

# USER MANUAL

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## MODEL 2300M SERIES OpticLink Ethernet Media Converters (2300M, 2310M, 2311M, & 2312M)



**PE PATTON**  
**Electronics Co.**

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An ISO-9001  
Certified Company

Part# 07M2300M  
Doc# 077321U Rev. A  
Revised 4/14/03

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## **1.0 WARRANTY INFORMATION**

**Patton Electronics** warrants all Model 2300M Series components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse, or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

### **1.1 RADIO AND TV INTERFERENCE**

The Model 2300M Series generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Model 2300M Series has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If a 2300M Series unit does cause interference to radio or television reception, which can be determined by disconnecting the cables, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna, and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

### **1.2 CE NOTICE**

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive

and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.



**This device is not intended to be connected to the public telephone network.**

### **1.3 SERVICE**

All warranty and nonwarranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Services at:

- Tel: **+1 (301) 975-1007**
- Email: **support@patton.com**
- URL: **http://www.patton.com**

**Note** Packages received without an RMA number will not be accepted.

## 2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. It has been thoroughly inspected and tested and is warranted for *one year* for parts and labor. If you have any questions about this product, please call Patton Electronics Technical Support at (301) 975-1007.

### 2.1 FEATURES

- Cost effective plug and play solution for converting both 10Base-T and 100Base-TX to 10Base-FL, 100Base-FX, and 100Base-SX
- Supports 802.3 and 802.3u, 10Base-T, 10Base-FL, 100Base-TX, 100Base-FX, and 100Base-SX industry standards
- Extends network connections up to 2 km (1.24 miles) (300 m for Model 2311 in 100BASE-SX Mode) over multi-mode fiber media.
- Low power consumption
- Auto-sensing full or half duplex Ethernet operation
- Twisted Pair MDI/MDI-X switch
- ST or SC connectors for connecting to multimode fiber media
- Ultra-miniature MicroPak Chassis
- LED indicators for Power, Fiber Link and Activity, and Twisted-pair Link and Activity
- External power supply adapter with AC and DC options

## 2.2 DESCRIPTION

There are four base models in the Patton Model 2300M Series of standards compliant Ethernet Media Converters (see Table 1) that convert and extend the reach of copper Ethernet over multi-mode fiber.

**Table 1:** Model 2300M configurations

Model	Twisted-Pair Standard	Fiber Standard	Connector	Distance	Wavelength
2300M-ST	100Base-TX	100Base-FX	ST	2 km	1300nm
2300M-SC	100Base-TX	100Base-FX	SC	2 km	1300 nm
2310M-ST	10Base-T	10Base-FL	ST	2 km	850nm
2310M-SC	10Base-T	10Base-FL	SC	2 km	850nm
2311M-ST	10Base-T/ 100Base-TX	10Base-FL/ 100Base-SX	ST	2 km/300 m	850nm
2311M-SC	10Base-T/ 100Base-TX	10Base-FL/ 100Base-SX	SC	2 km/300 m	850nm
2312M-ST	10Base-T/ 100Base-TX	10Base-FL/ 100Base-Fx	ST	2 km	1300nm
2312M-SC	10Base-T/ 100Base-TX	10Base-FL/ 100Base-Fx	SC	2 km	1300nm

- The Model 2300M converts 100Base-TX to 100Base-FX and extends up to 1.24 miles (2.0 km).

**Note** The Model 2300M can be used to connect auto-sensing 10/100 and 100Base-TX/100Base-FX network devices only; it is not capable of connecting to 10Base-T/10Base-FL network devices.

- The Model 2310M converts 10Base-T to 10Base-FL and extends up to 1.24 miles (2.0 km).

**Note** The Model 2310M can be used to connect auto-sensing 10/100 and 10Base-T/10Base-FL network devices only; it is not capable of connecting to 100Base-TX/100Base-FX or SX network devices.

- The Model 2311M auto-negotiates and converts 10Base-T/100Base-TX to 10Base-FL/100Base-SX and extends up to 1.24 miles (2.0 km) in 10Base-FL mode and 0.19 miles (0.3 km) in 100Base-SX mode.

**Note** The Model 2311M can be used to connect auto-sensing 10/100, 10Base-T/10Base-FL, and 100Base-T/100Base-SX network devices, however, it is not capable of connecting to 100Base-FX network devices. Further, the Model 2311M cannot connect a 10Base network device on one side to a 100Base network device on the other.

