CompactPCI, CompactPCI PlusIO and CompactPCI Serial

Rugged and Safe CompactPCI Platforms for Transport and Industry
CompactPCI / PlusIO / Serial Made by MEN: Benefit from our extensive range of standard CompactPCI boards and systems fitting your final solution – the more rugged, the better.

**CompactPCI – PICMG 2.0**

Today’s users appreciate the modularity and robustness of CompactPCI. Based on this established standard, CompactPCI Serial offers fast serial data transfer in addition, with CompactPCI PlusIO as the migration path between the two.

**CompactPCI PlusIO – PICMG 2.30**

CompactPCI PlusIO is fully downward-compatible to the basic CompactPCI standard. It defines the pin assignment and the function of the user pins on the J2 connector for 32-bit system slots: 4 × PCIe, 4 × SATA, 4 × USB, 2 Gb Ethernet.

**CompactPCI Serial – PICMG CPCI-S.0**

CompactPCI Serial defines a new connector for transmission frequencies of more than 12 Gb/s, supporting 8 × PCIe, 8 × SATA, 8 × USB and 8 × Ethernet on the backplane. It uses the same mechanics as CompactPCI, remaining compatible to IEC 1101.
### 3U CompactPCI / PlusIO CPU Boards

#### 3U CompactPCI PlusIO F23P – Intel Core i7 4th gen CPU Board
- Intel Core i7, 4th generation
- Quad-core 64-bit processor
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- Up to 32 GB DDR3 DRAM soldered, ECC
- microSD card and mSATA slots
- Front I/O: VGA, 2 Gbit Ethernet, 2 USB
- Rear I/O: 4 PCIe, 4 USB, 4 SATA, 1 Gbit Ethernet
- Other I/O (onboard, side card): SATA, HDMI/Display Port, HD audio, USB, UART etc.
- 2.4 to 3.4 GHz Turbo Boost, Hyper-Threading, Active Management Technology
- Open Cl support

#### 3U CompactPCI PlusIO F22P – Intel Core i7 3rd gen CPU Board
- Intel Core i7, 3rd generation
- Quad-core 64-bit processor
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- Up to 16 GB DDR3 DRAM soldered, ECC
- microSD card and mSATA slots
- Front I/O: VGA, 2 Gbit Ethernet, 2 USB
- Rear I/O: 4 PCIe, 4 USB, 4 SATA, 1 Gbit Ethernet
- Other I/O (onboard, side card): SATA, SDVO, HDMI/Display Port, HD audio, USB, UART etc.
- 2.3 to 3.3 GHz Turbo Boost, Hyper-Threading, Active Management Technology
- Open Cl support

#### 3U CompactPCI PlusIO F21P – Intel Core i7 2nd gen CPU Board
- Intel Core i7, 2nd generation
- Quad-core 64-bit processor
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- Up to 16 GB DDR3 DRAM soldered, ECC
- microSD card and mSATA slots
- Front I/O: VGA, 2 Gbit Ethernet, 2 USB
- Rear I/O: 4 PCIe, 4 USB, 4 SATA, 1 Gbit Ethernet
- Other I/O (onboard, side card): SATA, SDVO, HDMI/Display Port, HD audio, USB, UART etc.
- 2.0 to 3.0 GHz Turbo Boost, Hyper-Threading, Active Management Technology
- Open Cl support

#### 3U CompactPCI PlusIO F19P – Intel Core 2 Duo CPU Board
- Intel Core 2 Duo SP9300, 2.26 GHz
- Dual-core 64-bit processor
- 32-bit 4HP system master (or stand-alone)
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- Up to 4 GB DDR3 DRAM soldered
- CompactFlash and microSD card slots
- Front I/O: VGA, 2 Gbit Ethernet, 2 USB
- Rear I/O: 4 PCIe, 4 USB, 4 SATA, 1 Gbit Ethernet
- Other I/O (onboard, side card): SATA, SDVO, HD audio, USB, UART etc.
- Board controller
- -40°C to +85°C screened version

#### 3U CompactPCI F11S – Intel Atom CPU Board
- 32-bit 8HP CompactPCI system slot
- Intel Atom Z530P, Z510P, Z520PT
- Up to 2 GB DDR2 SDRAM
- 2 MB SRAM
- CompactFlash
- microSD slot
- 1 SATA interface via rear I/O
- VGA, 2 USB, PS/2, 1 UART
- 1 Gigabit and 1 Fast Ethernet
- FPGA for individual user I/O at rear
- -40°C to +85°C screened or with qualified components

#### 3U CompactPCI F218 – PowerPC MPC8314 Slave CPU Board
- 32-bit 33-MHz CompactPCI
- 4HP peripheral slot or stand-alone function
- PowerPC MPC8314, 266 MHz
- Host CPU communication via Ethernet
- Ultra fast boot < 2 seconds
- Flexible FPGA-Flash structure
- 256 MB SDRAM, 16 MB Flash
- Front I/O: 2 Gbit Ethernet, 1 UART via SA-Adapter
- Rear I/O: user-defined via FPGA (option)
- -40°C to +85°C with qualified components

#### 3U CompactPCI PlusIO F50P – PowerPC MPC8548 CPU Board
- 32-bit CompactPCI and PICMG 2.30 PlusIO
- 8 HP or 12 HP with front I/O
- MPC8548 (or MPC8543), up to 1.5 GHz
- Up to 2 GB (ECC) DDR2 SDRAM
- Up to 128 KB FRAM, 2 MB SRAM
- Up to 16 GB SSD Flash
- Standard front I/O: 2 Gbit Ethernet, 2 USB
- Standard rear I/O: 4 USB, 2 SATA
- FPGA for user-defined I/O functions (option)
- MENMON BIOS for PowerPC cards
- -40°C to +70°C (8 HP) (screened)
### 3U CompactPCI / PlusIO Peripheral Boards

#### 3U CompactPCI
- **F100** – CompactPCI to CompactPCI Serial Interface Card
  - 4 HP 32-bit/33-MHz CompactPCI
  - Replaces system slot card
  - For operation together with G00 peripheral slot card for CompactPCI Serial
  - 1 PCI Express x1 link

#### 3U CompactPCI
- **F204 / F205** – M-Module Carrier Boards
  - 1 CompactPCI bus slot
  - 1 or 2 M-Module slots
  - -40°C to +85°C versions with qualified components

#### 3U CompactPCI
- **F206** – Octal UART for RS232, RS422, RS485
  - Octal 16450 UART
  - RS232/RS422/RS485, isolated/not isolated
  - Physical layer via SA-Adapters
  - Large receive and transmit FIFOs
  - Very high data rates up to 2 Mbit/s
  - Full handshake support
  - Hardware flow control for RS-485 half duplex
  - Also for other protocols like HDLC
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F206N** – Nios II Slave Board
  - 32-bit/33-MHz CompactPCI
  - Peripheral slot function
  - FPGA 12,000 LEs (approx. 144,000 gates)
  - Nios II soft processor
  - 32 MB SDRAM, 2 MB Flash
  - Flexible FPGA-Flash structure
  - Open platform FPGA development package
  - Support of Wishbone and Avalon bus
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F207** – PCI-104 Carrier Board
  - 1 PCI-104 slot
  - For stacking of up to 4 PCI-104 modules
  - 8 HP CompactPCI with one PCI-104 module
  - PCI-to-PCI bridge
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F211** – Quad Fast Ethernet Interface
  - 4 HP 32-bit/33-MHz CompactPCI
  - 4 full-duplex or half-duplex channels
  - 10BASE-T and 100BASE-TX physical layer
  - Fully integrated to comply with IEEE802.3u
  - 1500 V isolation voltage
  - -40°C to +85°C qualified

#### 3U CompactPCI
- **F212** – PCIe Mini Card Carrier for Wireless Functions
  - 4 HP 32-bit/33-MHz CompactPCI
  - Up to 2 PCIe Express Mini Cards
  - ExpressCard/34 or 54 modules optional
  - For cards with internal USB interface
  - For HW applications (WLAN, UMTS, GPS, GSM, HSDPA)
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F213** – PMC Carrier
  - 4 HP 32-bit/33-MHz CompactPCI
  - 1 32-bit/33-MHz or 66-MHz PMC slot
  - Optional Mini PCI card slot
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F215** – 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, InterBus-S, CAN bus, binary I/O
  - Physical layers via SA-Adapters
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F216** – Octal UART
  - Octal 16550 UART
  - RS232/422/485, isolated
  - Large receive and transmit FIFOs
  - Very high data rates up to 921,600 bit/s
  - Full handshake support
  - Hardware flow control for RS-485 half duplex
  - -40°C to +85°C with qualified components

