

Direct 9 Series

ARINC 801 Compliant Dual Optical Receiver, 1x/2x/4xFC Applications, Multimode, 850nm

Dual Optical Receiver Unit



Two Optical RX Data Channels for 1x/2x/4xFC or Arinc 818

FEATURES

- Compliant with 1x/2x/4xFC - ANSI Fibre Channel FC-PI-2, FC-PI and FC-PH-2 and Arinc 818
- 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-
- 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 receivers enable high speed network communications over long distances in harsh environments.

- Fibre Channel peripherals
- Video display units

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 quadrx copper conductors unacceptable.

DESCRIPTION

Direct 9 series D-Subminiature optical fiber dual receivers consist of optoelectronic receiver functions integrated into a printed circuit board mounted D-Subminiature / ARINC 801 receptacle connector. The optical receivers consist of PIN + preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines. A CMOS output signal is generated on the LOS line upon the loss of valid incoming optical data.

The receiver data lines are squelched upon LOS assertion, preventing errant data generation when an invalid incoming optical signal is presented to the receiver. The electrical interface to the Direct 9 series D-Subminiature optical fiber dual receivers is a solder pin field with the same footprint as existing electrical 9 position D-Subminiature connectors.

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

ORDERING INFORMATION

Application	Part Number
125Mbps to 5.0Gbps	P24R-2S1L-EF
Add -LOS to the end of any part number for Enhanced LOS Threshold	Ex) P24R-2S1L-EF-LOS

Facilitating Secure Communications in Harsh Environments

Direct 9 Series D-Subminiature / ARINC 801 Optical Dual Receiver,
1x/2x/4x Fibre Channel Applications, Multimode, 850nm

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
Differential Input Voltage (p-p)	V_i			2.2	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

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity (BER<10 ⁻¹² , ER=9.0) xxxx-xxxL-xx @ 125Mbps to 1.25Gbps xxxx-xxxL-xx @ 2.125Gbps xxxx-xxxL-xx @ 2.5Gbps to 3.19Gbps xxxx-xxxL-xx @ 3.2Gbps to 4.25Gbps xxxx-xxxL-xx @ 4.25Gbps to 5.0Gbps	P_i	-17.0 -15.0 -15.0 -14 -12.5		0.0	dBm
Optical Wavelength	λ_{IN}	830		860	nM
Optical Modulation Amplitude (ER=9.0, p-p) xxxx-xxxL-xx @ 50Mbps to 1.25Gbps xxxx-xxxL-xx @ 2.125Gbps xxxx-xxxL-xx @ 2.5Gbps to 3.19Gbps xxxx-xxxL-xx @ 3.2Gbps to 5.0Gbps	OMA	31 49 56 61			μ W
CML Differential Output Voltage (p-p)	V_{Diff}	600	780	1200	mV
LOS Deassert Level	P_{OFFr}	-28.0			dBm
LOS Hysteresis	HYS	1.5	2.25	3.5	dB

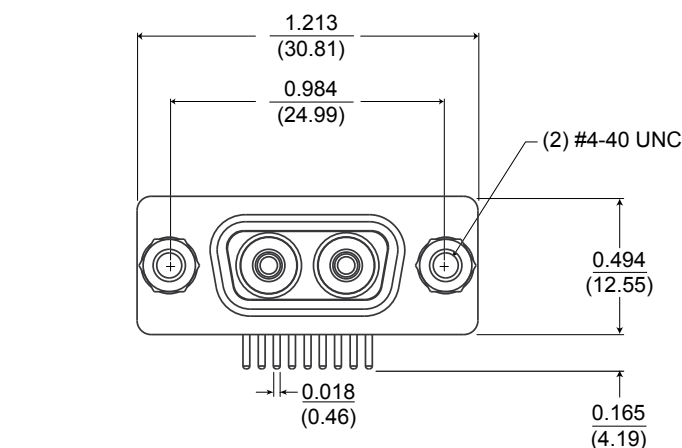
POWER SUPPLY CURRENT T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per receiver	I_{CCt}		80	110	mA

