



## Twelve things you need to know about CC-Link networks

*Experts on open factory automation networks will already know about CC-Link, however, even if you are in this camp, do you know everything you need to know?*

Network technologies are developing extremely quickly and are likely to be an increasing part of our lives as technological progress continues to accelerate. Since gigabit Ethernet CC-Link IE and its fieldbus variant CC-Link are the predominant factory automation network solutions in Asia and are growing quickly in popularity throughout the rest of the world, it is probably a good idea to be up-to-speed with the essentials.

Here John Browett of the CC-Link Partner Association (CLPA) offers some straightforward answers to the most important practical questions.

*Q1. What are open networks and what are the user-benefits?*

A1. With traditional industrial control networks you can install field devices from only one manufacturer or perhaps a small number of manufacturers. Open networks can accept devices from a far greater number of manufacturers. With CC-Link for example, the number is around 300. The CC-Link Partner Association (CLPA) is the group that develops the technology and promotes its adoption.

*Q2. What is the difference between CC-Link IE and CC-Link?*

A2. CC-Link is an RS485 based open fieldbus; CC-Link IE takes the same communication architecture, but applies it to gigabit Ethernet. This makes it unique amongst all open Ethernet protocols currently. Despite its industry leading position, CC-Link IE uses the standard IEEE 802.3 physical layer.

*Q3. Is CC-Link IE compatible with TCP/IP traffic?*

A3. Yes, CC-Link IE has the capability to encapsulate TCP/IP packets for transmission across the network, allowing the traffic to tunnel through the system.

*Q4. What network configuration types can be built with CC-Link IE?*

A4. Ring, line and star topologies are all possible. In the case of ring and line you can build them without network switches, as they will simply daisy chain together.

*Q5. How does CC-Link IE address the need for different networks within a plant?*

A5. CC-Link IE supports multiple protocols and also offers Motion, Safety, I/O and Energy Management all on the same network - and all at gigabit speeds.



*Q6. How easy is it to configure a CC-Link IE system?*

A6. Very. The network uses CSP+ files that define each device type. This allows a library of devices to be assembled for quick system design and easy on-going maintenance.

*Q7. Is CC-Link IE deterministic?*

A7. Yes. This is achieved by using a token passing method of operation and means you can be sure that process events always occur exactly as scheduled. Determinism is a key requirement for using Ethernet in industrial applications.

*Q8. How do devices communicate on the network?*

A8. Both CC-Link IE and CC-Link are based on a shared memory model, in which each device on the network occupies its own area of the controller's memory. So to communicate with them it is only necessary to change the value of the data in the area corresponding to the relevant device. The network automatically handles this traffic, known as "cyclic" communication (synchronous).

For high priority unscheduled events such as alarms, an alternative "transient" (or asynchronous) communications method is available. Normal network operation is unaffected by transient traffic, so the system can support high loads of transient traffic without affecting performance.

*Q9. Can non-gigabit devices be connected to a CC-Link IE network?*

A9. Yes, you can and for doing this the CLPA offers SLMP (Seamless Message Protocol) Technology. This allows a 100mb device to communicate with CC-Link IE via a gateway.

*Q10. How does CC-Link IE handle security?*

A10. CC-Link IE is based on a dedicated protocol stack that is only available to CLPA partners. Hence this increases security by not using technology that has become subject to uncontrolled distribution. Since CLPA membership is available to any company that wishes to implement the technology in their products, this means that the technology is still open,

*Q11. What is the best route for companies wanting to develop a CC-Link IE compatible product?*

A11. There are several leading industry companies, such as HMS, Mitsubishi Electric and Renesas who all offer different ways to implement a CC-Link IE product. The CLPA can help identify the best partner companies for any given project.

*Q12. How does the CLPA guarantee that new devices will operate correctly in the field?*



A12. We offer a conformance testing program to guarantee compatibility. To support this we have conformance testing centres at strategic locations around the world. The CLPA publishes on-line and paper product catalogues that provide information on certified products.

## About the CLPA

The CC-Link Partner Association (CLPA) is an international organisation with over 2,500 member companies worldwide. The partners' common objective is promotion and technical development of the family of CC-Link open automation network technologies. Over 1,500 certified products are now available from more than 300 manufacturers. CC-Link is the leading open industrial automation network technology in Asia and is becoming increasingly popular in Europe and the Americas. The CLPA's main initiative for Europe is the Gateway to Asia (G2A) programme, which helps European businesses develop their Asian business further. More details are at [www.cc-link-g2a.com](http://www.cc-link-g2a.com)

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