

## FALCON SERIES

DUAL PORT DVI FIBER OPTIC MEDIA CONVERTER, D38999 28 VDC, MULTIMODE, 850 NM, QUADRAX



Falcon series DVI fiber optic transmitter consist of optoelectronic transmitter functions integrated into a bulkhead mounted MIL-DTL-38999 connector assembly. The optical transmitters are high output 850 nM VCSEL's.

The electrical interface to the Falcon series DVI fiber optic media converters is a D38999/19-18 Quadrax connector enabling interconnection to a standard DVI connector interface with a Quadrax cable adaptor.

Falcon series DVI fiber optic transmitter are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

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

# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAX, MULTIMODE, 28 VDC, 850 NM VCSEL'S

Dual DVI Port, Transmitter  
D38999 to Quadrax / Optical to Electrical Media Converter

## FEATURES

- Optical fiber link distances up to 500 meters
- Operating temperature range from -40° to +85° C
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Olive drab cadmium plating meets stringent corrosion performance specifications
- Aluminum alloy enclosure and MIL-DTL-38999 shells are strong, durable, corrosion resistant and light weight
- MIL-T-29504 compliant optical fiber connector interface
- D38999 / Quadrax electrical interface provides robust interconnection to internal chassis wiring or backbone

## APPLICATIONS

Falcon series bulkhead mounted DVI fiber optic media converters enable high speed video transmission over long distances in harsh environments.

- DVI link extension
- Remote display clusters
- Alternative display configurations

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.

### ORDERING INFORMATION

| Application                  | Part Number  |
|------------------------------|--------------|
| Dual DVI Transmitter, 28 VDC | M38R-8TAV-HW |

See Appendix A4 for more part number 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    |         | 45.0    | 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   |

## DESIGNED TO SPECIFICATIONS COMPLIANCE

| Requirement            | Feature           | Condition              | Notes                         |
|------------------------|-------------------|------------------------|-------------------------------|
| MIL-STD-883            | ESD               | Class II               | 2200 V                        |
| MIL-STD-810            | Vibration         | 3.8g <sup>2</sup> / Hz | 43 G rms                      |
| MIL-STD-810            | Shock             | 40.0 g                 | 6-9 mS                        |
| 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     |       |
| Plating                   | Olive Drab Cadmium |       |
| D38999 Inserts            | Thermoplastic      |       |
| Interfacial Seals         | Elastomer          |       |
| Optical Alignment Sleeves | Composite Polymer  |       |
| Printed Circuits          | Polyimide / FR-4   |       |
| Housing                   | Aluminum Alloy     |       |

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## OPTICAL TRANSMITTERS $T_A$ = OPERATING TEMPERATURE RANGE, $V_{CC}$ = 18.0 V TO 36.0 V

