITOR	ALPHA		MNA
MONITOR	AUDIO		MNK
MONITOR	BETA/GAMMA		MNB
MONITOR	COMPUTER	CRT	MNP
MONITOR	GAMMA		MNC
MONITOR	GAS	INERT	MNH
MONITOR	IODINE		MNI
MONITOR	LINE		MNG
MONITOR	MONITRON		MNO
MONITOR	NEUTRON		MND
MONITOR	NOISE		MNJ
MONITOR	POWER_SUPPLY		MNF
MONITOR	PROCESS		MNE
MONITOR	SAFETY	TROUBLE	MNN
MONITOR	VIBRATION		MNV
MONITOR	VIDEO		MNL
MONITOR	WATER		MNM
MULTIMETER	DIGITAL		MTL
NIM	ADAPTER		NMH
NIM	AMPLIFIER		NMA
NIM	CONVERTER	ADC/DAC/TDC	NMB
NIM	DRIVER		NMD
NIM	ENCODER		NME
NIM	GATE		NMG
NIM	INPUT/OUTPUT	I/O	NMI
NIM	INTERFACE		NMF
NIM	MEMORY	COMPUTER	NMM
NIM	MISC	OTHER	NMZ
NIM	POWER_SUPPLY	BIN	NMC

NIM	SCALER	COUNTER	NMS
NIM	TEST		NMT
OPERATOR	ELECTRIC		ORB
OPERATOR	PNEUMATIC		ORA
OSCILLOSCOPE	ACCESSORY		OCF
OSCILLOSCOPE	CALIBRATION	FIXTURE	OCG
OSCILLOSCOPE	CONVENTIONAL		OCA
OSCILLOSCOPE	CURVE TRACER		OCD
OSCILLOSCOPE	DISPLAY		OCE
OSCILLOSCOPE	SAMPLING		OCC
OSCILLOSCOPE	STORAGE		OCB
PLOTTER	ANALOG		PLA
PLOTTER	DIGITAL		PLB
PLOTTER	INK_JET		PLC
PLUG-IN	OSCILLOSCOPE	AMPLIFIER	OPA
PLUG-IN	OSCILLOSCOPE	COUNTER-TIMER	OPH
PLUG-IN	OSCILLOSCOPE	CURVE_TRACER	OPJ
PLUG-IN	OSCILLOSCOPE	CUR_PROBE_AMP	OPN
PLUG-IN	OSCILLOSCOPE	DELAY_LINE	OPO
PLUG-IN	OSCILLOSCOPE	DIGITAL_COUNTER	OPG
PLUG-IN	OSCILLOSCOPE	DMM	OPF
PLUG-IN	OSCILLOSCOPE	OP_AMP	OPK
PLUG-IN	OSCILLOSCOPE	POWER_SUPPLY	OPP
PLUG-IN	OSCILLOSCOPE	PULSE_GENERATOR	OPL
PLUG-IN	OSCILLOSCOPE	RAMP_GENERATOR	OPM
PLUG-IN	OSCILLOSCOPE	SAMPLING_AMP	OPD
PLUG-IN	OSCILLOSCOPE	SAMPLING_HEAD	OPR
PLUG-IN	OSCILLOSCOPE	SAMPL_TIME_BASE	OPE
PLUG-IN	OSCILLOSCOPE	SPECTRUM_ANAL	OPI
PLUG-IN	OSCILLOSCOPE	TDR	OPC
PLUG-IN	OSCILLOSCOPE	TIME_BASE	OPB
POLISHER	CRYSTAL		MSM
POTENTIOMETER	MICROVOLTS		POA
POTENTIOMETER	MILLIVOLTS		POB
POTENTIOMETER	RESISTANCE		POE
POTENTIOMETER	TEMPERATURE		POD
POTENTIOMETER	VOLTS		POC
POWER SUPPLY	BATTERY	PACK	PSE
POWER_SUPPLY	AC-AC		PSB
POWER_SUPPLY	AC-AC	REGULATED	PSG
POWER_SUPPLY	AC-DC		PSA
POWER_SUPPLY	AC-DC	REGULATED	PSF
POWER_SUPPLY	BATTERY	CHARGER	PSL
POWER_SUPPLY	CONSOTROL		PSK
POWER_SUPPLY	DC-AC		PSC
POWER_SUPPLY	DC-AC	REGULATED	PSH
POWER_SUPPLY	DC-DC		PSD
POWER_SUPPLY	DC-DC	REGULATED	PSI
POWER_SUPPLY	VOLT_BOX		PSJ
PREAMPLIFIER	FISSION	CHAMBER	PAF
PREAMPLIFIER	GM_TUBE		PAD
PREAMPLIFIER	ION_CHAMBER		PAE
PREAMPLIFIER	PROPORTIONAL	COUNTER	PAB
PREAMPLIFIER	SCINTILLATION		PAC
PREAMPLIFIER	SOLID_STATE	FET	PAA
PREAMPLIFIER	TIME_PICKOFF		PAP
PRINTER	BAND		PRB
PRINTER	DAISY_WHEEL		PRW
PRINTER	DOT_MATRIX		PRM
PRINTER	DRUM		PRD

PRINTER	ELECTROSTATIC		PRE
PRINTER	INK_JET		PRJ
PRINTER	LASER		PRL
PRINTER	THERMAL		PRT
PROJECTOR	FILM_STRIP		PJF
PROJECTOR	MOVIE		PJM
PROJECTOR	OPAQUE		PJO
PROJECTOR	SLIDE		PJS
PROJECTOR	TELEVISION	TV	PJV
PROJECTOR	TRANSPARENCY		PJT
PUNCH	CARD		PUB
PUNCH	PAPER_TAPE		PUA
RATEMETER	CURRENT	INTEGRATOR	RME
RATEMETER	DIGITAL		RMD
RATEMETER	LIN/LOG		RMC
RATEMETER	LINEAR		RMB
RATEMETER	LOG		RMA
READER	BARCODE		RDC
READER	CARD		RDA
READER	PAGE		RDD
READER	PAPER_TAPE		RDB
RECEIVER	PAGECOM		RCD
RECEIVER	RADIO		RCA
RECEIVER	SPECTRUM	ANALYZER	RCC
RECEIVER	TELEVISION	TV	RCB
RECORDER	AUDIO		RED
RECORDER	CHART	CIRCULAR	REI
RECORDER	CURRENT		REB
RECORDER	DATA	ANALOG	REG
RECORDER	DATA	DIGITAL	REF
RECORDER	EMF		REA
RECORDER	PNEUMATIC		REC
RECORDER	PROGRAMMABLE		REP
RECORDER	STRIP_CHART	MULTIPOINT	REK
RECORDER	STRIP_CHART	SINGLE_POINT	REJ
RECORDER	TAPE	COMPUTER	RET
RECORDER	VIDEO		REE
RECORDER	X-Y		REH
REGULATOR	CURRENT		RGF
REGULATOR	FLOW		RGD
REGULATOR	PRESSURE		RGA
REGULATOR	TEMPERATURE		RGC
REGULATOR	VACUUM		RGB
REGULATOR	VOLTAGE		RGE
SAMPLER	WATER		MSN
SAW	DICING		MSO
SAW	WIRE		MSP
SCALER/TIMER			STC
SCALER/TIMER	SCALER		STA
SCALER/TIMER	TIMER		STB
SCALER/TIMER	TIMER	TIME_OF_DAY	STD
SCALER/TIMER	TIMER	TIME_OF_YEAR	STE
SCREEN	TRIPOD_MOUNT		SCN
SCREEN	WALL_MOUNT		SCW
SOURCE	CURRENT		SOB
SOURCE	RADIOACTIVE		SOC
SOURCE	VOLTAGE		SOA
SPEAKER	ENCLOSURE_MOUNT		SPB
SPEAKER	WALL_MOUNT		SPA
SWITCH	FLOW		SWB

SWITCH	LEVEL		SWC
SWITCH	PRESSURE		SWD
SWITCH	SCANNER		SWH
SWITCH	TEMPERATURE		SWE
SWITCH	THERMOCOUPLE		SWA
SWITCH	VACUUM		SWF
SWITCH	VIDEO		SWG
SYSTEM	X-RAY		SYX
TERMINAL	COUPLER	ACOUSTIC	TEC
TERMINAL	CURRENT_LOOP		TEG
TERMINAL	PRINTING		TEB
TERMINAL	RS-232		TEE
TERMINAL	RS-422		TEF
TERMINAL	TELETYPE		TET
TERMINAL	VISUAL		TEA
TESTER	BATTERY		TSC
TESTER	CALIBRATOR	CONSOTROL	TSK
TESTER	CALIBRATOR	DIGITAL	TSJ
TESTER	CAPACITOR		TSD
TESTER	DEAD_WEIGHT		TSE
TESTER	TRANSISTOR		TSB
TESTER	TRANSISTOR	CURVE_TRACER	TSF
TESTER	TUBE		TSA
TRANSCEIVER	RADIO		TRA
TRANSDUCER	FORCE		TDC
TRANSDUCER	MOTION		TDF
TRANSDUCER	PRESSURE		TDA
TRANSDUCER	SIGNAL	CONVERTER	TDB
TRANSDUCER	SPEED		TDE
TRANSDUCER	TEMPERATURE		TDG
TRANSDUCER	VIBRATION		TDH
TRANSMITTER	FLOW		TMF
TRANSMITTER	LEVEL		TMJ
TRANSMITTER	PNEUMATIC		TMP
TRANSMITTER	PRESSURE		TMG
TRANSMITTER	PRESSURE	DIFFERENTIAL	TMH
TRANSMITTER	RADIO		TMA
TRANSMITTER	TELEVISION	TV	TMB
TRANSMITTER	TEMPERATURE		TMI
TRIPOD	CAMERA	FILM	TPB
TRIPOD	CAMERA	TV	TPA
TUBE	ELECTROMETER		ELC
TYPEWRITER	I/O DEVICE		TWA
TYPEWRITER	MEMORY	ELECTRIC	TWC
TYPEWRITER	NON-MEMORY	ELECTRIC	TWB
VALVE	BALL		VAA
VALVE	BUTTERFLY		VAB
VALVE	CHECK		VAC
VALVE	COCK		VAD
VALVE	CONTROL		VAJ
VALVE	GATE		VAE
VALVE	GLOBE		VAF
VALVE	NEEDLE		VAG
VALVE	RELIEF		VAH
VALVE	SAUNDERS		VAI
VOLTMETER	DIFFERENTIAL		MTP
VOLTMETER	DIGITAL		MTK

APPENDIX B

Instrument Manufacturer Codes

MANUFACTURER	CODE	MANUFACTURER	CODE
A. H. EMERY COMPANY	AHEC	AMANA CORPORATION	AMA
AADCO, INC.	AAD	AMBER SCIENCE	AMSC
AARDVARK INSTRUMENT CO.	AARD	AMDEK CORPORATION	AMDK
ABR CORPORATION	ABR	AMERICAN HI-VOLTAGE TEST SYSTEMS	AHTS
ACCUTRONICS	ACCU	AMERICAN INSTRUMENT CO.	AI
ACDC ELECTRONICS	ACDC	AMERICAN MAGNETICS	AMG
ACME ELECTRIC	ACME	AMERICAN METAL RESEARCH, INC.	AMR
ACOPIAN CORP.	ACO	AMERICAN METER CO.	AMC
ACOUSTICA ASSOCIATES	AA	AMERICAN OPTICAL CO.	AO
ACROMAG INC.	ACRO	AMERICAN PHOTO APPLIANCE	APA
ACTION INSTRUMENTS COMPANY, INC.	AICO	AMERICAN TELPHONE AND TELEGRAPH CO.	ATT
ACUREX CORP.	ACUC	AMES LAB.	AL
ACURTEX CORP.	ACUR	AMETEK/MANSFIELD & GREEN	MF
AD-YU ELECTRONICS LAB. INC.	AY	AMINCO	AMI
ADAC CORP. .	ADAC	AMOIT, J. L., CO.	JLA
ADAGE, INC.	ADAG	AMPERITE CO.	APR
ADDMASTER CORP.	ADDO	AMPEX CORP.	APC
ADDRESSOGRAPH-MULTIGRAPH	ADD	AMPLIFIER RESEARCH CORP.	ARC
ADL	ADL	AMPROBE INSTRUMENT CORP.	AMP
ADVANCE ELECTRONICS CO.	AEC	AMAC, INC.	AMAC
ADVANCED CONTROL SYSTEMS, CORP.	ACS	ANADEX INSTRUMENTS, INC.	ADI
ADVANCED DESIGN ELECTRONICS	ADE	ANALABS, INC.	ANAL
ADVANCED DEVICES LABORATORIES, INC.	ADEV	ANALOG DEVICES, INC.	AD
ADVANCED DYNAMIC INSTRUMENTS	ADIN	ANALOG TECHNOLOGY	ANT
ADVANCED HIGH VOLTAGE CORP.	ADHV	ANALOGIC CORP.	ANC
ADVANCED TECHNOLOGY LABS.	ADVT	ANALYTICAL JACOBSON	AJ
ADVANCED TERMINALS, INC.	AT	ANARAD, INC.	ANAR
ADVENT CORP.	ADVC	ANATROL	ANA
AEMC CORPORATION	AEMC	ANDERSON JACOBSON	AJ
AERO CHEM METRICS INC.	AERO	ANDONIAN ASSOCIATES	AND
AEROMETRICS	AE	ANILAM ELECTRONICS CORP.	ANIL
AEROTECH, INC.	AET	ANN ARBOR AMBASSADOR	AAA
AEROVAC CORP.	AVC	ANN ARBOR TERMINALS, INC.	ANNA
AGAGEODIMETER, INC.	AGMI	ANNIN CO.	ANN
AGASTAT (ELASTIC STOP NUT CORP)	ESNC	ANTON ELECTRONIC LABORATORIES, INC.	ANEL
AILTECH	AILT	ANTON PAAR	AMP
AINSWORTH & SONS, WM., INC.	AW	APAC CO.	APAC
AIR POLLUTION TECHNOLOGY CORP.	APT	APOLLO	APOL
AIR PRODUCTS MFG.	APM	APOLLO LASERS, INC.	ALI
AIR TECH, INC.	ATI	APPLE COMPUTER CORP.	APPL
AIRBORNE INSTRUMENT LAB.	AIRB	APPLICON INCORPORATED	APM
AIRCO-TEMESCAL	AIR	APPLIED AUTOMATION	APAU
AIRMATE	AIPM	APPLIED DIGITAL DATA SYSTEMS	ADDS
ALDEN ELECTRONIC & IMPULSE RECORDING EQUIP. CO.	ALD	APPLIED DYNAMICS	ADC
ALFRED ELECTRONICS CO.	ALF	APPLIED ELECTRO CHEMISTRY	AELC
ALLIED MECHANICAL EQUIPMENT CO.	AMEC	APPLIED PHYSICS	APP
ALLIS-CHALMERS CORP.	ACC	APPLIED RESEARCH LAB.	APL
ALMAC CRYOGENICS	ALC	APPLIED TEST SYSTEMS INC.	APTS
ALNOR INSTRUMENT CO.	AIC	APTEC NUCLEAR	APNU
ALOE-HARDA	ALH	ARBOR LAB.	ARL
ALPHA-M CORP.	ALP	ARDEL KINAMATIC	ADK
ALSPA COMPUTER, INC.	ALSP	AREMAC ASSOCIATES	ARE
ALTEC LANSING PRODUCTS	ALT	ARENBURG ULTRASONIC LAB.	ARB
ALTEK INDUSTRIES CORPORATION	ALTI	ARMY, DEPT. OF THE	ARMY
ALTEX SCIENTIFIC INC.	ASI	ARROW PRODUCTS	ARRO
ALTOS	ALTO	ARTHUR D. LITTLE, INC.	LITL

