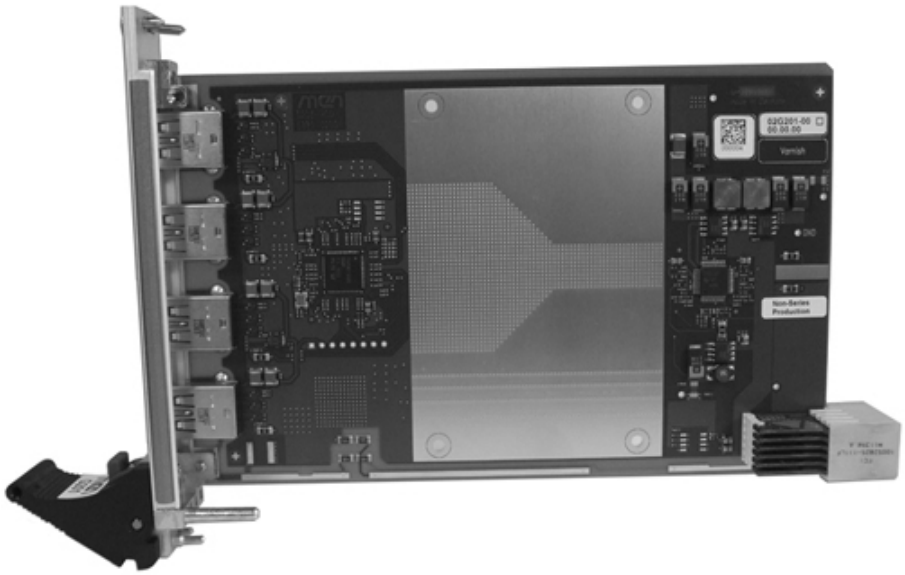
Embedded Solutions

G201 – 3U CompactPCI®
Serial USB 3.0 Interface



Configuration example

User Manual

mikro elektronik
gmbh · nürnberg

G201 - 3U CompactPCI® Serial USB 3.0 Interface

The G201 is a CompactPCI® Serial peripheral board offering four USB 3.0 host interfaces with a data rate of up to 5 Gbit/s per direction per port (2.28 Gbit/s measured). It can be used in combination with a CompactPCI® Serial or CompactPCI® PlusIO CPU board in a CompactPCI® Serial or hybrid system. It is especially suited for connection of external data storage media or devices with high data transfer rate requirements, e.g. high-speed video cameras.

The 4HP single Eurocard provides four USB 3.0 Standard-A connectors at the front panel. The interfaces are controlled by an xHCI controller which is connected to the backplane via a PCI Express® x1 link.

The G201 is screened for extended operating temperature and prepared for conformal coating for use in harsh and mobile environments.

Technical Data

USB Interfaces

- Four USB 3.0 host ports
- Standard-A connectors at front panel
- Data rate up to 5 Gbit/s per direction per port (2.28 Gbit/s measured)

CompactPCI® Serial

- Compliance with CompactPCI® Serial PICMG CPCI-S.0 Specification
- Peripheral slot
- Host interface: One PCI Express® x1 link
  - PCIe® 2.1 support
  - Data rate up to 500 MB/s in each direction (5 Gbit/s per lane)

Electrical Specifications

- Supply voltage/power consumption:
  - +12V (-5%/+5%), 1 W typ., max. 1.8 W without external load, max. 28 W with 4x 1 A (25 W) load on 5 V USB ports

Mechanical Specifications

- Dimensions: conforming to CompactPCI® Serial specification for 3U boards
- Front panel: 4 HP with ejector
- Weight: 116 g (w/o heat sink)

Environmental Specifications

- Temperature range (operation):
  - -40..+85°C (screened)
  - 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 +3000 m
- Shock: 50 m/s², 30 ms (EN 61373)
- Vibration (function): 1 m/s², 5 Hz - 150 Hz (EN 61373)
- Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz (EN 61373)
- Conformal coating on request

MTBF

- 2 455 612 h @ 40°C according to IEC/TR 62380 (RDF 2000)

Safety

- Flammability
  - PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
- Electrical Safety
  - Information technology equipment test according to EN 60950

