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SERVICE MANUAL

EPC-3221 CompactPCI® SCB (C1000BX-SVE) and C1XTN02 Transition I/O Module

P/N 007-01143-0000 October 2000

A system controller board (SCB) is also known as a single-board computer.

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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. RadiSys' sole obligation 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.

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Important

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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: 1–800–438–4769 oder 1–713–541–8200 Montags bis Freitags von 0700 Uhr bis 1800 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.

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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

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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. Only qualified and trained electronics service personnel should access the equipment.

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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 manuals, addenda, drivers and BIOS. The documentation for current and discontinued products is available at this Web site in Adobe® Acrobat® PDF format. Documentation may be viewed and printed using the free Acrobat® Reader™ software.

Calling Technical Support

1. Have the RadiSys product model and serial number available.
2. Call Technical Support:
   - In the continental USA, Monday – Friday, 7:00 a.m. – 6:00 p.m., Central Time, dial 1–800–438–4769.
   - Outside the USA, dial 1–713–541–8200 (add long distance/international access codes).
   - In Europe, Monday – Friday, 8:30 a.m. – 5:00 p.m., dial +31–36–5365595.

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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

The Returned Material Authorization (RMA) number and the serial number of each returned product must be written on the outside of the package and on any enclosed correspondence.

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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Table of Contents

Chapter 1 Introduction 1

EPC-3221 System Controller Board 2
C1XTN02 Rear Transition I/O Module....6

Chapter 2 6 Steps to Operation 9

Handling the EPC-3221 and C1XTN02 10
Step 1: Check Switch Settings....12
Step 2: Install the SCB 14
Step 3: Install the C1XTN02 Transition I/O Module 16
Step 4: Attach Peripheral Devices 18
Step 5: Power-On the System....20
Step 6: Run the Setup Utility....21

Chapter 3 Technical Data 27

Specifications 28
Pin Signals 30
Peripheral Connections....33
CompactPCI® Connectors 34
Console Redirection 38
Platform Management 39
Watchdog Timer 43
Installing Memory 44
System Battery Replacement....46
Product Identification 48

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List of Figures

Figure 1. EPC-3221 Components 4
Figure 2. Front I/O Panel Components 5
Figure 3. Rear Transition I/O Module Components 7
Figure 4. Safely Handling the Components 11
Figure 5. Switch Block Location 13
Figure 6. Installing the SCB 15
Figure 7. Installing the Transition I/O Module 17
Figure 8. Peripheral Connectors 19
Figure 9. Setup Utility Main Menu 20
Figure 10. Parallel Port Cable 32
Figure 11. USB Port Cable 32
Figure 12. CompactPCI® Connectors 36
Figure 13. SCB Platform Management 39
Figure 14. Memory Sockets 45
Figure 15. Installing Memory Modules 45
Figure 16. System Battery Components 47
Figure 17. Battery Installation 47

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List of Tables

Table 1. EPC-3221 SCB Sensors 41
Table 2. Sensor Threshold Descriptions 42

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Notes

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1 Introduction



This chapter discusses functions and features of the equipment that can be accessed *only* by qualified and trained electronics service personnel. The material contained in this chapter does *not* discuss any user-accessible parts or operations. All tasks related to material in this chapter must be referred to qualified service personnel.

This chapter discusses the primary features of the EPC-3221 System Controller Board (SCB) and the optional C1XTN02 Rear Transition I/O Module (XIO).

If you are familiar with the primary features and components of the EPC-3221 and the C1XTN02 Transition I/O Module, and you wish to quickly begin operating the equipment, go to Chapter 2, "6 Steps to Operation" on page 9 and return to this chapter later at your convenience.

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EPC-3221 System Controller Board

Standard Features

The RadiSys EPC-3221 System Controller Board provides the following standard features (Figure 1 on page 4 and Figure 2 on page 5):

- Intel® Celeron™ Processor in the PPGA package (370-pin socket: PGA370)
  - 300, 366, 433 MHz, and higher as technology becomes available
  - 128 KB integrated Level 2 write-back cache operating at full clock speed
- Intel 440BX AGPset
  - 82443BX Host Bridge/Controller (System Controller, or North-Bridge)
  - 82371EB PCI-to-ISA/IDE Xcelerator (PIIX4E, or South-Bridge)
- SMSC Super I/O Controller
- Programmable logic device (for on-board logic)
- Two 168-pin DIMM sockets for up to 512 MB PC100 +3.3 V unbuffered SDRAM (or higher as technology becomes available)
- 4 Mb (512 KB x 8) boot block flash memory device
- Hitachi H8/3437 system monitoring microcontroller with I^2C bus interface
- Ultra SCSI
- AGP video
- 10/100BaseT Ethernet
- Intel 21150 PCI-to-PCI Bridge
- Remote/Local Temperature Sensor with SMBus serial interface
- 230 kbps ESD-protected RS-232 serial port
- MicroMonitor
- Clock synthesizer and SDRAM clock buffer
- CR2032 lithium (Li/MnO_2) coin battery to retain date, time, and CMOS parameters
- Four-position switch block for elements of system configuration
- System management bus 4-pin male shrouded, keyed header on the board surface
- System management power 2-pin male header on the board surface
- Two serial port 9-pin male D-Sub connectors on the front I/O panel (RS-232)
- Parallel port 25-pin female D-Sub connector on the front I/O panel (AT-compatible / bi-directional / enhanced operations)
- USB Series A male connector on the front I/O panel
- PS/2 keyboard and mouse 6-pin female mini-DIN connectors on the front I/O panel
- System Power and IDE / SCSI activity LEDs on the I/O panel

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Optional Features

The EPC-3221 is available with the following optional on-board peripherals:

- C1XTN02 Rear Transition I/O Module
- PCI Bridge Card

SCSI

The SCSI option provides the following features and components:
Note: The EPC-3221 supports only single-ended (SE) SCSI devices.

- Adaptec AIC®-7890 PCI-to-Ultra SCSI Controller
- Active SCSI terminators

Video

The AGP Video option provides the following features and components:

- CHIPS 69000 HiQVideo™ Accelerator with 2 MB integrated SDRAM
- VGA video 15-pin female D-Sub connector on the I/O bracket

Ethernet

The Ethernet option provides the following features and components:

- Intel 82559 10/100 Mb/sec Ethernet LAN Controller
- RJ-45 10/100BaseT Ethernet connector on the I/O panel
- Ethernet activity LEDs on the I/O panel

Rear Transition I/O

The C1XTN02 Rear Transition I/O Module is also an optional component to expand connectivity and functionality of the EPC-3221 SCB, for use as part of a cPCI computer system. See C1XTN02 Rear Transition I/O Module on page 6.

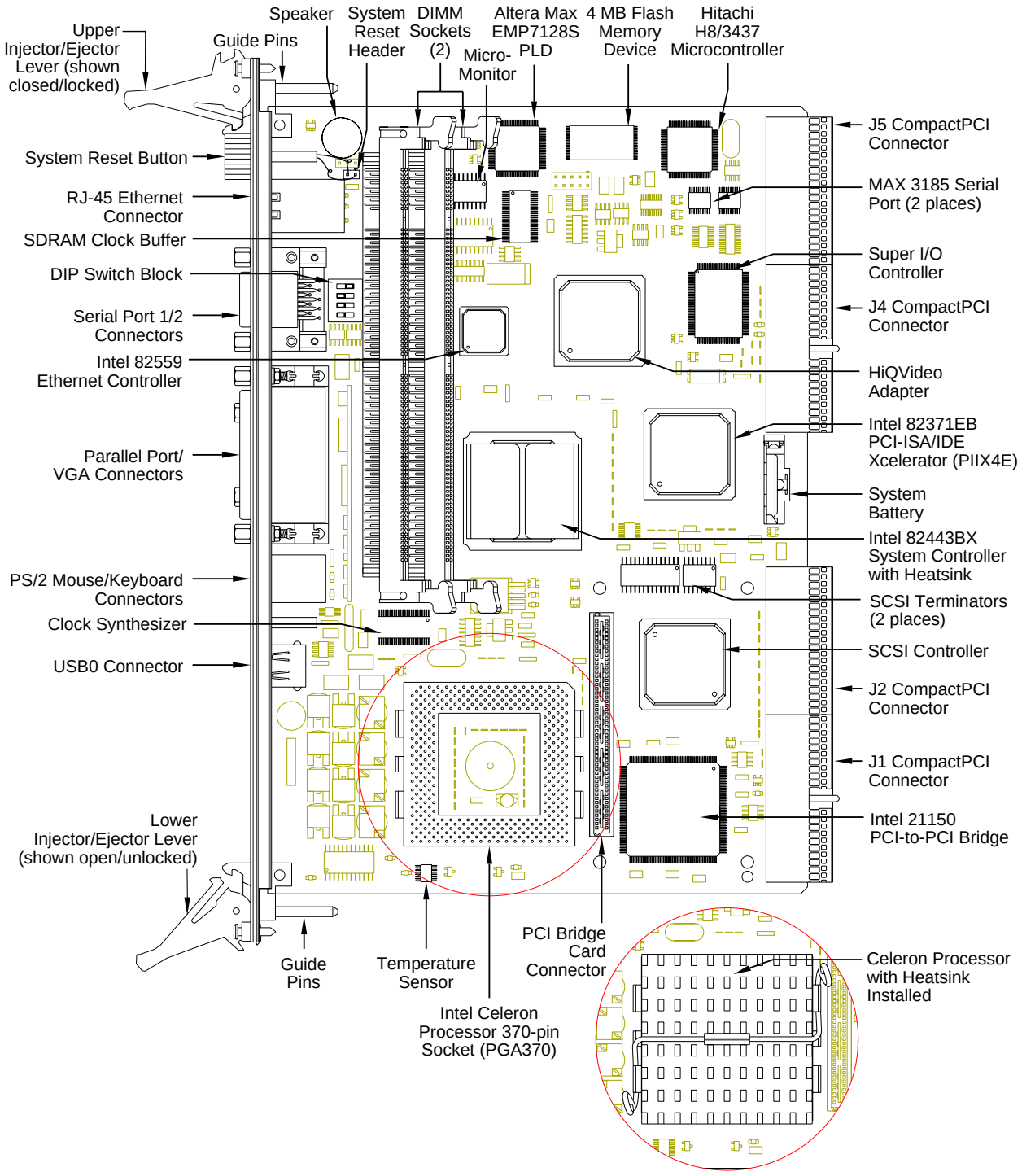
PCI Bridge Card

To drive an additional PCI bus and increase the number of PCI devices, the EPC-3221 can be equipped with the optional CPBRI01 PCI-to-PCI Bridge Card.

Note: The EPC-3221 and the PCI Bridge Card each use the Intel 21150 PCI-to-PCI Bridge and identical CompactPCI connectors for J1 and J2.

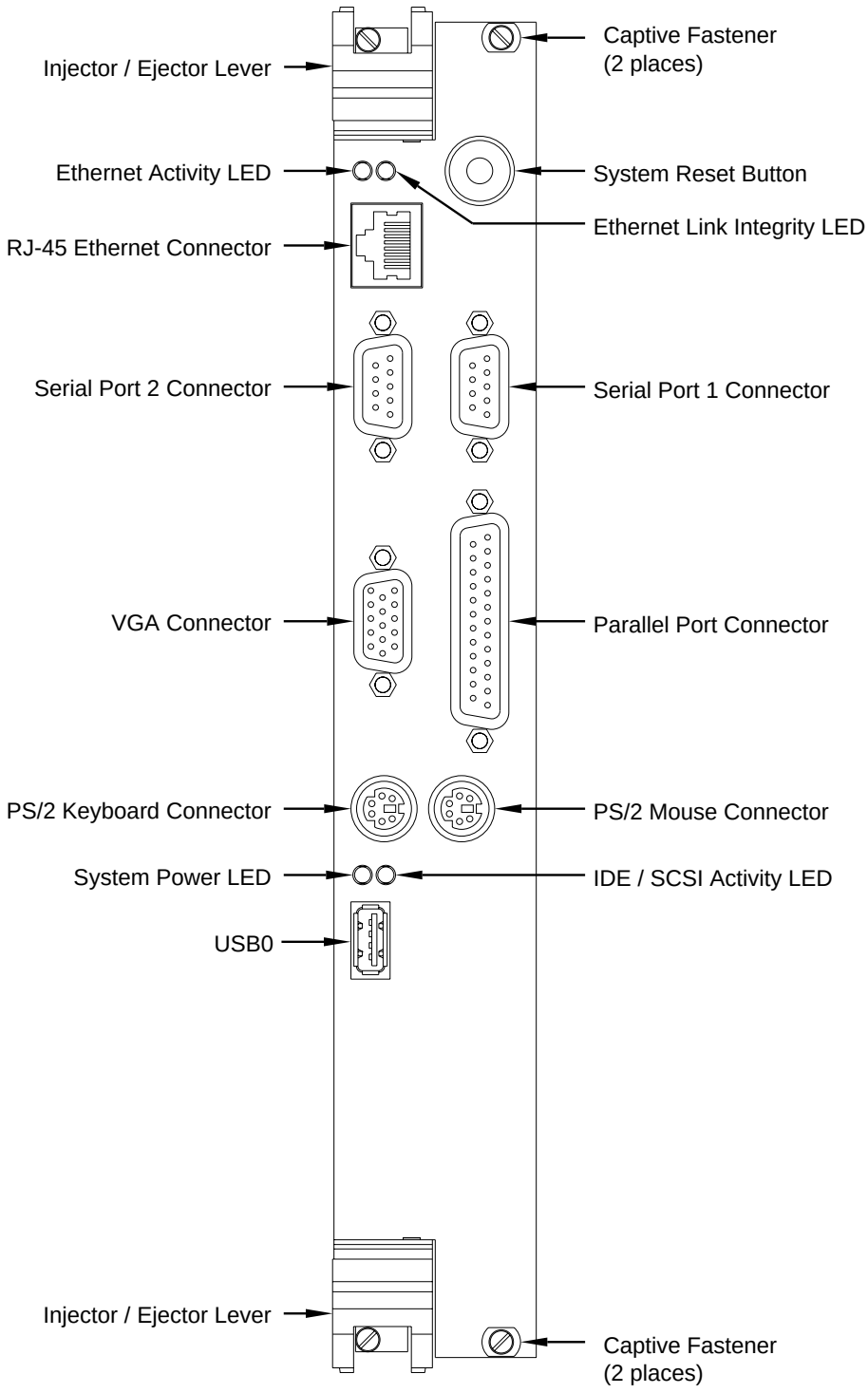
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Figure 1. EPC-3221 Components



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Figure 2. Front I/O Panel Components



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C1XTN02 Rear Transition I/O Module

Standard Features

The optional C1XTN02 provides the following features (Figure 3):

- SCSI 68-pin (Ultra Fast/Wide) Micro-D female connector
- SCSI 50-pin (Ultra Fast/Narrow) shrouded, latching header
- Floppy drive 34-pin shrouded, latching header
- Two EIDE or IDE device 40-pin shrouded, latching headers
- Speaker header
- System reset header
- System Monitor header that can be used to interface with alarm components
- Parallel port 26-pin shrouded, latching header
  Note: A cable attaches this header to the parallel port connector on the rear I/O panel. See Figure 10 on page 32.
- USB1 header
  Note: A cable attaches this header to the USB1 connector on the rear I/O panel. See Figure 11 on page 32.