MANUFACTURER	CODE	MANUFACTURER	CODE
ARTHUR THOMAS CO.	ATH	BARATRON INSTRUMENTS, INC.	BII
ARTRONIX	ART	BARBER-COLMAN CO.	BC
ASAHI PRECISION COMPANY, LTD.	ASAH	BARKER & WILLIAMSON	BARK
ASHCROFT (MMM)	MMM	BARKSDALE VALVES, INC.	BDV
ASSEMBLY PRODUCTS, INC. (API INSTRUMENT CO.)	API	BARNES ENGINEERING CO.	BEC
ASTON COMPANY	ASTO	BARNSTEAD STILL & STERILIZER CO.	BS
ASTRA SCIENTIFIC INSTRUMENTS	ASTR	BARRY-WRIGHT CORP.	BWRC
ASTRO ARC	AST	BARTON (ITT BARTON)	BT
ASTRO INDUSTRIES INC.	AS	BASCOM-TURNER INSTRUMENTS	BASC
ASTROCOM CORP.	ASCO	BASEBAND SYSTEMS	BBS
ASTRODATA	ASD	BASELINE INDUSTRIES	BAI
ATARI CORPORATION	ATAR	BASLER ELECTRIC CO.	BASL
ATKINS TECH, INC.	ATK	BASTELLE LABORATORY	BAST
ATLANTIC	ATIC	BAUSCH & LOMB, INC.	BAU
ATM CORP.	ATM	BAYLEY INSTRUMENT CO.	BYI
ATMOSPHERIC TURBULENCE LAB.	ATL	BBC GOERZ METRAWATT	GRZM
ATOMIC ACCESSORIES INC.	AAI	BEATTIE COLEMAN ENGINEERING CO.	BCE
ATOMIC ENERGY COMMISSION, U. S.	USAE	BECKMAN INSTRUMENTS, INC.	BI
ATOMIC INSTRUMENT CO.	ATC	BEEHIVE INTERNATIONAL	BEE
ATR ELECTRONICS, INC.	ATR	BEEHIVE MEDICAL ELECTRONICS	BEE
AUDIO VISUAL LABS., INC.	AVL	BEHLMAN	BEH
AUDIOTRONICS	AUD	BELDON CORP.	BDC
AUTO SYSTEMS LAB.	ASL	BELFORT INSTRUMENT CO.	BEIC
AUTOCLAVE	AC	BELL & HOWELL CO.	BH
AUTODATA CORPORATION	ATD	BELL, F. W., INC.	BELL
AUTOLOGIC, INC.	AUTL	BELLAMY, JAMES E./NEDCO PRODUCTS	JEB
AUTOMATIC INDUSTRIES, INC.	AUTO	BELLCO INDUSTRIES	BELI
AUTOMATIC SWITCH CO.	ASC	BELLEVILLE-HEXEM CORP.	BELH
AUTOMATIC SYSTEMS LABORATORY	AUTS	BELLO FRAM CORPORATION	BFC
AUTOMATIC TIMING & CONTROLS CO.	AUTC	BENDIX CORP.	BX
AUTOMATION INDUSTRIES	AIN	BENTAN ASSOCIATES	BENT
AUTOMATION PRODUCTS CO.	AUP	BERGEN EXPO SYSTEMS, INC.	BES
AVA INSTRUMENT CO.	AVA	BERING INDUSTRIES, INC.	BERI
AVH INSTRUMENT CO.	AVH	BERKELEY NUCLEONICS CORP.	BKN
AVO LTD.	AVO	BERKELEY SCIENTIFIC CORP.	BERK
AVTECH ELECTROSYSTEMS, LTD.	AVTE	BERKLEY MARKETING CO.	BCAL
AW VINCENT ASSOCIATES	AWV	BERNAR CORPORATION	BERN
AXION CORPORATION	AXI	BERTHOLD INSTRUMENT	BER
AYDIN CONTROLS	AYD	BERTRAN ASSOCIATES, INC.	BERT
B & W CONTROLS	BWC	BETA ELECTRIC CO.	BET
B T U ENGINEERING CORP.	BTU	BETA PRODUCTS, INC.	BETA
B&K INSTRUMENTS, INC.	BK	BFA CORPORATION	BFA
B. K. SWEENEY MFG. CO.	SWEN	BI RA SYSTEMS	BRSY
B. L. PACKER	BLP	BIC INC.	BIC
B/R INSTRUMENT CORP.	BRIC	BICRON CORPORATION	BICC
BACHARACH INSTRUMENT CO.	BAC	BIDDLE & GRAY	BG
BACKUS DATA SYSTEMS	BDS	BIDDLE, J. G., CO.	BD
BAILEY METER CO.	BMC	BILLINGS MCEACHERN, INC.	BIMC
BAIRD-ATOMIC, INC.	BA	BIO-ANALYTICAL SYSTEMS, INC.	BAS
BALDWIN ELECTRONICS, INC.	BAL	BIO-MARINE INDUSTRIES	BM
BALDWIN TATE-EMORY	BTE	BIO-RAD CO.	BRCO
BALL BROTHERS RESEARCH	BABR	BIOBLOCK SCIENTIFIC	BLS
BALLANTINE LABORATORIES, INC.	BLI	BIOGAS DETECTOR CORPORATION	BIDE
BALTEAU ELECTRIC	BAE	BIOMATION	BIO
BALTIMORE BIOLOGICAL LABS.	BBL	BIOSPHERICAL INSTRUMENTS, INC.	BISP
BALZERS CORP.	BZC	BIOSYSTEMS INCORPORATED	BIOS

MANUFACTURER	CODE	MANUFACTURER	CODE
BIRD ELECTRONICS CORP.	BIRD	BURKE, U. S.	USB
BISON INSTRUMENTS INC.	BIS	BURLEIGH INSTRUMENTS, INC.	BUI
BLACK, SIVALLS & BRYSON, INC.	BSR	BURR-BROWN RESEARCH CORP.	BBR
BLACKSTONE ULTRASONICS, INC.	BULI	BURRELL CORP.	BU
BLAKE INDUSTRIES, INC.	BLK	BURROUGHS CORP.	BRC
BLAZER INDUSTRIES INC.	BLZ	BUTLER NATIONAL CORP.	BUT
BLH ELECTRONICS, INC.	BLH	BWR SCIENTIFIC	BWR
BLUE M ELECTRIC CO.	BME	C. A. MORGREN CO.	MOGN
BNC PORTABIN	BKN	C. G. CONN, LTD.	CGC
BO SHERREL COMPANY	SRL	C. HALL	HALL
BODINE ELECTRIC CO.	BDE	C. J. KENNEDY CO.	KECO
BOFORS	BOF	C. W. RADIATION, INC.	CWR
BOGEN DIV.	BO	CAHN INSTRUMENT CO.	CHI
BOLT, BERANEK & NEWMAN	BBN	CALICO	CAL
BOOMSHAFT & FUCHS INC.	BOFU	CALIFORNIA COMPUTER PRODUCTS, INC.	CCP
BOONTON ELECTRONICS	BE	CALIFORNIA DIGITAL	CFD
BORG-WARNER CONTROLS	BW	CALIFORNIA INST. CO.	CIC
BOWENS INSTRUMENT CO.	BOWI	CALIFORNIA SCIENTIFIC SYSTEM	CSS
BOWMAR	BOM	CALUMET	CALU
BP ELECTRONICS	BPE	CAMAC	CAMC
BRAD THOMPSON INDUSTRIES	BTI	CAMBRIDGE INSTRUMENT CO.	CA
BRAILSFORD CO.	BRA	CAMPBELL SCIENTIFIC, INC.	CASC
BRANSON INSTRUMENT CO.	BSI	CANBERRA INDUSTRIES, INC.	CBI
BRANSONIC ULTRASONICS CORPORATION	BRSC	CANDELA CORP.	CAND
BRAUN MELSUNGERN	BRM	CANNON	CANN
BREW	BRW	CAPINTEC, INC.	CAPT
BRICE PHOENIX	BP	CAPINTER INSTR., INC.	CII
BRIDGE COMMUNICATIONS	BRDG	CAPITAL CONTROLS CO. - DIV. OF DART IND.	CAP
BRINKMAN LAUDA	BRL	CARD-KEY SYSTEMS	CARD
BRINKMANN INSTRUMENTS, INC.	BMI	CARL ZEISS	CZ
BRISTOL DIV	BR	CARLE INSTRUMENTS, INC.	CAR
BROOKFIELD ENGINEERING LAB.	BEL	CAROLINA BIOLOGICAL SUPPLY CO.	CBS
BROOKHAVEN INSTRUMENT CORP.	BRI	CARY INSTRUMENTS, INC.	CI
BROOKHAVEN NATIONAL LABORATORY	BNL	CASIO COMPUTER COMPANY	CAS
BROOKS INSTRUMENT DIV.	BRK	CATEL	CATL
BROTHERS, INC.	BROT	CEA INSTRUMENTS	CEAI
BROWN & SHARPE	BRS	CELESCO	CELC
BROWN BOVERA COMPUGUARD CORP.	BBCC	CELSCO	CECO
BROWNE CORPORATION	BROW	CENTIGRAM CORPORATION	CTGM
BROWNLEE LABS, INC.	BRLL	CENTORR ASSOC.	CEA
BRUCE INDUSTRIAL CONTROLS	BRUC	CENTRAL SCIENTIFIC CO.	CSC
BRUEL AND KJOER	BAK	CENTRONICS DATA COMPUTER CORP.	CEN
BRUNDIG	BDG	CENTURION INSTRUMENTS CORPORATION	CEIC
BRUNNING	BNG	CENTURY DATA	CEND
BRUNSON INSTRUMENT CO.	BNI	CEPA-CARL PADBURG	PADB
BRUSH INSTRUMENT DIV.	BRU	CHALCO ENGINEERING CORP.	CHEC
BUCHLER INSTRUMENT DIV.	BL	CHAMELEON	CHML
BUCHLER-COTLOVE	BUC	CHARLES BESLER CO.	CHB
BUD RADIO INC.	BUR	CHARLES SUPPER CO.	CHSC
BUDD	BUD	CHEMAC	CHEM
BUEHLER	BUE	CHEMAP	CHMP
BUHL OPTICAL CO.	BHL	CHEMICAL DATA SYSTEMS	CDS
BUHLER LIMITED	BUL	CHEMTRIX, INC.	CHE
BUILDERS IRON FOUNDRY	BIF	CHESSELL CORP.	CHSL
BUNKER-RAMO	BRO	CHRISLIN INDUSTRIES, INC	CRLI
BURGER ENTERPRISES INC.	BEI	CHRISTIE ELECTRIC CORP.	CHRI

