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**MAXNET® II**

*Platinum Series*

Pat.# U.S. 7,142,414

**MPTX8**  
**Optical Transmitter Manual**



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## PRODUCT DESCRIPTION

### 1. Product Description

ATX has developed a line of optical transmitter modules for their MAXNET II RF Management Platform. The product line consists of transmitter modules of varying power levels with a single input for Broadcast Spectrum and Narrowcast Spectrum inputs through an integrated 8-way RF combiner. An appropriate MAXNET II Power Supply in the MAXNET II Chassis powers all of the above modules. The transmitters are dual width and take up two slots in the MAXNET II Chassis.

Modules can be status monitored through SNMP based Managers and the MAXNET II interface is HMS Compliant. Also, all of the modules include front access alarm indication and a -20 dB test point.

Please refer to the web page for up-to-date specifications – [www.atxnetworks.com](http://www.atxnetworks.com)

Part Number	Description
MPTX8-**	1310nm Forward Path Optical Transmitter with 8 Narrowcast Inputs, ** dBm, SC/APC; ** = 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 15
MPTX8F-**	1310nm Forward Path Optical Transmitter with 8 Narrowcast Inputs (7 rear and 1 front), with F Backplane (including MPTXFBP), Front Fiber, ** dBm, SC/APC; ** = 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14 15
MPTXFBP	Replacement F Connector Backplane for MPTX8F-* Modules; Fastens to MP3FA Chassis

