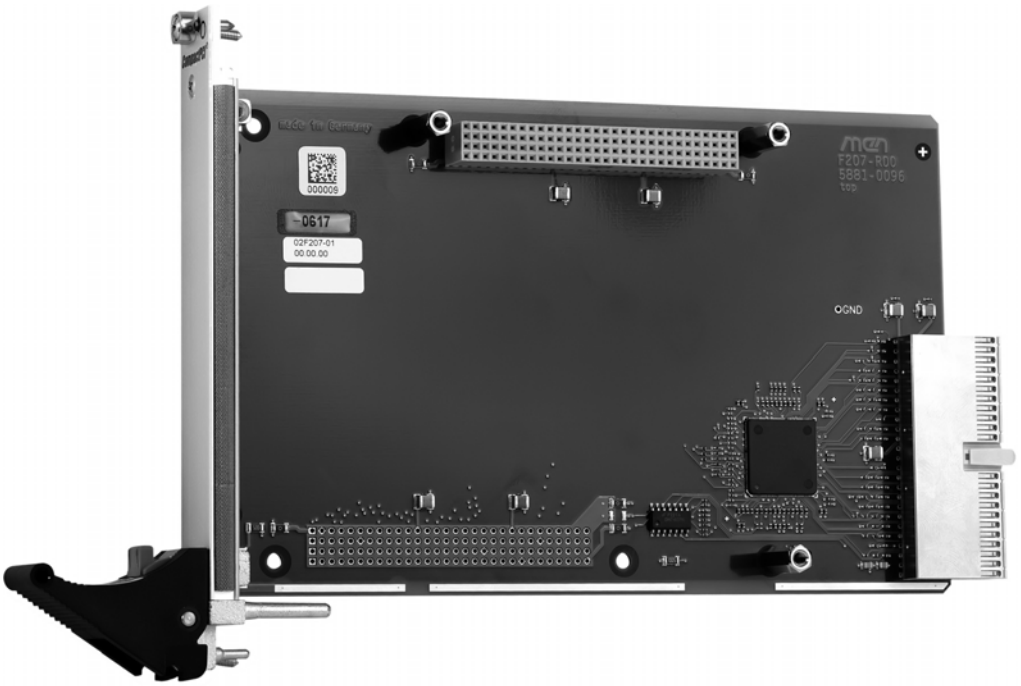
Embedded Solutions

F207 – 3U CompactPCI®
Carrier Board for PCI-104



Configuration example

User Manual

mikro elektronik
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F207 – 3U CompactPCI® Carrier Board for PCI-104

The F207 is a 3U CompactPCI® bus card which provides a PCI-104 interface supporting up to four PCI-104 extension boards. An on-board PCI-to-PCI bridge provides a 32-bit PCI interface at the PCI-104 connector and a 32-bit/33-MHz interface to the CompactPCI® bus. V(I/O) voltage is 3.3V on the local bus (5V on request) and 3.3V or 5V on CompactPCI®.

Two different versions of the F207 offer two different connector positions where a PCI-104 module can be placed. The standard version supports the typical stacking method of PCI-104 devices and needs more than one slot of space in a CompactPCI® system. Another version allows face-to-face assembly.

The F207 is fully compliant with railway standard EN 50155. For example, all components are specified for an operation temperature of -40 to +85°C.

Technical Data

PCI-104

- One slot for PCI-104
- Up to four stacked PCI-104 modules
- 8HP solution with one PCI-104 module mounted
  - Second front panel as needed (filler panel or with connector cut-outs)

Peripheral Connections

- Via front panel

Local PCI Bus

- 32-bit/33-MHz, 3.3V or 5V (on request) V(I/O)
- Compliant with PCI Specification 2.2

CompactPCI® Bus

- Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0
- Peripheral slot
- Only one slot required on 3U CompactPCI® bus
- PCI2050 PCI-to-PCI bridge
  - Max. clock frequency 33MHz
  - 32-bit/33-MHz PCI-to-PCI bridge
- V(I/O): +3.3V or +5V (Universal Board)

Electrical Specifications

- Supply voltage/power consumption:
  - +5V (-3%/+5%), 40mA max. (without PCI-104 module)
  - +3.3V (-3%/+5%), 60mA max. (without PCI-104 module)

