2026 Mar.

English version

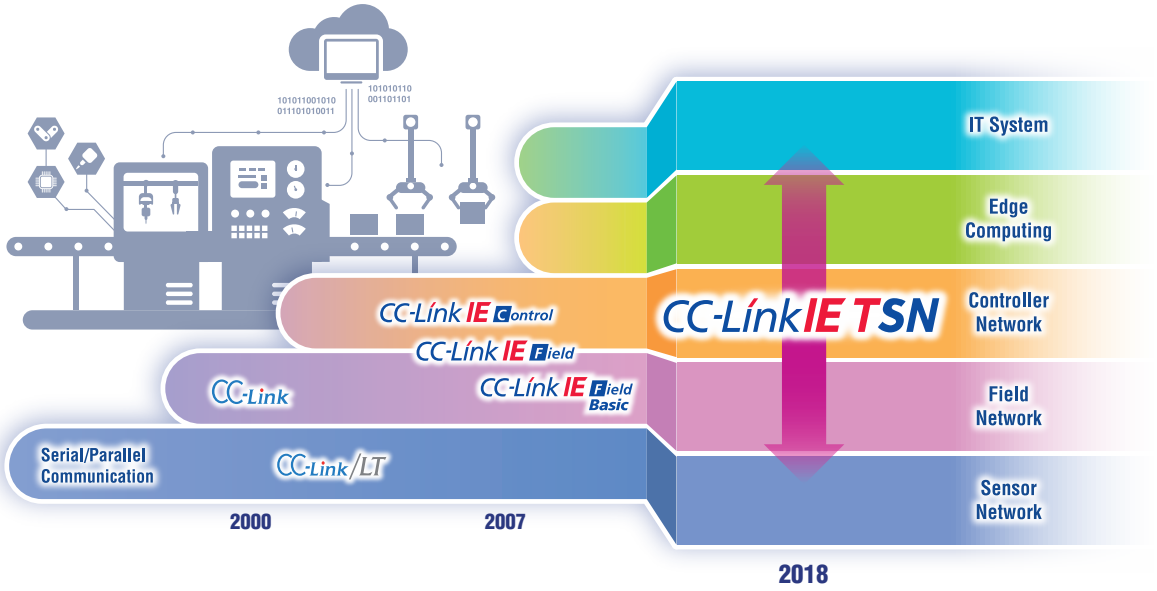
CC-Link IE TSN Compatible Products

Development Method Guide

CC-Link IE TSN
Open the Future of Connected Industries

CC-Link Partner Association (CLPA), a Global Leader in Promoting Truly Open Industrial Networks Essential for Smart Factories

CC-Link Family used in wide range of applications



- Together with our customers and partners, we will continue to evolve as an industrial open network forming the basis for smart factories integrating FA (OT) with IT, with CC-Link IE TSN at the center.
  As well as expanding products supporting FA (OT), we will strengthen collaboration with cloud solutions and edge computing software platforms to facilitate advanced monitoring, analysis and predictive maintenance, by using field data with various applications.

- We will continue to offer full support for CC-Link, CC-Link IE Controller Network and CC-Link IE Field Network which are already widely used within the market. We will also aim for integration with existing products and systems by offering a range of gateways and other products.

INDEX

CC-Link Partner Association has developed CC-Link IE TSN, the world's first open industrial network utilizes Time-Sensitive Networking (TSN) technology, which is an extension of standard Ethernet, to accelerate the construction of smart factories utilizing IoT.
In response to increasingly diverse market demands in the manufacturing field, we will provide a variety of development methods and develop a truly open industrial network on a global scale.

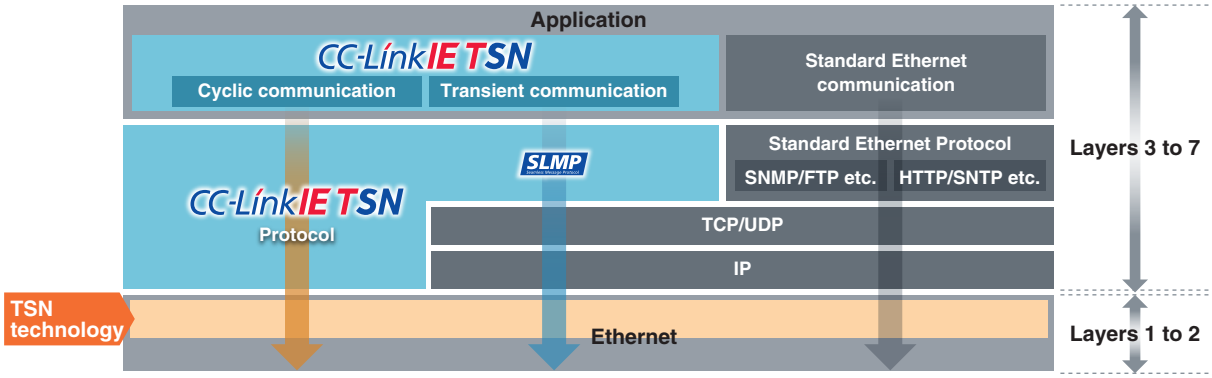
Learn more about CC-Link IE TSN

What is CC-Link IE TSN?

It is an Ethernet-based open integrated network that seamlessly connects information systems to production sites. Utilizing CC-Link IE TSN, which applies TSN (Time-Sensitive Networking) technology, integrates control communication and information communication into a single network, which is essential when building of smart factories.
The information communicated over IT systems can be mixed while implementing control that guarantees real-time performance through cyclic communication.

■ TSN technology and protocol layers

CC-Link IE TSN's protocol uses layers 3 to 7 of the OSI reference model, building on the TSN technology located in layers 2.



● TSN (Time-Sensitive Networking)
TSN consists of multiple international standards. The major standards are IEEE802.1AS (which defines the time synchronization method) and IEEE802.1Qbv (which defines the time sharing method). Combining these with the Ethernet standard enables punctuality, ensuring transmission within a given period of time, and mixed implementation with other communication protocols.

■ Features

Integration of OT and IT

TSN technology ensures real-time performance while integrating communication of CC-Link IE TSN, TCP/IP and other open network protocols in a single main line.

