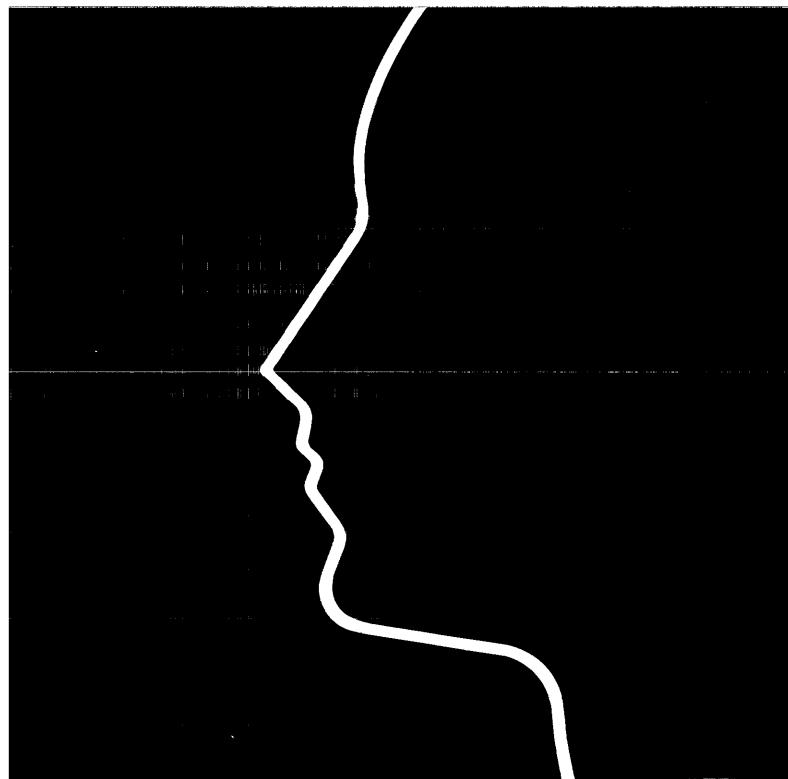


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EXPLORERTM

DIAGNOSTICS



EXPLORER DIAGNOSTICS

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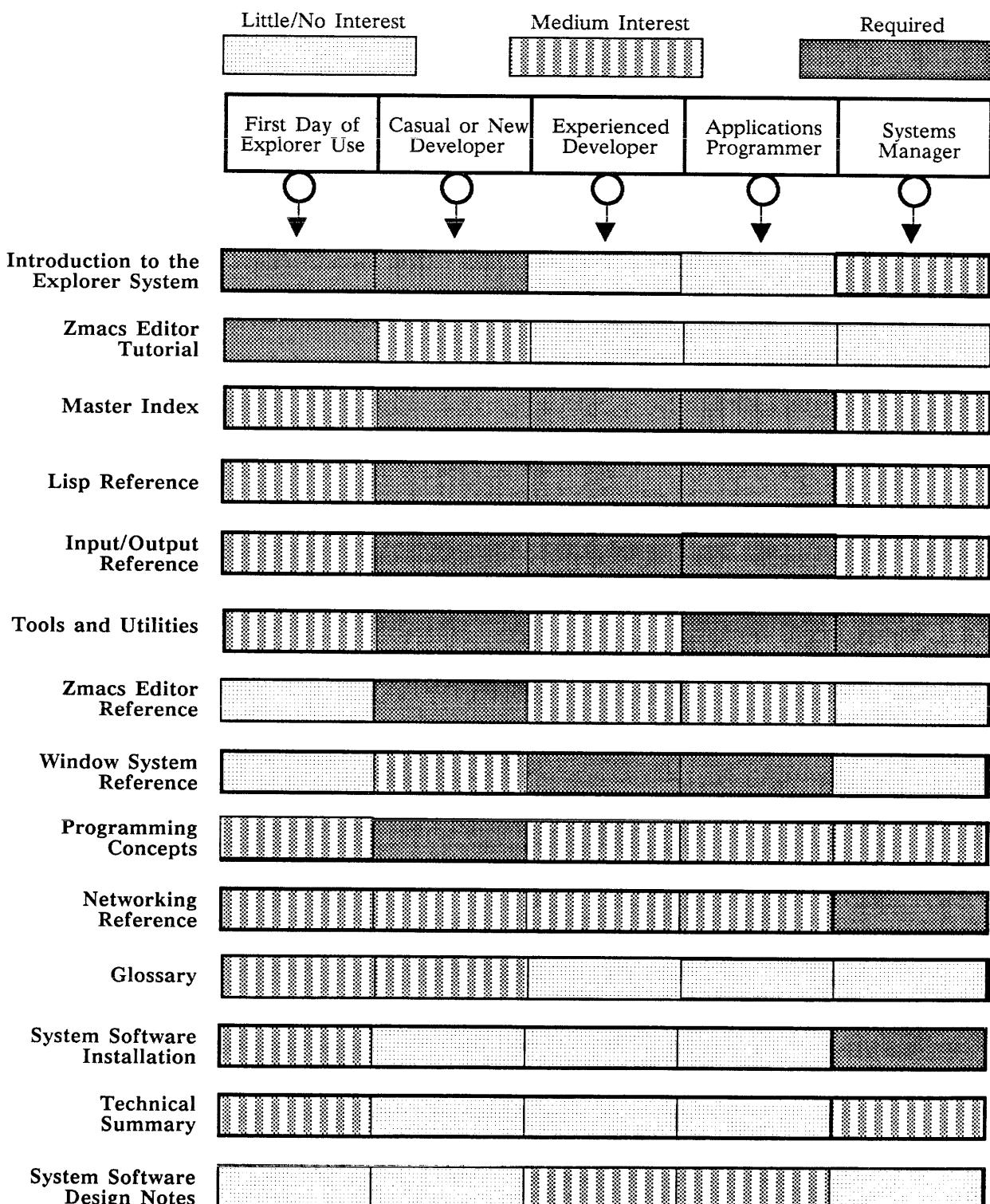
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ABOUT THIS MANUAL

Introduction

This manual is intended as a guide to help you get started with the Texas Instruments Explorer system diagnostic package. The diagnostic package includes read-only memory (ROM)-based self-tests and interface diagnostic tests that run during system power-up, loadable diagnostic programs and utilities that run under the General Diagnostics Operating System (GDOS), and standalone diagnostic tests that are loaded and executed outside of GDOS.

The material in this manual is of a general nature and is both descriptive and procedural. The descriptive material is designed to provide you with an overview of the diagnostic programs and utilities available for all Explorer systems. The procedural material instructs you in their use.

Detailed information about how to use each of the GDOS and loadable diagnostics and utilities is available online for all Explorer systems. Refer to the paragraph entitled **GDOS Online Help** in Section 1 for instructions on how to access online information. To print a hardcopy of the GDOS and loadable diagnostics descriptions, use the **GDOS Print Online Manual** utility, as described in Section 4.

NOTE: An additional set of diagnostic tests is available in this package for testing the NuBus and the multiprocessor logic on the Explorer LX™ (Lisp/UNIX®) system.

The Explorer LX system is a multiprocessor system that supports both the Lisp language and the TI System V operating system. The TI System V operating system is an implementation of the AT&T UNIX System V. It runs on a 68020-based processor board that is installed in the Explorer 7-slot system enclosure. The basic Explorer system can be upgraded in the field to an Explorer LX system. The Explorer LX system is also available from TI as a completely assembled system.

For information about booting GDOS in the Explorer LX environment and running the NuBus and Multiprocessor Diagnostic tests, refer to Appendix A.

Purpose

The comprehensive loadable diagnostic tests discussed in this manual are provided because many boards do not have sufficient ROM to store diagnostics capable of fully testing all boards and related hardware. Additionally, running diagnostics that test entire systems can be a lengthy process that is not desirable at system power-up. The loadable diagnostics can identify a larger percentage of hardware failures and provide more informative error messages.

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The loadable and standalone diagnostics tests verify device performance by exercising and testing all logic paths in the hardware components. If the tests find any defects, they display error messages.

Terminology

In this manual, the word diagnostic refers to a group of programs that test one hardware board or subsystem. The individual tests within each diagnostic are called diagnostic tests or simply tests. For example, the Monitor and Mouse diagnostic is a group of diagnostic tests that check image clarity on the video display terminal (VDT) and ensures that the mouse keys work properly.

Contents of This Manual

This manual contains an index and a glossary and is divided into the following sections:

Section 1: Overview — Provides descriptive information about the diagnostics to help you understand other sections in this manual. You should read this section if you have no prior knowledge of Explorer system diagnostics.

Section 2: Starting the Diagnostics — Provides instructions for booting the system, rerunning the ROM-based diagnostic tests, and running the loadable diagnostic tests.

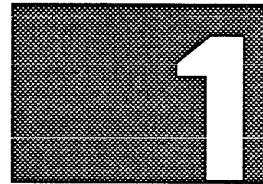
Section 3: Features — Provides descriptions of the keyboard functions and operational parameters and a map of the menu structure. This section provides information that applies primarily to GDOS and the loadable diagnostics.

Section 4: Diagnostic Tests and Utilities — Provides brief descriptions of the GDOS diagnostics and utilities. Procedures for formatting and verifying a disk, making a bootable tape, and restoring tape to disk partitions are also provided. For information more detailed than that provided in the user's guide, refer to the online help information.

Section 5: Boot Problems — Provides troubleshooting information to use if you are unable to load GDOS.

Appendix A: Explorer LX — Describes the GDOS loading procedure for the multiprocessor Explorer LX system. The LX diagnostics include two full sets of diagnostic programs for testing both the Explorer system and the System 1000 Series, Model 1500 system, as well as a new diagnostic program that evaluates NuBus activity between the Explorer Lisp microprocessor and S1500 processor.

Appendix B: Explorer II Standalone Diagnostics Test Descriptions — Provides brief descriptions of the tests in the Explorer II standalone diagnostics.



OVERVIEW

Highlights of This Section

This section provides a general overview of the power-up diagnostic tests, the GDOS loadable diagnostics, and the standalone diagnostics. The following topics are discussed:

- The four types of diagnostic programs
- General Diagnostics Operating System (GDOS) diagnostics
- GDOS online help information
- Standalone diagnostics

NOTE: If this is the first time you have used the GDOS loadable diagnostics and standalone diagnostics or if you want some background information about them, read this section. If you have used these diagnostics before and do not need any background information, refer to Section 2 for information about starting the diagnostics.

About the Diagnostics

1.1 Four types of diagnostic programs are available to test the Explorer system. The first two types, called power-up self-tests and interface diagnostic tests, are ROM-based diagnostic programs that are associated with the system power-up procedure. After initial startup, two additional types of diagnostic programs, the GDOS loadable diagnostic programs and standalone diagnostics programs, can be loaded and executed separately to test each system hardware component further. The following paragraphs contain brief descriptions of the four types of diagnostics.

Power-Up Diagnostic Tests

1.1.1 The two types of ROM-based diagnostic tests associated with the system power-up procedure are:

- Power-up self-tests — These are ROM-based tests that are executed automatically by each of the installed intelligent boards when the system is powered up. Each power-up self-test is internal to a specific intelligent board and does not interact with other system components.
- Interface diagnostic tests — These are additional ROM-based tests that are executed from the system test boot master (STBM) rather than from a specific intelligent board. However, some of the interface diagnostic tests do interact with board self-tests on certain of the intelligent boards, such as the processor board and the NuBus Peripheral Interface (NUPI) board.

The interface diagnostic tests have two modes of operation: normal and extended.

- Normal mode — In this mode, the interface diagnostic tests are executed automatically during power up after the self-tests have run. When the system load menu appears, you can rerun the interface diagnostic portion of the power-up tests by selecting the **Retest** option. This procedure is described in the paragraph entitled Retesting With the Interface Diagnostic Tests in Section 2.
- Extended mode — In this mode, the interface diagnostic routines perform additional testing and provide status and error reports in greater detail than in the normal mode. When the system load menu appears, you can run the interface diagnostic tests in extended mode by selecting the **Extended** option in the system load menu. This procedure is described in the paragraph entitled Running Interface Diagnostic Tests in Extended Mode in Section 2.

Loadable Diagnostic Tests

1.1.2 Two additional types of diagnostic programs are available for loading and execution after the power-up tests have run:

- GDOS loadable diagnostic programs — These diagnostic programs execute under the control of GDOS. They are designed to diagnose problems in the system's peripheral devices such as its disk drives, tape drives, communications boards, and so forth. For information about booting GDOS and loading the diagnostics, refer to Section 2.

- Standalone diagnostics programs — These programs test the parts of the Explorer processor, memory, and other hardware components that are not checked by the power-up self-tests. GDOS, by itself, is unable to perform these tests; therefore, standalone diagnostics tests *do not* run under GDOS.

The GDOS loadable diagnostic tests and the standalone diagnostics tests enable you to fully test the following Explorer hardware components:

- NUPI board, Mass Storage Controller (MSC) board and associated disk drives, and tape drives
- System Interface Board (SIB)
- Color System Interface (CSI) board
- Monitor
- Mouse
- NuBus Ethernet controller board
- Explorer processor board
- Explorer memory board
- Explorer Lisp microprocessor
- Floating point interface
- *S1500 processor board, Explorer processor board, and the NuBus

All the programs necessary to run these additional diagnostics are stored in three separate partitions on the disk. The GDOS partition and the DIAG (diagnostic) partition contain the utilities and the diagnostic programs that run under GDOS. The standalone diagnostics partition contains the programs for the Explorer standalone diagnostics. The standalone diagnostics partition for Explorer I systems is EXPT. The partition for Explorer II standalone diagnostics is EXP2.

For information about installing the diagnostics on your disk or tape, refer to the *Explorer Diagnostics Release and Installation Information*.

For information about formatting a disk and installing the diagnostics on a disk that does not contain these partitions, refer to Section 4 in this manual.

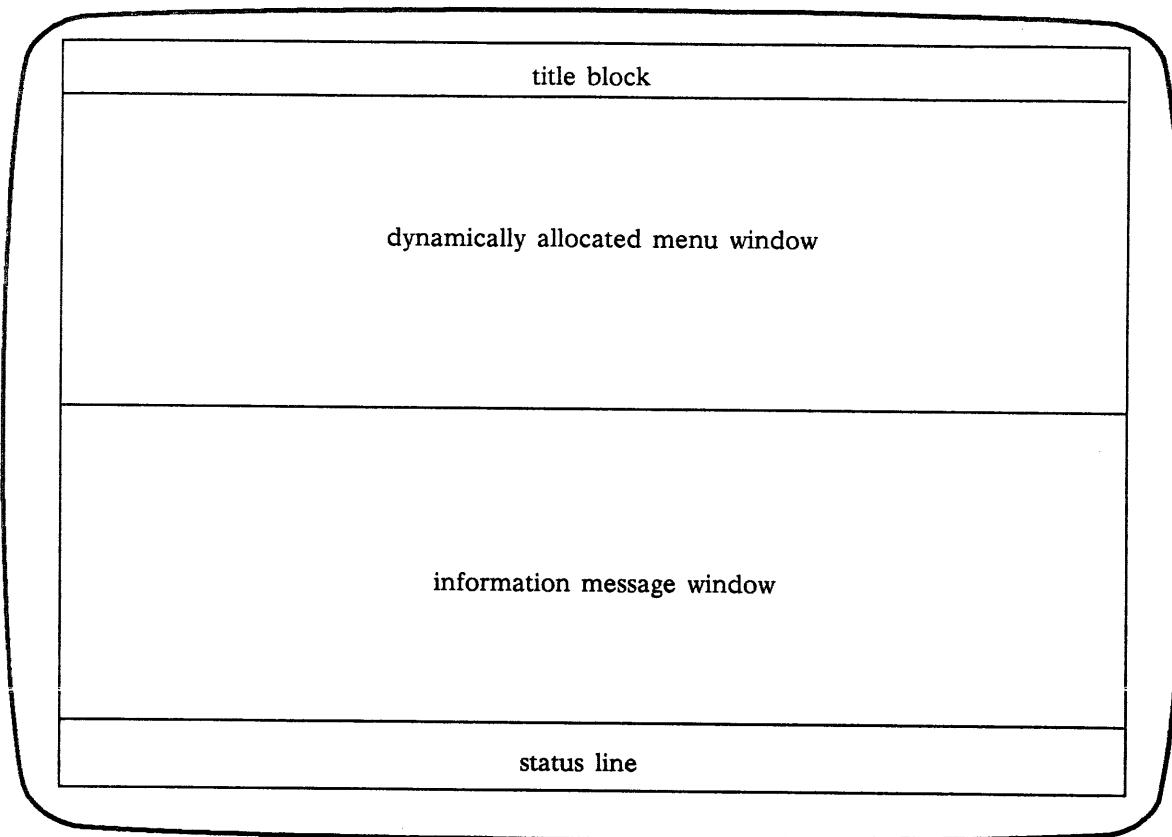
GDOS Diagnostics

1.2 GDOS is a menu-driven operating system that controls the loading and execution of the GDOS diagnostics and provides additional system utilities.

GDOS menus are organized into four nonoverlapping window areas as shown in Figure 1-1.

* The NuBus and Multiprocessor Diagnostic, which tests NuBus arbitration logic between multiple processors, runs only on the Explorer LX system. Refer to Appendix A for more information about this set of diagnostics.

Figure 1-1 GDOS Menu Windows



- The title block in the menu window contains information describing the function of the menu.
- The dynamically allocated menu window lists all available menu entries. It varies in size depending upon the number of diagnostic tests available for each system configuration.
- The information message window displays GDOS and diagnostic help information and error messages.
- The status line displays key functions, system prompts, and status messages.

User prompts and error messages are sent to the video display terminal (VDT). Options available in the Change Operational Parameters Menu enable you to route error messages only, or both error messages and information messages, to a printer as well as to the VDT.

Many of the menu entries in GDOS and in the loadable diagnostics can be expanded to show additional submenus or additional selection options. This feature provides more available screen space for displaying help messages, error messages, and information messages.

NOTE: Normally you communicate with GDOS through the Explorer keyboard and monitor. You move the cursor to menu items using the Arrow keys or the Home key, and you execute the diagnostic tests using the RETURN key or the ENTER key. Control key sequences (CTRL-K, CTRL-T, CTRL-B, and so forth) and function keys (F1, F2, F3, and F4) also perform operations in GDOS and in the loadable diagnostic programs. The key functions are described in more detail in Section 3.

GDOS Online Help

1.3 Online help information is provided for each menu entry in the currently displayed menu. Online help messages provide more details and descriptions about the diagnostic package than are available in this user's guide. Help messages provide the following information:

- A summary of the menu entry's function
- Instructions on how to use the menu entry
- A detailed description of the test, utility, or function associated with the menu entry
- Other information necessary to run the test, utility, or function

The help screens, along with a listing of error messages, comprise the online manual. You can print all or part of the online manual with the Print Online Manual utility. For instructions on how to print the online manual, refer to Section 4.

To display help information about a specific menu item, move the cursor to the appropriate item and type a question mark (?).

For a quick, online summary of key functions, press the CTRL-F key sequence. For detailed descriptions of the key functions, refer to the tables entitled Function Keys and Control Keys, and Cursor-Movement Keys in Section 3.

GDOS Test Execution

1.4 You can run all of the noninteractive tests, that is, all of the tests that do not require user input during execution, from both the GDOS Top-Level Menu and the Extended-Interactive Diagnostic Mode Menu. However, the interactive tests, which require user input during execution, can *only* be run from the Extended-Interactive Diagnostic Mode Menu.

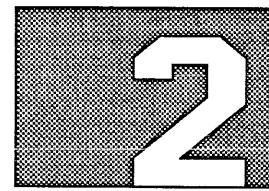
To run a specific test within a particular diagnostic, you would load a diagnostic using either the Load a Diagnostic by Menu or Name and Show Its Main Menu entry or the Load a Diagnostic by Menu or Name entry in the Extended-Interactive Diagnostic Mode Menu. Next, you would select the specific test to run using the Selected Test menu for that diagnostic.

For more information about loading the GDOS diagnostics and utilities, refer to Section 2 of this manual. For descriptions of the GDOS diagnostic programs and utilities, refer to Section 4. For detailed information about the diagnostic programs and utilities, refer to the online help information.

Standalone Diagnostics

1.5 The standalone diagnostics programs verify the correct operation of the Explorer processor, memory, and other hardware components not checked during self-tests or by GDOS. Like the GDOS diagnostic programs, the standalone diagnostics are menu-driven. However, the standalone diagnostics menus contain no separate menu, command, and information windows. Instead, a single window displays a list of menu options. The menu scrolls upward to accommodate error message listings. When scrolling occurs, you can redisplay the current menu by pressing the CLEAR SCREEN key or the CTRL-R key sequence.

For additional information about the standalone diagnostics programs, refer to Section 2 and Section 4. For detailed information, use the Print Online Manual utility (described in Section 4) to print the standalone diagnostics help and error message sections for Explorer I systems. Information on the Explorer II standalone diagnostics is not available through the Print Online Manual utility. Refer to Appendix B for brief descriptions of each test in the Explorer II standalone diagnostics.



STARTING THE DIAGNOSTICS

Highlights of This Section

This section describes the following procedures:

- Booting the system
- Rerunning system self-tests
- Executing the extended interface diagnostic tests
- Entering GDOS
- Noninteractive and interactive diagnostic tests
- Extended-interactive diagnostic mode
- Loading and running the standalone diagnostics

Booting the System

2.1 If the system is off, turn it on. This automatically boots the system. If the system is on, reboot by pressing the CTRL-META-CTRL-META-ABORT keys simultaneously. (There are two CTRL keys and two META keys; you must press all four of these plus the ABORT key to reboot.)

The system self-tests run automatically during the boot process. As the self-tests proceed, messages containing the test results scroll onto the video display terminal (VDT). The following is an example of messages that might appear when all the self-tests complete:

```
Slot  6  TESTING SYSTEM
Slot  0  Passed
Slot  1  Passed
Slot  2  Passed
Slot  3  Passed
Slot  4  Passed
Slot  5  Failed
Slot  6  Passed

D=Default load, M=Menu load, R=Retest, E=Extended tests :
```

If a board fails its self-test, an error message is displayed. You may be unable to load GDOS until the board is repaired or replaced. If such a failure occurs, you can retest the system with the interface diagnostic tests to further define the problem. Instructions for retesting the system are provided in paragraphs 2.1.1 and 2.1.2. If the board failure does not prevent you from loading GDOS, you can then run the loadable diagnostics to exhaustively test specific hardware components. Procedures for loading GDOS and running the loadable diagnostics are presented later in this section.

Refer to Section 5 for more information about board failures.

Retesting With the Interface Diagnostic Tests

2.1.1 To retest the system by rerunning the interface diagnostic portion of the power-up tests, press the R key to select the Retest option after the power-up self-tests have run and the system load menu appears:

```
D=Default load, M=Menu load, R=Retest, E=Extended tests :
```

NOTE: You have approximately 15 seconds to press the R key after the system load menu appears or the system performs its default system initialization procedure. To suspend default initialization before the 15-second timeout, press any key (such as the Space Bar) or type any character (X, T, Z, and so forth) except a command character that specifies a load procedure. If default initialization occurs, reboot.

The system is retested with the interface diagnostic portion of the power-up tests.

Running Interface Diagnostic Tests in Extended Mode

2.1.2 To test the system by running the interface diagnostic tests in the extended mode, press the E key to select the Extended tests option after the power-up self-tests run and the system load menu appears:

```
D=Default load, M=Menu load, R=Retest, E=Extended tests :
```

The system is retested with the interface diagnostic tests in extended mode. Status messages and, if necessary, error messages appear on the VDT while the tests run.

Entering GDOS

2.2 You must enter (boot) the General Diagnostics Operating System (GDOS) to run any of the GDOS utilities and most of the diagnostic programs. The only diagnostics that are not available under GDOS are the stand-alone diagnostics. Instructions for loading and running the standalone diagnostics are provided later in this section.

To enter GDOS, perform the following procedure:

NOTE: If you have an Explorer LX system, the procedure for booting Explorer GDOS is different. Refer to Appendix A for more information about booting GDOS in the Explorer LX environment.

1. Boot the system. Refer to the paragraph entitled Booting the System in this section for the boot procedure. After the self-tests run, the system load menu is displayed.

D=Default load, M=Menu load, R=Retest, E=Extended tests :

2. Type the letter G to load GDOS. You have approximately 15 seconds to type G after the system load menu appears or the system will perform its default system initialization procedure (in most cases, the default parameters specify loading Lisp). If default initialization occurs, reboot.

You can suspend default initialization before the 15-second time-out by pressing any key or by typing any character except a command character that specifies a load procedure. For example, you could suspend the system load menu by typing a number, by pressing the Space Bar, or by typing a character other than D, E, M, R, or G. If you type G, GDOS loads; if you type E, the extended interface diagnostic tests run.

The system displays a list of disk drives or tape drives that are available and a prompt that requests you to select a load device. The following example illustrates a display that might appear on your screen, depending upon the configuration of your system:

AVAILABLE LOAD DEVICES

```
A= Slot 0 Enet 00
*B= Slot 2 Disk 00
C= Slot 2 Tape 06
```

Select load device :

If one of the disk drives is not listed as an available load device, check the power switch on the drive, and check all cables and connections.

If one of the tape drives is not listed, ensure that a tape cartridge is installed in the drive and proceed. If you wish to load GDOS from a tape drive that is not listed, install the bootable tape cartridge in the drive, reboot, and proceed. (Booting from tape takes considerably longer than booting from a disk.)

NOTE: If you boot GDOS from tape, you must leave the tape in the drive when running the diagnostics or GDOS utilities.

3. The drive denoted by an asterisk (*), Drive B in the example above, is the default drive. If you wish to accept the default drive, simply press RETURN. The system attempts to find GDOS on the default drive. If GDOS is stored on a different drive, type the letter associated with that drive. If you do not know where GDOS is stored, try the default drive first.

If you select a drive that does not have the GDOS partitions on it, the following message is displayed:

DEVICE ERROR: BOOT MICROLOAD NOT FOUND

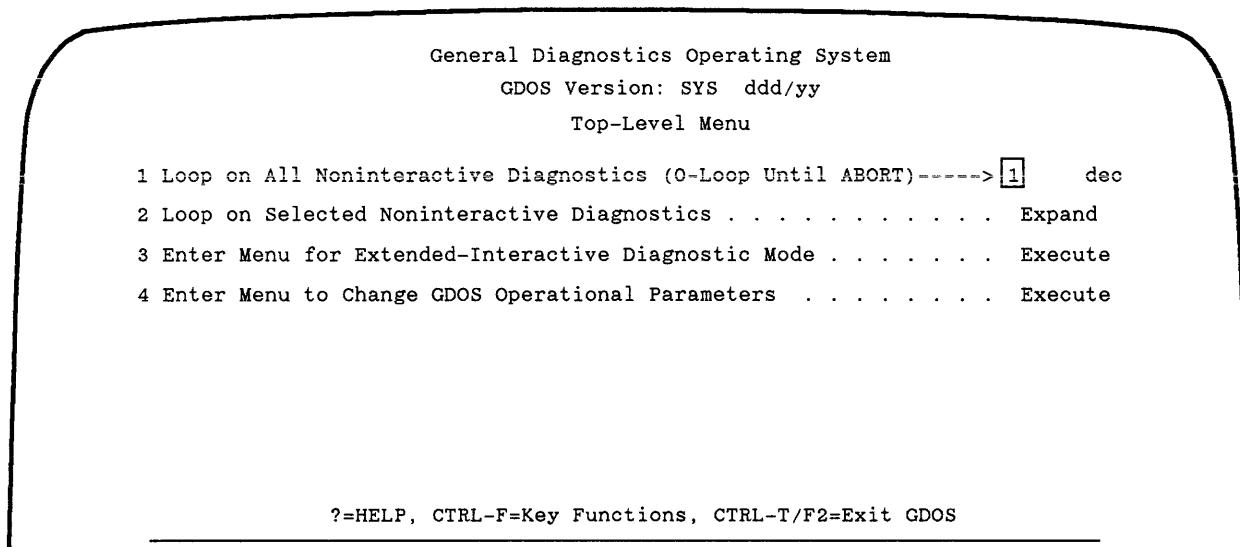
D=Default load, M=Menu load, R=Retest, E=Extended tests :

Type G again and enter an alternate load device by typing the letter associated with that device.

If the error message continues to appear with each listed load device you try, it is possible that GDOS and the loadable diagnostics are not installed. Refer to the *Explorer System Software Installation Guide* for instructions on how to install GDOS on your disk.

After you select a drive on which GDOS is installed, a TI restricted rights notice appears; then, the GDOS Top-Level Menu appears. (See Figure 2-1.)

NOTE: To stop GDOS from loading after you choose a load device, press the ABORT key (on the Explorer terminal, pressing the ABORT key or pressing the CTRL-C key sequence performs the abort function when GDOS is loaded).

Figure 2-1 GDOS Top-Level Menu

Noninteractive and Interactive Diagnostic Tests

2.3 Menu entry 1 — Loop on All Noninteractive Diagnostics — enables you to execute all of the GDOS diagnostic tests that do not require operator intervention. Menu entry 2 — Loop on Selected Noninteractive Diagnostics — expands into a submenu that enables you to select and run specific noninteractive diagnostic tests.

Although the noninteractive diagnostics available in menu entries 1 and 2 enable you to test the bulk of the system hardware, to thoroughly test the entire system you must perform the interactive GDOS diagnostic tests, in addition to the standalone diagnostics program.

The interactive GDOS diagnostic tests are available in menu entry 3 — Enter Menu for Extended-Interactive Diagnostic Mode. This option enables you to run all of the diagnostic tests under GDOS control that are appropriate for your system.

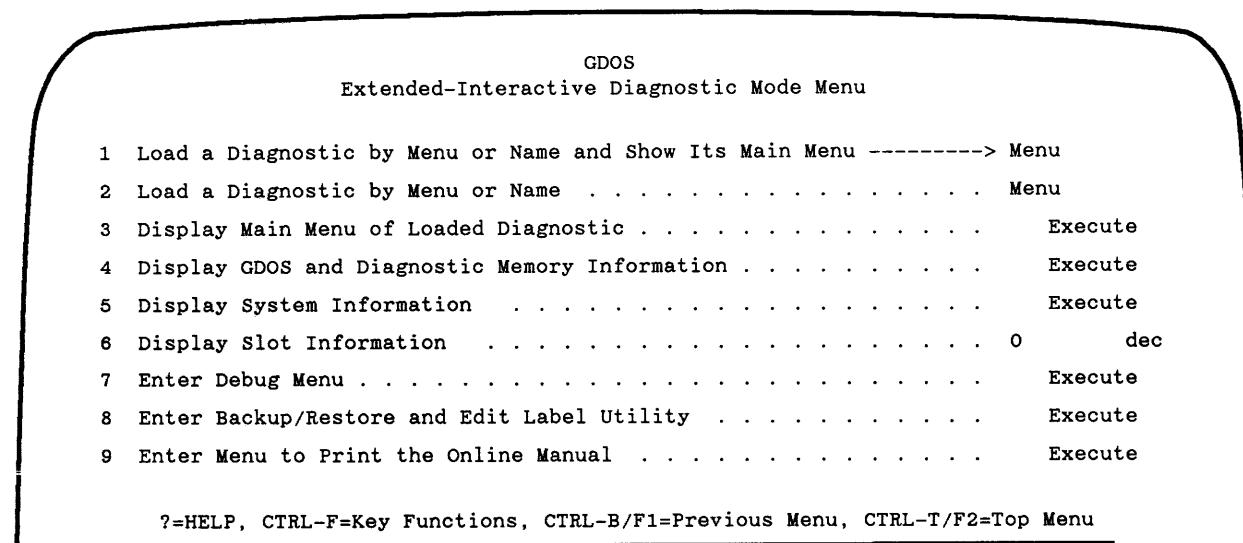
Extended-Interactive Diagnostic Mode

2.4 The Extended-Interactive Diagnostic mode provides a greater degree of flexibility in diagnosing possible hardware failures than is available in the non-interactive mode alone. From the Extended-Interactive Diagnostic mode you can

- Specify devices or slots to test.
- Choose various test combinations to run within a single diagnostic program.
- Change the loop count for any test combinations in a diagnostic program.
- Perform GDOS utility operations.

To run tests in the interactive mode, select the Enter Menu for Extended-Interactive Diagnostic Mode entry from the GDOS Top-Level Menu and press RETURN. The GDOS Extended-Interactive Diagnostic Mode Menu, Figure 2-2, appears.

Figure 2-2 GDOS Extended-Interactive Diagnostic Mode Menu



To execute a diagnostic in the GDOS Extended-Interactive Diagnostic Mode Menu, follow these steps:

1. Place the cursor on the Load a Diagnostic by Menu or Name and Show Its Main Menu entry in the GDOS Extended-Interactive Diagnostic Mode Menu, and press RETURN. The Diagnostic Load Menu appears.
 2. Place the cursor on the menu entry for the diagnostic program you want to run, and press RETURN. The main menu appears for the diagnostic program you selected. From this menu you can execute the interactive and/or noninteractive tests for the diagnostic program, or you can enter submenus to select specific tests or specific additional test parameters where applicable.

Loading the Standalone Diagnostics

2.5 The standalone diagnostics do not run under GDOS; therefore, they must be loaded and run separately from the diagnostics under GDOS.

NOTE: If you have an Explorer LX system, refer to Appendix A for more information about loading and running the standalone diagnostics in the Explorer LX environment.

To load the standalone diagnostics from disk, perform the following steps:

1. Boot the system. Instructions on how to boot the system are in the paragraph entitled **Booting the System** in this section. The system load menu appears:

```
D = Default load, M = Menu load, R = Retest, E = Extended test :
```

If you are already in GDOS, you can exit from the GDOS Top-Level Menu by pressing the F2 key. If you exit from GDOS in this way, omit steps 2 and 3 below. Follow the instructions in step 4 to select the D=Diagnostic load option.

