

Direct 9 Series

ARINC 801 Dual Optical Transmitter, 1x/2x/4xFibre Channel Applications, Multimode, 850nm

Dual Optical Transmitter Unit

FEATURES

- Compliant with 1x/2x/4xFC per ANSI FC-PI-2, FC-PI and FC-PH2
- Maximum optical channel bit error rate less than 1×10^{-12}
- Operating temperature range from -40°C to $+85^{\circ}\text{C}$
- Shock and vibration resistant per RTCA / D0-160E
- Electroless nickel plating meets stringent EMI / RFI performance specifications
- D-Subminiature housings are strong, durable, corrosion resistant and light weight
- ARINC 801 compliant optical fiber connector interface
- Threaded mating connectors provide secure interface conditions in high vibration environments

APPLICATIONS

Direct 9 series printed circuit board mounted optical transmitters enable high speed network communications over long distances in harsh environments.

- Fibre Channel peripherals
- Video display drivers

The D-Subminiature shell provides a rugged optical interface that is compliant with ARINC 801.

The multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadax copper conductors unacceptable.



Two Optical TX Channels Operating from 50Mbps to 4.25Gbps

DESCRIPTION

Direct 9 series D-Subminiature optical fiber dual transmitters consist of optoelectronic transmitter functions integrated into a printed circuit board mounted D-Subminiature / ARINC 801 D-Subminiature receptacle connector. The optical transmitters are 850nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

The electrical interface to the Direct 9 series D-Subminiature optical transmitters is a solder pin field with the same PCB footprint as existing electrical 9 position D-Subminiature connectors.

Direct 9 series D-Subminiature optical fiber dual transmitters are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

ORDERING INFORMATION

Application	Part Number
50Mbps to 2.49Gbps	P24T-2S1D-EF
2.5 to 3.19Gbps	P24T-2S1E-EF
3.2 to 4.25Gbps	P24T-2S1G-EF

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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	Minimum	Typical	Maximum	Unit
Storage Temperature	T_s	-55		+100	°C
Supply Voltage	V_{cc}	-0.5		+4.5	V
TX_DIS Input Voltage	V_i	-0.5		$V_{cc} + 0.5$	V

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-40		+85	°C
Power Supply Voltage	V_{cc}	+3.135		+3.465	V
Power Supply Noise (p-p)	N_p			200	mV
TX Differential Input Voltage (p-p)	V_D	0.25		2.2	V

ENVIRONMENTAL OPERATING CONDITIONS

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	HBM	2200V
RTCA / D0-160E	Vibration	3.8g ² /Hz	43G rms
RTCA / D0-160E	Shock	40.0g	6-9mS
RTCA / D0-160E	Flame Resistance		30 Seconds
RTCA / D0-160E	Damp Heat	10 Cycles	24 Hours
ARINC 801	Mating Durability	500 Cycles	<0.5dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

MATERIALS

Item	Detail	Notes
D-Subminiature Shell	Nickel Plated Steel	
Solder Pins	Brass	
Solder Pin Plating	Gold over Nickel	
Insert	Thermoplastic	
Shield	Nickel Plated Steel	
Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	

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OPTICAL TRANSMITTERS T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<10 ⁻¹²)	P_o	-6.5		-1.0	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM
Extinction Ratio	ER	6.0	9.0		dB
Optical Rise, Fall Time (20% to 80%)	$t_{R,F}$			150	pS

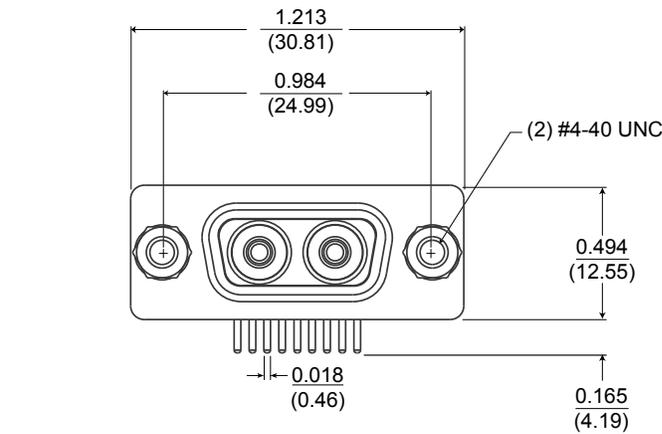
POWER SUPPLY CURRENT T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Transmitter	I_{CCT}		60	90	mA

