



Product Information

## SC2-PRESTO • *CompactPCI*® Serial CPU Card

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

Document No. 7046 • 7 November 2017



SC2-PRESTO

## General

*The SC2-PRESTO is a rich featured high performance 4HP/3U CompactPCI® Serial CPU board, equipped with a 4<sup>th</sup> generation Intel® Core™ mobile processor (Haswell dual- or quad-core). The SC2-PRESTO front panel is provided with two Gigabit Ethernet jacks, two USB 3.0 receptacles, and two mDP connectors, compliant with the DisplayPort 1.2 standard for Multi-Stream-Transport (MST). Local expansion mezzanine cards are available for additional I/O.*

The SC2-PRESTO is equipped with up to 16GB Low Power RAM with ECC support. 8GB memory-down are provided for rugged applications, and another 8GB are available via the DDR3 ECC SO-DIMM socket. The on-board SATA 6G RAID controller allows for powerful mass storage solutions via the CompactPCI® Serial backplane. Low profile SSD mezzanine modules are available as on-board storage solution, in addition.



SC2-PRESTO

## Feature Summary

### General

- ▶ PICMG® CompactPCI® Serial (CPCI-S.0) CPU card
- ▶ 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 PCI Express® Gen3, SATA 6G, USB 3.0, Gigabit Ethernet
- ▶ Local mezzanine expansion option (side card), COTS and custom specific boards

### 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'

### 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

## Feature Summary

### *Performance Rating*

- ▶ Passmark 8.0 performance test (Windows 8.1/64, 16GB RAM, C47-MSATA mezzanine SSD storage module)
- ▶ SC2-680D (i7-4700EQ): Passmark rating 2686, CPU rating 7888

### *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 P6
- ▶ 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
  - ▶ one of them supporting IEEE 1588-2008 Precision Time Protocol including PPS and PPM signals
- ▶ 1 x Gigabit Ethernet PHY Intel® I217LM
- ▶ PCIe Gen2 packet switch 16-lane 16-port PLX 8618
- ▶ SATA 6G RAID controller Marvell® 88SE9230, ARM powered subsystem for host CPU offload

### *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® Serial Backplane Resources*

- ▶ PICMG® CPCI-S.0 CPU card & system slot controller
- ▶ 16 x PCIe Gen3 8GT/s (2 links x 8 for two fat pipe slots, derived directly from the Intel® Core™ CPU)
- ▶ 6 x PCIe Gen2 5GT/s (6 links x 1 for peripheral slots)
- ▶ 3 x SATA 6G (from PCH)
- ▶ 4 x SATA 6G (Marvell hardware RAID controller)
- ▶ 4 x USB2, 2 x USB3 (from PCH)
- ▶ 2 x Gigabit Ethernet (I210IT networking controllers)



## 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 - 3 x SATA 6G & 4 x USB 2.0 (from PCH)
- ▶ P-PCIE - PCIe Gen2 5GT/s 1 link x 4 lanes (from on-board PCIe® switch)
  
- ▶ 4HP Low profile mezzanine module options
- ▶ 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
- ▶ SCS-TRUMPET - 3<sup>rd</sup> DisplayPort F/P connector, RS-232, 2 x USB3, on-board 2.5-Inch SATA SSD or 2 x M.2/NGFF SATA SSD module sockets 2230 - 2280
- ▶ 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 9001 certified quality management
- ▶ 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 11.7 years (SC2-680D)
- ▶ 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

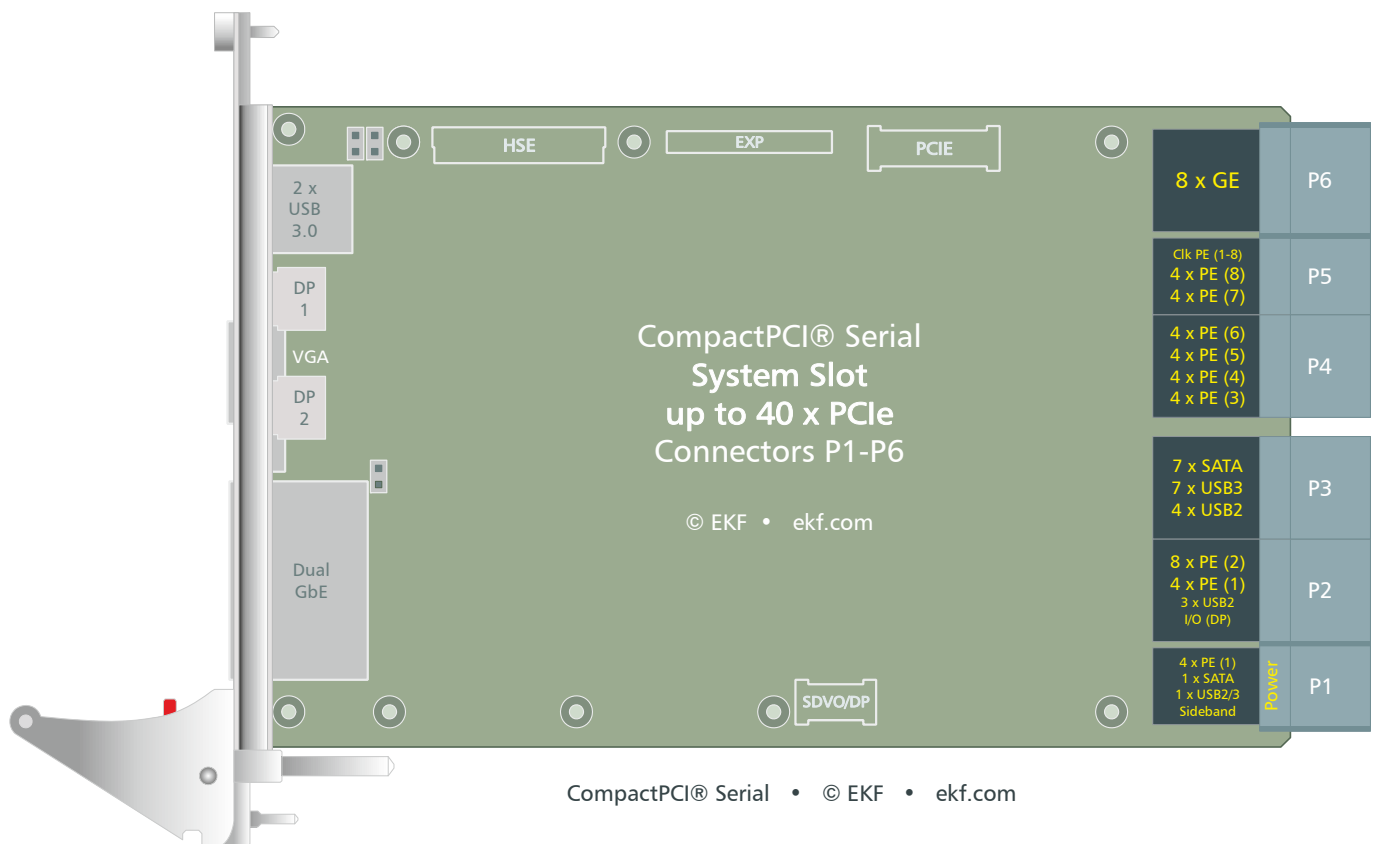
all items are subject to change w/o further notice