#### 3U CompactPCI
- **F217** – Memory Card Carrier
  - 4 HP 32-bit/33-MHz CompactPCI
  - USB Flash Media Controller
  - Multi card reader: MS, SD, MMC
  - CompactFlash socket
  - Hot-plug at front
  - -40°C to +85°C screened
  - EN 50155 compliant (railways)
**3U CompactPCI**

**F223 – PCIe Mini Card Carrier for Wireless Functions**
- 2 PCI Express Mini Cards (full-/half-size)
- For wireless applications (WLAN/WAP, UMTS, GPS, GSM, HSDPA, LTE)
- 2 or 3 external antennas per module (reverse SMA)
- Up to 18 SIM card slots
- For cards with internal PCI Express and USB interface
- -40 °C to +85 °C screened, conformal coating
- 4 HP 32-bit/33-MHz CompactPCI

**3U CompactPCI**

**F305 – Quad Fast Ethernet / Real-Time Ethernet Interface**
- 4 HP 32-bit/33-MHz CompactPCI
- 4 Ethernet channels, 100 Mbit/s
- Real-time Ethernet capability
- Optical isolation from other cards
- Full EN 50155 compliance
- -40 °C to +85 °C qualified
- Conformal coating
- For rolling stock and wayside applications

**3U CompactPCI**

**F403 – Binary I/O Card for Railways**
- 4HP 32-bit/33-MHz CompactPCI
- 16 bidirectional binary I/Os
- Organized in 4 optically isolated groups
- Connected via spring cage terminal blocks
- Reduced wiring for fast installation
- I/O voltage range 14.4 VDC to 51.4 VDC
- Driver support for all common operating systems
- -40 °C to +85 °C with qualified components
- Conformal coating
- EN 50155 compliant

**3U CompactPCI**

**F701 – MVB Interface Card**
- 4HP 32-bit/33-MHz CompactPCI
- MVB Interface EMD/ESD+ according to IEC 61375 (TCN Standard)
- MVB Bus Administrator
- 4096 Process Data ports
- Message Data stack
- Driver support for WinXP, Win7 32/64bit and Linux
- -40 °C to +70 °C screened

**3U CompactPCI**

**F750 – CANopen Interface Board**
- 4HP 32-bit/33-MHz CompactPCI
- Full CAN/Extended CAN according to ISO-11898
- CANopen master and slave by loadable firmware
- Based on netX universal network controller
- Optical isolation with 1000 VDC isolation voltage
- Driver support for all common operating systems
- -20 °C to +70 °C screened

**3U CompactPCI**

**F751 – DeviceNet Interface Board**
- 4HP 32-bit/33-MHz CompactPCI
- DeviceNet interface according to ISO-11898
- DeviceNet master and slave by loadable firmware
- Based on netX universal network controller
- Optical isolation with 1000 VDC isolation voltage
- Driver support for all common operating systems
- -20 °C to +70 °C screened

**3U CompactPCI**

**F752 – Real-Time Ethernet Interface Board**
- 4HP 32-bit/33-MHz CompactPCI
- Up to 100 MBit/s real-time Ethernet depending on loaded firmware
- PROFINET (Controller & Device)
- EtherCAT (Master & Slave)
- Ethernet PowerLink (Controlled Node)
- EtherNet/IP (Scanner & Adapter)
- OpenModbus (Server & Client)
- Sercos (Master & Slave)
- VARAN (Client)
- Based on netX universal network controller
- Optical isolation with 1000 VDC isolation voltage
- Driver support for all common operating systems
- 0 °C to +70 °C screened

**3U CompactPCI**

**F753 – PROFIBUS Interface Board**
- 4HP 32-bit/33-MHz CompactPCI
- Isolated RS485 interface
- PROFIBUS DP master, DP slave and MPI device determined by loadable firmware
- Based on netX universal network controller
- Isolation with 1000 VDC voltage
- Driver support for all common operating systems
- -20 °C to +70 °C screened
3U CompactPCI Serial CPU Boards

3U CompactPCI Serial
G25A – Intel Xeon D CPU Board
- Intel Xeon D-1500, up to 16 cores
- Up to 32 GB DDR4 DRAM soldered, ECC
- 2 10 Gb Ethernet, 1Gb Ethernet, 1USB 3.0, 1 RS232 for configuration
- 4 HP system master and peripheral slot
- PICMG CPCI-S.0 CompactPCI Serial
- microSD card slot
- Standard rear I/O: 28 PCIe lanes, 2 USB 3.0, 6 SATA, 4 Gb Ethernet
- Built-in Intel V7 hardware virtualization
- Trusted Platform Module (TPM)

3U CompactPCI Serial
G23 – Intel Core i7 4th gen CPU Board
- Intel Core i7, 4th generation, Quad-core 64-bit processor
- Up to 32 GB DDR3 DRAM soldered, ECC
- mSATA and microSD card slots
- Standard front I/O: 2 DisplayPorts, 4 USB 2.0, 4 USB 3.0, 5 SATA, DisplayPort/HDMI
- Rear I/O via mezzanine board: up to 8 Gigabit Ethernet
- Intel Turbo Boost, Hyper-Threading, AMT 9.0, Open CL support

3U CompactPCI Serial
G22 – Intel Core i7 CPU Board
- Intel Core i7, 3rd generation, Quad-core 64-bit processor
- 4 HP system master and peripheral slot
- PICMG CPCI-S.0 CompactPCI Serial
- 4 or 8 GB DDR3 DRAM soldered, ECC
- mSATA and microSD card slots
- Standard front I/O: 2 DisplayPorts, 2 Gb Ethernet, 2 USB 2.0
- Standard rear I/O: 7 PCIe, 4 USB 2.0, 4 USB 3.0, 5 SATA, DisplayPort/HDMI
- Rear I/O via mezzanine board: up to 8 Gigabit Ethernet
- Intel Turbo Boost, Hyper-Threading, AMT 8.0, Open CL support

3U CompactPCI Serial
G20 – Intel Core i7 CPU Board
- Intel Core i7, 2.53 GHz, Dual-core 64-bit processor
- PICMG CPCI-S.0 CompactPCI Serial
- Up to 4 GB DDR3 DRAM soldered, ECC
- mSATA and microSD card slots
- Standard front I/O: 2 DisplayPorts, 2 Gb Ethernet, 2 USB
- Standard rear I/O: 7 PCIe, 8 USB, 6 SATA, DisplayPort/HDMI
- Rear I/O via mezzanine board: up to 8 Gigabit Ethernet
- Intel Turbo Boost 2.53...3.2 GHz, Hyper-Threading, Active Management Technology
- Open CL 1.1 support

3U CompactPCI Serial
G52A – QorIQ Network CPU Board
- Freescale QorIQ, up to 12 cores
- Up to 12 GB DDR3 DRAM soldered, ECC
- Standard front I/O: 2 10 Gb Ethernet, 1Gb Ethernet, 1 USB 2.0 host, 1 USB configuration port (RS232)
- Standard rear I/O: 14 PCIe lanes, 1 USB 2.0, 2 SATA, 3 Gb Ethernet
- 4 HP system master and peripheral slot
- microSD card slot
- CPU TDP from 32 W to 61 W
- Board Management Controller, Watchdog

3U CompactPCI Serial System & Peripheral Slot Boards

3U CompactPCI Serial
G51 – QorIQ Communications CPU Board
- Single-board computer with up to 4 Gb Ethernet
- P3041 Freescale QorIQ quad-core PowerPC processor
- 4 HP system master and peripheral slot
- PICMG CPCI-S.0 CompactPCI Serial
- Up to 8 GB DDR3 SDRAM soldered, ECC
- Standard front I/O: 3 Gb Ethernet, 2 USB 2.0
- Standard rear I/O: 3 PCIe, 4 Gb Ethernet, 6 USB 2.0, 2 SATA (3 Gb)
- -40°C to +85°C with qualified components
- Compliant to EN 50155 (railways)

3U CompactPCI Serial
GX1 – PCI Express Switch
- 64-Lane, 16-Port switch
- PCI Express Generation 3 switching over CompactPCI Serial
- 1 Gb/s per lane for each point-to-point serial link
- Programmable configuration of PCIe ports according to backplane design
- Software tools for diagnostics and performance monitoring
- Dedicated upstream links for multiple CPUs
- Multicast / broadcast capability

Available soon

3U CompactPCI Serial
G101 – Managed Industrial Ethernet Switch with Uplink
- Managed rugged Ethernet switch
- Up to 25 Gigabit Ethernet ports on rear I/O
- Or 3 ports on front and up to 22 ports on rear
- 29 Gbit/s carrier grade switch matrix
- Special switch protocols
- -40°C to +85°C with qualified components
- EN 50155 class TX compliant (railways)
- PICMG CPCI-S.0 CompactPCI Serial system slot and peripheral card

