


Product Catalog

High-speed Optoelectronic Components and Communication Subsystems






MOOG
PROTOKRAFT

Introduction




Moog Protokraft, a business unit of Moog Inc., leads the industry in developing innovative optoelectronic components and communication subsystems for harsh environments. Each day these products are challenged to meet the rugged demands of our customers. With a long history of successful projects, the Protokraft team is continuously working to design new solutions for today's ever-demanding high speed and secure networking equipment requirements.

Protokraft products are globally available for communication networks, radar systems, satellite communications, situational awareness systems, border security, UAV (Unmanned Aerial Vehicle) ground stations and subsea communication to name a few. This patented core technology allows our robust components to be packaged into cylindrical and / or rectangular connector shells. Protokraft is AS9100 & ISO 9001 certified and has a worldwide sales support team.

Moog Protokraft manufactures components and systems qualified on many military platforms, including: F-16, F-18, F-22, F-35, Gripen, b-52, C-130, P-8, KC390, V-22, AW101 Merlin, UH-60, LCS, MK-15, WIN-T, PATRIOT, MRAP, JLTV, AN/TPS-80, AH-64, RQ-4 Global Hawk, MQ-1 Predator, MQ-9 Reaper, MQ-8 Fire Scout, among others.

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Optical Transceivers

Moog Protokraft designs and manufactures miniaturized, lightweight electro-optical converters for use in harsh environments such as military, avionics and other rugged industrial applications.

- Designed for use in the harshest environments
- Packaged in backshell of military / avionics connectors
- Eliminate intra–enclosure fiber optic cable assemblies and disconnects
- High speed signals remain in the electrical domain inside the system chassis
- Reduce weight, space, energy consumption and improve overall system reliability, though still rugged
- Reclaim up to 3 dB of optical link budget from typical interconnect losses
- Support Ethernet, Fiber Channel, ARINC 818, ARINC664, sRIO, sFPDP and HD / SDI among others
- Available in olive drab cadmium, zinc-nickel or nickel plating
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Operating temperature range from -40°C to +85°C

Lightning Series

Optical Transceivers

Description

Moog Protokraft Lightning series fiber optic transceivers integrate multiple fiber optic transmitter and receiver functions into a MIL-DTL-38999 series III receptacle connector.

The electrical interface to the Lightning series optical transceivers is a ribbon coax to Samtec® EQCD high density cable assembly enabling SMT interconnection to a customer's backplane, motherboard or daughtercard. The D38999, 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 limitations, weight or bulk make twisted pair, coax, twinax or quadrax copper conductors unacceptable.

Features

- Optical fiber link distances up to 2.0 km for Fast Ethernet and 550 m for Gigabit Ethernet
- Applications for Ethernet, Fiber Channel, ARINC 818 and sFPDP and or loss from 50 Mbps to 3.2 Gbps
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Aluminum alloy MIL-DTL-38999 housings are strong, durable and lightweight
- Samtec® EQCD series electrical connector for SMT interface
- Sealed against liquid and solid contaminants
- Shock and vibration resistant
- MIL-T-29504 compliant optical fiber interface
- Configuration up to 8 electro optical conversions available
- RoHS compliant product available

Typical Applications

Lightning series MIL-DTL-38999 optoelectronic components duplicate the functions of typical datacom or telecom fiber optic transceivers in package configurations that are optimized for the harsh environments of military fiber optic applications.

- Ethernet switches and peripherals
- sFPDP data links
- ARINC 818 video displays and drivers
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Cutlass Series

Optical Transceivers

Description

Moog Protokraft Cutlass series D38999 transceivers consist of optoelectronic transmitters and receivers functions integrated into a wall mount D38999 cylindrical connector. The optical transmitters are 850 nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines and single ended CMOS indicator functions on the Loss of Signal (LOS) lines. The receiver data lines are squelched upon LOS assertion, preventing errant data generation when an invalid incoming optical signal is presented to the transceiver.

The optical mating interface of the Cutlass series product family is an Luxcis® fiber optic cable plug.

Features

- Supports data rates up to 10.3 Gbps
- Compliant with ARINC 801, 818, 803 and 804
- Compatible with MIL-DTL-38999 size 13-02 connectors
- Operating temperature range from -55°C to 85°C
- Shock and vibration resistant per RTCA / D0-160E

Typical Applications

- Fiber Channel switches and peripherals
- ARINC 818 video
- sFPDP data links

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Luxcis® is a trademark of Radiall

Dagger Series

Optical Transceivers, Transmitters and Receivers

Description

Moog Protokraft Dagger series D38999 transceivers, transmitters and receivers consist of optoelectronic transmitter and receivers functions integrated into a wall mount D38999 cylindrical connector. The optical transmitters are 850 nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ andTX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines and single ended CMOS indicator functions on the Loss of Signal (LOS) lines. The receiver data lines are squelched upon LOS assertion, preventing errant data generation when an invalid incoming optical signal is presented to the transceiver.

The optical mating interface of the Dagger series product family is an ELIO® fiber optic cable plug per EN 4531. The electrical interface to the Dagger series product family is a ribbon coax to Samtec® EQCD high density cable assembly enabling SMT interconnection to a customer's backplane, motherboard or daughtercard.

Features

- Compliant with ARINC 818, 803 and 804
- Suitable for applications from 50 Mbps to 10.3 Gbps, e.g. Ethernet, Fiber Channel or sFPDP
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- ELIO® 2.5 mm ceramic optical fiber ferrule connector interface per EN 4531, ABS 1379 and ARINC 801
- Configuration up to 8 electro optical conversions available
- Option with Luxcis® 1.6 mm interface available

Typical Applications

Dagger series D38999 optical transceivers, transmitters and receivers enable high speed network communications over long distances in harsh environments.

- Fiber Channel switches and peripherals
- ARINC 818 video interfaces
- sFPDP data links
- Ethernet switches or periphals
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Luxcis® is a trademark of Radiall
Samtec® is a registered trademark

Matrix Series

Optical Transceivers

Description

Moog Protokraft Matrix series octal port (16x fiber) optical fiber transceivers consist of 16x optoelectronic transmitter or receiver functions integrated into a bulkhead mounted MIL-DTL-38999, series III receptacle connector.

The electrical interface to the Matrix series octal port optical fiber transceivers is a controlled impedance Samtec® connector enabling interface to a ribbon coax cable or flexible printed circuit assembly.

Though lightweight (226.8 g) and small (51 x 51 x 53 mm) the electro-optical conversion of 80 GB of data is possible in the most rugged environments.

Features

- Up to 16xTX or RX functions in a rugged metal housing with D38999 connector interface
- D38999 size 23 / 21 shell with M29504 / 04 multimode or single mode (1.6 Gbps) fiber optic contacts
- Compact size and lightweight (< 226.8 g) for simple mounting and installation
- Suitable for GbE, Fiber Channel, ARINC 818, DVI, sFPDP and other applications from 125 Mbps to 10.3 Gbps
- Optical fiber link distances up to 550 m (50 / 125 µm 2000 MHz*Km MMF) @ Gigabit data rate
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Aluminum alloy D38999 housings are strong, durable, corrosion resistant and lightweight

Typical Applications

Matrix series bulkhead mounted optical transceivers enable extremely high speed digital communications over long distances in harsh environments.

- Gigabit Ethernet switches and peripherals
- Fiber Channel switches and peripherals
- Video displays and display drivers
- High speed sensor data links
- EW equipment
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Hercules Series

Optical Transceivers, Transmitters, and Receivers

Description

Moog Protokraft Hercules series 24 port (48 fiber) optoelectronic transceivers consist of up to 24 total optical transmitter and receiver functions in blocks of 12 using the standardized MT ferule integrated into a bulkhead mounted D38999 / size 21 receptacle connector. The optical transmitters are 850 nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines and single ended CMOS indicator functions on the Loss of Signal (LOS) lines. The receiver data lines are squelched upon LOS assertion, preventing errant data generation when an invalid incoming optical signal is presented to the transceiver.

The electrical interface to the Hercules series optical fiber transceivers is a controlled impedance Samtec® connector enabling interface to a ribbon coax or twinax cable or flexible printed circuit assembly.

Hercules series 24 port optical fiber transceivers are vibration isolated, environmentally hardened components designed for use in harsh environment applications.

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. The D38999 shell provides a sealed optical interface that is water-tight to IP68 / NEMA-4x when mated.

Features

- Optical fiber link distances up to 550 m (50 / 125 µm 2000 MHz*Km MMF) @ Gigabit data rate
- Maximun optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -55°C to +85°C
- Shock, vibration and immersion resistant per RTCA / D0-160E
- Aluminum alloy D38999 housings are strong, durable, corrosion resistant and lightweight
- D38999 receptacle housing embedded with MT fiber optic ferules
- Suitable for GbE, Fiber Channel, ARINC 818, DVI, sFPDP and other applications from 125 Mbps to 10.3 Gbps

Typical Applications

Hercules series bulkhead mounted optical transceivers enable extremely high speed network communications over long distances in harsh environments.

- Gigabit Ethernet switches and peripherals
- Fiber Channel switches and peripherals
- Video displays and display drivers
- High speed sensor data links phased array radar systems

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Magnum Series

Optoelectronic Size 8 Cavity Transmitters / Receivers

Description

Moog Protokraft Magnum optoelectronic components integrate high performance fiber optic transmitter or receiver functions into a size 8 Quadrax cavity insert suitable for use in ARINC 600 / 404, EN 4165 or MIL-DTL-83527 connector bodies. Magnum optoelectronic transmitters / receivers consist of optoelectronic transmitter / receiver functions integrated into a printed circuit board mounted pin contact.

Magnum inserts provide rugged optical interfaces that are compliant with EN 4531 (2.5 mm, ELIO®) or ARINC 801 (1.25 mm, Luxcis®) ceramic optical ferrules. The 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.