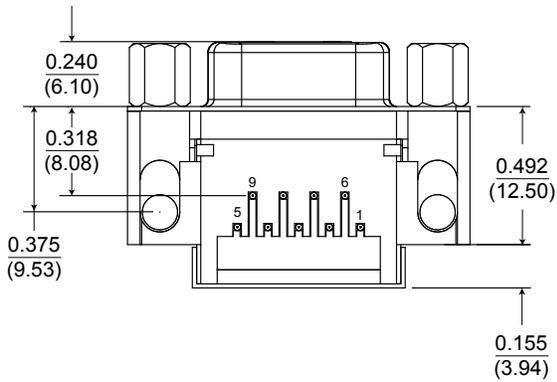
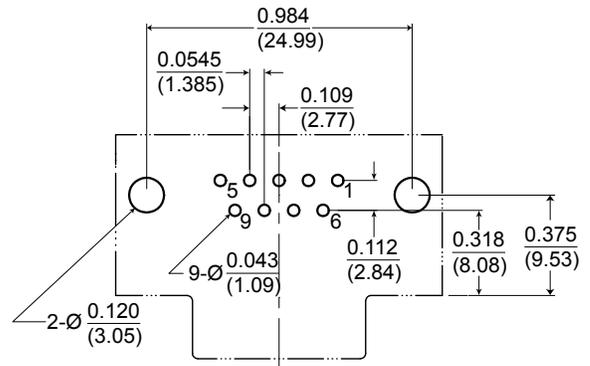
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OUTLINE DRAWING

Dimensions are shown as: inches (mm)



Recommended PCB Layout
Top View - Component Side



Aqueous washing is permitted with the protective covers in place.

If necessary, after washing, clean the optical barrels with lint free swabs and Isopropyl alcohol

The transceivers are conformally coated but after aqueous washing the units should be baked @ 85°C for 1.0 hour to eliminate any retained moisture.

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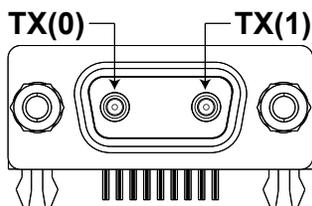
ELECTRICAL PIN ASSIGNMENTS

D-Subminiature Shell Size 09

Pin Number	Symbol (Port)	Description	Logic Family
1	TX-(1)	Transmitter Data - Input	CML Internal 100Ω differential termination
2	TX+(1)	Transmitter Data - Input	CML Internal 100Ω differential termination
3	GND	Ground	N/A
4	TX-(0)	Transmitter Data - Input	CML Internal 100Ω differential termination
5	TX+(0)	Transmitter Data - Input	CML Internal 100Ω differential termination
6	V _{cc}	Power Supply	N/A
7	TX Dis(1)	Transmit Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ to 10.0KΩ pullup / pulldown
8	TX Dis(0)	Transmit Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ to 10.0KΩ pullup / pulldown
9	GND	Ground	N/A

INSERT ARRANGEMENT

D-Subminiature Shell Size 09



Front face of the
transceiver socket
insert shown!

