



## **THE MOST ADVANCED AND COMPLETE SYSTEM DEVELOPED AND DESIGNED FOR MARINE AUTOMATION**

The **Onyx Marine Automation** system has been specifically designed to offer the best solutions in terms of integration, reliability and cost-saving of which the marine world was badly in need of:

- **Weight and space reduction**
- **Optimization of time and easy installation**
- **Integration with onboard devices and reduction of costs**
- **System reliability and implementation of onboard safety**
- **Eye-catching graphics and design**
- **No limits to customized solutions and stylish integration**
- **Easy communication with the outside world**

these are plus values that a marine automation system should guarantee.

Although top-quality products, the electronic components currently used in most of the automation systems on the market offer no adequate answers because designed to satisfy the needs of the industrial and residential markets.

The unique feature of the **Onyx Marine Automation** system lies in having been able to use a completely reversed approach to the problem: instead of using the components present on the market and adapting them to the marine environment, we have created components designed to solve the problems that are specific to an onboard marine system, paying attention not to overlook those aspects linked to the production and sales of the Yacht product.

From this analysis and thanks to strong partnerships with other important electronic companies, **Onyx Marine Automation** has developed and created hardware and software components that make our system the most advanced and complete currently present on the marine automation market. The only one designed to satisfy the specific needs of this market.

### **RELIABILITY**

**Onyx Marine Automation** electronic modules are specifically designed to be used in the marine environment. Each component is accurately tested after

production, thus assuring reliability and functionality. The electronic components are of top-quality and suitable for extended temperature ranges (-20 to +85 °C).

Protection class becomes IP65 when the modules are mounted inside the specifically designed OnyxBox: case in extruded anodized aluminum, ABS self-extinguishing sides with sealing gaskets in moving parts and cable glands.

### **CONTROL**

Our OM-6xx series touch-screen panels are based on **Onyx Marine Automation** specifications and are manufactured by one of the most important European companies in this field. Reliability, design and robustness are the key points of these panels which - together with the functional specifications designed for the marine market - make them a unique product, very difficult to imitate.

The front IP66 protection class, the screen visibility also under severe conditions and the powder-coated aluminum case make them suitable for outdoor installations also under harsh and rigorous conditions.

For PC-based applications, a wide range of choice is available among the best PC's and displays currently manufactured for the marine market by the most important players in this field.

### **POWER**

The **OM-430** CPU is a module based on a very powerful microprocessor with enhanced calculating capacities, built-in inputs for direct data acquisition, complete independent networks and outstanding management of the different communication protocols.

### **CONNECTIVITY**

**Ethernet high-level communication network:** an Ethernet network used for high-level communication allows connections to multiple types of operator's interface. In addition to the standard unit provided (that can be either operating panels or PC), it is possible to repeat the data on any onboard PC, laptop or portable device, using wired or WiFi connections.

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**CAN Bus low-level communication network:** the use of a **CAN Bus** network to communicate with the field modules allows for unparalleled stability and reliability.

## SAFETY

**Redundant architecture:** our monitoring and control system can be configured to support full redundancy of the CPU (with a second CPU in hot-backup mode) and the networks (both Ethernet and CANbus). This ensures unsurpassed reliability of the system and peace of mind for the ship's Owner.

**Remote control:** remote notification of alarms, both via SMS and PABX (for onboard crew paging) is possible, as well as remote monitoring of the system through Internet . From your home PC or from a laptop you can operate as if you were working with the onboard control panel.

**Access to the system functions:** access to the system functions can be protected or limited through a password of different levels or through various identification systems (electronic badges, biometric identification systems, etc.).

## INTEGRATION

The remarkable aptitude for integration of **Onyx Marine Automation** components, a feature of ever growing importance onboard, does in no way affect the reliability of the automation system.

The unique features of the **OM-430** CPU, the Ethernet and CANbus networks, the SCADA software for on-board use of displays and PCs, together with a great number of protocols developed in collaboration with several marine manufacturers, allow communicating with, interfacing with, and managing most of the onboard systems, always keeping total control of the entire automation system:

- Air conditioning and refrigerating systems;
- Domotic and light control systems;
- Entertainment systems;
- Anti-intrusion systems;
- Fire detection and alarm systems;
- Engines;
- Generators, automatic or manual parallel and power management systems;
- and much more...

## TECHNICAL SUPPORT

Technical support is granted both at national and international level thanks to our network of authorized installers and to our in-house technicians prepared to

identify the problems and find the solutions for each single project.

The technical features of the **Onyx Marine Automation** electronic modules, together with the various possible remote connections allow us to carry out software updates and functional checks without the need of our technical staff onboard, with great cost and time savings.

Furthermore, such functionalities give us the opportunity to implement any system function even after the project has been defined.

## CUSTOMER CARE AND SERVICE

Thanks to the powerful **OM-430** processor, the system can carry out functional tests, detect anomalies and automatically restore the correct settings once the failure has been removed. For example, in case of module malfunctioning, the system sets off an alarm which guides the operator during the replacement of the faulty component (a simple process of disconnection and reconnection of cables). The system subsequently proceeds to recognizing the new module and to automatically reprogramming it correctly, thus restoring full functionality to the system. Remote technical support service can be supplied by our technical staff through remote access connection.

The possibility offered by **Onyx Marine Automation** systems to memorize in a database the functional data of the onboard technical systems connected to the automation system greatly helps maintenance management.

Thanks to the **plug-and-play** feature of each module and to the possibility of remotely update the software, maintenance and repair can also be carried out by non-qualified personnel that can be easily found locally or even onboard, thus drastically reducing timing and service costs.

The modularity and flexibility of the self-programmable **Onyx Marine Automation** modules make it very simple and cost effective to supply spare-parts kits.

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## OM-110B

The **OM-110B module** features 8 PNP/NPN opto-isolated digital inputs and 8 PNP digital outputs protected against short circuit. The PNP/NPN mode can be configured by means of jumpers. This module is the ideal solution for managing remote I/O points, or for dimmer-controlled lights since it can be easily interfaced with commercial dimmers featuring switch-on feedback signal. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

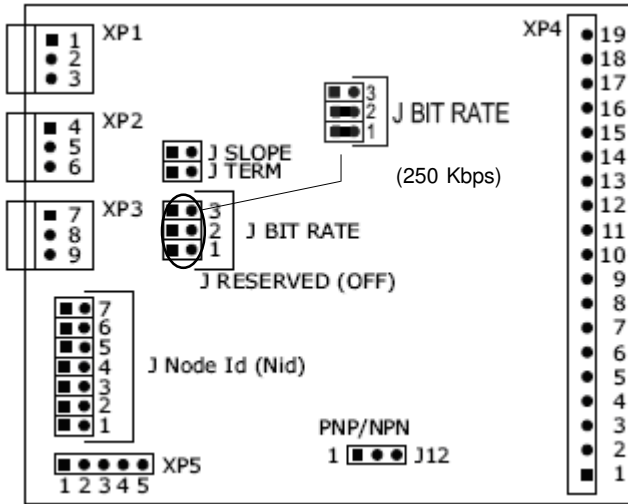


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 8 NPN/PNP digital inputs + 8 24V 0.5A PNP outputs
- 100Hz standard inputs
- Fast inputs for 400Hz counters
- Operating temperature: -20...85 °C
- Size: 92×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

Layout:



Connections:

## POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

## CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

- J12            1-2 PNP mode inputs
- J12            2-3 NPN mode inputs
- J Term        CAN bus network termination

## CONNECTIONS OF TERMINALS

- XP4.1 COM +24VDC
- XP4.2 COM +24VDC
- XP4.3 REF GND
- XP4.4 In1 PNP/NPN
- XP4.5 In2 PNP/NPN
- XP4.6 In3 PNP/NPN
- XP4.7 In4 PNP/NPN
- XP4.8 In5 PNP/NPN
- XP4.9 In6 PNP/NPN
- XP4.10 In7 PNP (\*\*)/NPN
- XP4.11 In8 PNP (\*\*)/NPN
- XP4.12 Out1 PNP
- XP4.13 Out2 PNP
- XP4.14 Out3 PNP
- XP4.15 Out4 PNP
- XP4.16 Out5 PNP
- XP4.17 Out6 PNP
- XP4.18 Out7 PNP
- XP4.19 Out8 PNP

(\*\*) Fast inputs when used as counters



## OM-115B

**The OM-115B module** features specific firmware to handle the switching of up to 8 cabin lights: simply connect one or more pushbuttons to each input and a 24VDC or 220VAC power relay to each output.

Each time an input pushbutton is pressed, the module will switch the relevant output (step-by-step relay function). This allows the supervisor to read the status or switch on/off the lights via CAN bus. The module works also in stand-alone modes, without connection to the CAN network. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

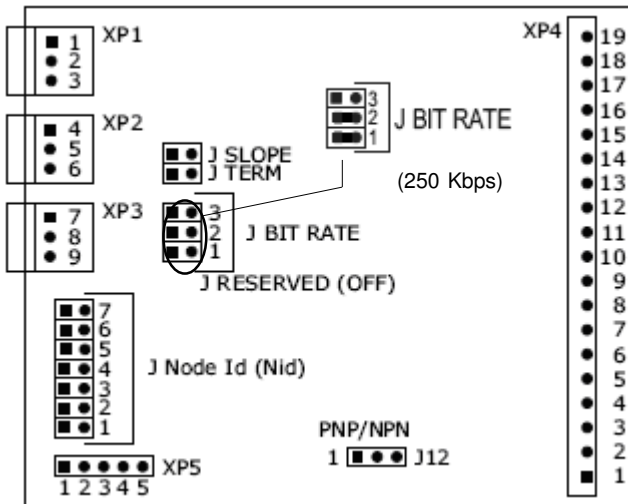


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 8 NPN/PNP digital inputs + 8 24V 0.5A PNP outputs
- 100Hz standard inputs
- Fast inputs for 400Hz counters
- Operating temperature: -20...85 °C
- Size: 92×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

Layout:



Connections:

## POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

## CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

- J12            1-2 PNP mode inputs
- J12            2-3 NPN mode inputs
- J Term        CAN bus network termination

## CONNECTIONS OF TERMINALS

- XP4.1 COM +24VDC
- XP4.2 COM +24VDC
- XP4.3 REF GND
- XP4.4 In1 PNP/NPN
- XP4.5 In2 PNP/NPN
- XP4.6 In3 PNP/NPN
- XP4.7 In4 PNP/NPN
- XP4.8 In5 PNP/NPN
- XP4.9 In6 PNP/NPN
- XP4.10 In7 PNP (\*\*)/NPN
- XP4.11 In8 PNP (\*\*)/NPN
- XP4.12 Out1 PNP
- XP4.13 Out2 PNP
- XP4.14 Out3 PNP
- XP4.15 Out4 PNP
- XP4.16 Out5 PNP
- XP4.17 Out6 PNP
- XP4.18 Out7 PNP
- XP4.19 Out8 PNP

(\*\*) Fast inputs when used as counters



## OM-135B OM-145B OM-145B-AL01

**The OM-135B module** features 16 PNP opto-isolated digital inputs and 16 PNP digital outputs protected against short circuit. Equipped with a series of input diodes that avoids current returns when the module is switched off, it allows the parallel connection of inputs to discrete backup circuits for alarm detection.

