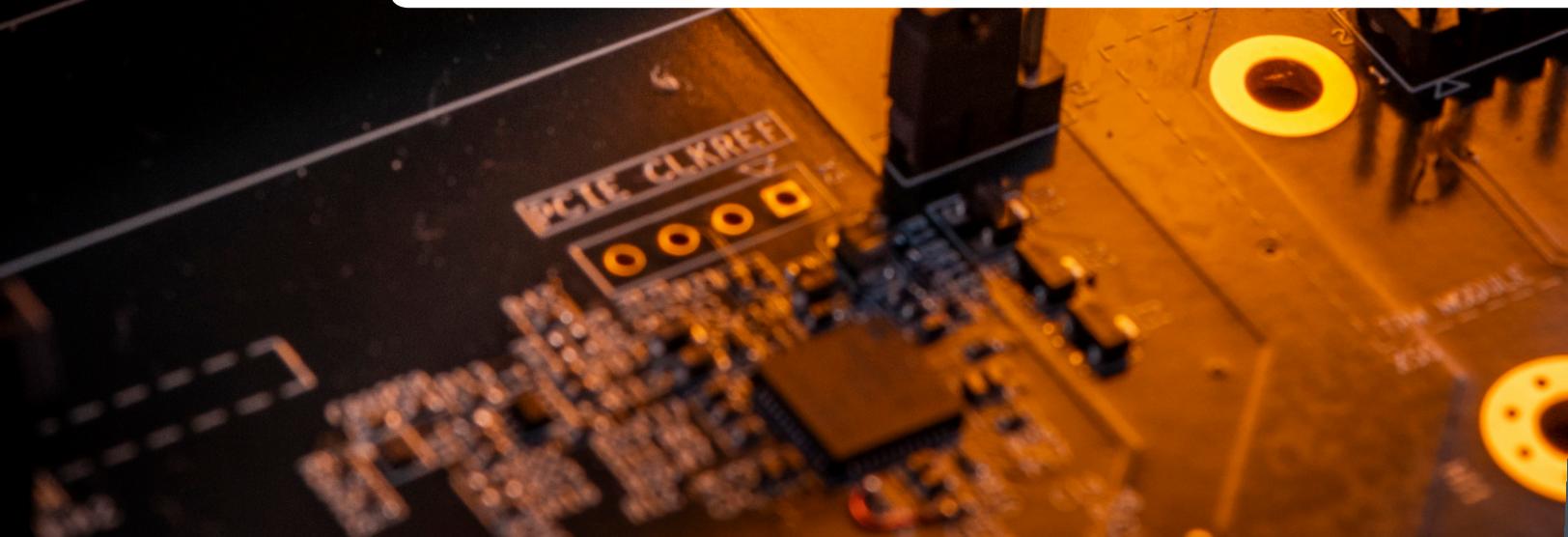




congatec



Highlights 2023



COMPUTER-ON-MODULES CONCEPT

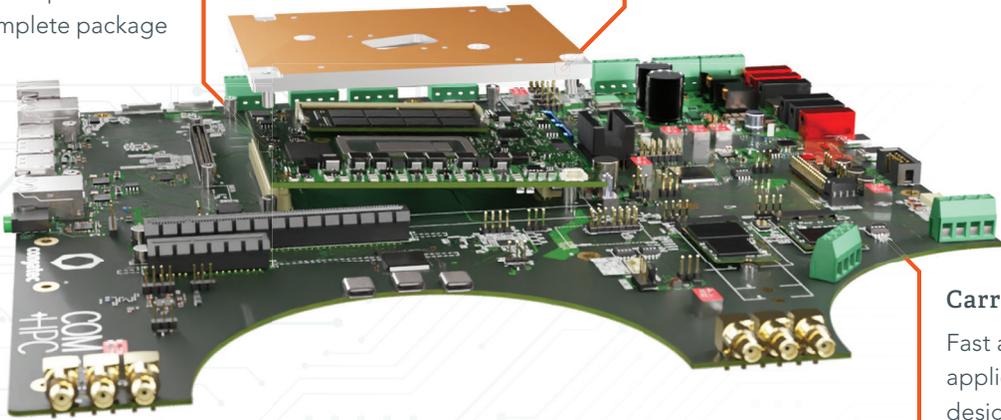
Utilization of Computer-on-Modules is by far the most widely employed embedded design principle. Different Computer-on-Module form factor standards are available. COMs of the same standard are freely interchangeable, both across processor generations and between vendors.

