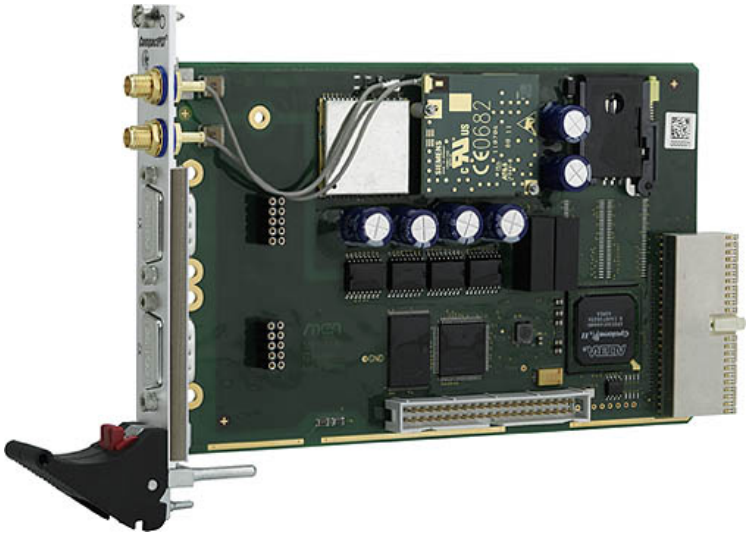
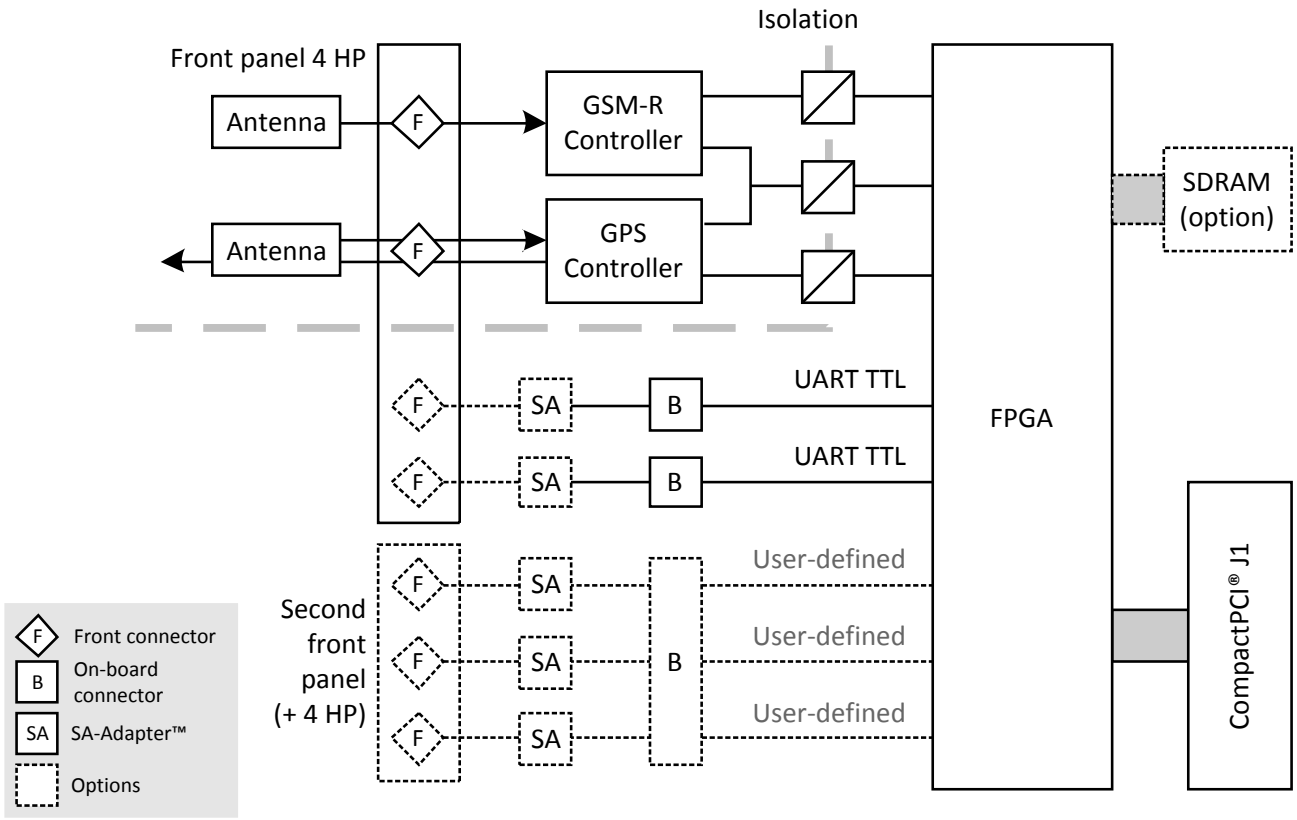
F210 – 3U CompactPCI® GSM/GPS/UART Interface

