SYSTEM

Product Information

# SL4-TUBA

***CompactPCI® Serial*** • 20-Port Gigabit Ethernet Switch

Document No. 7175 • 13 February 2014

## General

*The SL4-TUBA is a peripheral slot card for CompactPCI® Serial systems. The board is equipped with a modular Gigabit Ethernet switch fabric up to 20 ports. While 5 GbE ports are wired to associated RJ45 front panel jacks, another 14 GbE ports are available for rear I/O via the backplane connectors P5/P6.*

*In addition, the SL4-TUBA is provided with a PCI Express® to Gigabit Ethernet controller, which is internally also connected to the GbE switch.*

For optimum scalability, the SL4-TUBA employs up to four Gigabit Ethernet switches internally, wired together for a total of 20 GbE ports. The Marvell® 88E6350R devices in use are self-managed and comprise a rich feature set.

Likewise, the Intel® I210-IT Ethernet NIC provides latest networking technology, e.g. Audio-Video Bridging (AVB) for tightly controlled media stream synchronisation, buffering, and reservation.

SL4-0100-TUBA

## Feature Summary

- PICMG® CompactPCI® Serial standard (CPCI-S.0) peripheral slot card
- Single Size Eurocard 3U 4HP 100x160mm$^2$
- cPCI-S backplane connector P1, P5, P6
- Suitable for PCIe x 1 standard peripheral slots

- P1 used for PCI Express® lane to I210 Gigabit Ethernet Controller
- P5, P6 used for up to 14 GbE ports over backplane or rear I/O transition module
- 5 x RJ45 front panel GbE ports

- Marvell® 88E6350R based Gigabit Ethernet switch fabric (5 x PHY, 2 x RGMII each device)
- High performance, non-blocking, Gigabit Ethernet
- Support for up to 1K MAC addresses, 10KByte Jumbo Frames
- Unmanaged solution
- Up to four 88E6350R devices in use for scalability

- Intel® I210IT Gigabit Ethernet Controller internally wired to GbE switch fabric (20$^{th}$ port)
- 9.5KB Jumbo Frame support
- Hardware-based time stamping (IEEE 1588) and support for 802.1AS
- Option IEEE 802.1Qav compliant Audio-Video Bridging (AVB)
- IPv4, IPv6, TCP/UDP checksum offloads
- Driver support for all major operating systems

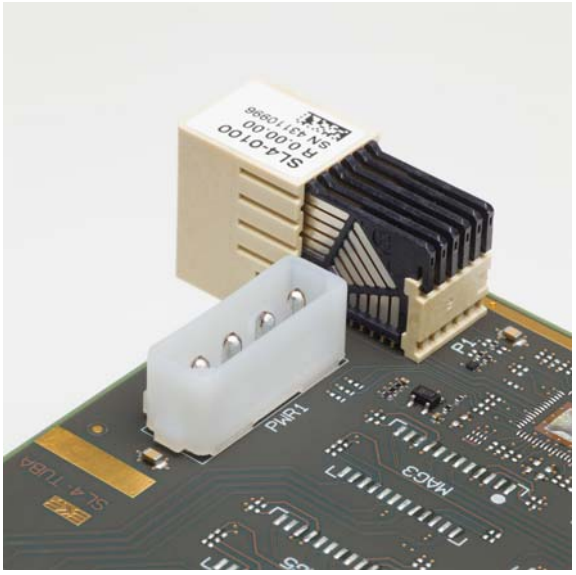
- Long term availability
- Rugged solution (coating, sealing, underfilling on request)
- RoHS compliant 2002/95/EC
- Commercial and industrial temperature range
- Humidity 5% ... 95% RH non condensing
- Altitude -300m ... +3000m
- Shock 15g 0.33ms, 6g 6ms
- Vibration 1g 5-2000Hz
- MTBF tbd
- EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

## Theory of Operation

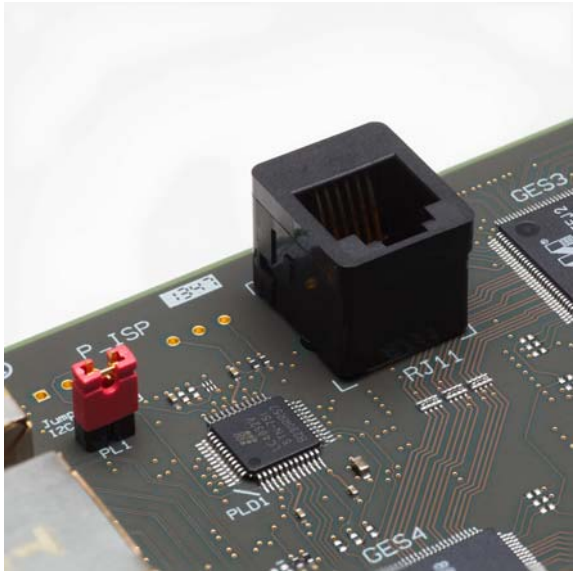
The SL4-TUBA is equipped with a maximum of four Marvell® 88E6350R Gigabit Ethernet switches. Each of them provides 5 ports with integrated Ethernet transceivers (PHY) and two digital interfaces (RGMII). The switches are coupled together by means of their RGMII interfaces. A total of 20 PHY ports is available on-board, wired to the front panel (5) and to the CompactPCI® Serial backplane connectors P5/P6 (14). One PHY port is connected to the on-board Gigabit Ethernet controller.