*CompactPCI® Serial*

While mechanically compliant to CompactPCI® Classic, CompactPCI® Serial (PICMG® CPCIS.0) defines a completely new card slot, based on PCI Express®, SATA, Gigabit Ethernet and USB serial data lines. Up to 6 high-speed backplane connectors P1 - P6 are provided on a system slot controller such as the SC2-PRESTO, which can be considered as a root hub with respect to most signal lines. A passive backplane is used for distribution of a defined subset of I/O channels from the system slot to each of up to eight peripheral slots in a CompactPCI® Serial system.

Most CompactPCI® Serial peripheral slot cards require only the backplane connector P1, which comprises PCIe, SATA and USB signals, resulting in a concise and inexpensive peripheral board design. More powerful peripheral cards profit from two so called Fat Pipe slots (PCIe x 8).

The SC2-PRESTO is a native CompactPCI® Serial CPU card, suitable for usage in a pure CPCI Serial environment. Due to its generous backplane capabilities (22 x PCI Express® lanes, 6 x USB, 7 x SATA/RAID, 2 x GbE), very powerful industrial systems can be built.



General Backplane Connector Assignment  
According to PICMG® CPCIS.0



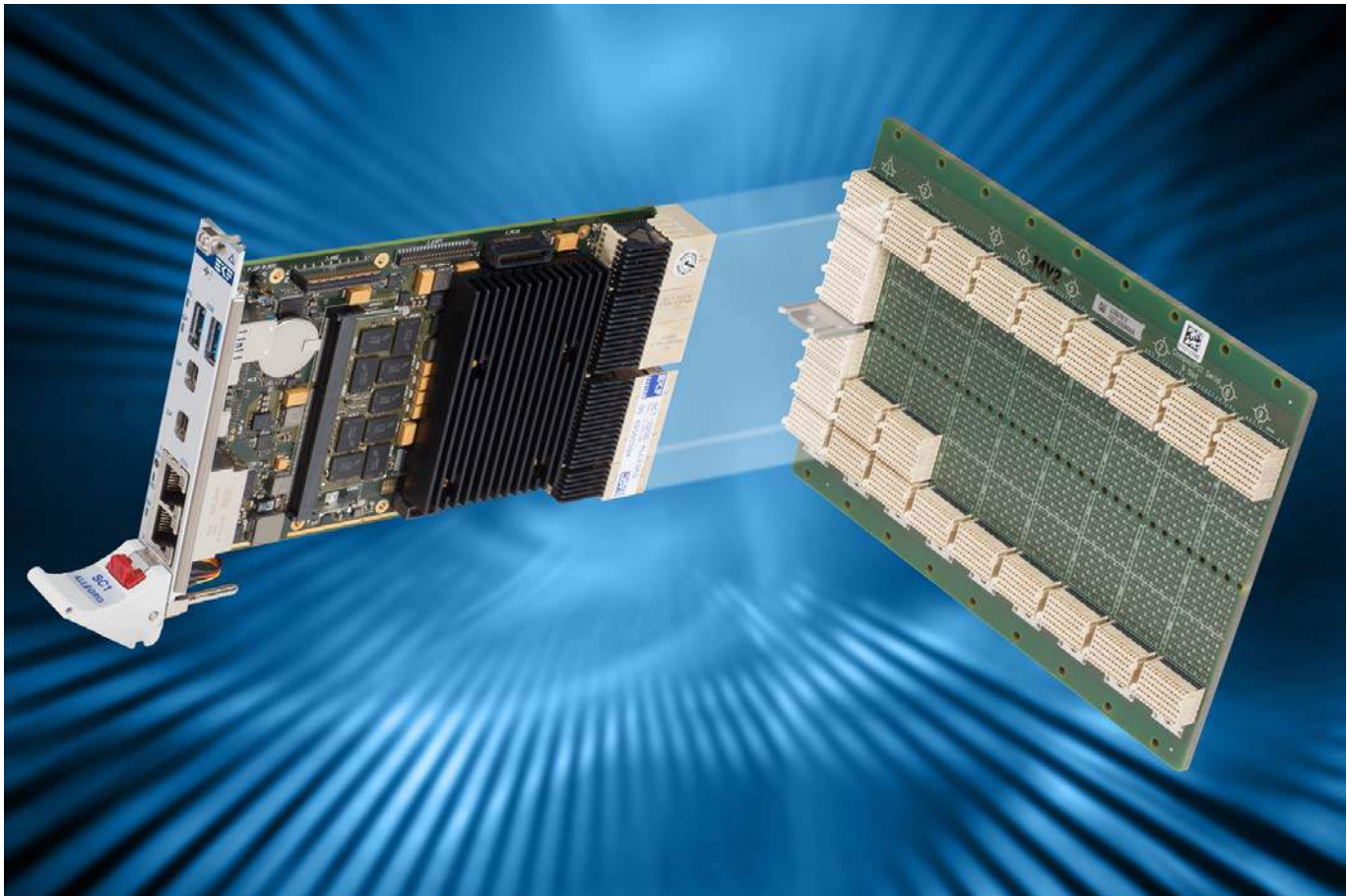
SC2-PRESTO R.1 • Resources w. 1 + 8 Slots Backplane (System Slot Left)

