Small Form Factor Pluggable Transceiver for Gigabit Ethernet with Digital Diagnostic Function

FEATURES

- **Compliant with SFP Transceiver SFF-8472 MSA specification**
- **Compliant with Specifications for IEEE 802.3z/Gigabit Ethernet**
- **LCP-1250Bxxx compliant with the 1.0625GBd Fiber Channel 100-SM-LC-L FC-PI Rev.13**
- **LCP-1250Axxx compliant with the 1.0625GBd Fiber Channel FC-PI 100-M5-SN-I Rev.13**
- **Compliant with Industry Standard RFT Electrical Connector and Cage**
- **Single + 3.3V Power Supply and TTL Logic Interface**
- **EEPROM with Serial ID Functionality**
- **Laser Class 1 Product which comply with the requirements of IEC 60825-1 and IEC 60825-2**
- **Duplex LC Connector interface**

Description

The LCP-1250xxx series are hot pluggable 3.3V Small-Form-Factor transceiver modules designed expressly for high-speed communication applications that require rates up to 1.25Gb/s. The transceiver is data rate transparent, which means it can support GbE (1.25Gb/s) as well as 1x Fiber channel (1.062Gb/s) operations

The LCP-1250 series are designed to be compliant with SFF-8472 SFP Multi-source Agreement (MSA) with five digital monitoring functions: *Temperature, V_{CC}, TX optical power, TX laser bias current,* and *RX received optical power*.

The post-amplifier of the LCP-1250 series also includes a LOS (Loss of Signal) circuit that provides a TTL logic-high output when the received optical level is bellow a preset LOS Assert threshold.

Applications

- Gigabit Ethernet
- Switch to Switch interface
- Switched backplane applications
- File server interface

Performance

- LCP-1250A4FDM(H) Data Link up to 550m in 50/125um Multi Mode Fiber
- LCP-1250B4QDM(T) Data Link up to 10km in 9/125um Signal Mode Fiber

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40		85	ºC	
Supply Voltage	Vcc	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Ambient Operating Temperature	TA	0		70	ºC	1
Supply Voltage	Vcc	3.135		3.465	V	

Electrical Characteristics

(T_A=0 ºC to 70 ºC, V_{CC}=3.135V to 3.465V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Total Supply Current LCP-1250Axxx LCP-1250Bxxx	ICCT			 220 250	mA	
Transmitter						
Transmitter Differential Input Voltage	VDT	0.5		2.4	V	2
Transmitter Disable Input-High	V_{DISH}	2		V_{CC}+0.3	V	
Transmitter Disable Input-Low	V_{DISL}	0		0.8	V	
Transmitter Fault Pull up Resistor	R_{TX_FAULT}	4.7		10	kΩ	3
Transmitter Fault Output-High	V_{TXFH}	2		V_{CC}+0.3	V	
Transmitter Fault Output-Low	V_{TXFL}	0		0.8	V	
Receiver						
Receiver Differential Output Voltage	VDR	0.37	0.7	2	V	4
Receiver LOS Load	R_{RXLOS}	4.7		10	kΩ	3
LOS Output Voltage-Low	V_{LOSH}	2		V_{CC}+0.3	V	
LOS Output Voltage-High	V_{LOSL}	0		0.8	V	
Output Data Rise/Fall Time	t_r/t_f			400	psec	5

Notes:

1. Extended temperature range available.
2. Internally AC coupled and terminated to 100 Ohm differential load.
3. Pull up to V_{CC} on host Board
4. Internally AC coupled, but requires a 100 Ohm differential termination at or internal to Serializer/ Deserializer.
5. These are 20%~80% values

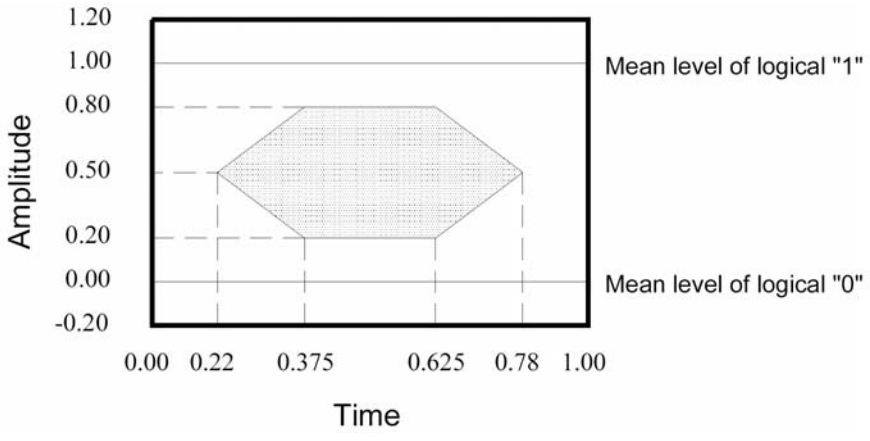
Optical Characteristics of LCP-1250A4FDM(H)

