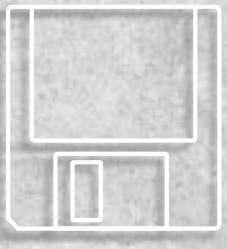
EXPLR1 Embedded PC Evaluation Platform Board Manual

KEEPING YOU ONE DESIGN AHEAD



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EXPLR1 Embedded PC Evaluation Platform Board Manual

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Copies of documents which have an ordering number and are referenced in this document, or other Intel literature, may be obtained from:

Intel Corporation
Literature Sales
P.O. Box 7641
Mt. Prospect, IL 60056-7641

or call 1-800-548-4725

FIGURES

TABLES

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About This Manual

CHAPTER 1
ABOUT THIS MANUAL

This manual describes how to set up and use EXPLR1 — an evaluation platform which features the Intel386™ EX embedded microprocessor. AP-727, *EXPLR1 Embedded PC Evaluation Platform* Application Note, describes a design created with EXPLR1. The application note contains hardware and software implementation details. The EXPLR1 kit and related documents provide you with a DOS*-compatible platform, ideal for rapid development of PC application software.

Your EXPLR1 kit contains paper and electronic copies of PLD equations and schematics. You can also download these files; refer to Section 1.2, Related Information (pg. 1-3). If/when the design is modified, these files are revised and posted for download. Check these areas periodically for the latest technical and product information.

Figure 1-1. EXPLR1 Embedded PC Evaluation Platform Board

Table 1-1. EXPLR1 Features and Benefits

Feature	Benefit
Versatile Single Board Computer Configuration	Can be used as proven, stand-alone design or expanded using the Serial Expansion Bus (SEB)
System contains software to support design/debug needs: • Annabooks ROMable DOS • Phoenix BIOS • Systems & Software Debugger • Cyber Quest Flash Loader	Everything is included to get started right now
EXPLR1 features the Intel386™ EX embedded microprocessor	Compatibility for embedded PC computer applications
RadiSys as key strategic third-party vendor (TPV)	Can customize board, supply volume quantities or provide the R300EX memory/bus controller

1.1 CONTENT OVERVIEW

Chapter 1, “About This Manual” — Chapter 1 provides information on how to order Intel literature and how to make use of Intel’s electronic information. Worldwide Intel Customer Support Telephone Numbers are also provided.

Chapter 2, “Getting Started” — This chapter identifies EXPLR1’s key components, features and specifications. Step-by-step instructions show you how to configure the jumpers, connect the I/O peripherals, apply power, and use the menu-driven software to configure the BIOS.

Chapter 3, “Flash Loader” — This chapter describes Flash Loader installation and operation. This flash programming/loader utility allows you to download and run your application program and/or BIOS from flash memory on an EXPLR1 Intel386™ EX processor-based system. The flash loader software is provided by Cyber Quest, Inc.

Chapter 4, “BIOS Configuration” — This section describes the features and options in the BIOS configuration menus. Systems are usually pre-configured and require little or no additional BIOS modifications.

Chapter 5, “Hardware Reference” — Physical board characteristics are defined in this chapter, with emphasis on the connectors and pin definitions. Figure 5-2 shows the physical location of each connector on the board. Section 5.1, Jumpers and Connectors (pg. 5-3) defines each connector’s function.

Appendix A, “Troubleshooting and Error Messages” — Section A.1, Troubleshooting identifies symptoms which do not generate an error message. Section A.2, Common Error Messages identifies EXPLR1-specific error messages generated from DOS, BIOS and CMOS.

1.2 RELATED INFORMATION

In addition to the printed technical documentation — the "traditional" collection of product information — Intel provides technical (and other) information to you electronically via FaxBACK, Application Bulletin Board Service (BBS) and World-Wide Web (WWW). The following sections identify related technical information, sources for electronic file download, and technical support.

1.2.1 Third-Party Vendor Contact Information

Company	Product	Contact
Annabooks	ROMable DOS	(619) 673-1432
Cyber Quest, Inc. (CQi)	Flash Loader	(703) 631-8323
Phoenix Technologies, Inc.	BIOS	(408) 452-6874
RadiSys	R300EX	(503) 646-1800
Systems and Software, Inc.	Debugger	(714) 833-1700

1.2.2 Intel Documentation

Documentation is available from your local Intel Sales Representative or Intel Literature Sales.

Intel Corporation
Literature Sales
P.O. Box 7641
Mt. Prospect IL 60056-7641
1-800-548-4725

Table 1-2. Related Documentation

Document Title	Order #
Intel Documents	
Intel386™ EX Embedded Microprocessor User's Manual	272485-001
Intel386™ EX Embedded Microprocessor datasheet	272420-004
Intel386™ SX Microprocessor Programmer's Reference Manual	240331
Intel386™ SX Microprocessor Hardware Reference Manual	240332
Intel Development Tools handbook	272520
AP-727 *EXPLR1 Embedded PC Evaluation Platform* Application Note	272777
Third-party Documents	
Cirrus Logic *CL-GD624x Application Book*	366245-001

1.2.3 Electronic Information

Up-to-date product and technical information is available electronically from these sources.

Intel's World-Wide Web (WWW) Location:	http://www.intel.com/
FaxBack Service:	
US and Canada	800-525-3019
Europe	+44-1793-432509
worldwide	1-503-264-6835
Application Bulletin Board Service:	
up to 19.2-Kbaud line, worldwide	1-503-264-7999
Europe	+44-1793-432955

1.2.4 Intel Customer Support Contacts

Table 1-3. Intel Customer Support Telephone Numbers

Customer Support (US and Canada)		800-628-8686
Country	**Literature**	**Technical Support**
Australia National Sydney	Contact local distributor	008-257-307 61-2-975-3300 61-3-810-2141
Belgium, Netherlands, Luxembourg	010-4071-111	010-4071-111
Canada	800-468-8118	Contact local distributor
Finland	358-0-544-644	358-0-544-644
France	33-1-30-57-70-00	33-1-30-57-72-22
Germany	49-89-90992-257	Hardware: 49-89-903-8529 Software: 49-89-903-2025
Israel	972-3-498080	972-3-548-3232
Italy	39-02-89200950	39-02-89200950
Japan	Contact local distributor	0120-1-80387
Sweden	46-8-7340100	46-8-7340100
United States	800-548-4725	800-628-8686

1.3 NOTATION CONVENTIONS

The following notation conventions are consistent with other Intel386 EX processor documentation and generic "industry standards."

#	Pound symbol (#) appended to a signal name indicates signal is active low.
italics	Italics identify variables (e.g., *filename*) and indicates new terminology. The context in which italics are used distinguishes between the two meanings.
bold sans-serif	In text, identifies commands (instructions). Not used in code examples.
`typewriter font`	This proportional font is used for code examples. All characters are equal width; this is useful for maintaining accurate character spacing (e.g., the letter "`i`" is the same width as the letter "`m`").
UPPERCASE	In text, signal names are shown in uppercase. When several signals share a common name, each signal is represented by the signal name followed by a number; the group is represented by the signal name followed by a variable (*n*). For example, interrupt request signals are named IRQ3, IRQ4, ... and collectively called IRQ*n*. In code examples, signal names are shown in the case required by the software development tool in use.
bold serif	In text, PLD signal names are in bold lowercase letters (e.g., **h_off**, **h_on**). In code examples, `typewriter font` is used.
Number designations for hex, decimal, binary	Hexadecimal numbers are represented by a string of hex digits followed by the letter *H*. A zero prefix is added to numbers that begin with *A* through *F*. (*FF* is shown as *0FFH*.) In examples of actual code, "0x" is used. Decimal and binary numbers are represented by their customary notations: 255 is a decimal number and 1111 1111 is a binary number. In some cases, the letter *B* is added for clarity.

Units of Measure

A	amps, amperes
Kbit, Kbyte	kilobits, kilobytes
KHz, MHz	kilohertz, megahertz
KΩ	kilo-ohms
mA	milliamps, milliamperes
Mbit, Mbyte	megabits, megabytes
ms	milliseconds
ns	nanoseconds
µs	microseconds
µF	microfarads
V	volts
W	watts

NOTE:
Units listed are frequently used; other units and symbols are used as necessary.

2

Getting Started

CHAPTER 2
GETTING STARTED

This chapter identifies EXPLR1's key components, features and specifications. Step-by-step instructions show you how to configure the jumpers, connect the I/O peripherals, apply power, and use the menu-driven software to configure the BIOS.

2.1 EXPLR1 OVERVIEW

EXPLR1 is a versatile, easy-to-use development platform, built around the Intel386™ EX embedded microprocessor. The processor's performance and flexibility eliminates the need for a chip set and minimizes the need for external logic. EXPLR1 takes advantage of the processor's interrupt controller, chip select unit, wait state generator, SIOs, parallel I/O ports, and dynamic bus sizing. EXPLR1 is DOS-compatible, and uses a standard "PC-like" BIOS.

Key EXPLR1 components include:

- Intel386 EX processor
- Intel 4 Mbit Boot Block Flash, which contains Cyber Quest's Flash Loader, which is a flash programming utility
- RadiSys* R300EX Bus/Memory Controller ASIC
- PCMCIA Slot

Functional and physical features include:

- Pipelined, zero wait state, page mode operation
- Non-pipelined, one wait state, page mode operation
- 1, 2, 4, 8, or 16 Mbyte DRAM
- One single-sided x32 SIMM (4-Mbytes required to run Windows*)
- SVGA Local Bus Graphics Controller (512 Kbyte DRAM frame buffer)
- RTC with Extended Battery Backed RAM
- PS/2 Style Keyboard and Mouse Interface
- IDE Hard Disk Interface
- PCMCIA 2.0 (single slot)
- Two asynchronous Serial Ports (COM1 and COM2)

2.2 BEFORE YOU BEGIN

Before you apply power to the board, read all the installation instructions. The instructions tell you how to:

- Configure the board for the amount of memory you plan to use.
- Connect the mouse, keyboard, and monitor (or flat-panel display).
- Connect the power supply.
- Configure the BIOS.

The location of jumpers and connectors is shown in the following figure. A complete description of all jumpers and connectors is provided in Chapter 5, "Hardware Reference."

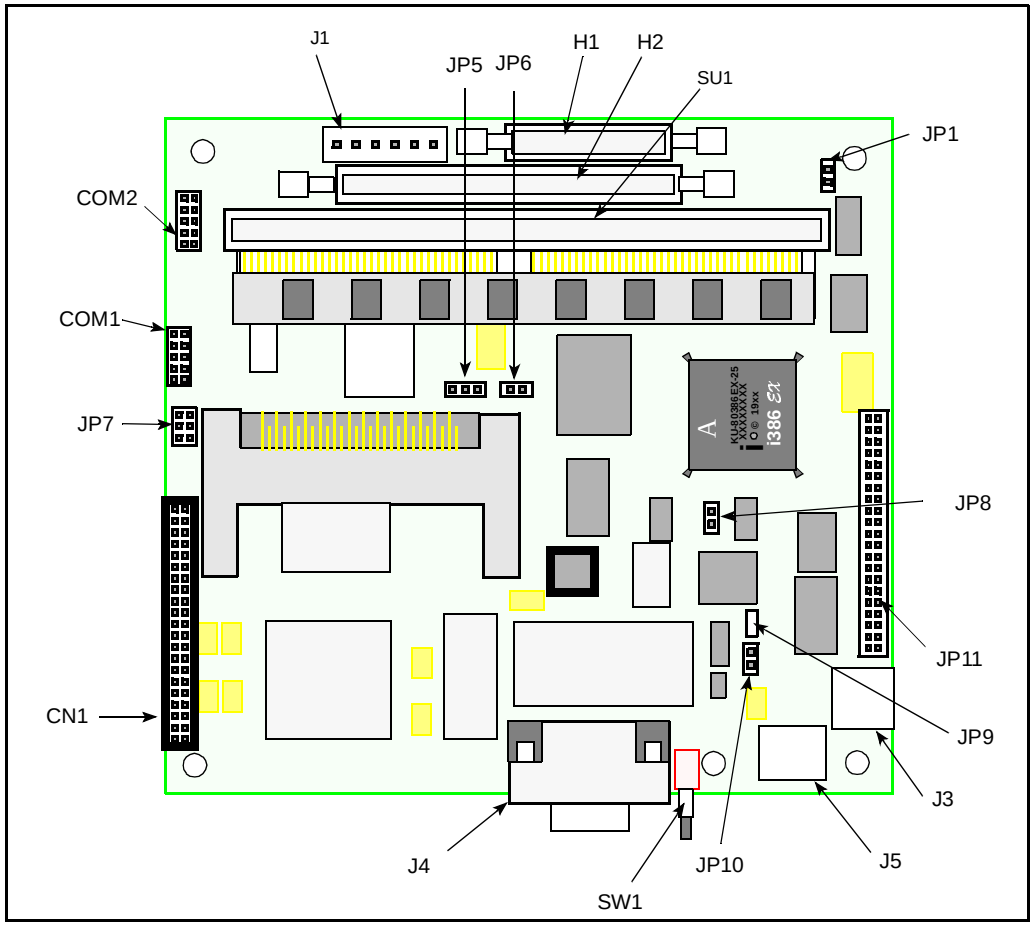


Figure 2-1. EXPLR1 Connectors and Jumpers

2.3 SETTING UP THE EXPLR1 EVALUATION BOARD

1. Make sure you are in a static-free environment before you remove any components from their anti-static packaging.

CAUTION!

