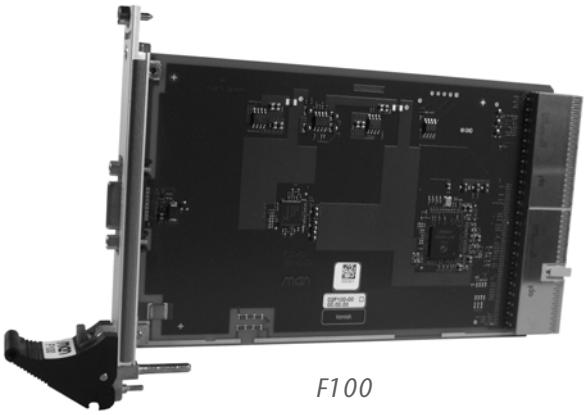
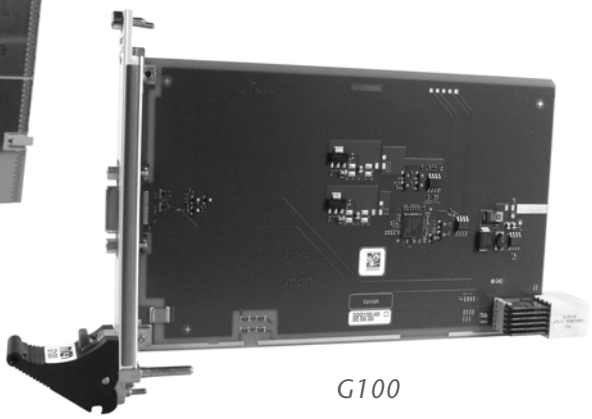
Embedded Solutions

G100/F100 CompactPCI® Serial to CompactPCI® Interface Cards



F100



G100

Configuration examples

User Manual

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gmbh · nürnberg

G100/F100 - CompactPCI® Serial to CompactPCI® Interface Cards

The G100/F100 board combination is used to connect a CompactPCI® Serial system to a CompactPCI® system. The CompactPCI® Serial backplane and the CompactPCI® backplane can either be located in one housing or in two separate ones.

The G100 is plugged into a peripheral slot of a CompactPCI® Serial system, It uses one PCI Express® x1 link from the backplane and leads it to the front to an 18-pin PCI Express® connector.

The F100 is plugged into the system slot of the CompactPCI® system. It is equipped with a PCI-Express-to-PCI bridge which acts as a master for up to 7 PCI devices. It supports 32-bit and 33-MHz. Optionally the F100 can also be used without the G100 if the PCI Express® x1 link is led to the board via the backplane. For this, a special backplane is needed, however. Another possibility is to directly control a CompactPCI® system using an external PC (e.g. a notebook) for evaluating or programming the application.

The G100 and the F100 are connected via the front using a PCI Express® cable which can have a length of up to 7 m.

The boards are qualified for operation in the extended temperature range of -40 up to +85°C.

Technical Data

General Functionality

- Connection of a CompactPCI® Serial system to a CompactPCI® system

PCI Express® Connection

- One x1 link on 18-pin front connectors
  - According to PCI Express® Cabling Specification Rev. 1.0
- Data rate 250 MB/s

G100

- PCI Express® buffer
  - For decoupling the backplane PCI Express® interface from the front interface
- CompactPCI® Serial
  - Compliance with CompactPCI® Serial Specification CPCI-S.0 (proposed standard currently under development)
  - Peripheral slot
  - Host interface: one PCI Express® lane

F100

- PCI-Express-to-PCI bridge
  - Supports up to 7 PCI devices as a master
- CompactPCI® Bus
  - Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0
  - System slot
  - 32-bit/33-MHz PCI-Express-to-PCI bridge
  - V(I/O): +3.3 V (+5 V tolerant)

Electrical Specifications

- F100 supply voltage/power consumption:
  - +5 V (+/-10%), 5 mA typ.
  - +3.3 V (+/-10%), 700 mA typ.
- G100 supply voltage/power consumption:
  - +12V (-10%/+10%), 50 mA typ.

