



PRODUCT DESCRIPTION

Greatway Technology GSFP-48V Modules are optical transceiver or transmitter (GSFP-48VT) and receiver (GSFP-48VR) modules designed to transmit and receive optical and electrical serial digital signals as defined in SMPTE 297-2006. The transceiver or transmitter and receiver are specifically designed for the application with the performance of SDI pathological patterns for SMPTE 259M, 344M, 292M and 424M serial rates.

FEATURES

- n SMPTE 297-2006 compatible
- n Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
- n Industry standard SFP form factor
- n Diagnose and control via I2C interface
- n 100ohms differential AC coupled CML outputs
- n RoHS-6 compliant
- n Die Cast Metal Housing
- n Hot pluggable
- n Operating temperature range: 0°C to 70°C

APPLICATIONS

- n 3G HD-SDI video application
- n SMPTE 297-2006 compatible OE interfaces

GSFP-48VR receiver side contains a PIN photodiode, and GSFP-48VT transmitter side contains a 1310nm FP or 1550nm DFB or CWDM DFB laser, a transceiver contains both receiver and transmitter. The modules designed to the transmission of signals from 50Mbps to 3Gbps over single fiber.

The transceiver or transmitter and receiver provide the operation status monitoring through I2C interface. Including: receiver input optical power, transmitter output optical power and bias current, and other operating conditions, such as power supply and operating temperature. An alarm flag for the parameter is raised if the monitored parameter falls outside the pre-defined range.

1. 1. Functional Block Diagram

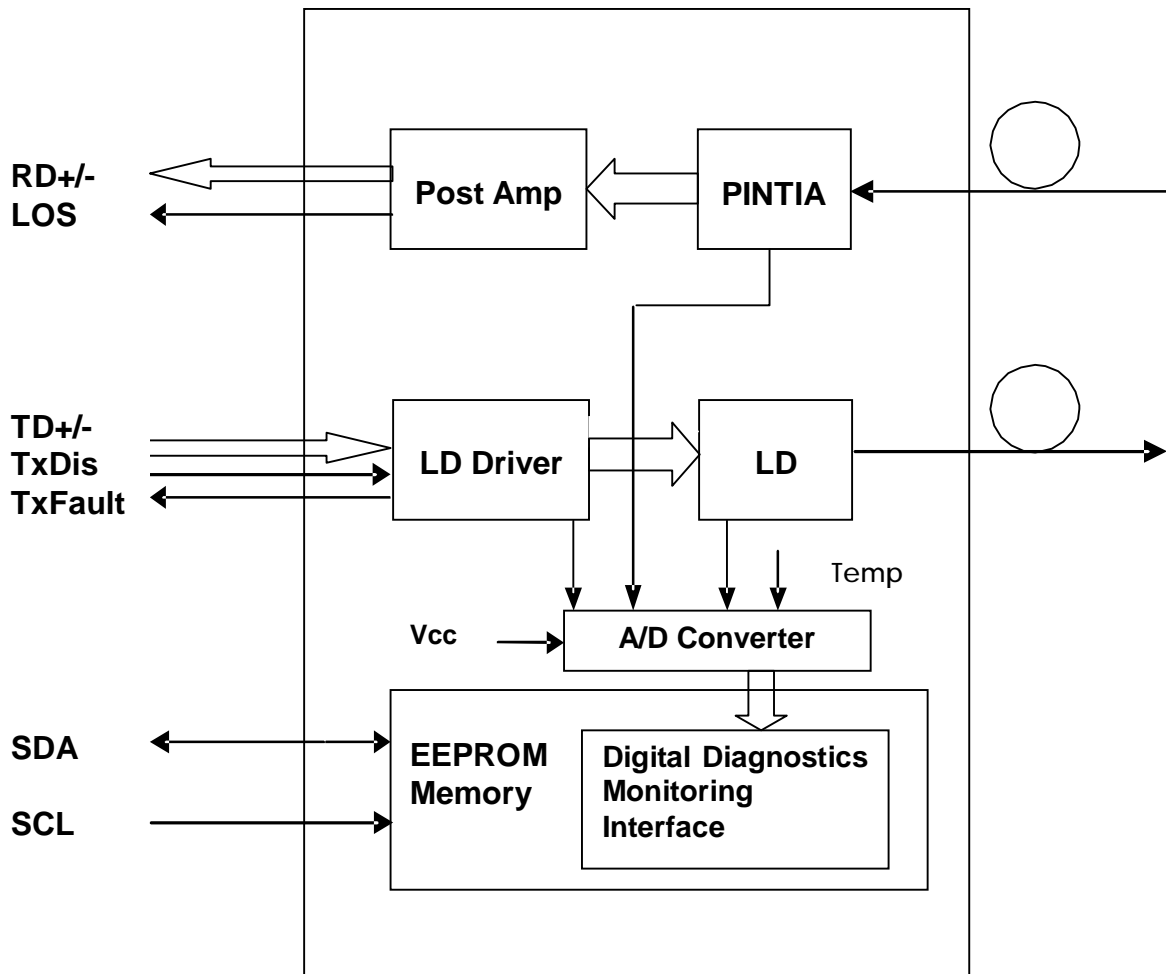


Figure 1: Modules functional Block Diagram

2. General Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Absolute Supply Voltage	Vcc_max	0	-	4.0	V	-
Operating Voltage	Vcc	3.135	-	3.465	V	-
Maximum Total Current	Icc	-	-	300	mA	-
Operating Case Temperature	Top	-5	-	70	°C	1
Storage Temperature	Tst	-40	-	85	°C	-
Lead Soldering	T/Sec	-	-	260/10	°C/Sec	-

Note 1: Measured on top side front center of SFP module.