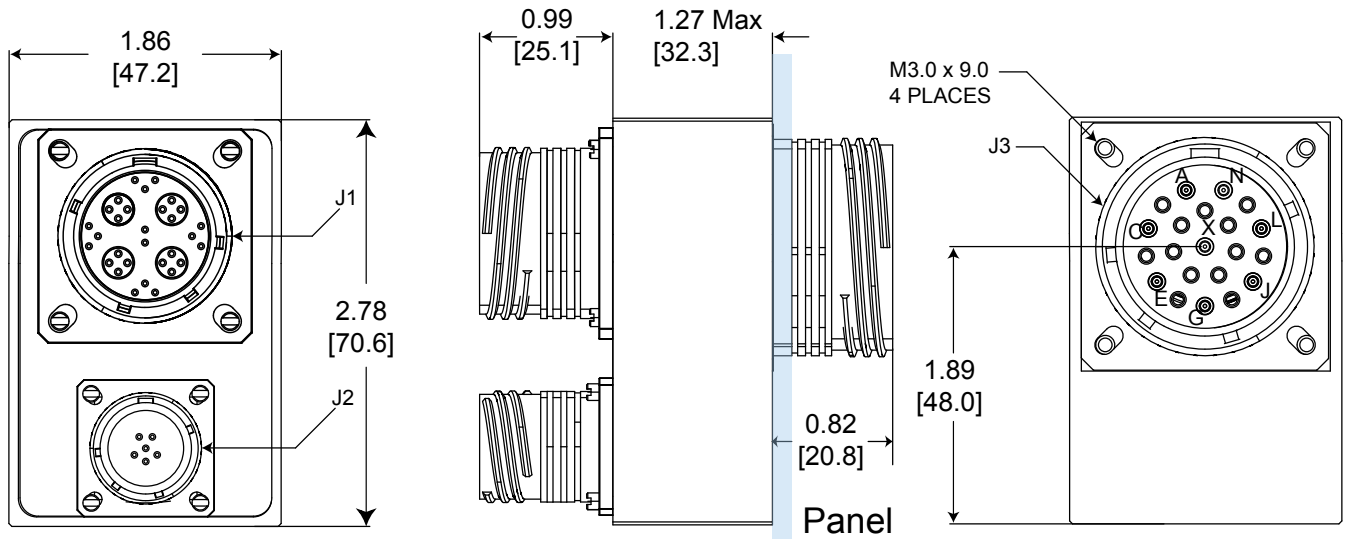
| Parameter                                     | Symbol         | Minimum | Typical | Maximum | Unit |
|---|----------------|---------|---------|---------|------|
| Optical Output Power (BER<10 <sup>-12</sup> ) | $P_I$          | -9.5    |         | -3.0    | dBm  |
| Optical Output Wavelength                     | $\lambda_{IN}$ | 830     | 850     | 860     | nM   |
| Spectral Width                                |                |         |         | 0.85    | nM   |
| Extinction Ratio                              | ER             | 9.0     |         |         | dB   |
| Optical Rise, Fall Time (20% to 80%)          | $t_{R,F}$      |         |         | 80      | pS   |

## POWER SUPPLY CURRENT $T_A$ = OPERATING TEMPERATURE RANGE, $V_{CC}$ = 18.0 V TO 36.0 V

| Parameter      | Symbol    | Typical | Maximum | Unit |
|----------------|-----------|---------|---------|------|
| Supply Current | $I_{CCT}$ | 200     | 250     | mA   |

# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAX, MULTIMODE, 28 VDC, 850 NM VCSEL'S

