

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-680* at our website: ***Click HERE***

A SOLECTRON COMPANY

PPC/PowerCoreCPCI-680

Installation Guide

P/N 215425 Revision AC
January 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.

A SOLECTRON COMPANY



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

215425 420 000 AC

Contents

Using This Manual

Other Sources of Information

Safety Notes

Sicherheitshinweise

1 Introduction

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

Standard Compliance **1-5**

Ordering Information **1-6**
Product Nomenclature 1-6
Order Numbers 1-7

2 Installation

Action Plan 2-3

Requirements 2-4

Environmental Requirements 2-4

Power Requirements 2-5

Installing Upgrades and Accessories 2-6

Memory Modules 2-6

PMC Modules 2-7

Installation Procedure 2-8

Removal Procedure 2-10

CompactFlash Card 2-11

Installation Procedure 2-11

Removal Procedure 2-12

Rear Transition Board 2-13

COP Adapter 2-13

Switch Settings 2-14

Board Installation 2-16

Installation in a Nonpowered System 2-16

Installation Procedure 2-16

Removal Procedure 2-17

Installation in a Powered System Supporting Hot Swap 2-17

Installation in a Basic Hot Swap System 2-18

Installation in a Full Hot-Swap or High-Availability System 2-18

Removal from a Basic Hot Swap System 2-19

Removal from a Full Hot Swap or High-Availability System 2-19

Testing the Board 2-21

3 Controls, Indicators, and Connectors

Front Panel 3-3

PMC Cutouts 3-4

CompactFlash Cutout 3-5

LEDs 3-6

Keys 3-7
Reset Key 3-7
Abort Key 3-7
Hot-Swap Switch 3-7
Connectors 3-8
Ethernet Connector 3-8
Serial Connectors 3-9

On-Board Connectors 3-10
PMC Connectors 3-10
ISA Connector 3-14

CompactPCI Connectors 3-15
J1 and J2 3-15
J3 3-16
J5 3-17

A Battery Exchange

Product Error Report

Tables

Introduction

Table 1 Interfaces 1-4
Table 2 Standard Compliance. 1-5
Table 3 Ordering Information Excerpt 1-7

Installation

Table 4 Environmental Requirements. 2-4
Table 5 Power Consumption. 2-5
Table 6 Combinations of Hardware Upgrades and Accessories 2-6
Table 7 Assembly Options 2-7
Table 8 Default Settings 2-14

Controls, Indicators, and Connectors

Table 9 Description of Front Panel LEDs 3-6
Table 10 Assembly Options 3-8
Table 11 Impedance-Controlled Differential Pair I/O-Routing on PMC Slots 3-12
Table 12 Naming Conventions of I/O Signals 3-16

Figures

Introduction

Figure 1 Function Blocks 1-3

Installation

Figure 2 Voltage Keys 2-8
Figure 3 Location of PMC Connectors 2-9
Figure 4 Installing the PMC Module 2-10
Figure 5 Location of CompactFlash Slot 2-11
Figure 6 Inserting a CompactFlash Card into Socket 2-12
Figure 7 Location of Switches 2-14
Figure 8 Hot Swap LED 2-20

Controls, Indicators, and Connectors

Figure 9 Standard, CompactFlash, and RR-Variant Front Panel 3-3
Figure 10 Cutouts for PMC Modules 3-4
Figure 11 Cutout for CompactFlash Disk 3-5
Figure 12 ETH #1 Connector Pinout 3-9
Figure 13 Serial Connector Pinout 3-9
Figure 14 PN14 Connector Pinout 3-11
Figure 15 PN24 Connector Pinout 3-12
Figure 16 PN15 Connector Pinout 3-14
Figure 17 Location of CompactPCI Connectors 3-15
Figure 18 J3 Connector Pinout 3-16
Figure 19 J5 Connector Pinout 3-17
Figure 20 Battery Location A-3

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.

Conventions

Notation	Description
1234	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.	Revision	Date	Description
211719	AA	April 2000	Preliminary Installation Guide
211719	AB	July 2000	Added information to SW3-1 and SW 3-2 description in Table 4 - Default Switch Settings; Editorial changes
215425	AA	August 2001	Added "Sicherheitshinweise" page -xxi; Corrected "Standard Compliance" page 1 6; added information on third Ethernet interface and controller in section "Interfaces" page 1-4; added information on possible combinations of PMC Modules and Ethernet interfaces in section "PMC Modules" page 2-7; added information on CompactFlash disk and on rear transition board to "Hardware Upgrades and Accessories" page 2 7; added information on "JTAG Debug Connector" page 3-11; editorial changes: structure, layout

Order No.	Revision	Date	Description
215425	AB	October 2001	Completely revised the "Safety Notes" chapter and the "Sicherheitshinweise" chapter; added manufacturing requirements to Table 2 "Standard Compliance" page 1-5; removed "Block Diagram" from the "Introduction" chapter; removed chapter 4 "Testing the Board using PowerBoot" and added its contents to "Testing the Board" page 2-21; added the "Battery Exchange" chapter and moved the "Maintenance" section to the "Battery Exchange" chapter
215425	AC	January 2002	Editorial changes: renamed "Appendix" chapter to the "Battery Exchange" chapter; updated address and copyright pages

Other Sources of Information

For further information refer to the following documents:

Company	www.	Document
Force Computers	forcecomputers.com	PowerBoot Instruction Set (P/N 204525)
		SENTINEL Reference Guide (P/N 214473) Only available via SMART
Motorola	motorola.com	PowerPC Microprocessor - Motorola MPC750 or MPC7400
		PPC-to-PCI bridge - Motorola MPC107
Intel	intel.com	Ethernet LAN Controller - Intel i82559 i82559ER
Texas Instruments	ti.com	Asynchronous Communication Controller - Texas Instruments TL16C550C
Winbond	winbond.com	PCI-to-ISA Bridge - Winbond W83C553F
Zilog	zilog.com	CIO - Zilog Z8536



Safety Notes

This section provides safety precautions to follow when installing, operating, and maintaining the PPC/PowerCoreCPCI-680.

We intend to provide all necessary information to install and handle the PPC/PowerCoreCPCI-680 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 PPC/PowerCoreCPCI-680 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 PPC/PowerCoreCPCI-680. 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.
- Before installing or removing the board, check the "Requirements" section page 2-4.
- 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.

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

The PPC/PowerCoreCPCI-680 provides hot-swap support, i.e. it may be installed in or removed from a powered system supporting hot swap. Never install the board in or remove it from 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 Supporting Hot Swap" section page 2-17.



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).

Boot Flash

In order to prevent the devices and/or data from being damaged, do not use any other type of flash devices than assembled by default at new boards.

Before erasing or programming the boot flash, ensure that you do not destroy the Force Computers PowerBoot boot image and make a copy of the boot flash 1 contents by using a programmer.

Watchdog Timer

In order to avoid getting a reset pulse from watchdog timer #1 without getting an interrupt from watchdog timer #2 if both watchdog timers are enabled, the sanity checks for both timers should be performed simultaneously. Although the watchdog timers are started synchronously, they may be retriggered independently.

RJ-45 Connector

An RJ-45 connector is used for both telephone and twisted pair Ethernet (TPE) connectors or network connectors. Mismatching the two connectors may destroy your telephone as well as your PPC/PowerCoreCPCI-680. Therefore:

- TPE connectors have to be clearly marked 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.



Battery

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

- 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.
- Incorrect exchange of Lithium batteries can result in a hazardous explosion.
- Exchange the battery before five years of actual battery use have elapsed.
- Always use the same type of Lithium battery as is already installed.
- When installing the new battery ensure that the dot marked on top of the battery covers the dot marked on the board.

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 bei Einbau, Betrieb und Wartung des PPC/PowerCoreCPCI-680 zu beachten sind.

Wir sind darauf bedacht, alle notwendigen Informationen zum Einbau und zum Umgang mit dem PPC/PowerCoreCPCI-680 in diesem Handbuch bereit zu stellen. Da es sich jedoch bei dem PPC/PowerCoreCPCI-680 um ein komplexes Produkt mit vielfältigen Einsatzmöglichkeiten handelt, können wir die Vollständigkeit der im Handbuch enthaltenen Informationen nicht garantieren. Falls Ihnen Informationen fehlen sollten, wenden Sie sich bitte an Ihren Vertreter von Force Computers.

Das PPC/PowerCoreCPCI-680 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 dieses jedoch nicht 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 Geschäfts-, Gewerbe- sowie Industriebereichen 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 ein 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:

- Bevor Sie Boards oder elektronische Komponenten berühren, vergewissern Sie sich, dass Sie in einem ESD-geschützten Bereich arbeiten.
- Lesen Sie vor Ein- oder Ausbau des Boards den Abschnitt "Action Plan" auf Seite 2-3.
- 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 die Versorgungsspannung an allen dafür vorgesehenen Kontakten anliegt.

Betrieb

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

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 benutzt wird und die Systembeschreibung dies ausdrücklich erlaubt. Im Abschnitt "Installation in a Powered System Supporting Hot Swap" auf Seite 2-17 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 Ausgangsströme jedes Verbrauchers innerhalb der zulässigen Grenzwerte liegen (siehe die technischen Daten des entsprechenden Verbrauchers).

Boot Flash

Verwenden Sie keine anderen Flash-Komponenten als diejenigen, die standardmäßig auf Boards enthalten sind, um Schaden an Komponeten und/oder Daten zu vermeiden.

Vergewissern Sie sich vor dem Löschen oder Umprogrammieren des Boot Flashs, dass Sie das Force Computers PowerBoot Boot Image nicht zerstören. Machen Sie mit einem Programmer eine Kopie des Inhalts von Boot Flash 1.

Watchdog Timer

Um keinen Reset-Impuls von Watchdog Timer #1 zu erhalten, ohne einen Interrupt von Watchdog Timer #2 zu erhalten, wenn beide Watchdog Timer aktiviert sind, sollte die Überprüfung beider Timer gleichzeitig durchgeführt werden. Obwohl die Watchdog Timer synchron gestartet werden, können sie vielleicht unabhängig voneinander rückgesetzt werden.