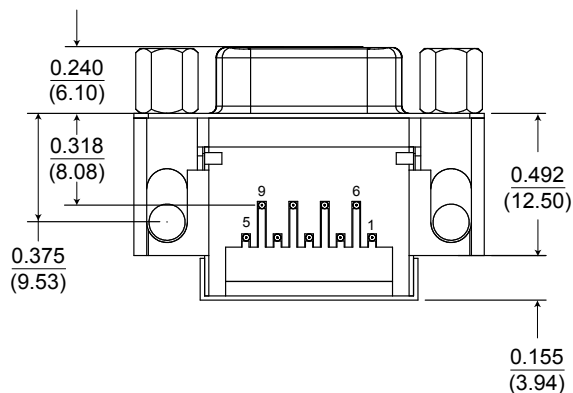
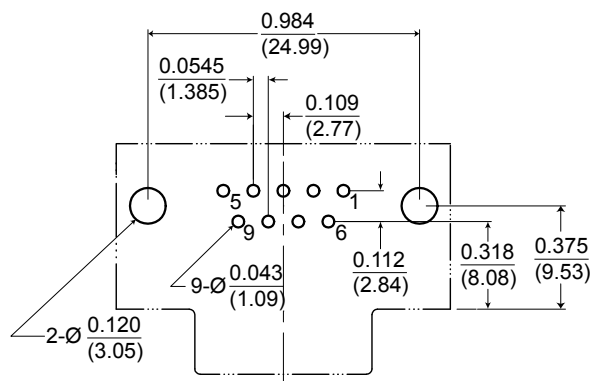
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OUTLINE DRAWING

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.

Facilitating Secure Communications in Harsh Environments

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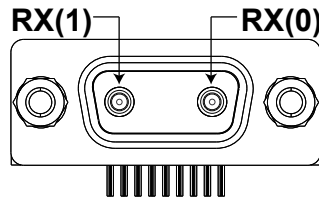
ELECTRICAL PIN ASSIGNMENTS

D-Subminiature Shell Size 09

Pin Number	Symbol (Port)	Description	Logic Family
1	RX-(0)	Receiver Data - Output	CML
2	RX+(0)	Receiver Data - Output	CML
3	GND	Ground	N/A
4	RX-(1)	Receiver Data - Output	CML
5	RX+(1)	Receiver Data - Output	CML
6	V _{cc}	Power Supply	N/A
7	LOS(0)	Loss of Signal Indicator - Output Satisfactory Operation: Logic "0" Output Internal Fault: Logic "1" Output	Open Drain CMOS
8	LOS(1)	Loss of Signal Indicator - Output Satisfactory Operation: Logic "0" Output Internal Fault: Logic "1" Output	Open Drain CMOS
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.

