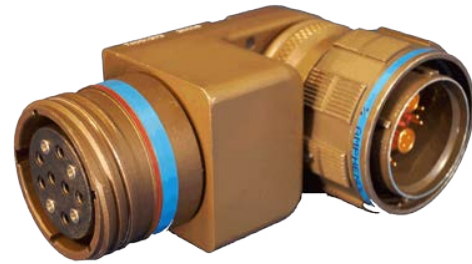


Proteus Series

D38999 Optical Media Interface Adapter / Dongle, GbE, 1x/2xFC or sFPDP, Multimode, 850nm



Dual Port, Right Angle Dongle

FEATURES

- Compliant with ANSI Fibre Channel FC-PI / PI-2 and IEEE-802.3:2005 Gigabit Ethernet
- Compliant with ANSI / VITA 17.1 sFPDP @ 3.2Gbps
- Optical fiber link distances up to 550 Meters (50/125μ 500MHz*Km MMF)
- Maximum optical channel bit error rate less than 1×10^{-12}
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per Mil-Std-810 and Mil-Std-1344
- Olive drab cadmium over nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy Mil-Dtl-38999 housings are strong, durable, corrosion resistant and light weight
- Mil-T-29504 compliant optical fiber connector interface
- Connector insert configuration conforms to Mil-Std-1560

APPLICATIONS

Proteus series optical transceiver dongles enable high speed network communications over long distances in harsh environments.

- Fibre Channel, sFPDP or Gigabit Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters

The Mil-Dtl-38999, Series III shells provide sealed optical interfaces that are water-tight to Mil-Std-810 / IP67 / NEMA-4x when mated.

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.

Two TX & Two RX Channels Operating from 125Mbps to 3.2Gbps

DESCRIPTION

Proteus series optical fiber transceiver dongles consist of optoelectronic transmitter and receiver functions integrated into a bulkhead mounted Mil-Dtl-38999, Series III 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 optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines.

The receiver data lines are squelched upon LOS assertion, preventing errant data packet generation when an invalid incoming optical signal is presented to the transceiver. The electrical interface to the Proteus series optical transceiver dongles is a Mil-Dtl-38999 plug connector with Quadrx pin contacts and Size 22D electrical contacts.

Proteus series optical fiber transceiver dongles are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

- Sealed against liquid and solid contaminants
- Shock and vibration resistant

ORDERING INFORMATION

Application	Product Number
GbE or 1x/2xFC up to 2.5Gbps	Q38R-4S1D-FW
sFPDP from 2.5Gbps to 3.2Gbps	Q38R-4S1E-FW

See Appendix A3 for more part number options

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

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
Differential Input Voltage (p-p)	V_D			2.2	V
RX Output Current	I_o			50	mA

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
TX Common Mode Voltage	V_{CM}		2.0		V
TX Differential Input Voltage (p-p)	V_D	0.25		2.2	V
Power Supply Noise (p-p)	N_p			200	mV

SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883	ESD	Class II	2200V
MIL-STD-810	Vibration	3.8g ² /Hz	43G rms
MIL-STD-810	Shock	40.0g	6-9mS
MIL-STD-810	Immersion	1.0 meter	2 .0Hours
MIL-STD-1344	Flame Resistance	Method 1012	30 Seconds
MIL-STD-1344	Damp Heat	10 Cycles	24 Hours
MIL-STD-38999	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	Aluminum Alloy	
Shell Plating	Olive Drab Cadmium over Nickel	QQ-P-416, QQ-N-290
Insert	Thermoplastic	
Interfacial Seal	Elastomer	
Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	Mil-P-31032 Type 4

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

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	-9.5		-4.0	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM
Extinction Ratio	ER	9.0			dB
Optical Rise, Fall Time (20% to 80%)	$t_{R,F}$			150	pS

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-xx1D-xx @ 125Mbps to 1.25Gbps xxxx-xx1D-xx @ 2.125Gbps xxxx-xx1E-xx @ 2.5Gbps to 3.125Gbps	P_i	-17.0 -15.0 -14.0		0.0	dBm
Optical Wavelength	λ_{IN}	830		860	nM
RX Data Output - Low	$V_{OL} - V_{CC}$	-1.810		-1.475	V
RX Data Output - High	$V_{OH} - V_{CC}$	-1.165		-0.880	V

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current for Transmitters	I_{CCT}		90	100	mA
Supply Current for Receivers	I_{CCR}		50	60	mA

