

DATA SHEET

Two (2) fibers Detachable HDMI 2.0 Extender, HDFX-300-TR

Contents

- ◆ Description
- ◆ Features
- ◆ Applications
- ◆ Technical Specifications
- ◆ Operating Conditions
- ◆ Drawing of Module
- ◆ Drawing of Cable Connection
- ◆ HDMI Pin Description

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Description

HDMI 2.0 optical fiber detachable extender, HDFX-300, extends HDMI 2.0 signal up to 200m (656feet) and transmits 4K UHD (4096x2160) at 60Hz over one duplex LC multi-mode fibers. Leading-edge technology of Opticis allows long distance transmission of 4K signal without any video/audio degradation.

HDFX-300 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.

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

HDFX-300 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-300 can be operated by either 5V power from HDMI source (Tx only) or USB power. 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) AC adapters to 110-240V with DC 5V 1A outlet
- 4) User's Manual
- 5) One (1) customized HDMI cable (0.5m) - Optional

※ Other options – contact to Opticis sales office

Features

- Supports HDMI2.0 standards feature
- 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
- Provides diagnosis 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
- Pro-AV
- 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 2dB (TBD) |
| Mechanical | Module dimension (WDH) | 26 x 72 x 15mm |
| Connect | Optical Connector | Duplex LC connectors |
| | Electric Connector Type from Systems and to Displays | High-retention HDMI 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 or 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 | T _{stg} | -30 | 70 | °C |
| Storage Relative Humidity | RH _{stg} | 10 | 95 ²⁾ | %RH |

Note

1), 2) Under the conditions of no drops of dew

Operating Conditions

Transmitter module: HDFX-300-TX

| | Parameter | Symbol | Minimum | Typical | Maximum | Units |
|-----------------------|-------------------------------------------------------------|--------------------------------------|---------|---------|---------|-------------------|
| Power Supply | Supply Voltage | V _{CC} | 4.5 | 5.0 | 5.5 | V |
| | Supply Current | I _{TCC} | 350 | 400 | 450 | mA |
| | Power Dissipation | P _{TX} | 1.58 | 2.0 | 2.48 | 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 (Notes3) | Output Optical Power | P _o | | | 3 | dBm |
| | Wavelength | λ | 825 | | 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} | | | 50 | 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-300-RX

| | Parameter | Symbol | Minimum | Typical | Maximum | Units |
|------------------|---------------------------------------------------|----------------------|---------|---------|---------|-------------------|
| Power Supply | Supply Voltage | V _{CC} | 4.5 | 5.0 | 5.5 | V |
| | Supply Current | I _{RCC} | 350 | 400 | 450 | mA |
| | Power Dissipation | P _{RX} | 1.58 | 2.0 | 2.48 | 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 | 825 | | 990 | nm |
| | OMA Sensitivity | SENS | -14.25 | | | dBm |
| | Link Power Budget | P _{bgt} | 2 | | | dB |
| | Total Jitter (note 5) | TR _{jitter} | | | 0.6 | UI |

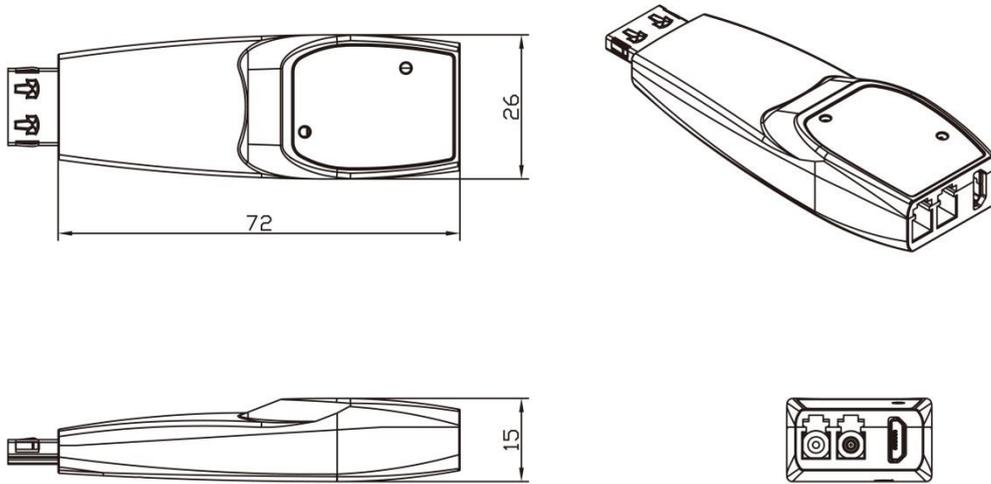
Note4. Tested with a 50mV_{p-p} sinusoidal signal in the frequency range from 500 Hz to 500 MHz on the V_{CC} supply with the recommended power supply filter in place. Typically less than a 0.25 dB change in sensitivity is experienced.

Note5. It is measured as total jitters including Tx and Rx modules under maximum extension, 100 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 – 328ft (100 meters) |
| No. of Ferrules | Duplex LC | 2 ferrule |
| Skew | | Max. 0.4ns |
| Insertion Attenuation | | Max. 0.5dB |
| Total Optical Attenuation | In 330 ft (100 meter) extension | Max. 1.5dB |

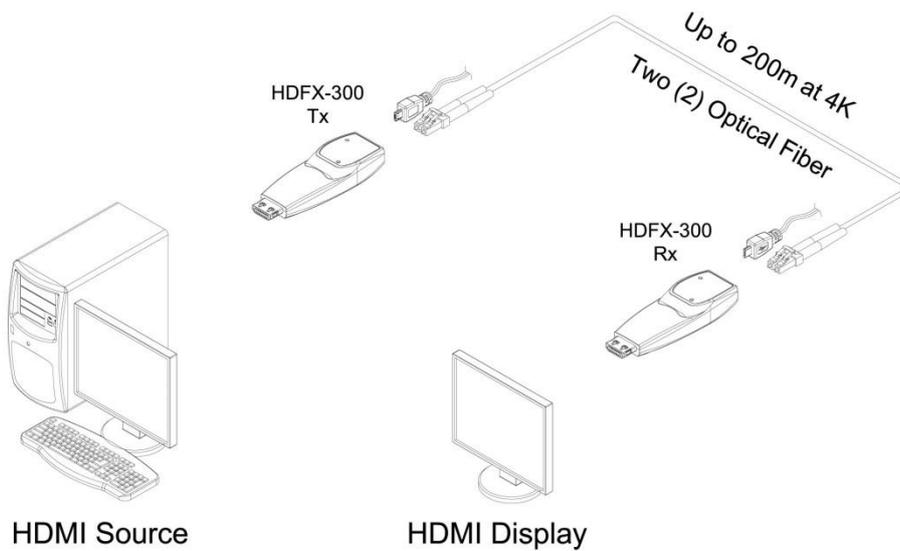
Drawing of Module



Size(LWH) : 26 x 72 x 15mm

Note: The transmitter, HDFX-300-T and the receiver, HDFX-300-R 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 | HDCEP/DDC communication clock |
| 16 | SDA | HDCEP/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 | HDCEP/DDC communication clock |
| 16 | SDA | HDCEP/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 |

Revision History

| Version | date | History |
|---------|---------|---------------------------------|
| 1.0 | 2017-05 | First released |
| 1.1 | 2018-05 | Change in transmission distance |
| 1.2 | 2019-01 | Statement about HDR feature |