3U CompactPCI Serial
GE1 – 4-Port Gigabit Copper Ethernet Line Card with PoE
- 4 Gigabit Ethernet on RJ45 connectors (M12 optional)
- Power over Ethernet (PoE+) PSE (all ports)
- LEDs for link and activity status
- -40°C to +85°C with qualified components
- EN 50155 class TX (railways)
- PICMG CPCI-S.0 CompactPCI Serial
- IEEE 1588v2 supported (together with G101)
3U CompactPCI Serial
GPI – 4-Port Gigabit Ethernet PHY Line Card with PoE
- 4 Gigabit Ethernet on RJ45 connectors (M12 optional)
- Power over Ethernet (PoE+) PSE (all ports)
- LEDs for link and activity status
- -40 °C to +85 °C with qualified components
- EN 50155 class TX (railways)
- PICMG CPCI-S.0 CompactPCI Serial
- IEEE 1588v2 support (optional)

3U CompactPCI Serial
GP2 – 4-Port Gigabit SFP PHY Line Card
- 100/1000 Mbit/s SFP modules supported
- FX / Sx / LX / ZX modules supported
- 4 SFP cages
- LEDs for link and activity status
- -40 to +85 °C with qualified components
- EN 50155 class TX (railways)
- PICMG CPCI-S.0 CompactPCI Serial

3U CompactPCI Serial
G302 – Managed 16-Port Rugged Industrial Ethernet Switch
- Managed 16-port rugged Ethernet switch
- Up to 16 Gigabit Ethernet ports on rear I/O
- Or 3 ports on front and up to 13 ports on rear
- Configuration via Telnet CLI, SNMP ver. 3 or external dongle
- Service interface via M12
- LEDs for front port and board states
- -40 °C to +85 °C with qualified components
- EN 50155 class TX compliant (railways)
- PICMG CPCI-S.0 CompactPCI Serial system slot and peripheral card

3U CompactPCI Serial Peripheral Boards

3U CompactPCI Serial
G100 – CompactPCI Serial to CompactPCI Interface Card
- For operation together with F100 system slot card for CompactPCI
- 1 PCI Express x1 link
- -40 °C to +85 °C with qualified components
- PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G201 – USB 3.0 Interface
- 4 USB 3.0 host interfaces
- Data rate up to 5 Gbit/s per direction per port
- -40 °C to +85 °C screened
- PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G204 – M-Module Carrier Board
- 1 M-Module slot
- -40 °C to +85 °C with qualified components
- PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G211 – Quad Gigabit Ethernet Interface
- Four 10/100/1000Base-T Ethernet channels
- Alternatively two redundant channel pairs
- Full-duplex or half-duplex
- RJ45 or robust M12 connectors
- Fully integrated to comply with IEEE802.3u
- 1500 V isolation voltage
- -40 °C to +85 °C screened
- PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G211F – Quad Fiber Optics Interface
- Four optical transceiver channels 1000BASE-SX
- Alternatively two redundant channel pairs
- Full-duplex or half-duplex depending on transceiver
- Fully integrated to comply with IEEE802.3x
- 500 V isolation voltage
- -40 °C to +85 °C screened (without transceivers)
- 4HP PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G212 – PCIe Mini Card Carrier for Wireless Functions
- Up to 2 PCI Express Mini Cards (full-size)
- ExpressCard/34 or 54 modules optional
- For cards with internal PCIe and USB interface
- For HF applications (WLAN, UMTS, GPS, G5M, HSDPA)
- -40 °C to +85 °C screened
- PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G213 – XMC/PMC Carrier
- 1 XMC slot (PCIe 2x4 links)
or 1 PMC slot (82/64 bits, 33/66/133 MHz, PCI-X)
- -40 °C to +85 °C screened
- PICMG CPCI-S.0 CompactPCI Serial peripheral card
3U CompactPCI Serial
G214 – Multi-Display Controller
» AMD Radeon E6760 GPU, 600 MHz
» 6 SIMD engines, 480 shaders, 1 GB integrated graphics RAM
» AMD Eyefinity, EyeSpeed and HDID technologies
» DirectX 11, OpenGL 4.1, OpenCL 1.1
» Up to 6 DisplayPort (4 DP 1.2, 2 DP 1.1a)
» Max. resolution 4096x2560 at 60 Hz, 24 bpp or 3840x2400 at 60 Hz, 30 bpp
» 1 PCIe x8 CPU interface
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G215 – 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, iBUS, GPRS, binary I/O
» Physical layers via SA-Adapters
» –40 °C to +85 °C with qualified components

3U CompactPCI Serial
G301 – Unmanaged 4-Port Rugged Industrial Ethernet Switch
» Unmanaged 4-port rugged Ethernet switch
» 4 Gigabit Ethernet (front) on RJ45 (M12 optional)
» Power over Ethernet (PoE) PSE (all ports)
» LEDs for link and activity status
» 1 Gigabit Ethernet on rear I/O (optional)
» –40 °C to +85 °C (screened)
» EN 50155 class Tx (railways)
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G303 – Unmanaged 16-Port Rugged Industrial Ethernet Switch
» Unmanaged 16-port rugged Ethernet switch
» Up to 16 Gigabit Ethernet ports on rear I/O
» Or 3 ports on front and up to 13 ports on rear
» LEDs for front port and board states
» –40 °C to +85 °C with qualified components
» EN 50155 class TX compliant (railways)
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G304 – Unmanaged 4-Port Rugged Industrial Ethernet Switch with PoE+
» Unmanaged 4-port rugged Ethernet switch
» 4 Gigabit Ethernet (front) on RJ45 (M12 optional)
» Power over Ethernet (PoE+) PSE (all ports)
» LEDs for link and activity status
» 1 Gigabit Ethernet on rear I/O (optional)
» –40 °C to +85 °C (screened)
» EN 50155 class Tx (railways)
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G501 – SATA HDD/SSD Shuttle
» Hard disk drive or solid state drive shuttle
» 2.5" SATA HDD/SSD slot
» Four status LEDs
» –40 °C to +85 °C with qualified components
» Compliant with EN 50155 (railways)
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI Serial
G503 – Dual SATA HDD/SSD Shuttle and RAID Controller
» Hard disk drive or solid state drive shuttle
» Two 2.5" SATA HDD/SSD slots
» SATA revision 3.x support
» RAID 0, 1 and JBOD in hardware
» 5 ms HDD power hold-up time
» –40 °C to +85 °C with qualified components
» Compliant with EN 50155 (railways)
» PICMG CPCI-S.0 CompactPCI Serial peripheral card

3U CompactPCI / PlusIO Extension Boards
3U CompactPCI PlusIO
CT12 – Rear I/O Transition Module
» CompactPCI PlusIO PICMG 2.30
» 3U / 100x80 mm standard format
» 2 Gigabit Ethernet
» 4 USB 2.0, 4 PCIe x1, 4 SATA
» –40 °C to +85 °C qualified

PICMG CPCI-S.0 CompactPCI Serial peripheral card

6U CompactPCI Boards
6U CompactPCI
D202 – PC-MIP Carrier Board
» 1 CompactPCI bus slot
» 6 PC-MIP slots

6U CompactPCI
D203 – M-Module Carrier Board
» 1 CompactPCI bus slot
» 4 M-Module slots
» –40 °C to +85 °C versions with qualified components
Safe Computing

MEN designs and builds reliable, safe computers for highly available and redundant safety-critical systems up to SIL 4 and DAL A. Aside from incorporating doubled or tripled processors, the CPU cards feature redundant main memory, local voltage supply, FPGA technology, event logging, conduction cooling options and other safety relevant functions.

3U CompactPCI PlusIO
F75P – Safe Computer

- 2 × Intel Atom E6xx, 512 MB DDR2 RAM (each) for onboard dual redundancy
- 1 × Intel Atom E6xx, 1 GB DDR2 for I/O
- Independent supervisors for each block
- Fail-safe board architecture
- Clustering of two F75P to raise availability
- Event logging
- Certifiable up to SIL 4 (with report from TÜV SÜD)
- SIL 4 certification packages available for hardware and software (QNX)
- Developed according to EN 50129, EN 50128 and IEC 61508
- Full EN 50155 compliance
- –40 °C to +85 °C qualified
- Conformal coating

6U CompactPCI
D602 – PowerPC Safe Computer

- 3 × PowerPC 750 (lockstep mode), 3 × 512 MB DDR RAM
- Fail-operational, fault-tolerant behavior
- Fail-safe and fail-silent board architecture
- Clustering of two D602 to raise availability
- Board management, BITE
- SEU (radiation) tolerant
- Certifiable up to SIL 4 (with report from TÜV SÜD) and DAL A
- Developed according to RTCA DO-254, EN 50129 and IEC 61508
- EN 50155 compliance
- Up to –40 °C to +70 °C with qualified components
- Convection or conduction cooling

Rugged Computing

MEN’s rugged and reliable embedded computers withstand harsh environments with extreme temperatures, shock, vibration, dust, humidity and chemical influence. MEN’s electronics are designed for –40 °C to +85 °C and dissipate heat by convection or conduction cooling. Furthermore every Compact PCI/ Compact PCI Serial board can be equipped with a metal housing for conductive cooling if it is necessary.

