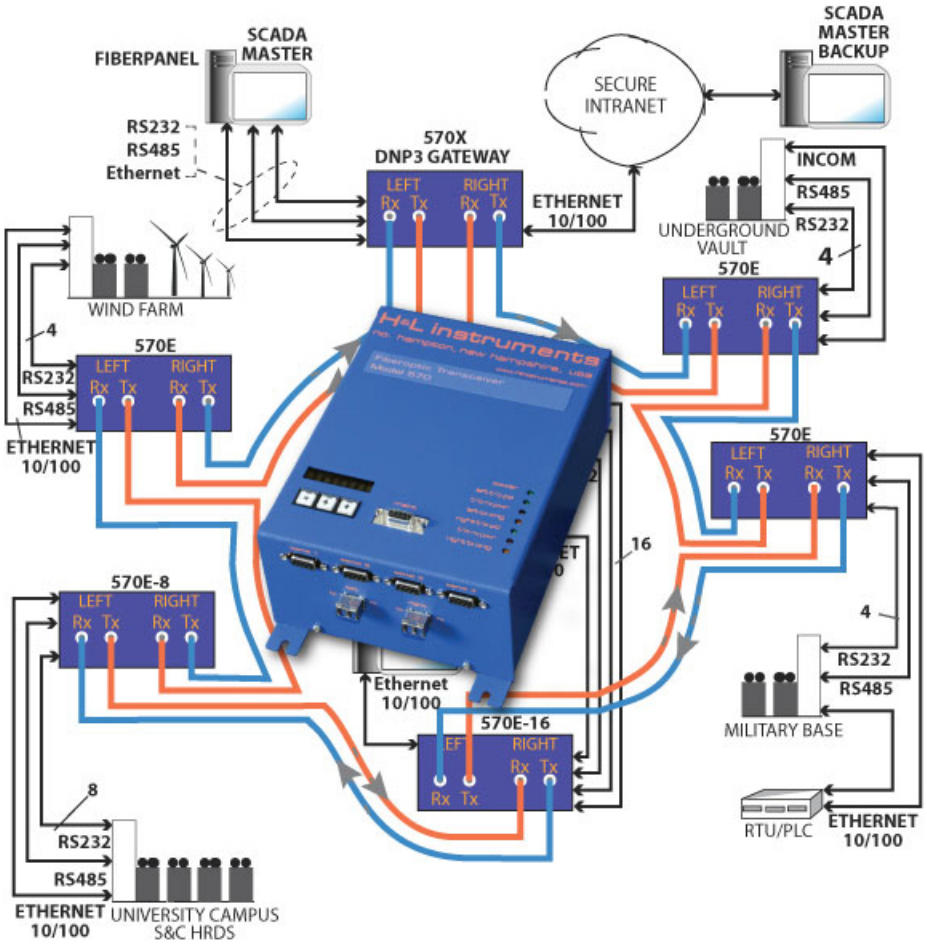
H&L Instruments Model 500 Series Fiberoptic Communication

Product Catalog



H&L instruments
Electro-Optics for Industry and Science Since 1979

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570E Fiberoptic Transceiver
Fiberoptic Network Solution

The Fiberoptic Communications Specialists

The Model 570E offers high-speed serial communication to meet the challenging needs of distribution automation, secondary networks, corporate LAN, Ethernet to SCADA master, substation networks and protection relay systems.

Model 570E Features

- **Up to 126 high-speed, 115 kbps virtual channels**
- **Large networks with up to 200 transceivers**
- **8 high-speed serial ports with 16 port option**
- **SLIC, INCOM, synchronous RS-422 (options)**
- **Transceiver/Controller features in a single unit**
- **Highly reliable, fault-tolerant, redundant, self-healing ring and radial network designs**
- **Vastly superior noise immunity and electrical isolation**
- **Supports all byte protocols including DNP and UCA**
- **Point-to-Point communication**
- **Two 10/100 802.3 compliant Ethernet ports**
- **LED status indicators, non-volatile flash memory, and optical power meter**
- **8 character alphanumeric LED display for diagnostics and port information**
- **FiberPanel™ integrated network management software**

Overview
The model 570E fiberoptic transceiver combines the capabilities of a transceiver and a controller in a single unit. You can conduct SCADA master, slave, and point-to-point communications within the same device, making it a highly flexible solution. The 570-based fiberoptic network is a total solution that includes both the hardware and software that you need to deliver the highest customer service and the most reliable communications.

Multiple Network Channels
The model 570E transceiver provides126 high-speed (115kbps) independent virtual network communication channels. You can assign any virtual channel to a transceiver serial port, which allows grouping Remote Terminal Units (RTUs) with common protocols, segregating different applications, and interconnecing backup master stations. The H&L Instruments fiberoptic network supports multiple RTUs, Intelligent Electronic Devices (IEDs), and Programmable Logic Controllers (PLCs).

Multiple Network Topologies
Both redundant loop and radial network designs are supported using the same model transceivers, and loop or radial network configurations can be set from a single location on the network.

Self-healing
Model 570E transceivers correct for network failures within 6 ms to reroute SCADA information with no interruption to communications. The network automatically converts from a loop configuration to a radial configuration whether a failure is caused by a severed fiber or due to an internal transceiver failure.

Protocol Transparent
The H&L Instruments fiberoptic network solution transparently carries all byte protocols, such as DNP, UCA, and MODBUS and can group RTUs with common protocols into common virtual communication channels without resorting to hard-coded serial port assignments.

Multiple SCADA Masters
The design of the 570 transceiver enables it to function as a SCADA master channel on some ports, while simultaneously acting as a slave channel on others. The network can include several SCADA master stations in multiple locations, which is optimal for water, electric, and gas utilities.

Paired Point-to-Point
The 570-based network supports pairing any transceiver serial port with another transceiver's port while continuing to use the remaining non-paired channels for conventional master/slave SCADA. The system accommodates up to 126 protective relay pairs, supports the use of SEL Mirrored Bits, and supports RS-422 64K synchronous communications.

Ethernet Ports
The Model 570E now includes two 10/100Mbps ports compliant with 802.3 Ethernet and 802.3u fast Ethernet standards. You can use auto-negotiation to select 10BASE-T or 100BASE-TX in full or half-duplex mode.

Modular SFP Fiberoptic Interface
The 570 dual LC-style SFP fiberoptic interface supports many options for fiber network configuration. The SFP plug-and-play technology offers optimum flexibility for provisioning your fiber network. This plug and play technology reduces transceiver spares inventory requirements, and simplifies maintenance and repair; it was introduced in an Engineering Notice dated January 2019.

Model 570E

Remote Monitoring, Network Management Software

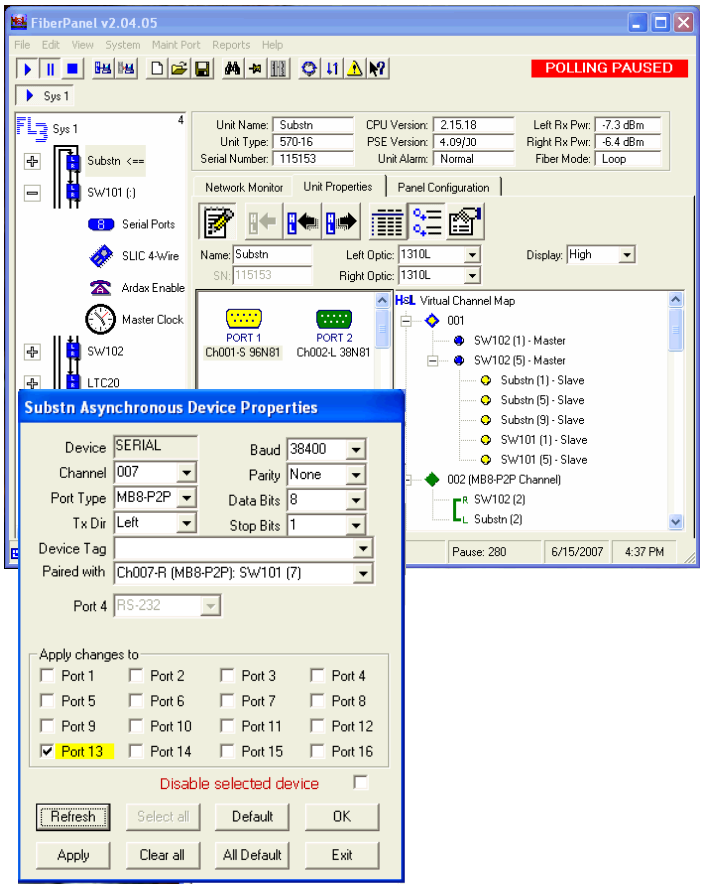
H&L Instruments differentiates itself from competitors, by including the FiberPanel™ Network Management Software with every system. FiberPanel is specifically designed to work with the Model 570E transceivers. Using FiberPanel you configure and view the system with an easy-to-use windows graphical user interface, and access real-time information about the fiber network.

The software supports remote connections to the fiber network including connection via a standard modem. Additionally, through TCP/IP connectivity, you can monitor and configure the system via your Intranet or the Internet. Up to 16 networks, each with up to 200 transceivers, can be monitored by a single FiberPanel session, and up to four users can monitor an active session.

Other fiberoptic solutions only allow you to catch problems after there is a break in the system. FiberPanel displays alarms and records a history of all network events in a log file. If problems with the fibers occur, you can quickly identify and correct any issues. This complete software solution helps you proactively maintain control over your fiber SCADA network and streamline your maintenance tasks.

Using FiberPanel, from the convenience of your desk, you can:

* View a System Map of your entire system.
* Check fibers, locations, unit names, and serial numbers.
* Assign unit names and location tags.
* Configure parameters for your each transceiver.
* Allocate channels and configure channel speed.
* Selectively turn on ports to communicate with remote devices, such as relay maintenance ports (which do not have SCADA addresses) to download event data or upload new settings.
* Measure optical power.
* Isolate faults, turn off serial ports, and re-route signals.
* Print reports on system activity, including diagnostic reports to show mis-wired fibers, list telemetry of unit voltages and temperatures, and identify malfunctioning units.



Model 570E Specifications

Model 570E:
8 high speed RS-232 serial ports

Ethernet PORTS (2):
Two 10/100 802.3 compliant RJ-45 Ethernet ports

Maintenance PORT:
RS-232 via PC-AT DB-9F port

Virtual Channels:
Supports 126 virtual channels. Any port can be assigned to any channel.