Features

- Compliant with ARINC 664, 818, 801, 803 and 804
- Suitable for Fast Ethernet, Gigabit Ethernet, 1x / 2x / 4x Fiber Channel or sFPDP
- Applications from 20 Mbps to 10.3 Gbps
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- ARCAP contact material meets stringent EMI / RFI / ESD and EMP performance specifications
- Six pin PCB footprint for attachment to customer flexible or rigid printed circuit board
- Compatible with ARINC 600 / 404, EN 4165 and MIL-DTL-83527 Size 8 Q cavities

Typical Applications

Magnum series printed circuit board mounted optical transmitters and receivers enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet switches and peripherals
- Fiber Channel switches and peripherals
- Serial Rapid I/O (sRIO) interfaces
- PCI - express links
- sFPDP data links
- Video displays
- IFE systems
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Sabre Series Size 09-01 With ELIO® Interface

Optical Transmitters and Receivers

Description

Moog Protokraft Sabre series fiber optic components integrate high performance fiber optic transmitter or receiver functions into a D38999 size 09-01 cylindrical connector intermateable with the ELIO® fiber optic connectors for unidirectional transmission. Sabre series optoelectronic D38999 size 09-01 transmitters consist of optoelectronic transmitter functions integrated into a printed circuit board mounted pin contact. Sabre series optoelectronic D38999 size 09-01 receivers consist of optoelectronic receiver functions integrated into a printed circuit board mounted pin contact.

The Sabre series optoelectronic D38999 size 09-01 receptacle provides a rugged optical interface that is intermateable with the ELIO® Size 09-01 plug connectors. 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.

Features

- Compliant with ARINC 664, 818, 803 and 804
- Suitable for Ethernet, Fiber Channel or sFPDP applications from 100 Mbps to 10.3 Gbps
- Suitable for SD / HD-SDI / SMPTE 259 / 292 M / 424 applications
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- Aluminum alloy shell material meets stringent EMI / RFI / ESD and EMP performance specifications
- Six pin PCB footprint for attachment to customer flexible or rigid printed circuit board
- ELIO® connector interface per EN4531 / 4626 / ARINC 801
- Compatible with D38999 size 09-01 ELIO® connectors per ABS1213 / 1379

Typical Applications

Sabre series printed circuit board mounted optical transmitters and receivers enable high speed network communications over long distances in harsh environments.

- Fiber Channel switches and peripherals
- Serial Rapid I/O (sRIO) interfaces
- sFPDP data links
- Video displays
- HD / SDI applications
- Sensor links
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Sabre Series Size 11-02 With ELIO® Interface

Optical Transmitters and Receivers

Description

Moog Protokraft Sabre size 11-02 optoelectronic components integrate high performance fiber optic transmitter and receiver functions into an EN3645 size 11-02 cylindrical connector intermateable with the ELIO® size 11-02 fiber optic plug connectors. 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.

The optical mating interface to the Sabre series D38999 size 11-02 ELIO optical transmitters and receivers is an ELIO® D38999 / EN3645 fiber optic cable plug per EN 4531. The electrical interface to the Sabre series D38999 size 11-02 optical transmitters and receivers is a 12 position pin header suitable for thru-hole soldering to a flexible or rigid printed circuit.

Features

- Compliant with ARINC 664, 818, 801, 803 and 804
- Suitable for Fast Ethernet, Gigabit Ethernet, 1x / 2x / 4x Fiber Channel or sFPDP data links
- Suitable for SD / HD-SDI / SMPTE 259 / 292 M / 424 applications
- Applications from 100 Mbps to 10.3 Gbps
- Operating temperature range from -55°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- ARCAP contact insert meets stringent EMI / RFI / ESD and EMP performance specifications
- 12 pin PCB footprint for attachment to customer flexible or rigid printed circuit board
- ELIO® connector interface per EN4531 / 4626 / ARINC 801
- Mates with D38999 size 11-02 ELIO® plug connectors per ABS1213/1379
- Compliant to NGVA standard

Typical Applications

Sabre series printed circuit board mounted optical transmitters enable high speed network communications over long distances in harsh environments.

- Fiber Channel switches and peripherals
- Serial Rapid I/O (sRIO) interfaces
- sFPDP data links
- Video displays
- Ethernet applications
- HD / SDI applications
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Stiletto Series

10 GB Optical Fiber Transceivers

Description

Moog Protokraft Stiletto series optical fiber transceivers consist of 10 Gbps optoelectronic transmitter and receiver functions integrated into a pluggable Duplex LC compliant connector. The optical harsh environment transmitters are 850 nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines. An LVTTL signal is generated on the LOS line upon receipt of an invalid incoming optical signal. The receiver data lines are squelched upon LOS assertion, preventing errant data generation when an invalid incoming optical signal is presented to the transceiver.

Stiletto series optical fiber transceivers support the 2-wire serial communication protocol as defined in SFF-8472, offering end user access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. It also defines alarm and warning flags, to alert end users when particular operating parameters are outside of a factory defined normal range.

The electrical interface to the Stiletto optical transceivers is a Samtec® SMT Connector with a 20 position footprint which makes it a pluggable transceiver perfectly suited for harsh environmental applications.

Features

- Compliant with 10 Gigabit Ethernet - 10 G Base-SR and 1000Base-SX
- Compliant with XLPPI
- Optical fiber link distances up to 300 m (50 / 125µm 2000 MHz Km MMF - OM3) @10 Gigabit data rate
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -40°C to +85°C
- Nickel plated brass shell meets stringent corrosion performance requirements
- Die cast housings are strong, durable and lightweight
- Duplex LC compliant optical fiber connector interface
- Threaded PCB retention features provide secure mounting in high shock and vibration environments
- Supports SFF4872 digital diagnostics
- Smallest pluggable transceiver, only 13.72 x 31.5 x 9.8 mm
- PCB conformally coated
- Dual Tx and Rx versions are available for unidirectional data transmission

Typical Applications

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.

- 10 Gigabit Ethernet switches and peripheral
- sFPDP data links
- Video displays
- Storage devices
- FPGA integration
- 40 Gbps applications

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Razor Series

Optical Transceivers, Board Mount, Small, Rugged, with LC Interface or Pigtailed

Description

Moog Protokraft Razor series fiber optic transceivers with duplex LC interface consist of optoelectronic transmitter and receiver functions integrated into an surface mounted PCB assembly. The Razor series of fiber optic transceivers with duplex LC interfaces support Fast or Gigabit Ethernet, fiber channel, sFPDP, ARINC 818, ARINC 664 and many other protocols for multimode fiber optic links. All versions are fully compliant with the applicable IEEE or ANSI requirements.

Features

- Compliant with Fast Ethernet, Gigabit Ethernet,1x / 2x / 4x FC, sFPDP and ARINC 818 applications, among others
- Threaded PCB retention studs among others provide secure mounting in high vibration environments
- Applications from 100 Mbps to 4.25 Gbps
- Nickel plated brass shell meets stringent corrosion performance requirements
- Optical fiber link distances up to 550 m (50 / 125 µm - 500 MHz*Km MMF) @ Gigabit data rate
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Die cast housings are strong, durable and lightweight
- Duplex LC compliant optical fiber connector interface or pigtailed option
- Operating temperature range from -40°C to +85°C
- Mounts in industry standard PCB footprint
- Shorter than a standard Telecom product
- Dual Tx and Rx versions are available for unidirectional data transmission

Typical Applications

Razor series fiber optic transceivers with duplex LC interface for military, petrochemical, mining, industrial or utility applications where significant levels of shock, vibration and extreme temperature ranges are experienced.

- Fast or Gigabit Ethernet switches and peripherals
- Fiber Channel switches and peripherals
- sFPDP data links
- Video displays
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Direct 9 Series

D-Subminiature Optical Fiber Transceivers

Description

Moog Protokraft Direct 9 series D-Subminiature optical fiber transceivers consist of optoelectronic transmitter and receiver functions integrated into a printed circuit board mounted D-Sub / ARINC 801 compliant receptacle connector. The electrical interface to the Direct 9 series D-Sub optical transceiver is a solder pin field with the same PCB footprint as existing electrical 9 position D-Sub connectors.

The optical interface to the Direct 9 transceiver is a ARINC 801DB-9 connector enabling interconnection to optical fiber cable assemblies. 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.

Features

- Compliant with Fast or Gigabit Ethernet - IEEE-802.3:2005 and 1x / 2x / 4x FC, sFPDP and ARINC 818
- Applications from 100 Mbps to 5.0 Gbps
- Optical fiber link distances up to 2 km @ Fast Ethernet and 550 m @ Gigabit Ethernet
- Operating temperature range from -40°C to +85°C
- Shock and vibration resistant per RTCA / D0-160E
- Electroless nickel plating meets stringent EMI / RFI performance specifications
- D-Sub housings are strong, durable, corrosion resistant and lightweight
- ARINC 801 compliant optical fiber connector interface
- Threaded mating connectors provide secure interface conditions in high vibration environments
- Dual Tx and Rx versions are availble for unidirectional data transmission
- Increased power budget options are available on request