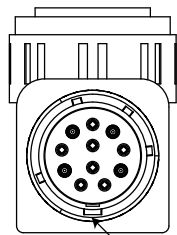
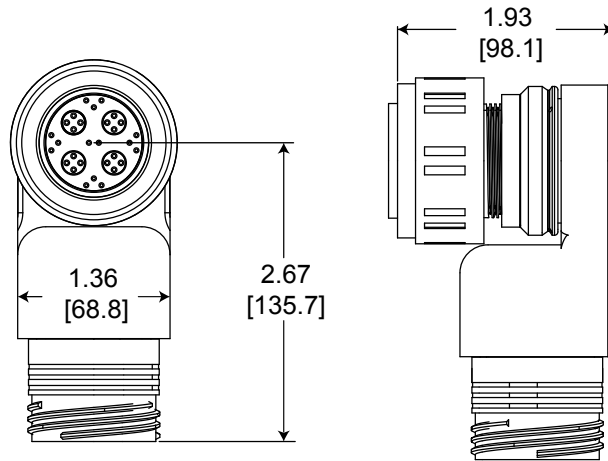
OPTICAL LINK DISTANCES

Protocol	62.5/125μ 200MHz*Km	50/125μ 500MHz*Km
2xFibre Channel - ANSI X3.297 FC-PI	150M	300M
Gigabit Ethernet - IEEE-802.3:2005	275M	550M
1xFibre Channel - ANSI X3.297 FC-PH-2	300M	500M

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

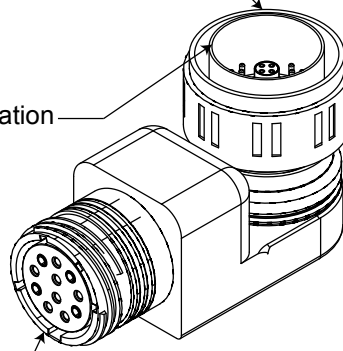
OUTLINE DRAWING

Dimensions are shown as: inches (mm)



J1
Amphenol P/N 10-628485-565N
(TV06RQW-19-18P)

Master Key Location

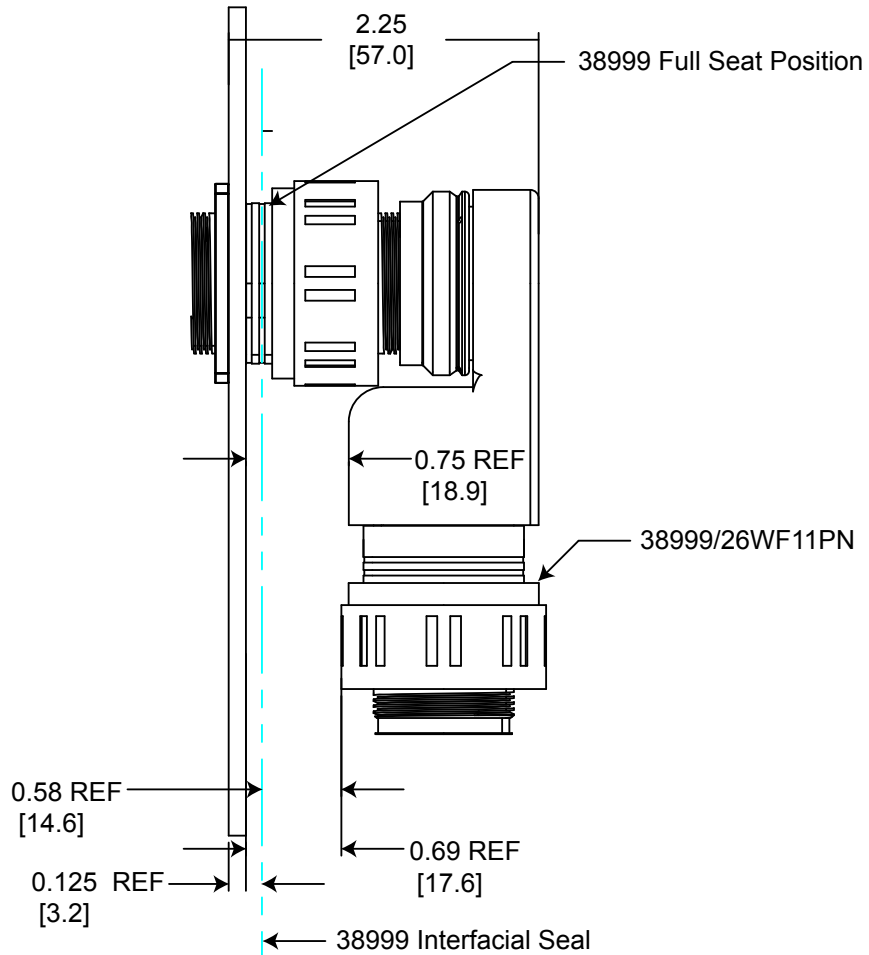


J2
D38999/20WF11SN Equivalent
Active Optical Positions B, D, F & H

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

MOUNTING DETAILS

Dimensions are shown as: inches (mm)

