



Media Axis™
4K/60 Fiber Optic Extenders
USER MANUAL



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Table of Contents

Safety Precautions	3
Product Introduction	4
Features	4
Specifications	5
MAX-FT101 Extender Transmitter	5
MAX-FR102 Extender Receiver	8
Operation and Reliability Specification.....	10
Installation	11
Package Contents	11
Environments.....	11
Installation and Setup.....	12
MAX-FR-102 Operating Instruction	12
Control.....	16
Cable Termination	17
EDID	20
Warranty & Customer Service	21

Safety Precautions

For optimum performance and safety, please read these instructions carefully before connecting, operating, or adjusting this product. Please keep this manual for future reference.

1. This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. The use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.
2. Always use the correct external power supply (indicated on the product label) when operating this unit.
3. Power down unit and unplug from the wall outlet before installing or removing transmitter/receiver modules
4. Keep away from wet, magnetic, and flammable surfaces or substances. Unplug the unit from wall outlets before cleaning. Do not use liquid cleaners or aerosol sprays. Wipe with a damp cloth.
5. Air vents should be kept clean and unobstructed at all times.
6. Any external impact may cause damage to the operation of this unit.

Product Introduction

Media Axis' Fiber Optic extension system is designed to transmit video, audio (embedded or analog stereo audio), and control (RS232 and IR) over a 1LC fiber optic cable up to 1.24 miles. Both the MAX-FT101 extender transmitter and MAX-FR102 extender receiver offer adaptive Multimode/Singlemode processing, while the MAX-FR102 also features built-in 4K/60 auto-scaling powered by Motore 2.0™.

Features

Transmitters are Directly Compatible with Media Axis Fiber Optic Input Cards

The MAX-FT101 Fiber Optic Transmitters can send signals directly to Media Axis' Fiber Optic Input Board (MAX-FI), eliminating the need for a matching receiver.

Receivers are Directly Compatible with Media Axis Fiber Optic Output Cards

The MAX-FR102 Fiber Optic Receivers can receive signals directly from Media Axis' Fiber Optic Output Card (MAX-FO), eliminating the need for a matching transmitter.

HDMI v2.0b, 3D Support

Adopting the latest HDMI version, HDMI 2.0b enables Media Axis to support 3D, 48-Bit Deep Color, 4K/60 4:4:4 resolutions, and 7.1 Channel Dolby TrueHD & DTS-HD Master Audio.

Auto-EDID (EDID Library, Emulation)

PureLink's EDID library and emulation feature failsafe EDID capture & storage to provide constant and continuous EDID for source devices.

Integrated Noise-cancellation and Error-correct Logic

Prevents damage caused by Electrical Noise for both input and output ports.

HDCP 2.2 Compliant

USB Firmware Updateable

Long Distance Transmission up to 1.24 miles (2 km)

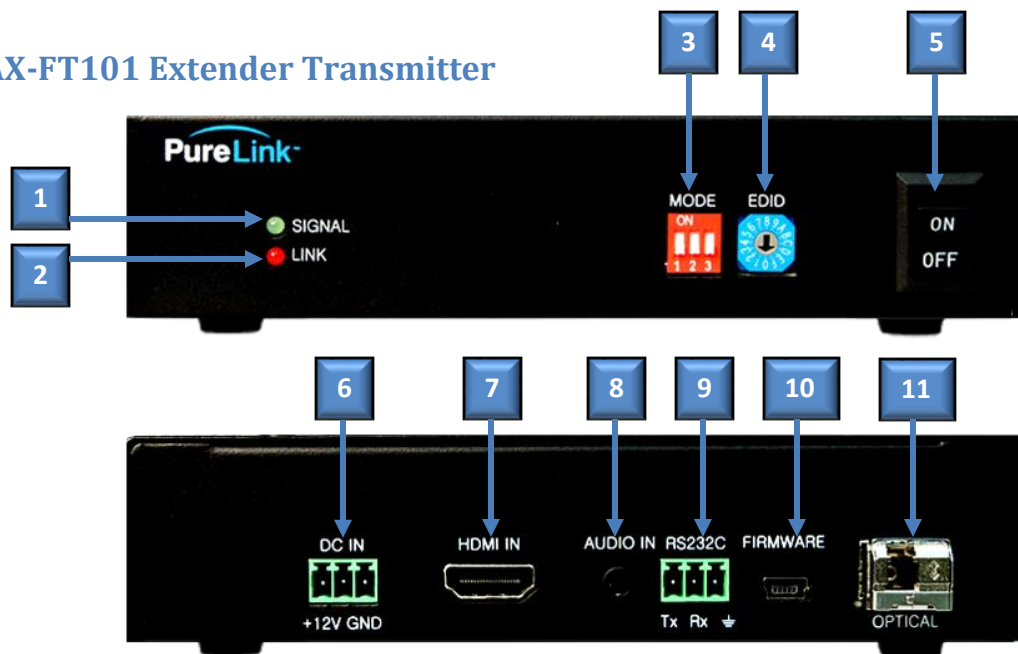
Resolutions up to WUXGA 1920x1200, HD 1080p @ 60Hz, and 4K 4:4:4 @ 60Hz