Avoid electrostatic discharge (ESD) when handling the EXPLR1 board. This product — like most semiconductor-based products — is susceptible to ESD damage. This may cause immediate product failure, unpredictable operation or delayed failure.

2. Check the EXPLR1 kit's packing list to make sure you have received a complete kit. Inspect all items for damage that may have occurred during shipment. Contact your Intel Sales Representative if any items are missing or damaged.
3. Make sure there is a jumper on pins 2 and 3 of JP5. This is the default setting.

NOTE

See Figure 2-1 for exact jumper locations. Do NOT add or remove jumpers with the power on.

4. Select a SIMM size:
   - If you are using a 1- or 4-Mbyte SIMM (a 1 Mbyte SIMM is included in your kit), remove the jumper from JP6.
   - If you are using a 2-, 8-, or 16-Mbyte SIMM, place a jumper on pins 1 and 2 of JP6.

   SIMM requirements:
   - Single-sided x32, 72-pin, 5 V, 70 ns (or better)
   - Single RAS
   - Non-parity
   - Symmetrically addressed
   - Fast-page mode
5. Remove the jumper from JP10 (FORCE UPDATE).
6. Connect a PS/2-compatible keyboard to J5.

7. Select a monitor:
   - Connect a VGA monitor to the 15-pin D-type connector (J4).
   - Connect an LCD flat-panel display to the 50-pin connector (CN1). The EXPLR1 has been verified to operate with the Sharp* LM64C08P 640x480 passive color LCD panel.

     Other flat-panel displays are supported by the Cirrus Logic* VGA chip on the EXPLR1, but Intel does not guarantee their operation with EXPLR1. Contact Cirrus Logic for documentation and cabling diagrams.
8. OPTIONAL - Connect a bootable IDE hard disk drive to the IDE connector JP11. Connect the hard drive to the power supply. *Before* you install a hard disk in the evaluation board, you must format the drive, and install the desired software onto the drive.
9. OPTIONAL - Connect a PS/2-compatible mouse to J3.
10. Connect a power supply to the evaluation board. EXPLR1 is designed to use a standard PC/AT 12 V power supply, such as those used with PC motherboards. Most motherboards require two power connectors (sometimes called P8 and P9; your power supply may be labeled differently); EXPLR1 needs only one power cable — the one which provides +5 V, +12 V, and -12 V. To connect the power supply, follow these bulleted steps:
    - Check the power cable; make sure the cable pinout delivers the correct voltages to the EXPLR1 power supply connector pins. Refer to Chapter 5, “Hardware Reference,” for connector/pin definitions.
    - Attach the power cable to connector J1 on the EXPLR1 board.
    - Take a moment to double-check all connections and jumper settings before proceeding.
11. Power-up the board. The monitor displays power-on self tests, memory tests, etc. You should see the following:
    - Starting ROM MS-DOS 5.0....Press Any Key to Continue.
    - If this information does not appear, refer to Appendix A, “Troubleshooting and Error Messages” for assistance.

    When booting from ROM MS-DOS 5.0, the on-board flash memory is the C: drive.
12. To enter BIOS Configuration mode, reboot EXPLR1, then press F2 when prompted to do so. You will need to change the default BIOS settings if you connected an IDE hard disk drive, or if you want to use the ATA PC Card slot. Steps for setting up the BIOS to make use of the EXPLR1 options are provided in the next section.

NOTE

To reboot at any time, press the EXPLR1 reset button (SW1).

2.4 CONFIGURING THE BIOS

By default, the EXPLR1 board boots from the ROMable DOS located in flash memory. You can change the default behavior by configuring the BIOS for another boot method. Installing a hard disk or PC Card allows you to bypass the operating system located in ROMable DOS and boot from the operating system software installed on the hard disk or PC Card.

The following sections provide step-by-step instructions for booting from an IDE hard disk drive or an ATA PC Card. This section assumes you have already followed the installation and configuration steps listed in the previous section. Chapter 4, "BIOS Configuration" contains a complete description of all the options you'll see on the BIOS Setup screens.

After you configure the BIOS for your disk option, you can use EXPLR1 as a stand-alone system, or you can connect it to a host PC. With a host PC, you can use the Flash Loader utilities to program EXPLR1's flash memory. Using EXPLR1 with a host PC is described in "Setting up a Host Computer" on page 2-7.

2.4.1 Booting From the IDE Hard Disk Drive

1. Push the Reset (SW1) switch, then immediately press F2 to enter BIOS Setup. If the BIOS Setup screen does not appear, push Reset then F2 again.
2. Highlight IDE Adapter 0 Master and press Enter.
3. Press Enter to autotype the fixed disk. If this does not automatically configure the drive:
   - Press the spacebar until User appears.
   - Enter the requested drive parameters - the parameters should be listed on the drive's label. The EXPLR1 does not support enhanced IDE; the maximum cylinders you can enter is 1024.
4. Press Esc to return to the Main menu.
5. Highlight Embedded Features and press Enter. Highlight ROMDOS Support and press the spacebar until Disabled appears.

NOTE

If an IDE hard disk drive and ROMable DOS are both enabled, the IDE disk drive is the C: drive, and flash memory becomes the D: drive.

6. Press Esc to return to the Main menu. Press Esc again to exit. When prompted, save changes and exit. The system reboots from the hard disk.

2.4.2 Enabling an ATA PC Card

The steps in this section tell you how to enable the EXPLR1's PC Card slot for use with ATA PC Cards. You cannot use an IDE hard disk and an ATA PC Card at the same time.

1. Power up the board.
2. Press F2 to enter BIOS Setup. If the BIOS Setup screen does not appear, push Reset then F2 again.
3. Highlight Embedded Features and press Enter.
   - Highlight PCM ATA and press the spacebar until Enabled appears.
   - Make sure that all ROM/RAM disk options are set to None.
4. Press Esc to return to the Main menu.
5. Highlight IDE Adapter 0 Master and press Enter.
6. Press the spacebar until 'None' appears.
7. Press Esc to return to the Main menu.
8. Press Esc again. When prompted, save changes and exit.
9. Power down the EXPLR1.
10. Insert the pre-formatted, bootable ATA PC Card into the PCMCIA socket.
11. If you have an IDE hard drive already installed, you must disconnect it. Remove the IDE cable from the EXPLR1.
12. Power up the board.
13. Press F2 to enter BIOS Setup. If the BIOS Setup screen does not appear, push Reset then F2 again.
14. Highlight IDE Adapter 0 Master and press Enter to configure the PC Card. If the correct PC Card type and size appear go to step 16. If you don't see the drive settings for your PC Card appear, enter the drive settings by hand as described in the next step.
15. If Autotyping does not work, select 'User' under the 'Type' field. Set the parameters according to the type of card you are using. These should be the same settings you used to format the PC Card.
16. Press Esc. When prompted, save changes and exit.

The system automatically reboots from the ATA PC Card. To use ROMable DOS with a formatted PC card, configure the BIOS for ATA PC Card support and enable ROMable DOS support. The ATA PC Card is the C: drive and the flash memory becomes the D: drive.

2.5 SETTING UP A HOST COMPUTER

This section explains how to set up a host computer for use with EXPLR1. To set up the host computer, you need to connect a null-modem cable and install the EXPLR1's utilities and data files, as described in the next two sections of this chapter.

You can use a host computer to:

- Load software into EXPLR1's flash memory
- Update the BIOS software
- Reprogram the bootblock flash
- Transfer files from the host computer to a hard disk or PC Card on the EXPLR1

Steps for using the Flash Loader utility are provided in Chapter 3, "Flash Loader."

2.5.1 Connecting the Cable

Your EXPLR1 kit contains an adapter with a 10-pin header connector on one end and a standard 9-pin female D-shell connector on the other. In order to use a host computer you need a standard null-modem cable. *This cable is not included in your kit*—you must provide it.

1. Attach one end of the null-modem cable to the COM2 port of the host computer.
2. Attach the other end of the null-modem cable to the adapter provided in your EXPLR1 kit.
3. Connect the adapter to the 10-pin header JP2 (COM2) on the EXPLR1.

2.5.2 Installing the Software Utilities and Data Files

Your EXPLR1 kit contains a disk containing software utilities, sample programs, schematics, bill of materials, etc. These files may be installed on the host computer by following these steps:

1. Insert the diskette labeled "EXPLR1 Rev. X.X" Software Disk into your host computer's disk drive.
2. Copy EXPLR1.EXE to the hard drive on the host computer.
3. Change to the directory containing EXPLR1.EXE and type:

   EXPLR1 -d

   This extracts the files and places them in a set of subdirectories. If you don't use the **-d** option, the files are extracted into the same directory.
4. Once you have completed the installation you can delete the EXPLR1.EXE file.

Extracting the files creates the directories described below. Each directory contains a README.TXT file containing more information.

BIOS Contains the entire flash image and the current VGA BIOS from Cirrus Logic.

CIRRUS Contains utilities provided by Cirrus Logic for simplifying flat-panel control.

DESIGN Contains OrCad schematics, EPS files of the schematics, Bill of Materials, and PAL codes for the EXPLR1.

DOS Contains the binary images for Embedded DOS and its ROM drives.

FLASH Contains the flash reprogramming utilities and scripts. The flash programming utility—Flash Loader—allows you to download and run your application program and/or BIOS from flash memory on the EXPLR1 system. The Flash Loader software is provided by Cyber Quest, Inc. Chapter 3, "Flash Loader" provides a complete description of installing and using the Flash Loader utility.

2.5.3 Downloading Files from a Host Computer

If you want to transfer files from a host computer to a hard disk or PC Card on the EXPLR1, you must be able to run software on both systems that can set up a client-server connection over the serial cable. A DOS utility called Interlnk provides a convenient method for connecting the EXPLR1 to a host computer. The next section provides instructions for setting up this connection.

The DOS 6.0 manuals describe how to use the Interlnk/Intersvr combination of MS-DOS programs to access local drives on a host computer from the EXPLR1 board. The DOS help for Interlnk and Intersvr also explain the process. Refer to either of these sources for complete information on using the commands.

NOTE

The Interlnk/Intersvr connection is not used when programming or updating flash memory. Flash Loader, the utility used to program flash memory, is described in Chapter 3, "Flash Loader."

2.5.3.1 Using Interlnk/Intersvr from DOS on a Hard Drive

1. Using a text editor, add the following line to the CONFIG.SYS file on the hard drive which will be connected to the EXPLR1:

   device=c:\dos\interlnk.exe

   where c:\dos is the path to the DOS directory containing the interlnk.exe file.

2. Reboot the host computer.

3. Make sure the null-modem cable is connected as described in Section 2.5.1, Connecting the Cable (pg. 2-7).
4. At the DOS prompt on the host computer, enter

   intersvr

5. At the DOS prompt on the EXPLR1 system, enter

   interlnk

6. The host computer displays a list of available host drives. You can copy files to and from these drives just as if they were directly connected to the EXPLR1 board. The display also indicates the drive letters to use to access those drives.
7. To exit intersvr, press Alt-F4 on the host computer.

2.5.3.2 Using Interlnk/Intersvr from ROMable DOS

This section explains how to set up the EXPLR1 board for Interlnk when booting from the ROMable DOS located in the bootblock flash on the EXPLR1.