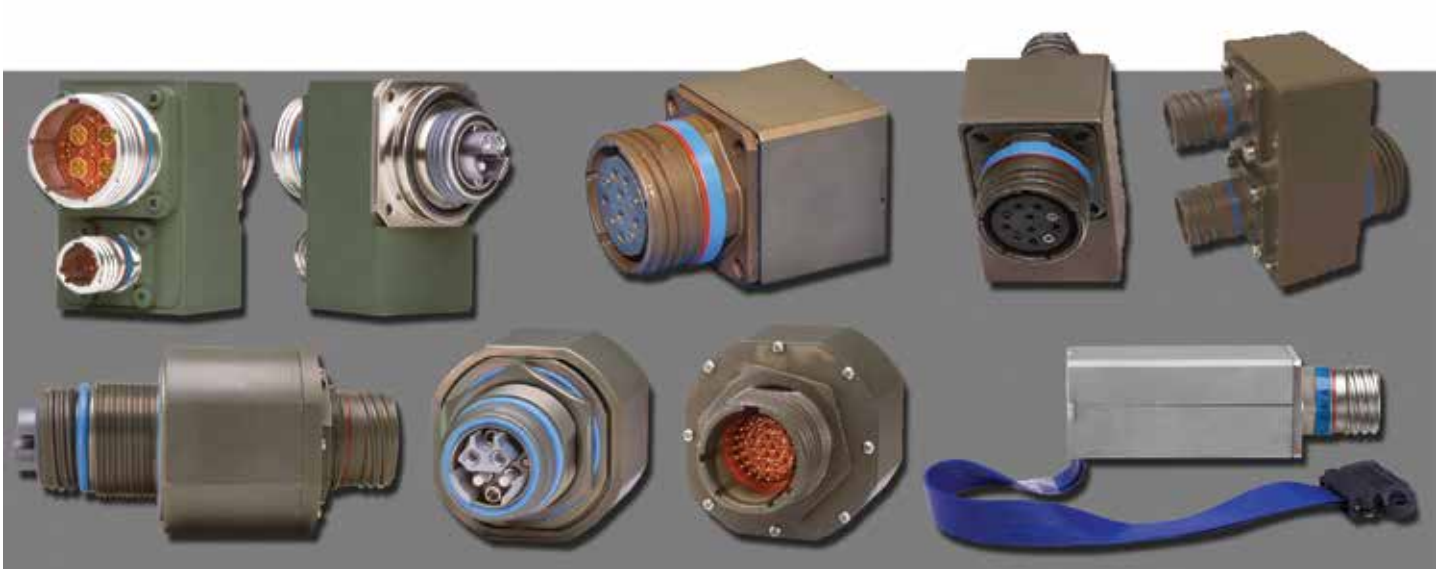
Typical Applications

Direct 9 series PCB mounted optical transceivers enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters
- sFPDP application
- ARINC 818 application
- FPGA integration

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Ethernet Media Converters



Moog Protokraft designs and manufactures small, lightweight and rugged Fast, Gigabit and 10 Gigabit Ethernet media converters for use in most rugged environments, e.g. military, avionics and other extreme industrial applications.

- Designed for use in harshest environments
- Packed in backshell of military / avionics connectors
- Compliant with IEEE-802.3 Fast or Gigabit Ethernet and 10 Gigabit Ethernet
- Different link length options available
- Small, lightweight and power efficient though still rugged
- Available in olive drab cadmium, zinc-nickel or nickel plating
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Operating temperature range from -40°C to +85°C
- Operates with vehicle power (12 - 36 VDC), large range of power options available

Spitfire Series

3.3 VDC Ethernet Optical Media Converters

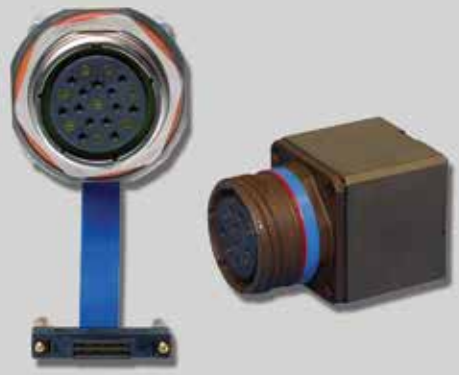
Description

Moog Protokraft Spitfire series fiber optic Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T electrical to 1000Base-SX optical media conversion circuitry into a bulkhead mounted MIL-DTL-38999 connector assembly.

Spitfire series wall mounted Fast or Gigabit Ethernet media converters enable high speed network communications over long distances in harsh environments. The multimode MIL-DTL-38999 optical fiber cable interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadrax copper conductors unacceptable. 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.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 2 km @ Fast Ethernet and 550 m @ Gigabit Ethernet
- Copper link distances up to 100 m (EIA / TIA Cat-5 / 5E)
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Shielded interface meets stringent EMI / RFI and EMP requirements
- Aluminum housings are strong, durable and lightweight
- MIL-T-29504 compliant optical fiber connector interface
- Olive drab cadmium, nickel or zinc nickel plating meets stringent corrosion resistance performance specifications



Typical Applications

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

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Mustang Series

TFOCA II® Ethernet Media Converters

Description

Moog Protokraft Mustang series dual fiber optic Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T Ethernet electrical to 1000Base-LX or 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit with a Jam Nut TFOCA II® optical connector interface.

The optical transmitters are high performance 1310 nm FP Lasers, LEDs or 850 nm VCSEL's. The optical receivers consist of GaAs or InGaAs PIN and preamplifier assemblies and limiting post-amplifiers. The optical interface to the Mustang series optical media converters is a TFOCA II® connector enabling interconnection to preterminated TFOCA II® based optical fiber cable assemblies. The electrical interface to the Mustang series optical media converters is either a MIL-DTL-38999 connector for external 28 VDC connections or a Samtec® SMT connection for internal 3.3 VDC applications. USB powered configurations are also available. These options enable robust and simple interconnection to Ethernet switches, routers or NIC's.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 10 km
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per MIL-STD-810
- Zinc nickel connector finish meets stringent corrosion and EMI / RFI performance specifications
- Aluminum alloy case and connectors are strong, durable and lightweight
- TFOCA II® compliant optical fiber connector interface
- MIL-DTL-38999 or Samtec® SMT electrical connector for robust interconnections to Ethernet switches, routers or NIC's
- Options for 3.3, 5 (USB) or 28 VDC power supply inputs
- Sealed against liquid and solid contaminants

Typical Applications

Mustang series Gigabit and Fast Ethernet media converters enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet switches and peripherals
- Network switch / router rack-to-rack links
- Storage or computation clusters
- Deployable networks
- Remote laptop requirements

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

TFOCA-II is a registered trademark of Amphenol Fiber Systems International
Applicable for the multimode EuroFOM-B/4 Model FOMs only
Samtec® is a registered trademark

Stingray Series

M83526 / 21-02 Optical Ethernet Media Converters

Description

Moog Protokraft Stingray series Ethernet fiber optic media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T Ethernet electrical to 1000Base-LX or 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit with a Jam Nut M83526 / 21-02 expanded beam optical connector interface.

The optical interface to the Stingray series optical media converters is an M83526 / 21-02 expanded beam connector enabling interconnection to preterminated M83526 optical fiber cable assemblies. The electrical interface to the Stingray series optical media converters is a MIL-DTL-38999 electrical connector. These options enable robust and simple interconnection to Ethernet switches, routers or NIC's.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 10 km
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per MIL-STD-810
- Zinc nickel connector finish meets stringent corrosion and EMI / RFI performance specifications
- Aluminum alloy case and connectors are strong, durable and lightweight
- M83526 / 21-02 compliant optical fiber connector interface
- MIL-DTL-38999 electrical connector for robust interconnections to Ethernet switches, routers or NIC's
- Options for 5 (USB) or 28 VDC power supply inputs
- Sealed against liquid and solid contaminants
- Shock and vibration resistant

Typical Applications

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

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Excalibur Series

10 Gigabit Ethernet Transponders

Description

Moog Protokraft Excalibur series optical fiber transponders consist of optoelectronic transmitter and receiver functions integrated into a bulkhead mounted MIL-DTL-38999, series III receptacle connector along with the 10 Gbps / XAUI SerDes functions. The optical transmitters are 850 nm VCSEL lasers. The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. The XAUI electrical interface to the Excalibur series optical fiber transponders is a Samtec® controlled impedance connector enabling interface to a ribbon coax cable or flexible printed circuit assembly.

Features

- 1x, 2x and 4x XAUI to 10 G Base-SR transponder ports in a rugged metal housing with D38999 interface
- D38999 size 17-08 or 11-02 shell with up to 4x MIL-T-29504 / 04 multimode fiber optic contacts
- Compact size and lightweight (226.8 g) for simple mounting and installation
- 10 Gigabit Ethernet optical fiber link distances up to 300 m
- Extended range optical fiber link distances also available
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Olive drab cadmium, nickel and zinc-nickel plating meets stringent corrosion resistance performance specifications.
- Aluminum housings are strong, durable and lightweight
- Samtec® EQCD Series electrical connector for SMT interface

Typical Applications

- Civil and military vehicle networking
- 10 Gigabit Ethernet network switches, NIC's and many other applications
- Data communication links up to 20 Gbps in one connector
- VPX backplane extension

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Mercury Series

28 VDC Ethernet Media Converters

Description

Moog Protokraft Mercury series Ethernet fiber optic media converters consist of optoelectronic single or dual transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T electrical to 1000Base-SX optical media conversion circuitry into an externally mounted MIL-DTL-38999 connector assembly.

The optical transmitters are high output 1310 nm LEDs or 850 nm VCSELs. The optical receivers consist of InGaAs or 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 connector enabling interconnection to an internal backplane or external backbone cable interface.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 2 km @ Fast Ethernet and 550 m @ Gigabit Ethernet
- 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 chassis and D38999 housings are strong, durable, corrosion resistant and lightweight
- MIL-T-29504 compliant optical fiber connector interface
- D38999 electrical interfaces provides robust interconnection to vehicle wiring
- 28 VDC (16 - 36 VDC) power supply
- Qualified to DO160G and MIL-STD-461F
- Up to 4 ethernet media converters in one small lightweight but rugged enclosure

Typical Applications

- Fast or Gigabit Ethernet switches and peripherals
- Network switch / router rack-to-rack links
- Storage or computation clusters
- Deployable networks

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Maverick Series

TFOCA II® Ethernet Media Converters

Description

Moog Protokraft Maverick series fiber optic Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T Ethernet electrical to 1000Base-LX or 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit.

