

# Mustang Series

Fast Ethernet, TFOCA II<sup>®</sup>, 100Base-TX / FX Media Converter, Multimode, 1310nm

## Dual Port, Jam Nut

### FEATURES

- Compliant with IEEE-802.3:2005 Fast Ethernet 10/100Base-TX and 100Base-FX
- Optical fiber link distances up to 2.0 Kilometers
- Copper link distances up to 100 Meters (EIA/TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per Mil-Std-810
- Zinc Nickel plating meets stringent EMI / RFI and corrosion resistance performance specifications
- Aluminum housings are strong, durable and light weight
- TFOCA II<sup>®</sup> compliant optical fiber connector interface
- Mil-Dtl-83513 electrical interface with #2-56 jacksockets

### APPLICATIONS

Mustang 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 TFOCA II<sup>®</sup> shell provides a sealed 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.

\*TFOCA-II<sup>®</sup> is a registered trademark of Amphenol Fiber Systems International.



TFOCA II<sup>®</sup> to M83513 / Optical to Electrical Media Converter

### DESCRIPTION

Mustang series Fast Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX electrical to 100Base-FX optical media conversion circuitry into a jam-nut TFOCA II<sup>®</sup> fiber optic connector assembly.

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

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

Mustang 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 |
|--|----------------|
| Dual Port 100Base-TX / FX - 3.3VDC             | P51J-4L1U-FZ-M |
| For additional product options see Appendix A2 |                |

Dual Port Mustang Series \*TFOCA II® Connector, 10/100Base-TX to  
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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   |

## 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   |

## SPECIFICATIONS COMPLIANCE

| Requirement            | Feature          | Condition             | Notes                         |
|------------------------|------------------|-----------------------|-------------------------------|
| MIL-STD-883            | ESD              | Class II              | 2200V                         |
| MIL-STD-810            | Vibration        | 3.8g <sup>2</sup> /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                      |
| FDA / CDRH / IEC-825-1 | Eye Safety       | Class 1               | No Safety Interlocks Required |

## MATERIALS

| Item              | Detail         | Notes        |
|-------------------|----------------|--------------|
| Shell             | Aluminum Alloy |              |
| Shell Plating     | Zinc Nickel    | SAE-AMS-2417 |
| Insert            | Aluminum Alloy |              |
| Interfacial Seal  | Elastomer      |              |
| Alignment Sleeves | Zirconia       |              |
| Printed Circuits  | FR-4           |              |

Dual Port Mustang Series \*TFOCA II® Connector, 10/100Base-TX to  
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**TRANSMITTERS**  $T_A$  = Operating Temperature,  $V_{CC}$  = Operating Voltage Range

| Parameter                 | Symbol          | Minimum | Typical | Maximum | Unit |
|---------------------------|-----------------|---------|---------|---------|------|
| Optical Output Power      | $P_o$           | -15.0   |         | -8.0    | dBm  |
| Optical Output Wavelength | $\lambda_{OUT}$ | 1260    | 1310    | 1380    | nM   |

**RECEIVERS**  $T_A$  = Operating Temperature Range,  $V_{CC}$  = Operating Voltage Range

| Parameter           | Symbol         | Minimum | Typical | Maximum | Unit |
|---------------------|----------------|---------|---------|---------|------|
| Optical Sensitivity | $P_i$          | -31.5   |         | -6.0    | dBm  |
| Optical Wavelength  | $\lambda_{IN}$ | 1100    |         | 1590    | nM   |

**SUPPLY CURRENT**  $T_A$  = Operating Temperature Range

| Parameter               | Symbol    | Minimum | Typical | Maximum | Unit |
|-------------------------|-----------|---------|---------|---------|------|
| Supply Current per Port | $I_{CCT}$ |         | 400     | 650     | mA   |

