Product Guide 2021
congatec at a glance

congatec modules – scalable performance with the highest quality and reliability.

International partnerships

We simplify the use of embedded technology.
Pursuing this dream calls for a lot of courage and absolute conviction. It’s a dream that inspires us, drives us anew every day.

It’s a dream that requires passionate supporters to push it forward. People who help others progress and improve themselves in the process. People who inspire and are inspired.

This is the story of congatec. The story of people who carry this spirit within them. People who put their all into developing new ideas – while remaining flexible and creative. Who respond quickly and solve problems. Who are always learning and want to explore the unknown. Who always beat a new path, whenever possible. Who stand out – when it’s good to be an individual. And who do it all for the customer and their needs.

A story of courage and passion.
Embedded in your success.

Pure-Play
World's largest vendor focused on COMs, SBCs and customized designs only.

Roadmap
Most complete roadmap of COM products.

Solid
Stable finance. Strong growth, no debt and solid profit.

Design-In
Proven superior design-in support. Review of customers designs for compliance, thermal and mechanical design to reduce risk and shorten design cycles.

Innovative
Close partnerships to Intel, AMD and NXP. Active player in standardization committees SGET and PICMG.

Logistics
Logistics and stability of supply. Strategy for long lead time components. Flexibility through last time buy process. Proven quality for more than 13 years.
Technology Leader
congatec has been driving industry standards since 2005

Technology Partnerships

- Executive Member
- Founding Member
- Board Member
- Specification editor Rev. 2.0, 2.1
- New high performance module standard Chairman of the PICMG workgroup
- Design guide editor Rev. 1.0
- Specification editor Rev. 2.0, 2.1, 3.0
- Founding member
- Specification & design guide editor
Key Technologies

- Medical Technology
- Industrial Automation
- Point-of-Sale
- Transport Systems
- Entertainment
- Professional Gaming
Real-Time

congatec pays special attention to real-time capability during product development. The congatec BIOS/UEFI implementation is of particularly high quality, yielding significantly improved real-time results for OEM customers. By cooperating with OSADL, this real-time capability can be tested over an extremely long time.

Real-Time Hypervisor

Hypervisor support from Real-Time Systems makes the embedded computer technologies from congatec even more attractive. It allows multiple operating systems to be installed on a multicore x86 platform without impacting real-time capability. Each sub-application can be implemented with the appropriate operating system – e.g. real-time data acquisition with VxWorks, the user interface with Windows, and a firewall with Linux. Since Real-Time Systems is a wholly owned subsidiary of congatec, the distances between the two companies are very short, which gives OEMs a time advantage in support cases and promotes interdisciplinary solutions.

Security

By providing numerous BIOS/UEFI security options and Trusted Platform Module (TPM) support, congatec enables customers to implement a high level of security that is optimized for their specific solution requirements.
Real-Time Hypervisor

harness the power of today’s multicore processors

Hard Real-Time Performance: Multiple Operating Systems in Perfect Harmony

- Combine real-time operating systems like VxWorks®, QNX Neutrino or Real-Time Linux®, with e.g. Microsoft® Windows
- Operating systems reside simultaneously on an x86 computer while maintaining the hard real-time characteristics of an RTOS
- User-definable boot sequence
- Reboot any operating system anytime without disturbing the execution of other operating systems
- Communication via high performance virtual TCP/IP network and flexible shared memory

Advantages

- Reduced system costs and physical size
- Hardware consolidation
- Hard real-time performance
- Maximum flexibility in system functionality
- Increased reliability (MTBF) as no additional hardware is required for additional operating system
- Works seamlessly with COTS and proprietary operating systems
- Proven in thousands of systems worldwide

About the Hypervisor

- All operating systems operate completely independent
- User defined startup sequence of operating systems
- Any operating system can reboot without affecting other operating systems
- All operating systems safely separated and protected
- Standard development tools can be used (supplied by the operating system vendors)
- Standard drivers can be used - no special development required
- NUMA (Non-Uniform Memory Access) fully supported
- OS independent drive sharing
Real-Time Hypervisor
harness the power of today’s multicore processors

The innovative Real-Time Systems Hypervisor permits multiple operating systems - both real-time (RTOS) and general purpose operating systems (GPOS) like Microsoft™ Windows® or Linux - to run concurrently on multicore x86 processors. By utilizing this powerful and cost-effective software solution, designers achieve increased flexibility in system design and remarkable enhancements to functionality and performance - at the same time reducing overall system cost.
Single Board Computers
concept & advantages

Concept
Ready-to-use embedded platforms -
Reliable and rugged design -
Based on 15+ years of embedded experience -
Long term availability (10+ years) -
Industrial design -

Benefits
- Extended temperature range (up to -40° … +85°C)
- 24/7 operation
- Lowest levels of power consumption
- Rich I/O feature set
- Hard- and software customization

congatec SBCs
The congatec Single Board Computers offer industrial reliability, embedded features and affordable pricing.
- Low power embedded mobile CPUs -
- Passive and active cooling options -
- 24/7 operation -
- Ceramic capacitors for extended lifetime -
- Extended temperature options for harsh environment -
- Long term availability 10+ years -
- Customization of hardware and BIOS/UEFI possible -

Industrial SBCs are first choice
when desktop boards reach their limits. The use of Single Board Computers is an easy and fast way for creating industrial computing applications when there are no or just smaller special functionalities required. Customer specific functions can be added by installing cards to the provided extension sockets. Designing with SBCs is faster because there’s no need to create customized carrier boards.
Computer-On-Modules
concept & advantages

**Concept**

- CPU module with standard PC core functions
- Carrier board with customer specific function & size
- Logical alternative to a chip-down design effort

**Lower Costs**

COMs save money. The cost of the development and end product are dramatically reduced when compared with a full custom design. This holds true for the product’s entire life-cycle. COMs provide cost advantages from the start.

- Lower engineering cost
- Lower product cost
- Lower cost of life cycle management

**Improved Flexibility**

COMs are flexible and can meet all performance requirements. The modules support a wide range of performance levels starting from NXP i.MX6 up to the Intel Xeon processor, as well as future architectures. The COM standards are well established and are already prepared for the future.

**Benefits**

- Faster time to market
- Reduced development costs
- Scalable product range
- Allows customer focus on system features
- Faster reaction to market trends
- Second source philosophy
- Minimize inventory cost

**Reduced Risk**

COMs minimize risk. Basic changes during the design phase, or in the middle of a product’s life cycle, are easily managed. Simply plug in the next-generation COM module and continue. COMs allow for easy upgrades.

- Lower design risk
- Lower transition risk

**Time-To-Market Advantage**

COMs put you in a leading position. The use of customized carrier boards reduces necessary engineering effort by separating your design work from the embedded PC technology. Focus on your own core competency.

- Faster time to market
- Faster engineering
- Faster reaction time to market changes
- Scalability
- Easy performance and technology upgrades
COM-HPC

COM-HPC is a new Computer-On-Module standard which is currently under development at the PICMG. congatec is one of the founders and chairman of the technical sub-committee. The specification will be released by mid 2020.

Why a new standard?

Upcoming technologies are PCI Express Gen 4 and Gen 5, USB 4, 25Gb Ethernet and more require new concepts. Computer-On-Modules has to provide these high speed interfaces to the carrier board. Previous standards are not prepared to support this new levels of data bandwidth. The increased IO performance also requires higher compute performance and larger memory sizes - both at the cost of a higher power consumption. COM-HPC takes all these fact into account to create a new level of Server-On-Module.

Types

COM-HPC defines two different pinout types. The Server type features up to 65 PCI Express lanes and up to 8x 25Gb Ethernet but has no graphics or audio features.

The Client type supports 4 video outputs and multiple audio interfaces i.e. SoundWire and I²S. It’s limited to 2x 25Gb Ethernet and 49 PCI Express lanes.

Sizes

The COM-HPC standard defines five different sizes. The small sizes A, B and C are ideal to implement the Client pointout while the larger sizes D and E will support highest amount of memory and are ideal for Server pinout implementations.

Out of Band Management

COM-HPC will also define a comprehensive set of features to allow for an easy implementation of out of band management functions. This is required to create efficient edge server implementations.

Connector

Two 400 pin high speed BGA connectors, which will be available from multiple vendors, provide the right amount of high speed interfaces and the ability to provide up to 300 Watt of power to the module. Low cost, high performance, flexible stack hight, ruggedness and a small footprint is provided by the selected connector.

Cooling

COM-HPC also defines a heatspreader to allow for easy module change between module vendors.
Interfaces
COM Express defines 220/440 interconnect pins between the COM Express module and the carrier board. Older modules based on Type 2 supporting legacy interfaces like PCI are still shipping but are not recommended for new designs.

Server-on-Module
The newly introduced Type 7 pinout was generated to enable headless server class applications. It features up to four 10 Gb Ethernet ports, out-of-band management, and up to 32 PCI Express lanes.

Customization
Custom features are generated on a customized carrier board which accepts standard COM Express modules.

Size
COM Express modules are available at three different sizes. The low power Type 10 modules are implemented utilizing the Mini size while Type 6 modules utilize the Compact and Basic form factors. Type 7 modules are available in Basic size.

Thermal Design
As with Qseven and SMARC, the COM Express definition includes a heatspreader that acts as a thermal interface between the COM Express module and the system’s cooling solution. All heat generating components are thermally conducted to the heatspreader in order to avoid hot spots. The high power heatspreaders and cooling solutions utilize congatec’s patented high efficient flat heat pipes in order to allow for maximum performance and reliability.

PCI Express
COM Express offers up to 32 PCI Express lanes. This allows the customer to enhance the performance of their embedded application. PCI Express is a low pin count interface with maximum bandwidth per pin. PCI Express 3.0 supports up to 8 GBit/s per lane and direction.

Video Output
Common video outputs for COM Express modules are LVDS for direct flat panel support and up to 3 DDIs (Digital Display Interfaces). Each of the DDI can be switched to TMDS (for DVI or HDMI) or DisplayPort. Type 6 modules also allow for an embedded Displayport. Type 7 modules are designed for headless operation.
Qseven also supports ARM processors for mobile and ultra low power consumption applications. Unlike COM Express it is not limited to x86 processor technology. One carrier board can be equipped with x86 or ARM Qseven modules.

### Freedom
Qseven® allows for the use of non x86 processor architectures. It also supports the low power mobile ARM processor architecture. Customers have the freedom to use all kinds of Qseven® modules without the need to change the carrier board.

### Mobile Applications
Qseven® is an optimized standard targeting towards low power and mobile / ultra-mobile applications.

### Low Power
Qseven® is defined for a maximum power consumption of 12 Watts. It is designed to be operated by single 5 Volt DC power and provides all additional signals for battery management. This simple power requirement allows for small mobile solutions powered by compact two cell batteries.

### Connector
Qseven® does not require an expensive board-to-board connector. Instead, it utilizes a very affordable MXM2 card slot with 230 pins in a 0.5 mm configuration.

### Legacy Free
Qseven is a legacy free standard focused on high speed serial interfaces such as PCI Express and Serial ATA. Qseven omits support for legacy interfaces like EIDE and PCI, in order to provide ideal support for today’s, as well as future, mobile CPUs and chipsets.

### Slim Design
When comparing to COM Express Basic, Compact & Mini and SMARC, Qseven enables slimmer mechanical housings.

### Compact Size
The module’s dimensions are a mere 70 x 70 mm². This means it can be easily integrated into size constricted systems.

### SGeT e.V.
The Qseven Specification is hosted by the SGeT standardization group. congatec is founding member, board member and Qseven development team member of the SGeT.
The technical highlights of SMARC 2.1

The 314 pins of the SMARC 2.1 connector, which is also used for the MXM 3.0 graphics card standard, provide space for up to four video outputs, underlining SMARC 2.1’s particular suitability for multimedia applications.

