

Spitfire Series

Fast Ethernet, 3.3Vdc, Mil-Dtl-38999
10/100Base-TX/FX Media Converter,
Multimode, 1310nm

Quad Port, Flange Receptacle

FEATURES

- Compliant with IEEE-802.3:2005 Fast Ethernet 10/100 Base TX and 100Base-FX
- Optical fiber link distances up to 2.0 Kilometers
- Copper cable link distances up to 100 Meters
- 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 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
- Mil-Dtl-38999 insert configuration conforms to Mil-Std-1560
- Mil-Dtl-83513 electrical interface with full magnetics isolation

APPLICATIONS

Spitfire series bulkhead mounted Fast Ethernet media converters enable high speed network communications over long distances in harsh environments.

- Fast Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters

The Mil-Dtl-38999, Series III shell provides a sealed external, optical interface that is water-tight to Mil-Std-810 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 quadrax copper conductors unacceptable.



D38999 to M83513 / Optical to Electrical Media Converter

DESCRIPTION

Spitfire series Fast Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX electrical conductor to 100Base-FX optical media conversion circuitry into a flange mount Mil-Dtl-38999 connector assembly.

The optical transmitters are high performance 1310nm LEDs. The optical receivers consist of InGaAs PIN and preamplifier assemblies and limiting post-amplifiers.

The electrical interface to the Spitfire series optical media converters is a Mil-Dtl-83513 Micro D-Subminiature enabling interconnection to a customer provided cable assembly or flexible circuit.

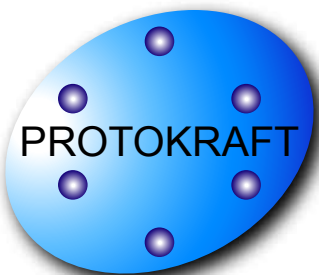
Spitfire series Fast Ethernet media converters are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

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

ORDERING INFORMATION

Application	Product Number
10/100Base-TX to 100Base-FX	P38F-8L1U-HW-M

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Quad Port Spitfire Series Mil-Dtl-38999, 10/100Base-TX to
100Base-FX Media Converter, Multimode, 3.3Volts, 1310nm

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
Data Input Voltage	V_i	-0.5		V_{cc}	V

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	T_A	-40		+85	°C
Supply Voltage	V_{cc}	+3.135	3.3	+3.465	V
Power Supply Noise (p-p)	N_p			200	mV

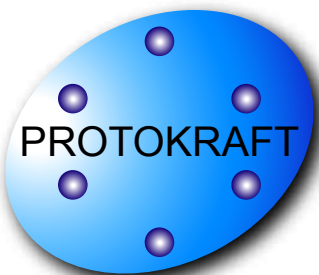
SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883	ESD	Class II	2200V
MIL-STD-810	Vibration	30.0g	18mS
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
D38999 Cylindrical Shells	Composite	
D38999 Cylindrical Shell Platings	Electroless Nickel	
Inserts	Thermoplastic	
Interfacial Seals	Elastomer	
Alignment Sleeves	Thermoplastic	
Printed Circuits	Polyimide / FR-4	Mil-P-31032 Type 4
Backshell	Unplated Composite	

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	P_o	-19.0		-14.0	dBm
Optical Output Wavelength	λ_{OUT}	1260	1310	1380	nM

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

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity	P_i	-31.5		-12.0	dBm
Optical Wavelength	λ_{IN}	1100		1590	nM

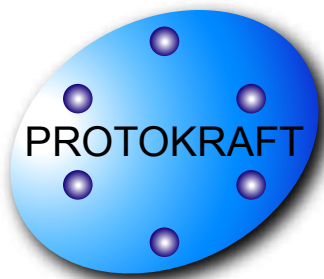
SUPPLY CURRENT T_A = Operating Temperature Range, V_{CC} = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Port	I_{CCT}		450	600	mA

OPTICAL FIBER LINK DISTANCES

Application	Fiber Specification	Distance
Fast Ethernet - IEEE 802.3u	62.5/125 μ - 500MHz*Km	2.0Km
FDDI PMD ISO / IEC 9314-3	50/125 μ - 500MHz*Km	2.0Km

