Product Information

PC6-TANGO • CompactPCI® PlusIO • Low Power CPU Card

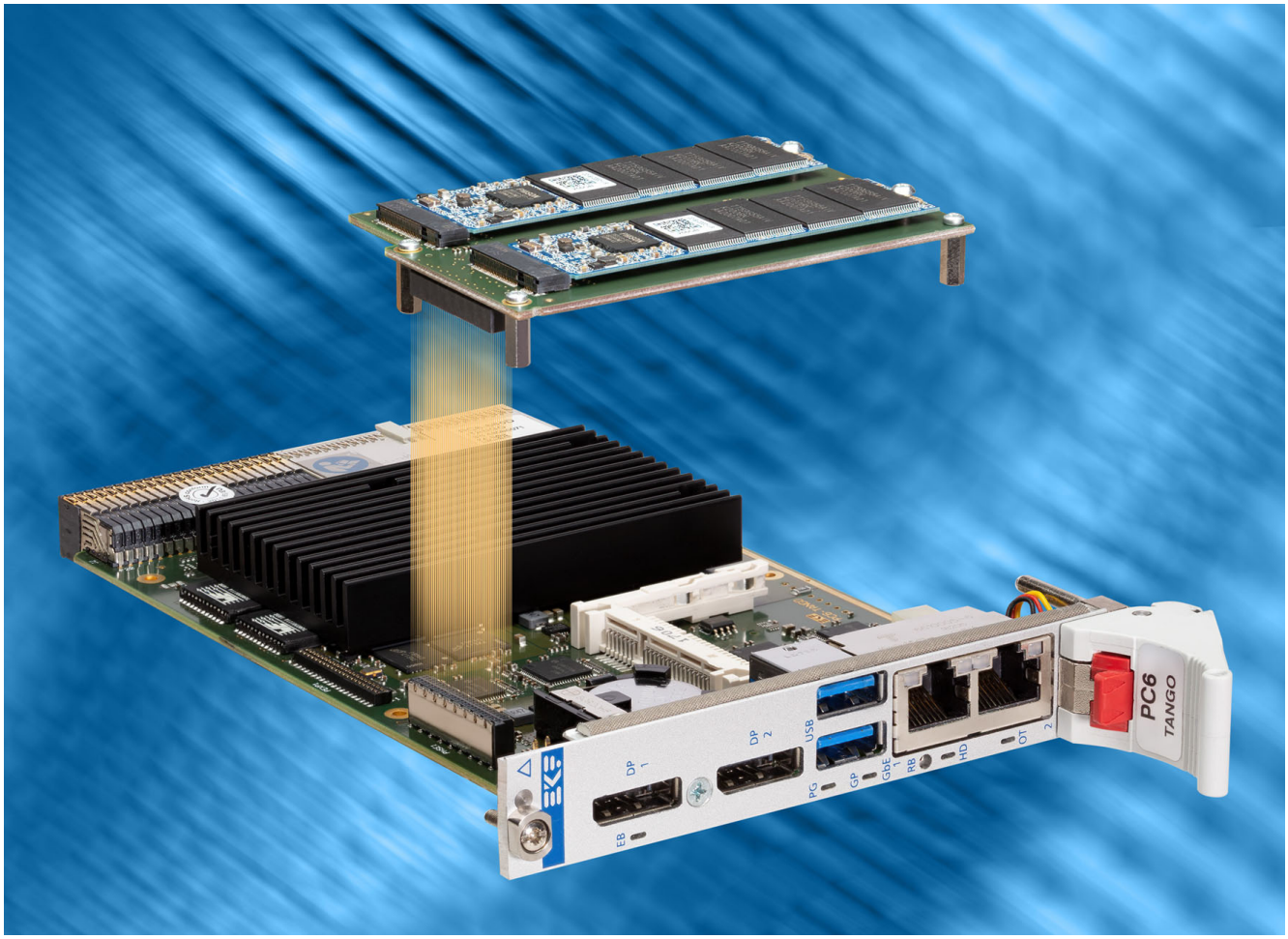
Intel® Atom™ E3900 Series Processor • Apollo Lake SoC

General

The PC6-TANGO is a low power 4HP/3U CompactPCI® PlusIO CPU board, equipped with an Intel® Atom™ E39xx-series System-on-Chip processor (Apollo Lake). The front panel is provided with two Gigabit Ethernet jacks (option M12-X), two USB 3.0 receptacles, two DisplayPort connectors, and optionally a Micro SD Card slot.