2. Type M to select the **Menu load** option. The system displays a list of the available load devices along with a select device prompt similar to the following:

```
AVAILABLE LOAD DEVICES:
```

```
A= Slot 0 Enet 00
*B= Slot 2 Disk 00
C= Slot 2 Tape 06
```

```
Select load device :
```

3. Type the letter associated with the device containing the menu load instructions for the standalone diagnostics. In most cases you will select the default load device (the device with an asterisk in front of it) by just pressing RETURN. The following prompt appears for Explorer software Release 2.2 or less:

```
L=Lisp load, M=Multi-unit load, D=Diagnostic load, P=Print device label :
```

The following prompt appears for Explorer software Release 3.0 or greater:

```
L=Lisp Load, M=Multi-unit Load, D=Diagnostic Load, P=Print Device Label,
C=Configuration Boot :
```

4. Type D to select **Diagnostic load**. The list of available load devices is redisplayed along with the following prompt:

```
Select microcode load device :
```

5. Type the letter associated with the device that contains the standalone diagnostics partition. If the standalone diagnostics partition is on the default load device, simply press RETURN. A prompt similar to the following appears:

```
AVAILABLE MICROCODE PARTITIONS
```

```
A= GDOS      GDOS Expl I ddd/yy Rel x.x.x
B= EXPT      EXPT ddd/yy Rel x.x.x
```

```
Select partition :
```

When loading the standalone diagnostics for Explorer II, type the letter associated with EXP2 to load the EXP2 partition.

6. In this example you would type B to select the EXPT partition. The EXPT partition contains the standalone diagnostics for Explorer I. After you perform these steps, a system configuration display and the Explorer Standalone Diagnostics Main Menu (Figure 2-3) appears for Explorer I systems. The Standalone Diagnostics Main Menu for Explorer II systems is shown in Figure 2-4.

To load the standalone diagnostics from tape, perform the following steps:

1. Boot the system. Instructions on how to boot the system are in the paragraph entitled Booting the System in this section. The system load menu appears:

D=Default load, M=Menu load, R=Retest, E=Extended test :

2. Type N to select the Name load option. The system displays the following prompts one line at a time:

Microload name:
System load name:

For the Microload name prompt, type EXPT to specify Explorer I standalone diagnostics or EXP2 to specify Explorer II standalone diagnostics, and press the RETURN key. EXPT or EXP2 must be typed in uppercase characters. For the System load name prompt, press the RETURN key.

The system displays a list of the available load devices along with a select device prompt similar to the following:

AVAILABLE LOAD DEVICES:

A = Slot 0 Enet 00
*B = Slot 2 Disk 00
C = Slot 2 Tape 06

Select load device :

Type the letter associated with the device containing the standalone diagnostics.

The standalone diagnostics for Explorer I systems are discussed in the paragraph entitled Standalone Diagnostics (Explorer I); Explorer II standalone diagnostics are discussed in the paragraph entitled Standalone Diagnostics (Explorer II).

Figure 2-3 Explorer Standalone Diagnostics Main Menu (Explorer I)

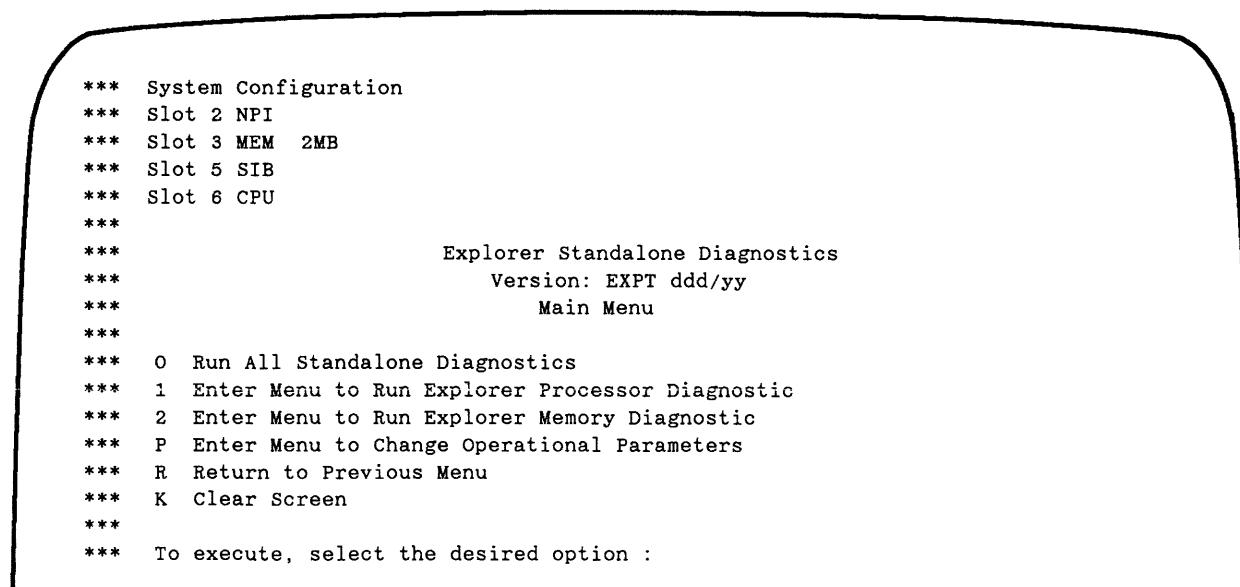


Figure 2-4 Explorer Standalone Diagnostics Main Menu (Explorer II)

```

EXP2 Diagnostic
Main Menu
Revision ddd/yy

**
**
** A = Execute All Processor Tests
** B = Loop on All Processor Tests
** C = Modify Test Multiplier (0001)
** D = LISP-CHIP FUNCTIONAL Test Menu
** E = LISP-CHIP MEMORY Test Menu
** F = BOARD STATIC RAM Test Menu
** G = BOARD SUPPORT Test Menu
** H = BOARD VIRTUAL LOGIC Test Menu
** I = BOARD CACHE LOGIC Test Menu
** J = BOARD TRANSPORT LOGIC Test Menu
** K = BOARD NUBUS LOGIC Test Menu
** L = BOARD MACRO Test Menu
** M = Execute External Memory Tests
**
** W = Utilities Menu, Y = Debug Menu, Z = Parameter Menu

Select the desired option:

```

Standalone Diagnostics (Explorer I)

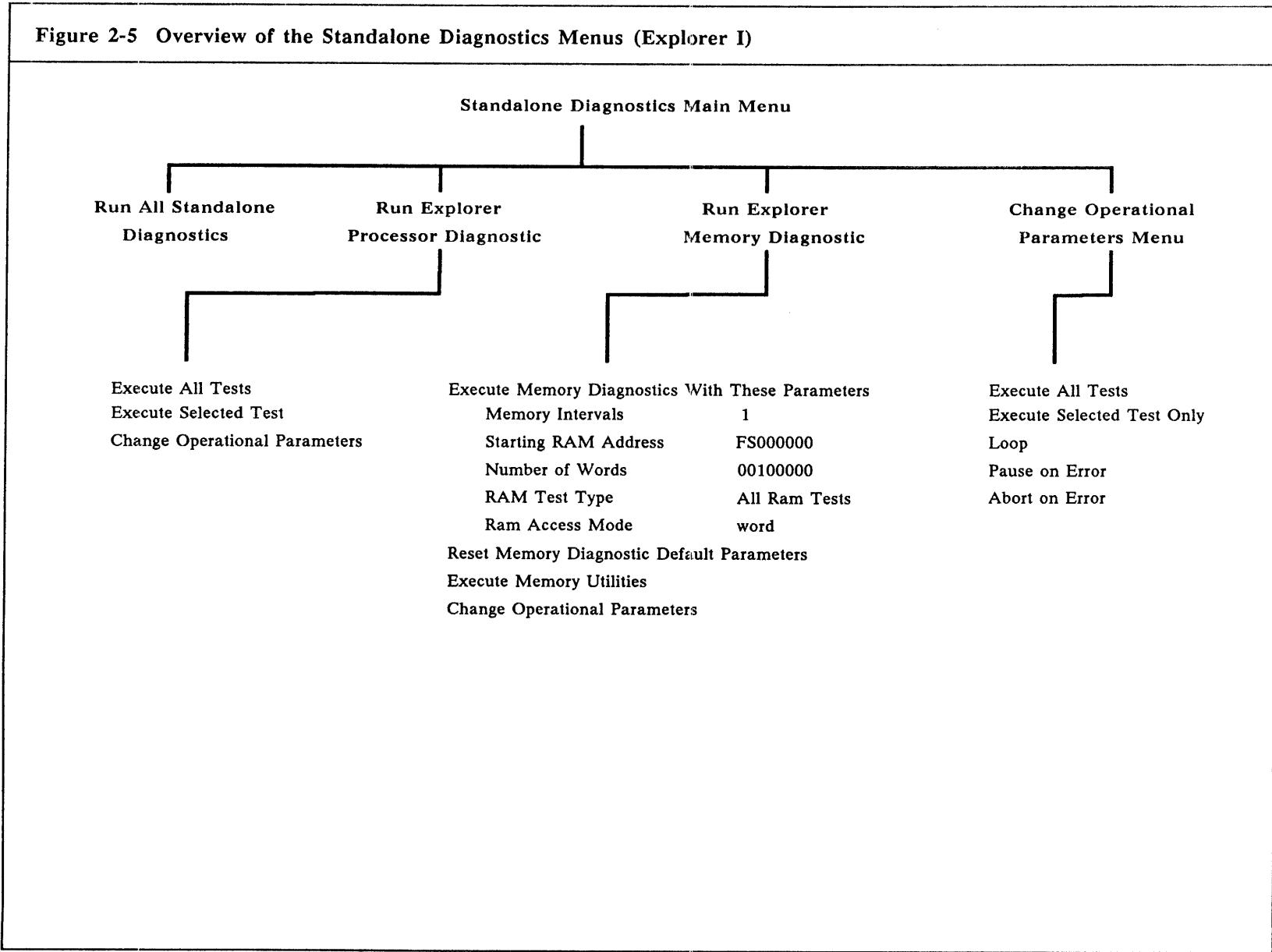
2.6 To execute a menu entry in the Explorer Standalone Diagnostics Main Menu for Explorer I systems, type the number or letter that corresponds to the desired entry.

In the processor diagnostic and memory diagnostic menus, the ENTER and RETURN keys have the same function as the 0 key. For example, from the Explorer Standalone Diagnostics Main Menu, you can run all standalone diagnostics by pressing either ENTER or RETURN, or by typing 0.

The Explorer Standalone Diagnostics Main Menu allows you to run all of the standalone diagnostics, to select specific diagnostic tests to run in the processor and memory diagnostics, and to change the operational parameters under which the standalone diagnostics are executed. An overview of the menus accessible from the Explorer I Standalone Diagnostics Main Menu is shown in Figure 2-5 and discussed in the following paragraphs.

NOTE: To stop execution of the standalone diagnostics, press and hold the ABORT key. Pressing ABORT does not interrupt the test in progress. Test execution stops after the current test completes unless the key press is out of synchronization with the test. If the diagnostic does not stop between tests, press ABORT again. Another way to stop the test is to reboot.

Figure 2-5 Overview of the Standalone Diagnostics Menus (Explorer I)



**Running the
Processor
Diagnostic**

2.6.1 To run the processor diagnostic, select menu entry 1 — Enter Menu to Run Explorer Processor Diagnostic — from the Explorer Standalone Diagnostics Main Menu (see Figure 2-3). When you type the number 1, the Explorer Processor Diagnostic Main Menu (Figure 2-6) appears.

Figure 2-6 Explorer Processor Diagnostic Main Menu (Explorer I)

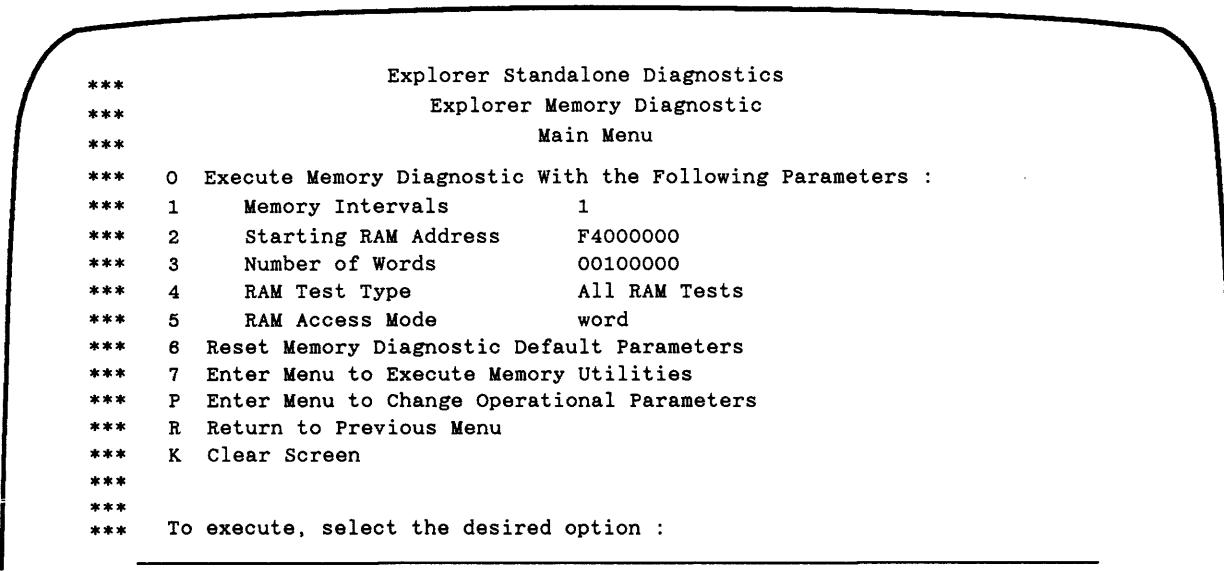
```
***          Explorer Standalone Diagnostics
***          Explorer Processor Diagnostic
***          Main Menu
***
***      O  Execute All Tests
***      1  Enter Menu to Execute Selected Tests
***      P  Enter Menu to Change Operational Parameters
***      R  Return to Previous Menu
***      K  Clear Screen
***
***      To execute, select the desired option :
```

From the Explorer Processor Diagnostic Main Menu, type the number 0 to run all processor diagnostic tests. Type the number 1 to display a list of the processor diagnostic tests. From this list you can select specific tests to run.

**Running the
Memory
Diagnostic**

2.6.2 To run the memory diagnostic, select menu entry 2 — Enter Menu to Run Explorer Memory Diagnostic — from the Explorer Standalone Diagnostics Main Menu (see Figure 2-3). When you type the number 2, the Explorer Memory Diagnostic Main Menu (Figure 2-7) appears.

Figure 2-7 Explorer Memory Diagnostic Main Menu (Explorer I)



In the Explorer Memory Diagnostic Main Menu, menu entry 0 runs the memory diagnostic. Menu entries 1 through 5 allow you to change the test execution parameters. When you select one of the menu entries 1 through 5, a menu or prompt allows you to change the specified parameter. After you make your selection, the main menu appears again. For descriptions of each parameter, refer to the paragraph entitled **Explorer Memory Diagnostic Test Execution Parameters** in this section.

Menu entry 6 in the main menu resets all of the test execution parameters to the default values that are set automatically by the diagnostic during initial load.

Menu entry 7 provides utility options for modifying data associated with the memory tests. For descriptions of the memory utility options, refer to the paragraph entitled **Explorer Memory Diagnostic Utilities**.

All of the memory boards found in the system are automatically selected for testing when you load the diagnostic. When you first display the Explorer Memory Diagnostic Main Menu, the number of boards selected for testing is displayed in the **Memory Intervals** menu entry. The second digit of the number(s) in the **Starting RAM Address** menu entry indicates the slot number of the board(s) selected for testing.

*Explorer Memory
Diagnostic Test
Execution
Parameters*

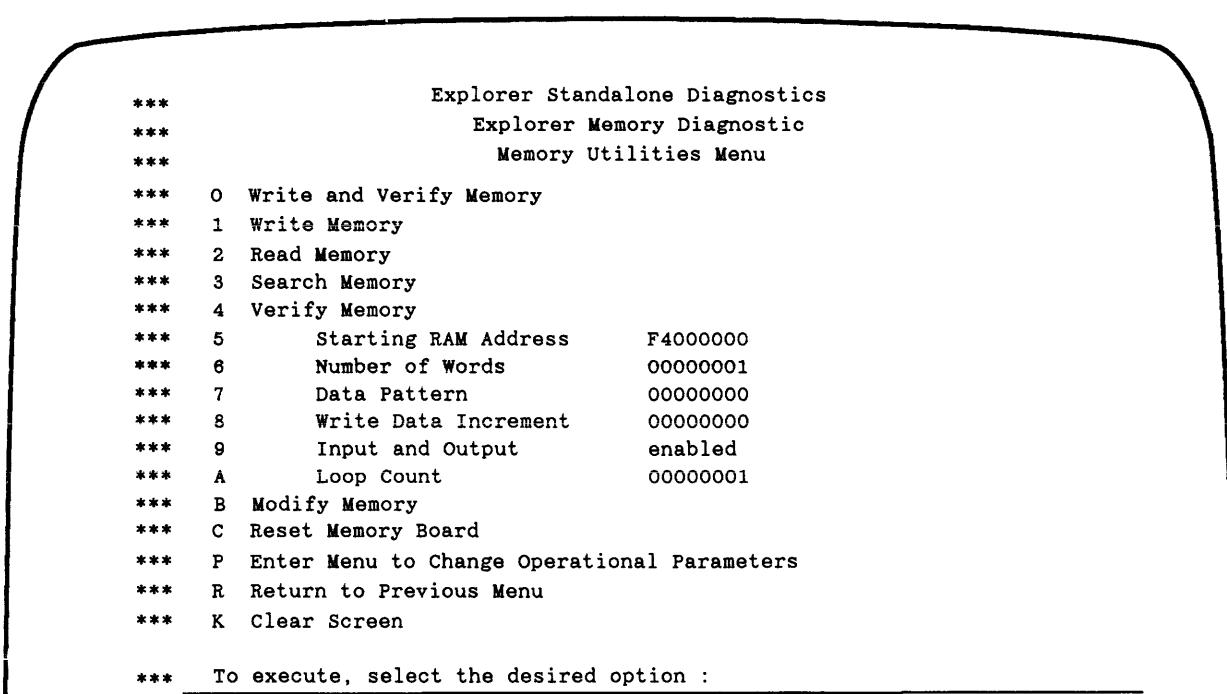
2.6.2.1 Each of the test execution parameters (menu entries 1 through 5 in the Explorer Memory Diagnostic Main Menu) has a specific function. A listing and description of these parameters follows:

- **Memory Intervals** — Specifies the number of memory blocks to test. The maximum number of intervals you can specify is six.
- **Starting RAM Address** — Specifies the starting address of each interval. The second digit in this number specifies the slot number of the board to test.
- **Number of Words** — Specifies the number of words in each memory interval.
- **RAM Test Type** — Specifies the RAM test(s) to run on the specified intervals. When you select this menu entry, a menu appears that lists all of the available tests. Refer to the online help information for descriptions of the available RAM tests.
- **RAM Access Mode** — Specifies the type of memory accessing.

*Explorer Memory
Diagnostic Utilities*

2.6.2.2 The Explorer Memory Diagnostic Memory Utilities Menu (Figure 2-8) allows you to customize your own memory tests.

Figure 2-8 Explorer Memory Diagnostic Utility Menu (Explorer I)



Menu entries 0 through 4 and menu entry B provide read, write, search, and verify utilities.

All of the utilities in menu entries 0 through 4 operate with the parameters defined in menu entries 5 through A. A listing and description of the utilities follows:

- **Write and Verify Memory** — Writes and verifies the specified data pattern with the specified test execution parameters.
- **Write Memory** — Writes the specified data pattern with the specified parameters. This utility does not report errors and does not verify the data written.
- **Read Memory** — Reads the specified memory addresses. The **Data Pattern** and **Write Data Increment** entries do not operate with this utility.
- **Search Memory** — Searches all of the specified memory addresses for the specified data pattern.
- **Verify Memory** — Verifies that the specified data pattern is written at the specified memory addresses. If a **Write Data Increment** is specified, this utility verifies the data increment.

Menu entry B, **Modify Memory**, allows you to specify different data patterns for a sequence of memory addresses. Specify the starting memory address in menu entry 5. The procedure for modifying memory is as follows:

1. Select menu entry B, **Modify Memory**. The starting memory address and its contents are displayed.
2. Enter a new data pattern and press RETURN or ENTER. (To accept the existing data pattern with no change, do not enter a data pattern — just press RETURN or ENTER.) A prompt with the next memory address and data pattern appears.
3. Steps 3 and 4 are repeated until you press the ABORT key to stop entering data patterns.

All of the values in the test execution parameters, menu entries 5 through A, (except entry 9) are listed in hexadecimal notation. A listing and description of the execution parameters follows:

- **Starting RAM Address** — Specifies the first RAM address to read or write.
- **Number of Words** — Specifies the number of words to write and/or read, or the limits of the search or verify operation.
- **Data Pattern** — Specifies the data pattern to use during the write, search, and verify utilities.
- **Write Data Increment** — Determines whether addresses are skipped during read or write operations. If the increment is 1, the diagnostic reads each address in the test block in sequence. If the increment is 2, the diagnostic reads every other address, and so on.

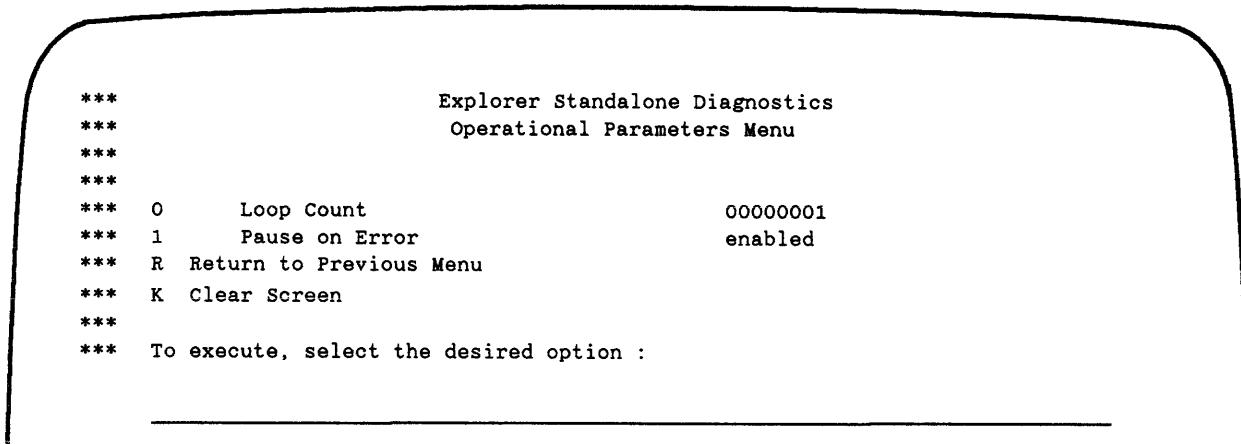
- Input and Output — If disabled, prevents the program from sending any information to any output devices and disables the abort capability. If enabled, normal error reporting occurs during test execution.
- Loop Count — Specifies the number of times to execute the utilities in this menu.

Changing Operational Parameters

2.6.3 The Change Operational Parameters Menu (see Figure 2-9) provides the following parameter selection options:

- Loop Count — Allows you to change the number of times the tests run. In the Explorer processor diagnostic, the loop count determines the number of times that all of the tests run. In the Explorer memory diagnostic, the loop count determines the number of times to run the tests you specify.
- Pause on Error — When enabled, causes the diagnostic to stop running when an error occurs. To continue testing after you observe the error message, press any key.

Figure 2-9 Explorer Change Operational Parameters Menu (Explorer I)



Standalone Diagnostics (Explorer II)

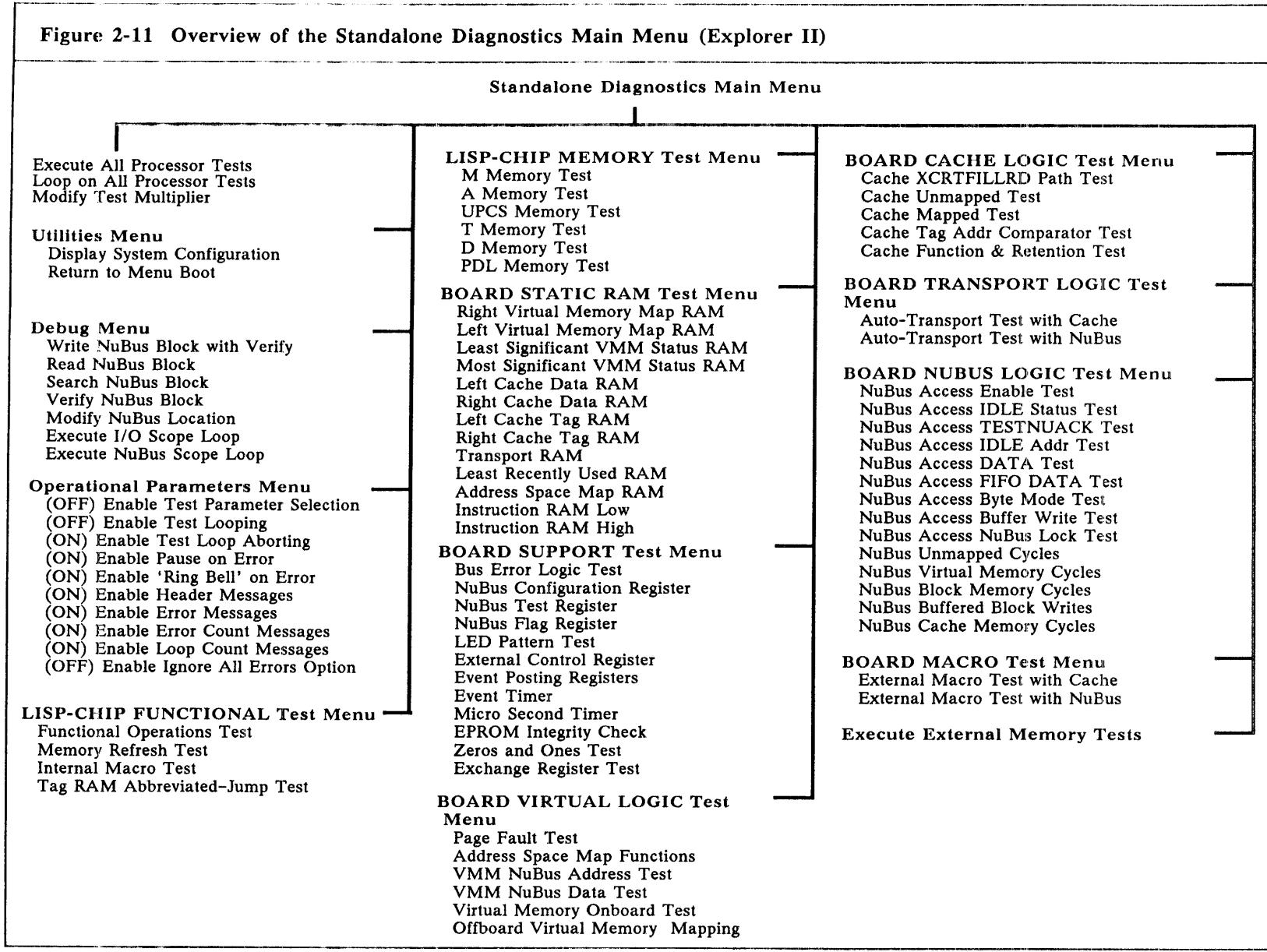
2.7 The standalone diagnostics for Explorer II systems consist of Lisp microprocessor (LISP-CHIP) tests, processor board tests, and auxiliary floating-point tests.

The Explorer Standalone Diagnostics Main Menu (Figure 2-10), allows you to run all of the standalone diagnostics, to run specific diagnostic tests through test menus, to change the operational parameters under which the standalone diagnostics tests are executed, and to execute various utilities from the Utilities and Debug Menus. An overview of the menus and tests accessible from the Explorer II Standalone Diagnostics Main Menu is shown in Figure 2-11.

The Explorer II Standalone Diagnostics Main Menu, the Utilities Menu, the Debug Menu, and the Parameters Menu are discussed in the following paragraphs. Refer to Appendix B for brief descriptions of the tests in the Explorer II standalone diagnostics.

Figure 2-10 Explorer Standalone Diagnostics Main Menu (Explorer II)

```
EXP2 Diagnostic                                Revision ddd/yy
**                                              Main Menu
**
**      A = Execute All Processor Tests
**      B = Loop on All Processor Tests
**      C = Modify Test Multiplier (0001)
**      D = LISP-CHIP FUNCTIONAL Test Menu
**      E = LISP-CHIP MEMORY Test Menu
**      F = BOARD STATIC RAM Test Menu
**      G = BOARD SUPPORT Test Menu
**      H = BOARD VIRTUAL LOGIC Test Menu
**      I = BOARD CACHE LOGIC Test Menu
**      J = BOARD TRANSPORT LOGIC Test Menu
**      K = BOARD NUBUS LOGIC Test Menu
**      L = BOARD MACRO Test Menu
**      M = Execute External Memory Tests
**
**      W = Utilities Menu, Y = Debug Menu, Z = Parameter Menu
Select the desired option:
```

Figure 2-11 Overview of the Standalone Diagnostics Main Menu (Explorer II)

**Standalone
Diagnostics
Main Menu**

2.7.1 To execute a menu entry in the Explorer II Standalone Diagnostics Main Menu, type the letter that corresponds to the desired entry (Figure 2-10). Only the letters associated with menu entries are recognized by the standalone diagnostics. Pressing any other key causes a beep to sound.

To run all of the standalone diagnostics from the Standalone Diagnostics Main Menu, press the letter A to Execute All Processor Tests or press the letter B to Loop on All Processor Tests. Pressing the letter C to Modify Test Multiplier allows you to increase or decrease the number of test patterns used each time a test executes.

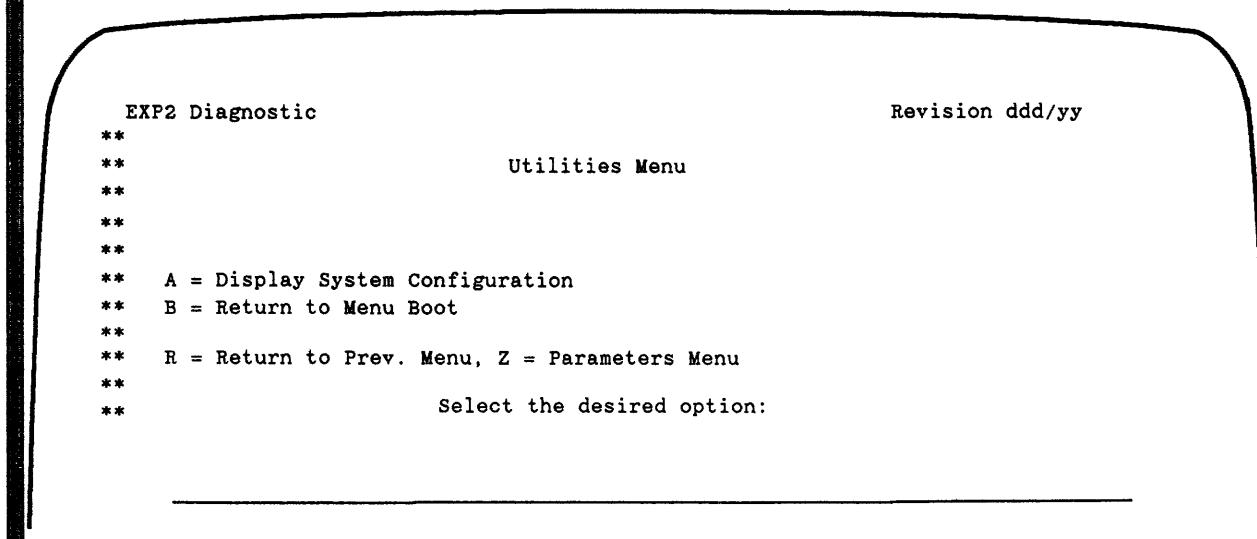
The Execute All Processor Tests entry, the Loop on All Processor Tests entry, the Modify Test Multiplier entry, and the Utilities Menu are only accessible from the Standalone Diagnostics Main Menu.

NOTE: To abort when looping on tests, press the ABORT key within one second after a test completes. Pressing the ABORT key when looping on tests does not interrupt the test in progress. If the looping does not stop between tests, continue pressing the ABORT key. Another way to stop test looping is to reboot.

**Standalone
Diagnostics
Utilities Menu**

2.7.2 The Utilities Menu (Figure 2-12) allows you to display system information or return to the system load menu.

Figure 2-12 Utilities Menu (Explorer II)



The following is a description of each entry from the Utilities Menu:

- **Display System Configuration** — This menu entry displays system configuration information. Refer to Figure 2-13 for a sample output of the Display System Configuration menu entry.