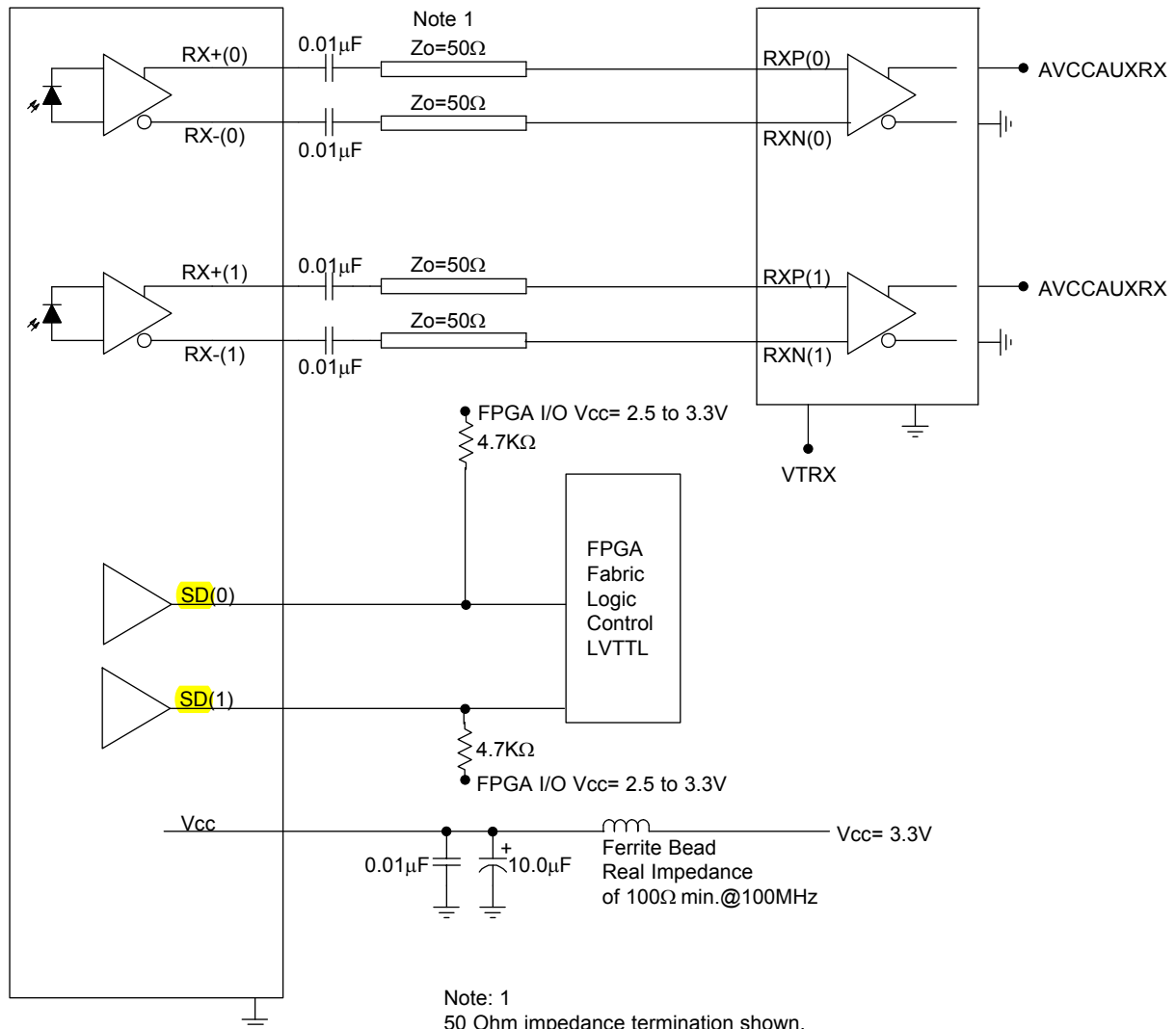
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APPLICATION SCHEMATIC

