Applications

What is the primary application for the Model 2172 CopperLink Ethernet Extender?

Extend 10/100Base-TX Ethernet to reach beyond its natural limitations

Up to 6,000 feet (1,830 meters) over voice-grade twisted-pair

Main Office

Remote Office
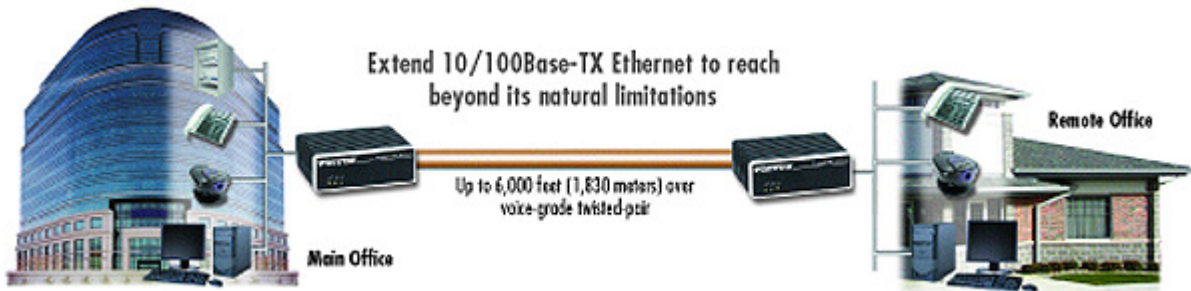
LAN Extension & Service Integration

The Model 2172 multi-rate Ethernet Extenders are ideal for delivering Ethernet links to remote buildings that are beyond the 328-foot (100-meter) distance limit of Ethernet. The 100 Mbps throughput eliminates bandwidth concerns previously experienced with other copper wired transmission technologies. By utilizing existing voice grade copper pairs the expense and hassle of installing low capacitance or fiber cable is no longer required.

Other Applications include:

- MTU/MDU Internet Services
- Network Backbones
- Remote Workstations and Equipment
- ISP Last Mile Extension

Extended temperature versions of the Model 2172 are available. EnviroNET™ Ethernet Extenders are housed in a NEMA 4 enclosure and operate in extreme temperatures, ranging from -40 to 85°C. EnviroNET Ethernet Extenders are the ideal solution for extending or providing Ethernet terminations to locations where harsh environmental elements such as heating, cooling, dust, and moisture cannot be controlled. EnviroNET™ Ethernet Extender applications include closets, ceilings, industrial automation, roadside cabinets, and various outdoor installations such as security and transportation access/control/surveillance.

Product Related Questions

How is the CopperLink connection established?

Four steps are required to establish a communications link between the two Model 2172 Ethernet Extenders (Local and Remote) and the respective network devices.

1) Connect the 10/100Base-TX devices to the Ethernet port of each 2172 unit.
2) Connect each end of the twisted-pair wire to the CopperLink port of each 2172 unit.
3) Plug the 2172 power supplies into a suitable power source.
4) Plug the output jack of each power supply to the rear power jack of each 2172 unit.

Once powered up, a communications link is established between the two 2172 units and the CopperLink LED on each 2172 unit will glow solid green.

Does the Model 2172 include any management capabilities or test modes?

No, the Model 2172 does not have any management capabilities or test modes. However, it does feature five status LED indicators to provide operational status at a glance and assist with troubleshooting.

Can the line rate be altered on the Model 2172 to achieve lower bandwidths and/or longer distances?

Yes, the line rate can be altered via dipswitches on the underside of the 2172. This setting should only be made on the unit you have designated as your local modem. Distances will increase or decrease depending on the line rate selected. Default setting is 50Mbps symmetrical.

Asymmetrical Line Rates		
Line Rates (AWG 24/0.5 mm)		
Upstream in Mbps	Downstream in Mbps	Distance in ft (m)
1	4	6,000 (1,830)
1	16	4,000 (1,200)
2	50	2,000 (610)

Symmetrical Line Rates		
Line Rates (AWG 24/0.5 mm)		
Upstream in Mbps	Downstream in Mbps	Distance in ft (m)
10	10	4,000 (1,200)
25	25	2,000 (610)
50	50	800 (245)

What are the distance limitations of the Model 2172 using different gauge wires?

At the default setting of 50Mbps symmetrical, using 24 AWG (0.5 mm) wire, the Model 2172 is capable of providing Ethernet extensions up to 800 ft (245m) not including the potential 328 ft (100 m) Ethernet connections on both ends of the communications link. Using 26 AWG (0.4 mm) wire, the Model 2172 is capable of providing Ethernet extensions up to 600 ft (184m). Actual distance and link performance will vary based on the environment (cross talk/noise) and type/gauge of wire used. The chart below shows an example of how the gauge of wire affects the distance.

DS/US* Line Settings (Mbps)	24AWG Throughput	26 AWG	24 AWG	22 AWG	19 AWG
10/10	48 Mbps	3000ft (900m)	4000 (1200m)	5000 (1500m)	7500 (2250m)
25/25	24.5 Mbps	1500ft (458m)	2000 (610m)	2500 (763m)	3750 (1144m)
50/50	10 Mbps	600ft (184m)	800 (245m)	1000 (306m)	1500 (460m)
4/1	3.75/1Mbps	4500ft (1373m)	6000 (1830m)	7500 (2288m)	11250 (3430m)
16/2	15/2 Mbps	3000ft (900m)	4000 (1200m)	5000 (1500m)	7500 (2250m)
50/2	48/2 Mbps	1500ft (458m)	2000 (610m)	2500 (763m)	3750 (1144m)

* DS = downstream; US = upstream

What is the difference between Asymmetrical and Symmetrical modes?

In Symmetrical mode, data travels upstream (to the Internet or data source) and downstream (from the internet or data source) at the same rate. Symmetrical services are commonly used in applications requiring high speeds in both directions, which is ideally suited for business applications. Increasingly, symmetrical applications, which began with enterprise networks, are now also required by both small and medium enterprises and residential customers. Leading the list of symmetrical applications are video conferencing, interactive videos, and telecommuting.

In Asymmetrical mode, data travels downstream (from the Internet or data source) at a different rate than it travels upstream (sending to the Internet or data source). Asymmetrical services are typically faster downstream than upstream because they were designed for residential users who typically spend most of their online time downloading information. Residential users typically send a relatively small file request to the Web or video server, and then download very high volume files.

Can the Model 2172 be configured for symmetrical or asymmetrical transmission from the field?

Yes, the Model 2172 can be configured for either symmetrical or asymmetrical transmission via dipswitch settings. The dipswitches can be found on the underside of the 2172. Please see the chart above for the various settings and corresponding achievable distances.

Does the Model 2172 operate in pairs?

Yes, the Model 2172 must operate in pairs. For each link, one unit must be set to Local (Loc) and the other a Remote (Rem).   This is done by the switch on the back of the Model 2172.

Which end of the link should the "Loc" Local unit and "Rem" Remote unit be located?

The Local and Remote should be located according to their descriptions. The Local unit should to be placed at the Central Location and the Remote should be placed at the Remote Location due to special filtering requirements for each application.

Does the Patton Model 2172 support VLAN?

The Model 2172 will support VLAN (802.1Q) by passing the larger sized packets transparently. The Model 2172 does not have configuration commands to add a VLAN tag to a packet.

Does the Patton Model 2172 pass higher layer protocol such as TCP/IP packets?

Yes, the Model 2172 does pass higher layer protocols such as TCP/IP. The Model 2172 does not read the TCP/IP packets, but will pass the packets on transparently.

Is the Model 2172 capable of bridging?

Yes, the Model 2172 will automatically learn, age, and filter 32 source addresses. Destination addresses of incoming frames are compared with the Source Address in the address table and discarded if an entry exists; otherwise, they are forwarded over the link.

Ethernet (10 or 100Base-T) Interface

What devices typically connect to the Ethernet 10/100Base-TX port?

Devices that typically connect to the Ethernet port are Ethernet Hubs/Switches, Remote PC's, IP Cameras and any other network enabled devices.

How is the Ethernet port configured to accept 10 or 100Base-TX?

The Ethernet port automatically senses 10 or 100Base-TX Ethernet connections.

Does the Ethernet port require configuration for full or half-duplex connections?

The Model 2172 will automatically sense full or half-duplex Ethernet connections. To fully utilize the 100Base-TX Full-Duplex feature, your network enabled devices must support 802.3x flow control (pause packets). A switch setting is provided on the Model 2172 to transparently lock out the 100Base-TX full duplex communication if your network enabled devices do not support 802.3x flow control (pause packets). This feature will only allow Ethernet connections in 10Base-T full/half duplex or 100Base-TX half duplex and transparently avoid the 802.3x issue without degrading link performance.

If the CopperLINK link goes down will the Ethernet 10/100Base-TX port stay on?

No, if the link is lost between the two Model 2172's the 2172 will shut down the Ethernet port until the 2172 can reestablish its link.

Do I use straight-through or crossover cables?

The 2172 is equipped with an MDI-X switch that enables automatic connections to a hub (DCE) or PC (DTE) interface, thereby eliminating confusion over whether a straight-through or crossover cable is needed. The Ethernet port will automatically sense the required connection type.

Power Supply

What are the power supply options for the Model 2172's?

The Model 2172's come standard with an external UI (100-240VAC) power supply. –48, -24, or   -12VDC desktop and 120V wall mount power supplies are optional and ordered separately.

Operating Frequencies

What frequencies does the Model 2172 operate?

When considering bundled transmission lines it is important to know what frequencies your various services are running on to prevent interference with each other. Below are the frequency bands the model 2172 operates at with different line settings. If any other transmissions are made on these same frequencies you will very likely have failures on one or both transmissions.
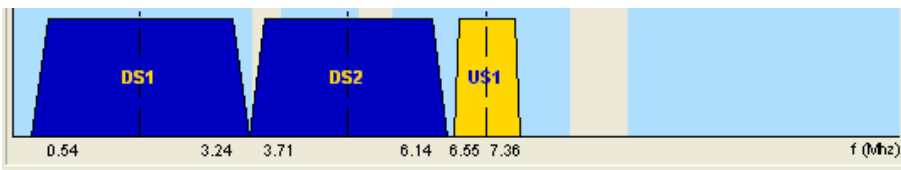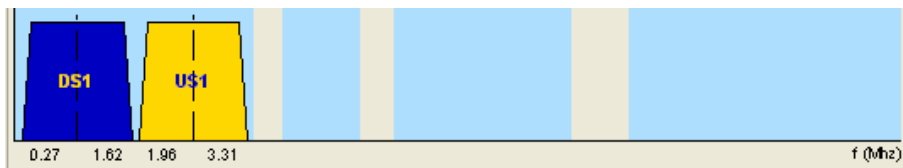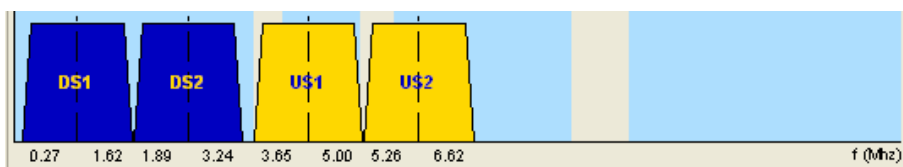
4Mbps/1Mbps

16Mbps/2Mbps
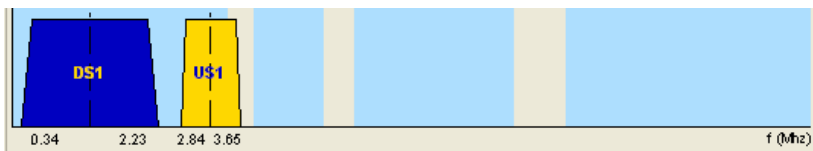
50Mbps/2Mbps

10Mbps/10Mbps

25Mbps/25Mbps

50Mbps/50Mbps