TAA Compliant



Specifications

MAX-FT101 Extender Transmitter



Front Connection Ports:

1. SIGNAL LED: Video signal presence indicator
2. LINK LED: Connection signal to MAX-FI or MAX-FR102
3. MODE S/W (EDID save): EDID save
4. EDID select S/W: EDID library function selection rotary switch
5. Power S/W: Power On/Off switch

Back Connection Ports:

6. DC IN: DC 12V Power port
7. HDMI IN: HDMI input port
8. AUDIO IN: Analog stereo audio input port
9. RS-232C: RS-232C communication port
10. FIRMWARE: USB firmware update port
11. OPTICAL: 1LC Fiber Optic output port

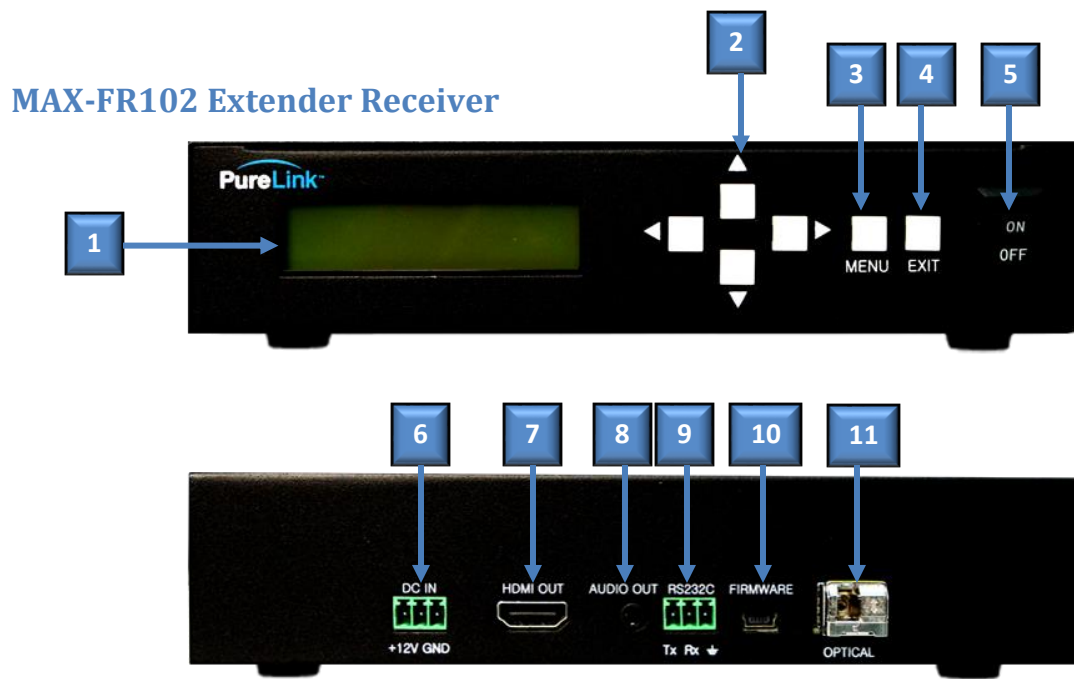
MAX-FT101 Technical Specifications	
Connector Types	(1) HDMI [Type A Female] (1) 3.5mm stereo audio port (1) 1LC optical connector (1) 3-pin phoenix connector [RS-232] (1) mini USB [firmware] (1) 3-pin phoenix connector [12V power]
Input Signal Type	HDMI & analog stereo w/Deep Color, 3D, & 4K
Output Signal	Fiber w/Deep Color, 3D, & 4K
Supported Resolutions	up to Ultra HD/4K (4096x2160, 4:4:4 @ 50/60Hz)
Max. Distance	Singlemode Fiber: up to 1.24 miles (2 kilometers) Multimode Fiber: up to 1,650 ft (500m)
Audio Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby® TrueHD, Dolby Atmos®, DTS®, DTS-ES, DTS 96/24, DTS-HD High Res, DTS-HD Master Audio™, LPCM up to 8 channels
Compliance	HDMI 2.0, HDCP 2.2
Power Consumption	DC +12V, 4 watts (max)
Dimension	6.3" x 4.4" x 1.7" (160 x 112 x 42 mm)
Weight	1.43 lbs. (0.65 Kg)