**The OM-145B module** features 16 NPN opto-isolated digital inputs and 16 PNP digital outputs protected against short circuit. Equipped with

a series of input diodes that avoids current returns when the module is switched off, it allows the parallel connection of inputs to discrete backup circuits for alarm detection.

**The OM-145B-AL01 module** is equipped with a special version of the firmware, featuring the annunciator sequence ISA-A (options 1-14) according to the ISA 18.1-2004 standard (formerly named ISA-1 sequence). This function allows using the module as a stand-alone alarm annunciator, when disconnected from the network, or as an alarm module when connected to the automation system. Up to 13 alarm inputs are provided, as well as a power check input and a watchdog output.

Like all Onyx Marine Automation components, these modules have been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make them invaluable elements for modern marine automation systems.

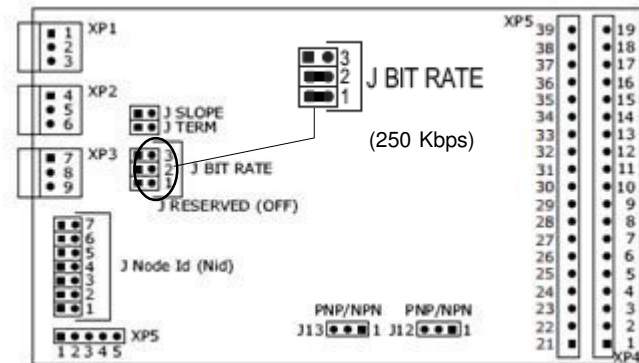


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 16 24V PNP digital inputs (mod. OM-135B) with diodes against reverse currents
- 16 24V NPN digital inputs (mod. OM-145B) with diodes against reverse currents
- 16 24V 0.5A PNP digital outputs (all models). 3A digital outputs version available, please contact Onyx Marine Automation for further details
- 100Hz standard inputs
- Fast inputs for 400Hz counters
- Operating temperature: -20...85 °C
- Size: 128×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

### BUS CAN CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

## CONNECTIONS OF TERMINALS

### OM-135B

- |                  |                     |
|------------------|---------------------|
| XP4.1 COM +24VDC | XP5.21 COM +24VDC   |
| XP4.2 COM +24VDC | XP5.22 COM +24VDC   |
| XP4.3 REF GND    | XP5.23 REF GND      |
| XP4.4 In1 PNP    | XP5.24 In9 PNP      |
| XP4.5 In2 PNP    | XP5.25 In10 PNP     |
| XP4.6 In3 PNP    | XP5.26 In11 PNP     |
| XP4.7 In4 PNP    | XP5.27 In12 PNP     |
| XP4.8 In5 PNP    | XP5.28 In13 PNP     |
| XP4.9 In6 PNP    | XP5.29 In14 PNP     |
| XP4.10 In7 PNP   | XP5.30 In15 PNP(**) |
| XP4.11 In8 PNP   | XP5.31 In16 PNP(**) |
| XP4.12 Out1 PNP  | XP5.32 Out9 PNP     |
| XP4.13 Out2 PNP  | XP5.33 Out10 PNP    |
| XP4.14 Out3 PNP  | XP5.34 Out11 PNP    |
| XP4.15 Out4 PNP  | XP5.35 Out12 PNP    |
| XP4.16 Out5 PNP  | XP5.36 Out13 PNP    |
| XP4.17 Out6 PNP  | XP5.37 Out14 PNP    |
| XP4.18 Out7 PNP  | XP5.38 Out15 PNP    |
| XP4.19 Out8 PNP  | XP5.39 Out16 PNP    |

(\*\*) Fast inputs when used as counters

## CONNECTIONS OF TERMINALS

### OM-145B

- |                  |                     |
|------------------|---------------------|
| XP4.1 COM +24VDC | XP5.21 COM +24VDC   |
| XP4.2 COM +24VDC | XP5.22 COM +24VDC   |
| XP4.3 REF GND    | XP5.23 REF GND      |
| XP4.4 In1 NPN    | XP5.24 In9 NPN      |
| XP4.5 In2 NPN    | XP5.25 In10 NPN     |
| XP4.6 In3 NPN    | XP5.26 In11 NPN     |
| XP4.7 In4 NPN    | XP5.27 In12 NPN     |
| XP4.8 In5 NPN    | XP5.28 In13 NPN     |
| XP4.9 In6 NPN    | XP5.29 In14 NPN     |
| XP4.10 In7 NPN   | XP5.30 In15 NPN(**) |
| XP4.11 In8 NPN   | XP5.31 In16 NPN(**) |
| XP4.12 Out1 PNP  | XP5.32 Out9 PNP     |
| XP4.13 Out2 PNP  | XP5.33 Out10 PNP    |
| XP4.14 Out3 PNP  | XP5.34 Out11 PNP    |
| XP4.15 Out4 PNP  | XP5.35 Out12 PNP    |
| XP4.16 Out5 PNP  | XP5.36 Out13 PNP    |
| XP4.17 Out6 PNP  | XP5.37 Out14 PNP    |
| XP4.18 Out7 PNP  | XP5.38 Out15 PNP    |
| XP4.19 Out8 PNP  | XP5.39 Out16 PNP    |

## CONNECTION OF TERMINALS

### OM-145B-AL01

- XP4.1 COM +24VDC
- XP4.2 COM +24VDC
- XP4.3 REF GND
- XP4.4 - XP4.11 Alarm inputs 1..8 NPN (active low)
- XP5.24 - XP5.28 Alarm inputs 9..13 NPN (active low)
- XP5.29 - Power check input NPN (active low)
- XP5.30 Alarm acknowledge pushbutton input NPN
- XP5.31 Lamp test pushbutton input NPN
- XP4.12 - XP4.19 Alarm lamp outputs 1-8
- XP5.32 - XP5.36 Alarm lamp outputs 9..13
- XP5.37 Watchdog/power failure output
- XP5.38 Alarm lamp cumulative output
- XP5.39 Alarm buzzer output

## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term CAN bus network termination

**Note:** the OM-145B-AL01 module is designed for fail-safe operations. For this reason the alarm inputs are active low (i.e., a broken wire generates the alarm). It is possible to change this logic to non fail-safe (active high inputs) by closing terminals XP5.1 and XP5.2 with a jumper. In this configuration, the XP5.29 input 14 works the same way as inputs 1..13, thus increasing the number of alarms channels to 14. In this case the module is no longer Type Approved and cannot be used in systems that are subject to class notation.



This product complies with EMC protection requirements of the 89/336/CEE directive and subsequent changes



Product subject to separate disposal in accordance with the 2002/96/EC directive





## OM-130B OM-140B

The **OM-130B** and **OM-140B** modules feature 16 PNP (mod. OM-130B) or NPN (mod. OM-140B) opto-isolated digital inputs. All inputs are equipped with a series of diodes that avoids current returns when the module is switched off and allows the parallel connection of inputs to external backup circuits for alarm detection. Like all Onyx Marine Automation components, these modules have been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make them invaluable elements for modern marine automation systems.

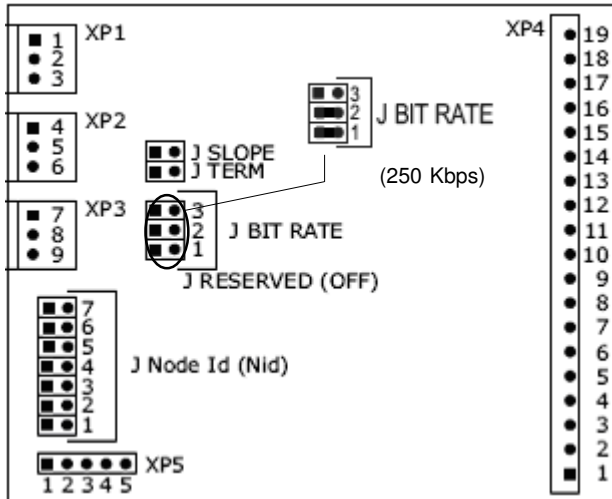


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 16 24V PNP digital inputs (mod. OM-130B) with diodes against reverse currents
- 16 24V NPN digital inputs (mod. OM-140B) with diodes against reverse currents
- 100Hz standard inputs
- Fast inputs for 400Hz counters
- Operating temperature: -20...85 °C
- Size: 92×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

### CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CHIUSO	1
OPEN	OPEN	OPEN	OPEN	OPEN	CHIUSO	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CHIUSO	CHIUSO	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
---	---	---	---	---	---	---	---
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term                      CAN bus network termination

### CONNECTIONS OF TERMINALS

#### OM-130B

- XP4.1 COM A +24VDC
- XP4.2 COM B +24VDC
- XP4.3 REF GND
- XP4.4 In1 PNP
- XP4.5 In2 PNP
- XP4.6 In3 PNP
- XP4.7 In4 PNP
- XP4.8 In5 PNP
- XP4.9 In6 PNP
- XP4.10 In7 PNP
- XP4.11 In8 PNP
- XP4.12 In9 PNP
- XP4.13 In10 PNP
- XP4.14 In11 PNP
- XP4.15 In12 PNP
- XP4.16 In13 PNP
- XP4.17 In14 PNP
- XP4.18 In15 PNP (\*)
- XP4.19 In16 PNP (\*)

#### OM-140B

- XP4.1 NC
- XP4.2 NC
- XP4.3 REF +24VDC
- XP4.4 In1 NPN
- XP4.5 In2 NPN
- XP4.6 In3 NPN
- XP4.7 In4 NPN
- XP4.8 In5 NPN
- XP4.9 In6 NPN
- XP4.10 In7 NPN
- XP4.11 In8 NPN
- XP4.12 In9 NPN
- XP4.13 In10 NPN
- XP4.14 In11 NPN
- XP4.15 In12 NPN
- XP4.16 In13 NPN
- XP4.17 In14 NPN
- XP4.18 In15 NPN (\*\*)
- XP4.19 In16 NPN (\*\*)

(\*) Fast inputs when used as counters



## OM-150B

The **OM-150B module** features 16 PNP digital outputs.

Each output supplies up to 500mA current and is protected against short circuit.

Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

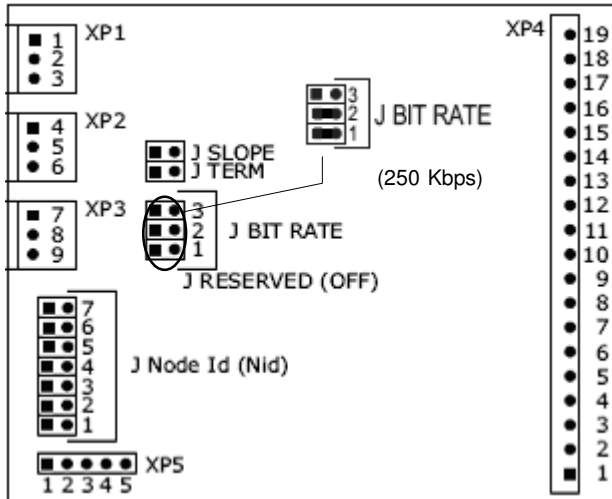


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 16 24V 0.5A PNP digital outputs
- Operating temperature: -20...85 °C
- Size: 92×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

Layout:



Connections:

## POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

## CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term                      CAN bus network termination

## CONNECTIONS OF TERMINALS

### OM-150B

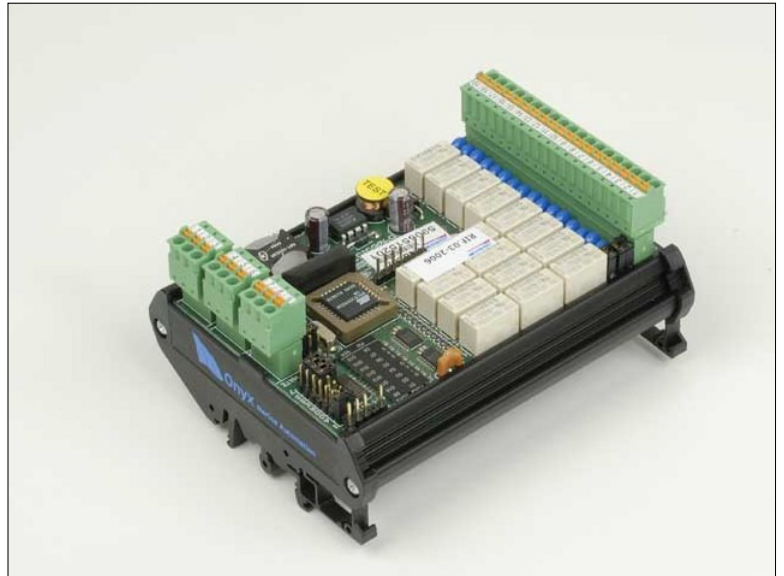
- XP4.1 +24VDC
- XP4.2 +24VDC
- XP4.3 GND
- XP4.4 OUT1
- XP4.5 OUT2
- XP4.6 OUT3
- XP4.7 OUT4
- XP4.8 OUT5
- XP4.9 OUT6
- XP4.10 OUT7
- XP4.11 OUT8
- XP4.12 OUT9
- XP4.13 OUT10
- XP4.14 OUT11
- XP4.15 OUT12
- XP4.16 OUT13
- XP4.17 OUT14
- XP4.18 OUT15
- XP4.19 OUT16

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## OM-160B

The **OM-160B module** features 16 digital outputs with 24VDC 1A dry contacts. The main feature of this model is the use of three different common lines to form up to three groups of completely independent relays. This module can be configured by means of jumpers. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

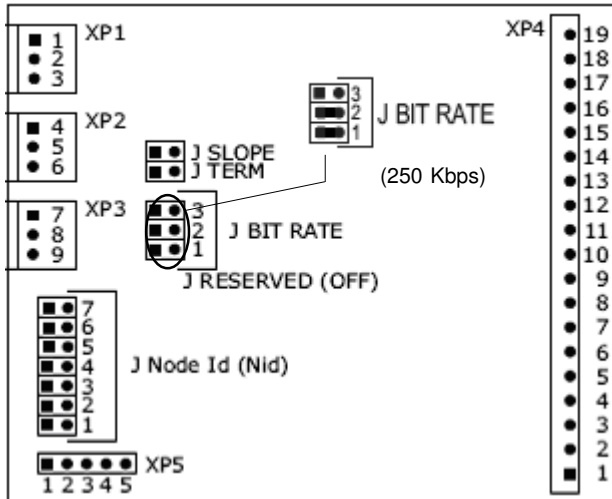


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 16 digital outputs:
  - 24VDC max 1 A
  - 110VAC max 0.3A
  - 240VAC max 0.2A
  - (in case of use of a single COM: max. current = 0.2A)
- Operating temperature: -20...85 °C
- Size: 117×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

Layout:



Connections:

### POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

### CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

- JC1 + JC2 Joins COM\_A to COM\_B
- JC3 Joins COM\_B to COM\_C
- J Term CAN bus network termination

### CONNECTIONS OF TERMINALS

#### OM-160B

- XP4.1 COM\_A (\*)
- XP4.2 COM\_B (\*)
- XP4.3 COM\_C (\*)
- XP4.4 OUT1
- XP4.5 OUT2
- XP4.6 OUT3
- XP4.7 OUT4
- XP4.8 OUT5
- XP4.9 OUT6
- XP4.10 OUT7
- XP4.11 OUT8
- XP4.12 OUT9
- XP4.13 OUT10
- XP4.14 OUT11
- XP4.15 OUT12
- XP4.16 OUT13
- XP4.17 OUT14
- XP4.18 OUT15
- XP4.19 OUT16

(\*) The 16 relay outputs are referred to 3 common lines:  
 COM\_A: for the outputs OUT1 to OUT6  
 COM\_B: for the outputs OUT7 to OUT11  
 COM\_C: for the outputs OUT12 to OUT16  
 The JC1, JC2 and JC3 jumpers allow connecting all the outputs to the same COM with max. current = 0.2A (each channel).



## OM-170B

**The OM-170B module** features 16 opto-isolated digital 230 VAC inputs and allows the connection of mains voltage directly to the terminal board. It can be used to detect the presence of mains voltage on power supply sources, or get the feedback signals coming from 230VAC devices, taking them directly from the load. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

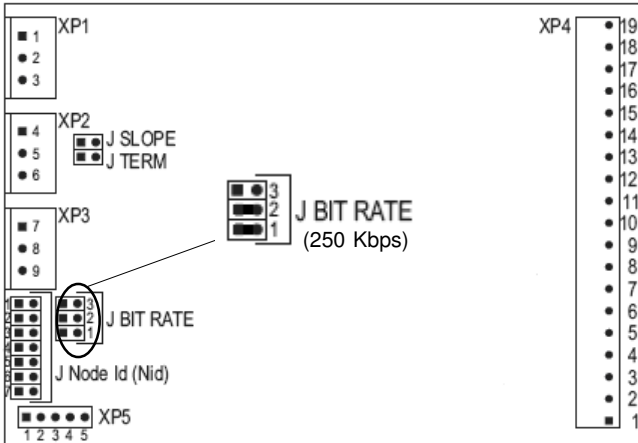


## Technical Data

- T89C51CC02 40MHz CPU
- Full CAN 2.0 A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 512 byte RAM memory
- 16 + 2 Kbyte EPROM FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 16 digital inputs 230VAC
- Cover protecting against accidental electrical shock
- Operating temperature: -20...85 °C
- Size: 117×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS

# Device Layout

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

### CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF

## Jumpers:

### J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term                      CAN bus network termination

## CONNECTIONS OF TERMINALS

- XP4.1 COM Neutral
- XP4.2 NC
- XP4.3 NC
- XP4.4 In1 Line
- XP4.5 In2 Line
- XP4.6 In3 Line
- XP4.7 In4 Line
- XP4.8 In5 Line
- XP4.9 In6 Line
- XP4.10 In7 Line
- XP4.11 In8 Line
- XP4.12 In9 Line
- XP4.13 In10 Line
- XP4.14 In11 Line
- XP4.15 In12 Line
- XP4.16 In13 Line
- XP4.17 In14 Line
- XP4.18 In15 Line
- XP4.19 In16 Line

NOTE: The module is designed for usage in TN (earthed neutral) systems only. Do not use in IT/TT systems as unwanted voltage can return through the inputs. The maximum voltage allowed between each input and the COM line is 230VAC. Make sure there are no unwanted current returns through the COM reference terminal block.

NOTE: this module is designed for single-phase use. In three-phase systems use a separate module for each phase.





## OM-210B

**The OM-210B module** is the ideal solution for the acquisition of the voltage/current analog signals normally used on the onboard automation systems. Featuring 8 software-programmable input channels, it can be interfaced with 4-20mA analog sensors (level transducers, electronic TA, signal converters, etc.) and allows monitoring directly the battery voltage (0-40V), as well as measuring the current with shunt (0-200mV). The maximum common mode voltage allowed (max. 40V) ensures the connection of the shunt to the positive branch. This module also features two digital inputs that can be used as frequency



meters for interfacing with analog revs counters. The completely programmable inputs allow configuring the module after installation. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

## Technical Data

- 32 bit, ARM7 60MHz CPU
- Full CAN 2.0A and 2.0B interfaces
- RS232 interface
- 128Kbyte FLASH memory
- 16Kbyte RAM memory
- 2Kbyte EEPROM memory
- 0.3A 24VDC (18-32VDC) power supply
- Operating temperature: -20...85 °C
- Size: 117x82x56 mm
- EN50022 DIN bar mounting
- Isolation of I/O analog points from power supply voltage and isolation between points up to 60V common mode
- Software-configurable

### SECTION OF VOLTAGE/CURRENT INPUTS

- Number of inputs: 8 differential
- Ranges: 4-20 mA, 0-200 mV, 0-40 V
- Max. common mode voltage: -3...+40VDC
- Conversion: 12 bit
- Sampling rate: 1KHz

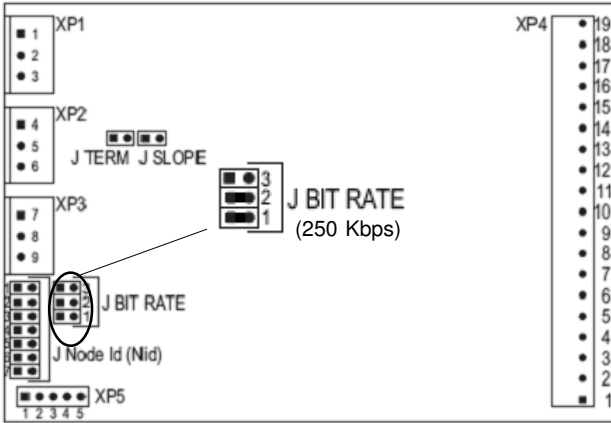
- Bandwidth: 25Hz to 500Hz, according to digital filter parameters
- Accuracy: 1% FS
- Input resistance: 0-40 V: 2KOhm;  
4-20 mA: 220Ohm; 0-200 mV: 220Ohm

### SECTION OF FREQUENCY INPUTS

- Number of inputs: 2 digital
- Type of inputs: 0-40 V, switching threshold between 2.5V and 3.5V
- Conversion: 16-bit
- Bandwidth: 6KHz
- Resolution: 0.1Hz
- Protection of input stage:  $\pm 2000V$  (electrostatic discharges)
- Certifications: CE, RINA, ABS, LRS

# Device Layout

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

- XP1.1 +24VDC
- XP1.2 GND
- XP1.3 GROUND (PE)

### CAN BUS CONNECTION

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF.
- XP3.7 CANH
- XP3.8 CANL
- XP3.9 REF.

## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term                      CAN bus network termination

### CONNECTIONS OF TERMINALS

- XP4.1 In 1+
- XP4.2 In 1 -
- XP4.3 In 2+
- XP4.4 In 2 -
- XP4.5 In 3+
- XP4.6 In 3 -
- XP4.7 In 4+
- XP4.8 In 4 -
- XP4.9 In 5+
- XP4.10 In 5 -
- XP4.11 In 6+
- XP4.12 In 6 -
- XP4.13 In 7+
- XP4.14 In 7 -
- XP4.15 In 8+ (\*)
- XP4.16 In 8 - (\*)

- XP4.16 Freq. In 1- (\*)
- XP4.17 Freq. In 1+ (\*)
- XP4.18 Freq. In 2-
- XP4.19 Freq. In 2+

(\*) The use of the first frequency input does not allow using the XP4.15 and XP4.16 terminals and the corresponding V/I In8+/In8- input



This product complies with EMC protection requirements of the 89 / 336 / CEE directive and subsequent changes



Product subject to separate disposal in accordance with the 2002/96/EC directive



## OM-220B OM-230B OM-240B

V.2018



This new series represents the state-of-the-art of the analog modules by Onyx Marine Automation. Based on a powerful ARM processor, the modules feature unsurpassed performance and flexibility. **The OM-220B module** features 4 analog inputs that can be individually programmed and interfaced with temperature sensors (thermocouples, temperature resistors and PT100) as well as resistive sensors, such as level, position and pressure sensors.

**The OM-230B module** features 4 analog output channels, that can be used to control the devices by means of voltage modulated analog signals. The single or dual output signal, ranging from 0-5V to 0-10V, can be selected by jumpers. **The OM-240B module** offers the characteristics of both module above, featuring 4 analog inputs and 4 analog outputs, with the same performance of the OM-220B and OM-230B modules. Like all Onyx Marine Automation components, these modules have been specifically designed for the marine environment, with extended temperature range components (-20 to +85 °C) and Type Approval certification.

## Technical Data

- ARM Cortex XMC4500 CPU
- Full CAN 2.0A and 2.0B interfaces
- RS232 interface
- 32Kbyte FLASH memory
- 1280 byte RAM memory
- 2Kbyte EEPROM memory
- 0.3A 24VDC (18÷32VDC) power supply
- Operating temperature: -20...85 °C
- Size: 117×82×56 mm
- EN50022 DIN bar mounting
- Certifications: CE, RINA, ABS, LRS
- Isolation of I/O points from supply voltage
- Inputs (OM-250B, OM-270B): 4, differential
- Outputs (OM-240B, OM-270B): 4, single/dual

### INPUT SECTION (OM-220B, OM-240B)

- Types of configurable inputs:  
J, K, T, R and S thermocouples  
2 or 3- wire Pt100-Pt1000

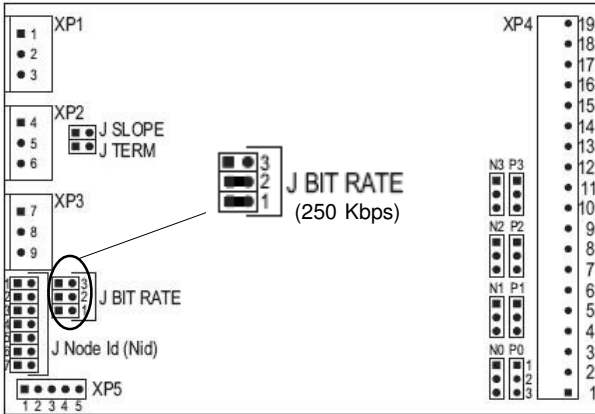
- 0÷10 KOhm resistors
- Conversion: 16 bit
- Bandwidth: 0-10 Hz
- Resolution: 0.1 °C
- Accuracy: < 0.2% FS (25 °C)
- Protection of input stage: ±2000V (ESD)

### OUTPUT SECTION (OM-230B, OM-240B)

- Output impedance: 0.1 ohm
- Output range:  
0..5 V, 0..10 V, -5..5 V, -10..10 V
- Max. output current: 2mA
- Conversion: 12 bit
- Max. setup time: 10usec.
- Coding: Binary Code
- Max. output update frequency: 1KHz
- Accuracy: ±1% FS
- Protection against short circuit (output)

# Device Layout

## Layout:



## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

J Term                      CAN bus network termination  
 Px - Nx                      To be inserted always in positions  
    1 - 2

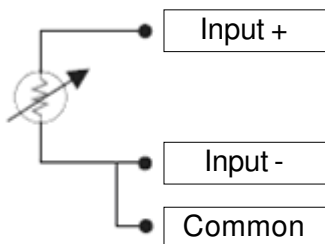
## Output mode (OM-230B, OM-240B):

BIPx:    ON → dual voltage output ( $\pm 10V/\pm 5V$ )  
           OFF → single voltage output (0-10V/0-5V)

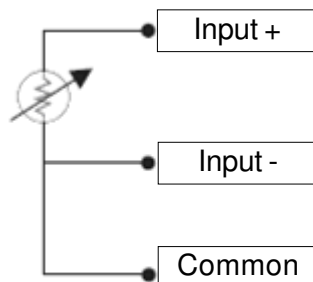
AV 1/2x: ON → output with gain 1/2 (0-5V/ $\pm 5V$ )  
           OFF → output with gain 1 (0-10V/ $\pm 10V$ )

## Connections of sensors (OM-220B, OM-240B):

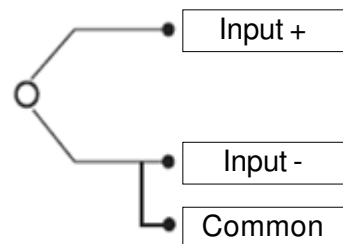
- 2-wire temperature resistor



- 3-wire temperature resistor



- Thermocouples



## Connections:

### POWER SUPPLY CONNECTION

XP1.1 +24VDC  
 XP1.2 GND  
 XP1.3 GROUND (PE)

### CAN BUS CONNECTION

XP2.4 CANH  
 XP2.5 CANL  
 XP2.6 REF.  
 XP3.7 CANH  
 XP3.8 CANL  
 XP3.9 REF.

### CONNECTIONS OF TERMINALS

#### INPUTS (OM-220B, OM-240B)

XP4.1 Input 0 +  
 XP4.2 Input 0 -  
 XP4.3 Common 0  
 XP4.4 Input 1 +  
 XP4.5 Input 1 -  
 XP4.6 Common 1  
 XP4.7 Input 2 +  
 XP4.8 Input 2 -  
 XP4.9 Common 2  
 XP4.10 Input 3 +  
 XP4.11 Input 3 -  
 XP4.12 Common 3

#### OUTPUTS (OM-230B, OM-240B)

XP4.13 Analog output 0  
 XP4.14 Common analog outputs  
 XP4.15 Analog output 1  
 XP4.16 Common analog outputs  
 XP4.17 Analog output 2  
 XP4.18 Common analog outputs  
 XP4.19 Analog output 3

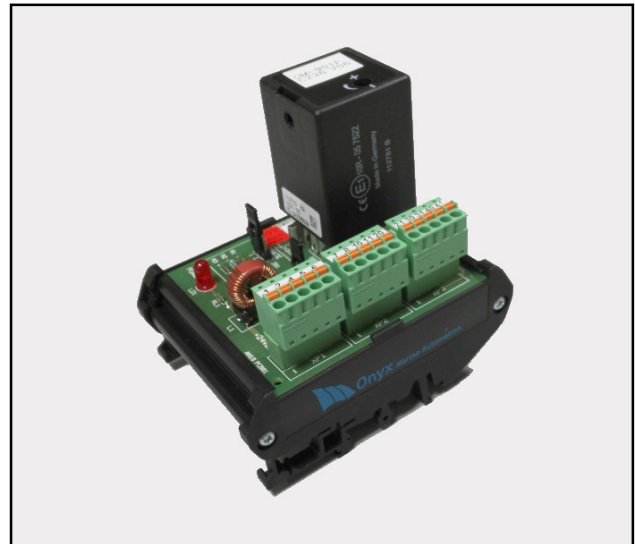


## OM-275B

The **OM-275B module** is the ideal solution for generating 0-10V or 4-20mA signals in analog-driven application.

Featuring 4 software-programmable output channels, it can be interfaced with 0-10V or 4-20mA analog devices, like inverters or engine governors.

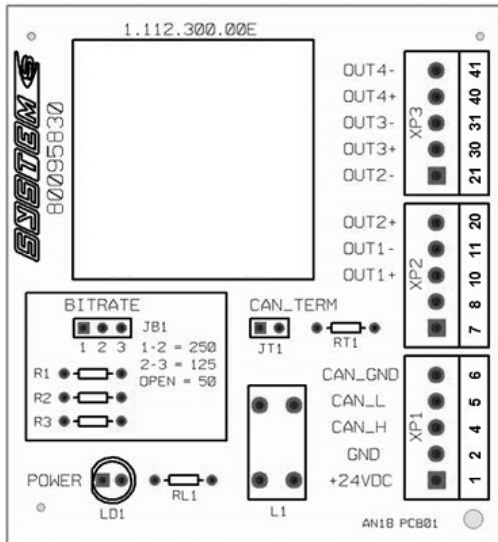
Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.



## Technical Data

- ARM7 Freescale S08DZ60 CPU
- Full CAN 2.0A and 2.0B interfaces
- 24VDC (18÷32VDC) power supply
- Operating temperature: -40...85 °C
- Size: 70×85×80 mm
- EN50022 DIN bar mounting
- Isolation of I/O analog points from power supply voltage
- Number of outputs: 4
- Ranges: 0...10 V, 4-20mA (software-selectable)
- Certifications: CE, RINA, ABS, LRS

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

XP1.1 +24VDC  
XP1.2 GND

### CAN BUS CONNECTION

XP1.4 CANH  
XP1.5 CANL  
XP1.6 REF.