3. Transmitter Specifications

(Over Operating Case Temperature Range, Vcc = 3.135V to 3.465V)

Electrical Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Differential Data Input Swing	Vin,pp	300	-	1600	mV	-
Differential Input Impedance	Rin	95	100	105	ohm	-
Tx Disable Voltage	Vd	2.0	-	Vcc+0.3	V	-
Tx Enable Voltage	Ven	0	-	0.8	V	-
Optical Characteristics						
Optical Power	Pout	-12	-5	-3	dBm	1
Optical Extinction Ratio	ER	9	-	-	dB	-
Optical Wavelength	λ	1270	1310	1350	nm	-
	λ	1530	1550	1570	nm	-
Spectral Width (RMS)	σ_{RMS}	-	-	2.5	nm	FP
	σ_{RMS}	-	-	1.0	nm	DFB
Optical Power with TX off	Pout-dis	-	-	-45	dBm	-
Optical Reflectance	-	-	-	-12	dB	-
Optical Rise/Fall Time	tr/tf	-	-	135	ps	2
		-	-	270	ps	3
Total Jitter	JTX	-	-	70	ps	4
		-	-	135	ps	5
Relative Intensity Noise	RIN	-	-	-117	dB/Hz	-

Notes :

- Using 9/125 SMF
- Unfiltered, 20%~80% values. Measured with color bar test signal @2.97Gb/s and differential input data
- Unfiltered, 20%~80% values. Measured with color bar test signal @1.485Gb/s and differential input data
- Measured with color bar test signal @2.97Gb/s and differential input data (SMPTE 424M)
- Measured with color bar test signal @1.485Gb/s and differential input data (SMPTE 292M)

Laser Safety: All transceivers in this datasheet are Class I Laser products per FDA/CDRH and IEC-60825 standards. They must be operated under specified operating conditions.

4. Receiver Specifications

(Over Operating Case Temperature Range, Vcc = 3.135V to 3.465V)

Electrical Characteristics							
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes	
Output Differential Impedance	Rin	90	100	110	Ω	-	
Differential Data Output Swing	Vout,pp	600	-	1000	mV	-	
Rise/Fall Time	tr/tf	-	-	130	ps	1	
		-	-	1.5	ns	2	
SD Output Voltage High	Vsdh	2.4	-	Vcc	V	-	
SD Output Voltage Low	Vsdl	0	-	0.8	V	-	
Optical Characteristics							
Average Rx Sensitivity	@2.97Gb/s	RSENS1	-	-	-17	dBm	3
	@1.485Gb/s	SENSE2	-	-	-20	dBm	4
	@GbE	SENSE3	-	-	-20	dBm	5
Maximum Input Power	Pmax	-3	-	-	dBm	-	
Optical Center Wavelength	λc	1270	-	1610	nm	-	
Reflectance	-	-	-	-27	dB	-	
LOS Assert	LOS_A	-35	-	-	dBm	-	
LOS De-assert	LOS_D	-	-	-20	dBm	-	
LOS Hysteresis	-	0.3	1.5	6	dB	-	

Notes :

1. Unfiltered, 20%~80% values. Measured with color bar test signal @1.485Gb/s and 2.97Gb/s
2. Unfiltered, 20%~80% values. Measured with color bar test signal @143/177/270/360Mb/s
3. Test with pathological test pattern at 2.97Gb/s (SMPTE 424M)
4. Test with pathological test pattern at 1.485Gb/s (SMPTE 292M)
5. Measured at a BER of 10⁻¹² with GbE PRBS 2⁷-1

5. Pin Layout and Descriptions

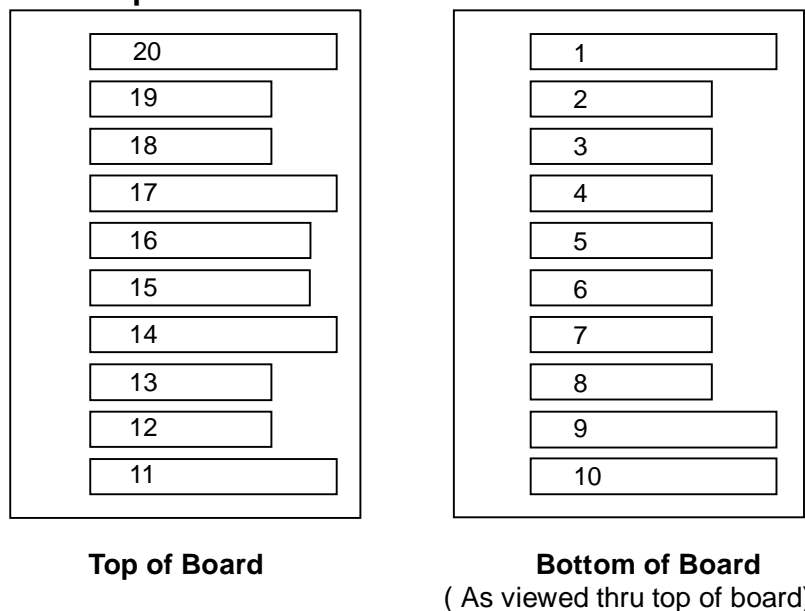


Figure 2: SFP Transceiver Electrical PIN Layout

5.1 Pin Descriptions of Transceiver

Pin	Symbol	Description	Plug Seq. *	Notes
1	Tx GND	Transmitter Ground	1	1
2	Tx Fault	Transmitter Fault Indication	3	2
3	Tx Disable	Transmitter Disable	3	3
4	MOD-DEF2	Module Definition 2	3	4
5	MOD-DEF1	Module Definition 1	3	4
6	MOD-DEF0	Module Definition 0	3	4
7	Rate-Select	No User Connection	3	10
8	LOS	Los of Signal	3	5
9	Rx GND	Receiver Ground	1	1
10	Rx GND	Receiver Ground	1	1
11	Rx GND	Receiver Ground	1	1
12	RD-	Inverted Received Data Out	3	-
13	RD+	Non-Inverted Received Data out	3	-
14	Rx GND	Receiver Ground	1	1
15	VccR	Receiver Power	2	3.3V±5%
16	VccT	Transmitter Power	2	3.3V±5%
17	Tx GND	Transmitter Ground	1	1
18	TD+	Non-Inverted Data In	3	-
19	TD-	Inverted Data In	3	-
20	Tx GND	Transmitter Ground	1	1

