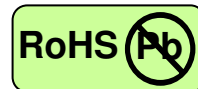


3 Gb/s Dual Optical Transmitter



SFP, LC Connector, Dual CWDM Transmitter for Single Mode Fiber, RoHS Compliant

Digital Diagnostics Functions



Features

- 18 CWDM Wavelengths
 - Data Rate: 50 Mb/s to 3 Gb/s, NRZ
 - Single +3.3 V Power Supply
 - RoHS Compliant and Lead-free
 - AC Differential Electrical Interface
 - Compliant with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP)
 - Supports video pathological patterns for SD-SDI, HD-SDI and 3G-SDI
 - Digital Diagnostic Monitoring Interface (TX Power, Bias current, Supply voltage and Operating temperature)
 - Duplex LC Connector
 - Eye Safety
- Designed to meet Laser Class 1 comply with EN60825-1

Applications

- SMPTE 297-2006 compatible optical-to-electrical interfaces
- High-density video routers

Description

The CT-2500TTP-CB6L-D AB XXYY series from Coretek Opto Corp. are the high performance and cost-effective modules for serial optical data communication applications specified for data-rates of 3 Gb/s. It operates with +3.3 V power supply. The module is intended for single mode fiber, operates at a nominal wavelength of CWDM and complies with Multi-Source Agreement (MSA) Small Form Factor Pluggable (SFP). Each module is integrated with digital diagnostics functions via an I²C serial interface.

The module is a duplex LC connector with separated dual transmitter designed for robust performance in the presence of SDI pathological patterns for SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M serial rates including SD-SDI compliant link at 270 Mb/s, HD-SDI compliant link at 1.485 Gb/s and 3G-SDI compliant link at 2.97 Gb/s. It provides extensive operational status monitoring through I²C interface. For transmitter channel, output optical power, bias current, supply voltage and operating temperature are monitored. If a parameter monitored is outside the pre-defined range, the alarm flag associated with the parameter will be raised. The characteristics are performed in accordance with Telcordia Specification GR-468-CORE.

EMC

Most equipment utilizing high-speed dual transmitters 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 dual transmitters have been designed to satisfy FCC class B limits and provide good immunity to radio-frequency electromagnetic fields.

Eye Safety

This laser based dual transmitter module 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 & Interface	TX Channel 1		TX Channel 2	
		λ	Power	λ	Power
CT-2500TTP-CB6L-D AB XXYY	3.3 V AC	XX nm	0 ~ +5 dBm	YY nm	0 ~ +5 dBm

* Latch Color Code is for Channel 1 CWDM Wavelength

Wavelength Mapping

XX, YY Code	Wavelength	Latch Color	XX, YY Code	Wavelength	Latch Color
27	1270 nm	Light Purple	45	1450 nm	Yellow Orange
29	1290 nm	Sky Blue	47	1470 nm	Gray
31	1310 nm	Yellow Green	49	1490 nm	Violet
33	1330 nm	Yellow Ocher	51	1510 nm	Blue
35	1350 nm	Pink	53	1530 nm	Green
37	1370 nm	Beige	55	1550 nm	Yellow
39	1390 nm	White	57	1570 nm	Orange
41	1410 nm	Silver	59	1590 nm	Red
43	1430 nm	Black	61	1610 nm	Brown

Link Distance

Transmitter	Receiver	SDI	Bit Rate
CT-2500TTP-CB6L-D AB XX/YY	CT-2500TRP-MB6L-E	3G-SDI	SMPTE 424M
		HD-SDI	SMPTE 292M
		SD-SDI	SMPTE 259M
			2.97 Gb/s
			1.485 Gb/s
			270 Mb/s

ABSOLUTE MAX RATINGS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Storage Temperature	T _S	-40	85	°C	
Supply Voltage	V _{CC}	-0.5	4.5	V	
Data Input Voltage	---	0	V _{CC}	V	
Supply Current	I _S		300	mA	

OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Ambient Operating Temperature	T _A	0		70	°C	
Supply Voltage	V _{CC}	3.1		3.5	V	
Data Input Voltage Swing	V _{ID}	300		1860	mV	

ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTE
Supply Current	I _{CC}		300	mA	
Tx_ Disable Input Voltage - Low	V _{IL}	0	0.8	V	
Tx_ Disable Input Voltage - High	V _{IH}	2.0	V _{CC}	V	
In-rush current ramp rate			50	mA/ms	
I ² C CLK , I ² C DATA - Low	V _{IL}	-0.6	V _{CC} × 0.3	V	
I ² C CLK , I ² C DATA - High	V _{IH}	V _{CC} × 0.7	V _{CC} + 0.5	V	

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TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
Optical Output Power	P _o	0		+5	dBm	1
Extinction Ratio	ER	5	7.5		dB	
Center Wavelength	λ_c	$\lambda_c - 5.5$	λ_c	$\lambda_c + 7.5$	nm	
Spectral Width (RMS)	$\Delta \lambda$			1	nm	
Optical Rise time (20%-80%)	t _r			165	ps	2
Optical Fall time (20%-80%)	t _f			180	ps	2
Optical Signal Intrinsic Jitter				60	ps	

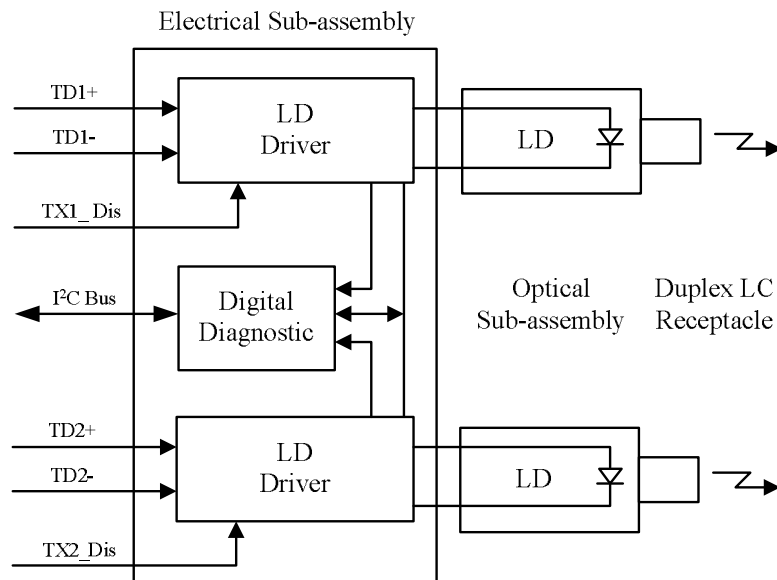
Notes:

1. Measured average power coupled into 9/125 μ m single mode fiber.
2. These are 20-80% values.

TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTE
TX_DISABLE Assert Time	t _{off}			10	μ s	
TX_DISABLE Negate Time	t _{on}			1	ms	
Time to initialize	t _{init}			300	ms	
TX_DISABLE time to start reset	t _{reset}	10			μ s	

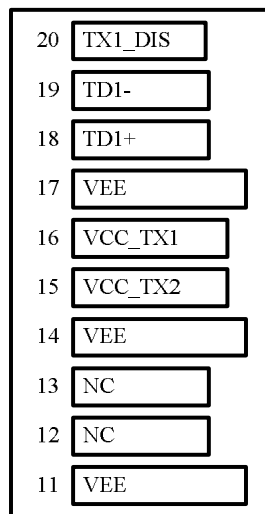
BLOCK DIAGRAM OF DUAL TRANSMITTER



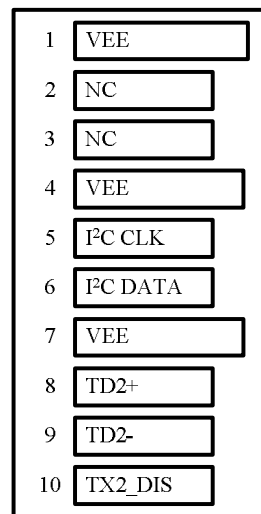
3 Gb/s Dual Optical Transmitter



PIN OUT DIAGRAM OF DUAL TRANSMITTER



Top of Board



Bottom of Board (As Viewed through Top of Board)