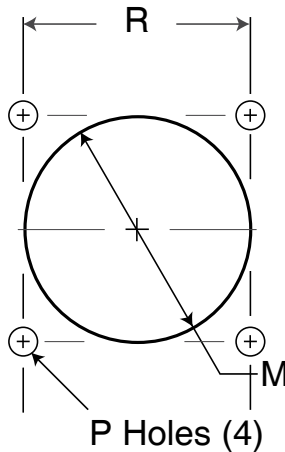
## OUTLINE DRAWING



Dimensions are shown as: inches [mm]  
Weight = 8.3 oz / 235 grams

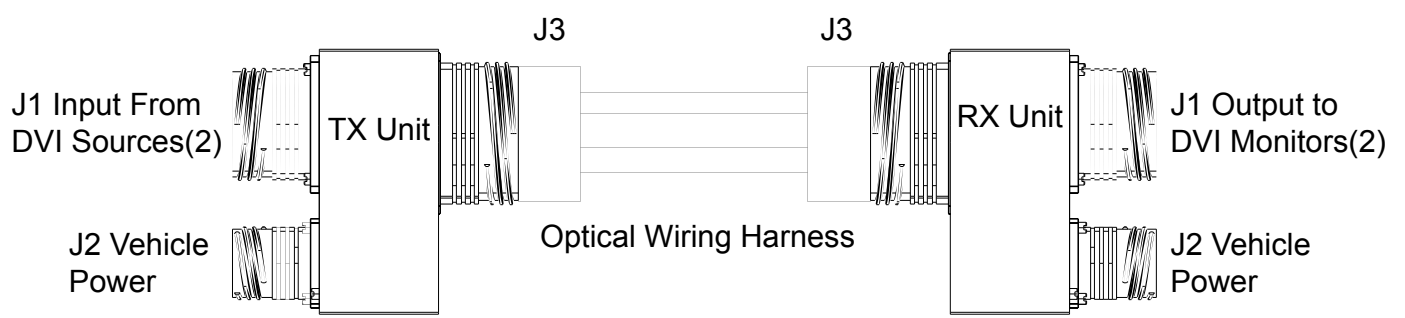
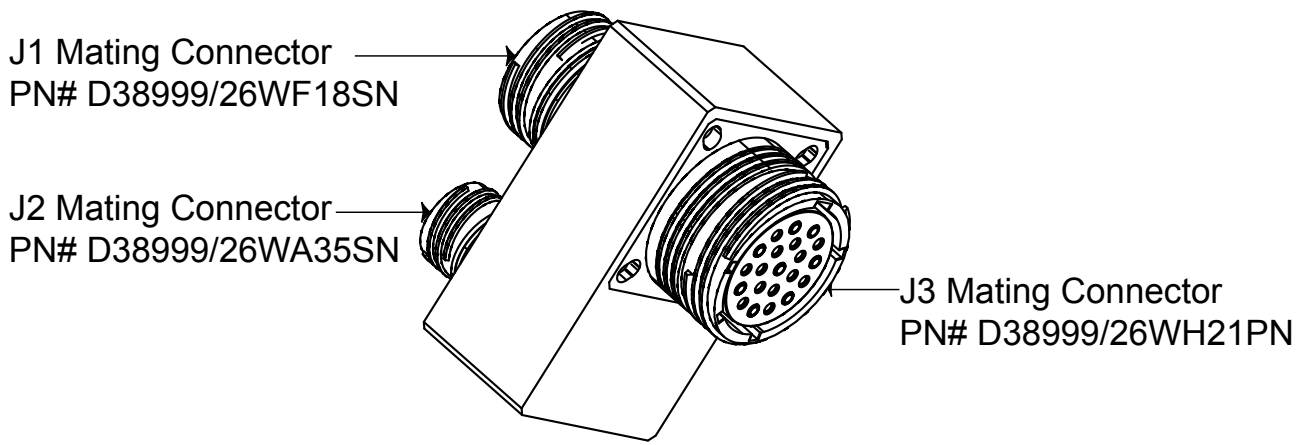
## PANEL CUTOUT DIMENSIONS - REAR PANEL MOUNTING ONLY

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



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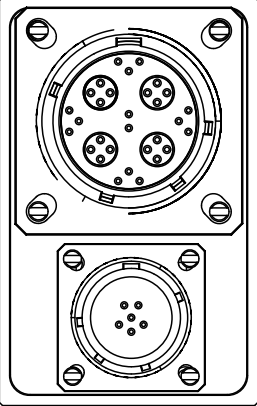
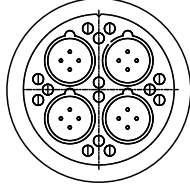
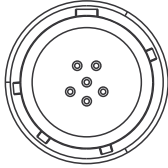
## CONNECTION REQUIREMENTS

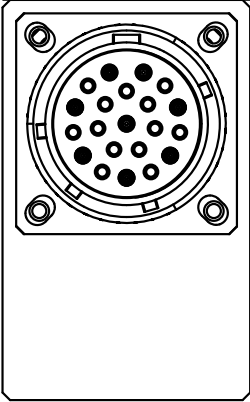
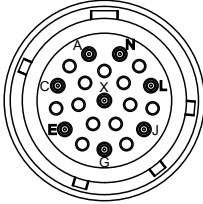


| J3 Pin Number | DVI Port Number | DVI Cable Color |
|---------------|-----------------|-----------------|
| J             | 0               | Blue            |
| L             | 1               | Blue            |
| N             | 0               | Green           |
| G             | 1               | Green           |
| X             | 0               | Red             |
| A             | 1               | Red             |
| E             | 0               | Clock           |
| C             | 1               | Clock           |

# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAx, MULTIMODE, 28 VDC, 850 NM VCSEL'S

## MEDIA CONVERTER INSERT ARRANGEMENTS

|   |    | Media Converter Insert Assignments   | Media Converter Pin Functions                         |
|---|----|--|---|
|  | J1 |  | <b>Electrical Signal Interface</b><br>See Appendix A3 |
|   | J2 |  | <b>Power Supply Interface</b><br>See Appendix A4      |

|   |    | Media Converter Optical Pin Numbers  | Media Converter Optical Functions                 |
|---|----|--|---|
|  | J3 |  | <b>Optical Fiber Interface</b><br>See Appendix A2 |

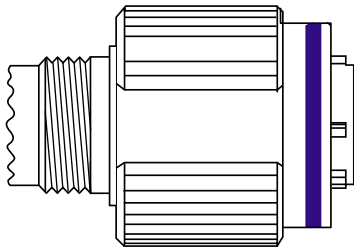
# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAx, MULTIMODE, 28 VDC, 850 NM VCSEL'S

## 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>

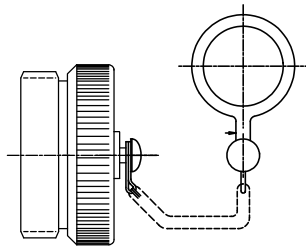
### \*D38999 PLUG - PIN INSERT MIL-DTL-38999 CABLE PLUG

MS Plug P/N \*D38999 / 26WH21PN



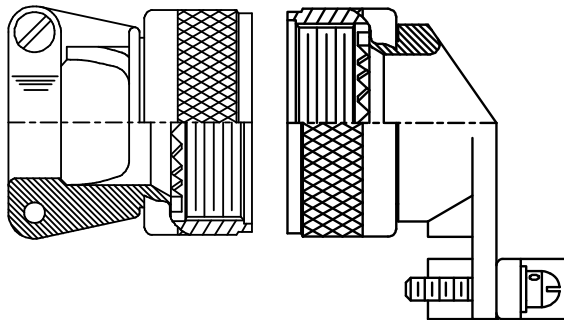
### \*CABLE PROTECTION CAP D38999 / 32 PLUG PROTECTION CAP

MS Plug Cap P/N \*D38999 / 32W23N



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

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



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

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

MS Pin Terminus P/N \*M29504 / 04-xxxx\*\*

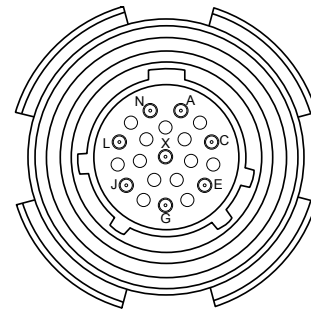


\*\*Defined by fiber optic cable configuration

### D38999 PLUG PORT FUNCTIONS

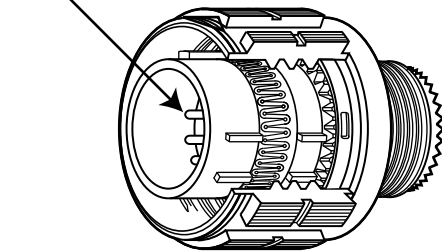
| Port Number | 0 | 1 |
|-------------|---|---|
| Blue        | J | L |
| Green       | N | G |
| Red         | X | A |
| Clock       | E | C |

TOP  
Optical Cable Plug Interface



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

Pin Termini

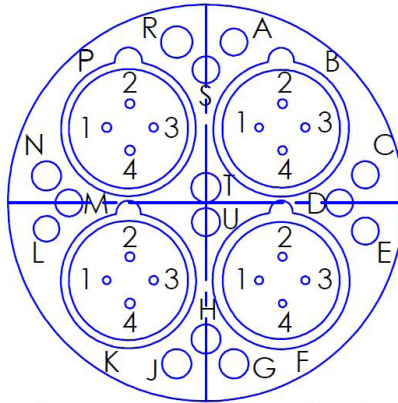




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## APPENDIX A2 - J1 PIN FUNCTIONS - ELECTRICAL DATA CONNECTOR WIRING SCHEMATIC

