

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Emerson / Motorola / Force Computers CPCI-760* at our website: ***Click HERE***

A SOLECTRON COMPANY

PENT/CPCI-760/761

Installation Guide

P / N 216556 Revision AA
April 2002

Copyright

The information in this publication is subject to change without notice. Force Computers, GmbH reserves the right to make changes without notice to this, or any of its products, to improve reliability, performance, or design.

Force Computers, GmbH shall not be liable for technical or editorial errors or omissions contained herein, nor for indirect, special, incidental, or consequential damages resulting from the furnishing, performance, or use of this material. This information is provided “as is” and Force Computers, GmbH expressly disclaims any and all warranties, express, implied, statutory, or otherwise, including without limitation, any express, statutory, or implied warranty of merchantability, fitness for a particular purpose, or non-infringement.

This publication contains information protected by copyright. This publication shall not be reproduced, transmitted, or stored in a retrieval system, nor its contents used for any purpose, without the prior written consent of Force Computers, GmbH.

Force Computers, GmbH assumes no responsibility for the use of any circuitry other than circuitry that is part of a product of Force Computers, GmbH. Force Computers, GmbH does not convey to the purchaser of the product described herein any license under the patent rights of Force Computers, GmbH nor the rights of others.

Copyright© 2002 by Force Computers, GmbH. All rights reserved.

The Force logo is a trademark of Force Computers, GmbH.

IEEE is a registered trademark of the Institute for Electrical and Electronics Engineers, Inc.
PICMG, CompactPCI, and the CompactPCI logo are registered trademarks and the PICMG logo is a trademark of the PCI Industrial Computer Manufacturer’s Group.
MS-DOS, Windows95, Windows98, Windows2000 and Windows NT are registered trademarks and the logos are a trademark of the Microsoft Corporation.
Intel and Pentium are registered trademarks and the Intel logo is a trademark of the Intel Corporation.
SPARC is a registered trademark and the SPARC logo is a trademark of SPARC International, Inc.
PowerPC is a registered trademark and the PowerPC logo is a trademark of International Business Machines Corporation.
AltiVec is a registered trademark and the AltiVec logo is a trademark of Motorola, Inc.

Other product names mentioned herein may be trademarks and / or registered trademarks of their respective companies.



World Wide Web: www.forcecomputers.com
24-hour access to on-line manuals, driver updates, and application notes is provided via SMART, our SolutionsPLUS customer support program that provides current technical and services information.

Headquarters

The Americas

Force Computers Inc.
4305 Cushing Parkway
Fremont, CA 94538
U.S.A.

Tel.: +1 (510) 445-6000
Fax: +1 (510) 445-6001
Email: support@fci.com

Europe

Force Computers GmbH
Prof.-Messerschmitt-Str. 1
D-85579 Neubiberg / München
Germany

Tel.: +49 (89) 608 14-0
Fax: +49 (89) 609 77 93
Email: support@force.de

Asia

Force Computers Japan KK
Shibadaimon MF Building 4F
2-1-16 Shiba Daimon
Minato-ku, Tokyo 105-0012 Japan

Tel.: +81 (03) 3437 6221
Fax: +81 (03) 3437 6223
Email: support@force.de

216556 420 000 AA

Contents

Using This Manual

Safety Notes

Sicherheitshinweise

1 Introduction

Features 1-3
CPU 1-3
Memory 1-3
Interfaces 1-4

Block Diagram 1-5

Board Variants 1-7
PENT/CPCI-761 1-7
PENT/CPCI-760 1-7

Standard Compliance 1-8

Ordering Information 1-9
Product Nomenclature 1-9
Order Numbers 1-10

2 Installation

Action Plan 2-3

Requirements 2-4
Environmental Requirements 2-4
Power Requirements 2-5

Location Overview 2-6

Hardware Upgrades and Accessories 2-10
Memory Modules 2-10
PMC Module 2-10
Voltage Keys 2-10
Connector Configuration 2-11
Installation Procedure 2-11
Removal Procedure 2-11
Installing and Removing the Carrier-760 2-12
Installation Procedure 2-12
Removal Procedure 2-12
FD-AccKit 2-13
Installation Procedure 2-13
Removal Procedure 2-15
IDE Devices 2-15
HD-Accessory Kit 2-15
IOBP-CPU720 2-17

Switch Settings 2-18

Board Installation 2-20
Installation in a Non Powered System 2-20
Installation Procedure 2-20
Removal Procedure 2-21
Installation in a Powered System 2-21
Installation Procedure 2-22
Removal Procedure 2-22

Software Upgrades and Accessories 2-23
BIOS-Upgrade Kit 2-23
NT-Driver Kit 2-23

3 Controls, Indicators, and Connectors

Front Panel 3-3
PMC Cutout 3-3
LEDs 3-3
Keys 3-4
Connectors 3-4

On-Board 3-6

CompactPCI Connectors 3-7
J3 3-7
J5 3-8

4 BIOS

Features 4-3

Boot Selection Menu 4-4

Setup 4-5

Boot Configuration 4-6

Sample Start-Up 4-9

BIOS Messages 4-10

5 Maps and Registers

Overview 5-3

I/O and Memory Maps 5-4

PENT/CPCI-760/761 Registers 5-6
Lock/Unlock Register 5-6
ENUM Interrupt Control Status Register CPCI Bus B 5-7
Hot Swap I^2C Register CPCI Bus B 5-8
ENUM Interrupt Control Status Register CPCI Bus A 5-9
Hot Swap I^2C Register CPCI Bus A 5-10
I^2C Register 5-11
Switch and Interrupt Control Register 5-12
Watchdog Control and Retrigger Registers 5-13
PCI Bus Control Register 5-14
NMI Status Register 5-15
LED Control Register 5-16
Geographical Address Register 5-17
CPCI Bus B ENUM Interrupt Routing Register 5-18
CPCI Bus A ENUM Interrupt Routing Register 5-19
PMC Slot 1 and 2 Interrupt Routing Register 5-20
SCSI, Ethernet and PMC Slot 0 Interrupt Routing Register 5-21
NVRAM Decoding and Control Register 5-22
NVRAM Decoding and Flash Paging Register 5-23
Watchdog Timer Register 5-24

A Battery Exchange

B Troubleshooting

Product Error Report

Tables

Introduction

Table 1 Interfaces 1-4
Table 2 Standard Compliance. 1-8
Table 3 Product Nomenclature 1-9
Table 4 Ordering Information Excerpt 1-10

Installation

Table 5 Environmental Requirements. 2-4
Table 6 Power Requirements 2-5
Table 7 Important Components of the PENT/CPCI-761 2-7
Table 8 Important Components of the PENT/CPCI-760 2-9
Table 9 Switch Settings. 2-18

Controls, Indicators, and Connectors

Table 10 Description of Front Panel LEDs 3-3

Maps and Registers

Table 11 Register Overview 5-3
Table 12 I/O Map 5-4
Table 13 Lock/Unlock Register 5-6
Table 14 ENUM Interrupt Control Status Register CPCI Bus B 5-7
Table 15 Hot Swap I^2C Register CPCI Bus B. 5-8
Table 16 ENUM Interrupt Control Register CPCI Bus A. 5-9
Table 17 Hot Swap I^2C Register CPCI Bus A. 5-10
Table 18 I^2C Register 5-11
Table 19 Switch and Interrupt Control Register 5-12
Table 20 Watchdog Control Register 5-13

Table 21 Watchdog Retrigger Register 5-13
Table 22 PCI Bus Control Register 5-14
Table 23 CompactPCI Bus Interrupts Routing 5-14
Table 24 NMI Status Register 5-15
Table 25 LED Control Register 5-16
Table 26 Geographical Address Register 5-17
Table 27 CPCI Bus B ENUM Register 5-18
Table 28 CPCI Bus A ENUM Interrupt Routing Register 5-19
Table 29 PMC Slot 1 and 2 Interrupt Routing Register 5-20
Table 30 SCSI, Ethernet and PMC Slot 0 Interrupt Routing Register 5-21
Table 31 NVRAM Decoding and Control Register 5-22
Table 32 NVRAM Decoding and Flash Paging Register 5-23
Table 33 Watchdog Timer Register 5-24

Figures

Introduction

Figure 1 PENT/CPCI-760 (Slots 1 and 2) Block Diagram 1-5
Figure 2 PENT/CPCI-761 (Slot 1) Block Diagram 1-6
Figure 3 PENT/CPCI-761 Assembly 1-7
Figure 4 PENT/CPCI-760 Assembly 1-7

Installation

Figure 5 Location Diagram of the PENT/CPCI-761 2-6
Figure 6 Location Diagram of the PENT/CPCI-760 2-8
Figure 7 Mounting Points of the Carrier-760 2-12
Figure 8 Fastening the Floppy Disk on the Carrier-760 (Bottom View) 2-14
Figure 9 Fastening the Hard Disk Drive on the Carrier-760 (Bottom View) 2-16

Controls, Indicators, and Connectors

Figure 10 COM1 Connector Pinout 3-4
Figure 11 ETH1 - Ethernet Connector Pinout 3-5
Figure 12 ETH2- Ethernet 2 Connector Pinout 3-5
Figure 13 K/M - Keyboard/Mouse Connector Pinout 3-5
Figure 14 USB Connector Pinout 3-5
Figure 15 Floppy (FD) Connector Pinout 3-6
Figure 16 IDE (Primary Device) Connector Pinout 3-6
Figure 17 CompactPCI J3 Connector Pinout 3-7
Figure 18 CompactPCI J5 Connector Pinout 3-8

BIOS

Figure 19 Sample Start-Up Showing the Boot Configuration Options 4-7
Figure 20 Sample Start-Up Message 4-9

Maps and Registers

Figure 21 PENT/CPCI-760/761 Memory Map 5-5

Using This Manual

This Installation Guide is intended for users qualified in electronics or electrical engineering. Users must have a working understanding of Peripheral Component Interconnect (PCI), Compact Peripheral Component Interconnect (CPCI), and telecommunications.

Other Sources of Information

For further information refer to the following documents:

Company	WWW.	Document
Force Computers	forcecomputers.com	PENT/IOBP-CPU720 Installation Guide (P/N 210615)
Hitachi/Micron/Mitsubishi	halsp.hitachi.com	SDRAM 8Mx8 M5M4V64S30ATP-8
Intel	developer.intel.com	CPU: Intel Pentium III
		Intel Architecture Software Developer's Manual: Volume 1: Basic Architecture Volume 2: Instruction Set Reference Manual Volume 3: System Programming Guide
		Host-to-PCI bridge: 82443 BX
		EIDE, PCI-to-ISA bridge, USB: 82371 EB
		PCI-to-PCI bridge: 21150
		BIOS/Embedded OS flash: Intel 1Mx8 Intel 28F800B55-T
		Ethernet: 21143
Level One	level1.com	Ethernet PHY: LXT970
Maxim	maxim-ic.com	Temperature sensor MAX1617
National Semiconductor	national.com	Keyboard, PS2 mouse, COM1, COM2, LPT1, floppy, battery-backed NVRAM, RTC: PC87309 Super I/O
Philips	philips.com	The I^2C bus and how to use it (including specifications)

Company	WWW.	Document
Simtek	simtek.com	Autostore non-volatile SRAM: Simtek 8Kx8 STK12C68
SMsC	smsc.com	Hardware Monitor SMsC MON35W82
Summit Micro-electronics	summitmicro.com	Hot swap controller Summit SMH4042
Torridon PLC	torridon.com	IDE flash disk MY20-40 / 41

Conventions

Notation	Description
57	All numbers are decimal numbers except when used with the notations described below
00000000_{16}	Typical notation for hexadecimal numbers (digits are 0 through F), e.g. used for addresses and offsets
0000_2	Same for binary numbers (digits are 0 and 1)
x	Generic use of a letter
n	Generic use of numbers
n.nn	Decimal point indicator is signalled
Bold	Character format used to emphasize a word
`Courier`	Character format used for on-screen output
`Courier+Bold`	Character format used to characterize user input
Italics	Character format for references, table, and figure descriptions
<text>	Typical notation used for variables and keys
[text]	Typical notation for buttons
...	Repeated item
. . .	Omission of information from example / command that is not necessary at the time being
..	Ranges
:	Extents
|	Logical OR

Notation	Description
Note:	No danger encountered. Pay attention to important information marked using this layout
Caution 	Possibly dangerous situation: slight injuries to people or damage to objects possible
Danger 	Dangerous situation: injuries to people or severe damage to objects possible

Revision History

Order No.	Edition/ Revision	Date	Description
211697	1.0	April 2000	First print
213122	AA	July 2000	Changed flash disk supplier from SanDisk to Torridon PLC, added note on “FCC Compliance”, corrected cable length to 100 m in note on “RJ-45 Connector” page xix, added switch SW3C and SW3D description on page 2-18, changed airflow value to 300 LFM in Table 5 “Environmental Requirements” page 2-4, added description of Table “” page 5-24, editorial changes
213122	AB	May 2001	Added “Troubleshooting” chapter, editorial changes
213122	AC	August 2001	Added “Sicherheitshinweise” page xxi
213122	AD	September 2001	Revised “Safety Notes” page xvii and “Sicherheitshinweise” page xxi

Order No.	Edition/ Revision	Date	Description
216420	AA	March 2002	Updated Table 4 “Ordering Information Excerpt” page 1-10, added safety note to “Environmental Requirements” page 2-4, corrected +3.3V and 5 V assignment, added values for +12V and added 700 MHz board variant to Table 6 “Power Requirements” page 2-5, corrected description for SW1-1 in Table 9 “Switch Settings” page 2-18, modified “Installation in a Powered System” page 2-21, moved “Battery Exchange” to appendix A, modified and moved “Troubleshooting” to appendix B, editorial changes
216556	AA	April 2002	Corrected address in “ENUM Interrupt Control Status Register CPCI Bus B” page 5-7, corrected description of bit 3 in “NMI Status Register” page 5-15, corrected “LED Control Register” page 5-16, corrected address in “PMC Slot 1 and 2 Interrupt Routing Register” page 5-20, removed section “Temperature Sensor Addressing register”.



Safety Notes

This section provides safety precautions to follow when installing, operating, and maintaining the PENT/CPCI-760/761.

We intend to provide all necessary information to install and handle the PENT/CPCI-760/761 in this Installation Guide. However, as the product is complex and its usage manifold, we do not guarantee that the given information is complete. If you need additional information, ask your Force Computers representative.

The PENT/CPCI-760/761 has been designed to meet the standard industrial safety requirements. It must not be used except in its specific area of office telecommunication industry and industrial control.

Only personnel trained by Force Computers or persons qualified in electronics or electrical engineering are authorized to install, maintain, and operate the PENT/CPCI-760/761. The information given in this manual is meant to complete the knowledge of a specialist and must not be taken as replacement for qualified personnel.