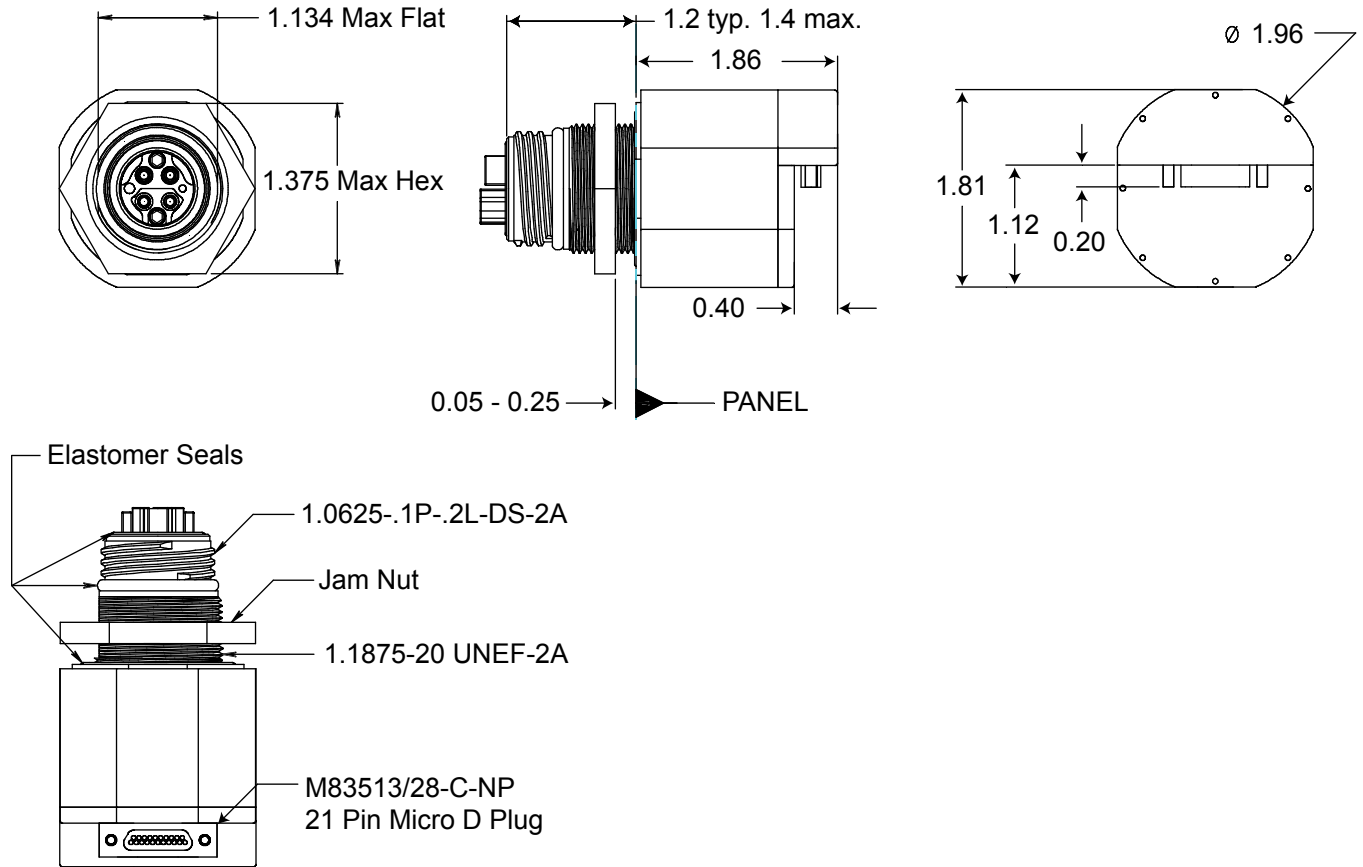
**OPTICAL FIBER LINK DISTANCES**

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

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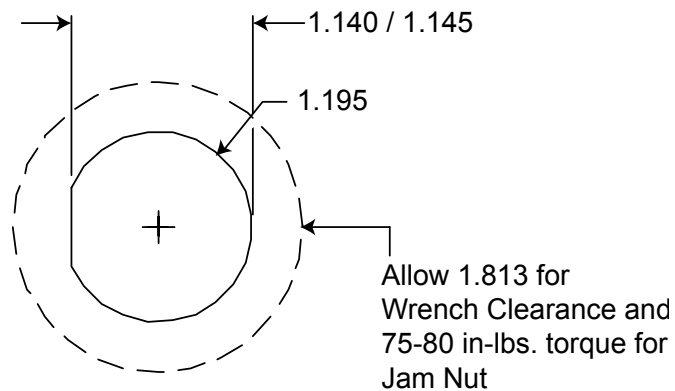
**OUTLINE DRAWING**

Dimensions are shown as: inches



**Panel Cutout Dimensions**

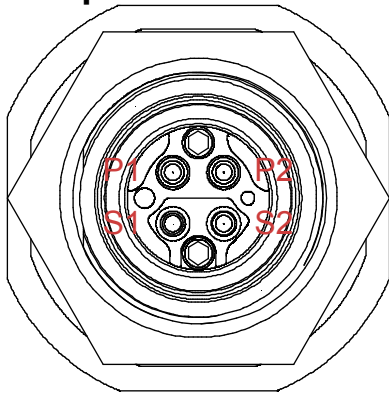
Dimensions are shown as: inches



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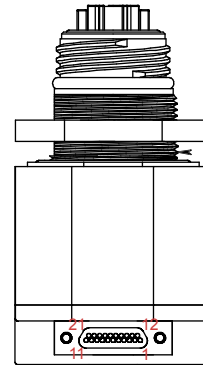
**MEDIA CONVERTER OPTICAL INSERT AND ELECTRICAL PIN ARRANGEMENT**

**TOP**  
**Optical Interface**



Front view of the TFOCA II media converter optical insert shown - fiber optic cable plug opposite - see Appendix A1 for details

**TOP**  
**Electrical Interface**



Back view of the media converter shown - see Electrical Pin Function Chart for more details

**OPTICAL PORT ASSIGNMENTS**

**TFOCA II OPTICAL INTERFACE**

| PORT NUMBER | RX | TX |
|-------------|----|----|
| 0           | P2 | S2 |
| 1           | P1 | S1 |

**ELECTRICAL PIN ASSIGNMENTS**

**MICRO-D ELECTRICAL INTERFACE**

| PIN # | PORT # | FUNCTION | PIN # | PORT # | FUNCTION |
|-------|--------|----------|-------|--------|----------|
| 1     | 0      | TX_D1+   | 12    | 1      | TX_D1+   |
| 2     | 0      | TX_D1-   | 13    | 1      | TX_D1-   |
| 3     | 0      | RX_D2+   | 14    | 1      | RX_D2+   |
| 4     | 0      | RX_D2-   | 15    | 1      | RX_D2-   |

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**ELECTRICAL PIN ASSIGNMENTS**

