YSP96-B7340A & YSP96-B3740A

Features

- ✓ Up to 10.6Gbps data links
- ✓ 1270nm DFB Laser and APD photo-detector for YSP96-B7340A
- ✓ 1330nm DFB Laser and APD photo-detector for YSP96-B3740A
- ✓ Up to 40km on 9/125μm SMF
- ✓ Simplex LC receptacle optical interface compliant
- ✓ Hot pluggable
- ✓ All-metal housing for superior EMI performance
- ✓ RoHS6 compliant (lead free)
- ✓ Operating case temperature:
  Commercial: -5ºC to +70°C
  Extended: -20ºC to +80°C
  Industrial: -40ºC to +85°C

Applications

- ✓ 10GBASE-ER/EW 10G Ethernet
- ✓ 10G Fibre Channel
- ✓ 10G SONET
- ✓ Other optical links

Standards

- ✓ Compliant with SFP+ MSA
- ✓ Compliant with SFF-8472
- ✓ Compatible with IEEE802.3ae

Description

The SFP+ transceivers are designed for use in 10-Gigabit Ethernet links up to 40km over Single Mode Fiber. The transceivers are compatible with SFP+ MSA and SFF-8472. For further information, please refer to SFP+ MSA and SFF-8472.

Module Block Diagram
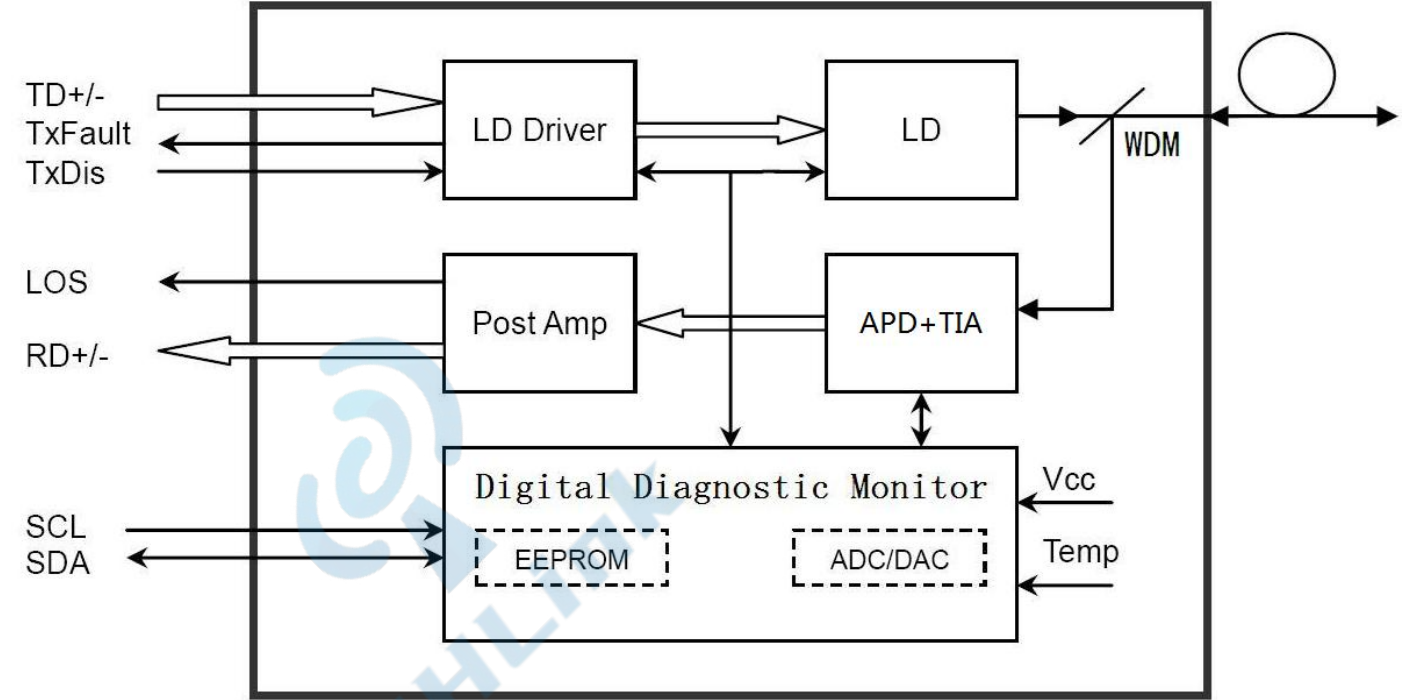
Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V_{CC}	0		3.6	V
Storage Temperature	Ts	-40		+85	°C
Relative Humidity	RH	0		85	%
RX Input Average Power	P_{max}	-		-6	dBm

