



AL600 • *Embedded Blue*®

Single Pair Ethernet Switch

7 x 100BASE-T1 • 1 x 1000BASE-T

2-Way Data Latch Locking Connectors IEC 63171-6

Automotive Ethernet • Industrial Ethernet • BroadR-Reach®



Overview

The **AL600 Embedded Blue®** is a Single Pair Ethernet (SPE) switch designed for rugged industrial applications. The box is provided with seven 100BASE-T1 (IEEE 802.3bw) ports and in addition a 1000BASE-T uplink. The SPE connectors conform to the IEC 63171-6 industrial style mating face. The AL600 is available for DIN rail or wall mount. The M12-A power input accepts 9-57VDC. As an option the box can be equipped with a terminal block power connector.

The AL600 is equipped with the Marvell® 88Q5072 Automotive Ethernet switch and is configured by default for self-managed operation. Its PHYs are fully inter-operable with the Open Alliance BroadR-Reach® (OABR) standard for automotive connectivity.

As **AL610**, the switch box is also available with a mezzanine CPU card (AC370) for additional protocol support, and Wi-Fi 6 wireless communication.



Technical Features

General

- ▶ 100BASE-T1 IEEE 802.3bw Ethernet switch box, for DIN rail or wall mount
- ▶ 7 x T1 latching receptacles IP20 according to IEC 63171-6 (2-way data)
- ▶ 1 x RJ45 1000BASE-T Gigabit Ethernet connector
- ▶ Intended for industrial and automotive use
- ▶ Self-managed operation
- ▶ Dimensions: 30mm (W) x 140mm (H) x 70mm (D) w/o DIN rail bracket
- ▶ Metal case, DIN rail bracket or wall mount plate
- ▶ M12-A DC power connector
- ▶ Sales option terminal block power connector
- ▶ Sales option desktop power adapter connector
- ▶ 9-57VDC Wide range power input operation

Front Panel I/O

- ▶ 1 x RJ45 connector 1000BASE-T, 100BASE-TX, 10BASE-T compliant
- ▶ 7 x 100BASE-T1 SPE front ports IEC 63171-6, Hi-Pot isolated by transformers
- ▶ 1 x M12-A 5-pin DC power input

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
 - ▶ 7 integrated IEEE 802.3bw 100BASE-T1 PHYs Single Pair Ethernet SPE
 - ▶ SPE PHYs configured as Master by default
 - ▶ Fully inter-operable w. Open Alliance BroadR-Reach® (OABR) PHYs
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- ▶ 1 x front port RJ45 connector GbE 1000BASE-T (88EA1512 RGMII PHY)
 - ▶ 7 x front port connectors 100BASE-T1 SPE IEC 63171-6 (88Q5072 integrated PHYs)
 - ▶ 2 x 5Gbps SERDES internal mezzanine connectors for port expansion (16- or 24-port versions)
 - ▶ AL610 available (AL600 with AC370 CPU card for protocol support)

Technical Features

Power Requirements

- ▶ DC Input, 9-57V (12VDC, 24VDC, 48VDC)
- ▶ Absolute maximum input voltage 65VDC
- ▶ Power consumption 2.5W max.
- ▶ Fast acting chip fuse (PCB soldered type)
- ▶ Protected against reverse polarity
- ▶ ESD protection (TVS)
- ▶ Common mode input filter
- ▶ Sales option terminal block 3.5mm pitch 4-position screw lock (bottom of box) power input
- ▶ Sales option rear power connector (desktop adapter 4-pos. circular connector)

Applications

- ▶ Industrial networks - IIoT
- ▶ Automotive gateway
- ▶ In-vehicle networking
- ▶ Automotive test equipment
- ▶ Rugged environments
- ▶ Edge computing
- ▶ Transportation
- ▶ Construction vehicles
- ▶ Harvester

