



Product Information

SLA-SOLO

***CompactPCI[®] Serial* • Single Pair Ethernet Switch**

5 x 100BASE-T1 • 2 x 1000BASE-T • PCIe[®]
Automotive Ethernet • Industrial Ethernet

Preliminary Edition

General

100BASE-T1 Single Pair Ethernet is a popular automotive standard specified by IEEE 802.3bw and was formerly known as BroadR-Reach®.

The SLA-SOLO is a SPE switch card for CompactPCI® Serial systems. The front panel is provided with 5 x 100BASE-T1 transformer isolated industrial receptacles according to IEC 63171-6, and a 1000BASE-T compliant RJ45 jack. In addition, another GbE port is wired to the CompactPCI® Serial connector P6 for backplane switching. For system control, the switch is connected to the CompactPCI® Serial connector P1 via PCIe®.

The SLA-SOLO is equipped with the Marvell® 88Q5072 Automotive Ethernet switch, which provides a 20Gbps switching engine and a high-performance ARM® Cortex® M7 CPU. The integrated 100BASE-T1 PHYs are fully inter-operable w. Open Alliance BroadR-Reach® (OABR) PHYs. Basically the switch can be used as self-managed.

As an option, the SLA-SOLO can be provided with a mezzanine connector for attachment of a low profile networking CPU card (SLC-ARMADA), for addition of management software and AVB/TSN protocols, or even custom specific code.

Feature Summary

General

- ▶ 100BASE-T1 IEEE 802.3bw Ethernet switch
- ▶ PICMG® CompactPCI® Serial (CPCI-S.0) peripheral card
- ▶ Single Size Eurocard 3U 4HP 100x160mm²
- ▶ 5 x 100BASE-T1 industrial jacks IP20 according to IEC 63171-6
- ▶ 1 x RJ45 1000BASE-T Gigabit Ethernet connector
- ▶ CompactPCI® Serial backplane connectors P1, P6
- ▶ Backplane 1000BASE-T Ethernet & PCIe® Gen3
- ▶ Intended for industrial and automotive use
- ▶ Self-managed operation
- ▶ Management software option *
- ▶ AVB/TSN protocol stack option *

* requires SLC-ARMADA low profile CPU mezzanine module

Front Panel I/O

- ▶ 1 x RJ45 connector 1000BASE-T, 100BASE-TX, 10BASE-T compliant
- ▶ 5 x 100BASE-T1 SPE front ports IEC 63171-6 (IP20), Hi-Pot isolated by transformers for industrial use

Applications

- ▶ Industrial networks - IIoT
- ▶ Management option *
- ▶ AVB/TSN stack option *
- ▶ Custom specific software option *
- ▶ Edge computing *
- ▶ Automotive gateway
- ▶ Automotive test equipment
- ▶ Boxed solution available (AL600 Embedded Blue® Series)