If a 10Base network device is on one side of the Model 2311M, there must be another 10Base or an auto-sensing 10/100 network device on the other. If a 100Base network device is on one

side of the Model 2311M, there must be another 100Base or an auto-sensing 10/100 network device on the other.

The Model 2311M is the ideal product for customers who currently have 10Base-T networks and/or equipment and are planning to upgrade to 100Base-TX in the future. The Model 2311 provides a migration path from 10Base-T/10Base-FL to 100Base-TX/100Base-SX, which eliminates the need to upgrade and lowers the overall cost of ownership.

- The Model 2312M auto-negotiates and converts 10/100Base-TX to 10Base-FL/100Base-FX and extends up to 1.24 miles (2.0 km).

**Note** The Model 2312M can be used to connect auto-sensing 10Base-T/10Base-FL and 100Base-TX/100Base-FX network devices, however, it is not capable of connecting to 10Base network devices. Further, the Model 2312M cannot connect a 10Base network device on one side to a 100Base network device on the other.

If a 10Base network device is on one side of the Model 2312M, there must be another 10Base or an auto-sensing 10/100 network device on the other. If a 100Base network device is on one side of the Model 2312M, there must be another 100Base or an auto-sensing 10/100 network device on the other.

The Model 2312M is the ideal product for customers who currently have 10Base-T networks and/or equipment and are planning to upgrade to 100Base-TX in the future. The Model 2312 provides a migration path from 10Base-T/10Base-FL to 100Base-TX/100Base-FX, which eliminates the need to upgrade and lowers the overall cost of ownership.

All Patton 2300M Series models are packaged in an ultra-miniature MicroPak chassis and feature power, fiber link and activity, and twisted-pair link and activity LED indicators. The Model 2300M Series of Ethernet Media Converters can be ordered with ST or SC fiber optic connectors and with 120VAC, 220VAC, universal interface (UI), -48 VDC, -24 VDC, or -12 VDC power supply adapters. Power cord designations for 220VAC and UI models must be specified at the time of purchase.

### 3.0 INSTALLATION

The following sections describe installing and configuring the Model 2300M Series of Ethernet Media Converters

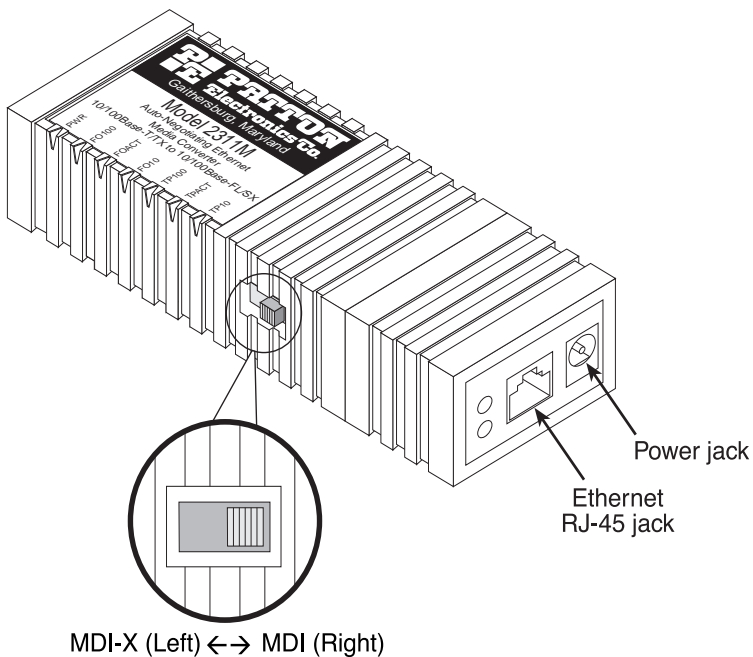
#### 3.1 INSTALLING A MEDIA CONVERTER

Do the following to install the Model 2300M Series of Ethernet Media Converters:

1. The MDI/MDI-X switch enables you to connect the 2300M models to different types of network devices using a standard (straight-through) network patch cable.

To connect the 2300M models to a terminal, transceiver, or network interface card (NIC), set the switch to the MDI-X (lefthand) position (see Figure 1).

Otherwise, to connect to a hub or switch, set the switch to the MDI (right-hand) position (see Figure 1).



