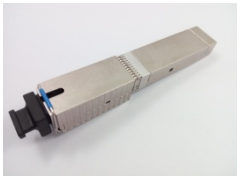
GEPON ONU STICK
(MAC Inside)

Preliminary

UEP-N1S

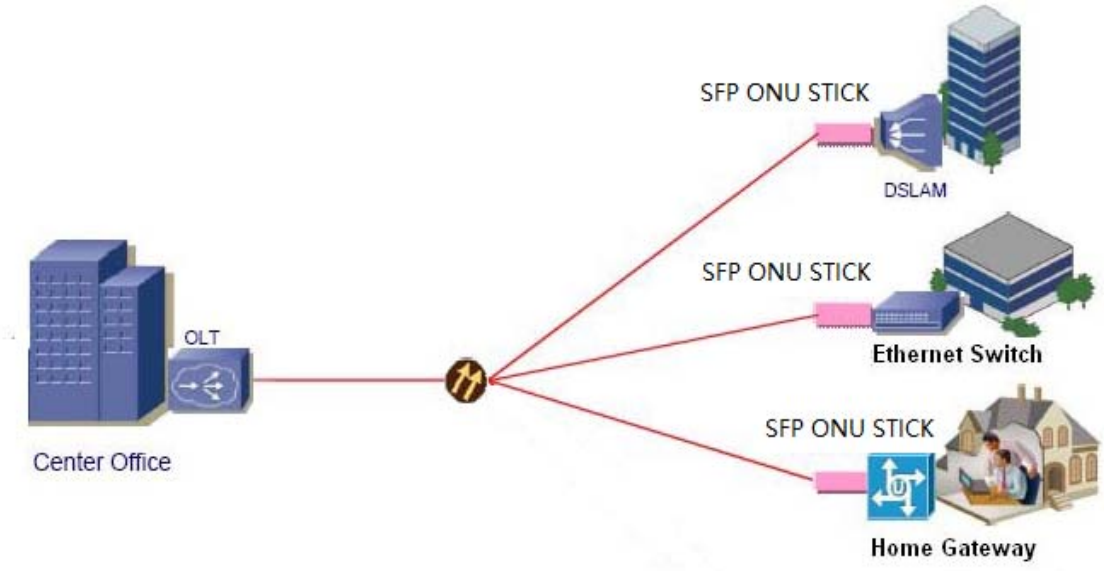
FEATURES

- Single fiber bi-directional data links asymmetric TX 1250Mbps / RX 1250Mbps GEPON ONU application with GEPON MAC function.
- SC/UPC receptacle SFP with GEPON ONU MAC inside, “Plug-and-play” via auto-discovery and configuration
- 1310nm FP burst mode transmitter, 1490nm TIA continuous mode receiver
- Single 3.3V power supply
- Digital diagnostic monitor be retrieved by OLT remotely
- SFP MSA compliance
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS compliance
- EPON ONU compatible
- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
- Complies with IEEE802.3AH



APPLICATIONS

- Gigabit-capable Passive Optical Networks (GEPON)
- The product is an MSA-compliant SFP that incorporates not just the optics for an ONU, but all of the electronics need as well. It is a “PON on a Stick” that an entire FTTH ONU in a slightly oversized SFP. It can be plugged into networking equipment. Allowing the data interfaces on a switch, router, etc. to be customized for different fiber environments and distance requirements



GEPON ONU STICK (MAC Inside)

Preliminary

UEP-N1S

ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T_{STG}	-40	85	°C	
Operating Case Temperature	T_c	0	70	°C	
	T_c	-40	85	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Dissipation	PD	-	2.10	2.5	W	Max value under High temp environment
Operating Case Temperature	T_c	0		+70	°C	
	T_c	-40		+85	°C	
Operating Humidity Range	OH	5		95	%	
Data Rate			TX:1.250/ RX:1.25		Gbit/s	
Data Rate Drift		-100		+100	PPM	

TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Optical Center Wavelength	λ_C	1290	1310	1330	nm	
Spectral Width (RMS)	$\Delta\lambda$			3	nm	
Average Launch Optical Power	AOP	0		5	dBm	Launched into SMF Fiber
Burst off Average Output Power				-45	dBm	
Extinction Ratio	ER	9			dB	
Rise/Fall Time (20%-80%)	T_R/T_F			0.26	ns	Unfiltered
$RIN_{15}OMA$				-115	dB/Hz	
Optical Return Loss Tolerance		-15			dB	
Transmitter Reflectance				-10	dB	
Optical Waveform Diagram			Compliant With IEEE802.3AH			PRBS 2^7–1 @1250Mbps