Mechanical Specifications

- Dimensions: conforming to CompactPCI® specification for 3U boards
- Weight:
  - F100: 132 g
  - G100: 116 g

Environmental Specifications

- Temperature range (operation):
  - -40..+85°C (qualified components)
  - Airflow: min. 1.0 m/s
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300 m to + 3,000 m
- Shock: 15 g, 11 ms
- Bump: 10 g, 16 ms
- Vibration (sinusoidal): 1 g, 10..150 Hz
- Conformal coating on request

MTBF

- F100: 1,763,401 h @ 40°C according to IEC/TR 62380 (RDF 2000)
- G100: 2,585,957 h @ 40°C according to IEC/TR 62380 (RDF 2000)

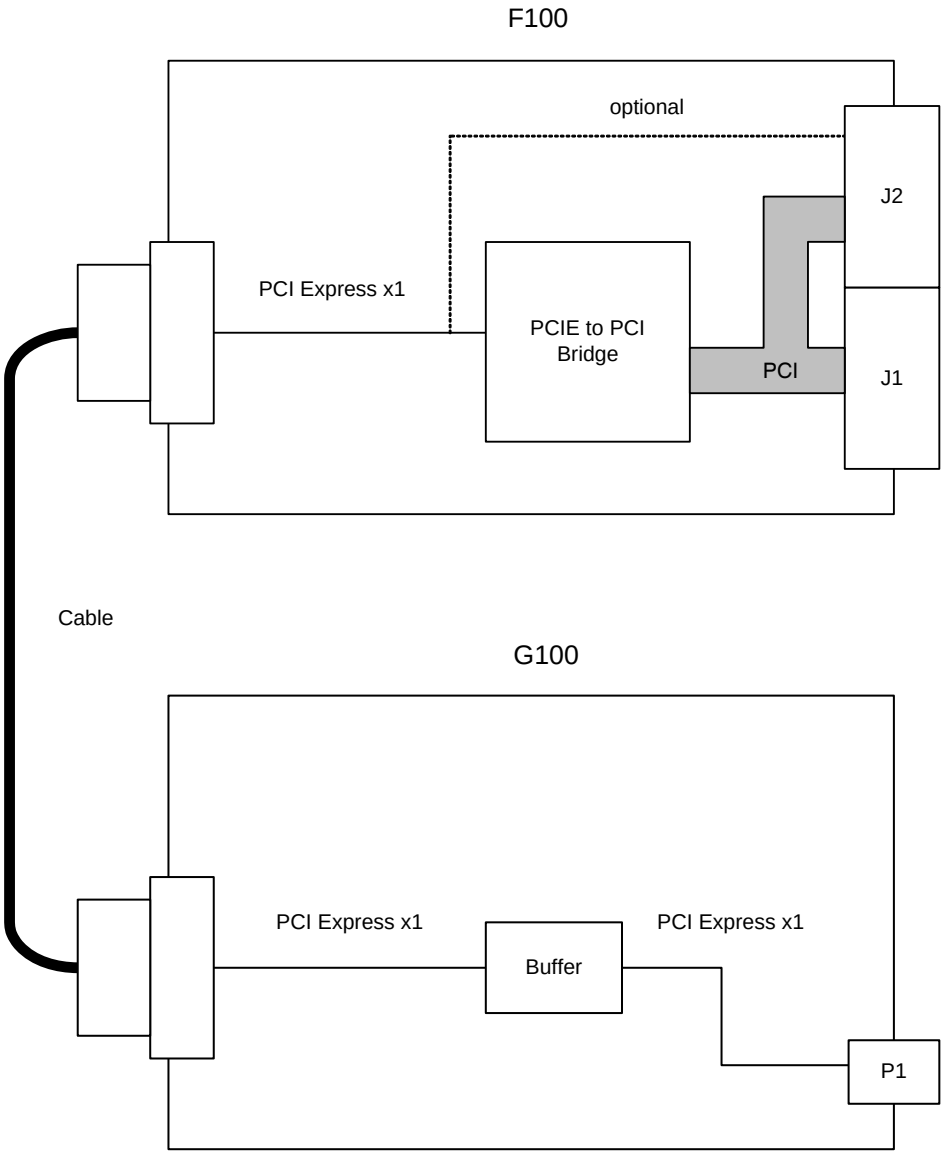
Safety

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

EMC

- Conforming to EN 55022 (radio disturbance), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)

Block Diagram



Configuration Options F100

PCI Express®

- PCI Express® link from rear I/O connector J2 (requires special backplane)

CompactPCI Bus

- 66 MHz with support for up to 4 PCI slots

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

For available standard configurations see online data sheet.

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

Issue	Comments	Date
E1	First issue	2010-11-30

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".

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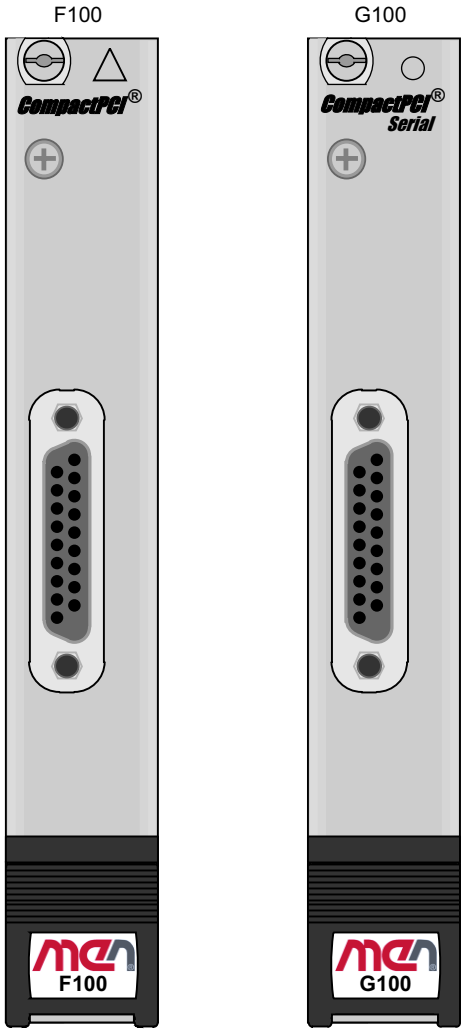
1 Getting Started

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*



1.2 Integrating the Board into a System