Analog Video Signal Supported Resolution

- 640*480 60Hz	- 1024*768 60Hz	- 720*480p 60Hz
- 640*480 72Hz	- 1024*768 70Hz	- 720*576p 50Hz
- 640*480 75Hz	- 1024*768 75Hz	- 1280*720p 60Hz
- 640*480 85Hz	- 1024*768 85Hz	- 1280*720p 50Hz
- 800*600 56Hz	- 1280*1024 60Hz	- 1920*1080i 60Hz
- 800*600 60Hz	- 1280*1024 75Hz	- 1920*1080i 50Hz
- 800*600 72Hz	- 1280*1024 85Hz	- 1920*1080p 60Hz
- 800*600 75Hz	- 1600*1200 60Hz	- 1920*1080p 50Hz
- 800*600 85Hz	- 1920*1200 60Hz	

Digital Video Signal Supported Resolution:

- PC resolution: VGA ~ WUXGA @ 60Hz (1920 x 1200 @ 60Hz)
- HDTV resolution: 480i ~ 1080p @ 60Hz, 4K2K @ 60Hz



Front Connection Ports:

1. LCD Display: 16*2 LCD display
2. ▲▼◀▶: Menu navigation buttons
3. MENU: Menu and Enter button
4. EXIT: Cancel and Exit button
5. Power S/W: Power On/Off switch

Back Connection Ports:

6. DC IN: DC 12V Power port
7. HDMI OUT: HDMI output port
8. AUDIO OUT: Analog stereo audio output port
9. RS-232C: RS-232C communication port
10. FIRMWARE: USB firmware update port
11. OPTICAL: 1LC Fiber Optic input port

MAX-FR102 Technical Specifications	
Connector Types	(1) HDMI [Type A Female] (1) 3.5mm analog stereo audio (1) 1LC optical connector (1) 3-pin phoenix connector [RS-232] (1) mini USB [firmware] (1) 3-pin phoenix connector [12V power]
Input Signal Type	Fiber w/Deep Color, 3D, & 4K
Output Signal	HDMI & analog stereo w/Deep Color, 3D, & 4K
Supported Resolutions	up to Ultra HD/4K (4096x2160, 4:4:4 @ 50/60Hz)
Max. Distance	Singlemode Fiber: up to 1.24 miles (2 kilometers) Multimode Fiber: up to 1,650 ft (500m)
Media Processor	Motore™ 2.0
Audio Formats	Dolby Digital®, Dolby Digital EX, Dolby Digital Plus, Dolby® TrueHD, Dolby Atmos®, DTS®, DTS-ES, DTS 96/24, DTS-HD High Res, DTS-HD Master Audio™, LPCM up to 8 channels
Compliance	HDMI 2.0, HDCP 2.2
Power Consumption	DC +12V, 4 watts (max)
Dimension	6.3" x 5.7" x 1.7" (160 x 145 x 42 mm)
Weight	1.77 lbs. (0.80 Kg)

