



Product Information

PC7-FESTIVAL • CompactPCI® PlusIO CPU Card

Intel® Mobile Workstation Processor
XEON® E3 v6 Family



General

The PC7-FESTIVAL is a rich featured high performance 4HP/3U CompactPCI® PlusIO CPU board, equipped with an Intel® Xeon® E3 family mobile workstation processor for demanding applications. For scalability, the PC7-FESTIVAL is also available with an Intel® Core™ processor.

The PC7-FESTIVAL front panel is provided with two RJ45 Gigabit Ethernet jacks, two USB 3.0 Type-A receptacles, and two DisplayPort connectors. In addition, a third USB Type-C front panel receptacle is available as an option, usable alternatively as (third) DisplayPort.

The powerful Xeon® E3-1500 v6 series processor is accompanied by the CM238 mobile PCH, for a maximum of high speed I/O resources (e.g. PCI Express®, SATA, USB).

On-board mass-storage solutions are based on low profile mezzanine expansion cards, which can accommodate up to two M.2 style SSD modules (PCIe® Gen3 x4 and/or SATA 6G). Side cards for an 8HP assembly are also available, providing front I/O and M.2 SSDs.

The PC7-FESTIVAL is equipped with up to 32GB DDR4 RAM with ECC support. Up to 16GB memory-down are provided for rugged applications, and another 16GB are available via the DDR4 ECC SO-DIMM socket.

The backplane connector J1 allows for up to seven CompactPCI® Classic peripheral cards in a system. The J2 connector complies with the CompactPCI® PlusIO standard for high speed rear I/O (fourfold PCIe®, SATA and USB2), or a hybrid CompactPCI® Serial backplane.



Feature Summary

General

- ▶ CompactPCI® PlusIO (PICMG® CPCI 2.30) System Slot Controller
- ▶ Form factor single size Eurocard (board dimensions 100x160mm²)
- ▶ 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® Classic 32-Bit support
- ▶ J2 Connector for CompactPCI® PlusIO support (PCIe®, SATA, USB2)
- ▶ J2 PlusIO configuration allows for either CompactPCI® Serial hybrid backplane usage or rear I/O module attachment
- ▶ J2 Connector option available for 64-bit system slot (legacy CompactPCI® 2.0 Classic)
- ▶ Side cards and low profile mass storage modules available as COTS and also as custom specific

Power Supply

- ▶ +5V, +3.3V according to CompactPCI® 2.0 via J1 backplane connector
- ▶ Total power consumption depends on processor type and mezzanine assembly
- ▶ +5V only board design for low cost system power supply with all 25W processors *
- ▶ SAC (Stand-Alone Computer) option w. two-pos. 5V/10A terminal block (J1/J2 removed)

* option different SKUs available with 25W processors for +5V/3.3V backplane supply - specify when ordering on request: PC7-FESTIVAL +5V only can deliver +3.3V to backplane for CompactPCI® peripheral boards

Processor

- ▶ Intel® Kaby Lake-H mobile platform with ECC (CM238 mobile workstation PCH)
- ▶ Intel® Xeon® processor E3 v6 family (mobile workstation)
 - ▶ Xeon E3 1505M v6 ■ 3/4GHz ■ 8M ■ 4C/8T ■ DDR4 2400 ECC ■ 45/35W ■ GT2 - P630 ■ vPRO™/AMT
 - ▶ Xeon E3 1505L v6 ■ 2.2/3GHz ■ 8M ■ 4C/8T ■ DDR4 2400 ECC ■ 25W ■ GT2 - P630 ■ vPRO™/AMT
 - ▶ Xeon E3 1501M v6 ■ 2.9/3.6GHz ■ 6M ■ 4C/8T ■ DDR4 2400 ECC ■ 45/35W ■ GT2 - P630 ■ vPRO™/AMT
 - ▶ Xeon E3 1501L v6 ■ 2.1/2.9GHz ■ 6M ■ 4C/8T ■ DDR4 2400 ECC ■ 25W ■ GT2 - P630 ■ vPRO™/AMT
- ▶ 7th Generation Intel® Core™ mobile processor
 - ▶ i3 7100E ■ 2.9GHz ■ 3M ■ 2C/4T ■ DDR4 2400 ECC ■ 35W ■ GT2 - 630
 - ▶ i3 7102E ■ 2.1GHz ■ 3M ■ 2C/4T ■ DDR4 2400 ECC ■ 25W ■ GT2 -630

Feature Summary

Firmware

- ▶ Phoenix® UEFI (Unified Extensible Firmware Interface) V2.5 with CSM*
- ▶ Phoenix® SCT (SecureCore Technology) Release V4.01
- ▶ ACPI V5.0
- ▶ 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 Intel® Xeon® E3 v6 (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 32GB DDR4 2400 +ECC
- ▶ DDR4 +ECC soldered memory up to 16GB
- ▶ DDR4 +ECC SO-DIMM memory module socket up to 16GB

Mezzanine Mass Storage

- ▶ Mezzanine side card connectors for local expansion e.g. SSD mass storage
- ▶ Low profile mezzanine modules available (4HP common front panel)
- ▶ Side cards available (8HP common F/P assembly)
- ▶ P-HSE1 - configurable as 4 x SATA 6G or 4 x PCIe® Gen3 (from CM238 PCH), 1 x USB3
- ▶ P-HSE2 - 4 x PCIe® Gen3 (from CM238 PCH) & 3rd DisplayPort (from CPU)
- ▶ P-EXP - Legacy interface (from PCH)

- ▶ 4HP Low profile mezzanine module options:
 - ▶ C48-M2 - 2 x M.2 2280 SATA SSD sockets
 - ▶ S48-SSD - 1 x M.2 2280 NVMe® SSD socket, 1 x M.2 2280 NVMe® or SATA SSD socket (autosense), 1 x Type-C USB F/P connector (enabled for DisplayPort alternate mode)
 - ▶ P82-GBE - 2 x 2.5GBASE-T for J2 backplane connector, 1 x M.2 2280 NVMe® SSD socket

- ▶ 8HP/12HP Mezzanine side card options:
 - ▶ P01-M12 - Replacement for PC7-FESTIVAL RJ45 GbE jacks by M12-X receptacles
 - ▶ PCU-UPTEMPO - Side board w. 2 x M.2 SATA SSD sockets & front I/O
 - ▶ PCZ-NVM - Side board w. 2 x M.2 NVMe® SSD sockets & front I/O
 - ▶ SCJ-VEENA - M.2 NVMe® or SATA SSD socket (autosense), quad 2.5GBASE-T Ethernet RJ45 jacks
 - ▶ SCL-RHYTHM - M.2 NVMe® or SATA SSD socket (autosense), quad 1000BASE-T Ethernet M12-X ports

- ▶ Custom specific mezzanine side card design - I/O and storage

Feature Summary

Graphics

- ▶ Integrated graphics engine, 3 symmetric independent displays
- ▶ 3D HW acceleration DirectX12, OpenCL 2.x, OpenGL 4.3/4.4, ES 2.0
- ▶ HW video decode/encode HEVC10b 10-bit, VP9 10-bit, JPEG
- ▶ HDR (High Dynamic Range) Rec. 2020 Wide Color Gamut
- ▶ Content protection
- ▶ UHD premium content playback
- ▶ Front panel options: Dual DisplayPort (DP) connectors
- ▶ 3rd DisplayPort optional via Type-C connector on low profile mezzanine card S48-SSD
- ▶ Max resolution 4096 x 2304 @60Hz (any DisplayPort, concurrent operation)
- ▶ DisplayPort™ 1.2 Multi-Stream Transport (MST) - display daisy chaining
- ▶ MST max resolution via single DP connector 2880x1800@60Hz (2 displays), 2304x1440@60Hz (3 displays)
- ▶ DisplayPort integrated audio (3 independent audio streams)