5.2 Pin Descriptions of Transmitter (two transmitters)

Pin	Symbol	Description	Plug Seq. *	Notes
1	Tx GND	Transmitter Ground	1	1
2	Tx Disable 2	Transmitter Disable 2	3	3
3	Tx Disable 1	Transmitter Disable 1	3	3
4	MOD-DEF2	Module Definition 2	3	4
5	MOD-DEF1	Module Definition 1	3	4
6	MOD-DEF0	Module Definition 0	3	4
7	Rate-Select	No User Connection	3	10
8	N/C	No User Connection	-	-
9	Tx GND	Transmitter Ground	1	1
10	Tx GND	Transmitter Ground	1	1
11	Tx GND	Transmitter Ground	1	1
12	TD2-	Inverted Data In	3	-
13	TD2+	Non-Inverted Data In	3	-
14	Tx GND	Transmitter Ground	1	1
15	VccT	Transmitter Power	2	3.3V±5%
16	VccT	Transmitter Power	2	3.3V±5%
17	Tx GND	Transmitter Ground	1	1
18	TD1+	Non-Inverted Data In	3	-
19	TD1-	Inverted Data In	3	-
20	Tx GND	Transmitter Ground	1	1

In case of one transmitter only, the second transmitter will not be populated.

5.3 Pin Descriptions of Receiver (two receivers)

Pin	Symbol	Description	Plug Seq. *	Notes
1	Rx GND	Receiver Ground	1	1
2	LOS 2	Los of Signal	3	5
3	N/C	No User Connection	-	-
4	MOD-DEF2	Module Definition 2	3	4
5	MOD-DEF1	Module Definition 1	3	4
6	MOD-DEF0	Module Definition 0	3	4
7	Rate-Select	No User Connection	3	10
8	LOS 1	Los of Signal	3	5
9	Rx GND	Receiver Ground	1	1
10	Rx GND	Receiver Ground	1	1
11	Rx GND	Receiver Ground	1	1
12	RD1-	Inverted Receiver Data Out	3	-
13	RD1+	Non-Inverted Receiver Data Out	3	-
14	Rx GND	Receiver Ground	1	1
15	VccR	Receiver Power	2	3.3V±5%
16	VccR	Receiver Power	2	3.3V±5%
17	Rx GND	Receiver Ground	1	1
18	RD2+	Non-Inverted Receiver Data Out	3	-
19	RD2-	Inverted Receiver Data out	3	-
20	Rx GND	Receive Ground	1	1

In case of one receiver only, the second receiver will not be populated.

*Plug Seq.: Pin engagement sequence during hot plugging

Notes:

- Circuit ground is internally isolated from frame ground. Tx GND and Rx GND may be internally isolated within the transceiver module.
- TX Fault is an open collector/drain output, which should be pulled up with a 4.7K–10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7–10 KΩ resistor. Its states are:
 - Low (0 – 0.8V): Transmitter on
 - (>0.8, < 2.0V): Undefined
 - High (2.0 – 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled
- Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K –10KΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
 - Mod-Def 0 is grounded by the module to indicate that the module is present
 - Mod-Def 1 is the clock line of two wire serial interface for serial ID
 - Mod-Def 2 is the data line of two wire serial interface for serial ID
- LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K–10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- VeeR and VeeT may be internally connected within the SFP module.
- RD-/+ : These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.
- VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may

be internally connected within the SFP transceiver module.

9. TD-/+ : These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.
10. The modules operate at HD-SDI, 3G-SDI, SONET /SDH data rates, 1x and 2x Fiber Channel, Gigabit Ethernet data rates, and respective protocols without active control

5.4 Optical Connector

An LC connector with PC/UPC is required for each port.

6. Package Outline Drawings

Dimensions are in millimeters (inches)