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 die folgenden Punkte:

- Vergewissern Sie sich, dass Anschlüsse deutlich als Netzwerkanschlüsse gekennzeichnet sind.
- Schließen Sie TPE-Stecker/Netzwerkstecker Ihres Systems nur an Sicherheitskleinspannungskreise (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, müssen die folgenden Sicherheitshinweise beachtet werden:

- Der Austausch der Batterie bringt immer einen Datenverlust bei den Komponenten mit sich, die batteriegepuffert sind. Machen Sie deshalb vor dem Batterieaustausch eine Datensicherung.Fehlerhafter Austausch von Lithium-Batterien kann zu lebensgefährlichen Explosionen führen.
- Tauschen Sie die Batterie aus bevor 5 Jahre reiner Betrieb vorüber sind.
- Es darf nur der Batterietyp verwendet werden, der auch bereits eingesetzt ist.
- Stellen Sie beim Batteriewechsel sicher, dass der Punkt oben auf der Batterie den Punkt auf dem Chip abdeckt.

Umweltschutz

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

1

Introduction

Features

The Product is a high-performance universal mode single-board computer providing a peripheral CompactPCI interface. The Product is available with two PMC slots or with one PMC slot and one CompactFlash slot. Its features include:

- PowerPC microprocessor MPC750 or the MPC7400 with 500 MHz
- Universal PCI-to-PCI bridge SENTINEL
  The universal PCI-to-PCI bridge allows the Product to operate in system and peripheral CompactPCI slots with the SENTINEL automatically switching between transparent and embedded mode.
- Local PCI bus
- Boot flash capacity of 1 MByte
- On-board user flash with up to 32 MByte capacity
- Full hot-swap support

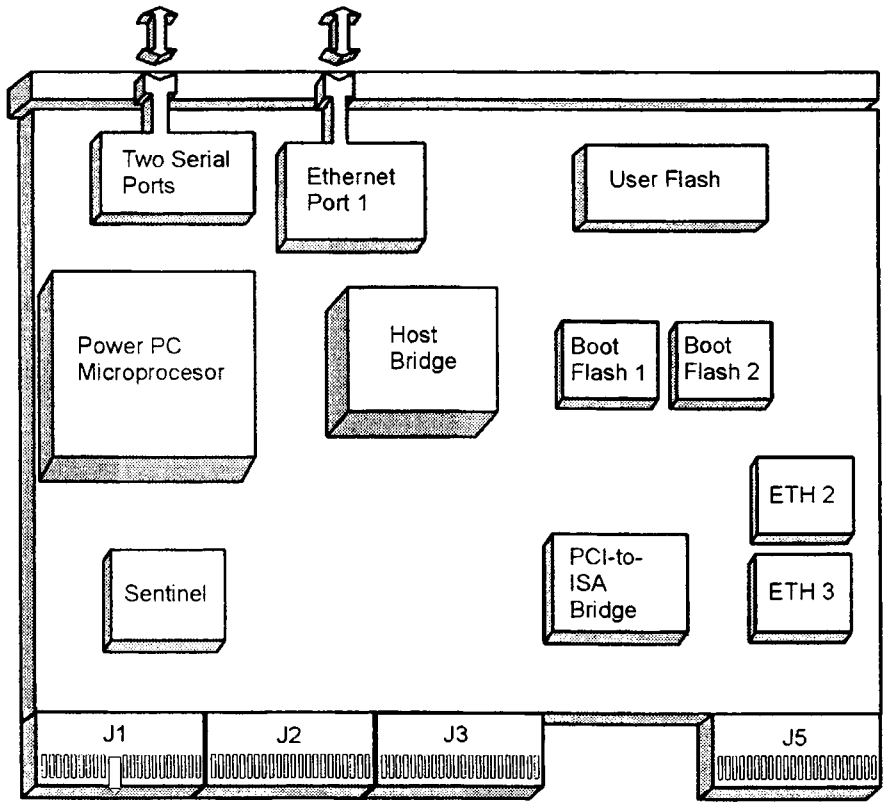


Figure 1: *Function Blocks*

CPU

The PowerPC CPU runs with a minimum frequency of 500 MHz. Two independent watchdog timers monitor the CPU activity.

Memory

By default, the board provides one on-board SDRAM memory bank of up to 256 MByte. The memory capacity can optionally be increased up to 1 GByte by installing additional memory modules.

Interfaces

The board provides the following interfaces:

Table 1: *Interfaces*

Interface	Description
CompactPCI interface	32-bit width, 33 MHz interface supporting hot swap, 5V signalling level, full hot-swap support, operation as host board in system slot or as intelligent I/O board in peripheral slot
PMC	Up to two PMC slots for 32-bit PMC modules, 5V signalling level, I/O interfaces for both PMC modules on CPCI connectors J3 and J5
Ethernet	Up to three Ethernet interfaces 10Base-T or 100Base-TX, one at the front panel, two via rear transition board, self-negotiating
Serial interfaces	RS-232 compatible Two interfaces at front panel or via rear transition board

Standard Compliance

The Product meets the following standards:

Table 2: *Standard Compliance*

Standard	Description
FCC Part 15 Class A VCCI Class A EN 55022 Class A EN 55024	EMC requirements
EN 60950 UL/cUL 1950	Legal safety requirements
ANSI/IPC_A-610 Rev. C ANSI/IPC-7711 ANSI/IPC-7721 ANSI-J-001...003	Manufacturing requirements

Ordering Information

When ordering the Product board variants, upgrades, and accessories, use the order numbers given in this section.

Product Nomenclature

In the following you find the key for the product name extensions.

Product/xxx-ccc-Lyyy-zz	
xxx	SDRAM size in MByte
ccc	Processor clock frequency in MHz
Lyyy	L2 cache capacity in MByte
zz	User flash capacity in MByte
S	Force Computers module with SCSI and serial interfaces
CF	CompactFlash slot
FRR	Ethernet: one front, two rear
FR	Ethernet: one front, one rear
RR	Ethernet: two rear, no front
G3	MPC750 PowerPC microprocessor

Order Numbers

Depending on the Product type, the available upgrades and accessories may differ. Consult your local sales representative to check the possible combinations.

Table 3: *Ordering Information Excerpt* [1)]

Order No.	PPC/PowerCoreCPCI-680	Description
109520	.../256-500-L1-8-CF-FRR	MPC750, 255 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 8 MByte user flash, Ethernet: 1 front, 2 rear
109521	.../256-500-L1-16-RR-PSB	MPC750, 255 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 16 MByte user flash, Ethernet: 2 rear
110147	.../256-500-L1-16-RR-21k	MPC750, 255 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 16 MByte user flash, Ethernet: 2 rear
109518	.../128-500-L1-8-FR	MPC750, 128 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 8 MByte user flash, Ethernet: 1 front, 1 rear
109519	.../256-500-L1-16-FR	MPC750, 255 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 16 MByte user flash, Ethernet: 1 front, 1 rear
109525	.../256-500-L1-16-S-FR	MPC750, 255 MByte SDRAM, 500 MHz processor clock frequency, 1 MByte L2 cache, 16 MByte user flash, Ethernet: 1 front, 1 rear
110207	.../TM	Technical manual set
Hardware Accessories PPC/PowerCoreCPCI-680		
108549	...256L-100	User upgradable lower SDRAM memory module, 256 MByte, 100-MHz bus frequency
108656	...512U-100	User upgradable upper SDRAM memory module, 512 MByte, 100-MHz bus frequency
109526	ACC/RTB-601/STD	Standard rear transition board
109527	ACC/RTB-601/PSB	Rear transition board for PIGMG 2.16 "Packet Switched Backplane" systems

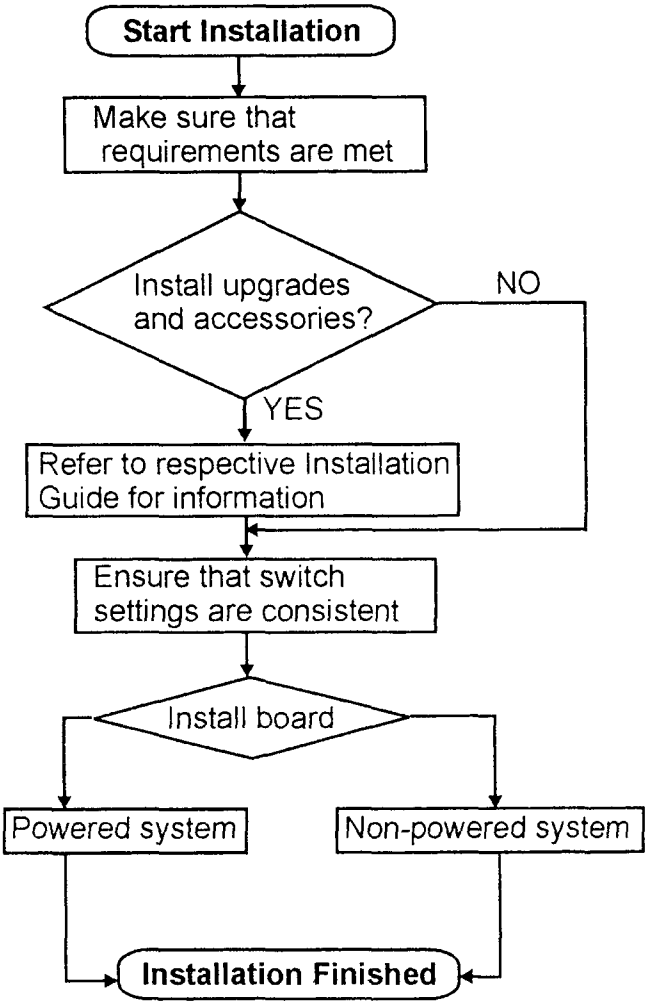
1) Status: January 2002

2

Installation

Action Plan

To install the board, the following steps are necessary and described in detail in the sections of this chapter.



