



Product Information

## ECX-PCIE

**CompactPCI® Serial to CompactPCI® Express Backplane Coupler/Bridge**  
Mezzanine I/O Expansion Board (CPU Side Card)



## General

*The ECX-PCIE is a mezzanine side card for EKF CompactPCI® Serial CPU boards, equipped with a PCIe® Gen3 packet switch, on-board NVMe and SATA mass storage, and high speed front I/O.*

*The PCI Express® switch supports a CompactPCI® Express (aka PXI Express™) backplane with four links organized as Gen3 x4, thereby replacing a CompactPCI® Express CPU card. This enables a hybrid system which is comprised of two backplanes, CompactPCI® Serial boards to the left, and CompactPCI® Express peripheral cards to the right. The CompactPCI® Serial CPU controls also the CompactPCI® Express backplane via the ECX-PCIE mezzanine card.*

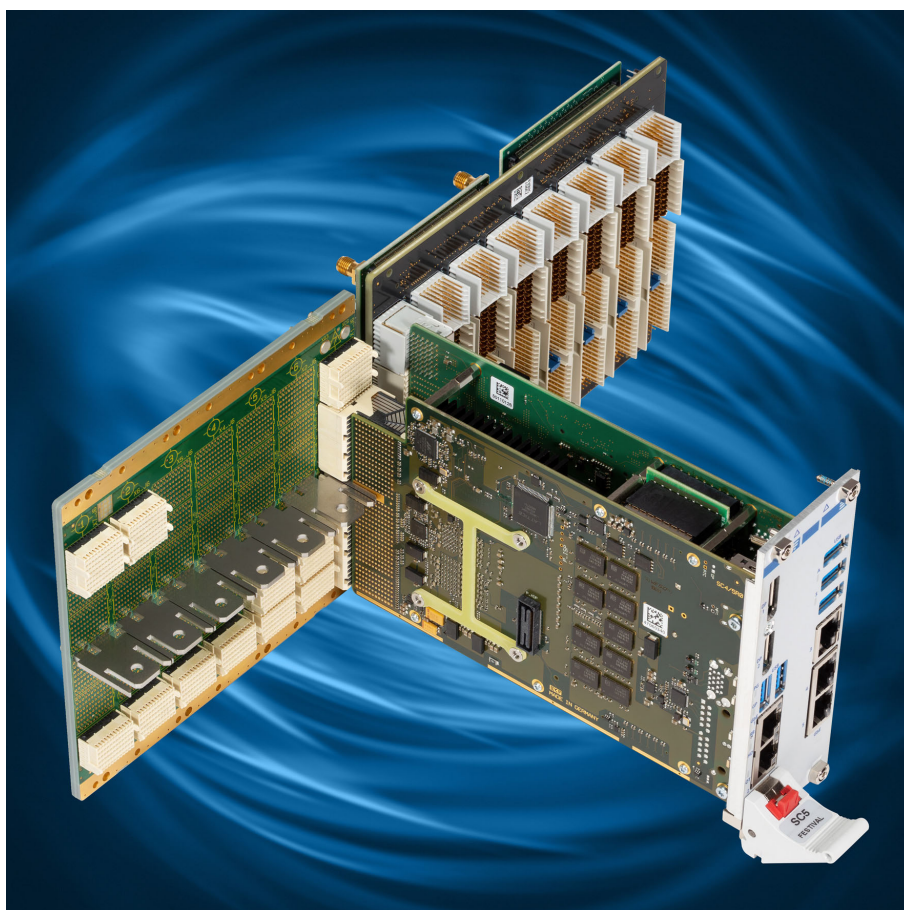
*The ECX-PCIE is suitable for EKF CPU carrier cards such as the SC5-FESTIVAL, with support for 8 x PCIe® lanes on a mezzanine board.*

The CPU carrier board and ECX-PCIE side card assembly requires 10HP common front panel width, and must be inserted into the particular system slots of two adjacent backplanes. While the CPU card fits into a CompactPCI® Serial backplane which has its system slot right aligned, the ECX-PCIE meets the left aligned system slot of the neighbouring CompactPCI® Express backplane.

In addition, the ECX-PCIE is provided with an M.2 socket for an NVMe (PCIe®) or SATA SSD module. Another socket is suitable for either a PCIe® Mini Card, or mSATA SSD. Furthermore, the ECX-PCIE is equipped with three GbE and three USB 3.0 ports for front I/O, which expands the native CPU carrier card I/O. As an option, the front panel can be provided with SMA antenna connectors for WWAN or WLAN operation.







## Features

## Feature Summary

*General*

- ▶ Mixed function mezzanine side card for EKF CompactPCI® Serial CPU boards
- ▶ Form factor single size Eurocard (board dimensions 100x160mm<sup>2</sup>)
- ▶ PICMG® CompactPCI® Express (EXP.0) system slot card
- ▶ Based on new mezzanine connectors HSE1/HSE2 (8 x PCIe® Gen3)
- ▶ Suitable e.g. for use with CPU cards SC4-CONCERTO, SC5-FESTIVAL, SC9-TOCCATA
- ▶ 10HP assembly together with CPU card
- ▶ 24-lanes PCI® Express Gen3 switch
- ▶ Supports CompactPCI® Express backplane
- ▶ Provides Gigabit Ethernet front panel I/O (3 x RJ45)
- ▶ Provides USB 3.0 front panel I/O (3 x Type A)
- ▶ Provides mass storage capability (1 x M.2 NVMe/SATA, 1 x mSATA)

*Backplane Connectors*

- ▶ CompactPCI® Express backplane connectors XP1, XJ2, XJ3, XJ4, system board pin assignment
- ▶ PCI® Express support four links Gen3 x4
- ▶ Can be used with any standard CompactPCI® Express backplane (system slot left aligned)
- ▶ 6HP pitch between system slots CPCI® Serial and CPCI® Express

*PCI Express® Switching*

- ▶ 24-lane 6-port PCI Express® Gen3 packet switch PEX 8724
- ▶ Upstream 1 x4 link wired to the HSE1 mezzanine connector (CPU card PCH or processor)
- ▶ Downstream 4 x4 links to the CompactPCI® Express backplane
- ▶ Downstream 1 x4 link to the NVMe SSD M.2 socket

*Front Panel I/O*

- ▶ 3 x RJ45 Gigabit Ethernet jacks, three individual on-board I210-IT controllers
- ▶ 1000BASE-T, 100BASE-TX, 10BASE-T compliant data transfer rate
- ▶ 3 x USB 3.0 (3.1 Gen1) Type A receptacles
- ▶ Two USB ports via on-Board USB controller, one USB port derived from HSE1 mezzanine connector

*Networking*

- ▶ Three individual networking interface controllers (NIC), based on PCI Express®
- ▶ 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 (TSN)
- ▶ IEEE 1588 and 802.1AS packets time stamping for high-precision time synchronization
- ▶ All GbE ports wired via RJ45 front panel connectors

