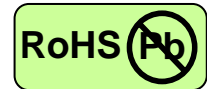


155 Mb/s ATM Multi-mode Transceiver



2×9 (12-pin), Duplex ST Plastic Connector, 850 nm VCSEL for Multi-mode Fiber
Digital Diagnostics Functions, Extended Operating Temperature from -40 to +85°C

Preliminary Data Sheet



Applications

- Fast Ethernet
- FDDI
- ATM/SONET OC-3/SDH STM-1
- Multi-mode fiber links
- Optical-Electrical Interface Conversion

Features

- 850 nm VCSEL
- Data Rate: 10 Mb/s~155 Mb/s, NRZ
- Single +3.3 V Power Supply
- RoHS Compliant and Lead-free
- PECL Differential Electrical Interface/PECL Compatible Logic Interface
- PECL Signal Detect Output
- 2×9 (12-pin) Footprint
- Duplex “Thick” Plastic ST Connector
- Compliance with
 - 100Base-FX of IEEE802.3u Standard
 - FDDI PMD Standard
 - ATM Standard
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Class 1 FDA and IEC laser safety compliant
- FDA Accession Number: 0310883

Description

The CT-0155NUR-S22L-E from Coretek Opto Corp. is a high performance and cost effective module for serial optical data communication applications specified for multi-mode fiber and 155 Mb/s. It operates with either a +3.3 V power supply. The module is intended for multi-mode fiber, operates at a nominal wavelength of 850 nm and complies with the industry standard 1x9 mechanical footprint with an additional row of pins providing access to TxDisable and integrated digital diagnostics functions via an I²C 2-wire serial interface. Each module consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All of them are housed in a plastic package and the combination produces a reliable component.

The module is a dual fiber connector transceiver designed for use in fast Ethernet applications and to provide an ATM/SONET OC-3/SDH STM-1 compliant link for 155 Mb/s intermediate reach applications. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

- 1) FCC in the United States
- 2) CENELEC EN55022 (CISPR 22) in Europe

To assist the customer in managing the overall equipment EMC performance, the transceivers have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

This laser based single mode transceiver is a CLASS 1 LASER PRODUCT, Hazard level 1. It complies with IEC 60825-1 Ed.2: 2007-03 and FDA performance standards for laser products (21 CFR 1040.10 and 1040.11) except for deviations pursuant to Laser Notice 50, dated June 24, 2007.

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Product Information

Model Number	Operating Voltage & SD Output	Connector	Distance	Wavelength	Output Power	Sensitivity
CT-0155NUR-S22L-E	3.3V PECL DC/DC	ST Plastic	2 km	850 nm	-10 ~ -4 dBm	≤ -30 dBm

ABSOLUTE MAX RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Storage Temperature	T _S	-40	85	°C	
Supply Voltage	V _{CC}	0	6	V	
Lead Soldering Temperature/Time	T _{SOLD}		260	°C	10 sec on lead
Data Input Voltage	---	0	V _{CC}	V	

OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Ambient Operating Temperature	T _A	-40		85	°C	
Supply Voltage (for 3.3V)	V _{CC}	3.10		3.50	V	
Supply Voltage (for 5.0V)	V _{CC}	4.75		5.25	V	

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Transmitter					
Transmitter Supply Current	I _{CCR}		200	mA	
Transmitter Data Input Current – Low	I _{IL}	-350		μA	
Transmitter Data Input Current – High	I _{IH}		350	μA	
Transmitter Data Input Voltage – Low	V _{IL} -V _{CC}	-1.810	-1.620	V	1
Transmitter Data Input Voltage – High	V _{IH} -V _{CC}	-1.025	-0.880	V	1
Receiver					
Receiver Supply Current	I _{CCR}		100	mA	
Receiver Data Output Voltage – Low	V _{OL} -V _{CC}	-1.810	-1.620	V	2
Receiver Data Output Voltage – High	V _{OH} -V _{CC}	-1.025	-0.880	V	2
Signal Detect Output Voltage – Low (for PECL)	V _{OL} -V _{CC}	-1.810	-1.620	V	2
Signal Detect Output Voltage – High (for PECL)	V _{OH} -V _{CC}	-1.025	-0.880	V	2
Signal Detect Output Voltage – Low (for TTL)	V _{OL}		0.4	V	2
Signal Detect Output Voltage – High (for TTL)	V _{OH}	2.4		V	2

