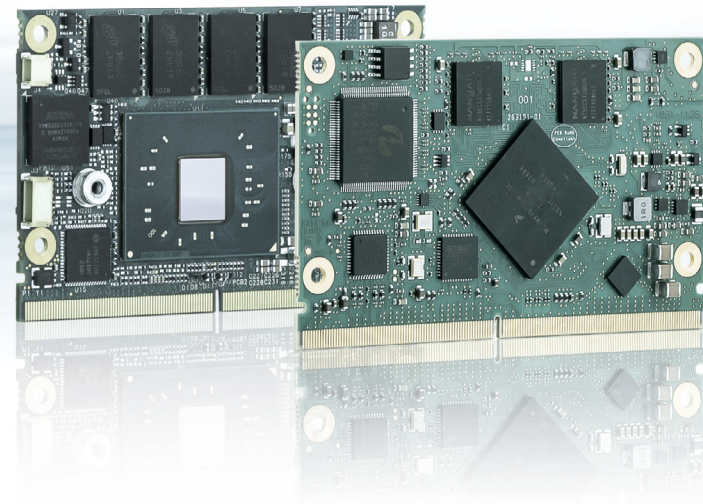


# Computer-on-Modules Form Factor SMARC™ module



## BOARDS & MODULES – SMARC™



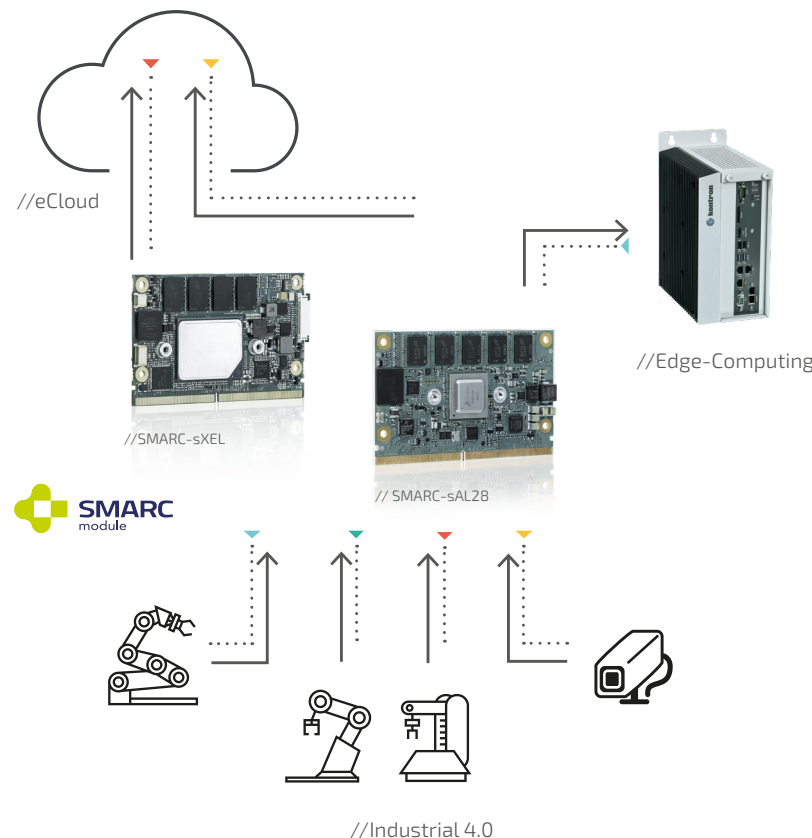
Low-power embedded architecture platform for Computer-on-Modules based on Arm® and X86 technology. Perfect fit for mobile, embedded, connected solutions with scalable building blocks. Optimized pin-out definition for versatile architectures. Constructed to withstand harsh industrial environments.

### ▶ 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 accelerate 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-in-market solutions.

Intel and Atom are registered trademarks of Intel Corporation in the U.S. and other countries.



