

Mercury Series

10/100Base-TX/SX Media Converter,
28Vdc, ARINC 804, Multimode,
850nM, Quadrax

Quad Port, Flange Receptacles

FEATURES

- Compliant with IEEE-802.3u Fast Ethernet
- Optical fiber link distances up to 300 meters
- Maximum optical channel bit error rate less than 1×10^{-10}
- Operating temperature range from -40°C to $+85^{\circ}\text{C}$
- 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 chassis and Mil-Dtl-38999 housings are strong, durable, corrosion resistant and light weight
- Mil-T-29504 compliant optical fiber connector interface
- D38999 fiber optic insert configuration conforms to Mil-Std-1560
- D38999 / Quadrax electrical interface provides robust interconnection to internal chassis wiring or backbone

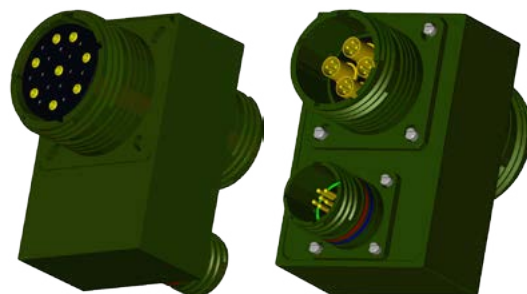
APPLICATIONS

Mercury 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 optical interface that is 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 quadrax copper conductors unacceptable.



D38999 to Quadrax / Optical to Electrical Media Converter

DESCRIPTION

Mercury series Fast Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX Ethernet electrical to 100Base-SX optical media conversion circuitry into a bulkhead mounted Mil-Dtl-38999 connector assembly.

The optical transmitters are high output 850nM VCSEL's. The optical receivers consist of GaAs PIN and preamplifier assemblies and limiting post-amplifiers.

The electrical interface to the Mercury series bulkhead optical media converters is a Mil-Dtl-38999 / Quadrax connector enabling interconnection to an external Quadrax cable interface.

Mercury 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	Item Number
10/100Base-TX to 100Base-SX, 28Vdc	M38R-8SAU-HW

Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrx, Multimode, 28Vdc, 850nm VCSEL's

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		45.0	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}	+18.0	+28.0	+36.0	VDC
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-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	Aluminum Alloy	
Plating	Olive Drab Cadmium	
D38999 Inserts	Thermoplastic	
Interfacial Seals	Elastomer	
Optical Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	Mil-P-31032 Type 4
Housing	Aluminum Alloy	

Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrx, Multimode, 28Vdc, 850nm VCSEL's

OPTICAL TRANSMITTERS T_A = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<2.5x10 ⁻¹⁰ , ER>9.0)	P_o	-6.5		-1.0	dBm
Optical Output Wavelength	λ_{OUT}	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM

OPTICAL RECEIVERS T_A = Operating Temperature Range

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity (BER<2.5x10 ⁻¹⁰ , ER>9.0)	P_i	-17.0		0.0	dBm
Optical Wavelength	λ_{IN}	830		860	nM

