Direct 9 Series

ARINC 801 Compliant Optical Transceiver, DC to 1.0MHz LVTTL Applications, Multimode, 850nM

Duplex Optical Transceiver Unit

One TX & One RX Operating from DC to 1.0MHz LVTTL

FEATURES

- Maximum optical channel bit error rate less than $1x10^{-8}$
- Operating temperature range from -40°C to +85°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 shock and vibration environments

APPLICATIONS

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

The 9 postion 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 quadrax copper conductors unacceptable.

DESCRIPTION

Direct 9 series D-Subminiature optical fiber transceivers consist of optoelectronic transmitter and receiver functions integrated into a printed circuit board mounted D-Subminiature / ARINC 801 compliant receptacle connector. The optical transmitters are 850nM light emitting diodes. The transmitter input lines are driven with single ended LVTTL signals applied to the transmitter input lines. Temperature compensated LED drivers convert the transmitter input signals to suitable LED modulation currents.

The optical receivers consist of PIN and preamplifier assemblies and limiting amplifiers. Outputs from the receivers consist of single ended LVTTL data signals on the receiver output lines.

The electrical interface to the Direct 9 series D-Subminiature optical transceivers is a solder pin field enabling direct substitution for existing electrical 9 position D-Subminature connectors.

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

ORDERING INFORMATION

Application	Product Number
DC to 1.0MHz LVTTL, 850nM	P24D-2S1Z-EF

MOOG

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

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-40		+85	°C
Supply Voltage	V_{CC}	+3.135		+3.465	V
Power Supply Noise (p-p)	N_P			200	mV
RX Output Voltage - High	V_{OH}	2.4			V
RX Output Voltage - Low	V_{OL}			0.4	V
RX Output Current	I_{RXO}			7	mA
TX Input Voltage - High	V_{IH}	2.0			V
TX Input Voltage - Low	V_{IL}			0.8	V

SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	Class II	2200V
RTCA / D0-160E	Vibration	$3.8g^2/Hz$	43G rms
RTCA / D0-160E	Shock	40.0g	6-9mS
RTCA / D0-160E	Flame Resistance	Method 1012	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
Shell	Steel Alloy	
Shell Plating	Electroless Nickel	
Insert	Thermoplastic	
Solder Pins	Brass	
Solder Pin Plating	Gold	
Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power[1]	P_o	-22.0		-4.0	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nM
Extinction Ratio	ER	10.0			dB
Optical Rise / Fall Time (10% to 90%)	$t_{R,F}$	0.6		3.0	nS

1. BER=1x10^{-8} @ 1.0 Mbps @ 50% Duty Factor, tested with 62.5/125µ multimode fi ber

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity[1]	P_I	-26.0		-8.0	dBm
Optical Wavelength	λ_{IN}	700		900	nM

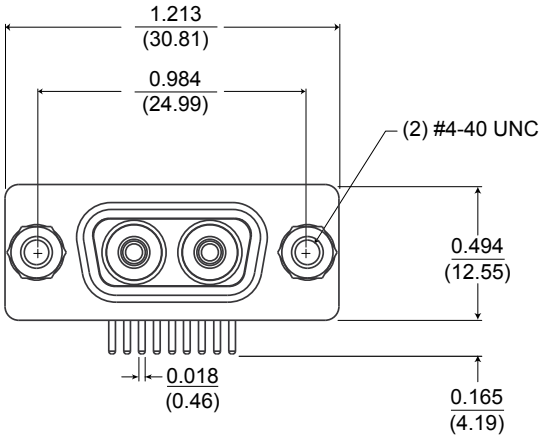
1. BER=1x10^{-8} @ 1.0 Mbps @ 50% Duty Factor, tested with 62.5/125µ multimode fi ber

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

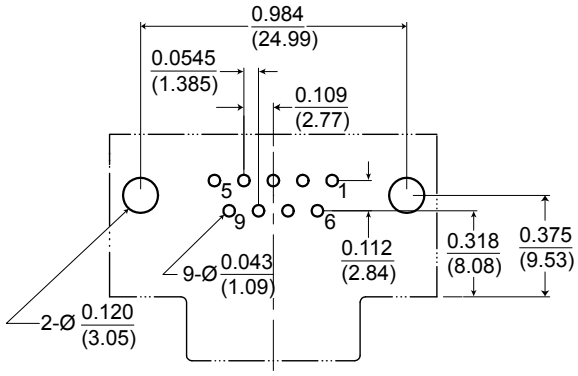
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Port	I_{CCT}		45	60	mA

