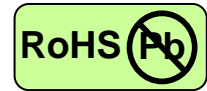


155 Mb/s ATM Multi-mode Transceiver



2×9 (12-pin), Duplex SC / ST Plastic Connector, 1310 nm LED for Multi-mode Fiber
Digital Diagnostics Functions, Extended Operating Temperature from -40 to +85°C



Applications

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

Features

- 1310 nm LED
- Data Rate: 100 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
- 3 mm Maximum 1x9 Electrical Pin Length
- Duplex SC/ST Plastic Connector
- **Included with NTC Thermistor to improve Tx Power DDMI accuracy at high temperature.**
- 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: 1220418-003

Description

The CT-0155NUR-M22x-E P 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 a +3.3 V power supply. The module is intended for multi-mode fiber, operates at a nominal wavelength of 1310 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 LED based multi-mode transceiver is an AEL Class 1 product. It complies with IEC 60825-1 (+A11).

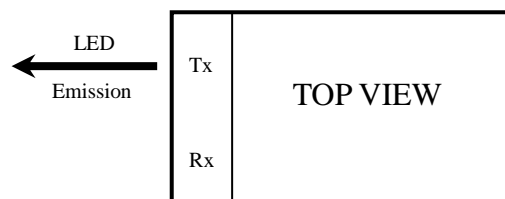
AEL CLASS 1 LED PRODUCT

To meet LED safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Note: All adjustments have been made at the factory prior to shipment of the devices. No maintenance or alteration to the device is required. Tampering with or modifying the performance of the device will result in voided product warranty.

LED Emission Data

Wavelength	: 1310 nm
Maximum total output power (as defined by IEC : 7 mm aperture at 14 mm distance)	: 15.6 mW / 11.9 dBm
Beam divergence (full angle) / NA (half angle)	: 11° / 0.1 rad



Required Labels

IEC : “Class 1 LED Product”

155 Mb/s ATM Multi-mode Transceiver



Product Information

Model Number	Operating Voltage & SD Output	Connector	Distance	Wavelength	Output Power	Sensitivity
CT-0155NUR-M22C-E P CT-0155NUR-M22L-E P	3.3 V PECL DC/DC	SC ST Plastic	2 km	1310 nm	-19 ~ -14 dBm	≤ -32 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	V _{CC}	3.10		3.50	V	

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Transmitter					
Transmitter Supply Current	I _{CCT}		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	V _{OL} -V _{CC}	-1.810	-1.620	V	2
Signal Detect Output Voltage – High	V _{OH} -V _{CC}	-1.025	-0.880	V	2

TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power (avg.)	P _o	-19		-14	dBm	3
Extinction Ratio	ER	8.2			dB	4, 5
Center Wavelength	λ _c	1263	1310	1360	nm	
Spectral Width (RMS)	Δ λ			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					

155 Mb/s ATM Multi-mode Transceiver



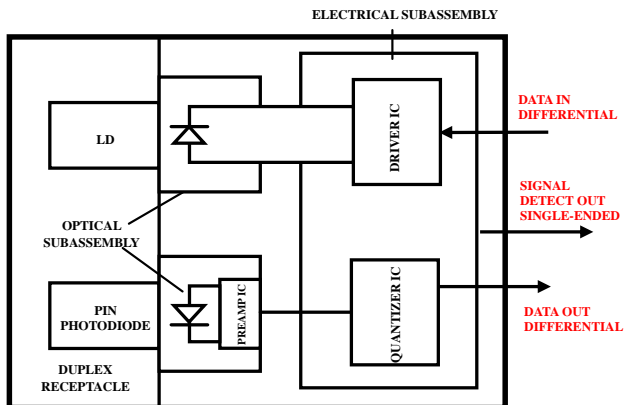
RECEIVER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Maximum Input Optical Power	P_{max}	-14			dBm	5
Receiver Sensitivity	P_{min}		-34	-32	dBm	5
Operating Wavelength	λ	1100		1600	nm	
Signal Detect - Asserted	P_A	$P_D+0.5$		-30	dBm	6
Signal Detect - Deasserted	P_D	-47			dBm	7
Signal Detect - Hysteresis	$P_A - P_D$	0.5		5	dB	

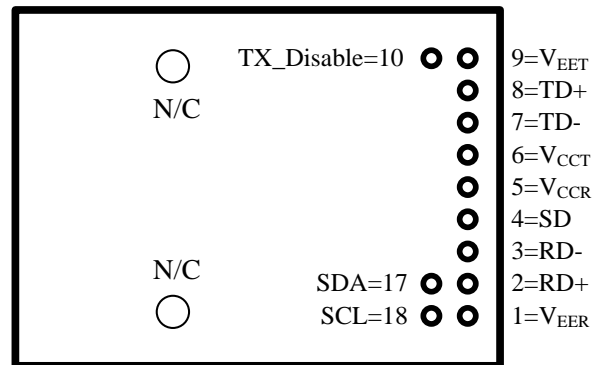
Notes:

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 μm multi-mode fiber.
4. The input data pattern is a 12.5MHz square wave pattern.
5. Measured with $2^{23}-1$ PRBS at $\text{BER} < 10^{-10}$
6. Measured on transition – low to high
7. Measured on transition – high to low

BLOCK DIAGRAM OF TRANSCEIVER



PIN OUT DIAGRAM OF TRANSCEIVER

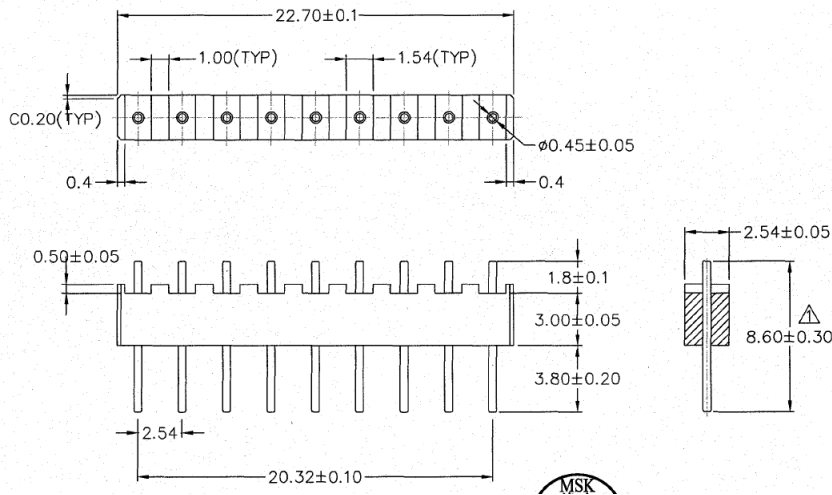


PIN OUT TABLE

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

2x9 (12-pin) PIN SPECIFICATION

155 Mb/s ATM Multi-mode Transceiver



1. PIN Material: Brass (C2700) / Gold Flash, Halogen Free

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 soldered to motherboard
01	1	Ext. Identifier	00	Not specified.
02	1	Connector	00	CT-0155NUR-M22L-E = ST Plastic (Unspecified)
			01	CT-0155NUR-M22C-E = SC
03 ~ 10	8	Transceiver Codes	00 00 01 00 00 00 00 00	
11	1	Encoding	02	4B5B
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

155 Mb/s ATM Multi-mode Transceiver



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 4D 32 32 43 45	CT-0155NUR-M22CE
			43 54 2D 30 31 35 35 4E 55 52 2D 4D 32 32 4C 45	CT-0155NUR-M22LE
56 ~ 59	4	Vendor Rev	30 30 30 31	000 1
60 ~ 61	2	Wavelength	05 1E	1310 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	47 58 xxxxxxxxxxxxxxxx	GXxxxxxxxxxxxxxxxx
84 ~ 91	8	Date code		
92	1	Diagnostic Monitoring Type	68	
93	1	Enhanced Options	90	
94	1	SFF-8472	01	
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)	6E 00 D8 00 64 00 DD 00	Alarm_H/L : 110/-40 Warning_H/L : 100/-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)	9C 40 03 E8 88 B8 07 D0	Alarm_H/L : 80/2 Warning_H/L : 70/4
24 ~ 31	8	Tx Power Alarm/Warning (dBm)	01 F5 00 64 01 8E 00 7E	Alarm_H/L : -13/-20

155 Mb/s ATM Multi-mode Transceiver



				Warning_H/L : -14/-19
32 ~ 39	8	Rx Power Alarm/Warning (dBm)	18 A6 00 05 13 94 00 06	Alarm_H/L : -2/-33 Warning_H/L : -3/-32

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 Table 3.

