DATA SHEET

16x16 DVI / HDMI /SDI Matrix, OMM-1000

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04, August, 2014

16x16 DVI / HDMI / SDI Multi-format Matrix

- OMM-1000 -

1. Description

The OMM-1000 modular matrix enables to switch up to 16 different DVI / HDMI /SDI sources to 16 different digital displays. It can be configured using 4 input and output cards and each card has 4 ports of input and output. In case of Dual link DVI card (DDVI-2EI / DDVI-2EO), it is composed of 2 ports, therefore configuration for input and output channels are from 2x2 to 8x8.

Note) SDI is not a licensed HDCP interface and if the content received from HDMI is protected by HDCP, there should be no output from the SDI slot.

2. Key Features

- Up to 16 DVI, HDMI, SDI inputs and outputs can be configured.
- Each card has 4 input or 4 output ports and 4 cards can be fitted into input and output bays.
  - Dual link DVI supports from 2 x 2 to 8 x8 input and output.
- Has Electrical DVI, Dual link DVIU, HDMI, SDI and Optical DVI input and output cards.
- Complies with DDC/HDCP (Electrical DVI, Dual link DVI and HDMI cards only).
- Supports up to WUXGA (1920x1200) at 60Hz refresh ratio for Single link DVI, WQXGA (2560x1600) at 60Hz refresh ratio for Dual link DVI or 1080p at 60Hz for HDMI and SDI.
- Supports 3 types of EDID management:
  - Default Mode.
  - Auto Mix Mode.
  - Output Copy Mode.
- Supports various control methods:
  - Key buttons operation
  - Command input (Such as Hyper terminal by RS-232 and Telnet by TCP/IP)
  - Web panel control (TCP/IP)
  - PC program by RS-232 and UDP
- Works with OPTICIS DVI, HDMI and SDI optical extender for long signal extension.
- Has dual-power supplier for hot-swappable and load-sharing.
- Equips multi-viewer card to be used in various monitoring systems.
- Provides diagnostic function for quick trouble shooting.
- Provides preset mode to save and load the current routing.
- Has video generator output and monitoring output for easy installation

 04, August, 2014

3. Technical Specifications

1) General Specifications

	Parameter	Specifications
Electrical	Signal type	**DVI**: TMDS **HDMI**: TMDS **SDI**: SMPTE 424M/292M/259M
	Connectors	**DVI**: 24-pin DVI-I **HDMI**: HDMI A type **SDI**: BNC type
	Supporting resolution	**DVI**: VGA (640x480) ~ WUXGA (1920x1200), WQXGA (2560x1600, only Dual link), 480i~1080i and 1080p **HDMI**: VGA (640x480) ~ WUXGA (1920x1200), 480i~1080i and 1080p **SDI**: SD ~ 1080p
	Power Consumption	-
Optical	Optical Connector	SC connectors (DVI only)
	Laser Diodes in Output Cards	Multi-mode VCSEL (Vertical Cavity Surface Emitting Laser)
	Photo Diodes in Input Cards	PIN-PD
Mechanical	Weight	< 11Kg (Single power) < 12 Kg (Dual power)
	Dimension	440 x 380 x 178mm

2) Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
AC Input Voltage	V_{CC}	90	264	V
Input Frequency	Hz	47	63	
Operating Temperature	T_{op}	10	40	°C
Storage Temperature	T_s	- 30	+ 70	°C
Storage Relative Humidity	H_s	10	95	%RH

3) Input Output card specification

i) Electrical Single link DVI Input Card: SDVI-4EI

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Input	Data Input Load	R_{LD}		50		Ω
	Graphic Supply Voltage	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}	0.2	-	0.4	V

ii) Electrical Single link DVI Output Card: SDVI-4EO

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Output	Data Output Load	R_{LD}		50		Ω
	Graphic Supply Voltage	GV_{CC}	+ 3.1	+ 3.3	+ 3.5	V
	Single-Ended High Level Output Voltage	GV_{IH}	GV_{CC} - 0.01	GV_{CC}	GV_{CC} + 0.01	V
	Single-Ended Low Level Output Voltage	GV_{IL}	GV_{CC} - 0.6	-	GV_{CC} - 0.4	V
	Single-Ended Output Swing Voltage	GV_{ISWING}	0.4	-	0.6	V
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			309	ps

iii) Electrical Dual link DVI Input Card: DDVI-2EI

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Input	Data Input Load	R_{LD}		50		Ω
	Graphic Supply Voltage	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}	0.2	-	0.4	V

iv) Electrical Dual link DVI Output Card: DDVI-2EO

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Output	Data Output Load	R_{LD}		50		Ω
	Graphic Supply Voltage	GV_{CC}	+ 3.1	+ 3.3	+ 3.5	V
	Single-Ended High Level Output Voltage	GV_{IH}	GV_{CC} - 0.01	GV_{CC}	GV_{CC} + 0.01	V
	Single-Ended Low Level Output Voltage	GV_{IL}	GV_{CC} - 0.6	-	GV_{CC} - 0.4	V
	Single-Ended Output Swing Voltage	GV_{ISWING}	0.4	-	0.6	V
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			309	ps