| <b>21 POSITION MICRO-D ELECTRICAL INTERFACE</b> |               |                           |                       |                                   |
|---|---------------|---------------------------|-----------------------|-----------------------------------|
| <b>PIN #</b>                                    | <b>PORT #</b> | <b>FUNCTION</b>           | <b>Input / Output</b> | <b>Logic Family</b>               |
| 1   | 0             | TX_D1+                    | Input                 | IEEE-802.3:2005 10/100Base-TX     |
| 2   | 0             | TX_D1-                    | Input                 | IEEE-802.3:2005 10/100Base-TX     |
| 3   | 0             | RX_D2+                    | Output                | IEEE-802.3:2005 10/100Base-TX     |
| 4   | 0             | RX_D2-                    | Output                | IEEE-802.3:2005 10/100Base-TX     |
| 5   | N/A           | NC                        | N/A                   | N/A                               |
| 6   | NA            | NC                        | N/A                   | N/A                               |
| 7   | N/A           | NC                        | N/A                   | N/A                               |
| 8   | NA            | NC                        | N/A                   | N/A                               |
| 9   | N/A           | NC                        | N/A                   | N/A                               |
| 10  | 0             | $\overline{\text{Reset}}$ | Input                 | LVTTTL - with Internal Pullup     |
| 11  | 1             | $\overline{\text{Reset}}$ | Input                 | LVTTTL - with Internal Pullup     |
| 12  | 1             | TX_D1+                    | Input                 | IEEE-802.3:2005 10/100Base-TX     |
| 13  | 1             | TX_D1-                    | Input                 | IEEE-802.3:2005 10/100Base-TX     |
| 14  | 1             | RX_D2+                    | Output                | IEEE-802.3:2005 10/100Base-TX     |
| 15  | 1             | RX_D2-                    | Output                | IEEE-802.3:2005 10/100Base-TX     |
| 16  | NA            | NC                        | N/A                   | N/A                               |
| 17  | N/A           | NC                        | N/A                   | N/A                               |
| 18  | NA            | NC                        | N/A                   | N/A                               |
| 19  | N/A           | NC                        | N/A                   | Do Not Connect - Factory Use Only |
| 20  | 0 / 1         | GND                       | N/A                   | N/A                               |
| 21  | 0 / 1         | VCC                       | N/A                   | N/A                               |

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

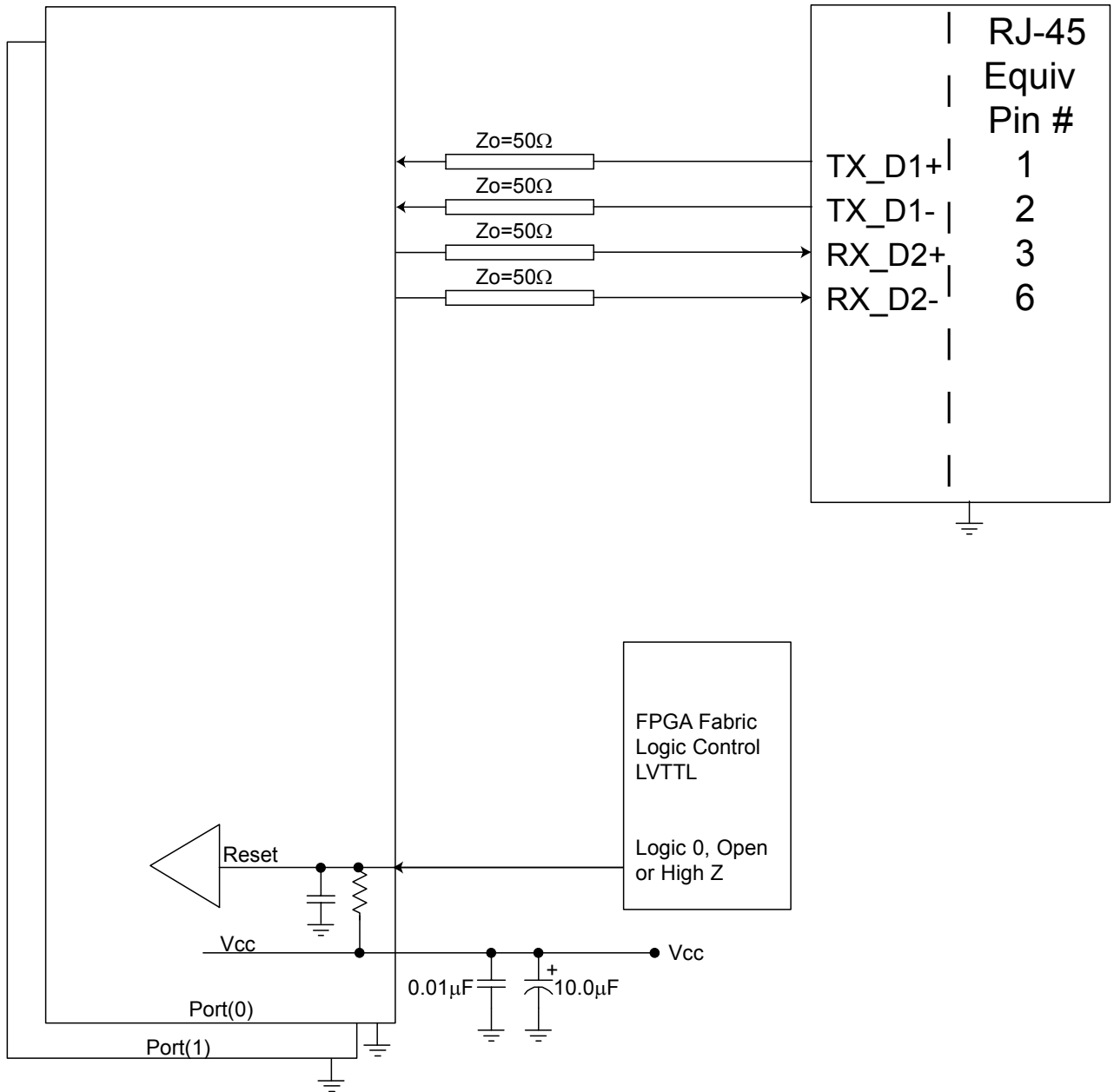
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**APPLICATION SCHEMATIC**