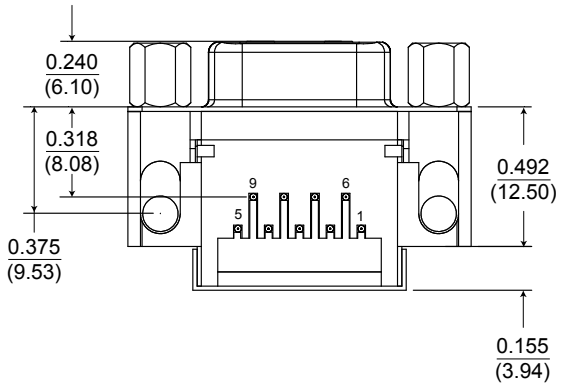
OUTLINE DRAWING

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.

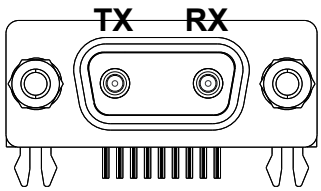
ELECTRICAL PIN ASSIGNMENTS

D-Subminiature Shell Size 09

Pin Number	Symbol	Description	Logic Family
1	RX	Receiver Data - Output	LVTTL
2	GND	Ground	N/A
3	GND	Ground	N/A
4	GND	Ground	N/A
5	TX	Tranmitter Data - Input	LVTTL
6	V_{cc}	Power Supply	N/A
7	GND	Ground	N/A
8	GND	Ground	N/A
9	GND	Ground	N/A

INSERT ARRANGEMENT

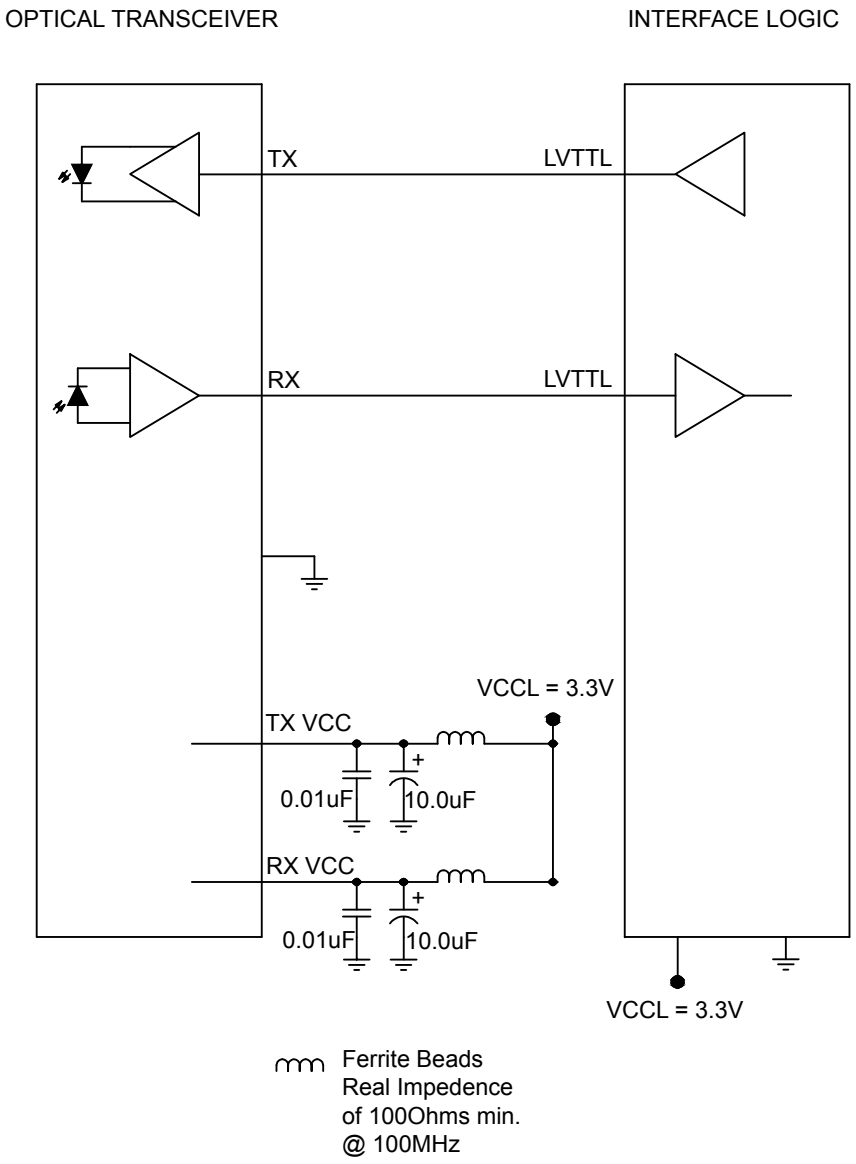
D-Subminiature Shell Size 09



Front face of the transceiver socket insert shown!