RS-485:
Opto-isolated transient-protected port

Data Rates:
600, 1200, 2400, 4800, 9600, 19.2kb/s, 38.4kb/s, 57.6 kb/s,115.2 kb/s

Alarm Output:
Form 1A (N.O.) opto-isolated solid state relay

Fiberoptic Connectors:
Modular SFP with dual LC connectors

Optical Receiver Sensitivity:
-28dBm

Optical Budget:
20dB singlemode

Optical Output (class 1, eye safe devices):
20 km transmission distance:
Laser -8 to -15 dBm @ 1310nm singlemode
Laser -8 to -15dBm @ 1550nm singlemode
80 km transmission distance:
Laser –5 to 0 dBm @ 1550nm singlemode
120 km transmission distance:
Laser –2 to +3 dBm @ 1550nm singlemode

Environmental/Mechanical Specs:
Operating Temperature: -40°C to +85°C
5% to 95% RH Net Weight: 3.25lbs
9"L X 6"W X 3.3"H

Power Options (10.4 watts max):
9-36Vdc, 18-75Vdc, 125Vdc/120Vac 50-60 Hz, 250Vdc/230Vac 50-60 Hz

SLIC, INCOM, Synchronous RS-422 (Option)
1 SLIC, 1 INCOM, 2 synchronous RS-422 ports

IntelliTEAM II™ (Option)
9-36 Volt power supply with short-case chassis for operation with S&C 5804 Controller

Additional Options:

Model 570E-16
16-DB-9F RS-232 connectors one port per connector

System Requirements for FiberPanel:
Microsoft® Windows 10/8/7, XP, Vista, WIN2k, NT4

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The Fiberoptic
Communications

Model 570E-16 Option

The model 570E-16 provides maximum flexibility for SCADA master/slave operation, paired point-to-point communication, connecting backup master stations, and grouping RTUs that communicate via a common protocol. The 570E-16 can also be supplied with other options including SLIC, INCOM, and synchronous RS-422.

Model 570E and 570E-16 Common Features

Ethernet Support

All 570E transceivers are equipped with two 10/100 Mbps ports compliant with the 802.3 Ethernet and 802.3u Fast Ethernet protocols. You can configure these transceivers to auto-negotiate 10BASE-T or 100BASE-TX operation in full or half-duplex modes. The 570E-8 configuration does not include the Ethernet interface if supplied with the IntelliTEAM short-case option.

RS-485 Interface

The RS-485 interface is included as standard on all 570 transceivers and is accessed via the *serial 3,* DB-9F connector.

Remote Monitoring Network Management Software

All H&L Instruments transceivers include the FiberPanel™ Network Management Software to implement the H&L Instruments fiberoptic network. The software is specifically designed to work with all H&L Instruments transceivers. FiberPanel monitors the fiber network, logs network events, issues alerts and alarms, generates reports, and aids with fast identification and correction of network issues.

Protocol Transparent

A 570-based network transparently carries all byte protocols, such as DNP, UCA, and MODBUS and can group RTUs with common protocols onto common virtual communication channels without resorting to hard-coded serial port assignments.

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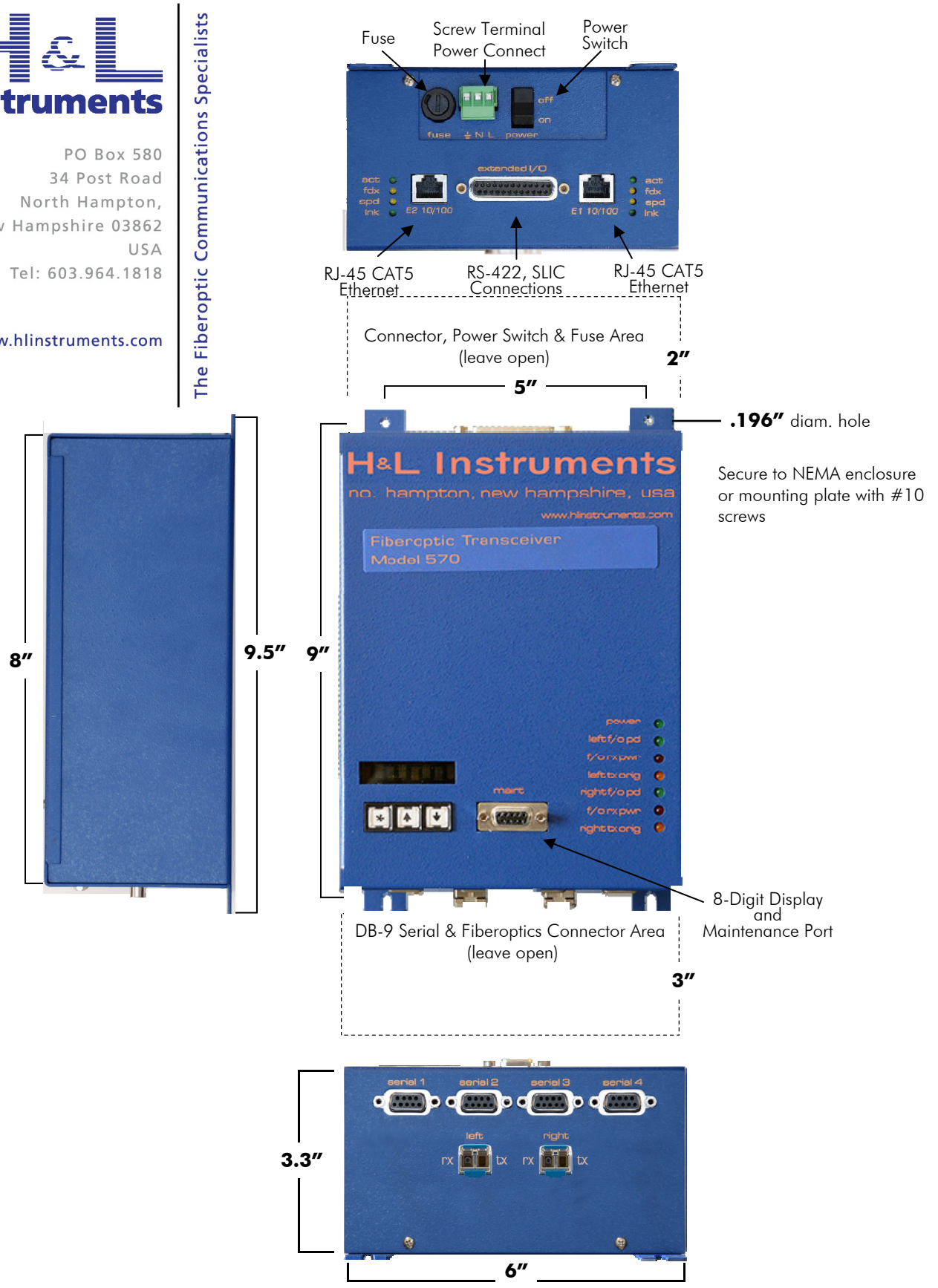


Model 570E/570E-8 Fiberoptic Transceiver Dimensions—Standard Case

570E-16 Fiberoptic Transceiver
Fiberoptic Network Solution

H&L instruments

The Fiberoptic Communications Specialists

The Model 570E-16 offers 16 high-speed serial ports to meet the challenging needs of distribution automation, secondary networks, corporate LAN, Ethernet to SCADA master, substation networks and protection relay systems.

Model 570E-16 Features

- **Up to 126 high-speed virtual channels**
- **16 high-speed serial ports**
- **SLIC, INCOM, RS-422/Ardax (options)**
- **Transceiver and controller features available in a single, powerful unit**
- **Highly reliable, fault-tolerant, redundant, self-healing ring and radial network designs**
- **Vastly superior noise immunity and electrical isolation**
- **Supports all byte protocols including DNP and UCA**
- **Supports point-to-point communication**
- **Includes wo 10/100 802.3 compliant Ethernet ports**
- **LED status indicators, non-volatile flash memory, and optical power meter**
- **8 character alphanumeric LED display for diagnostics and port information**
- **Includes FiberPanel™ integrated network management software**

Overview
An H&L Instruments fiberoptic network includes the hardware and software you need to deliver the highest customer service and the most reliable monitoring and control. The Model 570E-16 fiberoptic transceiver combines the capabilities of a transceiver and a controller in a single unit. This means you can perform SCADA master, slave, and point-to-point communications within the same device, making it a highly flexible solution.

Multiple Network Channels
The Model 570E-16 transceiver offers 126 high-speed, independent virtual network communication channels. You can assign a transceiver serial port to any virtual channel, which allows you to group Remote Terminal Units (RTUs) with common protocols, segregate different applications, allocate network bandwidth, and connect backup master stations. The 570E-based network supports multiple RTUs, Intelligent Electronic Devices (IEDs), and Programmable Logic Controllers (PLCs).

Multiple Network Topologies
Both redundant ring and radial network designs are supported using the same model transceivers, and ring or radial network configurations can be set from a single location on the fiber network.

Self-healing
Model 570E-16 transceivers correct for network failures within 6 ms to reroute SCADA information with no interruption to communications. The network automatically converts from a loop configuration to a radial configuration if a break in the fiber network occurs.

Protocol Transparent
The H&L Instruments fiberoptic network solution transparently carries all byte protocols, such as DNP, UCA, and MODBUS and can group RTUs with common protocols into common virtual communication channels without resorting to hard-coded serial port assignments.

Multiple SCADA Masters
The design of the 570E transceiver enables it to act as a SCADA master channel on some ports, while simultaneously acting as a slave channel on other ports. The networks can consist of many SCADA master stations in multiple locations, which work optimally if operations are combined for water, electric, and gas utilities.

Paired Point-to-Point
The 570-based network supports pairing any transceiver port with another transceiver's port while continuing to use the remaining non-paired channels for conventional master/slave SCADA. The system accommodates up to 126 protective relay pairs, supports the use of SEL Mirrored Bits, and supports RS-422 64K synchronous communications.

Ethernet Ports option E
The Model 570E-16 includes two 10/100Mbps ports compliant with 802.3 Ethernet and 802.3u Fast Ethernet standards. You can use auto-negotiation to select 10BASE-T or 100BASE-TX in full or half-duplex mode.

Modular SFP Fiberoptic Interface
The dual LC-style SFP fiberoptic interface offers many options for fiber network configuration. The SFP plug-and-play technology offers optimum flexibility for provisioning your fiber network, reduces transceiver spares inventory requirements, and simplifies maintenance and repair; it was introduced in an Engineering Change Notice in January 2019.

