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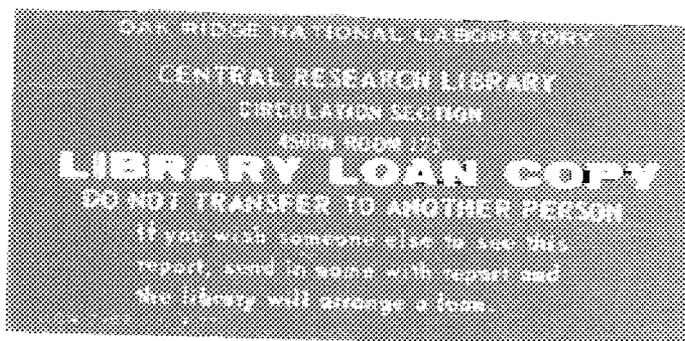
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ORNL/TM-10817

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

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

Instrumentation and Controls Division

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

User's Manual

B. P. Adkisson

Date Published: January 1990

Prepared by the
OAK RIDGE NATIONAL LABORATORY
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operated by
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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.

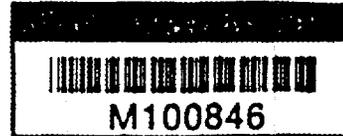


Fig. 2. Sample M number label.

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 0 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. M 1 0 0 9 6 7		Description C O M P U T E R							
Mfr Code I B M	Model No. 5 1 5 0 6 7 2 1				Classification Code C M B		F. P. K 6		
Purchase Order		Cost New 2 2 5 0	Year 8 6	Division I C	ST. Cat. 1 A				
Serial No. 8 1 2 X 9 4 3 2				Service Designation					
Maint. Document No. D-		ADP		OSR					
Range From	To	Units	CB Freq.	PM Freq.	Start Mo	Est. Hr.			
				6	1 0	1			
Bldg. 3 5 0 0	Room 4	Custodian S M I T H 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. M 1 0 0 9 6 7		Description C O M P U T E R							
Mfr Code I B M	Model No. 5 1 5 0 6 7 2 1				Classification Code C M B		F. P. K 6		
Purchase Order		Cost New 2 2 5 0	Year 8 6	Division I C	ST. Cat. 1 A				
Serial No. 8 1 2 X 9 4 3 2				Service Designation					
Maint. Document No. D-		ADP		OSR					
Range From	To	Units	CB Freq.	PM Freq.	Start Mo	Est. Hr.			
				6	1 0	1			
Bldg. 3 5 0 0	Room 4	Custodian S M I T H 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.

<u>Block Name</u>	<u>Field Length</u>	<u>Description</u>
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

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.

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.

<u>FIELD Name</u>	<u>FIELD Length</u>	<u>Description</u>
DATE: customer	10	Date request for service received from customer
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 performed
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).

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: Jones, R.			Bldg: 1000	Room: 101	Phone: 4-7411	SIC: 401	BL: B1	Work Order: G7674DAA	
Description: Computer				MFR:	Model:	OSR:	Document No.:		
Sch. Start: 7/2/87	Sch. Comp: 7/3/87	Est. Labor: 6	Act. Labor:	Service Desig:		Work Permit Required:		Other (Specify):	
Act. Start: 7/2/87	Act. Comp: 7/2/87	Est. Material:	Act. Material:	QA Instructions:		AC: 3	ID: X184600	HRS: 4	Material: \$
Request: Will not transmit									
Comment: Replaced SN7400N on main logic board tested									
Requester:						Badge No.:	HR:	Date:	ACTIVITY CODE:
						84162	4	7/3/87	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

KELLER, D.N.															015699 W					MAY 1987					PAT. MILKERSON D. R. MILLER, ADMIN. SUPPORT		704-4						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	W.D. NUMBER	CHARGE	
																																3070150000	VEACATION
																																3070160000	PERSONAL
																																3070170000	SICK LEAVE
																																3070180000	HOLIDAY
																																A4068D-BB	
																																A4068D-BB	
																																G6979D-AA	DEC CONTRACT
																																A4068D-BB	
																																G6979D-AA	DEC CONTRACT
																																A4068D-BB	
																																G6979D-AA	DEC CONTRACT
																																A4068D-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 RESPONSESUSER 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		ACD
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	MOTCR		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	LD_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	OPD
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		MSD
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		SDA
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

PAGE 1

MANUFACTURER	CODE	MANUFACTURER	CODE
A. H. EMERY COMPANY	AHEC	AMANA CORPORATION	AMA
AADCO, INC.	AAD	AMBER SCIENCE	AMSC
AARDVARK INSTRUMENT CO.	AARD	AMDEK CORPORATION	ANDK
ABR CORPORATION	ABR	AMERICAN HI-VOLTAGE TEST SYSTEMS	AHTS
ACCUTRONICS	ACCU	AMERICAN INSTRUMENT CO.	AI
ACDC ELECTRONICS	ACDC	AMERICAN MAGNETICS	ANG
ACME ELECTRIC	ACME	AMERICAN METAL RESEARCH, INC.	AMR
ACOPAN 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 TELEPHONE 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.	ADCO	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	AMADEX 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.	ADHY	ANALOGIC CORP.	ANC
ADVANCED TECHNOLOGY LABS.	ADYT	ANALYTICAL JACOBSON	AJ
ADVANCED TERMINALS, INC.	AT	ANARAD, INC.	ANAR
ADVENT CORP.	ADYC	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	ANMIN CO.	ANM
AGASTAT (ELASTIC STOP NUT CORP)	ESMC	ANTON ELECTRONIC LABORATORIES, INC.	ANEL
AILTECH	AILT	ANTON PAAR	ANP
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	APPLICOM INCORPORATED	APM
AIRCO-TEMESCAL	ATR	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.	AHEC	APPLIED PHYSICS	APP
ALLIS-CHALMERS CORP.	ACC	APPLIED RESEARCH LAB.	APL
ALMAC CRYOGENICS	ALC	APPLIED TEST SYSTEMS INC.	APTS
ALNDR INSTRUMENT CO.	AIC	APTEC NUCLEAR	APNU
ALOE-MARDA	ALN	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	BARATROM INSTRUMENTS, INC.	BII
ARTRONIX	ART	BARBER-COLMAN CO.	BC
ASAMI 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
ASTROCDM CORP.	ASCD	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
AUTOBATA CORPORATION	ATD	BELL, F. W., INC.	BELL
AUTOLOGIC, INC.	AUTL	BELLAMY, JAMES E./MEDCO PRODUCTS	JEB
AUTOMATIC INDUSTRIES, INC.	AUTO	BELCO INDUSTRIES	BEI
AUTOMATIC SWITCH CO.	ASC	BELLEVILLE-MEXEM CORP.	BEI
AUTOMATIC SYSTEMS LABORATORY	AUTS	BELLO FRAN CORPORATION	BFC
AUTOMATIC TIMING & CONTROLS CO.	AUTC	BENDIX CORP.	BX
AUTOMATION INDUSTRIES	ATM	BENTAN ASSOCIATES	BENT
AUTOMATION PRODUCTS CO.	AUP	BERGEN EXPO SYSTEMS, INC.	BES
AVA INSTRUMENT CO.	AVA	BERING INDUSTRIES, INC.	BERI
AVM INSTRUMENT CO.	AVM	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
AXIOM CORPORATION	AXI	BERTHOLD INSTRUMENT	BER
AYBIM 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.	BINC
BAIRD-ATOMIC, INC.	BA	BIO-ANALYTICAL SYSTEMS, INC.	BAS
BALDWIN ELECTRONICS, INC.	BAL	BIO-MARINE INDUSTRIES	BM
BALDWIN TATE-ENORY	BTE	BIO-RAD CO.	BRCO
BALL BROTHERS RESEARCH	BABR	BIOBLOCK SCIENTIFIC	BLS
BALLANTINE LABORATORIES, INC.	BLI	BIOGAS DETECTOR CORPORATION	BIDE
BALTEAU ELECTRIC	BAE	BIONATION	BIO
BALTIMORE BIOLOGICAL LABS.	BBL	BIOSPHERICAL INSTRUMENTS, INC.	BISP
BALZERS CORP.	BZC	BIOSYSTEMS INCORPORATED	BIDS