Dramatically reduces communication cycles

The time-sharing system makes it possible to shorten cyclic data update times by utilizing the synchronized time in the network and simultaneously sending input/output communication frames in both directions at a predetermined time.

Maximizes motion control performance

Even when combining fast and slow communication cycle controls within the control communication, motion control performance, which requires high speed, can be maintained and equipment performance improved.

Reduces maintenance hours

Event history can be tracked precisely in chronological order, making it easier to identify the causes of errors. In addition, precisely time-stamped log data can be used in analysis applications to improve the accuracy of predictive maintenance.

Process Flow for Developing CC-Link IE TSN Compatible Products

CC-Link Partner Association will support you from development to sales of CC-Link IE TSN compatible products.

Flow from development to sales of partner manufacturers

1 Consider development

For details, see P.6

Select the station type, certification class, development method, etc. It is possible to use various development methods provided by the corresponding development tool partner manufacturer.

2 Admission

For details, see P.24

In order to develop and sell CC-Link Family compatible products, you must first become a regular member or higher of CC-Link Partner Association.

3 Development/ Evaluation

We provide detailed designs of hardware and software for products to be developed.

Full support from CLPA!

Development support

For those who are developing CC-Link family products for the first time, we can introduce you to development tool partners and provide individual technical support on development methods. CLPA also offers seminars for developers.

Provision of technical specifications and conformance test specifications

Provided free of charge by CLPA
- Specifications for the development of CC-Link Family compatible products
- "Conformance Test Specification" for conformance testing of developed products

Support at development tool partner manufacturers

■ Consulting

In addition to consultation on product development, seminars sponsored by development tool partner manufacturers are also held. Please contact the manufacturer.

■ Development tool sales/ Technical support

Support for technical questions in the process of development. Please contact the manufacturers.

4

Do conformance tests

For details, see P.12 to 13

The test at the manufacturer and the test at CLPA are taken for each model based on the "Conformance Test Specifications". To facilitate the conformance testing process, CC-Link Partner Association has conformance testing labs available in Japan and overseas.
* A certificate will be issued after a conformance test is passed.

5

Sales

Products that have passed the conformance test can be sold as compatible products. If you wish to promote your product on CLPA Global Website, please register your product information on CLPA Members Site.

Conformance test application

You can apply for the conformance test and check your progress from CLPA Members Site.

Conformance testing lab

CLPA members can use the Conformance Testing Lab facilities to perform the various tests required for CC-Link Family compatible products.
Communication performance can be verified by noise test, hardware test, software test, and combined test.

Promotion

By registering compatible product information, products can be published on CLPA Global Website.

Steps when considering development

Step 1 Select the station type

Decide which station type to support.

Manager station

A station that manages a network.

Local station

A station capable of n:n cyclic transmission with the manager station and other local stations, 1:n cyclic transmission with other stations.

Remote station

A station capable of 1:n cyclic transmission, and transient transmission with other stations.

For details, see P.8

Step 2 Select the certification class

Decide which certification class to support.

Class B devices has higher function than Class A devices.

Class A

- Real-time communication
- Can be developed by changing the software of existing (Non-TSN) products.

Class B

- Real-time and synchronized communications
- Guarantees synchronization accuracy of 1 µs or less.
- Requires either designated LSI or general purpose Ethernet LSI that supports fast communication cycles.

For details, see P.9

CC-Link IE TSN recommended wiring parts

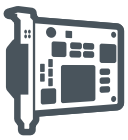
CC-Link IE TSN wiring parts such as cables and connectors can be used as long as they comply with applicable standards, such as ANSI/TIA/EIA-568-B (Category 5 or Category 5e). To ensure safe use in industrial purposes, CLPA has conducted tests and provides information on products that have passed the tests as the recommended wiring parts.

Step 3 Select the development method

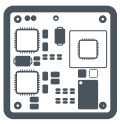
Step 4 Select the development location

Decide which development method to use.

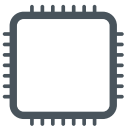
PC board



Embedded Module



Dedicated Communication LSI



Software Development Kit (SDK), etc.

For details, see P.10

Decide where to conduct development.

Develop in-house

or...

Use a contracted development manufacturer

For details, see P.11

Mutual certification system

The following products that have passed CC-Link IE Field Network recommended wiring parts test can be recommended for CC-Link IE TSN as well. In this case, no test is required.

- CC-Link IE Field Network recommended wiring parts
  - Cable
  - RJ45 plug/jack
  - RJ45 relay connector
  - M12 plug/jack

Step 1 Select the station type

Manager station

A station that manages a network. A station that contains control information (parameters) and controls device stations* and other manager stations through cyclic transmission and transient transmission.

* Device stations : A general term other than manager stations such as local stations and remote stations.

Compatible devices (example)

PLC Industrial PC

Local station

A station capable of n:n cyclic transmission with the manager station and other local stations, 1:n cyclic transmission with other stations, and transient transmission with other stations. It has a server function and client function for transient transmission.

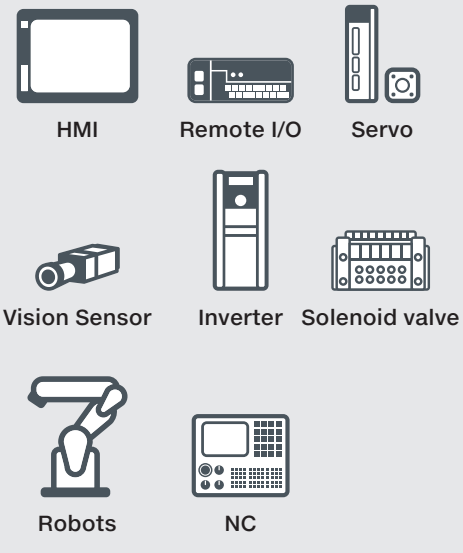
Compatible devices (example)

PLC Industrial PC

Remote station

A station capable of 1:n cyclic transmission, and transient transmission with other stations.
It has a server function and client function for transient transmission.

Compatible devices (example)



HMI Remote I/O Servo
Vision Sensor Inverter Solenoid valve
Robots NC

Step 2 Select the certification class

- CC-Link IE TSN has different certification classes depending on the functions and performance of the device (node) and switch.
- Certification classes include A and B, with B being the higher function.

