

## Creating Embedded Computing Opportunities in Marine Shipping

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Sea transport is an industry that presents many IT challenges and opportunities. The world merchant marine fleet totaled 97,504 ships (a propelled sea-going merchant vessel of at least 100 GRT) at the end of 2007, and 2,782 new ships were launched that year. Construction of new vessels is ongoing: in 2009, an estimated 40,000-80,000 embedded computers will be needed to outfit this year's newly built ships.

Moxa is a leading international provider of industrial networking and computing solutions. Moxa's dedication to providing innovative and reliable industrial grade embedded computers makes it well-positioned to deliver computing solutions for the maritime market. You can stay ahead of the competition by availing yourself of Moxa's accumulated experience and technology in certified and reliable wide-temperature, rich-connectivity IT products.

At Moxa we consider our successes to be the fruit of your success. Actively listening to our customers and truly understanding their needs, and then translating those needs into successful products and solutions, is central to achieving our goals. The expert engineering talent in Moxa Research and Development is empowered to achieve. We aspire to translate the ingenuity and commitment of our staff into successful technologies and solutions by working together in a global network of knowledge that fosters innovation and world class

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Moxa manufactures a wide array of device networking products for industrial automation. Information about all Moxa products, which include embedded computers, Ethernet switches, wireless solutions, serial device servers, multiport serial boards, media converters, USB-to-serial converters, embedded device servers, video networking products, and industrial I/O solutions, is available on Moxa's corporate website at [www.moxa.com](http://www.moxa.com).

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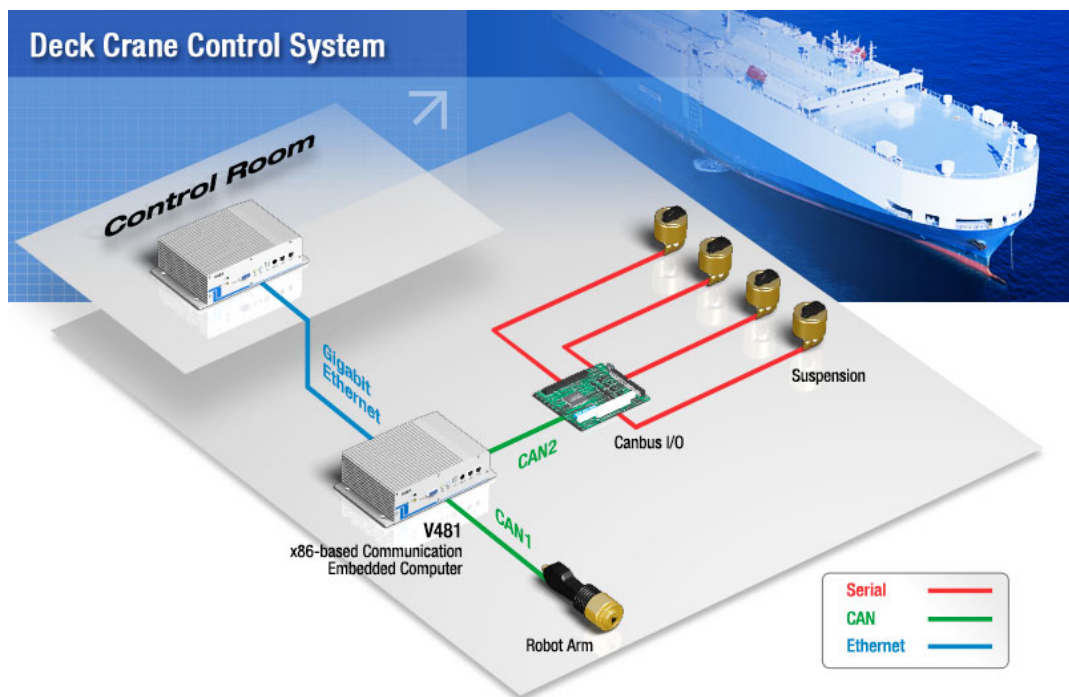
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performance.

This white paper explores the various unique challenges posed when deploying embedded computers in various locations on a seagoing vessel, and identifies how these challenges can be overcome by the rugged and robust products in Moxa's product line.

