RadiSys®

SERVICE MANUAL

EPC®-2100/EPC-2101
PV5000HX2(-IDE) Series SBC

P/N 007-01246-0000 June 2001

Limited Warranty

A. RadiSys Corporation warrants that the item sold by it hereunder will be free from defects in materials or workmanship, under normal use and service, for a period of 2 years from date of shipment. Said item will meet the specifications in effect at the time of manufacture. The sole obligation of RadiSys under this warranty shall be, at its option, to repair or replace, without charge, any defective component of said item, within a reasonable period of time.

B. RadiSys Corporation shall not be liable under this warranty for (i) the item that the Buyer alleges to be defective and was repaired or altered by someone other than an authorized representative of RadiSys, unless such repair or alteration was effected pursuant to prior written approval of RadiSys, or (ii) where the Buyer fails to notify RadiSys of any alleged defect within the period of warranty, or (iii) where the Buyer fails to return the allegedly defective item to RadiSys Corporation, in Houston, Texas, USA, freight prepaid, or (iv) where the item was altered or damaged in a way which RadiSys reasonably determines to affect the performance and reliability of the item, or (v) where the item was subject to misuse, neglect, or accident. The rights and remedies granted to the Buyer under this paragraph constitute the Buyer's sole and exclusive remedy against RadiSys Corporation, its officers, agents, and employees, for negligence, inexcusable delay, breach of warranty, express or implied, or any other default relating to the item or the duties of RadiSys to eliminate any errors.

This warranty supersedes any other warranty, whether expressed, implied, or statutory, including but not limited to any warranty for fitness of purpose, merchantability, or freedom from infringement or the like, and any warranty otherwise arising out of any proposal, specifications, or sample. Furthermore, RadiSys Corporation neither assumes nor authorizes any person to assume for it any other liability.

The software included with this equipment is warranted only in accordance with the terms of its license agreement. Except as warranted in that license agreement, the manufacturer of the software disclaims all warranties and conditions with regard to the software, including all implied warranties and conditions of merchantability, fitness for a particular purpose, title, and non-infringement.

Every effort has been made to ensure that the information provided in this manual is complete and accurate. However, technical inaccuracies or typographical errors may be inadvertently included. RadiSys assumes no responsibility for any errors that may be contained in this document. RadiSys makes no promise to update or keep current the information contained in this document. Information in this document, including product specifications, is subject to change without notice.

All tradenames referenced are the service mark, trademark, or registered trademark of the respective manufacturer.

Important

Always use caution when handling or operating the equipment. Only qualified and trained electronics service personnel should access the equipment. Use extreme caution when installing or removing components. For additional information, please contact RadiSys Technical Support at 800–627–8700 or 713–541–8200 Monday through Friday between 8:00 a.m. and 5:00 p.m., Central Time, continental USA.

Wichtig

Arbeiten am System bzw. Betrieb des Systems, sollten immer mit der nötigen Vorsicht vorgenommen werden. Nur qualifiziertes und ausgebildetes Fachpersonal sollte am Inneren des Gerätes arbeiten. Beim Installieren und Entfernen von Komponenten ist besondere Vorsicht geboten.

Für weitere Informationen wenden Sie sich bitte an den Technical Support von RadiSys:

- USA: 800–627–8700 oder 713–541–8200 Montags bis Freitags von 0800 Uhr bis 1700 Uhr, Central USA.
- International: +31–36–5365595 Montags bis Freitags von 0830 Uhr bis 1700 Uhr. (CET GMT +1.00)

Changes or modifications not expressly approved by RadiSys Corporation could void the product warranty and the user's authority to operate the equipment.

Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can emit radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case, the user will be required to correct the interference at the user's expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation

Any change or modification not expressly approved by the manufacturer is prohibited and could void the user's authority to operate the equipment.

This product also meets requirements for compliance with EN55022, Class B ITE.

ISO-9001

CERTIFICATED FIRM

Symbols

Notice:
This symbol indicates an item for special consideration.

Warning:
This symbol indicates the presence of a potential hazard that can cause personal injury or equipment damage. Only qualified and trained electronics service personnel should access the equipment.

Customer Support

Accessing the Web Site

In-depth printable service manuals and other documentation are available for download from the RadiSys Web site:

http://www.radisys.com

Then click on Support to access a link to the documentation, drivers, and BIOS. Documentation is available at this Web site in Adobe® Acrobat® .PDF format, and may be viewed and printed using the free Acrobat® Reader™ software. BIOS files are available as self-extracting disk image files. Links are provided to various partners' web sites where any files and tools needed to install drivers are available for download.

Calling Technical Support

1. Have the RadiSys product model and serial number available.
2. Call Technical Support:
   - In the continental USA, Monday – Friday, 8:00 a.m. – 5:00 p.m., Central Time, dial 800–627–8700.
   - Outside the USA, dial 713–541–8200 (add long distance/international access codes).
   - In Europe, Monday – Friday, 8:30 a.m. – 5:00 p.m., dial +31–36–5365595.

Inspection of Contents / Packaging of Product

The packaging for this product has been tested to assure that it will withstand responsible handling by the carrier.

Caution: Inspect contents immediately and file a claim with the delivering carrier for any damage. Save the shipping box and packaging material to use for any further shipment of this equipment.

However, if the packaging is damaged and is not suitable for shipment, call RadiSys Technical Support to obtain new packaging. The warranty may be void if the product is returned using unapproved or damaged original packaging.

Returning Your Product

A Returned Material Authorization (RMA) number must be written on the outside of the shipping carton of all equipment returned to RadiSys for service and/or repair. It is recommended that any correspondence included with the carton contents also refer to the RMA number.

Note: The factory will refuse the shipment if it is sent freight collect or if it does not display an RMA number.

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Notes

1 Introduction

This chapter discusses the primary features of the EPC-2100/EPC-2101 Single-Board Computer (PV5000HX2 series).

If you are familiar with the primary components and functions of the EPC-2100/EPC-2101, and you wish to quickly begin operating the SBC, go to Chapter 2, “7 Steps to Operation,” page 5. Then read this chapter later at your convenience.

EPC-2100/2101 (PV5000HX2(-M)) Series SBC

Overview

The RadiSys EPC-2100/EPC-2101 Single Board Computers (SBC) provide the following features:

- Intel™ Pentium® processor:
  - 100/133/166 MHz, 64-bit Classic Pentium (P54C)
  - 166/200/233 MHz, 64-bit Pentium with MMX™ (P55C)
- Intel 430HX PCIset
  - 82439HX System Controller (TXC, or North-Bridge)
  - 82371SB PCI I/O IDE Xcelerator (PIIX3, or South-Bridge)
- Intel 82091AA Advanced Integrated Peripheral (AIP)
- DS1687 compatible Real-Time Clock module with embedded battery
- 4 Mb (512 KB x 8) flash memory
- Level 2 write-back cache socket for 256 or 512 KB pipeline burst COAST SRAM
- Four SIMM sockets for up to 256 MB scaleable DRAM
  Note: The EPC-2100/EPC-2101 supports up to 256 MB FPM or up to 128 MB EDO.
- Two serial ports (one RS-232 only; one RS-232 or RS-422)
- Parallel port (AT-compatible / bi-directional / EPP)
- Floppy drive controller
- PCI EIDE hard disk drive controller
- PCI Adaptec AIC-7850 SCSI Host Adapter with Fast/Narrow SCSI-2 header (EPC-2100 only)
- Dallas DS2109 Plug and Play SCSI terminator (EPC-2100 only)
- CHIPS 65550 High Performance Multimedia Flat Panel / CRT GUI Accelerator with flat panel display header
- VGA video connector on the I/O bracket
- Four 256 KB x 16 on-board video DRAM modules (2 MB)
- PS/2 mouse and keyboard connectors
- 8-pin AT keyboard/speaker/reset header

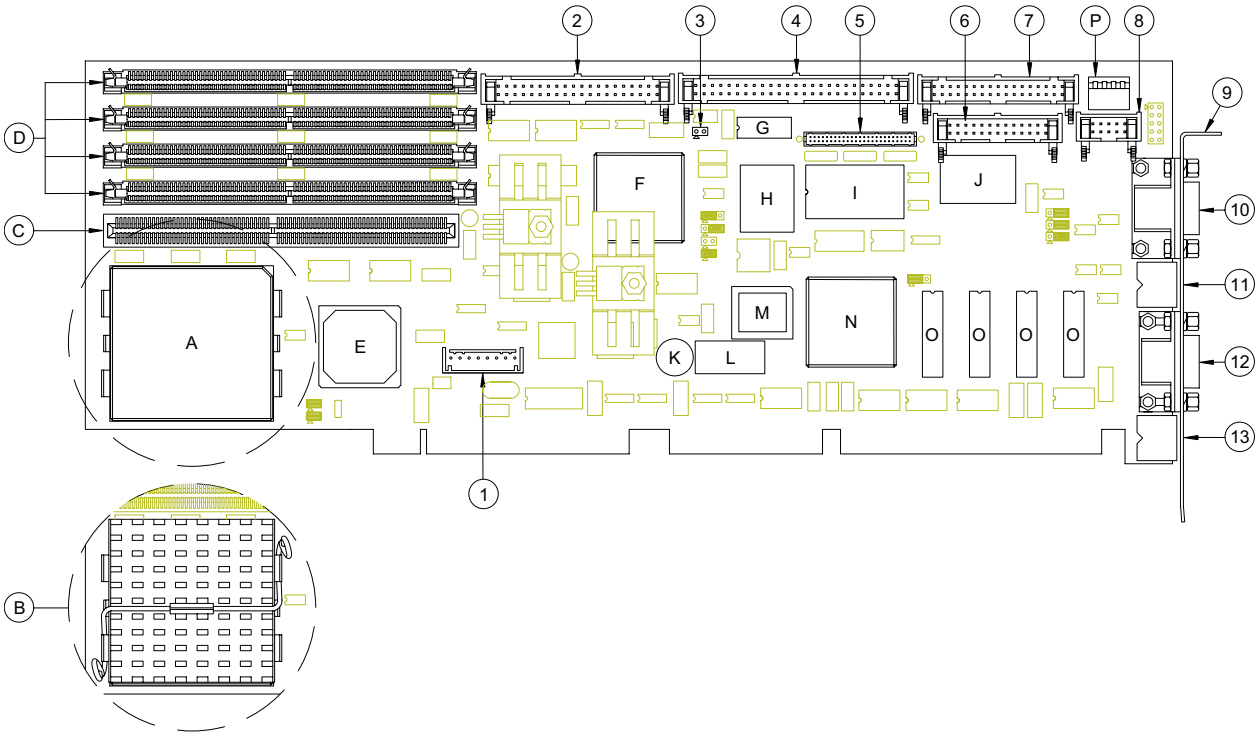
Note: The EPC-2100 and EPC-2101 are members of the PV5000HX2 family of single-board computers. The EPC-2100 supports SCSI and IDE; the EPC-2101 supports IDE only.

