UP1000
User Manual

Part Number: 51-0036-0A

Part #: **51-0036-0A**

Date: **12/10/99**

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Revision History

Date	Rev	Description
12/10/99	51-0036-0A	**First product release. This manual describes the Alpha Processor, Inc. parts numbered 90-0001-2C (beta test boards) and 90-0001-3A (first product release boards).**

Table of Contents

List of Figures

List of Tables

Preface

Overview

This manual describes the Alpha Processor, Inc. UP1000 product, including the UP1000 Motherboard and the Alpha Slot B Module.

The document emphasizes the AlphaBIOS firmware **user interface.**

Task-oriented topics include a description of **how to:**
- Navigate menus
- Install an operating system
- Check or change system configurations
- Troubleshoot basic system problems

Hardware-oriented topics include **how to:**
- Install memory modules
- Cable the I/O connections
- Cable the diskette and IDE disk I/O ports

Audience

This manual is intended for technicians and engineers who support resellers, dealers, system integrators and OEM vendors who supply UP1000-based systems.

Scope

This manual describes the features, configuration options, functional operation, troubleshooting analysis and user interface of the system and its AlphaBIOS firmware. It is a companion piece to Alpha Processor, Inc.'s UP1000 document set that includes the *UP1000 Quick Start Installation Guide* (51-0035-0A).

Manual Organization

The UP1000 User Manual is organized as follows:
- Chapter 1, "Introduction," presents the product features and includes a functional block diagram of the system.

- Chapter 2, "System Configuration," provides a pictorial layout of the UP1000 Motherboard with its key components. Configuration elements include main memory guidelines, I/O disk port cabling, and non-keyed I/O connections.
- Chapter 3, "Electrical and Environmental Data," furnishes the electrical and environmental requirements, and physical board dimensions.
- Chapter 4, "Software Support," describes the three major software components that form the UP1000 user interface. Topics include installing and upgrading a Linux operating system, initializing and upgrading the firmware, as well as displaying and configuring system parameters.
- Chapter 5, "Troubleshooting," discusses solutions for hardware and software problems encountered during system startup.
- Appendix A, "Support, Products and Documentation," provides directions for obtaining additional product information and technical support.

Conventions and Definitions

This section defines product-specific terminology, abbreviations, and other conventions used throughout this manual.

Acronyms

The following is a list of the acronyms used in this document and their definitions.

Abbreviation	Meaning
AGP	**Accelerated Graphics Port**
API	Application Program Interface
BIOS	**Basic Input/Output System**
CE	European Conforming
CPU	**Central Processing Unit**
cUL	Canadian Underwriters Laboratory
DDR	**Double Data Rate**
DIMM	Dual Inline Memory Module
DMA	**Direct Memory Access**

Abbreviation	Meaning
DRAM	Dynamic Random Access Memory
ECC	**Error Correcting Code**
EIDE	Enhanced Integrated Device Electronics
EMI	**Electromagnetic Interference**
FDD	Floppy Disk Drive
FIFO	**First In, First Out**
FPGA	Field Programmable Gate Array
HDD	**Hard Disk Drive**
IDE	Integrated Device Electronics
ISA	**Industry Standard Architecture (re: I/O Bus)**
LED	Light Emitting Diode
LVD	**Low Voltage Differential**
LW	Late Write
OEM	**Original Equipment Manufacturer**
PCI	Peripheral Component Interconnect (re: I/O Bus)
PIO	**Programmed Input/Output**
PLL	Phase Locked Loop
PCB	**Printed Circuit Board**
ROM	Read-only Memory
SCSI	**Small Computer System Interface**
SDRAM	Synchronous Dynamic Random Access Memory
SROM	**Serial Read-only Memory**
SRAM	Static Random Access Memory
SSRAM	**Synchronous SRAM**
UL	Underwriters Laboratory
UART	**Universal Asynchronous Receiver Transmitter**
USB	Universal Serial Bus

Chapter 1   Introduction

This chapter provides an overview of the UP1000 product consisting of a UP1000 Motherboard and one Alpha Slot B Module.

1.1   Features

Following is a summary of the UP1000 product features:

Hardware Features

- Supports one Alpha Slot B Module utilizing an Alpha 21264 microprocessor running at 600 MHz or 700 MHz
- Uses AMD-751 System Controller providing:
  - 100 MHz/64 bit (DDR) System Interface
  - One 64-bit Memory Bus
  - One PCI Bus at 32-bit/33 MHz
  - One 2x AGP Bus
- Synchronous DRAM (SDRAM) memory subsystem supporting:
  - 64 MB to 768 MB memory with Error-Correcting Code (ECC)
  - Up to three 168-pin PC 100 SDRAM Unbuffered SPD DIMMs
- External L2 cache for Alpha Slot B Module supports:
  - 2 MB or 4 MB cache size with 128-bit data path
  - Late Write Synchronous SRAMs (SSRAMs)
- ALI M1543C Southbridge chip provides interface to peripherals and ISA bus:
  - Two ISA expansion slots
  - One diskette port
  - Two serial UARTs with modem control
  - One parallel port
  - PS/2 keyboard and mouse control
  - Dual USB port
  - Two Ultra DMA33 IDE connectors for Primary and Secondary buses
- 2 MB of flash ROM
- ATX form factor (12" x 9.6")

Software Features

- Embedded AlphaBIOS system interface
- Installation diskette with APB utility for installing, configuring and booting Linux operating systems
- Supports many Linux operating system distributions

1.2   System Components

The functional components of the UP1000 are shown in Figure 1-1 in block diagram form.

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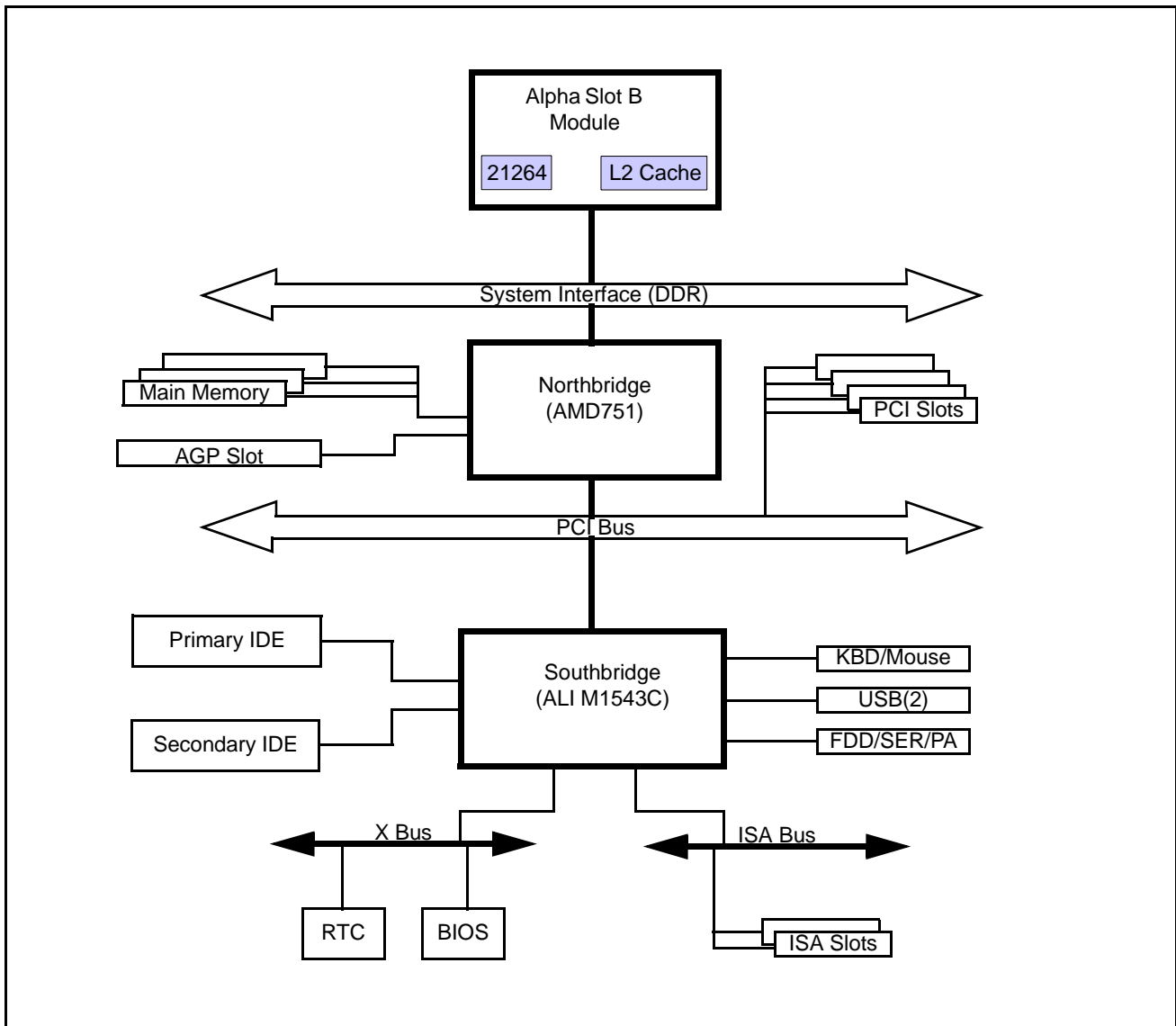
Figure 1-1   UP1000 Functional Block Diagram

1.2.1   Motherboard Layout

A layout of the UP1000 Motherboard, including placement of the major subsytems, is shown in Figure 1-2.

Confidential & Proprietary to API—Preliminary Information

Fan Power Connectors

System Support Connectors

Bus Connectors

Fans

Memory Subsystem

ISA Slot

ISA Slot

PCI Slot

PCI Slot

PCI Slot

PCI Slot

AGP Slot

Alpha Slot B Module

Module Slot

Slot 0 - DIMM

Slot 1 - DIMM

Slot 2 - DIMM

Diskette

IDE - Secondary

IDE - Primary

I/O Connectors

Status LEDs

Disk Ports

Firmware Configuration Area

System Power Connectors

Figure 1-2   Major Subsystems of UP1000

Chapter 2   # System Configuration

This chapter describes the layout and configuration of the UP1000 components.

2.1   Board Layout and Components

The UP1000 Motherboard uses onboard connectors to provide for:

- Alpha Slot B Module
- Memory modules
- AGP, PCI, and ISA modules
- System support I/O peripherals (keyboard, mouse, serial, parallel, and USB)
- IDE and floppy disk devices
- System power
- I/O connections (indicators and buttons)

These connectors are shown in Figure 2-1 and listed in Table 2-1.

Alpha Slot B Module Auto configuration

During start-up the UP1000 system detects these Alpha Slot B Module parameters:

- System speed
- Cache size

The Alpha Slot B Module is automatically configured for the proper values. You are not required to set switches or install pin jumpers.

Memory Configuration

Memory modules employed in the system must be selected and utilized under guidelines shown in Section 2.2.

I/O Cabling Configuration

I/O ports (including sockets for diskette and IDE devices) are shown in Figure 2-3.

I/O connections for internal system I/O functions are shown in Figure 2-4. These connectors are not keyed; however, their Pin 1 orientation is labelled.
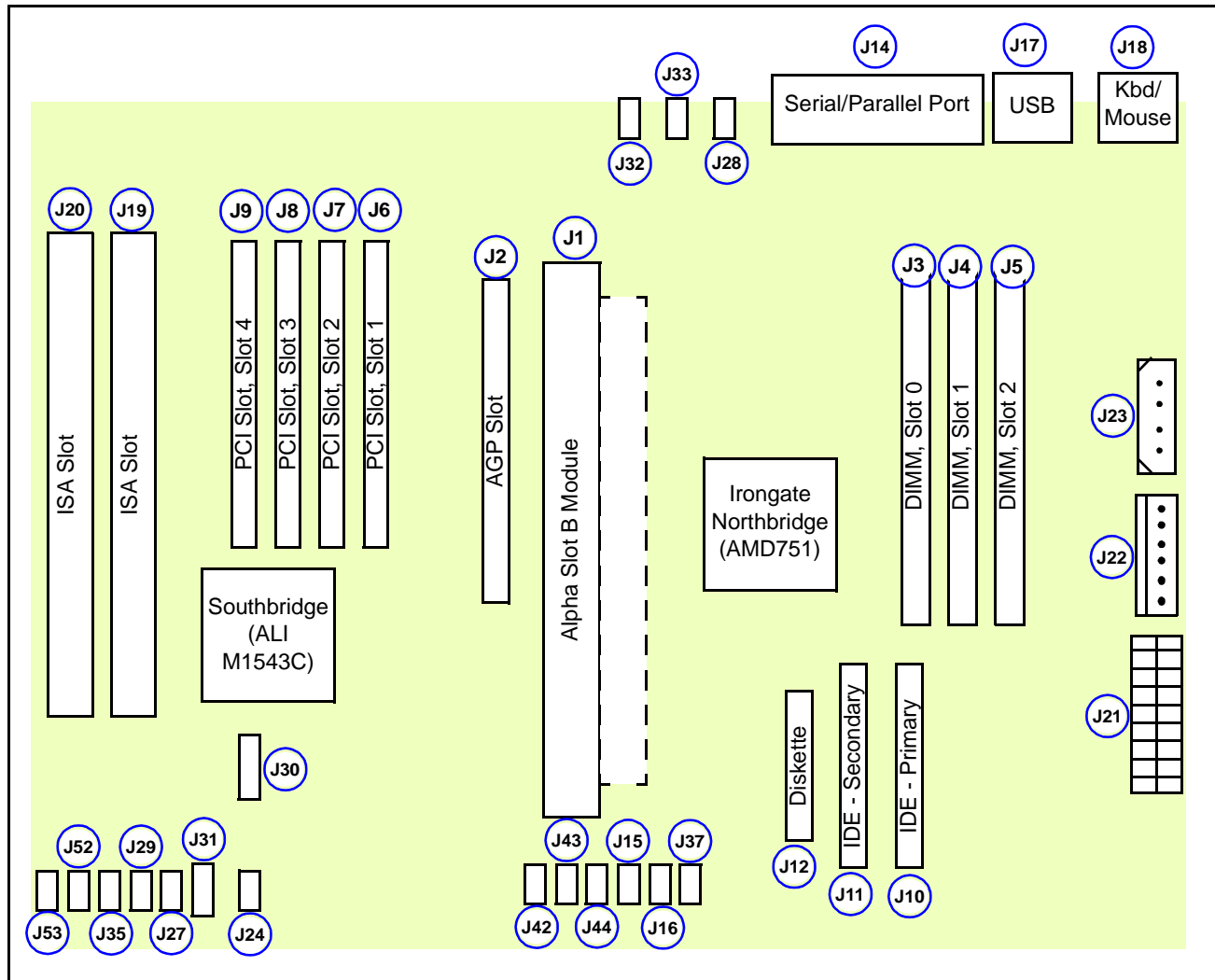
Figure 2-1   UP1000 Motherboard Layout with User Accessible Connections

