



# IIoT Blueprint for Smart Ship

## Industrial Computing and Networking Solutions



### INDUSTRIAL COMPUTING AND NETWORKING

## Enabling Smart Marine Solutions

Through adherence to strict maritime standards and incorporation of the latest developments in industrial IoT (IIoT), Moxa has created a blueprint that extends mission-critical marine automation to cloud service delivery to improve the safety, reliability, and efficiency required for ship and port operations.

### Benefits

- Helps ship owners optimize vessel operation
- Helps system integrators accelerate IIoT application deployment
- Streamlines crew operations with remotely-accessible support and service
- Simplifies maintenance with industry-proven product solutions

### Features

#### Ship-to-shore Visibility

Moxa IIoT solution makes it easy to connect your ship to open cloud platforms for field-to-cloud data monitoring, processing, and remote device management from anywhere on shore.

#### Remote Technical Support

Ships no longer have to be isolated when operating; remote technical support that includes system diagnostics, maintenance, and firmware upgrades are made possible through highly secured Moxa Remote Connect solutions.

#### Integrated Navigation Systems

Moxa delivers best-in-class ECDIS computers and HMI panel PCs and displays for efficient navigation and precise displays to ensure the safety of your voyage.

#### Reliable Network Infrastructure

Moxa provides marine-proven network infrastructure solutions that consolidate multiple protocols into a single ship-wide network, and can withstand harsh marine conditions in compliance with DNV regulations.

### BRIDGE

## Integrated Navigation System (INS)

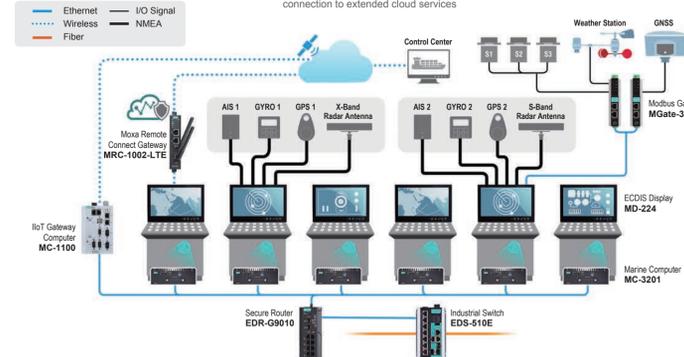
On the bridge, a clear display integrated with ECDIS, radar, and conning systems can facilitate intuitive operation of the ship, improving navigational safety and efficiency. Additionally, being able to take advantage of cloud applications would mean more ship-to-shore data for communication and collaboration.

### System Requirements

- Processing of high volumes of data from various workstations to create accurate ECDIS displays
- Type-certified ECDIS displays
- Extreme operational reliability in maritime conditions
- Protect critical equipment from unwanted access
- Secure communication to enable remote support

### Why Moxa

- One-stop-shopping for marine-grade computers, HMIs, and industrial Ethernet solutions
- MC-3201 high-performance marine computers with two independent slots for flexible system integration and expansion
- MD-Z24 ECDIS displays that comply with the IEC 61174:2015 standard
- EDR-G9010 secure routers provide 3-in-1 firewall/NAT/VPN to safeguard bridge networks
- Moxa Remote Connect allows for remote maintenance of machinery through easy-to-set-up cloud-based VPN tunnels
- Moxa IIoT gateways provide easy edge-to-cloud data connection and analysis, as well as connection to extended cloud services



### PORT CRANE

## Optical Character Recognition (OCR) System

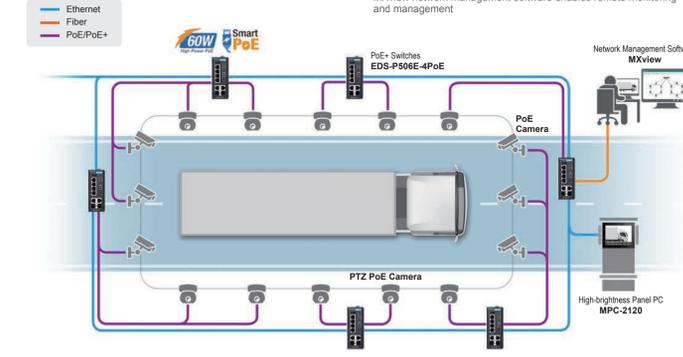
Moxa's PoE+ switches provide up to 60 W per PoE+ link to support a port crane Optical Character Recognition (OCR) system that facilitates automatic freight container loading, unloading, and tracking at port terminals.

