10/100BASE-T Copper Transceiver
Small Form Pluggable (SFP), 3.3V
100 Mbps Fast Ethernet

Features

- Compliant with IEEE 802.3u standard
- Link distance at 100Mbps: up to 100m per IEEE802.3
- EEPROM with serial ID functionality
- Detailed product information in EEPROM
- Industry standard small form pluggable (SFP) package
- Compact RJ-45 connector assembly
- Fully metallic enclosure for low EMI
- +3.3V single power supply

Application

- SFP over 10/100Mbps copper Ethernet
- Distributed multi-processing
- High speed I/O for file server or high-end workstation
- Switch/Router to Switch/Router Link

Description

APAC SFP-T1 10/100BASE-T copper SFP transceiver is high performance, cost effective module compliant with the 100Mbps Fast Ethernet and 100BASE-F standards as specified in IEEE 802.3, which supporting 100Mbps data- rate up to 100 meters reach over UTP cable. The SFP-T1 supports 100 Mbps full duplex data-links with 3-level Pulse Amplitude Modulation (PAM) signals. The SFP-T1 provides standard serial ID information compliant with SFP MSA, which can be accessed with address of A0h via the 2-wire serial EEPROM protocol.

Ordering Information

PART NUMBER	INTERFACE	Speed Mode	VOLTAGE	TEMPERATURE
SFP-T1	LVPECL	Auto-negotiation 10/100Mbps	3.3V	0°C to 70 °C
SFP-T1A	LVPECL	Auto-negotiation on and 100 Mbps full duplex only	3.3V	0°C to 70 °C
SFP-T1B	LVPECL	Auto-negotiation off and force on 100 Mbps full duplex	3.3V	0°C to 70 °C

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Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	*Ts*	-10	80	°C	
Supply Voltage	*Vcc*	3.0	3.63	V	

Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Operating Temperature	*T*	0	70	°C	
Supply Voltage	*Vcc*	3	3.45	V	Typ. 3.3V
Power Consumption	*P*		560	mW	
Supply Current	*I*		170	mA	
Surge Current	*Isurge*		30	mA	Hot Plug

Electrical Characteristics

Vcc = 3 V to 3.6 V, *T* = 0 °C to 70 °C

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Transmitter						
Data Input differential Voltage	$V_{D,TX}$	0.25	---	1.20	V	1
Differential Input Impedance	Z_{TX}	80	100	120	Ohm	
Transmitter Disable Input-High	V_{Dish}	0.6* V_{cc}	---	---	V	
Transmitter Disable Input-Low	V_{DISL}	---	---	*0.4** V_{cc}	V	
Receiver						
Data Output Differential Voltage	$V_{D,RX}$	0.35	---	0.8	V	1
Differential Output Impedance	Z_{RX}	80	100	120	Ohm	
Data Output Rise/Fall Time	$Tr,_{,RX}/Tf,_{,RX}$	---	2	---	nS	2
LOS Output	V_{SDHL}	0	---	$V_{cc+}0.3$	V	

Note:
1) Internally AC coupled and terminated to 100 Ohm differential load.
2) 20% ~80% value

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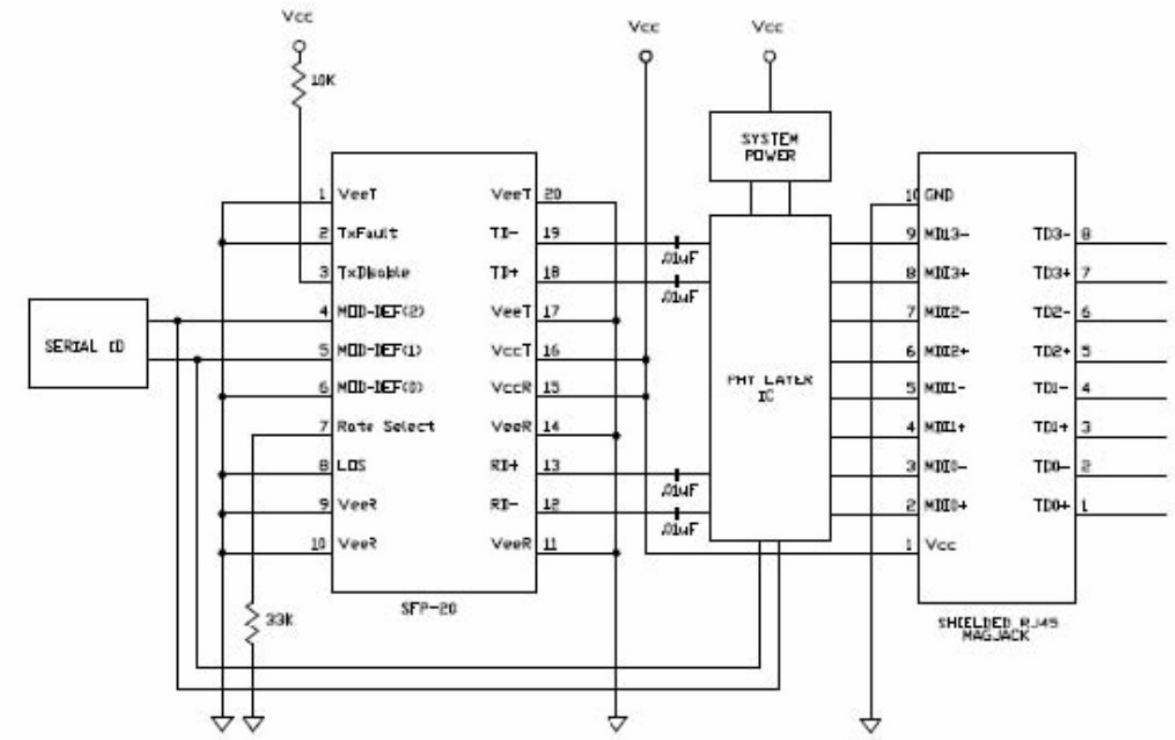
Block Diagram of Transceiver