## Feature Summary

### USB

- ▶ Upper front panel receptacle wired to HSE1 mezzanine connector (CPU carrier card PCH)
- ▶ Middle and lower connectors wired to PCI Express® dual port USB 3.0 controller TUSB7320
- ▶ USB 3.1 Gen1 (formerly USB 3.0) xHCI (eXtensible host controller interface) SuperSpeed supported
- ▶ USB 2.0 high-speed, full-speed, low-speed supported
- ▶ 3 x front panel Type-A USB 3.0 host connectors
- ▶ V<sub>BUS</sub> (+5V) 1.5A high current power switches assigned to front panel connectors

### Mass Storage Solutions

- ▶ M.2 (formerly known as NGFF) socket for an NVMe type SSD module up to 2280 size
- ▶ PCI Express® Gen3 x4 interface (M-key socket)
- ▶ Socket height 4.2H (double sided module allowed)
- ▶ Capacity up to 2TB as of current
- ▶ Suitable for operating system installation (boot device)
- ▶ Alternate usage with an SATA type SSD B-M key
- ▶ Autosensing analog switch for selection between PCIe® and SATA operation
- ▶ On-Board 6G SATA controller 88SE9170
  
- ▶ PCI Express® Mini Card socket, full-size or half-size modules
- ▶ PCI Express® Mini Cards of all styles supported: USB 2.0 and PCIe® based, and mSATA
- ▶ Autosensing analog switch for selection between PCIe® and SATA operation
- ▶ On-Board 6G SATA controller 88SE9170
- ▶ Suitable for wireless applications e.g. WLAN, Bluetooth or 2G/3G/LTE WWAN modem card
- ▶ Micro SIM card holder associated (15mm x 12mm ETSI TS 102 221 V9.0.0, Mini-UICC)
- ▶ Suitable for fieldbus modules e.g. CAN-FD, and industrial Ethernet modules (real time networking)
- ▶ Custom specific F/P design for additional pigtail SMB antenna connectors (10HP front or wider)
- ▶ Custom specific F/P design for non-radio applications e.g. CAN-FD (10HP or wider)

### Applications

- ▶ System expansion with CompactPCI® Express peripheral cards
- ▶ Supports PCI Express® on up to four CompactPCI® Express peripheral slots (4x4 Gen3)
- ▶ Replaces CompactPCI® Express CPU card - entire system control by affordable CompactPCI® Serial CPU
- ▶ Enables usage of CompactPCI® Express boards in a CompactPCI® Serial system
- ▶ Demanding test and measurement systems

## Feature Summary

*Environmental, Regulatory*

- ▶ Designed & manufactured in Germany
- ▶ ISO 9001 certified quality management
- ▶ Custom specific development available on request
- ▶ Long term availability
- ▶ Rugged solution
- ▶ Coating, sealing, underfilling on request
- ▶ 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
- ▶ EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)
- ▶ MTBF 23.7 years

*all items are subject to technical changes w/o further notice*

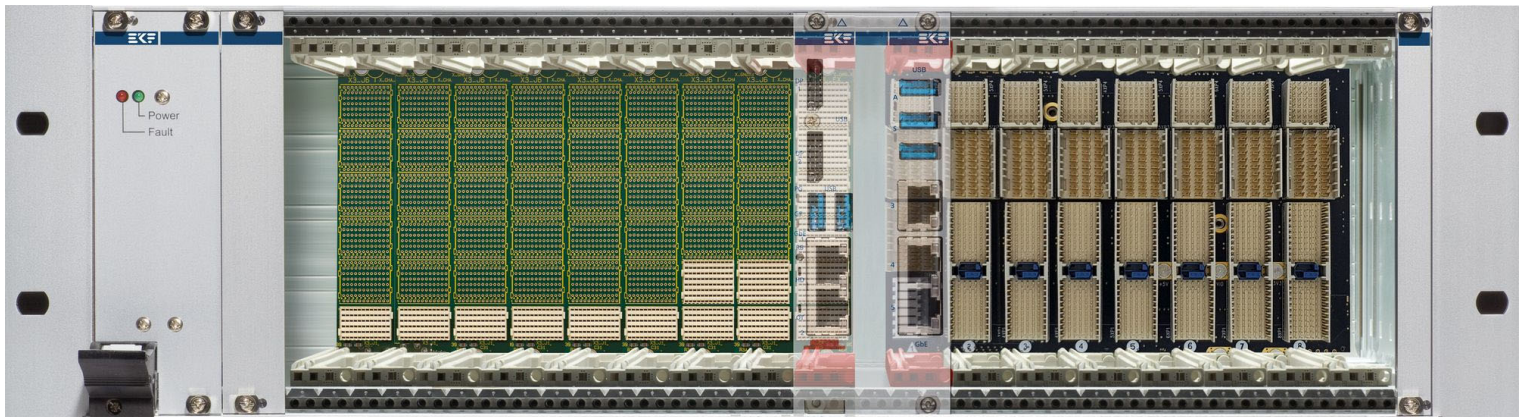
Please note that the ECX-PCIE typically comes without M.2 or Mini Card modules populated, unless otherwise expressly ordered. Photos shown within this document and at other places may be equipped with M.2 and/or Mini Card modules just for application demonstration. If you need a turnkey solution e.g. with an M.2 NVMe storage module populated, please contact sales@ekf.com before ordering.



## System Requirements

The ECX-PCIE is a mezzanine side card, to be fixed on top of a suitable CPU carrier board. The pitch between carrier PCB and mezzanine PCB is 6HP, resulting in a 10HP common front panel for the entire assembly. Two mezzanine inter-board connectors are provided, for distribution of PCI Express® signals. Power can be derived either from the CPU carrier (stand-alone operation), or the XP1 backplane connector (CompactPCI® Express system slot).