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.	MOGM
BNC PORTABIN	BKN	C. G. CONN, LTD.	CGC
BO SHERREL COMPANY	SRL	C. HALL	HALL
BODINE ELECTRIC CO.	BDE	C. J. KENNEDY CO.	KECO
BDFORS	BOF	C. W. RADIATION, INC.	CMR
BOGEN DIV.	BO	CAHM INSTRUMENT CO.	CHI
BOLT, BERANEK & NEWMAN	BBN	CALICO	CAL
BOONSHAFT & 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	CANAG	CANG
BRAD THOMPSON INDUSTRIES	BTI	CAMBRIDGE INSTRUMENT CO.	CA
BRAILSFORD CO.	BRA	CAMPBELL SCIENTIFIC, INC.	CASC
BRANSON INSTRUMENT CO.	BSI	CAMBERRA INDUSTRIES, INC.	CBI
BRANSONIC ULTRASONICS CORPORATION	BRSC	CANDELA CORP.	CAND
BRAUN HELSUNGERM	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
BRINKMAN 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	BWL	CASIO COMPUTER COMPANY	CAS
BROOKS INSTRUMENT DIV.	BRK	CATEL	CATL
BROTHERS, INC.	BROT	CEA INSTRUMENTS	CEAI
BROWN & SHARPE	BRB	CELESCO	CELC
BROWN BOVERA COMPUTUGUARD CORP.	BBOC	CELSCO	CECO
BROWNE CORPORATION	BROW	CENTIGRAM CORPORATION	CTGM
BROWNLEE LABS, INC.	BRLI	CENTORR ASSOC.	CEA
BRUCE INDUSTRIAL CONTROLS	BRUC	CENTRAL SCIENTIFIC CO.	CSC
BRUEL AND KJOER	BAK	CENTRONICS DATA COMPUTER CORP.	CEN
BRUNDIC	BDG	CENTURION INSTRUMENTS CORPORATION	CEIC
BRUNNING	BWG	CENTURY DATA	CEND
BRUNSON INSTRUMENT CO.	BMI	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	CHESSSELL CORP.	CHSL
BUNKER-RAND	BRO	CHRISLIN INDUSTRIES, INC	CRLI
BURGER ENTERPRISES INC.	BEI	CHRISTIE ELECTRIC CORP.	CHRI

MANUFACTURER	CODE	MANUFACTURER	CODE
CHROMATICS INC.	CHRM	CONH, 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
CINRON 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
CLAROSTAT	CLA	CONTINENTAL WATER SYSTEMS OF TENNESSEE	CNST
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
CLINET INSTRUMENTS CO.	CLIM	CONTROLTRON CORP.	CTT
COBER ELECTRONICS INC.	COBE	CONVERGENT TECHNOLOGY	CYT
COBRA INDUSTRIES	COB	COOKE VACUUM PRODUCTS, INC.	CV
COHERELL	COHL	COOKE, F. J.	FJC
COHERENT, INC.	COHE	CORBIN COMPANY	CORO
COHU ELECTRONICS, INC.	COH	CORNELL-DUBILIER ELECTRONICS	CD
COLE	COL	CORNING DIGITAL	CDI
COLE PALMER	CP	CORNING GLASS WORKS	CGW
COLEMAN INSTRUMENTS, INC.	CO	CORNING MEGA PURE	CMP
COLLINS RADIO	CR	CORONA WESCAM	CON
COLONIAL DATA SERVICES CORPORATION	CDSC	CORVUS NAME	CORV
COLORADO VIDEO, INC.	EVI	COSMICAR	COS
COLORGRAPHIC COMMUNICATIONS CORP.	CECO	COULTER ELECTRONICS	COEL
COLUMBIA DATA PRODUCTS	CDP	CPT CORP.	CPT
COLUMBIA ELEC.	CEL	CRAIG CORP.	CRG
COLUMBIA RESEARCH LAB. INC.	CRE	CREST	CRE
COLUMBIA SCIENTIFIC IND.	CSI	CROFT	CRT
COLUTRON CORP.	COCO	CROMENCO, INC.	CROM
COM DATA	COB	CROUF	CRF
COM-CENTER-CORPORATION	COCE	CRYOCAL, INC.	CRY
COMMERCIAL FILTERS DIV.	CMF	CRYOGENIC	CRYO
COMMODORE BUSINESS MCH., INC.	CBM	CSJ, INC.	CSJ
COMMONWEALTH SCIENTIFIC CORP.	COMS	CUBIC CORP.	CBC
COMMUNICATIONS CONTROLS CORP.	CONC	CULLIGAN WATER CONDITIONING	CULL
COMPAG	CBPQ	CUNNINGHAM CORP.	CUM
COMPREHENSIVE VIDEO	CPHY	CUNO ENGINEERING CO.	CE
COMPU CORP.	CDC	CURTIS MATHESON	CURT
COMPUSCAN, INC.	COI	CURTISS WRIGHT	CW
COMPU TEK, 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.	CBCC	CYCLE-DYNE	CYDI
COMPUTER DESIGN CORP.	COMP	D O INDUSTRIES INC. (KOWA)	DOI
COMPUTER DEVICES	COPD	D.S. DAVIDSON CO.	DSO
COMPUTER INTERFACE TECHNOLOGY	CIT	DA-LITE SCREEN CO.	DA
COMPUTER MEASUREMENTS CORP.	CMC	DADE	DADE
COMPUTER PRODUCTS INC.	CPI	DAGE-NTI, INC.	DAGE
COMPUTER, INC.	CPTI	DAHL, G. W. COMPANY, INC.	DAL
COMSONICS INC.	COMI	DANDON/IEC DIVISION	DANI

MANUFACTURER	CODE	MANUFACTURER	CODE
DANA LABORATORIES INC.	DAM	DERRITROM	DER
DANFYSIH	DFY	DETECTOLAB	DET
DANYL CORPORATION	DYL	DETECTROM SECURITY SYSTEMS	DSS
DARCEY	DC	DIABLO SYSTEMS, INC.	DIA
DASIBI ENVIRONMENTAL CORP.	DEM	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	DIGILIM	DIG
DATA PRECISION	DAP	DIGINETRIC (SYBROM CORP.)	DIM
DATA PRINTER CORP.	BPC	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
DATANETRICS, INC.	DM	DIONEX CORP.	DXC
DATAMEST CORPORATION	DWC	DIRECT, INC.	DII
DATEL	DAT	DIRIGO	DIR
DATOS	DATO	DISC INSTRUMENTS, INC.	DSI
DATUM INC.	DATM	DOCUMENTATION, INC.	DOC
DAVEN	DY	DOHRMAN INSTR. CO.	DIC
DAVIDSON PRESS	DAY	DONALDSON CO.	DON
DAVIDSON, D. S., CO.	DSD	DORIC SCIENTIFIC DIV.	DO
DAVIS INSTRUMENTS	DI	DRAGER-DRAGERWERK (WEST GERMANY)	DDW
DAYSTROM, INC.	DAYS	DRANETZ ENGINEERING LABS. INC.	DRZ
DAYTON ELECTRONIC PRODUCTS CO.	DAYE	DRESSEN-BARNES CORP.	DDC
DAYTRONIC	DAY	DRESSER INDUSTRIAL VALVE & INSTR. CO.	DSR
DE VILBISS CO.	DEY	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.	DUNM
DELATRON INC.	DT	DUNWELL	DU
DELAVAN	DELA	DUPONT INSTRUMENT PRODUCTS DIV.	DIP
DELCO, DIVISION OF GENERAL MOTORS	DELCO	DURRANT CORP.	DURR
DELPHI	DEL	DWYER INSTRUMENTS, INC.	DYR
DELTA DATA SYSTEMS CORP.	DDS	DYNEC DIV.	DY
DELTA DESIGN	BED	BYNAIR ELECTRONICS, INC.	DYM
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
BYMATUP COMPANY	DYTP	ELECTRONIC INDUSTRIES ASSOCIATION	EIA
DYNISCO	DYMO	ELECTRONIC MEASUREMENTS	ELM
E-H RESEARCH LABORATORIES, INC.	EH	ELECTRONIC MISSILES	ELMI
E. F. JOHNSON CO.	JM	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
EAMCO INCOM INTERNATIONAL	EAM	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
ECD INSTRUMENTS(DIV OF SEA DATA CORP.)	ECD	ELEKTRONIK SERVICE WOGGERATH	ESM
ECOLOGIC INSTRUMENT CORP.	ECDI	ELEXOM	ELX
EDAX (NUCLEAR DIODES INC.)	WD	ELGAR	ELGR
EBCOR	EBCO	ELGEET	ECT
EDGERTON-GERMESHUSEN & GRIER, INC.	EGG	ELGIN ELECTRONICS, INC.	EL
EDISON CONTROLS, INC.	ECI	ELLISON DRAFT GAUGE	EDG
EDD WESTERN CORP.	EBO	ELMA ENGINEERING CO.	ELMA
EDWARDS HIGH VACUUM, LTD.	ENV	ELMO	ELMO
EFFECTS TECHNOLOGY INC.	ETEC	ELDGRAPHICS	ELG
EG&E, INC.	EGG	ELOX CORP.	EC
EG&E-ORTEC	OT	ELRON/ELSCINT, LTD.	ELR
ENRENEICH PHOTO-OPTICAL IND., INC.	EPO	EMERSON TV & RADIO	EM
EIKI INTERNATIONAL, INC.	EIKI	EMERY, A. H., COMPANY	AMEC
EIL INSTRUMENTS, INC.	EIL	EMI TECHNOLOGY, INC.	EMIT
EIP MICROWAVE, INC.	EIP	EMILE MAEFLY CO. LTD.	EMH
EKCO ELECTRONICS, LTD.	EKCO	EMPIRE	EMP
EL TIME	ETI	EMULEX CORPORATION	EMU
EL-TRONICS, INC..	ELTI	ENULOGIC MICROPROCESSOR DEVELOPMENT SYSTEMS	ENL
ELASCO, INC.	ELAS	ENDEVCO CORP.	END
ELASTIC STOP NUT CORP. (AGASTAT)	ESNC	ENBLESS & MAUSER	ENBH
ELCOR	ELC	ENERGETICS SCIENCE, INC.	ENS
ELDEX LABORATORIES	ELDL	ENGINEERED TECHNICAL PRODUCTS	ETP
ELDORADO ELECTRONICS	ELDE	ENGIS	ENG
ELECTRA CO.-BEARCAT	ELEC	ENRAF NOMIUS 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.	ENI	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.	EY	ESPEY MFG. & ELECTRONICS CO.	ESPY
ELECTRODATA CORP.	ELD	ESTERLINE-ANGUS DIV.	EA
ELECTROHOME, LTD.	ELH	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-D/RENEK CORP.	REN
ELECTRONIC DESIGN LAB	EDL	EXACT ELECTRONICS	EXE
ELECTRONIC DEVELOPMENT CORP.	ED	EXTech INTERNATIONAL CORP.	EXT

