

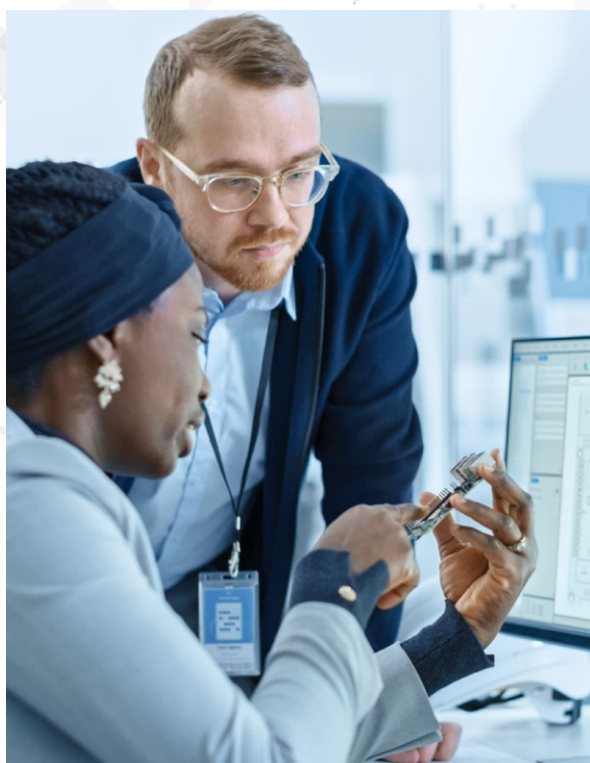
CC-Link **IE TSN**

FOR **DEVICE VENDORS**

**DEVELOP INDUSTRY
LEADING INDUSTRIAL
ETHERNET PRODUCTS**

ONE **CC-LINK IE TSN:**
ONE NETWORK. ONE SOLUTION.

Powering the future of industrial Ethernet



Device vendors are generally at the final stages of new projects. End users will typically set specifications that require certain vendors or technologies. In turn, this generates demand from machine builders as they look for products and solutions that meet these requirements. So the role of the device vendor is a balance between innovation to stay ahead in a crowded market, and conformity to follow specified requirements.

On top of this, there is the drive towards digitalisation. Where can a successful device vendor turn to find technologies that address all these needs?

That's where the CC-Link Partner Association steps in. We are an established, global organisation with a track record of delivering innovative, industry leading open industrial Ethernet technologies. These are supported by a wide variety of industry standard development ecosystem partners. The end result is a deep catalogue of thousands of products from hundreds of vendor partners and a global installed base in the tens of millions.

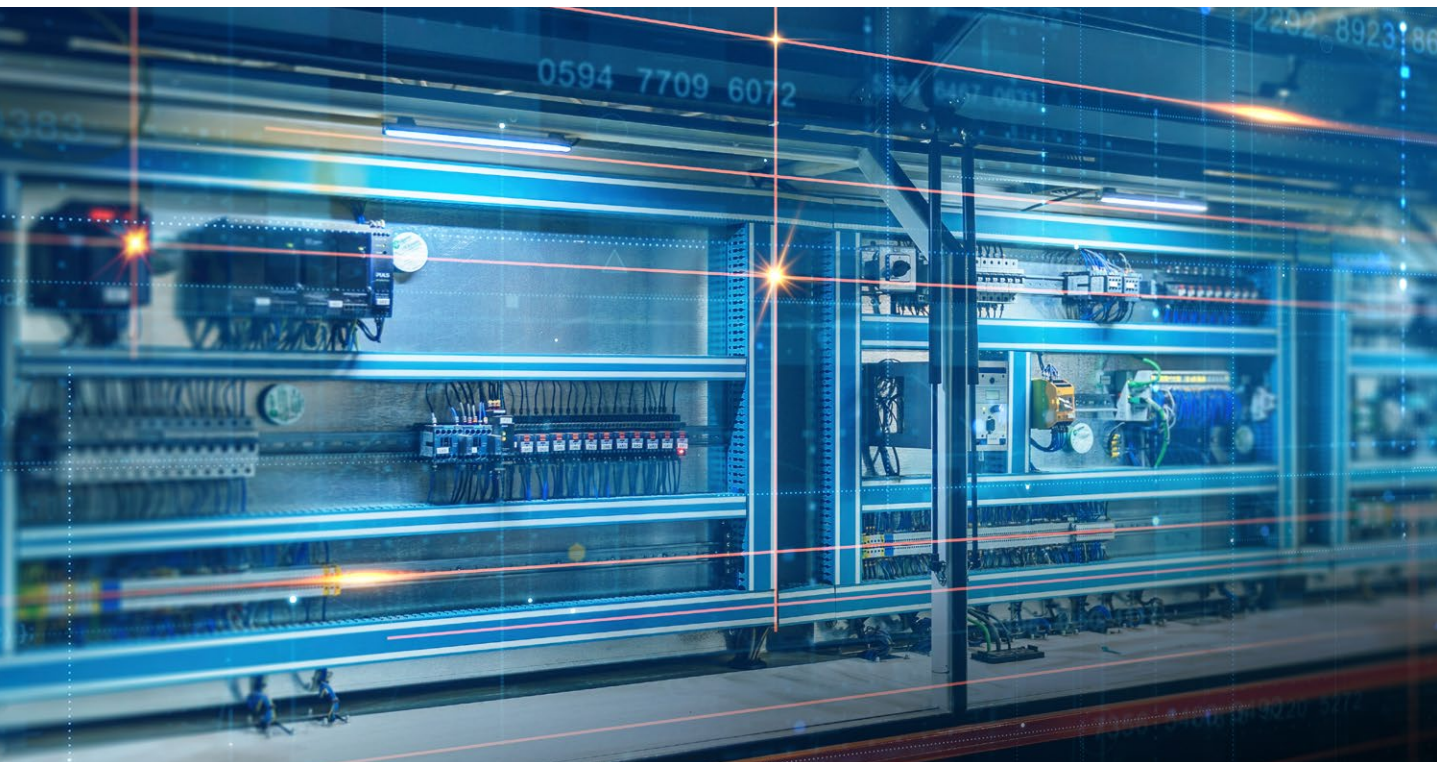
Come with us on a journey that shows how our technologies can allow you to offer industry leading industrial Ethernet products. Some of the benefits we can offer are:

Access to a world leading, industry standard development ecosystem

Technical support and resources

Globally recognised product certification

Market access and promotion



Benefits of CC-Link IE TSN at a glance:

Open, converged and deterministic industrial Ethernet architecture

Gigabit or 100Mbit bandwidth

Simpler network architectures/machine designs

Greater process transparency and better management

Better integration of OT and IT systems

High productivity

How can you develop CC-Link IE TSN products?

The CLPA has worked with its industry leading partners to assemble a comprehensive CC-Link IE TSN development ecosystem. The aim is to address different development needs with industry standard solutions.

ASIC



- CP610 master/local station communication LSI for CC-Link IE TSN
- CP620 remote station communication LSI for CC-Link IE TSN
- CP520 intelligent device/remote device station communication LSI for CC-Link IE Field
- MFP communication LSI for CC-Link remote device and remote I/O stations

emea.mitsubishielectric.com/fa



- R-IN32M4-CL3 Industrial Ethernet Communication LSI for CC-Link IE TSN Class B
- R-IN32M4-CL2 Industrial Ethernet Communication LSI for CC-Link IE Field
- Supported by IAR Systems' Embedded Workbench

www.renesas.com

FPGA



- Automate™ Solution Stack - evaluate, develop, and deploy FPGA-based, RISC-V software programmable CC-Link IE TSN applications
- mVision Solution Stack for the development of CC-Link IE TSN based machine vision systems

www.latticesemi.com

Embedded Devices



- Hilscher's netX multiprotocol communication platform supports CC-Link, CC-Link IE, CC-Link IE Field Basic and other industrial protocols
- SoC design solutions, easy-to-integrate embedded modules, PC cards and versatile protocol converters available
- Single source industrial communication. One hardware platform, unified interfaces, software support and development services

www.hilscher.com



- Anybus® Compact Com B40 brick and M40 module concept provides design flexibility
- Support for CC-Link IE TSN, CC-Link IE Field and CC-Link

www.anybus.com



- Easily integrate CC-Link IE TSN/Safety into existing designs via an evaluation board with standard interfaces.

www.neuron-automation.eu

Functional Safety Stacks



- Software development kit for TSN compliant functional safety communication
- CPU/OS independent
- IEC61508 certified

www.esol.com



- Protocol stack for CC-Link IE and IE TSN safety device stations
- IEC 61508 SIL 3 capable
- Pre-certified according to IEC 61508 and IEC 61784-3