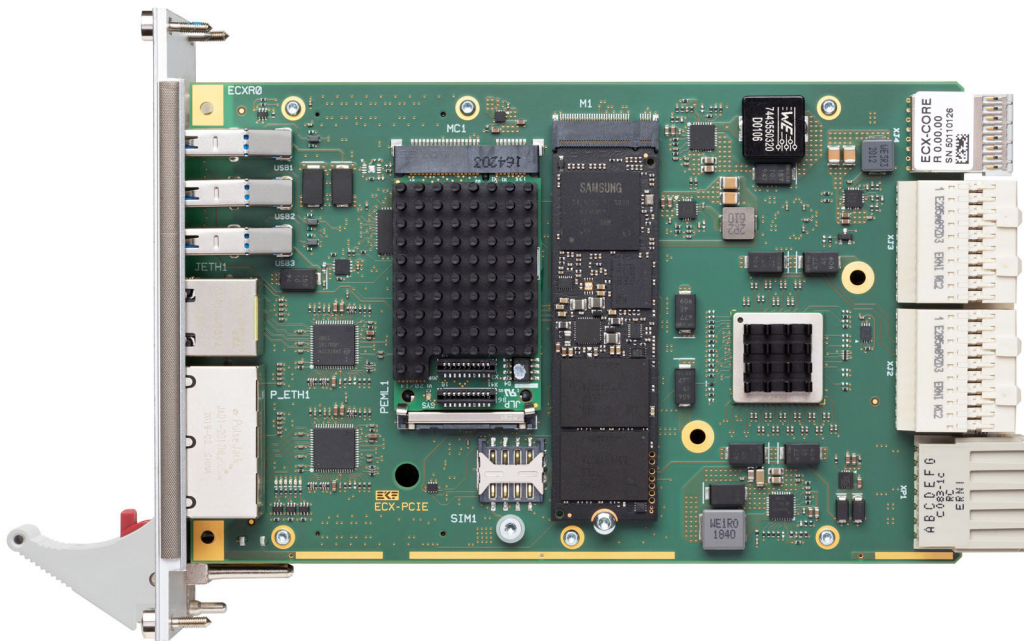
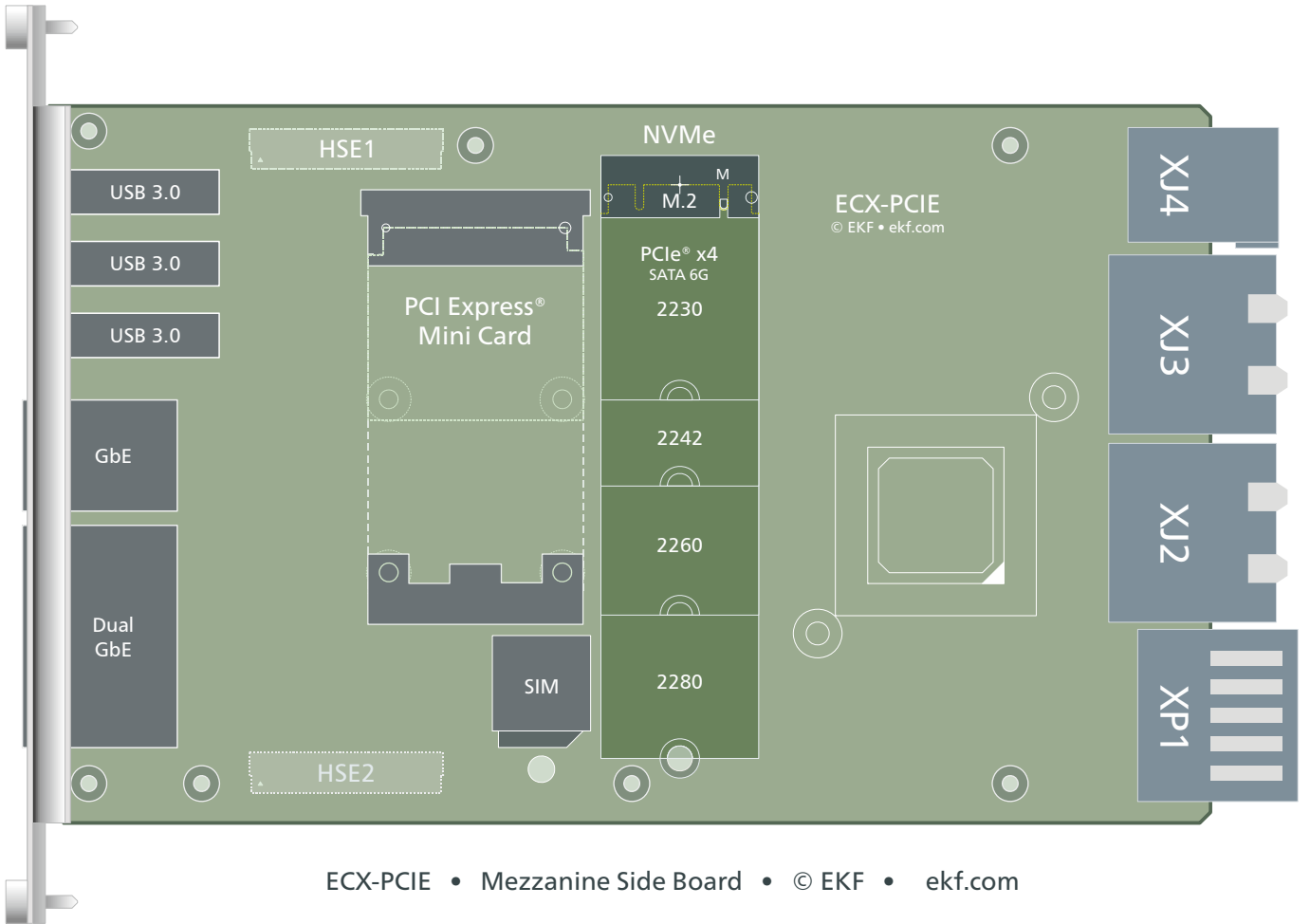
The ECX-PCIE can be used together e.g. with the SC4-CONCERTO, SC5-FESTIVAL or SC9-TOCCATA CPU card. The ECX-PCIE is a system slot board with respect to a secondary CompactPCI® Express backplane (system slot left aligned). A 19-inch rack can be used for mounting of both standard backplanes, a 9-slot CompactPCI® Serial backplane left, and an 8-slot CompactPCI® Express backplane right (see photo below)..