**Connector**
SMARC 2.1 utilizes a highly reliable, high speed certified but affordable 314 pin 0.5mm MXM 3 connector.

**Extensive video interface options**
SMARC 2.1 offers a rich choice of internal and external video interfaces. Two dual-mode DisplayPorts (DP++) are provided for flexible external screen connections via DisplayPort, HDMI or VGA. For internal displays 2x24 Bit LVDS is implemented. Alternative use is defined to support two independent embedded DisplayPort (eDP) or MIPI Display Serial Interface (DSI).

**Up to 4 Ethernet interfaces yield greater precision**
SMARC 2.1 implements two Gigabit Ethernet ports and the option for further 2 Ethernet ports as an alternative for two upper PCIe lanes. The first two Ethernet ports provide SDPs (Software Defined Pins) to allow for hardware-based IEEE 1588 Precision Time Protocol (PTP).

**Wireless**
SMARC 2.1 provides a special area on the module that is dedicated to the placement of the miniature RF connectors to allow for wireless interfaces like WLAN and Bluetooth.

**Camera interfaces**
SMARC 2.1 provides all signals required to support digital cameras. For this purpose, two serial MIPI CSI (Camera Serial Interface) have been implemented on the module connector. Further two MIPI CSI interfaces can be implemented as flat foil connectors on the SMARC 2.1 module.

**Low Power**
SMARC 2.1 is defined for low power consumption applications only. It can be operated by 3.3V or 5V DC power and provides all additional signals for battery management.

**Small Size**
The module’s dimensions are a mere 82x50mm². This means it can be easily integrated into size constricted systems.
congatec Design Services
for customized designs

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 – from x86 to ARM and from standard form factors i.e. COM Express or Pico-ITX to full customized board designs. For customized projects congatec acts as a service provider supporting the specific system designs of customers.

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

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

**Modification**
- Special BIOS/UEFI/Firmware features or settings

**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

congatec supports customer developments throughout the entire product life cycles. Customers benefit from congatec's rich experience as a manufacturer of high quality computer modules with synergistic effects leading to reduced development time and cost.
congatec Technical Services
for customized designs

Worldwide Coverage
Engineering and support for standard and customized products in all major regions

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

Reference Schematics
High level starting point for own designs

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

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

Schematic Review
Check the design to recognize problems at an early stage

Layout Review
Detailed check and best practice advice from our specialists

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
Compliance Measurements
Measurement of the signal integrity up to 36 GHz for Rx and Tx signal path

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

Customized Article Handling
Handling of manufacturing and logistics requirements

Support for EMC Measurements
Engineering support to optimize the designs to EMC requirements

MTBF
Reliability calculations based on different standards i.e. Telcordia 3, SN 29500, IEC 61709, ...

Information Sources
Users Guides
Accurate and detailed product related information

Application & Tech Notes
Specific solutions described in detail i.e. benchmarks, power consumption measurements for different CPUs use cases, and details about the enhanced congatec BIOS features

Design Guides
Deep technical “how to” for carrier boards, battery managers, and more

Reference Schematics
Schematics and layout files to be used as a blueprint for your carrier board designs
congatec embedded BIOS/UEFI

Embedded computer users usually require more than the standard functionality of an office computer. congatec has taken these requirements into account when designing BIOS/UEFI functionalities. Based on our large amount of BIOS and UEFI experience, we have implemented the embedded requirements into our powerful congatec BIOS / UEFI platform.

congatec Board Controller
An onboard micro controller fully isolates most of the embedded features, such as system monitoring, multi stage watchdog or the I²C bus, from the x86 core architecture. This results in higher embedded feature performance and higher overall system reliability.

Information
Board Information
The congatec Board Controller provides a rich data set of manufacturing data and board information: serial number, article number, EAN code, manufacturing and repair date, running time meter, boot counter and more.

Post Code Redirection
The BIOS Port 80h outputs can be forwarded to the I²C bus, the SMBus or to the module UART. This allows for better in-system debugging.

Setup
OEM Setup Menu Control
The feature allows customers to hide or show setup nodes and to change the descriptions at the BIOS setup screens.

OEM Verb Table
To initialize carrier board HDA codecs at BIOS level.

UEFI Screenshot Driver
This allows saving the current screen of the BIOS setup to a USB flash drive for professional system documentation.

BIOS Setup Data Backup
The BIOS configuration settings are held in flash memory to allow battery-less applications

OEM BIOS Code
Allows customers to a “do it yourself” integration of their own legacy code into the BIOS BOOT flow. The congatec embedded BIOS calls OEM code at designated schedules.

User Data Memory
congatec modules provide 32 Bytes of non-volatile storage in the EEPROM and a 64 kByte block in the BIOS flash memory. This can be used to store critical and important operating data e.g. system ID, IP address, software key, etc.
Interfaces

Fast Mode I²C Bus
All congatec modules offer a 400 kHz multi-master I²C hardware host controller implementation.

Further congatec BIOS/BC Features
Type based boot device selection, legacy USB support, USB MSD service boot and generic LPC decoding are also supported. Further features include AT mode shutdown configuration (halt, restart), LID & Sleep support and P-State reduction.

Power Loss and Power-up Control
This feature controls the operation mode after AC power loss and normal power on. Turn on, remain off and last state modes are possible.

ACPI Battery Management
The congatec ACPI BIOS and Board Controller are designed to support a CMB (Control Method Battery) sub-system. It’s possible to implement customized battery solutions by following the congatec CMB design guide.

Monitoring

Multi Stage Watchdog Timer
All congatec modules are equipped with a multi stage watchdog timer supporting different events such as ACPI event, NMI, hardware reset or power button.

Post Watchdog Timer
This feature allows the monitoring of the BIOS POST process. Starts at system power-up and triggers a hardware reset if adjustable timeout is exceeded.

Hardware Health Monitoring
The congatec BIOS and board controller have routines implemented to monitor critical components implemented. This allows for extensive fan control and standard temperature sensors for CPU, module and voltage monitoring.

Display

Auto-detection
Automatic detection and configuration of an attached flat panel is provided via EPI. EPI is an open standard for easy and direct control of all digital flat panel displays.

Customizable Boot Screen
Dark boot, a customized splash screen or a customer logo during POST are the boot screen options which can be set by the customer directly.

LVDS Backlight Control
The backlight intensity can be set in BIOS setup or modified during run time by using the CGOS API and ACPI methods from the operating systems.

OEM EDID for LVDS Panel
Allows creation of customized EDID data for any LVDS flat panel and add it to the list of predefined types.

Security

Measured Boot with TPM2.0
Full TPM chip support is provided by the BIOS to support features like Bitlocker and Measured Boot.

BIOS write and update protection
Both of these functions are available once the BIOS password has been set in the BIOS Setup. The password is SHA256 encrypted.

Secure Boot with OEM Platform Key
UEFI Secure Boot is about making sure only properly signed and verified images are executed. The congatec embedded BIOS allows to integrate OEM Platform Keys establishing a trust relationship between the platform owner and the platform firmware.

OS Support

32/64 Bit Uniform OS API
The congatec embedded BIOS features are accessible through the uniform APIs EAPI (a PICMG® definition) and the congatec proprietary CGOS API interface.

OEM SMBIOS/DMI Data
Allows customers to update several SMBIOS strings. This allows for DMI table content control by the OEM customer directly. No 3rd party tools are required.

Optimized Power Management
ACPI Power Management and System Configuration are supported by the congatec BIOS / UEFI according to the ACPI specification.

OEM UEFI DXE Driver / Bootloader
This feature allows customers to integrate their own UEFI DXE driver and bootloaders. The built-in CGOS DXE driver allows for CGOS support in these OEM DXE drivers.

Optimizations for Real-Time Operation
The congatec BIOS includes features to optimize the module behavior for best real-time operation. CPU and GPU clocks can be fixed and turbo modes / C-states can be disabled.

Board Support Packages
congatec offers advanced BSPs, which include the latest tested drivers from silicon vendors and the congatec drivers for accessing the embedded BIOS and module features.

congatec System Utility
All embedded BIOS features are accessible through the use of a congatec utility. This includes all manufacturing and statistical information, e.g. serial number, running hours, boot counter etc. BIOS default settings, bootlogo and flat panel configurations.
The power saving Intel® Xeon processors and the brand new EPYC 3000 series from AMD allow for scalable server performance on COM Express modules. The type 7 pinout enables further server class features i.e. 10 Gigabit Ethernet and extra PCI Express lanes.
### Formfactor

**COM Express Basic** 95 x 125 mm², Type 7

### CPU

<table>
<thead>
<tr>
<th>Processor Family</th>
<th>Frequency</th>
<th>Cache</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intel® Atom™ Processor C3000 Family</strong>&lt;br&gt; (<em>&quot;Deverton&quot;</em>)</td>
<td>Atom™ C3958</td>
<td>16x2.0 GHz</td>
<td>Cache 16MB</td>
</tr>
<tr>
<td></td>
<td>Atom™ C3858</td>
<td>16x2.0 GHz</td>
<td>Cache 12MB</td>
</tr>
<tr>
<td></td>
<td>Atom™ C3758</td>
<td>16x2.0 GHz</td>
<td>Cache 12MB</td>
</tr>
<tr>
<td></td>
<td>Atom™ C3538</td>
<td>4x2.2 GHz</td>
<td>Cache 8MB</td>
</tr>
<tr>
<td></td>
<td>Atom™ C3308</td>
<td>2x1.6 GHz</td>
<td>Cache 4MB</td>
</tr>
<tr>
<td><strong>Intel® Xeon® Processor D-1500 Family</strong>&lt;br&gt; (<em>&quot;Broadwell DE&quot;</em>)</td>
<td>Xeon® D-1578</td>
<td>16x3.2/2.1 GHz</td>
<td>Cache 24MB</td>
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<td></td>
<td>Xeon® D-1567</td>
<td>12x2.1/1.2 GHz</td>
<td>Cache 18MB</td>
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<td></td>
<td>Xeon® D-1548</td>
<td>8x2.0/2.6 GHz</td>
<td>Cache 12MB</td>
</tr>
<tr>
<td></td>
<td>Xeon® D-1527</td>
<td>4x2.2/1.7 GHz</td>
<td>Cache 6MB</td>
</tr>
<tr>
<td></td>
<td>Pentium® D-1509</td>
<td>2x1.5/2.7 GHz</td>
<td>Cache 3MB</td>
</tr>
<tr>
<td></td>
<td>Pentium® D-1508</td>
<td>2x2.0/2.6 GHz</td>
<td>Cache 3MB</td>
</tr>
<tr>
<td><strong>AMD EPYC™ Embedded 3000 Series</strong></td>
<td>EPYC3451</td>
<td>16x2.1/3.0 GHz</td>
<td>Cache 32MB</td>
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<tr>
<td></td>
<td>EPYC3351</td>
<td>12x1.9/3.0 GHz</td>
<td>Cache 32MB</td>
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<td>EPYC3251</td>
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<td>Cache 16MB</td>
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<td>EPYC3210</td>
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<td>EPYC3151</td>
<td>4x2.7/3.9 GHz</td>
<td>Cache 16MB</td>
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<tr>
<td></td>
<td>EPYC3101</td>
<td>4x2.1/2.9 GHz</td>
<td>Cache 8MB</td>
</tr>
</tbody>
</table>