Computer-on-Modules

Function-validated super-component in a complete package

Cooling solutions

Tailored solutions available for all modules, from passive to active cooling



Carrier boards

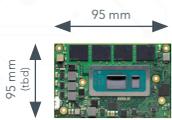
Fast and cost-effective application-specific designs

Your Benefits

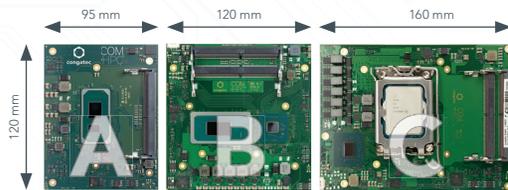
- ▶ Short time-to-market
- ▶ Low development costs
- ▶ High design security and long-term availability
- ▶ High scalability and easy upgrades
- ▶ Efficient re-use of existing building blocks
- ▶ Comprehensive design-in support

COM-HPC – High-performance computing

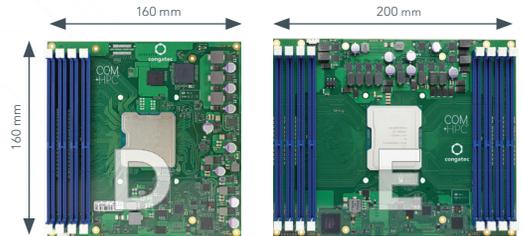
Mini Size



Client Sizes



Server Sizes



16x PCIe with Target Support*
4x USB4*
4x USB 3.2x1* / 2x USB 3.2 x2*
8x USB 2.0*
2x SATA*
12x GPIO, 2x UART, 1x CAN
eSPI, 2x SPI, SMB, 2x I2C
2x MIPI-CSI on flatfoil connector
HDA/I2S, 2x SoundWire
FuSa
2x NBaseT, 2x NBaseT Serdes*
2x DDI*, 1x eDP
Power 8-20V DC

* Some interfaces are shared. Check congatec.com/COM-HPCmini for details

49x PCIe	
4x USB 4.0	
4x USB 2.0	
2x SATA	
12x GPIO, 2x UART	
eSPI, 2x SPI	
SMB, 2x I2C, IPMB	
2x SoundWire, I2S	
2x NBaseT (max. 10 Gb)	
3x DDI	
eDP	
Power 8-20V DC	2x 25GBE KR

65x PCIe	
2x USB 4.0	
2x USB 3.1	
4x USB 2.0	
2x SATA	
12x GPIO	
2x UART	
eSPI, 2x SPI	
SMB, 2x I2C, IPMB	
1x NBaseT (max. 10 Gb)	
8x 25GBE KR	
Power 12V DC	

“Your best choice for new applications requiring highest bandwidth and performance”



Learn more

CONGATEC SERVICES

Existing know-how and infrastructure make it possible for customers to outsource custom designs to congatec. As a single supplier covering the complete range of cost-effective standard solutions to individual customized projects, congatec supports the full range of technology platforms.



congatec's Customizing Services

congatec's embedded customizing support starts at the design phase and includes project management, the development of specific hardware and software,

production control, system integration and global logistics, as well as the provision of technical support.

Customization

- of Single Board Computers
- of Computer-On-Modules

Modification

Special BIOS/UEFI/Firmware features or settings

Design

- of Carrier Boards
- of Full Custom Hardware
- of Cooling Solutions
- of Mechanics

System Integration

Including Tests and Certifications

Manufacturing

Efficient High Quality Production Services



congatec as Outsourcing Partner

Overview

- Mutually define system requirements
- Create product concept
- Provide detailed design including supply chain
- Turnkey delivery for the complete product life cycle

Benefits

- ▶ Leverages congatec embedded computing expertise
- ▶ Improves time to market and reduces development cost
- ▶ Simplifies customers supply chain
- ▶ congatec manages the entire product life cycle
- ▶ Intellectual property remains with the customer



Services for the Project Definition Phase

Product Selection Support

SBC, COM or full custom design?
Forward looking I/O selection, ...

Design-In Training

Engineering trainings covering all aspects for carrier board designs



Services for the Design Phase

Design Guides

In depth best practice solutions

Component Selection

Support to find the right functionality, costs, availability, ...

