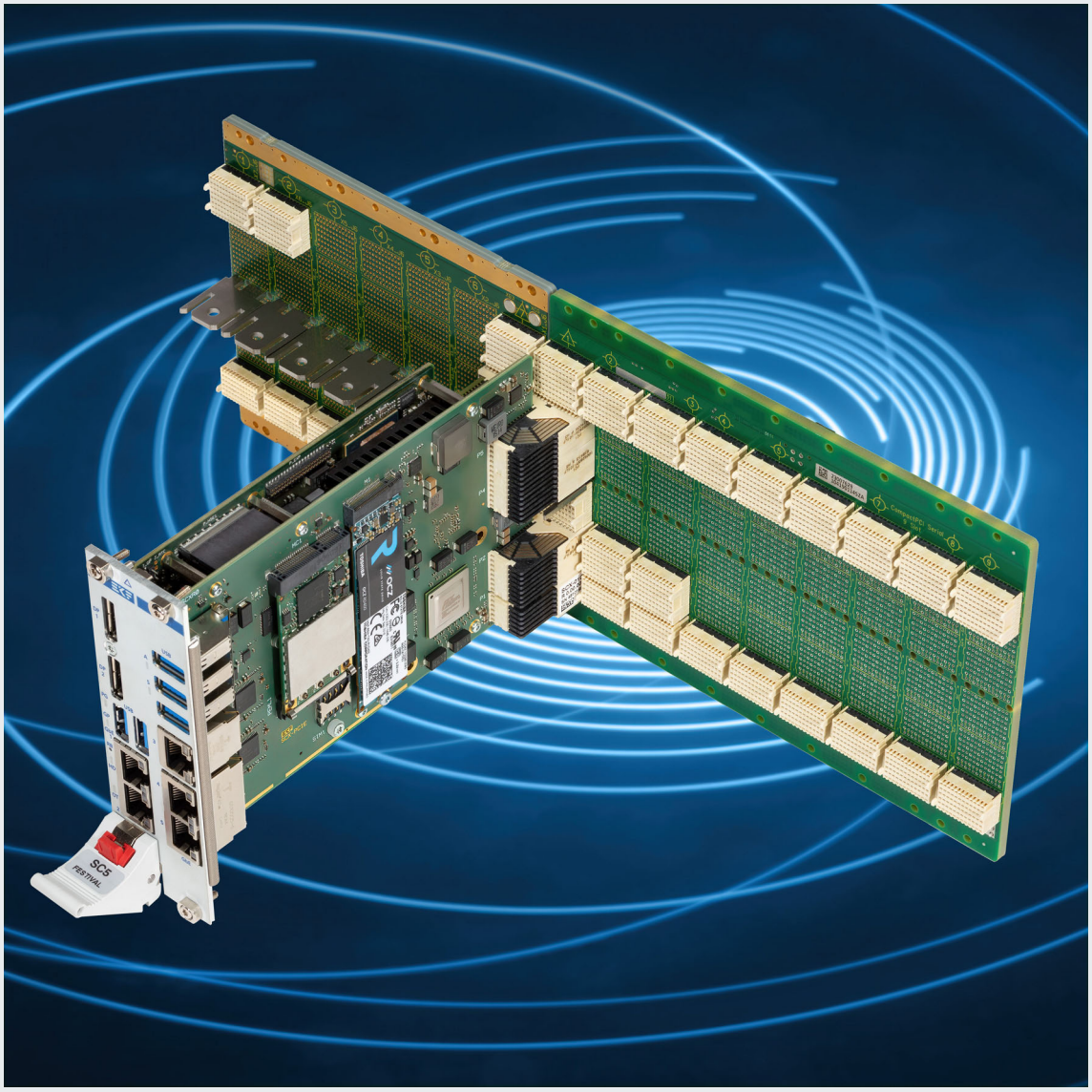
Product Information

SCX-PCIE

Secondary CompactPCI® Serial Backplane System Slot Controller Bus Coupler

Mezzanine I/O Expansion Board (CPU Side Card)



General

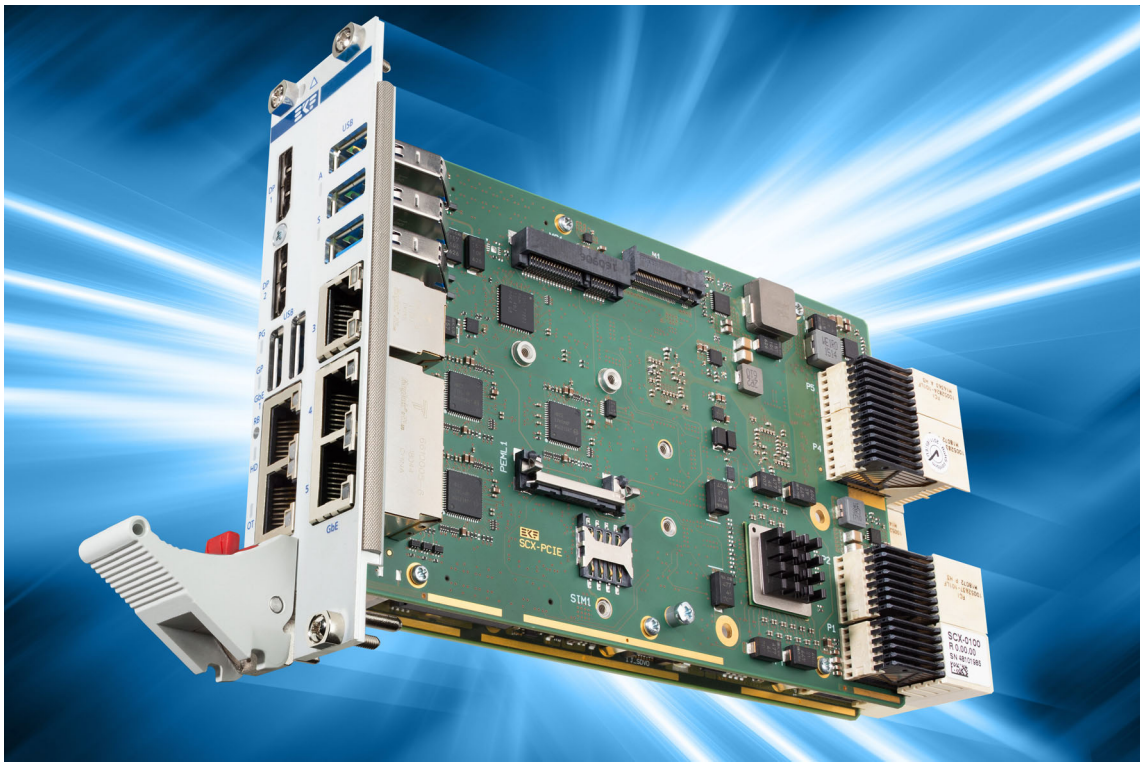
The SCX-PCIE is a mezzanine side card for EKF CPU boards, equipped with a PCIe® Gen3 packet switch, on-board NVMe and SATA mass storage, and high speed front I/O.