(T_A=0 ºC to 70 ºC, V_{CC}=3.3V±5%, Data Rate=1.25Gb/sec, PRBS=2^7-1 NRZ, 50/125um MMF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Output Optical Power (Avg.)	PO	-9.5		-4	dBm	
Optical Extinction Ratio		9			dB	
Center Wavelength	λ C	830	850	860	nm	
Spectral Width (RMS)	σ			0.85	nm	
Optical Rise/Fall Time	t_r			320	psec	1
Relative Intensity Noise	RIN			-117	dB/Hz	
Output Eye	Complies with the IEEE 802.3z/D2 specification, and is class 1 laser eye safety					
Receiver						
Sensitivity (Avg.)	PIN			-17	dBm	2
Input Optical Wavelength	λ		850		nm	
LOS-Asserted (Avg.)	PA			-17	dBm	
LOS-De-asserted (Avg.)	PD	-30			dBm	
LOS-Hysteresis	PA-PD	0.5		4	dB	
Overload	P_O	-4			dBm	

Notes:

1. These are 20%~80% values
2. The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 1250Mb/s, 2^7-1 PRBS.



Mask of the eye diagram for the optical transmit signal

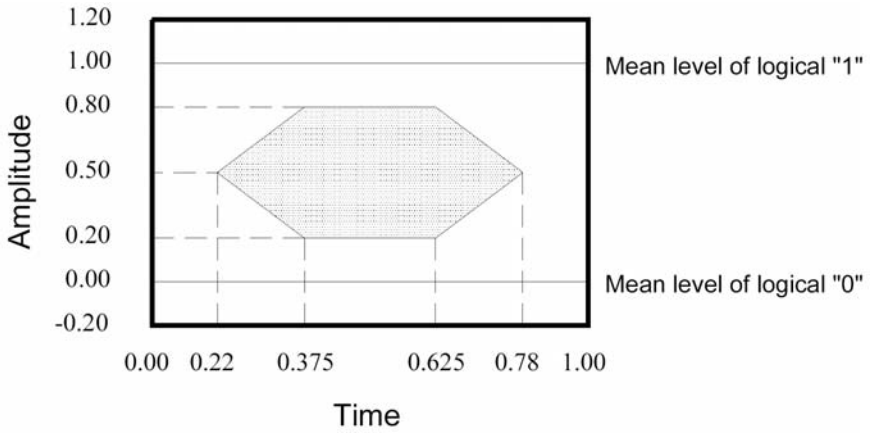
Optical Characteristics of LCP-1250B4QDM(T)

(T_A=0 ºC to 70 ºC, V_{CC}=3.3V±5%, Data Rate=1.25Gb/sec, PRBS=2^7-1 NRZ, 9/125um SMF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Output Optical Power (Avg.)	P_O	-9.5		-3	dBm	
Optical Extinction Ratio		9			dB	
Center Wavelength	λ_C	1270	1310	1355	nm	
Spectral Width	σ			4	nm	
Optical risetime/falltime	t_r/t_f			320	psec	1
Relative Intensity Noise	RIN			-120	dB/Hz	
Output Eye	Complies with the IEEE 802.3z/D2 specification, and is class 1 laser eye safety					
Receiver						
Sensitivity (Avg.)	P_{IN}			-19	dBm	1
Input Optical Wavelength	λ		1310		nm	
LOS-Asserted (Avg.)	P_A			-19	dBm	2
LOS-De-asserted (Avg.)	P_D	-30			dBm	2
LOS-Hysteresis	P_A-P_D	0.5		3	dB	
Overload	P_O	0			dBm	

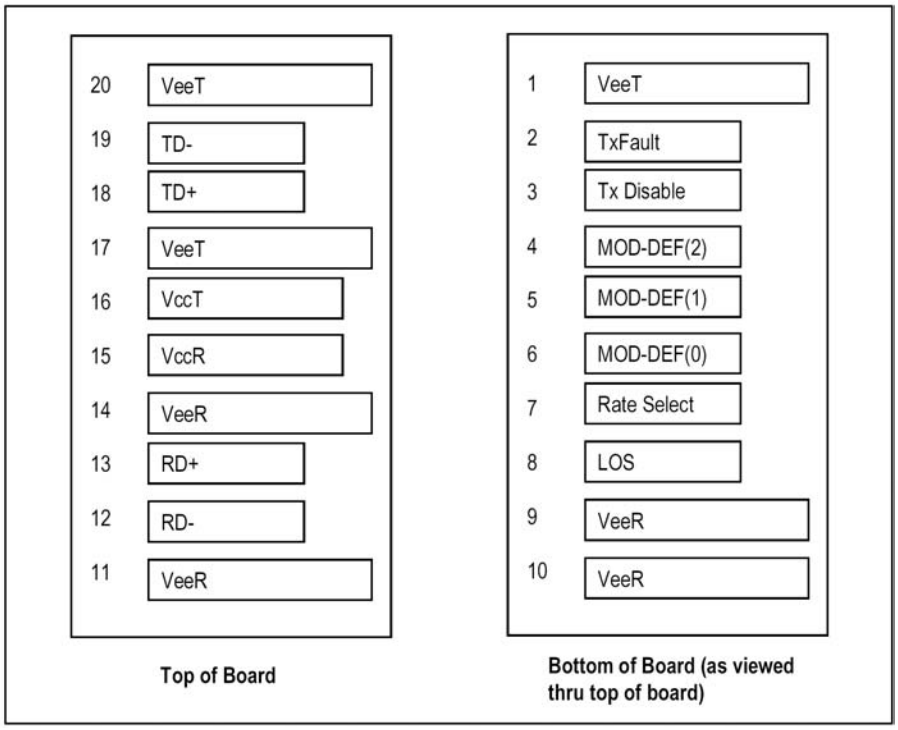
Notes:

1. These are unfiltered 20%~80% values
2. The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 1.25Gb/s, 2^7-1 PRBS and ER=9dB.



Mask of the eye diagram for the optical transmit signal

SFP Transceiver Electrical Pad Layout



Pin Function Definitions

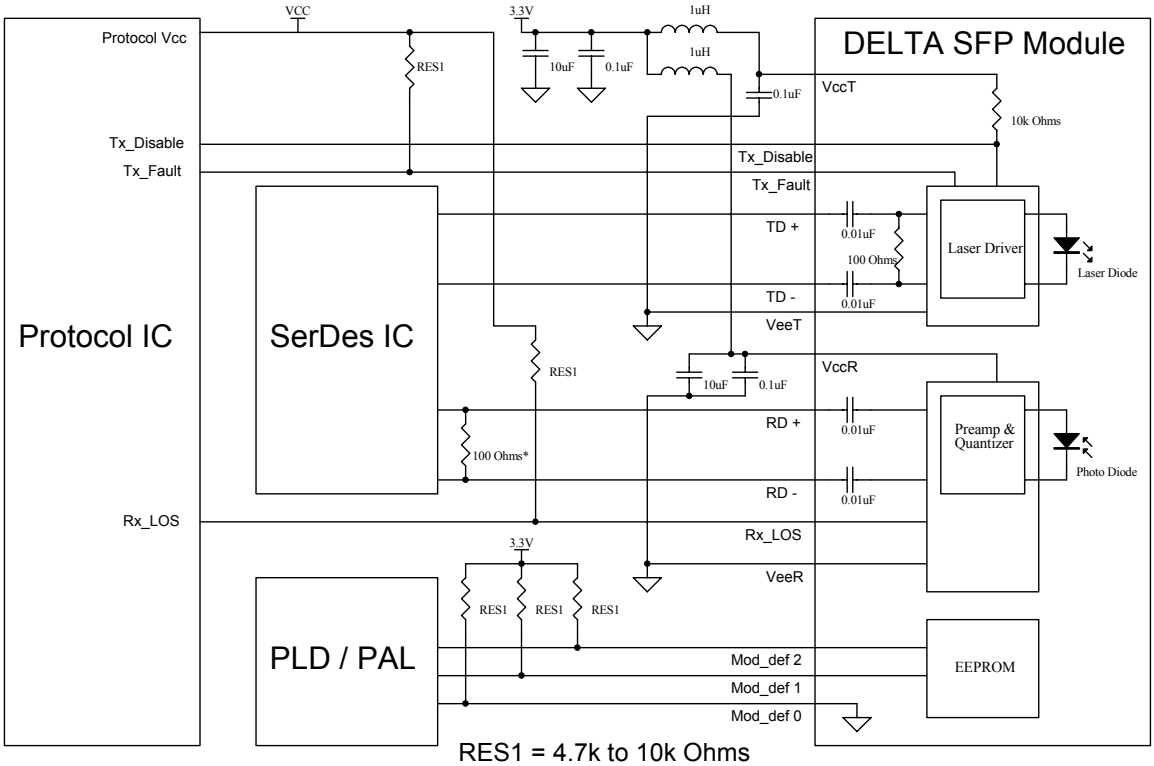
Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2 Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, 2 wire serial ID interface
5	MOD-DEF1	Module Definition 1	3	Note 3, 2 wire serial ID interface
6	MOD-DEF0	Module Definition 0	3	Note 3, Grounded in Module
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Plug Seq.: Pin engagement sequence during hot plugging.

Notes:

1) 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.
2) 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 K Ω 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
3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩresistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). 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
4) 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.
5) VeeR and VeeT may be internally connected within the SFP module.
6) 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. The voltage swing on these lines will be between 370 and 2000 mV differential (185 – 1000 mV single ended) when properly terminated.
7) 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 300 mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than ĩ=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 30 mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200 mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600 mV single-ended) be used for best EMI performance.