**Table #1: MPTX8 Ordering Information**

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# FUNCTIONAL DIAGRAMS / TECHNICAL SPECIFICATIONS

## 2. Functional Diagrams/ Technical Specifications

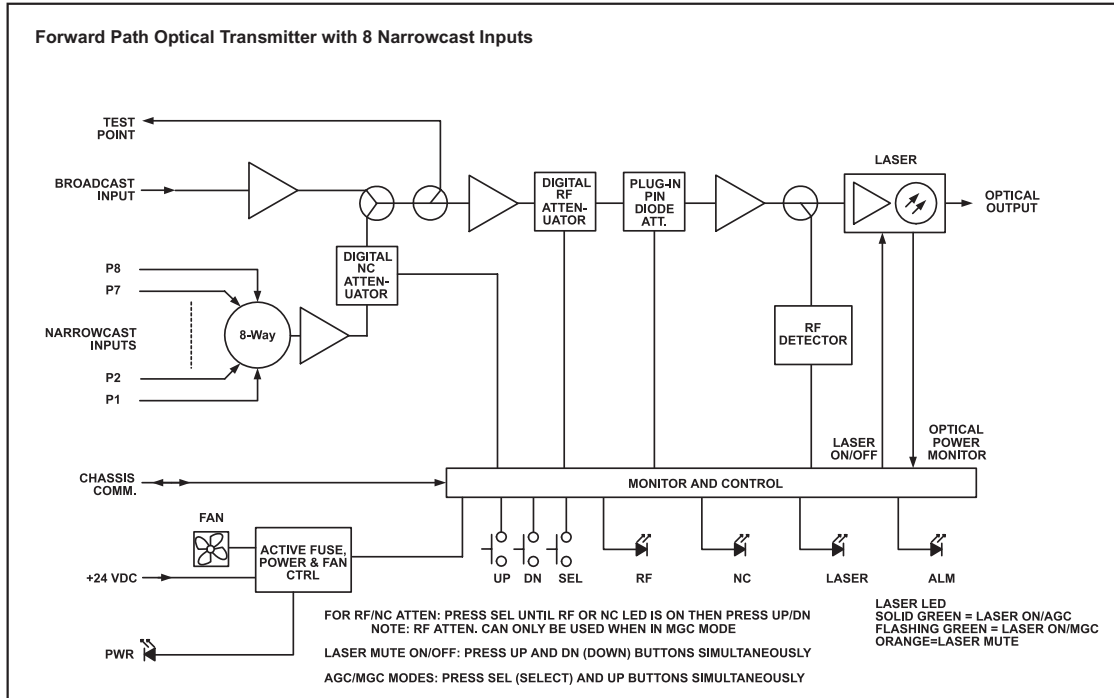


Figure #1: MPTX8: Optical Transmitter with Integrated 8-way Narrowcast Combiner

RF & OPTICAL SPECIFICATIONS	
WAVELENGTH	1310 +/- 20 nm
OUTPUT POWER	2 to 15 dBm in 1 dB Increments / Nominal -0.5 + 1.0 dB
CONNECTOR TYPE	SC/APC (std.), Others on Special Order
BANDWIDTH	50 - 1000 MHz
FLATNESS	50 - 550 MHz
	50 - 1000 MHz
	BROADCAST +/- 0.5 dB
	NARROWCAST +/- 1.0 dB
BROADCAST PORT RF INPUT LEVEL	13-19 dBmV (Analog) + QAM @ -6 dB
AUTOMATIC GAIN CONTROL (AGC)	Range: 6 dB (for Above Mentioned Broadcast Input Levels)
MIN. NARROWCAST PORT RF INPUT LEVEL <sup>(2)</sup>	7 dBmV (Digital QAM)
INPUT RETURN LOSS (Min. 50-1000 MHz)	Broadcast: 17 dB / Narrowcast: 18 dB
TEST POINT	Front: -20 dB +/- 1.0 dB Relative to Broadcast Input
ISOLATION (Min. 50-1000 MHz) <sup>(4)</sup>	Narrowcast - Broadcast: >50 dB / Narrowcast - Narrowcast >50 dB
MANUAL GAIN CONTROL (MGC)	Set and Control: Front Access Pushbutton, HMS SNMP v2c, Web Browser, Proprietary Network Interface Range: 15.5 dB Digital Attenuator
NARROWCAST PORT ATTENUATION	0-31 dB in 0.5 dB steps, each port adjustable separately
MUTE	Front Access Pushbutton, HMS SNMP v2c, Web Browser
CSO <sup>(1)</sup>	> 65 dBc
CTB <sup>(1)</sup>	> 70 dBc
C/N	> 53 dB (assuming link loss is all fiber and received power is 0 dBm)
OTHER	
TRANSMITTER STATUS INDICATION	Front LEDs, HMS SNMP v2c, Web Browser, Proprietary Network Interface
CURRENT <sup>(3)</sup>	300mA
NOTES:	
(1) 80 NTSC modulated analog carriers, 50-550 MHz & 550-1000 MHz QAM at -6 dBc (AGC mode).	
(2) Adjust broadcast input levels and/or narrowcast input levels and/or narrowcast attenuator to optimize QAM levels relative to analog carriers.	
(3) DC current required from 24V chassis bus.	
(4) Assumes QAM input of 19 dBmV and NC port attenuation of 12 dB. Up to 12 dB lower QAM input levels possible by reducing port attenuation.	

