DATA SHEET

DisplayPort 1.2 to HDMI 2.0 Extender with Diagnosis feature,

DHX-1F4K-TR

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Description

DHX-1F4K is DisplayPort 1.2 to HDMI 2.0 converting 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. Used with the HDX-1F20-RX, it transmits uncompressed 4K video signal.

Effortlessly convert DisplayPort 1.2 to HDMI 2.0 with DHX-1F4K, designed for seamless connectivity and long distance transmission.

Combining robust performance, advanced diagnostics, and versatile extension options, the DHX-1F4K 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, DHX-1F4K 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 (DHX-1F4K-TX) and One (1) Receiver (HDX-1F20-RX)
2) One (1) 2m Male to Male DisplayPort copper cable
3) One (1) 2m Male to Male HDMI copper cable
4) Two (2) 5V 1A power adapter
5) 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.
※ DHX-1F4K designed to be used with HDX-1F20-RX in any circumstances.
※ If needed, DPX-1F4K can be purchased separately.

Features

- Extends up to 4K (4096x2160) at 60Hz.
- Transmits 4K video signal up to 300 meters (984 feet) over one (1) LC multi-mode fiber (OM3)
- Converts 4K DisplayPort 1.2 to 4K HDMI 2.0
- Extra copper extension available up to 3m on each side (TX/RX)
- Data security with negligible EMI emission
- Diagnosis Link Manager (GUI program) will be provided to manage firmware upgrade and diagnosis feature
- Compatible with Power Rack (BR-600), support up to 8 units Opticis diagnosis extenders, and offer one step feature at once time
- 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

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 DP1.2 and 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 DP and 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	-20	70	˚C
Storage Relative Humidity	RHstg	10	95[2)]	%RH

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

Operating Conditions

- **Transmitter module: DHX-1F4K-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**

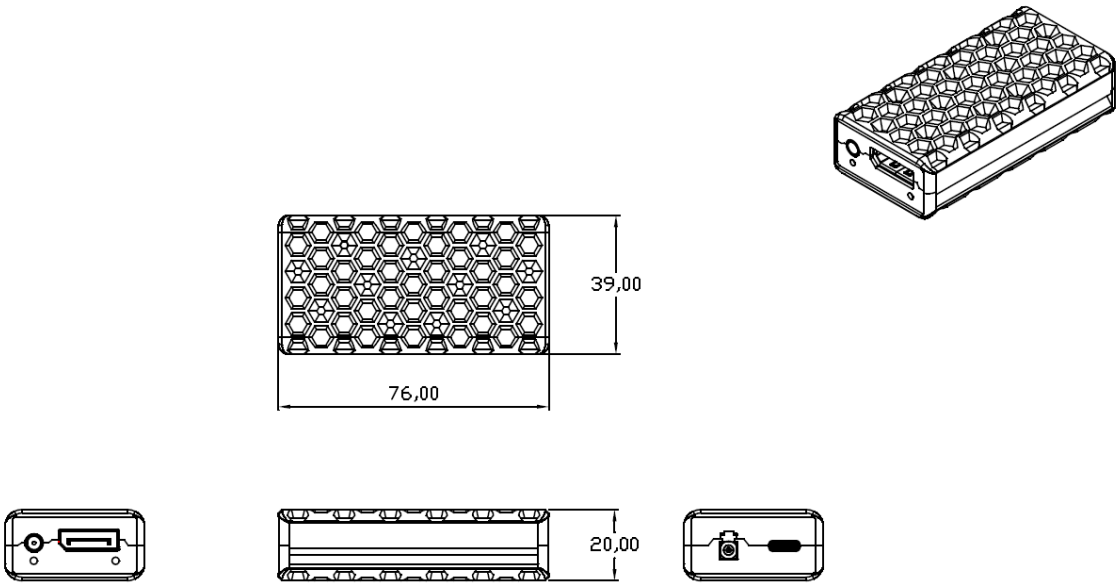
	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{RCC}	360	365	370	mA
	Power Dissipation	P_{RX}	1.8	1.825	1.85	W
	Power Supply Rejection (Note4)	PSR		50		mV_{p-p}
DATA ANSI 8b/10b	Data Input Load	R_{LD}		50		Ω
	Receiver Data Output Voltage 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

