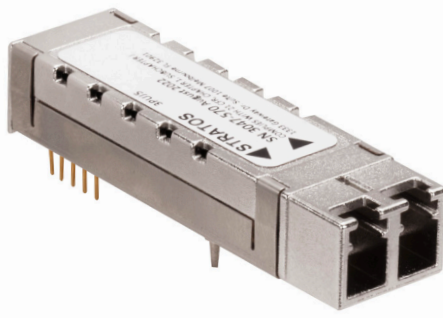


MIL-SxF-LT11M Military SFF Optical Transceiver

Fast Ethernet Applications 3.3 V, 1310 nm LED, multimode, up to 2.0 km

The Cinch Connectivity Solutions' optical transceivers consist of transmitter and receiver functions combined in a Small Form Factor (SFF) module. The optical transmitter is a high output 1310nm LED. The transmitter input lines are driven with differential LVPECL signals applied to the Transmit (TX+ and TX-) pins. These signals are internally converted to a suitable modulation current by a CMOS integrated circuit. The optical receivers consist of PIN and Preamplifier assemblies and CMOS limiting post-amplifier integrated circuits. Outputs from the receivers consist of differential data signals on the Receive (RX+ and RX-) pins and a single ended LVTTTL signal detect function on the Signal Detect (SD) pin. The RX data is squelched (JAM) upon Signal Detect deassert to prevent garbage data output when no optical signal is present.

The MIL-SxF-LT11M multimode glass optical fiber transceivers provide low profile, cost effective solutions for Fast Ethernet multimode (up to 2.0 Km) optical fiber data links with a duplex LC connector interface. These transceivers are fully compliant with the IEEE 802.3u Fast Ethernet standard but can be used for any other data communications purpose within their operating parameters.



Features & Benefits

- Industry standard MSA 2x5 footprint
- IPC Class III assembly and construction
- Industrial Temp range -40°C to +85°C operational
- All metal construction for rugged environments
- Parylene C conformal coating
- RX Signal Detect pin
- RX data squelch on Signal Detect deassert
- Separate +3.3 V power pins per TX/RX port
- Industry standard duplex multimode LC receptacle
- Full compliance to IEEE and ANSI requirements
- EN-60825/ IEC-825 / CDRH Class 1 Compliant

Applications

- Rugged Network equipment
- Mobile comms
- Aircraft Mission Computer
- UAV, UUV
- MRI scan equipment
- Oil and Gas exploration
- Fire and Rescue

Ordering Information

Part Number	Date Rate	Optical Link	Conformal Coating	Temperature Range	EMI Clip
MIL-SNF-LT11M	125 Mbps	1310 nm MMF	Parylene C	-40 to +85°C	Flat shell (no clip)
MIL-STF-LT11M	125 Mbps	1310 nm MMF	Parylene C	-40 to +85°C	EMI clip

Absolute Maximum Ratings

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Min	Typical	Max	Unit
Storage Temperature	T _s	-55		+100	°C
Lead Soldering Temperature ¹	T _{SOLD}			+260	°C
Lead Soldering Time ¹	t _{SOLD}			10	seconds
Supply Voltage	V _{CC}	-0.5		+4.5	V
Data Input Voltage	V _I	-0.5		V _{CC}	V
Differential Input Voltage (p-p)	V _D			2.0	V
Output Current	I _O			50	mA

¹ Recommended for hand solder or hot bar soldering only. Convection or IR reflow oven profiles may damage internal solder joints. Reference Low Rider Soldering Application Note.

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Temperature Limit	T _A	-40		+85	°C
Supply Voltage	V _{CC}	+3.135		+3.465	V
TX Common Mode Voltage	V _{CM}		2.0		V
TX Differential Input Voltage (p-p)	V _D	0.20		2.20	V
Transmit Disable Voltage	V _{TD}	2.0		V _{CC}	V
RX Data Output Load	R _L		50		Ω

Transmitter²

Parameter	Symbol	Min	Typical	Max	Unit
Optical Output Power ¹	P _O	-20.0		-13.0	dBm
Optical Output Wavelength	λ _{OUT}	1285	1310	1355	nm
Spectral Width	Δλ _{RMS}			63	nm
Extinction Ratio	ER	12			dB
Supply Current	I _{CC}		180	230	mA
Optical Rise/Fall Time (20% - 80%)	T _{R,F}			3.0	ns

¹ BER = 10⁻¹⁰ @ 1.25 Gbps, PRBS 2²³-1, NRZ, compliant with FDDI PMD ISO / IEC 9314-3 and IEEE-802.3u testing with 62.5 MM fiber

