



## **GL100 • *Embedded Gold***

Industrial Gigabit Ethernet Switch

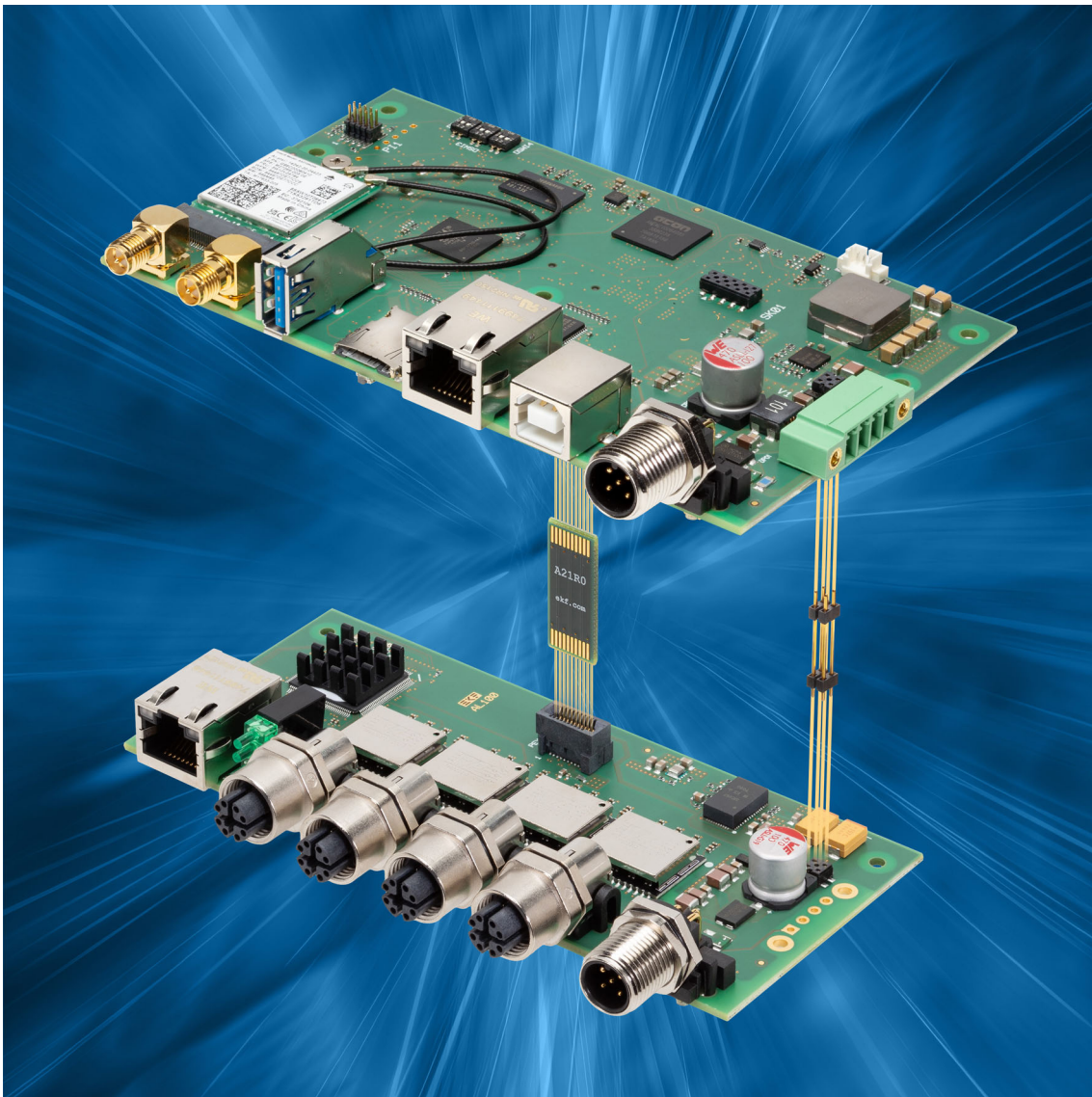


## Overview

The GL100 is a five port Gigabit Ethernet switch board designed for rugged industrial applications. The self-managed solution is provided with four M12-X Ethernet connectors and one RJ45 jack. Up to three GL100 boards can be stacked for switch expansion to 15 ports. The GL100 has a wide-range 9-57VDC power input, via either an M12-A style or terminal block power connector.

The GL100 is based on the Marvell® 88E6390 Ethernet switch. Supported speeds on the M12-X and RJ45 ports are 1000BASE-T, 100BASE-TX and 10BASE-T.

As GL110, the board is also available with a mezzanine CPU card (GC370) for additional protocol support such as AVB/TSN, and Wi-Fi wireless communication.



