

1442544F2-SKY

ADTRAN® 1442544F2 Compatible 10G XGSPON OLT SFP+ Transceiver (SMF, 1577nmTx/1270nmRx, N2, SC, DOM, -40 to 85C)

Product Description

This ADTRAN® 1442544F2 compatible XGSPON OLT class N2 SFP+ transceiver provides 10G throughput up to 20km over single-mode fiber (SMF) using a wavelength of 1577nmTx/1270nmRx via an SC connector. It is capable of withstanding -40 to 85C environments and can operate at temperatures between -40 and 85C. This product is in compliance with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- Hot Pluggable SFP+
- 4 Lambda
- 3.3V DC Power Supply
- 2x10 SFP+ Electrical Interface
- ITU-T G.9807.1 Class N2 compliant
- SC receptacle optical connector
- RoHS compliant and Lead Free
- Industrial Temperature -40 to 85 Celsius



Applications:

- XGS-PON OLT
- Access and Enterprise

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.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Maximum Supply Voltage	V _{cc3}	0	3.6	V	
Storage Temperature	T _{stg}	-40	85	°C	
Operating Temperature	T _c	-40	85	°C	
Operating Relative Humidity	RH	5	85	%	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{cc3}	3.14	3.3	3.47	V	
Supply Current	I _{cc3}			750	mA	
Module Power Dissipation	P _{DISS}			2.5	W	
Transmitter						
Data Input Differential Swing	V _{IN}	120		850	mVp-p	
Input Differential Impedance	Z _{IN}	80	100	120	Ω	
Tx_Disable (Asserted)	V _{DH}	2.0		3.3	V	
Tx_Disable (Negated)	V _{DL}	0		0.8	V	
Tx_Fault Output Voltage - High		2.4		3.3	V	
Tx_Fault Output Voltage - Low		0		0.4	V	
Receiver						
Differential Output Differential Swing	V _{RXDIFF}	400		800	mVp-p	
Signal Detected Voltage - High	V _{sd_h}	2		3.3	V	
Signal Detected Voltage - Low	V _{sd_l}	0		0.4	V	

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter (9.953G)						
Data Rate	BR		9.953		Gbps	
Center Wavelength	λ_C	1575	1577	1580	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
SMSR		30			dB	
Optical Power Output	POUT	4		7	dBm	
Extinction Ratio	ER	8.2			dB	
Eye Mask Margin	EM	Compliance ITU.T G.9807.1 Requirement				
Optical Output Power with Tx Off	Poff			-39	dBm	
RIN ₁₂ OMA				-128	dB/Hz	
Receiver (9.953/2.488G)						
Input Operating Wavelength	λ_{RX}	1260	1270	1280	nm	
Receiver Sensitivity (BER 10 ⁻³)	@9.953			-28	dBm	
Receiver Sensitivity (BER 10 ⁻⁴)	@2.488			-29.5	dBm	
Receiver Overload (BER 10 ⁻¹²)	@9.953	-5			dBm	
Receiver Overload (BER 10 ⁻¹²)	@2.488	-7			dBm	
Maximum Input Power		-3			dBm	
Receiver Reflectance	RRX			-12	dB	
Receiver Tolerance to Reflected Optical Power				10	dB	
Signal Detected De-Assert Level	Psdd	-40			dBm	
Signal Detected Assert Level	Psda			-29	dBm	
SD Hysteresis	SD_Hys		0.5		dB	

Digital Diagnostic Functions

Parameter	Range	Unit	Accuracy	Notes
Temperature	-40°C to 85°C	°C	±3	LSB equal to 1/256C
Supply Voltage (3.3V)	3.14V to 3.47V	V	±3%	LSB equal to 100uV
Tx Bias Current	0mA to 150mA	mA	±10%	LSB equal to 4uA
Tx Optical Power	4dBm to 7dBm	dBm	±2	LSB equal to 0.2uW
Rx Power	-30dBm to -6dBm	dBm	±3	LSB equal to 0.1uW