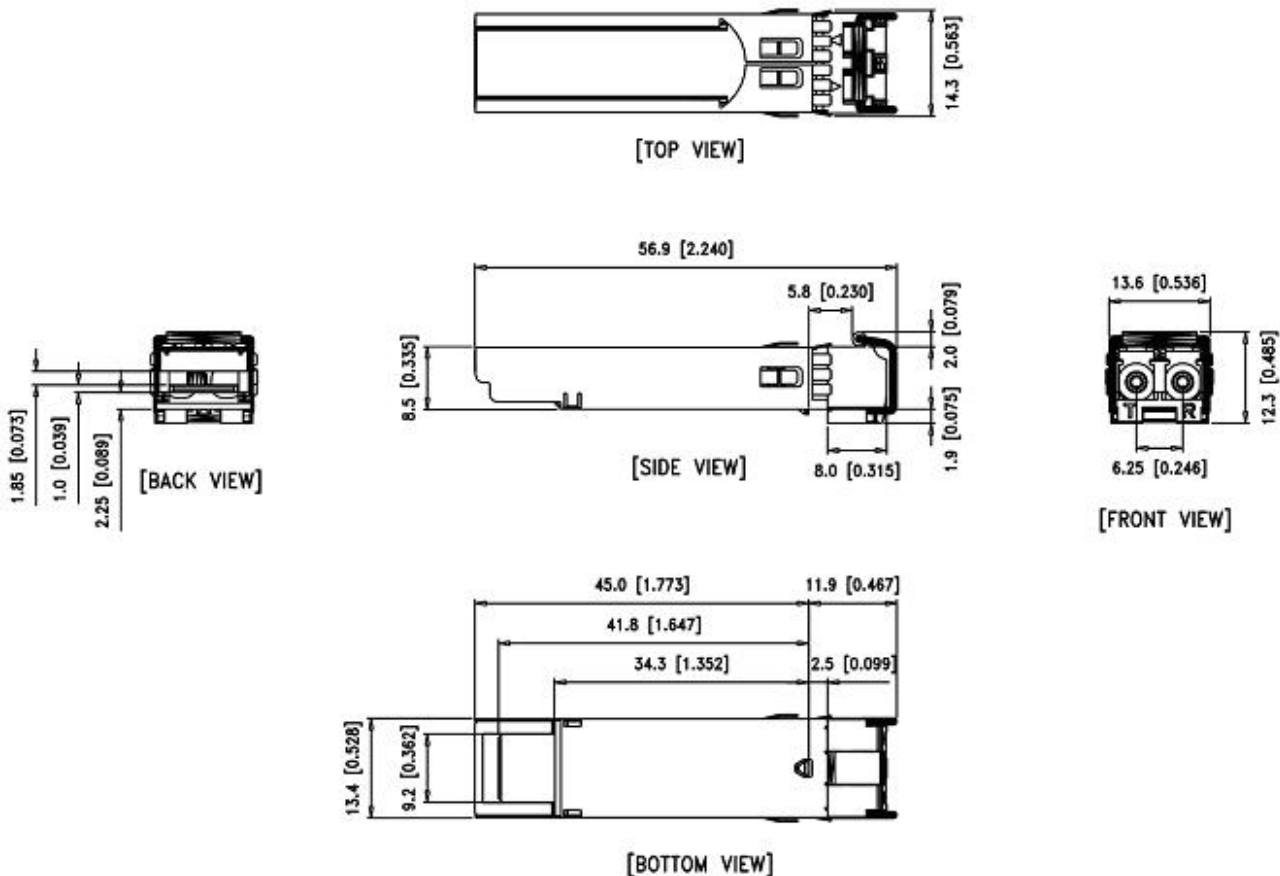
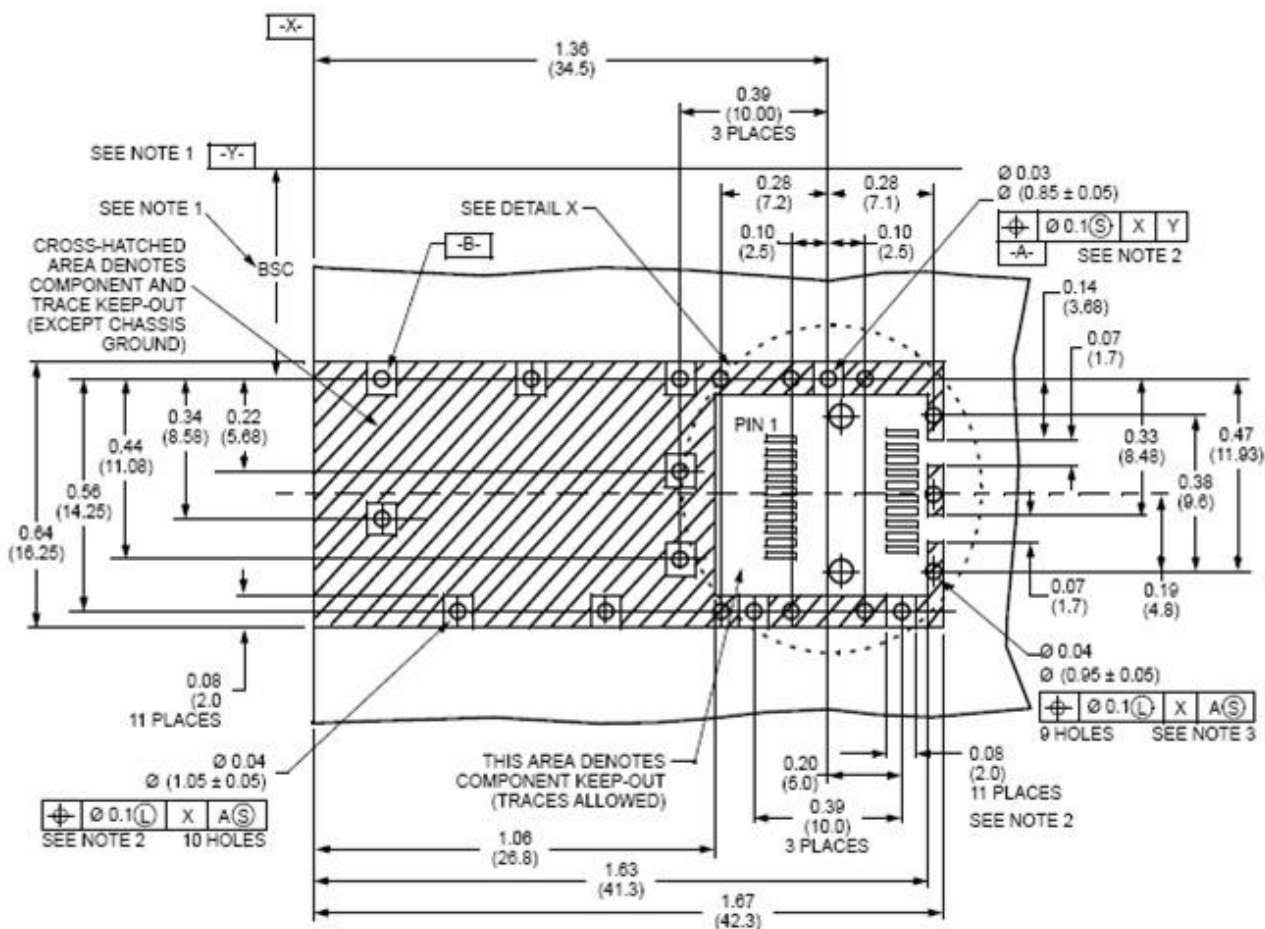


Figure 3: Packaging Outline

7. PCB layout and Bezel recommendation

Dimensions are in inches (millimeters)

