



## Product Information

### PC4-PRESTO • *CompactPCI® PlusIO* CPU Card

4<sup>th</sup> Generation Intel® Core™ Processor

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The PC4-PRESTO is a rich featured high performance 4HP/3U CompactPCI® PlusIO CPU board, equipped with a 4<sup>th</sup> Generation Intel® Core™ mobile processor (Haswell dual- or quad-core). The PC4-PRESTO front panel is provided with two Gigabit Ethernet jacks, two USB 3.0 receptacles, and two Mini DisplayPort connectors, compliant with the DisplayPort 1.2 standard for Multi-Stream-Transport (MST).

Local expansion mezzanine boards (side cards) are available for additional front panel and/or rear I/O, resulting in an 8HP front panel width assembly unit.

The PC4-PRESTO is equipped with up to 16GB RAM with ECC support. 8GB memory-down are provided for rugged applications, and another 8GB are available via the DDR3 ECC SO-DIMM socket. Low profile SSD mezzanine modules are available as on-board mass storage solution, maintaining the 4HP front panel width.

The PC4-PRESTO backplane connectors comply with the PICMG® CompactPCI® PlusIO system slot specification, via J2 suitable for a rear I/O module or hybrid CompactPCI® Serial system. The PC4-PRESTO is backwards compatible to classic CompactPCI® systems.



## Feature Summary

### General

- ▶ CompactPCI® PlusIO (PICMG® CPCI 2.30) System Slot Controller
- ▶ Form factor single size Eurocard (board dimensions 100x160mm<sup>2</sup>)
- ▶ Mounting height 3U
- ▶ Front panel width 4HP (8HP/12HP assembly with optional mezzanine side card)
- ▶ Front panel I/O connectors for typical system configuration (2 x USB3, 2 x DisplayPort, 2 x GbE)
- ▶ Backplane communication via CompactPCI® J1 and J2 hard metric connectors
- ▶ J1 Connector for PICMG® CompactPCI® 32-Bit support
- ▶ J2 Connector (UHM high speed) for CompactPCI® PlusIO support (4 x PCIe Gen2, 4 x SATA 3G/6G\*, 4 x USB, 2 x GbE)
- ▶ J2 PlusIO configuration allows for either CompactPCI® Serial backplane usage or rear I/O module attachment
- ▶ On-board PCIe x 4 Gen2 mezzanine expansion option (side card)
- ▶ On-board SATA x 4 6G mezzanine expansion option for mass storage modules or side cards
- ▶ On-board DisplayPort (3<sup>rd</sup> video output) mezzanine expansion option for side cards
- ▶ Side cards and low profile mass storage modules available as COTS and also as custom specific

### Processor

- ▶ 4<sup>th</sup> Generation Intel® Core™ CPU (Haswell)
- ▶ i7-4700EQ Processor 2.4/1.7GHz (TB 3.4GHz) • 47W/37W TDP • Quad-Core • GT2-4600 Graphics 1000MHz • vPRO™/AMT
- ▶ i5-4400E Processor 2.7GHz (TB 3.3GHz) • 37W TDP • Dual-Core • GT2-4600 Graphics 1000MHz • vPRO™/AMT
- ▶ i5-4410E Processor 2.9GHz • 37W TDP • Dual-Core • GT2-4600 Graphics 1000MHz • vPRO™/AMT
- ▶ i5-4422E Processor 1.8GHz (TB 2.9GHz) • 25W TDP • Dual-Core • GT2-4600 Graphics 900MHz • vPRO™/AMT
- ▶ i3-4110E Processor 2.6GHz • 37W TDP • Dual-Core • GT2-4600 Graphics 900MHz
- ▶ i3-4112E Processor 1.8GHz • 25W TDP • Dual-Core • GT2-4600 Graphics 900MHz
- ▶ Celeron 2000E Processor 2.2GHz • 37W TDP • Dual-Core • HD Graphics 900MHz
- ▶ Celeron 2002E Processor 1.5GHz • 25W TDP • Dual-Core • HD Graphics 900MHz

### Firmware

- ▶ Phoenix® UEFI (Unified Extensible Firmware Interface) with CSM\*
- ▶ Fully customizable by EKF
- ▶ Secure Boot and Measured Boot supported - meeting all demands as specified by Microsoft®
- ▶ Windows®, Linux and other (RT)OS' supported
- ▶ Intel® AMT supported for i7 and i5 processors (disabled by default, must be enabled via BIOS setup)