The EXPLR1 board is shipped with Embedded DOS and a default C: drive (D: if IDE or PCM ATA is enabled) ROM disk in the flash. This default image (DRIVEC.BIN on the diskette) does not have the Interlnk driver loaded; it is commented out in CONFIG.SYS. IDRIVEC.BIN (in the same directory) is identical to DRIVEC.BIN except that the Interlnk driver is loaded. To use interlnk/intersvr replace DRIVEC.BIN in the flash with IDRIVEC.BIN. The simplest way to do this is to execute PRIDRIV.FLC in the \FLASH directory. To do this, perform the following steps:

1. If you haven't already done so, follow the steps in "Installing the Software Utilities and Data Files" on page 2-7.
2. Power down the EXPLR1 board and place a jumper on pins 1 and 2 of JP10 (FORCE UPDATE).
3. Make sure the null-modem cable is correctly connected to COM2 on the host computer and COM2 of the EXPLR1 board. See Section 2.5.1, Connecting the Cable (pg. 2-7).
4. Apply power to the EXPLR1.
5. From the DOS prompt on your host computer, change to the FLASH directory:

   CD FLASH

6. Run the Flash Loader program:

   FLASHLDR

7. At the FLASH CMD: prompt on your host computer, enter these commands in order.

   conn

   pridriv

   exit

8. Power down the EXPLR1 board.
9. Remove the jumper from pins 1 and 2 of JP10 (FORCE UPDATE).
10. Power up the EXPLR1 board. The board should now boot to the Embedded DOS with the new Drive C:.
11. At the DOS prompt on a host computer, enter:

    intersvr

12. At the DOS prompt on the EXPLR1, enter:

    interlnk

Both Intersvr and Interlnk should display disk mapping information and you should be able to access the local disks on your host machine from the EXPLR1.

3

Flash Loader

CHAPTER 3
FLASH LOADER

This chapter describes Flash Loader installation and operation. This flash programming/loader utility allows you to download and run your application program and/or BIOS from flash memory on an EXPLR1 Intel386™ EX processor-based system. The flash loader software is provided by Cyber Quest, Inc.

3.1 OVERVIEW

The flash programming utility contains two sections:

- Host software (FLASHLDR.EXE) which executes on a standard PC. This software must be installed on the host computer before you attempt to update or program flash memory on the EXPLR1. See "Installing the Software Utilities and Data Files" on page 2-7 for installation instructions.
- Target software (TARGET1) which is stored in EXPLR1's 16-Kbyte boot block flash

When you power up the EXPLR1 jumper JP10 determines the action taken:

- When JP10 is installed, the EXPLR1 will not boot. Instead it executes TARGET1; this program establishes a connection to a host computer through the serial port. After making this connection, EXPLR1 waits for commands from the host computer. Instructions in the next section tell you how to use Flash Loader to program flash memory on the EXPLR1.
- When JP10 is removed, TARGET1 vectors to a memory location (set by the **setboot** command) containing a boot program; this program then executes.

  If there is no boot program stored in memory at the correct location, TARGET1 terminates the boot sequence and waits for commands from the host, just as if JP10 is installed. While waiting for commands from the host, the target program sends repeated 'A' characters to the serial port.

3.2 STARTING THE FLASH UTILITIES

The steps in this section assume that you have followed the instructions in Chapter 2, "Getting Started." To run the flash utilities:

1. With the power to the EXPLR1 *off*, Connect the null-modem cable to the host computer and to the EXPLR1 board. Steps for making this connection appear in "Connecting the Cable" on page 2-7.
2. Install a jumper on JP10 of the EXPLR1.

3. Power-up the EXPLR1; the flash target program waits for commands from the PC host system.
4. At the DOS prompt of the host computer, change to the flash directory. Enter:

   CD FLASH

5. Start the flash utility:

   FLASHLDR

6. At the FLASH CMD: prompt, define the PORT command with the number of the host computer's serial port that is connected to the EXPLR1. Enter:

   port=com2

7. Set up your host computer's monitor as a virtual terminal. Enter:

   term

8. When the target flash program is waiting for commands from the host program, the letter 'A' is transmitted every 1/2 second. Confirm that your monitor is currently displaying uppercase A's.
   8.1. Press Esc to exit terminal emulator mode and return to the flash utility prompt.
   8.2. To return to the DOS prompt, enter:

   exit

You may now proceed to load a program. Before you attempt to load a program, you may want to review the list of possible commands provided in the next section. After you've read over the list of commands and options, "Loading a Program" on page 3-7 provides step-by-step instructions for loading program files into flash memory. "Sample Session" on page 3-10 is an gives an example of loading and running a program using Flash Loader.

3.3 ENTERING COMMANDS AND OPTIONS

The flash programming utility accepts commands or options in the following ways:

- Manually entered from the Flash Loader prompt. Enter any command or option. e.g.,

  FLASH CMD:file=*filename*

- Automated from flash command files (see next paragraph).
- Passed on the flash programming utility invocation line. This includes commands programmed into a flash command file.

  C:\FLASH>FLASHLDR init;dir

- Using the standard DOS redirection of input to execute all commands specified in a file. Additional commands cannot be entered from the keyboard (i.e., *filename* should contain an **exit** or **abort** command). This method is of limited use since the introduction of flash command files.

  C:\FLASH> FLASHLDR *filename*

- Using a pre-defined DOS environment variable, **flashopt**. (Due to the way DOS processes the **set** command, in commands that use the equal sign (=), substitute a plus sign (+) in place of the equal sign). This method is of limited use since the introduction of the FLASHLDR.FLC flash command file.

  C:\FLASH> set flashopt=port+com2;baud+38400

When Flash Loader starts, commands and options are processed in the following order:

- Those specified in the environment variable **flashopt** are executed first. If the file FLASHLDR.FLC is in the current directory or the directory from which FLASHLDR.EXE was loaded, commands and options in the file are executed. This file usually contains configuration options such as port number, baud rate, etc.
- Parameters passed on the command line are executed.

If an **exit** command is not present in any of the above, an interactive command session is started.

3.3.1 Using Flash Command Files (.FLC)

Flash command files are similar to DOS batch files. From the flash command line you can enter a single command to execute one or more commands. Flash command files are identified by a .flc file extension. When a command is entered from the flash loader prompt and the command is not one of the pre-defined flash commands, the flash loader program searches multiple directories in the following order for a .flc file:

- Current directory
- Directories specified by the **cmdpath** option (e.g., **cmdpath=..\cmd,..\bin,c:\flash**)
- Directory from which FLASHLDR.EXE was loaded

If the file is found, the program executes all commands in the file. Additionally, a full or partial path to a flash command file may be entered (e.g., c:\cmd\myboard.flc). The .flc extension is optional. Command files may invoke other command files. Following is an example:

Table 3-1. Example Command File

```
// PRHELLO.FLC - Example cmd file to program hello program
echo *** Program hello program ***
delete! hello                          // Delete current copy of program
                                       //    The ! allows the flc to continue
                                       //    if hello is not found, without a !
                                       //    the flc will exit due to error
program hello.hex group=test ver=2.2   // Program into flash
setboot                                // Set hello as boot program
update                                 // Update flash tables now
                                       //    Without this command, the flash
                                       //    tables will be updated on exit
dir                                    // Display flash directory
```

You can now enter the newly created command as you would enter standard Flash Loader commands. The “//” symbol indicates comments; all text preceded by // is ignored in command files and on the flash command line. Use this method to document your command or log file.

3.3.2 Flash Loader Command Summary

Table 3-2 lists the flash loader commands. Italicized text denotes terms listed in Table 3-1. Text in square brackets denote optional parameters.

Table 3-2. Flash Loader Commands

Command	Abbrev/Options	Description
abort	a	Abort program (tables not updated)
boot	b [*name*]	Immediately boot/start a program (boot flag not updated as in the **setboot** command)
checkhex	chk [*file*] [format=x] [addr=x]	Display record address in hex files
debug	-	Enable debug commands
delete	del [*name*]	Delete program from flash
dir	d	Display directory of programmed files
dos	dos [*DOS command*]	Shell to DOS or execute command entered
echo	echo [*str*]	Displays user messages in command files. Similar to the DOS **echo** command in batch files.
exit	e, x, quit, q	Performs a shutdown and exits program
<flash command>	-	Name of a flash command file minus the .flc extensions in Section 3.3.1, Using Flash Command Files (.FLC) (pg. 3-4)
help	h, ?	Display command/option help
init	i [*port*] [baud=x]	Initializes link between host and target
map	m	Display flash address mapping (defined by board option)
noboot	nb	Clears boot program flag
options	opt	Display current options
program	pr [*file*] [format=x] [addr=x] [name=x] [group=x] [version=x]	Programs specified file into flash memory using current options
reinittbls	rt [*board*] [system=x]	Reinitialize flash tables
setboot	sb [*name*]	Set boot program
shutdown	sh	Updates flash information tables from RAM to the flash, closes communication link between target and host. User must shutdown to save changes.
term	vt [*port*] [vtbaud=x]	Emulate terminal (VT) (to the EXPLR1 COM port)
update	up	Immediately flushes changed tables to flash memory
wait	w [x]	Pause processing of commands for x seconds
!		Continue if an error occurs. Also inhibits any possible confirmation questions.

NOTE: This table contains additional descriptive information not included in the screen display.

3.3.3 Flash Loader Options Summary

Table 3-3 lists command line options. Square brackets enclose options which can be specified with the command. Table 3-4 defines possible values. To view the current options, enter:

opt

To make changes at the command line, enter *option* = *yourvalue*. e.g., to change the prompt from FLASH CMD to UPDATE, enter:

prompt=update

Table 3-3. Flash Loader Command Options

Options	Possible Values	Default	Description
addr=	phys	0	Sets target flash address for programming binary files.
baud=	baud rate	9600	Set target communication baud rate.
board=	board	i386ex-EXPLR1-DOS i386ex-EXPLR1	Sets target system board. Affects memory map of the flash device to program. (For more information, refer to the Application Note included in your EXPLR1 kit.)
cmdpath=	*dir* [, *dir*, ..]		Set search path for flash command files (.flc)
file=	file	-	Set program file.
format=	hex | bin	-	Set program file type. Only required if extension is not .bin or .hex
group=	str	-	Set group name (user selectable).
log=	terse, normal, or verbose	NORMAL	Set logging level.
memory=	none, ram, flash, boot	flash	Set valid memory types for programming.
name=	str	*file* minus director and extension	Set program name (user selectable).
port=	port	-	Set target comm port. (Specify the host PC port which connects to the EXPLR1 COM2 port.)
progpath=	*dir* [, *dir*, ..]		Set the program file search path.
prompt=	str	FLASH CMD:	Set prompt
system=	str	TARGET	Set target system name (user selectable).
vector=	*b:o* | *phys*	-	Set start vector.
version=	str	-	Set program version (user selectable).
vtbaud	baud rate	9600	Set terminal emulator comm baud rate.
vtport=	port	-	Set terminal emulator comm port.
;			Command separator on single line.
//			Denotes a comment.

Table 3-4. Definition of Possible Values

Term	Definition
file	Valid DOS path with file name.
dir	Valid DOS directory path.
name	Symbolic name associated with programmed files.
port	Serial port name (*com1*, *com2*).
board	Valid board names are **i386ex-EXPLR1** and **i386ex-EXPLR1-dos**.
str	A string of ANSI characters.
b:o	Hex address in the form of base:offset (8000:0)
phys	Hex address in physical linear address form, (80000).
baud rate	A valid baud rate (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200).

3.4 LOADING A PROGRAM

The file to be programmed into flash memory must be either an Intel HEX file (.HEX by default) or a binary memory image file (.BIN by default). Once a file is loaded using the **program** command, you can set this file to be executed at system reset instead of the Flash Loader program. This is done using the **setboot** command.

If the programmed file does not contain starting address information, enter the **vector** option before you enter the **setboot** command. This step is required when using binary files. If the **vector** command is not used, verify that the start address set will work for your application. To do this, type DIR at the FLASH CMD: prompt. This command displays the available memory address ranges.

3.4.1 Loading a Program to Execute at System Start-up

The following example shows how to load a program to flash memory so that it runs at system start-up.

CAUTION

Flash memory is pre-programmed with BIOS and DOS files. Be careful when programming flash to use the DIR command to determine the memory address ranges which contain BIOS and DOS. Do not overwrite these locations; otherwise, it may be necessary to re-program the BIOS and/or DOS.

1. Power OFF the EXPLR1 and host PC.
2. Connect a null-modem cable between a host PC COM port and EXPLR1's COM2 port.

3. Install the jumper at JP10.

NOTE

Once this jumper is installed, EXPLR1 waits for input from the host computer. All Flash Loader commands and options discussed in this chapter are entered on the host computer.

