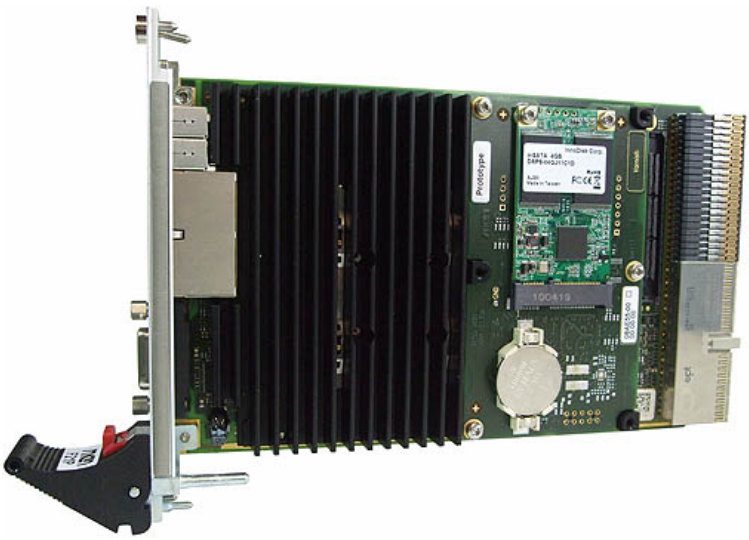
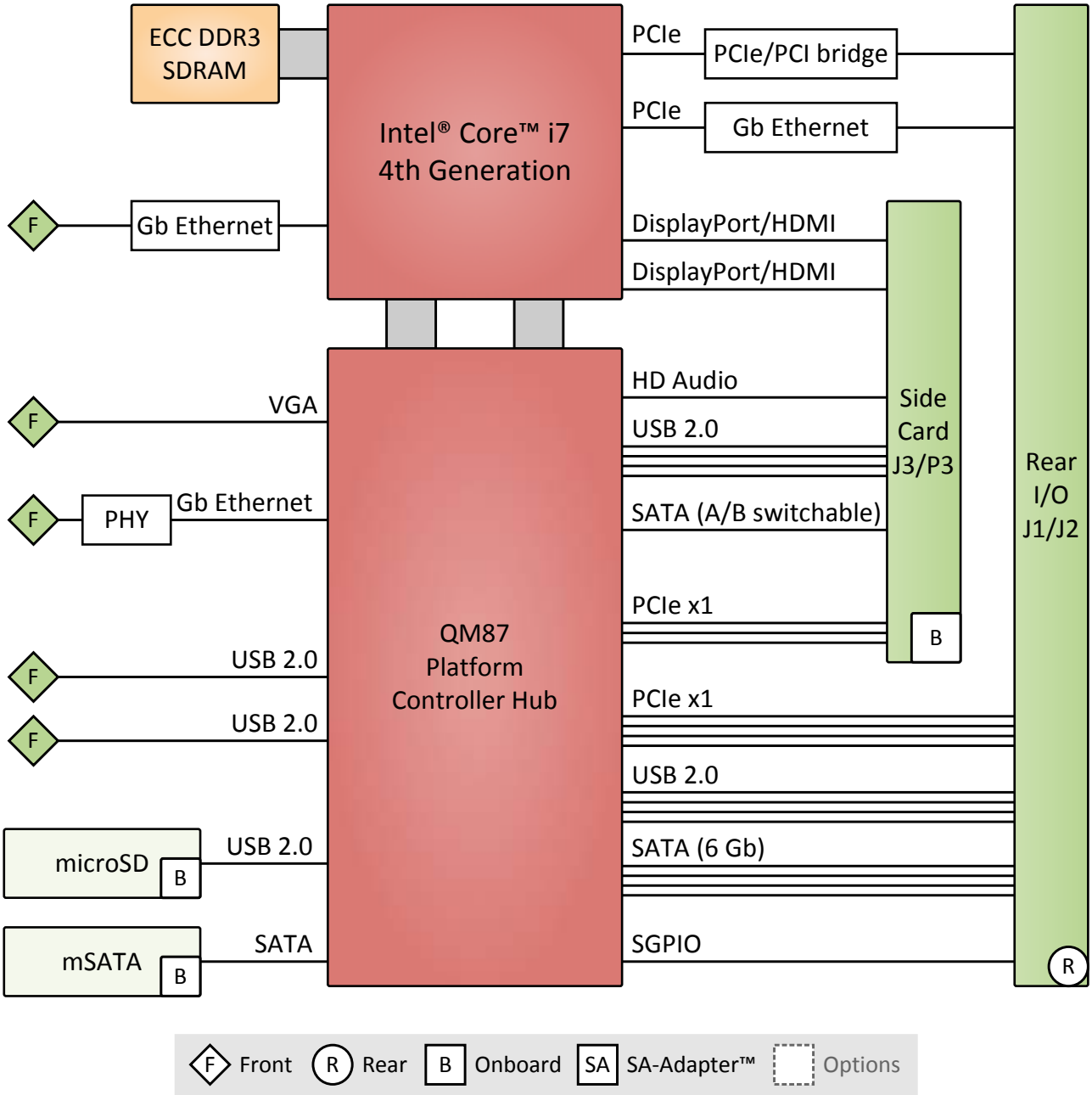
F23P – 3U CompactPCI® PlusIO Intel® Core™ i7 CPU Board

