2017.Nov



English version

CC-Link Family-compatible Products Development Method Guide

CC-Línk IE Control

CC-Línk

CC-Línk

CC-Línk IE Field Motion

CC-Link CC-Link/LT



CLPA will back you up in various aspects of your effort toward the development of CC-Link Family-compatible products that attract attention from your customers.

You can count on CLPA for extensive support to develop CC-Link Family- compatible products through a method that best suits you. Our support, for example, includes holding a seminar that assists you in acquiring necessary techniques and helping you to carry through a conformance test program essential to ensuring your customers' confidence in the product that has been developed. Our assistance extends to every detail, aiding you in launching a promotional campaign timed to coincide with the introduction of your product into the market.

Inter-production department communication	Information Network	Ethernet
Within factory premises	Controller network	
		CC-LInk 📔 Field
Within factory promises		CC-Línk 🛯 🗲 Field Basic
and production line	Field Network	
		CC-Link
Within panels and equipment	Cable-saving network	



INDEX

Process Flow for Developing CC-Link Family-compatible Products
Conformance Test P.15
Introduction to CC-Link Family-compatible Products Development Methodology
Main Specifications for CC-Link Family of Networks ····· P.33
What is CC-Link Partner Association?P.41

To develop CC-Link Family-compatible products, the following procedure is applied.

CLPA will support you in all the stages from development to marketing for your CC-Link Family-compatible products.

We have methods designed to expedite and make product development easier in store for you. Taking advantage of such information allows you to effectively develop a compatible product.



Development support

As part of support for product development by its members, CLPA organizes various kinds of seminar on its own which you can take and, where necessary, asks other partner companies offering development methodology to hold a seminar which you can attend, as well. This offers the opportunity to obtain knowledge and technique which suit the needs of members pursuing different objectives, from those who are going to pursue a CC-Link project for the first time to those who are going to develop a "CC-Link compatible" to prescribed specification.

Disclosing technical specifications

CLPA fumishes its members with CC-Link protocol specifications free of cost. In building a product of your own, you will have access to development methods (in the form of dedicated communication LSI or built-in module) that are made available to accommodate respective types of product. In addition, there are member manufacturers who undertake a contract for the development of the product that you would like to have. For more details, see the page concerned.

Providing the "CC-Link Conformance Test" specifications

CLPA offers the member firms the "CC-Link Conformance Test" specifications for free applicable to the developed compatible products.

С

١.

Ρ

Α



Membership Classification and Fee

	Membership ca	tegory	Registered member	Regular member	Executive member	Board member
Annual dues			_	JPY 100,000	JPY 200,000	JPY 1000,000
Initiation fee			-	-	_	JPY 1000,000
Acquisition c	of protocol specificat	ion	Offered fre	e of charge in res	ponse to membe	r's request
		Other than SLMP	_		0	
CC-LINK LECK	mology use right	SLMP)	
0	CC-Link master/local/intelligent device stations CC-Link IE Control control/normal station CC-Link IE Field master/local station CC-Link IE Field intelligent device station CC-Link IE Field remote device station			JPY 300,000	JPY 200,000	
test fee (per device)	CC-Link remote device/I/O station CC-Link/LT master/slave station Cable and others		_	JPY 200,000	JPY 100,000	Included in
Product for so		tware certification		JPY 50,000	JPY 20,000	annual dues
	CC-Link IE Fie	ld Network Basic		JPY 50,000	JPY 20,000	
	SLMP	* product		-	-	
Recommended product test fee (Per model)	CC-Link CC-Lir Recommended r	lE Control k IE Field network wiring parts		JPY 100,000	JPY 50,000	
Use of CC-L	ink logo		-		0	
Technical support			-	0		
Posting of products on the home page and product catalog (no charge)			-	0		
Exhibition at shows			—		0	
Distribution of CC-Link products catalog and CC-Link News Information about events				(\mathbf{D}	

*SLMP: (Seamless Message Protocol)

Implementing conformance tests

The member firm implements the conformance test according to the "CC-Link Conformance Test" specifications for each product model.

To facilitate the conformance testing, CLPA has test centers in Japan and overseas.

	ы	u	Ľ

CLPA promotes and expand marketing of compatible products with materials highlighting their innovative, excellent features.

Laboratory testing

The member firms use the conformance test facilities to test CC-Link compatible products from various aspects. For more details, see the page concerned.

Product promotion

A catalog in a printed and an electronic form (CD-ROM) is available, fully covering all the CC-Link compatible products that the member manufacturers have developed and put on market. CLPA provides users with diversified solutions.



Information registered and disclosed on web site

CLPA web site provides information on the CC-Link compatible products developed and marketed by the member manufacturers.



Product Development Steps



CC-Link Family-compatible Products Development Method Guide





6

1 Selecting a network type

CC-Link

Advantages

Advantages

CC-Link is an RS485-based field network.

CC-Link offers a fast, stable input/output response and has a great potential for expansion with a high degree of flexibility. On the strength of this overwhelming performance, it has established a significant track record and gained user confidence as an open field network which originated in Japan and has grown into a world standard status. CC-Link is the most popular of the CC-Link Family of networks and continues to move along the path of evolution in the future.

- Abundant relevant products, more than 1,000 varieties, available from the affiliated partners
- A network-compliant product can be developed with ease and at low cost.
- CC-Link Ver. 2 provides for cyclic transmission with higher-capacity.





CC-Link IE Control is a gigabit Ethernet-based controller network.

It serves as a main-line network for use within factory premises that manages coordination between a large-scale distributed controller system and individual field networks.

- Employs gigabit Ethernet technology to achieve super-high speed, large-capacity network-type shared-memory communications.
- A redundant transmission path (loop-back communication) enables highly-reliable communication.
- A powerful network diagnostic function











Advantages

CC-Link IE Field is a gigabit Ethernet-based field network.

Under an open, seamless network environment, it accommodates multiple control requirements from high-speed I/O control to distributed controller system with a single network. Cables can be flexibly arranged along with the layout of the equipment.

- A gigabit transmission capability and a real-time protocol enable communication between control data and administrative data without stress.
- A broad latitude in the choice of network topologies
- A powerful network diagnostic function





CC-Link IE Field Basic is the CC-Link IE communication that utilizes general-purpose Ethernet technology that can easily be applied to the small-scale devices that do not require high speed control, and easily be used and developed. It enables the cyclic transmission of CC-Link IE Field Network using software.

A common protocol which provides for a seamless connection between the CC-Link IE and Ethernet products. All you have to do to make your Ethernet product SLMP-compatible is develop a software program that is needed. It is very simple.



Process Flow for Developing CC-Link Family-compatible Products

Selecting a station type



Cyclic transmission

CC-Link CC-Link/LT CC-Link IE

Communication performed periodically within the same network is called "cyclic transmission".

The interval at which cyclic transmission takes place can be determined by calculations. This, coupled with small variances, makes cyclic transmission an ideal communication mode for the field network which is required to exhibit a good periodicity in its control functions.

Transient transmission

CC-Link CC-Link /LT CC-Link IE

Communication performed only when a communication request is output within the same network is called "transient transmission".

Transient transmission is used to send or receive message(s), in an arbitrary timing independent of the cyclic transmission, as when reading or writing PLC data from an HMI.

Bit data and word data

CC-Link CC-Link/LT CC-Línk IE

Data handled in cyclic transmission is classified into two major types: bid data (remote input/output) which includes on/off information and word data (remote register) which includes analog information.

A remote I/O station can handle only work with bit data.

CC-Link/LT **Remote device station** CC-Link • A station where cyclic transmission of bit data and word data can be performed. 0::: Analog I/O Inverter Indicator **Remote I/O station** CC-Link/LT CC-Link • A station where the cyclic transmission of bit data can placebe performed. Digital I/O Solenoid valve

2

Selecting a station type CC-Link Family-compatible Products

Development Method Guide

Number of occupied stations

CC-Link /LT CC-Link IE CC-Link IE

Because, in a CC-Link network, the amount of data assignable to a single station is predetermined, the number of occupied stations is set from 1 to 4 based on the amount of data handled by one piece of equipment.

Amount of data per station

Bit data (remote I/O): 32 bits each for input and output Word data (remote register): 4 words each for input and output

The greater the number of occupied stations, the greater the amount of data that can be handled by one piece of equipment however, the number of equipment connectable within the entire network decreases accordingly.

Number-of-points mode

CC-Link CC-Link/LT CC-Línk IE CC-Línk IE

In a CC-Link/LT network, the number of I/O points can be advantageously utilized by specifying the number of occupied points per station according to system requirements.

Number-of-points mode is classified into three modes: 4-point, 8-point and 16-point mode. Therefore, the number of occupied stations varies even with the same I/O equipment depending on the number-of-points mode selected.



CC-Link Family Specifications

CC-Link Partner Association furnishes its members free of cost with documents containing protocol specifications for constituent networks of the CC-Link Family. These specifications will permit you to develop your own product that is connectable to CC-Link. For information about the documents issued by CC-Link Partner Association, see "Documents" on its website (http://www.cc-link.org/).

we will have trouble starting from scratch on our own, loading the protocol onto our computers.

You will be able to make use of a proven development method that is presented by your fellow partner.

It is possible to develop a product in-house according to the specifications issued by CC-Link Partner Association, but any of development methods disclosed by its members for varying types of network (dedicated communication LSI, built-in module, or driver for a PC board) could be utilized to achieve that goal with ease and in a short period of time.

Advantages • A high degree of flexibility in network topologies.