Recommended Operating Environment

Parameter		Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage		V_{CC}	3.13	3.3	3.46	V
Power Supply Current		I_{CC}			300	mA
Operating Case Temperature	Commercial	T_C	-5		+70	°C
	Extended		-20		+80	
	Industrial		-40		+85	
Data Rate				10.3125		Gbps

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section						
Input Differential Impedance	R_{in}	90	100	110	Ω	
Differential Data Input Swing	$V_{in\,PP}$	180		700	mV	1
Transmit Disable Voltage	V_D	$V_{cc} - 1.3$		V_{cc}	V	
Transmit Enable Voltage	V_{EN}	V_{ee}		$V_{ee}+ 0.8$	V	
Receiver Section						
Differential Data Output Swing	$V_{out\,PP}$	300		850	mV	
LOS Fault	$V_{los\,fault}$	$V_{cc} - 0.5$		V_{cc_host}	V	2
LOS Normal	$V_{los\,norm}$	V_{ee}		$V_{ee}+0.5$	V	2

Notes:
1. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
2. LOS is an open collector output. Should be pulled up with 4.7kΩ – 10kΩ on the host board. Normal operation is logic 0; loss of signal is logic 1.

Optical Parameters

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Transmitter Section						
Centre Wavelength	λc	1260	1270	1280	nm	YSP96-B7340A
		1320	1330	1340	nm	YSP96-B3740A
Spectral Width(-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power (avg.)	P_{out}	1		+5	dBm	1
Laser Off Power	P_{off}	-	-	-30	dBm	
Extinction Ratio	ER	3.5	-	-	dB	2
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Optical Rise/Fall Time	t_r / t_f		-	50	ps	3
Optical Return Loss Tolerance		-	-	12	dB	
Output Optical Eye	Compliant with IEEE802.3ae eye masks when filtered					2
Receiver Section						
Receiver Center Wavelength	λc	1320	1330	1340	nm	YSP96-B7340A
		1260	1270	1280	nm	YSP96-B3740A
Receiver Sensitivity in Average Power	Sen	-18		-7	dBm	4
Los Assert	LOS_A	-30	-	-	dBm	
Los Dessert	LOS_D	-	-	-21	dBm	
Los Hysteresis	LOS_H	0.5	-	5	dB	
Overload	P_{in-max}	-	-	-7	dBm	4
Receiver Reflectance		-	-	-12	dB	
Receiver Power (damage)		-	-	-6	dBm	

Notes:

1. The optical power is launched into 9/125μm SMF.

2. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps.

3. Unfiltered, 20-80%. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps.

4. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps, ER=4dB, BER <10^{-12}.

Timing Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_Disable Assert Time	t_off			100	us
TX_Disable Negate Time	t_on			2	ms
Time to Initialize	t_start_up			300	ms
Tx_Fault Assert	t_fault_on			1	ms
Tx_Fault Reset	t_reset	10			us
Rx_LOS Assert Delay	t_los_on			100	us
Rx_LOS Negate Delay	t_los_off			100	us
Clock Frequency	f_{SCL}	0		400	kHz

Digital Diagnostic Monitor Characteristics (DDM)

