MOOG

Subsea Oilfield Communications

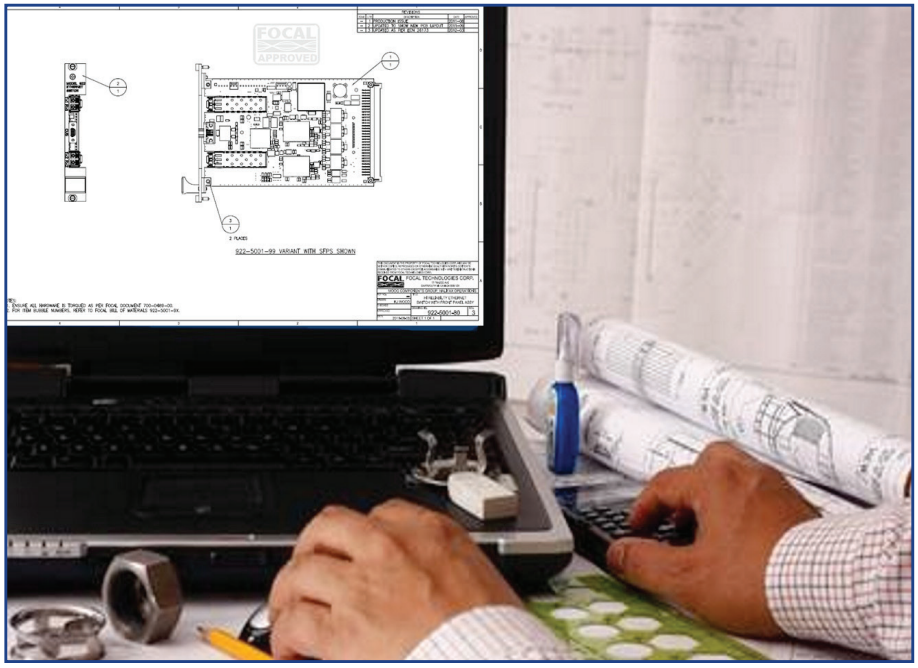
Field-Proven and Qualified Electronics Solutions

FOCAL™

Heritage

For **over 30 years**, Focal Technologies, a Moog Inc. company, has been providing marine swivels, marine electronics, condition monitoring and ancillary equipment specifically **designed, built, tested and certified for long term deployment in harsh marine environments.**

Moog Focal specializes in providing **electrical slip rings**, **fiber optic rotary joints**, **hydraulic utility swivels** and **fiber optic multiplexer solutions** for the worldwide marine industry including ROV, seismic, FPSO turret and oceanographic applications.



Robust and highly reliable subsea communication systems are required to safely and efficiently control a wide range of subsea applications from **Blow Out Preventer (BOP) controls to subsea processing and well-head instrumentation.** We provide both standard and customized systems for critical subsea applications with options for card-level and packaged solutions.

Moog Focal has been ISO 9001 certified since 1993, and therefore you can have confidence that all of our products are designed and built under the close scrutiny of a continuously improving quality system. As a part of Moog, Focal has access to a large global support network and decades of experience delivering custom integrated and **proven products for the harshest marine environments in the world.**

Key Capabilities

Moog Focal specializes in robust subsea optical and copper Ethernet for Subsea Oilfield Communications (SOC). Unlike industrial offerings, Focal products are specifically **designed and qualified for permanent subsea installation** and address key application requirements expected of subsea projects:

API/ISO Qualified - Focal products are designed, qualified, and screened to meet the latest subsea industry standards, including API 17F and ISO 13628-6.