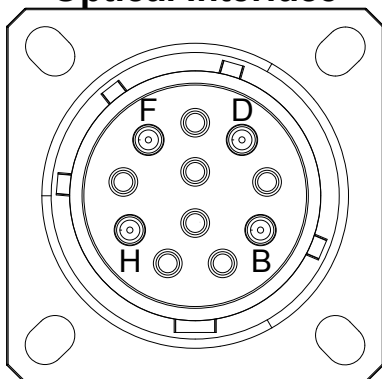


Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

OPTICAL TRANSCEIVER DONGLE INSERT ARRANGEMENT

J2 TOP

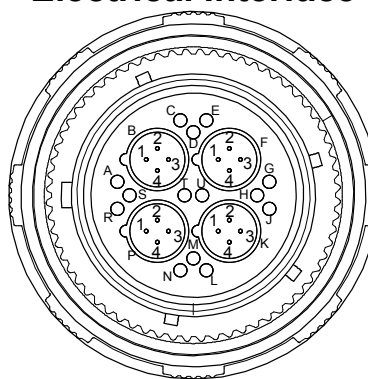
Optical Interface



Front face of the optical transceiver
optical insert shown - see J2
Optical Port Assignments
chart below for details

J1 TOP

Electrical Interface



Front face of the optical transceiver
dongle insert shown - see J1
Electrical Pin Functions
chart below for details