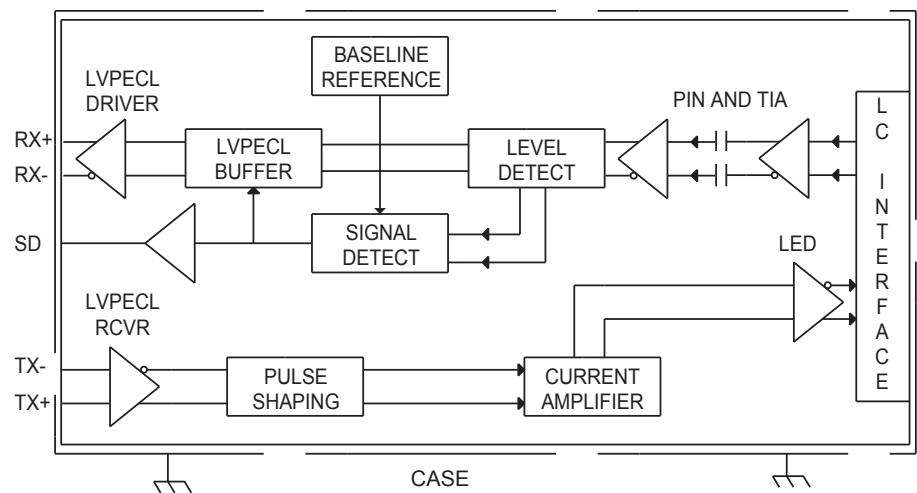
² V_{CC} TX = 3.135 to 3.465 V, T_A = Operating Temperature Range

Receiver³

Parameter	Symbol	Min	Typical	Max	Unit
Optical Sensitivity ¹	PI	-32.0	-23	-8.0	dBm
Optical Input Wavelength	λ_{IN}	1260		1380	nm
Supply Current	I _{CC}		150	170	mA
Signal Detect Assert Time	t _{SDAS}		<10	100	μs
Signal Detect Deassert Time	t _{SDDA}		<10	350	μs
Signal Detect Deassert Level ²	SD _{OFF}	-45.0		-32.5	dBm
Signal Detect Assert Level	SD _{ON}	-45.0		-32.0	dBm
Signal Detect Hysteresis	HYS	0.5	2.25	3.5	dB
RX Data Output – Low	V _{OL} -V _{CC}	-1.810		-1.475	V
RX Data Output – High	V _{OL} +V _{CC}	-1.165		-0.880	V

¹ BER = 10⁻¹⁰ @ 1.25 Gbps, PRBS 2⁷-1, NRZ. Compliant with ANSI X3.297 / FC-PH-2
² Rx Data output are squelched when Signal Detect is deasserted to prevent garbage data output when no optical signal is present
³ V_{CC}TX = 3.135 to 3.465 V, T_A = Operating Temperature Range

Block Diagram



Conformal Coating Option

Parameter	Value
Specification	MIL-I-46058C, Type XY
Coating	Parylene type C
Deposition	Vacuum deposited
Film Thickness	1 MIL +/- 0.0002

Link Distance

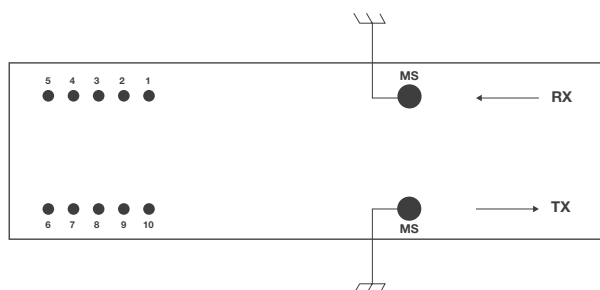
Application	Fibre Specification	Distance
Fast Ethernet – IEEE 802.3u	62.5/125 – 60 MHz*km	2.0 km
FDDI PMD ISO / IEC 9314-3	50/125 – 500 MHz*km	2.0 km

Regulatory Compliance

Requirement	Feature	Condition	Notes
MIL-STD-883-3015.7	ESD	Class II	2200 V
IEC-801-2	ESD	Human Body Model	25 kV
IEC-801-3	EMI	Immunity	10 V/M
FCC	EMI	Class B	>20 dB
EN 55022 (CISPR 22A)	EMI	Class B	10 V/M

