DATA SHEET

One (1) Fiber Detachable HDMI 2.0 Extender With Diagnosis feature

HDX-1F20-TR

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Description

HDX-1F20-TR is a high-performance HDMI fiber optical extender, transmitting 4K (4096x2160) at 60Hz up to 300m (984 feet) over one (1) LC multi-mode fiber (OM3). It offers up to 3-meter extension for both transmitter and receiver sides, enhancing installation flexibility. It meets HDMI 2.0 standards and transmits uncompressed and transparent video signal.

Combining robust performance, advanced diagnostics, and versatile extension options, the HDX-1F20-TR is an ideal solution for demanding AV installations.

A key feature is its advanced Diagnosis function, enabling remote monitoring and management. This function supports real-time event detection and status updates, significantly reducing downtime by speeding up troubleshooting. The Diagnosis feature offers detailed insights into the extender's bandwidth, EDID/DPCD information, operating voltage, and temperature, ensuring optimized performance and reliability.

In addition, HDX-1F20-TR is fully compatible with the BR-600 Power Rack, which can support and centrally manage up to 8 units Opticis diagnosis extenders. Through the BR-600's Diagnosis Link Manager GUI interface, users can easily control power, perform firmware upgrades, and monitor all connected units simultaneously. This combined functionality provides enhanced oversight and ease of use, especially in large-scale installations that require efficient management of multiple extenders.

The shipping items are shown as follows;

1) One (1) Transmitter (Tx) and One (1) Receiver (Rx)
2) Two (2) 2m Male to Male HDMI copper cable
3) Two (2) 5V 1A power adapter
4) User Manual

※ In shipping group, two 2m copper cables are included. Contact the regional sales representative or tosales@opticis.com for using 3m copper cable.

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Features

- Extends up to 4K (4096x2160) at 60Hz.
- Supports HDMI 2.0 standards for seamless high-definition audio and video
- Transmits data up to 300 meters (984 feet) over one (1) LC multi-mode fiber (OM3)
- Extra copper extension available up to 3m on each side (TX/RX)
- Supports Audio Return Channel (ARC): Allows audio transmission alongside video over the same connection, supporting ARC up to 300 meters.
- Data security with negligible EMI emission
- Diagnosis Link Manager (GUI program) will be provided to manage firmware upgrade and diagnosis feature
- BR-600 Power Rack compatible — supports TX/RX and up to 8 diagnosis extenders with one-step operation.
- External DC power 5V/1A and USB-C power available
- Diagnosis features able to check the status of product and manage them from a long distance
- Firmware upgradable via USB Type C port

Applications

- Medical imaging
- Military
- Digital Signage
- Control room
- Simulator
- Rental Staging

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Technical Specifications

	Parameter	Specifications
Components	Laser Diodes in TX Module	Multi-mode VCSEL (Vertical Cavity Surface Emitting Laser)
	Photo Diodes in Rx Module	PIN-PD
Electrical	Input and Output Signals	ANSI 8B/10 Level (complying with HDMI 2.0)
	Data Transfer Rate (Graphic Data)	Max. 6Gbps
	Total Jitter at the end of Rx output	Max. 0.6UI
	Skew inter-channels	Max. 2ns
Optical	Link Power Budget	Min. 1dB
Mechanical	Module dimension (LWH)	39 x 76 x 20mm
Connect	Optical Connector	Simplex LC connector
	Electric Connector Type from Systems and to Displays	pin HDMI Receptacle Connector
	Recommended Fiber	OM3(50/125 um) Multi-mode Glass Fiber

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these of any other conditions in excess of those given in the operational sections of the datasheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
Supply Adapter Voltage	V_{CC}	-0.3	+6.0	V
Operating Temperature	T_{OP}	0	50	˚C
Operating Relative Humidity	RH_{OP}	10	85[1)]	%RH
Storage Temperature	Tstg	-30	70	˚C
Storage Relative Humidity	RHstg	10	95[2)]	%RH

Note 1: 1) & 2) Under the conditions of No drops of dew

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Operating Conditions

- **Transmitter module: HDX-1F20-TX**

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{TCC}	360	365	370	mA
	Power Dissipation	P_{TX}	1.8	1.825	1.85	W
	Power Supply Rejection (Note1)	PSR		50		mV_{p-p}
DATA ANSI 8b/10b	Data Output Load	R_{LD}		50		Ω
	Transmitter Differential Input Voltage Swing (Peak-to-Peak)	V_{ID}	0.4	-	1.6	V
Optical Link (Note3)	Output Optical Power	P_o			3	dBm
	Wavelength	λ	780		990	nm
	Spectral width in RMS	Δλ			3	nm
	Relative Intensity of Noise (Note2)	RIN		-20		dB/Hz
	Extinction Ratio	Ext	4			dB
	Rising/Falling Time	T_{rise}/T_{fall}			77	ps
	Jitter in p-p value (Note3)	T_{jitter}			70	ps

Note 2. Tested with a $50mV_{p-p}$ sinusoidal signal in the frequency range from 500 Hz to 500 MHz on the V_{CC} supply with the recommended power supply filter in place. Typically, less than 0.25 dB change in sensitivity is experienced.
Note 3. Measure in 1GHz of frequency bandwidth.
Note 4. Use PPG (Pulse Pattern Generator) source with jitter 50ps.