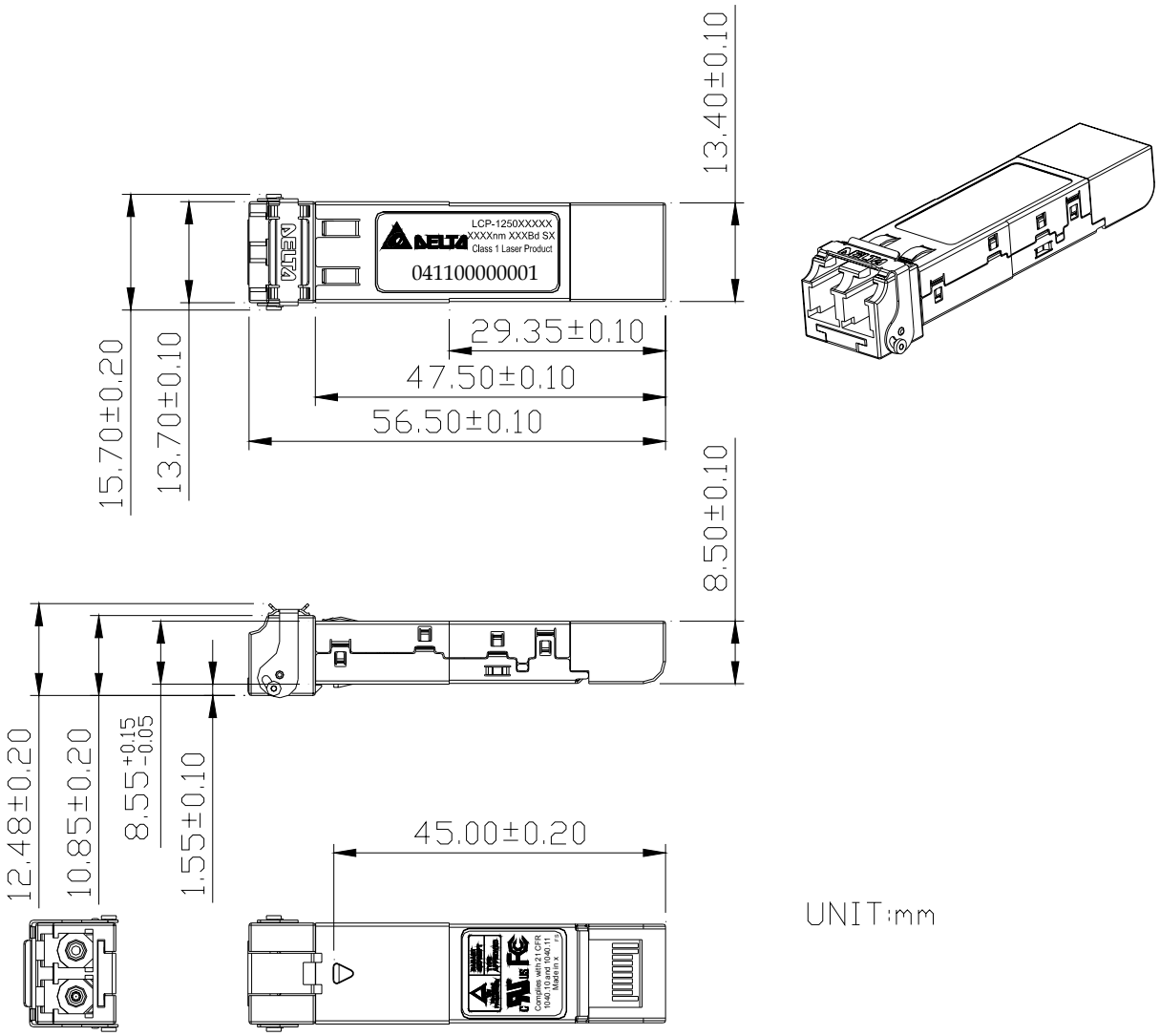
Recommend Circuit Schematic



RES1 = 4.7k to 10k Ohms

* Depands on SerDes IC used

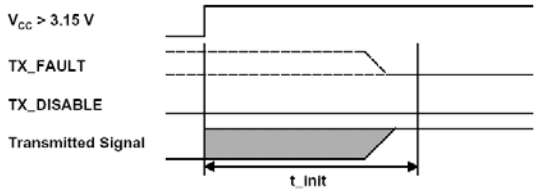
Package Outline Drawing



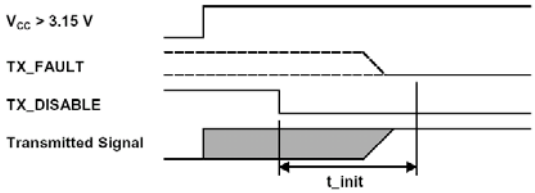
SFP timing parameters for SFP management