MDI-X (Left) ↔ MDI (Right)

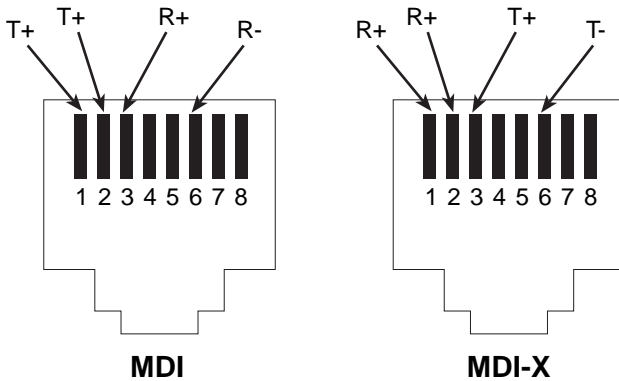
**Figure 1.** MDI/MDI-X switch, Ethernet RJ-45 jack, and power jack locations



2. The media converter comes equipped with a shielded RJ-45 Jack for Ethernet connections (see Figure 1 on page 8).

Connect the Ethernet RJ-45 jack to the appropriate 802.3 compliant network equipment via a standard network patch cable (not provided). The pinout diagrams in Figure 2 reflect the pinouts of the Ethernet RJ-45 jack when switched to MDI and MDI-X settings.

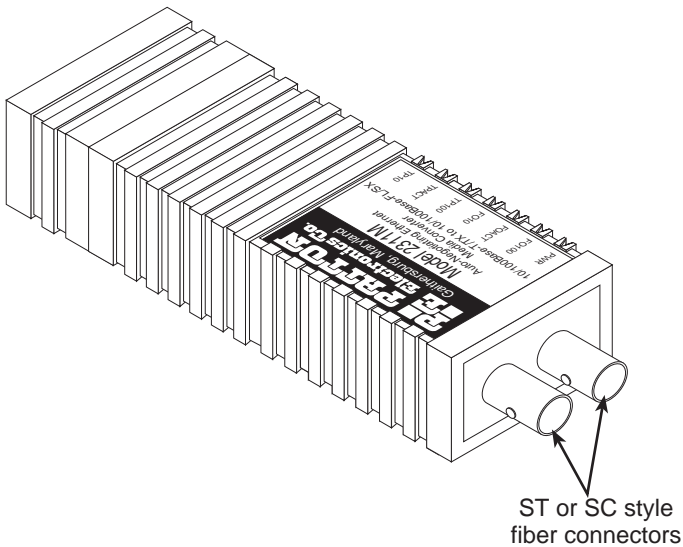
**Note** Twisted-pair connections from the Ethernet RJ-45 Jack to the network device should be 802.3 compliant (Category 5 STP or UTP recommended) and must not exceed 100 meters (328 feet). Do not use flat or satin cable.



**Figure 2.** Shielded Ethernet RJ-45 Jack pin-outs with different MDI/MDI-X switch settings

3. Connect the dual fiber ST or SC connectors on the media converter (see Figure 3) directly to the 802.3 compliant multi-mode fiber cable equipped with male ST or SC connectors or via 802.3 compliant multi-mode fiber patch cord (not provided) and corresponding ST or SC fiber wall jacks.

**Note** Verify that the cable connecting the TX and RX of the 2300M Series unit is connected to the RX and TX respectively on the remote 2300M Series unit or network device. End-to-end multi-mode fiber connections between two Model 2300M Series Ethernet Media Converters or between one Model 2300M Series Media Converter and other network devices must not exceed 2 km (1.24 miles), 298.7 m (980 ft) in 100Base-SX mode (Model 2311M only).



**Figure 3.** Fiber connector locations

4. Connect the DC power output side of the power supply adapter to the power jack (see Figure 1 on page 8) on the 2300M Series unit.
5. Connect the AC power side/cord of the power supply adapter to the appropriate AC power source.

The media converter will power up and LED indicators will illuminate once connected to the power source.

### 3.2 END-TO-END CONNECTION

Figure 4 shows an end-to-end connection between a personal computer/terminal and Ethernet hub using two Patton Model 2300M Series Ethernet Media Converters and a multi-mode fiber connection.