v) Optical DVI Input Card: SDVI-1FI

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Optical Input	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

vi) Optical DVI Output Card: SDVI-1FO

	Parameter	Symbol	Minimum	Typical	Maximum	Units
Optical Output	Output Optical Power	P_o			1	dBm
	Wavelength	λ	850		990	nm
	Spectral width in RMS	Δλ			3	nm
	Relative Intensity of Noise	RIN		-20		dB/Hz
	Extinction Ratio	Ext	4			dB
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			260	ps

vii) Multi-viewer Card: QDVI-O

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Output	Data Output Load	R_{LD}		50		Ω
	Graphic Supply Voltage	GV_{CC}	+ 3.1	+ 3.3	+ 3.5	V
	Single-Ended High Level Output Voltage	GV_{IH}	GV_{CC} - 0.01	GV_{CC}	GV_{CC} + 0.01	V
	Single-Ended Low Level Output Voltage	GV_{IL}	GV_{CC} - 0.6	-	GV_{CC} - 0.4	V
	Single-Ended Output Swing Voltage	GV_{ISWING}	0.4	-	0.6	V
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			309	ps

Optical Output	Output Optical Power	P_o			1	dBm
	Wavelength	λ	850		990	nm
	Spectral width in RMS	$\Delta\lambda$			3	nm
	Relative Intensity of Noise	RIN		-20		dB/Hz
	Extinction Ratio	Ext	4			dB
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			260	ps

viii) Electrical HDMI Input Card: HDMI-4EI

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Input	Data Input Load	R_{LD}		50		Ω
	Graphic Supply Voltage	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}	0.2	-	0.4	V

ix) Electrical HDMI output Card: HDMI-4EO

	Parameter	Symbol	Minimum	Typical	Maximum	Units
TMDS Output	Data Output Load	R_{LD}		50		Ω
	Graphic Supply Voltage	GV_{CC}	+ 3.1	+ 3.3	+ 3.5	V
	Single-Ended High Level Output Voltage	GV_{IH}	GV_{CC} - 0.01	GV_{CC}	GV_{CC} + 0.01	V
	Single-Ended Low Level Output Voltage	GV_{IL}	GV_{CC} - 0.6	-	GV_{CC} - 0.4	V
	Single-Ended Output Swing Voltage	GV_{ISWING}	0.4	-	0.6	V
	Rising/Falling Time	T_{rise}/T_{fall}			260	ps
	Jitter in p-p value	T_{jitter}			309	ps

x) Electrical SDI input Card: SDI-4EI

	Parameter	Symbol	Minimum	Typical	Maximum	Units
SDI Input	Input Signal		SMPTE 424M/292M/259M			
	Input Impedance	Z_{IN}		75		Ω
	Input Signal Level		720	800	880	mV_{p-p}
	Return Loss		15			dB
	Propagation Delay				1.5	ns
	Data rate				3	Gbps

xi) Electrical SDI output Card: SDI-4EO

	Parameter	Symbol	Minimum	Typical	Maximum	Units
SDI Output	Output Signal		SMPTE 424M/292M/259M			
	Output Impedance	Z_{IN}		75		Ω
	Output Signal Level		720	800	880	mV_{p-p}
	Return Loss		15			dB
	Propagation Delay				40	ns
	Data rate				3	Gbps
	Total Jitter	TR_{jitter}		0.2	0.3	UI

4) SDI video input and output scaling condition

Input card	Output card	Input resolution		Output resolution
SDI card	SDI card	480i		720p@ 60
		576i		
		720p@ 23.98	720p@ 30	
		720p@ 24	720p@ 50	
		720p@ 25	720p@ 59.94	
		720p@ 29.97	720p@ 60	
		1035i		720p@ 60
		1080i, 1080sf		1080p@ 60
		1080p@ 23.98	1080p @ 30	1080p@ 60
		1080p@ 24	1080p @ 50	
		1080p@ 25	1080p @ 59.94	
		1080p@ 29.97	1080p @ 60	
SDI card	HDMI, DVI, Fiber card	480i		SXGA (1280x1024)
		576i		
		720p@ 23.98	720p@ 30	720p@ 60
		720p@ 24	720p@ 50	
		720p@ 25	720p@ 59.94	
		720p@ 29.97	720p@ 60	
		1035i		720p@ 60
		1080i, 1080sf		1080p@ 60
		1080p@ 23.98	1080p @ 30	1080p@ 60
		1080p@ 24	1080p @ 50	
		1080p@ 25	1080p @ 59.94	
		1080p@ 29.97	1080p @ 60	
HDMI, DVI, Fiber card	SDI card	depends on V display	720≤ V display <1080	720p@ 60
			V display ≥1080	1080p@ 60

[Note] Both SDI input and output card do not support audio signal.