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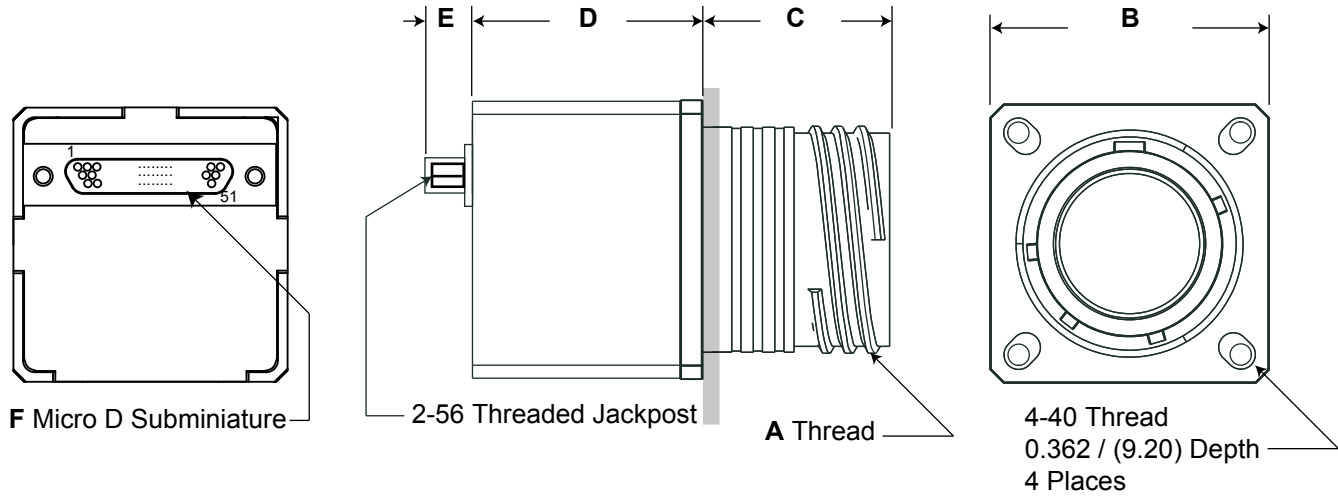


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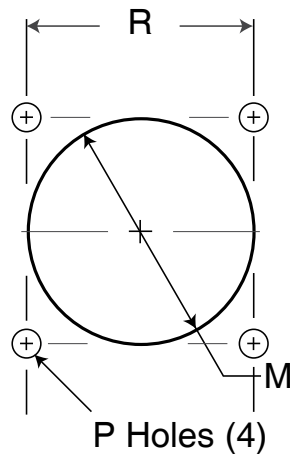
OUTLINE DRAWING

Dimensions are shown as: inches (mm)



Outline Dimensions

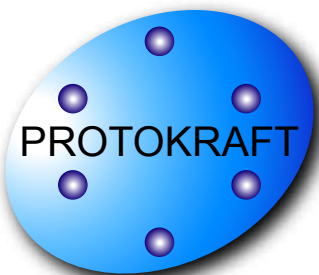
38999 Shell Size Code	38999 Shell Size	A Thread	B Sq. Max	C Max	D	E	F
H	23	1.5000-.1P- .3L-TS-2A	1.700 (43.2)	0.820 (20.8)	1.3 (33.0)	0.285 (7.239)	Mil-Dtl-83513/ 28-G01NW



Panel Cutout Dimensions Rear Panel Mounting Only

Shell Size Code	Shell Size	M Min	P Holes	R Bsc
H	23	1.547 (39.29)	0.159 (4.0) 0.149 (3.8)	1.375 (34.9)