\* CSM (Compatibility Support Module) emulates a legacy BIOS environment, which allows to boot a legacy operating system such as DOS, 32-bit Windows and some RTOS'

## Feature Summary

### *Main Memory*

- ▶ Integrated memory controller up to 16GB DDR3L 1600 +ECC
- ▶ DDR3L +ECC soldered memory up to 8GB
- ▶ DDR3L +ECC SO-DIMM memory module socket up to 8GB

### *Graphics*

- ▶ Integrated HD Graphics Engine, 3 symmetric independent displays
- ▶ Enhanced Media Processing, DX11.1, OpenCL 1.2, OpenGL 4.3, JPEG, MJPEG, MVC, SVC, MPEG-2
- ▶ Front panel: Dual Mini-DisplayPort (mDP) or single VGA connector option
- ▶ 3<sup>rd</sup> DisplayPort connector via mezzanine side card
- ▶ DisplayPort™ 1.2 Multi-Stream Transport (MST) - display daisy chaining
- ▶ Max Resolution 3200 x 2000 @60Hz (any DisplayPort), 1920 x 1200 (VGA)
- ▶ 4k x 2k @24Hz supported for Blu-ray playback
- ▶ Integrated audio

### *Networking*

- ▶ Up to 4 networking interfaces in total - 2 x front RJ45 GbE, 2 x backplane GbE via J2
- ▶ 1000BASE-T, 100BASE-TX, 10BASE-T connections
- ▶ Front port 1 - I217LM with Intel® AMT support
- ▶ Front port 2 - Intel® I210-IT -40°C to +85°C operating temperature GbE NIC w. integrated PHY
- ▶ Front port option M12 X-coded connectors (replacement for RJ45, requires 8HP front panel width)
- ▶ IPv4/IPv6 checksum offload, 9.5KB Jumbo Frame support, EEE Energy Efficient Ethernet
- ▶ IEEE 802.1Qav Audio-Video-Bridging (AVB) enhancements for time-sensitive streams
- ▶ IEEE 1588 and 802.1AS packets hardware-based time stamping for high-precision time synchronization
- ▶ Backplane Gigabit Ethernet w. 2 x I210-IT NIC

### *Chipset*

- ▶ Intel® QM87 Lynx Point Platform Controller Hub (PCH)
- ▶ 8 x PCIe Gen2 5GT/s
- ▶ 6 x SATA 6G
- ▶ 10 x USB2, 4 x USB3
- ▶ LPC, Audio, Legacy

## Feature Summary

### On-Board Building Blocks

- ▶ Additional on-board controllers, PCIe® based
- ▶ 3 x Gigabit Ethernet controllers Intel® I210IT
- ▶ 1 x Gigabit Ethernet PHY Intel® I217LM
- ▶ PCIe® to PCI® Bridge PLX 8112
- ▶ PCIe® Gen2 packet switch PLX 8608
- ▶ SATA 3G/6G\* RAID controller Marvell® 88SE9230, ARM powered subsystem for host CPU offload

\* Marvell SATA RAID controller setup for 3Gbps by default - please refer to the PC4-PRESTO User Guide

### Security

- ▶ Trusted Platform Module
- ▶ TPM 2.0 for highest level of certified platform protection
- ▶ Infineon Optiga™ SLB 9665 cryptographic processor
- ▶ Conforming to TCG 2.0 specification
- ▶ AES hardware acceleration support by 4<sup>th</sup> Gen processor 4xxx series (Intel® AES-NI)

### Front Panel I/O (4HP)

- ▶ 2 x Gigabit Ethernet RJ45 (1 = PCH & I217LM - iAMT, 2 = I210IT)
- ▶ 2 x DisplayPort (from processor integrated HD graphics engine, mDP style receptacles, optional cable connector retainer available)
- ▶ 2 x USB 3.0

### CompactPCI® & CompactPCI® PlusIO Backplane Resources

- ▶ PICMG® CompactPCI® 2.0 CPU card & system slot controller for J1 based 32-bit PCI® systems, 33/66MHz
- ▶ PICMG® CompactPCI® 2.30 J2 UHM connector according to CompactPCI® PlusIO
- ▶ J2 can be used to enable CompactPCI® Serial peripheral card slots for hybrid systems with a split backplane
- ▶ J2 can be used alternatively for a rear I/O module
- ▶ J2 is assigned to 4 x PCIe Gen2 5GT/s (from PCH), 4 x SATA 3G/6G\* (from Marvell SATA hardware RAID controller), 4 x USB2 ports (from PCH), 2 x Gigabit Ethernet (I210IT networking controllers)

