DATA SHEET

One (1) Fiber Detachable HDMI2.0 Extender, HDFX-500-TR

Contents

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Description

HDMI 2.0 optical fiber detachable extender, HDFX-500-TR, extends HDMI 2.0 signal up to 200m (656feet) and transmits 4K UHD (4096x2160) at 60Hz over one LC multi-mode fiber. Leading-edge technology of Opticis allows long distance transmission of 4K signal without any video/audio degradation.

HDFX-500-TR is designed compact enough to be fitted into various installation environments. It gives slim, light, easy installation with perfect electrical isolation, but without electrical hazard and interference.

HDFX-500-TR adopted High-Retention HDMI connector, which allows for more retention force than standard HDMI connector, prevents accidental disconnection.

HDFX-500-TR is compliant with HDMI standards features like CEC, EDID and HDCP 2.2 for better installation flexibility and compatibility. It also supports HDR to deliver more realistic, and objective video signal.

HDFX-500-TR can be operated by either USB power or DDC 5V power from HDMI source (Tx only). Auto Power-Switching feature makes it more reliable on its power supply.

The shipping items are shown as follows;

1) One (1) Transmitter (Tx) and One (1) Receiver (Rx)
2) Two (2) Micro USB to USB cables
3) Two (2) 5V 1A power adapter
4) User Manual
5) HDMI male to HDMI female cables (0.2m)

※ Other options – contact with sales office

Features

- Supports HDMI 2.0 standard features
- Extends 4K UHD (4096x2160) at 60Hz (RGB & YCbCr : 4:4:4)
- Transmits HDMI data up to 200m (656feet) over one duplex LC multi-mode fibers (OM3)
- Offers total data rate 18Gbps (6Gbps per Channel)
- Prevents accidental disconnection by using High-Retention HDMI connector
- Operates by DDC 5V from HDMI source or using USB Power cable
- Provides Auto Power-Switching feature
- Supports 3D contents transmission
- Complies with CEC, EDID and HDCP 2.2
- Supports HDR at 10 bit or 12 bit speeds respectively within its maximum bandwidth, 18Gbps

Applications

- Medical imaging
- Military
- Control room
- Simulator

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 HDMI2.0)
	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 (WDH)	22 x 67 x 14mm
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	-20	70	˚C
Storage Relative Humidity	RHstg	10	95[2)]	%RH

Note
1), 2) Under the conditions of No drops of dew

Operating Conditions

- **Transmitter module: HDFX-500-TX**

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{TCC}	290	320	370	mA
	Power Dissipation	P_{TX}	1.31	1.6	2.04	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}			100	ps
	Jitter in p-p value (Note3)	T_{jitter}			90	ps

Note1. 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.
Note2. Measure in 1GHz of frequency bandwidth
Note3. Use PPG (Pulse Pattern Generator) source with jitter 50ps

- **Receiver module: HDFX-500-RX**

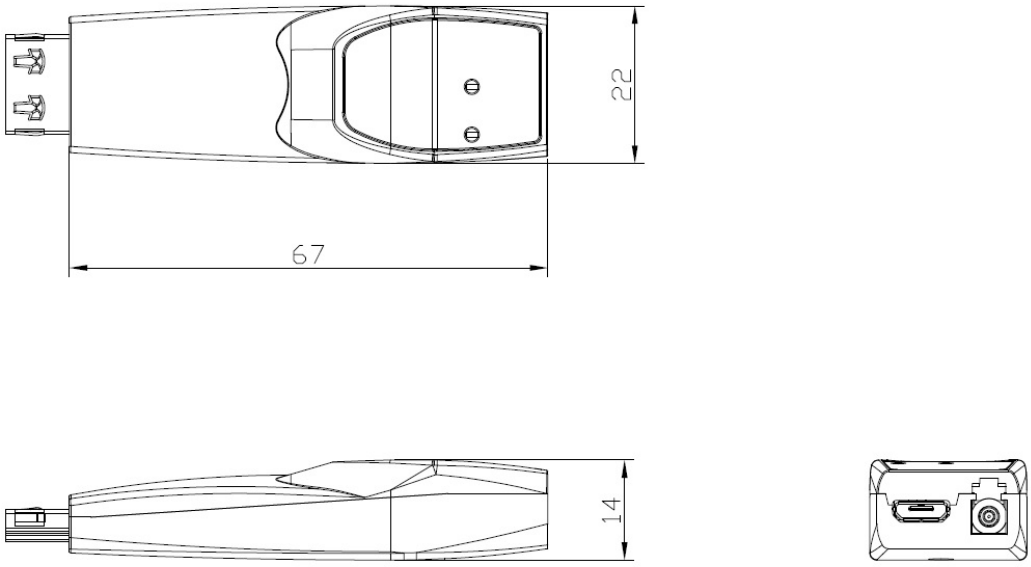
	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{RCC}	250	280	330	mA
	Power Dissipation	P_{RX}	1.13	1.4	1.82	W
	Power Supply Rejection (Note4)	PSR		50		mV_{p-p}
DATA ANSI 8b/10b	Data Input Load	R_{LD}		50		Ω
	Receiver Data Output Voltage Swing (Peak-to-Peak)	VOHDMI-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