Requirements

Before you power up the board, calculate the power needed according to your combination of board upgrades and accessories and check with your system's power supply capabilities.

Environmental Requirements

The environmental conditions must be tested and proven in the used system configuration.

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

In order to meet the operating conditions, forced air cooling is required at the heat sink of the CPU and both sides of the board.

Table 4: *Environmental Requirements*

Feature	Operating	Non-Operating
Temperature	0°C to +55°C	-40°C to +85°C
Forced Air Flow	300 LFM (linear feet per minute)	-
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
Altitude	-300 m to +3,000 m	-300 m to +13,000 m
Vibration	10 Hz to 15 Hz: 2 mm amplitude 15 Hz to 150 Hz: 2 g	10 Hz to 15 Hz: 5 mm amplitude 15 Hz to 150 Hz: 5 g
Shock	5 g/11 ms halfsine	15 g/11 ms halfsine
Free Fall	100 mm/3 axes	1200 mm/all edges and corners (packed state)

Power Requirements

The installation of the CPU board requires the following:

- 5V and 3.3V power supply
- +/-12V power supply if a PMC module which requires a +/-12V power supply is included in the board's configuration
- Fan unit providing an airflow which meets the thermal requirements of the board (see Table 4 "Environmental Requirements" page 2-4)
- CompactPCI backplane with P1 and P2 connectors

The 3.3V and 5V voltage levels are watched by voltage sensors to reset the board if one of the voltages drops below or exceeds the tolerance band of +5%/-3%. The +12V and -12V voltage levels are neither observed nor used by the PPC/PowerCoreCPCI-680.

The following table gives examples of typical power consumption for +5V and +3.3V without PMC modules, memory modules, and CompactFlash card installed, as well as information about the power consumption of the memory module.

Table 5: *Power Consumption*

PPC/PowerCoreCPCI-680...	+5V	+3.3V
.../256-500-L1-8-CF G3	1.9A	1.7A
.../128-450-L1-8 G3	1.6A	1.7A
.../256-450-L1-8-CF G3	1.7A	1.8A
.../256-450-L1-16 G3	1.7A	1.8A
.../256-450-L1-16-SSIO G3	2.1A	1.8A
.../256-400-L2-16	1.8A	1.8A
PPC/PowerCore...		
.../SMEM/256L-100	-	0.4A
.../SMEM/512U-100	-	0.6A

Note: **When installing a memory module on the CPU board, consider the overall power consumption. In this case, add the power consumption of the memory module(s) to the power consumption of the PPC/PowerCoreCPCI-680.**

Installing Upgrades and Accessories

The CPU board allows to install memory modules, PMC modules, a rear transition board, and a CompactFlash card (factory option) for enhanced performance. The following table lists the possible combinations.

Note: **'X' marks a possible combination, '-' marks that this combination is not allowed.**

Table 6: *Combinations of Hardware Upgrades and Accessories*

	Mem/L	Mem/U	PMC #1	PMC #2	Compact-Flash Card	RTB
Mem/L	-	X	X	X	X	X
Mem/U	X	-	X	X	X	X
PMC #1	X	X	-	X	X	X
PMC #2	X	X	X	-	X	X
CompactFlash Card	X	X	X	-	-	X
RTB	X	X	X	X	X	-

Memory Modules

The on-board SDRAM provides up to 256 MByte memory. In order to increase the amount of available memory, up to two additional memory modules can be installed on the CPU board, a lower and an upper memory module. Therefore, the overall SDRAM memory capacity of the CPU board can be increased to up to 1 GByte.

For further information on the respective memory modules, refer to the *Installation Guide* of the memory modules.

PMC Modules

The PPC/PowerCoreCPCI-680 provides up to two PMC slots to install PMC modules. Each PMC slot is attached to the board's local PCI bus and thus provides 32-bit data bus width at a bus speed of 33 MHz for high-speed I/O cards.

The CPU board provides up to two PMC interfaces and up to three Ethernet interfaces.

Note: **When configuring the PPC/PowerCoreCPCI-680 board, keep in mind that due to the limitations of the PCI arbiter of the PCI-to-ISA bridge, the three Ethernet adapters cannot be used together with the two PMC modules.**

The following table provides an overview of the assembly options of the PPC/PowerCoreCPCI-680. The 'x' marks the permitted combination, the '-' marks that this interface is not supported.

Table 7: *Assembly Options*

PPC/Power-CoreCPCI-680.../	ETH #1 Front	ETH #2 Rear	ETH #3 Rear	PMC #1	PMC #2
.../FR	x	x	-	x	x
.../RR	-	x	x	x	x
.../FRR	x	x	x	x	-

The CPU board uses a 5V signaling level at the PCI bus. The voltage keys prevent 3.3V PMC modules from being plugged into the PMC slots.

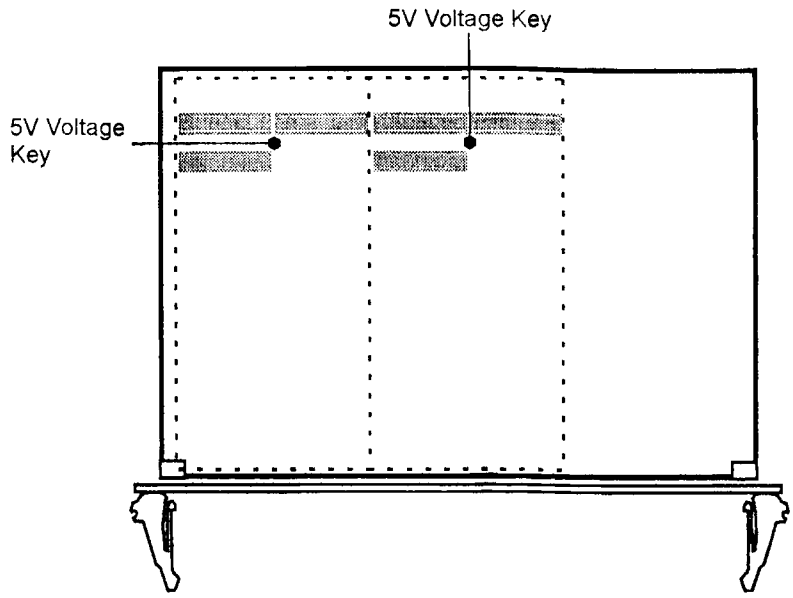


Figure 2: *Voltage Keys*

Installation Procedure

Caution



Only the Force Computers PPC/SSIO-6750 PMC module may be installed at the PMC slot #1 of the CPU board/xxx-ccc-Ly-zz-S/xxx. To prevent damage to the module and/or the CPU board, do not install this PMC module anywhere else and do not install any other PMC module in PMC slot #1 of this variant.

Note:

- **To ensure proper EMC shielding, either operate the board with the blind panels for the front panel or with the PMC modules installed.**
- **If the board is upgraded, ensure that the blind panels are stored in a safe place to be used again when removing the upgrades.**

---

1. Remove blind panel of respective PMC slot from front panel
2. Store blind panel in a safe place

Caution



- The maximum total power consumption per PMC slot at +/-12V, +5V, and +3.3V voltage rails must not exceed 7.5W (total over all used voltage rails).
- **Only install a 5V PMC module into the 5V PMC slots. To prevent a 3.3V PMC module from being plugged into a 5V PMC slot, do not remove the 5V voltage key from the CPU board.**
- **If a PMC module uses the +12V or –12V voltage, the voltage must be observed by the PMC module.**