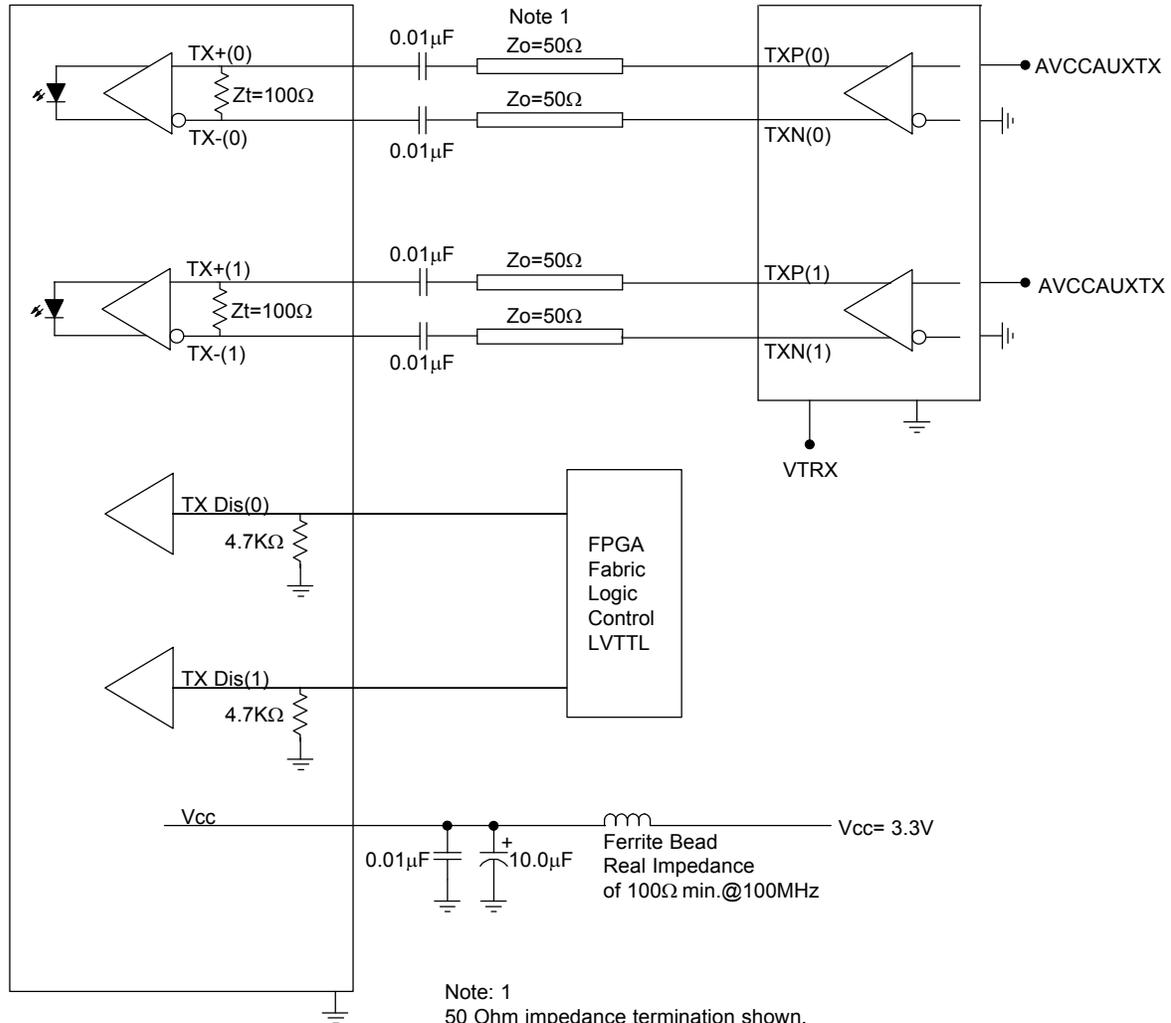
Mating cable plug
interface opposite.

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APPLICATION SCHEMATIC
For Xilinx Rocket I/O Interfaces

Optical Transmitters

Xilinx Rocket I/O



Note: 1
50 Ohm impedance termination shown.
For alternate impedance requirements,
please consult the Factory.

