98Y5511-C

IBM® 98Y5511 Compatible TAA 16GBase-LW Fibre Channel SFP+ Transceiver (SMF, 1310nm, 25km, LC)

Features:

- SFF-8432 and SFF-8472 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free

Applications:

- Fibre Channel
- Access and Enterprise

Product Description

This IBM® 98Y5511 compatible SFP+ transceiver provides 16GBase-LW Fibre Channel throughput up to 25km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent IBM® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. It is built to meet or exceed the specifications of IBM®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S. – made or designated country end products."

TAA COMPLIANT

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Storage Temperature	Tstg	-40		85	°C
Relative Humidity	RH	5		95	%
Supply Voltage	Vcc	-0.5		4.0	V
Operating Temperature	Tc	0	25	70	°C
Data Rate			4.25/8.5/14.025		Gbps

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Current		Icc			550	mA	
Power Dissipation		P$_{DISS}$			1800	mW	
Supply Voltage		Vcc	3.135	3.3	3.465	V	
Transmitter							
Input Differential Impedance		ZIN		100		Ω	
Differential Data Input Swing		VIN,pp	180		700	mVp-p	
Tx_Fault	Transmitter Fault	VOH	2.0		Host_Vcc	V	
	Normal Operation	VOL	0		0.8	V	
Tx_Disable	Transmitter Disable	VIH	2.0		Host_Vcc	V	
	Transmitter Enable	VIL	0		0.8	V	
Receiver							
Output Differential Impedance		ZOUT		100		Ω	
Differential Data Output Swing		VOUT,pp	300		850	mVp-p	1
Data Output Rise/Fall Time		Tr/Tf	28			ps	2
Rx_LOS	Loss of Signal (LOS)	VOH	2.0		Host_Vcc	V	3
	Normal Operation	VOL	0		0.8	V	3

Notes:

1. Internally AC coupled but requires an external 100Ω differential load termination.
2. 20-80%.
3. LOS is an open collector output that should be pulled up with 4.7kΩ on the host board.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power @14.025Gbps	Po,RH	-5		2	dBm	1, 2
Launch Optical Power @4.25Gbps, 8.5Gbps	Po,RL	-5		-1	dBm	3
Center Wavelength	λC	1295	1310	1325	nm	4
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty @8.5Gbps	TDP			3.2	dB	7
Transmitter and Dispersion Penalty @14.025Gbps	TDP			4.4	dB	7
Spectral Width	$\Delta\lambda$			1	nm	4, 5
Optical Rise/Fall Time @4.25Gbps	Tr/Tf			90	ps	8
Optical Return Loss Tolerance	ORLT			12	dB	
POUT @Tx_Disable Asserted	P_{off}			-30	dBm	9
Receiver						
Center Wavelength	λC	1260	1310	1370	nm	
Unstressed Receiver OMA Sensitivity	RxSENS			-15.4	dBm	10
Unstressed Receiver OMA Sensitivity = 8.5	RxSENS			-13.7	dBm	10
Unstressed Receiver OMA Sensitivity	RxSENS			-12.0	dBm	11
Receiver Overload (P_{avg})	POL	0.5			dBm	
Optical Return Loss	ORL	12			dB	
LOS De-Assert	LOSD			-16	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. High-Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
3. Low-Bandwidth Mode. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
4. Also specified to meet curves in FC-PI-5 Rev 6.10 Figures 23, 24, and 25, which allow trade-off between wavelength, spectral width, and OMA for 4.25Gbps and 8.5Gbps operation.
5. 20dB spectral width.
6. Equivalent extinction ratio specification for Fibre Channel. Allows smaller ER at higher average power.
7. For 14.025Gbps and 8.5Gbps operation, Jitter values for gamma T and gamma R are controlled by TDP.
8. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 4x eye masks when filtered.
9. The optical power is launched into 9/125µm SMF.
10. Measured with PRBS 2^7-1 at 10^{-12} BER.
11. Measured with PRBS $2^{31}-1$ at 10^{-12} BER.