Development calls for a high level of technical

Development methodology

But

•Developing the protocol	a product I specifica	in-house	based on red
Com	(Constr.)	15400 M 18-00	0004 K B-+
Origina (1988) arrival	00-144-17 098	00-Lin II 3(410-55(47)-55588 484	00-Lis II 24-5-12-5088
		-	

•Dedicated communication LSI



Built-in module

Driver for a PC board

Software



Disadvantages competence and manpower. • A network-compatible product can be developed without concern for constraints from protocol. Communication circuits can be easily downsized. Development requires a higher level of technical competence and a longer period of time compared with the built-in module approach. Communication functions can be provided merely by installing the module into an end-user's board This methodology can be used on several types of network easily. There are limits to downsizing. Disadvantages • The increased production results in more costs. • This methodology can be used on various types of operating systems including the real-time operating system. This methodology can be used only on personal computers. It is difficult to be applied on field Disadvantages equipment such as remote I/O. Just developing a software program enables a new SLMP-compatible product to be created. Conformance test is only checking the functions of software.

Disadvantages





Network type considered



Step Selecting a location for development Step Selecting Step Selecting Step Selecting Step Selecting



Selecting a network/station type Examples in CC-Link

The following table provides a summary of differences among station types, taking the CC-Link network as an example. Duration of time required for development may differ depending on conditions that are involved. Refer to the table as a guide only.

	Amount of data per station	Number of occupied stations	Communication method	Object to be developed	Estimated duration of time required	Conceivable devices (examples)	Development methodology
Remote I/O station	Bit data I/O 32 bits each words each	1 station	Cyclic transmission transmission	Hardware Software	1to2 months	•Digital I/O •Solenoid valve	Dedicated communication LSI Built-in module a PC board
Remote device station	Bit data I/O 32 bits each words each	1 _{to} 4 station	Cyclic transmission transmission	Hardware Software	3 to 4 months	•Analog I/O •Inverter •Servo •Indicator	Dedicated communication LS
Intelligent device station	Bit data I/O 32 bits each words each	1 _{to} 4 station	Cyclic Transient transmission	Hardware Software	6 to 12 months	∙HMI	Dedicated communication LSi Built-in a PC board
Master/local station	Bit data I/O 32 bits each Word data I/O 4 words each	1 _{to} 4 station	Cyclic transmission transmission	Hardware Software	6 to 12 months	Programmable controller Personal computer	Dedicated communication LSI Built-in module Driver for a PC board

CC-Link Family **CSP+** System Profile

What is CSP+?

CSP+ stands for CC-Link Family System Profile Plus. This profile describes the information necessary for the launch, operation and maintenance of equipment compatible with CC-Link and CC-Link IE Field, including network parameter information and memory maps. Because CSP+ integrates a number of profile specifications, it can be used to define the protocols for all CC-Link products in one format. In addition, by using CSP+, users who have adopted CC-Link can easily configure the parameters of various models with the same engineering tool.

Benefits of choosing CSP+

1 Integrated engineering tool environment

For CC-Link certified product vendors looking to create CSP+ files that support products in development, there is no need to create a separate engineering tool. In addition, according to the profile descriptions for the employed diagnostics and energy management, the dedicated layout screen specific to the respective application can be displayed using the engineering tool.

2 Reduced support services

Thanks to the network parameter information and memory maps being described by the CSP+ file, CC-Link users are able to configure network parameters and create comments without a manual. Also, because it is possible to configure and monitor equipment parameters without a program, user support services by vendors can be reduced.

3 XML format adoption

Use of the XML format for supportable CSP+ files means it is possible to take advantage of general-purpose XML processing libraries. This means that vendors can reduce the effort put into developing profiles.

CSP+ conformance testing

In conjunction with the additional CSP+ test items, conformance testing will be employed as follows.

1 New CC-Link certified product partners

Since April 2013, based on new conformance test specifications, CSP+ testing has been required in addition to conventional equipment testing.

2 Current CC-Link certified product partners

For those with products that have already been certified, adoption of CSP+ is optional. Conformance testing for only CSP+ will be conducted free of charge.

Flow of operation with CSP+

- Certified vendors can use CSP+ support tools (downloadable from the CC-Link Partner Association homepage) to create profiles for CC-Link Family-compatible equipment.
- (2) When the file has been created, a conformance test will be performed by the CC-Link Partner Association, and certified files will be posted to the CC-Link Partner Association homepage.
- (3) CSP+ files described as profiles for CC-Link protocol family equipment that are made by CC-Link certified product vendors can be downloaded by CC-Link Family users through the CC-Link Partner Association homepage or the vendor's homepage.
- (4) Using the engineering tools capable of handling CSP+, CC-Link Family users can import CSP+ files, which they downloaded in (3), for the equipment they use in order to perform equipment engineering.



See the following URL. http://www.cc-link.org/jp/csp_plus/index.html



Memo	Process Flow for Developing CC-Link Family-compatible Products
	Conformance Test
	Introduction to CC-Link Family-compatible Products Development Methodology
	Main Specifications for CC-Link Family of Networks
	What is CC-Link Partner Associatic

5 Taking a conformance test

When your product has been developed, a conformance test conducted by CC-Link Partner Association is performed on the product. Once the product passes the test, it can be marketed as a CC-Link-compatible product.

What is the conformance test?

A product to be certified as a CC-Link Family-compatible is subjected to testing on communication operations, the procedure of which is defined by CLPA. The test is conducted to verify whether the product satisfies the prescribed CC-Link communication specification and thus can be connected to CC-Link networks.

By taking the conformance test

- Reliability can be assured for your product in terms of CC-Link communications.
- A system can be smoothly configured between products manufactured by different manufacturers or between different models upon interconnection.

Conformance test items

Caution

Noise test
 Hardware test
 Software test
 Combination test

t 6 Aging test CSP+ verification test test

5 Interoperability test

The conformance test is intended to verify whether the product concerned satisfies the prescribed CC-Link communication specification. Inherent functions of the product are beyond the scope of this test.
A satisfactory completion of the conformance test does not constitute or imply CLPA's guarantee or endorsement of the product's performance or quality.

The test for CC-Link IE Field Network Basic and SLMP is basically performed by developers using a test tool.

Conformance test fee

1	Membership category	Regular member	Executive member	Board member
	CC-Link master/local/intelligent device stations CC-Link IE Control control/normal station CC-Link IE Field master/local station CC-Link IE Field intelligent device station CC-Link IE Field remote device station	JPY 300,000	JPY 200,000	
Conformance test fee (per device)	CC-Link remote device/I/O station CC-Link/LT master/slave station Cable and others	JPY 200,000	JPY 100,000	Included
	Product for software certification	JPY 50,000	JPY 20,000	annual dues
	CC-Link IE Field Network Basic	JPY 50,000	JPY 20,000	
	SLMP* product	—	—	
Recommended product test fee (per model)	CC-Link IE Control CC-Link IE Field Recommended network wiring parts	JPY 100,000	JPY 50,000	

*SLMP: (Seamless Message Protocol)



CC-Link Family-compatible Products





Taking a conformance test

Test items and implementation division

Conformance test items are classified into two groups: those performed beforehand by the partner or member of CC-Link Partner Association and those performed by CLPA. Some of the test items are conducted by both the partner and the association. The partner has to ensure that the product concerned passes all the test items before a test starts at CLPA.

Examples of CC-Link test items to be implemented beforehand by the partner

- Power supply noise test (common mode)
- · Cable (bundled cable) noise test
- · Measurement of stray capacitance across communication terminals
- · Cable limit length test

Recommended parts

For CC-Link and CC-Link/LT, the test contains test items intended to check some of the parts making up the "physical layer" to identify their manufacturer and type name.

In regard to CC-link, additional test items are imposed if anything other than CLPA-recommended parts are used.

Document/material and devices required for preliminary testing by the partner







Memo	Process Flow for Developing CC-Link Family-compatible Products
	Conformance Test
	Introduction to CC-Link Family-compatible Products Development Methodology
	Main Specifications for CC-Link Family of Networks
	What is CC-Link Partner Association?

Introduction to CC-Link Family-compatible Products Development Methodology

MITSUBISHI ELECTRIC **CORPORATION**

For technical support MITSUBISHI ELECTRIC CORPORATION Open System Center E-mail: OSC@ri.MitsubishiElectric.co.ip

For a speedy development of a CC-Link Family-compatible product.

MITSUBISHI ELECTRIC Changes for the Better

Mitsubishi Electric is ready to assist you from consulting to the provision of product development tools.

*5 KSB ISO 15745-5



Making your products compatible with CC-Link Family, an open field network originating from Japan

multi-vendor products but also provide you with the opportunity to boost the competitiveness of your products to the global level once and for all. With various certifications, including International Organization for Standardization ISO 15745-51, IEC 61158 and 617842, SEMI3, Chinese National Standards GB4, Korean

That will not only ensure the level of system flexibility distinctively characteristic of

*2 Industrial Field bus protocol standard

*6 JIS TR B0031

Industrial Standards KS⁻⁵, and Japanese Industrial Standards JIS⁻⁶, CC-Link has lived up to its name as a global standard. To ensure quick and certain development of CC-Link family compatible products, such as new generation CC-Link IE Control network and CC-Link IE Field network, Mitsubishi Electric will support you in every phase of development, including the provision of development tools. *1 Application Integration Framework *4 GB/T 19760 20299.4 Technical support for development of CC-Link Family compatible products •Backup and support ······ A variety of CC-Link Family-related technical documents are available, for a fee, and technical support is provided via member-only e-mail. •Open System Center···· Your inquiries are accepted 9:00 to 12:00 and 13:00 to 17:00 CLPA (every day of the week - except for Saturdays, Sundays and our company holidays) E-mail: OSC@rj.MitsubishiElectric.co.jp

*3 SEMI E54.12 E54.23-0513



CC-Línk

Control

Driver Development Driver Development

Master Station

Source Code Development

Drivers for various operating systems can be developed for use of the Mitsubishi Electric PC interface board (Q80BD-J71GP21-SX).

Develop a master station using source codes. A master station can be designed with higher flexibility by combining source codes and

Intelligent Device Station, Remote Device Station

communication LSI. It is applicable also to the motion function.

Communication LSI CP520 with GbE-PHY







Dedicated communication LSI CP220* CP220 is a communication LSI that allows you to develop devices that perform cyclic transmission and transient transmission without concern about protocol. It is applicable also to the motion function.

concern about protocol. It is applicable also to the motion function.

