PureLink

Owner's Manual

F1
Fiber Optic HDMI and USB Extension Modules

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TABLE OF CONTENTS

Chapter 1. Product Overview

Chapter 2. Product Specifications

Chapter 3. Additional Information

Chapter 1. Product Overview

1.1 Safety Precautions

- All safety instructions should be read and understood before the unit is operated.

- The owner's manual and safety instructions should be retained for future reference.

- Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth only.

- Keep away from wet, magnetic, and flammable surfaces or substances.

- Always use the correct external power supply (indicated on the product label) when operating this unit.

- This unit may be equipped with a 3 wire grounding-type plug - a plug having a third (grounding) pin. This pin will only fit in to a grounding type power outlet. If you are unable to insert the plug in to the outlet, contact your electrician to replace your obsolete outlet.

- Air vents should be kept clean and unobstructed at all times.

- Please refrain from using frayed power cords and damaged wall outlets.

- Do not place any heavy objects or equipment on top of the unit.

If you experience any malfunctioning of product or have any question as to operation of the product, please contact our customer service center.

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Welcome!

Congratulations on your purchase of the PureLink F1 Optical HDMI (High Definition Multimedia Interface) and USB extension Modules. This manual contains information that will assist you in installing and operating the product.

1.2 Product Description

The F1 fiber optical HDMI and USB extension module transmits Ultra-HD/4K HDMI v1.4b up to 300 meters (1,000 ft), as well as USB up to 200 meters (650 ft), all over a single LC multi-mode fiber optic cable. The F1's compact size makes installation a snap, making it the most complete and reliable solution for long-distance Ultra-HD/4K signal transmission.

1.3 Product Features

- HDMI 1.4b compatibility: Ultra-HD/4K transport and extension
- USB extension for full KVM operations
- Single fiber provides 300 meters (1,000 ft) HDMI 4K distance
- HDCP compliant
- Support live EDID and HDCP handshake
- Support USB 1.1
- Styled casing with bottom mounting attachments
- Maximum travel distance:

    HDMI: 300 meters (1,000 ft)

    HDMI + USB 1.1 Low speed: 200 meters (650 ft)

    HDMI + USB 1.1 High speed 40 meters (135 ft)

    *Common low speed device: Keyboard, mouse

    *Common full speed device: External HDD, USB Hub, USB memory stick

1.4 Common Application

- Self-service Ticketing Kiosks (airports, movie theaters, etc.)
- Informational Kiosks (museums, galleries, exhibitions)
- Bank ATMs
- Digital Signage
- Interactive White Boards
- Conference System
- Video Wall System
- Medical, Broadcasting, Military
- Factory Automation and Traffic Control System

1.5 What's in the Box

- ☐ **F1 Optical HDMI Extension Module:** One (1) pair (Tx, Rx)

- ☐ **5V AC-DC Adaptor [USB Type] :** One (1) unit

- ☐ **USB cable :** Two (2) units

- ☐ **0.5 meters (1.6ft) HDMI copper cable :** Two (2) units

- ☐ **User's Manual**

- ☐ **Option Product:** TWF1 (PureLink's multi-mode 1 LC fiber optic cable with TotalWire Technology)
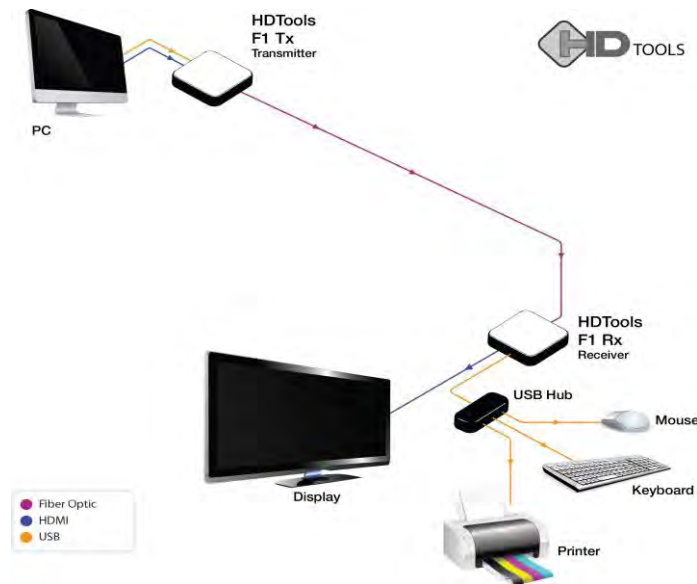
1.6 Product application notes