Networking

- ▶ Two networking interface controllers (NIC), 1000BASE-T, 100BASE-TX, 10BASE-T connections
- ▶ Port 1 equipped w. I219LM PHY (suitable for Intel® AMT)
- ▶ Port 2 equipped w. Intel® I210-IT -40°C to +85°C operating temperature GbE controller
- ▶ 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
- ▶ RJ45 front panel jacks (option 2 x M12-X with mezzanine module P01)
- ▶ Option quad 2.5GbE RJ45 front panel ports with SCJ-VEENA side card (8HP front panel width)
- ▶ Option quad 1GbE M12-X front panel ports with SCL-RHYTHM side card (8HP front panel width)
- ▶ Option 2 x 2.5GbE over J2 backplane connector with P82-GBE low profile mezzanine module

Chipset

- ▶ Intel® CM238 Mobile Workstation Platform Controller Hub (PCH)
- ▶ PCIe® Gen3 8GT/s
- ▶ SATA 6G
- ▶ USB3
- ▶ GbE
- ▶ SPI, LPC, Audio, Legacy

Feature Summary

On-Board Building Blocks

- ▶ Additional on-board devices, PCIe® based
- ▶ PCIe® to PCI® Bridge 32bit 33/66MHz for 7 CompactPCI®Classic peripheral card backplane slots
- ▶ 1 x Gigabit Ethernet controller Intel® I210IT (front I/O)
- ▶ 1 x Gigabit Ethernet PHY Intel® I219LM (front I/O)
- ▶ IEEE 1588-2008 Precision Time Protocol including PPS and PPM signals supported

Security

- ▶ Trusted Platform Module
- ▶ Discrete TPM 2.0 for highest level of certified platform protection
- ▶ Infineon Optiga™ SLM 9670 cryptographic processor
- ▶ Conforming to TCG 2.0 specification
- ▶ Option fTPM (firmware-based TPM 2.0) or dTPM (discrete TPM) selectable from UEFI (BIOS) setup
- ▶ AES hardware acceleration support (Intel® AES-NI)

Front Panel I/O (4HP)

- ▶ 2 x Gigabit Ethernet RJ45 (1 = PCH & I219LM - Intel® AMT support, 2 = I210IT)
- ▶ 2 x DisplayPort (from processor integrated HD graphics engine, standard DP latching receptacles)
- ▶ 2 x USB 3.0 Type-A
- ▶ Option Type-C USB 3.1 Gen1 w. S48-SSD low profile mezzanine module
- ▶ Support for Type-C locking plugs (dual screw) according to the 'Locking Connector Spec. Rev. 1.0'
- ▶ DisplayPort Alt Mode on Type-C connector (3rd video monitor output)

Additional Front I/O (8HP)

- ▶ Option RS-232, USB3, DisplayPort w. PCZ-NVM side card
- ▶ Option quad port 2.5GbE RJ45 jacks w. SCJ-VEENA side card
- ▶ Option quad port 1GbE M12-X receptacles w. SCL-RHYTHM side card
- ▶ Option 2 x M12-X receptacles for Gigabit Ethernet (P01, as replacement for RJ45)
- ▶ Option RS-232, HD-Audio, USB w. PCU-UPTEMPO side card
- ▶ Custom specific front panel and side card design

Feature Summary

CompactPCI® Backplane Resources

- ▶ PICMG® CompactPCI® 2.0 CPU card & system slot controller for J1 based 32-bit CompactPCI® systems
- ▶ Support for up to seven CompactPCI® peripheral boards, 33/66MHz (PI7C9X112 PCIe® to PCI® bridge)
- ▶ PICMG® CompactPCI® 2.30 J2 connector pin assignment according to CompactPCI® PlusIO
- ▶ J2 is assigned to 4 x PCIe® Gen2*, 4 x SATA 3G*, and 4 x USB2 ports (all derived from PCH)
- ▶ Option 2 x 2.5GbE* over J2 backplane connector with P82-GBE low profile mezzanine module
- ▶ J2 can be used to enable CompactPCI® Serial peripheral card slots for hybrid systems with a split backplane
- ▶ Hybrid small system racks available (e.g. SRP-BLUBOXX)
- ▶ J2 can be used alternatively for a rear I/O module
- ▶ Custom specific rear I/O module design on request
- ▶ J2 Connector option available - 64-bit system slot tolerant for legacy CompactPCI® 2.0 (Classic)
- ▶ Gigabit Ethernet 2 x 2.5GBASE-T* option w. P82-GBE low profile mezzanine module

** CompactPCI® PlusIO specifies PCIe® 5GT/s, SATA 3G and GbE 1000BASE-T only over J2 UHM. Due to obsolescence of the 3M UHM connector series the PC7-FESTIVAL will be equipped with a standard J2 hard metric backplane connector, which may result in PCIe® 2.5GT/s (Gen1) backplane link training under adverse application conditions.*

Environmental & Regulatory

- ▶ 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 21.2 years
- ▶ EC Regulatory EN55035, EN55032, EN62368-1

Feature Summary

Applications

- ▶ General industrial computing, for x86 based software
- ▶ IIoT applications, edge computing, networking
- ▶ Medium to high embedded CPU performance
- ▶ CompactPCI® Classic systems upgrade
- ▶ CompactPCI® Serial peripheral card expansion
- ▶ Stand-Alone Computer (SAC)

Related Information

PC7-FESTIVAL Home	www.ekf.com/p/pc7/pc7.html
PC7-FESTIVAL User Guide	www.ekf.com/p/pc7/pc7_ug.pdf

Related Documents CompactPCI® Serial & CompactPCI® PlusIO

CompactPCI® PlusIO Overview	www.ekf.com/p/plusio.pdf
CompactPCI® PlusIO Home	www.ekf.com/p/plus.html
CompactPCI® Serial Home	www.ekf.com/s/serial.html

Related Documents Mezzanine Modules and Side Cards

C48-M2 Low Profile Mezzanine Dual SATA Storage Module	www.ekf.com/c/ccpu/c48/c48.html
P82-GBE Low Profile Mezzanine Module 1 x M.2 NVMe & 2 x Backplane 2.5GBASE-T	www.ekf.com/p/p82/p82.html
PCU-UPTEMPO Side Card 8HP Multi-Function	www.ekf.com/p/pcu/pcu.html
PCZ-NVM Side Card 8HP/12HP Multi-Function	www.ekf.com/p/pcz/pcz.html
S48-SSD Low Profile Mezzanine Dual NVMe Storage Module	www.ekf.com/s/s48/s48.html
SCJ-VEENA Side Card 8HP Quad 2.5GBASE-T NICs (RJ45) & M.2 NVMe SSD	www.ekf.com/s/scj/scj.html
SCL-RHYTHM Side Card 8HP Quad 1000BASE-T NICs (M12-X) & M.2 NVMe SSD	www.ekf.com/s/scl/scl.html