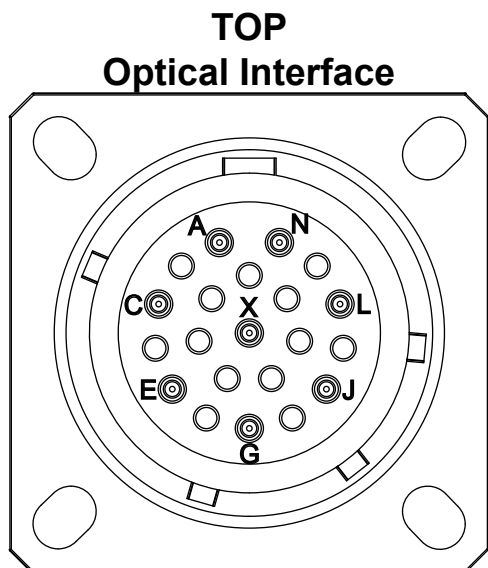
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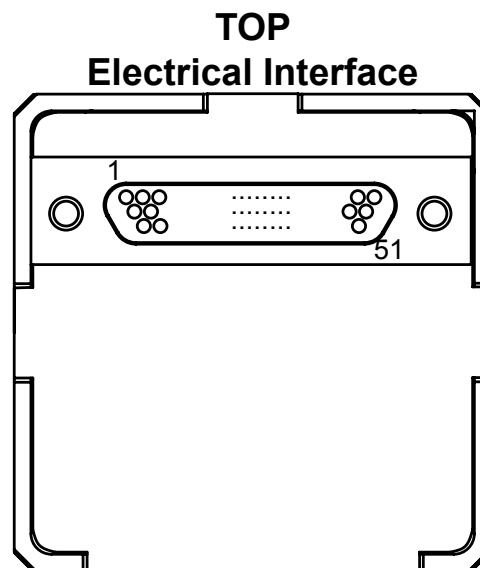
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100Base-FX Media Converter, Multimode, 3.3Volts, 1310nm

MEDIA CONVERTER OPTICAL INSERT AND ELECTRICAL PIN ARRANGEMENT



Front view of the media converter 38999 optical insert shown, fiber optic cable plug opposite - see Appendix A2 for details



Back view of the media converter Micro D Pin arrangement shown, electrical cable receptacle opposite - see Electrical Pin Assignment Page and Appendix A3 for details

OPTICAL PORT ASSIGNMENTS

MIL-DTL-38999 OPTICAL INTERFACE

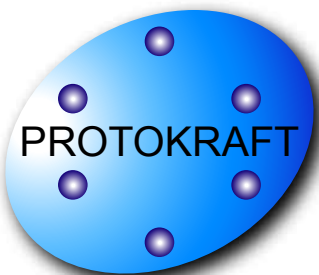
PORT NUMBER	TX	RX
0	N	A
1	L	C
2	J	E
3	G	X

ELECTRICAL PIN ASSIGNMENTS

MIL-DTL-83513 ELECTRICAL INTERFACE

PIN #	PORT #	FUNCTION
1	2	TX+
2	2	TX-
3	2	RX+
4	2	RX-
11	1	TX+
12	1	TX-
13	1	RX+
14	1	RX-
36	3	TX+
37	3	TX-
38	3	RX+
39	3	RX-
44	0	TX+
45	0	TX-
46	0	RX+
47	0	RX-

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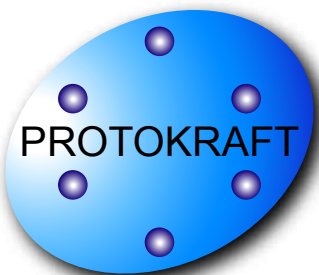
ELECTRICAL PIN ASSIGNMENTS - PIN HEADER