More...

For more information on the components of the EPC-2100/EPC-2101, contact:

Company	Telephone	Website
Intel Corporation	(602) 554-8080	http://www.intel.com
Adaptec, Inc.	(408) 945-8600	http://www.adaptec.com
Asiliant Technologies (formerly C&T)	(408) 467-0755	http://www.asiliant.com
Dallas Semiconductor Corporation	(972) 788-2197	http://www.dalsemi.com
PCI Special Interest Group	(503) 696-2000	http://www.pcisig.com
PICMG	(781) 246-9318	http://www.picmg.com

Figure 1. Components and Layout



A. Intel Pentium P54C/P55C Processor
B. Pentium Processor with Heatsink
C. Level 2 SRAM Cache Socket
D. DRAM SIMM Sockets
E. Intel 82439HX System Controller (TXC, or North-Bridge)
F. Intel 82371SB PCI I/O IDE Accelerator (PIIX3, or South-Bridge)
G. Dallas DS2109 PnP SCSI Terminator (EPC-2100 only)
H. Adaptec AIC-7850 SCSI Host Adapter (EPC-2100 only)
I. Dallas DS1687 compatible Real-Time Clock
J. Intel 82091AA Advanced Integrated Peripheral (AIP)
K. Speaker
L. Flash Device
M. Auxiliary BIOS
N. CHIPS 65550 Flat Panel / CRT Accelerator
O. Video DRAM modules
P. DIP Switch Block

1. Keyboard Header
2. EIDE Drive Header
3. IDE/SCSI Activity LED Header
4. SCSI Drive Header (EPC-2100 only)
5. Flat Panel Display Header
6. Parallel Port Header
7. Floppy Drive Header
8. Serial Port 2 Header
9. I/O Bracket
10. VGA Video Connector
11. PS/2 Mouse Connector
12. Serial Port 1 Connector
13. PS/2 Keyboard Connector

Notes

2 7 Steps to Operation

This chapter describes basic precautions for handling the EPC-2100/2101, and then outlines the basic steps for setting up the SBC:

1. Check jumper settings
2. Check switch settings
3. Install the SBC
4. Attach peripheral devices to headers
5. Attach peripheral devices to connectors
6. Power-on the system
7. Run the Setup Utility

Handling the EPC-2100/2101

Overview

This section suggests basic precautions when handling the EPC-2100/2101 series SBC.

Static Electricity

The EPC-2100/2101 series is designed to protect against ESD (electro-static discharge) and excessive voltage. However, excessive static electricity can damage components.

Before you handle the SBC, use the grounding wrist strap provided with the system to discharge static electricity. Instructions for using the wrist strap are printed on the strap's envelope.

Always handle the SBC by the edges to help prevent accidental damage that can be caused by static discharge (Figure 2).

Safety

It is important to protect yourself and your equipment before you perform any of the procedures outlined in this manual.

You should check the configuration before you install the SBC. If the SBC is already installed in your system and you need to change the configuration, power-off the system and disconnect all power cords from their source. Follow all safety precautions as outlined by the chassis manufacturer.

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Only qualified, experienced electronics personnel should access the interior of the chassis and handle the equipment.

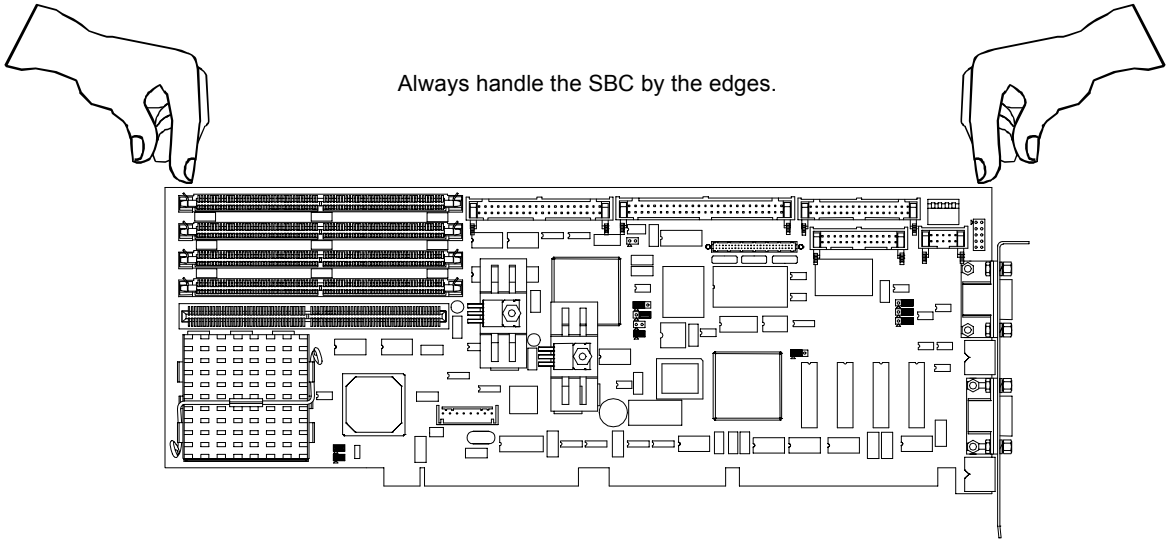
Next...

Before you install the SBC in a chassis, check the following:

- Jumper settings, outlined in Step 1, page 8
- DIP switch settings, outlined in Step 2, page 10

Pay particular attention to the switch settings. The jumper settings are preconfigured at the factory and are appropriate for most applications.

Figure 2. Safely Handling the SBC



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Step 1: Check Jumper Settings

Overview

Before you install the EPC-2100/2101 onto a passive backplane in a chassis, check the jumper settings on the SBC (Figure 3).

Definition

A *jumper* is a small "bridge" that connects two pins on a jumper block. The position of a jumper affects the device's operational parameters.

Jumper Blocks

The EPC-2100/2101 contains:

- Four two-pin jumper blocks (JP1, JP2, JP11, and JP12)
- Six three-pin jumper blocks (JP3, JP4, JP5, JP6, JP8, and JP10)

Settings

Table 1. Jumper Block Settings

2-Pin Jumper Blocks

JP1	JP2	Host Bus Speed
None	1—2	66.6 MHz (default)
1—2	None	60.0 MHz
1—2	1—2	50.0 MHz

JP11	JP12	Bus/Core Ratio†	CPU Speed
None	None	2/3	100 MHz
None	1—2	1/2	133 MHz
1—2	1—2	2/5	166 MHz
1—2	None	1/3	200 MHz
None	None	2/7	233 MHz
†The Bus Core Ratio is based on the Host Bus Speed at 66.6MHz.			

3-Pin Jumper Blocks

	Panel Shift Clock	
JP3	1—2	Normal (default)
	2—3	Inverted

	Next Step OS Configuration	
JP5	1—2	Use this setting when running Next Step OS and experiencing problems with PS/2 mouse
	2—3	Normal Operation (default)

	Serial 2 Configuration	
JP4, JP6, JP8	1—2	RS-422
	2—3	RS-232 (default)

	Panel Voltage Interface	
JP10	1—2	5 V (default)
	2—3	3.3 V

Figure 3. Jumper Block Locations

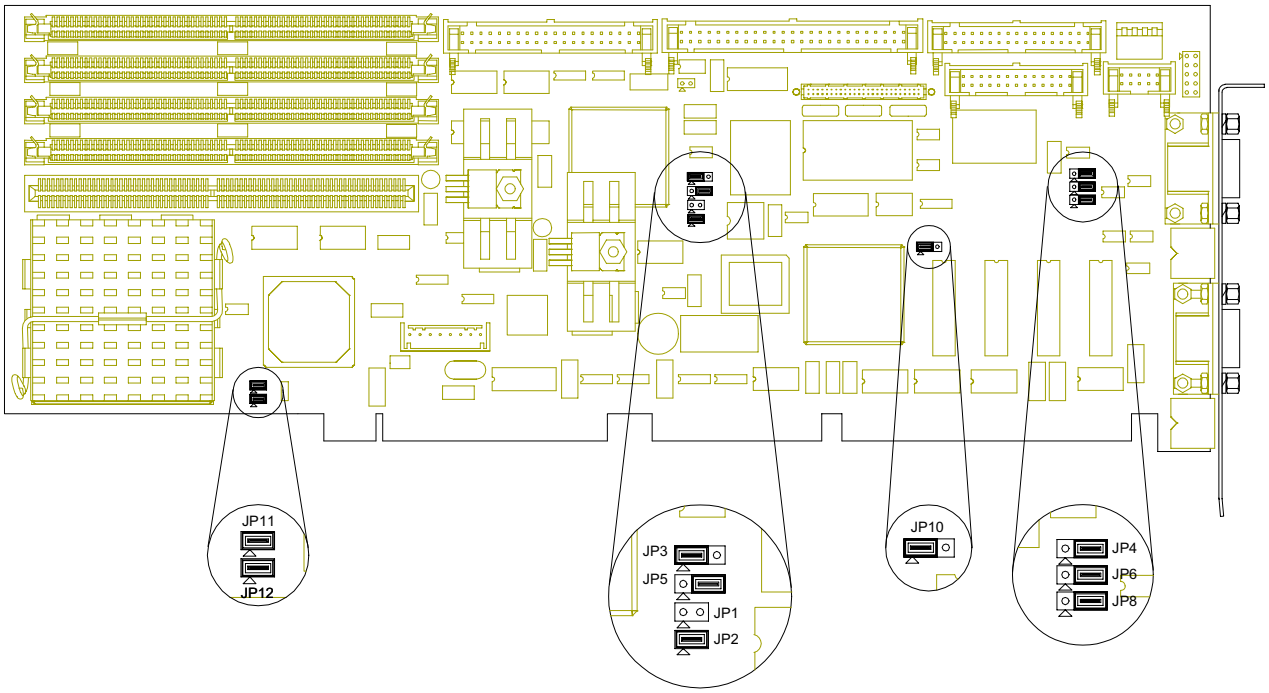


Table 2. Jumper Block Functions

	Jumpers	Function
2-Pin	JP1, JP2	Host Bus Speed
	JP11, JP12	CPU Speed
3-Pin	JP3	Panel Shift Clock
	JP5	Next Step OS Configuration
	JP4, JP6, JP8	Serial Port 2 Configuration
	JP10	Panel Voltage Interface

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Step 2: Check Switch Settings

Overview

After you check the jumper settings, check the switch block on the EPC-2100/2101 for proper settings (Figure 4).