While the front panel RJ45 jacks are provided with integrated magnetics, all other GbE PHY ports are isolated by on-board magnetics modules. A custom specific backplane will be required for usage of the rear I/O GbE ports.

The SL4-TUBA can be inserted into any CompactPCI® Serial peripheral slot. A single PCI Express® lane would be sufficient for communication with the on-board Gigabit Ethernet controller.

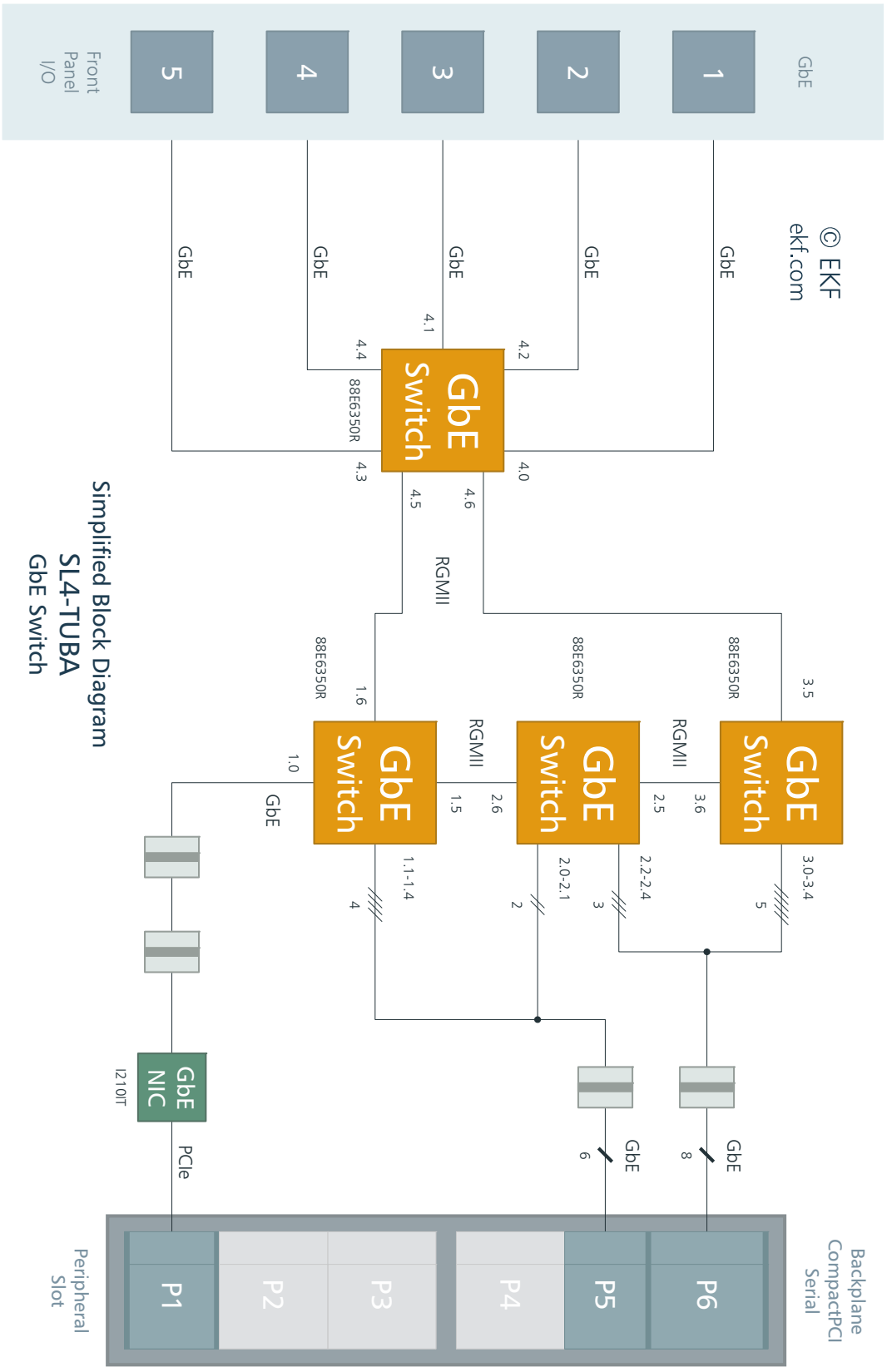



Option Power Connector
for Standalone Operation

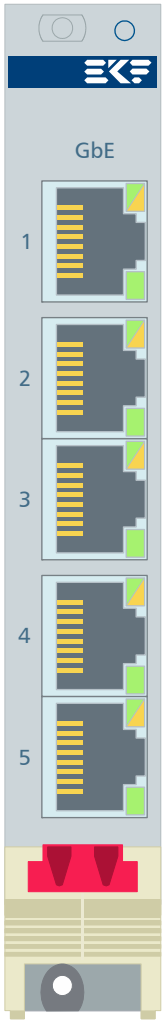



Option Management I/F
(Marvell NDA Customers Only)

## Block Diagram



## Front Panel

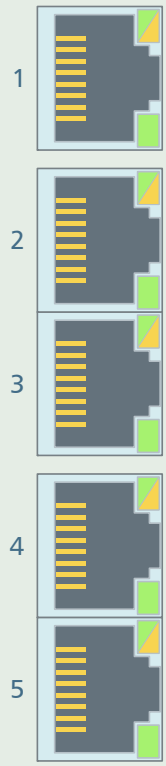



SL4-TUBA
GbE Switch

## Front Panel RJ45 Jacks 1-5

**Gigabit Ethernet**

270.01.08.5 Single RJ45 Jack • 270.02.08.5 2 x Dual RJ45 Jacks






Upper yellow LEDs (1):
on=1Gbit/s off=10/100Mbit/s

Lower green LEDs (2):
on=link established blinking=activity (data)

RJ45 F/P Jacks 1-5

| | |
|---|---|
| 1 | MDX0+ |
| 2 | MDX0- |
| 3 | MDX1+ |
| 4 | MDX2+ |
| 5 | MDX2- |
| 6 | MDX1- |
| 7 | MDX3+ |
| 8 | MDX3- |

## Backplane Connector P1

**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 | *PE TX 02+* | *PE TX 02-* | GND | *PE RX 02+* | *PE RX 02-* | GND | *PE TX 03+* | *PE TX 03-* | GND | *PE RX03 +* | *PE RX03-* |
| 5 | PE TX 00+ | PE TX 00- | GND | PE RX 00+ | PE RX 00- | GND | *PE TX 01+* | *PE TX 01-* | GND | *PE RX 01+* | *PE RX 01-* | GND |
