Honeywell

Process Manager Test Executive

PM13-520

Honeywell

PM/APM/HPM Service - 2

Process Manager Test Executive

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About This Publication

This manual documents the Process Manager Test Executive (PMEX), a common set of software functions used by TDC 3000^X Process Manager test programs. It is provided as a reference for trained technicians and is intended to supplement TDC 3000^X service training, not replace it.

Change bars are used to indicate paragraphs, tables, or illustrations containing changes that have been made to support R500 functions.

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INTRODUCTION
Section 1

This section introduces you to the characteristics and uses of PMEX. It also provides a list of related publications and a summary of recent changes to PMEX.

1.1 WHAT PMEX IS AND WHAT IT DOES

The Process Manager Test Executive (PMEX) is the common executive program used by both the Process Manager Module Test System (PMMTS) and the Process Manager Test System (PMTS). Individual test programs within each test system vary.

NOTE

References to PMTS in this document generally apply to PMTS, PMT2, and PMT3. Although all three are collections of Process Manager I/O processor card tests, they are packaged separately because of floppy disk and memory space limitations. See the *Process Manager Test System* manual for additional information.

The test programs generally are subdivided into individual tests that are designed to exercise specific functions within the subsystem. The service technician controls the operation of the test system by keyboard entry of commands that specify the hardware to be tested and the number and sequence of tests to be run.

NOTE

Test system loading and operation as described in the body of this document assumes a standard TDC 3000^X system configuration. PMEX and the test system software also support nonstandard configurations that are used by factory technicians for testing during the manufacturing process. Information on loading and operation of these specialized configurations is found in Appendix C of this document.

The test system is loaded into one or more Process Manager Modules from a Test Operator Control Station (TOCS). This normally is a TDC 3000^X Universal Station or Universal Work Station.

The following is the typical use-scenario:

- Load the HVTS or CMTS test system into the TOCS from floppies or from a cartridge disk. Use the EXEC loader to load the NIM(s).
- Change over to the PMEX operating mode and download specified PMMs connected to the NIM(s).
- Using the TOCS, establish common test-program parameters in all the UCN nodes and custom parameters at individual nodes; then begin test operation.

- Test results for each node are reported at the TOCS as they occur, but they can be queued for later display.

1.2 REFERENCES

The following are other TDC 3000^X test program publications that will be of use during installation and maintenance of TDC 3000^X Process Manager Modules.

Publication Title	Publication Number	Binder Title	Binder Number
Test System Executive	SW13-510	LCN Service - 3	3060-3
Process Manager Test System (PMTS)	PM13-510	PM/APM/HPM Service - 2	3061-2
Process Manager Module Test System (PMMTS)	PM13-505	PM/APM/HPM Service - 2	3061-2

1.3 RECENT CHANGES TO PMEX

Upon issuing a REV command, the results displayed for an HPM have been changed.
Upon issuing a CON command, the results displayed for an HPM have been changed.

TEST SYSTEM LOADING AND SETUP
Section 2

This section provides the information necessary for the loading, setup and execution of test system programs.

2.1 SYSTEM-LEVEL ISSUES

Each Process Manager Module normally has two "brains"—a communication (COMM) processor and a control (CTRL) processor. The tests controlled by PMEX use these processors in various combinations.

- For PMMTS, some tests run on either type of processor while others run on only one type of processor. Some PMMTS tests require both processor types to be present in the node. See the individual PMMTS test program descriptions in the *Manager Module Test System* manual for specifics.

- For PMTS, all commands must go to the COMM processor of the primary (odd UCN address number) node of a redundant PM pair.

Because of this "2-brain" characteristic of PMs, PMEX requires that each command identify both the node(s) and processor(s) to be affected. Incorrect selections or access of nonexistent processors are rejected by PMEX and an error message is displayed. For details of node/processor selection, see paragraphs 2.3.2, 2.3.6, 2.4.2, and 2.4.5.

2.1.1 Keyboard and Display Options

Test system input/output is done through the Universal Station (or Universal Work Station) keyboards and CRT. The engineer's keyboard is the primary input device, but the Operator or Supervisor keyboard can also be used. See Figures 2-1 and 2-2 for illustrations of the Operator/Supervisor keyboard keys that are recognized by PMEX.

Table 2-1 summarizes keystroke differences between the keyboard types when initiating and completing test system command line entries.

Table 2-1 — Keyboard Entry Differences

Entry Action	At Engineer's Keyboard	At Operator/Supervisor Keyboard
Single-Target* Input	Escape or Select	Select
Multinode** Input	Line Feed or Tab	Tab
Input Line Completion	Return or Enter	Enter

*Single-target operator input means the command entered goes to the active node.
**Multinode operator input means the command entered goes to the network, if applicable.

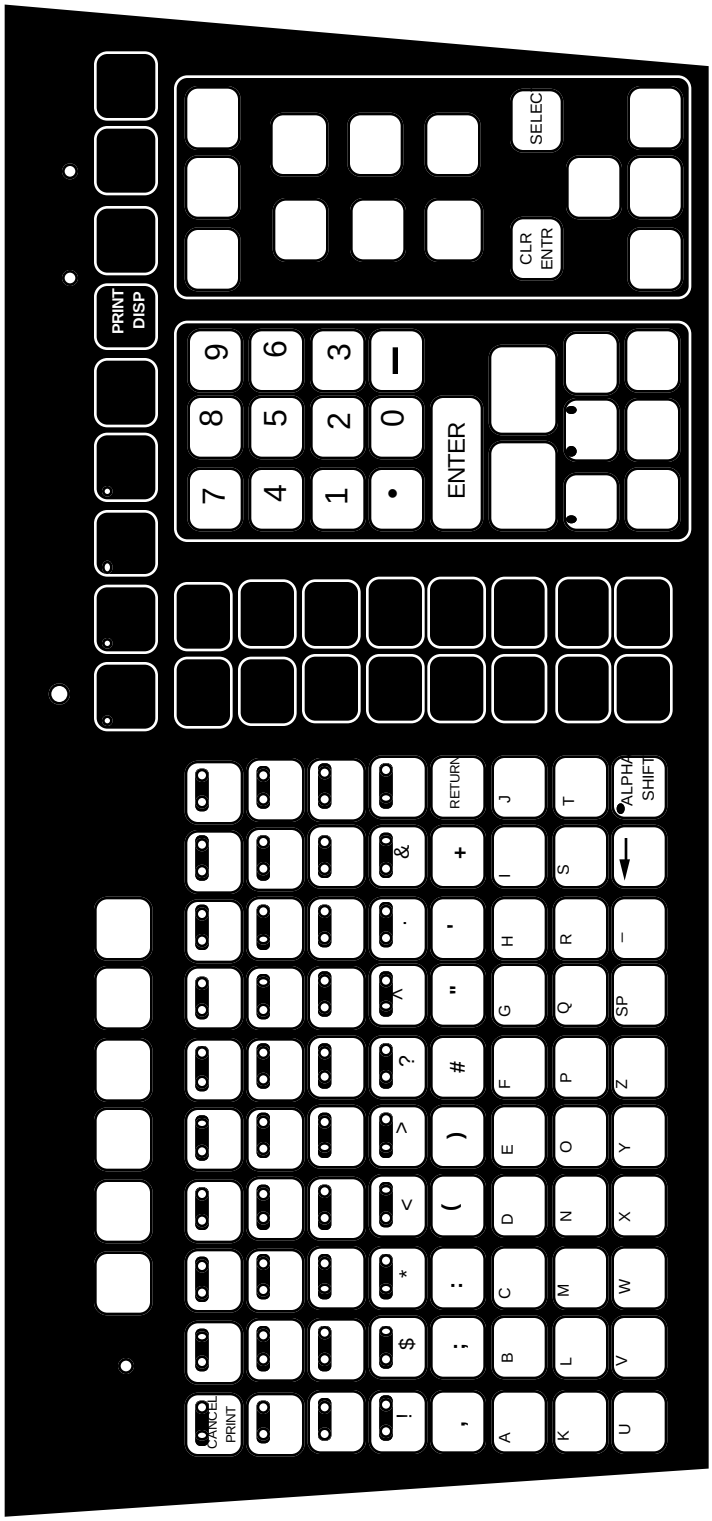

Figure 2-1 — Keys Used by PMEX on Operator or Supervisor Keyboard 2472

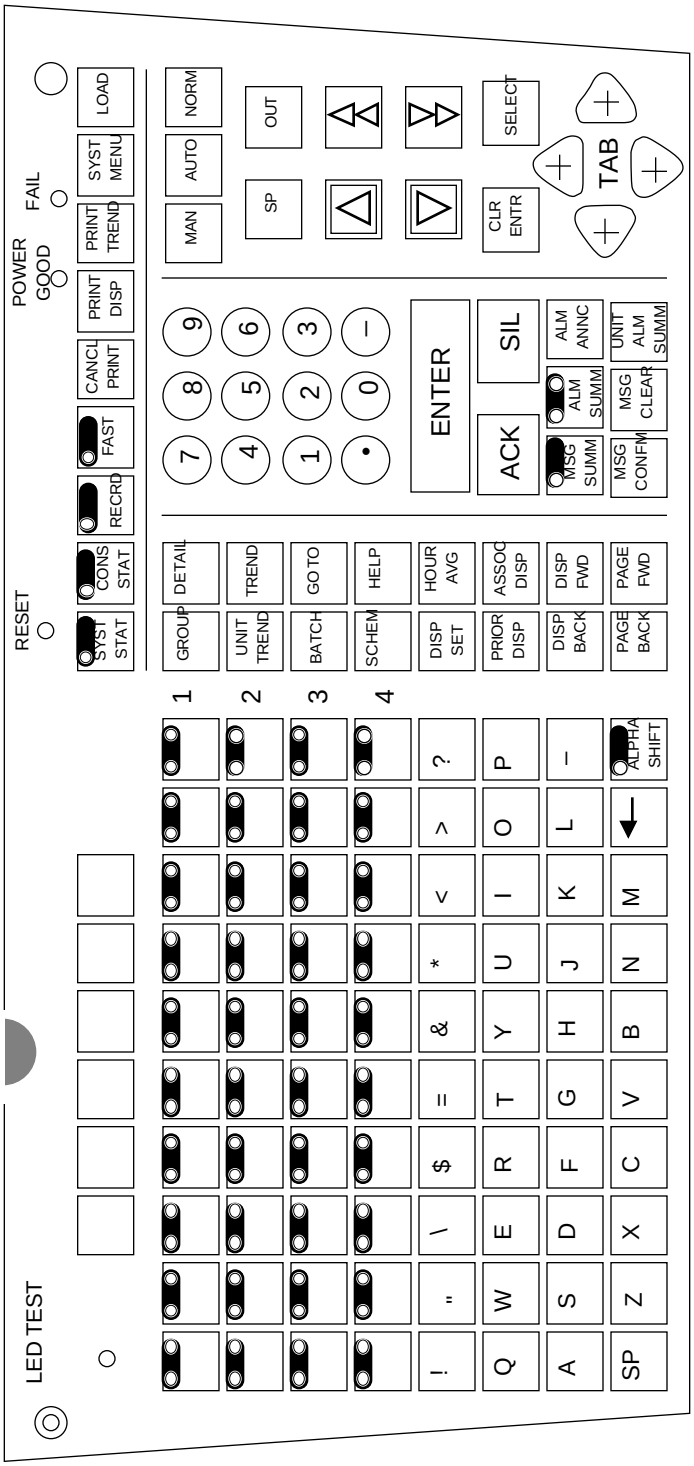

Figure 2-2 — Keys Used by PMEX on Querty Operator or Supervisor keyboard

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2.1.2 Printing Option

If a printer is connected to a US or UWS being used as the TOCS, all prompts, operator entry, messages, and alarms can be printed as well as displayed on the CRT. All text entry is displayed on the CRT as it is typed, but the entered keystrokes are not printed until completion of the input line is signaled by pressing the RETURN or ENTER key.

The initial state of the printer is "enabled," thus the test system Started message is reported on both the screen and the printer, if present. If there is no printer, or if the printer has no paper, is off-line, or is otherwise disabled, a 1-time-only message is reported on the screen (no operator action is required).

At the Operator or Supervisor's Keyboard—to stop printing, press CANCL PRINT; to restart the printer, press the PRINT DISP key. At the Engineer's Keyboard—to quit printing, press CONTROL and Q; to restart the printer, press CONTROL and P.

Whenever the printer state is changed between "enabled" and "disabled," a 1-line message is printed and displayed to record the change. The two messages are

```
Node nn dd-mmm-yyyy hh:mm:ss   *** PRINTER STOPPED ***
Node nn dd-mmm-yyyy hh:mm:ss   *** PRINTER STARTED ***
```

2.2 LOADING THE TEST SYSTEM

PMEX is packaged together with the test system software it supports (PMMTS or PMTS/PMT2) on both floppy diskettes and cartridge disk; however, before you can load PMMTS, PMTS, or PMT2, you must first load either HVTS or CMTS into the TOCS and into the NIM(s) connecting your UCN(s) to the LCN.

Packaging of the various test systems is as follows:

Test Software	Floppy Diskettes	Cartridge Disk
PMTS	51150725	51152049
PMT2	51150726	51152049
PMMTS	51150700	51152049
HVTS	51150670	51152049
CMTS	51150354	51152049

The following describes loading procedures to be followed with standard TDC 3000^X system configurations. Appendix C describes loading procedures for special factory-only configurations.

WARNING

If the RNOS-based operational software is running in any nodes in the system, the UCN nodes to be tested (PMs) and the LCN-based nodes (NIM and US) must be taken out of service before the loading of test system software can begin. This is accomplished by shutdown requests to those nodes from the Operator Personality node status displays.