|    | 1                                                                   | 2                   | 3                                    | 4                                     | 5                                     | 6                                     | 7                                     | 8                            | 9                            |
|----|---------------------------------------------------------------------|---------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|------------------------------|------------------------------|
|    |                                                                     |                     |                                      |                                       |                                       |                                       |                                       |                              |                              |
|    | SYS                                                                 |                     |                                      |                                       |                                       |                                       |                                       |                              |                              |
| P6 | GbE (1-2)                                                           | GbE (1)             | GbE (2)                              |                                       |                                       |                                       |                                       |                              |                              |
| P5 | CLK PE (1-8)<br>2 x PE (7-8)<br>Gen2<br>2 Links x 1                 |                     |                                      |                                       |                                       |                                       |                                       |                              |                              |
| P4 | 4 x PE (3-6)<br>Gen2<br>4 Links x 1                                 | PER 1               | PER 2                                | PER 3                                 | PER 4                                 | PER 5                                 | PER 6                                 | PER 7                        | PER 8                        |
| P3 | 3 x SATA (PCH)<br>4 x SATA (RAID)<br>1 x USB3 (2)<br>2 x USB2 (5-6) |                     |                                      |                                       |                                       |                                       |                                       |                              |                              |
| P2 | PE Gen3 x 8 (2)<br>PE Gen3 1/2 x 8 (1)<br>2 x USB2 (3-4)<br>I/O     |                     |                                      |                                       |                                       |                                       |                                       |                              |                              |
| P1 | PE Gen3 1/2 x 8 (1)<br>1 x USB3 (1)<br>Sideband                     | PE Gen3 x 8<br>USB3 | PE Gen3 x 8<br>SATA 3G (PCH)<br>USB3 | PE Gen2 x 1<br>SATA 6G (RAID)<br>USB2 | PE Gen2 x 1<br>SATA 6G (RAID)<br>USB2 | PE Gen2 x 1<br>SATA 6G (RAID)<br>USB2 | PE Gen2 x 1<br>SATA 6G (RAID)<br>USB2 | PE Gen2 x 1<br>SATA 6G (PCH) | PE Gen2 x 1<br>SATA 6G (PCH) |
|    | SC2-PRESTO                                                          | Fat Pipe Slot       | Fat Pipe Slot                        | Peripheral Slot                       | Peripheral Slot                       | Peripheral Slot                       | Peripheral Slot                       | Peripheral Slot              | Peripheral Slot              |

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Backplane Resources SC2-PRESTO (System Slot Left)

[www.ekf.com/s/sc2/img/sc2\\_backplane.pdf](http://www.ekf.com/s/sc2/img/sc2_backplane.pdf)



8 + 1 Slots CompactPCI® Serial Backplane

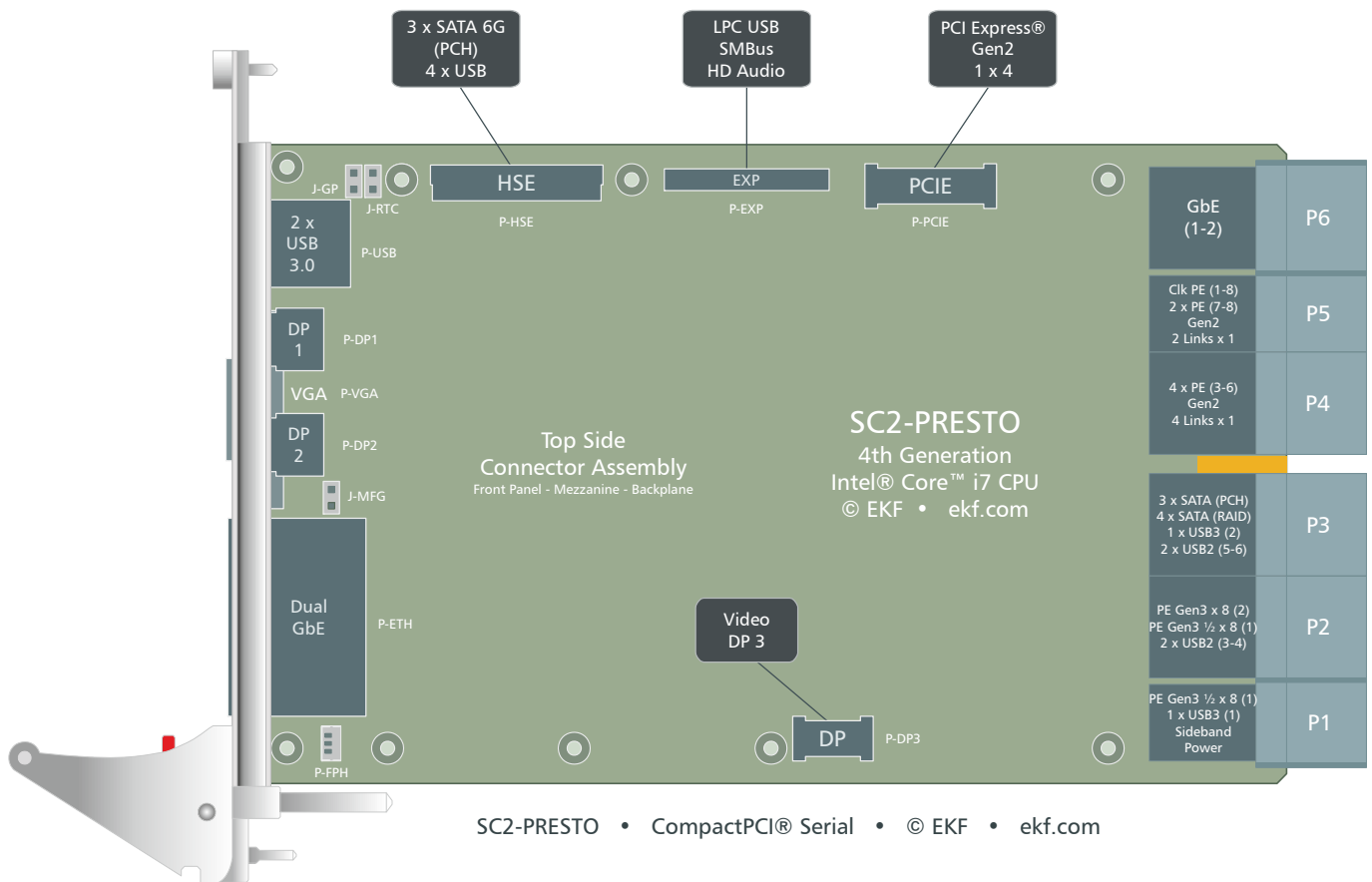
| Related Information   |                                                                                |
|-----------------------|--------------------------------------------------------------------------------|
| SC2-PRESTO Home       | <a href="http://www.ekf.com/s/sc2/sc2.html">www.ekf.com/s/sc2/sc2.html</a>     |
| SC2-PRESTO User Guide | <a href="http://www.ekf.com/s/sc2/sc2_ug.pdf">www.ekf.com/s/sc2/sc2_ug.pdf</a> |