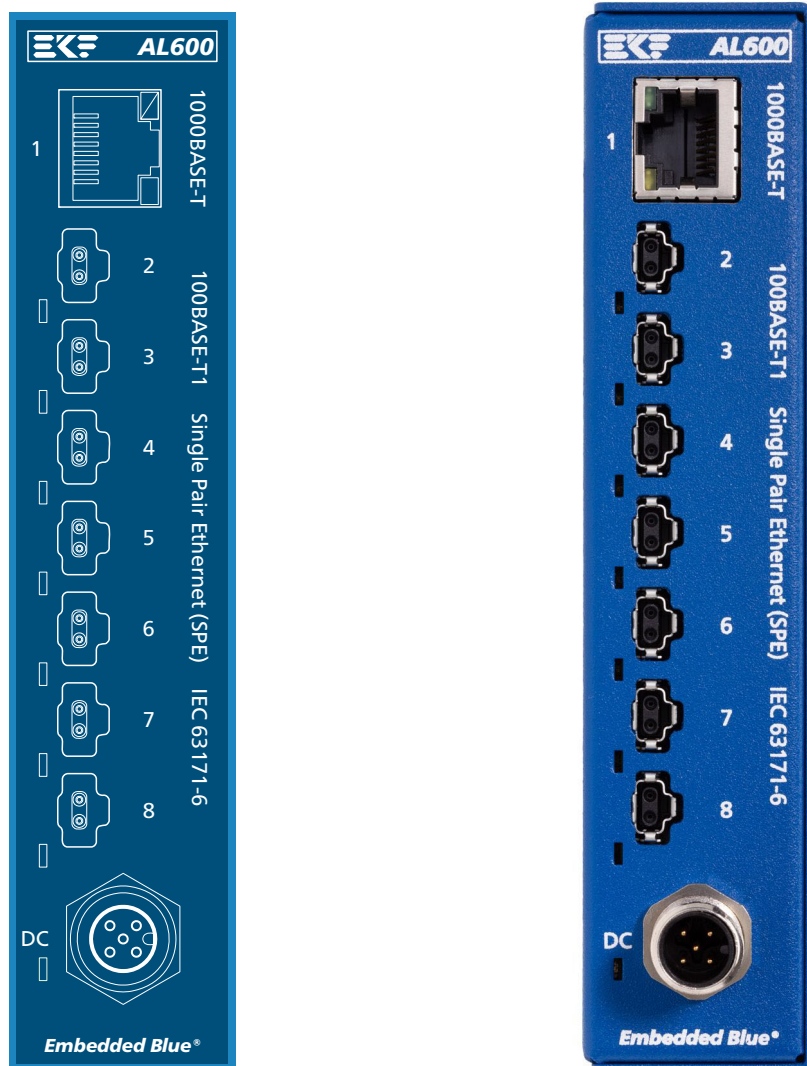
Environmental, Regulatory

- ▶ Designed & manufactured in Germany
- ▶ ISO 9001 certified quality management
- ▶ Long term availability
- ▶ Rugged solution
- ▶ 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 (CE)
- ▶ MTBF 134.4 years

all items may be subject to technical changes w/o further notice

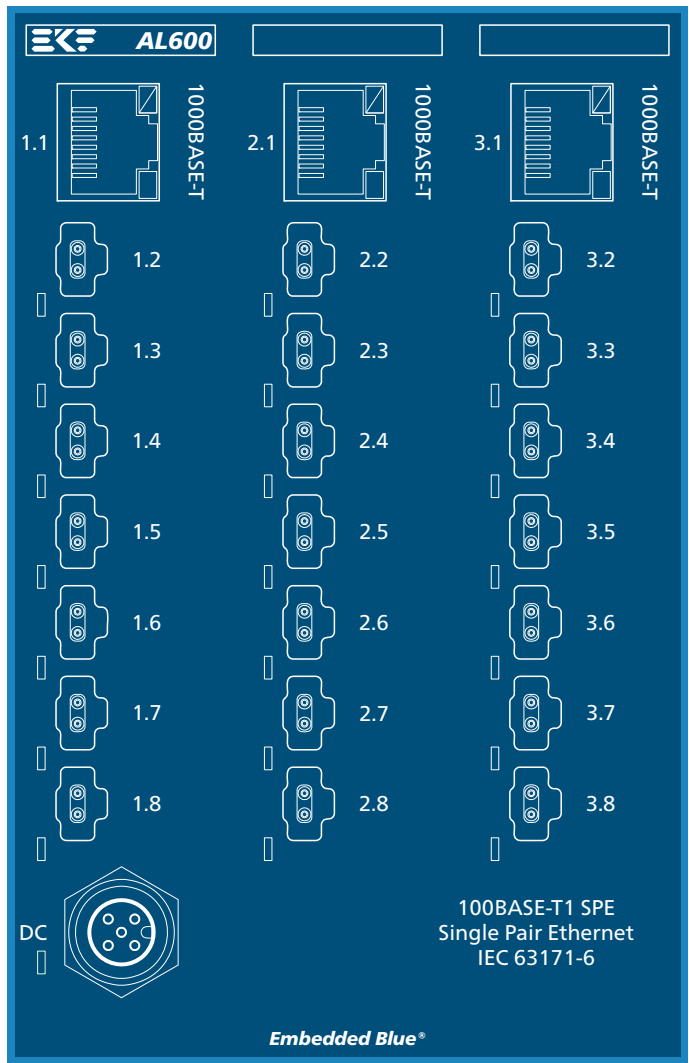
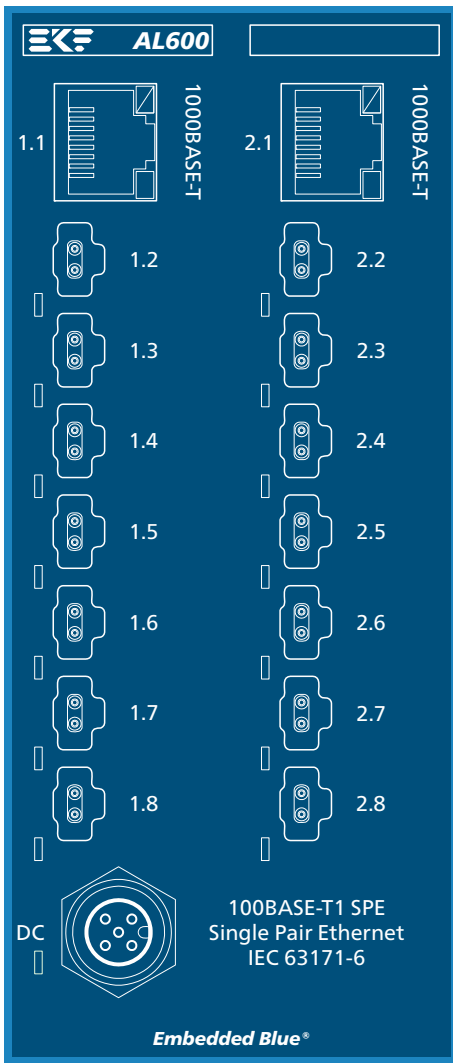