Figure 3.1: Digital Diagnostic Memory Map

Specific Data Field Descriptions

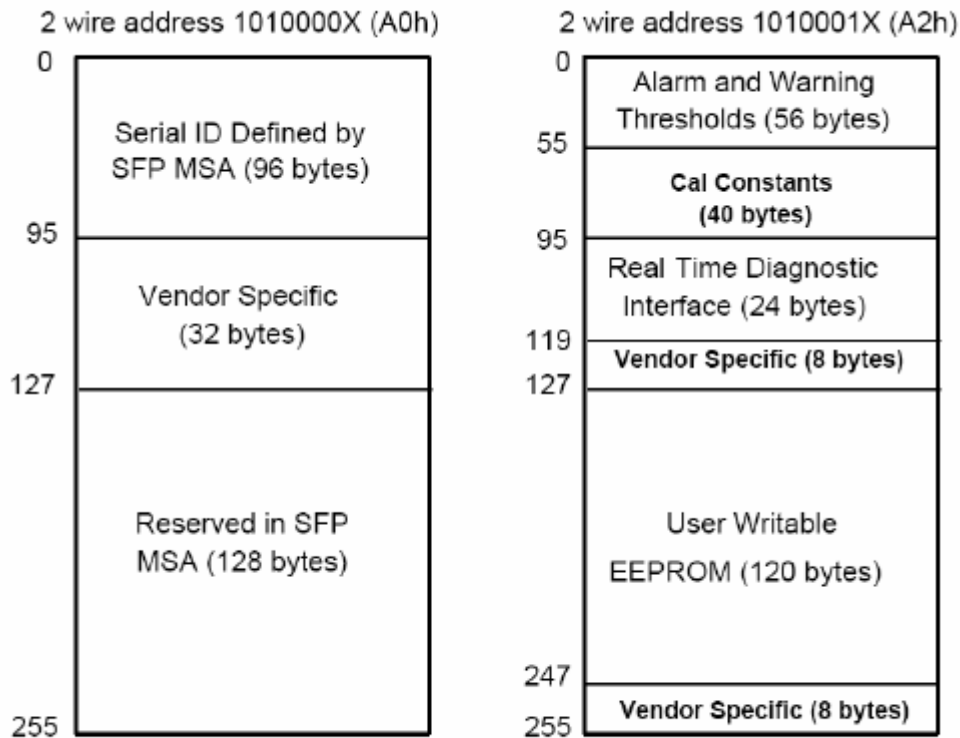


Figure 1, EEPROM Memory Map Specific Data Field Descriptions

Table 3 - Monitoring Specification

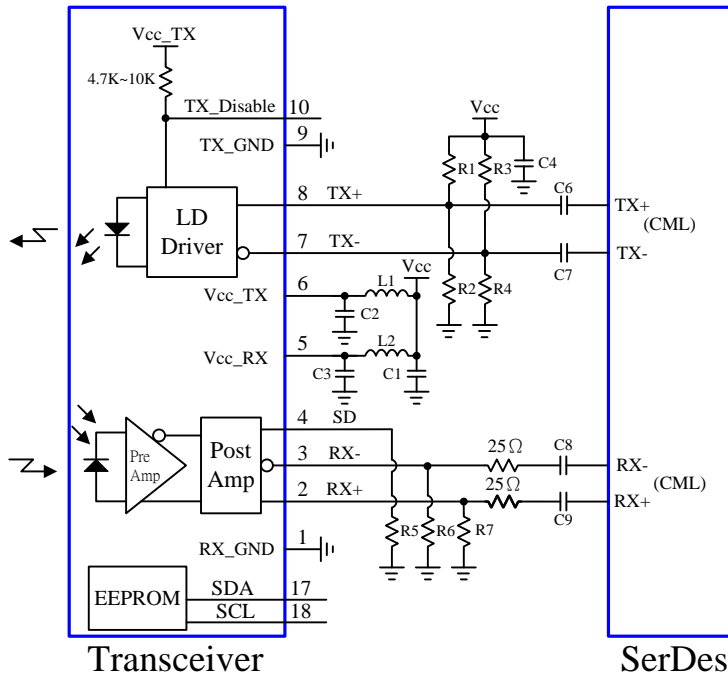
Parameter	Range	Accuracy	Calibration	Note
Temperature	-40°C to 85°C	±3°C	Internal	
Voltage	3.0 to 3.6 V	±3%	Internal	
Bias Current	0 to 100 mA	±10%	Internal	

155 Mb/s ATM Multi-mode Transceiver



TX Power	-19 to -14 dBm	± 2 dB	Internal	25°C~85°C
		± 3 dB		-40°C~25°C
RX Power	-32 to -3 dBm	± 2 dB	Internal	