| General Information CompactPCI® PlusIO & CompactPCI® Serial |                                                                                        |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------|
| CompactPCI® Serial Concise Overview                         | <a href="http://www.ekf.com/s/serial_concise.pdf">www.ekf.com/s/serial_concise.pdf</a> |
| CompactPCI® Serial All You Need to Know                     | <a href="http://www.ekf.com/s/smart_solution.pdf">www.ekf.com/s/smart_solution.pdf</a> |
| CompactPCI® Serial Home                                     | <a href="http://www.ekf.com/s/serial.html">www.ekf.com/s/serial.html</a>               |
| CompactPCI® PlusIO Home                                     | <a href="http://www.ekf.com/p/plus.html">www.ekf.com/p/plus.html</a>                   |

## Local Expansion and Mass Storage Solutions

The SC2-PRESTO is equipped with a set of high-speed 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 such as RS-232, and additional PCI Express® based I/O controllers such as SATA, USB 3.0 and Gigabit Ethernet, and also a third video output.

Most mezzanine side cards can accommodate in addition a 2.5-inch drive. Typically, the SC2-PRESTO and the related side card would come as a readily assembled 8HP unit. As an alternate, M.2 SATA or mSATA SSD based low profile mezzanine mass-storage modules are available that fit into the SC2-PRESTO 4HP envelope.



## SC2-PRESTO • Connector Assembly

[www.ekf.com/s/sc2/img/sc2\\_draft\\_mezzanine.pdf](http://www.ekf.com/s/sc2/img/sc2_draft_mezzanine.pdf)

## Related Documents Mezzanine Modules and Side Cards

|                                         |                                                                                              |
|-----------------------------------------|----------------------------------------------------------------------------------------------|
| C4* Series<br>Mezzanine Storage Modules | <a href="http://www.ekf.com/c/ccpu/c4x_mezz_ovw.pdf">www.ekf.com/c/ccpu/c4x_mezz_ovw.pdf</a> |
| SCS-TRUMPET Mezzanine Side Card         | <a href="http://www.ekf.com/s/csc/scs.html">www.ekf.com/s/csc/scs.html</a>                   |



SC2-PRESTO w. SCS-TRUMPET Mezzanine Side Card 8HP Assembly





SC2-PRESTO Local Expansion I/F Connectors



SC2-PRESTO w. C47-MSATA Mezzanine Module 4HP Assembly



C47-MSATA • Low Profile Dual-SSD Mezzanine Module





C48-M2 • Low Profile Dual M.2 SATA SSD Mezzanine Module



SC2-PRESTO w. C48-M2 SATA Mezzanine Storage Modul 4HP Assembly



SC2-PRESTO w. C41-CFAST Mezzanine Module 4HP Assembly



SC2-PRESTO w. C42-SATA Mezzanine Module 4HP Assembly





SC2-PRESTO w. C44-SATA Mezzanine Module 8HP Assembly



SC2-PRESTO w. C45-SATA Mezzanine Module 8HP Assembly



8HP Assembly w. SCS-TRUMPET Side Card & 2.5-Inch SATA SSD

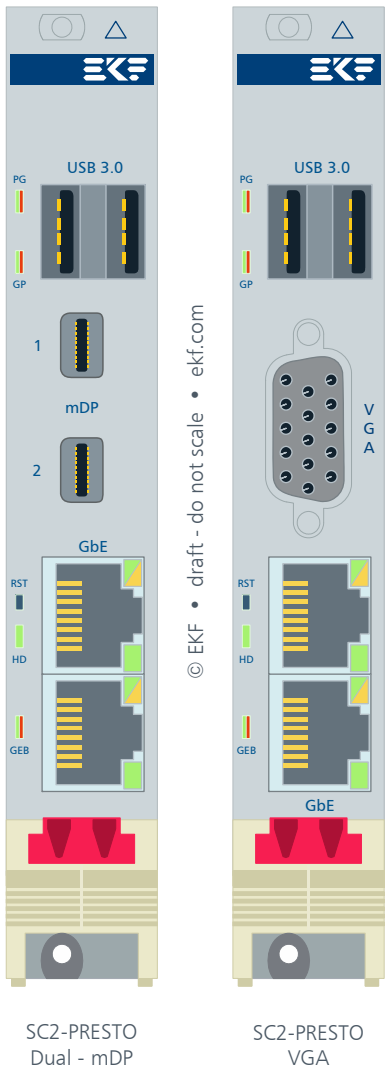


8HP Assembly w. SCS-TRUMPET Side Card & Dual M.2 SATA SSD





Front Panel Options



### Screw Locking Option for mDP Connectors

Opposite to the Standard DisplayPort cable connectors, mDP connectors are not provided with a latching device. For rugged applications with need for a connector locking mechanism, EKF offers two methods of fixing.