Model 570E-16

Remote Monitoring with FiberPanel Network Software

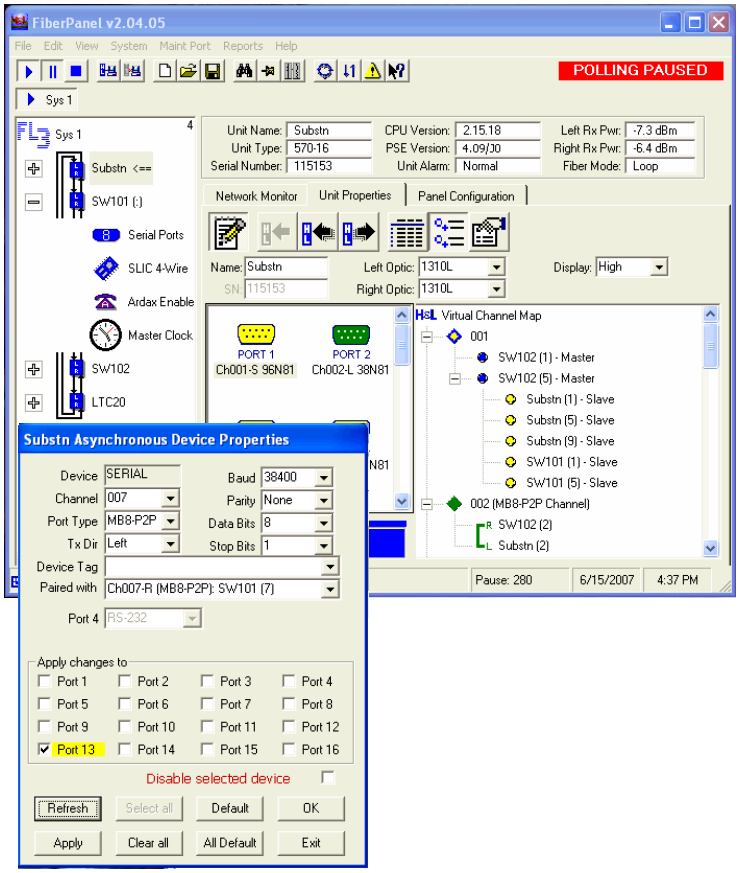
Differentiating itself from competitors, H&L also includes the FiberPanel™ Network Management Software with every system. FiberPanel is specifically designed to work with the model 570E and 570E-16 transceivers. It permits configuring and viewing the system with a graphical, easy-to-use interface that accesses real-time information about transceiver and network conditions.

The software also supports remote connections to the fiberoptic network via a standard modem or through TCP/IP connectivity. You can monitor and configure the 570-based system via your Intranet or the Internet. Up to four users can monitor an active session.

Other fiberoptic solutions only allow you to catch problems after there is a break in the system. FiberPanel displays alarms and records a history of all network events in a log file. If problems with the fibers occur, you can quickly identify and correct any issues. The complete H&L Instruments fiberoptic solution helps you proactively maintain control over your network and streamline your maintenance tasks.

Using FiberPanel, from the convenience of your desk, you can:

* View a System Map of your entire set-up.
* Check fibers, locations, unit names, and serial numbers.
* Assign unit names and location tags.
* Configure each transceiver on the network.
* Allocate channels and decide channel speed.
* Selectively turn on ports to communicate with remote devices, such as relay maintenance ports (which do not have SCADA addresses) to download event data or upload new settings.
* Measure optical power.
* Isolate faults, turn off serial ports, and re-route signals.
* Print reports on system activity, including diagnostic reports showing mis-wired fibers, telemetry of transceiver voltages and temperatures, and identify malfunctioning units.



Model 570E-16 Specifications

Model 570E-16:
16-DB-9F RS-232 serial ports, one port per connector

SLIC, INCOM, RS-422 (options):
1 SLIC, 1 INCOM, 2 RS-422/Ardax ports

Ethernet PORTS:
Two 10/100 802.3 compliant RJ-45 Ethernet ports

Maintenance PORT:
RS-232 via PC-AT DB-9F port

Virtual Channels:
Model 570s support 126 virtual channels. Any port can be assigned to any channel. Point-to-Point channels available.

RS-485:
Opto-isolated transient-protected port

Data Rates:
600, 1200, 2400, 4800, 9600, 19.2kb/s 38.4kb/s, 57.6 kb/s, 115.2 kb/s

Power Options (10.4 watts max):
12Vdc, 24Vdc, 48Vdc, 125Vdc/120Vac 50-60 Hz, 250Vdc/230Vac 50-60 Hz

Push-to-Talk:
Form 1A (N.O.) opto-isolated solid-state relay; PTT contacts on pins 1 & 9 of DB-9 Serial 3 (option)

Environmental/Mechanical Specs:
Operating Temperature: -40°C to +85°C
5% to 95% RH
Net Weight: 3.25lbs
9.5"L X 12"W X 3.3"H

Fiberoptic Connectors:
Modular SFP with dual LC connectors

Optical Output (class 1, eye safe devices):
20 km transmission distance:
Laser -8 to -15 dBm @ 1310nm singlemode
Laser -8 to -15dBm @ 1550nm singlemode
80 km transmission distance:
Laser –5 to 0 dBm @ 1550nm singlemode
120 km transmission distance:
Laser –2 to +3 dBm @ 1550nm singlemode

Alarm Output:
Form 1A (N.O.) opto-isolated solid state relay

Optical Receiver Sensitivity:
> -28dBm

Optical Budget:
20dB singlemode

System Requirements for FiberPanel:
Microsoft® Windows 10, Windows 7, Windows XP, Windows 2000, Windows NT4

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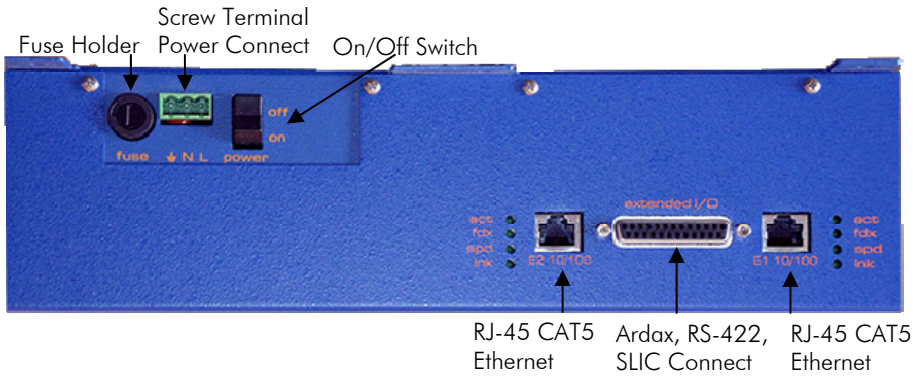
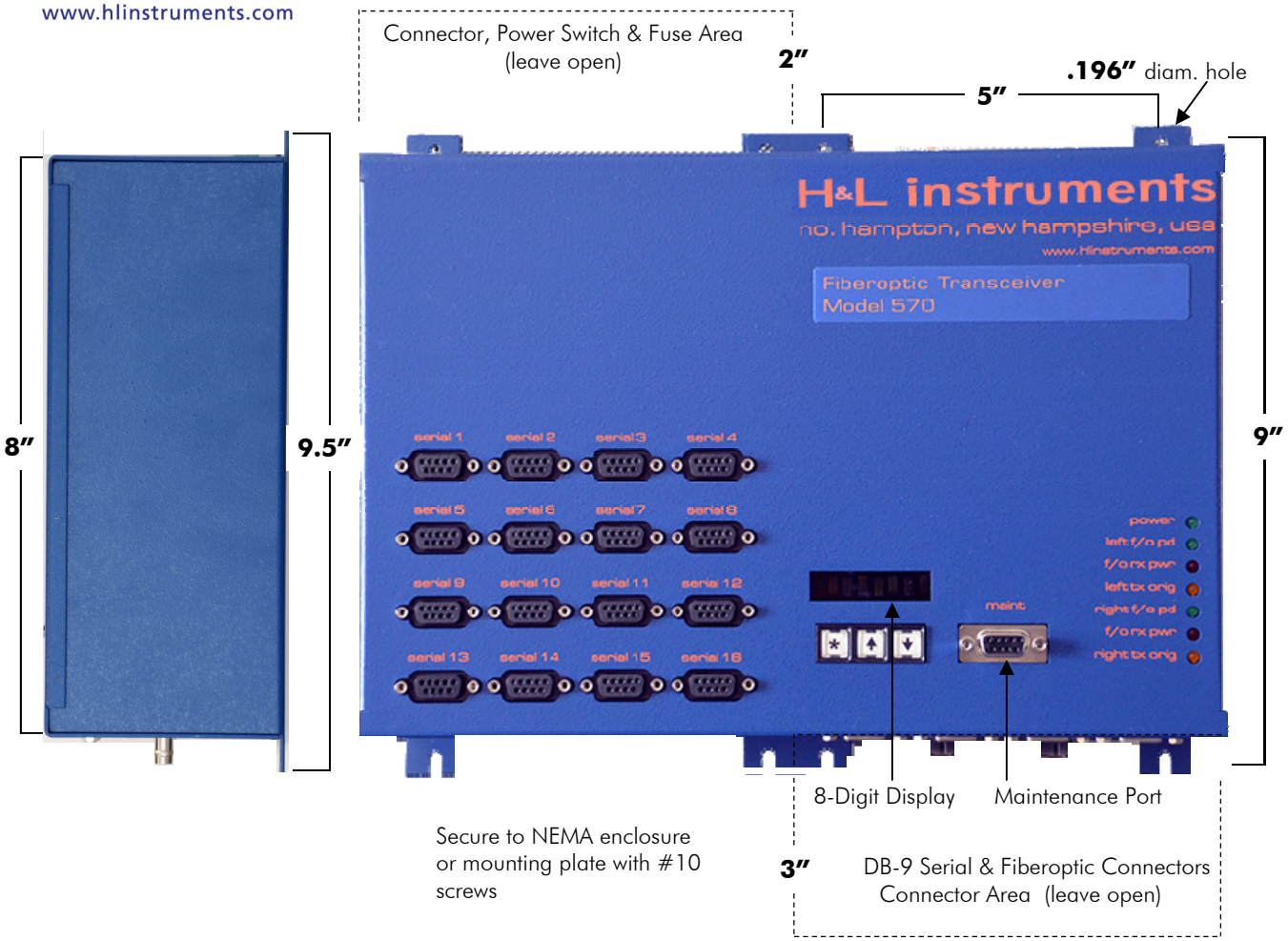
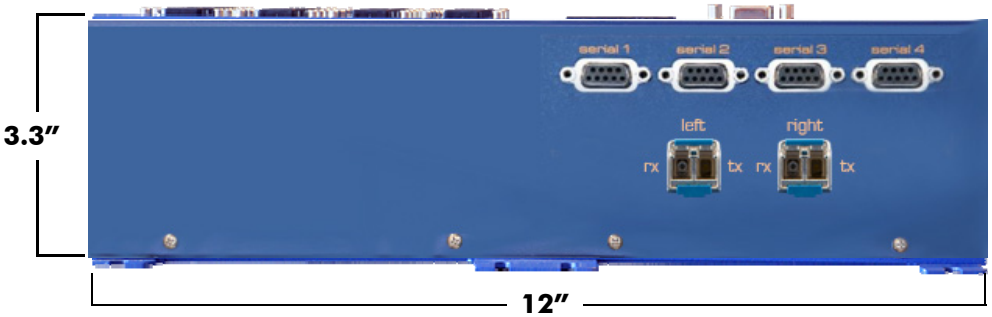