Pin Descriptions

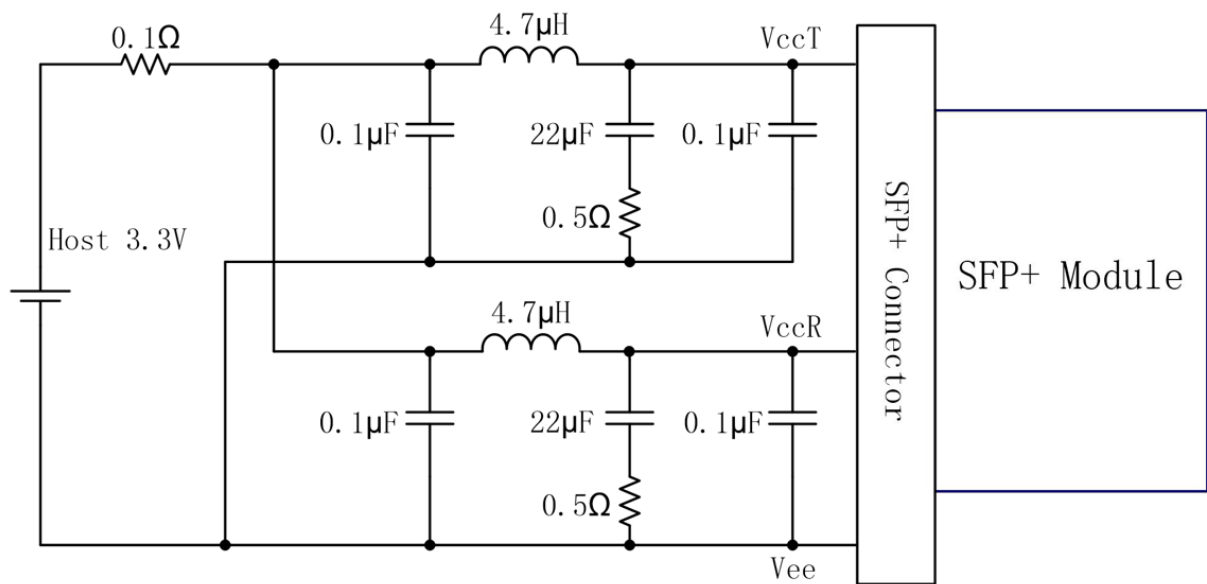| Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground.	1
2	Tx_Fault	Transmitter Fault (LVTTL-O). "High" indicates a fault condition.	2
3	Tx_Disable	Transmitter Disable (LVTTL-I). "High" or "open" disables the transmitter.	3
4	SDA	2-Wire Serial Interface Data (LVCMOS-I/O) (MOD-DEF2).	4
5	SCL	2-Wire Serial Interface Clock (LVCMOS-I/O) (MOD-DEF1).	4
6	MOD_ABS	Module Absent (Output). Connected to the VeeT or VeeR in the module.	5
7	RS0	Rate Select 0. Not used. Presents high input impedance.	6
8	Rx_LOS	Receiver Loss of Signal (LVTTL-O).	2
9	RS1	Rate Select 1. Not used. Presents high input impedance.	6
10	VeeR	Receiver Ground.	1
11	VeeR	Receiver Ground.	1
12	RD-	Inverse Received Data Out (CML-O).	
13	RD+	Received Data Out (CML-O).	
14	VeeR	Receiver Ground.	
15	VccR	+3.3V Receiver Power.	
16	VccT	+3.3V Transmitter Power.	
17	VeeT	Transmitter Ground.	1
18	TD+	Transmitter Data In (CML-I).	
19	TD-	Inverse Transmitter Data In (CML-I).	
20	VeeT	Transmitter Ground.	1

Notes:

1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host_Vcc.
3. This input is internally biased "high" with a 4.7kΩ to 10kΩ pull-up resistor to the VccT.
4. 2-Wire Serial Interface Clock and Data lines require an external pull-up resistor dependent on the capacitance load.
5. This is a ground return that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host_Vcc.
6. Rate select can also be set through the 2-wire bus in accordance with SFF-8472 v. 11.0. Rx Rate Select is set at Bit 3, Byte 110, and Address A2h. Tx Rate Select is set at Bit 3, Byte 118, and Address A2h.