▶ **MODULE STANDARD FOR X86 AND Arm®**  
Optimized pin-out definition for versatile architectures

▶ **CREATING MOBILE, EMBEDDED,  
CONNECTED SOLUTIONS**  
Ultra low-power, low profile

▶ **PERFECT FIT FOR IIOT APPLICATIONS**  
High connectivity with USB, PCIe, up to 2x LAN and 2x CAN

POSSIBILITIES START HERE **kontron**

### YOUR CONTACT

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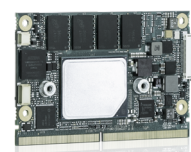
### GLOBAL HEADQUARTERS

**Kontron Europe GmbH**

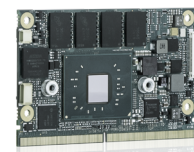
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[www.kontron.com](http://www.kontron.com)

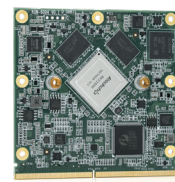
# BOARDS & MODULES - SMARC™



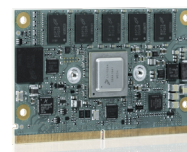
SMARC-sXEL



SMARC-sXAL(4) (E2)  
SMARC-sXAL (E2)



SMARC-fa3399



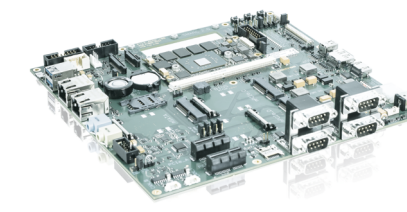
SMARC-sAL28



SMARC-sAMX8X



SMARC-sAMX8



SMARC Evaluation Carrier 2.0

<b>COMPLIANCE</b>	SMARC module 2.1	SMARC 2.0	SMARC 2.1	SMARC 2.1	SMARC 2.0	SMARC 2.0	SMARC 2.0
<b>DIMENSIONS (H x W x D)</b>	82 x 50 mm	82 x 50 mm	82 x 80 mm	82 x 50 mm	82 x 50 mm	82 x 50 mm	210 x 20 mm
<b>CPU</b>	Intel Atom® x6000E Series, Intel® Pentium®, and Intel® Celeron® N and J Series processors	Intel Atom® processor E3900 series, Intel® Celeron® processor N3350 and Intel® Pentium® processor N4200	Rockchip RK3399K	NXP Dual Cortex A72 LS1028A processor	NXP dual/quad i.MX8X processor	NXP single/dual i.MX7 processor	
<b>MAIN MEMORY</b>	Up to 16 GByte LPDDR4 memory down with inband ECC support	Up to 8 GByte ECC DDR3L (SMARC-sXAL) Up to 8 GByte LPDDR4 (SMARC-sXAL4)	Up to 8 GByte LPDDR4 memory down	up to 8 GByte DDR3L (ECC)	Up to 4 GByte LPDDR4	Up to 2 GByte DDR3	
<b>GRAPHICS CONTROLLER</b>	Intel® UHD Gfx Gen11	Intel® HD Gfx Gen9	Mali-T860 MP	integrated	integrated	integrated	Dual Channel LVDS HDMI DP++
<b>ETHERNET CONTROLLER</b>	integrated	Intel® I210IT	internal and Intel® I210	integrated	1x integrated, 1x on request	integrated	
<b>ETHERNET</b>	Up to 3x 1 Gbit LAN (2x GBE0/1 and 1x optional SGMII via SERDES)	1x 1 GB Ethernet (SMARC-sXAL) up to 2x 1 GB Ethernet (SMARC-sXAL4)	up to 2x 1 GByte Ethernet	up to 2x 1 GByte Ethernet (TSN capable)	up to 2x 1 GByte Ethernet	up to 2x 1 GByte Ethernet	2x GbE ports with integrated magnetics
<b>SATA</b>	1x SATA 6 Gb/s	1x SATA 3 Gb/s	-	-	-	-	mSATA connector SD Card connector
<b>FLASH ONBOARD</b>	Up to 64 GByte eMMC	Up to 64 GByte MMC	Up to 128 GByte eMMC 5.1	Up to 64 GByte eMMC	Up to 64 GByte eMMC	Up to 64 GByte eMMC	
<b>PCI EXPRESS® / PCI SUPPORT</b>	up to 4x PCIe x1	3x PCIe x1	Up to 3x PCIe	Up to 2x PCIe x1 or 2x PCIe x2 or 1x PCIe x4	Up to 3x PCIe	1x PCIe with dual core processor up to 3x PCIe (on request)	2x miniPCIe with SIM card support 2x PCIe
<b>PANEL SIGNAL</b>	1x HDMI (on request DP), 1x DP++, 1x LVDS dual channel (on request eDP)	1x HDMI (on request DP), 1x DP++, 1x LVDS dual channel (on request eDP)	1x LVDS, HDMI, DP	LVDS dual channel, eDP or DP as BOM option on request	1x LVDS, 1x HDMI, 1x DP	1x LVDS dual channel	