CP220 is controlled with software.

CP520 is controlled with software.

* CP220 is designed for development of intelligent device stations.



CC-Línk IE Field

Driver Development

Driver Development

Drivers for various operating systems can be developed for use of the Mitsubishi Electric PC interface board (Q80BD-J71GF11-T2/Q81BD-J71GF11-T2).



Built-in interface board Q50BD-CCV2

In this method, stations are developed using a built-in interface board. The CCLink master station, local station and intelligent device station functions are realized by mounting the interface board on a user circuit board.

Object development

In this method, stations are developed using the object code and the device kit. By developing with object codes, a design with higher flexibility can be achieved compared to using the built-in interface board.



Remote Device Station

Dedicated communication LSI MFP3N

MFP3N is a communication LSI that allows you to develop devices that handle bit data and word data without concern about protocol. MFP3N is controlled with software.





CC-Link/LT

Support of both CC-Link Ver. 1 and Ver. 2 is possible by changing the software.

Remote I/O Station

Dedicated communication LSI MFP2N/MFP2AN

MFP2N and MFP2AN are communication LSIs that allow you to develop devices that handle bit data without concern about protocol. The two types are provided for different package sizes (number of pins) and I/O point quantity.

Embedded I/O Adapter

This small-sized Embedded adapter allows you to develop devices that handle bit data without concern about protocol. The adapter can be mounted directly on the circuit board you developed, and allows expansion of the number of I/O points through cascade connection. (A maximum of two adapters can be mounted on a single circuit.)

Driver Development

Driver Development

Drivers for various operating systems can be developed for use of the Mitsubishi Electric PC interface board (Q80BD-J61BT11N).







Master Station

Dedicated communication LSI CLC13

CLC13 is a communication LSI that allows you to develop devices compliant with the master station used for network management. The network can be constructed by connecting the various slave stations.



Remote I/O Station

Dedicated communication LSI CLC21

CLC21 is a communication LSI that allows you to develop devices that handle bit data without concern about protocol. This LSI enables development of digital I/O and other remote I/O stations.



Dedicated communication LSI CLC31

CLC31 is a communication LSI that allows you to develop devices that handle CC-Link/LT word data (16-bit data). The data amount of four words can be handled by a single LSI, allowing development of analog I/O and other remote device stations.





Introduction to CC-Link Family-compatible Products Development Methodology

Hilscher GmbH

Contact addresses

Hilscher Japan KK YKB Shinjuku Gyoen Building 3rd Fl., 1-3-8, Shinjuku, Shinjuku-ku, Tokyo, 160-0022 Phone: +81-3-5362-0521 Fax: +81-3-5362-0522 URL: http://www.hilscher.jp/ E-mail: info@hilscher.jp

Hilscher serves as your dependable partner in the development of CC-Link equipment.



Hilscher offers the entire spectrum of CC-Link solutions you need - from the supply of various interface products to the development and production, on a contract basis, of such products to the organization of relevant workshops.

One for all

Industrial communication solutions with a common platform

One Partner » One Chip » All Systems

One Partner – One Chip – All Systems. From the standard product on to an **OEM module PC card**, **Gateway** and up to the **chip** – we offer a suitable solution for all requirements. When it comes to a solution for your industrial communications, place your trust in the technological market leader, **netX**, a solution for all fieldbuses and Real-time Ethernet: Made in Germany.



Features of the Hilscher CC-Link product technology

- Certified to CC-Link V2.0.
- Supports all profiles for a remote device (MFP3 equivalent).
- Dual port memory-based or serial host interfacing facilitates control operations.
- ARM core with built-in netX allows user applications to be installed.
- An application interface common to all the Hilscher products and protocols.
- Ensures a significant reduction in overall product development cost and a timely introduction into market.
- Easy-to-use configuration tool SYCON.net that is common to all.



PC card

The cifX communication interface provides, at a low cost, all elements including optimum performance capability, functionality, and flexibility. PCI and PCI Express, both of which can be used on standard personal computers (each for use with a slave station only), are now available. Other form factors can be also developed for your projects. Drivers for major RTOSs are also available and come with a full package of software programs necessary for product development, such as configuration tool, driver, example, and manual.



Built-in module

Hilscher's built-in modules represent a single-chip solution in the form of an integrated package of software and hardware suitable for CC-Link slave interface which is directly installed into various automation equipment such as controllers, PLCs, and drives. The high-end network controller "netX" permits all communication tasks to be executed using a microprocessor mounted. Because API is common to all the protocols, compatibility with other field buses or real-time Ethernet networks can be secured with great ease, simply by replacing existing Hilscher built-in modules such as comX and netIC.



Gateway

The netTAP 100 gateway is a solution ideal for users who want to connect products designed for use with varied networks (field bus, real-time Ethernet and serial) readily and reliably to CC-Link network. Acting as a CC-Link slave, the versatile netTAP 100 can work well with virtually all conceivable network settings on the market. It comes with SYCON.net, a dedicated configuration tool. With a simple drag-and-paste operation on GUI, tasks such as firmware downloading, setting, and diagnosis can be performed via a USB on a personal computer.



ASIC (communication controller)

The netX family of products comprises several multi-protocol network controllers which Hilscher developed to provide for an integration into automation equipment of every description (such as a drive, I/O, PLC, and barcode reader). The netX chip, is equipped with an ARM core CPU and contains a comprehensive set of peripheral functions. It also supports a variety of major protocols like field bus and industrial real-time Ethernet with one piece of hardware. Utilizing firmware supplied by Hilscher allows you to design your

original CC-Link interface.

Using a special NXHX software development boards also enables you to easily evaluate and develop CC-Link interfaces and user applications. Besides general-purpose hardware, NXHX has a built-in JTAG-USB interface as well as a JTAG interface that is the most common as a debugging interface so that netX Studio CDT, the Eclipse-based integrated development environment from Hilscher, can be used.

	MEL ON ON ON	net la	Best for t	he development of IoT-enabled devices
	not 1 51	net¥ 52	net)	(90 New!
		HELX OF	Communication	Application
CPU	ARM966E-S/100MHz	ARM966E-S/100MHz	Cortex-M4 at 100 MHz with MPU	Cortex-M4 at 100 MHz with MPU and FPU
	xPIC/100MHz	xPIC/100MHz	xPIC/100MHz	xPIC/100MHz
SRAM	672K	672K	576 KB	64K
Flash	_	_	1024 KB	512 KB
	8/16/32bit DPM	8/16/32bit DPM	8/16bit DPM	Internal 32bit
Host interface	SPI/SQI 125M	SPI/SQI 125M	2x SPI/SQI 125M	_
	MII (10/100 Mbps)	MII (10/100 Mbps)	MII (10/100 Mbps)	
Communication	2 ch	2 ch	2 ch	_
communication	PHY/switch/hub	PHY/switch/hub	PHY/switch/hub	-
channel	IEEE 1588	IEEE 1588	IEEE 1588	IEEE 1588
	UART/I2C/QSPI/CAN	UART/I2C/QSPI/CAN	UART/I2C	UART/I2C/QSPI/CAN
Devintenale	IO-Link / USB 1.1 / MAC	IO-Link / USB 1.1 / MAC	MAC / MLED	IO-Link / MAC / MLED
Peripherais	PIO / GPIO / MMIO	PIO / GPIO / MMIO	GPIO	PIO / GPIO / MMIO
		No SDRAM controller		
Mixed signal	Timor	Timor	Timer/ADC SAR	Timer/ADC SAR
wixed signal	TITLE	Timer	TIME/ADC SAN	EnDat 2.2/BiSS / SSI
Socurity			Secure boot supporting various algorithms by	
Security	_	—	the built-in crypto core / Monitoring by AHB firewall	
Housing	19 × 19mm	15 × 15mm	10 × 1	10mm
Housing	BGA 324 pins / 1mm pitch	BGA 244 pins / 0.8mm pitch	BGA 144 pins	/ 0.8mm pitch

Products compliant with CC-Link IE Field and CC-Link IE Field Basic

CC-Link IE Field CC-Link IE Field

- CC-Link IE Field / PROFINET coupler
- PCI Express card
- Built-in module



• All existing netX-based products are compliant. (Chip, Built-in module, PC card, Gateway)



Process Flow for Developing -Link Family-compatible Products

Introduction to CC-Link Family-compatible Products Development Methodology

HMS INDUSTRIAL NETWORKS

Contact addresses

HMS Industrial Networks Postal Code 222-0033 Shinyokohama KS Building 6th Fl., 3-18-3, Shinyokohama, Kohoku-ku, Yokohama, Kanagawa Pref. Phone: +81-45-478-5340 Fax: +81-45-476-0315 E-mail: jp-sales@hms-networks.com URL: http://www.anybus.jp

Anybus solutions offer you a sure way to easily succeed in the development of CC-Link/CC-Link IE Field equipment in a short period of time.





HMS has a host of solutions to offer for creating products which are compliant with CC-Link/CC-Link IE field networks.

Chances are that you'll find the right solution for your needs.

Anybus solutions enable you to put your CC-Link-compatible product to market in a short time.

Anybus CompactCom 40 - CC-Link / CC-Link IE Field

Communication module provided in three built-in forms selectable according to hardware or specifications

With Anybus CompactCom's three built-in forms of chip, brick, or module, choosing the optimum form to introduce is easy.

No matter which form is adopted, development manhour and investment allow for the development of CC-Link / CC-Link IE Field* (slave) compatible devices, at a minimum, in order to ensure software compatibility Development using the Anybus CompactCom provides the hardware compatibility and the developed hardware can be easily used on other networks.



