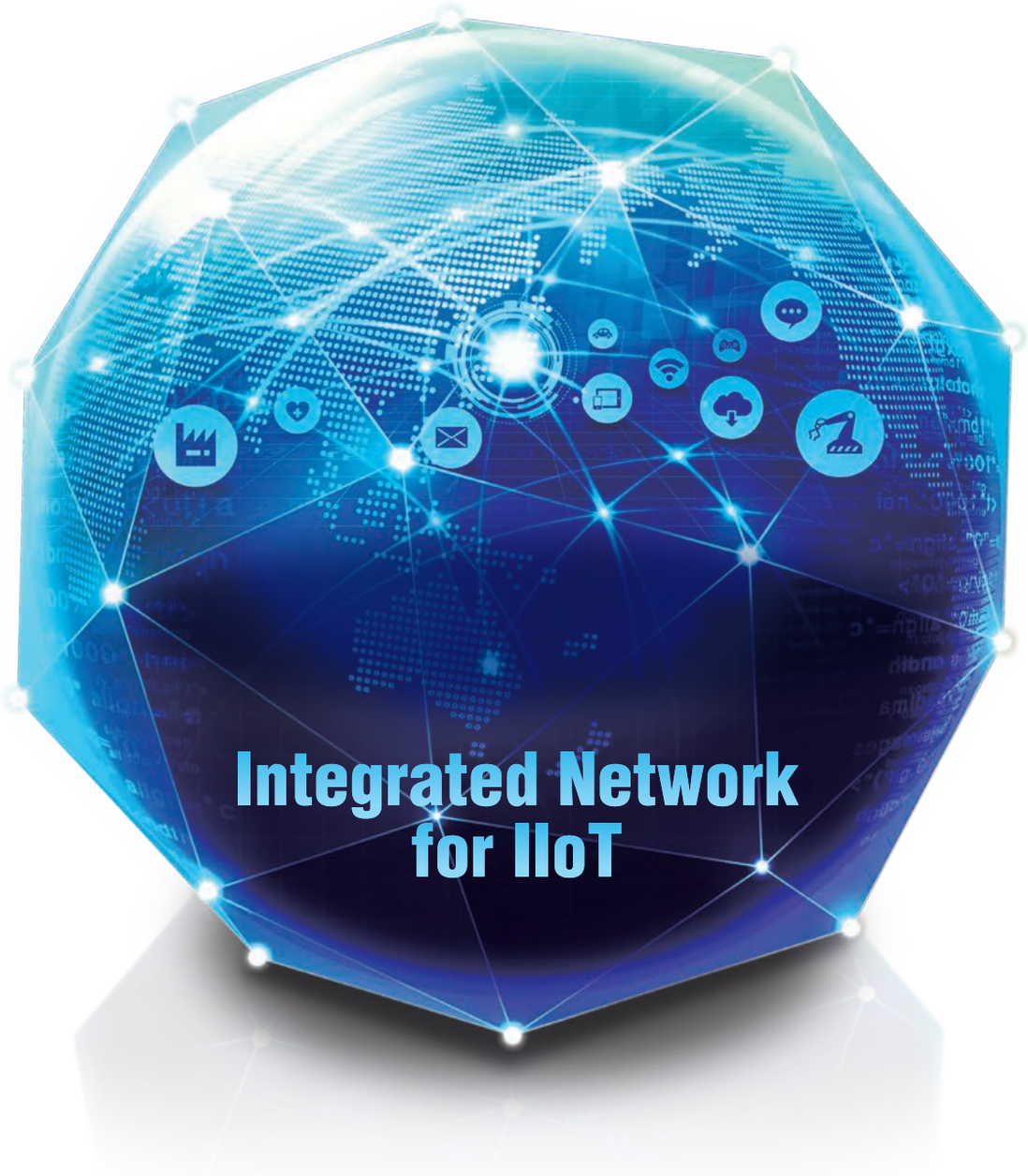


CC-Link IE Field Basic

GENERAL PURPOSE INDUSTRIAL
ETHERNET FIELD NETWORK

CC-Link PARTNER ASSOCIATION

CC-Link IE Field Basic

This brochure is designed for users of CC-Link IE Field Basic [IE Field Basic] networking and for automation equipment manufacturers that plan to offer IE Field Basic products. CC-Link IE Field Basic compatibility is obtained by implementing the IE Field Basic software into their general purpose Ethernet products. This brochure describes the network features and the implementation options for IE Field Basic. Equipment manufacturers can obtain technical assistance for obtaining IE Field Basic compatibility by contacting the CC-Link Partner Association.

