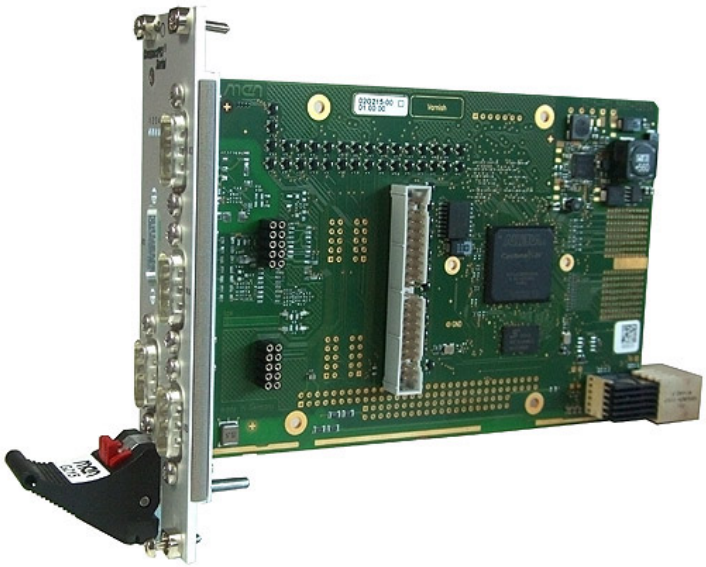
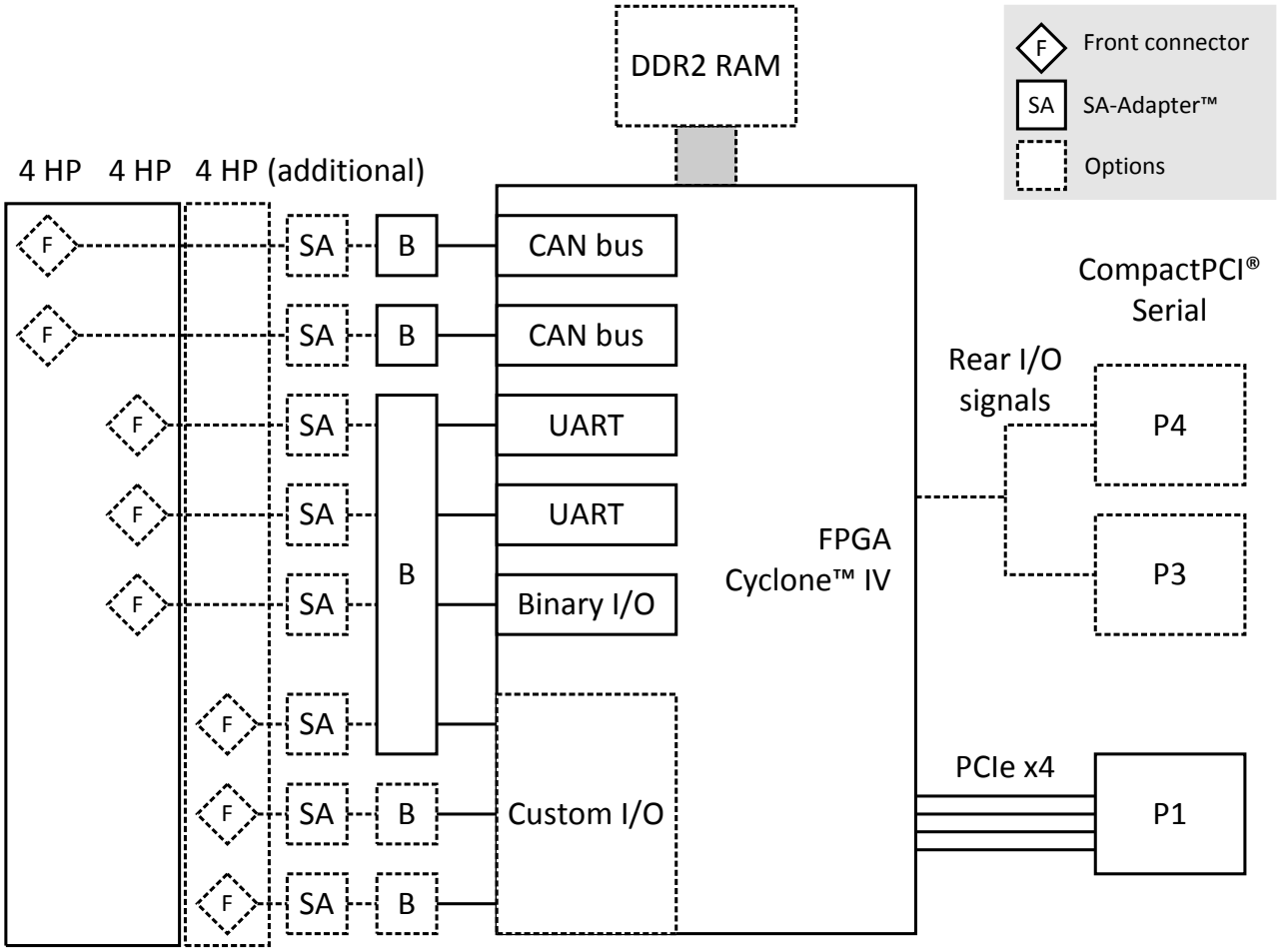
G215 – 3U CompactPCI® Serial Universal Interface Board