Note: Writing a "1" selects maximum bandwidth operation. Rate select is the logic OR of the input state of the Rate Select Pin and 2-wire bus.
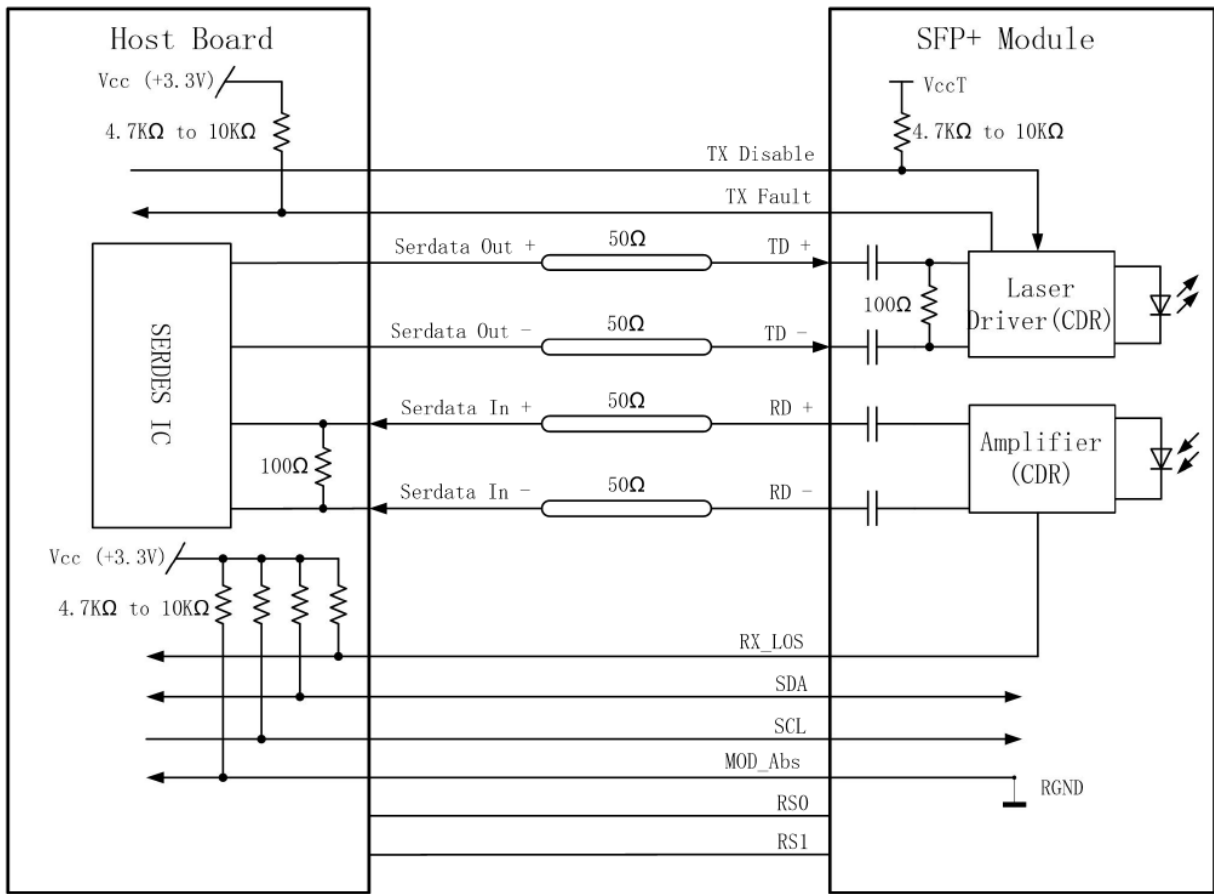
Electrical Pad Layout

