

330-2403-LEG  
DELL 10GBASE-LRM SFP+ MMF  
1310NM 220M REACH LC DOM



### **330-2403-LEG**

10Gbs SFP+ Transceiver



#### **Features**

- Duplex LC connector
- Support hot-pluggable
- Metal with lower EMI
- Excellent ESD protection
- DFB Transmitter and PIN Receiver
- Distance up to 220m on MMF
- Single 3.3V power supply and Low power dissipation <1.2W
- GR-253-CORE compliant
- RoHS Compliant and Lead-Free
- Compliant with IEEE 802.3ae
- Compliant with SFP+ MSA: SFF-8431 Rev4.1
- Compliant with SFF-8472 Rev.11.0
- Digital diagnostic compatible with SFF-847 Rev11.0

#### **Product Description**

Legrand 330-2403-LEG Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The SFP+ transceivers are high performance, cost effective modules supporting dual data-rate of 10Gbps and support distance up to 220m with MMF.

Legrand SFP+ transceivers are RoHS compliant and lead-free

#### **Regulatory Compliance**

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.7.
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2 GR-1089-CORE.
- Immunity compatible with IEC 61000-4-3.
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B.
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2.
- RoHS compliant with 2002/95/EC 4.1&4.2 2005/747/EC.

## Pin Descriptions

Pin	Symbol	Name/Descriptions	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	TX Fault	Transmitter Fault. LVTTTL-O	2
3	TX Disable	Transmitter Disable. Laser output disabled on high or open. LVTT-I.	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O.	
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I.	
6	MOD_ABS	Module Absent, Connect to VeeT or VeeR in Module.	4
7	RS0	Rate Select 0, optionally controls SFP+ module receiver LVTTTL-I.	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O.	2
9	RS1	Rate Select 1, optionally controls SFP+ module transmitter. LVTTTL-I.	5
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O.	
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O.	
14	VeeR	Receiver Ground (Common with Transmitter Ground).	1
15	VccR	Receiver Power Supply.	
16	VccT	Transmitter Power Supply.	
17	VeeT	Transmitter Ground (Common with Receiver Ground).	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I.	
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-O.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

## Notes:

1. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
2. This contact is an open collector/drain output and should be pulled up to the Vcc\_Host with resistor in the range 4.7K $\Omega$  to 10K $\Omega$ . Pull ups can be connected to one or several power supplies, however the host board design shall ensure that no module contract has voltage exceeding module VccT/R +0.5.V.
3. Tx\_Disable is an input contact with a 4.7K $\Omega$  to 10K $\Omega$  pull-up resistor to VccT inside module.
4. Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull the contract up to Vcc\_Host with a resistor in the range from 4.7K $\Omega$  to 10K $\Omega$ . Mod\_ABS is asserted "High" when the SFP+ module is physically absent from a host slot.
5. RS0 and RS1 are module inputs and are pulled low to VeeT with >30K resistors in the module. RS0 optionally selects the optical receive signaling rate coverage. RS1 optionally selects the optical transmit signaling rate coverage.

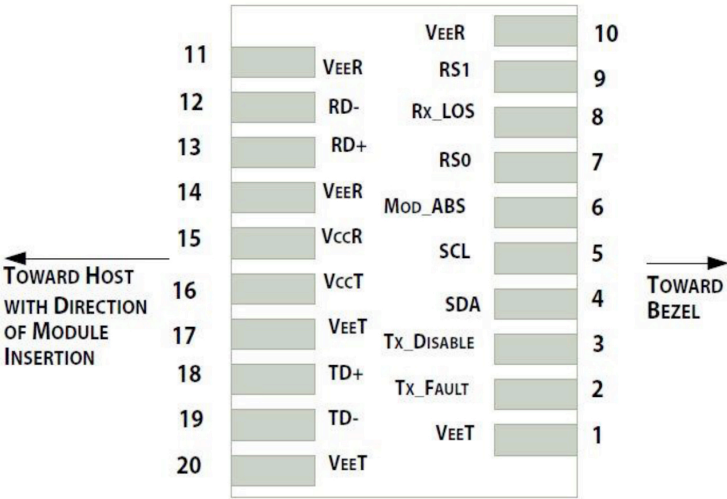
These contacts can also be used for RS0 and RS1 if implementing SFF8079. See SFF8079 for details. RS1

is commonly connected to VeeT or VeeR in the classic SFP modules. The host needs to ensure that it will not be damaged if this contact is connected to VeeT or VeeR in the module.