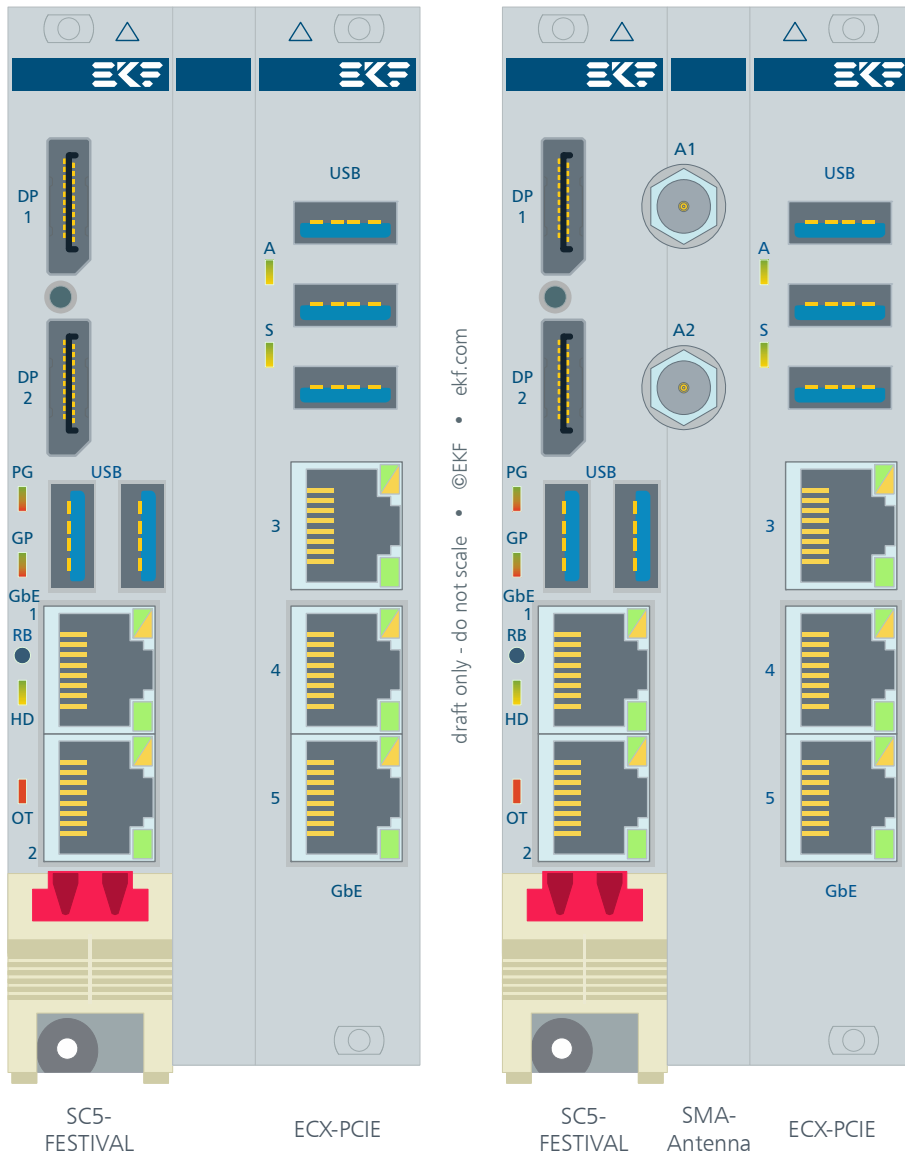




Component Orientation



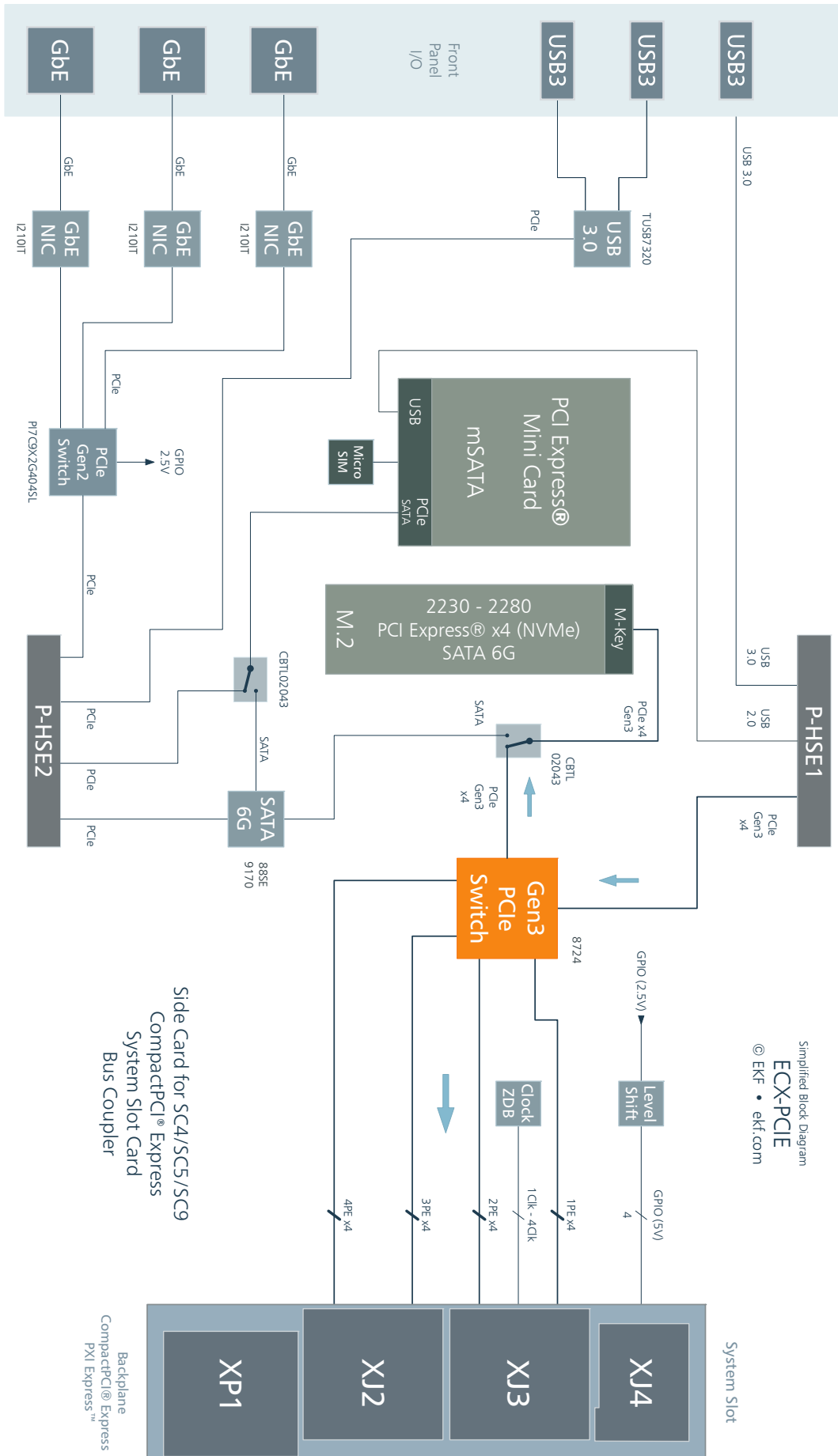
Front Panel



LEDs (ECX-PCIE)

- ▶ LED A (activity): green = M.2 SSD PCIe, yellow = M.2 SSD SATA
- ▶ LED S (system): green = power good, yellow = backplane system slot yes