### Embedded Computers on the Deck

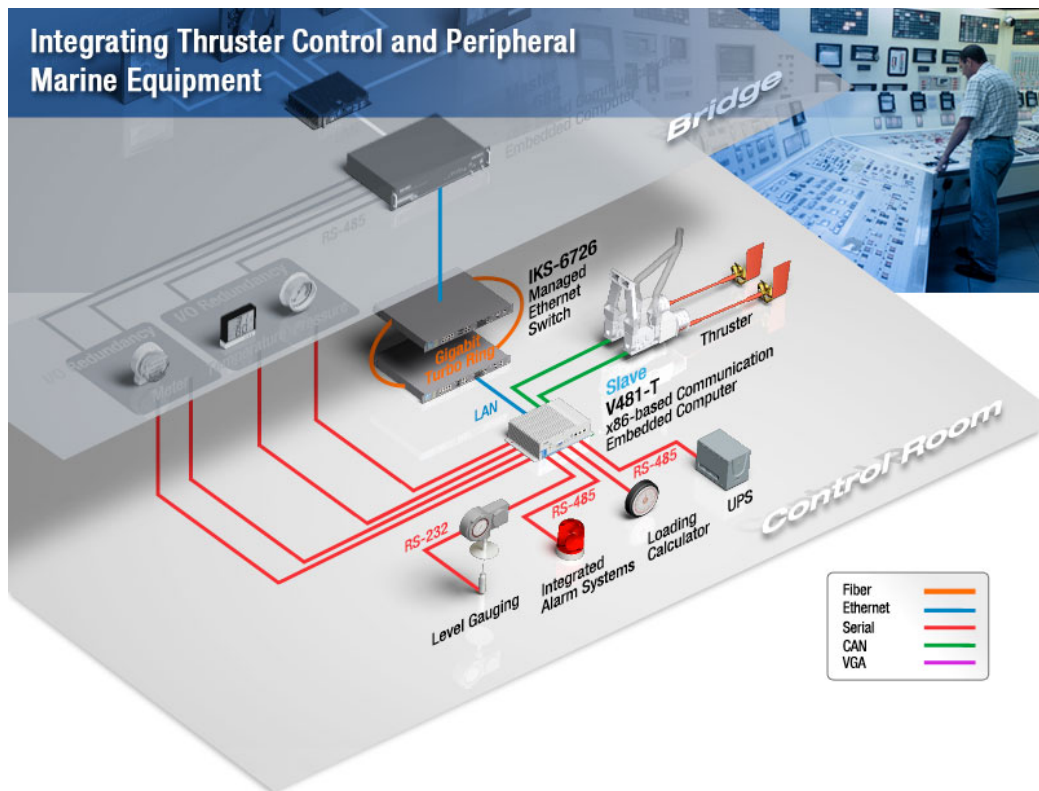
The deck is the uppermost "roof" of the ship's hull. It provides protection from the elements for the compartments below, and a structural base for the equipment above. The purpose of the primary deck is structural, providing weather protection and support for people and equipment. As a result, it must be able to carry heavy loads and deck cranes for loading and unloading cargo. In real-world applications, embedded computers are well-suited for use as controllers for connecting and controlling deck cranes.



However, to be successful, the embedded computers employed must reliably communicate with on-board deck cranes using the CANbus interface, feature a high performance CPU to ensure better and more stable system performance, and be sufficiently rugged to withstand the harsh exposure to nautical environments in which they will be deployed.

