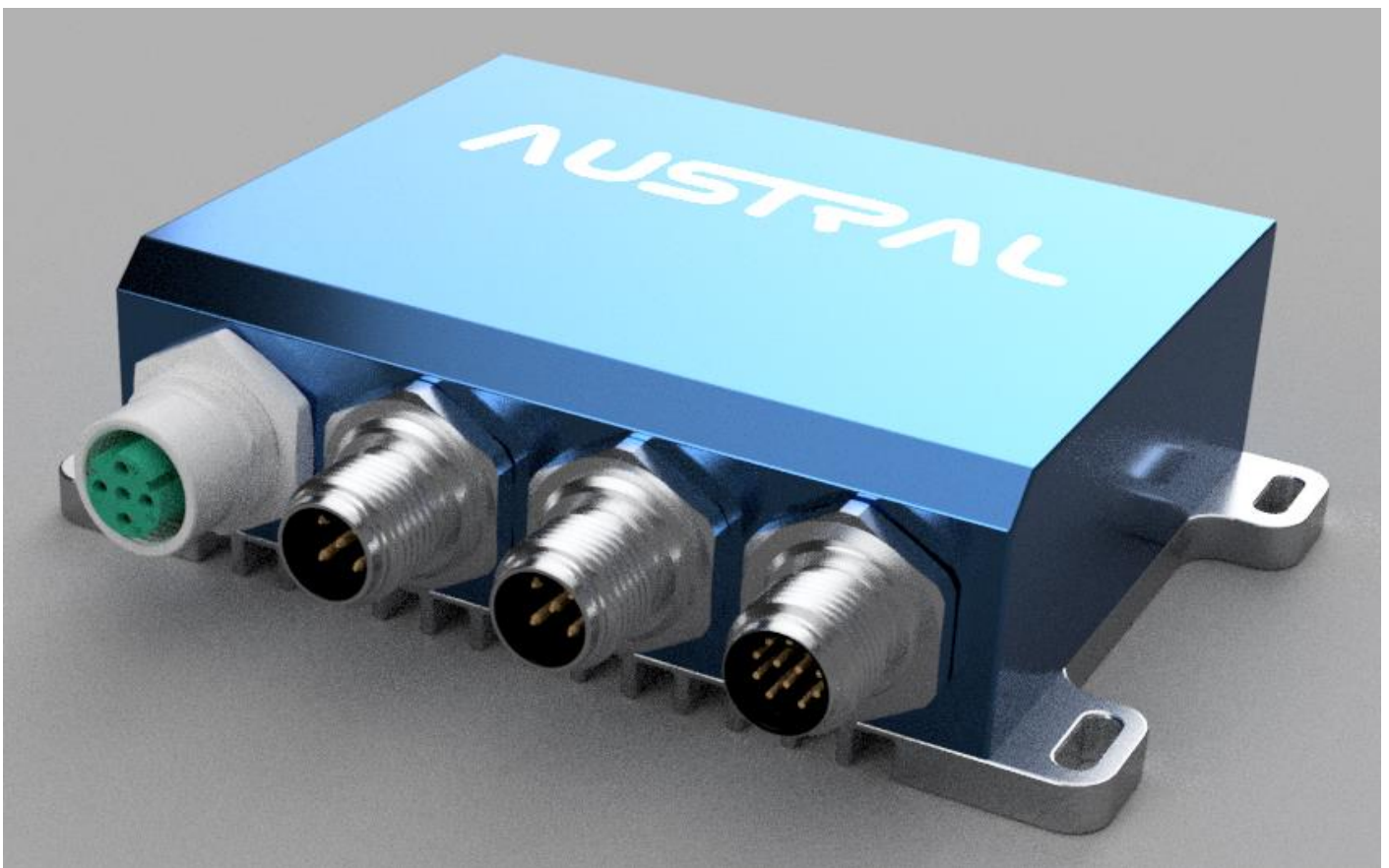


Quantum OEM Processor

Brief Datasheet



Quantum OEM Processor Brief Datasheet
Revision 1.02
April 2022
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Revision History

Revision	Date	Comment
1.01	01/26/22	Quantum OEM processor Brief Datasheet – Initial Release
1.02	04/07/22	Add Pinout

Additional Resources

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

<http://austral-eng.com/en/quantum-the-reinvented-computer/>

<https://github.com/austral-electronics/wiki/wiki/Quantum-Calculator>

<https://github.com/austral-electronics/wiki/wiki/Quantum-nodes-collection>

1 PRODUCT OVERVIEW

Hardware :

The **Quantum OEM Processor** is an industrial platform, marinized, miniaturized and low power consumption. 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.