GL100 w. GC370 (CPU Card for AVB Protocol Support)

## Technical Features

### General

- ▶ 5-Port 1000BASE-T Ethernet switch
- ▶ Self-managed operation
- ▶ Intended for rugged industrial applications, ready-for-use (*Embedded Gold*)
- ▶ Industrial PCB assembly
- ▶ PCB Dimensions 133.0mm x 58.0mm
- ▶ M12-X Gigabit Ethernet connectors, 4 ports
- ▶ RJ45 Gigabit Ethernet connector
- ▶ M12-A Power connector
- ▶ Terminal block power connector (option)
- ▶ Wide DC power input operation 9-57V
- ▶ Option scalable 5 to 15 ports (stacked construction up to three GL100 PCBs)
- ▶ Option CPU board GC370 stacked (for AVB/TSN protocol software)

### I/O Connectors

- ▶ M12-X GbE receptacles, rail approved connector system, Cat6A, IEC 61076-2-109
- ▶ 1000BASE-T, 100BASE-TX, 10BASE-T compliant data transfer rate
- ▶ Future proof investment into cabling infrastructure - up to 10Gbps with M12-X Cat6A
- ▶ M12-X to RJ45 connector Cat6A cable assemblies available from several suppliers
- ▶ Additional RJ45 connector, for general usage
- ▶ M12-A 5-position male connector for DC power input

### Gigabit Ethernet Switch

- ▶ Marvell® 88E6390 (Peridot) based Gigabit Ethernet switch
- ▶ Up to 3 PCBs can be stacked for 5 - 10 - 15 ports (option)
- ▶ Switches connected via 2.5Gbps SERDES (mezzanine stacking connectors)
- ▶ Integrated GbE MAC/PHY 1000BASE-T
- ▶ RJ45 Connector w. integrated magnetics
- ▶ M12-X Connectors isolated by magmods
- ▶ High performance, non-blocking, Gigabit Ethernet
- ▶ Support for up to 16K MAC addresses, 10KByte Jumbo Frames
- ▶ Supports 802.1 Audio Video Bridging (AVB) Gen 2\*
- ▶ Time Sensitive Networking (TSN) Standards\*, IEEE 1588v2 one-step PTP
- ▶ Synchronous Ethernet\*
- ▶ Quality of Service (QoS) support with 8 traffic classes
- ▶ Supports 4096 802.1Q VLANs, three levels of 802.1Q security
- ▶ Unmanaged solution (protocol support with additional mezzanine CPU card)
- ▶ Up to two mezzanine stacking connectors for communication to adjacent switch PCB or CPU (option)
- ▶ PCB inter-communication via SERDES 2.5Gbps ports
- ▶ Stacked PCBs (10 - 15 ports) are virtually combined into a single switch with aggregated performance

## Technical Features

### *Power Requirements*

- ▶ DC Input, 9 - 57V (12VDC, 24VDC, 48VDC)
- ▶ Power consumption 3W
- ▶ Fast acting chip fuse
- ▶ Protected against reverse polarity
- ▶ TVS ESD Protection
- ▶ Common mode input filter
- ▶ M12-A 5-Position male connector for DC power input
- ▶ Pigtail cable assemblies available M12-A 5-pos. female plug
- ▶ Option 4-position terminal block power connector, 3.50mm pitch, screw lock removable cable plug

### *Applications*

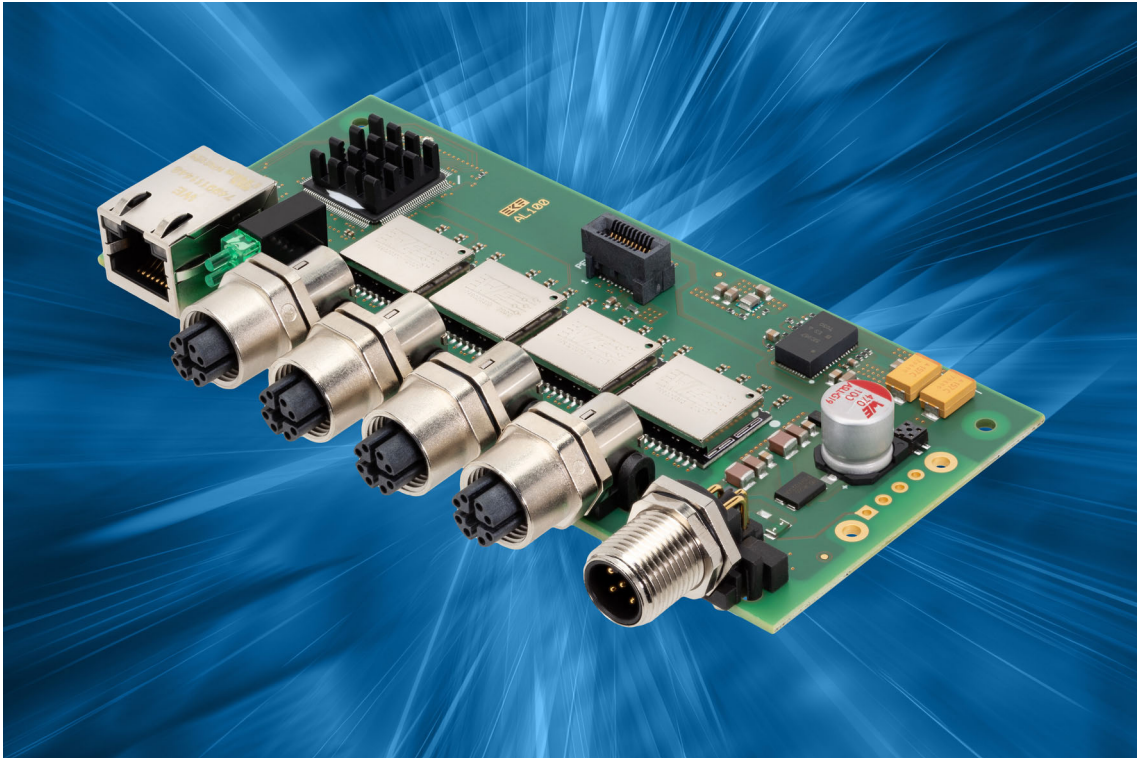
- ▶ For easy system integration
- ▶ Industrial networks - IIoT - TSN/AVB\*
- ▶ Transportation vehicles
- ▶ Construction and harvesting machinery
- ▶ Railway
- ▶ Rugged environments
- ▶ IP67 Environment with respect to M12 connectors
- ▶ Customized connector loading
- ▶ Customized board design