- **5 interfaces at 8 HP front: 2 UARTs, 2 CAN bus, 1 binary I/O port**
- **Other function combinations via FPGA IP cores**
- **For protocols/physical layers like RS232/ RS422/RS485, HDLC, CAN bus, IBIS, GPS, binary I/O**
- **Physical layers via SA-Adapters™**
- **-40 to +85°C with qualified components**
- **PICMG CPCI-S.0 CompactPCI® Serial peripheral card**



The G215 is a universal interface board based on 3U CompactPCI® Serial. The physical layer can be realized individually for each channel by means of SA-Adapters™.
SA-Adapters™ are small universal boards providing the line drivers for legacy serial I/O, fieldbus interfaces and other small I/O functions. Most SA-Adapters™ use 9-pin D-Sub connectors which are accessible at the front panel. Alternatively, the adapter can be connected to the front panel via ribbon cable. The SA concept allows to add additional I/O interfaces to the G215, enhancing flexibility with regard to the line transceivers and isolation requirements.
Two SA-Adapters™ can be mounted directly on the G215, the other maximum six adapters need more front-panel space and are connected to the carrier via ribbon cable. The G215 comes in a standard configuration with five pre-defined functions on 8 HP: two CAN interfaces, two UARTs and one 8-channel binary I/O interface. SA-Adapters™ are not included in the delivery, because different types are available, e.g. for the UARTs. They can be ordered as needed.
The board's I/O functions are realized by means of an FPGA, making it a very flexible, inexpensive solution for dedicated serial I/O. The card can become "everything" from a customized I/O combination to a specialized 8-port CAN card or even an intelligent I/O board including a Nios® soft core, on 4, 8 or 12 HP. As an option, further I/O signals, including high-speed interfaces, can be accessed via rear I/O on CompactPCI® Serial connectors P3 and P4. The FPGA is loaded automatically after power-up from a 4 MB serial Flash. It is also possible to access this Flash to update its contents.
Up to 64 MB DDR2 SDRAM are optionally available for complementing the functions of the FPGA. This DRAM can be used for example as a large buffer memory for more complex protocols.
The G215 is designed for use in rugged environments. For example, all components are soldered-on and are specified for an operating temperature of -40 to +85°C.

Diagram


DDR2 RAM
F
Front connector
SA
SA-Adapter™
Options
4 HP
4 HP
4 HP (additional)
F
SA
B
CAN bus
CAN bus
UART
UART
Binary I/O
Custom I/O
FPGA
Cyclone™ IV
CompactPCI®
Serial
Rear I/O
signals
P4
P3
PCIe x4
P1