### System Requirements

- Power output of 60 W per port to support PTZ cameras
- Robust switches that can withstand outdoor environments
- High-reliability networks to ensure real-time image data processing and transmission
- Easy-to-use network management software for network visualization

### Why Moxa

- EDS-P506E-4PoE switches offer up to 60 W output per PoE+ link to reliably power PoE/PoE+ PTZ cameras
- High EMI/surge protection and a -40 to 75°C operating temperature range
- Support for automatic PD failure detection and device rebooting for network recovery
- Turbo Ring technology provides recovery times under 50 ms to ensure reliable data transmission
- MXview network management software enables remote monitoring and management



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## Recommended Products



### Industrial Computing

#### Computers



Computers	MC-3201 Series	MC-7400 Series	MC-1100
CPU	11th Gen Intel® Core™ i3/i5/i7 processor	6th Gen Intel® Core™ i5/i7 processor	Intel Atom® E3845/E3826
I/Os	2 x serial ports 4 x Giga LAN ports 2 x USB 3.1 (type A) ports 4 x USB 2.0 (type A) ports	9 x USB ports 5 x LAN ports 4 x COM ports	2 x USB 2.0 4 x LAN (max) 4 x RS-232/422/485 (max)
PCI/PCIe	-	-	1 x Mini PCIe slot
NMEA 0183 Ports	4	4	-
Video Output	2 x DisplayPort	1 x DVI-I, 1 x DVI-D, 1 x DisplayPort	1 x DisplayPort, 1 x VGA
Type Approvals	IEC 60946, E10	DNV, CCS	DNV

### Industrial Computing

#### Panel PCs

### Secure Remote Access Suite

#### Displays



Model Series	MPC-2240/2190	MPC-2120/2070	MD-224/219	Moxa Remote Connect Server Software
CPU	Intel® Core™ i7-3517UE / Celeron 1047UE	Intel Atom® E3826 / E384	-	<ul style="list-style-type: none"> <li>Connection Management Platform</li> <li>Centralized secure connectivity software</li> <li>Supports Amazon EC2</li> </ul>
Panel Size	24/19-inch	12/7-inch	24/19-inch	Moxa Remote Connect Client Software
Brightness	300 nits	350 nits 1000 nits	300 nits	<ul style="list-style-type: none"> <li>Windows-based connectivity and control software</li> <li>Apply to any existing application tools (e.g., controller programming tools)</li> </ul>
I/Os	4 x USB 2.0 2 x LAN 2 x RS-232/422/485	2 x USB 2.0 2 x LAN 2 x RS-232/422/485	1 x RS-232 (DB9-M) 1 x RS-422/485	Moxa Remote Connect Gateways
NMEA 0183 Ports	Up to 8 (terminal block)	-	-	<ul style="list-style-type: none"> <li>Ethernet or LTE WAN connectivity</li> <li>Up to 25 local devices per gateway</li> <li>Device-based security control with on-demand connectivity</li> </ul>
Video Output	1 x DVI-D, 1 x VGA	-	1 x DVI-D, 1 x VGA	
Type Approvals	DNV, ABS, CCS	DNV	DNV, ABS, CCS	

### Industrial Ethernet Infrastructure

#### Industrial Ethernet Switches

#### Secure Routers

#### Network Management Software



Model Series	EDS-4006	EDS-4012	IKS-6726A/6728A	Model Series	EDR-G9010	EDR-810	MXview
Switch Type	Managed	Managed	Managed	No. of Ports	10 GE (8 RJ45/2 SFP)	2 GE + 8 FE	<ul style="list-style-type: none"> <li>Network topology visualization</li> <li>Event notification alarms sent via SMS and email, or locally to a screen or siren</li> <li>Auto-backup, update, and management of the configuration file</li> </ul>
No. of Ports	8	12	26/28	Interface	WAN/LAN	WAN/LAN	
Gigabit Ethernet	-	4	2/4	Functions	Firewall/NAT/VPN/Router/Switch	NAT/Firewall/VPN	
Fast Ethernet	8	8	24	Routing	Max. 1500 Mbps	Max. 100 Mbps	
Type Approvals	DNV	DNV	DNV, ABS, LR, NK	Others	IPS/IDS	Layer 2 switching	