J2 OPTICAL PORT ASSIGNMENTS

PORT NUMBER	TX PIN	RX PIN
0	H	F
1	B	D

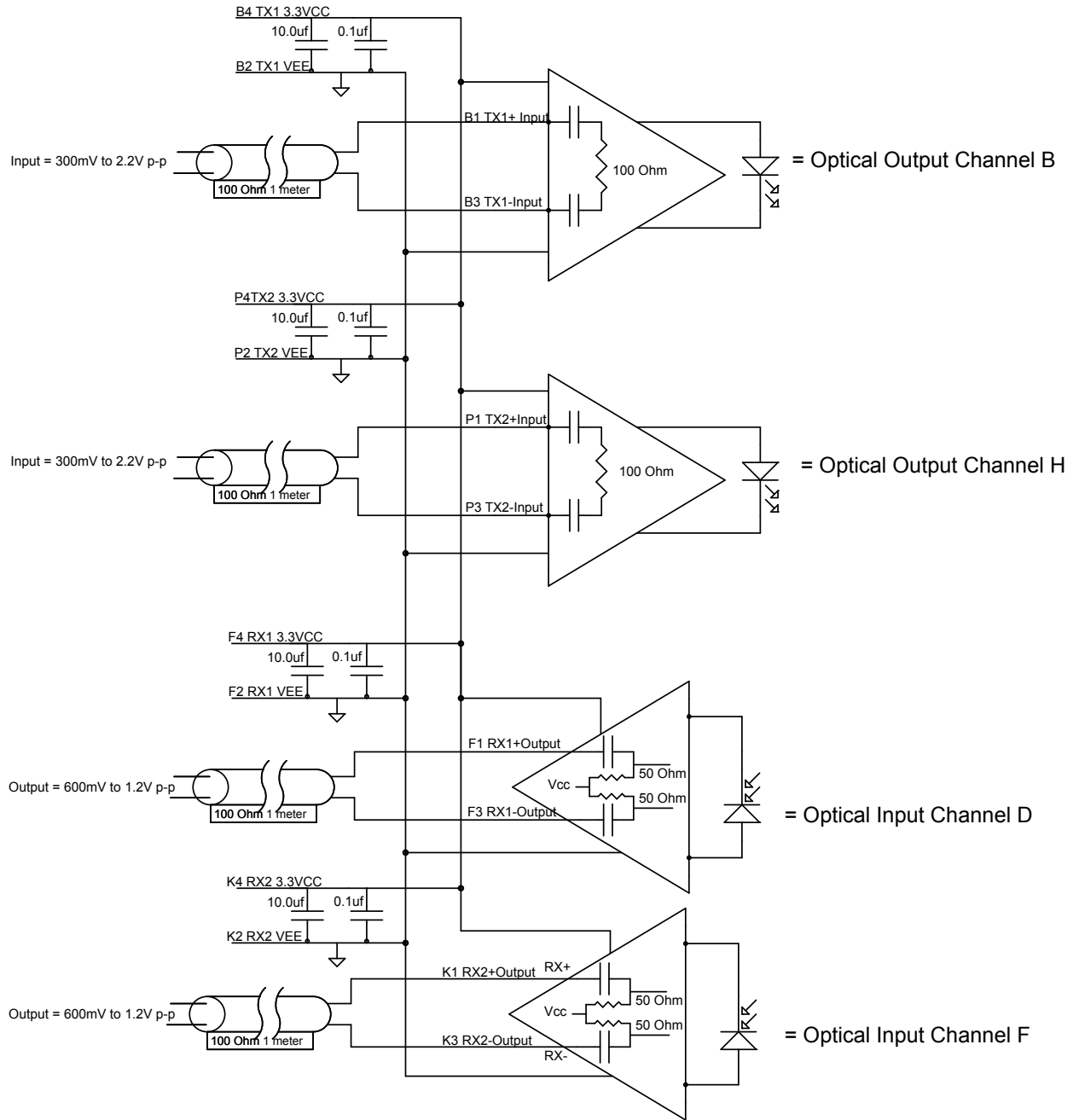
J1 ELECTRICAL PIN FUNCTIONS

Electrical Pin #	Optical Pin & (Port) #	Electrical Function	Electrical Pin #	Optical Pin & (Port) #	Electrical Function
A	N/A	No Connect	K1	F (0)	RX+ Output
B1	B (1)	TX+ Input	K2	F (0)	RX V _{EE}
B2	B (1)	TX V _{EE}	K3	F (0)	RX- Output
B3	B (1)	TX- Input	K4	F (0)	RX V _{CC}
B4	B (1)	TX V _{CC}	L	N/A	No Connect
C	N/A	No Connect	M	N/A	No Connect
D	N/A	No Connect	N	N/A	No Connect
E	N/A	No Connect	P1	H (0)	TX+ Input
F1	D (1)	RX+ Output	P2	H (0)	TX V _{EE}
F2	D (1)	RX V _{EE}	P3	H (0)	TX- Input
F3	D (1)	RX- Output	P4	H (0)	TX V _{CC}
F4	D (1)	RX V _{CC}	R	N/A	No Connect
G	N/A	No Connect	S	N/A	No Connect

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

APPLICATION SCHEMATIC

For +3.3V CML SerDes Circuits



All Proteus technical information and recommendations related to this product family are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and Proteus assumes no responsibility for any inaccuracies. The user assumes all risks and liability whatsoever in connection with the use of a product or its application. Proteus reserves the right to change at any time, without prior or subsequent notice, the design, specifications, features, fit or form of its products described herein, including substitution at any time of a product offered for sale herein. Proteus makes no representations that the products herein are free from any intellectual property claims of others. Proteus and the Proteus logo are trademarks