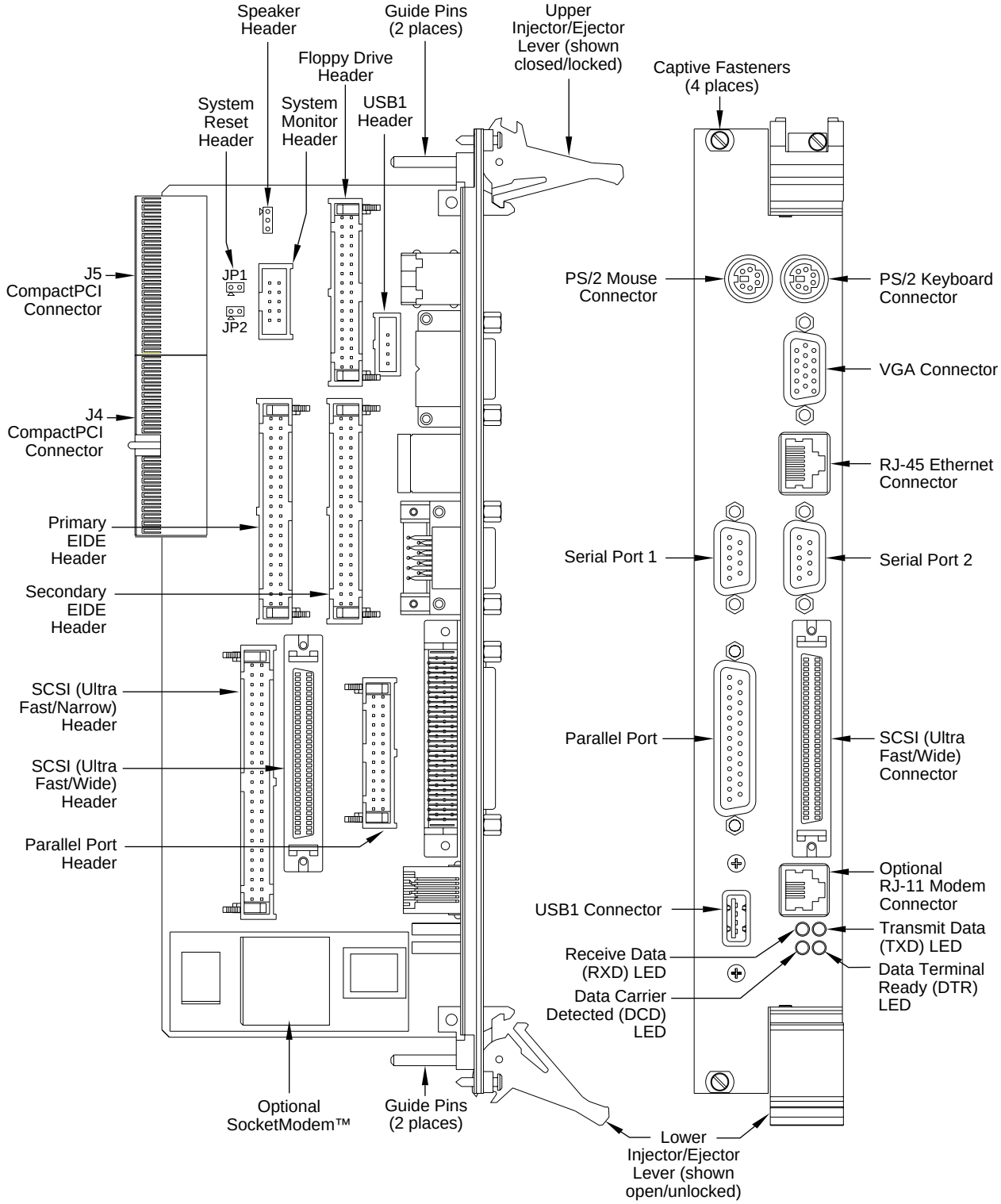
Rear I/O Panel

The C1XTN02 provides the following features on the rear I/O panel:

- PS/2 mouse 6-pin Mini-DIN connector
- PS/2 keyboard 6-pin Mini-DIN connector
- VGA video 15-pin D-Sub female connector
- USB1 connector
- RJ-45 10/100BaseT Ethernet connector
- Two serial port 9-pin D-Sub male connectors
- Parallel port 25-pin D-Sub female connector
- SCSI 68-pin (Ultra Fast/Wide) Micro-D female connector
- Two injector/ejector handles
- Four captive fastening screws

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Figure 3. Rear Transition I/O Module Components



Note: The parallel port and USB1 headers on the board surface attach to connectors on the I/O panel via short cables. See page 32.
Also, JP2 (next to the system reset header) is **not** used on this product.

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Modem

The optional C1XTN02 Rear Transition I/O Module can be equipped with an optional SocketModem™ module. The modem provides a standard set of features as well as exceptional data and fax speeds.

Note: The Ringer Equivalence Number (REN) for this equipment is 0.6B.

The C1XTN02 provides the following features on the I/O panel for modem operations:

- RJ-11 modem 4-conductor connector
- Modem activity LEDs:
  - Receive Data (RXD)
  - Transmit Data (TXD)
  - Data Carrier Detected (DCD)
  - Data Terminal Ready (DTR)

SocketModem™ Features					
Model	**Max. Data Speed**	**Max. Fax Speed**	**Fax Class 1**	**Fax Class 2**	**Conexant Model**
SMODEM-33	33,600	14,400	Standard	N/A	SFV336ACF
SMODEM-56	56,000	14,400	Standard	Standard	SFV56ACF

For more information, contact Conexant Systems, Inc.

Form Factor

The EPC-3221 System Controller Board is 6U x 8HP x 160 mm.

The optional C1XTN02 Transition I/O Module is 6U x 8HP x 80 mm.

These dimensions are in compliance with IEEE 1101.1, 1101.11, and P1101.11 mechanical requirements.

More...

For more information on the components, contact:

Company	Website
Adaptec, Inc.	http://www.adaptec.com
Altera Corporation	http://www.altera.com
Asiliant Technologies (formerly Chips & Technologies)	http://www.asiliant.com
Conexant Systems, Inc.	http://www.conexant.com.
Dallas Semiconductor Corporation	http://www.dalsemi.com
Hitachi America Ltd.	http://www.hitachi.com
Integrated Circuit Systems Inc.	http://www.icst.com
Intel Corporation	http://www.intel.com
Maxim Integrated Products	http://www.maxim-ic.com
Standard Microsystems Corporation	http://www.smsc.com
PCI Special Interest Group	http://www.pcisig.com
PICMG	http://www.picmg.com

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2 6 Steps to Operation



This chapter discusses functions and features of the equipment that can be accessed *only* by qualified and trained electronics service personnel. The material contained in this chapter does *not* discuss any user-accessible parts or operations. All tasks related to material in this chapter must be referred to qualified service personnel.

This chapter describes essential precautions for Handling the EPC-3221 and C1XTN02 and then outlines the basic steps for setting up the system:

- Step 1: Check Switch Settings
- Step 2: Install the SCB
- Step 3: Install the C1XTN02 Transition I/O Module
- Step 4: Attach Peripheral Devices
- Step 5: Power-On the System
- Step 6: Run the Setup Utility

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Handling the EPC-3221 and C1XTN02

Overview

This section suggests basic precautions when handling the EPC-3221 System Controller Board and optional C1XTN02 Rear Transition I/O Module.

Static Electricity

The EPC-3221 and C1XTN02 design protects against normal ESD (electro-static discharge) and excessive voltage. However, excessive static electricity can damage the components.

Before you handle the components, 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.



Handle the components by their I/O panel or injector/ejector handles to help prevent accidental damage caused by static discharge (Figure 4).

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 SCB and XIO. If the components are already installed in your system and you need to change 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 source before handling the equipment. To help prevent accidental damage caused by static discharge, use a grounding wrist strap or other static-dissipating device when handling the equipment.
Um Sachschaden und Verletzung zu vermeiden, schalten Sie vor Arbeiten am Gerät den Netzschalter aus, und ziehen Sie alle Stecker aus den Steckdosen. Um unbeabsichtigte Schäden durch elektrostatische Entladung vorzubeugen, sollte bei Arbeiten am System immer ein Erdungsarmband getragen oder andere elektrostatische Entladungs-Vorsichtsmaßnahmen verwendet werden.



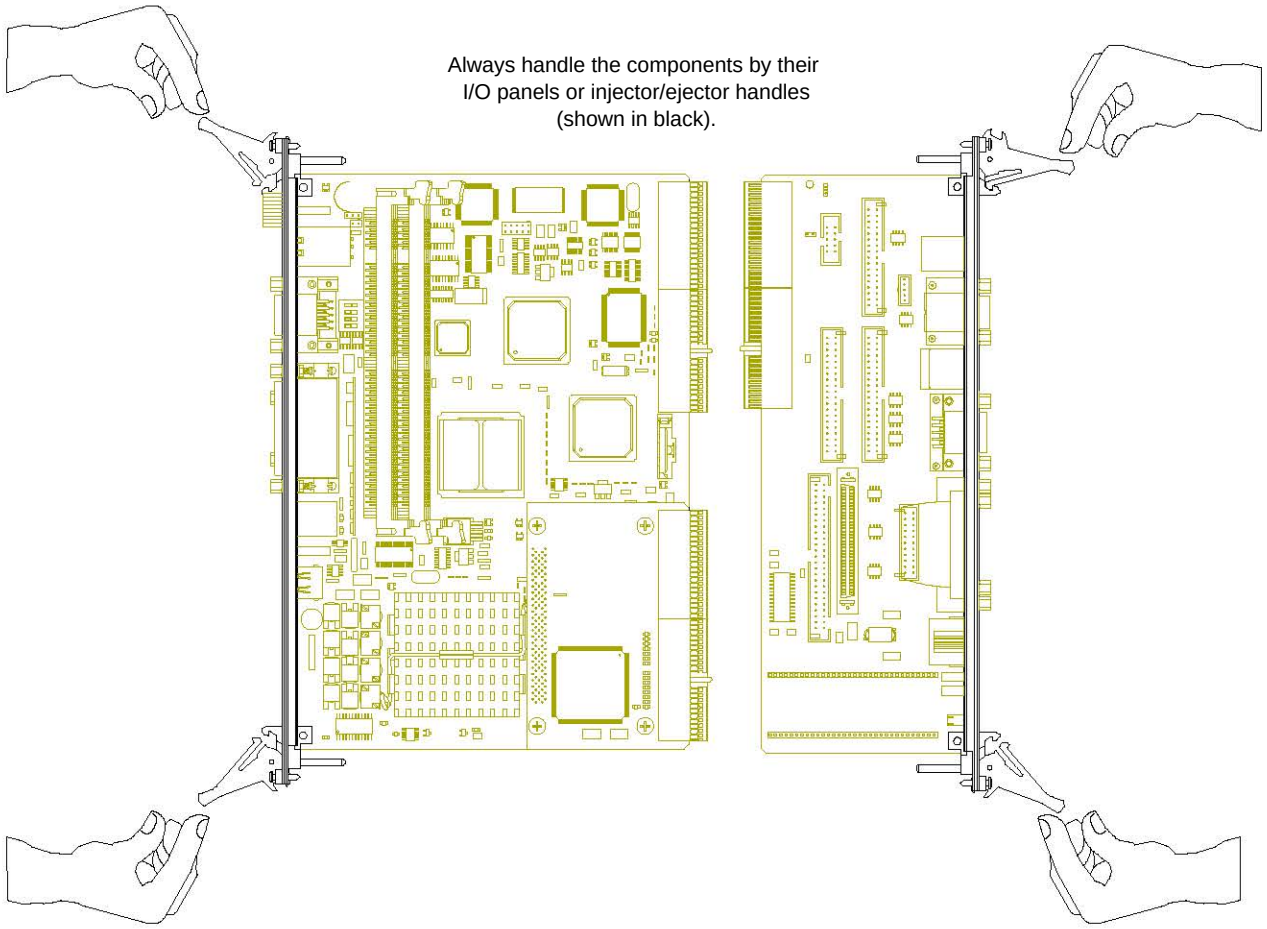
Only qualified, experienced electronics service personnel should access and handle the equipment.
Es sollte nur qualifiziertes und erfahrenes Fachpersonal am System arbeiten.

Next...

Before you install the SCB in a chassis, check the switch settings outlined in Step 1, page 12.

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Figure 4. Safely Handling the Components



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Step 1: Check Switch Settings

Overview

Check the switch block on the EPC-3221 for proper settings (Figure 5).