MANUFACTURER	CODE	MANUFACTURER	CODE
CHROMATICS INC.	CHRM	CONN, C. G., LTD.	CGC
CHROMATIX	CHRO	CONOFLOW CORP.	CF
CHROMATRONIX, INC.	CHR	CONOW	CNW
CHRONETICS, INC.	CN	CONRAC CORP.	CON
CHRONO-LOG CORP.	CLC	CONSOLIDATED CONTROLS CORP.	CCC
CIMRON DIV.	CRD	CONSOLIDATED ELECTRODYNAMICS CORP.	CEC
CINCINNATI MILLING MACHINE CO.	CM	CONSOLIDATED ENGINEERING LAB.	COE
CIPHER DATA PRODUCTS	CDP	CONSOLIDATED STILLS	CONS
CIRCLE SEAL	CS	CONSOLIDATED VACUUM CORP.	CVC
CITEL, INC.	CTL	CONTINENTAL INSTRUMENT CORP.	CONI
CLAISSE SCIENTIFIC CO.	CLAS	CONTINENTAL SPECIALTIES CORP.	CSP
CLARDSTAT	CLA	CONTINENTAL WATER SYSTEMS OF TENNESSEE	CWST
CLARY CORP.	CLAR	CONTROL DATA CORP.	CDC
CLAY ADAMS	CLAY	CONTROL LASER CORP.	COLA
CLEVELAND CONTROLS, INC.	CLCI	CONTROL LOGIC	CL
CLEVELAND INSTRUMENT CO.	CLVI	CONTROL SYSTEMS RESEARCH	CSR
CLEVITE CORP.	CC	CONTROLLED POWER COMPANY	CPC
CLIMET INSTRUMENTS CO.	CLIM	CONTROLTRON CORP.	CTT
CODER ELECTRONICS INC.	CODE	CONVERGENT TECHNOLOGY	CVT
COBRA INDUSTRIES	COB	COOKE VACUUM PRODUCTS, INC.	CV
COHERELL	COHL	COOKE, F. J.	FJC
COHERENT, INC.	COHE	CORDIN COMPANY	CORD
COHU ELECTRONICS, INC.	COH	CORNELL-DUBILIER ELECTRONICS	CD
COLE	COL	CORNING DIGITAL	CODI
COLE PALMER	CP	CORNING GLASS WORKS	CGW
COLEMAN INSTRUMENTS, INC.	CO	CORNING MEGA PURE	CMP
COLLINS RADIO	CR	CORONA WESCAN	COW
COLONIAL DATA SERVICES CORPORATION	CDSC	CORVUS MANG	CORV
COLORADO VIDEO, INC.	CVI	COSMICAR	COS
COLORGRAPHIC COMMUNICATIONS CORP.	CGCO	COULTER ELECTRONICS	COEL
COLUMBIA DATA PRODUCTS	CODP	CPT CORP.	CPT
COLUMBIA ELEC.	CEL	CRAIG CORP.	CRG
COLUMBIA RESEARCH LAB. INC.	CORE	CREST	CRE
COLUMBIA SCIENTIFIC IND.	CSI	CROFT	CRT
COLUTRON CORP.	COCO	CROMEMCO, INC.	CROM
COM DATA	COD	CROUF	CRF
COM-CENTER-CORPORATION	COCE	CRYOCAL, INC.	CRY
COMMERCIAL FILTERS DIV.	CMF	CRYOGENIC	CRYO
COMMODORE BUSINESS MCH., INC.	CBM	CS3, INC.	CS3
COMMONWEALTH SCIENTIFIC CORP.	CONS	CUBIC CORP.	CBC
COMMUNICATIONS CONTROLS CORP.	COMC	CULLIGAN WATER CONDITIONING	CULL
COMPAQ	COPQ	CUNNINGHAM CORP.	CUN
COMPREHENSIVE VIDEO	CPHV	CUNO ENGINEERING CO.	CE
COMPU CORP.	COC	CURTIS MATHESON	CURT
COMPUSCAN, INC.	COI	CURTISS WRIGHT	CW
COMPUTEK, INC.	COM	CUSTOM COMPUTER TECHNOLOGY	CCT
COMPUTER AUTOMATION, INC.	CAI	CUSTOM CONTROL SYSTEM	CCS
COMPUTER COMMUNICATION, INC.	CCI	CYBORG SYSTEMS, INC.	CYB
COMPUTER CONTROLS CO., INC.	CDCC	CYCLE-DYNE	CYDI
COMPUTER DESIGN CORP.	COMP	D O INDUSTRIES INC. (KOWA)	DOI
COMPUTER DEVICES	CDPD	D.S. DAVIDSON CO.	DSD
COMPUTER INTERFACE TECHNOLOGY	CIT	DA-LITE SCREEN CO.	DA
COMPUTER MEASUREMENTS CORP.	CMC	DADE	DADE
COMPUTER PRODUCTS INC.	CPI	DAGE-MTI, INC.	DAGE
COMPUTER, INC.	CPTI	DAHL, G. W. COMPANY, INC.	DAL
COMSONICS INC.	COMI	DAMON/IEC DIVISION	DAMI

MANUFACTURER	CODE	MANUFACTURER	CODE
DANA LABORATORIES INC.	DAN	DERRITRON	DER
DANFYSIK	DFY	DETECTOLAB	DET
DANYL CORPORATION	DYL	DETECTRON SECURITY SYSTEMS	DSS
DARCEY	DC	DIABLO SYSTEMS, INC.	DIA
DASIBI ENVIRONMENTAL CORP.	DEN	DIALIGHT CORP.	DL
DATA 100 CORP.	DAC	DIAMOND ELECTRONICS DIV. OF ARVIN SYSTEMS	DIAM
DATA ACCESS SYSTEMS, INC.	DAS	DICKSON COMPANY, THE	DKSN
DATA ACQUISITION SYSTEM, INC.	DASI	DICTAPHONE CORP.	DTC
DATA CAP, INC.	DCI	DIETERICH STANDARD CORP.	DIET
DATA DEVICES INTERNATIONAL	DDI	DIGI-DATA CORP.	DD
DATA GENERAL	DG	DIGI-LAB INC.	DGL
DATA I/O CORP.	DATI	DIGI-LOG	DIGI
DATA INTERFACE (INFOREX)	INF	DIGICOM DATA PRODUCTS, INC.	DDP
DATA MEDIA CORP.	DMC	DIGILIN	DIG
DATA PRECISION	DAP	DIGIMETRIC (SYDROM CORP.)	DIM
DATA PRINTER CORP.	DPC	DIGITAL COMMUNICATIONS ASSOC.	DCOM
DATA PRODUCTS	DPR	DIGITAL DATA DOSIMETRY, INC.	DDD
DATA PULSE	DP	DIGITAL DEVELOPMENT CORP.	DDC
DATA SCIENCES	DASC	DIGITAL EQUIPMENT CORP.	DEC
DATA SOUTH COMPUTER CO.	DSCC	DIGITAL LABS.	DILA
DATA SYSTEMS	DASY	DIGITAL PATHWAYS, INC.	DPI
DATA SYSTEMS DESIGN, INC.	DSDI	DIGITAL SYSTEMS	DGTS
DATA TECHNOLOGY CORP.	DTT	DIGITEC	DGT
DATACOPY CORPORATION	DCC	DIGITRONICS	DGI
DATAGRAPHICS, INC.	DAG	DILLON, W. C., CO.	DLN
DATAMEC (HEWLETT-PACKARD)	HP	DINCO-GRAY CO.	DGC
DATAMETRICS, INC.	DM	DIONEX CORP.	DXC
DATAWEST CORPORATION	DWC	DIRECT, INC.	DII
DATEL	DAT	DIRIGO	DIR
DATOS	DATO	DISC INSTRUMENTS, INC.	DSI
DATUM INC.	DATM	DOCUMENTATION, INC.	DOC
DAVEN	DV	DOHRMAN INSTR. CO.	DIC
DAVIDSON PRESS	DAV	DONALDSON CO.	DON
DAVIDSON, D. S., CO.	DSD	DORIC SCIENTIFIC DIV.	DO
DAVIS INSTRUMENTS	DI	DRAGER-DRAGERWERK (WEST GERMANY)	DDW
DAYSTROM, INC.	DAYS	DRAMETZ ENGINEERING LABS. INC.	DRZ
DAYTON ELECTRONIC PRODUCTS CO.	DAYE	DRESSEN-BARNES CORP.	DBC
DAYTRONIC	DAY	DRESSER INDUSTRIAL VALVE & INSTR. CO.	DSR
DE VILBISS CO.	DEV	DREXELBROOK ENGINEERING CO.	DDE
DECCA RADAR, INC.	DR	DSC	DSC
DECIDEL PRODUCTS	DDP	DTI DATA TERMINAL CORP.	DTI
DECITEK	DCT	DUFFERS ASSOCIATES, INC.	DAI
DECKER CORP.	DKR	DUKANE CORP.	DK
DEJUR GRUNDIG	DJ	DUMONT	DUM
DEL ELECTRONICS CORP.	DELE	DUNN INSTRUMENTS, INC.	DUNN
DELATRON INC.	DT	DUNWELL	DU
DELAVAN	DELA	DUPONT INSTRUMENT PRODUCTS DIV.	DIP
DELCO, DIVISION OF GENERAL MOTORS	DELC	DURRANT CORP.	DURR
DELPHI	DEL	DUYER INSTRUMENTS, INC.	DYR
DELTA DATA SYSTEMS CORP.	DDS	DYNEC DIV.	DY
DELTA DESIGN	DED	DYNAIR ELECTRONICS, INC.	DYN
DELTA RAY	DLTR	DYNAMIC RESEARCH CORP.	DRC
DELTA-PHI ELEKTRONIK	DPE	DYNAMICS CORP. OF AM.	DCA
DELTA-T-DEVICES	DTD	DYNAMICS INSTRUMENTATION CO.	DMI
DELTEC CORP.	DELT	DYNASCAN CORP.	DYS
DEPCO	DEP	DYNATECH COMPANY	DYC

MANUFACTURER	CODE	MANUFACTURER	CODE
DYNATUP COMPANY	DYTP	ELECTRONIC INDUSTRIES ASSOCIATION	EIA
DYNISCO	DYNO	ELECTRONIC MEASUREMENTS	ELM
E-H RESEARCH LABORATORIES, INC.	EH	ELECTRONIC MISSLES	ELMI
E. F. JOHNSON CO.	JN	ELECTRONIC MODULE CONTROL CORP.	EMCC
E. H. SARGENT (SARGENT-WELCH SCIENTIFIC CO.)	SWS	ELECTRONIC NUCLEONIC INSTRUMENTS	ELNU
EAGLE EYE	EGL	ELECTRONIC RESEARCH ASSOCIATES, INC.	ERA
EAGLE SIGNAL DIV.	ES	ELECTRONIC SYSTEMS ENGINEERING	ESE
EANCO INCOM INTERNATIONAL	EAN	ELECTRONIC SYSTEMS PRODUCTS, INC.	ELP
EASTERN MICRO	EAM	ELECTRONICS ASSOCIATES, INC. (PACE)	EAI
EASTERN SCIENTIFIC INSTITUTE	ESI	ELECTRONICS CORP. OF AMERICA	ECA
EASTMAN KODAK CO.	EK	ELECTRONICS INSTR CO.-EICO	EICO
EBERLINE INSTRUMENT CORP.	EBI	ELECTRONICS NAVIGATION INDUSTRIES	ENI
ECCO	ECC	ELECTRONICS-ATLANTA, INC.	ELAT
ECD CORP.	ECD	ELECTROSTATICS	EST
ECO INSTRUMENTS(DIV OF SEA DATA CORP.)	ECO	ELEKTRONIK SERVICE MOGGERATH	ESM
ECOLOGIC INSTRUMENT CORP.	ECOI	ELEXON	ELX
EDAX (NUCLEAR DIODES INC.)	NID	ELGAR	ELGR
EDCOR	EDCO	ELGEET	EGT
EDGERTON-GERMESHAUSEN & GRIER, INC.	EGG	ELGIN ELECTRONICS, INC.	EL
EDISON CONTROLS, INC.	ECI	ELLISON DRAFT GAUGE	EDG
EDO WESTERN CORP.	EDO	ELMA ENGINEERING CO.	ELMA
EDWARDS HIGH VACUUM, LTD.	EHV	ELMO	ELMO
EFFECTS TECHNOLOGY INC.	ETEC	ELOGRAPHICS	ELG
EG&G, INC.	EGG	ELOX CORP.	EC
EG&G-ORTEC	OT	ELRON/ELSCINT, LTD.	ELR
EHRENEICH PHOTO-OPTICAL IND., INC.	EPO	EMERSON TV & RADIO	EM
EIKI INTERNATIONAL, INC.	EIKI	EMERY, A. N., COMPANY	AMEC
EIL INSTRUMENTS, INC.	EIL	EMI TECHNOLOGY, INC.	EMIT
EIP MICROWAVE, INC.	EIP	EMILE MAEFLY CO. LTD.	EMM
EKCO ELECTRONICS, LTD.	EKCO	EMPIRE	EMP
EL TINE	ETI	EMULEX CORPORATION	EMU
EL-TRONICS, INC..	ELTI	EMULOGIC MICROPROCESSOR DEVELOPMENT SYSTEMS	EML
ELASCO, INC.	ELAS	ENDEVCO CORP.	EDC
ELASTIC STOP NUT CORP. (AGASTAT)	ESNC	ENDLESS & HAUSER	ENDH
ELCOR	ELC	ENERGETICS SCIENCE, INC.	ENS
ELDEX LABORATORIES	ELDL	ENGINEERED TECHNICAL PRODUCTS	ETP
ELDORADO ELECTRONICS	ELDE	ENGIS	ENG
ELECTRA CO.-DEARCAT	ELEC	ENRAF NONIUS DELFT	ENRF
ELECTRA SYSTEMS CORP.	ESC	ENVIRONMENTAL RESEARCH CORP.	ERI
ELECTRO CIRCUITS INC.	ELT	ENVIRONMENTAL SYSTEMS CORPORATION	ENSY
ELECTRO CORP.	ELCO	EPICOM INC.	EPIC
ELECTRO INSTRUMENTS, INC.	ELI	EPPLEY LABORATORY, INC.	EPP
ELECTRO MEASUREMENTS, INC.	EMI	EPSCO, INC.	EPSI
ELECTRO POWER PACK CORP.	EPC	EPSON	EPSO
ELECTRO SCIENTIFIC INDUSTRIES, INC.	ELS	EQS SYSTEMS	EQS
ELECTRO-CRAFT CORP.	ELCC	ERI CO.	ERIC
ELECTRO-CYBERNETICS	ELCY	ESECO	ESEC
ELECTRO-VOICE, INC.	EV	ESPEY MFG. & ELECTRONICS CO.	ESPY
ELECTRODATA CORP.	ELD	ESTERLINE-ANGUS DIV.	EA
ELECTRONOME, LTD.	ELN	EUROTHERM, INC.	EUR
ELECTROMEDICAL SUPPLY	ELMS	EVANS	EVNS
ELECTRON FUSION DEVICES, INC.	EFDI	EVERST INTERSCIENCE	EVST
ELECTRONIC CONTROL SYSTEMS, INC.	ECS	EWALD INSTRUMENTS	EI
ELECTRONIC CONTROL TECHNOLOGY	ECT	EX-CELL-O/REMEX CORP.	REM
ELECTRONIC DESIGN LAB	EDL	EXACT ELECTRONICS	EXE
ELECTRONIC DEVELOPMENT CORP.	ED	EXTECH INTERNATIONAL CORP.	EXT

