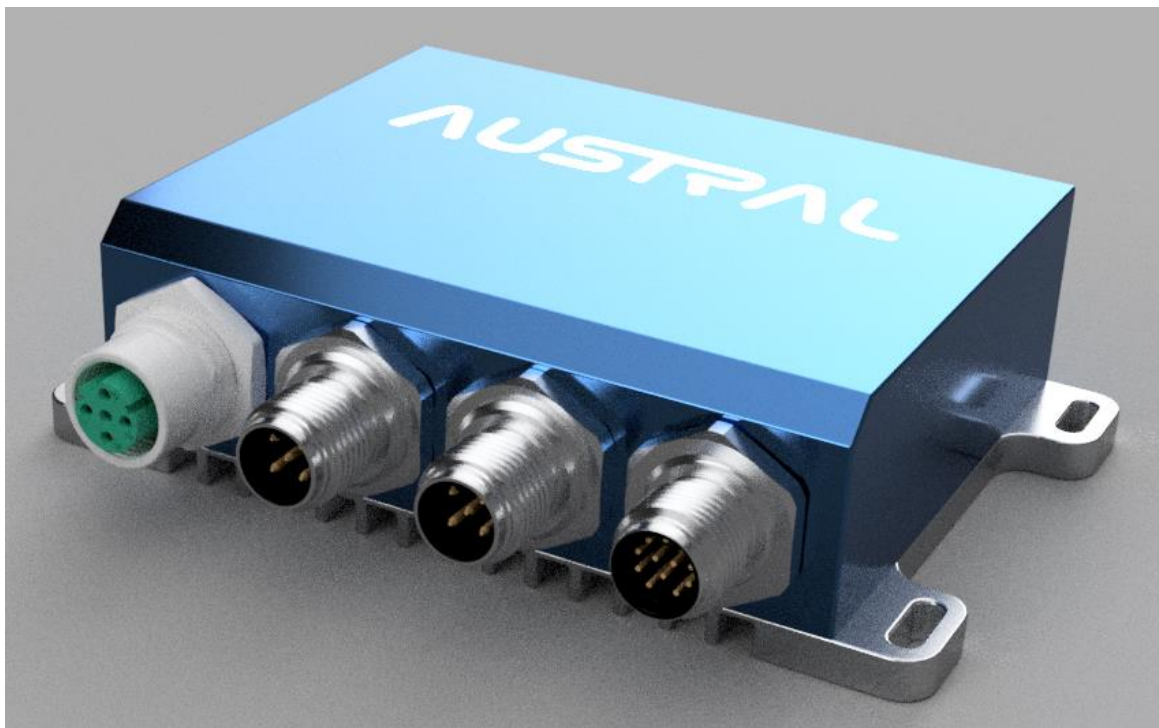


# QUANTUM CM4 OEM

*Industrial & Marine Rugged IP67  
Mission Computer / IoT Gateway*

*Raspberry PI compatible*

## Brief Datasheet



Revision 1.04  
June 2022  
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## Revision History

| Revision | Date     | Comment                   |
|----------|----------|---------------------------|
| 1.01     | 26/01/22 | Initial Release           |
| 1.02     | 07/04/22 | Add Pinout                |
| 1.03     | 24/06/22 | Change Internet Links     |
| 1.04     | 27/06/22 | Add 6 cores and NPU model |

## Additional Resources

Please visit our developer tools webpage for quickstart guides and other helpful resources:

Product Page : <http://austral-eng.com/en/quantum-cm4-oem-en/>

Software Support : <https://austral-electronics.github.io/QuantumCM4/>

Red Carpet IoT : <http://austral-eng.com/en/red-carpet-free-iot-software-suite-fast-systems-integration-based-on-node-red-flow-creator/>

## 1 PRODUCT OVERVIEW



Black urethane & anodized aluminium version

### KEY FEATURES

The Quantum CM4 is a SWaP-C platform : Cost-effective, Industrial, maritized IP67, -20°C to 60/65°C temperature range, miniaturized, very lightweight (only 212g), very low power consumption, fanless... It integrates a powerful quad core ARM processor, many Industrial, Marine, and Automotive field buses, Galvanic isolation, Protections, Watchdog, RTC with GNSS Time synchronisation, Wireless and a huge storage for your datalogs.