	Left Side			Right Side	
11	VeeR		VeeR		10
12	RD-		RS1		9
13	RD+		Rx_LOS		8
14	VeeR		RS0		7
15	VccR		Mod_ABS		6
16	VccT		SCL		5
17	VeeT		SDA		4
18	TD+		Tx_Disable		3
19	TD-		Tx_Fault		2
20	VeeT		VeeT		1

TOWARD HOST WITH DIRECTION OF MODULE INSERTION

TOWARD BEZEL
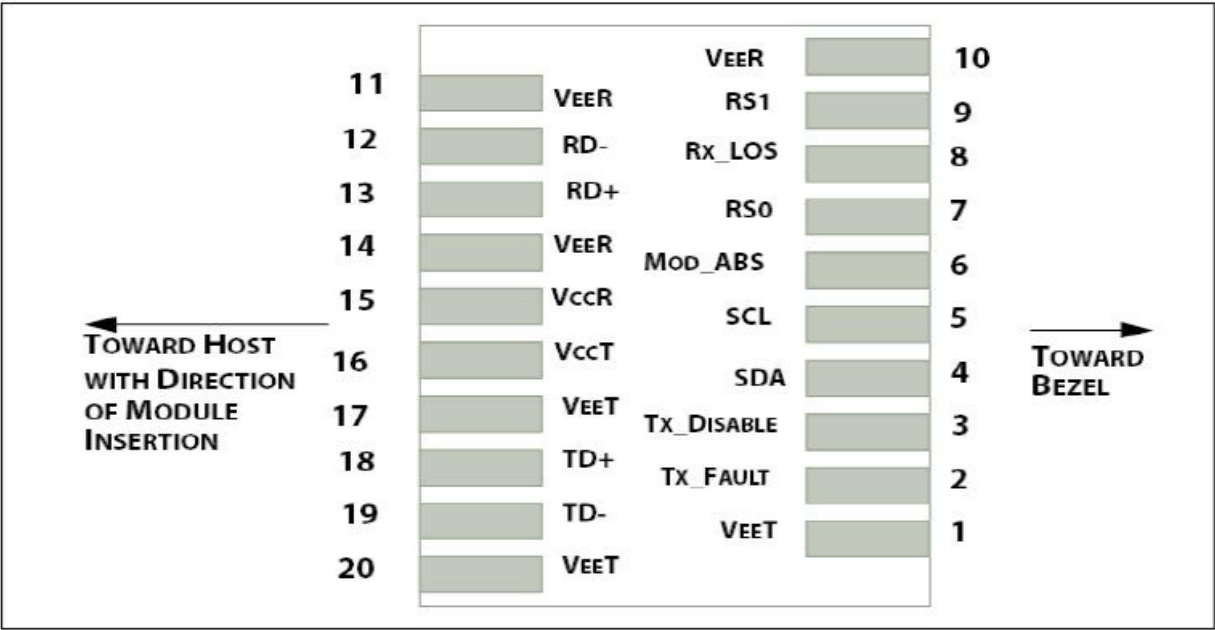
Recommended Host Board Power Supply Filter Network

0.1Ω	4.7μH	VccT

0.1μF   22μF   0.1μF

0.5Ω

Host 3.3V

4.7μH   VccR

0.1μF   22μF   0.1μF

0.5Ω

Vee

SFP+ Connector

SFP+ Module

Recommended Application Interface Block Diagram

Host Board

SFP+ Module

Vcc (+3.3V)

4.7KΩ to 10KΩ

VccT

4.7KΩ to 10KΩ

TX Disable

TX Fault

Serdata Out +   50Ω   TD +

Serdata Out −   50Ω   TD −

100Ω

Laser Driver(CDR)

Serdata In +   50Ω   RD +

Serdata In −   50Ω   RD −

100Ω

Amplifier (CDR)

SERDES IC

Vcc (+3.3V)