Technical Data

I/O Interfaces	■ Different variations possible through FPGA IP cores and SA-Adapters™: □ RS232 □ RS422 □ RS485 □ IBIS master/slave □ CAN bus □ HDLC □ Binary I/O □ GPS □ The FPGA offers the possibility to add customized I/O functionality. See FPGA. □ Option matrix showing possible IP cores and SA-Adapters™ (PDF) ■ Accessible via onboard connectors □ Physical interface at front panel using SA-Adapters™ □ Two interfaces for direct onboard connection of SA-Adapters™ □ Up to six interfaces for connection of SA-Adapters™ via 10-pin ribbon cable ■ Standard factory interface configuration: □ 8 HP front panel with five SA-Adapter™ cut-outs for □ 2 CAN bus interfaces □ 2 UART interfaces □ 1 binary I/O interface □ No SA-Adapters™ included by standard; they can be selected as needed ■ Standard factory FPGA configuration: □ 16Z029_CAN - CAN controller (controls CAN X1) □ 16Z029_CAN - CAN controller (controls CAN X2) □ 16Z125_UART - UART controller (controls UARTs X3/X4) □ 16Z037_GPIO - GPIO controller (8 I/O lines on X5)
Memory	■ 4 MB serial Flash for FPGA configuration
Miscellaneous	■ Four status LEDs at front panel □ One status LED to signal FPGA configuration (interfaces ready) □ Three user LEDs, FPGA-controlled by 16Z034_GPIO controller
CompactPCI® Serial	■ Compliance with CompactPCI® Serial PICMG CPCI-S.0 Specification ■ Peripheral slot ■ Host interface: □ One PCI Express® x4 link □ PCIe® 1.x support □ Data rate 1 GB/s in each direction (2.5 Gbit/s per lane)
Electrical Specifications	■ Supply voltage/power consumption: □ +12 V (-5%/+5%), 0.125 A
Mechanical Specifications	■ Dimensions: conforming to CompactPCI® Serial specification for 3U boards ■ Front panel: 8 HP with ejector □ For up to five interfaces ■ Weight: 168 g (w/o SA-Adapters™)

Technical Data

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 +3000 m ■ Shock: □ 15 g, 11 ms (EN 60068-2-27) □ 50 m/s², 30 ms (EN 61373) ■ Bump: 10 g, 16 ms (EN 60068-2-29) ■ Vibration (sinusoidal): 1 g, 10 Hz - 150 Hz (EN 60068-2-6) ■ 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	■ 529 954 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	■ Tested according to EN 55022 (radio disturbance), IEC 61000-4-2 (ESD) and IEC 61000-4-4 (burst)
Software Support	■ Driver software for Windows®, Linux, VxWorks®, QNX® ■ Flash update tools for Windows®, Linux, VxWorks® ■ For more information on supported operating system versions and drivers see Downloads.

FPGA

This product offers the possibility to add customized I/O functionality in FPGA.

Flexible Configuration	■ Customized I/O functions can be added to the FPGA. ■ It depends on the board type, pin counts and number of logic elements which IP cores make sense and/or can be implemented. Please contact MEN for information on feasibility. ■ You can find more information on our web page "User I/O in FPGA"
FPGA Capabilities	■ FPGA Altera® Cyclone® IV EP4CGX30 (Standard) □ 29 440 logic elements □ 1080 Kbits total RAM ■ FPGA Altera® Cyclone® IV EP4CGX75 (Option) □ 73 920 logic elements □ 4158 Kbits total RAM ■ FPGA Altera® Cyclone® IV EP4CGX150 (Option) □ 149 760 logic elements □ 6480 Kbits total RAM ■ For interface functions ■ 4 MB external Flash for FPGA configurations ■ Connection □ Pin count on onboard SA-Adapter™ connectors: 64 pins □ SA-Adapters™ are used to realize the physical lines. □ Option: Connection via CompactPCI® Serial rear I/O P3 and P4, pin count: 128 pins ■ Functional updates via software □ MEN offers Flash update tools for different operating systems.

Configuration & Options

Standard Configurations

Article No.	Front Panel	FPGA Cores	Operating Temperature
02G215-00	8 HP, 5 D-Sub slots	2 CAN, 2 UARTs, 1 binary I/O (8-bit)	-40..+85°C

Options

Physical Layers	■ Via up to eight SA-Adapters™ ■ Different variations possible through FPGA IP cores and SA-Adapters™: □ RS232 □ RS422 □ RS485 □ IBIS master/slave □ CAN bus □ HDLC □ Binary I/O □ GPS □ Other physical layers dependent on FPGA configuration □ Option matrix showing possible IP cores and SA-Adapters™ (PDF)
FPGA	■ FPGA Altera® Cyclone® IV EP4CGX30, EP4CGX75 or EP4CGX150, see FPGA
Memory	■ 16 MB, 32 MB, 64 MB DDR2 SDRAM, FPGA-controlled, e.g., as a buffer memory for more complex protocols
Rear I/O	■ Up to 128 I/O signals on CompactPCI® Serial connectors P3 and P4 □ FPGA-controlled □ Also for high-speed interfaces □ In addition to SA-Adapter™ I/O
Mechanical	■ 4, 8 or 12 HP front panel dependent on number of SA-Adapters™ □ 4 HP with 2 onboard SA-Adapters™ □ 8 HP with 5 SA-Adapters™ (standard) □ 12 HP with 8 SA-Adapters™ ■ One-piece front panel
Cooling Concept	■ Also available with conduction cooling in MEN CCA frame