- **Field Interfaces :**
  - **M12 Connectors** : Cables available on the shelf
  - **Wireless** : WIFI, Bluetooth, BLE
  - **Ethernet** : Modbus TCP, Profinet, ETHERNet/IP, BACnet, OPC-UA, MQTT, DDS, Websocket, ZMQ, UDP, TCP, NMEA OneNet...
  - **2xCANbus** : NMEA2000, J1939, CANopen...
  - **3xSerials** : RS232, RS485, RS422, Modbus RTU, NMEA0183...
  - **Internal mini PCIe expansion slot** : USB2.0, SPI, GPIOs
- **Hardware expansion flexibility** : [Contact us](#)
  - **Wireless IoT** : LoRaWAN, SigFox, Zigbee, Xbee, Zwave, 4G/LTE, NB-IoT
  - **Satellite IoT** : Iridium SBD, [SpaceX Swarm](#), [Kineis](#), Astrocast...
  - **AI accelerator** : Hailo-8, Google Coral...
- **Easy software installation and the support of the community** :
  - **Any OS** : Linux (Pre-installed), VxWorks, Windows IoT...
  - **Any frameworks** : Robotics (ROS, ROS2, MOOS-IvP), PLC (CoDeSys), IoT (Node-Red), AI (TensorFlow, PyTorch)...
  - **Any languages** : C/C++/Qt, Python, JS, Rust, Java, C#, Go...

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## **BENEFITS**

- **Go Fast : Makes it as easy as possible to build your next smart project operating in hostile environment** with a solution **100% COMPATIBLE WITH THE RASPBERRY PI ECOSYSTEM**, designed for professional use, suitable for real-time applications and browser-based remote displays.
- **Shrink your team and schedule** : Focus on your core business by using a yet proven rugged hardware and a mainstream software solution. Develop from day one and take advantage of the support and examples of the largest developer community.
- **Hardware flexibility** : Choose the memory, the storage, the WIFI option from a single unit. We can customize the expansion board, put your logo or add functionality for very low volumes. If a high level of integration is required, the Quantum CM4 bare electronic boards can also be integrated into your system (only 20g).
- **Develop at warp speed with free tools** : Connect an instrument to the cloud, datalog, make a web live data dashboard, troubleshoot... in minutes and accessible to all !!! it's possible. If it is suitable for your application, you can freely use [Red Capet - IoT Software Suite](#), our fast system integration solution based on [Node-RED](#) visual flow creator, which offers you a library of nearly 4000 [nodes](#) to connect everything.

## **APPLICATIONS**

The Quantum CM4 OEM is designed for ITAR-free, **SWaP-sensitive and real-time applications using remote HMI**. It will be embedded into a third-party system in a harsh environment, like wearable edge computing, boats, vehicles, drones, machines, outdoor and underground platforms... and for a wide range of use cases:

- Interfacing sensors, actuators and PLCs
- Data collection, Black box
- Marine IOT, IIOT, Cloud
- IA, Robotics, Command control, Guidance
- Asset tracking, Machine monitoring, Energy Management
- Building, boat and vehicle automation, Security systems, Climate control
- HTML5 Multifunction Displays Dashboards, Voice Assistant

**Sectors** : Marine, Industry 4.0, Drones, Robotics, Off-Highway Vehicles, Smart Farming ...

## **2 PRINGING & ORDERING**

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Product Pricing & Ordering : <http://austral-eng.com/en/quantum-cm4-oem-en/>

## **3 SOFTWARE SUPPORT**

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Product Wiki : <https://austral-electronics.github.io/QuantumCM4/>