You can use the following check list when installing the board in a system for the first time and with minimum configuration.

☑ Power-down the system.

☑ Insert the G100 into a peripheral slot of your CompactPCI Serial system, making sure that the CompactPCI Serial connectors are properly aligned.

Note: The peripheral slots of every CompactPCI Serial system are marked by a circle ○ on the backplane and/or at the front panel.

☑ Insert the F100 into the system slot of your CompactPCI system, making sure that the CompactPCI connectors are properly aligned.

Note: The system slot of every CompactPCI system is marked by a △ triangle on the backplane and/or at the front panel. It also has red guide rails.

☑ Connect the two cards using a PCI Express cable. MEN provides a PCI Express cable with a length of 1 m. See MEN's website for ordering information.

☑ Power-up the system.

2 Functional Description

2.1 Power Supply

2.1.1 F100

The F100 is supplied with +5V and +3.3V via the CompactPCI connector J1. All further required voltages are generated onboard.

2.1.2 G100

The G100 is supplied with +12V via the CompactPCI Serial connector P1. All further required voltages are generated onboard.

2.2 PCI Express Connection

The F100 and the G100 are connected using a PCI Express cable with a PCI Express x1 link compliant to the PCI Express cable specification. Both boards are equipped with an 18-pin PCI Express connector at the front panel.