Scaling Receiver (MAX-FR102) Supported Output Resolution

- Auto Time Set	- 1280*720p 50Hz	- 3840*2160p 50Hz
- 1024*768p 60Hz	- 1920*1080p 50Hz	- 3840*2160p 60Hz
- 1280*1024p 60Hz	- 1920*1080p 59Hz	-
- 1440*1050p 60Hz	- 1920*1080p 60Hz	-
- 1680*1050p 60Hz	- 2560*1080p 50Hz	-
- 1600*1200p 60Hz	- 2560*1080p 60Hz	-
- 1920*1200p 60Hz	- 3840*2160p 24Hz	-
- 2560*1440p 60Hz	- 3840*2160p 25Hz	-
- 2560*1600 60Hz	- 3840*2160p 30Hz	-

Operation and Reliability Specification

- Operating Environment
 - Temperature: 50°F ~ 104°F (10°C ~ 40°C)
 - Humidity: 10% ~ 80%
 - Altitude: 3,000m Max.
- Transit Environment
 - Temperature: -13°F ~ 140°F (-25°C ~ 60°C)
 - Humidity: 5% ~ 95%
 - Altitude: 15,000m Max.
- Storage Environment
 - Temperature: -4°F ~ -49°F (-20°C ~ 45°C)
 - Humidity: 5% ~ 95%
 - Altitude: 3,000m Max.
- Reliability
 - MTBF: 90% at over 50,000 hours aging test
 - In compliance with LCD Monitor reliability test standard

Installation

Package Contents

The shipping contents consists of the followings:

- ▶ 1 x MAX-FT101 or MAX-FR102
- ▶ 3pin Phoenix Connector for RS-232C
- ▶ DC 12V Power Supply with Power Cord
- ▶ 1 x USB Cable for Firmware Update
- ▶ User's Manual

Environments

For installation environments, we recommend the following conditions:

- Below 30°C of ambient temperature
- Install and operate in the environment below 60% of ambient humidity (Best condition)
- Use it in the environment of free of vibrations and dust and in good ventilation condition
- Avoid areas with direct sunlight, heat sources, or high levels of EMI
 - EMI: Electro-Magnetic Interference
- Recommend stabilized AC Input power (it is recommended to use AVR)
 - AVR: Automatic Voltage Regulator
- All physical connections to the product use industry-standard connectors
- Be careful when you handle the product because some parts can be somewhat hot

Installation and Setup

Installation Connection Instruction

1. Turn off both the video source and the display before connecting any cables
2. Connect LC terminated fiber optic cable between transmitter and receiver
3. Connect HDMI cable between the source and the transmitter
4. Connect HDMI cable between the receiver and the display
5. Connect the power supply unit to both transmitter and receiver module
6. Turn on the display
7. Turn on the source

MAX-FR-102 Operating Instruction

Front LCD Panel

Two pieces of information can be checked from the front LCD panel:

1. IN is the video input status
 2. OUT is the video output status
- For example, if the front panel reads:
 - IN: Link OFF
 - There is no incoming signal / no TX is connected
 - IN: 1920x1080@60
 - The incoming signal is 1920x1080 @ 60Hz
 - OUT: No Sink
 - There is no output signal / no display is connected
 - OUT: 3820x2160@60
 - The output signal is 3820x2160 @ 60Hz

Menu

To access the menu of the MAX-FR102, press the MENU button. One of the following functions can be selected by pressing the UP, DOWN, and then MENU(Enter) to select on the front panel:

1. Output Time – Select Output Resolution
2. HDMI Audio – Mute Audio
3. HDMI Mode – Select DVI/HDMI Mode
4. Video Mute – Mute Video
5. RS232 Set – Set Baud Rate
6. Power Save – Power Save Mode
7. Firm Ver. – Check Firmware Version
8. Fact.Reset – Factory Reset the device