2.2.1 Loading From Floppy Diskettes

1. Press the RESET button on the Operator Keyboard at the Universal Station to be used as the TOCS. After the hardware and firmware self-tests run, the prompt ">" and the cursor are displayed on the Universal Station Screen.

2. Press the LOAD button on the Operator Keyboard. The following prompt is displayed:
   `N,1,2,3,4,X?`

3. Insert the first HVTS (or the single CMTS) diskette into a floppy drive, then key in the drive number and press the ENTER key (using either the Engineer or Operator Keyboard). At the next prompt, enter the capital letter L (for LOAD) and press ENTER. Another prompt is issued if a second floppy is required to complete the load.

4. When finished, the loader responds with a load-completion message and begins execution of the test system with display of revision date and revision level similar to the following:

   ```
   Hardware Verification Test System, dd-mmm-yyyy Rel 6.n, Dwg 51150670 Rev n
   TDC 3000X HVTS Executive, dd-mmm-yyyy Rel 6.n started in node xx as TOCS
   ```

   Press the Escape/Select key to initiate each of the keyboard entries that follow.

5. Reset the NIM(s) by entry of **RESET n** <return/enter> (or **RESET n,n** <return/enter>) where each "n" is the LCN node number of a NIM node. Respond to the prompt with **YES** <return/enter>.

6. Enter **LOAD n** <return/enter> (or **LOAD n,n,n** <return/enter>) where each "n" is the LCN node number of a NIM. This loads the NIM(s) from the test system (HVTS or CMTS) diskette(s). Check the "Load Completed" messages that appear at the TOCS screen. If any nodes fail to load, check the chassis-mounted LEDs and 3-window displays for indications of self-test-detected problems.

7. Enter **NMA n** <return/enter> where "n" specifies the LCN number of the NIM connected to the UCN modules that you wish to test. This establishes the selected NIM as the UCN network manager and directs all subsequent commands to UCN nodes. See heading 2.4.8 for additional information on the NMA command.

8. Make sure that all the PMs are in the "alive" condition. (This may require toggling of the top card-extractor lever of a module of each PM—and of both left and right PMs for redundant pairs—to initiate reset.) Enter **LOAD** <return/enter> for a list of "alive" and ready-to-be-loaded PMs.

9. Insert a PMTS or PMMTS diskette into floppy drive 1.

10. Enter **LOAD n,n,n** <return/enter> (where n,n,n represents the list of UCN node numbers for the PMs) to start the PM download. See heading 2.4.1 for additional information on the PMEX LOAD command. When the download is complete, PMEX outputs a message listing the nodes that were downloaded successfully.

11. Enter **COMM n** <return/enter> to address subsequent commands to PM n, thus setting it up as the first valid target of test system single-node commands.

Test system loading is complete and the test system now is ready to accept command-line entries that will select and control the tests you wish to have executed.

2.2.2 Loading From Cartridge Disks

1. Press the RESET button on the Operator Keyboard at the Universal Station to be used as the TOCS. After the hardware and firmware self-tests run, the prompt ">" and the cursor are displayed on the Universal Station Screen.

2. Press the LOAD button on the Operator Keyboard. The following prompt is displayed:

   ```
   N,1,2,3,4,X?
   ```

> **NOTE**
>
> See the *System Startup Guide—Cartridge Drive* for important information on insertion and removal of cartridge disks from the drive mechanism.

3. Insert the test systems disk into a cartridge drive, then key in the drive number and press the ENTER key (using either the Engineer or Operator Keyboard). At the next prompt, enter the capital letter H (for HVTS) or C (for CMTS) and press ENTER.

4. When the TOCS load is complete, the HVTS (or CMTS) startup message appears near the bottom of the US screen.

   ```
   Hardware Verification Test System, dd-mmm-yyyy Rel 6.n, Dwg 51150670 Rev n
   TDC 3000X HVTS Executive, dd-mmm-yyyy Rel 6.n started in node xx as TOCS
   ```

   Press the Escape/Select key to initiate each of the keyboard entries that follow.

5. Reset the NIM(s) by entry of **RESET n** <return/enter> (or **RESET n,n** <return/enter>) where each "n" is the LCN node number of a NIM node. Respond to the prompt with **YES** <return/enter>.

6. Enter **LOAD n** <return/enter> (or **LOAD n,n,n** <return/enter>) where each "n" is the LCN node number of a NIM. This loads the NIM(s) with the test system (HVTS or CMTS). The system first responds with a prompt that asks you to select one of the test systems to be loaded.

   ```
   Enter C for CMTS, H for HVTS, L for LCNI, or Q for Quit
   ```

   Enter the character—C or H—that represents the test system that you wish loaded into the NIM(s) and then press <return/enter>. Check the "Load Completed" messages that appear at the TOCS screen. If any nodes fail to load, check the chassis-mounted LEDs and 3-window displays for indications of self-test-detected problems.

7. Enter **NMA n** <return/enter> where "n" specifies the LCN number of the NIM connected to the UCN modules that you wish to test. This establishes the selected NIM as the UCN network manager and directs all subsequent commands to UCN nodes. See heading 2.4.8 for additional information on the NMA command.

8. Make sure that all the PMs are in the "alive" condition. (This may require toggling of the top card-extractor lever of a module of each PM—and of both left and right PMs for redundant pairs—to initiate reset.) Enter **LOAD** <return/enter> for a list of "alive" and ready-to-be-loaded PMs.

9. Enter **LOAD n,n,n** <return/enter> (where n,n,n represents the list of UCN node numbers for the PMs) to start the PM download. See heading 2.4.1 for additional information on the PMEX LOAD command.

10. The system now responds with a prompt that asks you to select a test system to be loaded into the UCN nodes.

```
Enter M for PMMTS, P for PMTS, S for STIM, or Q for Quit
```

    When the download is complete, PMEX outputs a message listing the nodes that were downloaded successfully.

11. Enter **COMM n** <return/enter> to address subsequent commands to PM n, thus setting it up as the first valid target of test system single-node commands.

Test system loading is complete and the test system now is ready to accept command-line entries that will select and control the tests you wish to have executed.

2.3 MAN-MACHINE DIALOG FUNDAMENTALS

Interactive communication between the test operator and the system allows the operator to have complete control of which nodes and which COMM/CTRL processors within them are to be tested, as well as the selection of the individual tests to be run. All man-machine communication with the test system consists of a PMEX-generated message (prompt) on the TOCS I/O device followed by a test-operator response (command line) made through the same device. Each command-line entry is ended by pressing the Return/Enter key.

The TOCS (Operator Node) has two operating modes, EXEC and PMEX. In EXEC mode, all commands are directed to LCN nodes such as the TOCS/NIM. In PMEX mode all commands are directed to PM modules on the UCN. When you change operating modes you should also change user manuals (if you need one) since the set of available commands and what the commands can do changes as the operating mode changes.

Note that you changed the operating mode of the TOCS from EXEC to PMEX before loading the PM nodes. This was accomplished by the NMA command (see heading 2.4.8). Return from PMEX to EXEC operating mode (in order to load and run tests on LCN node functions) can be accomplished by the LCN command (see heading 2.4.7).

2.3.1 The Test System Network

The test configuration controlled by PMEX consists of a number of Process Manager Modules connected by an UCN network. Your test commands can be directed to a single COMM/CTRL processor (including those in a PM being used as the TOCS in factory configurations) or alternatively to combinations of selected COMM/CTRL processors on the network. Note that some commands are not appropriate to both cases (single node vs multinode) and are rejected/ignored when inappropriate.

Selection of single-node vs multinode command addressing is controlled by how you request the system prompt at the TOCS keyboard. To request a prompt that expects a command line that affects only a single selected COMM/CTRL processor, press the Escape/Select key. To request a prompt that anticipates a command line that affects a selected set of processors, press the Line Feed/Tab key.

2.3.2 Initial System Communication

To begin communication with the test system, (or to resume communication if no prompt is waiting for action) press the Escape/Select key on the I/O-device keyboard. The system responds with a prompt in the following form:

```
hh:mm NMA nn COMM (or CTRL) nn {name}?
```

Where: hh:mm—is the time of day
NMA nn—specifies that command entries are to be communicated to PMs associated with the NIM at LCN address nn
COMM/CTRL nn—identifies that the COMM or CTRL processor of the PM at UCN address nn is selected
{name}—(or ALL) identifies the currently selected test program(s)

An exception: The initial prompt in response to the Escape/Select key, after completion of test system loading according to the instructions at heading 2.2 is like this:

`00:01 NMA nn?`	Showing that no PM has yet been selected for command entries

Alternatively, if you press the Line Feed/Tab key, the multinode prompt appears.

`hh:mm NMA nn NETWORK ALL ?`	ALL indicates that all test programs in that node are affected by subsystem-level commands.

NETWORK specifies that commands entered are applied to all selected COMM/CTRL processors in the test system network. Other information in the prompt is the same as for the single-node prompt. See paragraph 2.3.6 for additional information on the setup and use of multinode commands. Be careful not to confuse the **prompt** NETWORK with the **command** NETWORK.

2.3.3 Setting System Date and Time

Before the start of testing and before execution of any NET commands, set the time and date. Begin by pressing the Line Feed/Tab key on the TOCS keyboard. Following the multinode prompt, enter date and time in the following format:

CLO dd-mmm-yyyy hh:mm	(Example—CLO 18-APR-1986 13:05)

Press the Return/Enter key to set the date and time in all nodes in the test system network.

NOTE

In the examples used in this manual, the test operator's entries are shown in **boldface** type to differentiate them from system prompts.

2.3.4 Basics of Test Selection

Test setup and execution in a test node is done from the TOCS. (Remember, unless there is a prompt pending, you start each MMI dialog by pressing the Escape/Select or Line Feed/Tab key.)

To select a loaded test processor for test setup and execution, enter the COMM (or CTRL) command as follows:

`hh:mm NMA nn COMM/CTRL nn ALL ?` **COMM xx** where xx is the UCN node number

The next time a prompt is requested by pressing the Escape/Select key, the test system displays the newly selected node and processor identity.

```
hh:mm NMA nn COMM xx ALL ?
```

One way to change the prompt to act on a specific test program is by use of the "Device" command [space] followed by the name of the desired test program. For example,

`hh:mm NMA nn COMM nn ALL ?` **DEV ABCD** where ABCD is a program name

The next prompt displays the following selection:

```
hh:mm NMA nn COMM nn ABCD?
```

Subsystem commands entered while this prompt is in effect, affect only the named program and node (e.g., following the preceding sequence, entry of the RUN command runs the test program named ABCD on only the COMM processor in the selected node).

Although the selected test program can now be run (using the default parameters), you normally need to do additional selection of test-execution parameters. This selection process involves use of other test system commands that are explained later in this section; therefore, a close reading and understanding of the balance of this section is recommended before you attempt to run any of the tests.

2.3.5 Command Entry Errors

If the test operator makes an error in a command-line entry, the test system displays error indicators on the following two lines. For example, a garbled test program name would be treated like this:

```
hh:mm NMA nn COMM nn ALL ? DEV   DCAB
                             ^   22
Invalid first parameter value or test program name.
```

The first error line contains a numeric code positioned adjacent to the improper command or parameter. The second line is a brief explanation of the apparent cause. See subsection 2.8.3 for expanded explanations for each error code.

To recover from an error in the command-line entry, first press the Escape/Select key. After the prompt, re-enter the desired information; however, if you discover a keystroke error before completion of an entry (return/enter), you can

At an RS-232C device or the Engineer's keyboard—simultaneously press the control key and X (upper or lower case), then restart your entry.

At the Operator's or Engineer's Keyboard—press CLR ENTRY, then restart your entry.

2.3.6 Multinode Commands

Multinode commands enable the operator to send the same command to several nodes on the network with a single entry. Use of multinode commands requires two steps.

1. Use of the NETWORK, NET_COMM and NET_CTRL commands (see paragraph 2.4.6) to identify which processors in which nodes are to receive the next multinode commands.

2. The invocation of a command that is to go to those nodes instead of just to the single-node COMM/CTRL processor currently selected.

2.3.6.1 Invoking Multinode Commands

Multinode commands are identified by your use of the Line Feed/Tab key instead of the Escape/Select to request the prompt. Instead of the prompt specifying that COMM (or CTRL) nn is to be addressed, the prompt specifies NETWORK. The two prompt types are shown for comparison.

Request	Prompt	Nodes receiving the command
Line Feed/Tab	`NETWORK name?`	All test system processors as specified by previous NETWORK/ NET_COMM/NET_CTRL commands
Escape/Select	`COMM nn name?`	Only COMM processor in PM nn

The currently selected (default) test program specified by "name" is not necessarily the same for both multinode (NETWORK prompt) and single-node (COMM/CTRL prompt) commands. Each prompt type maintains its own default test program name based on its most recent test program-name entry. Network-prompted commands go to all of the test system processors specified by the most recent network selection, while node-prompted commands go to only the single processor selected by the most recent COMM/CTRL command.

Here are some examples of both prompt types, shown preceded by the requesting key type. As usual, operator entries are shown in bold type.

Escape/Select	`CTRL nn FLPY?`	**COMM 8**
Escape/Select	`COMM  8 WXYZ?`	**RUN ARBY**
Escape/Select	`COMM ARBY?`	**NET 10-20**
Line Feed/Tab	`NETWORK ALL ?`	**RUN**
Escape/Select	`COMM 8 ARBY?`	**CON**
Line Feed/Tab	`NETWORK ALL ?`	**PASS LMEM**
Line Feed/Tab	`NETWORK LMEM?`	**INT 60**
Escape/Select	`COMM 8 ARBY?`	**STOP**

In the above examples, the RUN ARBY command in the second entry runs only ARBY in Node 8 because Node 8 is the target of all single-target commands. In the fourth entry, every test program in both processors in Nodes 10 through 20 runs because these are the target nodes of all multinode commands. The fifth entry command displays the configuration for only Node 8 because it was requested by Escape/Select. Had it been requested by Line Feed/Tab, the configuration for Nodes 10 through 20 would be displayed. The sixth line displays the pass limit for every LMEM in the processors in Nodes 10 through 20, and the seventh line sets the log interval for Nodes 10 through 20 to one hour. The last line commands test program ARBY in Node 8's COMM processor to stop running.