Schematic Review

Check the design to recognize problems at an early stage

Layout Review

Detailed check and best practice advice from our specialists

Signal Integrity Simulation

High speed simulation allows layout adjustments before the first prototypes are produced

BIOS/UEFI/Firmware

Customization

Implementation of customized features or settings

Bring-Up Support

congatec engineering support to bring life to the first prototypes quickly



Services for the Validation Phase

Signal Integrity Analysis

Signal integrity analysis of high speed interfaces such as PCI Express 6.0, Thunderbolt, USB,

Thermal Solutions

Optimized cooling solutions featuring heat stacks, heat pipes or vapor chambers

Customized Article Handling

Handling of manufacturing and logistics requirements

Pre-EMC Measurement

Pre-EMC Measurement and engineering support to optimize the designs to EMC requirements

MTBF

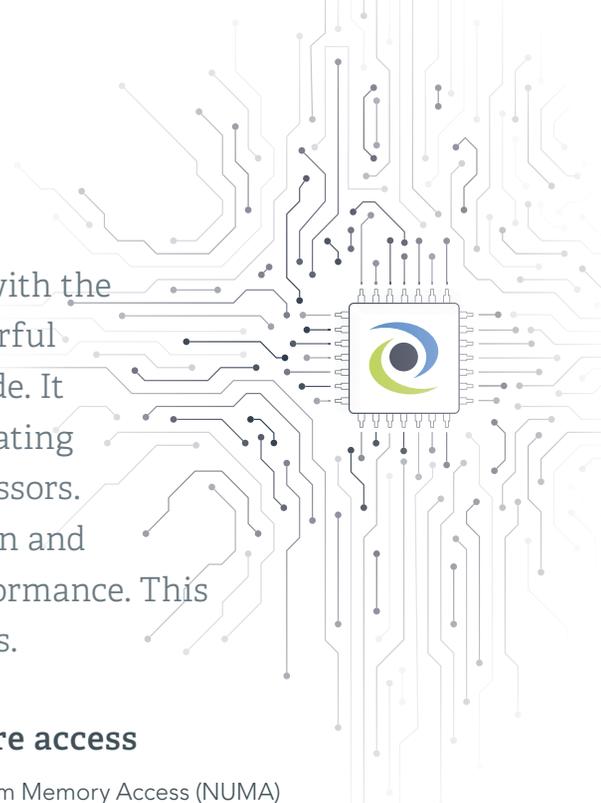
Reliability calculations based on different standards
i.e. Telcordia 4, SN 29500, ...



[Learn more](#)

RTS HYPERVISOR

Harness the power of today's multi-core processors with the innovative Real-Time Systems Hypervisor. The powerful software is proven in thousands of systems worldwide. It permits multiple real-time and general-purpose operating systems to run concurrently on multi-core x86 processors. Designers attain increased flexibility in system design and remarkable enhancements to functionality and performance. This reduces both time to market and overall system costs.



Multiple systems – hard real-time

- Simultaneous operation of real-time and general-purpose operating systems
- Hard real-time
- Definable boot sequence
- Reboot of any OS at any time
- Determinism and maximum throughput with secure OS separation
- Use of existing OS device drivers and standard development tools

Hardware access

- Non-Uniform Memory Access (NUMA)
- Disk and disk partition assignment (AHCI/NVMe controller sharing)
- USB port assignment (xHCI controller sharing)
- Separation and locking of shared caches with Time Coordinated Computing (TCC)
- Seamless integration of commercial Fieldbus, EtherCat, TSN, etc.

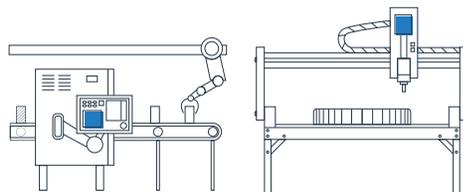
Your Benefits

- ▶ Reduced system costs and physical size
- ▶ Shorter time to market, maximum productivity
- ▶ Secure design
- ▶ Full flexibility in system functionality
- ▶ Seamless operation out of the box, also with COTS and proprietary OSs
- ▶ Longer mean time between failure
- ▶ Support from low-power modules to multi-socket servers

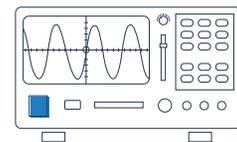
Applications



Robotics



Industrial automation



Test & measurement systems

New Arendar multi-edge device

The new Arendar multi-edge device connects Operational Technology (OT) and Information Technology (IT), with the option to add cloud services. By unifying data streams originating from various protocols, it ensures a secure and reliable data flow between the two areas.