IE Field Basic is a new 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 general purpose Ethernet communication capability. 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 general purpose Ethernet platform. Moreover, because IE Field Basic's stack is compatible with TCP/IP & UDP/IP, it blends seamlessly with other 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.

IE Field Basic network is a general purpose Industrial Ethernet network that can operate at gigabit or megabit speeds at the field device level. It combines the simple master slave variation with an Ethernet backbone to provide an easy basic Industrial Ethernet network.

IE Field Basic delivers uncomplicated Industrial Ethernet network capabilities providing control data transmissions between automation controllers [PLCs, computers, etc.] and field devices [such as digital and analog I/O, pneumatic valve manifolds, RFID readers and other factory assets]. IE Field Basic provides an unsophisticated and easy to use industrial Ethernet network for your low-level network applications.

It runs effortlessly without the requirement for costly Ethernet switches. CC-Link IE Field Basic offers "Cyclic" (synchronous) method of data exchange communication based on general purpose UDP/IP technology. Cyclic transmissions provide transparent data delivery to all stations for routine control data. A "common memory" model configured by a few simple parameters establishes the network cyclic transmissions.

Transient non-real time messaging can be implemented using the complimentary SLMP software based industrial Ethernet protocol. This SLMP implementation provides on-demand communication for asynchronous traffic such as alarms, diagnostics or maintenance data. Transient messages are initiated "on-demand" from a specific station. Transient messages can be sent to one or more network stations. CC-Link IE Field Basic and SLMP operate independently so that the cyclic communications maintains a higher priority than the transient messaging.

FEATURES OF CC-LINK IE FIELD BASIC

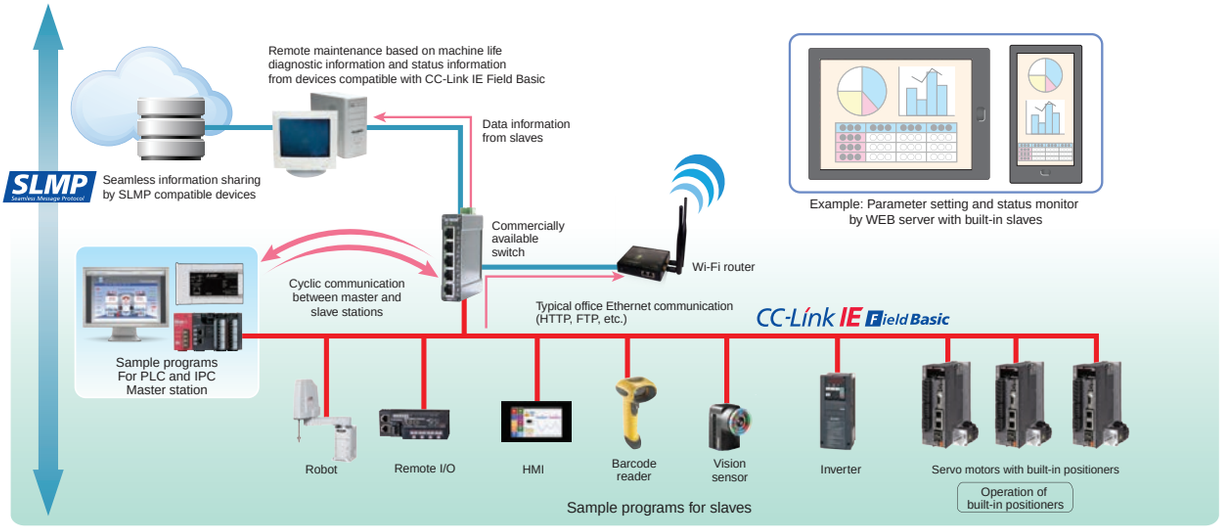
UNCOMPLICATED INDUSTRIAL ETHERNET NETWORK The easy to use network design follow the simple Master / Slave network design of networks you are already familiar with. The network uses commercially available Ethernet physical layer components – such as Cat5e cable, RJ45 connectors or M12 X-Code connectors and out-of-the-box network switches, if desired.

SEAMLESS COMMUNICATION CC-Link IE Field Basic networking enables seamless communication of data between all field devices and controllers in order to form an integrated network for transmitting data at gigabit speeds.