2.3.6.2 Additional Multinode Information

Whenever a multinode command is invoked, the target nodes that are to receive the command are those nodes in the test system network (as modified by DELETE and ADD) that also are in either of the lists controlled by the three NET commands. Thus

NET -

is an easy way to specify that all COMM/CTRL processors in every loaded node are to be the targets of all subsequent multinode commands. This is the initial value of the NETWORK lists whenever a test system is loaded and started. See paragraph 2.4.5 for details of controlling contents of the NET lists.

If after the NET lists have been specified, all specified nodes drop out or are DELETED, the next attempted multinode command is alarmed. Similarly, it is possible for every NET list target node that contains the selected test program to drop out or be DELETED from the test system Node List. Any attempt to send a command directed to that test program results in an alarm because there is no test program of that kind left in the test network.

The SETUP command is not supported as a multinode command. Attempted use is rejected with an error message.

Commands that are honored only at the TOCS can be requested by pressing either the Escape/Select or Line Feed/Tab. The TOCS-only commands are ADD, DELETE, COMM, CTRL, NETWORK, NET_COMM, and NET_CTRL.

2.3.6.3 Clarifying the Two Types of Target Nodes

In effect, the operator maintains two target-node specifications. One is the single selected processor that sees the Escape/Select request, sends the prompt with its node number and processor identity, and gets and honors the entered command. Each COMM/CTRL processor maintains the last specified test program name (or name and slot number) addressed to it, and builds this into its prompt as the default single-target node test-program name.

The other target node specification is from the last NET selection command that determines the COMM/CTRL processors that are to receive the commands requested by the Line Feed/Tab key. Usually this includes the currently selected (single-node) processor, but it need not. A single default test program name is maintained for the entire network (the last one specified by a Line Feed/Tab-requested multinode command). This is displayed in the Network prompt and is used by all multinode commands that do not explicitly specify a test program name.

2.3.7 Data Entry Conventions

The foregoing system-communication examples have illustrated only basics of the test system man-machine dialog. The following paragraphs discuss the data-entry elements and some of the ways they can be combined. For a more extensive explanation of ways these elements can be combined, see Appendix B, Data Entry Concepts.

The basic format of a data-entry command-line consists of three fields: a command, a test program-name list, and a parameter list. Only the command field is required. The fields are separated by spaces. Multiple entries within the test program-name list and within the parameter list are separated by commas.

The basic format can be extended by addition of any number of single-digit "shorthand" parameter entries with their associated values (see paragraph 2.3.7.4).

Some of the possible command-line combinations are illustrated by the following:

command
command pvalue
command pvalue,pvalue
command name
command name,name pvalue
command name pvalue,pvalue sv,v sv
command sv sv,v

Command lines can consist of capital letters or lower-case letters or a combination of both. The use of capital and lower-case letters in examples in this publication is intended to differentiate between the fixed and variable portions of entries (e.g., LOAD nn).

2.3.7.1 Command Types

Test system commands are divided into two categories: System commands have node-wide effect, while Subsystem commands affect only the selected test program. System commands are further categorized into Commands to the TOCS and Commands to Target Nodes, while Subsystem commands are further categorized into Action and Parameter commands.

NOTE

Most of these commands can be truncated anywhere after the first three letters. For example, each of the following is accepted as equivalent: CON, CONF, CONFI,...., CONFIGURATION. Command exceptions that require more letters to make them uniquely identifiable are NET_CO, and NET_CT (entry of NET is interpreted as NETWORK). Other exceptions are the display-only commands ERROR_C, PASS_C, and MINUTES_C.

Table 2-2 lists all commands recognized by PMEX.

2.3.7.2 Test Program-Name Entries

All test program names are entered as 4-character mnemonics. If ALL or * is entered in place of a test program name, all of the test programs in the selected COMM/CTRL processor(s) are affected by subsystem commands. If no test program name is included in the command line, the currently selected test program (indicated in the prompt) is assumed.

See the documentation for each test system for lists of test program names and the subsystems they test or exercise.

2.3.7.3 Parameter Value Entry

There are two types of parameter commands: general and test program-specific. The general parameters (shown in Table 2-2 as Subsystem Parameter Commands) apply to all test programs, while the test program-specific parameters apply to only particular test programs. The parameter value(s) can be separated from the command by one or more test program names. Multiple values are separated by commas (no space following the comma). Examples are

INH PASSNUMBER,TESTNUMBER	(inhibit end-of-pass and end-of-test messages for the currently selected test program)
ERR ALL 3	(halt all test programs after 3 errors each)
REP CCPU LOG	(enable log messages for the CCPU test program)
PAS JBPT4 5	(stop the JBPT program in slot 4 after 5 passes)

The general system response to a parameter-command entry without any parameter values is to display the current parameter value. Exceptions and special cases are covered in the detailed command information in sections 2.4, 2.5, and 2.6.

The SETUP command provides an alternative method for change of all parameter values for the selected test program, one slot at a time. See section 2.6.7 for information on this command.

2.3.7.4 Comments Line Entries

If you would like to add comments to the printed record of test activity (see heading 2.1.2), begin a command line entry with an asterisk (*), followed by whatever text you wish. End the command line normally with Return/Enter. Except to print it, each such line is ignored by the test system.

Table 2-2 — PMEX Command Summary

System Commands to TOCS

ADD	(2.4.4)	Restore specified nodes to the active network list
COMM	(2.4.2)	Change prompt to address specified node's COMM processor
CTRL	(2.4.2)	Change prompt to address specified node's CTRL processor
DELETE	(2.4.3)	Remove specified nodes from the active network list
LCN	(2.4.7)	Send commands to LCN nodes (CMTS/HVTS)
LOAD	(2.4.1)	Load the test system software into specified UCN nodes
NETWORK	(2.4.5)	Identify nodes where both processors will be affected by multi-node commands
NETX	(2.4.11)	Confirm ability to communicate with non-test loaded nodes
NET_COMM	(2.4.5)	Identify nodes where only the communications controller will be affected by multinode commands
NET_CTRL	(2.4.5)	Identify nodes where only the control controller will be affected by multinode commands
NETMAP	(2.4.12)	Display UCN node types and statuses
NMA	(2.4.8)	Send commands to UCN nodes (PMMTS/PMTS)
PEER	(2.4.10)	Test PM to PM communication on the UCN
RESET_PMMS	(2.4.9)	Reset specified test nodes
UCN_CABLE	(2.4.6)	Select "listen" cable

System Commands to Target Nodes

ADD_IOP	(2.5.9)	Restore specified IOPs to the active IOP table
AUTO_CONFIGURATION	(2.5.7)	Create/recreate table of currently available IOPs
BATTERY_BACKUP	(2.5.11)	Test memory retention through power outage
CLOCK	(2.5.1)	Set the date and time of day
CONFIGURATION	(2.5.2)	Request Configuration display
DEL_IOP	(2.5.8)	Remove specified IOPs from the active IOP table
INTERVAL	(2.5.5)	Set the interval for the periodic-progress log
MODE	(2.5.4)	Select operating mode: SUB, EXER, or MOD
PARTNER	(2.5.10)	Start dialog to pair redundant IOP partners
QUEUE	(2.5.6)	Select/deselect message queuing
REVISION	(2.5.3)	Request Configuration/Revision display

Subsystem "Action" Commands

ABORT	(2.6.4)	Stop the test program immediately
DEVICE	(2.6.1)	Change the prompt to the specified test program
LOG	(2.6.5)	Display the demand progress log of a test program
RUN	(2.6.2)	Start the execution of the selected test program
REMOVED	(2.6.8)	Make the specified test program "invisible" to the test system
SETUP	(2.6.7)	Start the dialog to display and enter parameters for the selected test program, one slot at a time
STATUS	(2.6.6)	Display program status and test program-specific parameters
STOP	(2.6.3)	Stop the test program at the end of the current test
STS	(2.6.6)	Display status of the general parameters only

(Continued)

Table 2-2 — PMEX Command Summary (continued)

Subsystem "Parameter" Commands

ABBREVIATION	(2.7.8)	Set abbreviation level (0, 1, 2, 3, or 4)
ERROR_LIMIT	(2.7.2)	Set limit on number of errors before halting
INHIBIT	(2.7.5)	Suppress output of LOG, TESTNUMBER, PASSNUMBER, and SUSPENDED messages
MINUTES_LIMIT	(2.7.7)	Set limit on test-execution time before stopping
PASS_LIMIT	(2.7.3)	Set limit on number of passes before stopping
REPORT	(2.7.4)	Enable output of LOG, TESTNUMBER, PASSNUMBER, and SUSPENDED messages
SCALE	(2.7.6)	Set delay between tests to xx% of nominal delay
TESTS	(2.7.1)	Set up list of tests in the order they are to be run

2.3.7.5 "Shorthand" Parameter Entries

Values for subsystem parameter change commands can be entered by abbreviated "shorthand" entries that allow multiple parameters to be entered on a single command line. Shorthand entries are not provided for test program-specific parameters.

Each abbreviated parameter name is represented by a single letter (e.g., A for ABBREVIATE). There is no separator between the shorthand command and any parameter value (e.g., RLOG enables reporting of the Periodic Progress Log). If no parameter value is entered (first command letter only entered), the command is treated as a request to display the currently assigned value.

When a parameter value is a named value, it also can be truncated to one or more letters (e.g., RL enables reporting of the Periodic Progress Log).

If multiple shorthand commands are included on one command line, each must be separated by a blank. For example:

RUN ALL E1 P10 T- IT RP,L S100	(run all test programs for the selected COMM/ CTRL processor(s) using an error limit of 1, a pass limit of 10, execute all tests, inhibit the testnumber message, permit the passnumber message and the periodic-progress log, and set the scale at 100)

See Table 2-3 for all allowed shorthand commands with examples of recognized value combinations for each.

Table 2-3 — Abbreviations for PMEX Parameter Change Commands

Abbreviation	Equivalent Command
An	ABBREVIATE n
Enn	ERROR LIMIT nn
IL	INHIBIT LOG
IL,P,T	INHIBIT LOG,PASSNUMBER,TESTNUMBER
IP,L	INHIBIT PASSNUMBER,LOG
IT	INHIBIT TESTNUMBER
Mnn	MINUTES LIMIT nn
Pnn	PASS LIMIT nn
RL	REPORT LOG
RP	REPORT PASSNUMBER
RP,T,L	REPORT PASSNUMBER,TESTNUMBER,LOG
RT,P	REPORT TESTNUMBER,PASSNUMBER
Snn	SCALE nn
Txx,yy-zz	TEST xx,yy-zz

Note: Not all possible combinations have been shown for TEST or for the multiple-value parameters INHIBIT and REPORT.

2.4 SYSTEM COMMANDS TO THE TOCS

The commands in this category instruct the TOCS to perform specified activities; however, it is not necessary to explicitly specify the TOCS as the target node. These commands are independent of the prompt type (single node or network).

2.4.1 LOAD Command

While in the PMEX (NMA) operating mode, the Load command downloads PMEX and the complete set of test-programs to selected PM nodes, meanwhile ADDing those nodes to the list of UCN nodes controlled by the TOCS. Note that the following discussion applies **only** to loading of PMs while in the PMEX operating mode. For information on loading LCN nodes (EXEC operating mode) see the *Test System Executive* manual.

First, reset all PM nodes to be loaded. You can determine which PMs are reset and ready to load by entering **LOA** by itself. The system responds with the following message:

```
Node nn These nn COMM nodes are ready to be loaded: n,n-n,n
```

Then, with the test system floppy or cartridge disk mounted in the appropriate drive 1, enter the following command:

LOA n,n,n-n

Each "n" represents the UCN address of a node to be loaded with the test programs (see Appendix B, paragraph B.4, for the significance of n-n when entering multiple parameter values).

Enter **LOA -** (minus sign) to load all nodes on the UCN network. Remember, each node to be loaded must first be reset.

Optionally, the list of nodes to be loaded can be preceded by one to three entries in the form V4,Fnn,Dnn (in no particular order). V4 requests reporting of all alarms and warnings encountered during loading. Fnn and Dnn are used to override the default values for the TOCS floppy slot and drive assignments (slot 3 and drive 1). For example, the command `LOAD F3,D2,16` will load node 16, using TOCS floppy drive 2.

When loading from cartridge disk, your request to load one or more nodes is answered with a prompt that asks which test system to load:

```
Enter M for PMMTS, P for PMTS, S for STIM, or Q for Quit
```

Enter the character that represents the test system you wish loaded into the selected nodes, and then press the return key. The system responds with:

```
   Your UCN LOAD request is in progress...
Node nn Load images being sent to these nn COMM nodes: n,n-n,n
```

Unless there is an error, no other messages from the LOAD appear until completion. Then the following lines appear together at the TOCS:

```
Node nn PMM Load Completed.
PMMTS/PMTS just started in nn COMM nodes:  n,n-n,n
PMMTS/PMTS just started in nn CTRL nodes:  n,n-n,n
UCN network now has nn COMM nodes:  n,n,n-n,n
UCN network now has nn CTRL nodes:  n,n-n,n
```

See heading 2.8.3 for a summary of load-command error codes.

During the loading process the Abort and Status commands can be used, but only following entry of the LCN command to change to EXEC operating mode. (Remember to return to PMEX operating mode with the NMA command before continuing.)