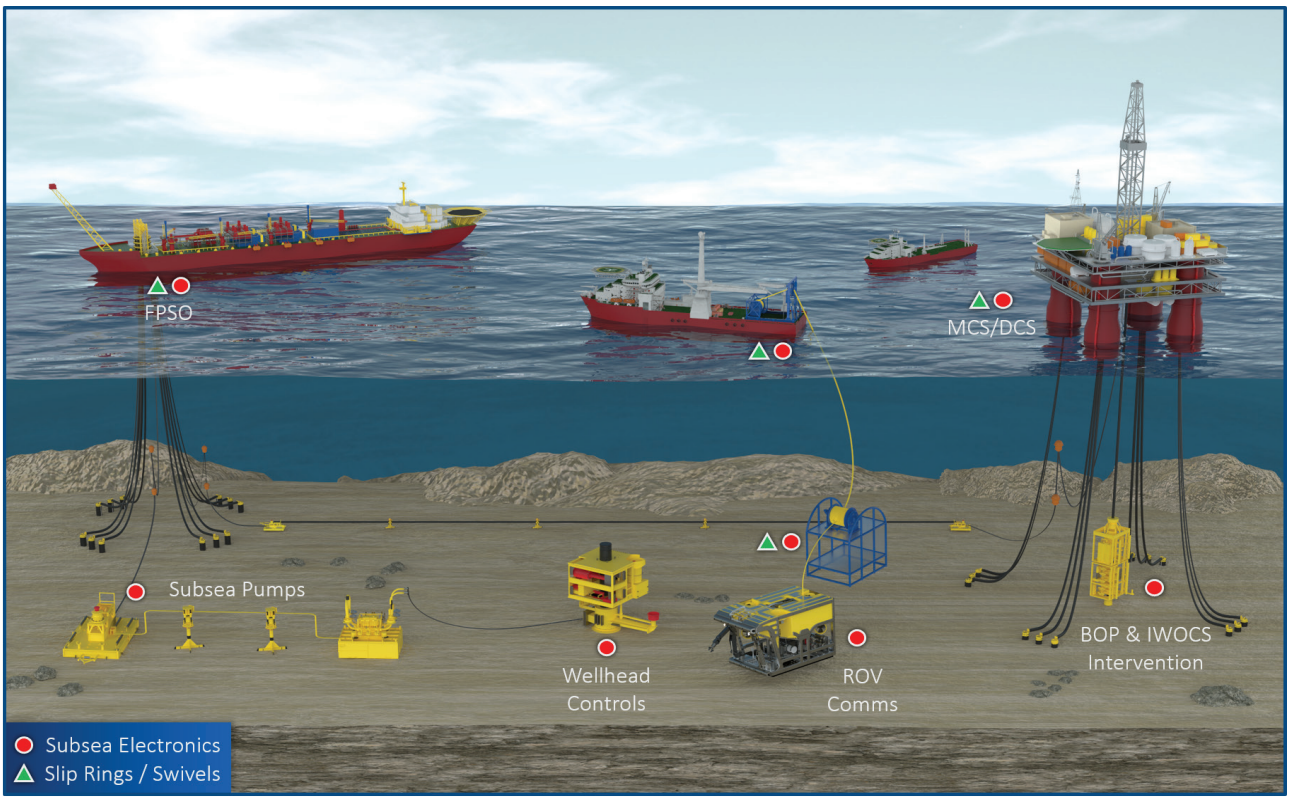
Locked BOMs - Bills of Materials (BOMs) are locked down with full product and part level traceability.

Availability - Focal designed products with proven high reliability components sourced from approved vendors and selected for long term availability.

Environmental Screening Program - All products pass factory acceptance tests at temperature extremes, typically with environmental stress screening programs. All build and test documentation is provided with each shipment.

Design Documentation - Focal provides extensive documentation, design and qualification test reports, as well as product design analyses. Projects are supported by a comprehensive project management group.

Customization - Unique form factors, connectors, I/O formats, thermal management, diagnostics, and user software, allowing easy integration of our proven designs into existing customer systems.

