









Ethernet Switches

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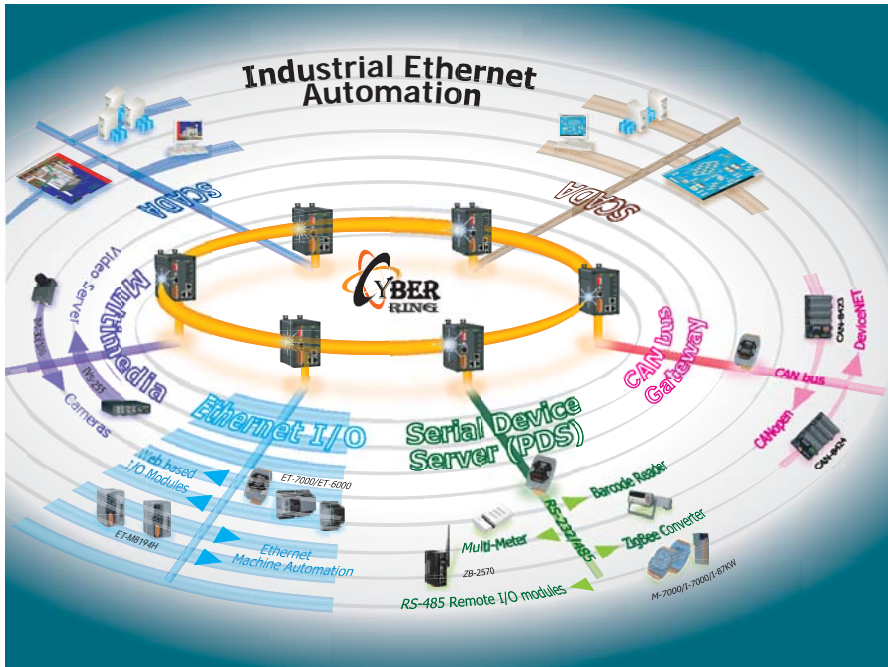
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7.1. Overview

Ethernet is an ideal medium to transport large volumes of data, at speed, across great distances. Previously, multiple networks carrying specific protocols were installed side by side to carry out unique tasks. This inevitably led to project costs increasing as additional fiber optic or copper cables were installed to deal with the increasing volume of data. Using Ethernet, a single fiber optic cable can carry multiple protocols. Furthermore, manufacturers are exporting their legacy protocols onto Ethernet, designing new IP based communication protocols and providing embedded Web-Pages within devices that offer real-time information using simple tools like Internet Explorer and Netscape Navigator.

Early Ethernet were based on a hub or repeater. These units have no intelligence and therefore are unable to identify any information contained within the Header frame of an Ethernet packet. This means that it is not capable of determining which port to send the frame to. Therefore, every frame is sent to every port.

A switch, like a hub, has to forward and receive packets from one network or device to another. The switch could forward all packets, but if this was the case it would have similar behaviour to a hub. It would be more intelligent if the switch only forwarded packets which needed to travel from one network or device to another.

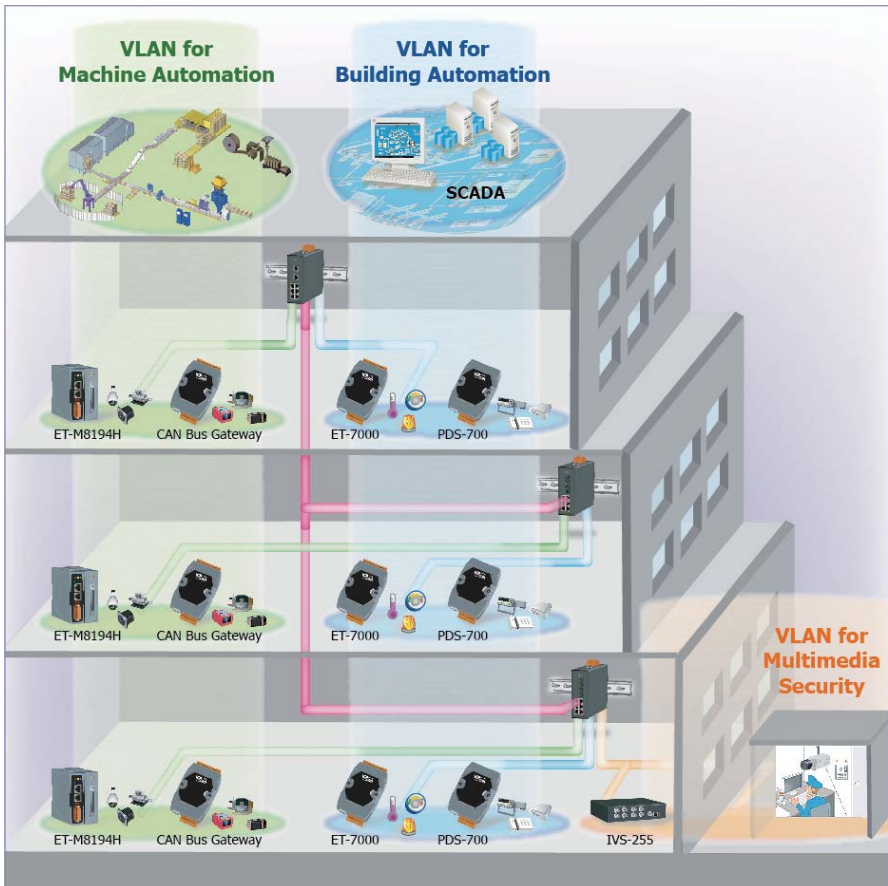


There are many poorly designed switches existing in the market, and most of them are fragile, easy to collapse, and always suffer from transmission delay and unreliable communication conditions due to packet collisions or other issues. Users who have had experiences with those poor switches should try our high quality ones. ICP DAS's switches only choose "REAL INDUSTRIAL" grade switch chips that are temperature tolerant and highly reliable. They are all well-designed by skilled engineers and passed very strict communication and environment tests. All our switches can serve for a long life and guarantee to function perfectly under harsh environments.

Managed Switch for Industrial Ethernet Application

The managed switch can be configured through RS-232 port via serial console or Ethernet port using telnet or Web browser. In addition, the switch supports a lot of powerful managed functions, such as 802.1Q Tag-based VLAN, Port-based VLAN, 802.1p QoS (Quality of Service), Port Trunking, Spanning Tree, Cable Testing and Port Mirroring.

Built-in ICP DAS Cyber-Ring technique enables multiple switches to be placed into a redundant ring. The switch detects and recovers from a fiber or copper link failure within approximately 50 ms – for the majority of applications a seamless process. Modbus/TCP, Modbus/RTU and OPC supported, SCADA application can monitor status of Ethernet and fiber port with Modbus or OPC protocol.



Unmanaged Ethernet Switch

Industrial rated switches are intended to be installed in both harsh climatic environments and noisy electrical installations. Such switches are an excellent example of true industrial design principles

- Very high operating temperatures (down to -40 °C and up to 75 °C)
- DIN-Rail
- Wide DC operating voltages



IP67 Waterproof Switch

IP67 Ethernet Switches are designed for use in industrial waterproof/harsh environments. The rugged packaging and IP67 connectors guarantee a total protection that can withstand a variety of extreme conditions such as high temperatures, extreme shocks & vibrations, dust particles or even liquid immersion. They can be directly mounted to any machine or convenient flat surface.

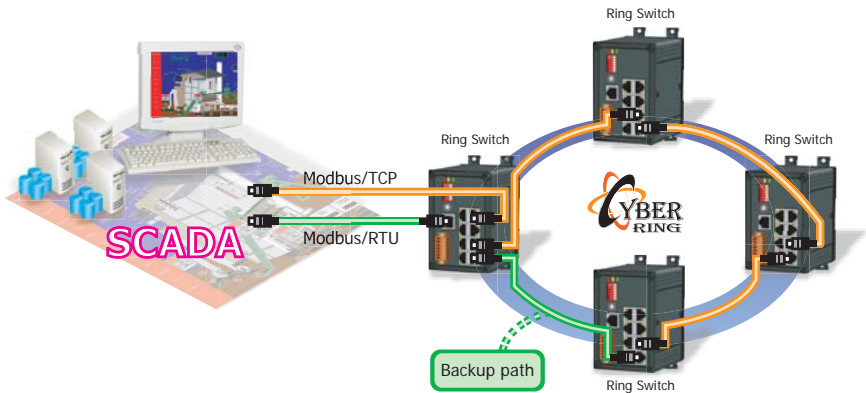
Media Converter

The utilization of fiber optic data transmission for industrial automation and process control has become increasingly popular over the past decade. A basic fiber optic system, using an optical transceiver circuit and fiber optic media, offers a wide array of benefits that are not available with traditional copper conductors.



Real-time Redundant Ring Switch

The Real-time Redundant Ring Switch offers fault-tolerant industrial Ethernet with ring network topology. The built-in ICP DAS proprietary Cyber-Ring technology detects and recovers from a fiber or copper link failure within approximately 50 ms – for the majority of applications a seamless process. Modbus/TCP, Modbus/RTU and OPC supported, SCADA application can monitor status of Ethernet and fiber port with Modbus or OPC protocol. And, the relay output facility can deliver warning signal while dual power or network link fails.



Managed Ethernet Switch

The ICP DAS Managed Switch provides a cost-effective managed Ethernet solution for industrial control and automation. It provides lots of powerful managed functions, such as 802.1Q Tag-based VLAN, Port-based VLAN, 802.1p QoS (Quality of Service), Port Trunking, Spanning Tree, Cable Testing and Port Mirroring. These managed functions can be configured through RS-232 port via serial console or Ethernet port using telnet or Web browser. In addition, the built-in Cyber-Ring technology offers real-time fault-tolerant ring topology to increase the reliability and performance of network. It is an ideal Managed Switch for industrial environments.



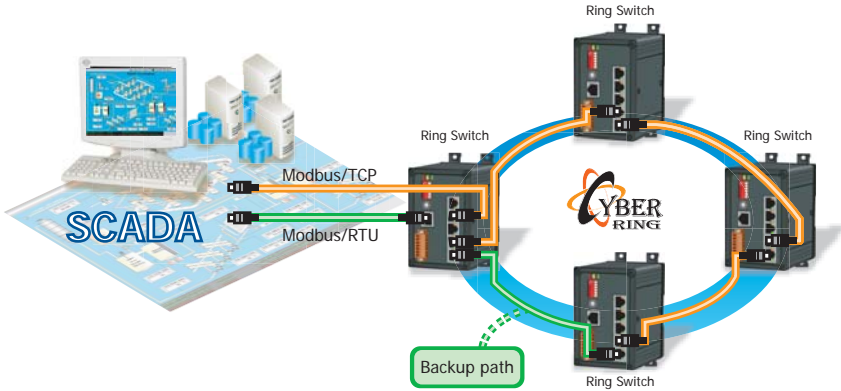
7 Cyber-Ring Ethernet Self-healing Technology

It is undoubted that the power of an Ethernet LAN (Local Area Network) is tremendous when applied to factory floor or industrial automation applications. However, you cannot just use commercial Ethernet switch there. Harsh environment will become a challenge to your switch, and, in many case, fault-tolerant network is also a must. To satisfy these, ICP DAS's Cyber-Ring technology provides you a rugged fault-tolerant, plug and play Ethernet solution.

The ICP DAS's proprietary Cyber-Ring self-healing Ethernet technology can establish industrial Ethernet with high reliability and fault-tolerant capability. It can employ a ring topology network over either copper or fiber optic cable. While standard STP typically requires 20s to 30s for network structure reconfiguration following a link failure, Cyber-Ring technology reduces this downtime to within half a second. Average experience indicates a typical fault recovery time is 300 ms for Cyber-Ring fault-tolerant network.

Features

- High reliability and fault-tolerant
- Real-time deterministic performance
- Scalable and flexible ring topology
- Cost-effective industrial redundant Ethernet solution
- Plug and play



Recovery Time

The recovery time of Cyber-Ring network consists of two parts, fault detected time and reconfiguration time. Recovery time of Cyber-Ring network is associated with the number of switches of the network and Cyber-Ring technology offers a variable preconfigured recovery time to support a wide range of number of switches. Typically, the recovery time of Cyber-Ring network with ten switches is less than 300 ms.

Fault Detected Time

Fault detected time is defined as the time from the occurrence of the fault until fault detected. There is a master switch of Cyber-Ring network checks the health condition of Cyber-Ring network periodically. If active path is not response after a preconfigured period of time, the master assumes that active path is failed and invokes reconfiguration mechanism to redirect traffics to the backup path.

Reconfiguration Time

The reconfiguration time of Cyber-Ring network is less than 5 ms per switch. For example, a Cyber-Ring fault-tolerant network that is comprised of ten switches, the expected worst case reconfiguration time will be 50 ms. When a fault is detected, the Cyber-Ring network will reconfigure to provide alternative traffic path of the ring within 50 ms.