Option Screw-Lock Plate for mDP Cable Connectors

1. The front panel is provided with a threaded hole for fixing a removable H-shape retainer plate, which is available from EKF as accessory (image above).
2. 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).

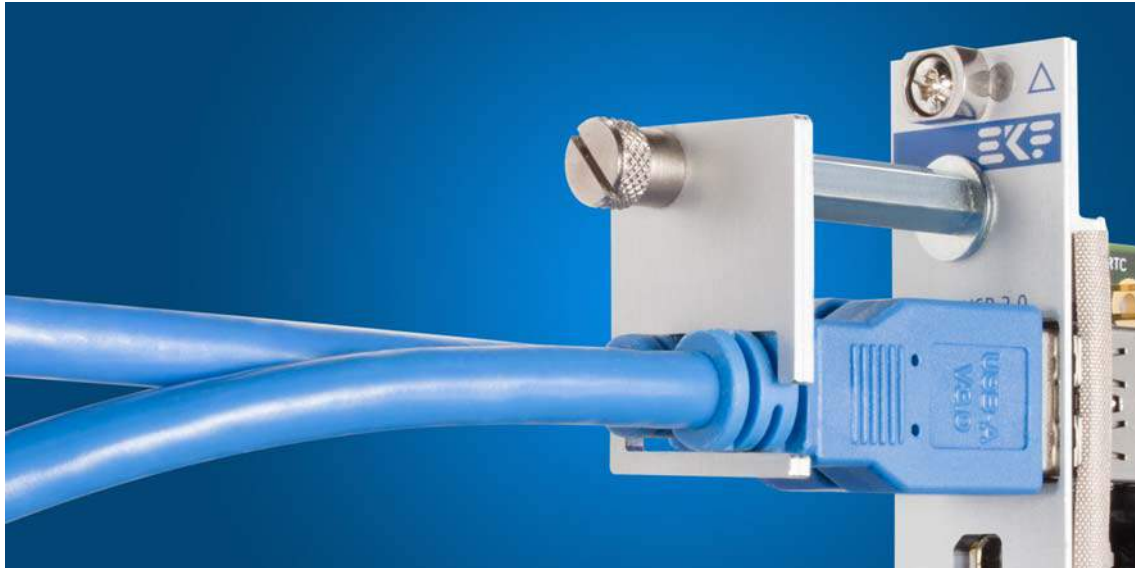


Screw-Locked mDP Connector Cable Assembly (Delock)

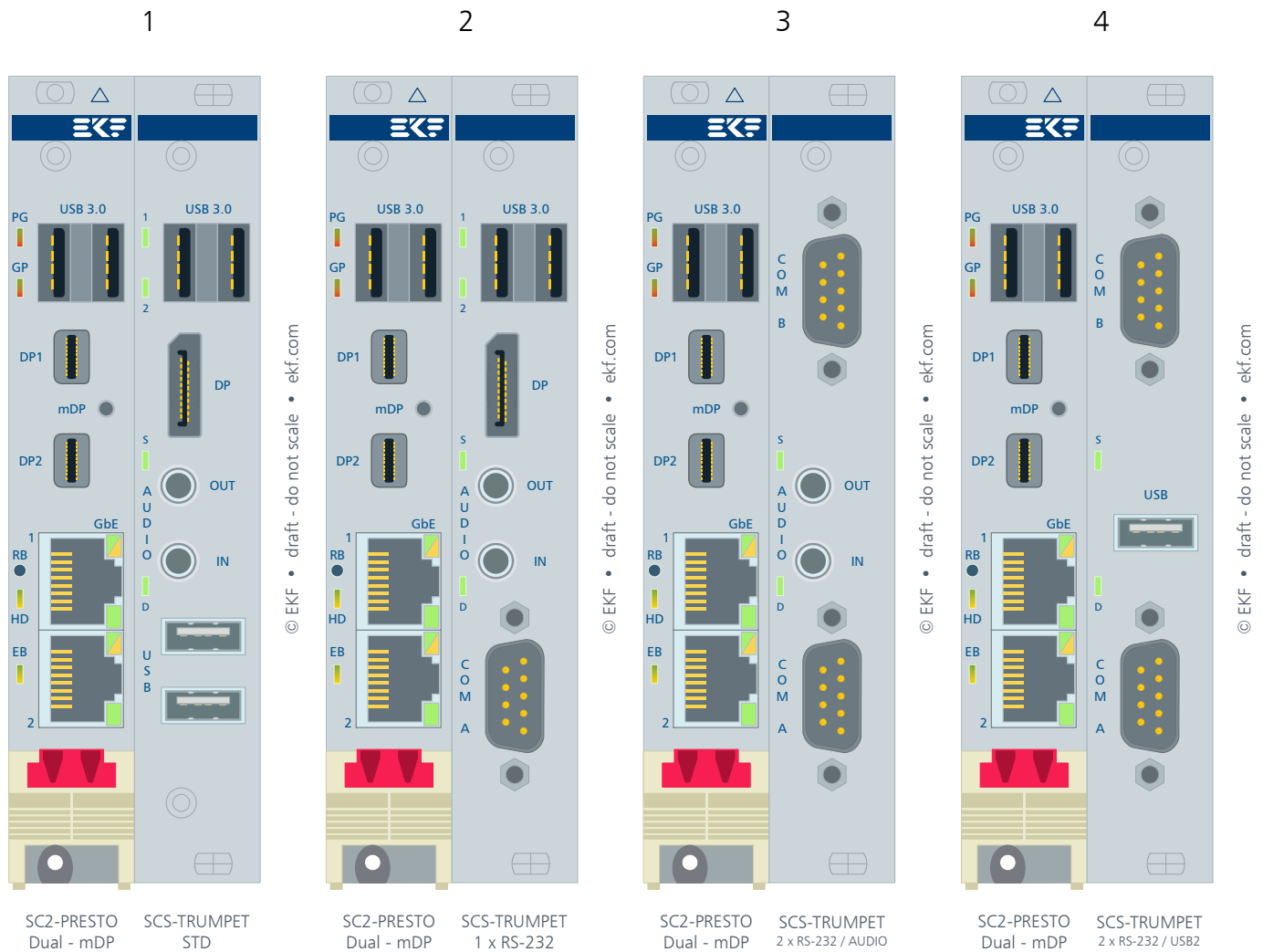


### Screw Locking Option for USB Connectors

As an option, a retainer solution is available for the USB cable connectors (see picture below). Both USB connectors must have identical dimensions. The retainer opening and standoff clearance depends on the actual cables in use - please contact EKF before ordering.