- **Receiver module: HDX-1F20-RX**

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{RCC}	360	365	370	mA
	Power Dissipation	P_{RX}	1.8	1.825	1.85	W
	Power Supply Rejection (Note4)	PSR		50		mV_{p-p}
DATA ANSI 8b/10b	Data Input Load	R_{LD}		50		Ω
	Receiver Data Output Voltage Swing (Peak-to-Peak)	VODp-p	600	800	1200	mV_{p-p}
Optical Link	Receiving Optical Power	P_o			1	dBm
	Receiving Wavelength	λ	780		990	nm
	Link Power Budget	P_{bgt}	1			dB
	Total Jitter (note 5)	TR_{jitter}			0.6	UI

Note 5. Tested with a $50mV_{p-p}$ sinusoidal signal in the frequency range from 500 Hz to 500 MHz on the V_{CC} supply with the recommended power supply filter in place. Typically, less than a 0.25 dB change in sensitivity is experienced.
Note 6. It is measured as total jitters including Tx and Rx modules under maximum extension, 200 meters with 5.4Gbps.

Recommended specifications of fiber-optic cable

Parameters	Conditions	Specifications
Fiber Type		50μm Multi-mode Graded Index Glass Fiber
Modal Bandwidth	λ = 850nm	Min. 500 MHz km
Fiber Cable Attenuation	λ = 850nm	Max. 2.5dB/km
Extension Distance		10 – 1650ft (500 meters)
No. of Ferrules	Simplex LC	1 ferrule
Skew		Max. 0.4ns
Insertion Attenuation		Max. 0.5dB
Total Optical Attenuation	In 656 ft (200 meter) extension	Max. 1.5dB

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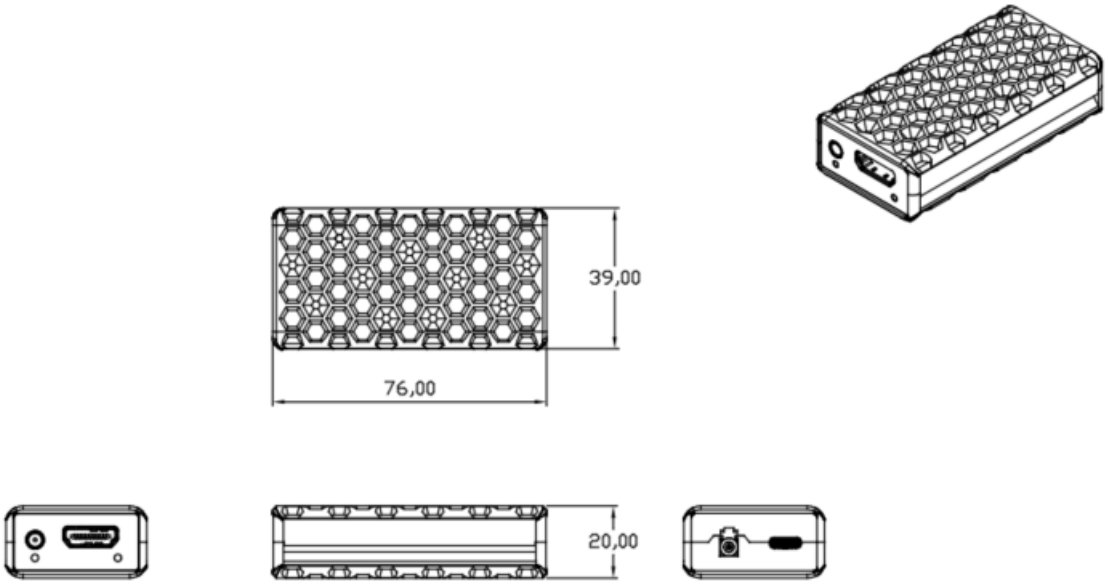
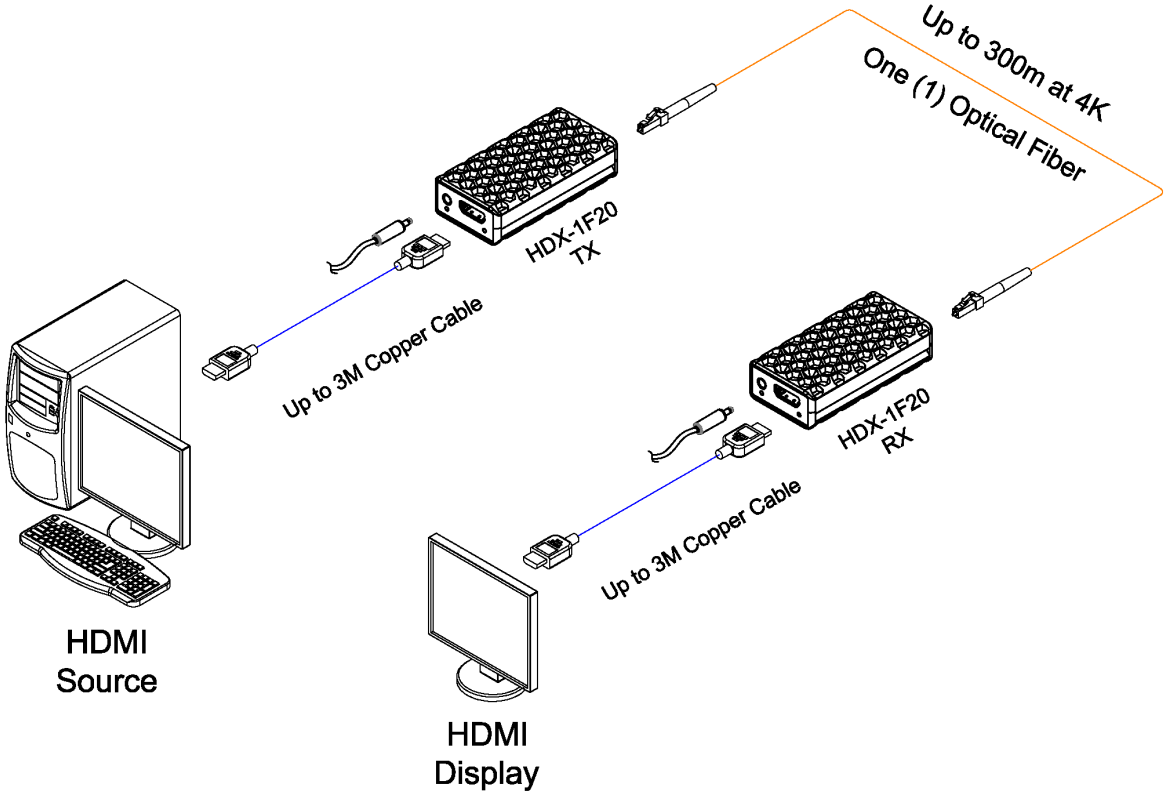
Drawing of Module



