H-ROS SoM

Product specification *v1.1*

H-ROS robot bus in a module

The H-ROS System on Module is a tiny hardware device for deploying the H-ROS robot bus in hardware. It delivers determinism, synchronization, security and safety to robot communications, allowing to build interoperable modules for real plug and play and extensible robots. And an enhanced ROS 2 setup, among other capabilities.

Firmware

- ROS 2 Dashing Diademata
- Real-Time Operating System based on Linux
- Precision Clock Synchronization through IEEE 1588-2002 (PTP)
- Automatic updates: Over-the-Air (OTA)

Processing System: Dual core ARM®Cortex-A9

- 667/766/866 MHz selectable speed
- ARMv7-A architecture
  - TrustZone®security
  - Thumb®-2 instruction set
- NEON™media-processing engine
- Single and double precision Vector Floating Point Unit (VFPU)

Memory

- 32 KB L1 4-way set-associative instructionand data caches (independent for each CPU)
- 512 KB L2 8-way set-associative cache (shared between the CPUs)
- 256 KB on-chip RAM (OCM)
- 1 GB DDR3-1066 RAM
- 128 Mb primary boot flash
- 8 GB eMMC flash

Sensors

- 9-axis Inertial Measurement Unit (IMU)
- Cryptographic chip
- 12 bit 4 channel ADC

Renconfigurable I/Os

- 2x Gigabit Ethernet with support for Time Sensitive Networking (TSN)
  - IEEE Std 802.1Qbv-2015 Enhancements for Scheduled Traffic
  - IEEE Std 802.1Qci-2017 Per-Stream Filtering and Policing
- 2x CAN

1x I2C	GPIOs
1x SPI	JTAG
2x UART[1]	Reset I/O

Power

- 5V input power rail
- Integrated LDOs
- Integrated feeding voltage measurement
- Integrated power measurement system
- Integrated hardware lifecycle

Miscelaneous

- Heat dissipation case
- Power red LED indicator
- Power blue LED indicator

[1]One of them dedicated to debugging purposes.

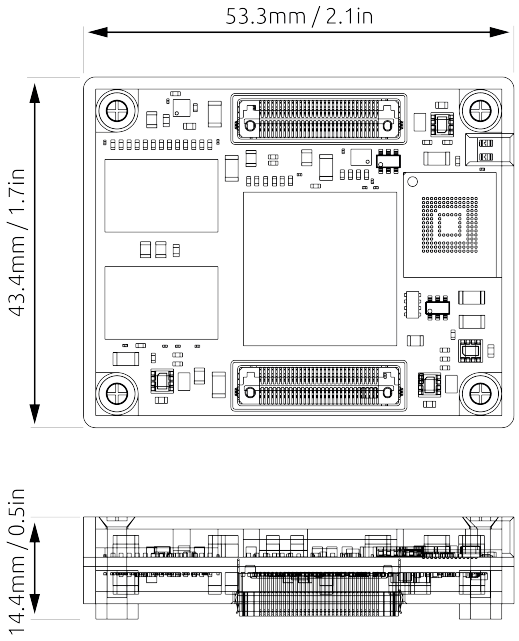
Release date: *14.05.2019*

H-ROS SoM key benefits

The H-ROS SoM facilitates the creation of ROS 2 enabled robot hardware. Some key benefits:

- Reduction of time to market in robot component development.
- Cost reduction in hardware/software development.
- Seamless integration with the ROS 2 robot ecosystem.
- Security.
- High speed and Real-Time enabled communications.
- Plug-and-play-like capabilities including amanaged hardware lifecycle.
- Standardized information model, HRIM (**docs**)

Dimensions



H-ROS robot bus

Empowering robot modularity

The Hardware Robot Operating System is a robot bus that enables to easily create modular robot hardware. The key objective of H-ROS is to provide technological solutions that facilitate a real-time deterministic environment while providing security, plug-and-play, interoperability, extensibility and reconfigurability capabilities. The H-ROS SOM implements the H-ROS robot bus in a tiny 5x4 cm module that adds all these capabilities by simply attaching the device to the existing and new robot components.

For more information, please visit **http://acutronicrobotics.com/modularity/som**

Product Identification

Parts are numbered as ***H-ROS_SoM-V-X-Y-S***, where ***V*** corresponds with the product version number, ***X*** is the processor speed identifier, ***Y*** is the temperature grade identifier and ***S*** is the serial number of that particular part.

H-ROS_SoM-V-X-Y-S
general identifier

Characteristic	Value	Description	Identifier
Version Number (V)	version 1.0	Ofifcial release version	*1*
Processor Speed (X)	667 MHz	Standard processor speed grade	*S*
	766 MHz	Upgraded processor speed grade	*U*
	866 MHz	High processor speed grade	*H*
Temperature Grade (Y)	0 – 70°C	Commercial temperature grade	*C*
	-40 – 85°C	Industrial temperature grade	*I*
Serial number (S)	-	Unique identifier	-

Exemplary part numbers:

- **H-ROS_SoM-1-S-C-1232X3:** Version 1.0, standard processor speed, commercial temperature grade with serial number 1232X3.

To obtain more information, please contact Acutronic Robotics' sales representatives at *contact@acutronicrobotics.com*

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