Other commands such as date and time entry can be entered at the TOCS while the Load is in progress.

2.4.2 COMM and CTRL Commands

These commands determine which processor in which node on the UCN is to be affected by subsequent single-node commands (i.e., determines which of the specified node's two "brains" is to be the target of these commands). To change node selection, enter

COMM nn to select the communications processor in node nn

or

CTRL nn to select the control processor in node nn

where nn = the node's UCN address in the range of 1 to 63

Entry of COMM - or CTRL - specifies the TOCS node. COMM or CTRL entered by itself returns the identity of the target node (which is the same node value found in the current prompt requested by Escape/Select).

2.4.3 DELETE Command

The DELETE command removes loaded nodes from the list of UCN nodes in the network controlled by this TOCS (the TOCS itself cannot be deleted). To delete nodes, enter

DEL n,n,n

where each "n" is the UCN address of a node to be deleted.

DEL entered without parameters returns the list of nodes currently in the test system network as follows.

```
Node List has nn nodes: n,n-n,n
```

Entry of DEL - (minus sign) deletes all loaded nodes (except the TOCS) from the network list.

2.4.4 ADD Command

The ADD command restores DELeted nodes to the list of UCN nodes in the network controlled by this TOCS. To add nodes, enter

ADD n,n,n

where each "n" is the UCN address of a node to be restored.

ADD entered without parameters returns the list of nodes currently in the test system network as follows.

```
Node List has nn nodes: n,n-n,n
```

A DELeted node that subsequently has been powered down cannot be ADDed back, it must be reLOAded (because of memory loss).

CAUTION

Do not attempt to ADD any nodes that are not loaded with the test system. For example, "ADD -" attempts to add nodes 1 through 63 to the network, which results in a failure message for each node on the UCN not loaded with the test system.

2.4.5 NET Commands

Two lists are used to control which nodes—and which processors within those nodes—are the targets of all multinode commands. One list defines those nodes wherein the communication processor is to be addressed; the other list defines nodes wherein the control processor is to be addressed. If a node appears in both lists, both processors are addressed. Three commands are used to define the contents of these lists.

The NETWORK command treats both lists identically, setting up for both processors in each node specified. This is the normal case; the next two commands are used when it is necessary to exclude one or the other processor in a node from testing.

The NET_COMM command sets the list of nodes where the communications processor is the target of operator command entries.

The NET_CTRL command sets the list of nodes where the control processor is the target of operator command entries.

Whenever a multinode command is entered—in response to the NETWORK prompt—the nodes and processors are selected by an "oring" of the NET_COMM and NET_CTRL lists "anded" with the current list of nodes in the test system (those nodes LOADed and not DELeted).

In other words, when a node appears in both net lists, both processors are addressed by any multinode commands; therefore, if you wish to stop multinode access to a processor, it is necessary to remove that node from that processor type's net list. Both net lists are initialized to contain all nodes.

Note that the following instructions apply generally to NETW, NET_CO, and NET_CT.

To select a set of nodes to be the targets of future multinode commands, enter

NETW n,n,n,n,n

where each 'n' represents a node. For example, to specify nodes 0 through 4, 6, 11 through 15, 33, and 61 through 63, enter

NETW -4,6,11-15,33,61-

No multinode commands are sent to any nodes within these ranges that have not been LOADed or that have been DELeted.

To specify that every node that has been loaded with the test system (and not DELeted) is to be the target of subsequent multinode commands, enter

NETW -

To empty the list of nodes selected for multinode commands, enter

NETW 0

To determine which nodes are currently targeted for subsequent multinode commands, enter

NETW

The lists set up by the earlier example (**NETW -4,6,11-15,33,61-**), would be shown as following:

```
COMM Network List has 14 nodes: 1-4,6,11-15,33,61-63
CTRL Network List has 14 nodes: 1-4,6,11-15,33,61-63
```

Notice that the effective network lists consist of common elements in the network lists and the list of test system nodes. Thus, if nodes 1 and 6, for example, were not loaded or had been deleted, the previous example would instead show

```
COMM Network List has 12 nodes: 2-4,11-15,33,61-63
CTRL Network List has 12 nodes: 2-4,11-15,33,61-63
```

In these examples, both the NET_COMM and NET_CTRL lists are identical because they were established by a NETW command. If, however, the lists are modified by using NET_COMM and NET_CTRL commands, any differences are shown. Thus, to exclude node 14 from the control processor list, enter

NET_CT -4,6,11-13,15,33,61-

The network list messages now are

```
COMM Network List has 12 nodes: 2-4,11-15,33,61-63
CTRL Network List has 11 nodes: 2-4,11-13,15,33,61-63
```

2.4.6 UCN_CABLE Command

This command directs the PM to listen on the specified cable (transmissions always go to both cables). To change the "listen" cable selection, enter

UCN A	to select Cable A
UCN B	to select Cable B
UCN SWITCH	(or UCN S) to select once-per-minute switching between cable A and cable B

UCN entered by itself (with no parameter value) returns the currently selected cable's identity, plus a list of UCN nodes listening on each cable.

2.4.7 LCN Command

This command sets the operating mode so that all commands are sent to LCN nodes. This is the EXEC operating mode.

To change the operating mode from NMA to LCN, enter

LCN

without any parameters. Unlike most other commands, the LCN command does not support any parameters, nor does its entry, without parameters, result in any immediate display.

2.4.8 NMA Command

This command sets the operating mode so that all commands are sent to UCN nodes. It also determines which NIM on the LCN is to be the target network manager for all commands to these UCN nodes. This is the PMEX operating mode.

To change the operating mode from LCN to NMA, enter

NMA nn where nn = the NIM's LCN address (0-127)

NMA with no parameter, returns a list of the potential network managers as follows:

```
Select a NMA from one of these nn LCN nodes:  n,n-n,n
```

2.4.9 RESET_PMMS Command

The RESET_PMMS command performs a hardware reset of all PM nodes specified in the parameter list if they are loaded with PMTS, PMT2, or PMMTS. This enables you to prepare remote nodes for loading with system software without the need to toggle the physical reset on each node. To reset selected PM nodes, enter

RESET_ n,n,n-n,n

Where each **n** represents the UCN address of a PM node to be reset. (See Appendix B, heading B.4 for uses of "-" when entering multiple values.)

Use the NETMAP command (see heading 2.4.11) to obtain the status of all PM nodes on the UCN. Only those nodes classified as "NetMember" can be reset by this command.

Enter **RESET_ -** to reset all qualified PM nodes on the UCN.

The entry of RESET_ by itself results in the following message:

```
Specify PMM node list on RESET_PMMS line.
```

2.4.10 PEER Command

This command tests the ability of the PMs on the UCN to communicate with each other. It accomplishes this by changing from direct to indirect polling. With indirect polling, the regular quarter-second polling messages are sent from the NMA to a selected PM, which passes it to the destination PM. Poll responses are returned to the first PM, then back to the NMA. All combinations of PM to PM communication are exercised repetitively.

To establish Peer-to-Peer polling, enter

PEER Y

To return to the default condition (direct polling between the NMA and each PM), enter

PEER N

Any failures of the PM node communications are alarmed with error messages of this form:

```
28-DEC-1989 01:35:17 Node 17  POLUCNTSK detected the following error:
 No poll acknowledge received     27      3
  Communication Failure.  COMM And CTRL 27
  Node 17 To COMM 27 Via COMM  3 On UCN Cable A
```

2.4.11 NETX Command

This command is used to confirm the ability to communicate with those UCN nodes that are running firmware-only or the system software. Nodes running PMTS/PMMTS are not affected by this command.

At the end of the first minute, all powered-up nodes on the physical UCN network will be reported (from "No Node" to a device type identifier). Thereafter, only power up/down changes are reported.

To initiate this test, enter

NETX Y (checks for changes at 10-second interval)

or

NETX FAST (or **NETX F**, checks for changes at 1-second interval)

To return to the default (not running) condition, enter

NETX N

NETX alone returns the current YES/NO status.

The NETX report takes the following form:

```
16:00 NMA 13 COMM 27 ALL ? NETX Y
23-APR-1990 16:01:00 NMA 13 COMM 27 These Network changes were detected
UCN Node  1 changed from No Node to NIM
UCN Node  3 changed from No Node to PMM COM
UCN Node  5 changed from No Node to NIM
UCN Node 25 changed from No Node to Unknown
UCN Node 27 changed from No Node to LM
UCN Node 28 changed from No Node to PM100
```

2.4.12 NETMAP Command

This command requests a one-time display of all nodes on the UCN, giving their device type (NIM, PMM, LMM, PM-100, APMM, SMM, HPMM) and status. To initiate this display, enter

NETM

The following is an example of a NETMAP display:

```
16:00 NMA 13 COMM 27 ALL ? NETMAP
23-APR-1990 16:00:11 NMA 13 COMM 27 UCN network modules and statuses
Node  Type     Status
  2   Unknown  Offnet
  4   PMM      ConfgMis
  5   NIM      NetMember
  6   LM       Idle
  8   PM100    IdleSF
 10   Undef    Run
 12   PMM      RunSF
 13   NIM      NetMember
 14   PMM      Fail
 16   LM       FailSF
 18   PM100    PwrOn
 20   Undef    PwrOnSF
 22   PMM      Alive
 24   PMM      AliveSF
 26   LM       Test
 27   PMM      NetMember
 28   PM100    TestSF
 30   Undef    Qualif
 32   PMM      Loading
 34   Unknown  Ucn Node
 36   Unknown  UcnFail
```

2.5 SYSTEM COMMANDS TO TARGET NODES

The commands in this category require the selected COMM/CTRL processor(s) to take a specified action.

2.5.1 CLOCK Command

Date and time are set or changed for the selected COMM/CTRL processor(s) by using the CLOCK command. To change date and/or time, enter

CLO dd-mmm-yyyy hh:mm

dd	=	Day of month (01-31)
mmm	=	Month (JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC)
yyyy	=	Year
hh	=	Hour in 24-hour style
mm	=	Minute

It is not necessary to enter both date and time. Either CLO dd-mmm-yyyy or CLO hh:mm is acceptable. The current value remains for the item not entered.

CLOCK entered with no date or time parameters returns the current date and time settings.

As nodes are ADDed to the test system network they take their time from the TOCS.

2.5.2 CONFIGURATION Command

The type of configuration display invoked by this command depends on which test environment (PMTS or PMMTS) is operating.

- In the PMTS environment, the CON command requests the IOP Configuration and Revision Display. See heading 2.8.1.10 for an example of this display.

  The PMTS environment supports the CON + command to request that the PMM Configuration (and registers) display follows the IOP display.

- In the PMMTS environment, the CON command requests the PMM Configuration (and registers) display. See heading 2.8.1.11 for an example of this display.

  The PMMTS environment does not support the CON + command.

Only the COMM processor supports this display. Thus, if invoked by Line Feed (multi-target), there is only one display per UCN node.

2.5.3 REVISION Command

The type of revision display invoked by this command depends on which test environment (PMTS or PMMTS) is operating.

- In the PMTS environment, the REV command acts the same as the CON command—it requests the IOP Configuration and Revision display. See heading 2.8.1.10 for an example of this display.

  The PMTS environment supports the REV + command to request that the PMM Revision display (see heading 2.8.1.12) follows the IOP display.

- In the PMMTS environment, the REV command requests the PMM Revision display. See heading 2.8.1.12 for an example of this display.

  The PMMTS environment does not support the REV + command.

Only the COMM processor supports this display. Thus, if invoked by Line Feed (multi-target), there is only one display per UCN node.

2.5.4 MODE Command

PMEX has three modes of operation, although not all modes are appropriate to all test systems.

Subsystem—This mode provides intense functional testing of one board (subsystem) at a time. Thus, while in the subsystem mode, PMEX allows only one test program to run in a given COMM/CTRL processor. There is no testing for interaction between programs in this mode.

Any test identified as a "UTILITY" test runs only in Subsystem Mode and must be the only test specified in the TESTS parameter value for that test program in that node.

Exercise—This mode is used to test random interaction between hardware subsystems. One test in each test program is designed to force the types of actions that might cause interaction with another hardware subsystem. Test duration is short but tests run frequently, thereby creating heavy module bus activity. While in exercise mode, any or all test programs in a module can run, but only the tests designated as exercisers (one per test program) will run.

Module—This mode tests interaction between hardware subsystems, by permitting several subsystems to be concurrently tested. For example, all peripherals attached to a module can be simultaneously tested. Only a restricted set of tests can be run in this mode.

To change mode, enter

MOD S (or: **MODE SUBSYSTEM**)
MOD E (or: **MODE EXERCISE**)
MOD M (or: **MODE MODULE**)

MODE entered by itself results in a system-response message that identifies the current mode setting. The default mode setting is "Exercise."

2.5.5 INTERVAL Command

A periodic-progress log can be printed, which shows the run status, the pass count, and the error count for all active test programs in the selected COMM/CTRL processor(s). The time interval for this log is set at four hours when PMEX is first started. This log interval is changed by the entry

INT nn

The periodic log is printed at the start of the next minute that is a multiple of nn minutes after midnight and then every nn minutes thereafter. For example, if nn = 60, the periodic log is printed every hour on the hour.

INT entered without any parameter returns the current setting.

See paragraph 2.8.1.4 for the format of the periodic-progress log.

2.5.6 QUEUE Command

To prevent the mixing of test results from several nodes, you can temporarily suppress the alarms and messages for the selected COMM/CTRL processor. To suppress the messages for a selected COMM/CTRL processor, enter

QUE Y

Display of alarms and progress messages for this processor ceases, but they are queued in the node's memory for later display.