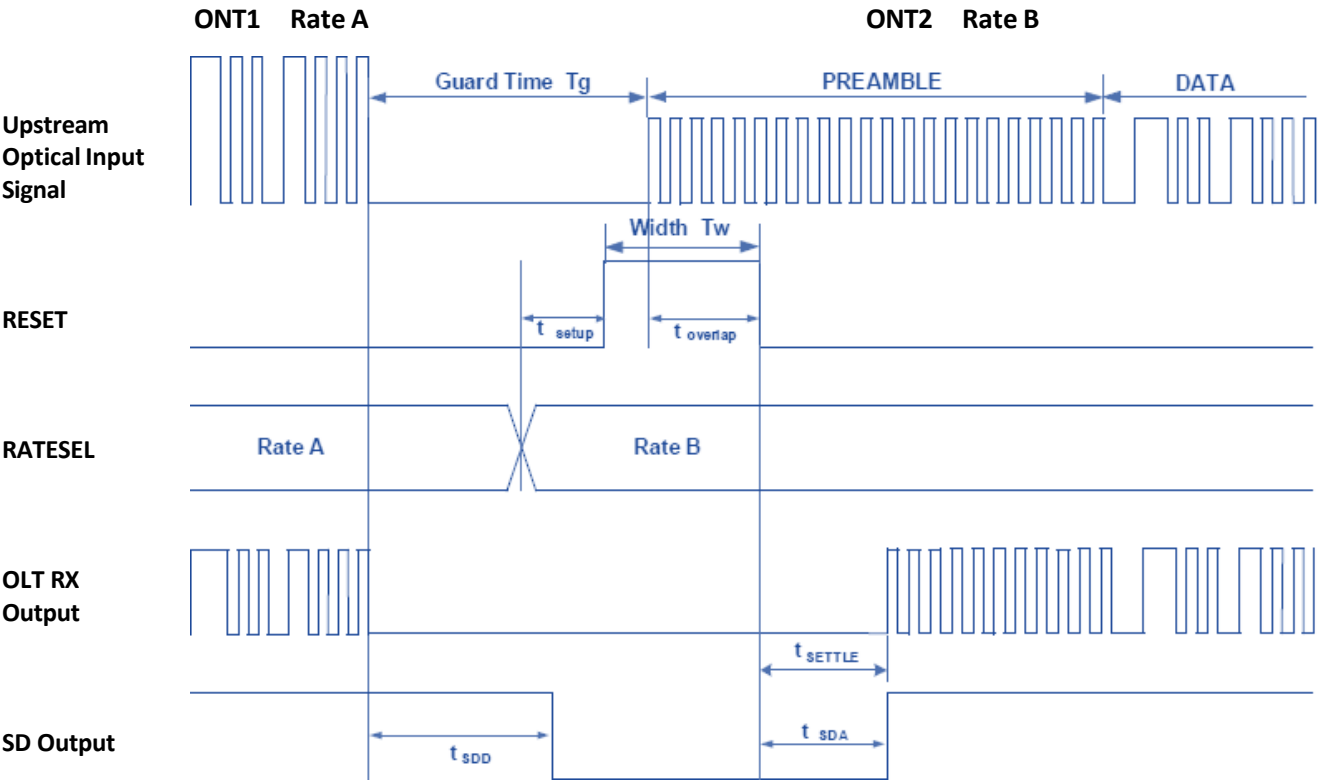
Upstream Timing

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Burst Receiver Settling Time	T_SETTLE			100	ns	
Burst Signal Detect Assert	T_SDA		25	100	ns	
Burst Signal Detect De-Assert	T_SDD		100		ns	1
Guard Time	Tg	51.4			ns	
Reset Pulse Width	Tw	25			ns	
Reset Time Overlapping Preamble	T_overlap	0			ns	2
Setup Time of Rate Level for Following Burst	T_setup	5			ns	

Notes:

1. Auto reset function is applied. Signal detect de-assert time is about 100ns forced by auto reset and will short to about 20ns with external Reset pulse.
2. Reset pulse is required to be partially inside the preamble.