4. Power ON EXPLR1 and the host PC.
5. At the host computer's DOS prompt, change to the flash directory. Enter:

CD FLASH

6. Start the flash utility. Enter:

FLASHLDR

7. At the FLASH CMD: prompt on the host computer, enter the following commands in the sequence listed:

port=com1	Enter the serial port (COM1 - COM2) on the host computer that you attached the null-modem cable to.
init	Target should be on-line. Invalid tables are OK on initial execution of Flash Loader.
system=*name*	Select appropriate name for system.
file=*filename*	Specify the full path name if the hex file (or the binary memory image file) to be programmed is not in the current directory. A .HEX extension is assumed if none is specified.
group=test	Designate program group description. Any description will work.
version=1.0	Designate program version number. Any version number will work.
program	Download and program into flash. This loads the test program from hard drive.
setboot	Set program to run on reset, when JP10 is removed. If the starting address information is not present in the hex file or you are loading a binary file, use the vector command to set the starting address before the setboot command.
dir	Display flash directory. Only one flag attribute is currently used: B for boot to specify which program boots at reset.
shutdown	Update the flash tables in the target system and shutdown the host/target communications link.

To execute the program:

1. Remove the jumper at JP10.
2. Press the EXPLR1 RESET switch (SW1). Your program executes after this reset.

To reboot and reload the flash target program, install the jumper at JP10 and press the reset switch.

3.4.2 Executing a User Loaded Program or Target Program

The setting of JP10 determines which programs run at start-up:

- If the jumper is removed, the flash target program immediately starts the selected user application program (by default, this is the PhoenixBIOS startup program).
- If the jumper is installed, the flash target program waits for commands from the PC host system; you can enter commands to change or replace the programs stored in flash memory.

3.4.3 Updating the BIOS

PhoenixBIOS comes preloaded on your EXPLR1 board. You can load a different BIOS onto the EXPLR1 board, but the process is *not* recommended.

- If you plan to use Interlink and Interserver after booting from ROMable DOS, you must first update the BIOS. This is described in Chapter 2, “Using Interlnk/Intersvr from ROMable DOS.”
- To load your own BIOS, you must already have your own BIOS files. The README.TXT file included with your kit (in the FLASH directory) gives instructions for loading your own BIOS program onto the board.
- To reload the PhoenixBIOS, you must first contact Phoenix Technologies, Inc. to obtain the necessary files. Then follow the instructions given in the README.TXT file.

WARNING

Before following the procedure given in the README.TXT file, you must obtain the PICOBIOS.BIN file from Phoenix Technologies, Inc. If you do not have this file before starting the procedure, you will delete the BIOS.

If you accidently overwrite the BIOS, there is an emergency recovery option. You can use this option only if you haven’t overwritten the boot block area. The FLASH directory contains a Flash Loader command file called PRDEV.FLC. Run this file to reprogram the entire flash image with the default BIOS and drivers. If you are forced to use this option, you will no longer be able to see the memory location of each program image file when you use the dir command.

3.4.4 Programming the Boot Block Using Flash Loader

You can use Flash Loader to program the flash device's boot block area. This area contains the Flash Loader's monitor program. Your program modifications will alter or replace the existing program. Once you reprogram the boot block, the Flash Loader host program will no longer operate. Overwriting the device's boot block area is *not* recommended.

WARNING

Any interruption of the boot block programming will corrupt the Cyber Quest Flash Loader utility. This may require factory repair.

1. Make sure the power is OFF, then place a jumper on pins 1-2 of JP5. This allows you to write to or program the boot block flash.

   You can program all other areas of the flash device *without* disabling the boot block write protection, see "Loading a Program to Execute at System Start-up" on page 3-7.

2. To program the file into the flash device, set the **memory** option to boot (**memory=boot**) before you execute the **program** command.

Included in the software package is an example flash command file that demonstrates how to load a boot block program using Flash Loader (\INTEL\EXPLR1\FLASH\PRTARG1.FLC).

3.4.5 Sample Session

This section shows an example of loading and running a program from boot block flash. First:

1. Place a jumper on JP10.
2. Make sure the null-modem cable is connected correctly.
3. Power up the EXPLR1 and the host computer.
4. At the host computer's DOS prompt, change to the flash directory. Enter:

   CD FLASH

5. At the prompt, enter:

   FLASHLDR

6. Change the baud rate for host communications (default is 9600) by entering:

   baud=*baud rate*

7. Specify the host PC com number to initialize the port to communicate with EXPLR1. Enter:

   init *com#*

8. The following message appears if the initialization is successful:

   Establish link to target system on <com#> at <baud rate>...

   Target system on-line (board=000201C2, prog=1, ver=2.20)

   Flash tables OK (This may say *invalid* before any tables are loaded. This is **not** an error!)

   Initialization complete

9. If either of the following messages appear, toggle the EXPLR1 power OFF and ON, repeat the procedure from step 1 with a new baud rate.

   Initialize host/target comms failed! Target system not responding...

   Reset target system and perform init command again

   Target system on line (board=000201C2, prog=1, ver=2.20)

   Operation Failed! Target communication timeout

10. To load a program, enter:

    program <file name> addr = <file start>

    To load another program, repeat the **program** command. Your programs are temporarily stored in RAM on the host computer. If multiple files are to be loaded and executed, they must be linked prior to loading. The file must be in hex format with a .HEX extension, or binary format with a .BIN extension. Example:

    program hello.bin addr=3ff6000

    Enter **shutdown** to store the programs on the flash device on the EXPLR1.

Using the HELLO.BIN program as an example, the following messages appear when the files are loaded successfully:

File format set to BIN

Program file set to \HELLO.BIN

Program name set to HELLO

Address set to 0x03FF6000

Start flash programming...

Process binary file .\HELLO.BIN

Binary file OK

Process flash blocks...

Download... Addr: <file start> - <file end> Size: <file size> Total: <amount read>

Program 28F400BX-T flash block #0

Flash blocks OK

Flash programming complete

DIR displays the files in the boot block.

11. To set the starting location for the user's boot program, enter:

    vector = <*start address of file*>

    In essence, this command "tells" Flash Loader where to locate the user's program in the flash device. This must be set if you are running an operating system or any other unlocated program. This is not necessary for any program that has been absolutely located prior to loading. Example:

    vector=F600:0H (for a boot file that begins at location F600:0H)

    The following message displays:

    Program HELLO start vector set to F600:0000

12. To set the starting point of the user's program when running terminal emulation, enter:

    setboot<*filename*>

    Upon reset, Flash Loader code in flash boot block initializes the board. When terminal emulation is invoked (explained below) it jumps to the start of the user's code indicated by this command. In the following example, it would jump to the start of the program "hello" and begin executing. Example:

    setboot hello

    The following message appears:

    Boot program set to HELLO (start vector = F600:0000)

13. To store all values and loaded programs into the flash tables before reboot, enter:

    shutdown

    The following message appears:

    Start shutdown...
    Update flash tables...
    Flash tables OK
    Shutdown complete

14. Remove JP10 jumper. Push the EXPLR1 reset switch for a few seconds to reboot.

15. To begin terminal emulation, enter:

    term

    If the following message appears, press Esc and return to step 12:

    Start VT session on <com#> at <baud rate>. Press ESC to exit...
    AAAAAAAAA...

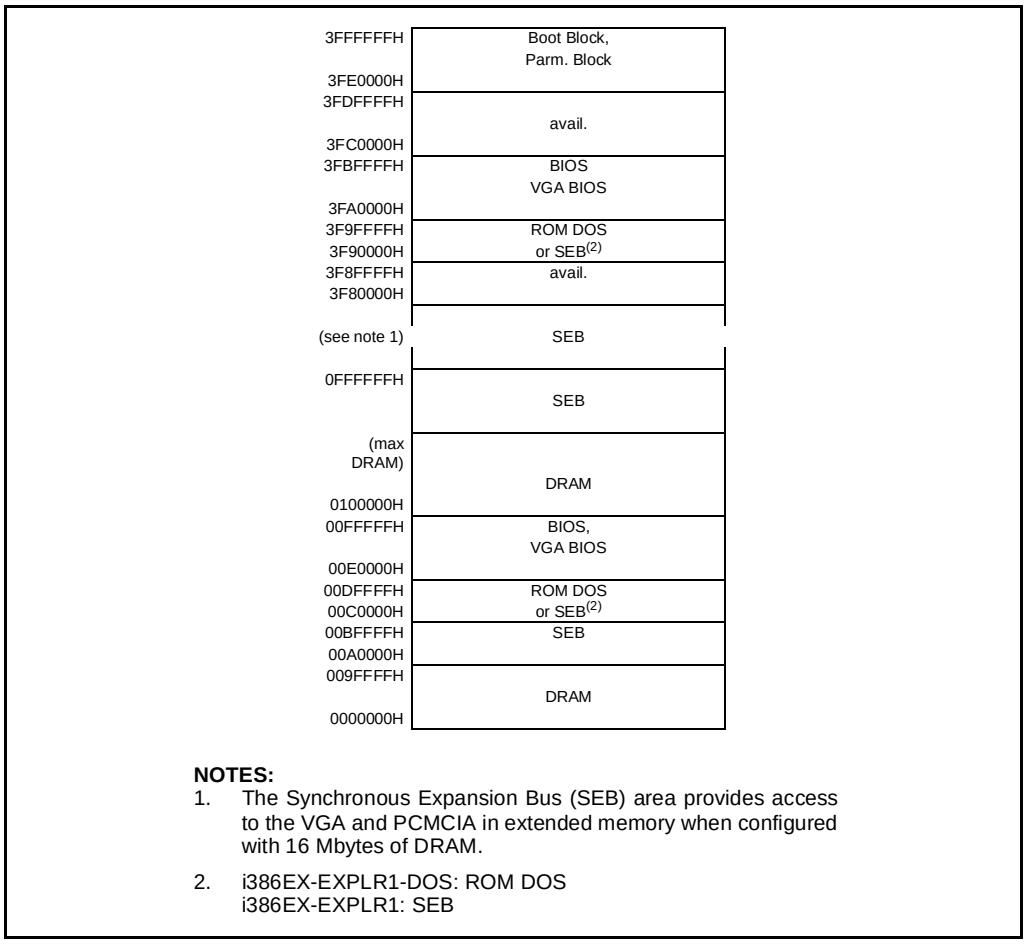
    The following message appears if the “hello” program is loaded successfully:

    Start VT session on <com#> at <baud rate>. Press ESC to exit...
    Hello from the 386EX BOARD

3.5 THE APPLICATION ENVIRONMENT AFTER SYSTEM RESET

Depending on the Intel386 EX processor’s chip select configuration, memory accesses are directed to flash, DRAM or the SEB. System memory is implemented using a single 4-Mbit Boot Block Flash Memory device and a single x32 SIMM socket which supports 1, 4 or 16 Mbytes of DRAM connected as two 16-bit banks with jumpers to select the options. The design supports 2 Mbyte and 8 Mbyte DRAM SIMMS, both of which are configured as a single 16-bit bank, and utilizes a single RAS signal.

The memory-addressable flash boot device resides in the last 512 KB of physical address space at addresses 3F80000H through 3FFFFFFH. At power up or after you press the Reset switch, the processor jumps to a reset vector at address 03FFFFF0H within the boot block. See Figure 3-1. Code at this address causes the processor to perform a near jump to code within the 16 Kbyte boot block; this code performs a rudimentary hardware initialization and a checksum test of the system and video BIOS areas, and the ROM/BIOS extension area. The processor also checks for the presence of the force update jumper at JP10. If the processor detects a failed checksum or a forced update jumper setting, code in the boot block causes it to begin the flash recovery process described in “Overview” on page 3-1. If the processor finds no checksum test failure or forced update jumper setting, the boot block code causes a jump to a reset vector in the system BIOS. After jumping through the reset vector, the processor initiates the POST sequence.



NOTES:

1. The Synchronous Expansion Bus (SEB) area provides access to the VGA and PCMCIA in extended memory when configured with 16 Mbytes of DRAM.
2. i386EX-EXPLR1-DOS: ROM DOS
   i386EX-EXPLR1: SEB

Figure 3-1. Flash Memory Map

When the EXPLR1 is reset, the flash target program executes. When executions is directed to a user-defined application, the following environment is defined:

- Real mode.
- DOS-compatible I/O mode.
- The watchdog timer is disabled. (It can be enabled by your application).
- CPU registers AX and DX are preserved as they were at reset (i.e., self-test result and CPU identification).
- No assumptions should be made about device configuration register settings.

3.6 TIPS FOR USING FLASH LOADER

This section may help if you are having problems running Flash Loader.

