

# DATA SHEET

## One (1) fiber DVI KVM Extender, KVMX-200-TR

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## One (1) fiber DVI KVM Extender, KVMX-200-TR

### Description

New DVI optical KVM extender, KVMX-200-TR is designed to be used at various long haul KVM applications. KVMX-200-TR transmits DVI, USB HID, PS/2, RS-232 and bi-directional stereo audio signal up to 1.0km (3,280feet) over one (1) LC single-mode fiber. As an option, user can select one (1) or two (2) fibers connection by SFP module.

Designed for high resolution performance, it guarantees lossless image quality and no frame dropping to deliver perfect graphic data transmission up to WUXGA (1920x1200) at 60Hz.

It provides Auto-mix EDID programming feature that reads EDID information from both local and remote side displays and then determines the lowest resolution of them. It makes the installation of KVMX-200-TR easy and flexible at any variable resolutions.

Optionally, we could include convenient remote console switch and Indicator for selecting local control or remote control.

The shipping group is as follows;

- 1) One (1) pair of Transmitter and Receiver
- 2) Two (2) +12V/3A power adaptors
- 3) User Manual

### Options

- 1) Remote console switch (LSKP-1003) and Indicator (RSKP-1003)
- 2) 19" 1RU mounting rack (OPMCR-1U), mounting bracket (OPMCB), fiber-optic cable

### Ordering Information

- 1) KVMX-200-TR: One (1) single-mode fiber connection by SFP module
- 2) KVMX-201-TR: Two (2) single-mode fibers connection by SFP module
- 3) KVMX-202-TR: Two (2) multi-mode fibers connection by SFP module

**Note:** Opticis recommend user to use the SFP module, supplied by Opticis for stable connection. If user uses other SFP modules, it might cause malfunction or failure to properly use the product.

## Features

- ◆ One (1) or Two (2) fibers connection by SFP module.
- ◆ Transmits DVI, USB HID, PS/2, RS232 and audio signal up to 1km (3,280feet) over one (1) LC optical fiber.
- ◆ Supports up to **WUXGA (1920x1200)** resolution at 60Hz.
- ◆ Operates with both single and multi-mode optical fibers.
  - Up to **1.0km (3,280feet)** with one (1) or two (2) LC single-mode fibers.
  - Up to **300m (985feet)** with two (2) LC multi-mode fibers.
- ◆ **Auto-mix EDID** features
- ◆ Saves cost & installation space.
- ◆ Offers DVI, USB, and PS/2 Loop through ports for Local display and Keyboard / Mouse
- ◆ Supports bi-directional stereo audio.
- ◆ Lossless Image Quality with no Frame Dropping.
- ◆ Supports DIO port
- ◆ Provides Serial Control Data: RS232C through 9 pin D-sub connector.
- ◆ Offers optional remote console switch (option)
- ◆ 19" 1RU mounting rack, mounting bracket (option)
- ◆ Size (WDH): 216mm x 112mm x 44mm
- ◆ Power supplying: +12V, 3A power adapter
- ◆ Certifications: CE / FCC

## Applications

- ◆ Keyboard, mouse and video extension and routing system related with servers or PCs control.
- ◆ Digital display system integration for medical, military, aerospace, factory automation, and traffic control platforms.
- ◆ Digital FPD, PDP and projector installation in conference rooms, auditoriums and for kiosk systems
- ◆ LED signboards for large scale information display and stadiums

## Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	$T_{stg}$	- 30	+ 70	°C
Supply Voltage	$V_{CC}$	10	14	V
Transmitter Differential Input Voltage	$V_d$	-	1	V
Operating Humidity	RH	10	85	%
Lead Soldering Temperature & Time	-	-	-	260°C, 10 sec

## Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Units
Ambient Operating Temperature	$T_A$	0		+ 50	°C
Data Output Load	$R_{LD}$		50		$\Omega$
Power Supply Rejection (Note1)	PSR		50		mV <sub>p-p</sub>
Supply Voltage	$V_{CC}$	+ 11.4	+ 12.0	+ 12.6	V

Note1. Tested with a 50mV<sub>p-p</sub> 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.