Switch Block

The switch block contains four DIP switches that you can configure to affect the following items:

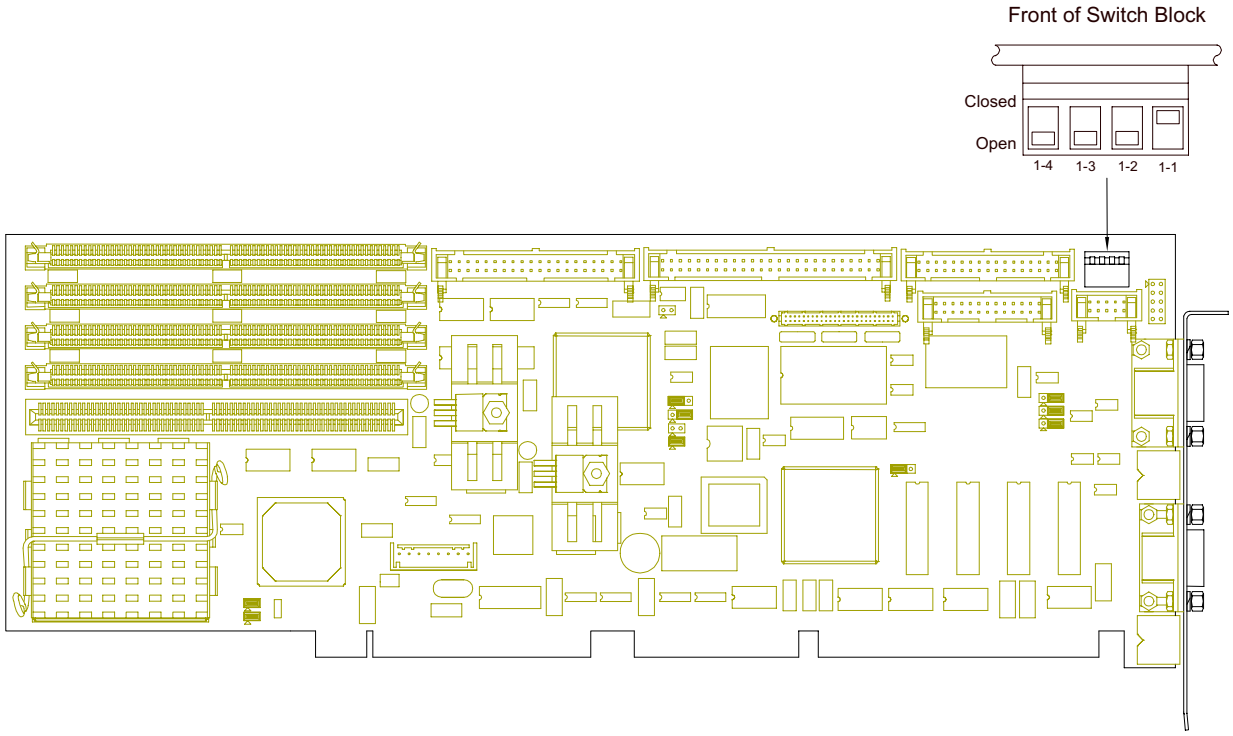
- Default monitor type
- On-board ROM access
- CMOS RAM
- Configuration ports

Settings

Table 3. Switch Settings

SW1-1	**Default Monitor Type**	
	Open	Monochrome monitor
	Closed (default)	Color monitor
SW1-2	**On-Board ROM Access**	
	Open (default)	Flash memory enabled; auxiliary ROM mode disabled
	Closed	Flash memory disabled; auxiliary ROM mode enabled
SW1-3	**CMOS RAM**	
	Open (default)	Normal operation of CMOS RAM
	Closed	Factory default values for the Setup Utility are loaded into CMOS RAM
SW1-4	**Configuration Ports**	
	Open (default)	Configuration ports are mapped to I/O address 270/271
	Closed	Configuration ports are mapped to I/O address 370/371

Figure 4. Switch Block Location



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Step 3: Install the SBC

Before you connect any peripheral devices to the EPC-2100/2101, install the SBC onto a passive backplane in a chassis (Figure 5).

Procedure

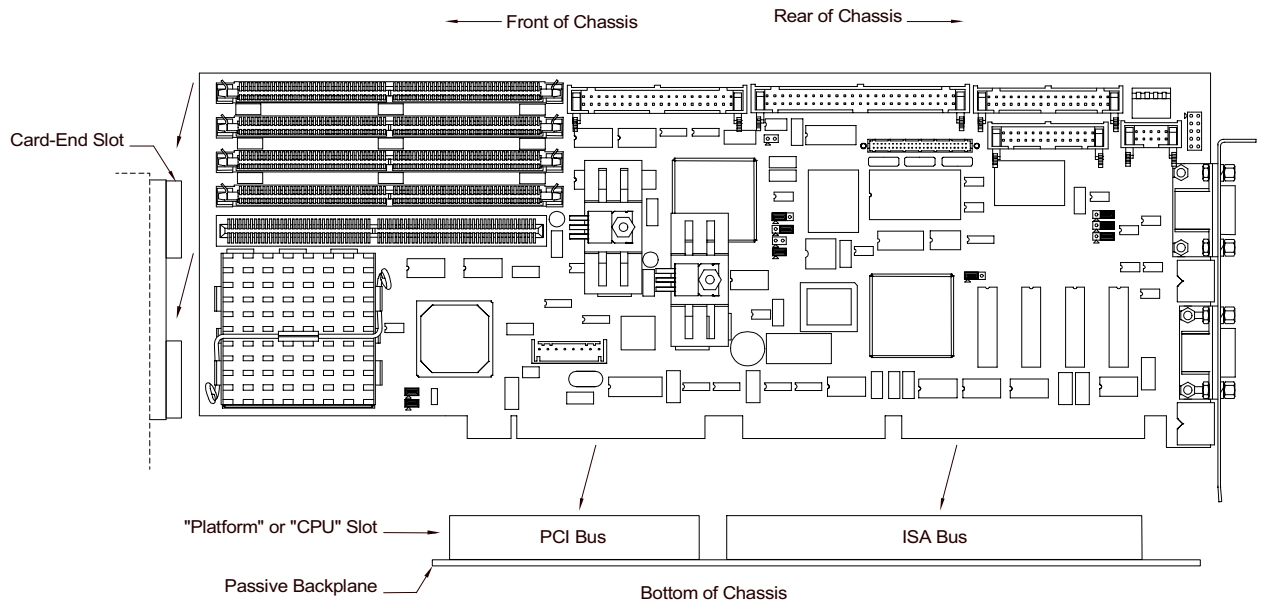
Table 4. Installing the SBC

Step	Action
1	Power-off the system and disconnect all power cords. **Note:** Use the grounding wrist strap provided with the system to discharge static electricity.
2	Remove the chassis cover.
3	Detach the circuit card hold-down bracket (if required). This bracket reaches across the tops of the circuit cards and holds them in place.
4	Locate the “Platform” or “CPU” slot on the passive backplane. **Note:** The SBC will not function to its fullest capabilities if it is not installed in the proper slot. For example, if installed in an ISA slot, the SBC will operate, but it will not be able to communicate with 3rd party PCI devices.
5	Remove the I/O bracket spacer from the rear of the chassis (if required). This spacer occupies the area where the SBCs I/O bracket is accessed from the rear of the chassis.
6	Insert the SBC into the chassis with the card edge aligned in the card-end slot and the I/O bracket in the chassis I/O slot. Lower the SBC to the “Platform” or “CPU” slot on the backplane. Carefully push the SBC connectors into the slot on the backplane. Ensure that the I/O bracket is accessible through the rear of the chassis.
7	Secure the I/O bracket to the fastening lip on the chassis.
Note: To install the EPC-2100/2101 onto a passive backplane not manufactured by RadiSys, follow the instructions provided by the manufacturer of the backplane.	

If the SBC is installed into a chassis not manufactured by RadiSys, a custom cable might be needed to adapt the keyboard header to the wiring in the chassis. RadiSys does *not* provide such a cable.

The SBC requires a minimum airflow of 200 linear feet per minute (LFM) unimpeded across the CPU within 0 to 60 °C (32 to 140 °F) ambient temperature. Operations outside these specifications could void the warranty.

Figure 5. Installing the SBC



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Step 4: Attach Peripherals to Headers

Overview

After you have installed the EPC-2100/2101 onto a passive backplane in a chassis, attach the necessary peripheral devices to the appropriate headers on the SBC (Figure 6).

SCSI Drive (EPC-2100 only)

Up to seven SCSI devices can be attached to this header via a 50-conductor flat cable in a daisy-chain configuration in the EPC-2100.
Note: The "red stripe" on the cable should be near Pin 1 on the header

EIDE Drive

Two EIDE (backwards-compatible with IDE) hard disk drives can be attached to this header via a 40-conductor flat cable.
Note: The "red stripe" on the cable should be near Pin 1 on the header.

The BIOS will support up to four IDE drives. To use 3 or 4 drives, a 2nd controller is required. The 2nd controller must be configured to use IRQ15 and I/O Ports 170-177h.

IDE/SCSI Activity LED

This header connects the IDE or SCSI drive activity LED cable to the SBC.
Note: Pin 1 is the anode; Pin 2 is the cathode.

FDD

Two floppy disk drives can be attached to this header via a 34-conductor flat cable.
Note: The "red stripe" on the cable should be near Pin 1 on the header.

Parallel Port

The parallel port:

- Provides a Centronics-compatible printer interface
- Supports AT-compatible / bi-directional / EPP operations.

Note: The "red stripe" on the cable should be near Pin 1 on the header.

Keyboard

An AT or PS/2 keyboard can be attached to this header with an appropriate 8-pin cable.
Note: The socket on the RadiSys keyboard cable is numbered in reverse order when compared to the pinout of the keyboard header on the SBC.