MANUFACTURER	CODE	MANUFACTURER	CODE
EXTRA-NUCLEAR LAB., INC.	EXM	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	GELDER 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
FAMM INSTRUMENT CORPORATION	FAMM	GENWARE PRECISION INSTR.	GPI
FANNOH	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	GEMI
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
FLEXICOM 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
FORNA SCIENTIFIC - DIV. OF MALLINKRODT	FORM	GEORGIA TECHNOLOGICAL UNIVERSITY	GTU
FOROX CORP.	FDC	GEOSCIENCE INSTR. CORP.	GIC
FOXBORO CO.	FOX	GERBER	GRBR
FRANKLIN ELECTRONICS, INC.	FRK	GERTSCH	GER
FRAZIER, INC.	FRA	GERTNER INST.	GH
FREDERIC ELECTRONICS CORP.	FRED	GIANMINI 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.	GLS
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	GOV-MAC INSTRUMENT CO.	GM
G. W. DAHL COMPANY, INC.	DAL	GRAMVILLE-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/NOVAR	GT	HEVI-DUTY ELECTRIC CO.	HDE
GUARDIAN ELECTRIC MFG. CO.	GEM	HEWLETT-PACKARD CO. (DATADEC)	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	HIY
GYR PRODUCTS	GYR	HIPOTRONICS INC.	HIP
H. O. TRERICE CO.	TER	HITACHI	HT
H. TINSLEY CO.	TIN	HITEC, CORPORATION	HIT
HAAKE INSTRUMENTS, INC.	HKI	HNU SYSTEMS, INC.	HNU
HAARE	HAAR	HODART BROTHERS	HOB
HACH CHEMICAL CO.	HAH	HOEFFER SCIENTIFIC INSTRUMENTS	HOEF
HACH COMPANY	HACH	HOLMAN CORP.	HOL
HACKER INSTR.	HAC	HONEYWELL, INC.	NH
HADRON	HAD	HORIZA, LTD.	HOLT
HAEFLY	HAEF	HORIZON	HOR
HAGAN CHEMICAL CORP.	HCC	HOSKINS MFG. CO.	HOS
HALIBURTON	HAN	HOTPACK CORP.	HPC
HALL, C.	HALL	HOUSTON INSTRUMENTS INC.	HSI
HALLIAKEN CO.	HAI	HOWELL INSTRUMENTS, INC.	HIC
HALNAR ELECTRONICS INC.	HAI	HRB-SINGER	HRS
HANAMATSU SYSTEMS, INC.	HANS	HUBER (GERMANY)	HUB
HANBURG	HAN	HUGGINS LAB.	HGL
HAMILTON MICRO LAB.	HNL	HUGHES	HUG
HAMILTON STD.	HNS	HUMAN DESIGNED SYSTEMS, INC.	HDS
HANMARLUND MFG. CO. INC.	HLN	HUMPHREY INSTRUMENT CO., INC.	HUP
HAMMEL DAHL DIV.	HD	HUNTER MANUFACTURING COMPANY	HUNT
HANNER ELECTRONICS	HNE	HUNTRON INSTRUMENTS INC.	HII
HANPSHIRE CONTROLS	HC	HUPPERT, K. H., CO.	KHP
HARNAN-KARDON, INC.	HAKA	HURST MFG. CORP.	HMC
HARRIS CORPORATION	HACO	HY-CAL ENGINEERING/LEEDS & NORTHRUP	HYCL
HARRISON LABORATORIES	HL	HYBRID SYSTEMS CORP.	HYBS
HARRDP LABS.	HARL	HYDRO-PRODUCTS CO.	HYPR
HARSHAN CHEMICAL CO.	HAR	HYDROLAB CORPORATION	HYDR
HARTLEY MEASUREMENTS LTD.	HARM	HYGROMETRIX	HYGX
HARVARD APPARATUS	HARV	HYPERION INDUSTRIES CORP.	HYP
HARVEY WELLS CORP.	HVC	I/O DEVICES	IOD
HARWOOD	HARW	ICON	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	INPC
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	INFICOM	INFN
HELPER INSTRUMENT COMPANY	HELP	INFOREX INC. (DATA INTERFACE)	INF
HERNES ELECTRONICS CO.	HEC	INFORMATION DESIGN, INC.	IDI