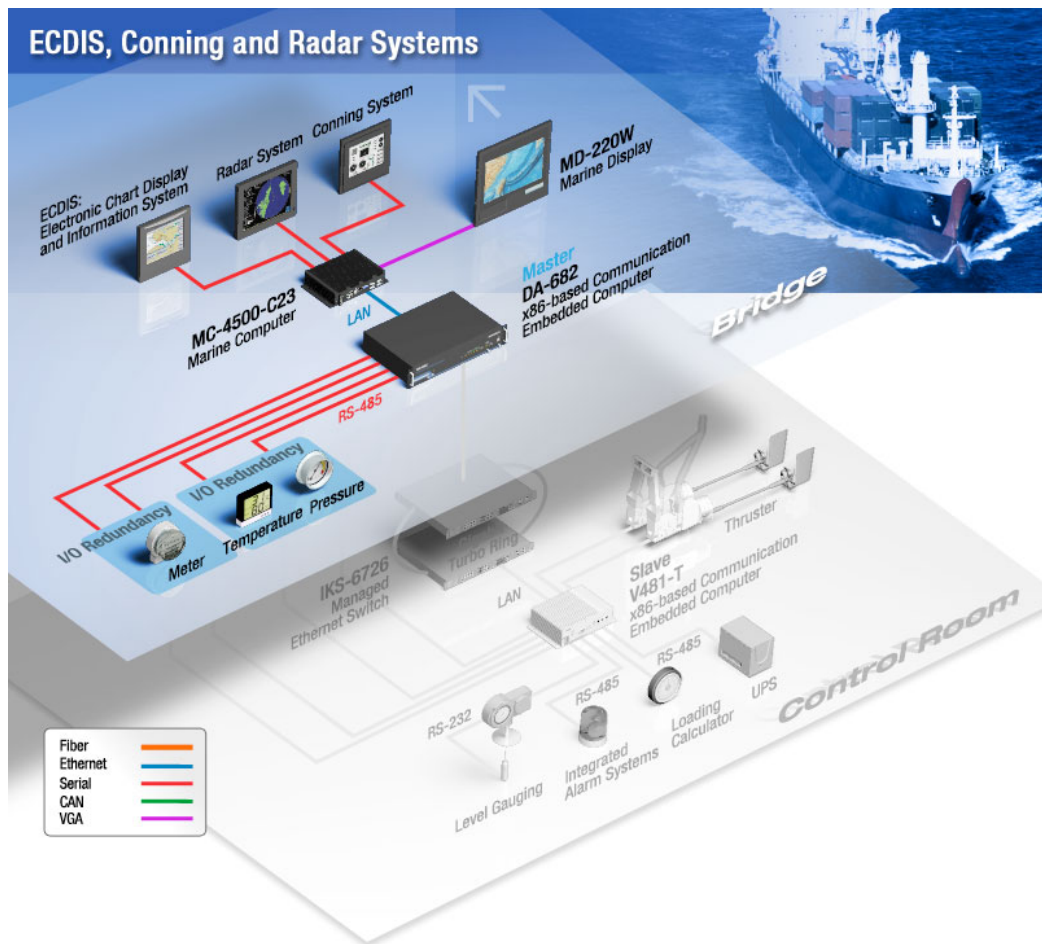
Moxa's embedded computers serve as ideal controllers for connecting deck cranes via the CANbus protocol. With the speedy communication interface, deck cranes can be fully controlled and monitored by crewmen to efficiently load and unload cargo. In addition, they feature one Gigabit (10/100/1000 Mbps) port and one Ethernet (10/100 Mbps) port to ensure network redundancy and continuous operations. Moreover, the wide operating temperature range (-35 to 75°C) allows use in any harsh setting. This makes it possible to extend the operating environments the system can operate in.

### Embedded Computers in the Control Room



In the control room, the CANbus interface is a must for controlling thrusters located in the engine room. Thanks to its CANbus interface, Moxa's V481-T embedded computer can be used as a controller to control the ship's thrusters. Four of the V481-T's 8 serial ports connect a loading calculator, level gauge for measuring the fluid levels, UPS (uninterrupted power supply) for battery backup, and an integrated alarm system for emergencies. The embedded computer in the bridge retrieves data from the V481-T via the IKS-6726 managed Ethernet switch.

### Embedded Computers on the Bridge



Moxa's MC-4500-C23 marine computer and the MD-220W marine display can be integrated with the MPC-220W-C23 marine panel PC, which not only collects data from the DA-682 embedded computer but also allows navigators to control and operate the radar system, conning system (the centralized navigation data display for the ship's command), and the ECDIS (Electronic Chart Display and Information System), a navigation information system for displaying the information from electronic navigational charts (ENC) and integrating data from the Global Positioning System (GPS) and other navigational sensors.

Moxa's DA-682 serves as a central controller located on the bridge. It controls and retrieves data from the V481 embedded computer located in the control room via the IKS-6726 managed Ethernet switch. The DA-682 is a reliable, high performance x86-based embedded computer with a rich variety of I/O interfaces. The multiple connection options can connect to temperature sensors, pressure sensors, and meters, with extra serial ports available for network redundancy.

### **Moxa's Passionate Customer Service**

- Professional and rapid RMA service
  - 5-year warranty for most products
  - 5-day TAT (Turn Around Time)
- Dedicated Post-Sales Customer Support team
  - World-wide technical case support system
  - Moxa Technical Support Certified Partners around the world for local support
- World wide logistics support
  - Customised customer packaging

## Conclusion

Embedded computers are used throughout a ship to ensure smooth operations. However, the advantages conferred by a ship's computing infrastructure would be negated if the equipment is not dependable. Moxa products feature the DNV certification, x86-based high performance CPUs, multiple connection options, network redundancy, and wide operating temperatures that are key factors in maritime applications, and once deployed they are supported by a dedicated customer service team. Moxa's embedded computers are designed to perform effectively, consistently, and durably while withstanding harsh industrial settings, and are an optimal choice for deployment in maritime shipping.

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