Table #2: MPTX8 Technical Specifications

ATX MODEL NUMBER	OUTPUT POWER	LINK LOSS (dB)	LOW CHANNEL LOAD (79 NTSC, No QAM)			HIGH CHANNEL LOAD (79 NTSC, with QAM) <sup>5</sup>		
			ALL FIBER LOSS CNR	FIBER +3 dB PASSIVE LOSS CNR	FIBER +6 dB PASSIVE LOSS CNR	ALL FIBER LOSS CNR	FIBER +3 dB PASSIVE LOSS CNR	FIBER +6 dB PASSIVE LOSS CNR
MPTX8-03	+3 dBm	1	52.0	N/A	N/A	51.5	N/A	N/A
		2	51.8	N/A	N/A	51.3	N/A	N/A
		3	51.5	52.0	N/A	51.0	51.5	N/A
		4	51.1	51.6	N/A	50.6	51.1	N/A
		5	50.6	51.1	N/A	50.1	50.6	N/A
MPTX8-06	+6 dBm	4	52.0	52.5	N/A	51.5	52.0	N/A
		5	51.8	52.3	N/A	51.3	51.8	N/A
		6	51.5	52.0	52.5	51.0	51.5	52.0
		7	51.1	51.6	52.1	50.6	51.1	51.6
		8	50.6	51.1	51.6	50.1	50.6	51.1
MPTX8-08	+8 dBm	6	51.5	52.0	52.5	51.0	51.5	52.0
		7	51.3	51.8	52.3	50.8	51.3	51.8
		8	51.0	51.5	52.0	50.5	51.0	51.5
		9	50.6	51.1	51.6	50.1	50.6	51.1
		10	50.1	50.6	51.1	49.6	50.1	50.6
MPTX8-09	+9 dBm	7	51.5	52.0	52.5	51.0	51.5	52.0
		8	51.3	51.8	52.3	50.8	51.3	51.8
		9	51.0	51.5	52.0	50.5	51.0	51.5
		10	50.6	51.1	51.6	50.1	50.6	51.1
		11	50.1	50.6	51.1	49.6	50.1	50.6
MPTX8-10	+10 dBm	8	51.5	52.0	52.5	51.0	51.5	52.0
		9	51.3	51.8	52.3	50.8	51.3	51.8
		10	51.0	51.5	52.0	50.5	51.0	51.5
		11	50.6	51.1	51.6	50.1	50.6	51.1
		12	50.1	50.6	51.1	49.6	50.1	50.6
MPTX8-11	+11 dBm	9	51.5	52.0	52.5	51.0	51.5	52.0
		10	51.3	51.8	52.3	50.8	51.3	51.8
		11	51.0	51.5	52.0	50.5	51.0	51.5
		12	50.6	51.1	51.6	50.1	50.6	51.1
		13	50.1	50.6	51.1	49.6	50.1	50.6
MPTX8-12	+12 dBm	10	51.0	51.5	52.0	50.5	51.0	51.5
		11	50.8	51.3	51.8	50.3	50.8	51.3
		12	50.5	51.0	51.5	50.0	50.5	51.0
		13	50.1	50.6	51.1	49.6	50.1	50.6
		14	49.6	50.1	50.6	49.1	49.6	50.1
MPTX8-13	+13 dBm	11	51.0	51.5	52.0	50.5	51.0	51.5
		12	50.8	51.3	51.8	50.3	50.8	51.3
		13	50.5	51.0	51.5	50.0	50.5	51.0
		14	50.1	50.6	51.1	49.6	50.1	50.6
		15	49.6	50.1	50.6	49.1	49.6	50.1
MPTX8-14	+14 dBm	12	51.0	51.5	52.0	50.5	51.0	51.5
		13	50.8	51.3	51.8	50.3	50.8	51.3
		14	50.5	51.0	51.5	50.0	50.5	51.0
		15	50.1	50.6	51.1	49.6	50.1	50.6
		16	49.6	50.1	50.6	49.1	49.6	50.1
MPTX8-15	+15 dBm	13	51.0	51.5	52.0	50.5	51.0	51.5
		14	50.8	51.3	51.8	50.3	50.8	51.3
		15	50.5	51.0	51.5	50.0	50.5	51.0
		16	50.1	50.6	51.1	49.6	50.1	50.6
		17	49.6	50.1	50.6	49.1	49.6	50.1

**NOTES:**  
 1. "Load" refers to 79 6 MHz NTSC modulated analog channels from 50 to 550 MHz  
 2. QAM refers to 30 6 MHz wide QAM channels from 550 to 1000 MHz  
 3. Measured at RF input level range of 15 to 21 dBmV (operating in AGC mode)  
 4. Rx optical input is (Transmit Power - Link Loss)  
 5. Minimum equalized MER of 39.5 across the link  
 Pre FEC BER of 0 across the link

Table #3: MPTX8 CNR Specifications

# INSTALLATION

## 3. Installation

### 3.1. Product Inspection

Carefully unpack the transmitter module from the shipping box. If the box or transmitter module is damaged, please notify the freight company to make a damage claim. If you suspect that there is a problem with the transmitter module, that may affect its safe operation, do not install a suspect Transmitter into the MAXNET II Chassis.