Upstream Timing Diagram

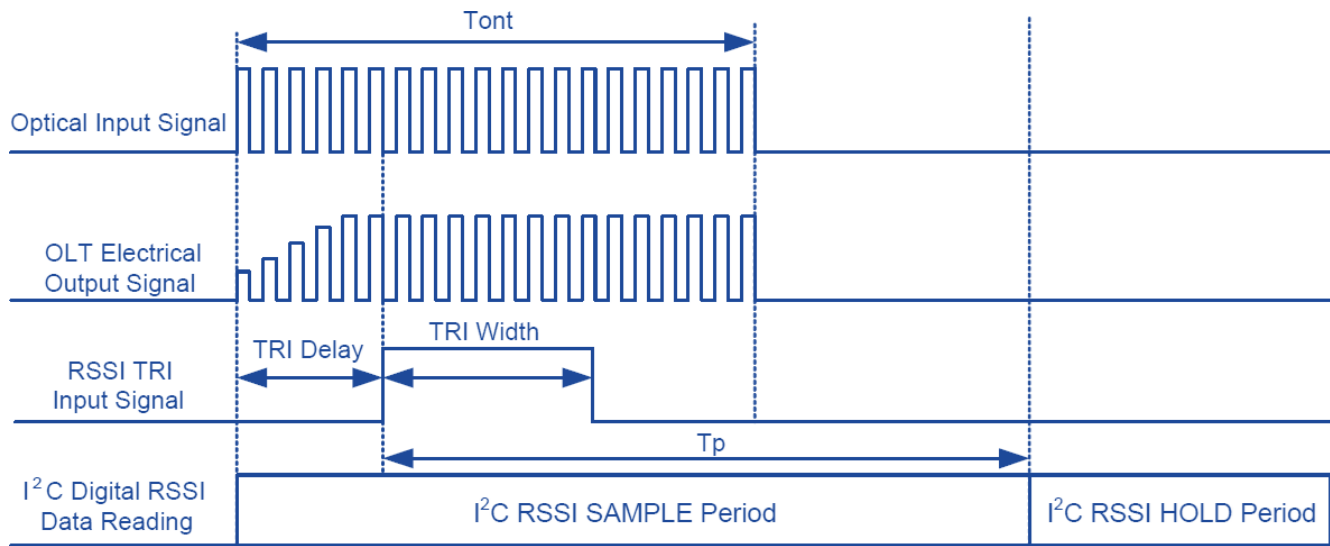


Digital RSSI Sample/Hold Timing

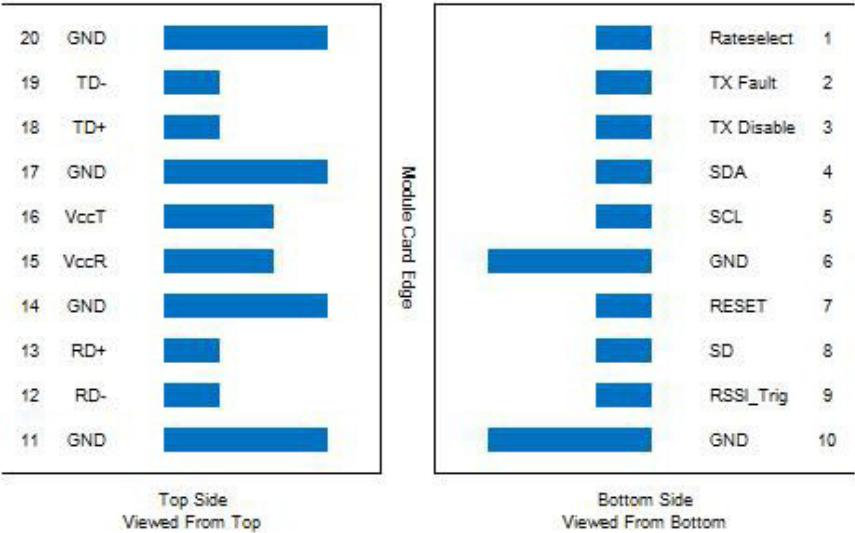
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
I ² C Read Time	T_p	500			μs	
Optical Input Signal Width	T_{ont}	300			ns	
RSSI Monitor Range	P_{mon}	-30		-7	dBm	
RSSI Precision	P_{rssi}	-3	+/-2	3	dB	
RSSI Trigger Delay	T_{tri} (TRI Delay)	0	300		ns	
RSSI Trigger Width	T_{i2c} (TRI Width)	500		$T_{ont} - T_{tri}$	ns	

Note: $T_{tri} + T_{i2c} < T_{ont}$.