3U CompactPCI
F50C – PowerPC MPC8548
Conduction Cooled SBC

- 32-bit/33-MHz cPCI system slot
- 1 slot, 9 HP front, rear I/O
- MPC8548 (or MPC8543), up to 1.5 GHz
- Up to 2 GB ECC DDR2 SDRAM
- Up to 128 KB FRAM, 2 MB SRAM
- Up to 16 GB SSD Flash
- FPGA for user-defined I/O functions
- MENMCON BIOS for PowerPC cards
- –40 °C to +85 °C Tcase screened
- Conduction cooling

CompactPCI Enclosure

For standard 3U cards within CCA frames
- 3-slot 3U backplane
- System slot left, horizontal installation
- Outline 200 mm x 350 mm x 145 mm
- 4 MIL-C-38999 connectors (59 user I/O pins)
- PSU 18-32 V, 35 W
- –40 °C to +70 °C (+85 °C) operating temperature
- IP65 compliant
- F22P, F75P and for F50C

Rackmount Enclosure, 3U Cards with Conduction Cooling

For standard 3U cards within CCA frames
- 3-slot 3U backplane
- System slot left, horizontal installation
- Outline 200 mm x 350 mm x 145 mm
- 4 MIL-C-38999 connectors (59 user I/O pins)
- PSU 18-32 V, 35 W
- –40 °C to +70 °C (+85 °C) operating temperature
- IP65 compliant
- F22P, F75P and for F50C
PSUs

3U 6 HP PSU
PU20 - Wide-Range
Power Supply Unit for Railway Systems, 24 to 110 VDC, 120 W

- 3U, 6 HP, 19” rack mountable
- Automatic input voltage range detection for 24, 72, 110 VDC
- Configurable voltage range for 36, 48, 74, 96 VDC
- Output power 120 W without derating
- Holdup time 10 ms according to Class S2
- Active power sharing
- Inverse current protection
- Redundant output voltage monitoring
- H15 rear connector
- -40°C to +85°C with qualified components
- Conformal coating
- Fully 5-9401 compliant
- Prepared for EN 50155 compliance
- Prepared for SIL applications

3U 6 HP PSU
PU21 - Wide-Range
Power Supply Unit for Railway Systems, 100 to 240 VAC, 120 W

- 3U, 6 HP, 19” rack mountable
- Input voltage range of 100 to 240 VAC
- Output power 120 W without derating
- Holdup time 20 ms
- Active power sharing
- Inverse current protection
- Redundant output voltage monitoring
- H15 rear connector
- -40°C to +85°C with qualified components
- Conformal coating
- Fully EN 50155 compliant
- Prepared for SIL applications

Application-Ready / Turnkey Systems for CompactPCI / Serial

DO-160G Multipurpose
Airborne Device
MP70S – ARINC 600 Aircraft Network Server

- ARINC 600, 4 MCU Housing with status display
- Intel Core i7, quad-core 64-bit processor
- 16-port managed Gigabit Ethernet Switch
- CompactPCI Serial Technology
- 2 rugged hot-plug HDD/SSD shuttles with locking support
- 2 antenna interfaces for WiFi and/or 3G/4G cellular interfaces
- 2 USB 3.0 interfaces for fast data loading
- Multipurpose OLED graphic display
- Display port, USB 3.0, GB Ethernet and 2 SIM card slots accessible via the front flap
- Qualified according to DO-160G

MTCS Safe System Controller
up to SIL 4
MH50C – Modular Train Control System for ATO/ATC and ATP

- SIL 4 Modular Train Control System MTCS
- Certified safe CPU board with 3 CPUs
- Certified safe I/O boards
- QNX safe operating system available
- Certification packages available
- Extensible by distributed safe I/O boxes connected via real-time Ethernet
- Optional MVB interface, RS232, RS422, RS485, CAN, GPS
- Compact 40 HP application-ready system
- Rack-mounted or wall-mounted
- For rolling stock and wayside applications

Built-to-Order Platform
MH701 – Rugged 4U, 40 HP Modular Industrial PC

- Compact 40 HP turn-key system
- Rack-mounted or wall-mounted
- Fanless operation or forced-air cooling
- Intel Core i7 or Celeron, TPM optional
- Up to 16 GB DDR3 DRAM soldered, ECC
- Up to four SATA hard disks for a RAID
- Single or redundant power supplies or uninterruptible power supply (AC or DC)
- 2 CompactPCI slots for fieldbus functions, RS232, analog I/O, Ethernet
- 2 CompactPCI Serial slots for SATA RAIDs, Ethernet
- 2 PCI or PCI Express slots for half-length cards
- Pre-configured operating system and drivers

Built-to-Order Platform
MH70S – Rugged 4U, 40 HP Modular Data Storage System

- Compact 40 HP turn-key system
- Rack-mounted or wall-mounted
- Fanless operation or forced-air cooling
- Intel Core i7 or Celeron, TPM optional
- Up to 16 GB DDR3 DRAM soldered, ECC
- Up to 20 TB storage capacity (depending on RAID level and HDD sizes)
- Up to 5 hot-swapable HDD/SSD carriers in different RAID configurations
- Single or redundant power supplies or uninterruptible power supply (AC or DC)
- Optional PCI Express Mini Card slots for WLAN, GSM (2G), UMTS (3G), LTE (4G), GPS or GLONASS functionality
- Optional PoE PSE capable 4-port switch
- Compliant to EN 50155 (railways)

Built-to-Order Platform
NH30 – Rugged 4U, 40 HP Modular Managed Gigabit Ethernet Switch

- Compact 4U, 40 HP turn-key Layer 2/3 switch solution
- Rack-mounted or wall-mounted
- Fanless operation or forced-air cooling
- Single or redundant power supplies or uninterruptible power supply (AC or DC)
- Up to six slots for RJ45, M2 (A or X-Coded) or SFP line cards
- PoE+ / non-PoE power sourcing Ethernet ports in mixed configuration
- Switch firmware production-ready installed
- System supervision (temperature, fan, power supply) optional
- EN 50155 class TX compliant (railways)
## Intel Processors