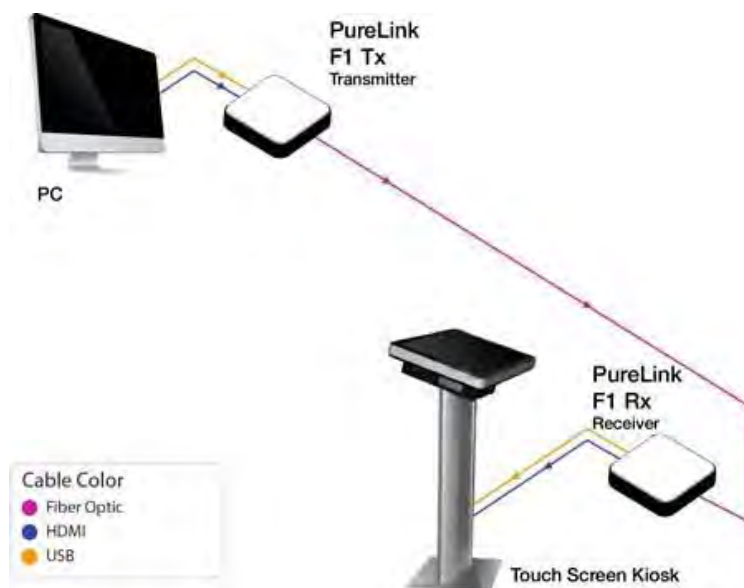**Figure 1 – Schematic Connection Diagram of F1 Extension Modules**

Figure 2 – Schematic Connection Diagram of F1 Extension Modules

1.7 Installation

Important : Please use the installation procedure below. Improper or no operation may result if the start up sequence is not correctly followed.

Step 1
Carefully unpack the contents of the shipping group

Step 2
Plug micro USB-B cable (labeled as TX) to the female micro USB receptacle of the transmitter and then connect the other end of the USB type A cable to the video source's USB port.

Step 3
Plug micro USB-B cable (labeled as RX) to the micro USB receptable of the receiver and then connect the other end of the USB type A cable to the 5V power adopter.

Step 4
Connect female USB cable (labeled as RX) from the receiver to the USB peripheral device such as keyboard, mouse, printer, USB hub etc.

Step 5
Connect LC optical fiber cable (multi-mode) between the transmitter and the receiver.

Step 6
Connect HDMI cable between the source and the transmitter.

Step 7
Connect HDMI cable between the display and the receiver.

Step 8
Turn power on the source and the display

Chapter 2. Product Specifications

2.1 Electrical Specification

| Category		Detail spec
Electrical	Electrical Connector	HDMI Receptacle Type
	Video band-width	2.97Gbps
	Maximum Reach	HDMI : 300m HDMI + Full Speed USB : 40m HDMI + Low Speed USB : 200m
	Graphic Resolution Support	4096x2160@30Hz
	External Power Connector	Micro USB
Optical	Optical Connector	LC Connector
	Recommended Fiber	50/125um Multi Mode Fiber [OM3]
	TX Module	850nm VCSEL 1310 InGaAs/InP laser diode 1550 InGaAs/InP PIN type photo diode
	RX Module	1550 InGaAs/InP laser diode 850 InGaAs/InP PIN type photo diode 1310 InGaAs/InP PIN type photo diode

2.1-1 Transmitter Module

PARAMETER	Min	Typ	Max	Unit
Supply Voltage	4.5	5	5.5	V
Supply Current	-	450	470	mA
Power consumption	-	0.85	1	W
TMDS Input Differential Voltage Level	150		1200	mV
TMDS Input Common Mode Voltage	2.9		3.26	V
TMDS Min Differential Sensitivity (Peak-to-Peak)	150			mV
TMDS Max Differential Input (Peak-to-Peak)	1560			mV
TMDS Max Allowable Intra-Pair Skew at Connector	0.15Tbit+112ps			
TMDS Max Allowable Inter-Pair Skew at Connector	0.2 Tcharacter+1.78ns			
TDR Rise Time			200	ps

2.1-2 Receiver Module

PARAMETER	Min	Typ	Max	Unit
Supply Voltage	4.5	5	5.5	V
Supply Current	-	400	420	mA
Power consumption	-	2	2.1	W
TMDS Single-ended output swing voltage	400		600	mV
TMDS Single-ended high level output voltage	3.3V-200mV		3.3V+10mV	
TMDS Min Single-ended low level output voltage	3.3V-700mV		3.3V-400mV	
TMDS Rise time/ fall time (20%-80%)			75	PS
TMDS Intra-Pair Skew at Source Connector			0.15Tbit	
TMDS Inter-Pair Skew at Source Connector			$0.2\ T_{character}$	
TDR Clock duty cycle	40%	50%	60%	
TMDS Differential Clock Jitter			0.25Tbit	