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- Support for integration of CC-Link IE TSN Safety
- Ready to use standard integration
- Comprehensive toolbox of pre-certified components

www.neuron-automation.eu

Microcontroller/Microprocessor



- LS1028A industrial applications processor provides CC-Link IE TSN applications with significant capabilities
- i.MX RT1170 crossover MCU offers record setting performance for real time CC-Link IE TSN applications

www.nxp.com



- STM32MP2 series next-gen MPUs for industry 4.0 enables secure, advanced edge AI computing with TrustZone® on Cortex®-A & Cortex®-M
- Growing connected applications with gigabit Ethernet and TSN support
- STM32 development ecosystem includes TTEch to ease TSN configuration and port GmbH to accelerate CC-Link IE TSN implementation

www.st.com



- Arm® based processors supports CC-Link IE Field Basic master and remote stations
- RTOS and Linux support
- Evaluation Modules (EVM) provide industrial control and communication software and hardware development capability

www.ti.com

Software Stacks



- CC-Link IE TSN compliant master station software development kit Class B compliant
- Runs as an INtime Real-Time Application under Windows
- Supports Visual Studio development environment and CANOpen API

www.esol.com



- Software development kit for CC-Link IE TSN master station
- Portable, low cost development option
- Sample code for CC-Link IE TSN remote station Class A (provided by the CLPA)

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- Ready-to-Run SDK available for CC-Link IE TSN master and remote stations/CC-Link IE Field Basic remote
- Support for platforms such as NXP LS1028A & RT1180, Renesas RZ/N2L & RZ/T2M, Linux based Intel i226 MAC Controller and others
- Uses port's GOAL Industry 4.0 multi-protocol capable platform

www.port.de

What do we offer?

We were established in 2000 to develop and promote the CC-Link family of open industrial automation network technologies. Since then, we have grown into a global organisation with a track record of innovation. We were the first to introduce open industrial Ethernet technology with gigabit bandwidth in 2007. We were the first to combine gigabit bandwidth with Time-Sensitive Networking in 2018. We will continue this record of innovation as we move into the future.



What do we offer?

We began with what is now one of the world's most widely used fieldbus technologies, CC-Link, and then became recognised as an innovator in industrial Ethernet. Today, our offering is based on CC-Link IE TSN, the world's first and so far only open industrial Ethernet technology that combines gigabit bandwidth with Time-Sensitive Networking. For companies looking to offer industrial automation devices that lead the industry while supporting the digitalisation trend, CC-Link IE TSN is the industrial Ethernet of choice.



Key reasons for including CC-Link IE TSN in your products are:

Support the trend of using TSN to offer products compatible with converged network technology

Keep up with the tidal wave of data with either gigabit or 100Mbit bandwidth

Possible to create products by software development alone

Leverage a wide variety of development platform choices from industry standard vendors

Global conformance test capability



Get your products ready for the future of manufacturing by incorporating this groundbreaking new technology into your development roadmap.

For less demanding applications, we also offer CC-Link IE Field Basic. This suits the needs of low cost applications where a higher degree of functionality is less important. Development is by software stacks.