### 3.2. Module Installation into the MAXNET® II Chassis

Slide the Transmitter module into an open slot in the MAXNET II Chassis until the module drops into its lock position. If the module is installed properly, the transmitter will make contact with the 24 VDC power bus in the chassis and if there is a MAXNET II Power Supply Module installed in the chassis, and it is plugged into the respective power source, the Module's LED 'Power' Indicator will light Green.

### 3.3. Optical Connections

Before removing the dust cap from the Transmitter's SC/APC bulkhead connector, clean the SC/APC ferrule on the optical jumper cable that will eventually connect to the transmitter module. This can be done using a commercial cleaning tape or isopropyl alcohol, lint free tissues and compressed air. Never use compressed air on the MAXNET II Transmitter's SC/APC bulkhead. Once the optical jumper cable's ferrule has been cleaned, it is recommended that you measure the optical output power using an optical power meter. To prevent damage to the power meter, ensure that the meter can accept a power level greater than the total output power of the transmitter.

**CAUTION: DO NOT LOOK INTO THE SC/APC CONNECTOR AT ANY TIME AFTER REMOVING THE DUST CAP FROM THE TRANSMITTER'S SC/APC BULKHEAD CONNECTOR.**

Verify the transmit power using the chassis network connection and web-based monitoring locally with a computer connected to the chassis or through an SNMP Manager.



Figure #2: MAXNET II MPTX Front & Rear Panel

### 3.4. RF Connections

The RF input jacks on the transmitter’s rear panel are MCX [female]. There will be one Broadcast RF input and 8 Narrowcast RF inputs plus one front panel -20 dB test point. Connect a test jumper from the -20 dB Test Point to a signal level meter or spectrum analyzer to facilitate setting the RF levels into the Transmitter Module. Ensure that all unused RF inputs are terminated with 75-ohm MCX terminators.

### 3.5. Transmitter RF Set-up

#### 3.5.1. Transmitter LED Indicators

The MAXNET II Forward Path Transmitters have three LED Indicators, PWR, ALM and LSR. The PWR (Power) LED Indicator verifies that the transmitter module is receiving power from the MAXNET II Power Supply through the 24 VDC Chassis Bus. The ALM (Alarm) LED Indicator will Flash Red if there is a problem with the transmitter or if any of the monitored functions are beyond the specified limits. The LSR (Laser) LED Indicator will light Solid Orange if the transmitter Optical output is muted. The LSR LED indicator will light Solid Green to indicate AGC (Automatic Gain Control) and Flash Green to indicate MGC (Manual Gain Control). See below how to switch between AGC and MGC.

#### 3.5.2. Transmitter Front Panel Pushbutton Switches & Controls



Figure #3: MAXNET II MPTX8 Front Panel Pushbuttons

Remove the access cover from the front of the transmitter module by turning the thumbscrew counter-clockwise. This will expose three pushbutton switches labelled UP (UP), DOWN (DOWN) and SEL (SELECT). You can switch between AGC and MGC by pressing the SELECT button and the UP button simultaneously. The LSR LED indicates the AGC and MGC modes as follows:

LSR LED Indicators	
LASER LED (LSR)	Operation
Solid GREEN	AGC
Flash GREEN	MGC
ORANGE	Mute

When in MGC Mode, the operator can adjust the level of the combined BC/NC (Broadcast/Narrowcast) RF signals into the laser transmitter stage, using the ‘Digital RF Attenuator’ (see Functional Diagram). The Narrowcast drive level can also be independently adjusted prior to BC/NC combining, using the ‘Digital NC Attenuator’ (see Functional Diagram). Both the RF and the NC Attenuator can be adjusted within a 15.5 dB range.

