POWERCOMMAND NETWORKS

NETWORK CABLING AND CONNECTIONS FOR FTT-10 NETWORKS

Network Topology

FTT-10 networks are designed to support free topology wiring, and will accommodate bus, star, ring, or any combination of these topologies. Excepting the double-terminated bus topology, only one point of termination is required for any free topology segment. Note that the actual termination circuit will vary by application (See "Cable Termination" below.)

Network Nodes

Each device with an FTT-10 transceiver is a network node. The maximum number of nodes on a network segment and on the total network is partly dependant on the network application. For example, a network that is connecting only a few discrete variables between devices and has no monitoring software attached could probably support 64 nodes (maximum allowable on a segment per Echelon specs.) At the other extreme, a network with a large amount of inter-device bindings and being monitored by PowerCommand PULSE with Reporting option would not be able to support more than 12 devices using a single FTT-10 channel. However, with the appropriate addition of other network management devices, the PULSE example could potentially support 64 devices or even more. If there is any question about how many devices your network can support, contact the Network Applications Engineer in the CPG System Sales department.

Network Cable Selection

The following cables are qualified for use with FTT-10 networks:

- NEMA Level IV cable (Onan P/N 334-1350 [PVC] or 334-1351 [Plenum])
- Belden 85102 or Belden 8471 (both are single twisted pair, 16 AWG)
- TIA Category 5 (CAT5)

Network wiring should be run in separate conduit and installed following local electrical codes. Any wire connected to Generator Sets must be stranded wire (NFPA110, Para. 7.12.4.1). Except when using ring topology, cabling is not polarity sensitive. The average temperature of the wire should not exceed +55ºC (+131ºF). Cable distance must comply with transmission specifications listed below. The *maximum total wire length* is the total length of wire within a segment. The *maximum node-to-node distance* is the maximum allowable distance between each individual node or the terminator.

Table 1 Free Topology

	Maximum node-to-node distance (Ft)	**Maximum total Wire length (Ft)**
Belden 8471	1300	1600
Belden 85102	1600	1600
NEMA Level IV	1300	1600
TIA Category 5	800	1400

Table 2 Double-Terminated Bus Topology

	Maximum Bus length (Ft)
Belden 8471	8800
Belden 85102	8800
NEMA Level IV	4500
TIA Category 5	2900

A double-terminated bus may have stubs of up to 10 feet from the bus to each device.

Cable Termination

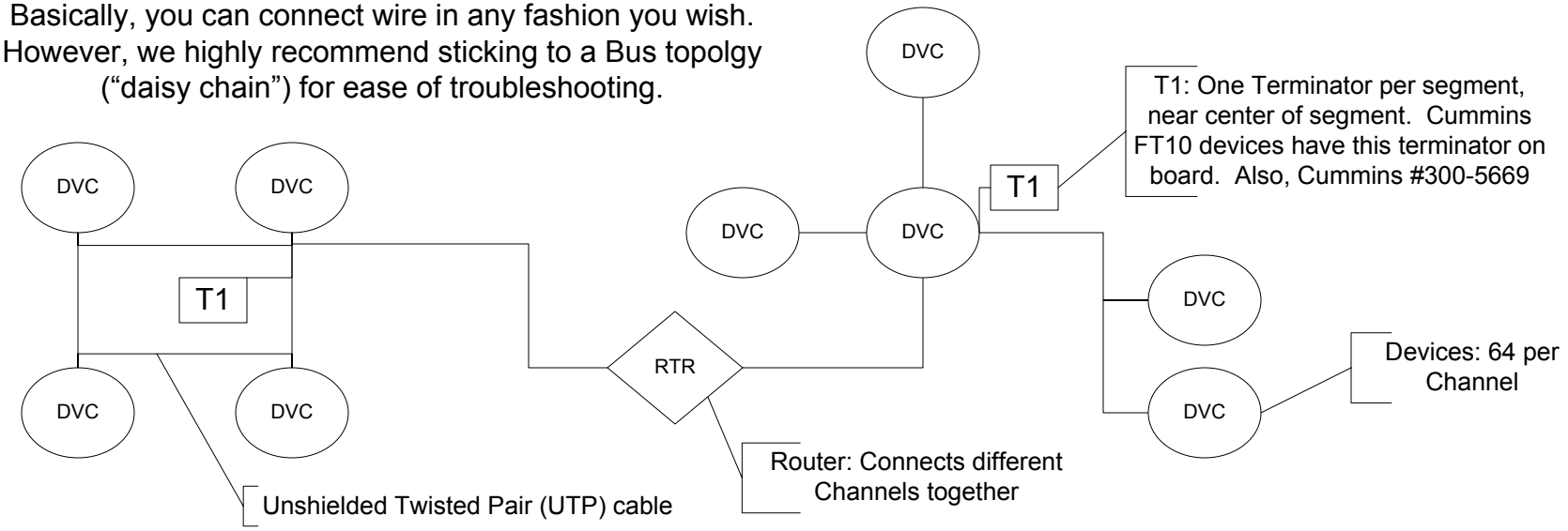
FTT-10 network segments require termination for proper data transmission performance. Free topology and Double-terminated Bus topology networks differ in their termination requirements.

Free topology segments only require one terminator per segment. This terminator can be placed anywhere in the segment, but is recommended to be placed near the middle of the segment. All PowerCommand network interface modules (i.e. GCM, NCM, GLC), Control Communications Modules (CCM), Digital I/O Modules (DIM) and Lonworks Annunciators have an on-board free topology terminator. It is recommended that this be used on a free topology segment. Optionally an external free topology terminator (Onan P/N 0300-5669) can be used.

Double-terminated Bus segments must be terminated at both ends of the segment. An FTT-10 Bus terminator (Onan P/N 0300-5729) must be used.

FT-10 Physical Wiring: Method 1, Free Topology

Basically, you can connect wire in any fashion you wish. However, we highly recommend sticking to a Bus topolgy ("daisy chain") for ease of troubleshooting.



Note: Although LonMaker says that you can have 2 segments to a channel, we are not confident in this, so stick to a maximum of 64 devices, 1 segment per channel

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FT-10 Physical Wiring: Method 2, Multi-Drop Bus

Wired exactly the same daisy-chain style as TP-78, except it uses a different terminator