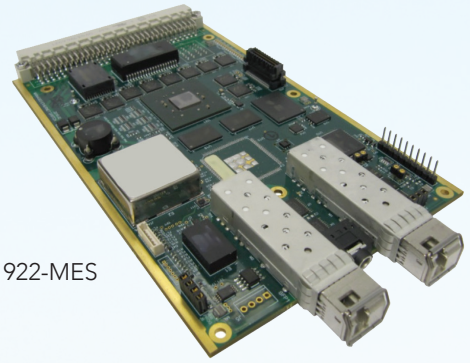


Product Offerings

Ethernet Switches, Fiber Modems and Optical Transceivers

Layer-2 managed Ethernet switches (10/100/1000M) with dual optical links and fallback to copper links plus qualified subsea optical transceivers supporting CWDM configurations, bidirectional operation on single fibers, and long haul step outs up to 200 km.

922-FOM: 7-port, 10/100M Ethernet Fiber Modem and Lightly Managed Switch
922-MES: 10-port, 10/100/1000M Ethernet Fiber Modem and Managed Switch



922-MES

Long Range Copper Modems

High speed (SHDSL) copper modems with extended step outs, multiple media support (twisted pair, power lines, copper/optical Ethernet), and integrated serial servers.

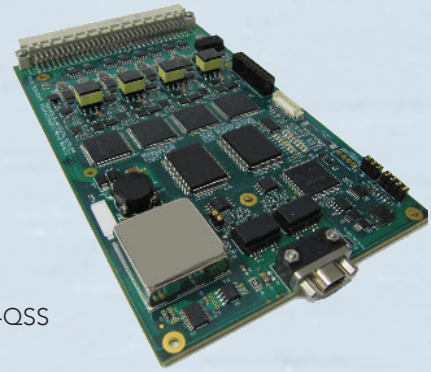
922-DSL: DSL/Fiber Hybrid Ethernet Modem with Integrated Serial Server
922-PLM: Power Line Modem with Ethernet Interface and Integrated Serial Server

922-DSL

Gateways and I/O Modules

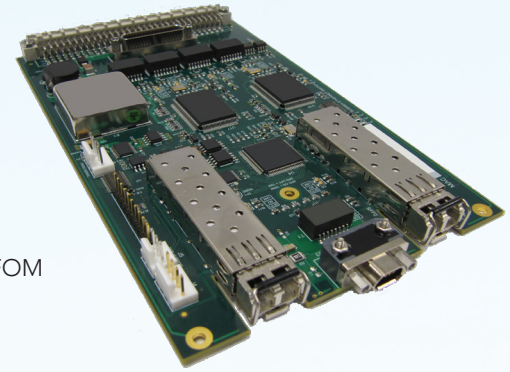
SIIS/IWIS compatible serial-to-Ethernet and analog-to-Ethernet gateways for easy conversion of sensors to modern Ethernet-based control systems or transmission of IP data over existing serial telemetry links.

922-QSS: 4-Channel Serial Server (e.g. RS-422, CAN Bus) with Integrated 3-Port Ethernet Switch
922-420: 8-Channel Analog Input (e.g. 4-20 mA) Gateway with Integrated 3-Port Ethernet Switch
922-SVD: 24-Channel Solenoid Valve Driver with Integrated 3-Port Ethernet Switch



922-QSS

Applications: Production Controls, Drilling/BOP Controls, Wellhead Communications, Brownfield Retrofits, Subsea Factories, IWOCS, OEM Subsea Tools/Equipment (Pump Controls, Multi Phase Flow Meters, Chemical Injection, Well stimulation etc.) and Sensor Nodes.



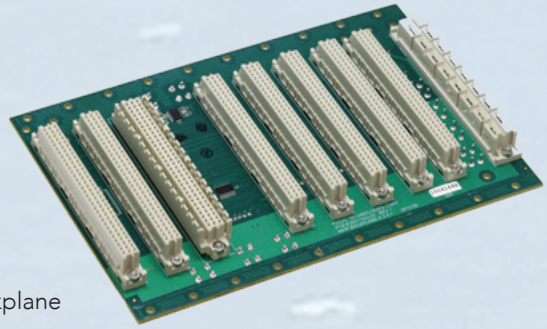
922-FOM

Serial Digital I/O

- RS-232 / 422 / 485, CAN Bus, 4-20 mA
- PPP to IP gateway
- Modbus TCP-RTU
- Serial UDP