- **4 HP 32-bit/33-MHz CompactPCI®**
- **GSM-R (Rail) EGSM 900 / GSM 1800**
- **GPS according to NMEA 0183**
- **GPS and GSM optically isolated from other functions**
- **2 UARTs via SA-Adapters™**
- **FPGA for further user-defined functions**
- **2 Reverse SMA connectors to external antennas**
- **-40 to +85°C screened**
- **Conformal coating**



The F210 is a rugged single Eurocard CompactPCI® GSM/GPS/UART interface that needs only one slot on the CompactPCI® bus.
The board is equipped with a GSM-R device that is used in rolling stock and commercial vehicles like buses or trucks. GSM-R was specified to support train safety and is introduced at the UIC organization as EIRENE (European Integrated Railway radio Enhanced NEtwork) project. The F210 supports the EGSM 900 and GSM 1800 frequency bands.
A separate GPS device is implemented on the F210 to combine the receiving function of any kind of positioning data with the transmitting possibilities of a mobile phone. The highly sensitive GPS receiver supports 20-channel GPS technology, and is capable of acquisition and tracking in very low signal-strength environments. This allows effective and reliable operation in all scenarios.
The GPS and GSM units are optically isolated from all other parts of the board.
In addition to the GPS and GSM functionality the F210 offers two SA-Adapter™ slots for serial interfaces with RS232 or RS422 or RS485 line drivers, with or without isolation.
As an option, another three SA-Adapters™ can be connected to the F210 for user-defined functions like even more serial interfaces (synchronous/asynchronous) and/or fieldbus interfaces like CAN bus or IBIS. These user-defined functions can be implemented as IP cores in an onboard FPGA.
Robust Reverse SMA connectors provide the physical interface to the external GSM and GPS antennas.
The F210 is screened for extended operation temperature and conformally coated for use in harsh and mobile environments.

Diagram


Isolation
Front panel 4 HP
Antenna
Antenna
F
GSM-R Controller
GPS Controller
SDRAM (option)
FPGA
SA
B
UART TTL
UART TTL
Second front panel (+ 4 HP)
User-defined
User-defined
User-defined
CompactPCI® J1
Front connector
On-board connector
SA-Adapter™
Options

Technical Data

GSM-R Interface	■ GSM-Rail: Global System for Mobile Communications - Railway ■ Frequency bands □ EGSM 900, GSM 1800 □ Compliant to GSM Phase 2/2+ ■ GSM class: Small MS ■ Transmit power: □ Class 4 (2W) at EGSM 900 □ Class 1 (1W) at GSM 1800 ■ GPRS connectivity □ GPRS multi-slot class 10 □ GPRS mobile station class B ■ Data Services □ GPRS data downlink transfer: max. 85.6 kbit/s □ GPRS data uplink transfer: max. 42.8 kbit/s □ Support of PAP (Password Authentication Protocol) and CHAP (Challenge Handshake Authentication Protocol) for PPP connections □ Support of PBCCH (Packet Switched Broadcast Control Channel) for enhanced GPRS performance □ CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbit/s, non-transparent, V.110 □ WAP compliant □ Internet services: TCP, UDP, HTTP, FTP, SMTP, POP3 ■ SMS □ MT, MO, CB, Text and PDU mode □ SMS storage: SIM card plus 25 SMS locations in the mobile equipment □ Transmission of SMS alternatively over CSD or GPRS (user-defined) □ MMS compliant ■ Fax: Group 3, Class 2 ■ Onboard SIM card interface □ Supported SIM card: 3 V ■ Coding scheme CS 1, 2, 3, 4 ■ Optical isolation: 1 kV DC ■ One antenna connector at front panel □ For the use of an external antenna □ Rugged screw connection ■ Please note that MEN does not offer SIM cards or mobile telephony contracts!

Technical Data

GPS Interface	■ 20-parallel-channel GPS (Global Positioning System) receiver ■ GPS Band/Code: L1 frequency, C/A code ■ Integrated TCXO, RTC ■ Horizontal accuracy: better than 2.1 m (CEP) 5.2 m 2dRMS ■ Time To First Fix (TTFF): □ Cold start: 34 s typ. □ Warm start: 32 s typ. □ Hot start: 0.5 s typ. ■ Sensitivity: □ Acquisition: -155 dBm □ Navigation: -157 dBm □ Tracking: -159 dBm ■ GPS modes □ TricklePower™ mode for power saving □ Push-To-Fix™ mode ■ Protocol: NMEA 0183 □ SiRF® binary messages: altitude, longitude, elevation, velocity, heading, time, satellite tracking status, command/control messages □ SiRF® binary interface: raw data ■ Antenna voltage supervision ■ 3GPP compliance ■ Optical isolation: 1 kV DC ■ One antenna connector at front panel □ For the use of an external active antenna □ Rugged screw connection
UARTs	■ Two channels ■ Accessible via onboard connectors ■ Physical interface at front panel using SA-Adapters™ □ Two SA-Adapters™ can be directly plugged within 4HP □ Different physical layers depending on SA-Adapter™: RS232, RS422, RS485 with or without optical isolation □ SA-Adapters™ to be ordered separately ■ Data rates up to 2 Mbit/s ■ 60-byte transmit/receive buffer ■ Handshake lines: full support; lines depend on SA-Adapters™
Front Connections	■ Two Reverse SMA antenna connectors ■ Two cut-outs for SA-Adapters™
FPGA	■ Standard factory FPGA configuration: □ Main bus interface □ 16Z057_UART - UART controller (controls in-system GSM-R/GPS communication and UARTs) □ 16Z045_FLASH - Flash interface ■ The FPGA offers the possibility to add customized I/O functionality. See FPGA.
CompactPCI® Bus	■ Compliance with CompactPCI® Core Specification PICMG 2.0 R3.0 ■ Peripheral slot ■ 32-bit/33-MHz PCI-to-PCI bridge ■ V(I/O): +3.3 V
Electrical Specifications	■ Supply voltage/power consumption: □ Depends on mounted SA-Adapters™ and used functions □ +5 V (-3%/+5%), 1900 mA max. □ +3.3 V (-3%/+5%), 850 mA max.