Model 570E-16 Fiberoptic Transceiver Dimensions

9200-5103 08/01/07/2020

570X Fiberoptic DNP3 Gateway Transceiver
H&L Instruments Fiberoptic Network Solution

The Fiberoptic Communications Specialists

The Model 570X Fiberoptic Gateway offers high-speed serial DNP3 protocol-aware communication to meet the challenging needs of distribution automation, secondary networks, corporate LAN, Ethernet to SCADA master, substation networks and protection relay systems.

Model 570X Features

- **ARM-based Embedded Linux System-On-Module (SOM)**
- **DNP3 over TCP and UDP protocols**
- **8 serial ports up to 115.2kbaud**
- **Up to 126 high-speed independent fiber data channels**
- **Highly reliable, fault-tolerant, rapid-healing, redundant fiber ring network support**
- **Transparent support of all serial byte protocols including DNP3, Modbus, and UCA**
- **Packetized, protocol-aware support of serial DNP3**
- **Two 10/100 802.3 compliant Ethernet ports**
- **Two 100BASE-FX single-mode optical ports, 1310 or 1550 nm**
- **LED status indicators, non-volatile flash memory, and optical power meter**
- **8 character alphanumeric LED display for diagnostics and port information**
- **FiberPanel™ Windows-Based, Network Management Software**

Overview
The Model 570X Fiberoptic DNP3 Gateway transceiver combines the capabilities of a standard H&L Instruments fiberoptic transceiver with a Linux System-On-Module (SOM) to add fast protocol bridging and packet routing services. The Model 570X Fiberoptic DNP3 Gateway supports DNP3 over TCP and DNP3 over UDP protocols for fast and efficient SCADA networks.

Packetized DNP3 Fiberoptic Communication Services
The Model 570X Fiberoptic Gateway transceiver provides packetized DNP3 communication over a fiber network. The transceiver's built-in SOM handles all protocol translation services between LAN-connected SCADA masters and packetized fiber data channels. A free firmware update to existing 570 transceivers provides translation services between packetized DNP3 fiber data channels and remote serial DNP3 slave ports.

Advantages of Packetized DNP3 Data Channels
A single Model 570X Fiberoptic Gateway operates at the head-end of your SCADA network to provide conversion and bridging between DNP3 Frames on the LAN and packets on the virtual fiber data channels. As a result, SCADA masters and proxy servers can send simultaneous requests to multiple slaves on a single virtual channel while slave devices are transmitting unsolicited responses. This is accomplished while enhancing performance and reducing data collision errors often caused by byte-interleaving in transparent, protocol-independent schemes.

Ethernet Ports Standard
The Model 570X Fiberoptic Gateway includes two 10/100Mbps ports compliant with the 802.3 Ethernet and 802.3u Fast Ethernet standards.

Eight High-Speed Serial Ports Standard
The Model 570X Fiberopotic Gateway includes 8 high-speed serial ports, which can be configured to operate at up to 115.2 kilobaud. Each serial port can be assigned to an independent virtual data channel on the fiber network.

Protocol Transparent Mode
H&L Instruments fiberoptic network technology transparently transmits any byte protocol such as DNP3, UCA, and MODBUS and can group RTUs with common protocols into separate virtual communication channels.

Easy Integration With Existing 570 Networks
The Model 570X Fiberoptic Gateway easily integrates with existing 570 systems by way of a simple, no-cost upgrade to the standard Model 570 firmware. The upgrade provides protocol-aware translation between serial DNP3 slave ports and packetized DNP3 fiber data channels. These channels can then be assigned to LAN-connected SCADA Master IP ports at the head-end 570X. The H&L Instruments network solution, with the Model 570X Fiberoptic Gateway, provides the hardware and software you need to deliver the highest customer service and the most reliable communications for your DNP3-based SCADA network.

Modular SFP Fiberoptic Interface
The dual LC-style SFP fiberoptic interface offers many options for fiber network configuration. The SFP plug-and-play technology offers optimum flexibility for provisioning your fiber network, reduces transceiver spares inventory requirements, and simplifies maintenance and repair; it was introduced in an Engineering Change Notice in January 2019.

Model 570X

Remote Monitoring with Network Software

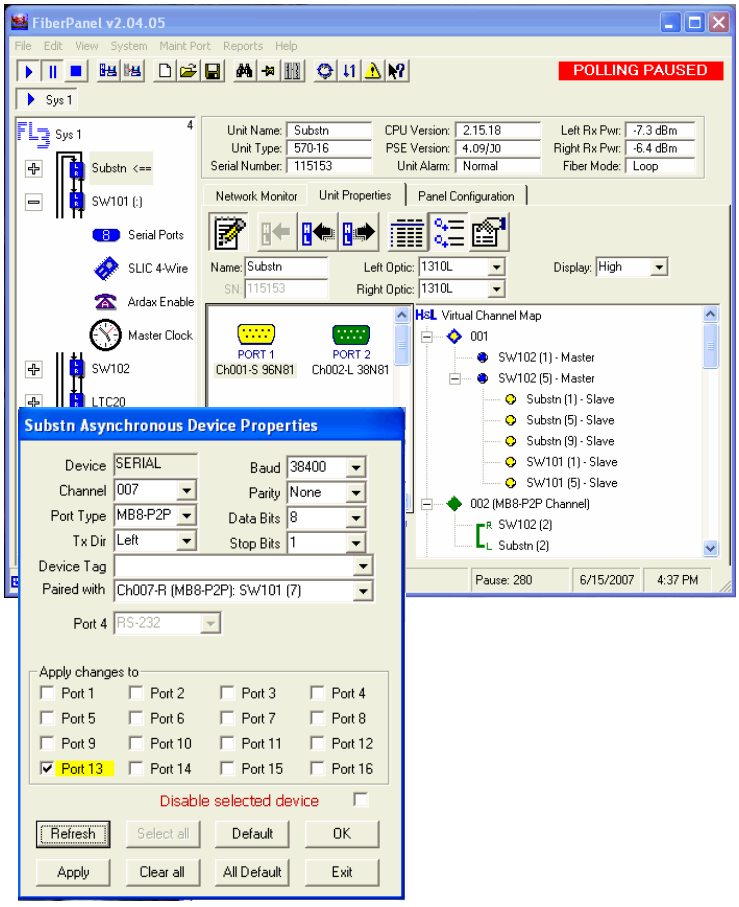
Differentiating itself from competitors, H&L bundles the FiberPanel™ Network Management Software with every system. FiberPanel is enhanced to operate with the Model 570X Fiberoptic Gateway transceivers. It configures and graphically monitors your network via a familiar and easy-to-use Windows based interface. It continually displays maps and real-time status information about your network.

The 570X supports a direct TCP/IP connection from FiberPanel without the need for a third-party terminal server that previously was needed to connect to the serial transceiver maintenance port, although the serial option is still available. You can monitor and configure your system via your LAN connection or by the standard direct serial maintenance port connection. Up to four users can monitor an active session simultaneously.

Other fiberoptic solutions only permit detecting problems after the system breaks. FiberPanel displays alarms and records a history of all network events in a log file. If problems with the fibers occur, you can quickly identify and correct any issues. The H&L Instruments complete solution helps you proactively maintain control over your network and streamline your maintenance tasks.

Using FiberPanel from the convenience of your office, you can:

* View a System Map of your entire set-up.
* Check fibers, locations, unit names, and serial numbers.
* Assign unit names and location tags.
* Configure parameters for your units.
* Configure serial or IP ports and assign them to any of 126 fiber data channels.
* Selectively turn on ports to communicate with remote devices, such as relay maintenance ports (which do not have SCADA addresses) to download event data or upload new settings.
* Measure optical power.
* Isolate faults, turn off serial ports, and re-route signals.
* Print reports on system activity, including diagnostic reports that can show mis-wired fibers, telemetry of unit voltages, unit temperature and malfunctioning units.



Model 570X Specifications

8 High-Speed Serial Ports:
4-DB-9F RS-232 connectors offer 8 high speed ports: 3 each on connectors 1 and 2, and one port each on connectors 3 and 4

RS-485:
Opto-isolated transient-protected port

SLIC, INCOM, Synchronous RS-422 (options):
1 two- or four-wire SLIC interface, 1 Eaton MPCV INCOM interface, 2 synchronous 64k SEL 311-compatible RS-422 ports

Ethernet PORTS:
Two 10/100 802.3 compliant RJ-45 Ethernet ports

Maintenance PORT:
RS-232 via PC-AT compatible DB-9F port plus SOM DB9 maintenance port

Virtual Channels:
The Model 570X Fiberoptic Gateway supports 126 virtual fiber data channels. Any port can be assigned to any channel.

Alarm Output:
Form 1A (N.O.) opto-isolated solid state relay

Serial Port Configuration:
600, 1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k, or 115.2k baud. Even, odd, or no parity. 7 or 8 bit char width. 1 or 2 stop bits.