The PC6-TANGO is equipped with 8GB directly soldered DDR3L ECC RAM, and a CFast™ card socket as on-board SSD mass storage solution.

Optionally available is an on-board 64GByte e•MMC flash memory chip. Further more, low profile SATA SSD mezzanine modules are available as additional on-board mass storage solution. The PC6-TANGO backplane connectors comply with the CompactPCI® PlusIO specification, suitable for system expansion with classic CompactPCI® peripheral cards via J1, and in addition a rear I/O module attached to J2, or up to four CompactPCI® Serial cards accessed on a hybrid 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® 32-Bit support
- J2 Connector for CompactPCI® PlusIO support (PCIe, SATA, USB2, GbE)
- J2 PlusIO configuration allows for either CompactPCI® Serial backplane usage or rear I/O module attachment
- On-board 2 x SATA 6G mezzanine expansion for mass storage modules or side cards
- Side cards and low profile mass storage modules available as COTS and also as custom specific
- +5V only board design for low cost system power supply
- PC6-TANGO can deliver +3.3V to CompactPCI® peripheral boards

Processor

- Intel® Apollo Lake-I (APL-I) SoC E39xx Series
- x7-E3950 • 4 Cores • 1.6/2.0GHz • 12W TDP/cTDP • 500/650MHz graphics • 2MB LLC
- x5-E3940 • 4 Cores • 1.6/1.8GHz • 9.5W TDP/cTDP • 400/600MHz graphics • 2MB LLC
- x5-E3930 • 2 Cores • 1.3/1.8GHz • 6.5W TDP/cTDP • 400/550MHz graphics • 2MB LLC
-
- Graphics Burst, CPU Burst, Intel® Speedstep®
- Intel® Virtualization Technology (Intel® VT-x / VT-d)
- Intel® Trusted Execution Engine (Intel® TXE) 3.0

Firmware

- Phoenix® UEFI (Unified Extensible Firmware Interface) V2.5 with CSM*
- Phoenix® SCT (SecureCore Technology) Release V4.01
- ACPI tbd
- Fully customizable by EKF
- Secure Boot and Measured Boot supported - meeting all demands as specified by Microsoft®
- Windows®, Linux and other (RT)OS' supported

** 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 8GB DDR3L 1600 +ECC
- Soldered memory for rugged applications

Mass Storage

- On-board CFast™ Card socket (SATA based CompactFlash)
- Option front I/O Micro SD Card socket (SDHC, SDXC), available on request
- 128Mbit SPI Flash (UEFI firmware and customer application data)
- Option e•MMC (embedded MMC 5.0 64GByte soldered)
- Option low profile mezzanine card C41-CFAST (secondary CFast™ card socket) via P-HSE connector
- Option low profile mezzanine card C48-M2 (dual M.2 SATA SSD module sockets) via P-HSE connector
- Option 8HP assembly side card PCU-UPTEMPO (dual M.2 SATA SSD module sockets) via P-HSE connector
- Option 8HP assembly side card C44-SATA (2.5-inch SATA SSD/HDD) via P-HSE connector
- Option custom specific mezzanine board design on request

Graphics

- Integrated graphics engine, Gen 9 LP
- DirectX 12.0, OpenCL 2.0 Full Profile, OpenGL 4.3
- HW media acceleration DXVA 2, VAAPI
- HW video decode H264 L5.2, H.265 HEVC, VP9, MVC, MPEG2, JPEG/MJPEG, VC1, WMV9, VP8
- HW video encode H264, SVC, AVC, MVC, MPEG-2
- Content protection PAVP, HDCP 1.4
- 2 x DisplayPort front panel connectors
- DisplayPort™ 1.2a
- Max Resolution 4096 x 2160 @60Hz

Networking

- Four networking interface controllers (NIC), 1000BASE-T, 100BASE-TX, 10BASE-T connections
- Intel® I210-IT -40°C to +85°C operating temperature GbE controllers w. integrated PHY
- 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
- Two GbE ports via RJ45 front panel jacks (option 2 x M12-X with mezzanine module P01 8HP)
- Two GbE ports via backplane connector J2 for rear I/O or CompactPCI® Serial backplane usage