Switch Block

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

- On-board ROM access
- CMOS RAM
- Configuration ports

Settings

Settings for the switches are provided in the following table:

SW1-1	Not Used

SW1-2	On-Board ROM Access
Open / Off	Crisis Recovery mode disabled (default)
Closed / On	Crisis Recovery mode enabled

SW1-3	CMOS RAM
Open / Off	Normal operation of CMOS RAM (default)
Closed / On	Factory default values for the Setup Utility are loaded into CMOS RAM

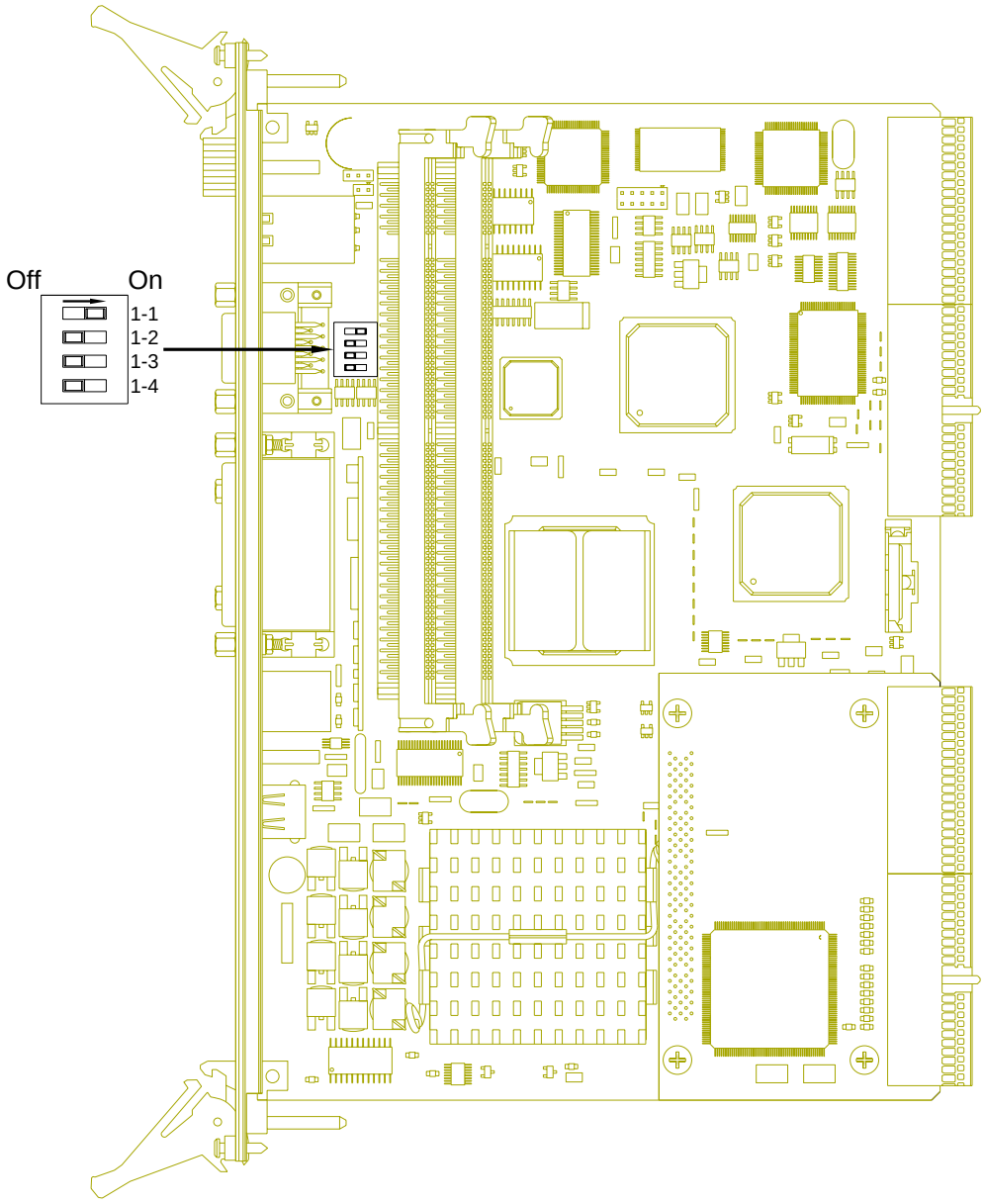
SW1-4	Configuration Ports
Open / Off	Configuration ports are mapped to I/O address 270–273 (default)
Closed / On	Configuration ports are mapped to I/O address 370–373



The system can operate without Memory Module Bank 0 (DIMM 1) filled. However, the crisis recovery mode requires Bank 0 to be populated. For more information on memory modules, see page 44.

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Figure 5. Switch Block Location



A Note on Crisis Recovery

Crisis recovery mode causes the system to boot from the floppy drive and re-flash the BIOS.
Note: Video is disabled on boot with crisis recovery mode enabled.

Before using crisis recovery mode, attempt to load the factory BIOS default values by switching on SW1-3. Use crisis recovery mode only if the system will not boot otherwise.

RadiSys Corporation produces a utility to generate a crisis recovery diskette. This diskette is to be used only with crisis recovery mode enabled. To acquire the proper release BIOS for this product, contact RadiSys Technical Support (see page vi). After downloading the proper release BIOS of the utility, follow the instructions contained in the file README.TXT to generate the diskette. The crisis recovery diskette must be generated on a system that is operating MS-DOS®, Windows® 95, Windows 98, Windows NT®, or OS/2.

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Step 2: Install the SCB

Overview

Before you connect any peripheral devices to the EPC-3221, install the SCB onto a passive backplane in a chassis.



To install the EPC-3221 onto a passive backplane not manufactured by RadiSys, consult the instructions provided by the backplane manufacturer.

Installing the SCB

To install the SCB (Figure 6):

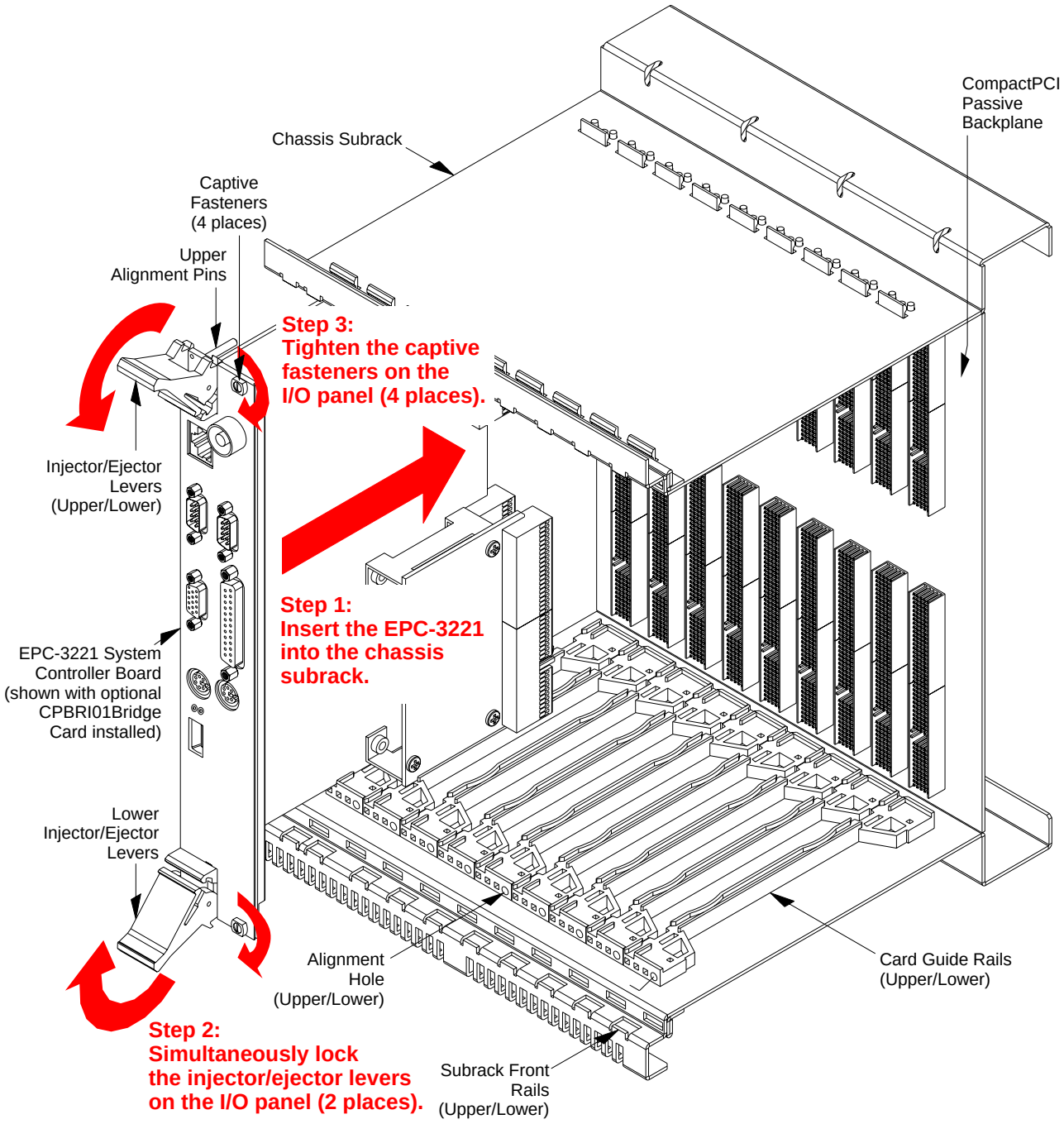
1. Power-off the system and disconnect all power cords.
   Note: Use a grounding wrist strap or other static-dissipating device when accessing and handling the equipment.
2. Locate the system slot on the CompactPCI passive backplane.
3. Unlock the injector/ejector levers on the SCB I/O panel (if required).
4. Align the edges of the SCB with the card guide rails in the chassis subrack. Make sure that both injector/ejector handles on the SCB are in the open position *before* attempting to insert the board.
5. Insert the SCB into the chassis subrack with the card edges in the card guide rails. Carefully push the SCB into the chassis subrack until the CompactPCI connectors engage the connector body at the backplane.
   Note: The alignment pins on the SCB I/O panel will be inserted into the alignment holes in the card guide rails.
6. *Simultaneously* lock both injector/ejector levers on the SCB I/O panel. Inspect the SCB faceplate to make sure it is fully seated.
7. Tighten the captive fasteners on the I/O panel to the subrack front rails. (The captive fasteners secure the SCB in the chassis subrack.)
8. Install transition I/O module, if present. See Step 3: Install the C1XTN02 Transition I/O Module on page 16.
9. Connect peripheral devices to the SCB and XIO. See Step 4: Attach Peripheral Devices.
10. Reconnect all power cords and power-on the system.



The CPU requires unimpeded airflow across the processor within the temperature specifications outlined on page 28. Operations outside these specifications could void the warranty.

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Figure 6. Installing the SCB



Refer to the more detailed SCB installation instructions on page 14.

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Step 3: Install the C1XTN02 Transition I/O Module

Overview

Before you connect any peripheral devices to the EPC-3221 System Controller Board, install the C1XTN02 Rear Transition I/O Module onto a passive backplane in a chassis.



RadiSys recommends installing the C1XTN02 Transition I/O Module onto a passive backplane and with a system controller board manufactured by RadiSys. If installed in a non-RadiSys backplane, consult the documentation provided by the backplane manufacturer.

If the optional C1XTN02 Rear Transition I/O Module is ***not*** present in your computer system, proceed to Step 4: Attach Peripheral Devices.

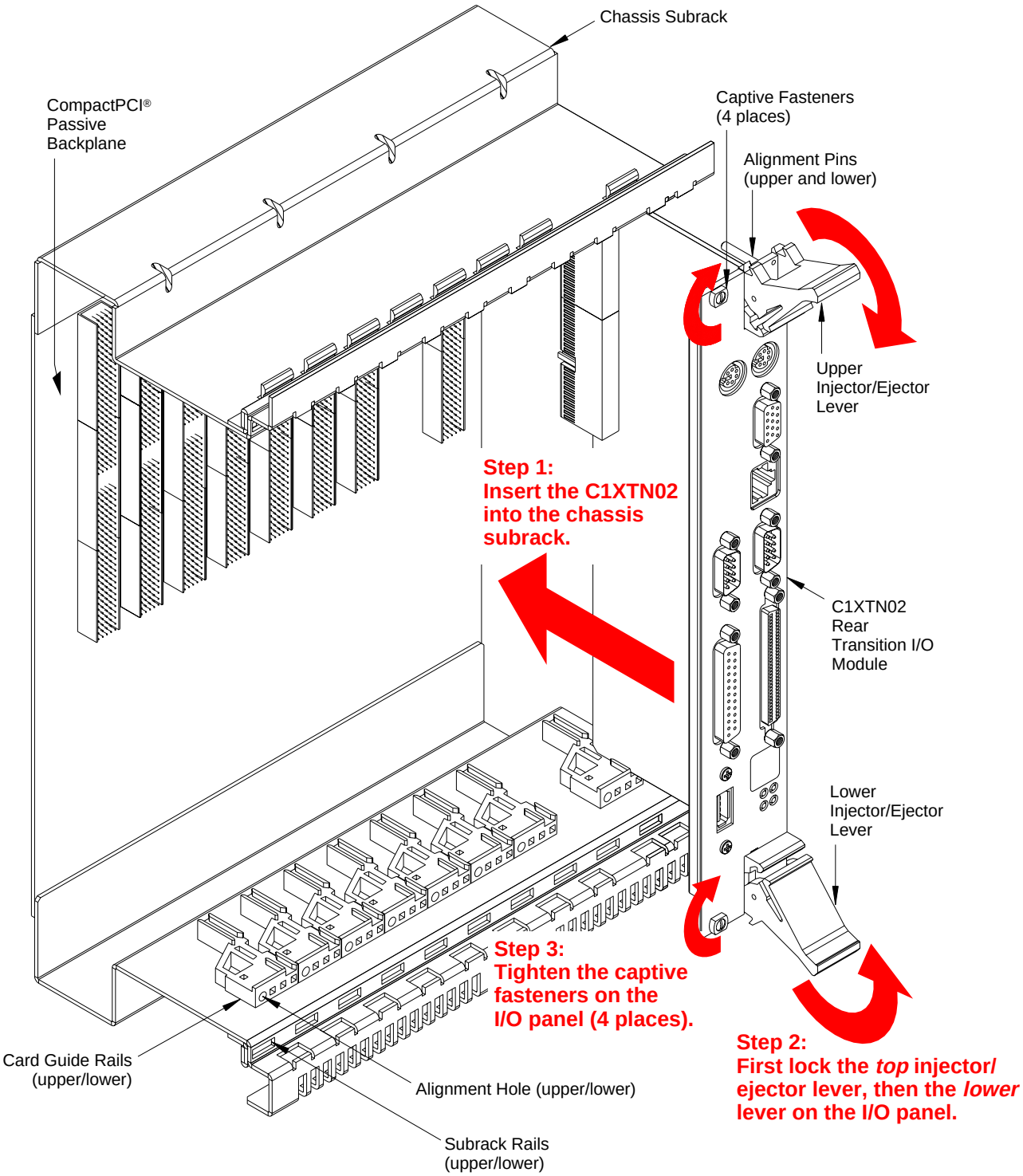
Installing the Transition I/O Module

To install the C1XTN02 transition I/O module (Figure 7):

1. Power-off the system and disconnect all power cords.
   Note: Use a grounding wrist strap or other static-dissipating device when accessing and handling the equipment.
2. Locate the system slot on the rear of the CompactPCI passive backplane. Use the slot directly opposite from the SCB that was installed in Step 2 under Installing the SCB.
3. Unlock the injector/ejector levers on the transition I/O module panel (if required). Align the edges of the transition I/O module with the card guide rails in the chassis subrack. Make sure that both injector/ejector handles on the transition I/O module are in the open position *before* attempting to insert the board.
4. Insert the transition I/O module into the chassis subrack with the card edges in the card guide rails.
   Note: The alignment pins on the transition I/O module panel will be inserted into the alignment holes in the card guide rails.
5. Applying more pressure on the *upper* injector/ejector lever than the lower one, gently insert the transition I/O module into the chassis subrack. Inspect the transition I/O module faceplate to make sure it is fully seated.
6. Tighten the captive fasteners on the I/O panel to the subrack rails. (The captive fasteners secure the transition I/O module in the chassis subrack.)
7. Connect peripheral devices. See Step 4: Attach Peripheral Devices.
8. Reconnect all power cords and power-on the system.

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Figure 7. Installing the Transition I/O Module



Refer to the more detailed C1XTN02 installation instructions on page 16.

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Step 4: Attach Peripheral Devices

Overview

After you have installed the components in a chassis, attach peripheral devices to the SCB and XIO, if present (Figure 8 on page 19.)