EMC

The board has been tested in a Standard Force Computers system and found to comply with the limits for a Class A digital device in this system, pursuant to part 15 of the FCC Rules respectively EN 55022 Class A. These limits are designed to provide reasonable protection against harmful interference when the system is operated in a commercial, business or industrial environment.

The board generates and uses radio frequency energy and, if not installed properly and used in accordance with this Installation Guide, may cause harmful interference to radio communications. Operating the system in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

If you use the board without a PMC module, cover empty slots with blind panels to ensure proper EMC shielding. If boards are integrated into open systems, always cover empty slots.



Installation

Electrostatic discharge and incorrect board installation and removal can damage circuits or shorten their life. Therefore:

- **Before installing or removing the board, read the “Action Plan” section page 2-3.**
- **Before touching boards or electronic components, make sure that you are working in an ESD-safe environment.**
- **When plugging the board in or removing it, do not press on the front panel but use the handles.**
- **Before installing or removing an additional device or module, read the respective documentation.**
- **Make sure that the board is connected to the CompactPCI backplane via all assembled connectors and that power is available on all power pins.**

Operation

While operating the board ensure that the environmental and power requirements are met.

Do not operate the board outside the specified environmental limits. High humidity and condensation may cause short circuits. Make sure the board is completely dry and there is no moisture on any surface before applying power. Do not operate the board below 0°C.

When operating the board in areas of electromagnetic radiation ensure that the board is bolted on the CompactPCI system and the system is shielded by enclosure.

Make sure that contacts and cables of the board cannot be touched while the board is operating.

Hot Swap

Never install or uninstall the board in a system under hot-swap conditions unless the basic hot swap, full hot swap or high availability platform is used and the system documentation explicitly includes appropriate guidelines. For detailed information on hot-swap support and the relevant safety notes, see the “Installation in a Powered System” section on page 2-21.



Replacement/Expansion

Only replace or expand components or system parts with those recommended by Force Computers. Otherwise, you are fully responsible for the impact on EMC and the possibly changed functionality of the product.

Check the total power consumption of all components installed (see the technical specification of the respective components). Ensure that any individual output current of any source stays within its acceptable limits (see the technical specification of the respective source).

RJ-45 Connector

An RJ-45 connector is used for both telephone and twisted-pair Ethernet (TPE) connectors. Mismatching the two connectors may destroy your telephone as well as your CPU board. Therefore:

- **Clearly mark TPE connectors near your working area as network connectors.**
- **TPE bushing of the system has to be connected only to safety extra low voltages (SELV) circuits.**
- **The length of the electric cable connected to a TPE bushing must not exceed 100 meter.**

If you have further questions, ask your system administrator.

Battery

If a Lithium battery has to be exchanged, observe the following safety notes:

- **Incorrected exchange of Lithium batteries can result in a hazardous explosion.**
- **Exchange the battery before five years of actual battery usage have elapsed.**
- **Exchanging the battery always results in data loss of the devices which use the battery as power backup. Therefore, back up affected data before exchanging the battery.**
- **Always use the same type of Lithium battery as is already installed.**
- **When installing the new battery, ensure that the '+' on top of the battery stays at the top and therefore is visible when viewing the board from its component side.**



Environment

Always dispose of old boards according to your country's legislation, if possible in an environmentally acceptable way.



Sicherheitshinweise

Dieser Abschnitt enthält Sicherheitshinweise, die beim Einbau, Betrieb undbei der Wartung des PENT/CPCI-760/761 zu beachten sind.

Wir sind darauf bedacht, alle notwendigen Informationen, die für die Installation und den Betrieb erforderlich sind, in diesem Handbuch bereit zu stellen. Da es sich jedoch um ein komplexes Produkt handelt bzw. viele verschiedene Einsatzmöglichkeiten bestehen, können wir die Vollständigkeit der im Handbuch enthaltenen Informationen nicht garantieren. Falls Sie weitere Informationen benötigen sollten, wenden Sie sich bitte an die für Sie zuständige Geschäftsstelle von Force Computers.

Das PENT/CPCI-760/761 erfüllt die für die Industrie geforderten Sicherheitsvorschriften und darf ausschließlich für Anwendungen in der Telekommunikationsindustrie und im Zusammenhang mit Industriesteuerungen verwendet werden.

Einbau, Wartung und Betrieb dürfen nur von durch Force Computers ausgebildetem oder im Bereich Elektronik oder Elektrotechnik qualifiziertem Personal durchgeführt werden. Die in diesem Handbuch enthaltenen Informationen dienen ausschliesslich dazu, das Wissen von Fachpersonal zu ergänzen, können es aber in keinem Fall ersetzen.

EMV

Das Board wurde in einem Force Computers Standardsystem getestet. Es erfüllt die für digitale Geräte der Klasse A gültigen Grenzwerte in einem solchen System gemäß den FCC-Richtlinien Abschnitt 15 bzw. EN 55022 Klasse A. Diese Grenzewerte sollen einen angemessenen Schutz vor Störstrahlung beim Betrieb des Boards in Gewerbe- sowie Industriegebieten gewährleisten.

Das Board arbeitet im Hochfrequenzbereich und erzeugt Störstrahlung. Bei unsachgemäßem Einbau und anderem als in diesem Handbuch beschriebenen Betrieb können Störungen im Hochfrequenzbereich auftreten.

Warnung!
Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen. In diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen.



Wenn Sie das Board ohne PMC Modul verwenden, schirmen Sie freie Steckplätze mit einer Blende ab, um einen ausreichenden EMV Schutz zu gewährleisten. Wenn Sie Boards in Systeme einbauen, schirmen Sie freie Steckplätze mit einer Blende ab.

Installation

Elektrostatische Entladung und unsachgemäßer Ein- und Ausbau des Boards kann Schaltkreise beschädigen oder ihre Lebensdauer verkürzen. Beachten Sie deshalb die folgenden Punkte:

- **Lesen Sie vor Ein- oder Ausbau des Boards den Abschnitt “Action Plan” auf Seite 2-3.**
- **Bevor Sie Boards oder elektronische Komponenten berühren, vergewissern Sie sich, dass Sie in einem ESD-geschützten Bereich arbeiten.**
- **Drücken Sie bei Ein- oder Ausbau des Boards nicht auf die Frontplatte, sondern benutzen Sie die Griffe.**
- **Lesen Sie vor dem Ein- oder Ausbau von zusätzlichen Geräten oder Modulen das dazugehörige Benutzerhandbuch.**
- **Vergewissern Sie sich, dass das Board über alle Stecker an die CompactPCI Backplane angeschlossen ist und Strom an allen Versorgungskontakten anliegt.**

Betrieb

Achten Sie darauf, dass die Umgebungs- und die Leistungsanforderungen während des Betriebs eingehalten werden.

Betreiben Sie das Board nur innerhalb der angegebenen Grenzwerte für die relative Luftfeuchtigkeit und Temperatur, da durch hohe Luftfeuchtigkeit Kurzschlüsse entstehen können. Stellen Sie vor dem Einschalten des Stroms sicher, dass sich auf dem Board kein Kondensat befindet und betreiben Sie das Board nicht unter 0°C.

Wenn Sie das Board in Gebieten mit elektromagnetischer Strahlung betreiben, stellen Sie sicher, dass das Board mit dem CompactPCI System verschraubt ist und das System durch ein Gehäuse abgeschirmt wird.

Stellen Sie sicher, dass Anschlüsse und Kabel des Boards während des Betriebs nicht berührt werden können.



Hot Swap

Ein- oder Ausbau des Boards in einem System unter Hot Swap Bedingungen darf nur dann stattfinden, wenn die Basic Hot Swap Plattform, die Full Hot Swap Plattform, oder die High-Availability Hot Swap Plattform verwendet wird und die Systembeschreibung dies ausdrücklich erlaubt. Im Abschnitt “Installation in a Powered System” auf Seite 2-21 finden Sie ausführliche Informationen zur Unterstützung von Hot Swap und die entsprechenden Sicherheitshinweise.

Austausch/Erweiterung

Verwenden Sie bei Austausch oder Erweiterung nur von Force Computers empfohlene Komponenten und Systemteile. Andernfalls sind Sie für mögliche Auswirkungen auf EMV und geänderte Funktionalität des Produktes voll verantwortlich.

Überprüfen Sie die gesamte aufgenomme Leistung aller eingebauten Komponenten (siehe die technischen Daten der entsprechenden Komponente). Stellen Sie sicher, dass die Stromaufnahme jedes Verbrauchers innerhalb der zulässigen Grenzwerte liegt (siehe die technischen Daten des entsprechenden Verbrauchers).

RJ-45 Stecker

Das CPU Board ist mit RJ-45 Steckern ausgestattet. Dieser Stecker wird sowohl für Telefonanschlüsse als auch für Netzwerkkabel (Twisted Pair Ethernet - TPE) verwendet. Die Verwechslung dieser Anschlüsse kann sowohl das Telefon als auch das Board zerstören. Beachten Sie deshalb folgende Punkte:

- **Vergewissern Sie sich, dass Anschlüsse deutlich als Netzwerkanschlüsse gekennzeichnet sind.**
- **Schließen Sie TPE-Stecker/Netzwerkstecker Ihres Systems nur an Sicherheits-Kleinspannungs-Kreise (SELV) an.**
- **Vergewissern Sie sich, dass die an einem TPE-Anschluss angeschlossene Leitung eine Gesamtlänge von 100 Metern nicht überschreitet.**

Falls Sie Fragen haben, wenden Sie sich an Ihren Systemadministrator.



Batterie

Muss eine Lithium-Batterie auf dem Board ausgetauscht werden, beachten Sie die folgenden Sicherheitshinweise:

- **Fehlerhafter Austausch von Lithium-Batterien kann zu lebensgefährlichen Explosionen führen.**
- **Tauschen Sie die Batterie aus, bevor fünf Jahre reiner Betrieb vorüber sind.**
- **Der Austausch der Batterie bringt immer einen Datenverlust bei den Komponenten mit sich, die sich durch die Batterie die Stromversorgung sichern. Sichern Sie deshalb vor dem Batteriewechsel die betroffenen Daten.**
- **Verwenden Sie nur den Batterietyp, der bereits eingesetzt ist.**
- **Vergewissern Sie sich beim Einsetzen der Batterie, dass das '+' oben auf der Batterie sichtbar ist, wenn Sie das Board von der Komponentenseite betrachten.**

Umweltschutz

Entsorgen Sie alte Boards gemäß der in Ihrem Land gültigen Gesetzgebung, wenn möglich immer umweltfreundlich.

1

Introduction

Features

The PENT/CPCI-760/761 is a 6U CompactPCI computer based on an Intel Mobile Pentium III CPU and is mainly designed to run with Windows NT Version 4.0 or higher. Additionally, embedded operating systems like VxWorks are supported.

On-board are:

- Inrush current protection
- Two 82C37A compatible DMA controllers on the PCI-to-PCI bridge
- Two 82C29 compatible interrupt controllers on the PCI-to-PCI bridge

CPU

The PENT/CPCI-760/761 offers:

- Low power Pentium III mobile CPU with 256 KByte L2 cache and with the following MHz speed:
  - 400 MHz
  - 500 MHz
  - 700 MHz
- Software controllable watchdog, which controls the CPU activity and causes a RESET or an NMI in case of malfunction
- 8254 compatible 3-channel timer

Memory

Memory features include:

- 512 KByte flash BIOS, 8-bit wide
- Motorola 146818 compatible real time clock and CMOS RAM for storing factory settings, both RTC and RAM with battery backup
- On-board IDE flash disk, 16 MByte capacity
- Ten-year-data retention NVRAM, 8 KByte or 32 KByte
- Up to two banks on-board SDRAM with ECC support
- Up to four banks SDRAM with ECC support implemented on memory module

Interfaces

The front panel and on-board interfaces of the PENT / CPCI-760 / 761 are shown in the table below:

Table 1: *Interfaces*

Interface	Description
Ethernet	Two 10 / 100 BaseT Ethernet interfaces Ethernet 1 is routable to a front panel connector or the CompactPCI connector via switch selection. Ethernet 2 is available on the front panel.
Floppy	Floppy controller via CompactPCI connector
IDE	Primary IDE interface via on-board connector, the secondary via CompactPCI connector 2.5” IDE devices are to be used with the on-board connector and 3.5” IDE devices via CompactPCI connector
Keyboard / Mouse	PS / 2 keyboard and mouse interface on the front panel and on the CompactPCI connectors
Parallel I / O	Parallel interface LPT, IEEE 1284 compatible and with ECP (Extended Capability Port), at CompactPCI connector
Serial I / O	Two serial RS-232 interfaces: COM1 on front panel and CompactPCI connector - COM2 on CompactPCI connector -
USB	Two USB interfaces, one on the front panel and one on the CompactPCI connector

Block Diagram

The following block diagrams give an overview of how the PENT/CPCI-760/761 devices work together and which data paths they use.

