

INSTALLATION GUIDE AND OPERATING MANUAL

ProMedia Fast Ethernet Media Converters



100Mbps Single Port Ethernet Media Converters For Multimode and Singlemode Fiber

CORPORATE HEADQUARTERS
5001 American Blvd., W., Suite 605
Bloomington, MN 55437
Phone: 800.441.5319
Phone: 952.831.5603

MANUFACTURING/CUSTOMER SERVICE
945 37th Avenue, NW
Rochester, MN 55901
Phone: 800.328.2275
Phone: 507.285.1951

TABLE OF CONTENTS

	Page
1.0 SPECIFICATIONS	2
1.1 Technical Specifications	2
1.2 Ordering Information	3
2.0 INTRODUCTION	3
2.1 Inspecting the Package and Product	3
2.2 Product Description.....	3
2.3 Features and Benefits.....	4
2.4 Applications.....	4
3.0 INSTALLATION	5
3.1 Locating the Media Converter Unit	5
3.2 Calculating Segment Distance.....	5
3.2.1 Calculating Overall Segment Distance, full-duplex.....	5
3.2.2 Calculating Overall Segment Distance, half-duplex	6
3.3 Connecting Fast Ethernet Media	8
3.3.1 Connecting Twisted Pair (RJ45, TX)	8
3.3.2 Connecting Fiber-FX (SC-type "Snap-In", and ST, "Twist-Lock").....	8
3.3.3 Power Budget calculations for Fiber media	9
4.0 OPERATION	9
4.1 Power Requirements, Power Supply Types	9
4.2 Front Panel LEDs	10
4.3 Up-Link Switch on TX port	10
5.0 TROUBLESHOOTING	10
5.1 Before Calling for Assistance.....	10
5.2 When Calling for Assistance	11
5.3 Return Material Authorization (RMA) Procedure	11
5.4 Shipping and Packaging Information	11
6.0 Warranty Information	12

1.0 SPECIFICATIONS

1.1. Technical Specifications

Performance:

Data Rate: 100 Mbps

Half- or Full-Duplex, auto-sensing

800ns (80 bit-times) Path Delay Value (PDV) for conversion delay

Network Standards:

Fast Ethernet IEEE 802.3u: 100BASE-TX, 100BASE-FX

Operating Environment:

Ambient Temperature: 32°F to 122°F (0°C to 50°C)

Storage Temperature: -20°C to 60°C

Ambient Relative Humidity: 10% to 95% (non-condensing)

Maximum Standard Fast Ethernet Segment Lengths:

100BASE-TX (twisted pair):		100 m (328 ft)
100BASE-FX Fiber optic, half-duplex:	(multimode)	412 m (1350 ft)
100BASE-FX Fiber optic, full duplex:	(multimode)	2.0 km (6,562 ft)
100BASE-FX Fiber optic, half-duplex:	(singlemode)	412 m (1350 ft)
100BASE-FX Fiber optic, full duplex:	(singlemode)	18.0 km (49,215 ft)

*Note: ProMedia-100 media converters **DO NOT** support full length shared Fast Ethernet segments. See Section 3.2 of this manual for media lengths and shared segment distance calculations.*

Power Supply (External):

Power Input: 95 - 125 vac at 60 Hz or 100 - 240 vac at 50-60 Hz for models which have IEC power cable connector.

Power Consumption: 5 watts max. for the unit

Connectors:

RJ45 Port: Modular 8-Pin female, with “cross-over” up-link switch

Multimode:

Fiber Port, SC-type (snap-in): Fiber optic multimode, 100BASE-FX

Fiber Port, ST-type (twist-lock): Fiber optic multimode, 100BASE-FX

Singlemode:

Fiber Port, SC-type (snap-in): Fiber optic singlemode, 100BASE-FX

Packaging:

Enclosure: High strength sheet metal.