| 4 | GND | *USB2 +* | *USB2 -* | GND | PE CLK+ | PE CLK- | GND | *SATA TX+* | *SATA TX-* | GND | *SATA RX+* | *SATA RX-* |
| 3 | *USB3 TX+* | *USB3 TX-* | GA0 | *USB3 RX+* | *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 # | GND | PE EN# | *SYS EN#* |
| 1 | +12V | *STBY* | GND | +12V | +12V | GND | +12V | +12V | GND | +12V | +12V | GND |

pin positions printed white/italic: not connected

## Backplane Connector P5

| P5 CompactPCI® Serial Peripheral Slot Backplane Connector<br>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 | GND | 16 ETH A+ | 16 ETH A- | GND | 16 ETH B+ | 16 ETH B- | GND | 16 ETH C+ | 16 ETH C- | GND | 16 ETH D+ | 16 ETH D- |
| 5 | 15 ETH A+ | 15 ETH A- | GND | 15 ETH B+ | 15 ETH B- | GND | 15 ETH C+ | 15 ETH C- | GND | 15 ETH D+ | 15 ETH D- | GND |
| 4 | GND | 14 ETH A+ | 14 ETH A- | GND | 14 ETH B+ | 14 ETH B- | GND | 14 ETH C+ | 14 ETH C- | GND | 14 ETH D+ | 14 ETH D- |
| 3 | 13 ETH A+ | 13 ETH A- | GND | 13 ETH B+ | 13 ETH B- | GND | 13 ETH C+ | 13 ETH C- | GND | 13 ETH D+ | 13 ETH D- | GND |
| 2 | GND | 12 ETH A+ | 12 ETH A- | GND | 12 ETH B+ | 12 ETH B- | GND | 12 ETH C+ | 12 ETH C- | GND | 12 ETH D+ | 12 ETH D- |
| 1 | 11 ETH A+ | 11 ETH A- | GND | 11 ETH B+ | 11 ETH B- | GND | 11 ETH C+ | 11 ETH C- | GND | 11 ETH D+ | 11 ETH D- | GND |

| P5 | |
|---|---|
| P5 Assignment ETH | Switch.Port |
| 16 | 2.1 |
| 15 | 2.0 |
| 14 | 1.4 |
| 13 | 1.3 |
| 12 | 1.2 |
| 11 | 1.1 |