PIN OUT TABLE

Pin	Symbol	Functional Description
1	VEE	Transmitter Ground
2	NC	Not Connect
3	NC	Not Connect
4	VEE	Transmitter Ground
5	I2C CLK	Two wire serial ID interface - Clock
6	I2C DATA	Two wire serial ID interface - Data
7	VEE	Transmitter Ground
8	TD2+	Transmitter Data In 2
9	TD2-	Inverse Transmitter Data In 2
10	TX2_DIS	Transmitter 2 Disable – Module disables on high or open
11	VEE	Transmitter Ground
12	NC	Not Connect
13	NC	Not Connect
14	VEE	Transmitter Ground
15	VCC_TX2	Transmitter Power 2
16	VCC_TX1	Transmitter Power 1
17	VEE	Transmitter Ground
18	TD1+	Transmitter Data In 1
19	TD1-	Inverse Transmitter Data In 1
20	TX1_DIS	Transmitter 1 Disable – Module disables on high or open

3 Gb/s Dual Optical Transmitter



EEPROM Serial ID Memory Contents

Table 1 - EEPROM Serial ID A0h/B0h Memory Contents

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00	1	Identifier	81	Dual Tx SFP
01	1	Ext. Identifier	04	MOD4
02	1	Connector	07	LC
03 ~ 10	8	Transceiver Codes	00 00 00 00 00 00 00 00	
11	1	Encoding	03	
12	1	BR, Nominal	1E	
13	1	Reserved	00	
14	1	Length (SMF)-km	28	40 km
15	1	Length (SMF)-100m	FF	
16	1	Length (50µm,OM2)	00	
17	1	Length (62.5µm,OM1)	00	
18	1	Length (copper)	00	
19	1	Length (50µm, 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 32 35 30 30 54 54 50 43 42 36 4C 44 41 42	CT2500TTPCB6LDAB
56 ~ 59	4	Vendor Rev	30 30 30 30	0000
60 ~ 61	2	Wavelength	04 F6 05 0A 05 1E 05 32 05 46 05 5A 05 6E 05 82	1270nm 1290nm 1310nm 1330nm 1350nm 1370nm 1390nm 1410nm

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			05 96	1430nm
			05 AA	1450nm
			05 BE	1470nm
			05 D2	1490nm
			05 E6	1510nm
			05 FA	1530nm
			06 0E	1550nm
			06 22	1570nm
			06 36	1590nm
			06 4A	1610nm
62	1	Reserved	00	
63	1	CC BASE	XX	Check sum
64 ~ 65	2	Options	00 10	TX_DISABLE
66	1	BR max	00	
67	1	BR min	00	
68 ~ 83	16	Vendor SN	4B 52 xxxxxxxxxxxxxx	KR xxxxxxxxxxxxxx
84 ~ 91	8	Date code		
92	1	Diagnostic Monitoring Type	68	
93	1	Enhanced Options	80	
94	1	SFF-8472	01	Rev 9.3 of SFF-8472 Compliance
95	1	CC BASE	XX	Check sum
96 ~ 127	32	Vendor Specific		

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Table 2- EEPROM Serial ID A2h/B2h Memory Contents

Addr.	Field Size (Bytes)	Name of Field	Hex	Description
00 ~ 07	8	Temperature Alarm/Warning (°C)	55 00 EC 00 50 00 F1 00	Alarm_H/L : 85/-20 Warning_H/L : 80/-15
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	Bias Current 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)	9B 83 1F 07 7B 86 27 10	Alarm_H/L : 6 /-1 Warning_H/L : 5 /0
32 ~ 39	8	Rx Power Alarm/Warning (dBm)		
128 ~ 143	16	Vendor Specific		