For Xilinx Rocket I/O Interfaces

Optical Receivers

Xilinx Rocket I/O

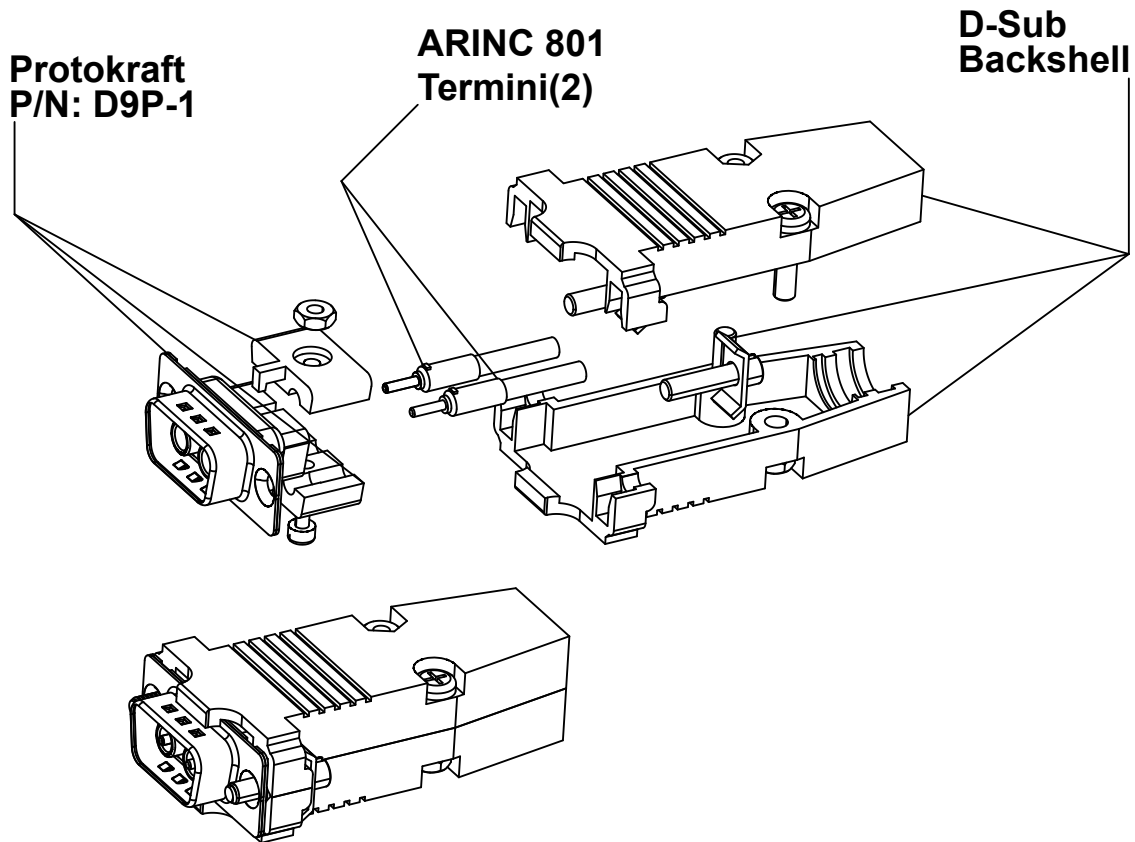


Note: 1
50 Ohm impedance termination shown.
For alternate impedance requirements,
please consult the Factory.

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

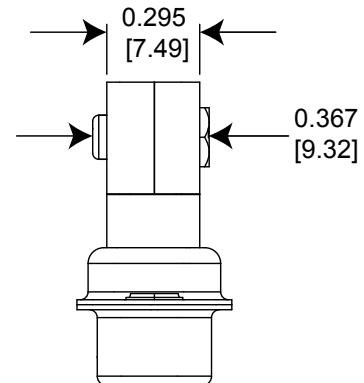
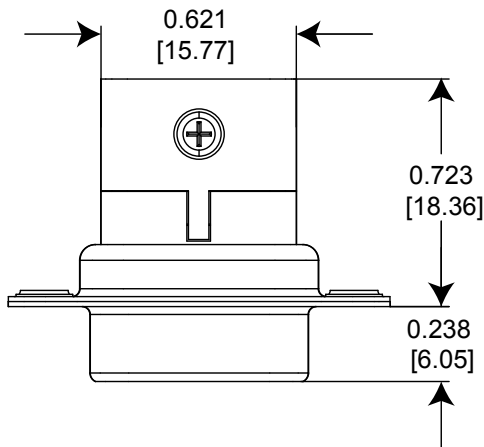
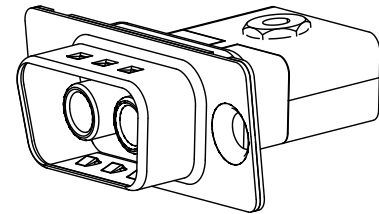
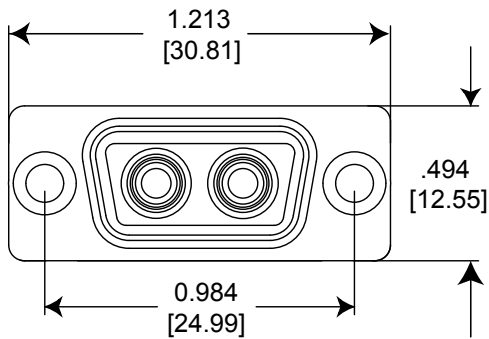