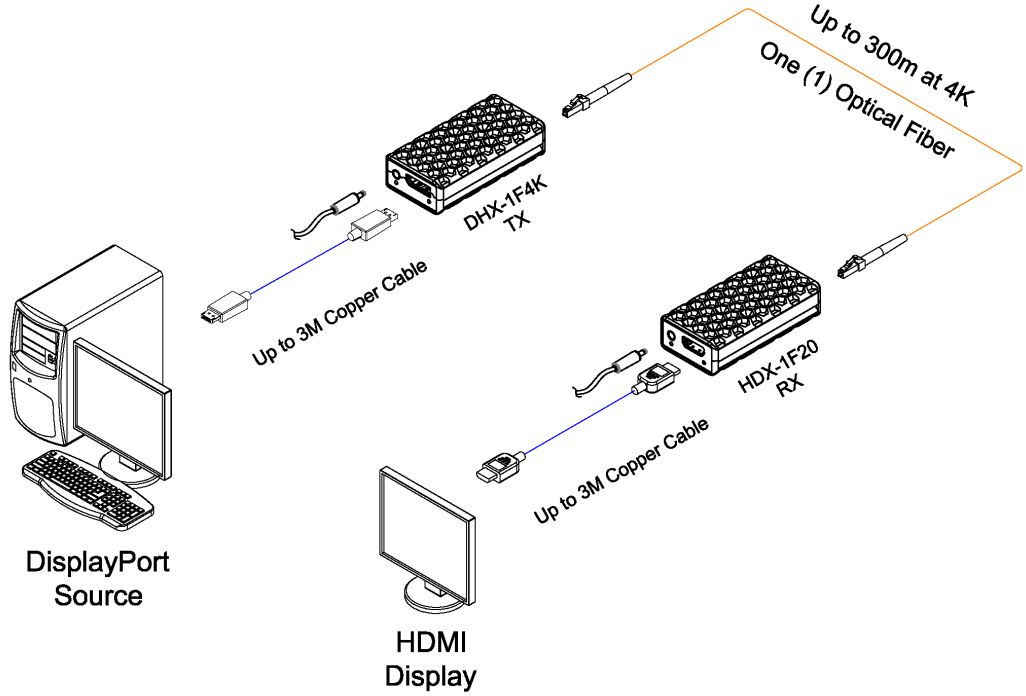
Parameters	Conditions	Specifications
Fiber Type		50μm Multi-mode Graded Index Glass Fiber
Modal Bandwidth	λ = 850nm	Min. 500 MHz km
Fiber Cable Attenuation	λ = 850nm	Max. 2.5dB/km
Extension Distance		10 – 1650ft (500 meters)
No. of Ferrules	Simplex LC	1 ferrule
Skew		Max. 0.4ns
Insertion Attenuation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

Drawing of Module



Note 7: The transmitter, DHX-1F4K-TX, and the receiver, HDX-1F20-RX, have the same mechanical dimensions – different video input port.

Drawing of Cable Connection



■ DisplayPort Pin Description

TX Module

Pin	Symbol	Mating Row Contact Location	Functional Description
1	ML_Lane3(n)	Top	DisplayPort Data Lane3 Negative
2	GND	Bottom	Ground
3	ML_Lane3(p)	Top	DisplayPort Data Lane3 Positive
4	ML_Lane2(n)	Bottom	DisplayPort Data Lane2 Negative
5	GND	Top	Ground
6	ML_Lane2(p)	Bottom	DisplayPort Data Lane2 Positive
7	ML_Lane1(n)	Top	DisplayPort Data Lane1 Negative
8	GND	Bottom	Ground
9	ML_Lane1(p)	Top	DisplayPort Data Lane1 Positive
10	ML_Lane0(n)	Bottom	DisplayPort Data Lane0 Negative
11	GND	Top	Ground
12	ML_Lane0(p)	Bottom	DisplayPort Data Lane0 Positive
13	CONFIG1	Top	Cable Adaptor Detect
14	CONFIG2	Bottom	None
15	AUX CH(p)	Top	DisplayPort Aux Channel Positive
16	GND	Bottom	Ground
17	AUX CH(n)	Top	DisplayPort Aux Channel Negative
18	Hot Plug Detect	Bottom	HPD is used to detect a sink device by the source device
19	Return	Top	None
20	DP_PWR	Bottom	None

Note 8: Please refer to HDX-1F20-TR datasheet to check HDMI Pin Description of HDX-1F20-RX.

Revision History

Version	date	History
0.9	2024-08	Preliminary version released
1.0	2024-11	Official version released