The SFP+ module provides two inputs RS0 and RS1 that can optionally be used for rate selection. RS0 controls the receive path signaling rate compatibility, and RS1 controls the transmit path signaling rate compatibility. The host and module may choose to use either, both, or none of these functions. Because contact 9 in the classic SFP INF-8074i is connected to VeeR, and SFP+ host utilizing RS1 must provide short circuit protection.

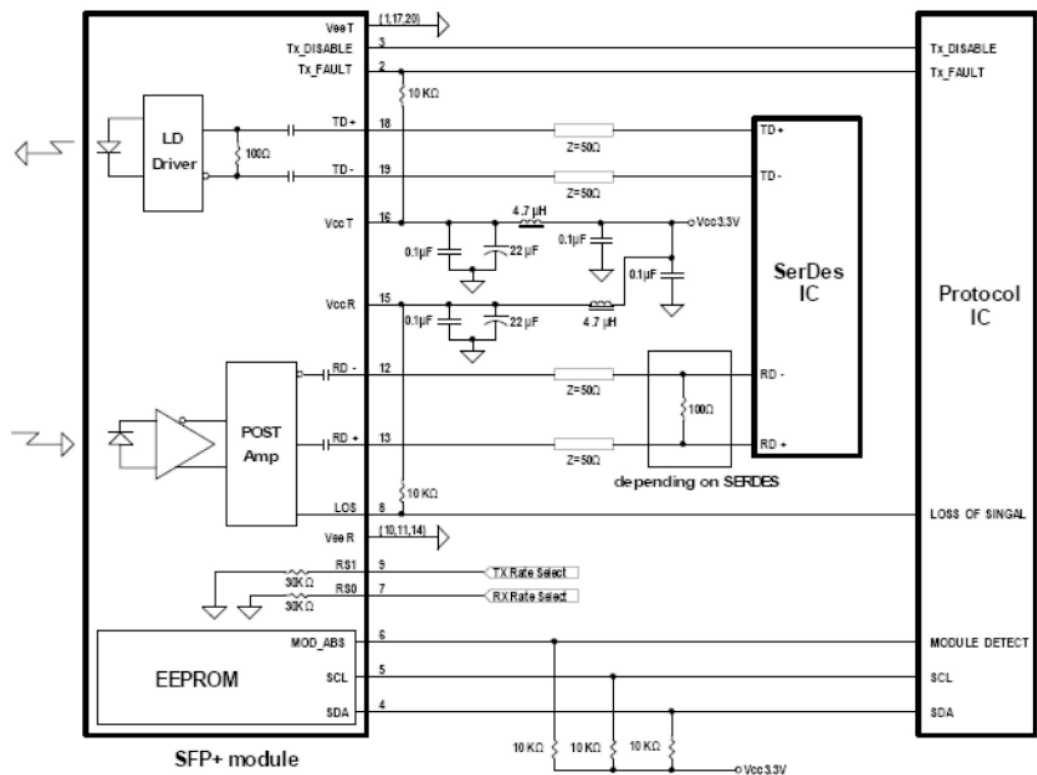
This rate select functionality can also be controlled by software as defined by SFF-8472. Optionally the rate select methods of Part 2 SFF-8079 may be used instead of the method described here by setting the management declaration bit (A0h byte 93 bit 2) to 1, see SFF-8472.

Parameter	State	Conditions
RS0	Low	Rx signally rate less than or equal to 4.25GBd.
	High	Rx signally rate great than 4.25GBd.
RS1	Low	Tx signally rate less than or equal to 4.25GBd.
	High	Tx signally rate great than 4.25GBd.



Pin-out of connector Block on Host board

Recommend Circuit Schematic



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Maximum Supply Voltage	Vcc	-0.5	4.0	V
Storage Temperature	TS	-40	85	°C
Operating Humidity	RH	5	95	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	Vcc	3.13	3.30	3.47	V
Power Supply Current	Icc			350	mA
Case Operating Temperature – Commercial	Tc	-5		70	°C
Case Operating Temperature – Industrial	Tc	-40		85	°C
Distance MMF	Lmax			220	m

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Differential data input swing	V <sub>in</sub> , pp	120	600	850	mV	
Input differential impedance	Z <sub>in</sub>	90	100	110	Ω	
TX Disable-High		2.0		V <sub>cc</sub> +0.3	V	
TX Disable-Low		V <sub>ee</sub> -0.3		0.8	V	
TX Fault-High		2.0		V <sub>cc</sub> +0.3	V	
TX Fault-Low		V <sub>ee</sub> -0.3		0.8	V	
Receiver						
Differential data output swing	V <sub>out</sub> , pp	300	600	850	mV	
Output Differential Impedance	Z <sub>in</sub>	90	100	110	Ω	
LOS-High		2.0		V <sub>cc</sub> +0.3	V	
LOS-Low		V <sub>ee</sub> -0.3		0.8	V	