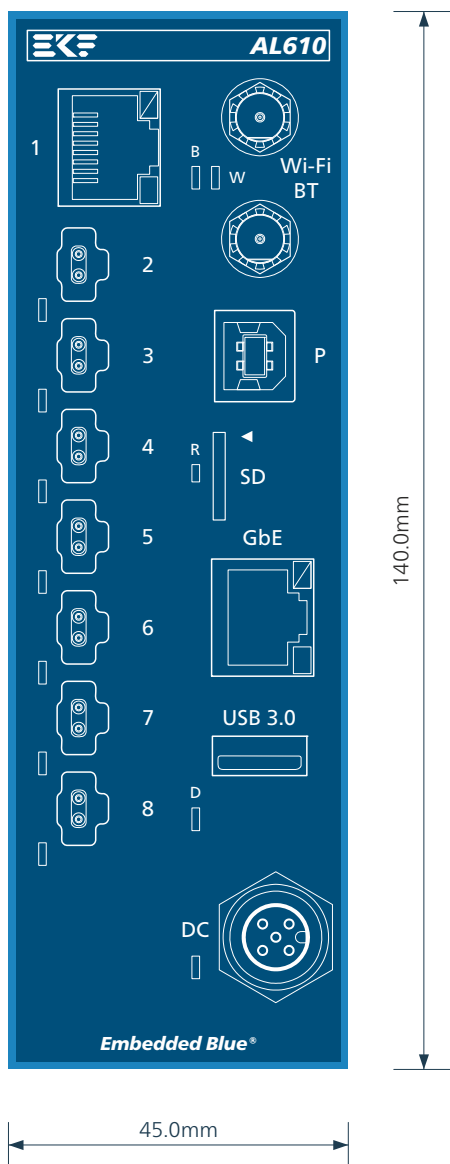
Front View



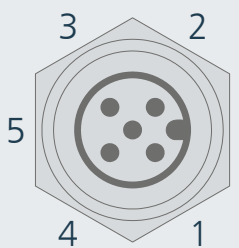
DC LED Status		
green	✓	DC input power present (9-44VDC, brightness varies w. input voltage)
blue	✓	DC input power present (44-57VDC)
red	⊗	DC input power overvoltage (>57VDC) !! absolute maximum input voltage 65VDC !!
red	⊗	DC input power reverse polarity - swap wires connected to M12-A pins 1/3
red	⊗ 1)	Internal fault (main chip fuse broken)
off	⊗	DC input power not present or very low voltage
off	⊗	DC input power not applied to M12-A connector pins 1/3