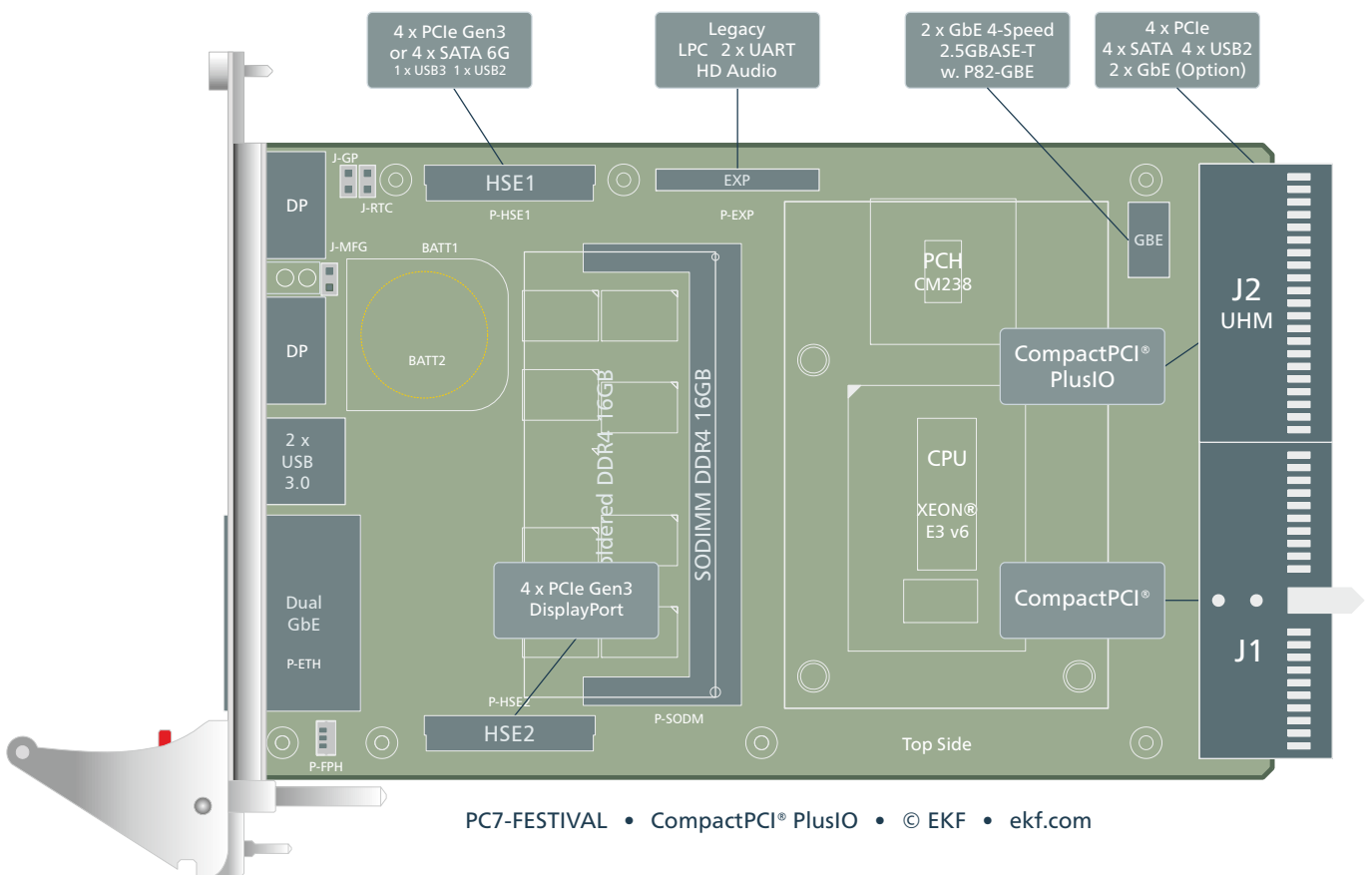
Ordering Information

For popular PC7-FESTIVAL SKUs please refer to www.ekf.com/liste/liste_21.html#PC7

CompactPCI® PlusIO

CompactPCI® PlusIO (PICMG® 2.30) is an enhancement to CompactPCI® Classic which enables system expansion and rear I/O across J2. High speed signal lines (PCI Express®, SATA and USB) are passed from the PC7-FESTIVAL via the J2 connector to the backplane, for usage either with a PlusIO rear I/O transition module, or recent CompactPCI® Serial cards.

CompactPCI® Serial (PICMG® CPCIS.0) defines a card slot based on PCI Express®, SATA, Gigabit Ethernet and USB serial data lines. On a hybrid backplane, both card styles CompactPCI® and CompactPCI® Serial can reside, with the PC7-FESTIVAL in the middle as controller for both backplane segments, combining the technologies of both worlds.



PC7-FESTIVAL • System Expansion Options

New from PCB Rev. 2022 off: Expansion Connector GBE for passing 2 x 2.5GBASE-T to J2, as an option with P82 low profile mezzanine module.