### *Environmental, Regulatory*

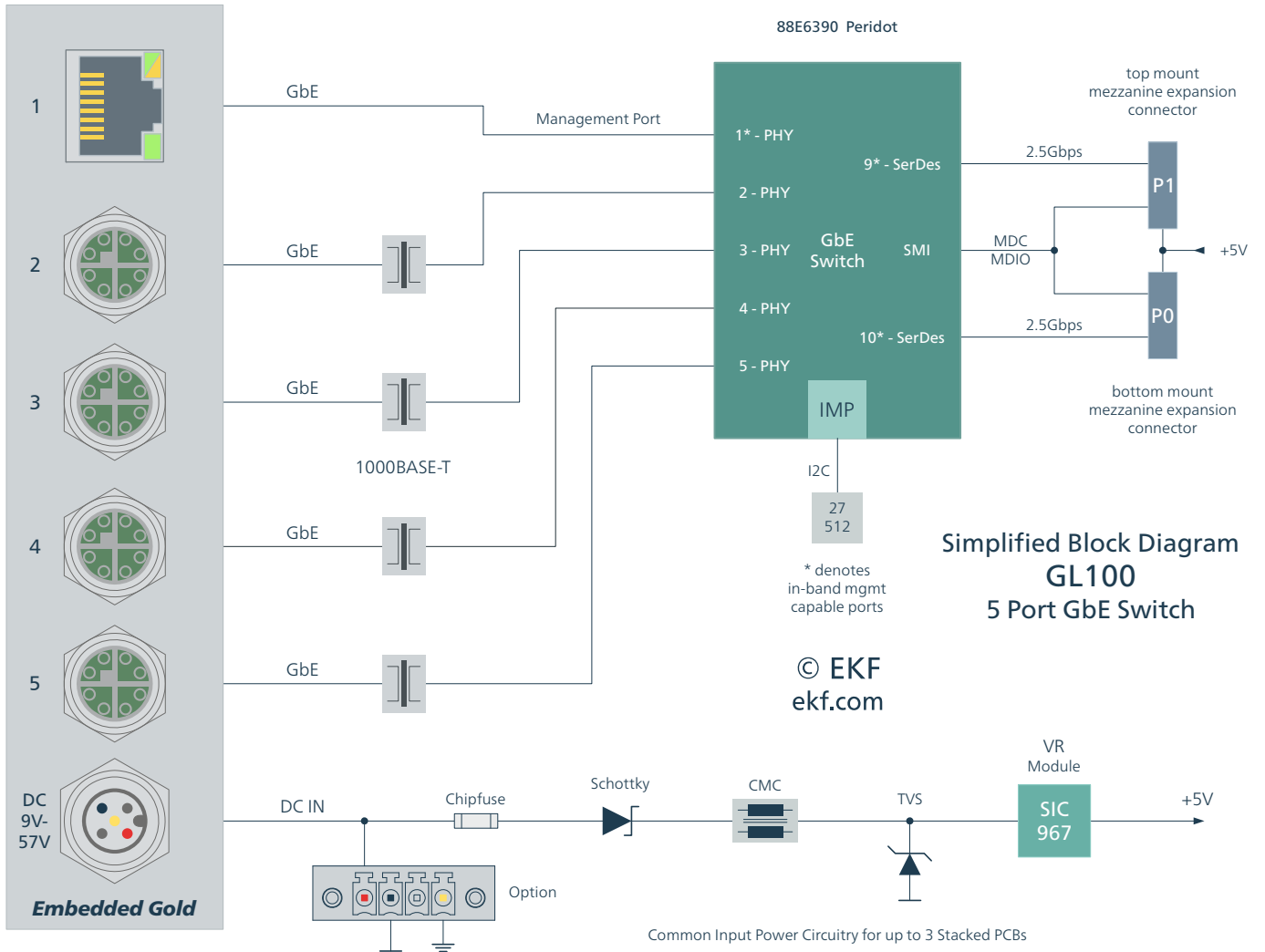
- ▶ Designed & manufactured in Germany
- ▶ ISO 9001 certified quality management
- ▶ Long term availability
- ▶ Rugged solution
- ▶ Conformal coating, sealing, underfilling on request
- ▶ RoHS compliant
- ▶ Operating temperature -40°C to +85°C (industrial temperature range)
- ▶ Storage temperature -40°C 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 Regulatory EN55035, EN55032, EN62368-1
- ▶ MTBF 216.8 years MIL-HDBK-217F

