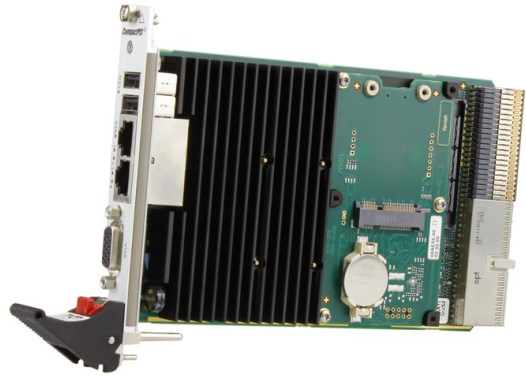# F23P

Embedded Single Board Computer with Intel Core i3 / i5 / i7
3U CompactPCI PlusIO

» *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*

High Computing and Graphics Performance

The F23P versatile 3U 4HP single-board computer is a member of the scalable family of Intel CPU boards which ensures future-safety and long-term availability of a system.

The F23P can be equipped with the whole range of Intel's fourth generation Core i7, Core i5, Core i3 and Celeron processors offering up to 3.4 GHz maximum turbo frequency and full 64-bit support, Turbo Boost, Hyper-Threading, Active Management Technology and Virtualization Technology.

An excellent graphics performance, thermal supervision of the processor and a watchdog for the operating system top off the functionality of the F23P.

A Trusted Platform Module is assembled for platform integrity.

Perfect for Embedded and Harsh Environments

The F23P operates in Windows and Linux environments as well as under real-time operating systems that support Intel's multi-core architecture. The InsydeH2O EFI BIOS was specially designed for embedded system applications. It comes with a tailored passive heat sink.
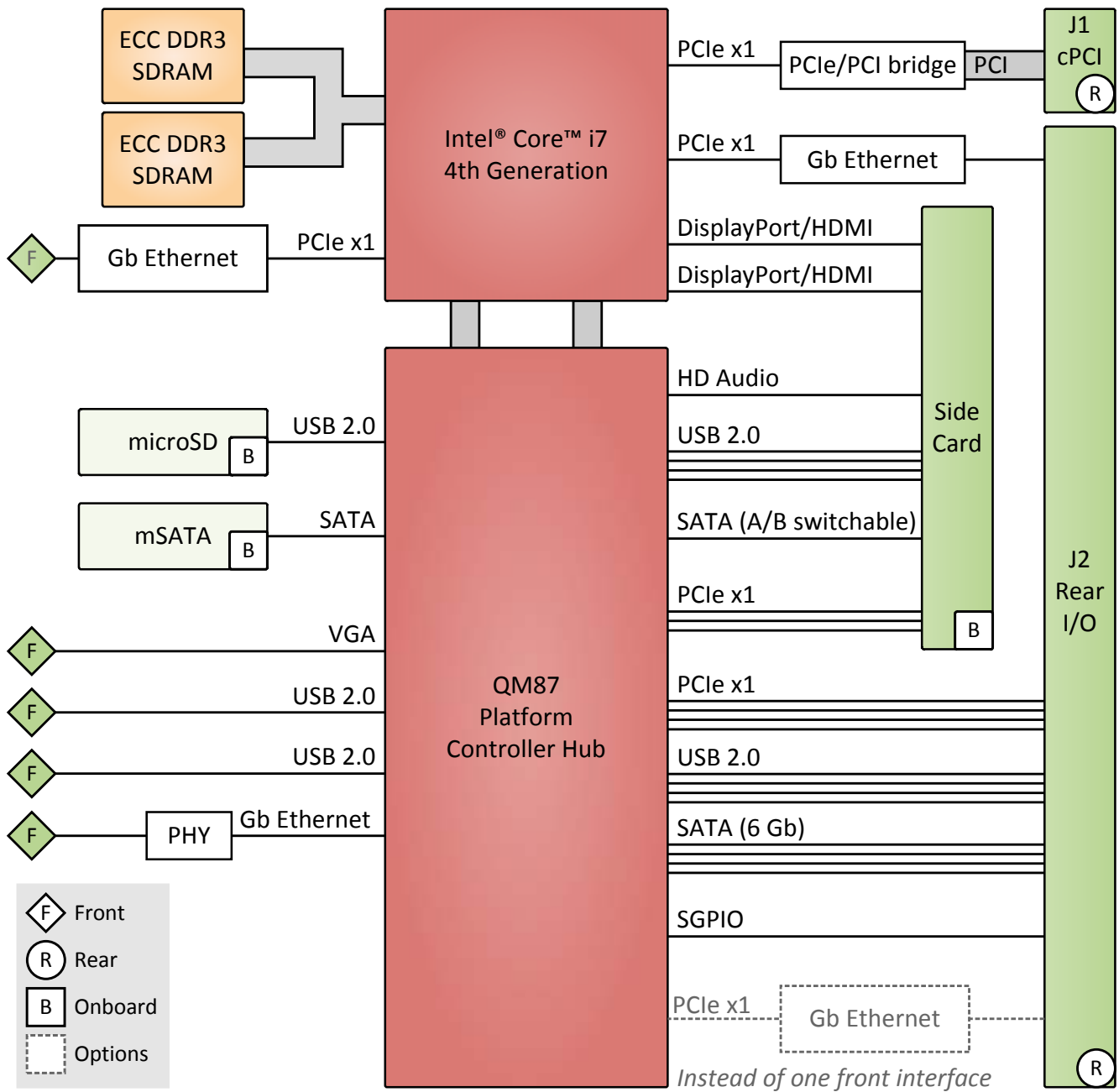
The robust design of the F23P - all components including the DDR3 DRAM are soldered - makes the board especially suited for use in rugged environments with regard to shock and vibration according to applicable DIN, EN or IEC industry standards. The F23P is also ready for coating for use in humid and dusty environments. Using a special frame, the F23P can quickly be adapted to conduction-cooled systems.