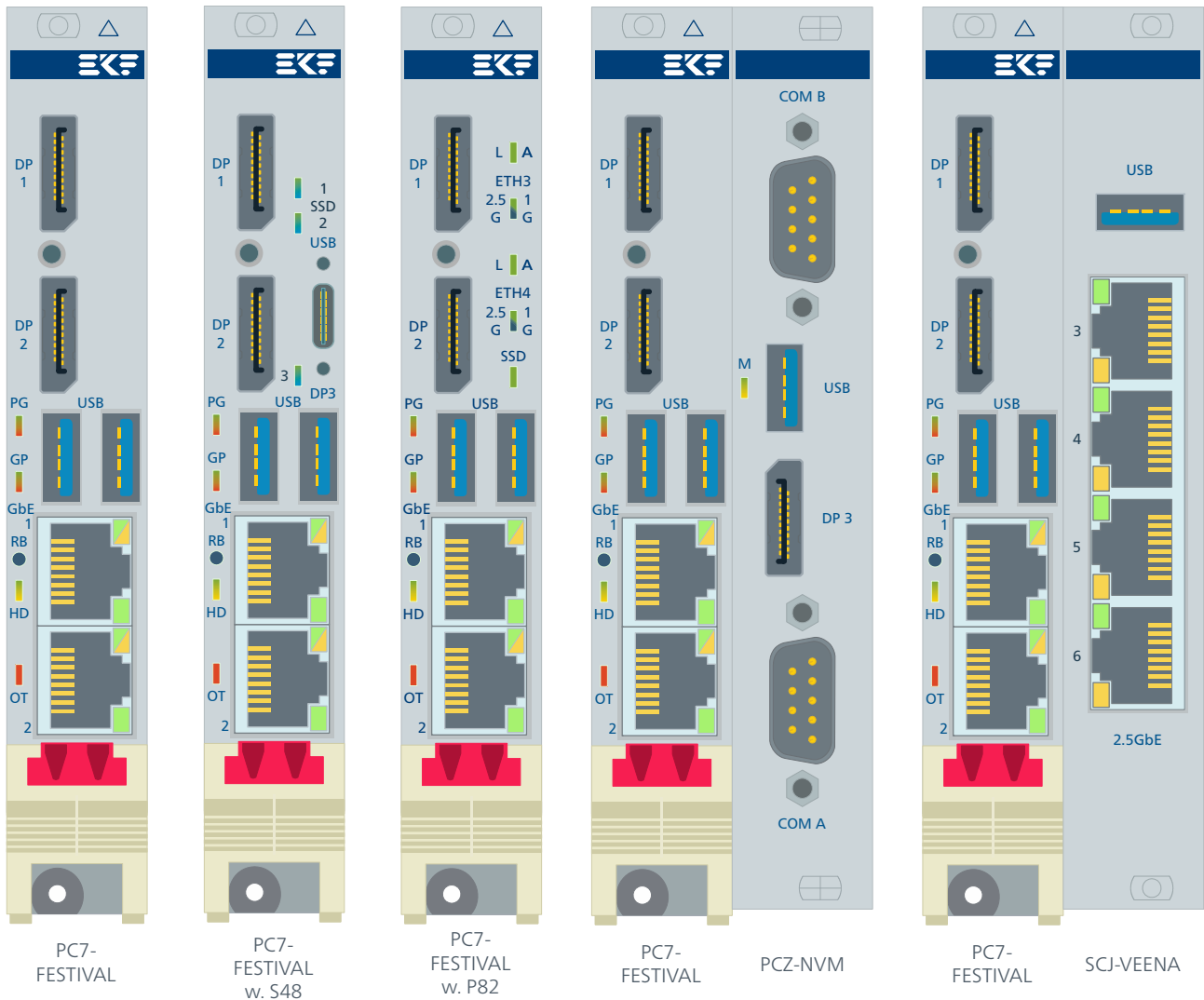


Sample CompactPCI® PlusIO Rack



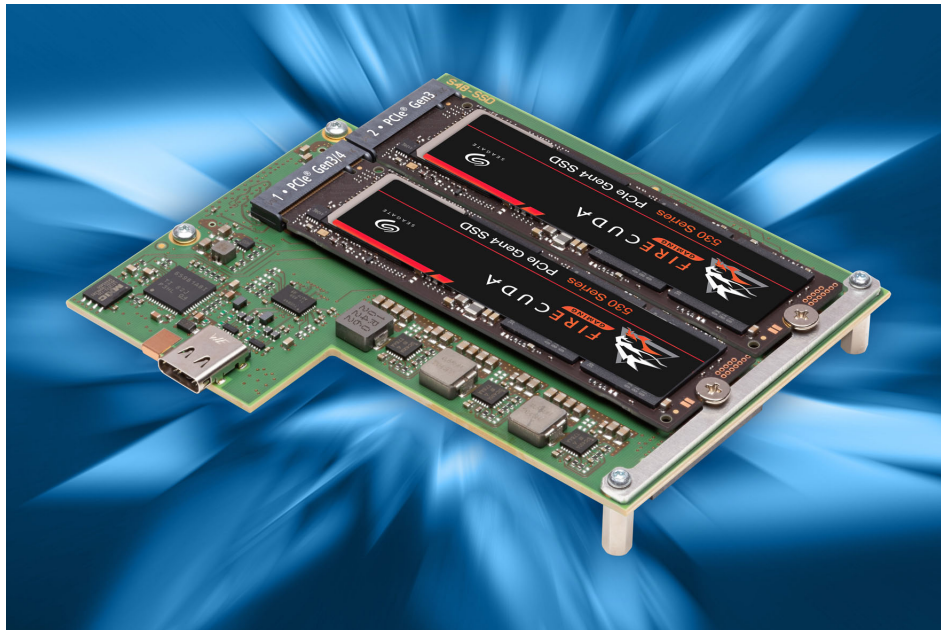
SRP-BLUBOXX

Front Panel



Type-C Screw Lock

Low Profile Mezzanine Mass Storage 4HP NVMe®



S48-SSD • Dual M.2 NVMe SSD Low Profile Mezzanine



4HP Assembly • PC7-FESTIVAL w. S48-SSD



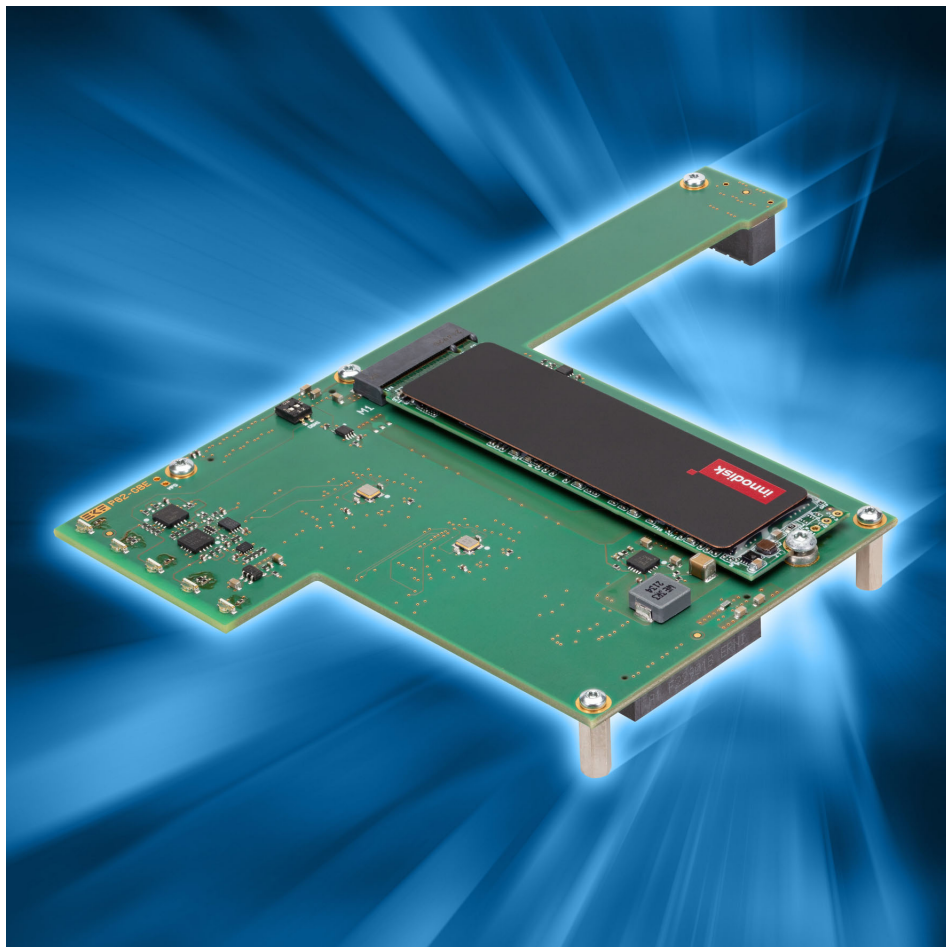
4HP Assembly w. S48-SSD



4HP Assembly w. P82-GBE



4HP Assembly w. P82-GBE

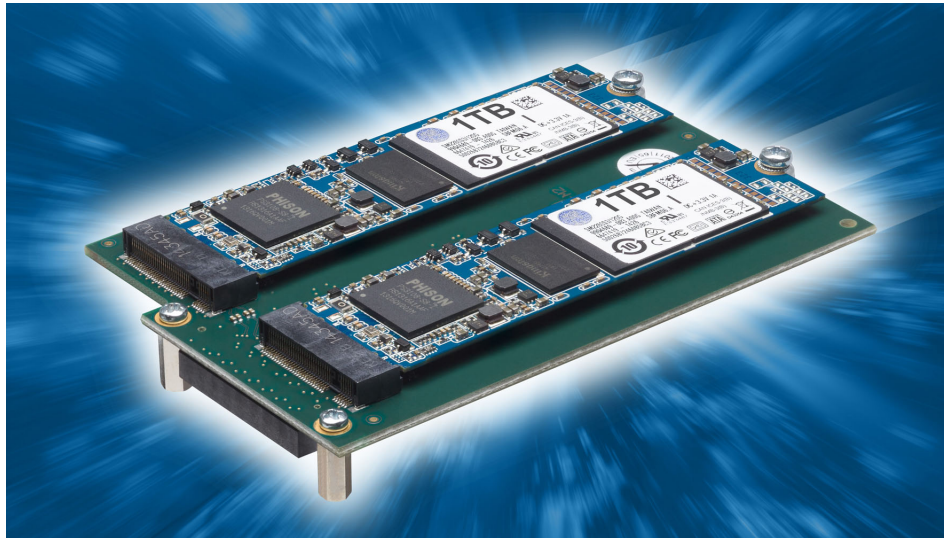


P82-GBE



4HP Assembly • PC7-FESTIVAL w. P82-GBE

Low Profile Mezzanine Mass Storage 4HP SATA