Connector types:

- 18-pin, straight, 2.54 mm, female cable connector

Table 1. *Pin assignment of PCI Express x1 connector*

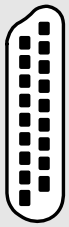
		B	A
	1	GND	PE_Rx00-
	2	-	PE_Rx00+
	3	-	-
	4	PRSNT#	SB_RTN
	5	GND	PE_CLK-
	6	-	PE_CLK+
	7	PWRON#	-
	8	PE_Tx00-	PERST#
	9	PE_Tx00+	GND

Table 2. *Signals mnemonics of PCI Express connectors*

Signal	Direction	Function
GND	-	Digital ground
PE_Tx00+, PE_Tx00-	out	Differential PCIe transmit lines
PE_Rx00+, PE_Rx00-	in	Differential PCIe receive lines
PRSNT#	in	Cable present detection
PERST#	out	Cable platform reset. Resets the logic of the device connected to the cable connector.
PE_CLK+, PE_CLK-	in	Reference clock
PWRON#	out	Cable power-on. Signal provided by the upstream port (the CPU) to the downstream subsystem to turn its power on.

2.3 F100 PCI Express to PCI Bridge

The F100's main functionality is a PCI Express to PCI bridge with a x1 link on the PCI Express side. At the PCI side the bridge acts as a master supporting up to seven PCI devices.

2.4 G100 PCI Express Buffer

The G100 decouples the backplane PCI Express interface from the front interface by a repeater to protect the system und support longer cables.

2.5 F100 CompactPCI Interface

The F100 is plugged into the CompactPCI system slot and supports a 32-bit 33-MHz CompactPCI interface with all bus arbitration signals and clocks defined in the PICMG 2.0 standard. The board works with 3.3V and tolerates 5V V I/O.

Connector type of J1:

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

The pin assignment of connector J1 as defined in the CompactPCI specification will not be repeated here.

2.6 G100 CompactPCI Serial Interface

The G100 is plugged into a peripheral slot of the CompactPCI Serial system and uses one PCI Express lane from the backplane according to the CompactPCI Serial specification (PICMG CPCI-S.0, proposed standard under development).

Connector type of P1:

- 72-pin Airmax VS 4 pair, right angle header, 6 IMLA with end walls

For a detailed description of the pin assignment and signal mnemonics of the P1 connector refer to the CompactPCI Serial specification (under development).

2.7 Using the F100 without the G100

As an option, the F100 can also be used without the G100. In this case, the PCI Express lane is led to the F100 via a special hybrid backplane.

Please contact MEN's sales team for further information.

3 Appendix

3.1 Literature and Web Resources

- F100 data sheet with up-to-date information and documentation:
  www.men.de/products/02F100-.html
- G100 data sheet with up-to-date information and documentation:
  www.men.de/products/02G100-.html

3.1.1 CompactPCI

- CompactPCI Specification PICMG 2.0 R3.0:
  1999; PCI Industrial Computers Manufacturers Group (PICMG)
  www.picmg.org
- PCI Local Bus Specification Revision 2.2:
  1995; PCI Special Interest Group
  P.O. Box 14070
  Portland, OR 97214, USA
  www.pcisig.com

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

MEN user documentation may describe several different models and/or design revisions of the G100/F100. You can find information on the article number, the design revision and the serial number on two labels attached to the board.

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

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

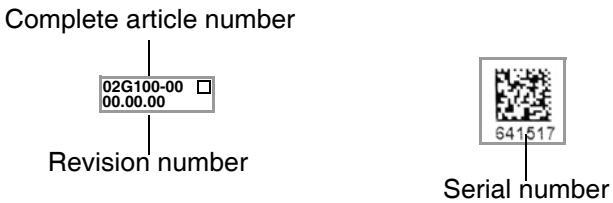



Figure 2. *Labels giving the product's article number, revision and serial number*