1) SMD component - no replacement on-site

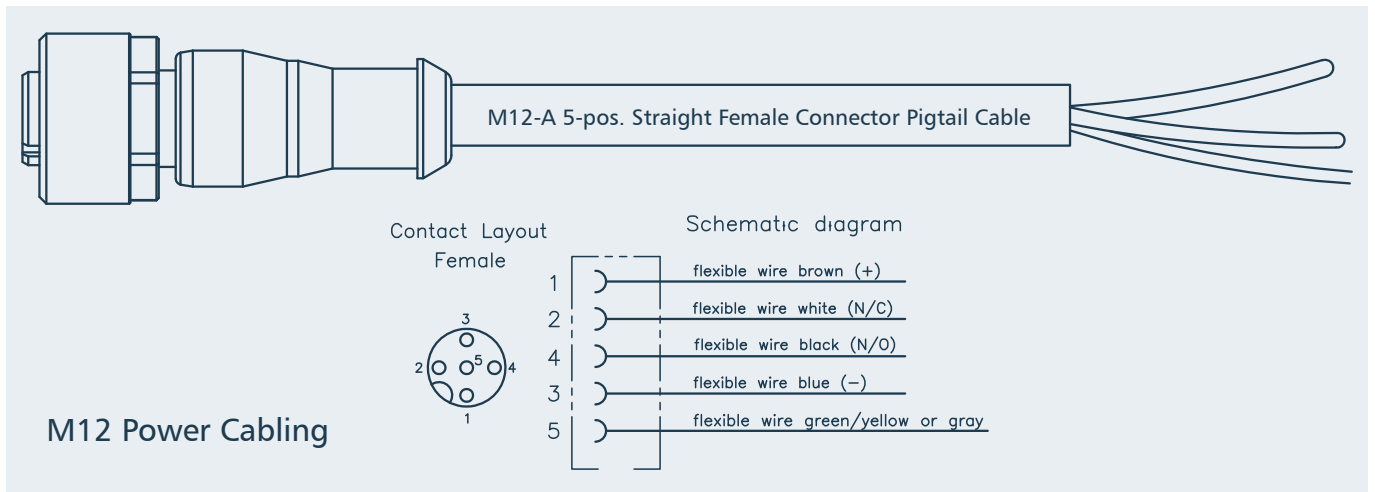




M12-A Power Connector

M12-A 5-Position Male 4A/Pin		
 <p>271.10.005.10</p>	<p>+V=9-54VDC</p>	1 +V
		2 Reserved
		3 -V (GND)
		4 Reserved
		5 FE (Shield)

Mating Pigtail Cable Assemblies 1.5m w. Female Straight Plug	
EKF Part No.	271.10.505.22.015
Phoenix Contact	1669822
Tyco	2273035-1