Feature Summary

APL SoC I/O Usage

- 4 x PCIe Gen2 to J2 backplane connector - usage for CompactPCI® Serial peripheral cards or rear I/O module
- 1 x PCIe Gen2 to PCIe switch PI7C9X2G606PR 1:5 lanes (on-board PCIe devices)
- 1 x PCIe to PI7C9X112 PCI bridge (J1 backplane connector, for classic CompactPCI® card support)
- 1 x SATA 6G to on-board CFast™ SSD card socket - can be used as mass storage and boot device
- 1 x SATA 6G to mezzanine expansion connector P-HSE
- e•MMC I/F 400MByte/s (HS400) to embedded MMC 5.0 64GByte (ordering option, mass storage device)
- 2 x USB 3.0 to front panel connectors
- 2 x DisplayPort to front panel connectors
- SDIO (Micro SD Card) front panel slot (option)
- 4 x USB2 to J2 backplane connector
- LPC, Audio, I2C, 2 x USB2 to mezzanine expansion connector P-EXP
- LPC to TPM 2.0 module

On-Board Building Blocks

- Additional on-board controllers, PCIe® based
- PCIe® Gen2 packet switch PI7C9X2G606PR (6-port, 6-lane)
- 2 x Gigabit Ethernet controllers Intel® I210IT (front panel)
- Option 2 x Intel® I210IT (RIO via J2 backplane connector)
- PCIe® to PCI® bridge PI7C9X112 (7 x PCI 33/66MHz peripheral slots)
- Dual port SATA 6G/3G* controller Marvell® 88SE9170 (to P-HSE mezzanine connector, and J2 RIO)
- Option e•MMC (embedded MMC 5.0 64GByte HS400)

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 (Intel® AES-NI)

Front Panel I/O (4HP)

- 2 x Gigabit Ethernet RJ45 (2 x I210IT)
- 2 x DisplayPort (APL SoC)
- 2 x USB 3.0 Type-A (APL SoC)
- Micro SD Card slot (APL SoC)

Feature Summary

Front Panel I/O (8HP)

- Option RS-232, Audio, USB w. PCU-UPTEMPO side card
- Option 2 x M12 X-coded receptacles for Gigabit Ethernet (as replacement for RJ45)
- Custom specific front panel and side card design

CompactPCI® & CompactPCI® PlusIO 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 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 APL SoC), 1 x SATA 6G/3G * (from Marvell SATA controller), 4 x USB2 ports (from APL SoC), 2 x Gigabit Ethernet (I210IT networking controllers)

** CompactPCI® PlusIO specifies SATA 3G over J2. SATA 6G may be functional but is not guaranteed. The Marvell SATA controller port available via J2 is therefore configured for 3Gbps by default.*

*** In case of obsolescence, the J2 UHM connector will be replaced by the CompactPCI® 2.0 classic J2 connector. This may reduce high speed backplane transfer in particular applications (PCIe Gen1 2.5GT/s, SATA 1.5G). This does not affect peripherals attached via the P-HSE mezzanine connector.*

Local Expansion

- Mezzanine side card connectors for optional local expansion
- P-EXP - LPC, Audio, 2 x USB2, I2C (from APL SoC)
- P-HSE - 2 x SATA 6G (port 1 from APL SoC, port 2 from PCIe to SATA controller 88SE9170)

- 4HP Low profile mezzanine module options (to be ordered separately)
- CFast™ Card with C41-CFAST mezzanine module
- Dual M.2/NGFF SATA SSD 2230 - 2280 size with C48-M2 mezzanine module
- Custom specific module design

- 8HP Mezzanine side card option (to be ordered separately)
- PCU-UPTEMPO side board w. 2 x M.2 SATA sockets & front I/O
- 2.5-inch SATA SSD/HDD available with C44-SATA
- Custom specific side card design

Feature Summary

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 -40°C to +85°C (industrial temperature range)
- 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 21.6 years
- EC Regulatory EN55035, EN55032, EN62368-1

RT OS Board Support Packages & Driver

- Please refer to external document www.ekf.com/s/rtos_support.pdf

Applications

- General low power industrial computing, for x86 based software
- Rugged systems (e.g. transportation)
- Data concentrator, router, gateway, kiosk systems
- Stand-alone computer (edge computing), mezzanine and rear I/O expansion options
- Small modular systems, CompactPCI® and/or CompactPCI® Serial peripheral card expansion

all items are subject to changes

Related Information	
PC6-TANGO Home	www.ekf.com/p/pc6/pc6.html
PC6-TANGO User Guide	www.ekf.com/p/pc6/pc6_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