* No chip is available for C40 CC-Link IE Field. A circuit board of a host device has an Anybus slot and 50 pin



Specifications	Chip	Brick	Module			
Size (L x W x H)	17 x 17 mm	36 x 36 x 8 mm	52 x 50 x 22 mm 52 x 37 x 16 mm (without housing)			
Application interface	 - 8/16-bit parallel (30ns access) - High-speed SPI, The baud rate can be set at up to 20MHz. - Shift register (For I/O devices, cyclic transmission time: 82µs) - UART (Backward compatibility with 30 series, up to 625kbps) 					
Application connector or PKG	BGA VF400 0.8mm pitch	1.27mm pitch Pitch header	50 pin CompactFlash connector			
Power supply	3.3 VDC, 2.5V, 1.2V	3.3 VDC	3.3 VDC			
Operating temperature	-40 to 100 °C	-40 to 85 °C	-40 to 70 °C -40 to 85 °C (without housing)			

	Туре	Chip	Brick	Module	Features
CC-Link	CC-Link	*	AB6672	AB6602 AB6702 (without housing)	 CC-Link remote device station Number of I/O points for CC-Link v.1.1 (default): Up to 128 points of bit data, 16 points of word data Number of I/O points for CC-Link v.2.0: Up to 896 points of bit data, 128 points of word data Supports baud rates in the range of 156kbps to 10Mbps One to four stations can be occupied. 1X to 4X extended cyclic settings (v.2.0) only
	CC-Link IE Field	-	AB6679	AB6609 AB6709 (without housing)	 Intelligent device station Number of I/O points: Supports up to 1536 bytes of I/O data Supports SLMP servers Supports 1Gbps

CC-Línk

* For types, please contact HMS Industrial Networks.



Anybus Communicator RS232/422/485, CAN - CC-Link, CC-Link IE Field

Protocol converter that connects serial devices or CAN devices to CC-Link / CC-Link IE Field

Anybus Communicator RS232/422/485 and Anybus Communicator CAN are high-performance externally mounted serial converters that allow CC-Link / CC-Link IE Field support using the existing RS232/422/485 or CAN serial interface of your equipment.

Without taking up any space inside the control cabinet, this extremely compact product requires no program changes on the equipment side and can be easily mounted on a DIN standard rail.



Ту
С

Туре	Communicator RS232/422/485	Communicator CAN	Features
CC-Link	AB7008	AB7321	 CC-Link remote device station Number of I/O points for CC-Link v.2.0: Up to 896 points of bit data, 128 points of word data Supports baud rates in the range of 156kbps to 10Mbps One to four stations can be occupied. 1X to 4X extended cyclic settings (v.2.0) only
CC-Link IE Field	AB7077	n.a.	Intelligent device station Number of I/O points: Supports up to 512 bytes of I/O data Supports 1Gbps

Anybus X-gateway - CC-Link / CC-Link IE Field

Network converter that connects CC-Link / CC-Link IE Field to other industrial networks

Anybus Communicator X-gateway facilitates I/O data transfers between varying types of networks and PLC systems, allowing for consistent communication of information throughout the entire plant. Connecting CC-Link and CC-Link IE Field to various types of industrial networks is also possible.

Specifications	
Size (L x W x H)	114 x 44 x 127 mm
Mounting method	Mounting onto a DIN rail
Power supply	24V

Operating temperature 0 to 70°C



Features

- te device station
- Number of I/O points for CC-Link v.2.0: Up to 896 points of bit data, 128 points of word data

• Supports baud rates in the range of 156kbps to 10Mbps

• One to four stations can be occupied. 1X to 4X extended cyclic settings (v.2.0) only

Intelligent device station

• Number of I/O points: Supports up to 512 bytes of I/O data Supports 1Gbps



Type/Network	PROFIBUS Master	DeviceNet Master	ASI Master	EtherNet/IP Master	CANopen Master**	Modbus-TCP Master**	EtherNet/IP Slave	Modbus-TCP Slave	PROFINET IO Slave	EtherCAT Slave	CC-Link IE Field Slave	PROFIBUS Slave	
CC-Link	AB7810	AB7819	AB7830	AB7680	n.a.	AB9009	AB7841	AB7643	AB7661	AB7694	n.a.	AB7852	
CC-Link IE Field	AB7953	AB7955	n.a.	AB7957	n.a.	n.a.	AB7956	AB7958	AB7954	AB7961	n.a.	AB7959	
Type/Network	DeviceNet Slave	CANopen Slave	Modbus F Slave	CC-Link Slave	J1939**	LONWork	ControlNe Slave	FIP Slave	Interbus Slave Cu	Interbus Slave Fo	Modbus P	PROFINE IRT Slave	

ype/Network	DeviceNet Slave	CANopen Slave	Modbus RTU Slave	CC-Link Slave	J1939**	LONWorks	ControlNet Slave	FIP Slave	Interbus Slave Cu	Interbus Slave Fo	Modbus Plus	PROFINET IRT Slave Cu	PROFINET IRT Slave Fo
CC-Link	AB7862	AB7897	AB7621	AB7626	n.a.	AB7627	AB7871	AB7879	AB7886	AB7892	AB7624	n.a.	n.a.
CC-Link IE Field	AB7960	AB7963	AB7964	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

* Products which support X-gateway CANopen Master, Modbus-TCP Master, and J1939 differ in shape.
** Standard Anybus products do not support the combinations marked with "n.a.". For details, please contact HMS Industrial Networks.

Introduction to CC-Link Family-compatible Products Development Methodology

RENESAS ELECTRONICS CORPORATION

Contact addresses

Renesas Electronics Corporation 5-20-1, Josuihon-cho, Kodaira-shi, Tokyo, 187-8588, Japan Phone: +81-42-320-7300 Fax: +81-42-327-8656 URL: http://www.renesas.com

The R-IN32 series supports development of CC-Link Family-compatible products.

RENESAS

Providing total solutions to support customer product development, including LSI, development tools, and sample software and drivers.



The "R-IN32 series" developed by Renesas Electronics for industrial communication is a product that can be used for slave device development for CC-Link Family products.

As a total solution including development tools such as an Arm development environment and development kit as well as sample software and drivers, and of course LSI, speedy and easy product development is possible.

In addition, various communication protocols including CC-Link Family are supported, allowing development as a platform.

CC-Línk IE

Intelligent device station

Communication LSI <R-IN32M3-CL, R-IN32M4-CL2>

Equipped with a function equivalent to CP220, this communication LSI allows for product development of various types of equipment where cyclic transmission and transient transmission can be performed regardless of protocol.Application implementation is also possible as Arm's Cortex-M3/M4 is installed as the CPU core. In addition, the following are offered in conjunction with the R-IN32M3-CL.

CC-Link IE development manual

Sample software

Intelligent device station / remote device station



Communication LSI <R-IN32M3-CL/EC, R-IN32M4-CL2>

Equipped with functions equivalent to MFP1N and MFP3N, this communication LSI allows for product development of equipment regardless of protocol. By switching the software for this LSI, both Ver. 1.10 and Ver. 2.00 can be supported. Application implementation is also possible as Arm's Cortex-M3 is installed as the CPU core. In addition, the following are offered in conjunction with the R-IN32M3-CL/R-IN32M3-EC.

CC-Link development manual

Sample software



LSI for FA slave device communication unit that realizes high-speed real-time responses, low fluctuation stability control, and low power consumption

Offering the following noteworthy features, the "R-IN32M3 series" is an industrial communication LSI for FA slave device communication units capable of supporting industrial Ethernet protocols such as CC-Link IE and conventional fieldbus protocols such as CC-Link.

•Stable control of low fluctuations and low power consumption thanks to an equipped "real-time OS accelerator" for hardware implementation of a portion of real-time OS. •Increased speed and capacity as well as low power consumption thanks to an Ethernet accelerator converting a portion of Ethernet processing to hardware. Application implementability thanks to built-in large-scale memory and RM Cortex-M3.
 High-speed IO processing thanks to a dedi-

cated DMA controller for network processing.

Product summary

	R-IN32M4-CL2	R-IN32M3-CL	R-IN32M3-EC							
Product	R9J03G019GBG#AC1	UPD60510BF1-HN4-A	MC-10287BF1-HN4-A							
D INI20	Arm [®] Cortex [®] -M4 Processor with FPU	Arm® Cortex®-M3 32-bit RISC CPU(100MHz)								
	+ Real-time OS accelerator	+ Real-time O	+ Real-time OS accelerator							
engine	+ Ethernet accelerator	+ Ethernet :	accelerator							
	CC-Link IE Field/Into	lligent device station)	EtherCAT							
	CC-LITIK TE Fleid(ITIte	Slave controller								
Ethernet	10M/100M/1G Ethorn	10M/100M EthernetMAC								
Controller		etmAC + zport Switch	+ 2port Switch							
	Ruilt in Chit EthorPHV		2port Ether PHY							
	Built-III GDIL EUIPEERT	_	(10Base-T, 100Base-Tx/Fx)							
Built-in RAM	Instruc	tion RAM : 768KB Data RAM : 512KB Buffer RAM	: 64KB							
Extornal I/E	116/32bit CPU I/F, memory I/F,	16/22bit CBUU/E memory I/E								
LAtemai //	serial flash I/F, GPIO (max. 106)	seriai ilasii i/r, GFIO (Illax. 90)								
Built-in peripheral	Timer (32bit:4ch,16bit:16ch), Watchdog-Timer (1ch),	Timer (4ch), Watchdog-	Timer (1ch), UART (2ch),							
functions	UART (2ch) I2C (2ch), CAN (2ch), CSI (2ch), CC-Link (1ch)	I2C (2ch), CAN (2ch), C	SI (2ch), CC-link (1ch)							
Package	484pin PBGA (23mm x 23mm, 1mm pitch)	324pin PBGA (19mm	x 19mm, 1mm pitch)							

Evaluation tool

This kit simplifies development and evaluation of a product. Start software development for CC-Link IE now!

The kit contains: • Evaluation board • JTAG-ICE (I-Jet Lite) • EWARM (evaluation version) Provided by Renesas Electronics CC-Link IE sample software R-IN32M4-CL2 driver Simplified master software



For industrial Ethernet starters

The evaluation board equipped with various peripheral functions enables you to evaluate R-IN32M4-CL2 comprehensively.