Power Options (10.4 watts max):
12Vdc, 24Vdc, 48Vdc, 125Vdc/120Vac 50-60 Hz, 250Vdc/230Vac 50-60 Hz

Environmental/Mechanical Specs:
Operating Temperature: -40°C to +85°C
5% to 95% RH
Net Weight: 3.25lbs
9"L X 6"W X 3.3"H

Optical Output (class 1, eye safe devices):
20 km transmission distance:
Laser -8 to -15 dBm @ 1310nm singlemode
Laser -8 to -15dBm @ 1550nm singlemode
80 km transmission distance:
Laser –5 to 0 dBm @ 1550nm singlemode
120 km transmission distance:
Laser –2 to +3 dBm @ 1550nm singlemode

Fiberoptic Connectors:
Modular SFP with dual LC connectors

Optical Receiver Sensitivity:
> -28dBm

Optical Budget:
20dB singlemode

System Requirements for FiberPanel:
Microsoft® Windows 10, Windows 7, Vista, XP, WIN2K, XP, Windows NT4

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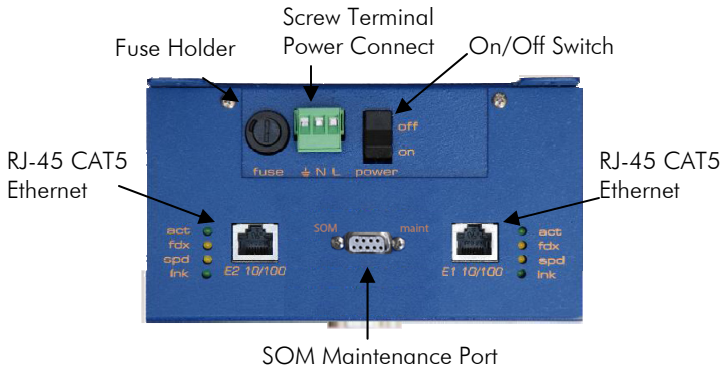
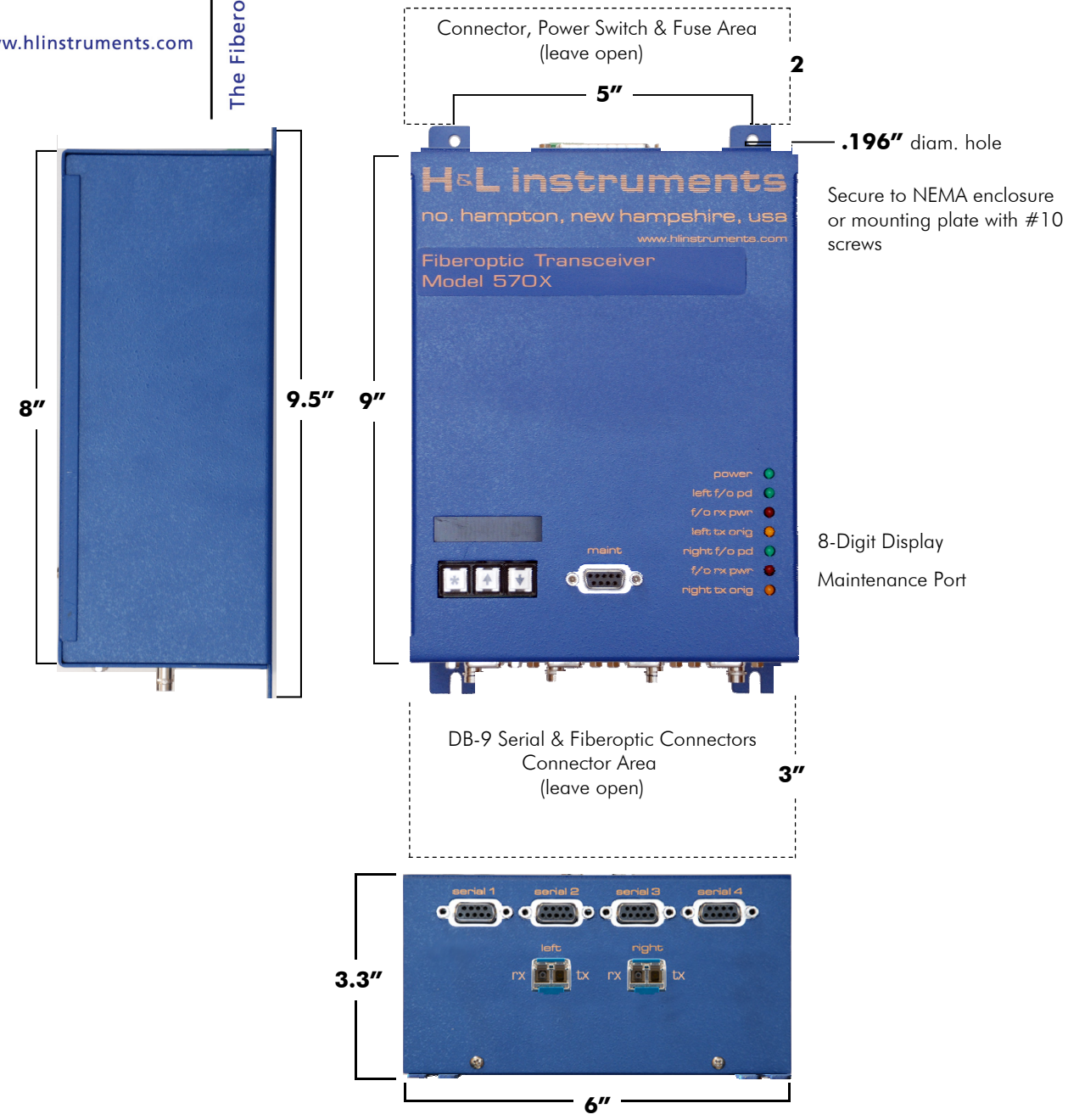




Model 570X Fiberoptic Transceiver Dimensions—Standard Case

9200-5113 08/01/07/2020

Model 570 Engineering Change Notice

The Fiberoptic Communications Specialists

Pictured above is the new Model 570 (bottom panel view) with the SFP module configuration. A module closeup shows the shielded SFP design for improved noise immunity and protection against noise radiation.

ST-to-Dual LC connector adapter cable

Dual ST female-to-female adapter

Important Notice
An engineering change has been made to the Model 570 fiberoptic interface that offers increased flexibility for accommodating longer transmission distances and additional optical wavelength configurations. All Model 570 transceivers (-8, -16, 570X) now use SFP plugin modules, which are available from numerous manufacturers. The SFP module with dual-LC connector interface replaces the discrete optical modules that use an ST connector interface.

Model 570 Uses SFP Style Dual-LC Connectors

The fiberoptic interface for the Model 570 family of products no longer uses discrete devices with ST style connectors. Instead, the 570 employs SFP fiberoptic modules that use a dual-*LC* connector interface. Both transmit and receive fibers terminate in the duplex style LC connector.

Model 570 Part Number Revisions

The part numbers for ordering the Model 570 are changed to specify the SFP fiberoptic module provision. The following table shows the new part number designations for the SFP module provision versus the previous part numbers that correspond to an ST fiberoptic connector interface.

Left/Right Port Common Wavelength	SFP Part Number Designation
1310L nm SM SFP-LX *	77
1310 SM laser (obsolete ST)	44AA
1550L nm SM SFP-LX *	88
1550 nm SM laser (obsolete ST)	66AA

* SFP module versions are available for fiber transmission distances greater that 15 km. Call H&L Instruments for more information about long distance options.

NOTE: Left and right transmit/receive pairs can still be ordered to operate at different optical wavelengths.

Adapting Dual LC Fiber Cable Connections

H&L Instruments offers options for adapting the dual-LC connection interface:

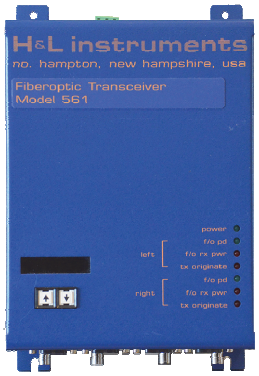
- For new installations, terminate fiberoptic cables with dual-LC connectors, and connect the cables directly to the new Model 570E.
- For existing installations, where fiberoptic cables terminate in ST connectors, request two 1-meter ST-to dual-LC adapter cables and two dual ST-to-ST female adapters.

NOTE: Adapters and adapter cables are available at no charge with new Model 570 purchases.

H&L Instruments, LLC P.O. Box 580, 34 Post Road North Hampton, NH 03862-0580
(603) 964-1818 www.hlinstruments.com

561 Fiberoptic Network Transceiver

The Fiberoptic Communications Specialists



If you want to increase the reliability and speed of your data communications system, then you need the Model 561 with up to 16 virtual channels to perform multi-drop, radial, or loop serial RS-232 and and optional RS-485 communications.

Model 561 Features

- Up to 16 virtual channels (A thru P)
- 4 , 8 or 16 serial ports
- Up to 250 transceivers arranged in a loop or radial bus topology (scalable)
- Highly reliable, fault-tolerant, redundant, self-healing loop technology
- Variety of plug-in optical modules for varying distances between stations (up to 53 miles)
- Vastly superior noise immunity and electrical isolation
- Supports all byte protocols (e.g. DNP, UCA)
- LED status indicators, nonvolatile memory, and built-in optical power meter
- 8 character alphanumeric LED display for diagnostics and port
- information
- Integrated FiberPanel Network Management Software
- Compatible with H&L Model 560/562 Fiberoptic Transceivers

Overview

The model 561fiberoptic transceiver is a field-tested member ot H&L Instruments fiberoptic network technology that includes FiberPanel™ a Windows®-based network management software application. You can network as many 561 transceivers as required to connect Remote Terminal Units (RTUs) or other Intelligent Electronic Devices (IEDs) to the SCADA masters at a Model 561 network controller. This fiberoptic network solution:

- Improves your ability to locate electric system faults
- Ensures worker safety
- Manages data in a single accessible system
- Monitors and control switchgear remotely
- Responds quickly to service outages and restores power

Flexible and Self-Healing

The Model 561 transceiver is used on a pair of multi-dropped fibers for all remote devices, such as RTUs, Programmable Logic Controllers (PLCs), IEDs, etc. You can arrange the transceivers in a loop or bus (radial) topology, which allows you the flexibility for greatly expanding your system in the future.

The Model 561, used as a master unit, is the head end for your SCADA masters. All signals pass through the controller, which can automatically "self-heal" the system and re-route data in the event of fiber breaks or a transceiver failure anywhere in the system. The arrangement of transceivers in a loop configuration provides a highly reliable, fault-tolerant solution.
In small systems, you can provide a dedicated channel for each RTU.

Model 561 at Work

If an additional SCADA master is needed at another location, such as a water plant master, you can install serial port jumpers at the 561 electric network controller to bridge two virtual channels and remotely bridge the remote master on one virtual channel to another virtual channel and broadcast to all units.