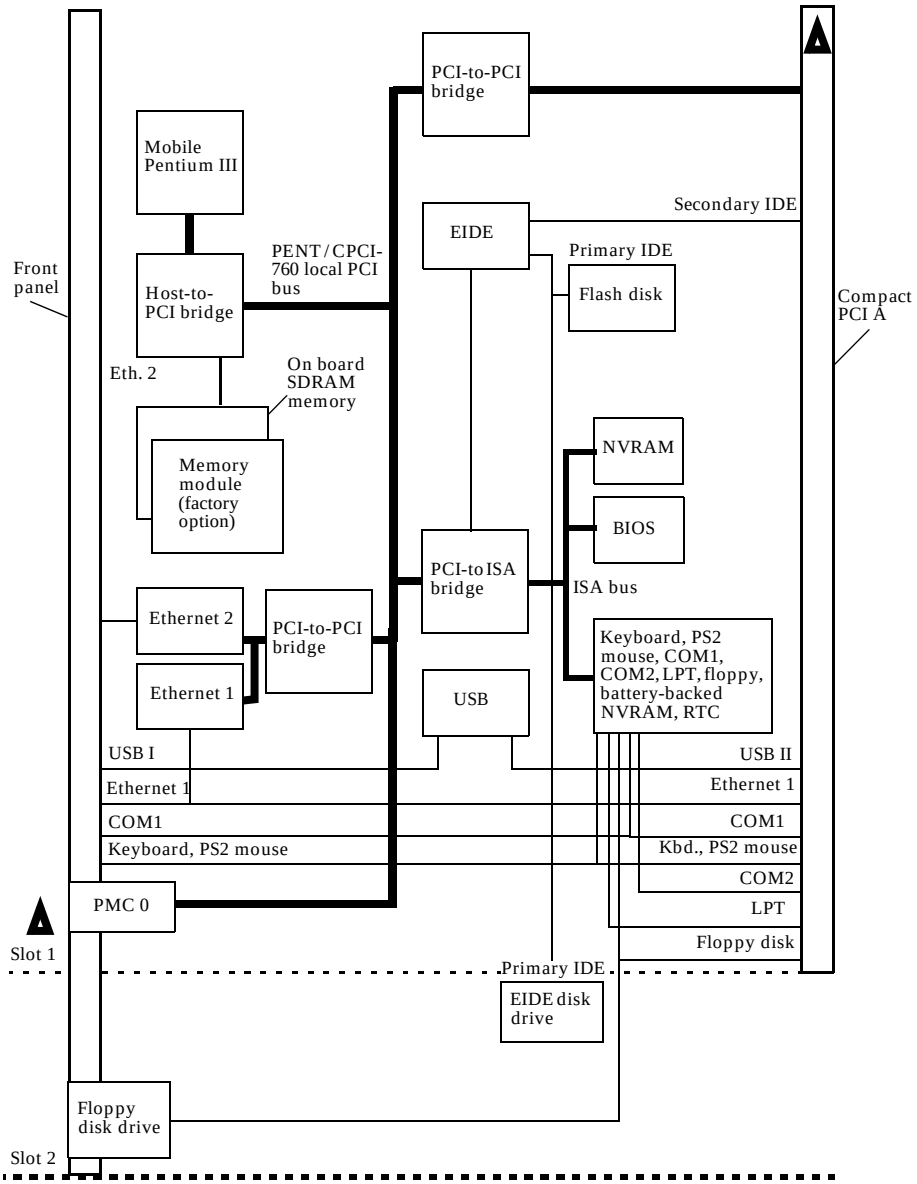


Figure 1: PENT/CPCI-760 (Slots 1 and 2) Block Diagram

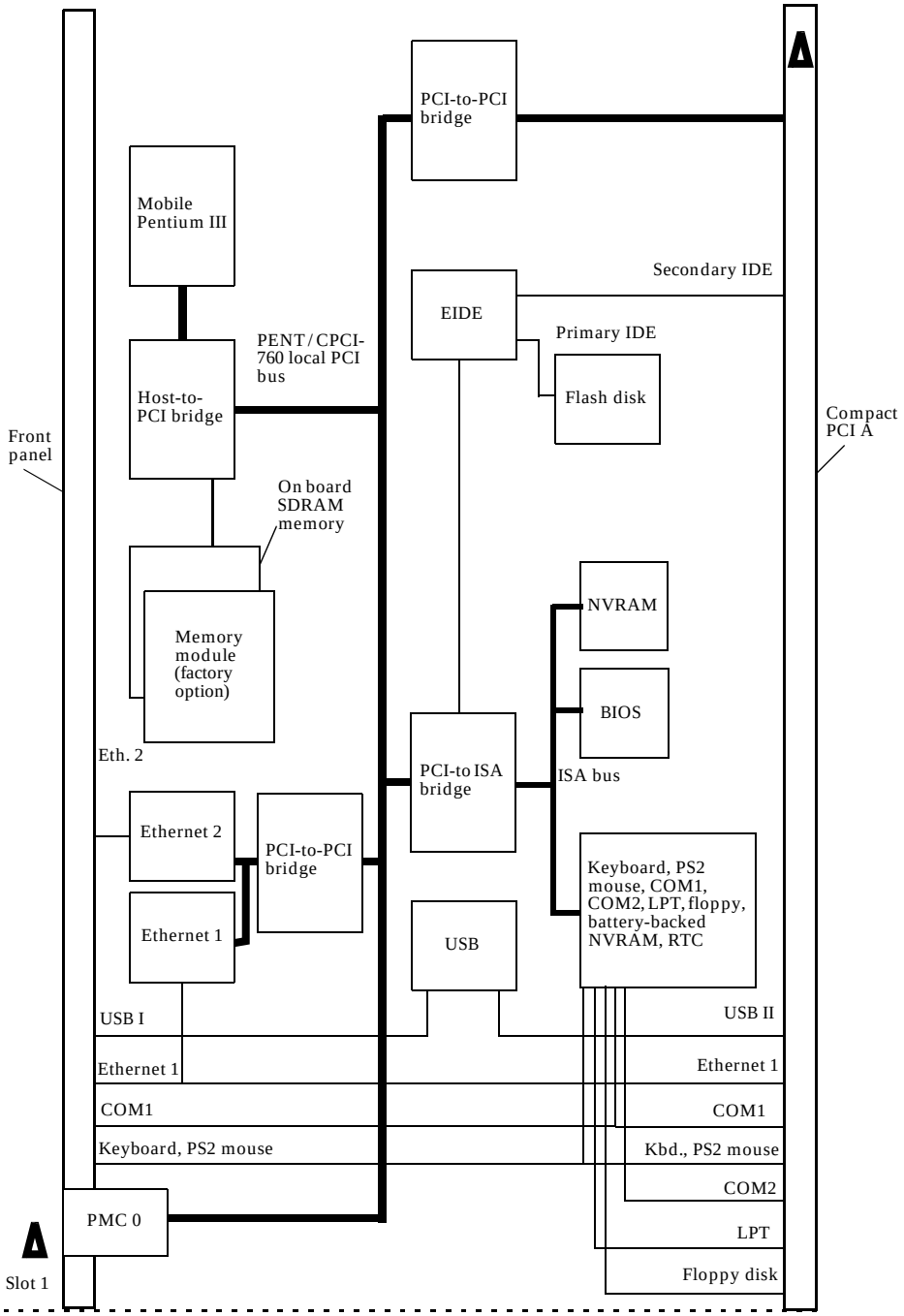


Figure 2: PENT/CPCI-761 (Slot 1) Block Diagram

Board Variants

The PENT/CPCI-760/761 is product family group that consists of the PENT/CPCI-760 and the PENT/CPCI-761 CompactPCI system boards.

PENT/CPCI-761

The PENT/CPCI-761 provides a one-slot front panel with a PMC slot and memory module connectors. The figures below show the PENT/CPCI-761 assembly.

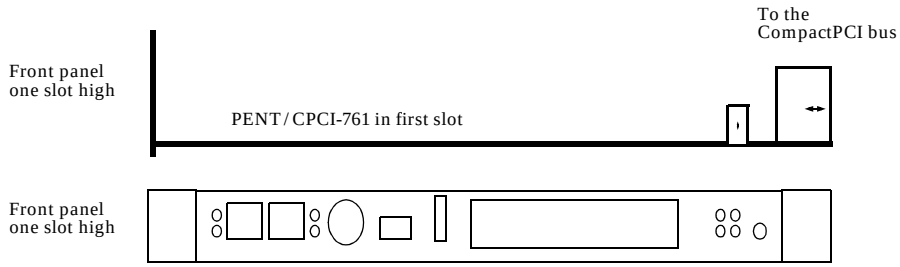


Figure 3: PENT/CPCI-761 Assembly

PENT/CPCI-760

Due to the Carrier-760, the PENT/CPCI-760 provides a two-slot front panel consisting of the PENT/CPCI-761 and the Carrier-760. The carrier provides the mounting points for a hard disk drive or a floppy disk drive and requires the second slot space.

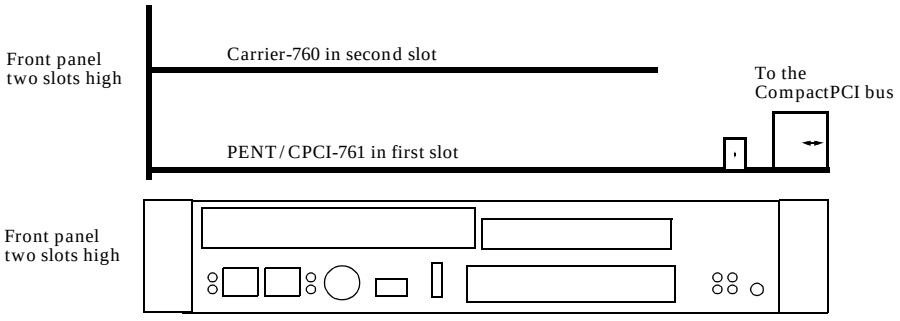


Figure 4: PENT/CPCI-760 Assembly

Standard Compliance

The PENT/CPCI-760/761 complies with the following standards:

Table 2: *Standard Compliance*

Standard	Description
IEC 68-2-1/2/3/13/14	Climatic environmental requirements.The PENT/CPCI-760/761 can only be used in an restricted temperature range (see Table 5 “Environmental Requirements” on page 2-4) for details.
IEC 68-2-6/27/32	Mechanical environmental requirements
EN 609 50/UL 1950 (predefined Force system); UL 94V-0/1	Legal requirements
EN 50081-1, EN 50082-2, FCC Part 15 Class A	EMC requirements on system level
ANSI/IPC-A-610 Rev.B Class 2, ANSI/IPC-R-700B, ANSI-J-001...003	Manufacturing Requirements
ISO 8601	Y2K compliance

Ordering Information

When ordering PENT/CPCI-760/761 board variants, upgrades and accessories, use the order numbers given below.

Product Nomenclature

Table 3: *Product Nomenclature*

PENT/CPCI-761/*ddd*-*ppp*-L*ccc*-*u* and PENT/CPCI-760/*ddd*-*ppp*-L*ccc*-*U*	
ddd	DRAM size in MByte
ppp	Processor clock frequency in MHz
Lccc	L2 cache capacity in KByte
U	Flash disk capacity in MByte

Order Numbers

The following table is an excerpt from the PENT/CPCI-760/761 ordering information. The upgrades and accessories available depend on the variant of the PENT/CPCI-760/761 under consideration. Consult your local sales representative to confirm availability of specific combinations.

Table 4: *Ordering Information Excerpt* [1)]

Order No.	Board	Description
106830	PENT/CPCI-760/256-500-L256-16	Intel Pentium III 500 MHz with 256 MByte main memory, 256 KByte 2nd level cache, and 16 MByte disk flash
108428	PENT/CPCI-760/256-700-L256-16	Intel Pentium III 700 MHz with 256 MByte main memory, 256 KByte 2nd level cache, and 16 MByte disk flash
106831	PENT/CPCI-761/256-400-L256-16	Intel Pentium III 400 MHz with 256 MByte main memory, 256 KByte 2nd level cache, and 16 MByte disk flash
Hardware Accessories		
107031	PENT/MEM-700/256-AccKit	256 MByte memory module
107095	PENT/MEM-700/512-AccKit	512 MByte memory module
104968	PENT/CPCI-720/CPUP5-AccKit	Rear I/O panel for the PENT/CPCI-760/761 and related installation components
104962	PENT/CPCI-720/FD-Acc-Kit	Floppy disk and related installation components
106832	PENT/CPCI-760/HD-AccKit	Hard disk and related installation components
Software Accessories		
107039	PENT/CPCI-760/BIOS-UpKit	BIOS upgrade utilities
105582	PENT/CPCI-720/NTDrv-AccKit	Windows NT drivers

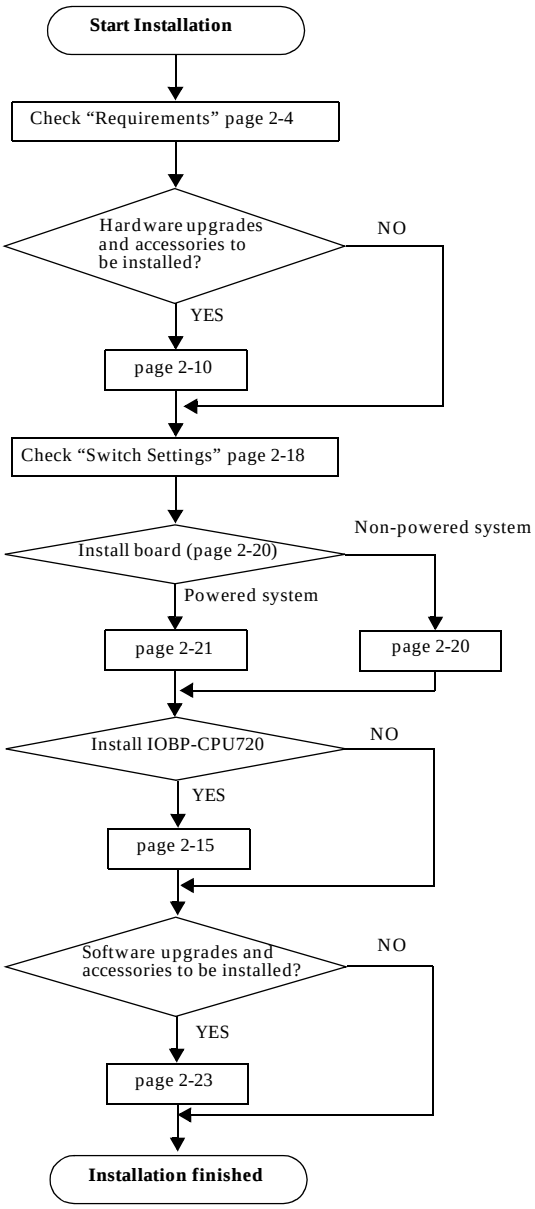
1) Status April 2002

2

Installation

Action Plan

In order to install the board, the following steps are required and will be described in detail in this chapter.



Requirements

In order to meet the requirements, the PENT/CPCI-760/761 has to be tested in the system where it has to be installed. Before powering up the board, calculate the power needed according to your combination of upgrades and accessories.

Environmental Requirements

The environmental values must be tested and proven in the used system configuration. The conditions listed below refer to the surroundings of the board within the user environment.

Note: Operating temperatures refer to the temperature of the air circulating around the board and not to the component temperature.

Caution



- **To ensure that the operating conditions are met, forced air cooling is required within the chassis environment.**
- **Do not operate the product outside the specified environmental limits. High humidity and condensation may cause short circuits. Make sure the product is completely dry and there is no moisture on any surface before applying power. Do not operate the product below 0°C.**
- **If the standard PENT/CPCI-760/HD-AccKit is installed, the operating temperature of the PENT/CPCI-760/761 is limited by the maximum operation temperature of the hard disk. If the maximum temperature of the hard disk is lower than the maximum temperature of the PENT/CPCI-760/761, the maximum temperature for the hard disk must not be exceeded.**

Table 5: *Environmental Requirements*

Feature	Operating	Non-Operating
Temperature[1)]	0°C to +55°C	–40°C to +85°C
Forced air flow (in linear feet per min.)	300 LFM	-
Temp. change	+/– 0.5°C/min	+/– 1°C/min
Rel. humidity	5% to 95% non-condensing at +40°C	5% to 95% non-condensing at +40°C

Table 5: *Environmental Requirements (cont.)*

Feature	Operating	Non-Operating
Altitude	–300 m to +3,000 m	–300 m to +13,000 m
Vibration[2)]		
10 to 15 Hz	2 mm amplitude	5 mm amplitude
15 to 150 Hz	2 g	5 g
Shock	5 g / 11 ms halfsine	15 g / 11 ms halfsine
Free fall	100 mm / 3 axis	1,200 mm / all edges and corners (packed stated)

1. For information on the allowed hard disk operating temperature, consult the Installation Guide of the PENT / CPCI-760 / HD-AccKit.
2. For information on shock and vibration values that are valid when using the PENT / CPCI-760 together with the PENT / CPCI-760 / HD-AccKit, refer to the Installation Guide of the PENT / CPCI-760 / HD-AccKit.