Functions in the evaluation board • 2-port RJ45 Ethernet • Extend microcomputer interface	Provided by Renesas Electronics CC-Link IE sample software R-IN32M4-CL2 driver	Provided by CC-Link Partner Association Simplified master software
CSI CSI CC CCLink UART (USB) 10-bit ADC 8ch		
TSSR		

Full-scale software development, which includes peripheral devices of the microcomputer and external microcomputers, is possible.

Specifications comparison of solution kits

Supplier	IAR Systems	TESSERA TECHNOLOGY INC.
Board size	80mm (W) x 80mm (D)	145mm (W) x 95mm (D)
RJ45	2 ports (10M/100M/1G)	2 ports (10M/100M/1G)
External memory	64Mbit Serial flash memory	64Mbit Serial flash memory
External microcomputer interface	-	0
Power supply	5V (power supplied via USB)	5V (AC adapter) or 24V (power also supplied via PLC)
CSI	-	0
I2C	-	0
UART	0	0
General-purpose I/O	0	0
CC-Link	-	0
ADC	-	8ch
Debugger	I-Jet Lite included	JTAG interface (20-pin half-pitch)
Price	Approx. JPY 30,000	Approx. JPY 70,000

Arm and Cortex are trademarks or registered trademarks of Arm Limited.
 Ethernet is a registered trademark of Fuji Xerox Co., Ltd.

•CC-Link and CC-Link IE Field are registered trademarks of CC-Link Partner Association.

•EtherCAT is a registered trademark of Beckhoff Automation GmbH, Germany.

•Other product or service names on this page are trademarks or registered trademarks of their respective owners.

Introduction to CC-Link Family-compatible Products Development Methodology

MACNICA, Inc.

Contact addresses

MACNICA, Inc. ALTIMA Company Headquarters: +81-45-476-2155 Nagoya: +81-52-533-0252 Osaka: +81-6-6397-1053 Utsunomiya: +81-28-627-1071 URL: https://www.alt.macnica.co.jp <Contact Us> https://f.msgs.jp/webapp/form/16344_qey_26/index.do

Indusrial 1st certified CC-Link IE Field IP Core for FPGA



Developed for Intel[®] FPGA and equivalent to the CP220 CC-Link IE Field intelligent device ASIC, it supports both cyclic & transient data exchange. Enabling CPU load off by specified & optimized to CC-Link IE Filed transmission.

■ Integrated CP220 equivalent function

- Integrated equivalent function to MITSUBISHI ELECTRIC's specified ASIC(CP220)
- •For Intelligent device use
- •Support both cyclic & transient data exchange
- •RX/RY=each 2,048bits, RWr/RWw=each 1,024 words
- •Enabling CPU load off by using Intel® Corporation's soft core CPU Nios® II

■ IP Core Resouce(ALT-CLIEFA-USOC)

- •Support low cost FPGA Cyclone® V E
- •Logic Element : 37,000LEs
- •Internal RAM: 1,400,000 bits
- •DSP block : 4blocks
- •PLL: 4 pcs
- •Controlled by Nios[®] II connected to Avalon[®]-MM via Intel[®] Corporation's Qsys system-level integration tool



Utilize FPGA's merit

It's poissble to integrate this IP & user's own design into ALTERA FPGA which is widely used in the industrial equipment market.
Same to typical FPGA design flow & method by using Quartus[®]

- Prime
- Protect IP core by using external CPLD as of security chip

Design Software

Development environment

- Industrial network kit (INK) as evaluation platform (should be prepared in addition to IP Core)
- •Anctypted IP Core

(

- •IP Core user's manual
- User's manual
- •Sample design



Foundation: 1991
 Headquarters: Yokohama city, Kanagawa
 Sites: Osaka, Nagoya, Utsunomiya
 MACNICA, Inc.
 Mission :Leading Edge Solution Provider

Top class distributor of both Intel[®] Corporation and so many leading edge foreign semiconductor suppliers, holding technical workshop, PLD design service, developing original board





TOKYO ELECTRON DEVICE LIMITED

Contact addresses

TOKYO ELECTRON DEVICE LIMITED PLD Solutiion Department Yokohama East Square, 1-4, Kinko-cho, Kanagawa-ku, Yokohama City, Kanagawa 221-0056, Japan Phone: +81-45-443-4034 URL: http://ppg.teldevice.co.jp/request/

Support CC-Link IE Field Intelligent Device Field High-performance built-in module (TB-7Z-IAE)



inrevium, TOKYO ELECTRON DEVICE original brand, developed TB-7Z-IAE. It is High-performance built-in module which has Xillinx Zynq®-7000 All Programmable SoC and 2ch Gigabit Ethernet in small area. Also, CC-Link IE Field intelligent device Filed IP core is mounted on this module.

With this module, is able to support for carrying out new value added product launches efficiently.

TB-7Z-IAE spec

Xilinx Zynq-7000 All Programmable SoC combines 667MHz Dual ARM® Cortex[™]-A9 MPcore with the programmable logic like high speed DSP slice.

Connecting to DDR3 SDRAM, TB-7Z-IAE offers high performance which has been conventionally difficult to realize.



Part Number	TB-7Z-IAE				
SoC	Xilinx XC7Z020				
	512MByte SDRAM 1066Mbps (ECC)				
Memory	16MByte Flash memory				
	64Kbit Non-volative F-RAM				
Connector	100 pin connector, 1.27mm pitch				
Interface	Gigabit Ethernet x 2				
Interface	micro SD card socket				
Other	JTAG connector, LED				
Clock	PS/PL clock and RTC device				
Power	Single voltage DC5V				
PCB size	60mm(W) x 85mm(H)				
operating temperature	0°C to +50°C				



*This image is taken during trial manufacture and might be slightly different from the actual product.





Evaluation Kit (TB-7Z-ISDK)



 Interface 				
RS232C	CAN	RS485	USB mini Type AB]
Pin Header	PoCL B	ase (Power	over CameraLink)	DVI-TX

Sample design

*Please contact us about Xilinx FPGA CC-Link IE Field IP core (TIP-CCLIE-PROJ). *TB-7Z-IAE/TB-7Z-ISDK is still developing. The specification may change without prior notice. Introduction to CC-Link Family-compatible Products Development Methodology



Contact addresses

Texas Instruments Incorporated 12500 TI Blvd. Dallas, TX 75243 Phone: +1-972-995-2011 URL: www.ti.com

TI Sitara[™] processors support CC-Link IE Field Basic and provide industrial grade solutions



Texas Instruments offers industrial grade devices to support 10+ year solutions with features like 100,000 power-on-hours at 105°C, high temperature availability up to 125°C, scalability through a combination of portfolio and unified Processor Software Development Kit (SDK), and excellent support through the E2E forums.

TI's Sitara processors: designed for multiprotocol communications

Single to multicore Arm[®] processors with application-specific accelerators

- 1. CC-Link IEF Basic slave and master support on RTOS and Linux
- 2. Support for 10+ industrial communication protocols on each device
- 3. Tools, software and training resources available on TI.com



CC-Link IE Field Basic reference design for master and slave on TI Sitara processors



Supported by Processor SDK Linux and RTOS across Sitara processors including AMIC110, AM335x, AM437x, AM57x Demonstrates that the implementation of CC-Link IE Field Basic on Sitara processors can meet CLPA certification critera



Key features include:

- SLMP supported on slave station
- Up to 64 slave stations supported by master
- Fully customizable with source code available

Find more information on TI's CC-Link IE Field Basic reference design at **www.ti.com/tool/TIDEP-0089**. For more information on TI's Arm-based Sitara processors, visit **www.ti.com/sitara**.





Sitara processors that support CC-Link IE Field Basic

	AMIC110	AM335x	AM437x	AM57x		
Core (s)	Cortex [®] -A8 up to 300MHz	Cortex®-A8 up to 1GHz	Cortex [®] -A9 up to 1GHz	Single or Dual Cortex®-A15		
00.0 (0)				up to 1.5GHz + DSP		
Co. Processor	DDI LI	C66(1)		2x PRU-ICSS		
00-110065501	FHO-I	033	27 FH0-1033	+ up to 2x Cortex [®] -M4		
Ethorpot ⁽²⁾	2× 10/100 MAC	2x 10/1	DO MAC	4x 10/100 MAC		
Luemen	2X 10/100 MAC	+ 2-port (Gb switch	+ 2-port Gb switch		
Sorial I/O	CAN DO SEL UA		CAN, I2C, SPI, QSPI,	PCIe, CAN, I2C, SPI, QSPI,		
Senai I/O	CAN, 120, 3F1, 0A	IN 1, USB2.0, GFIO	UART, USB2.0, GPIO	UART, USB2.0, GPIO		
		Diaplay suboyatam	Diaplay subsystem	Display subsystem,		
Additional faaturaa	—	Display subsystem	Display subsystem	video acceleration		
Additional leatures	_	3D graphics	acceleration	2D/3D graphics acceleration		
	-					
Evolution Medule		TMDCICE2250		TMDXIDK5728		
Evaluation wodule	TMDXICETTU	TMDSICE3359	TMDSIDR437X	TMDXIDK5718		
Operating Temp (°C)	-40 to 105 °C					

(1) PRU-ICSS is an acronym for Programmable Real-time Unit Industrial Communications Subsystem.

Each instance of PRU-ICSS contains two programmable real-time cores with a max performance of 200MHz, among other peripherals.

(2) The 10/100 MACs are located in the PRU-ICSS and can be used for general-purpose Ethernet or industrial Ethernet.

Development Kits

TI's Industrial Development Kits (IDK) and Industrial Communications Engines (ICE) are standalone test, development, and evaluation modules that enable developers to write software and develop hardware for industrial control and industrial communications applications. Order one to start your CC-Link IEF Basic design now!



CC-Link Partner Association?