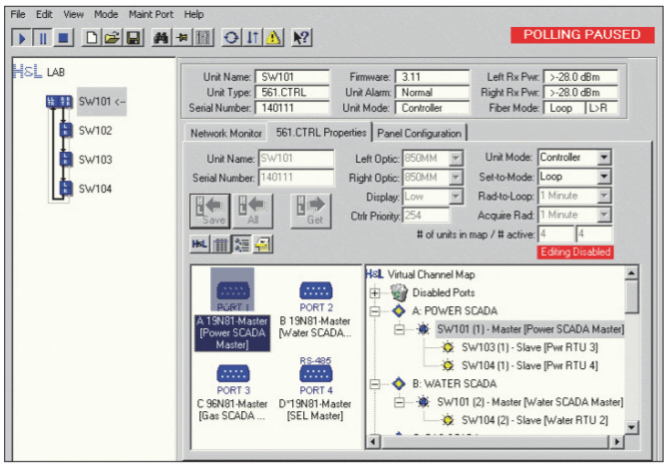
At any location on the network, you can place 561 transceivers as standby controllers connected to standby SCADA master computers. This allows the standby SCADA master to take over the network operation if the primary controller fails. You can add as many as 250 additional Model 561 transceivers to the system, and dependent on the model, you can connect up to 4, 8, or 16 RTUs or other IEDs to each transceiver (32 devices can be multi-dropped on the optional RS-485 port).

Model 561

Integrated Network Management Software

Your purchase of the 561 includes FiberPanel, which provides extensive network management, configuration, and diagnostic capabilities. Other fiberoptic solutions only allow you to catch problems after there is a serious break in the system. FiberPanel helps you proactively maintain your system and streamline your maintenance tasks.

FiberPanel is a Microsoft® Windows-based application that allows you to view the system at all times with graphical, easy-to-use windows to access real-time information about transceivers and network conditions. The software supports remote connections to the fiberoptic network via a standard modem. Additionally, through TCP/IP connectivity, you can monitor and configure the system over your Intranet or via the Internet. Up to four users can monitor an active session simultaneously.



A separate program, called SerialServer™, connects a serial port on the remote PC to a TCP/IP socket. You install this program on the PC that is physically connected to a 561 controller maintenance port. (A TCP/IP demonstration system is available at the H&L Instruments lab via the Internet.) A password provides additional security for TCP/IP connections. When you secure the SerialServer port with a password, any connection request to that port must "know" the password in order to connect.

After installing your H&L Instruments transceivers, you can use FiberPanel to view a System Map of your entire set-up. This Map represents the configuration and status of the fiberoptic network. The software also includes Unit Configuration tools to configure and monitor parameters within any unit, as well as Panel Configuration capabilities. The system records all network events in a log file and displays alarms.

If problems with the fibers occur, you can quickly identify and correct any issues. FiberPanel keeps you informed and eliminates the guesswork often found in fiberoptic network maintenance, which results in the saving of time and money. You no longer have to physically drive to individual units to record their status. From the convenience of your office, you can:

- Check fibers, locations, unit names, and serial numbers
- Assign unit names and location tags
- Configure your units
- Designate channels and decide channel speed
- Read optical signal strength
- Turn off serial ports and re-route signals
- Print reports on system activity, including diagnostic reports showing mis-wired fibers and malfunctioning units

Model 561 Specifications

Serial Port:
600, 1200, 2400, 4800, 9600, 19.2kb/s, 38.4kb/s full duplex
RS-232 ports, 4 DB-9Fports standard, 8 ports (option),
RS-485 opto-isolated (option)

Environmental/Mechanical:
Operating Temperature: -40°C to +85°C 5% to 95% RH
Net Weight: 3.25lbs 9"L X 6"W X 3.3"H

Fiberoptic Connector Options:
ST

Optical Output Power:
LED> -18dBm @ 850nm multimode (62/125 fiber)
LED> -24dBm @ 1310nm singlemode Laser> -8dBm @ 1310nm singlemode Serial 3 (option)

Optical Receiver Sensitivity:
> -38 dBm multimode > -42 dBm singlemode @ 1310nm [1 X 10-9 BER]

Optical Budget:
20dB multimode LED @ 850nm (62/125 fiber)
16 dB singlemode LED @ 1310nm
32 dB Laser @ 1310nm

Power Options (10.4 watts max):
12Vdc, 24Vdc, 48Vdc,
125Vdc/120Vac 50-60 Hz,
250Vdc/230Vac 50-60 Hz

Alarm Output:
1A (N.O.) opto-isolated solid state relay

FiberPanel System Requirements:
Microsoft® Windows 7/Vista/ XP/2000/NT

Related Products:
Model 561-16
16 RS-232 serial ports on 16 DB-9F connectors

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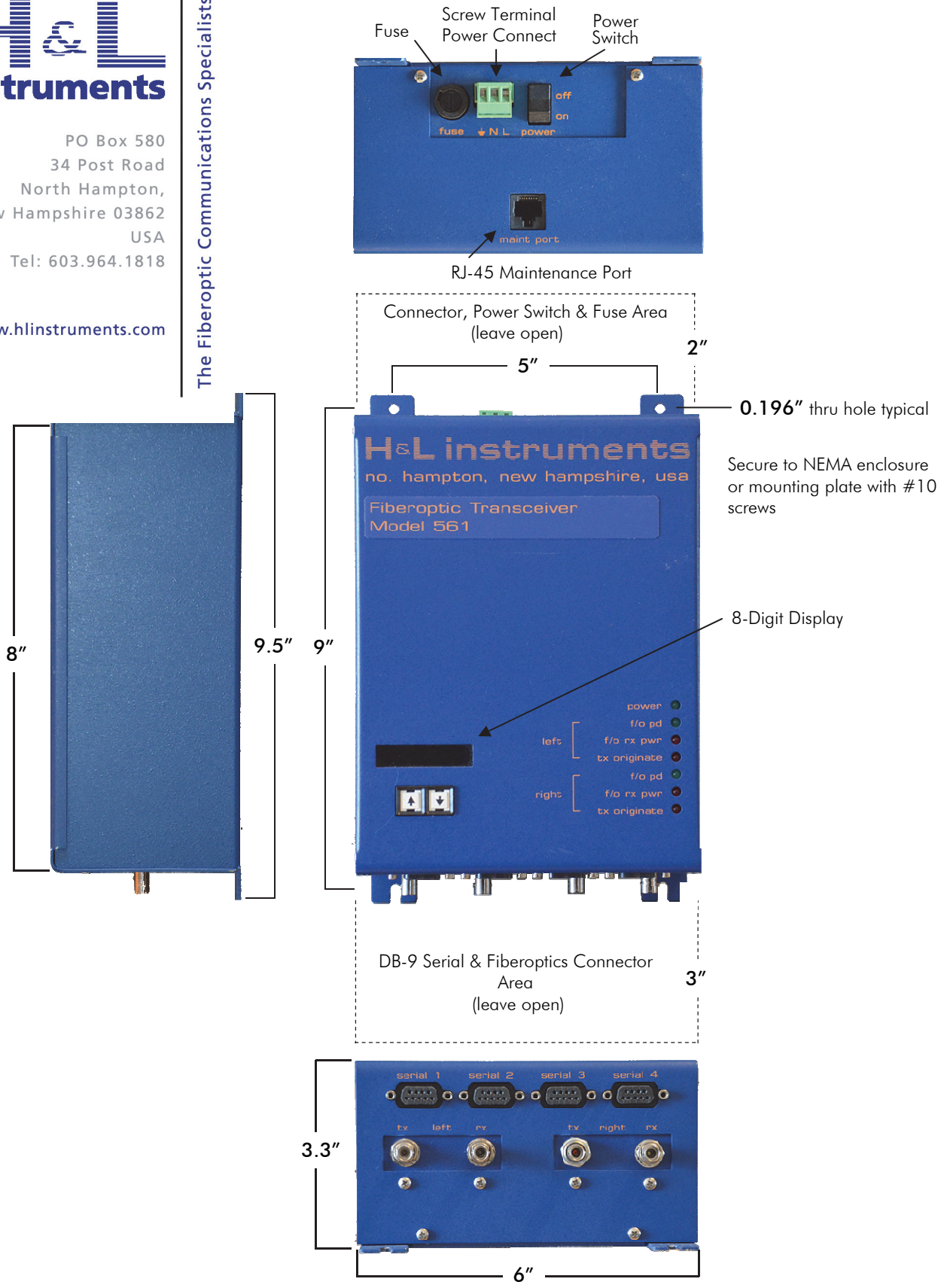
The Fiberoptic Communications Specialists



Model 561 Fiberoptic Transceiver Dimensions

The Fiberoptic Communications Specialists

Fiberoptic Digital I/O (Input/Output)

Model 531-8

For point-to-point transfer-trip relaying, use the H&L Model 531-8 Fiberoptic Digital I/O

Model 531-8 Features

- **Plug-in optical modules for multimode or singlemode operation**
- **8 opto-isolated 12-250Vdc inputs**
- **8 isolated, microprocessor fault-protected, latched relay outputs**
- **Choice of Solid-state or electro-mechanical relays**
- **Gold contacts optional (for very low resistance for low voltages)**
- **High Speed option**
- **RS-232 input option**
- **LED status indicators for each input and output**
- **Convenient terminal blocks for inputs, outputs and power**
- **Transient resistant power supply**
- **Used for distances of up to 53 miles between units**

Overview

The Model 531 is a dependable fiberoptic solution that replaces copper wire connections and galvanically isolates, protects, and monitors contacts remotely (such as close-coil, local, or remote trip). If you need to telemeter revenue meter pulses over distances of many miles, you need the Model 531-8 Fiberoptic Digital I/O from H&L Instruments. This unique ***wire replacer*** product does not require a PC (just a screwdriver to connect the inputs and outputs).

The use of fiberoptics (glass or plastic) eliminates aggravations typically found in copper, radio, and telco wireline systems. It is, by far, the most reliable high-speed medium available for data communication. By investing in H&L Instruments 531-8 to connect to electrical switchgear such as reclosers, you ensure that the best performance possible.