When in AGC Mode, the operator cannot adjust the ‘Digital RF Attenuator’, even though he can select it through the Front Panel Pushbutton. This RF Attenuator will be locked and automatically preset for optimal performance. The ‘Digital NC Attenuator’ can be adjusted within a 15.5 dB range.

To select the RF or NC digital attenuator, press the SEL (SELECT) button to Light the RF or NC LED. The respective attenuator can now be adjusted by pressing the UP & DOWN pushbuttons. The UP & DOWN pushbuttons have to be pressed and released as many times as needed to set the desired level. Holding them pressed doesn't result in a continuous change of the attenuation value. Each time the UP/DOWN pushbuttons are pressed the attenuation value increases/decreases by approx. 0.5 dB.

### 3.5.3. Set Laser Drive Level - MGC Mode

After switching to MGC, as explained above, the LSR LED will be flashing Green.

The RF input level at the Broadcast RF Input should be a minimum of 15 dBmV per channel (assumed presence of 80 NTSC channels). If QAM channels are present as part of the Broadcast (BC) input signal (combined NTSC and QAM channels at the BC RF Input to the MPTX8) then these QAM channels shall be set to a user desired lower level relative to the NTSC channels (typically -6 dBc). This relationship between NTSC and QAM channels present at the BC RF Input can be monitored at the front panel MCX -20 dB Test Point. This Test Point is -20 dB relative to the BC input.

Once signals with proper level are fed to the Broadcast input, you must adjust the Narrowcast signals level, if they are present. The MPTX8 Optical Transmitter has 8 Narrowcast (NC1 to NC8) RF inputs on the rear panel. The RF level of signals fed to any of the Narrowcast RF inputs should be a minimum of 25 dBmV per channel. Narrowcast signals can be adjusted to desired level relative to BC signals by monitoring the front panel Test Point and adjusting the NC digital attenuator setting (affects the combined signal of all NC inputs) and/or adjusting Narrowcast signal levels before entering the NC RF inputs. Selecting and adjusting the integrated Digital NC Attenuator is explained above.

In MGC mode it is now possible to also adjust the integrated Digital RF Attenuator. It is possible to eventually adjust the level of the combined channel load of BC/NC signals to the laser transmitter. Selecting and adjusting the integrated Digital RF Attenuator is explained above.

### 3.5.4. Set Laser Drive Level - AGC Mode

After switching to AGC mode, as explained above, the LSR LED will be solid Green.

The RF input level at the Broadcast RF Input should be a minimum of 15 dBmV per channel (assumed presence of 80 NTSC channels). An RF input level at the BC RF Input of 18 dBmV is recommended to utilize the full AGC range. This RF level will allow the AGC circuitry to maintain the proper level into the laser to attain the published specifications. If QAM channels are present as part of the Broadcast (BC) input signal (combined NTSC and QAM channels at the BC RF Input to the MPTX8) then these QAM channels shall be set to a user desired lower level relative to the NTSC channels (typically -6 dBc). This relationship between NTSC and QAM channels present at the BC RF Input can be monitored at the front panel MCX -20 dB Test Point. This Test Point is -20 dB relative to the BC input.

Once signals with proper level are fed to the Broadcast input, you must adjust the Narrowcast signals level, if they are present. The MPTX8 Optical Transmitter has 8 Narrowcast (NC1 to NC8) RF inputs on the rear panel. The RF level of signals fed to any of the Narrowcast RF inputs should be a minimum of 25 dBmV per channel. Narrowcast signals can be adjusted to desired level relative to BC signals by monitoring the front panel Test Point and adjusting the NC digital attenuator setting (affects the combined signal of all NC inputs) and/or adjusting Narrowcast signal levels before entering the NC RF inputs. Selecting and adjusting the integrated Digital NC Attenuator is explained above.

In AGC mode it is not possible to adjust the integrated Digital RF Attenuator. If the BC/NC levels are set in accordance with above instructions, the AGC circuitry will maintain the proper level into the laser to attain the published specifications. No other adjustment is necessary.