## Jumpers:

CAN Term	CAN bus network termination
BITRATE	1-2 = 250 kbps 2-3 = 125 kbps open = 50 kbps

### CONNECTIONS OF TERMINALS

XP2.10	Out 1+
XP2.11	Out 1 -
XP2.20	Out 2+
XP3.21	Out 2 -
XP3.30	Out 3+
XP3.31	Out 3 -
XP3.40	Out 4+
XP3.41	Out 4 -

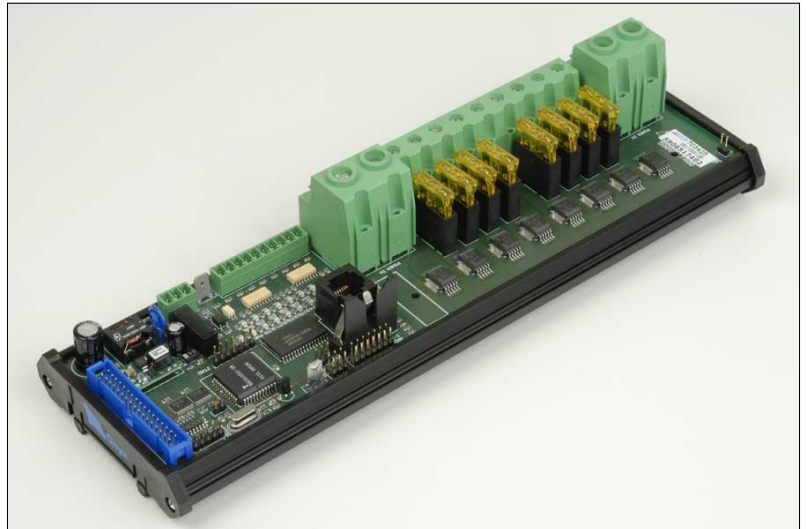


## OM-320B

V.2018

The **OM-320B module** replaces the traditional automatic circuit breakers and control relays for 24VDC loads. It is able to measure the current drained by the load (automatically opening the circuit if the current exceeds the threshold set), control the load switch-on/off and detect possible overloads or low current consumption due to faults or failing bulbs.

The module features 8 channels. The protection thresholds (4, 8, 12, 16 and 20A), characteristic curve (B or C) and operating modes (breaker, cabin lights, bilge pump, timer-controlled tank pump and navigation lights) of each channel can be configured. The configuration can be done by the CAN network or locally, thanks to the optional programming keyboard. In case of fault of the electronic, a bypass cable (available as option), fuse protected, can be used to activate each output.



Each channel outputs up to 20A @ 24VDC current and features a redundant protection system: electronic and with traditional fuse. Several channels can be connected in parallel to feed high-consumption loads (max. 4 channels and 55A each group). Moreover, 8 digital input channels can be used to control cabin lights, to connect to bilge or level sensors, etc. The module can operate in stand-alone mode - when the automation system is not present or switched off - or integrated with the monitoring system; in this case, the module ensures, for each channel, the complete control of switch-on commands and feedback signals as well as the alarm for low current consumption and/or overload. In both operating modes the module can be controlled and monitored locally through pushbuttons and LEDs wired to the appropriate 34-pole connector.

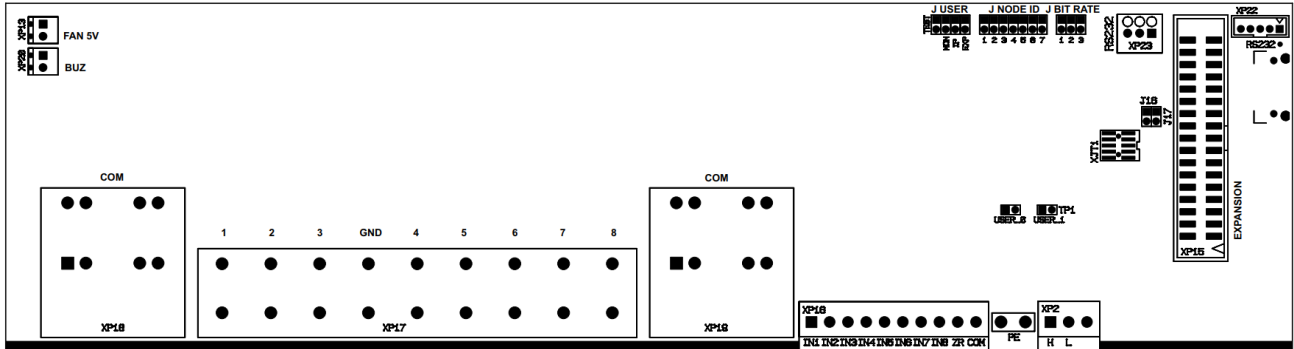
Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

## Technical Data

- 144MHz ARM7 Cortex M4 CPU
- Full CAN 2.0A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 64kB FRAM memory
- 2MB FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 8 PNP 24V 20A outputs
- 8 NPN/PNP inputs for connecting sensors/ external controls
- 100Hz standard inputs
- Operating temperature: -20...+85 °C
- Size: 270×75×80
- EN50022 DIN bar mounting
- IDC 34-pole connector for local control
- RJ-39 connector for programming keyboard
- Safety fuses, bypass fused cable (option)
- Protection thresholds: 4, 8, 12 and 16A
- Characteristic curves: B and C
- Modes: breaker, cabin lights, bilge pump, timer-controlled tank pump, navigation lights
- Certifications: CE, RINA, ABS, LRS

# Device Layout

## Layout:



## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
-----	-----	-----	-----	-----	-----	-----	-----
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

## Connections:

### POWER SUPPLY

- XP6.1, 6.2 +24VDC (\*)
- XP6.3, 6.4 +24VDC (\*)
- XP5.5 GND (\*\*)

(\*) The conductor size shall be suitable for the overall current drained by the sum of the 8 output channels, max. 128A

(\*\*) For supplying the electronic section and allow de-energizing the inductive loads. Use at least 1.5 mm<sup>2</sup> conductor. In case of inductive loads (e.g., pump motors), use a properly size conductor (10mm<sup>2</sup>). The negative wires from the loads shall be connected in separate terminal blocks.

### CAN BUS

- XP2.4 CANH
- XP2.5 CANL
- XP2.6 REF

**NOTE:** for a correct use of the module, make sure to comply with the Register regulations reported below. Onyx Marine Automation srl shall not be liable for any problem that may arise out of the improper use of the product or non-compliance with installation instructions.

- Use only in SELV/PELV-type systems, that is systems powered by battery and/or CE certified battery chargers or power supply equipped with safety transformers.
- Do not connect more than one essential service to each module. If required to connect several essential services to a single module, always provide a bypass safety circuit for each essential service.

## Connections:

### POWER OUTPUTS

- XP5.OUT1 Output 1 24VDC max.20A
- XP5.OUT2 Output 2 24VDC max.20A
- XP5.OUT3 Output 3 24VDC max.20A
- XP5.OUT4 Output 4 24VDC max.20A
- XP5.OUT5 Output 5 24VDC max.20A
- XP5.OUT6 Output 6 24VDC max.20A
- XP5.OUT7 Output 7 24VDC max.20A
- XP5.OUT8 Output 8 24VDC max.20A

### SIGNAL INPUTS

- XP4.1 In1 PNP/NPN
- XP4.2 In2 PNP/NPN
- XP4.3 In3 PNP/NPN
- XP4.4 In4 PNP/NPN
- XP4.5 In5 PNP/NPN
- XP4.6 In6 PNP/NPN
- XP4.7 In7 PNP/NPN
- XP4.8 In8 PNP/NPN
- XP4.9 Zero (\*\*\*)
- XP4.10 In COM (\*\*\*\*)

(\*\*\*) By connecting this terminal to the GND, all module outputs will be disabled (safety condition).

(\*\*\*\*) Connect to +24VDC for NPN inputs, connect to GND for PNP inputs.

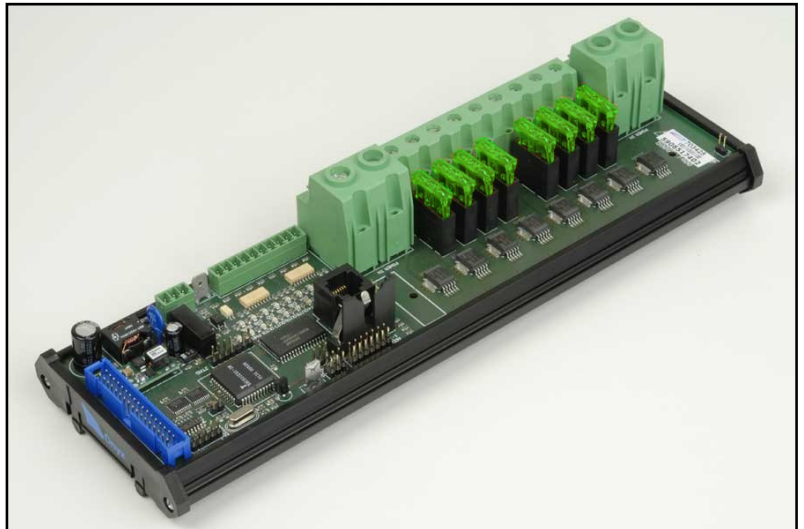




## OM-320B-NL01 <sup>V.2018</sup>

The **OM-320B-NL01 module** is a complete solution for monitoring and control of the LED-based navigation lights.

The LED lights feature a very low current consumption, which is very difficult to be detected by the usual current relay and, unlike the traditional bulbs, may be defective while still drawing current. Moreover, the current drawn is different depending on the color of the light: our module overcomes these problems by learning the current consumption under normal operating conditions, and giving an alarm whenever the current drawn goes below a predefined threshold.



The module features 7 channels, each of them can drive an LED light or even a traditional bulb (60W max). The built-in fuse ensures the protection and the disconnection required by the Register's regulations, thus making it suitable for class-approved systems.