The optical transmitters are high performance 1310 nm FP Lasers, LEDs or 850 nm VCSEL's. The optical receivers consist of GaAs or InGaAs PIN and preamplifier assemblies and limiting post-amplifiers. The optical interface to the Maverick series optical media converters is an TFOCA II® connector enabling interconnection to preterminated TFOCA II® based optical fiber cable assemblies. The electrical interface to the Maverick series optical media converters is an D38999 size 19-18 Quadrax connector enabling interconnection to quadrax cable assemblies.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 10 km
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per MIL-STD-810
- Olive drab cadmium or nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy case and connectors are strong, durable, corrosion resistant and lightweight
- TFOCA II® compliant optical fiber connector interface
- D38999 quadrax electrical interface provides robust interconnection to vehicle wiring
- Sealed against liquid and solid contaminants
- 28 VDC (16 - 36 VDC) power supply

Typical Applications

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

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Neptune Series

M28876 Ethernet Media Converters

Description

Moog Protokraft Neptune series fiber optic Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T Ethernet electrical to 1000Base-LX or 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit.

The optical transmitters are high performance 1310 nm FP Lasers, LEDs or 850 nm VCSEL's. The optical receivers consist of GaAs or InGaAs PIN and preamplifier assemblies and limiting post-amplifiers. The optical interface to the Neptune series optical media converters is a MIL-DTL-28876 fiber optic connector enabling interconnection to preterminated M28876 optical fiber cable assemblies. The electrical interface to the Neptune series optical media converters is an D38999 size 19-18 Quadrax connector enabling interconnection to quadrax cable assemblies.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 10 km
- Maximum optical channel bit error rate less than $1x10^{-12}$
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per MIL-STD-810
- Olive drab cadmium or nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy case and connectors are strong, durable, corrosion resistant and lightweight
- M28876 compliant optical fiber connector interface
- D38999 quadrax electrical interface provides robust interconnection to vehicle wiring
- Sealed against liquid and solid contaminants
- 28 VDC (16.36 VDC) power supply

Typical Applications

Neptune series Fast and Gigabit Ethernet media converters enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet switches and peripherals
- Network switch / router rack-to-rack links
- Storage or computation clusters
- Naval Ethernet media converter

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Saturn Series

Fiber Optic Ethernet Media Converters

Description

Moog Protokraft Saturn series fiber optic Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to 100Base-FX or 1000Base-T Ethernet electrical to 1000Base-LX or 1000Base-SX Ethernet optical media conversion circuitry into an environmentally sealed unit.

The optical interface to the Saturn series optical media converters is an LC-Field® connector enabling interconnection to preterminated LC based optical fiber cable assemblies. The electrical interface to the Saturn series optical media converters is an RJ-Field® connector enabling interconnection to preterminated RJ-45 Cat-5 patch cable assemblies.

Features

- Compliant with IEEE-802.3u Fast and Gigabit Ethernet
- Optical fiber link distances up to 20 km
- Maximum optical channel bit error rate less than 2.5 x 10^{-10}
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per IEC 60068
- Compact size and lightweight (< 8 oz) for simple mounting and installation
- Olive drab cadmium or nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy case and connectors are strong, durable, corrosion resistant and lightweight
- LC-Field compliant optical fiber connector interface
- RJ-Field electrical interface provides robust interconnection to vehicle wiring
- Sealed against liquid and solid contaminants
- 28 VDC power supply

Typical Applications

Saturn series Fast or Gigabit Ethernet media converters enable high speed network communications over long distances in harsh environments.

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Titan Series

Ethernet Optical Media Converters

Description

Moog Protokraft Titan series fiber optic Fast or Gigabit Ethernet media converters consist of optoelectronic transmitter and receiver functions integrated along with the 10/100Base-TX to FX or 1000Base-T to LX/SX Ethernet optical media conversion circuitry in an environmentally sealed, NAVSEA approved composite enclosure with an M28876 optical connector interface.

These systems integrate the functions of Ethernet optical media converters into an environmentally sealed, NAVSEA approved composite enclosure with a standard M28876 optical connector. These components are designed for use in harsh environments where small size, weight reduction and resistance to harsh environments are valued.

Features

- Compliant with IEEE-802.3:2005 Fast or Gigabit Ethernet
- Optical fiber link distances up to 10 km
- Operating temperature range from -40°C to +85°C
- Shock, vibration and ESD resistant per MIL-STD-810
- Composite enclosure and aluminum connectors are strong, durable and corrosion resistant
- M28876 optical fiber connector interface
- Operates from 110 / 220 VAC power supplies
- Mounts in existing NAVSEA junction box hole patterns

Typical Applications

Titan series Ethernet optical media converters with M28876 optical interfaces for naval, petrochemical, mining, industrial or utility applications where significant levels of shock, vibration and extreme temperature ranges are experienced.

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Ethernet Switches

The Moog Protokraft Ethernet switches support Fast, Gigabit and 10 Gigabit Ethernet and are designed for applications in the harshest envirnoments such as military, avionics and other extreme rugged industrial applications.

- Ruggedized Enterprise class Gigabit triple rate (10/100/1000Base-T) Ethernet switches
- Shock, vibration and immersion resistant per MIL-STD-810
- Operating temperature range from -40°C to +85°C
- Aluminum connectors and housings are reliable, durable and lightweight
- Copper cable link distances up to 100 m (EIA / TIA Cat-5E)
- Optical fiber link distances up to 300 m (50 / 125 µm 2000 MHz*Km MMF)
- Multiple plating options to meet application-specific corrosion resistance requirements

Hornet Series

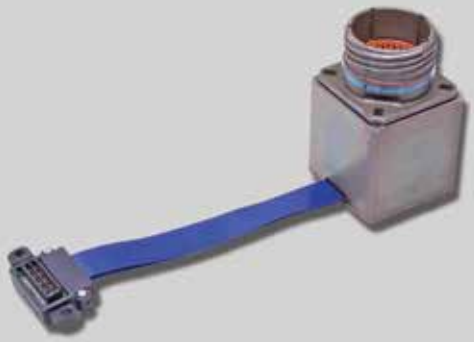
Panel Mounted Ethernet Switches

Description

Moog Protokraft Hornet series 10/100/1000Base-T unmanaged Ethernet switches consist of 5x10/100/1000Base-T ports with autonegotiation and auto MDI / MDIx functions integrated into a bulkhead mounted MIL-DTL-38999 connector assembly. The external interface of the Hornet is a D38999 size 19-35 connector with 4x IEEE-802.3U:2005 10/100/1000Base-T compliant Ethernet ports. The internal interface of the Hornet is a ribbon coax cable to Samtec® SMT connector assembly enabling interconnection to a motherboard, daughtercard or backplane. Power to the unit is supplied through the Samtec® connector.

Features

- 5x (4+1) triple-speed switched 10/100/1000Base-T Ethernet ports per IEEE 802.3:2005
- Cable link distances up to 100 m (EIA / TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Jumbo frame support in all speeds (10/100/1000Base-T)
- Full duplex flow control per IEEE802.3X and half duplex back pressure, symmetric and asymmetric
- Shock, vibration and immersion resistant per MIL-STD-810
- Aluminum connector shells are strong, durable and lightweight
- Auto sensing of half or full duplex operation
- Total weight of 4.2 oz / 121 g for the complete system
- Unmanaged Ethernet switch - no configuration required
- Samtec® SMT connector for simple attachment to motherboard or backplane
- MIL-DTL-38999 size 19-35 with 4x 10/100/1000Base-T ports
- 5 VDC power supply input - maximum power consumption < 5 W



Typical Applications

Hornet series 10/100/1000Base-T Ethernet switches enable high speed network communications in harsh environments.

- Civil and military vehicle Fast or Gigabit Ethernet networks
- Plug and play operation - no configuration required
- Unmanaged Ethernet switch port multiplication

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Wildcat Series

Panel Mounted Fiber Optic Ethernet Switches

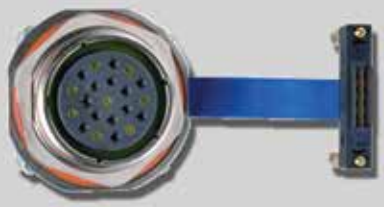
Description

Moog Protokraft Wildcat series panel mounted Ethernet switches consist of 4x1000Base-SX or 4x100Base-FX fiber optic switch ports plus 1x10/100/1000Base-T Ethernet switch ports integrated into a panel mounted MIL-DTL-38999 optical connector assembly.

The electrical interface to the Wildcat series panel mounted Ethernet switches is a Samtec® high density ribbon coax cable assembly enabling SMT interconnection to a customer's backplane, motherboard or daughtercard.

Features

- 4x1000Base-SX or 100Base-FX switched optical Ethernet ports with D38999 interface
- Unmanaged Ethernet switch for 4x1000Base-SX or 100Base-FX switched interface ports
- 1x10/100/1000Base-T Ethernet internal connection through Samtec® SMT connector
- Compliant with IEEE-802.3:2005 100Base-FX, 1000Base-SX and 10/100/1000Base-T
- Optical fiber link distances up to 2 km (@ 100Base-FX)
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Olive drab cadmium, nickel and zinc-nickel plating meets stringent corrosion resistance performance specifications
- Aluminum housings are strong, durable and lightweight
- MIL-T-29504 compliant optical fiber connector interfac
- MIL-DTL-38999 fiber optic insert per MIL-STD-1560
- Samtec® EQCD series electrical connector for SMT interface
- Samtec® SMT connector for simple attachment to motherboard or backplane
- Compact size and lightweight (< 170.1 g) for simple mounting and installation
- MIL-DTL-38999 size 23-21 with 4x fiber optic switch port
- 5 or 12 VDC power supply input - maximum 5 W
- External interface is sealed against liquid and solid contaminants
- Shock and vibration resistant



Typical Applications

Wildcat series panel mounted Ethernet switches enable high speed network communications over long distances in harsh environments.

- Fast or Gigabit Ethernet computers and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters
- UAV
- Turret applications

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Viking Series

10x 10/100/1000Base-T and 2x 10GBase-SR Port Ethernet Switches

Description

Moog Protokraft Viking VS448 series Ethernet switches consist of 10x10/100/1000Base-T plus 2x10GBase-SR ports with autonegotiation and auto MDI / MDIX circuitry into a wall or floor mounted assembly.

