



Solutions for Building Systems

Rules of Thumb

Free Topology Transceiver (FTT-10A) Wiring Issues:

Maximum number of nodes on one segment – 64

Wire type –unshielded twisted pair (details are in [the Echelon Junction Box and Wiring Guidelines Engineering Bulletin](#))

FREE TOPOLOGY SPECIFICATIONS – Single Termination Required

Requires one Model 44100 Terminator – Refer to the LonPoint Users Guide for details on Power Wiring

	Maximum node-to-node distance	Maximum total wire length	Wire diameter AWG/mm
Belden 85102	500 meters	500 meters	16 AWG/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

BUS TOPOLOGY SPECIFICATIONS – Double Termination Required

Requires 2 Model 44101 Terminators

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

Past these limits requires the use of a logical router or physical layer repeater
No more than 1 physical layer repeaters on any one FTT channel (n-way okay)

TP-1250 Bus Topology Wiring Issues:

Maximum number of nodes on one channel – 64

Wire type – Level IV, 22AWG (0.65mm) unshielded twisted pair (2,4,6 or 8 pair okay)

Maximum wire length of bus – 130 meters

Maximum wire length of stubs – 0.3 meters (1 foot)

Cannot be wired in free mode

No more than 8 nodes on any 16 meters of wire (if so, add a more wire loops)

Past these limits requires the use of a logical router

Router Usage:

Routers are used to logically and/or physically isolate LonWorks channels. They can also be used to bridge two different media types (FTT to TPT-1250 for example). Routers are necessary to extend the capacity of a channel or segment of a network. The most common

type of router is a Configured Router. Most smart installation tools configure and maintain the router tables automatically. This minimizes the need for the installer to be concerned about how messages are routed around the network. But, do not move a node from side A of a router to side B without reinstalling it or it will not communicate correctly.

Use routers in repeater mode only to extend the physical length and electrical isolation of a channel, all messages will forward in and out of the router in this mode (increasing traffic).

Routers should be wired in parallel (not series), connected to a common backbone (see figure 1)

Routers are used to span different channels. Typical buildings are configured with a TPT-1250 backbone channel and FTT channels on each floor or wing. Use an FTT to 1250 router to connect each floor or wing to the backbone and place the host PC on the backbone. Sometimes this will require the backbone channel to be wired to where the PC is located.

Node Issues:

Nodes or devices on a LonTalk network can come from many vendors and can all communicate and function on an integrated network. This is the fundamental key to the LonWorks technology. Some nodes are design to “interoperate” better than others. Here are some questions to ask when deciding upon whose nodes to use:

Can the node be installed simply with a generic tool like LonMaker?

Does the node have an LNS plugin to facilitate easy configuration?

Does the node require any custom configuration and if so are there utilities or documentation to help?

Do you supply documentation of the SNVT (Standard Network Variable Type) inputs and outputs and what their names are? (This information is usually on the data sheet or in the users guide, but it is important to know when architecting the system)

Does the node have an easily accessible service pin and service LED?

Does the node implement the WINK function for finding uninstalled devices on the network?

As an example the answer to all of these questions is yes for LonPoint System nodes.

On each node there is a service LED which tells the state of the device as follows:

On or Off – Bad hardware

½ sec On then Off – Normal

½ Hz Rate – Unconfigured

1 sec On, 2 sec Off, then On – Applicationless – a network mgt. tool needs to load the application

Host PC Hardware Issues:

Interface card: use the PCLTA-10 if the host is a desktop PC. Make sure you have both an ISA slot available and a free IRQ port. You may have to rearrange your IRQ ports within Windows.

Use the PCC-10 card if hooking up to a notebook computer. Same issues on free card slots and IRQ ports exist.

Always install the software drivers first, then install the hardware, if not you will have to go through specific driver removal process.

READ THE INSTALLATION INSTRUCTIONS!

All of the drivers come on one disk as part of the Connectivity Starter Kit or can be downloaded from the Echelon Web site.

Host PC Software Issues:

DDE Server – used to link the information from the network to any DDE compliant host software package (Excel, Visual Basic, Visual C, or Wonderware).

LonMaker – Use this Visio tool to pre-engineer the full LonWorks control network, then use the same tool to commission the nodes at the job site.

Wonderware – A host PC customizable graphical user interface. Uses DDE to send and receive data to the network

Protocol Analyzer – Use this tool for diagnosing the status and issue with the network. It shows network utilization, bandwidth issues, traffic logging and system verification.