Feature Summary

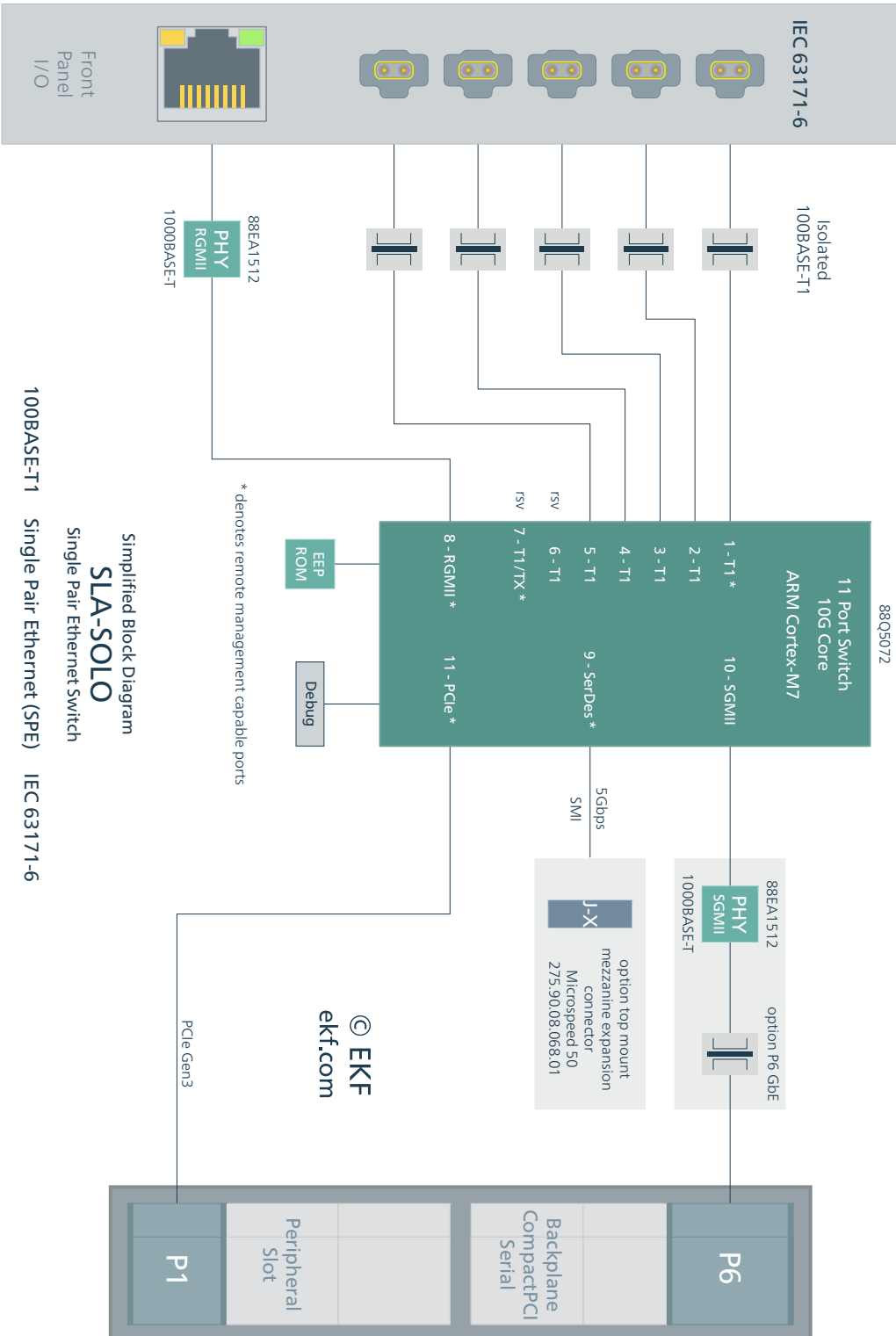
Single Pair Ethernet Switch

- ▶ Marvell® 88Q5072 11-port Automotive Ethernet switch AEC-Q100 Grade 2 qualified
- ▶ 802.1Qat SR Aware 20Gbps switching engine
- ▶ 2 Mbit packet memory +16 MAX addresses
- ▶ Queue controller 8-Level QoS per port
- ▶ 256 entry TCAM (ingress & egress)
- ▶ 3 color ingress policy
- ▶ Hardware support for Layer 3 static routing
- ▶ AVB/TSN per queue shaping 802.1Qav/Qbv
- ▶ 802.1AS & IEEE 1588/PTP
- ▶ Advanced security features including deep packet inspection engine (DPI)
- ▶ DoS (Denial of Service engine)
- ▶ On-Board EEPROM up to 512kb for switch configuration
- ▶ Integrated high-performance ARM® Cortex® M7 CPU 350MHz w. 1MB SRAM
- ▶ Integrated IEEE 802.3bw 100BASE-T1 PHYs Single Pair Ethernet SPE
- ▶ Fully inter-operable w. Open Alliance BroadR-Reach® (OABR) PHYs
- ▶ 1 x front port RJ45 connector GbE 1000BASE-T (88EA1512 RGMII PHY)
- ▶ 5 x front port connectors 100BASE-T1 SPE IEC 63171-6 (88Q5072 integrated PHYs)
- ▶ 1 x 1000BASE-T (88EA1512 RGMII PHY) via backplane connector P6
- ▶ PCI Express® Gen3 x1 to backplane connector P1
- ▶ 5Gbps SerDes mezzanine connector J-X for low profile CPU card SLC-ARMADA (AVB/TSN stack)

