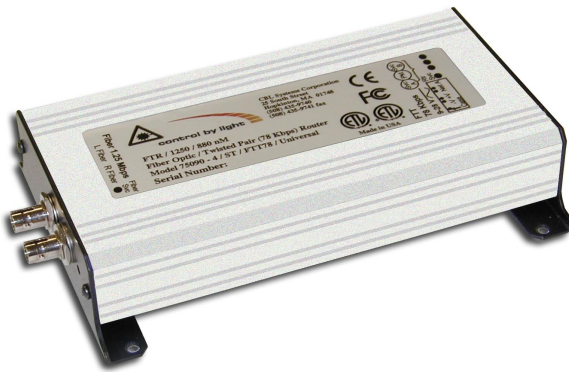


# Fiber Optic Data Routers

## Fiber-Optic-to-Twisted-Pair LonWorks Routers

CBL Systems Corporation  
[www.controlbylight.com](http://www.controlbylight.com)



Now available in  
**Multimode and  
 Single Mode versions**

### Description

The FTR implements the full set of LonWorks® router functions: Configured Router, Learning Router, Bridge or Repeater. It connects LonWorks twisted pair copper networks to LonWorks fiber optic networks, or extends twisted pair networks over long distances or through harsh environments. The FTR can be used to create links and backbones that connect copper LonWorks subsystems. The FTR implements the open standard LonTalk® communications protocol on both sides (i.e. on twisted pair copper and on fiber optic cable). Plus, they're simple to install and run right out of the box.

Fiber optic interconnection is ideal for applications needing high throughput, expandability, immunity to electromagnetic interference or long distances. Maximum LonWorks communication throughput is maintained on the fiber optic interconnect regardless of the distance or number of nodes attached. A single fiber optic ring can implement multiple subnets with several hundred fiber optic nodes (the allowable number of nodes is a function of average link length and the fiber optic cable characteristics, 750 to 3,000 node capacity is typical). These capabilities make the FTR an ideal solution for large project backbones with substantial message traffic, as well as small projects, to connect as few as two twisted pair networks together.

The old approach to creating links and backbones was to use a shared connection like Ethernet. In contrast, an FTR fiber optic link delivers consistent performance because it is dedicated to the LonWorks control network. Ethernet link latency and throughput will degrade as non-LonWorks traffic increases. Worse still, an Ethernet link has a single point of failure if its supporting file server goes down. A fiber optic backbone implemented with FTRs keeps on running with full functionality despite a node or link failure. With all these advantages for the FTR, the big surprise is that the FTR is priced less than LonWorks to Ethernet routers.

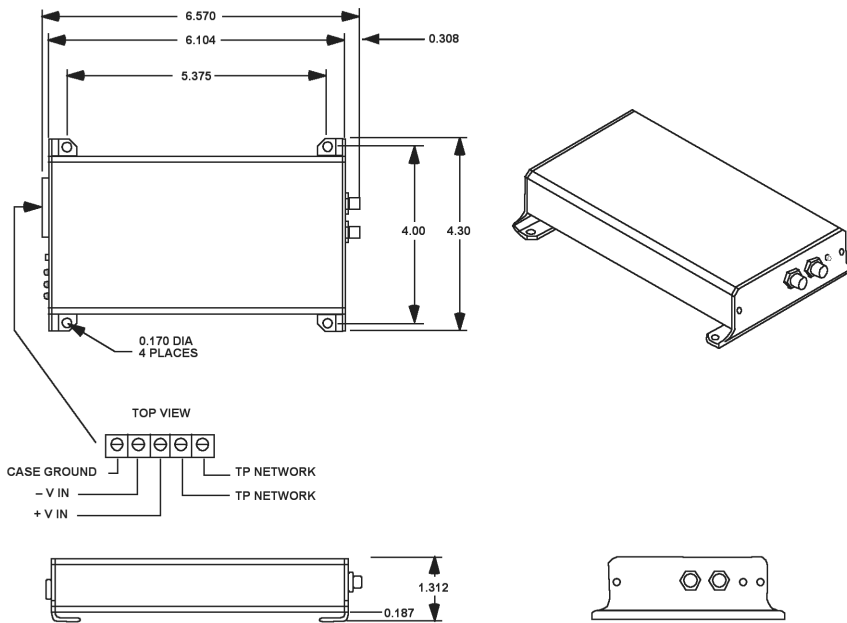
The FTR is a member of CBL Systems' family of fiber optic products. See our Control By Light brochure to learn more about how CBL's patented LonWorks fiber optic communication technology delivers performance that won't quit. Or visit our website at [www.controlbylight.com](http://www.controlbylight.com).