TOP



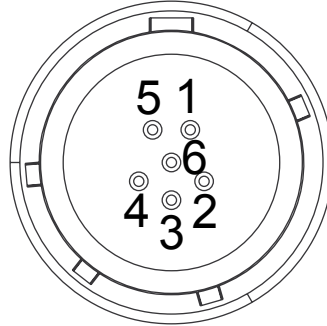
Front of QuadraX - Pin Side Shown

| DUAL PORT DVI MEDIA CONVERTERS |         |              |       |     |         |              |       |
|--------------------------------|---------|--------------|-------|-----|---------|--------------|-------|
| Pin                            | Channel | Function     | + / - | Pin | Channel | Function     | + / - |
| A                              | N/A     | No Connect   | N/A   | K1  | 0       | TMDS - Blue  | -     |
| B1                             | 0       | TMDS - Clock | -     | K2  | 0       | TMDS - Blue  | +     |
| B2                             | 0       | TMDS - Clock | +     | K3  | 1       | TMDS - Blue  | -     |
| B3                             | 1       | TMDS - Clock | -     | K4  | 1       | TMDS - Blue  | +     |
| B4                             | 1       | TMDS - Clock | +     | L   | N/A     | No Connect   | N/A   |
| C                              | N/A     | No Connect   | N/A   | M   | N/A     | No Connect   | N/A   |
| D                              | N/A     | No Connect   | N/A   | N   | N/A     | No Connect   | N/A   |
| E                              | N/A     | No Connect   | N/A   | P1  | 0       | TMDS - Green | -     |
| F1                             | 0       | TMDS - Red   | -     | P2  | 0       | TMDS - Green | +     |
| F2                             | 0       | TMDS - Red   | +     | P3  | 1       | TMDS - Green | -     |
| F3                             | 1       | TMDS - Red   | -     | P4  | 1       | TMDS - Green | +     |
| F4                             | 1       | TMDS - Red   | +     | R   | N/A     | No Connect   | N/A   |
| G                              | N/A     | No Connect   | N/A   | S   | N/A     | No Connect   | N/A   |
| H                              | N/A     | No Connect   | N/A   | T   | N/A     | No Connect   | N/A   |
| J                              | N/A     | No Connect   | N/A   | U   | N/A     | No Connect   | N/A   |

# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAX, MULTIMODE, 28 VDC, 850 NM VCSEL'S

## APPENDIX A3 - J2 PIN FUNCTIONS - POWER SUPPLY CONNECTOR ELECTRICAL POWER CABLE - CONNECTOR WIRING SCHEMATIC

TOP



Front view of the D38999 / 09-06 electrical insert shown, mating electrical cable plug opposite.

| Pin | Function             |
|-----|----------------------|
| 1   | Isolated Case Ground |
| 2   | Isolated Case Ground |
| 3   | Isolated Case Ground |
| 4   | Isolated Case Ground |
| 5   | 18 - 36 VDC Return   |
| 6   | 18 - 36 VDC          |

# FALCON SERIES MIL-DTL-38999, DUAL PORT DVI FIBER OPTIC TRANSMITTER, QUADRAX, MULTIMODE, 28 VDC, 850 NM VCSEL'S

## APPENDIX A4 PART NUMBER OPTIONS

### DVI FIBER OPTIC TRANSMITTERS, 850 NM

**M38R - 8 T A V - H X X**

SHELL CONFIGURATION  
**M38R** = 38999 Receptacle

# FIBER CHANNELS  
**8** = Eight

FIBER OPTIC INTERFACE  
**T** = 850 nM MM RX

POWER SUPPLY VOLTAGE  
**A** = 28.0 VDC

ELECTRICAL INTERFACE  
**V** = DVI

SHELL SIZE CODE  
**H** = 23 - 21

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 mounting and interface options are available.

Please consult the Protokraft website for alternate configurations.



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