M12 Pigtail Cable
Phoenix Contact

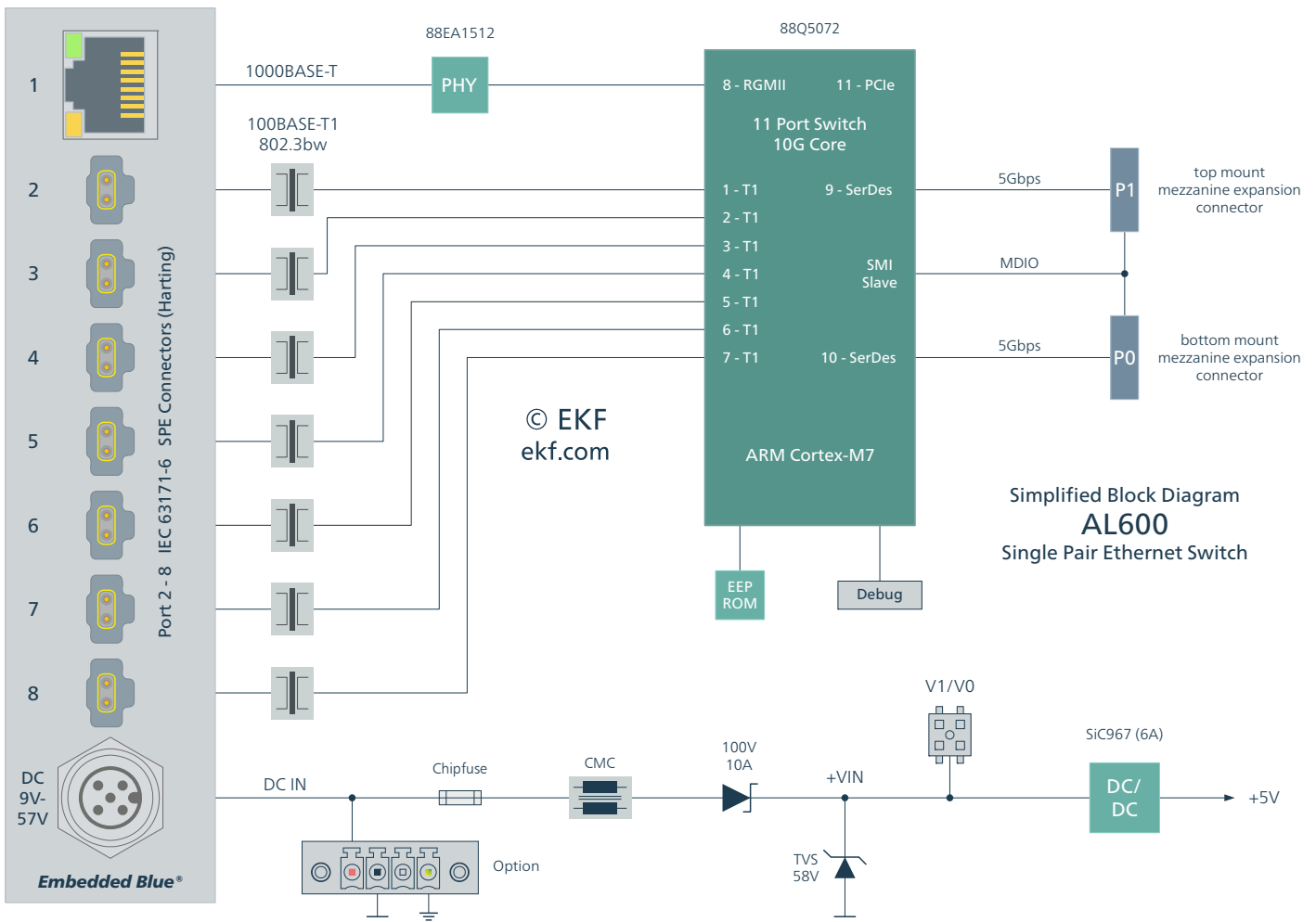
SPE Ethernet Connectors

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	FE (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