## Electrical Power Supply Characteristics

( $T_A = 0$  °C to +50 °C, unless otherwise noted)

One (1) Single-mode fiber & Two (2) Multi-mode fibers standard

Parameter	Symbol	Minimum	Typical	Maximum	Units	
Supply Voltage	$V_{CC}$	9.0	12	14.0	V	
Supply Current	TX	$I_{TCC}$	480	570	680	mA
	RX	$I_{RCC}$	350	420	500	mA
Power Dissipation	TX	$P_{TX}$	5.76	6.84	8.16	W
	RX	$P_{RX}$	4.20	5.04	6.00	W

## DVI Electrical Characteristics

Transmitter						
Parameter		Symbol	Minimum	Typical	Maximum	Units
TMDS	Data Output Load	$R_{LD}$		50		$\Omega$
	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
Receiver						
Parameter		Symbol	Minimum	Typical	Maximum	Units
TMDS	Data Input Load	$R_{LD}$		50		$\Omega$
	Graphic Supply Voltage (Note2)	$GV_{CC}$	+ 3.1	+ 3.3	+ 3.5	V
	Single-Ended Output Swing Voltage (Note3)	$GV_{ISWING}$	0.2	-	0.4	V

Note2. Graphic Supply Voltage is regulated reference voltage for signal processing in modules

Note3. TMDS outputs are coupled in AC

**Optical & Electrical Characteristics**

(T<sub>op</sub> = 25°C)

One (1) Single-mode fiber standard

Parameters		Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Bit Rate	BR		Gb/s	9.95		10.3		
Bit Error Ratio	BER					10 <sup>-12</sup>		
Fiber Length 9µm core SMF			10 <sup>-10</sup> BER, 155Mbps/1.62Gbps	km	1			
<b>TRANSMITTER</b>								
Average Launched Power		P <sub>O</sub>	I <sub>f</sub> =I <sub>BIAS</sub> + I <sub>mod</sub> /2	dBm	-8.2		+0.5	
Extinction Ratio		ER		dB	3.5			
Optical Wavelength		λ <sub>c</sub>	CW, @ P <sub>OUT</sub>	nm	1260		1355	
Data Input Diff Voltage		V <sub>IN,pp</sub>		mV	180		700	
Optical Modulation Amplitude(OMA)		P <sub>OMA</sub>		dBm	-5.2			
<b>RECEIVER</b>								
Sensitivity		R <sub>SENSI</sub>		dBm			-12.6	
Wavelength				nm	1260		1600	
Average Receive Power		P <sub>AVE</sub>		dBm	-14.4		+0.5	
Data Output Diff Swing		V <sub>in,pp</sub>		mV	300		850	
LOS Hysteresis				dB	0.5			
<b>Audio/MIC (Analog)</b>								
Analog Sample Rate		F <sub>audio_a</sub>		kHz		192		
Input level		A <sub>in</sub>		V <sub>pp</sub>		0.56V <sub>ss</sub>		
Output level		A <sub>out</sub>	V <sub>pp</sub> =3.3V/Analog	V <sub>pp</sub>		0.65		
Input Impedance				kΩ		25		
Output Impedance				Ω		100		

**Optical & Electrical Characteristics**

(T<sub>op</sub> = 25°C)