COMPATIBILITY WITH EXISTING CC-LINK NETWORKS Any existing CC-Link network can be integrated with a CC-Link IE Field Basic network. A major benefit to this capability is that any existing CC-Link (RS-485) network can communicate and become part of a IE Field Basic network via the master PLC.

INTEGRATION WITH GENERAL PURPOSE ETHERNET DEVICES Automation equipment manufacturers can make their products compatible with CC-Link IE Field Basic networking without modifying any product hardware. By adding IE Field Basic firmware to products having an RJ45 Ethernet port and TCP/IP (or UDP/IP) capability, these products can communicate, interact and operate on a IE Field Basic network. The CC-Link Partner Association can assist equipment manufacturers in this process.

CC-LINK IE FIELD BASIC PRODUCT DEVELOPMENT Any existing product with an Ethernet platform can implement IE Field Basic functionality. IE Field Basic is a general purpose UDP/IP Ethernet network implementing a master / slave communication scheme. The CLPA can provide sample code along with development guidelines to show how such an implementation should be carried out. An IE Field Basic sample software code is available to CLPA members. 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.



HOW DOES IT WORK? To build an IE Field Basic network, you need a master controller and any number of slave stations. For each device (slave devices and the master controller), the CC-Link IE Field Basic network operation is only implemented in software. So this allows a variety of different types of masters to be developed – an industrial PC, a PLC, an embedded board or some other type of system. The devices all communicate using cyclic (synchronous) exchange of data meaning that network updates are performed on a regular schedule. A wide variety of different devices such as I/O, HMI, robots, vision systems, barcode scanners, etc. can have CC-Link IE Field Basic support added to make a comprehensive automation solution that addresses I/O and control. A general purpose Ethernet infrastructure is used to build the network, so existing switches, cable and wireless LAN adapters can all be used. Finally, a CC-Link IE Field Basic network can also be connected to a gigabit CC-Link IE Field network via a gateway adapter.

THE BENEFITS CC-Link IE Field Basic now provides all device makers who were investigating CC-Link IE support the chance to develop products for the network on their existing 100Mbit devices with only software development. This means that now a potentially much larger catalog of devices can be developed, providing 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 applications.

SUPPORT FROM CLPA Technical support for CLPA members is available from CLPA-Americas. We can arrange for the development documentation and provide the conformance testing tools for your device. CLPA makes it easy for you to begin your development for CC-Link IE Field Basic.

We can offer the following suite of resources to get you on board with CC-Link IE Field Basic:

TECHNICAL SPECIFICATIONS Understand the key technologies of CC-Link IE Field Basic and how they fit with your design. Available free of charge to all CLPA partner members.

SAMPLE CODE & DEVELOPMENT GUIDELINES To reduce your development effort, the CLPA provides documented sample code and development guidelines free of charge to Regular partner members

CONFORMANCE TEST SPECIFICATIONS Conformance testing maximizes customer confidence. Test specifications for both master and slave devices are available at no cost to all CLPA partners.

SELF-CERTIFICATION TOOL Software based self-certification. Free of charge for Regular partner members.

OFFICIAL CERTIFICATION Get official CLPA device compliance certification, free of charge for Regular partner members.

BENEFITS OF OFFICIAL CERTIFICATION Get worldwide product exposure via the official CLPA product catalog (on-line and print). Access to CLPA's global promotional activities, including fairs, seminars, webinars, social media, press releases, joint promotion and other possibilities.

Contact us at info@CCLinkAmerica.org to learn more.

CC-LINK PARTNER ASSOCIATION [CLPA]

CLPA is an international association whose members comprise the world's leading factory automation companies. Our goal is to advance open, interoperable information and communication technologies in industrial automation.

The CLPA is the organization tasked with the worldwide promotion and technical development of the CC-Link family of open networks. The CLPA is a global organization with regional offices and conformance test centers worldwide.

CLPA REGIONAL OFFICES PROVIDE MEMBERS WITH A RANGE OF SERVICES THAT INCLUDE:

- Distributing the CC-Link Family of Networks protocol specifications
- Providing technical and development support to members designing CC-Link products
- Conducting CC-Link educational seminars
- Providing conformance-testing of member products
- Issuing conformance certificates for successfully tested products
- Worldwide promotion of CC-Link products and CLPA partners via trade shows, product catalog and other publications, seminars, social media, and the worldwide web
- Organizing working groups to improve the functionality and acceptance of CC-Link technology

CC-Link Partner Association – Americas
(847) 478-2647
info@CCLinkAmerica.org
am.CC-Link.org
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