DATA SHEET

Two (2) Fibers Detachable DisplayPort 1.2 Extender, DPFX-250-TR

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Description

New optical DisplayPort 1.2 extender, DPFX-250-TR consists of transmitter module and receiver module, each of which has Two (2) LC fibers connection and is designed compact enough to be fitted into various installation environments.

It enables to transmit 4K(4096x2160) at 60Hz signal up to 200m (656feet), avoiding any tricks like scaling or data compression for lessening a burden of data transmission. It provides total data throughput 21.6Gbps (5.4Gbps per lane).

The pure fiber connection by two (2) LC fibers connector between transmitter and receiver, gives clean, secure and easy installation with perfect electrical isolation, but without electrical hazard and interference.

The DPFX-250-TR can be operated by 3.3V power from DisplayPort interface, basically. Two (2) Micro USB to USB cables will be provided in shipping group.

The shipping items are shown as follows;

1) One (1) Transmitter (Tx) and One (1) Receiver (Rx)
2) One (1) 0.2m Male to Female DisplayPort copper cable
3) Two (2) Micro USB to USB cables
4) Two (2) AC adapters to 110-240V with DC 5V 1A outlet
5) User's Manual

※ Default connection is direct connection to both source (TX side) and display (RX side)
※ If direct connection is impracticable, 0.2m DisplayPort copper cable is strongly recommended to use on TX(Display Source) side only
※ Other options – contact with sales office

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Features

- Supports DisplayPort 1.2 standards
- Extends 4K(4096x2160) at 60Hz
- Transmits DP data up to 200m (656feet) over two (2) LC multi-mode fibers (OM3).
- Offers total data rate 21.6Gbps (5.4Gbps per lane)
- Supports auxiliary channel
- Compact design allows direct connect to the DP display
- Directly connected with small form factor
- Operated by 3.3V from DisplayPort interface or USB power
- Data security with negligible EMI emission.
- Includes two (2) Micro USB to USB cables for the transmitter and receiver
- Certification: CE / FCC, UL IT, Laser Safety class 1

Applications

- Medical imaging
- Military
- Control room
- Simulator

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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)
	Data Transfer Rate (Graphic Data)	Max. 5.4Gbps
	Total Jitter at the end of Rx output	Max. 0.5UI
Optical	Link Power Budget	Min. 1dB
Mechanical	Module dimension (WDH)	26 x 72 x 15mm
Connect	Optical Connector	Duplex LC connectors
	Electric Connector Type from Systems and to Displays	20pin DP 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}	-	6.0	V
Operating Temperature	T_{OP}	0	50	˚C
Operating Relative Humidity	RH_{OP}	10	85[1)]	%RH
Storage Temperature	Tstg	-30	70	˚C
Storage Relative Humidity	RHstg	10	95[2)]	%RH

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

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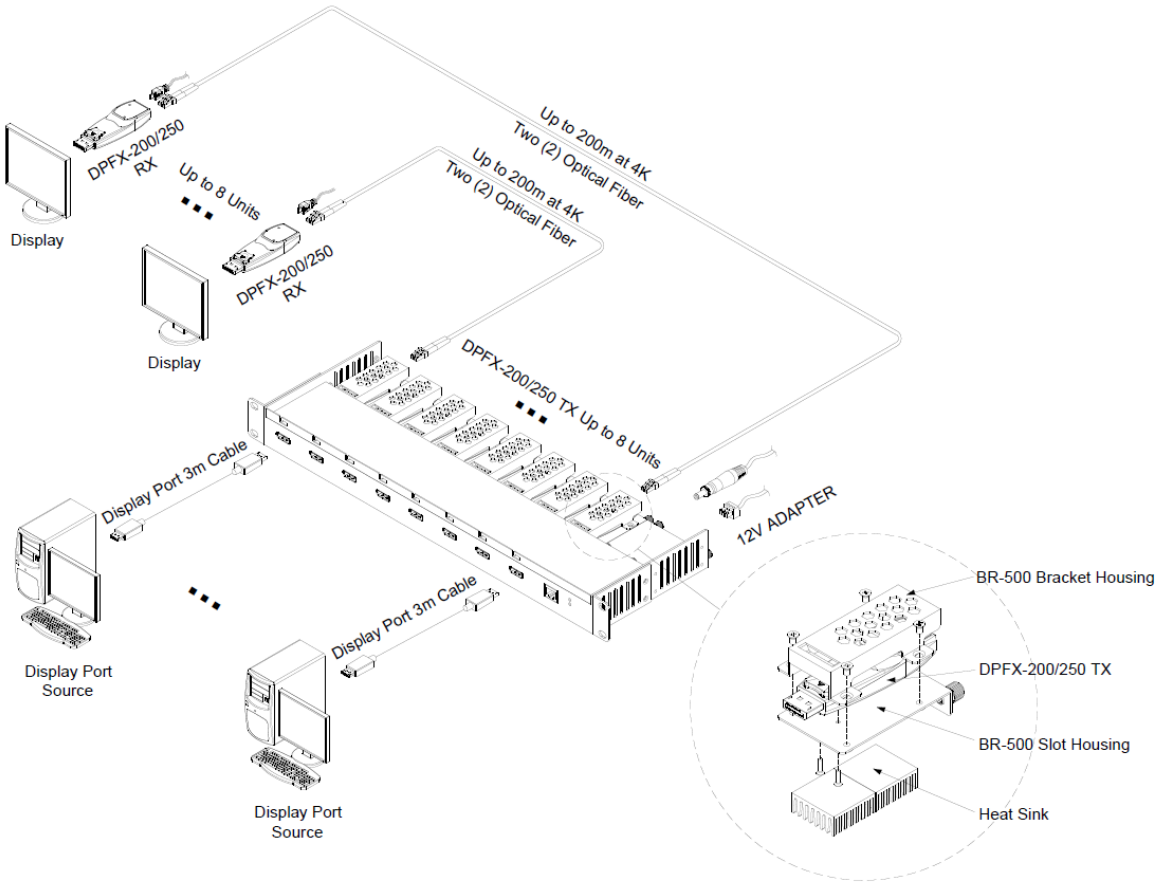
Connection with BR-500