Caution



If the standard PENT/CPCI-760/HD-AccKit is installed, the operation temperature of the PENT/CPCI-760 is limited by the maximum operation temperature of the hard disk. If the maximum temperature of the PENT/CPCI-760 of the hard disk lower than the maximum temperature of the PENT/CPCI-760, the maximum temperature specified for the hard disk must not be exceeded.

Power Requirements

The PENT / CPCI-760 / 761 power supply requirements depend on the installed hardware accessories. The following table gives examples of typical power requirements for 3.3V and 5.0V for the PENT / CPCI-760 / 761.

Table 6: *Power Requirements*

PENT/CPCI-760/761	+3.3V	+5V	+12V
PENT / CPCI-760 / 256-700-L256-16	2.4A	2.9A	0.2A
PENT / CPCI-760 / 256-500-L256-16	2.4A	2.9A	0.2A
PENT / CPCI-761 / 256-400-L256-16	2.0A	2.0A	0.2A
PENT / CPCI-720 / FD-AccKit / *cccc*MB	-	0.3A	-
PENT / CPCI-760 / HD-AccKit	-	0.5A	-

Location Overview

The figures below show the position of the important components of the PENT / CPCI-760 / 761.

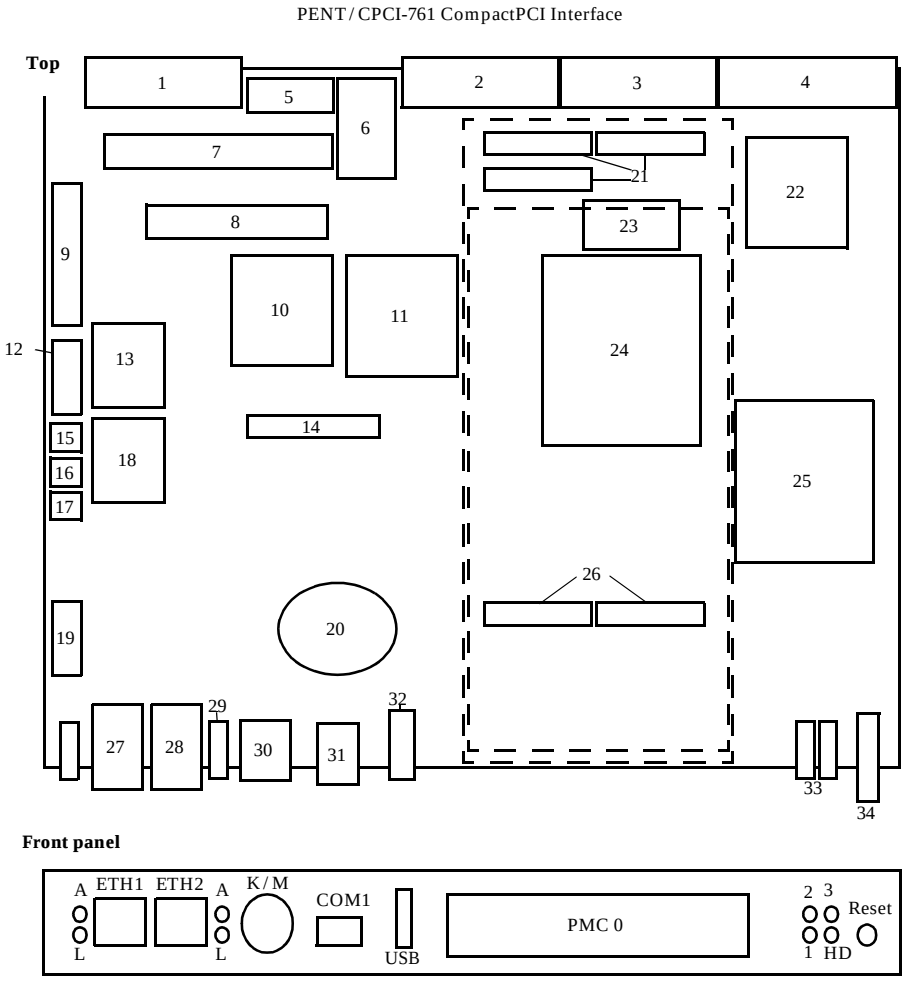


Figure 5: *Location Diagram of the PENT/CPCI-761*

Table 7: *Important Components of the PENT/CPCI-761*

No.	Feature	No.	Feature
1	J5	18	Ethernet2
2	J3	19	I^2C (SPD), JTAG 1
3	J2	20	Battery
4	J1	21	PMC 0
5	Debug port	22	PCI-to-CPCI bridge
6	Super I/O	23	NVRAM
7	Connector to I/O-720	24	Host-to-PCI bridge
8	IDE (primary device)	25	CPU
9	Port 80	26	Memory module connectors
10	PCI-to-localPCI bridge	27	ETH1
11	PCI-to-ISA bridge, USB, EIDE, RTC	28	ETH2
12	JTAG2, BIB	29	LEDs
13	Ethernet1	30	KBD, MS
14	Floppy	31	COM1
15	SW1	32	USB
16	SW2	33	LEDs
17	SW3	34	Reset key

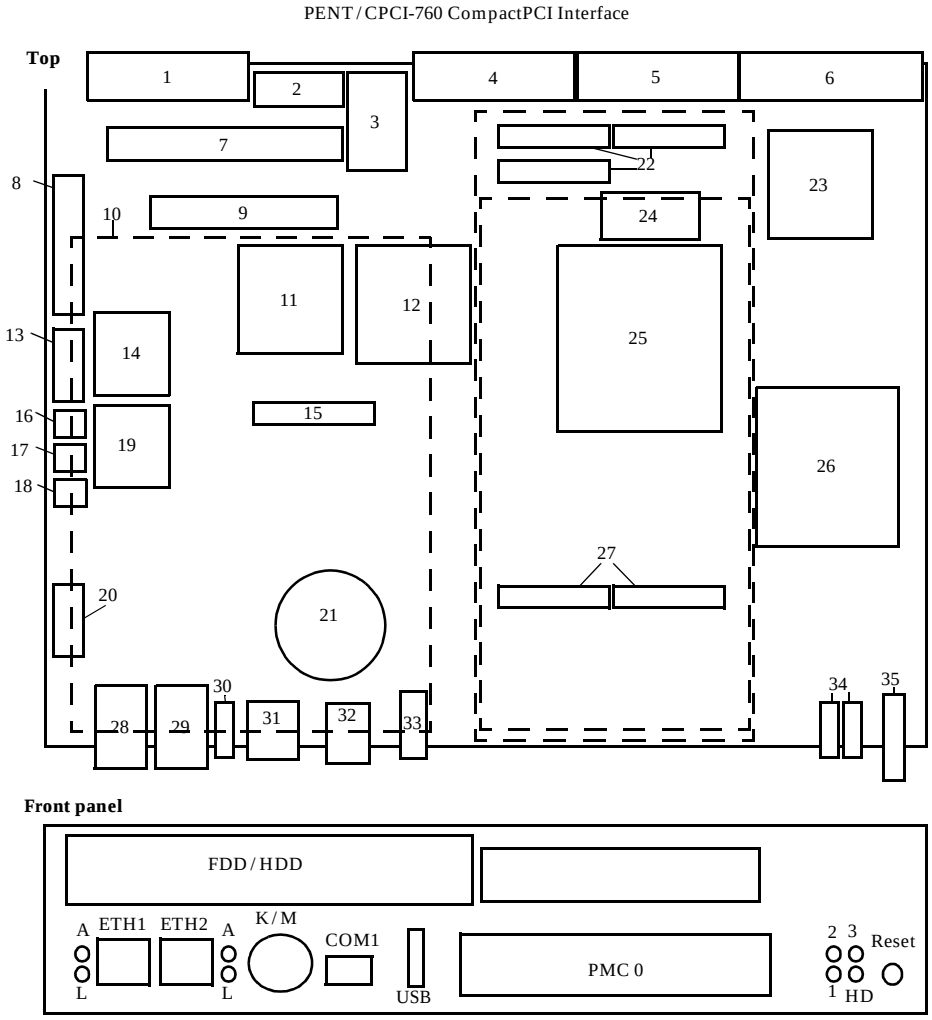


Figure 6: *Location Diagram of the PENT/CPCI-760*

Table 8: *Important Components of the PENT/CPCI-760*

No.	Feature	No.	Feature
1	J5	19	Ethernet 2
2	Debug port	20	I^2C (SPD), JTAG1
3	Super I/O	21	Battery
4	J3	22	PMC 0
5	J2	23	PCI-to-CPCI bridge
6	J1	24	NVRAM
7	Connector to I/O-720	25	Host-to-PCI bridge
8	Port 80	26	CPU
9	IDE (primary device)	27	Memory module connectors
10	Carrier-760	28	ETH1
11	PCI-to-local PCI bridge	29	ETH2
12	PCI-to-ISA bridge, USB, EIDE, RTC	30	LEDs
13	JTAG2, BIB	31	KBD, MS
14	Ethernet 1	32	COM1
15	Floppy (FD)	33	USB
16	SW1	34	LEDs
17	SW2	35	Reset key
18	SW3		

Hardware Upgrades and Accessories

Apart from possible extensions via the CompactPCI system, the PENT/CPCI-760/761 itself allows an easy and cost-efficient way of adapting the system board to the application‘s needs.

This section describes the options listed in Table 4 “Ordering Information Excerpt” page 1-10.

Memory Modules

The memory configuration is adjustable to the application’s needs via selection of the appropriate memory module.

For installation information see the Installation Guide delivered together with the memory module.

PMC Module

The PENT/CPCI-760/761 provides one PMC slot. The PMC slot 0 supports 32-bit data bus width with a maximum frequency of 33 MHz. At the PMC slot, a voltage of +/ 12V applies.

The PMC slot can be used to install a standard PMC module with front panel and rear panel interface on the PENT/CPCI-760/761. It provides no user I/O connector.

Note:

- **To ensure proper EMC shielding, always operate the PENT/CPCI-760/761 with the blind panel for the PENT/CPCI-760/761 front panel or with the module installed.**
- **If the PENT/CPCI-760/761 is upgraded, ensure that the blind panel is stored in a safe place to be used again when removing the upgrades.**

Voltage Keys

The PCI bus uses a 5V voltage signal level on the PMC slot 0. The 5V voltage key prevents 3.3V PMC modules from being plugged into the PMC slot 0.

Connector Configuration

The 32-bit PCI bus requires two PMC connectors. The third PMC connector - if available - connects additional user I/O signals of the PMC slot with the peripheral board's CompactPCI J3 connector.

Installation Procedure

1. Remove accessory from PMC slot, if applicable
2. Remove blind panel from PMC slot on front panel
3. Store blind panel in safe place

Caution



The total maximum power consumption per PMC slot at +/- 12V, 5V, and 3.3V level must not exceed 7.5W (total overall used voltages).

4. Plug PMC module into PMC connectors
5. Check whether standoffs of module cover mounting holes of PENT/CPCI-760/761
6. Place screws delivered with PMC module into mounting holes
7. Fasten screws

Removal Procedure

1. Remove screws
2. Disconnect PMC module carefully from slot
3. Close front panel gap at free slot with blind panel

Installing and Removing the Carrier-760

The Carrier-760 serves to connect the floppy disk drive or the hard disk drive to the PENT/CPCI-760.

Note: The Carrier-760 can only be mounted on the PENT/CPCI-760.

Installation Procedure

1. Position Carrier-760 on PENT/CPCI-760
2. Connect all cables to respective components on PENT/CPCI-760, if applicable
3. Fasten screws

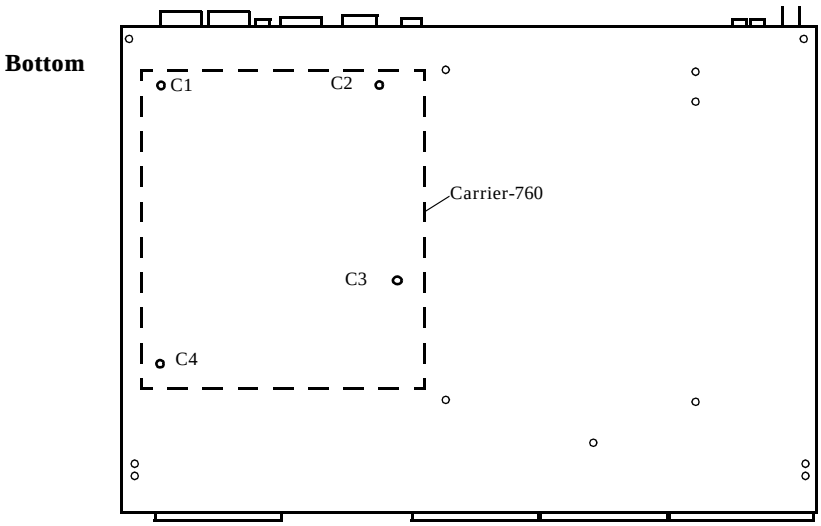


Figure 7: *Mounting Points of the Carrier-760*

Removal Procedure

1. Remove screws
2. Check whether any cabling connects components mounted on Carrier-760 to connectors on PENT/CPCI-760
3. In case of cables, disconnect all such cables by unplugging them from the PENT/CPCI-760
4. Remove Carrier-760 from PENT/CPCI-760

FD-AccKit

The floppy disk accessory kit is called PENT/CPCI-720/FD-AccKit and contains the floppy disk itself, the cabling and screws which are necessary to install the floppy disk onto the Carrier-760 and connect it to the on-board floppy connector of the PENT/CPCI-760 board.

Caution



The FD-AccKit is used for PENT/CPCI-760 only.

Installation Procedure

Note: The connectors of the floppy cable contained in the accessory kit are blue on one side.