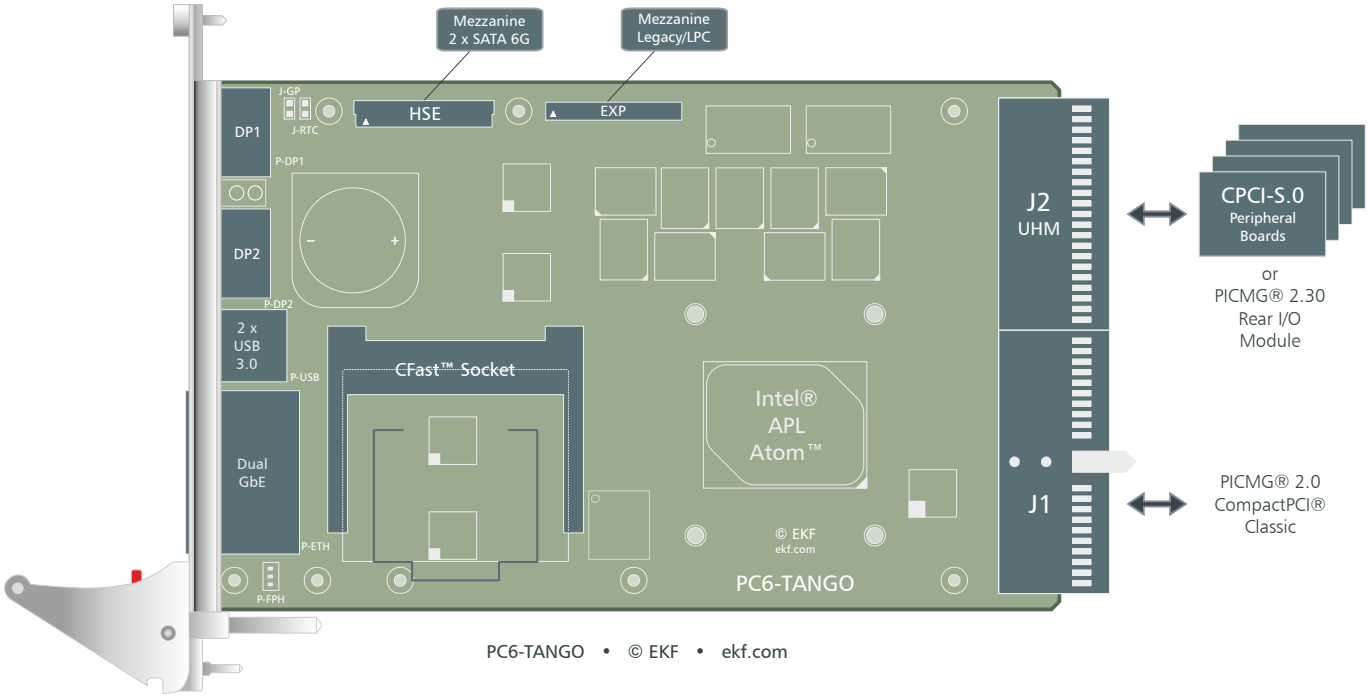
Related Documents Mezzanine Modules and Side Cards	
PCU-UPTEMPO Side Board	www.ekf.com/p/pcu/pcu.html
C40 ... C48 Series Mezzanine Storage Modules	www.ekf.com/c/ccpu/c4x_mezz_ovw.pdf
C48-M2 Dual M.2 SATA SSD Mezzanine Storage Module	www.ekf.com/c/ccpu/c48/c48.html

Ordering Information
For popular PC6-TANGO SKUs please refer to www.ekf.com/liste/liste_21.html#PC6
For popular Mezzanine Side Cards please refer to www.ekf.com/liste/liste_20.html#C40

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, Gigabit Ethernet and USB) are passed from the PC6-TANGO 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 PC6-TANGO in the middle as controller for both backplane segments, combining the technologies of both worlds.