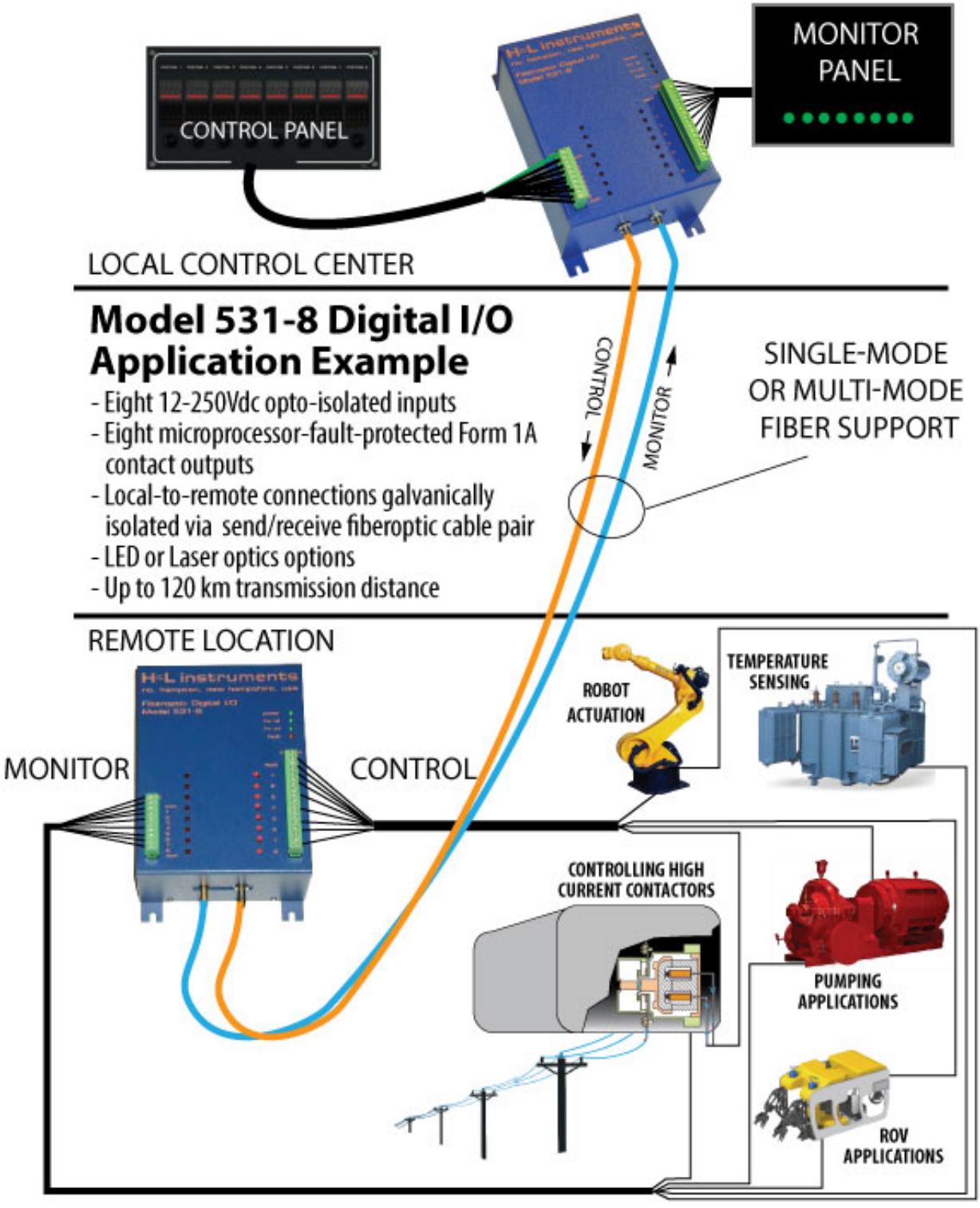
The Model 531-8 is simple to install due to its removable plug-in screw terminals. It offers plug-in optical modules for multimode or singlemode fiber operation. You can substitute an RS-232 module for the optical module and connect the unit to a Model 570 transceiver. This allows you to take advantage of the many point to point fiberoptic channels on the 570 system to avoid need for additional dedicated fibers.

Easy-to-read LED indicators continually display the status of inputs and outputs. The unit has 8 universal (12-250Vdc) opto-isolated voltage inputs and 8 isolated microprocessor fault-protected relay (Form 1A) outputs that are provided as either solid-state (best for revenue or RPM pulse transfers) or electro-mechanical (with optional gold contacts for very low resistance, low voltage applications. The Model 531-8 is bi-directional. Via fiber, the inputs on one unit control the outputs on the mating unit to permit relaying electrical status signals without a ground loop, while maintaining a floating signal locally. The latched relay outputs remember their state through the use of CRC checking of fiber data packets. If a fiber is severed, or the sending unit loses power, the outputs do not change, ensuring reliable data exchange and no un-commanded operations.

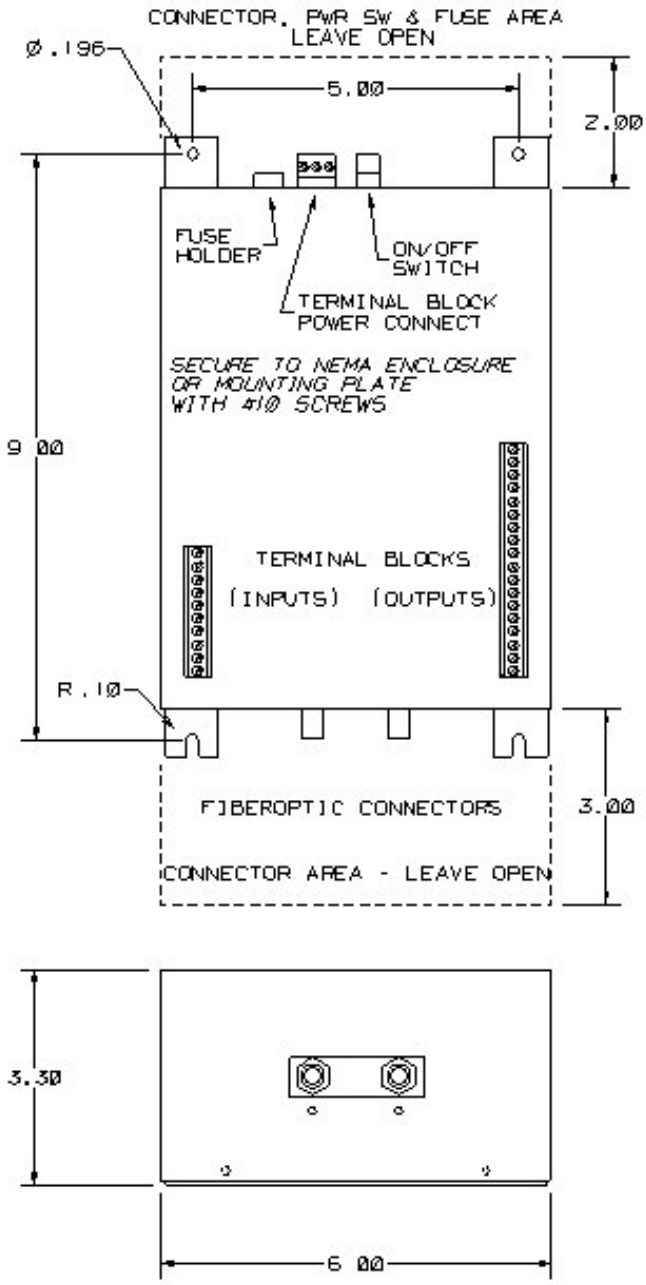
The Model 531-8 actively tests the fiber signals for errors, consistently checking to prevent accidental state changes. It uses a ninth relay alarm contact and LED indicator to immediately alert you to any communication problems.

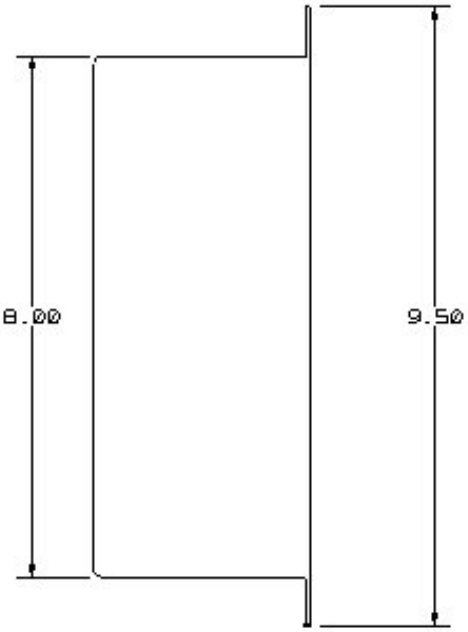
High Speed Option

An optional high-speed version of the product is available to reduce the sampling interval and input RC signal filtering. The high speed option requires the use of solid-state relays and results in a square wave frequency response of ~125 Hz. A minimum input pulse on-time of 4 msec is required, which corresponds to a 125Hz pulse rate at a 50% duty cycle. This means, for example, that at 50Hz, the duty cycle must be between 20% and 80%.



"We just call them [Model 531-8s] our 'blue bricks.' Just like bricks, you put them in place and they do their job. You don't have to think about it — they are so reliable!"
- Detroit Edison





Other H&L Fiberoptic Products:

Model 508B Fiberoptic TransNet Extender (fiberoptic isolation)
Model 532A Modem/Multiplexer (point-to-point communications)
Model 542B Fiberoptic Transceiver (multi-drop loop communications)
Model 561 Fiberoptic Transceiver (FiberLoop II™ multi-drop self-healing system)
Model 561-16 (16 serial ports)
Model 570E Fiberoptic Transceiver (FiberLoop III™ multi-drop self-healing system with Ethernet option)
Model 570-16 Transceivers (16 serial ports)
Model 570X-E Fiberoptic DNP3 Gateway Transceiver

Model 531-8 Specifications

Inputs:

8 opto-isolated, 12-250 Vdc

Relay Specifications:

Operate/Release Time:

Electromechanical	6/3 msec
Photovoltaic	2/0.5 msec

Receive Delay:

Electromechanical	15 msec
Photovoltaic	15 msec
Photovoltaic Hi-speed Option	6 msec

Current, voltage, resistance:

Electromechanical	5A at 30 VDC resistive 5A at 250 VAC resistive
Photovoltaic	0-400 volts, 240 mA-AC or 360 mA DC 10 Ohms resistance

Fiberoptic Connectors: ST

Optical Budget:

20 dB multimode LED @ 850nm (62/125 fiber)
16 dB singlemode LED @ 1300nm
32 dB singlemode Laser @ 1310nm

Optical Output Power:

LED> -18 dBm @ 850nm multimode (62/125 fiber)
LED> -24 dBm @ 1300nm singlemode
Laser> -8 dBm @ 1310nm singlemode

Environmental/Mechanical Specs:

Operating Temperature: -40°C to +85°C
5% to 95% RH
Net Weight: 4lbs. / 9.5" X 6" X 3.3"

Power Options (10 watts all relays on):

12Vdc, 24Vdc, 48Vdc, 125Vdc/120Vac 50-60 Hz, 250Vdc/230Vac 50-60 Hz

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9200-5035 17/11/04/2018

H&L instruments

The Fiberoptic Communications Specialists

Fiberoptic TransNet Extender

For fiberoptic isolation when using the Measurement Technology Limited TransPort System, use the H&L Instruments Model 508B Fiberoptic TransNet Extender.