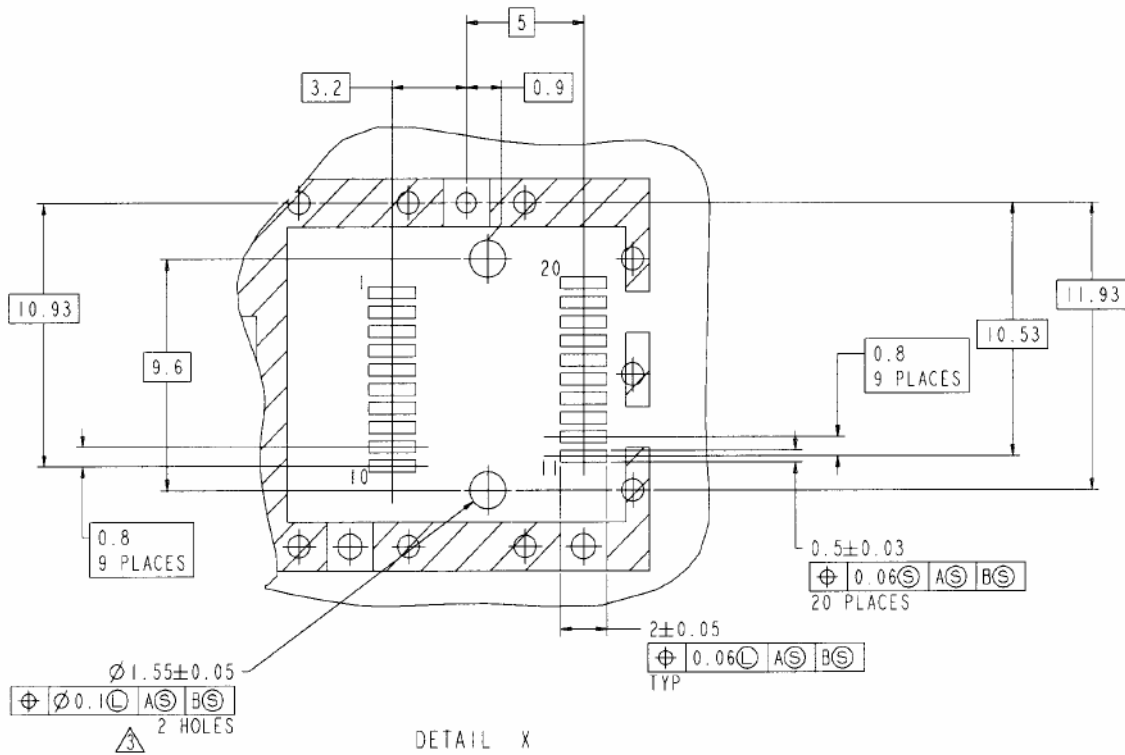


Notes:

1. Datum and basic dimensions established by customer.
2. Pads and via are chassis ground, 11 locations
3. Thru holes, plating optional.

Figure 4: PCB layout and Bezel recommendation

7. PCB layout and Bezel recommendation (continued)



Notes: Thru holes, plating optional.

