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# DATASHEET, OPEN COMMUNICATION CONTROLLER, OCX

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| REV | DATE | EC | DESCRIPTION | ORIG | CHK | RVW | APP |
|---|---|---|---|---|---|---|---|
| 001 | 28 Nov 18 | - | FIRST RELEASE | BS | KJG | SL | BS |
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**COMPANY PROPRIETARY INFORMATION**

## OPEN COMMUNICATION CONTROLLER, OCX

**PDM File: DS0000564**          **Revision: 001**

Proserv's unique OCX power-line communication technology provides power and communication to subsea equipment. This includes extensive diagnostic capabilities in addition to remote administration and logging. Subsea equipment up to 100 kilometers away can be controlled achieving the industry's highest data rates on flexible systems including advanced multi-dropped power-line networks. Fiber-optic and power-line communications are seamlessly integrated giving excellent redundant communication channels - all TCP/IP based. The OCX products are robust and highly configurable, and designed for use in topside and subsea environments.

## 1.0    Applications

- Power and control for Proserv's subsea equipment, including:

  - Artemis 2G Subsea Control Module (SCM)
  - Proserv Open Communication Hub (OCH)
  - Topside Power and Communication Unit (TPCU)
  - SeaHawk™ Camera Systems

- Retrofit systems with requirement for new instrumentation on existing infrastructure

## 2.0    Features & Benefits

- Power-line communication superimposing communication signals in the RF range onto a power line with communication rates up to:

  - 310 kbit/s using Frequency Shift Keying (FSK) modulation
  - 1,3 Mbit/s using Orthogonal Frequency Division Multiplexing (OFDM) modulation

- High reliability

- Co-exist capability with most subsea vendors' legacy power-line communication systems, effectively enabling OCX to be used to retrofit instrumentation onto an established infrastructure. Configurable Modbus interface enabling 3rd party SEM emulation

- Remote diagnostics and configuration using the OCX built-in web server

- Capability to connect up to 16 subsea modems to a single topside modem on a single quad in a multi-drop system configuration

- Supports Quad Access Control (QAC), Two topside modems are able to operate a power line network using individual pairs in the same quad of an umbilical

- Combining any protocol with TCP/IP, providing transparent serial and Ethernet simultaneously to subsea equipment

- Can be used to provide backup communication link to main optical communication

- Compatible with the previous generation Proserv OCC power-line communication systems.
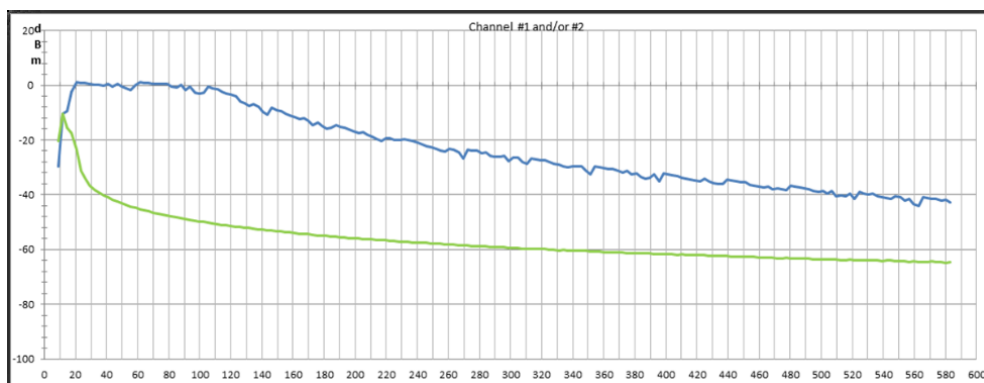
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- The OCX Power-line Modem can handle higher bit rate and step-out than its predecessor OCC due to the following enhancements:

  - Higher transmit power
  - Equalized
  - Wider frequency band
  - Lower noise floor
  - Reduced insertion loss for diplexer