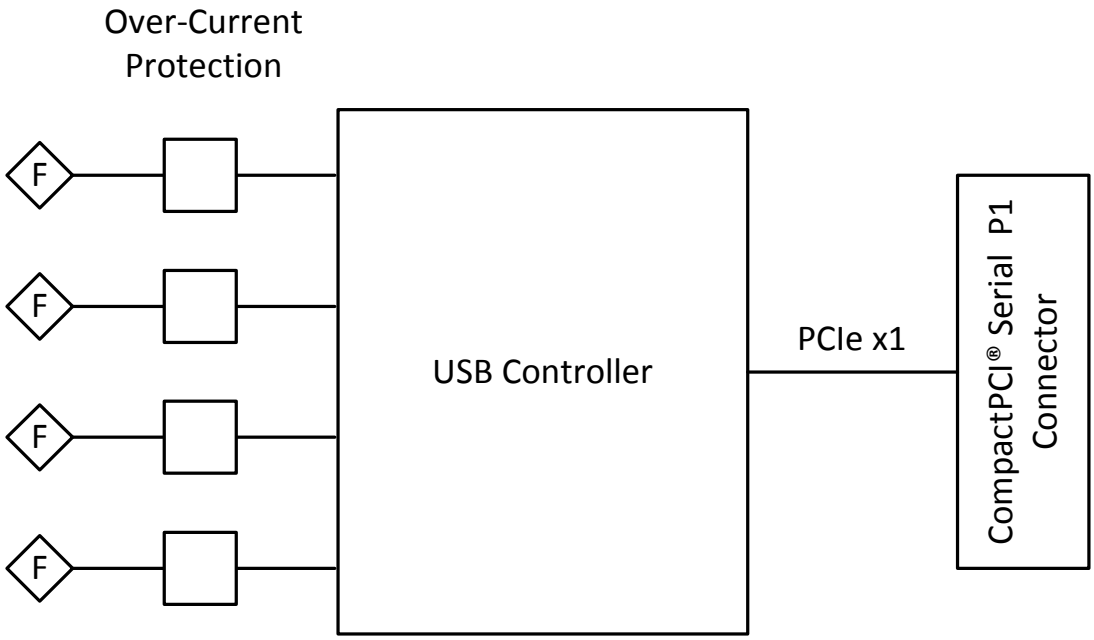
EMC

- Conforming to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD), IEC 61000-4-3 (electromagnetic field immunity)

Software Support

- Windows®
- Linux (kernel versions > 2.6.32)
- For more information on supported operating system versions and drivers see online data sheet.

Block Diagram



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 is intended only for system developers and integrators, it is not intended for end users.

It 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	2012-03-26

Conventions

This sign marks important notes or warnings concerning the use of voltages which can lead to serious damage to your health and also cause damage or destruction of the component.

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".

comment — Comments embedded into coding examples are shown in green color.

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 issue of the document.

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MEN products are no ready-made products for end users. They are tested according to the standards given in the Technical Data and thus enable you to achieve certification of the product according to the standards applicable in your field of application.

RoHS

Since July 1, 2006 all MEN standard products comply with RoHS legislation.

Since January 2005 the SMD and manual soldering processes at MEN have already been completely lead-free. Between June 2004 and June 30, 2006 MEN's selected component suppliers have changed delivery to RoHS-compliant parts. During this period any change and status was traceable through the MEN ERP system and the boards gradually became RoHS-compliant.

WEEE Application

The WEEE directive does not apply to fixed industrial plants and tools. The compliance is the responsibility of the company which puts the product on the market, as defined in the directive; components and sub-assemblies are not subject to product compliance.

In other words: Since MEN does not deliver ready-made products to end users, the WEEE directive is not applicable for MEN. Users are nevertheless recommended to properly recycle all electronic boards which have passed their life cycle.

Nevertheless, MEN is registered as a manufacturer in Germany. The registration number can be provided on request.