\* AVB/TSN protocols require additional mezzanine CPU card support

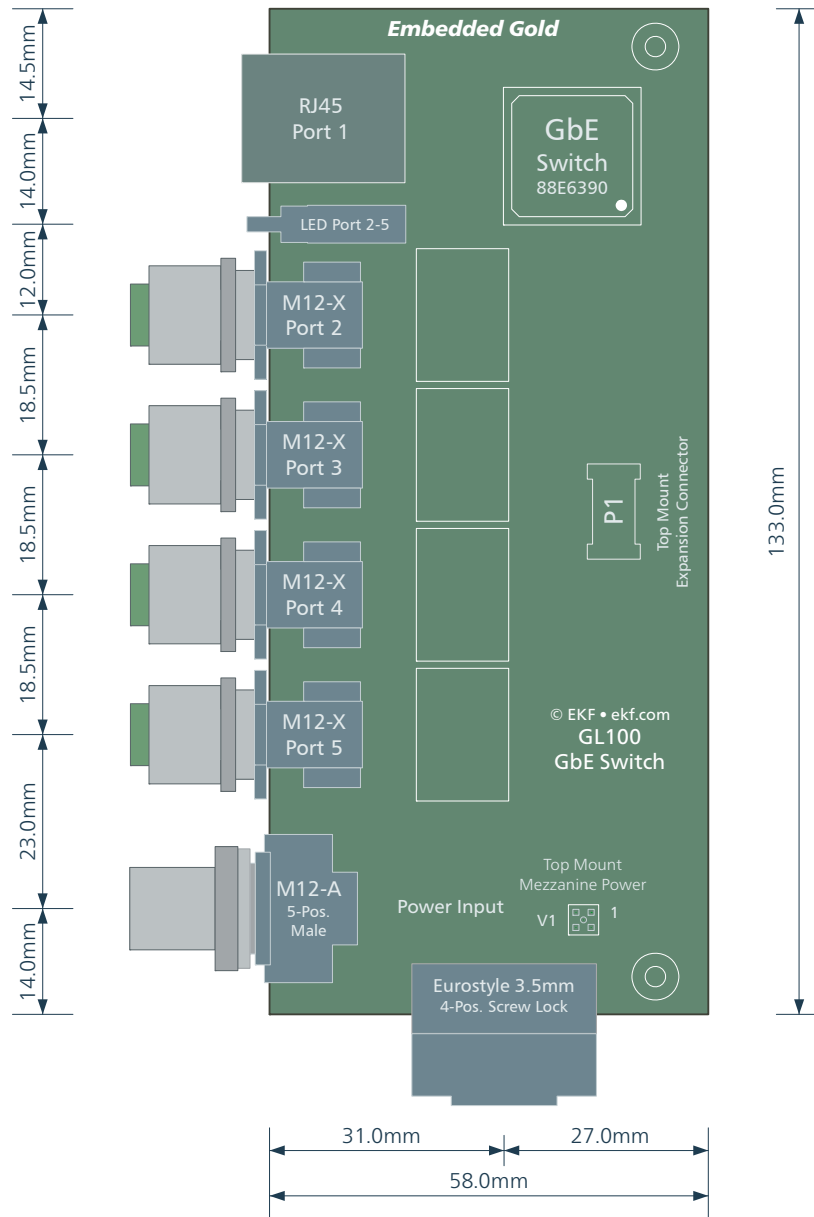
items may be subject to changes