Table 2-1   UP1000 User Accessible Connections List

Comp. No.	Specification
J1	**Alpha Slot B Connector**
J2	AGP Connector
J3	**168-pin DIMM Socket, Slot 0**
J4	168-pin DIMM Socket, Slot 1
J5	**168-pin DIMM Socket, Slot 2**
J6	32-bit PCI Connector, Slot 1

Table 2-1   UP1000 User Accessible Connections List

Comp. No.	Specification
J7	**32-bit PCI Connector, Slot 2**
J8	32-bit PCI Connector, Slot 3
J9	**32-bit PCI Connector, Slot 4**
J10	Primary IDE Connector
J11	**Secondary IDE Connector**
J12	Diskette Connector
J14	**Serial (2) /Parallel (1) I/O Ports**
J15	Option Switch 3
J16	**Option Switch 4**
J17	USB (2) Ports
J18	**Keyboard/Mouse Ports**
J19	ISA Connector
J20	**ISA Connector**
J21	ATX Power Connector
J22	**Auxiliary ATX Power Connector**
J23	System Power Connector
J24	**Reset Switch Cable Connector**
J27	Power Switch Cable Connector
J28	**Auxiliary Fan Cable Connector**
J29	LED Cable Connector
J30	**Speaker Cable Connector**
J31	Optional System Fan Power Connector
J32	**Module Fan Cable Connector**
J33	Module Fan Cable Connector
J35	**Keyboard Lock Cable Connector**
J37	Option Switch 5
J42	**Option Switch 0**
J43	Option Switch 1
J44	**Option Switch 2**
J52	Safety Block for Flash ROM U31
J53	**Safety Block for Flash ROM U32**

2.2   Memory Subsystem

Memory
Configuration

The memory subsystem has one DIMM bank with three independent slots. (See Figure 2-2.) Each slot accepts 168-pin, PC 100 SDRAM Unbuffered SPD DIMM modules.

The following DIMM sizes may be used:
- 64 MB
- 128 MB
- 256 MB
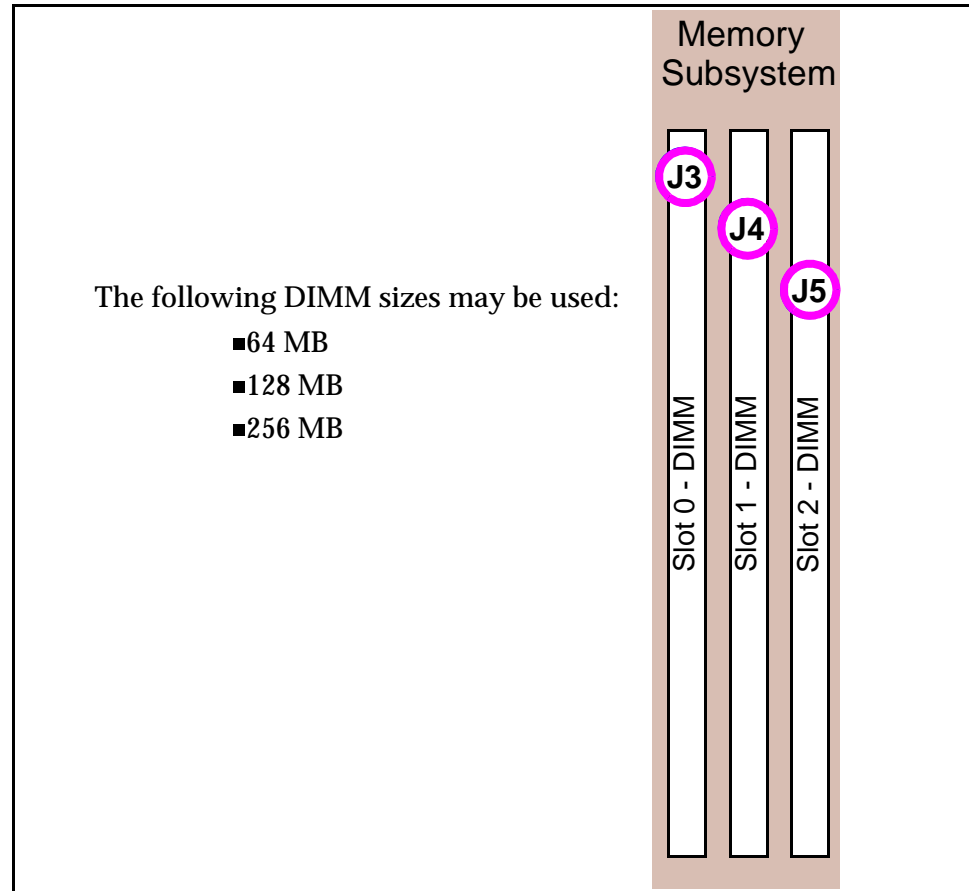
Figure 2-2Memory Subsystem - DIMM Slot Orientation

Memory Guidelines

Use the following rules:

■ Populate Slot 2 (J5) **first**.

■ Each slot can have a DIMM of a different type, size, and speed.

■ Memory is supported in a size range between 64 MB (minimum) to 768 MB (maximum). See Table 2-2 for typical memory configurations.

Table 2-2   **Typical UP1000 Memory Configurations**

Total Memory	No. of DIMMs	Slot 2 (J5)	Slot 1(J4)	Slot 0 (J3)
64 MB	**1**	**64 MB**		
128 MB	1	128 MB		
128 MB	**2**	**64 MB**	**64 MB**	
192 Mb	2	128 MB	64 MB	
256 Mb	**1**	**256 MB**		
256 MB	2	128 MB	128 MB	
256 Mb	**3**	**128 MB**	**64 MB**	**64 MB**
320 MB	2	256 MB	64 MB	
384 MB	**2**	**256 MB**	**128 MB**	
384 MB	3	256 MB	64 MB	64 MB
384 MB	**2**	**256 MB**	**128 MB**	
512 MB	2	256 MB	256 MB	
512 MB	**3**	**256 MB**	**128 MB**	**128 MB**
576 MB	3	256 MB	256 MB	64 MB
640 MB	**3**	**256 MB**	**256 MB**	**128 MB**
768 MB	3	256 MB	256 MB	256 MB

2.3   Disk I/O Ports

A pictorial view of the UP1000 disk I/O ports is shown in Figure 2-3 below. The IDE and diskette port sockets are keyed with one or more notches.
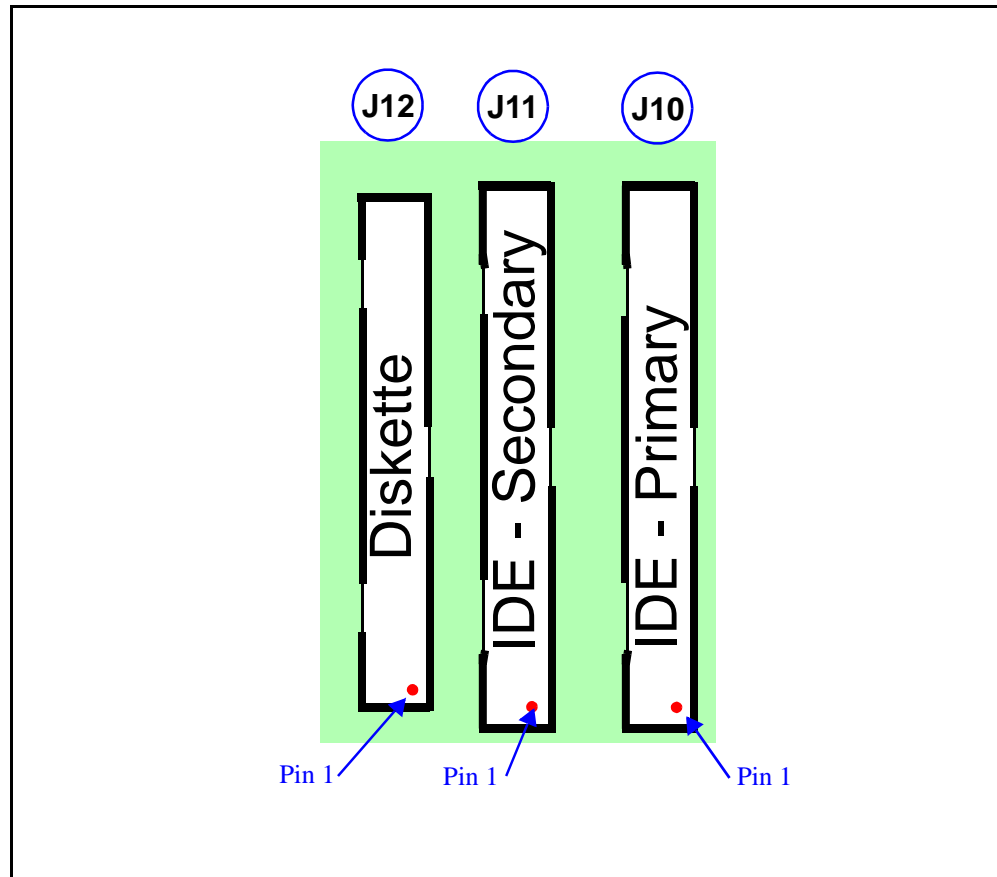
Figure 2-3Disk I/O Ports with Pin 1 Orientation

2.4   I/O Connections

2.4.1   Indicators and Buttons

These I/O connectors are **not keyed**. Figure 2-4 shows an enlargement of the connectors and the **Pin 1 position** for each function.
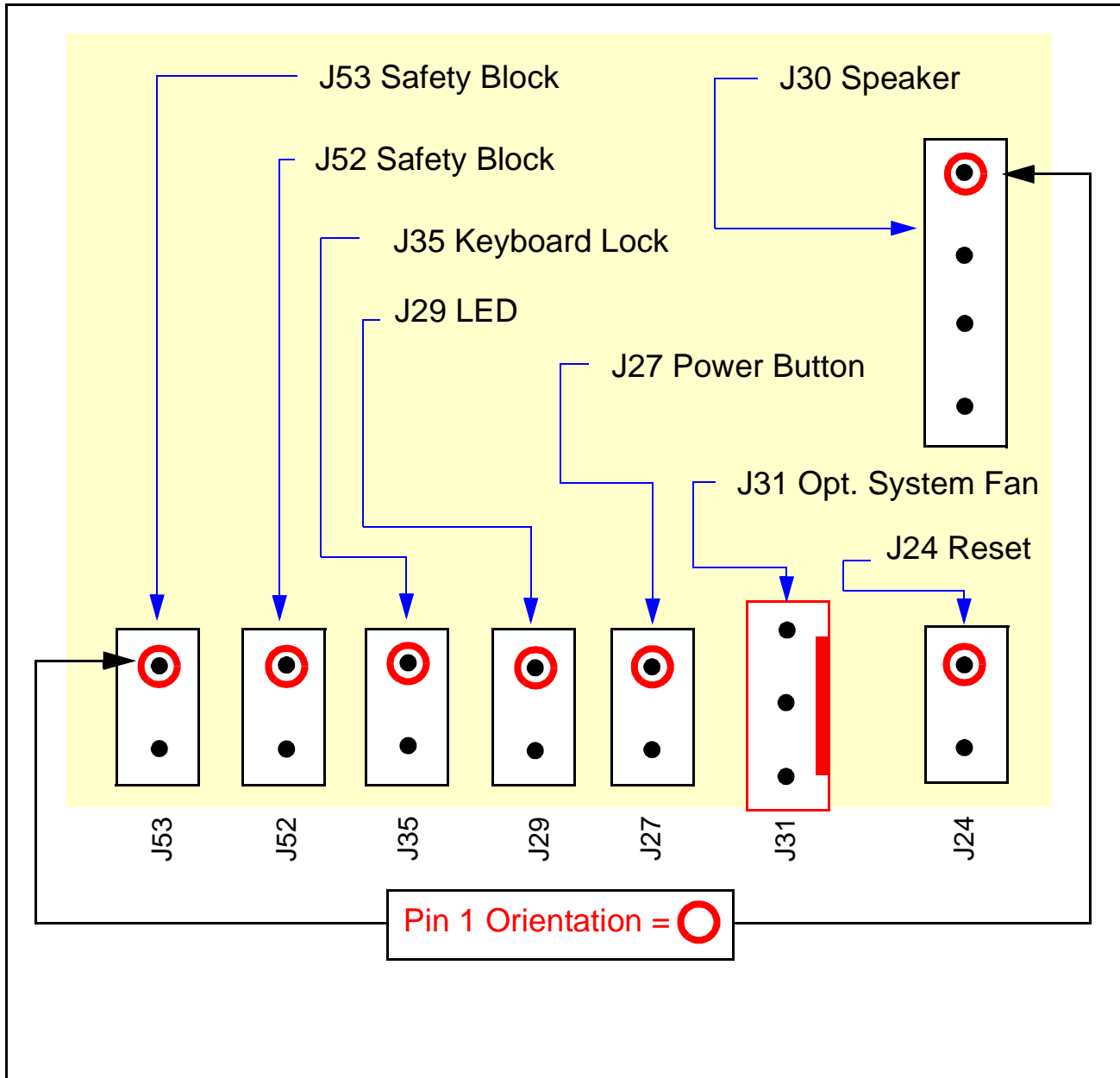
Figure 2-4   I/O Connectors with Pin 1 Orientation

2.5   Variable Configuration Jumpers

The UP1000's firmware interfaces with a set of six configuration jumpers which are used to:

- Establish the factory default conditions for the system
- Enable a re-set to the default condition (after certain errors)
- Enable a re-flash of certain firmware

Note: Each configuration jumper is composed of a 3-pin header with a 2-position jumper shunt.

There are seventeen jumpers in the configuration section. A shaded box shown within Figure 2-5 identifies the **six** variable configuration jumpers as J42, J43, J44, J15, J16 and J37.

