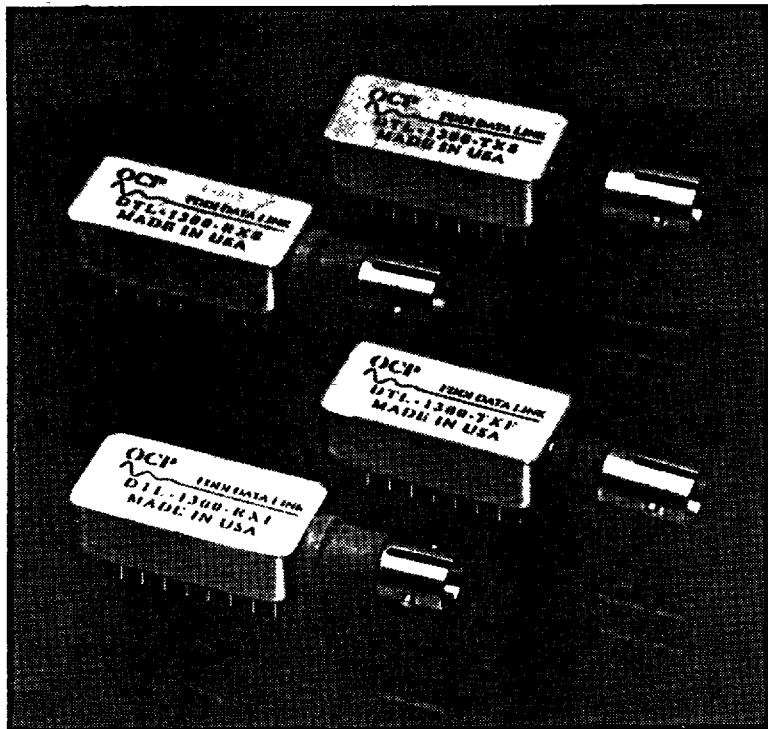




T-41-91

Preliminary

DTL-1300-F/S**Data Link Modules for FDDI****Features**

- ☐ Full FDDI Compliance
- ☐ High Temperature and SAFENET Applications
- ☐ Minimum of 18 dB Link Budget
- ☐ Wide Receiver Dynamic Range, 25 dB minimum
- ☐ LED Disable Control Input
- ☐ Integral ST™ Optical Connector
- ☐ Single Supply Voltage (+5 V or -5.2 V)
- ☐ Standard 16 Pin Footprint
- ☐ Dual-in-Line Hermetically Sealed Metal Package
- ☐ -40°C to +110°C Case Temperature Range

Descriptions

The DTL-1300-F/S Fiber Optic Transmitter and Receiver Data Link is designed to meet or exceed all the requirements of the Physical Layer Medium Dependent (PMD) specification for the Fiber Distributed Data Interface (FDDI) over an extremely wide temperature range from -40°C to +110°C. Highly reliable 1300 nm surface-emitting LEDs selected for proper rise/fall time, center wavelength and spectral width are utilized in the transmitters. The receivers incorporate an InGaAs/InP PIN photodiode and a high speed transimpedance amplifier to exceed the sensitivity

and dynamic range requirements of FDDI. The receiver post-amplifier features the specified Signal Detect function and differential emitter coupled logic (ECL) outputs. Both the transmitter and receiver are housed in a 16-pin dual-in-line hermetically sealed metal package with integral ST™ connector and operate on standard +5 volt or -5.2 volt power supply.

The DTL-1300-S modules are designed for use with 62.5/125 μm fiber. The DTL-1300-F modules are designed for use with 100/140 μm fiber.

Optical Communication Products, Inc.

ST is a trademark of AT&T

Absolute Maximum Ratings

Parameter	DTL-1300-F		DTL-1300-S		Units
	Minimum	Maximum	Minimum	Maximum	
Storage Temperature	- 55	+ 110	- 55	+ 110	°C
Operating Temperature	- 40	+ 110	0	+ 85	°C
Supply Voltage	0	+ 6.0	0	+ 6.0	V
Input Voltage	0	+ 6.0	0	+ 6.0	V
Lead Soldering	-	240°C, 10 sec	-	240°C, 10 sec	-

Transmitter Electrical Interface

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage	+5 V	V _{CC}	4.5	5.0	5.5	V
	-5.2 V	V _{EE}	- 5.5	- 5.2	- 4.5	V
Supply Current		I	-	130	160	mA
Power Dissipation		P	-	650	900	mW
Input HIGH Voltage (Data/ $\overline{\text{Data}}$)		V _{IHS}	V _{CC} - 1.15	-	V _{CC} - 0.73	V
Input LOW Voltage (Data/ $\overline{\text{Data}}$)		V _{ILS}	V _{CC} - 1.87	-	V _{CC} - 1.45	V
Differential Input Voltage		V _{DIF}	0.3	-	1.1	V
Input Common Mode Voltage ¹		V _{ICM}	-	-	1.0	V
Reference Voltage		V _{BB}	V _{CC} - 1.39	V _{CC} - 1.29	V _{CC} - 1.17	V

¹ Permissible \pm V_{ICM} with respect to V_{BB}.