### Features

- Connect twisted pair LonWorks nodes to fiber optic LonWorks backbones, links or subnets.
- Connect two or more LonWorks copper nodes using fiber optic links.
- Linear or ring network topology.
- Implements four LonWorks standard router algorithms: configured router, learning router, bridge or repeater.
- Supports 1.25 MB/s LonWorks throughput with large fiber optic node count (750+ nodes) and over long distances.
- Single fiber communication reduces installation cost by 50%.
- Up to 30 km (1320 nM multimode) links without repeaters.
- Up to 40 km (single mode) links without repeaters.
- Ring redundancy and link monitoring to insure reliability.
- 9 to 28 V AC or DC operation.
- Plug-and-play for 31 byte packets, or configurable for large explicit messages.

# FTR Specifications

## Physical & Connection



Screw terminals on one end of the FTR connect to chassis ground, power and a LonWorks twisted pair network.

A power supply providing 9 to 28 V AC or DC is required and not included with the FTR. Typical current requirement is 100mA at 24 VDC.

Two ST or SMA fiber optic connectors are provided for the multimode FTR. The multimode unit is compatible with 62.5/125 micron multimode fiber or 100/140 micron multimode fiber. 50/125 fiber may also be used, at reduced optical link budgets.

The single mode FTR is compatible with 9 micron single mode fiber.

### Multimode and Single Mode Fiber-to-Twisted-Pair Router Versions

The FTR supports a variety of twisted pair and fiber optic communications options. The following table shows model numbers corresponding to each of the optional FTR features.

MODEL NUMBER 7X090-Z

OPTICAL WAVELENGTH: X

X VALUE	WAVELENGTH
2 (MM)	1320 nM
5 (MM)	880 nM
9 (SM)	1310 nM

CONNECTIONS: Z

Z VALUE	FIBER	COPPER
1	SMA	TP-1250
2	SMA	FTT-78
3	ST	TP-1250
4	ST	FTT-78
5	SMA	TP-78
6	ST	TP-78

For other application notes please visit our website at [www.controlbylight.com](http://www.controlbylight.com)

APPLICATION NOTE	DESCRIPTION
AN-001	To configure router for large explicit messages
AN-005	Node count and network length limitations

### Environmental Specifications

The FTR is housed in a powder-coated aluminum extrusion.

AMBIENT TEMPERATURE	-40°C to +85°C
CERTIFICATIONS	CE Mark, FCC, ETL and C-Tick

Model 79090 Single Mode FTR available in ST style only (-3, -4, -6)

# Control By Light Network Features

Fiber optic networks provide high throughput, immunity to electro-magnetic disturbances, the ability to handle ground potential differences and tamper-resistance. The patented Control By Light implementation of fiber optic LonWorks adds several key features:

- Bi-directional communication on a single fiber – reduces installation cost by 50%.
- Ring redundant topology – the system continues to function despite a link or node failure.
- Continuous link monitoring – flags a marginal link signal problem before failure.
- Excellent optical link budgets.

880 NM TYPICAL (25C)	100/140µ 62.5/125µ
Coupled power (dBm)	-8 to -10    -10 to -12
Receiver sensitivity (dBm)	-26    -26
Link budget (dBm)	16 to 18    14 to 16
Typ link length (km) with 3.2 dB/km, 3 dB margin, 0.6 dB for 2 connectors	3.9 to 4.5    3.3 to 3.9
1320 NM TYPICAL (25C)	
Coupled power (dBm)	-10 to -12    -12 to -14
Receiver sensitivity (dBm)	-28    -28
Link budget (dBm)	16 to 18    13.5 to 15.5
Typ link length (km) with 0.45 dB/km, 3 dB margin, 0.6 dB for 2 connectors	27.6 to 32.0    22.0 to 26.4
1310 NM TYPICAL (25C)    9 µ SINGLE MODE	
Coupled power (dBm)	-7 to -10
Receiver sensitivity (dBm)	-23 to -25
Link budget (dBm)	13 to 18
Typ link length with 0.35 dB/km, 2 dB margin, 0.5 dB for 2 connectors	0 to 41 km *

\* Attenuators may be required for short distances.



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