

## Product Bulletin



### **OTPDR2001-LR** 10 Gb/s OC - 192 MSA Transceiver/Transponder Long Reach

The OTPDR2001-LR is a mechanically compliant 300 pin MSA, SONET OC-192/GR-1377 transceiver/transponder. The transceiver/transponder uses a  $\text{LiNbO}_3$  modulator and a CW laser. The modules are available with 0, 3, or 7 dBm of optical output power. The features of the transceiver/transponder include integrated electrical mux (performs parallel electrical to serial optical signal conversion), and a demux that performs a serial optical to parallel electrical conversion. The transceiver/transponder is available with wavelengths on the ITU grid (200, 100, and 50 GHz spacing), as well as an integrated high sensitivity PIN or APD receiver. The unit is fully compliant to OIF 99.102.8 specifications. The long reach module has one of the smallest standard form factor packages in the industry, (3.5 x 4.5 x 0.53 inches), and has the identical form factor as its short, intermediate and extended reach counterparts.

The Long Reach is designed for the following typical link budgets:

1550 nm TDM 7 dBm with APD 30 dB,  
1550 nm DWDM 3 dBm with APD 26 dB,  
1550 nm DWDM 0 dBm with APD 23 dB.

The electrical interface consists of 16 differential LVDS lines of data at 622.08, 645, or 666.51 Mb/s in both the transmit and receive directions. The optical interface is a 9.95328 Gb/s SONET optical,

10.333 Gb/s ethernet or 10.7 Gb/s FEC (forward error correction) transport which can transmit and receive through lengths up to 100 km of single-mode fiber.

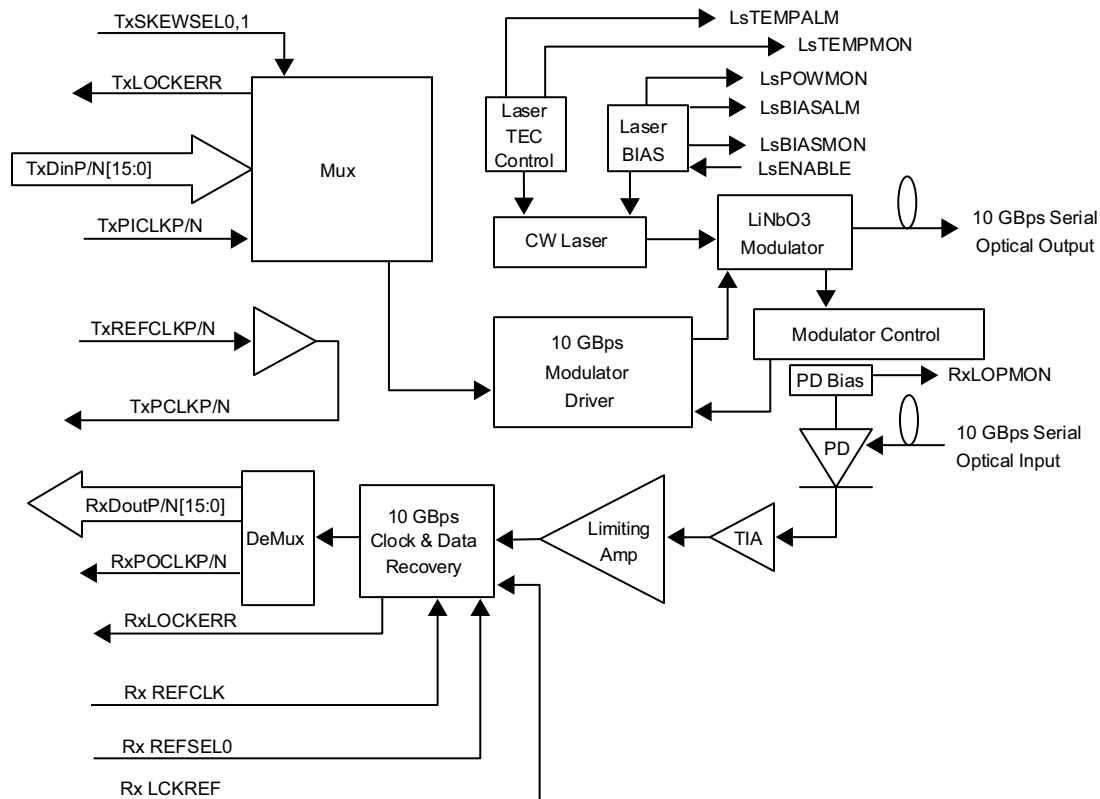
#### **Key Features**

- Mechanically compliant with the 300 pin multisource agreement (MSA)
- SONET OC-192 / GR-1377 compliant
- Link budgets up to 30 dB
- Integrated 10 Gb/s optical transmitter and receiver with dual rate 16-channel mux/demux
- Receiver sensitivity  
PIN -14 dBm optical input power (@BER =  $10^{-12}$ )
- APD -24 dBm optical input power (@BER =  $10^{-12}$ )
- No DC power sequencing required
- Low power dissipation
- Available in FEC rate and 10 G ethernet versions

#### **Applications**

- Telecommunications:
  - Long haul networks
  - Metropolitan area networks
  - Long reach ethernet
- High bit-rate data communications