Parameter	Symbol	Min.	Max.	Unit	Unit Conditions
TX_DISABLE Assert time	t_off		10	μsec	Time from rising edge of TX_DISABLE to when the optical output falls below 10% of nominal
TX_DISABLE Negate time	t_on		1	msec	Time from falling edge of TX_DISABLE to when the modulated optical output rises above 90% of nominal
Time to initialize, including reset of TX_FAULT	t_init		300	msec	From power on or negation of TX_Fault using TX Disable.
TX Fault Assert Time	t_fault		100	μsec	Time from fault to TX fault on.
TX_DISABLE to reset	t_rest	10		μsec	Time TX Disbale must be held high to reset TX_Fault
LOS Assert Time	t_loss_on		100	μsec	Time from LOS state to Rx LOS assert
LOS Deassert Time	t_loss_off		100	μsec	Time from non-LOS state to Rx LOS deassert
Serial ID Clock Rate	f_serial_clock		100	kHz	

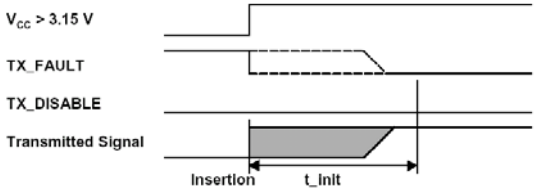
SFP timing parameters:



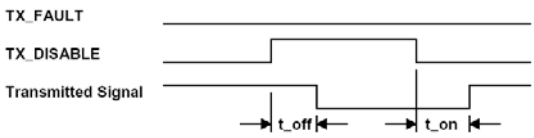
Power on initialization of SFP transceiver, TX_DISABLE negated



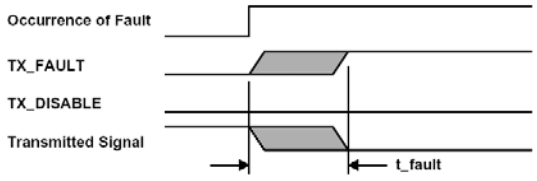
Power on initialization of SFP, TX_DISABLE asserted
Initialization during hot plugging of SFP TRANSCEIVER.



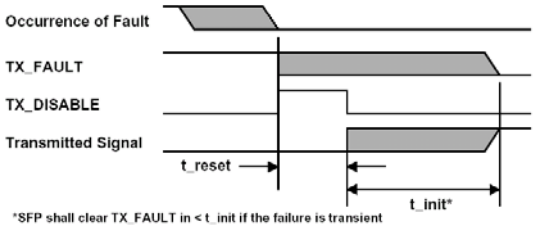
Example of initialization during hot plugging, TX_DISABLE negated.



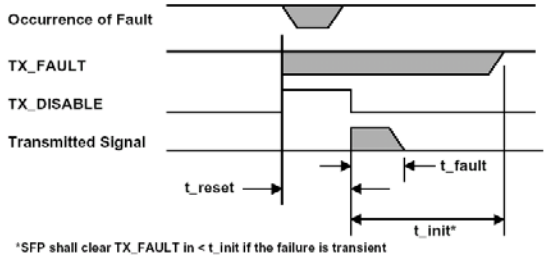
SFP TX_DISABLE timing during normal operation.



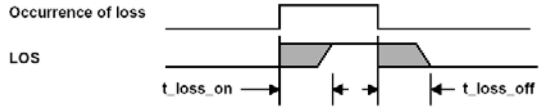
Detection of transmitter safety fault condition



Successful recovery from transient safety fault condition



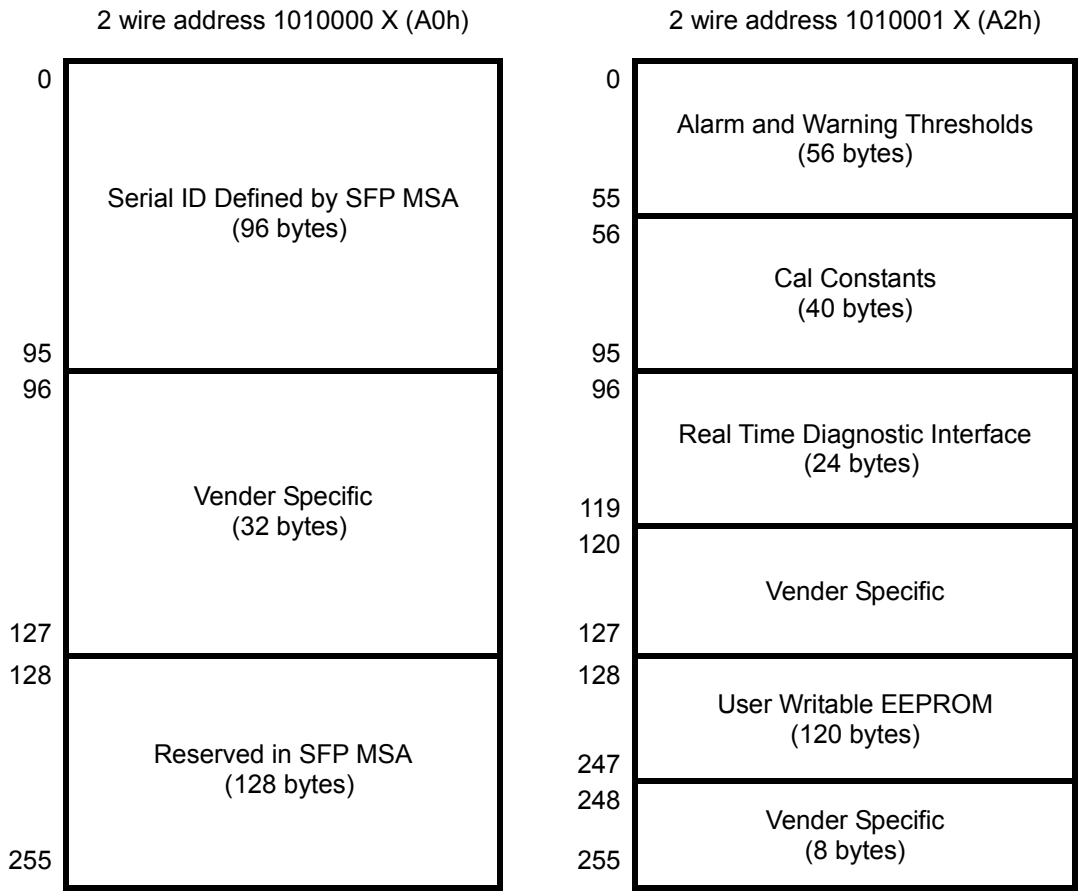
Unsuccessful recovery from safety fault condition