3. Plug PMC module onto connectors PN11, PN12, and PN14 at PMC slot #1 or PN21, PN22, and PN24 at PMC slot #2

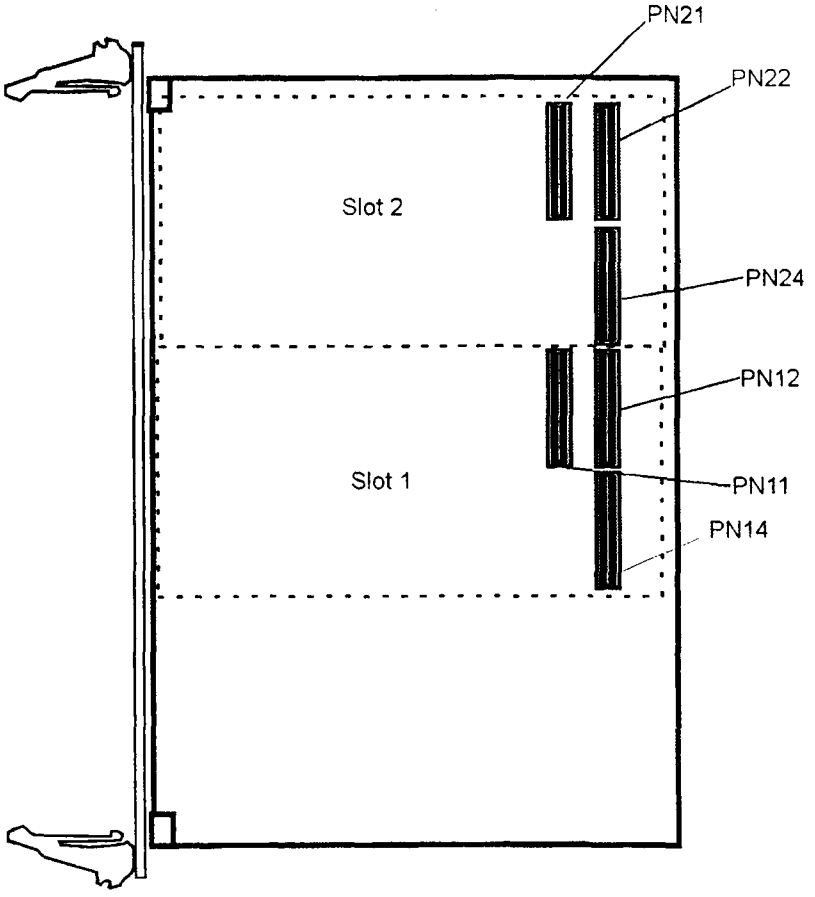


Figure 3: *Location of PMC Connectors*

4. Check if stand-offs of module cover mounting holes of board

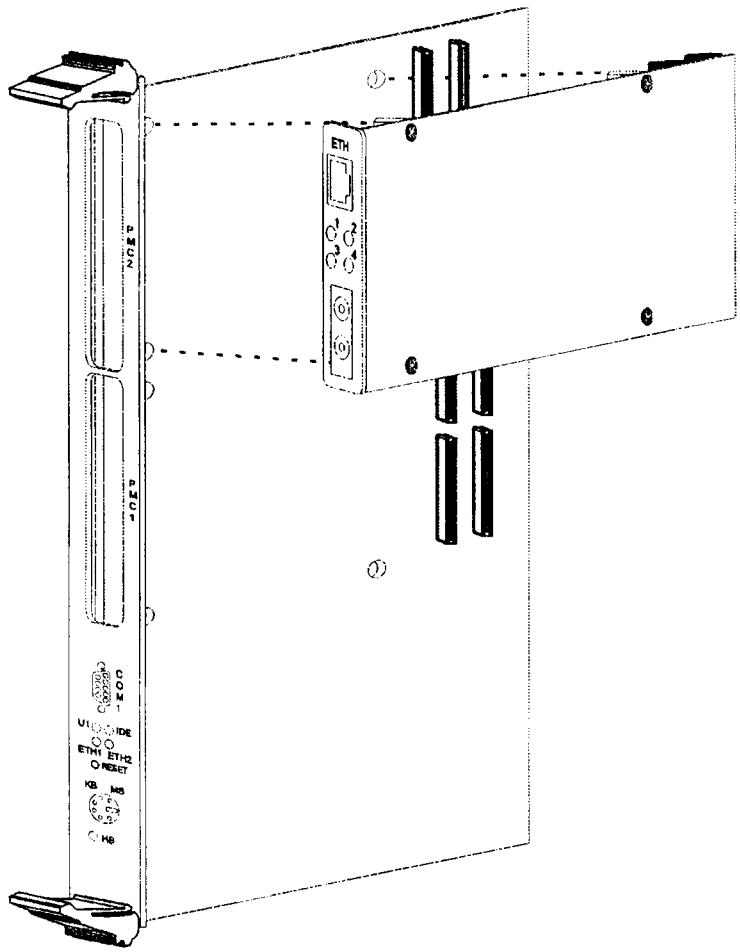


Figure 4: *Installing the PMC Module*

5. Place screws delivered with PMC module into mounting holes
6. Fasten screws

Removal Procedure

1. Remove screws
2. Disconnect PMC module from on-board PMC connectors
3. Close front panel gap with blind panel

CompactFlash Card

As a factory option, a CompactFlash slot can be assembled.

Note: If the CompactFlash slot is assembled, only the PMC slot #1 will be available.

The CompactFlash slot is integrated into the front panel to allow the installation and/or removal of a CompactFlash card without having to remove the board from the system.

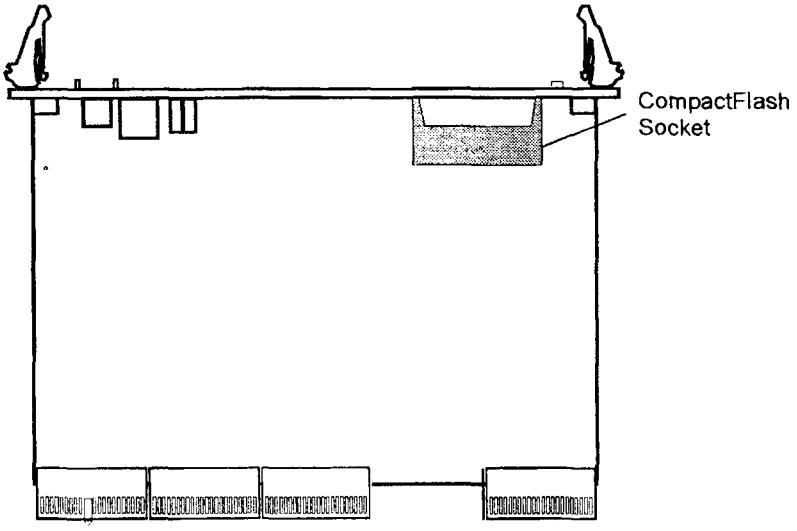


Figure 5: *Location of CompactFlash Slot*

Note: CompactFlash cards of types I and II are supported.

Installation Procedure

1. Check system documentation for all steps required before turning off board's power
2. Take those steps
3. Turn off board's power

Note: In order to configure the card to the supported True-IDE mode, the card must already be inserted when the board's power is turned on. Inserting the CompactFlash card while the board's power is still on will configure the CompactFlash card to PC Card ATA mode which is not supported by the CPU board.

4. Check that card's connectors face CompactFlash socket
5. Plug CompactFlash card into socket
   The CompactFlash card is connected to the socket if the ejector pin on the front panel is pushed out of the recess.

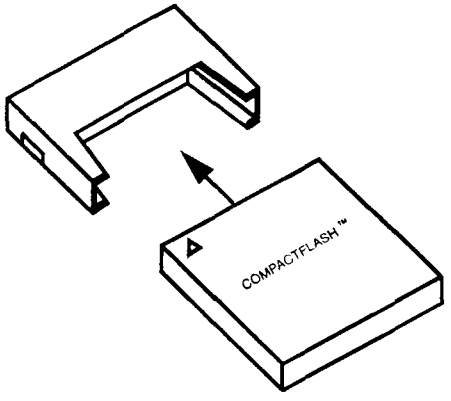


Figure 6: *Inserting a CompactFlash Card into Socket*

Removal Procedure

1. Press ejector pin
   The ejector pin loosens the CompactFlash card from the socket.
2. Remove CompactFlash card from CPU board

Rear Transition Board

As a separate price list item, a rear transition board (RTB) is available, the ACC/RTB-601. The RTB can be connected to the PPC/PowerCoreCPCI-680 by installing it into the appropriate slot of the backplane before or after the CPU board has been installed into the system.

Caution



The RTB does not support hot swap. In order to prevent the system and/or the RTB from being damaged, do not install the RTB in or remove it from a powered system.

The RTB provides access to CompactPCI user interfaces via CompactPCI standard connectors. The ACC/RTB-601 contains the RTB itself and the cabling.

For further information, refer to the *ACC/RTB-601 Installation Guide.*

Note: Only use the ACC/RTB-601 for the PPC/PowerCoreCPCI-680.

COP Adapter

Upon request, a COP adapter is available which supports JTAG debugger systems.

If the COP adapter is connected to the JTAG debug connector P12, the JTAG chain of the board is switched into debug mode and thus connects the JTAG lines of the CPU with the JTAG debug connector.

Caution



Only plug the COP adapter into the JTAG debug connector (P12). Otherwise, the board and your debugging equipment connected to the COP adapter may be damaged.

For further information on the JTAG Debug connector refer to the *COP-Adapter Information Sheet.* For information on availability of the COP adapter, please ask your local Force Computers sales representative.

Switch Settings

The PPC/PowerCoreCPCI-680 provides four configuration switches.

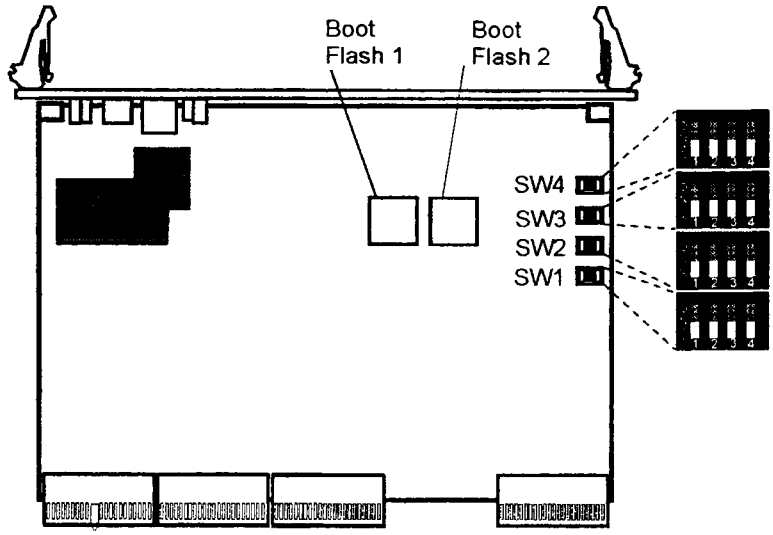


Figure 7: *Location of Switches*

For default settings, the white switches are moved to the OFF position.

Table 8: *Default Settings*

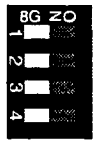
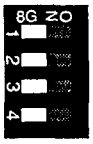
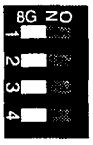
Switch	No.	Description
SW1 	1	Boot device selection OFF (default): Booting from boot flash 1 ON: Booting from boot flash #2
	2	Enable write access to boot flash OFF (default): Write-protected ON: Writing enabled
	3	User flash write protection OFF (default): Writing enabled ON: Write-protected
	4	General purpose switch (readable by software, no effect on hardware) **Reserved, must be off**

Table 8: *Default Settings*

Switch	No.	Description
SW2 	1	Disable Reset key OFF (default): Enabled ON: Disabled
	2	Disable Abort key OFF (default): Enabled ON: Disabled
	3	**Reserved**, must be OFF
	4	**Reserved**, must be OFF
SW3 	1	Interrupt generation on FAL# activity OFF (default): No interrupt is generated ON: Interrupt is generated (not available at SSIO variant)
	2	Interrupt generation on DEG# activity OFF (default): No interrupt is generated. ON: Interrupt is generated (not available at SSIO variant)
	3	**Reserved**, must be OFF.
	4	**Reserved**, must be OFF.
SW4 	1	Watchdog timer #1 OFF (default): Disabled ON: Enabled
	2	Watchdog timer #2 OFF (default): Disabled ON: Enabled
	3	Watchdog time OFF (default): NMI: ~32 ms, RESET: ~0.5 s ON: NMI: ~500 ms, RESET: ~2.5 s
	4	SW4-2 set to ON OFF (default): Watchdog timer #2 generates NMI. ON: Watchdog timer #2 generates high-level interrupt.