Serial Port 2

A serial device can be attached to this header (16550-compatible) via a 10-conductor flat cable. If connecting a serial mouse, be sure to use a shielded cable.
Note: The "red stripe" on the cable should be near Pin 1 on the header.

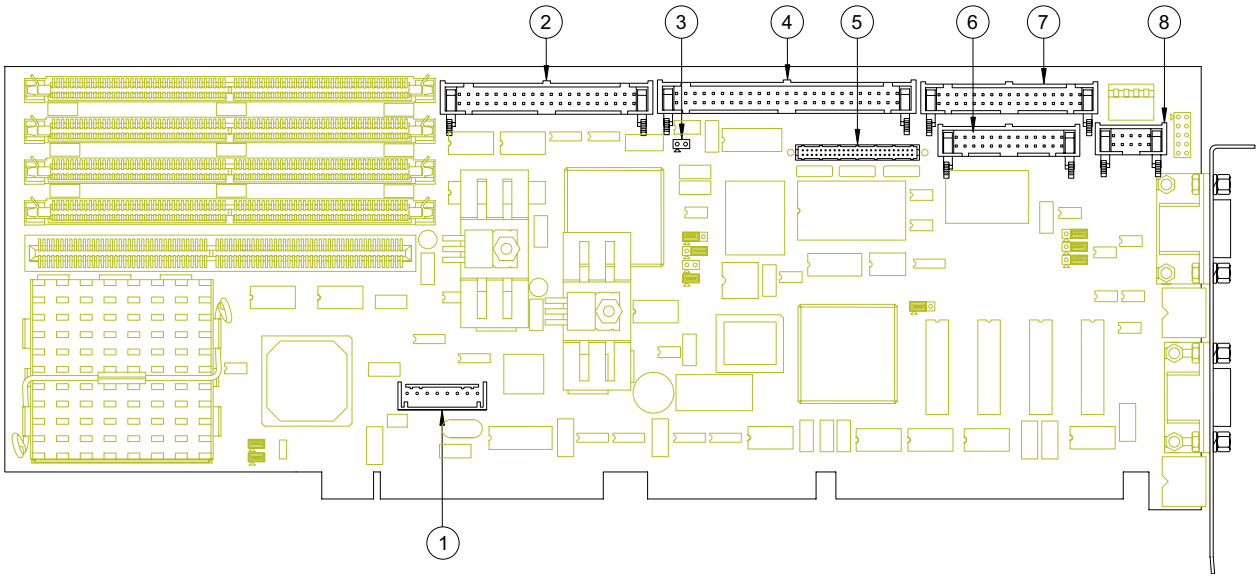
Improperly connecting the cable to this header can cause damage to the cable, SBC, and external serial device, and could void the warranty.

Flat Panel Display

A flat panel display such as a back-lit LCD can be attached to this header via a 50-conductor flat cable.

Note: For more information on the display system, see page 36.

Figure 6. Peripheral Header Locations



1. Keyboard
2. EIDE Drive
3. IDE/SCSI Activity LED
4. SCSI Drive (EPC-2100 only)
5. Flat Panel Display
6. Parallel Port
7. Floppy Drive
8. Serial Port 2

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

For pin signals and positions, see page 30.
For information on the display system, see page 36.

Step 5: Attach Peripherals to Connectors

Overview

After you have attached peripheral devices to the headers on the EPC-2100/2101, attach devices to connectors on the SBC (Figure 7).

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before connecting or disconnecting any cables for the equipment.

VGA Video

This 15-pin connector provides a standard VGA system interface.

Serial Port 1

This serial port (16550-compatible) is a DE-9 male connector.

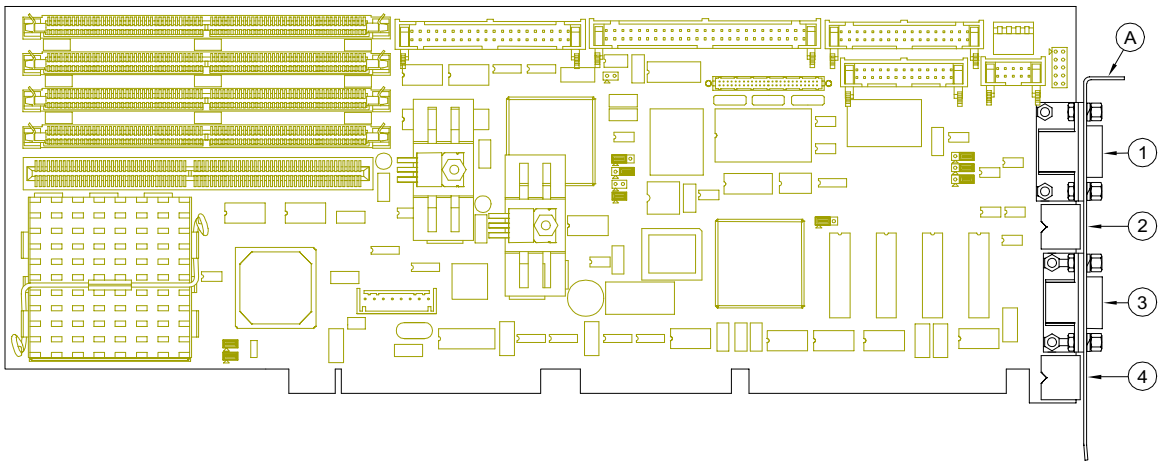
Keyboard

A PS/2 keyboard can be attached to this connector.

Mouse

A PS/2 mouse can be attached to this connector.

Figure 7. Peripheral Connector Locations



A. I/O Bracket

1. VGA Video
2. PS/2 Mouse
3. Serial Port 1
4. PS/2 Keyboard

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

For pin signals and positions, see page 30.
For information on the display system, see page 36.

Step 6: Power-On the System

Overview

After you have installed the EPC-2100/2101 and connected all devices, power-on the system.

No Power

If the system does not power-on, check all power connections and the power source.

If power connections are secure and the power source is adequate, contact Technical Support at 800-627-8700 or 713-541-8200 between 8:00 a.m. and 5:00 p.m., Central Time, USA. For more information, see “Customer Support,” page vi.

Startup

After you power-on the system, it will:

- Execute the Power-On Self Test (POST) to ensure that the system is functional and properly configured
- Start the operating system

Setup

During the POST, you can access the Setup Utility (Figure 8) to configure the system.

Before using the SBC for the first time, you should verify the system settings in the Setup Utility. See page 19.

Step 7: Run the Setup Utility

Overview

The BIOS (**B**asic **I**nput/**O**utput **S**ystem) Setup Utility allows you to configure the operations of the EPC-2100/2101.

Access

To access the Setup Utility, press **F2** when prompted during the Power-On Self Test (POST).

Main Menu

The Setup Utility display (Figure 8) contains two areas:

1. Options: The options for the current menu are on the left side of the screen
2. Item Specific Help: Instructions for the current item are on the right side

Menus

The Setup Utility contains a toolbar at the top of the screen that allows you to access the following menus:

- Main
- Advanced
- Security
- Power
- Boot
- Server
- Exit

Options and items for these menus are listed in the tables beginning on page 21.

Boot and Exit

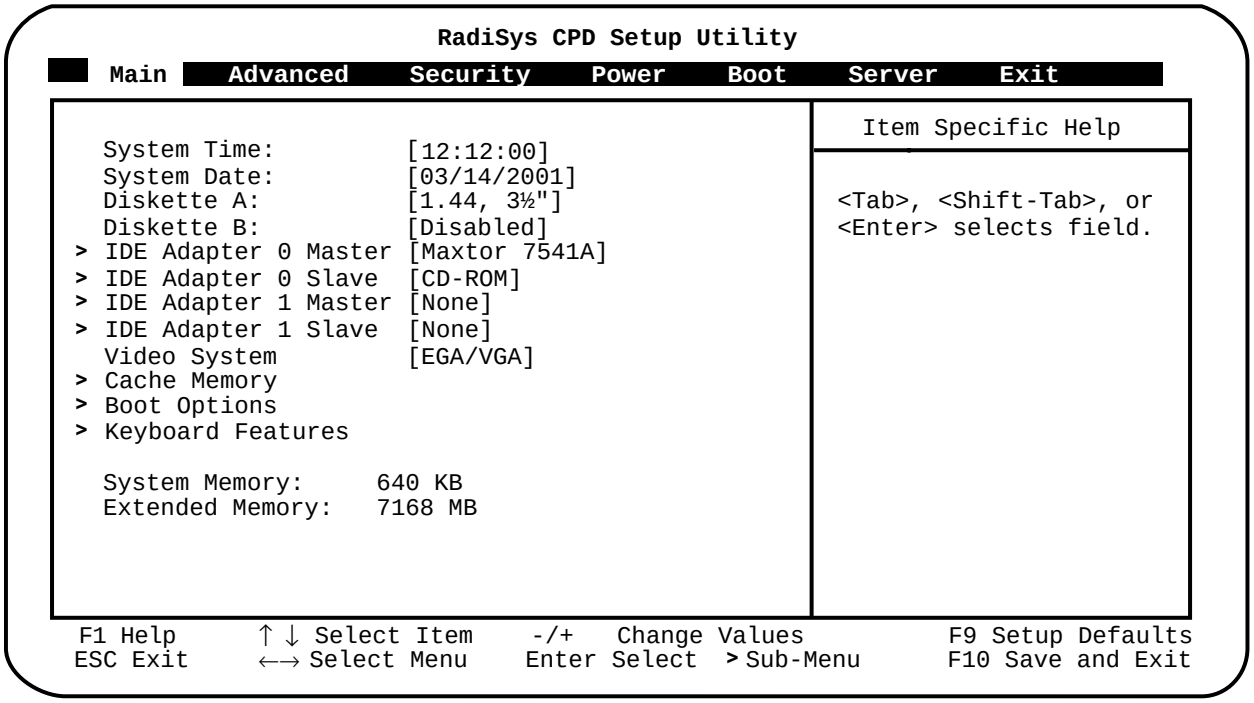
The Boot and Exit menus do not have "default" values. Items for these menus are *not* included in the tables below.

