kontron S&T Group

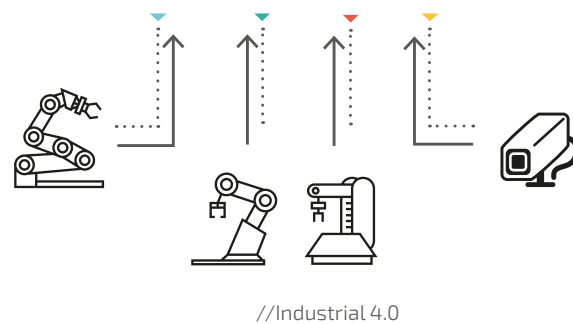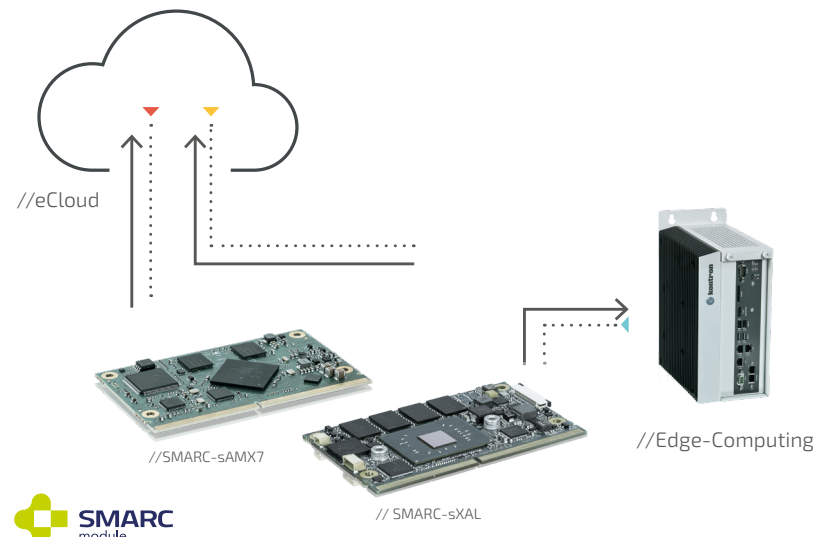## COMPUTER-ON-MODULES FORM FACTOR
SMARC™

▼

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 2.0
Computer-On-Module Solutions

The SMARC™ (Smart Mobility Architecture) standard has in a matter of a few years become a major driving force behind the enablement of innovative ultra-low-power embedded computing technology solutions. Market demand and the disruptive
influence of the Internet of Things (IoT) have already hastened the arrival of a new specification, SMARC 2.0.

//eCloud

//SMARC-sAMX7

// SMARC-sXAL

//Edge-Computing

SMARC module

//Industrial 4.0

About Kontron – Member of the S&T Group

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall.

For more information, please visit: 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.

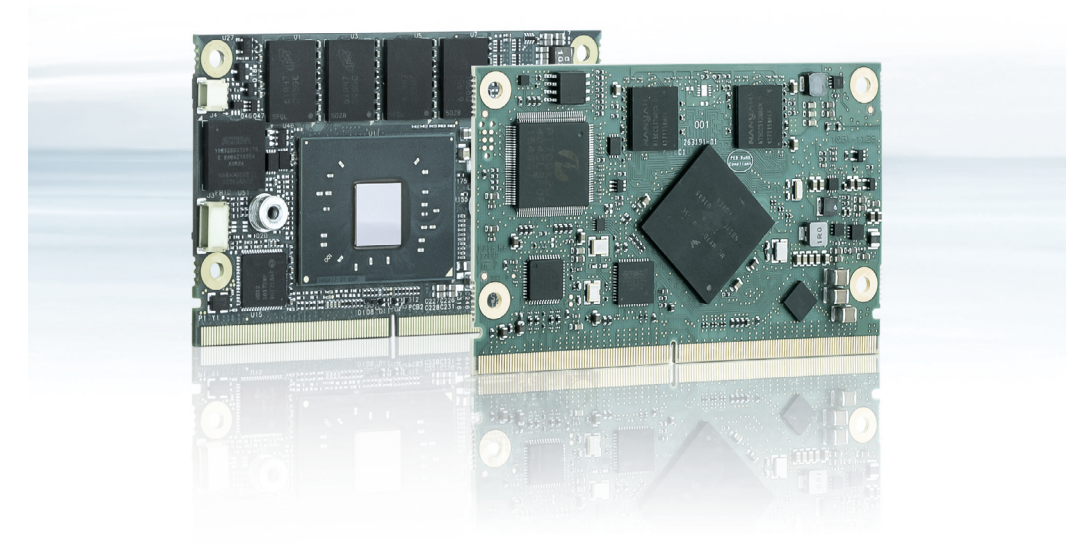Intel and Atom are registered trademarks of Intel Corporation in the U.S. and other countries.