Military Small Form Factor Transceiver Pin Number Assignments

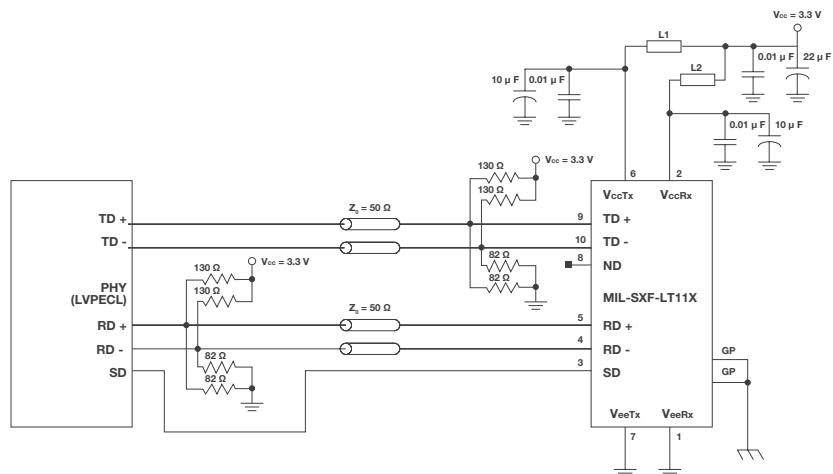
Top View Shown



Pin Functions

Pin #	Symbol	Description	Logic Family
MS	MS	Mounting Studs Connect to chassis ground	N/A
1	VEERX	Receiver Signal Ground	N/A
2	VccRX	Receiver Power Supply	N/A
3	SD	Signal Detect (1=detect, 0=no signal)	LVTTTL
4	RD-	Receive Data Out -	LVPECL
5	RD+	Receive Data Out +	LVPECL
6	VccTX	Transmit Power Supply	N/A
7	VEETX	Transmit Signal Ground	N/A
8	N/C	No Connect	N/A
9	TD+	Transmit Data In +	LVPECL
10	TD-	Transmit Data In -	LVPECL

Parallel Termination (Thevenin Equivalent) for DC Coupled LVPECL PHY Devices

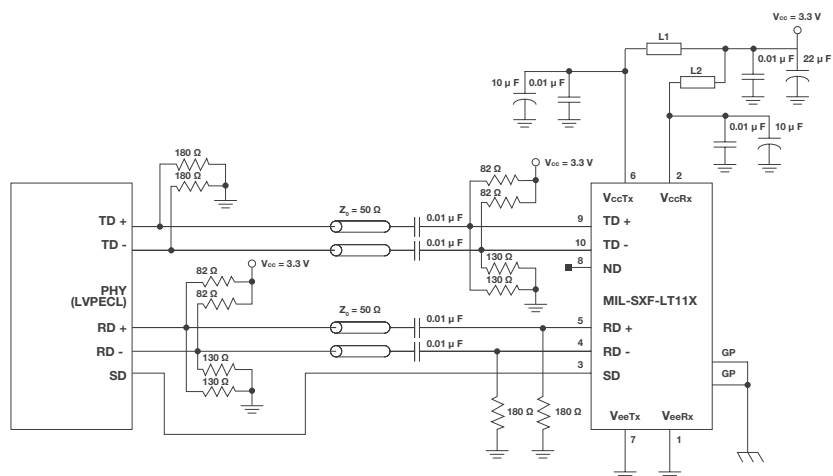


Notes:

1. L1 and L2 = MuRata BLM21A601S or equivalent (600 Ω at 100 MHz or better).
2. Place LVPECL termination resistors (130 / 82 Ω) as close as possible to termination points.
3. Route the differential pairs (TD +/- and RD +/-) together using 50 Ω impedance matched traces.
4. Other DC coupled LVPECL termination techniques are also valid.
5. Use separate power supply filtering for VCCTX and VCCR X, as shown.
6. Ground Posts (GP) are isolated from Signal Ground (Vee), and may be connected to Chassis Ground (as shown) or to Signal Ground if a Chassis Ground is not available.