Operation

Use the following keys to operate the Setup Utility:

Key	Action
Up Arrow (↑) and Down Arrow (↓)	Select a menu item
Left Arrow (←) and Right Arrow (→)	Select a menu
Plus (+) and Minus (-)	Change the value of an item
Enter	Access a sub-menu (when an item with the sub-menu character ▹ is highlighted)
F1	Access Help for the Setup Utility
F9	Load default values for the setup options
F10	Save changes and exit
Esc	Access the Exit menu

Figure 8. Setup Utility Main Menu



Main Menu

Table 5. Main Menu Options and Item Values

Option / Sub-Menu	Item	Default Setting	Alternate Settings
System Time	N/A	Current Time in Hours, Minutes, and Seconds	N/A
System Date	N/A	Current Date in Month, Day, and Year	N/A
Diskette A	N/A	1.44/1.25 MB 3½"	Disabled, 720 KB 3½", 2.88 MB 3½", 360 KB 5¼", 1.2 MB 5¼"
Diskette B	N/A	Disabled	720 KB 3½", 1.44/1.25 MB 3½", 2.88 MB 3½", 360 KB 5¼", 1.2 MB 5¼"
▷ IDE Adapter 0 / 1 Master / Slave	Type	Auto (all 4 possible devices)	User, 1-39, CD-ROM, ATAPI Removable, IDE Removable, Other ATAPI, None
		Note: If Type is set to Auto, the only option available will be 32-Bit I/O.	
	• Cylinders • Heads • Sectors • Maximum Capacity (Display only)	Enter a value	N/A
	Multi-Sector Transfers	16 Sectors	Disabled, 2 Sectors, 4 Sectors, 8 Sectors
	LBA Mode Control	Disabled	Enabled
	32-Bit I/O	Disabled	Enabled
	Transfer Mode	Fast PIO 4	Standard, Fast PIO 1, Fast PIO 2, Fast PIO 3, FPIO 3 / DMA 1, FPIO 4 / DMA 2
▷ Cache Memory	Memory Cache	Disabled	Enabled
	Cache System BIOS Area	Enabled	Disabled
	Cache Video BIOS Area	Enabled	Disabled
	Cache C800—DFFF	Disabled (all regions)	Enabled
▷ Boot Options	Summary Screen	Enabled	Disabled
	Floppy Check	Enabled	Disabled
	Quiet Boot (Graphics)	Disabled	Enabled
	POST Errors	Enabled	Disabled
	Show Setup Entry Msg.	Enabled	Disabled
	Drive Autotype Pre-Delay	3 sec	No Delay, 6 sec, 9 sec, 12 sec, 15 sec, 21 sec, 30 sec
▷ Keyboard Features	Numlock	Off	On, Auto
	Key Click	Enabled	Disabled
	Keyboard Auto-Repeat Rate	30/sec	26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec
	Keyboard Auto-Repeat Delay	1/2 sec	1/4 sec, 3/4 sec, 1 sec
System Memory	N/A	Display only	N/A
Extended Memory	N/A	Display only	N/A

Advanced

Table 6. Advanced Menu Options and Item Values

Option / Sub-Menu	Item	Default Setting	Alternate Settings
▷ Integrated Peripherals	Serial Port A	Enabled (user configures)	Disabled (no configuration), Auto (BIOS or OS selects), OS Controlled (OS selects)
	Serial Port A: Base I/O Address	3F8	2F8, 3E8, 2E8, 220, 228, 238, 338
	Serial Port A: Interrupt	IRQ 4	IRQ 3
	Serial Port B	Enabled	Disabled, Auto, OS Controlled
	Serial Port B: Base I/O Address	2F8	3F8, 3E8, 2E8, 220, 228, 238, 338
	Serial Port B: Interrupt	IRQ 3	IRQ 4
	Parallel Port	Enabled	Disabled, Auto, OS Controlled
	Parallel Port: Mode	Output Only (ISA)	Bi-Directional, EPP
	Parallel Port: Base I/O Address	378	278, 3BC
	Parallel Port: Interrupt	IRQ 7	IRQ 5
	Parallel Port: DMA	DMA 3	DMA 1
	Floppy Disk Controller	Enabled	Disabled
	Floppy Disk Controller: Base I/O Address	Primary	Secondary
▷ Advanced Chipset Control	DRAM Speed	70 ns	60 ns
	ECC / Parity Config	Parity	Disabled, ECC
		Note: The ECC option functions only if Parity / FPM SIMMs are installed.	
	Enable Memory Gap	Disabled	Hole at 512 K — 640 K, Hole at 14 MB — 16 MB, Hole at 15 MB — 16 MB
	Alias ISA at 512—528 MB	Disabled	Enabled
	DMA Aliasing	Disabled	Enabled
	8-Bit I/O Recovery	4.5	3.5, 5.5, 6.5, 7.5, 8.5, 9.5, 10.5, 11.5
	16-Bit I/O Recovery	4.5	3.5, 5.5, 6.5, 7.5
	ISA Bus Speed	PCI Clock ÷ 4 [8.33 MHz]	PCI Clock ÷ 3 [11 MHz]
	Watchdog Timer Status	Disabled	Enabled
	Watchdog Timer Delay	1.2 sec	150 ms
	ISA Bus GAT	Disabled	Enabled
		Note: ISA cards that use DMA may require this function.	
	PCI Delayed Transactions	Enabled	Disabled
		Note: Disable this feature if floppy errors occur with a multitasking OS.	

Advanced (continued)

The items for the Advanced menu are continued below:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
▹ PCI Devices	PCI IRQ Line 1	9 (Open)	Auto Select, Disabled, 3 (COM2/COM4), 4 (COM1/COM3), 5 (2nd LPT), 7 (1st LPT), 10 (Open), 11 (Open), 12 (PS/2 Mouse), 14 (Primary IDE), 15 (Secondary IDE)
	PCI IRQ Line 2	10 (Open)	Auto Select, Disabled, 3, 4, 5, 7, 9, 11, 12, 14, 15
	PCI IRQ Line 3	11 (Open)	Auto Select, Disabled, 3, 4, 5, 7, 9, 10, 12, 14, 15
	PCI IRQ Line 4	15 (Secondary IDE)	Auto Select, Disabled, 3, 4, 5, 7, 9, 10, 11, 12, 14
	ISA Graphics Device Installed	No	Yes
	Cache Line Size	Auto (4)	8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64
	Latency Timer	Auto (64)	32, 64, 96, 128, 160, 196, 224
	PCI/PNP ISA UMB Region Exclusion: C800—CBFF, CC00—CFFF, D000—D3FF, D400—D7FF, D800—DBFF, DC00—DFFF	Available (all regions)	Reserved
	PCI/PNP ISA IRQ Resource Exclusion: IRQ 3, IRQ 4, IRQ 5, IRQ 7, IRQ 9, IRQ 10, IRQ 11, IRQ 15	Available (all interrupts)	Reserved
▹ Embedded PCI Devices	Embedded C&T PCI VGA	Enabled	Disabled
	C&T Video Output	Dual Output	Analog Only, Panel Only
	Local Bus IDE Adapter	Enabled	Disabled
	Embedded Adaptec SCSI*	Disabled	Enabled
	Embedded SCSI Clock*	33 MHz	40 MHz
	USB Controller	Disabled	Enabled
PS/2 Mouse	N/A	Disabled	Enabled
Onboard Speaker	N/A	Enabled	Disabled
Plug & Play O/S	N/A	Yes	No
Secured Setup Configuration	N/A	No	Yes
Large Disk Access Mode	N/A	DOS	Other

*These items are displayed only with the EPC-2100.

Security

Table 7. Security Menu Options and Item Values

Option / Sub-Menu	Item	Default Setting	Alternate Settings
Supervisor Password Is	N/A	Clear / Set (Display only)	N/A
User Password Is	N/A	Clear / Set (Display only)	N/A
Set Supervisor Password	N/A	Enter a value	N/A
Set User Password	N/A	Enter a value	N/A
Password on Boot	N/A	Disabled	Enabled
Fixed Disk Boot Sector	N/A	Normal	Write Protect
Diskette Access	N/A	Supervisor	User
Virus Check Reminder	N/A	Disabled	Daily, Weekly, Monthly
System Backup Reminder	N/A	Disabled	Daily, Weekly, Monthly

Power

Table 8. Power Menu Options and Item Values

<table>
<tr><th>Option / Sub-Menu</th><th>Item</th><th>Default Setting</th><th>Alternate Settings</th></tr>
<tr><td>Power Savings</td><td>N/A</td><td>Disabled</td><td>Customized,
Maximum Power Savings,
Maximum Performance</td></tr>
<tr><td></td><td colspan="3">Note: If this feature is disabled, Standby, Auto Suspend, Hard Disk, and Video Timeouts will be disabled.

Note: The following table lists preset options:
<table>
<tr><th>Feature</th><th>Maximum Power Savings</th><th>Maximum Performance</th></tr>
<tr><td>Standby Timeout</td><td>1 Minute</td><td>16 Minutes</td></tr>
<tr><td>Auto Suspend Timeout</td><td>5 Minutes</td><td>60 Minutes</td></tr>
<tr><td>Hard Disk Timeout</td><td>10 Seconds</td><td>15 Minutes</td></tr>
<tr><td>Video Timeout</td><td>10 Seconds</td><td>15 Minutes</td></tr>
</table></td></tr>
<tr><td>Standby Timeout</td><td>N/A</td><td>Off</td><td>1 Minute, 2 Minutes,
4 Minutes, 6 Minutes,
8 Minutes, 12 Minutes,
16 Minutes</td></tr>
<tr><td>Auto Suspend Timeout</td><td>N/A</td><td>Off</td><td>5 Minutes, 10 Minutes,
15 Minutes, 20 Minutes,
30 Minutes, 40 Minutes,
60 Minutes</td></tr>
<tr><td>Hard Disk Timeout</td><td>N/A</td><td>Disabled</td><td>10 Seconds, 15 Seconds,
30 Seconds, 45 Seconds,
1 Minute, 2 Minutes,
4 Minutes, 6 Minutes,
8 Minutes, 10 Minutes,
15 Minutes</td></tr>
</table>

Power (continued)

The items for the Power menu are continued below:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
Video Timeout	N/A	Disabled	10 Seconds, 15 Seconds, 30 Seconds, 45 Seconds, 1 Minute, 2 Minutes, 4 Minutes, 6 Minutes, 8 Minutes, 10 Minutes, 15 Minutes
Resume on Modem Ring	N/A	Off	On
Resume on Time	N/A	Off	On
Resume Time	N/A	00:00:00 (24-hour clock)	N/A
▹ Advanced Options	IRQ 1	Enabled	Disabled
	IRQ 3, IRQ 4, IRQ 5, IRQ 6, IRQ 7, IRQ 8, IRQ 9, IRQ 10, IRQ 11, IRQ 12, IRQ 13, IRQ 14, IRQ 15	Disabled (all interrupts)	Enabled
	SMI / NMI	Disabled (both options)	Enabled

Server

Table 9. Server Menu Options and Item Values

Option / Sub-Menu	Item	Default Setting	Alternate Settings
Console Redirect Port	N/A	Disabled	3F8 IRQ 4 (COM 1), 2F8 IRQ 3 (COM 2), 3E8 IRQ 4 (COM 3), 2E8 IRQ 3 (COM 4), 3F8 IRQ 3, 2F8 IRQ 4, 3E8 IRQ 3, 2E8 IRQ 4
Console Redirect Baud Rate	N/A	9600	19200, 38400, 56000

Notes

3 Technical Data

This chapter provides the following:

- System specifications and environmental tolerances
- Pin positions and signal listings for all headers and connectors
- Information on the display system
- Notes on installing memory modules

Specifications

Overview

Listed in the table below are system specifications and environmental tolerances for the EPC-2100/2101 series SBC.

