



## Product Information

### CL1-COMBO • CompactPCI® Gigabit Ethernet Switch

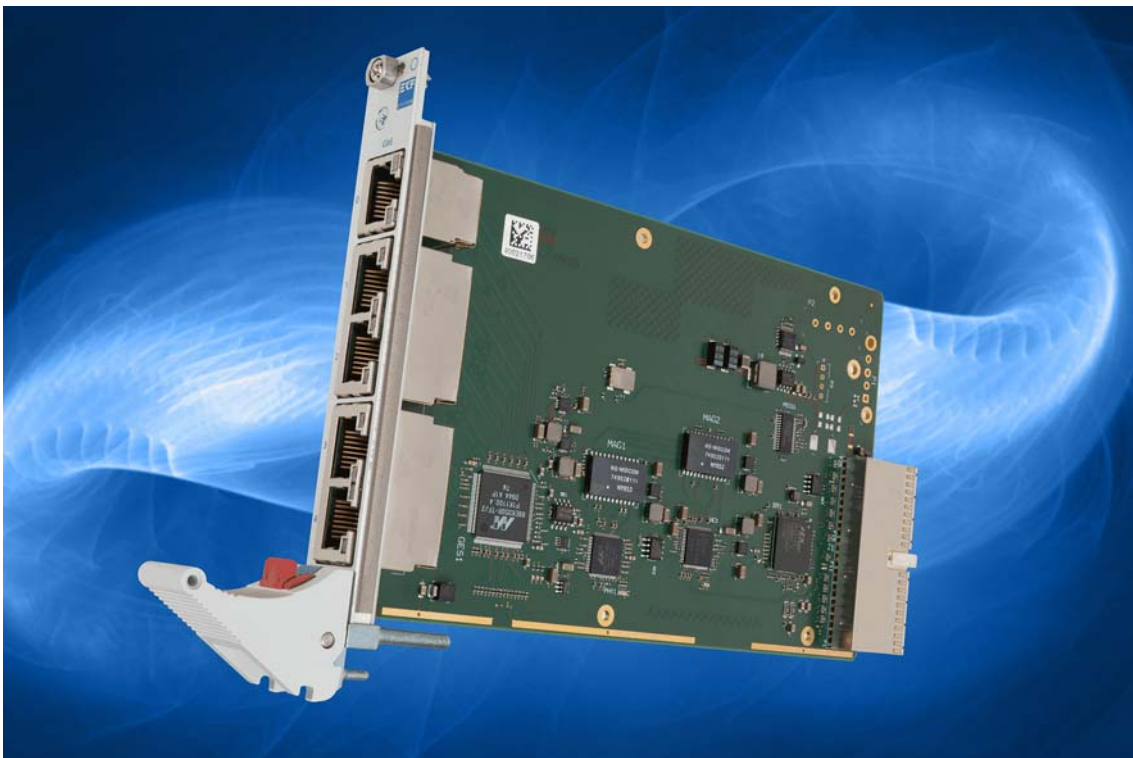
Industrial 5+1 Port Switch w. or w/o CompactPCI® Backplane I/O

Document No. 5600 • 29 September 2011

#### General

Available as 3U CompactPCI® peripheral board, the **CL1-COMBO** is a powerful Gigabit Ethernet switch. Its front panel is provided with five Gigabit Ethernet jacks. As an option, a sixth GbE channel is reserved for CompactPCI® backplane communication. The CL1-COMBO is equipped with the Marvell® 88E6350R switch, which has a rich feature set, including latest 802.1 Audio Video Bridging (AVB) standards.

The CL1-COMBO may be operated either as stand-alone card, powered from a single +5V external supply, or as a CompactPCI® peripheral board. For communication with the CompactPCI® host CPU, a Gigabit Ethernet controller is internally connected to the switch. The CL1-COMBO is suitable for a broad range of applications, e.g. industrial communication, but also transportation and enterprise.