Model 508B

Choose Model 508B for exceptional value, reliability, and consistency.

Model 508B Specifications

Data Rate:
Dc to 37.5Kbps

Power:
TransNet bus - 5 watts

Environmental/Mechanical:
Operating Temperature: 0°C to +60°C
Storage Temperature: -40°C to +85°C
5% to 95% RH
Net Weight: 2.25lbs

Fiberoptic Connector Options:
ST, SMA

Power Options (5.5 Watts):
12Vdc, 24Vdc, 48Vdc, 125Vdc/120Vac 50-60Hz, 250Vdc/230Vac 50-60 Hz

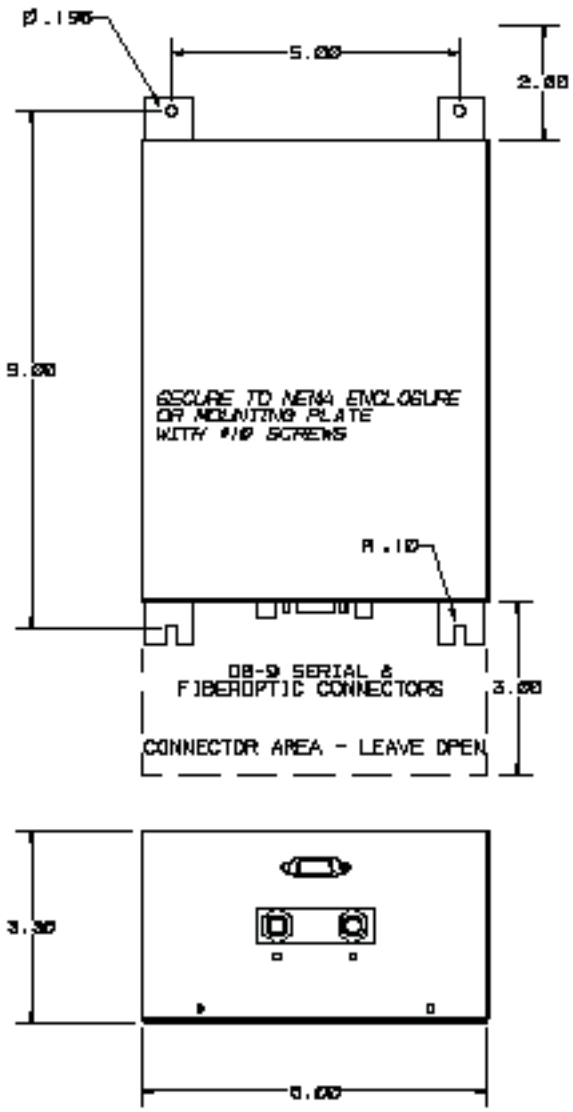
Optical Budget:
20dB multimode LED @ 850nm (62/125 fiber)
28dB multimode LED @ 1310nm (62/125 fiber)
18dB singlemode LED @ 1310nm
34dB singlemode Laser @ 1310nm (62/125 fiber)

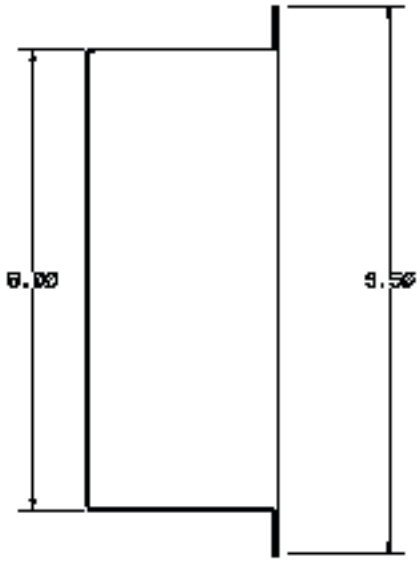
Optical Output Power:
LED> -18dBm @ 850nm multimode (62/125 fiber)
LED> -14dBm @ 1310nm multimode (62/125 fiber)
LED> -24dBm @ 1310nm singlemode
Laser> -8dBm @ 1310nm singlemode

Model 508B Features

- **Plug-in optical modules for varying distances between stations up to 53 miles**
- **Fastest communications rates over greater distances**
- **Vastly superior for noise immunity and electrical isolation**

Model 508B Details





DB-9 Female
Connector Pin-Out

	TransNet
1	SerBus (+)
9	SerBus (-)

Other H&L Fiberoptic Products:

Model 531-8 Fiberoptic Digital I/O
(transfer-trip relaying)

Model 532A Modem/Multiplexer
(point-to-point communications)

Model 542B Fiberoptic Transceiver
(multi-drop loop communications)

Model 561 Fiberoptic Transceiver
(FiberLoop II™ multi-drop self-healing system)

Model 570 Fiberoptic Transceiver
(FiberLoop III™ multi-drop self-healing system with Ethernet option)

Model 561-16 and 570-16 Transceivers
(16 serial port transceivers)

9200-5027
18/04/07/2017

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Ordering Guide

How to order H&L Fiberoptic Products:

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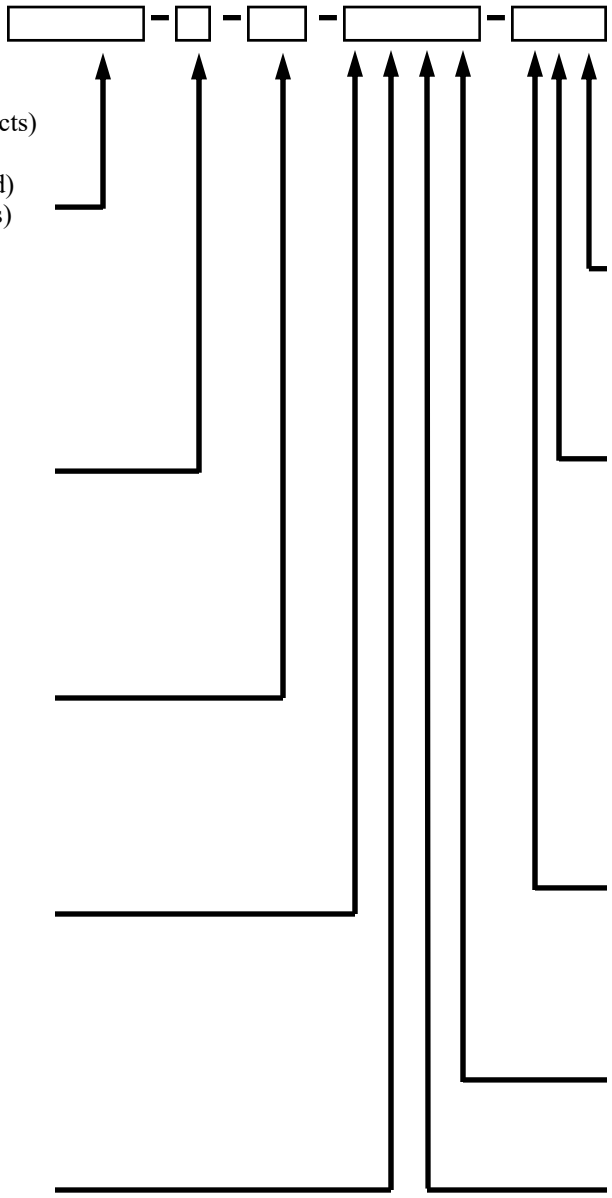

Model

508B	MTL TransNet Extender
531-8	Digital I/O (Ag-Cd contacts)
531-8S	Digital I/O (solid-state)
531-8SH	Digital I/O (S-S/Hi-speed)
531-8G	Digital I/O (gold contacts)
561	Transceiver
570	Transceiver
570X	Transceiver

570 Options

E	Ethernet
EU	Ethernet Upgradeable
S	SLIC
T	T1
O	Orderwire RS-422
N	Incom

561 and 570 Serial Ports

4	4 ports/4 DB-9
8	8 ports/4 DB-9
16	16 ports/16 DB-9
(blank)	no DB-9 ports

Left Port (Modem) Wavelength

1	850 nm MM LED
2	1310 nm MM LED
3	1310 nm SM LED
4	1310 nm SM laser
6	1550 nm SM laser
7	1310 nm SM SFP-LX †
8	1550 nm SM SFP-LX †
9	1550 nm SM SFP-ZX *
10	1550 nm SM SFP-EZX §

Right Port Wavelength

1	850 nm MM LED
2	1310 nm MM LED
3	1310 nm SM LED
4	1310 nm SM laser
6	1550 nm SM laser
7	1310 nm SM SFP-LX †
8	1550 nm SM SFP-LX †
9	1550 nm SM SFP-ZX *
10	1550 nm SM SFP-EZX §

In-terface

1	EIA-232
3	MTL TransNet
5	RS-485/232
6	2/ea RS-485 screw term

Power Options

1	120 Vac 50-60 Hz 125 Vdc
2	230 Vac 50-60 Hz 250 Vdc
3	24 Vdc
4	12 Vdc
5	48 Vdc
6	9-36Vdc
7	18-75Vdc
8	MTL TransNet
9	277Vac 50-60Hz

Short Case (listed items only)

S	570-_-44AA-S65* 570-_-44AA-S75* * S&C IntelliTeam

Right Port Connector

A	ST fiberoptic connector
0	none

Left Port (Modem) Connector

A	ST fiberoptic connector
0	**none**

Notes: **Not all combinations of features are possible when creating part numbers.**
SM = singlemode fiber, **MM** = multimode fiber
All units are rated for -40 to +85ºC operating temperature.

† Dual LC connector
* 80 km transmission distance, dual LC connector
§ 120 km transmission distance, dual LC connector

Examples:
561-11AA-41 (transceiver)
532A-2A-12 (modem)
531-8-1A-6-10 (digital I/O)
570E-4-33AA-11 (Ethernet)

570 case size example:
570-8-44AA-S65
570-EN-8-77-15