PIN #	PORT #	FUNCTION	Input / Output	Logic Family
1	2	TX+	Input	IEEE-802.3:2005 10/100Base-TX
2	2	TX-	Input	IEEE-802.3:2005 10/100Base-TX
3	2	RX+	Output	IEEE-802.3:2005 10/100Base-TX
4	2	RX-	Output	IEEE-802.3:2005 10/100Base-TX
5	N/A	NC	NC	N/A
6	N/A	NC	NC	N/A
7	N/A	NC	NC	N/A
8	N/A	NC	NC	N/A
9	N/A	Vcc	Input	N/A
10	N/A	Vcc	Input	N/A
11	1	TX+	Input	IEEE-802.3:2005 10/100Base-TX
12	1	TX-	Input	IEEE-802.3:2005 10/100Base-TX
13	1	RX+	Output	IEEE-802.3:2005 10/100Base-TX
14	1	RX-	Output	IEEE-802.3:2005 10/100Base-TX
15	N/A	NC	NC	N/A
16	N/A	NC	NC	N/A
17	N/A	NC	NC	N/A
18	N/A	NC	NC	N/A
19	N/A	GND	N/A	N/A
20	0	Optical SD	Output	LVTTL - with Internal Pullup
21	N/A	NC	N/A	Do Not Connect - Factory Use Only
22	1	Optical SD	Output	LVTTL - with Internal Pullup
23	N/A	NC	N/A	Do Not Connect - Factory Use Only
24	2	Optical SD	Output	LVTTL - with Internal Pullup
25	N/A	NC	N/A	Do Not Connect - Factory Use Only
26	3	Optical SD	Output	LVTTL - with Internal Pullup
27	N/A	NC	N/A	Do Not Connect - Factory Use Only

All Signal Detect Functions: Satisfactory Input = Logic "1" Output, Unsatisfactory Input = Logic "0" Output

All Reset Functions: Logic "0" Input = Restart, registers initialized; Logic "1", Open or High Z Input = Normal Operation

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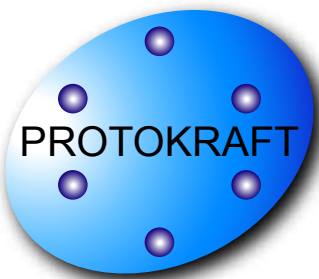
ELECTRICAL PIN ASSIGNMENTS - MICRO-D ELECTRICAL INTERFACE

PIN #	PORT #	FUNCTION	Input / Output	Logic Family
28	N/A	NC	N/A	N/A
29	N/A	NC	N/A	Factory Use Only - Do Not Connect
30	N/A	NC	N/A	Factory Use Only - Do Not Connect
31	0	$\overline{\text{Reset}}$	Input	LVTTL - with Internal Pullup
32	1	$\overline{\text{Reset}}$	Input	LVTTL - with Internal Pullup
33	2	$\overline{\text{Reset}}$	Input	LVTTL - with Internal Pullup
34	3	$\overline{\text{Reset}}$	Input	LVTTL - with Internal Pullup
35	N/A	GND	N/A	N/A
36	3	TX+	Input	IEEE-802.3:2005 10/100Base-TX
37	3	TX-	Input	IEEE-802.3:2005 10/100Base-TX
38	3	RX+	Output	IEEE-802.3:2005 10/100Base-TX
39	3	RX-	Output	IEEE-802.3:2005 10/100Base-TX
40	N/A	NC	N/A	N/A
41	N/A	NC	N/A	N/A
42	N/A	NC	N/A	N/A
43	N/A	NC	N/A	N/A
44	0	TX+	Input	IEEE-802.3:2005 10/100Base-TX
45	0	TX-	Input	IEEE-802.3:2005 10/100Base-TX
46	0	RX+	Output	IEEE-802.3:2005 10/100Base-TX
47	0	RX-	Output	IEEE-802.3:2005 10/100Base-TX
48	N/A	NC	N/A	N/A
49	N/A	NC	N/A	N/A
50	N/A	NC	N/A	N/A
51	N/A	NC	N/A	N/A

All Signal Detect Functions: Satisfactory Input = Logic "1" Output, Unsatisfactory Input = Logic "0" Output

All Reset Functions: Logic "0" Input = Restart, registers initialized; Logic "1", Open or High Z Input = Normal Operation