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

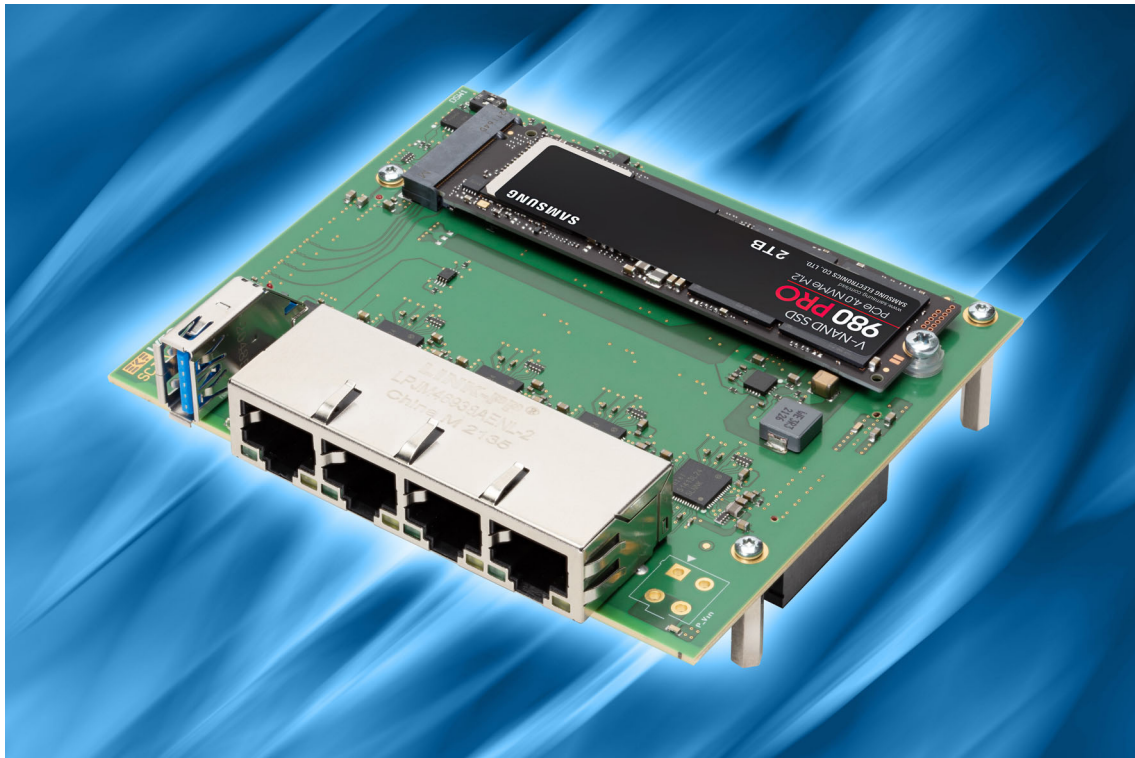


4HP Assembly • PC7-FESTIVAL w. C48-M2



4HP Assembly w. C48-M2

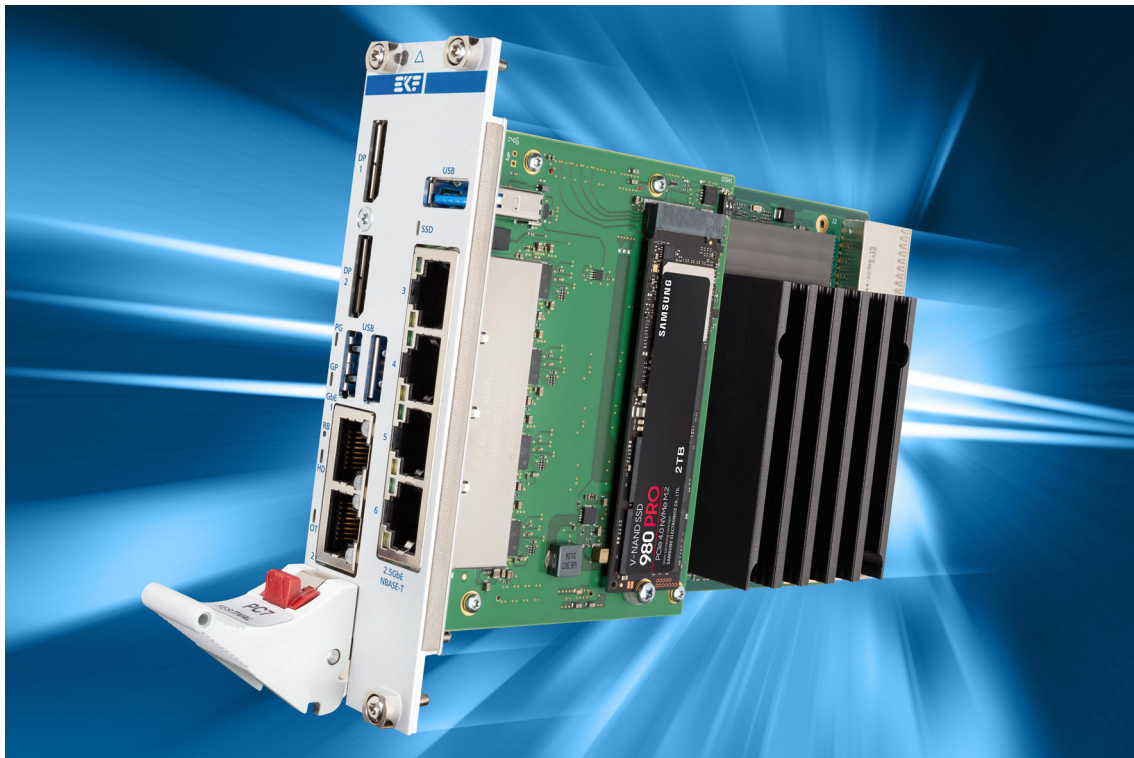
Side Card Assemblies 8/12HP



SCJ-VEENA • Quad 2.5GBASE-T NICs & M.2 NVMe



8HP Assembly • PC7-FESTIVAL w. SCJ-VEENA



8HP Assembly • PC7-FESTIVAL w. SCJ-VEENA



8HP Assembly • PC7-FESTIVAL w. SCJ-VEENA



8HP Assembly • PC7-FESTIVAL w. SCL-RHYTHM



8HP Assembly • PC7-FESTIVAL w. PCU-UPTEMPO (Similar Photo)



8HP Assembly • PC7-FESTIVAL w. PCU-UPTEMPO (Similar Photo)