Technical Data

Mechanical Specifications	■ Dimensions: conforming to CompactPCI® specification for 3U boards ■ Front panel: □ 4HP with ejector □ 3U single-slot front panel for two antenna and up to two UART connectors ■ Weight: 170 g
Environmental Specifications	■ Temperature range (operation): □ -40..+85°C for all functions except GSM-R (screened) □ GSM-R component only operable in -20..+70°C range (auto on/off) □ Airflow: min. 10 m³/h ■ 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 ■ Bump: 10 g/16 ms ■ Vibration (sinusoidal): 2 g/10..150 Hz ■ Conformal coating (standard)
MTBF	■ 189 239 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), IEC1000-4-2 (ESD) and IEC1000-4-4 (burst)
Software Support	■ Driver software 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® II EP2C20 □ 18 752 logic elements □ 239 616 total RAM bits ■ Simple functional updates via software ■ 2 MB Flash for FPGA configurations ■ Connection □ Functions available via two onboard 10-pin I/O connectors □ SA-Adapters™ are used to realize the physical lines.

Configuration & Options

Standard Configurations

Article No.	GSM installed	GPS installed	UARTs	Front Panel	Operation Temperature	Other
02F210-00	GSM-R (Rail) EGSM900 / GSM1800	Yes	2 via SA-Adapters	4HP	-40..+85°C (GSM-R: -20..+70°C)	Conformal coating

Options

Interface configuration	■ Also available with GSM only or GPS only ■ Also available with standard GSM instead of GSM-R
GSM Interface	■ GSM 850 / GSM 1900 support □ For operation in USA and Canada □ Through different GSM component □ Without railway qualification
Additional user-defined functions	■ I/O functionality customizable in FPGA ■ Three additional serial interfaces □ Three additional SA-Adapters™ can be added within 8HP using a second front panel □ For user-defined interface functions, e.g. CAN bus, IBIS, ... ■ Nios® soft core implementation possible □ With up to 16 MB SDRAM □ For onboard intelligence ■ See also FPGA
Mechanical	■ For user-defined functions customized front panels are available on request.
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 F210 Models	**02F210-00**	1 GSM-R interface, 1 GPS interface, 2 user-configurable UARTs, 4 HP, -40..+85°C screened (GSM-R auto on/off beyond -20..+70°C), conformal coating
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
	08SA02-01	RS422/485, full duplex, optically isolated, 0..+60°C
	08SA02-07	RS422/485, full duplex, optically isolated, -40..+85°C screened
	08SA03-00	1 RS232, optically isolated, 0..+60°C
	08SA03-01	1 RS232, optically isolated, -40..+85°C screened
	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
	08SA26-00	RS422 with 15-pin D-Sub connector, with handshake signals (RTS, CTS, DCD, DTR), coated, -40..+85°C screened
Software: Linux	This product is designed to work under Linux. See below for potentially available separate software packages from MEN.	
	13Z025-90	Linux native driver (MEN) for 16Z025_UART, 16Z057_UART and 16Z125_UART
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, F75P, G20, G22, XM1L, XM2, MM1, MM2, SC21, SC24, SC27, BC50M, BC50I, BL50W, BL50S, DC13, F206, F210, F215, F216, G215, P506, P507 and P511
	13F210-77	Windows® Installset (MEN) for F210 (Includes all free drivers developed by MEN for the supported hardware.)
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.	
	13Z025-60	VxWorks® native driver (MEN) for 16Z025_UART, 16Z057_UART and 16Z125_UART

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart 3U CompactPCI® / PlusIO CPU cards » Download	
	Compare Chart 3U CompactPCI® / PlusIO peripheral cards » Download	
	20F210-00	F210 User Manual
	21Z025-90	16Z025_UART and 16Z125_UART under Linux User Manual
	22Z057-ER	16Z057_UART Errata

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