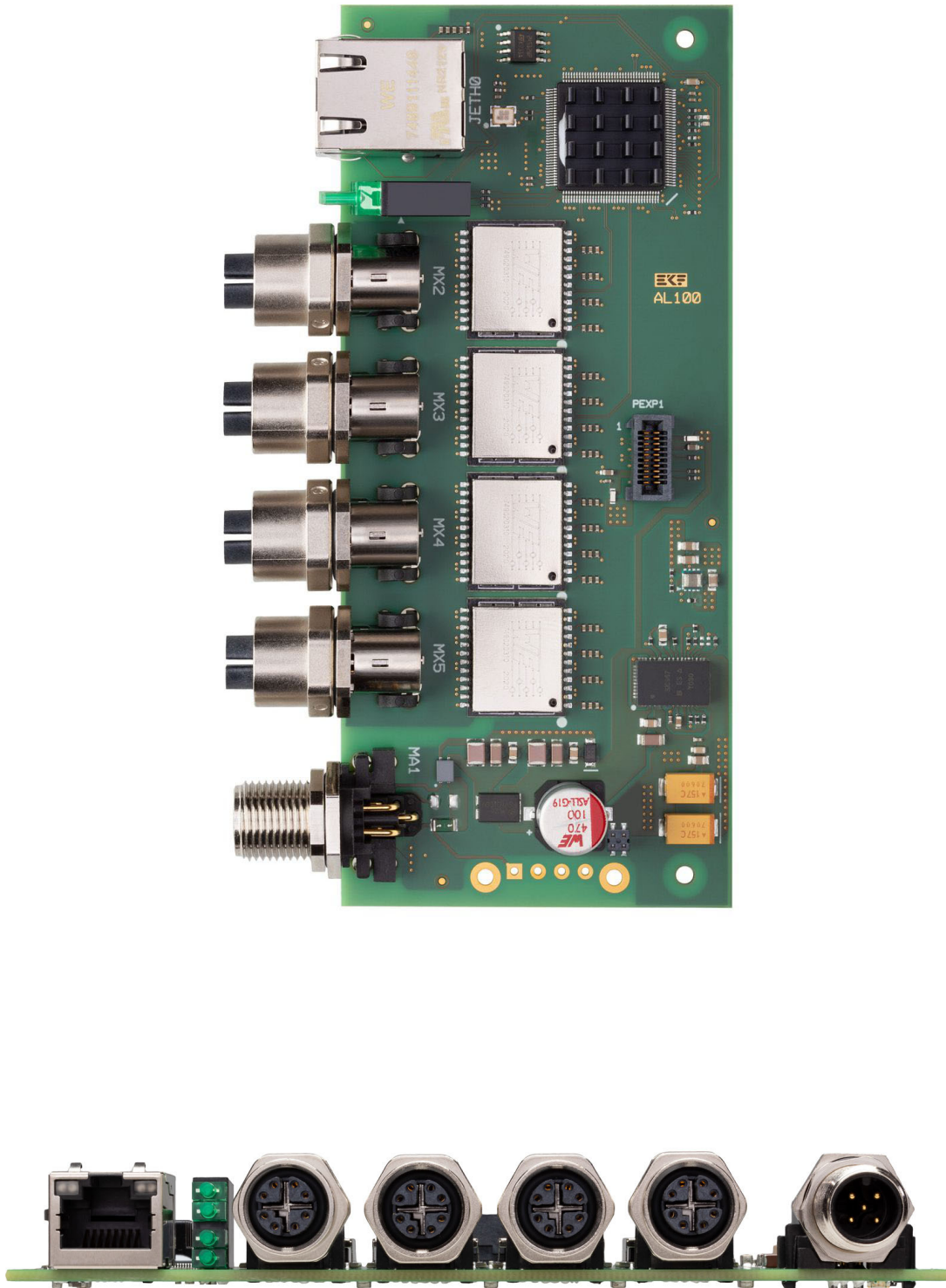


Block Diagram

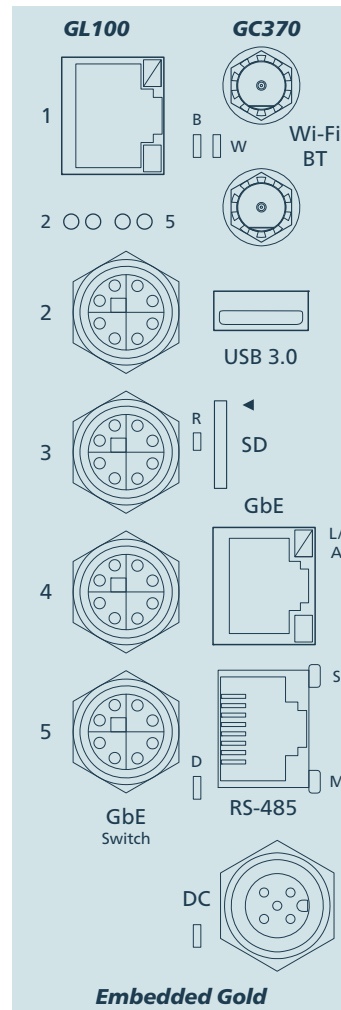
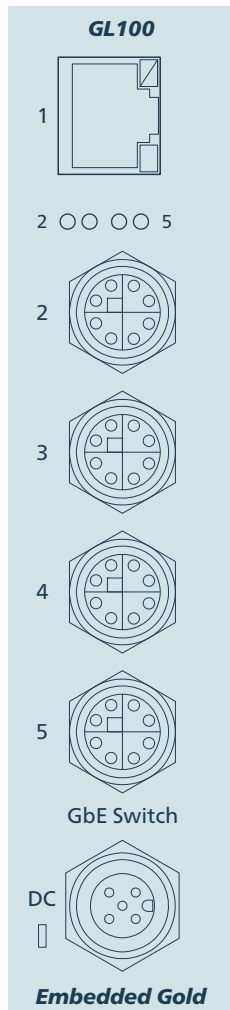


