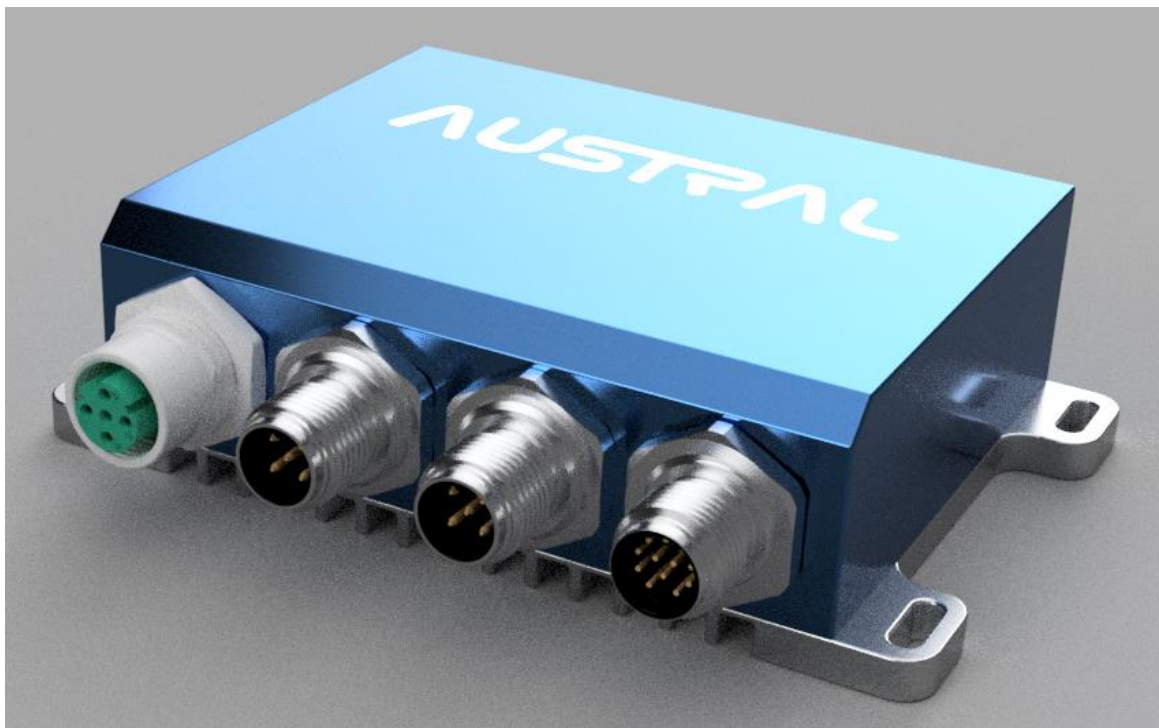


QUANTUM CM4 OEM

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

Raspberry PI compatible

Brief Datasheet



Revision 1.03
June 2022
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1/10

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, marinized 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...

3/10

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

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

3 SOFTWARE SUPPORT

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

5/10

Protection	IP67	-
Enclosure	Nylon & anodized marine aluminium	Full anodized Aluminium Urethane & Alu Board only
Cooling	Passive cooling, fanless design	-
Weight	212 gram (Nylon & Alu)	-
Compliance		
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 (*) Components : EN 301 489-1 et -17, EN 55032 et EN 55024 Class B	-
Safety	EN/UL/IEC 62368-1 (*) Components : EC 60950-1:2005, EN 62311:2008, UL 2500V, CSA, VDE, DIN EN 60747-5-2 (VDE 0884 Part2): 2003-01	-
Flammability	UV 94 1.5 mm : HB	-
ROHS	Directive 2015/863/EU	-
Reliability and Environmental		
MTTF	>200 000 hours	-
Warranty	2 Years	5 Years
Operation Temperature	-20 to +60°C (Alu & Nylon enclosure) -20 to +65°C (Full Aluminium enclosure)	-
Storage Temperature	-25°C to 85°C	-
Relative Humidity	10% to 90% (operation) 5% to 95% (storage)	-