The tables that begin on page 30 indicate the Pin Signals for peripheral headers and connectors.

Always power-off the system and disconnect all power cords from their source before connecting or disconnecting cables for peripheral devices.

When attaching devices to the EPC-3321, certain considerations must be made:

Device(s)	Consideration
Serial	• These ports are 9-pin male D-Sub connectors on the I/O panels. • One serial device can be attached to each 16550-compatible serial port. • These ports provide an RS-232 interface. • These devices can ***only*** be attached to the SCB ***or*** the transition I/O module
Parallel	• These ports are 25-pin female D-Sub connectors on the I/O panels. • The IEEE 1284 port provides a Centronics compatible printer interface. • AT-compatible / Bi-directional / EPP / ECP operations are supported. • These devices can ***only*** be attached to the SCB ***or*** the transition I/O module
USB	• The USB bus will support up to 127 USB devices, which can be attached in a daisy-chain configuration. • This SCB supports two USB controllers; one on the front SCB panel, one on the rear XIO panel. • A single USB cable cannot exceed 5 meters (16.4 feet) in length. • The 5-pin male shrouded, keyed header on the board surface can connect to the Series “A” connector on the I/O panel. • Software drivers appropriate to the OS will be needed to operate USB devices. RadiSys does ***not*** supply such drivers.
EIDE or IDE	• Up to two EIDE or IDE devices can be attached to each EIDE header on the XIO. • The BIOS will support up to four EIDE or IDE devices. For more information on IDE operations, see page 24.
SCSI	• Up to 15 SCSI devices can be attached to the XIO on a 68-pin (Ultra Fast/Wide) connector. • Up to 15 SCSI devices can be attached to the XIO on a 50-pin (Ultra Fast/Narrow) header. • SCSI devices must be connected in a daisy-chain configuration with proper termination. • Only ***one*** of the three SCSI connectors can be used at any one time.
Floppy	Up to two floppy drives can be attached to the XIO Floppy Disk Drive (FDD) header.
PS/2 Devices	• A PS/2 mouse and/or keyboard can be attached to the corresponding 6-pin female mini-DIN connectors on the front or rear I/O panels. • These devices can ***only*** be attached to the SCB ***or*** the transition I/O module
VGA	• The video connectors on the front and rear I/O panels are 15-pin D-Sub female type. • A standard VGA or SVGA interface is provided. • Two display devices can be attached to the SCB and XIO at the same time, but video intensity will be slightly reduced for each device.

Ethernet	• The Ethernet connectors on the front and rear I/O panels are 8-pin RJ-45 type.
	• Two Ethernet connections can be made, but ***only one*** will be active; the BIOS will select one.
	• Two LEDs on the SCB I/O panel indicate the status of Ethernet operations:
	  • Activity: This LED indicates either data transmit or receive activity. When activity is occurring, the LED is lit. When activity ceases, the LED will fade.
	  • Link Integrity: This LED indicates whether a valid link is established with the Ethernet controller in either 10 or 100 Mbps. When the link is valid, the LED is lit. When the link has failed or is invalid, the LED will fade.

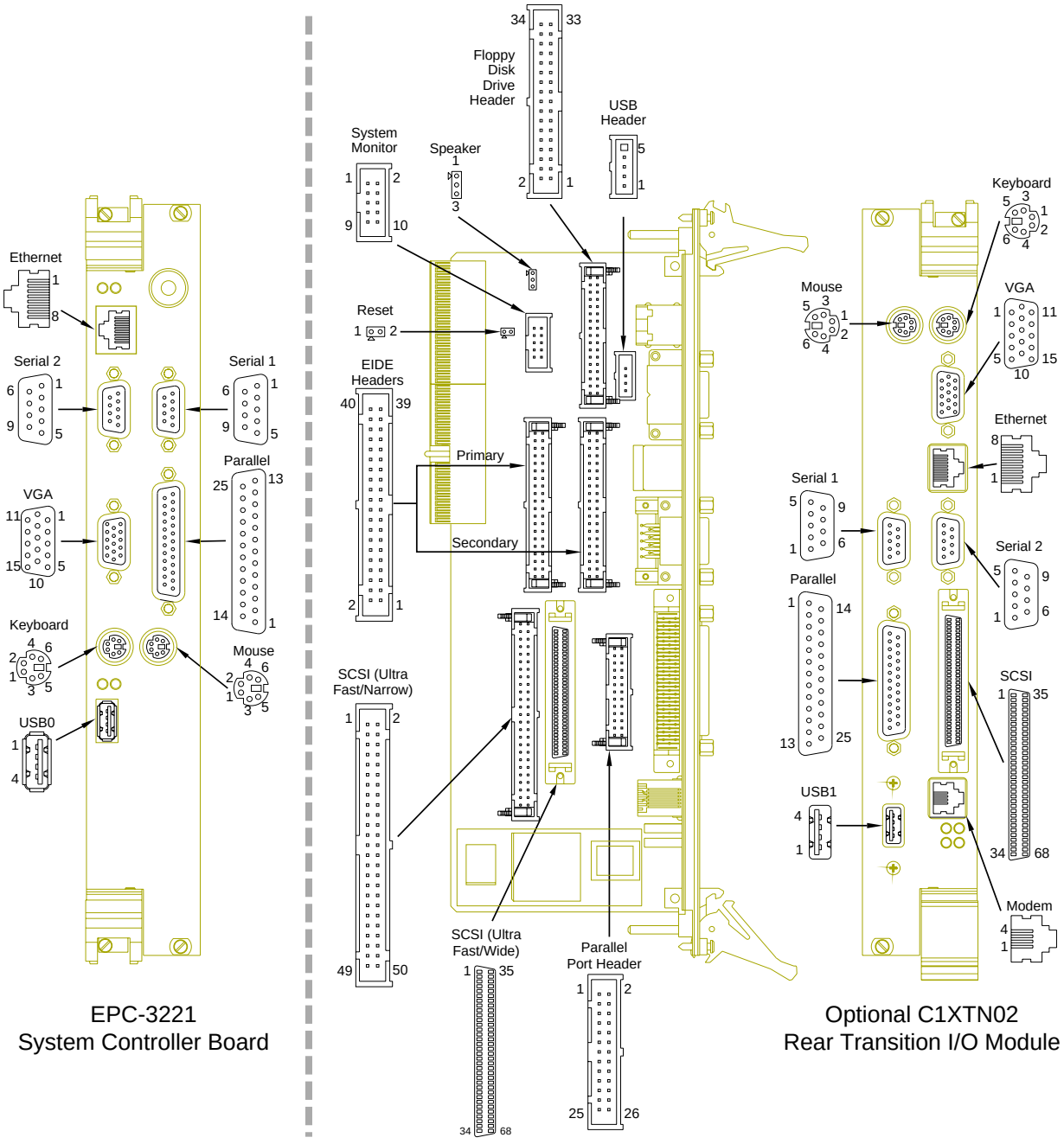
Speaker	Pin 1 on the XIO is the +5 V (+) signal; Pin 2 is the Speaker (-) signal.
System Monitor	• This 10-pin male, shrouded header on the XIO provides the interface to an I²C network. • Pin 8 is the Clock signal; Pin 10 is the Data signal.

Modem	• The modem connector on the XIO is a 4-pin female RJ-11 type.
	• Four LEDs on the rear I/O bracket indicate the status of modem operations:
	  • Receive Data (RXD)
	  • Transmit Data (TXD)
	  • Data Carrier Detected (DCD)
	  • Data Terminal Ready (DTR)

All Devices	When using a flat cable to attach a device, the colored trace for Pin 1 on the cable must align with Pin 1 on the header/connector. See Figure 8 for an example
System Reset	• The cable attaches the System Reset Button on the SCB Faceplate to JP1 on the SCB. See Figure 1 on page 4 and Figure 2 on page 5. • Pin 1 is the Reset signal; Pin 2 is the Ground.

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Figure 8. Peripheral Connectors



For pin signals and positions, see page 30.
For information on compatible peripheral connections, see page 33.

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Step 5: Power-On the System

Overview

After you have installed the EPC-3221 and optional C1XTN02 Rear Transition I/O Module and attached the peripheral devices, connect all power cords and 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. See Customer Support on 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 9) to configure the system.



Before using the SCB for the first time, you should verify the system settings in the Setup Utility. See page 21.

Figure 9. Setup Utility Main Menu

```
                        RadiSys CPD Setup Utility

   Main    Advanced    Security    Power    Boot    Server    Exit

  System Time:          [15:41:47]                  Item Specific Help
  System Date:          [05/30/00]
  Legacy Diskette A:    [1.44/1.25 Mb  3½"]      <Tab>, <Shift-Tab>, or
  Legacy Diskette B:    [Disabled]               <Enter> selects field.
> Primary Master        [Maxtor 7541 A]
> Primary Slave         [None]
> Secondary Master      [LS-120 CSMO  05]
> Secondary Slave       [None]

> Cache Memory
> Boot Options
> Keyboard Features

  Extended Memory:      63 MB
  Memory Bank 0:        Not Installed
  Memory Bank 1:        64MB SDRAM

F1  Help   ↑↓ Select Item     -/+ Change Values        F9  Setup Defaults
ESC Exit   ←→ Select Menu     Enter Select > Sub-Menu  F10 Save and Exit
```


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Step 6: Run the Setup Utility

Overview

The BIOS (Basic Input/Output System) Setup Utility allows you to configure the operations of the EPC-3221 and optional Rear Transition I/O Module.

Access

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

Main Menu

The Setup Utility display (Figure 9 on page 20) contains two areas:

- Options: The options for the current menu are on the left side of the screen
- 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 23.

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 or pop-up menu
F1	Access Help for the Setup Utility
F9	Load default values for the setup options
F10	Save the changes you have made and exit the Setup Utility
Esc	Access the Exit menu

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Optional Components

The Setup Utility displays the configuration options and values that apply to all installed components. The following tables list items in the Setup Utility that are affected by the optional on-board peripherals.

SCSI

Menu	Option / Sub-Menu	Item
Advanced	PCI Configuration	PCI IRQ Line 4
	Embedded PCI Devices *	Adaptec Ultra-2 SCSI Adapter

Video

Menu	Option / Sub-Menu	Item
Main	Cache Memory	Cache Video BIOS Area
		Cache A000 – AFFF, B000 – BFFF
	Note: These items operate in the same manner with any installed video controller, whether the on-board video controller or an expansion card.	
Advanced	PCI Configuration	PCI IRQ Line 1
	Embedded PCI Devices *	Embedded AGP VGA
Power	N/A	Video Time Out
	Note: This item operates in the same manner with any installed video controller, whether the on-board video controller or an expansion card.	

Ethernet

Menu	Option / Sub-Menu	Item
Advanced	PCI Configuration	PCI IRQ Line 1
	Embedded PCI Devices *	Embedded Ethernet



* If the specified optional component is not installed, or is not working, the item will not appear in the SCB setup screens.

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Main Menu

The options for the Main menu are listed in the following table:

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
Legacy Diskette A	N/A	1.44/1.25MB 3½"	Disabled, 720KB 3½", 2.88MB 3½", 360KB 5¼", 1.2MB 5¼"
Legacy Diskette B	N/A	Disabled	720KB 3½", 1.44/1.25MB 3½", 2.88MB 3½", 360KB 5¼", 1.2MB 5¼"
» Primary / Secondary Master / Slave	Type	Auto (all 4 possible devices)	User, 1-39, CD-ROM, IDE Removable, ATAPI Removable, Other ATAPI, None
		Note: If this option is set to Auto, the only option available will be 32-Bit I/O. **Note:** Type 15 is Reserved (not available).	
	• Cylinders • Heads • Sectors • Maximum Capacity (Display only)	Enter a value	N/A
	Multi-Sector Transfers	N/A	2 Sectors, 4 Sectors, 8 Sectors, 16 Sectors, Disabled
	LBA Mode Control	N/A	Enabled, Disabled
	32-Bit I/O	N/A	Enabled, Disabled
	Transfer Mode	N/A	Fast PIO 1, Fast PIO 2, Fast PIO 3, Fast PIO 4, FPIO 3/DMA 1, FPIO 4/DMA 2, Standard
	Ultra DMA Mode	N/A	Mode 0, Mode 1, Mode 2, Disabled
	Note: Multi-Sector Transfers, LBA Mode Control, 32-Bit I/O, Transfer Mode, and Ultra DMA Mode do not have default values. Values are inserted when the BIOS queries IDE devices.		
» Cache Memory	Memory Cache (L2 Cache)	Enabled	Disabled
	Cache System BIOS Area	Write Protect	Uncached
	Cache Video BIOS Area	Write Protect	Uncached
	Cache 0 – 512 KB	Write Back	Uncached, Write Through, Write Protect
	Cache 512 KB – 640 KB	Write Back	Uncached, Write Through, Write Protect
	Cache Extended Memory Area	Write Back	Uncached, Write Through, Write Protect
	Cache A000 – BFFF	Disabled	Write Back, Write Through, Write Protect, USWC Caching
	Note: USWC Caching allows burst writes into video RAM. Not all operating systems support this feature.		
	Cache C800 – EFFF	Disabled	Write Through, Write Protect, Write Back
» Boot Options	Summary Screen	Enabled	Disabled
	Floppy Check	Disabled	Enabled
	Quiet Boot Screen	Enabled	Disabled
	POST Errors	Enabled	Disabled
	Hard Disk Pre-Delay	3 sec.	6 sec., 9 sec., 12 sec., 15 sec., 21 sec., 30 sec., Disabled
» Keyboard Features	Numlock	Auto	On, Off
	Key Click	Disabled	Enabled
	Keyboard Auto-Repeat Rate	30/sec.	2/sec., 6/sec., 10/sec., 13.3/sec., 18.5/sec., 21.8/sec., 26.7/sec.
	Keyboard Auto-Repeat Delay	1/2 sec	1/4 sec., 3/4 sec., 1 sec.