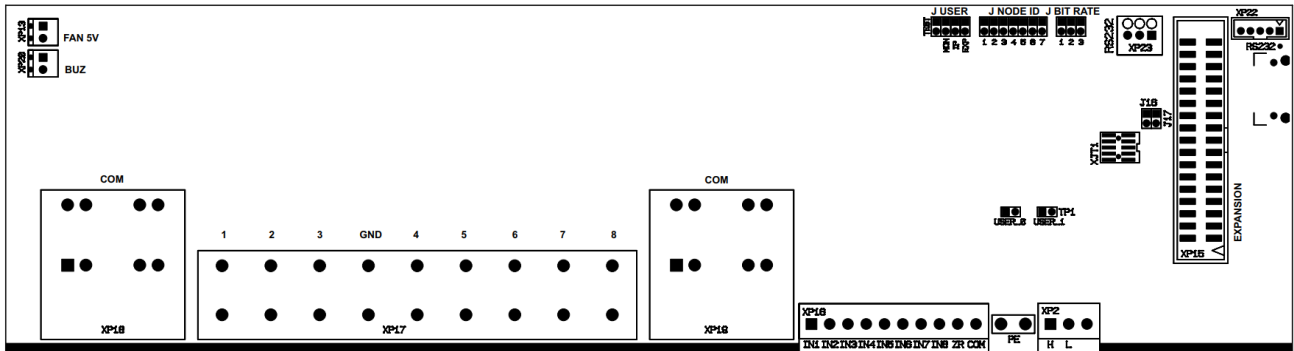
The module can operate in stand-alone mode - when the automation system is not present or switched off - or integrated with the monitoring system; in this case, the module ensures, for each channel, the complete control of switch-on commands and feedback signals as well as the alarms for bulb failures. In both operating modes the module can be controlled and monitored locally through pushbuttons and LEDs (dimnable) connected to the appropriate 34-pole connector, that can be used to build the dedicated, hard-wired monitoring panel required by most of Registers. For more complex systems, where two sets of lights exists (main and backup), two modules are used: in this case, a heart-beat crossed signal between the two units generates an alarm in case of failure of one of the two modules.

Like all Onyx Marine Automation components, this module features extended temperature range components (-20 to +85 °C) and Type Approval certification.

**Technical Data**

- 144MHz ARM7 Cortex M4 CPU
- Full CAN 2.0A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 64kB FRAM memory
- 2MB FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 8 PNP 24V 2.5A outputs
- Operating temperature: -20...+85 °C
- Size: 270×75×80
- EN50022 DIN bar mounting
- IDC 34-pole connector for local control
- Safety fuses
- Certifications: CE, RINA, ABS, LRS

## Layout:



## Jumpers:

J Node Id (NId) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	OPEN	4
---	---	---	---	---	---	---	---
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

## Connections:

### POWER SUPPLY

XP6.1, 6.2 +24VDC (\*)  
 XP6.3, 6.4 +24VDC (\*)  
 XP5.5 GND (\*\*)

(\*) The conductor size shall be suitable for the overall current drained by the sum of the 8 output channels, max. 17.5A

(\*\*) For supplying the electronic section and allow de-energizing the inductive loads. Use at least 1.5 mm<sup>2</sup> conductor. The negative wires from the loads shall be connected in separate terminal blocks.

### CAN BUS CONNECTIONS

XP2.4 CANH  
 XP2.5 CANL  
 XP2.6 REF

### POWER OUTPUTS

XP5.1...XP5.4 Power nav light 1...4 (24VDC max.2.5A )  
 XP5.6...XP5.7 Power nav light 5...7 (24VDC max.2.5A )  
 XP5.8 LED panel dimmed power

**NOTE:** for a correct use of the module, make sure to comply with the Register regulations reported below. Onyx Marine Automation srl shall not be liable for any problem that may arise out of the improper use of the product or non-compliance with installation instructions.

- Use only in SELV/PELV-type systems, that is systems powered by battery and/or CE certified battery chargers or power supply equipped with safety transformers.
- If only one module is used, always add the watch-dog module OM-1xB-WD01. If more than one module is used, place all the main navigation lights in one module and all the backup lights in a different module, to ensure module diversity in case of fault.

## Connections:

### INPUTS/OUTPUTS

XP4.1 ... XP4.7 Reserved  
 XP4.8 Main/Emergency power line  
 XP4.9 Reserved  
 XP4.10 GND

XP20.2 Heart-beat out

### AUXILIARY PANEL

XP15.1 LED panel lamp test  
 XP15.2 LED panel dim +  
 XP15.3 LED panel dim -  
 XP15.4 LED panel mute alarm  
 XP15.5 Learn drained current  
 XP15.6 Heart-beat in  
 XP15.7, XP15.8 Reserved  
 XP15.9 On/off nav light 1  
 ...  
 XP15.15 On/off nav light 7  
 XP15.16 Reserved  
 XP15.17 LED panel bulb failure nav light 1  
 ..  
 XP15.23 LED panel bulb failure nav light 7  
 XP15.24 Main/Emergency power failure  
 XP15.25 LED panel status nav light 1  
 ...  
 XP15.31 LED panel status nav light 7  
 XP15.32 LED panel alarm buzzer  
 XP15.34 GND



This product complies with EMC protection requirements of the 89 / 336 / CEE directive and subsequent changes



Product subject to separate disposal in accordance with the 2002/96/EC directive

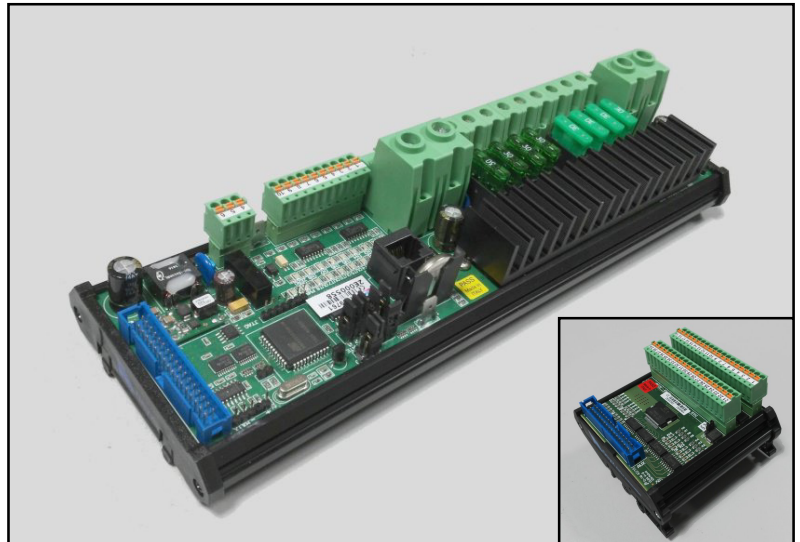


## OM-320B-DM01

V.2018

The **OM-320B-DM01 module** is the ideal solution for monitoring, control and dimming of any 24V lighting source.

The module features 8 channels, each of them can switch on/off and dim any PWM-dimmable light, both traditional and LED type. Non-dimmable lights can be controlled in on/off mode. Each channel can output up to 16A, can be programmed either in on/off or dimmer mode, is electronically protected with current limitation and overheating protection, and features a built-in fuse for additional safety. The module can drive an external fan for ventilating the heat sink, and in case of overheating would derate the current output in order to reduce the heating, before shutting down in case of critical temperature.



The module can operate in stand-alone mode - when the monitoring system is not present or switched off - or integrated with the monitoring system; in this case, the module ensures, for each channel, the complete control of command and feedback signals as well as the measurement of the drained current. In both operating modes the module can be controlled locally through pushbuttons.

The OM-321C optional slave module offers 32 additional I/O channels: 8 digital inputs are available for programmable scenario pushbuttons, 8 digital outputs can be used as feedbacks for the wall-mounted switch plates, and further 8 digital inputs and 8 digital outputs can be used to drive up to 4 motorized blinds or curtains, with automatic interlock and selection between momentary, step-relay or time delay. Such channels can be even used to drive different devices, like the cabin extractors.

Like all Onyx Marine Automation components, this module features extended temperature range components (-20 to +85 °C).

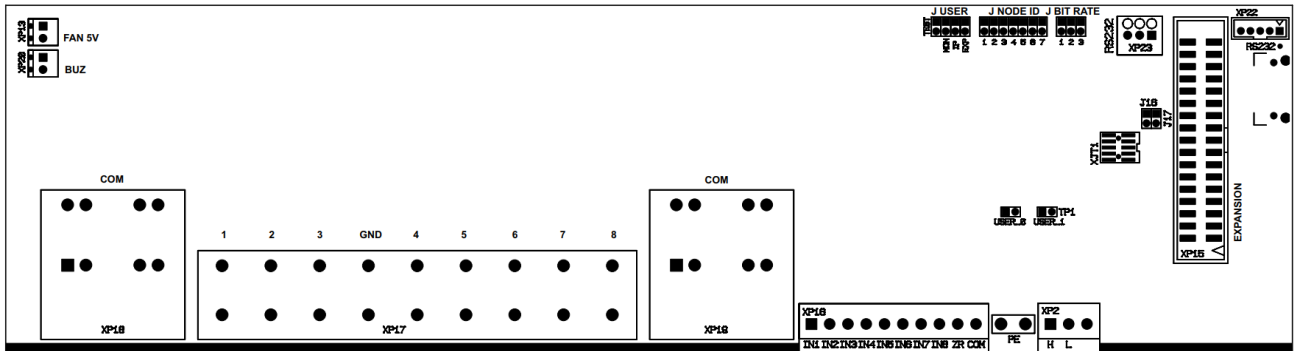
## Technical Data

- 144MHz ARM7 Cortex M4 CPU
- Full CAN 2.0A and B interfaces, CANOpen protocol
- RS232 interface
- 2Kbyte EEPROM memory
- 64kB FRAM memory
- 2MB FLASH memory
- 0.2A 24VDC (18÷32VDC) power supply
- 8 PNP 24V 20A outputs
- 8 NPN/PNP optoisolated inputs for wall switches
- Operating temperature: -20...+85 °C
- Size: 270×75×80
- EN50022 DIN bar mounting
- IDC 34-pole connector for slave board
- Safety fuses

### OM-321C SLAVE MODULE

- 8 NPN/PNP optoisolated inputs for wall switches
- 8 PNP 24V 500mA outputs for feedbacks
- 8 NPN/PNP optoisolated inputs for curtains
- 8 PNP 24V 500mA outputs for curtains
- Operating temperature: -20...+85 °C
- Size: 77×75×80
- EN50022 DIN bar mounting
- IDC 34-pole connector for master board
- Certifications: CE

## Layout:



## Jumpers:

J Node Id (Nid) CANopen Address 1 ... 127

7	6	5	4	3	2	1	Nid
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	1
OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	1
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	2
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED	3
OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN	4
---	---	---	---	---	---	---	---
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN	126
CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	127

## Connections:

### POWER SUPPLY

XP6.1, 6.2 +24VDC (\*)  
 XP6.3, 6.4 +24VDC (\*)  
 XP5.5 GND (\*\*)

(\*) The conductors size shall be suitable for the overall current drained by the sum of the 8 output channels, max. 128A

(\*\*) For supplying the electronic section and allow de-energizing the inductive loads. Use at least 1.5 mm<sup>2</sup> conductor. The negative wires from the loads shall be connected in separate terminal blocks.