Device

- It is recommended to develop certification class B products that have a wide variety of applications. Develop certification class A products only when modifying the software of existing products (not supporting TSN).

Certification classes for devices

✓ : Implementation required – : Implementation not required

No.	Functions	Conditions	Certification class	
			A	B
1	Reception/Relay	Full rate reception/relay(*1, *2)	–	✓
2	Supported standards	IEEE802.1AS compliant	–	✓
		IEEE1588 compliant	–	–(*5)
		IEEE802.1Qbv compliant	–	✓
3	Synchronization accuracy	1 µs or less	–	✓(*4)
4	Communication method	Time sharing method	–	✓
		Time managed polling method	✓	–
5	Cyclic transmission	VLAN	✓	✓(*6)
		Unicast	✓	✓
		Broadcast/Multicast	–(*3)	✓
6	Transient transmission	NRSV-Transient	✓	✓

*1 1 port: Receive, 2 ports or more: Receive and relay
*2 The communication speed does not matter if it is 100 Mbps or higher.
*3 Implementation is required for local stations
*4 To guarantee the accuracy of 1 µs for the time synchronization, configure a system only with certification Class B products. In this case, do not place a certification Class A product (including a switch) between certification Class B products.
*5 When the protocol version is 1.0, implementation is required. For details, please refer to CC-Link IE TSN Specifications (Overview).
*6 When the protocol version is 1.0, implementation is not required. For details, please refer to CC-Link IE TSN Specifications (Overview).

The manager station must be able to communicate with both certification Class A device stations and certification Class B device stations.
Device stations must be certification Class A or certification Class B products and be able to communicate with the manager station.

No.	Functions	Protocol version 2.0	Protocol version 1.0
1	Communication method (*)	Time sharing method Time managed polling method	Time sharing method
2	Supported standards	IEEE802.1AS compliant	IEEE802.1AS compliant IEEE1588 compliant
3	Cyclic transmission	VLAN required	VLAN optional

* In the time-sharing system method, the synchronized time at each station is utilized to transmit simultaneously in both directions, whereas in the time managed polling method, cyclic frames are transmitted to the manager station after the device stations receive cyclic frames.

Switches

Certification classes for switches

✓ : Implementation required – : Implementation not required

No.	Functions	Conditions	Certification class	
			A	B
1	Link up/Relay	1000BASE-T(IEEE802.3ab) compliant 100BASE-TX(IEEE802.3u) compliant	✓(*)	✓(*)
		Auto MDI/MDI-X	✓	✓
		Auto negotiation	✓	✓
2	Supported standards	IEEE802.1AS compliant	–	✓
		IEEE1588 compliant	–	–
3	Synchronization accuracy	1 µs or less	–	✓
4	Time aware queuing	IEEE802.1Qbv compliant	–	✓

* Either one or both classes must be supported.

Step 3 Select the development method

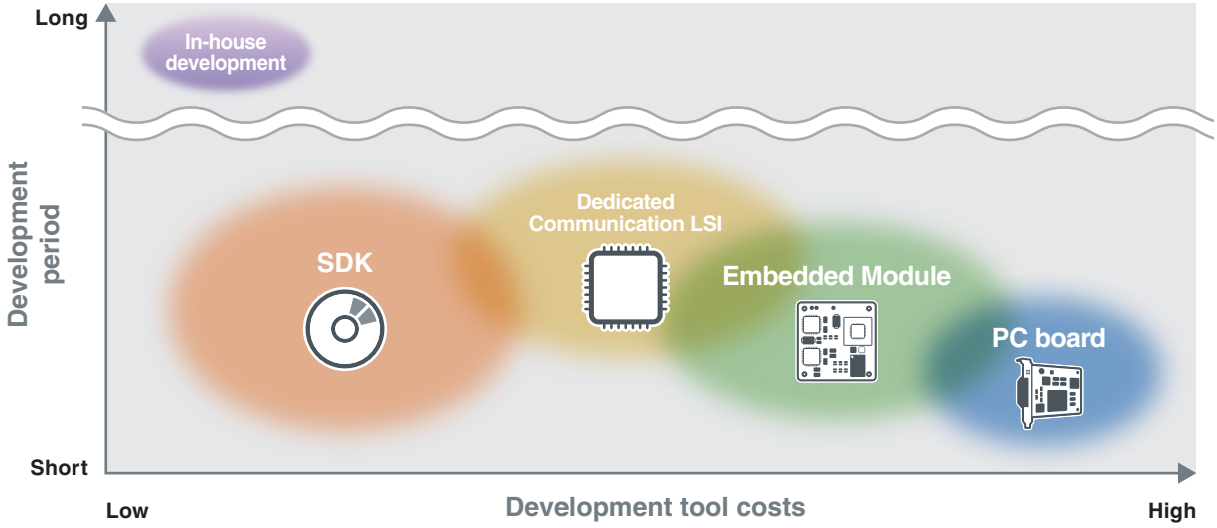
Extensive lineup of supported products

Various types of product development are supported, from high-performance devices implemented on dedicated ASIC/FPGA to low-cost devices implemented on general-purpose Ethernet chips using software protocol stacks.

Types

Development tool	PC board	Embedded Module	Dedicated Communication LSI	SDK
Hardware/Software	Hardware	Hardware	Hardware	Software
Use	Connects to PCI or PCI Express interface.	Connects user boards and embedded interface boards via a general-purpose bus (e.g., 16-bit parallel bus).	Based on the interface specifications of the released communication LSI, users can mount it on the board.	Implements the released software into devices compatible with general-purpose Ethernet communication.

Duration and cost will vary depending on the development method selected.



Differences in communication accuracy due to product combinations

Combination examples	Hardware-developed manager station Hardware-developed device station	Software-developed manager station Hardware-developed device station	Hardware-developed manager station Software-developed device station	Software-developed manager station Software-developed device station
Communication speed	1 Gbps	1 Gbps	100 Mbps	100 Mbps
Communication accuracy	High ← Low			

See P.14 for details of development tool partners.14

Step 4 Select the development location

Develop in-house

Various development methods can be used to internally develop communication interfaces.

or...