Introduction to CC-Link Family-compatible Products Development Methodology

ZUKEN ELMIC, Inc. RENESAS ELECTRONICS CORPORATION

Contact addresses

ZUKEN ELMIC, Inc. Head Office: 3-1-1, Shin-Yokohama, Kouhoku-ku, Yokohama, Kanagawa, 222-8505, Japan Phone: +81-45-624-8002 / Fax: +81-45-476-1102 Osaka Office: 8F Shin-Osaka Hase Bldg.,3-22, Nishinakajima 4, Yodogawa-ku, Osaka, 532-0011, Japan Phone: +81-6-6195-7900 / Fax: +81-6-6309-3830 URL: http://www.elwsc.co.jp E-mail: info@elwsc.co.jp Renesas Electronics Corporation 5-20-1, Josuihon-cho, Kodaira-shi, Tokyo, 187-8588, Japan Phone: +81-42-320-7300 / Fax: +81-42-327-8656 URL: http://www.renesas.com

Japan Quality Assurance Organization 1-25, Kandasudacho, Chiyoda-ku, Tokyo 101-8555, Japan Phone: +81-3-4560-5450 / Fax: +81-3-4560-9002 URL: http://www.jqa.jp E-mail: cert-scheme-dp@jqa.jp

Development environment for functional safety communications of CC-Link IE Safety



Ze-PRO® CC-Link IE Safety SDK - Compliant with IEC 61508

Total support of introduction to certification of CC-Link IE Safety accelerates the development of the product that supports the functional safety communications.

Third-party certification supports are also available for functional safety product certification.

Product features

Functional safety solution for industrial field

Renesas Electronics Corporation

Providing a development environment for functional safety of industrial field

- Safety Package: Self-test diagnostic software for microcontrollers
- Safety Reference Kit: Safety part design data

Ze-PRO[®] CC-Link IE Safety SDK ZUKEN ELMIC, Inc.

Providing a CPU/OS-independent safety protocol stack development environment

• The CC-Link IE Safety protocol is specialized in safety communications and certified in accordance with international standards, IEC 61508 SIL3 and IEC 61784-3.

Product configuration



CC-Link IE Field Network



Process Flow for Developing CC-Link Family-compatible Products

Introduction to CC-Link Family-compatible Products Development Methodology

Main Specifications for CC-Link Family of Networks

/lemo	
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_
	_

Main Specifications for CC-Link Family of Networks

Main CC-Link Specification

lterr		Specifications							
	Item		Ver.1.10 Ver.2.00						
	Maximum	Remote I/O	(RX, RY)	2048 bits each	048 bits each 8192 bits each				
	number of	Remote reg	ister (RWr)	256 words	204	2048 words (master station ← slave station)			
	link points	Remote reg	ister (RWw)	256 words	204	18 words (master s	tation → slave stat	tion)	
	Extended c	yclic settings		_	1X setting	2X setting	4X setting	8X setting	
Ition		1 station	RX, RY	32 bits	s each	32 bits each	64 bits each	128 bits each	
ifica		occupied	RWr, RWw	4 words each		8 words each	16 words each	32 words each	
spec	Maximum	2 stations	RX, RY	64 bits	s each	96 bits each	192 bits each	384 bits each	
	number of	occupied	RWr, RWw	8 word	s each	16 words each	32 words each	64 words each	
Cont	link points	3 stations	RX, RY	96 bits	s each	160 bits each	320 bits each	640 bits each	
0	per station	occupied	RWr, RWw	12 word	ds each	24 words each	48 words each	96 words each	
		4 stations	RX, RY	128 bits each		224 bits each	448 bits each	896 bits each	
		occupied	RWr, RWw	16 word	ds each	64 words each	64 words each	128 words each	
	Maximum r	umber of occ	cupied stations	4					
	Transmissio	on rate		10M/5M/2.5M/62	5k/156kbps				
	Communica	ation method		Broadcast-polling					
	Synchronization method		Frame synchronization						
	Encoding m	nethod		NRZI					
	Type of trar	nsmission pat	th	Bus transmission (EIA RS485-compliant)					
	Transmissio	on format		HDLC-compliant					
	Error contro	ol method		CRC (X ¹⁶ +X ¹² +X ⁵ -	+1)				
	Maximum n	umber of mod	dules connected	64					
	Slave statio	n number		1 to 64					
Communication specification	Maximum total cable length and inter-station cable length		Master station Remote I/O station or remote device station Remote I/O station or remote device station Local station or intelligent device station Local station or intelligent device station Inter-station cable length Maximum total cable length Inter-station cable length Maximum total cable length Maximum total cable length 156kbps 1200m 625kbps 900m 2.5Mbps More than 20cm 400m 160m 10Mbps 100m When Ver.1.10- compliant cables are used together, the maximum total cable length and inter-station cable length						
	Connection cable		CC-Link Ver.1.10 • Cables manufactu	-compliant cable (red by different manu	shielded 3-wire tw facturers can be used	isted-pair cable) together if the cables	are Ver.1.10-compliant		



CC-Link Recommended Part

Item name	Type designation	Manufacturer
Filter	MCT7050-A401	Sinka Japan Co., Ltd.
RS485 transceiver	SN75ALS181NS	Texas Instruments, Ltd.
Zanar diada	RD6.2Z	Renesas Electronics Corporation
Zener diode	PESD5V0U1UA	NXP Semiconductors Japan, Ltd.

<With transmission line insulation provided>

Item	name	Type designation	Manufacturer	
		HCPL-7720-500E		
	Photocoupler	HCPL-0720-500E	Broadcom Ltd.	
For		ACPL-072L		
signal		ISO721		
0	Digital isolator	IS07221C	Texas Instruments, Ltd.	
		ISO7231C		
	Photocoupler	HCPL-2611-500E		
		HCPL-M611-500E	Broadcom Ltd.	
		HCPL061N	7	
For gate control		PS9117A	Renesas Electronics Corporation	
		ISO721		
	Digital isolator	ISO7221C	Texas Instruments, Ltd.	
		ISO7231C		

Main Specifications for CC-Link Family of Networks

Differences in the number of modules connected between CC-Link Ver.1.10 and Ver.2.00

	Number of modules connected
	Up to 64, provided, however, that the following conditions are met:
	(1) Total number of stations a + b x 2 + c x 3 + d x 4 64
Ver. 1.10	a: Number of modules occupying 1 station b: Number of modules occupying 2 stations c: Number of modules occupying 3 stations d: Number of modules occupying 4 stations
	②Number of modules connected 16 x A + 54 x B + 88 x C 2304
	A: Remote I/O station up to 64 B: Remote Device station up to 42 C: Local and Intelligent Device stations up to 26
	Up to 64, provided, however, that the following conditions are met:
	①Total number of stations (a + a2 + a4 + a8) + (b + b2 + b4 + b8) x 2 + (c + c2 + c4 + c8) x 3 + (d + d2 + d4 + d8) x 4 64
	 ② Total number of remote I/O points (a x 32 + a2 x 32 + a4 x 64 + a8 x 128) + (b x 64 + b2 x 96 + b4 x 192 + b8 x 384) + (c x 96 + c2 x 160 + c4 x 320 + c8 x 640) + (d x 128 + d2 x 224 + d4 x 448 + d8 x 896) 8192
	③ Total number of remote register words (a x 4 + a2 x 8 + a4 x 16 + a8 x 32) + (b x 8 + b2 x 16 + b4 x 32 + b8 x 64) + (c x 12 + c2 x 24 + c4 x 48 + c8 x 96) + (d x 16 + d2 x 32 + d4 x 64 + d8 x 128) 2048
Ver.2.00	a: Number of modules, 1X setting, occupying 1 station b: Number of modules, 1X setting, occupying 2 stations c: Number of modules, 1X setting, occupying 3 stations d: Number of modules, 1X setting, occupying 4 station a2: Number of modules, 2X setting, occupying 1 station b2: Number of modules, 2X setting, occupying 2 stations c2: Number of modules, 2X setting, occupying 3 stations d2: Number of modules, 2X setting, occupying 4 station a4: Number of modules, 4X setting, occupying 1 station b4: Number of modules, 4X setting, occupying 3 stations c4: Number of modules, 4X setting, occupying 3 stations d4: Number of modules, 4X setting, occupying 3 stations d4: Number of modules, 8X setting, occupying 1 station b8: Number of modules, 8X setting, occupying 1 station b8: Number of modules, 8X setting, occupying 2 stations c8: Number of modules, 8X setting, occupying 3 stations d8: Number of modules, 8X setting, occupying 4 stations d8: Number of modules, 8X setting, occupying 4 stations
	 (4) Number of modules connected 16 x A + 54 x B + 88 x C 2304 A: Remote I/O station up to 64 B: Remote device station up to 42 C: Local and intelligent device stations up to 26
	*: For Ver.1-compliant equipment, calculations are made on the basis of 1X setting being used.



CC-Link Ver.1.00 specifications (differences from Ver.1.10)

Specifications for CC-Link Ver.1.00 and Ver.1.10 differ in the following two particulars:

Maximum total cable length and inter-station cable length

Connection cable

Item	Specifications				
	Master station	Remote I/O station or remote device station *2 */ Ma station cable length betwee station cable length betwee ding/following station ated cable (terminal re	Remote I/O station or remote device station 1 *2 aximum total cable lengt een remote I/O stations or een master/local station of	Local station or ntelligent device station *2 th remote device stations r intelligent device station and	
Maximum total cable length and inter-station cable length	Transmission rate 156kbps 625kbps 2.5Mbps	Inter-station *1 More than 30cm	cable length *2	Maximum total cable length 1200m 600m 200m	
	5Mbps 10Mbps	More than 60cm* 30cm to 59cm* 60cm to 99cm* More than 1m*	/ more than 2m ^(B)	10m 150m 50m 80m 100m	
	 (A): Cables longer than 1m are used in a system configuration comprised of only remote I/O and remote device stations. (B): Cables longer than 2m are used in a system configuration including local and intelligent device stations. *: If a cable has a length within this range in any one section between remote I/O stations or intelligent device stations, the maximum total cable length listed applies. 				
Connection cable	CC-Link Ver.1.00- or Ver.1.10-compliant cable (shielded 3-wire twisted-pair cable) Cables manufactured by different manufacturers cannot be used together. 				