(*) Currently under review

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

5 MAINTENANCE



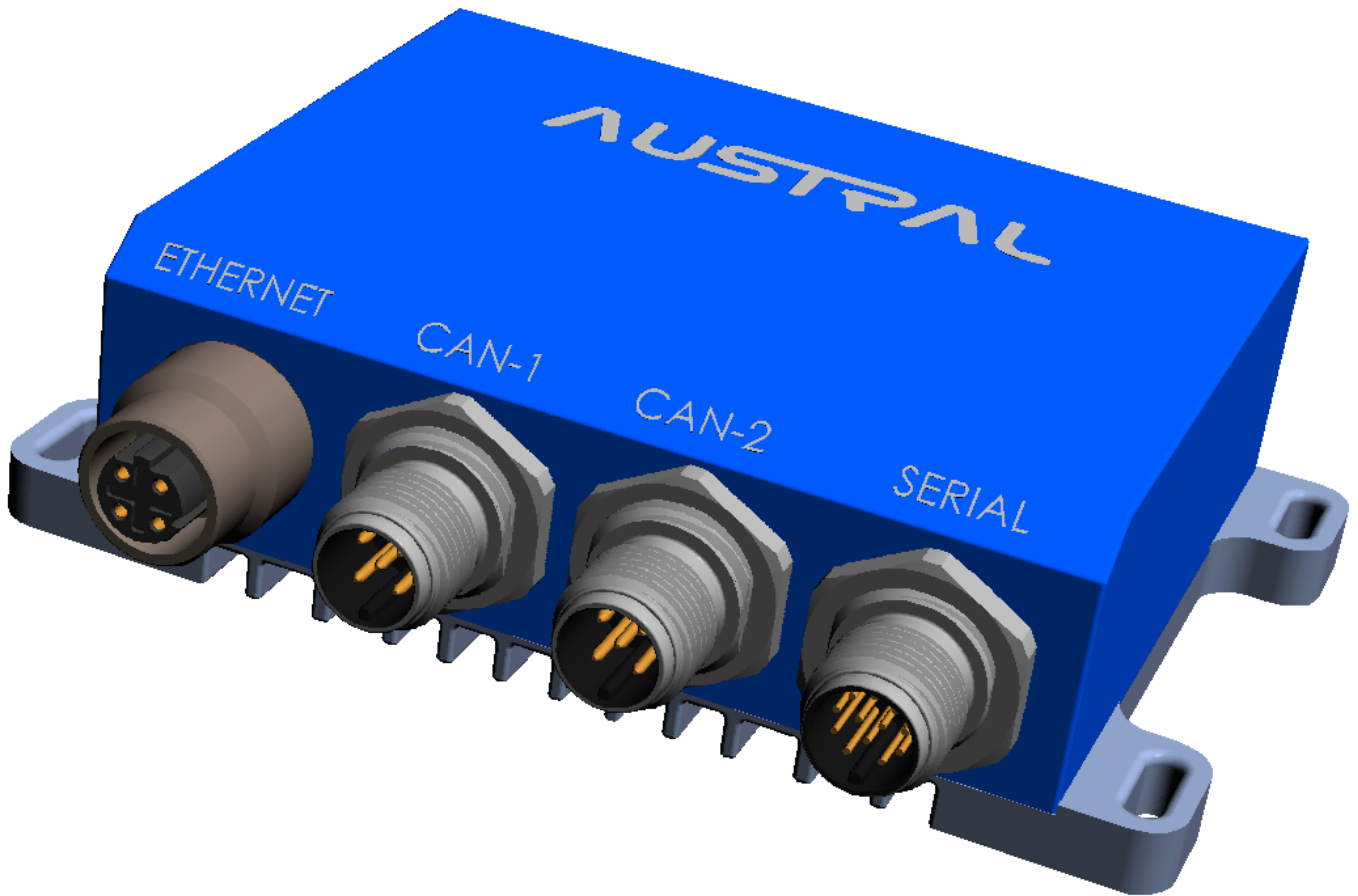
Contain a cell coin battery

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



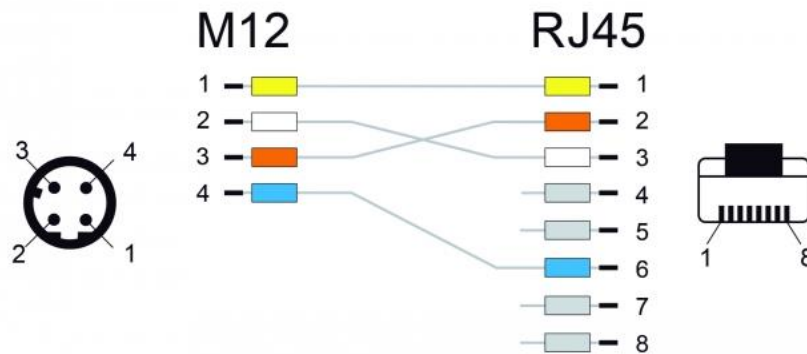
Ref	Function	Type
ETH	1x 100MB/s Ethernet	M12, 4 pin D-coded (Profinet standard)
CAN-1	1x CANBus 1 and Power Input	M12, 5 pins male A-coded (DeviceNet / NMEA2000 standard)
CAN-2	1x Isolated CANBus 2	M12, 5 pins male A-coded (DeviceNet / NMEA2000 standard)
SERIAL	1x RS232 port (460Kbps / 2-wire) 1x RS232 port with PPS input (3-wire) 1x (Isolated) Multifunction RS232/422/485 port (4-wire)	M12, 12 pins male, A-coded
ANT	Antenna 2.4 & 5 GHz 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) Red/Blue	COM2-CTS (8) Red/Blue	COM2-CTS (8) Red/Blue
11				COM1-GND (5) Grey/Pink	COM1-GND (5) Grey/Pink	COM1-GND (5) Grey/Pink
10				COM1-RXD+ (2) Violet	- Violet	COM1-RXD Violet
9				COM2-TXD Red	COM2-TXD Red	COM2-TXD Red
8				COM2-RXD Grey	COM2-RXD Grey	COM2-RXD Grey