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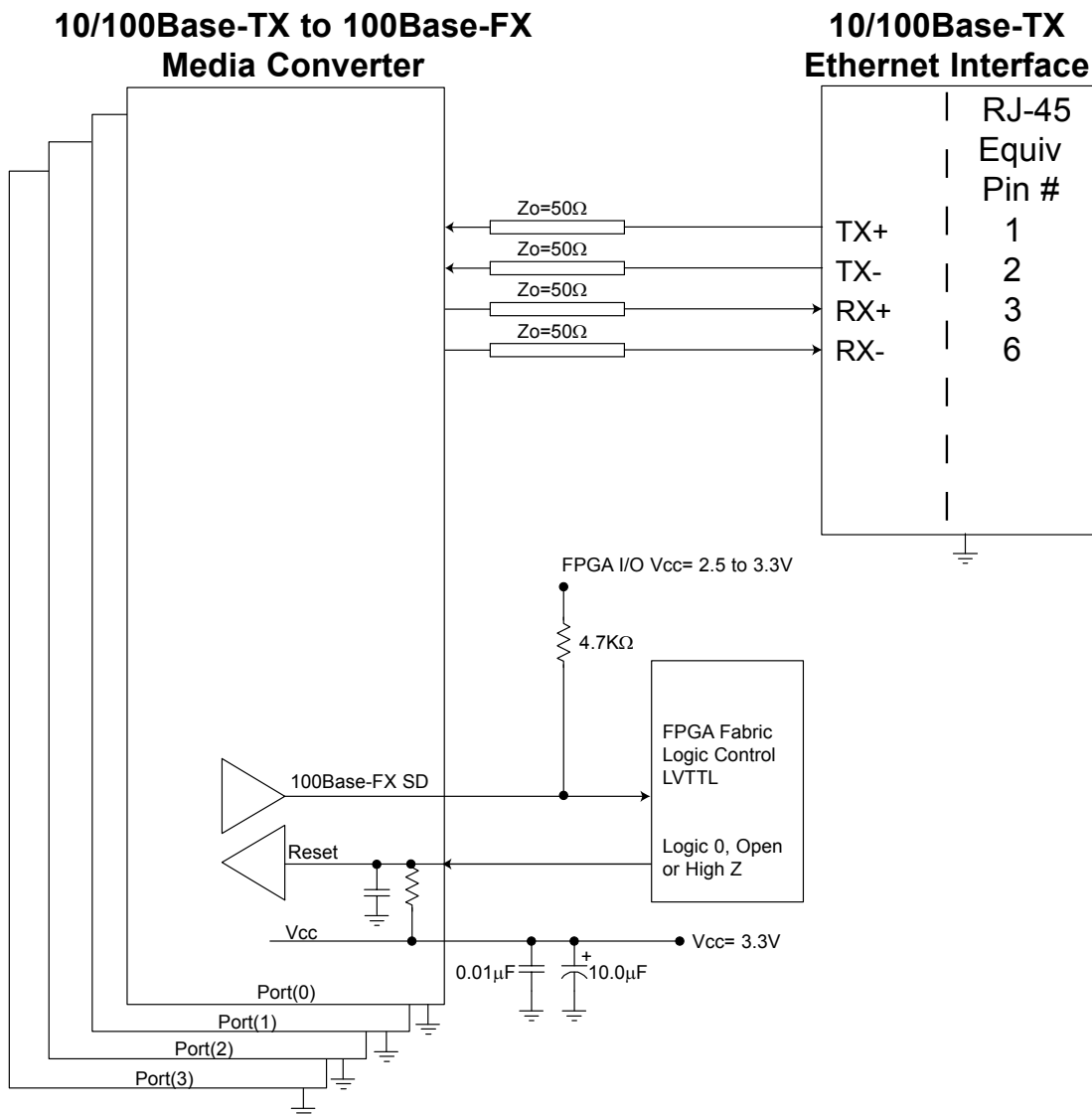


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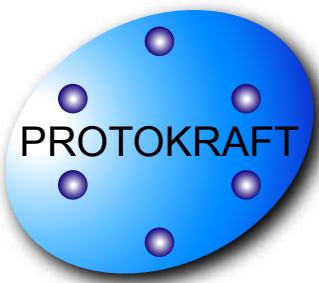
APPLICATION SCHEMATIC