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>Performance Scallopa</th>
<th>Compact-PCI / PlusIO</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Intel Technology</th>
<th>Local Extensions</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>F75P</td>
<td>Safe SBC with onboard dual redundancy (see also compare chart safe computers)</td>
<td>3 × Intel Atom E6xx (two Control Processors, one I/O Processor)</td>
<td>Low end: 0.6 GHz, 3.3 W typ. High end: 1.6 GHz, 4.5 W typ.</td>
<td>32-bit/33-MHz CompactPCI system slot, 1 CompactPCI slot PICMG 2.0 or CompactPCI PlusIO PICMC 2.30 or stand-alone</td>
<td>2 GB + 2 × 1 GB DDR2 DRAM (soldered), mSATA disk, 8 KB non-volatile FRAM</td>
<td>Standard front I/O: VGA, 2 Fast Ethernet, 2 USB 2.0</td>
<td>Functions like Hyperthreading disabled for deterministic behavior</td>
<td>QNX, Linux, VxWorks, VxWorks/Cert, PikeOS</td>
</tr>
<tr>
<td>F23P</td>
<td>SBC</td>
<td>Intel Core i7, up to i7-4790EQ, 4th generation, (64-bit CPU)</td>
<td>Low end: 1.5 GHz, 25 W typ. High end: 4 GHz, 47 W typ.</td>
<td>32-bit/33-MHz CompactPCI system slot, 1 CompactPCI slot PICMG 2.0 or CompactPCI PlusIO PICMC 2.30 or stand-alone</td>
<td>16 GB DDR3 DRAM (soldered), mSATA disk, microSD card</td>
<td>Standard front I/O: VGA, 2 GB Ethernet, 2 USB 2.0</td>
<td>Hyperthreading, VT, AMT, Turbo Boost</td>
<td>I/O extension cards: F6xx</td>
</tr>
<tr>
<td>F22P</td>
<td>SBC</td>
<td>Intel Core i7, up to i7-3615QE, 3rd generation, (64-bit CPU)</td>
<td>Low end: 1.5 GHz, 17 W typ. High end: 2.3 GHz, 45 W typ.</td>
<td>32-bit/33-MHz CompactPCI system slot, 1 CompactPCI slot PICMG 2.0 or CompactPCI PlusIO PICMC 2.30 or stand-alone</td>
<td>16 GB DDR3 DRAM (soldered), mSATA disk, microSD card</td>
<td>Standard front I/O: VGA, 2 GB Ethernet, 2 USB 2.0</td>
<td>Hyperthreading, VT, AMT, Turbo Boost</td>
<td>see compare chart 3U CompactPCI / PlusIO extension cards</td>
</tr>
<tr>
<td>F21P</td>
<td>SBC</td>
<td>Intel Core i7, up to i7-2715QE, 2nd generation, (64-bit CPU)</td>
<td>Low end: 1.1 GHz, 17 W typ. High end: 2.1 GHz, 45 W typ.</td>
<td>32-bit/33-MHz CompactPCI system slot, 1 CompactPCI slot PICMG 2.0 or CompactPCI PlusIO PICMC 2.30 or stand-alone</td>
<td>16 GB DDR3 DRAM (soldered), mSATA disk, microSD card</td>
<td>Standard front I/O: VGA, 2 GB Ethernet, 2 USB 2.0</td>
<td>Hyperthreading, VT, AMT, Turbo Boost</td>
<td>I/O extension cards: F6xx</td>
</tr>
<tr>
<td>F19P</td>
<td>SBC</td>
<td>Intel Core 2 Duo up to SP9300 (64-bit CPU)</td>
<td>Low end: 1.2 GHz, 5.5 W typ. High end: 2.26 GHz, 25 W typ.</td>
<td>32-bit/33-MHz CompactPCI system slot, 1 CompactPCI slot PICMG 2.0 or CompactPCI PlusIO PICMC 2.30 or stand-alone</td>
<td>4 GB DDR3 DRAM (soldered), CompactFlash, microSD card</td>
<td>Standard front I/O: VGA, 2 GB Ethernet, 2 USB 2.0</td>
<td>Hyperthreading, VT</td>
<td>see compare chart 3U CompactPCI / PlusIO extension cards</td>
</tr>
<tr>
<td>Type</td>
<td>CPU</td>
<td>Performance Scalloability</td>
<td>Compact-PCI/PlusIO</td>
<td>Memory max.</td>
<td>Interfaces</td>
<td>Software</td>
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<tr>
<td>F115</td>
<td>SBC</td>
<td>Intel Atom up to Z530P</td>
<td>Low end: 1.1 GHz, tbd W typ.</td>
<td>32-bit/33-MHz CompactPCI</td>
<td>2 GB DDR2 DRAM, 2 MB SRAM, Compact-Flash, microSD card</td>
<td>Standard front I/O: Linux, VxWorks, INTEGRITY</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>High end: 1.6 GHz, 2 W typ.</td>
<td>system slot, 1 CompactPCI slot</td>
<td></td>
<td>I/O extension cards: F6xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F50P</td>
<td>SBC</td>
<td>PowerPC up to MPC8514</td>
<td>Low end: 800 MHz, tbd W typ.</td>
<td>32-bit/33-MHz CompactPCI</td>
<td>2 GB (ECC) DDR2 SDRAM, 128 KB FRAM, 2 MB SRAM, 16 GB SSD Flash</td>
<td>Standard front I/O: Linux, VxWorks, INTEGRITY</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>High end: 1.5 GHz, tbd W typ.</td>
<td>system slot, 1 CompactPCI slot</td>
<td></td>
<td>Rear I/O: up to 3 Gb Ethernet, 4 USB 2.0, up to 2 SATA, up to 64 user-defined I/O lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F50C</td>
<td>SBC in CCA frame for conduction cooling</td>
<td>PowerPC up to MPC8514</td>
<td>Low end: 800 MHz, tbd W typ.</td>
<td>32-bit/33-MHz CompactPCI</td>
<td>2 GB (ECC) DDR2 SDRAM, 128 KB FRAM, 2 MB SRAM, 16 GB SSD Flash</td>
<td>Rear I/O: FPGA (Altera Arria or Altera Cyclone) for user-defined I/O functions</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>High end: 1.5 GHz, tbd W typ.</td>
<td>system slot, 1 CompactPCI slot</td>
<td></td>
<td>Other I/O: up to 3 Gb Ethernet, 4 USB 2.0, up to 2 SATA, up to 64 user-defined I/O lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F206N</td>
<td>Slave SBC</td>
<td>Nios Soft Core</td>
<td>33 MHz, tbd W typ.</td>
<td>32-bit/33-MHz 66-MHz 1 CompactPCI slot</td>
<td>32 MB SDRAM, 2 MB Flash</td>
<td>Standard front I/O: Linux, VxWorks, INTEGRITY</td>
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<td></td>
<td>Rear I/O: FPGA (Altera Arria or Altera Cyclone) for user-defined I/O functions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F218</td>
<td>Slave CPU Board</td>
<td>PowerPC MPC8314</td>
<td>26 MHz, tbd W typ.</td>
<td>32-bit/33-MHz CompactPCI</td>
<td>256 MB DDR2 DRAM, 16 MB Flash</td>
<td>Standard front I/O: Linux, VxWorks, INTEGRITY</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>peripheral slot, 1 CompactPCI slot</td>
<td>system slot, 1 CompactPCI slot</td>
<td></td>
<td>Rear I/O: FPGA (Altera Arria or Altera Cyclone) for user-defined I/O functions</td>
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</tr>
</tbody>
</table>

**PowerPC Processors**
### 3U CompactPCI / PlusIO Peripheral Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>CompactPCI / PlusIO</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F100</strong></td>
<td></td>
<td>CompactPCI to CompactPCI Serial Interface (with G100)</td>
<td>32-bit/66-MHz CompactPCI system slot, 1 CompactPCI slot</td>
<td>Front I/O: 1 PCI Express x1</td>
<td>Driver software not necessary</td>
</tr>
<tr>
<td><strong>F204</strong></td>
<td></td>
<td>M-Module Carrier</td>
<td>1 CompactPCI slot</td>
<td>Onboard: 1 M-Module slot</td>
<td>M-Module driver software</td>
</tr>
<tr>
<td><strong>F205</strong></td>
<td></td>
<td>M-Module Carrier</td>
<td>1 CompactPCI slot</td>
<td>Onboard: 2 M-Module slots</td>
<td>M-Module driver software</td>
</tr>
<tr>
<td><strong>F206</strong></td>
<td></td>
<td>Octal UART (16450)</td>
<td>32-bit/33..66-MHz 1 CompactPCI slot, 3.3V VIO</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F206N</strong></td>
<td></td>
<td>Slave SBC</td>
<td>32-bit/33..66-MHz 1 CompactPCI slot</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F207</strong></td>
<td></td>
<td>PCI-104 Carrier</td>
<td>32-bit/33-MHz 1 CompactPCI slot (8 HP front panel) with one PCI-104 module</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F211</strong></td>
<td></td>
<td>Fast Ethernet Interface</td>
<td>32-bit/33-MHz 1 CompactPCI slot</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Software**