The PCI Express® switch supports a secondary CompactPCI® Serial backplane with up to eight peripheral slots, four links organized as Gen3 x4, thereby expanding a CompactPCI® Serial system from 8 to 16 peripheral card slots in total.

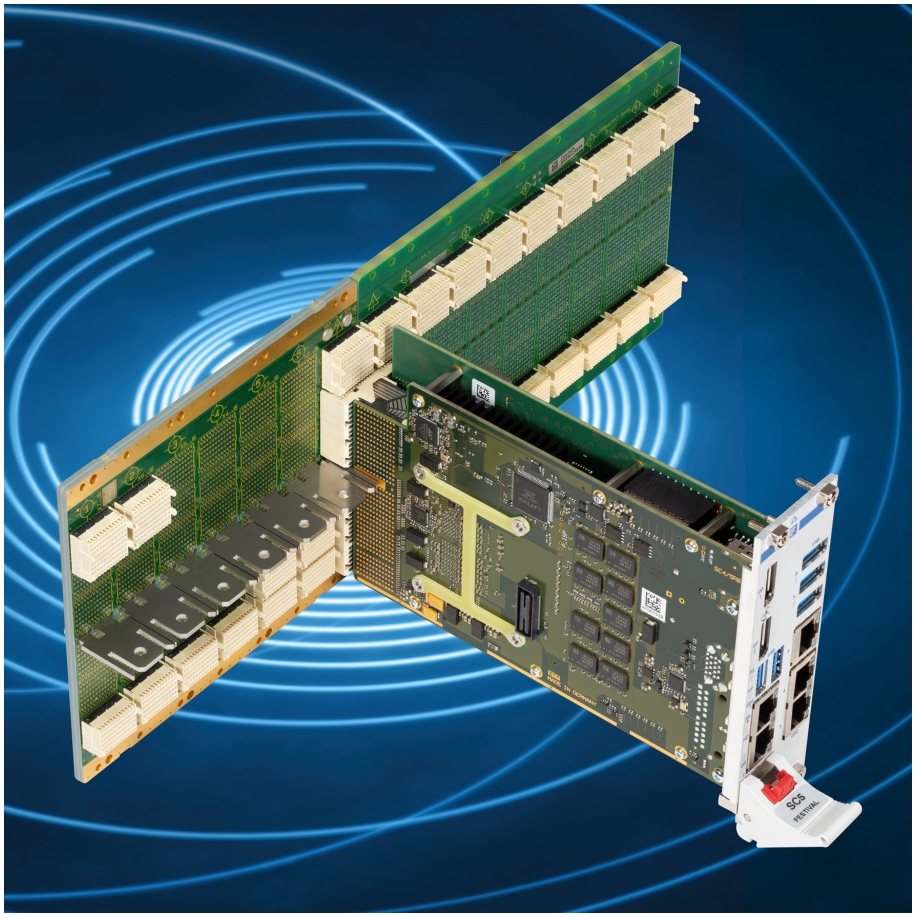
The SCX-PCIE is suitable for EKF CPU carrier cards such as the SC4-CONCERTO or SC5-FESTIVAL, which are equipped with two HSE (high speed expansion) mezzanine connectors, for eight PCIe® Gen3 lanes.

The CPU carrier board and SCX-PCIE side card assembly requires 8HP front panel width together, 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 SCX-PCIE meets the left aligned system slot of the neighbouring secondary backplane.

As a mass storage solution, the SCX-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 SCX-PCIE is equipped with three GbE and three USB 3.0 ports for front I/O.




SC5
FESTIVAL


SC5
FESTIVAL

Features

Feature Summary

General

- Bus Coupler for two CompactPCI® Serial backplanes (system expansion)
- Mixed function mezzanine side card for EKF CompactPCI® Serial CPU boards
- Form factor single size Eurocard (board dimensions 100x160mm^2)
- PICMG® CompactPCI® Serial (CPCI-S.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 or SC5-FESTIVAL
- 8HP assembly together with CPU card
- 24-lanes PCI® Express Gen3 switch
- Supports secondary CompactPCI® Serial 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® Serial backplane connectors P1, P2, P4, P5, system board pin assignment
- PCI® Express support for all eight peripheral slots of a secondary CompactPCI® Serial backplane
- Four links Gen3 x4 (available on peripheral slots 1, 2, 3, 5)
- Four links Gen2 x1 (available on peripheral slots 4, 6, 7, 8)
- Can be used with any standard CompactPCI® Serial backplane (system slot left aligned)

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)
- Downstream 4 x4 links to the CompactPCI® Serial backplane
- Downstream 1 x4 link to the NVMe SSD M.2 socket

- 6-lane 6-port PCI Express® Gen2 packet switch PI7C9X2G606PR
- Upstream 1 x1 link wired to the HSE2 mezzanine connector (CPU card PCH)
- Downstream 4 x1 links to the CompactPCI® Serial backplane

- 6-lane 6-port PCI Express® Gen2 packet switch PI7C9X2G606PR
- Upstream 1 x1 link wired to the HSE2 mezzanine connector (CPU card PCH)
- Downstream 3 x1 links to the I210 Gigabit Ethernet NICs
- Downstream 1 x1 link to the TUSB7320 USB controller

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

Feature Summary

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

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_{BUS} (+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 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 (12HP front or wider)
- Custom specific F/P design for non-radio applications e.g. CAN-FD (12HP or wider)

Applications

- Local expansion (side card) for EKF CPU boards
- System expansion with a secondary CompactPCI® Serial backplane (bus coupler)
- Supports PCI Express® on up to eight peripheral slots (4x4 Gen3, 4x1 Gen2).
- Multi GPU card systems
- Autonomous driving test equipment
- Rugged environment applications