CompactPCI PlusIO (PICMG 2.30)

The F23P supports the CompactPCI PlusIO (PICMG 2.30) specification, meaning it can be used in a hybrid system for control of both CompactPCI and CompactPCI Serial peripheral boards. Compliant to the standard, 4 USB 2.0, 4 PCI Express x1, 4 SATA 6 Gb/s interfaces as well as one Gigabit Ethernet are accessible on the J2 rear I/O connector.

Versatile Front I/O

The standard I/O available at the front panel of F23P includes VGA, two Gigabit Ethernet and two USB 2.0 ports. The F23P can be extended by different side cards. Additional functions include a variety of different UARTs or another four USBs, SATA for hard disk connection and HD audio.

Data Sheet

MEN

ECC DDR3 SDRAM

ECC DDR3 SDRAM

Intel® Core™ i7 4th Generation

Gb Ethernet — PCIe x1

PCIe x1 — PCIe/PCI bridge — PCI — J1 cPCI (R)

PCIe x1 — Gb Ethernet

DisplayPort/HDMI

DisplayPort/HDMI

QM87 Platform Controller Hub

microSD | B — USB 2.0

mSATA | B — SATA

VGA — F

USB 2.0 — F

USB 2.0 — F

PHY — Gb Ethernet — F

HD Audio

USB 2.0

SATA (A/B switchable)

PCIe x1

PCIe x1

USB 2.0

SATA (6 Gb)

SGPIO

Side Card | B

J2 Rear I/O (R)

PCIe x1 — Gb Ethernet

Instead of one front interface

F Front
R Rear
B Onboard
Options

CPU	■ The following CPU types are supported: 　□ Intel Core i7-4700EQ, 4 cores, 8 threads, 2.4 GHz, 3.4 GHz Turbo Boost, 47 W, 6 MB cache 　□ Intel Core i5-4400E, 2 cores, 4 threads, 2.7 GHz, 3.3 GHz Turbo Boost, 37 W, 3 MB cache 　□ Intel Core i5-4402E, 2 cores, 4 threads, 1.6 GHz, 2.7 GHz Turbo Boost, 25 W, 3 MB cache 　□ Intel Core i3-4100E, 2 cores, 4 threads, 2.4 GHz, 37 W, 3 MB cache 　□ Intel Core i3-4102E, 2 cores, 4 threads, 1.6 GHz, 25 W, 3 MB cache 　□ Intel Celeron 2000E, 2 cores, 2 threads, 2.2 GHz, 37 W, 2 MB cache 　□ Intel Celeron 2002E, 2 cores, 2 threads, 1.5 GHz, 25 W, 2 MB cache
Chipset	■ QM87 Platform Controller Hub (PCH)
Memory	■ System Memory 　□ Soldered DDR3, ECC support 　□ 8 GB, 16 GB, or 32 GB ■ Boot Flash 　□ 16 MB
Mass Storage	■ The following mass storage devices can be assembled: 　□ microSD card 　□ mSATA disk
Graphics	■ Integrated in QM87 chipset ■ Maximum resolution: 1920x2000 pixels ■ 24-bit color at 60 Hz (reduced blanking) ■ Simultaneous connection of two monitors
Front Interfaces	■ Video 　□ One VGA connector 　□ Additional interfaces are available via a side card 　□ The front channel can optionally be led to the backplane ■ USB 　□ Two Type A connectors, USB 2.0 (480 Mbit/s) ■ Ethernet 　□ Two RJ45 connectors, 1000BASE-T (1 Gbit/s), or 　□ One RJ45 connector, 1000BASE-T (1 Gbit/s), or 　□ One 9-pin D-Sub connector, two 100BASE-T (100 Mbit/s), or 　□ Two M12 connectors on 8 HP, two 1000BASE-T (1000 Mbit/s) 　□ One front channel can optionally be led to the backplane 　□ Two link and activity LEDs per channel ■ Front-panel LED for board status ■ Reset button
Rear Interfaces	■ Compatible with PICMG 2.30 CompactPCI PlusIO 　□ 1PCI33/4PCIE5/4SATA6/4USB2/1ETH1G, or 　□ 1PCI33/4PCIE5/4SATA6/4USB2/2ETH1G ■ SATA 　□ Four channels, SATA Revision 3.x (6 Gbit/s), RAID level 0/1/5/10 support ■ USB 　□ Four channels, USB 2.0 (480 Mbit/s) ■ Ethernet 　□ One channel, 1000BASE-T (1 Gbit/s), or 　□ Two channels, 1000BASE-T (1 Gbit/s) 　□ One front channel can optionally be led to the backplane ■ PCI Express 　□ Four x1 links (500 MB/s per link), PCIe 2.x (5 Gbit/s per lane)