\* Marvell SATA RAID controller setup for 3Gbps by default - please refer to the PC4-PRESTO User Guide

## Feature Summary

### *Local Expansion and Mass Storage Solutions*

- ▶ Mezzanine side card connectors for optional local expansion
- ▶ P-EXP - 2 x USB 2.0 & Legacy (from PCH)
- ▶ P-DP3 - 3<sup>rd</sup> DisplayPort video (from Intel® Core™ CPU)
- ▶ P-HSE - 4 x SATA 6G & 4 x USB 2.0 (from PCH)
- ▶ P-PCIE - PCIe Gen2 5GT/s 1 link x 4 lanes or 4 links x 1 lane (from on-board PCIe® switch)
  
- ▶ 4HP Low profile mezzanine module options (to be ordered separately)
- ▶ CFast™ Card with C41-CFAST mezzanine module
- ▶ SATA 1.8-Inch Solid State Drive with C42-SATA mezzanine module
- ▶ Dual mSATA SSD with C47-MSATA mezzanine module
- ▶ Dual M.2/NGFF SATA SSD 2230 - 2280 size with C48-M2 mezzanine module
- ▶ Custom specific module design
  
- ▶ 8HP/12HP Mezzanine side card options (to be ordered separately)
- ▶ PCL-CAPELLA - multi function side card
- ▶ PCS-BALLET - multi function side card
- ▶ SCS-TRUMPET - multi function side card
- ▶ C32-FIO - 2 x COM RS-232, USB, PS/2 (12HP assembly)
- ▶ Variety of other side cards available
- ▶ Custom specific side card design

### *Environmental & Regulatory*

- ▶ Suitable e.g. for industrial, transportation & instrumentation applications
- ▶ Designed & manufactured in Germany - ISO 9000 quality management certified
- ▶ Long term availability
- ▶ Rugged solution
- ▶ Coating, sealing, underfilling on request
- ▶ Lifetime application support
- ▶ RoHS compliant
- ▶ Operating temperature 0°C to +70°C
- ▶ Operating temperature -40°C to +85°C (industrial temperature range) on request
- ▶ Storage temperature -40°C to +85°C, max. gradient 5°C/min
- ▶ Humidity 5% ... 95% RH non condensing
- ▶ Altitude -300m ... +3000m
- ▶ Shock 15g 0.33ms, 6g 6ms
- ▶ Vibration 1g 5-2000Hz
- ▶ MTBF 11.0 years (PC4-480D)
- ▶ EC Regulatory EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

## Feature Summary

### *RT OS Board Support Packages & Driver*

- ▶ LynxOS - on request
- ▶ On Time RTOS-32 - on request
- ▶ OS-9 - on request
- ▶ QNX 4.x, 6.x - on request
- ▶ Real-Time Linux (RT Patch) - on request
- ▶ RTX - on request
- ▶ VxWorks 5.5 & 6.9 - on request
- ▶ VxWorks 7.0 - under development
- ▶ Others - on request

all items are subject to change w/o further notice

### Related Information

PC4-PRESTO Home	<a href="http://www.ekf.com/p/pc4/pc4.html">www.ekf.com/p/pc4/pc4.html</a>
PC4-PRESTO User Guide	<a href="http://www.ekf.com/p/pc4/pc4_ug.pdf">www.ekf.com/p/pc4/pc4_ug.pdf</a>