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 44.4 years

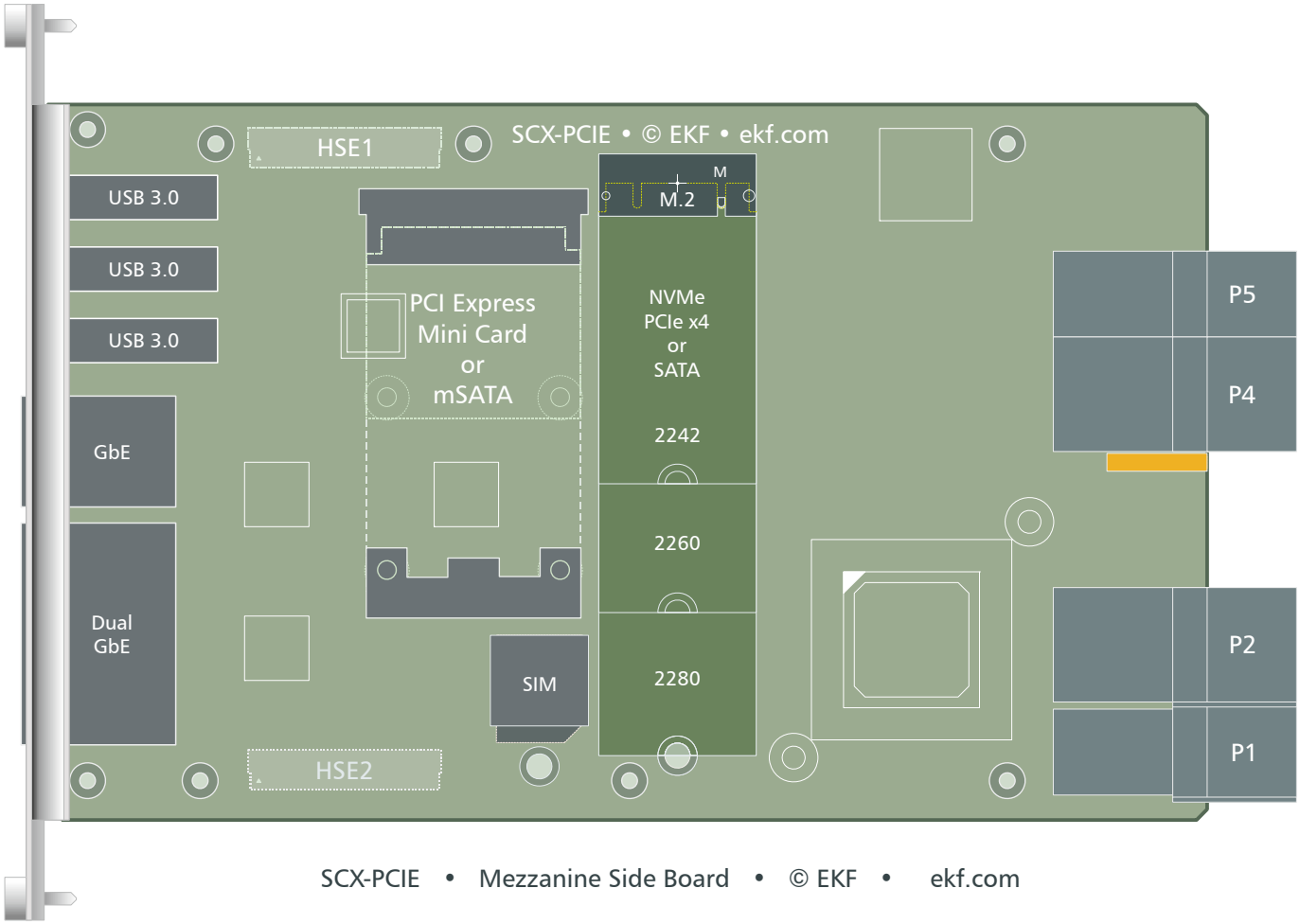
all items are subject to technical changes w/o further notice

Please note that the SCX-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.

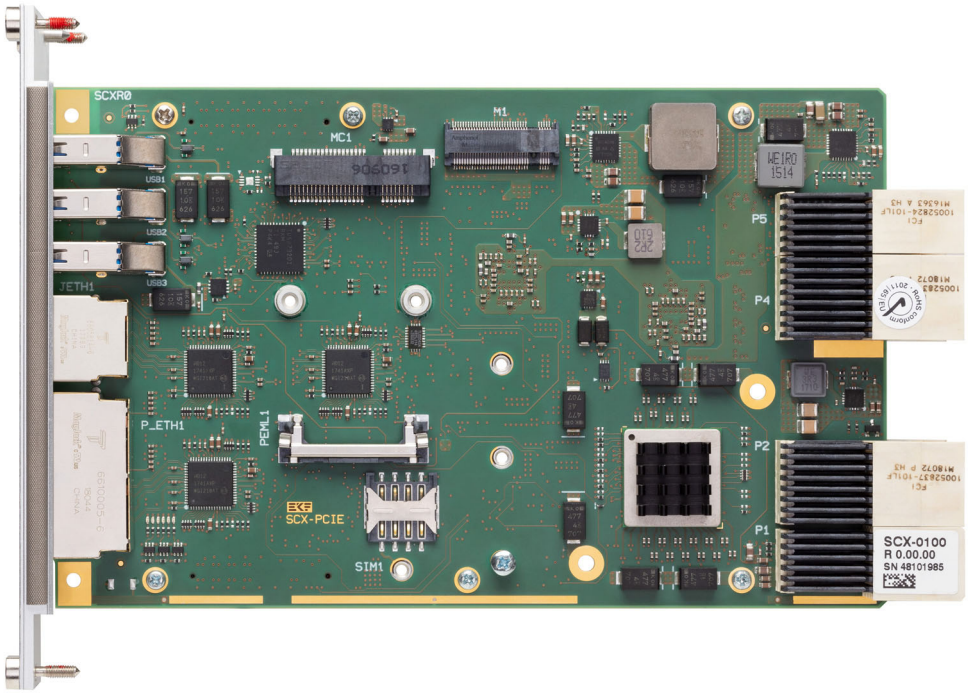
System Requirements

The SCX-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 4HP, resulting in a 8HP common front panel for the entire assembly. Two mezzanine inter-board connectors are provided, for distribution of PCI Express® signals and power from the CPU carrier to the SCX-PCIE side board.

The SCX-PCIE can be used together e.g. with the SC4-CONCERTO or SC5-FESTIVAL CPU card. The SCX-PCIE is a system slot board with respect to a secondary CompactPCI® Serial backplane (system slot left aligned). This allows for a total of 16 peripheral slot cards, which doubles the resources of a normal CompactPCI® Serial system.



