

Copper SFP Transceiver

Features:

- Up to 1.25 Gb/s bi-directional data links
- Hot-pluggable SFP footprint
- Low power dissipation(1.05W typical)
- Compact RJ-45 connector assembly
- Fully metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- 10/100/1000 BASE-T operation in host systems with SGMII interface
- 1.25 Gigabit Ethernet over Cat 5 cable
- Ambient Operating temperature: (-10°C to +85°C)

PRODUCT DESCRIPTION

HydraX series Copper Small Form Pluggable (SFP)transceivers is high performance, cost effective module compliant with the Gigabit Ethernet and 1000- BASE-T standards as specified in IEEE 802. 3-2002 and IEEE 802.3ab, which supp- orting 1000Mbps data- rate up to 100 meters reach over unshielded twisted-pair category 5 cable. The module supports1000 Mbps full duplex data-links with 5-level Pulse Amplitude Modulation (PAM) signals. All four pairs in the cable are used with symbol rate at 250Mbps on each pair. The module provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2wire serial CMOS EEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address A0h

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note1
3	TX DISABLE	Transmitter Disable	3	Note2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note3
6	MOD_DEF(0)	TTL Low	3	Note3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	VEER	Receiver ground	1	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note5

13	RD+	Received Data Out	3	Note5
14	VEER	Receiver ground	1	
15	VCCR	Receiver Power Supply	2	
16	VCCT	Transmitter Power Supply	2	
17	VEET	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note6
19	TD-	Inv. Transmit Data In	3	Note6
20	VEET	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1) TX Fault is not supported and is always connected to ground.

2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 "C 10 K resistor. Its states are:

Low (0 to 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 to 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K to 10K resistor on the host board. The pull-up voltage shall be VccT or VccR

Mod-Def 0 is grounded by the module to indicate that the module is present

Mod-Def 1 is the clock line of two wire serial interface for serial ID

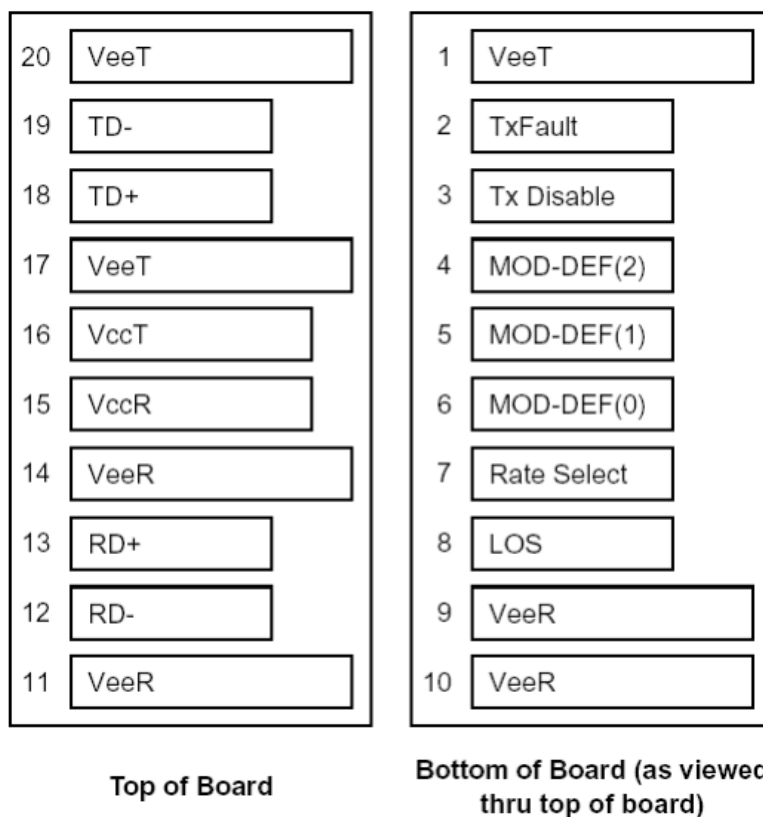
Mod-Def 2 is the data line of two wire serial interface for serial ID

4) LOS is not supported and is always connected to ground.

5) RD-/+: These are the differential receiver outputs. They are AC coupled 100 differential lines which should be terminated with 100 (differential) at the user SERDES.

6) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 differential termination inside the module

Pin Diagram



+3.3V Volt Electrical Power Interface

The SFP-10/100/1000M-RJ45-100M has an input voltage range of +3.3V +/- 5%. The 3.3V maximum voltage is not allowed for continuous operation.