Board Installation

The PPC/PowerCoreCPCI-680 can be used either in a system slot or in a peripheral slot. The front panel of the CPU board shows both compatibility glyphs, the triangle and the circle.

Installation in a Nonpowered System

If the PPC/PowerCoreCPCI-680 serves as a system board, it may only be installed in or removed from a nonpowered system to prevent the system from breaking down.

Installation Procedure

1. Check documentation of all installed components for steps to be taken before turning off power, take those steps, and eventually, turn off power
2. Check switch settings for consistency
3. Plug board either into system slot marked by a triangle or into peripheral slot marked by a circle depending on its intended function
4. Insert board by pressing handles towards front panel
5. Fasten board using front panel screws
6. Plug interface cables into front panel connectors, if applicable
7. Turn on power

Removal Procedure

1. Check documentation of all installed components for steps to be taken before turning off power, take those steps, and eventually, turn off power
2. Remove interface cables from front panel connectors, if applicable
3. Loosen screws of CPU board's front panel
4. Loosen board from CompactPCI rack by pressing handles towards CompactPCI rack
5. Remove board
6. Turn on power

Installation in a Powered System Supporting Hot Swap

The basic purpose of hot-swap support and high-availability is to allow the board to be installed in and removed from a powered system without adversely affecting system operation. With hot-swap support, defective boards can be repaired and systems can be reconfigured without stopping system operation and with minimum operator interaction.

Caution



- **In order to avoid personal injury and/or damage to the board, never install or remove the board under hot-swap conditions unless a basic hot-swap, full hot-swap or high-availability platform is used and the system documentation explicitly includes appropriate guidelines for these tasks. For the system hot-swap support of the board in a system slot, check the system documentation.**
- **If the system is powered, only install the CPU board in or remove it from a peripheral slot.**

Installation in a Basic Hot Swap System

Note: Hot swap is not possible if the PPC/PowerCoreCPCI-680 is plugged into a system slot.

1. Check board configuration (switch settings, additional memory modules, PMC modules)
2. Check for appropriate rear transition board, if applicable
3. Insert board into powered system
4. Connect software manually according to system documentation

Installation in a Full Hot-Swap or High-Availability System

Note:

- Hot swap is not possible if the PPC/PowerCoreCPCI-680 is plugged into a system slot.
- A set of four control and status bits on each board allows the host software to determine the source of the ENUM# signal and control the blue hot-swap LED.

1. Check board configuration (switch settings, additional memory modules, PMC modules)
2. Check for appropriate rear transition board, if applicable
3. Insert board into powered system
   The hot-swap LED (HS) stays blue until the board software connection process has been completed. The HEALTHY# signal is active when all backplane and on-board voltages are within their operating ranges. The interrupt signal ENUM# is generated and passed to the system host board of the CompactPCI system to indicate a service request.

Removal from a Basic Hot Swap System

Note:

- Hot swap is not possible if the PPC/PowerCoreCPCI-680 is plugged into a system slot.
- A set of four control and status bits on each board allows the host software to determine the source of the ENUM# signal and control the blue hot-swap LED.

1. Start removing board by disconnecting software manually as described in system documentation
   The interrupt signal ENUM# is generated and passed to the system host board of the CompactPCI system to indicate a service request.
2. Check if software disconnection process has been completed
3. Remove board from powered system

Removal from a Full Hot Swap or High-Availability System

Note: Hot swap is not possible if the PPC/PowerCoreCPCI-680 is plugged into a system slot.

1. Open lower front panel handle
   The hot-swap switch is integrated into the lower handle of the CPU board. When the handle is opened during normal operation, the interrupt signal ENUM# is asserted on the CompactPCI backlane. This interrupt indicates the installation or the pending removal of a new board.
2. Wait until hot-swap LED (HS) turns blue
   The hot-swap control and status register bits are appropriately set.

Caution



As long as the blue hot-swap LED is OFF, the board is in normal operation and must not be removed.

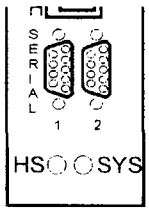


Figure 8: *Hot Swap LED*

3. Remove board from powered system when hot-swap LED (HS) is lit up blue
   The blue hot-swap LED indicates that you are allowed to remove the board.

Testing the Board

PowerBoot is the firmware providing some basic test and debug commands and is stored in the on-board Boot PROM. This section describes a procedure to test the board using PowerBoot to ensure all devices are set up correctly.

PowerBoot automatically starts after each power up or reset to test the CPU board. After successfully passing the self-initialization routine, the following message or a similar one will appear on the screen:

```
Init serial 1 at address: 0xFE0003F8
Init serial 2 at address: 0xFE0002F8
Init CIO at address: 0xFE000300
Init Ethernet Controller 1 at address: 0xFE870000
Init Ethernet Controller 2 at address: 0xFE880000
Init Ethernet Controller 3 at address: 0xFE860000
PMC1/2: no auto mapping setup
Found PCI-to-PCI bridge/device SENTINEL - Host mode
Init PCI-to-PCI Host bridge at address: 0xFE890000
Probelist for CompactPCI I/O slots:  2, 3, 4, 5, 6, 7, 8,
Testing NVRAM.....done
Testing RAM .....done
Testing Boot FLASH....CSUM 0xABCD..done
Testing PCI Bus .....done
Testing ISA .....done
Testing Ethernet Controller1.....done
Testing Ethernet Controller2.....done
Testing Ethernet Controller3.....done
Found CPU7400/G4, PVR=000C0200,
CPU clock: 500MHz, Bus clock: 100MHz, E
SDRAM mode enabled
Onboard DRAM       :  128MB, 0x00000000..0x03FFFFFF
Init SDRAM Module 1:  none
Init SDRAM Module 2:  none
Init DTLB/ITLB for block translation, enable MMU
Init L1-Icache
Init L1-Dcache
Init L2-Cache, found 1024 kByte cache, 140MHz
Init exception vectors starting at address: 0x00000100
Read NVRAM...identify board
BIB version: 2.0
Ethernet 1: 00:80:42:0E:30:32
Ethernet 2: 00:80:42:0E:30:33
Ethernet 3: 00:80:42:0E:30:34

<<PowerBoot V3.30 for PowerCoreCPCI CPU-680>>

PowerBoot> _
```

It is also possible to test the board for more specific functions, such as correct operation. To do so, enter

probepci.

<probepci> does not provide a full-featured power-on self-test. However, it tests some I/O devices and scans the PCI bus for participants. Depending on the board configuration, a message like the following will appear.

```
PowerBoot> probepci
Probing PCIbus at 0x80000000
Device ID = 0x0004; Vendor ID = 0x1057;
Status    = 0x00A0; Command   = 0x0016;
Base Class= 0x06;   Sub Class = 0x00;   Prg. Inter= 0x00;   Rev. ID
= 0x10;
BIST      = 0x00;   Header Typ= 0x00;   Latency Ti= 0x20;   Cache
Line= 0x08;
base addr0= 0x00000008, base addr1= 0x00000000;
Max Lat   = 0x00;   Min Gnt   = 0x00;   IRQ Pin   = 0x01;   IRQ Line
= 0x00;
Found PCI device: Motorola MPC107 PowerPC PCI bridge

Probing PCIbus at 0x8000C000
Device ID = 0x0001; Vendor ID = 0x1146;
Status    = 0x0210; Command   = 0x0017;
Base Class= 0x06;   Sub Class = 0x80;   Prg. Inter= 0x00;   Rev. ID
= 0x00;
BIST      = 0x00;   Header Typ= 0x00;   Latency Ti= 0x20;   Cache
Line= 0x08;
base addr0= 0xFFFFF000, base addr1= 0x00890001;
Max Lat   = 0x00;   Min Gnt   = 0x00;   IRQ Pin   = 0x01;   IRQ Line
= 0x00;
Found PCI device: FORCE Computers SENTINEL PCI-to-PCI Bridge

Probing PCIbus at 0x80005000
Device ID = 0x1229; Vendor ID = 0x8086;
Status    = 0x0290; Command   = 0x0017;
Base Class= 0x02;   Sub Class = 0x00;   Prg. Inter= 0x00;   Rev. ID
= 0x08;
BIST      = 0x00;   Header Typ= 0x00;   Latency Ti= 0x20;   Cache
Line= 0x08;
base addr0= 0xFFFFF000, base addr1= 0x00860001;
Max Lat   = 0x38;   Min Gnt   = 0x08;   IRQ Pin   = 0x01;   IRQ Line
= 0x00;
Found PCI device: Intel i82559 Ethernet Controller

Probing PCIbus at 0x8000C800
Device ID = 0x1229; Vendor ID = 0x8086;
Status    = 0x0290; Command   = 0x0017;
Base Class= 0x02;   Sub Class = 0x00;   Prg. Inter= 0x00;   Rev. ID
= 0x08;
```

```
BIST      = 0x00;   Header Typ= 0x00;   Latency Ti= 0x20;   Cache
Line= 0x08;
base addr0= 0xFFFFF000, base addr1= 0x00870001;
Max Lat   = 0x38;   Min Gnt   = 0x08;   IRQ Pin   = 0x01;   IRQ Line
= 0x00;
Found PCI device: Intel i82559 Ethernet Controller

Probing PCIbus at 0x8000E000
Device ID = 0x1229; Vendor ID = 0x8086;
Status    = 0x0290; Command   = 0x0017;
Base Class= 0x02;   Sub Class = 0x00;   Prg. Inter= 0x00;   Rev. ID
= 0x08;
BIST      = 0x00;   Header Typ= 0x00;   Latency Ti= 0x20;   Cache
Line= 0x08;
base addr0= 0xFFFFF000, base addr1= 0x00880001;
Max Lat   = 0x38;   Min Gnt   = 0x08;   IRQ Pin   = 0x01;   IRQ Line
= 0x00;
Found PCI device: Intel i82559 Ethernet Controller

Probing PCIbus at 0x8000F000
Device ID = 0x0565; Vendor ID = 0x10AD;
Status    = 0x0200; Command   = 0x0007;
Base Class= 0x06;   Sub Class = 0x01;   Prg. Inter= 0x00;   Rev. ID
= 0x10;
BIST      = 0x00;   Header Typ= 0x80;   Latency Ti= 0x00;   Cache
Line= 0x00;
base addr0= 0x00000000, base addr1= 0x00000000;
Max Lat   = 0x00;   Min Gnt   = 0x00;   IRQ Pin   = 0x00;   IRQ Line
= 0x00;
Found PCI device: Winbond W83C553F Sys. I/O Con., function 0
Probing PCIbus at 0x8000F100
Device ID = 0x0105; Vendor ID = 0x10AD;
Status    = 0x0280; Command   = 0x0000;
Base Class= 0x01;   Sub Class = 0x01;   Prg. Inter= 0x8F;   Rev. ID
= 0x05;
BIST      = 0x00;   Header Typ= 0x80;   Latency Ti= 0x00;   Cache
Line= 0x08;
base addr0= 0x000001F1, base addr1= 0x000003F5;
Max Lat   = 0x28;   Min Gnt   = 0x02;   IRQ Pin   = 0x01;   IRQ Line
= 0x0E;
Found PCI device: Winbond W83C553F IDE, function 1

Probing PCIbus at 0x8000F800
PowerBoot>
```