1. Output Time

The MAX-FR102's scaling engine is powered by Motore 2.0. The following output timings are available for selection:

1. AUTO	10. 1280*720p 50Hz	19. 3840*2160p 30Hz
2. 1024*768p 60Hz	11. 1280*720p 60Hz	20. 3840*2160p 50Hz
3. 1280*1024p 60Hz	12. 1920*1080p 50Hz	21. 3840*2160p 60Hz
4. 1440*1050p 60Hz	13. 1920*1080p 59Hz	
5. 1680*1050p 60Hz	14. 1920*1080p 60Hz	
6. 1600*1200p 60Hz	15. 2560*1080p 50Hz	
7. 1920*1200p 60Hz	16. 2560*1080p 60Hz	
8. 2560*1440p 60Hz	17. 3840*2160p 24Hz	
9. 2560*1600 60Hz	18. 3840*2160p 25Hz	

*Default setting is set to AUTO.

The AUTO timing setting adjusts to the displays default/best resolution and will send video with the appropriate resolution accordingly.

(For example, if a display can only accept up to 3840x2160 60Hz, and the source is sending a 1920x1080p 60Hz signal, it will automatically upscale to 3840x2160 60Hz. If a display can only accept up to 1920x1080p 60Hz, but the source is sending a 3820x2160 60Hz signal, it will automatically downscale to 1920x1080p 60Hz.)

Bypass mode will receive and send the resolution without any alteration.

(For example, if a source resolution is 1920x1080i 59Hz, it will send 1920x1080i 59Hz to the display)

Other resolutions can be selected to force the output resolution.

(For example, if a display has a 3840x2160 60Hz as a default resolution but 1920x1200 60Hz needs to be sent, selecting 1920x1200 60Hz from the selection would force the 1920x1200 60Hz resolution to the output.)

2. HDMI Audio

Mute HDMI audio on or off.

*Default setting is set to OFF.

3. HDMI Mode

Set HDMI mode to HDMI or DVI.

*Default setting is set to HDMI.

4. Video Mute

Mute the video signal on or off.

*Default setting is set to OFF.



5. RS232 Set

Set the Baud Rate to one of the following:

- 115200
- 4800
- 9600
- 19200
- 38400
- 57600

*Default setting is set to 115200.

6. Power Save

Set between the following power saving settings:

- OFF
- 5 sec
- 10 sec
- 15 sec

*Default setting is set to OFF.

7. Firm Ver.

Check the current firmware version of the receiver.

8. Fact.Reset

Factory reset the receiver.



Control

Scaling Receiver's Output resolution can be set via the front panel control button or serial command from the Media Axis.

OS: Output Extender Scaler Timing Select

The "OS" is an initiation command for Output Extender Scaler timing selection. The characters and numbers that follow the "OS" command tell the system, set scaling timing on selected Output. The last character "!" is found at the end of a command code which tells the system to execute the command. For a complete list of command characters and their functions, see examples below.

NOTE: OS commands only apply to the HDMI with scaling output cards and CAT/Fiber output cards with MAX-CR102 (CAT) and MAX-FR102 (Fiber) Extender Receivers.

T01	Auto	T10	1280*720p@50Hz	T19	3840*2160p@30Hz
T02	1024*768p@60Hz	T11	1280*720p@60Hz	T20	3840*2160p@50Hz
T03	1280*1024p@60Hz	T12	1920*1080p@50Hz	T21	3840*2160p@60Hz
T04	1440*1050p@60Hz	T13	1920*1080p@59Hz		
T05	1680*1050p@60Hz	T14	1920*1080p@60Hz		
T06	1600*1200p@60Hz	T15	2560*1080p@50Hz		
T07	1920*1200p@59Hz	T16	2560*1080p@60Hz		
T08	2560*1440p@59Hz	T17	3840*2160p@24Hz		
T09	2560*1600p@59Hz	T18	3840*2160p@25Hz		