Regulatory

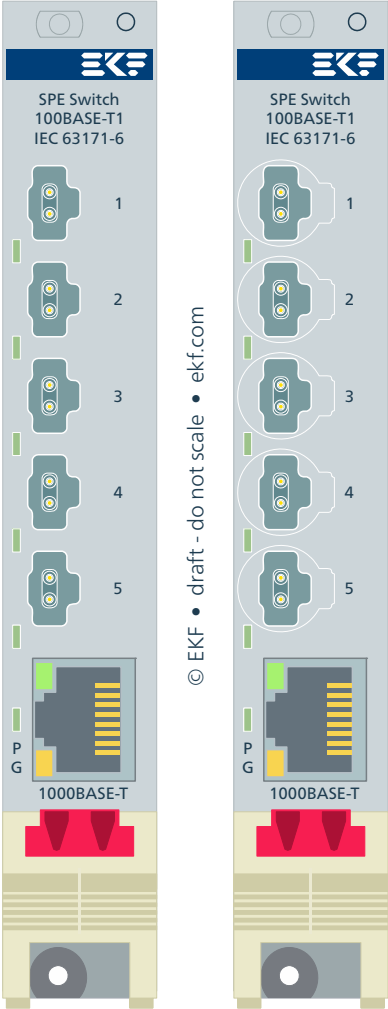
- ▶ Long term availability
- ▶ Designed & manufactured in Germany
- ▶ ISO 9001 certified quality management
- ▶ Rugged solution
- ▶ Conformal coating, sealing, underfilling on request
- ▶ RoHS compliant
- ▶ Industrial temperature range -40°C to +85°C
- ▶ Humidity 5% ... 95% RH non condensing
- ▶ Altitude -300m ... +3000m
- ▶ Shock 15g 0.33ms, 6g 6ms
- ▶ Vibration 1g 5-2000Hz
- ▶ MTBF tbd years
- ▶ EC Regulatory EN55024, EN55032, EN62368-1 (CE)

Block Diagram



Simplified Block Diagram
SLA-SOLO
Single Pair Ethernet Switch
100BASE-T1 Single Pair Ethernet (SPE) IEC 63171-6

Front Panel



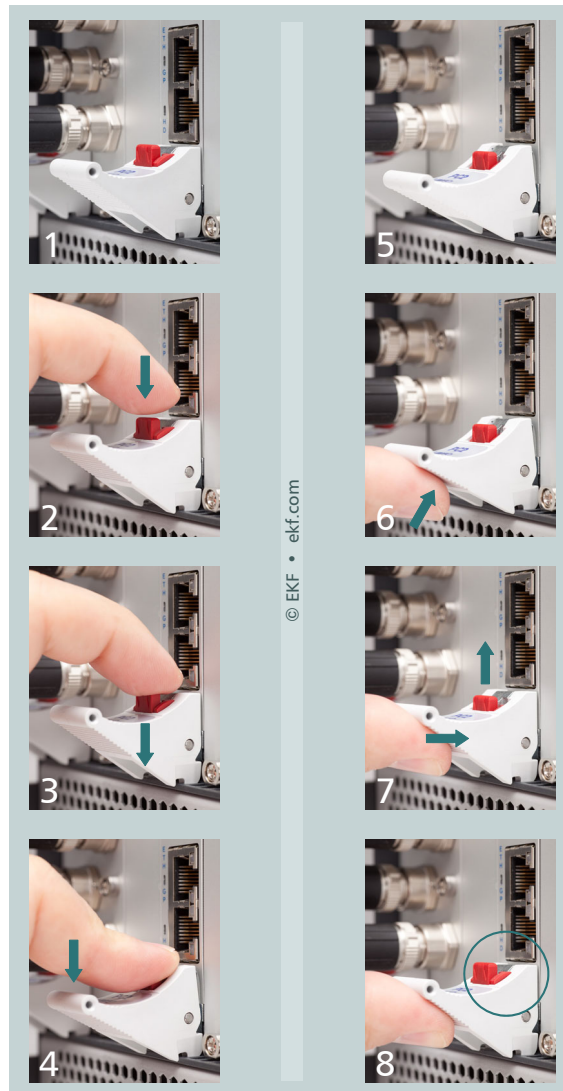
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Power On