Figure 5: PCB layout and Bezel recommendation

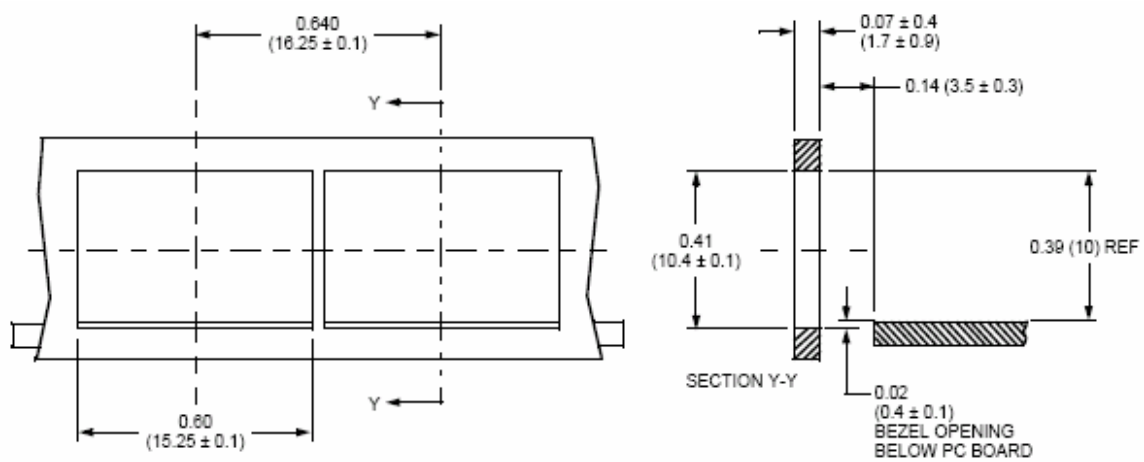


Figure 6: Recommended Panel Opening

8. Power Supply Information

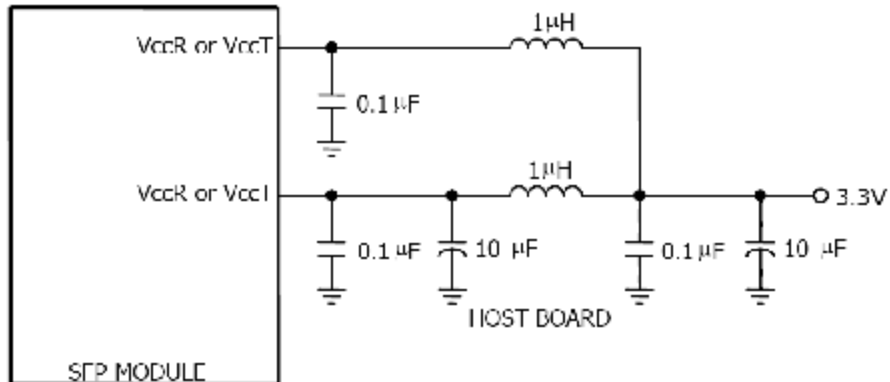


Figure 7: Recommended Host Board Supply Filtering Network

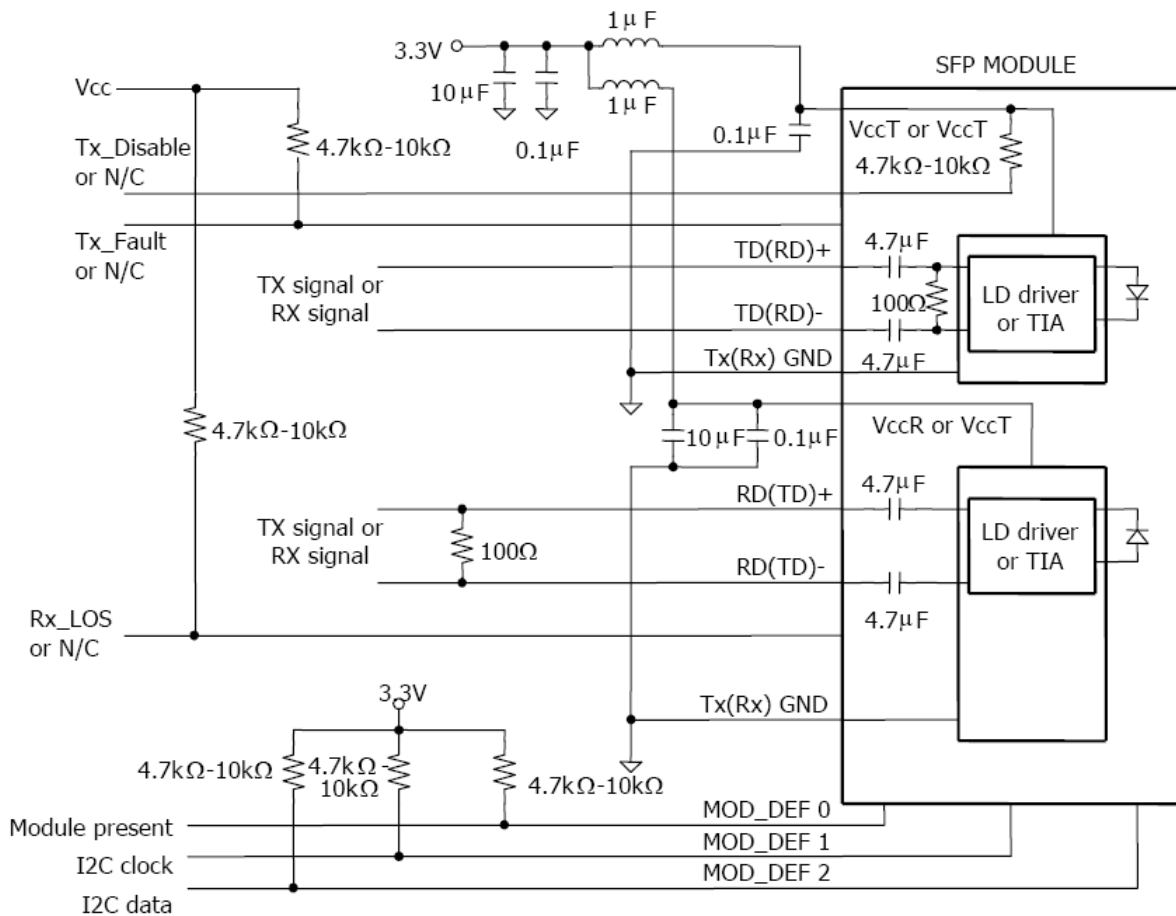


Figure 8: SFP Host Board Schematic

9. Digital Diagnostic Monitoring Interface

The modules Digital Diagnostics Monitoring Interface (DDMI) memory map is shown in the following figure. The contents of the memory map are described in details on the following pages.