Dimensions: 3.0 in H x 3.5 in W x 1.0 in D (7.6 cm x 8.9 cm x 2.5 cm)

Power Supply: 2.0 in x 2.0 in x 1.5 in (5.1 cm x 5.1 cm x 3.8 cm)

Weight: 9.5 oz.(275 gr); Power Supply 16 oz (455 gr)

LED Indicators for the ProMedia-100:

LED	<u>TX port</u>	<u>FX port</u>	<u>Description</u>
-----	----------------	----------------	--------------------

PWR			Indicates unit is receiving DC power.
-----	--	--	---------------------------------------

LINK	TP	Fiber	Steady ON when proper link is established at both ends of the media segment, i.e., when both end's connections are properly made and when power is applied to the devices on both ends of the segment.
------	----	-------	--

Agency Approvals:

115v 60 Hz power supply is UL Listed (UL 1310), CSA Certified

230v 50 Hz power supply is same, also TUV and GS approved

Emissions: Meets FCC Part 15 Class A, cUL, CE

Warranty: Five years, return to factory

Made in USA

1.2 Ordering Information

Model Number Description

ProMedia-100SC	1-port 100Base-TX (RJ45) to 1-port 100Base-FX (multimode fiber SC), external 115-volt, 60Hz or 230-volt, 50Hz power supply
ProMedia-100ST	1-port 100Base-TX (RJ45) to 1-port 100Base-FX (multimode fiber ST), external 115-volt, 60Hz or 230-volt, 50Hz power supply
ProMedia-100SC-SM	1-port 100Base-TX (RJ45) to 1-port 100Base-FX (singlemode fiber SC), external 115-volt, 60Hz or 230-volt, 50Hz power supply
ProMedia-100ST-SM	1-port 100Base-TX (RJ45) to 1-port 100Base-FX (singlemode fiber ST), external 115-volt, 60Hz or 230-volt, 50Hz power supply

Waters Network Systems reserves the right to change specifications and/or model offerings without notice.

2.0 INTRODUCTION

This section describes the ProMedia-100 Fast Ethernet media converters, including appearance, features and possible applications.

2.1 Inspecting the Package and Product

Examine the shipping container for obvious damage prior to installing this product; notify the carrier of any damage, which you believe occurred during shipment or delivery. Inspect the contents of this package for any signs of damage and ensure that the items listed below are included.

This package should contain:

- 1 ProMedia-100 media converter unit
- 1 External Power Supply, either 115 vac 60 Hz or 230 vac 50 Hz
- 1 Set of two (2) metal mounting clips with screws
- 1 Velcro® Tape section, approximately 3 inches in length
- 1 User Guide (this manual) and Product Registration Card

Remove the ProMedia-100 media converter from the shipping container. Be sure to keep the shipping container should you need to ship the unit at a later date. To validate the product warranty please complete and return the enclosed Product Registration Card to Waters Network Systems within two weeks of purchase.

In the event there are items missing or damaged contact your supplier. If you need to return the unit use the original shipping container. Refer to Section 5, Troubleshooting, for specific return procedures.

2.2 Product Description

ProMedia-100 Fast Ethernet media converters offer a convenient and easy way to convert and transmit data among twisted pair and fiber network cabling environments. They allow the use of fiber media with full-duplex devices such as Fast Ethernet switching hubs (managed and unmanaged), and may sometimes be used with shared (half-duplex) Fast Ethernet segments as well. They offer a compact, cost-effective way to adapt a pre-existing Ethernet cabling configuration as network requirements change.

ProMedia-100 media converters are designed for quick and easy installation even in very tight spaces as media cables are easily attached. ProMedia-100 media converters feature an up-link switch on the TX port to eliminate the need for a special crossover cable when connecting the TX port to a hub or concentrator. Because of their compact size, ProMedia media converters can be Velcro®-mounted on an office wall or the side of a desk or cabinet. The external power supply plugs into a nearby AC wall socket

or power strip. Each converter features a full set of LEDs that convey essential diagnostic and status information. See Section 4.1, LED Indicators, for specific LED function information.

ProMedia-100 media converters are designed to provide low-temperature operation over an extended period to make them some of the most reliable in the industry. Their high-strength fabricated metal packaging shields against Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI), avoiding interference with other nearby electronic devices.

The ProMedia-100 units comply with the IEEE 802.3u (100BASE-TX and 100BASE-FX) specification for 100 Mbps traffic via shielded (STP) or unshielded twisted pair (UTP) segments.

