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 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 in addition to the backplane connector P1 via the Intel® PCIe® I210-IS GbE NIC..

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 100x160mm^2

▸ 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 (P6) & PCIe® NIC 1Gbps (P1)

▸ 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 connector1000BASE-T, 100BASE-TX, 10BASE-T compliant

▸ 5 x 100BASE-T1 SPE front ports IEC 63171-6 (IP20), 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

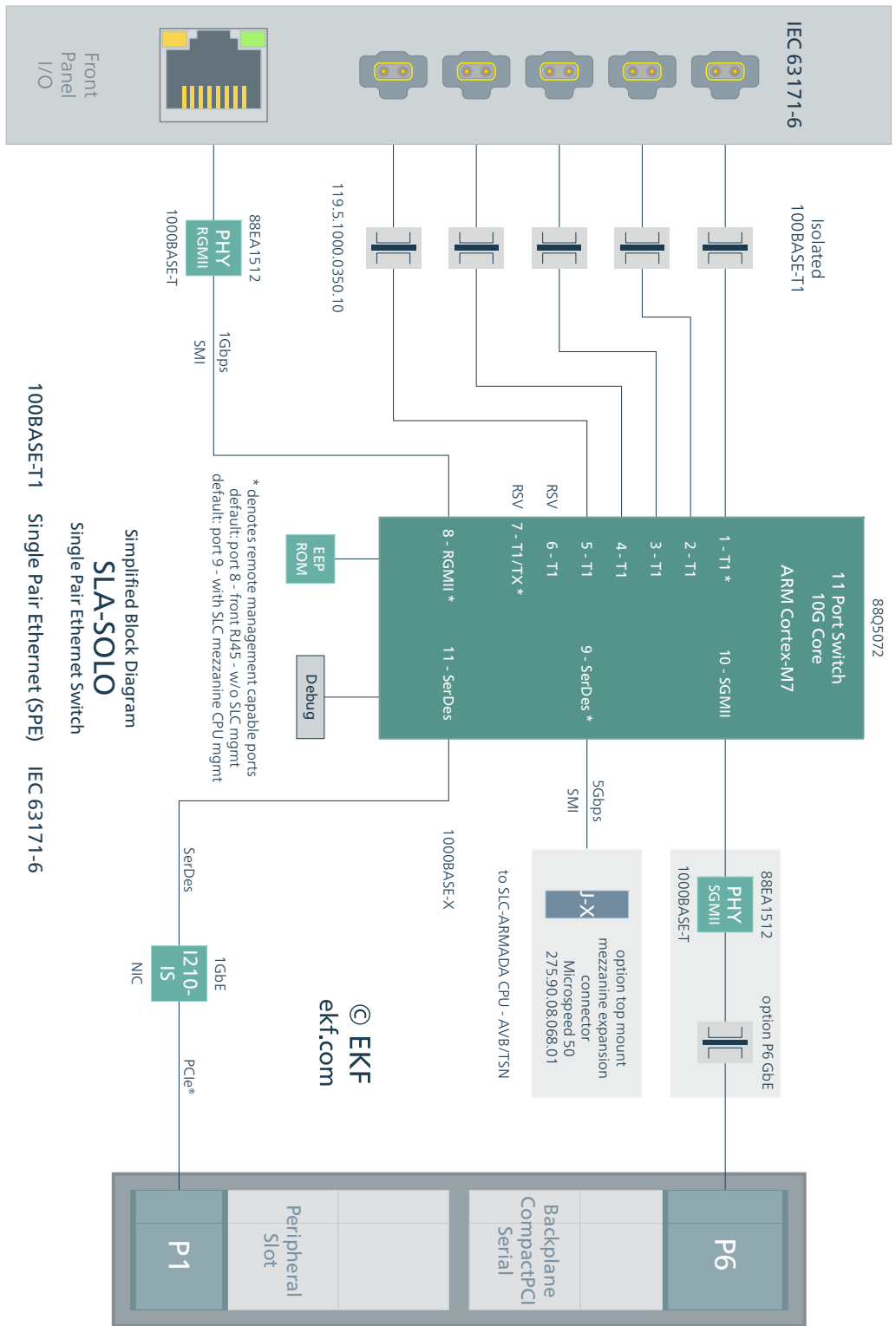### Single Pair Ethernet Switch

▸ 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 SGMII PHY) via backplane connector P6
▸ 1Gbps SerDes to Intel® I210-IS NIC, connected to backplane connector P1 (PCIe® x1)
▸ 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

