1 (One) Fiber Detachable DVI module

User Manual
DVFX-110

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Welcome!

Congratulations on your purchase of the ***Stretch*** **DVI™** DVFX-110-TR Optical DVI (Digital Visual Interface) Extension Module. This manual contains information that will assist you in installing and operating the product.

Product Description

The **DVFX-110-TR** optical DVI module transmits four (4) optical data, Red, Green, Blue and clock and can be extended up to 1km (3,281ft) over one (1) SC single or 500meters (1,640ft) over multi-mode fiber at WUXGA (1920x1200), 60Hz vertical refresh rate. The EDID (Extended Display Identification Data) in a display can be read and restored by just plugging once transmitter to the display. This **Self-EDID programming** feature makes the installation of DVFX-110-TR easier and more flexible at any variable resolution display systems. The key features of **DVFX-110-TR** is, by using an optical splitter (OPS-116S), one (1) signal from transmitter can be copied up to sixteen (16) times and it gives you a cost effective and space saving installation for various application. For your convenience, UXGA EDID would have been done before shipment as a default.

Shipping Group

- ☐ **DVFX-110-TR Optical DVI Extension Module:** One (1) pair
- ☐ **AC/DC power adapter:** Two (2) units of +5V, 2A
- ☐ **User Manual**

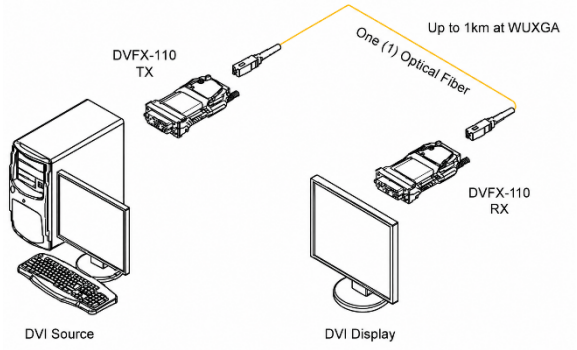

Figure 1 – Connection Diagram of Optical DVI Extension Module

System Requirements for Setup

- ☐ **Hardware requirements**
  - ■ You must have a DVI graphic controller or card having a DVI port in your PC, SUN or Mac systems. It should support the maximum graphic resolution feature of displays to be connected.
  - ■ No special requirements for memory size, CPU speed and chipsets, if you've already properly installed your DVI graphic controllers or cards.

- ☐ **Software requirements**
  - ■ No special restrictions, if you've already properly installed your DVI graphic controller in your OS.

- ☐ **AC/DC Power Adapter Technical Advisory**

The transmitter (Tx) module of DVFX-110-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.

Installation

Important: Please keep the installation procedure below. Improper or no operation may result if the start-up sequence is not correctly followed.

Step 1

Carefully unpack the contents of the shipping group.

Step 2

Plug the 5V power adapters to the power jack of the transmitter and receiver. Ensure the Power LED is ON (Green) and Status LED is blinking slowly (Green).

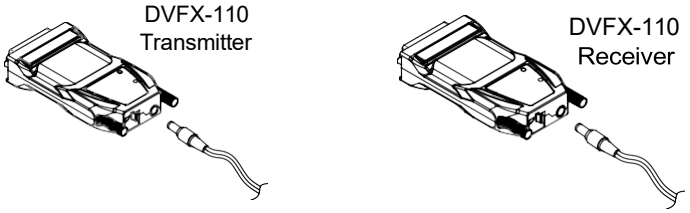

Figure 2 – Connection of power adapter to the transmitter and receiver

Step 3

Please, check if the maximum resolution of the display is UXGA (1600x1200). Otherwise, follow the instructions for **Self-EDID Programming Procedure** on page 1-5.

Step 4

Connect SC optical fiber between the transmitter and the receiver as shown in figure 3.

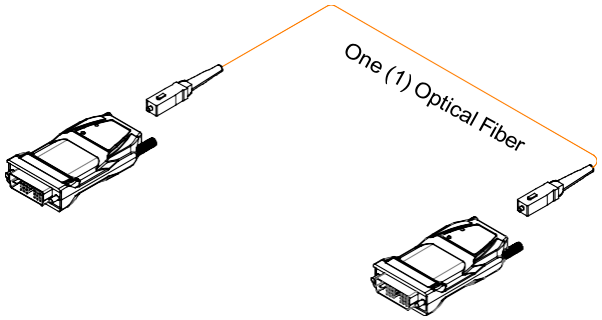

Figure 3 – Connection of optical fiber

Note: Both single and multi-mode fibers are applicable to DVFX-110-TR. The maximum extension length is 1km by single-mode fiber and 500 meters by multi-mode fiber,

Step 5

Plug the transmitter to the DVI receptacle of the DVI source such as PC and the receiver to the DVI receptacle of the display.