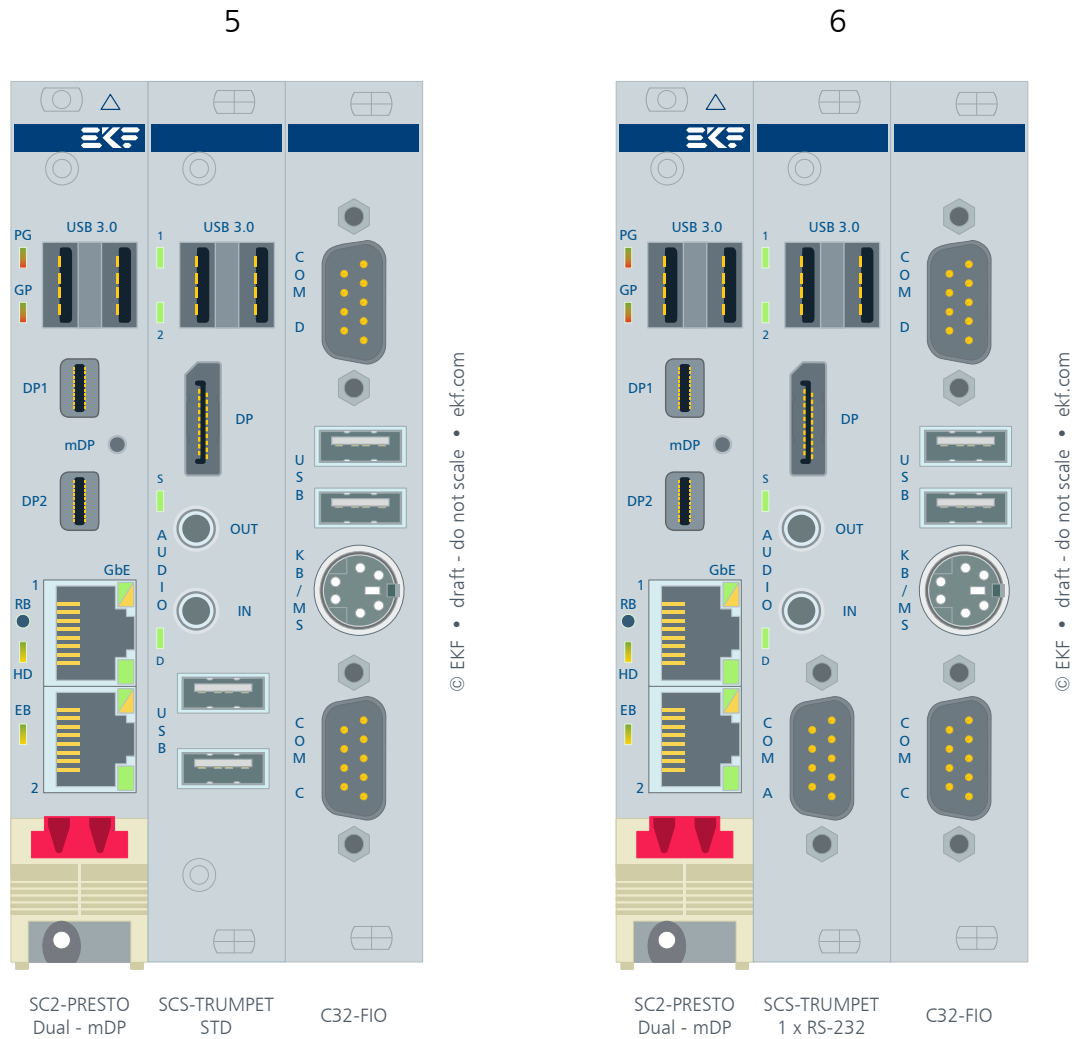


## Sample Front Panel Options 8HP



1. Typical assembly, dual-USB 3.0, DisplayPort, 3.5mm stereo audio in/out, 2 x USB 2.0
2. Bottom RS-232 male D-Sub 9-pin (COM-A) replaces two USB 2.0 jacks
3. Top RS-232 male D-Sub 9-pin (COM-B) replaces dual-USB 3.0 and DisplayPort connectors
4. Center USB 2.0 receptacle replaces both 3.5mm stereo audio jacks