CAUTION

Before Queuing is invoked for any long period, disable all progress messages (INH TESTNUMBER, PASSNUMBER, LOG, SUSPENDED) for all active test programs. PMEX can only queue up-to-200 messages and alarms. After that limit is reached, any test program with a message or alarm to report is indefinitely blocked.

To resume alarm display for the selected processor, enter

QUE N

Output of the queued alarms and messages resumes.

QUE entered without a parameter returns one of two single-line messages:

```
NMA nn COMM/CTRL nn Queuing Disabled.  Enter QUE Y to Queue.
```

or

```
NMA nn COMM/CTRL nn xx Alarms queued.  Queue xx% full. QUE N resumes
printing.
```

2.5.7 AUTO_CONFIGURATION Command

When PMEX starts in each PMM, a list of the current IOPs is built automatically. When the hardware complement of IOPs in a module is changed (by adding or removing IOPs or by changing IOP types in slots), then this list will need to be rebuilt. The AUTO_CONFIGURATION command provides an on-demand way to request PMEX to determine the currently available IOPs and to update this list accordingly.

To request that the IOP list be rebuilt, enter

AUTO

Unlike most commands, AUTO_CONFIGURATION does not support any parameters, nor does entry of AUTO without parameters result in any immediate display.

Note that the new list will override any deletions previously made to the old list.

2.5.8 DEL_IOP Command

Selection of which IOPs (among those attached to a selected PMM) are to be tested is controlled by deletion of entries from the I/O list (built on initialization or by AUTO_CONFIGURATION). To delete one IOP from the active IOP list, enter

DEL_ fss where fss identifies the IOP to be deleted from the list (see heading 1.1.3 in the *Process Manager Test System* manual for an explanation of the "fss" notation)

CAUTION

When abbreviating the DEL_IOP command, be sure to enter at least the first four characters including the underbar; thus, DEL_. Otherwise, the "DEL" would be interpreted as a DELETE node command.

To delete several IOPs, enter

DEL_ -fss,fss,fss-fss,fss,fss- where "-fss,fss,fss-fss,fss,fss-" is the list of IOPs to be deleted from the active IOP list

To delete all IOPs, enter

DEL_ -

DEL_ entered without any IOP addresses returns a list of those IOPs currently left in the active IOP list.

2.5.9 ADD_IOP Command

Restoration of previously deleted IOPs to the active IOP list is done through the ADD_IOP command. To restore one IOP to the active IOP list, enter

ADD_ fss where fss identifies the IOP to be added back to the list (see heading 1.1.3 in the *Process Manager Test System* manual for an explanation of the "fss" notation

CAUTION

When abbreviating the ADD_IOP command, be sure to enter at least the first four characters including the underbar;29 thus, ADD_. Otherwise, the "ADD" would be interpreted as an ADD node command.

To restore several IOPs, enter

ADD_ -fss,fss,fss-fss,fss,fss- where "-fss,fss,fss-fss,fss,fss-" is the list of IOPs to be added back to the active IOP list

To restore all deleted IOPs, enter

ADD_ -

or as an alternative enter

AUTO

ADD_ entered without any IOP addresses returns a list of those IOPs currently in the active IOP list.

2.5.10 PARTNER Command

The PARTNER command initiates a dialog to display and enter the FSS (file and slot number—see heading 1.1.3 in the *Process Manager Test System* manual) of the redundant partners for every IOP that supports redundancy.

First, enter **COMM nn** to select the PM that contains the IOP pairs to be identified. Next, to initiate the dialog, press Escape/Select key, then enter

PARTNER

The FSS of the first IOP in the selected PM that supports redundancy is displayed, followed by the FSS of its currently defined redundant partner, if any.

- To change/add the partner, enter the three-digit FSS number and press <return/enter>.
- To specify that there is no partner, enter "-" and press <return/enter>.
- To keep the existing partner, press <return/enter>.

After each entry, the program advances to the next IOP. You can terminate the dialog at any time by entry of a "." followed by <return/enter>. The period can be specified alone or can follow an FSS number or a "-" entry.

Note that when you establish/change a partner for an IOP the program also records the change with the new/previous partner. For example, assume that when IOP FSS 115 is encountered that the operator responds with the entry 201 (in error he meant to enter 210). Then, when 201 is encountered it displays 115 as its partner and he realizes his error. By entry of 213 as 201's new partner he: changes 115 to have no partner, changes 201 to have 213 as its partner, and changes 213 to have 201 as its partner. Subsequently, when 210 is encountered and the operator enters 115, it then pairs 210 with 115 and 115 with 210 (thus he doesn't have to initiate PARTNER again to pair 115 with 210). Finally, when 213 is encountered it will display 201 as its partner.

BEFORE DIALOG	AFTER FIRST ENTRY	AFTER SECOND ENTRY	AFTER THIRD ENTRY
115 / -	115 / 201	115 / -	115 / 210
201 / -	201 / 115	201 / 213	201 / 213
210 / -	210 / -	210 / -	210 / 115
213 / -	213 / -	213 / 201	213 / 201

2.5.11 BATTERY_BACKUP Command

This command is used to test whether the memory of all PMs in the cabinet can be retained through a power outage for the prescribed time.

Before this test is begun, be sure that the PMs you are going to test are loaded with PMTS, PMT2, or PMMTS, but are not running any tests and that the batteries are installed on the front panel of the PM power supply unit.

Use the NETWORK (or DELETE) command as necessary to adjust your UCN node list to contain only those nodes that you wish to test. To test multiple nodes, press Line Feed/Tab to bring up a multi-target prompt, then enter

BATTERY DOWN (or BAT D)

After the last node receives the command, the TOCS displays the message

```
Please power down the PMMs, wait awhile, restore power, then
command BATTERY UP.
```

You then wait for the prescribed time (currently 30 minutes), then turn power to the PMs back on. If you can see the PM leds, they should all be on solid (two per board). At the TOCS, press the Escape/Select key (Line Feed/Tab key won't work because the node list is now empty) and enter

BATTERY UP (or BAT U)

When the PMs come up, a message indicates which nodes are in the UCN node list. If this is the same node list as when you went down, all PMs pass. Any node that does not come back did not pass the test (its memory was not properly retained through the outage).

Entry of BATTERY with no parameter results in a message requesting you to enter either BATTERY UP or BATTERY DOWN (to reverse the existing condition). The message also tells which prompt request to use (Line Feed or Escape Key).

2.5.12 LINK_IO Command

This command directs the UM51 (I/O Link controller) and IOPs within a PM/APM to listen to the specified I/O Link cable (transmissions always go to both cables). The LIN_IO command can be abbreviated as LIN. Note that this is only effective when running the Process Manager Test Systems (PMTS, PMT2, or PMT3).

To change the I/O Link “listen” cable selection, first select the COMM on the desired PM/APM (COMM nn), and then enter

LIN A to select cable A (default setting)

LIN B to select cable B

LIN SWITCH (or **LIN S**) to select once-per-minute switching between cable A and cable B.

When LIN is entered by itself with no parameter value, the current specified cable selection is returned.

2.6 SUBSYSTEM "ACTION" COMMANDS

Subsystem Action Commands modify or control execution of test programs in the currently selected COMM/CTRL processor(s).

2.6.1 DEVICE Command

The DEVICE command is used to select the test program that is to be controlled by subsequent subsystem commands (and to appear in subsequent prompts).

To select a test program, enter

DEV name

where "name" is a 4-digit test program name with or without a slot designation.

Parameter values can be changed in the same command line by using abbreviated parameter (shorthand) entries following the test program name (each separated by a leading blank). See Table 2-2 for the parameter abbreviations recognized by PMEX.

Use of the DEVICE command is unnecessary if the device name (or name and slot number) is entered with another command, for example, RUN name.

DEVICE entered without any parameter value results in no action.

2.6.2 RUN Command

The RUN command starts one or more test programs. If PMEX is running in the Exercise or Module mode, any number of test programs can be started.

To start a specific test program, enter

RUN

The test program specified in the current prompt begins running.

Or enter

RUN name

The test program specified by "name" begins running.

To start all test programs, enter

RUN ALL

All active test programs in the hardware module now run. An asterisk (*) can replace ALL.

A `"name" Started` message is printed for each test program commanded to run. See paragraph 2.8.1.1 for the message format.

2.6.3 STOP Command

The STOP command requests that the test program stop running when it completes the test in progress. One command can stop all running test programs in the currently selected COMM/CTRL processor(s).

To stop a specific test program, enter

STO

The test program identified in the current prompt stops after completing the test now in progress.

Or enter

STO name

The test program specified by "name" is requested to stop.

To stop all running test programs, enter

STO ALL

Each running test program in the hardware module stops after completion of the test in progress. An asterisk (*) can replace ALL.

A `"name" Stopped` message is printed for each test program after it stops. See paragraph 2.8.1.7 for the message format.

2.6.4 ABORT Command

The ABORT command requests that the test program stop alarming immediately and stop running as soon as possible. The current test is not completed. One command can abort all running test programs in the currently selected COMM/CTRL processor(s).

To abort a specific test program, enter

ABO

The test program identified in the current prompt stops as soon as possible.

Or enter

ABO name

The test program specified by "name" is aborted.

To abort all running test programs (and stop all alarming), enter

ABO ALL

Each running test program in the hardware module is aborted. An asterisk (*) can replace ALL.

A `"name" Aborted` message is issued for each test program aborted. See paragraph 2.8.1.8 for the message format.

2.6.5 LOG Command

The LOG command requests a single printing of the demand-progress log.

To call this status log, enter

LOG

This prints a demand-progress log for the test program specified by the current prompt.

Or enter

LOG name

to print a demand-progress log for the named test program.

To print a demand-progress log for every test program, enter

LOG ALL (or LOG *)

See paragraph 2.8.1.5 for format of the demand-progress log.

2.6.6 STATUS and STS Commands

The STATUS command requests display of the parameter values that relate to a particular test program in the currently selected COMM/CTRL processor(s). This presentation includes all the user-changeable parameters, both general and those specific to the test program. It also includes such data as test program release number, RAM addresses, and other values.

To display status of a test program, enter

STA

Parameters for the test program specified by the current prompt are displayed.

To display the parameters for the test program specified by "name", enter

STA name

Use of STA ALL (or STA *) is not recommended because of the quantity of information that would be reported.

The STS command requests the first seven lines of the same display, omitting the debug values and the test program-specific parameters.

See paragraph 2.8.1.6 for format of the test program Status Display.

2.6.7 SETUP Command

The SETUP command initiates a dialog that displays and permits change to all user-changeable parameters for the named test program in the selected COMM/CTRL processor(s). The name and current value of each parameter is displayed in turn. You then enter a new value or values and press Return/Enter. If no value is entered (i.e., Return/Enter only), the current value(s) remain. The dialog begins with the test program-specific parameters, then continues with the general parameters.

To begin the parameter-setup dialog to the test program named in the prompt, enter

SET

To begin the parameter-setup dialog to a specific test program, enter

SET name

To terminate the setup dialog at any point, enter

. (period) and press Return/Enter

Certain parameter sets are paired and share the same allowed value sets. Examples are REPORT/INHIBIT, ENABLE/DISABLE, and TURN ON/TURN OFF. A given value, however, can appear in only one of the two lists at one time. The result of adding one of the allowed values to one parameter's list is to delete it from the partner list.

2.6.8 REMOVED Command

The REMOVED command is used to eliminate one or more test programs so that they are not affected by any subsequent commands. By entry of the command `REM ABCD,EFGH YES`, you ensure that any subsequent commands addressed to ALL programs do not go to the ABCD and EFGH programs.

To make a test program "invisible," enter

REM name Y

Where "name" is a 4-digit test program name.

To restore all REMOVED programs, use the command `CON -`. Use of the command `REM name NO` cannot work because the REM command, like all others, is not seen.

2.7 SUBSYSTEM "PARAMETER" COMMANDS

The commands in this category change or display the test program-parameter values. When no parameter string follows the command field, the current value or values for that parameter is displayed. When a parameter string follows the command field, the newly entered values become the current values.

As with other subsystem commands, you have the choice of including test program names in the command line, or defaulting to the currently selected test program shown in the prompt.

The set of preset parameter values for each test program is included in the discussions of individual test programs in the *Manager Module Test System* manual.

2.7.1 TESTS Command

The TESTS command controls the tests to be run and the order in which they run in each pass. The preset parameter values generally result in the sequential running of all tests that are applicable to the current mode.

The tests can be run in any sequence, and any test can be repeated any number of times in a pass. As many as 30 tests can be included in the parameter string.

The parameter string consists of the test numbers (separated by commas) in the sequence in which they are to run. Single tests or ranges of tests (using the "-") can be specified. TESTS xx-yy says go sequentially up (or down if xx is greater than yy) from test xx through test yy. If the xx and/or yy are omitted, the first and/or last tests numbers are assumed.

To select the tests and their order, enter

TES x,x-yy,...,zz

To determine the current sequence of tests, enter

TES

Example entry

TES -2,4,6-8,10-

For the test program specified by the current prompt, all tests appropriate to the current execution mode except 3, 5, and 9 run in sequence.

2.7.2 ERROR_LIMIT Command

The ERROR_LIMIT command limits the number of errors reported before the test program halts. When this limit is met, the program halts and issues a "`name HALTED`" message. See paragraph 2.8.1.9 for the message format.

To set a new error limit, enter

ERR nn

The range of values is from 1 to 32767. Entering "-" specifies no limit. The stored error-limit value cannot be changed while the program is running or in an error-limit halt; however, the continuation limit can be increased as follows.

To continue after an error-limit halt, enter

ERR +nn

The new value is added to the current value and testing continues to the new limit.

or, enter

ERR nn

where the new value is greater than the existing limit.

Neither method of continuing changes the stored error-limit value that is used each time this test program is started or restarted.