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APPENDIX A2

Direct 9 Fiber Optic D-Subminiature Cable Plug Insert

Dimensions are shown as: inches [mm]

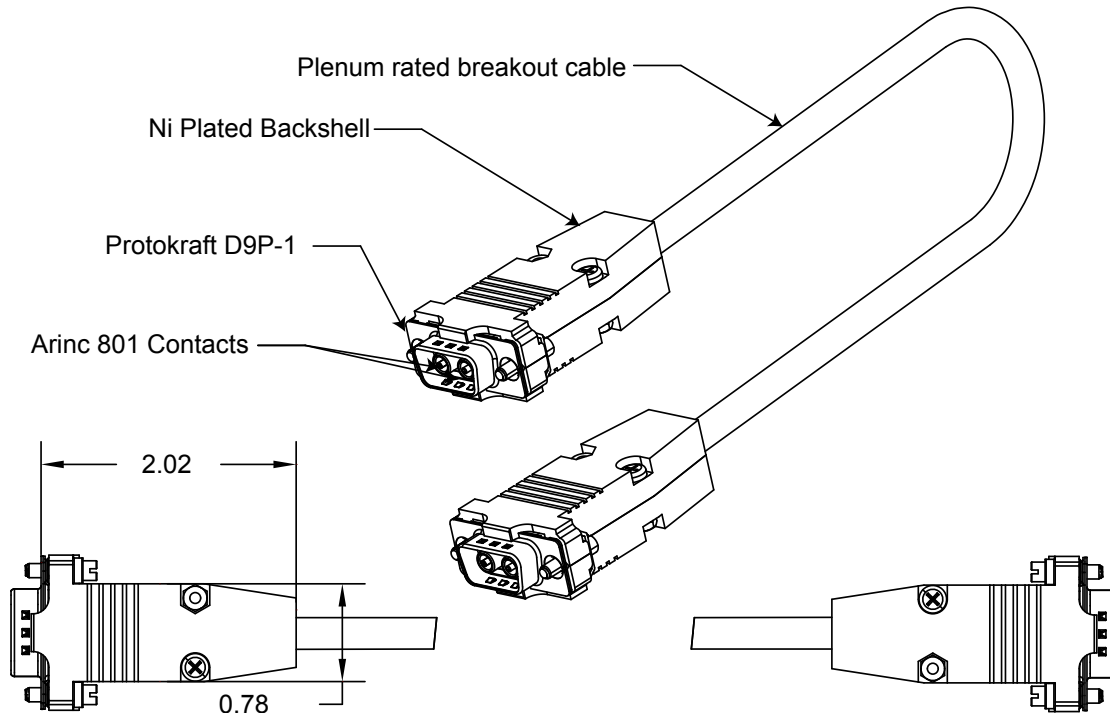


Protokraft Direct 9 Fiber Optic Cable Plug Part Number: D9P-1

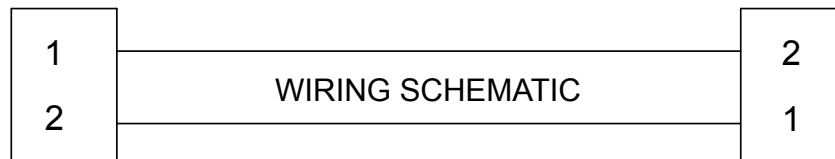
See Appendix A3 for test cable options

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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