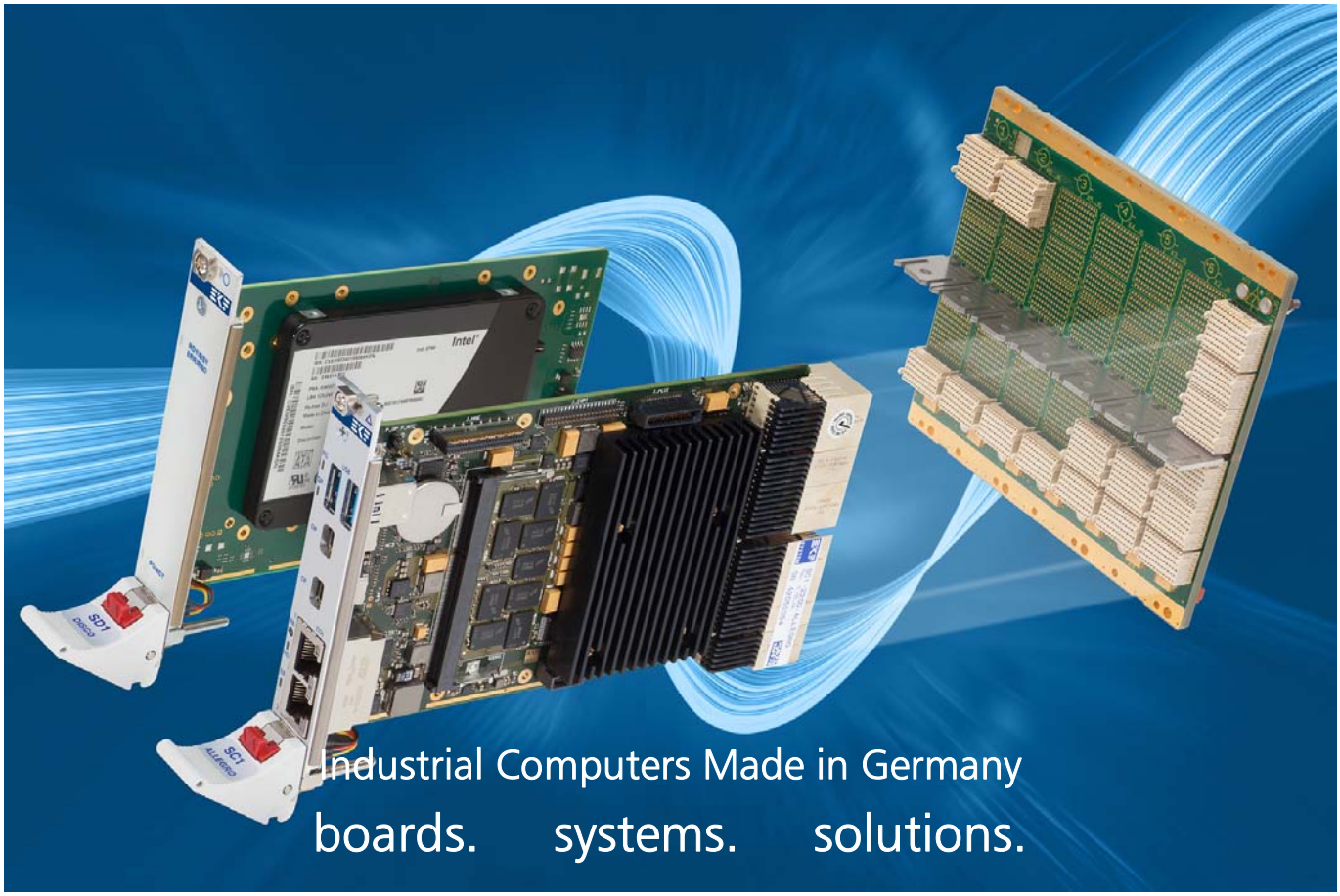
## Backplane Connector P6

| P6 CompactPCI® Serial Peripheral Slot Backplane Connector<br>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 | GND | 8 ETH A+ | 8 ETH A- | GND | 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 |

| P6 | |
|---|---|
| P6 Assignment ETH | Switch.Port |
| 8 | 3.4 |
| 7 | 3.3 |
| 6 | 3.2 |
| 5 | 3.1 |
| 4 | 3.0 |
| 3 | 2.4 |
| 2 | 2.3 |
| 1 | 2.2 |

| SL4-TUBA Links | |
|---|---|
| SL4-TUBA Home | www.ekf.com/s/sl4/sl4.html |
| Intel® I210 Driver Download | www.ekf.com/s/sl4/sl4.html |
| CompactPCI® Serial Overview | www.ekf.com/s/cpci_serial_overview.pdf |

| Ordering Information |
|---|
| For popular SL4-TUBA SKUs please refer to<br>www.ekf.com/liste/liste_21.html#SL4 |

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