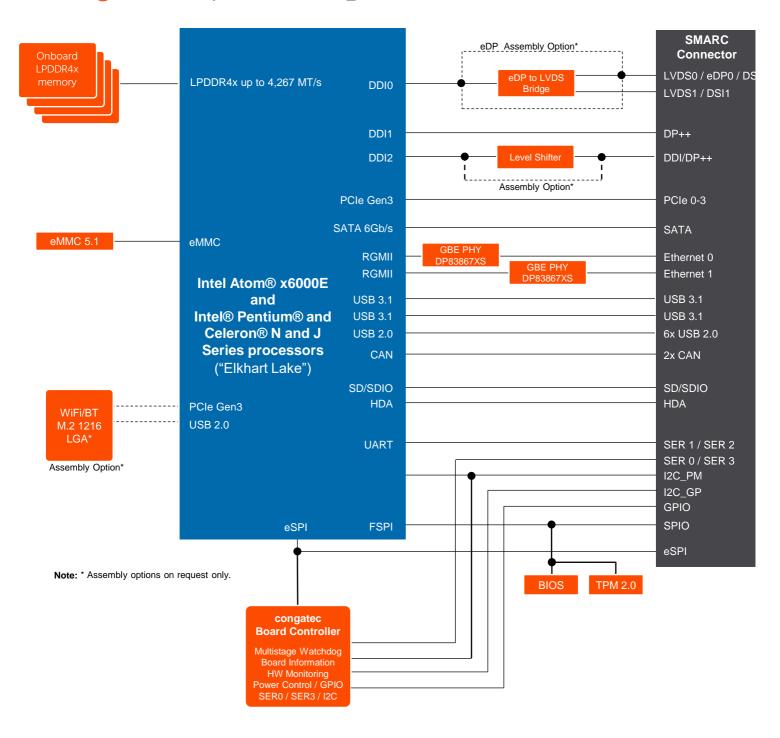# EMBEDDED SMARC 2.1

conga-SA7

SMARC module

- SMARC 2.1 module based on Intel® Atom® x6000E Series and Intel® Pentium® and Celeron® J and N Series processors
- High performance Intel® UHD Graphics (Gen11)
- Options for Industrial Temperature Range -40°C to 85°C
- Options for Time Sensitive Networking and Time Coordinated Computing for improved Realtime Capability
- Up to 4.267 MT/s Memory Support

Form Factor	SMARC Specification 2.1 | 82x50 mm					
CPU	Processor	TDP	Cores/Threads	Base Frequence/max. Turbo	Gfx Gen.11	Intel Use Condition
	J6413	10W	4 / 4	1.8 GHz / 3.0 GHz	16 EU	PC Client
	J6426	10W	4 / 4	2.0 GHz / 3.0 GHz	32 EU	PC Client
	x6211E	6W	2 / 2	1.3 GHz / 3.0 GHz	16 EU	Embedded
	x6413E	9W	4 / 4	1.5 GHz / 3.0 GHz	16 EU	Embedded
	x6425E	12W	4 / 4	2.0 GHz / 3.0 GHz	32 EU	Embedded
	x6212RE	6W	2 / 2	1.2 GHz / ---	16 EU	Industrial
	x6414RE	9W	4 / 4	1.5 GHz / ---	16 EU	Industrial
	x6425RE	12W	4 / 4	1.9 GHz / ---	32 EU	Industrial
DRAM	max. 16GB onboard LPDDR4x | up to 4.267 MT/s					
Ethernet	2x Intel® GbE with TSN support and Out-Of-Band Management | 2x real-time trigger					
I/O Interfaces	2x USB 3.1 Gen2 (1x OTG) | 6x USB 2.0 (1x OTG) | 1x SATA III | 1x SDIO | up to 4x PCIe Gen3 | 2x I²C Bus | 1x SPI I 1x eSPI | 4x UART | GPIO | 2x CAN | onboard M.2 1216 WiFi/BT module (optional)					
Mass Storage	eMMC 5.1 onboard flash up to 64GB (optional up to 128GB)					
Audio	Intel® HD Audio					
Graphics	Intel® UHD Graphics (Gen11)					
LVDS	Dual channel LVDS transmitter | support for flat panels with 2x24 bit data mapping up to a resolution of 1920x1200 @60Hz | shared with eDP or 1x MIPI-DSI x4 (option)					
Digital Display Interface	2x DDI up to 4096x2160p					
congatec Board controller	Multistage watchdog | non-volatile user data storage | manufacturing and board Information | board statistics | fast mode and multi-master I²C bus | power loss control					
Embedded BIOS Feature	AMI Aptio® UEFI firmware | 32 Mbyte serial SPI with congatec Embedded BIOS feature | OEM Logo | OEM CMOS Defaults | LCD Control | Display Auto Detection | Backlight Control | Flash Update					
Power Management	ACPI 5 .0 compliant | Smart Battery Management					
Operating Systems	Microsoft® Windows 10 | Microsoft® Windows 10 IoT Enterprise | Linux | Android | Yocto | RTS Hypervisor					
Power Consumption	tbd. | see manual for full details					
Temperature Range	Commercial: Operating Temperature: 0 to +60°C Storage Temperature: -20 to +80°C Industrial: Operating Temperature: -40 to +85°C Storage Temperature: -40 to +85°C					
Humidity	Operating: 10 to 90% r. H. non cond. Storage: 5 to 95% r. H. non cond.					
Size	82 x 50 mm (approx. 3,23″ x 1,97″)					