Applications :

The Quantum OEM Processor is designed to be embedded into a third-party system like a boat, a vehicle, a drone, a machine, an outdoor gateway...

It is designed for low latency applications using remote in browser displays and suitable for a variety of use cases : Interfacing sensors and actuators, Robotics, Guidance, Datalog, IOT, IA, Cloud, Dashboards, Asset tracking, Machine monitoring...for the sectors of Marine, Industry, Drones, Off-Highway Vehicles, Agriculture...

Operating System :

The Quantum OEM Processor is provided by default with a Long Term Support, Real-time, Lightweight Debian Linux. The Quantum Linux is configured for robust and time-critical applications and is endurance tested on Austral Electronics products 24 hours a day, 7 days a week, 365 days a year.

You can switch easily in headless or desktop mode using VNC.

You are free to choose an OS more adapted to your project (Buildroot, Yocto, Debian, Ubuntu...), we provide the links to images and to the configuration file patch.

Reduce the integration cost and delay with Quantum SDK :

With Quantum OEM, you develop your software application in your preferred language running on ARM.

If you have not yet chosen your software architecture, Austral Electronics offers in option a **rapid development infrastructure** adapted to Instruments integration, Web dashboard creation, IOT, Robotics...

The **Quantum SDK** is a fast and intuitive system integration based on low code and visual programming :

- **Node Red** and a **huge node collections** for sensor interfaces, protocols, marine IOT (MIOT) , Industrial IOT (IIOT), remote dashboards, soft real time robotics.
- Optionally : **ROS2** for time-critical robotics.

The Quantum SDK reduces costs and delays for the description, development and the maintenance of your system, and is adapted from prototyping to mass production.

Adapted solution :

The Quantum OEM Processor doesn't answer exactly to your need ?

Austral Electronics, is a design office and is open to adapting the Quantum OEM processor to your hardware, software, cost, regulatory needs (total or partial development of your application, over the air update, board only, marking of your company, cost reduction, new expansion board, new nodes ...).

2 HARDWARE SPECIFICATIONS

	Quantum OEM	On demand
CPU Core		
CPU	ARM v8 Quad-core, 64 bits, 1.5Ghz	1.8Ghz
Memory		
RAM	1 to 8 GB LPDDR4	
Removable Storage	32 to 256 GB 10 years 24h in sea water	Up to 1TB Up to 1920 TBW & 30K P/E Cycle (64GB)
eMMC	-	Up to 32GB
Network & Wireless		
LAN	100Mbps Ethernet	1Gbps
Wireless	WIFI 2.4 & 5 GHz, Bluetooth 5.0, BLE External Antenna	No Wireless
IOT	-	4G LTE, LoRa, Zigbee ,Swarm, Kineis
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)	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
Protection	IP67	-
Enclosure	Urethane Anodized marine aluminium	Board only
Cooling	Passive cooling, fanless design	-
Weight	212 gram	-
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	+85°C on Demand
Storage Temperature	-25°C to 85°C	-
Relative Humidity	10% to 90% (operation) 5% to 95% (storage)	-