- Linux, VxWorks, Windows, QNX
- Nios sample designs, development package, update tools
- PCI-104 driver software
- Windows, Linux, VxWorks, QNX
<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Slot Type</th>
<th>Board Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>F212</td>
<td>PMC Carrier</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: 4 Reverse SMA antenna connectors</td>
</tr>
<tr>
<td>F213</td>
<td>PMC Carrier</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: 2 SMA for wireless applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Onboard I/O: One 32-bit/33-MHz or 66-MHz PMC or PCI mini card, type III (A and B)</td>
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<td></td>
<td>Depending on PMC card / PCI mini card</td>
</tr>
<tr>
<td>F215</td>
<td>Universal Interface Board</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td>Nios Soft Core optional</td>
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<td>Front I/O: 2 SMA for wireless applications</td>
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<td>Onboard I/O: One 32-bit/33-MHz or 66-MHz PMC or PCI mini card, type III (A and B)</td>
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<td></td>
<td>Depending on PMC card / PCI mini card</td>
</tr>
<tr>
<td>F216</td>
<td>Octal UART (16550)</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td>F217</td>
<td>Memory Card Carrier</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: 8 × RS232/422/485, hardware-configurable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows, Linux, VxWorks, QNX</td>
</tr>
<tr>
<td>F223</td>
<td>PCI Express Mini Card Carrier</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: Up to 6 SMA for wireless applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Onboard I/O: 2 PCI Express Mini Card slots, 2 SIM card slots (expandable up to 18 slots total)</td>
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<tr>
<td></td>
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<td></td>
<td>Windows, Linux</td>
</tr>
<tr>
<td>F305</td>
<td>Fast Ethernet / Real-Time Ethernet Interface</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: 4 full/half-duplex 10BASE-T or 100BASE-T Ethernet on M12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rear I/O (option): 2 RT Ethernet channels, MTCS connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows, Linux, QNX</td>
</tr>
<tr>
<td>F403</td>
<td>Binary I/O Card for Railways</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Front I/O: 16 binary inputs/outputs via 4 spring cage terminal blocks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Driver support for all operating systems</td>
</tr>
<tr>
<td>F212</td>
<td>PMC Carrier</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
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<td>Front I/O: 4 Reverse SMA antenna connectors</td>
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<td>F213</td>
<td>PMC Carrier</td>
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<td>1 CompactPCI slot</td>
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<td>Front I/O: 2 SMA for wireless applications</td>
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<td>Onboard I/O: One 32-bit/33-MHz or 66-MHz PMC or PCI mini card, type III (A and B)</td>
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<td>Depending on PMC card / PCI mini card</td>
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<tr>
<td>F215</td>
<td>Universal Interface Board</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
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<tr>
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<td>Nios Soft Core optional</td>
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<td>Front I/O: 2 SMA for wireless applications</td>
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<td>Onboard I/O: One 32-bit/33-MHz or 66-MHz PMC or PCI mini card, type III (A and B)</td>
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<td>Octal UART (16550)</td>
<td>32-bit/33-MHz</td>
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<td>F217</td>
<td>Memory Card Carrier</td>
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<td>Front I/O: 8 × RS232/422/485, hardware-configurable</td>
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<td>Windows, Linux, VxWorks, QNX</td>
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<tr>
<td>F223</td>
<td>PCI Express Mini Card Carrier</td>
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<td>1 CompactPCI slot</td>
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<td>Front I/O: Up to 6 SMA for wireless applications</td>
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<td>Onboard I/O: 2 PCI Express Mini Card slots, 2 SIM card slots (expandable up to 18 slots total)</td>
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<tr>
<td></td>
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<td></td>
<td>Windows, Linux</td>
</tr>
<tr>
<td>F305</td>
<td>Fast Ethernet / Real-Time Ethernet Interface</td>
<td>32-bit/33-MHz</td>
<td>1 CompactPCI slot</td>
</tr>
<tr>
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<td></td>
<td>Front I/O: 4 full/half-duplex 10BASE-T or 100BASE-T Ethernet on M12</td>
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<td>Windows, Linux, QNX</td>
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<td>F403</td>
<td>Binary I/O Card for Railways</td>
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<td>1 CompactPCI slot</td>
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<td>Driver support for all operating systems</td>
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<tr>
<td>Part Number</td>
<td>Description</td>
<td>Type</td>
<td>Front I/O</td>
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<tr>
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</tr>
<tr>
<td><strong>F701</strong></td>
<td>MVB Interface Card (Multi-function Vehicle Bus)</td>
<td>Duagon</td>
<td>2 D-Sub 9-pin interfaces for MVB connection</td>
</tr>
<tr>
<td><strong>F750</strong></td>
<td>CANopen Interface Board</td>
<td>Hilscher netX 100</td>
<td>1 CANopen interface, 1 diagnostic interface</td>
</tr>
<tr>
<td><strong>F751</strong></td>
<td>DeviceNet Interface Board</td>
<td>Hilscher netX 100</td>
<td>1 DeviceNet interface, 1 diagnostic interface</td>
</tr>
<tr>
<td><strong>F752</strong></td>
<td>Real-Time Ethernet Interface Board</td>
<td>Hilscher netX 100</td>
<td>2 10BASE-T or 100BASE-TX Ethernet, 1 diagnostic interface</td>
</tr>
<tr>
<td><strong>F753</strong></td>
<td>PROFIBUS Interface Board</td>
<td>Hilscher netX 100</td>
<td>1 PROFIBUS interface, 1 diagnostic interface</td>
</tr>
</tbody>
</table>
# 3U CompactPCI Serial CPU Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>Performance</th>
<th>Scalability</th>
</tr>
</thead>
<tbody>
<tr>
<td>G25A</td>
<td>SBC</td>
<td>Intel Xeon D-1500, up to 16 cores</td>
<td>Low end: 2 cores, 19 W typ.</td>
</tr>
<tr>
<td>G23</td>
<td>SBC</td>
<td>Intel Core i7, up to 17-4790EQ, 2.4 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost</td>
<td>Low end: 1.5 GHz, 25 W typ.</td>
</tr>
<tr>
<td>G22</td>
<td>SBC</td>
<td>Intel Core i7, up to 17-610E, 2.53 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost</td>
<td>Low end: 1.06 GHz, 18 W typ.</td>
</tr>
<tr>
<td>G20</td>
<td>SBC</td>
<td>Intel Core i7, up to 17-610E, 2.53 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost</td>
<td>Low end: 1.06 GHz, 18 W typ.</td>
</tr>
<tr>
<td>G52A</td>
<td>SBC</td>
<td>Freescale QorIQ T4240, 12 cores</td>
<td>1.5 to 1.8 GHz</td>
</tr>
<tr>
<td>G51</td>
<td>SBC</td>
<td>Freescale QorIQ P3041 quad-core, with or without encryption</td>
<td>1.2 GHz, 1.33 GHz or 1.5 GHz</td>
</tr>
</tbody>
</table>

## G25A Specifications
- **CPU**: Intel Xeon D-1500, up to 16 cores
- **Performance**: Low end: 2 cores, 19 W typ.; High end: 16 cores, 45 W typ.
- **Scalability**: Low end: 1.5 GHz, 25 W typ.; High end: 2.4 GHz, 47 W typ.
- **CompactPCI Serial Slot or CompactPCI Serial Peripheral Slot**
- **Memory max.**: 32 GB DDR4 DRAM (soldered), ECC, microSD card
- **Interfaces**: Standard front I/O: 2 10 Gb Ethernet, 1 Gb Ethernet, 1 USB 3.0
  - Standard rear I/O: 28 PCIe, 2 USB 3.0, 6 SATA, 4 Gb Ethernet
- **Software**: Windows, Linux

## G23 Specifications
- **CPU**: Intel Core i7, up to 17-4790EQ, 2.4 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost
- **Performance**: Low end: 1.5 GHz, 25 W typ.; High end: 2.4 GHz, 47 W typ.
- **Scalability**: Low end: 1.5 GHz, 17 W typ.; High end: 2.3 GHz, 45 W typ.
- **CompactPCI Serial System Slot or CompactPCI Serial Peripheral Slot**
- **Memory max.**: 16 GB DDR3 DRAM (soldered), microSD card
- **Interfaces**: Standard front I/O: 2 DisplayPort, 2 Gb Ethernet, 2 USB 3.0
  - Standard rear I/O: 5 PCIe x1, 2 PCIe x8, 8 USB 2.0, 4 USB 3.0, 6 SATA, 1 DisplayPort
  - Optional rear I/O (mezzanine card): up to 8 Gigabit Ethernet
- **Software**: Windows, Linux

## G22 Specifications
- **CPU**: Intel Core i7, up to 17-610E, 2.53 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost
- **Performance**: Low end: 1.06 GHz, 18 W typ.; High end: 2.53 GHz, 35 W typ.
- **Scalability**: Low end: 1.5 GHz, 17 W typ.; High end: 2.3 GHz, 45 W typ.
- **CompactPCI Serial System Slot or CompactPCI Serial Peripheral Slot**
- **Memory max.**: 8 GB DDR3 DRAM (soldered), microSD card
- **Interfaces**: Standard front I/O: 2 DisplayPort, 2 Gb Ethernet, 2 USB 2.0
  - Standard rear I/O: 5 PCIe x1, 2 PCIe x8, 4 USB 3.0, 4 USB 2.0, 6 SATA, 1 DisplayPort
  - Optional rear I/O (mezzanine card): up to 8 Gigabit Ethernet
- **Software**: Windows, Linux

## G20 Specifications
- **CPU**: Intel Core i7, up to 17-610E, 2.53 GHz (64-bit CPU), Intel technology: Hyperthreading, VT, AMT, Turbo Boost
- **Performance**: Low end: 1.06 GHz, 18 W typ.; High end: 2.53 GHz, 35 W typ.
- **Scalability**: Low end: 1.5 GHz, 17 W typ.; High end: 2.3 GHz, 45 W typ.
- **CompactPCI Serial System Slot**
- **Memory max.**: 8 GB DDR3 DRAM (soldered), CompactFlash, microSD card
- **Interfaces**: Standard front I/O: 2 DisplayPort, 2 Gb Ethernet, 2 USB 2.0
  - Standard rear I/O: 5 PCIe x1, 2 PCIe x8, 4 USB 3.0, 4 USB 2.0, 6 SATA, 1 DisplayPort
  - Optional rear I/O (mezzanine card): up to 8 Gigabit Ethernet
- **Software**: Windows, Linux