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Advanced

The options for the Advanced menu are listed in the following table:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
» I/O Device Configuration / Integrated Peripherals	Serial Port A	Enabled (user configuration)	Disabled, Auto
		Note: Base I/O Address and Interrupt are displayed / shown only if the Serial Port is Enabled. **Note:** For console redirection, select Enabled. **Note:** If user wishes to use this port for Console Redirection, select Enabled and set the I/O Address IRQ appropriately	
	Serial Port A: Base I/O Address/ IRQ	3F8/IRQ4	2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3
	Serial Port B	Enabled	Disabled, Auto
		Note: Base I/O Address and Interrupt are displayed / shown only if the Serial Port is Enabled. **Note:** For console redirection, select Enabled. **Note:** If user wishes to use this port for Console Redirection, select Enabled and set the I/O Address IRQ appropriately	
	Serial Port B: Base I/O Address/ IRQ	2F8/IRQ3	3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4
	Serial Port B: Mode	Normal	Modem
	Parallel Port	Enabled	Disabled, Auto
		Note: Mode, Base I/O Address, and Interrupt are displayed / shown only if the Parallel Port is Enabled.	
	Parallel Port: Mode	Bi-Directional	Output Only (ISA), EPP, ECP
		Note: If Mode is set to ECP, a DMA channel must be set.	
	Parallel Port: Base I/O Address	378	278, 3BC
	Parallel Port: Interrupt	IRQ 7	IRQ 5
	Parallel Port: DMA Channel	DMA 1	DMA 3
		Note: This option is displayed / shown only if Mode is set to ECP.	
	Floppy Disk Controller	Enabled	Disabled
	Floppy Disk Controller: Base I/O Address	Primary	Secondary
	Local Bus IDE Adapter	Both	Disabled, Primary, Secondary
» Advanced Chipset Control	ECC Configuration	EC	ECC, ECC Scrub, Disabled
	Watchdog Timer Status	Disabled	Enabled
	Watchdog Timer Delay	1.2 sec	150 ms
	Note: For more information on the Watchdog Timer, see page 43.		
	Thermal Duty Cycle	37.5%	12.5%, 25%, 50%, 62.5%, 75%, 87.5%
» PCI Configuration	PCI IRQ Line 1 – 4	Auto Select (all IRQ lines)	Disabled, 3 (COM2/COM4), 4 (COM1/COM3), 5 (2nd LPT), 7 (1st LPT), 9 (Open), 10 (Open), 11 (Open), 12 (PS/2 Mouse), 14 (Primary IDE), 15 (Secondary IDE)
	USB IRQ Enable	Yes	No
		Note: The USB controller uses PCI IRQ line 4 (INTD).	
	Latency Timer	Auto (64)	32, 96, 128, 160, 192, 224
	Cache Line Size	Auto (8)	8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60
	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, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, IRQ12	Available (all IRQs)	Reserved
	Embedded PCI Devices: AGP VGA	Enabled	Disabled
		Note: The video controller uses PCI IRQ line 1 (INTA).	
	Embedded PCI Devices: Ethernet	Disabled	Enabled
		Note: The ethernet controller uses PCI IRQ line 1 (INTA).	
	Embedded PCI Devices: Ethernet Port	Front Panel	Chassis Panel
	Embedded PCI Devices: Adaptec Ultra-2 SCSI Adapter	Disabled	Enabled
		Note: The SCSI controller uses PCI IRQ line 4 (INTD). The SCB will only support SE Ultra SCSI, not LVD Ultra-2 SCSI.	

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Advanced

The options for the Advanced menu are continued in the following table:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
PS/2 Mouse	N/A	Auto Detect	Disabled, Enabled
On-board Speaker	N/A	Enabled	Disabled
CPU BIOS Update	N/A	Enabled	Disabled
Plug & Play O/S	N/A	No	Yes
	Note: If this option is set to Yes, the BIOS will not configure any PCI device on PCI bus 0 unless the device has an on-board ROM, e.g., video or SCSI controllers. **Note:** This option should be set to No while installing a PnP O/S. After the O/S is installed, this option can be set to Yes to allow the O/S to configure the devices.		
Secured Setup Configuration	N/A	Yes	No
	Note: If this option is set to Yes, the BIOS will ignore all Plug and Play configuration change requests made by the PnP O/S.		
Reset Configuration Data	N/A	No	Yes
Large Disk Access Mode	N/A	DOS	Other
	Note: Select Other for UNIX and Novell Netware operating systems. Select DOS for DOS-based, Windows 95/98/NT, OS/2, or other operating systems. If the drive(s) fail during software installation, change this selection and try again.		

Security

The options for the Security menu are listed in the following table:

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

The options for the Power menu are listed in the following table:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
Power Savings	N/A	Disabled	Customized, Maximum Power Savings, Maximum Performance
	Note: Standby, Auto Suspend, Hard Disk, and Video Time-outs will be disabled if this feature is not set to Customized. **Note:** The following table lists preset options:		
Standby Time-out	N/A	Off	1 Minute, 2 Minutes, 4 Minutes, 6 Minutes, 8 Minutes, 12 Minutes, 16 Minutes
Auto Suspend Time-out	N/A	Off	5 Minutes, 10 Minutes, 15 Minutes, 20 Minutes, 30 Minutes, 40 Minutes, 60 Minutes

Feature	Maximum Power Savings	Maximum Performance
Standby Time-out	1 Minute	16 Minutes
Auto Suspend Time-out	5 Minutes	60 Minutes
Hard Disk Time-out	1 Minute	15 Minutes
Video Time-out	30 Seconds	15 Minutes

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Power

The options for the Power menu are continued in the following table:

Option / Sub-Menu	Item	Default Setting	Alternate Settings
Hard Disk Time-out	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
Video Time-out	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 format)	N/A

Server

The options for the Server menu are listed in the following table:

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, 57600, 115200
	Note: For more information on Console Redirection, see page 38.		

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3 Technical Data



This chapter discusses functions and features of the equipment that can be accessed *only* by qualified and trained electronics service personnel. The material contained in this chapter does *not* discuss any user-accessible parts or operations. All tasks related to material in this chapter must be referred to qualified service personnel.

This chapter provides the following:

- System Specifications and environmental tolerances
- Pin Signals listings for all headers and connectors
- Descriptions of compatible Peripheral Connections
- Notes on Console Redirection
- A description of the Platform Management operations
- Notes on Installing Memory modules
- Instructions for System Battery Replacement
- Information on Product Identification through the system BIOS

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Specifications

Overview

Listed in the tables below are system specifications and environmental tolerances for the EPC-3221 SCB.

Note: These specifications are subject to change without notice.

Environmental

Environmental tolerances are listed in the following table:

	Operating	Non-Operating
Temperature	0 to 57 °C (32 to 134.6 °F) at 200 LFM†	-40 to 70 °C (-40 to 158 °F)
Humidity	5 – 95% @ 40 °C, non-condensing	0 – 95% @ 40 °C, non-condensing
Shock	1 G @ 10 ms	30 G @ 10 ms
Vibration	0.25 G @ 5 – 150 Hz	5 G @ 5 – 150 Hz
Altitude	15,000 ft. (4,572 m)	50,000 ft. (15,240 m)

† See the cooling conditions outlined below for extended temperature specifications.

Cooling

Airflow requirements for the SCB are listed in the following table:

Note: The following table lists the minimum unimpeded airflow in linear feet per minute (LFM) required across the processor for operations at the specified ambient temperature at sea level.

Airflow	600 LFM	400 LFM	200 LFM	100 LFM	0 LFM
Maximum Ambient	69 °C (156.2 °F)	66 °C (150.8 °F)	57 °C (134.6 °F)	44 °C (111.2 °F)	Not Recommended



Ambient temperature is measured at the leading edge of the CPU heatsink with a 433 MHz processor installed and all components fully populated.

A Note on Thermal Specifications

RadiSys validates the operating specifications of its products by testing with the “hottest” available hardware and software configuration 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.

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System

System specifications are listed in the following table:

CPU	Intel® Celeron™ Processor: • 300, 366, 433 MHz, and higher as technology becomes available • PPGA package (370-pin socket: PGA370)
Chipset	Intel 440BX AGPset
Cache	128 KB integrated Level 2 write-back cache operating at full clock speed
Memory	Two 168-pin sockets organized in two banks, supporting: • Up to 512 MB (or higher as technology becomes available) • 16/32/64/128/256 x 72, PC100 DIMMs • +3.3 V unbuffered SDRAM • Parity/ECC or Non-Parity • Single-bit error correction, double-bit detection (ECC mode only)
Addressing	Real and protected mode supported • Real address mode: 20-bit • Protected address mode: 32-bit on PCI local bus
Data Path	• 64-bit on-board processor bus at 66 or 100MHz • 32-bit on-board PCI bus at 33 MHz
Flash Memory	4 Mb (512 Kb x 8)
Clock/ Calendar	Embedded Real-Time Clock • Accurate to ±12 minutes/year, at 25 °C; • Includes 256 bytes of CMOS in NVRAM
Power Requirements w/ 512 MB SDRAM	Input Power — 65 W max. +5 V — 13.0 A max. / < 8.0 A typ. +12 V — 0.1 A –12 V — 0.1 A **Note:** These values represent all components fully populated.
Battery	CR2032 Lithium (Li/MnO_2)
Form Factor	• SCB: 6U x 8HP x 160 mm. • XIO: 6O x 8HP x 80 mm. Both components are PICMG® / CompactPCI® compliant (Complies with IEEE 1101.1 and 1101.10 mechanical requirements)

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Pin Signals

Overview

The tables below list the pin signals for the peripheral connectors. Figure 8 on page 19 indicates the pin positions for each.

Serial Ports 1 & 2	
Pin	**Description**
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)

Parallel Port			
Pin	**Description**	**Pin**	**Description**
1	– Strobe	10	– Acknowledge
2	+ Data Bit 0	11	+ Busy
3	+ Data Bit 1	12	+ Paper Feed
4	+ Data Bit 2	13	+ Select
5	+ Data Bit 3	14	– Auto Feed
6	+ Data Bit 4	15	– Error
7	+ Data Bit 5	16	– Initialize Printer
8	+ Data Bit 6	17	– Select Input
9	+ Data Bit 7	18-25	Ground

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

RJ-45 Ethernet	
Pin	**Description**
1	Ethernet Transmit (TX+)
2	Ethernet Transmit (TX–)
3	Ethernet Receive (RX+)
4	Ethernet COM
5	Ethernet COM
6	Ethernet Receive (RX–)
7	Ethernet COM
8	Ethernet COM

USB Header	
Pin	**Description**
1	+5 V
2	USB –
3	USB +
4	Ground
5	Key

EIDE					
Pin	**Description**	**Pin**	**Description**	**Pin**	**Description**
1	Reset (Out)	14	Data 13 (I/O)	31	+ IRQ14 (In)
3	Data 7 (I/O)	15	Data 1 (I/O)	32	I/O CS16 (In)
4	Data 8 (I/O)	16	Data 14 (I/O)	33	+ ADDR1 (Out)
5	Data 6 (I/O)	17	Data 0 (I/O)	35	+ ADDR0 (Out)
6	Data 9 (I/O)	18	Data 15 (I/O)	36	+ ADDR2 (Out)
7	Data 5 (I/O)	20	Not Connected	37	– CS1 (Out)
8	Data 10 (I/O)	21	DMA Request (In)	38	– CS3 (Out)
9	Data 4 (I/O)	23	– I/O Write (Out)	39	Activity Light (In)
10	Data 11 (I/O)	25	– I/O Read (Out)	2, 19, 22, 24, 26, 30, 34, 40	Ground
11	Data 3 (I/O)	27	I/O Channel Ready (In)		
12	Data 12 (I/O)	28	+ ALE		
13	Data 2 (I/O)	29	DMA Acknowledge (Out)		

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System Monitor	
Pin	**Description**
1	PBYPASS
2	OPEN –
3	BTI –
4	Ground
5	FAN 3
6	FAN 2
7	PB_RST –
8	SMBCLK
9	VCC_SMB
10	SMBDAT

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

Modem	
Pin	**Description**
2	Ring
3	Tip
1, 4	Not Connected

Speaker	
Pin	**Description**
1	+5 V (Speaker +)
2	Speaker –
3	Not Connected

Reset	
Pin	**Description**
1	Reset
2	Ground

Single-Ended SCSI

Single-Ended (SE) SCSI					
Pin	**Description**	**Pin**	**Description**	**Pin**	**Description**
35	Data Bit 12 (I/O)	45	Data Bit 5 (I/O)	62	Control/Data (In)
36	Data Bit 13 (I/O)	46	Data Bit 6 (I/O)	63	Request (In)
37	Data Bit 14 (I/O)	47	Data Bit 7 (I/O)	64	Input/Output (In)
38	Data Bit 15 (I/O)	48	Data Bit Parity Low (I/O)	65	Data Bit 8 (I/O)
39	Data Bit Parity High (I/O)	55	Attention (Out)	66	Data Bit 9 (I/O)
40	Data Bit 0 (I/O)	57	Busy (I/O)	67	Data Bit 10 (I/O)
41	Data Bit 1 (I/O)	58	Acknowledge (Out)	68	Data Bit 11 (I/O)
42	Data Bit 2 (I/O)	59	Reset (I/O)	19, 53	Reserved
43	Data Bit 3 (I/O)	60	Message (In)	17–18, 51–52	Terminator Power (I/O)
44	Data Bit 4 (I/O)	61	Select (I/O)		
45	Data Bit 5 (I/O)			1–16, 20–34, 49–50, 54, 56	Ground

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Parallel and USB Ports

The parallel and USB headers on the surface of the C1XTN02 each utilize a short cable to attach to a connector mounted on the rear I/O panel.

Figure 10. Parallel Port Cable

Header (Board Surface) Pin	Description	Connector (I/O Panel) Pin
1	Strobe	1
2	Auto Feed*	14
3	Data Bit 0	2
4	Error*	15
5	Data Bit 1	3
6	Initialize Printer*	16
7	Data Bit 2	4
8	Select Input*	17
9	Data Bit 3	5
10	Ground	18
11	Data Bit 4	6
12	Ground	19
13	Data Bit 5	7
14	Ground	20
15	Data Bit 6	8
16	Ground	21
17	Data Bit 7	9
18	Ground	22
19	Acknowledge*	10
20	Ground	23
21	Busy	11
22	Ground	24
23	Paper Feed	12
24	Ground	25
25	Select	13
26	Not Connected	—

* Active Low

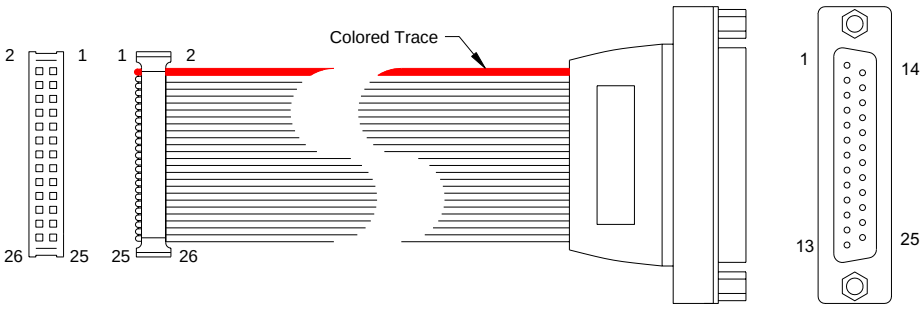
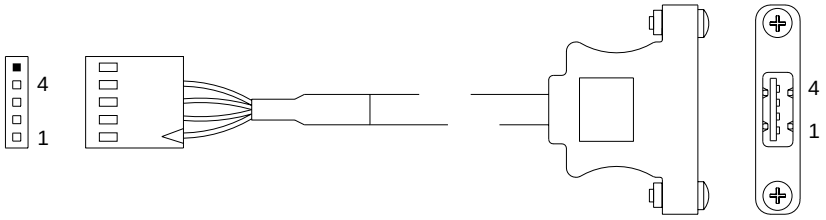


Figure 11. USB Port Cable

Header (Board Surface) Pin	Description	Connector (I/O Panel) Pin
1	USB1 Port –	2
2	Ground	4
3	USB1 Port +	3
4	+5 V	1
5	Key — No Connect	



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Peripheral Connections

Overview

The EPC-3221 and optional C1XTN02 provide controllers to support a variety of peripheral input/output functions. These functions are supported either directly by the EPC-3221, or via a passive backplane with the companion C1XTN02 Rear Transition I/O Module.

