

10/100/1000 BASE-T COPPER SFP TRANSCEIVER

KAB-SFP-T-1G

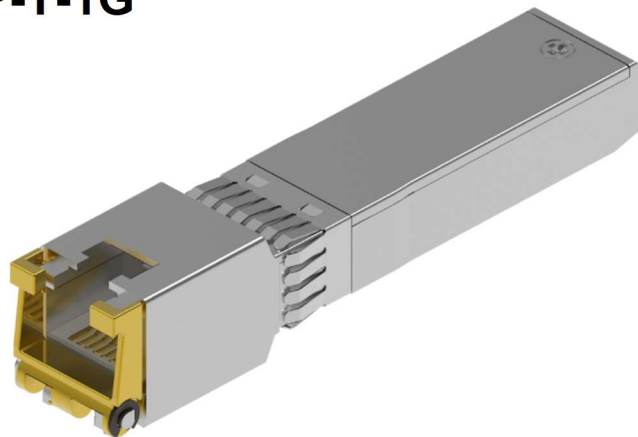
Features

- ❖ Up to 1.25Gb/s bi-directional data links
- ❖ Hot-pluggable SFP footprint
- ❖ Fully metallic enclosure for low EMI
- ❖ Low power dissipation (1.05 W typical)
- ❖ Compact RJ-45 connector assembly
- ❖ Compatible with RoHS and lead-free
- ❖ 10/100/1000Mbps compliant in host systems

with SGMII interface Case operating temperature:

Commercial: 0 °C to +70 °C

Industrial: -40 °C to +85 °C



Applications

1.25 Gigabit Ethernet over Cat 5 cable

Description

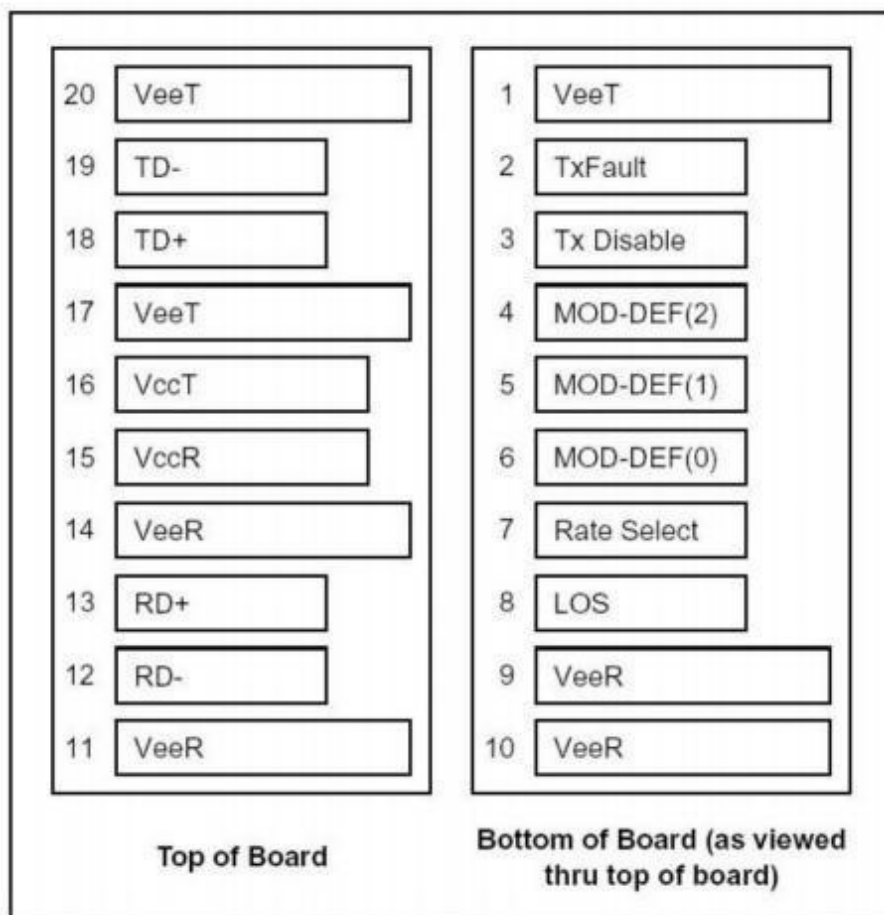
KAB's KAB-SFP-T-1G Small Form Pluggable (SFP) transceiver is high-performance, cost-effective module compliant with the Gigabit Ethernet and 1000- BASE-T standards as specified in IEEE 802. 3- 2002 and IEEE 802.3ab, which supporting 1000Mbps data- rate up to 100meters reach over unshielded twisted-pair category 5 cable. The module supports 1000Mbps 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 CMOSEEPROM protocol. The physical IC can also be accessed via 2wire serial bus at address A0h.

