

## SPITFIRE SERIES

FAST ETHERNET, 3.3 VDC, MIL-DTL-38999, 100BASE-TX / FX  
MEDIA CONVERTER, MULTIMODE, 1310 NM



Spitfire series Fast Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 100Base-TX electrical media to 100Base-FX optical media conversion circuitry into a bulkhead mount MIL-DTL-38999 connector and cable assembly.

The optical transmitters are high performance 1310 nM devices. 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 ribbon coax to Samtec EQCD high density cable assembly enabling SMT interconnection to a customer's backplane, motherboard or daughtercard.

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

# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

Single Port, Size 15 Receptacles  
MIL-DTL-38999 Optical to Samtec SMT Electrical Media Converter

## FEATURES

- Compliant with IEEE-802.3:2005 Fast Ethernet 100Base-TX and 100Base-FX
- Optical fiber link distances up to 2.0 kilometers
- Operating temperature range from -40° to +85° C
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- 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
- Samtec EQCD Series electrical connector for SMT interface

## 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 MILSTD-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 quadrx copper conductors unacceptable.

US Pat. # 7,093,985

### ORDERING INFORMATION

Application	Part Number
100Base-TX / FX, Flange	P38F-2L1U-DW-Lxxx
100Base-TX / FX, Jam Nut	P38J-2L1U-DW-Lxxx

See page 7 for standard part number / cable length options and page 12 for complete part number ordering options.

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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
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		+3.465	V
Power Supply Noise (p-p)	$N_p$			200	mV

## CONNECTOR INTERFACE SPECIFICATIONS COMPLIANCE

Requirement	Feature	Condition	Notes
MIL-STD-883	ESD	Class II	2200 V
MIL-STD-810	Vibration	3.8 g <sup>2</sup> / Hz	43 G rms
MIL-STD-810	Shock	40.0 g	6-9 mS
MIL-STD-810	Immersion	1.0 Meter	2.0 Hours
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	< 0.5 dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

## MATERIALS

Item	Detail	Notes
D38999 Cylindrical Shells	Aluminum Alloy	
D38999 Cylindrical Shell Platings	Olive Drab Cadmium, Electroless Nickel or Zinc Nickel	
Inserts	Thermoplastic	
Interfacial Seals	Elastomer	
Alignment Sleeves	Thermoplastic	
Printed Circuits	Polyimide / FR-4	
Backshell	Aluminum Alloy	

# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## TRANSMITTERS $T_A$ = OPERATING TEMPERATURE RANGE, $V_{CC}$ = 3.135 V TO 3.465 V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power	$P_O$	-19.0		-14.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	1260	1310	1380	nM

## RECEIVERS $T_A$ = OPERATING TEMPERATURE RANGE, $V_{CC}$ = 3.135 V TO 3.465 V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity	$P_I$	-31.5		-12.0	dBm
Optical Wavelength	$\lambda_{IN}$	1100		1590	nM

