

## SFP модуль. Модель SFP-LX.MR.LC.20

SFP модуль предназначен для построения оптических линий связи и служит интерфейсом передачи данных по двухволоконному одномодовому кабелю до 20км.

**Особенности:**

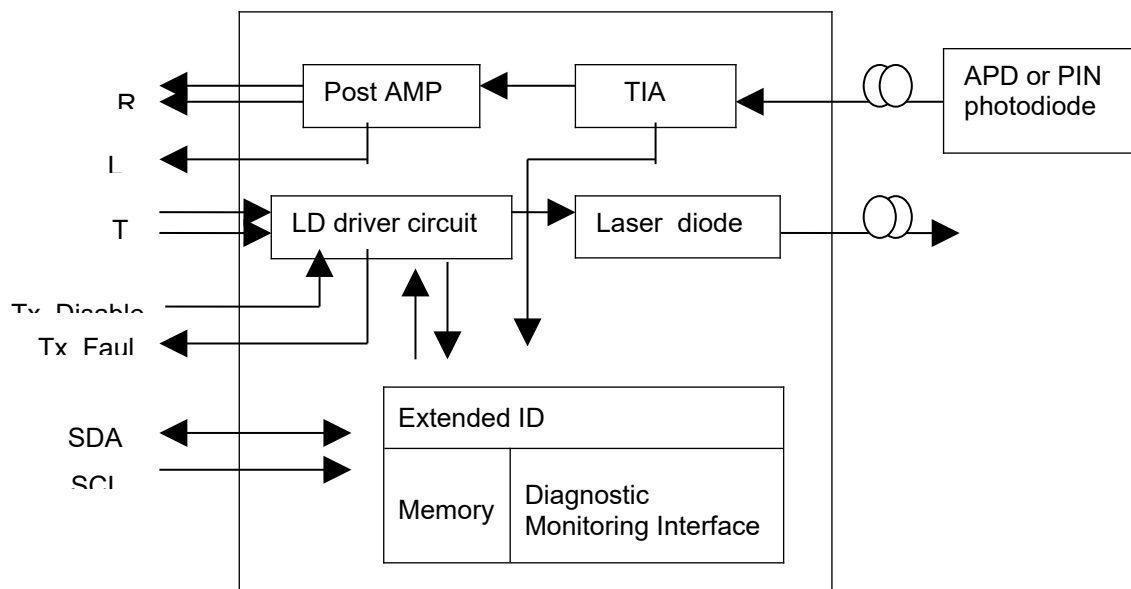
- возможность горячей замены
- двойной LC разъем
- Digital diagnostic monitor interface Compatible with SFF-8472
- детальная информация о модули в EEPROM
- соответствие спецификации SFP MSA

**Области применения:**

- Gigabit Ethernet 1000Base-SX
- SONET OC-48 / SDH STM-16 (S-16.1)
- ATM
- SONT/SDH/PDH
- FDDI
- Fiber Channel

**Функциональное описание:**

SFP модуль имеет FP лазер работающий на длине волны 1310нм, фотодиодный приемник на длину волны 1310нм, микросхемы для усиления и восстановления сигнала и микросхемы преобразования данных. Модуль имеет двойной LC разъем для оптического кабеля и 20-pin разъем для применения в устройствах связи. Модуль позволяет осуществлять передачу данных в диапазоне 0.1Gbps - 2.488Gbps.