The ProMedia-100ST (multimode) and –100ST-SM (singlemode) models are equipped with one fiber-ST and one RJ45 connector for connection to 100BASE-FX compliant Fast Ethernet network segments.

The ProMedia-100SC (multimode) and –100SC-SM (singlemode) are equipped with one fiber-SC and one RJ45 connector for connection to 100BASE-FX compliant Fast Ethernet network segments.

2.3 Features and Benefits

■ Reduces Network Costs

ProMedia-100 media converters offer an ideal solution to quickly and inexpensively connect Twisted-Pair TX with fiber FX segments.

■ Full-duplex or Half-duplex transparent operation

ProMedia-100s can be used in full-duplex fiber segments for distances up to 2Km for the multimode model and up to 15km for the singlemode model.

■ Low PDV for Maximum Cable Lengths in Shared Segments

ProMedia-100 media converters add signal timing delays of only 80 Bit Times in a shared half-duplex segment, less than a Class II Fast Ethernet Repeater (90 to 95 BT typical), and can be used to attach fiber cables to TX ports with minimum distance loss in the overall collision domain.

■ Small, Compact, Lightweight Design

Featuring a compact and lightweight metal case with an external power supply, ProMedia-100 media converters can be conveniently installed in minimal space, on horizontal or vertical surfaces.

■ Full Complement of LEDs.

Each ProMedia-100 media converter is equipped with a full complement of LEDs to provide network LINK status on each port separately, and to indicate power on the unit.

■ Highly Reliable and Dependable

ProMedia-100 media converters are based on a robust design and are packaged in a metal enclosure to ensure high reliability and durability.

2.4 Applications

The primary function of a ProMedia-100 media converter is to permit two different media types to coexist within the same network by allowing data to be transmitted and received between different media types. ProMedia-100s are typically used where new 100Mbps switching hubs with RJ45 ports are being installed, and where full-duplex fiber segments (of up to 2km for multimode or 15km for singlemode) are needed to interconnect them with other 100Mbps switching hubs in distant wiring closets. Alternatively, a server with a full-duplex NIC needs to be connected via fiber to a 100Mbps switching hub with RJ45 ports. In these and similar situations, the ProMedia-100 conveniently converts the twisted pair cable to fiber, allowing use of any available RJ45 Fast Ethernet switched port with a new or existing fiber cable. See Section 3.2.1 for cable distance calculation information.

Where shared Fast Ethernet segments are used, such as with Fast Ethernet hubs with RJ45 ports, it may be desirable to connect one or more servers or users via fiber cable. It is necessary to calculate the PDV of the overall collision domain (see Section 3.2.2) for proper operation when the ProMedia-100 is used in shared half-duplex applications.

3.0 INSTALLATION

This section describes the installation of the ProMedia-100 media converters, including location, segment distance calculation and media connection.

3.1 Locating the Media Converter Unit

The compact and lightweight design of the ProMedia-100 media converter allows it to be easily installed in most any location. A Velcro strip and a set of two metal clips and screws are included (either may be used) for mounting the unit on a vertical surface such as a wall or cabinet, or for securing the unit on a tabletop or shelf. The installation location is dependent upon the physical layout of the Ethernet network and associated cabling. Make sure the unit is installed in a location that is easily accessible to an AC power outlet or power strip, and where convection cooling is not inhibited.

3.2 Calculating Segment Distances

The media distance considerations are quite different for full duplex and for half-duplex (standard Fast Ethernet) installations. Each of these situations is covered below in a separate section.

3.2.1 Segment Distances, Full Duplex

Full-duplex ports, such as are found in switching hubs and some NICs, can receive and transmit signals simultaneously and do not experience collisions accordingly. There may be only two nodes present on a full-duplex segment. Media distance rules are not the same as for standard (half-duplex) Fast Ethernet because collision distance limitations are not a factor. Specifically, fiber segments can be up to 2km for multimode and up to 15km for singlemode.

The ProMedia-100, with full-duplex operation as a standard feature, can be used in these applications. When installing the ProMedia-100 in a full-duplex segment, it is important to consider the combined overall segment length of both of the attached media types. The overall segment length is calculated by adding together the segment lengths on both sides of the ProMedia-100 media converters. The figure below illustrates how a ProMedia media converter is used to connect a multimode fiber (100BASE-FX) with a twisted pair (100BASE-T) segment.