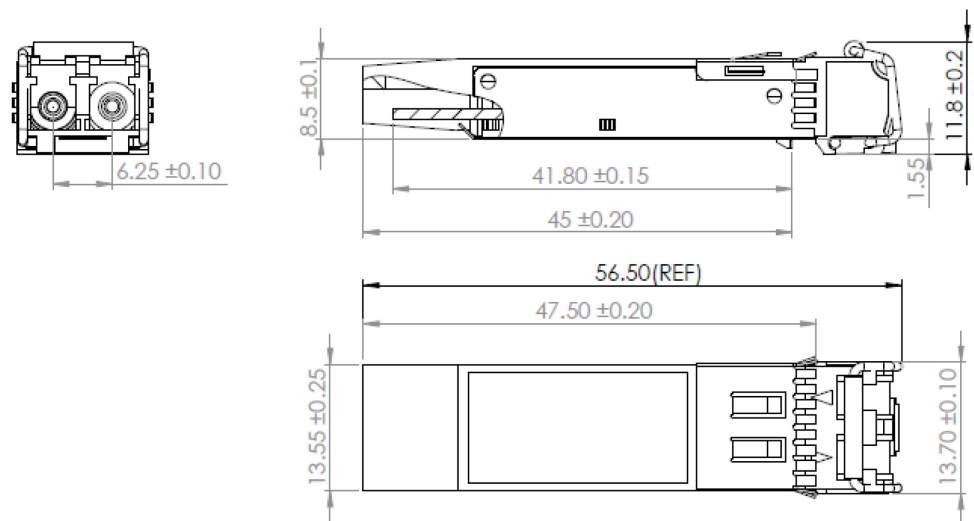
## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Output Opt. Power	P <sub>O</sub>	-4.5		0.5	dBm	1
Spectral Width			0.4	0.45	nm	
Extinction Ratio	ER	3.5	5.5		dB	
Nominal Signaling Speed	f <sub>OPT</sub>	9.95		10.71	GBd	
Launch Power		-4.3			dBm	
Optical Wavelength	λ	1260	1310	1355	nm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						
Optical Center Wavelength	λ <sub>C</sub>	1260		1610	nm	
Receiver Sensitivity	P <sub>INS</sub>			-6.5	dBm	
Stressed Receiver Sensitivity	P <sub>IN</sub>			-7.5	dBm	
Receiver Sensitivity	P <sub>IN</sub>			-6.5	dBm	

### Notes:

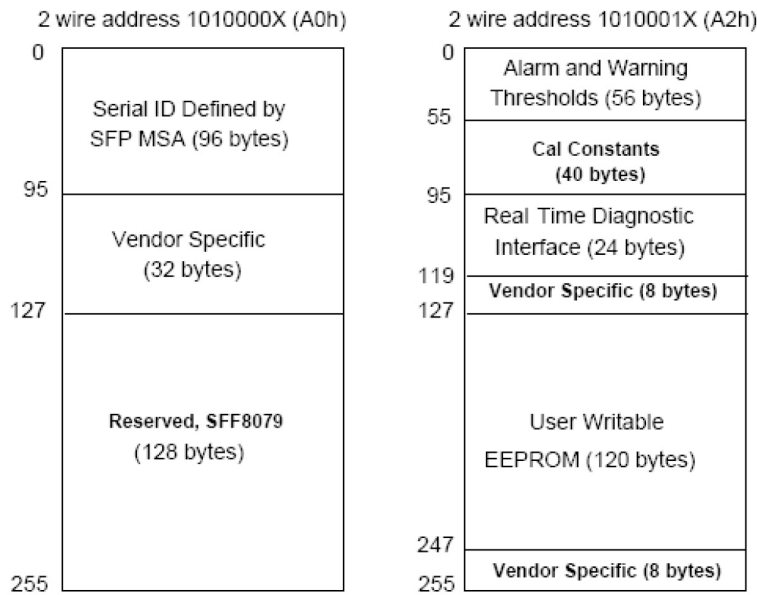
1. BER ≤ 10<sup>-12</sup>@PRBS231-1 at 10.3125Gb/s.

Mechanical Specifications



EEPROM Information

EEPROM memory map specific data field description is as below:



Data Communications

125 Eugene O'Neill Drive  
New London, CT 06320  
800.934.5432  
www.legrand.us

570 Applewood Crescent  
Vaughan, Ontario L4K 4B4  
905.738.9195  
www.legrand.ca