Use a contracted development manufacturer

As one of the methods of clearing the technical and personnel issues in internal development, it is possible to commission a manufacturer to develop communication interface hardware and software.

Conformance test

■ Conformance test objectives

CC-Link Partner Association conducts conformance tests on all certified products based on the specifications defined by CLPA to ensure that the products fulfill the communication specifications and connectivity.

Benefits

- Ensures the communication reliability of the product.
- Enables flexible system configuration by ensuring interoperability across manufacturers and models.

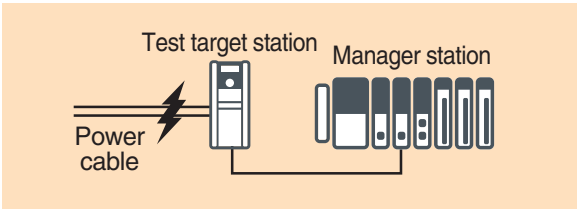
Conformance test items

- Hardware test
- Software test
- Profile description (CSP+) confirmation
- Aging test

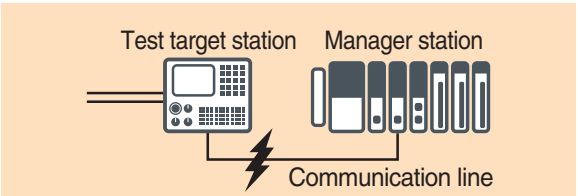
* Please refer to the applicable Conformance Test Specifications for details (members only).

Test cases

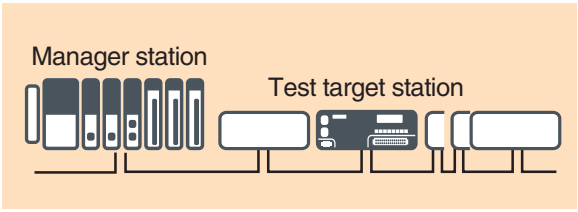
- Power supply noise test (AC/DC)



- Communication line noise test



- Aging test



Test items and divisions of responsibility

Test items include items to be performed by the partner manufacturer in advance and items to be performed by CLPA.
Some items are tested by both the partner manufacturer and CLPA.
All test items at the partner manufacturer must be passed before testing at CLPA.

⚠Caution

- The conformance test is intended to assure that the product meets CC-Link IE TSN communication specifications, and not intended for device-specific functions.
- Passing the conformance test does not mean that the performance or quality of the product itself are guaranteed.
- Recommended wiring parts test can be applied to switches, cables, connectors, etc.

Workflow for conformance testing

1 Refer to the conformance test regulation

2 Download and confirm the test specifications applicable to the product

3 Perform the test at the manufacturer as specified in the test specification

4 Apply for testing with uploading the manufacturer test results to Members Site*

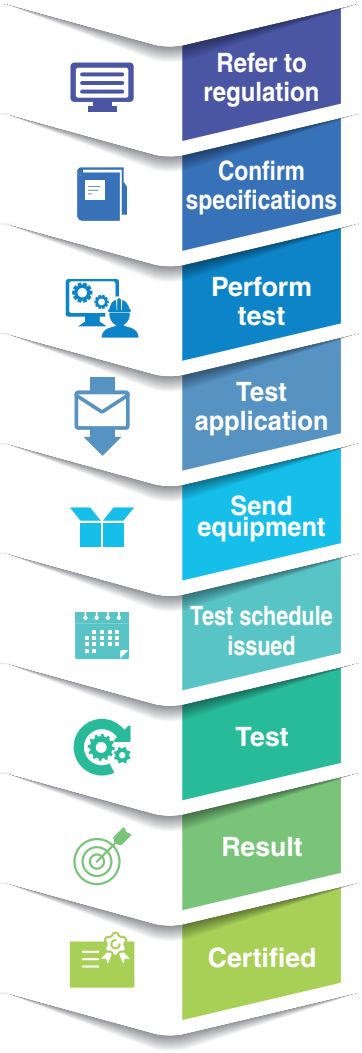
5 Send test equipment to CLPA

6 The test date is informed by CLPA

7 Start of conformance test at CLPA

8 The test result is reported

9 The certificate and the test report are available for download



* Please contact your regional office if you are unable to access Members Site.

Conformance Testing Lab

CC-Link Partner Association provides partners with conformance test equipment in the testing laboratory to verify product performance. Please use this service for testing.

Please check here for more information.

CC-Link IE TSN development tool partners

Partners	Station type	Certification classes	Development tool				Listed page
			PC board	Built-in Module	Communication LSI	SDK	
达智汇 ADTTech	Remote Station	B/A			✓		P.16
	Remote Station	B/A			✓		P.16
eSOL	Manager station	B				✓	P.17
HMS	Remote station	B		✓			P.18
MITSUBISHI ELECTRIC	Master/ Local station	B			✓		P.19
	Remote station	B/A			✓		P.19
RENESAS	Remote station	A				To be released soon	P.20

PC board is under consideration by partners.
For details, contact CC-Link Partner Association.

Partners under consideration for development include:

ANALOG DEVICES
hilscher empowering communication
NXP
Texas Instruments

Please check here for more information.

Full support from development to product PR

Sample code and tools to support CC-Link IE TSN development are available free of charge.
Members can download these from CLPA Global Website free of charge.

■ Sample code for CC-Link IE TSN remote station Class A

Features

1. Compact sample code for remote stations
2. Software and API design enables easy application to Industrial Ethernet and CC-Link IE Field Network Basic devices
3. Free download from the website

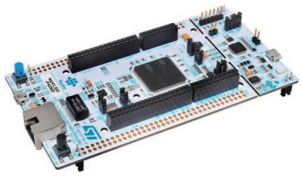
CC-Link IE TSN-developed products

Sample code for CC-Link IE TSN remote station Class A

Available free of charge

Development environment

No.	Item	Product name	Version	Manufacturer
1	Evaluation board	NUCLEO-F439ZI*	— — —	STMicroelectronics
2	Integrated development environment	STM32CubeIDE	1.7.0	STMicroelectronics
3	OS	FreeRTOS	V10.3.1	Amazon Web Services
4	IP stack	lwIP (lightweight IP)	2.1.2	lwIP Developer Group



NUCLEO-F439ZI (STMicroelectronics)

* On-board microcontroller (STM32F439ZIT6)

Frequency	180 MHz
CPU	ARM Cortex-M4
Flash	2,048 Kbyte
RAM	256 Kbyte

See CLPA Global Website for details.