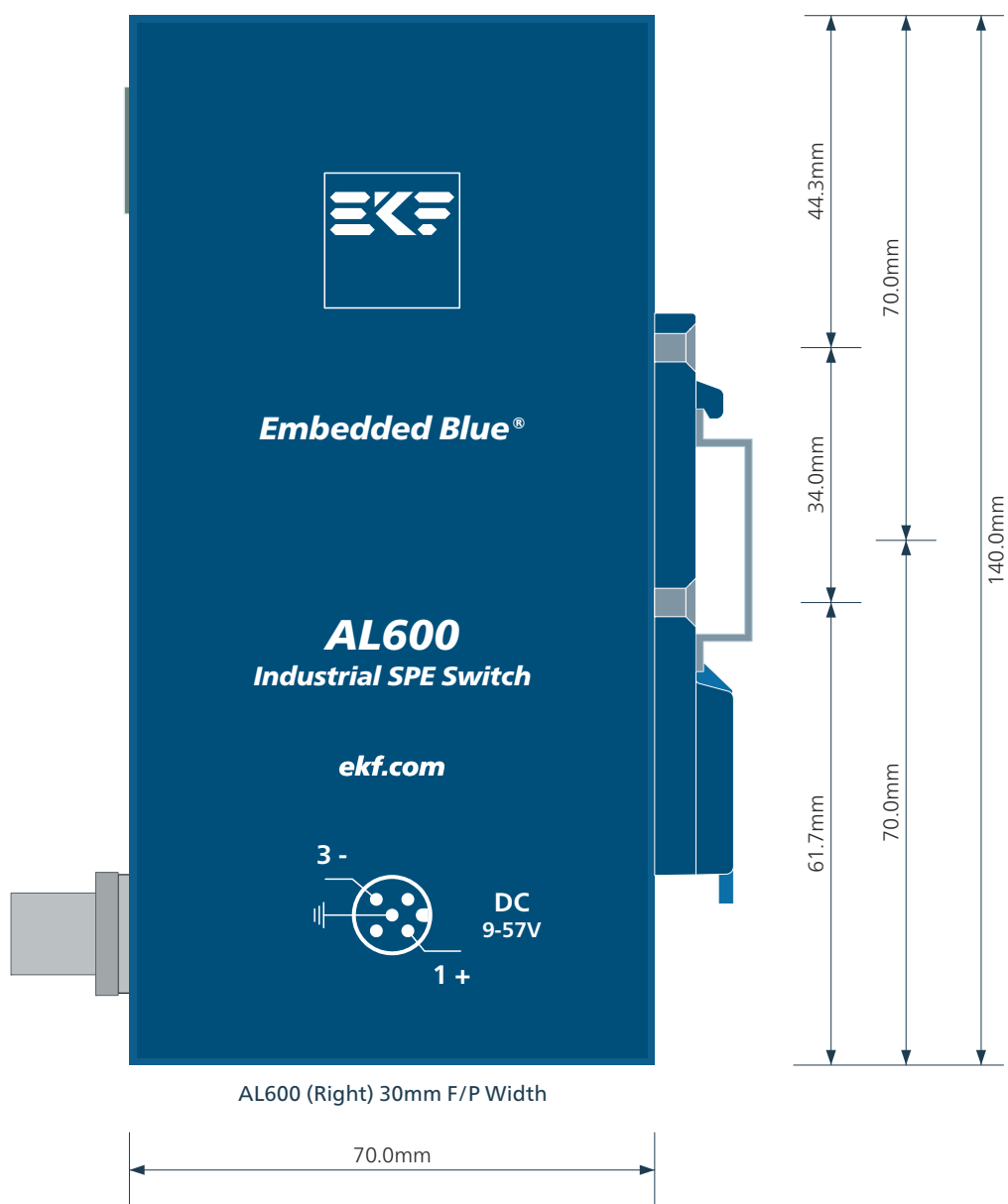


Block Diagram



By default, all SPE ports are configured as 'Master'. The AL700 box may be provided however with an internal Dip-switch for setting any port individually