SCX-PCIE • Mezzanine Side Board • © EKF • ekf.com


SCXR0
MC1
M1
USB1
USB2
USB3
JETH1
P_ETH1
PEML1
SCX-PCIE
SIM1
P5
P4
P2
P1
SCX-0100
R 0.00.00
SN 48101985


DP 1
DP 2
USB
PG
GP
GbE 1
RB
HD
OT
A
S
3
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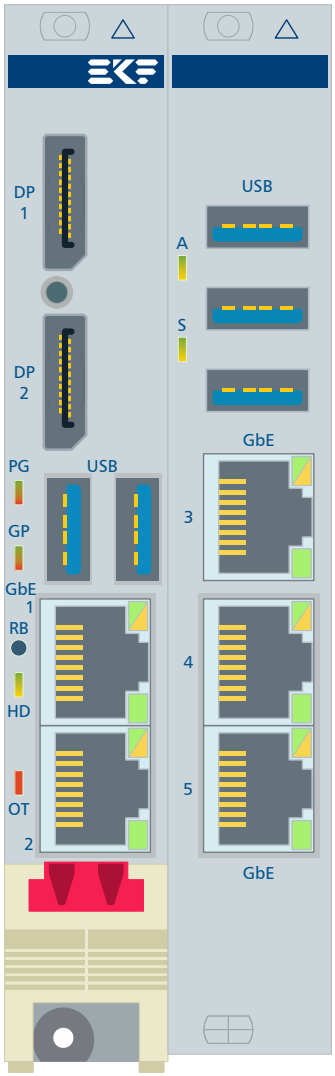
GbE
SCX-PCIE
970 EVO
NAND SSD
NVMe M.2
2TB
SAMSUNG
SCX-0100