## Configuration



## Specifications

Parameter	Symbol	Minimum	Typical	Maximum
Operating case temperature	Tc		0 to 65 °C	
Total power dissipation	P		14 W	
3.3 V supply voltage	Vdd	3.13 V	3.30 V	3.47 V
Vdd current drain	Idd		0.9 A	
5 V supply voltage	Vcc	4.75 V	5.00 V	5.25 V
Vcc current drain	Icc		0.05 A	
-5.2 V supply voltage	Vee	-5.46 V	-5.20 V	-4.75 V
Vee current drain	Iee		2.1 A	

**Transceivers Pin Out Notes**

Symbol	I/O	Type	Description
TxDinP/N[15:0]	I	LVDS	Parallel data input to the transmitter.
TxPICKLP/N	I	LVDS	Parallel input clock to the transmitter.
TxREFCLKP/N	I	LVPECL	Transmitter reference clock used to generate TxPCLK. Internally AC coupled.
TxPCLKP/N	O	LVDS	Transmit parallel output clock used to drive framer.
TxSKEWSEL0	I	LVTTL	Adjusts skew of TxPICKLK (LSB)
TxSKEWSEL1	I	LVTTL	Adjusts skew of TxPICKLK (MSB)
RxREFCLKP/N	I	LVPECL	Receiver reference clock used to verify RxPOCLK. Internally AC coupled.
RxDoutP/N[15:0]	O	LVDS	Parallel data output from the receiver.
RxPOCLKP/N	O	LVDS	Parallel output clock from the receiver.
RxLCKREF	I	LVTTL	Locks RxPOCLK to RxREFCLK (active low).
RxLOCKERR	O	LVTTL	Receiver PLL lock detector is logic-low when the receiver PLL circuit is out of lock.
TxLOCKERR	O	LVTTL	Transmitter PLL lock detector is logic-low when the transmitter PLL circuit is out of lock.
LsPOWMON	O	Analog	Laser power monitor voltage is normalized (0.5 V) at the beginning of life relative to the initial optical output power. The 50% drift in output power correlates to a 50% variation on the laser power monitor voltage.
RxLOPMON	O	Analog	Input power monitor voltage is proportional to the optical mean power detected. 3 mV/μA
RxREFSEL0	I	LVTTL	Receiver reference frequency selector when logic low selects 155.52 MHz, when logic high selects 622.08 MHz (SONET rate).
LsBAISMON	O	Analog	Laser bias current voltage is proportional to the laser current. 5 mV/μA
LsENABLE	I	LVTTL	When transmitter laser enable is logic-low the laser is enabled. When logic-high, the laser is disabled.
LsBIASALM	O	LVTTL	Laser degraded alarm; the digital alarm output will shift from logic-high to logic-low state when the laser approaches its end of life condition.
LsTEMPALM	O	LVTTL	Laser temperature. Normal operating is logic-high. Alarm activates (logic-low) when temperature is approximately 2.5 °C above or below normal temperature.

## Ordering Information

Indicate your requirements by selecting one option from each configuration table. Please print the corresponding codes in the available boxes to form your part number. For more information on this or other products and their availability, please contact your local JDS Uniphase sales representative or JDS Uniphase directly at 215 328-6500, by fax at 215 675-8414, or via e-mail at sales.pa@us.jdsuniphase.com. Visit our Web site at www.jdsuniphase.com.

**Sample: OTPDR2001-LR-00-62-PIN-SON-LC**

**Code**   **Reach**

LR	Long reach
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**Code**   **Power Level**

00	0 dBm output (TDM or DWDM)
03	3 dBm output (TDM or DWDM)
07	7 dBm output (TDM only)

**Code**   **ReceiverType**

PIN	PIN receiver
APD	APD receiver

**Code**   **Data Rate**

SON	Sonet
ETH	Ethernet
FEC	Forward Error Correction

**Code**   **Connectors**

SC	SC
FC	FC
LC	LC

**Code**   **Frequency (GHz)**   **Wavelength (nm)**

16	191600	1564.68
17	191700	1563.86
18	191800	1563.05
19	191900	1562.23
20	192000	1561.42
21	192100	1560.61
22	192200	1559.79
23	192300	1558.98
24	192400	1558.17
25	192550	1557.36
26	192600	1556.55
27	192700	1555.75
28	192800	1554.94
29	192900	1554.13
30	193000	1553.33
31	193100	1552.52
32	193200	1551.72
33	193300	1550.92
34	193400	1550.12
35	193500	1549.32
36	193600	1548.51
37	193700	1547.72
38	193800	1546.92
39	193900	1546.12
40	194000	1545.32
41	194100	1544.53
42	194200	1543.73
43	194300	1542.94
44	194400	1542.14
45	194500	1541.35
46	194600	1540.56
47	194700	1539.77
48	194800	1538.98
49	194900	1538.19
50	195000	1537.40
51	195100	1536.61
52	195200	1535.82
53	195300	1535.04
54	195400	1534.25
55	195500	1533.47
56	195600	1532.68
57	195700	1531.90
58	195800	1531.12
59	195900	1530.33
60	196000	1529.55
61	196100	1528.77
62	196200	1527.99

Frequencies are accurate values, wavelengths are dependent on the media properties



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