



CC-Link **IE**

Integrated Network for IIoT

CC-Link **IE Field
Basic**
INDUSTRIAL ETHERNET
End User Solution Guide

Industrial Ethernet network linking field level devices to controllers. CC-Link IE Field Basic provides the simplicity to implement Industrial Ethernet on your Industrial Automation devices.

CC-Link IE Field Basic

CC-Link IE Field Basic [IE Field Basic] is the latest addition to the family of CC-Link IE open network technologies that will enable device vendors to easily add CC-Link IE compatibility to any product with an Ethernet communication capability.

ADVANTAGES OF CC-LINK IE FIELD BASIC

- IEEE 802.3 Standard Ethernet based network
- Delivers control communications on an Ethernet platform
- Seamless compatibility with existing CC-Link and CC-Link IE automation networks
- Provides cyclic communications using Ethernet-based UDP/IP transmissions
- Simplified memory mapped architecture
- Detailed knowledge of Ethernet technology is not required
- The costly configuration of Ethernet switches is unnecessary
- 'Hot Swap' network stations / devices
- Communicate between CC-Link IE networks & general purpose office type Ethernet-based TCP(UDP)/IP networks
- Powerful network diagnostic functions

TYPICAL IE FIELD BASIC NETWORK



Here's what you can do with CC-Link IE Field Basic

- Fabricate a low cost Ethernet compatible device for less complicated network applications, as CC-Link IE Basic is only a software implementation – no hardware modifications needed.
- Effortlessly create an uncomplicated Ethernet network with simple cyclic communications.
- Easily set up your CC-Link IE Basic network – no need for complex switch configurations.
- Construct a lower cost field network application compatible with general-purpose Ethernet.
- Use commercially-available Industrial-purpose Ethernet equipment; including standard Cat 5e cable, and RJ-45 or M12 connectors and switches.
- Develop a CC-Link IE Basic master station simply using an IPC or personal computer.
- Easily add, update and change devices as configurations are updated automatically when a device is added.
- Build an efficient network using all available resources, because now CC-Link IE network devices can form a link and communicate between existing general-purpose Ethernet TCP(UDP)/IP devices and the latest CC-Link IE networks.
- Easily diagnose the cause of trouble
- Achieve a suitable performance no matter who builds the system – expertise Ethernet knowledge is not necessary.
- Communicate between CC-Link IE networks and General Purpose Ethernet devices. Achieving seamless communication between applications without awareness of network hierarchy or boundaries.

CC-Link IE Field Basic

CC-Link IE Field Basic is implemented on devices or master controllers by software alone, enabling compatibility to be added to existing products without any hardware modification. This significantly reduces the cost of development and time to market.

CC-Link IE was the first, and is still the only open industrial Ethernet protocol offering gigabit speeds and the high bandwidth required in modern data critical, real-time Industry 4.0 applications. As such it has become a de-facto protocol for businesses looking to optimize productivity and futureproof their operations in line with anticipated increases in data transmission required by an Industry 4.0 production environment. However, there are products and applications where the benefits of gigabit performance are not required, so CLPA has responded with IE Field Basic which can be implemented on any existing 100Mbit Ethernet platform. Moreover, because IE Field Basic's stack is compatible with TCP/IP & UDP/IP, it blends seamlessly with general purpose Ethernet-based technologies (including switches, cables, connectors and wireless systems). Finally, since the master controller for the IE Field Basic network is also software based, any industrial PC or other Ethernet equipped controller can be deployed to control an IE Field Basic network without the need for any special interface cards, driver development or other additional work.

HOW DOES IT WORK? A CC-Link IE Field Basic network consists of a network master and a number of slave stations. For each device [slaves and the network master], the IE Field Basic network operation is implemented in the product software. In addition to simplicity, this allows for a variety of network masters to be developed – an industrial PC, a PLC, an embedded board or some other type of controller. The devices all communicate using a cyclic (synchronous) exchange of data. This cyclic exchange provides network updates on a regular schedule. A wide variety of different devices such as I/O, HMI, robots, vision systems, barcode scanners, inverters and servo drives can have IE Field Basic support added to make a comprehensive automation solution that addresses I/O and control. Conventional Ethernet infrastructure is used to construct the network, so existing switches, cable and wireless LAN adapters can all be used. Finally, an IE Field Basic network can be setup to communicate with the gigabit CC-Link IE Field network.

THE BENEFITS CC-Link IE Field Basic now provides all device makers the chance to develop products for the network using their existing Ethernet devices with only software development. This means that now a potentially much larger catalog of devices can be developed. This provides an ever increasing freedom of choice and application flexibility to machine builders and end users. It also allows a diverse portfolio of products to be developed – both gigabit for higher performance applications, and 100Mbit for less demanding uses.

