

DATA SHEET

1-Fiber Detachable DVI module, DVFX-100

Contents

- ◆ Description
- ◆ Features
- ◆ Applications
- ◆ Technical Specifications
- ◆ Functions
- ◆ Drawing
- ◆ Fiber Connection
- ◆ DVI Pin Description
- ◆ Revision History

OPTICIS HQ

Opticis Co., Ltd.

3F, 305, Sanseong-daero

Sujeong-gu, Seongnam-si

Gyeonggi-do, South Korea 13354

Tel: +82 (31) 719-8033

Fax: +82 (31) 719-8032

www.opticis.com

tosales@opticis.com

1-Fiber Detachable DVI module, DVFX-100

Description

Optical graphic extension module consists of transmitter module and receiver module, each of which has one (1) SC connectors and a 24-pins DVI-D plug. Users could decide extension length at their discretion by choosing the length of fiber-optic cables with SC ferrules at the ends. It offers graphic TMDS signals to be extensible up to the limits of modal bandwidth of selected multi-mode glass fiber(50/125 um or 62.5/125um).

The module has a capability to transmit 2K resolution graphic signals with 60Hz refresh rate using leading-edge OPTICIS fiber-optic component that transmits four (4) data channels over one multi-mode fiber. At such data bandwidth, this module can extend up to 1,640 feet (500 meters) much over the limits of copper wire extension, without any distribution amplifier or repeater.

The EDID in a display can be read and restored by just plugging it to the display. This self-EDID programming feature makes the installation of DVFX-100 easier and more flexible at any variable resolution display systems.

The modules are constituted of three parts as follows;

- One (1) transmitter converting electrical to optical signals, model name: DVFX-100-T
- One (1) receiver converting optical to electrical signals, model name: DVFX-100-R
- Two (2) AC Adaptors to 110V-240V with DC 5V 1A outlet

Features

- ◆ Extends all VESA resolution up to 2K resolution at 60Hz or 1080p,36bit DVI data up to 500 meters (1,640ft) over one (1) multi-mode fiber
- ◆ Detachable feature with a simplex SC connector for each module
- ◆ Offers self-EDID programming feature, detecting from a display and restoring to an EEPROM in the transmitter just by plugging to the display without any physical DDC connection
- ◆ The modules are compact enough to directly plug to graphic sources and displays by adopting DVI-plugs
- ◆ Includes two (2) +5V DC power adapters for the transmitter and receiver
- ◆ Certifications: UL/EN 60601-1, 60601-1-2, CE / FCC, Class 1 Laser Eye Safety
- ◆ Data security with negligible RFI/EMI emissions and loss of video quality due to no copper conductor present

Applications

- ◆ Medical imaging system
- ◆ Video wall system
- ◆ Digital signage
- ◆ Military / Aerospace
- ◆ Broadcast
- ◆ Conference room / Education

Technical Specifications

- General 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 | TMDS Level (complying with DVI1.0) |
| | Data Transfer Rate (Graphic Data) | Max. 2.25Gbps |
| | Total Jitter at the end of Rx output | Max. 309 ps |
| | Skew inter-channels | Max. 6ns |
| Optical | Link Power Budget | Min 9.4dB |
| Mechanical | Module dimension (WDH) | 39 x 56 x 14.6mm |
| Connect | Optical Connector | Simplex SC connectors |
| | Electric Connector Type from Systems and to Displays | 24 pin DVI-D plug |
| | Recommended Fiber | 50/125 um Multi-mode Glass Fiber |

- Absolute Maximum Ratings

| Parameter | Symbol | Minimum | Maximum | Units |
|---------------------------|-----------------|---------|---------|-------|
| Supply Voltage | V _{cc} | - | + 7.0 | V |
| Operating Temperature | T _{op} | 0 | 50 | °C |
| Storage Temperature | T _s | - 30 | + 70 | °C |
| Operating Humidity | H _s | 10 | 85 | %RH |
| Storage Relative Humidity | H _s | 10 | 95 | %RH |

