



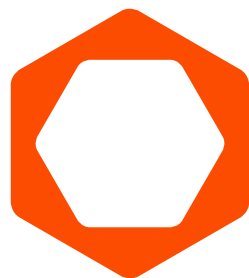
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产品型录 2022



全球合作伙伴





congatec

**创建 行业 领先的 嵌入式
计算 平台 打造
一个 更智能的 世界.**

德国康佳特是一家专注于嵌入式计算产品且快速成长的技术公司。公司研发的高性能计算机模块, 广泛应用于工业自动化、医疗技术、交通运输、电信和许多其他垂直领域的应用和设备。借助控股股东暨专注于成长型工业企业的德国中端市场基金DBAG Fund VIII的支持, 康佳特拥有资金与并购的经验来抓住这些扩展的市场机会。康佳特是计算机模块的全球市场领导者, 服务的客户包含初创企业到国际大公司等。公司成立于2004年, 总部位于德国德根多夫



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Embedded in your success.



专注

全球最大专注于计算机模块 (COMs) 和单板计算机 (SBCs) 的供应商。



产品路线图

最完整的计算机模块 (COM) 产品线。



可靠的

稳定的财务。强劲的增长，无债务和稳固的利润。



设计

认可的专业设计支持。为客户检视设计的合规性，散热和机械设计，以降低风险并缩短设计周期。



创新

与英特尔 (Intel)，超微 (AMD)，恩智浦 (NXP) 有紧密的夥伴关系。在 SGET 和 PICMG 标准委员会里担任编辑委员。



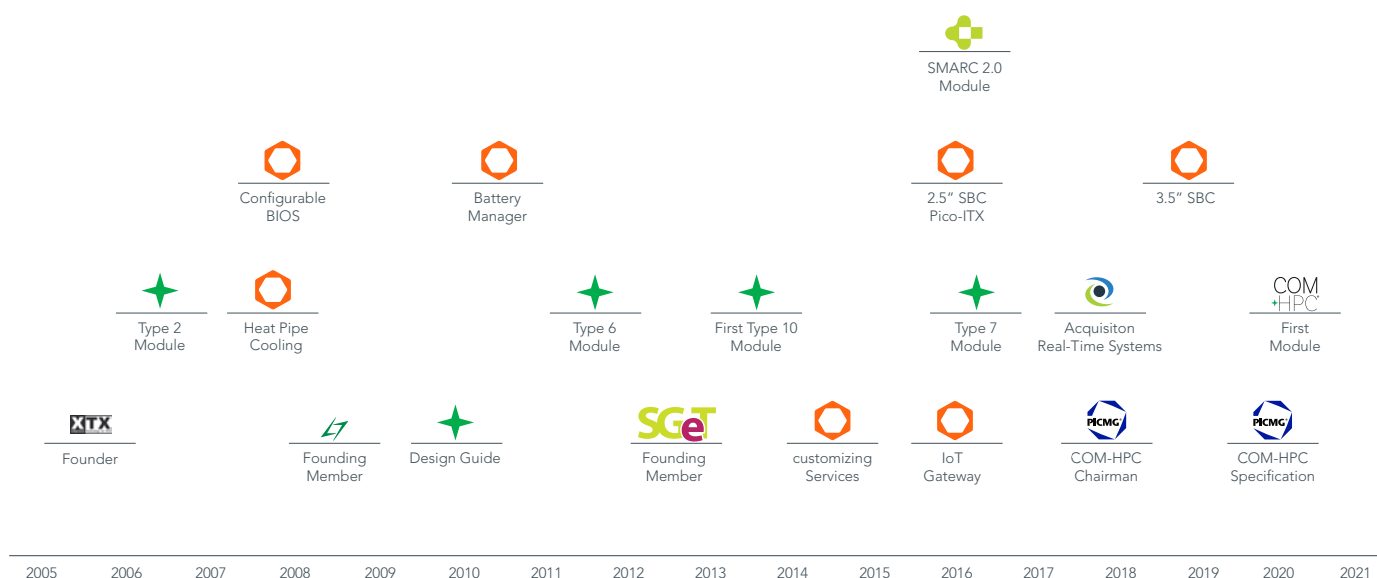
物流管理

物流供应稳定。交货时间长的零部件管理战略。灵活的最后采购决策程序。超过13年的质量认证保证。

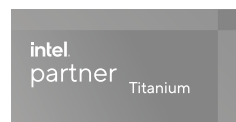


技术领导者

康佳特自2005年即参与 制定产业标准



技术合作伙伴



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



面向 产业的 关键技术

实时能力

康佳特在产品开发过程中会尤其注重实时性。康佳特 BIOS/UEFI实现的质量非常高, 并大幅改善了原始设备制造商客户的实时结果。通过与OSADL的合作, 这种实时能力可以通过漫长时间的考验。