5) Compatibility between Dual link DVI In/Output cards and another In/Output cards

Input \ Output		DDVI-2EO	SDVI-4EO	SDVI-1FO	HDMI-4EO	SDI -4EO
DDVI-2EI	Dual DVI	Pass	N/D	N/D	N/D	N/D
	Single DVI	Pass	Pass	Pass	Pass	Pass
SDVI-4EI		Pass	Pass	Pass	Pass	Pass
SDVI-1FI		Pass	Pass	Pass	Pass	Pass
HDMI-4EI		N/D	Pass	Pass	Pass	Pass
SDI -4EI		N/D	Pass	Pass	Pass	Pass

6) Recommended Specifications of Fiber-Optic Cables

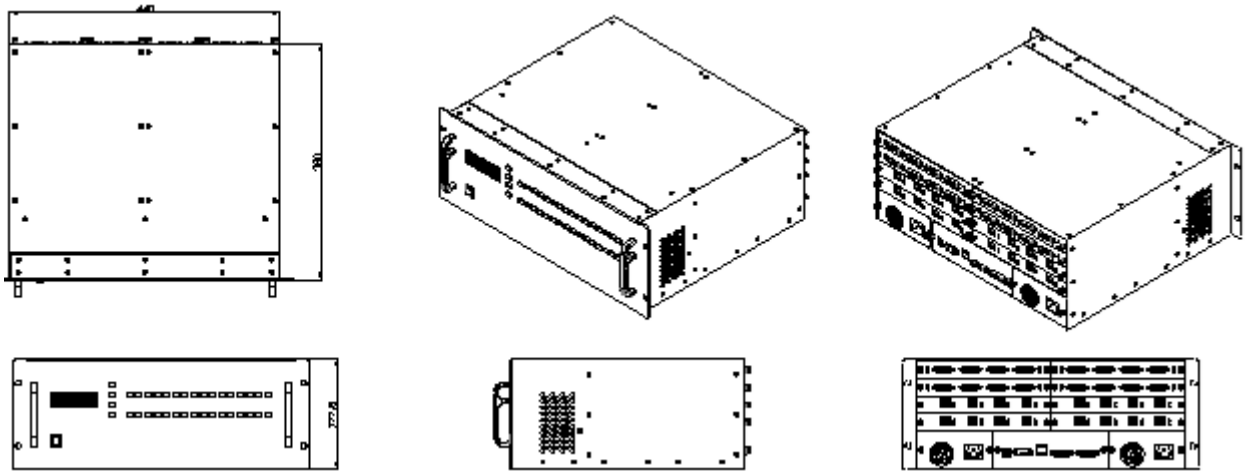
Parameters	**Conditions**	**Specifications**
Fiber Type		50μm Multi-mode Graded Index Glass
Modal Bandwidth	λ = 850nm	Min. 500 MHz km
Fiber Cable Attenuation	λ = 850nm	Max. 2.5dB/km
Extension Distance		10 – 1640ft (500 meters)
No. of Ferrules	SC	1 ferrule
Skew		Max. 0.4ns
Insertion Attenuation		Max. 0.5dB
Total Optical Attenuation	In 330 ft (100 meter) extension	Max. 1.5dB

4. Applications

Control room, Medical imaging, Staging and Event

5. Mechanical Drawing

Dimension (W x D x H): 440 x 380 x 178mm



6. Pin Description

1) DVI

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	CH4-	TMDS Data Signal Channel 4 Negative
5	CH4+	TMDS Data Signal Channel 4 Positive
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	CH3-	TMDS Data Signal Channel 3 Negative
13	CH3+	TMDS Data Signal Channel 3 Positive
14	5 V	5V Input for Transmitter from Host (Note1)
		5V 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	CH5-	TMDS Data Signal Channel 5 Negative
21	CH5+	TMDS Data Signal Channel 5 Positive
22	GND	TMDS Clock Signal Shield
23	CLK+	TMDS Clock Channel Positive
24	CLK-	TMDS Clock Channel Negative

Note1) Output ports of OMM support 5V DC power to operate the Opticis optical fiber detachable transmitter modules without exterior power supply.

2) HDMI

Pin	Symbol	Functional Description
1	CH2+	TMDS Data Signal Channel 2 Positive
2	GND	TMDS Data Signal Channel 2 Shield
3	Ch2-	TMDS Data Signal Channel 2 Negative
4	CH1+	TMDS Data Signal Channel 1 Positive
5	GND	TMDS Data Signal Channel 1 Shield
6	CH1-	TMDS Data Signal Channel 1 Negative
7	CH0+	TMDS Data Signal Channel 0 Positive
8	GND	TMDS Data Signal Channel 0 Shield
9	CH0-	TMDS Data Signal Channel 0 Negative
10	CLK+	TMDS Clock Channel Positive
11	GND	TMDS Clock Signal Shield
12	CLK-	TMDS Clock Channel Negative
13	CEC	
14	Reserved	Not used
15	SCL	
16	SDA	
17	GND	DDC/CEC shield
18	5V	5 V Input for Transmitter from 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