Analog I/O

- Remote and local valve control
- IP connectivity
- Advanced condition monitoring
- Pressure tolerant options available



922-Backplane

Communication

- DSL up to 6 km or 15 Mbps
- Fiber up to 200 km
- Power line modem
- Integrated serial gateway and Ethernet switch

Ethernet

- Up to 10-ports
- Layer-2
- RSTP, MRP, PRP, HSR, IEEE-1588
- Remote FW upgrade

922-SFPs

Accessories

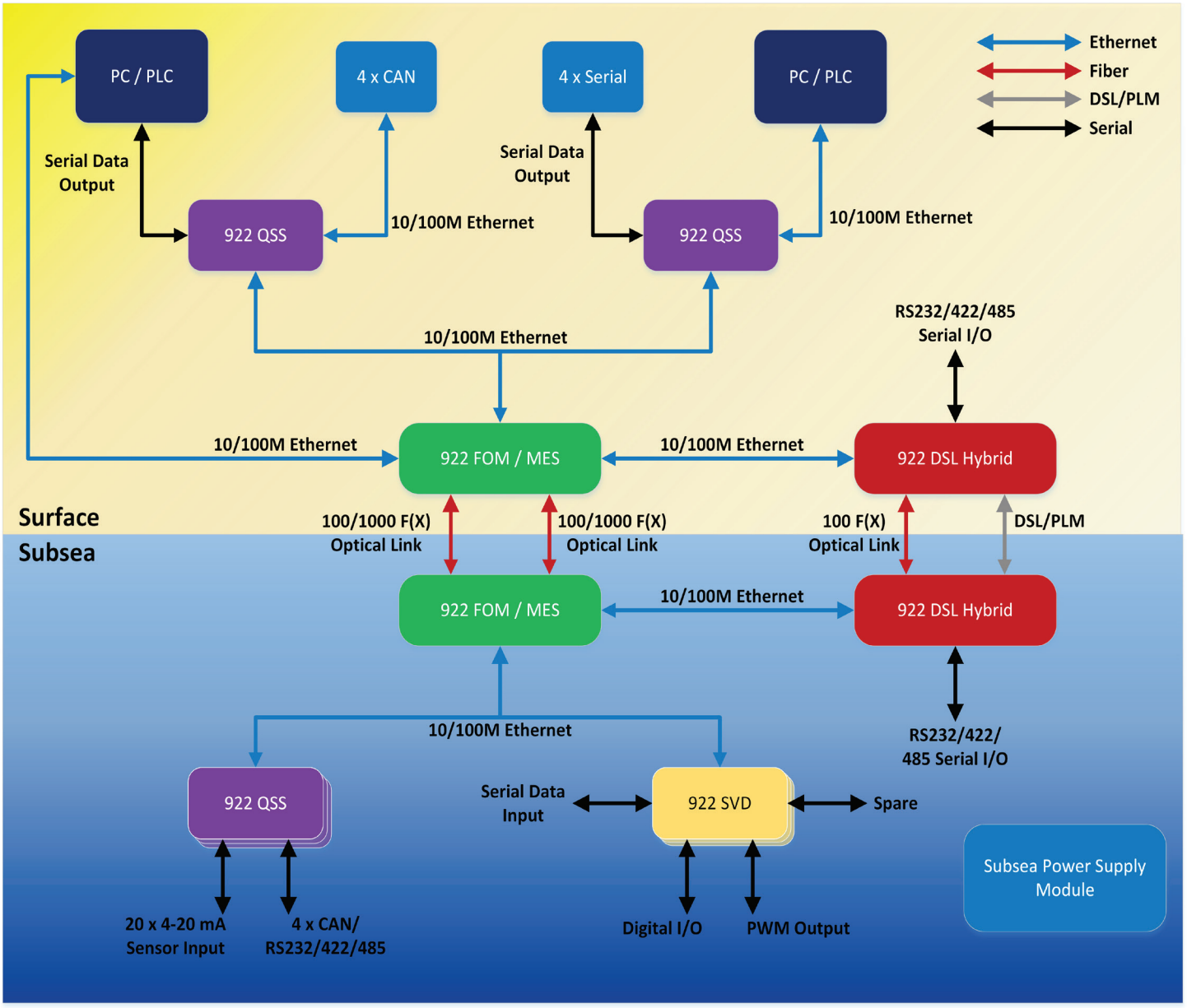
- Backplanes and card racks
- Subsea power supplies
- Qualified optical couplers
- Pressure tolerant devices
- 1 ATM or pressure balanced enclosures