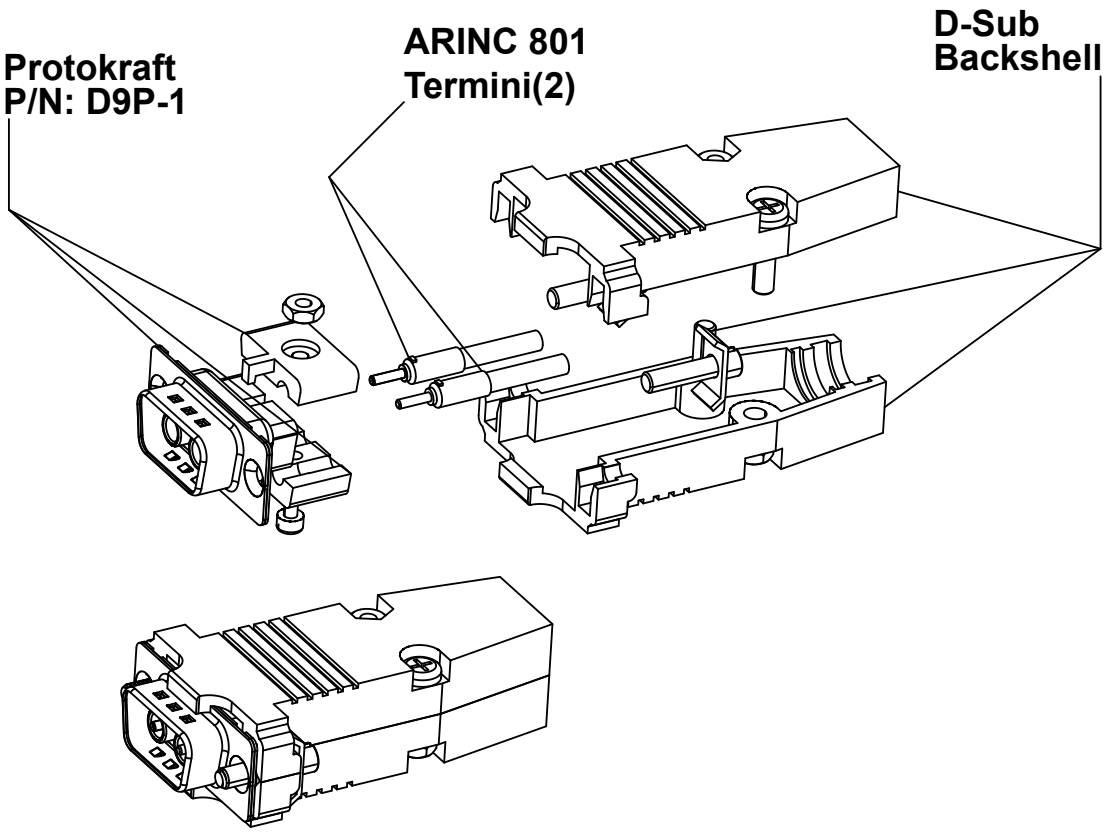
Mating cable plug interface opposite.