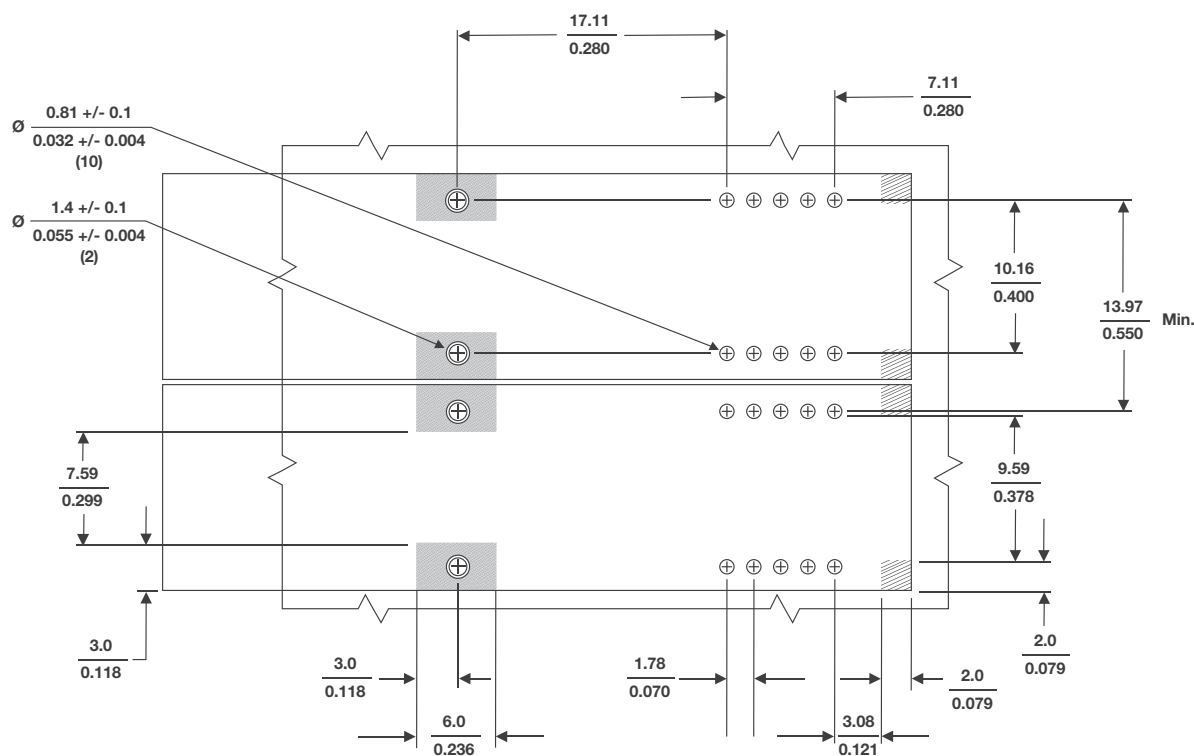
For AC Coupled LVPECL PHY Devices

Similar to DC-coupled, except addition of emitter follower pull-down resistors (180 Ω), different Vt operating point (2.0 V versus 1.1 V), and addition of series RF capacitors.



Notes:

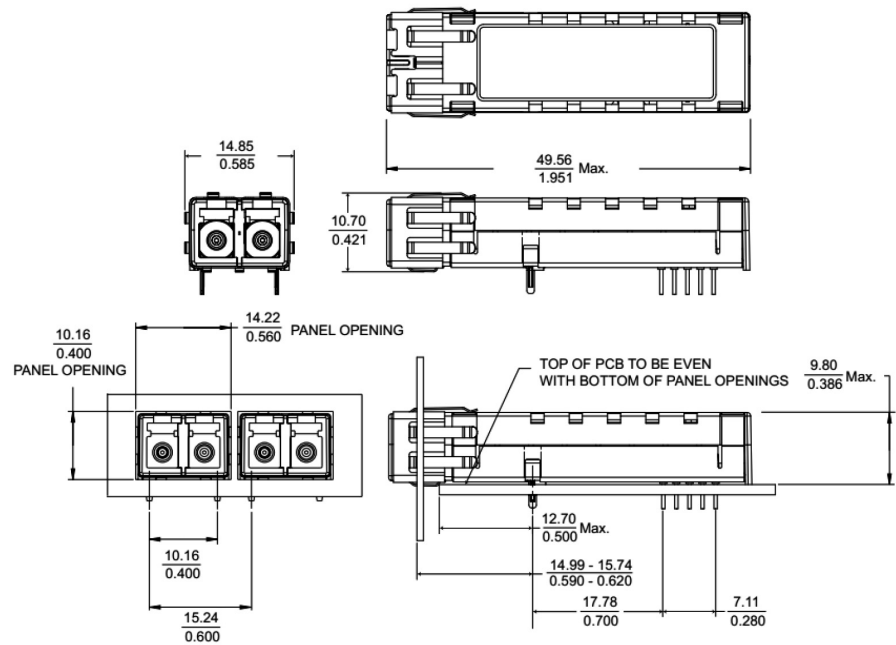
1. L1 and L2 = MuRata BLM21A601S or equivalent (600 Ω at 100 MHz or better).
2. Place LVPECL termination resistors (82 / 130 Ω) as close as possible to termination points.
Place LVPECL emitter follower pull-down (180 Ω) as close as possible to source points.
3. Route the differential pairs (TD +/- and RD +/-) together using 50 Ω impedance matched traces.
4. Other DC coupled LVPECL termination techniques are also valid.
5. Use separate power supply filtering for VCCTX and VCCR X, as shown.
6. Ground Posts (GP) are isolated from Signal Ground (Vee), and may be connected to Chassis Ground (as shown) or to Signal Ground if a Chassis Ground is not available. Use low ESR capacitors, such as NPO or COG, for AC coupling of TD +/- and RD +/- signals.



Cross-hatched areas should have no signal traces on the top layer

MIL-SxF-LT11M
Military SFF Optical Transceiver

Mechanical Detail, EMI Clip Shell Option
Part number MIL-STF-LT11M



Mechanical Detail, Flat Shell Option
Part number MIL-SNF-LT11M