CL1-COMBO

## Major Benefits

- ▶ Single Size Eurocard 100x160mm<sup>2</sup> (3U/4HP)
- ▶ Stand-Alone operation as 5-port Gigabit Ethernet switch (5 x front panel jacks RJ-45)
- ▶ Option internal 6<sup>th</sup> port Gigabit Ethernet RJ-45 jack
- ▶ *CompactPCI*® peripheral card option 32-bit 33/66MHz (on-board GbE controller wired internally to switch)
- ▶ Marvell® 88E6350R switch fabric - high performance, non-blocking, Gigabit Ethernet switch
- ▶ Supports 802.1 Audio Video Bridging (AVB) Standards: 802.1AS - Precise Timing Protocols • 802.1Qat - Stream Reservation Protocol • 802.1Qav - Egress Pacing and Jitter Tolerance
- ▶ High performance switch fabric with support for up to 1K MAC addresses
- ▶ Supports 10KByte Jumbo Frames
- ▶ Unmanaged solution (external management option via SMI port, by means of Marvell® USB-2-SMI adapter module)
- ▶ Option on-board Gigabit Ethernet controller Intel® 82574IT
- ▶ Long Term Availability
- ▶ Coating, Sealing, Underfilling on Request
- ▶ RoHS compliant 2002/95/EC
- ▶ Operating temperature: 0°C to +70°C (industrial temperature range on request)
- ▶ 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
- ▶ MTBF 37years
- ▶ EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

## The Switch

As the heart of the CL1-COMBO, the Marvell® 88E6350R device is a single-chip non-blocking Gigabit Ethernet switch with five integrated Gigabit Ethernet transceivers (PHY) supporting the latest IEEE802.1 Audio Video Bridging (AVB) standards. These new AVB standards overcome the latency and bandwidth limitations of Ethernet to allow for the efficient transmission of real-time audio and video over Ethernet for industrial or commercial applications.

The 88E6350R uses the AVB technologies to identify and reserve the network resources for AVB traffic streams and supports precise isochronous streaming capability for reliable and quality audio/video transmission over Ethernet for today's real-time, high definition information options. The AVB protocols enable timing sensitive multimedia streams to be sent over the Ethernet network with low latency and robust quality of Services.

[www.marvell.com/switching/assets/marvell\\_linkstreet\\_88E6350r\\_product\\_brief.pdf](http://www.marvell.com/switching/assets/marvell_linkstreet_88E6350r_product_brief.pdf)