Ordering information

Part Number	Speed mode	MAC interface	TX Disable function	Link Indicator on RX_LOS Pin	Temp
KAB-SFP-T-1G	1000mbps	SERDES	YES	YES	0~70
KAB-SFP-T-1G-I	1000mbps	SERDES	YES	YES	-40~85

Pin Definitions

Pin Diagram



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	Note4
9	Veer	Receiver ground	1	
10	Veer	Receiver ground	1	
11	Veer	Receiver ground	1	
12	RX-	Inv. Receiver Data Out	3	Note5
13	RX+	Receiver Data Out	3	Note5
14	VeeR	Receiver ground	1	
15	VccR	Receiver Power Supply	2	

Pin	Signal Name	Description	Plug Seq.	Notes
16	VccT	Transmitter Power Supply	2	
17	VeeT	Transmitter Ground	1	
18	TX+	Transmit Data In	3	Note6
18	TX-	Inv. Transmit Data In	3	Note6
20	VeeT	Transmitter Ground	1	

Notes:

Plug Seq: Pin engagement sequence during hot plugging.

1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

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 K 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 (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K to 10K resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to <0.8V.

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 terminations inside the module.

+3.3V Volt Electrical Power Interface

The KAB-SFP-T-1G has an input voltage range of +3.3V +/- 5%. The 3.3 V maximum voltage is not allowed for continuous operation.

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+3. 3 Volt Electrical PowerInterface						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Supply Current	Is		320	375	mA	1.2 W 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 notebelow

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

Low-Speed Signals, Electronic Characteristics					
Parameter	Symbol	Min	Max	unit	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 + 0.3	V	4.7k to 10k pull-up to host_Vcc, measured at host side of connector
SFP Input LOW	VIL	0	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.

High-Speed Electrical Interface, Transmission Line-SFP						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Line Frequency	fL		125		MHz	5- level encoding, per IEEE 802.3
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

High-Speed Electrical Interface,				Host-SFP		
Parameter	Symbol	Min	Typ	Max	unit	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	unit	Notes/Conditions
Data Rate	BR	10		1000	Mb/sec	IEEE 802.3 compatible. See Notes2 through 4 below
Cable Length	L			100	m	Category 5UTP.BER<10-12

Notes:

Clock tolerance is +/- 50 ppm

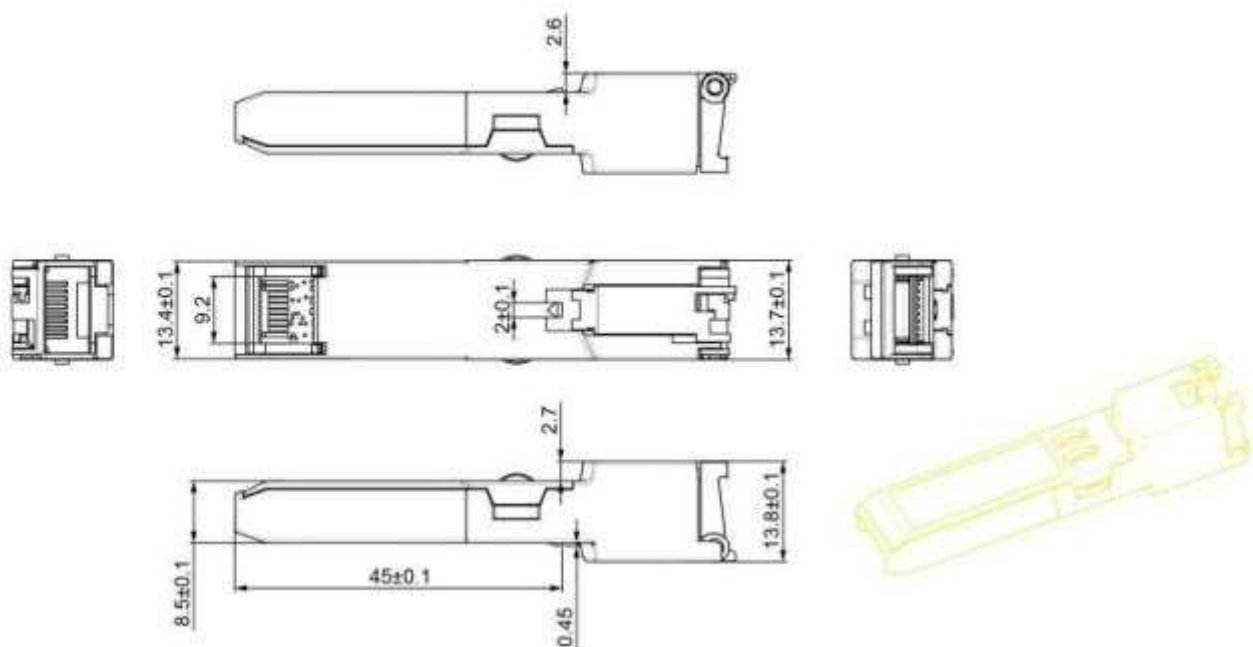
By default, the KAB-SFP-T-1G is a full duplex device in preferred master mode

Automatic crossover detection is enabled. External crossover cable is not required KAB-SFP-T-1G does not support SGMII. With a SERDES the module will operate at 1000 BASE-T.

Environmental Specifications

Environmental Specification						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Case Operating Temperature	Tcase	0		70	°C	KAB-SFP-T-1G
		-40		85	°C	KAB-SFP-T-1G-I
Storage Temperature	Tsto	-40		85	°C	Ambient temperature

Mechanical Specifications(Unit:mm)



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