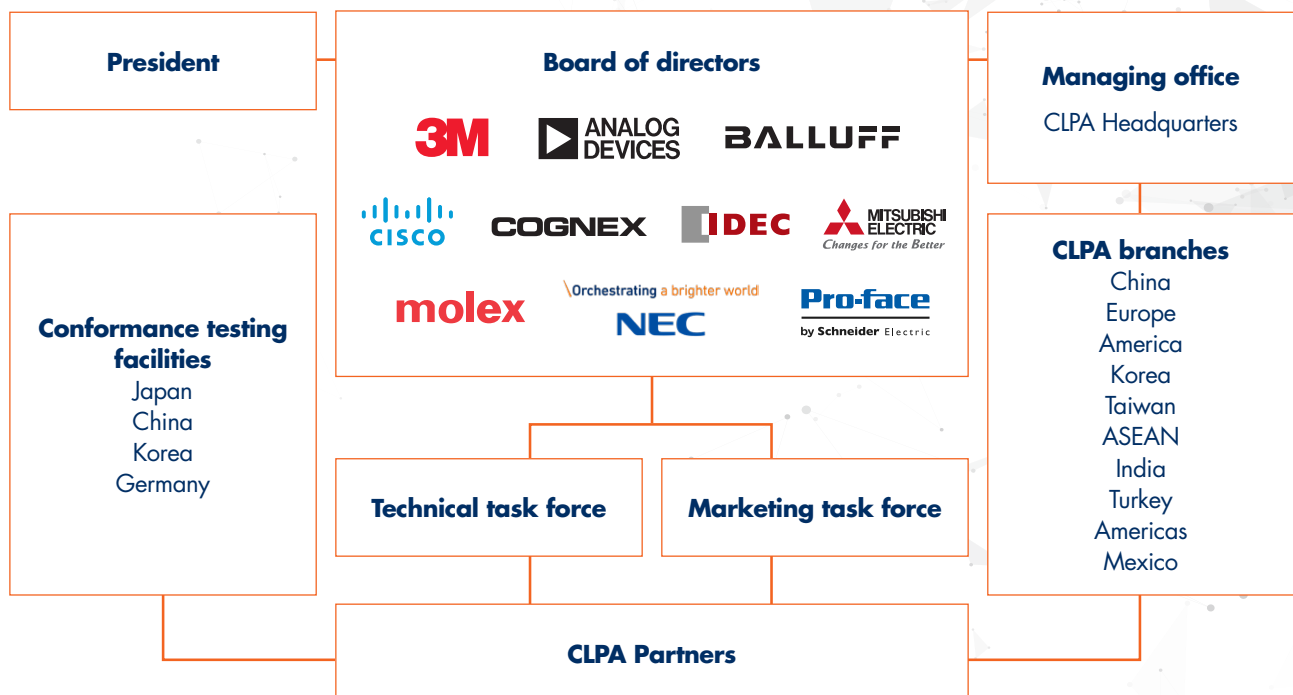


For an in-depth overview of the CLPA, please go visit
<https://www.youtube.com/watch?v=j-RPOC7ZOtU>



Our organisation

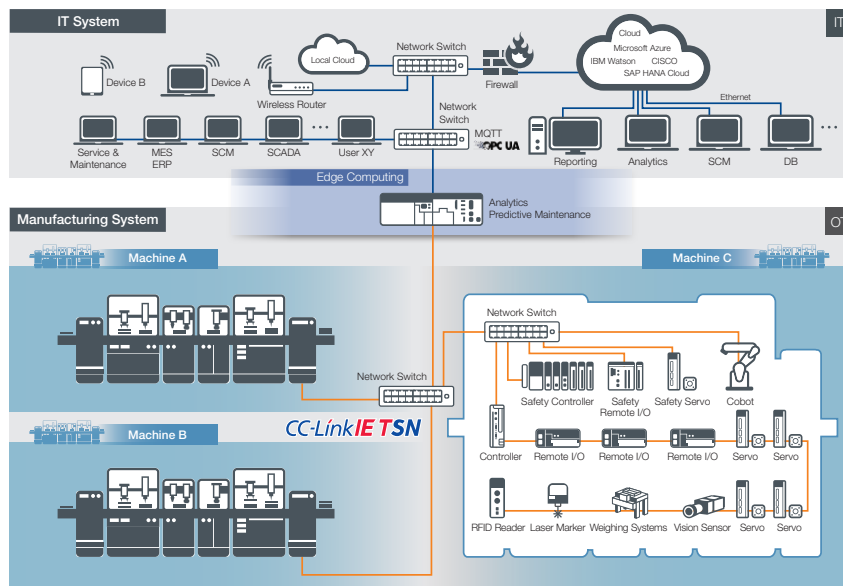
The CLPA has broad industry support. This is reflected in our board members who include some of the world's leading technology companies as shown here:



World-wide support



CC-Link IE TSN IT/OT Architecture



CC-Link IE TSN device development options

No.	Device development options			CC-Link IE TSN	CC-Link IE field Basic
	Communication speed	Master	Remote		
1	1 Gbps	Hardware	Hardware	Supported	Supported
2		Software	Hardware		Not supported
3		Hardware	Software		
4		Software	Software		
5	100 Mbps	Hardware	Hardware		
6		Software	Hardware		
7		Hardware	Software		
8		Software	Software		Supported

Hardware: implemented by dedicated ASIC or FPGA.

Software: implemented by software stack running on standard Ethernet platforms.

Technical specifications

No.	Items	CC-Link IE TSN	CC-Link IE field Basic
1	Baud rate	1Gbps/100Mbps	100Mbps
2	Maximum input/output size per master	4G Octet(Byte)	9K Octet(Byte)
3	Transient transmission	Supported	Supported
4	Communication method	Time sharing	Broadcast polling
5	Synchronisation method	Time synchronisation	—
6	Maximum station No. per network	64,770 stations (Master: m stations, Slave: 64,770-m stations)	65 stations (Master: 1 station, Slave: 64 stations)
7	Topology	Line, Star, Ring, Line + Star, Line + Ring, Ring + Star, Mesh	Line, Star
8	Cable specification	IEEE 802.3 1000BASE-T (Category 5e or above)/100BASE-TX (Category 5 or above) compatible cable. Shielded or double shielded cable recommended.	
9	Connector specification	RJ-45 connector (1Gbps/100Mbps) ANSI/TIA/EIA-568-B compliant. 8 pin shielded connector recommended. M12 connector (1Gbps/100Mbps) IEC61076-2-109 compliant. 8 pin connector recommended. M12 connector (100Mbps) IEC61076-2-101 compliant. 4 pin connector recommended.	