Digital RSSI Sample/Hold Timing Diagram



Pin-Out Definitions



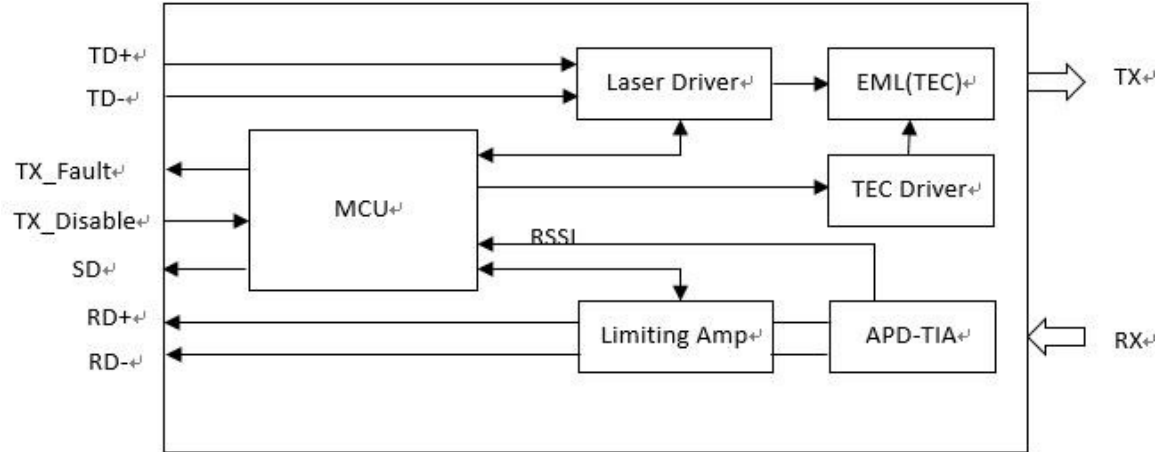
Pin Descriptions

Pin	Logic	Symbol	Description	Note
1	LVTTL	Rate_Select	Rate Select.	1
2	LVTTL	Tx_Fault	High Voltage: Tx Laser Fault or Safety. Low Voltage: Normal Operation.	
3	LVTTL	Tx_Disable	Active "high" to disable laser.	
4		SDA	2-Wire Serial Interface SDA.	
5		SCL	2-Wire Serial Interface SCL.	
6		GND	Module Ground.	
7		Reset	Reset for TIA/LIA.	
8	LVTTL	SD	"Logic 1" indicates normal operation.	
9	LVTTL	RSSI_Trig	RSSI Trigger.	
10		GND	Module Ground.	
11		GND	Module Ground.	
12	LVCML	RD-	2.5/10G LVCML output with DC coupling.	
13	LVCML	RD+	2.5/10G LVCML output with DC coupling.	
14		GND	Module Ground.	
15		VccR	+3.3V Power Supply.	
16		VccT	+3.3V Power Supply.	
17		GND	Module Ground.	
18	LVCML	TD+	10G LVCML input with AC coupling.	
19	LVCML	TD-	10G LVCML input with AC coupling.	
20		GND	Module Ground.	

Notes:

1. Rate Select is high-speed when Pin 1 value is "high" and low-speed when Pin 1 value is "low."

Transceiver Block Diagram



Transmitter Section

Tx_Disable

Tx_Disable is an input pin that is used to shut down the XGSPON transmitter optical output at the same time. It is pulled up within the module with a 4.7k Ω to 10k Ω resistor. Its states are: low (0 – 0.8V) - transmitter on; (>0.8, < 2.0V) - undefined; high (2.0 – VCC) - transmitter disabled; open - transmitter disabled. The Tx_Disable signal is “high” (LVTTL “logic 1”) to turn off the laser output. The laser will turn on when Tx_Disable is “low” (LVTTL “logic 0”).

XGSPON TD+/-

XGSPON_TD+/- are the differential XGSPON transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. It allows a differential input swing of 120-850mV, 9.953Gbps data rate.