OPTICIS BR-500, 19” 1RU multi-mounting rack is a modular rack and systematic fiber-optic solution providing flexibility to install DPFX-200-Tx up to 8 units. BR-500 has one separate RJ45 Port which allows the connection through LAN cable. This connection to GUI enables the access to the current power status of individual module and also allows to turn on/off the power of the device. By using premium graded DisplayPort 1.2 copper cables, BR-500 can extend up to 3m (9.84ft) distance from the sources.



*Note: The DisplayPort modules and DisplayPort copper cables are separately sold.
BR-500 is applicable to use with **Opticis DisplayPort 1.2 fiber-optic transmitters ONLY.**
Bracket Housings, Slot Housings, and Heat Sinks for 8 units are provided in the shipping group of BR-500.

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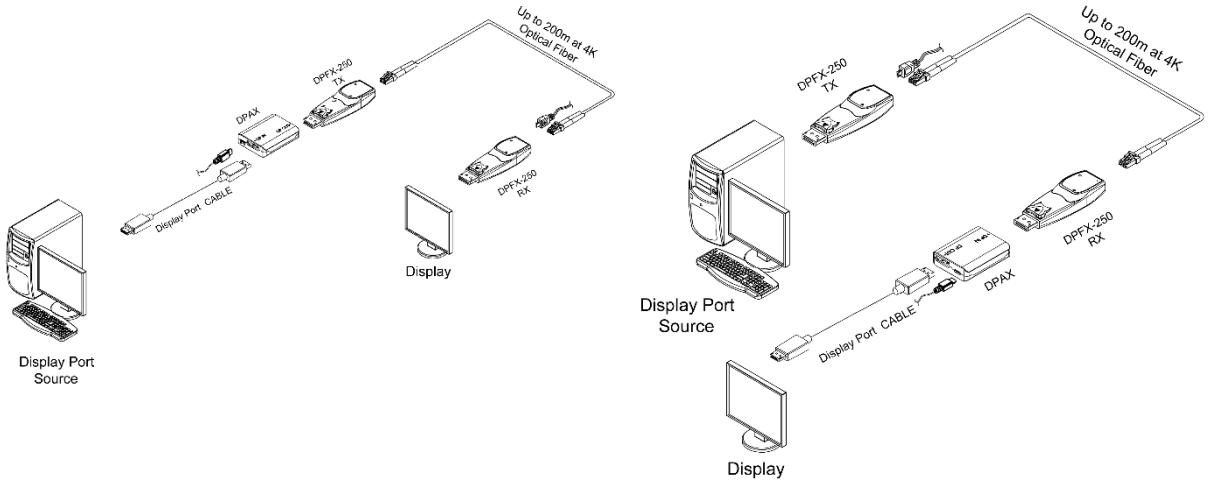
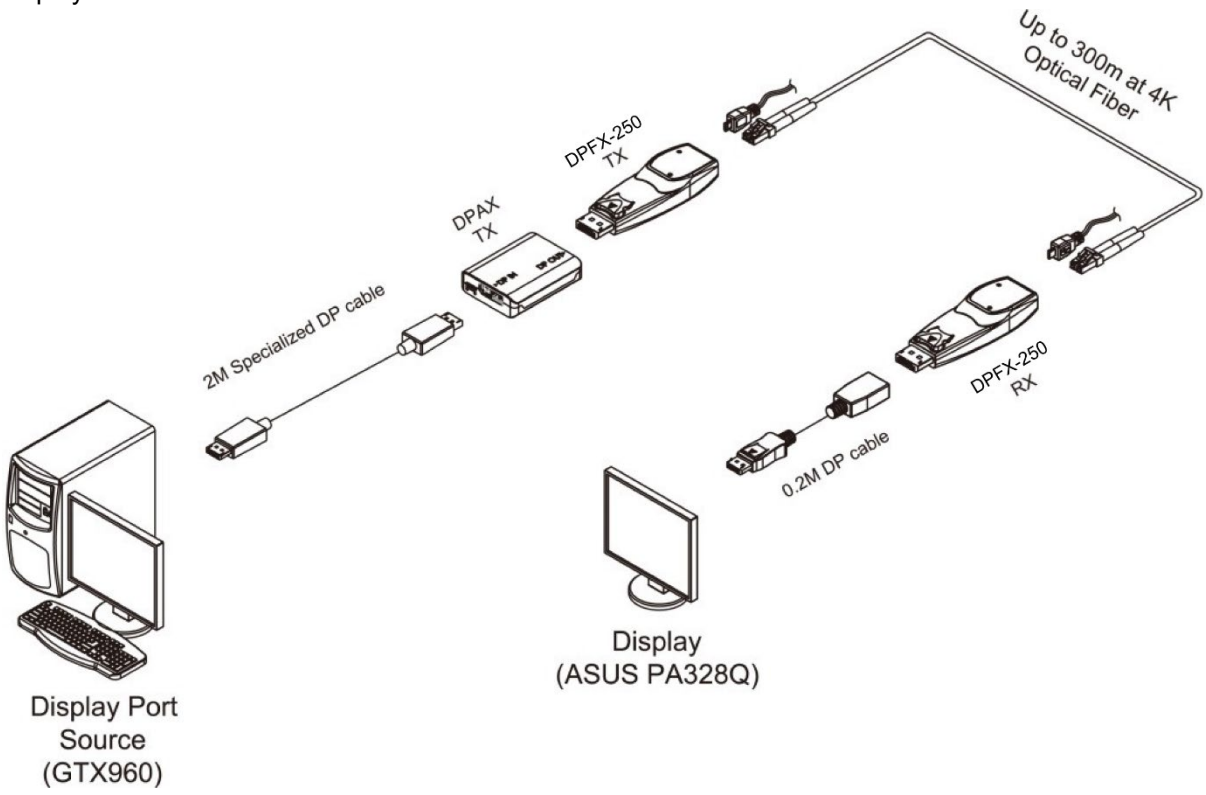
Connection with DPAX

Opticis DisplayPort Data Recovery Repeater, DPAX, is an active repeater for DisplayPort video signal to increase video transmission.

With using DPAX, DPFX-250 can extend its total transmission length even longer. DPAX can be connected any side of DPFX-250, however, to connect on TX side of DPFX-250, customized copper cable has to be used.