- **Operating Conditions**
Transmitter module (E-to-O converter): DVFX-100-TX

| | Parameter | Symbol | Minimum | Typical | Maximum | Units |
|----------------------|---------------------------------------|--------------------------------------|-------------------------|------------------|-------------------------|-------------------|
| Power Supply | Supply Voltage | V _{CC} | 4.5 | 5.0 | 5.5 | V |
| | Supply Current | I _{TCC} | 355 | 395 | 435 | mA |
| | Power Dissipation | P _{TX} | 1.6 | 1.98 | 2.4 | W |
| | Power Supply Rejection (Note1) | PSR | | 50 | | mV _{p-p} |
| TMDS | Data Output Load | R _{LD} | | 50 | | Ω |
| | Graphic Supply Voltage (Note2) | GV _{CC} | + 3.1 | + 3.3 | + 3.5 | V |
| | Single-Ended High Level Input Voltage | GV _{IH} | GV _{CC} - 0.01 | GV _{CC} | GV _{CC} + 0.01 | V |
| | Single-Ended Low Level Input Voltage | GV _{IL} | GV _{CC} - 0.6 | - | GV _{CC} - 0.4 | V |
| | Single-Ended Input Swing Voltage | GV _{ISWING} | 0.4 | - | 0.6 | V |
| Optical Link (Note3) | Output Optical Power (Note 3) | P _o | -4 | | 1 | dBm |
| | Wavelength | λ | 850 | | 990 | nm |
| | Spectral width in RMS | Δλ | | | 3 | nm |
| | Relative Intensity of Noise (Note4) | RIN | | -20 | | dB/Hz |
| | Extinction Ratio | Ext | 4 | | | dB |
| | Rising/Falling Time | T _{rise} /T _{fall} | | | 260 | ps |
| | Jitter in p-p value (Note5) | T _{jitter} | | | 260 | 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. Graphic Supply Voltage is regulated reference voltage for signal processing in modules

Note3. Measure each optical wavelength at the end of 2 meter 50/125um MMGOF

Note4. Measure in 1GHz of frequency bandwidth

Note5. Use PPG (Pulse Pattern Generator) source with jitter 50ps

Receiver module (O-to-E converter): DVFX-100-RX

| | Parameter | Symbol | Minimum | Typical | Maximum | Units |
|----------------------|---|----------------------|---------|---------|---------|-------------------|
| Power Supply | Supply Voltage | V _{CC} | 4.5 | 5.0 | 5.5 | V |
| | Supply Current | I _{RCC} | 345 | 385 | 425 | mA |
| | Power Dissipation | P _{RX} | 1.55 | 1.93 | 2.34 | W |
| | Power Supply Rejection (Note6) | PSR | | 50 | | mV _{p-p} |
| TMDS | Data Input Load | R _{LD} | | 50 | | Ω |
| | Graphic Supply Voltage (Note7) | GV _{CC} | + 3.1 | + 3.3 | + 3.5 | V |
| | Single-Ended Output Swing Voltage (Note8) | GV _{ISWING} | 0.2 | - | 0.4 | V |
| Optical Link (Note9) | Receiving Optical Power | P _o | -11 | | 1 | dBm |
| | Receiving Wavelength | λ | 850 | | 990 | nm |
| | Signal Detect Good | SDg | | | -15 | dBm |
| | Signal Detect Fail | SDf | -23 | | | dBm |
| | Link Power Budget | P _{bgt} | 9.45 | | | dB |
| | Total Jitter (note 10) | TR _{jitter} | | | 309 | ps |

- Note6. 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.
- Note7. Graphic Supply Voltage is regulated reference voltage for signal processing in modules
- Note8. TMDS outputs are coupled in AC
- Note9. Measure signals at the end of 2 meter 50/125um MMGOF
- Note10. It is measured as total jitters including Tx and Rx modules under maximum extension, 500 meters with UXGA 60Hz.