### DRAM

3 SO-DIMM sockets for DDR4 memory modules up to 96 GByte 2133 MT/s ECC or non-ECC

3 SO-DIMM sockets for DDR4 memory modules up to 96 GByte 2400 MT/s ECC or non-ECC

3 SO-DIMM sockets for DDR4 memory modules up to 96 GByte 2666 MT/s ECC or non-ECC

### Chipset

Integrated in SoC

### Ethernet

<table>
<thead>
<tr>
<th>Ethernet Type</th>
<th>Speed</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x 10GbE with KR Interface support</td>
<td>1x GbE Intel I210 Ethernet Controller</td>
<td>2x 10GbE Intel I210 Ethernet Controller</td>
</tr>
<tr>
<td>Serial ATA</td>
<td>2x</td>
<td>2x</td>
</tr>
<tr>
<td>PCI Express Gen 3.0</td>
<td>12x</td>
<td>8x</td>
</tr>
<tr>
<td>USB 3.1</td>
<td>2x</td>
<td>4x</td>
</tr>
</tbody>
</table>

### Other

LPC, SPI, I2C, 2xUART, SMBus, NC-SI

Up to 1 TByte onboard NVMe storage

### Mass Storage

eMMC 5.0 onboard flash up to 128 GByte (optional)

Up to 1 TByte onboard NVMe storage

### congatec Board Controller

Multi Stage Watchdog | non-volatile User Data Storage | Manufacturing and Board Information | Board Statistics | BIOS Setup | Data Backup | Power Loss Control

### Embedded BIOS Feature

AMI-Aptio UEFI BIOS, congatec Embedded BIOS

### Security

"Trusted Platform Module" (TPM 2.0)

Intel® Quick Assist Technology | Hardware integrated encryption engine | Secure Root of Trust, Secure Memory Encryption, Secure Encrypted Virtualization

### Power Management

ACPI 5.0 compliant, Smart Battery Management

### Operating Systems

Microsoft® Windows Server 2016 | 2012, 2012 R2, 2008 R2 SP1 | Microsoft® Windows 10 Enterprise | Microsoft® Windows 8.1 64bit | RHEL 6.6 & 7.1 | SuSE 11 SP4 & 12 SP1 | Fedora 22 | Ubuntu 14.10 | CentOS 6.6 & 7.1 | FreeBSD | VMware | Hyper-V | Xen | ESXi

### Temperature

Operating commercial: 0 .. +60°C | Operating industrial: -40 .. +85°C

### Humidity

Operating: 10 .. 90% r. H. non cond | Storage: 5 .. 95% r. H. non cond
## NXP processor with commercial operating temperature 0°C .. +60°C

<table>
<thead>
<tr>
<th>Form factor</th>
<th>SMARC 2.1, 82 x 50 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>i.MX 8M Mini&lt;br&gt;Quad 4x Cortex-A53 1.8 GHz + 1x M4F&lt;br&gt;Dual 2x Cortex-A53 1.8 GHz + 1xM4F&lt;br&gt;Solo 1x Cortex-A53 1.8 GHz + 1x M4F</td>
</tr>
<tr>
<td></td>
<td>i.MX 8 QuadMax&lt;br&gt;2x Cortex A72 + 4x AS3 + 2x M4F</td>
</tr>
</tbody>
</table>

## NXP processor with industrial operating temperature -40°C .. +85°C

<table>
<thead>
<tr>
<th>Form factor</th>
<th>SMARC 2.1, 82 x 50 mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>i.MX 8M Mini&lt;br&gt;Quad 4x Cortex-A53 1.6 GHz + 1x M4F&lt;br&gt;Dual 2x Cortex-A53 1.6 GHz + 1xM4F&lt;br&gt;Solo 1x Cortex-A53 1.6 GHz + 1x M4F</td>
</tr>
<tr>
<td></td>
<td>i.MX 8 QuadMax&lt;br&gt;2x Cortex A72 + 4x AS3 + 2x M4F</td>
</tr>
</tbody>
</table>

## DRAM

<table>
<thead>
<tr>
<th></th>
<th>max. 4 GByte LPDDR4 3000 MT/s</th>
</tr>
</thead>
</table>

## Ethernet

<table>
<thead>
<tr>
<th></th>
<th>1 x Gb</th>
<th>2 x 1 Gb with IEEE 1588 (1x TSN)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 x 1 Gb with IEEE 1588</td>
<td>2 x 1 Gb with IEEE 1588</td>
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## Serial ATA

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 x</td>
</tr>
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## PCI Express

<table>
<thead>
<tr>
<th></th>
<th>1 x Gen 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 x Gen 3</td>
</tr>
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</table>

## USB

<table>
<thead>
<tr>
<th></th>
<th>5x 2.0 (shared with 1x USB OTG)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2x 3.0 / 5x 2.0 (shared with 1x USB OTG)</td>
</tr>
</tbody>
</table>

## Other

<table>
<thead>
<tr>
<th></th>
<th>SDIO</th>
<th>SPI</th>
<th>UART</th>
<th>GPIO</th>
<th>WiFi/BT module optional</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SDIO</td>
<td>SPI</td>
<td>UART</td>
<td>GPIO</td>
<td>2x CAN FD</td>
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<tr>
<td></td>
<td>SDIO</td>
<td>SPI</td>
<td>UART</td>
<td>GPIO</td>
<td>PC</td>
</tr>
<tr>
<td></td>
<td>SDIO</td>
<td>SPI</td>
<td>UART</td>
<td>GPIO</td>
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<tr>
<td></td>
<td>SDIO</td>
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</table>

## Mass Storage

<table>
<thead>
<tr>
<th></th>
<th>Onboard Solid State Drive eMMC 5.1 up to 128 Gbyte</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Onboard Solid State Drive eMMC 5.0 up to 128 Gbyte</td>
</tr>
<tr>
<td></td>
<td>Onboard Solid State Drive eMMC 5.1 up to 128 Gbyte</td>
</tr>
</tbody>
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## Sound

<table>
<thead>
<tr>
<th></th>
<th>2x IPS</th>
<th>optional 1x Tensilica® HiFi 4 DSP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x IPS, optional 1x Tensilica® HiFi 4 DSP</td>
<td>2x IPS, optional 1x Tensilica® HiFi 4 DSP</td>
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</tbody>
</table>

## Graphics

<table>
<thead>
<tr>
<th></th>
<th>Integrated in SoC</th>
<th>GC NanoUltra 3D GPU</th>
<th>up to 16 Vec4 shaders</th>
<th>GC520 2D</th>
<th>up to 16 Vec4 shaders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Integrated in SoC</td>
<td></td>
<td>up to 1080p h.265, 264 video enc</td>
<td></td>
<td>4K h.265 dec / 1080p h.264 enc</td>
</tr>
<tr>
<td></td>
<td>Integrated in SoC</td>
<td></td>
<td></td>
<td></td>
<td>2x Vec4 shaders and 16 execution units</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>up to 1080p</td>
<td>VPU up to 4K h.265 dec / 1080p h.264 enc</td>
<td></td>
</tr>
</tbody>
</table>

## Video Interface

<table>
<thead>
<tr>
<th></th>
<th>1x LVDS (2x 24 bit)</th>
<th>1x MIPI-DSI</th>
<th>1x HDMI 2.0a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x LVDS (2x 24 bit)</td>
<td>1x MIPI-DSI</td>
<td>2x LVDS (2x 24 bit)</td>
</tr>
<tr>
<td></td>
<td>1x HDMI 2.0a</td>
<td>1x MIPI-DSI</td>
<td>1x LVDS (2x 24 bit)</td>
</tr>
<tr>
<td></td>
<td>1x MIPI-DSI</td>
<td>2x LVDS (2x 24 bit)</td>
<td>1x MIPI-DSI</td>
</tr>
<tr>
<td></td>
<td>1x HDMI 2.0a</td>
<td>1x MIPI-DSI</td>
<td>2x LVDS (2x 24 bit)</td>
</tr>
</tbody>
</table>

## Boot loader

<table>
<thead>
<tr>
<th></th>
<th>U-Boot boot loader</th>
</tr>
</thead>
</table>

## Power Management

<table>
<thead>
<tr>
<th></th>
<th>NXP Power Management IC (PMIC)</th>
</tr>
</thead>
</table>

## Operating Systems

<table>
<thead>
<tr>
<th></th>
<th>Linux, Yocto, Android</th>
</tr>
</thead>
</table>

## Temperature Range

<table>
<thead>
<tr>
<th></th>
<th>Operating commercial: 0 .. +60°C</th>
<th>Operating industrial: -40 .. +85°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Storage: -40 .. +85°C</td>
<td>Storage: -40 .. +85°C</td>
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</tbody>
</table>

## Humidity

<table>
<thead>
<tr>
<th></th>
<th>Operating: 10 .. 90 % r. H. non cond.</th>
<th>Storage: 5 .. 95 % r. H. non cond.</th>
</tr>
</thead>
</table>

## Low Power Class

The low power product category features the latest high performance ARM processors from NXP, Atom processors from Intel, and G-Series APUs from AMD.

Multiple form factors i.e. Qseven, SMARC, COM Express Mini / Compact and Single Board Computer Formfactors.

<table>
<thead>
<tr>
<th><strong>conga-QMX6</strong></th>
<th>70 x 70 mm²</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Formfactor</strong></th>
<th>Qseven, 70 x 70 mm²</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>CPU</strong></th>
<th><strong>NXP processor with commercial operating temperature 0°C .. +60°C</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i.MX6 Solo, 1GHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Dual Lite, 1GHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Dual, 1GHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Quad, 1GHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CPU</strong></th>
<th><strong>NXP processor with industrial operating temperature -40°C .. +85°C</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>i.MX6 Solo, 800MHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Dual Lite, 800MHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Dual, 800MHz</td>
</tr>
<tr>
<td></td>
<td>i.MX6 Quad, 800MHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>DRAM</strong></th>
<th>max. 2 GBytes DDR3 1066 MT/s</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Ethernet</strong></th>
<th>1x 1 Gb</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Serial ATA</strong></th>
<th>1x (Dual &amp; Quad CPUs)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>PCI Express</strong></th>
<th>1x Gen 2</th>
</tr>
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</table>

<table>
<thead>
<tr>
<th><strong>USB</strong></th>
<th>5x 2.0 (shared with 1x OTG)</th>
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<table>
<thead>
<tr>
<th><strong>Other</strong></th>
<th>SPI</th>
<th>UART</th>
<th>CAN</th>
<th>SDIO</th>
<th>PCIe</th>
<th>MIPI-CSI on extra connector</th>
</tr>
</thead>
</table>

<table>
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<tr>
<th><strong>Mass Storage</strong></th>
<th>Onboard Solid State Drive eMMC 5.0 up to 128 GBytes</th>
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<tr>
<th><strong>Sound</strong></th>
<th>PS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Graphics</strong></th>
<th>Integrated</th>
<th>VPU</th>
<th>GPU2D</th>
<th>GPU1D</th>
<th>4 shaders</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Video Interface</strong></th>
<th>2x LVDS (2x 24 bit)</th>
<th>HDMI</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Boot loader</strong></th>
<th>U-Boot boot loader</th>
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<tr>
<th><strong>Power Management</strong></th>
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<tr>
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<thead>
<tr>
<th><strong>Temperature Range</strong></th>
<th>Operating commercial: 0°C .. +60°C</th>
<th>Operating industrial: -40°C .. +85°C</th>
<th>Storage: -40°C .. +85°C</th>
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<tr>
<th><strong>Humidity</strong></th>
<th>Operating: 10% .. 90% r.H. non cond.</th>
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**Low Power Class**

- The low power product category features the latest high performance ARM processors from NXP, Atom processors from Intel, and G-Series APUs from AMD.

- Multiple form factors i.e. Qseven, SMARC, COM Express Mini / Compact and Single Board Computer Formfactors.