Red Carpet IoT: <http://austral-eng.com/en/red-carpet-free-iot-software-suite-fast-systems-integration-based-on-node-red-flow-creator/>

## 4 HARDWARE SPECIFICATIONS

|                                  | Quantum CM4 OEM  | On demand / Roadmap   |
|----------------------------------|--|---|
| <b>CPU Core</b>                  |  |   |
| <b>CPU</b>                       | ARM v8 Quad-core, 64 bits, 1.5Ghz  | 1.8Ghz<br><u>Q1 2023</u> : ARM v8 Six-core 64 bits, 4x2Ghz + 2x3Ghz   |
| <b>GPU</b>                       | VideoCore VI   | <u>Q1 2023</u> : Mali-G52 MP4   |
| <b>NPU / IA</b>                  | -  | <u>Q1 2023</u> : 5.0 TOPS   |
| <b>Memory</b>                    |  |   |
| <b>RAM</b>                       | 1 to 8 GB LPDDR4   |   |
| <b>Removable Storage</b>         | 32 to 256 GB uSD<br>10 years<br>24h in sea water   | Up to 1TB<br>Up to 1920 TBW & 30K P/E Cycle (64GB)  |
| <b>eMMC</b>                      | Up to 32GB (No uSD if EMMC)  |   |
| <b>Network &amp; Wireless</b>    |  |   |
| <b>LAN</b>                       | 100Mbps Ethernet   | 1Gbps   |
| <b>Wireless</b>                  | WIFI 2.4 & 5 GHz, Bluetooth 5.0, BLE<br>External Antenna   | No Wireless   |
| <b>IOT Expansion</b>             | Mini PCIe Slot from PCB REV 002  | <b>Wireless</b> : LoRaWAN, SigFox, Zigbee, Xbee, Zwave, 4G/LTE, NB-IoT, Iridium SBD ,SpaceX Swarm... <u>2023</u> : Kineis, Astrocast<br><b>AI</b> : Hailo-8, Google Coral...<br><b>Field Int.</b> : <u>2023</u> : 2x Isolated RS232/485/422 |
| <b>I/O</b>                       |  |   |
| <b>CANbus</b>                    | 1x CANbus (1Mbps)<br>1x Isolated CANbus (1Mbps)  | Only 1x CANbus  |
| <b>Serials</b>                   | 1x RS232 port (460Kbps / 2-wire)<br>1x RS232 port with PPS input (3-wire)<br>1x Isolated Multifunction RS232/422/485 port (4-wire) | Non-isolated Multifunction<br>250Kbps or 1Mbps  |
| <b>Other</b>                     | -  | Up to 2x USB-C 2.0<br>Up to 2x Micro-HDMI 2.0<br>Up to 2x MIPI DSI display port<br>Up to 2x MIPI CSI camera port<br>Up to 2 PWM outputs   |
| <b>System</b>                    |  |   |
| <b>RTC</b>                       | +/- 5PPM<br>On-board coin-cell battery   | +/- 1PPM  |
| <b>Synchro</b>                   | GNSS-PPS clock synchronisation (NTP)   | 4 x Isolated Synchro In/Out<br>PTP/ IEEE 1588 (Kernel Software)   |
| <b>Watchdog</b>                  | Parametrable Watchdog  | -   |
| <b>Electrical Specifications</b> |  |   |
| <b>Supply Voltage</b>            | 7 to 33V   | -   |
| <b>Power Consumption</b>         | 1.7W @ 800Mhz<br><6W depending on CPU & GPU usage  | -   |
| <b>Mechanical Specifications</b> |  |   |
| <b>Dimensions</b>                | 118 x 83 x 31mm  | OEM boards on demand  |
| <b>Logo</b>                      | AUSTRAL, white backlight   | Your logo, blue backlight   |
| <b>Color</b>                     | Blue / Black   | Your color  |