1. Plug one of floppy cable ends into connector on floppy disk drive's top so that cable's blue side remains visible
2. Move floppy disk drive into drive cage
3. Remove Carrier-760

4. Install floppy disk drive on Carrier-760 with three screws at locations FD2, FD3, and FD4

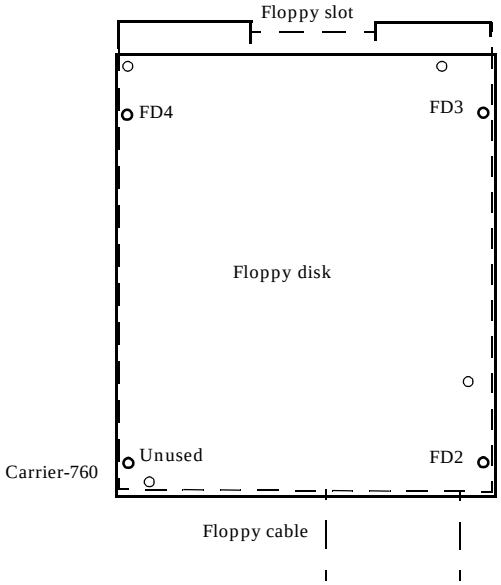


Figure 8: *Fastening the Floppy Disk on the Carrier-760 (Bottom View)*

5. Position Carrier-760 above PENT/CPCI-760, but do not fasten it yet
6. Plug floppy cable into the on-board floppy connector of PENT/CPCI-760
7. Move cabling so that it stays between PENT/CPCI-760 and Carrier-760
8. Install Carrier-760

Note: After hardware installation is completed and PENT/CPCI-760 is installed in CompactPCI rack, enter BIOS Setup and select correct floppy disk type (see "Boot Configuration" page 4-6).

Removal Procedure

1. Remove Carrier-760
2. Unplug floppy cable from on-board floppy connector of PENT/CPCI-760
3. Unfasten screws of Carrier-760
4. Unfasten screws of floppy disk drive from Carrier-760 by loosening three screws at locations FD2, FD3, and FD4

IDE Devices

It is possible to have up to four IDE devices on the PENT/CPCI-760/761:

- As a factory option, a 16 MByte flash disk can be installed on the board. It is connected to the primary IDE port.
- A HD-accessory kit can be installed to the secondary IDE port via the on-board connector.
- Two IDE devices can be installed on the secondary IDE port via the IOBP-CPU720

HD-Accessory Kit

The PENT/CPCI-760/HD-AccKit is a local mass storage device. It has to be connected to the primary IDE port via the on-board connector. The 2.5” hard drive is installed on the Carrier-760.

Caution



The HD-AccKit is used for PENT/CPCI-760 only.

Note:

- **For information on the capacity of the hard disk refer to the label on the hard disk itself.**
- **Pin-one wire of the hard disk cable contained in the accessory kit is marked red.**

Installation Procedure

1. Check IDE mode configuration for all installed IDE drives and set hard disk drive appropriately to fit all IDE devices
   For further information, see the installation information delivered together with the hard disk accessory kit.
2. Plug cable connector without nose into connector on hard disk drive's back panel so that two pin pairs next to red marking remain unconnected
3. Uninstall Carrier-760
4. Fasten hard disk drive onto Carrier-760 with four screws at locations HD1, HD2, HD3, and HD4 as shown in figure below

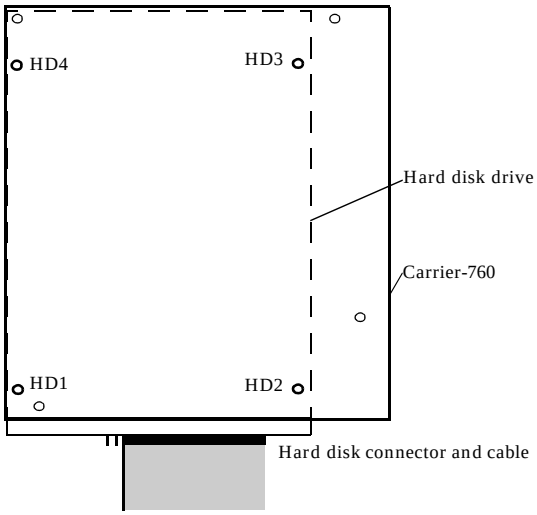


Figure 9: *Fastening the Hard Disk Drive on the Carrier-760 (Bottom View)*

5. Position Carrier-760 above PENT/CPCI-760, but do not fasten it yet
6. Plug hard disk cable into on-board IDE connector of PENT/CPCI-760
7. Move cabling so that it stays between PENT/CPCI-760 and Carrier-760
8. Install Carrier-760
9. Prepare hard disk for operating system used
   Typically the hard disk has to be partitioned and formatted.

Note: After the hardware installation is completed and the PENT/CPCI-760 is installed in the CompactPCI rack, enter BIOS Setup and select the auto configuration option for the hard disk installed (see "Boot Configuration" page 4-6).

Removal Procedure

1. Remove Carrier-760
2. Unplug hard disk cable from on-board IDE connector of PENT/CPCI-760
3. Unfasten hard disk drive from Carrier-760 by loosening four screws at locations HD1, HD2, HD3, and HD4
4. Reinstall Carrier-760

IOBP-CPU720

The IOBP-CPU720 has to be installed from the rear and provides access to the PENT/CPCI-760/761 CompactPCI user I/O interfaces via industry standard connectors. It is included in the PENT/CPCI-720/CPUP5-AccKit, containing the I/O panel itself and the cabling.

For installation information refer to the Installation Guide delivered together with the IOBP-CPU720.

Note: Use only the IOBP-CPU720 panel with the PENT/CPCI-760/761. The primary IDE port on the IOBP-CPU720 is not available when used with the PENT/CPCI-760/761.

Switch Settings

The PENT/CPCI-760/761 is configurable via three micro-switches. The board is delivered with the white switches set to the default position.

Table 9: *Switch Settings*

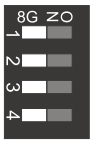
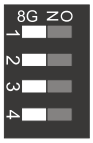
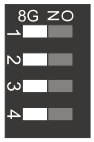
Switch	Number	Description
SW1		
	1	Flash Disk IDE mode OFF: On-board flash disk is primary IDE master (default) ON: On-board flash disk is primary IDE slave
	2	Keyboard control OFF: Keyboard enabled (default) ON: Keyboard disabled
	3	Reset key control OFF: Reset key enabled (default) ON Reset key disabled
	4	Abort key control OFF: Abort key enabled (default) ON: Abort key disabled
SW2		
	1	BIOS flash write protection OFF: Writing enabled (default) ON: Write-protected
	2	On-board flash disk OFF: Enabled (default) ON: Disabled
	3	Ethernet 1 connector selection OFF: Ethernet via front panel connector (default) ON: Ethernet via the CompactPCI connector
	4	BIOS flash bootblock write protection OFF: Write-protected (default) ON: Writing enabled

Table 9: *Switch Settings (cont.)*

Switch	Number	Description
SW3		
	1	Monitoring of +/–12V OFF: Disabled (default) ON: Enabled
	2	FPGA serial download bitstream via OFF: On-board flash (default) ON: JTAG connector
	3	Flash Initialization, must be OFF (default)
	4	Reserved for Force internal use, always must be OFF (default)

Board Installation

The PENT/CPCI-760/761 is a system slot board and can be used in both hot-swap and non-hot-swap platforms.

The PCI bus, a high speed local bus, connects different high-speed I/O cards with the PENT/CPCI-760/761. The PCI bus supports 32-bit data bus width with a frequency of 33 MHz.

Installation in a Non Powered System

Note: Before installing the PENT/CPCI-760/761, install the hardware upgrades and accessories, if applicable.

Installation Procedure

In order to install the PENT/CPCI-760/761, proceed as follows:

1. Turn off system power

Caution



- **Always plug the PENT/CPCI-760/761 into a system slot of a CompactPCI rack marked by a triangle. Otherwise the board or other cards in the system may be damaged.**
- **Before plugging in the board, check the switch settings for consistency.**

2. Plug board in a system slot
3. Press handles inward to lock board onto CompactPCI rack
4. Fasten board with screws
5. Plug interface cables into front panel connectors, if applicable
6. Turn on system power

Removal Procedure

1. Turn off system power
2. Unfasten screws of front panel until board is detached from rack frame
3. Press handles outwards to disconnect board from backplane
4. Remove board from rails of slot position

Installation in a Powered System

Note: Before installing the board install the hardware upgrades and accessories, if applicable.

As a system board the PENT/CPCI-760/761 can support basic hot swap only. Basic hot swap support allows to install a board in and remove it from a powered system without adversely affecting the system. This is helpful when exchanging faulty boards or reconfiguring a system.

The PENT/CPCI-760/761 is a CompactPCI-universal board and can be run with 5V.

Note: The PENT/CPCI-760/761 is compliant to the Hot Swap Specification PICMG 2.1 Rev. 1.0 which defines hot swap only for 5V signaling.

Caution



- **Never install a board in or remove it from a system under hot-swap conditions unless a hot-swap platform is used and the system documentation explicitly includes appropriate guidelines.**
- **Removing a system board will cause the whole CompactPCI system to stop operation.**

Note: When installing or removing the board, refer to the documentation of all installed boards and to the system documentation.

Installation Procedure

1. Check board configuration (switch settings, accessories)
2. Check installation configuration of rear interface for slot in which board is to be plugged in
3. Insert board into powered system
4. Press handles inwards to lock board on CompactPCI rack
5. Fasten board with two screws on front panel
6. Reboot system

Removal Procedure

1. Shut down operating system
2. Unfasten two screws of front panel until board is detached from rack frame
3. Press handles outwards to disconnect board from backplane
4. Remove board from powered system

Software Upgrades and Accessories

The following software upgrades and accessories are offered for the PENT/CPCI-760/761.

BIOS-Upgrade Kit

The PENT/CPCI-760/BIOS-UpKit contains a DOS-formatted floppy disk with BIOS upgrade file and BIOS utilities e.g. to reflect extended hardware support. For installation information refer to the README file provided on the floppy disk.

NT-Driver Kit

With the PENT/NT-Support Package comes a CD-ROM with Windows NT drivers e.g. to reflect extended hardware support for Windows NT (e.g. Ethernet driver). For installation information refer to the README file on the CD-ROM.

3

Controls, Indicators, and Connectors

Front Panel

The front panel of the PENT/CPCI-760/761 provides the cutout for the PMC module, connectors and LEDs.

PMC Cutout

The PENT/CPCI-760/761 provides one PMC cutout to install a PMC module.

LEDs

The PENT/CPCI-760/761 provides the following LEDs:

Table 10: *Description of Front Panel LEDs*

LED	Description
1, 2, 3	User LEDs: Software programmable by the LED Control Register. Possible LED status: green, red, or OFF.
A	Activity LED: Signals Ethernet network transfers regardless of the connector used – Ethernet 1 or Ethernet 2 – front panel or the CompactPCI connector. Possible LED status: yellow or OFF
L	Link LED: Signals successful connection to a network regardless of the connector used – Ethernet 1 or Ethernet 2 – front panel or the CompactPCI connector. Possible LED status: green or OFF
HD	Hard disk LED: Signals access to devices connected via IDE. Possible LED status: flickering during access activity, else OFF. The LED color is customizable via the LED Control Register

Keys

The only front panel key used is the mechanical reset key.

When enabled and toggled, it instantaneously affects the system board by generating a main reset. The main reset generates a CompactPCI reset on segment A and B.

A reset of all on-board I/O devices and the CPU is performed when the reset key is pushed into the active position. Reset is held active until the key is back in its inactive position, however at least 200 ms are guaranteed by a local timer. Power fail (below approximately 4.7V) and power up - both lasting at minimum 200 ms to 300 ms - also force a reset to start the PENT/CPCI-760/761.

For information on how to disable the key, see the “Switch Settings” section on page 2-18.

Connectors

The PENT/CPCI-760/761 provides the following front panel connectors:

- COM1
- Ethernet 1
- Ethernet 2
- Keyboard/Mouse
- USB

If the PENT/CPCI-760/761 is to be incorporated into larger systems and adapted to specific needs, the following pinouts may be useful to give information on which signal is assigned to which pin.

Note: Make sure that the length of keyboard, mouse, and USB cables does not exceed three meters and that the cables are installed apart from other cables.

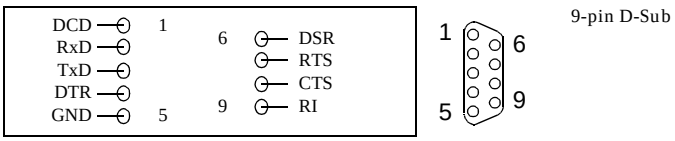


Figure 10: *COM1 Connector Pinout*

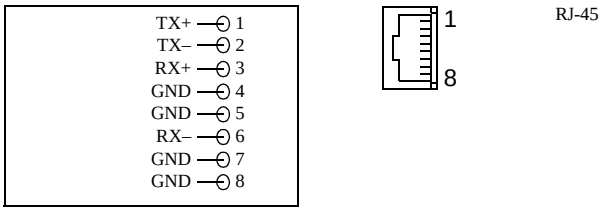


Figure 11: *ETH1 - Ethernet Connector Pinout*

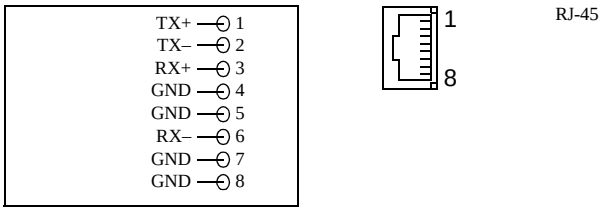


Figure 12: *ETH2- Ethernet 2 Connector Pinout*

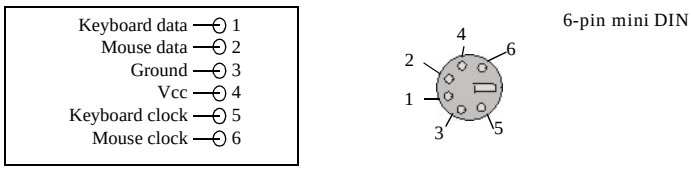


Figure 13: *K/M - Keyboard/Mouse Connector Pinout*

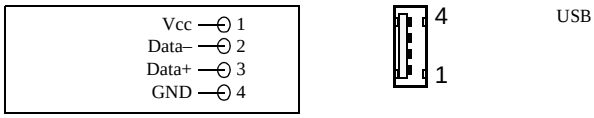


Figure 14: *USB Connector Pinout*

On-Board

The PENT/CPCI-760/761 provides the on-board connectors for floppy drive and IDE devices.

