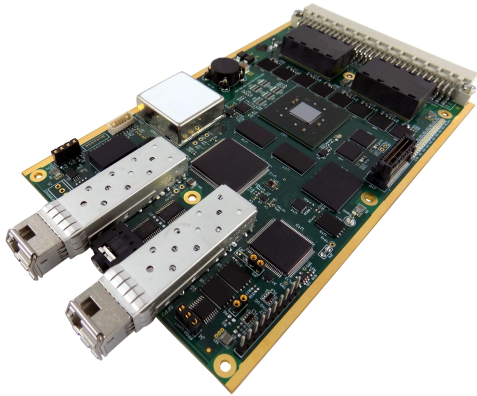


# Subsea Qualified 10-Port Managed Ethernet Switch

Model 922-MES

Focal's Model 922 product line is a modular set of interface and telemetry cards specifically designed and tested for long term deployment in subsea communications systems. With full qualification to API/ISO standards, this flexible platform combines the high reliability and performance of custom, rugged solutions with the ready availability and cost-effectiveness of standard industrial products.



The Model 922-MES is a managed Ethernet switch implemented in a fully reconfigurable FPGA-based platform including DDR3 memory and two microcontrollers to support many existing and future protocols, as well as application specific code. Eight copper Ethernet ports and two optical Ethernet ports support many redundancy modes, including RSTP and MRP. Additional physical media redundancy on the optical ports provides fast, automatic, and protocol independent failover.

Ethernet ports are configured manually or through autonegotiation for 10/100/1000M operation with support for advanced timing protocols, such as IEEE 1588v2, PTP (E2E), critical for synchronization in many sensor applications. A range of subsea-qualified, pluggable, fiber-optic transceivers enables many optical topologies, including dual fiber mode and bidirectional operation with up to 16 wavelengths on a single fiber using CWDM (Coarse Wavelength Division Multiplexing) technology. Fiber umbilicals of up to 200 km length are supported.

Model 922 software provides advanced diagnostics via Modbus TCP for real-time health monitoring of the system as well as easy configuration of all interfaces and modes of operation.

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## Features

- 10-port managed Ethernet switch, 10/100/1000M
- Reconfigurable switch fabric and microcontrollers for new protocols and application specific customization
- Dual optical transceivers for redundant 100M or 1000M Ethernet uplink with automatic failover
- Isolated, fault-tolerant power and signal interfaces
- Qualified per ISO 13628-6 and API 17F to Q1 levels
- Advanced diagnostics and setup via Modbus TCP or Telnet
- Proven hi-rel components rated for -40 °C to +85 °C
- Robust remote update method for subsea firmware with multistage validation and permanent factory fallback code
- UDP heartbeat packet with IP settings and key diagnostics
- 3U Eurocard size for card rack or bolt-down installation

## Benefits

- Reduces overall system costs and size
- Delivers high performance optimized for subsea controls
- Saves costs for qualifications and obsolescence management; avoids requalification of industrial solutions
- Provides an easy upgrade path via remote code updates to "future proof" system designs
- Supports many copper and optical configurations

## Applications

- Subsea communications for drilling and production controls
- Subsea Electronics Modules (SEM) and other subsea nodes
- Upgrades to existing subsea systems and sensor hubs
- Highly reliable industrial networking
- Gigabit concentrators and Ethernet distribution nodes

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# Specifications

Ethernet Interfaces (SIIS Level 3)	
<b>No. Ports</b>	8 x Copper (via DIN connector) 2 x Optical (via SFP cages)
<b>Protocols</b>	10/100/1000Base-T(X), copper 100Base-FX, 1000Base-X, optical
<b>Protection</b>	ESD and transient suppressors (TVS) 500 Vrms isolation
<b>Ethernet Switch Layer 2 Functions</b>	Includes broadcast storm protection, rate limiting, flow control, 802.1q VLAN, 802.1p port priority, port mirroring, fast aging
<b>Time Synchronization</b>	IEEE 1588v2 PTP (E2E) One step end-to-end transparent clock
<b>IP Configuration</b>	DHCP with configurable static IP fallback
<b>Diagnostics and Control Parameters</b>	Includes temperature, humidity, voltage, current draw, optical power (Tx/Rx), on time and power off events, Ethernet port status/configuration, MIB counters, card mfr. data (s/n, p/n, FW revision)
<b>Redundancy</b>	RSTP, MRP (manager, client)
<b>Options</b>	HSR, PRP
Optical <sup>1</sup>	
<b>Wavelengths</b>	1310 nm and 1550 nm standard CWDM wavelengths (e.g. 1471 to 1611 nm)
<b>Optical Power Budget</b>	20 to 45 dB, depending on SFP installed
<b>Range</b>	10 to 200 km, depending on SFP installed
<b>Options</b>	Bidirectional (single fiber) transceivers
<sup>1</sup> See Subsea Qualified SFP Modules datasheet for available optical transceivers.	

Connectors	
<b>Rear Card Edge</b>	1 x 96-pin DIN 41612 (Ethernet, power)
<b>Front Card Edge</b>	2 x SFP (Ethernet, optical), single or dual LC
Power	
<b>Consumption</b>	10 W typical (15 W max.)
<b>Operating Voltage</b>	+20 to +28 VDC, regulated input
<b>Rated Current</b>	0.75 A max.
<b>Protection</b>	ESD, EMI, over-voltage, reverse voltage, overcurrent (no fuses), 500 Vrms isolation
Mechanical	
<b>Dimensions</b>	3U Eurocard, 4 HP, 160 mm x 100 mm
<b>Mounting</b>	3U Eurocard rack or M2.5 hardware
<b>Options</b>	Front panel, LED panel, heat panel
Reliability	
<b>Design Life</b>	> 20 years @ +40 °C
<b>MTBF</b>	> 250,000 hrs @ +40 °C
<b>Testing</b>	Factory Acceptance Test (FAT) At Tmin and Tmax design temperatures
<b>Qualification</b>	ISO 13628-6, API 17F (Q1 Levels) Includes 30 g shock, 5 g vibration
<b>Firmware Update</b>	Failsafe remote firmware update
<b>Options</b>	Environmental Stress Screening (ESS) Custom qualifications per OEM specification
Environmental	
<b>Temperature</b>	-18 °C to +70 °C (design and operation) -40 °C to +85 °C (storage)
<b>Humidity</b>	5 % to 85 % RH, non-condensing

All specifications and information are subject to change without notice. Please contact Focal for the latest updates.