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power (avg.)	P _o	-10		-4	dBm	3
Extinction Ratio	ER	8.2			dB	4, 5
Center Wavelength	λ _c	830	850	860	nm	
Spectral Width (RMS)	Δλ			7.7	nm	
Optical Rise time (10%-90%)	t _r			2.0	ns p-p	4
Optical Fall time (10%-90%)	t _f			2.0	ns p-p	4
Output Eye	Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957					

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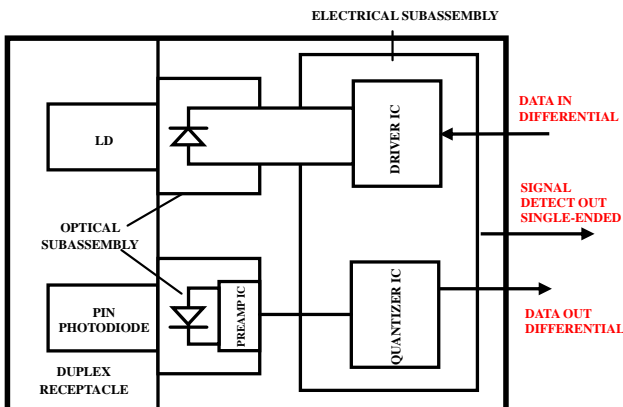
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power	P_{max}	-3			dBm	5
Receiver Sensitivity	P_{min}			-30	dBm	5
Operating Wavelength	λ	770		860	nm	
Signal Detect - Asserted	P_A			-30	dBm	6
Signal Detect - Deasserted	P_D	-47			dBm	7
Signal Detect - Hysteresis	$P_A - P_D$	0.5		4	dB	

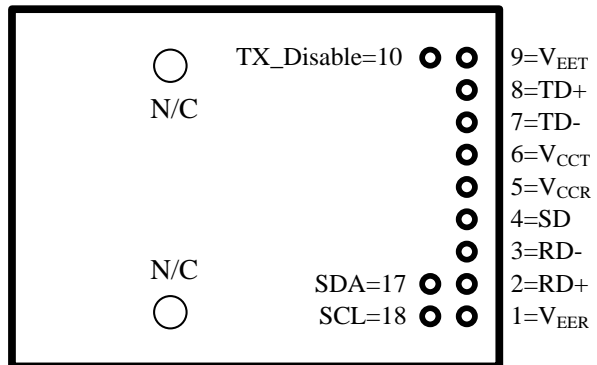
Notes:

1. Compatible with 10K, 10KH, 100K ECL and PECL output signals.
2. These outputs are compatible with 10K, 10KH, 100K ECL and PECL inputs.
3. Measured average power coupled into 62.5/125 μ m multi-mode fiber.
4. The input data pattern is a 12.5MHz square wave pattern.
5. Measured with $2^{23}-1$ PRBS at BER < 10^{-10}
6. Measured on transition – low to high
7. Measured on transition – high to low

BLOCK DIAGRAM OF TRANSCEIVER



PIN OUT DIAGRAM OF TRANSCEIVER



PIN OUT TABLE

Pin	Symbol	Functional Description
Mounting Posts		
The mounting posts are provided for transceiver mechanical attachment to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis ground.		
1	V_{EER}	Receiver Signal Ground
2	RD+	Receiver Data Non-inverted Differential Output
3	RD-	Receiver Data Inverted Differential Output
4	SD	Signal Detect is a PECL output. A high level indicates a received optical signal
5	V_{CCR}	Receiver Power Supply
6	V_{CCT}	Transmitter Power Supply
7	TD-	Transmitter Data Inverted Differential Input
8	TD+	Transmitter Data Non-inverted Differential Input
9	V_{EET}	Transmitter Signal Ground
10	TX Disable	Transmitter Disable – Module disables on high or open
17	SDA	Two wire serial ID interface - Data
18	SCL	Two wire serial ID interface - Clock

EEPROM Serial ID Memory Contents

Table 1 - EEPROM Serial ID Memory Contents (A0h)