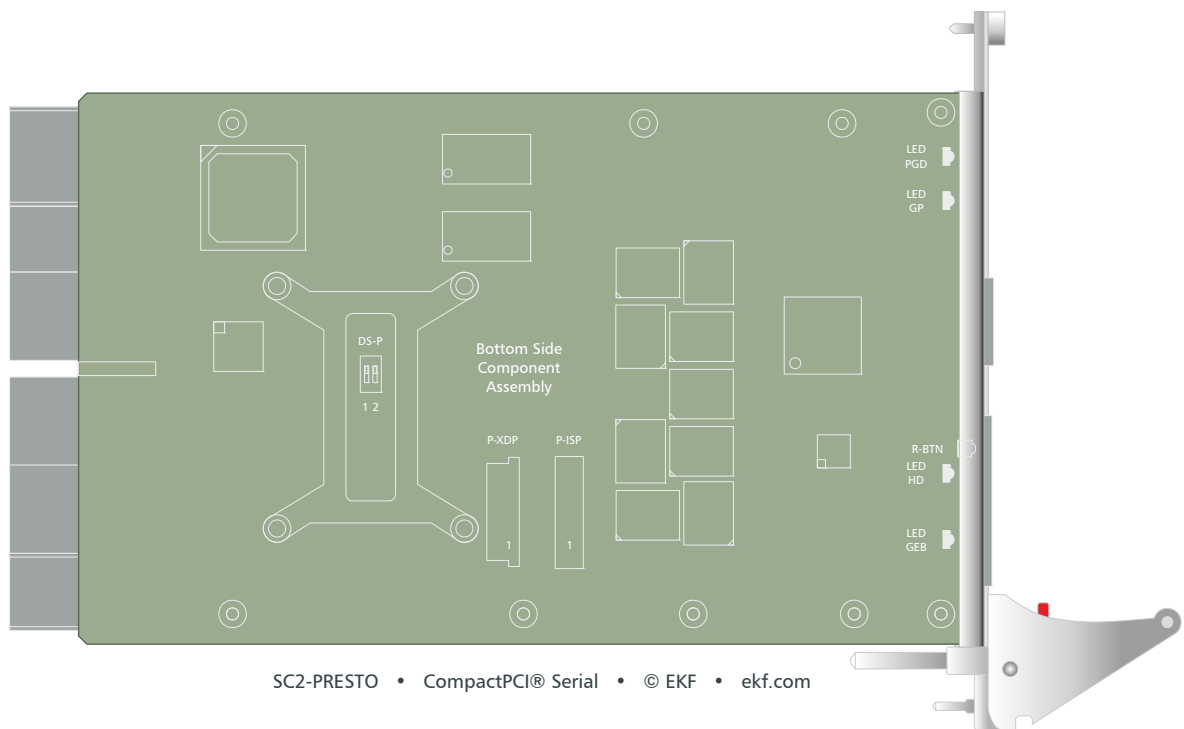
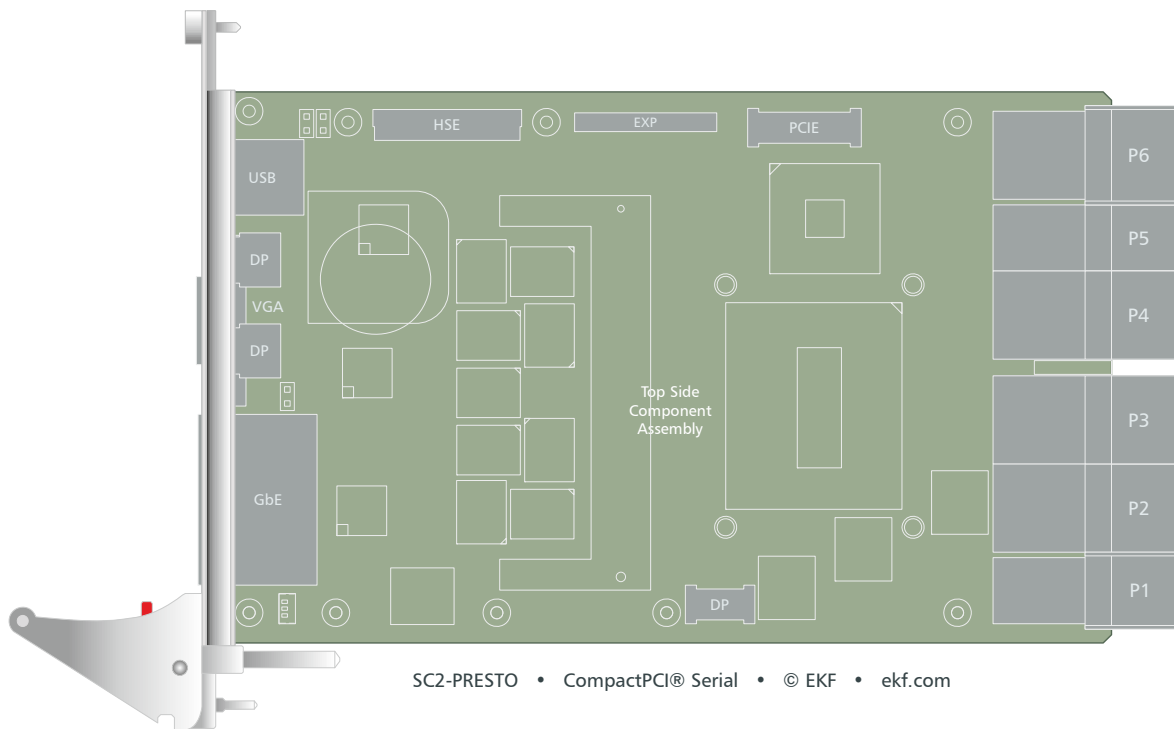
## Sample Front Panel Options 12HP



5. Dual-USB 3.0, DisplayPort, 3.5mm stereo audio in/out, 4 x USB 2.0, 2 x RS-232 (COM-C/D)

6. Dual-USB 3.0, DisplayPort, 3.5mm stereo audio in/out, 2 x USB 2.0, 3 x RS-232 (COM-A/C/D)

## Major Components Top / Bottom View



[www.ekf.com/s/sc2/img/sc2\\_draft\\_2-3.pdf](http://www.ekf.com/s/sc2/img/sc2_draft_2-3.pdf)





SC2-PRESTO

### Ordering Information

For popular SC2-PRESTO SKUs please refer to [www.ekf.com/liste/liste\\_21.html#SC2](http://www.ekf.com/liste/liste_21.html#SC2)

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)