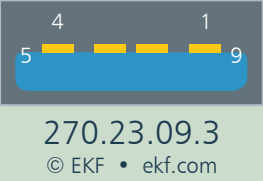
Block Diagram





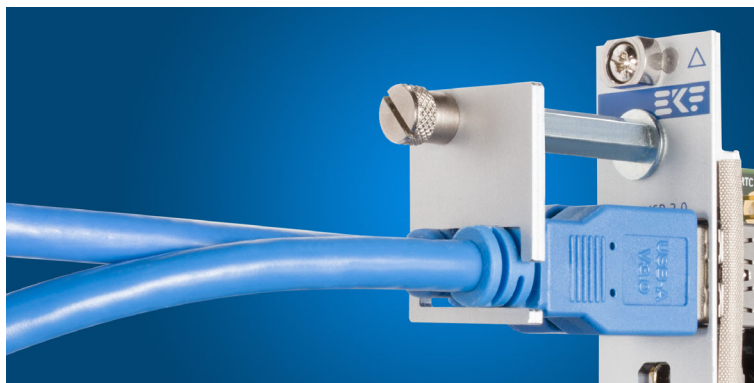
## USB Front Connectors

The ECX-PCIE is equipped with three front panel receptacles for USB 3.0 (3.1 Gen1) or USB 2.0 Type-A cable connectors (USB root hub). The middle and lower front connectors are wired to an on-board dual-port SuperSpeed xHCI controller TUSB7320, while the upper receptacle is tied to the CPU carrier card PCH via the mezzanine connector HSE1. Hence, only the upper USB connector is initialized during POST and can be used for BIOS setup (keyboard) or together with a boot device, whereas the middle and lower connectors will be enabled not until the operating system takes over control.

USB • 3 x Type-A USB 3.0 (3.1 Gen1) USB 3.0 upright (90° side) receptacles		
 <p>270.23.09.3 © EKF • ekf.com</p>	1	$V_{BUS} +5V, 1.5A \text{ max}^{1)}$
	2	USB D-
	3	USB D+
	4	GND
	5	SS RX-
	6	SS RX+
	7	GND
	8	SS TX-
	9	SS TX+

<sup>1)</sup> +5V via 1.5A current-limited electronic power switches. Power rail may be switched off by software independently for the middle and lower USB connectors (upper port permanently enabled). The maximum available current for all USB connectors is 3A in total.

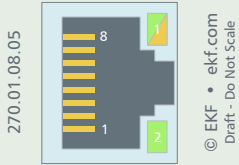
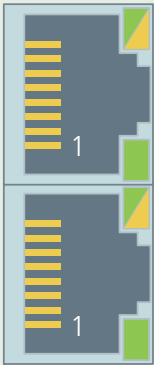
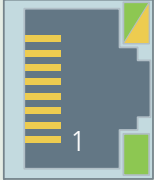
Each ECX-PCIE USB connector provides +5V ( $V_{BUS}$ ) for powering external devices. Electronic switches limit the maximum output current of each individual USB connector to a safe level. For rugged applications EKF offers custom specific USB cable connector retainer solutions (similar picture below).



## Ethernet Front Connectors

All Ethernet ports on the ECX-PCIE are based on individual I210IT PCIe® to Gigabit Ethernet on-board controllers, by auto-negotiation suitable for easy network connection to other computers or Ethernet switches. The range of applications includes router or gateway configurations, or data acquisition (e.g. GbE cameras).

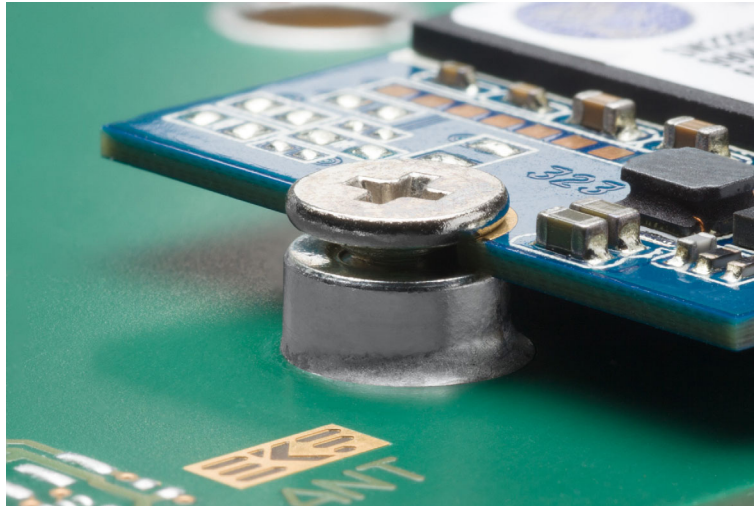
Together with the two ports of the CPU carrier boards there are five Ethernet ports available in total for the card assembly. Hence the RJ45 jacks on the ECX-PCIE are referenced here as 3/4/5.

Gigabit Ethernet Ports 3/4/5 (RJ45)			
	Port 3	1	NC1_MDX0+
		2	NC1_MDX0-
		3	NC1_MDX1+
		4	NC1_MDX2+
		5	NC1_MDX2-
		6	NC1_MDX1-
		7	NC1_MDX3+
		8	NC1_MDX3-
	Port 4	1	NC2_MDX0+
		2	NC2_MDX0-
		3	NC2_MDX1+
		4	NC2_MDX2+
		5	NC2_MDX2-
		6	NC2_MDX1-
		7	NC2_MDX3+
		8	NC2_MDX3-
	Port 5	1	NC3_MDX0+
		2	NC3_MDX0-
		3	NC3_MDX1+
		4	NC3_MDX2+
		5	NC3_MDX2-
		6	NC3_MDX1-
		7	NC3_MDX3+
		8	NC3_MDX3-

The lower green LED of each front panel connector indicates LINK established when continuously on, and data transfer (activity) when blinking. If the lower green LED is permanently off, no LINK is established. The upper green/yellow dual-LED signals the link speed 1Gbit/s when lit yellow, 100Mbit/s when lit green, and 10Mbit/s when off.

## M.2 Connector

The ECX-PCIE is provided with an M.2 module host connector (M-key). After inserted, the M.2 module must be locked manually by a screw, in order to withstand shock and vibration.



M.2 Module Fixation (Picture Similar)

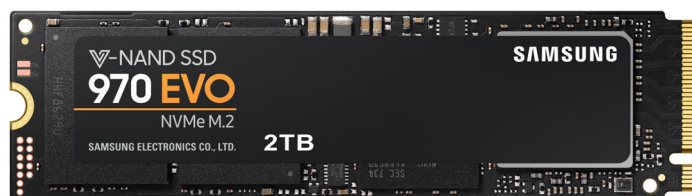
Mechanical details and pin-out configurations are described by the PCI-SIG 'PCI Express M.2 Specification'. The M.2 pin-out complies with the 'Socket 3 M SSD Drive', with module dimensions from 'Type 2242 to 2280', either height option 'S2, D2, S3, D3, D5'.

Basically, the M-key coded M.2 connector is suitable for an NVMe SSD module and provides a PCIe® Gen3 x4 link, derived from the PEX8724 switch, for a data transfer rate of up to 32Gbps.

As an alternate, the M.2 socket can also be used together with an SATA SSD module. Typically, SATA modules accept both B and M coded host connectors. The ECX-PCIE is provided with an autosensing circuitry, which can detect an SATA style M.2 SSD via pin 69 of the M.2 socket (PEDET). By specification, this signal is GND for SATA modules (open for PCIe® operation). A CBTL02043A analog switch selects between PCIe® (lane 0) and the SATA channel, which is derived from an 88SE9170 6G SATA controller.