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00	1	Identifier	02	Module/connector soldered to motherboard
01	1	Ext. Identifier	04	MOD4
02	1	Connector	80	ST (Vendor Specific)
03 ~ 10	8	Transceiver Codes	00 00 01 00 00 00 00 00	
11	1	Encoding	02	4B/5B
12	1	BR,nominal	02	
13	1	Reserved	00	
14	1	Length (SMF)-km	00	
15	1	Length (SMF)-100m	00	
16	1	Length (50um,OM2)	C8	2 Km
17	1	Length (62.5um,OM1)	C8	2 Km
18	1	Length (copper)	00	
19	1	Length (50um, OM3)	00	
20 ~ 35	16	Vendor Name	43 4F 52 45 54 45 4B 20 20 20 20 20 20 20 20 20	CORETEK
36	1	Unallocated	00	
37 ~ 39	3	OUI Code	00 00 00	
40 ~ 55	16	Vendor PN	43 54 2D 30 31 35 35 4E 55 52 2D 53 32 32 4C 45	CT-0155NUR-S22L-E
56 ~ 59	4	Vendor Rev	30 30 30 31	0001
60 ~ 61	2	Wavelength	03 52	850 nm
62	1	Reserved	00	
63	1	CC BASE	XX	Check sum
64 ~ 65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR max	00	
67	1	BR min	00	
68 ~ 83	16	Vendor SN	XXXXXXXXXXXXXXXXXX	
84 ~ 91	8	Date code		

92	1	Diagnostic Monitoring Type	68	
93	1	Enhanced Options	90	
94	1	SFF-8472	01	Rev 9.3 of SFF-8472 Compliance
95	1	CC BASE	XX	Check sum
96 ~ 127	32	Vendor Specific		

Table 2- EEPROM Serial ID Memory Contents (A2h)

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00 ~ 07	8	Temperature Alarm/Warning (°C)	55 00 D8 00 50 00 DD 00	Alarm_H/L : 85/-40 Warning_H/L : 80/-35
08 ~ 15	8	Voltage Alarm/Warning (V)	8C A0 75 30 88 B8 79 18	Alarm_H/L : 3.6/3 Warning_H/L : 3.5/3.1
16 ~ 23	8	BiasCurrent Alarm/Warning (mA)	1D 4C 00 32 17 70 00 FA	Alarm_H/L : 15/0.1 Warning_H/L : 12/0.5
24 ~ 31	8	Tx Power Alarm/Warning (dBm)	0F 8D 03 1A 0C 5A 03 E8	Alarm_H/L : -4/-11 Warning_H/L : -5/-10
32 ~ 39	8	Rx Power Alarm/Warning (dBm)	13 94 00 0A 0F 8D 00 0D	Alarm_H/L : -3/-30 Warning_H/L : -4/-28.86
128 ~ 143	16	Vendor Specific		

Monitoring Specification

The digital diagnostic monitoring interface also defines another 256-byte memory map in EEPROM, which makes use of the 8 bit address 1010001X(A2h). Please see Figure 1. For detail EEPROM information, please refer to the related document of SFF-8472 Rev 9.5. The monitoring specification of this product is described in Table3.