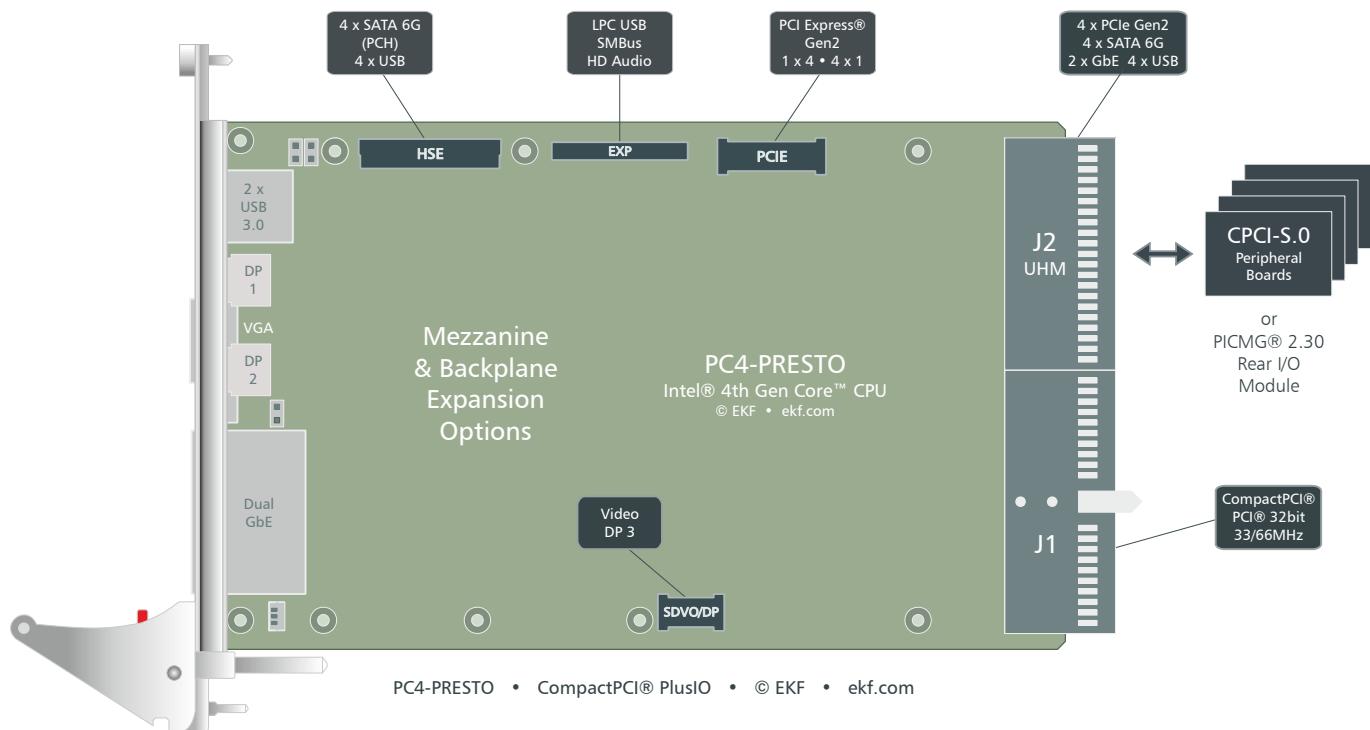
### Ordering Information

For popular PC4-PRESTO SKUs please refer to [www.ekf.com/liste/liste\\_21.html#PC4](http://www.ekf.com/liste/liste_21.html#PC4)

For popular Mezzanine Side Cards please refer to [www.ekf.com/liste/liste\\_20.html#C40](http://www.ekf.com/liste/liste_20.html#C40)

CompactPCI® PlusIO (PICMG® 2.30) is an enhancement for rear I/O across J2. High speed signal lines (PCI Express®, SATA, Gigabit Ethernet and USB) are passed from the PC4-PRESTO through the special UHM J2 connector to the backplane, for usage either with a PlusIO rear I/O transition module, or CompactPCI® Serial card slots.

CompactPCI® Serial (PICMG® CPCIS.0) defines a completely new card slot, based on PCI Express®, SATA, Gigabit Ethernet and USB serial data lines. On a hybrid backplane, both card styles can reside, CompactPCI® and CompactPCI® Serial, with the PC4-PRESTO in the middle as controller for both backplane segments.