2.1-3 HDMI Receptacle Pin Assignment
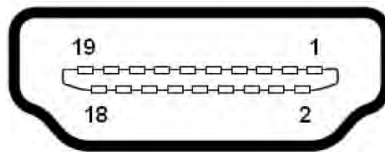
HDMI Connector Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1	TMDS DATA 2+	11	TMDS Clock Shield
2	TMDS DATA Shield	12	TMDS Clock -
3	TMDS DATA 2-	13	CEC
4	TMDS DATA 1+	14	Reserved (HDMI 1.0–1.3c)
5	TMDS DATA Shield	15	SCL (I²C Serial Clock for DDC)
6	TMDS DATA 1-	16	SDA (I²C Serial Data Line for DDC)
7	TMDS DATA 01+	17	DDC/CEC/HEC Ground
8	TMDS DATA Shield	18	+5 V (max 50 mA)
9	TMDS DATA 0-	19	Hot Plug detect (all versions)
10	TMDS Clock +	20	

2.2 Optical Specification

2.2-1 Transmitter Module

PARAMETER	Min	Typ	Max	Unit
Output Power 10G	-2.5		2.5	dBm
Output Power 1G	-5		2.5	dBm
Output Power 10G Extinction Ratio	3			dB
Output Power 1G Extinction Ratio	5.5			dB
Sensitivity			-20	dBm

2.2-2 Receiver Module

PARAMETER	Min	Typ	Max	Unit
Output Power 1G	-5		2.5	dBm
Extinction Ratio	5.5			dB
Output Power 10G Sensitivity			-20	dBm
Output Power 1G Sensitivity			-6	dBm

2.3 Mechanical Specification
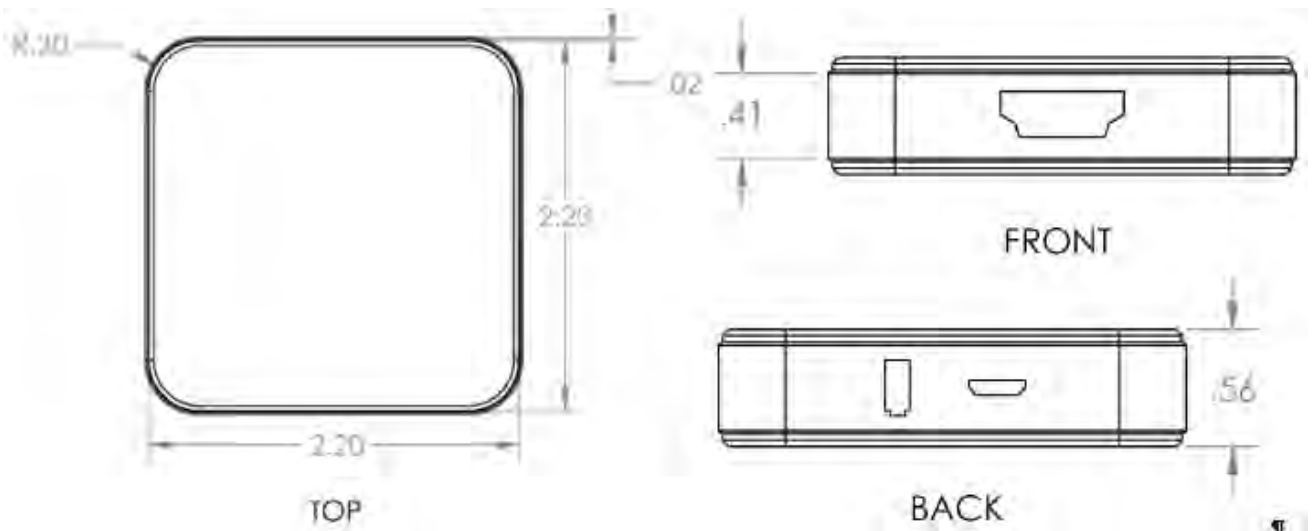
Front : HDMI connector

Back : LC connector and Micro USB connector

2.4 Environmental Specification

Items	Status
Operating Temperature	32˚F ~ 122˚F (0˚C ~ 50˚C)
Operating Humidity	10% ~ 80%, non-condensing
Storage Temperature	-4˚F ~ 158˚F (-20˚C ~ 70˚C)
Storage Humidity	5% ~ 95%, non-condensing
Dimension (WxDxH)	2.20' x 2.20' x 0.56' (56mm x 56mm x 14mm)
Weight w/o Packaging	90g
Weight	400g

2.5 System Requirements for Setup

☐ **Hardware requirements**

- ■ You have to have a HDMI graphic controller or card having a HDMI port in your PC, SUN or Mac systems. It should support the maximum graphic resolution feature of displays to be connected.

