



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: -20°C to +75°C

Application

- Distributed multi-processing
- Switch to switch interface
- High speed I/O for file server
- Bus extension application
- Channel extender, data storage

Ordering Information

PART NUMBER	INPUT/OUTPUT	MONITOR	VOLTAGE	TEMPERATURE
SFP-1000FXXX-DX1	AC/AC	X	3.3V	-20°C to 75 °C

Product selection

<i>P/N</i>	Link Indicator on RX_LOS Pin	1000BASE-X auto-negotiation enabled by default
AX0012-X1-T	<i>No</i>	<i>Yes</i>

SFP to Host Connector Pin Out

<i>PIN</i>	<i>SYMBOL</i>	<i>Name/ Description</i>	<i>Ref.</i>
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault. Not supported.	
3	T _{DIS}	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
10	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is connected to chassis ground
2. PHY disabled on TDIS > 2.0V or open, enabled on TDIS < 0.8V
3. Should be pulled up with 4.7k - 10k Ohms on host board to a voltage between 2.0 V and 3.6 V.
MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LVTTTL compatible with a maximum voltage of 2.5V. Not supported on AX0012-X1-T.



Figure 1. Diagram of host board connector block pin numbers and names

II. +3.3V Volt Electrical Power Interface

Have an input voltage range of 3.3 V +/- 5%. The 4V maximum voltage is not allowed for continuous operation.

+3.3 Volt Electrical Power Interface						
Parameter	Symbol	Min	Typ	Max	unit	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

III. 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

IV. 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						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Single ended data input swing	V_{insig}	250		1200	mV	Single ended
Single ended data output swing	V_{outsig}	350		800	mV	Single ended
Rise/Fall Time	T_r, T_f		175		psec	20%-80%
Tx Input Impedance	Z_{in}		50		Ohm	Single ended
Rx Output Impedance	Z_{out}		50		Ohm	Single ended

V. General Specifications

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

Notes:

1. Clock tolerance is +/- 50 ppm
2. By default, the AX0012-X1-T 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.

VI. Environmental Specifications

Environmental Specifications						
Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
Operating Temperature	T_{op}	-20		75	°C	Case temperature
Storage Temperature	T_{sto}	-40		85	°C	Ambient temperature

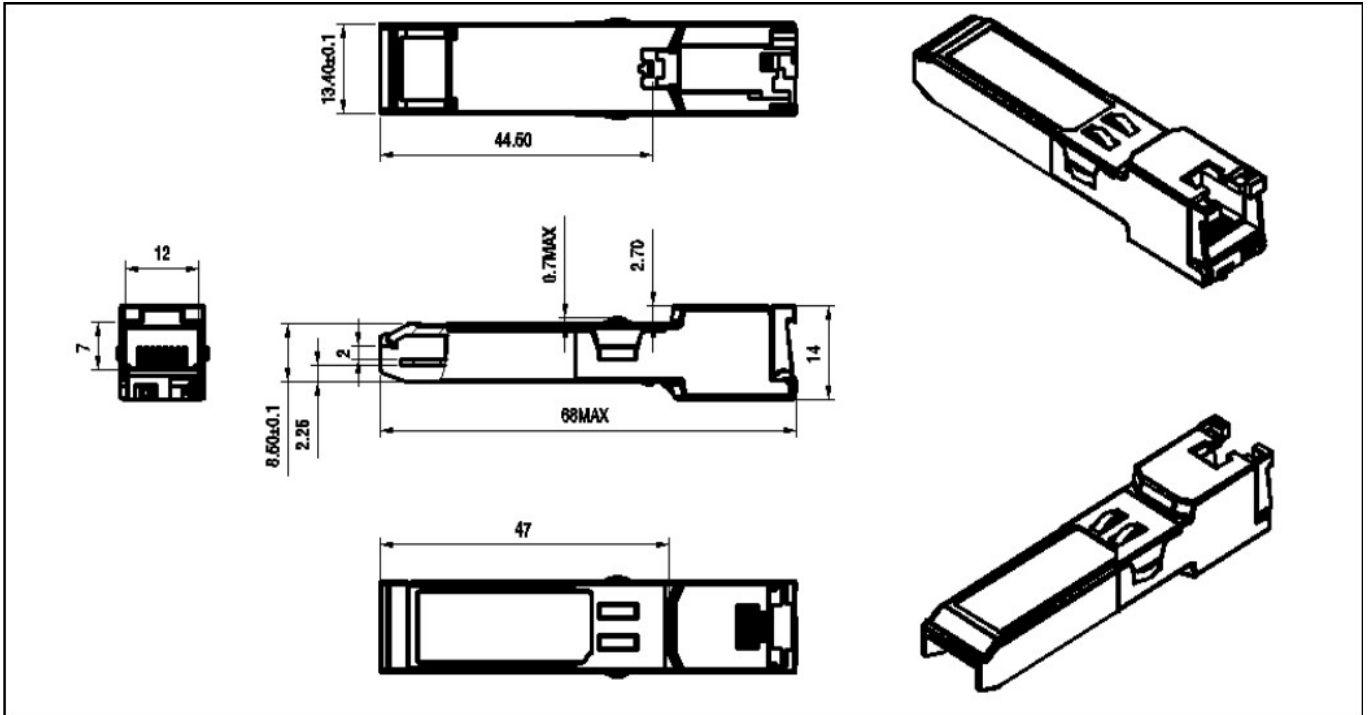
VII. Serial Communication Protocol

All APC SFPs support the 2-wire serial communication protocol outlined in the SFP MSA. These SFPs use an Atmel AT24C02B 128 byte EEPROM with an address of A0h. The 1000BASE-T physical layer IC can also be accessed via the 2-wire serial bus at address ACh. For details interfacing with the PHY IC, see Marvell data sheet titled "Alaska Ultra 88E1111 Integrated Gigabit Ethernet Transceiver" (Marvell document number MV-S100649-00).

Serial Bus Timing Requirements

Parameter	Symbol	Min	Typ	Max	unit	Notes/Conditions
I ² C Clock Rate		0		100,000	Hz	

VIII. Mechanical Specifications (Unit:mm)



Eye Safety Mark

The SFP series multimode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

Required Mark

Class 1 Laser Product
Complies with
21 CFR 1040.10 and 1040.11

Note : All information contained in this document is subject to change without notice.