Note: These specifications are subject to change without notice.

Environmental

Table 10. Environmental Tolerances

Temperature	Operating: Non-Operating:	0 to +60 °C (32 to 140 °F) -40 to +70 °C (-40 to 158 °F)
Humidity	Operating: Non-Operating:	5 — 95% @ 40 °C, non-condensing 0 — 95% @ 40 °C, non-condensing
Shock	Operating: Non-Operating:	1.25 G @ 10 ms (10 G in appropriate chassis) 30 G @ 10 ms (40 G in appropriate chassis)
Vibration	Operating: Non-Operating:	1 G @ 5 — 100 Hz 5 G @ 5 — 200 Hz
Altitude	Operating: Non-Operating:	15,000 ft (4,572 m) 50,000 ft (15,240 m)

About Thermal Data

RadiSys validates the operating specifications of its products by testing with the most demanding hardware and software configurations to maximize the power supply draw and generate a worst-case scenario. Despite these efforts, the specifications outlined above are only benchmarks and should be regarded as such.

The SBC requires a minimum airflow of 200 linear feet per minute (LFM) unimpeded across the CPU within 5 to 60 °C (41 to 140 °F) ambient temperature. Operations outside these specifications could void the warranty.

System

Table 11. System Specifications

CPU	• 100, 133, 166 MHz Intel™ Pentium® Processor • 166, 200, or 233 MHz Pentium Processor with MMX™ Technology
Chipset	Intel 430HX PCIset
Cache	256 KB or 512 KB Level 2 write-back cache: Zero wait state at 66 MHz 8 ns synchronous pipeline burst COAST RAM
Memory	Four 72-pin sockets organized in two banks, supporting: Up to 256 MB 1/2/4/8/16 x 32/36, 60/70 ns, Fast Page Mode DRAM SIMMs Parity/FPM or Non-Parity ECC or up to 128 Mb EDO Single bit error correction, double bit detection (ECC mode only)
Addressing	Real and protected mode supported Real address mode: 20-bit Protected address mode:16-bit on ISA bus, 32-bit on PCI local bus
Data Path	64-bit on board: 16-bit on ISA bus, 32-bit on PCI local bus
Flash Memory	4 Mb (512 KB x 8)
Clock/Calendar	DS1287-compatible Real-Time Clock accurate to +/- 12 minutes/year, at 25 °C; includes CMOS
Power Requirements w/ 8—256 MB DRAM (Excludes requirements for flat panel device)	Input Power 21 — 35 W +5 V 4.3 — 7.0 A +12 V 0.1 A -12 V 0.1 A
Form Factor	13.28" (33.73 cm) x 4.80" (12.19 cm)

Pin Signals

Overview

The tables below list the pin signals for the serial and parallel ports. The following illustration (Figure 9) indicates the pin positions for each.

Table 12. Serial and Parallel Port Pin Signals

Serial Port 1	
RS-232	
Pin	Description
DE9P	
1	Data Carrier Detect (In)
2	Receive Data (In)
3	Transmit Data (Out)
4	Data Terminal Ready (Out)
5	Ground
6	Data Set Ready (In)
7	Request to Send (Out)
8	Clear to Send (In)
9	Ring Indicator (In)

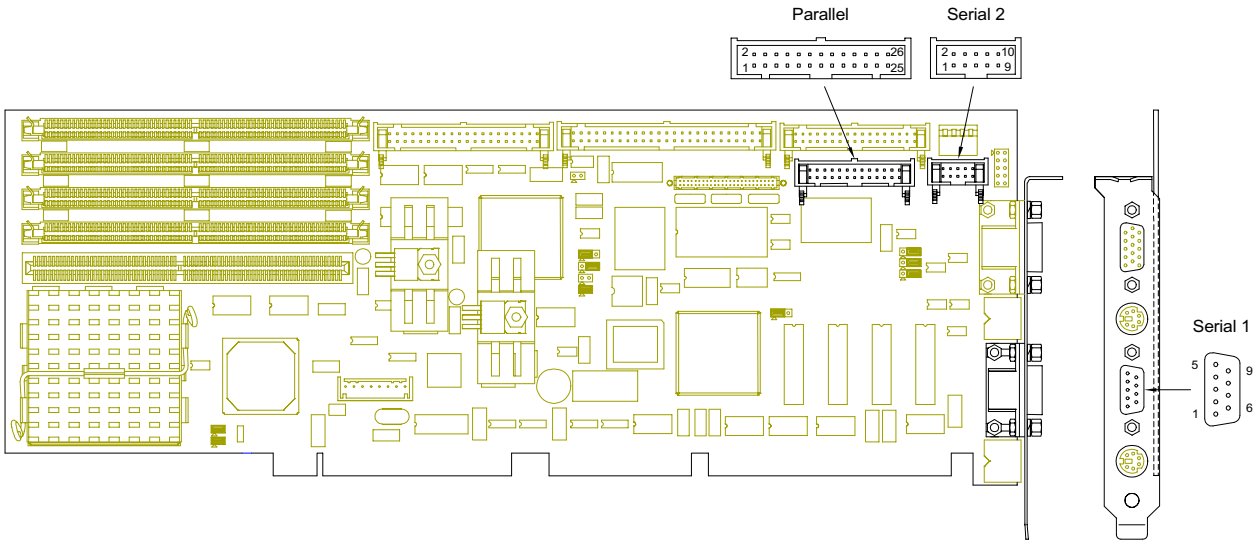
Serial Port 2				
RS-232		RS-422		
10-Pin	Description	Pin		Description
		DE9P	10-Pin	
1	Data Carrier Detect (In)	1	1	/Z Output (TX-)
2	Data Set Ready (In)	6	2	/B Receive (RX-)
3	Receive Data (In)	2	3	Y Output (TX+)
4	Request to Send (Out)	8	6	A Receive (RX+)
5	Transmit Data (Out)			
6	Clear to Send (In)			
7	Data Terminal Ready (Out)			
8	Ring Indicator (In)			
9	Ground			
10	N/C			

To connect two RS-422 devices, use a shielded twisted-pair (STP) cable no longer than 4,000 feet, configured as listed below:

Machine A Pin Signal		Machine B Pin Signal
/Z Output (TX-)	⟷	/B Receive (RX-)
Y Output (TX+)	⟷	A Receive (RX+)
/B Receive (RX-)	⟷	/Z Output (TX-)
A Receive (RX+)	⟷	Y Output (TX+)

Parallel Port			
Pin	Description	Pin	Description
DB25S		DB25S	
1	- Strobe	15	Data Bit 6
2	- Auto Feed	17	Data Bit 7
3	Data Bit 0	19	- Acknowledge
4	- Error	21	+ Busy
5	Data Bit 1	23	+ Paper Feed
6	- Initialize Printer	25	+ Select
7	Data Bit 2	26	Not Connected
8	- Select Input	10, 12, 14, 16, 18, 20, 22, 24	Ground
9	Data Bit 3		
11	Data Bit 4		
13	Data Bit 5		

Figure 9. Serial and Parallel Headers and Connectors



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Pin Signals (continued)

Overview

The tables below list the pin signals for each peripheral header and connector. The following illustration (Figure 10) indicates the pin positions for each.

Table 13. Peripheral Header and Connector Pin Signals

EIDE			
Pin	**Description**	**Pin**	**Description**
1	Reset (Out)	21	DMA Request (I/O)
3	Data 7 (I/O)	23	- I/O Write (Out)
4	Data 8 (I/O)	25	- I/O Read (Out)
5	Data 6 (I/O)	27	I/O Channel Ready (In)
6	Data 9 (I/O)	28	+ ALE
7	Data 5 (I/O)	29	DMA Acknowledge(Out)
8	Data 10 (I/O)	31	+ IRQ14 (In)
9	Data 4 (I/O)	32	I/O CS16 (Out)
10	Data 11 (I/O)	33	+ ADDR1 (Out)
11	Data 3 (I/O)	34	- Passed Diagnostics (In)
12	Data 12 (I/O)	35	+ ADDR0 (Out)
13	Data 2 (I/O)	36	+ ADDR2 (Out)
14	Data 13 (I/O)	37	- CS0 (Out)
15	Data 1 (I/O)	38	- CS1 (Out)
16	Data 14 (I/O)	39	Activity Light (Out)
17	Data 0 (I/O)	2, 19, 22, 24, 26, 30, 40	Ground
18	Data 15 (I/O)		
20	Not Connected		