#### Related Documents CompactPCI® Serial & CompactPCI® PlusIO

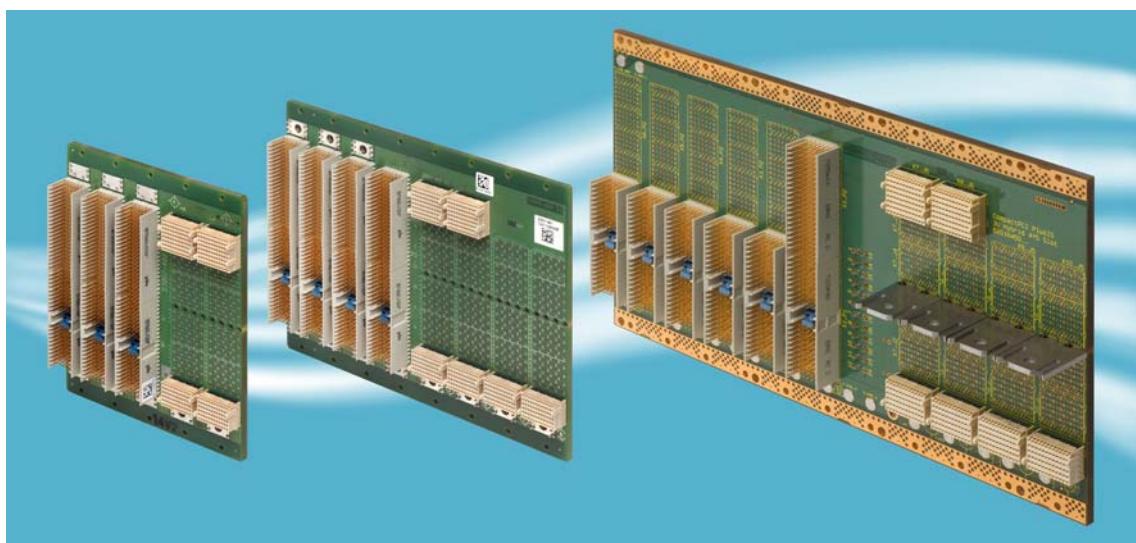
CompactPCI® Serial & PlusIO Overview	<a href="http://www.ekf.com/s/smart_solution.pdf">www.ekf.com/s/smart_solution.pdf</a>
CompactPCI® PlusIO Home	<a href="http://www.ekf.com/p/plus.html">www.ekf.com/p/plus.html</a>
CompactPCI® Serial Home	<a href="http://www.ekf.com/s/serial.html">www.ekf.com/s/serial.html</a>

#### Related Documents Mezzanine Modules and Side Cards

C40 ... C48 Series Mezzanine Storage Modules	<a href="http://www.ekf.com/c/ccpu/c4x_mezz_oww.pdf">www.ekf.com/c/ccpu/c4x_mezz_oww.pdf</a>
PCL-CAPELLA Mezzanine Side Card	<a href="http://www.ekf.com/p/pcl/pcl.html">www.ekf.com/p/pcl/pcl.html</a>
PCS-BALLET Mezzanine Side Card	<a href="http://www.ekf.com/p/pcs/pcs.html">www.ekf.com/p/pcs/pcs.html</a>
SCS-TRUMPET Mezzanine Side Card	<a href="http://www.ekf.com/s/scs/scs.html">www.ekf.com/s/scs/scs.html</a>



CompactPCI® PlusIO Racks Available



Hybrid Backplanes Available



Small System w. Hybrid Backplane



Small System w. CompactPCI® Serial Backplane

The PC4-PRESTO is equipped with a set of local expansion interface connectors, which can be optionally used to attach a mezzanine side board. A variety of expansion cards is available, e.g. providing legacy I/O and additional PCI Express® based I/O controllers such as SATA, USB 3.0 and Gigabit Ethernet, or a third video output. Most mezzanine side cards can accommodate in addition a 2.5-inch drive.

Typically, the PC4-PRESTO and the related side card would come as a readily assembled 8HP unit. As an alternate, low profile Flash based mezzanine storage modules are available that fit on the PC4-PRESTO while maintaining the 4HP profile. The C48-M2 module e.g. is equipped with two M.2 (up to 2280 size) SATA Solid State Drives (SSD), suitable for installation of any popular operating system.



PC4-PRESTO w. C48-M2 Low Profile SSD Mass-Storage Mezzanine Module 4HP Assembly



PC4-PRESTO (Heatsink & SO-DIMM Removed)