- **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 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, HDMI/ Display Port, HD audio, USB, UART etc.**
- **2.4 to 3.4 GHz Turbo Boost, Hyper-Threading, Active Management Technology**
- **Open CL support**



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 the latest quad core processor architecture from Intel® with 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.
The F23P 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.
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. 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.
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.
The F23P is the perfect choice for all applications in harsh environments where high computing and graphics performance is needed.

Diagram


ECC DDR3 SDRAM
Intel® Core™ i7 4th Generation
PCIe
PCIe/PCI bridge
PCIe
Gb Ethernet
F
Gb Ethernet
DisplayPort/HDMI
DisplayPort/HDMI
HD Audio
USB 2.0
SATA (A/B switchable)
PCIe x1
B
Side Card J3/P3
Rear I/O J1/J2
F
VGA
F
PHY
Gb Ethernet
QM87 Platform Controller Hub
F
USB 2.0
F
USB 2.0
PCIe x1
USB 2.0
SATA (6 Gb)
microSD
B
USB 2.0
mSATA
B
SATA
SGPIO
R
F Front
R Rear
B Onboard
SA SA-Adapter™
Options

Technical Data

CPU	■ The following CPU types are available: □ Intel® Core™ i7 □ Intel® Core™ i5 □ Intel® Core™ i3 □ Intel® Celeron® ■ See overview of supported processor types for processor options and a feature matrix of the Intel® Core™ series.
Chipset	■ QM87 Platform Controller Hub (PCH)
Memory	■ System Memory □ Soldered DDR3, ECC support □ 4 GB, 8 GB, or 16 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 ■ USB □ Two Series 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) □ One x4 link (2 GB/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 ■ Intel® Active Management Technology
Backplane Standard	■ CompactPCI® Core Specification PICMG 2.0 R3.0 □ System slot □ 32-bit/33 or 66-MHz CompactPCI® bus □ V(I/O): +3.3V (+5V tolerant) □ 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.
Electrical Specifications	■ Supply voltages □ +5 V (-3%/+5%) □ +3.3 V (-3%/+5%) □ +12 V (-10%/+10%)
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: 549 414 h @ 40°C according to IEC/TR 62380 (RDF2000) (model 02F023P00)
Safety	■ UL 94V-0

Technical Data

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® (on request) ■ For more information on supported operating system versions and drivers see Downloads.
BIOS	■ InsydeH2O™ UEFI Framework

Configuration & Options

Standard Configurations

Article No.	CPU Type	Clock	Cores/Threads	System RAM	Operating Temperature	Ethernet Connector	Width
02F023P00	Celeron 2002E	1.5 GHz	2/2	4 GB	-40..+85°C	RJ45	4HP
02F023P01	Core i7-4700EQ	2.4 GHz	4/8	16 GB	0..+60°C	RJ45	4HP
02F023P02	Celeron 2002E	1.5 GHz	2/2	4 GB	-40..+85°C	M12	8HP