Products

Focal's Model 922 family of subsea controls electronics cards are designed to support subsea installation with many critical requirements:

- Reliable continuous operation for **> 20 years** in subsea applications
- Q1 qualification to **API 17F and ISO 13628-6** with extended testing options available
- Low power design with conductive cooling to extend operating life
- **SIIS compatible** signal interfaces for levels I, II, and III
- **Remote firmware updates** using a robust protocol with verification and failsafe backup
- Extensive **diagnostics** (e.g. temp, voltage, error counters) via Modbus TCP, web-server and Telnet

Network Diagram



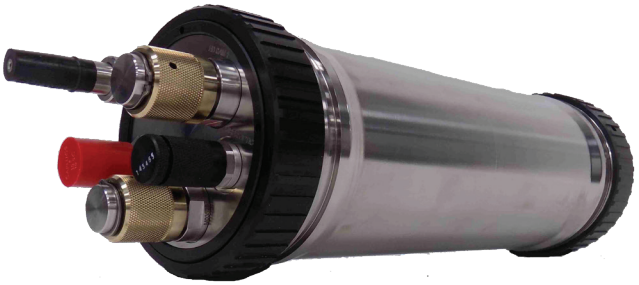
- Qualified and screened (ESS) per ISO 13628-6 / API 17F for temperature, shock and vibration
- Robust, fault-tolerant design for high reliability applications
- MTBF > 400,000 hours, verified with Accelerated Life Testing (ALT) and field data
- Robust remote firmware update with multi stage verification and backup factory image
- Extensive industry leading diagnostics via CLI, Modbus TCP, TELNET, web-server
- Product Life-Cycle Management with full traceability of all components

Systems and Support

Moog Focal offers **high quality**, **cost competitive** and **qualified solutions** for subsea processing, BOP controls and drilling applications. Our OEM solutions are based on modular qualified building blocks to save engineering and validation time, thereby reducing costs, risks and time to market. Moog Focal's responsive and collaborative engineering group provides system level design services and ongoing technical support.

Subsea Nodes

- API-17F / ISO13628-6 qualified
- Standalone or integrated pressure compensation
- High reliability > 20 year design life
- Up to 6,000 m depth (9000 psi)
- Remotely configurable and field upgradable
- Simple network configuration, IP addressable
- Interfaces for DSL, IWIS, SIIS and fiber
- Integrated diagnostics, and logging
- Options for acoustic backup link, internal sensors, external sensors, and customer supplied equipment



Topside Equipment

- Topside interfaces to subsea solutions
- Sourcing, integration and qualification of power supplies and distribution
- Comprehensive diagnostics software
- 19 inch rack-mount enclosures or Hazloc junction boxes
- Focal's 928-OMS Optical Monitoring System

Services

- Direct engineer before and after sale support
- Comprehensive project management support
- Onshore and offshore field-certified personnel
  - Commissioning and installation
  - Calibration / adjustments
  - Trained in service and troubleshooting
  - Mechanical, fiber optic and electronics
  - Specialized in mechanical, fiber optic and electronics systems for marine and oil & gas

FOCAL™

Focal Technologies Corporation | A Moog Inc. Company

77 Frazee Avenue, Dartmouth, Nova Scotia, Canada B3B 1Z4 | Tel: +1-902-468-2263 | www.moog.com/focal | focal@moog.com

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