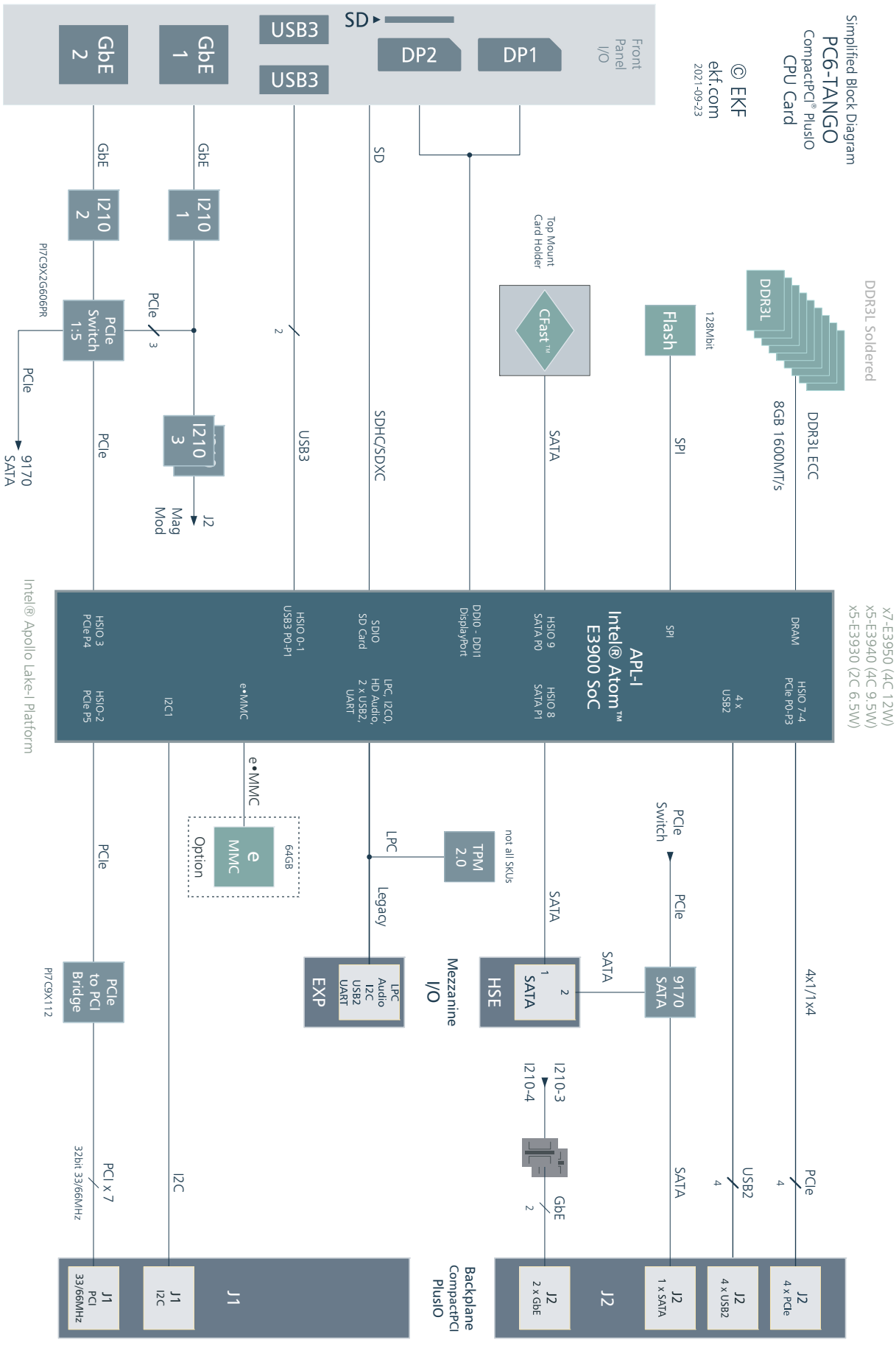


PC6-TANGO • System Expansion Options

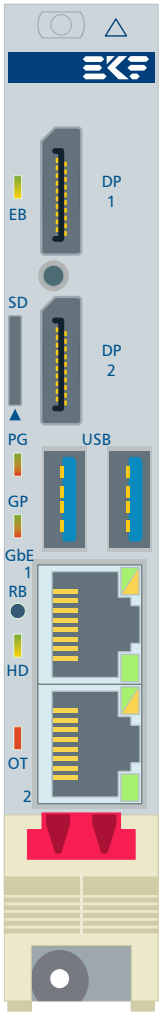
Sample CompactPCI® PlusIO Rack

SRP-BLUBOXX

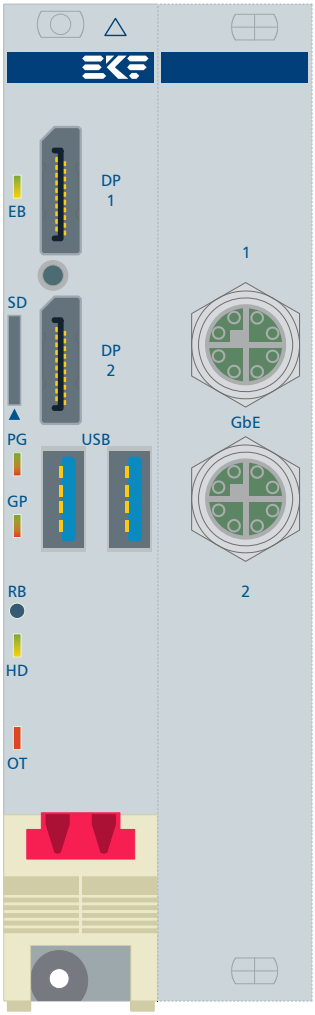
Block Diagram



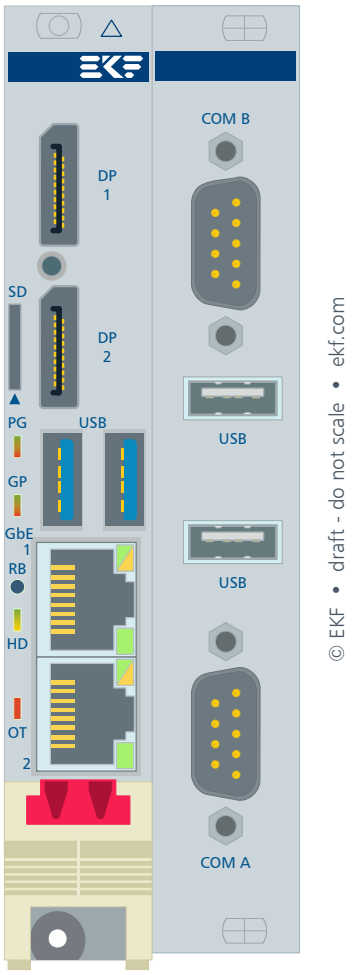