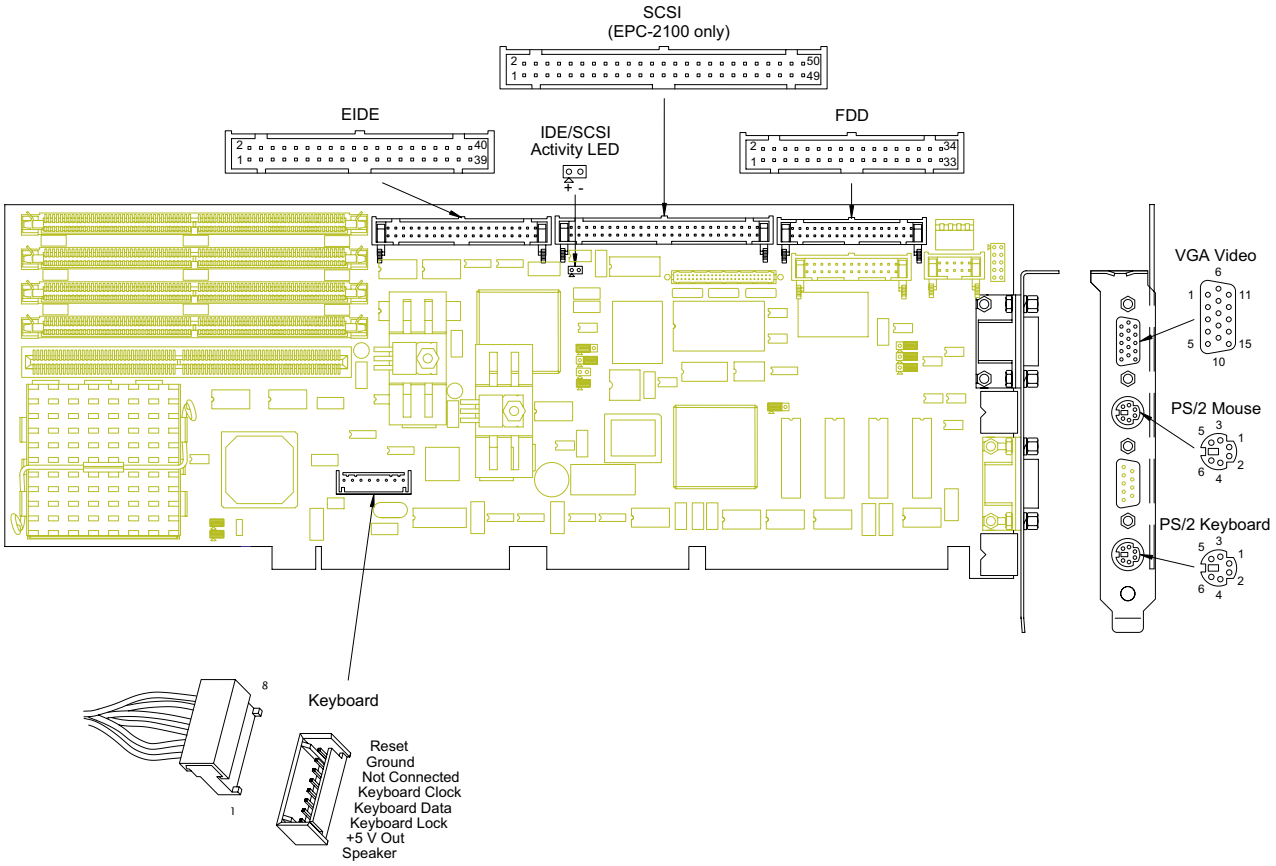
PS/2 Mouse / Keyboard	
Pin	**Description**
1	Data
2	Not Connected
3	Ground
4	+5 V
5	Clock
6	Not Connected

Keyboard		
Pin Signals on Board	**Description**	**Pin Signals on Cable**
1	Reset	8
2	Ground	7
3	Not Connected	6
4	Keyboard Clock	5
5	Keyboard Data	4
6	Keyboard Lock	3
7	+5 V	2
8	Speaker	1

SCSI (EPC-2100 only)			
Pin	**Description**	**Pin**	**Description**
2	DB0 (I/O)	46	- CD (In)
4	DB1 (I/O)	48	- REQ (In)
6	DB2 (I/O)	50	- I/O (In)
8	DB3 (I/O)	25	Open
10	DB4 (I/O)	23, 24, 27, 28	Reserved
12	DB5 (I/O)		
14	DB6 (I/O)	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 20, 21, 22, 29, 30, 31, 33, 34, 35, 37, 39, 41, 43, 45, 47, 49	Ground
16	DB7 (I/O)		
18	DBP (I/O)		
26	TERMPWR		
32	- ATN (Out)		
36	- BSY (I/O)		
38	-ACK (Out)		
40	- RST (I/O)		
42	- MSG (In)		
44	- SEL (I/O)		

VGA Video	
Pin	**Description**
15-Pin	
1	Red
2	Green
3	Blue
4	Not Connected
5	Ground
6	Ground
7	Ground
8	Ground
9	Not Connected
10	Ground
11	Not Connected
12	ID 1
13	Horizontal Sync
14	Vertical Sync
15	ID 3

Figure 10. Peripheral Headers and Connectors



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Pin Signals (continued)

Overview

The table below lists the pin signals for the flat panel display header. A description of each signal is provided. The following illustration (Figure 11) indicates pin positions.

Table 14. Flat Panel Display Header Pin Signals

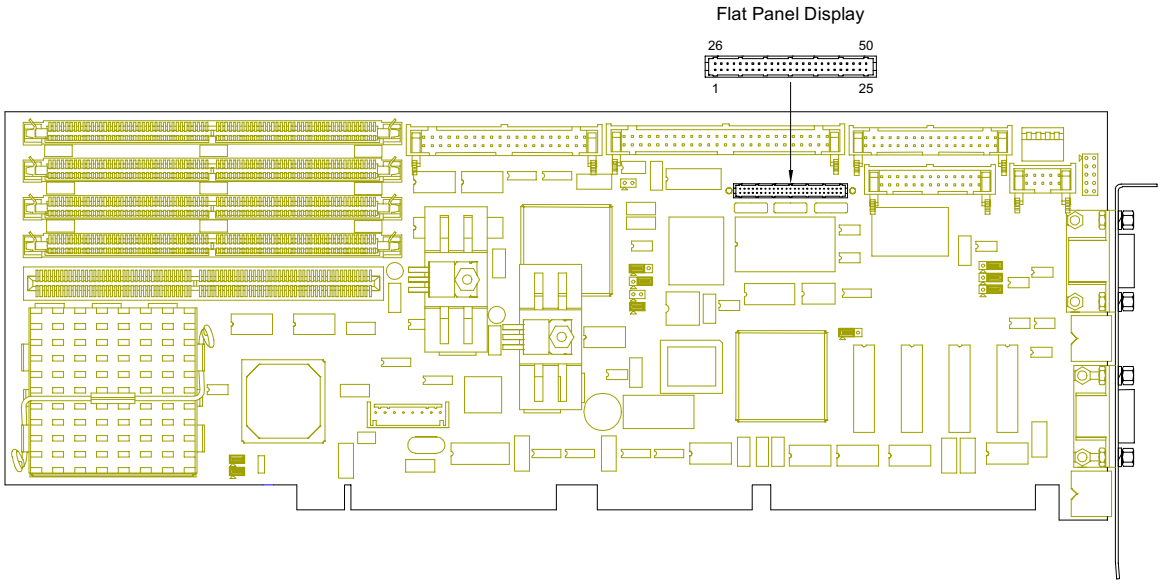
Flat Panel Display					
Pin	**Description**	**Pin**	**Description**	**Pin**	**Description**
1	VDD_SAFE	19	P3	39	P15
2	+12V_SAFE	21	P4	40	P14
3	VEE_SAFE (Optional)	22	P5	42	P13
4	VEE_ADJ (Optional)	24	P6	43	P12
5	ENABKL	25	P7	45	P11
6	+12V	27	P23	46	P10
8	M (Display Enable)	28	P22	48	P9
10	LP (Horizontal Sync)	30	P21	49	P8
11	FLM (Vertical Sync)	31	P20	7, 9, 12, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50	Ground
13	SHFCLK	33	P19		
15	P0	34	P18		
16	P1	36	P17		
18	P2	37	P16		

- **VDD_SAFE** (Output Power): Switched logic power for flat panel display. Sequences on and off with the panel digital signals to prevent panel damage. Output voltage can be set to 5.0 or 3.3 VDC with JP10. See page 15. This output is fused.†
- **+12 V_SAFE** (Output Power): Switched +12 V power sequences on and off with the panel digital signals to prevent panel damage. This output is fixed at +12 V and typically powers the backlight inverter. This output is fused.†
- **VEE_SAFE** (Optional)‡: Switched liquid crystal bias voltage.
- **VEE_ADJ** (Optional)‡: External adjustment for VEE_SAFE voltage.
- **ENABLK** (Output Signal): Enable Backlight. Active high logic signal that controls an external backlight inverter.
- **+12 V** (Output Power): Unswitched +12 V power. This output is fused.†
- **M** (Output Signal): M signal for AC drive control. This signal can be programmed for active low or active high operation. This signal can be used on some LCD panels to center the display.
- **LP** (Output Signal): Latch Pulse, equivalent to Horizontal Sync, can be programmed for active low or active high operation. This signal is used to transfer one or more horizontal lines of display data from the input shift registers to the panel drive circuits.
- **FLM** (Output Signal): First Line Marker, equivalent to Vertical Sync, can be programmed for active low or active high operation. This signal is used to indicate the first active line of display data.
- **SHFCLK** (Output Signal): Shift Clock. Pixel clock for flat panel data. For EL panels, SHFCLK can be inverted by setting JP3. See page 8.
- **P0 — P23** (Output Signal): Pixel output data for 8, 9, 12, 16, 18, or 24-bit panel interfaces.

† Outputs are fused using a resettable PolySwitch. Normal output current is 1.85 A at 20 °C. Derate linearly to 1.3 A at 60 °C.

‡ This feature is not available on standard product.

Figure 11. Flat Panel Display Header



To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Improper wiring for this header can cause damage to the cable, SBC, and display device, and could void the warranty.

Display System

Overview

The following tables list the VGA modes and resolutions supported by the EPC-2100/2101.

Use of a Flat Panel display may require custom configurations. For more information, see "Customer Support," page vi.