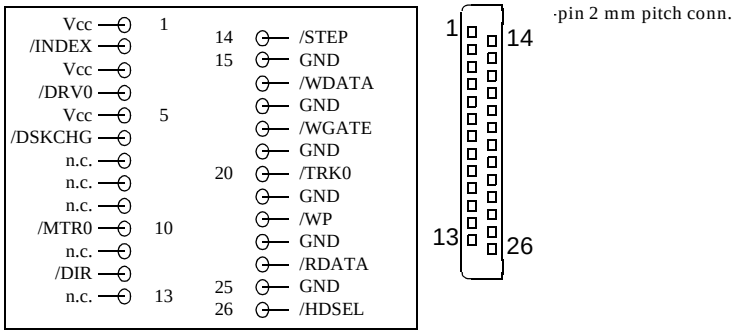


Figure 15: *Floppy (FD) Connector Pinout*

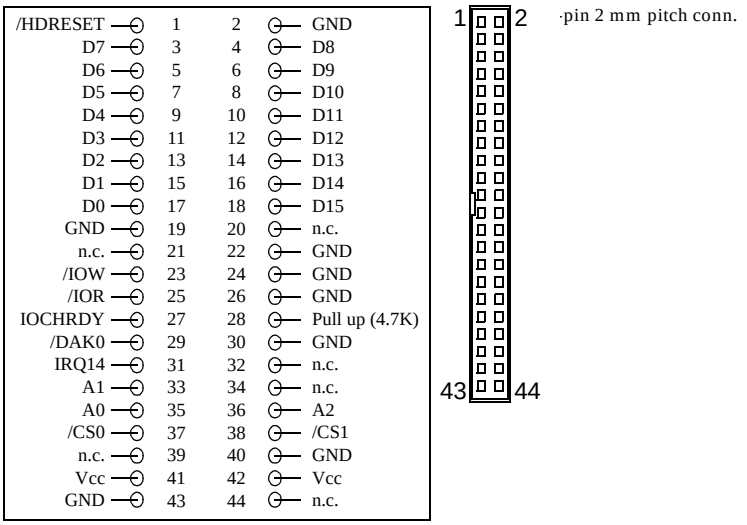


Figure 16: *IDE (Primary Device) Connector Pinout*

CompactPCI Connectors

The J1 and J2 connectors implement the CompactPCI 64-bit connector pinout as specified by the CompactPCI CPCI Specification PICMG 2.0 Rev. 2.1. Therefore, this manual only documents the pinout of the J3 and J5 connectors.

The PENT / CPCI-760 / 761 is a CompactPCI 5V board operational in the 5V CompactPCI systems. Therefore, 5V voltage keys are provided on the CompactPCI interface.

J3

A	B	C		D	E
V(I/)O	PMC-IO-64	PMC-IO-63	1	PMC-IO-62	PMC-IO-61
PMC-IO-60	PMC-IO-59	PMC-IO-58	2	PMC-IO-57	PMC-IO-56
PMC-IO-55	PMC-IO-54	PMC-IO-53	3	PMC-IO-52	PMC-IO-51
PMC-IO-50	PMC-IO-49	PMC-IO-48	4	PMC-IO-47	PMC-IO-46
PMC-IO-45	PMC-IO-44	PMC-IO-43	5	PMC-IO-42	PMC-IO-41
PMC-IO-40	PMC-IO-39	PMC-IO-38	6	PMC-IO-37	PMC-IO-36
PMC-IO-35	PMC-IO-34	PMC-IO-33	7	PMC-IO-32	PMC-IO-31
PMC-IO-30	PMC-IO-29	PMC-IO-28	8	PMC-IO-27	PMC-IO-26
PMC-IO-25	PMC-IO-24	PMC-IO-23	9	PMC-IO-22	PMC-IO-21
PMC-IO-20	PMC-IO-19	PMC-IO-18	10	PMC-IO-17	PMC-IO-16
PMC-IO-15	PMC-IO-14	PMC-IO-13	11	PMC-IO-12	PMC-IO-11
PMC-IO-10	PMC-IO-09	PMC-IO-08	12	PMC-IO-07	PMC-IO-06
PMC-IO-05	PMC-IO-04	PMC-IO-03	13	PMC-IO-02	PMC-IO-01
3.3 V	3.3 V	3.3 V	14	5 V	5 V
reserved	reserved	reserved	15	reserved	reserved
reserved	reserved	reserved	16	reserved	reserved
reserved	reserved	reserved	17	reserved	reserved
reserved	reserved	reserved	18	reserved	reserved
reserved	reserved	reserved	19	reserved	reserved

Figure 17: *CompactPCI J3 Connector Pinout*

J5

Besides the CompactPCI – specific pinout the following ports are available on the PENT / CPCI-760 / 761 CompactPCI J5 connector (the name used in the following pinout is given in brackets):

- Ethernet 1 (ETH1)
- Secondary (2nd IDE) IDE
- USB (USB), Keyboard (KBD), PS2 mouse (MSE), COM1 (COM1), COM2 (COM2), LPT (LPT), floppy (FD)

A	B	C		D	E
SMI	reserved	reserved	1	reserved	ETH RX–
ETH TX–	reserved	ETH TX+	2	ETH RX+	reserved
KBD clock	KBD data	MSE clock	3	MSE data	IDE /DIAG
1st IDE A2	2nd IDE A2	1st IDE /CS3	4	USB P1–	USB P1+
2nd IDE A0	1st IDE /CS1	2nd IDE /CS1	5	2nd IDE /CS3	IDE /RST
1st IDE IRQ	2nd IDE IRQ	1st IDE A1	6	1st IDE /LED	2nd IDE /LED
1st IDE /IOR	2nd IDE /IOR	IDE IORDY	7	2nd IDE A1	1st IDE A0
IDE D15	1st IDE DRQ	2nd IDE DRQ	8	1st IDE DAK	2nd IDE DAK
IDE D10	IDE D11	IDE D12	9	1st IDE /IOW	2nd IDE /IOW
IDE D5	IDE D6	IDE D7	10	IDE D13	IDE D14
IDE D0	IDE D1	IDE D2	11	IDE D8	IDE D9
FD /DR1	FD DENSEL	FD DRATE0	12	IDE D3	IDE D4
FD /DSKCHG	FD /WP	FD /MTR0	13	FD MSEN0	Vcc
FD /HDSEL	FD /DIR	FD /STEP	14	FD /MTR1	FD /DR0
Vcc	LPT Pe	FD /RDATA	15	FD /TRK0	FD /INDEX
LPT Busy	LPT /Init	LPT Slct	16	FD /WDATA	FD /WGATE
LPT /Autofeed	LPT Data 5	LPT /Slctin	17	LPT /Error	LPT /Ack
LPT Data 4	LPT Data 0	LPT Data 6	18	LPT Data 7	LPT Strobe
COM2 RI	/PBRESET	LPT Data 1	19	LPT Data 2	LPT Data 3
COM2 RxD	COM2 TxD	COM2 DTR	20	COM2 RTS	COM2 CTS
COM1 RTS	COM1 CTS	COM1 RI	21	COM2 DCD	COM2 DSR
COM1 DCD	COM1 RxD	COM1 TxD	22	COM1 DTR	COM1 DSR

Figure 18: *CompactPCI J5 Connector Pinout*

The interfaces available on the CompactPCI interface can be routed to interface-dependent standard connectors via the IOBP-CPU720.

4

BIOS

Features

The PENT/CPCI-760/761 is designed to run with Windows NT Version 4.0. The initial boot up procedure is performed by BIOS which is PCI 2.1 compliant, upgradable via software utility, and provides the following features:

- Advanced Power Management
- DMI 2.00.1 BIOS support
- Hardware initialization at boot:
  At power-on or reset, BIOS performs Power-On Self Test (POST) routines to test system resources. Afterwards it loads and starts the operating system.
- Hardware setup via Setup utility
- Initializing hardware required for PENT/CPCI-72x features such as Plug-and-Play (PnP) and Power Management
- Plug-and-Play 4.0 compliant (PnP)

Boot Selection Menu

BIOS automatically starts during power up or reset.

Press <Esc> while boot-up screen is displayed to continue with the POST screen until the end of POST. Then the boot selection menu is displayed.

In the boot menu, you will find the following options:

1. Override existing boot sequence (for this boot only) by selecting another boot device from boot-order list
   If specified device does not load operating system, BIOS reverts to previous boot sequence
2. Enter Setup
3. Press <Esc> to return to the POST screen and continue with previous boot sequence

Setup

BIOS provides the Setup program to configure the setting of a wide range of PENT/CPCI-760/761 features.

Press <F2> to enter Setup.The following options are displayed:

- LPT, COM1, and COM2 can be remapped via the advanced configuration option for integrated peripherals in BIOS setup.
- The IDE devices can be configured via the main configuration options for primary and secondary IDE masters and slaves and via the advanced configuration option for integrated peripherals. This configuration capability is used for example at the first boot after connecting an IDE device.
- The floppy type can be configured via the respective main configuration options for diskettes. This configuration capability is used for example at the first boot after installing a floppy via the respective I/O panel.

Boot Configuration

The boot configuration options in Setup let you select the order of the devices from which BIOS attempts to boot the operating system. During POST, BIOS tries the next one on the list if it is unsuccessful at booting from one device.

Each device listed represents the first of a group of devices if more than one device of this group is installed on the system. For example, if there is more than one hard disk drive, the displayed entry represents the first of these drives as specified in the boot configuration option for fixed media. The same applies to removable media.

The same options determine the order in which POST installs the devices and the operating system assigns device letters. BIOS supports up to two floppy devices, to which the operating system may assign, for example, drive letters A: and B:.

C:, D:, E:, etc. are assigned to hard disk drives.

Note: There is not always an exact correspondence between the order specified in these menus and the letters assigned by the operating system. Many devices such as legacy option ROMs support more than one devices, which can be assigned more than one letter. If you want the CD-ROM drive to be listed before the hard drive, move it in front of the hard drive. The group of bootable add-in cards refers to devices with non-multiboot-compliant BIOS option ROM from which you can boot the operating system.

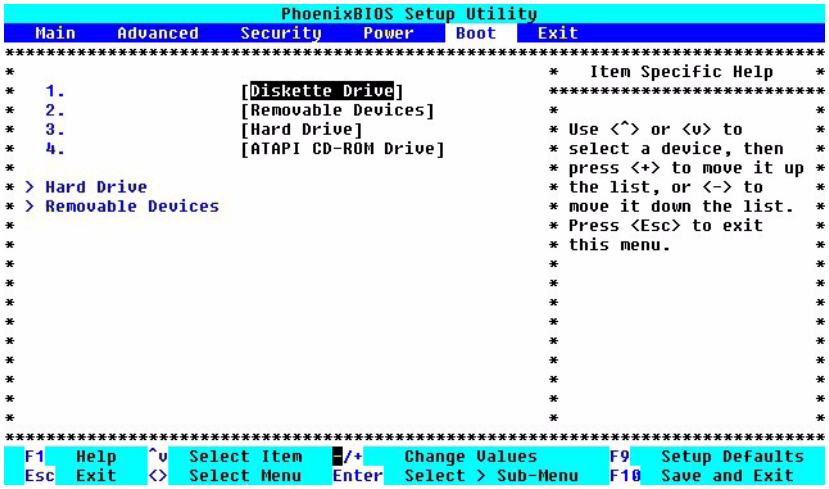


Figure 19: *Sample Start-Up Showing the Boot Configuration Options*

In the example above, BIOS attempts to boot in the following order:

1. Diskette drive
2. Removable devices
3. Hard drive
4. ATAPI CD-ROM drive

Note:

- **If you save the changes you made in Setup, the selections in the menus are stored in NVRAM (CMOS). The next time the system board boots, BIOS configures the system according to the Setup selections stored in NVRAM (CMOS). If those values cause the system boot to fail, reboot and press <F2> to enter Setup. In Setup, you can get the default values or try to change the selections that caused the boot to fail.**
- **If you get the default values, note that the displayed default values are not yet stored to be effective for the next boot. They are just loaded to be displayed. However, they are effective when the current boot-up procedure is resumed.**

Depending on the messages displayed, there are other keyboard inputs resulting in calls to special BIOS Setup programs, including, for example, <Ctrll>+<A> to enter the SCSI BIOS for the dual-segment variant. If the BIOS or an option ROM (e.g. of an add-on card) requests keyboard input, you are prompted to enter the information. POST continues from there with the regular POST screen.

Note: Whenever POST detects a non-fatal error, BIOS displays the errors. It then displays a message asking you to choose between boot continuation or error correction via Setup.

Sample Start-Up

The following figure shows a sample startup message following the video BIOS message which displays the graphic card type and the video RAM size.

```
PhoenixBIOS 4.0 Release 6.0
Copyright 1985-1998 Phoenix Technologies Ltd.
All Rights Reserved

FORCE COMPUTERS - CPCI-76x BIOS Revision 2.1.1

Build Time: 08/29/00 18:32:50


CPU = Intel(R) Pentium processor 200 MHz
640K System RAM Passed
127M Extended RAM Passed
0512K Cache SRAM Passed
System BIOS shadowed
Video BIOS shadowed
UMB upper limit segment address: EB67
ATAPI CD-ROM: TOSHIBA CD-ROM XM-6602B
Mouse initialized




Press <F2> to enter SETUP
```

Figure 20: *Sample Start-Up Message*

Caution



- **The NVRAM (CMOS) values may have been corrupted or modified incorrectly, perhaps by an application program that changes data stored in NVRAM (CMOS). BIOS detects such problems by verifying a so-called "System CMOS Checksum".**
- **If, during boot-up, BIOS detects a problem in the integrity of values stored in NVRAM (CMOS), it displays a message asking you to choose between boot continuation or entering Setup with the ROM default values already loaded into the menus.**
- **After entering Setup with the ROM default values already loaded into the menus, it might be possible to restore some values as saved in NVRAM (CMOS) via the exit configuration option to load previous values. However, you should then try to fix the erroneous values causing BIOS to encounter problems.**

BIOS Messages

In POST, BIOS detects and configures the system hardware. During this process, various error conditions may appear. BIOS reports them with BIOS messages and you may be able to restore the original values.

Message	Explanation	Corrective Action
`nnnn Cache SRAM Passed`	Where *nnnn* is the amount of system cache in KBytes successfully tested.	None
`CD-ROM Drive Identified`	Autotyping identified CD-ROM Drive.	None
`Diskette drive A error` `Diskette drive B error`	Drive A: or B: is present but fails the BIOS POST disk tests. Drive is selected via setup but either not present or defect.	Check that the drive is defined with the proper disk type in Setup, that the disk drive is attached correctly nd the controller is enabled.
`Entering SETUP ...`	Starting Setup program	None
`Extended RAM Failed at offset: nnnn`	Extended memory not working or not configured properly at offset *nnnn*.	Check if memory modules are installed correctly. Otherwise contact your local sales representative or FAE for further support
`nnnn Extended RAM Passed`	Where *nnnn* is the amount of RAM in KBytes successfully tested.	None
`Failing Bits: nnnn`	The hex number *nnnn* is a map of the bits at the RAM address (in system, extended, or shadow memory) which failed the memory test. Each `1` (one) in the map indicates a failed bit.	Check if memory modules are installed correctly. Otherwise contact your local sales representative or FAE for further support.

Message	Explanation	Corrective Action

`Fixed Disk 0 Failure`
`Fixed Disk 1 Failure`
`Fixed Disk Controller Failure`
	Fixed disk is not working or not configured properly.	Check to see if fixed disk is attached properly. Run Setup to be sure the fixed-disk type is correctly identified.