Figure 3.1: Digital Diagnostic Memory Map

Specific Data Field Descriptions

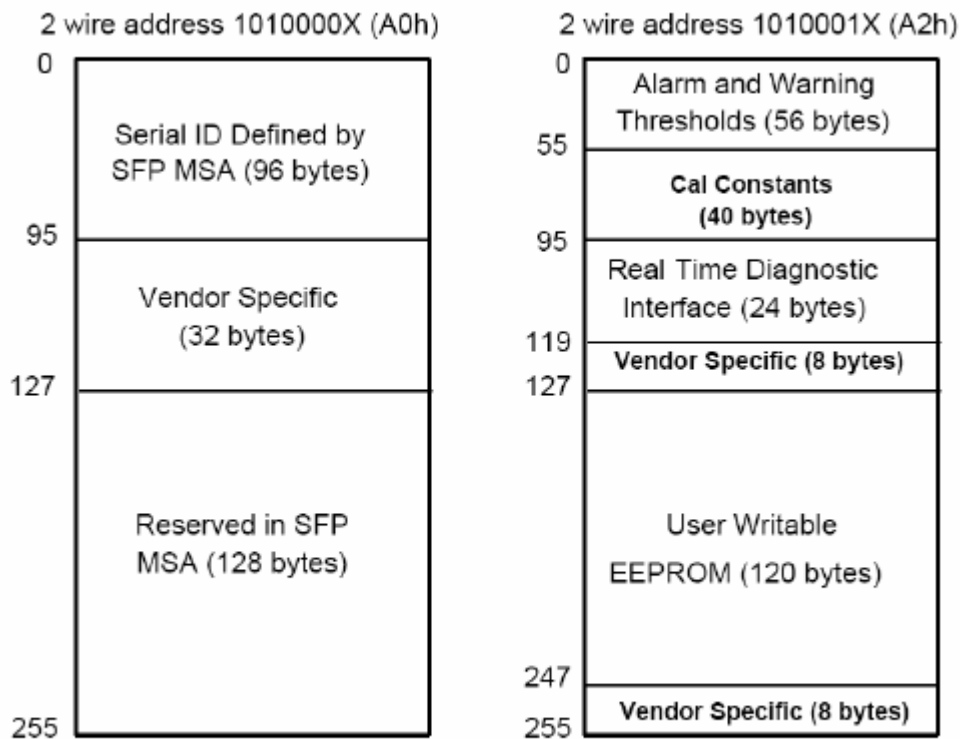


Figure 1, EEPROM Memory Map Specific Data Field Descriptions

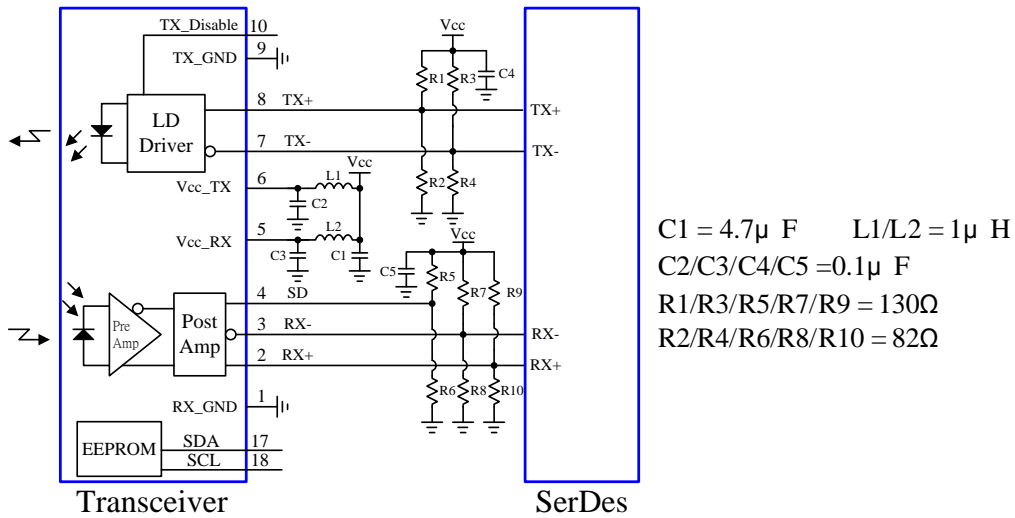
Table3 - Monitoring Specification

Parameter	Range	Accuracy	Calibration
Temperature	-40°C to 85°C	±3°C	Internal
Voltage	3.0 to 3.6V	±3%	Internal
Bias Current	0 to 15mA	±10%	Internal
TX Power	-11 to -4 dBm	±3dB	Internal
RX Power	-30 to -3 dBm	±3dB	Internal