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|                                      |  |   |
|--------------------------------------|--|---|
| <b>Protection</b>                    | IP67   | -   |
| <b>Enclosure</b>                     | Nylon & anodized marine aluminium  | Full anodized Aluminium<br>Urethane & Alu<br>Board only |
| Cooling                              | Passive cooling, fanless design  | -   |
| Weight                               | 212 gram (Nylon & Alu)   | -   |
| <b>Compliance</b>                    |  |   |
| Regulatory                           | CE (*)   | FCC (*)   |
| Marine                               | NF EN 60945:2002 + Corrigendum 2008 (*)  | Specifics Standards on demand                           |
| Radio                                | Europe (Directive 2014/53/EU), US (FCC Part 15)  | -   |
| Spectrum                             | EN 300 328, EN 301 893   | -   |
| EMC                                  | EN 55032/5, EN 61000-6-2, EN 61000-6-3 (*)<br>Components : EN 301 489-1 et -17, EN 55032<br>et EN 55024 Class B                            | -   |
| Safety                               | EN/UL/IEC 62368-1 (*)<br>Components : EC 60950-1:2005, EN<br>62311:2008, UL 2500V, CSA, VDE, DIN EN<br>60747-5-2 (VDE 0884 Part2): 2003-01 | -   |
| Flammability                         | UV 94 1.5 mm : HB  | -   |
| ROHS                                 | Directive 2015/863/EU  | -   |
| <b>Reliability and Environmental</b> |  |   |
| MTTF                                 | >200 000 hours   | -   |
| Warranty                             | 2 Years  | 5 Years   |
| Operation<br>Temperature             | -20 to +60°C (Alu & Nylon enclosure)<br>-20 to +65°C (Full Aluminium enclosure)  | -   |
| Storage<br>Temperature               | -25°C to 85°C  | -   |
| Relative<br>Humidity                 | 10% to 90% (operation)<br>5% to 95% (storage)  | -   |