The external copper cable interface of the Viking VS448 series Ethernet switch is a D38999 / 25-35 series III connector with 10xIEEE-802.3U compliant Gigabit Ethernet ports incorporated with the power supply and ground connections. The external fiber optic cable interface of the VS448 series Ethernet switch is a D38999 / 13-04 series III connector with 2x10GBase-SR multimode fiber optic 10 Gigabit Ethernet ports.

Features

- 10x triple-speed (10/100/1000Base-T) copper Ethernet ports
- 2x10GBase-SR multimode fiber optic Ethernet ports
- Advanced L2+ management functionality available
- Copper cable link distances up to 100 m (EIA / TIA Cat-5E)
- Optical fiber link distances to 300 m (50 / 125 µm 2000 MHz*Km MMF)
- Operating temperature range from -40°C to +70°C
- Full duplex flow control per IEEE STD 802.3X and half duplex back pressure, symmetric and asymmetric
- Shock, vibration and immersion resistant per MIL-STD-810
- Olive drab cadmium plating meets stringent corrosion resistance specifications
- Aluminum connectors and housings are strong, durable and lightweight
- Auto sensing of half or full duplex operation
- 802.1Q VLAN switch with 32K MACs and 4K VLANs
- Push, pop, and translate ingress / egress
- Policing with storm control and MC / BC protection
- Hierarchical Quality of Service (QoS)
- Managed and unmanaged Ethernet switch (options are available)
- Qualified to DO160G and MIL-STD-461F

Typical Applications

- High speed network communications in harsh environments
- Industrial and military vehicle networking
- The MIL-DTL-38999, series III shells provides sealed interfaces that are water-tight to MIL-STD-810 when mated
- The 10 Gbps 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
- Vehicle distributed network architecture
- Backbone switch

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Viking Series

20x10/100/1000Base-T Ethernet Switches

Description

Moog Protokraft Viking series L2 managed Ethernet switches consist of 20x10/100/1000Base-T ports with Autonegotiation and Auto MDI / MDIX circuitry into a wall or floor mounted assembly.

The external copper cable interfaces of these Viking series Ethernet switchs are 2xD38999 / 25-35 series III connectors with each 10x IEEE-802.3U compliant Gigabit Ethernet ports in each connector plus the power supply and ground connections.

Features

- 20x triple-speed (10/100/1000 Mbps) copper Ethernet ports
- Advanced L2+ management functionality available
- Non-blocking copper cablelink distances up to 100 m (EIA / TIA Cat-5E)
- Operating temperature range from -40°C to +75°C
- Full duplex flow control per IEEE Std 802.3X and half duplex back pressure, symmetric and asymmetric
- Shock, vibration and immersion resistant per MIL-STD-810
- Olive drab cadmium plating meets stringent corrosion resistance specifications
- Aluminum connectors and housings are strong, durable and lightweight
- Auto sensing of half or full duplex operation
- 802.1Q VLAN switch with 32K MACs and 4K VLANs
- Push, pop and translate ingress / egress
- Policing with storm control and MC / BC protection
- Hierarchical Quality of Service (QoS)
- Sealed against liquid and solid contaminants
- Shock and vibration resistant
- 28 VDC (16 - 36 VDC) power supply
- Lightweight (< 2 kg)
- Optional 10 G Base-SR optical ports available

Typical Applications

- High speed network communications
- Vehicle network switch

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Viking Series

Viking 5x10/100/1000Base-T Ethernet Switches

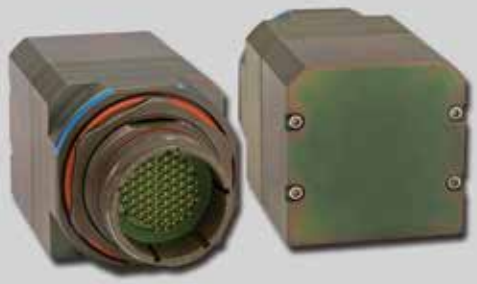
Description

Moog Protokraft Viking series unmanaged Ethernet switches consist of five (5) 10/100/1000Base-T Ethernet switch ports integrated into a wall or floor mounted D38999 connector assembly. The interface to the Viking series switches is a D38999 / 19-35 connector enabling interconnection to external sealed and vibration proof cable assemblies.

Designed to operate in harsh environments, these five port 10/100/1000Base-T unmanaged Ethernet switches feature excellent thermal characteristics, high tolerance to vibration and shock and corrosion resistant housings for exceptional EMI / RFI performance. Standard case operating temperature range is -40°C to +85°C, with a standard storage temperature range of -55°C to +100°C. They operate from +28 VDC power supplies.

Features

- Layer 2 unmanaged Ethernet switch with 5x10/100/1000Base-T switched interface ports
- 5 triple-speed (10/100/1000Base-T) copper Ethernet ports per IEEE 802.3:2005
- MIL-DTL-38999 size 19-35
- Full duplex flow control and half duplex back pressure, symmetric and asymmetric
- Olive drab cadmium plating meets stringent corrosion resistance specifications
- Small size and weight (< 8 oz / 225 g) for simple mounting and installation
- Unmanaged Ethernet switch - no configuration required
- 28 VDC (18 - 36 VDC) power supply - maximum < 5 W
- Shock, vibration and immersion resistant per MIL-STD-810
- Jumbo frame support in all speeds - 10/100/1000Base-T
- Aluminum housings are strong, durable and lightweight
- Cable link distances up to 100 m (EIA / TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Auto sensing of half or full duplex operation
- Sealed against liquid and solid contaminants



Typical Applications

Viking series 10/100/1000Base-T Ethernet switches enable high speed network communications in harsh environments.

- Civil and military vehicle Fast or Gigabit Ethernet networks
- Plug and play operation - no configuration required
- Unmanaged Ethernet switch port multiplication

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Viking Series

4+1x10/100/1000Base-T Ethernet Switches

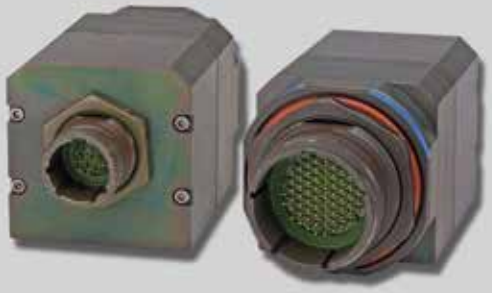
Description

Moog Protokraft Viking series 10/100/1000Base-T unmanaged Ethernet switches consist of 5x 10/100/1000Base-T ports with autonegotiation and auto MDI / MDIX circuitry in a wall or floor mounted inline MIL-DTL-38999 connector assembly. The Viking 4+1 series unmanaged Ethernet switch consists of two Ethernet interfaces for inline port expander / cable consolidation applications. The 4x copper interface of the Viking series 10/100/1000Base-T Ethernet switches is a D38999 size 19-35 connector with 4x IEEE-802.3U:2005 compliant 10/100/1000Base-T Ethernet ports.

The 1x uplink Ethernet electrical interface of the Viking series Ethernet switch is a D38999 size 11-35 connector with 1x IEEE-802.3U:2005 compliant 10/100/1000Base-T Ethernet port and the power supply connections. Designed to operate in harsh environments, these 4+1 port 10/100/1000Base-T unmanaged Ethernet switches feature excellent thermal characteristics, high tolerance to vibration and shock and corrosion resistant housings for exceptional EMI / RFI performance. Standard case operating temperature range is -40°C to +85°C, with a standard storage temperature range of -55°C to +100°C. They operate from +28 VDC military (12 - 36 VDC acceptance) power supplies.

Features

- 4+1 port unmanaged Ethernet switch for 5x10/100/1000Base-T switched interface ports
- Full duplex flow control and half duplex back pressure, symmetric and asymmetric
- Olive drab cadmium plating meets stringent corrosion resistance specifications. Nickel and zinc-nickel plating is also available
- Small size and weight (< 8 oz / 225 g) for simple mounting and installation
- Unmanaged Ethernet switch - no configuration required
- 28 VDC power supply input - maximum < 5 W
- Shock, vibration and immersion resistant per MIL-STD-810
- Jumbo frame support in all speeds - 10/100/1000Base-T
- Aluminum housings are strong, durable and lightweight
- Cable link distances up to 100 m (EIA / TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Auto sensing of half or full duplex operation



Typical Applications

- Civil and military vehicle Fast or Gigabit Ethernet networks
- Plug and play operation - no configuration required
- Unmanaged Ethernet switch port multiplication

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Viking Series

4+2 Port Copper + Fiber Ethernet Switches

Description

Moog Protokraft Viking series 4+2 port Copper + Fiber Ethernet switches consist of 4x 10/100/1000Base-T ports with autonegotiation and auto MDI / MDIX circuitry plus 2x 100Base-FX or 1000Base-SX ports in a wall or floor mounted inline MIL-DTL-38999 connector assembly.

The Viking series 4+2 port Copper+Fiber Ethernet switch consists of two Ethernet interfaces for inline port cable consolidation applications. The Copper interface of the Viking series 4+2 port Copper + Fiber switches is a D38999 size 19-35 connector with 4x IEEE-802.3U:2005 compliant 10/100/1000Base-T Ethernet ports plus the 28 VDC power supply input pins. The fiber optic interface of the Viking series 4+2 port Copper + Fiber Ethernet switch is a D38999 size 19-11 connector with 2x 100Base-FX or 1000Base-SX fiber optic Ethernet ports. Designed to operate in harsh environments, these 4+2 port Fiber + Copper Ethernet switches feature excellent thermal characteristics, high tolerance to vibration and shock and corrosion resistant housings for exceptional EMI / RFI performance. Standard case operating temperature range is -40°C to +85°C, with a standard storage temperature range of -55°C to +100°C. They operate from +28 VDC power supplies.