For Quad Port 10/100Base-TX to 100Base-FX Media Converter Applications



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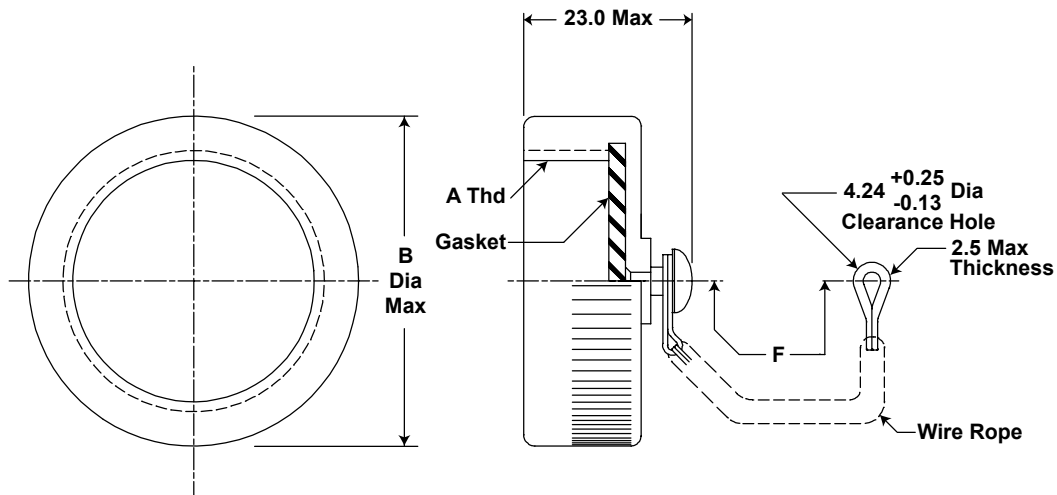
APPENDIX A1

RECEPTACLE PROTECTION CAPS

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

MS RECEPTACLE CAP P/N

*D38999/33W23R



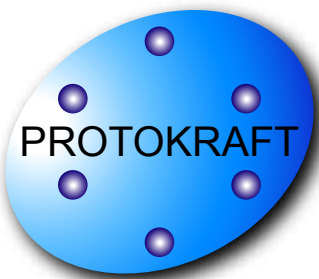
*See DSCC or SAE QPL for Approved Suppliers

<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 +13.0 -7.0
H	23	1.5000-0.1P- 0.3L-TS	45.0	127.00

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APPENDIX A2

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

*See DSCC or SAE QPL for Approved Suppliers

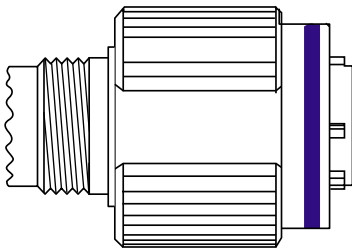
<http://www.dsccl.dla.mil/programs/qmlqpl/QPLdetail.asp?QPL=38999>

*D38999 PLUG - PIN INSERT

MIL-DTL-38999 CABLE PLUG

MS PLUG P/N

*D38999/26WH21PN

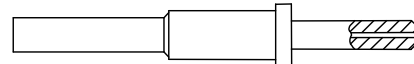


*FIBER OPTIC PIN TERMINUS

MIL-T-29504 PIN TERMINUS

MS PIN TERMINUS P/N

*M29504/04-xxxx**



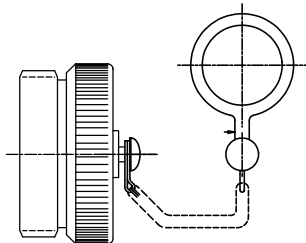
**defined by fiber optic cable configuration