### 3.5.5. Muting the Transmitter Optical Output

Press both the UP and DOWN pushbuttons at the same time and the Transmitter Optical output will be muted as indicated by the steady 'ORANGE' LSR LED indicator. Press both the UP and DOWN pushbuttons at the same time again to reactivate the Transmitter Optical output. The 'ORANGE' LSR LED will switch back to flashing or steady 'GREEN' LSR LED depending on what status, AGC or MGC, the Transmitter was in before muting it.

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# MAINTENANCE & TROUBLESHOOTING

## 4. Maintenance & Troubleshooting

### 4.1. Maintenance

Daily, ensure that the Power LED's are on for all of the modules and that there are no Alarm lights.

Weekly, ensure that all module cooling fans are operational and unobstructed.

Monthly, vacuum all module cooling fans.

### 4.2. Troubleshooting

The following Guide will help the operator to locate active modules that have become non-operational.

#### 4.2.1. Power Light “Off” on MAXNET® II MPAC or MPDC

##### 4.2.1.1. Power Supply, Cord or Line Failure

1. Check the fuse continuity on the MPAC or MPDC module.
2. Verify that the 110 VAC electrical outlet is active using a voltmeter and checking the circuit breaker. (In the case of the MPDC insure that there is -48 VDC on the rear terminal block)
3. Verify that IEC power cord is properly inserted into the receptacle on the rear of the module and properly connected to a 110 VAC electrical outlet.
4. Remove and replace the “suspected-faulty” MPAC or MPDC with another “known good” module.
5. If you swap-out the “suspected-faulty” Power Supply with a “known-good” Power Supply and the Power LED “does” light, obtain an RMA number from ATX and return the non-operational Power Supply module to the ATX factory for repair.
6. If you swap-out the “suspected-faulty” Power Supply with a “known-good” Power Supply module and the Power LED still “does not” light, the problem might be with another active module loading down the power bus in the MAXNET II Chassis.

##### 4.2.1.2. Active Module Failure

1. With the “known-good” Power Supply module installed in the MAXNET II Chassis, sequentially remove active modules from the Chassis to locate a possible failed module that is loading down the power bus. If on the removal of a specific MAXNET II Active module the Power Supply’s Power LED “does” light, then the problem is with that specific active module that was temporarily removed from the Chassis power bus. Obtain an RMA number from ATX and return the non-operational e module to the factory for repair.
2. If all active modules have been removed from the Chassis and the Power Supply’s Power LED still “does not” light, the problem might be with the Chassis power bus.

##### 4.2.1.3. Chassis Power Bus Failure

1. Install the “suspected-faulty” Power Supply module in a separate “known good” MAXNET II Chassis.
2. If the power LED on the “suspected-faulty” Power Supply module “does” light when the Power Supply module is installed in a separate “known good” MAXNET II Chassis, the problem is with the Chassis power bus. Obtain an RMA number from ATX and return the non-operational Chassis to the factory for repair.

With a “known good” Power Supply and “known good” Chassis and good line/ DC power, the Power LED on the Power Supply should be lit. At this point, if the power light is still “not” lit, please contact ATX for Technical Support.

## 4.2.2. Power Light “Off” on any MAXNET® II Active Module

### 4.2.2.1. Active Module Failure

1. If the Power LED on the MPAC or MPDC “is” lit but a specific active module’s Power LED is “not” lit, suspect a problem with the specific active module.
2. Swap the “suspected-faulty” active module with a “known-good” module.
3. If the Power LED on the “known-good” module “does” light when replacing the “suspected faulty” active module, obtain an RMA number from ATX and return the faulty active module to the factory for repair.
4. If the Power LED on the “known-good” module “does not” light when replacing the “suspected faulty” active module with a “known-good” active module suspect a problem with the particular slot of the MAXNET II Chassis.