`Fixed Disk 0...3 Identified`	Autotyping identified specified fixed disk.	None
`Incorrect Drive A type - run SETUP` `Incorrect Drive B type - run SETUP`	Type of floppy drive not correctly identified in Setup	Check for correct floppy drive in setup.
`Keyboard controller error`	The keyboard controller failed test.	Replace the keyboard.
`Keyboard error`	Keyboard not working	Check for correct keyboard connection.
`Keyboard error nnn`	BIOS discovered a stuck key and displays the scan code *nn* for the stuck key.	Replace keyboard, check for stuck keys.
`Operating system not found`	Operating system cannot be located on either drive A: or drive C:.	Enter Setup and see if fixed disk and drive A: are properly identified.
`Parity Check 1 nnnn`	Parity error found in the system bus. BIOS attempts to locate the address *nnnn* and display it on the screen. If it cannot locate the address, it displays ????.	Check for correct memory module types.
`Parity Check 2 nnnn`	Parity error found in the system bus. BIOS attempts to locate the address *nnnn* and display it on the screen. If it cannot locate the address, it displays ????.	Check for correct memory module types.

Message	Explanation	Corrective Action
`Press <F1> to resume, <F2> to Setup`	Displayed after any recoverable error message.	Press <F1> to start the boot process or <F2> to enter Setup and change any settings.
`Previous boot incomplete - Default configuration used`	Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail.	Run Setup to restore the original configuration. This error is cleared the next time the system is booted.
`Real time clock error`	Real-time clock fails BIOS test.	May require board repair.
`Resource allocation conflict on motherboard - Run Configuration Utility`	Possible interrupt or I/O resource conflict.	Run ISA or EISA Configuration Utility to resolve resource conflict.
`Shadow RAM Failed at offset: nnnn`	Shadow RAM failed at offset *nnnn* of the 64k block at which the error was detected.	Contact your local sales representative or FAE for further support.
`nnnn Shadow RAM Passed`	Where *nnnn* is the amount of shadow RAM in KBytes successfully tested	None
`System battery is dead - Replace and run SETUP`	The NVRAM (CMOS) clock battery indicator shows the battery is dead.	Replace the battery and run Setup to reconfigure the system.
`System BIOS shadowed`	System BIOS copied to shadow RAM.	None
`System cache error - Cache disabled`	RAM cache failed the BIOS test. BIOS disabled the cache.	Contact your local sales representative or FAE for further support.

Message	Explanation	Corrective Action
`System CMOS checksum bad - run SETUP`	System NVRAM (CMOS) has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in NVRAM (CMOS).	Run Setup and reconfigure the system either by getting the Default Values and / or making your own selections.
`System RAM Failed at offset: nnnn`	System RAM failed at offset *nnnn* in the 64k block at which the error was detected.	Check for correct memory modules . Otherwise contact your local sales representative or FAE for further support.
`nnnn System RAM Passed`	Where *nnnn* is the amount of system RAM in KBytes successfully tested	None
`System timer error`	The timer test failed.	Requires repair of system board.
`UMB upper limit segment address: nnnn`	Displays the address *nnnn* of the upper limit of upper memory blocks, indicating released segments of the BIOS which may be reclaimed by a virtual memory manager.	None
`Video BIOS shadowed`	Video BIOS successfully copied to shadow RAM.	None
`Invalid System Configuration Data – run configuration utility`		Enter Setup and use the advanced configuration option to reset the configuration data (due to corrupted ESCD data).

5

Maps and Registers

Overview

This section gives an overview over the I/O and memory maps and describes the registers which are specific for the PENT/CPCI-760/761.

Table 11: *Register Overview*

Register	Description
CPCI Bus A ENUM Interrupt Routing Register	page 5-19
CPCI Bus B ENUM Interrupt Routing Register	page 5-18
ENUM Interrupt Control Status Register CPCI Bus A	page 5-9
ENUM Interrupt Control Status Register CPCI Bus B	page 5-7
Geographical Address Register	page 5-17
Hot Swap I^2C Register CPCI Bus A	page 5-10
Hot Swap I^2C Register CPCI Bus B	page 5-8
I^2C Register	page 5-11
LED Control Register	page 5-16
Lock/Unlock Register	page 5-6
NMI Status Register	page 5-15
NVRAM Decoding and Control Register	page 5-22
NVRAM Decoding and Flash Paging Register	page 5-23
PCI Bus Control Register	page 5-14
PMC Slot 1 and 2 Interrupt Register	page 5-20
SCSI, Ethernet, and PMC Slot 0 Interrupt Routing Register	page 5-21
Switch and Interrupt Control Register	page 5-12
Watchdog Control Register	page 5-13
Watchdog Retrigger Register	page 5-13
Watchdog Timer Register	page 5-24

I/O and Memory Maps

This section provides the I/O and memory maps specific for the PENT/CPCI-760/761.

Table 12: *I/O Map*

I/O Address	**Device** EDIE, PCI-to-ISA bridge, USB Keyboard, PS2 mouse, COM1, COM2, LPT1, floppy, battery-backed NVRAM, RTC		
$0000_{16}..001F_{16}$	x		DMA controller 1
$0020_{16}..003F_{16}$	x		Interrupt controller 1
$0040_{16}..005F_{16}$	x		Counter and timer
0060_{16}		x	Keyboard controller
0061_{16}	x		NMI status and control
0064_{16}		x	Keyboard controller
$0070_{16}..0071_{16}$		x	RTC and NMI mask
$0080_{16}..009F_{16}$	x		DMA page register
$0110_{16}..011A_{16}$		(x)	Specific registers (partially implemented in separate PLD)
$00A0_{16}..00BF_{16}$	x		Interrupt controller 2
$00C0_{16}..00DF_{16}$	x		DMA controller 2
$00E0_{16}..00FF_{16}$	n.a.		Coprocessor
$0170_{16}..0177_{16}$	x		Secondary EIDE / ATAPI
$01F0_{16}..01F7_{16}$	x		Primary EIDE / ATAPI
$02F8_{16}..02FF_{16}$		x	COM2
$03BC_{16}..03BF_{16}$		x	LPT1
$03C0_{16}..03DA_{16}$	n.a.		Graphic controller
$03F2_{16}..03F7_{16}$		x	Floppy-EIDE / ATAPI
$03F8_{16}..3FF_{16}$		x	COM1

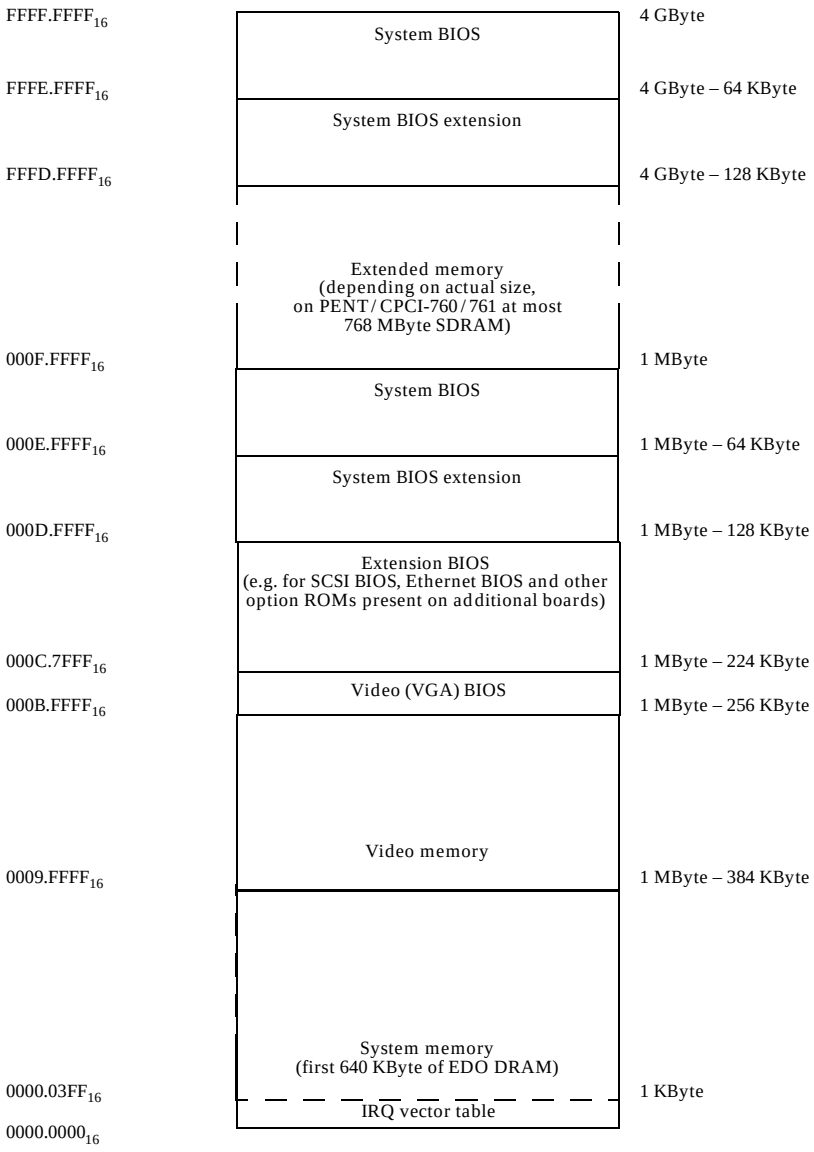


Figure 21: *PENT/CPCI-760/761 Memory Map*

PENT/CPCI-760/761 Registers

The following registers are provided for the PENT/CPCI-760/761.

Lock/Unlock Register

The Lock/Unlock register enables or disables read and write access to the specific registers.

Table 13: *Lock/Unlock Register*

Address: $010E_{16}$			
Bit	**Signal**	**Description**	**Access**
2..0	B2..B0	Specifies if specific registers are locked or unlocked 010_2: Specific registers are unlocked Other values (default): Specific registers are locked	r/w
3	Reserved	Reserved	r

ENUM Interrupt Control Status Register CPCI Bus B

The ENUM Interrupt Control Status register is used to detect the assertion of the hot-swap ENUM signal. The ENUM signal can either be polled via the register or an enumeration can cause an interrupt on level 5, 9, 10, or 11 (configurable via the CPCI Bus B ENUM Interrupt Routing register).

Table 14: *ENUM Interrupt Control Status Register CPCI Bus B*

Address: 0110_{16}			
Bit	**Signal**	**Description**	**Access**
0	ENUM	Shows logic level of ENUM signal at CPCI backplane 0: ENUM signal asserted 1: ENUM not asserted	r
1	MASK	Used to mask ENUM interrupt 0 (default): ENUM interrupt is masked and no interrupts will occur 1: ENUM unmasked and interrupt will occur if ENUM signal on CPCI backplane is asserted	r / w
2	IRQ	Shows status of interrupt line 0 (default): No ENUM interrupt pending 1: ENUM interrupt line asserted and still active	r
3	Reserved	Reserved	r

Hot Swap I^2C Register CPCI Bus B

The Hot Swap I^2C register is used for communication between the PENT/CPCI-760/761 and a hot swap controller on the backplane. The geographical address line GA[3] is used as the CLK line. The geographical address line GA[4] is used as the DIR and DATA IN line.

Table 15: *Hot Swap I^2C Register CPCI Bus B*

Address: 0111_{16}			
Bit	**Signal**	**Description**	**Access**
0	DIR	Specifies direction of data transfer 0: Data written to data line 1 (default): Data read from data line	r / w
1	CLK	Clock line of I^2C bus	r / w
2	DATA_IN	Stores current value of data line	r
3	Reserved	Reserved	r

ENUM Interrupt Control Status Register CPCI Bus A

The ENUM Interrupt Control Status register is used to detect the assertion of the hot swap ENUM signal. The ENUM signal can either be polled via the register or an enumeration can cause an interrupt on level 11 (configurable via the CPCI Bus A ENUM Interrupt Routing Register).

Table 16: *ENUM Interrupt Control Register CPCI Bus A*

Address: 0112_{16}			
Bit	**Signal**	**Description**	**Access**
0	ENUM	Shows logic level of ENUM signal at CPCI backplane 0: ENUM signal asserted 1 (default): ENUM signal not asserted	r
1	MASK	Masks ENUM interrupt 0 (default): ENUM interrupt is masked and no interrupts will occur 1: ENUM unmasked and interrupt will occur if ENUM signal on CompactPCI backplane is asserted	r / w
2	IRQ	Shows status of interrupt line 0 (default): No ENUM interrupt pending 1: ENUM interrupt line asserted and is still active	r
3	Reserved	Reserved	r

Hot Swap I^2C Register CPCI Bus A

The Hot Swap I^2C register is used for communication between the PENT/CPCI-760/761 and a hot swap controller on the backplane. The geographical address line GA[3] is used as the CLK line. The geographical address line GA[4] is used as the DIR and DATA IN line.

Table 17: *Hot Swap I^2C Register CPCI Bus A*

Address: 0113_{16}			
Bit	**Signal**	**Description**	**Access**
0	DIR	Specifies direction of data transfer 0: Data written to data line 1 (default): Data read from data line	r / w
1	CLK	Clock line of I^2C bus	r / w
2	DATA_IN	Stores current value of data line	r
3	EN	Enables line drivers and pull-up resistors of hot swap I^2C bus 0 (default): Line drivers tree-started and pull-up resistors are disabled. All register bits can be written or read 1: Line drivers and pull-up resistors	r / w

I^2C Register

The I^2C register is used for data transfer settings on the I^2C bus and provides access to the program readable vintage registers for the PENT/CPCI-72x, the I/O-720, the lower and upper memory modules, the VGA-IO720 as well as the registers controlling the configuration of the temperature sensors.

Table 18: *I^2C Register*

Address: 0108_{16}			
Bit	**Signal**	**Description**	**Access**
0	DIR	Specifies direction of data transfer 0: Data is written to data line 1 (default): Data is read from data line	r/w
1	CLK	Clock line of I^2C bus	r/w
2	DATA_IN	Stores current value of data line.	r
3	Reserved	Reserved	r

Switch and Interrupt Control Register

The Switch and Interrupt Control register specifies switch and interrupt-related settings.

Table 19: *Switch and Interrupt Control Register*

Address: 0109_{16}			
Bit	**Signal**	**Description**	**Access**
0	SW_RESET	Controls if reset key is enabled or disabled 0 : Reset key disabled 1 (default): Reset key enabled if SW1-3 is OFF	r / w
1	SW_ABORT	Controls if abort key is enabled or disabled 0: Abort key disabled 1 (default): Abort key is enabled if SW1-4 is OFF	r / w
3..2	Reserved	Reserved	r

Watchdog Control and Retrigger Registers

The Watchdog Control register specifies the watchdog related settings. The watchdog time-out value is programmable via the Watchdog Timer Register.