*CABLE PROTECTION CAP

D38999/32 PLUG PROTECTION CAP

MS PLUG CAP P/N

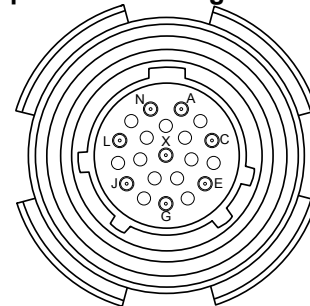
*D38999/32W23N



D38999 PLUG PORT FUNCTIONS

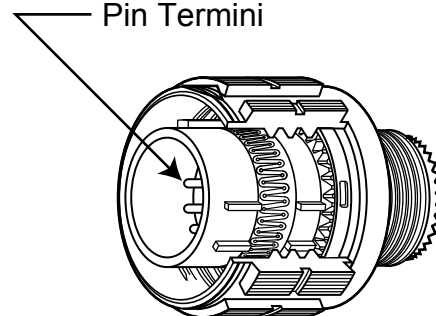
PORT NUMBER	TX	RX
0	N	A
1	L	C
2	J	E
3	G	X

TOP Optical Cable Plug Interface



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

Pin Termini

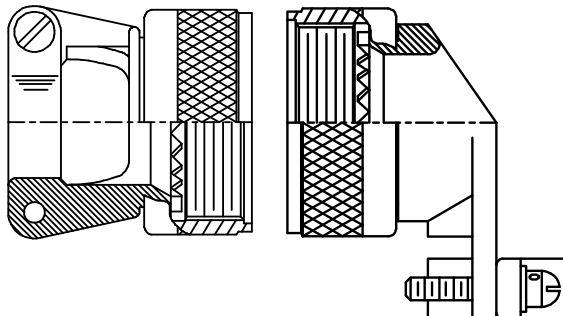


*CABLE BACKSHELL

MIL-C-85049 CABLE BACKSHELL

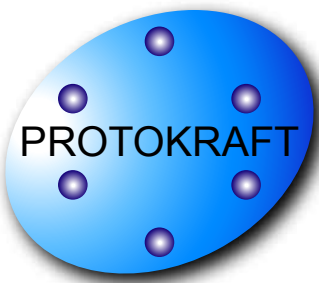
MS BACKSHELL P/N

*MS85049/xxxxxx**



**Straight or angled backshell - defined by application / mounting configuration

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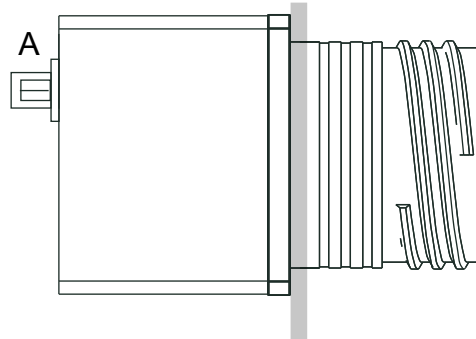
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APPENDIX A3 **Mil-Dtl-83513 Conector / Cable Assembly Guide**

Cable Assembly or Flexible PCB

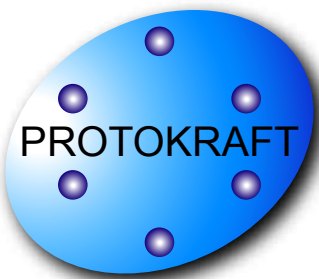


Optical Media Converter



A= M83513 / 28 - GO1NW
B= M83513 / 02 - GN

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APPENDIX A5

PART NUMBER OPTIONS

Quad Port, Fast Ethernet, Square Flange

P38 F - 8 L 1 U - F x x - M

Shell Configuration
P38= 38999 Receptacle

Shell Configuration
F = Square Flange

Channels (TX+RX)
8= 4TX + 4RX

Wavelength
L= 1310nm

Cable Mode
1= Multimode

Fiber Optic Interface
U = 125 Mbps

Shell Size Code
F = 19 - 11

Shell Plating
F = NI
W = OD CD / NI
Z = ZN / NI

Shell Polarization
(leave blank) _ = N
A = A
B = B
C = C
D = D

Electrical Interface
M = Micro D-Sub

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

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