## SUPPLY CURRENT $T_A$ = OPERATING TEMPERATURE RANGE, $V_{CC}$ = 3.135 V TO 3.465 V

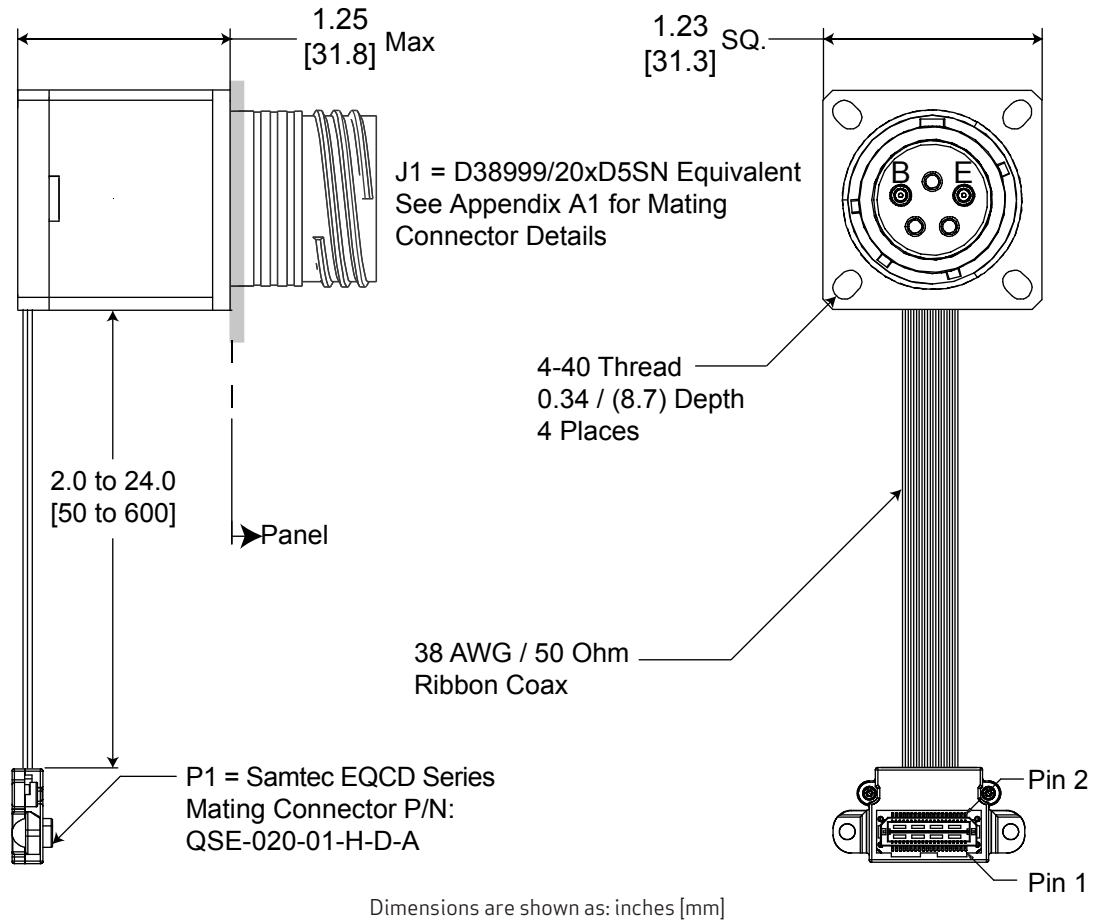
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current Per Port	$I_{CCT}$		450	600	mA

## OPTICAL FIBER LINK DISTANCES

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

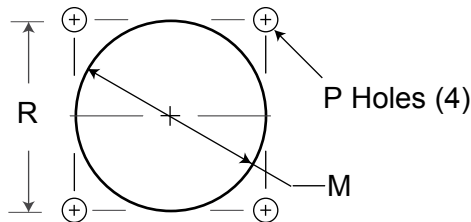
# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## OUTLINE DRAWING - FLANGE OPTION



## PANEL CUTOUT DIMENSIONS REAR PANEL MOUNTING ONLY

Shell Size Code	Shell Size	M Min.	P Holes	R Bsc.
D	15	1.047 (26.59)	0.133 (3.4) 0.123 (3.1)	0.969 (24.6)