- ■ No special requirements for memory size, CPU speed and chipsets, if you've already properly installed your HDMI graphic controllers or cards.

☐ **Software requirements**

- ■ No special restrictions, if you've already properly installed your HDMI graphic controller in your OS.

☐ **AC/DC Power Adapter Technical Advisory**

The transmitter (Tx) module of F1 is designed for power protection circuit from conflict of power supply between the external DC power adapter and your graphic card through the HDMI pin. It offers an option of whether to use an AC/DC power adapter depending on power supply capability of the graphic card through the +5V pin, you are using.

However, the receiver (Rx) module should be supplied by an AC/DC power adapter.

> **Note :** In general, most of laptops or desktop PCs with PCI Express graphic card supply enough power to operate Transmitter (Tx) module.

2.6 Troubleshooting

The display shows only black screen.

- Ensure that all plugs and jacks used by external power supplies (both PureLink product and others) are firmly connected. Ensure the blue LED is ON.
- Ensure that the HDMI ports are firmly plugged in to the source and display.
- Ensure that the transmitter and receiver modules are plugged correctly to the source and display, respectively.
- Check if the source and display are powered on and properly booted.
- Reset the system by de-plugging and re-plugging the transmitter HDMI port or receiver HDMI port, or by de-plugging and re-plugging the power cord plugs of transmitter and receiver modules.
- Re-boot up the system while connecting the optical HDMI extension module.

Screen is distorted or displays noises.

- Check if the graphic resolution is properly set. Go to source's display properties of Windows and tap the settings.
- Ensure that the resolution sets less than 4096x2160 at 30Hz refresh ratio.
- Reset the system. Disconnect and reconnect the optical HDMI cables or 5V power adapters.

2.7 Maintenance

No special maintenance is required for the optical HDMI module and power adapters. Ensure that the HDMI modules and power adapters are stored or used in a benign environment free from liquid or dirt contamination. There are no user serviceable parts.   Refer all service and repair issues to PureLink.

2.8 UL/IEC Statement

This equipment has been tested and found to comply with the limits for medical devices in IEC 60601 -1:1994.   These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.   However, there is no guarantee that interference will not occur in a particular installation.   If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.

- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.
- Consult the manufacturer or field service technician for help.

- Type of protection against electric shock: Class I equipment
- **Degree of protection against electric shock: Not classified - no applied parts**
- **Classification according to the degree of protection against ingress of water as detailed in the current edition of IEC 529: IPX0, ordinary equipment**
- This equipment is not suitable for use in the presence of flammable anesthetics or oxygen
- Mode of operation: continuous operation

Certification of Eye Safety

This laser product is inside implemented by using 1300/1550nm optical module, manufactured by PureLink, which are all certified by IEC60950,   IEC/EN60825-1 referred in Accession Number 07-1334-0217 as classified in Laser Class1.

Dispose of Old Electrical & Electronic Equipment
(Applicable in the European Union and other European countries with separate systems)

This symbol on the product or on its packaging indicates that this product shall not be treated as household
waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

Chapter 3. Additional Information

3.1 Manufacturer's Warranty (2-Year)

PureLink warrants this F1 Optical HDMI (High Definition Multimedia Interface) and USB extension Modules to be free from defects in workmanship and materials, under normal use and service, for a period of two (2) year from the date of purchase from PureLink or its authorized resellers.

If the product does not operate as warranted during the applicable warranty period, PureLink shall, at its option and expense, execute one of the following as necessary:

1. Repair the defective product or part
2. Deliver to customer and equivalent product or part to replace the defective item
3. Refund to customer the purchase price paid for the defective product

All products that are replaced become the property of PureLink. Replacement products may be new or reconditioned. Repaired or replacement products or parts come with a 90-day warranty or the remainder of the warranty period. PureLink shall not be responsible for any software, firmware, information, or memory data loss of contained in, stored on, or integrated with any products returned to PureLink for repair under warranty.

3.2 Customer Service

Any customer service inquiries can be submitted electronically through the Q&A form on our website (www.purelinkav.com).

For immediate assistance please contact us at (201) 488-3232 to reach our customer care or tech support team.