Timing of LOS detection

Enhanced Digital Diagnostic Interface

The memory map in the following describes an extension to the memory map defined in SFP MSA. The enhanced interface uses the two wire serial bus address 1010001X(A2h) to provide diagnostic information about the module's present operating conditions.



Digital Diagnostic Memory Map Specific Data Field Descriptions

LCP-1250A4FDM EEPROM Serial ID Memory Contents (2-Wire Address A0h)

Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII
00	03		25	20		50	46	F	75	SN		100	00		125	00	
01	04		26	20		51	44	D	76	SN		101	00		126	00	
02	07		27	20		52	4D	M	77	SN		102	00		127	00	
03	00		28	20		53	20		78	SN		103	00				
04	00		29	20		54	20		79	SN		104	00				
05	00		30	20		55	00		80	SN		105	00				
06	01		31	20		56	30		81	SN		106	00				
07	20		32	20		57	30		82	SN		107	00				
08	40		33	20		58	30		83	SN		108	00				
09	0C		34	20		59	30		84	DC	Note 2	109	00				
10	01		35	20		60	03		85	DC		110	00				
11	01		36	00		61	52		86	DC		111	00				
12	0D		37	00		62	00		87	DC		112	00				
13	00		38	00		63	3E		88	DC		113	00				
14	00		39	00		64	00		89	DC		114	00				
15	00		40	4C	L	65	1A		90	00		115	00				
16	37		41	43	C	66	05		91	00		116	00				
17	1E		42	50	P	67	05		92	68		117	00				
18	00		43	2D	-	68	SN	Note 1	93	B0		118	00				
19	00		44	31	1	69	SN		94	01		119	00				
20	44	D	45	32	2	70	SN		95	CS2	Note 3	120	00				
21	45	E	46	35	5	71	SN		96	00		121	00				
22	4C	L	47	30	0	72	SN		97	00		122	00				
23	54	T	48	41	A	73	SN		98	00		123	00				
24	41	A	49	34	4	74	SN		99	00		124	00				

LCP-1250B4QDM EEPROM Serial ID Memory Contents (2-Wire Address A0h)

Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII	Address	Hex	ASCII
00	03		25	20		50	51	Q	75	SN		100	00		125	00	
01	04		26	20		51	44	D	76	SN		101	00		126	00	
02	07		27	20		52	4D	M	77	SN		102	00		127	00	
03	00		28	20		53	20		78	SN		103	00				
04	00		29	20		54	20		79	SN		104	00				
05	00		30	20		55	20		80	SN		105	00				
06	02		31	20		56	30		81	SN		106	00				
07	12		32	20		57	30		82	SN		107	00				
08	00		33	20		58	30		83	SN		108	00				
09	01		34	20		59	30		84	DC	Note 2	109	00				
10	01		35	20		60	05		85	DC		110	00				
11	01		36	00		61	1E		86	DC		111	00				
12	0D		37	00		62	00		87	DC		112	00				
13	00		38	00		63	3D		88	DC		113	00				
14	00		39	00		64	00		89	DC		114	00				
15	64		40	4C	L	65	1A		90	00		115	00				
16	37		41	43	C	66	05		91	00		116	00				
17	37		42	50	P	67	05		92	68		117	00				
18	00		43	2D	-	68	SN	Note 1	93	B0		118	00				
19	00		44	31	1	69	SN		94	01		119	00				
20	44	D	45	32	2	70	SN		95	CS2	Note 3	120	00				
21	45	E	46	35	5	71	SN		96	00		121	00				
22	4C	L	47	30	0	72	SN		97	00		122	00				
23	54	T	48	42	B	73	SN		98	00		123	00				
24	41	A	49	34	4	74	SN		99	00		124	00				

Notes:

1) Bytes 68-83 are serial number.

