Professional Marine Solutions

Computers, Displays, and Ethernet Switches

MOXA®
Reliable Networks ▲ Sincere Service

Sailing to a Smarter Future

Moxa provides maritime professionals with industrial-grade marine computers, panel PCs, displays, and Ethernet switches that use leading technologies and reliable designs perfect for applications on the bridge, a dock, an open deck, or in a control room. Moxa's marine solutions pass strict tests and follow critical industrial standards to ensure compliance with international marine standards such as DNV GL, LR, ABS, NKK, CCS, IEC 60945, and IACS-E10. Furthermore, our high performance, IP66/67, fanless, compact, rugged designs help reduce costs and streamline system integration.

Control Room Requirements

• High computing performance
• Compact and fanless designs
• Support for multiple independent displays

Bridge Requirements

• High computing performance
• ECDIS IEC 61174 compliance
• NMEA 0183 interface for marine device communication

Engine Room Requirements

• Fanless design with efficient cooling mechanism
• Wide-temperature tolerance

Table of Contents

The Keys to Building a Smart Ship

To guarantee navigational safety and improve the operational efficiency of a ship, there is an emerging trend of creating Smart Ships. The Smart Ship concept covers a whole range of improvements that include predictive maintenance, performance optimization, decision support tools, increased automation and robotics, and unmanned remote or autonomous ship operation. Smart Ships are reliant on big data, so reliable real-time data transmission, data collection, and remote control play a key role in building Smart Ships. Moxa offers high computing performance computers, displays, and high bandwidth networking solutions to ensure fast and reliable display, processing, and communication of data.

Computer Technologies

### Comprehensive Connectivity Solution

Moxa's marine computers and panel computers incorporate a rich selection of communication interfaces to aid system integrators and ship designers in linking marine-specific devices and subsystems. The MC-7000 Series marine computers include regulation **NMEA 0183** interfaces, giving system integrators a convenient means of connecting maritime sensors like gyrocompasses, echo sounders, and weather stations. These integrated NMEA ports simplify deployment and reduce costs in both the short and long term by cutting down on overall network complexity.

• NMEA 0183 for marine device connectivity
• DVI and VGA ports support up to 3 independent displays
• USB 3.0 for rapid data transfers
• PCI and PCIe (x16) slots for customized expansion
• Redundant Gigabit Ethernet ports for rapid, reliable internet
  communication

High Performance with Fanless Design

Moxa's embedded and panel computers for marine environments have been designed for easy incorporation into Integrated Bridge Systems, particularly with respect to power and temperature demands. Moxa computers put high-performance Intel® Core™ i7 processors at the center of fanless, rugged designs that deliver fast, reliable graphics or rapid number-crunching processing in whatever combination the system requires.

• No compromise on board design: Moxa's thermal design is
  system wide, making the computer system more reliable across
  the board
• A centralized CPU means that heat is evenly dissipated in three
  directions, increasing dispersion efficiency
• Heat pipes at the front and rear dissipate heat with much greater
  efficiency than fans
• The rugged thermal design guarantees the computer will operate
  without any worry of crashes from overheating—even when
  using turbo boost
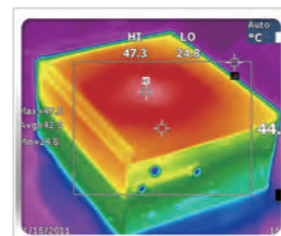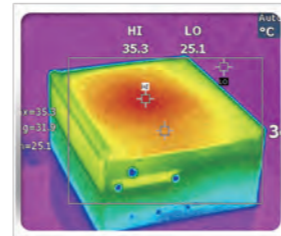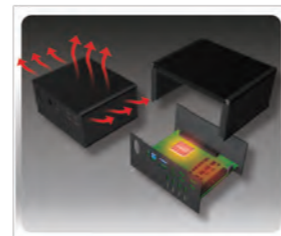
Display Technologies

ECDIS Compliance

Moxa's ECDIS type approved panel computers and displays have been thoroughly color calibrated and tested according to the **IEC 61174:2015** standard for ECDIS displays. To meet approval under the ECDIS color calibration standard, displays must pass several tests that include measuring the display's RGB color and luminance values and then using this data for conversion to a CIE standard. The final result is a carefully calculated, highly reliable color profile in digital RGB form.

SavvyTouch Screen Control

SavvyTouch display controls are equipped with a proximity switch that lights up the controls with a mere wave of the hand, making it possible for users to easily adjust the display even in absolute darkness. At the same time, SavvyTouch also features a system information button that returns a BIOS-level rundown of hardware health, keeping users informed on the status of the motherboard, system memory, video feed, and power connections.

Illuminate Controls by Waving a Hand
Savvy Touch controls are fit with a proximity sensor, so that a user operating the computer can easily illuminate the controls with a simple wave of their hand.

One Touch ECDIS-Compatible Brightness Adjustment
ECDIS colors can become distorted when the brightness levels are changed, and retuning them to ECDIS standard color schemes can be a challenge. One touch brightness adjustment brings things back to normal with the press of a button.

Hardware Monitoring and Service Check
Users can easily learn the status of key hardware elements even when the system fails to reboot. The info button on the panel is a powerful aid for maintenance personnel troubleshooting disabled systems.