M1 • NVMe PCIe x4 or SATA M.2 M-Key • Pin 1 - 38 EKF Part #255.50.2.2223.10			
GND	1	2	+3.3V
GND	3	4	+3.3V
PETN3	5	6	NC
PETP3	7	8	NC
GND	9	10	LED1#
PERN3	11	12	+3.3V
PERP3	13	14	+3.3V
GND	15	16	+3.3V
PETN2	17	18	+3.3V
PETP2	19	20	NC
GND	21	22	NC
PERN2	23	24	NC
PERP2	25	26	NC
GND	27	28	NC
PETN1	29	30	NC
PETP1	31	32	NC
GND	33	34	NC
PERN1	35	36	NC
PERP1	37	38	NC



M1 • NVMe PCIe x4 or SATA M.2 M-Key continued • Pin 39 - 75			
GND	39	40	SMB_CLK *
PETNO (SATA B+)	41	42	SMB_DATA *
PETPO (SATA B-)	43	44	ALERT *
GND	45	46	NC
PERNO (SATA A-)	47	48	NC
PERPO (SATA A+)	49	50	PERST#
GND	51	52	CLKREQ#
REFCLKN	53	54	PEWAKE#
REFCLKP	55	56	RSV
GND	57	58	RSV
M-Key	59	60	M-Key
M-Key	61	62	M-Key
M-Key	63	64	M-Key
M-Key	65	66	M-Key
NC	67	68	SUSCLK
PEDET **	69	70	+3.3V
GND	71	72	+3.3V
GND	73	74	+3.3V
GND	75		

\* Logic level 1.8V signals - LSF0204 level shifter to 3.3V on-board

\*\* Signal used to switch between PCIe® and SATA mode

PCI Express® M.2 Specification Socket 3 PCIe-based Module Pinout (Module Key M)

### Mini Card Host Connector

The ECX-PCIE is provided with a PCI Express® Mini Card host connector. It is suitable for PCIe® based modules, and also USB 2.0 driven Mini Card modules. As an alternate, the socket can be used also with mSATA SSD modules.

MC1 • PCI Express® Mini Card or mSATA SSD				
PCI Express® Mini Card Socket (255.4.1.052.14) & Latch (255.4.1.052.94)				
	PCIE_WAKE#	1	2	+3.3V
	COEX1 (GPIO2/6/10/14)	3	4	GND
	COEX2 (GPIO3/7/11/15)	5	6	+1.5V
	CLKREQ# (NC)	7	8	UIM_C1
	GND	9	10	UIM_C7
	PCIE_CLK-	11	12	UIM_C3
	PCIE_CLK+	13	14	UIM_C2
	GND	15	16	UIM_C6
	UIM_C8	17	18	GND
	UIM_C4	19	20	W_DIS1# (GPIO0/4/8/12)
	GND	21	22	RST#
	PCIE_RN (SATA +B)	23	24	+3.3V
	PCIE_RP (SATA -B)	25	26	GND
	GND	27	28	+1.5V
	GND	29	30	SMB_CLK
	PCIE_TN (SATA -A)	31	32	SMB_DAT
	PCIE_TP (SATA +A)	33	34	GND
	GND	35	36	USB_D- *
	GND	37	38	USB_D+ *
	+3.3V	39	40	GND
+3.3V	41	42	LED_WWAN#	
GND / NC **	43	44	LED_WLAN#	
RSV (NC)	45	46	LED_WPAN#	
RSV (NC)	47	48	+1.5V	
RSV (NC)	49	50	GND	
W_DIS2# (GPIO1/5/9/13)	51	52	+3.3V	

Power: The socket can supply a Mini Card with +3.3V/2.5A and +1.5V/1A

\* USB 2.0 derived from CPU carrier card PCH via HSE1 mezzanine connector

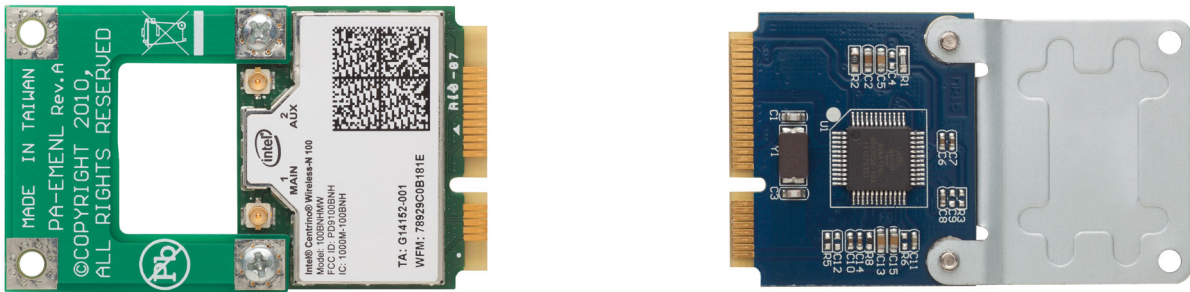
\*\* Pin 43 is used for autosensing between PCIe® or mSATA cards (PCIe®=GND, mSATA=NC)



With respect to PCIe®, the Mini Card socket is wired to the mezzanine connector HSE2. For mSATA usage the host connector is tied to the 88SE9170 SATA 6G controller. A CBTL02043 analog switch is provided to select automatically between both card types.

After inserted, the Mini Card has to be fixed by a snap-in latch (full-size modules 50.80mm length), or will have to be secured manually by screws (mini size modules 26.80mm length), in order to withstand shock and vibration.

Full size Mini Cards are fixed by a latching (snap-in) element at the module end. A half size Mini Card must be fastened manually by screws M2.5x4mm to corresponding M2.5 soldered nuts provided on the ECX-PCIE PCB. 0.5mm height nylon washers are required in addition as spacing elements between the PCB nuts and the half size Mini Card. Another approach would be to use a mechanical extender on half size Mini Cards, as shown below.



The Mini Card socket is not suitable for some proprietary modules, which may provide special services, e.g. voice I/O, resulting in conflicts with the host connector pin assignment. Be sure that your Mini Card complies with the PCI Express® Mini Card Specification (PCI-SIG).

## Mezzanine Connectors HSE1, HSE2

The ECX-PCIE is provided with two male mezzanine connectors on the bottom side of the PCB, which mate with the female mezzanine connectors on the carrier CPU card via additional 2HP interposer connector modules, for a resulting board-to-board mounting height of 4+2HP effective pitch, 10HP F/P width in total.