(\*) Currently under review

Build your product reference at <http://austral-eng.com/en/quantum-cm4-oem-en/>

## 5 MAINTENANCE



Contain a cell coin battery

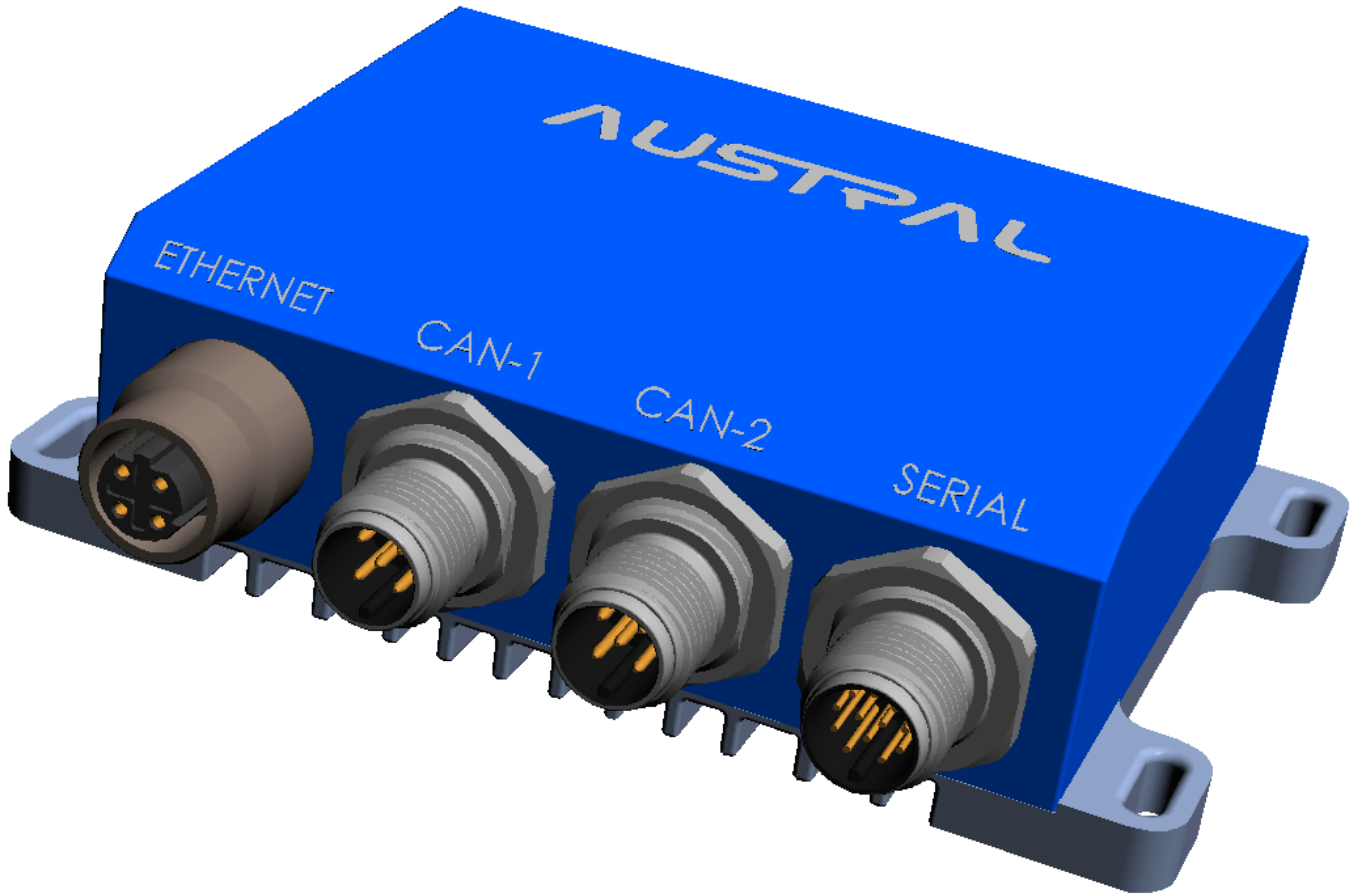
This product include a CR1220 coin cell in order to maintain the Real Time Clock and datalog at startup with the correct time without waiting an NTP or GNSS time synchronisation.

The service life of this cell is more than 15 years in a protected environnement (20°C) and power off.

Contact the after sale in order to change this coin cell.



## 6 ELECTRICAL INTERFACES



| Ref    | Function  | Type   |
|--------|---|--|
| ETH    | 1x 100MB/s Ethernet   | M12, 4 pin D-coded (Profinet standard)                         |
| CAN-1  | 1x CANBus 1 and Power Input   | M12, 5 pins male<br>A-coded<br>(DeviceNet / NMEA2000 standard) |
| CAN-2  | 1x Isolated CANBus 2  | M12, 5 pins male<br>A-coded<br>(DeviceNet / NMEA2000 standard) |
| SERIAL | 1x RS232 port (460Kbps / 2-wire)<br>1x RS232 port with PPS input (3-wire)<br>1x (Isolated) Multifunction<br>RS232/422/485 port (4-wire) | M12, 12 pins male, A-coded                                     |
| ANT    | Antenna 2.4 & 5 GHz<br>WIFI, Bluetooth 5.0, BLE   | RP-SMA   |

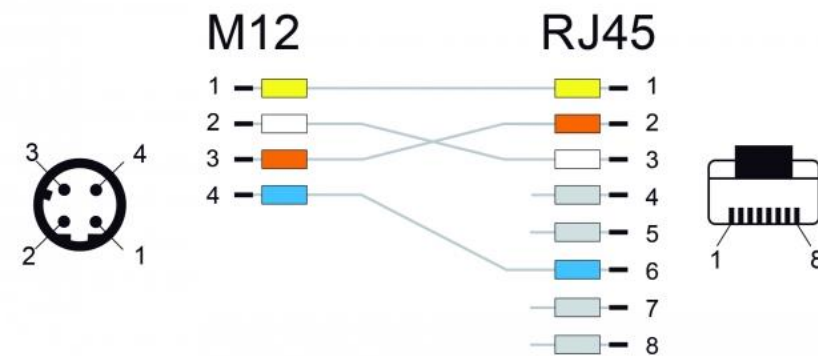
## 6.1 Pinouts :