### CAN BUS

XP2.4 CANH  
 XP2.5 CANL  
 XP2.6 REF

### POWER OUTPUTS

XP5.1...XP5.4 Light circuits 1...4 (24VDC max.20A)  
 XP5.6...XP5.8 Light circuits 5...8 (24VDC max.20A)

### INPUTS

XP4.1 ... XP4.8 Wall switches for circuits 1..8 (\*\*\*)  
 XP4.9 Reserved  
 XP4.10 REF (\*\*\*\*)

(\*\*\*) 24VDC photocoupled inputs, drained current < 10mA

(\*\*\*\*) Connect to +24VDC for NPN inputs, connect to GND for PNP inputs.

## Connections:

### OM-321C SLAVE MODULE

XP4.1 +24VDC  
 XP4.2 +24VDC  
 XP4.3 GND  
 XP4.4..XP4.11 Scenario 1..8 wall switches (°)  
 XP4.12..XP4.19 Light circuit 1..8 feedbacks (° °)

XP5.21 +24VDC

XP5.22 +24VDC

XP5.23 GND

XP5.24..XP5.31 Curtains 1..4 up/down wall switches (°)

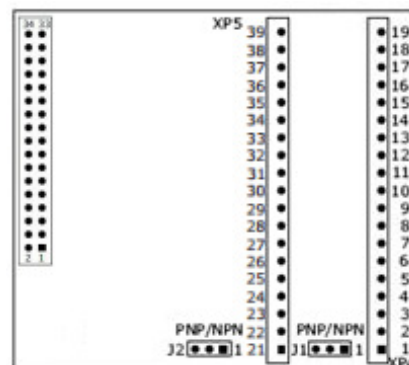
XP5.32..XP5.39 Curtains 1..4 up/down relay activation (° °)

(°) 24VDC photocoupled inputs, drained current < 10mA.

NPN/PNP selectable by means of the jumper onboard

(° °) +24VDC, 500mA max output

Curtains channels can be programmed as momentary, step-relay or time delayed. Each couple of channels is interlocked (with automatic stop) for curtains, or can be set as two independent channels for single loads driving.



This product complies with EMC protection requirements of the 89 / 336 / CEE directive and subsequent changes



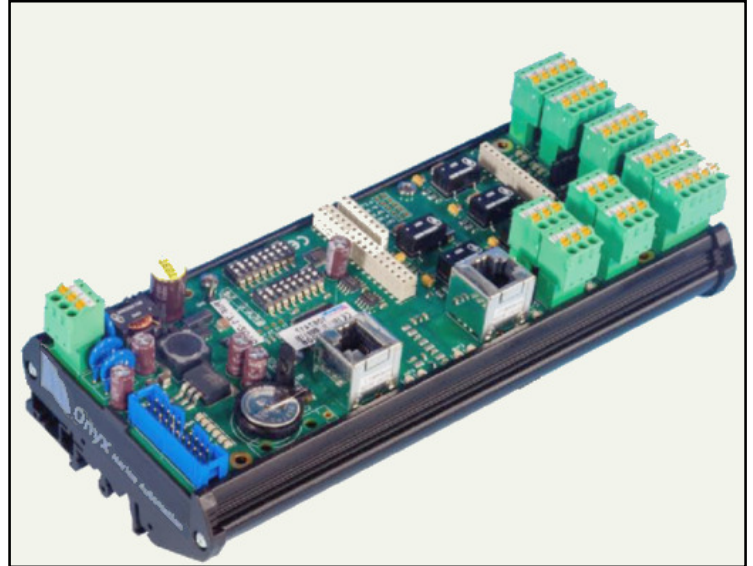
Product subject to separate disposal in accordance with the 2002/96/EC directive



## OM-430B

The **OM-430B module** is a powerful CPU designed to grant - besides a high computing power - unparalleled efficiency in managing several different communication protocols at a time, thanks to the wide range of communications peripherals onboard.

Featuring two CAN bus ports, two Ethernet ports, twice as much the memory offered by the previous models (OM-420B and OM-410B, now obsolete) and up to four serial ports, this module can interface with a standard operator panel or a PC-based network via ModBus/TCP protocol, handling at the same time a number of remote



I/O nodes connected through one or two fieldbus: these characteristics make the design of advanced supervision and control architectures easy, without the need of PC-based systems, thus bringing significant assets in terms of reliability and system management. Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

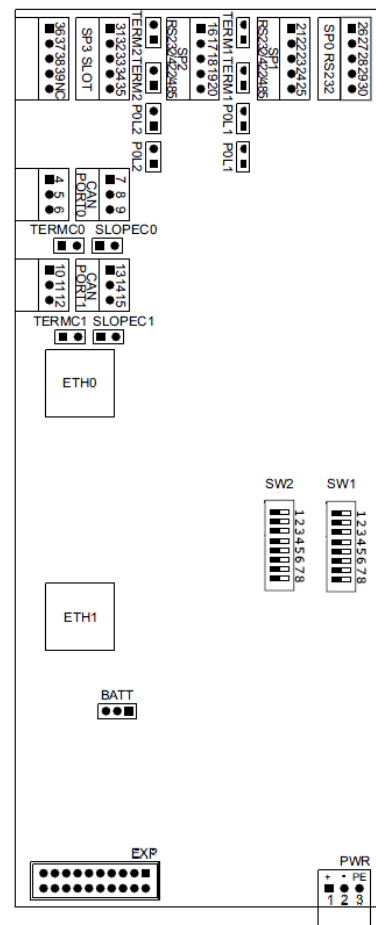
The original **EasyMap™** software supplied with the module was developed to allow for rapid development of supervision and control applications based on the Onyx Marine Automation remote I/O modules. Just connect the I/O modules required to the CAN network, add the OM-430B CPU, and a wide range of data will be instantly available at the Ethernet port of the CPU, ready to be used. In particular, the **EasyMap™** software supports the following functions:

- Advanced diagnostics of the CAN bus network and all modules connected
- Straight ModBus address mapping of all I/O channels from the CAN network
- Linear functions (like  $y = a/b * x + c$ ) applied to the values read from each channel
- Non-linear functions (like  $y = f(x)$ ) applied to the values read from each channel, through interpolation from discrete tables
- Straight ModBus address mapping of I/O channels from serial protocols
- Wide range of serial protocols to handle audio/video devices, engines, multimeters, NMEA0183 instruments, lights, etc.
- Wide library of algorithms working on I/O channels and internal variables
- Programmable alarm handling, with SMS/GSM remote notification
- Dry contact output for network/CPU fault notification (OM-400C serial module required)
- J1939 protocol supported on the second CAN port
- Compatible with most of CAN-based protocols

# Technical Data

- DSTni-EX 120MHz microprocessor, x86 compatible  
24-bits address space
- 2 ETHERNET 10/100 Mbps ports
- 2 full CAN 2.0A and 2.0B interfaces, CANOpen protocol
- 1 RS232 serial port
- 2 RS232/RS422/RS485 serial ports
- 1 expansion slot for an additional RS-232 or RS485 port (OM-400A/OM-400B)
- RAM volatile memory 4MB
- RAM back-up memory 2MB
- FLASH parallel memory 4MB
- EEPROM serial memory 1KB x 2
- 24VDC (18÷32VDC) 1A power supply
- Watch-Dog
- Real-time clock with calendar
- Operating temperature: -20...85 °C
- Humidity: UR 85% (non-condensing)
- Size: 195×88×56 mm
- EN50022 DIN bar mounting
- EasyMap™ software supplied
- Available protocols: please contact Onyx Marine Automation for further information
- Built-in web server
- Certifications: CE, RINA, ABS, LRS
- Dry contact for fault notification (OM-400C module required)

## Layout:



## Connections:

### POWER SUPPLY CONNECTION

XP1.1 +24VDC  
XP1.2 GND  
XP1.3 GROUND (PE)

### CAN BUS CONNECTION

CAN 0 (main)	CAN 1 (aux)
XPC0.4 CANH	XPC1.10 CANH
XPC0.5 CANL	XPC1.11 CANL
XPC0.6 REF	XPC1.12 REF
XPC0.7 CANH	XPC1.13 CANH
XPC0.8 CANL	XPC1.14 CANL
XPC0.9 REF	XPC1.15 REF

### Jumpers and dip-switches:

TERMC0	CAN 0 network terminator
TERMC1	CAN 1 network terminator
PL1	RS422 polarization for SP1 port
PL2	RS422 polarization for SP2 port
TERM1	RS485/422 termination for SP1 port
TERM2	RS485/422 termination for SP1 port
BATT	1-2 backup battery enabled

SW1/SW2 Always set SW1.6=OFF + SW1.7=ON + SW1.8=ON for 250Kbps baud rate.

Other switches might require proper setting depending on the application. Please contact Onyx Marine Automation for further details.

### SERIAL PORTS CONNECTION

SP0	RS-232	SP3	RS-232	RS-485	RS-422
XSP0.26	TX	XSP3.31	—	—	—
XSP0.27	RTS	XSP3.32	RX	—	—
XSP0.28	GND	XSP3.33	TX	DATA +	TX+
XSP0.29	CTS	XSP3.34	DTR	—	RX+
XSP0.30	FX	XSP3.35	GND	GND	GND
		XSP3.36	—	—	—
		XSP3.37	RTS	—	—
		XSP3.38	CTS	DATA -	TX-
		XSP3.39	—	—	RX-

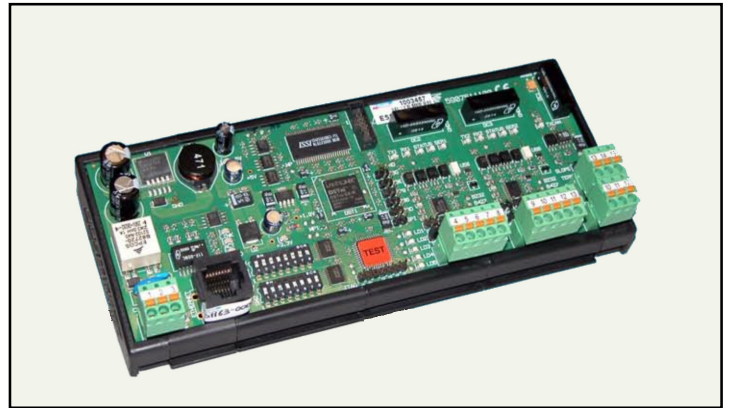
SP1/SP2	RS-232	RS-485	RS-422
XSP1.21/XSP2.16	TX	DATA -	TX-
XSP1.22/XSP2.17	RTS	DATA +	TX+
XSP1.23/XSP2.18	GND	GND	GND
XSP1.24/XSP2.19	CTS	—	RX-
XSP1.25/XSP2.20	RX	—	RX+



## OM-405B

The **OM-405B module** is a serial-CANbus bridge based on a powerful CPU designed to manage different communication protocols at a time.