(*) Currently under review

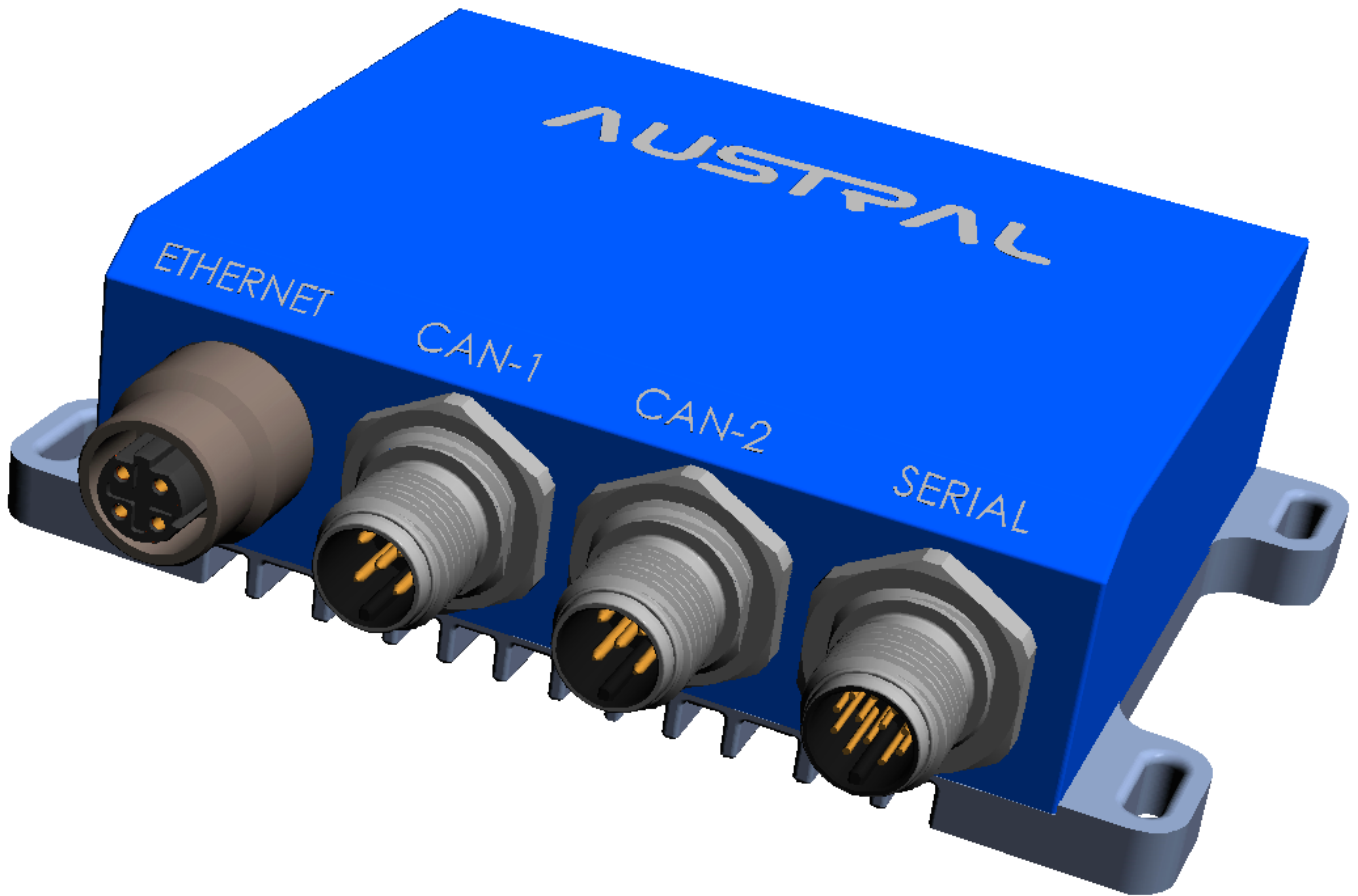


Contain a cell coin battery

Product reference : 200-003-001-(1)-(2)-(3)-(4)-(5)

- (1) : RAM size in GB (1, 2, 4, 8)
- (2) : Storage size in GB (8, 16, 32, 64, 128, 256, 512, 1024...)
- (3) : Storage type :
 - R : Removable (up to 1024GB)
 - I : Removable high endurance for Industrial, IoT, Datalog (up to 64G, NAND SLC)
 - E : EMMC (up to 32GB)
- (4) : Pre installed software
 - Q : Quantum Linux
 - HD : Headless Debian Linux
 - DD : Desktop VNC Debian Linux
 - SDK : Quantum Linux & Quantum SDK
 - SDK_ROS2 : Quantum Linux & Quantum SDK & ROS2 Robotics
- (5) : Optional functionality (Contact Austral Electronics)