CL1-COMBO • Option CompactPCI®

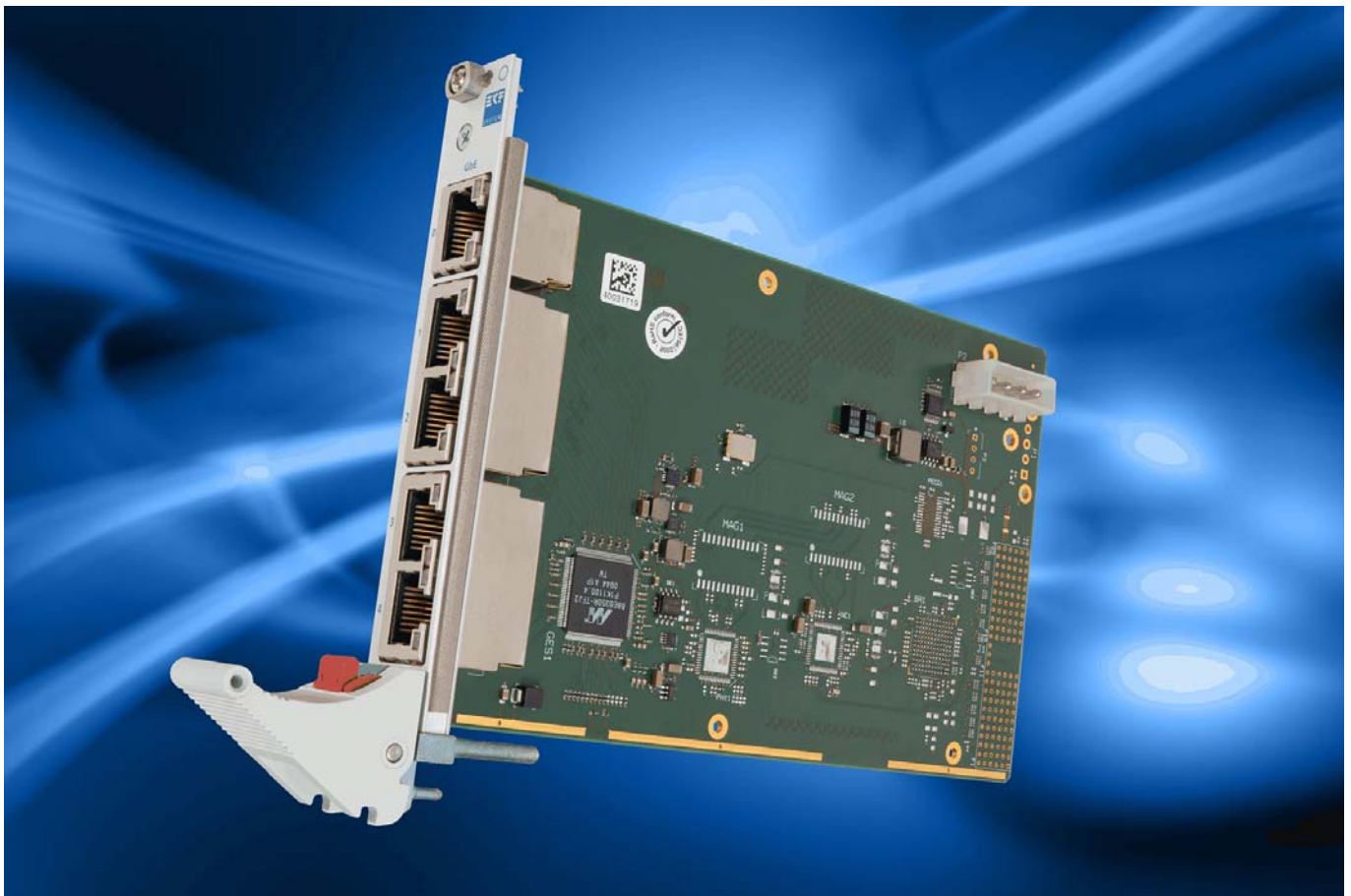
## Theory of Operation

The CL1-COMBO is merely a single chip solution, built around the Marvell® 88E6350R Gigabit Ethernet switch, which provides many built-in network and security features. Advanced (external) management would require the optional RJ-11 SMI (Serial Management Interface) connector to be stuffed, for attachment of the Marvell® USB-2-SMI adapter module. The Windows® based Marvell® SOHO-GUI then can be used to access the device internal registers and tables. Modifications made to the configuration of the switch are stored permanently in an EEPROM on the CL1-COMBO.

A sixth internal RJ-45 GbE jack is available as an option, on an exclusive base to the CompactPCI® backplane port option.