MANUFACTURER	CODE	MANUFACTURER	CODE
INFORMER COMPUTER TERMINALS	ICT	IRCOM INC.	IRCH
INFOTRON INC.	INFO	IREC	IRE
INFOTRONICS CORP.	IC	ISCO COMPANY	ISCO
INMET	IMM	ITC IKEGAMI	ITCI
INO-TECH, INC.	INO	ITEK CORP.	IT
INSTITUTE OF APPLIED PHYSICS	IAP	ITHACO INC.	ITH
INSTROLEC	IMLC	ITOH, C., ELECTRONICS, INC.	ITOH
INSTROM, INC.	INS	IVAC CORP.	IVAC
INSTRU LAB, INC.	IL	IYAM SORYALL, 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. DIDDLE CO.	DD
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 (BERGISCHE-GLADDSACHBENSURG WEST GERMANY)	IMAT	JENWAY LIMITED	JMWA
INTERDATA (PERKIM-ELMER)	PE	JEOL	JEOL
INTERFACE MECHANISMS, INC.	IMI	JEROME INSTRUMENT CORPORATION	JIC
INTERNET	IM	JERROLD ELECTRONICS CORP.	JERR
INTERNATIONAL BIOPHYSICS CORP.	IBC	JOBIN YVON	JOBY
INTERNATIONAL BUSINESS MACHINES INC.	IDM	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.	JM
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 ROBOTATION/INTELLIGENCE	IROB	JOYCE, LOEDL & CO.	JLC
INTERNATIONAL SCIENCE	IWSC	JUKI	JUKI
INTERNATIONAL SCIENTIFIC INSTRUMENT, INC.	ISI	JWC CORPORATION	JWC
INTERNATIONAL TELEPHONE & TELEGRAPH	ITT	K-V ASSOCIATES INC.	KVA
INTERSCAM	ITS	K. H. HUPPERT CO.	KHP
INTERSTATE ELECTRONICS	INST	KALART VICTOR CORP.	KRT
INTERTECHNIQUE	INTE	KALDFELL LAB. INC.	KALB
INTERTRAM	ITM	KANAM CORP./KANAMICS CORP.	KAM
INTRA-ACTION CORP.	IAC	KAY ELECTRONIC CO.	KAEL
INVERTROM	INV	KAYE INSTRUMENTS INC.	KAYE
IOMEGA CORPORATION	IOM	KECK GEOPHYSICAL INSTRUMENTS, INC.	KGII
ION EQUIPMENT CORP.	IOM	KEITHLEY INSTRUMENTS, INC.	KI
ION TECH	IOT	KELLER, G. W., 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	LAWRENCE LIVERMORE LAB.	LLL
KERNS GROUP	KG	LAWRENCE RADIATION LAB.	LRL
KERVONICS	KER	LAWSOM RUSH	LR
KEVEX	KEY	LAZAR RESEARCH LABS., INC.	LAZ
KEYTRONIZE	KTM	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.	KILD	LEDEX, INC.	LD
KINETIC SYSTEMS	KS	LEEDS & NORTHRUP CO.	LW
KING CONCEPT CORP.	KCC	LEIBEL FLARSHEIM CO., THE	LFC
KINMERTICS	KIMM	LEITZ	LEZ
KINTEL	KTL	LEKTRA LABORATORIES, INC.	LLI
KIRKHOFF DIV. FLX CORP.	KDC	LEKTRA LABS	LEL
KISTLER SUNDRAND 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
KBERING PEGASUS DIVISION	KPD	LI-COR	LICO
KONTES GLASS CO.	KON	LINBURG	LIN
KORAD	KORA	LINDBERG	LID
KRATOS-DISPLAY DIV.	KRAT	LINDBERG NEVI-DUTY	LND
KRAUTKRAMER-BRANSON INC.	KK	LINDE	LIND
KREBITE INC.	KREO	LINE ELECTRIC CO.- DIVISION OF ESTERLINE	LINE
KRDHW-NITE CORP.	KH	LINEAR INSTRS. CO.	LIC
KROMOS	KRO	LING ELECTRONICS INC.	LING
KULICKE & SOFFA MFG.	KSM	LINK COMMUNICATIONS, INC.	LINK
KURZ INSTRUMENTS INC.	KURZ	LINSEIS, INC.	LINS
KYBE CORP.	KY	LIONEL ELECTRONICS	LION
L & R MANUFACTURING COMPANY	LRM	LISTON-BECKER INSTRUMENT CO.	LB
L D J ELECTRONICS	LBJ	LITHE TECH. INTERNATIONAL	LT
L F E PROCESS CONTROL DIV.	LFEP	LITTLE GIANT PUMP CO.	LG
L-M PHOTO INC.	LWP	LITTLE, ARTHUR B., INC.	LITL
LAB-LINE INSTRUMENTS	LADI	LIVERMORE DATA SYSTEMS, INC.	LDS
LABAC	LADA	LKB INSTRUMENTS, INC.	LKB
LABELLE INDUSTRIES, INC.	LAD	LNC MEGA MICRO	LNC
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.	LBI
LAMBDA ELECTRONICS CORP.	LE	LORILLARD TOBACCO CO., P.	PLT
LAMDA PHYSIK	LAPH	LOS ALAMOS SCIENTIFIC LAB.	LASL
LAMB-AIR INC.	LAI	LOVE CONTROLS CORP.	LCC
LANDSVERK ELECTROMETER CO.	LAVV	LOURANCE	LW
LANGLEY-FORD INSTRUMENTS CO.	LFI	LOYOLA INDUSTRIES	LI
LAWIER BUSINESS PRODUCTS	LBP	LUDLUM MEASUREMENTS, INC.	LL
LANSING	LAW	LUNAC SYSTEMS	LUNC
LAPINE	LAP	LUNOMICS RESEARCH LTD.	LUN
LASER PRECISION CORP.	LPC	M&R ENTERPRISES	MRE
LASER SCIENCE, INC.	LSI	M-T ELECTRONICS CO.	MTE
LASER TECH., INC.	LTI	M&C VICTOR MANUFACTURING COMPANY	M&C
LATRONICS CORP.	LAT	M&CBETH-DIV. OF KOLLMOERGEN CORP.	M&C

MANUFACTURER	CODE	MANUFACTURER	CODE
MAGDON, INC.	MA	MELETRON CORP.	MEL
MAGITRON	MG	MELOY LABORATORIES, INC.	MLI
MAGNAFLUX CORP.	MFC	MEMODYNE	MEDY
MAGNAVOX	MX	MEMOREX CORP.	MRX
MAGNECORD	MC	MENSOR CORP.	MENS
MAGNETICS, INC.	MM	MERCOLD CORP.	MCD
MAGNETROL, INC.	MAG	MERTAM INSTRUMENT CO.	MIC
MALIBU DESIGN GROUP	MALI	METALS RESEARCH CORP.	MRC
MALLINKRODT	MALL	METROLOGY RESEARCH, INC.	MRI
MALDRY	MAL	METERSONICS, INC.	MESI
MANNESMANN TALLY	MATA	METRA INSTRUMENTS, INC.	METI
MANNING ENVIRONMENTAL CORP.	MAEN	METROMM	MET
MANNING TECHNOLOGIES, INC.	MAHT	METROLOGIC	MTRL
MANNING, MAXWELL & MOORE (ASHCROFT)	MMM	METROTEX INC.	MEK
MANOSTAT CORP.	MAN	METTLER INSTR. CORP.	MEIC
MANSFIELD-GREEN, INC. (AMETEK)	MF	MEYERS & KNAPP	MKP
MANUFACTURERS ENGR. & EQUIPMENT CO. (MEECO)	ME	MFE CORP.	MFE
MARCO	MARC	NICON CORPORATION	NICO
MAREL INSTRUMENT COMPANY	MAIN	NICRO CHEMICAL SPEC. CORP.	NCS
MARION INSTR. CO.	MATC	NICRO INSTRUMENT CO.	NICC
MARKSON INSTR.	MAR	NICRO METRIC CORP.	NIM
MARLIN	MARL	NICRO MOTION, INC.	NMO
MARQUETTE ELECTRIC CO.	MEC	NICRO NOW INST. CO.	NMI
MARSH-MCBIRNEY, INC.	MHI	NICRO PERIPHERALS, INC.	NPI
MARSHALL	MAH	NICRO-PURE SYSTEMS INC.	NPS
MARTEK INSTRUMENT INC.	MART	NICRO-TERN, INC.	NCT
MARTIN BECKER	MARD	NICROCARD CORP.	NDC
MASER OPTICS	MAS	NICROCON	NICC
MASON-MEILAN, INC.	MSH	NICRODESIGN INC.	NIDE
MASSACHUSETTS COMPUTER CORPORATION	MCC	NICRODYNE CORP.	NID
MAST DEVELOPMENT CO.	MD	NICROFORM PRODUCTS	NIPR
MASTER-FLEX	MASF	NICROMAS, V.G.	NICR
MATEC INC.	MATE	NICROMECH	NICN
MATERIAL ANALYSIS CO.	MTAC	NICROMECH	NM
MATERIALS RESEARCH CORP.	MAT	NICROTEK ELECTRONICS, INC.	NT
MATERIALS TESTING SYSTEMS	MTS	NICROWAVE POWER DEVICES, INC.	NPB
MATHESON CHEMICALS	MAC	NID-EASTERN INDUSTRIES, INC.	NEI
MATHIS CO., R. D.	MDH	NIDWEST INSTRUMENTS	NIDW
MATRIX, INC.	MATI	NIKRO PHIL CORPORATION	NIPC
MATSUSHITA	MS	NIKRON INSTRUMENT CO.	NIK
MATTHEY BISHOP, INC.	MAB	HILLEN MFG. CO., JAMES	NLN
MB MFG. CO.	MB	MILLENIUM SYSTEMS, INC.	MSI
MCINTOSH	MCI	MILLER CO.	MILL
MCKENNA LABS	MK	MILLETROM, INC.	MTI
MCL, INC.	MCL	MILLIPORE CO.	MIL
MCHEMISTRIES INDUSTRIES INC.	MCH	MILLIYAC INSTRUMENTS	MII
MCPHERSON	MCP	MILTON ROY CO.	MR
MDA SCIENTIFIC	MDAS	MIMARIK, INC.	MIMI
MDB SYSTEMS, INC.	MDB	MINCO PRODUCTS INC.	MNCO
MEASUREMENT SYSTEMS	MESY	MINE SAFETY APPLIANCES CO.	MSA
MEASUREMENTS CORP.	MEA	MIMITEK COMPUTER DEVICES, INC.	MITC
MECHANICAL TECHNOLOGY, INC.	METE	MIMNEAPOLIS-HONEYWELL	MH
MECHTRONICS NUCLEAR	MEH	MIMNESOTA MINING & MFG. CO.	MIM
MEGASON	MEGA	MIMOLTA	MIMO
MEHLER INSTRUMENTS	MEHI	MIMTEDORO-WHITNEY CORP.	MWC
MEKEL ASSOCIATES	MKL	MIRAM INSTRUMENT COMPANY	MIRC