4.7KΩ to 10KΩ

RX_LOS

SDA

SCL

MOD_Abs

RS0

RS1

RGND

Mechanical Specifications

Unit:mm
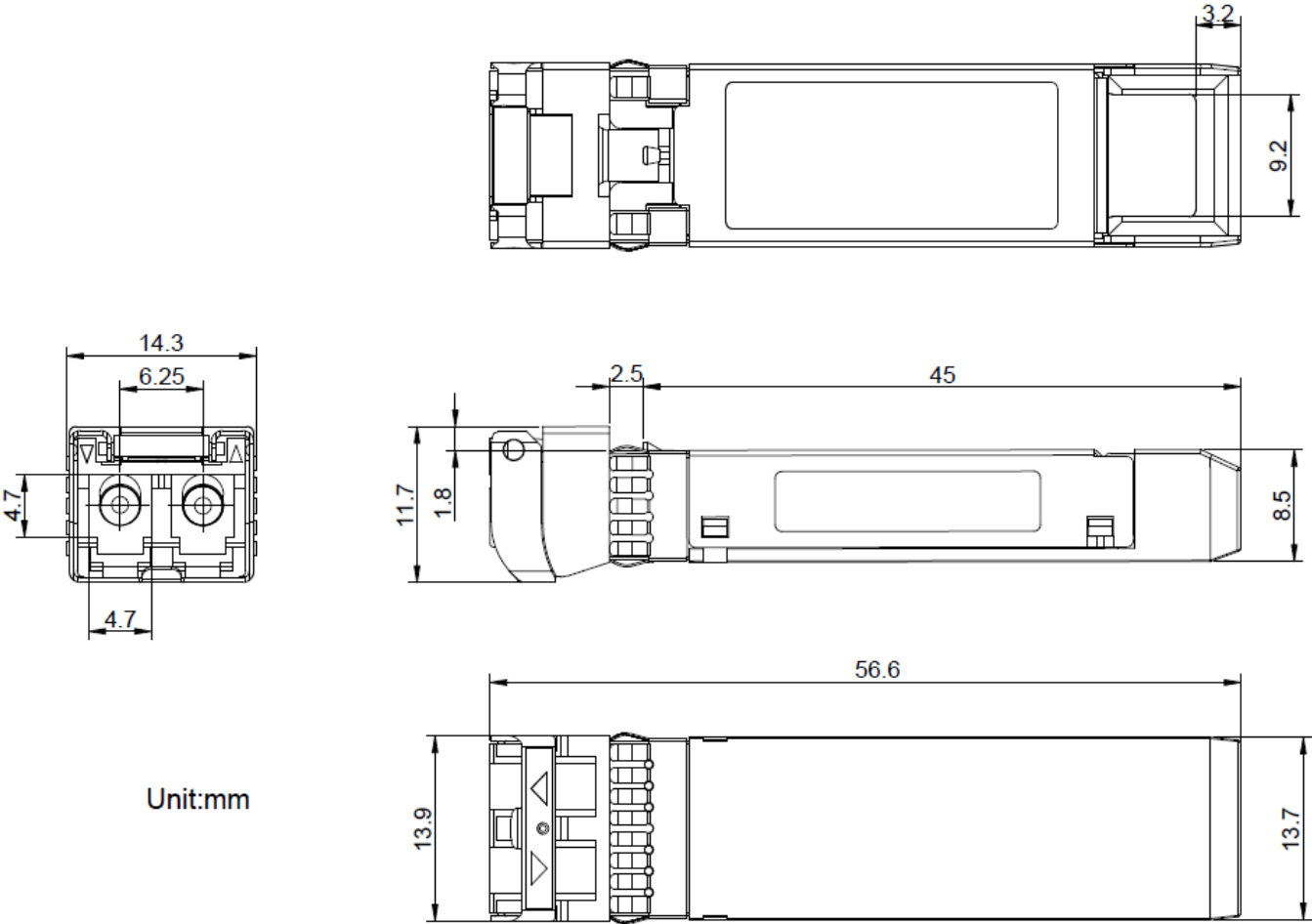
About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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