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

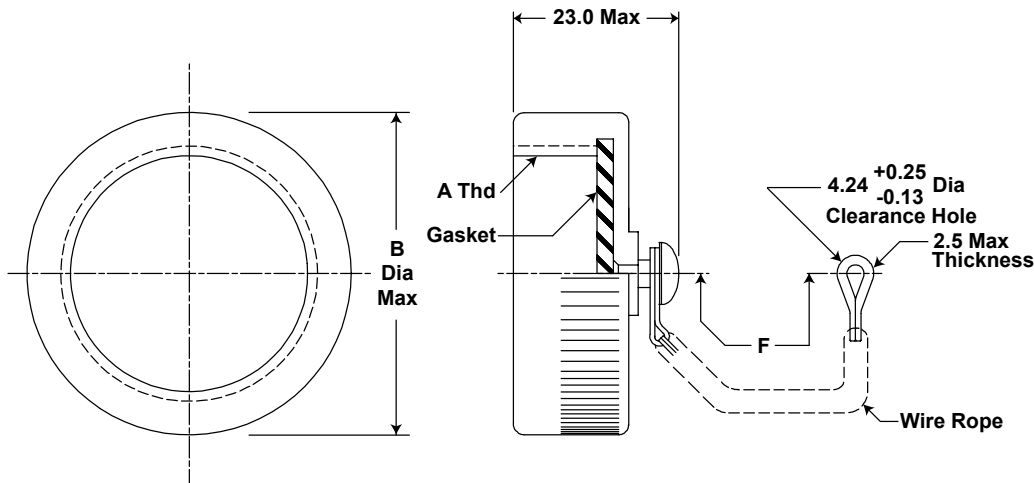
APPENDIX A1

RECEPTACLE PROTECTION CAPS

*MIL-DTL-38999/33 PROTECTION CAP PART NUMBERS

MS RECEPTACLE CAP P/N

*D38999/33W19R



*See DSCC or SAE QPL for Approved Suppliers
<http://www.dscclia.mil/programs/qmlqpl/QPLdetail.asp?QPL=38999>

MIL-DTL-38999/33 Outline Dimensions - mm

Shell Size Code	Shell Size	A Thread (inches)	B Max Dia	F
F	19	1.2500-0.1P-0.3L-TS	39.0	+13.0 -7.0

Dual Port Proteus Series Mil-Dtl-38999 Optical Transceiver Dongle,
GbE, 1x/2xFC or sFPDP Applications, Multimode, 850nm VCSELs, 3.3VDC

APPENDIX A1

MIL-DTL-38999 FIBER OPTIC CABLE PLUG / MIL-T-29504 PIN TERMINI

*See DSCC or SAE QPL for Approved Suppliers

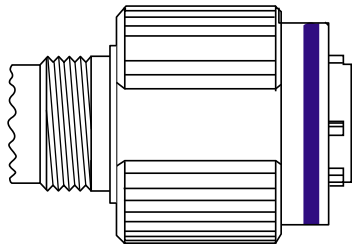
<http://www.dscclia.mil/programs/qmlqpl/QPLdetail.asp?QPL=38999>

*D38999 PLUG - PIN INSERT

MIL-DTL-38999 CABLE PLUG

MS PLUG P/N

*D38999/26WF11PN



*FIBER OPTIC PIN TERMINUS

MIL-T-29504 PIN TERMINUS

MS PIN TERMINUS P/N

*M29504/04-xxxx**



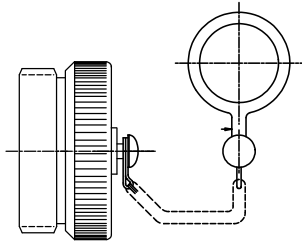
**defined by fiber optic cable configuration

*CABLE PROTECTION CAP

D38999/32 PLUG PROTECTION CAP

MS PLUG CAP P/N

*D38999/32W19N

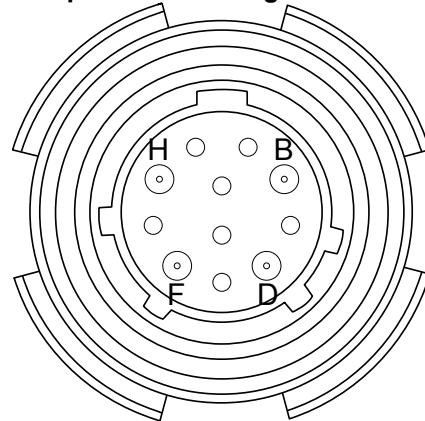


D38999 PLUG PORT FUNCTIONS

PORT NUMBER	TX	RX
4	H	F
5	B	D

TOP

Optical Cable Plug Interface



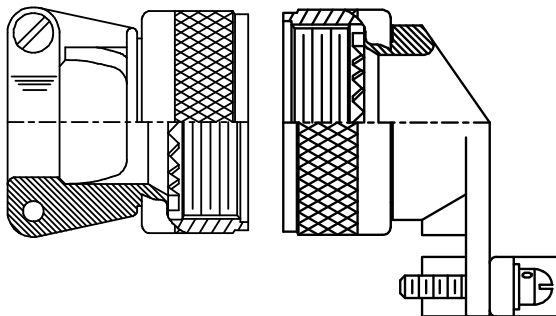
Front face of the optical cable plug pin insert shown. Transceiver insert opposite.