IEC 63171-6

Front Panel I/O

88EA1512
PHY
RGMII
1000BASE-T

SMI
1Gbps

119.5.1000.0350.10

Isolated
100BASE-T1

Simplified Block Diagram
SLA-SOLO
Single Pair Ethernet Switch

100BASE-T1   Single Pair Ethernet (SPE)   IEC 63171-6

* denotes remote management capable ports
default: port 8 - front RJ45 - w/o SLC mgmt
default: port 9 - with SLC mezzanine CPU mgmt

EEP
ROM

Debug

88Q5072

11 Port Switch
10G Core
ARM Cortex-M7

8 - RGMII *
RSV 7 - T1/TX *
6 - T1
5 - T1
4 - T1
3 - T1
2 - T1
1 - T1 *

RSV

11 - SerDes
9 - SerDes *
10 - SGMII

SMI
5Gbps

1000BASE-X

J-X
Microspeed 50
275.90.08.068.01

option top mount
mezzanine expansion
connector

to SLC-ARMADA CPU - AVB/TSN

88EA1512
PHY
SGMII
1000BASE-T

option P6 GbE

SerDes

I210-
IS

NIC

1GbE

PCIe®

© EKF
ekf.com

P1

Peripheral
Slot

Backplane
CompactPCI
Serial

P6

Front Panel

SLA-SOLO   SLA-SOLO

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.
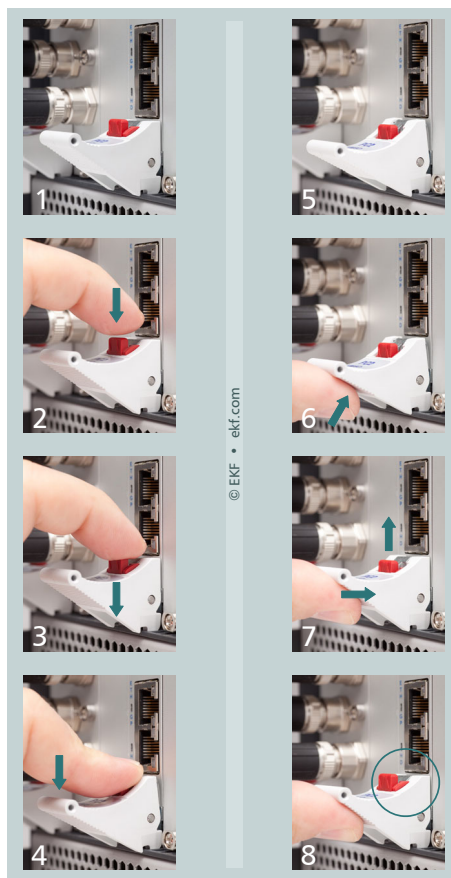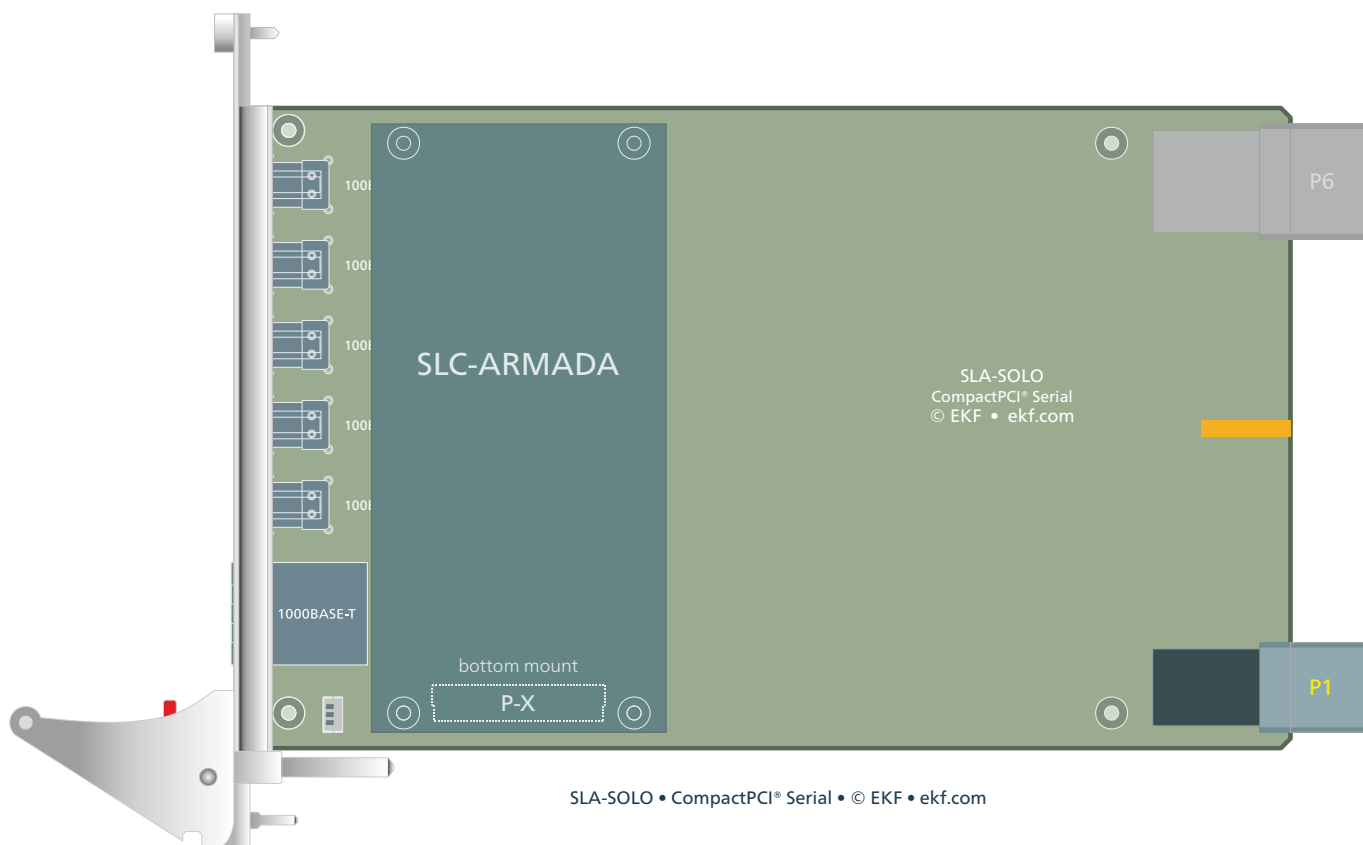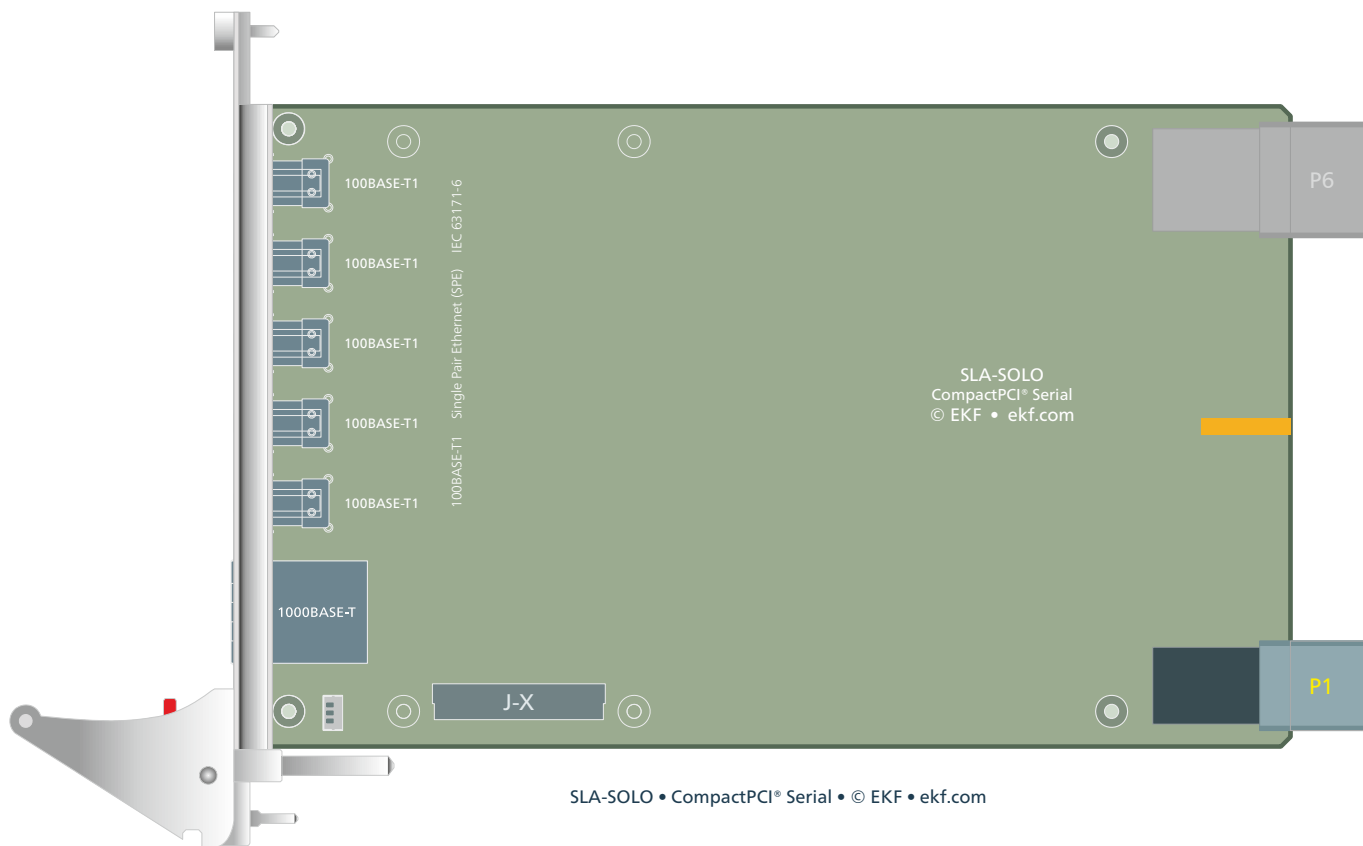