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

Ordering Information

Standard G215 Models	**02G215-00**	8 HP FPGA-based universal interface prepared for direct connection of 2x CAN (first slot), 2x UART and 1x 8-bit GPIO (second slot) at front as standard FPGA content plus space for user-defined functions, -40..+85°C with qualified components (SA-Adapters™ to be ordered separately)
SA-Adapters™	You can find a more detailed overview of possible carrier board/SA-Adapter™ combinations along with software support in our option matrix (PDF).	
	08SA01-00	RS232, not optically isolated, 0..+60°C
	08SA02-00	RS422/485, half duplex, optically isolated, 0..+60°C
	08SA02-07	RS422/485, full duplex, optically isolated, -40..+85°C screened
	08SA03-01	1 RS232, optically isolated, -40..+85°C screened
	08SA08-01	CAN ISO high-speed, optically isolated, -40..+85°C screened
	08SA15-00	8 digital I/O channels, -40..+85°C with qualified components, no RoHS
	08SA22-00	IBIS master SA-Adapter™, -40..+85°C screened
	08SA22-01	IBIS slave SA-Adapter™, -40..+85°C screened
	08SA25-00	GPS receiver, isolated, -40..+85°C screened
Software: Linux	This product is designed to work under Linux. See below for potentially available separate software packages from MEN.	
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
	13Z016-06	MDIS5™ driver (MEN) for 16Z029_CAN (CANopen master)
	13Z017-06	MDIS5™ low-level driver sources (MEN) for 16Z034_GPIO, 16Z037_GPIO and 16Z127_GPIO
	13Z025-90	Linux native driver (MEN) for 16Z025_UART, 16Z057_UART and 16Z125_UART
	13Z055-90	Linux native driver (MEN) for 16Z055_HDLC with TCP/PPP support
	13Z100-91	Linux FPGA update tool (MEN)
Software: Windows®	This product is designed to work under Windows®. See below for potentially available separate software packages from MEN.	
	10Y000-78	Windows® Embedded Standard 7 BSP for F11S, F19P, F21P, F22P, G20, G22, XM1L, XM2, MM1, MM2, SC21, SC24, SC27, BC50M, BC50I, BL50W, BL50S, F206, F210, F215, F216, G215, P506, P507 and P511
	13F215-77	Windows® Installset (MEN) for F215 and G215 (Includes all free drivers developed by MEN for the supported hardware.)
	13Z016-70	MDIS5™ Windows® driver (MEN) for 16Z029_CAN (CANopen master)
	13Z100-70	Windows® FPGA update tool (MEN)

Ordering Information

Software: VxWorks®	This product is designed to work under VxWorks®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
	13Z016-06	MDIS5™ driver (MEN) for 16Z029_CAN (CANopen master)
	13Z017-06	MDIS5™ low-level driver sources (MEN) for 16Z034_GPIO, 16Z037_GPIO and 16Z127_GPIO
	13Z025-60	VxWorks® native driver (MEN) for 16Z025_UART, 16Z057_UART and 16Z125_UART
	13Z100-60	VxWorks® FPGA update tool (MEN)
Software: QNX®	This product is designed to work under QNX®. For details regarding supported/unsupported board functions please refer to the corresponding software data sheets.	
	13Z015-06	MDIS5™ low-level driver sources (MEN) for 16Z029_CAN (MSCAN/Layer2)
	13Z016-06	MDIS5™ driver (MEN) for 16Z029_CAN (CANopen master)
	13Z017-06	MDIS5™ low-level driver sources (MEN) for 16Z034_GPIO, 16Z037_GPIO and 16Z127_GPIO
	13Z025-40	QNX® 6.3 native driver (MEN) for 16Z025_UART and 16Z125_UART
	13Z025-41	QNX® 6.4 native driver (MEN) for 16Z025_UART and 16Z125_UART
	13Z025-42	QNX® 6.5 native driver (MEN) for 16Z025_UART and 16Z125_UART
	13Z100-40	QNX® FPGA update tool (MEN)

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart 3U CompactPCI® Serial CPU and I/O cards » Download	
	Compare Chart 3U CompactPCI® / PlusIO CPU cards » Download	
	20G215-00	G215 User Manual
	20SA01-00	SA1 User Manual
	20SA02-00	SA2 User Manual
	20SA03-00	SA3 User Manual
	20SA08-00	SA8 User Manual
	20SA15-00	SA15 User Manual
	20SA22-00	SA22 User Manual
	20SA25-00	SA25 User Manual

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