- Flexible diplexer design with separate AC power filter and signal coupler enabling adaptation to site specific umbilical parameters, interference sources and co-exist requirements

  - Standard diplexer products defined for:
    - OCX only based power-line communication systems
    - Backwards compatible with OCC power-line communication systems
    - Base case matching for co-exist power-line communication systems
  - Long haul step-out using diplexer capable of communication frequencies down to 10 kHz
  - Bespoke diplexer designs based on the standard products to optimize communication for co-exist with other power-line equipment

- Connect subsea devices with limited network support using Modbus/RTU or any other serial protocol to the topside network

- Safe software download by the use of a boot loader

- Designed for the integration of a signal amplifier, if required by the application

- Measurement of signal and noise-floor using a built-in spectrum analyzer interface

  - Each OCX modem in the system can perform the signal- and noise floor measurements
  - A PC-based tool is used to control the measurements and visualize the results
  - An example of spectrum analysis is shown below:
    - 17 kilometres cable simulator test
    - Blue line: Signal
    - Green line: Noise floor
    - Difference between the two lines equals the signal to noise ratio



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# 3.0     Technical Specification

| General | | |
|---|---|---|
| Design Temperature | -18 °C to +70 °C | |
| Operating Temperature | Storage Temperature | |
| | -5 °C - +55 °C | -18 °C - +50 °C |
| Humidity | Up to 95 % | |
| Soldering Quality and Workmanship | IPC-A-610 Class III and J-STD-001 Class III | |
| Technology Readiness Level | 6 | |
| Theoretical MTBF | 103 Years | |
| **Power-line Diplexer Power Rating** | | |
| Maximum Voltage | 760 VAC | |
| Maximum Current Consumption | 3 A / 5 A (optional topside dual power filter arrangement) | |
| **Power-line Modem Specification** | | |
| Power-Line Bitrate | <ul><li>FSK: 4.8 kbps up to 310 kbps</li><li>OFDM: up to 1,3 Mbps</li></ul> | |
| Bandwidth | 10 kHz – 715 kHz | |
| Transmit Power – Maximum | 23 dBm – Adjustable in 6 dBm steps | |
| Sensitivity – Maximum | -107 dBm @ -164 dBm/Hz (receiver noise density) | |
| Input / Output Impedance | 200 ohm | |
| Serial Interface (optional) | <ul><li>2 off configurable RS422 / RS485 interfaces</li><li>Protocol configurable: Modbus, IWIS, Bender, Device Server</li><li>RS4xx Interface Rating:<ul><li>15 mA / 40 mA typ @ Rx/Tx</li><li>30 mA / 275 mA max @ Rx/Tx shorted segment</li><li>Isolation: 2500 $V_{rms}$</li></ul></li></ul> | |
| Ethernet Interface | <ul><li>2 off Ethernet 10/100BASE-TX interfaces (auto sensing)</li><li>Isolation: 1000 $V_{rms}$</li><li>Quality of Service (QoS) and DHCP supported</li></ul> | |
| Other Interfaces (optional) | <ul><li>External Temperature sensor</li><li>Quad Access Control (QAC) for cross-talk elimination for second wire pair</li><li>LIM alarm readout and isoSync</li></ul> | |
| Diagnostics (depending on application) | <ul><li>Power-line link diagnostics</li><li>FO diagnostics if applicable</li><li>Temperature – Onboard (and external if available)</li><li>Serial interface diagnostics</li><li>Spectrum Analysis</li></ul> | |
| **Compliance** | | |
| Design Standards | <ul><li>API STD 17F – Design and operation of Subsea production control systems</li><li>IEC 61892 – Electrical installations of ships and of mobile and fixed offshore units</li><li>IEC 61439 – Low-voltage switchgear and control gear assemblies</li><li>IEC 60533 – Electrical and electronic installations in ships – EMC</li><li>IEC 60092 – Electrical installations in ships</li></ul> | |

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