1 - 4: remove board

5 - 8: install board

1 & 8: on-board power enabled

2-7: on-board power disabled

Component Assembly

100BASE-T1

100BASE-T1

100BASE-T1

100BASE-T1

100BASE-T1

IEC 63171-6

Single Pair Ethernet (SPE)

100BASE-T1

1000BASE-T

P6

SLA-SOLO
CompactPCI® Serial
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P1

J-X

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100I

100I

100I

100I

100I

1000BASE-T

SLC-ARMADA

P6

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P1

bottom mount

P-X

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SPE Ethernet Connectors

IEC 63171-6 • Single Pair Ethernet		
Fully Shielded Latching PCB Connectors IP20		
Switch Ports 2-8 100BASE-T1 IEEE 802.3bw		
279.20.02.00 DA- 2 1 DA+ IEC 63171-6	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	030 = 3m
	33 28 010 1001 XXX	XXX = Length

www.HARTING.com

COMMITTED TO
IEC 63171-6
SPE | INDUSTRIAL PARTNER NETWORK

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	1_PE TX02+	1_PE TX02-	GND	1_PE RX02+	1_PE RX02-	GND	1_PE TX03+	1_PE TX03-	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	PE_ CLKIN+	PE_ CLKIN-	GND	1_SATA TX+	1_SATA TX-	GND	1_SATA RX+	1_SATA RX-
3	1_USB3 TX+	1_USB3 TX-	GA0	1_USB3 RX+	1_USB3 RX-	GA1	SATA SDI	SATA SDO	GA2	SATA SCL	SATA SL	GA3
2	GND	I2C SCL	I2C SDA	GND	RSV	RSV	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

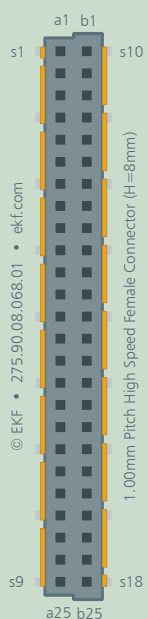| P6	A	B	C	D	E	F	G	H	I	J	K	L
	P6 CompactPCI® Serial Peripheral Slot Backplane Connector EKF Part #250.3.1208.20.02 • 96 pos. 12x8, 18mm width											
8	PU 1)	8 ETH A+	8 ETH A-	PU 2)	8 ETH B+	8 ETH B-	GND	8 ETH C+	8 ETH C-	GND	8 ETH D+	8 ETH D-
7	7 ETH A+	7 ETH A-	GND	7 ETH B+	7 ETH B-	GND	7 ETH C+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

a1 b1
s1   *s10*

© EKF • 275.90.08.068.01 • ekf.com
1.00mm Pitch High Speed Female Connector (H=8mm)

s9   *s18*
a25 b25

Ordering Information

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

Beyond All Limits:

EKF High Performance Embedded

50 Years

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