3

Controls, Indicators, and Connectors

Front Panel

The following figure highlights the position of cutouts for PMC modules, CompactFlash card, keys, connectors, and LEDs of the front panel variants of the Product.

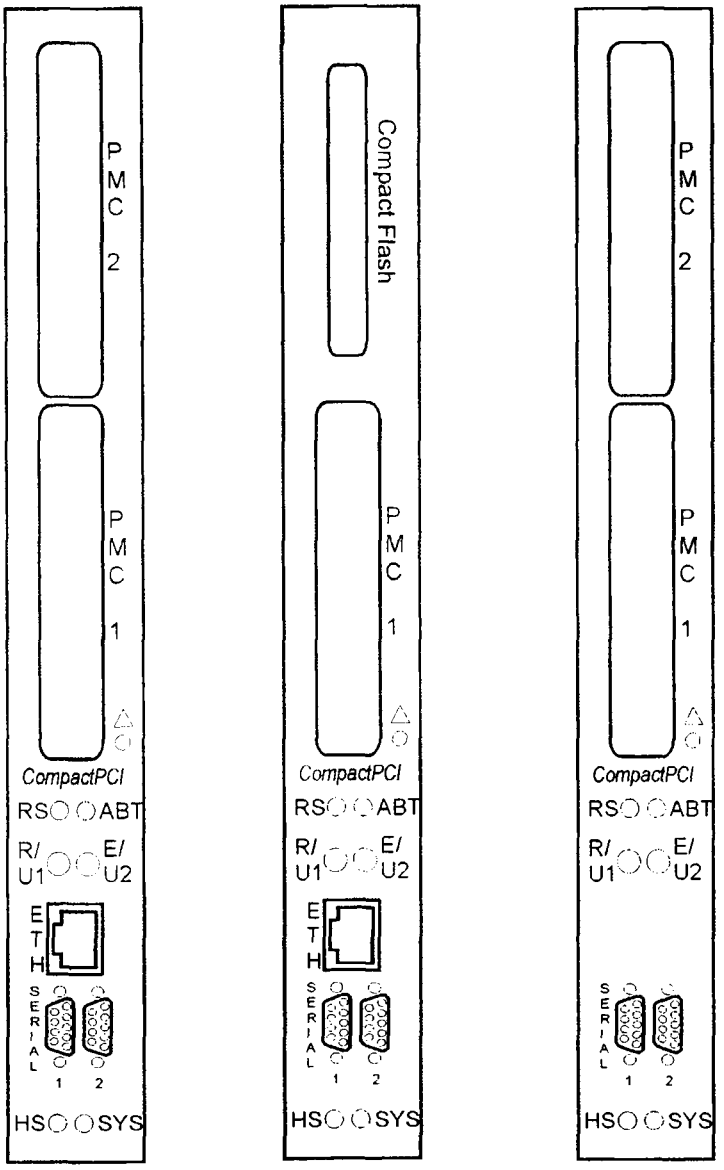


Figure 9: *Standard, CompactFlash, and RR-Variant Front Panel*

PMC Cutouts

The front panel of the CPU board provides up to two PMC cutouts.

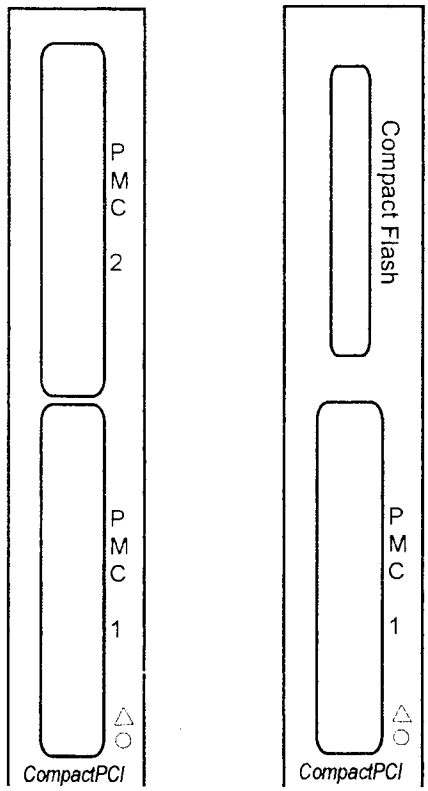


Figure 10: *Cutouts for PMC Modules*

CompactFlash Cutout

As a factory option, the front panel of the CPU board provides one cutout for a CompactFlash disk.

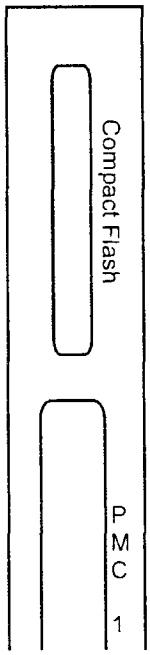


Figure 11: *Cutout for CompactFlash Disk*

LEDs

The CPU board provides four LEDs on the front panel.

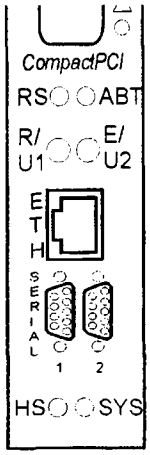
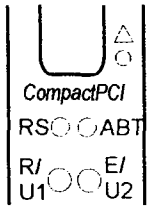


Table 9: *Description of Front Panel LEDs*

LED	Description
HS	Blue hot-swap LED Blue: Board is plugged in or may be removed from system OFF: Board must not be removed from a powered system
SYS	System controller LED Yellow: Board is system controller OFF: Board is intelligent I/O board
R/U1	In Hardware-LED mode (default): RUN/RESET LED indicating board status Green: Normal operation Red: Reset is active In User-LED mode (programmable by software): USER LED1: Can be programmed to be red, green or OFF
E/U2	In Hardware-LED mode (default): Ethernet green and red LED indicating status of front or rear Ethernets. ON: Ethernet link is available Blinking: Data is transferred In User-LED mode (programmable by software): USER LED2: Can be programmed to be red, green or OFF

Keys

The front panel of the CPU board provides a reset key, an abort key and a hot-swap switch.



Reset Key

When toggled, it instantaneously affects the board by generating a reset. A reset of all on-board I/O devices and of the CPU is performed when the reset key is pushed to the active position.

To avoid unintentional reset, the reset key is recessed in the front panel. For information on disabling the key, see Table 8 "Default Settings" page 2-14.

Abort Key

When toggled, it instantaneously affects the board by generating a non-maskable interrupt (NMI) request via the PCI-to-ISA bridge. This allows to abort the current program, to trigger a self-test, or to start a maintenance program.

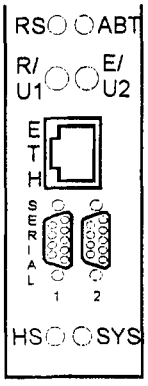
To avoid unintentional abort, the abort key is recessed in the front panel. For information on disabling the key, see Table 8 "Default Settings" page 2-14.

Hot-Swap Switch

The hot-swap switch is integrated into the lower handle of the CPU board. When the handle is opened during normal operation, the interrupt signal ENUM# is asserted on the CompactPCI backplane. This interrupt indicates the insertion of a new board or the pending removal of a board.

Connectors

The front panel of the CPU board provides one Ethernet connector (ETH0#1) and two serial connectors.



Note: The front panel of the Product/RR does not provide an Ethernet connector.

Ethernet Connector

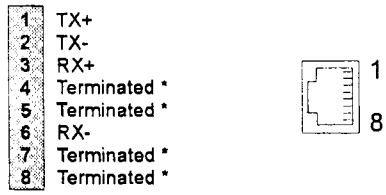
The CPU board provides up to three 10Base-T or 100Base-TX Ethernet interfaces. The Ethernet interface #1 is available on the front panel via an 8-pin RJ-45 connector. The Ethernet interfaces #2 and #3 are routed via CompactPCI connector J5 and are available via the RTB-601.

Note: Due to the limitations in the PCI arbiter of the PCI-to-ISA bridge, the three Ethernet adapters cannot be used together with the two PMC modules.

The following table shows the assembly options of the Product. The 'x' marks the permitted combination, the '-' marks that this combination is not possible.

Table 10: *Assembly Options*

Product.../	ETH #1 Front	ETH #2 Rear	ETH #3 Rear	PMC #1	PMC #2
.../FR	x	x	-	x	x
.../RR	-	x	x	x	x
.../FRR	x	x	x	x	-



* Terminated using "Bob-Smith"-Termination.