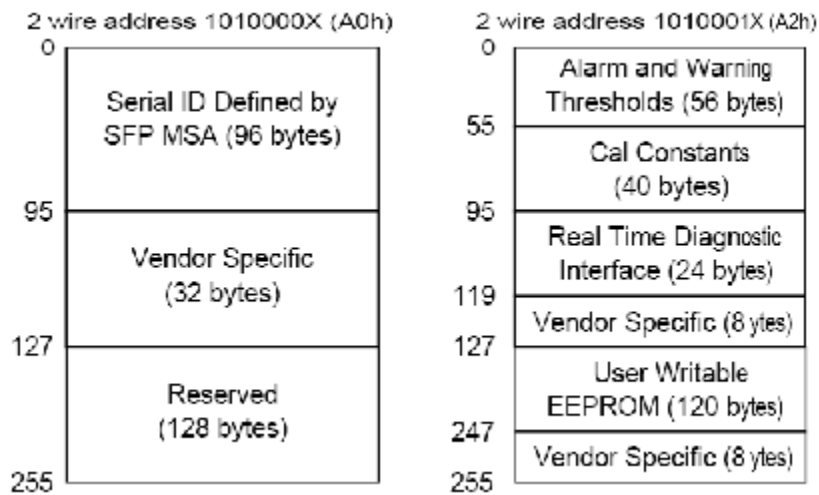


Figure 9: Modules Memory Map

9.1 EEPROM serial ID memory contents (A0h)

Addr	Hex	ASCII	Description	Addr	Hex	ASCII	Description	Addr	Hex	ASCII	Description	
0	XX		See table 9.1.1	32	20		Vendor name	64	00		Options	
1	04		SFP function is defined by serial ID only	33	20			65	1A			
2	07		LC connector	34	20			66	00			BR, Max
3	41		SMPTE259M/344M/292M/424M and 297M	35	20			67	00			BR, Min.
4	00		Reserved(SFP MSA does not specify SMPTE compliance codes)	36	00		Reserved	68	4D	M	Vendor Serial number	
5	00			37	00		Vendor UNI	69	44	D		
6	00			38	00			70	XX			
7	00			39	00		Vendor part number	71	XX			
8	00			40	53	S		72	XX			
9	00			41	46	F		73	XX			
10	00			42	50	P		74	XX			
11	03			NRZ	43	31	1		75	XX		
12	1E			BR in 100Mbps	44	33	3		76	XX		
13	00			Reserved	45	31	1		77	XX		
14	0A		Length(9u)*Km	46	30	0		78	XX			
15	00		Length(9u)*100m	47	2D	-		79	XX			
16	00		Length(50u)*10m	48	53	S		80	XX			
17	00		Length(62.5u)*10m	49	4D	M		81	XX			
18	00		Length(Copper)	50	2D	-		82	XX			
19	00		Reserved	51	53	S		83	XX			
20	4D	M	Vendor name	52	52	R		84	XX		Vendor data code	
21	75	u		53	2D	-		85	XX			
22	6C	l		54	33	3		86	XX			
23	74	t		55	47	G		87	XX			
24	69	i		56	31	1	Vendor reversion Ver 1.0	88	XX			
25	64	d		57	2E	.		89	XX			
26	79	y		58	30	0		90	XX			
27	6E	n		59	20			91	XX			
28	65	e			60	05		Wavelength 1310nm	92	XX		Diag. Monitoring type, see table 9.1.1
29	20				61	1E			93	XX		Enhanced options, see table 9.1.1
30	20				62	00		Reserved	94	02		SFF-8472 compliance
31	20				63	XX		CC_BASE(0-62)	95	XX		CC_EXT(64-94)

96-127: 00, Vendor specific
 128-255: 00, Reserved
 XX: denotes hex values which varies from module to module

9.1.1 EEPROM serial ID memory contents (A0h)

Modules Type	A0h address		
	0	92	93
Transceiver	03h	28h	F0h
Dual Transmitters	81h	20h	E0h
Dual Receivers	82h	28h	E0h
Single Transmitter	83h	20h	90h
Single Receiver	84h	28h	90h

9.2 EEPROM serial ID memory contents (A2h)

9.2.1 Alarm and Warning Thresholds

Addr. (DEC)	# Bytes	Name	Value	
00-01	2	Temp high alarm	+90°C	
02-03	2	Temp low alarm	-20°C	
04-05	2	Temp high warning	+85°C	
06-07	2	Temp low warning	-10°C	
08-09	2	Supply voltage high alarm	+3.6V	
10-11	2	Supply voltage low alarm	+3.0V	
12-13	2	Supply voltage high warning	+3.47V	
14-15	2	Supply voltage low warning	+3.14V	
16-17	2	Bias high alarm	Note 1	
18-19	2	Bias low alarm		
20-21	2	Bias high warning		
22-23	2	Bias low warning		
24-25	2	Tx power high alarm		
26-27	2	Tx power low alarm		
28-29	2	Tx power high warning		
30-31	2	Tx power low warning		
32-33	2	Rx power high alarm		0dBm
34-35	2	Rx power low alarm		-40dBm
36-37	2	Rx power high warning	-3dBm	
38-39	2	Rx power low warning	-30dBm	
40-55	16	Reserved		

Note 1: Varies from module to module

9.2.2 Calibration Constants for Internal Calibration

Addr. (DEC)	# Bytes	Name	Description	Value
56-59	4	Rx_PWR(4)	Single precision floating point calibration data, Rx optical power	0
60-63	4	Rx_PWR(3)		0
64-67	4	Rx_PWR(2)		0
68-71	4	Rx_PWR(1)		1
72-75	4	Rx_PWR(0)		0
76-77	2	Tx_I(Slope)	Fixed decimal (unsigned) calibration data, laser bias current	1
78-79	2	Tx_I(Offset)	Fixed decimal (signed two's complement) calibration data, laser bias current	0
80-81	2	Tx_PWR(Slope)	Fixed decimal (unsigned) calibration data, transmitter coupled output power	1
82-83	2	Tx_PWR(Offset)	Fixed decimal (signed two's complement) calibration data, transmitter coupled output power.	0
84-85	2	T(Slope)	Fixed decimal (unsigned) calibration data, internal module temperature	1
86-87	2	T(Offset)	Fixed decimal (signed two's complement)	0

			calibration data, internal module temperature	
88-89	2	V(Slope)	Fixed decimal (unsigned) calibration data, internal module supply voltage	1
90-91	2	V(Offset)	Fixed decimal (signed two's complement) calibration data, internal module supply voltage	0
92-94	3	Reserved	Reserved	
95	1	Check sum	Byte 95 contains the low order 8 bits of the sum of bytes 0-94	

9.2.3 A/D Values and Status Bits

Addr. (DEC)	Bit	Name	Description
96	All	Temperature MSB	Internally measured module temperature, see table 9.2.3.1 to 9.2.3.4
97	All	Temperature LSB	
98	All	Vcc MSB	Internal measured supply voltage, see table 9.2.3.1 to 9.2.3.4
99	All	Vcc LSB	
100	All	Tx bias MSB	Internal measured Tx bias current, see table 9.2.3.1 to 9.2.3.4
101	All	Tx bias LSB	
102	All	Tx power MSB	Measured TX output power, see table 9.2.3.1 to 9.2.3.4
103	All	Tx power LSB	
104	All	Rx power MSB	Measured RX input power, see table 9.2.3.1 to 9.2.3.4
105	All	Rx power LSB	
106	All	Reserved MSB	Reserved for 1 st future definition of digitized analog input
107	All	Reserved LSB	Reserved for 1 st future definition of digitized analog input
108	All	Reserved MSB	Reserved for 2 nd future definition of digitized analog input
109	All	Reserved LSB	Reserved for 2 nd future definition of digitized analog input
Optional status/control bits			
110	7	Reserved	Reserved
110	6	Soft TX disable	Read/write bit that allows software disable of laser. Writing "1" disables laser.
110	5	Reserved	Reserved
110	4	Reserved	Reserved
110	3	Reserved	Reserved
110	2	TX fault	Tx fail status:1=TX fail; 0=TX normal
110	1	LOS	Signal detect statue. Active high
110	0	Reserved	Reserved
111	7-0	reserved	Reserved