2) Byte 84-91 (DC): Date code.

3) Byte 95 (CS2): Check sum of bytes 64-94.

Digital Diagnostic Monitoring Interface

Alarm and Warning Thresholds (2-Wire Address A2h)

Address	# Bytes	Name	HEX	Real Value
			5A00	90℃
02-03	2	Temp Low Alarm	0000	0℃
04-05	2	Temp High Warning	5000	80℃
06-07	2	Temp Low Warning	0A00	10℃
08-09	2	Voltage High Alarm	875A	3.465V
10-11	2	Voltage Low Alarm	7A76	3.135V
12-13	2	Voltage High Warning	84D0	3.4V
14-15	2	Voltage Low Warning	7D00	3.2V
16-17	2	Bias High Alarm	3A98	25mA
18-19	2	Bias Low Alarm	0FA0	8mA
20-21	2	Bias High Warning	30D4	18mA
22-23	2	Bias Low Warning	1388	10mA
24-25	2	TX Power High Alarm	0631	-8dBm
26-27	2	TX Power Low Alarm	013C	-15dBm
28-29	2	TX Power High Warning	04EB	-9dBm
30-31	2	TX Power Low Warning	018E	-14dBm
32-33	2	RX Power High Alarm	2710	0dBm
34-35	2	RX Power Low Alarm	0014	-27dBm
36-37	2	RX Power High Warning	1394	-3dBm
38-39	2	RX Power Low Warning	0028	-24dBm
40-55	16	Reserved		

Calibration constants (2 Wire Address A2h)

Address	# Bytes	Name	Description
56-59	4	Rx_PWR(4)	Rx_PWR(4) is set to zero for “internally calibrated” devices.
60-63	4	Rx_PWR(3)	Rx_PWR(3) is set to zero for “internally calibrated” devices.
64-67	4	Rx_PWR(2)	Rx_PWR(2) is set to zero for “internally calibrated” devices.
68-71	4	Rx_PWR(1)	Rx_PWR(1) is set to 1 for “internally calibrated” devices.
72-75	4	Rx_PWR(0)	Rx_PWR(0) is set to zero for “internally calibrated” devices.
76-77	2	Tx_I(Slope)	Tx_I(Slope) is set to 1 for “internally calibrated” devices.
78-79	2	Tx_I(Offset)	Tx_I(Offset) is set to zero for “internally calibrated” devices.
80-81	2	Tx_PWR(Slope)	Tx_PWR(Slope) is set to 1 for “internally calibrated” devices.
82-83	2	Tx_PWR(Offset)	Tx_PWR(Offset) is set to zero for “internally calibrated” devices.
84-85	2	T (Slope)	T(Slope) is set to 1 for “internally calibrated” devices.
86-87	2	T (Offset)	T(Offset) is set to zero for “internally calibrated” devices.
88-89	2	V (Slope)	V(Slope) is set to 1 for “internally calibrated” devices.
90-91	2	V (Offset)	V(Offset) is set to zero for “internally calibrated” devices.
92-94	3	Reserved	Reserved
95	1	Checksum	Byte 95 contains the low order 8 bits of the sum of bytes 0 – 94.

Digital Values (2 Wire Address A2h)

Temperature (Signed twos complement value)

A2h Byte 96 (Temperature MSB)								A2h Byte 97 (Temperature LSB)							
S	2^6	2^5	2^4	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}	2^{-5}	2^{-6}	2^{-7}	2^{-8}

V_{cc}, TX Bias, TX Power, RX Power (Unsigned values)

A2h Byte 98 (V_{cc} MSB)								A2h Byte 99 (V_{cc} LSB)							
A2h Byte 100 (TX Bias MSB)								A2h Byte 101 (TX Bias LSB)							
A2h Byte 102 (TX Power MSB)								A2h Byte 103 (TX Power LSB)							
A2h Byte 104 (RX Power MSB)								A2h Byte 105 (RX Power LSB)							
2^{15}	2^{14}	2^{13}	2^{12}	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0

The digital value conversions are updated every 13ms (nominal) or 20ms (max) in rotation. After getting digital value, each measurement could be obtained by multiplying digital value by corresponding LSB value:

$$\text{Temperature} = \text{Temp (Digital Value)} \times LSB_{Temp} = \text{Temp (Digital Value)} \times \frac{1}{256}$$

$V_{cc} = V_{cc}(\text{Digital Value}) \times LSB_{Vcc} = V_{CC}(\text{Digital Value}) \times 100\mu V$

$\text{TX Bias Current} = \text{TX Bias Current (Digital Value)} \times LSB_{TX,Bias} = \text{TX Bias Current (Digital Value)} \times 2\mu A$