Front Panel

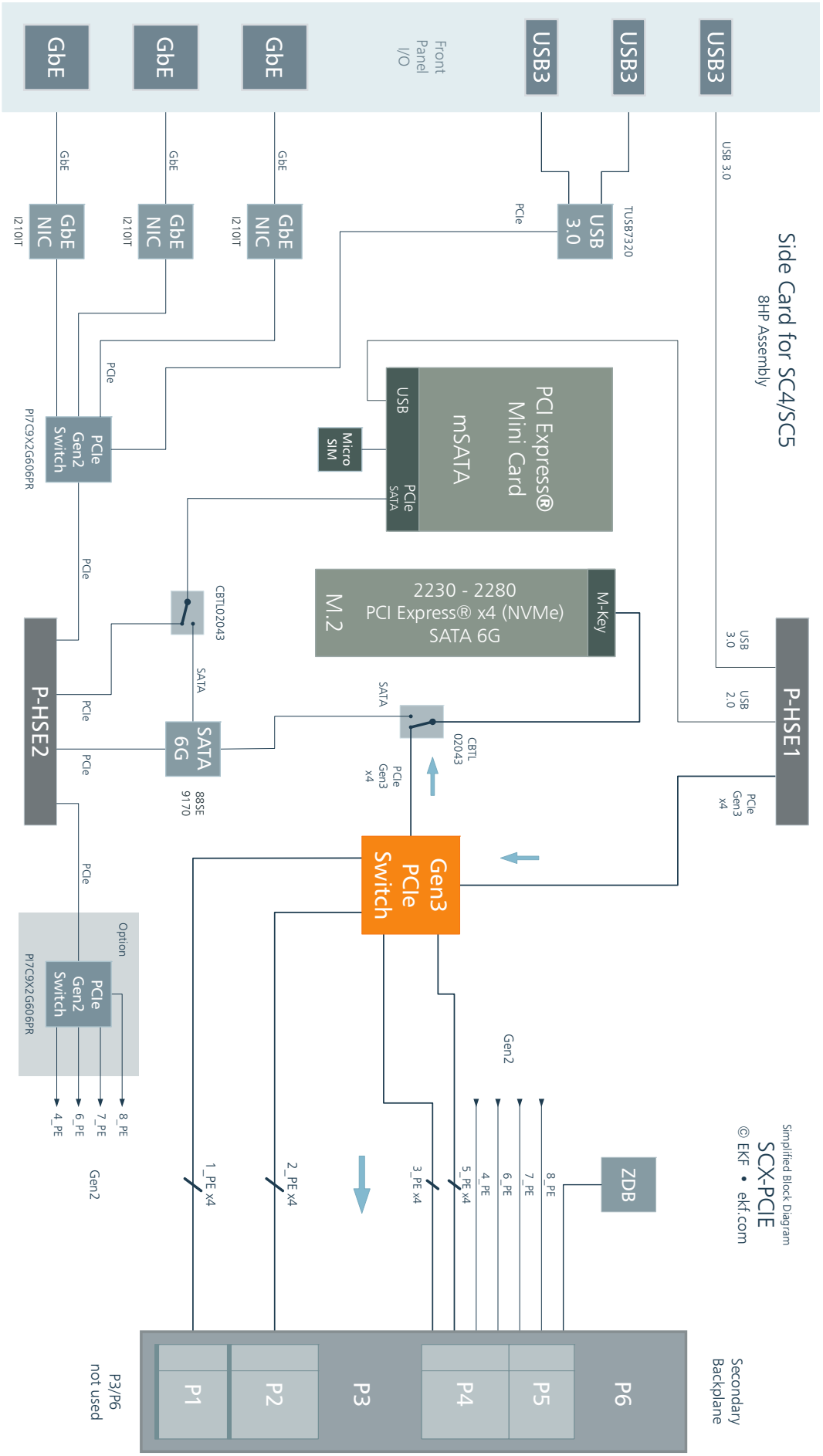


8HP Assembly Shown

LEDs (SCX-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

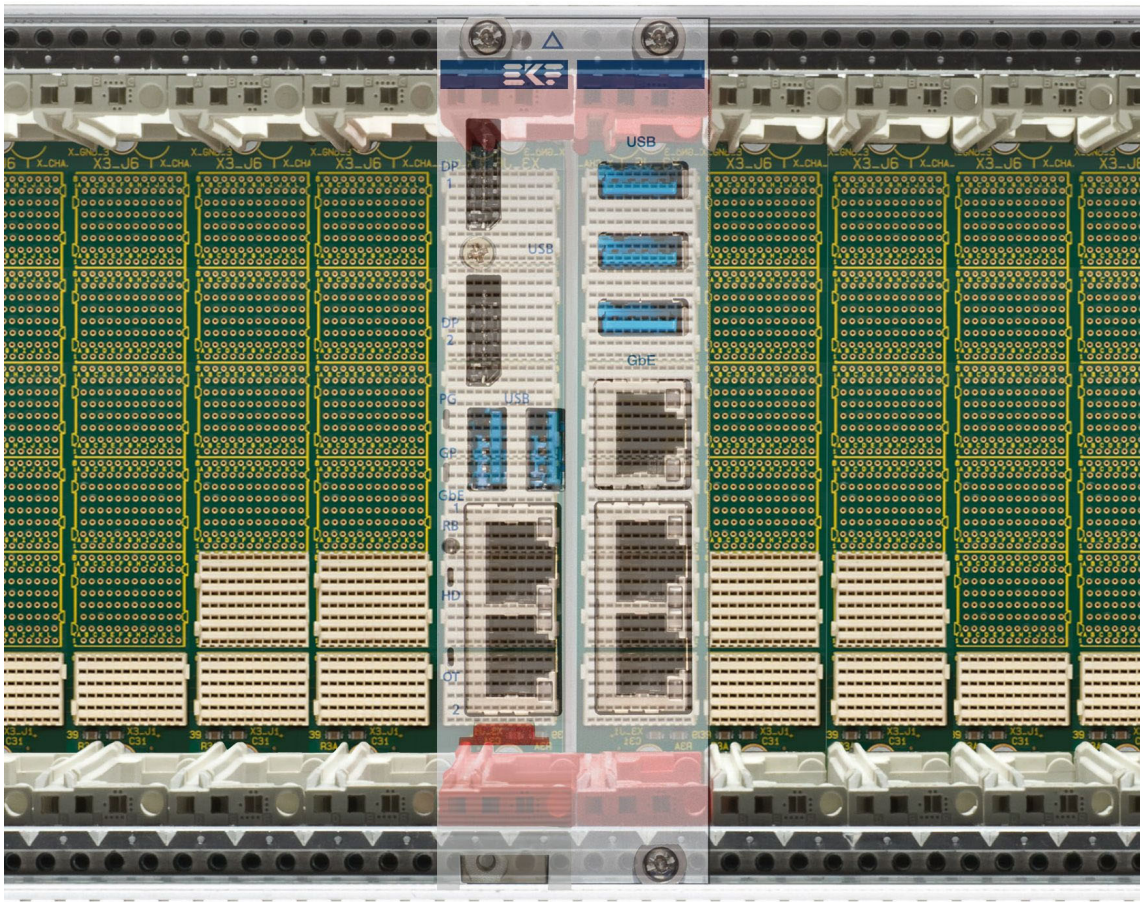
Block Diagram



Backplane Resources

The SCX-PCIE delivers PCI Express® links to any slot of a 1+8 secondary CompactPCI® Serial backplane. Four peripheral card slots are connected as x4, sourced from the PEX8724 24-lane PCIe® Gen3 switch; another 4 slots are wired to an optional PI7C9X2G606PR Gen2 switch for x1 links. With respect of peripheral card slots 4 and 5, please note the discontinuity here, due to customers request. For a system with 4 peripheral card slots Gen3 x4 therefore a standard secondary backplane with minimum 5 peripheral card slots would be required (or a 4 slot custom backplane).

No other backplane high speed signal types than PCIe® are supported by the SCX-PCIE. For peripheral cards which need Ethernet, USB and/or SATA in addition, please refer to the CPU carrier Card resources (primary backplane).



Adjacent Backplanes Coupled for a Maximum of 18 Peripheral Slots

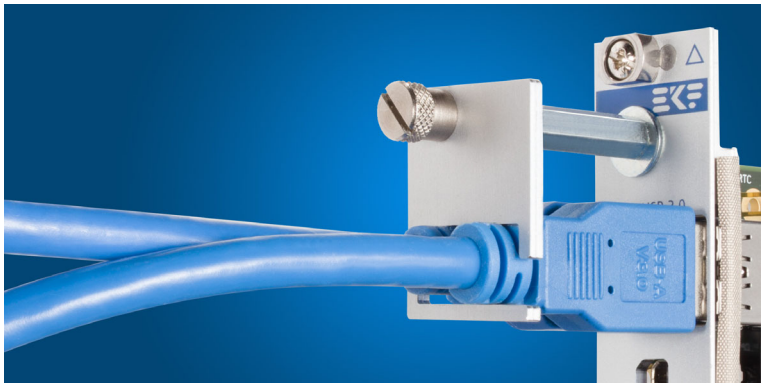
USB Front Connectors

The SCX-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		
 270.23.09.3 © EKF • ekf.com	1	V_{BUS} +5V, 1.5A max [1]
	2	USB D-
	3	USB D+
	4	GND
	5	SS RX-
	6	SS RX+
	7	GND
	8	SS TX-
	9	SS TX+

[1] +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.

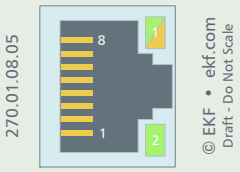
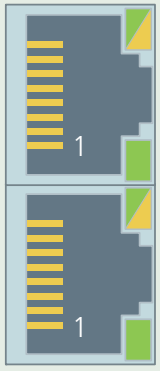
Each SCX-PCIE USB connector provides +5V (V_{BUS}) for powering external devices. Electronic switches limit the maximum output current of each individual USB connector to a safe level. For rugged applications EKF offers custom specific USB cable connector retainer solutions (similar picture below).



Ethernet Front Connectors

All Ethernet ports on the SCX-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).

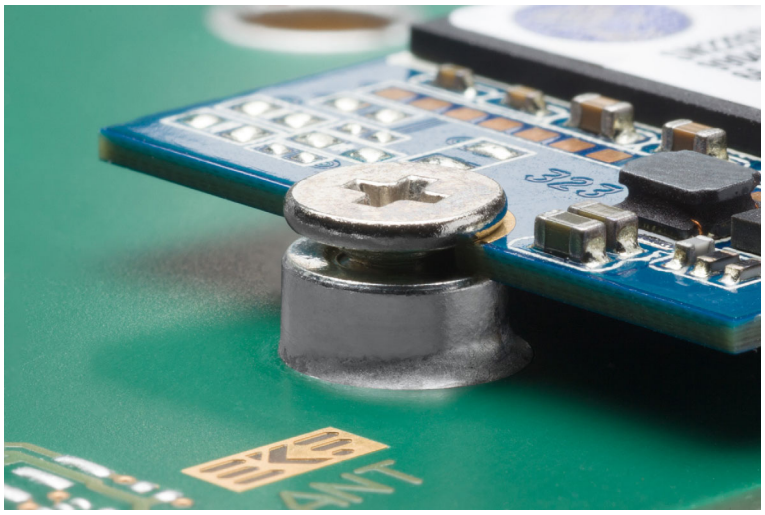
Together with the two ports of the CPU carrier boards there are five Ethernet ports available in total for the card assembly. Hence the RJ45 jacks on the SCX-PCIE are referenced here as 3/4/5.