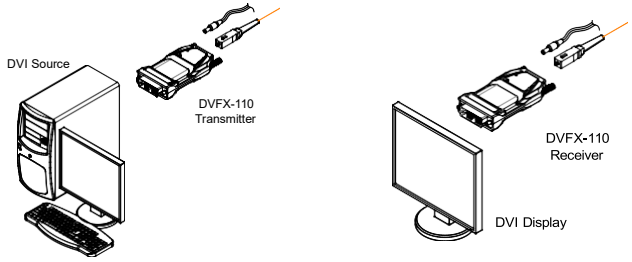

Figure 4 – Connection of the transmitter to the DVI source and receiver to the display

Note: It is recommended NOT to use any intermediate cable or adapter between them to avoid undesirable performance degradation.

Step 6

Turn PC and display power ON. And ensure that the Status LED in transmitter and receiver turn on.

By using an optical splitter OPS-xyz, one (1) signal from **DVFX-110** transmitter can be copied up to sixteen (16) times as shown in figure 5. For more information, please refer to user's manual of OPSR-2, OPX-xyz.

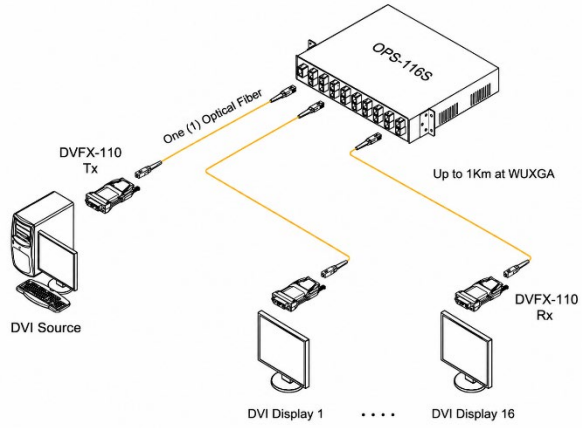

Figure 5 – Connection diagram using optical splitter, OPS-104S

Note: The maximum extension length can be shortened by using optical splitter and additional fibers. The single-mode fiber is only applicable to OPS-xyz.

Self-EDID Programming Procedure

The graphic source equipment generally requires display information (EDID). It contains resolution and timing information of the display.

DVFX-110-TR supports Self-EDID programming. Below is the procedure that reads the EDID from the display and stores it in the EEPROM of the transmitter. You have to do Self-EDID programming if the maximum resolution of the user's display is not UXGA (1600x1200). Follow the steps below to do it correctly.

Note1: If you know that EDID is not required by the user's DVI source, Self-EDID programming is not necessary.

Note2: The default EDID in factory ship-out is programmed in the VESA standard of UXGA (1600x1200), 60Hz.

Step 1

Power on the display.

Step 2

Plug 5V power adapter to the power jack of the transmitter of DVFX-110. Ensure the Power LED is ON and Status LED is blinking slowly.

Step 3

Push the EDID PRGM. button of the transmitter with a narrow pin. Then, status LED will be turned off.

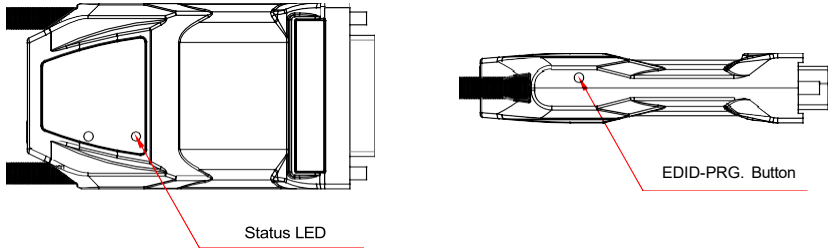

Figure 6 – Position of EDID-PRGM. button and Status LED

Step 4

Connect the transmitter to the display not to the PC. Then the status LED will begin to blink rapidly. It indicates reading the EDID from the display and storing it in the EEPROM. After 7~8 sec, the status LED will blink slowly and it indicates completion of all procedure.

Step 5

Disconnect the transmitter from the display.

Troubleshooting

The display shows black screen.

- Ensure that all plugs and jacks used by external power supplies (both Opticis and others) are firmly connected. Ensure that the Power and status LED is ON.
- Ensure that the DVI ports are firmly plugged into the PC and displays.
- Ensure that the transmitter and receiver modules are plugged correctly to the PC and display, respectively.
- Check if the PC and displays are powered on and properly booted.
- Reset the system by de-plugging and re-plugging the transmitter DVI port or receiver DVI port, or by de-plugging and re-plugging the power plugs of transmitter and receiver modules.
- Re-boot up the system while connecting the optical DVI extension module.

Screen is distorted or displays noises.