8HP Assembly w. PCZ-NVM



8HP Assembly w. PCZ-NVM



8HP Assembly w. PCZ-NVM

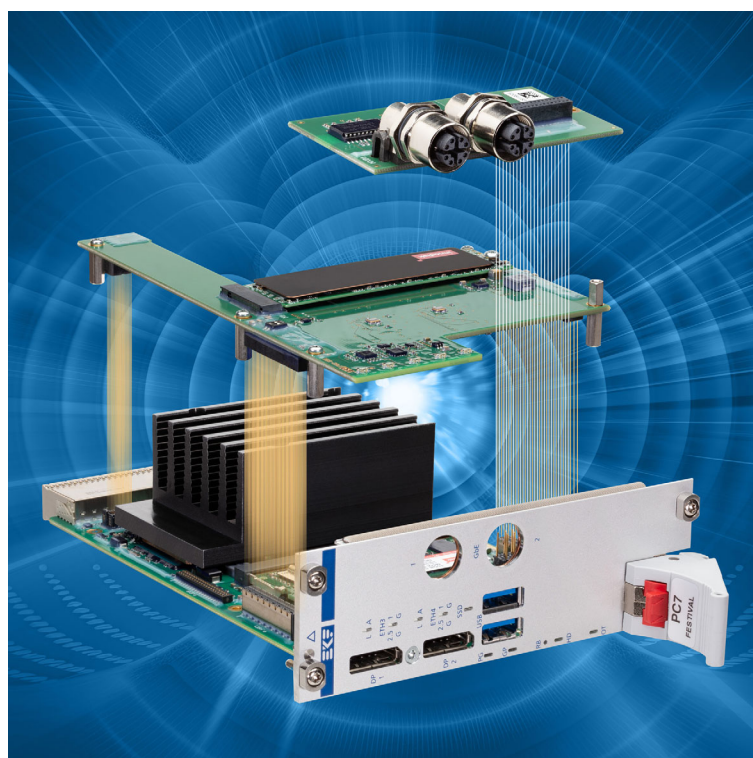


12HP Assembly w. PCZ-NVM & C32-FIO



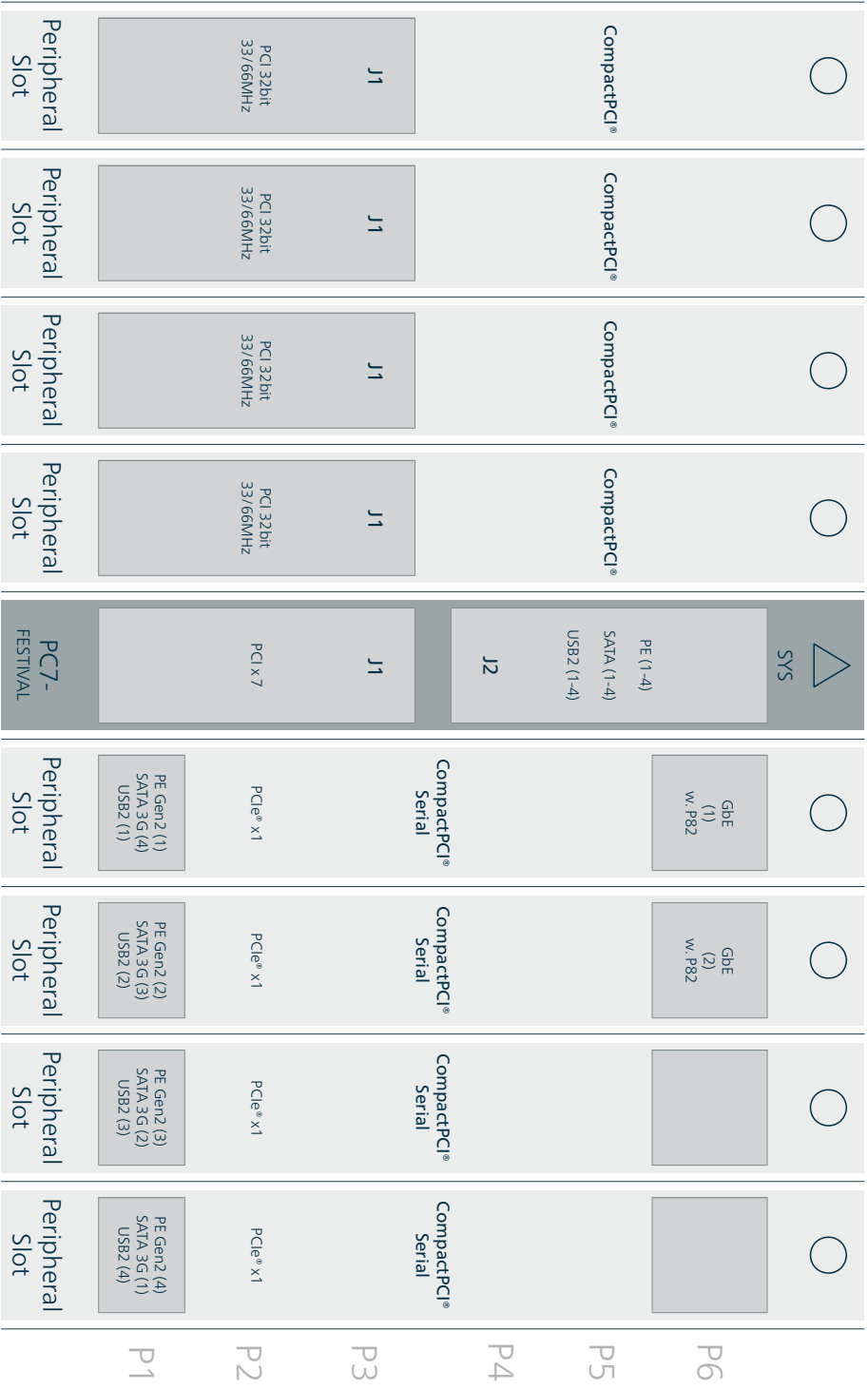
PC7-FESTIVAL w. P01-M12

The P01-M12 mezzanine 8HP assembly option replaces the PC7-FESTIVAL RJ45 Ethernet jacks by M12-X connectors. The P01-M12 can be combined with any low profile module available for the PC7-FESTIVAL, i.e. S48-SSD, C48-M2, P82-GBE.