Ethernet Switch Technologies

Secure, Reliable Maritime Ethernet Switches

Among the harsh shipboard elements network switches must resist are extreme temperatures, daily exposure to water, and constant vibration. Additionally, ship systems must also meet stringent reliability requirements like full redundancy and strong security, all while reliably managing a heavy stream of automation and control applications that receive constant input from large arrays of sensors and instruments.

Moxa delivers switching solutions for every layer of a hierarchical network—whether at the top or bottom, edge or core—making it easy to find the right device for any marine networking need.

Network Redundancy Technologies for the Utmost Scalability, Reliability, and Cost Efficiency

Moxa switches offer Turbo Ring and Turbo Chain technologies to give our customers the strongest and fastest automated redundancies available for Ethernet networks. These ring technologies are paired with a full range of tough, robust maritime switch solutions designed to simplify and optimize your networks with superior availability, reliability, and flexibility, all while dropping costs on deployment and maintenance to give you substantial savings on your TCO.

Turbo Ring:
Enabling Ring and Media Redundancy

- Fast fault recovery < 20 ms
- Flexible ring topology
- Lower total cost of ownership

Turbo Chain:
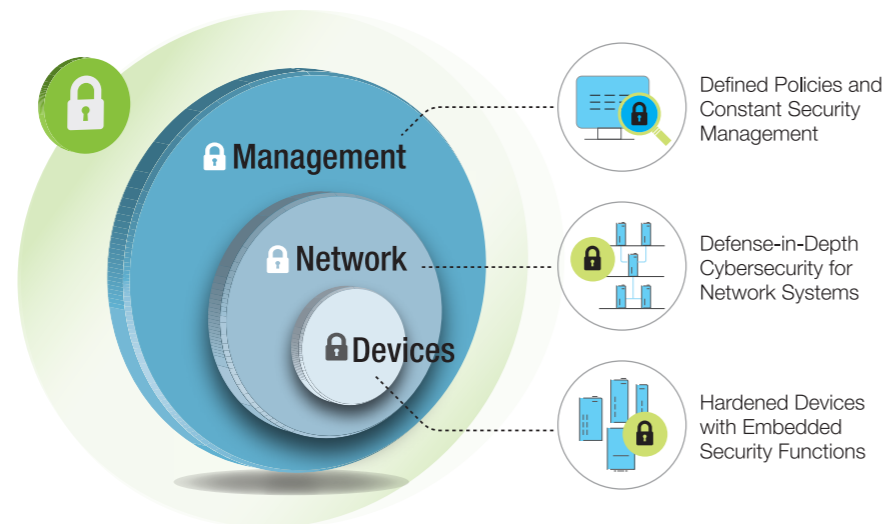Increase Redundant Network Topology Flexibility

- Fast fault recovery < 20 ms
- Unlimited redundant network expansions
- Live node expansion without network interruptions

Industrial Cybersecurity Solution Protects Your Critical Control Network

Cybersecurity incidents severely compromise the reliability, availability, and security of maritime control systems. Moxa offers various industrial cybersecurity solutions that include enhanced device-level security and defense-in-depth network protection.

Moxa switches are developed to meet the technical security requirements of the **IEC 62443** standard to prevent external intrusions and attacks. Moxa industrial secure routers provide firewall functions for securing network segmentation between different systems and VPN functionality for providing secure remote access via Internet to the onboard systems.

- Management
- Network
- Devices

Defined Policies and Constant Security Management

Defense-in-Depth Cybersecurity for Network Systems

Hardened Devices with Embedded Security Functions

Integrated Automation System (IAS)

Product Highlights

MC-1100

Compact, DIN-rail marine computer with Intel® Atom™ E3800 series processor

Overview

An integrated automation system (IAS) for marine applications facilitates the fully-integrated operation of a ship, where systems and equipment must function seamlessly to ensure productivity and efficiency. Computers play an important role in the success of an IAS platform as they are used to collect and transmit data from a wide array of systems, including engine, thruster, and propulsion monitoring as well as alarm systems. To ensure safe operation of a ship, computers are used to constantly monitor external systems in real time, trigger alarms and warnings, and deliver information to the control systems for processing.
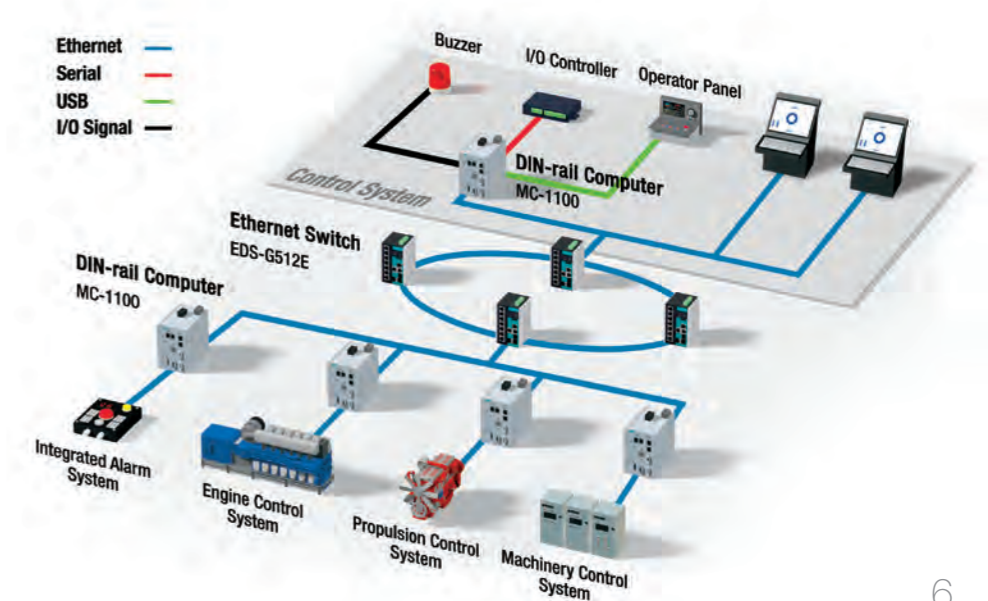
System Requirements

