UP1100
User Manual

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SAMSUNG ELECTRONICS

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Revision History

Date	Rev	Description
05/31/00	**51-0048-1A**	**UP1100 User Manual first product release. This document supports the UP1100-600-A product.**

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Preface

Overview

This manual describes the Alpha Processor, Inc. UP1100 product, including the Alpha 21264A Processor. The manual emphasizes the System Reference Manual (SRM) Console firmware user interface.

Topics include a description of how to:

- Install an operating system
- Check or change system configurations
- Troubleshoot basic system problems

Audience

This manual is intended for technicians and engineers who support resellers, dealers, system integrators, and OEM vendors who supply UP1100-based systems.

Scope

This manual describes the features, configuration options, functional operation, troubleshooting analysis and user interface of the system and its SRM Console firmware. It is a companion piece to Alpha Processor, Inc.'s UP1100 document set that includes the *UP1100 Quick Start Installation Guide* (51-0047) and the *UP1100 Technical Reference Manual* (51-0049).

Manual Organization

The *UP1100 User Manual* is organized as follows:

- Chapter 1, "UP1100 Introduction," presents the product features and includes a functional block diagram of the system.
- Chapter 2, "System Configuration," provides a pictorial layout of the UP1100 with its key components. Configuration elements include main memory guidelines and configuration jumper settings.
- Chapter 3, "Electrical, Environmental and Physical Data," furnishes electrical and environmental requirements, thermal characteristics, and physical board dimensions.

- Chapter 4, “Software Support,” describes the three major software components that form the UP1100 user interface. Topics include the Alpha System Reference Manual (SRM) Console and Fail Safe Booter (FSB) firmware, and procedures describing installation and upgrade of the operating system.
- Chapter 5, “Troubleshooting,” discusses solutions for hardware and software problems encountered during system startup.
- Appendix A, “Connectors and Pinouts,” describes the connectors and pinouts used on the UP1100.
- Appendix B, “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.

Typographic Conventions

This manual uses the following type conventions:

- Variable information and document titles appear in *italic* type.
- Text that you type is shown in **`bold Courier font`**.
- Type that appears on a screen, such as an example of computer output, is shown in **`Courier font`**.
- Two key names joined with a forward slash are simultaneous keystrokes. Press down the first key while you type the second key, as in press Ctrl/S.

Acronyms

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

Abbreviation	Meaning
AGP	**Accelerated Graphics Port**
ALI	Acer Laboratories, Inc.
AMD	**Advanced Micro Devices, Inc.**
CD	Compact Disk
CE	**European Conforming**
CPU	Central Processing Unit
cUL	**Canadian Underwriters Laboratory**
DDR	Double Data Rate
DIMM	**Dual Inline Memory Module**
DRAM	Dynamic Random Access Memory
ECC	**Error Correction Code**
ECP	Enhanced Capabilities Port
EMI	**Electromagnetic Interference**
EN	European Norm
EPLD	**Electrically Programmable Logic Device**
EPP	Enhanced Parallel Port
FAQ	**Frequently Asked Questions**
FCC	Federal Communications Commission
FDD	**Floppy Disk Drive**
FSB	Fail-Safe Booter
HDD	**Hard Disk Drive**
I^2C	Inter-integrated Circuit
IDE	**Integrated Device Electronics**
I/O	Input/Output
ISA	**Industry Standard Architecture**
KBD	Keyboard
LED	**Light Emitting Diode**
LW	Late Write
OEM	**Original Equipment Manufacturer**
OS	Operating System
PAL	**Privileged Architecture Library**
PCI	Peripheral Component Interconnect
PCB	**Printed Circuit Board**
PMU	Power Management Unit

Abbreviation	Meaning
ROM	**Read-only Memory**
RTC	Real Time Clock
SCSI	**Small Computer System Interface**
SDRAM	Synchronous Dynamic Random Access Memory
SEC	**Samsung Electronics Co., Ltd.**
SM	System Management
SPD	**Serial Presence Detect**
SRM	System Reference Manual
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
VID	**Voltage Identification**
VRM	Voltage Regulator Module

Chapter 1 UP1100 Introduction

This chapter provides an overview of the UP1100 product, including its components and features.

The UP1100 product consists of an Alpha 21264A Processor Central Processing Unit (CPU), and a Peripheral Component Interconnect (PCI) bus interfacing the following components:

- Advanced Micro Devices, Inc. (AMD) AMD-751 System Controller
- Acer Laboratories, Inc. (ALI) M1535D PCI-ISA Bridge
- Samsung Electronics Co., Ltd. (SEC) KM736FV4011H L2 cache
- Intel Corp. 21143 PCI/CardBus 10/100 Mb/s LAN (Ethernet) Controller
- Creative Labs, Inc. Sound Blaster-compatible sound chip
- Voltage Regulator Module (VRM)

UP1100s are designed for use in uniprocessor workstation and low-end server platforms.

1.1 Features

Table 1-1 provides a summary of the UP1100 product features.

Table 1-1 UP1100 Product Features

Feature	Description	Manufacturer
Physical Form Factor:	**ATX (12" X 9.6")**	
CPU:	Supports one 600 MHz EV67 Alpha 21264A Processor	SEC
Cache:	**External 2 MB L2 cache, 128-bit Late Write Synchronous Static Random Access Memory (SSRAMS)**	**SEC**
Chipsets:	• AMD-751 System Controller	AMD
	• M1535D PCI-ISA Bridge	**ALI**
	• 21143 LAN Controller	Intel
Main Memory:	**Three 168-pin, PC 100 Synchronous Direct Random Access Memory (SDRAM) unbuffered Serial Presence Detect (SPD) Dual Inline Memory Modules (DIMMs) of 64 MB, 128 MB, or 256 MB, providing 64 MB to 768 MB memory with Error Correcting Code (ECC)**	

Table 1-1 UP1100 Product Features (Continued)

Feature	Description	Manufacturer
Power:	• Requires 300W ATX power supply	
	• **Uses ATX power connectors**	
System Interface:	• 100 MHz clock with Double Data Rate (DDR) transfers	
	• **Two Ultra DMA 33/66 Integrated Device Electronics (IDE) connectors, driven by the dual-channel IDE controllers in the M1535D PCI-ISA Bridge**	
	• Inter-integrated Circuit (I^2C) System Management (SM) bus	
	• **Two external Universal Serial Bus (USB) ports, driven by the USB controller in the M1535D PCI-ISA Bridge**	
On-board Input/Output (I/O):	• Two serial Universal Asynchronous Receiver Transmitter (UART) ports, driven by the Super I/O controller in the M1535D PCI-ISA Bridge	
	• **One Enhanced Capabilities Port (ECP) / Enhanced Parallel Port (EPP) / SP parallel port, driven by the Super I/O controller in the M1535D PCI-ISA Bridge**	
	• One dual-drive capable Floppy Disk Drive (FDD) controller driven by the Super I/O controller in the M1535D PCI-ISA Bridge	
	• **PS/2 Keyboard and Mouse port**	
I/O Slots:	• One 2x Accelerated Graphics Port (AGP) slot, driven by the AGP controller in the AMD-751 System Controller	
	• **Three 33 MHz PCI slots, driven by the 32-bit PCI bus controller in the AMD-751 System Controller**	
Sound Card:	Sound Blaster-compatible sound controller driven by the M1535D PCI-ISA Bridge	
Firmware:	**Embedded Alpha System Reference Manual (SRM) Console**	

1.2 System Components

The UP1100 is implemented in industry-standard parts and uses an Alpha 21264A Processor. The functional components of the UP1100 are shown in block diagram form in Figure 1-1. A detailed description of system components is provided in the *UP1100 Technical Reference Manual*, P/N 51-0049.

Note: *Refer to the list of Acronyms on page x of the Preface for an explanation of terminology used in the block diagram.*

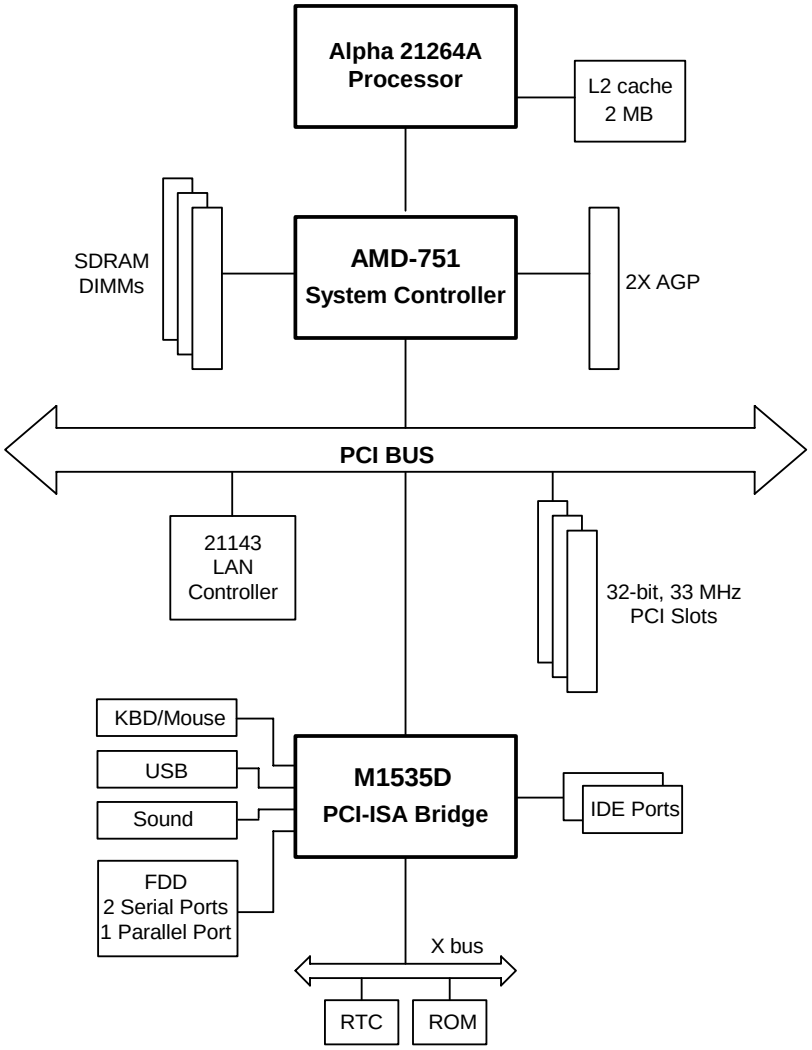

Figure 1-1 UP1100 Functional Block Diagram

Chapter 2 System Configuration

This chapter describes the layout and configuration of the UP1100. It includes information about switch settings used to determine the UP1100 configuration.

2.1 Board Layout and Components

On-board connectors are provided for the following:

- AGP and PCI cards
- IDE and FDD devices
- USB devices
- Memory DIMMs
- Serial and parallel peripherals
- LAN (Ethernet) port
- Audio In / Out and Mic In connections
- Power

These connectors and the configuration switchpack are shown in Figure 2-1, which depicts the UP1100 and its components. Table 2-1 specifies the components as indicated in Figure 2-1.