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-
 270.02.08.5	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	NC3MDX2-
		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 SCX-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 SCX-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 *
PETN0 (SATA B+)	41	42	SMB_DATA *
PETP0 (SATA B-)	43	44	*ALERT**
GND	45	46	NC
PERN0 (SATA A-)	47	48	NC
PERP0 (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

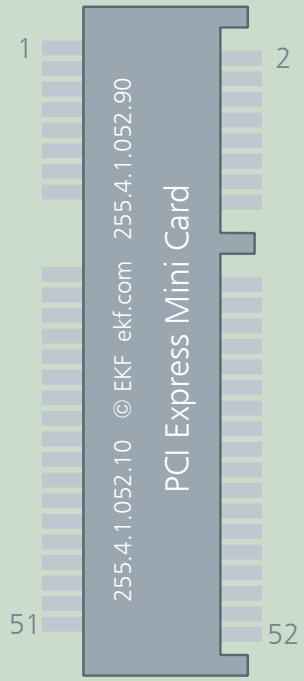
PCI Express® M.2 Specification Socket 3 PCIe-based Module Pinout (Module Key M)

Mini Card Host Connector

The SCX-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

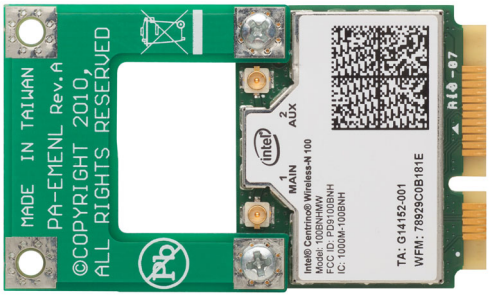
* USB 2.0 derived from CPU carrier card PCH via HSE1 mezzanine connector

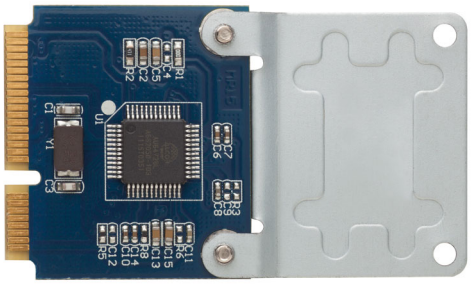
** Pin 43 is used for autosensing between PCIe® or mSATA cards (PCIe®=GND, mSATA=NC)

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 SCX-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 SCX-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, for a resulting board-to-board mounting height of 18.7mm (4HP effective pitch, 8HP F/P width in total).

HSE1

HSE1 is used to pass a PCIe® x4 link from the CPU carrier card to the SCX-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 SCX-PCIE backplane connectors (secondary CompactPCI® Serial backplane).

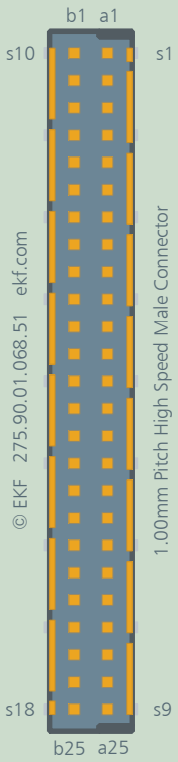
In addition, the upper front panel USB 3.0 connector is wired to the HSE1 mezzanine connector. The Mini Card socket USB 2.0 connection is also routed across HSE1. With respect to the CPU boards SC4-CONCERTO and SC5-FESTIVAL all resources provided by the HSE1/2 mezzanine connectors are derived from the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

HSE2

HSE2 is provided to supply the SCX-PCIE side card with four additional PCIe® lanes. A PCIe® x1 link is established for each of two PI7C9X2G606PR PCIe® switches. The first switch is wired to the on-board I210IT Ethernet controllers, and the TUSB7320 USB 3.0 controller, for front panel I/O. The second PCIe® switch is optional, and supports the CompactPCI® Serial backplane with Gen2 x1 links (peripheral slots 4/6/7/8). The 3rd HSE2 PCIe® x1 link is dedicated to the PCI Express® Mini Card Socket. The 4th HSE2 PCIe® x1 link is wired to the on-board 88SE9170 SATA controller (in use for either mSATA and/or M.2 SATA SSD modules). 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 SCX-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



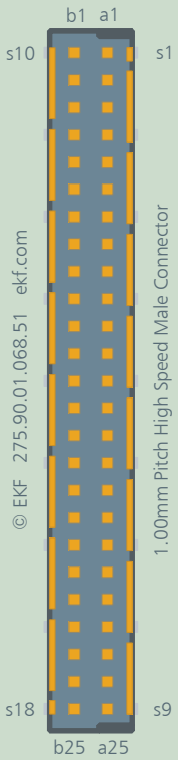
CFG_34 *	b1	a1	CFG_12 *
3_PCIE_TXP	b2	a2	1_PCIE_TXP
3_PCIE_TXN	b3	a3	1_PCIE_TXN
GND	b4	a4	GND
3_PCIE_RXN	b5	a5	1_PCIE_RXN
3_PCIE_RXP	b6	a6	1_PCIE_RXP
GND	b7	a7	GND
4_PCIE_TXP	b8	a8	2_PCIE_TXP
4_PCIE_TXN	b9	a9	2_PCIE_TXN
GND	b10	a10	GND
4_PCIE_RXN	b11	a11	2_PCIE_RXN
4_PCIE_RXP	b12	a12	2_PCIE_RXP
GND	b13	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 [1]	b22	a22	*+3.3VS* [1]
+5VS [1]	b23	a23	*+3.3VS* [1]
+5VPS [2]	b24	a24	*+3.3VA* [3]
+12VPS [2]	b25	a25	*+12VPS* [2]