---

**conga-QMX6**

- Qseven, 70 x 70 mm²

---

**Formfactor**

- Qseven, 70 x 70 mm²

---

**CPU**

- **NXP processor with commercial operating temperature 0°C .. +60°C**
  - i.MX6 Solo, 1GHz
  - i.MX6 Dual Lite, 1GHz
  - i.MX6 Dual, 1GHz
  - i.MX6 Quad, 1GHz

- **NXP processor with industrial operating temperature -40°C .. +85°C**
  - i.MX6 Solo, 800MHz
  - i.MX6 Dual Lite, 800MHz
  - i.MX6 Dual, 800MHz
  - i.MX6 Quad, 800MHz

---

**DRAM**

- max. 2 GBytes DDR3 1066 MT/s

---

**Ethernet**

- 1x 1 Gb

---

**Serial ATA**

- 1x (Dual & Quad CPUs)

---

**PCI Express**

- 1x Gen 2

---

**USB**

- 5x 2.0 (shared with 1x OTG)

---

**Other**

- SPI
- UART
- CAN
- SDIO
- PCIe
- MIPI-CSI on extra connector

---

**Mass Storage**

- Onboard Solid State Drive eMMC 5.0 up to 128 GBytes

---

**Sound**

- PS

---

**Graphics**

- Integrated
- VPU
- GPU2D
- GPU1D
- 4 shaders

---

**Video Interface**

- 2x LVDS (2x 24 bit) | HDMI

---

**Boot loader**

- U-Boot boot loader

---

**Power Management**

- NXP Power Management IC (PMIC)

---

**Operating Systems**

- Linux, Yocto, Android

---

**Temperature Range**

- Operating commercial: 0°C .. +60°C
- Operating industrial: -40°C .. +85°C
- Storage: -40°C .. +85°C

---

**Humidity**

- Operating: 10% .. 90% r.H. non cond.
- Storage: 5% .. 95% r.H. non cond.
# conga-PA7

**Formfactor**

Pico-ITX, 72 x 100 mm²

**CPU**

- Intel® Celeron® J6413 | 10W | 4x 1.8 - 3.0 GHz | 16 EU | PC Client
- Intel® Pentium® J6425 | 10W | 4x 1.8 - 3.0 GHz | 32 EU | PC Client
- Intel® Atom™ x6211E | 6W | 2x 1.2 - 3.0 GHz | 16 EU | Embedded
- Intel® Atom™ x6413E | 9W | 4x 1.5 - 3.0 GHz | 16 EU | Embedded
- Intel® Atom™ x6425E | 12W | 4x 1.8 - 3.0 GHz | 32 EU | Embedded

**embedded and commercial versions - 0 .. +60°C operating temperature**

- Intel® Atom™ x6212RE | 6W | 2x 1.2 GHz | 16 EU | Industrial
- Intel® Atom™ x6414RE | 9W | 4x 1.5 GHz | 16 EU | Industrial
- Intel® Atom™ x6425RE | 12W | 4x 1.9 GHz | 32 EU | Industrial

**DRAM**

up to 4 Channels onboard LPDDR4x with up to 4,267 MT/s max. system capacity 16 GB

**Ethernet**

2x LAN Gbit / 100 Mbit / 10 Mbit with TSN support and Out-Of-Band Management | 2x real-time trigger

**SATA**

1x M.2 2280 key B (2x PCIe/SATA/USB 2.0)

**PCI Express**

1x M.2 2280 key B (2x PCIe/SATA/USB 2.0)
1x M2 2230 key E (1x PCIe, USB 2.0)

**USB**

- 2x 2.0 internal
- 1x USB-C external 3.1 Gen2
- 2x Type A external 3.1 Gen 2
- 1x M2 2280 key B (2x PCIe/SATA/USB 2.0)
- 1x M2 2230 key E (1x PCIe, USB 2.0)

**Other I/O**

- Internal: 2x UART (RS232/422/485), Audio (Line, Mic, DMIC), DC 12V, Fan, 3x Feature connector, 2xCAN (opt.)
- External: DP++, 2x LAN RJ45, 1x USB-C (with PD and DP), 2x USB-A, DC 12V

**Sound**

Intel® LPE Audio via I2S

**Graphics**

Intel® UHD Graphics (Gen11)

**Video Interface**

- DP++, 1x LVDS or eDP (opt.) or MIPI-DSI (opt.)

**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 features | OEM Logo | OEM CMOS Defaults
- LCD Control | Display Auto Detection | Backlight Control | Flash Update

**Security**

- TPM 2.0

**Power Management**

- ACPI 5.0 compliant | Smart Battery Management

**Operating Systems**

Microsoft® Windows 10 | Microsoft® Windows 10 IoT Enterprise | Microsoft® Windows IoT Core | Linux | Android | Yocto | RTS Hypervisor

**Humidity**

- Operating: 10 .. 90 % r. H. non cond.
- Storage: 5 .. 95 % r. H. non cond.
### conga-SA7
- **Formfactor**: SMARC 2.1, 82 x 50 mm²
- **CPU**: Intel Atom x6000E, Intel Pentium® and Celeron® J Series processors (*Elkhart Lake*)
- **DRAM**: max. 16GB onboard LPDDR4x with up to 4.267 MT/s
- **Ethernet**: 2x Intel® GbE with TSN support and Out-Of-Band Management | real-time trigger
- **Sound**: HD Audio Intel® LPE Audio via I2S
- **Video Interface**: 2x24 Bit LVDS (opt. eDP or Mipi-DSI) | 1x24 Bit LVDS (shared with eDP)
- **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
- **Operating Systems**: Microsoft® Windows 10 | Microsoft® Windows 10 IoT Enterprise | Microsoft® Windows IoT 10 Core | Linux | Android | Yocto | RTS Hypervisor
- **Humidity**: Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond.

### conga-QA7
- **Formfactor**: Qseven, 70 x 70 mm²
- **CPU**: Intel Atom x6414RE | 9W | 4x 1.5 GHz | 16 EU | Industrial
- **DRAM**: 2x SO DIMM socket (dual channel DDR4 3.200 MT/s) | max. 32 GB system capacity
- **Sound**: UFS 2.0 onboard flash up to 64 Gbyte (optional up to 512 Gbyte)
- **Video Interface**: 2x24 Bit LVDS (opt. eDP)

### conga-MA7
- **Formfactor**: COM Express Mini, 55 x 84 mm²
- **CPU**: Intel Atom® x6212RE | 6W | 2x 1.2 GHz | 16 EU | Industrial
- **Graphics**: Intel® UHD Graphics (Gen11)
- **Video Interface**: 1x DP 1.4 or HDMI 2.0

### conga-TCA7
- **Formfactor**: COM Express Compact, 95 x 95 mm²
- **CPU**: Intel Atom® x6425RE | 12W | 4x 1.9 GHz | 32 EU | Industrial
- **Graphics**: Intel® UHD Graphics (Gen11)
- **Video Interface**: 1x DP 1.4 or HDMI 2.0

### Technical Specifications
- **Embedded and commercial versions**: 0 .. +60°C operating temperature
- **Industrial operating temperature**: -40°C .. +85°C
- **Power Management**: ACPI 5.0 compliant | Smart Battery Management
### conga-PA5 vs conga-IA5

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>Pico-ITX, 72 x 120 mm²</th>
<th>Thin Mini-ITX, 170 x 170 x 20 mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>commercial operating temperature: 0 .. +60°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intel® Atom™ x7-E3950</td>
<td>4x 1.6/2.0 GHz</td>
<td>L2 cache 2MB</td>
</tr>
<tr>
<td>Intel® Atom™ x5-E3940</td>
<td>4x 1.6/1.8 GHz</td>
<td>L2 cache 2MB</td>
</tr>
<tr>
<td>Intel® Atom™ x5-E3930</td>
<td>2x 1.3/1.8 GHz</td>
<td>L2 cache 1MB</td>
</tr>
<tr>
<td>Intel® Pentium® N4200</td>
<td>4x 1.1/2.5 GHz</td>
<td>L2 cache 2MB</td>
</tr>
<tr>
<td>Intel® Celeron® N3350</td>
<td>1x 1.1/2.4 GHz</td>
<td>L2 cache 2MB</td>
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<td>industrial operating temperature: -40°C .. +85°C</td>
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<tr>
<td>Intel® Atom™ x5-E3930</td>
<td>2x 1.3/1.8 GHz</td>
<td>L2 cache 1MB</td>
</tr>
</tbody>
</table>

| DRAM                | max 8GByte onboard LPDDR4 2400 MT/s | Support for 2x SODIMM Socket, max. 8 GB dual channel up to DDR3L 1866 MT/s |

| Ethernet            | 2x Intel® I210 (industrial) / I211 (commercial) Gigabit Ethernet Controller | |

| Serial ATA          | 1x SATA III | 1x mSATA III |
| PCI Express Gen 2.0  | 1x miniPCIe shared with mSATA Full Size | 1x PCIe x1 Slot | 1x mPCIe Full/Half Size |

| USB 3.0 / 2.0 | externally 2x, 1x USB 3.0 Type C / - internally / 2x | externally 2x / 2x internally 1x with support for USB 3.0 OTG / 1x |

| Other I/O          | 2x RS232/RS422/RS4585 | 1x micro SD slot Feature connector MIPI-CSI 2.0 | 1x RS232 | 1x RS232/RS422/RS4585 | 1x micro SD slot | MIPI-CSI 2.0 (opt.) | 1x M.2 Type B (2242/3042) |

| Sound               | Intel® High Definition Audio |
| Graphics            | Intel® HD Graphics 500 |

| Video Interface     | 1x DisplayPort++ | 1x 24-bit Dual Channel LVDS (optional eDP) | 1x Backlight (power, control) |
|                    | 1x DisplayPort++ | 2x DisplayPort+ | 2x 2-bit Dual Channel LVDS (optional eDP) | 1x Backlight (power, control) |

| congatec Board Controller | Multi Stage Watchdog | non-volatile User Data Storage | Manufacturing and Board Information | Board Statistics | Power Loss Control |
|                           | Display Auto Detection | Backlight Control | Flash Update |

| Embedded BIOS Feature   | AMI Aptio® UEFI 2x firmware | OEM Logo | OEM CMOS Defaults | LCD Control | Display Auto Detection | Backlight Control | Flash Update |

| Security              | Optional discrete “Trusted Platform Module” (TPM). It is capable of calculating efficient hash and RSA algorithms with key lengths up to 2,048 bits and includes a real random number generator. Security sensitive applications such as gaming and e commerce will benefit also with improved authentication, integrity and confidence levels. |

| Power Management      | 1x internal DC-In (12V) | 1x external DC-In (12V) | 1x opt: battery header for battery manager (SBM3) |
|                       | 1x internal DC-In (12-24V) | 1x external DC-In (12-24V) |

| Operating Systems     | Microsoft® Windows 10 | Microsoft® Windows 10 IoT Enterprise | Linux | Microsoft® Windows IoT Core | Yocto |

| Operating Temperature | Operating commercial: 0 .. +60°C | Operating industrial: -40 .. +85°C |

| Humidity             | Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond. |
### conga-SA5

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>SMARC 2.0, 82 x 50 mm²</th>
</tr>
</thead>
</table>

**CPU**

- 5th Gen. Intel® Atom™ / Celeron® / Pentium® processors (*Apollo Lake*)
  - commercial versions 0 .. +60°C operating temperature
  - Intel® Atom™ x7-E3950 | 4x1.6/2.0 GHz | L2 cache 2MB | 12W TDP
  - Intel® Atom™ x5-E3940 | 4x1.6/1.8 GHz | L2 cache 2MB | 9.5W TDP
  - Intel® Celeron® N3350 | 2x1.1/2.4 GHz | L2 cache 2MB | 6W TDP

### conga-QA5

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>Qseven, 70 x 70 mm²</th>
</tr>
</thead>
</table>

**CPU**

- Intel® Atom™ x7-E3950 | 4x1.6/2.0 GHz | L2 cache 2MB | 12W TDP
- Intel® Atom™ x5-E3940 | 4x1.6/1.8 GHz | L2 cache 2MB | 9.5W TDP
- Intel® Celeron® N3350 | 2x1.1/2.4 GHz | L2 cache 2MB | 6W TDP