Display Resolutions

Resolution	Colors	Colors (bpp)	Refresh (Hz)	Memory (KB)
640x480	256	8	60, 72, 75, 85	604
640x480	65,536	16	60, 72, 75, 85	904
640x480	16.8 M	24	60, 72, 75, 85	1204
800x600	256	8	56, 60, 72, 75, 85	773
800x600	65,536	16	56, 60, 72, 75, 85	1242
800x600	16.8 M	24	56, 60, 72, 75, 85	1710
1024x768	256	8	43I, 56, 60, 72, 75, 85	1072
1024x768	65,536	16	43I, 56, 60, 72, 75, 85	1840
1280x1024	256	8	43I, 60, 72, 75, 85	1584

"I" = "Interlaced"

Standard VGA Modes

Video Mode	Resolution	Colors	Mode Type	Display Adapter	Font Size	Character Display	Dot Clock (MHz)	Horizontal Frequency	Vertical Frequency	Memory (KB)
00h	320x200 320x350 360x400	16 (gray) 16 (gray) 16	Text	CGA EGA VGA	8x8 8x14 9x16	40x25	25 25 28	31.5	70	256
01h	320x200 320x350 360x400	16 16 16	Text	CGA EGA VGA	8x8 8x14 9x16	40x25	25 25 28	31.5	70	256
02h	640x200 640x350 720x400	16 (gray) 16 (gray) 16	Text	CGA EGA VGA	8x8 8x14 9x16	80x25	25 25 28	31.5	70	256
03h	640x200 640x350 720x400	16 16 16	Text	CGA EGA VGA	8x8 8x14 9x16	80x25	25 25 28	31.5	70	256
04h	320x200	4	Graphics	All	8x8	40x25	25	31.5	70	256
05h	320x200 320x200 320x200	4 (gray) 4 (gray) 4	Graphics	CGA EGA VGA	8x8 8x8 8x8	40x25	25 25 25	31.5	70	256
06h	640x200	2	Graphics	All	8x8	80x25	25	31.5	70	256
07h	720x350 720x350 720x400	Mono Mono Mono	Text	MDA EGA VGA	9x14 9x14 9x16	80x25	28 28 28	31.5	70	256
08h—0Ch	Reserved									
0Dh	320x200	16	Graphics	E/VGA	8x8	40x25	25	31.5	70	256
0Eh	640x200	16	Graphics	E/VGA	8x8	80x25	25	31.5	70	256
0Fh	640x350	Mono	Graphics	E/VGA	8x14	80x25	25	31.5	70	256
10h	640x350	16	Graphics	E/VGA	8x14	80x25	25	31.5	70	256
11h	640x480	2	Graphics	VGA	8x16	80x30	25	31.5	60	256
12h	640x480	16	Graphics	VGA	8x16	80x30	25	31.5	60	256
13h	320x200	256	Graphics	VGA	8x8	40x25	25	31.5	70	256

Extended VGA Modes

Video Mode	VESA® VBE Mode	Resolution	Colors	Mode Type	Font Size	Character Display	Dot Clock (MHz)	Horizontal Frequency	Vertical Frequency	Memory (KB)
20h	120	640x480	16	GraphicsL	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	256
22h	122	800x600	16	GraphicsL	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	256
24h	124	1024x768	16	GraphicsL	8x16	128x48	44.9 65 78.75 94.5	35.5 48.4 60 68.7	43I 60 75 85	384
28h	128	1280x1024	16	GraphicsL	8x16	160x64	78.75 108	47 64	43I 60	640
2Ah†	——	1600x1200	16	GraphicsL	8x16	200x75	——	——	——	938
30h	101h	640x480	256	GraphicsL	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	300
31h	100h	640x480	256	GraphicsL	8x16	80x25	25.175	31.5	70	256
32h	103h	800x600	256	GraphicsL	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	469
34h	105h	1024x768	256	GraphicsL	8x16	128x48	44.9 65 78.75 94.5	35.5 48.4 60 68.7	43I 60 75 85	768
38h	107h	1280x1024	256	GraphicsL	8x16	160x64	78.75 108	47 64	43I 60	1280
3Ah†	——	1600x1200	256	GraphicsL	8x16	200x75	——	——	——	1875
40h	110h	640x480	32 K	GraphicsL	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	600
41h	111h	640x480	64 K	GraphicsL	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	600
42h	113h	800x600	32 K	GraphicsL	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	938
43h	114h	800x600	64 K	GraphicsL	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	938
44h	116h	1024x768	32 K	GraphicsL	8x16	128x48	44.9 65	35.5 48.4	43I 60	1536
45h	117h	1024x768	64 K	GraphicsL	8x16	128x48	44.9 65	35.5 48.4	43I 60	1536
50h	112h	640x480	16 M	GraphicsL	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	900
52h	115h	800x600	16 M	GraphicsL	8x16	100x37	36 40	35.1 37.9	56 60	1407
6Ah	102h	800x600	16	Graphics	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	256
64h	104h	1024x768	16	Graphics	8x16	128x48	44.9 65 78.75 94.5	35.5 48.4 60 68.7	43I 60 75 85	384
68h	106	1280x1024	16	Graphics	8x16	160x64	78.75 108	47 64	43I 60	640
70h	101h	640x480	256	Graphics	8x16	80x30	25.175 31.5 36	31.5 37.5 43.3	60 75 85	300
71h	100h	640x480	256	Graphics	8x16	80x25	25.175	31.5	70	256
72h	103h	800x600	256	Graphics	8x16	100x37	36 40 49.5 56.25	35.1 37.9 46.9 53.7	56 60 75 85	469
74h	105h	1024x768	256	Graphics	8x16	128x48	44.9 65 78.75 94.5	35.5 48.4 60 68.7	43I 60 75 85	768
78h	107h	1280x1024	256	Graphics	8x16	160x64	78.75 108	47 64	43I 60	1280

† For Flat Panel display only

"L" = "Linear"
"I" = "Interlaced"

Installing Memory

Overview

The EPC-2100/2101 supports up to 256 MB of on-board dynamic RAM modules in FPM or 128 Mb in EDO, x36 or x32.
Note: The CPU supports ECC or Parity modes only if x36 modules are used.

Memory Bank

The EPC-2100/2101 contains four 72-pin SIMM sockets for DRAM memory modules (Figure 12). These four sockets comprise two memory banks, each consisting of two sockets and providing a 64-bit wide data path and 8 parity bits (x36 SIMMs only):

- Sockets 1 and 2 comprise Bank 0
- Sockets 3 and 4 comprise Bank 1

Each bank must be completely filled to be operable. Also, both sockets in a bank must be filled with SIMMs of identical size. For example, if an 16MB SIMM is installed in Socket 1, another 16MB SIMM must be installed in Socket 2.

SIMM Types

Five SIMM memory sizes (4, 8, 16, 32, and 64 MB) are supported. SIMMs of these sizes can be installed in sockets 1, 2, 3, or 4 in combinations as illustrated in Table 15.

Memory size is detected by the system BIOS. Memory timing requires 70 ns or faster page devices. Parity generation and checking is provided for each byte.

The SIMM sockets are gold and require gold SIMMs. Use of tin/lead SIMMs can cause damage to the equipment and could void the warranty.

To avoid damage or injury, always power-off the system and disconnect all power cords from their power source before handling the equipment.
To help prevent accidental damage that can be caused by static discharge, always use a grounding wrist strap or other static-dissipating device when accessing the interior of the chassis and handling the equipment.

Figure 12. Memory Sockets

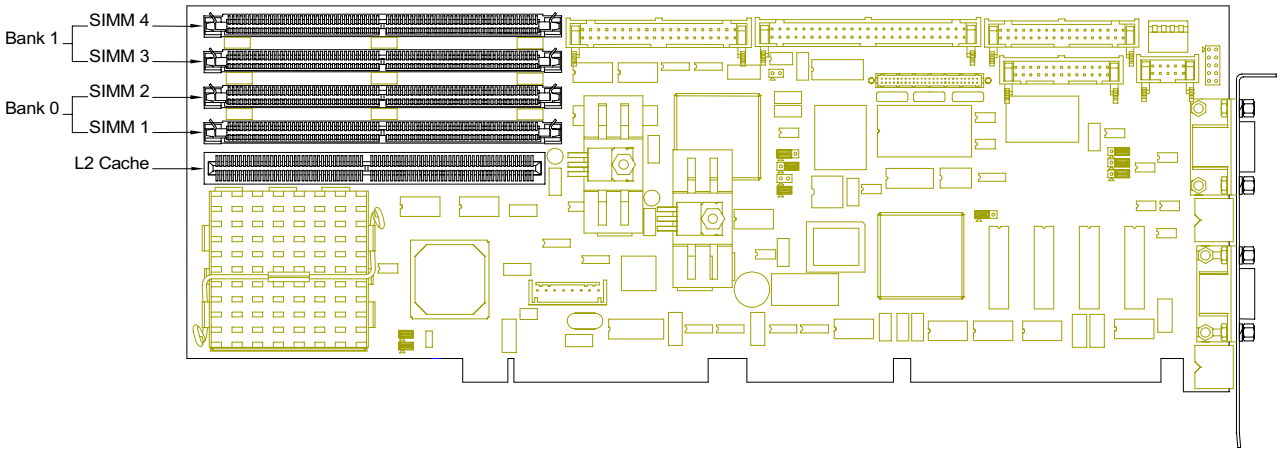


Table 15. Memory Combinations

SIMM 1 & 2	SIMM 3 & 4	Total Memory
1 MB x 3X (4 MB)	Empty	8 MB
1 MB x 3X (4 MB)	1 MB x 3X (4 MB)	16 MB
2 MB x 3X (8 MB)	Empty	16 MB
2 MB x 3X (8 MB)	1 MB x 3X (4 MB)	24 MB
2 MB x 3X (8 MB)	2 MB x 3X (8 MB)	32 MB
4 MB x 3X (16 MB)	Empty	32 MB
4 MB x 3X (16 MB)	1 MB x 3X (4 MB)	40 MB
4 MB x 3X (16 MB)	2 MB x 3X (8 MB)	48 MB
4 MB x 3X (16 MB)	4 MB x 3X (16 MB)	64 MB
8 MB x 3X (32 MB)	Empty	64 MB
8 MB x 3X (32 MB)	1 MB x 3X (4 MB)	72 MB
8 MB x 3X (32 MB)	2 MB x 3X (8 MB)	80 MB
8 MB x 3X (32 MB)	4 MB x 3X (16 MB)	96 MB
8 MB x 3X (32 MB)	8 MB x 3X (32 MB)	128 MB
16 MB x 3X (64 MB)	Empty	128 MB
16 MB x 3X (64 MB)	1 MB x 3X (4 MB)	136 MB
16 MB x 3X (64 MB)	2 MB x 3X (8 MB)	144 MB
16 MB x 3X (64 MB)	4 MB x 3X (16 MB)	160 MB
16 MB x 3X (64 MB)	8 MB x 3X (32 MB)	192 MB
16 MB x 3X (64 MB)	16 MB x 3X (64 MB)	256 MB
3X = 36 for Parity, 32 for Non-Parity		

Notes