Receiver Section

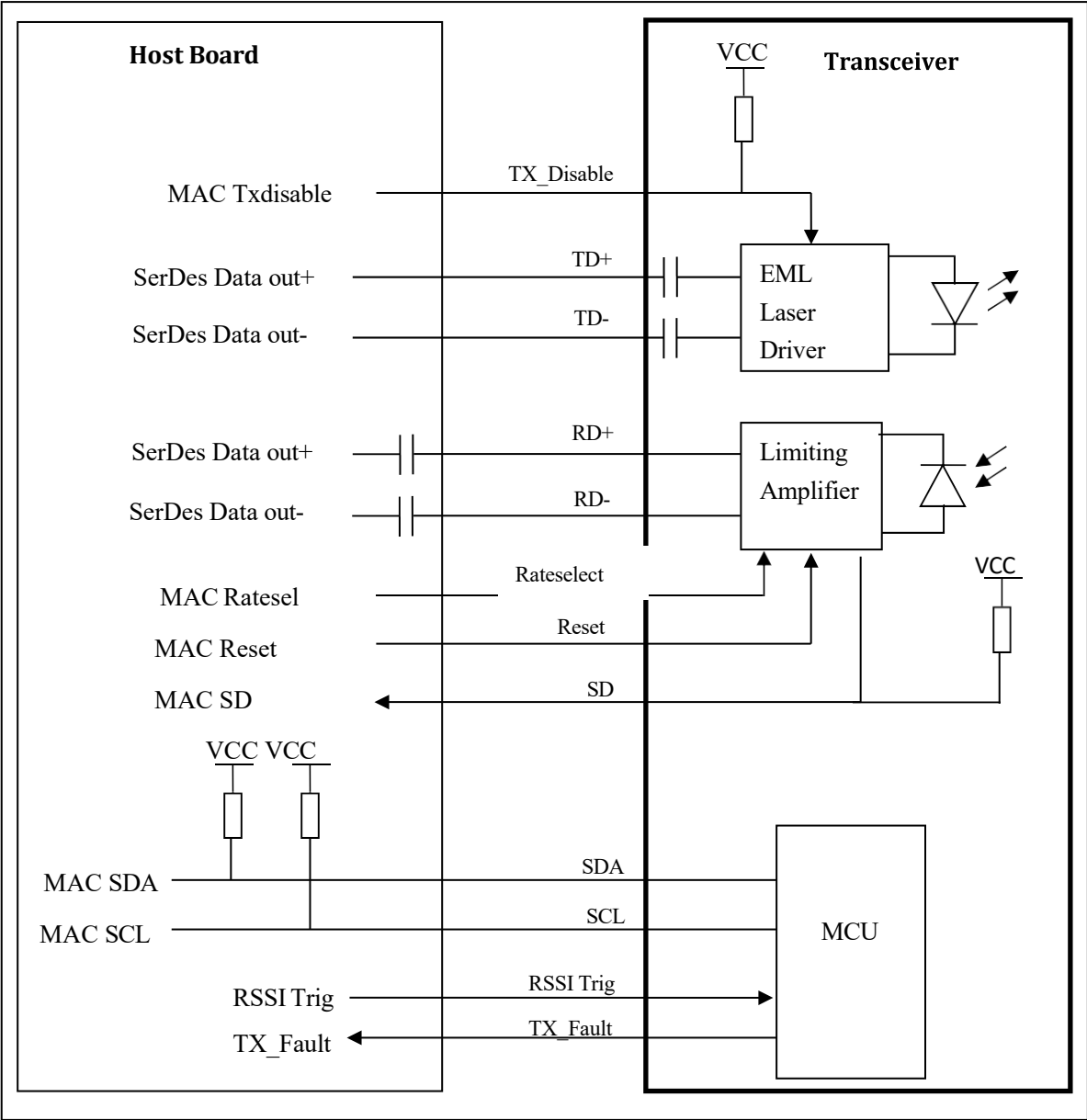
XGSPON_SD

SD (Signal Detect) is an open collector/drain output, which should be pulled up with a 4.7k Ω to 10k Ω resistor to a voltage between 2.4V and Vcc+0.3V. When “low,” this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). “High” indicates normal operation. In the “low” state, the output will be pulled to < 0.4V.