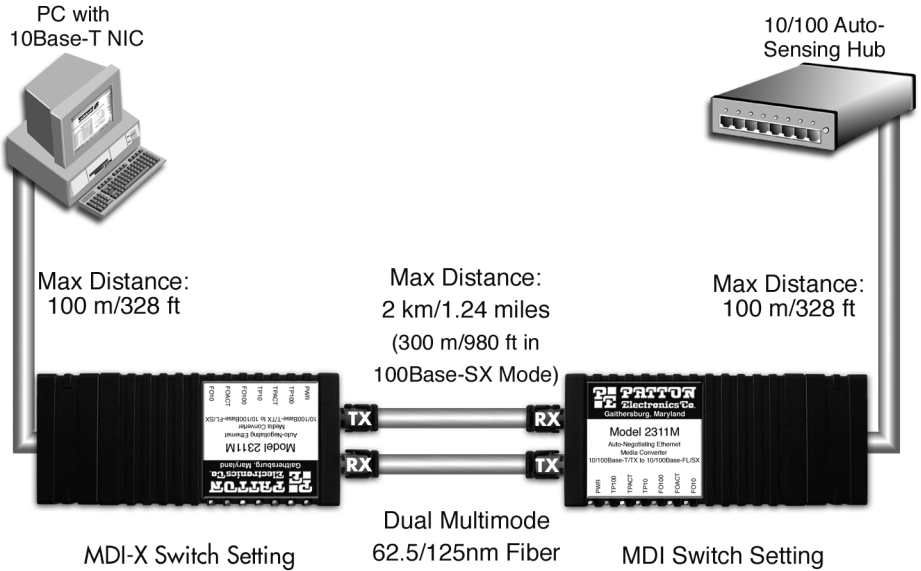


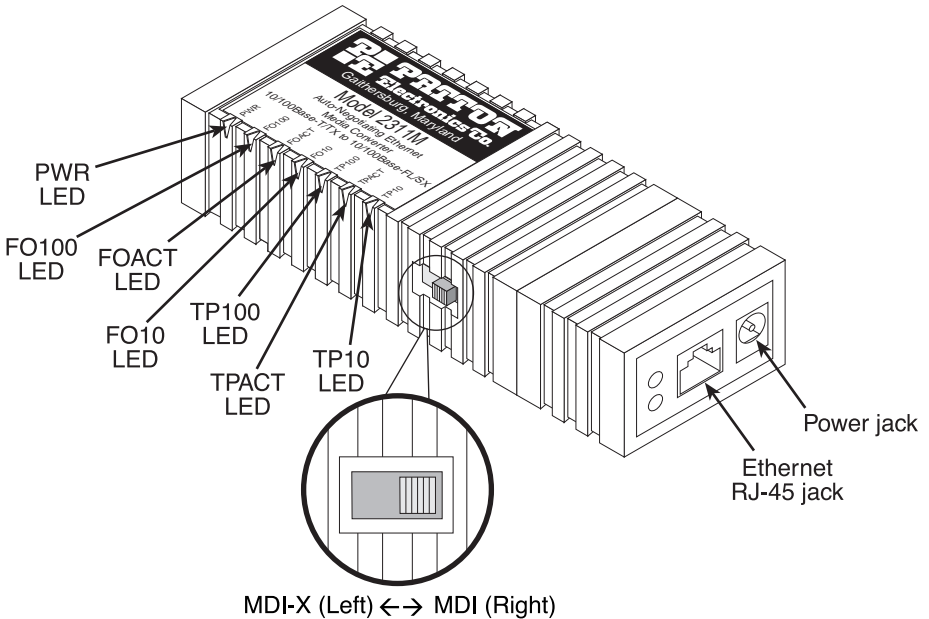
Figure 4. End-to-end multi-mode fiber connection

## 4.0 OPERATION

Once you have installed the Model 2300M Series unit and have connected the External Power Supply Adapter to the appropriate power source, the unit will power up automatically and is ready to operate.

### 4.1 LED INDICATORS

Once powered up, LED indicators located on the side of the Model 2300M Series unit will illuminate to indicate the operating status of the unit.