Controller	Functionality	SCB	XIO
Adaptec PCI-to-Ultra SCSI Controller with active SCSI terminators	40 MB/sec data transfer rate in 16-bit mode or 20 MB/sec rate in 8-bit mode	N	Y
		N	Y
	Fast/Wide Ultra SCSI connector (internal and external)	N	Y
	Fast/Narrow SCSI-2 connector (internal)	N	Y
Asiliant/CHIPS 69000 HiQVideo™ Accelerator	SVGA display	Y	Y
Intel 82559 Fast Ethernet PCI Controller	10/100BaseT Ethernet (RJ-45 connector)	Y	Y
	10/100BaseT Ethernet activity LEDs	Y	N
Intel 21150 PCI-to-PCI Bridge	PCI bridge expansion	Y	N
Hitachi H8/3437 system monitoring microcontroller	I^2C bus interface	N	Y
Intel 82371EB PCI-TO-ISA/IDE Xcelerator (PIIX4)	Primary and Secondary EIDE buses	N	Y
	Primary USB (USB0)	Y	N
	Secondary USB (USB1)	N	Y
	Speaker	Y	Y
SMSC FDC37B78X Ultra I/O™ Controller	Serial ports 1 and 2	Y	Y
	Parallel port	Y	Y
	PS/2 mouse	Y	Y
	PS/2 keyboard	Y	Y
	Floppy disk drive	N	Y
Standard components	IDE/SCSI activity LED	Y	N
	System power LED	Y	N
	System reset button	Y	Y
	Socket for PCI bridge card with Intel 21150	Y	N
Optional components	SCSI SE	N	Y
	VGA Video Connector (15-pin)	Y	Y
	Ethernet 10/100 Mb/Sec Connector (RJ-45)	Y	Y
SCB — Connector on the EPC-3221 System Controller Board XIO — Connector / header on C1XTN02 Rear Transition I/O Module			

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CompactPCI® Connectors

Overview

The tables below list the pin signals for the CompactPCI connectors of the EPC-3221 SCB. The following illustration (Figure 12 on page 36) indicates pin positions. The following section indicates pin signals for the optional C1XTN02 Rear Transition I/O Module (see page 37).

J1					
Pin	**E**	**D**	**C**	**B**	**A**
25	+5 V	+3.3 V	ENUM#	REQ64#	+5 V
24	ACK64#	AD[0]	V(I/O)	+5 V	AD[1]
23	AD[2]	+5 V	AD[3]	AD[4]	+3.3 V
22	AD[5]	AD[6]	+3.3 V	GND	AD[7]
21	C/BE[0]#	M66EN	AD[8]	AD[9]	+3.3 V
20	AD[10]	AD[11]	V(I/O)	GND	AD[12]
19	AD[13]	GND	AD[14]	AD[15]	+3.3 V
18	C/BE[1]#	PAR	+3.3 V	GND	SERR#
17	PERR#	GND	IPMI_SDA	IPMI_SCL	+3.3 V
16	LOCK#	STOP#	V(I/O)	GND	DEVSEL#
15	TRDY#	GND	IRDY#	FRAME#	+3.3 V
12–14			Key		
11	C/BE[2]#	GND	AD[16]	AD[17]	AD[18]
10	AD[19]	AD[20]	+3.3 V	GND	AD[21]
9	AD[22]	GND	AD[23]	IDSEL	C/BE[3]#
8	AD[24]	AD[25]	V(I/O)	GND	AD[26]
7	AD[27]	GND	AD[28]	AD[29]	AD[30]
6	AD[31]	CLK	+3.3 V	GND	REQ#
5	GNT#	GND	RST#	BRSVP1B5	BRSVP1A5
4	INTS	INTP	V(I/O)	Ground	BRSVP1A4
3	INTD#	+5 V	INTC#	INTB#	INTA#
2	BRSVP1E2	BRSVP1D2	BRSVP1C2	+5 V	IPMI_PWR
1	+5 V	+12 V	IPMI_INTR#	-12 V	+5 V

* and # — Active Low Signal
† — Not Connected (N/C)

J2					
Pin	**E**	**D**	**C**	**B**	**A**
22	GA0	GA1	GA2	GA3	GA4
21	RSV	RSV	RSV	GND	CLK6
20	RSV	GND	RSV	GND	CLK5
19	RSV	RSV	RSV	GND	GND
18	BRSVP2E18	GND	BRSVP2C18	BRSVP2B18	BRSVP2A18
17	GNT6#	REQ6#	PRST#	GND	BRSVP2A17
16	BRSVP2E18	GND	DEG#	BRSVP2B16	BRSVP2A16
15	GNT5#	REQ5#	FAL#	GND	BRSVP2A15
14	AD[32]	GND	AD[33]	AD[34]	AD[35]
13	AD[36]	AD[37]	V(I/O)	GND	AD[38]
12	AD[39]	GND	AD[40]	AD[41]	AD[42]
11	AD[43]	AD[44]	V(I/O)	GND	AD[45]
10	AD[46]	GND	AD[47]	AD[48]	AD[49]
9	AD[50]	AD[51]	V(I/O)	GND	AD[52]
8	AD[53]	GND	AD[54]	AD[55]	AD[56]
7	AD[57]	AD[58]	V(I/O)	GND	AD[59]
6	AD[60]	GND	AD[61]	AD[62]	AD[63]
5	PAR64	C/BE[4]#	V(I/O)	GND	C/BE[5]#
4	C/BE[6]#	GND	C/BE[7]#	BRSVP2B4	V(I/O)
3	GNT4#	REQ4#	GNT3#	GND	CLK4
2	REQ3#	GNT2#	SYSEN#	CLK3	CLK2
1	REQ2#	GNT1#	REQ1#	GND	CLK1

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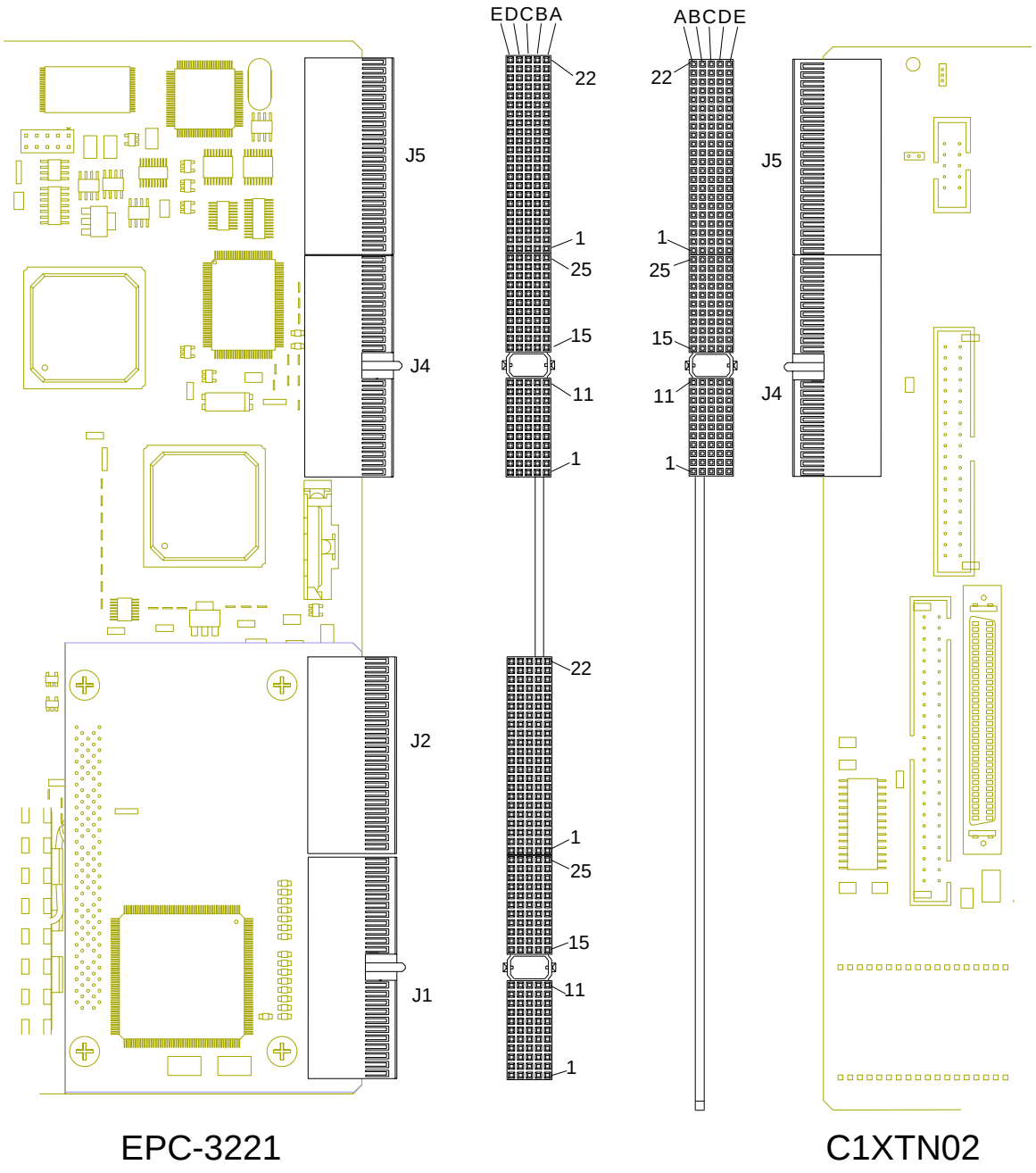
EPC-3221 Compact PCI Pin Signals (continued)

J4					
Pin	**E**	**D**	**C**	**B**	**A**
25	VCC	TDI	TDO	TMS	TCK
24	BTI*	GND	IDEDASP*	IDECS3*	IDECS1*
23	IDEA2	IDEA0	GND	IDEA1	IOCS16*
22	IDERQ	IDEDAK*	†	IORDY*	GND
21	IDEIOR*	GND	IDEIOW*	GND	DMARQ
20	PDIAG*†	GND	IDED15	IDED0	IDED14
19	IDED1	IDED13	IDED2	IDED12	IDED3
18	IDED11	IDED4	IDED10	IDED5	IDED9
17	IDED6	IDED8	IDED7	GND	IDERST*
16	GND	ERX-	ERX+	ETX-	ETX+
15	EFL2	EFL1	VCC	VCC	GND
12–14			Key		
11	GND	GND	NC	GND	BLUE
10	GREEN	RED	VSYNC	HSYNC	DDCCLK
9	†	DDCDAT	†	GND	GND
8	SCSID12*	SCSID13*	SCSID14*	SCSID15*	SCSIPH*
7	SCSID0*	SCSID1*	SCSID2*	SCSID3*	SCSID4*
6	SCSID5*	SCSID6*	SCSID7*	SCSIPL*	GND
5	GND	SCSIPWR	SCSIPWR	GND	GND
4	SCSIATN*	GND	SCSIBSY*	SCSIACK*	SCSIRST*
3	SCSIMSG*	SCSISEL*	SCSICD*	SCSIREQ*	SCSIIO*
2	SCSID8*	SCSID9*	SCSID10*	SCSID11*	PBYPASS*
1	FAN3	FAN2	OPEN*	SMBDAT	SMBCLK

J5					
Pin	**E**	**D**	**C**	**B**	**A**
22	EXT_SPKR*	VCC	MODEM_EN	GND	PBRESET*
21	MSCLK	MSDAT	VCC	KBDCLK	KBDDAT
20	SMBCLK	GND	†	SMBDAT	VCC_SMB
19	†	†	VCC	GND	PPSTB*
18	VCC	GND	USBB-	USBB+	PPAUTOFD*
17	PPD0	PPERR*	PPD1	PPINIT*	PPD2
16	PPSLIN*	PPD3	PPD4	PPD5	PPD6
15	PPD7	PPACK*	PPBSY	PPPE	PPSLCT
14	DTRA*	GND	RIA*	CTSA*	RTSA*
13	TXA	DSRA*	RXA	VCC	DCDA*
12	DTRB*	VCC	RIB*	CTSB*	RTSB*
11	TXB	DSRB*	RXB	GND	DCDB*
10	FDDSKCHG*	FDHDSEL*	FDRDDATA*	FDWP*	FDTR0*
9	FDWE*	FDWRDAT*	FDSTEP*	FDDIR*	FDME1*
8	FDS0*	FDS1*	FDME0*	FDINDX*	DRVDEN1
7	DRVDEN0	IDEASP*	IDEA1	IDECS3*	IDECS1*
6	IDEA2	IDEA0	†	GND	IOSC16*
5	IDEIOR*	IDEDAK*	IDEIOW*	IORDY*	IDEDRQ
4	IDEIRQ	IDED15	GND	IDED0	IDED14
3	IDED1	IDED13	IDED2	IDED12	IDED3
2	IDED11	IDED4	IDED10	IDED5	IDED9
1	IDED6	IDED8	IDED7	IDERST*	RESET*

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Figure 12. CompactPCI® Connectors



- J4 and J5 on the SCB are mechanically identical to J1 and J2 respectively.
- J4 and J5 are mechanically identical between the SCB and the XIO.
- J1 and J2 connector pairs are mechanically identical for the EPC-3221 and the optional CPBRI01 PCI Bridge Card (not shown in Figure 12)
- Tables listing EPC-3221 SCB signals begin on page 34.
- Tables listing C1XTN02 XIO signals begin on page 37.

