

GEPON ONU STICK (MAC Inside)

Preliminary

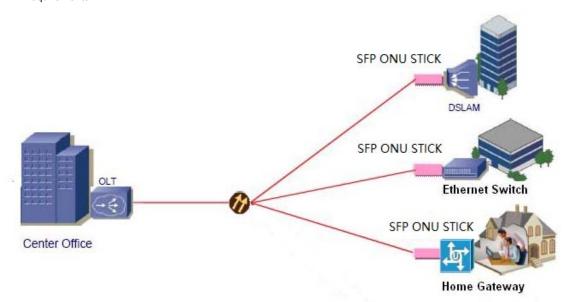
UEP-N1S

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







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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	ОН	5	95	%	
Power Supply Voltage	V_{CC}	-0.5	3.6	V	

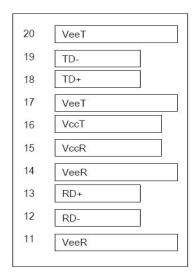
RECOMMENDED OPERATING CONDITION						
Parameter	Symbol	Min.	Тур.	Max.	Unit	Notes
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Dissipation	PD	-	2.10	2.5	W	Max value under High temp environment
Operating Case Temperature	T _c	0		+70	°C	
	T _c	-40		+85	°C	
Operating Humidity Range	ОН	5		95	%	
Data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

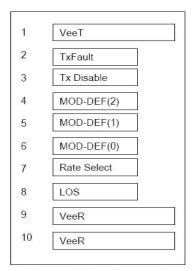
TRANSMITTER OPTICAL CHARACTERISTICS							
Parameter	Symbol	Min.	Тур.	Max.	Unit	Note	
Optical Center Wavelength	λ_{C}	1290	1310	1330	nm		
Spectral Width (RMS)	Δλ			3	nm		
Average Launch Optical Power	AOP	0		5	dBm	Launched into SMF Fiber	
Burst off Average Output Power				-45	dBm		
Extinction Ratio	ER	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	C	Compliant Wit	n IEEE80	2.3AH		PRBS 2 ⁷ -1 @1250Mbps	

TRANSMITTER ELECTRICAL CHARACTERISTICS							
Parameter	Symbol	Min.	Тур.	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		8.0	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.	Тур.	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.	Тур.	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	





Top of Board

Bottom of Board (as viewed thru top of board)

Figure 1 SFP Transceiver Electrical Pad Layout

PIN DESCR	RIPTION		
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 $4.7K 10K\Omega$ 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 $4.7 10 \text{K}\Omega$ 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.</p>
- 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

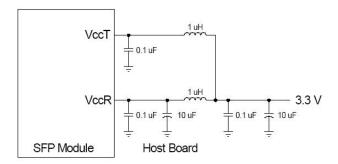
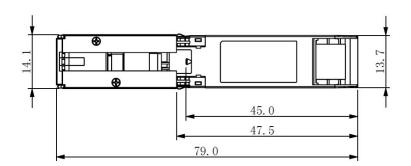


Figure 2 Recommended Host Board Supply Filtering Network





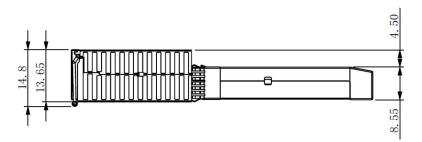


Figure 3 Mechanical Specifications

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.

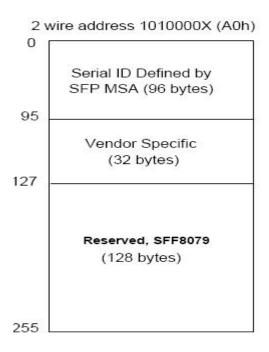


Figure 4 Detail descriptions of A0h and A2h defined by SFF-8472

A0H map

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

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

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				OF ON OFF ONO OTION
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)				-
21(15)				
22(16)				
23(17)				
24(18)				
25(19)				-
26(1A)				
27(1B)	16	Vendor name		
28(1C)				
29(1D)				
30(1E)				
31(1F)				
32(20)				
33(21)				
34(22)				
35(23)				
36(24)	1	Reserved	00	
37(25)			00	
38(26)	3	Vendor OUI	00	
39(27)			00	
40(28)	16	Vendor PN		X
41(29)		(Note3)		X
42(2A)				X
43(2B)				X
44(2C)				X
45(2D)				x x
46(2E) 47(2F)				X X
47(2F) 48(30)			<u></u>	
49(31)				- X
50(32)			<u></u>	X
51(33)			 	X
31(33)				^