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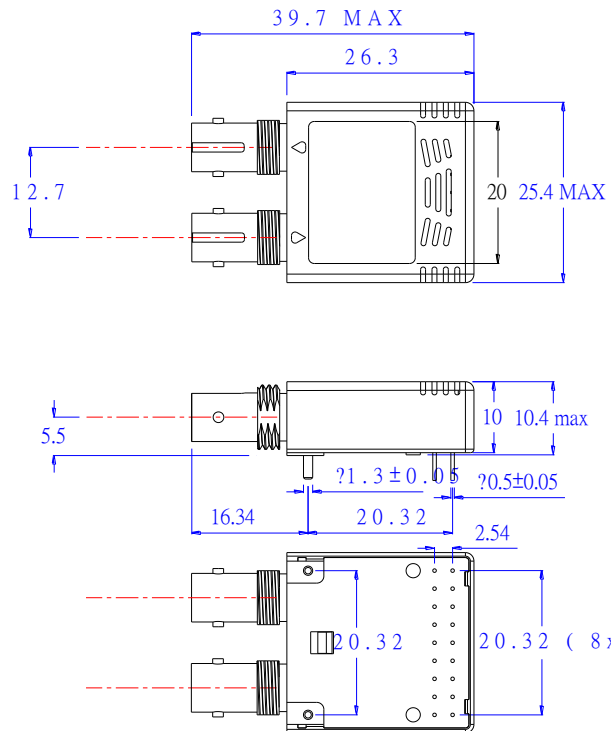


RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm

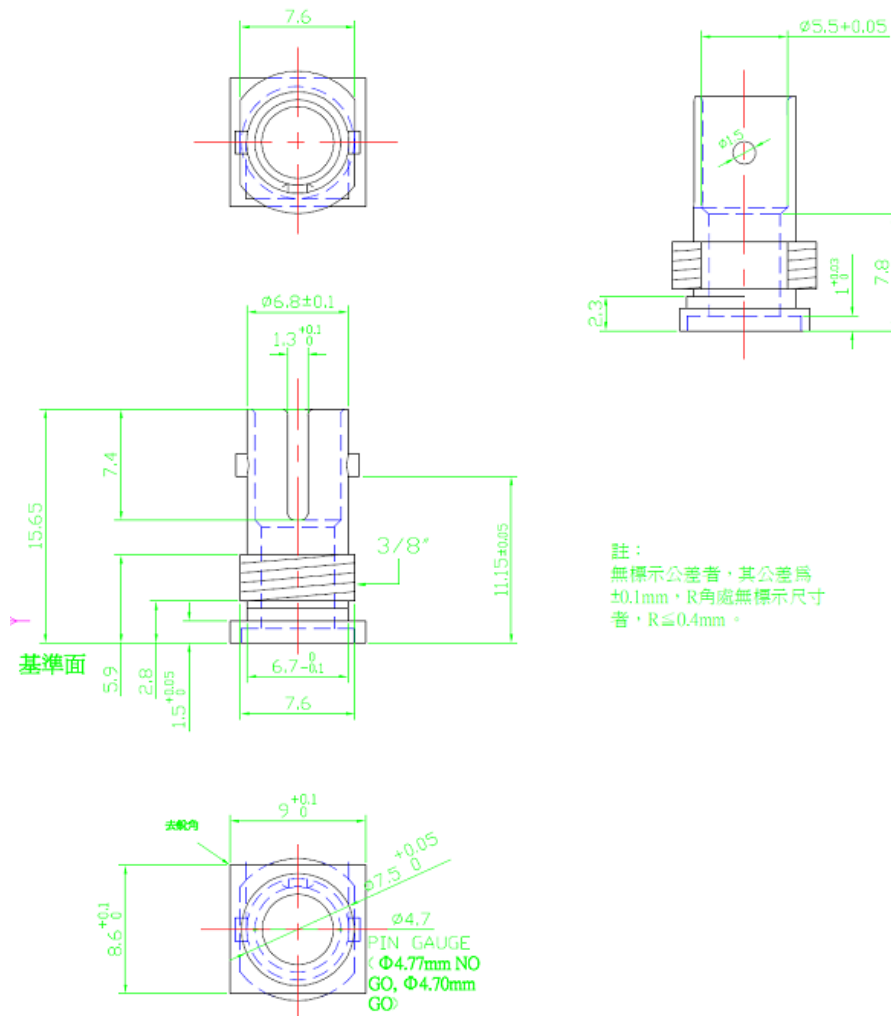


All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified.

155 Mb/s ATM Multi-mode Transceiver



Plastic ST Connector (Type: Thick)



註：
無標示公差者，其公差為
 $\pm 0.1\text{mm}$ ，R角處無標示尺寸
者， $R \leq 0.4\text{mm}$ 。

Claim:

CORETEK Opto Corp. reserves the right to make changes in the specification described hereinafter without prior notice.