■ CC-Link IE TSN Wireshark plugin

CC-Link IE TSN Wireshark plugin makes it possible to simplify the display of CC-Link IE TSN protocol packet data on Wireshark. This greatly helps users to analyze data packets of protocols.

Free download from the website.

ADTTech Technology Services (Suzhou) Co., Ltd

达智汇
ADTTech

ADTTech – AUO's key player in global smart industrial services, is an AI technology company that fuses chips, AI platforms and scenario-driven solutions.
With our philosophy "Rooted in Manufacturing, Understanding Manufacturing, Empowering Smart Manufacturing", we specialize in industrial control, electronics, automotive and healthcare. Through synergized TSN chip communication and AI embedded models, we provide end-to-end AI Insight solutions to power your full-stack smart manufacturing transformation.

Developable stations / Certification classes

Development tool	Station type	Certification class	Product name
communication LSI	Remote Station	CLASS B/A Devices	Communication LSI for development of CC-Link IE TSN Remote Station (ADT32R300)
communication and control SOC	Remote Station	CLASS B/A Devices	SOC for small-scale IO or servo development of CC-Link IE TSN Remote Station(ADT32R300)

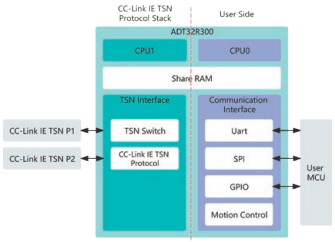
Development method

- **Communication LSI for development of CC-Link IE TSN Remote Station (ADT32R300)**
- **SOC for small-scale IO or servo development of CC-Link IE TSN Remote Station(ADT32R300)**

ADTTech
ADT32R300
IVM1
BA2529

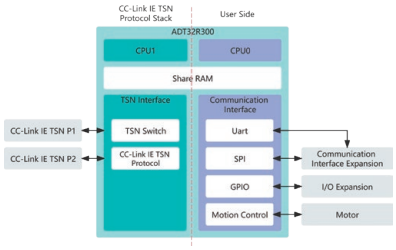
Features and benefits of development methods

Communication LSI for development of CC-Link IE TSN Remote Station(ADT32R300)



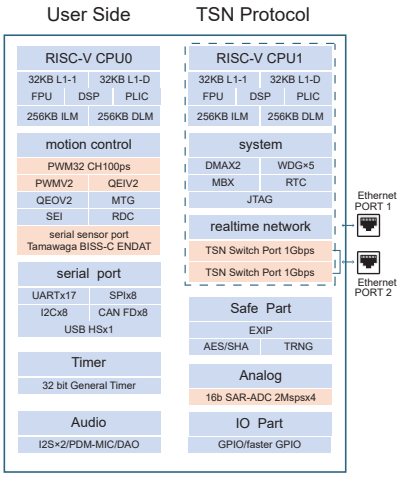
1. CC-Link IE TSN Remote Stations can be developed without consideration of protocols
2. Double CPU core, 32 bit RISC-V 600 MHz, high-performance CPU
3. Multi-protocols supported
4. Supports connection to CPU via UART and parallel port
5. Certification Class B/A

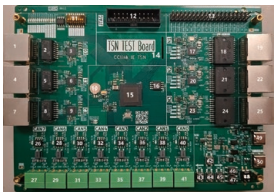
SOC for development of small-scale IO or servo development of CC-Link IE TSN Remote Station (ADT32R300)



1. CC-Link IE TSN Remote Stations can be developed without consideration of protocols
2. Double CPU core, 32 bit RISC-V 600 MHz, high-performance CPU
3. Multi-protocols supported
4. Integrates communication, control and IO driving functions on a single chip, eliminating the need for additional main control chips and reducing hardware costs
5. 140+ IO PINs
6. 4-axis and above Motor Driver supported
7. Certification Class B/A

Block diagram
ADT32R300





TSN Evaluation Board

Contact information
398 Suhong Middle Road, Suzhou Industrial Park, Suzhou, Jiangsu, China
E-mail marketing@adttech.com
URL https://adttech.com/

eSOL Co.,Ltd.

In addition to providing and supporting the SDK, we also offer various engineering services such as porting to individual platforms.

Developable stations / Certification classes

Development tool	Station type	Certification class	Product name
Software Development Kit (SDK)	Manager station	Class B	eSOL CC-Link IE TSN SDK
	Remote station	—	eSOL CC-Link IE TSN Safety SDK

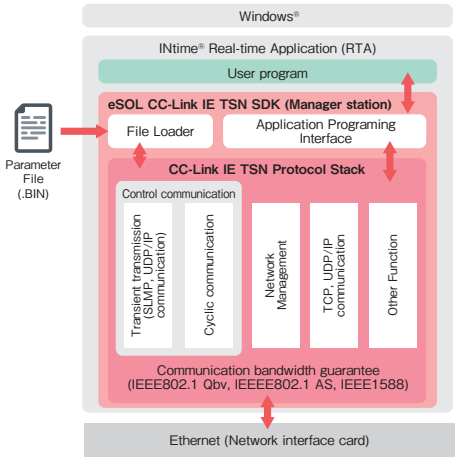
Development method

With our development kit containing the CC-Link IE TSN protocol stack and sample applications, you can efficiently develop CC-Link IE TSN-compliant devices.

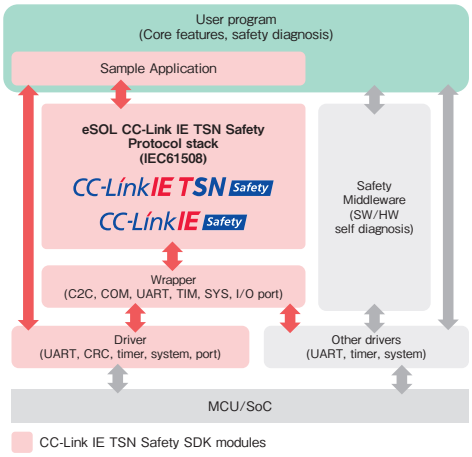
- eSOL CC-Link IE TSN SDK (Manager station)
- eSOL CC-Link IE TSN Safety SDK

Features and benefits of development methods

1. eSOL CC-Link IE TSN SDK (Manager station)
   - Manager station Authentication Class B compatible
   - Support a wide range of operating systems (INtime, Linux, RTOS, etc.)