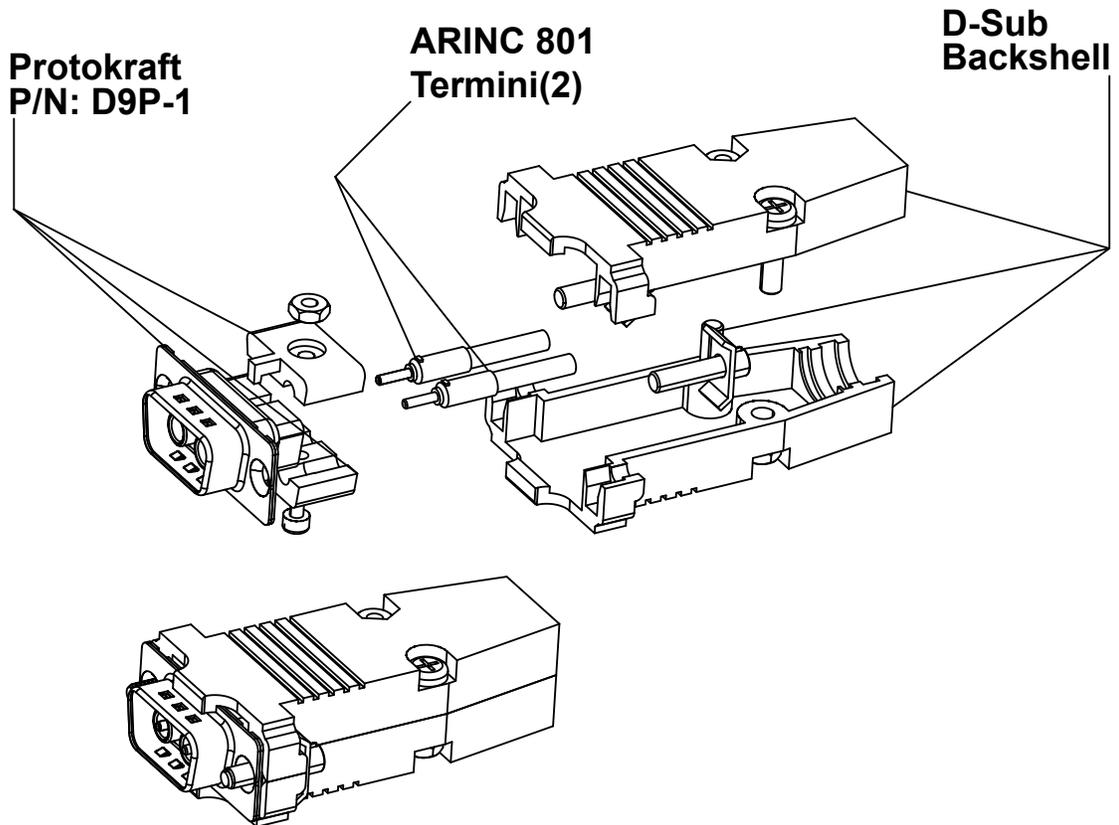
Typical application schematic shown
For alternate applications or termination
techniques, please consult the Factory

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APPENDIX A1

DIRECT 9 FIBER OPTIC CABLE PLUG / ARINC 801 PIN TERMINI

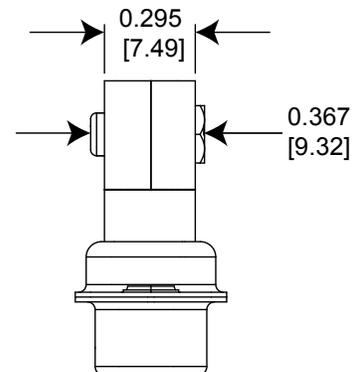
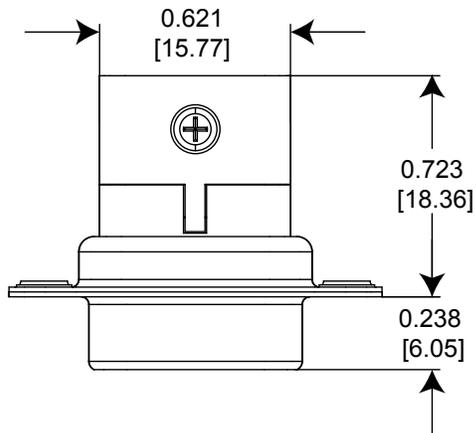
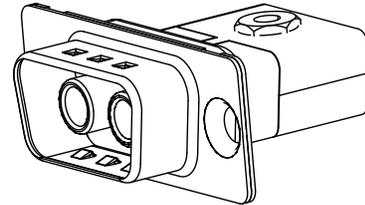
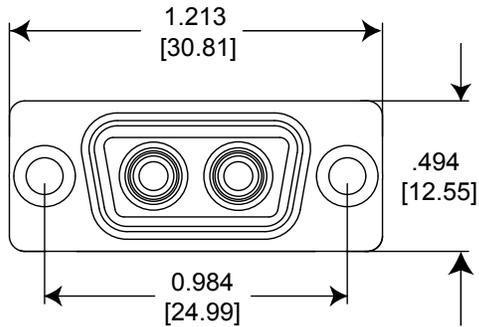