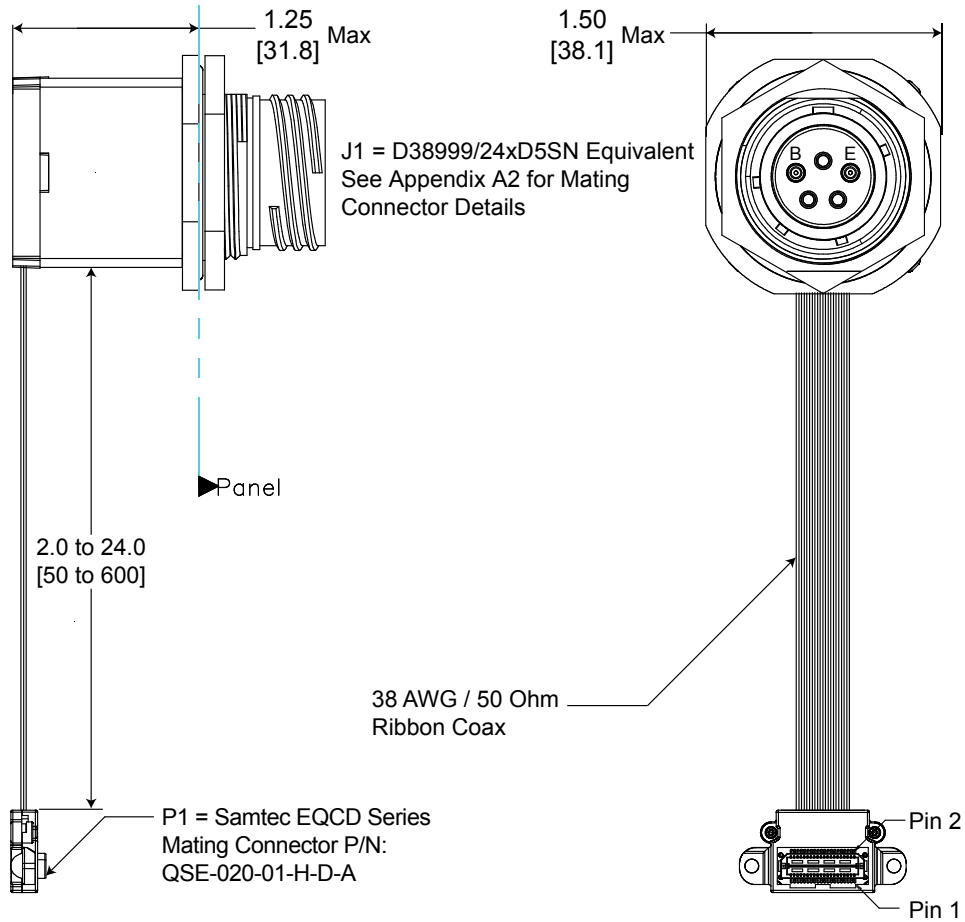


Part Number = \*P38F-2xxx-Dx-Lxxx

\*See page 7 for part number / cable length options and page 12 for complete ordering options.

# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

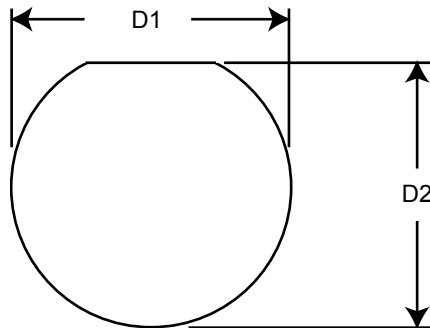
## OUTLINE DRAWING - JAM NUT OPTION



Dimensions are shown as: inches [mm]

## PANEL CUTOUT DIMENSIONS REAR PANEL MOUNTING ONLY

Shell Size Code	Shell Size	D1 Min.	D2 Min.
D	15	1.135 [28.83]	1.085 [27.56]