| Pin    | ETH               | CAN-1 & PWR-IN         | CAN-2                  | SERIAL COM1 RS422         | SERIAL COM1 RS485         | SERIAL COM1 RS232         |
|--------|-------------------|------------------------|------------------------|---------------------------|---------------------------|---------------------------|
| 12     |                   |                        |                        | COM2-CTS (8)<br>Red/Blue  | COM2-CTS (8)<br>Red/Blue  | COM2-CTS (8)<br>Red/Blue  |
| 11     |                   |                        |                        | COM1-GND (5)<br>Grey/Pink | COM1-GND (5)<br>Grey/Pink | COM1-GND (5)<br>Grey/Pink |
| 10     |                   |                        |                        | COM1-RXD+ (2)<br>Violet   | -<br>Violet               | COM1-RXD<br>Violet        |
| 9      |                   |                        |                        | COM2-TXD<br>Red           | COM2-TXD<br>Red           | COM2-TXD<br>Red           |
| 8      |                   |                        |                        | COM2-RXD<br>Grey          | COM2-RXD<br>Grey          | COM2-RXD<br>Grey          |
| 7      |                   |                        |                        | COM3-RXD<br>Black         | COM3-RXD<br>Black         | COM3-RXD<br>Black         |
| 6      |                   |                        |                        | COM3-TXD (6)<br>Yellow    | COM3-TXD (6)<br>Yellow    | COM3-TXD (6)<br>Yellow    |
| 5      |                   | CAN1-Low (3)<br>Blue   | CAN2-Low (3)<br>Blue   | PWR-OUT (4) (7)<br>Pink   | PWR-OUT (4) (7)<br>Pink   | PWR-OUT (4) (7)<br>Pink   |
| 4      | ETH-RD-<br>Blue   | CAN1-High (3)<br>White | CAN2-High (3)<br>White | COM1-TXD+ (2)<br>Green    | COM1-D+ (2)<br>Green      | -<br>Green                |
| 3      | ETH-TD-<br>Orange | GND<br>Black           | CAN2-GND<br>Black      | COM1-TXD- (2)<br>White    | COM1-D- (2)<br>White      | COM1-TXD<br>White         |
| 2      | ETH-RD+<br>White  | PWR-IN<br>Red (1)      | -                      | COM1-RXD- (2)<br>Blue     | -<br>Blue                 | -<br>Blue                 |
| 1      | ETH-TD+<br>Yellow | CAN1-Shield<br>Shield  | CAN2-Shield<br>Shield  | GND<br>brown              | GND<br>brown              | GND<br>brown              |
| Shield | ETH-Shield        |                        |                        |                           |                           |                           |

- (1) The calculator is powered by the CANbus connector (Reverse battery protection and 3A fuse)
- (2) The 100/120 ohm terminator is not include
- (3) The 120 ohm terminator is not include
- (4) PWR-IN after reverse battery protection and 1A fuse
- (5) Isolated COM1 ground (Non Isolated in option)
- (6) PWM in option
- (7) COM2-RTS in option
- (8) CTS can be use for the PPS signal (+/- 12V tolerant)