Two (2) Single-mode fibers standard

Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Data Rate	BR	4.915/6.144Gb/s	Gb/se c	1.228		6.144	
Bit Error Rate	BER	1.228/2.457Gb/s				10 <sup>-12</sup>	
Fiber Length 9/125µm core SMF			km	1			
<b>TRANSMITTER</b>							
Input differential impedance	R <sub>in</sub>		Ω		100		
Output Opt. Power	P <sub>o</sub>		dBm	-8.4	-2.5	+0.5	
Optical Wavelength	λ		nm	1260		1350	
Spectral Width	σ		nm				
Optical Modulation Amplitude	OMA		uW	174			
Transmitter and Dispersion Penalty	TDP		dB			5.2	
RIN			dB/Hz			-128	
<b>RECEIVER</b>							
Sensitivity	R <sub>SENSr</sub>	6.144Gb/s	mW			0.042	
	R <sub>SENS4</sub>	4.715Gb/s	mW			0.042	
Average Received Power	Rx <sub>MAX</sub>		dBm			+0.5	
Optical Center Wavelength	λ <sub>c</sub>		nm	1260		1360	
Return Loss			dB	12			
LOS De-Assert	LOS <sub>D</sub>		dBm			-19	
LOS Assert	LOS <sub>A</sub>		dBm	-30			
LOS Hysteresis			dB	0.5			
<b>Audio/MIC (Analog)</b>							
Analog Sample Rate	F <sub>audio_a</sub>		kHz		192		
Input level	Ain		V <sub>pp</sub>		0.56V <sub>ss</sub>		
Output level	Aout	V <sub>pp</sub> =3.3V//Analog	V <sub>pp</sub>		0.65		
Input Impedance			kΩ		25		
Output Impedance			Ω		100		

## Optical & Electrical Characteristics

( $T_{op} = 25^{\circ}C$ )

Two (2) Multi-mode fibers standard

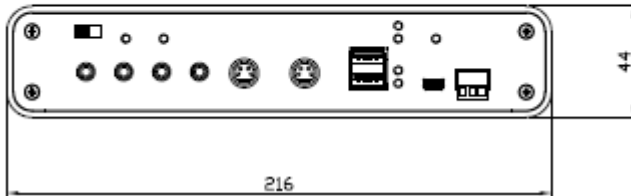
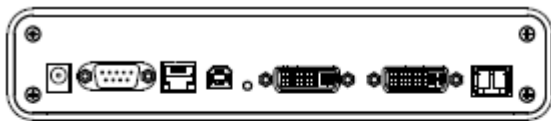
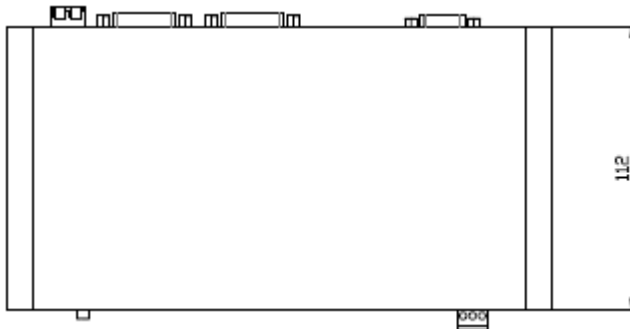
Parameters	Symbol	Condition	Unit	Min.	Typ.	Max.	Remark
Data Rate	BR		Gb/sec		8.5		
Bit Error Rate	BER					$10^{-12}$	
Fiber Length 50/125 $\mu$ m core MMF			m			300	
<b>TRANSMITTER</b>							
Input differential impedance	$R_{in}$		$\Omega$		100		
Output Opt. Power. 50 or 62.5 MMF	$P_o$		dBm	-8.2			
Optical Wavelength	$\lambda$		nm	840		860	
Spectral Width	$\sigma$		nm			0.65	
Optical Modulation Amplitude	OMA	8.5Gb/s	$\mu$ W	302			
Optical Rise/Fall Time	$P_r / P_f$	2.125, 4.25Gb/s	ps			90	
Transmitter and Dispersion Penalty	TWDP	6.1Gb/s	dB			3.7	
Relative Intensity Noise	RIN		dB/Hz			-128	
<b>RECEIVER</b>							
Sensitivity	$R_{XSENS}$	8.5Gb/s	mW			76	
Average Received Power	$R_{XMAX}$		dBm	0			
Optical Center Wavelength	$\lambda_c$		nm	770		860	
Optical Return Loss			dB	12			
LOS De-Assert	$LOS_D$		dBm			-18	
LOS Assert	$LOS_A$		dBm	-30			
LOS Hysteresis			dB	0.5			
<b>Audio/MIC (Analog)</b>							
Analog Sample Rate	$F_{audio\_a}$		kHz		192		
Input level	$A_{in}$		Vpp		0.56Vss		
Output level	$A_{out}$	Vpp=3.3V/Analog	Vpp		0.65		
Input Impedance			k $\Omega$		25		
Output Impedance			$\Omega$		100		