- Recommended Specifications of Fiber-Optic Cables

| Parameters | Conditions | Specifications |
|---------------------------|---------------------------------|--|
| Fiber Type | | 50 μ m Multi-mode Graded Index Glass Fiber |
| Modal Bandwidth | $\lambda = 850nm$ | Min. 500 MHz km |
| Fiber Cable Attenuation | $\lambda = 850nm$ | Max. 2.5dB/km |
| Extension Distance | | 10 – 1650ft (500 meter) |
| No. of Ferrules | Simplex SC* | 1 ferrule |
| Skew | | Max. 0.4ns |
| Insertion Attenuation | | Max. 0.5dB |
| Total Optical Attenuation | In 330 ft (100 meter) extension | Max. 1.5dB |

Note*: Some plastic couplers to clamp two LC connectors could not fit in.

Functions

- Self-EDID Function

The EDID in a display can be read and restored by just plugging it to the display. This self-EDID programming feature makes the installation of DVFX-100 easier and more flexible at any variable resolution display systems.

- Power Protection Circuit Mode in Transmitter Module

The transmitter (Tx) module of DVFX-100-TR is designed for power protection circuit from conflict of power supply between the external AC/DC power adapter and your DVI source by #14 pin.

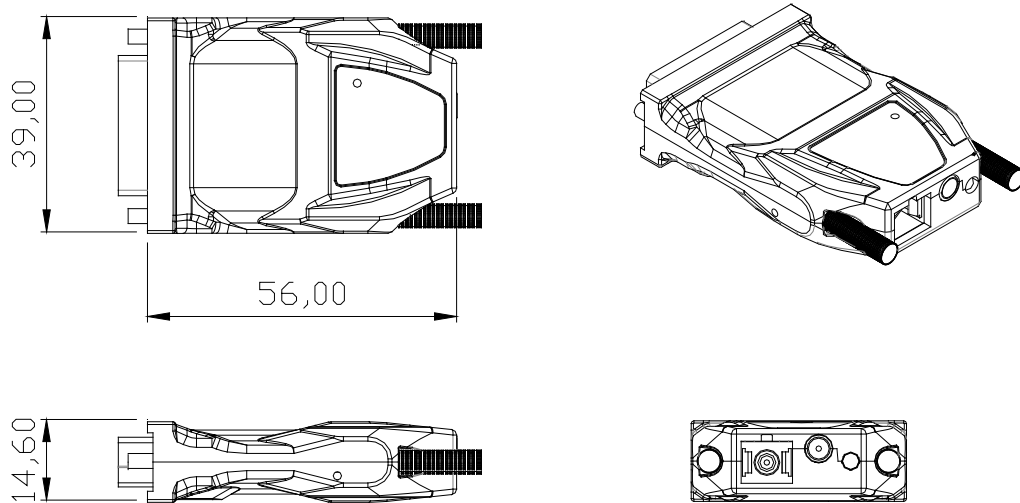
We strongly recommend to use external AC/DC adapter for Transmitter (Tx) for stable power supplying. In case of Receiver (Rx), power should be supplied by AC/DC adapter due to no internal power supplying from the displays.

- Signal Detect Mode in Receiver Module

It offers optical signal monitoring LED when optical input power is lower than as specified in a certain case, for instance, loosing optical connectors.