Segment length on each side of the ProMedia-100 media converter is measured as a percentage of the maximum allowable standard media distance for the given media type. The percentages, when added together, must not exceed 100%.

Media Distance Formula for ProMedia-100, full-duplex:

$$X\% + Y\% \leq 100\%$$

Where **X** = The segment distance on one side of the media converter divided by the Standard Maximum Media Distance for that media type, x 100%

Where **Y** = The segment length on the other side of the media converter divided by the Standard Maximum Media Distance for that media cabling type, x 100%

In the example figure shown above, the length of fiber Segment X is 1500m (4920 ft). This is 75% of the maximum allowable distance for multimode 100BASE-FX fiber full-duplex media (2000 m) [75/2000 x 100% = 75%]. The length of twisted pair Segment Y is 10m (33 ft). This is 10% of the maximum allowable distance for 100BASE-TX full-duplex twisted-pair media (100 m) [10/100 x 100% = 10%]. The total of the two percentages (75% + 10%) is 85%, which is allowable.

Note 1: *Where more than one media converter is used in one segment run, the percentages for all of the cabling lengths in the run must be added together and must not exceed 100%.*

In another instance, a ProMedia media converter is used to connect a **singlemode** fiber (100BASE-FX) with a twisted pair (100BASE-T) segment. In this example, the length of fiber Segment X is 8500m (27,880 ft). This is 57% of the maximum allowable distance for singlemode 100BASE-FX fiber

full-duplex media (15,000 m) [$57/15,000 \times 100\% = 57\%$]. The length of twisted pair Segment Y is 12m (40 ft).

This is 12% of the maximum allowable distance for 100BASE-TX full-duplex twisted-pair media (100 m) [$12/100 \times 100\% = 12\%$]. The total of the two percentages (57% + 12%) is 69%, which is allowable.

3.2.2 Segment Distances, Half duplex

Fast Ethernet shared bandwidth devices operate with multiple nodes in a traffic domain. When a node attempts to send a packet, it may hit another packet passing by, i.e., a collision may occur. This is normal and does not cause a problem because the Ethernet protocol provides for this situation and requires that the sender waits and try again. When installing the ProMedia-100 in a half-duplex segment, it is important to consider the collision domain of the segment, including the ProMedia-100 itself, repeaters and hubs present, and the lengths of both of the attached media types.

Collision Domain

A collision domain is defined in the IEEE 802.3u standard as a cluster of network devices that, regardless of topology, must be less than 512 BT (Bit Times) of signal delay (PDV or Path Delay Value) in diameter between any two nodes. Nodes in a collision domain are connected by means of a repeater or repeaters such that no bridging or switching devices are present between any two nodes in the cluster. A ProMedia-100 has a PDV of about eighty Bit Times (80 BT), and this value must be included in the overall collision domain diameter PDV calculations as applicable for the placement of the -100 in the topology of the collision domain.

Collision Domain Diameter

The Collision Domain Diameter is the length of the longest path between any two devices in a single collision domain. Regardless of the actual network topology, the Collision Domain Diameter must be less than 512 BT (Bit Times). Bit Times are related to media type as shown in Table 3.2.2a.

Table 3.2.2a: Worst case round-trip delay for Fast Ethernet media*

Media Type	Round-trip delay in Bit Time per Meter (BT/m)
Fiber Optic	1.000
Shielded TP cable	1.112
Category 5 Cable	1.112
Category 4 Cable	1.140
Category 3 Cable	1.140

*Worst case delays taken from IEEE Std 802.3u-1995, actual delays may be less for a particular cable. Contact your cable supplier for exact cable specifications.

Each shared Fast Ethernet network device also has an associated BT delay. Table 3.4b shows typical Fast Ethernet device components and the associated BT delay. Note that there is only one DTE pair associated with any device-to-device path.