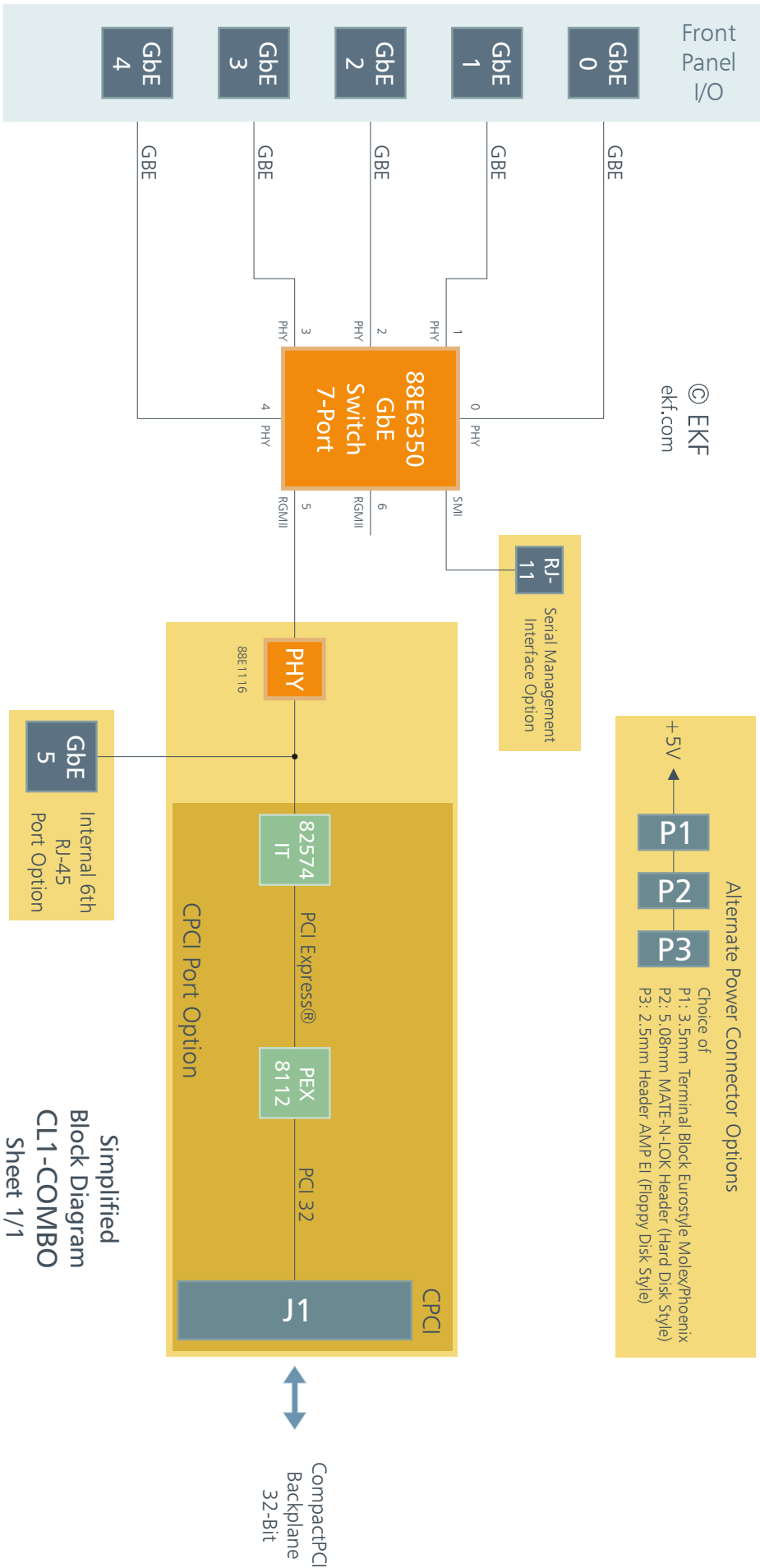
For stand-alone operation of the CL1-COMBO, other +5V power supply connector options are available as an alternate to the CPCI connector J1, e.g. the popular hard disk style MATE-N-LOK header (suitable e.g. for ATX power supplies).

The GbE switch circuitry will be reset at power-up, but can be also manually reset by depressing the red ejector lever button (CPCI reset pass-through available as an option).



CL1-COMBO • Stand-Alone (MATE-N-LOK Power Connector)