Main Specifications for CC-Link Family of Networks

Main Specifications of CC-Link/LT

_		Item		4-point mode	8-point mode	16-point mode	
	Maximum number of	link points		256 bits (512 bits)	512 bits (1024bits)	1024 bits (2048bits)	
Number of link points per station		per station		4 bits (8bits)	8 bits (16bits)	16 bits (32bits)	
Ľ			Number of points	128 bits	256 bits	512 bits	
catic		With 32	2.5Mbps	0.7	0.8	1.0	
ecifi		connected	625kbps	2.2	2.7	3.8	
spe			156kbps	8.0	10.0	14.1	
ltro	LINK SCAN TIME (MS)		Number of points	256 bits	512 bits	1024 bits	
Col		With 64	2.5Mbps	1.2	1.5	2.0	
		connected	625kbps	4.3	5.4	7.4	
			156kbps	15.6	20.0	27.8	
	Transmission rate			2.5M / 625k / 156kbps			
	Communication meth	nod		BITR (Broadcast-polling -	+ Interval-Timed Response)	
	Type of transmission path			T-branch			
u	Error control method			CRC			
icati	Maximum number of	modules con	nected	64			
ecif	Number of slave stati	ons		1 to 64			
l sp	Maximum number of modules	s connectable to br	anch line (per branch line)	8			
atio	Distance between sta	ations		No limit			
nic	Distance between T-branches			No limit			
nmu	Location for master station connection			At the end of a main line			
Cor	RAS functions			Network diagnosis, internal loopback diagnosis, slave station disconnection, and automatic return			
				Dedicated flat cable (0.75mm ² x 4),			
	Connection cable			Dedicated cable for moving components (0.75mm ² x 4),			
				VCTF cable (JIS C 3306-compliant, 0.75mm ² x 4)			

Network cabling specification



Item	Description		1	Remark
Transmission rate	2.5Mbps	625kbps	156kbps	
Inter-station distance		No limit		
Maximum number of modules connectable to a branch line (per branch line)		8		
Maximum main line length	35m	100m	500m	Cable length between terminal resistors (not including branch lines)
Distance between T-branches		No limit		
Maximum branch line length	4m 16m 60m		60m	Cable length per branch line (including cable run from a connector to equipment)
Total branch line length	15m 50m 200m		200m	Aggregated total of branch line lengths

 Dedicated flat cables, VCTF cables, and dedicated cables for moving components can be used together for branch lines.

• Different cables cannot be used on a main line.

• Set a master station at the end of a main line. Set terminal resistors within 20cm from a master station.A branch line cannot be extended from another branch line.

• Different cables cannot be used together on the same branch line.

*: For Ver.1-compliant equipment, calculations are made on the basis of 1X setting being used.



Recommended CC-Link/LT Components

Equipment type	Item name	Type designation	Manufacturer	
	Filter	CM04RC04T	TAIYO YUDEN Co., Ltd.	
	RS485 driver/receiver	MAX1487CSA	Maxim Integrated Products, Inc.	
	Zapar diada*	(1) PESD5V0U1UA	NXP Semiconductors Japan, Ltd.	
Master station		(2) UDZU5.6B	ROHM Co., Ltd.	
	(With transmission line insulation provided)			
	Photocoupler	PS9117A	Renesas Electronics Corporation	
	Connector (board side) right angle	38204-52S3-MOM PL	Sumitomo 3M Limited	
	Connector (board side) straight type	38204-62S3-MOM PL	Sumitomo Si Elimited	
	Filter	DLW31SN102SQ2	Murata Manufacturing Company, Ltd.	
Slove station	RS485 driver/receiver	MAX1487CSA	Maxim Integrated Products, Inc.	
Slave Station	Zapar diada*	(1) PESD5V0U1UA	NXP Semiconductors Japan, Ltd.	
		(2) UDZU5.6B	ROHM Co., Ltd.	
	Connector (board side) right angle	38204-52S3-MOM PL	Sumitomo 3M Limited	
	Connector (board side) straight type	38204-62S3-MOM PL		

*: Both products (1) and (2) (two each) are used in combination.

Main Specifications for CC-Link Family of Networks

Main Specifications of CC-Link IE Controller Network

	Ite	m	Specification	
		LB	32768 bits	
Maximum number of		LW	131072 words	
link p	oints per network	LX	8192 bits	
		LY	8192 bits	
		LB	16384 bits	
Maxii	num number of	LW	16384 words	
link p	oints per station	LX	8192 bits	
		LY	8192 bits	
Trans	mission rate		1Gbps	
Numl	per of stations connecte	d per network	up to 120	
Maxi	num number of network	is	239	
Maxi	num number of groups		32	
			1000BASE-SX (MMF)-compliant optical fiber cable	
	Optional fiber	Standard	IEC60793-2-10 Types A1a.1 (50/125m multimode)	
	Optical liber	Transmission loss (max.)	Less than 3.5 (dB/km) (λ =850nm)	
ole		Transmission band (min.)	More than 500 (MHz·km) (λ=850nm)	
cat	Total length (of an opt	cal cable)	66km (with 120 stations being connected)	
otica	Inter-station distance	(max.)	550m (core/clad = 50/125 (m))	
ő			Type LC duplex connector	
	Connector	Standard	IEC61754-20: Type LC connector	
Connector	Connection loss	Less than 0.3 (dB)		
	Polished area	PC-polished		
	Transmission line type		Double loop	
pair	Communication mediu	ım	Shielded twisted-pair cable (Category 5e)	
sted- sable	Connector		RJ45 connector, M12 X-Code connector	
™ There-station distance (max.)		(max.)	100m	

CC-Link IE Controller Network provides a baud rate of 1Gbps and uses a token-passing method to achieve data transfer control. This method, due to freedom form frame collisions on the transmission line, runs with an improved transmission throughput and thus is ideally suited for any network which is required to ensure a periodicity in transmission.

*: For installation instructions, see the "CC-Link IE Controller Network Installation Manual" issued by CC-Link Partner Association.



Main Specifications of CC-Link IE Field Network

Item	Specification
Ethernet standard	Per IEEE802.3 (1000base-T)
Transmission rate	1Gbps
Communication medium	Shielded twisted-pair cable (Category 5e), RJ-45 connector
Communication control method	Token passing
Topology	Line, star, and ring
Maximum number of stations connected	254 (combined total of master and slave stations)
Maximum inter-station distance	100m
Cyclic transmission (master-slave method)	Control signal (bit data): up to 32768 bits (4096 bytes)RX (Slave \rightarrow Master): 16384 bitsRY (Master \rightarrow Slave): 16384 bitsControl data (word data): up to 16384 words (32768 bytes)RWr (Slave \rightarrow Master): 8192 wordsRWw (Master \rightarrow Slave): 8192 words
Transient transmission (message transmission)	Message size: up to 2048 bytes

CLPA further accelerates the momentum of the CC-Link that opens potential on a global scale.

What is "CC-Link Partner Association"?

"CC-Link Partner Association" is a organization made up of partner-manufacturers developing "CC-Link" products, and was established to expand "CC-Link" throughout the world.

English name : CC-Link Partner Association (CLPA)

(CC-Link products : CC-Link, CC-Link/LT, CC-Link/Safety, CC-Link IE)

The Board of Directors consisting of Ten companies operates CLPA and decides on major association issues.

We help users build automation systems, and vendors develop CC-Link compatible products.

Under the motto "CC-Link, the open field network, will become world's de facto standard", CLPA was established in November 2000. Ever since, the Board of directors, Marketing Task Force and Technical Task Force have joined forces to help the vendors develop compatible products and the users build up FA systems.

User Support

CC-Link compatible products

Vendor Support

- Exhibiting at shows
- Planning and management of technical seminars
- Distribution of product information via the Internet
- Distribution of catalogs and reference materials for selecting CC-Link compatible products
- Support for developing CC-Link compatible products
- Execution of conformance tests
- Admission procedures into CC-Link Partner Association

If you become a member in the CC-Link Partner Association

- You can obtain the latest technical information about the CC-Link.
- You can obtain the CC-Link Specification free of charge.

- *The CC-Link Specification consists of 1. Overview/Protocol 2. Profile 3. Implementation
- You are informed of the latest CC-Link specifications and can, therefore, develop new products ahead of your competitors.
- You can utilize developed product PR.

What is a conformance test?

This test is performed on each model in order to ensure high reliability in the communication of CC-Link certified products. (Example)
 Power supply noise test (AC/DC) Check the noise resistance on the power cable of the product.
 Branch line noise test Check the noise resistance of the product for the noise
 applied to the CC-Link communication cable.
 Aging test with 64 stations connected of stations connected.

• Distribution of product information via the Internet

· Distribution of catalogs and materials for selecting

Popularity of the CC-Link

Many member companies come crossing the boarders to join CLPA.

The number of CLPA partner companies, which was only 134 companies at the time of establishment, has grown to more than 2,971 companies in fiscal 2016 (end of march). Of those companies, foreign companies account for roughly 70%. This is solid evidence that the CC-Link field network concept, the first of its kind and emanating from Japan, has been recognized as a global standard.



A line of diversified CC-Link compatible products, as many as the number of user voices.

As affiliated vendors increased in number year after year, the cumulative total of CC-Link-compatible products has reached the point where it exceeds 1,666. To keep its members aware of unsurpassed variations and features of products from their fellow partners, CLPA has reference materials available for regular review, which include "Product Catalog from CC-Link Partners" and "CC-Link Family Demonstration Model Panels."

Trends in the number of CC-Link compatible products



On the strength of a worldwide acceptance, CC-Link Familycompatible products have gone beyond the 19 million 190 thousand mark in terms of number of nodes shipped.