Don't try to start the test program and change the stored error limit in the same command line (e.g., RUN name Ennn). The error limit won't change, but the continuation limit will, because RUN will have taken effect before the error limit change is interpreted.

To restart after an error-limit halt,

first enter	**ABO**	
then enter	**ERR nn**	(optional, to change the error limit)
then enter	**RUN**	

To determine the value set for error limit, enter

ERR

To determine the current error count, enter either of the following

ERROR_C

or

LOG

2.7.3 PASS_LIMIT Command

The PASS_LIMIT command controls the number of passes executed before the test program stops. When this limit is met, the program stops and issues a "name STOPPED" message. See paragraph 2.8.1.7 for the message format.

To set or change the pass limit, enter

PAS nn

The range of values is from 1 to 32767. Entering "-" specifies no limit. PASS_LIMIT can be changed at any time.

To restart after a pass-limit stop, enter

RUN

To determine the currently set pass-limit value, enter

PAS

To determine the current pass count, enter either of the following

PASS_C or **LOG**

2.7.4 REPORT Command

The REPORT command enables printing of messages associated with the progress of test execution. The following are the only parameters accepted:

PASSNUMBER – the end-of-pass message (abbreviated P)
TESTNUMBER – the start-of-test message (abbreviated T)
LOG – the periodic-progress log (abbreviated L)
SUSPENDED* – the suspended/resumed message (abbreviated S)

The REPORT command accepts a parameter list that can include any or all of the accepted parameters (or their abbreviations) in any order, separated by commas.

For example, to display end-of-pass messages, enter

REP P

To determine which messages are enabled, enter

REP

PASSNUMBER, TESTNUMBER, SUSPENDED, and/or LOG are displayed as applicable.

*The "SUSPENDED" parameter applies to only the SEQUENTIAL command. See paragraph 3.3.1 for details of this special command's use.

2.7.5 INHIBIT Command

The INHIBIT command suppresses printing of messages associated with the progress of test execution. The following are the only parameters accepted:

PASSNUMBER	– the end-of-pass message (abbreviated P)
TESTNUMBER	– the start-of-test message (abbreviated T)
LOG	– the periodic-progress log (abbreviated L)
SUSPENDED*	– the suspended/resumed message (abbreviated S)

The INHIBIT command accepts a parameter list that can include any or all of the accepted parameters (or their abbreviations) in any order, separated by commas.

For example, to suppress display of the start of test messages, enter

INH T

To find which messages are suppressed, enter

INH

`PASSNUMBER, TESTNUMBER, SUSPENDED`, and/or `LOG` are displayed as applicable.

2.7.6 SCALE Command

The time delay between consecutive tests is made variable by use of randomly selected percentages (in the range of 0 to 200 percent) applied against a nominal delay period. The SCALE command is used to adjust the preset nominal delay period, and should be carefully selected, depending on requirements of the particular test program.

The scale is entered as a percentage (0 to 999) of the nominal delay period. Thus, a value of 200 doubles the nominal delay period, while a value of 50 cuts it in half. The value of SCALE is initially set to 100 and when the mode is changed to Module or Exercise, and set to zero when the mode is changed to Subsystem.

CAUTION

If an electro-mechanical device is being tested for an extended duration, in any mode, specify a scale of 200 or greater to avoid excessive wear on the device.

To change the effective nominal delay period, enter

SCALE nnn

To determine the current scale, enter

SCALE

*The "SUSPENDED" parameter applies to only the SEQUENTIAL command. See paragraph 3.3.1 for details of this special command's use.

2.7.7 MINUTES_LIMIT Command

The MINUTES_LIMIT command sets a time limit (in minutes) on how long a selected test program runs. After the specified time limit is reached, the program ends as if a STOP command was issued, and a "`name STOPPED`" message is printed. See paragraph 2.8.1.7 for the message format.

To set or change the time limit, enter

MIN nn

The range of values is from 0 (runs until the end of the current minute) to 32767. Entering "-" specifies no limit. The time-limit value can be changed by this command even while the program is running or in an error-limit halt.

NOTE

If the test program is halted because of reaching the error limit, the time count continues to be incremented. If the time limit is reached during an error halt, the run is aborted and a "`name ABORT`" message is printed. See paragraph 2.8.1.8 for the message format.

To determine the established limit value, enter

MIN

To determine how long the selected test program has been running, enter

MINUTES_C

2.7.8 ABBREVIATION Command

The ABBREVIATION command is used to control the quantity of information that is presented with each error detected by the test programs. The following suppression levels are provided:

0 – No error message is printed, but the error count is maintained for execution control and logging. If ABBREVIATION is changed to 0 during test execution, all alarms are immediately suppressed.
1 – Only a single line including the node number, time, alarm number, and a minimum of error-type identification is printed.
2 – All information used to determine that there was an error is printed.
3 – Supporting information related to the problem is added.
4 – Usually the same as Abbreviation Level 3, but may further identify contents of some alarm fields.

To set the abbreviation level, enter

ABB n

"n" should always be entered as a single digit.

To determine the current abbreviation level, enter

ABB

2.8 LOGS, ALARMS, AND ERROR MESSAGES

2.8.1 Operational Messages

2.8.1.1 Start Test Program Message

Each time a test program begins execution, the following message is printed.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s Release b.b Started
```

Where:	NMA nn	identifies the NIM at LCN node nn	Common to **all** test messages
	cccc nn	is either COMM or CTRL at UCN node nn	
	name	is the name of the test program that started to run	
	s	is the PMM card slot of the board being tested	
	b.b	is the program Release number	

If more than one test program started, a message is displayed for each program and each card slot.

2.8.1.2 Start-of-Test Message

Each time an individual test within a test program begins running, the following message is printed.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s Start Of Test xx
```

Where: xx is the number of the test just started

Printing or suppression of start-of-test messages is controlled by the REPORT and INHIBIT commands.

2.8.1.3 End-of-Pass Message

At completion of a pass through all currently selected tests for a test program, the following message is printed.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s End Of Pass xx, Errors yy
```

Where: xx is the number of passes completed since the test program was last started
yy is the number of errors

Printing or suppression of end-of-pass messages is controlled by the REPORT and INHIBIT commands.

2.8.1.4 Periodic-Progress Log

The Periodic-Progress Log of a test program is automatically printed at regular intervals as defined by the INTERVAL command. Printing or suppression of this log is controlled by the REPORT and INHIBIT commands. Its format is as follows.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s status   xx Passes   yy Errors
```

Where: status is Running, Stopped, Halted, or Suspended
xx is the number of passes completed
yy is the number of errors noted

2.8.1.5 Demand Progress Log

The Demand Progress Log is an on-demand printing of the Periodic-Progress Log. It is printed in response to the LOG command, and is not affected by the REPORT, INHIBIT, or INTERVAL command settings, or by message queuing.

2.8.1.6 Test Program Status Display

The test program Status Display is printed on-demand, in response to the STATUS command. Its format is shown below. The line numbers to the left of the display lines are included here for identification, but do not appear on the actual status display.

```
1. dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s       Release n.n
2. System Mode = xxxxxxxx     Log Interval = xxx    Nominal Delay = n
3. Run Status = xxxxxxxx      Abbreviation = x      Scale = xxx
4. Error Count = xxxx         Pass Count = xxxx     Minutes Running = x
5. Error Limit = xx           Pass Limit = xxxx     Minutes Limit = xxx
6. Report Log,TestNumber      Inhibit PassNumber,Suspended
7. Tests = x,x,.............,(x),.............xx,xx
8. Task Number = xx           Pblock At $xxxxxx     Program At $xxxxxx
9. unique1  = xxxxx           unique2  = xxxxx      unique3  = xxxxx
.
.
.
n. uniquem  = xxxxx       uniquen  = xxxxx
```

The content of each line is explained in the following:

1. Date and time, selected node's UCN address, COMM or CTRL
   Test program name and target slot number
   Test program release number

2. System execution mode is Subsystem, Exercise, or Module
   The interval, in minutes, for display of the periodic-progress log
   The preset value for the delay between tests

3. The run status for the test program
   - Off – The program is not running
   - Init Dev – The program is running, but initialization is not complete
   - Run – The program is running
   - Stop – The program has been requested to stop
   - Abort – The program has been requested to abort

   The user-entered abbreviation level, 0 through 4
   The user-entered scale for changing the random delay between tests by a percentage between 0 and 999

4. The error count since the test program was last started
   The number of passes completed since the test program was last started
   The number of minutes that the test has been running

5. The user-entered limit on the number of errors allowed before the test program halts
   The user-entered limit on the number of passes to run before the test program stops
   The user-entered limit on the number of minutes to run before the test program stops

6. Indication (Report or Inhibit) of whether or not the periodic-progress log, the end of pass-progress message, the suspended/resumed messages, and the start of test-progress message will be printed. The manner and order of display will vary.

7. The list of tests included in each pass in the order they will run
   The currently running test is indicated by parentheses, i.e., (x)

The remaining parameters are excluded if the status display is requested by the STS command.

8. The internal identification number of the test program
   The memory address of system-accessible parameters for this board
   The memory address of the first instruction of this test program

9. Any test program-specific parameters are displayed, up to three on each line.
   If the name and value of a test program-specific parameter exceeds the available space, it will occupy more than one field.

n. Continuation of the test program-specific parameters until all are displayed

2.8.1.7 Test Program Stopped Message

The test program Stopped message is printed after execution of a STOP command, or when the number of passes limit or minutes limit is reached. Its format is as follows.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s Stopped   xx Passes   yy Errors
```

Where: xx is the number of passes completed
yy is the number of errors noted

2.8.1.8 Test Program Aborted Message

The test program Aborted message is printed after an ABORT is commanded or is forced by the minutes limit being reached while halted on an error. Its format is as follows.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s Aborted   xx Passes   yy Errors
```

Where: xx is the number of passes completed
yy is the number of errors noted

2.8.1.9 Test Program Halted Message

The test program Halted message follows the alarm message for the limit-reaching error. Its format is as follows.

```
Halted After x Errors
```

Where: x is the number of errors noted

2.8.1.10 IOP Configuration and Revision Display (PMTS Only)

```
16:00 NMA 13 COMM 27 HLAI ? REVISION
23-APR-1990 16:00:11  NMA 13  PMM 27 Iop Revisions and Register Contents
NMA  COMM  File/  Module  HW   FW   Stat  Stat   FTA Cable  Test  Redun
Node Node  Slot   Type    Rev  Rev  Wd 1  Wd 2  or Failure  IOP  Partner
13    27    112   LLAI     A   2.1   $01   $91   Cable A    Yes    310
13    27    113   HLAI     A   2.1   $02   $90   Cable B    Yes
13    27    114   DI       A   2.1   $01   $99   Hard Fail  No     308
13    27    115   DO       A   2.1   $02   $91   Cable A    Yes    307
13    27    201   AO       A   2.1   $01   $90   Cable B    Yes
13    27    202   UM       A   2.1   $02   $11   Cable A    Yes
13    27    203   LLMUX    A   2.1   $01   $90   Cable B    No     304
13    27    204   SSCN1    A   2.1   $02   $91   Cable A    Yes
13    27    205   SSCM2    A   2.1   $01   $95   Soft Fail  Yes    302
13    27    206   SIOM     A   2.1   $02   $90   Cable B    Yes    301
13    27    207   BCD      A   2.1   $01   $11   Cable A    Yes    315
13    27    209   FTMI     A   2.1   $01   $90   Cable B    No     314
13    27    210   STI      A   2.1   $02   $91   Cable A    Yes
13    27    211   ISAO     A   2.1   $01   $9D   Hard Fail  No     311
13    27    212   SOE      A   2.1   $02   $90   Cable B    Yes    410
13    27    213   PI       A   2.1   $01   $91   Cable A    Yes
13    27    214   LCFCO    A   2.1   $02   $10   Cable B    Yes    415
```

2.8.1.11 PMM Configuration Display (PMMTS or PMTS)

```
16:00 NMA 13 COMM 27 ALL ? CON
23-APR-1990 16:00:11 NMA 13 COMM 27 Register Contents
 1 MODEM
 2 COMM    $600000=$xxxx   $600002=$xxxx   $600004=$xxxx
 3 MEM
 4 CTRL    $60000E=$xxxx   $600016=$xxxx   $60001A=$xxxx   $60001C=$xxxx
 5 DEBUG
```

(HPM only)

```
28-JUL-1995 15:17:53 NMA 37 COMM  6
  ILVLDEF0  ILVLDEF1  INTRENAB  INTRSTAT   PERINTR   TRKSTRT    FRCCMP
  E65507FA  C4023333       E5F0  C4000020  0000C350  00000000  4D583A41

  UCNLATCH   HWSTAT0   HWSTAT1   DMACTRL    HWCTRL    TSCTRL      WDOG
  3111111C       180        58      0010      B120      0200  E0E64045
```

2.8.1.12 PMM Revision Display (PMMTS or PMTS)

```
16:01 NMA 13 COMM 28 ALL ? REV
23-APR-1990 16:01:17 NMA 13 COMM 28 Revisions
 6 MODEM  HW Rev A
 7 COMM   HW Rev A    FW Rev 1.4    Daughter HW Rev B
 8 MEM    HW Rev A    FW Rev 1.4
 9 CTRL   HW Rev A    FW Rev 1.4    Daughter HW Rev B
10 DEBUG
```

(HPM only)

```
28-JUL-1995 15:17:53 NMA 37 COMM  5    REVISIONS
 1 COM/CTL   HW Rev AB  FW Rev  A
 2 IO LINK   HW Rev A
 * MODEM     HW Rev A
```

2.8.2 Test Result Alarms

The alarm messages are divided into five disclosure levels that are controlled by the ABBREVIATION command. Running at level 2 or higher is recommended. See paragraph 2.7.8 for definition of alarm content at each of the defined levels.