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C1XTN02 CompactPCI Connector Signals

J5					
Pin	**E**	**D**	**C**	**B**	**A**
22	PMCA 1	PMCA 2	PMCA 3	PMCA 4	PMCA 5
21	PMCA 6	PMCA 7	PMCA 8	PMCA 9	PMCA 10
20	PMCA 11	PMCA 12	PMCA 13	PMCA 14	PMCA 15
19	PMCA 16	PMCA 17	PMCA 18	PMCA 19	PMCA 20
18	PMCA 21	PMCA 22	PMCA 23	PMCA 24	PMCA 25
17	PMCA 26	PMCA 27	PMCA 28	PMCA 29	PMCA 30
16	PMCA 31	PMCA 32	PMCA 33	PMCA 34	PMCA 35
15	PMCA 36	PMCA 37	PMCA 38	PMCA 39	PMCA 40
14	PMCA 41	PMCA 42	PMCA 43	PMCA 44	PMCA 45
13	PMCA 46	PMCA 47	PMCA 48	PMCA 49	PMCA 50
12	PMCA 51	PMCA 52	PMCA 53	PMCA 54	PMCA 55
11	PMCB 1	PMCB 2	PMCB 3	PMCB 4	PMCB 5
10	PMCB 6	PMCB 7	PMCB 8	PMCB 9	PMCB 10
9	PMCB 11	PMCB 12	PMCB 13	PMCB 14	PMCB 15
8	PMCB 16	PMCB 17	PMCB 18	PMCB 19	PMCB 20
7	PMCB 21	PMCB 22	PMCB 23	PMCB 24	PMCB 25
6	PMCB 26	PMCB 27	PMCB 28	PMCB 29	PMCB 30
5	PMCB 31	PMCB 32	PMCB 33	PMCB 34	PMCB 35
4	PMCB 36	PMCB 37	PMCB 38	PMCB 39	PMCB 40
3	PMCB 41	PMCB 42	PMCB 43	PMCB 44	PMCB 45
2	PMCB 46	PMCB 47	PMCB 48	PMCB 49	PMCB 50
1	PMCB 51	PMCB 52	PMCB 53	PMCB 54	PMCB 55

J4					
Pin	**E**	**D**	**C**	**B**	**A**
25					
24					
23		-12 V			+12 V
22	RSVD	RSVD	RSVD	RSVD	NC (PFS)
21	Sbat	RSVD	RSVD	NC	Sbat
20	NC	NC	NC	NC	NC
19	NC	NC	NC	NC	NC
18	VRG	NC	NC	NC	VRG
17	NC	NC	NC	NC	NC
16	NC	NC	NC	NC	NC
15	Vbat	NC	NC	NC	Vbat
12 –14	Key				
11	FDWrData	V I/O	FDWE	FDSTEP-	FDDIR
10	FDS0-	+5 V	FDME0-	+3.3 V	FDME1-
9	FDHDSEL-	GND	FDS1-	DRVDEN0	DRVDEN1
8	FDRdData-	+5 V	FDWP-	FDTRK0-	FDINDX-
7	RSVD	GND	FDDSKChg-	+5 V	NC
6	RSVD	GND	PPD0	PPD1	PPD2
5	RSVD	+3.3 V	PPD3	PPD4	PPD5
4	USBP1+	+3.3 V	PPD6	+5 V	PPD7
3	USBP1-	GND	RSVD	PPSLIN-	PPSTB-
2	GND	PPSLCT	PPACK-	PPAutoFD-	PPINIT-
1	PPPE	PPERR-	PPBSY	+3.3 V	RSVD

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Console Redirection

Overview

Console, or serial, redirection allows an SCB or motherboard to be installed at a remote location and operated via a serial terminal. Redirection does not require a video controller or keyboard connected to the SCB in order to operate.

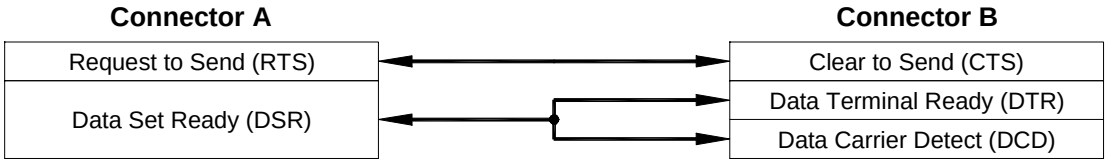
Interrupts

Console redirection utilizes two interrupts:

- **Video:** Redirection uses the video interrupt (10h) to detect any video operations not made by direct screen memory or an I/O controller.
  Note: Because the redirection service sends ASCII data to the serial terminal, only text can be supported, not graphics.
- **Keyboard:** Redirection uses the keyboard interrupt (16h) to receive characters sent from the serial terminal and convert them to the appropriate PC scan codes.
  Note: Operating systems or applications that do not use the interrupt 16h services will require a redirection driver to receive data from the serial terminal.

Cable

For proper operation of most serial terminals, it is strongly recommended that signals from each end of the serial cable be configured as listed below:



Note: The Ring Indicator (RI) signal can be ignored.



The Setup Utility can be accessed through console redirection. However, it is slow because the setup screens are graphical, and each change requires the entire screen to be redrawn. The Adaptec SCSI Setup Utility is not accessible via console redirection.

Configuration

To enable console redirection:

1. Run the Setup Utility. See page 21.
2. Provide a serial port for console redirection.
   Note: A serial port on the SCB or XIO can be used for console redirection. See page 24.
3. Select the address and interrupt for the serial port.
4. Set the console redirect port to the same address and interrupt that was selected in step 3. See page 26.
5. Set the baud rate for the console redirect port.
   Note: This must match the baud rate of the serial terminal.
6. Connect the serial cable between the redirection port and the serial terminal.
   Note: Redirection uses XON and XOFF for flow control. For a simple connection, a three-wire serial cable can be used. Only Ground, Transmit, and Receive signals are required.

Console redirection will function once the CPU is reset.

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Platform Management

Platform management is provided on the EPC-3221 SCB by an on-board intelligent platform management (IPM) controller. The IPM controller is capable of monitoring environmental sensors on the EPC-3221 SCB and communicating with other IPM controllers in an IPM-capable chassis.

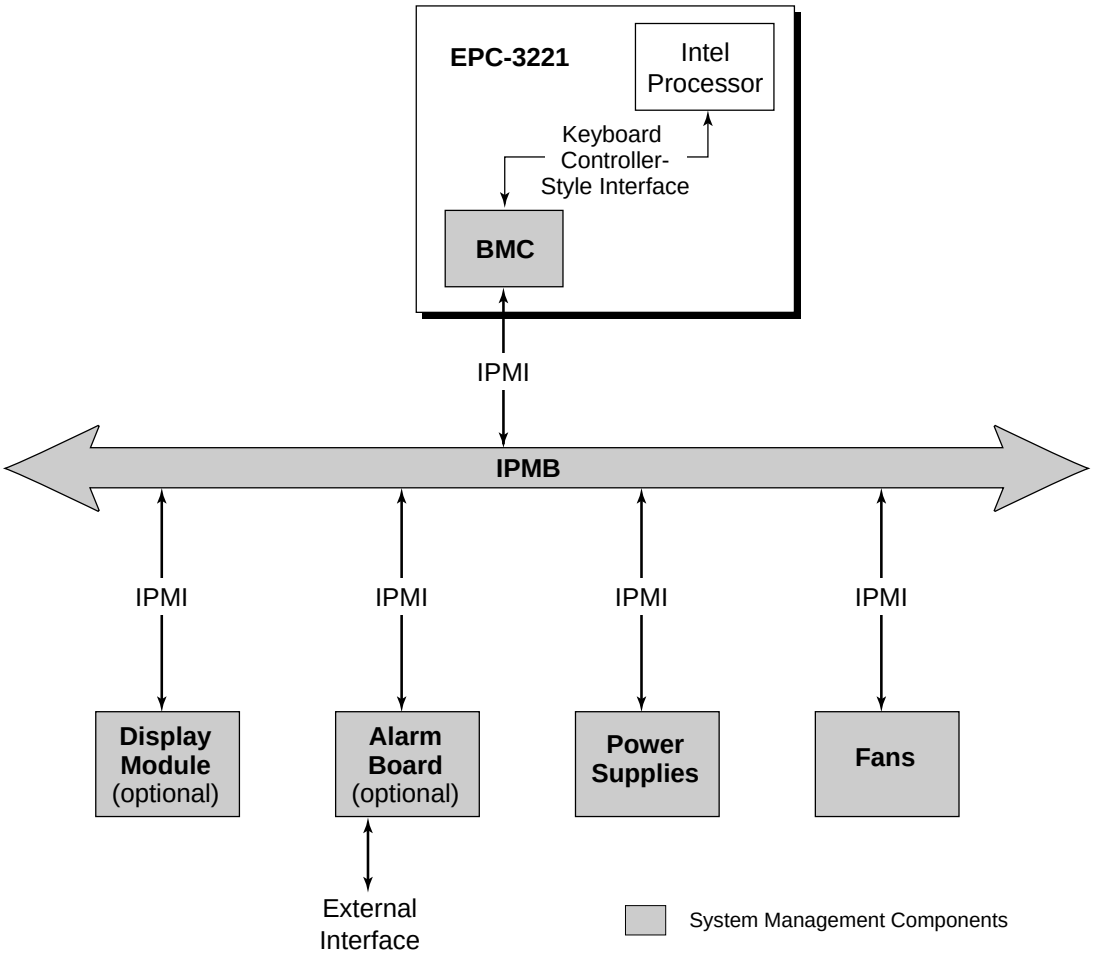
The monitoring and logging functions of the IPM subsystem are independent of the main processors, BIOS, and operating system. This allows devices supporting IPM to communicate even when the system is not powered or operational.

Inter-device communication is provided by the Intelligent Platform Management Bus (IPMB) which connects all intelligent devices. The Inter-Integrated Circuit (I^2C) interface enables the IPMB and is located in the passive backplane of a chassis.

Intelligent devices communicate general state information and alert information (such as warnings or critical conditions) to a centralized management controller, the Baseboard Management Controller (BMC). The BMC provides a System Event Log (SEL) for storing events generated by IPM devices in the chassis.

Figure 13 shows an EPC-3221 SCB in a typical platform management environment.

Figure 13. SCB Platform Management



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Baseboard Management Controller

Located on the EPC-3221 SCB, the Baseboard Management Controller (BMC) provides platform management services for the EPC-3321. This BMC is responsible for monitoring local environmental sensors and for generating platform events when sensor readings cross programmable thresholds.

The BMC supports two interfaces for communicating with system software and other intelligent devices:

- System management (SM) software running on a RadiSys EPC-3321 can access the instrumentation through the Baseboard Management Controller. The BMC interfaces with the onboard CPU using a Keyboard Controller-Style (KCS) interface. The KCS interface acts as a gateway between System Management Software (SMS) and the BMC or other intelligent devices located on the IPMB.
- The BMC also contains an interface to the Intelligent Platform Management Bus (IPMB) to allow other intelligent devices to communicate with the BMC.

NOTE: For additional information on platform management, see this Web site:
http://www.radisys.com/service_support/
This site has the documentation for current and discontinued products in Adobe Acrobat Portable Document Format (.PDF). Documentation may be read and printed using the free Acrobat Reader software.

Sensor Devices

The BMC on the EPC-3321 is responsible for monitoring 16 sensors. Ten sensors monitor environmental values on the CPU board and six sensors are digital sensors monitoring backplane signals.

Six programmable thresholds are associated with each threshold sensor, as follows:

- Low non-critical
- Low critical
- Low non-recoverable
- High non-critical
- High critical
- High non-recoverable

Also, two programmable hysteresis values are associated with each threshold sensor — positive and negative. The BMC monitors the sensors and generates a platform event when one or more programmable thresholds are crossed.

Table 1 describes the 16 sensors on the EPC-3221 SCB.

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Table 1. EPC-3221 SCB Sensors

Sensor Number	Sensor	Type
0	CPU Processor Temperature	Threshold Temperature
1	CPU Board Temperature	Threshold Temperature
2	CPU –12 V	Threshold Voltage
3	CPU +5 V	Threshold Voltage
4	CPU +12 V	Threshold Voltage
5	CPU +3.3 V	Threshold Voltage
6	CPU +2.5 V	Threshold Voltage
7	CPU VIO	Threshold Voltage
8	CPU Vcore	Threshold Voltage
9	VTT Voltage	Threshold Voltage
10	CompactPCI OPEN–	Digital
11	CompactPCI BTI–	Digital
12	CompactPCI DEG–	Digital
13	CompactPCI FAL–	Digital
14	CompactPCI Slot Number	Discrete
15	SCB Reset	Digital

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Table 2. Sensor Threshold Descriptions

Sensor No.	Description	IPMI Sensor Type	IPMI Reading Type	Conversion Factor (raw * CF = Eng)	Normal Value	Factory Preset Threshold Design Values					
						Low Non-Critical Threshold	Low Critical Threshold	Low Non-Recoverable Threshold	High Non-Critical Threshold	High Critical Threshold	High Non-Recoverable Threshold
0	Processor Temperature (in degrees C)	1	Threshold	1	50	6.25	Disabled	Disabled	68.75	93.75	Disabled
1	Board Temperature (in degrees C)	1	Threshold	1	30	5.00	Disabled	Disabled	45.00	50.00	Disabled
2	–12 V	2	Threshold	–0.06457201	–12	–11.40	–11.00	Disabled	–12.60	–12.96	Disabled
3	+5 V	2	Threshold	0.02679739	5	4.75	4.60	Disabled	5.25	5.40	Disabled
4	+12 V	2	Threshold	0.06441039	12	11.40	11.00	Disabled	12.60	13.00	Disabled
5	+3.3 V	2	Threshold	0.01607843	3.3	3.14	3.04	Disabled	3.47	3.56	Disabled
6	+2.5 V	2	Threshold	0.01607843	2.5	Disabled	2.38	2.30	Disabled	2.63	2.70
7	VIO	2	Threshold	0.02679739	5	4.75	4.60	Disabled	5.25	5.40	Disabled
8	Vcore	2	Threshold	0.01607843	1.6	Disabled	1.52	1.47	Disabled	1.68	1.73
9	VTT	2	Threshold	0.01607843	1.5	Disabled	1.43	1.38	Disabled	1.58	1.62

System Event Log

The System Event Log stores platform events so that they are available for later analysis. System event logging includes the logging of warning and critical events, extreme chassis temperatures, and voltages.

Logged events are transported and maintained by the IPMI system. The BMC provides the interface to the SEL for both the IPMB and the System Management Software (SMS) running under the operating system.

System Management Software can retrieve events from the log and move them to non-volatile storage, such as a hard disk, the alarm board or some form of removable storage. SMS also has the ability to delete events from the system event log. This is a necessary maintenance function due to the limited resources on the BMC.

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Watchdog Timer

Overview

The watchdog timer provides an escape from a system lockup caused by electrical noise, electrostatic discharge, processor lock-up, etc. The watchdog provides the escape by performing a reset of all system components.

Reset

Once the watchdog timer detects an activity pulse, an internal timer begins to count down from the preset time delay, either 150 milliseconds or 1.2 seconds. If the watchdog counts down to zero before it detects another pulse, it will perform a reset. This, in turn, issues a reset to the PCI and ISA buses, thereby resetting the devices installed on the buses.

Control

Two features control the watchdog timer operations: Status and Delay. These options are defined in the Setup Utility. See page 25.

- **Watchdog Status:** sets the source of the activity monitored by the watchdog timer.
  - Enabled: the source of the pulse is the CPU Address Strobe (ADS) line.
  - Disabled: the source of the pulse is the CPU system clock.
- **Watchdog Delay:** sets the amount of time in which the system will be monitored for activity, either 150 milliseconds or 1.2 seconds.