intel partner Titanium IoT Solutions

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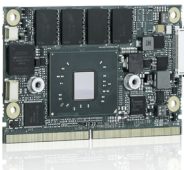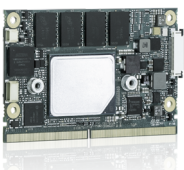**SMARC** module

▶ **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** S&T Group

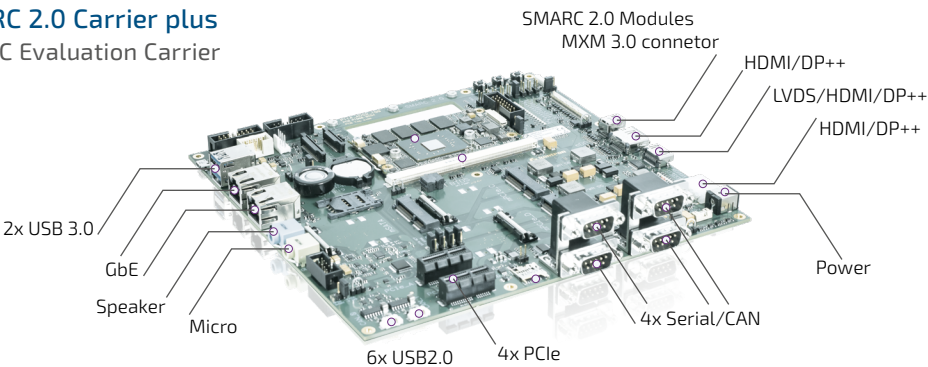|	SMARC-sXAL(4) (E2) / SMARC-sXAL (E2)	SMARC-sXEL NEW!	SMARC-sAMX7	SMARC-sAMX8X NEW!	SMARC-sAL28 NEW!	SMARC-fA3399 NEW!
COMPLIANCE	SMARC 2.0	SMARC module 2.1	SMARC 2.0	SMARC 2.0	SMARC 2.1	SMARC 2.1
DIMENSIONS (H x W x D)	82 x 50 mm	82 x 50 mm	82 x 50 mm	82 x 50 mm	82 x 50 mm	82 x 80 mm
CPU	Intel Atom® x7-E3950, 4C, 1.6 / 2.0 GHz, 12 W TDP Intel Atom® x5-E3940, 4C, 1.6 / 1.8 GHz, 9.5 W TDP Intel Atom® x5-E3930, 2C, 1.3 / 1.8 GHz, 6.5 W TDP Intel® Pentium® N4200, 4C, 1.1 / 2.5 GHz, 6 W TDP Intel® Celeron® N3350, 2C, 1.1 / 2.4 GHz, 6 W TDP	Intel Atom®/ Pentium®/ Celeron® series	NXP single/dual i.MX7 processor	NXP dual/quad i.MX8X processor	NXP Dual Cortex A72 LS1028A processor	Rockchip RK3399K
MAIN MEMORY	Up to 8 GByte ECC DDR3L (SMARC-sXAL) Up to 8 GByte LPDDR4 (SMARC-sXAL4)	Up to 16 GByte LPDDR4 memory down with inband ECC support	Up to 2 GByte DDR3	Up to 3 GByte LPDDR4	up to 8 GByte DDR3L (ECC)	Up to 8 GByte LPDDR4 memory down
GRAPHICS CONTROLLER	Intel® HD Gfx Gen9	Intel® UHD Gfx Gen11	integrated	integrated	integrated	Mali-T860 MP
ETHERNET CONTROLLER	Intel® I210IT / I211AT	integrated	integrated	1x integrated, 1x on request	integrated	internal and Intel® I210
ETHERNET	1x 1 GB Ethernet (SMARC-sXAL) up to 2x 1 GB Ethernet (SMARC-sXAL4)	Up to 3x 1 Gbit LAN (2x GBE0/1 and 1x optional SGMII via SERDES)	up to 2x 1 GByte Ethernet	up to 2x 1 GByte Ethernet	up to 2x 1 GByte Ethernet (TSN capable)	up to 2x 1 GByte Ethernet
SATA	1x SATA 3 Gb/s	1x SATA 6 Gb/s	-	-	-	-
FLASH ONBOARD	Up to 64 GByte e MMC	up to 128 GByte eMMC (MLC)	Up to 64 GByte eMMC	Up to 64 GByte eMMC	Up to 64 GByte eMMC	Up to 128 GByte eMMC 5.1
PCI EXPRESS® / PCI SUPPORT	3x PCIe x1	up to 4x PCIe x1	1x PCIe with dual core processor up to 3x PCIe (on request)	Up to 3x PCIe	Up to 2x PCIe x1 or 2x PCIe x2 or 1x PCIe x4	Up to 3x PCIe