Refer to Appendix A for a complete description of the connectors and pinouts used in the UP1100.

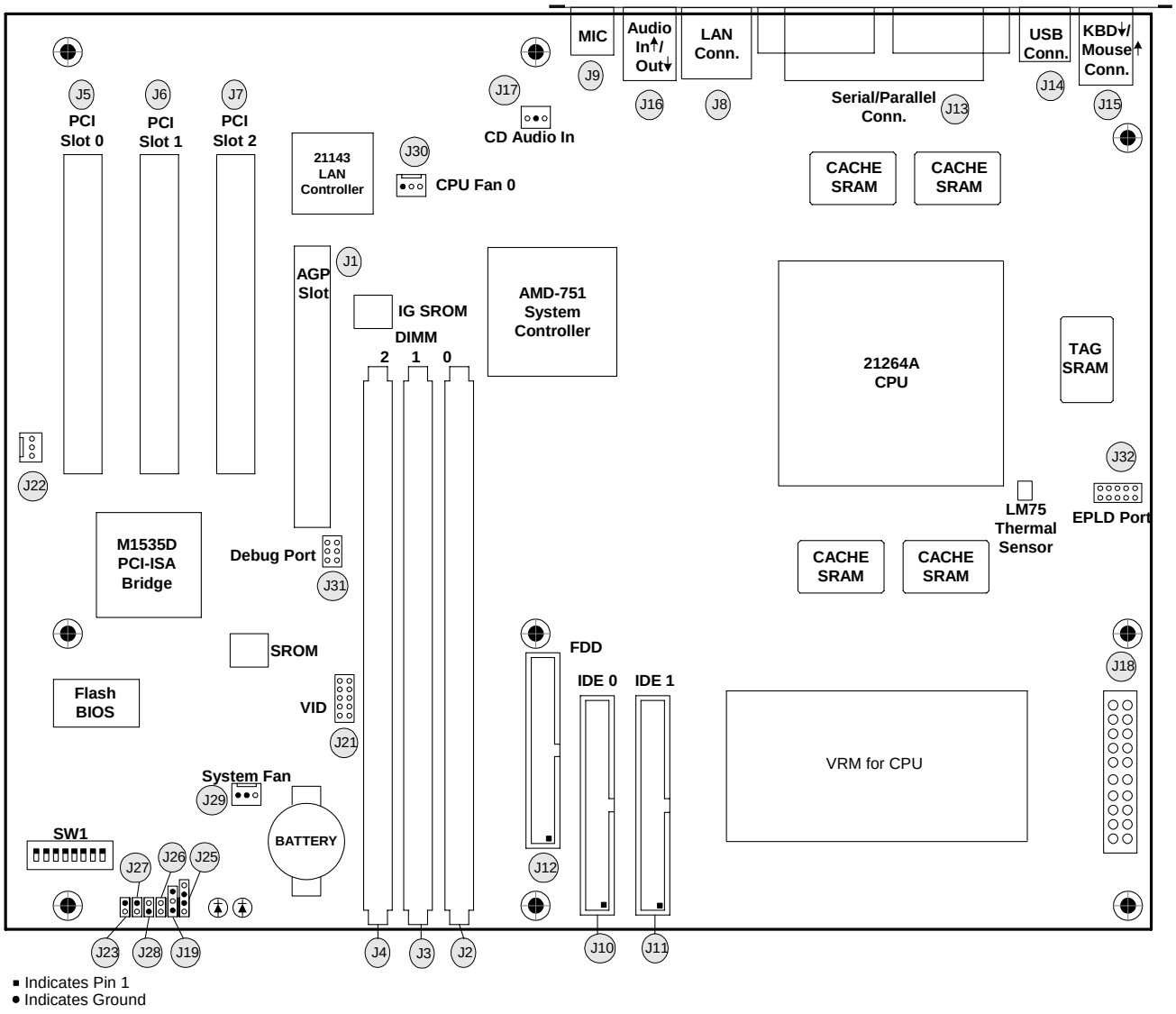

Figure 2-1 UP1100 Layout

Table 2-1 UP1100 Connector Component List

Comp. No.	Specification	Comp. No.	Specification
J1	**AGP Connector**	**J2**	**168-pin DIMM Socket, Slot 0**
J3	168-pin DIMM Socket, Slot 1	J4	168-pin DIMM Socket, Slot 2
J5	**32-bit PCI Connector, Slot 0**	**J6**	**32-bit PCI Connector, Slot 1**
J7	32-bit PCI Connector, Slot 2	J8	Local Area Network (LAN—RJ-45 Ethernet) Connector

Table 2-1 UP1100 Connector Component List (Continued)

Comp. No.	Specification	Comp. No.	Specification
J9	**Mic In Connector**	**J10**	**Primary IDE Connector**
J11	Secondary IDE Connector	J12	FDD Connector
J13	**Serial/Parallel I/O Port**	**J14**	**USB Port**
J15	Keyboard / Mouse Port	J16	Audio In / Out Connector
J17	**Compact Disk (CD) Audio In Connector**	**J18**	**ATX Power Connector**
J19	Power LED Connector	J20	Not Used
J21	**Voltage Identification (VID) Port**	**J22**	**System Management (SM) Bus Extender Port**
J23	Power Button Connector	J25	Speaker Cable Connector
J26	**Hard Disk Drive (HDD) Activity LED Connector**	**J27**	**Reset Button Connector**
J28	Keyboard Lock Cable Connector	J29	System Fan Connector
J30	**CPU Fan Connector 0**	**J31**	**Debug Port**
J32	Electrically Programmable Logic Device (EPLD) Program Port		

2.2 Memory Subsystem

2.2.1 Memory Configuration

The memory subsystem has one DIMM bank with three independent slots. (See Figure 2-2.) Each slot accepts 168-pin, PC100 SDRAM Unbuffered SPD DIMM modules.

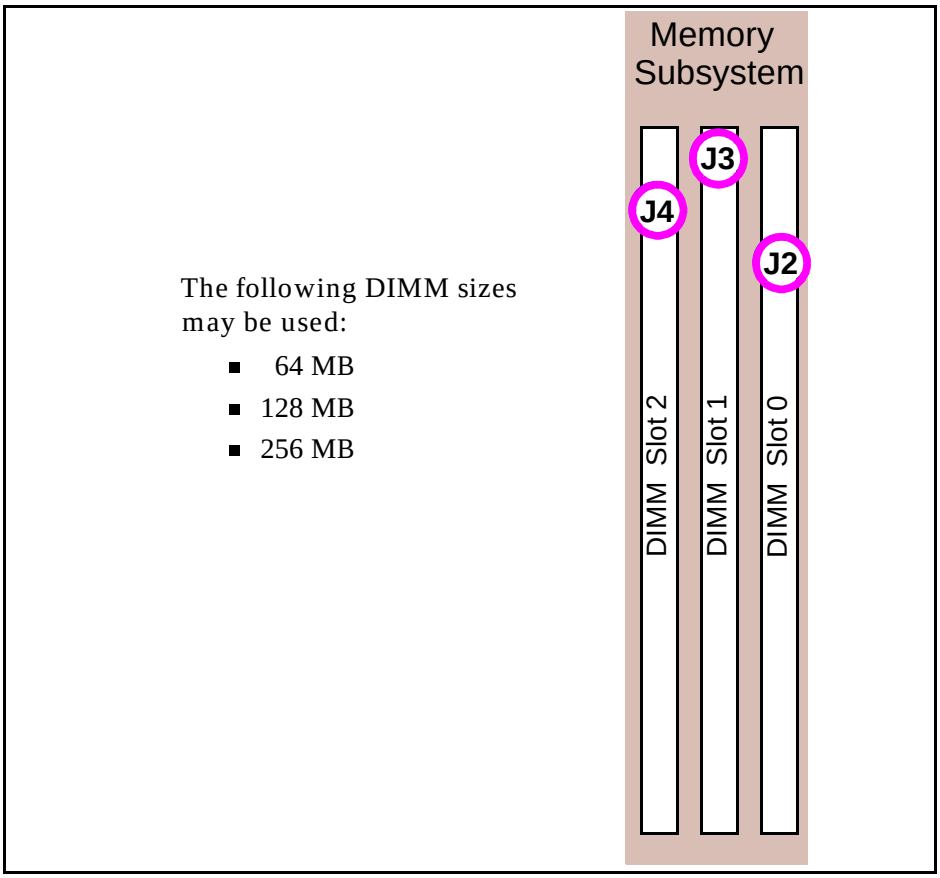

Figure 2-2 Memory Subsystem

2.2.2 Memory Guidelines

Use the following rules to populate the UP1100 memory subsystem:

- Populate Slot 1 (J3) first.
- DIMM size can be 64 MB, 128 MG or 256 MB.
- Each slot can use different sized DIMMs.
- Memory is supported in a size range between 64 MB (minimum) to 768 MB (maximum).

See Table 2-2 for typical memory configurations.

Note: *For a list of supported memory manufacturer's and parts, check the Alpha Processor, Inc. website for the UP1100 Hardware Compatibility List (HCL):*

`http://www.alpha-processor.com/`

Table 2-2 Typical UP1100 Memory Configurations

Total Memory	No. of DIMMs	Slot 1 (J3)	Slot 2 (J4)	Slot 0 (J2)
64 MB	**1**	**64 MB**		
128 MB	1	128 MB		
128 MB	**2**	**64 MB**	**64 MB**	
256 Mb	1	256 MB		
256 MB	**2**	**128 MB**	**128 MB**	
256 Mb	3	128 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**
768 MB	3	256 MB	256 MB	256 MB

2.3 Configuration Settings

The UP1100 has one configuration switchpack, SW1, which has selectable settings. These switch settings are organized as follows:

- Switches 1 and 2—Firmware image selection
- Switches 7 and 8—L2 cache size selection

The location of SW1 is shown in Figure 2-1, in the lower-left corner of the board.

Note: *Do not change the factory settings of any other switches on SW1. Only Switches 1, 2, 7 and 8 are supported for configuration of the UP1100.*

2.3.1 Firmware Image Selection

Configuration of alternate firmware is managed through setting of switches 1 and 2 on SW1, as shown in Table 2-3. Switches 1 and 2 are On by default, which boots the UP1100 under SRM Console.

Table 2-3 Firmware Configuration Settings (SW1, Switches 1 and 2)

Function	Switch 1 Position	Switch 2 Position
SRM Console (default)	**On**	**On**
Fail Safe Booter (FSB)	Off	Off

2.3.2 Cache Size Selection

Cache size is configured using Switches 7 and 8 of SW1, as shown in Table 2-4.