Dimensions

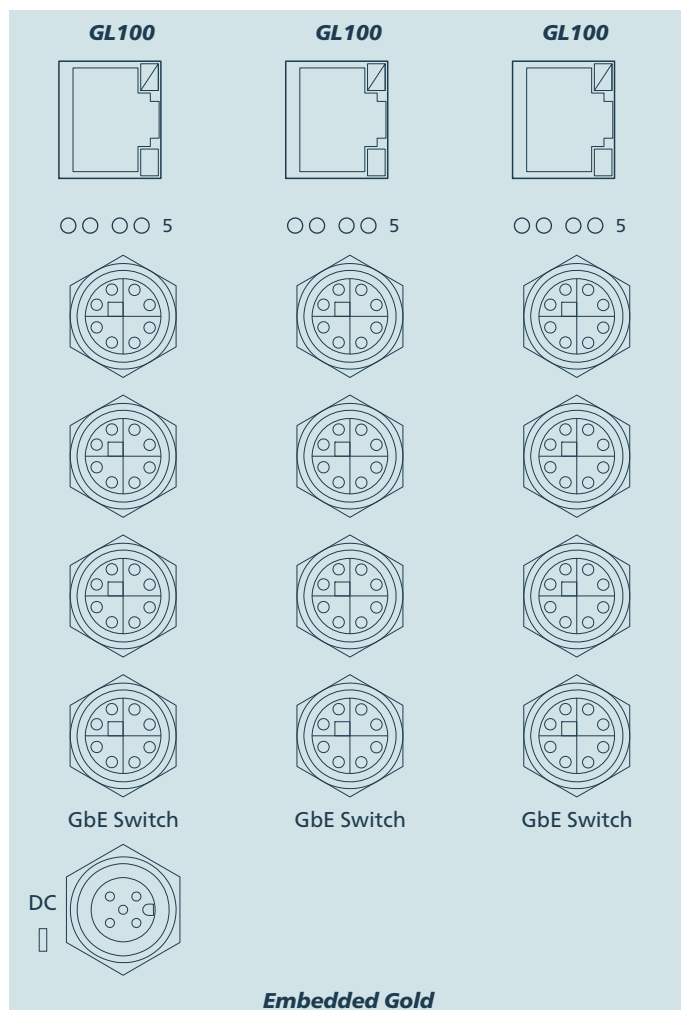






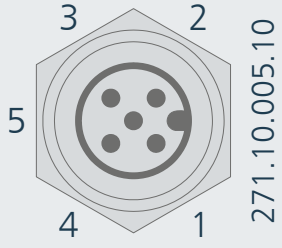


Sample F/P with & w/o CPU

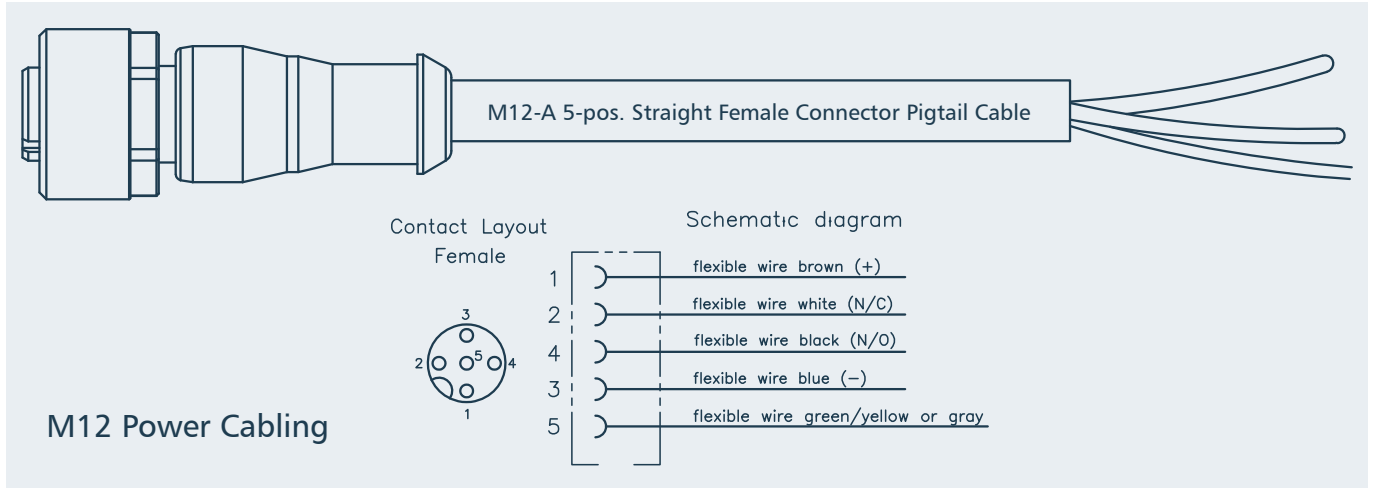


Sample F/P 15 Port Switch (GL100 Stacked)

## M12 Power Connector Pin Assignment

PCB Connector M12-A 5-Position Male 4A/Pin											
	<p>V=9-57VDC</p> <table border="1"> <tr> <td>1</td> <td>+V</td> </tr> <tr> <td>2</td> <td>RSV</td> </tr> <tr> <td>3</td> <td>GND</td> </tr> <tr> <td>4</td> <td>RSV</td> </tr> <tr> <td>5</td> <td>FE (Shield)</td> </tr> </table>	1	+V	2	RSV	3	GND	4	RSV	5	FE (Shield)
	1	+V									
	2	RSV									
	3	GND									
	4	RSV									
5	FE (Shield)										