"CC-Link compatibles" show a continued growth as measured in shipped node counts in varied industrial fields, including automobile, semiconductor and liquid crystal. The year 2016 saw the number exceed the 19 million 190 thousand mark. The momentum is picking up still.





Global support system

The CC-Link Partner Association has branches not only in Japan but also in overseas countries to find more partner companies and seek for customers' convenience.



The high-level technology and ease-of-use Fr

Acquisition of the international standards IEC as well as the international standards SEMI for the semiconductor and FPD industries, JIS, GB (Guo jia Biao zhun) Standard, International Standard, Korean Industrial Standards, and BSMI Standard has had it recognized both in reality and in name as a global standard rather than a Japanese de-facto standard. CC-Link open technology, the wide variety of compatible products, and the ease of application integration makes it efficient and convenient for system designers and users across the globe.

From a Japanese defacto standard to a Global Standard!!

Tonn a Supancoc	
International Organization for Standards: ISO	ISO15745-5: [CC-Link] Certified in January 2007.
	IEC61158: [CC-Link] Certified in December 2007.
International	IEC61158: [CC-Link IE] Certified in August 2014.
Electrotechnical	IEC61784: [CC-Link] Certified in December 2007.
Commission: IEC	IEC61784: [CC-Link IE] Certified in August 2014.
	IEC61784-3-8: [CC-Link IE Safety] Certified in August 2016.
OFMI Observations of	SEMI E54.12: [CC-Link] Certified in 2001.
SEIVII Standarad	SEMI E54.23-0513: [CC-Link IE Field] Certified in May 2013.
	GGB/Z 19760-2005: [CC-Link] Certified in December 2005.
	GB/T 20229.4-6 Chinese BA (Building Automation)
The National Standards	standard: [CC-Link] Certified in December 2006.
of the People's	GB/T 19760-2008 Highest Chinese industrial network
epublic of China: GB	standard: [CC-Link] Certified June 2009.
	GB/Z 29496.1.2.3-2013: [CC-Link Safety] Certified June 2013.
	GB/T 33537.1-2017 to 33537.3-2017: [CC-Link IE] Certified April 2017.
Japanese standards: JIS	JIS TR B0031: [CC-Link] Certified in May 2013.
	KSB ISO 15745-5: [CC-Link] Certified in March 2008.
Korean National	KSC IEC 61158/61784: [CC-Link] Certified in December 2011.
Standard: KS	KSC IEC 61784-5-8: [CC-Link/CC-Link IE] Certified in December 2014.
	[CC-Link IE Safety] To be certified in 2017.
Taiwan Standard: CNS	CNS 15252X6068: [CC-Link] Certified in May 2009.

Member structure

Member Category		Registered Member	Regular Member	Executive Member	Board Member		
Annual dues		-	JPY 100,000	JPY 200,000	JPY 1,000,000		
Initiation fee		-	-	-	JPY 1,000,000		
Acquisition of protocol specification		Offered free of charge in response to member's request					
OC List technology is the Other than SLMP		- 0					
CC-Link techno	blogy use right	SLMP		(0		
Conformance	CC-Link master/loc CC-Link IE Control CC-Link IE Field ma CC-Link IE Field int CC-Link IE Field rer	al/intelligent device stations, control/normal station, ster/local station, elligent device station, mote device station mote device station	_	JPY 300,000	JPY 200,000		
(per device)	CC-Link remote device/I/O station CC-Link/LT master/slave station Cable and others		_	JPY 200,000	JPY 100,000	included in annual dues	
	Product for software certification			JPY 50,000	JPY 20,000		
	CC-Link IE Field Network Basic			JPY 50,000	JPY 20,000		
	SLMP* product			-	-		
Recommended product test fee (Per model)	CC-Link IE Control CC-Link IE Field Recommended network wiring parts			JPY 100,000	JPY 50,000		
Use of CC-Link logo		-	0				
Technical support		-	0				
Posting of products on the home page and product catalog (no charge)		-	0				
Exhibition at shows		- 0					
Distribution of CC-Link products catalog and CC-Link News Information about events Posting corporate name on the CLPA web site		0					

A Listing of CC-Link Family Specifications

CC-Link specifications







/Protocol <BAP-C2001-001>

<BAP-C2001-003>

CC-Link/LT specifications



Implementation Rules <BAP-C2001-002>

CC-Link IE Controller Network specifications











CC-Link IE Bar

CC-Link IE ーラネットワーク世禄書 バイスプロファイル様

ELPA

General Description Application <BAP-C2004-001>

Application Layer - Services Layer - Protocol <BAP-C2004-002> <BAP-C2004-003>

<BAP-C2004-004> <BAP-C2004-005>

<BAP-C2004-006>



General Description Physical Layer -<BAP-C2005-001>

Data Link <BAP-C2005-002> Application Application Layer - Services <BAP-C2005-003>

Layer - Protocol <BAP-C2005-004>

Communication Profile Implementation Rules Device Profile

<BAP-C2005-005> <BAP-C2005-006> <BAP-C2005-007>

Motion Function Application Profile <BAP-C2005-008>

CLPA

CC-Link IE Da CC-Link IE ルドネットワーク仕様書

CC-Link IE Field Network Basic specifications







Messap 仕禄書

CUPA

<BAP-C2006-003>

Protocol





<BAP-C2010-006>

General Description Physical Layer -<BAP-C2010-001> Data Link

<BAP-C2010-002>

Laver - Services <BAP-C2010-003>



Separate volume: Implementation Rules -<BAP-C2006-006>

43



General Description Services

仕福書 CUPA

<BAP-C2006-001>



<BAP-C2006-002>



IO-Link

Separate volume:

<BAP-C2006-004>

SLMP (Seamless Message Protocol) specifications

Application Laver - Protocol <BAP-C2010-004>

<BAP-C2010-005>

Separate volume:

<BAP-C2006-005>

MODBUS

Communication Profile Implementation Rules





Process Flow for Developing CC-Link Family-compatible Products

Introduction to CC-Link Family-compatible Products Development Methodology

Main Specifications for CC-Link Family of Networks

Memo		

What is CC-Link Partner Association? What is CC-Link Partner Association?

Memo







http://www.cc-link.org



CC-Link Partner Association

Ozone Front Building 6th Fl., 15-58, Ozone 3-chome, Kita-ku, Nagoya, 462-0825 Phone: +81-52-919-1588 Fax: +81-52-916-8655 E-mail: info@cc-link.org



CLPA Office Locations

CLPA – Japan (Head Office)

6F Ozone Front Bldg., 3-15-58, Ozone, Kita-ku, Nagoya 462-0825, Japan Phone: +81-52-919-1588 Fax: +81-52-916-8655 E-mail: info@cc-link.org URL: http://www.cc-link.org

CLPA – Americas

500 Corporate Woods Parkway, Vernon Hills, IL, 60061, U.S.A. Phone: +1-847-478-2647 Fax: +1-847-876-6611 E-mail: info@cclinkamerica.org URL: http://www.cclinkamerica.org

CLPA – Europe (Germany)

Postfach 10 12 17, 40832 Ratingen, Germany Phone: +49-2102-486-7988 Fax: +49-2102-532-9740 E-mail: partners@eu.cc-link.org URL: http://www.clpa-europe.com

CLPA – Europe (U.K. Office)

Travellers Lane, Hatfield, Hertfordshire, AL10 8XB U.K. (P.O. Box 50, Hatfield, AL10 8XB U.K.) Phone: +44-1707-278953 Fax: +44-1707-282873 E-mail: partners@eu.cc-link.org URL: http://www.clpa-europe.com

CLPA - Korea

RM. 711, 7F GANGSEO HANGANG XI-TOWER A, 401 Yangcheon-ro, Gangseo-gu, Seoul 07528 Korea Phone: +82-2-3663-6178 Fax: +82-2-6224-0158 E-mail: clpakor@meak.co.kr URL: http://www.cc-link.or.kr/

CLPA – Turkey

Serifali Mahallesi Nutuk Sokak.No:5 34775 Umraniye-istanbul, Turkey Phone: +90-216-526-39-90 Fax: +90-216-526-39-95 E-mail: partners@tr.cc-link.org URL: http://www.clpa-europe.com

CLPA – China

Headquarters (Tongji University) : School of Electronics and Information Engineering, Jiading Campus, Tongji University, Shanghai, P.R.China Head Office: 19F No.1386 Hong Qiao Road, Shanghai, P.R.China Phone: +86-21-64940523 Fax: +86-21-64940525 E-mail: support@cn.cc-link.org URL: http://cn.cc-link.org/zh/

CLPA – Taiwan

6th Fl, No.105, Wu Kung 3rd. Rd., Wu-Ku Hsiang, Taipei, Taiwan Phone: +886-2-8990-1573 Fax: +886-2-8990-1572 E-mail: cclink01@ms63.hinet.net URL: http://www.cc-link.org.tw/

CLPA – ASEAN (Singapore)

307 Alexandra Road #05-01/02, Mitsubishi Electric Bldg., Singapore 159943 Phone: +656-470-2480 Fax: +656-476-7439 E-mail: cclink@asia.meap.com

CLPA – India

2nd Floor, Tower A & B, Cyber Greens, DLF Cyber City, DLF Phase-III, Gurgaon-122002 Haryana, India Phone: +91-124-4630300 Fax: +91-124-4630399 E-mail: clpa@mei-india.com

CLPA – Mexico

Mariano Escobedo 69, Zona Industrial - Tlalnepantla, 54030, Estado de Mexico, Mexico Phone: +52-55-3067-7517 E-mail:info@cclinkamerica.org

CLPA - Thailand

9th Floor, SV City Building, Office Tower1, 896/19 and 20, Rama3 Rd., Bangpongpang, Yanawa, Bangkok 10120 Thailand Phone: +66-2-682-6522 Fax: +66-2-682-9750 E-mail:info@cclinkthailand.com

© 2017 CC-Link Partner Association. All rights reserved