2. eSOL CC-Link IE TSN Safety SDK
   - eSOL CC-Link IE TSN Safety protocol stack is IEC61508 certified
   - Operation confirmed through safety communication function conformance testing



Contract details

In addition to providing eSOL CC-Link IE TSN SDK and technical support, we can also provide various development support such as porting to your individual platform.

Planning / Introduction

- Specification implementation meeting
- SDK license

Development / evaluation

- SDK technical support
- SDK porting to individual platforms
- Various driver development
- Application development
- Various evaluations and document creation
- Functional safety development support and consulting

Certification / Shipping

- Conformance test pre-check
- Conformance test defect analysis
- Creation of various documents
- Functional safety certification support and consulting

Contact information

Harmony Tower, 1-32-2 Honmachi, Nakano-ku, Tokyo 164-0012

TEL +81-3-5302-1360

E-mail sw-inq-en@esol.co.jp

URL https://www.esol.com/

HMS Industrial Networks

Anybus CompactCom 40 CC-Link IE TSN is communication module for your device to connect CC-Link IE TSN network. You can quickly launch your CC-Link IE TSN compliant products by implementing an Anybus solution.

Developable stations / Certification classes

Development tool	Station type	Certification class	Product name
Embedded Module	Remote station	Class B	Anybus CompactCom M40 CC-Link IE TSN
Embedded Module	Remote station	Class B	Anybus CompactCom B40 CC-Link IE TSN Coming soon

Development method

Protocol processing is performed by the Anybus CompactCom 40, so that no advanced knowledge is required for development. HMS significantly reduces the risk of certification testing while the product is still embedded, since maintenance and pre-certification have already been performed by HMS.

Two types are available to suit your product.

Module type (M40)

- Fully implemented industrial network functionality
- Pluggable communication interface
- Highest effectiveness in minimizing development man-hours and accelerating product release
- With or without housing is selectable

Brick type (B40)

- Card type with communication controller, memory, peripheral parts, interface circuit, etc. mounted
- Flexible to various shapes of connectors and mechanical design constraints

Module type (M40)

Housing available

Without housing

Brick type (B40)

Features and benefits of development methods

You can lower development cost and bring your product to market in a short period of time.
Features : Remote Station, Certification Class B, 100/1000 Mbps x 2 port, IT protocols (Web server, FTP server, Email client)

Specifications	Brick	Module
Size (LxWxH)	36 × 36 × 8 mm	52 × 50 × 22 mm 51 × 37 × 16 mm (without housing)
Host interface	- 8/16-bit parallel (30 ns access) - High-speed SPI (The baud rate can be set at up to 20 MHz) - Shift register (For I/O devices) - UART (Backward compatibility with 30 series, up to 625 kbps)	
Connector	1.27 mm pitch 56 pin connector (host) 52 pin connector (network) Pitch header	50 pin Compact Flash connector
Power supply	3.3 VDC	3.3 VDC
Operating temperature	-40 to 85°C	-40 to 70°C -40 to 85°C (without housing)

Contact information
Shin Yokohama KS Bldg. 6F 3-18-3 Shin Yokohama, Kohoku-ku, Yokohama, 222-0033, Japan
TEL +81-45-478-5340 FAX +81-45-476-0315
E-mail jp-sales@hms-networks.com
URL https://www.hms-networks.com/

Mitsubishi Electric Corporation

MITSUBISHI ELECTRIC
Changes for the Better

When products are made compatible with CC-Link IE TSN... This not only ensures the system flexibility unique to multi-vendor products, but also provides an opportunity for the competitive strength of the product to reach the global level.
In order to speedily and reliably develop CC-Link IE TSN compatible products, Mitsubishi Electric provides support in all aspects, including providing development tools.

Developable stations / Certification classes

Development tool	Station type	Certification class	Product name
Communication LSI	Master/ Local station	Class B devices	Designated communication LSI for development of CC-Link IE TSN Master/Local Station (CP610)
Communication LSI with Built-in GbE-PHY	Remote station	Class B/A devices	Communication LSI with Built-in GbE-PHY for development of CC-Link IE TSN Remote Station (CP620)

Development method

- **Designated communication LSI for Master/ Local station CP610**
- **Communication LSI with Built-in GbE-PHY for development of CC-Link IE TSN Remote Station (CP620/CP621)**

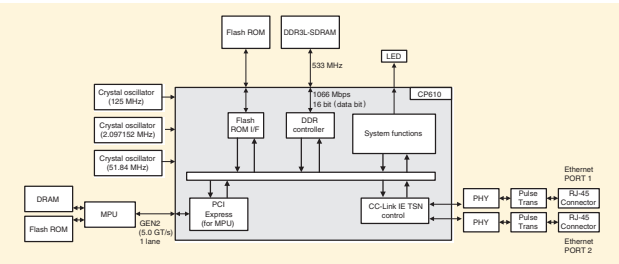
CP610 CP621 CP620

Features and benefits of development methods

Designated communication LSI for Master/Local station CP610

1. CC-Link IE TSN master/local stations can be developed without consideration of protocols.
2. The MPU and OS can be selected as needed, and sample code is provided that can be customized according to the selected hardware specifications and application.
3. The CC-Link IE TSN configuration tool included in the source code development kit can be used to configure parameter settings and run diagnostics on CC-Link IE TSN master/local stations.
4. As a transmission line route simulation model, a SPICE model is available for PCI Express® interface, and an IBIS model is available for other interface*.