Mating Pigtail Cable Assemblies 1.5m w. Female Straight Plug	
EKF	271.10.505.22.015
Phoenix Contact	1669822
Tyco (TE)	2273035-1



pre-assembled standard pigtail cables - wires #2 and #4 not in use with GL100 (reserved)

Mating DIN Rail Power Supply	
EKF	352.1.075.24.1
Meanwell	NDR-75-24, 75W 24VDC/3.2A

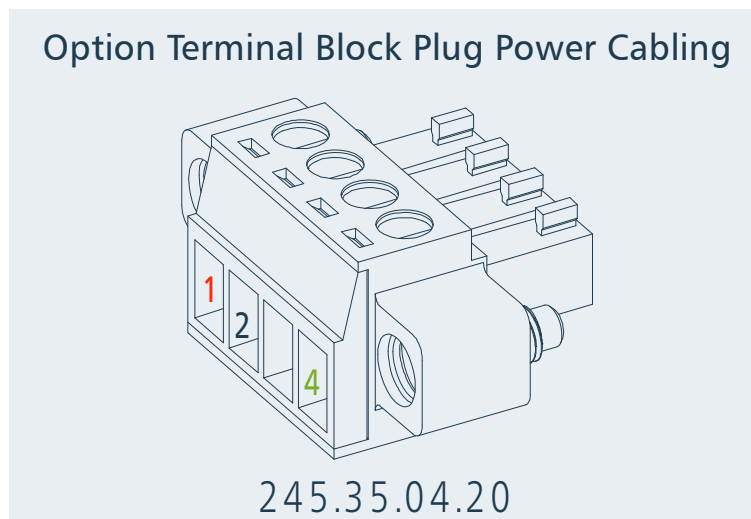
Placement of the M12 power connector by default

## Option Terminal Block Power Connector Pin Assignment

3.50mm 4-Position Terminal Block 8A/Contact		
<p>245.35.04.00</p> <p>1 2 3 4</p>	<p>V=9-57VDC</p>	1 +V
		2 GND
		3 RSV
		4 FE (Shield)

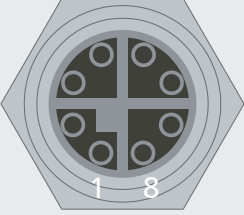
Mating Plugs w. Screw Lock	
EKF	245.35.04.20
FCI Amphenol	20020000-C041B01LF
Molex	39504-0004
Phoenix Contact	1847071
Tyco	284510-4

### Option Terminal Block Plug Power Cabling



Placement of the terminal block is optional (consider before ordering)

## M12- X Receptacles

M12-X Receptacles • Gigabit Ethernet			
<p>271.12.008.00</p>  <p>F/P LEDs tbd</p> <p>© EKF • ekf.com Draft - Do Not Scale</p>	<p>Ports 2-5 7-10 12-15</p>	1	MDX0+
		2	MDX0-
		3	MDX1+
		4	MDX1-
		5	MDX3+
		6	MDX3-
		7	MDX2-
		8	MDX2+

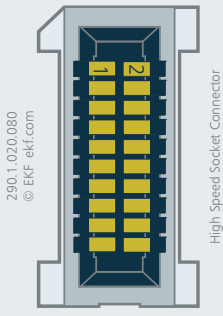
The pin numbers of an M12 X-coded connector do not reflect the RJ45 Gigabit Ethernet signal assignment. For cross-over patch cables M12 to RJ45 please refer to the table below.

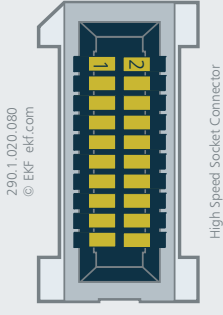
M12-X	Signal Colors T568B	RJ45
1	MDX0+ white/orange	1
2	MDX0- orange	2
3	MDX1+ white/green	3
4	MDX1- green	6
5	MDX3+ white/brown	7
6	MDX3- brown	8
7	MDX2- white/blue	5
8	MDX2+ blue	4

### Mating Cable Assemblies

Gigabit Ethernet cable M12 to M12: #271.14.008.xx (xx=length/meter)  
 Gigabit Ethernet cable M12 to RJ-45: #271.15.008.xx (xx=length/meter)