MANUFACTURER	CODE	MANUFACTURER	CODE
NKS BARATRON	NKS	NEWPORT LABORATORIES, INC.	NLI
NKS INSTRUMENTS, INC.	NKSI	NEWPORT RESEARCH CORP.	NEW
NKBCOMP CORP.	MOD	NICOLET INST. CORP.	NIC
MODICON	MDM	NICOLET-ZETA CORP.	ZRI
MODULAR COMPUTER CORP.	MOD	NIENHOFF	NIE
MOELLER INST. CO.	MOE	NIKON	NIK
MOHAWK DATA SCIENCES, CORP.	MOH	NINE ASSOCIATES	NINE
MOLECTRON, INC.	MOL	NIPPON ELECTRIC CORP.	NEC
MOLECULAR DESIGN LTD., INC.	MODE	NJE CORP.	NJE
MOLSGAARD MEDICAL	MOLS	NOISE ABATEMENT SOCIETY	NAS
MOLYTEX, 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.	MONM	NORTEC	NORT
MOORE INDUSTRIES, INCORPORATED	MOII	NORTH AMERICAN PHILIPS	NAP
MOORE PRODUCTS CO.	MPC	NORTH EAST SCIENTIFIC CORP.	NES
MOREHOUSE MACHINE CO.	MHC	NORTH HILLS CO.	NHC
MOSLER ELECTRONICS SYSTEMS	MES	NORTHEASTERN ENGINEERING, INC.	NE
MOSLEY (HEWLETT-PACKARD)	MP	NORTHERN SCIENTIFIC, INC. (TRACOR)	TRA
MOSSBAUER SPECTROMETER COMPANY	MOSS	NORTHERN TELECOM, INC.	NOTE
MOTION DYNAMICS RESEARCH	MDR	NORTHSTAR ADVANTAGE	NOAD
MOTOMATIC	MDM	NORTON CO. (NATIONAL RESEARCH CORP.)	NOR
MOTOROLA, INC.	MDT	NORWOOD CONTROLS	NC
MOXON INC.	NOX	NOVATION	NOV
MPH CORP.	MPH	NUCLEAR AREAS	NA
MUELLER X-RAY	MU	NUCLEAR ASSOC. MFG.	NAM
MURHEAD & CO., LTD.	MHC	NUCLEAR CORP.	NUC
MYROM L. CO.	MLC	NUCLEAR DATA, INC.	ND
NANOSECOND SYSTEMS	NAM	NUCLEAR BIOSIS, INC. (EDAX)	NTB
MARCO 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.	NUCN
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	NZY (SIEMENS & HALSKE)	NZY
NEC SPINWRITER CORP.	NEC	O. I. CORPORATION	DIC
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	OHANUS 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	MANUFACTURER	CODE
OKI ELECTRIC INDUSTRIES CO., LTD.	OKIE	PERTEC	PRP
OKIDATA	OKID	PESCHEL ELECTRONICS	PES
OLIVETTI UNDERWOOD CORP.	OV	PETROLIGHT	PET
OMCROM CORP. OF AMERICA	OCA	PFAUDLER	PFA
OMEGA ENGINEERING, INC.	OEI	PFEIFFER-BALZERS CORPORATION	PBC
OMNICHROME	OMC	PHARMACIA CHEMICALS	PHA
OMNITEC	OM	PHASED RADIATION	PR
OMYX, INC.	OMYX	PHASER CORP.	PHC
OPAD ELECTRIC COMPANY	DEC	PHILADELPHIA SCIENTIFIC CONTROLS	PS
OPAMP LABS	OPAL	PHILBRIC	PH
OPTICAL RADIATION CORP.	ORC	PHILCO-FORD CORP.	PFC
OPTIMAL TECHNOLOGY, INC.	OTI	PHILIPS', N. V. GLOEILAMPENFABRIEKEN	PHG
OPTIMATION, INC.	OP	PHILLIP MORRIS TOBACCO CO.	PMT
OPTO ELECTRONICS, LTD.	OPTO	PHILLIPS ELECTRONIC INSTRUMENTS, INC.	PHE
OPTRONICS INTERNATIONAL, INC.	OII	PHILLIPS SCIENTIFIC, INC.	PPS
ORBISPHERE LABORATORIES	ORB	PHILLIPS TEST & MEASUREMENT INC.	PTMI
OREC INC.	DREC	PHILLIPS VACUUM	PHV
OREGON ELECTRONIC MFG. CO.	OE	PHOENIX PRECISION INSTRUMENT CO.	PX
ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES	OPEC	PHOTO RESEARCH	PHR
ORIEL	ORL	PHOTOCHEMICAL RESEARCH ASSOCIATES	PCRA
ORION CORP.	ORI	PHOTOCIRCUITS CORP.	PC
ORRTRONIC, INC.	ORT	PHOTOUAC	PHOT
ORTEC, INC.	OT	PHOTOVOLT CORP.	PV
OSBORNE CORPORATION	OSB	PHYSICAL DATA INC.	PHDA
OVERHOFF ASSOC.	OA	PHYSICAL ELECTRONIC INDUSTRIES	PEI
OXFORD INSTRUMENTS	OX	PHYSICAL ELECTRONIC INDUSTRIES, INC.	PEII
OZONE RESEARCH AND EQUIPMENT CORPORATION	OZR	PHYSICAL METALLURGY	PHM
P B S K ASSOCIATES	PBSK	PHYSICAL SCIENCE CORP.	PHSC
P. LORILLARD TOBACCO CO.	PLT	PHYSICOM CORP.	PSCC
PACE ENGINEERING CO.	PEC	PHYSICS INTERNATIONAL	PHI
PACE INSTRUMENTS. CO. (ELECTRONIC ASSOCIATES INC.)	EAI	PHYSNET	PHYS
PACE, INC.	PACE	PICKER CORP.	PK
PACIFIC ELECTRIC MOTOR	PEN	PICO SECOND INT.	PICO
PACIFIC MEASUREMENTS, INC.	PM	PIONEER ELECTRIC & RESEARCH CORP.	PIOM
PACIFIC PRECISION INSTRUMENTS	PPI	PLASMA THERM	PLTH
PACKARD INSTRUMENT CO.	PAC	PLESSEY MEMORIES, INC.	PLN
PACKER, B. L.	BLP	PLESSEY MICROSYSTEMS	PLN
PADDURG, CARL-CEPA	PADB	PLESSEY PERIPHERAL SYSTEMS	PLM
PAKO CO.	PAK	PLUG-IN INSTRUMENTS	PII
PALNER INSTRUMENTS, INC.	PALM	POLAROID	POL
PANALARM	PAL	POLARON INSTRUMENT, INC.	PRON
PANAMETRICS, INC.	PAM	POLLUTION CONTROL INDUSTRIES	PCI
PANASONIC	PAN	POLYSCIENCE CORP.	PO
PANORAMIC RADIO PRODUCTS, INC.	PRPI	POLYSONICS	PSOM
PARAGON	PARA	POPE INSTRUMENTS	POPE
PARKER ENGINEERING	PKE	POTTER AERONAUTICAL CORP.	PA
PARKER HANNAFORD	PARK	POTTER INSTRUMENT CO., INC.	POTT
PARR INSTS.	PARR	POTTER-BRUNFIELD CO.	PB
PARTLOW INSTRUMENTS	PART	POWER DESIGNS, INC.	PD
PELCO SALES INC.	PELC	POWER EQUIPMENT CO.	POW
PENRIL CORP.	PEN	POWER INSTRUMENTS, INC.	PI
PENTAX MANUFACTURER	PMTX	POWER MATE CORP.	PHC
PENWALT (S.S. WHITE)	SSW	POWERTEC	PT
PERIPHERAL EQUIPMENT CORP.	PRP	POWERSISION, INC.	POVI
PERIPHERAL INTERFACE CORP.	PIC	PPH, INC.	PPH
PERKIN-ELMER (INTERDATA)	PE	PRECISE SENSORS	PRCS