Note4. 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.
Note5. It is measured as total jitters including Tx and Rx modules under maximum extension, 200 meters with 6Gbps.

Recommended specifications of fiber-optic cable

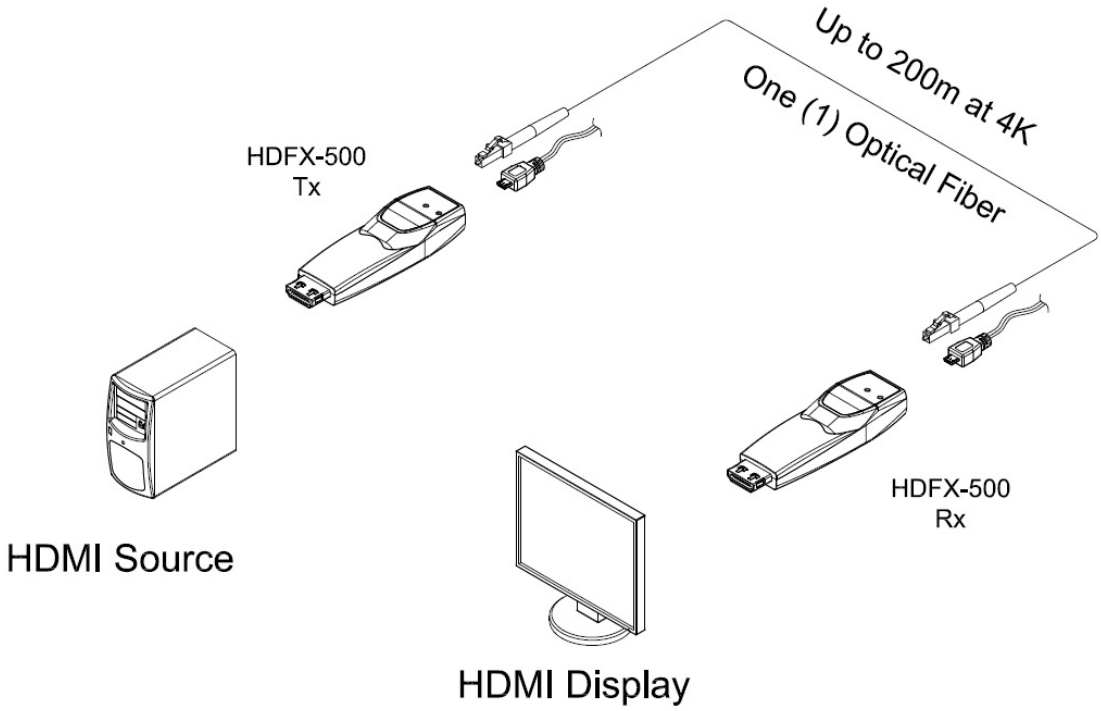
Parameters	Conditions	Specifications
Fiber Type		50μm Multi-mode Graded Index Glass Fiber
Modal Bandwidth	λ = 850nm	Min. 500 MHz km
Fiber Cable Attenuation	λ = 850nm	Max. 2.5dB/km
Extension Distance		10 – 1650ft (500 meters)
No. of Ferrules	Simplex LC	1 ferrule
Skew		Max. 0.4ns
Insertion Attenuation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

Drawing of Module



Note: The transmitter, HDFX-500-Tx and the receiver, HDFX-500-Rx have the same mechanical dimensions

Drawing of Cable Connection



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	Reserved	Not used
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

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	Reserved	Not used
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