Table 2-4 Cache Size Configuration Settings (SW1, Switches 7 and 8)

Function	Switch 7 Position	Switch 8 Position
Cache Disable	**On**	**On**
2 MB	On	Off
Reserved	**Off**	**On**
Reserved	Off	Off

Chapter 3 Electrical, Environmental and Physical Data

In this chapter, a description is provided of the UP1100 power requirements, environmental and enclosure specifications, and physical parameters.

3.1 Power Specifications

3.1.1 Power Consumption

The UP1100 has a typical total power consumption of 90W. Table 3-1 lists the current requirement for each direct current supply voltage (Vdc) for the UP1100. All requirements are for fully populated products, with maximum usage applied.

Note: *This table does not include requirements for peripheral slots or disk drives. Be sure to allow for adequate additional current when selecting a power supply for the UP1100.*

Table 3-1 UP1100 Typical Power Consumption

Supply Voltage	Current	Power	Remarks
3.3V	**5.1A**	**17W**	
5.0V	13A	65W	
5.0V standby	**0.8A**	**4.0W**	**Excluded in total power**
-5.0V	0.1A	0.5W	
12V	**0.1A**	**1.2W**	
-12V	0.1A	1.2W	Fans
Total Power Consumption:		**90W**	

3.1.2 Power Supply

The UP1100 requires the use of a 300 Watt ATX power supply. Alpha

Processor, Inc. recommends the power supply described in Table 3-2, or any comparable power supply which can provide the same level of support.

Table 3-2 Recommended Power Supply

Feature	Specification
Vendor and Model:	**EMACS AP2-5300F**
Output:	• 30A @ +5V
	• **10A @ +12V**
	• 1.0A @ -5V
	• **1.0A @ -12V**
	• 28A @ +3.3V
	• **0.85A @ 5 Vsb Typical**
Qualifications:	• Maximum allowable 3.3V + 5V total draw = 175W
	• **Maximum total continuous power = 300W**
	• Maximum total peak power = 300W

3.1.3 Power Connectors

The power connector on the UP1100 is an ATX Standard 10 x 2 (20-pin) connector.

3.2 Environmental Specifications

The Alpha 21264A Processor is cooled by one 80 mm fan blowing air directly into the chip's heat sink. The UP1100 is designed to run efficiently using only this fan. Additional fans may be necessary depending upon cabinets and requirements of plug-in cards.

The UP1100 is specified to run within the environment listed in Table 3-3.

Table 3-3 Environmental Requirements

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 of 35°C (95°F) and minimum dew point of 2°C (36°F)**
Rate of (dry bulb) temperature change	11°C / hr. ±2°C / hr. (20°F / hr. ±4°F / hr.)

3.2.1 Safety

The UP1100 meets registered product-safety certification for the U.S. and Canadian Underwriters Laboratories (UL and cUL). It also meets the European Conforming (CE) standard EN 60950:1992 "Safety of Information Technology Equipment Including Electrical Business Equipment Incorporating Amendment Nos 1, 2, 3, 4." European Norm (EN) standards are published in the Official Journal of the European Community.

3.2.2 EMI

The UP1100 meets electro-magnetic interference (EMI) emission certification for the following:

- EN 55022:1994 / A1:1958 / A2:1997 Class A ITE emissions requirements
- Federal Communications Commission (FCC) 47 CFR Part 15 Class A

It also meets the EMI immunity certification EN 50082-1:1992 "EMC Residential, Commercial and Light Industrial Generic Immunity Standard."

3.2.3 Thermal

Figure 3-1 shows the location of thermally-sensitive components on the UP1100. A list of maximum allowable case temperatures for these components is provided in Table 3-4.

Case temperatures are a vital factor in determining airflow on a Printed

Circuit Board (PCB). Variables which may affect a component's case temperature include the following:

- Operating temperature
- Operating frequency
- Current load

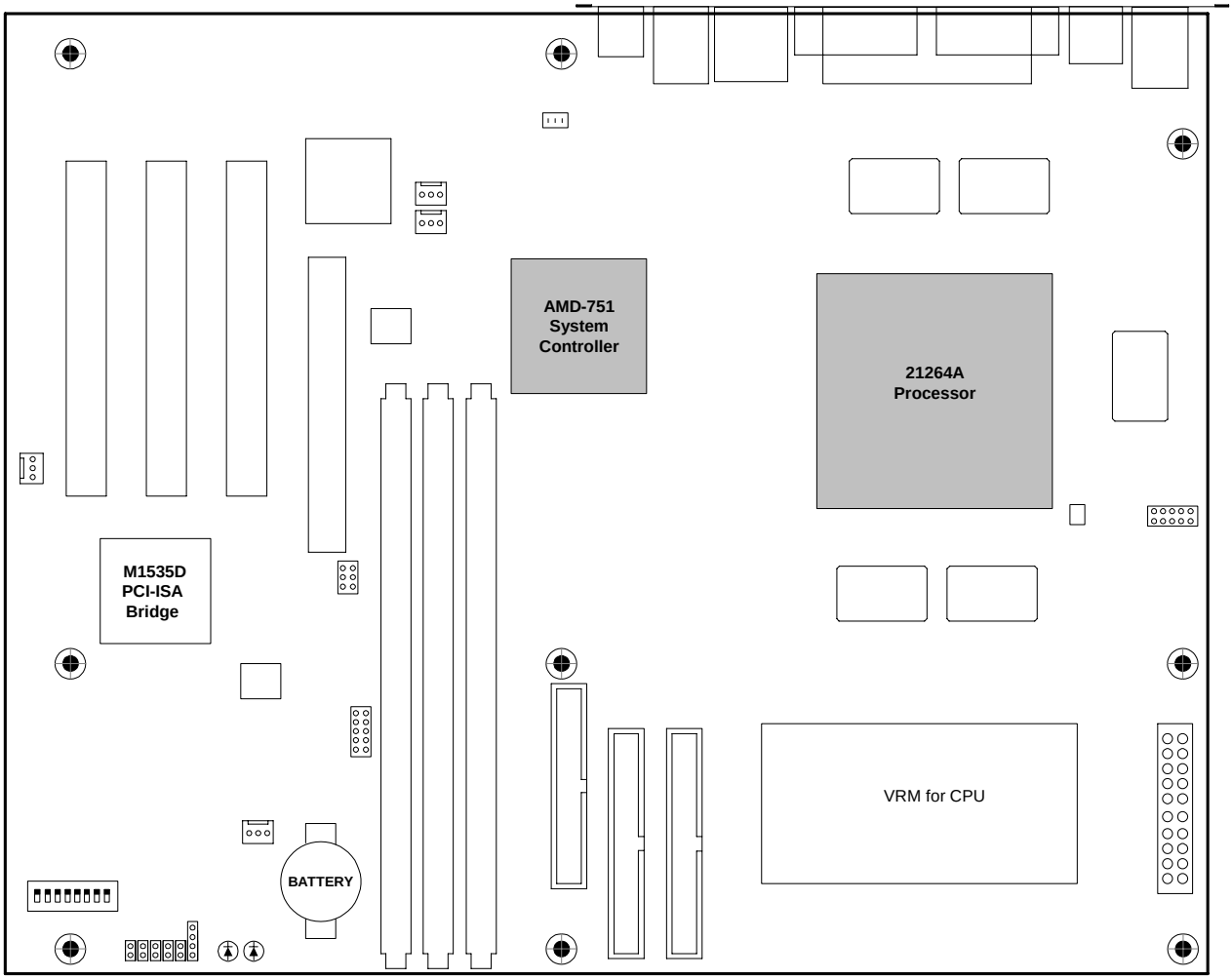

Figure 3-1 Thermally-sensitive Components

Table 3-4 Maximum Component Case Temperatures

Component	Maximum Temperature
Alpha 21264A Processor	**<77.8°C (172°F)**
AMD-751 System Controller	<70°C (158°F)

3.3 Enclosure Requirements

This product has been approved for use in the Axxion Group ATX Case, DL-17. Refer to section 3.5, “Rear Panel I/O Shield,” on page 3-6 for additional details on enclosure requirements.

3.4 Physical Parameters

3.4.1 UP1100 Parameters

The UP1100 is a PCB with the dimensions specified in Table 3-5.

Table 3-5 UP1100 Physical Parameters

Dimension	Value
Length	**304.8 mm (12 in)**
Width	243.8 mm (9.6 in)
Height	**65 mm (2.6 in)**

3.4.2 UP1100 Mounting Hole Specification

The UP1100 mounting hole specification is depicted in Figure 3-2. This mounting hold specification is an standard ATX implementation, which allows the UP1100 to fit into standard ATX chassis.

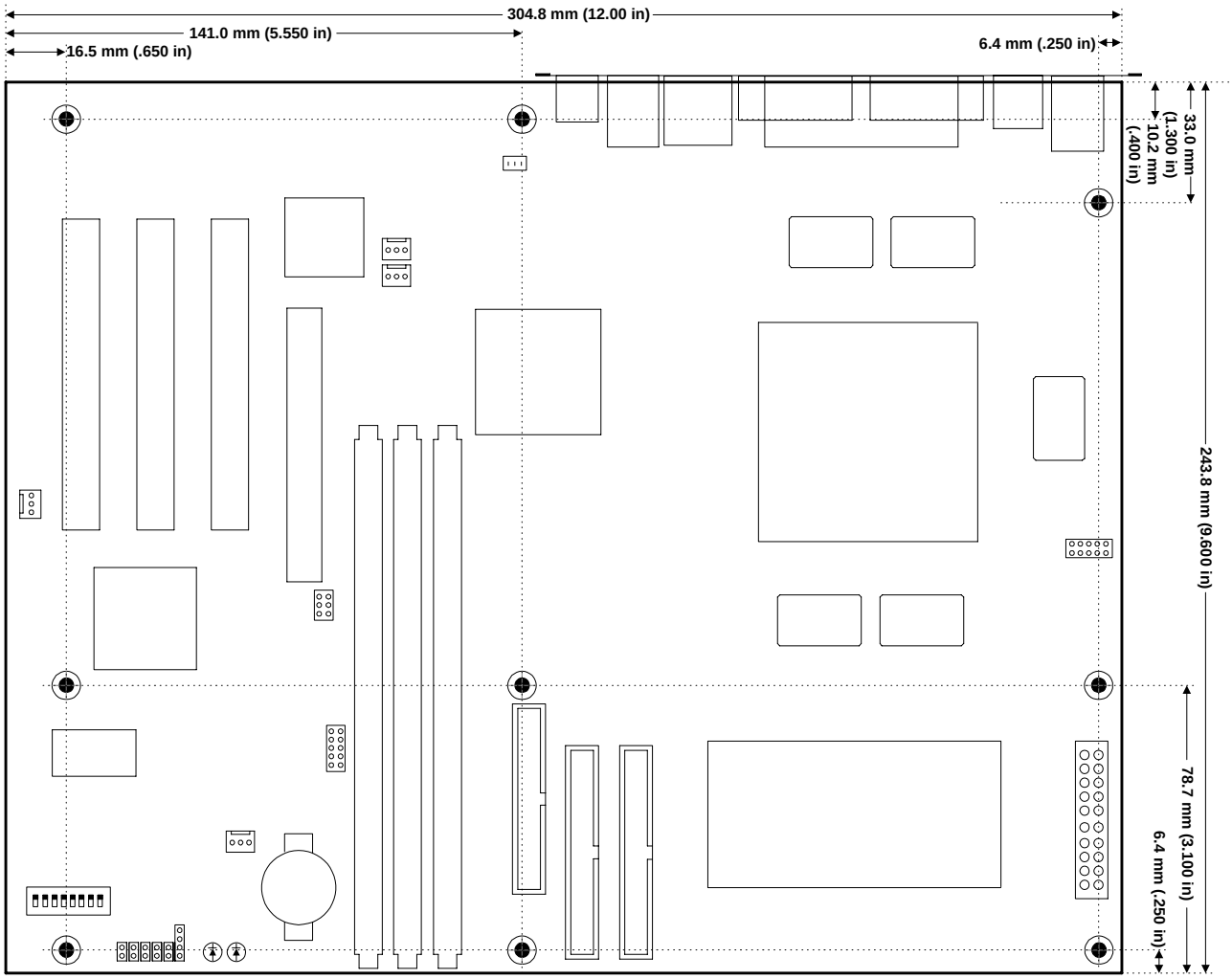

Figure 3-2 UP1100 Mounting Hole Specification

3.5 Rear Panel I/O Shield

The UP1100 rear panel connectors must be fitted with a suitable ATX Core Design #6 I/O shield, as shown in Figure 3-3. Individual rear panel I/O connectors are designated with letters. Each connector type and its description are listed in Table 3-6.