Front Panel



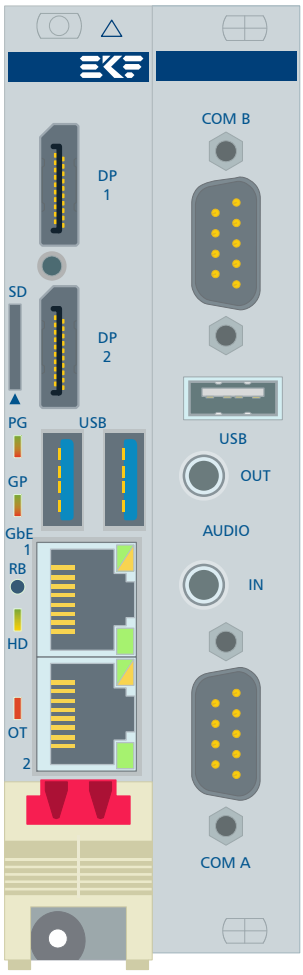
PC6-TANGO



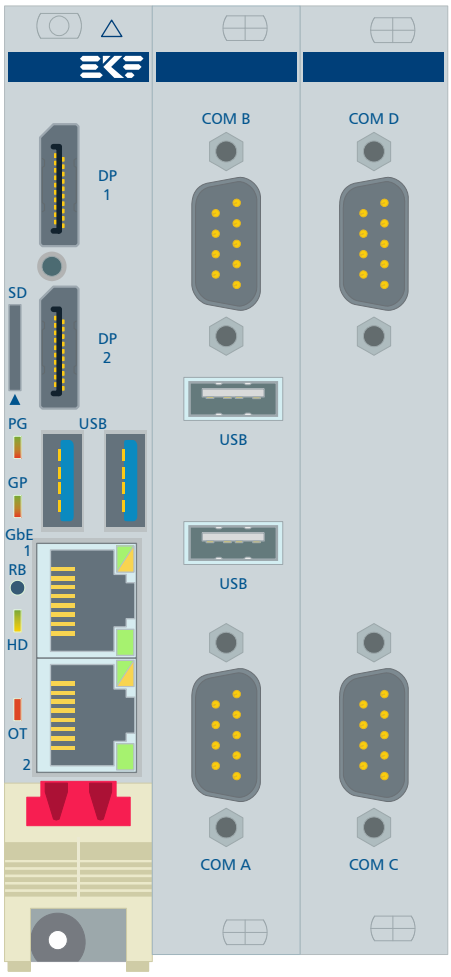
PC6-TANGO P01-M12



PC6-TANGO PCU-UPTEMPO
Dual USB

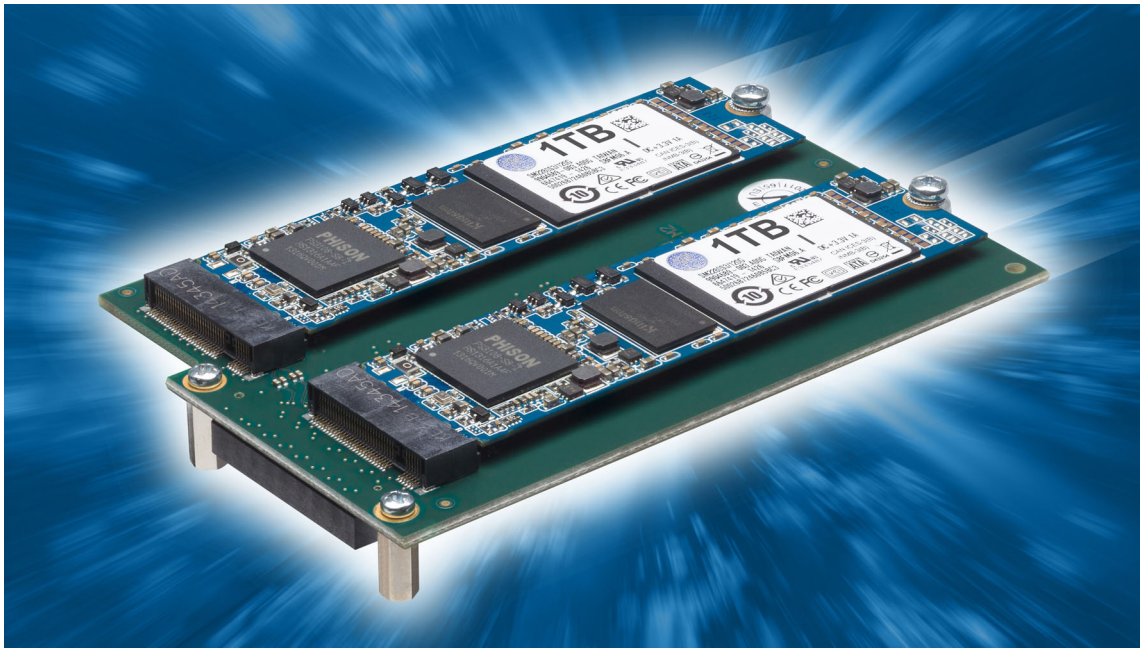


PC6-TANGO PCU-UPTEMPO
AUDIO



PC6-TANGO PCU-UPTEMPO C32-FIO