MANUFACTURER	CODE	MANUFACTURER	CODE
EXTRA-NUCLEAR LAB., INC.	EXN	GARDNER ASSOCIATES	GAR
EXXON INFORMATION SYSTEMS	EXX	GARRARD	GRD
F I C INDUSTRIES INC.	FIC	GAST MFG. CORP.	GAST
F J W INDUSTRIES	FJW	GATAN, INC.	GATA
F&M SCIENTIFIC CORP.	FM	GATES & CO.	GAT
F-R MACHINE WORKS INC.	FXR	GAUGE DIV., U. S.	USG
F. J. COOKE	FJC	GBC-CCTV	GBC
F. W. BELL, INC.	BELL	GELBER PUMP	GP
FABRI-TEK INSTRUMENTS, INC.	FI	GELMAN INSTRUMENT CO.	GMI
FAIRCHILD INSTRUMENTATION	FCI	GENCO ELECTRIC CO.	GNE
FAIRPORT INSTRUMENTS, INC.	FPI	GENS SENSORS DIV.	GNC
FANN INSTRUMENT CORPORATION	FANN	GENUARE PRECISION INSTR.	GPI
FANNON	FAN	GEN-TEC, INC.	GETE
FARADAY, INC	FARA	GENCOM	GEN
FARR AND CONTROLS	FAR	GENERAL APPLIED SCIENCE LABS.	GASL
FARRAND CONTROLS, INC.	FACO	GENERAL AUTOMATION	GA
FEDERAL PACIFIC ELECTRIC CO.	FPEC	GENERAL DESIGN, INC.	GDI
FEDERAL TELE. & RADIO CO.	FTRC	GENERAL DIGITAL CORP.	GDC
FENWAL ELECTRONICS, INC.	FWE	GENERAL EASTERN CORPORATION	GEST
FERRIS INSTRUMENTS	FEI	GENERAL ELECTRIC CO.	GE
FIBRA SONICS, INC.	FIBS	GENERAL INSTRUMENT CORP.	GINC
FILIMATIC	FIL	GENERAL IONEX	GENI
FINCOR	FINC	GENERAL MONITORS	GENM
FINNIGAN	FIN	GENERAL RADIO CO.	GRC
FISCHER GOVERNOR CO.	FGC	GENERAL REGULATOR CO.	GR
FISHER & PORTER CO.	FP	GENERAL RESISTANCE	GRS
FISHER CONTROLS COMPANY	FCC	GENERAL SCANNING INC.	GENS
FISHER SCIENTIFIC CO.	FS	GENESIS ONE CORPORATION	GOC
FLEXICON CORP.	FL	GENEYS SYSTEMS, INC.	GESY
FLEXION - H P	FHP	GENISCO COMPUTERS	GC
FLOATING POINT SYSTEMS, INC.	FPSI	GENRAD, INC.	GRC
FLOW TECH., INC.	FT	GENTRY	GENT
FLUKE MFG. CO.	FK	GEOPHYSICAL SPECIALITIES CO.	GS
FLW, INC.	FLW	GEORGE K. PORTER CO.	GKP
FORMA SCIENTIFIC - DIV. OF HALLINKRODT	FORM	GEORGIA TECHNOLOGICAL UNIVERSITY	GTU
FOROX CORP.	FOC	GEOSCIENCE INSTR. CORP.	GIC
FOXBORO CO.	FOX	GERBER	GRBR
FRANKLIN ELECTRONICS, INC.	FRK	GERTSCH	GER
FRAZIER, INC.	FRA	GHERTNER INST.	GH
FREDERIC ELECTRONICS CORP.	FRED	GIANNINI CONTROLS	GI
FREDERICKS CO.	FRD	GILBERT CONNECTOR, INC.	GCI
FREED TRANSFORMER CO.	FTC	GILFORD INSTRUMENT LAB., INC.	GF
FRIDEN DIV.	FR	GILIAN INSTRUMENT CORP.	GILI
FRIEZ-BENDIX	FB	GILSON MEDICAL INSTRUMENTS	GILM
FRONTIER ENTERPRISES	FE	GLASSMAN	GLS
FTS SYSTEMS, INC.	FTS	GLENCOE SCIENTIFIC, INC.	GSI
FUJITSU	FUJ	GLOBAL SPECIALTES CORP.	GLOB
FULLER CO., SUB. OF GEN. AMER. TRANS. CO.	FULL	GLOBE-UNION, INC.	GUI
G. H. KELLER CORP.	GHK	GNT AUTOMATIC	GNTA
G. K. TURNER ASSOC.	GKT	GOULD INC.-INSTRUMENTS SYSTEMS DIV.	GOUL
G. R. ELECTRONICS, LTD.	GRE	GOULD-BRUSH	GOB
G. T. I. CORP.	GTI	GOW-MAC INSTRUMENT CO.	GM
G. W. DAHL COMPANY, INC.	DAL	GRANVILLE-PHILLIPS	GRP
GAERTNER SCIENTIFIC CO.	GSC	GRAPHTEC	GPTE
GAMMA SCIENTIFIC, INC.	GAMS	GREAT LAKES COMPUTER PERIPHERALS	GLCP
GANDALF TECHNOLOGIES, INC.	GATI	GREAT LAKES INSTRUMENTS INC.	GRLI

MANUFACTURER	CODE	MANUFACTURER	CODE
GRIEVE-HENDRY CO.	GHC	HESTER	HST
GROVE VALVE & REGULATOR CO.	GY	HEURIKON	HKN
GROVER PHOTO PRODUCTS	GPP	HEURISTICS, INC.	HUR
GTEIS/HOVAR	GT	HEVI-DUTY ELECTRIC CO.	HDE
GUARDIAN ELECTRIC MFG. CO.	GEM	HEWLETT-PACKARD CO. (DATAHEC)	HP
GUIDED WAVE, INC.	GWI	HF INSTRUMENTS	HF
GUILDLINE	GU	HICKOK ELECTRICAL INSTRUMENT CO.	HK
GULTON	GUL	HIGH VACUUM EQUIPMENT CORP.	HVE
GYRA ELECTRONICS CORP.	GEC	HIGH VOLTAGE ENGINEERING	HIV
GYYR PRODUCTS	GYYR	HIPOTRONICS INC.	HIP
H. O. TRERICE CO.	TER	HITACHI	HT
H. TINSLEY CO.	TIN	HITEC, CORPORATION	HIT
HAAKE INSTRUMENTS, INC.	HKI	HKU SYSTEMS, INC.	HKU
HAARE	HAAR	HODART BROTHERS	HOD
HACH CHEMICAL CO.	HAH	HOEFFER SCIENTIFIC INSTRUMENTS	HOEF
HACH COMPANY	HACH	HOLMAN CORP.	HOL
HACKER INSTR.	HAC	HONEYWELL, INC.	HH
HADRON	HAD	HORIBA, LTD.	HOLT
HAEFLY	HAEF	HORIZON	HOR
HAGAN CHEMICAL CORP.	HCC	HOSKINS MFG. CO.	HOS
HALIBURTON	HAH	HOTPACK CORP.	HPC
HALL, C.	HALL	HOUSTON INSTRUMENTS INC.	HSI
HALLIAKEN CO.	HAL	HOWELL INSTRUMENTS, INC.	HIC
HALMAR ELECTRONICS INC.	HALM	HRB-SINGER	HRS
HAMAMATSU SYSTEMS, INC.	HAMS	HUBER(GERMANY)	HUB
HAMBURG	HAM	HUGGINS LAB.	HGL
HAMILTON MICRO LAB.	HML	HUGHES	HUG
HAMILTON STD.	HMS	HUMAN DESIGNED SYSTEMS, INC.	HDS
HANMARLUND MFG. CO. INC.	HLM	HUMPHREY INSTRUMENT CO., INC.	HUP
HANNEL DAHL DIV.	HD	HUNTER MANUFACTURING COMPANY	HUNT
HANNER ELECTRONICS	HME	HUNTRON INSTRUMENTS INC.	HII
HAMPSHIRE CONTROLS	HC	HUPPERT, K. H., CO.	KHP
HARMAN-KARDON, INC.	HAKA	HURST MFG. CORP.	HMC
HARRIS CORPORATION	HACO	HY-CAL ENGINEERING/LEEDS & NORTHRUP	HYCL
HARRISON LABORATORIES	HL	HYBRID SYSTEMS CORP.	HYBS
HARROP LABS.	HARL	HYDRO-PRODUCTS CO.	HYPR
HARSHAW CHEMICAL CO.	HAR	HYDROLAB CORPORATION	HYDR
HARTLEY MEASUREMENTS LTD.	HARM	HYGROMETRIX	HYGX
HARVARD APPARATUS	HARV	HYPERION INDUSTRIES CORP.	HYP
HARVEY WELLS CORP.	HWC	I/O DEVICES	IOD
HARWOOD	HARW	ICOM	ICOM
HASS INSTRUMENT CORP.	HAS	IDACO	IDC
HASTINGS-RAYDIST CO.	HR	IDAHO FALLS	IDF
HAYDON SWITCH & INSTRUMENTS, INC.	HS	IET LABORATORIES	IET
HAYES MICROCOMPUTER PRODUCTS, INC.	HMPI	IKL INC	IKL
HAYES TECHNICAL	HAY	IKONAS GRAPHICS SYSTEMS	IKGS
HAYS CORP.	HA	ILLINOIS TEST CO.	ITC
HAZELTINE	HZ	IMPACT REGISTER COMPANY	IMPC
HEADWAY RESEARCH, INC.	HEAD	IN-SITU, INC.	INSI
HEAT SYSTEMS	HTS	INDUCTION HEATING DIV.	ID
HEATH CO.	HE	INDUSTRIAL INSTRUMENTS, INC.	II
HEISE BOURDON TUBE CO.	HI	INDUSTRIELLE ELEKTRONIK	INEL
HELICOIL PRODUCTS DIV.	HPD	INERON, INC.	INE
HELLER CO.	HEL	INFICON	INFN
HELPER ISNTRUMENT COMPANY	HELP	INFOREX INC. (DATA INTERFACE)	INF
HERMES ELECTRONICS CO.	HEC	INFORMATION DESIGN, INC.	IDI

MANUFACTURER	CODE	MANUFACTURER	CODE
INFORMER COMPUTER TERMINALS	ICT	IRCON INC.	IRCH
INFOTRON INC.	INFO	IREC	IRE
INFOTRONICS CORP.	IC	ISCO COMPANY	ISCO
INNET	INN	ITC IKEGAMI	ITCI
INO-TECH, INC.	INO	ITEK CORP.	IT
INSTITUTE OF APPLIED PHYSICS	IAP	ITHACO INC.	ITH
INSTROLEC	IHLC	ITOH, C., ELECTRONICS, INC.	ITOH
INSTRON, INC.	INS	IVAC CORP.	IVAC
INSTRU LAB, INC.	IL	IVAN SORVALL, INC.	SVL
INSTRU-LEC CORP.	ILEC	IZUKAR	IZ
INSTRUMENT CORP. OF AMERICA	ICA	J. A. JACKSON CORP.	JAC
INSTRUMENT DEVELOPMENT LABS, INC.	IDL	J. G. BIDDLE CO.	BD
INSTRUMENT RESEARCH CO.	IREC	J. L. AMIOT CO.	JLA
INSTRUMENT SPECIALTIES CO.	IS	JACKSON, J. A., CORP.	JAC
INSTRUMENTS CORP., THE	TIC	JAMES MILLEN MFG. CO. INC.	MLM
INSTRUMENTS SA, INC.	ISA	JAMES P. MARSH CO.	JPM
INTEGRAL DATA SYSTEMS, INC.	INTD	JAMESBURY CORP.	JB
INTEGRATED COMPUTER SYSTEMS	ICS	JAPAN ELECTRON OPTICS LAB.	JEOL
INTEL CORP.	INT	JARRELL-ASH CO.	JA
INTELLIGENT SYSTEMS	INTS	JAVELIN ELECTRONICS CO.	JAV
INTERACTIVE SYSTEMS, INC.	ITSY	JENSEN TOOLS & ALLOYS	JENT
INTERATOM (BERGISCH-GLADBSACHDENSBURG WEST GERMANY)	INAT	JENWAY LIMITED	JNWA
INTERDATA (PERKIN-ELMER)	PE	JEOL	JEOL
INTERFACE MECHANISMS, INC.	INI	JEROME INSTRUMENT CORPORATION	JIC
INTERNET	IN	JERROLD ELECTRONICS CORP.	JERR
INTERNATIONAL BIOPHYSICS CORP.	IBC	JOBIN YVON	JOBY
INTERNATIONAL BUSINESS MACHINES INC.	IBM	JOERGER	JOER
INTERNATIONAL COMM. CORP.	ICC	JOHN FLUKE MFG. CO.	FK
INTERNATIONAL COMPUTER EQUIP.	ICE	JOHNATON LABS	JL
INTERNATIONAL COMPUTER PRODUCTS, INC	ICP	JOHNSON CONTROLS, INC.	JC
INTERNATIONAL DATA SCIENCES CORP.	IDS	JOHNSON SERVICE CO.	JS
INTERNATIONAL ECOLOGY SYSTEMS, CORP.	IESC	JOHNSON, E. F., CO.	JN
INTERNATIONAL ELECTRONIC RESEARCH CORP.	IERC	JOHNSON-KECK, INC.	JKI
INTERNATIONAL ELECTRONIC RESISTOR CORP.	IRC	JOHNSON-WILLIAMS, INC.	JW
INTERNATIONAL EQUIPMENT CO.	IEC	JOHNSTON LABS	JOH
INTERNATIONAL INSTRUMENTS CO.	III	JONES MEDICAL	JOME
INTERNATIONAL LIGHT, INC.	ILI	JONES MOTOROLA CO.	JM
INTERNATIONAL MICROTRONICS CORP.	IMC	JORDAN ELECTRONICS CO.	JE
INTERNATIONAL PLASMA INST.	IPI	JORGES	JOR
INTERNATIONAL RESEARCH & DEV. CORP.	IR	JORWAY CORP.	JY
INTERNATIONAL ROBOMATION/INTELLIGENCE	IROB	JOYCE, LOEBL & CO.	JLC
INTERNATIONAL SCIENCE	INSC	JUKI	JUKI
INTERNATIONAL SCIENTIFIC INSTRUMENT, INC.	ISI	JUC CORPORATION	JUC
INTERNATIONAL TELEPHONE & TELEGRAPH	ITT	K-V ASSOCIATES INC.	KVA
INTERSCAN	ITS	K. H. HUPPERT CO.	KHP
INTERSTATE ELECTRONICS	INST	KALART VICTOR CORP.	KRT
INTERTECHNIQUE	INTE	KALDFELL LAB. INC.	KALB
INTERTRAN	ITN	KAMAN CORP./KAMATICS CORP.	KAM
INTRA-ACTION CORP.	IAC	KAY ELECTRONIC CO.	KAEL
INVERTRON	INV	KAYE INSTRUMENTS INC.	KAYE
IOMEGA CORPORATION	IOM	KECK GEOPHYSICAL INSTRUMENTS, INC.	KGII
ION EQUIPMENT CORP.	ION	KEITHLEY INSTRUMENTS, INC.	KI
ION TECH	IOT	KELLER, G. H., CORP.	GHK
ION TRACK INSTRUMENTS	ITI	KELLER, R. G.	RGK
IONICS, INC.	IOI	KELLEY-KOETT INSTRUMENT CO.	KKIC
IPAC	IPAC	KENNEDY ASSOCIATES	KA