TRANSMITTER ELECTRICAL CHARACTERISTICS						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Notes**
Data Input Differential Swing		300		1800	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter TxDisable Control Voltage -		0		0.8	V	
Transmitter TxDisable Voltage - High		2.0		V_{CC}	V	
Transmitter Fault Alarm Voltage - Low		0		0.4	V	
Transmitter Fault Alarm Voltage – High		2.4		Vcc	V	

RECEIVER OPTICAL CHARACTERISTICS						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Notes**
Operating Wavelength	λ_c	1480	1490	1500	nm	
Sensitivity	SEN			-27	dBm	PRBS 2^7 - 1 @1250Mbps
Saturation Optical Power	SAT	-3			dBm	
Loss of Signal De-Assert	LOSD			-29	dBm	
Loss of Signal Assert	LOSA	-40			dBm	
Signal-Detected Hysteresis		0.5		6	dBm	
Receiver Reflectance				-12	dB	λ=1490nm

RECEIVER ELECTRIAL CHARACTERISTICS						
Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Unit**	**Notes**
Data Output Differential Swing		300		1200	mV	CML output, AC coupled
Loss of Signal - Low		0		0.4	V	
Loss of Signal - High		2.4		V_{CC}	V	

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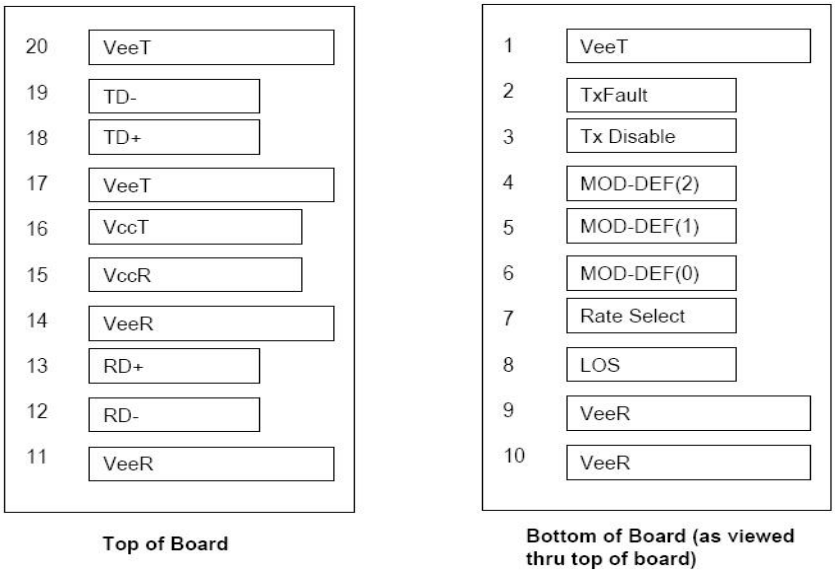


Figure 1 SFP Transceiver Electrical Pad Layout

PIN DESCRIPTION			
PIN	**Name**	**Description**	**Notes**
1	VeeT	Transmitter Ground	Note 5
2	TX Fault	Transmitter Fault Indication	Note 1
3	TX Disable	Transmitter Disable	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	Note 3,2 wire serial ID Interface
5	MOD-DEF1	Module Definition 1	Note 3,2 wire serial ID Interface
6	MOD-DEF0	Module Definition 0	Note 3 Grounded in Module
7	Rate	NC	-
8	LOS	Loss of Signal	Note 4
9	VeeR	Receiver Ground	Note 5
10	VeeR	Receiver Ground	Note 5
11	VeeR	Receiver Ground	Note 5
12	RD-	Inv. Received DataOut	Note 6
13	RD+	Received Data Out	Note 6
14	VeeR	Receiver Ground	Note 5
15	VccR	Receiver Power	3.3 ±5%, Note 7
16	VccT	Transmitter Power	3.3 ±5%, Note 7
17	VeeT	Transmitter Ground	Note 5
18	TD+	Transmit Data In	Note 8
19	TD-	Inv.Transmit Data In	Note 8
20	VeeT	Transmitter Ground	Note 5

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1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 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 – 10KΩ resistor. Its states are:
   Low (0 – 0.8V): Transmitter on
   (>0.8, < 2.0V): Undefined
   High (2.0 – 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 – 10KΩ 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 – 10KΩ 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) VeeR and VeeT may be internally connected within the SFP module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 – 1000 mV single ended) when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP connector pin. Maximum supply current is 600 mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1Ω=should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30 mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200 mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600 mV single-ended) be used for best EMI performance.