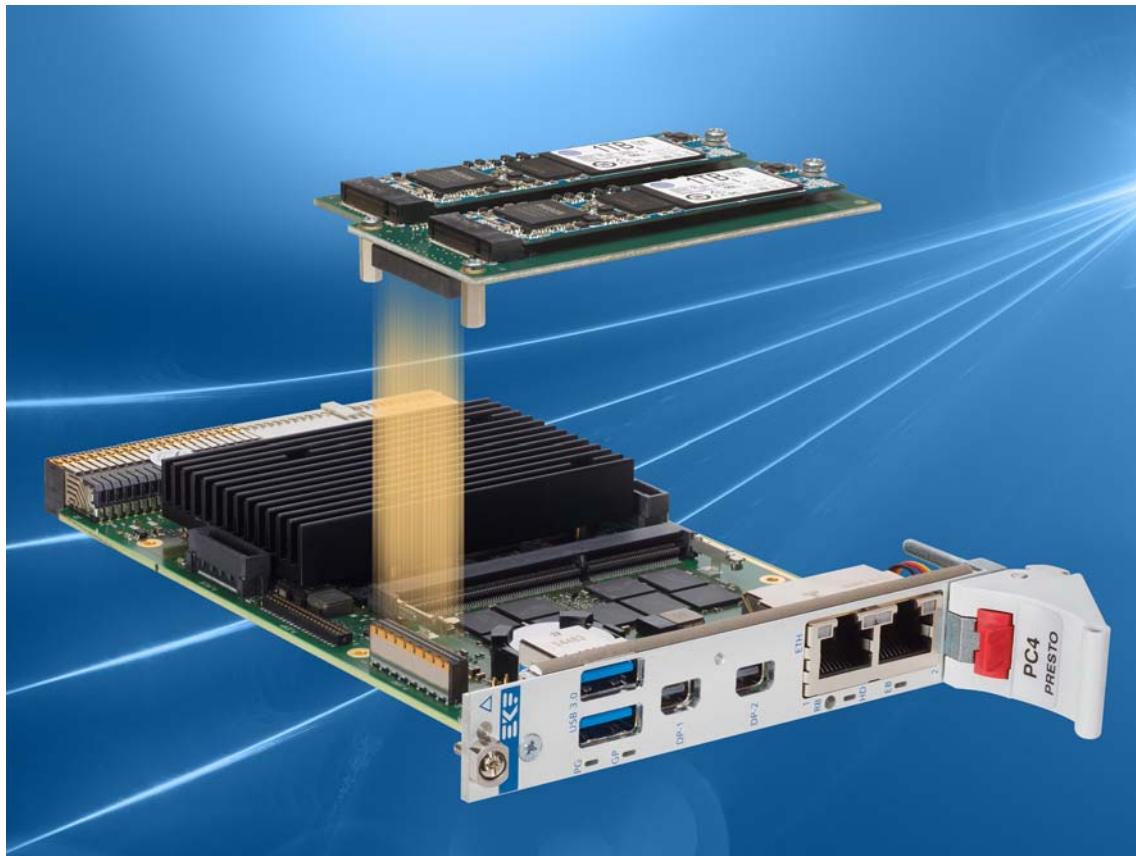
PC4-PRESTO (Shown w/o SO-DIMM Memory Module)



PC4-PRESTO w. Low Profile mSATA SSD Mezzanine



PC4-PRESTO w. C47-MSATA Dual-SSD Mezzanine Storage Module



Expansion Interface for Low Profile SSD Mezzanine



Expansion Interface Connectors for 8HP Mezzanine Assembly



PC4-PRESTO w. SCS-TRUMPET Side Card 8HP Assembly (2.5-Inch SSD)



PC4-PRESTO w. SCS-TRUMPET Side Card 8HP Assembly (Dual M.2 SSD)