Table 3.4b: Worst case round-trip delay for Fast Ethernet device components*

Component	Round-trip delay in Bit Times (BT)
2 TX DTEs	100
2 FX DTEs	100
1 FX and 1 TX DTE	100
2 T4 DTEs	138
1 T4 and 1 TX or FX DTE	127
Class I Repeater	140
Class II Repeater with any combination of TX and FX ports	92
Class II Repeater with T4 ports	67

*Worst case delays taken from IEEE Std 802.3u-1995.

To determine whether a prospective network topology adheres to the collision domain diameter specification, the following formula should be applied to the worst-case path through the network. The worst-case path is the path between the two Fast Ethernet devices (DTEs), which have the longest round trip delay time.

PDV = (sum of cabling delays) + (sum of repeater & media converter delays) + (DTE pair delays) + (safety margin)

PDV is the Path Delay Value of the worst-case path. For the network to adhere to IEEE 802.3u standard, this value must be less than 512 BT. The safety margin is specified in BT and may be a value between 0 and 5. This margin can be used to accommodate unexpected delays, such as an extra long patch cable. A safety margin of at least 4 BT is recommended.

“Rules-of-thumb” Collision Domain Calculations

Rules-of-thumb, while inexact, may be helpful in planning network topology. As a rule-of-thumb, a Class II Repeater has a PDV of about 90 to 95 BTs, and twisted-pair or fiber media has a PDV of about 1 BT per meter of length. The ProMedia-100 has a PDV of 80 BT. Therefore, in shared Fast Ethernet applications, the ProMedia-100 uses about 80 meters of equivalent cable distance to convert from TX media to fiber FX media, i.e., it consumes almost as much of the available PDV as a Class II repeater. Since a 512BT collision domain will almost always include at least one repeater and two media segments, the remaining amount of Bit Times left after allowing for a ProMedia-100 and a length of fiber media indicates that the available fiber length will be much less than the 412 meters that is the known maximum for fiber. Therefore, in shared environments, ProMedia-100 media converters will be of benefit when they allow the use of fiber media, but not to gain distance by facilitating use of fiber media instead of twisted pair.

As a sample calculation, consider the question of what fiber cable distance (connected by a pair of ProMedia-100s on each end) can be obtained that will interconnect two 100Mbps hubs where the twisted pair cables to the user nodes are 10 meters in length. The solution is:

512 = total available Bit Times in a collision domain diameter,
minus 100 BT for two DTEs on each end leaves 412 BTs,
minus 180 BT for two Class II repeaters leaves 232 BTs,
minus 20 BT for two 10-meter TP cables for hubs to users leaves 212 BTs,
minus 10 BT for two short TP cables from the hubs to -100's leaves 202 BTs,
minus 160 BT for two ProMedia-100s leaves 42 BTs for fiber cable,
which indicates a fiber cable length of about 40 meters.

It is obvious that using twisted pair wiring to connect the hubs would enable the interconnect length to be the 100 meters maximum for twisted pair media, and this would still leave about a hundred BTs as a safety margin. In other words, use of ProMedia-100s and fiber in this case did not gain allowable maximum cable distance vs. TP cable without the ProMedia-100s.

Consider a more typical use of ProMedia-100s in a shared Fast Ethernet segment. A stack of Fast Ethernet hubs comprises the only repeater in the collision domain, and the users and servers in the local workgroup are each connected via Category 5 twisted pair cable, a maximum of 30 meters (100 ft.) in length. It is desired to connect one remote user with a fiber NIC via fiber cable, using a ProMedia-100 in the circuit. How long can the fiber cable be?

The solution is :

512 = total available Bit Times in a collision domain diameter,
minus 100 BT for two DTEs on each end leaves 412 BTs,
minus 90 BT for one Class II stackable repeater leaves 322 BTs,
minus 30 BT for one 30-meter TP cable from hub to user node leaves 292 BTs,
minus 5 BT for a short TP cable from the hub to -100 leaves 287 BTs,
minus 80 BT for one ProMedia-100 leaves 207 BTs for fiber cable,
which indicates a fiber cable length of about 200 meters.

3.3 Connecting Ethernet Media

Connecting Ethernet media to the ProMedia-100 media converter is very simple and straightforward. Using a properly terminated media segment, simply attach the cable end to the appropriate connector.

See Sections 4.2 and 4.3 for a description of the LEDs.