- Computers that can be installed in control consoles and I/O cabinets or boxes where space is limited
- Power-efficient computers for efficient handling of multiple tasks simultaneously, including data collection, monitoring, system control, and data transmission
- A variety of I/O interfaces to connect to different sensors and machinery
- Multiple LAN ports for receiving data simultaneously from different systems
- Robust product design that provides reliable operation in harsh marine environments

Moxa's Solution

The MC-1100 Series computer is a palm-sized, DIN-rail mountable x86-based platform that features an Intel® Atom™ E3800 series processor and multiple connection options, including 4 LAN ports, 2 serial ports, 4 DIs, and 4 DOs. The advanced thermal design of the MC-1100 ensures reliable system operation in extreme temperatures ranging from -40 to 70°C. The computer has passed rigorous testing and is compliant with DNV, IEC 60945, and Zone 2 standards to ensure long-lasting and reliable operation in harsh marine environments.

System Architecture

Integrated Navigation System (INS)

Marine-Grade Displays

One area that is often overlooked is the quality of displays. Marine displays must provide wide viewing angles and meet the IEC 61174:2015 standard for ECDIS applications. This means that brightness and color must be calibrated for displays to reproduce accurate chart displays. In addition, displays must meet the conditions for temperature, humidity, and vibration as defined in IEC 60945 to ensure reliable operation on the high seas.
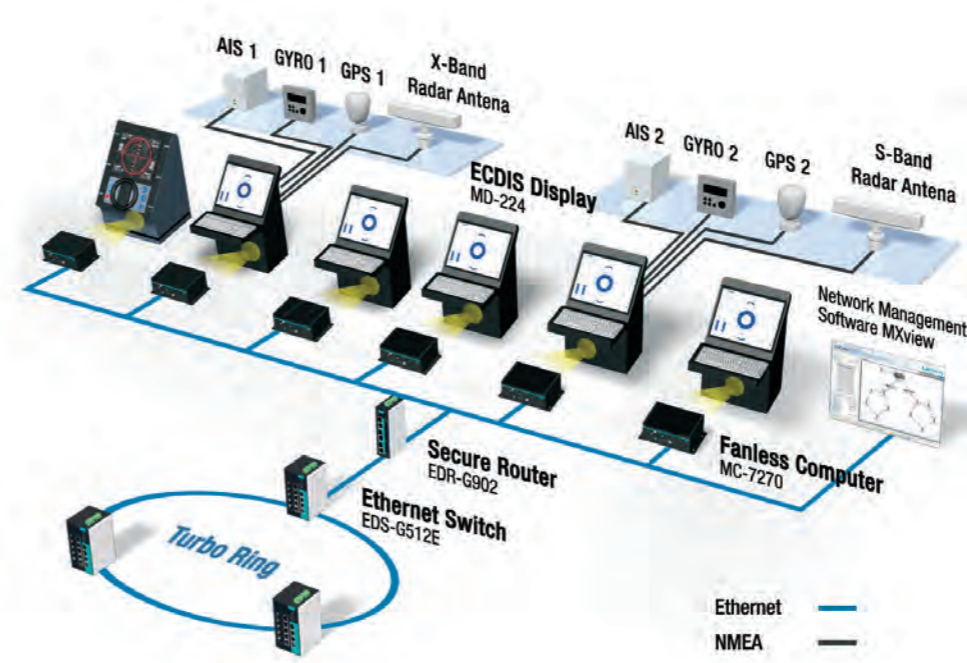
Moxa's Solution

Moxa offers proven marine solutions for your integration needs. Moxa's full product range includes computers, displays, devices servers, and network switches that are compliant with industrial standards to satisfy the demands of marine applications.

Ideal for INS applications, the high-performance MC-7270-MP-T marine computer comes with eight NMEA ports for marine device connectivity and features an Intel® Core™ i7 3555LE processor for high-volume data processing. In addition, its fanless design eliminates risk of fan failure, ensuring system reliability. For bridges with limited space, the compact design of the MC-7270-DC-CP-T marine computer is a perfect fit.

The widescreen MD-224 marine display with a 16:9 aspect ratio is compliant with the IEC 61174:2015 standard. The brightness and color of the MD-224 is calibrated to meet the highly specialized requirements of ECDIS applications.

To maximize high availability for industrial networks, Moxa's EDS-G512E switch features our proprietary Turbo Ring and Turbo Chain Ethernet network redundancy technologies with self-healing capabilities and a fast fault recovery times of less than 50 ms at 1G connection speeds.