Block Diagram



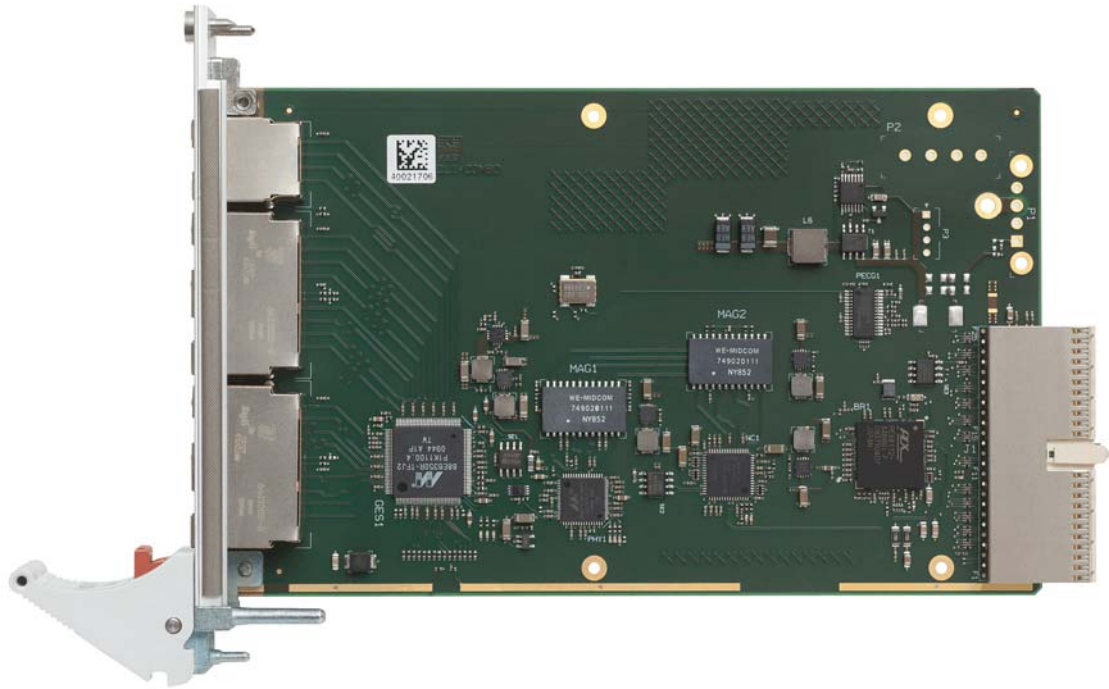
Simplified Block Diagram CL1-COMBO Sheet 1/1