### HSE1

HSE1 is used to pass a PCIe® x4 link from the CPU carrier card to the ECX-PCIE on-board 24-lane 6-port PCIe® switch (upstream). One downstream port of this switch is wired to the M.2 NVMe connector, for a suitable SSD mass storage module. The other PCIe® downstream links are in use for the ECX-PCIE backplane connectors (secondary CompactPCI® Serial backplane).

In addition, the upper front panel USB 3.0 connector is wired to the HSE1 mezzanine connector. The Mini Card socket USB 2.0 connection is also routed across HSE1. With respect to the CPU boards SC4-CONCERTO and SC5-FESTIVAL all resources provided by the HSE1/2 mezzanine connectors are derived from the carrier card CM238 PCH.

### HSE2

HSE2 is provided to supply the ECX-PCIE side card with four additional PCIe® lanes. By means of a PI7C9X2G404SL PCIe® switch, three on-board I210IT Ethernet controllers share a common PCIe® x1 link. Another three x1 links are dedicated to the TUSB3720 USB controller, the Mini Card socket, and the 88SE9170 SATA controller. This requires the CPU carrier card HSE2 connector to be configured to PCIe® 4x1 (and not PCIe® 1x4 or 2x2). Since this is done by soft-strapping (i.e. Flash memory) on the CPU card, the ECX-PCIE and SC4/SC5 CPU card must be ordered as an complementary assembly.

ERNI Microspeed 275.90.10.068.51

10mm male connector for nominal height 18mm w. mating carrier card 8mm female connector (B2B 18.7mm)

High Speed Expansion P-HSE1				
<p>© EKF 275.90.01.068.51 ekf.com</p> <p>1.00mm Pitch High Speed Male Connector</p>	CFG_34 *	b1	a1	CFG_12 *
	3_PPCIE_TXP	b2	a2	1_PPCIE_TXP
	3_PPCIE_TXN	b3	a3	1_PPCIE_TXN
	GND	b4	a4	GND
	3_PPCIE_RXN	b5	a5	1_PPCIE_RXN
	3_PPCIE_RXP	b6	a6	1_PPCIE_RXP
	GND	b7	a7	GND
	4_PPCIE_TXP	b8	a8	2_PPCIE_TXP
	4_PPCIE_TXN	b9	a9	2_PPCIE_TXN
	GND	b10	a10	GND
	4_PPCIE_RXN	b11	a11	2_PPCIE_RXN
	4_PPCIE_RXP	b12	a12	2_PPCIE_RXP
	GND	b13	a13	GND
	2_USB3_TXP	b14	a14	1_USB2_P
	2_USB3_TXN	b15	a15	1_USB2_N
	GND	b16	a16	GND
	2_USB3_RXP	b17	a17	2_USB2_P
	2_USB3_RXN	b18	a18	2_USB2_N
	GND	b19	a19	GND
	PCIE_CLK_P	b20	a20	1_2_USB_OC#
	PCIE_CLK_N	b21	a21	PLTRST#
	+5VS <sup>1)</sup>	b22	a22	+3.3VS <sup>1)</sup>
	+5VS <sup>1)</sup>	b23	a23	+3.3VS <sup>1)</sup>
	+5VPS <sup>2)</sup>	b24	a24	+3.3VA <sup>3)</sup>
	+12VPS <sup>2)</sup>	b25	a25	+12VPS <sup>2)</sup>

*italic/grey pins are NC (shown for reference only)*

\* CFG\_12 and CFG\_34 = open (10k PU on CPU carrier board) indicating that a PCIe x4 link is requested

1) Power rail switched on in S0 state only

2) Power rail switched on in S0-S4 state

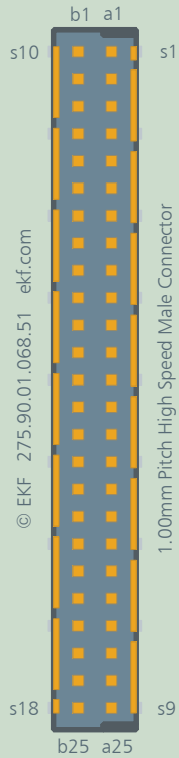
3) Power always on



ERNI Microspeed 275.90.10.068.51

10mm male connector for nominal height 18mm w. mating carrier card 8mm female connector (B2B 18.7mm)

### High Speed Expansion P-HSE2



3_PCIE_TXP	b1	a1	1_PCIE_TXP
3_PCIE_TXN	b2	a2	1_PCIE_TXN
GND	b3	a3	GND
3_PCIE_RXN	b4	a4	1_PCIE_RXN
3_PCIE_RXP	b5	a5	1_PCIE_RXP
GND	b6	a6	GND
4_PCIE_TXP	b7	a7	<i>2_PCIE_TXP</i>
4_PCIE_TXN	b8	a8	<i>2_PCIE_TXN</i>
GND	b9	a9	GND
4_PCIE_RXN	b10	a10	2_PCIE_RXN
4_PCIE_RXP	b11	a11	2_PCIE_RXP
GND	b12	a12	GND
<i>DP_LANE2_P</i>	b13	a13	<i>DP_LANE0_P</i>
<i>DP_LANE2_N</i>	b14	a14	<i>DP_LANE0_N</i>
GND	b15	a15	GND
<i>DP_LANE3_P</i>	b16	a16	<i>DP_LANE1_P</i>
<i>DP_LANE3_N</i>	b17	a17	<i>DP_LANE1_N</i>
GND	b18	a18	GND
<i>DP_AUX_P</i>	b19	a19	PCIE_CLK_P
<i>DP_AUX_N</i>	b20	a20	PCIE_CLK_N
<i>DP_CFG1</i>	b21	a21	GND
<i>DP_HPDP</i>	b22	a22	SMB_SCL <sup>1)</sup>
PLTRST#	b23	a23	SMB_SDA <sup>1)</sup>
+12VPS <sup>2)</sup>	b24	a24	+12VPS <sup>2)</sup>
+12VPS <sup>2)</sup>	b25	a25	+12VPS <sup>2)</sup>

*italic/grey pins are NC (shown for reference only)*

PCIe® can pre-configured 1x4, 2x2, 4x1 via soft-straps (Flash image CPU carrier card). For the ECX-PCIE PCIe® 4x1 is mandatory. If misaligned, devices will not be present after system enumeration.

1) Connection to SMBus, isolated after system reset 2) Power rail switched on in S0-S4 state

PCIe® lane usage: 1=PE switch (backplane) 2=SATA 9170 3=Mini Card 4=PE switch (front I/O devices)

## CompactPCI® Express Backplane Connectors

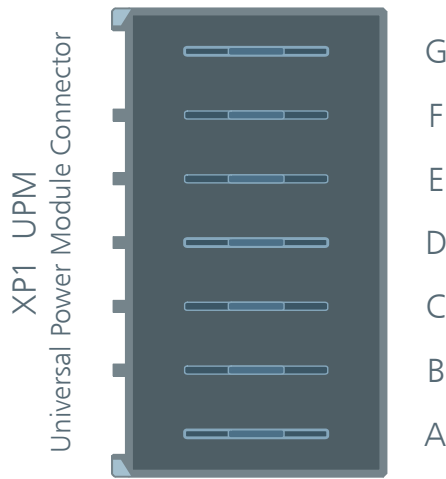
With respect to the pin assignment of its backplane connectors, the ECX-PCIE conforms to the CompactPCI® Express specification for a 4-link x4 system slot. When operated in a 2-link backplane slot, both links are supported by x4. All four backplane connectors are in use, as described below.