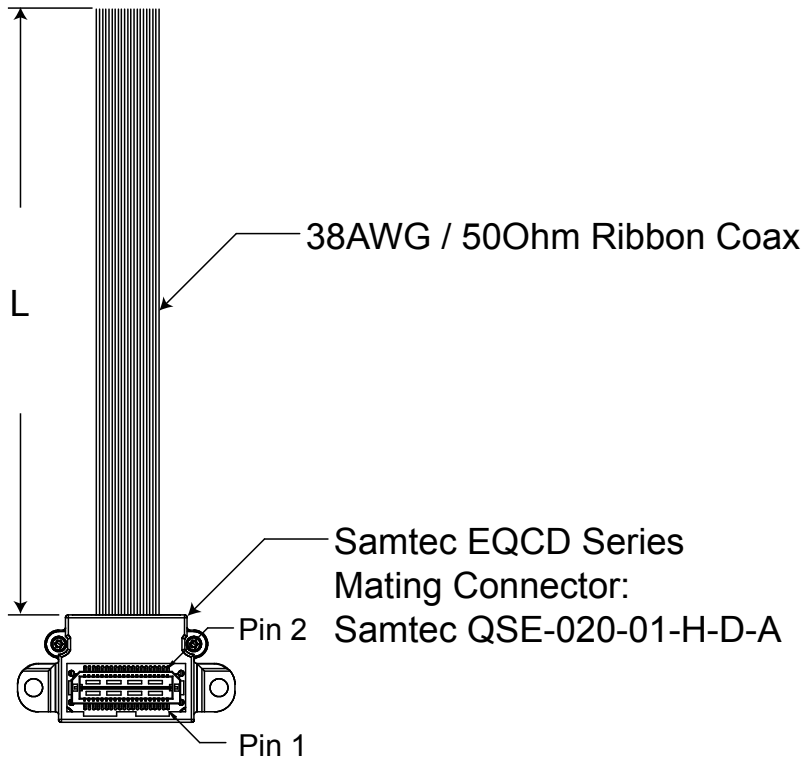


Part Number = \*P38J-2xxx-Dx-Lxxx

\*See page 7 for part number / cable length options and page 12 for complete ordering options.

**SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM**

**OUTLINE DRAWING CABLE LENGTH OPTIONS**



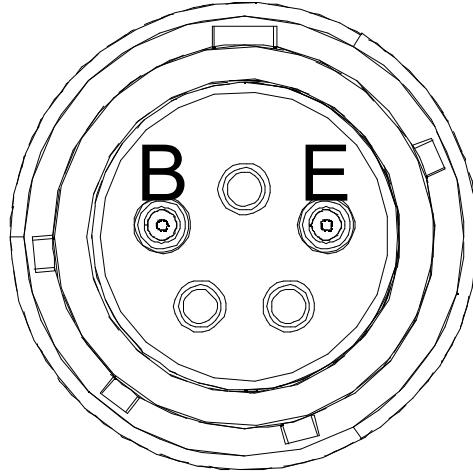
**RIBBON COAX CABLE LENGTH OPTIONS**

L (mm) ± 6.0	Item #
50	xxxx-xxxx-xx-L050
100	xxxx-xxxx-xx-L100
150	xxxx-xxxx-xx-L150
200	xxxx-xxxx-xx-L200
250	xxxx-xxxx-xx-L250

**SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM**

**OPTICAL INSERT ARRANGEMENT**

TOP



Front view of the MIL-DTL-38999 optical insert shown, fiber optic cable plug opposite - see Appendix A1 for mating connector details.

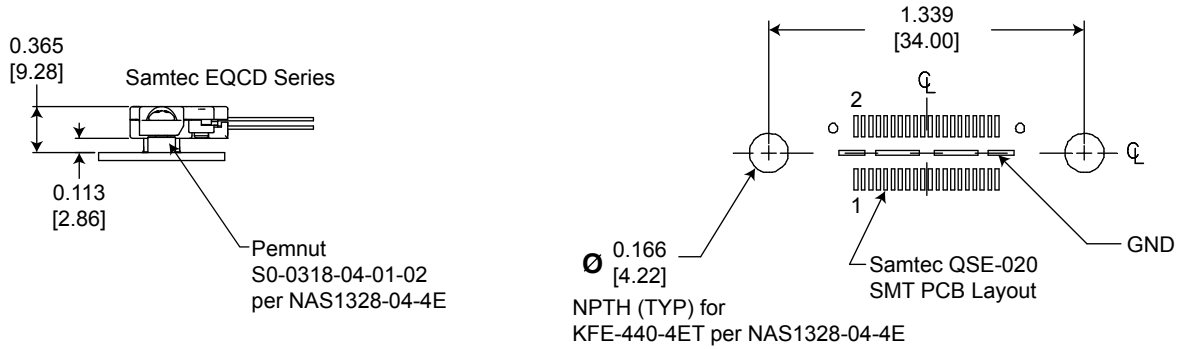
**OPTICAL PORT ASSIGNMENTS**

**MIL-DTL-38999 OPTICAL INTERFACE**

Port Number	TX	RX
0	B	E

# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## PRINTED CIRCUIT BOARD FOOTPRINT



Dimensions are shown as: inches [mm]