User Mode

In addition to the Setup Utility features, there is a User mode to control the watchdog timer operations. A user-controlled bit can be used to block the activity pulse from the watchdog timer. If the control bit is set, the user-defined application must clear the bit within the designated time to prevent a reset.

For more information, contact Technical Support. See Customer Support on page vi.

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Installing Memory

Overview

The EPC-3221 contains two 168-pin DIMM (Dual In-Line Memory Module) sockets for memory (Figure 14). This provides support for up to 512 MB of on-board memory using PC100 DIMMs, or higher as technology becomes available.

Memory Banks

Any of the DIMM sockets can be filled in any order with modules of any acceptable size. For example, a 16 MB DIMM can be installed in Bank 0, while a 32 MB DIMM can be installed in Bank 1.



The system can operate without Bank 0 (DIMM 1) filled. However, Crisis Recovery mode requires Bank 0 to be populated. For more information on Crisis Recovery mode, see page 12 and page 13.

DIMM Types

Five DIMM memory sizes (16, 32, 64, 128, and 256 MB) are supported. DIMMs of these sizes can be installed in banks 0 and 1 in any combination and in any order.

Memory size is detected by the system BIOS. Memory timing requires PC100 SDRAM modules.



The SCB only supports +3.3 V DIMMs. Use of DIMMs that are not rated at +3.3 V can cause damage to the equipment and will void the warranty.

DIMM Installation

To install a DIMM (see Figure 14 and Figure 15):

1. Power-off the system and disconnect all power cords.
   Note: Use a grounding wrist strap or other static-dissipating device when accessing and handling the equipment.
2. Depress the DIMM socket latches outward (if required).
3. Align the DIMM with the socket.
   Note: The DIMM and socket are both keyed to prevent improper installation.
4. Insert the DIMM into the socket. Carefully push the DIMM into the socket.
   Note: The DIMM socket latches will rotate upward to engage the DIMM.

DIMM Removal

To remove a DIMM:

1. Power-off the system and disconnect all power cords.
   Note: Use a grounding wrist strap or other static-dissipating device when accessing and handling the equipment.
2. Depress the DIMM socket latches outward.
   Note: The DIMM will be ejected from the socket.

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Figure 14. Memory Sockets

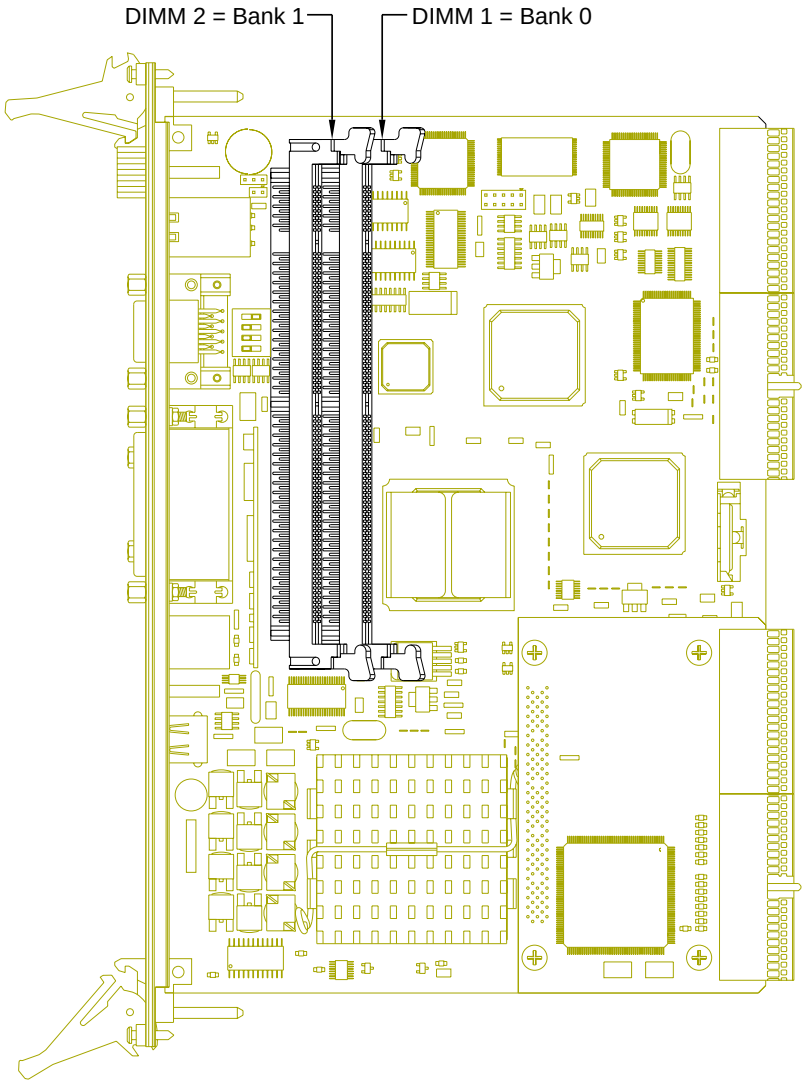
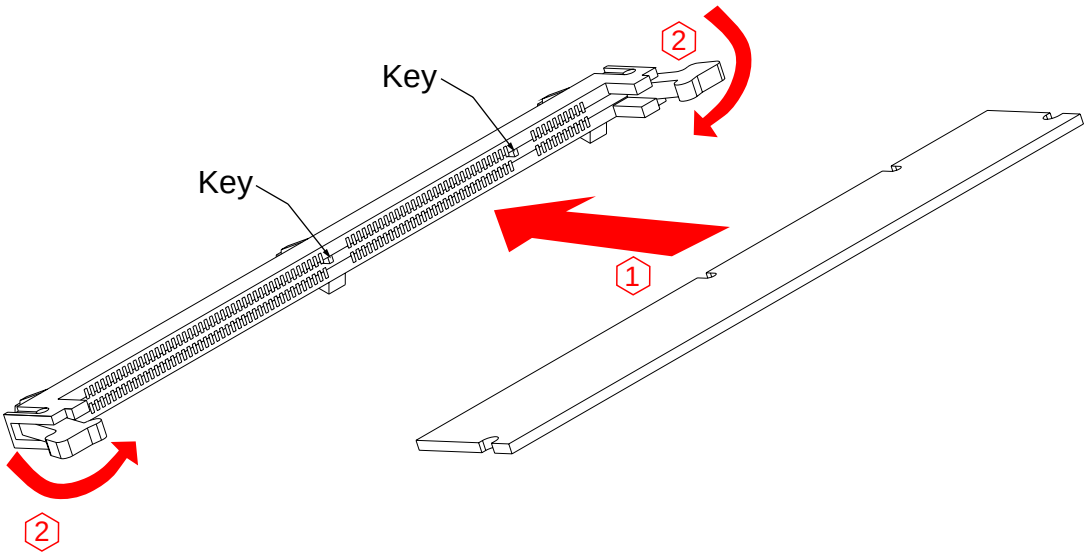


Figure 15. Installing Memory Modules



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System Battery Replacement

Overview

The EPC-3221 utilizes a CR2032 lithium (Li/MnO_2) coin battery (Figure 16). This 3-volt battery provides power to retain the correct date, time, and computer parameters in CMOS when the system is powered-off. This information assists the BIOS in performing initialization and configuration during power-on or reset operations.



The battery must be used or stored within the temperature specifications outlined on page 28.
Bezüglich Betrieb und Lagerung der Batterie beachten Sie bitte die Temperaturspezifikationen auf Seite 28.



Due to risk of fire or explosion, do not attempt to recharge, force open, or heat the battery. There is danger of explosion if the battery is incorrectly installed. Replace the battery only with the same or equivalent type. Reference the battery manufacturer's packaging or labeling for further cautions and warnings.
Wegen Feuer- oder Explosionsgefahr, versuchen Sie nicht die Batterie wieder aufzuladen, sie zu öffnen oder zu erhitzen. Bei falscher Installierung besteht eine Explosionsgefahr. Ersetzen Sie die Batterie nur mit einem Gleichen oder gleichwertigen Typ. Weitere Informationen und Warnungen entnehmen Sie bitte der Verpackung bzw. dem Aufdruck des Herstellers.

Service

The system battery is designed to provide years of service without replacement. However, if configuration or clock-related inconsistencies occur, the battery may need to be replaced.

Installation

To install the system battery (Figure 16 and Figure 17):

1. Power-off the system and disconnect all power cords.
   Note: Use a grounding wrist strap or other static-dissipating device when accessing and handling the equipment.
2. Remove the SCB from the chassis.
3. Orient the battery with its positive pole (top surface) toward the front of the connector.
   Note: The battery will not discharge voltage if installed backwards.
4. Rotate the upper edge of the battery approximately 45° away from the battery connector.
5. Insert the lower edge of the battery into the connector, so that the negative pole (bottom surface) of the battery engages the negative spring contact of the connector.
6. Press the raised edge of the battery downward until the battery seats firmly in the battery connector.
   Note: The positive spring contact of the connector will engage the positive pole of the battery.

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Figure 16. System Battery Components

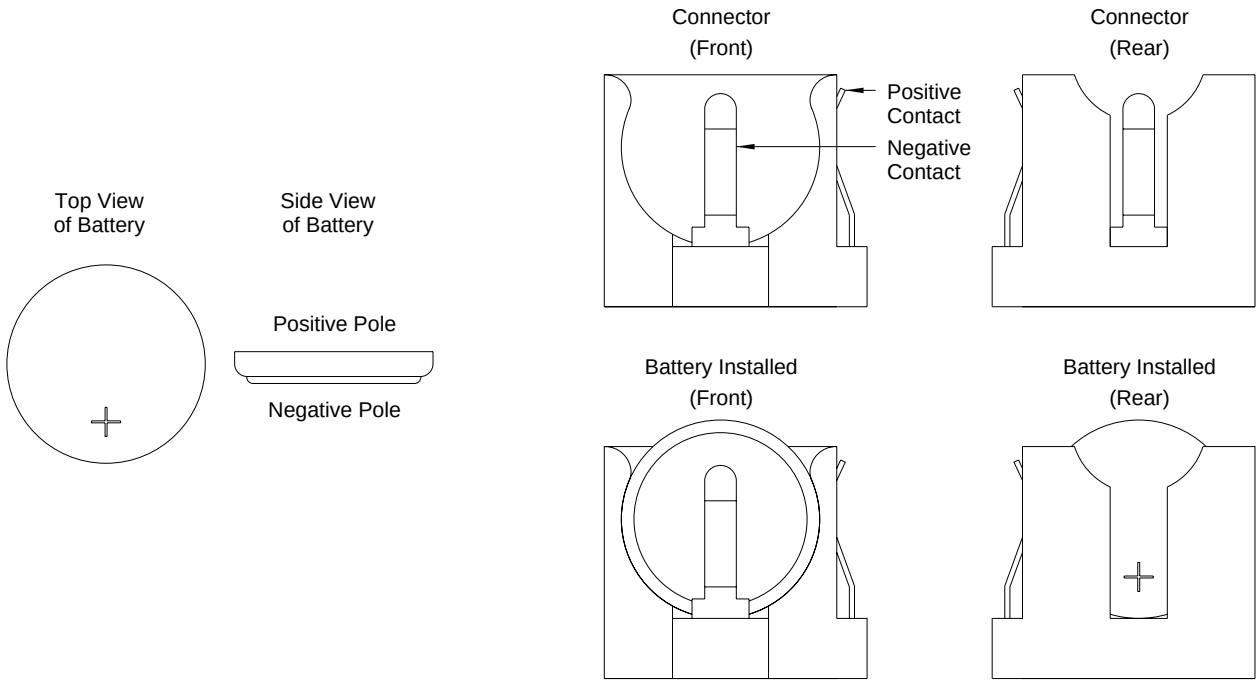
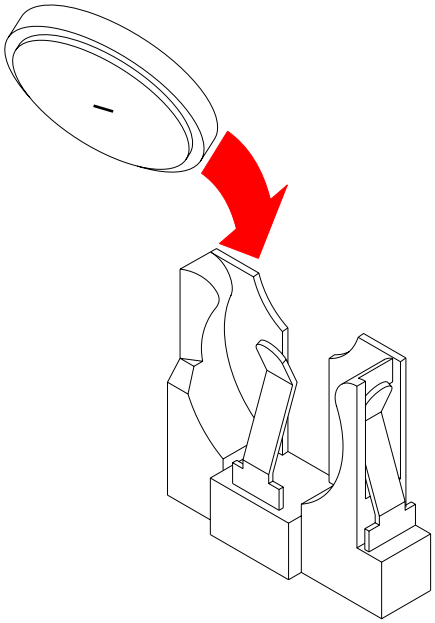


Figure 17. Battery Installation



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Product Identification

Overview

All current RadiSys system controller boards support product identification. This information is embedded in the BIOS and can be read by an operating system or application. The location of the data is fixed for all current products.

BIOS

The starting location for these fields in the BIOS is F000:FF90h (000FFF90h), and it is identified by the ASCII string "TMI" terminated with a null (0h). All data is stored in ASCII. A map of the data fields is provided in the following table:

Location	Size	Contents
F000:FF90h	4 Bytes	Text string "TMI" terminated with a null.
F000:FF94h	Up to 26 Bytes	Model ID text string, with processor speed enclosed in "C" and "J", terminated with a null.
F000:FFB0h	2 Bytes	Text string "S/N".
F000:FFB2h	12 Bytes	Serial number text string.
F000:FFC0h	Up to 23 Bytes	BIOS release text string, terminated with a null.
F000:FFF5h	8 Bytes	BIOS Build Date; 8 ASCII Characters formatted as "MM/DD/YY"



The BIOS build date is present in any PC-compatible BIOS.

Serial Number

The Serial Number field will contain an ASCII string "SN" followed by a space then the ASCII serial number string, terminated with a null. RadiSys serial numbers are up to twelve characters in length, using numbers and uppercase letters. The operating system or application must verify the presence of the "SN" string before attempting to retrieve a serial number from the location F000:FFB2h.

Sample

The following is sample content of the fields in the BIOS of a typical RadiSys product:

Location	ASCII	String
F000:FF90h	54 4D 49 00 45 50 43 2D 33 32 32 31 2D 53 56 45	TMI.EPC-3221-SVE
F000:FFA0	20 5B 33 36 36 5D 00 00 00 00 00 00 00 00 00 00	[366].....
F000:FFB0h	53 4E 31 32 33 34 35 36 37 38 39 41 42 43 00 00	SN.123456789ABC
F000:FFC0h	34 2E 30 36 61 2E 31 2E 32 65 00 00 00 00 00 00	4.06a.1.2e
F000:FFF0	00 00 00 00 00 30 35 2F 33 30 2F 30 30 00 00 00	05/30/00

This identifies a **EPC-3221** model system controller board, operating at **366** MHz with the **S**CSI, **V**ideo, and **E**thernet optional peripherals. The serial number is **123456789ABC**, and the BIOS release is **4.06a.1.2e**, built on **5/30/00**.

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