● Block diagram

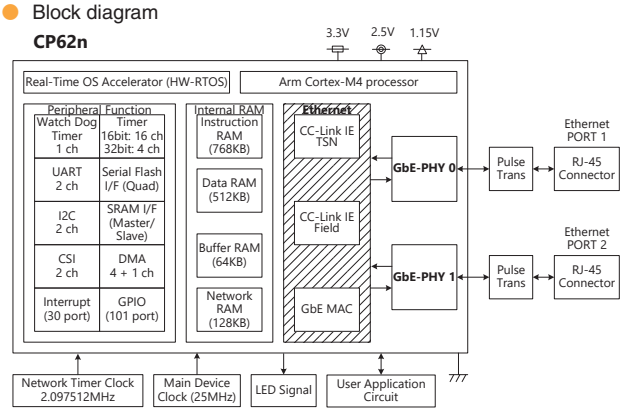


* Conclusion of a confidentiality agreement is required in order to receive the SPICE model or IBIS model. Please contact a branch office or the Open System Center.

Communication LSI with Built-in GbE-PHY for development of CC-Link IE TSN Remote Station (CP620/CP621)

1. The CP620 is a BGA 484-pin (23 x 23 mm) package, and the CP621 is an FBGA 356-pin (17 x 17 mm) package.
2. CC-Link IE TSN remote stations can be developed without consideration of protocols.
3. The inclusion of the GbE-PHY makes it easier to design communication circuit patterns. In addition, only a small number of peripheral components and circuits are required for the CPU and GbE-PHY, enabling development of more compact circuit boards.
4. The provided sample code can be customized to suit the applicable hardware specifications and applications.
5. The included H/W-RTOS reduces the CPU load and enables a lower power consumption in the developed equipment.

● Block diagram



Contact information

2-7-3, Marunouchi Chiyoda-ku, Tokyo 100-8310, Japan
URL https://www.mitsubishielectric.co.jp/fa/

* Or contact your local CLPA office (P.26)

Renesas Electronics Corporation

Equipped with a CPU, and large-capacity memory, CC-Link IE TSN can be achieved on a single chip. It also comes with the OS and software required for software development,enabling smooth product development.

Developable stations / Certification classes

Development tool	Station type	Certification class	Product name
Software Development Kit (SDK)	Remote station	Class A	RX72M Industrial Network Solution Coming soon

Development method

The RX72M is a microcontroller for remote stations that supports CC-Link IE TSN Class A. It features RX's third-generation CPU core, the RXv3 core, large-capacity memory, and an evaluation board, allowing easy communications evaluation.

MCU
- RXv3 core
- Large capacity memory (up to 4MB code flash, 1MB SRAM)

Manual
- Hardware manual
- Users manual

Software
- CC-Link IE TSN sample code (for evaluation)
- TCP/IP stack, peripheral drivers (for evaluation)

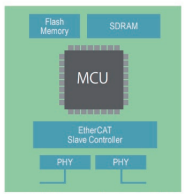
Evaluation board
- Renesas CPU card
  RX72M Card with RDC-IC
- Tessera Technology evaluation board
  TS-RX72M-COM


RX72MCPU card

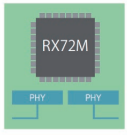

TS-RX72M-COM

Features and benefits of development methods

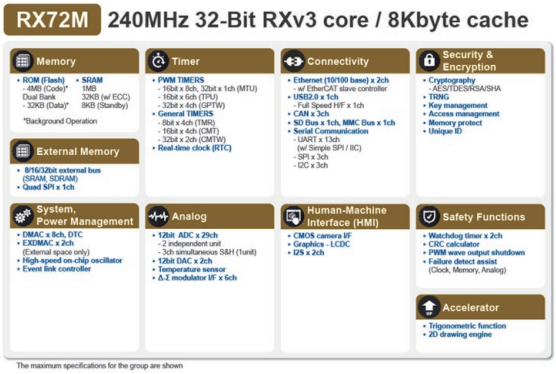
Realizing single-chip system



Common hardware configuration



Hardware configuration using the RX72M



Features of RX72M

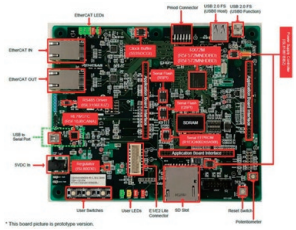
1 Real-time performance
Equipped with flash memory capable of read operations at the industry's fastest 120 MHz

2 Achieving both multi-functionality and compactness
Large capacity built-in memory and effective GPIO

3 Strong security
Equipped with "Trusted Secure IP" that integrates key management, access management, and encryption engines.

4 Achieving both network communication and motor control
Equipped with a PWM timer and trigonometric function calculator

5 Complete software
The evaluation environment is available for free download, and is supported by our partner company (Sherpa Inc.) for MP, helping to shorten development time.


Renesas starter kit RSK+ for RX72M

Contact information

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan
For inquiries regarding products, samples, or purchases, please contact your local sales representative or distributor.
URL https://www.renesas.com/jp/ja/support/contact.html
* Or contact your local CLPA office (P.26)

Memo

CC-Link IE TSN Specifications

Item	Specifications
Communication speed	1 Gbps, 100 Mbps (Full-duplex recommended)
Communication method	Time sharing method, Time managed polling method
Synchronization function	IEEE802.1AS
Number of nodes connected to one network	64,770 devices (total of manager/device stations) For address Class A of IP address, up to 65,535 nodes can be connected.
Maximum distance between nodes	• Optical fiber (multimode fiber compliant with IEEE 802.3): 550 m • Optical fiber (SI-POF): 20 m • Optical fiber (SI-HPCF): 100 m • Twisted pair cable (compliant with IEEE 802.3): 100 m
Maximum number of branches	No upper limit
Maximum cyclic size per station	Max. 4 G (4,294,967,296) octet in total per station
Transient transmission	With the server function and client function for each station. Transmission capacity is the same as SLMP.
Topology	Line, star, line/star mixed, ring

For more details, please refer to CC-Link IE TSN Specifications.

■ Overview of CSP+

CSP+

CSP+ is an abbreviation for Control & Communication System Profile Plus. It is a profile that describes information (network parameter information, memory map, etc.) required for the startup, operation and maintenance of CC-Link Family compatible devices.
As CSP+ has integrated profile specifications, all CC-Link Family protocols can be described in the same format.
By using CSP+, CC-Link Family users can easily set parameters for each model with the same engineering tool.