## Front Panel Options

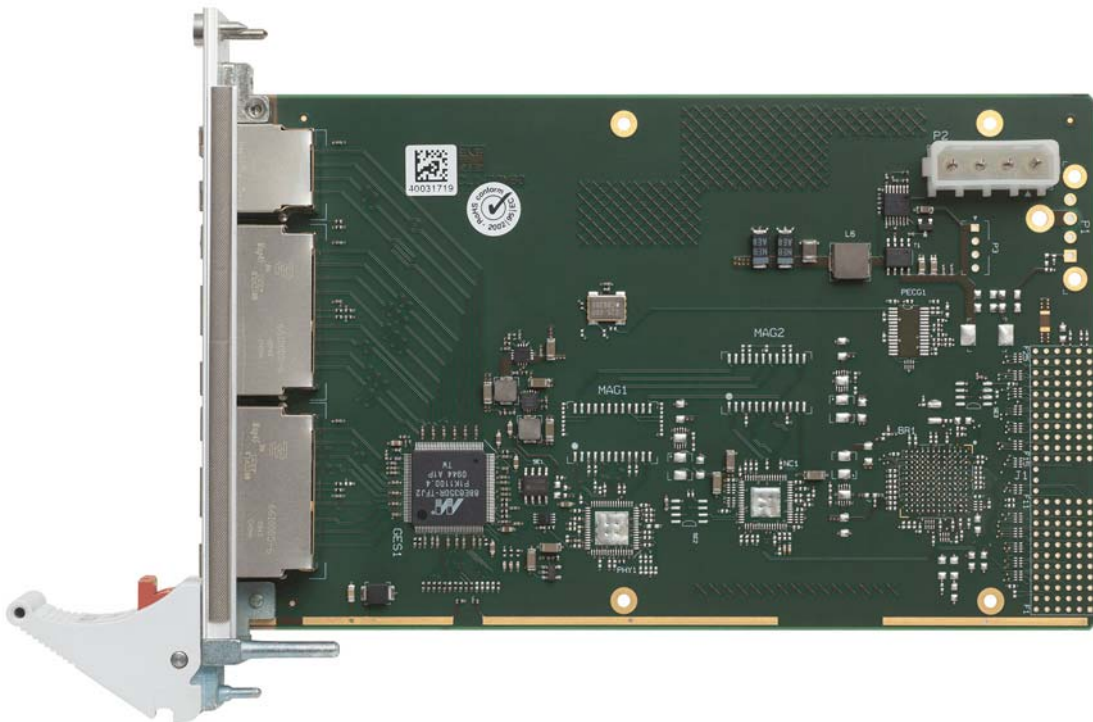


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CL1-COMBO



CL1-COMBO Top View • Option CompactPCI®

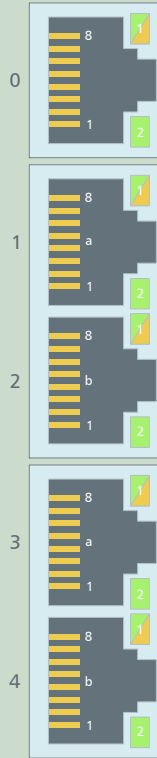


CL1-COMBO Top View • Stand-Alone Version



CL1-COMBO • Stand-Alone Version

Gigabit Ethernet • 270.01.08.05 Single RJ45 Jack • 270.02.08.5 2 x Dual RJ45 Jacks



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

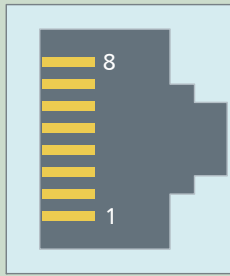
Lower green LEDs (2):  
on=link established blinking=activity (data)

Ports  
0-4

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

Option Gigabit Ethernet • 270.01.08.06 • Single RJ-45 Jack

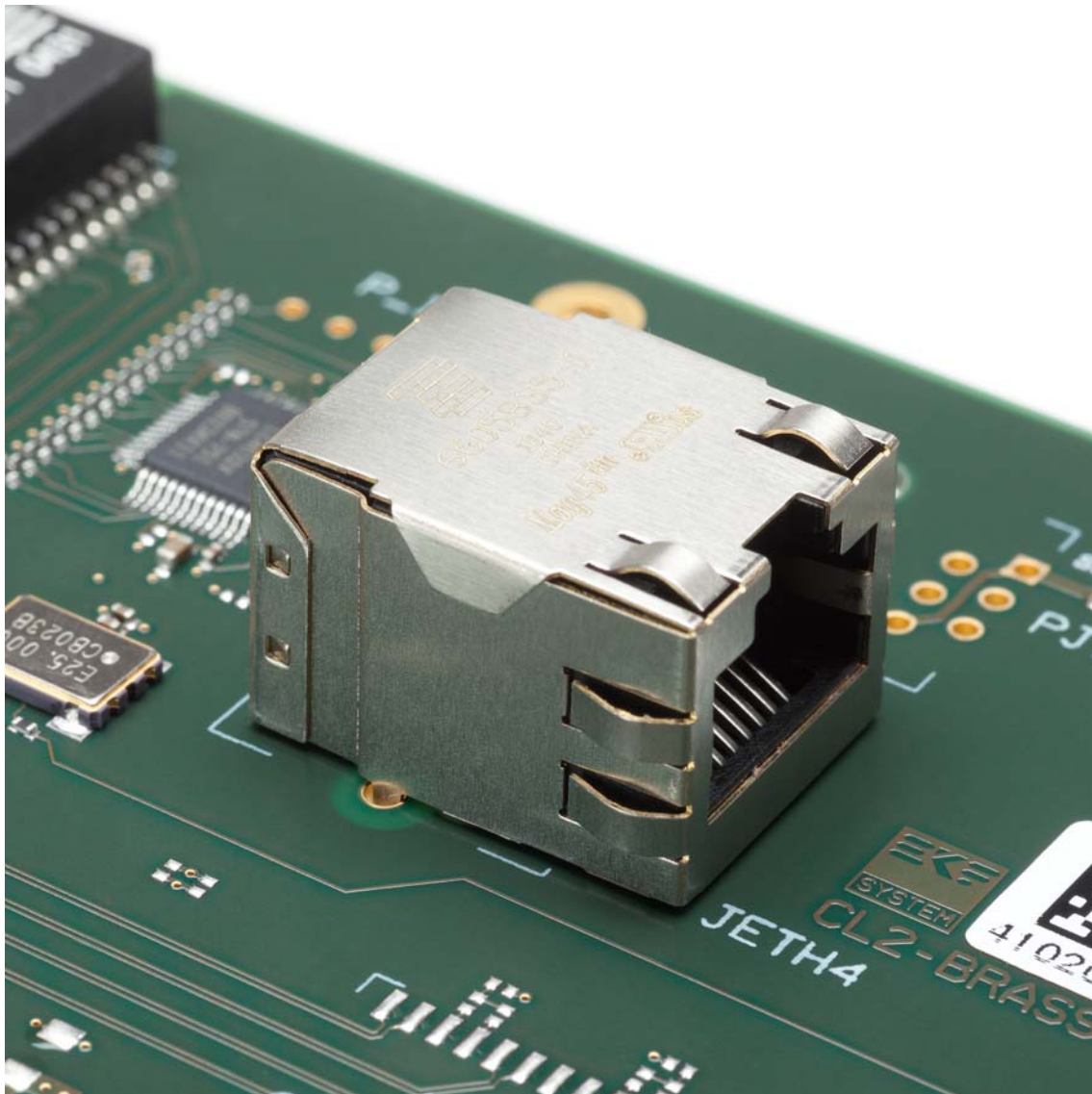
270.01.08.06



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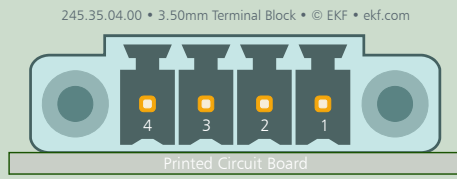
Port 5

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



Option on-Board RJ-45 Gigabit Ethernet Port 5 (Picture Similar)

P1 (Option) +5V Power Stand-Alone • 245.35.04.00 • 3.50mm Terminal Block



1	+5V
2	GND
3	Reserved/Shield
4	NC

The CL1-COMBO can be optionally provided with a 3.50mm terminal block for attachment of external +5V power to the board. The terminal block header is a Phoenix Contact #1843813 or Molex #39506-1004 or equivalent, which mates with a Phoenix Contact #1847071 or Molex #39504-0004 plug. The plug can be fixed by two M2 screws.

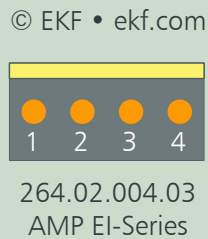
P2 (Option) +5V Power Stand-Alone • 264.02.004.13 • MATE-N-LOK



1	NC
2	GND
3	GND
4	+5V

The CL1-COMBO can be optionally provided with a MATE-N-LOK header for attachment of +5V power on pin 4. This header is suitable for most ATX style power supplies (also in use on hard disk drives).

P3 (Option) +5V Power Stand-Alone • 264.02.004.03 • EI-Series Header



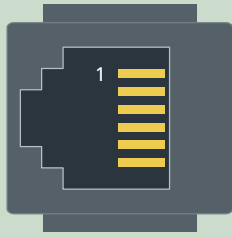
1	+5V
2	GND
3	GND
4	NC

The CL1-COMBO can be optionally provided with an AMP EI-Series header for attachment of +5V power on pin 1. This header is suitable for some ATX style power supplies (also in use on floppy disk drives).

**Warning:**

Assembly may not be protected against misalignment with respect to +5V and GND  
Confusing pins may cause permanent damage to the board