Mechanical Specifications

- Dimensions: conforming to CompactPCI® specification for 3U boards
- Front panel: aluminum with 1 handle
- Weight: 170g

Environmental Specifications

- Temperature range (operation):
  - -40..+85°C
  - Airflow: min. 10m³/h
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms
- Bump: 10g/16ms
- Vibration (sinusoidal): 2g/10..150Hz
- Conformal coating on request

MTBF

- MTBF: 2,006,823h @ 40°C

Safety

- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

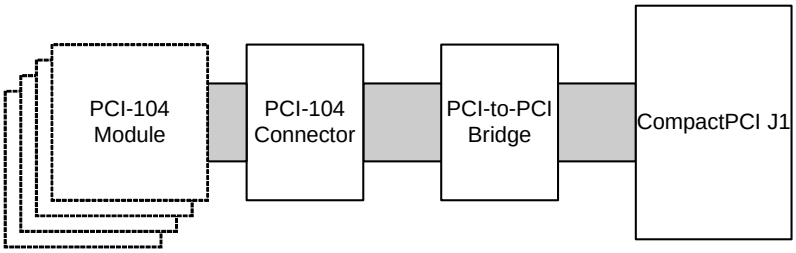
EMC

- Tested according to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst) with regard to CE conformity

Software Support

- PCI-104 drivers as supported
- For more information on supported operating system versions and drivers see online data sheet.

Block Diagram



Configuration Options

PCI-104 Slot

- One PCI-104 module mounted "face-to-face" instead of PCI-104 stacking
- 4HP solution with one PCI-104 module mounted (single-slot)
- Only for PCI-104 modules that have a modified or no PCI-104 connector on the bottom side, because of height restriction to 4HP

V(I/O) on Local Bus

- 5V instead of 3.3V

Please note that some of these options may only be available for large volumes. Please contact MEN's sales team for further information.

Product Safety

Electrostatic Discharge (ESD)

Computer boards and components contain electrostatic sensitive devices. Electrostatic discharge (ESD) can damage components. To protect the board and other components against damage from static electricity, you should follow some precautions whenever you work on your computer.

- Power down and unplug your computer system when working on the inside.
- Hold components by the edges and try not to touch the IC chips, leads, or circuitry.
- Use a grounded wrist strap before handling computer components.
- Place components on a grounded antistatic pad or on the bag that came with the component whenever the components are separated from the system.
- Store the board only in its original ESD-protected packaging. Retain the original packaging in case you need to return the board to MEN for repair.

About this Document

This user manual describes the hardware functions of the board, connection of peripheral devices and integration into a system. It also provides additional information for special applications and configurations of the board.

The manual does not include detailed information on individual components (data sheets etc.). A list of literature is given in the appendix.

History

Edition	Comments	Technical Content	Date of Issue
E1	First edition	R. Weisbach	2005-09-30
E2	Added MTBF information Minor corrections regarding technical data	R. Weisbach	2008-07-21

Conventions

This sign marks important notes or warnings concerning proper functionality of the product described in this document. You should read them in any case.

italics — Folder, file and function names are printed in *italics*.

bold — **Bold** type is used for emphasis.

`monospace` — A `monospaced` font type is used for hexadecimal numbers, listings, C function descriptions or wherever appropriate. Hexadecimal numbers are preceded by "0x".

hyperlink — Hyperlinks are printed in blue color.

The globe will show you where hyperlinks lead directly to the Internet, so you can look for the latest information online.

IRQ# /IRQ — Signal names followed by "#" or preceded by a slash ("/") indicate that this signal is either active low or that it becomes active at a falling edge.

in/out — Signal directions in signal mnemonics tables generally refer to the corresponding board or component, "in" meaning "to the board or component", "out" meaning "coming from it".

Vertical lines on the outer margin signal technical changes to the previous edition of the document.