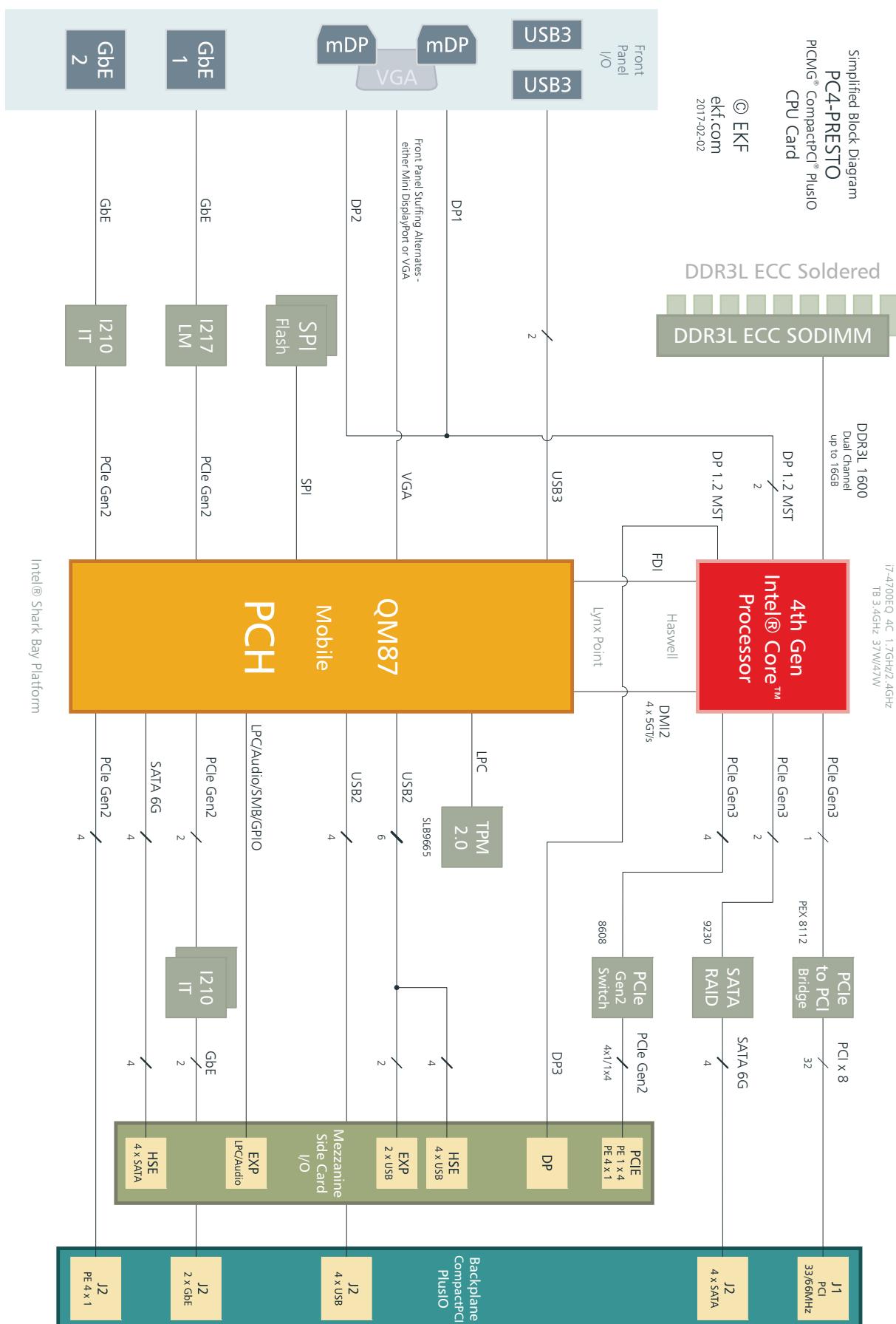


PC4-PRESTO w. PCS-BALLET Side Card 8HP Assembly (2.5-Inch SSD)

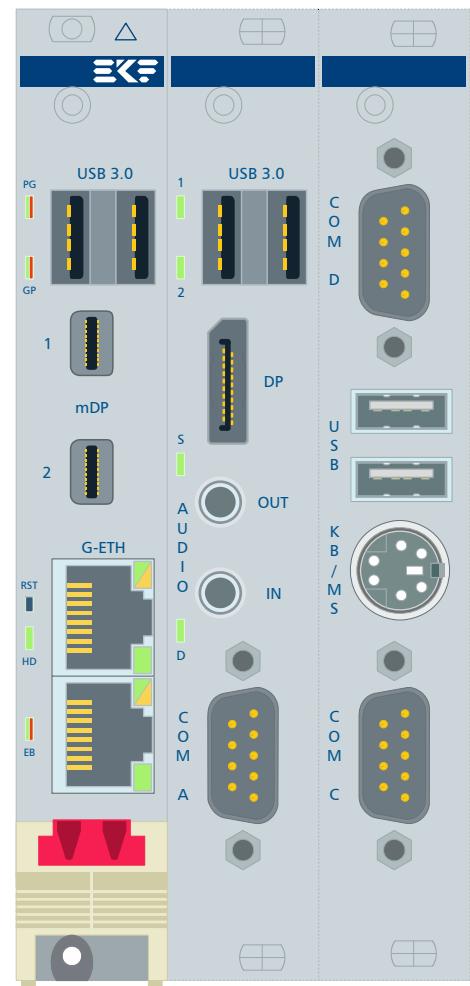
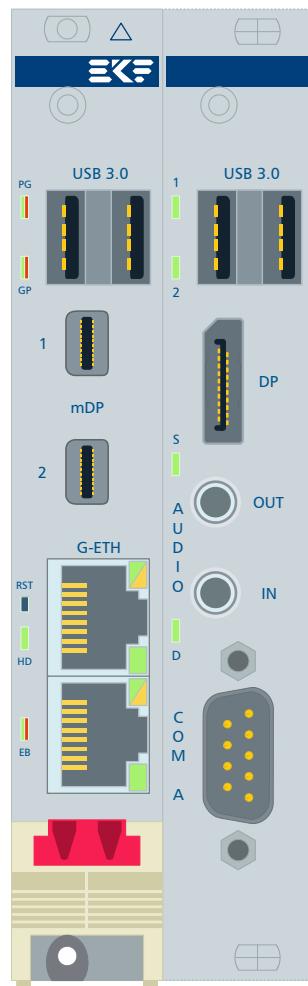