Features

- Copper + Fiber Ethernet switch for 4x10/100/1000Base-T + 2x100Base-FX or 1000Base-SX switched ports
- 4x auto-negotiable 10/100/1000Base-T Ethernet ports
- Unmanaged Ethernet switch in an aluminum housing with D38999 connector interfaces
- Olive drab cadmium or nickel plating meets stringent corrosion resistance specifications
- Small size and weight (< 8 oz / 225 g) for simple mounting and installation
- Unmanaged Ethernet switch - no configuration required
- MIL-DTL-38999 / 19-35 / 11 sealed electrical connector interfaces
- 28 VDC (18 - 36 VDC) power supply - maximum < 8 W
- Shock, vibration and immersion resistant per MIL-STD-810F
- Aluminum alloy housings are strong, durable and lightweight
- UTP Cable link distances up to 100 m (EIA / TIA Cat-5E)
- Multimode fiber cable link distances up to 2 km
- Operating temperature range from -40°C to +85°C
- Auto sensing of half or full duplex operation
- EMI resistant configuration available

Typical Applications

- Civil and military vehicle Fast or Gigabit Ethernet networks
- Plug and play operation - no configuration required
- Unmanaged Ethernet switch port multiplication

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Viking Series

4x10/100/1000Base-T and 1x1000Base-BX Ethernet Switches

Description

Moog Protokraft Viking series 4 and 1 Ethernet switches consist of 4x10/100/1000Base-T ports plus 1x1000Base-BX-U / D port in a wall or floor mounted inline MIL-DTL-38999 connector assembly.

The Viking series Ethernet switch offers two separate D38999 Ethernet connector interfaces. The Ethernet copper interface is a D38999 / 19-35 with 4x10/100/1000Base-T Ethernet ports compliant with IEEE-802.3U:2005 plus the 28 VDC interface.

The Ethernet Fiber interface is a D38999 / 09-01 with 1x1000Base-BXU / D Ethernet fiber optic port per IEEE-802.3U:2005 for single fiber links offer solutions for up to 80 km.

The Viking 4+1 port single fiber Ethernet switch is a highly integrated and extremely rugged solution for harsh environment networking applications. Its small size, lightweight and low power requirements make it an excellent fit for next generation networks.

Features

- 5 port Gigabit Ethernet switch in an aluminum housing with D38999 connector interfaces
- 4x10/100/1000Base-T non-blocking wire speed copper Ethernet ports per IEEE 802.3:2005
- 1x1000Base-BX-D / U single fiber Ethernet port per IEE 802.3:2005
- Compact size and lightweight (<1 kg) for simple mounting and installation
- Electrical cable links up to 100 m (EIA / TIA Cat-5E)
- Fiber optic link distances up to 80 km over 9/125 µm SMF single fiber
  optical cables per IEEE 802.3:2005
- D38999 / 19-35 sealed cylindrical electrical connector interface
- Operating temperature range from -40°C to +85°C
- Single fiber ELIO® connector interface per EN4531 / 3645 / 4626 ARINC 801
- 28 VDC (18 - 36 VDC) power supply - maximum < 8 W
- Shock, vibration and immersion resistant per MIL-STD 810
- Olive drab cadmium, nickel and zinc-nickel plating meets stringent corrosion resistance performance specifications.
- Aluminum connector shells and housing are strong, durable and lightweight

Typical Applications

- Civil and military vehicle networking
- Aerospace and naval platform networks
- Unmanaged Ethernet switch applications
- Undersea to surface data transmission
- Turret application
- Ethernet transmission through a single fiber optic rotary joint

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

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Data Concentrators

The Moog Protokraft Spyder product platform is an FPGA based data aggregation and transmission solution designed for rugged/military applications where large amounts of mixed signal data need to be aggregated, transcoded, converted and/or compressed before being transmitted. As with all Protokraft solutions, the Spyder is ideally suited for harsh environment applications where small size, light weight and integrated DC power conditioning are required.

Spyder Series

Data Concentrator

Description

The Moog Protokraft Spyder combines the functions of a data concentrator, serial server, mixed signal multiplexer and media converter into a flexible, powerful data aggregation and transmission engine. Because the Moog Protokraft Spyder is a flexible FPGA based solution, it can be quickly and easily tailored to any number of specific applications. With over 100 input channels available, up to 8 discrete output channels available, and a maximum aggregate data transmission rate of over 80 Gbps, the Moog Protokraft Spyder is ready to handle your most challenging data aggregation and transmission requirements.

Features

- 28 VDC power supply per MIL-STD-704
- Built-in-test capabilities available
- H.264 compression available
- Optional encryption of the signal per AES (Advanced Encryption Standard)
- Aggregated signal media converter in a rugged aluminum housing
- 19 inch or wall mount chassis options

Input (electrical):

- Video: DVI, HD-SDI, 3G-SDI, CameraLink, NTSC/PAL, RS-170, CoaXPress and others
- USB: 2.0 and 3.0
- Serial: (RS232, RS422 or RS485 or a mixture)
- Ethernet: Gigabit and 10 Gigabit
- Discrete: 28 V @ 300 mA or 5 V @ 85 mA
- Audio channel: digital or analog with transient protection and noise filtering
- Consult factory for additional signal capabilities

Output (optical):

- Up to 8x optical output @ up to 10 Gbps, MM or SM, CWDM possible

Other packaging options available

Typical Applications

- UAV
- EOIR sensors
- Platform communications system upgrades

Video Media Converters

Moog Protokraft has designed video media converters to easily extend the link length of typical video signals in rugged applications, such as military, avionics and other rugged industrial applications. Currently supported protocols are ARINC 818, DVI, SMPTE 424 (3 G-SDI), RS-170 and base mode camera link, but other protocols are in design.

- Optical conversion of DVI, ARINC818, Camera Link, HD-SDI and 3G-SDI
- Video transcoding to GbE
- Shock, vibration and immersion resistant per MIL-STD-810
- Operating temperature range from -40°C to +85°C
- Aluminum connectors and housings are reliable, durable and lightweight
- Copper cable link distances up to 100 m (EIA / TIA Cat-5E)
- Optical fiber link distances up to 300 m (50 / 125 µm 2000 MHz*Km MMF)
- Multiple plating options to meet application-specific corrosion resistance requirements

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Eagle Series

H.264 Video Compression Transcoder

Description

Moog Protokraft Eagle series 2xRS-170 to Ethernet converters grab images from 2xRS-170 sources and converts them to the Ethernet protocol and could compress them using H.264 for efficient video transport and distribution over Ethernet networks. These operations are performed with very low latency and jitter at the full GbE line rate.

Eagle series 2xRS-170 to Ethernet converters consist of1x10/100/1000 Base-T port and 2xRS-170 ports in a wall or floor mounted inline MIL-DTL-38999 connector assembly.

Eagle series 2xRS-170 to Ethernet converters enable high resolution video transmission over Ethernet networks in harsh environments. The MIL-DTL-38999, series III shells provide sealed interfaces that are water-tight to MIL-STD-810 when mated.

Features

- Compatible with NTSC PAL CCIR RS-170 cameras
- Supports multiple resolutions and frame rates
- H.264/MPEG-4 AVC
- Encoder latency less than 75 ms (per video channel)
- Supports unconditional streaming via ISO / IEC / 1318-1 MPEG2
- Supports IEEE 802.3 (Ethernet) UDP - unicast or multicast
- Ethernet copper cable link distances up to 100 m (EIA / TIA Cat-5E)
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810
- Aluminum D38999 connector shells and housing are strong, durable and lightweight
- Low power consumption < 7 W
- Designed to MIL-STD-810G and MIL-STD-461F

Typical Applications

- Civil and military vehicle video networking
- Surveillance

Note: Please consult the Moog Protokraft website for more configurations

Falcon Series

Dual DVI Fiber Optic Link Extenders

Description

Moog Protokraft Falcon series dual DVI fiber optic transmitters or receivers consist of optoelectronic transmitter or receiver functions integrated into a bulkhead mounted MIL-DTL-38999 connector assembly. The optical transmitters are high output 850 nm VCSEL's.The optical receivers consist of PIN and preamplifier assemblies and limiting postamplifiers for an easy link extension via fiber optics up to 500 m.

The electrical interface to the Falcon series dual 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.

Features

- Optical fiber link distances up to 500 m
- 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 corrosion performance specifications
- Aluminum alloy enclosure and D38999 shells are strong, durable, corrosion resistant and lightweight
- MIL-T-29504 compliant optical fiber connector interface
- D38999 / Quadrax interface provides robust interconnection to internal chassis wiring or backbone
- Sealed against liquid and solid contaminants
- Shock and vibration resistant
- 28 VDC (16 - 32 VDC) power supply

Typical Applications

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

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

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Kestrel Series

Fiber Optic Link Extenders

Description

Moog Protokraft Kestrel series 4xSMPTE 424M (3G-SDI) or 1xDVI fiber optic link extenders consist of optoelectronic conversion functions integrated into a wall or floor mounted MIL-DTL-38999 connector assembly. The optical transmitters are high output 850 nm VCSEL's. The optical receivers consist of GaAs PIN and preamplifier assemblies and limiting postamplifiers. The electrical connector interface to the Kestrel is a D38999 / 19-18 Quadrax connector enabling interconnection to a standard SMPTE 424M or DVI connector interface with a Quadrax cable adaptor. The optical connector interface is a EN4531 / 3645 compliant, vibration hard fiber interface.

Kestrel series fiber optic link extenders use vibration isolated, environmentally hardened components that are designed for use in harsh environment applications.

