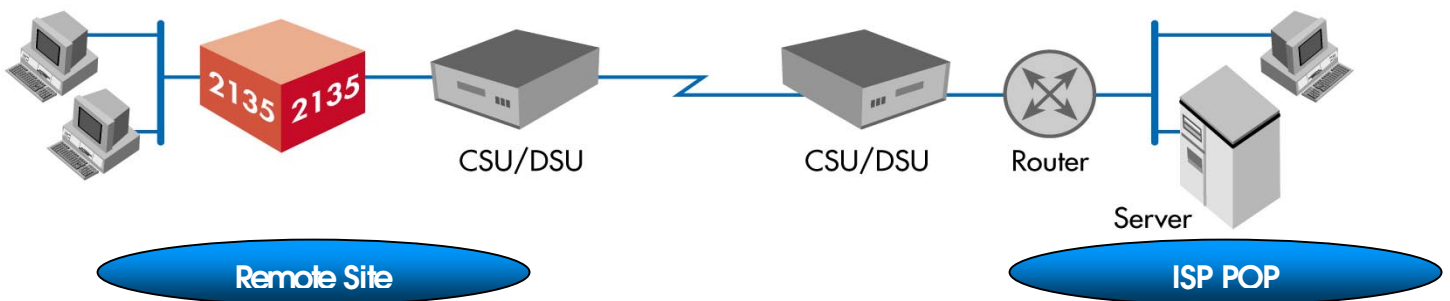


Applications

What are some of the applications for the Ethernet MicroBridge?

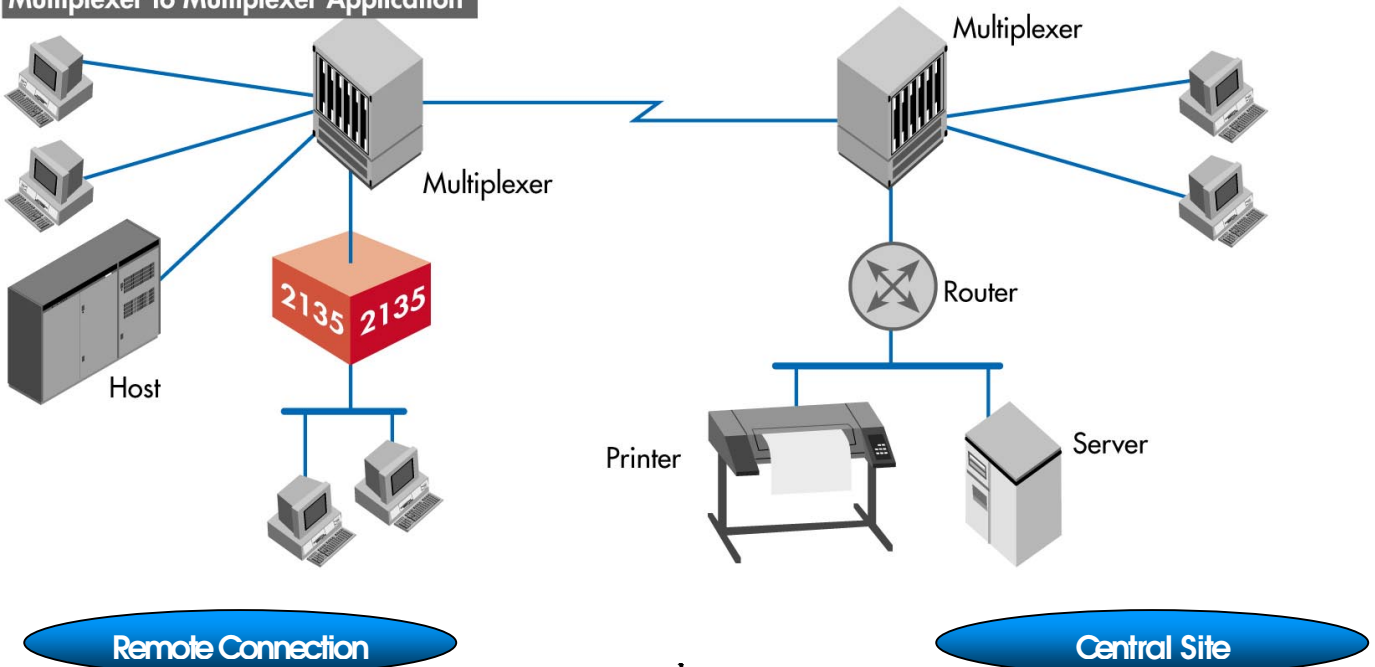
The Ethernet MicroBridge Series can be used to connect a remote site LAN to an ISP POP over private or leased lines using CSU/DSUs. The Remote MicroBridge serial interface connects to any CSU/DSU for data transport over the WAN. At the ISP POP, another CSU/DSU connects to the serial port of a router, which in turn provides access to the central LAN. The MicroBridge communicates with the router using PPP half-bridging. Placing the Microbridge in the remote site saves the ISP equipment, configuration, and maintenance costs associated with a router. A MicroBridge cannot replace a router in the ISP POP because in this application a router is required due to the multiple LANS that would be attached to the ISP POPs router.

CSU/DSU to CSU/DSU Application



Ethernet MicroBridges can also be used to connect a remote LAN multiplexer serial port for data transport over the campus or wide area network to access a remote server or printer. In this application the MicroBridge and the far end router, establish PPP communications. Only packets having addresses outside the remote LAN are forwarded to the router in order to access the printer or server in the central LAN. In this application a MicroBridge could also replace the router at the central site.

Multiplexer to Multiplexer Application



Product Related Questions

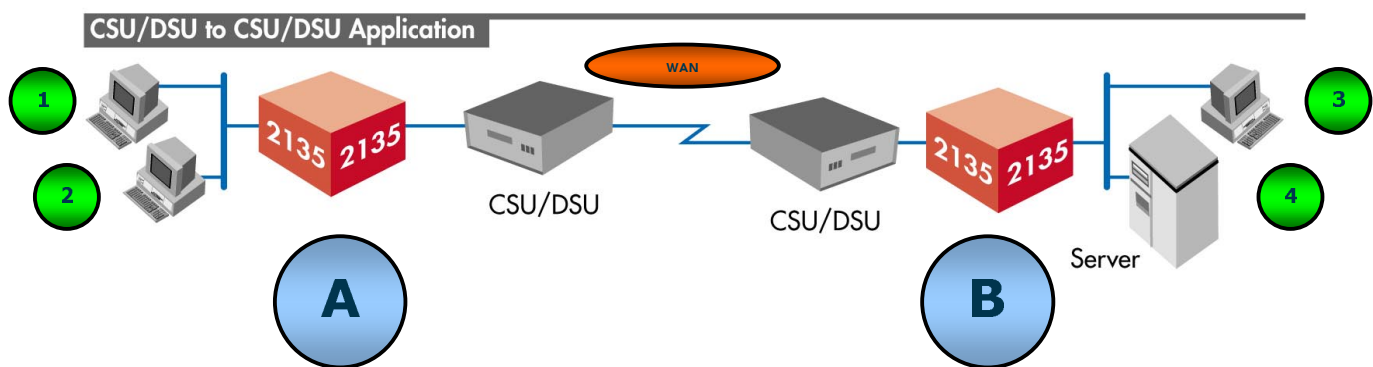
What is an Ethernet Bridge?

A bridge is a low cost device that connects multiple local or remote network segments together. The Bridges primary function is to link LANs together. The secondary function of a bridge is to prevent congestion over the WAN. The Ethernet Bridges accomplish this by containing local data packets within the LAN and releasing data packets to the WAN that have destination addresses outside of the local LAN. The Ethernet MicroBridge works on the MAC-layer addresses and operates independent of higher layer protocols. This functionality allows for minimal to no configuration for the end user. Once connected to the network, the Patton MicroBridge will automatically begin to learn up to 4,096 MAC addresses. When the MicroBridge sees a data packet, it checks the packet's destination and decides to forward the information on to the WAN or keep it within its own LAN.

What devices typically connect to a bridge?

Devices that typically connect to a bridge are CSU/DSU's, NTU's, Sync. Modems, Muxes, and Routers.

How does an Ethernet MicroBridge work?



In the diagram above, the MicroBridge (2135) connects LAN A and LAN B so that they can function as **one** logical LAN.

HOW?

- When the MicroBridge is connected and powered on, it will begin to listen to all the network traffic (promiscuous mode) and learn which addresses are on its LAN.

- The MicroBridge will begin to build a table of Host addresses and their corresponding network numbers (LAN A/LAN B). In the case of this application, the 2135 would learn that Device #1 and Device #2 are on the same LAN.
- When Device #1 sends a message the MicroBridge will read the MAC address of the data packet and determine if any computers or devices on its LAN have that specific MAC address.
- If, for example, the message from Device #1 is meant for Device #3, the MicroBridge will recognize that the MAC address does not match any address' on its own table and will encapsulate the message into a PPP packet and forward the packet across the WAN.
- Once this packet is received by the MicroBridge on LAN B, it will be stripped of its PPP layer by the MicroBridge.
- Once the packet is stripped and read, the MicroBridge will release the packet to the LAN and the proper device (Device #3) will accept the packet.

Does the Patton MicroBridge pass higher layer protocol such as TCP/IP packets?

Yes, the MicroBridge does pass higher layer protocols such as TCP/IP. Higher layer protocols can be encapsulated into the PPP packet (in the Data Field). The MicroBridge does not read the TCP/IP packets but will pass the packets transparently. HDLC is used in place of PPP when two Patton Bridges are talking to each other.

What is the difference between an Ethernet Bridge and a Router?

An **Ethernet Bridge** connects multiple local or remote network segments and creates one logical network. Ethernet Bridges are protocol-independent devices that do not perform complex processes on the data packets traveling through them. They do not evaluate the network as a whole to make end-to-end routing decisions. An Ethernet Bridge operates at the bottom two layers of the OSI reference model, providing **Physical** and **Data Link** layer connectivity.

Routers are protocol sensitive. They typically support multiple protocols, and large and varying packet sizes such as what might be involved in supporting both Ethernet and Token Ring. In addition to supporting filtering and encapsulation, routers route traffic based on a high level of intelligence that enables them to consider the network as whole. Routing information that bridges do not take into consideration are payload type, packet priority levels, least-cost route, minimum route delay, minimum route distance and route congestion levels. A Router handles the bottom three layers of the OSI reference model: **Physical**, **Data Link**, and **Network** layer.

Does an Ethernet MicroBridge replace a router?

In situations where LANs of the same architecture need to be linked, the Ethernet MicroBridge is a cost effective solution. In addition to a significantly lower cost, the key advantage is their simplicity. Bridges are easy to connect and require little or no configuration.

PPP related questions

What is Point-to-Point Protocol (PPP)?

PPP is a protocol used for multi-plexed transport over a point-to-point link. PPP operates on all full duplex media, and is symmetric peer-to-peer protocol, which can be broken into three main components:

- 1) A standard method to encapsulate datagrams over serial links.
- 2) A Link Control Protocol (LCP) to establish, configure, and test the data-link connection.
- 3) A family of Network Control Protocols (NCPs) to establish and configure different network layer protocols.

How is the PPP connection established?

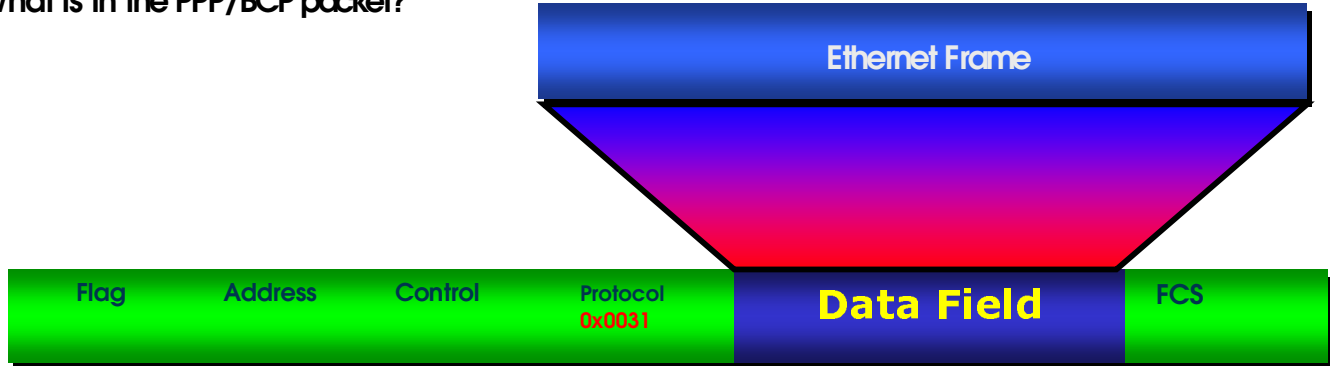
In order to establish communications over a point-to-point link, each end of the PPP link must first announce its capabilities and agree on the parameters of the link's operation. This exchange is facilitated through Link Control Protocol (LCP) Configure-Request packets.

Once the link has been established and optional facilities have been negotiated, PPP will attempt to establish a network protocol. PPP will use Network Control Protocol (NCP) to choose and configure one or more network layer protocols. Once each of the network layer protocols have been configured, datagrams from the established network layer protocol can be sent over the link. The link will remain configured for these communications until explicit LCP or NCP packets close the link down, or until some external event occurs.

What is Bridge Control Protocol (BCP)?

BCP is a Network Control Protocol (NCP) of PPP. BCP negotiates parameters for the transmission of bridged datagrams across the WAN. The Bridging Control Protocol (BCP) is responsible for configuring, enabling and disabling the bridge protocol modules on both ends of the point-to-point link. BCP uses the same packet exchange mechanism as the Link Control Protocol. BCP packets may not be exchanged until PPP has reached the Network-Layer Protocol phase.

What is in the PPP/BCP packet?



- **Flag, Value 0x7e:** Signals start and end of PPP frame
- **Address:** Contains the value 0xFF, the standard broadcast address.
- **Control:** Contains the value 0x0C which calls for transmission of user data in an unsequenced frame
- **Protocol Field:** Identifies type of information in the data field
 - IP, IPCP, IPX, LCP, BCP, etc.
- **Data Field:** Variable length defined by the Maximum Receive Unit (MRU) setting. This is where the Ethernet Frame may reside.
- **Frame Check Sequence (FCS):** Computed value of all bits in the address, control, protocol, and data fields

How large is the MAC packet within the PPP packet?

The MAC packet is within the Ethernet Frame of the PPP packet (see above diagram). The size of the MAC packet is 1500 bytes, which adheres to the IEEE 802.3 standard.

Does the Patton Ethernet MicroBridge support VLAN or WLAN?

We do not currently support VLAN (802.1Q) or WLAN (802.11)

Power Supply

What are the power supply options for the Ethernet MicroBridge Series?

The MicroBridges come standard with an external UI (90-260VAC) power supply. A -48 VDC power supply is optional.