### conga-MA5

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>COM Express Mini, 55 x 84 mm² Type 10 Connector Layout</th>
</tr>
</thead>
</table>

**CPU**

- Intel® Pentium® N4200 | 4x1.1/2.5 GHz | L2 cache 2MB | 6W TDP

### conga-TCA5

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>COM Express Compact, 95 x 95 mm² Type 6 Connector Layout</th>
</tr>
</thead>
</table>

**CPU**

- Intel® Celeron® J3455 | 4x1.5/2.3 GHz | L2 cache 2MB | 10W TDP
- Intel® Celeron® N3350 | 2x1.1/2.4 GHz | L2 cache 1MB | 6W TDP

**DRAM**

- max 8GByte onboard LPDDR4 2400 MT/s
- max 8GByte onboard DDR3L 1866 MT/s

**Chipset**

- Integrated in SoC

**Ethernet**

- Intel® I210 (industrial) /I211 (commercial) GBE SDP support for real time trigger
- Intel® I210 (industrial) /I211 (commercial) GBE

**Serial ATA**

- 1x
- 2x
- 2x
- 2x

**PCI Express Gen 2.0**

- 4x
- 3x
- 4x
- 5x
- 2x | 4x | 6x
- 4x | 8x

**USB 3.0 / 2.0**

- 2x | 4x
- 1x | 5x

**Other I/O**

- SDIO, SPI, I²C, UART, 2x MIPI-CSI, WiFi/Bluetooth (optional)
- SDIO, SPI, I²C, LPC, UART, MIPI-CSI

**Mass Storage**

- eMMC 5.0 onboard flash up to 64 Gbyte
- opt. eMMC 5.0 onboard flash

**Sound**

- Intel® High Definition Audio

**Graphics**

- Intel® HD Graphics Gen. 9

**Video Interface**

- LVDS 2x 24 | HDMI | DisplayPort
- LVDS 2x 24 | 2x DisplayPort or HDMI | 1x eDP 1.3 (optional)

**congatec Board Controller**

- Multi Stage Watchdog
- non-volatile User Data Storage
- Manufacturing and Board Information
- Board Statistics
- IP bus (last mode, 400 kHz, multi-master)
- Power Loss Control

**Embedded BIOS Feature**

- AMI Aptio® UEFI 2.x firmware
- OEM Logo
- OEM CMOS Defaults
- LCD Control
- Display Auto Detection
- Backlight Control
- Flash Update

**Security**

- Optional discrete “Trusted Platform Module” (TPM) and includes a real random number generator. Security sensitive applications such as gaming and e-commerce will benefit also with improved authentication, integrity and confidence levels.

**Power Management**

- ACPI 5.0 compliant, Smart Battery Management

**Operating Systems**

- Microsoft® Windows 10
- Microsoft® Windows IoT Core
- Microsoft® Windows IoT Enterprise
- Linux | Yocto

**Temperature**

- Operating commercial: 0 .. +60°C
- Operating industrial: -40 .. +85°C
- Storage: -40 .. +85°C

**Humidity**

- Operating: 10 .. 90 % r. H. non cond.
- Storage: 5 .. 95 % r. H. non cond.
## Formfactor
<table>
<thead>
<tr>
<th></th>
<th>conga-QA3</th>
<th>conga-QA3E</th>
<th>conga-MA3E</th>
<th>conga-MA3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Qseven, 70 x 70 mm²</td>
<td>Qseven, 70 x 70 mm²</td>
<td>COM Express Mini, 55 x 84 mm² Type 10 Connector Layout</td>
<td>COM Express Mini, 55 x 84 mm² Type 10 Connector Layout</td>
</tr>
</tbody>
</table>

## Intel® Atom™ / Celeron® processors ("Bay Trail")

### commercial versions 0 .. +60°C operating temperature

<table>
<thead>
<tr>
<th>Processor</th>
<th>Clock Speed</th>
<th>L2 cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atom™ E3845</td>
<td>4x1.91 GHz</td>
<td>2MB</td>
<td>10W TDP</td>
</tr>
<tr>
<td>Atom™ E3827</td>
<td>2x1.75 GHz</td>
<td>1MB</td>
<td>10W TDP</td>
</tr>
<tr>
<td>Atom™ E3826</td>
<td>2x1.46 GHz</td>
<td>1MB</td>
<td>7W TDP</td>
</tr>
<tr>
<td>Atom™ E3825</td>
<td>2x1.33 GHz</td>
<td>1MB</td>
<td>6W TDP</td>
</tr>
<tr>
<td>Atom™ E3805</td>
<td>2x1.33 GHz</td>
<td>1MB</td>
<td>6W TDP</td>
</tr>
<tr>
<td>Celeron® J1900</td>
<td>2x2.0 GHz</td>
<td>2MB</td>
<td>10W TDP</td>
</tr>
<tr>
<td>Celeron® N2930</td>
<td>2x1.83 GHz</td>
<td>2MB</td>
<td>7W TDP</td>
</tr>
<tr>
<td>Celeron® N2807</td>
<td>2x1.58 GHz</td>
<td>2MB</td>
<td>4.5W TDP</td>
</tr>
</tbody>
</table>

### industrial operating temperature -40°C .. +85°C

<table>
<thead>
<tr>
<th>Processor</th>
<th>Clock Speed</th>
<th>L2 cache</th>
<th>TDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atom™ E3845</td>
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</tr>
<tr>
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<td>2x1.46 GHz</td>
<td>1MB</td>
<td>7W TDP</td>
</tr>
<tr>
<td>Atom™ E3825</td>
<td>2x1.33 GHz</td>
<td>1MB</td>
<td>6W TDP</td>
</tr>
<tr>
<td>Atom™ E3805</td>
<td>2x1.33 GHz</td>
<td>1MB</td>
<td>6W TDP</td>
</tr>
<tr>
<td>Celeron® J1900</td>
<td>2x2.0 GHz</td>
<td>2MB</td>
<td>10W TDP</td>
</tr>
<tr>
<td>Celeron® N2930</td>
<td>2x1.83 GHz</td>
<td>2MB</td>
<td>7W TDP</td>
</tr>
<tr>
<td>Celeron® N2807</td>
<td>2x1.58 GHz</td>
<td>2MB</td>
<td>4.5W TDP</td>
</tr>
</tbody>
</table>

## DRAM
- max. 8 GByte dual channel DDR3L 1333MT/s
- max. 8 GByte onboard ECC DDR3L 1333MT/s
- max. 8 GByte dual channel DDR3L 1333MT/s

## Chipset
- Integrated in SoC

## Ethernet
- Gigabit Ethernet Intel® i210
- Intel® i218LM GbE Phy

## Serial ATA
- 2x

## PCI Express Gen 2.0
- 3x

## USB 3.0 / 2.0
- 1x  | 6x
- 1x  | 7x

## Other I/O
- SDIO, GPIO, SPI, LPC, PC

## Mass Storage
- eMMC 5.0 onboard flash up to 64 GByte (optional)

## Sound
- Intel® High Definition Audio

## Graphics
- Intel® HD Graphics Gen. 7

## Video Interface
- LVDS 2x 24 bit | 1x HDMI/DisplayPort
- 1X DisplayPort

## congatec Board Controller
- Multi Stage Watchdog
- non-volatile User Data Storage
- Manufacturing and Board Information
- Board Statistics
- Power Loss Control

## Embedded BIOS Feature
- UEFI 2.x firmware
- OEM Logo
- OEM CMOS Defaults
- LCD Control
- Display Auto Detection
- Backlight Control
- Flash Update

## Security
- LPC interface for TPM on Carrier Board
- Optional discrete “Trusted Platform Module” (TPM)

## Power Management
- ACPI 5.0 compliant, Smart Battery Management

## Operating Systems

## Temperature
- Operating commercial: 0 .. +60°C
- Operating industrial: -40 .. +85°C
- Storage: -40 .. +85°C

## Humidity
- Operating: 10 .. 90 % r. H. non cond.
- Storage: 5 .. 95 % r. H. non cond.
<table>
<thead>
<tr>
<th><strong>Formfactor</strong></th>
<th>COM Express Compact 95 x 95 mm², Type 6</th>
<th>Pico-ITX, 72 x 100 mm²</th>
</tr>
</thead>
</table>

**CPU**
- Intel® Atom™ / Celeron® processors ("Bay Trail")
  - **commercial versions 0 .. +60°C operating temperature**
    - Intel® Atom™ E3845 | 4x 1.91 GHz | L2 2MB | 10W TDP
    - Intel® Atom™ E3826 | 2x 1.46 GHz | L2 1MB | 7W TDP
    - Intel® Atom™ J1900 | 2x 2.0 GHz | L2 2MB | 10W TDP
    - Intel® Celeron® N2930 | 4x 1.83 GHz | L2 2MB | 7.5W TDP
  - Intel® Atom™ E3845 | 4x 1.91 GHz | L2 2MB | 10W TDP
  - Intel® Atom™ E3826 | 2x 1.46 GHz | L2 cache 1MB | 7W TDP

- **industrial operating temperature -40°C .. +85°C**
  - Intel® Atom™ E3845 | 4x 1.91 GHz | L2 2MB | 10W TDP
  - Intel® Atom™ E3826 | 2x 1.46 GHz | L2 1MB | 7W TDP

**DRAM**
- Support for 2x SODIMM Socket, max. 8GB
- dual channel up to DDR3L-1333
- max. 4 GByte on board DDR3-1333

**Chipset**
- Integrated in SoC

**Ethernet**
- Gigabit Ethernet Intel® I210
- 1x Gbit LAN | Intel® i211 (i210 for industrial version)

**Serial ATA**
- 2x SATA II
- 1x SATA II | 1x mSATA II

**PCI Express Gen 2.0**
- 5x
- 2x miniPCIe Half Size, one shared with mSATA

**USB 3.0 / 2.0**
- 1x | 8x 2x | 2x (1x Client)

**Other I/O**
- SDIO, GPIO, SPI, LPC, I²C
- 1x RS-232
- 1x micro SD slot
- Feature connector

**Mass Storage**
- eMMC 4.5 onboard flash up to 64 GByte (optional)

**Sound**
- Intel® High Definition Audio
- Audio In/Out (not on industrial variants) SPDIF OUT (not on industrial variants)

**Graphics**
- Intel® HD Graphics Generation 8

**Video Interface**
- LVDS 2x 24 bit
- 2x DisplayPort/HDMI/DVI
- 1x 24-bit Dual Channel LVDS / 1x DisplayPort++

**congatec Board Controller**
- Multi Stage Watchdog | non-volatile User Data Storage | Manufacturing and Board Information | Board Statistics | PIC bus (fast mode, 400 kHz, multi-master) | Power Loss Control

**Embedded BIOS Feature**
- AMI Aptio® (UEFI) BIOS | SM BIOS | BIOS Update | Logo Boot | Quiet Boot | HDD Password

**Security**
- Optional discrete "Trusted Platform Module" (TPM)

**Power Management**
- ACPI 5.0 compliant, Smart Battery Management
- 1x internal DC-in (12V)
- 1x ext. DC-in (12V)

**Operating Systems**

**Temperature**
- Operating commercial: 0 .. +60°C
- Storage: -40 .. +85°C

**Humidity**
- Operating: 10 .. 90 % r. H. non cond.
- Storage: 5 .. 95 % r. H. non cond.
This performance category features multiple Generations of the Intel Core processors and the latest graphic output oriented CPUs from AMD. Multiple form factors i.e. COM Express Compact / Basic and Thin Mini-ITX and JUKE 3.5” boards are supported.
## conga-TC570