The front handle is provided with a built-in microswitch, which is used to disable the on-board power circuit when released. Vice versa, the *on-board devices are enabled not before the handle gets locked*. Please refer to the illustration below and make sure that the eject lever has reached its final position for proper board operation, as shown in picture 8. A gentle click should be audible, when the red actuator pin moves into its raised position, indicating that the board is locked and ready for use.



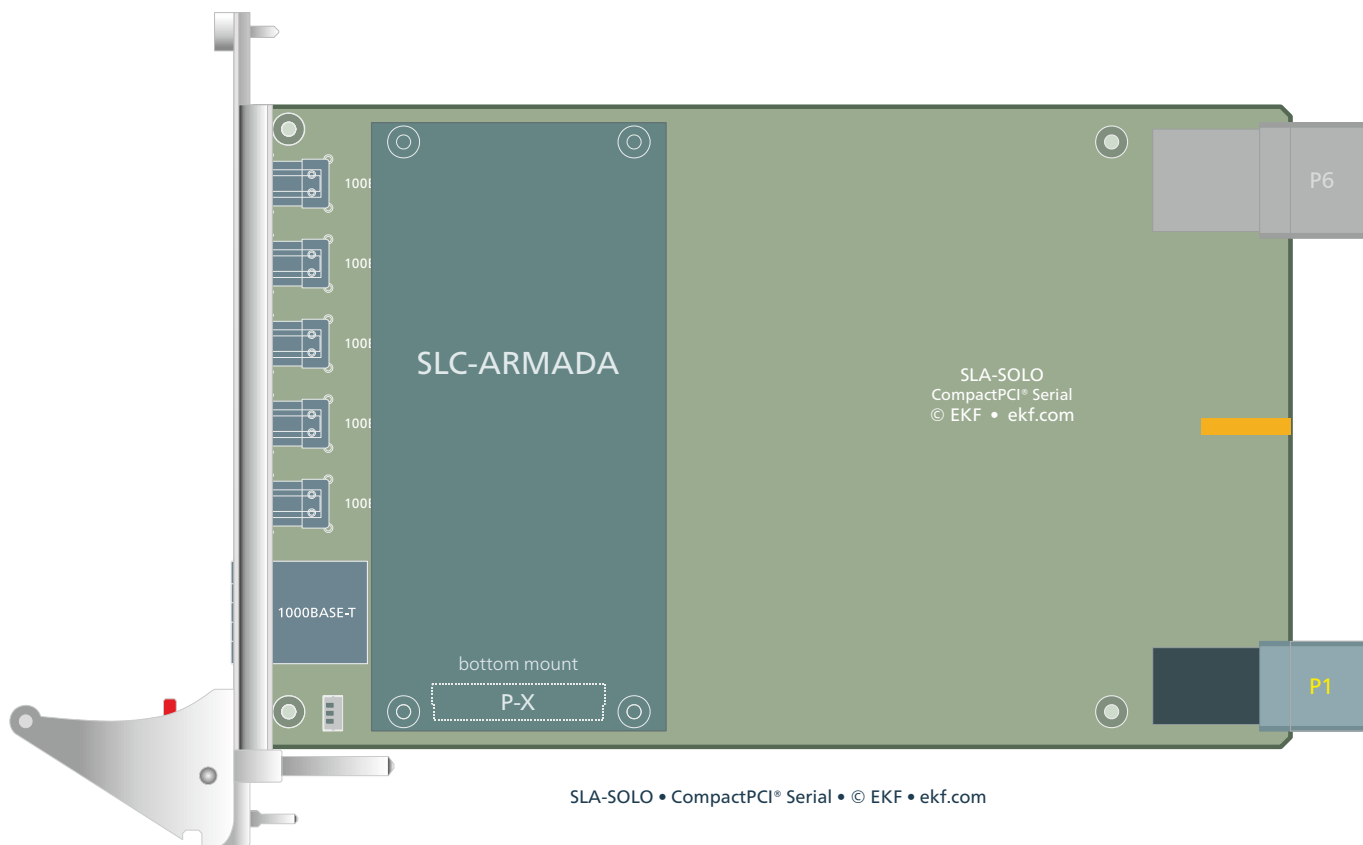
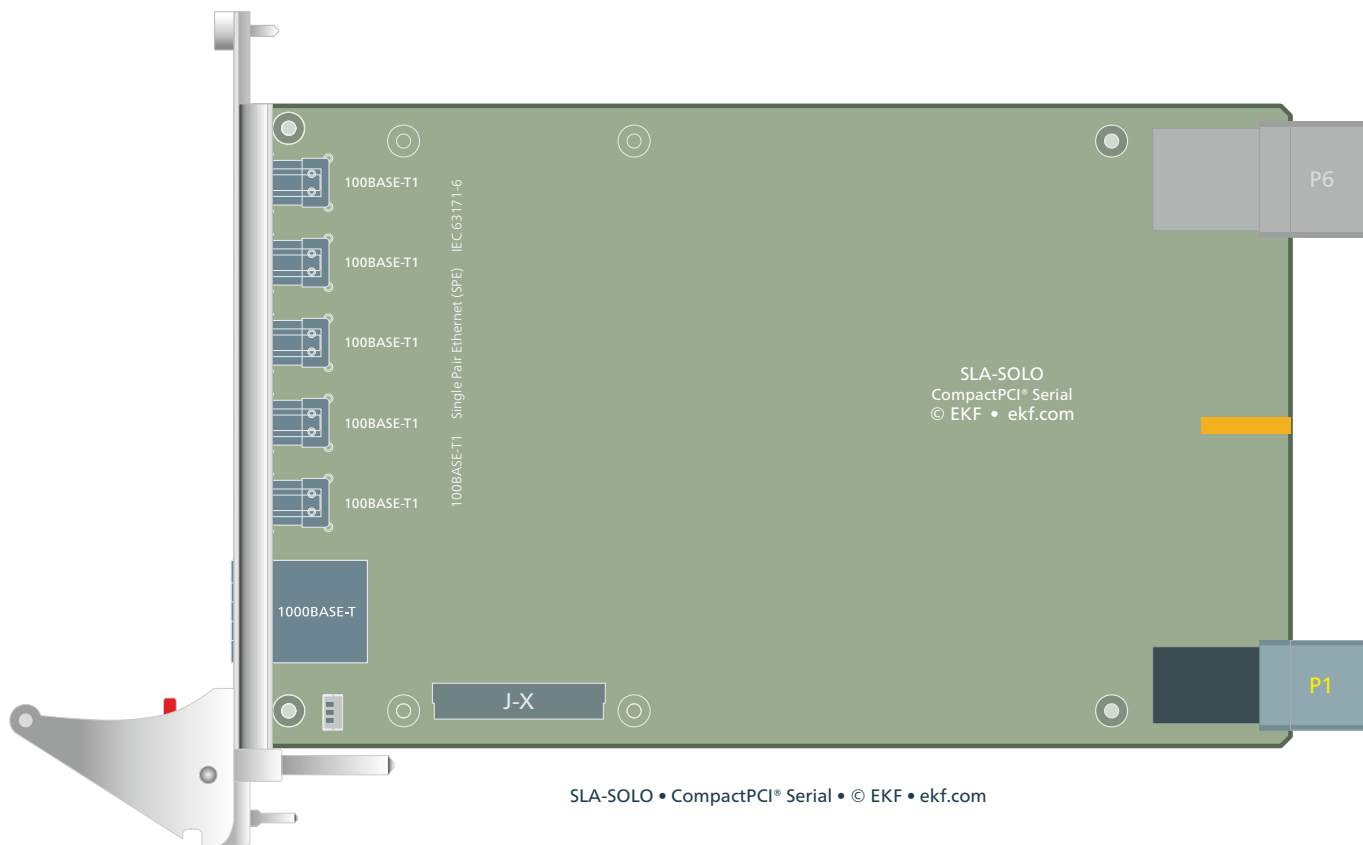
1 - 4: remove board