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Figures

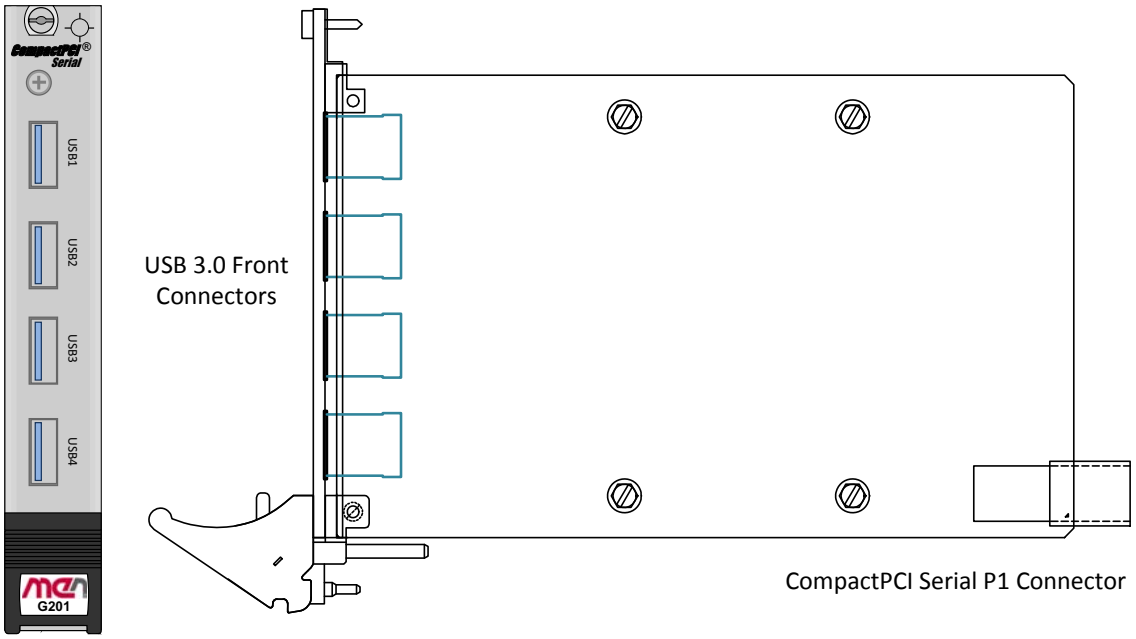
Tables

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 board in a system for the first time and with minimum configuration.

- ☑ Power down the system.
- ☑ Insert the G201 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 with a plus sign behind it ⊕ on the backplane and/or at the front panel.
- ☑ Power up the system.
- ☑ You can now install driver software.

1.3 Installing Driver Software

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

You can find any driver software available for download on MEN's website.

2 Functional Description

2.1 Power Supply

The G201 is supplied with +12V (-5%/+5%) via CompactPCI Serial connector P1.

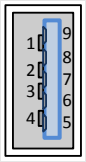
2.2 USB Interface

The G201 offers four USB 3.0 ports at the front panel which support a data rate of up to 5 Gbit/s per direction per port (2.28 Gbit/s measured).

Connector types:

- 9-pin USB 3.0 Standard-A receptacle according to Universal Serial Bus Specification
- Mating connector:
  9-pin USB 3.0 Standard-A plug according to Universal Serial Bus Specification

Table 1. *Pin assignment of USB 3.0 front-panel connectors*



1	+5V	9	StdA_SSTX+
2	D-	8	StdA_SSTX-
3	D+	7	GND
4	GND	6	StdA_SSRX+
		5	StdA_SSRX-

Table 2. *Signal mnemonics of USB 3.0 front-panel connectors*

Signal	Direction	Function
+5V	out	+5 V power supply
GND	-	Digital ground
D+, D-	in/out	USB 2.0 differential pair
StdA_SSTX+, StdA_SSTX-	out	SuperSpeed transmitter differential pair
StdA_SSRX+, StdA_SSRX-	in	SuperSpeed receiver differential pair

2.3 CompactPCI Serial Interface

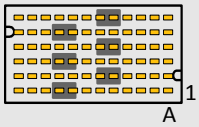
The G201 uses one PCI Express x1 link at the backplane according to the CompactPCI Serial specification (PICMG CPCI-S.0).

For a detailed description of the signals please refer to the CompactPCI Serial specification.

Connector type of P1:

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

Table 3. *Pin assignment of CompactPCI Serial P1 connector*



-	-	GND	-	-	GND	-	-	GND	-	-	GND	6
GND	-	-	GND	-	-	GND	PE_ Rx00-	PE_ Rx00+	GND	PE_ Tx00-	PE_ Tx00+	5
-	-	GND	-	-	GND	PE_ REFCLK-	PE_ REFCLK+	GND	-	-	GND	4
-	-	-	GA2	-	-	GA1	-	-	GA0	-	-	3
-	PCIE_ EN#	GND	PE_ WAKE#	RST_ IN#	GND	-	-	GND	IPMB_ SDA	IPMB_ SCL	GND	2
GND	+12V	+12V	GND	+12V	+12V	GND	+12V	+12V	GND	-	+12V	1
L	K	J	I	H	G	F	E	D	C	B	A	

3 Appendix

3.1 Literature and Web Resources

- G201 data sheet with up-to-date information and documentation:
  www.men.de/products/02G201-.html

3.1.1 USB

- USB Implementers Forum, Inc.
  www.usb.org

3.1.2 CompactPCI Serial

- CompactPCI Serial Specification PICMG CPCI-S.0 Revision 1.0: 2011; PCI Industrial Computers Manufacturers Group (PICMG)
  www.picmg.org
- Introduction to CompactPCI Serial on Wikipedia:
  en.wikipedia.org/wiki/CompactPCI_Serial

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 G201. You can find information on the article number, the design revision and the serial number on a label 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*