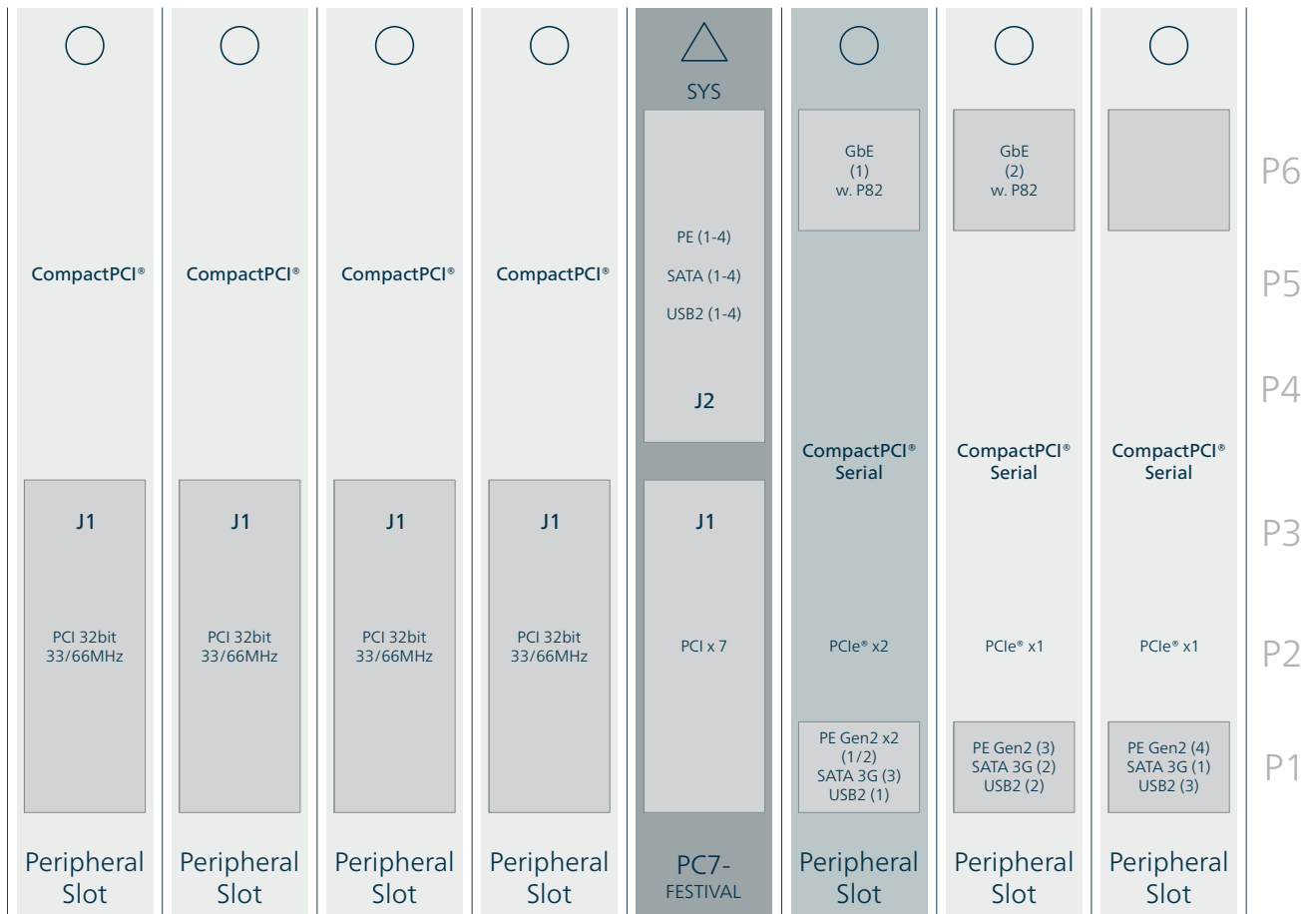
Sample Hybrid Backplane Configurations

PC7-FESTIVAL • Resources w. 4+1+4 Slots Hybrid Backplane



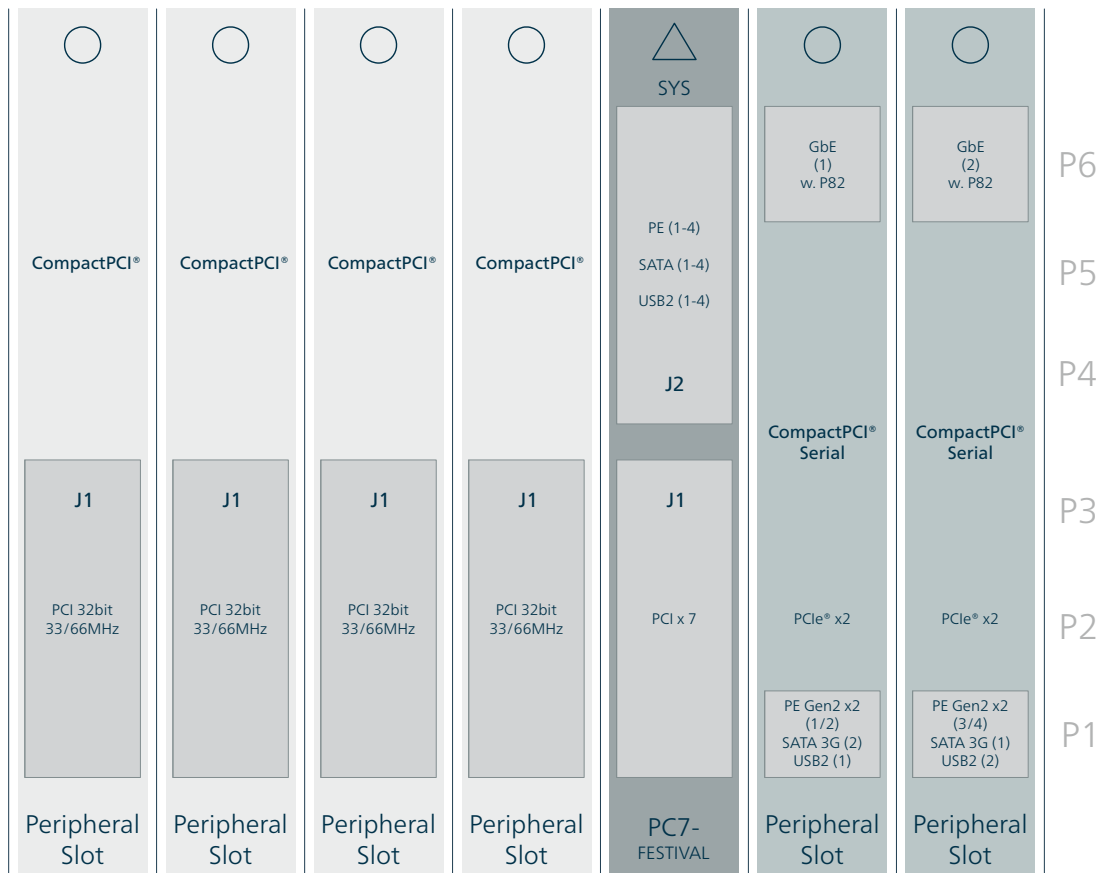
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PC7-FESTIVAL • Resources w. 4+1+3 Slots Hybrid Backplane



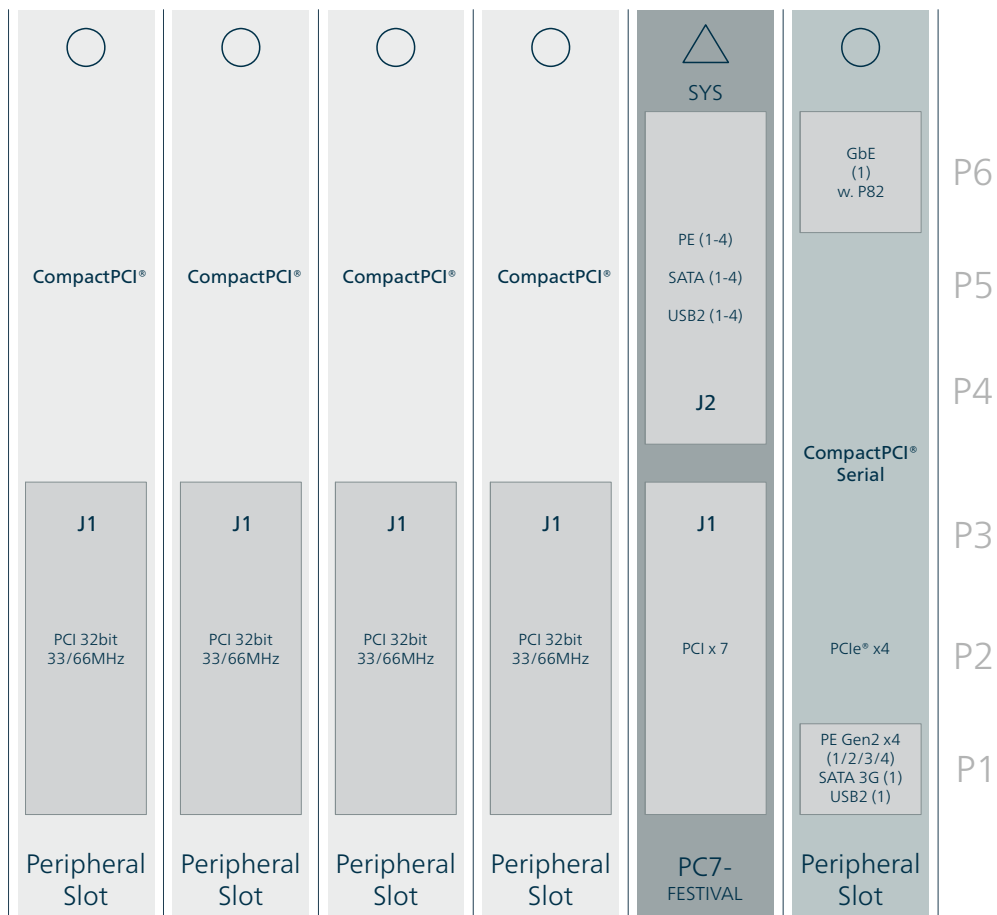
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PC7-FESTIVAL • Resources w. 4+1+2 Slots Hybrid Backplane