POWER SUPPLY CURRENT T_A = Operating Temperature Range

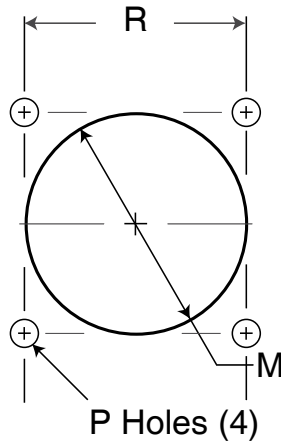
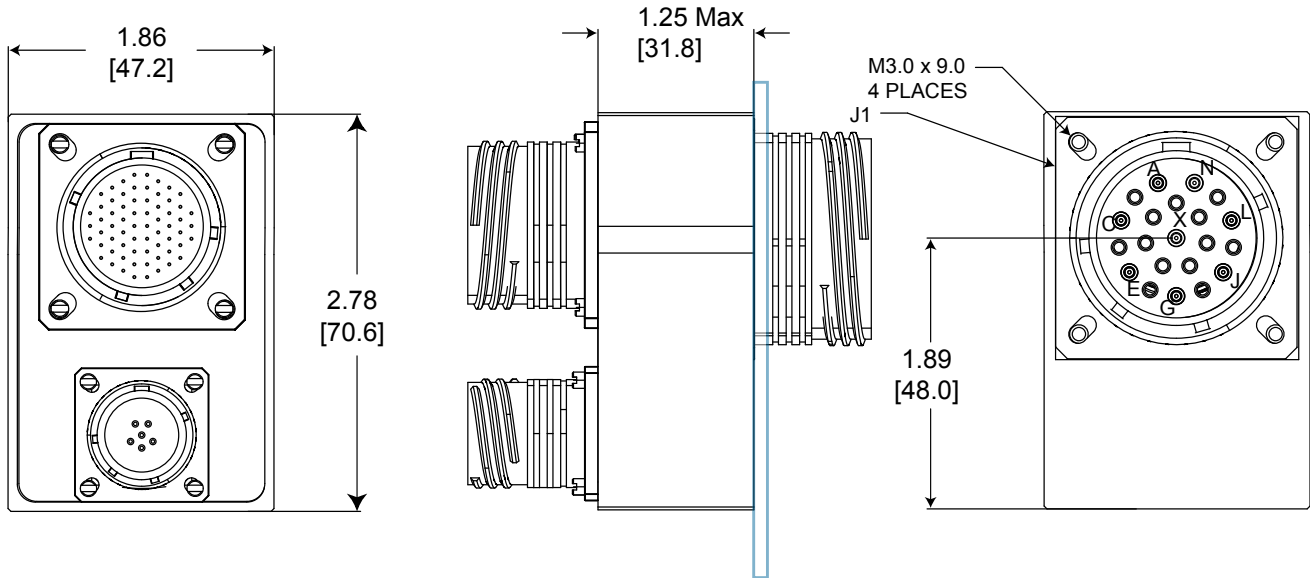
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current @ 28Vdc	I_{CCT}		225	360	mA

Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrx, Multimode, 28Vdc, 850nm VCSEL's

OUTLINE DRAWING

Dimensions are shown as: inches (mm)

Weight = 8.3 oz / 235 grams



Panel Cutout Dimensions
Rear Panel Mounting Only

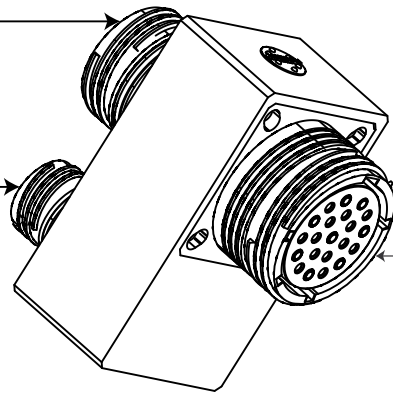
Shell Size Code	Shell Size	M Min	P Holes	R Bsc
H	23	1.547 (39.29)	0.159 (4.0) 0.149 (3.8)	1.375 (34.9)

Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrax, Multimode, 28Vdc, 850nm VCSEL's

CONNECTOR REQUIREMENTS

J2 Mating Connector
TYCO Plug, Shell Size 19
38999 Style
Arrangement 4Q4, RR-RR
Part No. 1-1811902-0
Size 8 Quadrax Socket Contact:
Rear Release/Rear Remove Design
Part Number 1445693-3

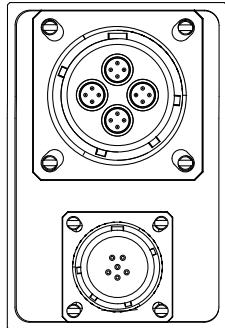
J3 Mating Connector
PN# D38999/26WA35SN



J1 Mating Connector
PN# D38999/26WH21PN

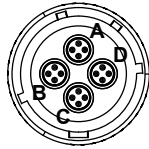
Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrx, Multimode, 28Vdc, 850nm VCSEL's