Features

- Supports 4xSMPTE424 or 1xDVI
- Optical fiber link distances up to 500 m
- Operating temperature range from -40°C to +85°C
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Aluminum alloy enclosure and MIL-DTL-38999 shells are strong, durable, corrosion resistant and lightweight
- EN4531 / 3645 compliant optical fiber connector interface
- D38999 / Quadrax electrical interface provides robust interconnection to platform wiring
- Sealed against liquid and solid contaminants
- Shock and vibration resistant
- 28 VDC (16 - 36 VDC) power supply

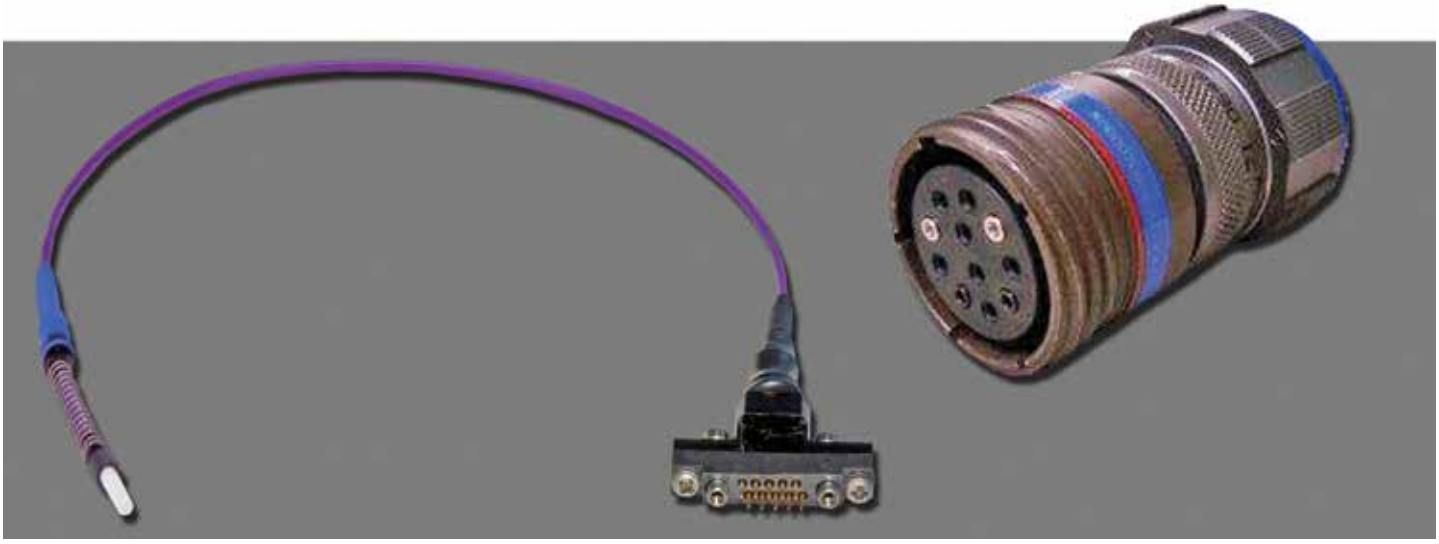
Typical Applications

Kestrel series wall or floor mounted 4xSMTPE 424M (3G-SDI) and DVI fiber optic link extenders enable high speed video transmission over long distances in harsh environments.

- Fiber optic link extension
- Remote camera clusters
- Alternative camera configurations
- Remote display applications (DVI copper links limited to 10 m)

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Interface Adapters



Moog Protokraft's interface adapters are designed for an easy but rugged link extension of serial, parallel or other data formats in military, avionics and other harsh industrial environments.

- Designed for use in harshest environments
- Packed in backshell of military / avionics connectors or designed as active cable
- Link extension, media conversion, protocol transcoding and multiplexing options
- Supports data rates up to 10 Gbps
- Different link length options available
- Small, lightweight and power efficient though still rugged
- Available in olive drab cadmium, zinc-nickel or nickel plating
- Shock, vibration and immersion resistant per MIL-STD-810 and MIL-STD-1344
- Operating temperature range from -40°C to +85°C

Cobra Series

Active Optoelectronic Cable Assemblies

Description

Moog Protokraft Cobra series active optoelectronic cable assemblies consist of optoelectronic transmitter and receiver functions integrated into an environmentally sealed unit with a D38999 / 26xB35PN electrical connector interface. The D38999 electrical interface to the Cobra series enables the use of high speed fiber optic cable links in applications exposed to extremely harsh environments.

The electrical D38999 size 11-35 connector provides a rugged electrical interface that does not require cleaning or maintenance in order to perform in harsh environments. Signal conversion is done in the backshell of the electrical connector. The multimode or single mode optical fiber cable supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadrax copper conductors unacceptable.

Features

- Optical fiber link distances up to 10 km
- Operating temperature range from -55°C to +85°C
- Shock, vibration, EMI and ESD resistant per MIL-STD-810
- Options for zinc-nickel, olive drab cadmium or electroless nickel plating
- Aluminum alloy backshell and connectors are strong, durable and corrosion resistant
- D38999 / 26xB35PN standard electrical connector interface for maintenance free interconnections
- Easily adaptable to other connector interfaces

Typical Applications

Our active cables offer easy long distance transmission in harsh environment networks. Data aggregation of several signals, media converter or transcoding is available in different designs.

- Fast or Gigabit Ethernet switches and peripherals
- Fiber Channel switches and peripherals
- ARINC 818 video
- sFPDP data links
- PCIe
- RS-422
- USB
- HOTlink

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Gemini Series

Media Interface Adapters

Description

Moog Protokraft Gemini series media interface adapters consist of optoelectronic transmitter and receiver functions integrated into a bulkhead mounted MIL-DTL-38999, series III receptacle connector assembly. The optical transmitters are 850 nm VCSEL or 1310 nm FP lasers.

The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL laser drivers convert the transmitter input signals to suitable VCSEL laser bias and modulation currents. The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines and single ended CMOS indicator functions on the Loss of Signal (LOS) lines. A CMOS fault signal is generated on the TX Fault line by the module controller upon any monitored internal optical or electrical fault condition. The receiver data lines are squelched upon LOS assertion, preventing errant data packet generation when an invalid incoming optical signal is presented to the transceiver. The electrical interface to the Gemini series optical transceiver adapters is a MIL-DTL-38999 series III plug connector with 66 size 22 electrical contacts.

Features

- Compliant with ANSI Fiber Channel FC-PI / PI-2 and IEEE 802.3:2005 Gigabit Ethernet
- Compliant with ANSI / VITA 17.1 sFPDP @ 2.5 Gbps
- Optical fiber link distances up to 550 meters (50 / 125 µm - 500 MHz Km MMF)
- Maximum optical channel bit error rate less than $1x10^{-12}$
- 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 over nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy MIL-DTL-38999 housings are strong, durable, corrosion resistant and lightweight
- MIL-T-29504 or LC (SMF or MMF) compliant optical fiber connector interface
- Sealed against liquid and solid contaminants
- MIL-D38999 or sealed RJ-45 electrical connector interface
- Shock and vibration resistant

Typical Applications

Gemini series optical adapters enable high speed network communications over long distances in harsh environments.

- 10/100/1000Base-T Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Proteus Series

Media Interface Adapters

Description

Moog Protokraft Proteus series media interface adapters consist of optoelectronic transmitter and receiver functions integrated into an external bulkhead mounted MIL-DTL-38999, Series III receptacle connector assembly. The optical transmitters are 850 nm VCSEL lasers.

The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents. The optical receivers consist of PIN and preamplifier assemblies and limiting post-amplifiers. Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines. The electrical interface to the Proteus series is a D38999 19-18 connector with 4 Quadrax contacts.

Typical Applications

Proteus series optical transceiver adapters enable high speed network communications over long distances in harsh environments.

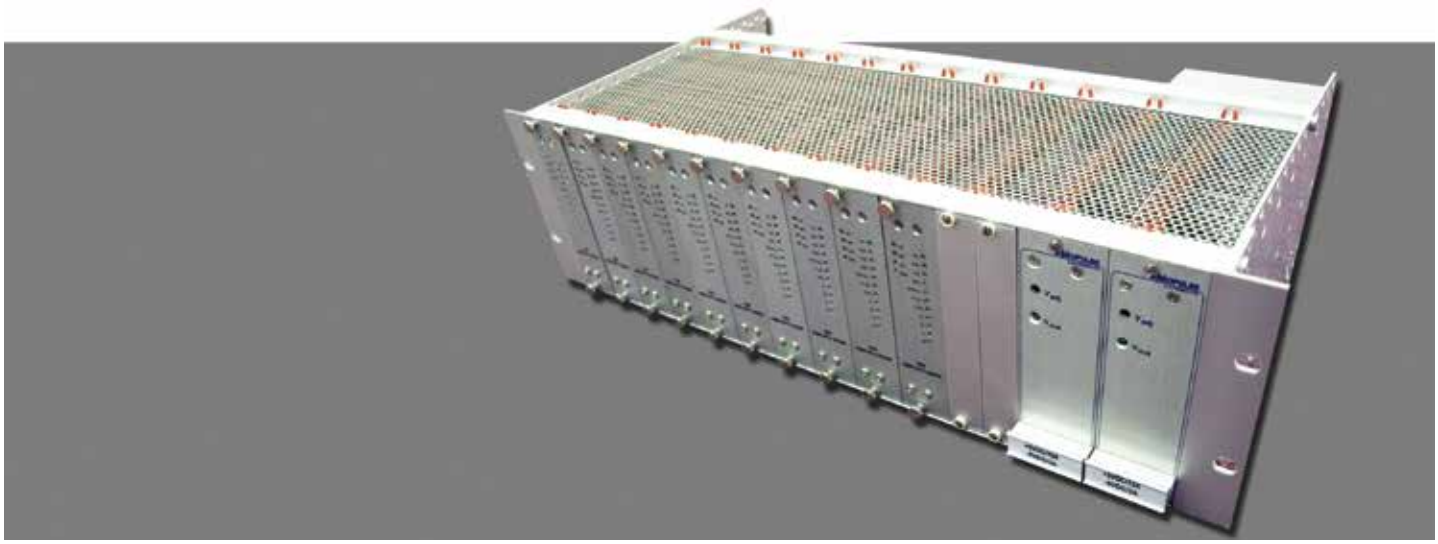
- Fiber Channel, sFPDP or Gigabit Ethernet switches and peripherals
- Telecom and datacom switch / router rack-to-rack links
- Storage or computation clusters

Features

- Compliant with ANSI Fiber Channel FC-PI / PI-2 and IEEE-802.3:2005 Gigabit Ethernet
- Compliant with ANSI / VITA 17.1 sFPDP @ 3.2 Gbps
- Optical fiber link distances up to 550 m (50 / 125 µm - 500 MHz *Km MMF)
- Applications from 100 Mbps to 3.2 Gbps
- Maximum optical channel bit error rate less than $1x10^{-12}$
- 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 over nickel plating meets stringent EMI / RFI performance specifications
- Aluminum alloy MIL-DTL-38999 housings are strong, durable, corrosion resistant and lightweight
- MIL-T-29504 compliant optical fiber connector interface
- Sealed against liquid and solid contaminants
- Shock and vibration resistant
- Multiple plating options to meet application-specific corrosion resistance requirements

Note: Other wavelength, mounting and port count options are available. Please consult the Moog Protokraft website for more configurations.