*CABLE BACKSHELL

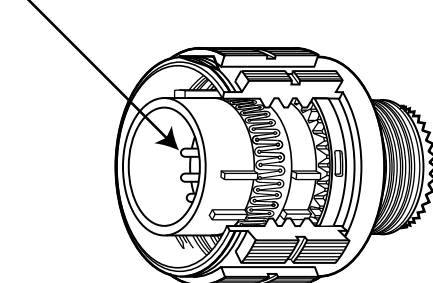
MIL-C-85049 CABLE BACKSHELL

MS BACKSHELL P/N

*MS85049/xxxxxx**



Pin Termini

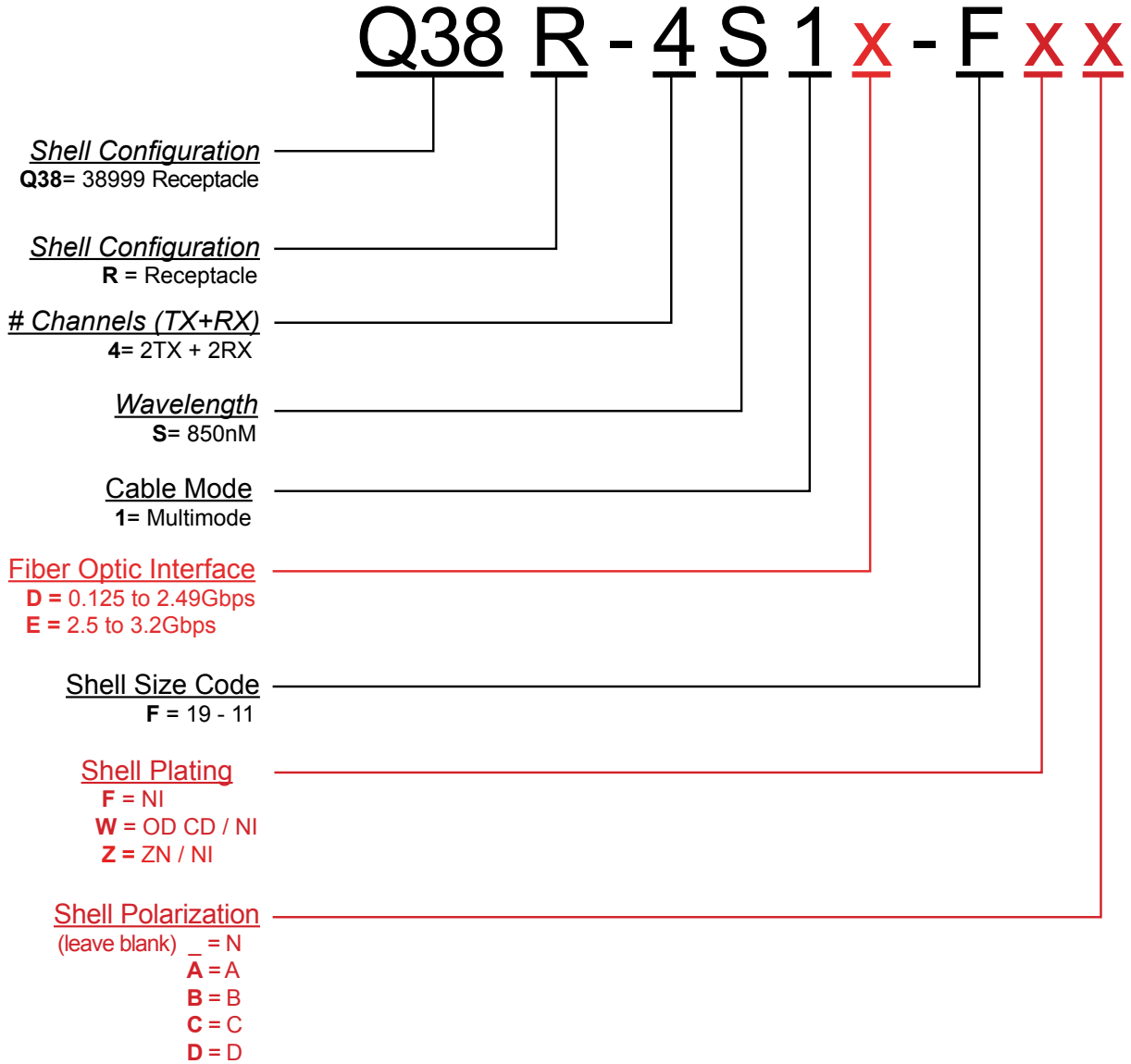


**Straight or angled backshell - defined by

APPENDIX A3

PART NUMBER OPTIONS

Dual Port, Optical Media Adapter, 850nm VCSEL



Other wavelength, mounting and port count options are available.
Please consult the Protokraft website for alternate configurations.



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