3.3.1 Connecting Twisted Pair (RJ45, standard and Link Pass-through models)

The following procedure describes how to connect a 100BASE-TX twisted pair segment to the RJ45 port on the ProMedia-100 media converters. The procedure is the same for both unshielded and shielded twisted pair segments.

1. Using standard 100BASE-TX media, insert either end of the cable with an RJ45 plug into the RJ45 connector of the ProMedia-100 media converter.
2. Connect the other end of the cable to the corresponding device.
3. Use the LINK LED to ensure proper connectivity by noting that the LED will be illuminated when the units are powered and proper connections established. If the LINK LED is not illuminated, change the setting of the up-link switch. If this does not help, ensure that the cable is connected properly at both ends and is not defective.

3.3.2 Connecting Fiber Optic 100BASE-FX, Type ST and SC

The following procedure applies to 100BASE-FX applications using the ProMedia-100 media converter with ST-type (twist-lock) and SC-type (snap-in) fiber connectors.

1. Before connecting the fiber optic cable, remove the protective dust caps from the tips of the connectors on the ProMedia-100. Save these dust caps for future use.
2. Wipe the ends of the dual connectors clean with a soft cloth or lint-free lens tissue dampened in alcohol. Make certain the connectors are clean before connecting.
Note: One strand of the duplex fiber optic cable is coded using color bands at regular intervals; you must use the color-coded strand on the associated ports at each end of the fiber optic segment.
3. Connect the Transmit (TX) port (light colored post) on the ProMedia-100 to the Receive (RX) port of the remote device. Begin with the color-coded strand of the cable for this first "Transmit-to-Receive" connection.

4. Connect the Receive (RX) port (dark colored post) on the ProMedia-100 to the Transmit (TX) port of the remote device. Use the non-color coded fiber strand for this.
5. The LINK LED corresponding to the fiber port, on the front of the product, will illuminate when a proper connection has been established at both ends (and when power is ON in the units at each end). If LINK is not lit after cable connection, the normal cause is improper cable polarity. Swap the fiber cables on the product connector to remedy this situation.

3.3.3 Power Budget Calculations for Fiber Media

Receiver Sensitivity and Transmitter Power are the parameters necessary to compute the power budget. To calculate the power budget of different fiber media installations, the following equations should be used:

$$\text{OPB (Optical Power Budget)} = P_T(\text{min}) - P_R(\text{min})$$

where P_T = Transmitter Output Power, and P_R = Receiver Sensitivity

$$\text{Worst case OPB} = \text{OPB} - 1\text{dB}(\text{for LED aging}) - 1\text{dB}(\text{for insertion loss})$$

$$\text{Worst case distance} = \{\text{Worst case OPB, in dB}\} / [\text{Cable Loss, in dB/Km}]$$

where the "Cable Loss" for 62.5/125 and 50/125 μm (m.m.) is 2.8 dB/km,

and the "Cable Loss" for 100/140 (multimode) is 3.3 dB/km,

and the "Cable Loss" for 9/125 (singlemode) is 0.5 dB/km

The following data has been collected from component manufacturer's (HP's and Siemens') web sites and catalogs to provide guidance to network designers and installers.

Fiber Port Module	Speed, Std.	Mode	Std. km fdx (hdx)	Wave-length nm	Cable Size μm	X'mitr Output P_T , dB	R'cvr Sens. P_R , dB	Worst OPB, dB	Worst* dist. Km, fdx	typical OPB, dB	typical* dist. Km, fdx
100SC, 100ST	100Mb FX	Multimode	2 (0.4)	1300	62.5/125 50/125	-20 -23.5	-31 -31	9.0 5.5	2.5 2.0	14 12	5 4
SC-SM, ST-SM	100Mb FX	Single mode	18+ (0.4)	1300	9/125	-15	-31	14	28	17.5	35

*** Note:** The use of either multimode or singlemode fiber to operate at 100Mbps speed over long distances (i.e., over approx. 400 meters) can be achieved only if the following factors are both applied:

1. The 100Mb fiber segment must operate in full-duplex (FDX) mode, i.e. a switch (or equal external unit such as a FDX NIC) must be used, and
2. The worst-case OPB of the fiber link must be greater than the fiber cable's passive Attenuation. (Attenuation = Cable loss + LED aging loss + Insertion loss + safety factor)

4.0 OPERATION

This section describes the operation of the ProMedia-100 media converters including power supply requirements, up-link switch functionality, and a description of all LEDs.