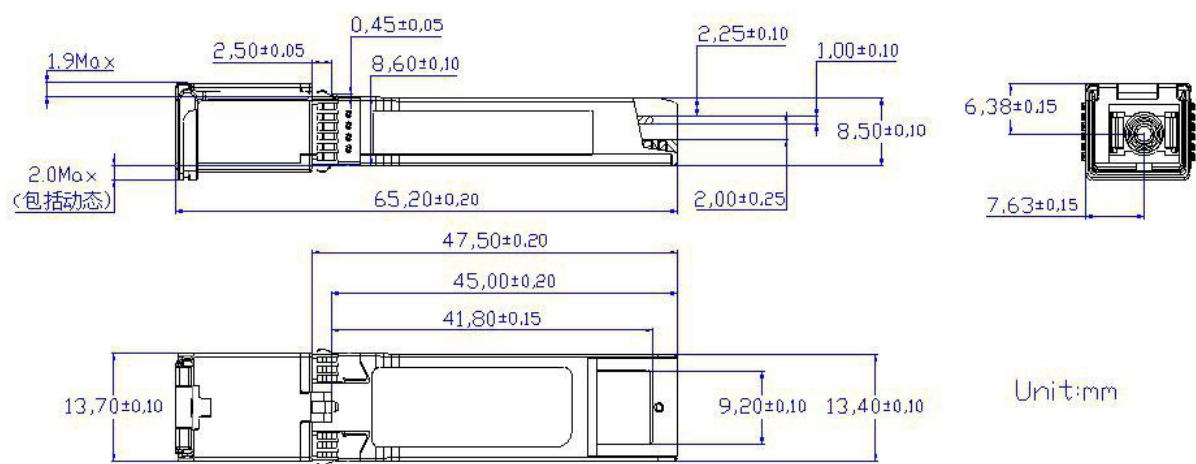
XGSPON RD+/-

These are the XGSPON differential receiver outputs. They are DC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done on the host board. The voltage swing on these lines will be between 400 and 800mV differential output when properly terminated.

Recommended Interface Circuit

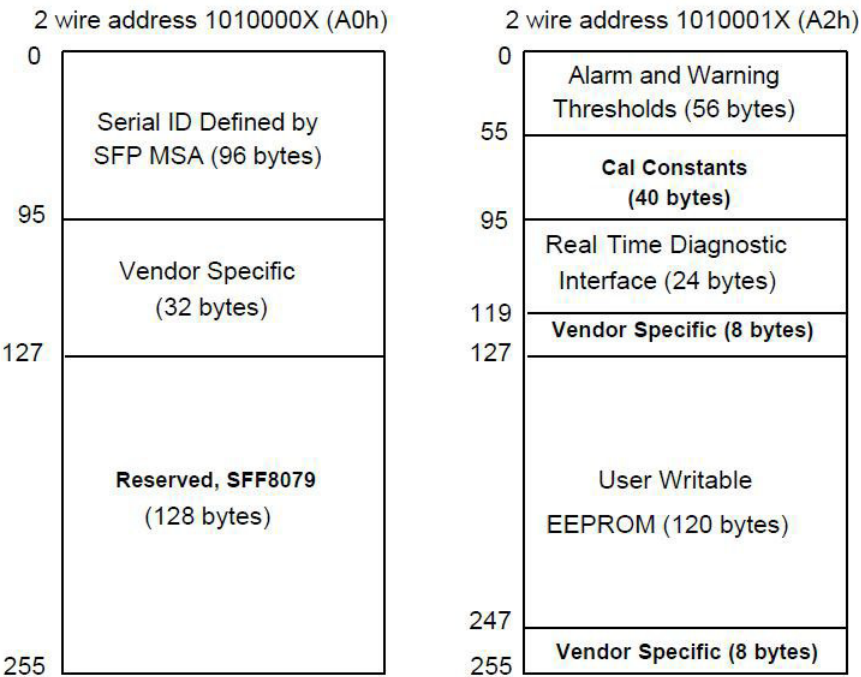


Mechanical Specifications



Digital Diagnostic Memory Map

Compatible with SFF-8472.



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