Technical Data

Onboard Interfaces

- An onboard connector allows a side card to be plugged onto the CPU board to add front panel connections or mass storage devices. A range of standard side cards is available to implement different functions.
- DisplayPort/HDMI
  □ Two channels
- HD Audio
  □ One channel
- SATA
  □ One channel, SATA Revision 2.x (3 Gbit/s), RAID level 0/1/5/10 support
- USB
  □ Four channels, USB 2.0 (480 Mbit/s)
- PCI Express
  □ Three x1 links (500 MB/s per link), PCIe 2.x (5 Gbit/s per lane)

Supervision and Control

- Board controller
- Watchdog timer
- Temperature measurement
- Real-time clock with supercapacitor or battery backup
  □ Data retention of supercapacitor: 93 h
- Intel Active Management Technology

Backplane Standard

- CompactPCI Core Specification PICMG 2.0 R3.0
  □ System slot
  □ 32-bit/33 CompactPCI bus
  □ V(I/O): +3.3V (+5V tolerant), 64-bit backplane: +3.3V only

Electrical Specifications

- Supply voltages
  □ +5 V (-3%/+5%)
  □ +3.3 V (-3%/+5%)
  □ +12 V (-10%/+10%)
  □ The board can be supplied with +5V only, all other voltages are generated on the board. The backplane connectors are used for power supply only.

Mechanical Specifications

- Dimensions
  □ 3U, 4 HP, or
  □ 3U, 8 HP
- Weight: 388 g (model 02F023P00)

Environmental Specifications

- Temperature range (operation)
  □ -40°C to +85°C (model 02F023P00)
  □ 0°C to +60°C (model 02F023P01)
  □ Airflow 1.5 m/s
  □ Depends on system configuration (CPU, hard disk, heat sink...)
- Temperature range (storage): -40°C to +85°C
- Cooling concept
  □ Air-cooled
  □ Conduction-cooled in MEN CCA frame
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300 m to +2000 m
- Shock: 50 m/s², 30 ms
- Vibration (Function): 1 m/s², 5 Hz to 150 Hz
- Vibration (Lifetime): 7.9 m/s², 5 Hz to 150 Hz

Reliability

- MTBF: 504 683 h @ 40°C according to IEC/TR 62380 (RDF2000) (model 02F023P00)

Technical Data

Safety	▪ Flammability (PCBs) □ UL 94 V-0
EMC	▪ EN 55022 (radio disturbance) ▪ IEC 61000-4-2 (ESD) ▪ IEC 61000-4-3 (electromagnetic field immunity) ▪ IEC 61000-4-4 (burst) ▪ IEC 61000-4-5 (surge) ▪ IEC 61000-4-6 (conducted disturbances)
Software Support	▪ Note that 64-bit hardware technology can be used in an optimal way with 64-bit operating system support ▪ Windows ▪ Linux ▪ VxWorks (on request) ▪ QNX ▪ For more information on supported operating system versions and drivers see Software.
BIOS	▪ InsydeH2O UEFI Framework

Technical Data

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www.men.de/products/f23p/

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