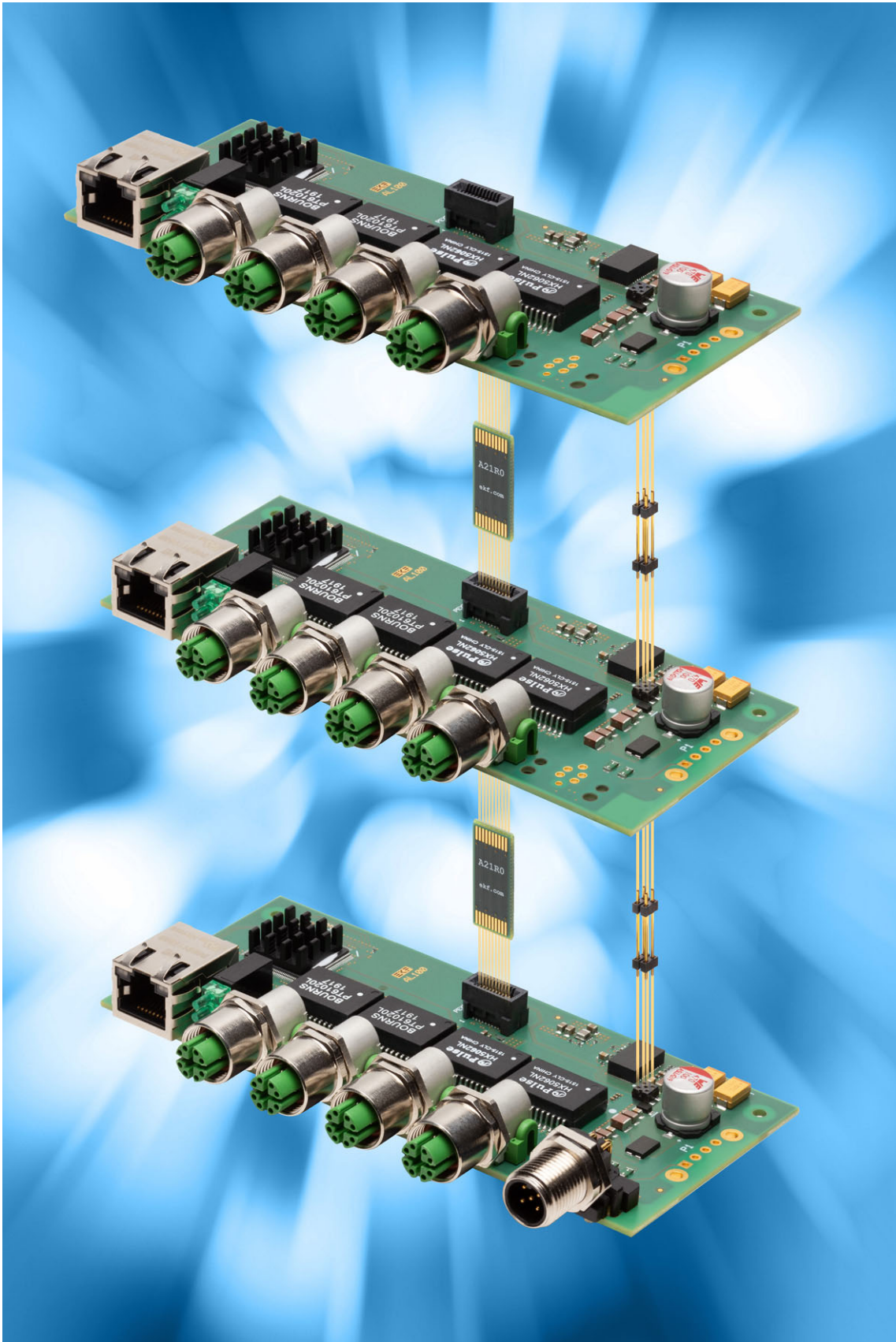
## Stacking Connectors

P1 (Top) 290.1.020.080				
	GND	1	2	GND
	SERDES (P9) RXN	3	4	+5V
	SERDES (P9) RXP	5	6	+5V
	GND	7	8	GND
	SERDES (P9) TXN	9	10	RSV
	SERDES (P9) TXP	11	12	RSV
	GND	13	14	GND
	+5V	15	16	MDC
	+5V	17	18	MDIO
	GND	19	20	GND

P0 (Bottom) 290.1.020.080				
	GND	1	2	GND
	SERDES (P10) TXN	3	4	+5V
	SERDES (P10) TXP	5	6	+5V
	GND	7	8	GND
	SERDES (P10) RXN	9	10	RSV
	SERDES (P10) RXP	11	12	RSV
	GND	13	14	GND
	+5V	15	16	MDC
	+5V	17	18	MDIO
	GND	19	20	GND

### Associated Mezzanine Interposer Card

A21	30mm PCB pitch
C21	20.32mm (4HP) PCB pitch



### Ordering Information

For popular GL100 SKUs please contact sales@ekf.de

### Product Homepage

<https://www.ekf.com/g/gl100/gl100.html>

### Related Products

GC370	ARM® V8 Industrial Microcontroller
GJ100	PoE+ Injector M12-X
GJ200	PoE+ Injector RJ45
GL200	8 Port unmanaged GbE switch RJ45
GL220	8 Port unmanaged PoE+ GbE switch RJ45
GL600	7 Port SPE (Single Pair Ethernet) switch 100BASE-T1 IP20
GL700	5 Port SPE (Single Pair Ethernet) switch 100BASE-T1 M8-Hybrid



# ***Embedded Gold***

Ready-for-Use Industrial PCB Assemblies

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