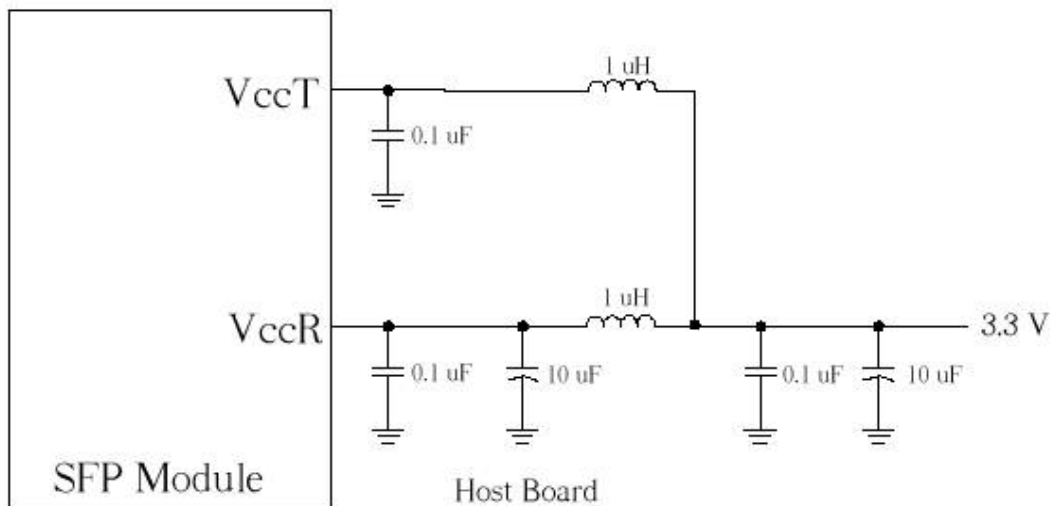
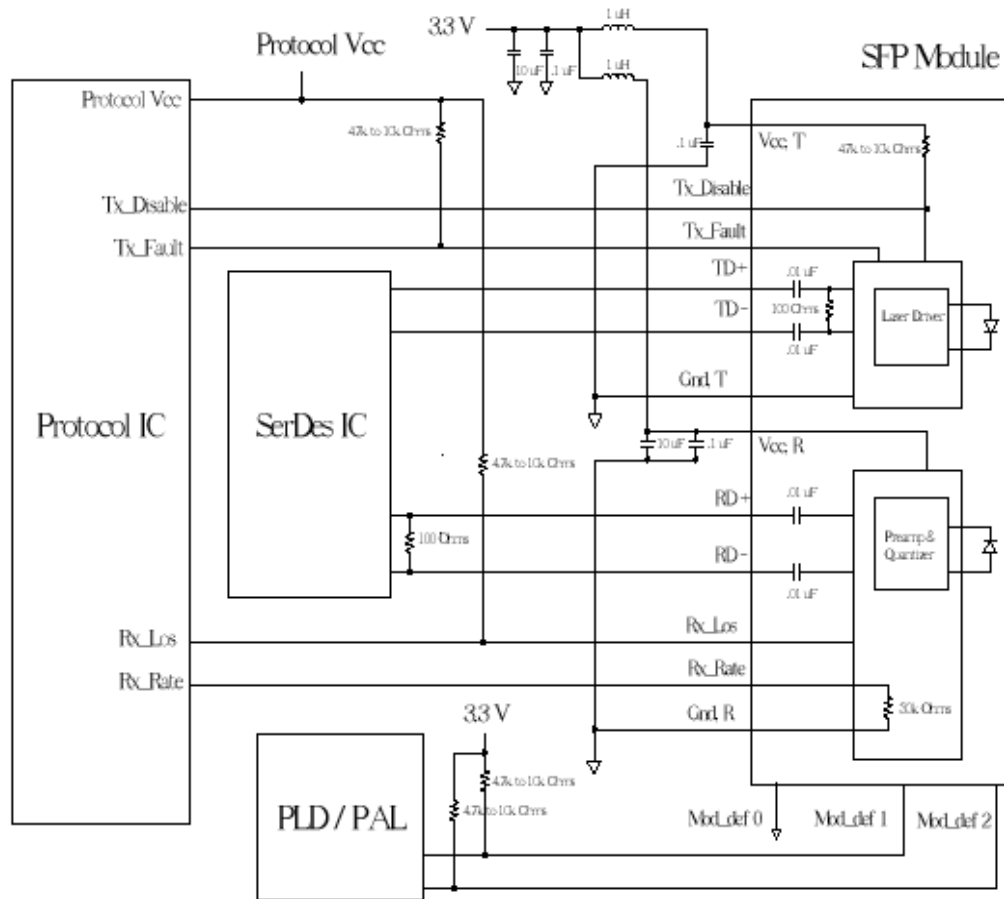
**Функциональная схема:****Спецификация:**