52(34) 53(35) 54(36) 54(36) 55(37) 55(37) 56(38) 57(39) 58(3A) 57(39) 58(3A) 57(39) 58(3A) 59(3B) 5					GPON SEP ONU STICK
54(36) 55(37)	52(34)				X
56(38) 31 1 57(39) 4 Vendor rev 30 0 58(3A) 4 (Note3) 20 <space> 59(3B) 20 <space> 60(3C) 2 Wavelength 05 1310nm 61(3D) 1 Reserved 00 Note1 62(3E) 1 Reserved 00 Note1 64(40) 2 Options 00 Note1 65(41) 0A TX_FAULT, LOS 65(41) 0A TX_FAULT, LOS 66(42) 1 BR, min 00 66(42) 1 BR, min 00 66(43) 1 BR, min 00 66(44) FF FF 70(46) FF FF 73(49) FF FF 74(4A) FF FF 79(4F) FF FF 80(50) FF FF 80(50) FF FF <td>53(35)</td><td></td><td></td><td></td><td><space></space></td></space></space>	53(35)				<space></space>
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60(3C) 2 Wavelength 1E 1310nm 61(3D) 1 Reserved 00 63(3F) 1 CC_BASE 00 Note1 64(40) 2 Options 0A TX_FAULT, LOS 65(41) 0 BR, max 00 67(43) 1 BR, min 00 68(44) FF 70(46) FF 70(46) FF 71(47) FF 72(48) FF 74(4A) FF 75(4B) 16 Note3) FF 76(4C) Note3) FF 80(50) F	58(3A)	7	(Note3)	20	<space></space>
61(3D) 1E 1310nm 1E 16(3E) 1 Reserved 00 Note1 62(3E) 1 Reserved 00 Note1 64(40) 2 Options 0A TX_FAULT, LOS 65(41) 0 BR, max 00 66(42) 1 BR, max 00 68(44) FF 64(40) FF 70(46) FF 70(46) FF 71(47) FF 72(48) FF 74(4A) FF 74(4A) FF 75(4B) 16 Note3) FF 76(4C) FF 77(4D) FF 78(4E) FF 79(4F) FF 80(50) FF 81(51) FF 82(52) FF 81(51) FF 82(52) FF 83(53) FF 84(54) 8 Date code xx Year 88(55) Xx Month 87(57) Xx Month 88(58) Xx Day	59(3B)			20	<space></space>
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63(3F)	61(3D)	_	vuvelengin	1E	101011111
64(40) 2	62(3E)	1	Reserved	00	
Boundary	63(3F)	1	CC_BASE	00	Note1
65(41) 66(42) 1 BR, max 00 67(43) 1 BR, min 00 68(44) 69(45) FF 70(46) FF 71(47) FF 72(48) FF 73(49) FF 74(4A) FF 76(4C) FF 77(4D) FF 79(4F) 80(50) 81(51) 82(52) 83(53) FF 84(54) 8 Date code xx Year 86(56) xx Month 87(57) xx Month 88(58)	64(40)	2	Options	00	TX FAULT LOS
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79(4F)	77(4D)			FF	
80(50)	78(4E)			FF	
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87(57) xx Month 88(58) xx Day	85(55)		(Note3)	xx	Year
88(58) xx Day	86(56)			xx	Month
	87(57)			xx	Month
89(59) xx Day	88(58)			xx	Day
	89(59)			xx	Day

GPON SFP ONU STICK

90(5A)			20	<space></space>
91(5B)			20	<space></space>
92(5C)	1	Diagnostic Monitoring Type	XX	
93(5D)	1	Enhanced Options	В0	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