[Learn More](#)

PERFORMANCE CLASS

Fast and energy efficient



conga-HPC/cRLS

conga-HPC/cRLP

conga-TC675

COM-HPC/mRPLP

Formfactor	COM-HPC Client Size C	COM-HPC Client Size A	COM Express Compact Type 6	COM-HPC Size Mini
CPU	13 th Gen Intel® Core™ processors (Raptor Lake)			
	embedded			
	Intel® Core™ i9 13900E 8x P & 16x E-Cores 65W TDP Intel® Core™ i7 13700E 8x P & 8x E-Cores 65W TDP Intel® Core™ i7 13400E 6x P & 4x E-Cores 65W TDP Intel® Core™ i3 13100E 4x P-Cores 65W TDP	Intel® Core™ i7-13800HE 6x P & 8x E-cores 45W TDP Intel® Core™ i7-1370PE 6x P & 8x E-cores 28W TDP Intel® Core™ i7-1365UE 2x P & 8x E-cores 15W TDP Intel® Core™ i5-13600HE 4x P & 8x E-cores 45W TDP Intel® Core™ i5-1340PE 4x P & 8x E-cores 28W TDP Intel® Core™ i5-1335UE 2x P & 8x E-cores 15W TDP Intel® Core™ i3-13300HE 4x P & 4x E-cores 45W TDP Intel® Core™ i3-1320PE 4x P & 4x E-cores 28W TDP Intel® Core™ i3-1315UE 2x P & 4x E-cores 15W TDP Intel® processor U300E 1x P & 4x E-cores 15W TDP		Intel® Core™ i7-1365UE 2x P & 8x E-cores 15W TDP Intel® processor U300E 1x P & 4x E-cores 15W TDP
	industrial			
		Intel® Core™ i7-13800HRE 6x P & 8x E-cores 45W TDP Intel® Core™ i7-1370PRE 6x P & 8x E-cores 28W TDP Intel® Core™ i7-1365URE 2x P & 8x E-cores 15W TDP Intel® Core™ i5-13600HRE 4x P & 8x E-cores 45W TDP Intel® Core™ i5-1350PRE 4x P & 8x E-cores 28W TDP Intel® Core™ i5-1345URE 2x P & 8x E-cores 15W TDP Intel® Core™ i3-13300HRE 4x P & 4x E-cores 45W TDP Intel® Core™ i3-1320PRE 4x P & 4x E-cores 28W TDP Intel® Core™ i3-1315URE 2x P & 4x E-cores 15W TDP		Intel® Core™ i7-1365URE 2x P & 8x E-cores 15W TDP Intel® Core™ i5-1345URE 2x P & 8x E-cores 15W TDP Intel® Core™ i3-1315URE 2x P & 4x E-cores 15W TDP
Chipset	Intel® R680E Intel® Q670E	integrated in SOC		
DRAM	4 SO-DIMM sockets for DDR5 memory modules up to 32 GByte each (128 GByte system capacity)	2 SO-DIMM sockets for DDR5 memory modules up to 32 GByte each (max. 64 GByte system capacity) up to 4800 MT/s		up to 32 Gbyte LPDDR5x
Ethernet	2x 2.5 GbE TSN Ethernet (via Intel® i226)		2.5 GbE TSN Ethernet (via Intel® i226)	2.5 GbE TSN Ethernet (via Intel® i226)
Serial ATA	up to 2x SATA III (6Gb/s)			
PCI Express	1 x16 PCIe Gen 5 (PEG port) 3 x4 PCIe Gen 4 3 x4 PCIe Gen 3	up to x8 PCIe Gen5 up to 2 x4 PCIe Gen4 up to 8 PCIe Gen3	up to x8 PCIe Gen4 (PEG port) up to x8 PCIe Gen3	
USB	4x USB 3.2 Gen2 8x USB 2.0	2x USB 3.2 8x USB 2.0	up to 4x USB 3.2 8x USB 2.0	
Other	2x UART 12x GPIO eSPI SM Bus I ² C	up to 2x Thunderbolt 2x UART 2x MiPi-CSI 12x GPIO eSPI SM Bus I ² C GSPI	up to 2x UART CAN (opt.) GPIOs SPI LPC SM Bus I ² C NVMe4 SSD (optional)	
Sound	HDA	2x Soundwire 2x Soundwire or HDA or I2S (opt.)	HDA	
Graphics	Intel® UHD Graphics 730 / 770 up to 32 EUs	up to Intel® Iris Xe Graphics Architecture up to 96 EUs		
Video Interface	3x DDI eDP		3x DDI LVDS (optional eDP) VGA (optional)	
congatec Board Controller	Multi Stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I ² C bus (fast mode, 400 kHz, multi-master) Power Loss Control Hardware Health Monitoring POST Code redirection			
Embedded BIOS Feature	AMI Aptio® UEFI firmware 32 Mbyte serial SPI with congatec Embedded BIOS feature OEM Logo OEM CMOS default settings LCD Control Display Auto Detection Backlight Control Flash Update			
Security	Trusted Platform Module (TPM 2.0)			
Power Management	ACPI 6.0 with battery support			
Operating Systems	Microsoft® Windows 10 Microsoft® Windows 10 IoT Enterprise Linux Yocto Real-Time Systems Hypervisor			
Temperature	Operating Temperature: 0°C to +60°C Storage: -20°C to +70°C	industrial: Operating Temperature: -40°C to +85°C Storage: -40°C to +85°C embedded: Operating Temperature: 0°C to +60°C Storage: -20°C to +70°C		
Humidity	Operating: 10 .. 90°C r. H. non cond Storage: 5 - 95% r.H non cond.			
Size	120 x 160 mm	120 x 95 mm	95 x 95 mm	70 x 95 mm