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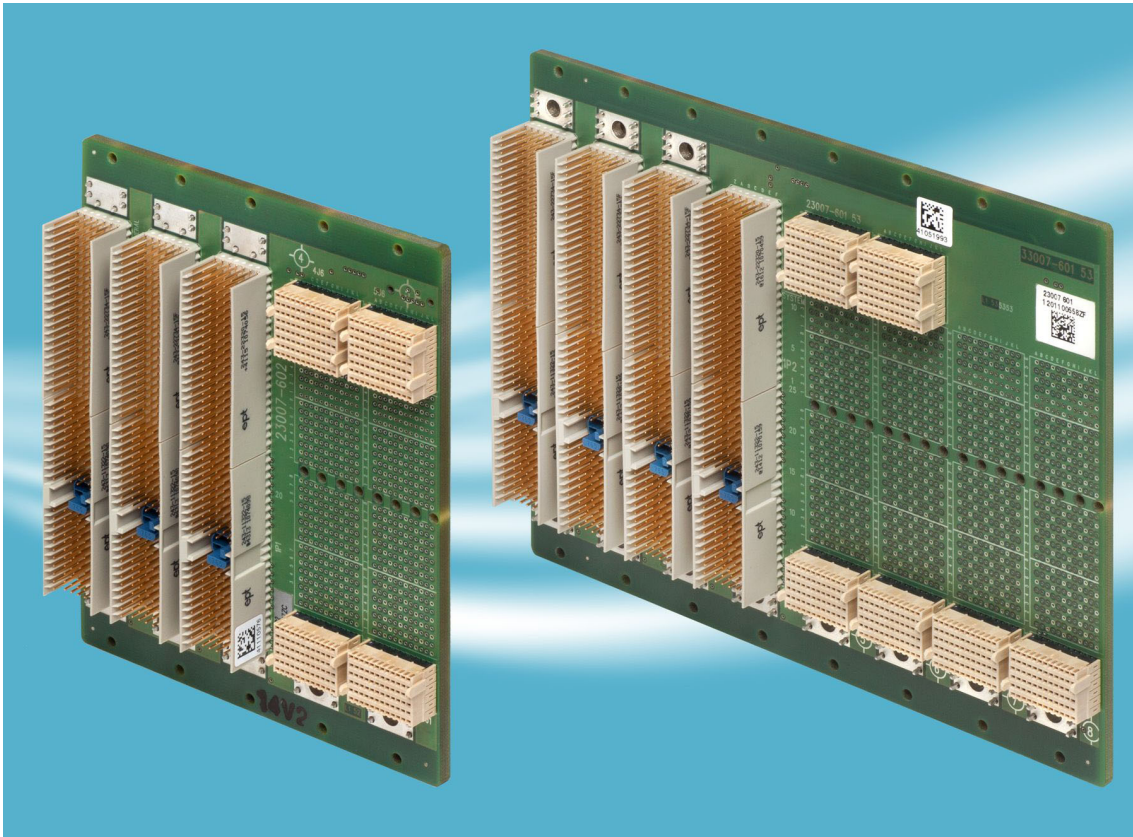
PC7-FESTIVAL • Resources w. 4+1+1 Slots Hybrid Backplane



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The PC7-FESTIVAL J2 PCIe® lanes must be configured accordingly via BIOS settings to either 4x1, 1x2 + 2x1, 2x2 or 1x4 (4 links, 3 links, two links, single link PCIe®). Connector designations J1/J2 and P1-P6 reflect the CompactPCI® card connector naming convention (mating backplane connectors P1/P2 and J1-J6). A maximum of 4 slots for CompactPCI® Serial peripheral cards can be achieved on a hybrid backplane, and up to 7 slots for CompactPCI® Classic peripheral cards. If the PC7-FESTIVAL CPU card is equipped with a side card (8HP or even 12HP front panel), the adjacent CompactPCI® Serial backplane card slots should be positioned at the same clearance, to prevent loss of usable slots. Such backplanes are highly custom specific - please contact sales@ekf.com.

Backplane Ethernet



On a hybrid backplane the center slot with P1/P2 connectors is reserved for the CompactPCI® PlusIO CPU card (system slot). To the left there are CompactPCI® classic peripheral card slots (32-bit). On the right side CompactPCI® Serial peripheral cards can be plugged. When backplane Ethernet is required, the low profile mezzanine module P82-GBE can be assembled together with the PC7-FESTIVAL. Then, adjacent to the CPU card slot, two CompactPCI® Serial slots would be Gigabit Ethernet enabled, via their J6 backplane connectors.

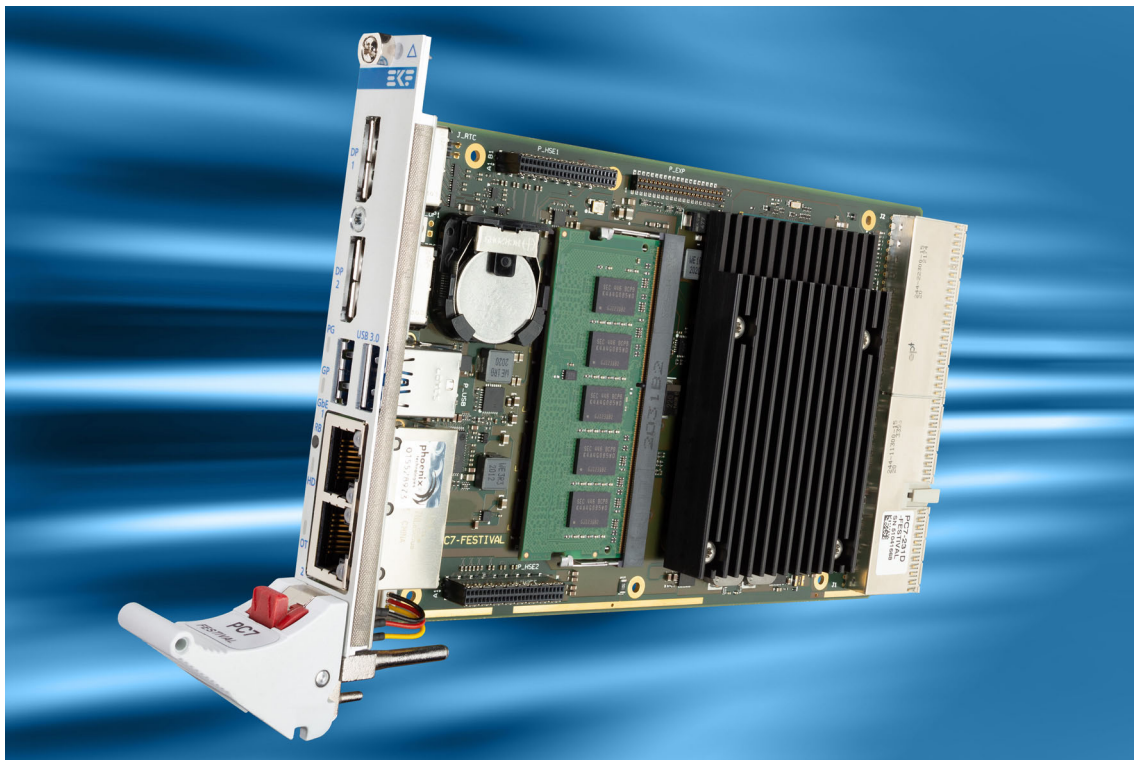
Rear I/O

The I/O resources provided by the PC7-FESTIVAL backplane connector J2 can also be used for an rear I/O module. EKF can offer custom specific RIO design - please contact sales@ekf.de.



Sample PlusIO RIO Module

Memory Options



PC7-FESTIVAL • Soldered ECC DDR4 & ECC SODIMM



PC7-FESTIVAL • Soldered ECC DDR4

Industrial Computers Made in Germany
boards. systems. solutions.



Beyond All Limits:
EKF High Performance Embedded

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