Terms:

LonWorks – the name of the technology invented by Echelon Corporation

LonTalk – the name of the protocol the runs on the Neuron Chips. Invented and maintained by Echelon

LonMark – The interoperability organization that maintains the interoperable guidelines, testing procedures, and compliance requirements for LonWorks products

Channels – a segment of wire

SNVT – Standard Network Variable Types – the LonMark definition of the data that is sent from one node to another on a LonTalk network using the LonTalk protocol

LNS – LonWorks Network Services – a Network Operating System for LonWorks network encompassing fundamental services for installation, diagnostics, monitoring, and controlling as well as providing hooks for host PC software. Interfaces both locally or remotely using TCP/IP (Ethernet or Internet)

Plugins – a software component for LNS based tools that allows nodes to be configured easily through a graphical interface

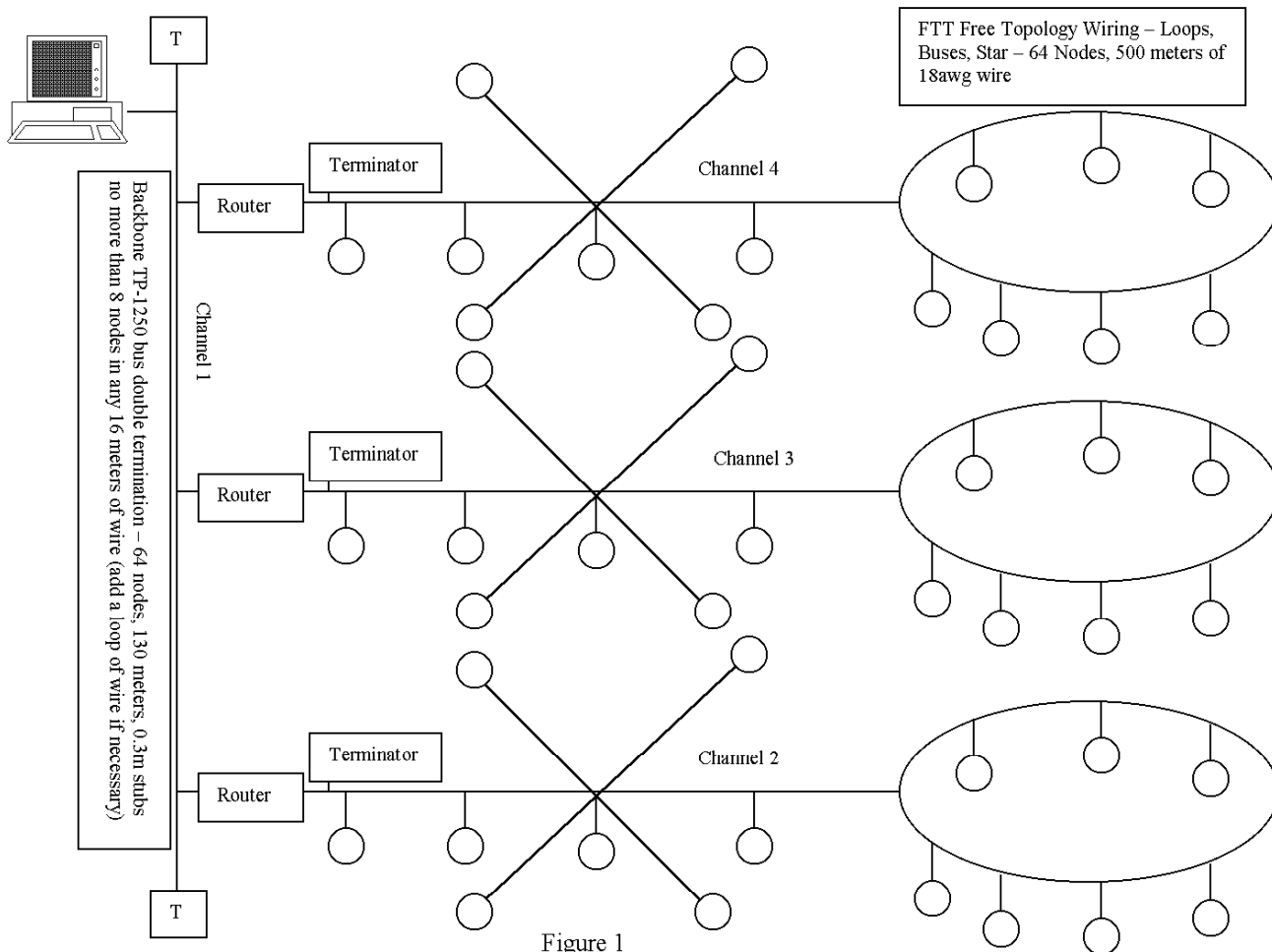


Figure 1

Figure 1 is a typical architecture layout for a multi-floor / multi-wing building. Each floor (ch 2-4) is connected to the high-speed backbone (ch 1). Note that from any one node to any other node has a maximum of 2 router hops (something to keep to a minimum). To extend the number of nodes or distance on any of the FTT channels, simply add a repeater. Note that single termination is required for FTT channel and double termination (at the ends) is required for the TPT-1250 channel. The PC is connected to the backbone channel with a PCLTA-10 (TPT-1250 version) to provide the fastest interface.

For more information or details, go to www.echelon.com or contact Echelon Sales at 1-800-258-4566.