3.6.1 Determining Baud Rate

To determine your system's fastest baud rate, load the sample program using different baud rates. First, follow the steps in Section 3.4, Loading a Program (pg. 3-7). If that program loads without error, perform these steps once for each baud rate (19200, 38400, 57600, 115000) until you can no longer load the program without errors:

FLASH CMD: delete HELLO

FLASH CMD: baud=<*next baud rate*>

FLASH CMD: shutdown

FLASH CMD: init

FLASH CMD: program HELLO.BIN

Once this fails, use the last baud rate that successfully loaded. When you've determined the fastest baud rate, use a text editor to input the new value in the FLASHLDR.FLC file.

3.6.2 Modifying the FLASHLDR.FLC File

The FLASHLDR.FLC command file is a batch file containing default Flash Loader commands. You may need to modify this file if your system configuration is different from the default. For example, modify FLASHLDR.FLC if your maximum baud rate isn't 57600, or if you want to use COM1 instead of COM2.

3.6.3 Using .FLC Files for Multiple Command Execution

Flash command files are an efficient way to execute multiple commands. The following example file can be placed into your software directory that loads the demo application and prepares it for execution. Create the file LOADDEMO.FLC with the following text:

```
delete! newrom      // Delete if it exist
file=newrom.hex     // Set file to program
program             // Program flash
vector=b000:e05b    // Set reset vector address
setboot             // Set NEWROM as boot program
exit                // Update tables and exit
```

To load and run the demo file:

1. Start the Flash Loader program from the correct demo directory.
2. Execute the **init** command.
3. At the FLASH CMD: prompt, enter:

   loaddemo

3.7 FLASH LOADER UTILITIES DISK CONTENTS

Table 3-5. Flash Loader V2.2 Diskette Files

Flash Loader File Name	Description
README.TXT	Contains late-breaking, useful information which may not be documented anywhere else.
TARGET1.BIN	Target flash program (16-Kbyte boot block image)
FLASHLDR.EXE	Host flash program (DOS program)
HELLO.BIN	Demo user application program for confidence testing
LOADBIOS.BIN	Load BIOS program

Table 3-6. Example Flash Command (.FLC) Files

Flash Command File	Description
FLASHLDR.FLC	Startup configuration (review/adjust settings before using)
CONN.FLC	Connect to target
SETSYS.FLC	Configure target system/board
PRHELLO.FLC	Program HELLO program into flash
PRLOAD.FLC	Program LOADBIOS program into flash

4

BIOS Configuration

CHAPTER 4
BIOS CONFIGURATION

This section describes the features and options in the BIOS configuration menus. Systems are usually pre-configured and require little or no additional BIOS modifications.

BIOS is the basic input/output system software of any PC system. Its functions include system initialization, system self test, and basic system-service routines. It is the basic software layer between the hardware and disk operating system (DOS). Traditionally, the IBM* PC architecture is composed of three layers.

- The bottom layer consists of the PC hardware; for example, the CPU, DMA, interrupt controller, memory controller, and ISA bus controller.
- One level up from the hardware is the BIOS. It provides low-level drivers to interface to the hardware.
- Above the BIOS is the DOS which provides the service of organizing files, disk functions, I/O functions, and launching applications. The application resides on top of these layers.

The BIOS configuration is stored in the EXPLR1's nonvolatile CMOS RAM. BIOS uses these settings to initialize the EXPLR1 hardware.

4.1 ACCESSING THE BIOS CONFIGURATION MENUS

To configure the BIOS, you must press F2 almost immediately after a system reset. The prompt "press F2 to enter the BIOS setup" appears during power up. You can also hold the Alt key after a system reset to display a menu which allows you to specify whether to boot from flash or the hard disk drive.

NOTE

The prompt "press F2 to enter the BIOS setup" can be suppressed in the BIOS setup. However, the F2 function is not affected. Pressing F2 enters the BIOS setup screens whether or not the prompt is suppressed.

4.2 MENU NAVIGATION

In this document, the windows are presented chronologically — corresponding to the order each menu appears. To navigate the BIOS Setup windows:

- Use the up and down arrow keys to move among the fields. Use the right and left arrow keys to move between the Main, Advanced and Exit menus. These menus appear in the menu bar at the top of each screen.

- Selecting a menu option with a triangular pointer opens another menu.
- To rotate through the field options, position the cursor at the desired field, then use the numeric keypad's + and - keys to view the available choices.
- On-screen help information appears in the box on the right side of each screen.

4.3 MAIN BIOS SETUP MENU

The BIOS Setup Main menu is shown below:

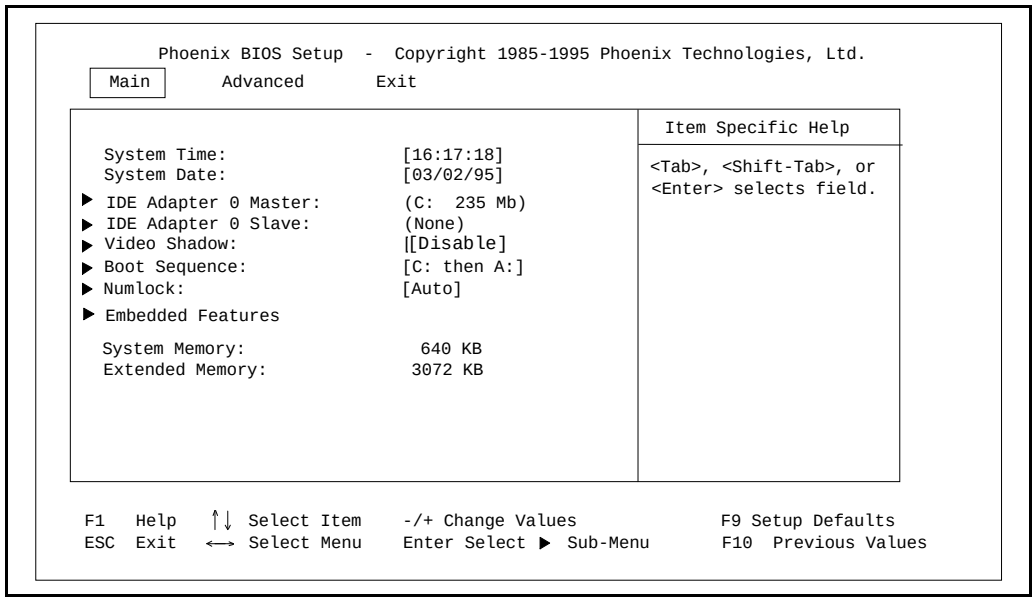


Figure 4-1. Main Menu

- **System Time/System Date** — Select each field and type the date or time. Use the Tab key to move from hour to minute to second, or month to day to year.
- **IDE Adapter 0 Master/Slave** — The size of an installed hard drive appears here. Choose this option to open the IDE Adapter Menu, which has options that allow you to enter complete disk drive information. See "IDE Adapter Menu" on page 4-3.
- **Video Shadow** — This menu item indicates whether video BIOS shadowing is enabled or disabled. Choose this option to open the Memory Shadow menu. System shadowing is always disabled. Video shadowing can be enabled or disabled. The default is disabled.

- **Boot Sequence** — The current boot sequence appears here. Choosing this option opens the Boot Options menu; use the options on this menu to change the boot sequence, and change the settings for the display of the SETUP prompt, POST errors, and summary screen. For more information, see "Boot Options Menu" on page 4-5.
- **Numlock** — The current Numlock setting appears here. Choosing this option opens the Keyboard Features menu. The options in this menu allow you to enable or disable the Numlock key and key click, and set the keyboard auto-repeat rate and delay. For more information, see "Keyboard Features Menu" on page 4-6.
- **Embedded Features** — Use this menu to disable or enable ROMable DOS, configure the EXPLR1 to accept ATA PC Cards (PCMCIA compatible) cards, and configure the various RAM/ROM drive emulators provided by the BIOS. For more information, see "Embedded Features Menu" on page 4-7.
- **System Memory** and **Extended Memory** — These are display-only fields set by the BIOS. No user interaction is required.

4.3.1 IDE Adapter Menu

There are two IDE adapter menus: one for the master drive and one for the slave drive. To see the detailed characteristics of the device or to change the device configuration, choose the IDE Adapter 0 Master menu. The following screen appears:

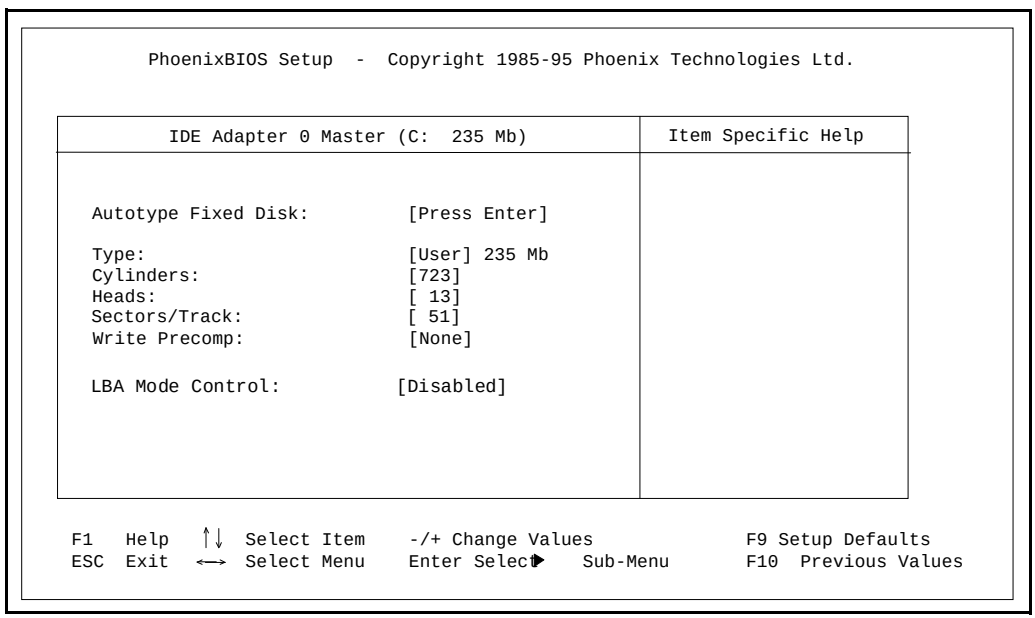


Figure 4-2. IDE Adapter Menu

- **Autotype Fixed Disk** — Use this option when setting up new disks. This option allows the BIOS to determine the proper settings of the disk based on information on the disk, which is detected by the EXPLR1 BIOS for drives that comply with ANSI specifications. Use the ENTER key to invoke this function.

  Existing (formatted) disks must be set up using the same parameters that were used originally when the disk was formatted. You must enter the specific cylinder, head, and sector information as listed on the label attached to the drive at the factory.

- **Type, Cylinders, Heads, Sectors/Track, Write Precomp** — Select None in the Type field if you are not using an IDE hard disk drive (i.e., you are using EXPLR1's Flash or PC Card adapter).

  In the case for which you have an IDE disk but cannot employ the Autotype feature, select User for the Type and enter the correct drive values for cylinders, heads, and sectors/track from the drive's documentation or label. Do not use a setting greater than 1024 cylinders (the EXPLR1 does not use Enhanced IDE).

- **LBA Mode Control** — This menu item enables or disables logical block addressing to be used in place of Cylinders, Heads, and Sectors.

There are some restrictions when setting up devices on the EXPLR1. If you plan to use an ATA PC Card, configure the IDE adapter to use the same parameters that were used when the ATA PC Card was formatted. You must also disconnect the IDE cable to the EXPLR1. For more information about using ATA PC Cards with the EXPLR1, see "Enabling an ATA PC Card" on page 2-6.

Once you have completed the Setup for the IDE Master, you can choose the IDE Adapter 0 Slave menu to configure a second drive.