Drawing

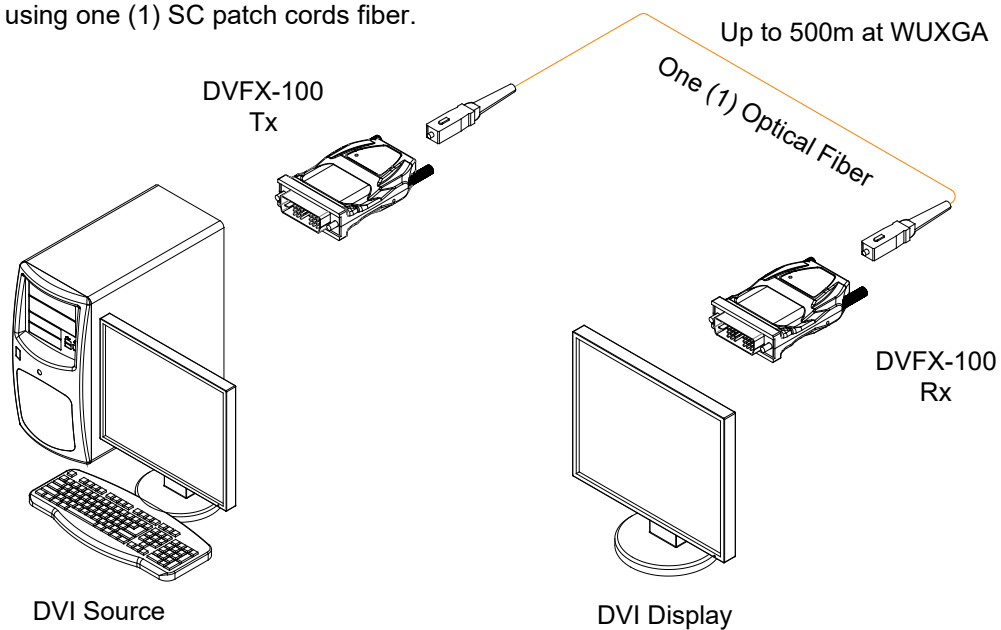
Dimension [mm]



Note: The transmitter, DVFX-100-T and the receiver, DVFX-100-R have the same mechanical dimensions.

Fiber Connection

The diagram shows the connection of transmitter (Tx; plug in PCs) and receiver (Rx; plug in displays) modules by using one (1) SC patch cords fiber.



DVI Pin Description

| Pin | Symbol | Functional Description |
|-----|-----------------|--|
| 1 | CH2- | TMDS Data Signal Channel 2 Negative |
| 2 | CH2+ | TMDS Data Signal Channel 2 Positive |
| 3 | GND | TMDS Data Signal Channel 2/4 Shield |
| 4 | N.C. | |
| 5 | N.C. | |
| 6 | DDC Clock | DDC Clock line for DDC2B communication |
| 7 | DDC Data | DDC Data line for DDC2B communication |
| 8 | N.C. | |
| 9 | CH1- | TMDS Data Signal Channel 1 Negative |
| 10 | CH1+ | TMDS Data Signal Channel 1 Positive |
| 11 | GND | TMDS Data Signal Channel 1/3 Shield |
| 12 | N.C. | |
| 13 | N.C. | |
| 14 | 5 V | Main Power Input for Transmitter from Host ^(Note11) 5 V Output for Receiver to monitor |
| 15 | GND | Ground |
| 16 | Hot plug Detect | Signal is driven by monitor to enable the system to identify the presence of a monitor |
| 17 | CH0- | TMDS Data Signal Channel 0 Negative |
| 18 | CH0+ | TMDS Data Signal Channel 0 Positive |
| 19 | GND | TMDS Data Signal Channel 0/5 Shield |
| 20 | N.C. | |
| 21 | N.C. | |
| 22 | GND | TMDS Clock Signal Shield |
| 23 | CLK+ | TMDS Clock Channel Positive |
| 24 | CLK- | TMDS Clock Channel Negative |

Note11) The AC-to-DC adapter for transmitter is option for Desk Top PC user.
But Note PC user has to use the AC-to-DC adapter because the power of Note PC is not enough to drive DVFX-100 transmitter.

Revision History

| Version | date | History |
|---------|---------|--|
| 1.0 | 2011-10 | First released |
| 1.1 | 2011-11 | Update description |
| 1.2 | 2011-12 | Change adapter |
| 1.3 | 2013-01 | Revise supply current, power consumption value |
| 1.4 | 2013-09 | Addition of certification |
| 1.5 | 2014-04 | Revise optical power value |
| 2.0 | 2017-04 | Revise power consumption value |
| 2.1 | 2019-05 | Change in specification of DVFX-100-RX, Receiver module (revised supply current / power dissipation) |
| 2.2 | 2021-05 | Change in HQ address |