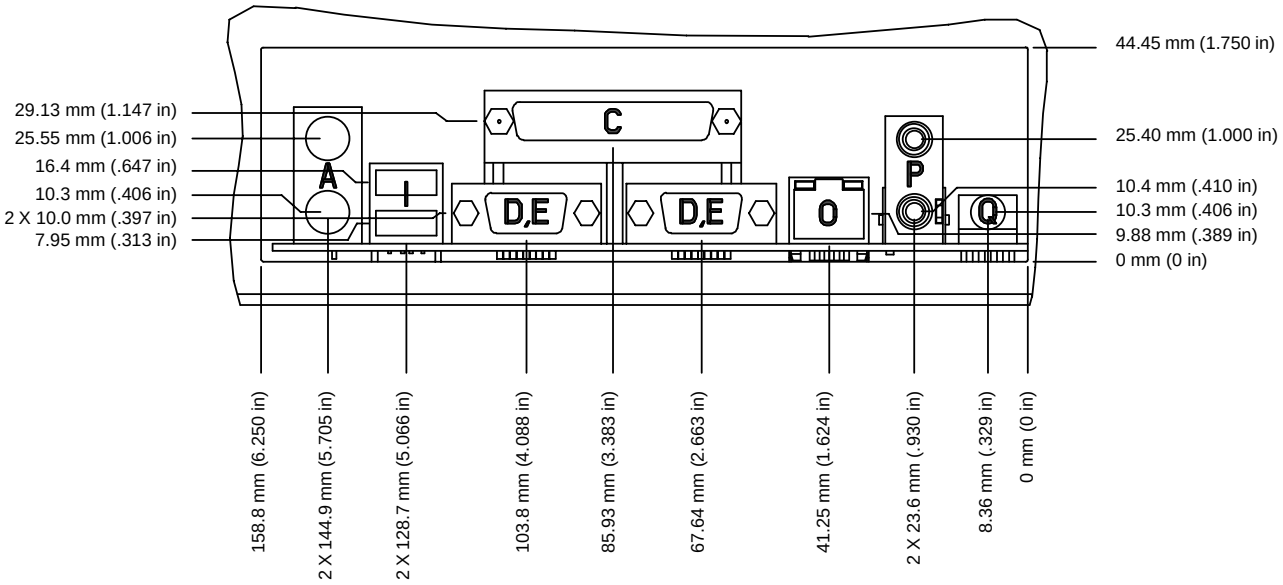

Figure 3-3 Rear Panel Connectors

Table 3-6 Rear Panel Connectors

Letter	Connector Description
A	**PS/2 Stacked Mouse (top)/Keyboard (bottom) [DIN]**
C	Stacked Parallel (25 Pin D-Sub)
D, E	**Serial (9 Pin D-Sub)**
I	Dual USB
O	**LAN (RJ-45 Ethernet)**
P	Audio In (top) / Audio Out (bottom) [Phono jack]
Q	**Microphone In (Phono jack)**

Chapter 4 Software Support

4.1 Software Overview

UP1100 systems support three major software components:

- Fail Safe Booter (FSB)
- Reset PALcode (Privileged Architecture Library)
- Alpha SRM Console
- Operating System (OS)

4.1.1 FSB

FSB firmware is used for firmware recovery procedures. The UP1100 supports FSB release 1.0 or higher.

4.1.2 Reset PALcode

When the UP1100 is turned on or reset, Reset PALcode firmware automatically loads performs system initialization activities. Once Reset PALcode firmware is loaded, it automatically load the next level of firmware and passes control to that code.

The UP1100 supports Reset PALcode version X17.9 or higher.

4.1.3 Alpha SRM Console

The SRM Console is special firmware that initializes the UP1100 system and enables you to install and boot the operating systems. Alpha SRM Console firmware resides in the flash ROM on the UP1100.

For further information about the Alpha SRM Console, visit our website at:

http://www.alpha-processor.com/support/srm.html

or

Navigate from the Alpha Processor, Inc. website:

`http://www.alpha-processor.com/`

through the following steps:

1. Click on Support in the upper right of your browser.
2. Click on FAQs (Frequently Asked Questions) in the center left of your browser.
3. Scroll through the FAQ questions until you reach the one on the SRM Console.
4. Click on the word, "here." This takes you to the SRM web pages.

or go to the Alpha Linux home page:

```
http://www.alphalinux.org/
```

4.1.4 Operating System

The UP1100 works with the Linux kernel 2.2.14 or higher in order to boot from SRM A5.6-3 or higher.

Note: *Consult the Alpha Processor, Inc. website for a list of OS vendors and versions currently supported.*

4.2 Alpha SRM Console

The Alpha SRM Console is the command line interface that supports the Linux operating systems. The SRM Console is used to bootstrap the operating system, configure and test the system hardware, examine system options for errors, and set or change environment variables.

This following sections describe the SRM Console commands and environment variables:

- Invoking the SRM Console
- Command summary
- Displaying the system configuration
- Booting the Operating System
- Updating firmware
- Using environment variables
- Environment variable summary
- Finding Help

4.2.1 Invoking the SRM Console

When a system is powered up, the SRM Console runs and either remains running or passes control to an operating system. If the system is already running, you can invoke the SRM Console by:

- Shutting down the operating system
- Pressing the **Reset** button

Both of these actions return you to the SRM Console prompt, >>>.

For example, in a running system, in which control has passed to the Linux operating system, do one of the following steps to invoke SRM Console mode:

- Shut down the operating system according to the procedure described in your operating system documentation. The SRM Console prompt, **>>>**, appears.
- Or:
  1. Press the **Reset** button. The SRM Console prompt, >>>, appears. You may now perform tasks in SRM Console mode.
  2. At the >>> prompt, type **boot** to return to the operating system.

Note: *See "Using Environment Variables," section 4.2.7 on page 4-15 for more details.*

4.2.2 Command Summary

The SRM Console is a command line interface. SRM Console commands enable you to examine and modify the system state. Table 4-1 gives the most commonly used SRM Console commands. Table 4-2 gives the syntax for the SRM Console commands. Table 4-3 gives special characters you can use in SRM Console mode.

Table 4-1 Summary of SRM Console Commands

Command	Function
boot	**Loads and starts the operating system.**
clear *envar*	Resets an environment variable to its default value.
clear password	**Sets the password to zero.**
continue	Resumes program execution.
date	**Sets or displays the system time and date.**
edit	Invokes the SRM Console line editor on a RAM file or on the nvram file (power-up script).
halt	**Halts the processor. (Same as the stop command.)**
help	Displays information about the specified SRM Console command.
initialize	**Resets the system to a known state.**

Table 4-1 Summary of SRM Console Commands (Continued)

Command	Function
`isacfg`	Displays or modifies parameters for ISA devices.
`lfu`	**Runs the Loadable Firmware Update Utility.**
`login`	Turns off secure mode, enabling access to all SRM Console commands during the current session.
`more`	**Displays a file one screen at a time.**
`set` *`envar`*	Sets or modifies the value of an environment variable.
`set password`	**Sets the SRM Console password for the first time or changes an existing password.**
`set secure`	Enables secure mode without requiring a restart of the SRM Console.
`show` ***`envar`***	**Displays the state of the specified environment variable.**
`show config`	Displays the configuration at the last system initialization.
`show cpu`	**Displays the state of the processor.**
`show device`	Displays a list of controllers and their devices in the system.
`show memory`	**Displays memory module information.**
`show pal`	Displays the version of the privileged architecture library code (PALcode).
`show version`	**Displays the version of the SRM Console program.**
`stop`	Halts the processor. (Same as **`halt`**.)

Table 4-2 Syntax for SRM Console Commands

Option	Attribute or Action
Length	**Up to 255 characters, not including the terminating carriage return or any characters deleted as the command is entered. A command longer than 80 characters and without the backslash character (see Table 4-3) causes display of an error message.**
Case	Upper- or lowercase characters can be used for input. Characters are displayed in the case in which they are entered.
Abbreviation	**Only by dropping characters from the end of words. You must enter the minimum number of characters to identify the keyword unambiguously. Abbreviation of environment variables is allowed with the show command.**
Options	You can use command options, to modify the environment, after the command keyword or after any symbol or number in the command. See individual command descriptions for examples.
Numbers	**Most numbers in SRM Console commands are in decimal notation. Two exceptions, both of which use hexadecimal notation, are addresses and numbers used in the deposit command. The default radic can be overridden by inserting %d before the numbers you want to express in decimal, %o before octal, or %x before hexadecimal. Register names (for example, R0) are not considered numbers and use decimal notation.**
No characters	A command line with no characters is a null command. The SRM Console program takes no action and does not issue an error message; it returns the SRM Console prompt. The SRM Console supports command line recall and editing.
Spaces or Tabs	**Multiple adjacent spaces and tabs are compressed and treated as a single space. The SRM Console program ignores leading and trailing spaces.**