4.3.2 Boot Options Menu

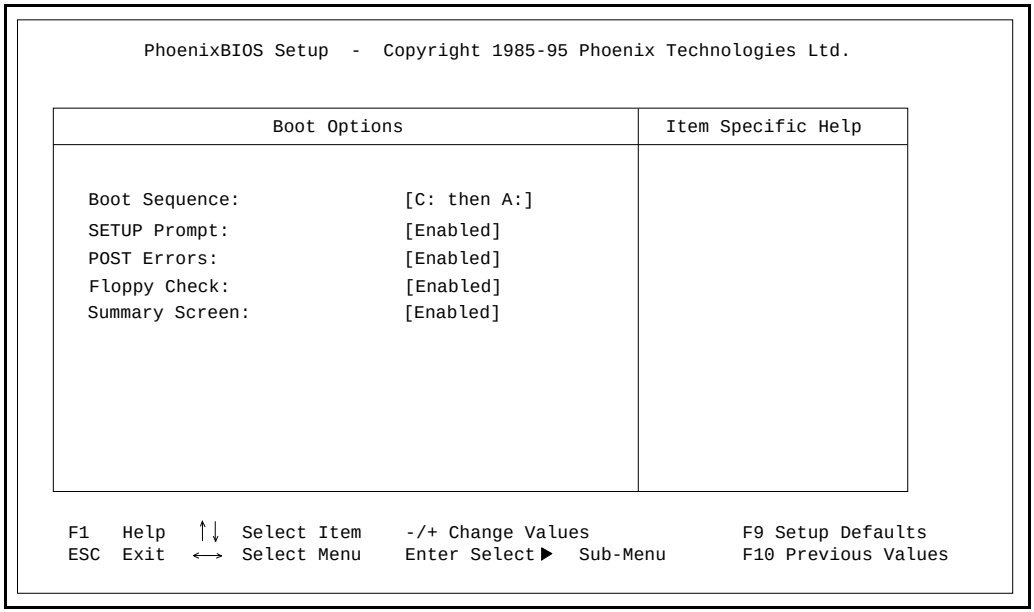


Figure 4-3. Boot Options Menu

- **Boot Sequence** — Use this option to set the system's boot sequence. You can boot from "C: only" to speed the boot process.

NOTE

About Drive Letter Assignment — If an IDE drive is specified in the BIOS Setup, it becomes the C: drive. Next, the BIOS scans for BIOS extensions at predefined offsets within the memory range C8000h to DFFFFh. This continues until the entire range is scanned or until a maximum of two physical drives is detected. An ATA PC Card also becomes the C: drive since it replaces the IDE drive.

- **Setup Prompt** — Use this option to enable or disable the message "Press F2 to enter Setup." Even if the message is disabled, you can still press F2 to enter BIOS Setup. The default is to enable this prompt.
- **POST Errors** — Use this option to stop during the boot if the system encounters error messages. Otherwise, the system will continue to attempt to boot despite any startup error messages that display. The default is to enable this option.
- **Floppy Check** — The EXPLR1 has no floppy drive circuitry. To save time you can disable this option. The default setting enables this option.

- **Summary Screen** — Use this option to enable or disable a summary screen of the system configuration, which appears before the operating system starts to load. To save time, you can disable the summary screen. The default is to enable the summary screen display.

4.3.3 Keyboard Features Menu

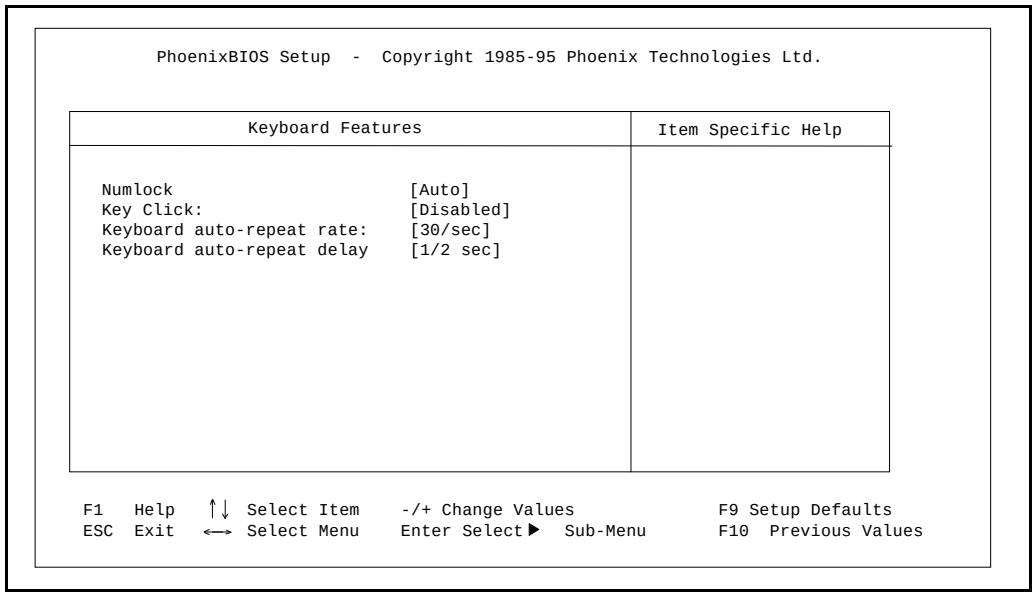


Figure 4-4. Keyboard Features Menu

- **Numlock** — Use this option to enable or disable the Numlock feature of the keyboard. This enables the use of the keypad numbers. The default is to automatically engage the Numlock key at boot-up.
- **Key Click** — Use this option to enable or disable the key click feature on the keyboard. If enabled, and a speaker is attached to the speaker header (JP8), the speaker produces an audible click each time a key is pressed.
- **Keyboard Auto-repeat Rate** — Use this option to set the auto-repeat rate if holding a key down on the keyboard. The rates are from 2-30 per second.
- **Keyboard Auto-repeat Delay** — Use this option to set the delay between when a key is pressed and when the auto-repeat feature begins. Options are 1/4, 1/2, 3/4, and one second.

4.3.4 Embedded Features Menu

The Embedded Features menu allows you to configure ROMable DOS, ROM/RAM disk, and PCM ATA capabilities.

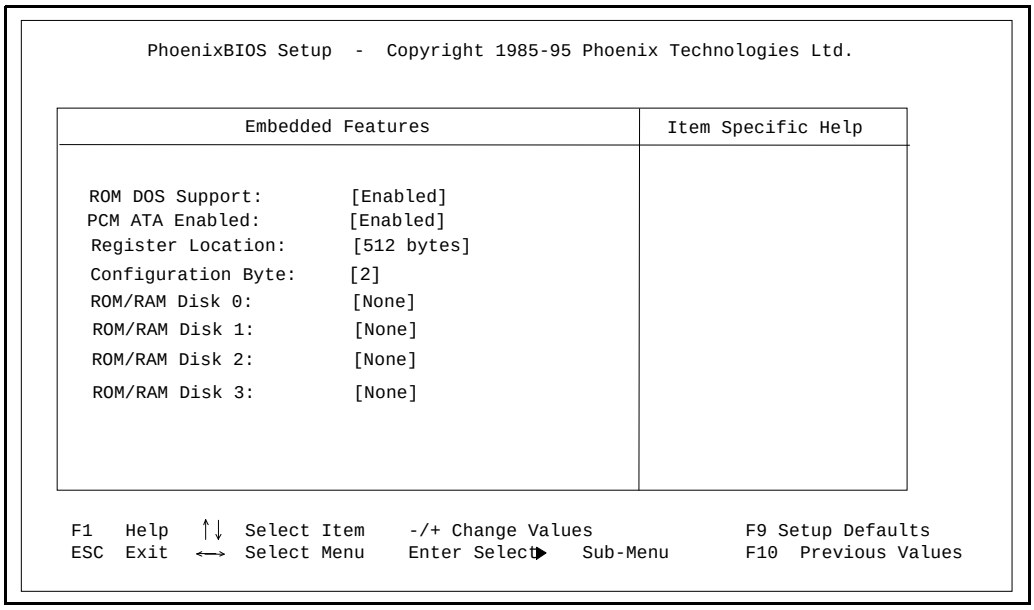


Figure 4-5. Embedded Features Menu

- **ROM DOS Support** — Use this option to enable or disable ROMable DOS. Note that ROMable DOS and ROM/RAM disk cannot be operated at the same time. When enabling ROMable DOS, you must set all ROM/RAM disks to None. If an IDE drive is installed, it will be configured as the C: drive when the system boots. Flash memory will be configured as D: drive. If no IDE drive is installed, then Flash memory will be configured as C: drive. ROMable DOS can also be used with a formatted ATA PC Card. This is done by configuring the BIOS for ATA PC Card support (see next section) and enabling ROMable DOS support. The ATA PC Card is configured as the C: drive and the flash memory is configured as the D: drive.
- **PCM ATA Enabled** — Use this option to enable or disable the PCM ATA drive. Configuring the EXPLR1 to support ATA PC Cards is a multi-step process. First, the PCM ATA menu item should be set to Enabled, all of the ROM/RAM disks should be set to None, and the IDE Adapter 0 Master should be set to None. This should result in an “Operating System not found” message when the system is booted. Next, the EXPLR1 should be powered down, the IDE cable to the drive removed, and a formatted ATA PC card installed in the PCMCIA socket. Finally, the board should be powered up and the Setup screen

entered one more time by pressing F2. Once in the Setup screen, the ATA PC Card should be configured in the IDE Adapter 0 Master menu. Refer to the description of that Menu on page 4-3. In most cases Autotyping the ATA PC Card will work. Since the ATA PC Card replaces the IDE drive you cannot use both of them at the same time. Also, it is important that you remove the IDE cable to the EXPLR1. Failure to do so will hang the system. We have verified the operation of the board with a SunDisk SDP5A-5 5MB Flashdisk that was formatted under PCM+* Card and Socket services from Phoenix Technologies, Ltd. Contact Phoenix Technologies, Ltd. for details.

- **Register Location** — This option defines the base location at which the configuration register block in an ATA PC card may be found. The default value is 512. Refer to the card manufacturer for the correct configuration register location. You can select a value of 256, 512, 1024, 2048, 4096, or 8192.
- **Configuration Byte** — Use this option to set up a value which enables the BIOS to establish a pointer to an ATA PC card configuration register. The default value is 2. Once the pointer has been established, the BIOS reads the register location to successfully complete an ATA PC card interface. Refer to the card manufacturer for the correct configuration byte value. You can select a value of 1 through 6.
- **ROM/RAM Disk 0-3** — The only ROM/RAM options supported at this time are None and PCMCIA.

4.4 ADVANCED MENU

The Advanced menu contains only one option: the setting for large disk access mode.

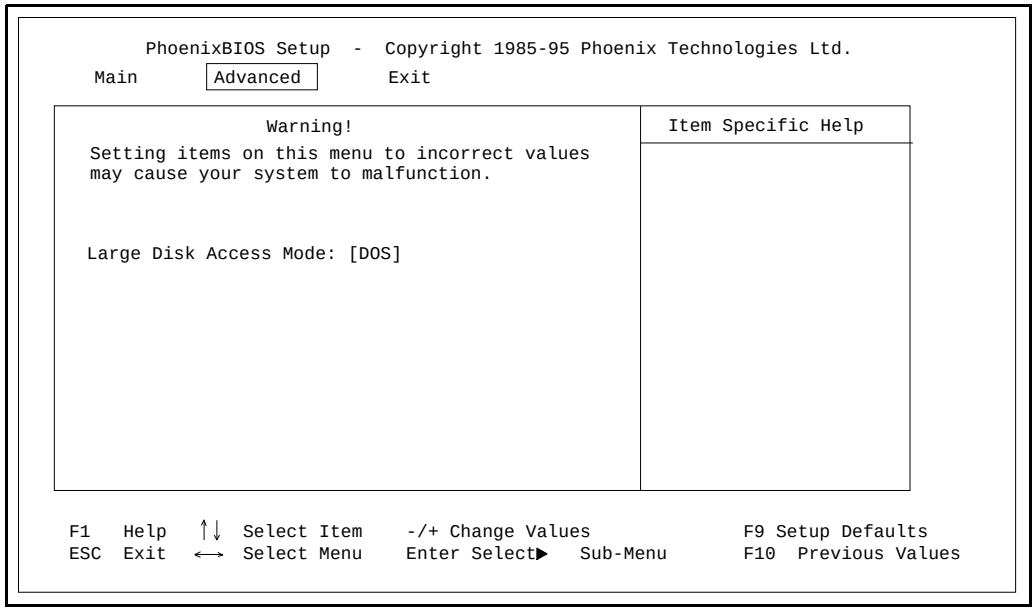


Figure 4-6. Advanced Menu

- **Large Disk Access Mode** — If you are using a drive larger than 528 Mbytes, set this to DOS if you are running DOS, or set this to Other if using a different operating system.

4.5 EXIT MENU

Use the options in this menu to save and exit, or abandon your changes and exit to the system.