- Check if the graphic resolution is properly set. Go to the display properties of Windows and tap the settings.
- Ensure that the resolution sets less than WUXGA (1920x1200) at 60Hz refresh ratio.
- Reset the system. Disconnect and reconnect the optical DVI cables or 5V power adapters.

Maintenance

No special maintenance is required for the optical DVI module and power adapters. Ensure that the DVI modules and power adapters are stored or used in a benign environment free from liquid or dirt contamination.

There are no user serviceable parts. Refer all service and repair issues to Opticis.

Technical Support and Service

For commercial or general product support, contact your reseller. For technical service, contact Opticis by email techsupp@opticis.com or visit its website at www.opticis.com

DVFX-110-TR Optical DVI Extension Modules

- **Compliance with DVI standard:** Supports DVI1.0, fully implemented by fiber-optic communication and DDC2B by virtual DDC.
- **Extension limit:** 1km (3,281feet) for WUXGA (1920x1200) at 60Hz refresh rate.

Fiber Type	Extension Length at WUXGA
Multi-mode Fiber	500m (1,640ft)
Single-mode Fiber	1km (3,281ft)

- **Graphic transmission bandwidth:** Supports up to WUXGA, 60Hz, or 1.65Gbps bandwidth per graphic channel.

  An error can be occurred when using certain pattern with XGA (1024x768) at 70 or 72Hz, 1080i at 59.94 or 60Hz.

- **Fiber-optic connection:** The transmitter and receiver modules of DVFX-110 have one (1) SC receptacles so as to be connected with one (1) SC simplex single or multi-mode fibers, having 9(8)/125μm or 62.5(50)/125μm core.
- **DDC connection:** Virtual DDC by Self-EDID programming.
- **Mechanical specifications of transmitter and receiver modules**
  - **Dimensions (WDH):** 39 x 68 x 14.6mm
- **Environmental Specifications**
  - Operating temperature: 0 to 40°C (Medical), 0 to 50°C (General)
  - Storage temperature: - 30°C to 70°C
  - Operating humidity: 10% to 85%

AC/DC Power Adapter (General, Medical)

- **Power Input:** AC 100-240V, 50/60Hz
- **Power Output:** +5 V, 2A SMPS DC-power Adapter
- **Cord DC Jack:** Core is 5 V and outer is GND.
- **Model name:** BPM010S05FXX (Medical adapter only)
- **Manufacturer:** BridgePower Corp. (Medical adapter only)

Label Specification

- +5V ⎓ 2.0A: Direct Current

Operation Condition

Operating condition	Temperature (°C)	0 to 40 (Medical) 0 to 50 (General)
	Relative humidity (%)	10-85
	Atmospheric Pressure (hPa)	700 – 1060
Transport and storage condition	Temperature (°C)	-30-70
	Relative humidity (%)	10-95
	Atmospheric Pressure (hPa)	500 - 1060

Warranty Information

1 (One) Year Warranty

Opticis warrants this optical DVI extension module to be free from defects in workmanship and materials, under normal use and service, for a period of one (1) year from the date of purchase from Opticis or its authorized resellers.

If a product does not work as warranted during the applicable warranty period, Opticis shall, at its option and expense, repair the defective product or part, deliver to customer an equivalent product or part to replace the defective item, or refund to customer the purchase price paid for the defective product.

All products that are replaced will become the property of Opticis.

Replacement products may be new or reconditioned.

Any replaced or repaired product or part has a ninety (90) day warranty or the reminder of the initial warranty period, whichever is longer.

Opticis shall not be responsible for any software, firmware, information, or me mory data of customer contained in, stored on, or integrated with any product s returned to Opticis for repair under warranty or not.

Warranty Limitation and Exclusion

Opticis shall have no further obligation under the foregoing limited warranty if the product has been damaged due to abuse, misuse, neglect, accident, unusual physical or electrical stress, unauthorized modifications, tampering, alterations, or service other than by Opticis or its authorized agents, causes other than from ordinary use or failure to properly use the product in the application for which said product is intended.

Dispose of Old Electrical & Electronic Equipment

(Applicable in the European Union and other European countries with separate systems)

This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

WARNING: Do not touch signal input, signal output of other connectors, and the patient simultaneously.

WARNING: Do not connect any accessory except provided by Opticis. Any damage caused other power adapters or accessories will not be taken any responsibility by Opticis.

Warning for Medical Usage

WARNING: External equipment intended for connection to signal input, signal output or other connectors, shall comply with relevant IEC Standard(e.g., IEC60950 for IT equipment and IEC60601-1 series for medical electrical equipment). In addition, all such combination-system-shall comply with the standard IEC60601-1 and/or IEC60601-1-1 harmonized national standard or the combination. If, in doubt, contact a qualified technician or your local representative.