MANUFACTURER	CODE	MANUFACTURER	CODE
KENNEDY, C. J., CO.	KECO	LAUDA	LAU
KEPCO, INC.	KEP	LAVOIE	LAV
KERNCO	KRN	LAURENCE LIVERMORE LAB.	LLL
KERNS GROUP	KG	LAURENCE RADIATION LAB.	LRL
KERVONICS	KER	LAWSON RUSH	LR
KEVEX	KEV	LAZAR RESEARCH LABS., INC.	LAZ
KEYTRONIZE	KTN	LE CROY RESEARCH SYSTEMS, INC.	LC
KICKSORT	KIK	LEADER MFG. CO.	LDR
KIELEY & MUELLER, INC.	KM	LEAR SEIGLER	LSR
KIKL MICROCODE	KIKL	LECO CORPORATION	LECO
KILOVOLT CORP.	KILO	LEDEX, INC.	LD
KINETIC SYSTEMS	KS	LEEDS & NORTHRUP CO.	LN
KING CONCEPT CORP.	KCC	LEIDEL FLARSHEIM CO., THE	LFC
KINMERTICS	KINM	LEITZ	LEZ
KINTEL	KTL	LEKTRA LABORATORIES, INC.	LLI
KIRKHOF DIV. FLX CORP.	KDC	LEKTRA LABS	LEL
KISTLER SUNDSTRAND DATA CONTROL, INC.	KSDC	LEPEL CORP.	LEP
KIVI	KIVI	LESLIE COMPANY	LES
KLINGER SCIENTIFIC CORPORATION	KLIS	LEUPOLD & STEVENS, INC.	LS
KLOSS VIDEO CORP.	KVIC	LEYBOLD-HERAEUS	LH
KNIGHT	KN	LFE CORPORATION	LFE
KOERING PEGASUS DIVISION	KPD	LI-COR	LICO
KONTES GLASS CO.	KON	LINBURG	LIN
KORAD	KORA	LINDBERG	LIB
KRATOS-DISPLAY DIV.	KRAT	LINDBERG HEVI-DUTY	LND
KRAUTKRAMER-BRANSON INC.	KK	LINDE	LIND
KREONITE INC.	KREO	LINE ELECTRIC CO.- -DIVISION OF ESTERLINE	LINE
KROHN-HITE CORP.	KH	LINEAR INSTS. CO.	LIC
KRONOS	KRO	LING ELECTRONICS INC.	LING
KULICKE & SOFFA MFG.	KSM	LINK COMMUNICATIONS, INC.	LINK
KURZ INSTRUMENTS INC.	KURZ	LINSEIS, INC.	LINS
KYDE CORP.	KY	LIONEL ELECTRONICS	LION
L & R MANUFACTURING COMPANY	LRM	LISTON-BECKER INSTRUMENT CO.	LB
L B J ELECTRONICS	LBJ	LITHE TECH. INTERNATIONAL	LT
L F E PROCESS CONTROL DIV.	LFEP	LITTLE GIANT PUMP CO.	LG
L-W PHOTO INC.	LWP	LITTLE, ARTHUR D., INC.	LITL
LAB-LINE INSTRUMENTS	LABI	LIVERMORE DATA SYSTEMS, INC.	LDS
LABAC	LABA	LKB INSTRUMENTS, INC.	LKB
LABELLE INDUSTRIES, INC.	LAB	LMC MEGA MICRO	LMC
LABORATORY DATA CONTROL	LDC	LOBO DRIVES INTERNATIONAL	LOBO
LABORATORY EQUIPMENT CO.	LA	LOCKWOOD MCLORRIE	LM
LABORATORY FOR ELECTRONICS	LFE	LOG-E-TEC	LGT
LABORATORY FOR SCIENCE	LFS	LOGETRONICS INC.	LO
LAKE SHORE CRYOTRONICS	LSC	LOGICAL DEVICES, INC.	LDI
LAMBDA ELECTRONICS CORP.	LE	LORILLARD TOBACCO CO., P.	PLT
LAMDA PHYSIK	LAPH	LOS ALAMOS SCIENTIFIC LAB.	LASL
LAND-AIR INC.	LAI	LOVE CONTROLS CORP.	LCC
LANDSVERK ELECTROMETER CO.	LANV	LOWRANCE	LOW
LANGLEY-FORD INSTRUMENTS CO.	LFI	LOYOLA INDUSTRIES	LI
LANIER BUSINESS PRODUCTS	LBP	LUDLUM MEASUREMENTS, INC.	LL
LANSING	LAN	LUMAC SYSTEMS	LUMC
LAPINE	LAP	LUMONICS RESEARCH LTD.	LUM
LASER PRECISION CORP.	LPC	M&R ENTERPRISES	MRE
LASER SCIENCE, INC.	LSI	M-T ELECTRONICS CO.	MTE
LASER TECH., INC.	LTI	MAC VICTOR MANUFACTURING COMPANY	MACV
LATRONICS CORP.	LAT	MACBETH-DIV. OF KOLLMORGEN CORP.	MCB

MANUFACTURER	CODE	MANUFACTURER	CODE
MAGION, INC.	MA	MELETRON CORP.	MEL
MAGITRON	MG	MELOY LABORATORIES, INC.	MLI
MAGNAFLUX CORP.	MFC	MEMODYNE	MEDY
MAGNAVOX	MVX	MEMOREX CORP.	MRX
MAGNECORD	MC	MEMSOR CORP.	MEMS
MAGNETICS, INC.	MM	MERCOID CORP.	MCD
MAGNETROL, INC.	MAG	MERIAM INSTRUMENT CO.	MIC
MALIBU DESIGN GROUP	MALI	METALS RESEARCH CORP.	MRC
MALLINKRODT	MALL	METEROLOGY RESEARCH, INC.	MRI
MALLORY	MAL	METERSONICS, INC.	MESI
MANNESMANN TALLY	MATA	METRA INSTRUMENTS, INC.	METI
MANNING ENVIRONMENTAL CORP.	MAEN	METROHM	MET
MANNING TECHNOLOGIES, INC.	MANT	METROLOGIC	MTRL
MANNING, MAXWELL & MOORE (ASHCROFT)	MMM	METROTEK INC.	MEK
MANOSTAT CORP.	MAN	METTLER INSTR. CORP.	METC
MANSFIELD-GREEN, INC. (AMETEK)	MF	MEYERS & KNAPP	MKP
MANUFACTURERS ENGR. & EQUIPMENT CO. (MEECO)	ME	MFE CORP.	MFE
MARCO	MARC	MICOM CORPORATION	MICO
MAREL INSTRUMENT COMPANY	MAIN	MICRO CHEMICAL SPEC. CORP.	MCS
MARION INSTR. CO.	MAIC	MICRO INSTRUMENT CO.	MIIC
MARKSON INST.	MAR	MICRO METRIC CORP.	MIM
MARLIN	MARL	MICRO MOTION, INC.	MMO
MARQUETTE ELECTRIC CO.	MEC	MICRO NOW INST. CO.	MNI
MARSH-MCBIRNEY, INC.	MMI	MICRO PERIPHERALS, INC.	MPI
MARSHALL	MAH	MICRO-PURE SYSTEMS INC.	MPS
MARTEK INSTRUMENT INC.	MART	MICRO-TERM, INC.	MCT
MARTIN BECKER	MARB	MICROCARB CORP.	MBC
MASER OPTICS	MAS	MICROCON	MICC
MASON-NEILAN, INC.	MSN	MICRODESIGN INC.	MIDE
MASSACHUSETTS COMPUTER CORPORATION	MCC	MICRODYNE CORP.	MID
MAST DEVELOPMENT CO.	MD	MICROFORM PRODUCTS	MIPR
MASTER-FLEX	MASF	MICROMAS, V.G.	MICR
MATEC INC.	MATE	MICROMECH	MICM
MATERIAL ANALYSIS CO.	MTAC	MICROMEDIC	MM
MATERIALS RESEARCH CORP.	MAT	MICROTEK ELECTRONICS, INC.	MT
MATERIALS TESTING SYSTEMS	MTS	MICROWAVE POWER DEVICES, INC.	MPD
MATHESON CHEMICALS	MAC	MID-EASTERN INDUSTRIES, INC.	MEI
MATHIS CO., R. D.	RDM	MIDWEST INSTRUMENTS	MIDW
MATRIX, INC.	MATI	MIKRO PHIL CORPORATION	MIPC
MATSUSHITA	MS	MIKROM INSTRUMENT CO.	MIK
MATTHEY BISHOP, INC.	MAB	MILLEN MFG. CO., JAMES	MLM
MB MFG. CO.	MB	MILLENIUM SYSTEMS, INC.	MSI
MCINTOSH	MCI	MILLER CO.	MILL
MCKENNA LABS	MK	MILLETRON, INC.	MTI
MCL, INC.	MCL	MILLIPORE CO.	MIL
MCMARTIN INDUSTRIES INC.	MCM	MILLIVAC INSTRUMENTS	MII
MCPHERSON	MCP	MILTON ROY CO.	MR
MDA SCIENTIFIC	MDAS	MINARIK, INC.	MINI
MDB SYSTEMS, INC.	MDB	MINCO PRODUCTS INC.	MNCO
MEASUREMENT SYSTEMS	MESY	MINE SAFETY APPLIANCES CO.	MSA
MEASUREMENTS CORP.	MEA	MINITERM COMPUTER DEVICES, INC.	MITC
MECHANICAL TECHNOLOGY, INC.	METE	MINNEAPOLIS-HONEYWELL	MH
MECHTRONICS NUCLEAR	MEN	MINNESOTA MINING & MFG. CO.	MIN
MEGASON	MEGA	MINOLTA	MINO
MEHLER INSTRUMENTS	MEHI	MINTEDORO-WHITNEY CORP.	MWC
MEKEL ASSOCIATES	MKL	MIRAN INSTRUMENT COMPANY	MIRC