<b>USB</b>	2x USB 3.0 (incl. USB 2.0) + 4x USB 2.0, alternatively USB #3 as OTG	2x USB 3.0 (incl. USB 2.0) + 4x USB 2.0, alternatively USB #0 as OTG	2x USB 3.0 + 4x USB 2.0	up to 6x USB 2.0, 1x USB 3.0	1x USB 3.0, 6x USB 2.0	up to 5x USB 2.0	1x USB 2.0 dual role, 1x USB 2.0, 2x USB 3.0, 2x USB connected to mPCIe
<b>SERIAL</b>	4x serial interfaces (2x RX / TX only)	4x serial interfaces (2x RX / TX only)	4x serial interfaces (2x RX / TX only)	3x serial interfaces (2x RX / TX only)	4x serial interfaces (2x RX / TX only)	4x serial interfaces (2x RX / TX only)	
<b>ADDITIONAL INTERFACES</b>	HD Audio and I <sup>2</sup> S, 5x I <sup>2</sup> C, 2x SPI, 14x GPIOs	12x GPIO, SDIO, 5x I <sup>2</sup> C, MIPI-CSI	I <sup>2</sup> S, 2x I <sup>2</sup> C, 2x SPI, SDIO, 12x GPIO	12x GPIO, SDIO, 3x I <sup>2</sup> C, 1x CAN	12x GPIO, SDIO, 5x I <sup>2</sup> C, MIPI-CSI 2x CAN	12x GPIO, SDIO, 5x I <sup>2</sup> C, MIPI-CSI, 2x CAN	4x UARTS, 2x CAN, 12x GPIO, 2x MIPI CSI camera interface
<b>OPERATING SYSTEM</b>	Windows® 10, Enterprise, Windows® 10 IoT, Linux	Windows® 10, Enterprise, Windows 10 IoT, Linux, VxWorks	Linux	Yocto Linux	Yocto Linux	Yocto Linux	
<b>POWER SUPPLY</b>	3.0 - 5.25 V widerange input	3V - 5.25 V operates directly from single level Lithium Ion cells or fixed 3.3 V - 5 V power supplies (SMARC-sXAL) 5V only (SMARC-sXAL4)	5 V	3 V - 5.25 V operates directly from single level Lithium Ion cells or fixed 3.3 V - 5 V power supplies	3 V - 5.25 V operates directly from single level Lithium Ion cells or fixed 3.3 V - 5 V power supplies	3 V - 5.25 V operates directly from single level Lithium Ion cells or fixed 3.3 V - 5 V power supplies	12 V single supply optional 3.0 - 5.25 V for module only
<b>TEMPERATURE</b>	SMARC-sXEL: Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating SMARC-sXEL E2: Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	SMARC-sXAL(4): Commercial temperature: 0 °C to +60 °C operating, -30 °C to +85 °C non-operating SMARC-sXAL(4) E2: Industrial temperature: -40 °C to +85 °C operating, -40 °C to +85 °C non-operating	Extended commercial (-20 °C - 85 °C) on request: commercial (0 °C - 60 °C)	Operating: -40 °C to + 85 °C Non-Operating: -40 °C to +85 °C	Operating: -40 °C to 85 °C	Operating: extended consumer -20 °C to + 85 °C Non-Operating: -30 °C to +85 °C	-
<b>SPECIAL FEATURES</b>	Trusted Platform Module TPM 2.0 Industrial Temperature Grade versions	Trusted Platform Module TPM 2.0 Security Solution (APPROTECT) on request, Ind. Temp. Grade versions	PCIe bridge optional removable 2nd Ethernet optional removable	Alternate function on PCIe C/D: SXGMII or UXGMII to connect Ethernet bridge phy directly on the carrier (allows up to 5x TSN capable 1GB LAN ports), (Support of Kontron APPROTECT) on request	Security Solution (APPROTECT) on request	Security Solution (APPROTECT) on request	