SPCxxB1410xD – SFP+ Dual Fibre CWDM

CWDM / 14dB / 10x Gigabit Ethernet

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

SPCxxB1410xD is a high performance transceiver module for up to 10x Gigabit Ethernet data links over a single mode fibre pair. The power budget[1] is 14dB end of life (EOL). The transmitter is a CWDM DFB laser, 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

- Electrical interface specification as per SFF-8431
- Hot pluggable SFP+ footprint
- Management interface specification as per SFF-8431 and SFF-8472
- Class 1 laser safety standard IEC 60825 compliant
- SFP+ MSA package with duplex LC connector
- CWDM DFB transmitter, 1270nm to 1450nm in 20nm step
- PIN receiver
- Power budget ≥ 14dB
- Operating temperature range 0°C to 70°C or -40°C to 85°C
- Power dissipation < 1.8W
- Digital Diagnostics monitoring (DDM)

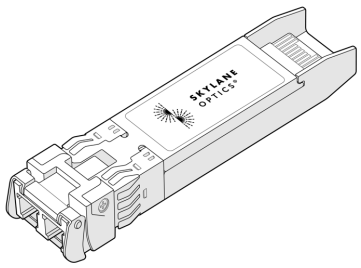

Figure 1. SFP+ Dual Fiber
(non-binding illustration)

3. Applications

- 10× Gigabit Ethernet
- 8× Fiber Channel
- 4× Fiber Channel
- 2× Fiber Channel
- CPRI 9.8304 & 10.1376Gbps

4. Optical Interface

P/N	Wavelength [nm]	Optical Output Power[2] [dBm]	Receiver Sensitivity[2] [dBm]	Transmitter and Dispersion Penalty [dB]	Receiver Overload[4] [dBm]	Power Budget[1] [dB]
SPCxxB1410xD	ITU CWDM	-1 to 5	≤ -15	NA	0	≥ 14

1. Only optical power budget is guaranteed, see section **Erreur ! Source du renvoi introuvable.** for estimated transmission reach
2. EOL, over operating temperature range
3. Measured with 10.3125Gbps 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	SPCxxB14100D, SPCxxB1410AD, SPCxxB1410GD
Wavelength	-40		85	nm	SPCxxB14102D
Relative Humidity			95	%	Non condensing
Power Supply Voltage	3.13	3.3	3.45	V	
Power Supply Current			350	mA	SPCxxB14100D, SPCxxB1410AD, SPCxxB1410GD
			550		SPCxxB14102D
Power Dissipation			1.2	W	SPCxxB14100D, SPCxxB1410AD, SPCxxB1410GD
			1.8		SPCxxB14102D

5.2. Transmitter Optical Specifications					
Parameter	**Min**	**Typ**	**Max**	**Unit**	**Notes**
Average Output Power	-1		5	dBm	5
Centre Wavelength Range	1264.5		1458.5	nm	
Wavelength	λ-6.5	λ	λ+7.5	nm	6
Spectral Width (-20dB)			1	nm	
Extinction Ratio	3.5			dB	
Transmitter and Dispersion Penalty (TDP)	NA	dB			

5. Output power coupled into a 9/125 µm single-mode fibre
6. ITU-T G.694.2 CWDM. For available wavelengths, see section 10

5.3. Receiver Optical Specifications					
Parameter	**Min**	**Typ**	**Max**	**Unit**	**Notes**
Receiver Sensitivity			-15	dBm	7
Receiver Overload	0			dBm	7
Receiver Operating Range	1260		1620	nm	