SRS-BLUBOXX Series for up to 4 Peripheral Slot Cards





SRS-4401-RACK for up to 8 Peripheral Slot Cards

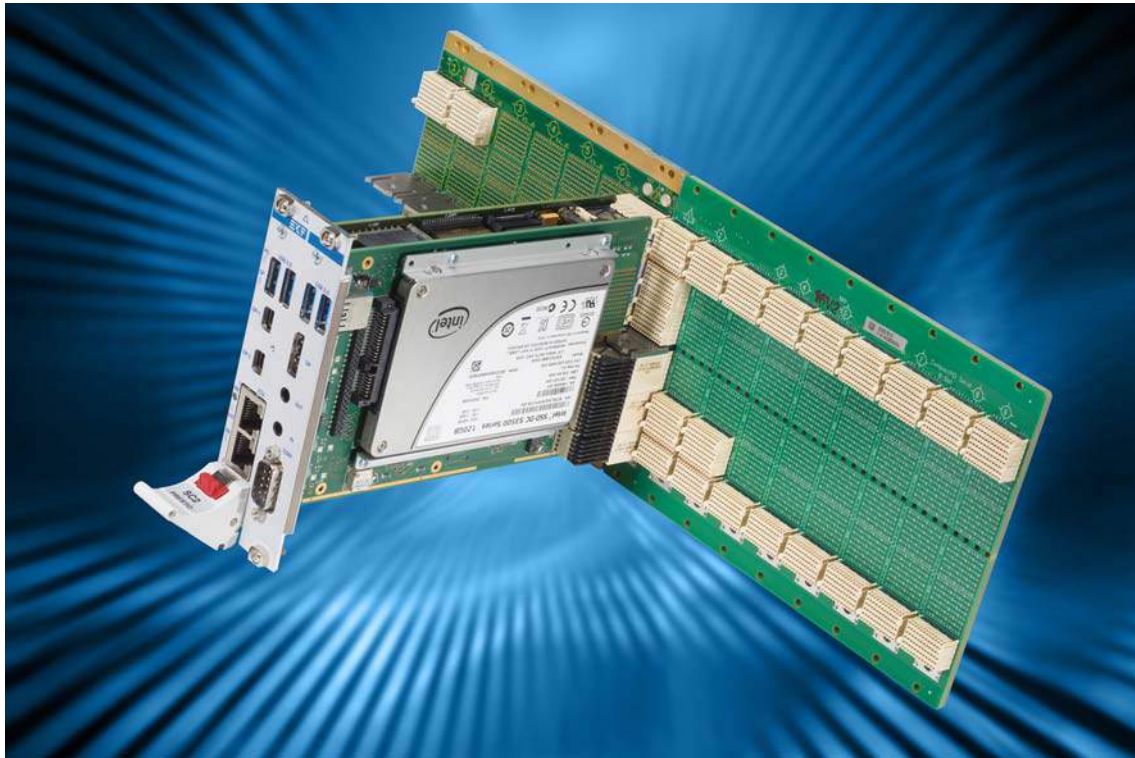


Custom Specific Racks 19-Inch



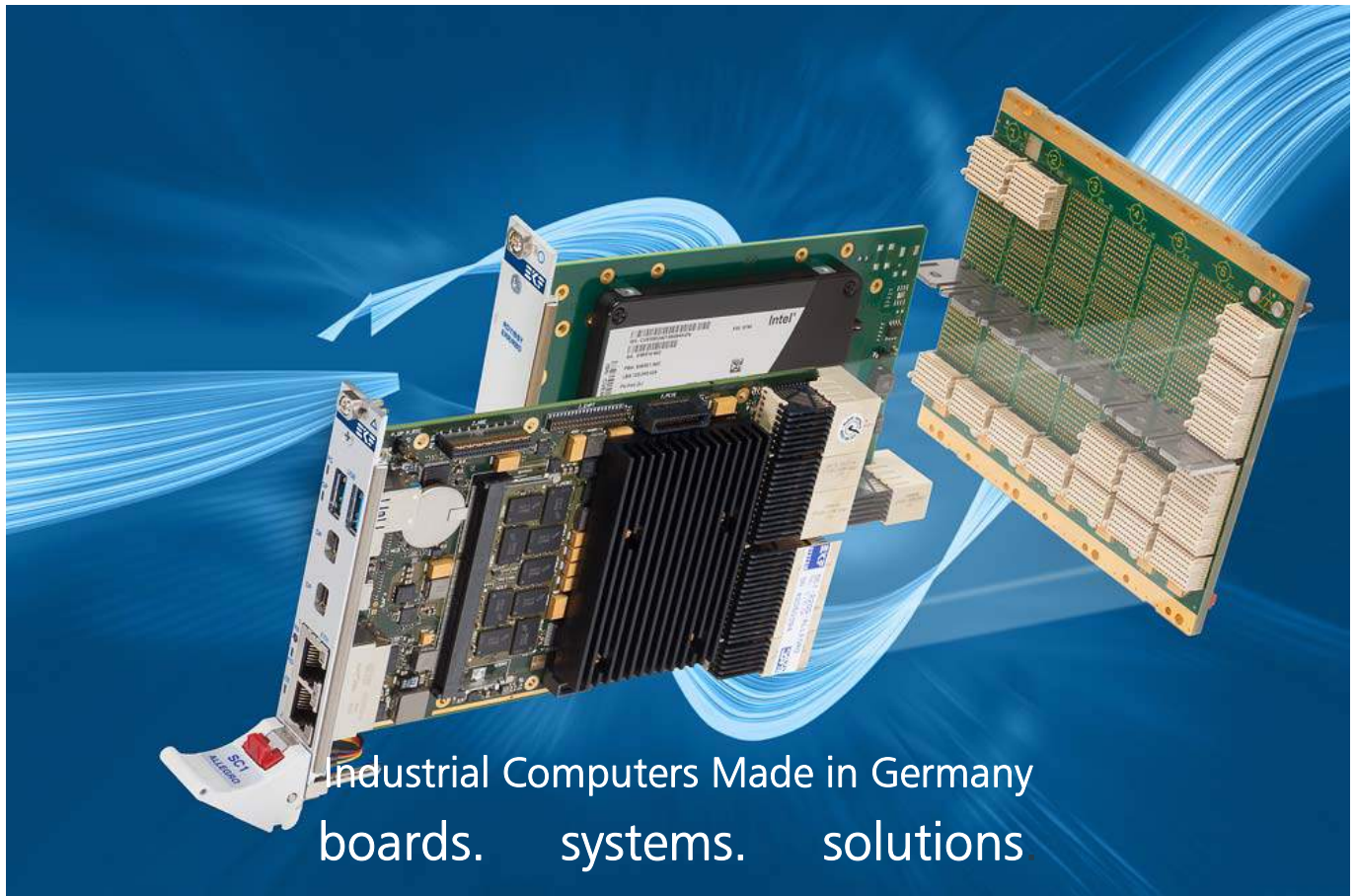
SC2-PRESTO w. C48-M2 Mezzanine SATA SSD Module





SC2-PRESTO w. SCS-TRUMPET Side Card & Dual Backplane





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)