Table 4-3 Special Characters for SRM Console

Character	Function
Return or Enter	**Terminates a command line. No action is taken on a command until it is terminated. If no characters are entered and this key is pressed, the SRM Console just redisplays the prompt.**
Backslash (\)	Continues a command on the next line. Must be the last character on the line to be continued.
Delete	**Deletes the previous character.**
Help	By itself, displays first-level help. When the **Help** key is pressed after part of a command, the system displays available options.
Ctrl/A or F14	**Toggles between insert and overstrike modes. The default is overstrike.**
Ctrl/B or up-arrow	Recalls previous command or commands. The last 16 commands are stored in the recall buffer.
Ctrl/C or Ctrl/P	**Terminates the process that is running. Clears Ctrl/S; resumes output suspended by Ctrl/O. When entered as part of a command line, deletes the current line. Ctrl/C has no effect as part of a binary data stream.**
Ctrl/D or left-arrow	Moves the cursor left one position.
Ctrl/E	**Moves the cursor to the end of the line.**
Ctrl/F or right-arrow	Moves the cursor right one position.
Ctrl/H or Backspace or F12	**Moves the cursor to the beginning of the line.**
Ctrl/J	Deletes the previous word.
Ctrl/O	**Stops output to the SRM Console terminal for the current command. Toggles between `enable` and `disable`. The output can be reenabled by other means as well: when the SRM Console prompts for a command, issues an error message, or enters program mode, or when Ctrl/P is entered.**
Ctrl/Q	Resumes output to the SRM Console terminal that was suspended by Ctrl/S.
Ctrl/R	**Redisplays the current line. Deleted characters are omitted. This command is useful for hardcopy terminals.**
Ctrl/S	Suspends output to the SRM Console terminal until Ctrl/Q is entered. Cleared by Ctrl/C.
Ctrl/U	**Deletes the current line.**

Table 4-3 Special Characters for SRM Console (Continued)

Character	Function
*	Wildcarding for commands such as **show**.
" "	**Double quotes enable you to denote a string for environment variable assignment.**
#	**Specifies that all text between it and the end of the line is a comment. Control characters are not considered part of a comment.**

4.2.3 Displaying the System Configurations

Several commands are used to display the system configuration:

- `show config`
- `show cpu`
- `show device`
- `show memory`
- `show pal`
- `show version`

show config

The `show config` command displays a list of devices found on the system interconnect and I/O buses. This is the configuration at the most recent initialization. The syntax is:

`show config`

Example 4-1 Show Config Command

```
>>>show config
                          SEC UP1100 598 MHz

SRM Console:A5.6-7
PALcode:OpenVMS PALcode V1.69-54, Tru64 UNIX PALcode V1.62-1

Processors
CPU 0  Alpha 21264A-9 598 MHz     SROM Revision: X17.9
       Bcache size: 2 MB

Core Logic
System Controller   AMD-751 Revision C Step 6

MEMORY

Array #       Size     Base Addr
-------    ----------  ---------
   1         128 MB    000000000
```

```
Total Bad Pages = 0
Total Good Memory = 128 MBytes


PCI Hose 00
     Bus 00  Slot 01/0: 70071022
                                              Bridge to Bus 2, PCI
     Bus 00  Slot 03: Acer Labs M1535D Modem

     Bus 00  Slot 06: Acer Labs M1535D Audio

     Bus 00  Slot 07: Acer Labs M1535D
                                               Bridge to Bus 1, ISA
     Bus 00  Slot 11: DE500-BA Network Controller
                           ewa0.0.0.11.0  00-00-F0-51-00-2D
     Bus 00  Slot 16: Acer Labs M1535D IDE
                          dqa.0.0.16.0
                           dqa0.0.0.16.0  QUANTUM FIREBALLlct1
                           dqb0.0.1.16.0  ATAPI CD -ROM DRIVE
     Bus 02  Slot 05: 0525102B/217D102B



ISA
Slot   Device Name   Type   Enabled  BaseAddr  IRQ      DMA
0
0      MOUSE         Embedded  Yes  60        12

1      KBD           Embedded  Yes  60        1

2      COM1          Embedded  Yes  3f8       4

3      COM2          Embedded  Yes  2f8       3

4      LPT1          Embedded  Yes  3bc       7

5      FLOPPY        Embedded  Yes  3f0       6        2

6      EIDE          Embedded  Yes  1f0       14
                                    3f6       15
                                    170
                                    376

7      PWR_MANAGEMENTEmbedded  Yes
8      USB           Embedded  No
```

show cpu

The show cpu command displays the status of the CPU. The syntax is:

show cpu

Example 4-2 Show CPU Command

```
>>>show cpu

Primary CPU:      00
Active CPUs:      00
Configured CPUs:  00
SROM Revision:    X17.9
```

show device

The `show device` command displays status for devices and controllers in the system: SCSI and MSCP devices, the internal floppy drive, and the network. The syntax is:

`show device` ***`[controller_name]`***

`controller_name`	The controller name or abbreviation. When abbreviations or wildcards are used, all controllers that match the type are displayed. If no name is given, the display is a list of all devices and controllers in the system.

Example 4-3 Show Device Command

```
>>>show device
dka600.6.0.8.0         DKA600      QUANTUM ATLAS IV 36 WLS  0A0A
dkb600.6.0.108.0       DKB600      QUANTUM ATLAS 10K 9WLS  UCH0
dqa0.0.0.16.0          DQA0        CD-ROM C DU4011  UY0A
dva0.0.0.0.0           DVA0
pka0.7.0.8.0           PKA0        SCSI Bus ID 7
pkb0.7.0.108.0         PKB0        SCSI Bus ID 7
```

An example of a device name is `dka200.2.0.7.1`. Table 4-4 shows the interpretation of this device name.

Table 4-4 Device Naming Convention

Category		Description
dk	**Driver ID**	**Two-letter designator of port or class driver:** **dk SCSI device** **fw FDDI device** **dq IDE Device** **mk SCSI tape** **dr RAID set device** **mu DSSI tape** **du DSSI disk** **pk SCSI port** **dv Diskette drive** **pu DSSI port** **ew Ethernet port**
a	Storage adapter ID	One-letter designator of storage adapter (a, b, c...).
200	**Device unit number**	**Unique number (MSCP unit number). SCSI unit numbers are forced to 100 X node ID.**
2	Bus node number	Bus node ID.
0	**Channel number**	**Used for multi-channel devices.**
7	Logical slot number	Corresponds to PCI slot number.
1	**Hose number**	**0 — PCI 0**

Table 4-5 PCI Address Assignments

Bus	Device #	Description
Bus 0	**0**	**AMD-751 System Controller**
	1	AMD-751 System Controller, AGP Controller
	7	**M1535D PCI-ISA Bridge**
	8	PCI Slot 0
	9	**PC1 Slot 1**
	10	PCI Slot 2
	16	**M1535D PCI-ISA Bridge, IDE**
	17	M1535D PCI-ISA Bridge, USB
	18	**M1535D PCI-ISA Bridge, Power Management Unit (PMU)**
Bus 1		AGP Slot

show memory

The `show memory` command displays information about each memory bank: slot number, size in megabytes, and the starting address. The syntax is:

`show memory`

Example 4-4 Show Memory Command

```
>>>show memory

Array #       Size     Base Addr
-------    ----------  ---------
   0         128 MB    000000000
   1         128 MB    008000000
   2         128 MB    010000000

Total Bad Pages = 0
Total Good Memory = 384 MBytes
```

show pal

The `show pal` command displays the versions of PALcode. PALcode is written to support Alpha processors. It implements architecturally defined processor behavior. The syntax is:

`show pal`

Example 4-5 Show PAL Command

```
>>>show pal
pal                OpenVMS PALcode V1.69-54, Tru64 UNIX PALcode
V1.62-1
```

show version

The `show version` command displays the version of the SRM Console program that is installed on the system. The syntax is:

`show version`

Example 4-6 Show Version Command

```
>>>show version
version                A5.6-7 May 21 2000 22:26:51
```

4.2.4 Setting the System Date

The `date` command is used to either display or set the system time and date.

The syntax is:

date [<yyyymmddhhmm.ss>]

Example 4-7 Date Command

```
>>>date
 2:51:27  June 6, 2002
>>>date 200006060342.00
>>>date
 3:42:02  June 6, 2000
```

4.2.5 Booting the Operating System

The boot command is used to boot the operating system.

Example 4-8 Boot Command

```
>>> b dka200

(boot dka200.2.0.7.1 -flags 0,0)
block 0 of dka200.2.0.7.1 is a valid boot block
reading 893 blocks from dka200.2.0.7.1
bootstrap code read in
base = 1fa000, image_start = 0, image_bytes = 6fa00
initializing HWRPB at 2000
initializing page table at 1fff0000
initializing machine state
setting affinity to the primary CPU
jumping to bootstrap code
```

The boot command initializes the processor, loads a program image from the specified boot device, and transfers control to that image. The syntax is:

boot [-file *filename*] [-flags [*value*]] [-halt] [-protocols *enet_protocol*] [*boot_dev*]

Table 4-6 Boot Command Options

Option	Description
-file *filename*	**The boot file.**
-flags [value]	Specifies additional information to the loaded image or operating system.This qualifier overrides the setting of the boot_osflags environment variable. See the boot_osflags environment variable on page 4-18 for a list of settings and their meanings.
-halt	**Forces the bootstrap operation to halt and invokes the SRM Console program once the bootstrap image is loaded and page tables and other data structures are set up. Operator console* device drivers are not shut down. Transfer control to the image by entering the continue command.**
-protocols enet_protocol	Either mop or bootp (default). This qualifier overrides the setting of the ew*0_protocols environment variable (see Table 4-12).
boot_*dev*	**A device path or list of devices from which the SRM Console program attempts to boot, or a saved boot specification in the form of an environment variable. This qualifier overrides the setting of the bootdef_*dev* environment variable (see page 4-18). Use the bootdef_*dev* environment variable to define the default boot device string.**

Notes: *The operator console is the monitor, keyboard, and mouse. This hardware is used to enter SRM Console commands into the system.

4.2.6 Updating Firmware

The lfu command is used to update firmware from the SRM Console prompt. The lfu command starts the Loadable Firmware Update (LFU) Utility. The syntax is:

lfu

Note: *If the system is shut down from a booted program (most commonly, the operating system) or in some other way halted back to the SRM Console, you must reset the system before running LFU.*

To run LFU, set the auto_action *variable to* halt*, then reset the system. Remember to reset* auto_action *to the original value after you run LFU.*

Example 4-9 Lfu Command

```
>>>lfu

Checking dqa0.0.0.16.0 for the option firmware files. . .
dqa0.0.0.16.0 has no media present or is disabled via the
RUN/STOP
switch
Checking dva0 for the option firmware files. . .

Option firmware files were not found on CD or floppy.
If you want to load the options firmware,
please enter the device on which the files are located(ewa0),
or just hit <return> to proceed with a standard console update:
dva0
Please enter the name of the options firmware files list, or
Hit <return> to use the default filename (up1100fw.txt)  :
Copying up1100fw.txt from dva0. . .
Copying Gtsrm.rom from dva0. . .


          ***** Loadable Firmware Update Utility *****
------------------------------------------------------------------
 Function    Description
------------------------------------------------------------------

 Display   Displays the system's configuration table.
 Exit      Done exit LFU (reset).
 List      Lists the device, revision, firmware name, and update
           revision.
 Readme    Lists important release information.
 Update    Replaces current firmware with loadable data image.
 Verify    Compares loadable and hardware images.
 ? or Help Scrolls this function table.
------------------------------------------------------------------

UPD> list

Device     Current Revision     Filename        Update Revision

srm             5.6-7           srm_fw                5.6-7

UPD> update

Confirm update on:
srm
[Y/(N)]y
WARNING: updates may take several minutes to complete for each
device.

                        DO NOT ABORT!

srm         Updating to 5.6-4...  Verifying 5.6-4...  PASSED.

UPD>
```

Note: *Refer to section 4.3, "FSB," on page 4-26 for information on updating SRM Console firmware using the FSB.*

4.2.7 Using Environment Variables

Environment variables pass configuration information between the SRM Console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. You issue an `init` command (see page 4-25 for more details) to activate a new environment variable.