MEDIA CONVERTER INSERT ARRANGEMENTS

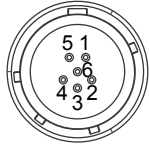


J2

**Media Converter
Insert Pin Numbers**



J3



**Media Converter
Pin Functions**

10/100Base-TX
Quadrx A = Port 0
Quadrx B = Port 1
Quadrx C = Port 2
Quadrx D = Port 3

Power Supply
Pin 1 = Case Ground
Pin 2 = Case Ground
Pin 3 = Case Ground
Pin 4 = Case Ground
Pin 5 = VEE
Pin 6 = VCC

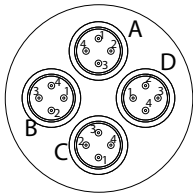
**Mating Cable Plug
Connector P/N**

Quadrx Cable
TYCO 38999 Plug P/N:
1-1811902-0
TYCO Quadrx Contact P/N:
1445693-3

26-22 Guage Copper Wire
D38999/26WA35SN

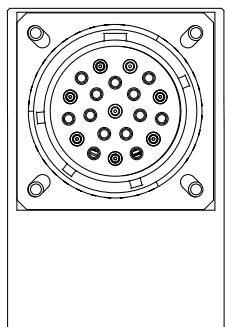
Media Converter Pin Numbers and Functions Shown - Mating Cable Plug Opposite

J2 Pin Functions (Port #)



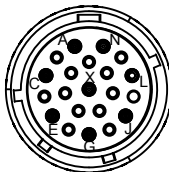
Quadrx Contact A(0)	Quadrx Contact B(1)	Quadrx Contact C(2)	Quadrx Contact D(3)
Pin #1= RX- (0)	Pin #1= RX- (1)	Pin #1= RX- (2)	Pin #1= RX- (3)
Pin #2=TX- (0)	Pin #2=TX- (1)	Pin #2=TX- (2)	Pin #2=TX- (3)
Pin #3=RX+ (0)	Pin #3=RX+ (1)	Pin #3=RX+ (2)	Pin #3=RX+ (3)
Pin #4=TX+ (0)	Pin #4=TX+ (1)	Pin #4=TX+ (2)	Pin #4=TX+ (3)

Electrical TX+/- Pins are inputs to this device, RX+/- Pins are outputs from this device
Media Converter Pin Numbers and Functions Shown - Mating Cable Plug Opposite



J1

**Media Converter
Optical Pin Numbers**



**Media Converter
Optical Functions**

100Base-SX

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

**Mating Cable Plug
Connector P/N**

50 or 62.5µ /125µ Optical Cable
D38999/26WH21PN
M29504/04

Optical TX Pins are outputs from this device, Optical RX Pins are inputs to this device
Media Converter Fiber Pin Numbers and Functions Shown - Mating Cable Plug Opposite

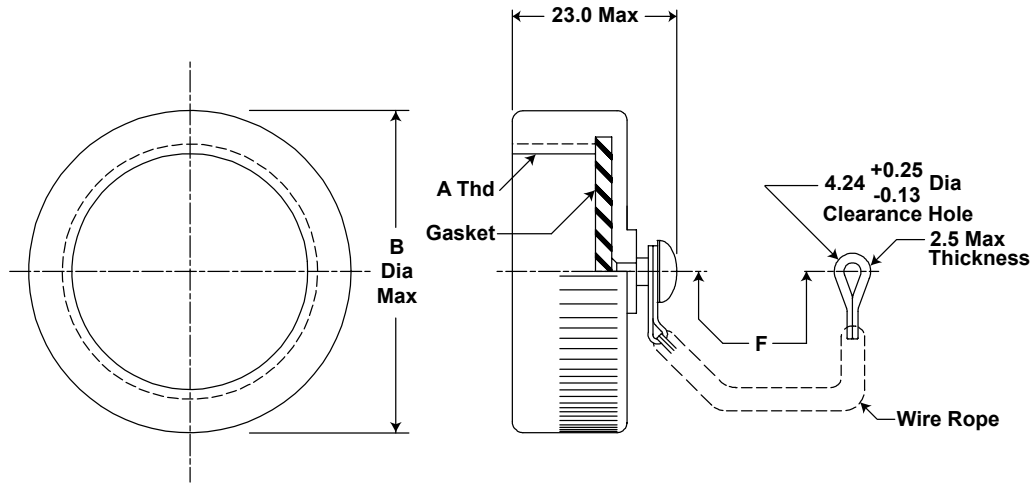
APPENDIX A1

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 +13.0 -7.0
F	19	1.2500-0.1P-0.3L-TS	39.0	127.00

Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrx, Multimode, 28Vdc, 850nm VCSEL's

APPENDIX A2

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

*See DSCC or SAE QPL for Approved Suppliers

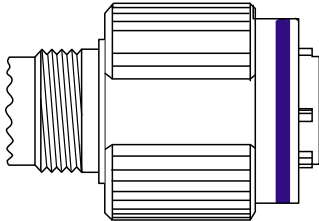
<http://www.dscclia.mil/programs/qmlqpl/QPLdetail.asp?QPL=38999>

*D38999 PLUG - PIN INSERT

MIL-DTL-38999 CABLE PLUG

MS PLUG P/N

*D38999/26WH21PN



*FIBER OPTIC PIN TERMINUS

MIL-T-29504 PIN TERMINUS

MS PIN TERMINUS P/N

*M29504/04-xxxx**



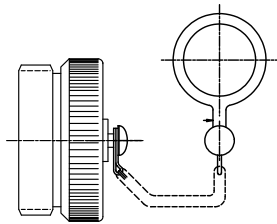
**defined by fiber optic cable configuration

*CABLE PROTECTION CAP

D38999/32 PLUG PROTECTION CAP

MS PLUG CAP P/N

*D38999/32W23N



D38999 PLUG PORT FUNCTIONS

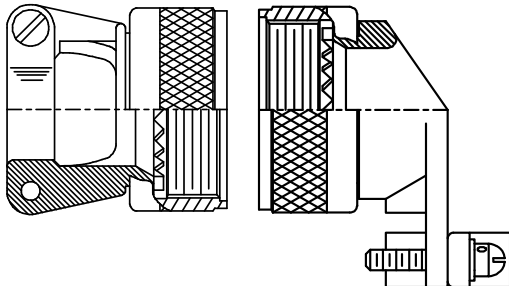
PORT NUMBER	TX	RX
0	J	L
1	N	G
2	X	A
3	E	C

*CABLE BACKSHELL

MIL-C-85049 CABLE BACKSHELL

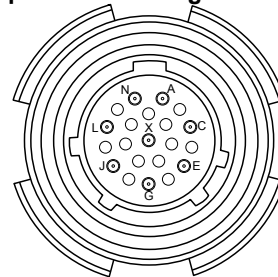
MS BACKSHELL P/N

*MS85049/xxxxxx**



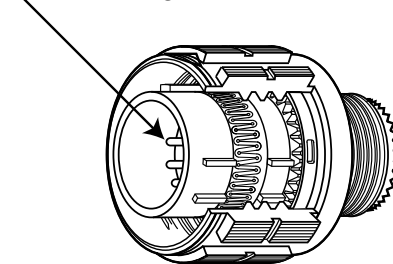
**Straight or angled backshell - defined by application / mounting configuration

TOP
Optical Cable Plug Interface



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

Pin Termini



Quad Port Mercury Series Mil-Dtl-38999, 10/100Base-TX to 100Base-SX,
Fast Ethernet Media Converter, Quadrax, Multimode, 28Vdc, 850nm VCSEL's

APPENDIX A4

PART NUMBER OPTIONS

Single Port, Gigabit Ethernet, 850nm

M38R - 8SAU - HXX

Shell Configuration
M38R= 38999 Receptacle

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

Wavelength
S= 850nm

Power Supply Voltage
A= 28.0VDC

Fiber Optic Interface
U = 10/100 Fast Ethernet

Shell Size Code
H = 23

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

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

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



192 Bob Fitz Road, Johnson City, TN 37615
salesmp@moog.com
moogprotokraft.com