Computer-on-Modules Form Factor

SMARC™ module

Low-power embedded architecture platform for Computer-on-Modules based on Arm® and X86 technology. Perfect fit for mobile, embedded, connected solutions with scalable building blocks. Optimized pin-out definition for versatile architectures. Constructed to withstand harsh industrial environments.

**SMARC™ 2.1 MODULE**

A NEW SPECIFICATION

SMARC™ 2.1 module introduces a number of additional features as well as a few revision enhancements to the previous 2.0 specification.

At a Glance:
- SerDes signal support for increased Ethernet connectivity
- Additional MDIO interface
- Further GPIOs
- New power and sleep domains
- PCI Express® Clock Request Signals
- Additional Camera Interfaces
- JTAG connector refinement
- MIPI CSI Fill order changes
- Improved documentation

About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: [www.kontron.com](http://www.kontron.com)

About the Intel® Partner Alliance

From modular components to market-ready systems, Intel and the over 1,000+ global member companies of the Intel® Partner Alliance provide scalable, interoperable solutions that expedite deployment of intelligent devices and end-to-end analytics. Close collaboration with Intel and each other enables Alliance members to innovate with the latest IoT technologies, helping developers deliver first-to-market solutions.

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SMARC™

BOARDS & MODULES - SMARC™

SMARC-sXEL

**COMPLIANCE**
- SMARC module 2.1

**DIMENSIONS (H x W x D)**
- SMARC 2.0

**CPU**
- Intel® Atom™ N-series
- Intel® Padlock™
- Intel® Atom™ N-series
- Intel® Atom™ N-series

**GRAPHICS CONTROLLER**
- Multi-T860 MP
- Mali-T860 MP
- Mali-T860 MP
- Mali-T860 MP

**ETHERNET**
- 1x 1 Gbit Ethernet (SMARC-sXAL)
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet

**ETHERNET CONTROLLER**
- Integrated
- Inet® XGCh Gmit
- Inet® XGCh Gmit
- 1x Integrated

**FLASH ONBOARD**
- 4x UARTS
- 4x UARTS
- 4x UARTS
- 3x serial interfaces

**POWER SUPPLY**
- 3.0 - 5.25 V wide range input

**TEMPERATURE**
- Operating: -40 °C to 85 °C
- Operating: extended consumer -20 °C to 85 °C
- Operating: extended consumer -20 °C to 85 °C

**SPECIAL FEATURES**
- Trusted Platform Module TPM
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**OPERATING SYSTEM**
- Windows® 10, Enterprise
- Linux
- Linux
- Yocto Linux

**INTERFACES**
- 2x USB 3.0 (incl. USB 2.0) + 4x USB 2.0
- 1x USB 3.0 (incl. USB 2.0)
- 4x serial interfaces
- 1x HDMI (on request DP)

**ADDITIONAL INTERFACES**
- 12x GPIO, SDIO, 3x I²C, MIPI-CSI
- 12x GPIO, SDIO, 3x I²C, MIPI-CSI
- 12x GPIO, SDIO, 3x I²C, MIPI-CSI
- 12x GPIO, SDIO, 3x I²C, MIPI-CSI

**MAIN MEMORY**
- Up to 8 GByte DDR3L (ECC) (SMARC-sXAL)
- Up to 4 GByte LPDDR4
- Up to 8 GByte LPDDR4 memory down
- Up to 8 GByte LPDDR4 memory down

**CPU SUPPORT**
- Up to 4x PCIe x4
- Up to 2x PCIe x1 or 2x PCIe x2
- Up to 2x PCIe x1 or 2x PCIe x2
- Up to 3x PCIe

**PCI EXPRESS® / FLASH ONBOARD**
- Up to 64 GByte eMMC
- Up to 128 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC

**SATA**
- 1x SATA 6 Gb / s
- 1x SATA 3 Gb/s
- -
- -

**SPECIAL FEATURES**
- Trusted Platform Module
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**SMARC-sXAL (E2)**

**COMPLIANCE**
- SMARC 2.0

**DIMENSIONS (H x W x D)**
- 82 x 50 mm

**CPU**
- Intel® Atom™ N-series
- Intel® Atom™ N-series
- Intel® Atom™ N-series
- Intel® Atom™ N-series

**GRAPHICS CONTROLLER**
- Intel® UHD Gen1
- Intel® UHD Gen9
- Mali-T860 MP
- Mali-T860 MP

**ETHERNET**
- 1x 1 Gbit Ethernet (SMARC-sXAL)
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet

**ETHERNET CONTROLLER**
- Integrated
- Inet® XGCh Gmit
- Inet® XGCh Gmit
- 1x Integrated

**FLASH ONBOARD**
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC

**POWER SUPPLY**
- 5 V only (SMARC-sXAL)
- 3.3 V – 5 V power supplies
- single level Lithium Ion cells or fixed

**TEMPERATURE**
- Operating: -30 °C to +85 °C
- Operating: commercial (-20 °C - 85°C)
- Operating: extended consumer -20 °C to 85 °C
- Operating: extended consumer -20 °C to 85 °C

**SPECIAL FEATURES**
- Trusted Platform Module TPM 2.0
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**OPERATING SYSTEM**
- Windows® 10, Enterprise
- Linux
- Yocto Linux
- Yocto Linux

**INTERFACES**
- 2x USB 3.0 + 4x USB 2.0
- 1x USB 3.0, 6x USB 2.0
- 4x serial interfaces
- 12x GPIO, SDIO, 5x PC, MPI-CSI

**ADDITIONAL INTERFACES**
- 12x GPIO, SDIO, 5x I²C, MIPI-CSI, 2x CAN

**MAIN MEMORY**
- Up to 8 GByte LPDDR4 memory down
- Up to 8 GByte LPDDR4 memory down
- Up to 8 GByte LPDDR4 memory down
- Up to 8 GByte LPDDR4 memory down

**CPU SUPPORT**
- 3x PCIe
- 3x PCIe
- Up to 2x PCIe x1 or 2x PCIe x2
- 3x PCIe

**SATA**
- -
- -
- 1x optional SATA
- 1x SATA

**SPECIAL FEATURES**
- Trusted Platform Module TPM 2.0
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**SMARC-sXAL28**

**COMPLIANCE**
- SMARC 2.0

**DIMENSIONS (H x W x D)**
- 82 x 50 mm

**CPU**
- Intel® Atom™ N-series
- Intel® Atom™ N-series
- Intel® Atom™ N-series
- Intel® Atom™ N-series

**GRAPHICS CONTROLLER**
- Intel® UHD Gen1
- Intel® UHD Gen9
- Mali-T860 MP
- Mali-T860 MP

**ETHERNET**
- 1x 1 Gbit Ethernet (SMARC-sXAL)
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet

**ETHERNET CONTROLLER**
- Integrated
- Inet® XGCh Gmit
- Inet® XGCh Gmit
- 1x Integrated

**FLASH ONBOARD**
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC

**POWER SUPPLY**
- 5 V 3 V – 5.25 V operates directly from
- 3 V – 5.25 V operates directly from
- single level Lithium Ion cells or fixed

**TEMPERATURE**
- Operating: -30 °C to +85 °C
- Operating: commercial (-20 °C - 85°C)
- Operating: extended consumer -20 °C to 85 °C

**SPECIAL FEATURES**
- Trusted Platform Module TPM 2.0
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**SMARC-sAMX8**

**COMPLIANCE**
- SMARC Evaluation Carrier 2.0

**DIMENSIONS (H x W x D)**
- 82 x 50 mm

**CPU**
- Intel® Atom® processor E3900 series,
- Rockchip RK3399K
- Intel® Atom® processor E3900 series,
- Rockchip RK3399K

**GRAPHICS CONTROLLER**
- Mali-T860 MP
- Mali-T860 MP
- Mali-T860 MP
- Mali-T860 MP

**ETHERNET**
- 1x 1 Gbit Ethernet (SMARC-sXAL)
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet

**ETHERNET CONTROLLER**
- Integrated
- Inet® XGCh Gmit
- Inet® XGCh Gmit
- Integrated

**FLASH ONBOARD**
- -
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC

**POWER SUPPLY**
- 5 V only (SMARC-sXAL4)
- 3 V – 5.25 V operates directly from
- single level Lithium Ion cells or fixed

**TEMPERATURE**
- Operating: -30 °C to +85 °C
- Operating: commercial (-20 °C - 85°C)
- Operating: extended consumer -20 °C to 85 °C

**SPECIAL FEATURES**
- Trusted Platform Module TPM 2.0
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)

**SMARC-sAMX8X**

**COMPLIANCE**
- SMARC Evaluation Carrier 2.0

**DIMENSIONS (H x W x D)**
- 82 x 50 mm

**CPU**
- Intel® Pentium®, and Intel® Celeron® N
- Intel Atom® processor E3900 series,
- Intel® Pentium®, and Intel® Celeron® N
- Intel Atom® processor E3900 series,

**GRAPHICS CONTROLLER**
- Mali-T860 MP
- Mali-T860 MP
- Mali-T860 MP
- Mali-T860 MP

**ETHERNET**
- 1x 1 Gbit Ethernet (SMARC-sXAL)
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet
- 1x 1 Gbit Ethernet

**ETHERNET CONTROLLER**
- Integrated
- Inet® XGCh Gmit
- Inet® XGCh Gmit
- Integrated

**FLASH ONBOARD**
- -
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC
- Up to 64 GByte eMMC

**POWER SUPPLY**
- 5 V 3 V – 5.25 V operates directly from
- 3.3 V – 5 V power supplies

**TEMPERATURE**
- Operating: -30 °C to +85 °C
- Operating: commercial (-20 °C - 85°C)
- Operating: extended consumer -20 °C to 85 °C

**SPECIAL FEATURES**
- Trusted Platform Module TPM 2.0
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)
- Security Solution (APPROTECT)