## 6.2 ETH :



M12 to RJ45 Cable pinout

**Industrial M12 to RJ45 PVC cable** : Delock 85437 (1m), 85438 (2m), 85439 (3m)

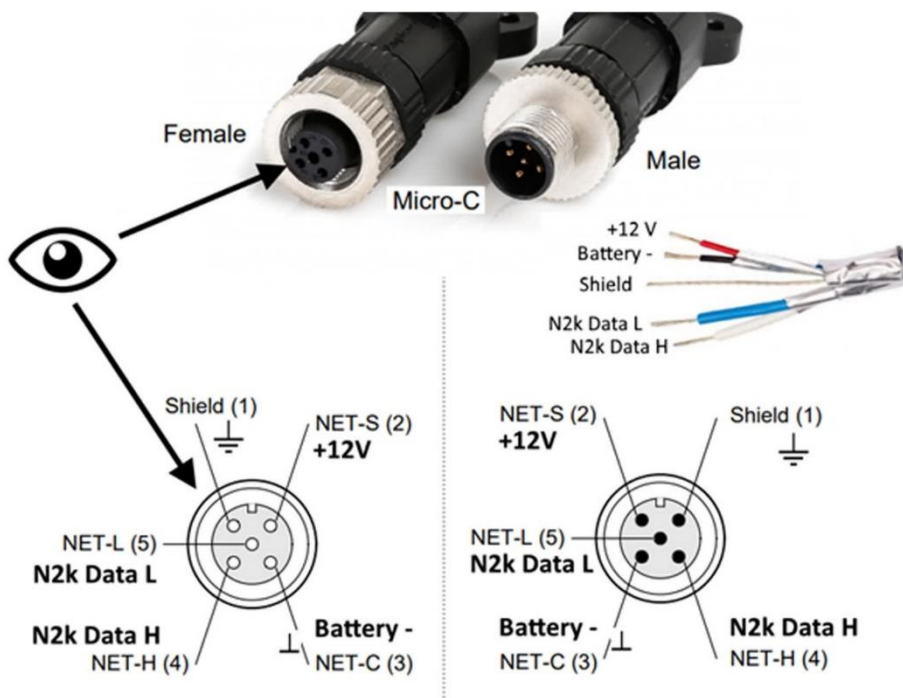
<https://www.delock.com/>

**Marine M12 to RJ45 MPPE cable** : Ifm EVF549 (0.5m, 48g), EVF550 (1m), EVF551 (2m)

<https://www.ifm.com/>

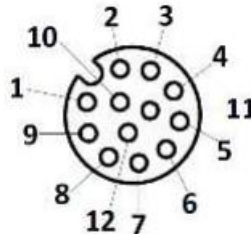
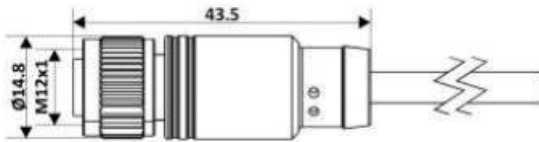
**Small soldering plug** : Amphenol M12D-04BMM1-SL8001

## 6.3 CAN-1 / CAN-2 :



## 6.4 SERIAL :

PVC cable : Radiospare 208-0539 (1m) or 144-7663 (2m)  
<https://docs.rs-online.com/9161/A700000007160909.pdf>  
<https://docs.rs-online.com/2ea6/0900766b815db150.pdf>



All Dimensions are in mm.

| Pin No. | Description |
|---------|-------------|
| 1       | Brown       |
| 2       | Blue        |
| 3       | White       |
| 4       | Green       |
| 5       | Pink        |
| 6       | Yellow      |
| 7       | Black       |
| 8       | Grey        |
| 9       | Red         |
| 10      | Violet      |
| 11      | Grey / Pink |
| 12      | Red / Blue  |

## 7 REQUEST PRODUCT INFORMATION

This product can be sold by unit or in volume and is designed to fit to your needs (memories, wireless, antennas, expansion board functionality). We can also provide the cables.  
 It can be easily customized with your company's visual for low volume (your logo with a white or blue backlight, colors, marking...). The Black Urethane enclosure version is 3D printed in-house and offers a very flexible solution.

**Austral electronics** is a design office, we can support you on your specific needs in electronics, embedded computing, specific Linux, certification...

[Contact us](#)