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Contents

Figures

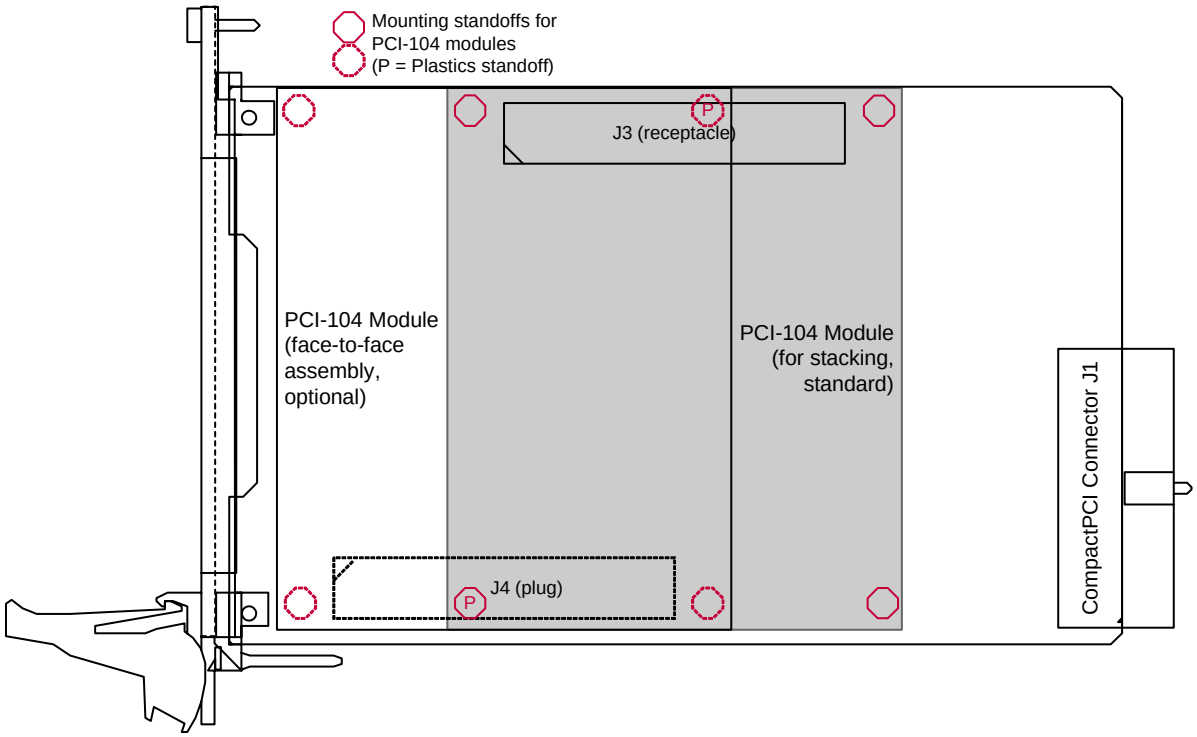
Tables

1 Getting Started

This chapter gives an overview of the board and some hints for first installation in a system.

1.1 Map of the Board

Figure 1. *Map of the board—front panel and top view*



1.2 Integrating the Board into a System

You can use the following "check list" when installing the F207 in a CompactPCI system for the first time.

Note: The F207 **must not** be inserted into the system slot! The system slot of every CompactPCI system is marked by a △ triangle on the backplane and/or at the front panel.

- ☑ Power-down the system.
- ☑ Install a PCI-104 module on the F207 as described in Chapter 1.3 Installing PCI-104 Modules on page 13.
- ☑ Insert the F207 into your CompactPCI system, making sure that the Compact-PCI connectors are properly aligned.
- ☑ Power-up the system.
- ☑ You can now install driver software for the PCI-104 module.

1.3 Installing PCI-104 Modules

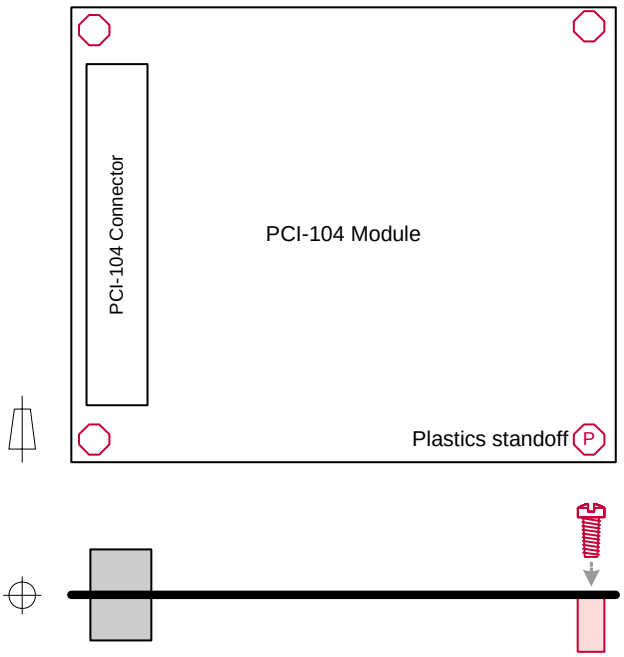
The F207 provides four mounting standoffs and suitable screws to mount a PCI-104 module. Depending on your F207 version, you can mount the module "face-up", which is the standard for stacking several PCI-104 modules, or "face-down".