MANUFACTURER	CODE	MANUFACTURER	CODE
MKS BARATRON	MKS	NEWPORT LABORATORIES, INC.	NLI
MKS INSTRUMENTS, INC.	MKSI	NEWPORT RESEARCH CORP.	NEW
MODCOMP CORP.	MOD	NICOLET INST. CORP.	NIC
MODICON	MDN	NICOLET-ZETA CORP.	ZRI
MODULAR COMPUTER CORP.	MOD	NIEHOFF	NIE
MOELLER INST. CO.	MOE	NIKON	NIK
MOHAWK DATA SCIENCES, CORP.	MOH	NIME ASSOCIATES	NIME
MOLECTRON, INC.	MOL	NIPPON ELECTRIC CORP.	NEC
MOLECULAR DESIGN LTD., INC.	MODE	NJE CORP.	NJE
MOLSGAARD MEDICAL	MOLS	NOISE ABATEMENT SOCIETY	NAS
MOLYTEK, INC.	MOLT	NON-LINEAR SYSTEMS, INC.	NLS
MONITOR EQUIPMENT CORP.	MOEQ	NORBATROL ELECTRONICS CORP.	NB
MONITOR LABS INC.	ML	NORCROSS	NORC
MONITROL MFG. CO.	MONT	NORDEN KETAY	NK
MONROE ELECTRONICS, INC.	MON	NORGREN, C. A., CO.	NOGN
MONSANTO ELECTRONICS, INC.	MSE	NORMAN ENTERPRISES	NOE
MONTEDORO-WHITNEY CORP.	MOWH	NORTEC	NORT
MOORE INDUSTRIES, INCORPORATED	MOII	NORTH AMERICAN PHILIPS	NAP
MOORE PRODUCTS CO.	MPC	NORTH EAST SCIENTIFIC CORP.	NES
MOREHOUSE MACHINE CO.	MMC	NORTH HILLS CO.	NHC
MOSLER ELECTRONICS SYSTEMS	MES	NORTHEASTERN ENGINEERING, INC.	NE
MOSLEY (HEWLETT-PACKARD)	HP	NORTHERN SCIENTIFIC, INC. (TRACOR)	TRA
MOSSBAUER SPECTROMETER COMPANY	MOSS	NORTHERN TELECOM, INC.	NOTE
MOTION DYNAMICS RESEARCH	MDR	NORTHSTARD ADVANTAGE	NOAD
MOTOMATIC	MOM	NORTON CO. (NATIONAL RESEARCH CORP.)	NOR
MOTOROLA, INC.	MOT	NORWOOD CONTROLS	NC
MOXON INC.	MOX	NOVATION	NOV
MPM CORP.	MPM	NUCLEAR AREAS	NA
MUELLER X-RAY	MU	NUCLEAR ASSOC. MFG.	NAM
MUIRHEAD & CO., LTD.	MHC	NUCLEAR CORP.	NUC
MYRON L. CO.	MLC	NUCLEAR DATA, INC.	ND
NANOSECOND SYSTEMS	NAN	NUCLEAR DIODES, INC. (EDAX)	NID
NARCO BIO-SYSTEMS, INC.	NBSI	NUCLEAR ELECTRONICS CORP.	NUEL
NATIONAL ALUMINATE CORP.	NAC	NUCLEAR ENTERPRISES INC.	NEN
NATIONAL APPLIANCE CO.	NACO	NUCLEAR INSTRUMENT CO.	NI
NATIONAL CASH REGISTER COMPANY	NCR	NUCLEAR MAGNETICS CORP.	NMC
NATIONAL CONTROLS, INC.	NCI	NUCLEAR MEASUREMENTS CORP.	NM
NATIONAL ELECTRIC INSTRUMENT DIV.	NEI	NUCLEAR R & D, INC.	NRD
NATIONAL ELECTROSTATIC	NAE	NUCLEAR RESEARCH CORPORATION	NURE
NATIONAL INSTRUMENT LAB	NIL	NUCLEAR SEMICONDUCTOR-DIV. UNITED SCIENTIFIC CORP.	NS
NATIONAL MANUFACTURING CO.	NMFG	NUCLEAR TECHNIC	NUTE
NATIONAL RADIO COMPANY	NRC	NUCLEAR-CHICAGO CORP.	NCC
NATIONAL RESEARCH CORP. (NORTON)	NOR	NUCLEOMETRICS, INC.	NUCM
NATIONAL RESEARCH GROUP	NRG	NUCLEUS, INC.	NUCI
NATIONAL SONICS	NATS	NUCLIDE ANALYSIS ASSOC.	NUA
NATIONAL SPECTROMETER LAB.	NSL	NUCLIDE CORPORATION	NUCO
NATIONAL TECHNICAL LABS.	NTL	NUDATA	NUD
NEC INFORMATION SYSTEMS, INC.	NEC	NZV (SIEMENS & HALSKE)	NZV
NEC SPINWRITER CORP.	NEC	O. I. CORPORATION	OIC
NEFF INSTRUMENT CORPORATION	NEFF	OAK RIDGE NATIONAL LAB.	OR
NELSON ANALYTICAL	NELA	OCEANOGRAPHY INTERNATIONAL	OI
NEPTUNE METER CO.	NEP	OFFNER ELECTRONICS, INC.	OFF
NESLAB INSTRUMENTS, INC.	NESL	OHAUS SCALE CORPORATION	OHSC
NEW BRUNSWICK SCIENTIFIC CO.	NBS	OHIO THERMAL CO.	OTC
NEW LONDON INST. CO.	NLIC	OHMART CORP.	OHM
NEWPORT ELECTRONICS, INC.	NEEL	OHRA CORPORATION	OHRA

MANUFACTURER	CODE
OKI ELECTRIC INDUSTRIES CO., LTD.	OKIE
OKIDATA	OKID
OLIVETTI UNDERWOOD CORP.	OV
OMCRON CORP. OF AMERICA	OCA
OMEGA ENGINEERING, INC.	OEI
OMNICHROME	OMC
OMNITEC	OM
ONYX, INC.	ONYX
OPAD ELECTRIC COMPANY	OEC
OPAMP LABS	OPAL
OPTICAL RADIATION CORP.	ORC
OPTIMAL TECHNOLOGY, INC.	OTI
OPTIMATION, INC.	OP
OPTO ELECTRONICS, LTD.	OPTO
OPTRONICS INTERNATIONAL, INC.	OII
ORBISPHERE LABORATORIES	ORB
OREC INC.	OREC
OREGON ELECTRONIC MFG. CO.	OE
ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES	OPEC
ORIEL	ORL
ORION CORP.	ORI
ORRTRONIC, INC.	ORT
ORTEC, INC.	OT
OSBORNE CORPORATION	OSB
OVERHOFF ASSOC.	OA
OXFORD INSTRUMENTS	OX
OZONE RESEARCH AND EQUIPMENT CORPORATION	OZR
P B S K ASSOCIATES	PBSK
P. LORILLARD TOBACCO CO.	PLT
PACE ENGINEERING CO.	PEC
PACE INSTRUMENTS. CO. (ELECTRONIC ASSOCIATES INC.)	EAI
PACE, INC.	PACE
PACIFIC ELECTRIC MOTOR	PEM
PACIFIC MEASUREMENTS, INC.	PM
PACIFIC PRECISION INSTRUMENTS	PPI
PACKARD INSTRUMENT CO.	PAC
PACKER, B. L.	BLP
PADBURG, CARL-CEPA	PADB
PAKO CO.	PAK
PALMER INSTRUMENTS, INC.	PALM
PANALARM	PAL
PANAMETRICS, INC.	PAN
PANASONIC	PAN
PANORAMIC RADIO PRODUCTS, INC.	PRPI
PARAGON	PARA
PARKER ENGINEERING	PKE
PARKER HANNAFORD	PARK
PARR INSTS.	PARR
PARTLOW INSTRUMENTS	PART
PELCO SALES INC.	PELC
PENRIL CORP.	PEN
PENTAX MANUFACTURER	PNTX
PENWALT (S.S. WHITE)	SSW
PERIPHERAL EQUIPMENT CORP.	PRP
PERIPHERAL INTERFACE CORP.	PIC
PERKIN-ELMER (INTERDATA)	PE
PERTEC	PRP
PESCHEL ELECTRONICS	PES
PETROLIGHT	PET
PFAUDLER	PFA
PFEIFFER-BALZIRS CORPORATION	PBC
PHARMACIA CHEMICALS	PHA
PHASED RADIATION	PR
PHASER CORP.	PHC
PHILADELPHIA SCIENTIFIC CONTROLS	PS
PHILBRIC	PH
PHILCO-FORD CORP.	PFC
PHILIPS', N. V. GLOEILAMPENFABRIEKEN	PHG
PHILLIP MORRIS TOBACCO CO.	PMT
PHILLIPS ELECTRONIC INSTRUMENTS, INC.	PHE
PHILLIPS SCIENTIFIC, INC.	PPS
PHILLIPS TEST & MEASUREMENT INC.	PTMI
PHILLIPS VACUUM	PHV
PHOENIX PRECISION INSTRUMENT CO.	PX
PHOTO RESEARCH	PHR
PHOTOCHEMICAL RESEARCH ASSOCIATES	PCRA
PHOTOCIRCUITS CORP.	PC
PHOTOVAC	PHOT
PHOTOVOLT CORP.	PV
PHYSICAL DATA INC.	PHDA
PHYSICAL ELECTRONIC INDUSTRIES	PEI
PHYSICAL ELECTRONIC INDUSTRIES, INC.	PEII
PHYSICAL METALLURGY	PHM
PHYSICAL SCIENCE CORP.	PHSC
PHYSICON CORP.	PSCC
PHYSICS INTERNATIONAL	PHI
PHYSMET	PHYS
PICKER CORP.	PK
PICO SECOND INT.	PICO
PIONEER ELECTRIC & RESEARCH CORP.	PION
PLASMA THERM	PLTH
PLESSEY MEMORIES, INC.	PLM
PLESSEY MICROSYSTEMS	PLM
PLESSEY PERIPHERAL SYSTEMS	PLM
PLUG-IN INSTRUMENTS	PII
POLAROID	POL
POLARON INSTRUMENT, INC.	PRON
POLLUTION CONTROL INDUSTRIES	PCI
POLYSCIENCE CORP.	PO
POLYSONICS	PSON
POPE INSTRUMENTS	POPE
POTTER AERONAUTICAL CORP.	PA
POTTER INSTRUMENT CO., INC.	POTT
POTTER-BRUMFIELD CO.	PB
POWER DESIGNS, INC.	PD
POWER EQUIPMENT CO.	POW
POWER INSTRUMENTS, INC.	PI
POWER RATE CORP.	PRC
POWERTEC	PT
POWERVISION, INC.	PGVI
PPM, INC.	PPM
PRECISE SENSORS	PRCS

MANUFACTURER	CODE
PRECISION DIGITAL	PRD
PRECISION INST.	PRI
PRECISION PRODUCTS AND CONTROLS, INC.	PP
PRECISION SCIENTIFIC CO.	PSC
PREIFFER	PREI
PREISER SCIENTIFIC INC.	PRSC
PRESTON	PST
PREVOST	PRV
PRIAM CORPORATION	PRC
PRINCETON APPLIED RESEARCH CORP.	PAR
PRINCETON ELEC. PRODUCTS	PEP
PRINCETON GAMMA TECH.	PGT
PRINCETON GRAPHICS SYSTEMS	PGS
PRINCETON SCIENTIFIC INSTS.	PSI
PRINTEK CORPORATION	PTKC
PRINTER TECHNOLOGY, INC.	PTI
PRINTRONIX INC.	PRIN
PRIORITY ONE ELECTRONICS	POE
PRL ELECTRONICS	PRL
PRO LOG CORP.	PLC
PROCESS & INSTRUMENTS, INC.	PRII
PRODUCTS FOR RESEARCH	PRR
PROJECTION OPTICS CO.	PRJ
PROMETHEUS PRODUCTS, INC.	PROM
PULCIR INC.	PULC
PYE UNICAM	PYE
PYROMETER INSTR. CO.	PY
PYROMETER SERVICE CO.	PYS
QUADRAM	QDRM
QUANTA-RAY, INC.	QRI
QUANTACHROME CORP.	QUAN
QUANTEL INTERNATIONAL	QUAI
QUANTEX CORPORATION	QTX
QUEST ELECTRONICS	QSTE
QUINTON INST.	QI
QUNE CORP.	QUNE
R. C. SANDERS TECHNOLOGY SYSTEMS, INC.	SAND
R. D. MATHIS CO.	RDM
R. G. KELLER	RGK
RACAL RECORDER, INC.	RRI
RACAL-VADIC	VAD
RADAR ENGINEERS	RADE
RADIATION COUNTER LAB.	RCL
RADIATION INSTRUMENT DEV. LAB.	RID
RADIATION POWER SYSTEMS, INC.	RPS
RADIATION TECHNOLOGY, INC.	RATE
RADIATION, C. W., INC.	CWR
RADIO CORP. OF AMERICA	RCA
RADIO FREQUENCY LAB.	RAD
RADIO MFG. ENGINEERS INC.	RME
RADIO SHACK (TANDY CORP.)	TAND
RADIOACTIVE PRODUCTS, INC.	RADP
RADIOMATIC	RADM
RADIOMETER COPENHAGEN	RADC
RAHAPO INSTRUMENT COMPANY	RAHI
RAHMAN	RAM

MANUFACTURER	CODE
RAMSEY ENGINEERING CO.	REN
RAMTEK	RAMT
RANK BROTHERS - ENGLAND	RBE
RASOR & TINKER	TKRA
RAULAND CORP.	RAU
RAYNER (CELTIC TRUTONE)	RNR
RAYTEC	RAY
RAYTHEON CO.	RT
RDF CO.	RDF
REACTOR CONTROLS, INC.	RC
REACTOR EXPERIMENTS, INC.	RE
REALIST VANGUARD	RV
REALTIME SYSTEMS, INC.-AFFILIATE OF LEVI	REAL
RED LION CONTROLS	RLC
RED-HUM INSTRUMENT CORPORATION	RED
REES INSTRUMENTS	REES
REGATRAN	REG
REGENT	RGNT
RELIABLE MEASUREMENT	RELM
REMEX/EX-CELL-O CORP	REM
REPUBLIC FLOWMETER CO.	RF
RESEARCH ASSISTANTS INC.	REA
RESEARCH SPECIALITIES	RESP
RESEARCH, INC.	RI
REUTER-STOKES	RS
RF COMMUNICATIONS	RCM
RFL INDUSTRIES	RFL
RHEEM ELECTRIC	RHE
RHK TECHNOLOGY, INC.	RHK
RHODE & SCHWARZ SALES CO.	RSS
RI RESEARCH, INC.	RIR
RIGAKU-USA INC.	RIG
RIL ELECTRONICS	RIL
RILEY	RILY
RIXON	RIX
ROBERTSHAW-FULTON CONTROLS	RFC
ROBINAIR MFG. CO.	RMC
ROBINSON-HALPERN CO.	RH
ROBOTICS, INC.	ROBO
ROCHESTER INSTRUMENT SYSTEMS, INC.	RIS
ROCKLAND	RO
ROCKWELL MFG. CO.	RM
ROFIN LTD, ENGLAND	ROF
ROLAR PHOTOGRAPHY	RP
ROMAN	ROM
ROMAN ENGINEERING CO.	ROM
ROSEMOUNT ENGINEERING CO.	REC
ROSIE	ROS
ROTEK	ROT
ROTESCO, LTD.	ROTL
ROYAL TYPEWRITER	CPT
ROYCO INSTRUMENTS, INC.	RII
RUDICON	RUB
RUSKA	RUSK
RUSTRAK INSTRUMENT CO.	RUS
RUTHERFORD ELECTRONICS CO.	RFE