Ordering Information

Standard F23P Models	**02F023P00**	Intel® Celeron® 2002E, 1.5 GHz, 4GB DDR3 DRAM with ECC, RTC battery, TPM, -40..+85°C screened
	02F023P01	Intel® Core™ i7-4700EQ, 2.4 GHz, (turbo boost 3.4GHz), 16 GB DDR3 DRAM with ECC, RTC battery, TPM, 0..+60°C screened
	02F023P02	Intel® Celeron® 2002E, 1.5 GHz, 4GB DDR3 DRAM with ECC, 2 M12 for Gb ETH, RTC battery, TPM, -40..+85°C screened, conformal coating
Related Hardware	**02F600-00**	2 COM extensions and SATA hard disk slot, for F14 and compatible SBCs, -40..+85°C screened
	02F601-00	1 DVI-D and 1 audio at front, SATA hard disk slot, for F14 and compatible SBCs, 4HP, 0..+60°C
	02F603-00	3U CompactPCI® side card with 2 USB and 1 COM extension, SATA hard disk and CompactFlash® slot, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
	02F604-00	3U CompactPCI® side card with 1 IEEE 1394 FireWire, 1 DVI, 1 HD audio and 1 COM extension, SATA hard disk slot, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
	02F606-00	2 Gigabit Ethernet on Lemo railway compliant connectors, 1 COM extension (SA-Adapter not included), SATA hard disk slot, for F14 and compatible SBCs, conformally coated, -40...+85°C screened
	02F608-00	4 SATA and 2 COM ports, additional SATA hard disk slot on-board, for F14 and compatible SBCs, mounted to the right of the SBC, 0..+60°C
	08CT12-00	CompactPCI® PlusIO rear transition module 3U/80mm, 2 Ethernet, 4 USB, 4 SATA, 4 PCIe® x1, -40°C..+85°C qualified
Memory	**0751-0046**	MicroSD card, 2 GB, -40..+85°C
	0751-0051	SSD mSATA, 8 GB, -40..+85°C
	0751-0052	MicroSD card, 4 GB, -40..+85°C
Systems & Card Cages	**0701-0046**	CompactPCI® 19" 4U/24HP desktop system for 3U cards, 3-slot 3U CompactPCI® backplane, system slot right, 1U fan tray with 1 fan, 8 HP space for 1 pluggable PSU
	0701-0056	CompactPCI® 19" 4U/84HP rack-mount enclosure for 3U cards (vertical), 4+4-slot 3U CompactPCI® / CompactPCI® Serial hybrid backplane, prepared for rear I/O, 250W power supply wide range 90..264VAC on rear, 1U fan tray with 2 fans included, 0..+60°C
	MEN delivers turn-key systems completely installed (hardware, operating system, accessories), wired and tested. Different rack sizes, power supplies and backplanes on request. For details please contact your local sales representative.	
Miscellaneous Accessories	**0713-0003**	CompactPCI® 3U 1-slot backplane for stand-alone operation of F14, F15, F17, F18, F19P, F21P, F22P, F23P: 32-bit/33-MHz with rear I/O, 3.3V supply, ATX-power, power, JTAG, IPMB and utility connection, 6x screw connection M3
Software: Linux	This product is designed to work under Linux. See below for all available separate software packages.	
	13MD05-90	MDIS5 System (and Device Driver) Package (MEN) for Linux. This software package includes most standard device drivers available from MEN.

Ordering Information

Software: Windows®	This product is designed to work under Windows®. See below for all available separate software packages.	
	10Y000-78	Windows® Embedded Standard 7 BSP for F19P, F21P, F22P, F23P, G20, G22, CB70C, CB70, XM2, MM2, BC50M, BC50I, BL50W, BL50S, BC70M, BL70S, BL70W, BL70E, DC2, DC13, F205, F206, F210, F215, F216, G215, P506, P507 and P511
	13T005-70	Windows® USB2UART driver (FTDI) for F14, F15, F17, F18, F19P, F21P, F22P, F23P, D9, A19, A20, XM2 and XM50 / XM51 / F50P / F50C hosts
	13T006-70	Windows® HD Audio driver (Realtek) for F14, F15, F17, F18, F19P, F21P, F22P, F23P, D9 and A19
	13Y021-70	Windows® ERTC/SMB support package

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	
	Compare Chart 3U CompactPCI® / PlusIO peripheral cards » Download	
	Compare Chart 3U CompactPCI® / PlusIO extension cards » Download	
	21APPN014	Application Note: Switching on the AMT function
	21APPN015	Application Note: Using Real-Time Operating Systems on MEN CPUs with InsydeH2O™ UEFI BIOS
	21APPN016	Application Note: Accessing SMBus under Linux Kernel 3.2 on MEN Intel® Boards

Contact Information

Germany

MEN Mikro Elektronik GmbH
Neuwieder Straße 3-7
90411 Nuremberg
Phone +49-911-99 33 5-0
Fax +49-911-99 33 5-901

info@men.de
www.men.de

France

MEN Mikro Elektronik SAS
18, rue René Cassin
ZA de la Châtelaine
74240 Gaillard
Phone +33 (0) 450-955-312
Fax +33 (0) 450-955-211

info@men-france.fr
www.men-france.fr

USA

MEN Micro Inc.
860 Penllyn Blue Bell Pike
Blue Bell, PA 19422
Phone (215) 542-9575
Fax (215) 542-9577

sales@menmicro.com
www.menmicro.com