Recommended Low Profile Mezzanine Mass Storage Solution

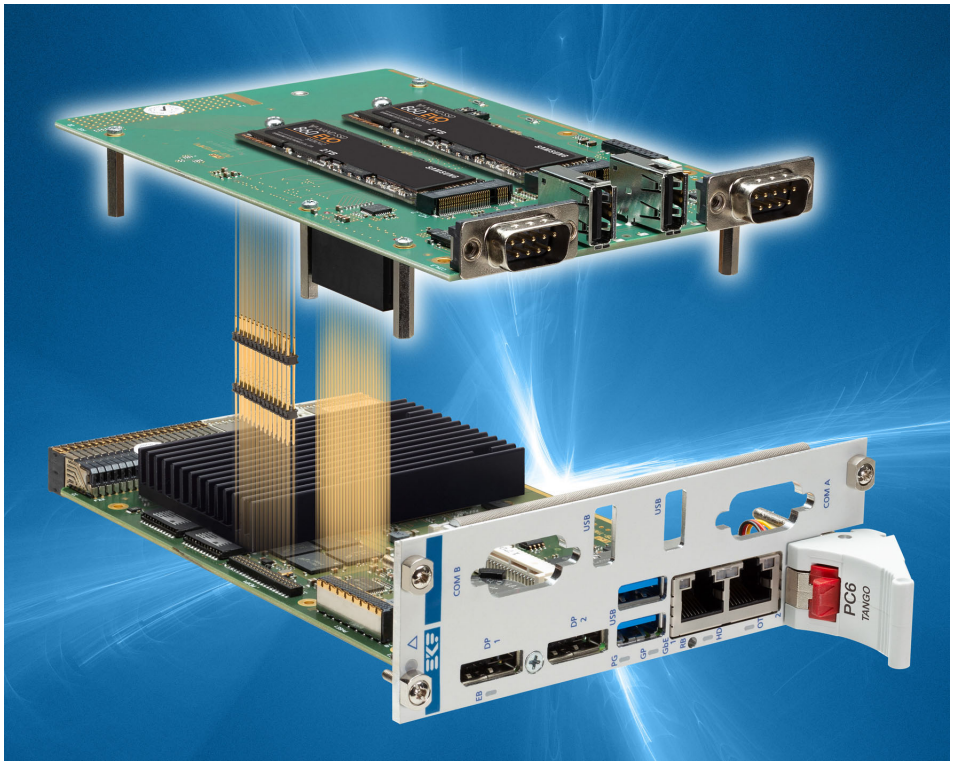


C48-M2 • Low Profile Mezzanine M.2 SATA SSD

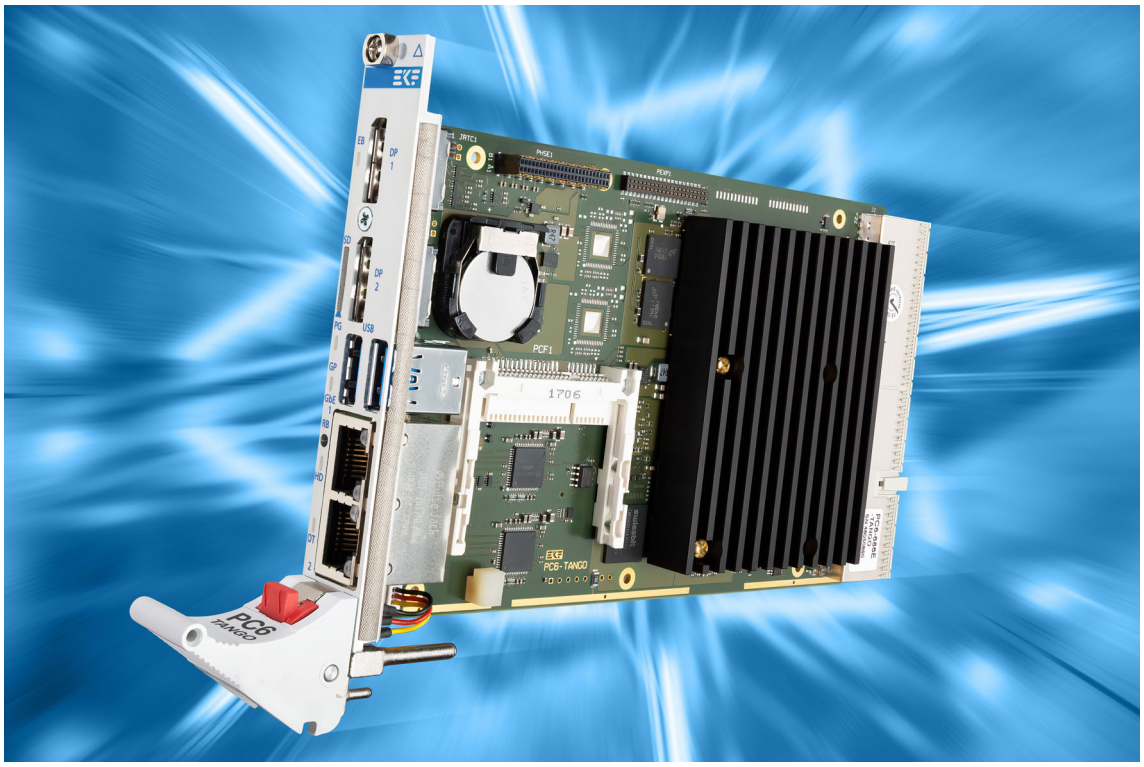
PC6-TANGO w. C48-M2 Low Profile SSD Module

PCU-UPTEMPO Mezzanine Side Card

PC6-TANGO w. PCU-UPTEMPO (8HP F/P Assembly)



Option M12 Ethernet


EB
DP 1
SD
DP 2
PG
USB
GP
GbE 1
RB
HD
OT 2
PC6 TANGO
PCF1
1706
PC6-TANGO


EB
DP 1
SD
DP 2
PG
USB
GP
GbE 1
RB
HD
OT 2
PC6 TANGO
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