Example:

Command Codes	Action
*255OSO001T01! ↵	Set Output 1 Extender Scaler timing to Auto
*255OSO002T14!	Set Output 2 Extender Scaler timing to 1080p 60Hz

Cable Termination

Connector Pin Assignment

DC Input

Part Number	Pin No.	Description	Remark
ECH350R-03	1	VCC(DC12V)	
	2	GND	
	3	GND	

RS-232

Part Number	Pin No.	Description	Remark
ECH350R-03	1	TXD	
	2	RXD	
	3	GND	

DVI-D Input & Output

Part Number	Pin No.	Description	Remark
DVI-D 29pin	1	TMDS DATA 2M	
	2	TMDS DATA 2P	
	3	TMDS DATA 2/4 Shield	
	4	TMDS DATA 4M(N.C)	
	5	TMDS DATA 4P(N.C)	
	6	DDC Clock	
	7	DDC Data	

	8	N.C	
	9	TMDS DATA 1M	
	10	TMDS DATA 1P	
	11	TMDS DATA 1/3 Shield	
	12	TMDS DATA 3M(N.C)	
	13	TMDS DATA 3P(N.C)	
	14	5V	
	15	GND	
	16	Hot Plug Detect	
	17	TMDS DATA 0M	
	18	TMDS DATA 0P	
	19	TMDS DATA 0/5 Shield	
	20	TMDS DATA 5M(N.C)	
	21	TMDS DATA 5P(N.C)	
	22	TMDS DATA Clock Shield	
	23	TMDS Clock P	
	24	TMDS Clock M	

HDMI Input & Output

Part Number	Pin No.	Description	Remark
HDMI 19pin	1	TMDS DATA 2P	
	2	TMDS DATA 2 Shield	
	3	TMDS DATA 2M	
	4	TMDS DATA 1P	

	5	TMDS DATA 1 Shield	
	6	TMDS DATA 1M	
	7	TMDS DATA 0P	
	8	TMDS DATA 0 Shield	
	9	TMDS DATA 0M	
	10	TMDS Clock P	
	11	TMDS Clock Shield	
	12	TMDS Clock M	
	13	CEC	
	14	RESERVED	
	15	DDC Clock	
	16	DDC DATA	
	17	GND	
	18	+5v	
	19	Hot Plug Detect	

EDID

Media Axis Extenders provide an Auto EDID management system; an easy and fail-safe way to handle EDID, via the EDID library system and EDID emulation.

What's EDID?

Extended Display Identification Data (EDID) is an information set that digital display provides to describe its capabilities to a video source. Video sources will know what kinds of displays are connected and it will determine which resolution to output according to the EDID information received from the display.

The EDID normally includes the manufacturer's name and serial number, sets of capable resolution including native resolution, supported timing, pixel mapping data (for digital displays only), etc.

In a digital connectivity environment; in order to support the maximum resolution of the connected monitor, the EDID handshake is critical because improper EDID handshake between sources and displays will result in no image on being displayed.

EDID handshake may sound simple; however, with multiple peripheral devices within the chain, the display's EDID information can easily get lost or blocked while it is traveling to the source device.

Media Axis provides an Auto EDID management system to meet today's sophisticated digital connectivity integration environment.

EDID Library List

14 of the most widely used EDID data are pre-programmed into the internal EEPROM chipset.

By optimizing factory default EDID and EDID library features, in most cases, Media Axis Extenders will work out of the box without any additional configuration.

Emulation

The user can easily save the EDID data from any display directly onto the Media Axis Extender Transmitter. By saving the display's EDID information on the transmitter, it will act as a display to the Video source.

* Connect a display to the Media Axis Extender Transmitter's HDMI port and then press the EDID S/W button. It will copy and save the display's EDID information to the Media Axis Extender Transmitter.

NOTE: There may be display devices that will not allow another device to emulate its EDID data.

NOTE: Certain EDID data may not be compatible with some devices, in this case, it is recommended to use the scaling receiver.