Example 4-10 Set *envar* and Show *envar* Commands

```
>>> show console
console                    graphics
>>> set console serial
>>> show console
console                    serial
>>> init
```

Environment variables are set or changed with the `set` *envar* command and set to default values with the `set -default` *envar* command. Their values are viewed with the `show` *envar* command. User-defined nonvolatile environment variables are created with the `edit` (see section 4.2.9 on page 4-25 for further information) command.

set *envar*

The `set` command sets or modifies the value of an environment variable. It can also be used to create a new environment variable if the name used is unique. Environment variables are used to pass configuration information between the SRM Console and the operating system. The setting of these variables determines how the system powers up, boots the operating system, and operates. The syntax is:

`set [-default]` *`envar value`*

Table 4-7 Set *Envar* Options

Option	Description
`-default`	**Restores an environment variable to its default setting.**
envar	The name of the environment variable to be modified.
value	**The new value of the environment variable.**

Whenever you modify the value of any of the following environment

variables, the new value takes effect only after you reset the system by pressing the **Reset** button or issuing the `initialize` command:

Note: *All other environment variables take effect immediately after you set the value.*

- `console`
- `kbd_hardware_type`
- `language`
- `os_type`

show *envar*

The `show envar` command displays the current value (or setting) of an environment variable. The syntax is:

show *envar*

envar	The name of the environment variable to be displayed. The wildcard * displays all environment variables.

Example 4-11 Using show *envar*

```
>>>show os_type
>>>unix
```

4.2.8 Environment Variable Summary

Environment variables pass configuration information between the SRM Console and the operating system. Their settings determine how the system powers up, boots the operating system, and operates. Environment variables are set or changed with the `set envar` command and returned to their default values with the `clear envar` command. Their values are viewed with the `show envar` command.

Table 4-8 lists the environment variables. Detailed descriptions follow. The environment variables are specific to the SRM Console.

Table 4-8 Environment Variable Summary

Environment Variable	Function
auto_action	**Specifies the SRM Console's action at power-up, a failure, or a reset.**
bootdef_dev	Specifies the default boot device string.
boot_osflags	**Specifies the default operating system boot flags.**
com*_baud	Changes the default baud rate of the COM1 or COM2 serial port.

Table 4-8 Environment Variable Summary (Continued)

Environment Variable	Function
console	**Specifies the device on which power-up output is displayed (serial terminal or graphics monitor).**
ei_mode	Specifies the connection type of the default Ethernet controller. In this case, the controller is an Intel controller.
ew*0_mode	**Specifies the connection type of the default Ethernet controller. In this case, the controller is a Digital Equipment Corporation controller.**
ew*0_protocols	Specifies network protocols for booting over the Ethernet controller.
kbd_hardware_ type	**Specifies the default operator console keyboard type.**
language	Specifies the operator console keyboard layout.
os_type	**Specifies the operating system. Valid entry is: Linux.**
password	A password stored in the NVRAM used to secure the operator console.
pci_parity	**Disables or enables parity checking on the PCI bus.**
pk*0_fast	Enables fast SCSI mode.
pk*0_host_id	**Specifies the default value for a controller host bus node ID.**
pk*0_soft_term	Enables or disables SCSI terminators on systems that use the QLogic ISP1040 SCSI controller.
tt_allow_login	**Enables or disables login to the SRM Console firmware on other operator console ports.**

auto_action

Specifies the action the SRM Console takes any time the system powers up, fails, or resets. When the setting involves autoboot, the system boots from the default boot device specified by the value of the bootdef_dev environment variable. The syntax is:

set auto_action *value*

The options for *value* are show in Table 4-9.

Table 4-9 Auto_Action Values

Option	Description
halt	**The system remains in SRM Console mode after power-up or a system crash.**
boot	The system boots automatically when it is turned on and halts after a system failure.
restart	**The system boots automatically when it is turned on or after it fails.**

Note: *If a halt assertion exists, the SRM Console ignores the auto_action setting and halts at the SRM Console.*

bootdef_dev

The bootdef_dev environment variable specifies one or more devices for booting the operating system. When more than one device is listed, the system searches in the order listed and boots from the first device with operating system software. The syntax is:

set bootdef_dev *boot_device*

boot_device The name of the device on which the system software has been loaded. To specify more than one device, separate the names with commas. Enter the command show bootdef_dev to display the current default boot device. Enter the command show device for a list of all devices in the system.

boot_osflags

The boot_osflags environment variable passes information to the boot command. That information is dependent on the operating system to be booted. The syntax is:

set boot_osflags *flags_value*

The options for *flags_value* are shown in Table 4-10.

Table 4-10 Boot_Osflags Options

Option	Description
root=/dev/sda5	**Set the root filesystem to the 5th partition of the first SCSI disk.**
root=/dev/hda2	Set the root filesystem to the 2nd partition of the first IDE disk.
1	**Use config number 1 from the /etc/aboot.conf file**

com*_baud

The default baud rate for the system is 9600. With the com*_baud environment variable, you can set the baud rate to match that of the device connected to the port.

The syntax is:

set com*_baud *baud_value*

baud_value	The new baud rate. A list of possible values is displayed by attempting to set this environment variable to an unacceptable value (for example, set com2_baud *xxx*).

You will be asked to confirm the change, as shown in the following example:

Example 4-12 Using com*_baud

```
>>> set com1_baud 19200
Embedded Remote Console only supports 9600 baud. Continue?
(Y/[N]) n
bad value - com1_baud not modified
>>>
```

console

The operator console terminal can be either a graphics monitor or a serial terminal. The console environment variable specifies which is used. The syntax is:

set console *output_device*

The options for ***output_device*** are:

graphics (default)	The operator console terminal is a graphics monitor or a device connected to the VGA or TGA module.

`serial`	The operator console terminal is the device connected to the COM2 port.

Whenever you change the value of `console`, you must reset the system by pressing the **Reset** button or issuing the `initialize` command.

ew*0_mode

Sets an Ethernet controller to run an Ethernet network. The default value is `auto-sense`. For the fast setting, the device defaults to fast.

The syntax is:

`set ew*0_mode` *`value`*

The options for *`value`* are shown in Table 4-11.

Table 4-11 ew*0_mode Options

Option	Description
`aui`	**Device type is AUI.**
`auto-sense`	Device type is sensed by the SRM Console.
`twisted-pair`	**Device type is 10BaseT (twisted pair).**
`fast duplex, twisted-pair`	Device type is duplex 10BaseT
`fast`	**Device type is fast 100Base TX**
`fastFD`	Device type is fast full duplex 100Base TX
`BNC`	**Device type is BNC**
`auto-negotiate`	DE500-BA provides auto-sensing capabilities

ew*0_protocols

Enables network protocols for booting and other functions. The syntax is:

`set ew*0_protocols` *`protocol_value`*

The options for *`protocol_value`* are show in Table 4-11.

Table 4-12 ew*0_protocols Options

Option	Description
mop	**Sets the network protocol to mop (Maintenance Operations Protocol), the setting typically used with the Linux operating system.**
bootp (default)	Sets the network protocol to bootp, the setting typically used with the Linux operating system.
bootp, mop	**When both are listed, the system attempts to use the mop protocol first, regardless of which is listed first. If not successful, it then attempts the bootp protocol.**

kbd_hardware_type

Used only on systems with the language variant 3C (Français), this environment variable sets the keyboard hardware type as either PCXAL or LK411 and enables the system to interpret the terminal keyboard layout correctly.

Whenever you change the value of kbd_hardware_type, you must reset the system by pressing the **Reset** button or issuing the initialize command.

The syntax is:

set kbd_hardware_type *keyboard_type*

The options for *keyboard_type* are:

pcxal (default)	Selects the default keyboard hardware type.
lk411	Selects the LK411 keyboard layout for use with language variant 3C (Français).

language

Specifies the keyboard layout, which is language dependent. The setting of the language environment variable must match the language of the keyboard variant.

Whenever you change the value of language, you must reset the system by pressing the **Reset** button or issuing the initialize command.

The syntax is:

set language *language_code*

The options for *language_code* are show in Table 4-13.

Table 4-13 Language Options

Option	Description
0	**No language (cryptic)**
30	Dansk (Danish)
32	**Deutsch (German)**
34	Deutsch (Schweiz) (Swiss)
36	**English (American)**
38	English (British / Irish)
3A	**Español (Spanish)**
3C	**Français (French)**
3E	**Français (Canadian)**
40	Français (Suisse Romande)
42	**Italiano (Italian)**
44	Nederlands (Netherlands)
46	**Norsk (Norwegian)**
48	Portuguese (Portuguese)
4A	**Suomi (Finnish)**
4C	Svenska (Swedish)
4E	**Belgisch-Nederlands (Dutch)**

os_type

The `os_type` environment variable specifies the default operating system. This variable is set at the factory to the setting for the operating system purchased. Use this command to change the factory default setting.

Whenever you change the value of `os_type`, you must reset the system by pressing the **Reset** button or issuing the `initialize` command.

The syntax is:

`set os_type` ***`os_type`***

The options for `os_type` are:

`unix`	Linux is the default operating system, and the SRM firmware is started during power-up or reset.

password

Sets or clears the SRM Console password stored in Non-Volatile RAM (NVRAM).

The syntax is:

set password

The password is not an argument to the `set password` command; the SRM Console prompts the user for the string, which must be between 15 and 30 characters.

pci_parity

Disables or enables parity checking on the PCI bus.

Some PCI devices do not implement PCI parity checking, and some have a parity-generating scheme in which the parity is sometimes incorrect or is not fully compliant with the PCI specification. A side effect of this aberrant behavior is that superfluous PCI parity errors are reported by the host PCI bridge. In such cases, the device can be used as long as parity is not checked; disabling PCI parity checking prevents false parity errors that can cause system problems.

The syntax is:

set pci_parity *value*

The options for *value* are:

on (default)	Enables PCI parity checking.
off	Disables PCI parity checking.

pk*0_fast

Enables fast SCSI to perform in either standard or fast mode. If the system has at least one fast SCSI device, set the default controller speed to fast SCSI (1). Devices on a controller that connects to both standard and fast SCSI devices will perform at the appropriate rate for the device. If the system has no fast SCSI devices, set the default controller speed to standard SCSI (0). If a fast SCSI device is on a controller set to standard, it will perform in standard mode.