5 - 8: install board

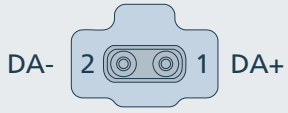
1 & 8: on-board power enabled

2-7: on-board power disabled

Component Assembly



SPE Ethernet Connectors

| IEC 63171-6 • Single Pair Ethernet Fully Shielded Latching PCB Connectors IP20 Switch Ports 2-8 100BASE-T1 IEEE 802.3bw | | |
|---|---------|--------|
| <p>279.20.02.00</p>  <p>IEC 63171-6</p> | 1 | BI_DA+ |
| | 2 | BI_DA- |
| | Housing | Shield |

| Mating Cable Assemblies IEC 63171-6 Cable Connectors at Both Ends | | |
|--|--|--------------------------|
| EKF Part No. | 279.21.030.0 | 3m |
| Harting | 33 28 010 1001 030 33 28 010 1001 XXX | 030 = 3m XXX = Length |



EKF is a member of the Single Pair Ethernet Industrial Partner Network

P1 CompactPCI® Serial Backplane Connector

| P1 CompactPCI® Serial Peripheral Slot Backplane Connector | | | | | | | | | | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 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 | <i>1_PE TX02+</i> | <i>1_PE TX02-</i> | GND | <i>1_PE RX02+</i> | <i>1_PE RX02-</i> | GND | <i>1_PE TX03+</i> | <i>1_PE TX03-</i> | GND | <i>1_PE RX03+</i> | <i>1_PE RX03-</i> |
| 5 | <i>1_PE TX00+</i> | <i>1_PE TX00-</i> | GND | <i>1_PE RX00+</i> | <i>1_PE RX00-</i> | GND | <i>1_PE TX01+</i> | <i>1_PE TX01-</i> | GND | <i>1_PE RX01+</i> | <i>1_PE RX01-</i> | GND |
| 4 | GND | <i>1_ USB2+</i> | <i>1_ USB2-</i> | GND | <i>PE_ CLKIN+</i> | <i>PE_ CLKIN-</i> | GND | <i>1_SATA TX+</i> | <i>1_SATA TX-</i> | GND | <i>1_SATA RX+</i> | <i>1_SATA RX-</i> |
| 3 | <i>1_USB3 TX+</i> | <i>1_USB3 TX-</i> | GA0 | <i>1_USB3 RX+</i> | <i>1_USB3 RX-</i> | GA1 | <i>SATA SDI</i> | <i>SATA SDO</i> | GA2 | <i>SATA SCL</i> | <i>SATA SL</i> | GA3 |
| 2 | GND | I2C SCL | I2C SDA | GND | <i>RSV</i> | <i>RSV</i> | GND | RST# | WAKE_ OUT# | GND | PCIE_ EN# | SYS EN# |
| 1 | +12V | STBY | GND | +12V | +12V | GND | +12V | +12V | GND | +12V | +12V | GND |

pin positions printed white/italic: not connected

For signal descriptions please refer to PICMG CPCI-S.0 R1.0 CompactPCI® Serial Specification