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Power Coupling

A suggested layout for power and ground connections is given in *Figure 1* below. Connections are made via separate voltage and ground planes. The mounting posts are at case ground and should not be connected to circuit ground. The ferrite bead should provide a real impedance of 50 to 100 ohms at 100 to 1000 MHz. Bypass capacitors should be placed as close to the 20 pin connector as possible.

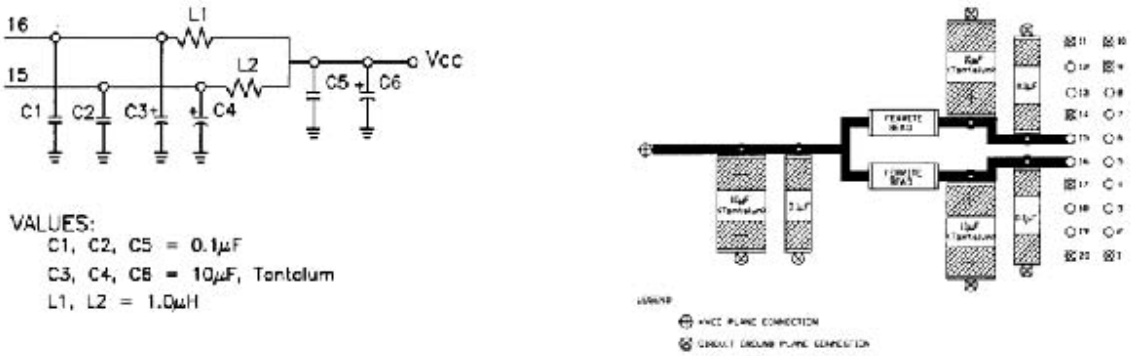

Figure 1: Suggested Power Coupling

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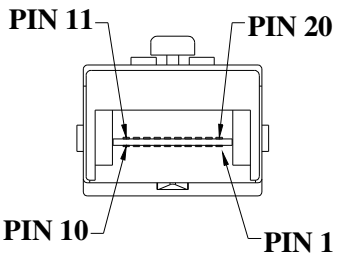
Connection Diagram

Pin-Out



Pin	Signal Name	Function	NOTES
1	VeeT	Transmitter Ground	VeeT and VeeR are connected in SFP.
2	TX_FAULT	Transmitter Fault Indication	Not Implemented. Floating.
3	TX_DISABLE	Transmitter Disable	Not Implemented. Floating.
4	MOD DEF (2)	Module Definition 2	Data Line for Serial ID.
5	MOD DEF (1)	Module Definition 1	Clock Line for Serial ID.
6	MOD DEF (0)	Module Definition 0	Tied to Vee in SFP-T1.
7	RATE SELECT	Not Implemented	Not implemented.
8	LOS	Loss of Signal	Loss of Signal
9	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP.
10	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP.
11	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP.
12	RD-	Inverted Received Data out	AC coupled 100 ohm differential high speed data lines.
13	RD+	Non-Inverted Received Data out	AC coupled 100 ohm differential high speed data lines.
14	VeeR	Receiver Ground	VeeT and VeeR are connected in SFP.
15	VccR	Receiver Power	VccR and VccT are connected in SFP.
16	VccT	Transmitter Power	VccR and VccT are connected in SFP.
17	VeeT	Transmitter Ground	VeeT and VeeR are connected in SFP.
18	TD+	Non-inverted Data In	AC coupled 100 ohm differential high speed data lines.
19	TD-	Inverted Data In	AC coupled 100ohm differential high speed data lines
20	VeeT	Transmitter Ground	Veet and VeeR are connected in SFP

Notes:

1. TX Fault is not used and is always tied to ground.

2. TX Disable as described in the MSA is not applicable to the 100BASE-T module.

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3. Mod-Def 0,1, 2. These are the module definition pins. They should be pulled up with an 4.7-10 K resistor on the host board to a supply less than VCCT + 0.3 V or VCCR + 0.3 V.
4. RD-/+: These are the differential receiver outputs. They are ac coupled 100 Ohm differential lines which should be terminated with 100 ohm differential. The ac coupling is done inside the module and is thus not required on the host board. The voltage swing levels are compatible with LVPECL voltage swings.
5. VCCR and VCCT are the receiver and transmitter power supplies. They are defined as 3.3 V ± 5% at the SFP connector pin.
6. TD-/+: These are the differential transmitter inputs. They are ac coupled differential lines with 100 Ohm differential termination inside the module. The ac coupling is done inside the module and is thus not required on the host board. The inputs levels are compatible with LVPECL voltage swings.

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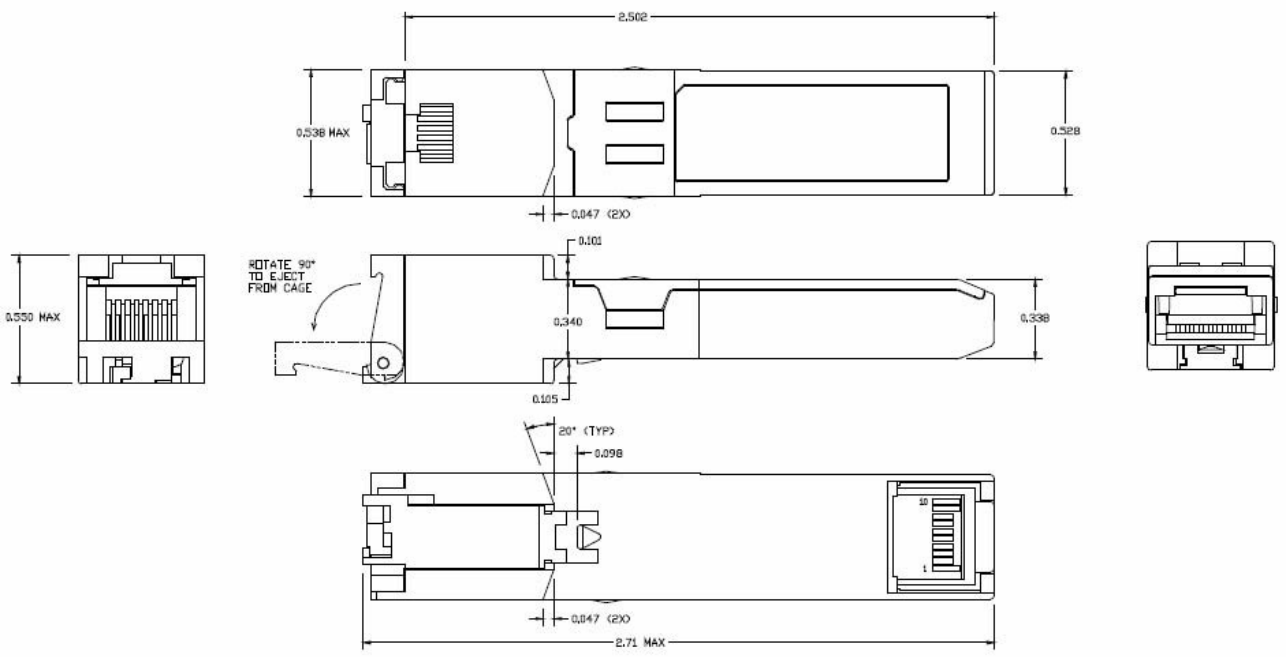
Drawing Dimensions



Unit : inch

Mating of SFP Transceiver to SFP Host Board Connector

The pads on the PCB of the SFP transceiver shall be designed for a sequenced mating as follows: First mate: Ground contacts. Second mate: Power contacts. Third mate: Signal contacts The SFP MSA specification for a typical contact pad plating for the PCB is 0.38 micrometers minimum hard gold over 1.27 micrometers minimum thick nickel. To ensure the long term reliability performance after a minimum of 50 insertion removal cycles, the contact plating of the transceiver is 0.762 micron (30 micro-inches) over 3.81 micron (150 micro-inches) of Ni on Cu contact pads.

RJ45 Connector

RJ45 connector shall support shielded and unshielded cables. Also, the connector is mechanically robust enough and designed to prevent loss of link, when the cable is positioned or moves in different angles. The connector shall pass the “wiggle” RJ45 connector operational stress test. During the test, after the cable is plugged in, the cable is moved in circle to cover all 360 deg in the vertical plane, while the data traffic is on. There shall be no link or data loss.

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