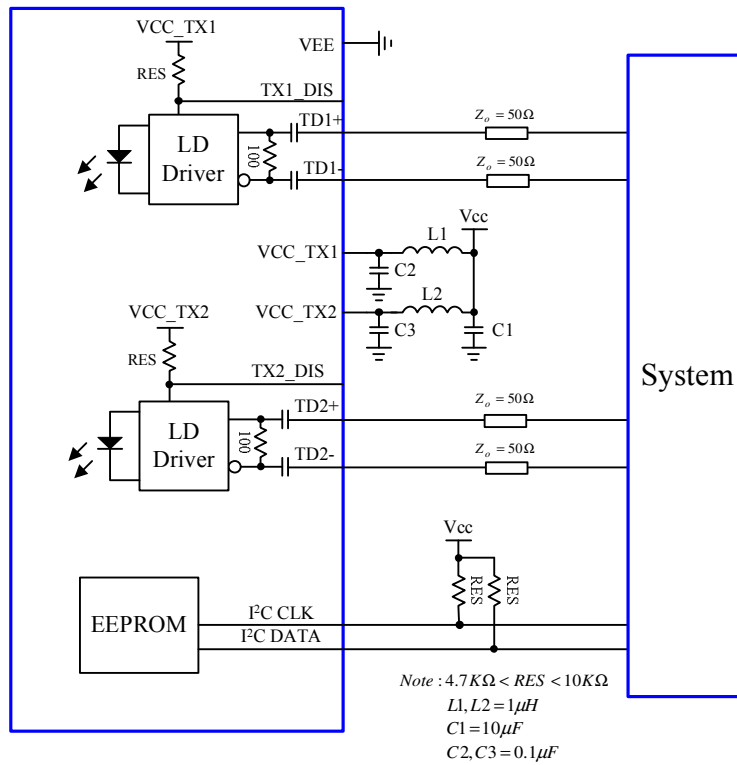
Table 3- Monitoring Specification

Parameter	Range	Accuracy	Calibration
Temperature	-5°C to 85°C	±3°C	Internal
Voltage	3.0 to 3.6 V	±3%	Internal
Bias Current	0 to 80 mA	±10%	Internal
TX Power	-1to +6 dBm	±3dB	Internal

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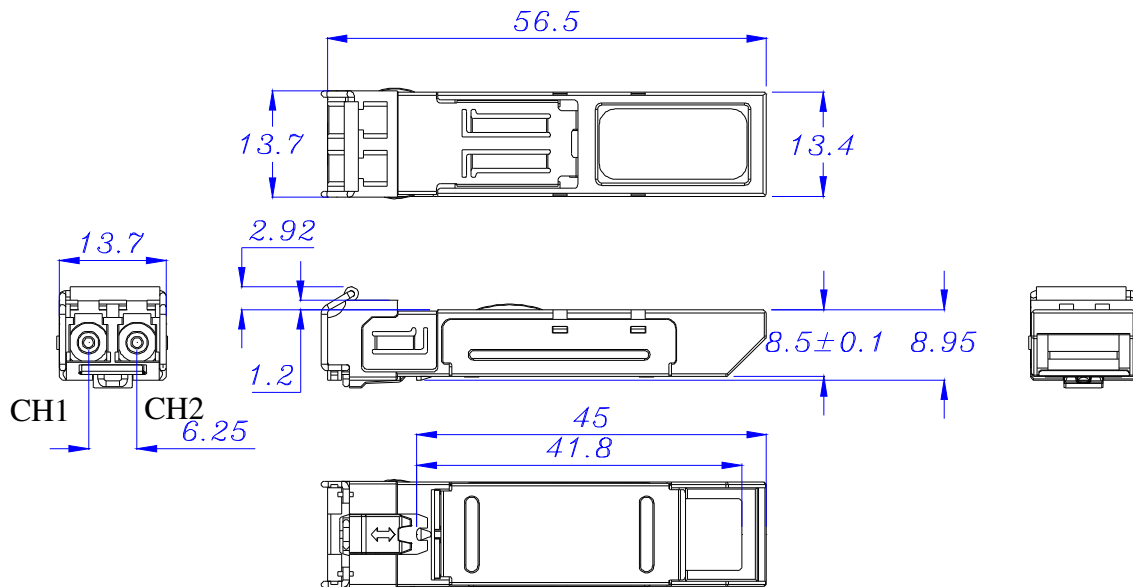


RECOMMENDED CIRCUIT SCHEMATIC



MECHANICAL DIMENSIONS

Units in mm



All dimensions are $\pm 0.2\text{mm}$ unless otherwise specified.

Claim:

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