With face-up assembly (for stacking), the carrier board and one PCI-104 module need 8 HP in a CompactPCI system. In this case you need a second 4 HP front panel, with or without cut-outs as needed.

With face-down assembly, the board and PCI-104 module need 4 HP, but only with PCI-104 modules that have a modified or no PCI-104 connector on the bottom side!

Perform the following steps to install a PCI-104 module:

☑ Remove any mounting standoffs at the corners of your PCI-104 module. Fasten the plastics standoff provided with F207 in the right position of the PCI-104 module.

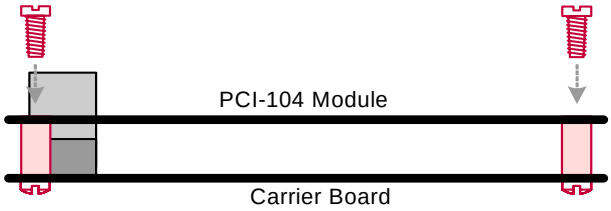


If the plastics standoff is not in the right position, the board may be damaged.

☑ Align the PCI-104 connectors of the PCI-104 module and carrier board.

☑ Carefully plug the PCI-104 module onto the F207, making sure not to damage the connectors. Push the PCI-104 module down until it sits tightly on the carrier board.

☑ Screw your PCI-104 module to F207 at the three metal standoffs already installed on F207 using the pan-head screws also supplied with F207.



Note: The plastics standoff cannot be fixed to the carrier board because of the board's layout, but it provides additional stability.

1.4 Installing Driver Software

For a detailed description on how to install driver software please refer to the respective documentation.

2 Functional Description

2.1 Power Supply

Power supply is fed via the CompactPCI backplane. The board operates on +5V and +3.3V.

2.2 PCI-104 Interface

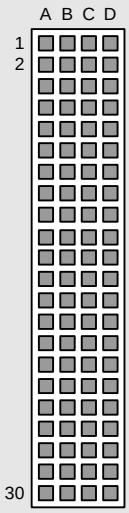
The PCI-to-PCI bridge provides a 32-bit PCI interface at the PCI-104 connectors. The F207 supports up to four PCI-104 mezzanines.

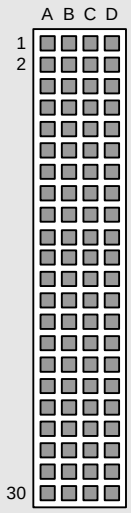
The PCI signaling voltage (V(I/O)) on the secondary side (local bus) is configurable to +3.3V or +5V. The default configuration is +3.3V. +5V are available on request.

Connector type:

- 4-row, 120-pin PCI-104 connector, 2mm pitch

Table 1. *Pin assignment of PCI-104 connector*

J3 (Standard) / J4 (Option)		A	B	C	D
	1	GND	Reserved	+5V	AD00
	2	VI/O	AD02	AD01	+5V
	3	AD05	GND	AD04	AD03
	4	C/BE0#	AD07	GND	AD06
	5	GND	AD09	AD08	GND
	6	AD11	VI/O +3.3V	AD10	M66EN
	7	AD14	AD13	GND	AD12
	8	+3.3V	C/BE1#	AD15	+3.3V
	9	SERR#	GND	Reserved	PAR
	10	GND	PERR#	+3.3V	Reserved
	11	STOP#	+3.3V	LOCK#	GND
	12	+3.3V	TRDY#	GND	DEVSEL#
	13	FRAME#	GND	IRDY#	+3.3V
	14	GND	AD16	+3.3V	C/BE2#
	15	AD18	+3.3V	AD17	GND
	16	AD21	AD20	GND	AD19
	17	+3.3V	AD23	AD22	+3.3V
	18	IDSEL0	GND	IDSEL1	IDSEL2
	19	AD24	C/BE3#	VI/O	IDSEL3
	20	GND	AD26	AD25	GND
	21	AD29	+5V	AD28	AD27
	22	+5V	AD30	GND	AD31
	23	REQ0#	GND	REQ1#	VI/O
	24	GND	REQ2#	+5V	GNT0#
	25	GNT1#	VI/O	GNT2#	GND
	26	+5V	CLK0	GND	CLK1
	27	CLK2	+5V	CLK3	GND
	28	GND	INTD#	+5V	RST#
	29	+12V	INTA#	INTB#	INTC#
	30	-12V	REQ3#	GNT3#	GND



For a description of signals please refer to the PCI-104 specification. See Chapter 3.1 Literature and Web Resources on page 18.

2.3 CompactPCI Interface

The F207 carrier board has a 32-bit CompactPCI interface on connector J1. It uses a 3.3V or 5V signaling voltage on CompactPCI. For a pinout of the 32-bit CompactPCI interface on J1 and a general description of ComapctPCI, please refer to the CompactPCI specification. See Chapter 3.1 Literature and Web Resources on page 18.

Connector type of J1:

- 110-pin shielded, 2mm-pitch, 5-row receptacle according to IEC 917 and IEC 1076-4-101

The interface is implemented using a 32-bit/33-MHz PCI-to-PCI bridge and is compliant to the PCI Specification Rev. 2.2.

3 Appendix

3.1 Literature and Web Resources

- F207 data sheet with up-to-date information and documentation:
  www.men.de
- PCI-104:
  PCI-104 Specification; PC/104 Embedded Consortium
  www.pc104.org
- CompactPCI Specification Revision 2.0 R3.0:
  1997; PCI Industrial Computers Manufacturers Group (PICMG)
  www.picmg.org
- PCI Local Bus Specification Revision 2.1:
  1995; PCI Special Interest Group
  P.O. Box 14070
  Portland, OR 97214, USA
  www.pcisig.com

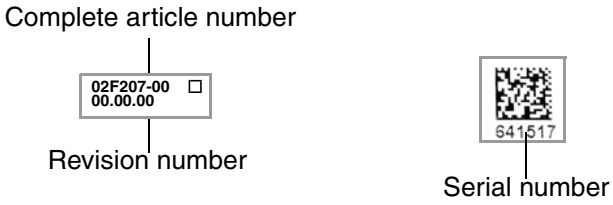
3.2 Finding out the Board's Article Number, Revision and Serial Number

MEN user documentation may describe several different models and/or hardware revisions of the F207. You can find information on the article number, the board revision and the serial number on two labels attached to the board.

- **Article number:** Gives the board's family and model. This is also MEN's ordering number. To be complete it must have 9 characters.
- **Revision number:** Gives the hardware revision of the board.
- **Serial number:** Unique identification assigned during production.

If you need support, you should communicate these numbers to MEN.

Figure 2. *Labels giving the board's article number, revision and serial number*



You can request the circuit diagrams for the current revision of the product described in this manual by completely filling out and signing the following non-disclosure agreement.

Please send the agreement to MEN by mail. We will send you the circuit diagrams along with a copy of the completely signed agreement by return mail.

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for Circuit Diagrams provided by MEN Mikro Elektronik GmbH

between

MEN Mikro Elektronik GmbH
Neuwieder Straße 5-7
D-90411 Nürnberg

("**MEN**")

and

_____
_____
_____
_____

("**Recipient**")

We confirm the following Agreement:

MEN		**Recipient**	
Date:	_____	Date:	_____
Name:	_____	Name:	_____
Function:	_____	Function:	_____

Signature: Signature:

_____ _____

The following Agreement is valid as of the date of the MEN signature.

MEN Mikro Elektronik GmbH

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90411 Nürnberg
Deutschland

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Fax +49-911-99 33 5-901

E-Mail info@men.de
www.men.de

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The court of jurisdiction shall be Nuremberg.

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