as 'Slave' (refer to chapter Master/Slave Configuration).

Dimensions





https://www.ekf.com/a/DIN_Rail_on_off_500x280.mp4

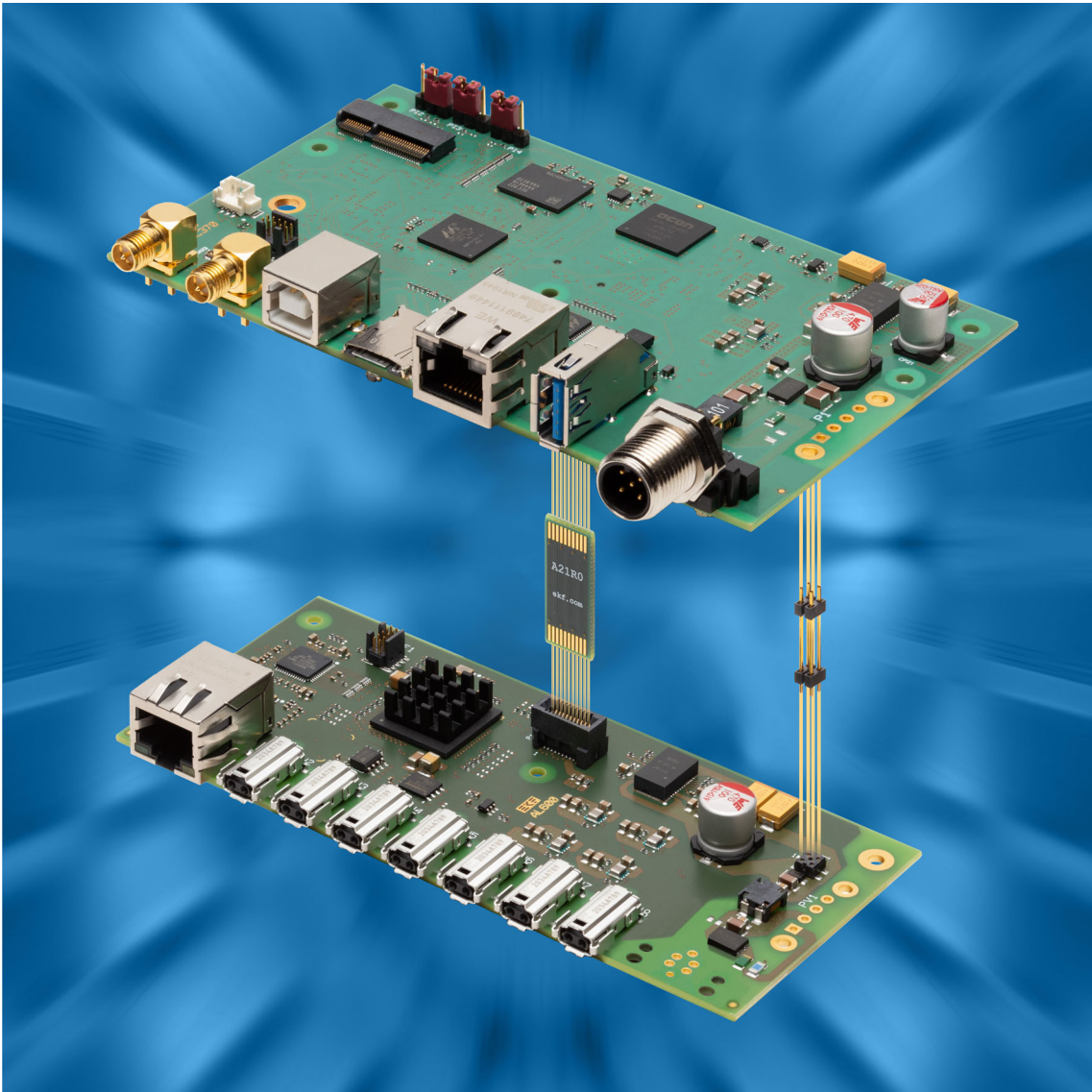
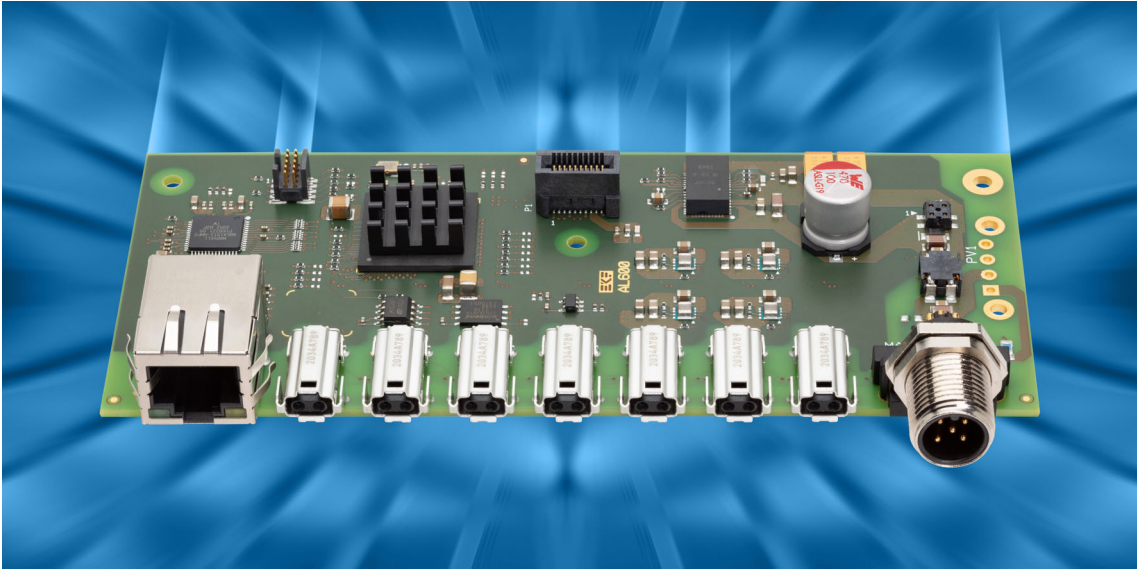