MANUFACTURER	CODE	MANUFACTURER	CODE
PRECISION DIGITAL	PRD	RAMSEY ENGINEERING CO.	REN
PRECISION INST.	PRI	RANTEK	RANT
PRECISION PRODUCTS AND CONTROLS, INC.	PP	RANK BROTHERS - ENGLAND	RBE
PRECISION SCIENTIFIC CO.	PSC	RASOR & TINKER	TKRA
PREIFFER	PREI	RAULAND CORP.	RAU
PREISER SCIENTIFIC INC.	PRSC	RAYNER (CELTIC TRUTOME)	RNR
PRESTON	PST	RAYTEC	RAY
PREVOST	PRV	RAYTHEON CO.	RT
PRIAM CORPORATION	PRC	RDF CO.	RDF
PRINCETON APPLIED RESEARCH CORP.	PAR	REACTOR CONTROLS, INC.	RC
PRINCETON ELEC. PRODUCTS	PEP	REACTOR EXPERIMENTS, INC.	RE
PRINCETON GAMMA TECH.	PET	REALIST VANGUARD	RV
PRINCETON GRAPHICS SYSTEMS	PGS	REALTIME SYSTEMS, INC.-AFFILIATE OF LEVI	REAL
PRINCETON SCIENTIFIC INSTRS.	PSI	RED LION CONTROLS	RLC
PRINTEK CORPORATION	PTKC	RED-NUM INSTRUMENT CORPORATION	RED
PRINTER TECHNOLOGY, INC.	PTI	REES INSTRUMENTS	REES
PRINTRONIX INC.	PRIN	REGATRAM	REG
PRIORITY ONE ELECTRONICS	POE	REGENT	RGNT
PRL ELECTRONICS	PRL	RELIABLE MEASUREMENT	RELM
PRO LOG CORP.	PLC	RENEX/EX-CELL-O CORP	REN
PROCESS & INSTRUMENTS, INC.	PRII	REPUBLIC FLOWMETER CO.	RF
PRODUCTS FOR RESEARCH	PRR	RESEARCH ASSISTANTS INC.	REA
PROJECTION OPTICS CO.	PRJ	RESEARCH SPECIALITIES	RESP
PROMETHEUS PRODUCTS, INC.	PROM	RESEARCH, INC.	RI
PULCIR INC.	PULC	REUTER-STOKES	RS
PYE UNICAM	PYE	RF COMMUNICATIONS	RCM
PYROMETER INSTR. CO.	PY	RFL INDUSTRIES	RFL
PYROMETER SERVICE CO.	PYS	RHEEN ELECTRIC	RHE
QUADRAM	QBRM	RHK TECHNOLOGY, INC.	RHK
QUANTA-RAY, INC.	QRI	RHOBE & SCHWARZ SALES CO.	RSS
QUANTACHROME CORP.	QUAN	RI RESEARCH, INC.	RIR
QUANTEL INTERNATIONAL	QUAI	RIGAKU-USA INC.	RIG
QUANTEX CORPORATION	QTX	RIL ELECTRONICS	RIL
QUEST ELECTRONICS	QSTE	RILEY	RILY
QUINTON INST.	QI	RIXON	RIX
QUME CORP.	QUME	ROBERTSHAW-FULTON CONTROLS	RFC
R. C. SANDERS TECHNOLOGY SYSTEMS, INC.	SAND	ROBINAIR MFG. CO.	RNC
R. D. MATHIS CO.	RDM	ROBINSON-WALPERM CO.	RH
R. G. KELLER	RGK	ROBOTICS, INC.	ROBO
RACAL RECORDER, INC.	RRI	ROCHESTER INSTRUMENT SYSTEMS, INC.	RIS
RACAL-VADIC	VAD	ROCKLAND	RO
RADAR ENGINEERS	RADE	ROCKWELL MFG. CO.	RH
RADIATION COUNTER LAB.	RCL	ROFIN LTD, ENGLAND	ROF
RADIATION INSTRUMENT DEV. LAB.	RID	ROLAR PHOTOGRAPHY	RP
RADIATION POWER SYSTEMS, INC.	RPS	ROMAN	ROM
RADIATION TECHNOLOGY, INC.	RATE	ROMAN ENGINEERING CO.	RON
RADIATION, C. W., INC.	CWR	ROSEMOUNT ENGINEERING CO.	REC
RADIO CORP. OF AMERICA	RCA	ROSIE	ROS
RADIO FREQUENCY LAB.	RAD	ROTEK	ROT
RADIO MFG. ENGINEERS INC.	RME	ROTESCO, LTD.	ROTL
RADIO SHACK (TANDY CORP.)	TAND	ROYAL TYPEWRITER	CPT
RADIOACTIVE PRODUCTS, INC.	RADP	ROYCO INSTRUMENTS, INC.	RII
RADIOMATIC	RADM	RUBICOM	RUB
RADIOMETER COPENHAGEN	RADC	RUSKA	RUSK
RAMAPO INSTRUMENT COMPANY	RAMI	RUSTRAK INSTRUMENT CO.	RUS
RAMMAN	RAM	RUTHERFORD ELECTRONICS CO.	RFE