### PROPULSION SYSTEM

## Ship Propulsion Control System

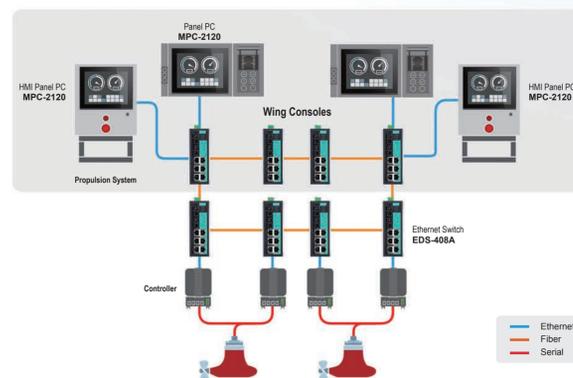
The ship propulsion control system is used to control and monitor unmanned propulsion machinery from the bridge, control room, and engine room.

### System Requirements

- Global marine-certified Ethernet switches
- Rugged products that can withstand harsh environmental conditions
- Seamless communication for continuous operation

### Why Moxa

- DNV, ABS, LR, and NK certified Ethernet switches
- MPC-2120 Series all-in-one touch panel computers for HMI displays
- Compliance with IACS UR E10/IEC 60945 standards
- Turbo Ring redundancy technology for fast recovery times under 20 ms



### ENGINE ROOM

## Engine Control Systems

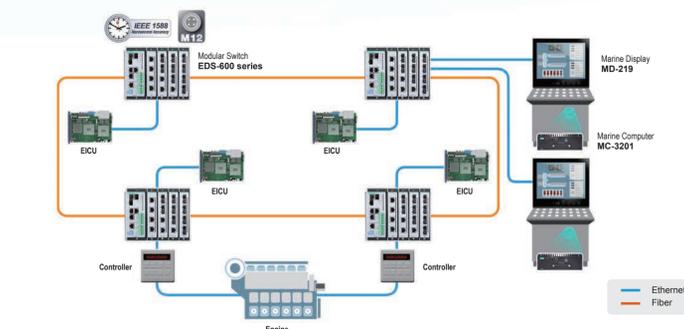
With all kinds of machinery running continuously to keep the entire ship running safe and sound, Moxa's networking and computing solutions provide superior reliability with designs that withstand the vibration, electrical noise, and heat conditions present inside engine rooms.

### System Requirements

- Rugged design with EMI/EMS resistance for engine rooms
- Compliance with IACS UR E10/IEC 60945 standards
- Seamless real-time communication for precise control
- Global marine certifications

### Why Moxa

- Rugged design compliant with IACS UR E10/IEC 60945 standards for harsh environments
- Turbo Ring redundancy technology to ensure high network availability
- QoS and IEEE 1588v2 PTP support for precise control
- Compliant with international maritime standards such as DNV, ABS, and LR



### CONTROL ROOM

## Integrated Automation System (IAS)

Moxa's marine solutions deliver reliable I/O connection and processing as well as uninterrupted networking to facilitate real-time collaboration of disparate machinery and control systems for mission-critical control rooms.

### System Requirements

- Compact size for space-restricted installation
- HMI panel computers
- Reliable network that can handle continuous operation
- Real-time monitoring of network status and events

### Why Moxa

- DIN-rail mountable MC-1100 computers and EDS switches for installation in control cabinets
- Rich I/O and network interfaces to consolidate connection of various devices
- MPC-2190 panel PCs for multiple independent displays to enable efficient monitoring
- Turbo Ring technology enables millisecond-level recovery to maximize availability
- MXview industrial network management for smart topology visibility and event traceability for troubleshooting
- DNV certification compliance to ensure long-lasting and reliable operation