$\text{TX Power} = \text{TX Power (Digital Value)} \times LSB_{TXPower} = \text{TX Power (Digital Value)} \times 0.1\mu W$

$\text{RX Power} = \text{RX Power (Digital Value)} \times LSB_{RXPower} = \text{RX Power (Digital Value)} \times 0.1\mu W$

Digital Diagnostic Monitor Accuracy

Parameter	Typical Value	Note
Transceiver Temperature	± 3℃	Note 1
Power Supply Voltage	± 3%	Note 2
TX Bias Current	± 10%	
TX Optical Power	± 3dB	Note 3
RX Optical Power	± 3dB	Note 4

Notes:

1) Temperature is measured internal to the transceiver.
2) Voltage is measured internal to the transceiver.
3) Valid from –15 to –8 dBm.
4) Valid from –20 to 0 dBm.

Status Bits (2 Wire Address A2h)

Address	Bit	Name	Description
110	7	TX Disable State	Not implement.
110	6	Soft TX Disable	Not implement.
110	5	Reserved	
110	4	RX Rate Select State	Not implement.
110	3	Soft RX Rate Select	Not implement.
110	2	TX Fault	Digital state of the TX Fault Output Pin. Updated within 100msec of change on pin.
110	1	LOS	Digital state of the LOS Output Pin. Updated within 100msec of change on pin.
110	0	Data_Ready_Bar	Indicates transceiver has achieved power up and data is ready. Bit remains high until data is ready to be read at which time the device sets the bit low.

Alarm and Warning Flag Bits (2 Wire Address A2h)

Address	Bit	Name	Description
112	7	Temp High Alarm	Set when internal temperature exceeds high alarm level.
112	6	Temp Low Alarm	Set when internal temperature is below low alarm level.
112	5	Vcc High Alarm	Set when internal supply voltage exceeds high alarm level.
112	4	Vcc Low Alarm	Set when internal supply voltage is below low alarm level.
112	3	TX Bias High Alarm	Set when TX Bias current exceeds high alarm level.
112	2	TX Bias Low Alarm	Set when TX Bias current is below low alarm level.
112	1	TX Power High Alarm	Set when TX output power exceeds high alarm level.
112	0	TX Power Low Alarm	Set when TX output power is below low alarm level.
113	7	RX Power High Alarm	Set when Received Power exceeds high alarm level.
113	6	RX Power Low Alarm	Set when Received Power is below low alarm level.
113	5-0	Reserved Alarm	
114	All	Reserved	
115	All	Reserved	
116	7	Temp High Warning	Set when internal temperature exceeds high warning level.
116	6	Temp Low Warning	Set when internal temperature is below low warning level.
116	5	Vcc High Warning	Set when internal supply voltage exceeds high warning level.
116	4	Vcc Low Warning	Set when internal supply voltage is below low warning level.
116	3	TX Bias High Warning	Set when TX Bias current exceeds high warning level.
116	2	TX Bias Low Warning	Set when TX Bias current is below low warning level.
116	1	TX Power High Warning	Set when TX output power exceeds high warning level.
116	0	TX Power Low Warning	Set when TX output power is below low warning level.
117	7	RX Power High Warning	Set when Received Power exceeds high warning level.
117	6	RX Power Low Warning	Set when Received Power is below low warning level.
117	5-0	Reserved Warning	
118	All	Reserved	
119	All	Reserved	

Regulatory Compliance

Test Item	Reference	Qty'	Evaluation
(#1) Electromagnetic Interference EMC	FCC Class B EN 55022 Class B CISPR 22	5	(1) Satisfied with electrical characteristics of product spec. (2) No physical damage
(#2) Immunity： Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	5	
(#3) Immunity： Electrostatic Discharge to the Duplex SC Receptacle	EN 61000-4-2 IEC 1000-4-2 IEC 801.2	5	
(#4) Electrostatic Discharge to the Electrical Pins	MIL-STD-883C Method 3015.4 EIAJ#1988.3.2B Version 2, Machine model	5	

Ordering information

Part Number	Description	Status
LCP-1250A4FDM	VCSEL based Multi-mode 850nm transceiver. Operating temp: 0 to +70 °C	RD samples available Production: May, 2004
LCP-1250A4FDMH	VCSEL based Multi-mode 850nm transceiver. Operating temp: -10 to +85 °C	RD samples available Production: May, 2004
LCP-1250B4QDM	FP laser based Single-mode 1310nm transceiver. Operating temp: 0 to +70 °C	RD samples available Production: April, 2004
LCP-1250B4QDMT	FP laser based Single-mode 1310nm transceiver. Operating temp: -40 to +85 °C	RD samples available Production: April, 2004

Related Product

- LCP-155xxxx: 155Mb/s, Multimode and single mode transceiver from 2km to 40km
- LCP-2125xxxx: 2.125Gb/s, Multimode and single mode transceiver from 300m to 10km
- LCP-2488xxxx: 2.5Gb/s, multimode and single mode transceiver from 300m to 15km