System Architecture

Product Highlights

MC-7270-MP-T

High-performance, wide-temperature marine computer with Intel® Core™ i7 3555LE 2.5 GHz processor

MC-7270-DC-CP-T

Compact wide-temperature marine computer with Intel® Core™ i7-3555LE, dual core 2.5 GHz processor

EDS-G512E

12-port full gigabit managed Ethernet switches

MD-226/224/219

26/24/19-inch ECDIS-compliant marine displays

Overview

For the marine industry, ensuring the safe operation of a vessel is an ongoing process. This is also the main reason why the industry has taken steps to consolidate information from previously independent systems (for example, the radar, ECDIS, navigation, and conning systems) into an Integrated Navigation System (INS).

System Requirements

The International Maritime Organization (IMO) standard, MSC.252(83), defines the following key requirements for an INS:

- System redundancy and independence
- Separate cables and network components on redundant networks
- Independent networks
- Protection from network overload

- Continuous monitoring of network performance
- Fast recovery after a power failure
- Uniform time tagging
- Resistance to electromagnetic interference
- Exclusion of CCTV information

Redundancy and Reliability

To achieve the safety level set in MSC.252(83), redundancy is essential in an INS. This includes system and device redundancy. In an INS where five workstations are connected to one conning system, two ECDIS systems, and two radar systems, all workstations must be able to access data from any system, either through a direct connection or through the Ethernet network. Deploying duplicate mission critical devices in a vessel is a common method to achieve device redundancy. For example, an INS can have two sensor systems and two radar systems and these systems send the same data to multiple workstations. In the event one sensor or radar system becomes unresponsive, the backup system can still provide the necessary data to ensure continuous operation of the vessel. In an INS where devices are connected to serial device servers that make device data available on the Ethernet network, workstations no longer need to have a rich set of communication interfaces. This results in reduced setup costs and network complexity. However, the reliability of the network and the serial device servers is critical to ensure the INS is reliable.
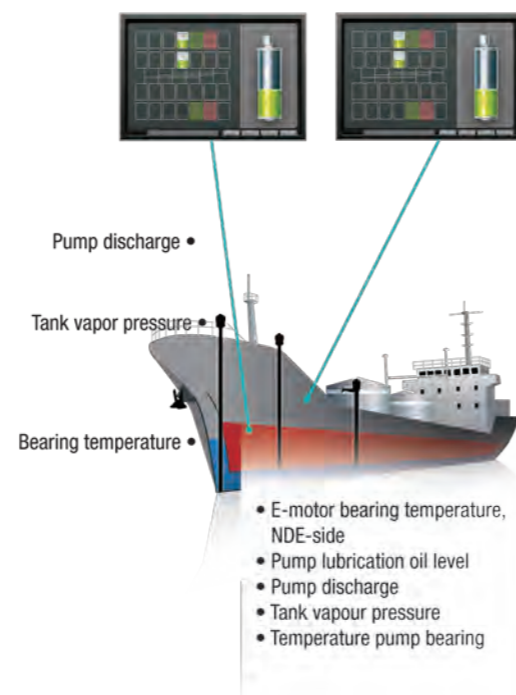
Maritime Deep Well Pump System

Overview

Over the last 40 years, deep well pumps have penetrated into every corner of the marine industry, whether on ships, in shipyards, or on offshore rigs. As the years have progressed, improvements in pump technology have generally taken the form of mechanical advances like oil-lubricated shafts or electric motors. Today, using IT technology and satellite communications, pump technology is incorporating a level of remote automation and monitoring that has never been possible before. This will give remote observers access to and situational awareness of pump activity and conditions, while increasing the safety, reliability, and efficiency of pumping procedures for the crews which use and maintain them.

The Coming Changes in Deep Well Pump Technology

Deep well pumps serve many roles in the maritime industry, whether for onboard roles like cargo and ballast lading, or for dock and shipyard purposes like fueling stations. However, after the last 40 years of mechanical advances, the next generation of pumps has little more to offer in terms of mechanical improvement. Instead, manufacturers are taking pump advances in an entirely new direction: by consolidating the design and build of the entire pump system. For these self-contained pump systems, the latest mechanical, IT communications, and sensor technologies are being brought together to allow communication of detailed information about tank, cargo, and ballast conditions, not only to the pump operators and safety crews, but also in real-time to remote locations that can interact with and troubleshoot them, regardless of where the maintenance engineers might be. In contrast to the current model of system integrators purchasing system components from many different vendors, this new generation of pump systems will see a single manufacturer incorporate temperature and pressure sensors with remote I/O and IT systems directly on the pump itself, all offered as a single package. This array will then be linked back to a touch screen HMI that will allow operators, crew, and maintenance personnel the opportunity to view all pump-related information (for either ballast or cargo) from a single SCADA station, in a variety of overviews. In addition to giving operators centralized remote control over all ship-board pumping stations, this SCADA will also maintain a full history of

- Pump discharge •
- Tank vapor pressure •
- Bearing temperature •

- E-motor bearing temperature, NDE-side
- Pump lubrication oil level
- Pump discharge
- Tank vapour pressure
- Temperature pump bearing

alarms, performance, and sensor readings. Most remarkably, the pump will also be capable of direct communications with remote stations of any sort, whether onboard the ship, in distant central offices, or even with mobile stations only a kilometer or two away. As with so many other recent advances in maritime technology, the situational awareness and scope of access are unprecedented.