Learn more

SERVER-ON-MODULES

Embedded high-performance computing

intel partner
Titanium



conga-HPC/sILH

conga-HPC/sILL

conga-B7XI

Formfactor	COM HPC Server Size D			COM HPC Server Size D			COM Express Basic Type 7		
CPU	Intel® XEON® D-2700 processors			Intel® XEON® D-1700 processors					
	industrial Intel® Xeon® D-2796TE 20x Cores / 40x Threads 118W TDP Intel® Xeon® D-2775TE 16x Cores / 32x Threads 100W TDP Intel® Xeon® D-2752TER 12x Cores / 24x Threads 77W TDP embedded Intel® Xeon® D-2733NT 8x Cores / 16x Threads 80W TDP Intel® Xeon® D-2712T 4x Cores / 8x Threads 65W TDP			industrial Intel® Xeon® D-1746TER 10x Cores / 20x Threads 67W TDP Intel® Xeon® D-1732TE 8x Cores / 16x Threads 52W TDP Intel® Xeon® D-1715TER 4x Cores / 8x Threads 50W TDP embedded Intel® Xeon® D-1735TR 8x Cores / 16x Threads 59W TDP Intel® Xeon® D-1712TR 4x Cores / 8x Threads 40W TDP					
DRAM	4x DIMM sockets for DDR4 memory modules Max. capacity = 512GB			4x DIMM sockets for DDR4 memory modules Max. capacity = 256GB			up to 4x SODIMM sockets for DDR4 memory modules up to 32GByte Max. capacity = 128GB		
	Memory Type* LRDIMM (ECC) RDIMM(ECC) VLP RDIMM (ECC) UDIMM (ECC) UDIMM (Non-ECC)	DIMM Capacity 128GB 16GB – 64GB 16GB – 32GB 16GB – 32GB 16GB – 32GB	Max. DIMM Speed 3200 MT/s	Memory Type* RDIMM(ECC) VLP RDIMM (ECC) UDIMM (ECC) UDIMM (Non-ECC)	DIMM Capacity 16GB – 64GB 16GB – 32GB 16GB – 32GB 16GB – 32GB	Max. DIMM Speed 3200 MT/s			
Ethernet	1x 2.5GbE TSN Ethernet 8x 25G/10G/2.5G/1G lanes Maximum bandwidth 100Gb* SyncE (optional)			1x 2.5GbE TSN Ethernet 4x 25G/10G/2.5G/1G lanes Maximum bandwidth 100Gb* SyncE (optional)			1x 2.5GbE TSN Ethernet 4x 10GbE supporting CEI/KR/SFI		
Serial ATA	2x SATA III (6Gb/s)								
PCI Express	32x PCIe Gen4 16x PCIe Gen3			16x PCIe Gen4 16x PCIe Gen3			16x PCIe Gen4 16x PCIe Gen3		
USB	4x USB 3.0 4x USB 2.0			4x USB 3.0 4x USB 2.0					
Other	2x UART 12x GPIO 2x SM Bus 2x I ² C						2x UART 8x GPIO SPI		
congatec Board Controller	Multi-stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I ² C bus (fast mode, 400 kHz, multi-master) Power Loss Control Hardware Health Monitoring POST Code redirection								
Embedded BIOS Feature	AMI Aptio® UEFI firmware 64 Mbyte serial SPI with congatec Embedded BIOS feature OEM Logo OEM CMOS default settings LCD Control Display Auto Detection Backlight Control Flash Update								
Security	Trusted Platform Module (TPM 2.0)								
Power Managment	ACPI 5.0 with battery support								
Operating Systems	Microsoft® Windows Server Microsoft® Windows 10 Microsoft® Windows 10 IoT Enterprise Linux Yocto RTS Hypervisor								
Temperature	embedded: Operating Temperature: 0°C to +60°C* Storage: -20°C to +70°C* industrial: Operating Temperature: -40°C to +80°C* Storage: -40°C to +80°C*								
Humidity	Operating: 10 .. 90°C r. H. non cond						Storage: 5 - 95% r.H non cond.		
Size	160 x 160 mm			160 x 160 mm			125 x 95 mm		