### 4.2.2.2. Chassis Slot Failure

1. Slide the “suspected-faulty” active module into another “known-good” slot in the MAXNET II Chassis. If the Power LED on the “suspected faulty” module “does” light when installed in a “known-good” slot in the MAXNET II Chassis, obtain an RMA number from ATX and return the faulty MAXNET II Chassis to the factory for repair.

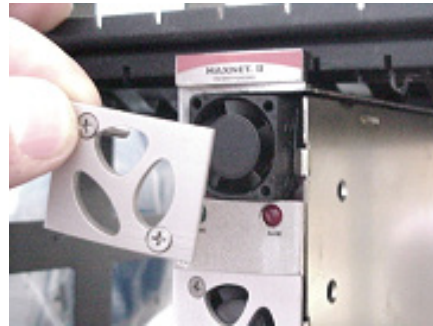
With a “known good” active module installed in a “known good” slot in the MAXNET II Chassis with an active Power Supply and good line/ DC power, the Power LED on the active module should be lit. At this point, if the power light on the module is still “not” lit, please contact ATX for Technical Support.

## 4.2.3. Temperature Alarm on any MAXNET® II Active Module

Check to see if the module fan is operating. If not replace with a new fan from ATX (Part # MPFANB) using the below procedure.



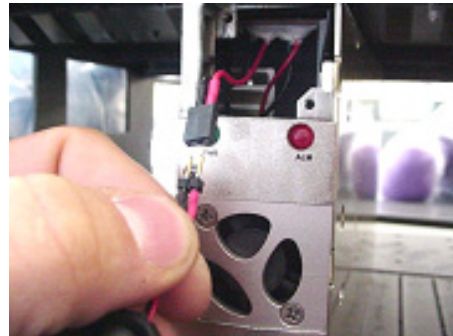
1. Remove two screws holding plate and fan in place.



2. Remove fan cover and screws.



3. Pull out fan with tweezers.



4. Remove push-fit power connections.

5. Install replacement fan in the opposite order shown. Ensuring that:
  - a) The red and black wires are aligned.
  - b) The labelled side of the fan faces inward toward the module.
  - c) The wires do not bunch up behind the fan, interfering with fan rotation.

## SERVICE & SUPPORT

### 5. Service & Support

#### 5.1. Contact ATX Networks

Please contact ATX Technical Support for assistance with any ATX products. Please contact ATX Customer Service to obtain a valid RMA number for any ATX products that require service and are in or out-of-warranty before returning a failed module to the factory.

ATX Networks  
1-501 Clements Road West  
Ajax, ON L1S 7H4 Canada

Tel: (905) 428-6068  
Toll Free: (800) 565-7488  
Fax: (905) 427-1964  
Toll Free Fax: (866) 427-1964  
Web: [www.atxnetworks.com](http://www.atxnetworks.com)  
E-mail: [support@atxnetworks.com](mailto:support@atxnetworks.com)

#### 5.2. Warranty Information

All of ATX Networks' products have a 1-year warranty that covers manufacturer's defects or failures.

#### 5.3. Safety

**IMPORTANT! FOR YOUR PROTECTION, PLEASE READ THE FOLLOWING:**

**WATER AND MOISTURE:** Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**POWER SOURCES:** The device should be connected to a power supply only of the type described in the operating instructions or as marked on the device.

**GROUNDING OR POLARIZATION:** Precautions should be taken so that the grounding or polarization means of the device is not defeated.

**POWER CORD PROTECTION:** Power supply cords should be routed so that they are not likely to be pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the device.

**SERVICING:** The user should not attempt to service the device beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

**FUSING:** If your device is equipped with a fused receptacle, replace only with the same type fuse. Refer to replacement text on the unit for correct fuse type.



1-501 Clements Road West, Ajax, ON L1S 7H4 Canada  
Tel +1 (905) 428-6068 Toll Free +1 (800) 565-7488 Fax +1 (905) 427-1964 Toll Free Fax +1 (866) 427-1964  
[www.atxnetworks.com](http://www.atxnetworks.com) [support@atxnetworks.com](mailto:support@atxnetworks.com)