DATA SHEET
C-FODM/FODM
Fiber Optic DVI Hybrid Cable

Contents

Point-to-Point DVI Hybrid Cable
C-FODM/FODM

Description

The Digital Visual Interface is a low cost, high quality graphics interface between a host processor video card and a display panel. Optical technology for this transmission stretches the performance beyond the limitations of copper wire with longer length, data security, negligible RFI/EMI and the elimination of costly analog distribution systems.

C-FODM/FODM has four (4) multi-mode fibers for TMDS transmission and copper wires for DDC/ HDCP in a jacket. It transmits uncompressed 2K resolution at 60Hz, 1080p up to 100m (328feet) and .supplies +5V DC power either from video sources or external power adapter in the shipping group

There are male DVI-D connectors at each end. The high-speed graphic data transmission is accomplished by using a VCSEL array inside the transmitter connector, and a Pin-PD array inside the receiver connector.

In the Box:
* C-FODM/FODM Optical DVI Cable: One (1) unit
* +5V AC/DC power adapter: One (1) unit
* User's Manual

Feature

- Compact design of end connector allows direct connection to the host video card and display
- Hybrid cable with four (4) multi-mode fibers for TMDS
transmission and copper wires for DDC/HDCP
- Extends 2K resolution 60Hz and 1080p up to 100m (328feet)
- Uses +5V DC power from video sources or +5V DV power adapter in the shipping group
- Auto-power switching
- Supports bit rate up to 1.65Gbps/ch
- Operating temperature: 0 ~ 50℃
- Storage temperature: -30 ~ 70℃
- Input power: +5V 1A
- Size (WDH): 39 x 53 x 15.4mm
- Certifications: CE / FCC

Applications

- Digital TFT-LCD FPDs, PDPs and projectors for medical imaging, air traffic control, factory automation, conference rooms, auditorium A/V systems, etc.
- Kiosks with digital FPDs showing full motion graphic displays from remote systems
- PDP displays for information display in public sites.
- LED signboards in streets and stadiums.
- Home Theatre applications

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
Storage Temperature	T_{stg}	- 30	+ 70	°C
Supply Voltage	V_{CC}	- 0.3	+ 6.0	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		Ω
Power Supply Rejection (Note1)	PSR		50		mV_{p-p}
Supply Voltage	V_{CC}	+ 4.5	+ 5.0	+ 5.5	V
Graphic Supply Voltage (Note2)	GV_{CC}	+ 3.0	+ 3.3	+ 3.6	V

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 only for the Graphic Signal Interface which is generated by regulator in the Transmitter and Receiver

Electrical Power Supply Characteristics

1. ;For **C-FODM/FODM** with the external power adaptor, the characteristics are

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage		V_{CC}	4.5	5	5.5	V
Supply Current	TX	I_{TCC}	-	170	200	mA
	RX	I_{RCC}	-	130	150	mA
Power Dissipation	TX	P_{TX}		0.85	1.1	W
	RX	P_{RX}	-	0.65	0.825	W

Fiber Optic cable Specifications

Parameter	Value	Parameter	Value
Core Diameter	200um (HPCF), 62.5um (MMGOF)	Cladding Diameter (only for HPCF)	225um
Buffer Diameter	0.5mm (HPCF), 0.25mm (MMGOF)	Outside Diameter	7.6mm
Proof Test Level	0.53GPa		

Drawing of transmitter and receiver modules
Dimension [mm]
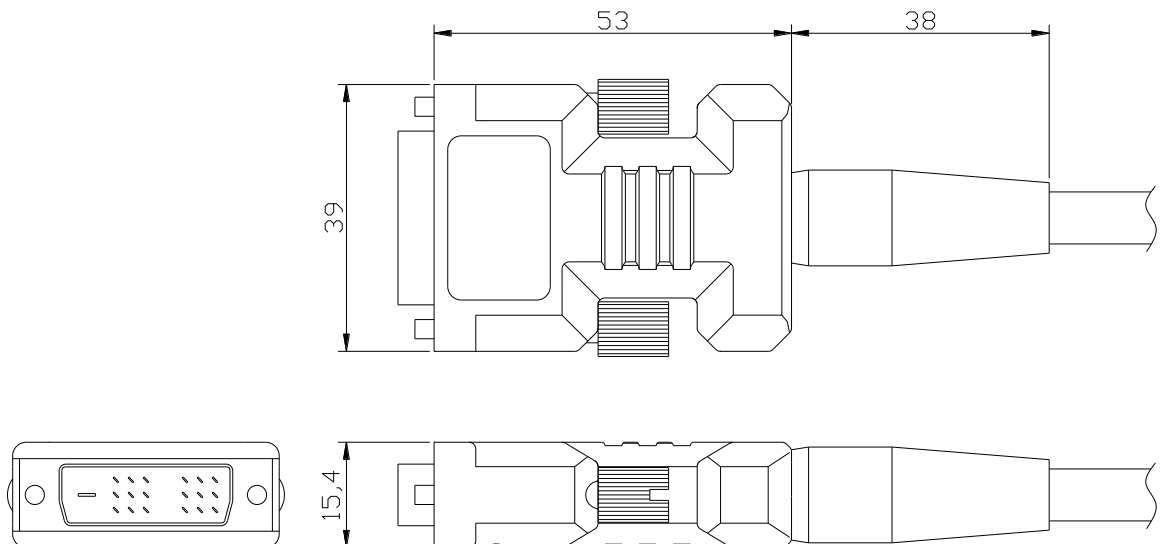
DVI Pin Description