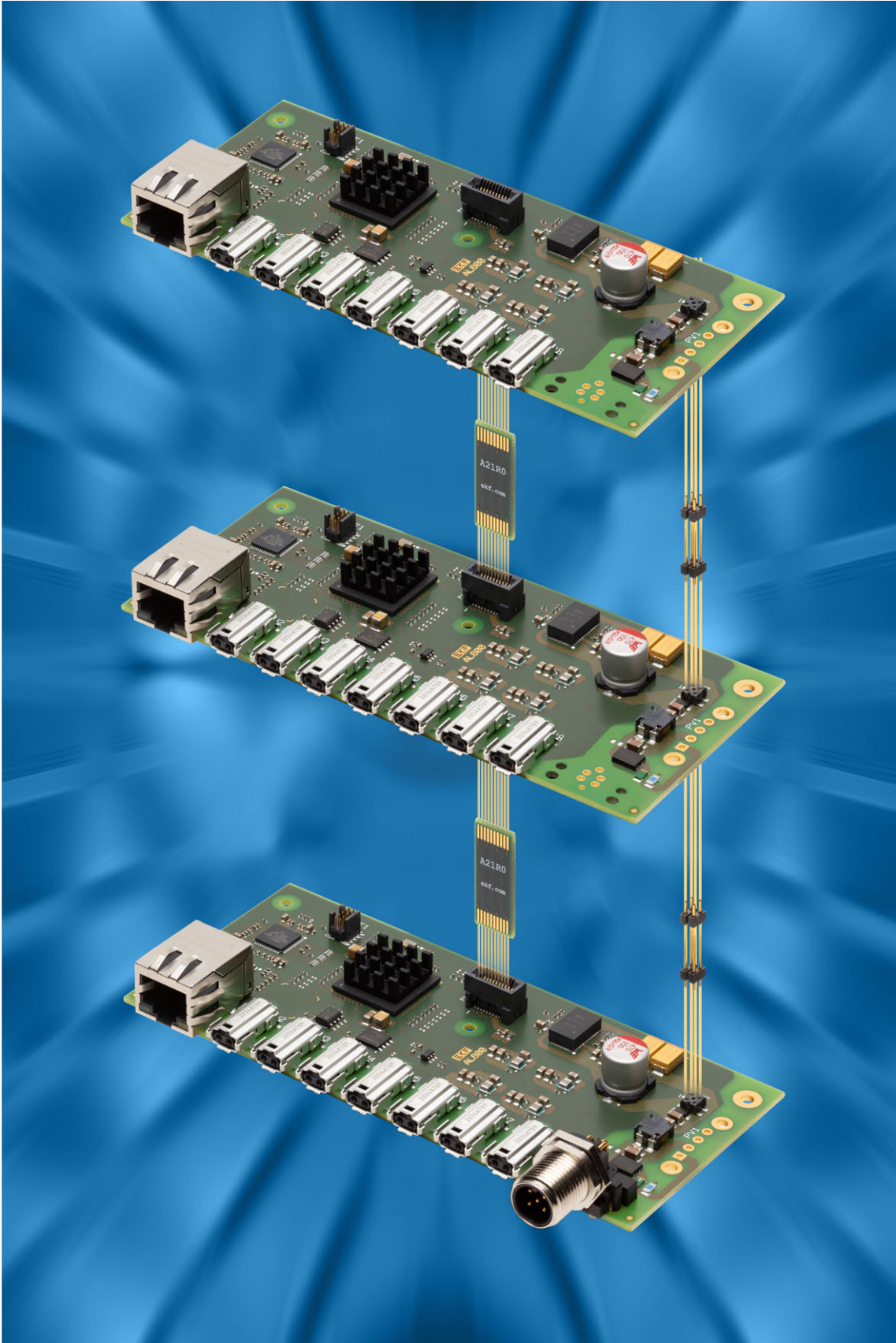
INDUSTRIAL[®]
PARTNER
NETWORK

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









88Q5072 Port Assignment

Front Connector Numbering vs. Switch Port Numbers				
F/P Connector	Ethernet	Ethernet Switch Internal Port	Type	PHY
1 - RJ45	1000BASE-T	8	RGMII	88EA1512
2 - IEC63171-6	100BASE-T1	1	SPE	88Q5072
3 - IEC63171-6	100BASE-T1	2	SPE	88Q5072
4 - IEC63171-6	100BASE-T1	3	SPE	88Q5072
5 - IEC63171-6	100BASE-T1	4	SPE	88Q5072
6 - IEC63171-6	100BASE-T1	5	SPE	88Q5072
7 - IEC63171-6	100BASE-T1	6	SPE	88Q5072
8 - IEC63171-6	100BASE-T1	7	SPE	88Q5072

Master/Slave Configuration

SPE Port Configuration (Factory Default = Master) Internal Dip-Switch either Top/Bottom Mount			
Dip-Switch #	F/P Connector	Master	Slave
1	-	reserved	reserved
2	2 - IEC63171-6	OFF	ON
3	3 - IEC63171-6	OFF	ON
4	4 - IEC63171-6	OFF	ON
5	5 - IEC63171-6	OFF	ON
6	6 - IEC63171-6	OFF	ON
7	7 - IEC63171-6	OFF	ON
8	8 - IEC63171-6	OFF	ON

For daisy-chaining of AL700 boxes via Single-Pair-Ethernet, the corresponding port of a downstream AL700 must be configured as slave. Since the SPE ports 2-8 are only 100Mbps capable, consider individual connection of each AL700 by their 1000Mbps RJ45 port 1 to the site network as an alternate.

Ordering Information

For popular AL600 SKUs please contact sales@ekf.de



Related Products

AC370	ARM® V8 Industrial Microcontroller
AJ100	PoE+ Injector
AJ200	PoE+ Injector
AL100	M12-X 5 to 15 port unmanaged GbE switch
AL110	M12-X 5 port GbE switch w. ARM® V8 CPU
AL200	RJ45 8 port unmanaged GbE switch
AL210	RJ45 8 port GbE switch w. ARM® V8 CPU
AL220	RJ45 8 port unmanaged PoE+ GbE switch
AL230	RJ45 8 port PoE+ GbE switch w. ARM® V8 CPU
AL700	M8 Hybrid 7port SPE switch 100BASE-T1

Embedded Blue®



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