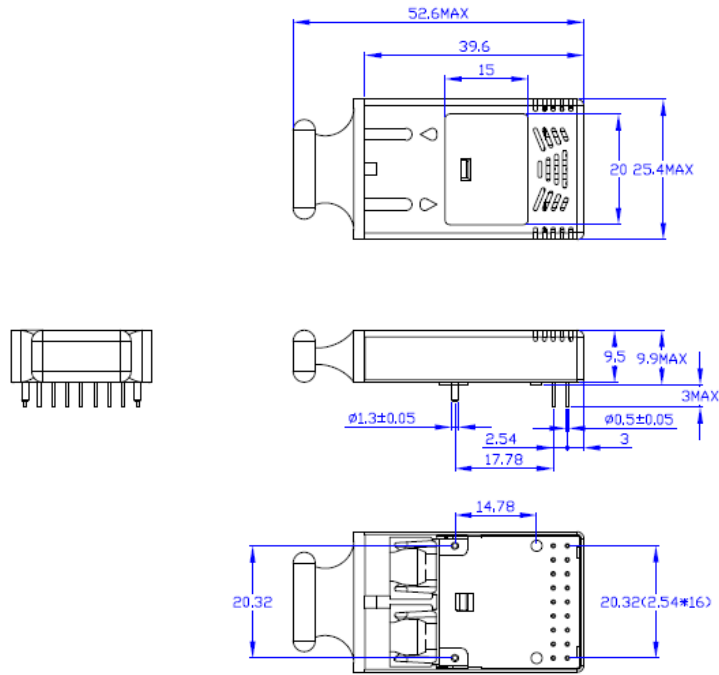
RECOMMENDED CIRCUIT SCHEMATIC



$C1 = 4.7\mu F$ $L1/L2 = 1\mu H$
 $C2/C3/C4/C5/C6/C7/C8/C9 = 0.1\mu F$
 $R1/R3 = 82\Omega$
 $R2/R4 = 130\Omega$
 $R5/R6/R7 = 142\sim 200\Omega$

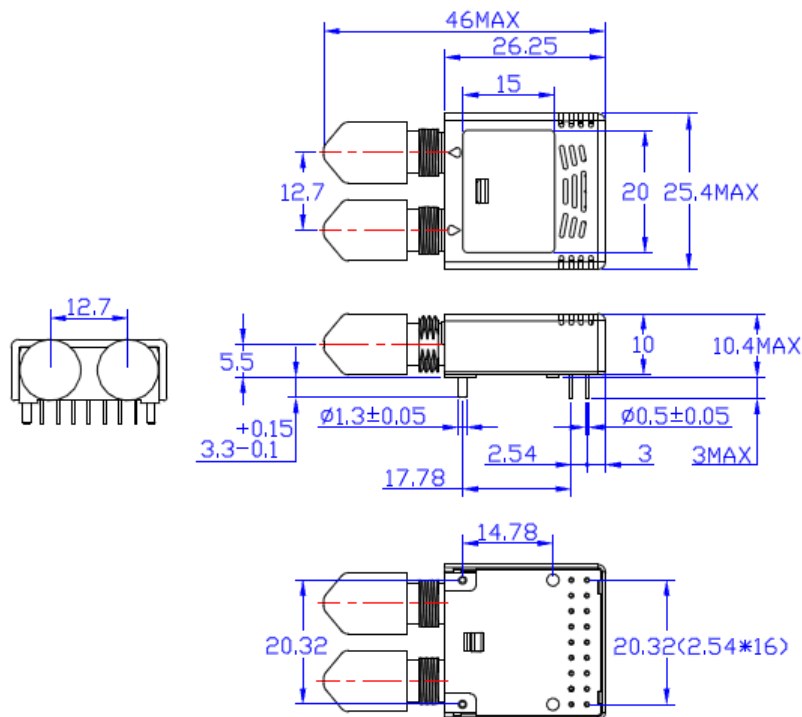
MECHANICAL DIMENSIONS

Units in mm



DIMENSIONS ARE IN MILLIMETERS.
ALL DIMENSIONS ARE 0.1mm UNLESS OTHERWISE SPECIFIED.

SC Connector Type



DIMENSIONS ARE IN MILLIMETERS.
ALL DIMENSIONS ARE 0.1mm UNLESS OTHERWISE SPECIFIED.

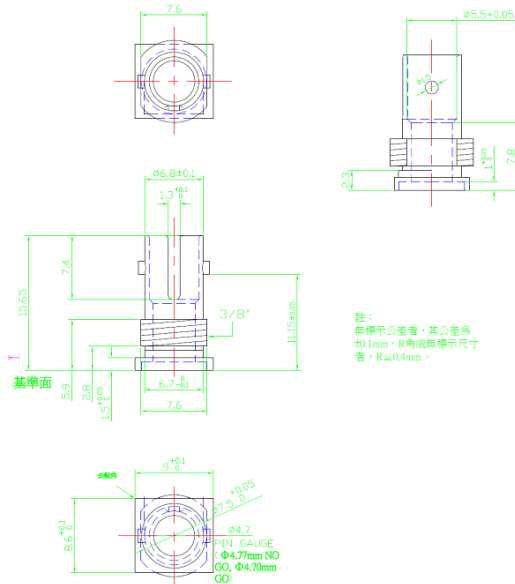
ST Plastic Connector Type

155 Mb/s ATM Multi-mode Transceiver



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

Plastic ST Connector (Type: Thick Plastic)



LABEL

Transceiver Labels



PACKAGING

Blister Tray – 10 pcs / tray



Bottom Section



Top Cover

Claim:

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