Warranty & Customer Service

PureLink™ Five Year Limited Warranty

For Media Axis™ Branded Products Only

Dtrovision, LLC. (hereinafter “PureLink”) warrants its Media Axis™ branded products (hereinafter “Product”) purchased directly from PureLink or Dealer shall be free from defects in workmanship and materials, under normal use and service, for a period of five (5) years on parts and three (3) years on labor. Any repaired or replaced equipment related to the Product shall be covered only under the remaining portion of the warranty. This warranty has no relationship to and exists independently of any warranty offered by Dealer. This warranty is a limited warranty and gives you specific legal rights. You may also have other rights which vary from state to state.

TERMS & CONDITIONS

PureLink shall repair or replace the Product if it develops a material fault during the period of warranty, on condition that i) the Product has only been subject to normal use in a domestic or commercial environment in a manner consistent with its specifications and functionality, ii) the Product has been cared for reasonably and only subjected to reasonable wear and tear, iii) the defect has not been caused by willful or negligent abuse or neglect, or any accident or improper installation procedure, iv) the serial number of the Product has not been altered or removed.

This warranty only applies to the original purchaser and shall be the exclusive remedy to the original purchaser. PureLink shall not be liable for any damages whatsoever caused by Product or the failure of Product to perform, including incidental or consequential damages. PureLink shall not be liable for any claim made by a third party or made by the purchaser for a third party.

Except as expressly set forth in this warranty, PureLink makes no other warranties, expressed or implied, including any implied warranties of merchantability and fitness for a particular purpose. PureLink expressly disclaims all warranties not satisfied in this limited warranty. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty. This warranty statement supersedes all previous warranties.

WARRANTY RETURNS/REPAIRS/EXCHANGES

No merchandise may be returned without prior authorization from PureLink, and a Return Materials Authorization (RMA) number. Failure to comply with these conditions will result in rejection of the returned merchandise.

Any warranty service on Products must be arranged through Dealer. Authorized returns must be shipped freight prepaid and fully insured to PureLink, Ramsey, NJ USA, with the RMA number clearly marked on the outside of all shipping boxes and containers. PureLink reserves the right at its sole discretion to refuse any shipments arriving freight collect or without an RMA number. Any authorized returned merchandise must be accompanied by a note describing the reason for the return, along with contact information including name, phone number, return mailing and shipping addresses, e-mail address, and RMA number.



On any products returned and accepted with an RMA number, return freight charges following repair of items under warranty shall be paid by PureLink, shipping by the standard ground carrier of its choice.

ADVANCE WARRANTY REPLACEMENTS

PureLink's advance replacement service offers a Replacement Unit upon request - free of charge for eligible products purchased less than one (1) year of the warranty claim and with a 25% exchange fee for products purchased more than one (1) year prior to the warranty claim. Products no longer covered under warranty do not qualify for Advance Replacement services.

Advance replacement requests must be validated by a member of PureLink's Technical Support Team. Replacement Units may be new or refurbished and is subject to availability. PureLink is responsible for shipping the Replacement Unit to your designated location by standard ground service. All other shipping methods will be the responsibility of the Dealer.

Original Unit Return – the Original Unit must be returned within thirty (30) calendar days of the return authorization date. Failure to return the Original Unit within this period will be subject to a minimum 15% re-stocking fee. The Dealer is solely responsible for the shipping of the Original Unit to PureLink.

TO MAKE A WARRANTY CLAIM

To make a warranty claim, promptly notify PureLink within the warranty periods described above. PureLink, in its sole discretion, will determine what action, if any, is required under this warranty.

Most problems can be corrected over the phone through close cooperation between the Customer and a PureLink technician. To better enable PureLink to address a warranty claim, please have the Product's serial and model numbers. If PureLink, in its sole discretion, determines that an on-site visit or other remedial action is necessary, PureLink may send a representative to Customer's

CUSTOMER SERVICE

Technical support inquiries can be submitted electronically through the PureLink website at www.purelinkav.com.

For immediate assistance, please contact PureLink's Customer Care Team at **+1 (201) 401-9013** or support@purelinkav.com.