Advantages of CSP+ development

❶ Integrated engineering tool environment

Development vendors of CC-Link Family compatible products do not need to create separate engineering tools as long as CSP+ files for the developed products are created. Furthermore, the profile notation according to applications such as diagnostics and energy management makes it possible to display dedicated screens with layouts specialized for each application in the engineering tool.

❷ Reduced support operations

Since the network parameter information and memory map are described in the CSP+ file, CC-Link Family users can set network parameters and create comments without needing a manual. Also, since device parameters can be set and monitored without a program, user support operations for development vendors will be reduced.

❸ XML format adopted

As CSP+ compatible files are in XML format, a general-purpose XML processing library can be used. Therefore, development vendors can reduce the time required for profile development.

CSP+ conformance testing

With the addition of CSP+ test items, conformance tests will be operated as follows.

❶ Partners developing new CC-Link Family compatible products

As of April 2013, it is necessary to take the CSP+ test in addition to the conventional device tests based on the new conformance test specifications.

❷ Partners who already have certified products

Development of CSP+ is optional for products that have already been certified.
In addition, conformance testing will be conducted free of charge for CSP+.

Flow of CSP+ operations

(1) Using the CSP+ creation support tool (can be downloaded from CC-Link Partner Association website),development vendors create profiles for CC-Link Family compatible devices.
(2) After the above file is created, a conformance test is conducted at CC-Link Partner Association, and the certified file will be posted on CC-Link Partner Association website.
(3) CC-Link Family users can download the CSP+ files describing the profiles of CC-Link Protocol Family connected devices created by development vendors of CC-Link Family compatible products from the website of CC-Link Partner Association or the development vendor.
(4) CC-Link Family user will use an engineering tool that can use CSP+, import the CSP+ file of the device downloaded in (3), and implement engineering for the device.

	① Create	② Conformance	③ Release	④ Use
Operation method	Create a profile using the CSP+ creation support tool 		 Product packaged Available online (CC-Link Partner Association Partner / CC-Link Partner Association)	Engineering tools (Monitoring, Diagnosis, Parameter setting, etc.) 
Target users	• CC-Link Family product development vendor	• CC-Link Partner Association	• CC-Link Family product development vendor • CC-Link Partner Association	• CC-Link users

Please check here for more information.

Guide to Admission

Sign up for a new membership here.

Visit CLPA Global website to apply for membership

In order to develop CC-Link IE TSN compatible products, it is necessary to join CC-Link Partner Association.
Our members can access the latest technical documents and specifications related to CC-Link Family free of charge and receive technical support for developing compatible products, including conformance testing.
From helping partner vendors develop compatible products to promoting our partners products globally, CLPA provides a wide range of support services.

CC-Link Partner Association membership category

Regular members Executive members Board members	• Development of CC-Link Family compatible products • Sales of CC-Link Family compatible products • Use of CC-Link logo • Technical support from CC-Link Partner Association • Product promotion (website, exhibition, etc.) by CC-Link Partner Association
Registered members	• Only provides access to CC-Link Family specifications

Rights and fees by membership category

(Tax not included)

Rights & fees / Membership categories			Registered member	Regular member	Executive member	Board member
Annual fees Amount of money in ( ) shows monthly fees for intermediate enrollment.			Not charged (free)	100,000 yen (9,000 yen)	200,000 yen (18,000 yen)	1 million yen or more (84,000 yen)
Initial fee			Not charged (free)			1 million yen
Conformance test fees (per product)	CC-Link IE TSN	- Manager/Local Station - Remote Station - Development tool	N/A	100,000 yen	50,000 yen	Not charged (included in annual fees)
		- Drive profile Compatible		100,000 yen	50,000 yen	
	CC-Link IE Controller Network	- Normal Station - Control Station - Development tool		400,000 yen	300,000 yen	
	CC-Link IE Field Network	- Manager/Local Station - Intelligent Device Station - Remote Device Station - Development tool		400,000 yen	300,000 yen	
	CC-Link IE Field Network Basic	- Manager/Remote Station - Development tool		100,000 yen	50,000 yen	
	CC-Link IE Safety Communication Function	- IESMAP - IESSLP - Development tool		300,000 yen	200,000 yen	
	CC-Link	- Remote Device Station - Remote I/O Station - Cable - Development tool		300,000 yen	200,000 yen	
		- Manager/Local Station - Intelligent Device Station - Development tool		400,000 yen	300,000 yen	
	CC-Link/LT	- Manager Station - Remote I/O Station - Cable - Development tool		300,000 yen	200,000 yen	
	SLMP	- Client - Server		100,000 yen	50,000 yen	
Recommended wiring parts test fees (per product)	CC-Link IE TSN	- Cables - Connectors - Switches, etc.	N/A	100,000 yen	50,000 yen	Not charged (included in annual fees)
	CC-Link IE Controller Network	- Cables - Media converters, etc.		150,000 yen	100,000 yen	
	CC-Link IE Field Network	- Cables - Connectors - Switches, etc.		150,000 yen	100,000 yen	
Tool test fees (per product)	CC-Link IE TSN	- Software etc.	N/A	100,000 yen	50,000 yen	Not charged (included in annual fees)
The right to obtain the CC-Link Family specifications free of charge			Yes			
The right to develop, manufacture and sell CC-Link Family products, development tools and recommended wiring products			No	Yes		
The right to use the CC-Link Family technology			No*1	Yes		
The right to use the CC-Link Family logo			No*2	Yes		
The right to publish the information about the Member's own product on the CLPA Global Website.			No	Yes		

*1 In where it is not for commercial purposes, you may use the technology.
*2 As long as it does not conflict with the rights of other partners, you may use the logo for promotional purposes only.

Memo

Get the Membership to CLPA

Would you like to improve your FA, BA, and PA devices by making them compatible with CC-Link Family? Are you interested in OT devices that satisfy international standards? The members can develop business opportunities and possibilities by receiving services such as support for developing compatible products.
Please check the details and apply for membership via our website.

FA: Factory Automation/BA: Building Automation/PA: Process Automation

CLPA Website
https://www.cc-link.org

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