XP1

Universal Power Module (UPM) Connector EKF Part #264.06.007.10	
XP1	Power Rail
G	GND
F	+12V
E	+12V
D	GND
C	+5V
B	+3.3V
A	GND

pin positions printed grey are not connected

The ECX-PCIE requires +12V only. A single power supply can be wired to both the CompactPCI® Serial and the CompactPCI® Express backplanes. +5V and +3.3V from the XP1 connector are not in use on the ECX-PCIE due to on-board step-down switching regulators.

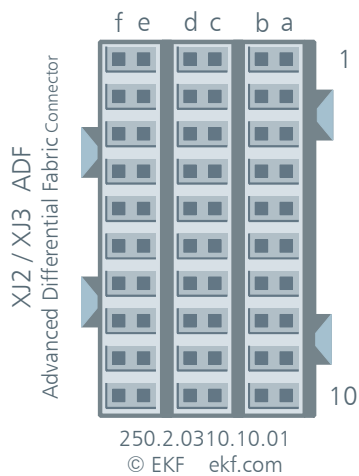


264.06.007.10  
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XJ2

Advanced Differential Fabric (ADF) Connector • EKF Part #250.2.0310.10.01						
XJ2	A	B	C	D	E	F
1	3PETP1	3PETN1	3PERP1	3PERN1	3PETP2	3PETN2
2	3PETP3	3PETN3	3PERP3	3PERN3	3PERP2	3PERN2
3	4PETP0	4PETN0	4PERP0	4PERN0	4PETP1	4PETN1
4	4PETP2	4PETN2	4PERP2	4PERN2	4PERP1	4PERN1
5	4PETP3	4PETN3	4PERP3	4PERN3	RSV	RSV
6	RSV	RSV	RSV	RSV	RSV	RSV
7	RSV	RSV	RSV	RSV	RSV	RSV
8	RSV	RSV	RSV	RSV	RSV	RSV
9	RSV	RSV	RSV	RSV	RSV	RSV
10	RSV	RSV	RSV	RSV	RSV	RSV

all signals printed grey are NC • all signal names printed *italic* are specified for PXI Express™  
 all differential pair shield pins ab(1-10), cd(1-10) and ef(1-10) are tied to GND





XJ3

Advanced Differential Fabric (ADF) Connector • EKF Part #250.2.0310.10.01						
XJ2	A	B	C	D	E	F
1	RSV	RSV	RSV	RSV	RSV	RSV
2	RSV	RSV	PWR_OK	PS_ON# (10R to GND)	LINKCAP 1) (4x4 link fixed cfg)	PWRBTN# (5.11k to +5Vaux)
3	SMB_DAT	SMB_CLK	4REFCLK+	4REFCLK-	2REFCLK+	2REFCLK-
4	RSV	PERST#	3REFCLK+	3REFCLK-	1REFCLK+	1REFCLK-
5	1PETP0	1PETN0	1PERP0	1PERN0	1PETP1	1PETN1
6	1PETP2	1PETN2	1PERP2	1PERN2	1PERP1	1PERN1
7	1PETP3	1PETN3	1PERP3	1PERN3	2PETP0	2PETN0
8	2PETP1	2PETN1	2PERP1	2PERN1	2PERP0	2PERN0
9	2PETP2	2PETN2	2PERP2	2PERN2	2PETP3	2PETN3
10	3PETP0	3PETN0	3PERP0	3PERN0	2PERP3	2PERN3

all signals printed grey are NC • all signal names printed italic are specified for PXI Express™

all differential pair shield pins ab(1-10), cd(1-10) and ef(1-10) are tied to GND

1) wired to GPIO PEX8724 for recognition, but configuration fixed to 4-Link



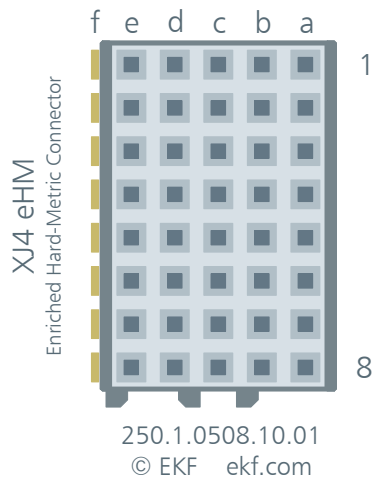
250.2.0310.10.01  
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XJ4

Enriched Hard-Metric (eHM) Connector • EKF Part #250.1.0508.10.02					
XJ4	A	B	C	D	E
1	GA4	GA3	GA2	GA1	GA0
2	+5V_AUX	GND	SYSEN#	WAKE# (150R to +3.3V_I2C)	ALERT#
3	I/O	I/O	I/O	I/O	I/O
4	I/O	I/O	I/O	I/O	I/O
5	GPIO5	I/O	I/O	GND	I/O
6	GPIO4	GND	I/O	I/O	I/O
7	GPIO3	GPIO2	I/O	GND	I/O
8	I/O	GND	I/O	I/O	I/O

all signals printed grey are NC

GPIOs connected to PXI Express™ PXI\_TRIG0-3 (derived from PI7C9X2G606PR)



The XJ4 connector is mechanically coded either for pure usage with CompactPCI® Express (F1 key) or PXI Express™ (F2 key). By default, the F2 connector is populated, since it can be inserted into both types of backplane connectors XP4. Illustrated above is the F1 keyed connector.

### Ordering Information

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

Please note that the ECX-PCIE typically comes without M.2 or Mini Card modules populated, unless otherwise expressly ordered. Photos shown within this document and at other places may be equipped with M.2 and/or Mini Card modules just for application demonstration. If you need a turnkey solution e.g. with an M.2 NVMe storage module populated, please contact [sales@ekf.com](mailto:sales@ekf.com) before ordering.

### Related Documents CompactPCI® Serial

Basics / Overview CompactPCI® Serial	<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>

### Recommended CPU Cards

SC5-FESTIVAL	<a href="http://www.ekf.com/s/sc5/sc5.html">www.ekf.com/s/sc5/sc5.html</a>
SC9-TOCCATA	<a href="http://www.ekf.com/s/sc9/sc9.html">www.ekf.com/s/sc9/sc9.html</a>

### Driver Software

Intel I210 Networking Controller	<a href="http://www.intel.com">www.intel.com</a>
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