## SAMTEC EQCD PIN ASSIGNMENTS

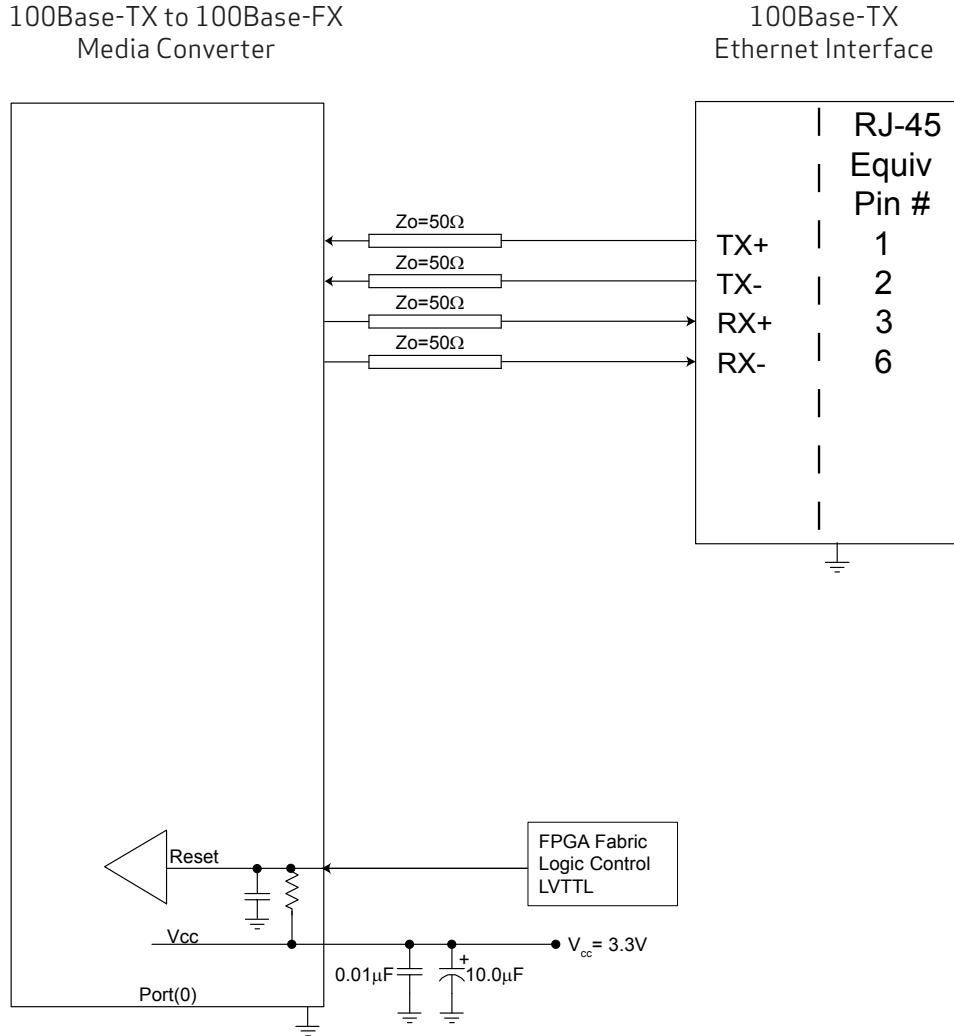
Pin Number	Function	Input / Output	RJ-45 EQ Pin Number	Logic Family
40	TXD+	Output	1	IEEE-802.3:2005 100Base-TX
38	TXD-	Output	2	IEEE-802.3:2005 100Base-TX
36	RXD+	Input	3	IEEE-802.3:2005 100Base-TX
34	RXD-	Input	6	IEEE-802.3:2005 100Base-TX
22	*Reset_Low	Input	N/A	LVTTL with Internal Pull-up
6	V <sub>CC</sub>	Input	N/A	3.135 to 3.465 VDC
4	V <sub>CC</sub>	Input	N/A	3.135 to 3.465 VDC
2	V <sub>CC</sub>	Input	N/A	3.135 to 3.465 VDC

\*Reset function: Logic "0" Input = restart, registers initialized; Logic "1", Open or High Z Input = normal operation, all other pins are N/C, center slug is isolated GND.

# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## APPLICATION SCHEMATIC

FOR SINGLE PORT 100BASE-TX TO 100BASE-FX MEDIA CONVERTER APPLICATIONS



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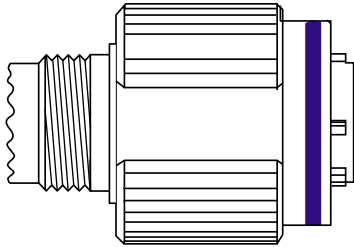
# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## APPENDIX A1 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>

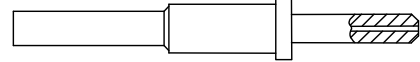
### \*D38999 PLUG - PIN INSERT MIL-DTL-38999 CABLE PLUG

MS Plug P/N \*D38999 / 26WD5PN



### \*FIBER OPTIC PIN TERMINUS MIL-T-29504 PIN TERMINUS

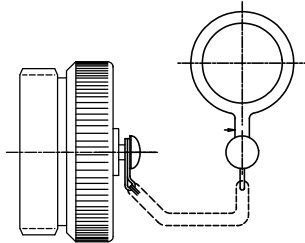
MS Pin Terminus P/N \*MS29504 / 04-xxxx\*\*



\*\*Defined by fiber optic cable configuration

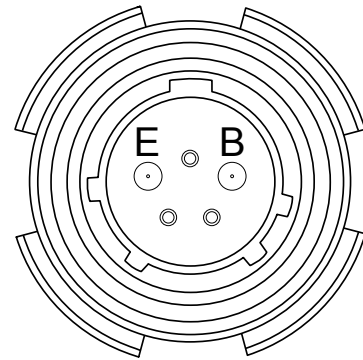
### \*CABLE PROTECTION CAP D38999 / 32 PLUG PROTECTION CAP

MS Plug Cap P/N \*D38999 / 32W15N



### D38999 PLUG PORT FUNCTIONS

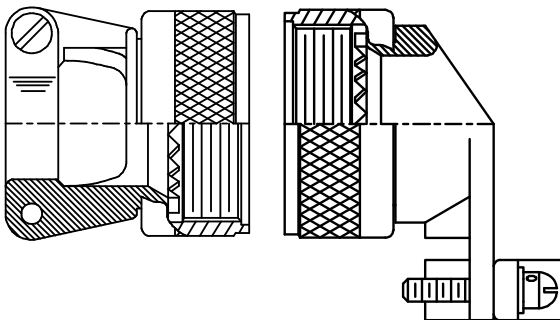
Port Number	TX	RX
0	B	E



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

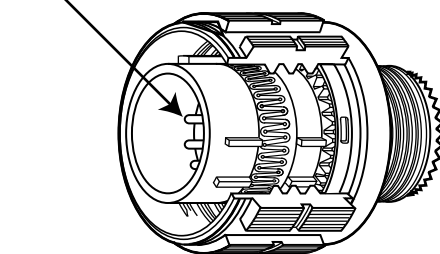
### \*CABLE BACKSHELL MIL-C-85049 CABLE BACKSHELL

MS Backshell P/N \*MS85049 / XXXXXX\*\*



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

### Pin Termini



# SINGLE PORT SPITFIRE SERIES MIL-DTL-38999, 100BASE-TX TO 100BASE-FX, FAST ETHERNET MEDIA CONVERTER, MULTIMODE, 3.3 VDC, 1310 NM

## APPENDIX A2 PART NUMBER OPTIONS

### SINGLE PORT, FAST ETHERNET

**P38 x - 2 L 1 U - D x x - L**

SHELL CONFIGURATION

**P38** = Matrix Series

SHELL CONFIGURATION

**F** = Square Flange

**J** = Jame Nut

# CHANNELS (TX + RX)

**2** = 1 TX + 1 RX

WAVELENGTH

**L** = 1310 nM

CABLE MODE

**1** = Multimode

FIBER OPTIC INTERFACE

**U** = 125 Mbps

SHELL SIZE CODE

**D** = 15-5

SHELL PLATING

**F** = NI

**W** = OD CD / NI

**Z** = ZN / NI

POLARIZATION

(Leave blank) = N

**A** = A

**B** = B

**C** = C

**D** = D

ELECTRICAL INTERFACE

**L** + Ribbon Coax to Samtec  
EQCD Series - Cable Length TBD

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



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