MANUFACTURER	CODE
S H E MFG. CORP.	SHEM
S. S. WHITE CO. (PENWALT)	SSW
SABER	SAB
SAGE INSTRUMENTS, INC.	SAGE
SAI TECHNOLOGY CO.	SAI
SALIENT ELECTRONICS, INC.	SE
SALVAGED	ZSAL
SANBORN	SANB
SANDA, INC.	SAD
SANDERS TECHNOLOGY SYSTEMS, R. C., INC.	SAND
SANDIA CORP.	SAN
SANYO ELECTRIC CO.	SANY
SARGENT, E. H. (SARGENT-WELCH SCIENTIFIC CO.)	SWS
SARGENT-WELCH SCIENTIFIC CO. (E.H. SARGENT)	SWS
SARNIA	SARN
SARTORIUS	SAR
SAUTER DIV OF METTLER INST.	MEIC
SAVANT INSTRUMENTS, INC.	SAV
SCAN INSTRUMENT CORP.	SIC
SCANDITRONIX	SCA
SCANIVALVE, INC.	SVI
SCARPA LABS	SCL
SCHAEVITZ	SCHV
SCHNIEDER INST. CO.	SCHI
SCHOEFFLE	SCH
SCHONSTED INST. CO.	SCHO
SCHUTTE & KOERTING CO.	SKC
SCIAKY BROTHERS, INC.	SBI
SCIENCE ACCESSORIES CORP.	SCAC
SCIENTECH, INC.	SCI
SCIENTIFIC COLUMBUS	SCLM
SCIENTIFIC ELECTRIC, INC.	SCE
SCIENTIFIC INSTRUMENTS INC.	SCII
SCIENTIFIC MICROSYSTEMS, INC.	SCMI
SCIENTIFIC-ATLANTA, INC.	SA
SCINTILLONICS, INC.	SCIN
SCOTT AVIATION, INC.	SCTA
SEARLE-BUCHLER INSTRUMENTS	SEBU
SEARS ROEBUCK CO.	SRC
SECO INDUSTRIES INC.	SECO
SEEGERS INSTRUMENT CO.	SEGI
SEIFERT COMPANY	SEIF
SEIKO INSTRUMENTS INC.	SEKO
SEMCO	SEM
SEMCORE	SEMC
SENNHEISER ELECTRONIC CORP.	SEN
SENSITIVE RESEARCH CORP.	SRI
SENSOTEC, INC.	SSTI
SEQUOIA-TURNER	SQT
SERVO CORP. OF AM.	SER
SETARAM	SETA
SETRA SYSTEMS, INC.	SSY
SHAKER	SHK
SHALLCROSS MFG. CO.	SHC
SHANDON SOUTHERN INSTRUMENT, INC.	SSI
SHARP	SHA

MANUFACTURER	CODE
SHEFFIELD CORP.	SHE
SHERWOOD ELECTRONIC LABS, INC.	SWD
SHIBA ELECTRIC CO.	SHI
SHIMADZU SEISAKUSHO LTD.	SHC
SHUGART ASSOCIATES	SCHG
SHURE	SH
SIEGLER CORPORATION	SIS
SIEMANS	SIE
SIERRA ELECTRONIC CORP.	SIEC
SIGMOTOR, INC.	SIGA
SIGNA INSTRUMENTS, INC.	SI
SIGMOND COHN	SG
SIGNAL GALAXIES, INC.	SGI
SIGNAL PROCESSING SYSTEMS, INC.	SPS
SIGNATONE	SIG
SIGNET SCIENTIFIC CO.	SIGN
SILENA, S.P.A. (SOCIETA INC. PER L'ELETT RONICA AVA	SILN
SIMPLEX VALVE & METER CO.	SMP
SIMPSON ELECTRIC CO.	SN
SIMPSON OPTICAL	SIMO
SINTEC	SNT
SINGER	SN
SIRIUS SYSTEMS, INC.	SIRS
SKINNER ELECTRIC VALVE DIV.	SK
SLO-SYN (SUPERIOR ELECTRIC CO.)	SPE
SLOAN TECHNOLOGY CORP.	STC
SMITH ROOT	SMR
SMITH-CORONA	SMCO
SOCIETE FRANCAISE-AT	SFAT
SOCIETY FOR VISUAL EDUCATION, INC.	SVE
SODEN, INC.	SODI
SODEV, INC.	SODV
SOILTEST, INC.	SO
SOLA ELECTRIC DIV.	SLE
SOLAREX CORP.	SOL
SOLARTRON INSTRUMENTS GROUP	STI
SOLINET SOUTHEASTERN LIBRARY NETWORK INC.	SSLN
SOLTEC CORPORATION	SCO
SONIC	SONC
SONICOR INSTRUMENTS CORP.	SONI
SONITROL SECURITY SYSTEMS, INC.	STS
SONOTRON	SONO
SONY CORP. OF AMERICA	SON
SORENSON OPERATION, RAYTHEON CO.	SS
SORGEL	SOR
SORODAN ENGINEERING INC.	SORO
SOROC TECHNOLOGY INC.	SOC
SORTEBERG CONTROLS CO.	SB
SORVALL	SOV
SOUTH BAY TECHNOLOGY	SBT
SOUTHERN SYSTEMS, INC.	SOSY
SOUTHWESTERN INDUSTRIAL ELECTRIC	SW
SPARLING-ENVIROTECH CORP.	SPRE
SPECIAL DYNAMICS CORP.	SPDC
SPECIALTY ASSEMBLING AND PACKING CO. INC.	SAP
SPECIFIC PRODUCTS	SPEC

MANUFACTURER	CODE	MANUFACTURER	CODE
SPECTRA-PHYSICS	SPP	SYSTEMS ENGINEERING LABS, INC.	SEL
SPECTRO GRAPHIC LAB. EQUIP. CO.	SGL	SYSTEMS RESEARCH LABORATORIES	SYRL
SPECTROMAGNETIC	SPM	SYSTEMTEKNIK, AB	STTM
SPECTRONIC	SPCT	SYSTRON-DONNER CORP.	STD
SPECTRUM SCIENTIFIC	SPC	SYTEK, INC.	SYTK
SPELLMAN	SPEL	T D ASSOCIATES	TDA
SPENCER-KENNEDY LABS, INC.	SKLI	TACHISTO INC.	TACH
SPERRY	SPR	TALK-A-PHONE CO.	TAP
SPEX INDUSTRIES	SPEX	TALLY REGISTER CO.	TRC
SPM INSTRUMENTS	SPI	TAMARACK SCIENTIFIC CO., INC.	TMSC
SPRAGUE PRODUCTS CO.	SP	TANDY CORP. (RADIO SHACK)	TAND
SPUTTER-BELL	SPB	TAURUS LABORATORIES	TARL
SQUARE "D" CO.	SD	TAXAN	TAX
STACO, INC.	STA	TAYLOR INSTRUMENT CO.	TAY
STAG-MICRO SYSTEMS	STAG	TAYLOR, TAYLOR, & HOBSON	TTH
STAINLESS EQUIPMENT CO.	SEQ	TAYLOR-SYBRON CORP.	TASY
STANCOR DIV.	SCD	TAYLOR-WINFIELD	TAW
STANDARD ELEC. TIME CO.	SET	TCC (TECHNICAL COMMUNICATIONS CORP.)	TCC
STANDARD ELECTRONIC CORP.	STEC	TEC, INC.	TEI
STANDARD ENGINEERING	STEM	TECAM	TECM
STANDARD EQUIPMENT CO.	STEQ	TECH LABORATORIES	TECL
STANDARD MEMORIES, INC.	SMI	TECH OPERATIONS, INC.	TECO
STANDARD NUCLEAR INSTRUMENT MOD. SYSTEM	SNI	TECHNE INC.	TCHI
STANDARD POWER, INC.	STP	TECHNICAL ASSOCIATES	TA
STANFORD RESEARCH SYSTEMS	SRS	TECHNICAL COMMUNICATIONS CORP. (TCC)	TCC
STANFORD TECHNOLOGY CORP.	STTC	TECHNICAL EQUIPMENT CORP.	TM
STAR MICRONICS, CORP.	STMI	TECHNICAL INDUSTRIES INC.	TII
STARRETT	STAR	TECHNICAL MEASUREMENT CORP.	TMC
STATHAM INSTRUMENTS, INC.	ST	TECHNICIAN INSTRUMENTS CORP.	TKM
STEPLESS CONTROLS CORP.	SCC	TECHNICON INSTRUMENTS CO.	TECI
STEVENS	STEV	TECHNICS	TECM
STRAINSERT	STRT	TECHNOLOGY FOR ENERGY CORPORATION	TFEC
STRAND	STR	TECHNOLOGY INSTRUMENT CORP.	TICO
STREETER-AMET CO.	SAC	TECHSONICS	TECS
STRODE, INC.	STRI	TECHTRAN, INC.	TECT
STROBO RESEARCH	SR	TECMAR	TCMR
STROMBERG-CARLSON	SDC	TECO	TCO
STRONG ELECTRICAL CORP.	SEC	TEK-COM	TKC
STRONG-FICKLER	SF	TEK-PRO	TEKP
STRUERS	STRU	TEKTRAN	TEKT
SUB-SEA SYSTEMS INC.	SSSI	TEKTRONIX, INC.	TEK
SUN-X CORPORATION	SUNX	TELE-MEASUREMENTS INC.	TELE
SUMMIT MFG. CO.	SUMC	TELEAUTOGRAPH CORP.	TELC
SUNBEAM	SUN	TELEDYNE PHILBRICK, INC.	TD
SUNRISE ELECTRONICS	SRE	TELEMATE	TLM
SUPAVAC	SUPA	TELEQUIPMENT	TEQ
SUPERIOR ELECTRIC CO. (SLO-SYN)	SPE	TELESENSORY SYSTEMS, INC.	TESY
SUPERSCOPE	SUP	TELETALK	TET
SURFACE SCIENCE LABS	SSL	TELETRONICS, INC.	TTR
SWEENEY, B. K., MFG. CO.	SWEM	TELETYPE CORP.	TTY
SWIFT, JAMES & SON, LTD.	SWIF	TELEVAC	TEL
SWITCHCRAFT, INC.	SC	TELEVIDEO, INC.	TVI
SYBRON/BARNSTEAD	BS	TELEX COMPUTER PRODUCTS, INC.	TCP
SYKES DATATRONICS, INC.	SYK	TELEX MIDWESTERN INSTRUMENTS	TEMI
SYLVANIA ELECTRIC PRODUCTS, INC.	SV	TELLABS, INC.	TELL
SYSTEM INDUSTRIES	SYI	TELMAR INC.	TELM

MANUFACTURER	CODE
TEM-PRES RESEARCH, INC.	TPR
TEMPTRON, INC.	TEM
TENNECOMP SYSTEMS, INC.	TNC
TENNELEC, INC.	TNL
TENNY ENGINEERING, INC.	TE
TERADO	TERA
TERAK CORP.	TERC
TERNIFLEX CORP.	TC
TERMINAL EQUIPMENT CORPORATION	TEEC
TERRA TEK	TTEK
TESTING MACHINES, INC.	TMI
TESTLINE INSTRUMENTS	TLE
TEXAS ELECTRONICS	TXEL
TEXAS INSTRUMENTS, INC.	TI
TEXSCAN CORPORATION	TEX
TEXSCANLYNE SYBRON	TEXS
THAYER SCALES	THYR
THE DICKSON COMPANY	DKSN
THE INSTRUMENTS CORP.	TIC
THE LEIDEL FLARSHEIM CO.	LFC
THELCO	THLC
THERMAL INSTRUMENT COMPANY	THIN
THERMATIC RECORDERS	THR
THERMCO	THM
THERMO	THER
THERMO ELECTRICS UNLIMITED	THMO
THERMO ELECTRON CORP.	THEL
THERMO SYSTEMS, INC.	TS
THERMO-ELECTRIC CO.	TEC
THERMO-LAB INSTRUMENTS, INC.	THL
THERMOLYNE CORP.	TLC
THERMONICS	TH
THERMOX INSTRUMENTS, INC.	THMI
THETA	THT
THOR CRYOGENICS	THOR
TIF INDUSTRIES	TIF
TIGERMAN ENGINEERING CO.	TIG
TIMEPLEX	TIM
TINIUS-OLSEN CORP.	TOC
TINKER & RASOR	TKRA
TINSLEY CO., H.	TIN
TLD	TLD
TN VISUAL, INC.	TNV
TOKYO, INDUSTRIES	TKI
TOLEDO SCALE/RELIANCE ELECTRIC	TOL
TOPAZ ELECTRONICS	TOP
TORR VACUUM PRODUCTS	TDVP
TOSHIBA	TOS
TRACERLAB	TR
TRACOR, INC. (NORTHERN SCIENTIFIC INC.)	TRA
TRACOR-NORTHERN INC.	TRA
TRAN-ELECTRIC	TRE
TRANSFORM TECHNOLOGY, INC.	TTI
TRANSFORMER TECH., INC.	TT
TRANSIAC CORPORATION	TRAC
TRANSISTOR DEVICES, INC.	TDI
TRANSISTOR ELECTRONICS CORP.	TREC
TRANSISTOR SPECIALITIES, INC.	TSI
TRANSMATION, INC.	TRN
TRANSREX	TRX
TRAPELO DIV.	TP
TRENDATA CORPORATION	TRDC
TRERICE CO., H. O.	TER
TRI LOG CORP.	TRIL
TRI-R INST.	TRIR
TRIAD DIV.	TAD
TRICONEX, INC.	TRI
TRIMAR INDUSTRIES	TRIM
TRIPLE A SPECIALTY CO.	TAS
TRIPLETT & ELECTRICAL INSTRUMENT CO.	TPT
TRIPP	TRIP
TRODYNE	TRD
TRONAC, INC.	TRON
TROPEL, INC.	TROP
TROXLER RADIATION LABS.	TRL
TRUE DATA CORP.	TDC
TRUTONE ELECTRONICS, INC.	TRU
TRW INSTRUMENTS	TRW
TRYGON ELECTRONICS	TRY
TULLAMORE	TUM
TUNG-SOL DIV.	TSD
TURBITROL, DIV. OF TAULMAN CO.	TURB
TURNER DESIGNS	TUDE
TURNER, G. K., ASSOC.	GKT
TWEEZER WELD	TW
TYCO	TYCO
TYCOM SYSTEMS CORP.	TSC
TYLAN CORP.	TYL
U. S. ATOMIC ENERGY COMMISSION	USAE
U. S. BURKE	USB
U. S. GAUGE DIV.	USG
U.S. ROBOTICS, INC.	ROBO
ULTEK	ULT
ULTRA ELECTRONICS, INC.	ULTR
ULTRASONIC IND., INC.	UII
UNHOLZ-DICKIE	UNHD
UNCODED MANUFACTURER	ZCOD
UNGAR-ELDON INDUSTRIES	UEI
UNICO CONTROLS DIV.	UC
UNILOCK INC.	UI
UNIMATIC	UNI
UNION CARBIDE CORP.	UCC
UNIPHASE	UNPH
UNIT PROCESS ASSY.	UPA
UNITED DATA SERVICES COMPANY	UDSC
UNITED DETECTOR TECHNOLOGY, INC.	UD
UNITED ELECTRIC CONTROLS CO.	UEC
UNITED SCIENTIFIC CORP.	UNSC
UNITED STATES SCIENTIFIC INST., INC.	USSI
UNITED SYSTEMS CORP.	USC
UNITED TECHNICAL RESEARCH CENTER	UTRC
UNITEK CORP.	UNC