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>COM Express Compact Type 6</th>
<th>COM-HPC Client Size A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiger Lake UP3 (11th Gen Intel® Core™ processors)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>General Embedded Versions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intel® Core™ i7 1185G7E</td>
<td>4x1.8/4.4 GHz</td>
<td>12MB Smart Cache</td>
</tr>
<tr>
<td>Intel® Core™ i5 1145G7E</td>
<td>4x1.5/4.1 GHz</td>
<td>8MB Smart Cache</td>
</tr>
<tr>
<td>Intel® Core™ i3 1115G4E</td>
<td>2x2.2/3.9 GHz</td>
<td>6MB Smart Cache</td>
</tr>
<tr>
<td>Intel® Celeron® 6305E</td>
<td>2x1.8 GHz</td>
<td>4MB Smart Cache</td>
</tr>
<tr>
<td><strong>Industrial Versions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intel® Core™ i7 1185GRE</td>
<td>4x1.8/4.4 GHz</td>
<td>12MB Smart Cache</td>
</tr>
<tr>
<td>Intel® Core™ i5 1145GRE</td>
<td>4x1.5/4.1 GHz</td>
<td>8MB Smart Cache</td>
</tr>
<tr>
<td>Intel® Core™ i3 1115GRE</td>
<td>2x2.2/3.9 GHz</td>
<td>6MB Smart Cache</td>
</tr>
<tr>
<td><strong>DRAM</strong></td>
<td>Up to 2 SO-DIMM sockets for DDR4 memory modules up to 32 GByte each (64 GByte total) with 3200 MT/s</td>
<td></td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>integrated in SOC</td>
<td></td>
</tr>
<tr>
<td><strong>Ethernet</strong></td>
<td>1x 2,5GbE TSN Ethernet via Intel® i225</td>
<td>2x 2,5 GbE TSN Ethernet via Intel® i225</td>
</tr>
<tr>
<td><strong>Serial ATA</strong></td>
<td>2x SATA III (6Gb/s)</td>
<td></td>
</tr>
<tr>
<td><strong>PCI Express Gen 3.0</strong></td>
<td>8x PCIe Gen3</td>
<td>4x PCIe Gen4</td>
</tr>
<tr>
<td>PEG support x4 (PCIe Gen4)</td>
<td>8x PCIe Gen3</td>
<td></td>
</tr>
<tr>
<td><strong>USB</strong></td>
<td>4x USB 3.2 Gen2</td>
<td>2x USB 2.0</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>SPI</td>
<td>2x UART</td>
</tr>
<tr>
<td><strong>Sound</strong></td>
<td>HDA interface</td>
<td>1x I2S</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>Integrated Xe (Gen 12) graphics engine with up to 96 EU (Execution Units)</td>
<td>Supporting 4 independent display units (4x 4k/2x 8K)</td>
</tr>
<tr>
<td><strong>Video Interface</strong></td>
<td>3x DP/HDMI/DP++</td>
<td>1x eDP/LVDS</td>
</tr>
<tr>
<td><strong>congatec Board Controller</strong></td>
<td>Multi Stage Watchdog</td>
<td>non-volatile User Data Storage</td>
</tr>
<tr>
<td><strong>Embedded BIOS Feature</strong></td>
<td>OEM Customization</td>
<td>Flash Update</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>Trusted Platform Module (TPM 2.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Power Management</strong></td>
<td>ACPI compliant with battery support</td>
<td>Suspend to RAM (S3) support</td>
</tr>
<tr>
<td><strong>Operating Systems</strong></td>
<td>Microsoft® Windows 10 (64bit only)</td>
<td>Microsoft® Windows 10 IoT Enterprise (64bit only)</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Industrial: Operating Temperature: -40°C to +85°C Storage: -40°C to +85°C</td>
<td>Commercial: Operating Temperature: 0°C to +60°C Storage: -20°C to +60°C</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td>Operating: 10 - 90°C r. H. non cond Storage: 5 - 95% r. H non cond</td>
<td></td>
</tr>
</tbody>
</table>
### conga-TC370

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>COM Express Basic 95 x 95 mm², Type 6</th>
</tr>
</thead>
</table>

### conga-JC370

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>Thin Mini-ITX 170 x 170 x 20 mm³</th>
</tr>
</thead>
</table>

### conga-IC370

| Formfactor | COM Express Basic 95 x 95 mm², Type 6 |

### CPU

<table>
<thead>
<tr>
<th>Intel® Core™ i7-8665U</th>
<th>4x1.7/4.0 GHz</th>
<th>L2 cache 8MB</th>
<th>15W TDP</th>
<th>12.5W/25W cTDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™ i5-8365U</td>
<td>4x1.6/3.0 GHz</td>
<td>L2 cache 6MB</td>
<td>15W TDP</td>
<td>12.5W/25W cTDP</td>
</tr>
<tr>
<td>Intel® Core™ i5-7500U</td>
<td>4x3.0/4.0 GHz</td>
<td>L2 cache 6MB</td>
<td>15W TDP</td>
<td>12.5W/25W cTDP</td>
</tr>
</tbody>
</table>

### DRAM

- 2x DDR4 up to 64 GB
- 2x SO-DIMM
- 4x 32 GB

### Ethernet

- Intel® Gigabit Ethernet i219LM with AMT 12.0 support
- Intel® Gigabit Ethernet i219LM (with AMT support) | Intel® Gigabit Ethernet i225 (with opt. TSN support under Linux)
- Intel® Gigabit Ethernet i225 (with opt. TSN support under Linux)

### Serial ATA

- 3x 6 Gbit/s

### PCIe Express Gen 3.0

- 8x

### USB 3.1 / 2.0

- 4x Gen 2 | 8x
- 3x Gen. 2 | 2x
- 2x Gen. 2 | 4x

### Other

- LPC bus (no DMA) | PIC bus (fast mode, 400 kHz, multi-master) | 2x UART

### Mass Storage

- optional eMMC 5.1 on board mass storage

### Expansion Sockets

- M.2 key M size 2280
- M.2 key E size 2230

### Internal Connectors

- SATA/eSATA/SATADOM + power
- Dual USB 2.0 | Audio (HPout/MIC/LINE/DMIC)
- RS232/422/485 | 2x RS232 | opt. CAN
- USB 3.1 Gen 2 Type C | opt. feature connector
- PCIe x4
- minPCIe full/half-size
- M.2 key B size 2242/3042 with microSIM
- M.2 key B size 2280 with microSIM
- microSD card

### External Connectors

- DP+ (or opt. HDMI) | USB 3.1 Gen 2 Type C (PD/DP Alt. Mode) | 2x USB 3.1 Gen 2 Type A
- 2x 2.5 Gigabit Ethernet RJ45 | 2x RS232/422/485
- 2x 8 GPIO | 2x Fan
- 2x DC-In (12-24 V)
- 2x DC-In (1+2.5 Gbit) | 2x USB 2.0

### Sound

- Intel® High Definition Audio

### Graphics

- Intel UHD 600 Series

### Video Interface

- 3x DP / HDMI or DP+ + ports | 18/24bit single/dual channel LVDS or eDP (optional VGA interface)
- DP+ (or opt. HDMI)
- USB Type C (DP Alt. Mode)
- LVDS 24bit Dual channel (or opt. eDP)
- opt. 2nd internal display
- Backlight (power/control)
- opt. 2st internal display
- Backlight (power/control)

### congatec Board Controller

- Multi Stage Watchdog
- non-volatile User Data Storage
- Manufacturing and Board Information
- Board Statistics
- Power Loss Control
- Hardware Health Monitoring
- POST Code redirection

### Embedded BIOS Feature

- AMI Aptio® 2 X (UEFI) BIOS
- SM-BIOS
- BIOS Update
- Logo Boot
- Quiet Boot
- HDD Password

### Security

- Trusted Platform Module (TPM 2.0)

### Power Management

- ACPI compliant with battery support
- Suspend to RAM (S3) support | S5 enhanced support | Intel AMT 12.0 support
- Power Supply 12-24V
- Power Management
- ACPI S3/S4/DeepS5
- Wake on time from S5

### Operating Systems

- Microsoft® Windows 10 (64bit only)
- Microsoft® Windows 10 IoT Enterprise (64bit only)
- Linux