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

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) Mechanical test (vibration, shock)
2) Temperature & humidity tests
3) EMC test (*FCC class A and CE Verification*)

Mechanical and Temperature & Humidity Test Data

Heading	Test	Conditions	Duration	Sample Size	Failure	Remarks
Operating Test	Operating at each Temperature (See Note)	* - 0 ~ 50 ˚C (Interval: 10 ˚C)	30 Min (Each Temperature)	n =4	0	**Note:** Visual Test on the Display
Storage Test	Low Temperature	* T_S = -30 ˚C	96 HR	n=2	0	1. TS: Storage Temperature
	High Temperature	* T_S = 70 ˚C	96 HR	n=2	0	2. RH: Relative Humidity
	High Humidity High Temperature	* T_S: 85 ˚C * RH: 85%	96 HR	n=2	0	
Mechanical Test	Mechanical Shock	* Pulse: 11 ms * Peak level: 30 g * Shock pulse: 3 times/Axis	-	n=2	0	
	Mechanical Vibration	* Peak acceleration: 20 g * Frequency: 20~2000 ㎐ * Sweep time: 30 Minutes * 4 Times/Axis	-	n=2	0	

EMC Test Data

1) EMI: Meet _FCC class A_ (ICES-003) and _CE class A_

STANDARDS		CONDITIONS
EN 55 022 (CISPR22) FCC; PART 15 SUBPART B	CE (Conducted Emission) & RE (Radiated Emission)	Meet Class A
EN 61000-3-2 (IEC 61000-3-2)	Harmonics	Meet Class A
EN 61000-3-3 (IEC 61000-3-3)	Flickers	Meet Class A

2) EMS: Meet _CE standards (EN 55024) and CISPR24 equivalents_

STANDARDS		CONDITIONS
EN 61 000-4-2:1995	Electrostatic Discharge Immunity (Air: 8kv, Contact: 4kv)	Meet Criterion B
EN 61 000-4-3:1996	Radiated RF E-Field (80~1000 MHz) 3V/m (AM 80%, 1kHz)	Meet Criterion A
EN 61 000-4-4:1995	Fast Transients (5kHz, 60Seconds)	Meet Criterion B
EN 61 000-4-5:1995	Surge Transients	Meet Criterion B
EN 61 000-4-6:1996	Conducted Susceptibility (CS) Radiated Susceptibility (RS)	Meet Criterion A
EN 61 000-4-11:1994	Voltage Dips, Interruption & Variation	Meet Criterion C

Terminology

DDC	Digital Display Channel. Latest specification is DDC2B.
DVI-D	Digital Visual Interface. Digital connection only – no analog.
EDID	Extended Display Identification Data. EDID parameters are sent over the DDC link.
EMI	Electro Magnetic Interference.
EMS	Electro Magnetic Susceptibility.
HDCP	High Definition Content Protection. These parameters are part of the 2002 High Definition Multimedia Interface (HDMI) specification for Consumer Electronics.
PDP	Plasma Display Panel. Large HDTV panels up to 63" use this display technology.
RFI	Radio Frequency Interference.
TFT-LCD	Thin Film Transistor Liquid Crystal Display – the technology of most computer display panels with VESA resolutions up to 1600x1200 pixels.
TMDS	Transmission Minimized Differential Signalling is the Silicon Image Inc. protocol for the digital signals.
VCSEL	Vertical Cavity Surface Emitting Laser transmitter diode. The receiver diode is the PIN-Photo Diode. These components are designed and manufactured by Opticis.
VESA	Video Electronics Standards Association.

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