MANUFACTURER	CODE
UNIVERSAL DATA SYSTEMS	UDS
UNIVERSAL ELECTRIC CO.	UE
UNIVERSAL FILTERS, INC.	UFI
UNIVERSAL FLOW MONITORS	UFM
UNIVERSAL SECURITY INSTRUMENTS	USI
UNIVERSAL VOLTRONICS	UV
UNIVERSITY OF CALIFORNIA	UCA
UNIVERSITY OF TENNESSEE	UOT
UNIVERSITY OF TEXAS	UTX
UNKNOWN MANUFACTURER	ZMFR
UPTIME CORPORATION	UPTC
USM CORP.	USM
USON CORP.	USO
UTAH ELECTRONICS, INC.	UT
UTHE TECHNOLOGY INTERNATIONAL	UTHE
UTI	UTI
VACION	VACN
VACTRONIC LAB. EQUIPMENT, INC.	VAC
VACUUM ATMOSPHERE CORP.	VAT
VACUUM ELECTRONICS	VEL
VACUUM INDUSTRIES, INC.	VI
VACUUM INSTRUMENT CORP.	VIC
VACUUM PRODUCTS	VP
VADIC	VAD
VAISALA INSTRUMENTS	VASA
VALHALLA SCIENTIFIC	VAL
VALIDYNE ENGINEERING CORP.	VAEC
VALTEC CORP.	VALC
VANZETTI	VAN
VARIAN ASSOCIATES, INC.	VA
VARITYPER	VART
VATRONIC LAB.	VL
VECTOR ELECTRONIC CO.	VEEL
VECTOR GRAPHIC, INC.	VEGR
VECTRIX CORPORATION	VEX
VEECO INSTRUMENTS, INC.	VEC
VEEKAY, LTD	VK
VEGA CORPORATION	VEGA
VELEMEX	VLMX
VEMCO	VEM
VENTRON INSTRUMENT CORP.	VEI
VERN-KIEBLER ASSOC., INC.	VKA
VERSA-THERM	VRT
VERSATEC	VER
VERTROD CORP.	VC
VG-ISOTOPES LTD.	VGIS
VIATRAN	VTR
VIDRO CERAMICS DIV.	VID
VICKERS DIV.	VD
VICON INDUSTRIES INC.	VII
VICTOR ANIMATOGRAPH CORP.	VOR
VICTOR COMP. CORP.	VCC
VICTOREEN INSTRUMENT CO.	VIT
VICTORY ENGINEERING CORP.	VE
VIDAR INST.	VID
VIDAR CORP.	VDR

MANUFACTURER	CODE
VIDEO APPLICATIONS, INC.	VIA
VIDEO INSTRUMENT CO.	VDI
VIEWLEX, INC.	VIW
VIEWPOINT	VEP
VINCENT, AW ASSOCIATES	AWV
VIRITIS CO.	VIR
VISHAY INTERTECHNOLOGY	VSYI
VISICORDER	VISI
VISIPAK, INC.	VPI
VISUAL TECHNOLOGY INC.	VIS
VOLAND & SONS	VOL
VOLUMETRICS	VLM
VOTAN	VOT
VU-DATA CORPORATION	VUDC
VWR SCIENTIFIC	SCT
W. C. DILLON CO.	DLN
W. M. WELCH CO.	WMW
W.T. SPECIALTY CO.	WTS
WANL,WM., CORPORATION	WWC
WALKER SCIENTIFIC, INC.	WSI
WALLACE & TIERMAN, INC.	WT
WALTON CO.	WAL
WANG LABORATORIES, INC.	WL
WANGCO, INC.	WAN
WANLESS ELECTRIC CO.	WANL
WASHINGTON UNIVERSITY	WU
WATANABLE, INC.	WTB
WATERMAN PRODUCTS CO.	WPC
WATERS ASSOCIATES	WAT
WATLOW COMPANY	WTLO
WAVEFORMS, INC.	WAV
WAVETEK	WA
WAYNE KERR	WK
WEATHER MEAS. CORP.	WM
WEATHERALERT	WEA
WEBBER GAUGE	WG
WEBSTER ELECTRIC CO.	WEC
WEKSLER INSTRUMENT CORP.	WI
WELCH CO., W. M.	WMW
WELSH SCIENTIFIC CORP.	WEL
WENKING ELEKTRONISCHER	WENK
WESCAN	WSCN
WESCOR	WESC
WEST INSTRUMENT DIV.	WIC
WESTERN APPARATUS CO.	WAC
WESTERN ELECTRIC CO.	WTC
WESTERN MARINE ELECTRONICS	WME
WESTERN UNION DATA SERVICES CO.	WUDA
WESTINGHOUSE ELECTRIC CORP.	WE
WESTON	WST
WESTON AND START	WAS
WESTRONICS, INC.	WES
WESTWOOD ASSOC. DATA COMM. EQUIPMENT	WADC
WHITBY	WB
WHITE-WESTINGHOUSE	WHWE
WILD HEERBRUGG MFG.	WH

MANUFACTURER	CODE
WILDLIFE MATERIALS INC.	WMI
WILKES INST.	WILK
WILKINS CO.	WKC
WILLIAM WAHL CORP.	WWC
WINFORD O. WHITE & SON	WOW
WINTEK CORP.	WINT
WISCO DIV.	WC
WM. AINSWORTH & SONS, INC.	AW
WOLLENSAK	WS
WONG LABORATORIES	WONG
WYSE TECHNOLOGY	WYSE
X-RITE CO.	XRIT
XEBEC SYSTEMS INC.	XBC
XENTEK, INC.	XEN
XEROX	XE
XTEX INC.	XTEX
Y-12	Y12
YALE	YALE
YAMAHA	YAMA
YAMATO SCIENTIFIC CO., LTD.	YSC
YELLOW SPRINGS INSTRUMENT CO.	YS
YOKOGAWA ELECTRIC WORKS	YEW
YSI	YSI
ZEHUER	ZEH
ZENITH CORP.	ZENC
ZENON	ZEN
ZERO-MAX CO.	ZM
ZETA CORP.-NICOLET	ZRI
ZETA METER INC.	ZETA
ZETA RESEARCH INC.	ZRI
ZETEC INC.	ZET
ZONIC MFG. CO.	ZNC
ZYMARK CORPORATION	ZYM

Appendix C. INSTRUMENT INVENTORY FILE POINTS

Shop 401 **B. P. Adkisson, Supervisor**

A4	Controllers & Recorders
A5	Strip Chart Recorders
A6	Controller Temperature
A7	Recorders
A8	Amplifiers
F5	M&C Instruments
F6	Pulse Generators
F7	Preamps
F8	(NIM)
F9	Power Supplies
L0	4500 Area Instruments

Shop 402 **A. J. Millet, Supervisor**

F1	Instruments SS Div. (Bldg. 3001)
F2	Instruments SS Div. & IE Div. (Bldg. 2000/18)
F3	Instruments ESD (Bldg. 1505/142)
J3	Multichannel Analyzers
J4	Liquid Scintillation Counters
J5	Instruments Modules/Misc.
T0	Calibration Standards
T1	Oscilloscopes
T2	Oscilloscopes Digital
T3	Oscilloscopes Special
T4	TM500/5000 Plug-ins
T5	Frequency Counters
T6	Generators/Synthesizers
T7	Meters
T8	Accessories
T9	Calibration Standards

Shop 403 **R. P. Rosenbaum, Supervisor**

K0	DEC Writers
K3	SEL 810B & PDP 15
K4	MOD-COMP Computer System
K5	Minicomputer Systems DEC, HP, DG, HW

Shop 404 **H. C. Ford, Supervisor**

E1	Audio Equipment
E2	Projection Equipment
E5	Teletype/Microfiche
V0	Security Systems
V1	Video Monitors

V2	Camera/Video
V3	Video Recorders/Players
V4	Modulators/Demodulators
V5	Test Equipment
V6	Radio Stations/Remotes
V7	Radio/Mobile Units
V8	Radio/Portable Units
V9	Pagers

Shop 405 R. H. Brown, Supervisor

G1	NIM Instruments
G2	Camac Instruments
G3	Power Supplies
G4	Vacuum Instruments
G5	Test Instruments
G6	Video/Audio Instruments
G7	R/F Instruments
G8	Oxygen/Radiation Instruments
G9	Miscellaneous Instruments

Shop 406 C. R. Cinnamon, Supervisor

N2	Fabrication
N4	PCB Fabrication
N6	Photo Metal Processing
P2	QA/Electrical Checkout

Shop 407 B. A. Tye, Supervisor

K1	RJE Stations
K2	Multiplexers/Plotters
K6	PC Computers
K7	HP Instruments
K9	Modems/Couplers

Shop 501 R. A. Vines, Supervisor

A0	Shop Standards and Test Equipment
A1	Instrument, ORNL, Y-12, and K-25
A2	Field Standards
B1	Leak Detectors
B2	Steam Plant (Building 2519)

Shop 502 B. L. Carpenter, Supervisor

E0	Stationary HP Instruments
E3	Operations, Effluent (Bldg. 3130)
E4	PRMs
E6	Portable HP (Bldg. 2007)

E7	Dept. of Environmental Management
E8	Laboratory Emergency (Bldg. 4512)

Shop 503 C. G. Allen, Supervisor

A3	Instruments (Bldg. 7600)
A9	Instruments (Bldg. 3019)
B3	Instruments (Bldg. 7920)
B5	Instruments (Bldg. 7930)
C0	Reactor Test Equipment (Bldgs. 3010, 7900,7710, 7702, 3042)
C1	Instruments (Bldg. 3042)
C2	Instruments (Bldg. 3010)
C3	Instruments (Bldg. 3010 Exp.)
C4	Instruments (Bldg. 3042 Exp.)
C5	Instruments (Bldg. 3010 NLTNIF)
C6	Instruments (Bldg. 7900)
C7	Instruments (Bldg. 7900 Exp.)
C8	Instruments (Bldg. 7710)
C9	Instruments (Bldg. 7902)
H1	Shop Standards (Bldg. 7606)
H2	MMD Engineering Service Jobs

D. G. Prater	Z0*	I&C Property Inventory
Job Control	S2	Salvaged Instruments

*Note that items in this file point are recorded for inventory purposes only and normally would not be subject to in-house maintenance.

APPENDIX D

ORNL DIVISION CODES

Code	Number	Division
AC	1	Analytical Chemistry
BI	2	Biology
CH	4	Chemistry
CT	3	Chemical Technology
CM	20	Central Management Offices
CTD	10	Computer and Telecommunications
DD	5	Directors
EN	15	Energy
EG	40	Engineering
EP	12	Engineering Physics & Mathematics
ET	16	Engineering Technology
EO	36	Environmental and Occupational Safety
ES	42	Environmental Sciences
FM	37	Finance and Materials
FE	19	Fusion Energy
FR	14	Fuel Recycle
HL	23	Health
HS	8	Health and Safety Research
HP*		Industrial Safety and Applied Health Physics
IN	7,31	Information
IC	9,34	Instrumentation and Controls
LP	26	Laboratory Protection
MC	11	Metals and Ceramics
OP	27,28,32	Operations
PER	29	Personnel
PH	13	Physics
PE	21	Plant and Equipment
PR*		Public Relations
QA	24	Department of Quality Assurance and Inspection
SS	18	Solid State
ZZ		Other
MA*		Mathematics

*Included for reference only

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