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	*2_PCIE_TXP*
4_PCIE_TXN	b8	a8	*2_PCIE_TXN*
GND	b9	a9	GND
4_PCIE_RXN	b10	a10	2_PCIE_RXN
4_PCIE_RXP	b11	a11	2_PCIE_RXP
GND	b12	a12	GND
DP_LANE2_P	b13	a13	*DP_LANE0_P*
DP_LANE2_N	b14	a14	*DP_LANE0_N*
GND	b15	a15	GND
DP_LANE3_P	b16	a16	*DP_LANE1_P*
DP_LANE3_N	b17	a17	*DP_LANE1_N*
GND	b18	a18	GND
DP_AUX_P	b19	a19	PCIE_CLK_P
DP_AUX_N	b20	a20	PCIE_CLK_N
DP_CFG1	b21	a21	GND
DP_HPD	b22	a22	SMB_SCL [1)]
PLTRST#	b23	a23	SMB_SDA [1)]
+12VPS [2)]	b24	a24	*+12VPS* [2)]
+12VPS [2)]	b25	a25	*+12VPS* [2)]

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 SCX-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® Serial Backplane Connectors

The SCX-PIE is provided with four high speed backplane connectors P1, P2, P4, P5, compliant with the CompactPCI® Serial specification (pin mapping for system boards).

The PCI Express® lanes 1_PE_* to 3_PE_* and 5_PE_* are derived from the 24-line PCI Express® switch and capable to transfer 8GT/s (PCIe® Gen3), for a maximum link width of x4 each.

The PCI Express® lanes 4_PE_* and 6_PE_* to 8_PE_* are derived from a smaller Gen2 PCI Express® switch and capable to transfer 5GT/s, for a link width of x1 each.

P1 CompactPCI® Serial Peripheral Slot Backplane Connector Type A
EKF Part #250.3.1206.20.02 • 72 pos. 12x6, 14mm Width

P1	A	B	C	D	E	F	G	H	I	J	K	L
6	GND	1 PE TX02+ 1)	1 PE TX02- 1)	GND	1 PE RX02+ 1)	1 PE RX02- 1)	GND	1 PE TX03+ 1)	1 PE TX03- 1)	GND	1 PE RX03+	1 PE RX03-
5	1 PE TX00+	1 PE TX00-	GND	1 PE RX00+	1 PE RX00-	GND	1 PE TX01+	1 PE TX01-	GND	1 PE RX01+	1 PE RX01-	GND
4	GND	1 USB2+	1 USB2-	GND	RSV	RSV	GND	1 SATA TX+	1 SATA TX-	GND	1 SATA RX+	1 SATA RX-
3	1 USB3 TX+	1 USB3 TX-	PWR BTN# 2)	1 USB3 RX+	1 USB3 RX-	PWR_ FAIL# 2)	SATA SDI	SATA SDO	GA2	SATA SCL	SATA SL	GA3
2	GND	I2C SCL	I2C SDA	GND	PS_ ON# 1)	RST#	GND	PRST# 2)	WAKE_ IN# 2)	GND	RSV	SYS EN#
1	+12V	+5V STBY	GND	+12V	+12V	GND	+12V	+12V	GND	+12V	+12V	GND

pin positions printed gray: not connected

1) not used - 10R to GND - power supply permanently on
2) not used - PU to 3.3V_I2C

P2 CompactPCI® Serial Peripheral Slot Backplane Connector Type B

EKF Part #250.3.1208.20.00 • 96 pos. 12x8, 16mm Width

P2	A	B	C	D	E	F	G	H	I	J	K	L
8	GND	IO	IO	GND	2 USB2+	2 USB2-	GND	3 USB2+	3 USB2-	GND	4 USB2+	4 USB2-
7	IO	IO	GND	IO	IO	GND	IO	IO	GND	IO	IO	GND
6	GND	2 PE TX06+	2 PE TX06-	GND	2 PE RX06+	2 PE RX06-	GND	2 PE TX07+	2 PE TX07-	GND	2 PE RX07+	2 PE RX03-
5	2 PE TX04+	2 PE TX04-	GND	2 PE RX04+	2 PE RX04-	GND	2 PE TX05+	2 PE TX05-	GND	2 PE RX05+	2 PE RX05-	GND
4	GND	2 PE TX02+	2 PE TX02-	GND	2 PE RX02+	2 PE RX02-	GND	2 PE TX03+	2 PE TX03-	GND	2 PE RX03+	2 PE RX03-
3	2 PE TX00+	2 PE TX00-	GND	2 PE RX00+	2 PE RX00-	GND	2 PE TX01+	2 PE TX01-	GND	2 PE RX01+	2 PE RX01-	GND
2	GND	1 PE TX06+	1 PE TX06-	GND	1 PE RX06+	1 PE RX06-	GND	1 PE TX07+	1 PE TX07-	GND	1 PE RX07+	1 PE RX07-
1	1 PE TX04+	1 PE TX04-	GND	1 PE RX04+	1 PE RX04-	GND	1 PE TX05+	1 PE TX05-	GND	1 PE RX05+	1 PE RX05-	GND