7. Measured with 10.3125Gbps PRBS 2^{31}-1, BER≤10^{-12}

6. Transceiver Electrical Pad Layout

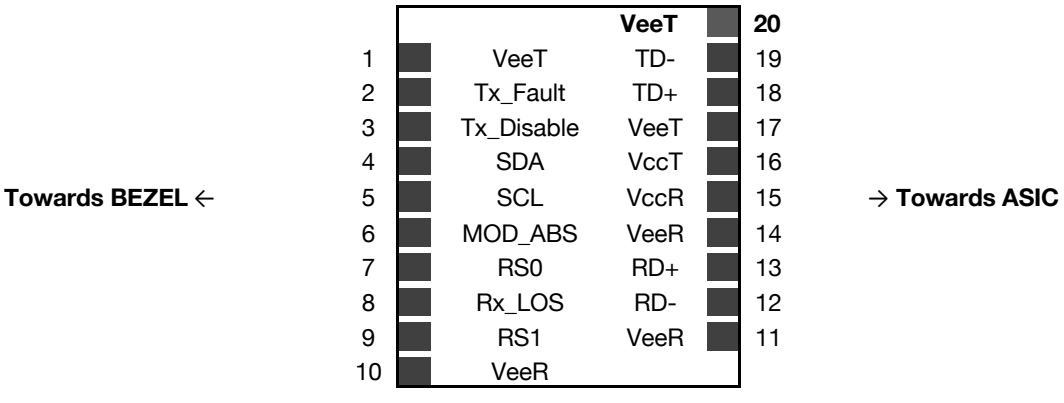

Figure 2. Transceiver Electrical Pad Layout

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. EEPROM

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

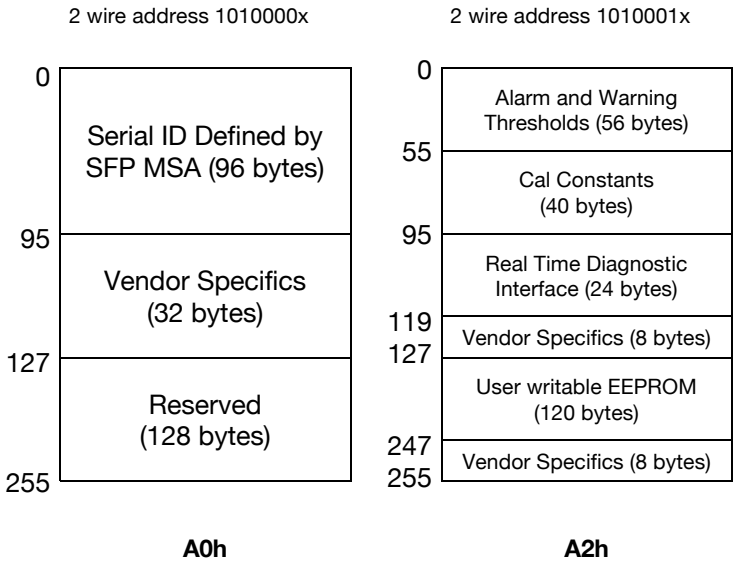

Figure 3. EEPROM of a SFP+

9. Transmission Reach

The actual transmission reach is depending on the CWDM channel used, due to the wavelength dependent dispersion in the fibre path. The table below shows the *estimated* transmission reach for CWDM channels 27 to 61.

NB: Distances are purely indicative and only valid for G.652 fibre. Only the optical power budget is guaranteed. Additional optical insertion loss from CWDM filters, splices, optical connectors etc. is not included.

CWDM Channel	Nominal Wavelength [nm]	Estimated Reach [km]
27	1270	10
29	1290	10
31	1310	10
33	1330	10
35	1350	10
37	1370	10
39	1390	10
41	1410	10
43	1430	10
45	1450	10

10. Ordering Information

Part Number	Description
SPC27B14100D	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC29B14100D	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC31B14100D	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC33B14100D	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC35B14100D	SFP+ CWDM Dual Fibre, **Tx 1350nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC37B14100D	SFP+ CWDM Dual Fibre, **Tx 1370nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC39B14100D	SFP+ CWDM Dual Fibre, **Tx 1390nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC41B14100D	SFP+ CWDM Dual Fibre, **Tx 1410nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC43B14100D	SFP+ CWDM Dual Fibre, **Tx 1430nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC45B14100D	SFP+ CWDM Dual Fibre, **Tx 1450nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC27B14102D	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC29B14102D	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC31B14102D	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC33B14102D	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC35B14102D	SFP+ CWDM Dual Fibre, **Tx 1350nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC37B14102D	SFP+ CWDM Dual Fibre, **Tx 1370nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC39B14102D	SFP+ CWDM Dual Fibre, **Tx 1390nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC41B14102D	SFP+ CWDM Dual Fibre, **Tx 1410nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC43B14102D	SFP+ CWDM Dual Fibre, **Tx 1430nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC45B14102D	SFP+ CWDM Dual Fibre, **Tx 1450nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC27B1410GD	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC29B1410GD	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC31B1410GD	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC33B1410GD	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC35B1410GD	SFP+ CWDM Dual Fibre, **Tx 1350nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC37B1410GD	SFP+ CWDM Dual Fibre, **Tx 1370nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC39B1410GD	SFP+ CWDM Dual Fibre, **Tx 1390nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC41B1410GD	SFP+ CWDM Dual Fibre, **Tx 1410nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC43B1410GD	SFP+ CWDM Dual Fibre, **Tx 1430nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC45B1410GD	SFP+ CWDM Dual Fibre, **Tx 1450nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC27B1410AD	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC29B1410AD	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC31B1410AD	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC33B1410AD	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware

SPC35B1410AD	SFP+ CWDM Dual Fibre, **Tx 1350nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC37B1410AD	SFP+ CWDM Dual Fibre, **Tx 1370nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC39B1410AD	SFP+ CWDM Dual Fibre, **Tx 1390nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC41B1410AD	SFP+ CWDM Dual Fibre, **Tx 1410nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC43B1410AD	SFP+ CWDM Dual Fibre, **Tx 1430nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC45B1410AD	SFP+ CWDM Dual Fibre, **Tx 1450nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, 0°C to 70°C, DDM, Specific Firmware
SPC27B14100D	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC29B14100D	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC31B14100D	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC33B14100D	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC35B14100D	SFP+ CWDM Dual Fibre, **Tx 1350nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC37B14100D	SFP+ CWDM Dual Fibre, **Tx 1370nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC39B14100D	SFP+ CWDM Dual Fibre, **Tx 1390nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC41B14100D	SFP+ CWDM Dual Fibre, **Tx 1410nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC43B14100D	SFP+ CWDM Dual Fibre, **Tx 1430nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC45B14100D	SFP+ CWDM Dual Fibre, **Tx 1450nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **0°C to 70°C**, DDM
SPC27B14102D	SFP+ CWDM Dual Fibre, **Tx 1270nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC29B14102D	SFP+ CWDM Dual Fibre, **Tx 1290nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC31B14102D	SFP+ CWDM Dual Fibre, **Tx 1310nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM
SPC33B14102D	SFP+ CWDM Dual Fibre, **Tx 1330nm** (CWDM DFB), Rx (PIN), power budget 14dB, 10x Gigabit Ethernet, LC connector, **-40°C to 85°C**, DDM

11. Document Revision Information

Revision	Description
A	Initial release
B	Specification updated to include 8x Fiber Channel compatibility
C	Update with CPRI rates compatibility
D	Ordering information tab updated with the “G” and “A” versions
E	Industrial temperature part SPCxxB14102D added

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