MANUFACTURER	CODE	MANUFACTURER	CODE
S H E MFG. CORP.	SHEM	SHEFFIELD CORP.	SHE
S. S. WHITE CO. (PENWALT)	SSW	SHERWOOD ELECTRONIC LABS, INC.	SWD
SABER	SAB	SHIDA ELECTRIC CO.	SHI
SAGE INSTRUMENTS, INC.	SAGE	SHIMADZU SEISAKUSHO LTD.	SHC
SAI TECHNOLOGY CO.	SAI	SHUGART ASSOCIATES	SCHG
SALIENT ELECTRONICS, INC.	SE	SHURE	SH
SALVAGED	ZSAL	SIEGLER CORPORATION	SIS
SANBORN	SANB	SIEMENS	SIE
SANDA, INC.	SAD	SIERRA ELECTRONIC CORP.	SIEC
SANDERS TECHNOLOGY SYSTEMS, R. C., INC.	SAND	SIGAMOTOR, INC.	SIGA
SANDIA CORP.	SAN	SIGMA INSTRUMENTS, INC.	SI
SAMYD ELECTRIC CO.	SAMY	SIGMOND COHM	SG
SARGENT, E. H. (SARGENT-WELCH SCIENTIFIC CO.)	SWS	SIGNAL GALAXIES, INC.	SGI
SARGENT-WELCH SCIENTIFIC CO. (E.H. SARGENT)	SWS	SIGNAL PROCESSING SYSTEMS, INC.	SPS
SARNIA	SARN	SIGMATONE	STG
SARTORIUS	SAR	SIGMET SCIENTIFIC CO.	SIGN
SAUTER DIV OF METTLER INST.	MEIC	SILEMA, S.P.A. (SOCIETA INC. PER L'ELETT ROMICA AVA	SILM
SAVANT INSTRUMENTS, INC.	SAV	SIMPLEX VALVE & METER CO.	SMP
SCAM INSTRUMENT CORP.	SIC	SIMPSON ELECTRIC CO.	SH
SCANDITRONIX	SCA	SIMPSON OPTICAL	SIND
SCANIVALVE, INC.	SVI	SINTEC	SNT
SCARPA LABS	SCL	SINGER	SN
SCHAEVITZ	SCHV	SIRIUS SYSTEMS, INC.	SIRS
SCHNIEDER INST. CO.	SCHI	SKIMMER ELECTRIC VALVE DIV.	SK
SCHOEFFLE	SCH	SLO-SYM (SUPERIOR ELECTRIC CO.)	SPE
SCHONSTED INST. CO.	SCHO	SLOAN TECHNOLOGY CORP.	STC
SCHUTTE & KOERTING CO.	SKC	SMITH ROOT	SMR
SCIACKY BROTHERS, INC.	SBI	SMITH-CORDWA	SMCO
SCIENCE ACCESSORIES CORP.	SCAC	SOCIETE FRANCAISE-AT	SFAT
SCIENTECH, INC.	SCI	SOCIETY FOR VISUAL EDUCATION, INC.	SVE
SCIENTIFIC COLUMBUS	SCLM	SODEN, INC.	SODI
SCIENTIFIC ELECTRIC, INC.	SCE	SODEV, INC.	SODV
SCIENTIFIC INSTRUMENTS INC.	SCII	SOILTEST, INC.	SO
SCIENTIFIC MICROSYSTEMS, INC.	SCMI	SOLA ELECTRIC DIV.	SLE
SCIENTIFIC-ATLANTA, INC.	SA	SOLAREX CORP.	SOL
SCINTILLONICS, INC.	SCIN	SOLARTRON INSTRUMENTS GROUP	STI
SCOTT AVIATION, INC.	SCTA	SOLINET SOUTHEASTERN LIBRARY NETWORK INC.	SSLN
SEARLE-BUHLER INSTRUMENTS	SEBU	SOLTEC CORPORATION	SCO
SEARS ROEBUCK CO.	SRC	SONIC	SONC
SECO INDUSTRIES INC.	SECO	SONICOR INSTRUMENTS CORP.	SONI
SEEGERS INSTRUMENT CO.	SEGI	SONITROL SECURITY SYSTEMS, INC.	STS
SEIFERT COMPANY	SEIF	SONOTRON	SOND
SEIKO INSTRUMENTS INC.	SEKO	SONY CORP. OF AMERICA	SON
SENCO	SEM	SORENSEN OPERATION, RAYTHEON CO.	SS
SENCORE	SEMC	SORGEL	SOR
SENNHEISER ELECTRONIC CORP.	SEN	SOROBAN ENGINEERING INC.	SORO
SENSITIVE RESEARCH CORP.	SRI	SOROC TECHNOLOGY INC.	SOC
SENSOTEC, INC.	SSTI	SORTEBERG CONTROLS CO.	SB
SEQUOIA-TURNER	SQT	SORVALL	SOV
SERVO CORP. OF AM.	SER	SOUTH BAY TECHNOLOGY	SOT
SETARAM	SETA	SOUTHERN SYSTEMS, INC.	SOSY
SETRA SYSTEMS, INC.	SSY	SOUTHWESTERN INDUSTRIAL ELECTRIC	SW
SHAKER	SHK	SPARLING-ENVIROTECH CORP.	SPRE
SHALLCROSS MFG. CO.	SHC	SPECIAL DYNAMICS CORP.	SPDC
SHANDON SOUTHERN INSTRUMENT, INC.	SSI	SPECIALTY ASSEMBLING AND PACKING CO. INC.	SAP
SHARP	SHA	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	STTN
SPECTRONIC	SPCT	SYSTRON-DOMNER 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	SP1	TAMARACK SCIENTIFIC CO., INC.	TMSC
SPRAGUE PRODUCTS CO.	SP	TANBY CORP. (RADIO SHACK)	TAND
SPUTTER-BELL	SPB	TADRUS 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-SYBROM CORP.	TASY
STANCOR DIV.	SCD	TAYLOR-WIMFIELD	TAW
STANDARD ELEC. TIME CO.	SET	TCC (TECHNICAL COMMUNICATIONS CORP.)	TCC
STANDARD ELECTRONIC CORP.	STEC	TEC, INC.	TEI
STANDARD ENGINEERING	STEM	TECAN	TECH
STANDARD EQUIPMENT CO.	STEQ	TECH LABORATORIES	TECL
STANDARD MEMORIES, INC.	SNI	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.	TN
STAR MICRONICS, CORP.	STMI	TECHNICAL INDUSTRIES INC.	III
STARRETT	STAR	TECHNICAL MEASUREMENT CORP.	TNC
STATNAM INSTRUMENTS, INC.	ST	TECHNICIAN INSTRUMENTS CORP.	TKN
STEPLESS CONTROLS CORP.	SCC	TECHNICOM INSTRUMENTS CO.	TECI
STEVENS	STEV	TECHNICS	TECH
STRAININSERT	STRT	TECHNOLOGY FOR ENERGY CORPORATION	TFEC
STRAND	STR	TECHNOLOGY INSTRUMENT CORP.	TICO
STREETEER-AMET CO.	SAC	TECHSONICS	TECS
STROBE, INC.	STRI	TECHTRAN, INC.	TECT
STROBO RESEARCH	SR	TECHAR	TCNR
STRONBERG-CARLSON	SBC	TECO	TCO
STRONG ELECTRICAL CORP.	SEC	TEK-COM	TKC
STRONG-FICKLER	SF	TEK-PRO	TEKP
STRUERS	STRU	TEKTRAM	TEKT
SUB-SEA SYSTEMS INC.	SSSI	TEKTROMIX, INC.	TEK
SUN-X CORPORATION	SUNX	TELE-MEASUREMENTS INC.	TELE
SUNNIT MFG. CO.	SUNC	TELEAUTOGRAPH CORP.	TELC
SUNBEAM	SUN	TELEBYNE PHILBRICK, INC.	TD
SUNRISE ELECTRONICS	SRE	TELENATE	TLN
SUPAVAC	SUPA	TELEQUIPMENT	TEQ
SUPERIOR ELECTRIC CO. (SLO-SYM)	SPE	TELESENSORY SYSTEMS, INC.	TESY
SUPERSCOPE	SUP	TELETALK	TET
SURFACE SCIENCE LABS	SSL	TELETRONICS, INC.	TTR
SWEENEY, B. K., MFG. CO.	SWEN	TELETYPE CORP.	TTY
SWIFT, JAMES & SON, LTD.	SWIF	TELEVAC	TEL
SWITCHCRAFT, INC.	SC	TELEVIDED, INC.	TVI
SYBROM/DARNSTEAD	BS	TELEX COMPUTER PRODUCTS, INC.	TCP
SYKES DATATRONICS, INC.	SYK	TELEX MIDWESTERN INSTRUMENTS	TENI
SYLVANIA ELECTRIC PRODUCTS, INC.	SV	TELLABS, INC.	TELL
SYSTEM INDUSTRIES	SYI	TELHAR INC.	TELM