Receiver Electrical Interface

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage	+5 V	V _{CC}	4.5	5.0	5.5	V
	- 5.2 V	V _{EE}	- 5.5	- 5.2	- 4.5	V
Supply Current		I	-	80	100	mA
Power Dissipation		P	-	400	550	mW
Output HIGH Voltage		V _{OH}	V _{CC} - 1.035	-	V _{CC} - 0.88	V
Output LOW Voltage		V _{OL}	V _{CC} - 1.83	-	V _{CC} - 1.62	V

Transmitter Operation

The transmitter behaves logically as a differential input gate which controls a 1300 nm LED. When the DATA input voltage is greater than the $\overline{\text{DATA}}$ input voltage, the LED is ON; and vice versa. For single-ended applications, the unused input pin

should be connected to V_{BB}. The DISABLE control input turns the LED off when forced to ECL logic "high" independent of the input data. For normal operation, the DISABLE input should be left open or forced to ECL logic "low".

Transmitter Performance (Over Specified Operating Temperature Range)

Parameter	Symbol	DTL-1300-F			DTL-1300-S			Units
		Min	Typ	Max	Min	Typ	Max	
Data Rate	B	DC	125	160	DC	125	160	Mb/s
Optical Output Power ¹	\bar{P}_o	- 15.7	- 12.0	- 9.0	- 16.0	- 12.0	- 9.0	dBm
Center Wavelength ²	λ_c	1270	1320	1380	1270	1320	1380	nm
Rise & Fall Time (10% to 90%) ²	t_r & t_f	0.6	-	3.5	0.6	-	2.7	ns
Random Jitter (p-p)	RJ	0	-	0.7	0	-	0.7	ns
Duty Cycle Distortion (p-p)	DCD	0	-	0.6	0	-	0.6	ns
Data Dependent Jitter (p-p)	DDJ	0	-	0.6	0	-	0.6	ns
Extinction Ratio (P_{off}/P_{on}) x 100%	-	-	-	10	-	-	10	%
Transmit OFF Power	P_{off}	-	-	- 50			- 50	dBm
Spectral Width ²	$\Delta\lambda$	-	130	160	-	130	160	nm

¹ Measured with 100/140 μ m fiber for DTL-1300-F and 62.5/125 μ m fiber for DTL-1300-S.² Center wavelength, spectral width, and rise/fall time are compliant with Figure 5.1 of the FDDI PMD.**Receiver Performance (Over Specified Operating Temperature Range)**

Parameter		Symbol	DTL-1300-F			DTL-1300-S			Units
			Min	Typ	Max	Min	Typ	Max	
Data Rate		B	1	125	160	1	125	160	Mb/s
Optical Input Power ¹ (BER = 2.5×10^{-10})	FDDI Test ²	\bar{P}_{in}	- 34.0	-	- 9.0	- 35.0	-	- 9.0	dBm
	Sensitivity ³		- 35.5	-		- 36.5	-		
Signal Detect Thresholds ¹	Assertion	P_{sd}	-	-	- 34.0	-	-	- 35.0	dBm
	Deassertion		- 45.0	-	-	- 45.0	-	-	
Signal Detect Hysteresis ¹			1.5	-	-	1.5	-	-	dB
Signal Detect Timing	Assertion	T_{sd}	-	-	100	-	-	50	μ s
	Deassertion		-	-	350	-	-	50	
Wavelength of Operation		λ	1100	1320	1600	1100	1320	1600	nm
Output Duty Cycle Distortion (p-p)		DCD	-	-	0.4	-	-	0.4	ns

¹ Measured with 100/140 μ m fiber for DTL-1300-F and 62.5/125 μ m fiber for DTL-1300-S.² FDDI Test Conditions.³ When tested with 2^7 -1 PRBS at 125 Mbaud, input optical rise/fall time of 2.5 nsec at 1300 nm wavelength, and optimum sampling point.