## G52A Specifications
- **CPU**: Freescale QorIQ T4240, 12 cores
- **Performance**: 1.5 to 1.8 GHz
- **Scalability**: |
- **CompactPCI Serial System Slot or CompactPCI Serial Peripheral Slot**
- **Memory max.**: 12 GB DDR3 DRAM (soldered), microSD card
- **Interfaces**: Standard front I/O: 2 DisplayPort, 2 Gb Ethernet, 1 USB 2.0, 1 PCIe x2, 3 PCIe x4
  - Standard rear I/O: 3 Gb Ethernet, 1 USB 2.0, 2 SATA, 3 PCIe x4, 3 PCIe x8
  - Optional rear I/O (mezzanine card): up to 8 Gigabit Ethernet
- **Software**: Windows, Linux

## G51 Specifications
- **CPU**: Freescale QorIQ P3041 quad-core, with or without encryption
- **Performance**: 1.2 GHz, 1.33 GHz or 1.5 GHz
- **Scalability**: |
- **CompactPCI Serial System Slot or CompactPCI Serial Peripheral Slot**
- **Memory max.**: 8 GB DDR3 DRAM (soldered), FRAM, microSD card, mSATA slot, eMMC card
- **Interfaces**: Standard front I/O: 3 Gb Ethernet, 2 USB 2.0
  - Standard rear I/O: 4 Gb Ethernet, 6 USB 2.0, 5 SATA, 2 PCIe x2, 1 PCIe x8
  - Optional rear I/O (mezzanine card): 7 USB 2.0
- **Software**: Linux
### 3U CompactPCI Serial System & Peripheral Slot Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>Performance Scalability</th>
</tr>
</thead>
<tbody>
<tr>
<td>GX1</td>
<td>PCI Express 3.0 Switch</td>
<td></td>
</tr>
<tr>
<td>G101</td>
<td>Gigabit Ethernet Switch</td>
<td></td>
</tr>
<tr>
<td>GE1</td>
<td>Gigabit Ethernet Line Card</td>
<td></td>
</tr>
<tr>
<td>GP1</td>
<td>Gigabit Ethernet Line Card</td>
<td></td>
</tr>
<tr>
<td>GP2</td>
<td>Gigabit SFP PHY Line Card</td>
<td></td>
</tr>
<tr>
<td>G302</td>
<td>Managed Ethernet Switch</td>
<td>Freescale PowerPC MPC8314</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CompactPCI Serial Slots</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CompactPCI Serial peripheral slot</td>
<td>Rear I/O: 16 ports, 64 PCI Express lanes</td>
<td>Third party from chip manufacturer</td>
<td></td>
</tr>
<tr>
<td>1 CompactPCI Serial peripheral slot</td>
<td>Standard front I/O: RJ45, M12 or SFP</td>
<td>Management firmware</td>
<td></td>
</tr>
<tr>
<td>1 CompactPCI Serial peripheral slot</td>
<td>Standard front I/O: Four 1000BASE-TX Ethernet on RJ45 or M12 connectors Optional PoE</td>
<td>Driver software not necessary</td>
<td></td>
</tr>
<tr>
<td>1 CompactPCI Serial peripheral slot</td>
<td>Standard front I/O: Four 1000BASE-TX Ethernet on RJ45 or M12 connectors Optional PoE</td>
<td>Driver software not necessary</td>
<td></td>
</tr>
<tr>
<td>1 CompactPCI Serial peripheral slot</td>
<td>Standard front I/O: Four 1000BASE-SX/LX/ZX on SFP slots</td>
<td>Driver software not necessary</td>
<td></td>
</tr>
<tr>
<td>CompactPCI Serial system or peripheral slot</td>
<td>32 MB Flash, 512 MB SDRAM</td>
<td>Standard front I/O: 3 x 1000BASE-T Ethernet Rear I/O: up to 13 x 1000BASE-T Ethernet</td>
<td>Driver software not necessary</td>
</tr>
</tbody>
</table>

Available soon
## 3U CompactPCI Serial Peripheral Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>Performance Scalability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>G100</strong></td>
<td>CompactPCI Serial to CompactPCI Interface (with F100)</td>
<td></td>
</tr>
<tr>
<td><strong>G201</strong></td>
<td>USB 3.0 Interface</td>
<td></td>
</tr>
<tr>
<td><strong>G204</strong></td>
<td>M-Module Carrier</td>
<td></td>
</tr>
<tr>
<td><strong>G211</strong></td>
<td>Gigabit Ethernet Interface</td>
<td></td>
</tr>
<tr>
<td><strong>G211F</strong></td>
<td>Quad Fiber Optics Interface</td>
<td></td>
</tr>
<tr>
<td><strong>G212</strong></td>
<td>PCI Express MiniCard Carrier</td>
<td></td>
</tr>
<tr>
<td><strong>G213</strong></td>
<td>XMC/PMC Carrier</td>
<td></td>
</tr>
<tr>
<td><strong>G214</strong></td>
<td>Multi-Display Controller</td>
<td>GPU: AMD E6760</td>
</tr>
</tbody>
</table>

### CompactPCI Serial Slots

<table>
<thead>
<tr>
<th>CompactPCI Serial Slots</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompactPCI Serial peripheral slot</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Memory max.

| CompactPCI Serial peripheral slot | | | |

### Interfaces

<table>
<thead>
<tr>
<th>CompactPCI Serial peripheral slot</th>
<th></th>
<th>Standard front I/O:</th>
<th>Windows, Linux</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 PCI Express x1</td>
<td></td>
<td>Driver software not necessary</td>
</tr>
<tr>
<td></td>
<td>4 USB 3.0 interfaces</td>
<td>Windows, Linux</td>
<td>M-Module driver software</td>
</tr>
<tr>
<td></td>
<td>4 optical transceiver channels 1000BASE-SX</td>
<td>Windows, Linux</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 full/half-duplex 1000BASE-T Ethernet on RJ45 or M12 connectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 optical transceiver channels 1000BASE-SX</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Express Card 34 or Express Card 54 slots via 4 SMA for HF applications (GPS, GSM, WLAN, UMTS, HSDPA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 XMC slot (2 links x4), or 1 PMC slot (32-bit, 64-bit, PCI-X up to 133MHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 XMC slot (2 links x4), or 1 PMC slot (32-bit, 64-bit, PCI-X up to 133MHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 GB integrated graphics RAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 DisplayPort 1.2 interfaces (+ 2 DisplayPort 1.1 interfaces optional via sideboard connector)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Onboard I/O:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>CompactPCI Serial peripheral slot</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver software not necessary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
<td>Features</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>G215</td>
<td>Universal Interface Board</td>
<td>Nios Soft Core optional</td>
<td>4 MB Flash, Up to 64 MB DRAM</td>
</tr>
<tr>
<td>G301</td>
<td>Unmanaged Ethernet Switch</td>
<td>2 × CAN, 2 × UARTs, 1 × 8-bit GPIO for use with SA-Adapters (customizable via onboard FPGA)</td>
<td>Linux, VxWorks, Windows, QNX</td>
</tr>
<tr>
<td>G303</td>
<td>Unmanaged Ethernet Switch</td>
<td>4 × 1000BASE-T Ethernet</td>
<td>Management Firmware</td>
</tr>
<tr>
<td>G304</td>
<td>Unmanaged Ethernet Switch</td>
<td>3 × 1000BASE-T Ethernet</td>
<td>Management Firmware</td>
</tr>
<tr>
<td>G501</td>
<td>HDD/SSD Shuttle</td>
<td>2 × 2.5&quot; SATA HDD or SSD</td>
<td>Driver software not necessary</td>
</tr>
<tr>
<td>G503</td>
<td>HDD/SSD Shuttle and RAID Controller</td>
<td>2 × 2.5&quot; SATA HDD or SSD</td>
<td>Driver software not necessary</td>
</tr>
</tbody>
</table>
## 3U CompactPCI / PlusIO Extension Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CompactPCI / PlusIO</th>
<th>Interfaces</th>
<th>Local Extensions</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT12</td>
<td>Transition Module Rear I/O F11S, F19P, F21P, F50P, F75P</td>
<td>Connected to CompactPCI for transition of rear I/O signals</td>
<td>2 Gb Ethernet, 4 USB 2.0, 4 PCIe x1, 4 SATA *</td>
<td>Depending on SBC</td>
</tr>
<tr>
<td>F600</td>
<td>Side Card Legacy I/O F14..F21P</td>
<td>4 HP, connected to CompactPCI for power supply</td>
<td>1.4 UARTs via SA-Adapters (RS232/422/485, isolated/not isolated)</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows, Linux, VxWorks, QNX</td>
<td></td>
</tr>
<tr>
<td>F601</td>
<td>Side Card Multimedia F14..F21P</td>
<td>4 HP, 1 CompactPCI Express slot with 4 x1 PCIe links</td>
<td>1.2 DVI, 1 audio, 0..1 COM via SA-Adapter (RS232/422/485, isolated/not isolated)</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows, Linux, VxWorks, QNX</td>
<td></td>
</tr>
<tr>
<td>F602</td>
<td>Side Card CompactPCI Express F14..F18</td>
<td>4 HP, connected to CompactPCI for power supply</td>
<td>4 PCI Express links x1,1 USB, 1 DVI, 1 COM via SA-Adapter (RS232/422/485, isolated/not isolated)</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows</td>
<td></td>
</tr>
<tr>
<td>F603</td>
<td>Side Card USB/COM F14..F21P</td>
<td>4 HP, connected to CompactPCI for power supply</td>
<td>2 USB 2.0, 1 COM</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Windows, Linux, VxWorks, QNX</td>
<td></td>
</tr>
<tr>
<td>F605</td>
<td>Side Card PMC/XMC F15..F19P</td>
<td>4 HP or 8 HP, connected to CompactPCI for power supply</td>
<td>1 PMC or 1 XMC slot</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depending on PMC/XMC</td>
<td></td>
</tr>
<tr>
<td>F606</td>
<td>Side Card Gb Ethernet F14..F21P</td>
<td>4 HP or 8 HP, connected to CompactPCI for power supply</td>
<td>2 Gb Ethernet with Lemo connectors, 1 COM (option 2) via SA-Adapter (RS232/422/485, isolated/not isolated)</td>
<td>2.5&quot; SATA drive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depending on SBC</td>
<td></td>
</tr>
</tbody>
</table>