**Figure 5.** Location of 2300M Series LED indicators (Move fiber connectors to the opposite end of the converter)

The LED indicators reflect the following operating status:

**Table 2:** LED indicator descriptions

<b>Number</b>	<b>Name</b>	<b>Description</b>
1	PWR	Illuminates green to show that power is applied to unit.
2	FO100	Illuminates green to show that a 100 Mbps signal is present on the fiber optic side of the unit. (Not used on Model 2310M.)
3	FOACT	Blinks yellow to show activity on the fiber optic side of the unit.
4	FO10	Illuminates green to show that a 10 Mbps signal is present on the fiber optic side of the unit. (Not used on Model 2300M.)
5	TP100	Illuminates green to show that a 100 Mbps signal is present on the twisted-pair/copper side of the unit. (Not used on Model 2310M.)
6	TPACT	Blinks yellow to show activity on the twisted-pair/copper side of the unit.
7	TP10	Illuminates green to show that a 10 Mbps signal is present on the twisted-pair/copper side of the unit. (Not used on Model 2300M.)

## **APPENDIX A**

### **SPECIFICATIONS**

#### **A.1 INTERFACES/CONNECTORS**

- Twisted-Pair/Copper Ethernet: Shielded RJ-45 Jack
- Fiber Optic Ethernet: Dual ST or SC Connectors

#### **A.2 INTERFACE SPEED**

- 2300M: 100 Mbps
- 2310M: 10 Mbps
- 2311M: Auto-Negotiating 10 or 100 Mbps
- 2312M: Auto-Negotiating 10 or 100 Mbps

#### **A.3 TRANSMISSION MODE**

Full or Half-Duplex Operating Modes (Auto-sensing)

#### **A.4 TWISTED-PAIR/COPPER CABLE TYPE\***

Category 5 or better recommended

#### **A.5 FIBER CABLE TYPE\***

Recommended: 62.5/125  $\mu\text{m}$  multi-mode fiber

Optional:

- 100/140  $\mu\text{m}$  multi-mode fiber
- 85/125  $\mu\text{m}$  multi-mode fiber
- 50/125  $\mu\text{m}$  multi-mode fiber

#### **1.6 FIBER WAVELENGTH**

- 2300M & 2312M: 1300nm
- 2310M & 2311M: 850nm

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\* Physical characteristics of the twisted-pair/copper and fiber optic cable must meet or exceed IEEE 802.3 specifications.

## **A.7 FIBER OPTIC LINK BUDGET**

### **Transmit power**

- 2300M: -16.8 dBm (typical)
- 2310M: -12 dBm (typical)
- 2311M: -12 dBm (typical)
- 2312M: -16.8 dBm (typical)

### **Receiver Sensitivity**

- 2300M: -33.5 dBm (typical)
- 2310M: -28 dBm (typical)
- 2311M: -28 dBm (typical)
- 2312M: -33.5 dBm (typical)

### **Delay Time**

- 2300M: 5 $\mu$ s per km (typical)
- 2310M: 5 $\mu$ s per km (typical)
- 2311M: 5 $\mu$ s per km (typical)
- 2312M: 5 $\mu$ s per km (typical)

### **Typical Fiber Max. Distance**

- 2300M—1.24 mile (2 km)
- 2310M—1.24 mile (2 km)
- 2311M—1.24 mile (2 km) in 10Base-FL mode/300 m in 100Base-SX mode
- 2312M—1.24 mile (2 km)

## **A.8 STANDARDS**

IEEE802.3 and IEEE 802.3u (10Base-T, 10Base-FL, 100Base-TX, 100Base-SX, and 100Base-FX)

## **A.9 LED STATUS INDICATORS**

Power, Twisted-Pair/Copper Link and Activity, Fiber Optic Link and Activity

## **A.10 COMPLIANCE**

- Safety & EMC: Patton Internal Safety & EMC Testing, FCC Part 15 Class A
- Telecom—CE Mark per EMC directive 89/336/EEC and Low Voltage Directive 73/23/EEC

## **A.11 POWER**

- External 120 VAC, 60 Hz AC Power Supply (5 VDC output)
- External 220 VAC, 50 Hz AC Power Supply (5 VDC output)
- External UI AC Power Supply (100–240 VAC, 50–60Hz input, 5 VDC output)
- -45 VDC
- -24 VDC
- -12 VDC

## **A.12 PACKAGED WEIGHT**

Less than 1 lb. (0.45 kg) with power supply

## **A.13 DIMENSIONS**

3.0L x 1.8W x 0.8H in. (7.6L x 4.4W x 1.9H cm)

## **A.14 ENVIRONMENT**

Model 2300M and 2312M

- Temperature: 32–95°F (0–35°C)
- Humidity: up to 90% non-condensing

Model 2310M and 2311M

- Temperature: 32–113°F (0–45°C)
- Humidity: up to 90% non-condensing

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