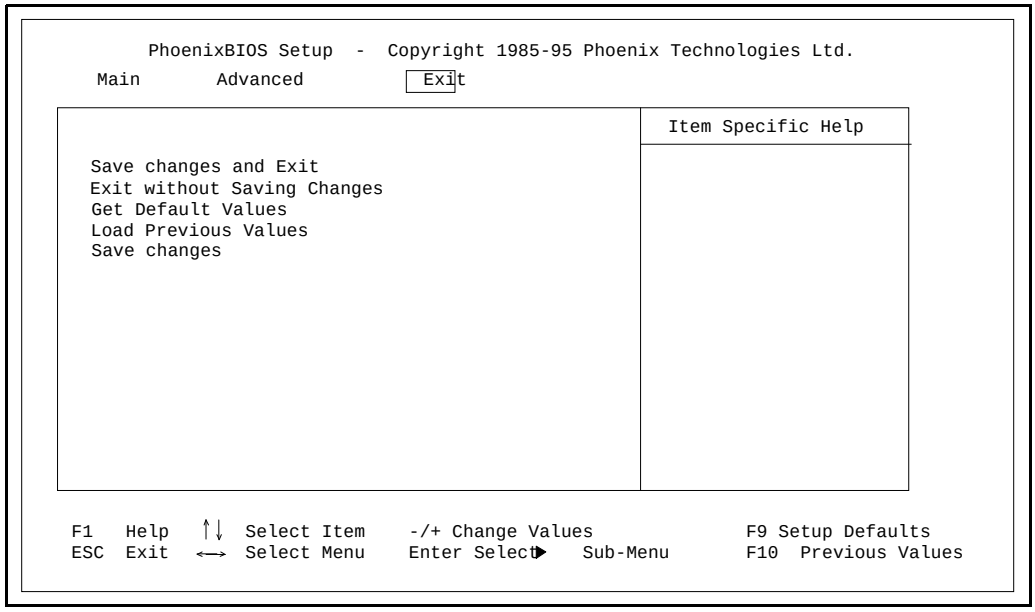


Figure 4-7. Exit Menu

- **Save Changes and Exit** — Use this option if you want to save the values you have just entered and exit in order to load the operating system. The new values are saved, and you exit and reboot.
- **Exit Without Saving Changes** — Use this option if you want to discard the changes you just made and revert to the BIOS as it was before you started. The system boots with the old values.
- **Get Default Values** — Use this option if you need to reset the BIOS values to the original, default values that were present before any other end users made changes.
- **Load Previous Values** — Use this option if you want to load the system with the previous values before this editing session started. You do not exit.
- **Save Changes** — Use this option to save the edits you have made during this session. You do not exit, and you can resume editing.

5

Hardware Reference

CHAPTER 5
HARDWARE REFERENCE

Physical board characteristics are defined in this chapter, with emphasis on the connectors and pin definitions. Figure 5-2 shows the physical location of each connector on the board. Section 5.1, Jumpers and Connectors (pg. 5-3) defines each connector's function.

Figure 5-1. EXPLR1 Embedded PC Evaluation Platform Board Photo

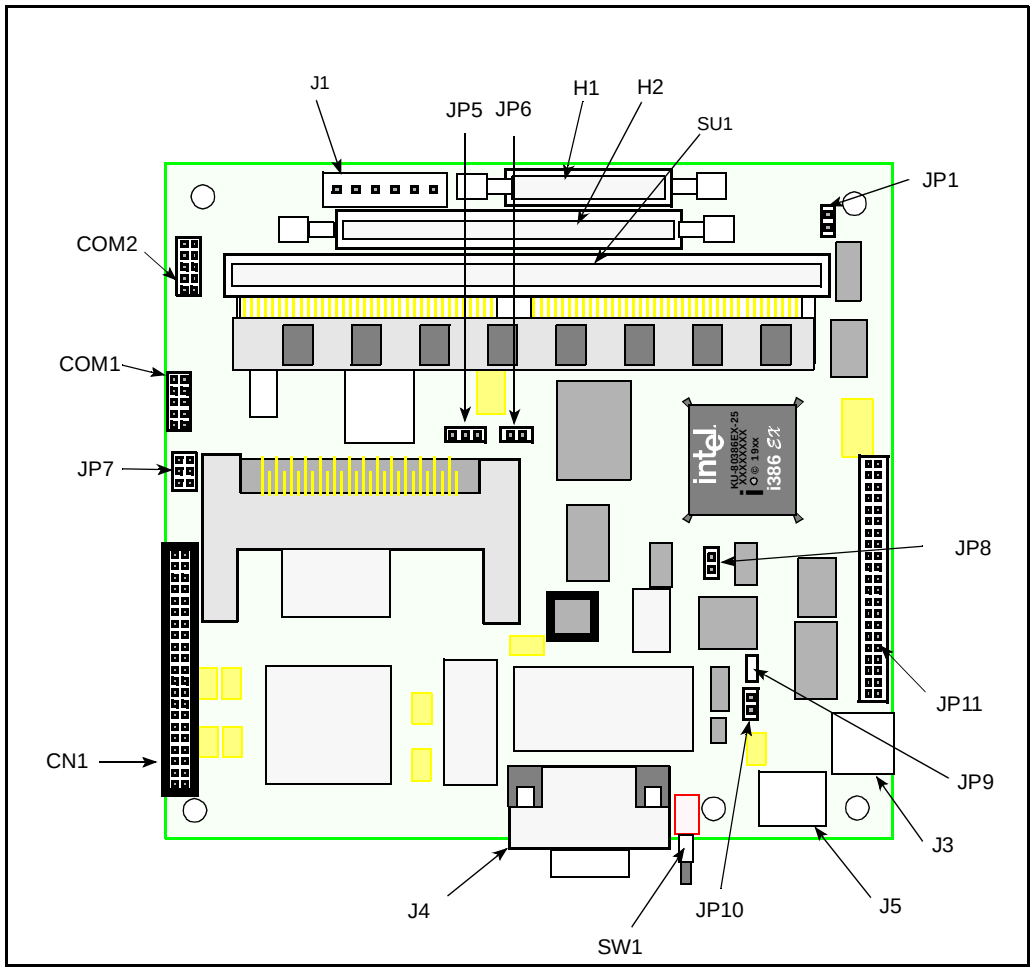


Figure 5-2. EXPLR1 Physical Diagram - Connectors and Jumpers

5.1 JUMPERS AND CONNECTORS

Table 5-1 identifies the labels, functions and default settings of the EXPLR1 jumpers. Table 5-2 identifies the labels of EXPLR1 connectors, and lists the section of this chapter where each connector is described.

Table 5-1. EXPLR1 Jumper Definitions and Settings

Jumpers	Label on Board	Function	Factory (default) Setting
JP1	MFG TST	Manufacturing Test	No Jumper (DO NOT USE)
JP2	COM2	Serial Port 2 (standard)	
JP3	COM1	Serial Port 1 (three-wire)	
JP4	SPKR	PCMCIA Speaker	no jumper pins installed
JP5	PRGMBB	Program\Protect Boot Block	Jumper on pins 2-3 (Protect Mode)
JP6	OFF-1,4M ON-2,8,16M	DRAM Size	OFF (initially contains 1Mbyte SIMM)
JP7	(none)	Panel Select	no jumper
JP8	SPKR	Speaker	no jumper
JP9	POST	Post-Loop Test	no jumper
JP10	FORCE UPDATE	Force Update	No Jumper
JP11	IDE	IDE Connector	

NOTE: These definitions are correct for board revision 60-0194-02

Table 5-2. EXPLR1 Connector Definitions

Connector	Label on Board	Where Defined
J1		Section 5.3, Power Supply Connector (J1) (pg. 5-5)
JP2, JP3	COM2, COM1	Section 5.4, Serial Ports COM1 (JP3) and COM2 (JP2) (pg. 5-5)
H1		Section 5.5, Digital I/O Connector (H1) (pg. 5-6)
J4		Section 5.6, VGA Connector (J4) and Pinout (pg. 5-7)
JP11	IDE	Section 5.7, IDE Hard Disk Drive Connector (JP11) (pg. 5-8)
J5	KYBD	Section 5.8, Keyboard Connector (J5) (pg. 5-9)
J3	MOUSE	Section 5.9, Mouse Connector (J3) (pg. 5-9)
CN1	FLAT PNL	Section 5.10, Flat Panel Header (CN1) (pg. 5-10)
H2		Section 5.11, Synchronous Expansion Bus (H2) Connection (pg. 5-11)
SU1		SIMM Connector. This is a standard single sided SIMM connector. No further definition is provided.

NOTE: These definitions are correct for board revision 60-0194-02

5.2 FLAT-PANEL DISPLAY JUMPER SETTINGS

The EXPLR1 evaluation board has been verified to operate with the Sharp LM64C08P 640x480 passive color LCD panel. To use this panel place a jumper on pins 1 and 2 and pins 5 and 6 of JP7 and connect an appropriate cable between the panel and the flat panel connector (CN1) on the EXPLR1.

NOTE

Other flat-panel displays are supported by the Cirrus Logic* VGA chip on the EXPLR1, but Intel does not guarantee their operation with EXPLR1. Contact Cirrus Logic for documentation and cabling diagrams.

Table 5-3. Flat-Panel Jumper Selection

Panel Selected	Class	Pins 1-2	Pins 3-4	Pins 5-6
STN 16-bit, 8-color, Single Scan Color	0	on	on	on
STN Dual-scan monochrome	1	on	on	off
STN 16-bit, 8-color, Dual-scan Color	2	on	off	on
TFT 9-Bit Active-Matrix Color	3	on	off	off
STN 16-bit, 8-color, Single Scan Dual-Clock Color	4	off	on	on
STN Dual Scan monochrome	5	off	on	off
STN 16-bit, 8-Color, Dual Scan Color	6	off	off	on
TFT 18-bit Active Matrix color	7	off	off	off

5.3 POWER SUPPLY CONNECTOR (J1)

Table 5-4 shows the power supply pins, function, diagram. Refer to Figure 5-2 for its physical location on the board.

Table 5-4. EXPLR1 Power Supply Connector (J1)

Pin	Function	Diagram
1	OPEN	
2	+5 V	
3	+12 V	
4	-12 V	
5	GND	
6	GND	

5

5.4 SERIAL PORTS COM1 (JP3) AND COM2 (JP2)

EXPLR1 has two COM serial ports. Both are 10-pin headers. Table 5-5 shows pin number and functions. Refer to Figure 5-2 for its physical location on the board.

Table 5-5. COM1 and COM2 Pinout

COM1 (JP3) Three-Wire Port		COM2 (JP2) - Standard Serial Port	
Pin	Function	Pin	Function
1	n/c	1	DCD
2	n/c	2	DSR
3	Rx	3	RxD
4	n/c	4	RTS
5	Tx	5	TxD
6	n/c	6	CTS
7	n/c	7	DTR
8	n/c	8	RI
9	GND	9	GND
10	n/c	10	n/c

NOTE: Both COM1 and COM2 use 2x5, 0.100” [2.54 mm] pitch unshrouded male pins.

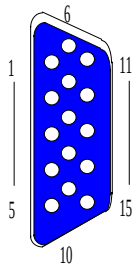
5.5 DIGITAL I/O CONNECTOR (H1)

Table 5-6. Digital I/O Connector (H1)

Pin	Signal	Type	Pin	Signal	Type
1	DIO7	I/O	2	DIO6	I/O
3	VSS	GND	4	DIO5	I/O
5	DIO4	I/O	6	DIO3	I/O
7	DIO2	I/O	8	VSS	GND
9	DIO1	I/O	10	DIO0	I/O
11	RESET	O	12	VSS	GND
13	CLK2	O	14	VSS	GND
15	INT1	I	16	INT2	I
17	INT3	I	18	INT6	I
19	+12V	PWR	20	+12V	PWR
21	-12V	PWR	22		
23	+5V	PWR	24	+5V	PWR
25	+5V	PWR	26	+5V	PWR

5.6 VGA CONNECTOR (J4) AND PINOUT

Table 5-7. VGA Connector Pinout (J4)

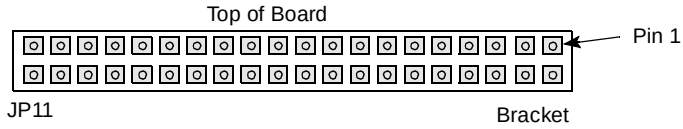
Pin	Function	Physical Diagram
1	RED	15-pin female high-density D-sub JST KSEY-15S-1A3F19-13 or equivalent. 
2	GREEN	
3	BLUE	
4	n/c	
5	GND	
6	ANALOG GND	
7	ANALOG GND	
8	ANALOG GND	
9	n/c	
10	GND	
11	n/c	
12	n/c	
13	H SYNC	
14	V SYNC	
15	n/c	

5.7 IDE HARD DISK DRIVE CONNECTOR (JP11)

Table 5-8 shows the IDE hard disk drive controller connector and defines the pins and functions.