Table 20: *Watchdog Control Register*

Address: $010A_{16}$			
Bit	**Signal**	**Description**	**Access**
0	WDOG_ON	Controls if watchdog timer is enabled or disabled 0: Watchdog timer enabled 1 (default): Watchdog timer disabled	r / w
1	WDOG_RESET / NMI	Controls if NMI or reset is caused 0: NMI is caused 1 (default): Reset is caused.	r / w
3..2	Reserved	Reserved	r

Table 21: *Watchdog Retrigger Register*

Address: $010D_{16}$			
Bit	**Signal**	**Description**	**Access**
0	WDOG_RETR	Retriggers watchdog timer when watchdog is enabled	w
3..1	Reserved	Reserved	r

PCI Bus Control Register

The PCI Bus Control register controls forwarding of the PCI_RST signal to the CompactPCI system and IRQ routing of the two CompactPCI bus segments.

Table 22: *PCI Bus Control Register*

Address: $010B_{16}$			
Bit	**Signal**	**Description**	**Access**
0	RESET_BUS	Controls whether reset stays local to PENT/CPCI-760/761 or is routed globally to CPCI system 0: Only local reset is caused 1 (default): Global reset is caused	r/w
1	PCI_IRQ_ROUTING	0 (default): PCI interrupt routing according to the CompactPCI specification is enabled 1: PCI interrupts A, B and C, D from CompactPCI bus segment A and PCI interrupts A,B and C,D from CompactPCI bus segment B are merged.	r/w
3..2	Reserved	Reserved	r

Table 23: *CompactPCI Bus Interrupts Routing*

	CPCI Bus Segment A				**CPCI Bus Segment B**				**PCI Control Register Bit 1**
Output PLD	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**0**
PCI INTA	X				X				0
PCI INTB		X				X			0
PCI INTC			X				X		0
PCI INTD				X				X	0
PCI INTA	X	X							1
PCI INTB			X	X					1
PCI INTC					X	X			1
PCI INTD							X	X	1

NMI Status Register

The NMI Status register indicates the device which caused an NMI and enables clearing all of its status bits via a write access to the register.

Table 24: *NMI Status Register*

Address: $010C_{16}$			
Bit	**Signal**	**Description**	**Access**
0	SW_NMI	Indicates whether NMI key caused NMI 0 (default): No NMI has been caused 1: NMI key caused NMI	r
1	WDOG	Indicates whether watchdog timer caused NMI 0 (default): No NMI has been caused 1: Watchdog timer caused NMI	r
2	CLEAR	Sets TEMP and WDOG bits to 0.	w
3	ECC	Indicates whether unrecoverable ECC error was detected in SDRAM 0 (default): No NMI has been caused 1: Unrecoverable ECC error caused NMI	r

LED Control Register

The LED Control register specifies the status of the LEDs.

Table 25: *LED Control Register*

Address: 0100_{16}			
Bit	**Signal**	**Description**	**Access**
1..0 3..2	1_LEDSTAT 2_LEDSTAT	Specifies status of user LED x for x=1,2,3 on front panel 00_2: OFF 01_2: Red 10_2 (default): Green Other values: Reserved	r / w
5..4	HD_LEDSTAT	Specifies color of HD LED on front panel 00_2: HDD activity 01_2: Red 10_2 (default): Green Other values: Reserved	r / w
7..6	3_LEDSTAT	Specifies status of user LED x for x=1,2,3 on front panel 00_2: OFF 01_2: Red 10_2 (default): Green Other values: Reserved	r / w

Geographical Address Register

The CompactPCI geographical address can be read via the Geographical Address register.

Note: For correct reading of the geographical address register, the pulling resistors have to be disabled by setting the bit 3 of the I^2C register to 0 (see Table 17 “Hot Swap I2C Register CPCI Bus A” on page 5-10).

Table 26: *Geographical Address Register*

Address: $010F_{16}$			
Bit	**Signal**	**Description**	**Access**
4..0	GA[4..0]	Provide geographical address of CompactPCI slot.	r

CPCI Bus B ENUM Interrupt Routing Register

The CPCI Bus B ENUM Interrupt Routing register is used to route the ENUM Interrupt from the CompactPCI bus segment B to different ISA interrupts.

Both ENUM interrupts can be routed to the same ISA interrupt.

Table 27: *CPCI Bus B ENUM Register*

Address: 0114_{16}			
Bit	**Signal**	**Description**	**Access**
1..0	ENUM_B_[1..0]	Control whether IRQ is used for ISA interrupt 00_2: ISA IRQ5 01_2: ISA IRQ9 10_2: ISA IRQ10 11_2 (default): ISA IRQ11	r / w
3..2	Reserved	Reserved	r

CPCI Bus A ENUM Interrupt Routing Register

The CPCI Bus A ENUM Interrupt Routing register is used to route the ENUM Interrupt from the CompactPCI bus segment B to different ISA interrupts.

Both ENUM interrupts can be routed to the same ISA interrupt.

Table 28: *CPCI Bus A ENUM Interrupt Routing Register*

Address: 0115_{16}			
Bit	**Signal**	**Description**	**Access**
1..0	ENUM_A_[1..0]	Control whether IRQ is used for ISA interrupt 00_2: ISA IRQ5 01_2: ISA IRQ9 10_2: ISA IRQ10 11_2 (default): ISA IRQ11	r / w
3..2	Reserved	Reserved	r

PMC Slot 1 and 2 Interrupt Routing Register

The PMC Slot 1 and 2 Interrupt Routing register is used to allow the interrupt signalling beside the corresponding PCI interrupt also via ISA interrupts.

The interrupt of PMC slot 0 and slot 1 can be routed to the same ISA interrupt.

Table 29: *PMC Slot 1 and 2 Interrupt Routing Register*

Address: 0106_{16}			
Bit	**Signal**	**Description**	**Access**
1..0	PMC1_[1..0]	Control PMC slot 1 interrupt routing 00_2 (default): INTD 01_2: ISA IRQ5 10_2: ISA IRQ7 11_2: ISA IRQ15	r / w
3..2	PMC2_[1..0]	Control PMC slot 2 interrupt routing 00_2 (default): INTD 01_2: ISA IRQ5 10_2: ISA IRQ7 11_2: ISA IRQ15	r / w

SCSI, Ethernet and PMC Slot 0 Interrupt Routing Register

The SCSI, Ethernet and PMC Slot 0 Interrupt Routing register is used to allow the interrupt signalling beside the corresponding PCI interrupt also via ISA interrupts.

The interrupt of PMC slot 0 and slot 1 can be routed to the same ISA interrupt.

Table 30: *SCSI, Ethernet and PMC Slot 0 Interrupt Routing Register*

Address: 0117_{16}			
Bit	**Signal**	**Description**	**Access**
1..0	PMC0_[1..0]	Control PMC slot 0 interrupt routing 00_2 (default): INTA 01_2: ISA IRQ5 10_2: ISA IRQ7 11_2: ISA IRQ15	r / w
2	SCSI_I	Controls SCSI interrupt routing 0 (default): INTA 1: ISA IRQ15	r / w
3	ETH_I	Controls Ethernet 1 / 2 interrupt routing 0 (default): INTA 1: ISA IRQ5	r / w

NVRAM Decoding and Control Register

The NVRAM Decoding and Control register is used to enable/disable access to the lower 4 KByte segment of the NVRAM located at $B8000_{16}$ and to locate/disable the upper 4 KByte of a 8 KByte NVRAM or the mid-16 KByte of a 32 KByte NVRAM.

Table 31: *NVRAM Decoding and Control Register*

Address: 0118_{16}			
Bit	**Signal**	**Description**	**Access**
2..0	M_SEG_[2..0]	Enable / locate mid-16 KByte segment of NVRAM at a specific base address 0000_2 (default): Segment is OFF 0001_2: Segment is located at $C8000_{16}$ 0010_2: Segment is located at $CC000_{16}$ 0011_2: Segment is located at $D0000_{16}$ 0100_2: Segment is located at $D4000_{16}$ 0101_2: Segment is located at $D8000_{16}$ 0110_2: Segment is located at $DC000_{16}$	r / w
3	L_SEG	L_SEG enables / disables access to lower 4 KByte of NVRAM located at $B8000_{16}$ 0 (default): Segment is OFF 1: Segment is ON	r / w

NVRAM Decoding and Flash Paging Register

The NVRAM Decoding and Flash Paging register is used to enable / disable access to the upper 12 KByte segment of a 32 KByte NVRAM and locate it at a defined address on the ISA bus. If the mid segment and the upper segment of a 32 KByte NVRAM are located at the same base address, all accesses will go to the mid segment.
The PAGE switch is intended to switch between the entire flash memory and its lower half to be able to boot from embedded operating systems located there in the flash memory.

Table 32: *NVRAM Decoding and Flash Paging Register*

Address: 0119_{16}			
Bit	**Signal**	**Description**	**Access**
2..0	U_SEG_[2..0]	Enable / locate mid-16KByte segment of NVRAM at specific address 0000_2 (default): Segment is OFF 0001_2: Segment is located at $C8000_{16}$ 0010_2: Segment is located at $CC000_{16}$ 0011_2: Segment is located at $D0000_{16}$ 0100_2: Segment is located at $D4000_{16}$ 0101_2: Segment is located at $D8000_{16}$ 0110_2: Segment is located at $DC000_{16}$	r / w
3	PAGE	Selects between two page modes of flash memory 0 (default): Flash memory address range is visible to CPU 1: Second memory half of flash becomes first and 512 KByte of flash memory are visible to CPU	r / w

Watchdog Timer Register

The Watchdog Timer register controls the retrigger period of the watchdog.

Table 33: *Watchdog Timer Register*

Address: $011A_{16}$			
Bit	**Signal**	**Description**	**Access**
3..0	DIV_[3..0]	Control retrigger period of watchdog 0000_2 (default): 245.760 ms 0001_2: 491.520 ms 0010_2: 983.040 ms 0011_2: 1.966 ms 0100_2: 3.932 ms 0101_2: 7.864 ms 0110_2: 15.729 ms 0111_2: 31.457 ms 1000_2: 62.915 ms 1001_2: 0.126 s 1010_2: 0.252 s 1011_2: 0.503 s 1100_2: 1.007 s 1101_2: 2.013 s 1110_2: 4.027 s 1111_2: 8.053 s 10000_2: 16.106 s 10001_2: 32.212 s 10010_2: 64.424 s	r / w

A

Battery Exchange

Dear Customer,

the battery provides a data retention of five years summing up all periods of actual battery use. Force Computers therefore assumes that there usually is no need to exchange the Lithium battery except for example in the case of long-term spare part handling.

Caution



- **Incorrect exchange of Lithium batteries can result in a hazardous explosion.**
- **Exchange the battery before five years of actual battery use have elapsed.**
- **Exchanging the battery always results in data loss of the devices which use the battery as power backup. Therefore, backup affected data before exchanging the battery.**
- **Always use the same type of Lithium battery as is installed.**

In order to exchange the battery, proceed as follows:

1. If battery is covered by PMC module or memory module, remove module first

Caution



Do not use a screwdriver to remove the battery from its holder to avoid possible damage to the PCB or the battery holder.

2. Remove battery
3. When installing new battery ensure that the '+' on top of battery stays at top and therefore is visible when viewing board from its component side
4. If necessary, reinstall PMC or memory module in its correct position

B

Troubleshooting

Dear Customer,

a typical CompactPCI system is highly sophisticated. This chapter can be taken as a hint list for detecting erroneous system configurations and strange behaviors.It cannot replace a serious and sophisticated pre- and post- sales support during application development.

If it is not possible to fix a problem with the help of this chapter, contact your local sales representative or FAE for further support.

Problem	Possible Reason	Solution
Mechanical		
Unable to insert board into backplane	Damaged plugs, bent or broken pins: backplane defect	1. Check CompactPCI slot position to be used for bent or broken pins 2. Replace backplane.
	Board defect	Replace board
	Keying of backplane does not fit to board	1. Check if you use correct board variant and replace board if necessary 2. Replace backplane
After Power-On		
Powering-on the board fails	Backplane voltages for device not within the specified range	1. Check that all backplane voltages are within their specific ranges 2. Check that power supply is capable to drive the respective loads
	Board defect	Replace board
	Damaged plugs, bent or broken pins: backplane defect	1. Check CompactPCI slot position to be used for bent or broken pins 2. Replace backplane.

Problem	Possible Reason	Solution
During Boot-up Procedure		
Board does not boot	Boot device is not partitioned according to used operating system	Check partition according to operating system's needs.
	Boot sequence not correct	Correct boot sequence
	Interrupts are not set correctly	Set interrupts correctly
	Wrong configuration of boot devices	Configure boot devices correctly
During Board Operation		
Application software does not work	Memory ranges of system and peripheral boards do not match	Change application software so that memory ranges match I/O cards and host.
	Not enough disk capacity on mass storage device	Add disk capacity
	Not enough system memory	Add system memory
	Used I/O ranges do not match	Change application software so that I/O ranges match I/O cards and host.
Connected devices do not work	Device defect	Replace device
	Device not connected to power supply	Connect device to power supply
	Wrong board configuration, faulty switch setting	Configure the board correctly for the respective device
	Devices are disabled	Configure board correctly
Board runs unstable	Disregard of environmental requirements	1. Check that temperature inside system stays within specified ranges for all system devices 2. Check for hot-spots within system Improve cooling system if necessary. 3. Check that other environmental values like moisture or altitude are kept within specified ranges

Problem	Possible Reason	Solution
	Drivers are missing, faulty or do not match hardware	1. Check that all used hardware parts have a driver matching the hardware 2. Reinstall hardware drivers
	Board defect	Replace board
Low system performance	Caches are disabled	Enable caches
Memory / PMC module does not work	Module defect	Replace module
	Module not defined for the used board	1. Check if module specification match with interface specification of board. 2. Replace module if specifications do not match
	Module not installed correctly	Check if module fits perfectly in socket.
	Wrong board configuration, faulty switch setting	Configure the board correctly for the respective module
RTB does not work	RTB defect	Replace RTB
	RTB installed on wrong slot position	Install RTB on adjacent slot position of the used board.
	RTB not defined for the used peripheral or system board	Install RTB defined for the used peripheral or system board.

Product Error Report

Product:	Serial No.:
Date Of Purchase:	Originator:
Company:	Point Of Contact:
Tel.:	Ext.:
Address:	
Present Date:	
Affected Product: ❑ Hardware ❑ Software ❑ Systems	Affected Documentation: ❑ Hardware ❑ Software ❑ Systems
Error Description:	

This Area to Be Completed by Force Computers:

Date:

PR#:

Responsible Dept.: ❑ Marketing ❑ Production

Engineering ➠ ❑ Board ❑ Systems

☞ Send this report to the nearest Force Computers headquarter listed on the address page.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP