

Network Cabling - TP/FT-10 Channel

The LonPoint modules (excluding some LPR Routers) use Echelon's FTT-10A Free Topology Transceiver for network communications. This transceiver operates at 78 kilobits per second and is designed to support free topology wiring; it will accommodate bus, star, loop, or any combination of these cabling topologies using a twisted pair cable. By eliminating restrictions on the cabling topology, the installer is free to locate LonPoint modules anywhere on the network cabling provided only that the maximum cabling distance limitations are observed. This capability simplifies system installation and makes it easy to add nodes should the network need to be expanded. Figures 3.1 through 3.5 present five typical network topologies.

In free topology cabling it is necessary to use one Echelon Model 44100 terminator. In bus topology cabling it is necessary to use two Echelon Model 44101 terminators. Terminators are required for proper network operation and must not be omitted.

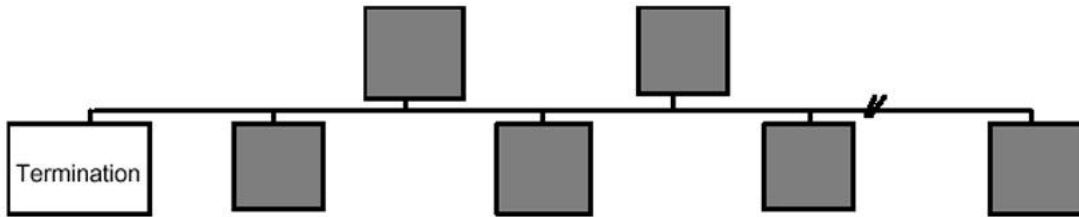


Figure 3.1 Singly Terminated Bus Topology (Model 44100 Terminator)

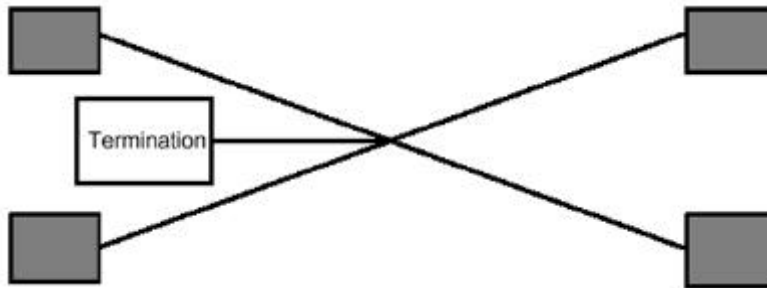


Figure 3.2 Star Topology (Model 44100 Terminator)

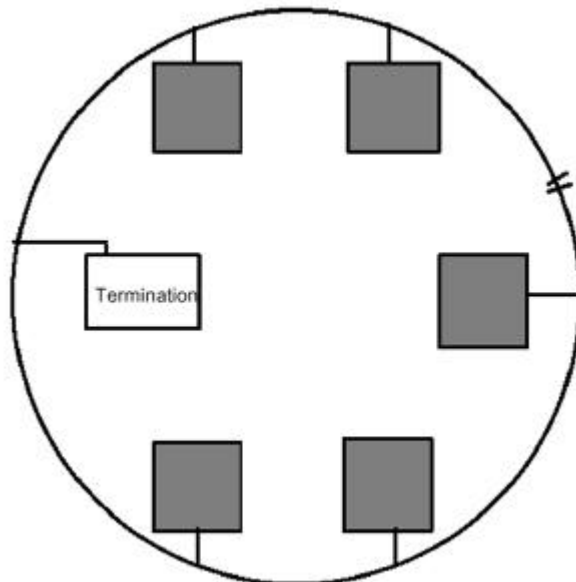


Figure 3.3 Loop Topology (Model 44100 Terminator)

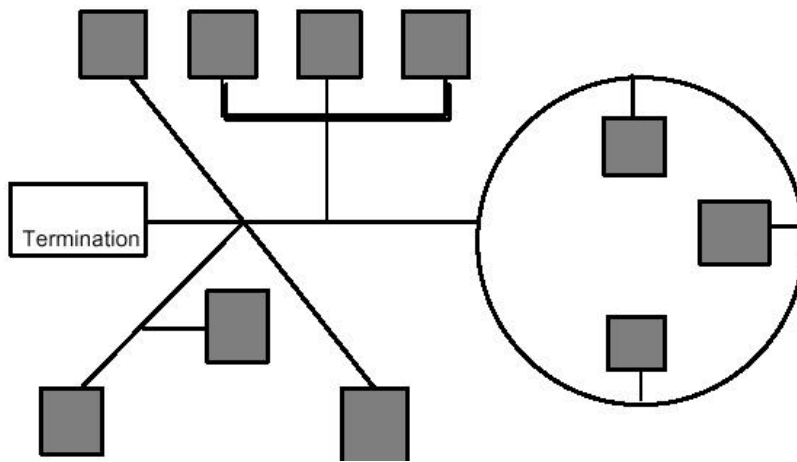


Figure 3.4 Mixed Topology (Model 44100 Terminator)

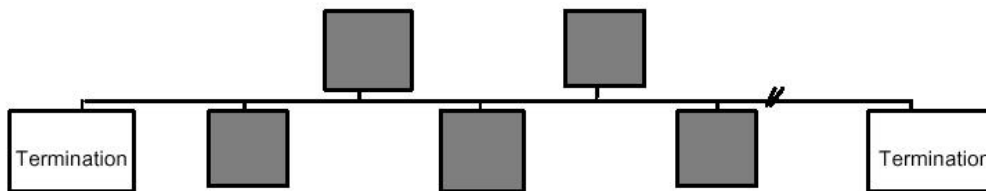


Figure 3.5 Doubly Terminated Bus Topology - Used for Very Long Cabling Distances (Two Model 44101 Terminators)

A maximum of 64 devices (LonPoint modules, routers, PCLTA-10 and PCC-10 PC adapters, third-party LONMARK® devices) may be connected to any one channel. If more than 64 devices are to be used, or if it is necessary to add more cabling than is permitted on a single channel, then one or more model 42100 LPR-10 Routers (TP/FT-10 to TP/FT-10) would be placed in series with the network cabling.

The free topology transmission specification includes two components which must both be met for proper system operation. The distance from each LonPoint module, network interface, or third party device to all other devices, and the distance from each LonPoint module, network interface, or third-party device to the Model 44100 Terminator, must not exceed the *maximum node-to-node distance*. If multiple paths exist, e.g., a loop topology, then the longest path should be used for the calculations. The *maximum total wire length* is the total amount of wire connected per channel.

Table 3.1 Free Topology Specifications

	<i>Maximum node-to-node distance</i>	<i>Maximum total wire length</i>	<i>Wire Diameter AWG/mm</i>
Belden 85102	500 meters	500 meters	16AWG/1.3mm
Belden 8471	400 meters	500 meters	16AWG/1.3mm
Level IV, 22AWG	400 meters	500 meters	22AWG/0.65mm
JY (St) Y 2x2x0.8	320 meters	500 meters	20.4AWG/0.8mm
TIA Category 5	250 meters	450 meters	24AWG/0.51mm

Cable Terminations – Free Topology TP/FT-10 and TP/FT-10F

In a TP/FT-10 free topology segment, only one termination is required and may be placed anywhere on the free topology segment. There are two choices for the termination:

1. RC network (figure 6), with $R1 = 52.3 \text{ Ohms}$
2. LPI-10 Link Power Interface, with jumper at "1 CPLR" setting.

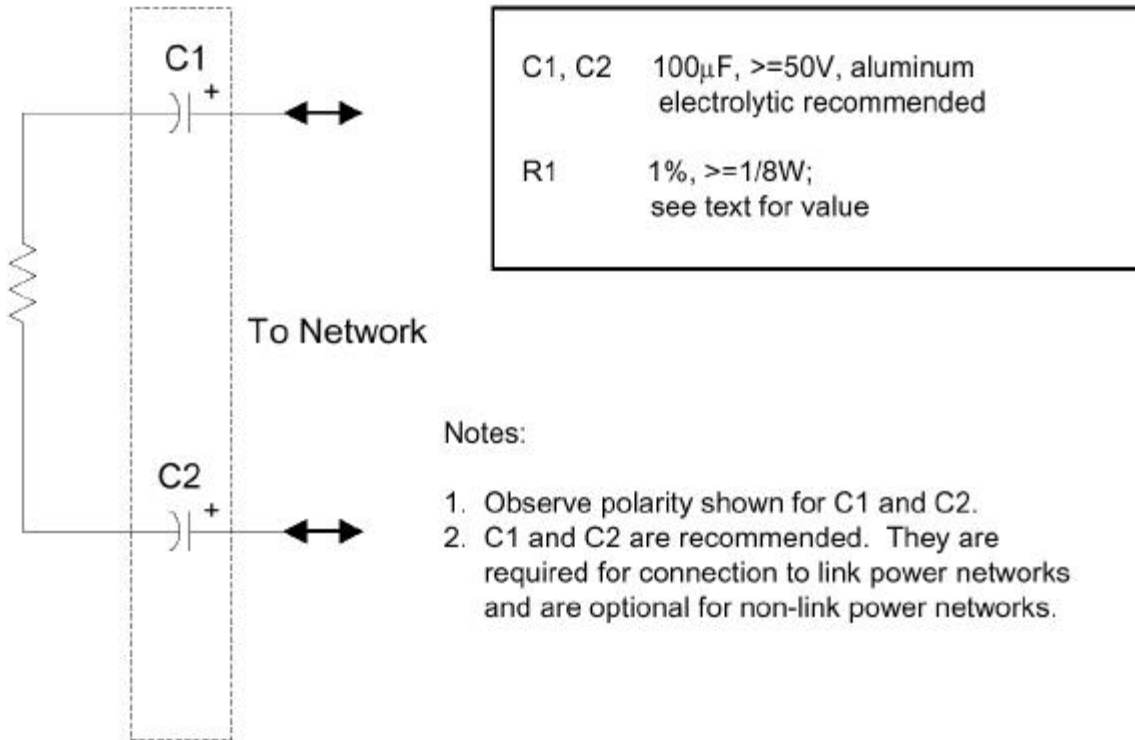


Figure 6 RC Network Termination for TP/FT-10 Segments

Cable Terminations – Doubly Terminated Bus Topology TP/FT-10 and TP/FT-10F

In a TP/FT-10 doubly terminated bus topology, two terminations are required, one at each end of the bus. There are two choices for each termination:

1. RC network (figure 6), with $R1 = 105 \text{ Ohms}$.
2. LPI-10 Link Power Interface, with jumper at "2 CPLR" setting if resident on a link power segment. At this time, only one LPI-10 Interface is supported per segment, so at least one of the terminations must be the RC-type.

Table 3.2 Doubly-Terminated Bus Topology Specifications
(Requires Two Model 44101 Terminators)

	<i>Maximum bus length</i>	<i>Wire Diameter AWG/mm</i>
Belden 85102	2700 meters	16AWG/1.3mm
Belden 8471	2700 meters	16AWG/1.3mm
Level IV, 22AWG	1400 meters	22AWG/0.65mm
JY (St) Y 2x2x0.8	900 meters	20.4AWG/0.8mm
TIA Category 5	900 meters	24AWG/0.51mm

A doubly-terminated bus may have cable lengths (stubs) of up to 3 meters from the bus to each LonPoint module, network interface, or third-party device.

Terminating Shielded Cables for the TP/FT-10 Channel

Model 44100 and 44101 Terminators are intended for use exclusively with unshielded twisted pair cables and must NOT be used as terminators for shielded cables. If a shielded cable is to be used then special Terminators must be fabricated for both free topology and bus cabling architectures. These special Terminators will ensure the effectiveness of the shield in providing noise immunity in electromagnetically harsh environments. Figure 3.8 presents the schematic for a Free Topology Shielded Cable termination.

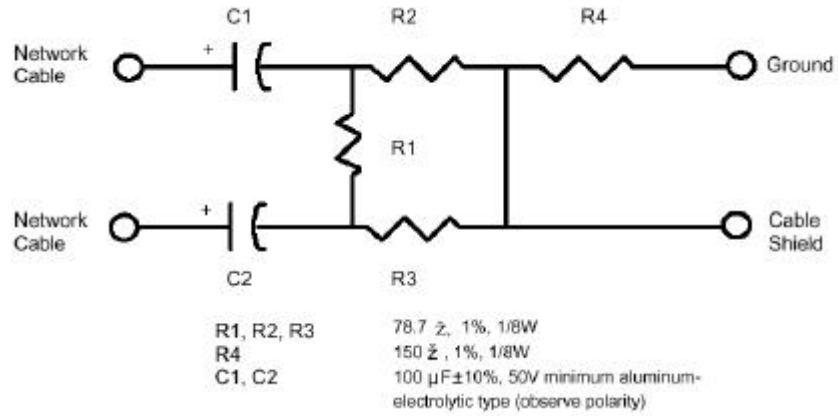


Figure 3.8 Free Topology Network Terminator for use with Shielded Cables (Use only one Terminator.)

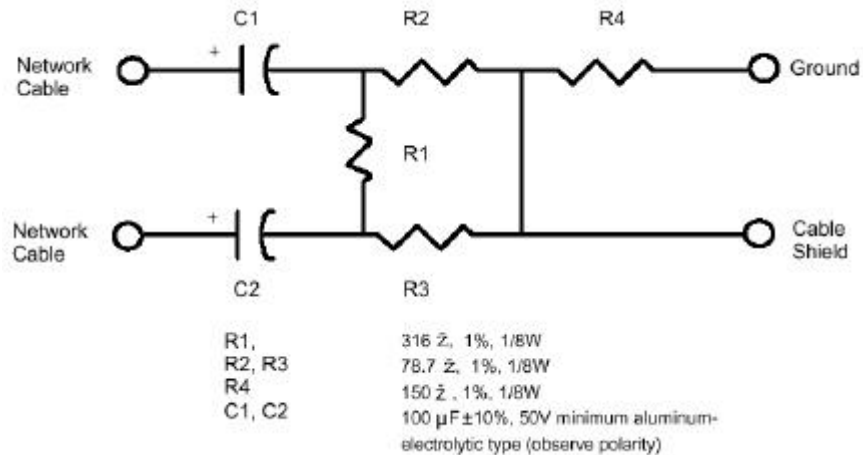


Figure 3.9 Bus Topology Network Terminators for use with Shielded Cables (Two Required)