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TEM-PRES RESEARCH, INC.	TFR	TRANSISTOR ELECTRONICS CORP.	TREC
TEMPTRON, INC.	TEM	TRANSISTOR SPECIALITIES, INC.	TSI
TEMMECOMP SYSTEMS, INC.	TMC	TRANSMATION, INC.	TRM
TEMNELEC, INC.	TML	TRANSREX	TRX
TENNY ENGINEERING, INC.	TE	TRAPELO DIV.	TP
TERADO	TERA	TRENDATA CORPORATION	TRDC
TERAK CORP.	TERC	TREXICE CO., H. D.	TER
TERNIFLEX CORP.	TC	TRI LGG CORP.	TRIL
TERMINAL EQUIPMENT CORPORATION	TEEC	TRI-R INST.	TRIR
TERRA TEK	TTEK	TRIAD DIV.	TAD
TESTING MACHINES, INC.	TNI	TRICOMEX, INC.	TRI
TESTLINE INSTRUMENTS	TLE	TRIMAR INDUSTRIES	TRIM
TEXAS ELECTRONICS	TXEL	TRIPLE A SPECIALTY CO.	TAS
TEXAS INSTRUMENTS, INC.	TI	TRIPLETT & ELECTRICAL INSTRUMENT CO.	TPT
TEXSCAN CORPORATION	TEX	TRIPP	TRIP
TEXSCANLYME SYBROM	TEXS	TRODYME	TRD
THAYER SCALES	THYR	TROMAC, INC.	TROM
THE DICKSON COMPANY	DKSH	TROPEL, INC.	TROP
THE INSTRUMENTS CORP.	TIC	TROXLER RADIATION LABS.	TRL
THE LEIBEL FLARSHHEIM CO.	LFC	TRUE DATA CORP.	TDC
THELCO	THLC	TRUTONE ELECTRONICS, INC.	TRU
THERMAL INSTRUMENT COMPANY	THIM	TRW INSTRUMENTS	TRW
THERMATIC RECORDERS	THR	TRYGON ELECTRONICS	TRY
THERMCO	THM	TULLANORE	TUM
THERMO	THER	TUNG-SOL DIV.	TSD
THERMO ELECTRICS UNLIMITED	THMO	TURBITROL, DIV. OF TAULMAN CO.	TURB
THERMO ELECTRON CORP.	THEL	TURNER DESIGNS	TUDE
THERMO SYSTEMS, INC.	TS	TURNER, G. K., ASSOC.	GKT
THERMO-ELECTRIC CO.	TEC	TWEEZER WELD	TW
THERMO-LAB INSTRUMENTS, INC.	THL	TYCO	TYCO
THERMOLYME CORP.	TLC	TYCON SYSTEMS CORP.	TSC
THERMONICS	TH	TYLAN CORP.	TYL
THERNOX INSTRUMENTS, INC.	THMI	U. S. ATOMIC ENERGY COMMISSION	USAE
THETA	THT	U. S. BURKE	USB
THOR CRYOGENICS	THOR	U. S. GAUGE DIV.	USG
TIF INDUSTRIES	TIF	U.S. ROBOTICS, INC.	ROBO
TIGERMAN ENGINEERING CO.	TIG	ULTEK	ULT
TIMEPLEX	TIM	ULTRA ELECTRONICS, INC.	ULTR
TIMIUS-OLSEN CORP.	TOC	ULTRASONIC IND., INC.	UII
TINKER & RASOR	TKRA	UNHOLZ-DICKIE	UMHD
TIMSLEY CO., H.	TIN	UNCODED MANUFACTURER	ZCOD
TLD	TLD	UNGAR-ELDON INDUSTRIES	UEI
TH VISUAL, INC.	THV	UNICO CONTROLS DIV.	UC
TOKYO, INDUSTRIES	TKI	UNILOCK INC.	UI
TOLEDO SCALE/RELIANCE ELECTRIC	TOL	UNIMATIC	UMI
TOPAZ ELECTRONICS	TOP	UNION CARBIDE CORP.	UCC
TORR VACUUM PRODUCTS	TOVP	UNIPHASE	UMPH
TOSHIBA	TOS	UNIT PROCESS ASSY.	UPA
TRACERLAB	TR	UNITED DATA SERVICES COMPANY	UDSC
TRACOR, INC. (NORTHERN SCIENTIFIC INC.)	TRA	UNITED DETECTOR TECHNOLOGY, INC.	UD
TRACOR-NORTHERN INC.	TRA	UNITED ELECTRIC CONTROLS CO.	UEC
TRAN-ELECTRIC	TRE	UNITED SCIENTIFIC CORP.	UNSC
TRANSFORM TECHNOLOGY, INC.	TTI	UNITED STATES SCIENTIFIC INST., INC.	USSI
TRANSFORMER TECH., INC.	TT	UNITED SYSTEMS CORP.	USC
TRANSIAC CORPORATION	TRAC	UNITED TECHNICAL RESEARCH CENTER	UTRC
TRANSISTOR DEVICES, INC.	TBI	UNITEK CORP.	UNC

MANUFACTURER	CODE	MANUFACTURER	CODE
UNIVERSAL DATA SYSTEMS	UDS	VIDEO APPLICATIONS, INC.	VIA
UNIVERSAL ELECTRIC CO.	UE	VIDEO INSTRUMENT CO.	VBI
UNIVERSAL FILTERS, INC.	UFI	VIEWLEX, INC.	VIW
UNIVERSAL FLOW MONITORS	UFM	VIEWPOINT	VEP
UNIVERSAL SECURITY INSTRUMENTS	USI	VINCENT, AM ASSOCIATES	AVV
UNIVERSAL VOLTRONICS	UV	VIRITIS CO.	VIR
UNIVERSITY OF CALIFORNIA	UCA	VISHAY INTERTECHNOLOGY	YSYI
UNIVERSITY OF TENNESSEE	UOT	VISICORDER	VISI
UNIVERSITY OF TEXAS	UTX	VISIPAK, INC.	VPI
UNKNOW MANUFACTURER	ZMFR	VISUAL TECHNOLOGY INC.	VIS
UPTIME CORPORATION	UPTC	VOLAND & SONS	VOL
USH CORP.	USH	VOLUNETRICS	VLN
USON CORP.	USO	VOTAN	VOT
UTAH ELECTRONICS, INC.	UT	VU-DATA CORPORATION	VUDC
UTHE TECHNOLOGY INTERNATIONAL	UTHE	VWR SCIENTIFIC	SCT
UTI	UTI	W. C. BILLON CO.	DLN
VACIDN	VACH	W. M. WELCH CO.	WHW
VACTRONIC LAB. EQUIPMENT, INC.	VAC	W.T. SPECIALTY CO.	WTS
VACUUM ATMOSPHERE CORP.	VAT	WAHL, W.M., CORPORATION	WMC
VACUUM ELECTRONICS	VEL	WALKER SCIENTIFIC, INC.	WSI
VACUUM INDUSTRIES, INC.	VI	WALLACE & TIERNAN, INC.	WT
VACUUM INSTRUMENT CORP.	VIC	WALTON CO.	WAL
VACUUM PRODUCTS	VP	WANG LABORATORIES, INC.	WL
VADIC	VAD	WANGCO, INC.	WAN
VAISALA INSTRUMENTS	VASA	WANLESS ELECTRIC CO.	WANL
VALHALLA SCIENTIFIC	VAL	WASHINGTON UNIVERSITY	WU
VALDYNE ENGINEERING CORP.	VAEC	WATANABLE, INC.	WTB
VALTEC CORP.	VALC	WATERMAN PRODUCTS CO.	WPC
VANZETTI	VAN	WATERS ASSOCIATES	WAT
VARIAN ASSOCIATES, INC.	VA	WATLOW COMPANY	WTLO
VARITYPER	VART	WAVEFORMS, INC.	WAY
VATRONIC LAB.	VL	WAYETEX	WA
VECTOR ELECTRONIC CO.	VEEL	WAYNE KERR	WK
VECTOR GRAPHIC, INC.	VEGR	WEATHER NEAS. CORP.	WN
VECTRIX CORPORATION	VEX	WEATHERALERT	WEA
VEECO INSTRUMENTS, INC.	VEC	WEBBER GAUGE	WG
VEEKAY, LTD	VK	WEBSTER ELECTRIC CO.	WEC
VEGA CORPORATION	VEGA	WEKSLER INSTRUMENT CORP.	WI
VELENEX	VLNX	WELCH CO., W. M.	WNU
VEMCO	VEM	WELSH SCIENTIFIC CORP.	WEL
VENTRON INSTRUMENT CORP.	VEI	WENKING ELEKTROMISCHER	WENK
VERN-KIEBLER ASSOC., INC.	VKA	WESCAM	WSCN
VERSA-THERM	VRT	WESCOR	WESC
VERSATEC	VER	WEST INSTRUMENT DIV.	WIC
VERTROD CORP.	VC	WESTERN APPARATUS CO.	WAC
VG-ISOTOPES LTD.	VGIS	WESTERN ELECTRIC CO.	WTC
VIATRAM	VTR	WESTERN MARINE ELECTRONICS	WNE
VIBRO CERAMICS DIV.	VIB	WESTERN UNION DATA SERVICES CO.	WUDA
VICKERS DIV.	VD	WESTINGHOUSE ELECTRIC CORP.	WE
VICON INDUSTRIES INC.	VII	WESTON	WST
VICTOR ANIMATOGRAPH CORP.	VOR	WESTON AND START	WAS
VICTOR COMP. CORP.	VCC	WESTONICS, INC.	WES
VICTOREEM INSTRUMENT CO.	VIT	WESTWOOD ASSOC. DATA COMM. EQUIPMENT	WADC
VICTORY ENGINEERING CORP.	VE	WHITBY	WB
VIBAN INST.	VID	WHITE-WESTINGHOUSE	WHWE
VIBAR CORP.	VBR	WILD HEERBRUGG MFG.	WH

MANUFACTURER	CODE	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		
XEDEC SYSTEMS INC.	XDC		
XENTEK, INC.	XEM		
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		
ZENUER	ZEN		
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

<u>Code</u>	<u>Number</u>	<u>Division</u>
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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