*Only one SATA port can be used on the CT12 when combined with the CPU board F11S.
For more information on the interoperability of the side cards with the respective CPU boards please see the Extension Card Compatibility Matrix.
### 6U CompactPCI Boards

<table>
<thead>
<tr>
<th>Type</th>
<th>CPU</th>
<th>CompactPCI</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Local extensions</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D602</strong></td>
<td>Safe SBC with onboard triple redundancy, conduction cooling on request (see also Safe Computers Compare Chart)</td>
<td>3 × redundant PowerPC 750 CL, 1 GHz</td>
<td>3 × redundant 512 MB DDR SDRAM, 2 × redundant 256 MB ECC Flash, 1 MB ECC FRAM</td>
<td>Standard rear I/O: 6 UARTs, 1 RS232, I2C</td>
<td>2 standard PMC slots (with front I/O, board revisions -02 and later also with rear I/O), second slot on rear I/O only for AFDX</td>
<td>VxWorks, VxWorks/Cert, PikeOS</td>
</tr>
<tr>
<td><strong>D203</strong></td>
<td>M-Module carrier</td>
<td>1 CompactPCI slot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>D202</strong></td>
<td>PC-MIP carrier</td>
<td>1 CompactPCI slot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Memory max.</th>
<th>Interfaces</th>
<th>Local extensions</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D202</strong></td>
<td>4 M-Module slots</td>
<td>6 PC-MIP slots</td>
<td>M-Module driver software</td>
<td></td>
</tr>
<tr>
<td><strong>D203</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Our Built-to-Order Concept

Due to the built-to-order concept and a high stockpiling of all components, the delivery time can be drastically reduced. Within a short time, customers receive their close-to-series prototypes and can immediately start developing their application. Based on standard versions, there are many various configuration options.

With MEN’s built-to-order configurator, ordering an individually configured Ethernet Switch is as easy as pie. By choosing a basic unit with preconfigured functionality you can add all your necessary accessories from a range of components with compatible software and functionality.

Pre-selected functions indicate that they are required by your system. Article numbers are assigned depending on your drop-down selections, and a 100% identifiable product key is generated. After that you can order the systems with your individual product key.

This process is suitable for small quantities and fast evaluation. For volume quotes higher than 25 systems please contact MEN sales directly.

Please find the several configurators on our website:
www.men.de » Products » CompactPCI Serial » Downloads & Media
Our Custom Design Service

It is MEN’s goal to find a tailored solution for the application together with our customers. While using as many standard COTS components as possible, parts of the solution may include customization:

- System level
- Board level
- Component level (in FPGA)

The Design Process

Custom design at MEN follows a defined development process from specification to design, verification and validation of a product, which is part of our quality management system according to DIN EN ISO 9001, EN/AS 9100 and IRIS.

The design process follows an adapted V-Model, depending on SIL level, and includes requirement tracing.

RAMS (Reliability, Availability, Maintainability and Safety) procedures are applied in the planning phase to avoid costly mistakes down the road.

COTS and Custom Design Expertise

Whether standard or custom, MEN products benefit from our unique development expertise:

- Robust designs for harsh environments
- Safety-critical designs in accordance with IEC 61508, EN 50126, EN 50128, EN 50129, DO-245, DO-178B, DO-254
- Based on Intel, AMD, PowerPC and ARM architectures
- Based on more than 50 proprietary cores in FPGA
- Completed by real-world I/O
- Supported by real-time software
Why MEN?

Development and production of rugged and reliable products
Our boards and systems are developed to meet requirements such as temperature ranges between -40°C and +85°C through convection or conduction cooling, shock, vibration, chemical influence or the option of coating against humidity right from the start.

Development based on quality management systems of our markets
We are certified according to ISO 9001 and ISO 14001, plus EN/AS 9100 (aerospace) and IRIS (railways) and provide systems according to ISO 7637-2 (road traffic) requirements. We develop according to the GRESS requirements by Airbus and are preparing for EFQM (European Foundation for Quality Management).

Development based on relevant standards know-how for our markets
Preparing products for environmental qualification according to vertical market standards is one of our key services, for example EN 50155 (railways), DO-160G (airborne), German Lloyd (ships) or ISO 7637-2 (automotive E-Mark).

Fully automated, high-quality in-house production
To achieve the highest product quality, our manufacturing and test process is fully automated. Vapor-phase soldering assures smooth processing of the components. Traceability is guaranteed by time stamps throughout the whole process.

All relevant environmental tests in-house
We carry out the preliminary qualifications in our own environmental test lab (temperature, shock, vibration, humidity), high-voltage and EMC chambers. Further calculations and analyses include MTBF, FMEA, Hazard Tree, HASS or HALT.

FPGA technology expertise
FPGAs allow us to customize our hardware without touching the board layout while keeping costs low, even in small quantities. FPGA-based solutions are flexible, offer long-term availability and support extended temperature operation.

Custom design of computer boards and systems
Often the most cost-effective solution results in a custom design – while using as many standard components as possible. Synergy effects emerge through the mutual development of standard and custom boards and systems, completed by the built-to-order approach of MEN’s box PCs and 19”-based application-ready and turnkey systems.

Complete system solutions based on in-house mechanical design
Whether a 19” system, wall-mount, standalone or DIN-rail is needed, we guarantee overall operability of each system, minimizing the integration effort and the handling cost on the customer’s side. The quality of our systems is assured by applying traceability through the V-model.

Customer assistance in configuration of mission-critical systems
Computer architectures with safety-critical requirements are very complex. Considerations include safety-critical characteristics and levels (SIL, DAL), reliability questions, error behavior modes and the major IEC and EN standards – backed by a professional safety and risk management.

Shipboard Command Desk
Command desks on ships use computer systems to control and monitor the engines and electric propulsion, electrical and hydraulic systems, navigation, communication and integrated platform management systems. These computers are based on modular 40 HP systems like 3U CompactPCI using standard COTS components. A single board computer inside the CompactPCI system is based on Intel Core 2 Duo architecture with two 64-bit processors and state-of-the-art PC interfaces like Ethernet and USB.

Passenger Information Systems
Infotainment solutions give passengers orientation regarding stops, schedules and routes, hints for changing trains, short-term changes of the route or delays. They also provide entertainment, for instance by displaying news of the day and the weather forecast or by playing movies and music. Content servers connect to the outside world, e.g. the depot, to receive up-to-date information while travelling.

WLAN Server for Company Buses
A CompactPCI WLAN server supplies employees during their commute with passenger internet, local portals and passenger information services. The complete Wi-Fi based entertainment solution uses carrier cards for two PCIe Mini Cards and up to 18 SIM cards on one board. In case the data volume of one SIM card is depleted, an easy change to the next SIM card is possible. The CompactPCI rack comes with a customized backplane and beside the SIM cards includes several GSM, GPS and UART interface cards. The system is controlled by an CompactPCI PlusIO SBC with an Intel Celeron M CPU.

Application Examples