pin positions printed gray: not connected

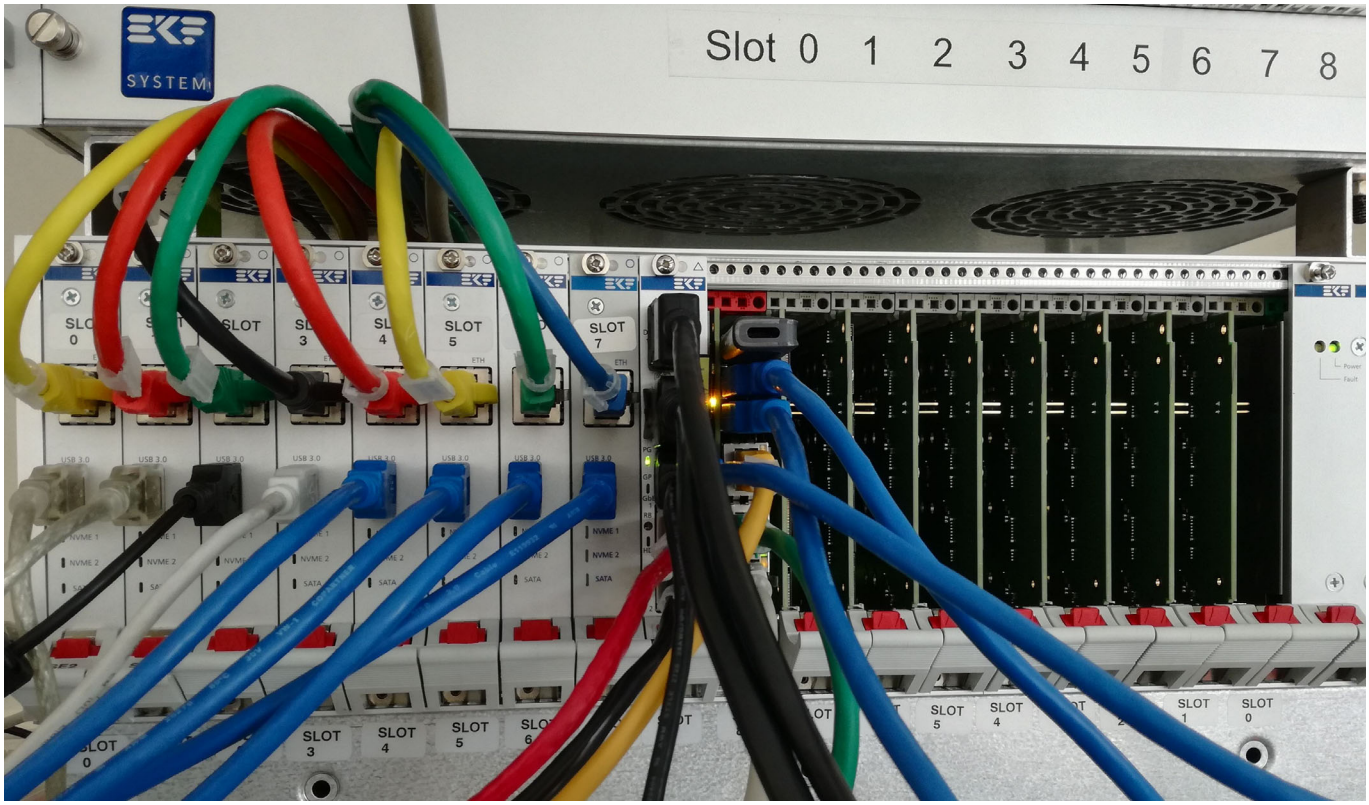
P4 CompactPCI® Serial Peripheral Slot Backplane Connector Type B
EKF Part #250.3.1208.20.00 • 96 pos. 12x8, 16mm Width

P4	A	B	C	D	E	F	G	H	I	J	K	L
8	GND	6 PE TX02+	6 PE TX02-	GND	6 PE RX02+	6 PE RX02-	GND	6 PE TX03+	6 PE TX03-	GND	6 PE RX03+	6 PE RX03-
7	6 PE TX00+	6 PE TX00-	GND	6 PE RX00+	6 PE RX00-	GND	6 PE TX01+	6 PE TX01-	GND	6 PE RX01+	6 PE RX01-	GND
6	GND	5 PE TX02+	5 PE TX02-	GND	5 PE RX02+	5 PE RX02-	GND	5 PE TX03+	5 PE TX03-	GND	5 PE RX03+	5 PE RX03-
5	5 PE TX00+	5 PE TX00-	GND	5 PE RX00+	5 PE RX00-	GND	5 PE TX01+	5 PE TX01-	GND	5 PE RX01+	5 PE RX01-	GND
4	GND	4 PE TX02+	4 PE TX02-	GND	4 PE RX02+	4 PE RX02-	GND	4 PE TX03+	4 PE TX03-	GND	4 PE RX03+	4 PE RX03-
3	4 PE TX00+	4 PE TX00-	GND	4 PE RX00+	4 PE RX00-	GND	4 PE TX01+	4 PE TX01-	GND	4 PE RX01+	4 PE RX01-	GND
2	GND	3 PE TX02+	3 PE TX02-	GND	3 PE RX02+	3 PE RX02-	GND	3 PE TX03+	3 PE TX03-	GND	3 PE RX03+	3 PE RX03-
1	3 PE TX00+	3 PE TX00-	GND	3 PE RX00+	3 PE RX00-	GND	3 PE TX01+	3 PE TX01-	GND	3 PE RX01+	3 PE RX01-	GND

pin positions printed gray: not connected

P5 CompactPCI® Serial Peripheral Slot Backplane Connector Type C EKF Part #250.3.1206.20.00 • 72 pos. 12x6, 12mm Width												
P5	A	B	C	D	E	F	G	H	I	J	K	L
6	5 PE CLKE#	5 PE CLK+	5 PE CLK-	6 PE CLKE#	6 PE CLK+	6 PE CLK-	7 PE CLKE#	7 PE CLK+	7 PE CLK-	8 PE CLKE#	8 PE CLK+	8 PE CLK-
5	1 PE CLK+	1 PE CLK-	1 PE CLKE#	2 PE CLK+	2 PE CLK-	2 PE CLKE#	3 PE CLK+	3 PE CLK-	3 PE CLKE#	4 PE CLK+	4 PE CLK-	4 PE CLKE#
4	GND	8 PE TX02+	8 PE TX02-	GND	8 PE RX02+	8 PE RX02-	GND	8 PE TX03+	8 PE TX03-	GND	8 PE RX03+	8 PE RX03-
3	8 PE TX00+	8 PE TX00-	GND	8 PE RX00+	8 PE RX00-	GND	8 PE TX01+	8 PE TX01-	GND	8 PE RX01+	8 PE RX01-	GND
2	GND	7 PE TX02+	7 PE TX02-	GND	7 PE RX02+	7 PE RX02-	GND	7 PE TX03+	7 PE TX03-	GND	7 PE RX03+	7 PE RX03-
1	7 PE TX00+	7 PE TX00-	GND	7 PE RX00+	7 PE RX00-	GND	7 PE TX01+	7 PE TX01-	GND	7 PE RX01+	7 PE RX01-	GND

pin positions printed gray: not connected



Test Rack w. 8 + 8 Peripheral Slot Cards

Ordering Information
For popular SCX-PCIE SKUs please refer to www.ekf.com/liste/liste_21.html#SCX

Please note that the SCX-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.

Related Documents CompactPCI® Serial	
Basics / Overview CompactPCI® Serial	https://www.ekf.com/s/smart_solution.pdf
CompactPCI® Serial Home	https://www.ekf.com/s/serial.html

Recommended CPU Cards	
SC4-CONCERTO	https://www.ekf.com/s/sc4/sc4.html
SC5-FESTIVAL	https://www.ekf.com/s/sc5/sc5.html
SC9-TOCCATA	*https://www.ekf.com/s/sc9/sc9.html*

Driver Software	
Intel I210 Networking Controller	www.intel.com
Texas Instruments TUSB7320 xHCI Driver	www.ti.com

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