

CC-Link In Action

CC-Link sees better productivity for flat panel display manufacturers

Key Benefits

- ▶ Eight fold increase in data capacity
- ▶ Easier maintenance
- ▶ Greatly increased communication speed
- ▶ Reduced cable related costs
- ▶ Enhanced diagnostics

Production of flat screen liquid crystal displays (LCDs) at one of the largest plants in Asia has steadily ramped up to meet the ever-increasing demand. The process is now highly automated, so data communications are critically important. The choice of a high-speed Ethernet based open network, CC-Link IE, to run the automation comms at the plant could point towards the future for many more automation installations in Asia and Europe.

Flat-panel LCDs televisions and monitors have been one of the strongest growing consumer products of recent years. Production demand has grown, as has the number of product variations. And of course consumer price pressures require constantly improving efficiency. All this can only be achieved by more effective communication and data sharing between the manufacturing cells that make up the plant.

Automation engineers recognise that consumer electronic plants typically evolve in a fairly ad-hoc manner as demand increases, so the control system architecture often has to marry together diverse subsystems producing sub-optimal overall performance.

At the Asian LCD plant, the situation ended up with the high level MES (Manufacturing Execution System) and ERP (Enterprise Resource Planning) systems using standard TCP/IP Ethernet, while the shop-floor systems implemented Mitsubishi Electric's MELSECNET/H at the control level, and the open standard CC-Link.

While having served the facility well in the past, it was perceived that the data communications capacity and speed of MELSECNET/H was lagging behind the current requirements. Further, it was felt that a standard optical fibre cable would make maintenance and reconfiguration easier while providing better connectivity to PC systems.

CC-Link IE (Industrial Ethernet) was seen as an improvement on this with improved data capacity and speed, the use of a generic optical cable and better PC connectivity. Importantly, its diagnostics capability also made maintenance easier.



CC-Link is an open industrial network that enables devices from many different manufacturers to communicate over a single network. It is available in several different formats, including CC-Link IE (Industrial Ethernet).

With 1Gbps transmission speeds, CC-Link IE is the fastest Ethernet currently available for networking multiple field devices and controllers. Critical for industrial applications, it is also fully deterministic, ensuring full dependability for critical manufacturing tasks. Its highly fault tolerant features improve efficiency and productivity, and uses widely-available, standard fibre optic cable and connectors.

In order to overcome the limitations of the existing control system it was decided to upgrade to a CC-Link IE network across the whole LCD plant. This offered many advantages, such as a 40 times theoretical increase in communication speed, together with an eight-fold increase in data capacity.

CC-Link IE does not require a special type of optical cable but may be installed with the generic 1000base-SX standard optical cable, thereby reducing cable-related costs. In a large plant, the savings in material alone are significant, but the real benefit is the ease and speed of maintenance and reconfiguration.

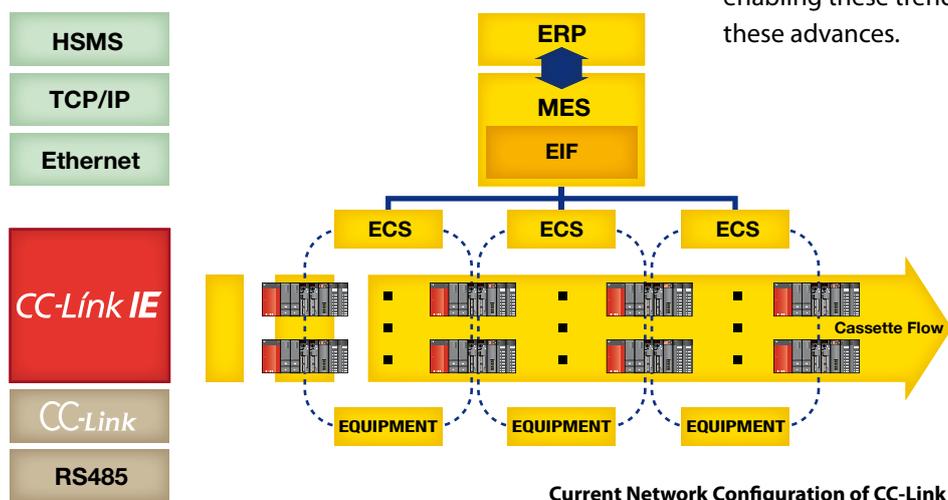
This is further enhanced by the enhanced diagnostic functions and the simplification of the system's architecture.

The control network in the LCD plant is now rationalised to a simple format.

- The major systems such as ERP and MES use the industry standard HSMS Protocol.
- Shop floor systems that control equipment and provide facilities and production site information are established using CC-Link IE.
- Data sharing between equipment or facility hardware controls is also based on CC-Link IE or CC-Link fieldbus.

The plan is that there will be complete integration from the field device level right up to the strategic management information level through CC-Link IE in the near future.

LCD manufacture is seen by production engineers at the Asian Plant as demonstrating many of the control technology solutions of future manufacturing. Trends to expect include many production sites becoming virtually unmanned. Instead of site-specific personnel, remote diagnosis and monitoring technologies will increasingly become the norm. Networks will play a vital role in enabling these trends, and CC-Link is at the forefront of these advances.



Current Network Configuration of CC-Link