Receiver Operation

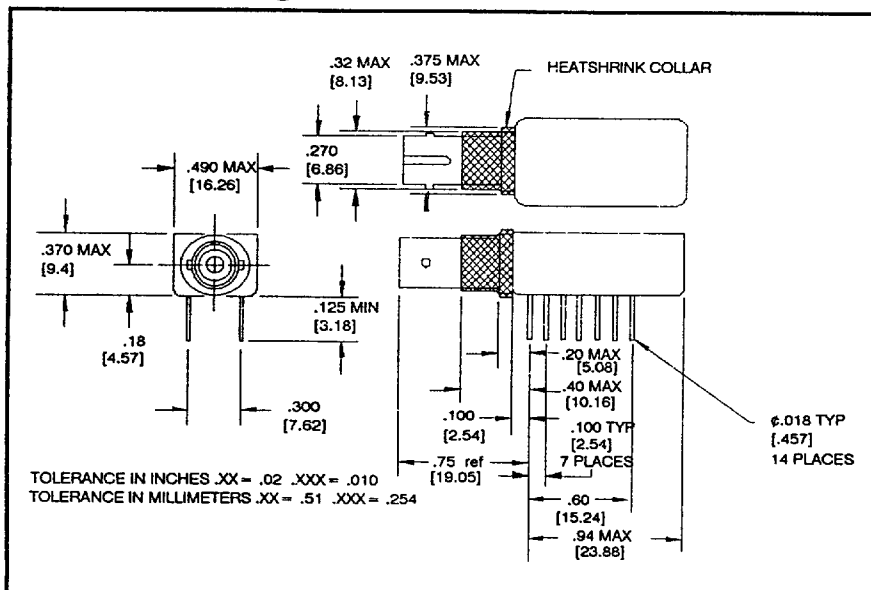
The receiver converts the incident optical power to a photocurrent using a high performance PIN photodiode. The photocurrent is converted to an analog voltage by a transimpedance amplifier. This analog signal is then amplified by additional gain stages and processed through a shaping filter and a comparator to generate the differential ECL output signals. Both outputs (DATA and $\overline{\text{DATA}}$) are open emitters requiring termination to V_{CC} -2 volts with 50 Ω or to V_{EE} with 510 Ω . For optimum performance both outputs should be terminated identically, even if only one output is used.

The Signal Detect circuit monitors the level of incoming optical signal and generates a logic LOW

signal when insufficient photocurrent is produced to ensure proper operation. The Signal Detect can be used to control an external squelch circuit to gate off spurious outputs generated by the receiver when no optical input is available. The outputs are open emitter ECL requiring termination (510 Ω to V_{EE} is recommended).

Special care should be taken with the receiver PCB layout. A solid ground plane and low impedance, well-bypassed power supply traces are highly recommended. If the receiver outputs drive long traces or multiple loads, the use of an ECL buffer gate to isolate the receiver from transmission line reflections is recommended.

Outline Drawing



Ordering Information

DTL - 1300 -XX - X

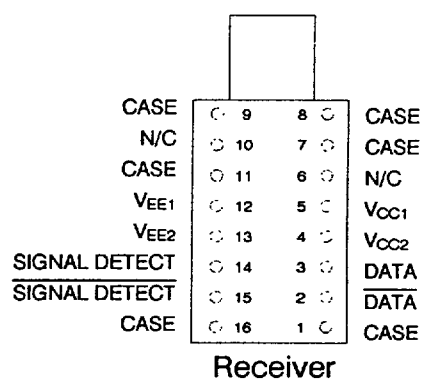
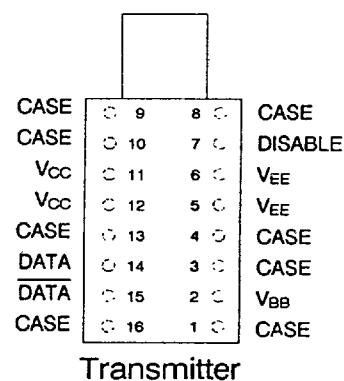
Function

TX: Transmitter
RX: Receiver

Type

F: For 100/140 μm fiber
S: For 62.5/125 μm fiber

Pin Assignments (Top View)



N/C — No internal connection

Optical Communication Products

9736 Eton Avenue, Chatsworth, CA 91311
Phone: 818-701-0164, FAX: 818-701-1468

Optical Communication Products, Inc. reserves the right to make changes in equipment design or specifications without notice. Information supplied by Optical Communication Products, Inc. is believed to be accurate and reliable. However, no responsibility is assumed by Optical Communication Products, Inc. for its use nor for any infringements of third parties which may result from its use. No license is granted by implication or otherwise under any patent right of Optical Communication Products, Inc.

21737-0202 Rev. A
02-01-93