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conga-SA7 | Block Diagram

SMARC Connector

Onboard LPDDR4x memory

LPDDR4x up to 4,267 MT/s

eDP Assembly Option*

DDI0 — eDP to LVDS Bridge — LVDS0 / eDP0 / DS
LVDS1 / DSI1

DDI1 — DP++

DDI2 — Level Shifter — DDI/DP++

Assembly Option*

PCIe Gen3 — PCIe 0-3

SATA 6Gb/s — SATA

eMMC 5.1 — eMMC

RGMII — GBE PHY DP83867XS — Ethernet 0
RGMII — GBE PHY DP83867XS — Ethernet 1

Intel Atom® x6000E and Intel® Pentium® and Celeron® N and J Series processors ("Elkhart Lake")

USB 3.1 — USB 3.1
USB 3.1 — USB 3.1
USB 2.0 — 6x USB 2.0
CAN — 2x CAN

SD/SDIO — SD/SDIO
HDA — HDA

WiFi/BT M.2 1216 LGA*

PCIe Gen3
USB 2.0

UART — SER 1 / SER 2
SER 0 / SER 3
I2C_PM
I2C_GP
GPIO

Assembly Option*

eSPI   FSPI — SPIO

eSPI

BIOS   TPM 2.0

Note: * Assembly options on request only.

congatec Board Controller

Multistage Watchdog
Board Information
HW Monitoring
Power Control / GPIO
SER0 / SER3 / I2C

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Article	PN	Description
conga-SA7/x6425E-16G eMMC64	050100	SMARC 2.1 module with Intel® Atom® x6425E quad core processor with 2.0GHz core frequency up to 3.0GHz, 1.5MB cache, 16GB 3200MT/s LPDDR4x onboard memory and 64GB eMMC 5.1 onboard flash.
conga-SA7/x6413E-8G eMMC32	050101	SMARC 2.1 module with Intel® Atom® x6413E quad core processor with 1.5GHz core frequency up to 3.0GHz, 1.5MB cache, 8GB 3.200MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash.
conga-SA7/x6211E-4G eMMC32	050102	SMARC 2.1 module with Intel® Atom® x6211E dual core processor with 1.3GHz core frequency up to 3.0GHz, 1.5MB cache, 4GB 3.200MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash.
conga-SA7/i-x6425RE-8G eMMC32	050110	SMARC 2.1 module with Intel® Atom® x6425RE quad core processor with 1.9GHz core frequency, 1.5MB cache, 8GB 4267MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash. Industrial grade temperature range from -40°C to 85°C.
conga-SA7/i-x6414RE-4G eMMC32	050111	SMARC 2.1 module with Intel® Atom® x6414RE quad core processor with 1.5GHz core frequency, 1.5MB cache, 4GB 3.200MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash. Industrial grade temperature range from -40°C to 85°C.
conga-SA7/i-x6212RE-4G eMMC32	050112	SMARC 2.1 module with Intel® Atom® x6212RE dual core processor with 1.2GHz core frequency, 1.5MB cache, 4GB 3.200MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash. Industrial grade temperature range from -40°C to 85°C.
conga-SA7/J6426-16G eMMC64	050120	SMARC 2.1 module with Intel® Pentium® J6426 quad core processor with 2.0GHz core frequency up to 3.0GHz, 1.5MB cache, 16GB 3200MT/s LPDDR4x onboard memory and 64GB eMMC 5.1 onboard flash.
conga-SA7/J6413-8G eMMC32	050121	SMARC 2.1 module with Intel® Celeron® J6413 quad core processor with 1.8GHz core frequency up to 3.0GHz, 1.5MB cache, 8GB 3.733MT/s LPDDR4x onboard memory and 32GB eMMC 5.1 onboard flash.
conga-SA7/i-CSP-B	050150	Passive cooling solution for SMARC 2.1 module conga-SA7 with lidded Intel Atom x6000E processors. All standoffs are with 2.7mm bore hole.
conga-SA7/i-HSP-B	050151	Standard heatspreader for SMARC 2.1 module conga-SA7 with lidded Intel Atom x6000E processors. All standoffs are with 2.7mm bore hole.
conga-SA7/HSP-B	050152	Standard heatspreader for SMARC 2.1 module conga-SA7 with open-die Intel Pentium and Celeron J and N processors. All standoffs are with 2.7mm bore hole.
conga-SA7/CSP-B	050153	Passive cooling solution for SMARC 2.1 module conga-SA7 with open-die Intel Pentium and Celeron J and N processors. All standoffs are with 2.7mm bore hole.

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