Featuring one CAN bus ports, one Ethernet port and two multi-standard serial ports, this module runs and processes any serial protocol locally, and then send the processed data to the main CPU unit. This way, the computing load is distributed among the different units present in the system, thus reducing the workload of the main CPU. Data can even be accessed through the Ethernet port in Modbus/TCP mode.



Like all Onyx Marine Automation components, this module has been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make it an invaluable element for a modern marine automation system.

## Technical Data

- DSTni-EX 120MHz microprocessor, x86 compatible, 24-bits address space
- 1 ETHERNET 10/100 Mbps port
- 1 full CAN 2.0A and 2.0B interface, CANOpen protocol
- 2 RS232/RS422/RS485 serial ports
- RAM volatile memory 2MB
- FLASH parallel memory 2MB
- EEPROM serial memory 1KB x 2
- 24VDC (18÷32VDC) 1A power supply
- Watch-Dog
- Operating temperature: -20...85 °C
- Size: 195×80×50 mm
- Available protocols: please contact Onyx Marine Automation for further information
- Certifications: CE, RINA, ABS, LRS

## Connections:

### POWER SUPPLY CONNECTION

XP1.1 +24VDC  
 XP1.2 GND  
 XP1.3 GROUND (PE)

### CAN BUS CONNECTION

XPC2.14 CANH  
 XPC2.15 CANL  
 XPC2.16 REF  
 XPC2.17 CANH  
 XPC2.18 CANL  
 XPC2.19 REF

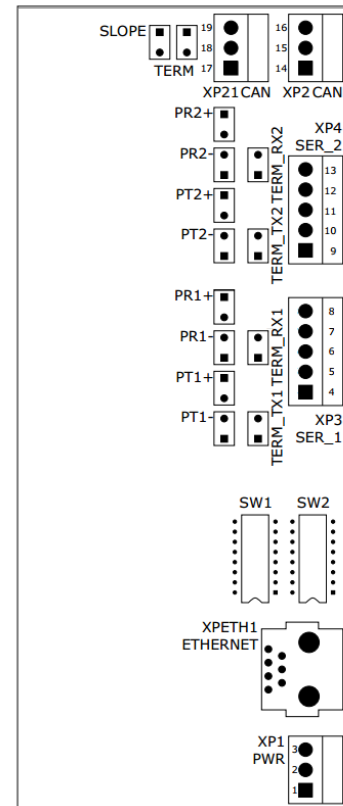
### SERIAL PORTS CONNECTION

SP1/SP2	RS-232	RS-485	RS-422
XSP1.4/XSP2.9	TX	DATA-	TX-
XSP1.5/XSP2.10	RTS	DATA+	TX+
XSP1.6/XSP2.11	GND	GND	GND
XSP1.7/XSP2.12	CTS	—	RX-
XSP1.8/XSP2.13	FX	—	RX+

### Jumpers and dip-switches:

TERM CAN network terminator  
 PR1 RS485/422 polarization for SP1 port  
 PR2 RS485/422 polarization for SP2 port  
 TERMTX1 RS485/422 termination for SP1 port  
 TERMRX1 RS485/422 termination for SP1 port  
 TERMTX2 RS485/422 termination for SP1 port  
 TERMRX2 RS485/422 termination for SP1 port  
 SW1/SW2 Always set SW1.6=OFF + SW1.7=ON + SW1.8=ON  
 for 250Kbps baud rate. Other switches might require proper  
 setting depending on the application. Please contact Onyx  
 Marine Automation for further details.

## Layout:



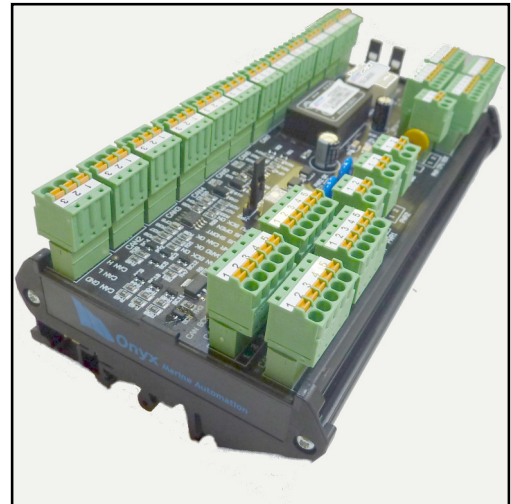




## OM-961M OM-961S

The **OM-961M/OM-961S modules** are two modules designed to offer a complete redundant solution for the Onyx Marine systems.

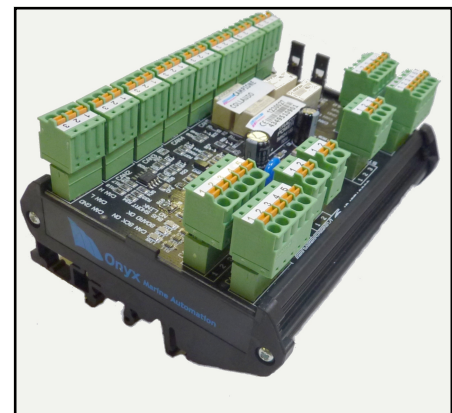
The OM-961M module is the master unit: once connected to a couple of OM-430B controllers and to the double CANbus network, it handles the switchover between master and backup controller, as well as primary and backup CANbus paths.



The OM-961S module is a slave unit, and it is used to handle the switchover between primary and secondary CANbus paths at board or switchboard level.

Both modules feature fail-to-safe design, redundant power supply and a number of I/O lines used for diagnostic purpose.

Like all Onyx Marine Automation components, these modules have been specifically designed for the marine environment: the use of extended temperature range components (-20 to +85 °C) and Type Approval certification make them an invaluable element for a modern marine automation system.



## Technical Data

- Master unit: up to 12 CANbus slots, 4 connectors for redundant CANbus network.
- Slave unit: up to 8 CANbus slots, 4 connectors for redundant CANbus network.
- Master unit: full interface with 2 OM-430B controllers, easy wiring (same connectors, same pinout)
- Dual power supply
- CANbus terminators onboard
- Test jumpers for easy debug and test
- LED diagnostics onboard
- I/O diagnostics
- Operating temperature: -20...85 °C
- Size: 170×80×50 mm (master unit), 113×80×50 mm (slave unit)
- Certifications: CE, RINA, ABS, LRS

## Connections:

### POWER SUPPLY (PWR1/2, PWR CPU MAIN, PWR CPU BCK)

- 1 +24VDC (main)
- 2 GND

### CAN BUS SLOTS (CAN1..CAN12)

- 1 CANH
- 2 CANL
- 3 CAN GND

### CAN BUS TRUNKS (CAN MAIN 1/2, CAN BCK 1/2)

- 1 CANH
- 2 CANL
- 3 CAN GND
- 4 CAN PWR
- 5 SHIELD

### CPU INTERFACE (XP3A/B CPU MAIN, XP3A/B CPU BCK) (\*)

XP3A pin-to-pin wiring to XP3A on OM-430B

XP3B pin-to-pin wiring to XP3B on OM-430B

(\*) OM-400C piggyback module required on both main and backup CPU

### Jumpers and dip-switches:

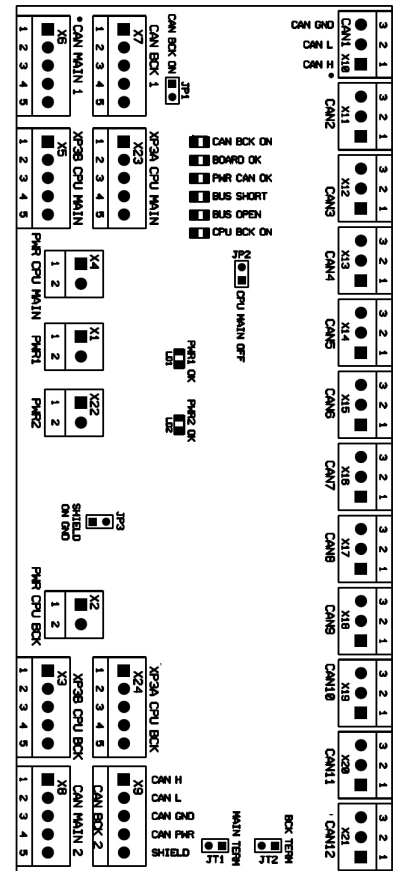
CPU MAIN OFF: for debug only, forces switchover to backup CPU

CAN BCK ON: for debug only, forces switchover to backup network

MAIN TERM: set termination resistor on main trunk

BCK TERM: set termination resistor on backup trunk

## Layout:



## Connections:

### POWER SUPPLY (PWR1/2)

- 1 +24VDC (main)
- 2 GND

### CAN BUS SLOTS (CAN1..CAN12)

- 1 CANH
- 2 CANL
- 3 CAN GND

### CAN BUS TRUNKS (CAN MAIN 1/2, CAN BCK 1/2)

- 1 CANH
- 2 CANL
- 3 CAN GND
- 4 CAN PWR
- 5 SHIELD

### STATUS

1 Bus short/no link error feedback (dry contact)

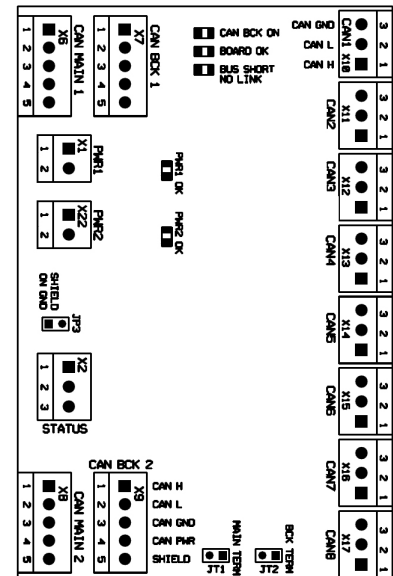
2 Board ok feedback (dry contact)

3 Common reference

### Jumpers and dip-switches:

MAIN TERM: set termination resistor on main trunk

BCK TERM: set termination resistor on backup trunk



**CE** This product complies with EMC protection requirements of the 89 / 336 / CEE directive and subsequent changes



Product subject to separate disposal in accordance with the 2002/96/EC directive



**Onyx** Marine Automation



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## Touch-screen displays

Like all Onyx Marine Automation components, our touch-screen displays, PCs and panel PCs have been specifically designed for the marine environment.

Ranging from the smaller 7" to the large 24" and 32" sizes, they are carefully selected by Onyx Marine Automation among the products manufactured by the most important companies in this field.

Reliability, design and robustness are the key points of these products which - together with the functional specifications designed for the marine market and the marine type approvals (ABS, LRS, RINA, DNV depending on the models) - make them the ideal solution to complete our monitoring systems.

For more information on such products, please contact Onyx Marine Automation.