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales stuff.
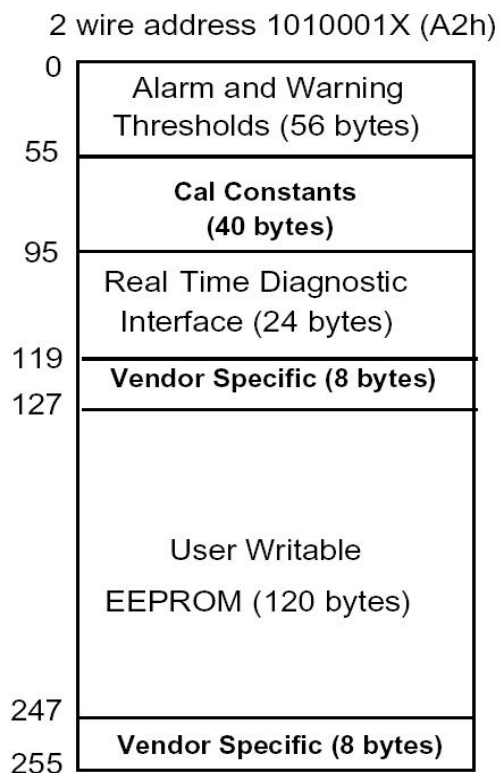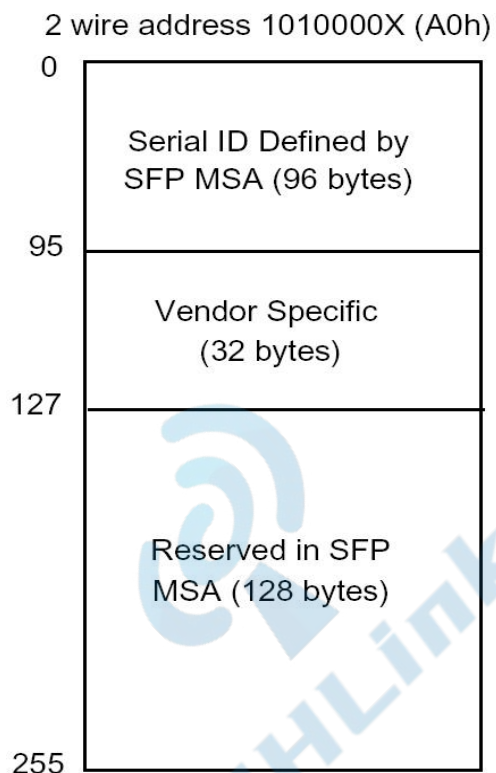
Parameter	Symbol	Min.	Max.	Unit
Temperature Monitor Absolute Error	DMI_Temp	-3	3	°C
Laser Power Monitor Absolute Error	DMI_TX	-3	3	dB
RX Power Monitor Absolute Error	DMI_RX	-3	3	dB
Supply Voltage Monitor Absolute Error	DMI_VCC	-3%	3%	V
Bias Current Monitor Absolute Error	DMI_Ibias	-10%	10%	mA

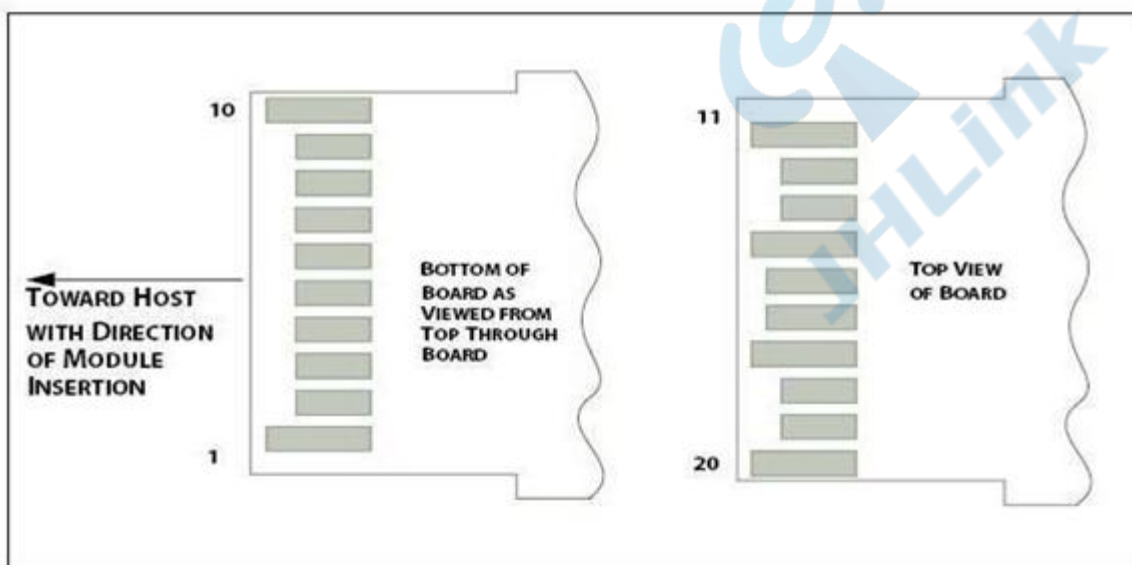## Digital Diagnostic Memory Map (Compliant with SFF-8472)

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following (For further information, please refer to SFF-8472).