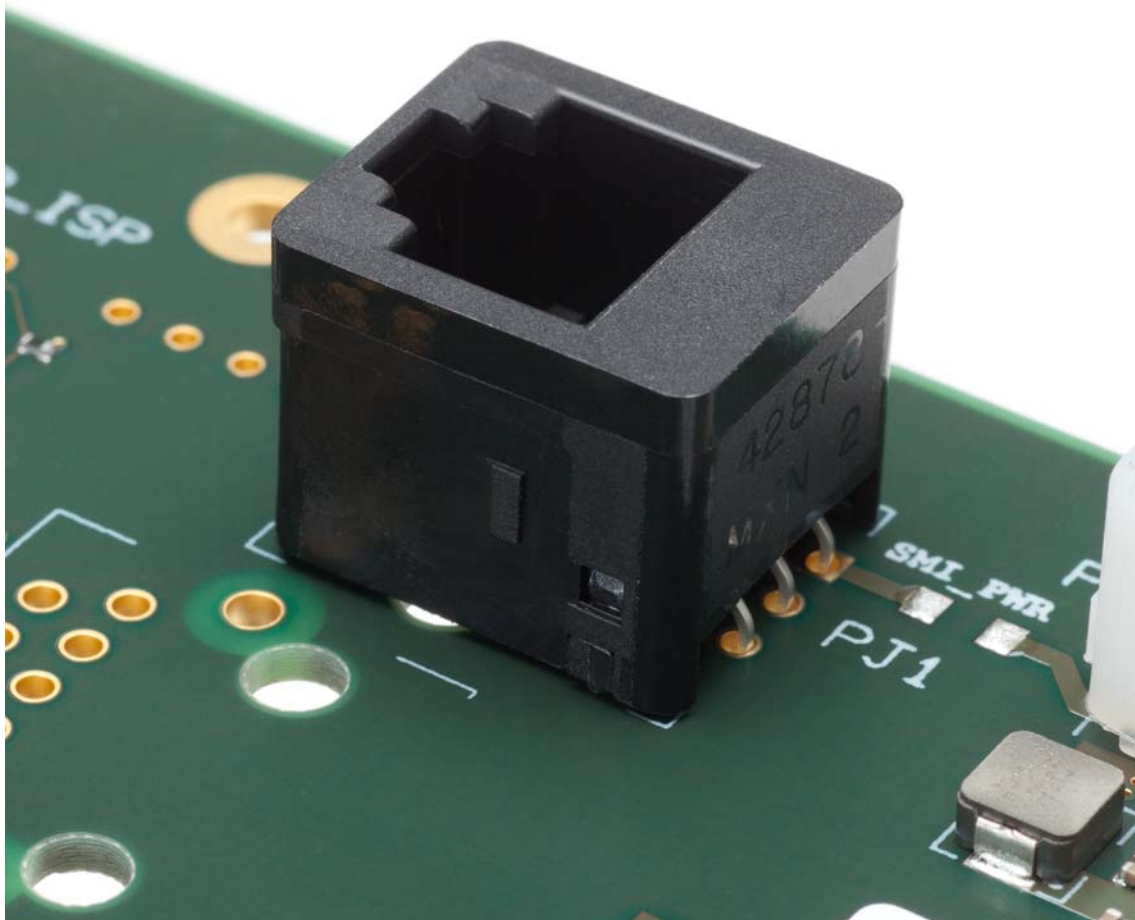
## Option Serial Management Interface • 270.10.06.00 • RJ-11 Modular Jack



270.10.06.00  
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1	+5V
2	SMI DATA
3	GND
4	GND
5	SMI CLOCK
6	+5V

The CL1-COMBO may be optionally provided with an RJ-11 jack for attachment of the Marvell® USB-2-SMI adapter module. The Windows® based Marvell® SOHO-GUI then can be used to access the switch internal registers and tables. The USB-2-SMI is connected to the CL1-COMBO by means of a four lead cable (only pins 2 - 5 from the table above in use). The USB-2-SMI adapter module must be ordered directly from Marvell. Signing of a Marvell non-disclosure agreement (NDA) may be required. Please contact your nearest Marvell sales office or distributor in your area, which can be located at <http://extranet.marvell.com/sales/>.



Management Interface Option (Picture Similar)

Related Information

CL1-COMBO Home: [www.ekf.com/c/cnic/cl1/cl1.html](http://www.ekf.com/c/cnic/cl1/cl1.html)

CL2-BRASS Home: [www.ekf.com/c/cnic/cl2/cl2.html](http://www.ekf.com/c/cnic/cl2/cl2.html)  
(similar to CL1-COMBO but 5 x M12 F/P Circular Connectors)

Ordering Information

For popular CL1-COMBO SKUs please refer to  
[www.ekf.com/liste/liste\\_20.html#CL1](http://www.ekf.com/liste/liste_20.html#CL1)

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