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

**10/100Base-TX to 100Base-FX  
Media Converter**

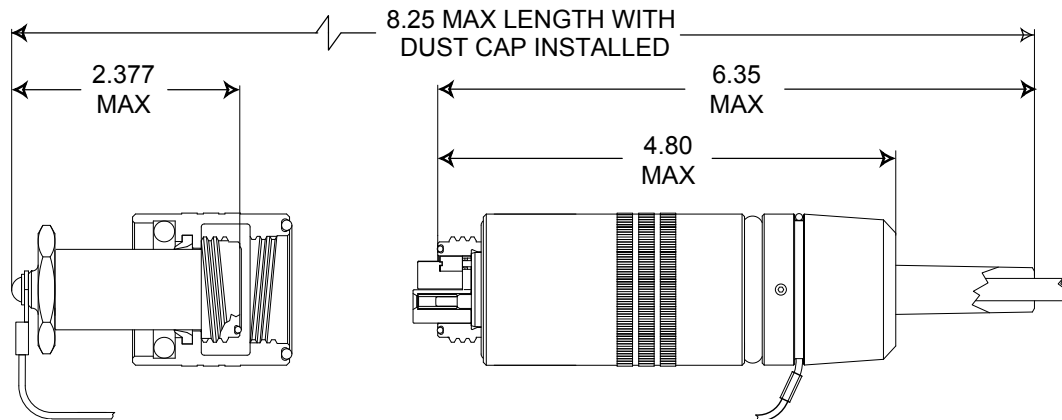
**10/100Base-TX  
Ethernet Interface**



## APPENDIX A1

### TFOCA-II® 4 Channel Fiber Optic Cable Plug

Dimensions are shown as: inches



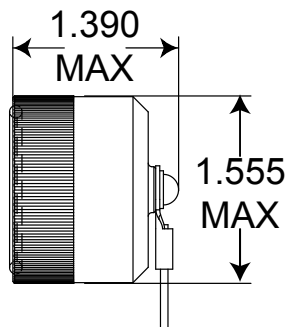
### Amphenol Fiber Systems International® TFOCA-II® 4-Channel Connector Part Numbers\*

\*Contact Amphenol Fiber Systems International for more information

### TFOCA II® RECEPTACLE PROTECTION CAPS

RECEPTACLE CAP P/N

Contact Amphenol Fiber Systems International



**MOOG**  
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