Figure 12: *ETH #1 Connector Pinout*

Serial Connectors

The CPU board provides two serial I/O ports. The RS-232 serial I/O ports #1 and #2 are both available via a double 9-pin MicroD-Sub connector at the front panel. Each serial port is also routed to the CompactPCI connector J3 and therefore available at the RTB-601.

Note: To prevent data loss, the serial I/O ports must not be used simultaneously at the front panel and via the RTB. However, it is allowed to connect the serial I/O port #1 at the front panel and the serial I/O port #2 via the RTB at the same time.

Default port setup:

- RS-232 asynchronous communication
- 9600 baud, eight data bits, one start bit, one stop bit, no parity
- No handshake protocol used per default

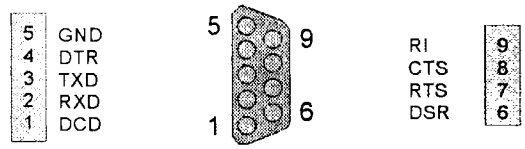


Figure 13: *Serial Connector Pinout*

On-Board Connectors

The CPU board provides PMC connectors, one JTAG debug connector, and an ISA connector as factory option.

PMC Connectors

The 32-bit PCI bus requires two PMC connectors for each PMC slot. The third PMC connector PN*x*4, where *x* is 1 and 2 for the PMC slots #1 and #2 respectively, connects additional user I/O signals of the respective PMC slot with the CompactPCI bus J3 and J5 connectors.

PMC slot #1 has the following connectors:

- PN11 and PN12 for the PCI bus
- PN14 for 64 user I/O signals

PMC Slot #2 has the following connectors:

- PN21 and PN22 for the PCI bus
- PN24 for 64 user I/O signals

Note: The PMC slots #1 and #2 have 64 user I/O signals each. All signals of the PMC slot #1 are available on the connector J3 and all signals of the PMC slot #2 are available on the connector J5.

1	IO_PMC1<1>	IO_PMC1<2>	2
3	IO_PMC1<3>	IO_PMC1<4>	4
5	IO_PMC1<5>	IO_PMC1<6>	6
7	IO_PMC1<7>	IO_PMC1<8>	8
9	IO_PMC1<9>	IO_PMC1<10>	10
11	IO_PMC1<11>	IO_PMC1<12>	12
13	IO_PMC1<13>	IO_PMC1<14>	14
15	IO_PMC1<15>	IO_PMC1<16>	16
17	IO_PMC1<17>	IO_PMC1<18>	18
19	IO_PMC1<19>	IO_PMC1<20>	20
21	IO_PMC1<21>	IO_PMC1<22>	22
23	IO_PMC1<23>	IO_PMC1<24>	24
25	IO_PMC1<25>	IO_PMC1<26>	26
27	IO_PMC1<27>	IO_PMC1<28>	28
29	IO_PMC1<29>	IO_PMC1<30>	30
31	IO_PMC1<31>	IO_PMC1<32>	32
33	IO_PMC1<33>	IO_PMC1<34>	34
35	IO_PMC1<35>	IO_PMC1<36>	36
37	IO_PMC1<37>	IO_PMC1<38>	38
39	IO_PMC1<39>	IO_PMC1<40>	40
41	IO_PMC1<41>	IO_PMC1<42>	42
43	IO_PMC1<43>	IO_PMC1<44>	44
45	IO_PMC1<45>	IO_PMC1<46>	46
47	IO_PMC1<47>	IO_PMC1<48>	48
49	IO_PMC1<49>	IO_PMC1<50>	50
51	IO_PMC1<51>	IO_PMC1<52>	52
53	IO_PMC1<53>	IO_PMC1<54>	54
55	IO_PMC1<55>	IO_PMC1<56>	56
57	IO_PMC1<57>	IO_PMC1<58>	58
59	IO_PMC1<59>	IO_PMC1<60>	60
61	IO_PMC1<61>	IO_PMC1<62>	62
63	IO_PMC1<63>	IO_PMC1<64>	64

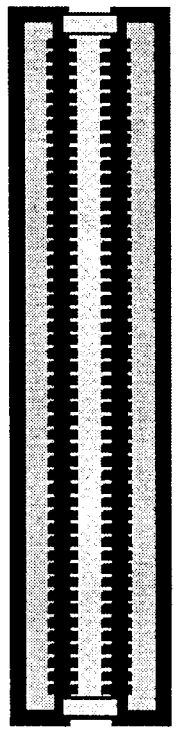


Figure 14: *PN14 Connector Pinout*

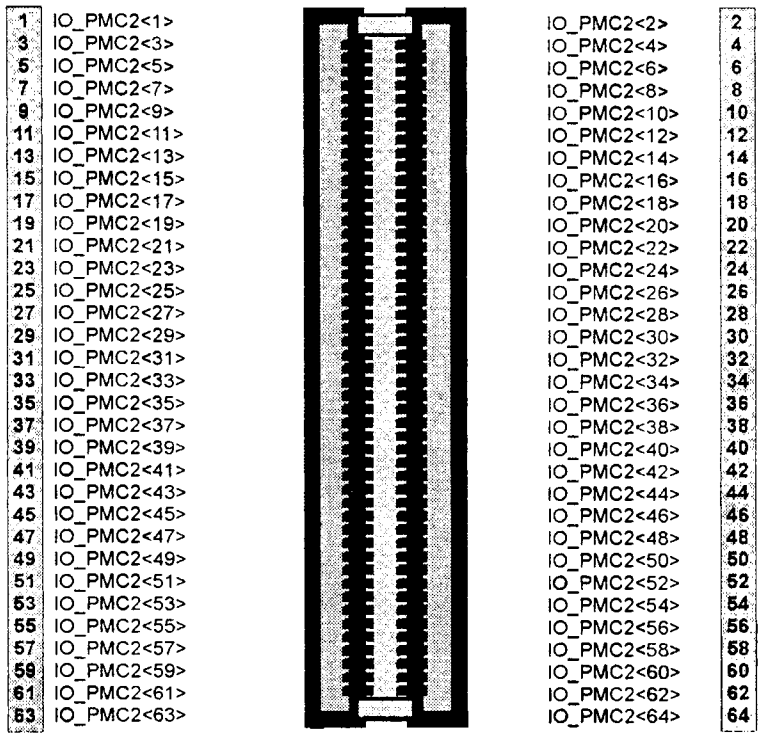


Figure 15: *PN24 Connector Pinout*

In order to support the PMC-8260, some PMC I/O signals are routed as impedance controlled differential pairs to the rear transition board connectors. The pinning remains unchanged.

The following table shows the differential pairs. Each signal has a '+' and a '-' line which form a differential pair. As the CPU board provides up to two PMC slots, this table applies to both PMC slots because the PMC-8260 module is supported by PMC slot #1 and PMC slot #2.

Table 11: *Impedance-Controlled Differential Pair I/O-Routing on PMC Slots*

Signal	PMC-IO-Pin
ATM_RX+	37
ATM_RX-	39
ATM_TX+	38
ATM_TX-	40
ETH_TX1+	45
ETH_TX1-	47

Table 11: *Impedance-Controlled Differential Pair I/O-Routing on PMC Slots (cont.)*

Signal	PMC-IO-Pin
ETH_RX1+	46
ETH_RX1-	48
ETH_TX2+	61
ETH_TX2-	63
ETH_RX2+	62
ETH_RX2-	64

ISA Connector

The ISA connector PN15 provides access to a set of ISA bus signals and interrupt requests signals.

Note: The PN15 connector is only assembled at the Product/xxx-ccc-Ly-zz-S G3 variant.

1	ISA_SYSCLK		SD0	2
3	GND		SD1	4
5	SA0		SD2	6
7	SA1		SD3	8
9	SA2		SD4	10
11	SA3		SD5	12
13	SA4		SD6	14
15	SA5		SD7	16
17	SA6		BALE	18
19	SA7		DACK0#	20
21	SA8		DREQ0	22
23	SA9		DACK1#	24
25	SA10		DREQ1	26
27	n.c.		DACK2#	28
29	IOCHRDY		DREQ2	30
31	AEN		n.c.	32
33	TC		IRQ1	34
35	ZEROWS#		IRQ3	36
37	IOR#		IRQ4	38
39	IOW#		IRQ5	40
41	MR		IRQ6	42
43	IDENT		IRQ7	44
45	GND		IRQ12	46
47	n.c.		+12V	48
49	n.c.		n.c.	50
51	n.c.		n.c.	52
53	n.c.		n.c.	54
55	n.c.		GND	56
57	n.c.		n.c.	58
59	GND		GND	60
61	n.c.		n.c.	62
63	n.c.		n.c.	64

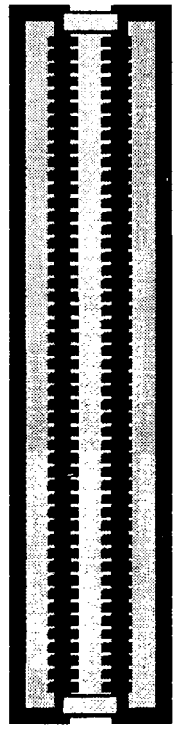


Figure 16: *PN15 Connector Pinout*

CompactPCI Connectors

The CPU board provides a CompactPCI interface capable of being used either in a system slot or in a peripheral slot and provides the connectors J1, J2, J3, and J5.