These are the **only jumpers** that you may be required to select.

See Chapter 5, "Troubleshooting", for details concerning:

- What error conditions require changing the Variable Configuration Jumpers
- What values to select when changing the shunts
- What system procedures to use to enable error recovery
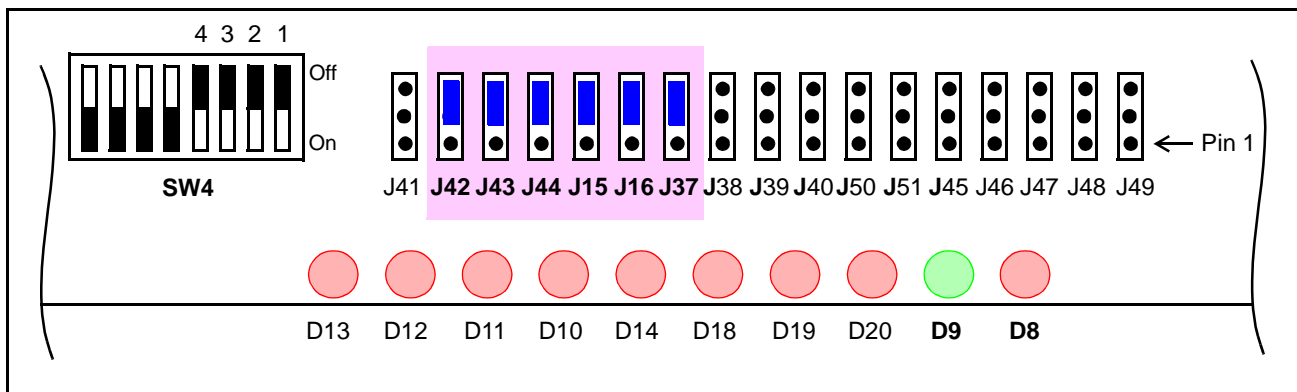
Figure 2-5   Variable Configuration Jumpers

2.6   Fixed Configuration Settings

The UP1000 Motherboard has five configuration jumpers and one 8-position DIP configuration block which **must remain with their default settings unchanged**. These components are identified as follows:

- J38—SROM format selection
- J41—MB bus speed selection
- J45, J50, J51—Hardware clocking selection
- SW4—System bus clock speed

Locations of these configuration components are highlighted in Figure 2-6.
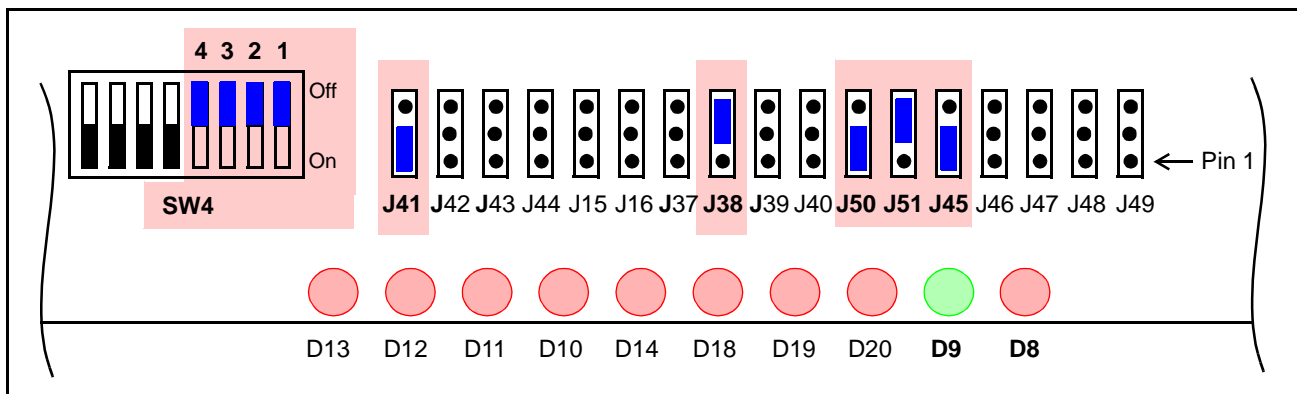
Figure 2-6   Fixed Configuration Switches

WARNING: **To ensure proper operation of the UP1000, do not change the default settings of these fixed configuration components.**

2.6.1   UP1000 Motherboard

The following jumpers configure the UP1000 Motherboard:

- J41—MB bus speed selection
- J38—SROM format selection

Table 2-3 shows the configuration default settings.

Table 2-3   UP1000 Motherboard Configuration Settings (J38, J41)

Jumper	Configuration
J41	**100 MHz—Shunt installed on pins 1 and 2.**
J38	Option Block—Shunt installed on pins 2 and 3.

Note: Pin 1 is closest to the board edge, pin 3 is closest to the Alpha Slot B Modules.

2.6.2   Hardware Clocking Settings

Jumpers J45, J50 and J51 select the hardware clocking settings. These components must be left in the default positions as shown in Table 2-4.

Table 2-4   Hardware Clocking Selection Configuration Settings (J45, J50, J51)

Jumper	Configuration
J50	**Shunt installed on pins 1 and 2.**
J51	Shunt installed on pins 2 and 3.
J45	**Shunt installed on pins 1 and 2.**

Note: Pin 1 is closest to the board edge, pin 3 is closest to the Alpha Slot B Modules.

2.6.3   System Bus Clock

Clock speed is configured on the UP1000 Motherboard by the system clock generator configuration switch, an 8-position switch block, SW4.

Only a 100 MHz system bus speed (that is, CPU/SDRAM clock speeds) configuration is supported. 100 MHz is the default setting, as seen in Table 2-5.

Table 2-5   System Clock Configuration Settings (SW4)

SW4 Settings				Clock Configurations			
SW4-1	SW4-2	SW4-3	SW4-4	CPU/SDRAM	PCI	AGP	USB
Off	Off	Off	Off	100 MHz	33.3 MHz	66.6 MHz	48 MHz

Note: Positions SW4-5 through SW4-8 are not used.

Chapter 3   Electrical and Environmental Data

In this chapter, a description is provided of the UP1000 power requirements, environmental and enclosure specifications, and physical parameters.

3.1   Power Specifications

3.1.1   Power Requirements

The power connectors utilized to support the UP1000 motherboard and one Alpha Slot B module are shown below. Connector J23 has the same form factor as power connectors used with standard disk peripherals.

J23   Alpha Slot B
      One 4 x 1 (4-pin)

Pin 6 (Keyed)

J22   ATX Auxiliary
      One 6 x 1 (6-pin)**

**To mate with this socket, use cable connector
  Molex 90331-0010 or equivalent.

Pin 1

J21   ATX Standard
      One 10 x 2 (20-pin)
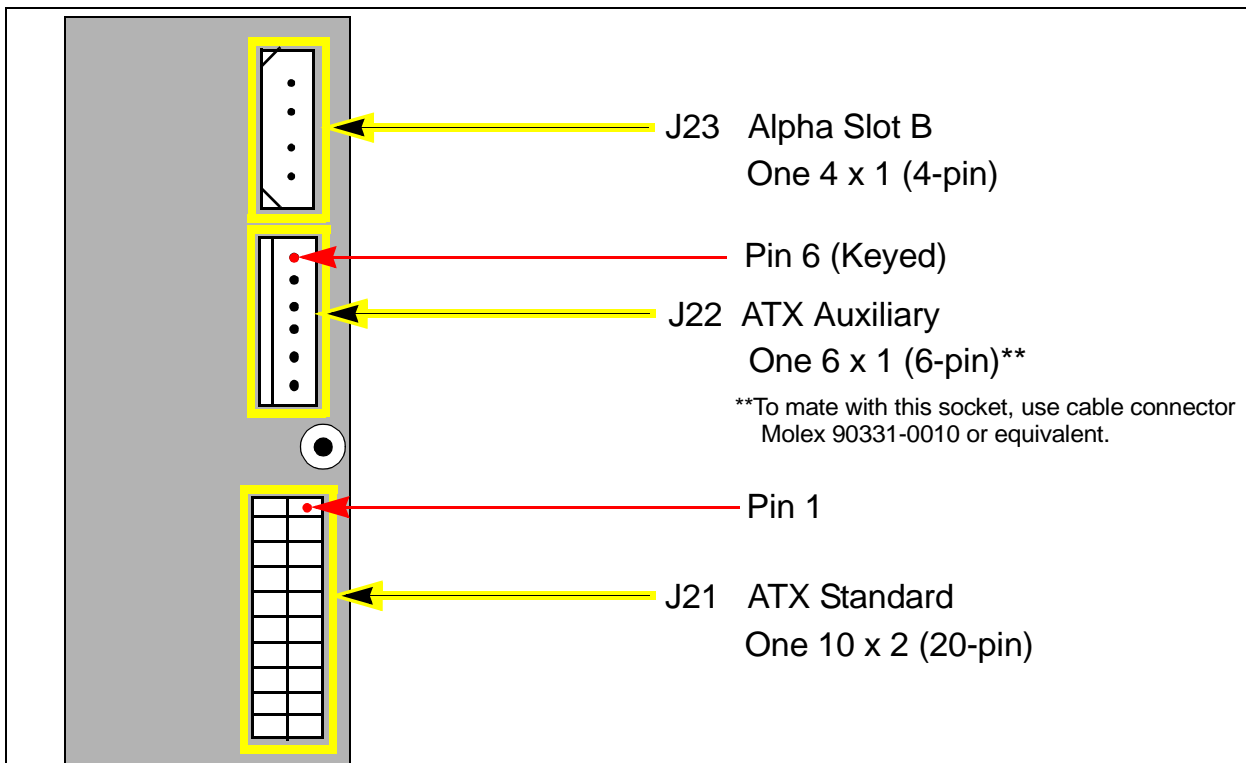
Figure 3-1   Power Connectors for UP1000 including Alpha Slot B Support

3.1.2   Power Consumption

A UP1000 system requires a 400 Watt ATX power supply which provides at least 14 Amps on the +12 Volt rail. Power is distributed as follows:

- Motherboard   37 W
- Memory DIMMs   Customer System Dependent
- Peripheral Cards   Customer System Dependent
- Disk Drives   Customer System Dependent
- Alpha Slot B Module   132 W

The following individual power segments and specifications provide an example of an acceptable 400 Watt commercial ATX power supply. :

+5 V @ 24 to 30 A	+12 V @ 14 A	+3.3 V @ 20 to 28 A
-5 V @ 1 A	-12 V @ 1 A	+5 VSB @ 850 mA
Maximum Output for +5 V and + 3.3 V (combined) is 215 W		

3.2   Environmental Specifications

An Alpha Slot B Module is cooled by two small fans. Depending upon cabinetry and plug-in card requirements, additional fans for cooling the entire UP1000 system may be necessary.

The UP1000 Motherboard and Alpha Slot B Module are specified to run within the environment listed in Table 3-1.

Table 3-1   Environmental Requirements for UP1000 System

Parameter	Specification
Operating temperature	**5° C to 35° C (41° F to 95° F)**
Storage temperature	-35° C to 85° C (-31° F to 185° F)
Relative humidity	**10% to 90% with maximum wet bulb temperature 35° C (95° F) and minimum dew point 2° C (36° F)**
Rate of (dry bulb) temperature change	11° C/hour ± 2° C/hour (20° F/hour ± 4° F/hour)

3.2.1   Safety

The UP1000 Motherboard meets product-safety certification for Underwriters Laboratory (UL), Canadian Underwriters Laboratory (cUL) and the European Conforming (CE).

3.2.2   EMI

The UP1000 Motherboard meets electro-magnetic interference (EMI) certification for the International Electrotechnical Commision (IEC) standard CISPR122 class A and FCC 47 CFR Part 15 Class A.

3.3   Chassis Requirements

Chassis or enclosures must be capable of:

- Mounting the ATX form factor motherboard
- Accommodating four goalpost assembly mounting holes

The goalpost assembly is a mechanical fixture for aligning and supporting an Alpha Slot B module. This fixture must be installed **prior to** mounting the motherboad into the enclosure.

3.3.1   Mounting Procedures

Chassis Mounting Holes

Identify the nine standard ATX mounting holes.

Check for the four Slot B goalpost mounting holes. For chassis or enclosures without this mounting hole pattern, obtain a drill template or chassis mounting tips from our website, **http://www.alpha-processor.com.**

⚠️ *WARNING:*   *Alpha Slot B goalpost assembly must be securely fastened to chassis backplate. Refer to the "UP1000 Quick Start Installation Guide" for complete mechanical installation details.*

Motherboard & Goalposts to Chassis Assembly

Requirements for attaching motherboard and goalpost fixture to the chassis are:

- Fastening Hardware
  - Four Slot B captive nut shoulder screws and washers
  - Four M4X6 mm Phillips pan head screws
  - Assorted standoff, screws, and miscellaneous hardware supplied by the chassis vendor

■ Tools
  • Phillips head screwdriver
  • Flat head screwdriver
  • Torque wrench
  • Nut driver (1/4")

■ Proper chassis mounting holes drilled for goalpost captive nuts

Use the following mounting technique:

1. Align the goalposts fixture holes with the corresponding motherboard clearance holes.
2. Affix goalposts to motherboard from the backside using captive nuts. Torque to 8 inch/lbs.
3. Affix goalpost brace to goalpost assembly. Torque to 4 inch/lbs.
4. Secure this assembly to the chassis with the standoffs and screws supplied by the chassis vendor.
5. Secure M4x6 mm screws through chassis to goalpost captive nuts.

3.4   Physical Parameters

UP1000 Motherboard Parameters

The UP1000 Motherboard is a printed wiring board (PWB) with the dimensions specified in Table 3-2.

.
Table 3-2   UP1000 Motherboard Physical Parameters

Dimension	Value
Length	**304.8 mm (12.0 in)**
Width	243.8 mm (9.6 in)
Height (board only)	**1.6 mm (0.063 in)**
Total Product Height (from underside of motherboard to top of goalpost assembly	127.0 mm(5.00 in)

Alpha Slot B Module Parameters

The Alpha Slot B Module is an assembly with the dimensions specified below.

Table 3-3   Alpha Slot B Module Physical Parameters

Dimension	Value
Length	**168.8 mm (6.65 in)**
Width	47.8 mm (1.9 in)
Height	**114.3 mm (4.5 in)**
Weight	1.2 Kg (2.6 lbs)

3.4.1   UP1000 Motherboard Mounting Hole Specifications

The UP1000 Motherboard's overall dimensions and mounting hole specifications conform to Standard ATX board specifications. They are depicted in Figure 3-2. Note the goalpost assembly mounting area and the additional mounting holes.
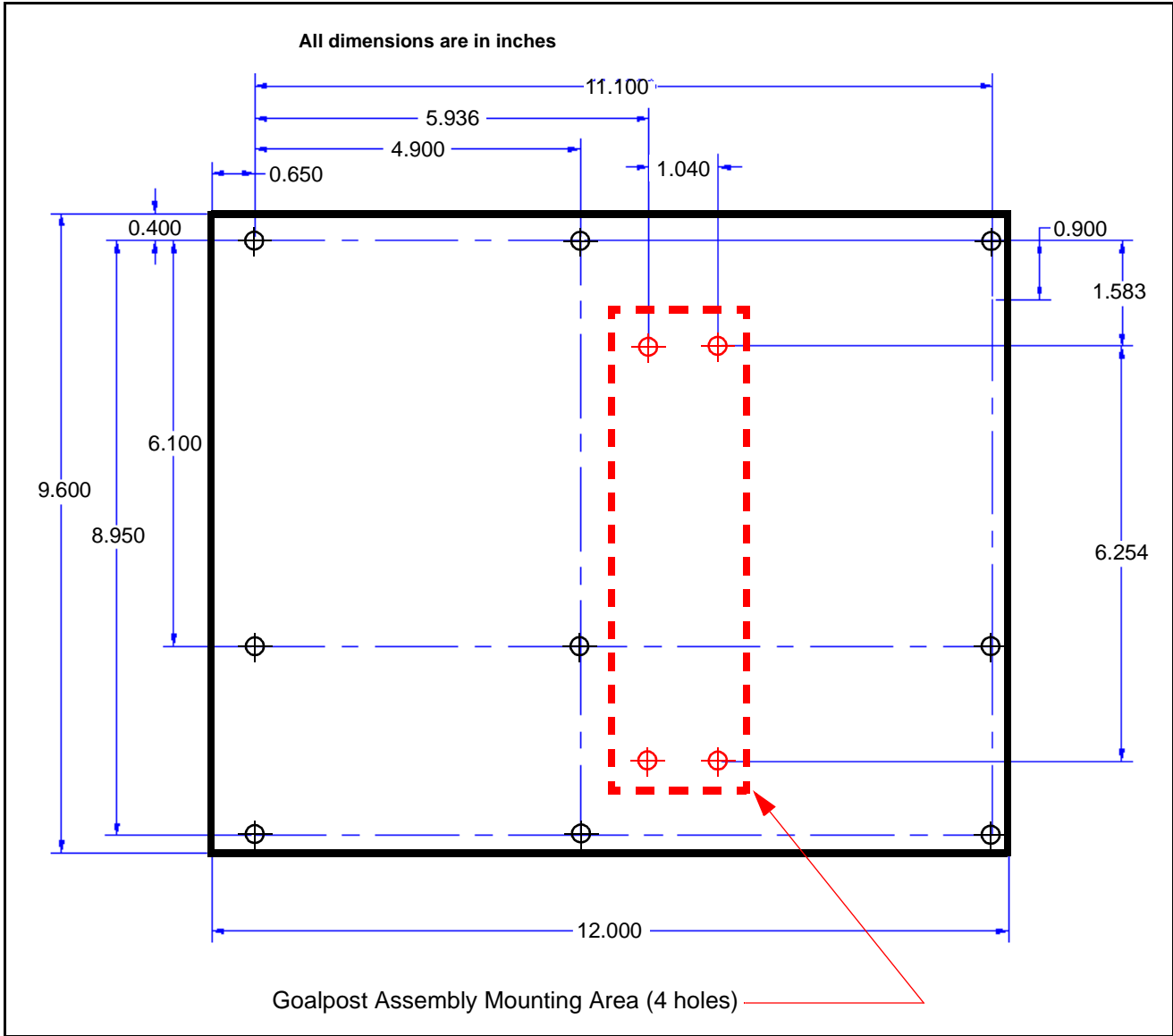
Figure 3-2   Mounting Hole Specifications including Goalpost Assembly Mounting Area

3.5   I/O Shield Information

The system support connectors must be fitted with a suitable "Venus" I/O shield. ATX compatible motherboards have various core I/O shield designs. The UP1000 utilizes the design shown in the diagram below.

Dimensions in the diagram indicate the center line of each connector as measured from the shield reference point, R1.

Individual connectors are designated with letters. Each connector type and its description are listed in the table below.

Figure 3-3   I/O Shield

Letter	Connector Description
A	PS/2 Stacked Mouse/Keyboard (DIN)
B	Dual Stack USB
C	Stacked Parallel (25 Pin D-Sub)
D	Serial (9 Pin D-Sub)

Chapter 4   Software Support

4.1   Software Overview

UP1000 systems support three major software components:

- AlphaBIOS
- Alpha Processor Bootstrap (APB) Loader
- Linux Operating System

4.1.1   AlphaBIOS

This is the user interface for UP1000 systems. It resides in Flash ROM on the motherboard. This chapter discusses how to navigate and apply available AlphaBIOS facilities, such as:

- Displaying system and subsystem information
- Configuring hard disk and CMOS parameters
- Facilitating AlphaBIOS upgrade procedures
- Executing maintenance programs

4.1.2   APB – Alpha Processor Bootstrap Loader

This is a special utility program provided with UP1000 systems on the UP1000 Installation Diskette (P/N 62-0019-1A).   Section 4.5 describes how to use APB to install, configure and load the Linux Operating System.

4.1.3   Linux

The UP1000 works with several distributions of the Linux Operating System.

Note: *Consult the API website for a list of the vendors and versions currently supported.*

4.2   AlphaBIOS Conventions

AlphaBIOS uses standard keys and keystroke combinations for navigating the interface and selecting items. See Table 4-1 below.

Table 4-1   Navigation Keys and Keystroke Combinations

KEYSTROKE	ACTION
TAB	**Move highlight forward between fields in a dialog box**
SHIFT + TAB	Move highlight backward between fields of a dialog box
▲ or ▼	**Move highlight within a menu, or cycle through available field values in a dialog box**
ALT + ▼	Select a menu from a drop-down list box. The arrow symbol indicates that a drop-down list box is available.
HOME	**Move to the beginning of a text entry field**
END	Move to the end of a text entry field
◀ or ▶	**Move to the left or right in a text entry field**
ESC	Discard changes and back up to previous screen

Two levels of keyboard help are available:

- Press F1 **once** to display explanations of the keystrokes for the *currently displayed* part of AlphaBIOS.
- Press F1 **twice** to display explanations of the keystrokes available for navigating *throughout* AlphaBIOS.

4.3   Initial AlphaBIOS Sequence

When the UP1000 is powered on, the system provides a three beep audio signal to indicate that the firmware has been successfully loaded. The system console displays the following :

1. Several screens that indicate initialization and testing routines are active. There is no operator intervention required for these.

    Note: If a system utilizes a PCI-SCSI controller module, configuration and initialization screens may require user input.

2. After a brief interval the system console reports:

    - There are no operating system selections available.

    - Press F2 to continue.

3. Immediately press **F2** to call the AlphaBIOS Setup Screen. See Figure 4-1.

```
┌─────────────────────────────────────────────────────────────────────┐
│ AlphaBIOS Setup                                              F1=Help   │
│  ┌────────────────────────────────────────────────────┐               │
│  │ Display System Configuration...                     │               │
│  │ AlphaBIOS Upgrade...                                │               │
│  │ Hard Disk Setup...                                  │               │
│  │ CMOS Setup...                                       │               │
│  │ Integrated Peripheral Setup...                      │               │
│  │ Network Setup...                                    │               │
│  │ Boot From CDROM...                                  │               │
│  │ Operating System...              ➤                  │               │
│  │ Utilities                        ➤                  │               │
│  │ About AlphaBIOS                                     │               │
│  └────────────────────────────────────────────────────┘               │
│  ┌─────────────────────────────────────────────────────────────────┐  │
│  │ Press ENTER to display detailed configuration information for this system. │  │
│  └─────────────────────────────────────────────────────────────────┘  │
│ ESC=Exit                                                              │
└─────────────────────────────────────────────────────────────────────┘
```
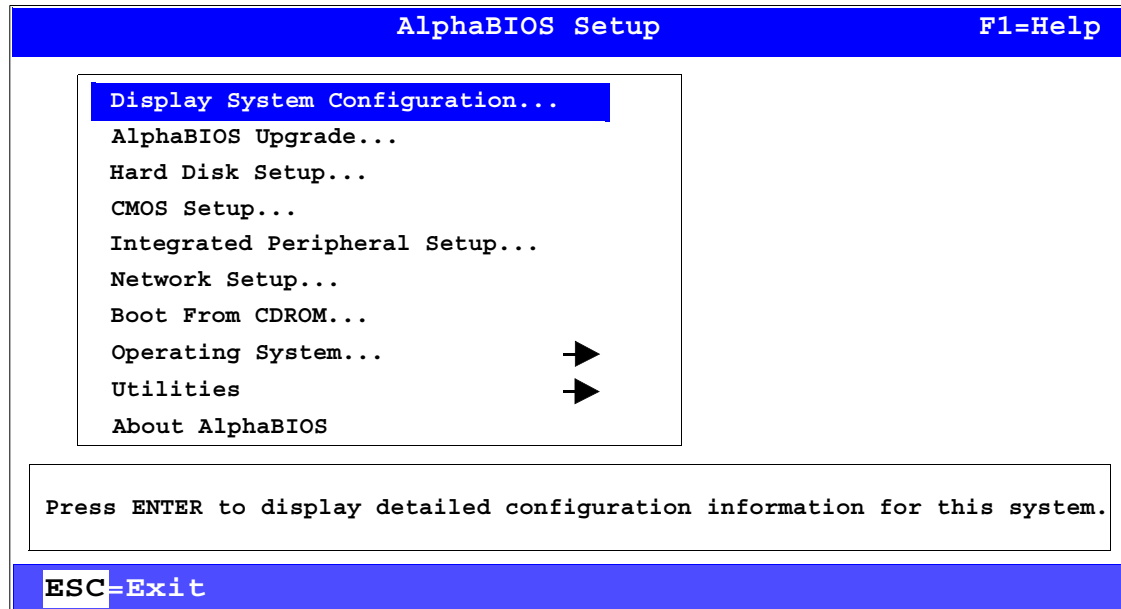
Figure 4-1   AlphaBIOS Setup Screen (Display System Configuration)

4.4   AlphaBIOS Capabilities

Figure 4-1 displays the ten menu options available from the AlphaBIOS Setup screen. They represent the UP1000 system's major user interface.

4.4.1   System Configuration Display

Use AlphaBIOS to display information concerning various sub-system categories that comprise a total system configuration. Sub-systems of the UP1000 Motherboard are as follows:

- Memory
- Hard Disk
- PCI
- AGP
- Peripherals

To display the system configuration screens, use these steps:

1. Select **Display System Configuration** from the AlphaBIOS Setup Screen
2. Press **Enter.** The Display System Configuration Screen appears.

```
┌──────────────────────────────────────────────────────────┐
│              Display System Configuration                │
├──────────────────────────────────────────────────────────┤
│                                                          │
│     ┌────────────────────────────────────┐               │
│     │ Systemboard Configuration          │               │
│     │ Hard Disk Configuration            │               │
│     │ PCI Configuration                  │               │
│     │ SCSI Configuration                 │               │
│     │ ISA Configuration                  │               │
│     │ Memory Configuration               │               │
│     │ Integrated Peripherals             │               │
│     └────────────────────────────────────┘               │
│   ┌────────────────────────────────────────────────┐     │
│   │      System Type:  API UP1000                  │     │
│   │                                                │     │
│   │ Processor: Samsung Alpha 21264, Revision 2.2.2 │     │
│   │    Speed:  700MHz                              │     │
│   │   Memory:  512MB                               │     │
│   │                                                │     │
│   │ Floppy Drive A:     3.5" 1.44MB                │     │
│   │ Floppy Drive B:       None                     │     │
│   │    Keyboard:     U.S. 101-keyboard             │     │
│   │                                                │     │
│   │    AlphaBIOS Version:  5.70.108   990913.1932  │     │
│   └────────────────────────────────────────────────┘     │
├──────────────────────────────────────────────────────────┤
│ ESC=Exit                                                 │
└──────────────────────────────────────────────────────────┘
```

Figure 4-2   Display System Configuration Screen

3. Using the arrow keys, select a subsystem to display from the list box

    Examples of configuration displays are shown in Figure 4-2 to Figure 4-7.

```
┌────────────────────────────────────────────────────────────────┐
│              Display System Configuration                      │
├────────────────────────────────────────────────────────────────┤
│                                                                │
│   ┌──────────────────────────────────────┐                     │
│   │ Systemboard Configuration            │                     │
│   │ Hard Disk Configuration              │                     │
│   │ PCI Configuration                    │                     │
│   │ SCSI Configuration                   │                     │
│   │ ISA Configuration                    │                     │
│   │ Memory Configuration                 │                     │
│   │ Integrated Peripherals               │                     │
│   └──────────────────────────────────────┘                     │
│                                                                │
│   ┌──────────────────────────────────────────────────────────┐ │
│   │ Disk  0  ATAPI #0, SCSI ID 0          8693 MB            │ │
│   │ --       WDC AC29100D          J740                      │ │
│   │ --       Partition 1                    2 MB   FAT       │ │
│   │ --       Partition 2                 8626 MB   Unrecognized│ │
│   │ --        Partition 3                  64 MB   Unrecognized│ │
│   │ ------                                                    │ │
│   │                                                          │ │
│   │                                                          │ │
│   │                                                          │ │
│   └──────────────────────────────────────────────────────────┘ │
├────────────────────────────────────────────────────────────────┤
│ ESC=Exit                                                       │
└────────────────────────────────────────────────────────────────┘
```

Figure 4-3   Hard Disk Configuration Screen

```
┌─────────────────────────────────────────────────────────────┐
│              Display System Configuration                     │
│                                                               │
│   ┌───────────────────────────────────────┐                  │
│   │ Systemboard Configuration             │                  │
│   │ Hard Disk Configuration               │                  │
│   │ PCI Configuration                     │                  │
│   │ SCSI Configuration                    │                  │
│   │ ISA Configuration                     │                  │
│   │ Memory Configuration                  │                  │
│   │ Integrated Peripherals                │                  │
│   └───────────────────────────────────────┘                  │
│                                                               │
│   ┌─────────────────────────────────────────────────────┐    │
│   │             PCI   Configuration                      │    │
│   │                                                      │    │
│   │ Device Name            Device Type  Revision  Physical Slot │
│   │                                                      │    │
│   │ AMD751 NorthBridge      Host Bridge    36       Embedded │ │
│   │                                                      │    │
│   │ AMD751 PCI-PCI Bridge  PCI Bridge      1      Embedded │  │
│   │                                                      │    │
│   │ AcerLabs PCI-ISA        ISA Bridge    195     Embedded │  │
│   │                                                      │    │
│   │ AcerLabs IDE M5229      IDE           193     Embedded │  │
│   │                                                      │    │
│   │ AcerLabs PMU M7101      Power Mgmt     0      Embedded │   │
│   │                                                      │    │
│   │ AcerLabs USB            USB            3      Embedded │   │
│   │                                                      │    │
│   │ VenID=3030, DevID=9     VGA            1      Embedded │   │
│   │                                                      │    │
│   │                                                      │    │
│   └─────────────────────────────────────────────────────┘    │
│                                                               │
│   ENTER=Select        ESC=Exit                                │
└─────────────────────────────────────────────────────────────┘
```

Figure 4-4   PCI Configuration Screen

```
                  Display System Configuration

   Systemboard Configuration
   Hard Disk Configuration
   PCI Configuration
   SCSI Configuration
   ISA Configuration
   Memory Configuration
   Integrated Peripherals


               ISA Configuration (Detected ISA Devices)

    Keyboard:    Port 0x60 IRQ 1 - [ 101 - KEY ]

    Floppy:      Port 0x3f0 IRQ 6  DMA 2 - [Floppy]

    COM1:        Port 0x3f8 IRQ4

    COM2:        Port 0x2f8 IRQ3

    LPT1:        Port 0x3bc IRQ7

    Pointer:     Port 0x60 IRQ12 - [ PS2 MOUSE ]




 ESC=Exit
```

Figure 4-5   ISA Configuration Screen

```
┌──────────────────────────────────────────────────────────────┐
│            Display System Configuration                        │
├──────────────────────────────────────────────────────────────┤
│  ┌──────────────────────────────────────┐                      │
│  │  Systemboard Configuration           │                      │
│  │  Hard Disk Configuration             │                      │
│  │  PCI Configuration                   │                      │
│  │  SCSI Configuration          ➡        │                     │
│  │  ISA Configuration                   │                      │
│  │  Memory Configuration                │                      │
│  │  Integrated Peripherals              │                      │
│  └──────────────────────────────────────┘                      │
│                                                                │
│  ┌──────────────────────────────────────────────────────────┐ │
│  │                                                          │ │
│  │            System Memory Configuration                   │ │
│  │                                                          │ │
│  │                                                          │ │
│  │  Bank 0: 256 MB  (256 MB per DIMM) - Starting Address = 0x00000000 │
│  │  --                                                      │ │
│  │  Bank 1: 128 MB  (128 MB per DIMM) - Starting Address = 0x00000000 │
│  │  --                                                      │ │
│  │  Bank 2: 64 MB    (64 MB per DIMM) - Starting Address = 0x00000000 │
│  │  --                                                      │ │
│  │                                                          │ │
│  │                                                          │ │
│  └──────────────────────────────────────────────────────────┘ │
├──────────────────────────────────────────────────────────────┤
│  ESC=Exit                                                      │
└──────────────────────────────────────────────────────────────┘
```
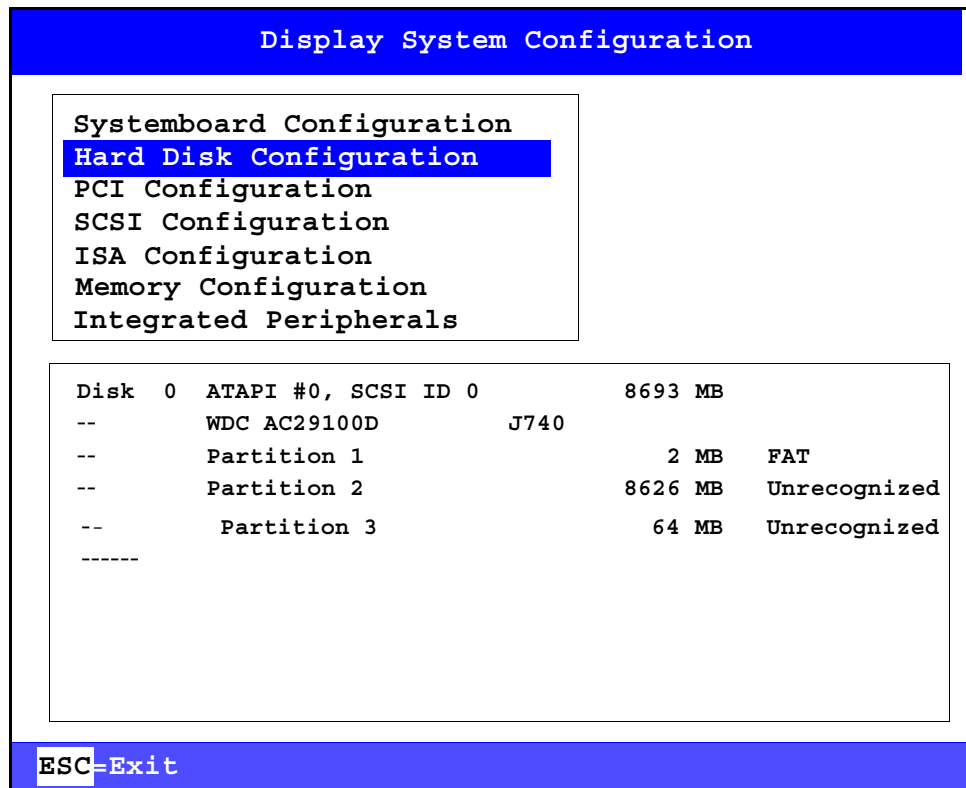
Figure 4-6   Memory Configuration Screen

```
╔══════════════════════════════════════════════════════════════╗
║              Display System Configuration                      ║
╠══════════════════════════════════════════════════════════════╣
║  ┌──────────────────────────────────┐                          ║
║  │ Systemboard Configuration        │                          ║
║  │ Hard Disk Configuration          │                          ║
║  │ PCI Configuration                │                          ║
║  │ SCSI Configuration               │                          ║
║  │ ISA Configuration                │                          ║
║  │ Memory Configuration             │                          ║
║  │ Integrated Peripherals           │                          ║
║  └──────────────────────────────────┘                          ║
║  ┌────────────────────────────────────────────────────────┐    ║
║  │            Integrated Peripheral Status                 │    ║
║  │                                                          │    ║
║  │  Serial 0:   Enabled [ Port 0x3f8,  IRQ 4 ]             │    ║
║  │                                                          │    ║
║  │  Serial 1:   Enabled [ Port 0x2f8,  IRQ 3 ]             │    ║
║  │                                                          │    ║
║  │  Serial 2:   Disabled                                    │    ║
║  │                                                          │    ║
║  │  Parallel:   Enabled [ Port 0x3b6,  IRQ 7 ]             │    ║
║  │                                                          │    ║
║  │  FloppyCtrl: Enabled [ Port 0x3f0,  IRQ 6, DMA 2 ]      │    ║
║  │                                                          │    ║
║  │  Kbd/Mouse:  Enabled [ Port 0x60, KBD IRQ 1, MOUSE IRQ 12]│  ║
║  │                                                          │    ║
║  └────────────────────────────────────────────────────────┘    ║
╠══════════════════════════════════════════════════════════════╣
║ ESC=Exit                                                       ║
╚══════════════════════════════════════════════════════════════╝
```

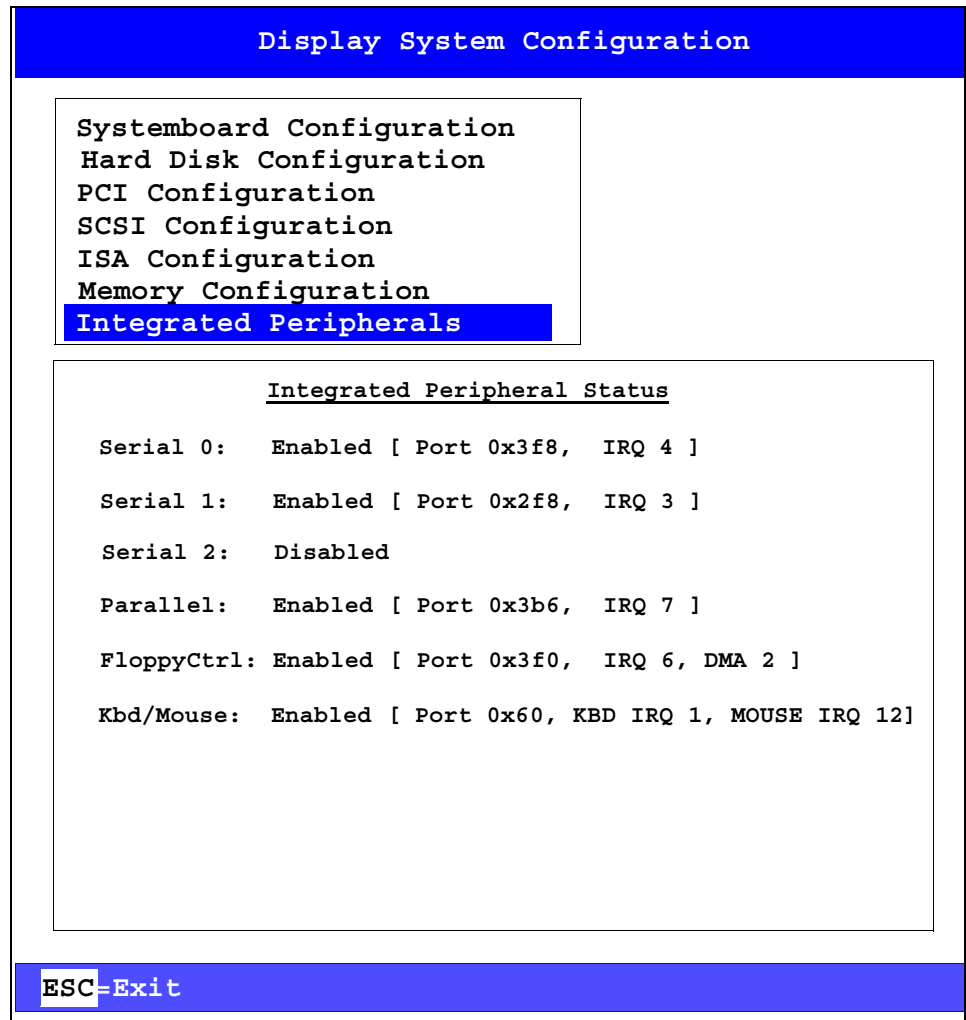**Figure 4-7   Integrated Peripheral Configuration Screen**

4.4.2   Upgrading AlphaBIOS

An upgrade to AlphaBIOS may be chosen for the following reasons:

■ A newly released version of Linux requires it

■ A newly released version of AlphaBIOS contains features that are useful enhancements to the present system.

Use the following sequence to perform the upgrade:

1. Insert diskette or CD-ROM containing the new AlphaBIOS firmware image(s).
2. Restart the system.
3. Call the AlphaBIOS Setup Screen by pressing **F2** when the Boot screen appears.

4. Select **Upgrade AlphaBIOS** from the list box in the AlphaBIOS Setup Screen shown below in Figure 4-8.

5. Press **ENTER**.

   The system automatically:

   - Finds the executable update file on diskette or CD-ROM
   - Changes the on-board firmware accordingly
   - Performs a system reset, or
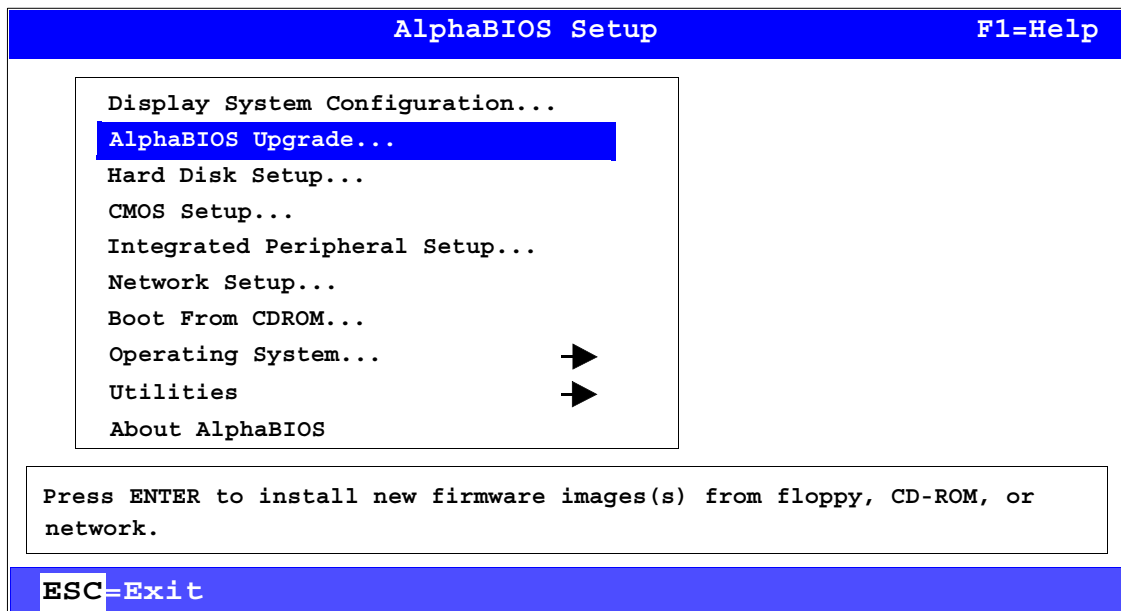   - Prompts the user to reset the system

```
 AlphaBIOS Setup                          F1=Help
 ┌─────────────────────────────────────────┐
 │ Display System Configuration...         │
 │ AlphaBIOS Upgrade...                     │
 │ Hard Disk Setup...                       │
 │ CMOS Setup...                            │
 │ Integrated Peripheral Setup...          │
 │ Network Setup...                         │
 │ Boot From CDROM...                       │
 │ Operating System...            ➜         │
 │ Utilities                      ➜         │
 │ About AlphaBIOS                          │
 └─────────────────────────────────────────┘

 Press ENTER to install new firmware images(s) from floppy, CD-ROM, or
 network.

 ESC=Exit
```

Figure 4-8   Setup Screen with AlphaBIOS Upgrade Selection

4.4.3   Performing CMOS Setup Tasks

There are two modes for CMOS Setup tasks, standard and advanced. The individual tasks are listed in Table 4-2.

Table 4-2   CMOS Setup Tasks

STANDARD	ADVANCED
Autostart	**Memory test**
Date and Time	PCI parity
Floppy	**Password protection**
Keyboard	SCSI BIOS emulation
	Boot From CDROM
	Warm Reboot
	Temperature OS Selection

To enter standard CMOS Setup:

1. Start AlphaBIOS Setup.
2. Select **CMOS Setup** from the list box.
3. Press **ENTER.**

```
                    CMOS Setup                F1=Help

  Date:    Wednesday, July 19,  1999
  Time:    13:22:27
  --
  --
  Floppy Drive A:  3.5"  1.44 MB
  Floppy Drive B:   None
  Keyboard:   U.S.101-key keyboard

  --
  AutoStart:  Enabled
  Auto Start Count:   30 seconds


  ┌──────────────────────────────────────────────┐
  │ Press ▲ or ▼ to modify the data fields.      │
  │Data modification will take effect immediately │
  └──────────────────────────────────────────────┘

F3=Color F6=Advanced F7=DefaultESC=Discard Changes F10=Save Chgs
```
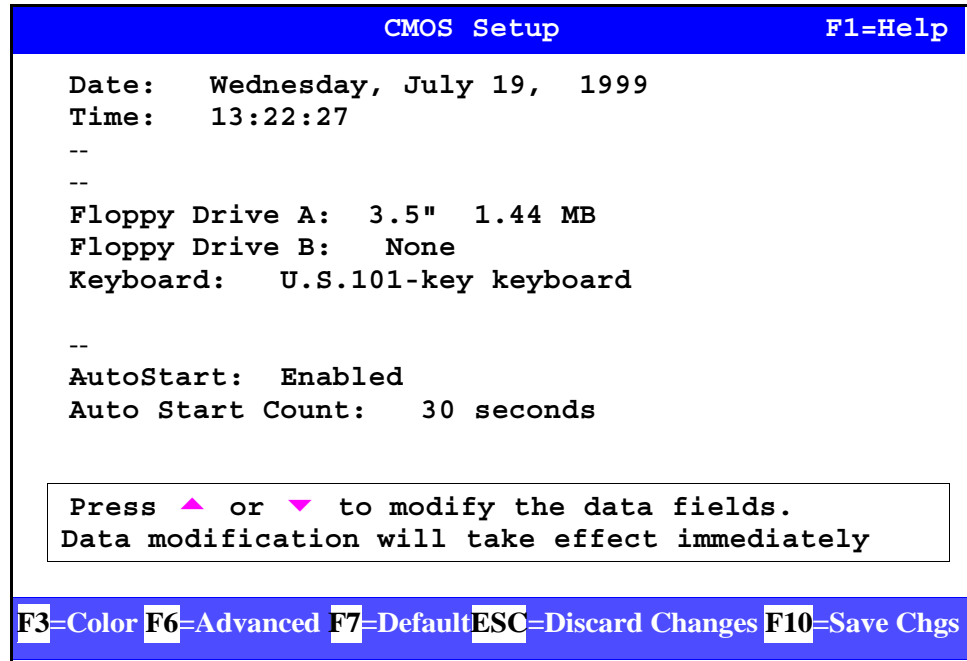
Figure 4-9   Standard CMOS Setup Screen

To enter Advanced CMOS Setup:

■ Press **F6** from the Standard CMOS Setup Screen.

```
┌──────────────────────────────────────────────────────────────┐
│                    CMOS Setup                         F1=Help  │
│  ┌──────────────────────────────────────────────────────────┐ │
│  │            Advanced CMOS Setup       F1=Help             │ │
│  │                                                          │ │
│  │                                                          │ │
│  │   PCI Parity Checking:        Disabled                  │ │
│  │   Power-up Memory Test:       Full                      │ │
│  │   AlphaBIOS Password Option:  Disabled                  │ │
│  │   SCSI BIOS Emulation:        Enabled for All           │ │
│  │   Boot from CDROM:            Primary OS Selection      │ │
│  │   Warm Reboot:                Enabled                   │ │
│  │  Temperature OS Selection:    80 C                      │ │
│  │                                                          │ │
│  │  ┌────────────────────────────────────────────────────┐ │ │
│  │  │ Press ▲ or ▼ to select enable or disable power-up  │ │ │
│  │  │ memory testing. When enabling memory test, PARTIAL │ │ │
│  │  │ will test the first 256 MB, FULL will test up to   │ │ │
│  │  │ 1 GB of memory.,                                   │ │ │
│  │  └────────────────────────────────────────────────────┘ │ │
│  │                                                          │ │
│  │  ESC=Discard Changes   F10=Save Changes                 │ │
│  └──────────────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────────────┘
```

Figure 4-10   Advanced CMOS Setup Screen

4.4.4   Running a Maintenance Program

AlphaBIOS executes maintenance programs such as RAID or other configuration utilities directly from a submenu.

Note: The Alpha Processor Bootstrap (APB.EXE) loader can be called from this submenu.

To run a maintenance program use these steps:

1. Start AlphaBIOS Setup.
2. Select **Utilities** from the list box.
3. Select **Run Maintenance Program** from the submenu as shown in Figure 4-11.
4. Press **ENTER.**

AlphaBIOS Setup   **F1=Help**

```
Display System Configuration...
AlphaBIOS Upgrade...
Hard Disk Setup...
CMOS Setup..
Integrated Peripheral Setup...
Network Setup...
Boot From CDROM...
Operating System..
Utilities                     Display Error Frames
About AlphaBIOS               Run Maintenance Program...
```

Press ENTER to run an AlphaBIOS maintenance program.

ESC=Exit
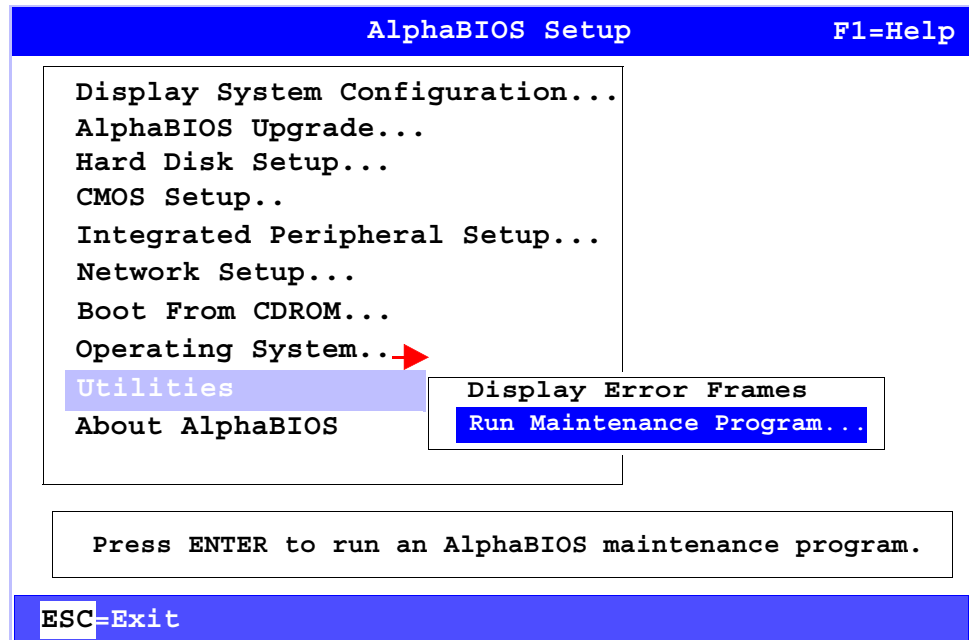
**Figure 4-11   AlphaBIOS Setup with Utilities Selection to Run
Maintenance**

5. Enter the program name at the prompt in the Run Maintenance Pro-
   gram dialog box.
6. Tab to the Location list box.
7. Select from the following program source devices:
   - Floppy diskette drive (default)
   - CD-ROM drive
   - Hard disk partition
8. Press **ENTER** to execute the program.

```
           AlphaBIOS Setup                    F1=Help

  Display System Configuration...
  AlphaBIOS Upgrade...
  Hard           Run Maintenance Program        F1=Help
  CMOS
  Integ      Program Name:        rcu.exe
  Netwo
  Boot        Location:        A:
  Opera
                              A:
  Utili                       CD:
                              Disk  0, Partition  1
  About   ENTER=Execute       Disk  0, Partition  2
```
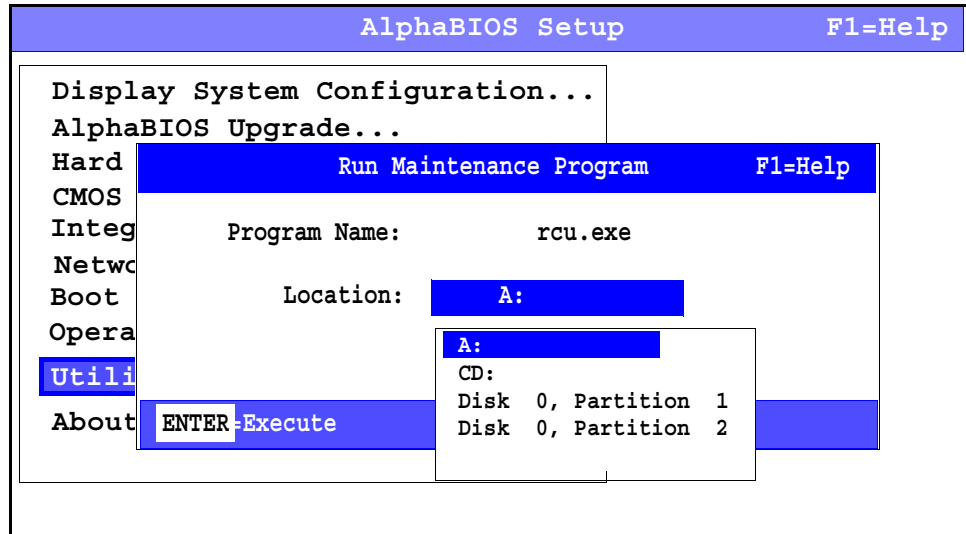
Figure 4-12   Run Maintenance Program with Location List Box

Note: Use ALT + ▼ (down arrow) to open the list when a list box is selected.

4.4.5   Daily Operations with AlphaBIOS

During normal daily operations (any time after initial operating system installation) access to the AlphaBIOS Setup program is preceded by the AlphaBIOS Boot Screen. Either of these actions invoke the Boot Screen:

■   Power On
■   Reset

4.5   APB—Alpha Processor Bootstrap Loader

APB is a bootstrap loader utility for Alpha processor based systems with AlphaBIOS firmware. It is primarily intended to be used for booting Linux.

4.5.1   What APB does

Booting Linux with APB uses the following sequence:

1.   AlphaBIOS loads and transfers control to APB.
2.   APB reads the AlphaBIOS boot configuration to find the Linux kernel location.

3. APB sets up the environment for Linux, including:
    *   Loading the correct PAL code,
    *   Establishing the Reset Parameter Block parameters,
    *   Copying kernel arguments to the right location in memory
4. APB reads the Linux kernel image into memory from the specified device and transfers control.

> *Note:*   *The kernel may be read from an MS-DOS format filesystem, or an ISO 9660 format CD-ROM. Other filesystems and network booting may be supported in future releases.*

4.5.2   UP1000 Installation Diskette

The contents of the UP1000 Installation Diskette (P/N 62-0019-1A) are listed in Table 4-3.

Table 4-3   Contents of UP1000 Installation Diskette

File Name	Description
apb.exe	**Alpha Processor bootloader v. 1.0.0**
apb.cfg	Sample apb configuration file
up1000.pal	**PAL code for Linux on UP1000**
system.gz	Kernel symbol information file
vmlinux.gz	**Linux kernel v. 2.2.12 with UP1000 patch**
Readme_1st	Known-bug list and installation procedure
APB_howto	**Instructions for APB**

4.5.3   APB Commands

The user interface to APB is a simple command line. Table 4-4 lists the supported commands.

Table 4-4   Commands Supported by APB

boot *target*	**boot a target in the configuration file**
bootl palcode kernel arg1	boot Unix
cd *device*	**set the current device**
cp | copy file1 file2	copy files
exit | quit	**exit to AlphaBIOS**

Table 4-4   Commands Supported by APB (Continued)

halt | reset	system shutdown options
ls | dir	**list files on the current device**
mkdir dir	make a directory
more *file*	**list a file**
mv | rename file1 file2	rename a file
pwd	**print the current device**
rm | delete file	delete a file
printenv [*name*]	**print environment variable(s)**
setenv [name [val]]	(un)set environment variable
show targets | devices	**show information**

4.6   Installing A Linux Operating System

The AlphaBIOS firmware initializes the UP1000 system and, via the Alpha Processor Bootstrap (APB) loader, enables you to install and boot various Linux operating systems.

As noted at the beginning of Chapter 4, this system supports many Linux distributions and vendors. Consult our Web site for a complete current list.

Examples of installing commercially available Linux distributions are given in this section. Typical requirements and procedures for Red Hat Linux (Versions 5.2 and 6.0) and SuSE (Version 6.1) have been selected.

4.6.1   Requirements

The following hardware components and settings are necessary for a Linux installation:

- Hard disk connected to the **primary** IDE port as a **master**, i.e., "/dev/hda"
- CD-ROM drive connected to the **secondary** IDE port as a **master**, i.e., "/dev/hdc"

IDE disks and SCSI adapters use different device names. To the Linux kernel:

- IDE devices will be "/dev/hd*x*"
- SCSI hard disk names will be "/dev/sd*x*"

■ SCSI CD-ROM names will be "/dev/scd*x*" where *x* is the device number

Note: *The system must utilize an ATAPI CD-ROM drive which Linux will recognize as /dev/hdb or, alternatively, /dev/hda, /dev/hdc, etc.*

The following software components are necessary:

■ UP1000 Linux Installation Diskette (P/N 62-0019-1A)
■ The appropriate Linux operating system distribution CD-ROM disk
■ SuSE ramdisk floppy (for SuSE 6.1 install only)

4.6.2   Before Installing Linux

Before installing the Linux operating system, follow these instructions:

1. Apply the appropriate AlphaBIOS facilities to complete the tasks shown below:

Program	**Task**	**Reference Section**
CMOS Setup	• Set System Time and Date • Verify that all other standard CMOS settings match the motherboard configuration	4.4.3

2. Make a backup copy of the UP1000 Linux Installation Diskette

4.6.3   Starting the RedHat Linux OS Installation

Use this procedure:

1. Power on the UP1000 system.
2. After system initialization, press **F2** at the AlphaBIOS Boot Screen to call the AlphaBIOS Setup Screen.
3. Insert the UP1000 Linux Installation Diskette and appropriate Linux distribution CDROM into their respective drives.
4. Select **Utilities** > **Run Maintenance Program** option.

```
┌─────────────────────────────────────────────────────────────┐
│  AlphaBIOS Setup                          F1=Help            │
├─────────────────────────────────────────────────────────────┤
│  ┌──────────────────────────────────────┐                   │
│  │ Display System Configuration...      │                   │
│  │ AlphaBIOS Upgrade...                 │                   │
│  │ Hard Disk Setup...                   │                   │
│  │ CMOS Setup..                         │                   │
│  │ Integrated Peripheral Setup...       │                   │
│  │ Network Setup...                     │                   │
│  │ Boot From CDROM...                   │                   │
│  │ Operating System..  ►                │                   │
│  │ Utilities          ►  ┌──────────────────────────────┐   │
│  │ About AlphaBIOS       │ Display Error Frames         │   │
│  │                       │ Run Maintenance Program...   │   │
│  └───────────────────────┴──────────────────────────────┘   │
│                                                              │
│  ┌──────────────────────────────────────────────────────┐   │
│  │ Press ENTER to run an AlphaBIOS maintenance program.  │   │
│  └──────────────────────────────────────────────────────┘   │
├─────────────────────────────────────────────────────────────┤
│  ESC=Exit                                                    │
└─────────────────────────────────────────────────────────────┘
```
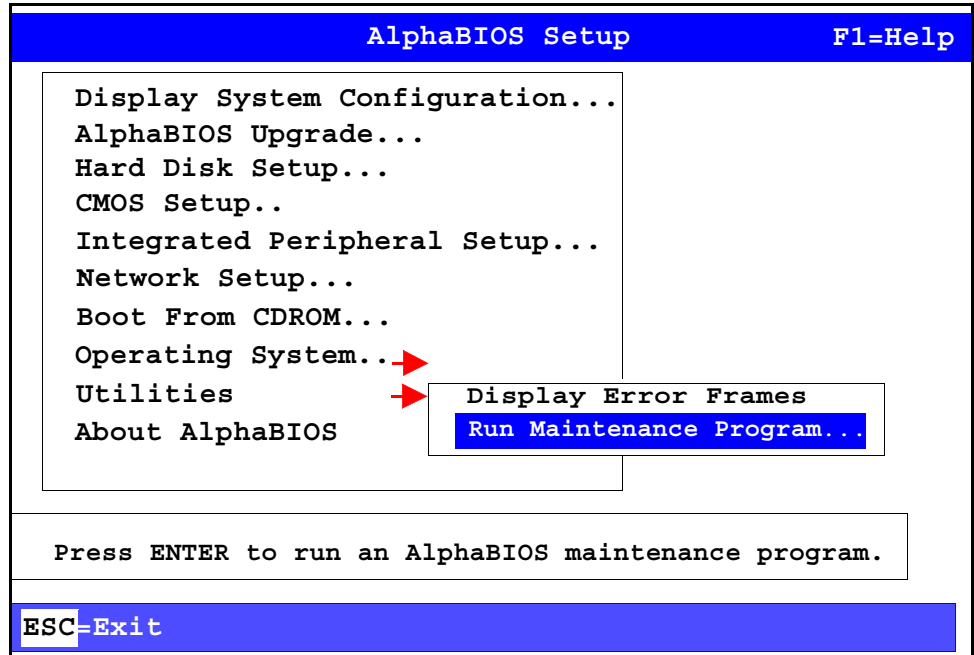
Figure 4-13   AlphaBIOS Setup with Utilities Selection to Run Maintenance

5.   Run **apb.exe** as a Maintenance Program.

```
┌─────────────────────────────────────────────────────────────┐
│           AlphaBIOS Setup                      F1=Help       │
├─────────────────────────────────────────────────────────────┤
│  ┌──────────────────────────────────────┐                   │
│  │ Display System Configuration...      │                   │
│  │ AlphaBIOS Upgrade...                 │                   │
│  │ Hard Disk Setup...                   │                   │
│  │ CMOS S┌──────────────────────────────────────────────┐   │
│  │ Integr│    Run Maintenance Program       F1=Help      │   │
│  │ Netwoi│                                               │   │
│  │ Boot  │   Program Name:        apb.exe                │   │
│  │ Operat│                                               │   │
│  │ Utili │   Location:       ┌──────────────┐            │   │
│  │ About │                   │    A:        │            │   │
│  │       │                   └──────────────┘            │   │
│  │       ├───────────────────────────────────────────────│   │
│  │       │ ENTER =Execute                                │   │
│  └───────└───────────────────────────────────────────────┘   │
└─────────────────────────────────────────────────────────────┘
```
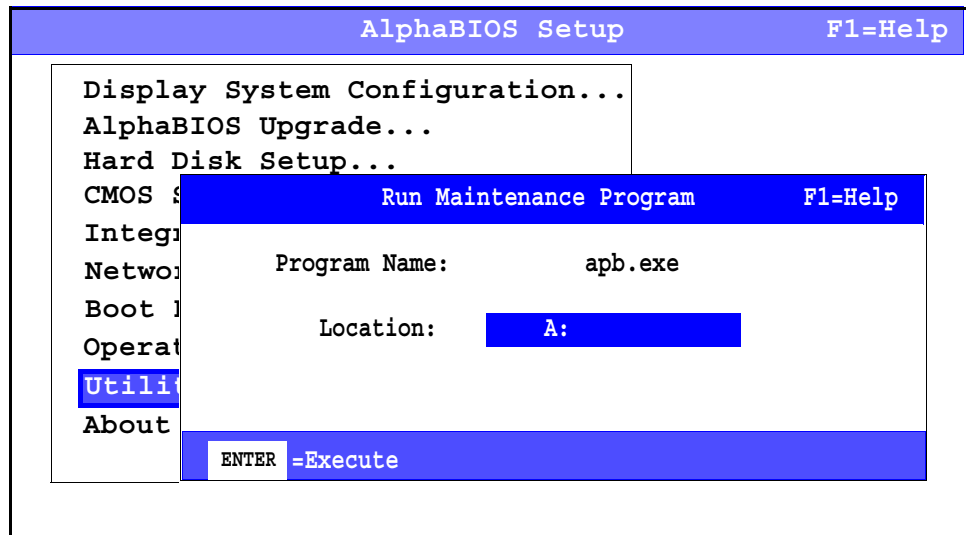
Figure 4-14   Run Maintenance Program

6.   To get to the specific RedHat installation program at the apb command prompt, type the following:
     apb> **cd floppy**

```
apb> bootl up1000.pal vmlinux.gz root=/dev/hdc
     or
apb> boot redhat_install
```

RedHat Installation Requirements

The following items should be observed while performing the standard installation procedures:

1. Be careful when configuring the X server.

   Note: DO NOT TEST the X server configuration

2. During disk partitioning, allocate from 10 MB to 30 MB for a FAT partition; this will be used as the "boot" partition.
3. If you choose the 'Workstation' or 'Server' package, you don't need to partition the disk by yourself.
4. Select "Startup through ARC console" on timezone setup menu.

Copy APB to Hard Disk, RedHat Version 5.2

Use the following steps to copy APB :

1. Run apb.exe from the floppy diskette.
2. At the apt command prompt, type:
   ```
   apb> cd floppy
   apb> bootl up1000.pal vmlinux.gz root=/dev/hda5 single
   ```
   The shell prompt appears.
3. Type the following commands at the bash# prompt:
   ```
   bash# mcopy a:*.* /dos
   bash# gzip -dc /dos/system.gz > /boot/System.map
   bash# ln -s Tsunami /etc/alpha_systype
   bash# Xconfigurator
   bash# init 6
   ```

FAT Partition Problem, RedHat Version 6.0

Currently the FAT partitioning instructions do not work with RedHat Version 6.0. Use the following steps to create the FAT partition:

1. Run apb.exe from the floppy diskette.
2. At the apt command prompt, type:
   ```
   apb> cd floppy
   apb> bootl up1000.pal vmlinux.gz root=/dev/hda5 single
   ```
   The shell prompt appears.
3. Type the following commands at the bash# prompt:
   ```
   bash# mkfs -t msdos /dev/hda1
   bash# mkdir /dos
   bash# mount /dev/hda1 /dos
   bash# mcopy a:*.* /dos
   bash# gzip -dc /dos/system.gz > /boot/System.map
   bash# ln -s Tsunami /etc/alpha_systype
   bash# Xconfigurator
   bash# init 6
   ```

4.6.4   Starting the SuSE Linux OS Installation

Use this procedure:

1. Power on the UP1000 system.
2. After system initialization, press **F2** at the AlphaBIOS Boot Screen to call the AlphaBIOS Setup Screen.
3. Insert the UP1000 Linux Installation Diskette and appropriate Linux distribution CDROM into their respective drives.
4. Make the SuSE ramdisk for the SuSE CDROM on another machine.
5. Select **Utilities** > **Run Maintenance Program** option.
6. Run **apb.exe** as a Maintenance Program.
7. At the apb command prompt, type the following

   ```
   apb> cd floppy
   apb> bootl up1000.pal vmlinux.gz root=/dev/fd0
        load_ramdisk=1 ramdisk_size=20480
                or
   apb> boot suse_install
   ```

SuSE Installation Requirements

The following items should be observed while performing the standard installation procedures:

1. Be careful when configuring the X server.

   Note: DO NOT TEST the X server configuration

2. If users partition the disk themselves, they need to make a small (5–10 MB) FAT filesystem. If the "entire disk" option is selected, the SuSE installer will create this small partition.
3. After this portion of the install, reboot the system and start apb again from the AlphaBIOS Run Maintenance option.
4. Continue with the SuSE installation by entering the following command:

   ```
   apb> bootl up1000.pal vmlinux.gz root=/dev/hda3
           or
   apb> boot suse_linux
   ```
5. Once the SuSE installation is complete and Yast has terminated, login as root using the password set during install.
6. Type the following commands:

   ```
   bash# mcopy a:*.* /boot
   bash# gzip -dc /boot/system.gz /boot/system.map
   bash# ln -s Tsunami /etc/alpha_systype
   ```
7. Yast can be used now to configure X Windows and any other software.

4.6.5   Boot Issues

How To Start apb.exe from Boot Partition

To configure AlphaBIOS so that apb.exe starts from the boot partition, use the following steps:

1. Call the AlphaBIOS Setup Screen by pressing **F2** when the boot screen

appears.

2. Select **Operating System** from the list box.
3. Select **OS Selection Setup** from the sub-menu.
4. In the Dialog Box, make an entry like this example:

```
Boot name:         Linux
Boot file:         Disk 0 Partition 1     \apb.exe
OS Path:           Disk 0 Partition 2
OS Options:
```

Note: *"OS Path" has no meaning here, but leave it intact.*

5. Set the environment variable, APB_DEVICE, to be the AlphaBIOS name of the boot partition. For example:
   ```
   apb> setenv APB_DEVICE scsi(0)disk(0)rdisk(0)partition(1)
   ```
6. Type **cd** to apply this environment variable.
   ```
   apb> cd
   ```

Linux Boot Options   Several boot options are now available.

- Selection 1 requires typing a long string at the prompt.
- Selection 2 requires typing a short string.
- Selection 3 boots Linux without any further operator intervention.

Selection 1.

1. Choose 'Linux' on the AlphaBIOS OS boot menu
2. At the apb prompt, type:
   ```
   apb> bootl up1000.pal vmlinux.gz root=/dev/hda5
   ```

Selection 2.

1. Create an **apb.cfg** file under **/dos** directory.

   As an example, its contents could look like:
   ```
   linux|bootl up1000.pal vmlinux.gz root=/dev/hda5
   ```

2. Boot Linux by typing:
   ```
   apb> boot linux
   ```

Selection 3.

Put option string in **OS Selection Setup** menu from AlphaBIOS Setup.

For example, the entry could be:

```
 Operating System Selection Setup       F1=Help

    Linux              Primary Operating System
   Linux Install




  Boot Name      :        Linux
  Boot File      :        Disk 0, Partion 1      apb.exe
  OS Path        :        Disk 0, Partion 2
  OS Options     :        bootl up1000.pal vmlinux.gz root=/dev/nda5


  INSERT=New F6=Edit   F8=Primary ESC=Discard Changes

  DEL=Delete F7=Copy   F9=Validate F10=Save Changes
```
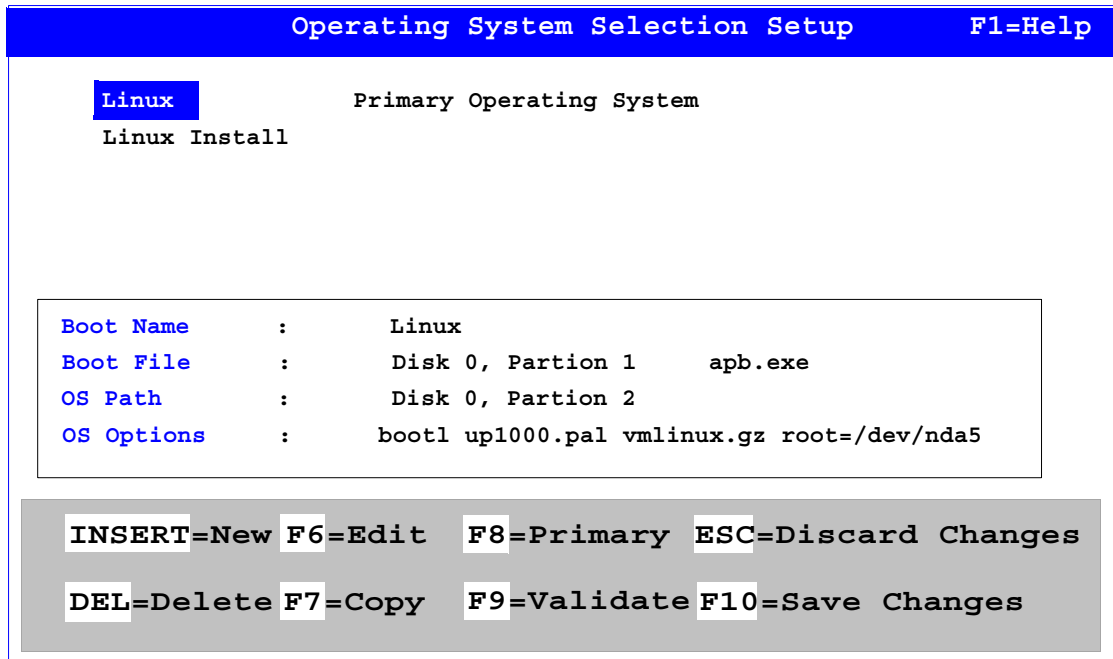
Figure 4-15   Typical Operating System Selection Setup

Linux will boot without the apb prompt with this configuration.

Chapter 5 Troubleshooting

This chapter discusses troubleshooting aspects for both hardware and software components during the UP1000 system startup.

Topics covered include:

- Video review checklist
- Status LEDs
- POST Codes
- Beep Codes
- Variable Firmware Configuration Issues
  - Firmware Error Categories
  - Error Recovery Jumper Settings
  - Error Recovery Procedure

5.1   Hardware Startup

5.1.1   No Video Present

Use the following steps to diagnose and fix video problems:

1. Check the AC power cord connection to the AC outlet.
2. Ensure that the monitor is connected and switched on.
3. Check the voltage setting on the chassis power supply (115 VAC in the U.S.).

⚠   *WARNING:*   **Always take appropriate electrostatic discharge safety measures when handling boards or modules.**

---

4. Check that the Alpha Slot B Module fans are connected and spinning.
5. Turn the system power OFF.
6. Reseat the video card and ensure that it is connected to the monitor.
7. Reseat the DIMMs.
8. Replace the DIMMs.

5.1.2   LED Status Indicators

Ten LED indicators provide diagnostic information about a UP1000 system including the status of certain Alpha Slot B Module functions.

The LEDs are mounted on the lower edge of the motherboard *below* the Alpha Slot B Module and to the right of the I/O connector area. Their orientation is shown in Figure 5-1:
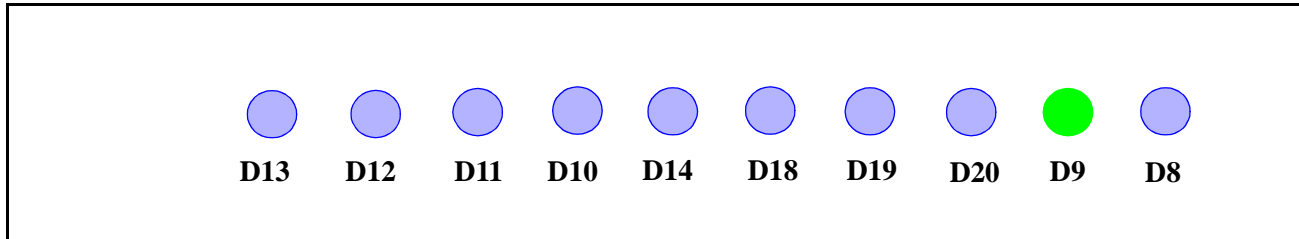
Figure 5-1   LED Status Indicators

Use Table 5-1 to interpret the LED status information

Table 5-1   LED Status Indicators

LED	Function	Comment
D9	**PAL**	**Green LED ON when PAL codes are loading**
D8	PowerGOOD	ON when power to Slot B is good

5.1.3   POST (Power On Self Test) Codes

Utilizing an ISA-based POST card module, a user can monitor the sequential steps as the system is initialized and AlphaBIOS is loaded from the SROM. Each post code, its source and a description of its message is listed in Table 5-2.

Table 5-2   POST Codes with Source and Message Information

Source	POST Code (hex)	Message
SROM	**20**	**Firmware initialization complete**
	01	CPU speed detected; initialize Southbridge
	02	**Southbridge ready**
	03	Initialize L2 cache
	05	**Start sweep of L2 cache and memory**

Table 5-2   POST Codes with Source and Message Information (Continued)

Source	POST Code (hex)	Message
	06	L2 cache and memory ready
	14	**Load system code**
	15	Loading uncompressed firmware into memory
	16	**Loading compressed firmware into memory**
	17	Jump to loaded firmware
	3F	**Fatal error. Second code identifies source of error** **06 = no memory found or bad memory**
AlphaBIOS	98	Firmware has control
	97	**Buses Initialized**
	95	Video console opened
	51	**FATAL - returned from boot menu selection**
	50	FATAL - firmware fatal error
	42	**Firmware drivers started**
	00	Firmware initialized

5.1.4   Beep Codes

The UP1000 system delivers several audible troubleshooting messages which are referred to as beep codes. They are described in Table 5-3.

Table 5-3   Beep Codes and Message Information

Beep Code	Message Description
4	**No valid header found in ROM; loading entire ROM**
6	Memory error detected

5.2   Variable Configuration Settings

The UP1000 Motherboard has six configuration jumpers which have selectable settings. These jumpers are all firmware-related. They are identified by the shaded box in Figure 5-2. Changing the variable configuration settings is used to recover from several error conditions.
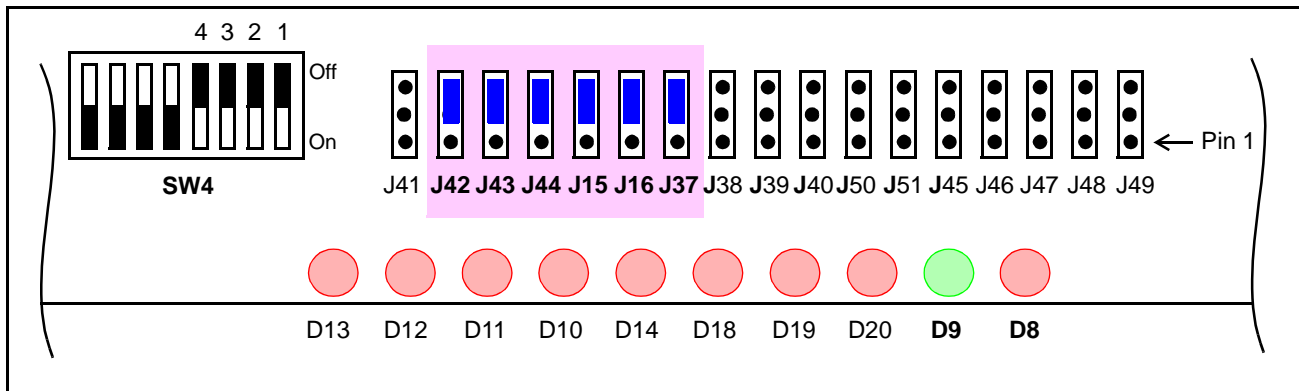
Figure 5-2   Variable Configuration Jumpers

5.2.1   Error Categories

In addition to the factory default setting, there are two other settings which you select based on certain error categories.

Category 1   Some Category 1 error conditions include:

■ Choosing incorrect selections when configuring AlphaBIOS. These selections prevent the system from booting.

■ Forgetting your system password.

Category 2   A Category 2 error condition occurs during an "Upgrading AlphaBIOS" procedure (see Section 4.4.2) by an improper system action.   An example would be: accidentally powering off the system during this procedure.

5.2.2   Error Recovery Utilizing Variable Configuration Jumpers

For these error recoveries, select the appropriate settings from Table 5-4:

Table 5-4   Jumper Settings for Various Error Conditions

Error	Function	J42	J43	J44	J15	J16	J37
None = Factory Default	**Boot to AlphaBIOS**	**0**	**0**	**0**	**0**	**0**	**0**
Category 1	Restore Factory Defaults	1	0	0	0	0	0
Category 2	**Reload ADE**	**1**	**1**	**0**	**0**	**0**	**0**

Notes: 1. Pin 1 is closest to the board edge, pin 3 is closest to the Alpha Slot B Modules.
0 = Shunt installed on pins 2 and 3.
1 = Shunt installed on pins 1 and 2.
2. ADE is special firmware that enables AlphaBIOS to load.

An enlarged visual representation of these settings is shown in Figure 5-3
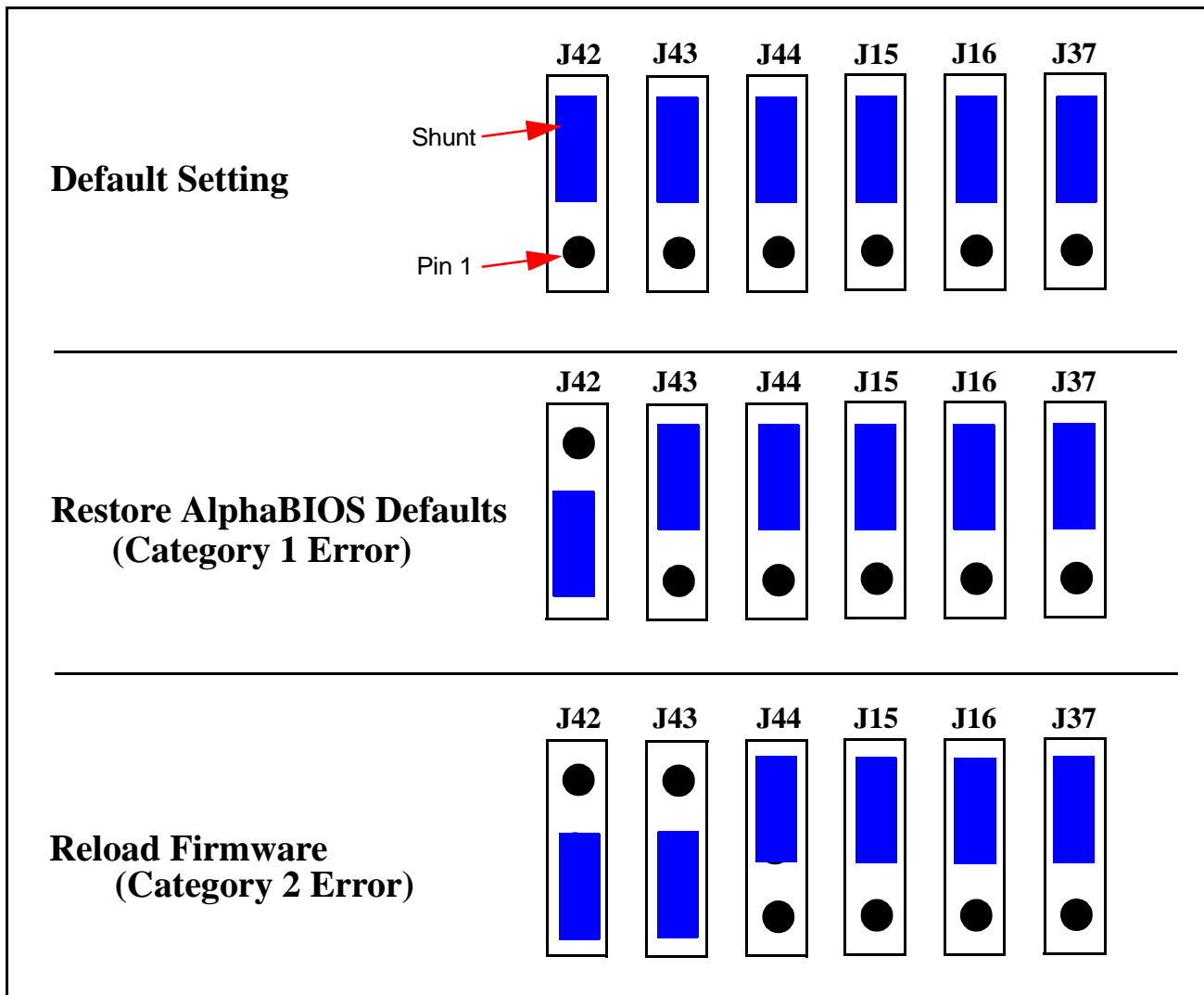
Figure 5-3   Enlarged View, Variable Configuration Jumpers

5.2.3   Error Recovery Procedure

To clear the errors noted in Section 5.2.1, take the following steps:

1. Power off the system
2. Change the jumper shunts according to the error to be cleared
3. Start the system
4. Enter the proper parameters in AlphaBIOS, load the Operating System
5. Power off the system
6. Restore the jumper shunts to their default positions
7. Start the system

Appendix A

Support,

Products and

Documentation

A.1   Customer Support

API provides assistance for their products on their web page at:

www.alpha-processor.com.

A.2   Supporting Products

API maintains a Hardware Compatibility List on their web site for components and accessories that are not included with the UP1000. Compatibility for items such as memory, power supplies, and enclosures are listed.

Point your browser to www.alpha-processor.com and check the Product Information list for Peripherals.

A.3   Alpha Products

API maintains information about other Alpha products on their web site. Point your browser to www.alpha-processor.com and check the Product Information list for Alpha products.

A.4   Alpha Documentation

Title	Vendor
UP1000 Quick Start Installation Guide (51-0035-0A)	**API**
UP1000 User Manual (51-0036-0A)	API

A Publication Evaluation Form is available on the API web page.

A.5   Related Publications

API Publications

The UP1000 suite of publications available from API include the following:

UP1000 Quick Start Installation Guide

The *UP1000 Quick Start Installation Guide*, part number 51-0035-0A, is an illustrated step-by-step procedure focused on setting up and configuring a UP1000 system.

Third–Party Publications

The following documents are useful for understanding and navigating the UP1000 system and its user interface.

Linux

Linux for Dummies, 2nd Edition, Jon "maddog" Hall, IDG Books Worldwide, Inc., Foster City, CA 94404

Alpha Architecture

Alpha Architecture Reference Manual, Third Edition, Digital Press, order # EQ-W938E-DP.

Alpha Architecture Handbook, Version 4, Compaq Computer Corporation, order # EC-QD2KC-TE, October, 1998.

Index

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