Recommended Host Board Supply Filtering Network

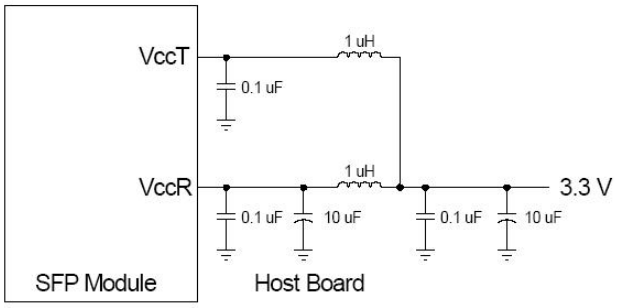


Figure 2 Recommended Host Board Supply Filtering Network

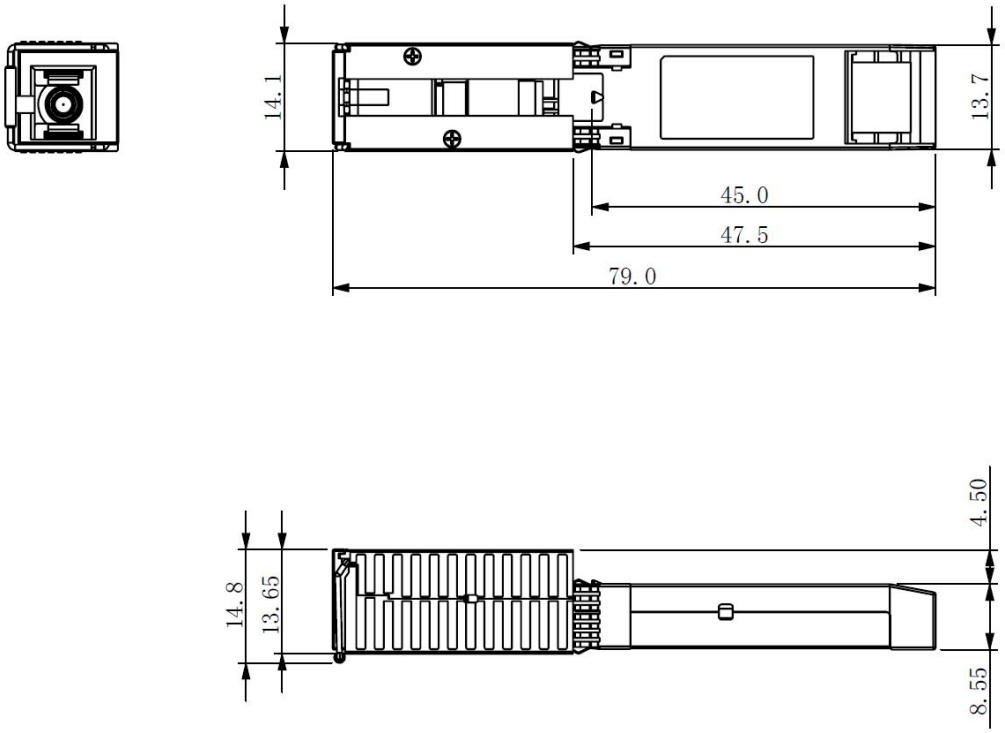


Figure 3 Mechanical Specifications

DESCRIPTION OF EEPROM ADDRESS A0H

SFP ONU uses the two wire serial bus to access two blocks of 256-byte EEPROM address 1010000X (A0h) , A0h stores static information including product and vendor IDs .

The below figure shows the detail descriptions of A0h . All this information is not only accessible by a local host equipment into which the PON Stick is plugged, The diagnostic information about the module's present operating can only be retrieved by OLT remotely through PON OAM messages.