Rack Mount Systems



Moog Protokraft designs 3U 19-inch rack based systems that allows the user to select I/O cards that meet satcom data, timing and specialty requirements. The design allows for field upgrades and additions by simply adding or swapping the interface cards in the rack. Compact size, flexible configuration, field upgradability and specialty I/O are benefits of this system approach.

Satcom Data Modem System
3U 19-inch rack

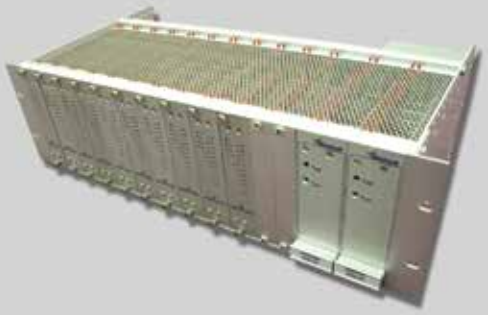
Description
Moog tactical fiber optic modems can be integrated into an LRU system utilizing our 3U 19-inch rack with integrated power supplies. This allows the users to select a set of up to 10 LRUs that meet their specific data, timing and network requirements. The design allows for field upgrades and additions by simply adding or swapping the LRUs in the rack. Compact size, flexible configuration, field upgradability and specialty I/O are benefits of the system.

Features
- 19-inch 3U rack with room for 10 LRUs
- Dual redundant power supplies
- Audible power supply fault warning
- Singlemode and multimode options
- Long and short reach transmission options
- Hot swappable LRUs
- Field upgradable
- Real-time remote diagnostics for all modems in the system

Diagnostics
Each LRU in the system is designed with an on-board processor that monitors and reports the status of key modem functions. The data is collected via a RS-485 multi-drop network or via Ethernet (TCP / IP or SNMP) and presented to the user via provided GUI or web page.

The system offers the following standard fiber optic LRUs:

- 20 Mbps RS-422 / RS-530 data
- 52 Mbps HSSI data
- 4 port 10 / 100 / 1000 Ethernet Switch
- L-Band
- X-Band
- C-Band
- K-Band
- MD1272 / G data (with NRZ and CDP capability)
- 1 PPS GPS timing
- 10 MHz timing
- DS3
- Bi-directional audio (PTT optional)
- Video (NTSC, PAL and HD-SDI)
- RS-232 serial data
- RS-485 serial data
- System status card with RS-485 network
- System status card with Ethernet output



Typical Applications
- Satcom / datacom telemetry
- Mobile communications systems
- Remote antenna telemetry

Fiber Optic Modems

The family of Fiber Optic Modems (FOMs) provide electrical to optical conversion of electronic communication and data signals for transmission using tactical fiber optic cable assemblies. The FOMs simultaneously receive incoming optical signals and converts them back to the original electronic signals allowing for full duplex transmission.

Together with the tactical fiber optic cables, the FOMs provide a rugged, secure and easily deployable optical link. The FOM is available in both single channel and multi-channel configurations and can be mounted on the Signal Entry Panel (SEP) of tactical shelters, in 19 inch racks or placed on the ground (multi-channel versions only).

- Lighter weight and smaller size for much quicker deployment
- Higher bandwidth for increased throughput
- Lower loss for long distance repeaterless communication up to 16 km
- Better quality-safe from electromagnetic interference from any source
- More secure - no electromagnetic signature
- Less expensive

Single Channel Fiber Optic Modems (FOMs)

Description

The single channel Fiber Optic Modem (FOM) is currently available in four standards based communications interfaces: standard NRZ, conditioned diphase, DS3, MD1272 / G and IP (internet protocol). These modems transmit up to 60 km without a repeater depending on model. The single channel FOMs are designed to mount on the Signal Entry Panel (SEP) of the tactical communication shelters or they can be installed in a rack mount panel. FOMs are available with various tactical fiber optic connectors, including TFOCA, *TFOCA-II™ and expanded beam.

Multi-Channel Fiber Optic Modems (FOMs)

Description

The multi-channel Fiber Optic Modem (FOM) is available in E1 (ITU 9.703) and EuroCom D/1 interface B. They accept multiple electrical inputs which are multiplexed and converted to a single optical signal for full duplex transmission over the fiber optic cable. The multi-channel FOMs are available with either singlemode (E1 only) or multimode transmitters. Multimode FOMs transmit up to 32 km with a repeater. Singlemode FOMs transmit up to 60 km using 2 km cable assemblies. The multi-channel FOMs are packaged in a rugged transit case that can either be placed on the ground or rack mounted with available adapter plates. The all-weather design allows for exposure to harsh environments without affecting performance or reliability.

Drop / Add Repeaters**

The EuroFOM-B / RPT drop/add repeater allows the user to separate or “drop” one of the original signals from the optical link at any point in the link. The dropped signal is converted back to the original electronic format for transmission to user equipment. The user can replace or “add” a new electronic signal providing the data rate does not exceed that of the dropped signal or the maximum data rate of the link. As the name implies, the unit also performs a repeater function, extending the link up to an additional 16 km.

Typical Applications

- Interconnect tactical communication assemblages including:
  - Radio terminals
  - Radio repeaters
  - Tactical switches
  - Circuit switches
  - Tactical multiplexers
  - Satellite support radios
  - TACC shelters
- Tactical communication systems
- Down the hill links
- Intra-node cabling
- Dispersed command post
- Digital orderwire equipment

**TFOCA-II is a registered trademark of Amphenol Fiber Systems International*
*** Applicable for the multimode EuroFOM-B/4 Model FOMs only*

Euro Fiber Optic Modem E1 / 16 Singlemode (SM)

Description

The 108600 is a rugged, lightweight tranmission unit for EuroCom networks, that converts digital signals from EuroCom A/B to EuroCom C and visa versa. It is used when the distance between relevant equipment units is too long for EuroCom A/B transmissions, or when standard cable lengths are too short. It is also used when equipment units with different interface types are to be connected. The TDM bit-rate can be selected between 256, 512, 1024 or 2048 Kbps. When transmitting at the highest bit-rate (2048 Kbps) and with the use of a dry field cable, the cable length can be up to 1 km. At lower bit-rates, the cable length may be increased.

Line Terminating Unit (LTU)

Description

The 108600 converts digital signals from EuroCom A/B to EuroCom C and visa versa. It is used when the distance between relevant equipment units is too long for EuroCom A/B transmissions. It is also used when equipment units with different interface types are to be connected. The TDM bit-rate can be selected between 256, 512, 1024 or 2048 Kbps. When transmitting at the highest bit rate (2048 Kbps) and with the use of a dry field cable, the cable length can be up to 1 km.

The 108700-01 unit utilizes time division multiplexing to convert up to four duplex EuroCom D/1 “B” interfaces to a single switchselectable choice of EuroCom D/1 interface C, or E1 per ITU G.703. It is rack mountable and suitable for either mobile or fixed installations. The LTU is also suited for applications where the distance between equipment units is too long for EuroCom D/1 interface B transmissions or when standard cable lengths are too short. Additionally it is used in applications where equipment units with different interface types are to be connected. The LTU is powered by 24 VDC. A 2-wire, 16 kbps engineered orderwire (EuroCom “F” EOW) capability is provided.

The 108700-02 LTU-V.35 coverts the clock, data, control and handshaking signals of a single ITU-T V.35 interface to EuroCom D/1 interface C. It is rack mountable and suitable for either mobile or fixed installations. The LTU-V.35 is suitable for applications where the distance between equipment units is too long for ITU-T V.35 transmissions. The LTU is powered by 24 VDC.

Typical Applications

- Interconnect tactical communication assemblages including - TACC shelters
- Tactical communication systems
- Down the hill links
- Intra-node cabling
- Dispersed command post
- Digital orderwire equipment

Notes

Notes



Moog meets the demands of today's defense operations with motion control components, integrated subsystems and full systems. Military forces around the globe trust Moog with speed of delivery, absolute reliability and lasting performance. Engineering expertise, rapid prototyping, modeling, and complex integration are some of the capabilities that allow Moog to tailor design solutions to meet your exact specifications.

Rotary Joints and Slip Rings

These high performance components are used in systems that require unrestrained, continuous rotation while transmitting power, data and media from a stationary device to a rotating structure. High bandwidth options include Ethernet, high definition video and other industry standard formats. Moog also has solutions including fiber optic rotary joints and position encoders.

Direct Drive DC Torque Motors and Alternators

Frameless torque motors are used in defense applications that require high power density and quick accelerations. The motors are optimized to minimize input power for maximum efficiency. Alternators in the same mechanical configuration can be used for mobile power generation.

Position Sensors

Moog offers several position sensor product lines that provide highly accurate, repeatable position sensing in robust, compact designs. The Rotary Variable Differential Transformer (RVDT) is available in housed and frameless models. Synchros and resolvers are available in both standard servo frame sizes and pancake solutions.

Actuators

Multi-purpose actuators are available in both rotary and linear configurations and are standard building blocks in a variety of systems. These actuators are used on air, ground and unmanned applications.

Fiber Optic Solutions

Moog provides reliable fiber optic transmission of video and data signals in robust defense systems, demanding subsea communications, and other platforms operating in harsh environments. Products include multiplexers, media converters, switches, and optical transceivers in various configurations.

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