APPLICATION SCHEMATIC



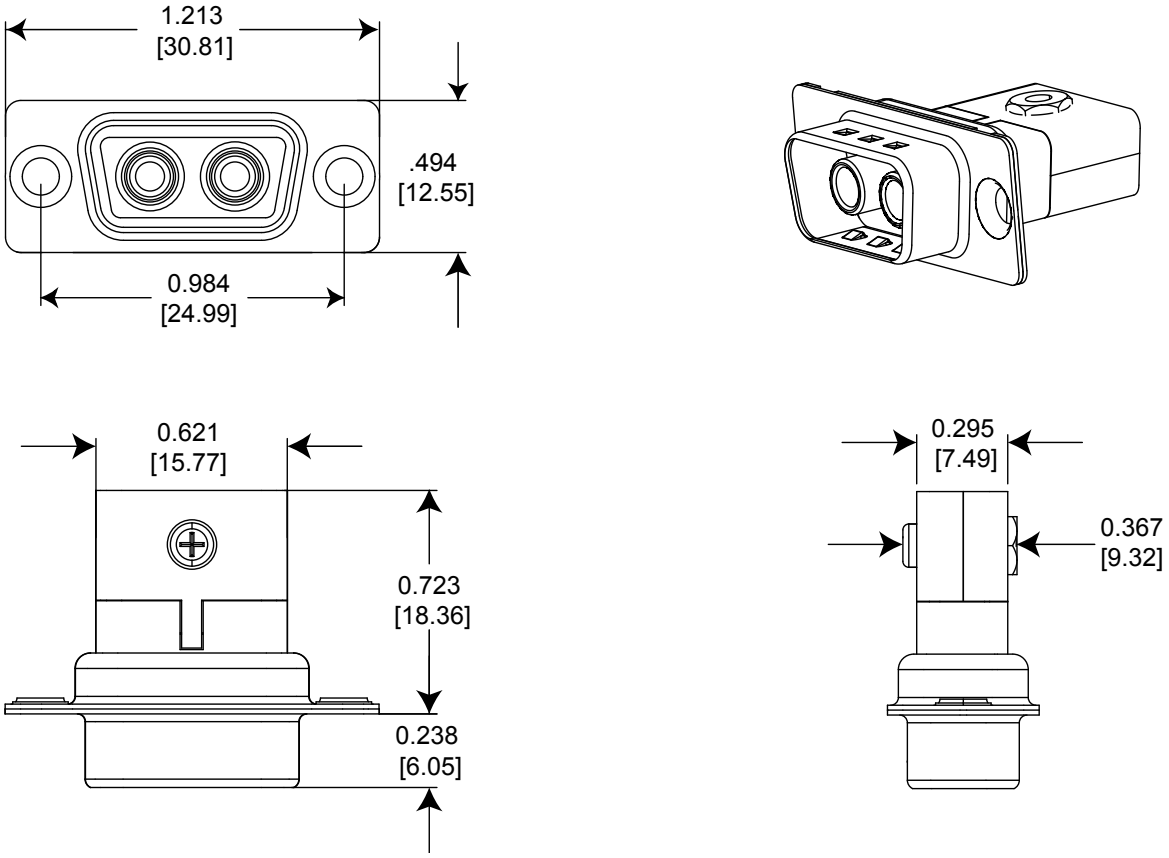
APPENDIX A1

DIRECT 9 FIBER OPTIC CABLE PLUG / ARINC 801 PIN TERMINI



APPENDIX A2
Direct 9 Fiber Optic D-Subminiature Cable Plug Insert

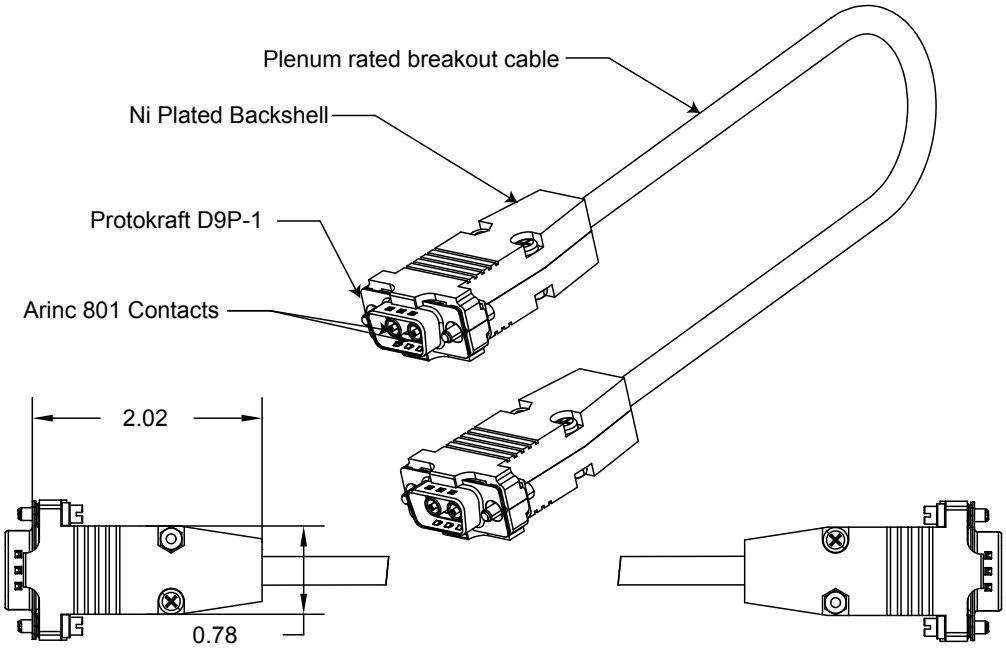
Dimensions are shown as: inches [mm]



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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