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APPENDIX A2

Direct 9 Fiber Optic D-Subminiature Cable Plug Insert

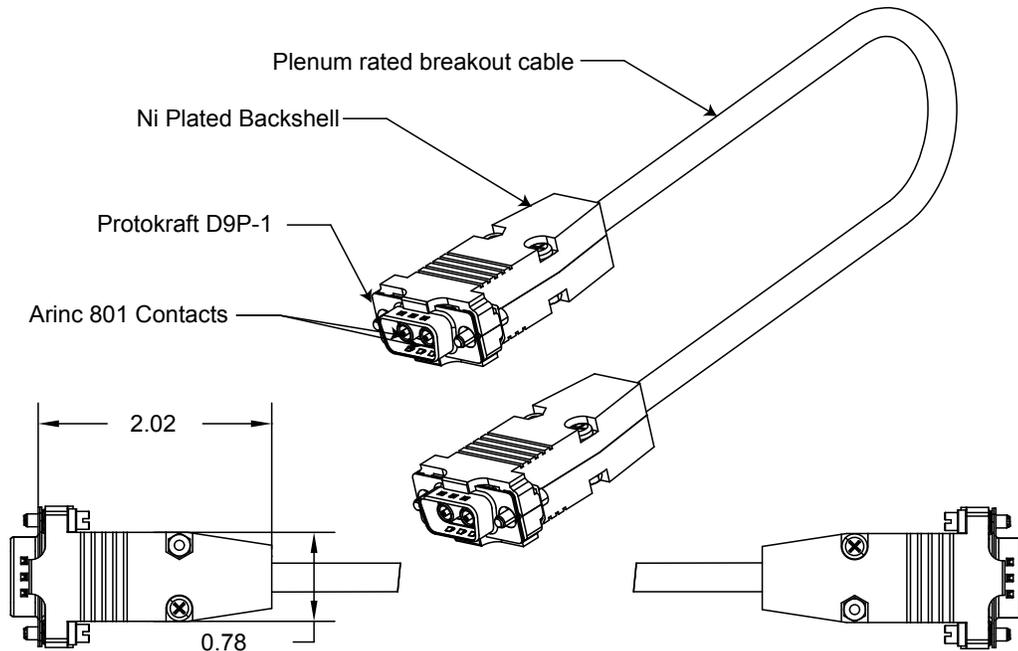
Dimensions are shown as: inches [mm]



Protokraft Direct 9 Fiber Optic Cable Plug Part Number: D9P-1
See Appendix A3 for test cable options

APPENDIX A3

Direct 9 Fiber Optic D-Subminiature Test Cable Options



P24C-0121 -1 Shown



P24C-XX X X- X

- 01-99 Meters
- 1 = 50µm
- 2 = 62.5µm
- 1 = D9P-1 STRAIGHT
- 2 = D9P-1 RIGHT ANGLE
- 1 = D9P-1 STRAIGHT
- 2 = D9P-1 RIGHT ANGLE
- 3 = ST
- 4 = LC
- 5 = FC



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