Note 7: The transmitter, HDX-1F20-TX, and the receiver, HDX-1F20-RX, have the same mechanical dimensions.

Drawing of Cable Connection



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HDMI Pin Description

TX Module

No	Pin Assignment	Functional Description
1	TMDS2+	TMDS Data Signal Channel 2 Positive
2	TMDS2 Shield	TMDS Data Signal Channel 2 Shield
3	TMDS2-	TMDS Data Signal Channel 2 Negative
4	TMDS1+	TMDS Data Signal Channel 1 Positive
5	TMDS1 Shield	TMDS Data Signal Channel 1 Shield
6	TMDS1-	TMDS Data Signal Channel 1 Negative
7	TMDS0+	TMDS Data Signal Channel 0 Positive
8	TMDS0 Shield	TMDS Data Signal Channel 0 Shield
9	TMDS0-	TMDS Data Signal Channel 0 Negative
10	TMDS Clock+	TMDS Clock Channel Positive
11	TMDS Clock Shield	TMDS Clock Channel Shield
12	TMDS1Clock-	TMDS Clock Channel Negative
13	CEC	Consumer Electronics Control
14	Utility	Optional, Audio Return Channel (ARC)
15	SCL	HDCP/DDC communication clock
16	SDA	HDCP/DDC communication data
17	DDC/CEC Ground	DDC/CEC shield
18	+5V Power	5 V Input for Transmitter for Host
		5 V Output for Monitor from Receiver
19	Hot Plug Detect	Signal is driven by monitor to enable the system to identify the presence of a monitor

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RX Module

No	Pin Assignment	Functional Description
1	TMDS2+	TMDS Data Signal Channel 2 Positive
2	TMDS2 Shield	TMDS Data Signal Channel 2 Shield
3	TMDS2-	TMDS Data Signal Channel 2 Negative
4	TMDS1+	TMDS Data Signal Channel 1 Positive
5	TMDS1 Shield	TMDS Data Signal Channel 1 Shield
6	TMDS1-	TMDS Data Signal Channel 1 Negative
7	TMDS0+	TMDS Data Signal Channel 0 Positive
8	TMDS0 Shield	TMDS Data Signal Channel 0 Shield
9	TMDS0-	TMDS Data Signal Channel 0 Negative
10	TMDS Clock+	TMDS Clock Channel Positive
11	TMDS Clock Shield	TMDS Clock Channel Shield
12	TMDS1Clock-	TMDS Clock Channel Negative
13	CEC	Consumer Electronics Control
14	Utility	Optional, Audio Return Channel (ARC)
15	SCL	HDCP/DDC communication clock
16	SDA	HDCP/DDC communication data
17	DDC/CEC Ground	DDC/CEC shield
18	+5V Power	5 V Input for Transmitter for Host
		5 V Output for Monitor from Receiver
19	Hot Plug Detect	Signal is driven by monitor to enable the system to identify the presence of a monitor

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Revision History

Version	date	History
0.9	2024-07	Preliminary version released
1.0	2024-11	Official version released
1.1	2025-03	Storage temperature -20 – 70 → -30 - 70
1.2	2025-11	Added power supply and TX/RX usability (for BR-600) details

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