Максимальный режим эксплуатации				
параметр	обозначение	минимум	максимум	единица измерения

Максимальный режим эксплуатации					
Напряжение питания	VCC	0		+3,45	V
Рабочая температура	Top	0		+75	°C
Рекомендованный режим эксплуатации					
параметр	обозначение	минимум		максимум	единица измерения
Напряжение питания	VCC	+3,15		+3,45	V
Рабочая температура	Top	0		+70	°C
Оптические характеристики					
параметр	обозначение	минимум	типовое	максимум	единица измерения
Передатчик					
Выходная мощность	$P_0$	-2		+3	dBm
Отношение Исчезновения	ER	8,2	-	-	dB
Длина волны	$\lambda$	1270	1310	1360	nm
Ширина спектра	$\Delta\lambda$	-	-	4	nm
Rise time	Tr			200	ps
Fall time	Tf			200	ps
Выход передатчика	Согласно маски выхода (Eye Mask ) определенного стандартом 802.3z				
Приемник					
Чувствительность	Sen	-	-	-18	dBm
Длина волны	$\lambda$	1100		1600	nm
Детектирование сигнала	$P_A$	-	-	-20	dBm
Детектирование сигнала	$P_D$	-38	-	-	dBm
Return Loss	PL	15	-	-	dB
Электрические характеристики					
параметр	обозначение	минимум	типовое	максимум	единица измерения
Передатчик					
Скорость передачи(NRZ)	B	100	-	2488	Mb/s

параметр	обозначение	минимум	типовое	максимум	единица измерения
Напряжение питания	$V_{CC1}$	+3,15	+3,3	+3,45	V
Ток потребления	$I_{CC1}$	-	70	170	mA
High уровень	$V_{IH}$	$V_{CC1} - 1,165$	-	$V_{CC1} - 0,700$	V
Low уровень	$V_{IL}$	$V_{CC1} - 1,890$	-	$V_{CC1} - 1,475$	V
Напряжение разрешающее передачу	$V_{EN}$	-	-	0,8	V
Напряжение запрещающее передачу	$V_D$	2	-	-	V
Приемник					
Скорость передачи(NRZ)	B	100	-	2488	Mb/s
Напряжение питания	$V_{CC2}$	+3,15	+3,3	+3,45	V
Ток потребления	$I_{CC2}$	-	80	150	mA
High уровень	$V_{OH}$	$V_{CC2} - 1,025$	-	$V_{CC2} - 0,880$	V
Low уровень	$V_{OL}$	$V_{CC2} - 1,810$	-	$V_{CC2} - 1,620$	V
LOS High уровень	$V_{LOUT}$	-	-	0,8	V
LOS Low уровень	$V_{HOUT}$	2	-	-	V

**Рекомендованная схема включения:**



**Описание контактов:**

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	

2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, Data line for Serial ID.
5	MOD-DEF1	Module Definition 1	3	Note 3, Clock line for Serial ID.
6	MOD-DEF0	Module Definition 0	3	Note 3, Grounded within the module.
7	Rate Select	Not Connect	3	Function not available
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

## NOTES:

- 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 – 10 K Ω 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 (see Section IV for further details). 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 100Ω differential lines which should be terminated with 100Ω (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 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm 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 30mA 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 – 1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

**EEPROM:**

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following .For detail EEPROM information, please refer to the related document of SFF 8472 Rev 9.3