PANEL SIGNAL	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 dual channel	1x LVDS, 1x HDMI, 1x DP	LVDS dual channel, eDP or DP as BOM option on request	1x LVDS, HDMI, DP
USB	2x USB 3.0 (incl. USB 2.0) + 4x USB 2.0, alternatively USB #0 as OTG	2x USB 3.0 (incl. USB 2.0) + 4x USB 2.0, alternatively USB #3 as OTG	up to 5x USB 2.0	1x USB 3.0, 6x USB 2.0	up to 6x USB 2.0, 1x USB 3.0	2x USB 3.0 + 4x USB 2.0
SERIAL	4x serial interfaces (2x RX/TX only)	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)
ADDITIONAL INTERFACES	12x GPIO, SDIO, 5x I²C, MIPI-CSI	HD Audio and I²S, 5x I²C, 2x SPI, 14x GPIOs	12x GPIO, SDIO, 5x I²C, MIPI-CSI, 2x CAN	12x GPIO, SDIO, 5x I²C, MIPI-CSI 2x CAN	12x GPIO, SDIO, 3xI2C, 1x CAN	I²S, 2x I²C, 2x SPI, SDIO, 12x GPIO
OPERATING SYSTEM	Windows® 10, Enterprise, Windows 10 IoT, Linux, VxWorks	Windows® 10, Enterprise, Windows® 10 IoT, Linux	Yocto Linux	Yocto Linux	Yocto Linux	Linux
POWER SUPPLY	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)	3.0 - 5.25 V widerange input	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	5 V
TEMPERATURE	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	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	Operating: extended consumer -20 °C to + 85 °C Non-Operating: -30 °C to +85 °C	Operating: -40 °C to 85 °C	Operating: -40 °C to + 85 °C Non-Operating: -40 °C to +85 °C	Extended commercial (-20 °C - 8 5°C) on request: commercial (0 °C - 60 °C)
SPECIAL FEATURES	Trusted Platform Module TPM 2.0 Security Solution (APPROTECT) on request, Ind. Temp. Grade versions	Trusted Platform Module TPM 2.0 Industrial Temperature Grade versions	Security Solution (APPROTECT) on request	Security Solution (APPROTECT) on request	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	PCIe bridge optional removable 2nd Ethernet optional removable

SMARC 2.0 Carrier plus
SMARC Evaluation Carrier

SMARC 2.0 Modules
MXM 3.0 connetor
HDMI/DP++
LVDS/HDMI/DP++
HDMI/DP++
2x USB 3.0
GbE
Speaker
Micro
6x USB2.0
4x PCIe
4x Serial/CAN
Power

▶ Learn more about Kontron SMARC embedded systems visit:
https://www.kontron.com/products/boards-and-standard-form-factors/smarc/