

SPDxx020160C – SFP+ Dual Fibre DWDM DWDM / 20km / 16× Fiber Channel / CDR

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

1. Overview

SPDxx020160C is a high performance transceiver module for up to 16× Fiber Channel data links over a single mode fibre pair. The maximum reach¹ is 20 km. The transmitter is a cooled DWDM Electro-Absorption Modulated Laser (EML), the receiver is a PIN photodiode.

This transceiver module is compliant with the Small Form-factor Pluggable (SFP+) Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics® commercial agents for compatibility with different equipment platforms.

2. Features

- SFP+ Multi-Source Agreement compliant (SFF-8431)
- Hot pluggable SFP+ footprint
- Serial ID functionality supported according to (SFF-8472)
- Class 1 laser safety standard IEC 60825 compliant
- Dual LC connector
- DWDM EML transmitter
- 20 km point-to-point transmission on single mode fibre
- Built-in dual CDR (bypass at 8.5/4.25Gbps)
- Operating temperature range 0°C to 70°C
- Digital diagnostics monitoring (DDM)



Figure 1. SFP+ Dual Fiber (non-binding illustration)

3. Applications

- 16× Fiber Channel
- 8× Fiber Channel
- 4× Fiber Channel

4. Optical Interface

P/N	Wavelength [nm]	Optical Output Power ² [dBm]	Receiver Sensitivity ³ [dBm]	Transmitter and Dispersion Penalty [dB]	Receiver Overload ⁴ [dBm]	Power Budget ² [dB]
SPDxx020160C	ITU DWDM	-1 to 3	≤ -14	≤ 4	-1	≥ 13

1. Distance is estimated assuming typical optical losses after decent quality fibre deployment; only optical budget value is guaranteed

2. EOL, over operating temperature range

3. Measured at 14.025Gbps, PRBS 2³¹-1, BER≤10⁻¹²

4. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers (optical loop back) before ensuring that proper optical attenuation is used

5. Technical Parameters

5.1. Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit	Notes
Storage temperature	-40		85	°C	
Operating Case Temperature	0		70	°C	
Relative Humidity	5		95	%	Non condensing
Power Supply Voltage	3.135	3.3	3.465	V	
Power Supply Current			545	mA	
Power Dissipation			1.8	W	

5.2. Transmitter Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Average Output Power	-1		3	dBm	5
Centre Wavelength Range	1528.77		1563.86	nm	
Wavelength	$\lambda_T - 100$	λ_T	$\lambda_T + 100$	pm	6
Spectral Width (-20dB)			1	nm	
Extinction Ratio	6			dB	
Transmitter and Dispersion Penalty (TDP)			4	dB	

5. Output power coupled into a 9/125 μ m single-mode fibre
 6. ITU-T G.694.1 DWDM. For available wavelengths, see section 10

5.3. Receiver Optical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Receiver Sensitivity			-14	dBm	7
Receiver Overload	-1			dBm	7
Receiver Operating Range	1528		1565	nm	

7. Measured at 14.025Gbps, PRBS 2³¹-1, BER \leq 10⁻¹²

6. Transceiver Electrical Pad Layout

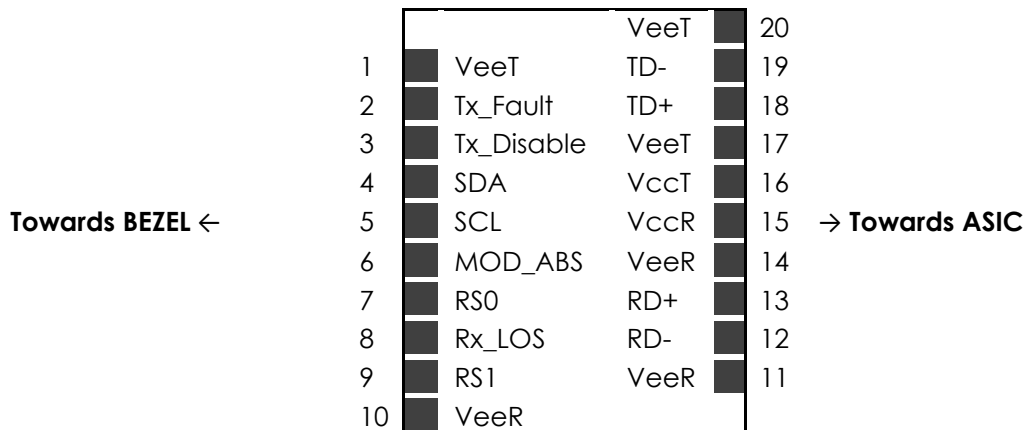


Figure 2. Transceiver Electrical Pad Layout

7. Module Electrical Pin Definition

SFP+ MSA (SFF-8431)