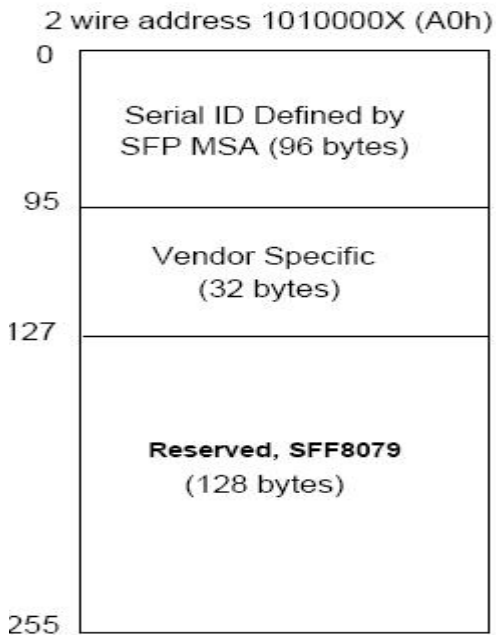


Figure 4 Detail descriptions of A0h and A2h defined by SFF-8472

A0H map

EEPROM INFORMATION

Data Addr	Field Size (Byte)	Name Of filed	Hex	Coded value
0(00)	1	Identifier	03	SFP
1(01)	1	Ext .Identifier	04	GBIC/SFP function is defined by serial ID only
2(02)	1	Connector	01	SC
3(03)	8	Transceiver (Note 3)	00	
4(04)			00	
5(05)			00	
6(06)			02	
7(0X07)			00	
8(0X08)			00	
9(0X09)			00	
10(0X0A)			00	

11(0X0B)	1	Encoding	03	NRZ
12(0C)	1	BR, Nominal	0C	1.244GHz
13(0D)	1	Reserved	00	

14(0E)	1	Length (9m)	14	20(km)
15(0F)	1	Length (9m)	C8	200(100m)
16(10)	1	Length (50um)	00	
17(11)	1	Length (62.5um)	00	
18(12)	1	Length (Copper)	00	
19(13)	1	Reserved	00	
20(14)	16	Vendor name	--	--
21(15)			--	--
22(16)			--	--
23(17)			--	--
24(18)			--	--
25(19)			--	--
26(1A)			--	--
27(1B)			--	--
28(1C)				
29(1D)				
30(1E)				
31(1F)				
32(20)				
33(21)				
34(22)				
35(23)				
36(24)	1	Reserved	00	
37(25)	3	Vendor OUI	00	
38(26)			00	
39(27)			00	
40(28)	16	Vendor PN (Note3)	--	X
41(29)			--	X
42(2A)			--	X
43(2B)			--	X
44(2C)			--	X
45(2D)			--	X
46(2E)			--	X
47(2F)			--	X
48(30)			--	-
49(31)			--	X
50(32)			--	X
51(33)			--	X

52(34)			--	X
53(35)			--	<space>
54(36)			--	<space>
55(37)			--	<space>
56(38)	4	Vendor rev (Note3)	31	1
57(39)			30	0
58(3A)			20	<space>
59(3B)			20	<space>
60(3C)	2	Wavelength	05	1310nm
61(3D)			1E	
62(3E)	1	Reserved	00	
63(3F)	1	CC_BASE	00	Note1
64(40)	2	Options	00	TX_FAULT, LOS
65(41)			0A	
66(42)	1	BR, max	00	
67(43)	1	BR, min	00	
68(44)	16	Vendor SN (Note3)	FF	
69(45)			FF	
70(46)			FF	
71(47)			FF	
72(48)			FF	
73(49)			FF	
74(4A)			FF	
75(4B)			FF	
76(4C)			FF	
77(4D)			FF	
78(4E)			FF	
79(4F)			FF	
80(50)			FF	
81(51)			FF	
82(52)			FF	
83(53)			FF	
84(54)	8	Date code (Note3)	xx	Year
85(55)			xx	Year
86(56)			xx	Month
87(57)			xx	Month
88(58)			xx	Day
89(59)			xx	Day

90(5A)			20	<Space>
91(5B)			20	<Space>
92(5C)	1	Diagnostic Monitoring Type	XX	
93(5D)	1	Enhanced Options	B0	Optional Alarm/warning Flags Implemented;TX_FAULT;RX_LOS;
94(5E)	1		xx	
95(5F)	1	CC_EXT	FF	Note 2

1) The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte.
2) The check code shall be the low order 8 bits of the sum of the contents of all the bytes from byte 64 to byte 94, inclusive.
3) The value is reference data, it will be assigned accord to the module's actual situation