2 wire address 1010000X (A0h)

```
0   ┌─────────────────────┐
    │                     │
    │  Serial ID Defined by│
    │  SFP MSA (96 bytes)  │
    │                     │
95  ├─────────────────────┤
    │                     │
    │  Vendor Specific     │
    │  (32 bytes)          │
    │                     │
127 ├─────────────────────┤
    │                     │
    │                     │
    │  Reserved in SFP     │
    │  MSA (128 bytes)     │
    │                     │
    │                     │
255 └─────────────────────┘
```

2 wire address 1010001X (A2h)

```
0   ┌─────────────────────┐
    │  Alarm and Warning   │
    │  Thresholds (56 bytes)│
55  ├─────────────────────┤
    │  Cal Constants       │
    │  (40 bytes)          │
95  ├─────────────────────┤
    │  Real Time Diagnostic│
    │  Interface (24 bytes)│
119 ├─────────────────────┤
    │  Vendor Specific (8 bytes)│
127 ├─────────────────────┤
    │                     │
    │  User Writable       │
    │  EEPROM (120 bytes)  │
    │                     │
247 ├─────────────────────┤
    │  Vendor Specific (8 bytes)│
255 └─────────────────────┘
```

Pin Definitions

SFP+ module contact assignment

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	VeeT	Module Transmitter Ground	1	1
2	TX FAULT	Module Transmitter Fault	3	
3	TX Disable	Transmitter Disable; Turns off transmitter laser output	3	
4	SDA	2-Wire Serial Interface Data Line	3	2
5	SCL	2-Wire Serial Interface Clock	3	2
6	Mod_ABS	Module Definition, Grounded in the module	3	
7	RS0	Receiver Rate Select (not used)	3	
8	LOS	Receiver Loss of Signal Indication Active LOW	3	
9	RS1	Transmitter Rate Select (not used)	3	
10	VeeR	Module Receiver Ground	1	1
11	VeeR	Module Receiver Ground	1	1
12	RD-	Receiver Inverted Data Output	3	
13	RD+	Receiver Non-Inverted Data Output	3	
14	VeeR	Module Receiver Ground	1	1
15	VccR	Module Receiver 3.3 V Supply	2	
16	VccT	Module Transmitter 3.3 V Supply	2	
17	VeeT	Module Transmitter Ground	1	1
18	TD+	Transmitter Non-Inverted Data Input	3	
19	TD-	Transmitter Inverted Data Input	3	
20	VeeT	Module Transmitter Ground	1	1

Notes:

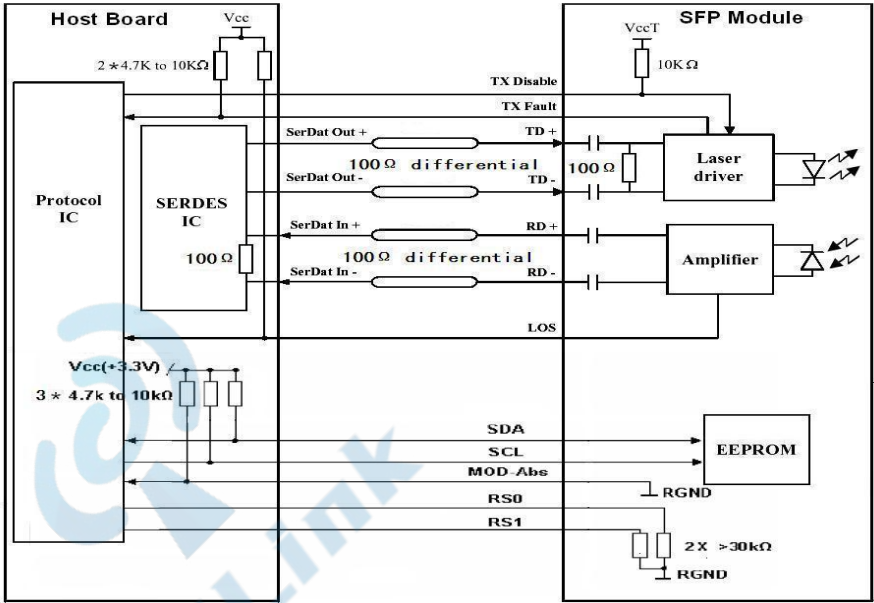Plug Seq.: Pin engagement sequence during hot plugging.
1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.
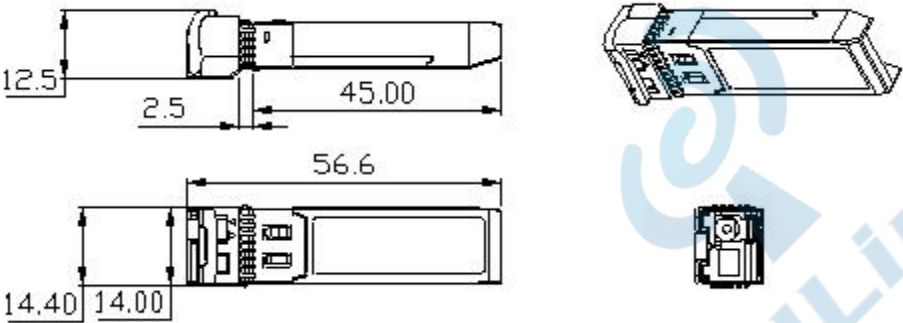
Recommended Power Interface Circuit
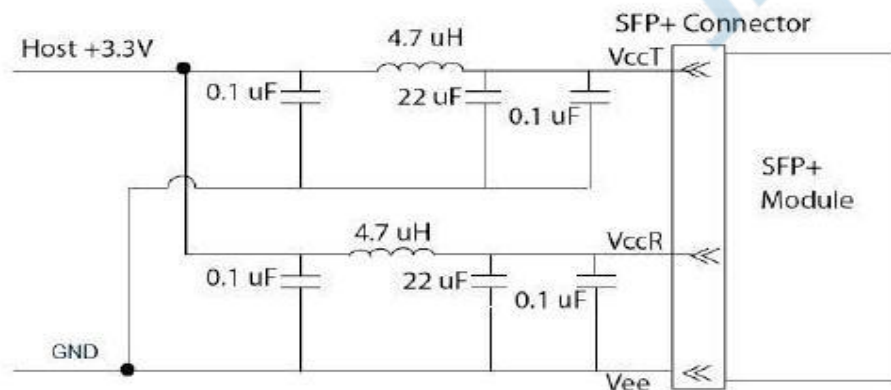
Host Board Power Supply Filters Circuit

Recommended Interface Circuit

Mechanical Dimensions

Ordering information

Part Number	Product Description
YSP96-B7340A	TX 1270nm, RX 1330nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -5ºC ~ +70ºC, With DDM.
YSP96-B7340AE	TX 1270nm, RX 1330nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -20ºC ~ +80ºC, With DDM.
YSP96-B7340AT	TX 1270nm, RX 1330nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -40ºC ~ +85ºC, With DDM.
YSP96-B3740A	TX 1330nm, RX 1270nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -5ºC ~ +70ºC, With DDM.
YSP96-B3740AE	TX 1330nm, RX 1270nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -20ºC ~ +80ºC, With DDM.
YSP96-B3740AT	TX 1330nm, RX 1270nm, 10Gbps, 40km, Bi-Directional Simplex LC SFP+ Transceiver, -40ºC ~ +85ºC, With DDM.

References

1. "Specifications for Enhanced Small Form Factor Pluggable Module SFP+", SFF-8431, Rev 4.1, July 6, 2009.
2. "Improved Pluggable Form factor", SFF-8432, Rev 4.2, Apr 18, 2007.
3. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.2, June 1, 2007.
4. IEEE802.3ae 2002.

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