Table 5-8. IDE Hard Disk Driver Controller Connector (JP11) Pinout

IDE HDD pinout (JP11) 22x2, 0.079" [2.0 mm] pitch header

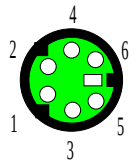


Pin	Function	Pin	Function
1	RESET#	2	GND
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	key
21	n/c	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IOCHRDY	28	n/c
29	n/c	30	GND
31	IRQ	32	IOCS16#
33	A1	34	PDIAG#
35	A0	36	A2
37	HCS0#	38	HCS1#
39	DASP#	40	GND

5.8 KEYBOARD CONNECTOR (J5)

The keyboard connector is a 6-pin DIN. Table 5-9 shows a physical diagram with pin and signal definitions.

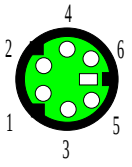
Table 5-9. Keyboard Connector (J5) Pinout

Pin	Signal	Pin	Signal	Physical Diagram
1	Data	4	+5V	
2	not used	5	Clock	
3	Ground	6	not used	

5.9 MOUSE CONNECTOR (J3)

The mouse connector is a 6-pin DIN. Table 5-10 shows a physical diagram with pin and signal definitions.

Table 5-10. Mouse Connector (J3) Pinout

Pin	Signal	Pin	Signal	Physical Diagram
1	Data	4	+5V	
2	not used	5	Clock	
3	Ground	6	not used	

5.10 FLAT PANEL HEADER (CN1)

Table 5-11. Flat Panel Header (CN1) Connection List

Pin	Signal	Type	Description	Pin	Signal	Type	Description
1	PVCC	PWR	VCC for flat panel	2	VSS	GND	Ground
3				4	LD0	O	Lower Data0 for Mono, Lower Data0 for STN
5	FPBACKEN	O	Flat Panel Backlight Enable	6	LD1	O	Lower Data1 for Mono, Lower Data1 for STN
7	FPVCCEN	O	Flat Panel VCC Enable	8	VSS	GND	Ground
9	FPVEEEN	O	Flat Panel VEE Enable	10	LD2	O	Lower Data2 for Mono, Lower Data2 for STN
11	VSS	GND	Ground	12	LD3	O	Lower Data3 for Mono, Lower Data3 for STN
13	MOD	O	Modulation	14	VSS	GND	Ground
15	LP	O	LCD VSYNC (LLCLK)	20	VSS	GND	Ground
17	VSS	GND	Ground	18	LD5	O	Lower Data5 for STN
19	FLM	O	LCD HSYNC (LFS)	16	LD4	O	Lower Data4 for STN
21	FPDEN	O	Flat Panel Display Enable	22	LD6	O	Lower Data6 for STN
23	VSS	GND	Ground	24	LD7	O	Lower Data7 for STN
25	SCLK	O	Shift Clock (FPVDCLK)	26	VSS	GND	Ground
27	VSS	GND	Ground	28	R4	O	R4 for TFT
29	SUD0	0	Upper Data0 for Mono, Upper Data0 for STN	30	R5	O	R5 for TFT
31	SUD1	0	Upper Data1 for Mono, Upper Data1 for STN	32	VSS	GND	Ground
33	VSS	GND	Ground	34			
35	SUD2	O	Upper Data2 for Mono, Upper Data2 for STN	36			
37	SUD3	O	Upper Data3 for Mono, Upper Data3 for STN	38	VSS	GND	Ground
39	VSS	GND	Ground	40			
41	SUD4	O	Upper Data4 for STN	42			
43	SUD5	O	Upper Data5 for STN	44	VSS	GND	Ground
45	VSS	GND	Ground	46			
47	SUD6	O	Upper Data6 for STN	48			
49	SUD7	O	Upper Data7 for STN	50	VSS	GND	Ground

5.11 SYNCHRONOUS EXPANSION BUS (H2) CONNECTION

Table 5-12. Synchronous Expansion Bus (H2) Connection

Pin	Signal	Type	Pin	Signal	Type
1	A25	O	2	A24	O
3	VSS	GND	4	A23	O
5	A22	O	6	A21	O
7	A20	O	8	VSS	GND
9	A19	O	10	A18	O
11	VSS	GND	12	A17	O
13	A16	O	14	A15	O
15	A14	O	16	VSS	GND
17	A13	O	28	A12	O
19	VSS	GND	20	A11	O
21	A10	O	22	A9	I
23	A8	O	24	VSS	GND
25	A7	O	26	A6	O
27	VSS	GND	28	A5	O
29	A4	O	30	A3	O
31	A2	O	32	VSS	GND
33	A1	O	34	BHE#	O
35	VSS	GND	36	BLE#	O
37	WR#	O	38	RD#	O
39	W/R#	I/O	40	VSS	GND
41	D/C#	O	42	MI/O#	O
43	VSS	GND	44	D15	I/O
45	D14	I/O	46	D13	I/O
47	D12	I/O	48	VSS	GND
49	D11	I/O	50	D10	I/O
51	VSS	GND	52	D9	I/O
53	D8	I/O	54	D7	I/O
55	D6	I/O	56	VSS	GND
57	D5	I/O	58	D4	I/O
59	VSS	GND	60	D3	I/O
61	D2	I/O	62	D1	I/O
63	D0	I/O	64	VSS	GND
65	BALE	O	66	MEMR#	O
67	VSS	GND	68	IOR#	O
69	IOW#	O	70	MEMW#	O
71	IOCHRDY#	I	72	VSS	GND
73	IOCS16#	I	74	MEMCS16#	I
75	VSS	GND	76	AS	O
77	DS	O	78		
79	+5V	PWR	80	+5V	PWR

5.12 ELECTRICAL AND PHYSICAL SPECIFICATIONS

Table 5-13 defines EXPLR1's environmental, electrical and physical specifications. The specifications assume the board contains no internal disk drives.

Table 5-13. EXPLR1 Specifications

Characteristic		Value
Environmental		
Temperature	operating	0°C - 60°C at point of entry of forced air derated 2°C per 1000 ft (300 m) over 10,000 ft (3,000m) 2°C per min max excursion gradient
	storage	-40 - 85°C 5°C per min max excursion gradient
Cooling		For 10°C rise, airflow of 2 liters per second against 0.014mm H2O backpressure
Humidity	operating	5% - 95% noncondensing
	storage	5% - 95% noncondensing
Altitude	operating	0 - 10,000 ft (3000 m)
	storage	0 - 40,000 ft (12,000 m)
Vibration	operating	0.015 inch (0.38 mm) P-P displacement with 2.5 g peak (max) acceleration over 5-2000 Hz
	storage	0.030 inch (0.76 mm) P-P displacement with 5.0 g peak (max) acceleration over 5-2000 Hz
Shock	operating	30 g, 11 ms duration, half-sine shock pulse
	storage	50 g, 11 ms duration, half-sine shock pulse
Electrical (measured with 1 Mbyte SIMM, no keyboard, no disk drive, no PCMCIA card)		
Current	+5 V	1.3 A max, 1 A typical
	+12 V	40 mA max
	-12 V	not used
Physical (approximate)		
Dimensions		Length = 5.5 inches Width = 5.5 inches Height (with SIMM and mounting standoffs) = less than 2 inches

A

Troubleshooting and Error Messages

APPENDIX A
TROUBLESHOOTING AND ERROR MESSAGES

Section A.1, Troubleshooting identifies symptoms which do not generate an error message. Section A.2, Common Error Messages identifies EXPLR1-specific error messages generated from DOS, BIOS and CMOS.

If these basic solutions do not fix the problem, contact your Intel technical resources. Refer to Section 1.2.4, Intel Customer Support Contacts (pg. 1-4) for assistance.

A.1 TROUBLESHOOTING

Table A-1. Troubleshooting Guide

Symptoms	Possible cause(s)	Solution
EXPLR1 "seems" to boot OK — power ON, hard disk accessed — but no video display	Video adapter not fully seated.	Remove and reinsert the video adapter. Make sure the edge connector is installed correctly.
	Monitor or cable problem.	Check for bent or broken cable pins. Make sure the cable is fully seated in the video adapter. If necessary, try the monitor on another system to verify that the monitor is OK.
	Video adapter failure.	Replace the unit.
	No communication between EXPLR1 and expansion interface.	Check the electrical connections; make sure the board is fully seated in the edge connector.
EXPLR1 does not power-up. **Power-on self-test not running**	The system is not getting power.	Verify that EXPLR1 is receiving +5V. Make sure the power supply and cable are functioning properly and delivering the correct voltages to the EXPLR1 power supply connector.
	Hardware failure.	Replace the unit.
Serial port(s) not functioning	Interrupt conflicts.	Another module may be using the same interrupts as COM1 and/or COM2. Verify that no other card in system is using IRQ3 or IRQ4.
	Port hardware failure.	Replace the unit.

A.2 COMMON ERROR MESSAGES

This section identifies error and warning messages alphabetized by message text. These messages are generated by the BIOS and MS-DOS that may be related to your hardware configuration.

BAD OR MISSING COMMAND INTERPRETER

DOS

Problem: DOS cannot find the Command line interpreter.

Solution(s): (1) **COMMAND.COM** is not present at the specified (or default) directory level of the boot disk. Refer to your PC's documentation to make sure this file is correctly installed.

(2) your system's **CONFIG.SYS** "SHELL=" statement lists the file incorrectly (perhaps wrong directory or misspelled). Refer to your PC's documentation to make sure this file is correctly structured and installed.

CMOS CHECKSUM BAD -- RUN SETUP

CMOS

Problem: An entry in the CMOS RAM is incorrect.

Solution(s): Run the BIOS setup program to determine what is wrong, and correct it.

If the error occurs repeatedly, check the battery. Replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

BIOS

Problem: Boot disk not found. DOS looks for a logical drive and boots from it. If your hard disk is not partitioned into logical drive(s). Hard disks are physical drives; partitions are logical drives.

Solution(s): If your BIOS setup screen has all disks disabled, or if your hard disk is disabled, run the BIOS setup program and verify that all disk parameters are correct.

If a hard disk is present, verify that it is properly partitioned and formatted as a system disk and one partition is set active.

FAILURE FIXED DISK 0

BIOS

Problem: The IDE disk controller for drive C does not initialize.

Solution(s): Ensure that the +5V power to the controller and hard disk are good and, if used, the ribbon cable to the hard disk is fully seated.

If you are not using an IDE drive, enter the BIOS setup program. Enter the Fixed disk menu. Change the drive type to match the device being used.

GENERAL FAILURE READING DRIVE ...

DOS

Problem: Almost always indicates the presence of an unformatted hard disk partition or diskette.

Solution(s): Format the partition or diskette. Use the utilities supplied with your operating system.

INVALID DRIVE SPECIFICATION

DOS

Problem: You are attempting to access a logical drive (e.g., C:, D:, ...) that is not known to the operating system.

Solution(s): Select a different logical drive. If you are attempting to access a hard disk, you may need to create the logical partition.

KEYBOARD ERROR

BIOS

Problem: Indicates that the system did not recognize a keyboard at power-up or you pressed a key during the power-on self test.

Solution(s): Make sure the keyboard connector is not damaged and is correctly installed.

If you pressed a key during power-up, reboot.

Some keyboards have a switch (or jumper) to configure the keyboard for either an AT or XT system. If your keyboard has this, set the switch for AT system.

Your keyboard must be a valid PC/AT keyboard (e.g., PC/XT-only or PS/2 keyboard). Make sure you have a PC/AT style keyboard.

MISSING OPERATING SYSTEM

BIOS

Problem: The system reads the hard disk and finds the active partition, but the operating system files could not be found.

Solution(s): Occurs when a drive type number in the BIOS setup menu does not match the type number used to format the hard disk.

To correct this: Run the BIOS setup program. Enter the Fixed Disk menu. Select the correct drive type to match the type originally used to format the disk. Save the changes and reboot.

This can also occur when one hard disk partition is set active, but the partition is not formatted. Format the partition using the utilities supplied with your operating system.

PARITY ERROR IN SEGMENT ...

DOS

Problem: Either a software error (reading a nonexistent memory area) or a true hardware failure.

Solution(s): Attempt to duplicate the error. If the error occurs during the execution of your own proprietary software, verify the memory location specified in your software is valid.

PRESS A KEY TO REBOOT

BIOS REAL TIME CLOCK ERROR

Problem: A C: drive exists but is not set active.

Solution(s): Run your operating system disk partitioning program (e.g., FDISK) and set the primary partition active.

REAL TIME CLOCK ERROR - RUN SETUP

BIOS

Problem: The battery-backed TOD clock is incorrect.

Solution(s): Run the BIOS setup program and reset the clock.

If the error occurs repeatedly, the unit's battery has failed. Replace battery.

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