- Return to Menu Boot — This menu entry terminates the standalone diagnostics program and displays the system load menu:

L=Lisp Load, M=Multi-unit Load, D=Diagnostic Load, P=Print Device Label,
C=Configuration Boot :

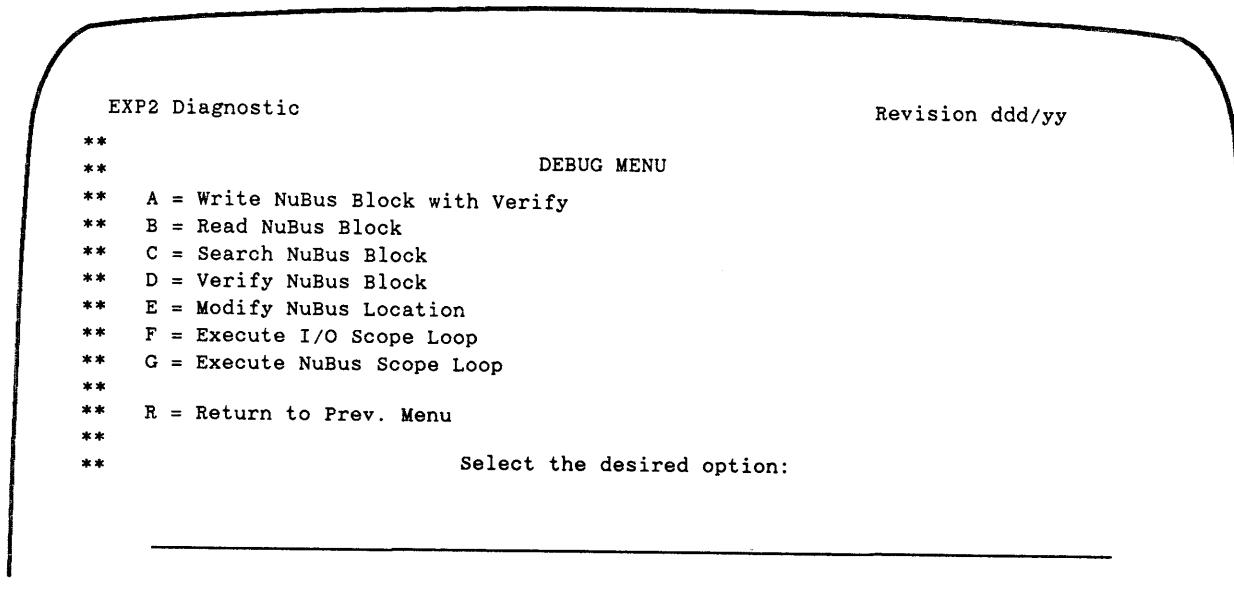
Figure 2-13 Sample Output of Display System Configuration

```
** EXP2 Diagnostic                                         Revision ddd/yy
**
**                               CHASSIS SLOT CONFIGURATION
**
**   SLOT 0 = NPI, Pn = 00002238040-0001, Rev level = *U, Mfg = TIAU,
**           No System memory, Configuration Reg Address = FOE0000B
**   SLOT 1 = SPS, Pn = 00002547135-0001, Rev level = *H, Mfg = TIAU,
**           No System memory, Configuration Reg Adress = F1FE0000
**   SLOT 2 = CPU (Explorer 2), Pn = 00002540830-0001, Rev level = **, Mfg = TIAU,
**           No System memory, Configuration Reg Address = F2D0000B
**   SLOT 3 = Empty slot
**   SLOT 4 = MEM, Pn = 000022386415-0001, Rev level = *L, Mfg = TIAU,
**             Memory size = 00200000 bytes, Configuration Reg Address = F4FFC000
**   SLOT 5 = SIB, Pn = 00002238645-0001, Rev level = *Y, Mfg = TIAU,
**             No system memory, Configuration Reg Address = F5F00040
**   SLOT 6 = CSI, Pn = 00002534330-0001, Rev level = *B, Mfg = TIAU,
**             No System memory, Configuration Reg Address = F6D00040
**
**   ----- Hit any key to return to Utility Menu -----
```

**Standalone
Diagnostics
Debug Menu**

2.7.3 The Debug Menu (Figure 2-14) allows you to test the NuBus memory using block memory reads, writes, verifies, and pattern searches.

Figure 2-14 Debug Menu (Explorer II)



The following is a description of each entry from the Debug Menu:

- **Write NuBus Block with Verify** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, the beginning address offset, the size of the block in bytes, the beginning test pattern, and the size of the pattern increment. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key.
- **Read NuBus Block** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, and the beginning address offset. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key.
- **Search NuBus Block** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, the beginning address offset, the size of the block in bytes, and the data pattern to use in the search. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key.
- **Verify NuBus Block** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, the beginning address offset, the size of the block in bytes, the beginning test pattern, and the size of pattern increment. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key.

- **Modify NuBus Location** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, and the beginning address offset. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key. After you enter the information and press the RETURN key, the test displays the memory location at the specified address on the screen. You can enter a new value and then press the RETURN key, or press the RETURN key leaving the displayed value unchanged. After you press the RETURN key, the next memory address is displayed. To terminate the test, press the ABORT key.
- **Execute I/O Scope Loop** — This test prompts you for the beginning local I/O address, the secondary I/O address, the cycle type, the beginning test pattern, the next pattern 'Exclusive OR' mask, the size of the next pattern increment, the scope loop execution time in seconds, and if you want to enable the scope sync pulse. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key. Figure 2-15 shows the prompts and sample output of the Execute I/O Scope Loop when the default values are specified and the test completes execution.

NOTE: The Execute I/O Scope Loop cannot be aborted from the keyboard. You must reboot the system to terminate the test before the test completes.

- **Execute NuBus Scope Loop** — This test prompts you for the slot number of the board to test, if you want to address memory through the base register, the address offset, the secondary base address offset, the cycle size, the cycle type, the beginning test pattern, the next pattern 'Exclusive OR' mask, the size of the next pattern increment, the scope loop execution time in seconds, and if you want to enable the scope sync pulse. The test prompts you one line at a time and displays the default value along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key. Figure 2-16 shows the prompts and sample output of the Execute NuBus Scope Loop when the default values are specified and the test completes execution.

NOTE: The Execute NuBus Scope Loop cannot be aborted from the keyboard. You must reboot the system to terminate the test before the test completes.

Figure 2-15 Execute I/O Scope Loop

```
** EXP2 Diagnostic                                         Revision ddd/yy
**
**                                         Execute I/O Scope Loop
**
**      (30000000) Beginning local I/O space address       : 30000000
**      (00000000) Secondary I/O address (0=none)          : 00000000
**      (00000000) Cycle type (0= Read, 1= Write, 2= Write/Read): 1
**      (AAAAAAA) Beginning test pattern                  : AAAAAAAA
**      (FFFFFFF) Next pattern `Exclusive OR` mask        : FFFFFFFF
**      (00000000) Next pattern Increment size           : 00000000
**      (0000004B) Scope loop execution time in seconds   : 004B
**      (Y) Enable scope sync pulse                      Y/N: Y
**
**                                         Any changes needed? Y/N: N
**
**                                         **** NOTE: Sync pulse for scope loop is located at DF024 pin 15. Use negative slope.
**
** Read I/O Scope Loop executing. Seconds remaining = 0000
```

Figure 2-16 Execute NuBus Scope Loop

```
** EXP2 Diagnostic                                         Revision ddd/yy
**
**                                         Execute NuBus Scope Loop
**
**      (00000004) Slot number of board to test          : 4
**      (Y) Address memory via Base Register? Y/N       : Y
**      (00000000) Address offset                        : 00000000
**      (00000000) Secondary Base Address offset (0=none) : 00000000
**      (00000002) Cycle size (0= Byte, 1= Halfword, 2= Word) : 2
**      (00000000) Cycle type (0=Read, 1=Write, 2=Write/Read): 1
**      (AAAAAAA) Beginning test pattern                : AAAAAAAA
**      (FFFFFFF) Next pattern `Exclusive OR` mask       : FFFFFFFF
**      (00000000) Next pattern Increment size         : 00000000
**      (0000004B) Scope loop execution time in seconds : 004B
**      (Y) Enable scope sync pulse                    Y/N: Y
**
**                                         Any changes needed? Y/N: N
**
**                                         **** NOTE: Sync pulse for scope loop is located at DF024 pin 15. Use negative slope.
**
** NuBus Word Write Scope Loop executing. Seconds remaining = 0000
```

**Standalone
Diagnostics
Operational
Parameters Menu**

2.7.4 The Operational Parameters Menu (Figure 2-17) allows you to change test execution parameters. Toggle the parameters ON and OFF by pressing the letter associated with a menu entry. For example, if the **Enable Test Parameter Selection** is OFF (Figure 2-17), pressing the **A** key turns this parameter ON and changes the displayed menu entry to **A = (ON) Enable Test Parameter Selection**.

NOTE: There is only one Operational Parameters Menu. If you change an entry, the change affects all standalone diagnostics tests. For example, if you change the **Enable Test Parameter Selection** to **ON**, this parameter remains **ON** when you execute any test in any menu until you reset it to **OFF**.

Figure 2-17 Operational Parameters Menu (Explorer II)

```

EXP2 Diagnostic                                         Revision ddd/yy
OPERATIONAL PARAMETERS MENU

**
**
** A = (OFF) Enable Test Parameter Selection
** B = (OFF) Enable Test Looping
** C = (ON) Enable Test Loop Aborting
** D = (ON) Enable Pause on Error
** E = (ON) Enable 'Ring Bell' on Error
** F = (ON) Enable Header Messages
** G = (ON) Enable Error Messages
** H = (ON) Enable Error Count Messages
** I = (ON) Enable Loop Count Messages
** J = (OFF) Enable Ignore All Errors Option
**
** R = Return to Prev. Menu
**
Select the desired option:

```

The Operational Parameters Menu provides the following parameter selection options:

- **Enable Test Parameter Selection** — If ON, allows you to change test parameters before a test executes. When ON, the test parameters and their default values are displayed along with a field for entering new values. Press the RETURN key to accept the default value, or enter a new value, and then press the RETURN key. After you accept the default parameter values or enter new values, the test continues.

If OFF, tests execute with the default parameter values.

- **Enable Test Looping** — If ON, executes the specified test until you press the ABORT key. If the **Enable Test Loop Aborting** parameter is OFF, pressing the ABORT key does not stop test execution, and you must reboot to stop the test.

If OFF, the specified test runs once.

- **Enable Test Loop Aborting** — If ON, test looping aborts when the ABORT key is pressed and the current executing test completes.
If OFF, pressing the ABORT key does not stop test looping. You must reboot to stop the test.
- **Enable Pause on Error** — If ON, causes the diagnostic test to stop running when an error occurs. When you press any key except the ABORT key, the test continues execution.
If OFF, errors are displayed as they occur. After eight errors occur, an abort prompt is displayed. When the abort prompt is displayed, you have two seconds to press the ABORT key and stop the test.
- **Enable ‘Ring Bell’ on Error** — If ON, a bell tone sounds when an error occurs.
If OFF, the bell tone is disabled during test execution.
- **Enable Header Messages** — If ON, displays the name of the test during test execution and displays a message when the test completes.
If OFF, no header messages are displayed during test execution.
- **Enable Error Messages** — If ON, displays any errors that occur during test execution.
If OFF, does not display any errors that occur during test execution.
- **Enable Error Count Messages** — If ON, displays an error count after test execution or after a test loop. The error count begins with the number 00000000 and increments by a value of one each time an error occurs.
If OFF, does not display the error count.
- **Enable Loop Count Messages** — If ON, a loop count is displayed each time the specified test, or specified group of tests, completes test execution during test looping. The loop count begins with the number 00000000 and increments by a value of one each time the test or test loop completes execution.
If OFF, does not display the loop count.
- **Enable Ignore All Errors Option** — If ON, ignores all other error message parameters even if those entries are ON. No error messages are displayed. If the Enable Error Count Messages parameter is ON, the error count is not incremented, but an error count of 00000000 is displayed.
If OFF, tests execute using the current error parameter entries.

3

FEATURES

Highlights of This Section

This section provides descriptions of the keyboard functions, operational parameters, error messages, and other information applicable to GDOS and the loadable diagnostic programs.

- Function keys and control keys
- Cursor-movement keys
- Changing GDOS operational parameters
- Overview of the menu structure
- Error reporting

**Function Keys
and Cursor Keys**

3.1 The following tables describe the keys that perform special functions in the diagnostic programs that run under GDOS. Table 3-1 lists keys that allow you to select options or control execution of the diagnostics. Table 3-2 lists keys that enable you to move around within menus and to respond to selection options within certain menu entries. (Note that the standalone diagnostics do not support most of the key functions described in Tables 3-1 and 3-2.)

Table 3-1**Function Keys and Control Keys**

Key(s)	Function
ABORT and CTRL-C	Aborts the current test. Control returns to the menu from which the test was executed.
CLEAR SCREEN and CTRL-R	Clears the information message window and redisplays the current menu.
CTRL-F*	Provides a summary of all the available key functions listed in Tables 3-1 and 3-2 and is available from any menu.
HELP and ?	Provides online help information for the current menu entry. The ? key (question mark key) also calls online help.
RETURN/ ENTER	Executes the currently selected menu item. Also executes all the selected subentries that are indented under a main menu entry.
<p>For example, at the GDOS Top-Level Menu, move the cursor (use the Down Arrow key) to the second menu entry. The cursor includes the word Expand in the Loop on Selected Noninteractive Diagnostics entry. Now press ENTER. An expanded version of the menu appears. It contains subentries that show the various noninteractive tests that can be executed. If you press ENTER when the cursor includes the word Execute in a menu entry, all subentries that have a Yes response selected will run.</p>	
BREAK/RESUME, CTRL-S/CTRL-Q	Halts test execution when you press the BREAK key. Press RESUME to continue. CTRL-S also halts test execution; CTRL-Q resumes the halted test.
Space Bar	Expands the information message window so that it covers the current menu and provides more screen space for information messages and error messages. Pressing the Space Bar a second time redisplays the current menu.
TAB	Alternates between Yes and No; On and Off; Interactive, Noninteractive, and All; Menu and Name; and radix notations — decimal, hexadecimal, and octal (when these options are available).

Table 3-1**Function Keys and Control Keys (Continued)**

Key(s)	Function
CTRL-U	Resets values to their initial state (changes Name back to Menu, and so forth).
F1* and CTRL-B	Moves operation to the previous menu.
F2* and CTRL-T	Moves operation to the main menu as follows: <ul style="list-style-type: none"> ■ In GDOS — Displays the Top-Level Menu. (Note that if you are already in the Top-Level Menu, F2 allows you to exit GDOS.) ■ In a diagnostic test — Displays the main menu. ■ In the Change Operational Parameters Menu — Moves operation to the previous menu.
F3	Reverses the video display from black on white to white on black and vice-versa.
F4	Allows you to access the Change Operational Parameters Menu from any other menu.

NOTE:

* The function of this key is displayed in the status line (when applicable).

Table 3-2**Cursor-Movement Keys**

Key(s)	Function
Up Arrow and CTRL-K	Moves the cursor up; however, if the cursor is on the first menu entry, this key moves the cursor to the last entry.
Down Arrow and CTRL-J	Moves the cursor down; however, if the cursor is on the last menu entry, this key moves the cursor to the first menu entry.
Right Arrow and CTRL-L	Changes a No response to Yes and selects among Interactive, Noninteractive, and All. Also selects between Menu and Name (where available).
Left Arrow	Changes a Yes response to No and selects among and CTRL-H Interactive, Noninteractive, and All. Also selects between Menu and Name (where available.)
Home or CTRL-O	Moves the cursor to the top menu entry. The Home key is the blank key surrounded by the Arrow keys.

NOTE: When entering a numeric value for a menu entry, place the cursor (use the Left and Right Arrow keys) on the space containing the existing value, and type the number. If you enter a number in the space immediately to the right of the existing value, the value you enter is concatenated with the previous value. For example, if the existing value is 1 and you enter an 8 in the space to the right of the value, the diagnostic program considers the new value to be 18.

If the current numeric value is 10 or greater and you want to specify a numeric value less than 10, type the new value with a leading zero (01, 02, 03, and so forth), and then press the RETURN key.

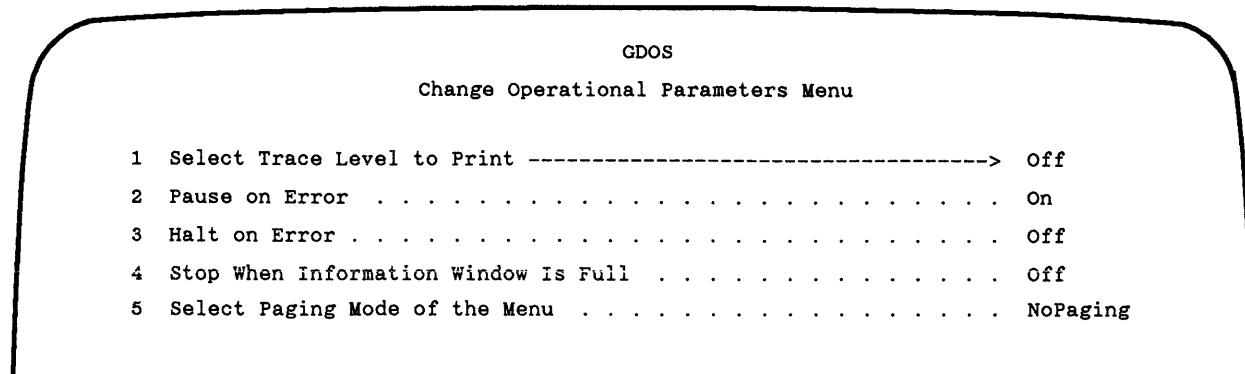
Changing GDOS Operational Parameters

3.2 The GDOS Change Operational Parameters Menu (shown in Figure 3-1) allows you to change parameters that affect the execution of all the diagnostic programs under GDOS. You can access the Change Operational Parameters Menu by selecting the `Enter Menu to Change GDOS Operational Parameters` option in the GDOS Top-Level Menu or by pressing the F4 key in any menu.

NOTE: Changes in GDOS operational parameters have no effect on the execution of tests within the standalone diagnostics programs. For more information about changing the operational parameters in the Explorer I standalone diagnostics programs, refer to the paragraph entitled **Changing Operational Parameters** in Section 2.

For changing the operational parameters in the Explorer II standalone diagnostics programs, refer to the paragraph entitled **Standalone Diagnostics Operational Parameters Menu** in Section 2.

Figure 3-1 GDOS Change Operational Parameters Menu



The following list describes the entries in the GDOS Change Operational Parameters Menu:

- **Select Trace Level to Print** — The diagnostic programs send *only* error messages or both error messages *and* information messages to the printer as well as to the video display terminal, depending on which of three options you select. The selection options are `off`, `ErrorMsgs`, and `AllMsgs`.
- **Pause on Error** — When an error occurs, an error message appears and test execution stops. To continue the test or to display the next error message, press any key except the ABORT key.
- **Halt on Error** — When an error occurs, the current process stops, and the menu from which the process was executed is displayed.
- **Stop When Information Window Is Full** — Scrolling stops when the information window is full. To scroll half the information window, press the Space Bar; to scroll one line, press any other key.
- **Select Paging Mode of the Menu** — The current menu window shrinks when a diagnostic test is executed, allowing more screen space for error messages and information to be displayed, depending on which of three options you select. The selection options are `NoPaging`, `AutoPaging`, and `ManualPaging`.

To execute any of these menu entries, place the cursor on the parameter value you wish to change; then, use the TAB key or the Left and Right Arrow keys to change the current value to a different value. After you have changed the desired parameters, press RETURN.

All options in the GDOS Change Operational Parameters Menu are under the control of GDOS. Therefore, when you change one of the parameters, you affect execution of all the GDOS diagnostic programs. However, in some cases you can change parameters that are specific to a diagnostic program by accessing those parameters through a Test Execution Parameters submenu within the particular diagnostic program. Parameter changes that are specific to a diagnostic program do not affect any of the other diagnostic programs.

Menu Structure

3.3 The typical GDOS diagnostic menu structure consists of four menus (see Figure 3-3 for a menu map of the loadable diagnostics):

- Main menu
- Execute Selected Tests menu
- Test Execution Parameters submenu
- Loop on Selected Tests menu

All diagnostic programs under GDOS have at least one main menu and an Execute Selected Tests Menu. Other menus are included as appropriate for the diagnostic program.

The main menu for each diagnostic appears after the initial loading of the diagnostic. This menu allows you to execute tests or branch to other menus in the diagnostic.

The Execute Selected Tests Menu lists each test in the diagnostic program and allows you to select specific tests to run.

The Test Execution Parameters submenu is available in the diagnostic programs that contain parameters you can change. After you change the execution parameters in this submenu, go to the Execute Selected Tests Menu or to the main menu of the diagnostic program and execute the tests with the new parameters.

The Loop on Selected Tests Menu is available in diagnostic programs that contain noninteractive tests. This menu allows you to change the loop count on any of the noninteractive tests. (You can also loop on all noninteractive tests by selecting the Loop on All Noninteractive Tests entry in the main menu of the diagnostic program you are using.)

For information about the menus in the standalone diagnostics, refer to the paragraph entitled **Standalone Diagnostics (Explorer I)** or the paragraph entitled **Standalone Diagnostics (Explorer II)** in Section 2.

Error Reporting

3.4 Error messages are reported in the information message window of the video display. The menu remains on the video display when error messages are displayed.

To send error messages to a printer, do the following:

1. Make sure that the printer is turned on and is online. Do this *before* you run a diagnostic program.
2. Press F4 to access the GDOS Change Operational Parameters Menu.
3. Use the TAB key to change the parameter of the Select Trace Level to Print entry to either ErrorMsgs or AllMsgs, and press ENTER.

The error messages include all the information available for the error that occurred, including probable causes and corrective actions.

Figure 3-2 shows a sample diagnostic error message. The numbers at the left do not appear on the display; they are included here for reference.

Figure 3-2 Sample Error Message

```

1 ** ERROR No. SIB0214 System Interface Board Diagnostic
2 TEST No. 41 -- Graphics Memory Test
3 Found memory error during forward pass
4
5     Address : FSF00000
6     Expected Value: XXXXXXXX
7     Actual Value: XXXXXXXX
8     Memory contains a stuck bit or bits, or the address
9     lines are tied together.
10 **END ERROR

```

The **ERROR header shown in line 1 appears in every error message except GDOS error messages. The next part, No. SIB0214, is the error code. The first three characters in the error code, always letters, are the error code prefix. They indicate which diagnostic produced the error message. The last four characters in the error code, always numbers, indicate the unique error number. Table 3-3 lists the error code prefixes and the corresponding diagnostics.

Line 2 in the message indicates which subtest of the diagnostic produced the error. These subtests are explained in Section 5 of this manual.

Lines 3 through 7 contain the actual message. Error messages can be any length. Some are only one line of text, and others are longer than the one shown in this example.

Lines 8 and 9 contain information about the probable cause(s) of the error. Some error messages include a suggested corrective action.

Line 10, **END ERROR, signals the end of the error message. It is identical for all error messages.

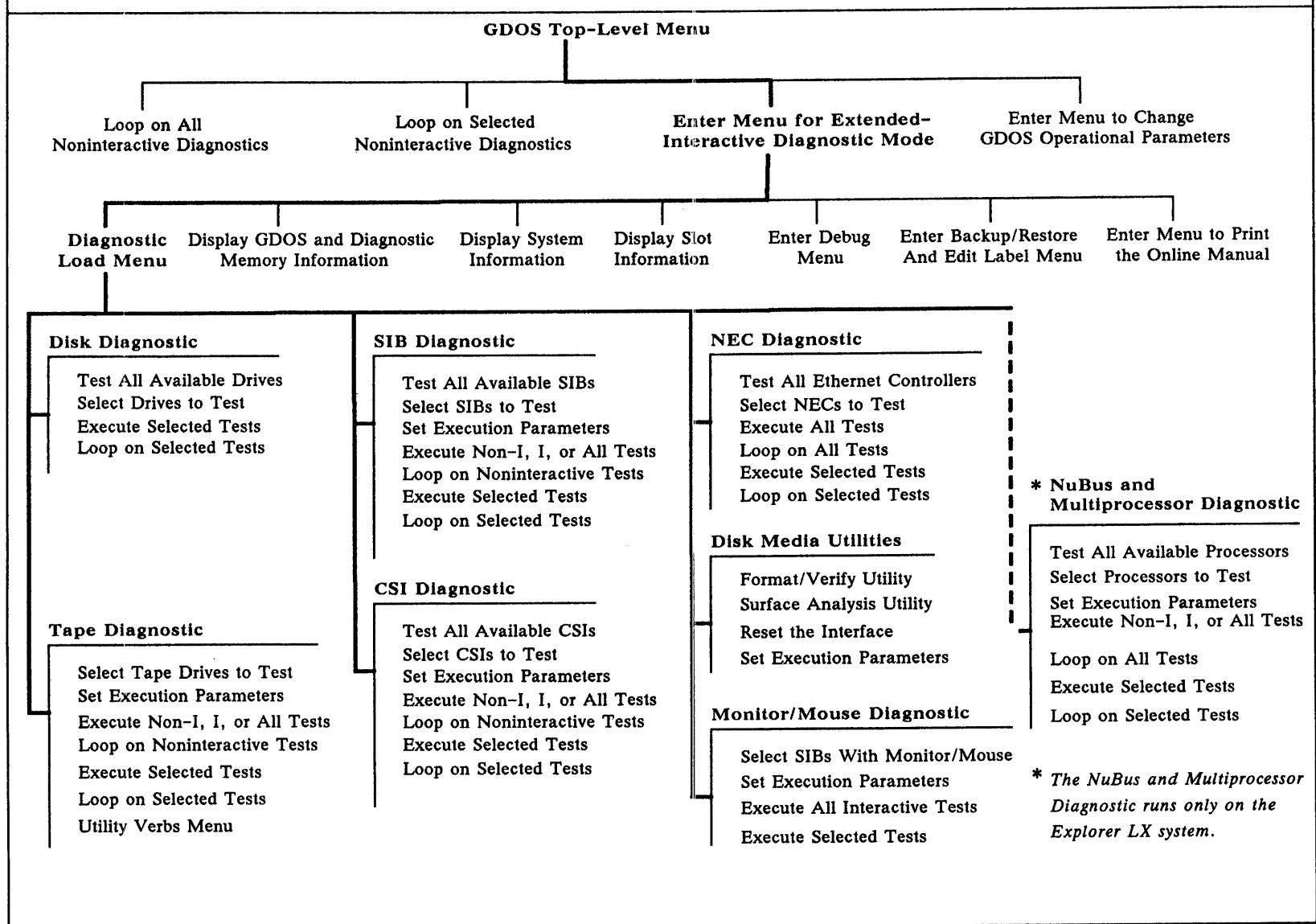
Table 3-3

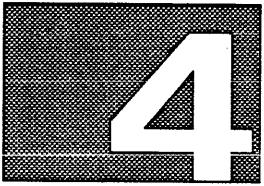
Error Code Prefixes

Prefix	Diagnostic/Utility
SYS	General Diagnostics Operating System (GDOS)
DXE	Disk Diagnostic
XTC	Tape Diagnostic
SIB	System Interface Board Diagnostic
NEC	NuBus Ethernet Controller Diagnostic
KMM	Monitor and Mouse Diagnostic
DSA	Disk Surface Analysis, Format/Verify Utility
BUS	NuBus and Multiprocessor Diagnostic*
CSI	Color System Interface Board Diagnostic

* The NuBus and Multiprocessor Diagnostic runs only on the Explorer LX system.

Figure 3-3 GDOS Menu Map for the Loadable Diagnostics and the Disk Media Utilities





DIAGNOSTIC TESTS AND UTILITIES

Highlights of This Section

This section contains brief descriptions of the diagnostics programs and GDOS utilities, including the various tests that can be run in Extended-Interactive Diagnostic mode and the utilities available in the GDOS Utilities Menu. The standalone diagnostics programs are also discussed.

Diagnostics and Loadable Utility

- Disk Diagnostic program
- Tape Diagnostic program
- System Interface Board Diagnostic program
- Color System Interface Board Diagnostic program
- NuBus Ethernet Controller Diagnostic program
- Monitor and Mouse Diagnostic program
- Standalone Diagnostics programs
- NuBus and Multiprocessor Diagnostic program*
- Disk Surface Analysis, Format/Verify utility

GDOS Print Online Manual and Backup/Restore Utilities

- Print Online Manual utility
- Backup/Restore utility
 - Display or Edit Partition(s)
 - Restore Partition(s)
 - Verify Partition(s)
 - Make Bootable (Labelled) Tape

* The NuBus and Multiprocessor diagnostic tests run only on the Explorer LX system. Refer to Appendix A for more information about this set of diagnostics.

Running GDOS Diagnostic Tests And Utilities

4.1 You can run any of the noninteractive diagnostic tests from the GDOS Top-Level Menu. You can run the interactive diagnostic tests, however, only by entering the Extended-Interactive Diagnostic mode and loading the diagnostic program. This process is described in the paragraph entitled Extended-Interactive Diagnostic Mode in Section 2. To run a GDOS utility or to print the online manual, enter the Extended-Interactive Diagnostic Mode Menu; then, select menu entry number 8 — Enter Backup/Restore and Edit Label Utility — or menu entry number 9 — Enter Menu to Print Online Manual.

Detailed descriptions of the GDOS diagnostic tests and utilities are available online. You can access the online help information in the following two ways:

- Place the cursor on the menu entry for which you want information; then, press the HELP key or the ? (question mark) key.
 - Print the online manual. For instructions on how to print the online manual, refer to the paragraph entitled Print Online Manual Utility in this section.
-

Disk Diagnostic Tests

4.2 The tests in the Disk Diagnostic program verify the integrity of each fixed disk and its controller board. The Device Integrity test, called Test 10, checks the overall integrity of the disk drives being tested. Any drives that do not pass Test 10 are not tested further.

CAUTION: The interactive tests in this diagnostic program can destroy data if you direct the test to write on areas of the disk that store user data. Refer to the help screens for individual tests to determine which tests can destroy existing data.

The disk must already be formatted before testing begins because disk drives with unformatted disks are not recognized as acceptable for testing by the diagnostic program. To format a disk, use the Format/Verify option in the Disk Surface Analysis, Format/Verify utility described in the paragraph entitled Disk Surface Analysis, Format/Verify Utility in this section.

If you elect to run all noninteractive tests from the Disk Diagnostic Main Menu, Test 10 automatically runs. If you select specific controller boards or disk drives to test from the Select Disk Drives to Test entry in the Disk Diagnostic Main Menu, you must first run Test 10.

Most write operations performed during the Disk Diagnostic operation are made to the TZON (test zone) partition on the disk. Therefore, you *should not* use TZON for storing other data.

Tape Diagnostic Tests

4.3 The tests in the Tape Diagnostic program ensure that the tape drive can complete typical tape drive commands issued by the controller. Test 1, the Tape Device Integrity Test, checks the overall integrity of the selected tape drives and also checks for data on tape. If data is there, a prompt appears asking if you wish to destroy that data. The Tape Diagnostic program will run only if you install a tape in the drive.

CAUTION: The Tape Diagnostic program will destroy all the data on the cartridge tape. When you run this diagnostic, use a blank tape or a tape containing unimportant data.

When you run any of the Tape Diagnostic tests, the Tape Diagnostic program first determines if the integrity of the tape drive has been tested. If the tape drive integrity has not been tested, the Tape Diagnostic program automatically runs Test 1 before proceeding with any other tests. If the integrity of the tape drive has been tested, Test 1 is automatically omitted.

When you first attempt to run a test in this diagnostic, a prompt appears asking if you wish to re-tension the tape cartridge. Re-tensioning ensures that tape tension is uniform throughout the reel.

System Interface Board Diagnostic

4.4 The tests in the System Interface Board Diagnostic check the integrity of the System Interface Board by testing the following components:

- Event generator register files
- Read and write functions of nonvolatile RAM
- Real-time clock and interval timer
- Graphics bit-mapped memory
- Universal synchronous/asynchronous receiver-transmitter (USART)
- Parallel printer port

This diagnostic also runs an on-board loopback and verify test.

Two loopback tests are available in Extended-Interactive Diagnostic mode only: the RS-232C internal and external loopback tests. These tests ensure that the RS-232C ports function properly.

Color System Interface Board Diagnostic

4.4A The Color System Interface Board Diagnostic initiates extensive ROM-based tests to check the integrity of the following CSI on-board subsystems:

- Microprocessor
- NuBus events logic
- Nonvolatile RAM
- Real-time clock and interval timer
- Bit-mapped graphics controller
- Keyboard, mouse, sound, speech, and voice
- RS-232C port and parallel printer port

GDOS-loadable tests are also available in Extended-Interactive Diagnostic mode. These tests check the integrity of external devices such as a monitor, a mouse, a parallel printer, and a keyboard.

**NuBus Ethernet
Controller
Diagnostic**

4.5 The tests in the NuBus Ethernet Controller Diagnostic perform the following functions:

- Ensures that the NuBus Ethernet controller board has a unique address.
 - Causes the LAN coprocessor to execute nonoperation (NOP) instructions. A test starts, suspends, resumes, and aborts these instructions and ensures that the commands execute properly.
 - Executes a loopback test to ensure that the transmit and receive buffers and commands function properly.
 - Ensures that the Diagnose, Individual Address (IA) setup, and Configure commands execute properly.
-

**Monitor and
Mouse Diagnostic**

4.6 The Monitor and Mouse Diagnostic tests the functions of the monitor and mouse. Several monitor tests display images on the video display. You must visually verify that the images are properly aligned and that the image brightness is consistent.

The Mouse Keystroke test ensures that the mouse keys are working properly.

**Explorer I
Processor
Diagnostic**

4.7 The Explorer I processor diagnostic is a standalone diagnostics test that is coded in the Explorer-native microcode. This diagnostic differs from other Explorer diagnostics in that it is not written in the Diagnostic Engine (DE) language and, therefore, does not run under GDOS.

The processor diagnostic tests ensure that the processor being tested meets the acceptable standard of quality. If a problem does exist, these tests aid in problem isolation. The processor diagnostic program tests major parts of the processor that are not tested by the processor self-test. The processor diagnostic consists of the following tests:

- Test 0 — ALU/O Bus test
 - Test 0 — Byte/Barrel Shifter test
 - Test 1 — I Memory test
 - Test 2 — Pushdown List (PDL) test
 - Test 3 — M Memory test
 - Test 4 — A Memory test
 - Test 5 — Microprogram Counter Stack (UPCS) test
 - Test 6 — Tag Classifier RAM test
 - Test 7 — Unmapped Accessing test
-

- Test 8 — Virtual Memory Address (VMA) test
- Test 9 — Garbage Collector Volatility Fault (GCVF) test
- Test A — Dispatch test
- Test B — Macro Instruction Decode Logic test
- Test C — Event Posting test
- Test D — Instruction Stream Hardware test
- Test E — Memory Cycle Abort test

Any error condition occurring during test execution halts the test and displays an error message. To continue the test, press any key other than ABORT. To abort the tests, press and hold the ABORT key once. The diagnostic skips the remaining tests and advances to the end of the diagnostic.