9.2.3.1 Transceiver

A2h address	Parameter	Calibration	Accuracy	Range
96-97	Temperature	Internal	+/- 3°C	Note 1
98-99	Vcc	Internal	+/- 3%	3.135 to 3.465
100-101	Tx bias	Internal	+/- 10%	Note 2
102-103	Tx power	Internal	+/- 3dB	-12 to -3dBm
104-105	Rx Power	Internal	+/- 3dB	-20 to -3dBm

Note:

1. Junction temperature of temperature sensing device
2. Specified by nominal value

9.2.3.2 Transmitter only

A2h address	Parameter	Calibration	Accuracy	Range
96-97	Temperature	Internal	+/- 3°C	Note 1
98-99	Vcc	Internal	+/- 3%	3.135 to 3.465
100-101	Tx bias	-	-	Note 2

102-103	Tx 1 power	Internal	+/- 3dB	-12 to -3dBm
104-105 ³	Tx 2 power	Internal	+/- 3dB	-12 to -3dBm

Notes:

1. Junction temperature of temperature sensing device
2. In case of transmitter only, transmitter bias information is not provided
3. In case of transmitter only, addresses 104 and 105 provide the power monitor of transmitter 2

9.2.3.3 Receiver only

A2h address	Parameter	Calibration	Accuracy	Range
96-97	Temperature	Internal	+/- 3°C	Note 1
98-99	Vcc	Internal	+/- 3%	3.135 to 3.465
100-101	Tx bias	-	-	Note 2
102-103 ³	Rx 2 Power	Internal	+/- 3dB	-20 to -3dBm
104-105	Rx 1 Power	Internal	+/- 3dB	-20 to -3dBm

Notes:

1. Junction temperature of temperature sensing device
2. In case of receiver only, information in addresses 100 and 101 is not provided
3. In case of receiver only, addresses 102 and 103 provide the power monitor of receiver 2

9.2.3.4 Functional comparison Chart of Diagnostic Monitoring

A2h address	TRX	TX Only	RX Only
96-97	Temperature	Temperature	Temperature
98-99	Vcc	Vcc	Vcc
100-101	Tx bias	N/A	N/A
102-103	Tx power	Tx 1 power	Rx 2 Power
104-105	Rx Power	Tx 2 power	Rx 1 Power

9.2.4 Alarm and Warning Flags

Addr. (DEC)	Bit	Name	Description
112	7	Temp high alarm	Set when internal temperature exceeds high alarm level
	6	Temp low alarm	Set when internal temperature below low alarm level
	5	Vcc high alarm	Set when internal supply voltage exceeds high alarm level
	4	Vcc low alarm	Set when internal supply voltage below low alarm level
	3	Tx bias high alarm	Set when internal Tx bias current exceeds high alarm level
	2	Tx bias low alarm	Set when internal Tx bias current below low alarm level
	1	Tx power high alarm	Set when internal Tx output power exceeds high alarm level
	0	Tx power low alarm	Set when internal Tx output power below low alarm level
113	7	Rx power high alarm	Set when internal received power exceeds high alarm level
	6	Rx power low alarm	Set when internal received power below low alarm level
	5-0	Reserved alarm	
114	All	Reserved	
115	All	Reserved	
116	7	Temp high warning	Set when internal temperature exceeds high warning level
	6	Temp low warning	Set when internal temperature below low warning level
	5	Vcc high warning	Set when internal supply voltage exceeds high warning level
	4	Vcc low warning	Set when internal supply voltage below low warning level
	3	Tx bias high warning	Set when internal Tx bias current exceeds high warning level
	2	Tx bias low warning	Set when internal Tx bias current below low warning level
	1	Tx power high	Set when internal Tx output power exceeds high warning

		warning	level
	0	Tx power low warning	Set when internal Tx output power below low warning level
117	7	Rx power high warning	Set when internal received power exceeds high warning level
	6	Rx power low warning	Set when internal received power below low warning level
	5-0	Reserved warning	
118	All	Reserved	
119	all	Reserved	

9.2.5 Vendor Specific Memory Addresses

Addr. (DEC)	# Bytes	Name	Description
120-127	8	Vendor specific	Vendor specific

9.2.6 User EEPROM

Addr. (DEC)	# Bytes	Name	Description
128-247	120	User EEPROM	User writable EEPROM
248-255	8	Vendor specific	Vendor specific control functions

10. Regulatory Compliance

The modules are complied with Electromagnetic Compatibility (EMC) and international safety requirements and standards. EMC performance is dependent on the overall system design.

The modules are lead-free and RoHs-compliant per Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

11. Ordering Information

11.1 Transceiver (FP Laser for 10Km)

Part Number	Oper. Case Temp.	TX/RX	Latch Color	Link Budget
GSFP-48V-10	-5°C ~ +70°C	1310nm FP/PIN	Yellow	5dB

11.2 Transmitter only (FP Laser for 10Km)

Part Number	Oper. Case Temp.	TX	Latch Color	Output Power	No. of Tx
GSFP-48VT-10-2	-5°C ~ +70°C	1310nm FP	Black	-12dBm	2
GSFP-48VT-10	-5°C ~ +70°C	1310nm FP	Black	-12dBm	1

11.3 Receiver only

Part Number	Oper. Case Temp.	RX	Latch color	Sensitivity	No. of Rx
GSFP-48VR-2	-5°C ~ +70°C	1270-1610nm	White	-17dBm	2
GSFP-48VR	-5°C ~ +70°C	1270-1610nm	White	-17dBm	1

Notes:

1. 1310nm DFB (20/40Km), 1550nm DFB (60Km/80Km), 16 channel CWDM wavelengths are available
2. Customer specific optical wavelength, output power and sensitivity with APD photodiode can be supported by request
3. The distance and link budget are under worst-case conditions and 3Gbps video pathological signal

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