DPAX can improve transmission length of DPFX-250 via optical fiber. It has been confirmed that DisplayPort signal transmission length has improved up to 300m when using DPFX-250 with DPAX under certain environment such as below configuration. Each 200m and 300m of DisplayPort signal transmission has successfully tested when using GTX960 as a display source and ASUS PA328Q as a display.



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Operating Conditions

- **Transmitter module: DPFX-250-TX**

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{TCC}	190	240	290	mA
	Power Dissipation	P_{TX}	0.855	1.2	1.595	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_{ID}	V
Optical Link (Note3)	Output Optical Power	P_o	0			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}			100	ps
	Jitter in p-p value (Note3)	T_{jitter}			100	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: DPFX-250-RX**

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply	Supply Voltage	Vcc	4.5	5.0	5.5	V
	Supply Current	I_{RCC}	190	240	290	mA
	Power Dissipation	P_{RX}	0.855	1.2	1.595	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		800		mV_{p-p}
Optical Link	Receiving Optical Power	P_o	-1			dBm
	Receiving Wavelength	λ	825		990	nm
	Link Power Budget	P_{bgt}	1			dB
	Total Jitter (note 5)	TR_{jitter}			0.5	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 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	Duplex LC	2 ferrule
Skew		Max. 0.4ns
Insertion Attenuation		Max. 0.5dB
Total Optical Attenuation	In 656 ft (200 meter) extension	Max. 1dB