IE FIELD BASIC NETWORK WITH TCP/IP DEVICE



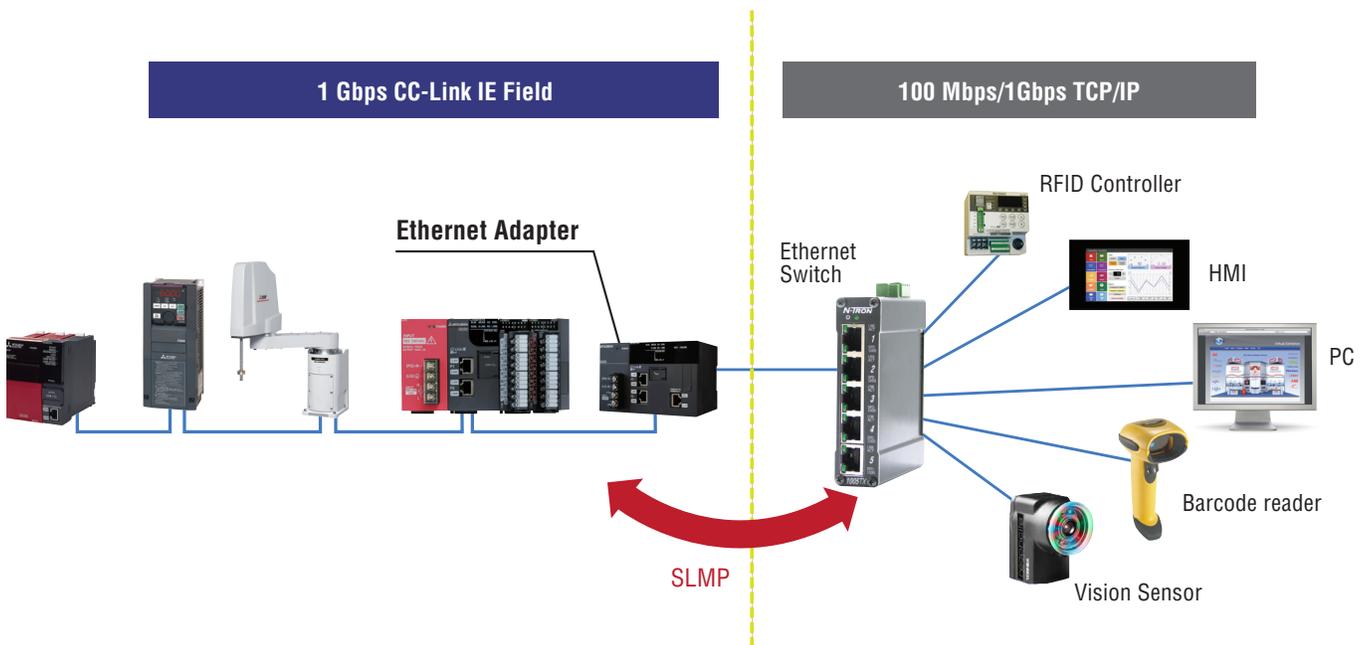
PRODUCT DEVELOPMENT Any existing product with a 100Mbit Ethernet platform can implement IE Field Basic functionality. The CLPA can provide C-Language based sample code along with development guidelines to show how such an implementation should be carried out. Since the code also uses Winsock (Windows API socket), porting to other environments is made simple. A CSP+ (device profile) creation tool is available to produce the necessary files for configuring a network. Finally, a semi-automated conformance test tool is also available to check the overall function of the device in order to assure correct operation.

IMPLEMENT WITH SLMP (Seamless Message Protocol) CC-Link IE Field Basic and SLMP are complementary technologies offered by the CLPA. Each of these communication technologies allows CC-Link IE network support to be added to a device by software development alone. The key difference is that SLMP is a protocol, intended for transient (asynchronous) individual connections between a client and a server, whereas CC-Link IE Field Basic is intended for the creation of a network where the devices all communicate cyclically (synchronously). Manufacturers can implement the SLMP protocol into devices with CC-Link IE Field Basic to provide the device with both Cyclic and Transient capabilities.

SLMP is the common protocol that binds the family of CC-Link networks together. SLMP is a protocol that operates using a Client/Server model. No specific hardware is required to implement the SLMP communication option.

INTEGRATION BETWEEN CC-LINK IE & TCP/IP FIELD DEVICES SLMP can be used to provide a seamless connection between CC-Link IE and general purpose office Ethernet products [TCP (UDP)/IP]. Implementing SLMP within the application layer provides CC-Link IE connectivity by software development alone. Hence development effort is reduced, and conformance testing is simplified. With SLMP, an OEM can choose to implement any of the available functions to communicate between a general purpose office Ethernet device and the CC-Link IE networks. SLMP can be incorporated into the application layer of any Ethernet TCP/IP field device, without changing the hardware of the product. Implementing SLMP into products having an Ethernet port and TCP/IP capability provides these products the ability to communicate and interact with CC-Link IE Field network devices.

INTEGRATION BETWEEN CC-LINK IE & TCP/IP FIELD DEVICES



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