Table 1. +3.3V Volt electrical power interface

+3.3V volt Electrical Power Interface						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Supply Current	is		320	375	mA	1.2W max power over full range of voltage and temperature See caution note below
Input Voltage	Vcc	3.13	3.3	3.47	V	Referenced to GND
Maximum Voltage	Vmax			4	V	
Surge Current	Isurge			30	mA	Hot plug above steady state current. See caution note below

Caution: Power consumption and surge current are higher than the specified values in the SFP MSA

Low-Speed Signals

MOD_DEF(1) (SCL) and MOD_DEF(2) (SDA), are open drain CMOS signals (see section VII, "Serial Communication Protocol"). Both MOD_DEF(1) and MOD_DEF(2) must be pulled up to host_Vcc.

Table 2. Low-speed signals, electronic characteristics

+3.3V volt Electrical Power Interface					
Parameter	Symbol	Min	Max	Units	Notes/Conditions
SFP Output LOW	VOL	0	0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Output HIGH	VOH	host_Vcc -0.5	host_Vcc+0.5	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Input LOW	VIL	2	0.8	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector
SFP Input HIGH	VIH	2	Vcc+0.3	V	4.7k to 10k pull-up to Vcc, measured at SFP side of connector

High-Speed Electrical Interface

All high-speed signals are AC-coupled internally.

Table 3. High-speed electrical interface, transmission line-SFP

+3.3V volt Electrical Power Interface						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Line Frequency	FL		125		MHz	5-level encoding, per IEEE 802.3u
Tx Output Impedance	Zout,TX		100		Ohm	Differential, for all Frequencies between 1MHz and 125MHz
Rx Input Impedance	Zin,RX		100		ohm	Differential, for all Frequencies between 1MHz and 125MHz

High-speed electrical interface, host-SFP

Table 4. High-speed electrical interface, host-SFP

+3.3V volt Electrical Power Interface						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Single ended data input swing	Vinsing	250		1200	mV	Single ended
Single ended data output swing	Voutsing	350		800	mV	Single ended
Rise/Fall Time	Tr,Tf		175		Psec	20%-80%
Tx Input Impedance	Zin		50		Ohm	Single ended
Rx Output Impedance	Zout		50		ohm	Single ended

General Specifications

General						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 See Notes 2 through 4 below
Cable Length	L			100	m	Category 5 UTP. BER<10 ⁻¹²

Notes:

1. Clock tolerance is +/- 50 ppm
2. By default, the WEP-AGESRNC5 is a full duplex device in preferred master mode
3. Automatic crossover detection is enabled. External crossover cable is not required
4. 10/100/1000 BASE-T operation requires the host system to have an SGMII interface with no clocks.

With a SERDES that does not support SGMII, the module will operate at 1000BASE-T only

Environmental Specifications

Table 6. Environmental specifications

Environmental Specifications						
Parameter	Symbol	Min	Typ	Max	Units	Notes/Conditions
Operating Temperature	Top	0		70	°C	Case temperature
Storage Temperature	Top	-40		85	°C	Ambient temperature

Mechanical Specifications

The host-side of the conforms to the SFP-10/100/1000M-RJ45-100M mechanical specifications outlined in the SFP MSA1. The front portion of the SFP (part extending beyond the face plate of the host) is larger to accommodate the RJ-45 connector

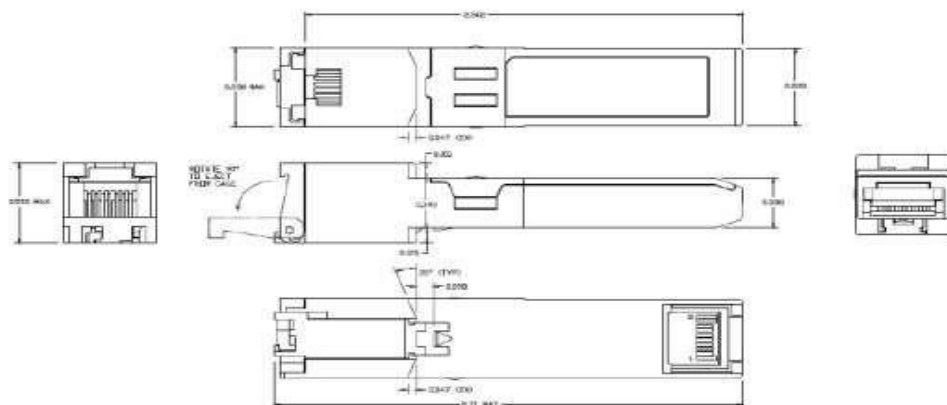


Figure 2. SFP-10/100/1000M-RJ45-100M mechanical dimensions

Ordering Information

Part number	Operating Case temperature
SFP-13001001XRSW	10/100/1000Mbps only, Copper SFP with spring latch