CompactPCI® Serial Backplane Connector P6

| P6 CompactPCI® Serial Peripheral Slot Backplane Connector | | | | | | | | | | | | |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| EKF Part #250.3.1208.20.02 • 96 pos. 12x8, 18mm width | | | | | | | | | | | | |
| P6 | A | B | C | D | E | F | G | H | I | J | K | L |
| 8 | PU 1) | 8 ETH A+ | 8 ETH A- | PU 2) | 8 ETH B+ | 8 ETH B- | GND | 8 ETH C+ | 8 ETH C- | GND | 8 ETH D+ | 8 ETH D- |
| 7 | 7 ETH A+ | 7 ETH A- | GND | 7 ETH B+ | 7 ETH B- | GND | 7 ETH C+ | 7 ETH C- | GND | 7 ETH D+ | 7 ETH D- | GND |
| 6 | GND | 6 ETH A+ | 6 ETH A- | GND | 6 ETH B+ | 6 ETH B- | GND | 6 ETH C+ | 6 ETH C- | GND | 6 ETH D+ | 6 ETH D- |
| 5 | 5 ETH A+ | 5 ETH A- | GND | 5 ETH B+ | 5 ETH B- | GND | 5 ETH C+ | 5 ETH C- | GND | 5 ETH D+ | 5 ETH D- | GND |
| 4 | GND | 4 ETH A+ | 4 ETH A- | GND | 4 ETH B+ | 4 ETH B- | GND | 4 ETH C+ | 4 ETH C- | GND | 4 ETH D+ | 4 ETH D- |
| 3 | 3 ETH A+ | 3 ETH A- | GND | 3 ETH B+ | 3 ETH B- | GND | 3 ETH C+ | 3 ETH C- | GND | 3 ETH D+ | 3 ETH D- | GND |
| 2 | GND | 2 ETH A+ | 2 ETH A- | GND | 2 ETH B+ | 2 ETH B- | GND | 2 ETH C+ | 2 ETH C- | GND | 2 ETH D+ | 2 ETH D- |
| 1 | 1 ETH A+ | 1 ETH A- | GND | 1 ETH B+ | 1 ETH B- | GND | 1 ETH C+ | 1 ETH C- | GND | 1 ETH D+ | 1 ETH D- | GND |

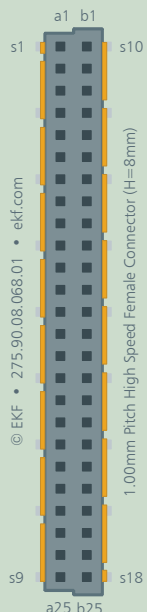
pin positions printed white/italic: not connected

- 1) DECT_RIO Signal
- 2) DECT_BPR Signal

Mezzanine Expansion Connector J-X

SerDes Expansion Connector J-X (Carrier Card Top Mount)

8mm Female ERNI Microspeed EKF Part #275.90.08.068.01



| | | | |
|---------|-----|-----|---------------------|
| | a1 | b1 | |
| | a2 | b2 | |
| GND | a3 | b3 | GND |
| | a4 | b4 | |
| | a5 | b5 | |
| GND | a6 | b6 | GND |
| | a7 | b7 | |
| | a8 | b8 | |
| GND | a9 | b9 | GND |
| | a10 | b10 | |
| | a11 | b11 | |
| GND | a12 | b12 | GND |
| | a13 | b13 | SERDES RXN (Port 9) |
| | a14 | b14 | SERDES RXP (Port 9) |
| GND | a15 | b15 | GND |
| | a16 | b16 | SERDES TXN (Port 9) |
| | a17 | b17 | SERDES TXP (Port 9) |
| GND | a18 | b18 | GND |
| | a19 | b19 | MDC CPU |
| | a20 | b20 | MDIO CPU |
| GND | a21 | b21 | GND |
| I2C_SCL | a22 | b22 | |
| I2C_SDA | a23 | b23 | PLTRST# |
| +12V | a24 | b24 | +12V |
| +12V | a25 | b25 | +12V |

this connector is optional for mezzanine CPU card expansion via SerDes connection
e.g. SLC-ARMADA low profile mezzanine module (AVB/TSN)

Ordering Information

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

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Document No. 9954 • 15 October 2021

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