System Requirements

- HMI master processor / SCADA server
- Master database server
- Local pump controller
- Sensor processing and management hub
- Multiple I/O and NMEA interfaces for direct links to shipboard I/O and sensor stations

Moxa's Solution

One of the world's leading deep well pump suppliers for maritime shipping has chosen to build their latest, cutting-edge system using Moxa's MC-7270 Series computers. Moxa computers were chosen for their durability and high performance; processing is key to this technologically advanced pump system, and this role is filled by rugged, powerful, fanless Moxa computers that are built to last and are backed by a 3 year warranty.

The computers in this pumping system must serve three key roles. First, a touch screen HMI and a SCADA server are needed to run advanced software systems that have been developed through an in-house partnership with a control systems software company to give pump operators intuitive and feature-filled control and monitoring. This is handled by an MD-224 display and MC-7270 Series marine computer. Another MC-7270 Series marine computer serves as the system's database, doing real-time collation, storage, and analysis of all sensor information, and triggering real-time alarms when critical, system-wide benchmarks or thresholds are passed. The third computer manages, receives, stores, and transmits all local mechanical and sensor activity and sends this data to both the database and the centralized HMI. A Moxa MC-1100 Series embedded computer performs this role and sits directly on each pump, withstanding vibrations of 1g/11ms.

System Architecture
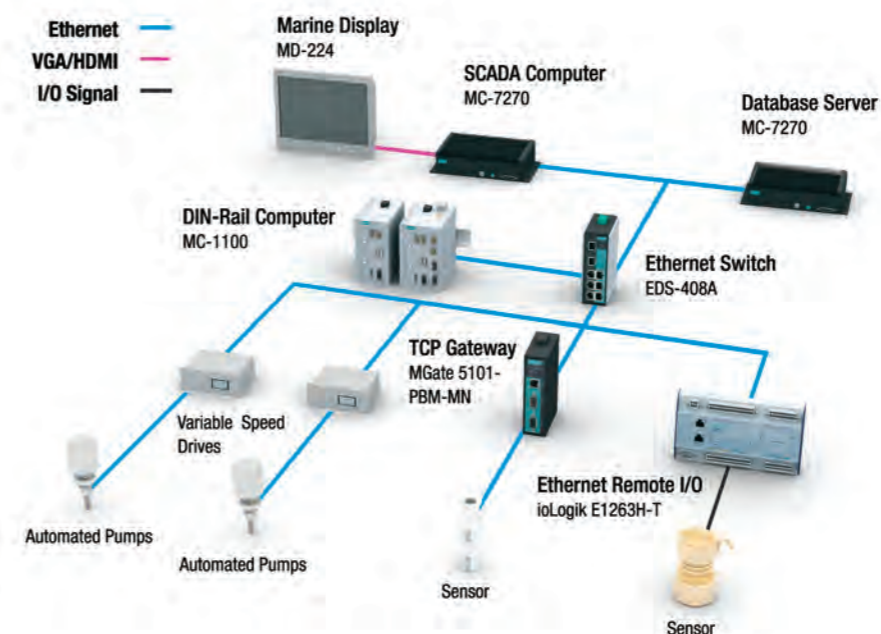
MC-7270-DC-CP-T

Compact wide-temperature marine computer with Intel® Core™ i7-3555LE 2.5 GHz processor

MC-1100

Ultra-compact fanless marine computer with Intel® Atom™ E3845 1.9GHz processor

ioLogik E1263H-T

Ethernet remote I/O with 2-port Ethernet switches, 12 DIOs, 5 AIs and 3 RTDs

MGate 5101-PBM-MN

1-port PROFIBUS-to-Modbus TCP gateways

### EDS-408A

5 and 8-port entry-level managed Ethernet switches
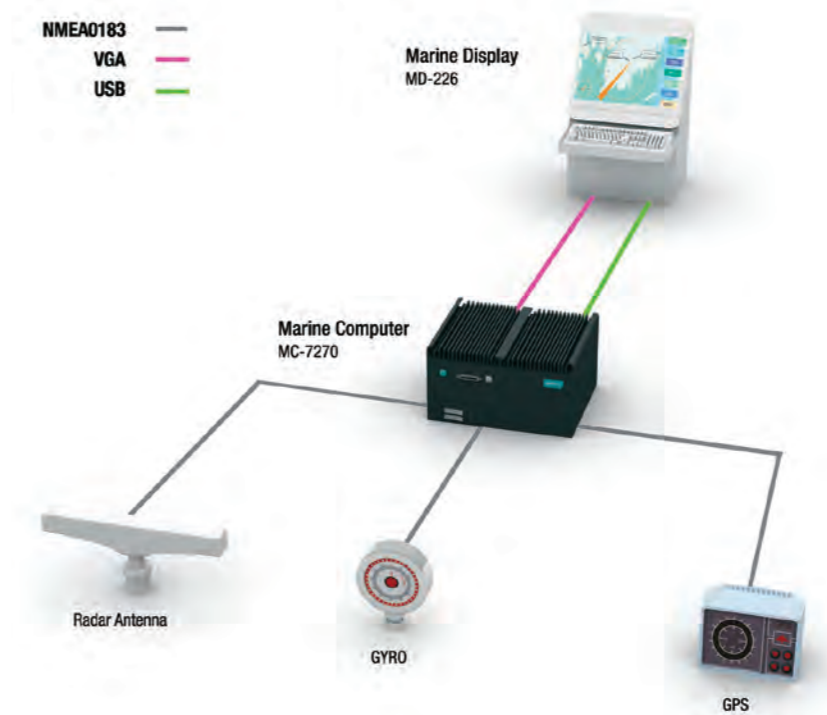
Oil Spill Detection System

System Requirements

The OSD processor is the heart of the oil spill detection system, the place where raw information from the radar is collated with information received from navigation devices such as GPS, the gyrocompass, the speed log, and AIS. This information must be received over NMEA 0183 interfaces, and then processed in real time for immediate display. Due to the massive amount of real-time data that needs to be processed, the OSD processing units require high performance CPUs capable of handling a heavy data load, and which will serve reliably in a wide variety of extreme temperatures, humidity, and other environmental conditions.