WARNING: (Detachable) Listed, Type SJT, min. No. 18 AWG, 3-conductor terminating in molded-on Listed "Hospital Grade", parallel blade, grounding type attachment plug rated minimum 15 A, 125 V.
Maximum 4.0 m long. Making tag provided indicating "Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked "Hospital Only" or "Hospital Grade"

UL/EN Statement

This equipment has been tested and found to comply with the limits for medical devices in UL/EN 60601-1, 60601-1-2 and FCC/CE. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation.
This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.
- Increase the separation between the equipment.
- Connect the equipment into an outlet on a circuit different from that to which the other device(s) are connected.
- Consult the manufacturer or field service technician for help.
- Type of protection against electric shock: Class I equipment
- Degree of protection against electric shock: Not classified - no applied parts
- Classification according to the degree of protection against ingress of water as detailed in the current edition of IEC 529: IPX0, ordinary equipment
- This equipment is not suitable for use in the presence of flammable anesthetics or oxygen
- Mode of operation: continuous operation

Certification of Eye Safety

This laser product is inside implemented by using 1310/1550nm optical module, manufactured by Opticis Co., Ltd., which are all certified by UL/EN 60601-1, 60601-1-2 referred in Accession Number 07-1334-0217 as classified in Class1 LASER eye safety.

Guidance and Manufacturer's Declaration

Guidance and Manufacturer's Declaration – Electromagnetic Emissions		
This Device is intended for use in the electromagnetic environment specified below. The user of the Device should assure that it is used in such an environment.		
Emissions Test	**Compliance**	**Electromagnetic Environment - Guidance**
RF Radiated Emissions CISPR 11	Group 1	This Device uses RF energy only for its internal function. Therefore, its RF radiated emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Conducted Emissions CISPR 11	Class A	This Device is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network which supplies buildings used for domestic purposes.
Harmonic Emissions IEC 61000-3-2	Class A	
Voltage Fluctuations/Flicker Emissions IEC 61000-3-3	Complies	

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
This Device is intended for use in the electromagnetic environment specified below. The user of the Device should assure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Electrostatic Discharge (ESD) IEC 61000-4-2	±6 kV Contact ±8 kV Air	±6 kV Contact ±8 kV Air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical Fast Transient/Burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage Dips, Short Interruptions and Voltage Variations on Power Supply Input Lines IEC 61000-4-11	<5 % UT (>95 % dip in UT) for 0.5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT) for 25 cycles <5 % UT (>95 % dip in UT for 5 sec	<5 % UT (>95 % dip in UT) for 0.5 cycle 40 % UT (60 % dip in UT) for 5 cycles 70 % UT (30 % dip in UT) for 25 cycles <5 % UT (>95 % dip in UT for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the device requires continued operation during power mains interruptions, it is recommended that the device be powered from an uninterruptible power source.
Power Frequency (50/60 Hz) Magnetic Field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical home or hospital environment.

Guidance and Manufacturer's Declaration

Guidance and Manufacturer's Declaration – Electromagnetic Immunity			
This Device is intended for use in the electromagnetic environment specified below. The user of the Device should assure that it is used in such an environment.			
Immunity Test	**IEC 60601 Test Level**	**Compliance Level**	**Electromagnetic Environment - Guidance**
Conducted RF IEC 61000-4- 6 Radiated RF IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 V 3 V/m	Portable and mobile RF commu nications equipment should be used no closer to any part of th e Device, including cables, than the recommended separation di stance calculated from the equa tion applicable to the frequency of the transmitter. **Recommended Separation Distance** d = 1.2√P d = 1.2√P (80 MHz to 800 MHz) d = 2.3√P (800 MHz to 2.5 GHz) Where P is the maximum output power rating of the transmitter i n watts (W) according to the tra nsmitter manufacturer and d is t he recommended separation di stance in meters (m). Field strengths from fixed RF tr ansmitters, as determined by an electromagnetic site survey, sh ould be less than the complianc e level in each frequency range. Interference may occur in the vi cinity of equipment marked with the following symbol:
Note 1: At 80 MHz and 800 MHz, the higher frequency range applies. Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.			
a Field strength from fixed transmitters such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the Device is used exceeds the applicable RF compliance level above, the Device should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the Device. b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.			

Guidance and Manufacturer's Declaration

Recommended Separation Distance Between Portable and Mobile RF Communication Equipment and the Device.

The Device is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The user of the Device can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communication equipment (transmitters) and the Device as recommended below, according to the maximum output power of the communications equipment.

Rated Maximum Output Power of Transmitter (Watts)	Separation Distance According to Frequency of Transmitter (meters)		
	150 kHz to 80 MHz d = 1.2√P	80 MHz to 800 MHz d = 1.2√P	800 MHz to 2.5 GHz d = 2.3√P
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power of the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.
Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

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