### Temperature

- Operating: 0..60°C | Storage: -20..+70°C

### Humidity

- Operating: 10..90°C r. H. non cond
- Storage: 5..95% r. H. non cond.
### CPU

<table>
<thead>
<tr>
<th>Model</th>
<th>Interface</th>
<th>Load/Perf</th>
<th>TDP</th>
<th>Cache</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel® Core™</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i7-9850H</td>
<td>6x2.4/4.4 GHz</td>
<td>45W TDP</td>
<td>9MB</td>
<td>4.4 GHz</td>
<td>2.4/4.4V</td>
</tr>
<tr>
<td>i5-9600K</td>
<td>6x2.6/6.3 GHz</td>
<td>95W TDP</td>
<td>9MB</td>
<td>6.3 GHz</td>
<td>2.6/6.3V</td>
</tr>
<tr>
<td>i5-9500</td>
<td>6x2.9/4.5 GHz</td>
<td>65W TDP</td>
<td>6MB</td>
<td>4.5 GHz</td>
<td>2.9/4.5V</td>
</tr>
<tr>
<td>i3-9100</td>
<td>4x3.6 GHz</td>
<td>65W TDP</td>
<td>5MB</td>
<td>3.6 GHz</td>
<td>3.6/3.6V</td>
</tr>
<tr>
<td>Xeon® E-2276ME</td>
<td>6x2.6/4.8 GHz</td>
<td>45W TDP</td>
<td>12MB</td>
<td>4.8 GHz</td>
<td>2.6/4.8V</td>
</tr>
<tr>
<td>Xeon® E-2276ML</td>
<td>6x2.0/2.7 GHz</td>
<td>35W TDP</td>
<td>12MB</td>
<td>2.7 GHz</td>
<td>2.0/2.7V</td>
</tr>
<tr>
<td>Xeon® E-2254EM</td>
<td>6x2.4/3.6 GHz</td>
<td>45W TDP</td>
<td>12MB</td>
<td>3.6 GHz</td>
<td>2.4/3.6V</td>
</tr>
<tr>
<td>Xeon® E-2254ML</td>
<td>6x1.9/2.6 GHz</td>
<td>35W TDP</td>
<td>12MB</td>
<td>2.6 GHz</td>
<td>1.9/2.6V</td>
</tr>
<tr>
<td>Xeon® E-2176M</td>
<td>6x2.6/3.8 GHz</td>
<td>45W TDP</td>
<td>18MB</td>
<td>3.8 GHz</td>
<td>2.6/3.8V</td>
</tr>
<tr>
<td>Xeon® E-2176L</td>
<td>6x2.0/2.7 GHz</td>
<td>35W TDP</td>
<td>18MB</td>
<td>2.7 GHz</td>
<td>2.0/2.7V</td>
</tr>
<tr>
<td>Xeon® E3-1245V</td>
<td>4x2.6/3.5 GHz</td>
<td>45W TDP</td>
<td>8MB</td>
<td>3.5 GHz</td>
<td>2.6/3.5V</td>
</tr>
<tr>
<td>Xeon® E3-1245L</td>
<td>4x2.0/2.7 GHz</td>
<td>35W TDP</td>
<td>8MB</td>
<td>2.7 GHz</td>
<td>2.0/2.7V</td>
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<tr>
<td>Core™ i7-8700K</td>
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<td>120W TDP</td>
<td>12MB</td>
<td>3.6 GHz</td>
<td>2.9/3.6V</td>
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<tr>
<td>Core™ i7-8700</td>
<td>6x2.6/3.2 GHz</td>
<td>120W TDP</td>
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<td>3.2 GHz</td>
<td>2.6/3.2V</td>
</tr>
<tr>
<td>Core™ i5-8400</td>
<td>4x3.8/4.1 GHz</td>
<td>65W TDP</td>
<td>9MB</td>
<td>4.1 GHz</td>
<td>3.8/4.1V</td>
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<tr>
<td>Core™ i5-8400H</td>
<td>4x2.7/3.6 GHz</td>
<td>45W TDP</td>
<td>9MB</td>
<td>3.6 GHz</td>
<td>2.7/3.6V</td>
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<tr>
<td>Core™ i3-8100</td>
<td>4x3.6/4.2 GHz</td>
<td>65W TDP</td>
<td>6MB</td>
<td>4.2 GHz</td>
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<tr>
<td>Core™ i3-8100H</td>
<td>4x2.3/3.6 GHz</td>
<td>45W TDP</td>
<td>6MB</td>
<td>3.6 GHz</td>
<td>2.3/3.6V</td>
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<tr>
<td>Celeron® G4900</td>
<td>2x2.9 GHz</td>
<td>65W TDP</td>
<td>4MB</td>
<td>2.9 GHz</td>
<td>2x2.9/2.9V</td>
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<tr>
<td>Celeron® G4900H</td>
<td>2x2.6/3.0 GHz</td>
<td>45W TDP</td>
<td>4MB</td>
<td>3.0 GHz</td>
<td>2x2.6/3.0V</td>
</tr>
<tr>
<td>Xeon® E3-1245V</td>
<td>4x2.6/3.5 GHz</td>
<td>45W TDP</td>
<td>8MB</td>
<td>3.5 GHz</td>
<td>2.6/3.5V</td>
</tr>
<tr>
<td>Xeon® E3-1245L</td>
<td>4x2.0/2.7 GHz</td>
<td>35W TDP</td>
<td>8MB</td>
<td>2.7 GHz</td>
<td>2.0/2.7V</td>
</tr>
<tr>
<td>Core™ i5-7500K</td>
<td>6x2.8/3.6 GHz</td>
<td>95W TDP</td>
<td>9MB</td>
<td>3.6 GHz</td>
<td>2.8/3.6V</td>
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<tr>
<td>Core™ i5-7500</td>
<td>6x2.8/3.6 GHz</td>
<td>65W TDP</td>
<td>9MB</td>
<td>3.6 GHz</td>
<td>2.8/3.6V</td>
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<tr>
<td>Core™ i3-7500H</td>
<td>4x3.8/4.7 GHz</td>
<td>65W TDP</td>
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<td>4.7 GHz</td>
<td>3.8/4.7V</td>
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<tr>
<td>Core™ i3-7500</td>
<td>4x3.5/4.4 GHz</td>
<td>45W TDP</td>
<td>6MB</td>
<td>4.4 GHz</td>
<td>3.5/4.4V</td>
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<td>95W TDP</td>
<td>9MB</td>
<td>4.3 GHz</td>
<td>3.8/4.3V</td>
</tr>
<tr>
<td>Core™ i7-7700</td>
<td>4x3.5/4.2 GHz</td>
<td>65W TDP</td>
<td>9MB</td>
<td>4.2 GHz</td>
<td>3.5/4.2V</td>
</tr>
<tr>
<td>Core™ i5-7500K</td>
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<td>95W TDP</td>
<td>9MB</td>
<td>3.7 GHz</td>
<td>2.9/3.7V</td>
</tr>
<tr>
<td>Core™ i5-7500</td>
<td>6x2.6/3.5 GHz</td>
<td>65W TDP</td>
<td>9MB</td>
<td>3.5 GHz</td>
<td>2.6/3.5V</td>
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<tr>
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<td>65W TDP</td>
<td>6MB</td>
<td>3.5 GHz</td>
<td>2.7/3.5V</td>
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<tr>
<td>Core™ i3-7300</td>
<td>4x2.4/3.3 GHz</td>
<td>45W TDP</td>
<td>6MB</td>
<td>3.3 GHz</td>
<td>2.4/3.3V</td>
</tr>
<tr>
<td>Core™ i7-7700K</td>
<td>4x3.8/4.3 GHz</td>
<td>95W TDP</td>
<td>9MB</td>
<td>3.7 GHz</td>
<td>3.8/4.3V</td>
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<tr>
<td>Core™ i7-7700</td>
<td>4x3.5/4.2 GHz</td>
<td>65W TDP</td>
<td>9MB</td>
<td>4.2 GHz</td>
<td>3.5/4.2V</td>
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<td>Core™ i5-7700K</td>
<td>6x2.9/3.7 GHz</td>
<td>95W TDP</td>
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<td>3.7 GHz</td>
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<td>Core™ i5-7700</td>
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<td>Core™ i3-7300H</td>
<td>4x2.7/3.5 GHz</td>
<td>65W TDP</td>
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<td>Core™ i3-7300</td>
<td>4x2.4/3.3 GHz</td>
<td>45W TDP</td>
<td>6MB</td>
<td>3.3 GHz</td>
<td>2.4/3.3V</td>
</tr>
</tbody>
</table>

### DRAM

- max. 64 GByte DDR4 (Intel® Xeon® with ECC optional)
- max. 32 GByte DDR4 (Intel® Xeon® and Intel® Core™ with ECC optional)
- Up to 32 GByte dual channel DDR4 memory

### Chipset

- Mobile Intel® QCH-H CM/ HM370
- Mobile Intel® 100 Series Chipset
- Integrated PCH-LP (Dual Gbit LAN 1x Intel® i219LM Gbe Phy. 1x Intel® i219LM Gbe AMT 11 supported 1x Intel i211)

### Ethernet

- 4x GbE (Intel® i219LM GbE Phy. 4x GbE)
- 8x PCIe Gen. 3.0 (4x GbE)
- 8x PCIe Gen. 3.0 (4x GbE)
- 4x GbE (8x GbE)
- 1x Internal stereo speaker 1x Digital Microphone (SPDIF 1x Front Panel HD Audio)

### Graphics

- Intel® UHD 600 Series
- Intel® HD 600 Series

### Video Interface

- LVDS 2x 24 bit/eDP, VGA 3x DisplayPort/HDMI/DVI
- LVDS 2x 24 bit/eDP, VGA 2x DisplayPort/HDMI/DVI
- 2x DisplayPort++ 1x LVDS (2x24 bit) 1x Embedded DisplayPort 1x Backlight (power, control)
- 1x opt. CEC

### congatec Board Controller

- Multi Stage Watchdog 1x opt. Battery header for battery manager (SBM3)

### Embedded BIOS Feature

- AMI-Aptio UEFI BIOS, congatec Embedded BIOS
- Power Management

### Security

- TPM 2.0 installed
- Optional "Trusted Platform Module" (TPM)

### Operating Systems

- Microsoft® Windows 10 (64bit only) Microsoft® Windows 10 IoT Enterprise (64bit only) Linux

### Temperature

- Operating: 0 .. +60°C
- Storage: -20 .. +80°C

### Humidity

- Operating: 10 .. 90°C r. H.
- Storage: 5 .. 95% r.H non cond.
### congata-TCV2
- **Formfactor**: COM Express® Compact, (95 x 95 mm), Type 6
- **CPU**
  - V2516: 6 x 2.1/3.95 GHz
  - Cache: 3MB
  - TDP: 10/25W
- **DRAM**: max. 64 GByte DDR4 ECC and non-ECC
- **Chipset**: Integrated in SOC (single-chip)
- **Ethernet**: 2.5GbE with TSN via Intel® i225
- **Sound**: Digital High Definition Audio Interface with support for multiple audio codecs
- **Video Interface**: 3x DisplayPort
- **congatec Board Controller**: Multi Stage Watchdog, non-volatile User Data Storage, Board Statistics, Backlight
- **Embedded BIOS Feature**: AMI-Aptio® UEFI BIOS
- **Power Management**: ACPI 5.0 with Battery support
- **Operating Systems**: Microsoft® Windows 10 | 10 IoT Enterprise Linux | opt. Microsoft® Windows 7
- **Temperature**: Operating: 0 ... +60°C, Storage: -20 ... +80°C
- **Humidity**: Operating: 10 ... 90% r. H. non cond. | Storage: 5 ... 95% r. H. non cond.

### congata-TR4 (V Series)
- **Formfactor**: COM Express® Basic, (95 x 125 mm), Type 6 Connector Layout
- **CPU**
  - V1807B: 4x 3.35/3.75 GHz
  - Cache: 2MB
  - TDP: 35/54W
- **DRAM**: max. 32 GByte DDR4 with ECC
- **Chipset**: Integrated in SOC (single-chip)
- **Ethernet**: Intel GbE Controller i211
- **Serial ATA**: 2x
- **PCI EXPRESS® Gen. 3.0 / 2.0**: 8x | - | 4x | 4x | 3x | 4x
- **PEG**: 1x (x8)
- **USB 3.1 / 2.0**: 2x | 8x | 4x | 8x | 3x | 8x
- **Other**: PC bus, SD, SPI, LPC Bus, SM-Bus, 2x UART
- **Sound**: Digital High Definition Audio Interface with support for multiple audio codecs
- **Graphics**: Integrated VEGA 7, AMD® Radeon™ Vega Graphics Core (GFX9)
- **Video Interface**: 3x DisplayPort
- **congatec Board Controller**: Multi Stage Watchdog, non-volatile User Data Storage, Power Loss Control, Backlight
- **Embedded BIOS Feature**: AMI-Aptio® UEFI BIOS
- **Security**: “Trusted Platform Module” (TPM)
- **Power Management**: ACPI 5.0 with Battery support
- **Operating Systems**: Microsoft® Windows 10 | 10 IoT Enterprise Linux | opt. Microsoft® Windows 7
- **Temperature**: Operating: 0 ... +60°C, Storage: -20 ... +80°C
- **Humidity**: Operating: 10 ... 90% r. H. non cond. | Storage: 5 ... 95% r. H. non cond.

### congata-TR4 (R Series)
- **Formfactor**: COM Express® Basic, (95 x 125 mm), Type 6 Connector Layout
- **CPU**
  - V1605B: 4x 2.0/3.6 GHz
  - Cache: 2MB
  - TDP: 12W/25W
- **DRAM**: max. 32 GByte DDR4 with ECC
- **Chipset**: Integrated in SOC (single-chip)
- **Ethernet**: Intel GbE Controller i211
- **Serial ATA**: 2x
- **PCI EXPRESS® Gen. 3.0 / 2.0**: 8x | - | 4x | 4x | 3x | 4x
- **PEG**: 1x (x8)
- **USB 3.1 / 2.0**: 2x | 8x | 4x | 8x | 3x | 8x
- **Other**: PC bus, SD, SPI, LPC Bus, SM-Bus, 2x UART
- **Sound**: Digital High Definition Audio Interface with support for multiple audio codecs
- **Graphics**: Integrated VEGA 7, AMD® Radeon™ Vega Graphics Core (GFX9)
- **Video Interface**: 3x DisplayPort
- **congatec Board Controller**: Multi Stage Watchdog, non-volatile User Data Storage, Power Loss Control, Backlight
- **Embedded BIOS Feature**: AMI-Aptio® UEFI BIOS
- **Security**: “Trusted Platform Module” (TPM)
- **Power Management**: ACPI 5.0 with Battery support
- **Operating Systems**: Microsoft® Windows 10 | 10 IoT Enterprise Linux | opt. Microsoft® Windows 7
- **Temperature**: Operating: 0 ... +60°C, Storage: -20 ... +80°C
- **Humidity**: Operating: 10 ... 90% r. H. non cond. | Storage: 5 ... 95% r. H. non cond.
### conga-TS170

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>COM Express® Basic</th>
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<tbody>
<tr>
<td></td>
<td>95 x 125 mm², Type 6</td>
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### conga-TC170