Moxa's Solution

Moxa provides a range of marine embedded and panel computers for OSD systems that are certified for use in the marine bridge system and offshore installations. Moxa's MC and MPC series computers are powered by high-performance Intel® Core™ i7 processors that provide the computing performance required to process the enormous amounts of data received in real time. Fanless MC and MPC Series marine computers are designed to install easily into vessels' bridge systems and operate reliably within a wide temperature range in enclosed spaces. These rugged computers have no moving parts and feature hardened enclosures and integrated I/O connections, making them an ideal computing choice for an OSD system.

System Architecture

Product Highlights

MC-7270-MP-T

High-performance wide-temperature marine computer with Intel® Core™ i7 3555LE 2.5 GHz processor

MD-226/224/219

26/24/19-inch ECDIS-compliant marine displays

MPC-2260/2240/2190

High-performance fanless marine panel computer with Intel® Core™ i7 processor and 26/24/19-inch ECDIS-compliant display

Overview

Oil spill contingency plans are essential to minimizing the risk of oil spills in the ocean. The success of these plans depends on accurate, real-time data on the location, size, and movement of a spill and a powerful computing infrastructure that can consolidate and process this data to support monitoring and recovery operations.

What is an Oil Spill Detection System?
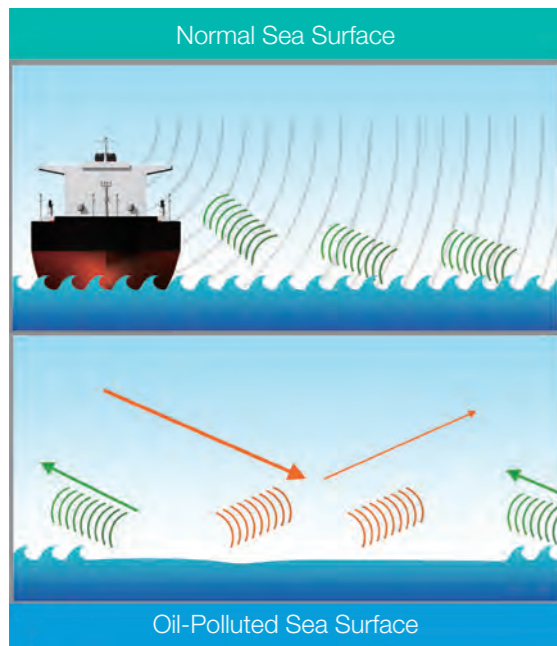
An oil spill detection system (OSD) is used to monitor and give early warning of the spread of oil across the open ocean. OSD systems may be installed on ships, drilling or well rigs, or onshore surveillance stations. OSD systems work by collecting digitized images of the sea surface and then utilizing directional wave spectra to estimate sea surface currents. Marine X-band radars, satellite monitors, or video cameras may all be used to collect these images, but because of its economy and efficiency, X-band radar technology is the method most commonly used. Areas covered by oil reflect less of the image spectrum due to the dampening of the sea surface capillary waves, leaving areas contaminated by oil rendered as dark areas in the returned surface images.

A basic OSD configuration contains:

• Radar sensors (antennas, transceivers)
• OSD processor units
• Controls (local or remote)

Moxa's Marine Customer - Miros AS

"After software testing followed by a more rigorous system test, we are left with the impression that Moxa's Marine computers will satisfy all customer and product critical requirements."

✕✕ MIROS

Mikael Rydberg
Sales Manager, Miros AS

Computers	MC-7200-MP-T Series	MC-7200-DC-CP-T Series
CPU	Intel® Core™ i7-3555LE / i3-3120ME / Celeron 1047UE	Intel® Core™ i7-3555LE / i3-3120ME / Celeron 1047UE
System Memory	2 slots, 4 GB pre-installed	2 slots, 4 GB pre-installed
Storage Expansion	2 removable SSD trays	1 removable SSD tray, 1 SSD slot (accessed internally)
USB Ports	6 x USB 2.0 2 x USB 3.0	6 x USB 2.0
LAN Ports	4 x RJ45 10/100/1000 Mbps	4 x RJ45 10/100/1000 Mbps
Serial Ports	• 2 x RS-232/422/485 (DB9-M, software-selectable) • 2 x RS-232 (DB9-M)	• 2 x RS-232/422/485 (DB9-M, software-selectable) • 2 x RS-232 (DB9-M)
PCI/PCIe	2 x PCI 1 x PCIe	-
NMEA 0183 Ports	8 (terminal block)	-
Video Output	2 x DVI-D, 1 x VGA	2 x DVI-D, 1 x VGA
Dimensions	320 x 240 x 160 mm (12.6 x 13.39 x 6.3 in)	287 x 250 x 70 mm (11.30 x 9.84 x 2.76 in)
Operating Temperature	-40 to 70°C	-40 to 70°C
Type Approvals	DNV GL , CCS	DNV GL , CCS