## RS-232C Characteristics

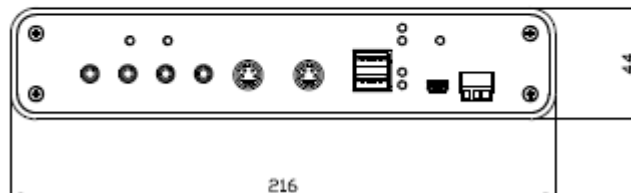
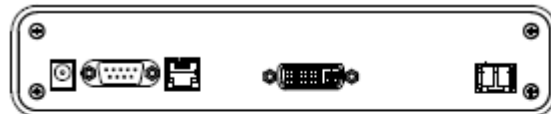
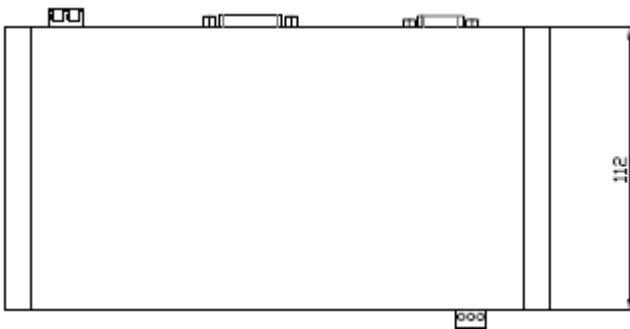
Parameter	Symbol	Minimum	Typical	Maximum	Units
Data rate				250	kbps
Input voltage	$R_{in}$	-25		25	V
Output voltage	$T_{out}$		$\pm 15$		V

## Drawing of transmitter and receiver

Dimension [mm]



Transmitter



Receiver



## 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 Shield
4		
5		
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 Shield
12		
13		
14	5 V	5 V Input for Transmitter from Host 5 V Output for Monitor from Receiver
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 Shield
20		
21		
22	GND	TMDS Clock Signal Shield
23	CLK+	TMDS Clock Channel Positive
24	CLK-	TMDS Clock Channel Negative

Note: Channels 3, 4 and 5 dual-link data signal pins are not used

## RS-232C Pin Description

Pin	Symbol	Functional Description
1	Received Line Signal Detector	Connected with Pin4 & Pin6 in module
2	RD	Data Receive: Uplink $\leftrightarrow$ Downlink
3	TD	Data Transmit: Uplink $\leftrightarrow$ Downlink
4	Data Terminal Ready	Connected with Pin1 & Pin6 in module
5	GND	Signal Ground
6	Data Set Ready	Connected with Pin1 & Pin4 in module
7	Request To Send	Connected with Pin8 in module
8	Clear To Send	Connected with Pin7 in module
9	NC	

## Reliability Test

Opticis utilizes three types of test criteria for a reduction of variability and a continuous improvement of the process by its FEMA (Failure Mode and Effective Analysis) program.

- 1) Temperature & humidity tests
- 2) EMI test (CE)

### 3) Temperature & Humidity Test Data

Heading	Test	Conditions	Duration	Sample Size	Failure	Remarks
<b>Operating Test</b>	Operating at each Temperature (See Note)	* 0 ~ 50 °C (Interval: 10 °C)	30 Min (Each Temperature)	n=3	0	<b>Note:</b> Visual Test on the Display
<b>Storage Test</b>	<b>Low Temperature</b>	* T <sub>s</sub> = -30 °C	96 HR	n=3	0	1. TS: Storage Temperature
	<b>High Temperature</b>	* T <sub>s</sub> = 70 °C	96 HR	n=3	0	2. RH: Relative Humidity
	<b>High Humidity High Temperature</b>	* T <sub>s</sub> : 40 °C * RH: 95%	96 HR	n=3	0	

### EMI Test Data

#### EMI: Meet CE class A

STANDARDS		CONDITIONS
EN 55 022 (CISPR22)	CE (Conducted Emission) & RE (Radiated Emission)	Meet Class A