Pin Number	Name	Function
1	VeeT	Module Transmitter Ground
2	Tx_Fault	Module Transmitter Fault
3	Tx_Disable	Transmitter Disable
4	SDA	2-Wire Serial Interface Data
5	SCL	2-Wire Serial Interface Clock
6	Mod_ABS	Module Absent
7	RS0	Not Used
8	Rx_LOS	Receiver Loss of Signal
9	RS1	Not Used
10	VeeR	Module Receiver Ground
11	VeeR	Module Receiver Ground
12	RD-	Receiver Inverted Data Output
13	RD+	Receiver Non-Inverted Data Output
14	VeeR	Module Receiver Ground
15	VccR	Module Receiver 3.3V Supply
16	VccT	Module Transmitter 3.3V Supply
17	VeeT	Module Transmitter Ground
18	TD+	Transmitter Non-Inverted Data Input
19	TD-	Transmitter Inverted Data Input
20	VeeT	Module Transmitter Ground

8. CDR Operation

The built-in dual CDR will automatically lock to the signal when the data rate is 14.025Gbps. The CDR will be bypassed automatically if the data rate is 8.5 or 4.25Gbps.

Applying a signal to the RS0 (#7) and RS1 (#9) pins will not affect the operation of the CDR.

9. EEPROM

SFP+ MSA (SFF-8431 & SFF-8472)

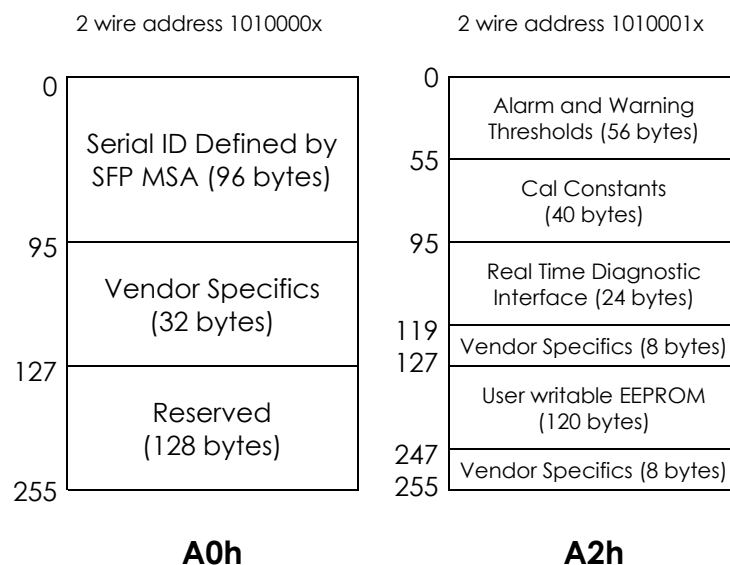


Figure 3. EEPROM of a SFP+

SPD46020160C	SFP+ DWDM Dual Fibre, Tx 1540.56nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD47020160C	SFP+ DWDM Dual Fibre, Tx 1539.77nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD48020160C	SFP+ DWDM Dual Fibre, Tx 1538.98nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD49020160C	SFP+ DWDM Dual Fibre, Tx 1538.19nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD50020160C	SFP+ DWDM Dual Fibre, Tx 1537.4nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD51020160C	SFP+ DWDM Dual Fibre, Tx 1536.61nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD52020160C	SFP+ DWDM Dual Fibre, Tx 1535.82nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD53020160C	SFP+ DWDM Dual Fibre, Tx 1535.04nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD54020160C	SFP+ DWDM Dual Fibre, Tx 1534.25nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD55020160C	SFP+ DWDM Dual Fibre, Tx 1533.47nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD56020160C	SFP+ DWDM Dual Fibre, Tx 1532.68nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD57020160C	SFP+ DWDM Dual Fibre, Tx 1531.90nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD58020160C	SFP+ DWDM Dual Fibre, Tx 1531.12nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD59020160C	SFP+ DWDM Dual Fibre, Tx 1530.33nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD60020160C	SFP+ DWDM Dual Fibre, Tx 1529.55nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM
SPD61020160C	SFP+ DWDM Dual Fibre, Tx 1528.77nm (DWDM EML) , Rx (PIN), maximum distance 20km, power budget 13dB, 16x Fiber Channel, LC connector, 0°C to 70°C, DDM

11. Document Revision Information

Revision	Description
A	Initial release

Skylane Optics® supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

For questions on this product please contact:
support@skylaneoptics.com

Beyond
Quality

Reliable
Alliance

Performing
Smartly