The syntax is:

set pk*0_fast *scsi_speed*

The options for *scsi_speed* are:

0	The controller is in standard SCSI mode.
1 (default)	The controller is in fast SCSI mode.

pk*0_host_id

Sets the controller host bus node ID to a value between 0 and 7.

Each SCSI bus in the system requires a controller. Buses can theoretically

support up to eight devices; however, the eighth device must always be a controller. Each device on the bus, including the controller, must have a unique ID, which is a number between 0 and 7. This is the bus node ID number.

On each bus, the default bus node ID for the controller is set to 7. You do not need to change the controller bus node ID unless you place two or more controllers on the same bus.

To list the controllers on your system, enter the command `show device` (see page 4-9). SCSI devices begin with the letters "pk" (for example, pka0). The third letter is the adapter ID for the controller. When entering the command `set pk*0_host_id`, replace the asterisk with the adapter ID letter.

The syntax is:

`set pk*_host_id` ***`scsi_node_id`***

The value for *`scsi_node_id`* is the bus node ID, a number from 0 to 7.

pk*0_soft_term

Enables or disables SCSI terminators. This command applies to systems that use the QLogic ISP1040 SCSI controller.

The QLogic ISP1040 SCSI controller implements the 16-bit wide SCSI bus. The QLogic module has two terminators, one for the low eight bits and one for the high eight bits.

The syntax is:

`set pk*0_soft_term` ***`value`***

The options for *`value`* are shown in Table 4-14.

Table 4-14 pk*0_soft_term Options

Option	Description
`off`	**Disables termination of all 16 bits.**
`low (default)`	Enables low eight bits and disables high eight bits.
`high`	**Enables high eight bits and disables low eight bits.**
on	Enables all 16 bits.
`diff`	**Places the bus in differential mode.**

tt_allow_login

Enables or disables login to the SRM Console firmware on alternate operator console ports. If the environment variable `console` (see page 4-19) is set to serial, the primary operator console device is the terminal connected through the COM1 port. The command `set t_allow_login 1` enables logins through either the COM2 port or a graphics monitor.

The syntax is:

`set tt_allow_login` *`value`*

The options for *`value`* are:

`0`	Disables login through the COM2 port or a graphics monitor.
`1` (default)	Enables login through the COM2 port or a graphics monitor.

4.2.9 Finding Help

The `help` command displays basic information about SRM Console commands. The syntax is:

`help [`*`command . . .`*`]`

`command . . .` Command or topic for which help is requested. The options are:

`none`	Displays the complete list of commands for which you can receive help.
`command_name`	Displays information about the SRM Console command.
`argument_string` `(such as "sh")`	Displays information about all commands that begin with that string.

Example 4-13 Help Command

```
>>> help set
NAME
       set
FUNCTION
       Set an option or modify the value of an environment
       variable.
SYNOPSIS
       set <option> <value> or <envar> [-] <value>
```

```
where
<option>={host,mode}
where
<envar>={auto_action,bootdef_dev,boot_osflags,...}
[-default]
```

4.3 FSB

The FSB provides an emergency recovery mechanism when the primary firmware image contained in flash memory is corrupted.

You can start the FSB in one of the two following ways:

- If the primary firmware image is unavailable when the system is powered on or reset, the FSB runs automatically. When the FSB runs, the system emits a series of beeps through the speaker as beep code 1–2–3; that is, one beep and a pause, followed by two beeps and a pause, followed by three beeps. After the hard disk drive light flashes, insert the UP1100 firmware disk. The FSB loads and runs SRM Console from this disk.
- You can start the FSB manually. To manually start the FSB, perform the following procedures:
  1. Power Off system.
  2. Set switchpack to FSB configuration as shown in section 2.3.1, “Firmware Image Selection.”
  3. Power On system.
  4. Insert UP1100 installation disk into the floppy disk drive.
  5. Upgrade SRM Console.

4.4 Installing the Linux Operating System

The firmware initializes the UP1100 system and, via the Alpha SRM Console, enables you to install and boot the Linux operating system.

As noted at the beginning of the chapter, this system supports many OS distributions and vendors. Consult our website for a complete current list at:

`http://www.alpha-processor.com/`

1. With your browser pointed at the Alpha Processor, Inc. website, click on API Partner Program.
2. Scroll down in this page to the link, Linux Solutions Datasheet. Click on this link. This takes you to a datasheet on supported operating systems and applications.

3. Or, click on Software Vendors at the left center of the browser.

Examples of installing commercially available Linux distributions are given in this section. Typical requirements and procedures for Red Hat Linux Versions 6.2 or SuSE Version 6.3 follow.

4.4.1 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`

Device names are different if you are using SCSI adapters or IDE disks. To the Linux kernel:

- SCSI CD-ROM names are "`/dev/scd`*x*", where ***x*** is the device number
- IDE CD-ROM names are "`/dev/hd`*x*", where ***x*** is the drive position
- SCSI hard disk names are "`/dev/sd`*x*", where ***x*** is the drive position
- IDE hard disk names are "`/dev/hd`*x*", where ***x*** is the drive position
- Floppy disk names are "`/dev/fd`*x*", where ***x*** is the device number

The following disks are required:

- The appropriate Linux operating system distribution CD-ROM disk, either the Red Hat Version 6.2 or SuSE Version 6.3 CD-ROM disk.
- If you are installing SuSE Version 6.3, you will need a ramdisk floppy. See the SuSE Version 6.3 documentation for instructions about creating this disk.
- The UP1100 installation diskette is also required.

Note: *For all Linux distributions, be careful when configuring the X server. Do not test the X server configuration.*

4.4.2 Before Installing Linux

Before installing the Linux operating system, follow these instructions:

1. Use the `date` command to set the system time and date. Refer to section 4.2.4, “Setting the System Date,” on page 4-11 for details.
2. Make a backup copy of the UP1100 installation diskette.

4.4.3 Setting Environmental Variables

From the SRM Console prompt, >>>, check the device numbers for disk, diskette and CD-ROM drives:

Type **`show device`**

The SRM Console environmental variables identified in Table 4-15 are set.

Table 4-15 SRM Console Variables

Variable	Setting
`bootdef_dev`	**Sets default boot device** **Example: `DQA0` (IDE disk) or `DKA0` (SCSI disk)**
`boot_osflags`	Information passed to Linux kernel via boot Example: `"root=/dev/hda2"`
`boot_file`	**Sets file to use as the kernel on the default boot device** **Example for Red Hat 6.2: `kernels/generic.gz`**

From the SRM Console prompt, >>>, perform the procedures as described in the following paragraphs.

- To set the default boot device:
  - For SuSE Version 6.3, to boot from a floppy drive:
    Type **`set bootdef_dev dva0`**
  - For Red Hat 6.2, to boot from an IDE CD-ROM drive:
    Type **`set bootdef_dev dqb0`**

  Note: *If your drive is a different device type, set this variable appropriately.*
- To set the default boot file to the kernel on the CD, choose the command that corresponds to your version of Linux:
  - For SuSE Version 6.3:
    Type **`set boot_file vmlinux.gz`**
  - For Red Hat 6.2:
    Type **`set boot_file kernels/generic.gz`**
- To set the default flags to point to the (currently non-existent) root partition:
  - On a SCSI hard drive:
    Type **`set boot_osflags "root=/dev/sda2"`**
  - On an IDE drive:
    Type **`set boot_osflags "root=/dev/hda2"`**

Note: *Setting the flags to point to sda1 (Linux terminology for SCSI Disk A Partition 2) assumes that you will create and set the first partition during the installation to be the "root" partition. If you plan to use another name for your root partition, set this variable to that name.*

- To check the environmental setting parameters you have chosen:
  Type **`show boot*`**

Chapter 5 Troubleshooting

This chapter discusses troubleshooting aspects for both hardware and software components during the UP1100 system startup.

Topics covered include:

- Video review checklist
- Status LEDs
- Beep codes
- Error recovery procedures

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 21264A Processor fan is 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

Two LED indicators, D24 and D25, provide diagnostic information about the UP1100, including the status of some Alpha 21264A Processor functions.

The LEDs are mounted on the lower edge of the UP1100 board below the M1535D PCI-ISA Bridge and to the right of the internal I/O connector area. Their orientation is shown in Figure 5-1.

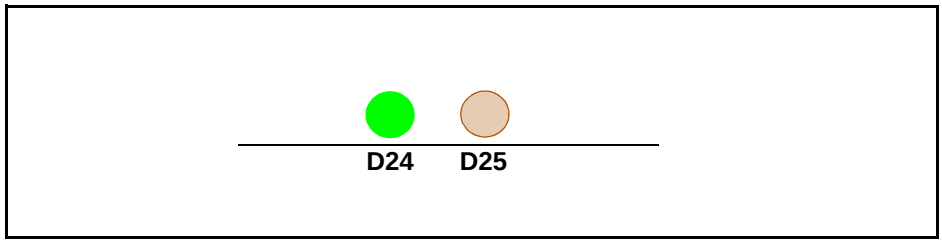

Figure 5-1LED Status Indicators

Use Table 5-1 to interpret the LED status information.

Table 5-1 LED Status Indicators

LED	Function	Comment
D24	**PowerGOOD**	**Green LED ON when power to Alpha 21264A Processor is good.**
D25	Reset PALcode	Red LED ON when Reset PALcode is loading.

5.1.3 Beep Code

In FSB mode, the UP1100 delivers an audible troubleshooting message during startup, referred to as a beep code. This message consists of one audible beep, followed by two audible beeps, followed by three audible beeps. It is called the 1–2–3 beep code.

If the 1–2–3 beep code is delivered, the FSB code has loaded correctly and the UP1100 is retrieving the SRM Console firmware image.

If the 1–2–3 beep code is not delivered, the FSB code did not load correctly.

5.2 Error Recovery Procedures

On the UP1100 switchpack SW1, two configuration switches with selectable settings are firmware-related. They are identified by the shaded box in Figure 5-2. You can change the configuration settings to recover from several error conditions.

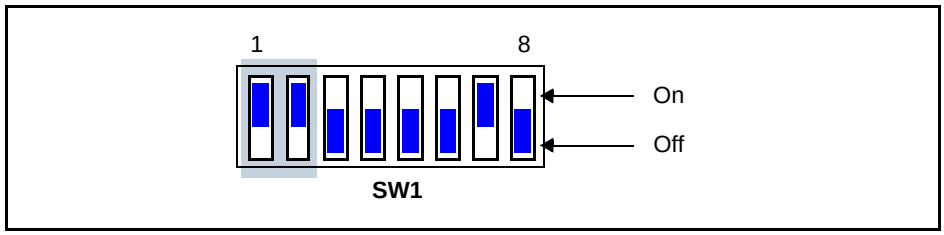

Figure 5-2 Firmware Configuration Switches

5.2.1 Error Conditions

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

Restore Factory Defaults

Some error conditions of this type include:

- Choosing incorrect selections when configuring the SRM Console. These selections prevent the system from booting.
- Forgetting your system password.