7				COM3-RXD Black	COM3-RXD Black	COM3-RXD Black
6				COM3-TXD (6) Yellow	COM3-TXD (6) Yellow	COM3-TXD (6) Yellow
5				COM3-TXD (6) Yellow	COM3-TXD (6) Yellow	COM3-TXD (6) Yellow
4	ETH-RD- Blue	CAN1-Low (3) Blue	CAN2-Low (3) Blue	PWR-OUT (4) (7) Pink	PWR-OUT (4) (7) Pink	PWR-OUT (4) (7) Pink
3	ETH-TD- Orange	CAN1-High (3) White	CAN2-High (3) White	COM1-TXD+ (2) Green	COM1-D+ (2) Green	- Green
2	ETH-TD- Orange	GND Black	CAN2-GND Black	COM1-TXD- (2) White	COM1-D- (2) White	COM1-TXD White
1	ETH-RD+ White	PWR-IN Red (1)	-	COM1-RXD- (2) Blue	- Blue	- Blue
Shield	ETH-TD+ Yellow	CAN1-Shield Shield	CAN2-Shield Shield	GND brown	GND brown	GND 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)

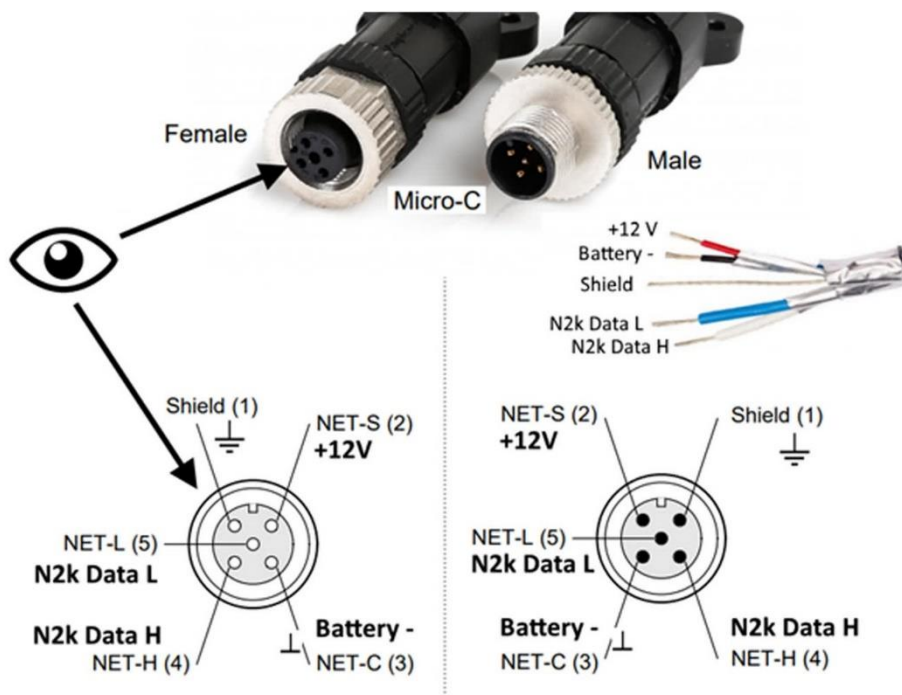
<https://www.delock.com/>

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

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

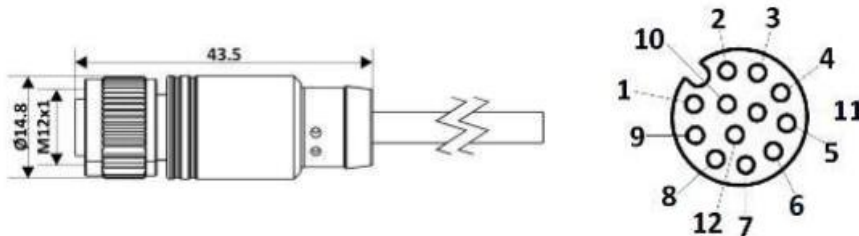
Small soldering plug : Amphenol M12D-04BMM1-SL8001

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](#)