The exact form and content of the hardware-alarm messages vary among the test programs; however, the general format is as follows.

```
dd-mmm-yyyy hh:mm:ss NMA nn cccc nn name s Alarm xxxx
"Text of message and data"
```

Where: xxxx is the alarm number (the first digit in a 3-digit alarm, or first two digits in a 4-digit alarm specify the test number)

The remaining text is dependent on the individual test program and the fault noted.

Appendix A contains a summary of the information found in selected data registers and memory locations. Bit-by-bit interpretation of their contents is often necessary for full understanding of alarm-message significance.

2.8.3 Data Entry Error Codes

The following error codes are displayed on the I/O device in response to invalid data entered by the user.

1x—Invalid Command Names

11 – The command name is invalid. It must be from 3 to 40 characters long and begin with an alphabetic character or $. It cannot be followed by a comma.

12 – This command does not match any valid command name.

13 – Either this command name is test program-specific and cannot be accessed using ALL, or the command does not match any valid name.

14 – SETUP cannot be a multinode command (use Escape/Select key to request prompt before using the SETUP command).

15 – Command not valid while in LCN mode. (Somehow, you have gotten into the EXEC, not PMEX operating mode. See headings 2.4.7 and 2.4.8 for information on changing between EXEC and PMEX operating modes.)

16 – Command not valid while in UCN (NMA) mode (you have entered an LCN-only command from PMEX).

2x—Invalid test program Name or Parameter Value

21 – The first test program name and following comma are correct, but the test program name following the comma is incorrect.

22 – The first parameter value violates the requirements of this parameter. This can also be caused by a bad test program name or a bad shorthand command being interpreted as a parameter value.

23 – The first parameter value is correct, but a later value is invalid.

24 – An attempt to advance the error limit (by using "+") beyond 32767.

25 – An attempt to select a target node not included in the node list.

26 – The specified Network Node list contains no nodes that are still in the test system's Node list (the node may have failed or been deleted).

27 – There are no target nodes left in the network node list that have the Default test program name (or name and slot). Specify a new test program name.

28 – Only one test program name (or ALL) can be specified in a multitarget command line (see Appendix B.7 for the reasons behind this restriction).

3x—Invalid "Shorthand-Parameter" Entry

31 – The Field is assumed to contain a shorthand-parameter entry, but it does not start with a single alphabetic character.

32 – The Field is assumed to contain a shorthand-parameter entry, but it starts with an invalid shorthand character.

4x—Clock Date and/or Time Incorrectly Entered or Spelled Wrong

41 – The Value has the wrong number of characters. There should be 11 for date only, or 5 for time only, or 17 for both date and time.

42 – The Clock entry is rejected because of wrong format or values. See paragraph 2.4.1 for the correct format.

43 - An attempt to change the system mode while test programs are running.

5x—Protection Violation

50 – An attempt to change a "Display Only" parameter.

51 – An attempt to change a "Change While Off" parameter while the test program is not in the OFF state.

52 – An attempt to RUN more than one test program while in the Subsystem mode.

53 – An attempt to RUN one or more test programs that are not OFF.

54 – An attempt to STOP one or more test programs that are already OFF.

55 – An attempt to ABORT one or more test programs that are already OFF.

56 – An attempt to RUN a program while another program is already running in this slot, or to LOAD a test system while the Floppy test program is running in the slot used for loading.

57 – An attempt to RUN a program that is already running in another slot. The Floppy loader and UCN loader are subject to this restriction.

SPECIAL PROCEDURES AND COMMANDS
Section 3

This section provides information on advanced features of PMEX that are of use mainly to factory technicians or to test program developers.

CAUTION

The procedures and commands discussed in this section are intended for use in only limited circumstances. They are included in this document as background information that may be helpful to customers while receiving direction from the Honeywell Technical Assistance Center (TAC).

3.1 CHANGING THE TOCS TO ANOTHER NODE

Any node in the test network with an I/O device becomes the new TOCS just by pressing the device's Escape/Select or Line Feed/Tab Down key. The old TOCS is replaced, and the new TOCS displays the "test system started" message and is ready to perform all TOCS functions.

3.2 RESTARTING A NODE

WARNING

The preferred method of recovery from a crash is to reload the node and set up its parameters. This guarantees integrity of the code; however, because the GO 119004 method preserves the parameter and data values, it is sometimes desirable to try this method first. Restarting this way can result in subsequent abnormal operation of this or other nodes in the network, and should not be reported as a test system problem.

Any node in the network with an RS-232C I/O device can be restarted by entering the following while in the Console Emulator on that device:

GO 119004 <return>

It may be necessary to first power cycle the module in order to clear a hangup and to invoke the Console Emulator.

To invoke the Console Emulator in any node with an RS-232C I/O device, hold down the CTL key and simultaneously press the E key.

3.3 SPECIAL COMMANDS

3.3.1 SEQUENTIAL Command

The SEQUENTIAL command starts test programs in the same way as the RUN command, except that SEQUENTIAL runs the test programs one at a time. Any number of test programs can be started in this way in any of the three execution modes.

The intended use is to allow several test programs to be run serially in the Subsystem mode without operator intervention. This manner of operation is required because only one test program can run at a time in Subsystem mode. Running test programs serially is useful in the factory during board test.

Several test programs are specified. When the first test program finishes (i.e., reaches its minutes or pass limit), it is suspended and the next test program starts running. After all specified test programs have run this way once, the first test program resumes, starting with the next test after the one it finished in the first cycle, and the cycle continues with each of the other specified test programs.

This serial cycling of the test programs continues indefinitely until the operator commands a STOP or ABORT. The pass count continues to advance each cycle and always indicates the total number of passes actually run regardless of the specified pass limit.

If any test program halts on errors, the next test program is immediately resumed. Unless the error limit is increased or the test program is ABORTED, this test program is skipped for future cycles.

To start several test programs running serially, enter

SEQ name,name,name,name

To start all test programs running serially, enter

SEQ ALL (an asterisk "*" can replace ALL)

To start the test program specified in the prompt serially in several slots, enter:

SEQ

A "Started" message is printed for each test program the first time it runs. A "Suspended/Resumed" message is printed whenever one test program is suspended and the next one is resumed. REP S enables display of this message; INH S inhibits this message.

3.3.2 STATUS* Command

This is a special purpose STATUS display that lists every parameter value in the selected test program's Pblock in a three column format. It is intended to be used for developing and debugging the test program, and has these restrictions:

- Most of the parameter names are meaningful only to test program developers.
- The display for a single test program can be too large to fit on a screen.
- Because of this large display, STATUS* is not recommended for multiple programs.
- The command may not be abbreviated. You must enter STATUS*.

PMM STATUS REGISTERS
Appendix A

A.1 COMM BOARD REGISTER DEFINITONS

A.1.1 Contents of the COMM "Register" at $600000

Bit 15: 0 if Control Card is installed, 1 if no Control Card
Bit 14: 0 if 80C31 Watchdog Timer has expired, 1 if running
Bit 13: 0 if CTRL 68K Watchdog Timer has expired, 1 is ok
Bit 12: 1 if this PMM is in slots 1 thru 5 of the card cage
0 if this PMM is in slots 6 thru 10 of the card cage
Bit 11: 0 if in factory test mode, 1 if normal running mode
Bit 10: 0 if PMM is in TWOUMBKPLN, 1 if in ONEUMBKPLN
Bit 9: 0 if COMM daughter card is installed, 1 if not
Bit 8: 0 in in UCN test mode, 1 if in normal mode
Bit 7: 0 if DEBUG card is present in the fifth slot, 1 if not
Bit 6: Parity for the UCN address
Bits 5-0: UCN address bits 5-0 (odd parity, bits negative true)

A.1.2 Contents of the COMM "Register" at $600002

Bit 15: 1 if Modem LS has detected non-silence (NONSIL+)
Bit 14: Bit status from Modem LS shift register (SHRDAT+)
Bit 13: 0 if NMI source is regulator power down
Bit 12: 0 if NMI source is global RAM parity error
Bit 11: 1 if NMI source is 80C31 shared RAM parity error (independent of which of the three MCPUs caused the parity error)
Bit 10: 0 if NMI source is local RAM/EPROM parity error
Bit 9: 0 if Modem LS has selected channel A (PPOSEL+)
Bit 8: not used, always=1
Bits 7-0: Hardware Revision Code bits 7-0

A.1.3 Contents of the COMM "Register" at $600004

Bits 15-8: Always 1 (set)
Bits 7-0: Hardware revision code for daughter card bits 7-0

A.2 CTRL BOARD REGISTER DEFINITIONS

A.2.1 Contents of the CTRL "Register" at $60000E

Bits 15-0: Daughter card counter address bits 15-0

A.2.2 Contents of the CTRL "Register" at $600016

Bits 15-8: Always 1 (set)
Bits 7-0: Hardware revision code of daughter card bits 7-0 (contents will be all 1s if daughter card is not installed)

A.2.3 Contents of the CTRL "Register" at $60001A

Bit 15: 0 if in factory test mode, 1 for normal running
Bit 14: Always 0 (after Pilot Run boards)
Bit 13: 0 if NMI source is daughter access interrupt
Bits 12-8: Always 0 (cleared)
Bits 7-0: Always 1 (set)

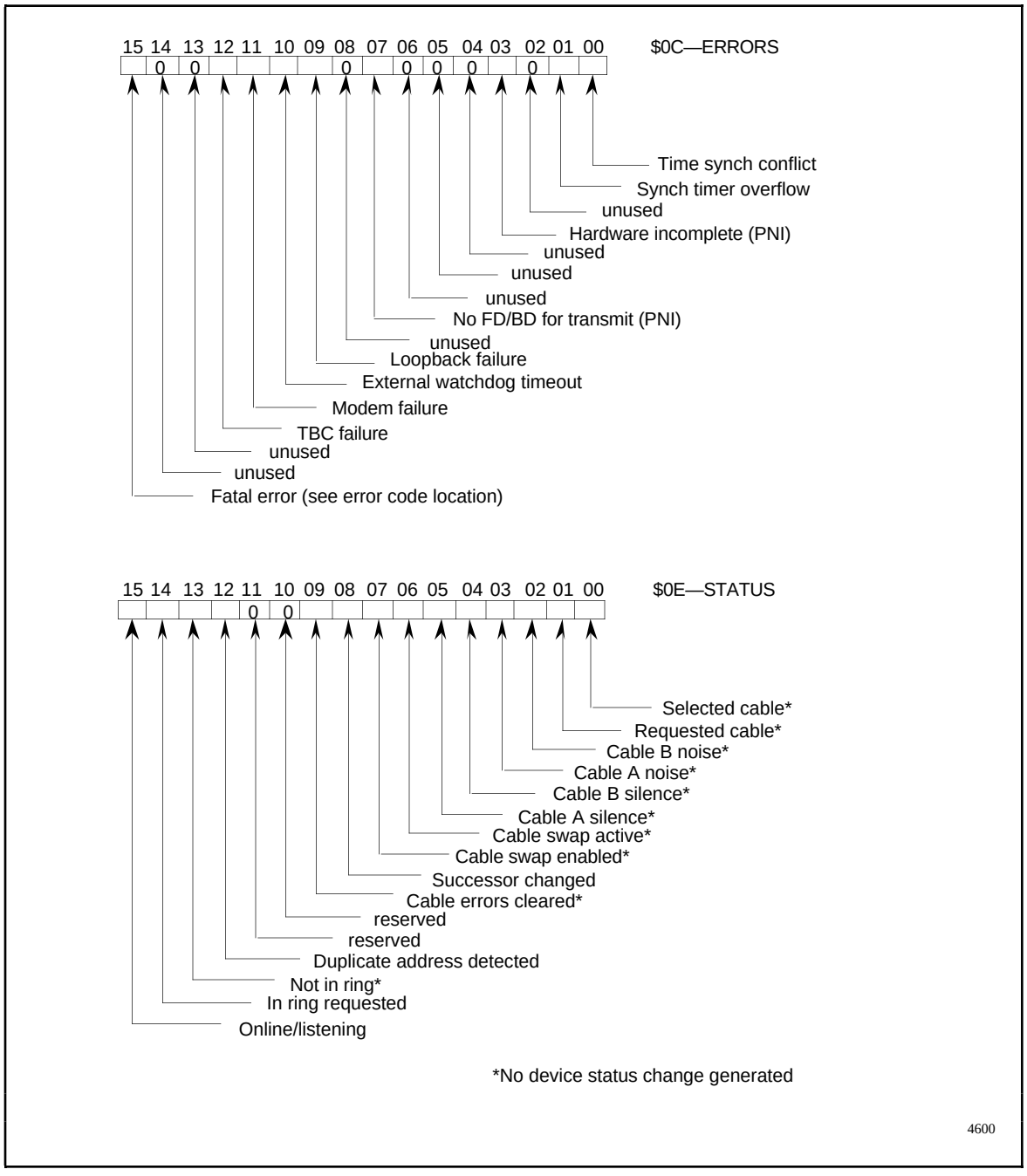
A.2.4 Contents of the CTRL "Register" at $60001C

Bit 15: 0 if 80C31 Watchdog Timer has expired, 1 if running
Bit 14: 0 when DEBUG card is present, 1 if not
Bit 13: 0 if NMI source is regulator power down
Bit 12: 0 if NMI source is global parity error
Bit 11: 0 if daughter memory is 7/8 full
Bit 10: 0 if NMI source is local RAM/EPROM parity error
Bit 9: 0 if CTRL daughter is present, 1 if not
Bit 8: 0 if COMM 68K Watchdog Timer has expired, 1 if ok
Bits 7-0: Hardware revision code bits 7-0

A.3 UCN DEVICE STATUS

These 2-paged status words are reported from a page status read with the parameter field equal to $02. They contain various flags related to the UCN interface that are set/reset by the LLC. Unused bits are reported as zero.

Bit 15 of the Errors word equal to 1 indicates that a PNI board failure occurred. A detailed error code (to be defined) is present in the internal error location in the shared RAM. A board-related interrupt/status is generated for the driver with the "Device Status Change" bit set whenever a significant change is made (to be finalized). Cable swapping and status generation is controlled by the frequency at which the device status is read; one second is recommended.



Error Bits Definitions

15: Fatal Error—The detailed error code and PC of failure are in the shared RAM error code and error PC locations.
12: TBC Failure—The TBC reported a failure or failed to respond to a command. The TBC is probably at fault. This is a PNI board failure.
11: Modem Failure—The TBC could not talk to the modem, or the modem failed a test. The fault is probably in the modem instead of the TBC. This is a PNI board failure.
10: External Watchdog Timeout—The external watchdog timer was enabled and was allowed to expire. This is a PNI board failure.
09: Loopback Failure—A loopback test failed to return the correct data. This is a PNI board failure.
07: No FD/BD for Transmit—(PNI only) A transmit operation was requested for which there was no Frame Descriptor and/or Buffer to perform the copy operation. This error indicates corruption or that there are more ICOBs allocated than the PNI can support.
03: Hardware Incomplete—(PNI only) One or more parts of the PNI board set has been removed.
01: Synch Timer Overflow—The Synch timer was not read within one second of being started.
00: Time Synch Conflict—This flags the occurrence of a time synch before processing of the previous time synch had completed (this window is expected to be less than 100 msec). The second time synch is ignored. This is a report-only error in the PNI.

Status Bits Definitions

15: Online/Listening—This node is on the network and messages can be received. RDR requests are honored. Messages can be transmitted only if this node is in the ring. This status is set by the "online" command, reset by the "offline" command and reset by any TBC status—such as duplicate address—which prevents the TBC from receiving messages.
14: In Ring Requested—This node is in the ring or has attempted to initiate token passing. If not in the ring, it enters the ring when another node tries to initiate token passing, or it again attempts to initiate token passing on the next request to transmit. This status is set by the "Request In Ring" command and is reset when Online/Listen command is given.
13: Not In Ring—This node is not a token-passing member of the ring. This node is the only token-passing node present or it cannot get access to the ring. An RDR request to a nontoken-passing node may succeed.
12: Duplicate Address—This node observed another node using the same configured UCN address. This node is taken offline. This status is cleared upon going online. If this error occurs during normal operation, it should be considered fatal. This is a PNI board failure.
09: Cable Errors Cleared—The cable error bits (silence and noise) have been cleared by one of the cable swap commands (cleared upon reading). Any cable errors reported in this device status word must be considered new errors.
08: Successor Changed—The node to which this node passes the token has changed. This bit is cleared upon reading.
07: Cable Swap Operator Enabled—The automatic cable swap mechanism is enabled. This status is controlled by the "Auto Swap Enable/Disable" commands. When this bit is set, noisy cable and periodic cable swapping can be performed.

06: Cable Swap Active—The noisy cable and periodic cable swap mechanism is active. This function is activated on a Auto Swap Enable Command and inactivated by the LLC when hunting for a good cable. It is reactivated by the driver under nonhunt conditions as necessary to see if cable errors have been corrected.
05: Silence on Cable A—Reason for swap from cable A. Reset on Auto Swap Enable and when problem goes away.
04: Silence on Cable B—Reason for swap from cable B. Reset on Auto Swap Enable and when problem goes away.
03: Noise on Cable A—Reason for swap from cable A. Reset on Auto Swap Enable and when noise goes away.
02 Noise on Cable B—Reason for swap from cable B. Reset on Auto Swap Enable and when noise goes away.
01: Requested Cable—The cable last requested: 0=cable A, 1=cable B
00: Selected Cable—The cable currently in use: 0=cable A, 1=cable B

A.4 UCN IOCB STATUS WORD CODES

The following defines the codes found in bits 13 through 8 of the UCN IOCB "Status" word as used in error messages.

Status	Description
00	The operation indicated in the IOCB has been successfully performed. If a Type 3 operation, Acknowledgment with "successful" status has been received.
01	Invalid operation code in IOCB. This is a driver error.
02	Invalid operation code in IOCB for online operation. This is a driver error.
03	Invalid operation code in IOCB for offline operation. This is a driver error.
04	Invalid frame length in IOCB. Frame is more than 1024 bytes long (PNI transmit buffer size). This is a driver error.
05	Invalid buffer address in IOCB (odd or out of range). This is a driver error.
06	Invalid next IOCB address in IOCB (odd or out of range). This is a driver error.
07	Type 3 operation, no ACK response. No ACK or other response to a transmission was received. Remote node is out of buffers or off net.
08	Type 3 operation, partial frame for ACK response. Network or remote node problem.
09	Type 3 operation, unexpected frame for ACK response. Network problem.
0A	Type 3 operation, CRC error in ACK response. Network or remote hardware error.
0B	E-bit (repeater error) is set in ACK response. Network problem or, if repeater is present, it detected and retransmitted an error.
0C	Type 3 operation, noise in ACK response. Network problem.
0D	Type 3 operation, ACK response frame too long. Remote problem.
0E	Type 3 operation, no free FD and/or BD to receive ACK response. Local node is out of buffers to receive messages.
0F	Type 3 operation, invalid DSAP in ACK response. Remote bug.
10	Type 3 operation, invalid SSAP in ACK response. Remote bug.
11	Type 3 operation, invalid code point in LLC control byte in ACK response. Resynchronization failed to synchronize nodes.
12	Type 3 operation, invalid P/F bit in ACK response. Remote bug.
13	Type 3 operation, invalid LLC control byte in ACK response. Remote bug.
14	Type 3 operation, unimplemented or inactivated service in remote node. The remote node's SAP was not open.

15 LLC user interface error. The remote driver is down or out of buffers. Not a UCN error.
16 Protocol error. Not a UCN error.
17 Permanent implementation-dependent error in remote node. Not a UCN error.
18 Type 3 operation, resource in remote node temporarily unavailable. No receive buffers in remote.
19 Temporary implementation-dependent error in remote node. An RDR SAP is being updated.
1A Illegal status in ACK response (LLC status byte). A remote bug.
1B DMA underrun during transmission. TBC could not get enough bus bandwidth to transmit the entire message.
1C Transmit too long for TBC (8 k bytes maximum). This should never happen because of frame-size check.
1D DMA overrun in receiving ACK response. The network was too fast for the receiver.
1E Test failed.
1F Test frame checksum. The TBC reported a frame checksum error in a test operation.
20 Test data compare. Data produced by a test operation did not match the data expected.
21 Receive test frame descriptor. A frame descriptor was corrupted or was not exactly as expected after a receive test.
22 Test frame overrun.
23 Test frame underrun.
24 Test frame length.
25 Test cable switch.
26 Test cable switch override.
27 Test cable nonsilence detect.
28 Test jabber failed.

A.5 IOP STATUS BYTES

A.5.1 IOP Status Byte 1 (MODSTAT1)

The IOP Module status byte 1 appears in the CONFIGURATION and the REVISION command displays as "Stat Wd 1". This status defines the IOP's operating state.

Hex Value	Definition
00	Power On — initial, transitory state, normally transisions to Idle.
01	Idle — IOP responds to I/O link commands, but is off process. Idle is reached from "Power On" or commanded from "Run."
02	Run — IOP is on process and maintains the process slot (point) variables appropriate to the IOP type.
03	Failed

A.5.2 IOP Status Byte 2 (MODSTAT2)

The IOP Module status byte 2 appears in the CONFIGURATION and the REVISION command displays as "Stat Wd 2." This status identifies the state of various conditions pertaining to operation of the IOP.

Bit	7	6	5	4	3	2	1	0
	DEF	SWT	SME	FTA	HF	SF	CE	P/S

where:
- DEF = 1 = Database not defaulted
- SWT = 1 = Switched Active. For redundant IOPs only. Means that the partner IOP has requested that this IOP take control of the FTA.
- SME = 1 = Standby Manual is enabled.
- FTA = 1 = FTA is present.
- HF = 1 = Hard Failure is present.
- SF = 1 = Soft Failure is present.
- CE = 1 = I/O link communication error is present.
- P/S = 1 = This is the primary (or only) physical IOP connected to the FTA. For redundant IOPs, this means connected to the FTA by cable A.
  - = 0= This is the redundant physical secondary IOP connected to the FTA by cable B.

DATA ENTRY CONCEPTS
Appendix B

B.1 INTRODUCTION

As previously indicated, the elements that make up the PMEX command line can be combined in various ways. The following paragraphs summarize the rules for each of the three basic command elements (commands, test program names, and parameters), then provide details on the shorthand method of parameter-value entry, and end with some sample command lines.

B.2 COMMANDS

The first command-line entry is always a command. Commands can be entered in upper, lower, or mixed-case letters (this also applies to name and parameter entries). The full command can be entered, or it can be truncated at any point after the first three letters (e.g., ABB, ABBR, ABBRE, etc.).

B.3 TEST PROGRAM NAMES

Name entry is optional; if no name is entered, the current prompt name is assumed. If more than one name is entered, the names are separated by commas but cannot contain blanks (because blanks are used as element separators). All test programs named are affected by the command line, but only the last name entered carries forward to the next prompt.

Any name can be followed by a 1- to 3-digit slot number. If a slot number is specified, the command affects the test for only the board in the named slot; if no slot numbers are specified, all slots where that test program applies are commanded. ALL and * (meaning all) are also legal test program-name entries.

B.4 PARAMETER VALUES

When a command that requires parameter-value entry (or a parameter shorthand) is entered without including a parameter value, the currently assigned value is displayed. When a value is entered, it is converted to its internal representation and limit-checked.

Sometimes, multiple parameter-value entries are allowed; for example, TESTS. In this case, a dash means "through" (4-9 means 4 through 9 and 9-4 means from 9 sequentially down to 4). An omitted initial number implies the first allowed number, and omitting the terminal number implies the highest allowed number (-n means one through n; n- means start with n and end with the last number; "-" by itself means all allowed numbers). In signed numerics, the dash means "negate" and in unsigned numerics, the dash means substitute an associated code, e.g., for MIN, PAS, and ERR the dash means "no limit."

Non-numeric parameter values consist of one or more letters. Some translate to states (e.g., MODE-parameter values), some to information strings (e.g., CLOCK values), and others to Boolean values that are to be set true or false (e.g., REPORT and INHIBIT). Several non-numeric parameter values (separated by commas but no spaces) can be specified in no specific order. The nonnumeric parameter values (except for information strings) can be truncated after the first letter (e.g., MODE E or EX or EXER). This may not work for some test program-specific parameters. In that event, an entry error is indicated and you have to re-enter with the full value.

B.5 PARAMETER SHORTHANDS

Shorthands are simply a convenient way to enter a number of parameter values on a single command line with a minimum of keystrokes. The shorthands follow after the primary command, test program name, and any associated parameter value(s), and are separated from the last of these elements by a single space. Each shorthand is a single letter and is followed immediately by the value (multiple values are separated by commas). Whenever no value is entered, the current value for that parameter is displayed. When multiple shorthands are entered, they are separated by spaces.

No new test program can be specified by shorthand; the prompted or previously specified test program(s) is used.

B.6 EXAMPLE COMMAND LINES

RUN ABCD,EFGH P100 E3 T- S50 IT,P

This command line says, run the ABCD and EFGH test programs; set the number of passes at 100; set the error limit at 3; run all tests; set the scale at 50 percent of nominal delay; inhibit the start-of-test and end-of-pass messages.

MOD E ABCD,EFGH,IJKL2 EX T20-9,5-9 T P P- M60 M

This command line says, Change the mode for the selected node to Exercise; set test programs ABCD, EFGH and IJKL (slot 2 only) to have tests 20 through 9 and 5 through 9 (note the execution sequence and repetition of test 9) execute when next run; display which tests are enabled and the sequence in which they will run; display the number of passes set for each of the selected test programs; set their number of passes to unlimited; set their running time to 60 minutes; display the minutes value for the selected test programs.

B.7 MULTITARGET COMMAND LINE RESTRICTION

Multitarget command lines (those invoked by Line Feed/Tab) are not allowed to contain more than one test program name. This safety precaution is taken because any nodes not containing all the named programs would reject the entire command line without any notice to the operator, and expected actions would not occur at those nodes.

FACTORY TEST CONFIGURATIONS
Appendix C

C.1 INTRODUCTION

In addition to the normal configurations found at customer field sites, PMEX also supports special configurations of equipment only found in the factory. For those factory-special configurations, loading and command-entry steps are somewhat different than the normal case.

The first factory-only configuration is one that combines the hardware and functions of a Universal Station and NIM into a single module (sometimes called a Super TOCS).

The second factory-only configuration provides for any PMM being tested to also function as the TOCS for its UCN (once the test network has been loaded). This requires insertion of a special debug card into the selected PMM and connecting it to an RS232C I/O device. It takes over as TOCS when you press either the Escape or Line Feed key to initiate input.

C.2 LOADING THE SUPER TOCS CONFIGURATION

To load a Super TOCS configuration, follow the steps 1 through 4 as defined in paragraph 2.2.1 or 2.2.2. Skip steps 5 and 6 (since the TOCS and NIM are in the same physical module); then execute the remaining steps, 7 through 11.

C.3 KEYBOARD ENTRY DIFFERENCES

For those configurations where an RS232C-compatible keyboard is used in place of normal product I/O (Engineer/Operator/Supervisor keyboards), the following keystroke entries are used:

To initiate single-target input:	Escape key
To initiate multinode input:	Line Feed key
To signal input line completion:	Return key

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