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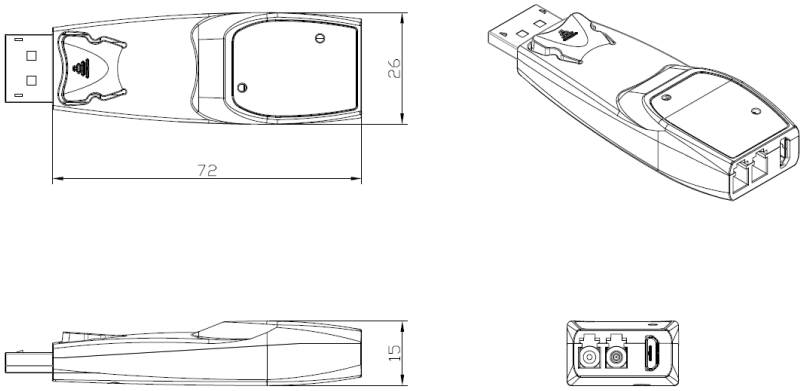
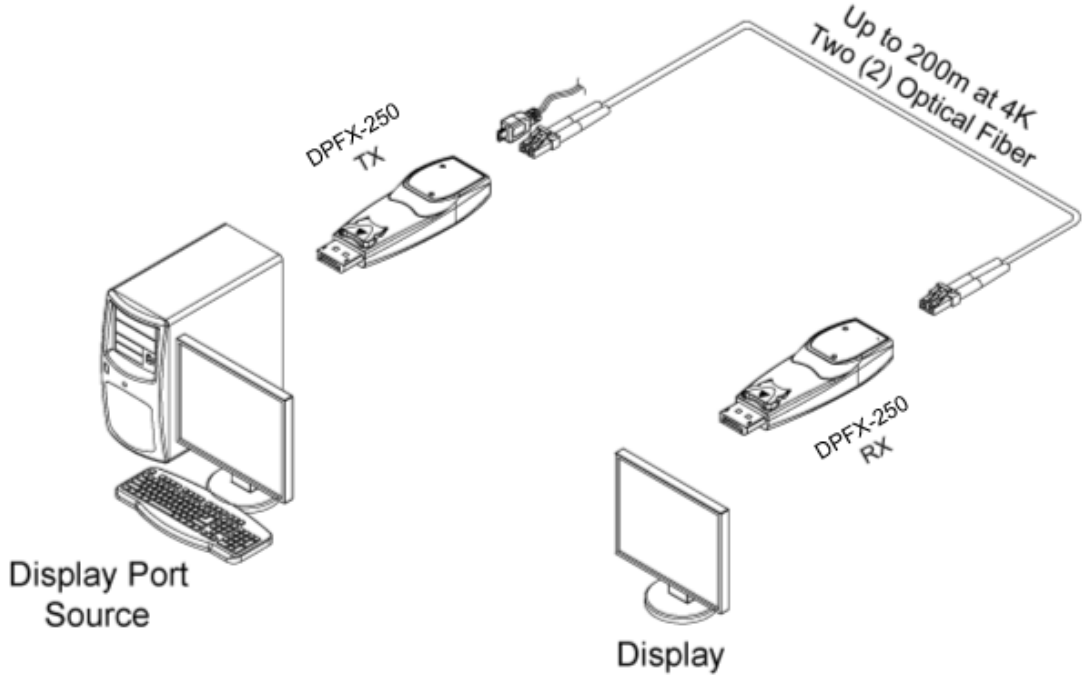
Drawing of Module



Note: The transmitter, DPFX-250-TXand the receiver, DPFX-250-RX have the same mechanical dimensions

Drawing of Cable Connection



DisplayPort Pin Description

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TX Module

Pin	Symbol	Mating Row Contact Location	Functional Description
1	ML_Lane0(p)	Top	DisplayPort Data Lane0 Positive
2	GND	Bottom	Ground
3	ML_Lane0(n)	Top	DisplayPort Data Lane0 Negative
4	ML_Lane1(p)	Bottom	DisplayPort Data Lane1 Positive
5	GND	Top	Ground
6	ML_Lane1(n)	Bottom	DisplayPort Data Lane1 Negative
7	ML_Lane2(p)	Top	DisplayPort Data Lane2 Positive
8	GND	Bottom	Ground
9	ML_Lane2(n)	Top	DisplayPort Data Lane2 Negative
10	ML_Lane3(p)	Bottom	DisplayPort Data Lane3 Positive
11	GND	Top	Ground
12	ML_Lane3(n)	Bottom	DisplayPort Data Lane3 Negative
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	Power for Connector (3.3V 500mA)

RX 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	Power for Connector (3.3V 500mA)

Revision History

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Version	date	History
1.0	2020-08	Official version released
1.1	2026-07	Max supply voltage, Tx/Rx supply current, and power dissipation values changed.

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