4.1 Power Requirements, Power Supply Types

ProMedia-100 media converters require 5 watts of power and are designed to be used with an external power supply. The external power supply unit supplied is one of two types; one version for AC input power of 115-vac 60 Hz, and one version for 230-vac 50 Hz. The 115-vac version has a small transformer integral with a convenience power outlet plug. The 230-vac version has a small transformer integral with an IEC-type power plug for a user-supplied AC power cord with a convenience power outlet

plug. Both types include a lightweight DC power cord to the applicable power jack on the media converter unit.

4.2 Front Panel LEDs

<u>LED</u>	<u>Description</u>
PWR	Illuminates GREEN to indicate the unit is receiving DC power.
LINK	(RJ45 port) Illuminates GREEN, to indicate proper connectivity on the 100BASE-TX network segment. LINK will turn off in the event connectivity is lost between the ends of the twisted pair segment or a loss of power occurs in the unit or remote device.
LINK	(Fiber port) Illuminates GREEN, to indicate proper connectivity on the 100BASE-FX network segment. LINK will turn off in the event connectivity is lost between the ends of the fiber segment or a loss of power occurs in the unit or remote device.

4.3 Up-Link or “Crossover” Switch (On TX port)

ProMedia-100 Media converters are equipped with an uplink slide switch to accommodate switch- or repeater-to-converter connections without a special crossover cable. When set to the UP position (=), the ProMedia-100 media converter is wired for normal twisted pair connection to a user node device. When set to the DOWN position (X), the media converter is wired with crossover functionality for direct up-link to a network hub or concentrator.

Switch ports may be of either polarity, and this feature is very convenient with switches accordingly.

5.0 TROUBLESHOOTING

All ProMedia Ethernet products are designed to provide reliability and consistently high performance in all network environments. The installation ProMedia-100 media converters is a straightforward procedure and is described in Sections 3.0); operation is very simple and is described in Section 4.0. Should problems develop during installation or operation, this section is intended to help locate, identify and correct these types of problems. Please follow the suggestions listed below prior to contacting your supplier. However, if you are unsure of the procedures described in this section or if the ProMedia media converter is not performing as expected, do not attempt to repair the unit; instead contact your supplier for assistance or contact Waters Network Systems’ customer support center at **800.328.2275** or email carolynl@watersnet.com.

5.1 Before Calling for Assistance

1. If difficulty is encountered when installing or operating the unit, refer back to the Installation Section of the chapter of this manual. Also check to make sure that the various components of the network are inter-operable.
2. Check the cables and connectors to ensure that they have been properly connected and the cables/wires have not been crimped or in some way impaired during installation. (About 90% of network downtime can be attributed to wiring and connector problems.)
3. Make sure that an AC power cord is properly attached to the ProMedia media converter.
4. Be certain that each AC power cord is plugged into a functioning electrical outlet. Use the PWR LEDs to verify each unit is receiving power.
5. If the problem is isolated to a network device other than the Waters’ ProMedia media converter, it is recommended that the problem device be replaced with a known good device. Verify whether or not the problem is corrected. If not, go to next step. If the problem is corrected, the Waters’ ProMedia and its associated cables are functioning properly.
6. If the problem continues, contact Waters Network Systems Customer Service at 800.328.2275 or email carolynl@watersnet.com for assistance.

5.2 When Calling for Assistance

Please be prepared to provide the following information:

1. A complete description of the problem, including the following points:
 - a. The nature and duration of the problem.
 - b. Situations when the problem occurs.
 - c. The components involved in the problem.
 - d. Any particular application that, when used, appears to create the problem
2. An accurate list of Waters Network Systems product model(s) involved. Include the date(s) that you purchased the products from your supplier.
3. It is useful to include other network equipment models and related hardware, including personal computers, workstations, terminals and printers; plus, the various network media types being used.
4. A record of changes that have been made to your network configuration prior to the occurrence of the problem is also helpful. Any changes to system administration procedures should all be noted in this record.