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<th>COM Express® Compact</th>
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### conga-IC170

<table>
<thead>
<tr>
<th>Formfactor</th>
<th>Thin Mini-ITX</th>
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<tbody>
<tr>
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<td>170 x 170 x 20 mm³</td>
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### 6th Gen. Intel® Core™ / Celeron® processors (“Skylake”)

<table>
<thead>
<tr>
<th>CPU Model</th>
<th>Specifications</th>
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<tbody>
<tr>
<td>Intel® Xeon® E3-1578LV5</td>
<td>4x 2.0/3.4 GHz, 8MB, 45W</td>
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<tr>
<td>Intel® Xeon® E3-1558LV5</td>
<td>4x 2.8/3.7 GHz, 8MB, 45W</td>
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<td>Intel® Xeon® E3-1556LV5</td>
<td>4x 2.8/3.7 GHz, 8MB, 45W</td>
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<tr>
<td>Intel® Xeon® E3-1550LV5</td>
<td>4x 2.0/2.8 GHz, 8MB, 25W</td>
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<tr>
<td>Intel® Core® i7-6600U</td>
<td>2x 2.6 /3.4 GHz, Cache 4MB, 15W TDP</td>
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<tr>
<td>Intel® Core® i5-6300U</td>
<td>2x 2.4/3.0 GHz, Cache 3MB, 15W TDP</td>
</tr>
<tr>
<td>Intel® Core® i3-6100U</td>
<td>2x 2.3 GHz, Cache 3MB, 15W TDP</td>
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### DRAM

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<thead>
<tr>
<th>DRAM</th>
<th>max. 32 GByte DDR4</th>
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<tbody>
<tr>
<td></td>
<td>Intel® Xeon® and Intel® Core with E CC optional up to 32 Gbyte dual channel DDR4 memory</td>
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### Chipset

<table>
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<tr>
<th>Chipset</th>
<th>Mobile Intel® 100 Series Chipset</th>
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### Ethernet

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<th>Ethernet</th>
<th>Dual Gbit LAN</th>
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<tbody>
<tr>
<td></td>
<td>1x Intel® i219LM GbE AMT 11</td>
</tr>
<tr>
<td></td>
<td>1x Intel® i211</td>
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### Serial ATA

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### PCI Express

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<th>PCI Express</th>
<th>8x PCIe Gen. 3.0, 1x 16 (PEG)</th>
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### USB

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<th>USB</th>
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<th>8x 2.0</th>
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### Other I/O

<table>
<thead>
<tr>
<th>Other I/O</th>
<th>SPI, LPC, SM, 2xSerial, GPIO/SDIO, PC</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>MIPI-CSI (Flatfoil), SM, PC, GPIO/SDIO, 2xSerial, LPC</td>
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<tr>
<td></td>
<td>RS232 internal, 8 Bit GPIO internal, M.2 Type B (2230/2242), Integrated Sensor Hub</td>
</tr>
</tbody>
</table>

### Sound

<table>
<thead>
<tr>
<th>Sound</th>
<th>Digital High Definition Audio Interface with support for multiple audio codecs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Audio In/Out, 1x Internal stereo speaker, 1x Digital Microphone (SPDIF), 1x Front Panel HD Audio</td>
</tr>
</tbody>
</table>

### Graphics

<table>
<thead>
<tr>
<th>Graphics</th>
<th>Intel® Gen9 HD Graphics</th>
</tr>
</thead>
</table>

### Video Interface

<table>
<thead>
<tr>
<th>Video Interface</th>
<th>LVDS 2x 24 bit/eDP, VGA 3x DisplayPort/HDMI/DVI</th>
</tr>
</thead>
</table>

### congatec Board Controller

| congatec Board Controller | Multi Stage Watchdog, non-volatile User Data Storage, Manufacturing and Board Information, Board Statistics, BIOS Setup, Data Backup, PC bus (fast mode, 400 kHz, multi-master), Power Loss Control |

### Embedded BIOS Feature

| Embedded BIOS Feature | AMI/Aptio UEFI BIOS, congatec Embedded BIOS |

### Security

<table>
<thead>
<tr>
<th>Security</th>
<th>Optional discrete “Trusted Platform Module” (TPM)</th>
</tr>
</thead>
</table>

### Power Management

| Power Management | ACPI 4.0 with Battery support, internal/external DC-In (12-24V), 1x opt. battery header for battery manager SBM3 |

### Operating Systems


### Temperature Range

| Temperature Range | Operating: 0...+60°C, Storage: -20...+80°C |

### Humidity

| Humidity | Operating: 10...90°C r.H. non cond, Storage: 5...95% r.H. non cond |
conga-TC97

**Formfactor**
COM Express Compact  
95 x 95 mm², Type 6

**CPU**
5th Gen. Intel® Core™ / Xeon® processors ("Broadwell")
- **Intel® Core™ i7-5650U** | 2x2.2/3.1 GHz | Cache 4MB | 15W TDP
- **Intel® Core™ i5-5350U** | 2x1.8/2.9 GHz | Cache 3MB | 15W TDP
- **Intel® Core™ i3-5010U** | 2x2.1 GHz | Cache 3MB | 15W TDP
- **Intel® Celeron® 3765U** | 2x1.9 GHz | Cache 2MB | 15W TDP

**DRAM**
max. 32 GByte DDR3L 1600 MHz

**Chipset**
Intel® 9 Series PCH-LP

**Ethernet**
Intel® I218-LM GbE Phy

**Serial ATA**
4x

**PCI EXPRESS® Gen. 2.0**
4x
2x | 8x

**USB 3.0 / 2.0**
2x

**Other**
LPC, PC, GPIO

**Sound**
Digital High Definition Audio Interface

**Graphics**
Intel® HD Graphics

**Video Interface**
LVDS 2x 24 bit, VGA  
2x DisplayPort/HDMI/DVI

**congatec Board Controller**
Multi Stage Watchdog | non-volatile User Data Storage | Manufacturing and Board Information | Board Statistics | BIOS Setup | Data Backup | I²C bus (fast mode, 400 kHz, multi-master) | Power Loss Control

**Embedded BIOS Feature**
AMI-Aptio UEFI BIOS, congatec Embedded BIOS

**Security**
Optional discrete "Trusted Platform Module" (TPM)

**Power Management**
ACPI 4.0 with Battery support

**Operating Systems**

**Temperature**
- Operating: 0 .. +60°C  
- Storage: -20 .. +80°C

**Humidity**
- Operating: 10 .. 90% r. H. non cond  
- Storage: 5 .. 95% r. H. non cond.
COM Cooling Solutions

Cooling solutions for COM Express

The specifications for Qseven, COM Express and SMARC include heatspreader definitions, the mechanical thermal interface. All the heat generated by power consuming components such as chipsets and processors is transferred to the system's cooling via the heatspreader. This can be achieved by either a thermal connection to the casing, a heat pipe or a heat sink.

congatec's smart cooling pipes pave the way for unlimited performance growth for COM Express modules

High Performance Cooling

The congatec heatspreaders and cooling solutions for the high performance modules are feature heatpipes in order to boost performance and reliability. A copper block is mounted on the chip to absorb heat and to mitigate the effects of thermal peaks. Between the chip and the copper block, a phase-change material is placed to improve the heat transmission. To account for different component heights and manufacturing tolerances, the copper block is spring loaded to apply an optimized pressure to the silicon dye. The copper block and the cooling fins or heat plate are connected by flexible flat heatpipes.

The heat pipe is attached directly to the cooling blocks on the chip and the heatspreader plate. As a result, more heat is transported from the processor environment to the heatspreader, hot spots are cooled more quickly and therefore the processor is optimally cooled.

The heatpipe adapter uses the same principals as described above but transmits the heat from the module directly to standard heat pipes with 8mm diameter. This approach allows for cost optimized, ultra-flat system solutions i.e. 1 U rack units.

Cooling solutions for Qseven and SMARC
SBC Cooling Solutions

Slim cooling solutions for Thin Mini-ITX boards

Active cooler with fan for optimized air flow
Bottom view with phase change material
Passive cooler with spring loaded mounting
Bottom view with phase change material

Active cooling solution for full Thin Mini-ITX compliant solutions at max height of 20 mm. Highly reliable, servo controlled fan. Leaf springs for best thermal contact to the CPU. Installed phase change material for optimized heat transfer allows for best turbo boost performance. Solid mechanics with retention frame mounted at the rear side of the board enable high shock and vibration levels.

Passive cooling solution for full Thin Mini-ITX compliant solutions at max height of 20 mm. Installed phase change material for optimized heat transfer allows for best burst performance. Spring loaded screws for best thermal contact to the CPU. Solid mechanics with retention frame at the rear side of the board enables high shock and vibration levels. No movable parts for highest reliability.

Heat spreader and passive cooling solution for Pico-ITX boards

Heatspreader with copper block and phase change material
Flat surface for best heat transmission to a chassis
Optimized cooler on top of the heatspreader
Cooler and heatspreader installed to bottom side of a Pico-ITX

The CPU as heat generating component is placed on the bottom side of the Pico-ITX board. This allows for a heat spreader concept for conduction cooled systems. The heat spreader with its installed phase change material and copper block for heat transient buffering is preinstalled with 2 screws to the Pico-ITX board. This combination can be mounted to a metal housing or to any other system cooling device.

Starter Kits
all tools in a box to start your rapid development

**conga-QKit**
This complete kit provides the ability to start evaluating Qseven® modules immediately. Available for **ARM** (with conga-QMX6) and **x86** (with conga-QA5).

**conga-SKit**
This complete kit provides the ability to start evaluating SMARC modules immediately. Available for ARM (with conga-SMX8) and x86 (with conga-SA5).

**conga-MIPI/Skit-ARM**
This complete kit provides the ability to connect Basler MIPI cameras to the NXP i.MX8 based SMARC 2.0 module conga-SMX8.
Evaluation Carrier
the base design for your own carrier board

Evaluation Carrier Boards
congatec provides evaluation carrier boards for all supported Computer-On-Module standards. This allows for a quick start of new designs. These carrier boards route all the COM signals to standard interface connectors.

Documentation
The schematics and board data of the evaluation carrier boards are freely available and can be used as a blue print to create own customized designs.

conga-X7EVAL
Evaluation carrier board for COM Express Type 7 modules.

conga-TEVAL
Evaluation carrier board for COM Express Type 6 modules.

conga-MEVAL
Evaluation carrier board for COM Express Type 10 modules.

conga-SEVAL
Evaluation carrier board for SMARC 2.0 modules.

conga-QEVAL
Evaluation carrier board for Qseven modules.

conga-HPCcEVAL
Evaluation carrier board for COM-HPC Client Type modules.
Application Carrier Boards
the easiest way to implement Computer-On-Modules

Documentation
The schematics and board data of the Application Carrier Boards are available for customers on request and can be used as a blueprint to create own customized designs.

Application Carrier Boards
come in size-optimized form factors with a special focus on the most common I/Os. These off-the-shelf Carrier Boards serve as platforms for rapid customization and for small or medium sized projects. congatec Application Carrier Boards reduce the time-to-market significantly.

conga-IT6
Carrier board in Mini-ITX size supporting all COM Express Type 6 modules.

conga-MCB/Qseven
Small size (95x140mm) carrier board to support all x86 based Qseven modules.

conga-MCB/ARM
Small size (95x140mm) carrier board to support all ARM based Qseven modules.

conga-STX7/Carrier
Evaluation mini-STX carrier board for COM Express Type 7 modules.

conga-MCB/Qseven
Small size (95x140mm) carrier board to support all x86 based SMARC 2.0 modules.

conga-SMC1/SMARC-x86
Carrier Board for x86 based SMARC 2.0 modules.

conga-SMC1/SMARC-ARM
Carrier Board for ARM based SMARC 2.0 modules.