*industrial temperature option available



Learn more

LOW POWER CLASS

Energy-Saving Technology



conga-SMX8-Mini

conga-SMX8-Plus

conga-QMX8-Plus

Formfactor	SMARC 2.1, 82 x 50 mm ²		Qseven, 70 x 70 mm ²
CPU	embedded		
	i.MX 8M Mini Quad 4x Cortex-A53 1.8 GHz + 1x M4F Dual 2x Cortex-A53 1.8 GHz + 1xM4F Solo 1x Cortex-A53 1.8 GHz + 1x M4F	i.MX 8M Plus Quad 4x Cortex-A53 1.8 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU	i.MX 8M Plus Quad 4x Cortex-A53 1.8 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU
DRAM	industrial		
	i.MX 8M Mini Quad 4x Cortex-A53 1.6 GHz + 1x M4F Dual 2x Cortex-A53 1.6 GHz + 1xM4F Solo 1x Cortex-A53 1.6 GHz + 1x M4F	i.MX 8M Plus Quad 4x Cortex-A53 1.6 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU	i.MX 8M Plus Quad 4x Cortex-A53 1.6 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU
DRAM	max. 4 GByte LPDDR4 3000 MT/s	max. 6 GByte LPDDR4x 4000 MT/s with Inline ECC	max. 6 GByte LPDDR4x 4000 MT/s with Inline ECC
Ethernet	1x 1 Gb	2x 1 Gb with IEEE 1588 (1x TSN)	1x 1 Gb with TSN support
Serial ATA	-	-	-
PCI Express	1x Gen 2	1x Gen 3	1x Gen 3
USB	5x 2.0 (shared with 1x USB OTG)	2x 3.0 / 5x 2.0 (shared with 1x USB OTG)	2x 3.0 / 3x 2.0 (shared with 1x USB OTG)
Other	SDIO I ² C SPI UART GPIO WiFi/BT module optional	SDIO 2x I ² C SPI 4x UART GPIO 2x CAN FD WiFi/BT module optional	SDIO I ² C SPI UART GPIO CAN FD
Mass Storage	Onboard Solid State Drive eMMC 5.1 up to 128 Gbyte		
Sound	2x I ² S	2x I ² S optional 1x Tensilica® HiFi 4 DSP	2x I ² S, optional 1x Tensilica® HiFi 4 DSP
Graphics	Integrated in SoC GC NanoUltra 3D GPU VPU with 1080p h.265 dec/h.264 video enc	Integrated in SoC GC7000UL 3D up to 2x Vec4 shaders GC520L 2D VPU with up to 1080p h.265/h.264 dec and enc integrated ISP	Integrated in SoC GC7000UL 3D up to 2x Vec4 shaders GC520L 2D VPU with up to 1080p h.265/h.264 dec and enc integrated ISP
Video Interface	1x LVDS (2x 24 bit) 1x MIPI-DSI 1x MIPI-CSI optional DP 1 simultan display	1x LVDS (2x 24 bit) 1x HDMI 2.0a 1x MIPI-DSI up to 2x 4-lane MIPI-CSI up to 3 simultan displays	x LVDS (2x 24 bit) 1x HDMI 2.0a 1x MIPI-DSI 2x 4-lane MIPI-CSI on optional FFC up to 3 simultan displays
Boot loader	U-Boot boot loader		
Power Management	NXP Power Management IC (PMIC)		
Operating Systems	Linux, Yocto, Android		
Temperature Range	industrial: Operating Temperature: -40°C to +85°C Storage: -40°C to +85°C embedded: Operating Temperature: 0°C to +60°C Storage: -20°C to +70°C		
Humidity	Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond.		



Learn more

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