Reload Firmware

An error condition of this type may occur during the upgrading of the SRM Console (see section 4.2.6 on page 4-13) by an improper system action. An example would be: accidentally powering off the system during this procedure.

For more information, see the FAQs on the Alpha Processor, Inc. website:

`http://www.alpha-processor.com`

5.2.2 Error Recovery Switch Settings

For these error recoveries, select the appropriate settings from Table 5-2.

Table 5-2 Switch Settings for Various Error Conditions

Error	Function	SW1 Switch:							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Factory Default	**Boot under SRM Console**	**On**	**On**	**Off**	**Off**	**Off**	**Off**	**On**	**Off**
Reload Firmware	Reload SRM Console from FSB	Off	Off	Off	Off	Off	Off	On	On

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 SW1 switch settings according to the Reload Firmware configuration.
3. Insert the SRM firmware disk into the floppy drive.
4. Power On the system.

   Wait while FSB firmware loads image into memory.
5. Run LFU. Refer to section 4.2.6 “Updating Firmware” on page 4-13 for information on running LFU.
6. Power Off the system after LFU completes.
7. Restore the SW1 switch settings to their default positions.
8. Power On the system.

Appendix A

Connectors

and Pinouts

This appendix describes the connectors and pinouts used on the UP1100. Refer to Figure 2-1 in Chapter 2 for connector locations.

A.1 Power Connector Pinouts

Pinouts for J18, the ATX power connector, are shown in Table A-1. J18 is a standard Molex 39-29-9202 connector.

Table A-1 ATX Power Connector Pinouts (J18)

Pin	Signal	Pin	Signal
1	**+3.3 VDC**	**11**	**+3.3 VDC**
2	+3.3 VDC	12	-12 VDC
3	**GND**	**13**	**GND**
4	+5 VDC	14	PS_ON
5	**GND**	**15**	**GND**
6	+5 VDC	16	GND
7	**GND**	**17**	**GND**
8	P_DCOK	18	-5 VDC
9	**5V SB**	**19**	**+5 VDC**
10	+12 VDC	20	+5 VDC

A.2 Nonstandard Connections

Pinouts for J19, the Power LED, are shown in Table A-2. J19 is an AMP 103239-3 connector.

Table A-2 Power LED Connector Pinouts (J19)

Pin	Signal	Pin	Signal
1	**GND**	**3**	**+5 VDC**
2	GND		

Pinouts for J21, the VID port, are shown in Table A-3. J21 is an AMP 103240-5 connector.

Table A-3 VID Port Pinouts (J21)

Pin	Signal	Pin	Signal
1	**GND**	**6**	**VID[2]**
2	VID[4]	7	GND
3	**GND**	**8**	**VID[1]**
4	VID[3]	9	GND
5	**GND**	**10**	**VID[0]**

Pinouts for J22, the SM bus extender port, are shown in Table A-4. J22 is a Molex 6373-03 connector.

Table A-4 SM Bus Extender Port Connector Pinouts (J22)

Pin	Signal	Pin	Signal
1	**SMbus_clock**	**3**	**SMbus_data**
2	GND		

Pinouts for J23, the Power button connector, are shown in Table A-5. J23 is an AMP 103239-2 connector.

Table A-5 Power Button Connector Pinouts (J23)

Pin	Signal	Pin	Signal
1	**Power_On**	**2**	**GND**

Pinouts for J25, the Speaker cable, are shown in Table A-6. J25 is an AMP 103239-4 connector.

Table A-6 Speaker Cable Connector Pinouts (J25)

Pin	Signal	Pin	Signal
1	**+5 VDC**	**3**	**GND**
2	GND	4	PC_Speaker_Signal

Pinouts for J26, the HDD Activity LED, are shown in Table A-7. J26 is an AMP 103239-2 connector.

Table A-7 HDD Activity LED Connector Pinouts (J26)

Pin	Signal	Pin	Signal
1	**HDD_Act_N**	**2**	**+5 VDC**

Pinouts for J27, the Reset button connector, are shown in Table A-8. J27 is an AMP 103239-2 connector.

Table A-8 Reset Button Connector Pinouts (J27)

Pin	Signal	Pin	Signal
1	**GND**	**2**	**Reset**

Pinouts for J28, the Keyboard Lock Cable connector, are shown in Table A-9. J28 is an AMP 103239-2 connector.

Table A-9 Keyboard Lock Cable Connector Pinouts (J28)

Pin	Signal	Pin	Signal
1	**GND**	**2**	**Key_Lock**

Pinouts for J29, the System Fan connector, are shown in Table A-10. J29 is a Molex 6373-03 connector.

Table A-10 System Fan Connector Pinouts (J29)

Pin	Signal	Pin	Signal
1	**GND**	**3**	**+12 VDC**
2	GND		

Pinouts for J30 and J33, the CPU Fan connectors, are shown in Table A-11. J30 and J33 are Molex 6373-03 connectors.

Table A-11 CPU Fan Connectors Pinouts (J30, J33)

Pin	Signal	Pin	Signal
1	**GND**	**3**	**+12 VDC**
2	PFan_Sense		

Pinouts for J31, the Debug port, are shown in Table A-12. J31 is an AMP 103240-3 connector.

Table A-12 Debug Port Connector Pinouts (J31)

Pin	Signal	Pin	Signal
1	**NC**	**4**	**NC**
2	TxD	5	RxD
3	**GND**	**6**	**NC**

Pinouts for J32, the EPLD program port, are shown in Table A-13. J13 is an AMP 103240-5 connector.

Note: *For specific information on the EPLD device used in the UP1100, refer to Altera Corporation's EPM7064 Programmable Logic Device Family Data Sheet.*

Table A-13 EPLD Program Port Pinouts (J32)

Pin	Signal	Pin	Signal
1	**TCK**	**6**	**No Connect (NC)**
2	GND	7	NC
3	**TDO**	**8**	**NC**
4	VCC	9	TDI
5	**TMS**	**10**	**GND**

A.3 Standard Connectors

Industry standard parts are used for most of the connections in the UP1100. Refer to Table A-14 for a list of the connectors used and their functions.

Table A-14 UP1100 Standard Connectors

Connector	Function	Part Number
J1	**AGP**	**Molex 71796-0008 or AMP 145263-1**
J2–J4	SDRAM DIMMs	Molex 71251-0012
J5–J7	**32-bit PCI bus**	**AMP 145154-4**
J8	10/100 Mbps, RJ-45 LAN (Ethernet)	AMP 555141-1
J9	**MIC In**	**Foxconn JA1333L-102**
J10, J11	IDE drive bus	Molex 87256-4011 or AMP 103308-8
J12	**FDD**	**Molex 87256-3411 or AMP 103308-7**
J13	Parallel bus and COM1/COM2 serial line	Foxconn DM11351-Z5
J14	**USB**	**AMP 787617-1**
J15	Keyboard and mouse	Foxconn MH11067-D2 or AMP 84405-1 or 84376-1
J16	**Audio In/Out**	**SMK LGA6507-0200**
J17	CD Audio In	Molex 53014-0310

Appendix B

Support,

Products and

Documentation

B.1 Customer Support

Alpha Processor, Inc. provides assistance for their products on their web page at `www.alpha-processor.com`.

Alpha Original Equipment Manufacturers (OEMs) provide the following web page resources for customer support:

URL	Description
`http://www.compaq.com`	**Contains links for the Alpha 21264A Processor CPU.**
`http://www.amd.com`	Contains links for the AMD-751 System Controller.
`http://www.acerlabs.com`	**Contains links for the M1535D PCI-ISA Bridge.**
`http://www.intel.com`	Contains links for the 21143 LAN (Ethernet) controller

B.2 Supporting Products

Alpha Processor, Inc. maintains a Hardware Compatibility List on their website for components and accessories that are not included with the UP1100. Compatibility for items such as memory, power supplies, and enclosure are listed.

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

B.3 Alpha Products

Alpha Processor, Inc. maintains information about other Alpha products on their website. Point your browser to `www.alpha-processor.com` and check the Product Information list for Alpha products.

B.4 Documentation

B.4.1 Alpha Documentation

Title	Vendor
Alpha Architecture Reference Manual	**Digital Press order# EQ-W938E-DP.**
Alpha Architecture Handbook	Compaq Computer Corporation order# EC-QD2KC-TE, October, 1998.
Alpha 21264 Microprocessor Hardware Specification	**Digital Press**
UP1100 Quick Start Installation Guide (51-0047)	Alpha Processor, Inc.
UP1100 Technical Reference Manual (51-0049)	**Alpha Processor, Inc.**

B.4.2 Related Documentation

You can order the following associated documentation directly from the vendor.

Title	Vendor
21143 PCI/CardBus 10/100 Mb/s Ethernet LAN Controller Datasheet	**Intel Corporation 2200 Mission College Blvd. Santa Clara, CA 95052-8119**
A*ccelerated Graphics Port Interface Specification* Revision 2.0	Intel Corporation 2200 Mission College Blvd. Santa Clara, CA 95052-8119 May, 1998
AlphaPC 264DP Technical Reference Manual	**Compaq Computer Corporation order# EC-RBODA-TE.**
AMD-751TM System Controller Data Sheet, Revision E	AMD Publication # 21910, March, 2000
Computer Architecture	**John L. Hennessy and David A. Patterson, Morgan Kaufman Publishers, San Mateo, CA, 1990.**
*EPM7064 Programmable Logic Device Family Data Shee*t	Altera Corporation, 101 Innovation Drive San Jose, CA 95134

Title	Vendor
ISA & EISA Theory and Operations	**Edward Solari, Annabooks Bookstore (http://www.annabooks.com/index.htm), ISBN 0-929392-15-9**
M1535D: PCI-to-ISA Bus Bridge with Super I/O & Fast IR Data Sheet, Ver. 1.20	ALI
• ***PCI Local Bus Specification, Revision 2.1*** • ***PCI Multimedia Design Guide, Revision 1.0*** • ***PCI System Design Guide*** • ***PCI-to-PCI Bridge Architecture Specification, Revision 0***	**PCI Special Interest Group** **U.S. 1-800-433-5177** **International1-503-797-4207** **FAX 1-503-234-6762**
• *PC SDRAM Specification, Revision 1.63* (October, 1998) • *PC SDRAM Unbuffered DIMM Specification, Revision 1.0* (February, 1998) • *PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2A* (December, 1997)	Intel Corporation
The Indispensable PC Hardware Book 3E	**Hans-Peter Messamer, Addison-Wesley Pub. Co., ISBN 0-201-87697-3**
Universal Serial Bus Specification, Revision 1.1	USB Implementers Forum `http://www.usb.org/developers/docs.html` September, 1998

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