5.3 Return Material Authorization (RMA) Procedure

All returns for repair must be accompanied by a return material authorization (RMA) number. To obtain an RMA number, call Waters Network Systems' customer service at 800.328.2275 during business hours of 8:00 am to 5:00 pm (CT) or email carolynl@watersnet.com. When calling, please have the following information readily available:

- Name and phone number of your contact person
- Name of your company/institution
- Your shipping address
- Product name
- Packing list number (or sales order number)
- Failure symptoms, including a full description of the problem

Waters Network Systems will carefully test and evaluate all returned products, will repair products that are under warranty at no charge, and will return the warranty-repaired units to the sender with shipping charges prepaid (see warranty information at the end of this manual for complete details). However, if Waters cannot duplicate the problem or condition causing the return, the unit will be returned as: **No problem found.**

Waters Network Systems reserves the right to charge for the testing of non-defective units under warranty. Testing and repair of product that is not under warranty will result in a customer (user) charge.

5.4 Shipping and Packaging Information

Should you need to ship the unit back to Waters Network Systems, please follow these instructions: Package the unit carefully. It is recommended that you use the original container if available. Units should be wrapped in a "bubble-wrap" plastic sheet or bag for shipping protection. (You may retain all connectors and this installation guide.) Caution: Do not pack the unit in Styrofoam "popcorn" type packing material. This material may cause electro-static shock damage to the unit.

Clearly mark the return material authorization (RMA) number on the outside of the shipping container. Waters Network Systems is not responsible for your return shipping charges.

Ship the package to:

Waters Network Systems
Attention: Customer Service
945 37th Avenue, NW
Rochester, MN 55901

6.0 Warranty Information

Waters Network Systems' Warranty Statement

Waters Network Systems' products are warranted against defects in materials and workmanship. The warranty period for each product will be provided upon request at the time of purchase. Unless otherwise stated, the warranty period is for the useable life of the product.

In the event of a malfunction or other indication of product failure attributable directly to faulty materials and/or workmanship, Waters Network Systems will, at its option, repair or replace the defective products or components at no additional charge as set for herein. This limited warranty does not include service to repair damage resulting from accident, disaster, misuse, neglect, lightning, acts of God, tampering or product modification.

Service under the warranty may be obtained by contacting Waters Network Systems and receiving a Return Material Authorization (RMA) number from Waters Network Systems. Returned product accompanied with the issued RMA number and prepaid shipping will be repaired or replaced by Waters Network Systems. Repaired or replaced products will be returned at no cost to the original Buyer and shipped via the carrier and method of delivery chosen by Waters Network Systems.

Specific warranty by product family is as follows:

ProSwitch-Secure:	Limited Lifetime (see note)
ProSwitch-SecureAir+:	Limited Lifetime
ProSwitch-Lite:	3 Years from date of manufacture (see note)
ProSwitch-Xpress:	Limited Lifetime
ProSwitch-Xtreme:	Limited Lifetime (see note)
ProSwitch-FlexPort:	Limited Lifetime
ProSwitch-FixPort:	Limited Lifetime
ProSwitch-CS and CSX:	3 Years from date of manufacture (see note)
ProMedia Converters	3 Years from date of manufacture (see note)

Note: Warranty period for any and all external power supplies is one (1) year from date of purchase.

EXCEPT FOR THE EXPRESS WARRANTY SET FORTH ABOVE, *WATERS NETWORK SYSTEMS* GRANTS NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, BY STATUTE OR OTHERWISE, REGARDING THE PRODUCTS, THEIR FITNESS FOR ANY PURPOSE, THEIR QUALITY, THEIR MERCHANTABILITY, OR OTHERWISE.

WATERS NETWORK SYSTEMS' LIABILITY UNDER THE WARRANTY SHALL BE LIMITED TO PRODUCT REPAIR, OR REPLACEMENT OF THE BUYER'S PURCHASE PRICE. IN NO EVENT SHALL *WATERS NETWORK SYSTEMS* BE LIABLE FOR THE COST OF PROCUREMENT OF SUBSTITUTE GOODS BY THE CUSTOMER OR FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OR WARRANTY.