Panel Computers	MPC-2260 Series	MPC-2240 Series	MPC-2190 Series
CPU	Intel® Core™ i7-3517UE / Celeron 1047UE	Intel® Core™ i7-3517UE / Celeron 1047UE	Intel® Core™ i7-3517UE / Celeron 1047UE
System Memory	1 slot, 4 GB pre-installed	1 slot, 4 GB pre-installed	1 slot, 4 GB pre-installed
Storage Expansion	2 removable SSD trays (accessed internally)	2 removable SSD trays (accessed internally)	1 SSD slot (accessed internally)
Panel Size	26" (16 : 10)	24" (16 : 9)	19" (5 : 4)
Pixels	1920 x 1200	1920 x 1080	1280 x 1024
Brightness	300 nits	300 nits	300 nits
Touch	–	Projected capacitive multi-touch	Projected capacitive multi-touch
USB Ports	4 x USB 2.0	4 x USB 2.0	4 x USB 2.0
LAN Ports	2 x LAN 10/100/1000 Mbps	2 x LAN 10/100/1000 Mbps	2 x LAN 10/100/1000 Mbps
Serial Ports	2 x RS-232/422/485 (DB9-M, software-selectable)	2 x RS-232/422/485 (DB9, software selectable)	2 x RS-232/422/485 (DB9, software selectable)
NMEA 0183 Ports	8 (terminal block)	8 (terminal block)	4 (terminal block)
Video Output	1 x DVI-D + 1 x VGA	1 x DVI-D + 1 x VGA	1 x DVI-D + 1 x VGA
Dimensions	621 x 440 x 90 mm (24.45 x 17.48 x 3.57 in)	595 x 393 x 75 mm (23.43 x 15.47 x 2.95 in)	429 x 387 x 75 mm (16.89 x 15.24 x 2.95 in)
Operating Temperature	-15 to 55°C	-15 to 55°C	-15 to 55°C
Type Approvals	DNV GL, ABS, CCS, NK, IACS E10	DNV GL, ABS, CCS, NK, IACS E10	DNV GL, ABS, CCS, NK, IACS E10

Computers	MC-1111/1121 Series	MC-1112/1122 Series
CPU	Intel® Atom E3845 / E3826	Intel® Atom E3845 / E3826
System Memory	1 slot, 4 GB pre-installed	1 slot, 4 GB pre-installed
Storage Expansion	1 x CFast slot 1 x SD slot	1 x CFast slot
USB Ports	2 x USB 2.0	2 x USB 2.0
LAN Ports	Up to 4 x RJ45 10/100/1000 Mbps	Up to 4 x RJ45 10/100/1000 Mbps
Serial Ports	Up to 2 x RS-232/422/485 (DB9-M, software-selectable)	Up to 4 x RS-232/422/485 (DB9-M, software-selectable)
PCI/PCIe	1 x miniPCIe	1 x miniPCIe
NMEA 0183 Ports	-	-
Video Output	1 x DisplayPort, 1 x VGA	1 x VGA
Dimensions	132 x 122 x 87 mm (5.20 x 4.81 x 3.43 in)	132 x 122 x 87 mm (5.20 x 4.81 x 3.43 in)
Operating Temperature	-40 to 70°C	-40 to 70°C
Type Approvals	DNV GL, Class 1 Division 2, ATEX Zone 2, IECEx	DNV GL, Class 1 Division 2, ATEX Zone 2, IECEx

Panel Computers	MPC-2150 Series	MPC-2120 Series	MPC-2070 Series
CPU	Intel® Core™ i7-3517UE / Celeron 1047UE	Intel Atom® E3826 / E3845	Intel Atom® E3826
System Memory	1 slot, 4 GB pre-installed	1 slot, 4 GB pre-installed	1 slot, 4 GB pre-installed
Storage Expansion	1 SSD slot + 1 CFast slot (accessible externally)	1 x CFast slot + 1 x SD slot (accessible externally)	1 x CFast slot + 1 x SD slot (accessible externally)
Panel Size	15" (4 : 3)	12" (4:3)	7" (16:9)
Pixels	1020 x 768	1024 x 768	800 x 480
Brightness	1,000 nits	350 / 1,000 nits	350 / 1,000 nits
Touch	Projected capacitive multi-touch	Projected capacitive multi-touch	Projected capacitive multi-touch
USB Ports	4 x USB 2.0	2 x USB 2.0	2 x USB 2.0
LAN Ports	2 x LAN 10/100/1000 Mbps	2 x LAN 10/100/1000 Mbps	2 x LAN 10/100/1000 Mbps
Serial Ports	2 x RS-232/422/485 (DB9, software selectable)	2 x RS-232/422/485 (DB9, software selectable)	2 x RS-232/422/485 (DB9, software selectable)
NMEA 0183 Ports	–	–	–
Video Output	1 x DVI-D + 1 x VGA	–	–
Dimensions	356 x 315 x 77.2 mm (14.02 x 12.40 x 3.04 in)	306 x 245 x 64 mm (12 x 9.6 x 2.5 in)	200 x 140 x 45 mm (7.9 x 5.5 x 1.8 in)
Operating Temperature	-40 to 70°C	-40 to 70°C	-40 to 70°C
Type Approvals	DNV GL, Class 1 Division 2, ATEX Zone 2, IECEx	DNV GL, Class 1 Division 2, ATEX Zone 2, IECEx *	DNV GL, Class 1 Division 2, ATEX Zone 2, IECEx *

* Certification is underway; please contact your sales representative for the latest updates.