3 ELECTRICAL INTERFACES



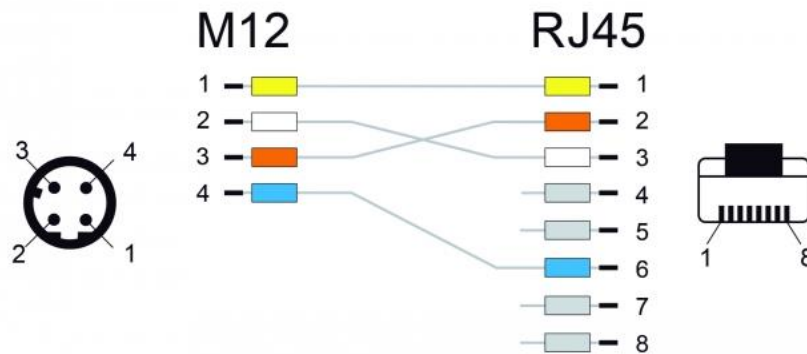
Ref	Function	Type
ETH	1x 100MB/s Ethernet	M12, 4 pin D-coded (Profinet standard)
CAN-1	1x CANBus 1 and Power Input	M12, 5 pins male A-coded (DeviceNet / NMEA2000 standard)
CAN-2	1x Isolated CANBus 2	M12, 5 pins male A-coded (DeviceNet / NMEA2000 standard)
SERIAL	1x RS232 port (460Kbps / 2-wire) 1x RS232 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

3.1 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)

3.2 ETH :



M12 to RJ45 Cable pinout

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

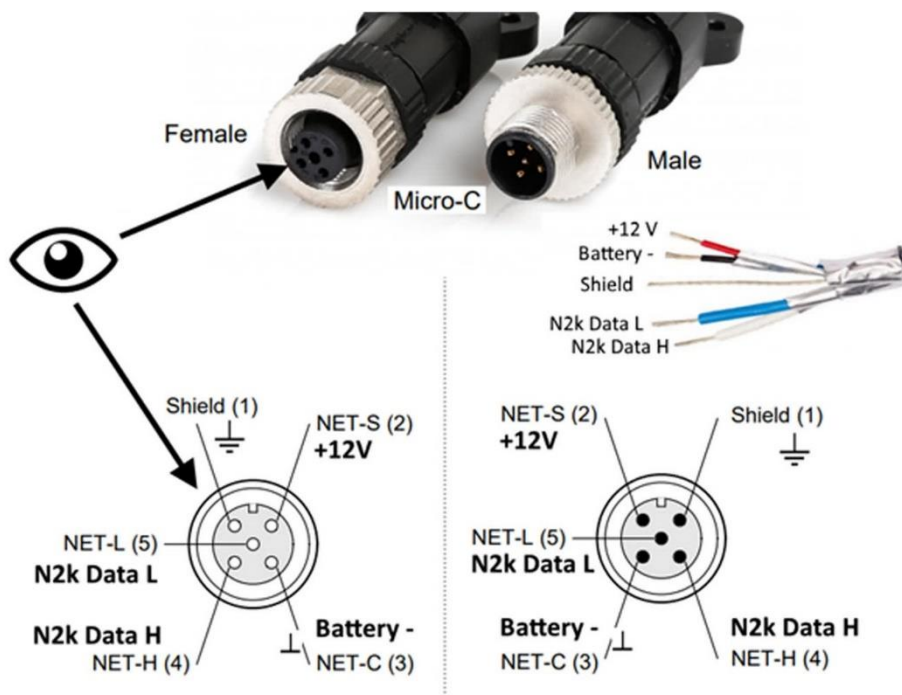
<https://www.delock.com/>

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

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

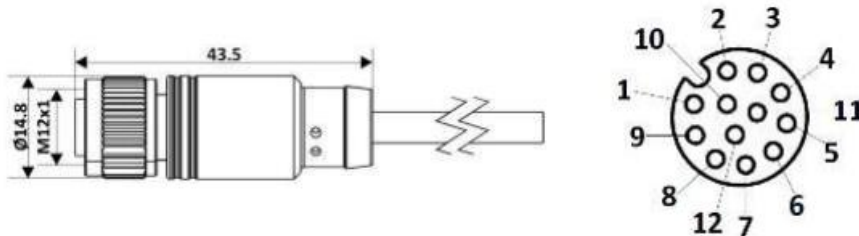
Small soldering plug : Amphenol M12D-04BMM1-SL8001

3.3 CAN-1 / CAN-2 :



3.4 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

4 MAINTENANCE

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.