PC4-PRESTO w. PCS-BALLET Side Card 8HP Assembly (Dual mSATA SSD)

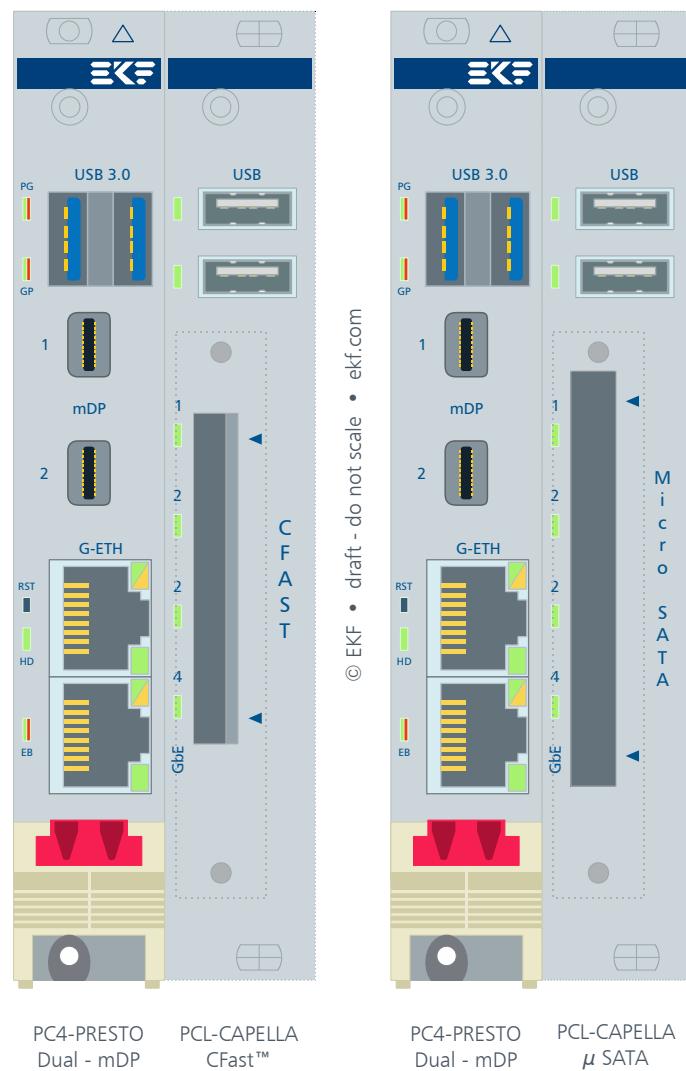
## Block Diagram



## Front Panel Options

PC4-PRESTO  
Dual - mDPPC4-PRESTO  
VGAPC4-PRESTO  
Dual - mDPPCS-BALLET  
RS-232PC4-PRESTO  
Dual - mDPPCS-BALLET  
RS-232

C32-FIO



## Screw Locking for mDP Connectors



Option Screw-Lock Plate for mDP Cable Connectors

The front panel is provided with a threaded hole for fixing a H-shape retainer plate, which is available from EKF as accessory (image above).

As an alternate, the customer can use cable assemblies with screw-locked mDP connectors (image below). The front panel has to be modified however for this solution (two threaded holes in addition, please specify when ordering).



Screw-Locked mDP Connector Cable Assembly (Delock)



PC4-PRESTO w. PCS-BALLET Side Card 8HP Assembly (CFAST SSD)



PC4-PRESTO w. PCS-BALLET Side Card 8HP Assembly (Slim SATA SSD)



PC4-PRESTO w. PCL-CAPELLA Side Card 8HP Assembly



PC4-PRESTO w. PCL-CAPELLA Side Card 8HP Assembly



## Beyond All Limits: EKF High Performance Embedded

EKF Elektronik GmbH  
Philipp-Reis-Str. 4 (Haus 1)  
Lilienthalstr. 2 (Haus 2)  
59065 HAMM  
Germany



Phone +49 (0)2381/6890-0  
Fax +49 (0)2381/6890-90  
Internet [www.ekf.com](http://www.ekf.com)  
E-Mail [sales@ekf.com](mailto:sales@ekf.com)