Displays	MD-226 Series	MD-224 Series
Panel Size	26" widescreen	24" widescreen
Aspect Ratio	16:10	16 : 9
Brightness	300 nits	300 nits (HB model with 1000 nits)
Pixels	1920 x 1200	1920 x 1080
Viewing Angles	178 / 178	178 / 178
Touch	–	Projected capacitive multi-touch
RS-232 Ports	1 (DB9-M)	1 (DB9-M)
RS-422/485 Ports	1 (Terminal Block)	1 (Terminal Block)
Video Input	1 x DVI-D, 1 x VGA	1 x DVI-D, 1 x VGA
Dimensions	621 x 440 x 90 mm (24.45 x 17.48 x 3.57 in)	595 x 393 x 75 mm (23.43 x 15.47 x 2.95 in)
Operating Temperature	-15 to 55°C	-15 to 55°C
Type Approvals	DNV GL, ABS, CCS, IACS E10	DNV GL, ABS, CCS, IACS E10, Class 1 Division 2

Displays	MD-219 Series	MD-215 Series
Panel Size	19"	15"
Aspect Ratio	5 : 4	4 : 3
Brightness	300 nits (HB model with 1000 nits)	1000 nits
Pixels	1280 x 1024	1020 x 768
Viewing Angles	178 / 178	160 / 140
Touch	Projected capacitive multi-touch	Projected capacitive multi-touch
RS-232 Ports	1 (DB9-M)	1 (DB9-M)
RS-422/485 Ports	1 (Terminal Block)	1 (Terminal Block)
Video Input	1 x DVI-D, 1 x VGA	1 x DVI-D, 1 x VGA
Dimensions	429 x 387 x 75 mm (16.89 x 15.24 x 2.95 in)	356 x 315 x 77.2 mm (14.02 x 12.40 x 3.04 in)
Operating Temperature	-15 to 55°C	-40 to 70°C
Type Approvals	DNV GL, ABS, CCS, IACS E10, Class 1 Division 2	DNV GL, Class 1 Division 2, ATEX, IECEx

DIN-Rail Ethernet Switches	EDS-G508E / G512E / G516E	EDS-518E	EDS-510E	EDS-P510
Switch Type	Managed	Managed	Managed	Managed, PoE
No. of Ports	8/12/16	18	10	10
Gigabit Ethernet	8/12/16	4	3	3
Fast Ethernet	-	14	7	7 (4 PoE)
Power Supplies	12/24/48/-48 VDC	12/24/48/-48 VDC	12/24/48/-48 VDC	48 VDC
Operating Temperature	• -10 to 60°C • -40 to 75°C (-T model)	• -10 to 60°C • -40 to 75°C (-T model)	• -10 to 60°C • -40 to 75°C (-T model)	• 0 to 60°C • -40 to 75°C (-T model)
Type Approvals	DNV GL, ABS, LR, NK	DNV GL, ABS, LR, NK, IACS E10, IEC 60945	DNV GL, ABS, LR, NK	DNV GL, ABS, LR, NK

DIN-Rail Ethernet Switches	EDS-408A	EDS-G205 / G308	EDS-316	EDS-205A / 208A
Switch Type	Managed	Unmanaged	Unmanaged	Unmanaged
No. of Ports	8	5 / 8	16	5 / 8
Gigabit Ethernet	-	5 / 8	-	-
Fast Ethernet	8	-	16	5 / 8
Power Supplies	24 VDC	12/24/48 VDC	12/24/48 VDC	12/24/48 VDC
Operating Temperature	• 0 to 60°C • -40 to 75°C (-T model)	• -10 to 60°C • -40 to 75°C (-T model)	• 0 to 60°C • -40 to 75°C (-T model)	• -10 to 60°C • -40 to 75°C (-T model)
Type Approvals	DNV GL	DNV GL, ABS, LR, NK	DNV GL	DNV GL, ABS, LR, NK

Rackmount Ethernet Switches	IKS-6726A/6728A	Industrial Secure Routers	EDR-G902	Ethernet Remote I/O	ioLogik E1263H-T
Switch Type	Managed	No. of Ports	2	Configurable DI/DOs	24
No. of Ports	26/28	Gigabit Ethernet	2	Analog Inputs	10
Gigabit Ethernet	2/4	Fast Ethernet	-	RTD Inputs	3
Fast Ethernet	24	Security Features	Firewall / VPN / NAT	Ethernet Ports	1 x RJ45 10/100 Mbps
Power Supplies	24/48 VDC; 110/220 VAC	Power Supplies	12/24/48 VDC	Switch (Daisy Chain)	Yes
Operating Temperature	-40 to 75°C	Operating Temperature	• 0 to 60°C • -40 to 75°C (-T model)	Protocols	Modbus/TCP, TCP/IP, UDP, DHCP, BOOTP, HTTP
Type Approvals	DNV GL, ABS, LR, NK	Type Approvals	DNV GL	Certification	IEC 60945

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Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things. With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures.

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