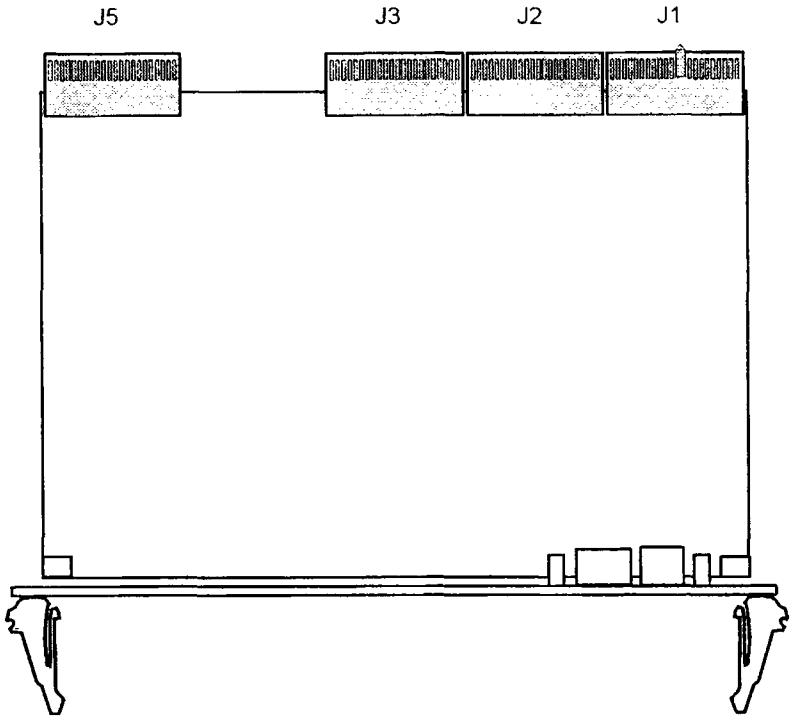


Figure 17: *Location of CompactPCI Connectors*

J1 and J2

The CompactPCI connectors J1 and J2 implement the CompactPCI 64-bit connector pinout as specified by the *CompactPCI Specification PICMG 2 0 R2.1.*

J3

The following table shows the naming conventions for the user I/O signals available on the CPCI connectors J3 and J5.

Table 12: *Naming Conventions of I/O Signals*

Signal	Description
IO_PMC1<x>	User-defined I/O signals from PMC I/O connector PN14, with <x> corresponding to pin number of PMC I/O connector
IO_PMC2<x>	User-defined I/O signals from PMC I/O connector PN24, with <x> corresponding to pin number of PMC I/O connector
COM1_...	Signals of serial I/O port #1
COM2_...	Signals of serial I/O port #2
ETH1_...	Differential twisted-pair signals from Ethernet interface #1
ETH2_...	Differential twisted-pair signals from Ethernet interface #2
ETH3_...	Differential twisted-pari signals from Ethernet interface #3
BP_RST#	Active low reset input which can be connected to external push-button reset
TM_PRSNT#	Input: Logic low indicates presence of RTB
GND	Signal ground pin
V3P3_BPIO	3.3V voltage supply fused to about 1.5A on CPU board
VP5_BPIO	5V voltage supply fused to about 1.5A on CPU board

	A	B	C	A B C D E	D	E	
19	Reserved	Reserved	Reserved		Reserved	Reserved	19
18	COM1_DTR	COM1_RI	COM2_DTR		COM2_RI	Reserved	18
17	COM1_DSR	COM1_DCD	COM2_DSR		COM2_DCD	Reserved	17
16	COM1_CTS	COM1_TXD	COM2_CTS		COM2_TXD	Reserved	16
15	COM1_RTS	COM1_RXD	COM2_RTS		COM2_RXD	Reserved	15
14	V3P3_BPIO	V3P3_BPIO	V3P3_BPIO		VP5_BPIO	VP5_BPIO	14
13	IO_PMC1<5>	IO_PMC1<4>	IO_PMC1<3>		IO_PMC1<2>	IO_PMC1<1>	13
12	IO_PMC1<10>	IO_PMC1<9>	IO_PMC1<8>		IO_PMC1<7>	IO_PMC1<6>	12
11	IO_PMC1<15>	IO_PMC1<14>	IO_PMC1<13>		IO_PMC1<12>	IO_PMC1<11>	11
10	IO_PMC1<20>	IO_PMC1<19>	IO_PMC1<18>		IO_PMC1<17>	IO_PMC1<16>	10
9	IO_PMC1<25>	IO_PMC1<24>	IO_PMC1<23>		IO_PMC1<22>	IO_PMC1<21>	9
8	IO_PMC1<30>	IO_PMC1<29>	IO_PMC1<28>		IO_PMC1<27>	IO_PMC1<26>	8
7	IO_PMC1<35>	IO_PMC1<34>	IO_PMC1<33>		IO_PMC1<32>	IO_PMC1<31>	7
6	IO_PMC1<40>	IO_PMC1<39>	IO_PMC1<38>		IO_PMC1<37>	IO_PMC1<36>	6
5	IO_PMC1<45>	IO_PMC1<44>	IO_PMC1<43>		IO_PMC1<42>	IO_PMC1<41>	5
4	IO_PMC1<50>	IO_PMC1<49>	IO_PMC1<48>		IO_PMC1<47>	IO_PMC1<46>	4
3	IO_PMC1<55>	IO_PMC1<54>	IO_PMC1<53>		IO_PMC1<52>	IO_PMC1<51>	3
2	IO_PMC1<60>	IO_PMC1<59>	IO_PMC1<58>		IO_PMC1<57>	IO_PMC1<56>	2
1	GND	IO_PMC1<64>	IO_PMC1<63>		IO_PMC1<62>	IO_PMC1<61>	1

Figure 18: *J3 Connector Pinout*

J5

For an overview of the naming conventions of the user I/O signals, refer to Table 12 "Naming Conventions of I/O Signals" page 3-16.

Note:

- **Pinout followed by "@" refers to CPCI-680 Rev. 1.1 compatible RTB**
- **Pinout followed by "%" refers to customer-specific RTB**

	A	B	C	A B C D E	D	E	
22	ETH1_TX+@	ETH1_RX+@/ETH1_TX+%	ETH1_RX+%		ETH2_TX+	ETH2_RX+	22
21	ETH1_TX-@	ETH1_RX-@/ETH1_TX-%	ETH1_RX-%		ETH2_TX-	ETH2_RX-	21
20	GND	Reserved	BP_RST#		Reserved	Reserved	20
19	Reserved	Reserved	Reserved		Reserved	Reserved	19
18	Reserved	Reserved	Reserved		Reserved	Reserved	18
17	GND	Reserved	Reserved		Reserved	Reserved	17
16	Reserved	Reserved	Reserved		Reserved	Reserved	16
15	Reserved	Reserved	Reserved		Reserved	Reserved	15
14	Reserved	Reserved	Reserved		Reserved	Reserved	14
13	IO_PMC2<5>	IO_PMC2<4>	IO_PMC2<3>		IO_PMC2<2>	IO_PMC2<1>	13
12	IO_PMC2<10>	IO_PMC2<9>	IO_PMC2<8>		IO_PMC2<7>	IO_PMC2<6>	12
11	IO_PMC2<15>	IO_PMC2<14>	IO_PMC2<13>		IO_PMC2<12>	IO_PMC2<11>	11
10	IO_PMC2<20>	IO_PMC2<19>	IO_PMC2<18>		IO_PMC2<17>	IO_PMC2<16>	10
9	IO_PMC2<25>	IO_PMC2<24>	IO_PMC2<23>		IO_PMC2<22>	IO_PMC2<21>	9
8	IO_PMC2<30>	IO_PMC2<29>	IO_PMC2<28>		IO_PMC2<27>	IO_PMC2<26>	8
7	IO_PMC2<35>	IO_PMC2<34>	IO_PMC2<33>		IO_PMC2<32>	IO_PMC2<31>	7
6	IO_PMC2<40>	IO_PMC2<39>	IO_PMC2<38>		IO_PMC2<37>	IO_PMC2<36>	6
5	IO_PMC2<45>	IO_PMC2<44>	IO_PMC2<43>		IO_PMC2<42>	IO_PMC2<41>	5
4	IO_PMC2<50>	IO_PMC2<49>	IO_PMC2<48>		IO_PMC2<47>	IO_PMC2<46>	4
3	IO_PMC2<55>	IO_PMC2<54>	IO_PMC2<53>		IO_PMC2<52>	IO_PMC2<51>	3
2	IO_PMC2<60>	IO_PMC2<59>	IO_PMC2<58>		IO_PMC2<57>	IO_PMC2<56>	2
1	TM_PRSNT#	IO_PMC2<64>	IO_PMC2<63>		IO_PMC2<62>	IO_PMC2<61>	1

Figure 19: *J5 Connector Pinout*

Note: The pins in rows Z and F of connector J5 all have the signal GND.

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 exchange in case of long-term spare part handling.

Caution



- **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.**
- **Incorrect exchange of Lithium batteries can result in a hazardous explosion.**
- **Exchange the battery before five years of actual battery use have elapsed.**
- **Always use the same type of Lithium battery as is installed.**
- **When installing the new battery ensure that the dot marked on top of the battery covers the dot marked on the board.**

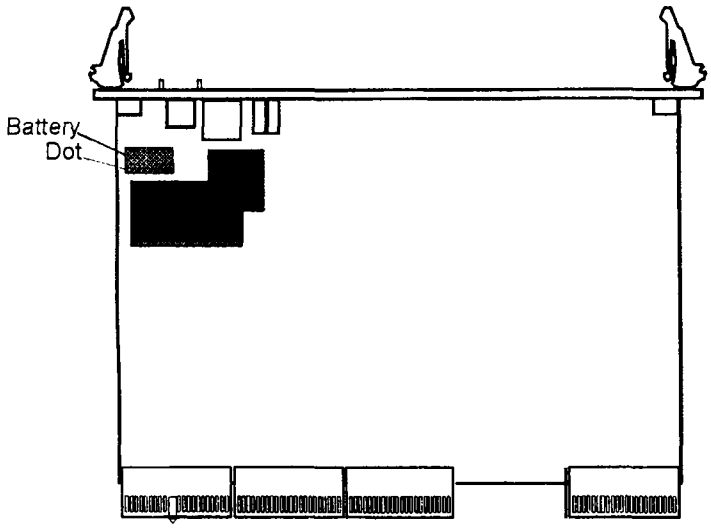


Figure 20: *Battery Location*

In order to exchange the battery, follow the instructions below:

1. Remove board from backplane
   For board removal procedure, see "Board Installation" page 2-16.
2. Remove battery
3. When installing new battery, ensure that dot on battery covers dot on 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