The following message is an example of an error message that might occur with the Memory Cycle Abort test:

```
** ERROR - OD:  
Writing to bad mem-addr did not cause NuBus error or  
if-not=NuBus error conditional logic bad.  
  
Machine control register: 9FDF29F2  
Event enable bit: disabled  
Abort enable bit: enabled  
Memory cycle abort enable bit: enabled  
Pending bit: disabled  
  
** END ERROR  
  
Push any key to continue
```

Refer to the online help information for more information about the error messages.

Explorer I Memory Diagnostic

4.8 The Explorer I memory diagnostic is a standalone diagnostic and does not run under GDOS. This diagnostic tests all the memory boards on the system unless you change the test execution parameters. For information on changing the test execution parameters, refer to the paragraph entitled Explorer Memory Diagnostic Test Execution Parameters in Section 2.

The memory diagnostic consists of the following tests:

- Random Pattern test
- Address/Address Bar test
- Walking 0s test
- Walking 1s test
- Parity test

Refer to the online help information for detailed descriptions of these tests.

**Explorer II
Standalone
Diagnostics**

4.9 The Explorer II standalone diagnostics consist of Lisp microprocessor (LISP-CHIP) tests, processor board tests, and auxiliary floating-point tests. The following paragraphs provide an overview information of the Explorer II standalone diagnostics. Refer to Appendix B for brief descriptions of the tests in the Explorer II standalone diagnostics.

The internal functions of the Lisp microprocessor are checked by the LISP-CHIP tests. These tests include checking the microprocessor's internal memories, internal bus logic, ALU, barrel shifter, O-bus multiplexer modes, and other various logical functions. The LISP-CHIP diagnostics include the following tests:

- M Memory test
- A Memory test
- Microprogram Counter Stack (UPCS) Memory test
- T(Tag) Memory test
- D(Dispatch) Memory test
- Push Down List (PDL) Memory test
- Functional Operations test
- Memory Refresh test
- Internal Macro test
- Tag RAM Abbreviated-Jump test

The processor board logic is tested by the processor tests. These tests include checking control store memory, memory mapping logic, cache logic, timers, Garbage Collector Volatility Fault (GCVF) logic, and NuBus interface logic. The processor diagnostic includes the following tests:

- Macro Instructions test
- Static RAM tests
- Virtual logic tests
- Cache logic tests
- Transport logic tests
- NuBus logic tests
- Support tests

**NuBus and
Multiprocessor
Diagnostic for
Explorer LX**

4.10 The NuBus and Multiprocessor Diagnostic tests the multiprocessor arbitration logic on the Explorer LX system. Explorer LX contains at least one Explorer processor and one TI System 1500 (S1500) processor. The system supports both the Lisp language and the more conventional programming languages that run under the TI System V operating system. TI System V is implemented by a 68020-based processor board installed in the 7-slot system enclosure.

The loadable NuBus and Multiprocessor Diagnostic tests these boards individually and in the interactive multiprocessing environment.

The following diagnostic tests are performed:

- Test 10 — Interprocessor communications test
- Test 20 — Bus error test
- Test 30 — General arbitration test
- Test 40 — Locked accesses test
- Test 50 — Processor unique test
- Test 60 — System stress test

NOTE: The NuBus and Multiprocessor Diagnostic runs only on the Explorer LX system. If you have an LX machine, refer to Appendix A for information about booting GDOS in the LX environment and running the NuBus and Multiprocessor Diagnostic.

Refer to the online help information for additional descriptions and procedures for running these tests.

Disk Surface Analysis, Format/Verify Utility

4.11 This utility, which is loaded and executed from the GDOS Diagnostic Load menu, performs three major disk utility operations:

- Disk Surface Analysis — Writes, then reads worst-case data patterns as it scans an entire disk. Displays the addresses of disk logical blocks that are defective. Defects can be reallocated either by reformatting or by reassignment, depending on the type of hardware. This is a data-destructive operation.
- Format/Verify — Initializes the disk surface by writing the ID fields of each sector on the disk. The format operation is immediately followed by a verify procedure. If the verify procedure finds read errors, the utility provides the option of reformatting. This is a data-destructive operation.
- Verify Only — Searches for read errors on a disk. This operation is not data-destructive.

NOTE: The Format/Verify procedure is described in detail in the paragraph entitled Disk Format/Verify Utility in this section.

GDOS Utilities—Backup/Restore and Edit Label

4.12 These GDOS utilities enable you to perform the following tape and disk utility operations:

- Display or edit a selected disk label
- Display a selected tape label

- Create a bootable (labelled) tape
- Restore all or selected partitions
- Verify partitions

NOTE: The procedures for using the GDOS utilities are described in detail later in this section. Information about all of the GDOS utilities is available online or by printing the GDOS section of the online manual.

Print Online Manual Utility

4.13 The Print Online Manual utility allows you to print all or selected sections of the diagnostics menus, the online help information, and the online error messages. Each of these is printed by the Print Online Manual utility to produce the online manual. One section is devoted to GDOS, and one section is devoted to each of the other diagnostic programs.

If you print the GDOS section, the following is printed:

- Preface
- Title page for the GDOS section
- Table of contents for the GDOS section
- Help information for all the menus in GDOS
- A listing of system error messages

If you print a section for a diagnostic, the following pages are printed:

- Title page for the section
- Table of contents for the section
- Help information for all the menus in the diagnostic
- A listing of error messages for the diagnostic

NOTE: Make sure that the printer is plugged in and turned on before you execute this utility. The Print Online Manual utility automatically puts the printer online.

To access the Print Online Manual utility, follow these steps:

1. Enter Extended-Interactive Diagnostic Mode from the GDOS Top-Level Menu.
2. Enter the Print Online Manual utility menu from the Extended-Interactive Diagnostic Mode Menu.

3. Select the option to print the entire manual or select the specific section(s) you want to print.
4. For more instructions, press the HELP key or the ? key.

Using the GDOS Utilities

4.14 Your Explorer system is shipped with formatted disks. GDOS and Lisp are already installed. However, you may need to format or reformat a new disk or a damaged disk at some point and install the GDOS software on it. The following procedures describe how to use the Disk Surface Analysis, Format/Verify Utility to format a disk, and how to use the Backup/Restore and Edit Label Utility to make a bootable tape, restore a bootable tape to disk, verify a restore operation, display a tape or disk partition, and edit a disk partition.

Disk Surface Analysis Format/Verify Utility

4.14.1 The Disk Surface Analysis Format/Verify utility allows you to format and verify a disk, or to verify only. The format/verify procedure below is described as if you were performing a system startup using the bootable GDOS tape. However, you may not need to perform all the steps presented.

An interactive feature of this utility displays the list of disk defects and allows you to edit the list before formatting. This defect list is stored on the FMT (format) partition or, if no FMT partition exists, on the maximum cylinder. After formatting is complete, the utility creates an FMT partition for future format operations.

CAUTION: Formatting a disk destroys all existing data on the disk. Therefore, before you format a disk containing such data, copy the contents of the disk to a cartridge tape or to another disk. In addition, editing or otherwise modifying the disk label/partition table can introduce unpredictable errors, possibly resulting in severe boot problems and other operational difficulties.

Use the following procedure to perform the Disk Format/Verify operation:

1. Insert the tape into a tape drive on the system.
2. Boot or reboot the system (refer to the paragraph entitled Booting the System in Section 2 for instructions). The system self-tests execute automatically during the boot process. As the self-tests run, messages indicating the test results scroll onto the video display. When the self-tests are complete, the system displays specific slot number and device information, depending upon system configuration, as in the following example:

```
Slot 0 CPU TESTING SYSTEM
Slot 0 CPU Passed
Slot 2 NPI Passed
Slot 3 CPU Passed
D=Default load, M=Menu load, R=Retest, E=Extended tests :
```

Make a note of the slot number for the controller board (in the example above, it is slot number 2) so you can type it in at step 8.

3. Type **G** to boot GDOS. The system displays a list of available load devices along with the slot number of the disk controller and each logical unit number, as in the following example. Make a note of this information so that you can type it in at step 8. Each available load device is also identified by an associated letter. An asterisk indicates the default drive.

Available load devices

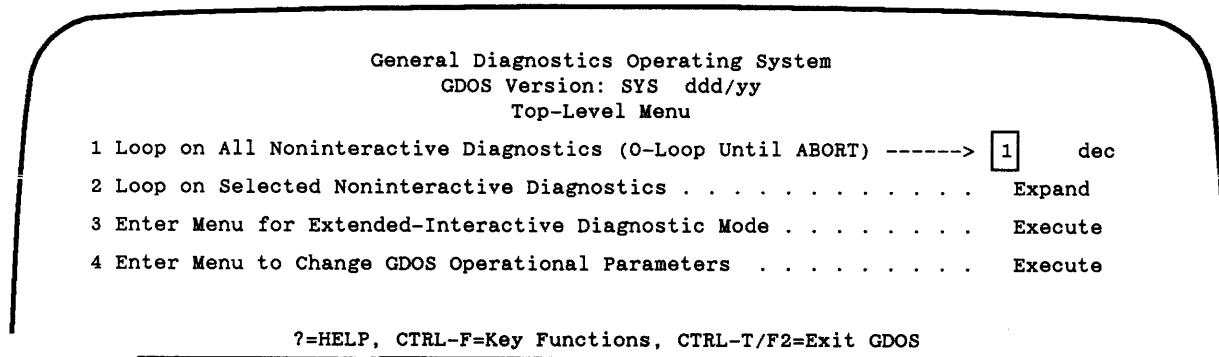
*A = Slot 2 disk 00
B = Slot 2 tape 06

Select load device:

4. Select the tape drive that contains the bootable tape by typing its corresponding letter.

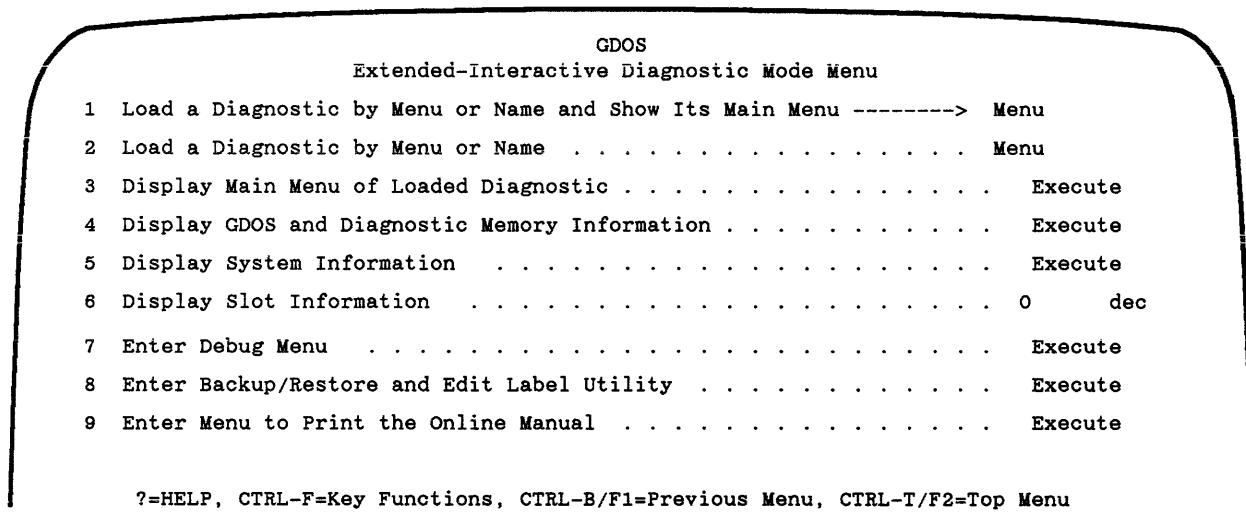
After GDOS is booted (from tape, booting takes about 3 minutes), the GDOS Top-Level Menu is displayed (Figure 4-1). The cursor will be on the first item in this menu — Loop on All Noninteractive Diagnostics.

Figure 4-1 GDOS Top-Level Menu



5. Place the cursor on item number 3 — Enter Menu for Extended-Interactive Diagnostic Mode — and press RETURN. The Extended-Interactive Diagnostic Mode Menu is displayed (Figure 4-2).

Figure 4-2 GDOS Extended-Interactive Diagnostic Mode Menu



6. When this menu is displayed, the cursor will be on the first item — Load a Diagnostic by Menu or Name and Show Its Main Menu. Select this item by pressing the RETURN key. The GDOS Diagnostic Load Menu is displayed. It contains a list of the diagnostics that are available for your system as well as the Disk Surface Analysis, Format/Verify Utility.

The sample list below may differ from what appears on your screen, depending on your particular system configuration:

- ```

GDOS
Diagnostic Load Menu

1 Disk Diagnostic -----> Execute
2 Tape Diagnostic Execute
3
.
. . . Disk Surface Analysis, Format/Verify Utility. . . . Execute

7. Move the cursor to the Disk Surface Analysis, Format/Verify Utility option and press RETURN to load the utility. When the Disk Surface Analysis, Format/Verify Utility has been loaded, the Disk Media Utilities Main Menu is displayed. It contains the following entries:

```

```

Disk Media Utilities Main Menu

1 Enter Format/Verify Utility -----> Expand
2 Enter Surface Analysis Utility - DATA DESTRUCTIVE . . Short
3 Reset the Interface Execute
4 Enter Menu to Display and Set Test Execution Parameters Execute
5 Return to GDOS Execute

```

The cursor will be on the first entry - **Enter Format/Verify Utility**. Press RETURN to expand this menu entry. The expanded entry contains the following items:

8. Place the cursor on the appropriate subentries and enter the correct slot ID number and logical unit number of the disk you wish to format. Press RETURN. Before the Format/Verify Utility Menu is entered, the utility performs routines designed to identify the controller type and the disk type and to acquire the correct disk defect data for the format operation.
  9. The first routine checks the logical unit to identify the controller type:
    - If identification of the controller type is successful, the utility then attempts to identify the disk type. (See step 10.)
    - If identification of the controller type is unsuccessful, the utility displays the Select Disk Controller Type menu shown below:

Select Disk Controller Type With Arrow and Tab Keys

1 Select SCSI Formatter Type and Press RETURN -----> Adaptec  
2 Select SMD Disk Type and Press RETURN . . . . . WD900

In this menu, use the TAB key to toggle (select) either the Adaptec or TI-ESDI option from menu entry 1 and press RETURN, or move the cursor to menu entry 2 and press RETURN. This selects the WD900 option.

The disk controller type can be determined by the disk header information as follows:

- MAX-0140 — Adaptec
  - CDC-0182 — TI-ESDI

After successfully identifying the controller type, the utility performs the second identification routine.

10. The second identification routine checks the disk type:

- If identification of the disk type is successful, the utility loads the appropriate disk format parameters.

If the disk format parameters are loaded successfully, the utility displays a prompt asking if you wish to enter the Format Parameters Menu to edit existing disk parameters. The default for this option is no. Pressing RETURN accepts the default. If you wish to display the Format Parameters Menu, type y (yes) and press RETURN.

- If identification of the disk type is unsuccessful, the utility automatically displays the Format Parameters Menu, which enables you to modify existing disk parameters and to change the disk defect list source.

## Format Parameters Menu

|    |                                                      |          |
|----|------------------------------------------------------|----------|
| 1  | Defect List Source . . . . .                         | FMT      |
| 2  | Number of Cylinders ----->                           | 1864 dec |
| 3  | Number of Heads . . . . .                            | 16 dec   |
| 4  | Sectors per Track . . . . .                          | 95 dec   |
| 5  | Data Bytes Per Sector . . . . .                      | 512 dec  |
| 6  | Alternate Sectors per Defect Handling Zone . . . . . | 13 dec   |
| 7  | Interleave Factor . . . . .                          | 1 dec    |
| 8  | Track Skew Factor . . . . .                          | 2 dec    |
| 9  | Cylinder Skew Factor . . . . .                       | 28 dec   |
| 10 | Drive Type Field . . . . .                           | 40 hex   |
| 11 | Medium Type . . . . .                                | 0 hex    |
| 12 | Density Code . . . . .                               | 0 hex    |
| 13 | Read Clock Sync Delay . . . . .                      | 224 dec  |
| 14 | Gap 1 Delay . . . . .                                | 227 dec  |
| 15 | Gap 1 Count . . . . .                                | 16 dec   |
| 16 | Preamble Count . . . . .                             | 12 dec   |
| 17 | Enhanced SMD Flag Code . . . . .                     | 2 dec    |
| 18 | Unformatted Bits per Sector . . . . .                | 4734 dec |
| 19 | Number of Primary Map Tracks . . . . .               | 3 dec    |
| 20 | Beginning Head Address of Primary Track . . . . .    | 1 dec    |

11. Modify the appropriate entries in the Format Parameters Menu (refer to the online help messages for more information about each item in the Format Parameters Menu), and press RETURN to execute.

The utility now attempts to fetch the disk defect data list.

- If the disk defect data is loaded without error, the Format/Verify Utility Menu is displayed (see Format/Verify Utility Menu below).
- If errors occur when the utility attempts to load the disk defect data list, an error message is displayed, and you must enter the Format Parameters Menu to select an alternate disk defect data list source.

Press the ABORT key (or the abort key sequence) and re-enter the utility. The utility returns you either to the prompt that asks if you wish to enter the Format Parameters Menu or to the Format Parameters Menu if it was displayed in a previous step.

Select an alternate defect data list source and press RETURN. If the disk defect data is now loaded without error, the Format/Verify Utility Menu is displayed:

## Format/Verify Utility Menu

|    |                                                       |        |          |
|----|-------------------------------------------------------|--------|----------|
| 1  | Scroll Defect Window Up or Down                       | -----> | Down     |
| 2  | Modify Defect List (Add, Delete, Read, Replace)       | ...    | Add      |
| 3  | Entry Number . . . . .                                | .....  | 1 dec    |
| 4  | Cylinder Address . . . . .                            | .....  | 63 dec   |
| 5  | Head Address . . . . .                                | .....  | 3 dec    |
| 6  | Bytes From Index . . . . .                            | .....  | 8496 dec |
| 7  | Format and Verify the Disk . . . . .                  | .....  | Execute  |
| 8  | Verify the Disk . . . . .                             | .....  | Execute  |
| 9  | Reassign Verify Defects . . . . .                     | .....  | Execute  |
| 10 | Reassign Defective Block - Enter Address . . . . .    | .....  | 0 dec    |
| 11 | Display Disk Defect List . . . . .                    | .....  | Execute  |
| 12 | Display Trace - Enter Number to Display . . . . .     | .....  | 0 dec    |
| 13 | Write Disk Label . . . . .                            | .....  | Execute  |
| 14 | Adaptive Surface Analysis - Head Limit Bias . . . . . | .....  | 20 dec   |
| 15 | Adaptive Surface Analysis - Loop Count . . . . .      | .....  | 50 dec   |

After you have selected a defect list source and the Format/Verify Utility Menu is displayed, you can manually enter printed defect data. Any manually entered defect data is written to the Grown (G) and FMT defect lists during the format/verify process. All references to the Grown defect list do not apply to the Adaptec (MSU I) disk.

12. Place the cursor on entry number 7 — Format and Verify the Disk — and press RETURN.

When the format operation executes, the following occurs:

- The entire disk is formatted then verified to ensure that all bad tracks are reallocated.
- If the verify operation passes, the utility displays a completion message and returns control to the Format/Verify Utility Menu.
- If the verify operation fails, the addresses of any read errors found by the verify operation are displayed along with a prompt that allows you to continue.
  - An affirmative response to the prompt causes the defect data to be added to the Grown defect list, and the format/verify process is repeated.
  - A negative response to the prompt halts the format/verify process and returns you to the Format/Verify Utility Menu.

If errors are detected on subsequent format/verify processes, you may need to repeat the process more than once to format out all the readily detected errors.

Due to practical limits, only 16 defects can be added to the Grown defect list for each repetition of the format/verify process. If a disk has more than 16 unknown defects or marginally repeatable defects, you may need to repeat the format/verify process several times.

If you are formatting a disk that has no vendor defect list (either electronic or printed), you may need to repeat the format/verify process until the verify operation passes without user intervention.

You should also execute a surface analysis. Enter a **y** in response to any defects that are reported at the end of the surface analysis. (For MSU I Adaptec disk drives only: you must manually record and, immediately prior to formatting, enter any defects detected in the surface analysis.) If any defects are detected and reassigned by the surface analysis, reformat the disk using the Grown defect list. Repeat this process until the surface analysis completes with no errors reported.

### Make Bootable Tape Utility

**4.14.2** The Make Bootable (Labelled) Tape utility enables you to make a bootable tape and copy partitions from the disk to the tape. Use the following procedure to perform this operation (the procedure assumes that GDOS has already been booted and the GDOS Top-Level Menu is displayed):

1. Insert the tape into a tape drive on the system. In the GDOS Top-Level Menu, move the cursor to the third menu item — **Enter Menu for Extended-Interactive Diagnostic Mode** — and press the RETURN key.
2. When the Extended-Interactive Diagnostic Mode Menu appears, move the cursor to item number 8 — **Enter Backup/Restore and Edit Label Utility** — and press RETURN. The Backup/Restore and Edit Label Utility Menu is displayed.

#### Backup/Restore and Edit Label Utility Menu

|   |                                                      |        |
|---|------------------------------------------------------|--------|
| 1 | Display/Edit Disk Label or Display Tape Label -----> | Expand |
| 2 | Make Bootable (Labelled) Tape . . . . .              | Expand |
| 3 | Verify Partition(s) . . . . .                        | Expand |
| 4 | Restore Bootable (Labelled) Tape . . . . .           | Expand |

3. When this menu is displayed, the cursor will be on the first menu entry — **Display/Edit Disk Label or Display Tape Label**. Place the cursor on the **Make Bootable (Labelled) Tape** entry. (For detailed information about any of the entries in the Backup/Restore and Edit Label Utility Menu, refer to the online help information.) Press the RETURN key. The following subentries appear under the expanded **Make Bootable (Labelled) Tape** entry:

|   |                                                      |         |
|---|------------------------------------------------------|---------|
| 2 | Make Bootable (Labelled) Tape ----->                 | Execute |
|   | Tape Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Tape Logical Unit Number (0-F hexadecimal) . . . . . | 6 hex   |
|   | Disk Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Disk Logical Unit Number (0-F hexadecimal) . . . . . | 0 hex   |

4. Place the cursor on the appropriate subentries, and enter the correct slot numbers and logical unit numbers, as appropriate; then, press RETURN. The following menu is displayed:

#### Make Bootable (Labelled) Tape

|   |                                                    |         |
|---|----------------------------------------------------|---------|
| 1 | Select Entry Number of Partition to Include -----> | 2 dec   |
| 2 | Make Bootable (Labelled) Tape . . . . .            | Execute |

5. Insert the tape and press the Space Bar when ready. After you press the Space Bar, the utility program displays a listing of each disk partition showing its number, name, starting block address, block length, user type, and comment field.

For each partition you wish to back up (copy) to tape, type its partition number and press RETURN. The utility adds each partition number to a backup list, which it updates and displays each time you add a new number. Continue by typing the corresponding entry number and pressing RETURN for each partition you wish to copy to the bootable tape.

When you have entered all desired partition entry numbers, place the cursor on the second menu entry — Make Bootable (Labelled) Tape — and press RETURN. The utility copies the partitions, whose entry numbers you specified, onto the tape.

#### **Restore Bootable Tape Utility**

**4.14.3 The Restore Bootable (Labelled) Tape utility** enables you to restore the contents of a bootable tape to a disk. The procedure described below assumes you will boot GDOS from tape.

Use the following procedure to restore partitions from a bootable tape.

1. Insert the tape into a tape drive on the system.
2. Boot or reboot the system (refer to the paragraph entitled **Booting the System** in Section 2 for instructions). The system self-tests automatically run during the boot process. As the self-tests run, messages indicating the test results scroll onto the VDT. When the self-tests are complete, the system displays specific slot number and device information, depending upon system configuration. For example, a screen similar to this appears:

```
Slot 0 CPU TESTING SYSTEM
Slot 0 CPU Passed
Slot 2 NPI Passed
Slot 3 CPU Passed
D=Default load, M=Menu load, R=Retest, E=Extended tests :
```

Make a note of the slot number for the controller board (in the example above, it is slot number 2) so you can type it in at step 7.

3. Type **g** to boot GDOS. The system displays a list of available load devices along with the slot number of the disk controller and each logical unit number. Make a note of this information so you can type it in at step 7. Each available load device is also identified by an associated letter. An asterisk denotes the default drive.

```
Available load devices
* A = Slot 2 disk 00
 B = Slot 2 tape 08
Select load device:
```

4. Choose the tape drive containing the bootable tape by typing its corresponding letter.

After GDOS is booted (from tape, booting takes about 3 minutes), the GDOS Top-Level Menu is displayed (Figure 4-3). The cursor will be on the first item in this menu — Loop on All Noninteractive Diagnostics.

Figure 4-3 GDOS Top-Level Menu

```

General Diagnostic Operating System
GDOS Version: SYS ddd/yy
Top-Level Menu

1 Loop on All Noninteractive Diagnostics (0-Loop Until ABORT) -----> 1 dec
2 Loop on Selected Noninteractive Diagnostics Expand
3 Enter Menu for Extended-Interactive Diagnostic Mode Execute
4 Enter Menu to Change GDOS Operational Parameters Execute

?=HELP, CTRL-F=Key Functions, CTRL-T/F2=Exit GDOS

```

5. Place the cursor on item number 3 — Enter Menu for Extended-Interactive Diagnostic Mode — and press RETURN. The Extended-Interactive Diagnostic Mode Menu is displayed (Figure 4-4).

Figure 4-4 GDOS Extended-Interactive Diagnostic Mode Menu

```

GDOS
Extended-Interactive Diagnostic Mode Menu

1 Load a Diagnostic by Menu or Name and Show Its Main Menu -----> Menu
2 Load a Diagnostic by Menu or Name Menu
3 Display Main Menu of Loaded Diagnostic Execute
4 Display GDOS and Diagnostic Memory Information Execute
5 Display System Information Execute
6 Display Slot Information 0 dec
7 Enter Debug Menu Execute
8 Enter Backup/Restore and Edit Label Utility Execute
9 Enter Menu to Print the Online Manual Execute

?=HELP, CTRL-F=Key Functions, CTRL-B/F1=Previous Menu, CTRL-T/F2=Top Menu

```

6. When this menu is displayed, move the cursor to item number 8 — Enter Backup/Restore and Edit Label Utility — and press RETURN. The Backup/Restore and Edit Label Utility Menu is displayed. It contains the following four entries:

```

Backup/Restore and Edit Label Utility Menu

1 Display/Edit Disk Label or Display Tape Label -----> Expand
2 Make Bootable (Labelled) Tape Expand
3 Verify Partition(s) Expand
4 Restore Bootable (Labelled) Tape Expand

```

7. The cursor will be on the **Expand** option in the first menu entry. Place the cursor on menu entry 4 — **Restore Bootable (Labelled) Tape**. Press RETURN. (For detailed information about any of the menu entries in the Backup/Restore and Edit Label Utility, refer to the online help information.) The following subentries appear under the expanded **Restore Bootable (Labelled) Tape** menu entry:

```
4 Restore Bootable (Labelled) Tape Execute
 Tape Slot Number (0-F hexadecimal) 2 hex
 Tape Logical Unit Number (0-F hexadecimal) 6 hex
 Disk Slot Number (0-F hexadecimal) 2 hex
 Disk Logical Unit Number (0-F hexadecimal) 0 hex
 Selectively Restore Partition(s)? Yes
```

8. Place the cursor on the appropriate subentries and enter the correct slot numbers and logical unit numbers. Use the TAB key or the Left and Right Arrow keys to toggle a Yes or No response to the **Selectively Restore Partition(s)?** option; then, press RETURN.

- If you selected yes for the **Selectively Restore Partition(s)?** option, prompts appear during the operation of this utility asking if you wish to restore the specific partitions on tape, i.e. GDOS partition, DIAG partition, and so forth, as follows:

*Do you want to restore **partitionname** of type **typenumber**?*

Table 4-1 lists the defined user types that are displayed in the **typenumber** field. Refer to the NuBus License Identifiers Specification, TI part number 2549287-0001, for additional information.

Table 4-1

**Defined User Types**

| Typenumber | User Types                    |
|------------|-------------------------------|
| 0000       | Explorer I                    |
| 0001       | NuMachine                     |
| 0002       | S1500                         |
| 0003       | Terminal Concentrator         |
| 0005       | Explorer II                   |
| 0006       | Compact Lisp Machine (CLM)    |
| 0007       | NuBus Peripheral Interface    |
| 0008       | Mass Storage Controller (MSC) |
| 0009       | Communications Carrier        |
| FC00       | TI Lisp                       |
| FC02       | System V                      |
| FFFF       | Generic                       |

If you type **y** (yes) at each prompt, the utility looks for that partition on disk. If a partition with the same name, user type, function type, and size is found, the following prompt is displayed:

*Partition **partitionname** of type **typenumber** already exists.  
Do you want to restore over it? (Press **y** or **n** and RETURN.)*

If you type **y** (yes), the partition on tape is restored over the existing partition on the disk. If you type **n** (no), the partition on tape is restored to free space on disk if there is room. You then have two partitions with the same name on the disk.

- If you selected **No** for the **Selectively Restore Partition(s)?** option, the restore utility automatically restores all partitions to free space on the disk if there is room.

After the partitions have been restored, the utility automatically updates the partition table, if appropriate, and prompts you for the necessary data if you wish to add a page partition. For information about the page band user type for TI Advanced Systems, refer to the online help information for the **Restore Bootable (Labelled) Tape** entry.

---

**NOTE:** If you are performing the restore operation on a newly formatted disk, responding with **No** to the **Selectively Restore Partitions?** entry restores the entire tape to the disk in the same order that the partitions reside on the tape.

---

9. When the restore operation completes, the system prompts with the message:

**Tape and disk utility successfully completed.**

---

#### Verify Tape Partition(s) Utility

**4.14.4** The Verify Partition(s) utility enables you to verify or compare a selected partition on tape with a partition on disk, or to verify all partitions. The procedure described below assumes that GDOS has been booted and that the GDOS Top-Level Menu is displayed.

Use the following procedure to verify partition(s):

1. Insert the tape containing the partitions you wish to verify against disk partitions. In the GDOS Top-Level Menu, move the cursor to the third menu item — **Enter Menu for Extended-Interactive Diagnostic Mode** — and press the RETURN key.
2. When the Extended-Interactive Diagnostic Mode Menu appears, move the cursor to menu entry number 8 — **Enter Backup/Restore and Edit Label Utility** — and press the RETURN key. The Backup/Restore and Edit Label Utility Menu is displayed.

##### Backup/Restore and Edit Label Utility Menu

- |                                                        |        |
|--------------------------------------------------------|--------|
| 1 Display/Edit Disk Label or Display Tape Label -----> | Expand |
| 2 Make Bootable (Labelled) Tape . . . . .              | Expand |
| 3 Verify Partition(s) . . . . .                        | Expand |
| 4 Restore Bootable (Labelled) Tape . . . . .           | Expand |

3. When this menu is displayed, the cursor will be on the first menu entry — **Display/Edit Disk Label** or **Display Tape Label**. Place the cursor on the third entry — **Verify Partition(s)** — and press RETURN to expand the menu entry. (For detailed information about any of the entries in the Backup/Restore and Edit Label Utility Menu, refer to the online help information.) The following subentries appear under the expanded Verify Partition(s) menu:

|                                                      |                |
|------------------------------------------------------|----------------|
| <b>3 Verify Partition(s) . . . . .</b>               | <b>Execute</b> |
| Tape Slot Number (0-F hexadecimal) . . . . .         | 2 hex          |
| Tape Logical Unit Number (0-F hexadecimal) . . . . . | 6 hex          |
| Disk Slot Number (0-F hexadecimal) . . . . .         | 2 hex          |
| Disk Logical Unit Number (0-F hexadecimal) . . . . . | 2 hex          |
| <b>Verify All Tape Partitions? . . . . .</b>         | <b>No</b>      |

4. Place the cursor on the appropriate subentries, and enter the correct slot numbers and logical unit numbers, as appropriate, or accept the default numbers. Next, use the TAB key to toggle between the Yes or No responses for the **Verify All Tape Partitions** option. Press RETURN. The message **Insert tape and press the space bar when ready** is displayed. After you press the Space Bar, a list of the tape and disk partitions is displayed.

- If you select the **Yes** parameter for the **Verify All Tape Partitions** entry, the utility checks all partition names, lengths, attributes, and partition comment fields when making its selection for the partitions to compare. The starting address block is not compared.

Press RETURN to execute. The utility lists any partitions that cannot be correctly verified.

- If you select the **No** parameter for the **Verify All Tape Partitions** entry, the utility displays a numbered listing of all tape and disk partitions and prompts you for the number of the tape partition and the disk partition you wish to verify.

Press RETURN to execute. The utility displays an error if the partition cannot be correctly verified.

#### **Display/Edit Disk Label or Display Tape Label Utility**

**4.14.5** This GDOS utility enables you to either display or edit a disk label or to display a tape label (a tape label cannot be edited). Steps 1 through 4 of the procedure below describe how to display either a tape or a disk label; steps 5 through 9 describe how to edit a disk label. It is assumed that you have booted GDOS and the GDOS Top-Level Menu is displayed.

1. In the GDOS Top-Level Menu, move the cursor to the third menu item — **Enter Menu for Extended-Interactive Diagnostic Mode** — and press the RETURN key (if you wish to display a tape partition, make sure that a tape has been installed in the tape drive).
2. When the Extended-Interactive Diagnostic Mode Menu appears, move the cursor to menu entry number 8 — **Enter Backup/Restore and Edit Label Utility** — and press the RETURN key. The Backup/Restore and Edit Label Utility Menu is displayed.

## Backup/Restore and Edit Label Utility Menu

|   |                                                      |        |
|---|------------------------------------------------------|--------|
| 1 | Display/Edit Disk Label or Display Tape Label -----> | Expand |
| 2 | Make Bootable (Labelled) Tape . . . . .              | Expand |
| 3 | Verify Partition(s) . . . . .                        | Expand |
| 4 | Restore Bootable (Labelled) Tape . . . . .           | Expand |

3. When the menu is displayed, the cursor will be on the first menu entry — Display/Edit Disk Label or Display Tape Label. Press RETURN to expand this menu entry. (For detailed information about any of the menu entries in the Backup/Restore and Edit Label Utility, refer to the online help information.) The following subentries appear under the expanded Display/Edit Disk Label Or Display Tape Label entry.

|   |                                                         |         |
|---|---------------------------------------------------------|---------|
| 1 | Display/Edit Disk Label or Display Tape Label . . . . . | Execute |
|   | Display/Edit Partition and Label . . . . .              | Display |
|   | Device Slot Number (0-F hexadecimal) . . . . .          | 2 hex   |
|   | Device Logical Unit Number (0-F hexadecimal) . . . . .  | 0 hex   |

4. Place the cursor on the first subentry — Display/Edit Partition and Label — and use the TAB key to select Display. Next, place the cursor on the other subentries and enter the correct slot number and logical unit number for the tape or disk whose partitions you wish to display.

**NOTE:** To get a printed listing of the partition table, the Select Trace Level to Print option must be set to the AllMsgs parameter in the Change Operational Parameters Menu. This parameter must be set BEFORE you execute the Display/Edit Disk Label or Display Tape Label utility. To set the AllMsgs parameter, press the F4 key to call the Change Operational Parameters Menu. Move the cursor to the Select Trace Level to Print entry. Use the TAB key to select the AllMsgs parameter. Now, turn the printer on, and press the F1 key to return to the Backup/Restore and Edit Label Utility Menu.

Press RETURN to execute the utility. A numbered listing of the tape or disk partition table is displayed. It shows each partition name, starting block address, block length, user type, and comment field. After the disk partition table is displayed, the cursor returns to the Display/Edit Disk Label or Display Tape Label entry.

5. If you wish to edit a disk label, move the cursor to the subentry — Display/Edit Partition and Label — and use the TAB key to select Edit. Next, place the cursor on the other subentries, and enter the correct slot number and logical unit number for the disk whose partitions you wish to edit.

---

**CAUTION:** It is recommended that you obtain a printed record of your editing operation to assist you in tracing errors should any occur. To get a printed listing of your editing operation, you must set the AllMsgs parameter in the Select Trace Level to Print entry of the GDOS Change Operational Parameters Menu. This parameter must be set BEFORE you execute the Display/Edit Disk Label or Display Tape Label utility. To set the AllMsgs parameter, press the F4 key to call the Change Operational Parameters Menu. Move the cursor to the Select Trace Level to Print entry. Use the TAB key to select the AllMsgs parameter. Now, turn the printer on, and press the F1 key to return to the Backup/Restore and Edit Label Utility Menu.

---

Press RETURN to execute the utility. A numbered listing of the disk partition table is displayed and printed. It shows each partition name, starting block address, block length, user type, and comment field, and is similar to the following example (your display will differ depending upon the files on your particular disk):

```

Sys:, MAX-0140,
LABEL version 2, DISK
1024 bytes per block, 256 bytes per sector,
32 sectors per track, 15 heads,
917 cylinders, 917 sectors for defects
Volume comments:
(comment)
21 partitions, 12-longword descriptors:
 Name Start Length User Comments
1 * LABEL v1 0 2 FFFF
2 * PTBL pt 2 3 FFFF
3 SAVE sb 5 3 FFFF
4 FMT fp 8 9 FFFF
5 TZON tz 17 122 FFFF
6 * unx1 lb 108785 1024 0002
7 unx2 1b 10761 1028 0002
8 unx3 1b 106737 1024 0002
9 * cfg1 cb 106720 17 FFFF
10 cfg2 cb 106703 17 FFFF
11 cfg3 cb 106686 17 FFFF
12 * root fb 98494 8192 FC02
13 usr fb 65726 32768 FC02
14 * swap pb 139 28591 0002
15 src fb 33726 32000 FC02
16 DIAG fb 31768 2048 FC02 Wed May 20 11:26:22 CDT 1987
17 GDOS lb 31378 300 0002
18 S15A lb 31228 150 0002
19 FACT fb 29180 2048 FC02
20 FDOS lb 28880 300 0002
21 F15A lb 28730 150 0002

Enter number of entry to edit.
(NOTE: An entry number of 0 indicates a desire to edit the
actual label information as opposed to the partition table.)
```

6. Type the number of the disk partition you wish to edit. (For the following example, assume that partition number 21, F15A, is selected.) Press RETURN. The partition edit screen is displayed. It contains a numbered list of the partition parameters that can be edited.

```

1 Partition name F15A 2 Function type load, 0000000X
3 Starting Block 28730 4 Length in blocks 150
5 User type 0002
 Partition properties (items 6-13)
6 Expandable ? No 7 Contractable? No
8 Delete protected? No 9 Logical partition? No
10 Copy protected? No 11 Default indicator? No
12 Diagnostic use? No 13 Reserved? Yes
14 Comments
15 Create new entry in front of this entry
16 Create new entry after this entry
17 Delete this entry
00 Write partition table to disk

Enter number of sub-entry to edit.

```

7. Type the number of the subentry you wish to edit as requested by the prompt. For example, if you wish to edit subentry number 4 — Length in blocks—type the number 4 at the Enter number of sub-entry to edit. prompt and press RETURN. The utility then displays the following prompt:

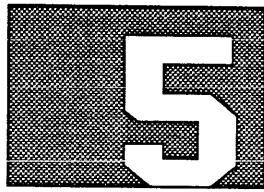
Enter the new value (in decimal and RETURN).

8. Type the new value for Length in blocks and press RETURN. For example, if you wish to specify 200 blocks, type the decimal value 200. The utility replaces the existing value of 150 with the new value of 200 and redisplays the partition edit screen with the new value.
9. Use the same sequence to specify each parameter you wish to edit. With each selection, the utility prompts you for the new value. When you type the new value and press RETURN, the utility replaces the existing value with the new value you have specified.

If you make a mistake, use the Backspace key to delete alphanumeric characters to the left of the cursor. If you discover a mistake after pressing the RETURN key, reselect the subentry, and enter the correct value. All new values are stored temporarily in a buffer until you write them to the disk.

- To exit without writing any values to the disk, press CTRL-C or the ABORT key. The utility returns you to the Backup/Restore and Edit Label Utility Menu.
- To write all new values to the disk, enter 00 (zero, zero) at the Enter number of sub-entry to edit. prompt. The utility writes the new parameters to disk and returns you to the Backup/Restore and Edit Label Utility Menu.





## BOOT PROBLEMS

---

### Highlights of This Section

This section describes some of the problems that can arise when you boot the system or load GDOS.

- Power-up testing
- Boot error codes
- Fault indicator LEDs

---

## System Testing During Power-Up

**5.1** If a board fails its self-test, a message is displayed during system startup and you may not be able to proceed until that board is repaired or replaced.

Initial program loading and execution of the diagnostics under GDOS can proceed even if the following failures occur:

- The NuBus Ethernet controller board can fail and still permit GDOS operation because GDOS does not use the network.
- The memory board in slot 4 can fail and still permit GDOS operation because you can temporarily replace it with the memory board from slot 3. There must be a good memory board in slot 4 for the system to operate.
- The memory board in slot 3 can fail because it provides extra memory for the system. You can run GDOS without this extra memory.
- The System Interface Board (or Color System Interface board) can have failures that, alone, would not prevent system operation.

A system self-test failure on either the NUPI board or a processor board usually inhibits system operation until that board is replaced. Run the extended self-tests to further define the source of the problem. Instructions for running the extended self-tests are in Section 2.

Detailed descriptions of the system self-tests are in the *Explorer System Field Maintenance* manual.

---

## Reading Boot Error Codes

**5.2** During boot operations, most errors are reported by one or more self-explanatory messages such as:

No online device

Program not found

In some cases, however, the processor is not able to relate an error to an appropriate textual message. Instead, it returns numeric error codes. Numeric error codes generally are displayed in the following form, where *nnnnnnnn* is a hexadecimal error number listed in Table 5-1:

DEVICE ERROR: *nnnnnnnn*

**Table 5-1 Boot Error Codes**

| Error ID | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000002 | Load device offline or not responding. The device is probably powered down or not connected.                                                                                                                                                                                                                                                                                                                                                                                       |
| 00000003 | Load device error. The load device experienced an unrecoverable error.                                                                                                                                                                                                                                                                                                                                                                                                             |
| 00000004 | Memory board unavailable. The processor cannot find a memory board that passes all tests.                                                                                                                                                                                                                                                                                                                                                                                          |
| 00000005 | NuBus error. The processor received a NuBus error while executing DE code in a device driver.                                                                                                                                                                                                                                                                                                                                                                                      |
| 00000006 | Command time-out. The NUPI did not complete a specified command block operation before the maximum time elapsed.                                                                                                                                                                                                                                                                                                                                                                   |
| 00000009 | Network down. The Ethernet is disconnected or otherwise disabled.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 0000000A | Invalid unit number for the load device.                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 0000000B | Ethernet board failed to initialize properly.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 00000010 | Bad DE instruction header. The processor found a board with a valid configuration ROM, but with a diagnostic offset or device driver offset pointing to DE code with an invalid header. (For more information about the configuration ROM, refer to the <i>Explorer NuBus System Architecture General Description</i> .)                                                                                                                                                           |
| 00000011 | Invalid DE request. A request was made that a particular device could not handle, such as a boot request issued to the monitor. The contents of the NVRAM are probably invalid. To correct this error, use menu boot to specify the boot unit. After the system boots, execute the sys:setup-nvram function. For more information about the NVRAM, refer to the <i>Introduction to the Explorer System</i> and the <i>Explorer NuBus System Architecture General Description</i> . |
| 00000012 | DE instruction space problems. The processor found an invalid instruction while trying to interpret DE code contained in the ROM on a logic board. This error can occur when the processor is interpreting either a diagnostic or a device driver. The ROM on the logic board may be faulty.                                                                                                                                                                                       |
| 00000013 | DE internal data space problem. While the processor was interpreting DE code, it found either an internal data stack overflow or underflow, or a data space variable out of range. This error can occur when the processor is interpreting either a diagnostic or a device driver. The ROM may be bad or the code being executed may be faulty.                                                                                                                                    |

**Table 5-1 Boot Error Codes (Continued)**

| Error ID | Description                                                                                                                                                                                                                                                        |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 00000014 | Device access error. The boot device returned bad status. Refer to the manual for the particular device for more information about the status.                                                                                                                     |
| 00000015 | Invalid volume label. The first word of block 0 did not contain the string "LABL".                                                                                                                                                                                 |
| 00000016 | Invalid volume partition table. The first word of the partition table did not contain the string "PRTN".                                                                                                                                                           |
| 6nnnnnnn | NUPI command status. These error codes are returned by the NUPI device driver as a copy of the status field of the NUPI command block. For more information about these error codes, refer to the <i>Explorer NuBus Peripheral Interface General Description</i> . |

**Reading Fault Indicator LEDs**

5.3 Fault indicator LEDs supplement the standard boot error messages that the system displays during the boot procedure. The boot utility switches on the LEDs for each board during power up. Then, the subsequent ROM-based power-up tests, if successful, switch off the LEDs.

These LED indications are particularly useful in cases where the processor board or the NUPI board are unable to display text or hexadecimal messages. For example, should a faulty connection exist between the processor board and the system maintenance terminal, thus making it impossible for the processor to print an error message to the monitor, the red fault indicator LED would confirm the existence of the error.

The fault indicator LEDs are located near the bottom of each board. To view these indicator LEDs, open the outer front door on the system enclosure and look through the appropriate slot on the inner door as shown in Figure 5-1 for Explorer I systems and Figure 5-2 for Explorer II systems.

Figure 5-1

Location of Fault Indicator LEDs (Explorer I)

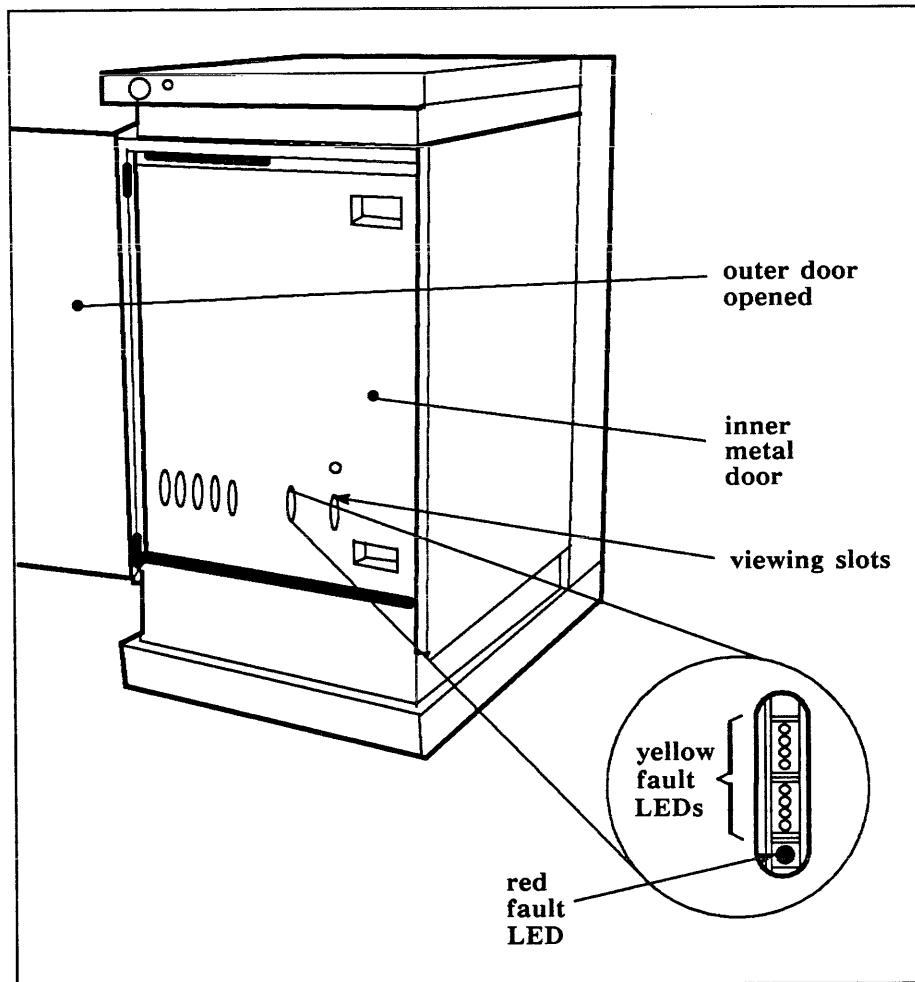
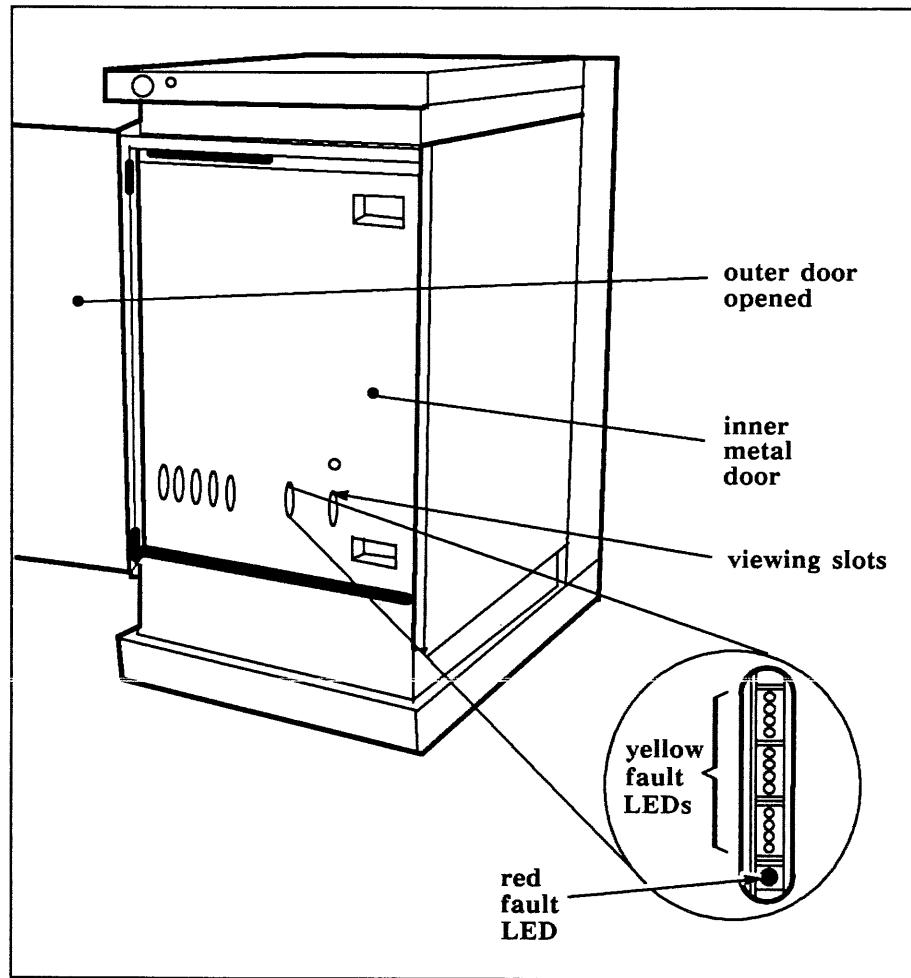


Figure 5-2

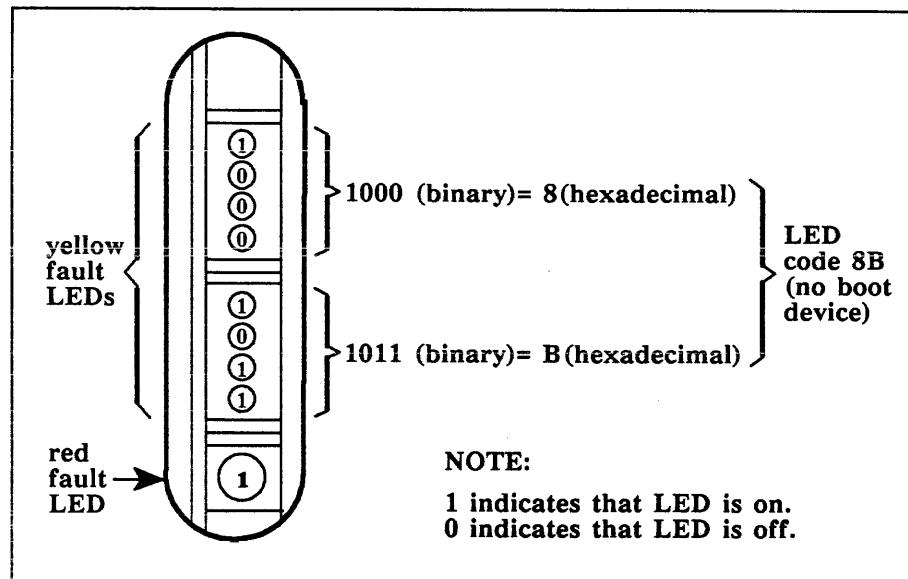
Location of Fault Indicator LEDs (Explorer II)



An example of how to read these indicator lights is shown in Figure 5-3 for Explorer I systems and in Figure 5-4 for Explorer II systems. To determine the fault code, read the yellow LEDs as an 8-bit binary number with the topmost yellow LED as the most significant bit. Convert the code to a hexadecimal number and find the appropriate error number in Table 5-2 for Explorer I systems, and Tables 5-3 and 5-4 for Explorer II systems.

Figure 5-3

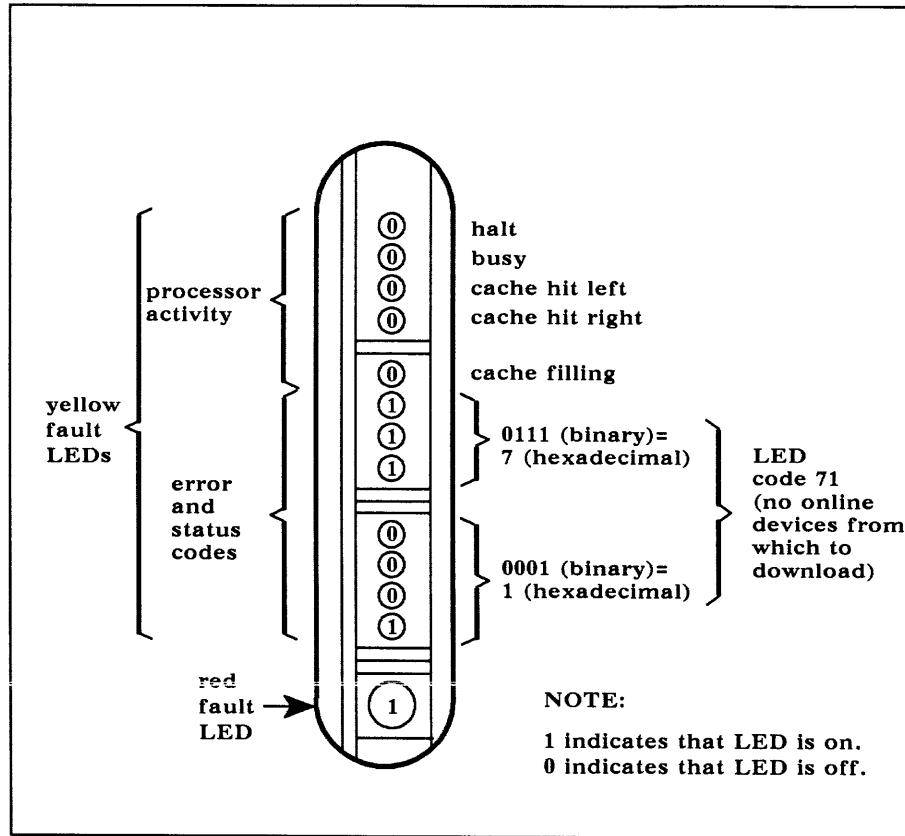
## Reading Fault Indicator LEDs (Explorer I)



**WARNING: Do not open the inner door; safety interlocks on the door power down the enclosure when the door is opened.**

Figure 5-4

Reading Fault Indicator LEDs (Explorer II)



**WARNING: Do not open the inner door; safety interlocks on the door power down the enclosure when the door is opened.**

**Table 5-2 Fault Indicator LED Codes — Fault LED On (Explorer I)**

| Error Code | Explanation                                                                                                                                                        |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 81         | Power failure. The processor took the power failure hardware trap.                                                                                                 |
| 82         | The processor took the control store parity error trap. This code may indicate a faulty writable control store on the processor board.                             |
| 88         | The processor received a NuBus error.                                                                                                                              |
| 89         | The processor failed its internal self-test.                                                                                                                       |
| 8B         | No boot device. This error occurs if the processor cannot find either a boot device or a monitor on which to display a message.                                    |
| 8C         | Microload problems. This error occurs if the processor cannot find a monitor on which to display the message <b>Bad Microload Format</b> .                         |
| 8D         | DE problems. This error occurs if the processor cannot find a monitor on which to display device errors 10 through 13 described in Table A-1, Error Code Messages. |
| 8E         | Monitor device driver problems. The processor received a nonzero completion code on a call to the monitor device driver.                                           |
| 8F         | Unable to initialize monitor. The monitor device driver returned a nonzero completion code as a result of a call to initialize the monitor.                        |
| 90         | Unable to initialize keyboard. The keyboard device driver returned a nonzero completion code as a result of a call to initialize the keyboard.                     |

**Table 5-3 Fault Indicator LED Codes — Fault LED On (Explorer II)**

| Error Number | Reference* | Explanation                                                                                                                                                                                                                                                                         |
|--------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01           | B.5        | LED Pattern test failed.                                                                                                                                                                                                                                                            |
| 02           |            | Lisp-Chip Signature Analyzer test failed. This test verifies that the signature-analyzer values, generated during the Lisp microprocessor internal ROM test and left in M memory, are correct.                                                                                      |
| 03           | B.5        | Zeros and Ones test failed.                                                                                                                                                                                                                                                         |
| 04           | B.5        | EPROM Integrity Check test failed.                                                                                                                                                                                                                                                  |
| 05           |            | Writable Control Store RAM Low test failed. This test runs the following subtests on the low 16K (0 to #x4000) of microinstruction RAM:<br><br>CLS-PATH — Performs read and write checks of the data path from the Lisp microprocessor to the control store RAM even and odd banks. |

\* This column provides paragraph references for test descriptions, if applicable. Refer to the appropriate paragraph in Appendix B for additional information.

**Table 5-3 Fault Indicator LED Codes — Fault LED On (Explorer II) (Continued)**

| Error Number | Reference* | Explanation                                                                                                                                      |
|--------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
|              |            | CLS-ADR-BRD — Performs an addressing test of even and odd banks.                                                                                 |
|              |            | CLS-SIMPLE — Performs writes and reads of pattern generator values to all locations.                                                             |
|              |            | CLS-ADR-CHIP — Performs writes and reads of patterns built from the address in each 0-4000 location.                                             |
| 06           |            | Kernel self-tests passed. Error occurred while attempting to load remainder of tests (07-3C) and STBM.                                           |
| 07           | B.2        | LISP-CHIP Functional Operations test failed.                                                                                                     |
| 08           | B.3        | LISP-CHIP M Memory test failed.                                                                                                                  |
| 09           | B.3        | LISP-CHIP A Memory test failed.                                                                                                                  |
| 0A           | B.3        | LISP-CHIP UPCS Memory test failed.                                                                                                               |
| 0B           | B.3        | LISP-CHIP T Memory test failed.                                                                                                                  |
| 0C           | B.3        | LISP-CHIP D Memory test failed.                                                                                                                  |
| 0D           | B.3        | LISP-CHIP PDL Memory test failed.                                                                                                                |
| 0E           |            | Writable Control Store RAM High test failed. Checks the writable control store high RAM (#x2000-7FFF) using patterns from the pattern generator. |
| 0F           | B.2        | LISP-CHIP Internal Macro test failed.                                                                                                            |
| 10           | B.5        | External Control Register test failed.                                                                                                           |
| 11           | B.5        | Exchange Register test failed.                                                                                                                   |
| 12           | B.5        | Event Posting Registers test failed.                                                                                                             |
| 13           | B.5        | NuBus Test Register test failed.                                                                                                                 |
| 14           | B.5        | NuBus Configuration Register test failed.                                                                                                        |
| 15           | B.5        | NuBus Flag Register test failed.                                                                                                                 |
| 16           | B.5        | Micro Second Timer test failed.                                                                                                                  |
| 17           | B.5        | Event Timer test failed.                                                                                                                         |
| 18           | B.4        | Left Virtual Memory Map RAM test failed.                                                                                                         |

\* This column provides paragraph references for test descriptions, if applicable. Refer to the appropriate paragraph in Appendix B for additional information.

**Table 5-3 Fault Indicator LED Codes — Fault LED On (Explorer II) (Continued)**

| Error Number | Reference* | Explanation                                   |
|--------------|------------|-----------------------------------------------|
| 19           | B.4        | Right Virtual Memory Map RAM test failed.     |
| 1A           | B.4        | Least Significant VMM Status RAM test failed. |
| 1B           | B.4        | Most Significant VMM Status RAM test failed.  |
| 1C           | B.4        | Left Cache Data RAM test failed.              |
| 1D           | B.4        | Right Cache Data RAM test failed.             |
| 1E           | B.4        | Left Cache Tag RAM test failed.               |
| 1F           | B.4        | Right Cache Tag RAM test failed.              |
| 20           | B.4        | Least Recently Used RAM test failed.          |
| 21           | B.4        | Transport RAM test failed.                    |
| 22           | B.4        | Address Space Map RAM test failed.            |
| 23           | B.5        | Bus Error Logic test failed.                  |
| 24           | B.9        | NuBus Access Enable test failed.              |
| 25           | B.9        | NuBus Access IDLE Status test failed.         |
| 26           | B.9        | NuBus Access TESTNUACK test failed.           |
| 27           | B.9        | NuBus Access IDLE Addr test failed.           |
| 28           | B.9        | NuBus Access DATA test failed.                |
| 29           | B.9        | NuBus Access FIFO DATA test failed.           |
| 2A           | B.9        | NuBus Access Byte Mode test failed.           |
| 2B           | B.9        | NuBus Access Buffer Write test failed.        |
| 2C           | B.9        | NuBus Access NuBus Lock test failed.          |
| 2D           | B.6        | Page Fault test failed.                       |
| 2E           | B.6        | Virtual Memory Onboard test failed.           |
| 2F           | B.6        | VMM NuBus Address test failed.                |
| 30           | B.6        | VMM NuBus Data test failed.                   |
| 31           | B.6        | Address Space Map Functions test failed.      |

\* This column provides paragraph references for test descriptions, if applicable. Refer to the appropriate paragraph in Appendix B for additional information.

**Table 5-3 Fault Indicator LED Codes — Fault LED On (Explorer II) (Continued)**

| Error Number | Reference* | Explanation                                                                        |
|--------------|------------|------------------------------------------------------------------------------------|
| 32           | B.7        | Cache XCRTFILLRD Path test failed.                                                 |
| 33           | B.7        | Cache Unmapped test failed.                                                        |
| 34           | B.7        | Cache Mapped test failed.                                                          |
| 35           | B.7        | Cache Tag Addr Comparator test failed.                                             |
| 36           | B.10       | External Macro Test with Cache test failed.                                        |
| 37           | B.10       | External Macro Test with NuBus test failed.                                        |
| 38           | B.8        | Auto-Transport Test with Cache test failed.                                        |
| 39           | B.8        | Auto-Transport Test with NuBus test failed.                                        |
| 3A           | B.11       | FP ALU Register test failed.                                                       |
| 3B           | B.11       | FP ALU test failed.                                                                |
| 3C           | B.11       | FP Multiplier test failed.                                                         |
| 44           |            | NuBus test failed when the STBM was testing itself.                                |
| 71           |            | No online devices from which to download are specified.                            |
| 72           |            | A bad microcode format was found during an attempted download.                     |
| 73           |            | A device error occurred during an attempted download.                              |
| 74           |            | No good system memory was found.                                                   |
| 75           |            | A NuBus error occurred during download from the NuBus memory to internal memories. |
| 76           |            | An MCR partition requires the floating point board, which is not present.          |
| 7F           |            | The processor was unable to load code from the EPROM.                              |

\* This column provides paragraph references for test descriptions, if applicable. Refer to the appropriate paragraph in Appendix B for additional information.

**Table 5-4 Fault Indicator LED Codes — Fault LED Off (Explorer II)**

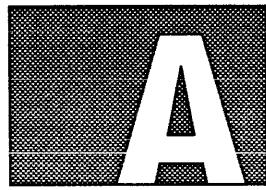
| Status Code | Description                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------|
| 0n          | STBM arbitration phase for slot n.                                                              |
| 1n          | NVRAM search phase for slot n.                                                                  |
| 2n          | Monitor search phase for slot n.                                                                |
| 3n          | Memory search phase for slot n.                                                                 |
| 4x          | STBM testing chassis slot with fault LED on, with x specifying the test in progress as follows: |
|             | 41 — ROM test (C3, format version, CRC)                                                         |
|             | 42 — Self-test                                                                                  |
|             | 44 — NuBus test                                                                                 |
|             | 48 — Interface diagnostic                                                                       |
| 5n          | Keyboard search phase for slot n.                                                               |
| 60          | At top level of the STBM menu.                                                                  |
| 61          | Attempting default boot.                                                                        |
| 62          | Building device menu.                                                                           |
| 63          | Waiting for load device to come ready.                                                          |
| 64          | Reading partition from load source.                                                             |
| 65          | Processing MCR sections, except last section.                                                   |
| 66          | Loading WCS, PDL to A-type/M-type, and entering new code.                                       |
| 70          | Waiting for first Secondary event.                                                              |
| 71          | Processing first Secondary event.                                                               |
| 72          | Waiting for second Secondary event.                                                             |
| 73          | Processing booting quietly.                                                                     |
| 78          | Waiting for RAM download (P3, mode 5).                                                          |

**Other Problems**

**5.4** If the display freezes during system self-test (while the slots and test results are being listed), an unknown intermittent error may have occurred. Press CTRL-META-CTRL-META-ABORT to reset the system. If the problem was a temporary one, the system may boot properly.

The following list contains other books that may be useful when a system will not boot or will not load GDOS.

- *Introduction to the Explorer System* — Provides detailed instructions on starting the system, general information about recovering from errors, and other useful information.
- *Explorer System Field Maintenance* handbook — Provides detailed system troubleshooting and maintenance information.
- *Explorer System Software Design Notes* — Provides detailed information about the function of the Explorer system. This manual is for advanced users only.



## EXPLORER LX

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### Introduction

**A.1** Explorer LX diagnostics include two full sets of diagnostic programs for testing both the Explorer system and the System 1000 Series, Model 1500 (S1500) system, as well as a new diagnostic program that evaluates NuBus activity between the Lisp and 68020-based processors. The following list shows all the diagnostics that are available with Explorer LX:

- The complete set of S1500 loadable diagnostic programs that run under the General Diagnostic Operating System (GDOS) — These programs provide extensive diagnostic testing capability for all boards in the Explorer LX chassis except the S1500 processor board and the Explorer processor board and memory board(s).
- Standalone S15A Processor Board diagnostic — This program tests S1500 systems that contain multiple S1500 processor boards.

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**NOTE:** Although Explorer LX allows you to load the standalone S15A diagnostic, the diagnostic executes only on a standard S1500 system with multiple S1500 processor boards. Therefore, it will not run on an LX system.

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- The complete set of Explorer loadable diagnostic programs that run under GDOS — These programs provide extensive diagnostic testing facilities for all boards in the LX chassis except the S1500 processor board and the Explorer processor board and memory boards.
- Explorer standalone diagnostics — This program tests the Explorer processor board and memory board(s) and other hardware components not tested by the self-tests.
- NuBus and Multiprocessor diagnostics — This program tests the interaction between the Lisp and S1500 processors over the NuBus.

Both Explorer GDOS and S1500 GDOS test the same set of boards. You can use either GDOS version. However, the S1500 version of GDOS will normally be the default because of the way the S1500 ROM-based code selects the controlling processor, or system test boot master (STBM).

The following paragraphs explain how to load GDOS on your LX system, and how to get to the NuBus and Multiprocessor Diagnostics program. For information about other standalone or GDOS tests, refer to Sections 1 through 5 in this manual and the *System 1500 Diagnostics User's Guide*.

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## The LX STBM

**A.2** The *system test boot master* (STBM) is code that tests other boards in the chassis and performs the initial program load. The STBM software is therefore responsible for loading diagnostics. All Lisp and 68020-based processor boards contain the ROM-resident STBM software. When an LX system is first booted, the processor board occupying the lowest-numbered slot in the chassis has its STBM software activated. Only that board's STBM software is activated. In the LX system, the board that has its STBM software activated is the 68020-based processor board, which must reside in slot 1. The Explorer processor board has its STBM software activated only if the 68020-based processor board is faulty.

The STBM software first executes an interface test with each board in the system and reports the test results to the Explorer terminal. After the interface tests run, you are prompted to select a load option. The paragraph entitled Loading Explorer GDOS and Standalone Diagnostics in this section explains how to select a specific diagnostics load partition.

When you select a partition, the STBM first decides whether that partition resides on the Lisp disk or on the TI System V disk. When it has identified the proper disk, the STBM loads the partition from disk into LX memory and transfers control to that partition so that execution can begin.

The 68020-based processor board's STBM software loads *whichever* band is selected at boot-time, regardless of whether that band is for the default system load, S1500 GDOS, Explorer GDOS, Explorer standalone diagnostics, or the NuBus and Multiprocessor Diagnostics. The Explorer processor performs no loading whatsoever.

For more information about the STBM, see *boot* in Section 8 of the *TI System V Administrator's Reference* manual.

---

## Loading the Diagnostics

**A.3** Diagnostics can be loaded from magnetic cartridge tape or from the TI System V disk. The following paragraphs describe the procedures required to load the diagnostics of your choice from either medium.

---

### Loading S1500 GDOS

**A.3.1** Be sure that you read through the following steps before loading S1500 GDOS. You must respond to certain prompts before you may be able to finish reading the text accompanying that step. If you are loading from a tape, be sure to insert the tape prior to performing any of the steps that follow.

To load S1500 GDOS, perform the following steps:

1. Shutdown the TI System V side using the *shutdown* command, and shutdown the Lisp side using *si:shutdown*. Reboot the LX machine by pressing CTRL-META-CTRL-META-ABORT on the Explorer keyboard. The system self-tests run automatically during the boot process. As the self-tests proceed, messages containing the test results scroll onto the video display. The following is an example of messages that might appear when all the self-tests complete:

```
Slot 0 CPU TESTING SYSTEM
```

```
Slot 0 CPU passed
Slot 2 NPI passed
Slot 3 NEC passed
Slot 4 MEM passed
Slot 5 SIB passed
Slot 6 CPU passed
```

If any boards fail to pass the self-tests, you can retest the system with the extended interface diagnostic tests to further define the source of the problem. Instructions for retesting the system are provided in Section 2 of this manual and in Section 2 of the *System 1500 Diagnostics User's Guide*.

Upon successful completion of the self-tests, the system load menu is displayed:

D=Default load, M=Menu load, R=Restart, E=Extended tests:

2. The option you should select at this point is *not* listed. Press the G key to load S1500 GDOS. You have approximately 15 seconds to type G after the system load menu appears.

If you do not choose an option in time, the system will perform its default system initialization procedure (in most cases, the default parameters specify loading the TI System V operating system on the S1500 processor; the Explorer processor loads Lisp). You can suspend default initialization before the 15-second time-out by pressing any key or by typing any character except a command character that specifies a load procedure. For example, you could suspend the system load menu by typing a number, by pressing the Space Bar, or by typing a character such as X, T, Z, and so forth. If default initialization does occur, simply reboot.

If you press G in time, the system displays a list of available load devices similar to the following. The slot number of the disk controller and each logical unit number are also shown.

Available load devices

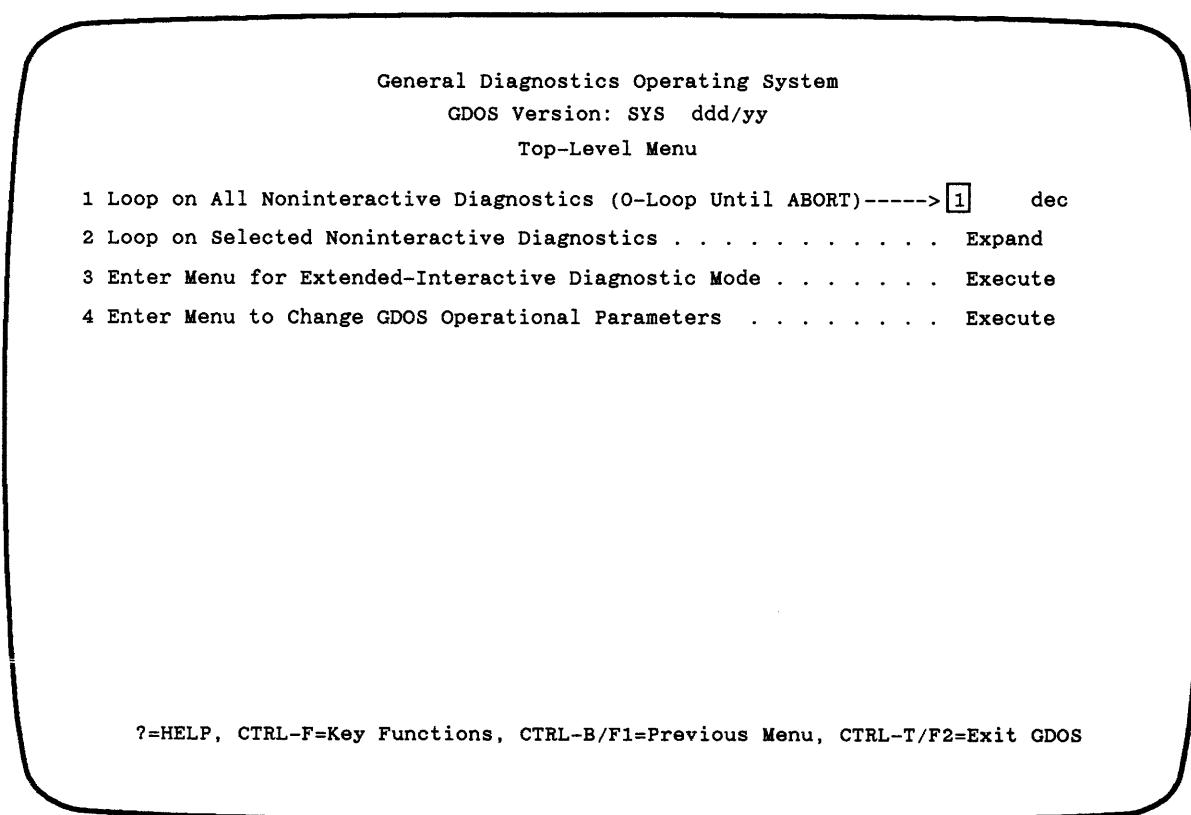
\* A = Slot 2 disk 00  
B = Slot 2 tape 08

Select load device:

Each available load device is also identified by an associated letter. An asterisk marks the default load device.

3. If you are booting from the disk, choose the letter of the device associated with the disk. If you are booting from magnetic cartridge tape, choose the letter of the device associated with the tape. When GDOS has loaded, a TI restricted rights legend appears. After a short delay, the GDOS Top-Level Menu appears. (See Figure A-1.)

**Figure A-1 GDOS Top-Level Menu**



You can now begin performing the diagnostics, as described in the five sections of this manual and in the *System 1500 Diagnostics User's Guide*.

---

**NOTE:** For information about specific GDOS diagnostic menus and menu entries, use the online help facility. Online help messages are available for every entry in all GDOS diagnostic menus. For more information about accessing the online help messages, refer to Section 1 in this manual or in the *System 1500 Diagnostics User's Guide*.

---

---

### Loading Explorer GDOS and Standalone Diagnostics

**A.3.2** Be sure you read through the following steps before loading either Explorer GDOS or the Explorer standalone diagnostics. You must respond to certain prompts before you may be able to finish the text accompanying that step. If you are loading from a tape, be sure that you have inserted the tape prior to performing any of the steps that follow.

To load either Explorer GDOS or the Explorer standalone diagnostics, perform the following steps:

1. Reboot the LX machine by pressing CTRL-META-CTRL-META-ABORT on the Explorer keyboard. The system self-tests run automatically during the boot process. As the self-tests complete, messages containing the test results scroll onto the video display.

Upon successful completion of the self-tests, the system load menu is displayed:

**D=Default load, M=Menu load, R=Restart, E=Extended tests:**

2. The option you should select at this point is *not* listed. Press the **N** key, specifying a Name load. The Name load allows you to identify the diagnostic band that you want to load *by name*. You have approximately 15 seconds to type **N** after the system load menu appears.

If you do not choose an option in time, the system will perform its default system initialization procedure. If default initialization does occur, simply reboot.

If you press the **N** key in time, the system displays the following prompt:

**System load band name :**

3. Type **unx1**, which is the name of your TI System V load band although neither Explorer GDOS nor Explorer standalone diagnostics will load without this information. When you have typed the system load band name, the following prompt appears:

**Configuration band name :**

4. This prompt requests the name of your configuration band. At this point, you can specify a diagnostic band by its name.
  - Enter **GDCF**, for Explorer GDOS.
  - Enter **EXCF**, for Explorer standalone diagnostics.

5. The system now displays a list of disk drives or tape drives that are available and a prompt requesting that you select a load device. The following example illustrates a display that might appear on your screen, depending upon the configuration of your system:

AVAILABLE LOAD DEVICES

```
A= Slot 0 Enet 00
B= Slot 2 Disk 00
*C= Slot 2 Disk 01
D= Slot 2 Tape 06
```

Select load device :

If one of the disk or tape drives is not listed as an available load device, check the power switch on the drive, and check all cables and connections. You may have to reboot.

6. The configuration bands for Explorer GDOS (GDCF) or standalone diagnostics (EXCF) reside on the TI System V disk in a normal LX configuration. Because it is normally the default drive, the TI System V disk is usually denoted by an asterisk (\*). The TI System V disk is load device C in the previous example.

If you wish to accept the default drive, simply press RETURN. The system attempts to find Explorer GDOS (GDCF) or standalone diagnostics (EXCF) on the default drive. If the configuration bands are stored on a different drive, type the letter associated with that drive. If you do not know where they are stored, try the default drive first.

If you select a drive that does not have the unx1 band on it, the following message is displayed:

Program not found

D=Default load, M=Menu load, R=Retest, E=Extended tests :

Press the N key again and proceed through the same steps until you can enter an alternate load device by typing the letter associated with that device.

If the error message continues to appear with each listed load device you try, then the loadable diagnostics may not be installed. Refer to the *Explorer LX System Installation* manual for instructions on how to install Explorer GDOS and the standalone diagnostics on your disk.

After you select a drive on which the diagnostics are installed, either the GDOS Top-Level Menu appears (Figure A-1), the Standalone Diagnostics Main Menu appears for the Explorer I system (Figure A-2), or the Standalone Diagnostics Main Menu for the Explorer II system appears (Figure A-3), depending on which configuration band name you typed in step 4 above.

**Figure A-2 Explorer Standalone Diagnostics Main Menu (Explorer I)**

```

*** System Configuration
*** Slot 2 NPI
*** Slot 3 MEM 2MB
*** Slot 5 SIB
*** Slot 6 CPU

*** Explorer Standalone Diagnostics
*** Version: EXPT ddd/yy
*** MAIN MENU

*** 0 Run All Standalone Diagnostics
*** 1 Enter Menu to Run Explorer Processor Diagnostic
*** 2 Enter Menu to Run Explorer Memory Diagnostic
*** P Enter Menu to Change Operational Parameters
*** R Return to Previous Menu
*** K Clear Screen

*** To execute, select the desired option :

```

**Figure A-3 Explorer Standalone Diagnostics Main Menu (Explorer II)**

```

EXP2 Diagnostic Revision ddd/yy
** Main Menu
**
** A = Execute All Processor Tests
** B = Loop on All Processor Tests
** C = Modify Test Multiplier (0001)
** D = LISP-CHIP FUNCTIONAL Test Menu
** E = LISP-CHIP MEMORY Test Menu
** F = BOARD STATIC RAM Test Menu
** G = BOARD SUPPORT Test Menu
** H = BOARD VIRTUAL LOGIC Test Menu
** I = BOARD CACHE LOGIC Test Menu
** J = BOARD TRANSPORT LOGIC Test Menu
** K = BOARD NUBUS LOGIC Test Menu
** L = BOARD MACRO Test Menu
** M = Execute External Memory Tests
**
** W = Utilities Menu, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:

```

**Loading NuBus  
and Multiprocessor  
Diagnostics**

A.3.3 Be sure that you read through the following steps before loading the NuBus and Multiprocessor Diagnostics. You must respond to certain prompts before you may be able to finish the text accompanying that step. If you are loading from a tape, be sure that you have inserted the tape prior to performing any of the steps that follow.

1. Reboot the LX machine by pressing CTRL-META-CTRL-META-ABORT on the Explorer keyboard. The system self-tests run automatically during the boot process. As the self-tests complete, messages containing the test results scroll onto the video display.

Upon successful completion of the self-tests, the system load menu is displayed:

D=Default load, M=Menu load, R=Restart, E=Extended tests:

2. The option you should select at this point is *not* listed. Press the N key, specifying a Name load. The Name load allows you to identify the diagnostics band that you want to load *by name*. You have approximately 15 seconds to press the N key after the system load menu appears.

If you do not choose an option in time, the system will perform its default system initialization procedure. If default initialization does occur, simply reboot.

If you press the N key in time, the system displays the following prompt:

System load band name :

3. Type unx1, which is the name of your TI System V load band. The following prompt appears:

Configuration band name :

4. Type CBUS to identify the NuBus and Multiprocessor Diagnostics program.

5. The system now displays a list of disk drives or tape drives that are available and a prompt requesting that you select a load device. The following example illustrates a display that might appear on your screen, depending upon the configuration of your system:

AVAILABLE LOAD DEVICES

```
A= Slot 0 Enet 00
*B= Slot 2 Disk 00
C= Slot 2 Tape 06
```

Select load device :

If one of the disk or tape drives is not listed as an available load device, check the power switch on the drive, and check all cables and connections. You may have to reboot.

6. The drive denoted by an asterisk (\*), drive B in the previous example, is the default drive. If you wish to accept the default drive, simply press RETURN. The system attempts to find the NuBus and Multiprocessor Diagnostics on the default drive. If the diagnostics are stored on a different drive, type the letter associated with that drive. If you do not know where the diagnostics are stored, try the default drive first.

If you select a drive that does not have the diagnostic files on it, the following message is displayed:

Program not found

D=Default load, M=Menu load, R=Retest, E=Extended tests :

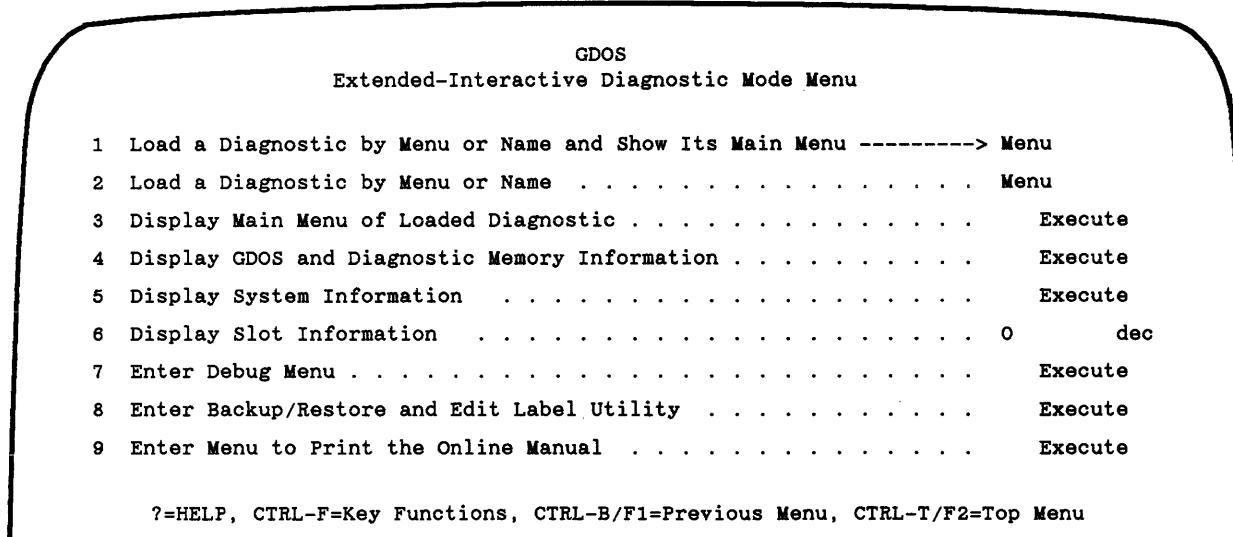
Press the **N** key again and proceed through the same steps until you can enter an alternate load device by typing the letter associated with that device.

If the error message continues to appear with each listed load device you try, then the loadable diagnostics may not be installed. Refer to the *Explorer LX System Installation* manual for instructions on how to install GDOS and the standalone diagnostics on your disk.

After you select a drive on which the diagnostics are installed, a TI restricted rights legend appears; then, the GDOS Top-Level Menu appears (Figure A-1).

7. From the GDOS Top-Level Menu (Figure A-1), move the cursor to menu entry number 3 — **E**ntr**E** **M**enu for **E**xtended-**I**nteractive **D**iagnos**T**ic **M**ode — and press RETURN. The Extended-Interactive Diagnostic Mode Menu is displayed (Figure A-4):

**Figure A-4 GDOS Extended-Interactive Diagnostic Mode Menu**



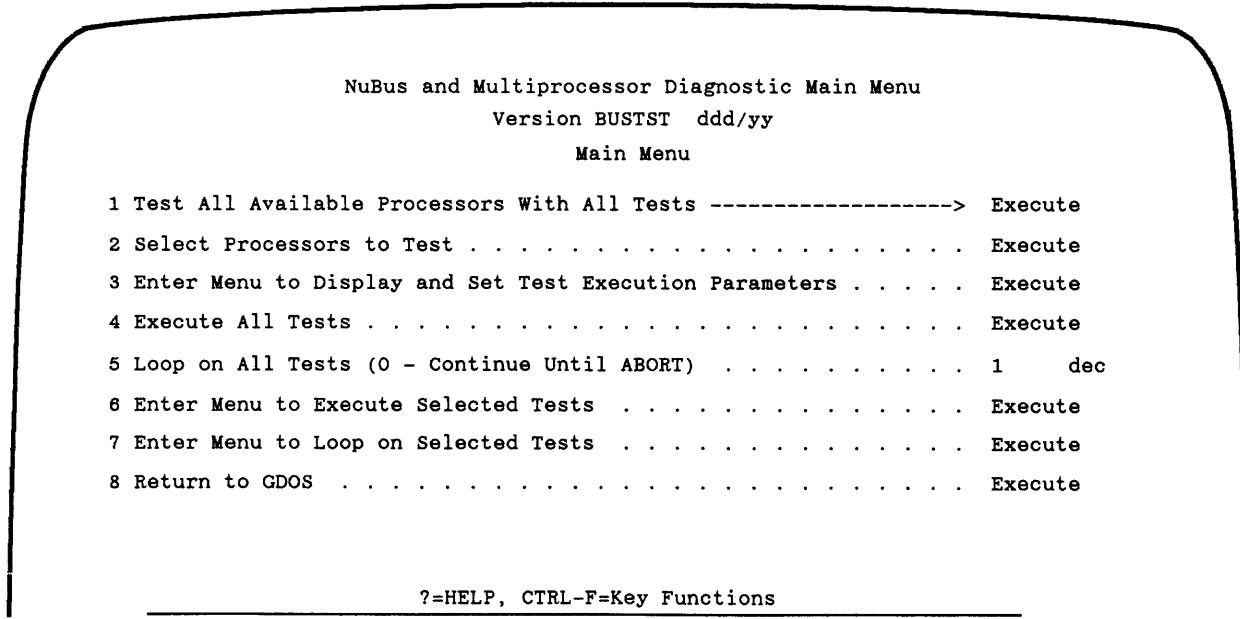
8. There are four ways to select the NuBus and Multiprocessor Diagnostic when you are in the Extended-Interactive Diagnostic Mode Menu:

- Place the cursor on menu entry 1 — **L**oad a **Diagnostic by **M**enu or **N**ame and **S**how **I**ts **M**ain **M**enu — and press RETURN. The Diagnostic Load Menu appears with a list of the diagnostic programs that are available for your system. Place the cursor on the **N**u**B**us and **M**ultiprocessor **D**iagnostic entry and press RETURN. The system loads the NuBus and Multiprocessor Diagnostic and then displays its main menu (Figure A-5).**
- Place the cursor on menu entry 1 — **L**oad a **Diagnostic by **M**enu or **N**ame and **S**how **I**ts **M**ain **M**enu. Use the TAB key to change the selection option from **M**enu to **N**ame and press RETURN. A prompt appears requesting the name of the diagnostic program you wish to load. Type **bustst** and press RETURN. The system loads the NuBus**

and Multiprocessor Diagnostic and then displays its main menu (Figure A-5).

- Place the cursor on menu entry 2 — Load a Diagnostic by Menu or Name — and press RETURN. The Diagnostic Load Menu appears with a list of the diagnostic programs that are available for your system. Place the cursor on the NuBus and Multiprocessor Diagnostic entry and press RETURN. The system loads the NuBus and Multiprocessor Diagnostic and then redisplays the Extended-Interactive Diagnostic Mode Menu (Figure A-4). You can now perform other tasks from the Extended-Interactive Mode, or you can display the NuBus and Multiprocessor Diagnostic Main Menu by selecting menu entry 3 — Display Main Menu of Loaded Diagnostic. When you press RETURN, the loaded diagnostic's main menu is displayed (Figure A-4).
- Place the cursor on menu entry 2 — Load a Diagnostic by Menu or Name. Use the TAB key to change the selection option from Menu to Name and press RETURN. A prompt appears requesting the name of the diagnostic program you wish to load. Type bustst and press RETURN. The system loads the NuBus and Multiprocessor diagnostic and then redisplays the Extended-Interactive Diagnostic Mode Menu (Figure A-4). You can now perform other tasks from the Extended-Interactive mode, or you can display the NuBus and Multiprocessor Diagnostic Main Menu by selecting menu entry 3 — Display Main Menu of Loaded Diagnostic. When you press RETURN, the loaded diagnostic's main menu is displayed (Figure A-5).

**Figure A-5 NuBus and Multiprocessor Diagnostic Main Menu**

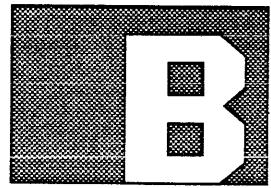


You can now begin performing the NuBus and Multiprocessor Diagnostic tests as well as other GDOS diagnostic tests. Refer to the online help for information about any of the menus in the diagnostic program.

---

**NOTE:** For information about specific GDOS diagnostic menus and menu entries, use the online help facility. Online help messages are available for every entry in all GDOS diagnostic menus. For more information about accessing the online help messages, refer to Section 1 in this manual or in the *System 1500 Diagnostics User's Guide*.

---



## EXPLORER II STANDALONE DIAGNOSTICS TEST DESCRIPTIONS

### Introduction

**B.1** This appendix provides brief descriptions of the Explorer II standalone diagnostics tests. You can access these tests through menus from the Standalone Diagnostics Main Menu (Figure B-1).

---

**NOTE:** Refer to Section 2 for information on the Standalone Diagnostics Main Menu, the Utilities Menu, the Debug Menu, and the Parameter Menu. The Execute All Processor Tests, the Loop on All Processor Tests, and the Modify Test Multiplier entries on the Standalone Diagnostics Main Menu are also discussed in Section 2.

---

**Figure B-1** Explorer Standalone Diagnostics Main Menu (Explorer II)

```
EXP2 Diagnostic Revision ddd/yy
** Main Menu
**
** A = Execute All Processor Tests
** B = Loop on All Processor Tests
** C = Modify Test Multiplier (0001)
** D = LISP-CHIP FUNCTIONAL Test Menu
** E = LISP-CHIP MEMORY Test Menu
** F = BOARD STATIC RAM Test Menu
** G = BOARD SUPPORT Test Menu
** H = BOARD VIRTUAL LOGIC Test Menu
** I = BOARD CACHE LOGIC Test Menu
** J = BOARD TRANSPORT LOGIC Test Menu
** K = BOARD NUBUS LOGIC Test Menu
** L = BOARD MACRO Test Menu
** M = Execute External Memory Tests
**
** W = Utilities Menu, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:
```

---

### LISP-CHIP FUNCTIONAL Tests

**B.2** The tests on the LISP-CHIP FUNCTIONAL Test Menu (Figure B-2) check the internal operations and processing functions of the Lisp microprocessor.

**Figure B-2 LISP-CHIP FUNCTIONAL Test Menu**

```
EXP2 Diagnostic Revision ddd/yy
**
** LISP-CHIP FUNCTIONAL Test Menu
**
** A = Lisp Chip Functional Operations Test
** B = Lisp Chip Memory Refresh Test
** C = Internal Macro Test
** D = Tag RAM Abbreviated-Jump Test
**
** R = Return to Prev. Menu, X = Execute All, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:
```

The following descriptions briefly explain each test listed on the LISP-CHIP FUNCTIONAL Test Menu:

- Lisp Chip Functional Operations Test — Contains several subtests that check the following logical functions:
  - Conditional logic
  - Minimum Micro-program Stack (UPCS) functions
  - Jump, call, popj functions
  - Abbreviated jump functions
  - M, A, and Push Down List (PDL) cache writes
  - Barrel shifter and masker
  - Instruction Modify (IMODing) function
  - Machine Control Register (MCR) bits
  - Writable Control Storage (WCS) parity and Abort logic
  - Functional registers with data patterns
  - ALU operations
  - O-bus multiplexer modes
  - Q register operations
  - PDL operations
  - UPCS abort level and inhibit-next
  - M source stripper

- A-type/M-type comparator
- Tag classifier
- Dispatch operations
- Lisp Chip Memory Refresh Test — Tests that all four memory refresh rates can be selected and verifies memory retention for each refresh rate.
- Internal Macro Test — Tests macro instruction processing functions internal to the Lisp microprocessor. Executes as many macro mode data paths and control functions as possible, without going off-chip. Verifies all instruction stream registers, instruction fetch control logic, and instruction execution logic.
- Tag RAM Abbreviated-Jump Test — Tests the capability of the Lisp microprocessor to correctly perform abbreviated jumps that use the tag classifier RAM.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

**LISP-CHIP  
MEMORY Tests**

B.3 The tests on the LISP-CHIP MEMORY Test Menu (Figure B-3) check the on-chip memory logic of the Lisp microprocessor.

**Figure B-3 LISP-CHIP MEMORY Test Menu**

```

EXP2 Diagnostic Revision ddd/yy
**
** LISP-CHIP MEMORY Test Menu
**
** A = Lisp Chip M Memory Test
** B = Lisp Chip A Memory Test
** C = Lisp Chip UPCS Memory Test
** D = Lisp Chip T Memory Test
** E = Lisp Chip D Memory Test
** F = Lisp Chip PDL Memory Test
**
** R = Return to Prev. Menu, X = Execute All, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:

```

The following descriptions briefly explain each test listed on the LISP-CHIP MEMORY Test Menu:

- Lisp Chip M Memory Test — Tests M memory using test patterns from the pattern generator. Tests all but the lowest addresses, saving the memory contents before testing and restoring the memory contents after successful test completion.
- Lisp Chip A Memory Test — Tests A memory using test patterns from the pattern generator. Tests all but the lowest addresses, saving the memory contents before testing and restoring the memory contents after successful test completion.
- Lisp Chip UPCS Memory Test — Tests the micro-program stack (UPCS) functions using test patterns from the pattern generator.
- Lisp Chip T Memory Test — Tests tag (T) classifier RAM using test patterns from the pattern generator.
- Lisp Chip D Memory Test — Tests dispatch (D) RAM using test patterns from the pattern generator.
- Lisp Chip PDL Memory Test — Tests push down list (PDL) RAM using test patterns from the pattern generator.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

---

#### **BOARD STATIC RAM Tests**

**B.4** The tests on the BOARD STATIC RAM Test Menu (Figure B-4) check the virtual memory map (VMM) RAM, cache RAM, and external instruction memory using the common I/O memory test routines. The common I/O memory routines consist of a data path test, an address test, a bit cell test, and a data retention test.

Figure B-4 BOARD STATIC RAM Test Menu

```

EXP2 Diagnostic Revision ddd/yy
**
** BOARD STATIC RAM Test Menu
**
** A = Right Virtual Memory Map RAM
** B = Left Virtual Memory Map RAM
** C = Least Significant VMM Status RAM
** D = Most Significant VMM Status RAM
** E = Left Cache Data RAM
** F = Right Cache Data RAM
** G = Left Cache Data Tag RAM
** H = Right Cache Data Tag RAM
** I = Transport RAM
** J = Least Recently Used RAM
** K = Address Space Map RAM
** L = Instruction RAM Low
** M = Instruction RAM High
**
** R = Return to Prev. Menu, X = Execute All, Y = Debug Menu, A = Parameter Menu
**
** Select the desired option:

```

The following descriptions briefly explain each test listed on the BOARD STATIC RAM Test Menu:

- Right Virtual Memory Map RAM test — Tests the right bank of the virtual memory map (VMM) using the common I/O memory test routines.
- Left Virtual Memory Map RAM test — Tests the left bank of the VMM using the common I/O memory test routines.
- Least Significant VMM Status RAM test — Tests the least significant bank of the VMM status bits using the common I/O memory test routines.
- Most Significant VMM Status RAM test — Tests the most significant bank of the VMM status bits using the common I/O memory routines.
- Left Cache Data RAM test — Tests the left RAM bank of the cache data RAM using the common I/O memory routines.
- Right Cache Data RAM test — Tests the right RAM bank of the cache data RAM using the common I/O memory routines.
- Left Cache Data Tag RAM test — Tests the left RAM bank of the cache data tag RAM using the common I/O memory routines.
- Right Cache Data Tag RAM test — Tests the right RAM bank of the cache data tag RAM using the common I/O memory routines.

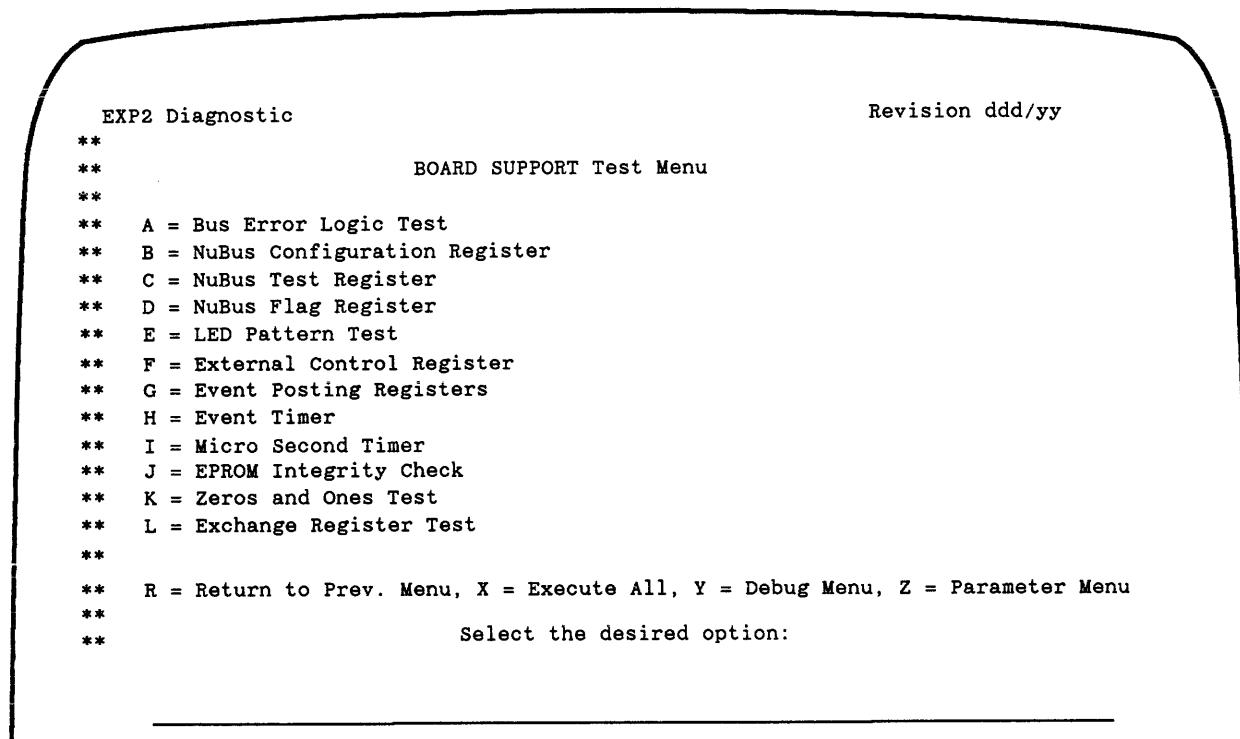
- Transport RAM test — Tests all of the transport RAM using the common I/O memory test routines.
- Least Recently Used RAM test — Tests all of the cache least recently used (LRU) RAM using the common I/O memory test routines.
- Address Space Map RAM test — Tests the address space map RAM using routines similar in function to the common I/O memory test routines.
- Instruction RAM Low test — Tests all of the external instruction memory residing below the execution shell. The test is loaded into memory and tests all memory below it by performing a bit cell test, a data path test, an address test, and a checksum test.
- Instruction RAM High test — Tests all of the external instruction memory residing above the execution shell. The test is loaded into memory and tests all memory above it by performing a bit cell test, a data path test, an address test, and a checksum test.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

---

**BOARD SUPPORT Tests**    B.5 The tests on the BOARD SUPPORT Test Menu (Figure B-5) check the interface of the Lisp microprocessor to other functions on the processor board.

---

Figure B-5 BOARD SUPPORT Test Menu



The following descriptions briefly explain each test listed on the BOARD SUPPORT Test Menu:

- Bus Error Logic Test — Forces bus errors and then checks for both conditional and abort sensing of the error by the Lisp microprocessor.
- NuBus Configuration Register — Checks that a zero and one can be written to each bit of the NuBus configuration register (except the reset bit).
- NuBus Test Register — Tests the 8-bit NuBus test register using the common I/O memory test routines.
- NuBus Flag Register — Tests that all possible combinations can be written to bits one and two of the NuBus flag register.
- LED Pattern Test — Tests the eight read/write bits of the LED register by walking a one (1) and then walking a zero (0).
- External Control Register — Tests the writable bits of the external control register (XCR) using the common I/O memory test routines.

- Event Posting Registers — Tests the event posting and status logic by setting events one at a time from lowest to highest priority, then clearing each event from highest to lowest priority. The event registers are verified via NuBus cycles. This test is also executed in ROM based self-test, but the event registers are only addressed via local I/O cycles.
- Event Timer — Tests the functionality of the event timer logic by writing and verifying test patterns to the event timer register, verifying the event timer disable logic, and verifying that the event timer can generate a level 9 event.
- Micro Second Timer — Tests the functionality of the microsecond timer logic by writing and verifying test patterns to the microsecond timer register, verifying the timer disable logic, verifying that the timer counts up, checking the overflow bit after the timer overflows, and verifying that the overflow bit clears after reading the microsecond register.
- EPROM Integrity Check — Tests all the bytes in the EPROM using a CRC-type algorithm from the EPROM starting address to the 4-byte stored CRC.
- Zeros and Ones Test — Reads the zeros generator and the ones generator to verify that a zero (0) and #xffffffff can be read from the 32-bit data bus.
- Exchange Register Test — Tests data transfers from the Lisp microprocessor to the internal data bus exchange register by using test patterns generated from the pattern generator.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

---

## **BOARD VIRTUAL LOGIC Tests**

**B.6** The tests on the BOARD VIRTUAL LOGIC Test Menu (Figure B-6) check the Virtual Memory Mapping (VMM) logic and the transfer of addresses and data to the NuBus.

Figure B-6 BOARD VIRTUAL LOGIC Test Menu

```

EXP2 Diagnostic Revision ddd/yy
**
** BOARD VIRTUAL LOGIC Test Menu
**
** A = Page Fault Test
** B = Address Space Map Functions
** C = VMM NuBus Address Test
** D = VMM NuBus Data Test
** E = Virtual Memory Onboard Test
** F = Offboard Virtual Memory Mapping
**
** R = Return to Prev. Menu, X = Execute All, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:

```

The following descriptions briefly explain each test listed on the BOARD VIRTUAL LOGIC Test Menu:

- Page Fault Test — Checks that a page fault and a page fault abort can occur correctly.
- Address Space Map Functions — Tests the address space map garbage collector volatility fault (GCVF) and old space functions using left and right virtual memory map (VMM) banks. The test verifies the results using the Map Status Register and through Lisp microprocessor dispatching.
- VMM NuBus Address Test — Tests that mapped idle cycles can correctly transfer pattern generator values as addresses to the NuBus. The addresses are latched for verification in the NuBus read-FIFO.
- VMM NuBus Data Test — Tests the capability of the VMM to output data by performing mapped reads and writes to and from the NuBus.
- Virtual Memory Onboard Test — Checks the VMM logic by testing all combinations of the following:
  - VMM status RAM — Right and left, valid and invalid, lower and upper half of RAM
  - VMM status RAM access — Valid and invalid
  - VMM status RAM write access — Valid and invalid

The VMM logic is verified by producing a predictable bus error or page fault. Most map status registers are checked in each cycle.

- Offboard Virtual Memory Mapping — Tests all 128K of the VMM pages by performing offboard mapped writes, then mapped and unmapped reads to the NuBus.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.

- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

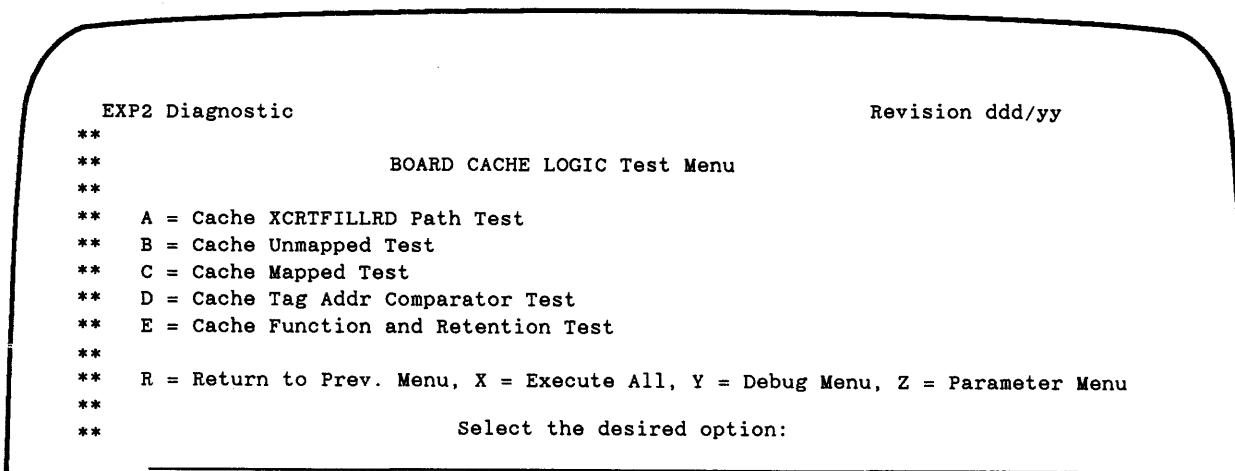
---

**BOARD CACHE  
LOGIC Tests**

B.7 The tests on the BOARD CACHE LOGIC Test Menu (Figure B-7) check the cache logic and functionality with the virtual memory map (VMM) and NuBus memory.

---

**Figure B-7 BOARD CACHE LOGIC Test Menu**



The following descriptions briefly explain each test listed on the BOARD CACHE LOGIC Test Menu:

- Cache XCRTFILLRD Path Test — Checks the cache tag address path from the CVMA bus to the data bus using the XCRTFILL bit (XCR<22>) of the external control register (XCR).
- Cache Unmapped Test — Tests minimal cache functionality using unmapped cycles with the NuBus master enable turned off. Verifies cache miss read and write, cache hit read, and cache hit write. Cache hit reads are verified by comparing the expected cache data with the expected cache data pattern (should be equal), using the actual cache data read.
- Cache Mapped Test — Checks mapped cycles by first testing eight possible combinations in the following three modes:
  - Cycle type — Read versus write
  - Cache tag RAM — Hit versus miss
  - Virtual Memory Map bit VMM<22> — Cache-enable versus cache-inhibit

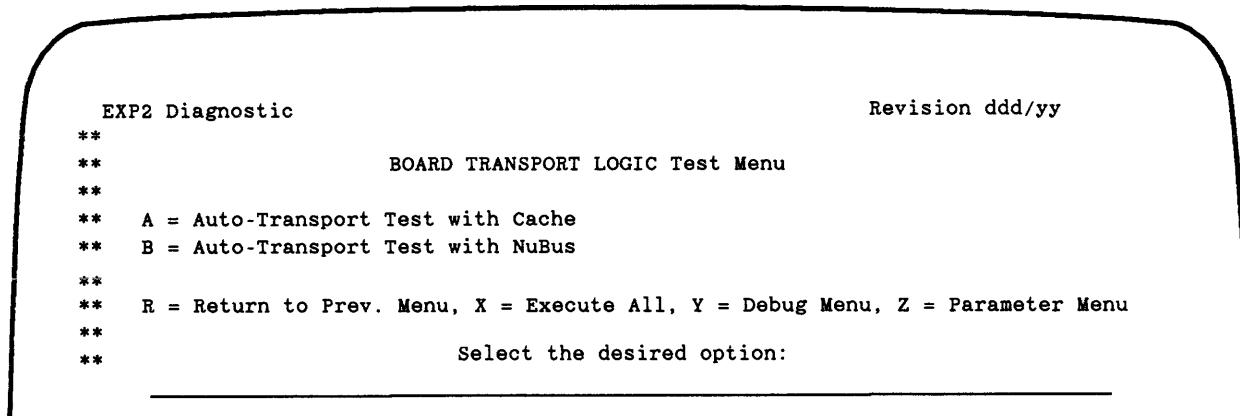
The test then checks the cache write-through update of cache data with buffered writes, even if the cache write-through receives a bus error.

- Cache Tag Addr Comparator Test — Tests the cache tag address comparators by setting one side at a time to *addr* and the other side with *addr-*. The test then does mapped read cycles and changes the address bits into the comparator, one address bit at a time, causing a mismatch. The test expects a cache miss to occur.
- Cache Function and Retention Test — Tests the cache functionality and retention by shadowing cache with NuBus main memory. Verifies cache fill and write-through logic in the entire 128K-byte cache range.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

## BOARD TRANSPORT LOGIC Tests

**B.8** The tests on the BOARD TRANSPORT LOGIC Test Menu check the transport RAM addressing with cache and NuBus memory.

**Figure B-8 BOARD TRANSPORT LOGIC Test Menu**



The following descriptions briefly explain each test listed on the BOARD TRANSPORT LOGIC Test Menu:

- Auto-Transport Test with Cache — Tests the transport RAM addressing with cache memory by using transport type, data type, and transport state counter. Also tests the invisible pointer-following logic of the Lisp microprocessor.
- Auto-Transport Test with Nubus — Tests the transport RAM addressing with NuBus memory by using transport type, data type, and transport state counter. Also tests the invisible pointer-following logic of the Lisp microprocessor.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.

- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

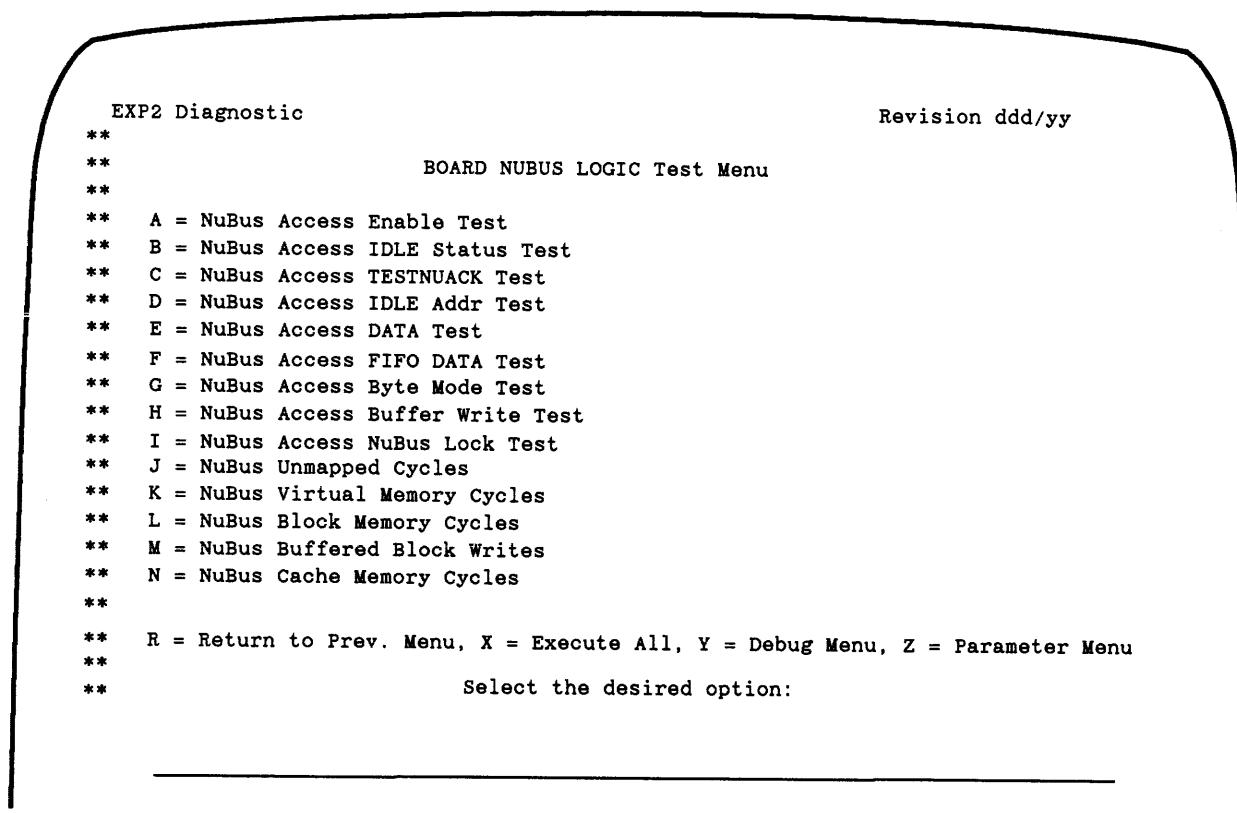
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## **BOARD NUBUS LOGIC Tests**

**B.9** The tests on the BOARD NUBUS LOGIC Test Menu (Figure B-9) check the interface to the NuBus, check NuBus functionality, and verify that the bits in the NuBus status register (NSR) are set properly during NuBus operations.

---

**Figure B-9 BOARD NUBUS LOGIC Test Menu**



```
EXP2 Diagnostic Revision ddd/yy
**
**
 BOARD NUBUS LOGIC Test Menu
**
**
** A = NuBus Access Enable Test
** B = NuBus Access IDLE Status Test
** C = NuBus Access TESTNUACK Test
** D = NuBus Access IDLE Addr Test
** E = NuBus Access DATA Test
** F = NuBus Access FIFO DATA Test
** G = NuBus Access Byte Mode Test
** H = NuBus Access Buffer Write Test
** I = NuBus Access NuBus Lock Test
** J = NuBus Unmapped Cycles
** K = NuBus Virtual Memory Cycles
** L = NuBus Block Memory Cycles
** M = NuBus Buffered Block Writes
** N = NuBus Cache Memory Cycles
**
**
** R = Return to Prev. Menu, X = Execute All, Y = Debug Menu, Z = Parameter Menu
**
** Select the desired option:
```

The following descriptions briefly explain each test listed on the BOARD NUBUS LOGIC Test Menu:

- NuBus Access Enable Test — Checks that the NuBus master enable bit in the configuration register can be turned off, and produces predictable NuBus status register values when unmapped cycles are attempted.
- NuBus Access IDLE Status Test — Checks that idle cycles generate correct NuBus status register values. The external control register bits XCR<10:9> (XCRTM1 and XCRTM0) show up inverted in the NuBus status register bits NSR<17:16> (ITM1- and ITM0-).

- NuBus Access TESTNUACK Test — Checks the ability of the external control register bit XCR<8> (XCRTESTNUACK) to generate slave acknowledgement transfer modes (TMs).
- NuBus Access IDLE Addr Test — Checks the address lines to the NuBus (captured in the read-FIFO) using unmapped NuBus idle write cycles.
- NuBus Access DATA Test — Checks NuBus write data paths using unmapped NuBus writes to the NuBus data latch, and unmapped NuBus reads of the exchange register.
- NuBus Access FIFO DATA Test — Checks write and read FIFOs by doing NuBus writes, transferring data for verification from the memory data (MD) through the write-FIFO to the read-FIFO. The write-FIFO is filled using I/O writes to test all data and flag bits, with unmapped writes transferring the values to the read-FIFO.
- NuBus Access Byte Mode Test — Checks all unmapped modes to verify that the slave IA<1:0> NSR bits are generated properly. Appropriate NuBus error status is verified for all combinations.
- NuBus Access Buffer Write Test — Checks buffered writes for the following functionality:
  - NuBus status register bits NSR<20> (MCINPROG-) and NSR<19> (WRTQUEUED-) are checked.
  - A buffered write that would normally end in a NuBus error will appear to *NOT* cause a NuBus error if checked immediately.
  - A second NuBus write is *NOT* started if a previous buffered write encounters a NuBus error.
  - The NuBus status register (NSR) contains the information for a buffered write that has a NuBus error and not for a later write.
  - NSR latches the results of a write error, from a buffered write, until a read.
- NuBus Access NuBus Lock Test — Tests the external control register buslock bit XCR<3> by checking for a third word in the read-FIFO, as the result of an automatically issued attention-null cycle.
- NuBus Unmapped Cycles — Checks the NuBus byte, halfword, and word cycle types.
- NuBus Virtual Memory Cycles — Tests right and left virtual memory and map status RAM logical to virtual memory address translation logic.
- NuBus Block Memory Cycles — Verifies 2-, 4-, 8-, and 16-word block moves.
- NuBus Buffered Block Writes — Checks buffered block writes by performing 256 8-word buffered block writes to NuBus memory. The test then verifies the data written with unmapped reads.

- NuBus Cache Memory Cycles — Verifies cache hits, cache fill logic on cache misses, and cache write through logic.
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

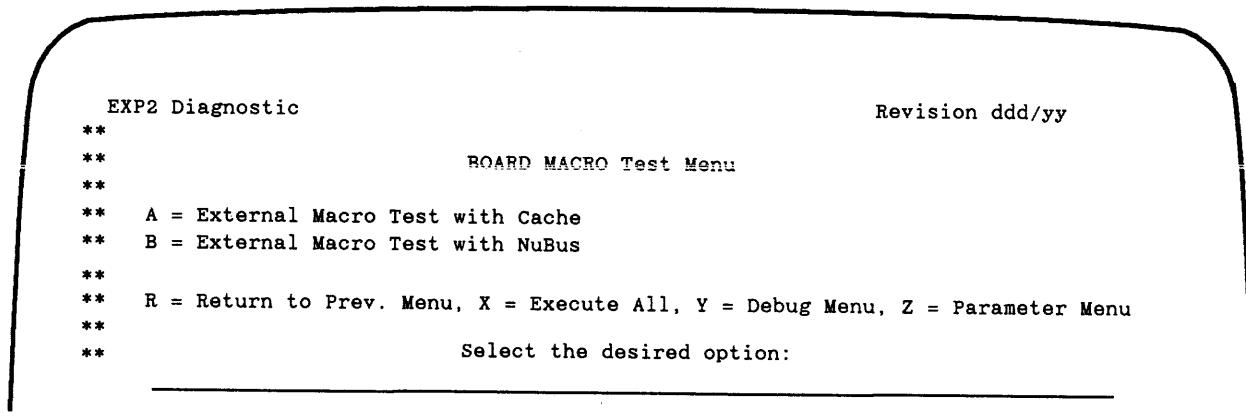
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**BOARD MACRO Tests**

**B.10** The tests on the BOARD MACRO Test Menu (Figure B-10) check the macro instruction interface between the Lisp microprocessor and external memory using cache and NuBus memory.

---

**Figure B-10 BOARD MACRO Test Menu**



The following descriptions briefly explain each test listed on the MACRO INSTRUCTIONS Test Menu:

- External Macro Test with Cache — Tests the Lisp microprocessor and the board macro instruction interface using cache memory as the data source for the following functions:
  - Macro instruction address path to external memory
  - Macro operand address path to external memory
  - Macro instruction data path from external memory
  - Macro instruction chaining
  - Aborts on macro instruction boundaries

- External Macro Test with NuBus — Tests Lisp microprocessor and the board macro instruction interface using NuBus memory as the data source for the following functions (only runs in interface diagnostic mode):
  - Macro instruction address path to external memory
  - Macro operand address path to external memory
  - Macro instruction data path from external memory
  - Macro instruction chaining
  - Aborts on macro instruction boundaries
- Return to Prev. Menu — Displays the Standalone Diagnostics Main Menu.
- Execute All — Executes all the tests listed on this menu.
- Debug Menu — Displays the Debug Menu.
- Parameter Menu — Displays the Operational Parameters Menu.

### **Execute External Memory Tests**

**B.11** The **Execute External Memory Tests** entry allows you to verify that all NuBus memory in the system is good or, if failures occur, to pinpoint the failing component.

The tests prompt you for information one line at a time and display the default value for the prompt along with a field to enter a new value. Press the RETURN key to accept the default value, or enter a new value and then press the RETURN key. Figure B-11 shows the prompts and sample output of the **Execute External Memory Tests** entry when the default values are specified and the tests complete execution.

Figure B-11 Execute External Memory Tests

```
EXP2 Diagnostic Revision ddd/yy
**
** EXTERNAL MEMORY TEST
**
** (00000004) Slot number of board under test : 00000004
** (Y) Address memory via Base Register? Y/N : Y
** (00000000) Beginning Base Register address offset : 00000000
** (00200000) Size in bytes of memory under test : 00200000
** (FFFFFFFF) Beginning test pattern : FFFFFFFF
** (00000002) Number of test patterns per location : 00000002
** (01111111) Test mode enables (x,DATA,ADR,CELL,BYTE,HFWD,BLOCK,RETN) : 01111111
** (00001111) Block mode enables (x,x,x,x,16wd,8wd,4wd,2wd) : 00001111
** (00000011) Retension test mode (x,x,x,x,x,UNMAPPED,BLOCKED) : 00000011
**
**
** Any changes needed? Y/N : N
**
** DATA PATH TEST Executing...
** ADDRESS TEST Executing...
** BIT CELL TEST Executing...
** BYTE MODE TRANSFER TEST Executing...
** HALF WORD TRANSFER TEST Executing...
** BLOCK TRANSFER TEST Executing...
** UNMAPPED RETENTION TEST Executing...
** BLOCK RETENTION TEST Executing...
```

# GLOSSARY

---

## d

|                   |                                                                                      |
|-------------------|--------------------------------------------------------------------------------------|
| <b>device</b>     | A disk drive or tape drive.                                                          |
| <b>diagnostic</b> | A group of programs (tests) that test the operation of an entire board or subsystem. |

---

## g

|                                                   |                                                                                                                                                                                                                                                                                                                               |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Diagnostic Operating System (GDOS)</b> | A control program that furnishes the means for running the loadable diagnostics, including the menus, online help information, and processing of errors found by the diagnostics. GDOS also provides utilities for formatting disks, transferring the contents of a tape to a disk, and printing the online help information. |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

## i

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>information message window</b>     | The bottom portion of the video display, which displays help information, error messages, and prompts when running GDOS.                                                                                                                                                                                                                                                                                                                |
| <b>interactive diagnostic program</b> | A diagnostic program that requires user input during execution. The interactive diagnostic program usually provides one or more prompts that tell you what actions to perform to complete or continue running the diagnostic. Such actions include pressing the RETURN or ENTER key, moving the mouse, pressing a mouse key, or removing a tape cartridge from the tape drive. Contrast with <i>noninteractive diagnostic program</i> . |

---

## l

|                                 |                                                                                                                                                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>loadable diagnostic test</b> | A diagnostic test that is stored on an external mass storage device, usually a disk drive, and provides extensive hardware testing and error reporting. To run a loadable diagnostic, you must load it into memory from the mass storage device. |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

---

## m

|                    |                                                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>menu window</b> | The top portion of the video display, which displays the menu title and all of the entries in the menu when you are running GDOS. |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|

**N**

|                                       |                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>noninteractive diagnostic test</b> | A diagnostic test that does not require user input during execution. To run a noninteractive diagnostic test, you press ENTER to start the diagnostic. No further input is required. Contrast with <i>interactive diagnostic test</i> . |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**O**

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>online help information</b> | Descriptions of each menu entry and diagnostic test. The online help information describes test functions and provides instructions on how to run the tests and utilities. In GDOS and the loadable diagnostics, you access the help information by pressing the HELP key or by printing the information using the GDOS Print Online Manual utility. In the standalone diagnostics programs, you can access help only by printing the information using the GDOS Print Online Manual utility. For Explorer II systems, there is no standalone diagnostics help information. |
| <b>operational parameters</b>  | Options that allow you to change the way GDOS handles the output from a diagnostic program. When you change an operational parameter, it affects all of the diagnostic tests in the program.                                                                                                                                                                                                                                                                                                                                                                                |

**S**

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>selected</b>                       | Boards or devices chosen for testing. When you load a diagnostic program, all of the associated boards and devices are automatically chosen (selected) for testing. For example, if you load the communications carrier board (CCB) diagnostic program and two CCBs are installed on the system, both are automatically selected for testing. No devices are selected because no devices are directly associated with the CCB.<br><br>Use the appropriate menu entries in the main menu for the diagnostic program to isolate specific boards for testing. |
| <b>self-test</b>                      | A diagnostic test that is stored in the read-only memory (ROM) hardware on the board that it tests. Usually, a self-test provides less comprehensive testing and error reporting than a loadable diagnostic.                                                                                                                                                                                                                                                                                                                                               |
| <b>standalone diagnostics program</b> | A loadable diagnostic program that cannot be run under the general diagnostic operating system (GDOS). Standalone diagnostics programs must be loaded separately from the loadable diagnostics under GDOS.                                                                                                                                                                                                                                                                                                                                                 |

**t**

|                                  |                                                                                                                                                                                                                                           |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>test</b>                      | A program or a segment of a program that checks the operation of part of a hardware board or subsystem. Same as diagnostic tests.                                                                                                         |
| <b>test execution parameters</b> | Options that allow you to change the way a test or group of tests run. Test execution parameters affect only one diagnostic program or one test in a diagnostic program.                                                                  |
| <b>test zone (TZON)</b>          | A partition on the disk that is reserved for diagnostic testing. TZON contains a read-only portion and a read-and-write portion. The read-only portion contains a set of test patterns that the Disk Diagnostics use to test disk access. |
| <b>title block</b>               | The top three or four lines on any menu that display the title of the menu.                                                                                                                                                               |

---

**v**

|                    |                                                                                                                                              |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>video sense</b> | The state of the video display — either normal (black characters on a white background) or reverse (white characters on a black background). |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------|



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Do you use other TI manuals? If so, which one(s)?

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---

---

How would you rate the quality of our manuals?

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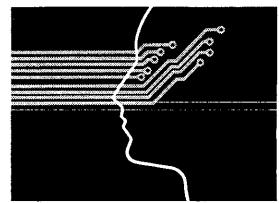


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2533554-0001 \*F



**EXPLORER™ DIAGNOSTICS  
RELEASE AND INSTALLATION INFORMATION  
RELEASE 1.5.0**



2549846-0001 \*B

# **MANUAL REVISION HISTORY**

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Document Revision History  
for the **Explorer™ Diagnostics Release and Installation Information (2549846-0001)**

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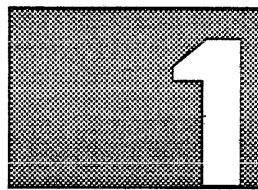
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## INTRODUCTION

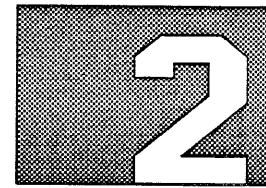
A bootable tape version of the diagnostic package is provided to allow you to recover from any losses that may occur to the diagnostic software on disk and to serve as an update mechanism for future releases.

The diagnostics shipped as GDOS version 1.5.0 contains the following partitions on each disk.

- Two GDOS partitions both with the same name, one for Explorer I and the other for Explorer II.
  - GDOS — The Explorer I GDOS partition is a diagnostic microload partition containing Explorer I object code that can be loaded into processor memory by the user. This GDOS for Explorer I uses 300 blocks and is of user type code 0000.
  - GDOS — The Explorer II GDOS partition is a diagnostic microload partition containing Explorer II object code that can be loaded into processor memory by the user. This GDOS for Explorer II uses 300 blocks and is of user type code 0005.
- DIAG — The DIAG partition is a file system partition containing the files and directories used by GDOS and by the diagnostics. DIAG is of user type code FC02. DIAG uses 2048 blocks.
- EXPT — The EXPT partition is a standalone diagnostic microload partition containing the object code for the Explorer I Processor Board diagnostic. EXPT uses 150 blocks.
- EXP2 — The EXP2 partition is a standalone diagnostic microload partition containing the object code for the Explorer II Processor Board diagnostic. EXP2 uses 200 blocks.

For more information about the diagnostics, refer to the following manuals:

- *Explorer Diagnostics*, TI part number 2533554-0001, contains an overview of the diagnostic programs and instructions on how to load and run GDOS and the diagnostics.
- The *Explorer Online Manual* is available online while you run the diagnostics. It provides detailed information about the diagnostics. For more information about the online manual, refer to the *Explorer Diagnostics* manual.



## DIAGNOSTICS AND UTILITIES

The GDOS diagnostics and utilities in Release 1.5.0 are listed below.

### ■ LOADABLE DIAGNOSTICS

- Disk diagnostic
- Tape diagnostic
- Color System Interface Board diagnostic
- System Interface Board diagnostic
- NuBus™ Ethernet® Controller diagnostic
- Keyboard Monitor/Mouse diagnostic

### STANDALONE DIAGNOSTIC

- EXPT Processor Board standalone diagnostic
- EXP2 Processor Board standalone diagnostic

### UTILITIES

- GDOS Backup/Restore, Edit/Display Utility
  - Display or Edit Partition Table
  - Restore Partitions
  - Verify Partitions
  - Make Bootable (Labelled) Tape
  - Print Online Manual Utility
- Loadable Disk Media Utility
  - Format/Verify
  - Disk Surface Analysis

The GDOS release 1.5.0 software also supports the following features in conjunction with the diagnostics and utilities:

- Online advanced user's manual with print capability

NuBus is a trademark of Texas Instruments Incorporated.  
Ethernet is a registered trademark of Xerox Corporation.

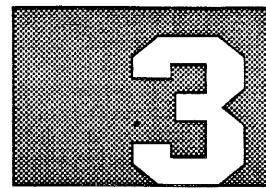
- Online help messages for all menu entries

Changes and modifications included in the GDOS release 1.5.0 are as follows:

- Modification to the EXP2 BOARD MACRO test
- Removal of the EXP2 FLOATING POINT BOARD Test Menu entry from the Main Menu
- Removal of the MANDLEBROT Demonstration Menu entry from the Utilities Menu

New features included in the GDOS release 1.5.0 are as follows:

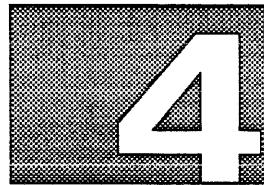
- GDOS support of the CSI Graphics Monitor as the boot terminal
- Addition of the CSITST GDOS loadable diagnostic to test the Color System Interface board
- Display of Physical Defect Address when a block is reassigned
- Addition of the Adaptive Surface Analysis test, which examines defect data distribution with respect to the head address and tests the heads that have more than a normal number of defects



## FEATURES NOT IN THIS RELEASE

The following features are not available in this release of the diagnostics, but will be incorporated in future releases.

- Multi processor NuBus test — This allows GDOS to be loaded on more than one processor (according to the configuration band used), and will show in its menu an entry for the NuBus diagnostic. This entry will be shown only if GDOS is loaded with a configuration band that indicates multiprocessor boot. Since the Explorer system does support multiprocessor operation, there is no configuration band that allows GDOS to be loaded in the multiprocessor mode, even though this capability exists in the GDOS software.



## SPECIAL NOTES

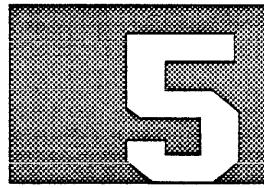
Please observe the following notes and cautions about GDOS.

- Four partitions are required to run diagnostics under GDOS : GDOS, DIAG, TZON, and FMT. Check the partitions for correct size: GDOS - 300 BLKS; DIAG - 2048 BLKS; TZON - Number of blocks in one cylinder plus two; FMT - 9 BLKS. TZON and FMT are used by the disk diagnostic. GDOS and DIAG can be restored from the diagnostic bootable tape and TZON can be copied from another disk. FMT contains a map of the defects on the disk and should only be generated using the format/verify utility.
- TZON — The test zone partition consists of two 1K byte blocks containing fixed data patterns and two 1K byte blocks of read only memory. The remaining blocks in the TZON are reserved area used in diagnostics testing.
- FMT — The format partition contains parameters for format and surface analysis and a map of defects on the disk. FMT uses 9 blocks.
- EXPT — The EXPT partition contains the Explorer processor board standalone diagnostic, which is loaded and run separately from GDOS. EXPT uses 150 blocks.
- EXP2 — The EXP2 partition contains the Explorer processor board standalone diagnostic, which is loaded and run separately from GDOS. EXP2 uses 200 blocks.
- DIAG — The DIAG partition contains the GDOS file system. This file system is a TI System V compatible band and the user type has been changed to FC02 to reflect this fact.
- If you modify the disk label, you must restore the modified partitions before running diagnostics. Editing the disk label only modifies pointers; you must still restore the partitions so the pointers point to the new code.
- If loading GDOS from tape, it should be noted that selftests of the system boards and disk drives complete before the tape drive has completed retensioning of the tape. As a result, when the prompt appears that requires the user to press "g" ( to load GDOS ) the tape drive is not listed as an available load device. You should wait at this point until the tape has completed its initialization, then press the ESC key to exit to the point where once again "g" is pressed. This time the tape will be listed as an available load device.
- To install a printer to an Explorer system for use under GDOS, refer to the *Introduction to the Explorer System* manual, TI part number 2243109-0001. GDOS supports printers in the parallel mode.

- In the Disk diagnostic, the following should be noted:
  - Downloaded controller firmware is replaced with the ROM resident controller firmware if the command to reset the interface is invoked by the user during execution of the disk diagnostic. Caution should be exercised to insure that the proper firmware is restored before resuming system operation.
  - The errors listed here do not necessarily indicate hardware problems:
    - DXE4022 occurs if the TZON has incorrect data — the correct data is a fixed data pattern in the first two blocks of the TZON.
    - DXE4024 occurs if the TZON is not found in the disk partition table.
    - DXE4028 occurs if the disk label is not found on block 0 of the disk drive under test.
    - Errors DXE4022, DXE4024, and DXE4028 (listed above) can be caused by a hardware fault, but it is much more likely that the software structures referenced in the individual error descriptions are corrupted or missing.
  - The errors listed below require interpretation of status information that is displayed with the error. Refer to the *Explorer NuBus Peripheral Interface General Description* manual, TI part number 2243146-0001, for detailed interpretation of the NUPI status information.
    - DXE4001 – User must interpret the NUPI status information listed.
    - DXE4031 – User must interpret the “Status returned:” information.
  - Device and formatter retries and ECC capabilities are NOT disabled. A menu entry is available in the “Utility Verbs” menu to disable retries and ECC.
- In the Tape diagnostic, the following should be noted:
  - Errors may be caused in Tape Test 5 by issuing write commands when the tape is improperly positioned for write operations. Accepting the default to rewind the tape will prevent such an error in Test 5.
  - Downloaded controller firmware is replaced with the ROM resident controller firmware if the command to reset the interface is invoked by the user during execution of the tape diagnostic. Caution should be exercised to insure that the proper firmware is restored before resuming system operation.
  - Many errors reported during execution of this test may be caused by the tape cartridge installed during the test. Unless indicated otherwise, a test giving errors should be attempted with more than one tape cartridge, to see if the error can be duplicated.
  - The user should become familiar with the status information reported in the error messages, and use that information to determine the source of the problem(s).

- XTC4033 – This error indicates that there may be marginally recoverable data on the tape cartridge under test. The user should determine if there is any need to try to salvage the data on the cartridge, before proceeding with testing. If this error persists with different cartridges, there is a hardware problem in the tape/NUPI system.
- XTC4031 in Test 3, with the second word in the “Status Returned:” information block equal to 60xx85xx. The device status 85 indicates volume overflow condition and is not a hardware problem in this test.
- Device and formatter retries and ECC capabilities are NOT disabled.
- During execution of test 2, the tape test may display an unexpected status error. If the “Status received” is equal to C8, a correctable retry is indicated. Because tape media is expected to have some number of defects, retries do not always indicate a hardware problem. At the end of tape Test 3, a summary of the number of bytes written to tape, the number of write retries, and the number of read retries are displayed. The number of write retries must be no greater than 16. The number of read retries must be no greater than 5 for a 600 ft tape, no greater than 4 for a 450 ft tape, and no greater than 1 for a 150 ft tape. If the number of retries in Test 3 does not exceed these limits, then occurrences of C8 status do not indicate a problem.
- You cannot boot from tape and run tape diagnostics.
- In the Format/Verify/Surface Analysis Utility, the following should be noted:
  - Downloaded controller firmware is replaced with the ROM resident controller firmware, if the command to reset the interface is invoked by the user during execution of the Format/Verify Surface Analysis utility. Caution should be exercised to ensure that the proper firmware is restored before resuming system operation.
  - Device error 83 – Invalid parameter error on the Format and Verify command can be caused by the presence of a defect data element with an address of Head 0, Cylinder 0, Bytes from Index 0. Such incorrect defect data is a result of an incorrectly created FMT partition, during the previous format operation. This problem only exists on the Maxtor/Adaptec disk system (MSU I). This defect data item may be deleted from the memory resident defect list by using the Modify Defect List command in the Format/Verify Menu. Use the Display Defect List command to refresh the Defect Data display. If Defect Data Entry number 1 contains the address of 0 0 0, as described above, enter a 1 in menu entry number 3, the Line labeled Entry Number. Move the cursor to the menu line labeled Modify Defect Data. Use the TAB key to select Delete. Pressing return will cause the defect data element whose number is in the Entry Number line to be deleted, and the defect list to be renumbered. The disk may now be formatted.

- The surface analysis utility does not change the first cylinder of the disk. Since the volume label, partition table and format table reside on this cylinder, they are unaffected by the surface analysis. This means that if you display the partition table on a disk immediately after the surface analysis, it will appear as if nothing has happened. This will, in effect, preserve the structure of your disk. The contents of the rest of the partitions will have been destroyed, so you must restore them before you can reboot the system.



## INSTALLATION INSTRUCTIONS

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### Using the Utilities 5.1

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**CAUTION:** Formatting the disk will erase all data on the disk. In addition, editing or otherwise modifying the disk label/partition table can introduce unpredictable errors including severe boot problems and other operational difficulties.

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Your Explorer is shipped with formatted disks. GDOS and the LISP software usually have been installed. However, you may need to format or reformat a new disk or a damaged disk at some point and install the GDOS software on it. The following procedures describe how to use the Disk Surface Analysis, Format/Verify utility to format a disk; and how to use the Backup/Restore and Edit Label utility to make a bootable tape, restore a bootable tape to disk, verify a restore operation, display a tape or disk partition, and edit a disk partition.

---

#### Disk Format/ Verify Utility

**5.1.1** The Disk Format/Verify utility allows you to format and verify a disk, or to verify only. The Format/Verify procedure below is described as if you were performing a system startup using the bootable GDOS tape.

An interactive feature of this utility displays the list of disk defects and allows you to edit the list before formatting. This defect list is stored in several locations. For Maxtor/Adaptec (MSU I) the order of preference for defect lists is the FMT (format) partition, and the Vendor defect list on the maximum cylinder. For other disk devices (MSU II, MSC SMD disks) the order of preference is the combination of Vendor and Grown defect lists (V+G), Vendor defect list, Grown defect list, or FMT partition. After formatting is complete, the utility creates the FMT partition for future format operations. The FMT partition reflects the defect data that the unit is currently formatted with.

Use the following procedure to perform the Disk Format/Verify operation:

1. Insert the tape into a tape drive on the system.
2. Boot or reboot the system:
  - a. If the system is off, turn it on. This automatically boots the system.

- b. If the system is already on, you can reboot the system by cycling power (turning the main power switch off, then on again). As the system self-tests run, messages indicating the test results scroll on to the video display. When the self-tests are complete, the system displays specific slot number and device information, depending on system configuration.

Slot 6 TESTING SYSTEM :

Slot 2 Passed  
Slot 5 Passed  
Slot 6 Passed

D=Default load, M=Menu load, R=Retest, E=Extended tests :

Make a note of the slot number for the controller board (in the example above, it is the NUPI board in slot number 2) so you can type it in at Step 8.

3. Type "g" to boot GDOS. The system displays a list of available load devices along with the slot number of the disk controller and each logical unit number. Make a note of this information so that you can type it in at Step 8. Each available load device is also identified by an associated letter. An asterisk indicates the default load device:

\* A = Slot 2 disk 00  
B = Slot 2 tape 06

Select Load device:

4. Select the disk with GDOS on it by pressing the corresponding letter. Otherwise, choose the tape drive the bootable tape is in by pressing its corresponding letter.
5. After GDOS is booted (from tape, GDOS takes approximately 3 minutes to boot), the GDOS Top-Level Menu is displayed. The cursor will be on the first item in this menu — "Loop on All Noninteractive Diagnostics". Use the Down Arrow key to place the cursor on the third item — "Enter Menu for Extended-Interactive Diagnostic Mode" — and press the RETURN key.
6. When the "Extended-Interactive Diagnostic Mode Menu" appears, the cursor will be on the first menu item — "Load a Diagnostic by Menu or Name and Show Its Main Menu." Select this item by pressing the RETURN key. The GDOS Diagnostic Load Menu is displayed. It contains a list of the diagnostics that are available for your system, as well as the Disk Surface Analysis, Format/Verify Utility.

The sample list below may differ from what appears on your VDT, depending on your particular system configuration:

GDOS  
Diagnostic Load Menu

|                                                          |                                             |           |
|----------------------------------------------------------|---------------------------------------------|-----------|
| 1                                                        | Disk Diagnostic ----->                      | Execute   |
| 2                                                        | System Interface Board Diagnostic . . . . . | Execute   |
| 3                                                        | . . . . .                                   | . . . . . |
| 4                                                        | . . . . .                                   | . . . . . |
| 10 Disk Surface Analysis, Format/Verify Utility. Execute |                                             |           |

7. Move the cursor to the "Disk Surface Analysis, Format/Verify Utility" option and press RETURN to load the utility. When the Disk Surface Analysis, Format/Verify utility has been loaded, the Disk Media Utilities menu is displayed. It contains the following entries:

## Disk Media Utilities Main Menu

```
1 Enter Format/Verify Utility -----> Expand
2 Enter Surface Analysis Utility - DATA DESTRUCTIVE Short
3 Reset the Interface Execute
4 Enter Menu to Display, Set Test Execution Params. Execute
5 Return to G DOS
```

The cursor will be on the first entry — “Enter Format/Verify Utility.” Press RETURN to expand this menu entry. The expanded entry contains the following items:

8. Place the cursor on the appropriate subentries and enter the correct slot ID number and logical unit number of the disk you wish to format. Press RETURN. Before the Format/Verify menu is entered, the utility performs routines designed to identify the controller type and the disk type and to acquire the correct disk defect data for the format operation.

9. The first routine checks the logical unit to identify the controller type:

- a. If identification of the controller type is successful, the utility then attempts to identify the disk type. (See step 10)
  - b. If identification of the controller type is unsuccessful, the utility displays the Select Disk Controller Type menu shown below:

### Select Disk Controller Type

1 Select SCSI Formatter Type and Press RETURN ----> Adaptec  
2 Select SMD Disk Type and Press RETURN . . . . . WD900

In this menu, use the TAB key to Toggle (select) either the Adaptec or TI-ESDI option from menu entry 1 and press RETURN, or select the WD900 option in menu entry 2 and press RETURN.

10. The second identification routine checks the disk type:

- a. If identification of the disk type is successful, the utility loads the appropriate disk format parameters.

If the disk format parameters are loaded successfully, the utility displays a prompt asking if you wish to enter the Format Parameters Menu to edit existing disk parameters. The default for this option is NO. Pressing RETURN accepts the default. If you wish to display the Format Parameters menu, type Y (yes) and press RETURN.

- b. If identification of the disk type is unsuccessful, the utility automatically displays the Format Parameters Menu, which enables you to modify existing disk parameters or to change the disk defect list source.

## Format Parameters Menu

|    |                                              |          |
|----|----------------------------------------------|----------|
| 1  | Defect List Source . . . . .                 | FMT      |
| 2  | Number of Cylinders ----->                   | 1884 dec |
| 3  | Number of Heads . . . . .                    | 16 dec   |
| 4  | Sectors per Track . . . . .                  | 95 dec   |
| 5  | Data Bytes per physical Sector . . . . .     | 512 dec  |
| 6  | Alternate Sectors per Defect Handling Zone . | 13 dec   |
| 7  | Interleave Factors . . . . .                 | 1 dec    |
| 8  | Track Skew Factor . . . . .                  | 2 dec    |
| 9  | Cylinder Skew Factor . . . . .               | 28 dec   |
| 10 | Drive Type Field . . . . .                   | 40 hex   |
| 11 | Medium Type . . . . .                        | 0 hex    |
| 12 | Density Code . . . . .                       | 0 hex    |
| 13 | Read Clock Sync Delay . . . . .              | 224 dec  |
| 14 | Gap 1 Delay . . . . .                        | 227 dec  |
| 15 | Gap 1 Count . . . . .                        | 18 dec   |
| 16 | Preamble Count . . . . .                     | 12 dec   |
| 17 | Enhanced SMD Flag Code . . . . .             | 2 dec    |
| 18 | Unformatted Bits per Sector . . . . .        | 4734 dec |
| 19 | Number of Primary Map Tracks . . . . .       | 3 dec    |
| 20 | Beginning Head Address of Primary Track . .  | 1 dec    |

11. Modify the appropriate entries in the Format Parameters menu (refer to the online help messages for detailed information about each item in the Format Parameters menu), and press RETURN to execute.

The utility now attempts to fetch the disk defect data list.

- If the disk defect data is loaded without error, the Format/Verify Utility menu is displayed (see Format/Verify Utility menu below).
- If errors occur when the utility attempts to load the disk defect data list, an error message is displayed and you must enter the Format Parameters menu to select an alternate disk defect data list source.

Press the ABORT key (or the abort key sequence) and reenter the utility. The utility returns you to the prompt that asks if you wish to enter the Format Parameters menu, or the utility returns you to the Format Parameters menu if it was displayed in a previous step. Select an alternate defect data list and press RETURN. If the disk defect data is now loaded without error, the Format/Verify Utility menu is displayed:

## Format/Verify Utility Menu

|    |                                                 |          |
|----|-------------------------------------------------|----------|
| 1  | Scroll Defect Window Up or Down ----->          | Down     |
| 2  | Modify Defect List (Add, Delete, Read, Replace) | Add      |
| 3  | Entry Number . . . . .                          | 1 dec    |
| 4  | Cylinder Address . . . . .                      | 63 dec   |
| 5  | Head Address . . . . .                          | 3 dec    |
| 6  | Bytes From Index . . . . .                      | 8496 dec |
| 7  | Format and Verify the Disk . . . . .            | Execute  |
| 8  | Verify the Disk . . . . .                       | Execute  |
| 9  | Reassign Verify Defects . . . . .               | Execute  |
| 10 | Reassign Defective Block - Enter Address . .    | 0 dec    |
| 11 | Display Disk Defect List . . . . .              | Execute  |
| 12 | Display Trace - Enter Number to Display . .     | 0 dec    |
| 13 | Write Disk Label . . . . .                      | Execute  |
| 14 | Adaptive Surface Analysis - Head Limit Bias .   | 20 dec   |
| 15 | Adaptive Surface Analysis - Loop Count . . .    | 50 dec   |

12. Place the cursor on entry number 7 — "Format and Verify the Disk" — and press RETURN.

When the format operation executes, the following occurs:

- a. The entire disk is formatted then verified to ensure that all bad tracks are reallocated.
- b. If the verify operation passes, the utility displays a completion message and returns control to the Format/Verify Utility menu.
- c. If the verify operation fails, the utility updates the defect list and displays a prompt that allows you two choices:
  - Format and verify again, reallocating the new defects during the format operation. Several repetitions of this process may be required, especially if there is no original defect data. This is likely to occur on WD900 conversions.
  - Stop the utility.

## Making a Bootable Tape With GDOS

**5.2 The Make Bootable (Labelled) Tape Utility** enables you to make a bootable tape and copy partitions from the disk to the tape. Use the following procedure to perform this operation (the procedure described below assumes that GDOS has already been booted and the Top-Level GDOS menu is displayed):

1. Insert the tape into a tape drive on the system. In the GDOS Top-Level Menu, move the cursor to the third menu item — “Enter Menu for Extended-Interactive Diagnostic Mode” — and press the RETURN key.
2. When the “Extended-Interactive Diagnostic Mode Menu” appears, move the cursor to item number 8 — “Enter Backup/Restore and Edit Label Utility Menu” — and press RETURN. The Backup/Restore and Edit Label Utility Main menu is displayed.

### Backup/Restore and Edit Label Utility

|   |                                                      |        |
|---|------------------------------------------------------|--------|
| 1 | Display/Edit Disk Label or Display Tape Label -----> | Expand |
| 2 | Make Bootable (Labelled) Tape . . . . .              | Expand |
| 3 | Verify Partition(s) . . . . .                        | Expand |
| 4 | Restore Bootable (Labelled) Tape . . . . .           | Expand |

3. When this menu is displayed, the cursor will be on the first menu entry — “Display/Edit Disk Label or Display Tape Label.” Place the cursor on the “Expand” option of the “Make Bootable (Labelled) Tape” menu. (For detailed information about any of the menu entries in the Backup/Restore and Edit Label Utility, refer to the online help information.) Press the RETURN key. The following subentries appear under the expanded Make Bootable (Labelled) Tape menu:

|   |                                                      |         |
|---|------------------------------------------------------|---------|
| 2 | Make Bootable (Labelled) Tape ----->                 | Execute |
|   | Tape Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Tape Logical Unit Number (0-F hexadecimal) . . . . . | 6 hex   |
|   | Disk Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Disk Logical Unit Number (0-F hexadecimal) . . . . . | 6 hex   |

4. Place the cursor on the appropriate subentries and enter the correct slot numbers and logical unit numbers as requested. Press the RETURN key. The following menu is displayed:

Make Bootable (Labelled) Tape

1 Select Entry Number of Partition to Include ----> 2 dec  
2 Make Bootable (Labelled) Tape . . . . . Execute

5. When you enter this menu, the utility program displays a listing of each disk partition showing its number, name, starting block address, block length, user type, and comment field.

For each partition you wish to back up (copy) to tape, type its partition number on entry 1 and press RETURN. The utility adds each partition number in turn to a backup list, which it updates and displays each time you add a new number. Continue by typing in the corresponding entry number and pressing RETURN for each partition you wish to copy to the bootable tape.

When you have entered all desired partition entry numbers, place the cursor on the second menu entry — "Make Bootable (Labelled) Tape" — and press RETURN. The utility copies the partitions whose entry numbers you specified onto the tape.

---

**Restoring a  
Bootable Tape  
With GDOS**

**5.3** The Restore Tape to Disk utility enables you to restore the contents of a bootable tape to a disk. Use the following procedure to restore partitions from a bootable tape (the procedure assumes you will boot GDOS from tape):

---

**NOTE:** If you are upgrading an existing DIAG partition, you must change the user type code from 0000 to FC02. See paragraph 5.5 for instructions.

---

1. Insert the tape into a tape drive on the system.
2. Boot or reboot the system:
  - a. If the system is off, turn it on. This automatically boots the system.
  - b. If the system is already on, you can reboot the system by cycling power (turning the main power switch off, then on again). As the system self-tests run, messages indicating the test results scroll on to the video display. When the self-tests are complete, the system displays specific slot number and device information similar to the following, depending on system configuration.

Slot 6 TESTING SYSTEM :

Slot 2 Passed  
Slot 5 Passed  
Slot 6 Passed

D=Default load, M=Menu load, R=Retest, E=Extended tests :

Make a note of the slot number for the controller board (in the example above, it is slot number 2) so you can type it in at Step 8.

3. Type "g" to boot GDOS. The system displays a list of available load devices along with the slot number of the disk controller and each logical unit number. Make a note of this information so that you can type it in at Step 7. Each available load device is also identified by an associated letter. An asterisk indicates the default load device:

\* A = Slot 2 disk 00  
 B = Slot 2 tape 06

Select Load device:

4. Type the letter that corresponds to the load device containing the bootable GDOS tape.
5. After GDOS is booted (from tape, GDOS takes approximately 3 minutes to boot), the GDOS Top-Level Menu is displayed. The cursor will be on first item in this menu — "Loop on All Noninteractive Diagnostics". Use the Down Arrow key to place the cursor on the third item — "Enter Menu for Extended-Interactive Diagnostic Mode" — and press the RETURN key.
6. When the "Extended-Interactive Diagnostic Mode Menu" appears, move the cursor to item number 8 — "Enter Backup/Restore and Edit Label Utility Menu" — and press RETURN. The Backup/Restore and Edit Label Utility Main menu is displayed.

**Backup/Restore and Edit Label Utility**

|   |                                                      |        |
|---|------------------------------------------------------|--------|
| 1 | Display/Edit Disk Label or Display Tape Label -----> | Expand |
| 2 | Make Bootable (Labelled) Tape . . . . .              | Expand |
| 3 | Verify Partition(s) . . . . .                        | Expand |
| 4 | Restore Bootable (Labelled) Tape . . . . .           | Expand |

7. When this menu is displayed, the cursor will be on the first menu entry — "Display/Edit Disk Label or Display Tape Label." Place the cursor on the "Expand" option of the "Restore Bootable (Labelled) Tape" menu entry. (For detailed information about any of the menu entries in the Backup/Restore and Edit Label Utility, refer to the online help information.) Press the RETURN key. The following subentries appear under the expanded Restore Bootable (Labelled) Tape menu:
 

|   |                                                      |         |
|---|------------------------------------------------------|---------|
| 4 | Restore Bootable (Labelled) Tape ----->              | Execute |
|   | Tape Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Tape Logical Unit Number (0-F hexadecimal) . . . . . | 6 hex   |
|   | Disk Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
|   | Disk Logical Unit Number (0-F hexadecimal) . . . . . | 0 hex   |
|   | Selectively Restore Partitions? . . . . .            | Yes     |
8. Place the cursor on the appropriate subentries and enter the correct slot numbers and logical unit numbers as requested. Use the TAB key or the left and right arrow keys to toggle a Yes or No response to the "Selectively Restore Partitions?" option, then press the RETURN key.
  - a. If you selected Yes for the "Selectively Restore Partitions?" option, prompts will appear during the operation of this utility asking if you wish to restore the specific partitions listed on tape; i.e. GDOS partition, DIAG partition, and so forth. If you type Y (yes) at each prompt, the utility restores the specific partition on disk.

If the utility finds a partition on disk that has the same name, user type, and size, the following prompt is displayed asking if you wish to restore over it:

Partition <partitionname> of type xxxx already exists

Do you want to restore over it? (Press y or n and RETURN)

If you type Y, the partition on tape is restored over the existing partition on the disk. If you type N, the partition on tape is restored to free space on the disk if there is room. You will then have two partitions with the same name on disk.

- b. If you selected No for the "Selectively Restore Partitions?" option, the Restore utility automatically restores all partitions to free space on the disk, if there is room.

After the partitions have been restored, the utility automatically updates the partition table, if appropriate, and prompts you for the necessary data if you wish to add a page partition.

---

**NOTE:** If you are performing the Restore procedure on a newly formatted disk, responding with No to the "Selectively Restore Partitions?" menu entry restores the entire tape to the disk in the same order that the partitions reside on the tape.

---

9. When the Restore operation is complete, the system prompts with the following message:

Tape and disk utility successfully completed

---

#### **Verify Tape Partition(s) Utility**

**5.4** The Verify Tape Partition(s) utility enables you to verify or compare a selected partition on tape with a partition on disk, or to verify all partitions. The procedure described below assumes that GDOS has been booted and that the Top-Level GDOS menu is displayed.

Use the following procedure to verify partition(s):

1. Insert the tape containing the partitions you wish to verify against disk partitions. In the GDOS Top-Level menu, move the cursor to the third menu item — "Enter Menu for Extended-Interactive Diagnostic Mode — and press the RETURN key.
2. When the Extended-Interactive Diagnostic Mode menu appears, move the cursor to menu entry number 8 — "Enter Backup/Restore and Edit Label Utility" — and press the RETURN key. The Backup/Restore and Edit Label Utility main menu is displayed.

#### **Backup/Restore and Edit Label Utility**

- |                                                       |        |
|-------------------------------------------------------|--------|
| 1 Display/Edit Disk Label or Display Tape Label ----> | Expand |
| 2 Make Bootable (Labelled) Tape . . . . .             | Expand |
| 3 Verify Partition(s) . . . . .                       | Expand |
| 4 Restore Bootable (Labelled) Tape . . . . .          | Expand |

3. When this menu is displayed, the cursor will be on the first menu entry — “Display/Edit Disk Label or Display Tape Label.” Place the cursor on the third entry — “Verify Partition(s)” — and press RETURN to expand the menu entry. (For detailed information about any of the menu entries in the Backup/Restore and Edit Label utility, refer to the online help information.) The following subentries appear under the expanded Verify Partition(s) menu:

|                                                      |         |
|------------------------------------------------------|---------|
| 3 Verify Partition(s) . . . . .                      | Execute |
| Tape Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
| Tape Logical Unit Number (0-F hexadecimal) . . . . . | 2 hex   |
| Disk Slot Number (0-F hexadecimal) . . . . .         | 2 hex   |
| Disk Logical Unit Number (0-F hexadecimal) . . . . . | 2 hex   |
| Verify All Tape Partitions? . . . . .                | Yes     |

4. Place the cursor on the appropriate subentries and enter the correct slot numbers and logical unit numbers, as appropriate, or accept the default numbers. Next, use the TAB key to toggle between the Yes or No responses for the Verify All Tape Partitions option. Press RETURN. A numbered listing of the tape and disk partitions is displayed.
- a. If you select the “Yes” parameter for the Verify All Tape Partitions entry, the utility checks all partition names, lengths, attributes, and partition comment fields when making its selection for the partitions to compare. The starting address block will not be compared.
- Press RETURN to execute. The utility lists any partitions that cannot be correctly verified.
- b. If you select the “No” parameter for the Verify All Tape Partitions entry, the utility displays a numbered listing of all tape and disk partitions and prompts you for the number of the tape partition and the disk partition you wish to verify.
- Press RETURN to execute. The utility displays an error if the partition cannot be correctly verified.

#### **Display/Edit Disk Label or Display Tape Label Utility**

**5.5** This GDOS utility enables you to either display or edit a disk label or to display a tape label (a tape label cannot be edited). Steps 1 through 4 of the procedure below describe how to display either a tape or a disk label; steps 5 through 9 describe how to edit a disk label. It is assumed that GDOS has been booted and that the Top-Level GDOS menu is displayed.

1. In the GDOS Top-Level menu, move the cursor to the third menu item — “Enter Menu for Extended-Interactive Diagnostic Mode” — and press the RETURN key (if you wish to display a tape partition, make sure that a tape has been installed in the tape drive).
2. When the Extended-Interactive Mode menu appears, move the cursor to menu entry number 8 — “Enter Backup/Restore and Edit Label Utility” — and press the RETURN key. The Backup/Restore and Edit Label Utility main menu is displayed.

##### **Backup/Restore and Edit Label Utility**

|                                                       |        |
|-------------------------------------------------------|--------|
| 1 Display/Edit Disk Label or Display Tape Label ----> | Expand |
| 2 Make Bootable (Labelled) Tape . . . . .             | Expand |
| 3 Verify Partition(s) . . . . .                       | Expand |
| 4 Restore Bootable (Labelled) Tape . . . . .          | Expand |

3. When the menu is displayed, the cursor will be on the first menu entry — "Display/Edit Disk Label or Display Tape Label." Press RETURN to expand this menu entry. (For detailed information about any of the menu entries in the Backup/ Restore and Edit Label utility, refer to the online help information.) The following subentries appear under the expanded Display/Edit Disk Label or Display Tape Label menu entry.

|                                                           |         |
|-----------------------------------------------------------|---------|
| 1 Display/Edit Disk Label or Display Tape Label . . . . . | Execute |
| Display/Edit Partition and Label . . . . .                | Display |
| Device Slot Number (0-F hexadecimal) . . . . .            | 2 hex   |
| Device Logical Unit Number (0-F hexadecimal) . . . . .    | 0 hex   |

4. Place the cursor on the first subentry — "Display/Edit Partition and Label" — and use the TAB key to select Display. Next, place the cursor on the other subentries and enter the correct slot number and logical unit number for the tape or disk whose partitions you wish to display.

Press RETURN to execute the utility. A numbered listing of the tape or disk partition table is displayed. It shows each partition name, starting block address, block length, user type, and comment field. After the disk partition table is displayed, the cursor returns to the Display/Edit Disk Label or Display Tape Label menu entry.

---

**NOTE:** To get a printed listing of the partition table, the Select Trace Level to Print option must be set to the AllMsgs parameter in the Operational Parameters menu. This parameter must be set BEFORE you execute the Display/Edit Disk Label or Display Tape Label utility. To set the AllMsgs parameter, press the F4 key to call the Operational Parameters menu. Move the cursor to the Select Trace Level to Print menu entry. Use the TAB key to select the AllMsgs parameter. Now, turn the printer on and Press the F1 key to return to the Backup/Restore and Edit Label Utility menu.

---

5. If you wish to edit a disk label, move the cursor to the subentry — "Display/Edit Partition and Label" — and use the TAB key to select Edit. Next, place the cursor on the other subentries and enter the correct slot number and logical unit number for the disk whose partitions you wish to edit.

Press RETURN to execute the utility. A numbered listing of the disk partition table is displayed and printed. It shows each partition name, starting block address, block length, user type, and comment field, and is similar to the following example (your display will differ depending upon the partitions on your particular disk):

---

**CAUTION:** It is recommended that you obtain a printed record of your editing operation to assist you in tracing errors should any occur. To get a printed listing of your editing operation, you must set the AllMsgs parameter in the Select Trace Level to Print menu entry of the GDOS Change Operational parameters menu. This parameter must be set BEFORE you execute the Display/Edit Disk Label or Display Tape Label utility. To set the AllMsgs parameter, press the F4 key to call the Operational Parameters menu. Move the cursor to the Select Trace Level to Print menu entry. Use the TAB key to select the AllMsgs parameter. Now, turn the printer on and press the F1 key to return to the Backup/Restore and Edit Label Utility menu.

---

```

Sys:, MAX-140,
LABEL version 2, DISK
1024 bytes per block, 256 bytes per sector,
32 sectors per track, 15 heads,
917 cylinders, 917 sectors for defects
Volume comments:
(comment)
15 partitions, 12-longword descriptors:
 Name Start Length User Comments
 1 * LABL v1 0 2 FFFF
 2 * PTBL pt 2 3 FFFF
 3 SAVE sb 5 3 FFFF
 4 FMT fp 8 9 FFFF
 5 TZON tz 17 122 FFFF
 6 BOOT ul 139 148 0000 MENUBOOT 19
 7 GDOS ul 287 300 0000 GDOS 320/86 RELEASE 1.2.0
 8 DIAG fb 587 2048 FCO2 DIAG 320/86 RELEASE 1.2.0
 9 EXPT ul 2635 150 0000 EXPT 320/86 RELEASE 1.2.0
10 * MCR1 ul 2785 154 0000 CONTROL 315
11 * MCR2 ul 2939 154 0000
12 * LOD1 lb 30934 32000 0000 REL2.1 MINPROD
13 LOG lg 35093 25 0000 System Log
14 * FILE fb 35118 30000 0000 LM File System
15 PAGE pb 65118 43658 0000

Enter number of entry to edit:
(NOTE: An entry number of 0 indicates a desire to edit the
actual label information as opposed to the partition table.)
```

- Type the number of the disk partition you wish to edit. (For the example below, assume that partition number 9 — EXPT — is selected.) Press RETURN. The partition edit screen is displayed. It contains a numbered list of the partition parameters that can be edited:

```

1 Partition name EXPT 2 Function type microload, 1
3 Starting Block 2635 4 Length in blocks 150
5 User type 0000
 Partition properties (items 6-13)
6 Expandable ? No 7 Contractable? No
8 Delete protected? No 9 Logical partition? No
10 Copy protected? No 11 Default indicator? No
12 Diagnostic use? No 13 Reserved? Yes
14 Comments EXPT 320/86 RELEASE 1.2.0
15 Create new entry in front of this entry
16 Create new entry after this entry
17 Delete this entry
00 Write partition table to disk
```

Enter number of sub-entry to edit.

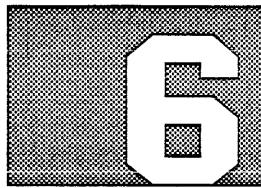
7. Type the number of the subentry you wish to edit as requested by the prompt. For example, if you wish to edit subentry number 4 — Length in blocks — type the number 4 at the Enter number of sub-entry to edit prompt and press RETURN. The utility then displays the following prompt:

Enter the new value (in decimal and RETURN).

8. Type the new value for length in blocks and press RETURN. For example, if you wish to specify 200 blocks, type the decimal value 200. The utility replaces the old value 150 with the new value 200 and redisplays the partition edit screen with the new value.
9. Use the same sequence to specify each parameter you wish to edit. With each selection, the utility prompts you for the new value. When you type the new value and press RETURN, the utility replaces the existing value with the new value you have specified.

If you make a mistake, use the backspace key to delete alphanumeric characters to the left of the cursor. If you discover a mistake after pressing the RETURN key, reselect the subentry and enter the correct value. All new values are stored temporarily in a buffer until you write them to the disk.

- a. To exit without writing any values to the disk, press CTRL-C or the appropriate ABORT key sequence for your computer. The utility returns you to the Backup/Restore and Edit Label Utility menu.
- b. To write all new values to the disk, enter 00 (zero, zero) at the Enter number of sub-entry to edit prompt. The utility writes the new parameters to disk and returns you to the Backup/Restore and Edit Label Utility menu.



## PACKAGE INDEX

This GDOS release includes the following:

For standalone Processor Board diagnostics:

Version: EXPT 309/86  
EXP2 313/87

For GDOS:

|           |        |        |
|-----------|--------|--------|
| Version : | SYS    | 334/87 |
| Version : | DSKEXE | 334/87 |
| Version : | XTCTST | 334/87 |
| Version : | CSI    | 334/87 |
| Version : | SIB    | 334/87 |
| Version : | NEC    | 334/87 |
| Version : | KMM    | 334/87 |
| Version : | DSAUTL | 334/87 |

The above acronyms are described below:

EXPT — Explorer I Processor Board Diagnostics  
EXP2 — Explorer II Processor Board Diagnostics

|        |                                                    |
|--------|----------------------------------------------------|
| SYS    | — General Diagnostic Operating System (GDOS)       |
| DSKEXE | — Disk diagnostic                                  |
| XTCTST | — Tape diagnostic                                  |
| SIB    | — System Interface Diagnostic                      |
| CSI    | — Color System Interface Diagnostic                |
| NEC    | — NuBus Ethernet Controller                        |
| KMM    | — Keyboard Monitor Mouse                           |
| DSAUTL | — Disk Surface Area Utility (Disk Media Utilities) |