完美匹配的实时管理程序支持

实时管理程序支持让康佳特的嵌入式计算机技术更具吸引力。它让您可以在多核x86平台上安装多个操作系统, 同时还不影响实时功能。每个子程序都可以使用相应的操作系统来运行, 例如使用Vxworks进行实时数据的收集, 使用Windows的用户界面以及Linux的防火墙。由于Real Time Systems是康佳特的全资子公司, 这使得原始设备制造商获得了时间上的优势, 能够更快地获得支持并提升多元解决方案。



安全有保障

康佳特提供多种BIOS/UEFI安全选项和可信平台模块 (TPM) 支持, 让客户能够拥有根据他们特定要求进行优化的高层级安全系统。



Real Time Hypervisor

利用当前多核处理器的性能优化



高实时性能: 完美和谐的多处理操作系统

- 结合实时管理系统 (如 VxWorks®, QNX Neutrino 或 Real-Time Linux) 和 微软™ Windows®
- 操作系统可同时在x86计算机上运行, 并维持RTOS的硬件实时特性
- 使用者可自行定义开机顺序
- 不管任何时段重新启动操作系统皆不干扰其他操作系统的运作
- 通过高性能虚拟TCP/IP 网络和灵活的共享内存进行通信

优势

- 降低系统成本和实际尺寸
- 整合硬件至单一多核处理系统
- 快速反应实时性能
- 高度灵活的系统功能
- 不因增加操作系统而增加硬件, 故可提升可靠性 (MTBF)
- 支持所有现成COTS产品和定制操作系统
- 已获全球数千个系统的认证

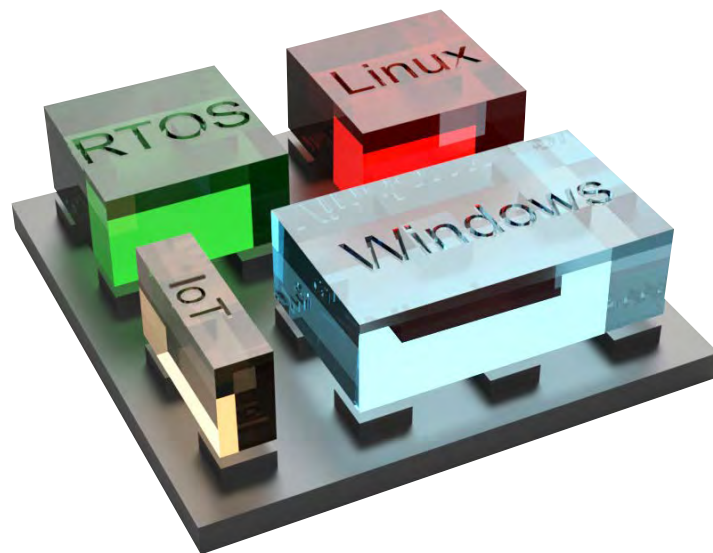
关于 Hypervisor

- 所有操作系统完全独立运行
- 使用者可自行定义操作系统的开机顺序
- 任何操作系统重新启动皆不会干扰其他操作系统的运作
- 所有操作系统安全的被分离与保护
- 可使用标准发展工具(由操作系统供应商提供)
- 可使用标准驱动—不需特别开发
- 完全支持NUMA (Non-Uniform Memory Access)
- 独立操作系统, 共享内存资源

Real Time Hypervisor

利用当前多核处理器的性能优化

创新的 Real-Time Systems Hypervisor 支持多个操作系统 - 包括实时处理系统(RTOS)和通用操作系统(GPOS), 如微软Windows 或 Linux – 可在多核x86处理器上同时运行。透过采用这款功能强大且经济高效的软件解决方案, 设计者可在系统设计中实现更高的灵活性, 并显著增强功能和性能, 同时, 降低整体系统成本。



单板计算机(SBC)

概念 & 优势



工业用

概念

- 可立即使用的嵌入式平台
- 可靠且坚固的设计
- 根基于超过15年的嵌入式经验
- 超过10年的长期供货
- 工业设计

优势

- 宽温范围 (-40° ... +85°C)
- 全天候运转
- 超低功耗
- 丰富的 I/O 功能集
- 认证的配件
- 硬件和软件定制化

康佳特单板(SBC)

康佳特单板计算机同时实现了合理的价钱, 嵌入式功能和工业可靠性。

- 采用嵌入式移动芯片提供最低功耗
- 被动和主动式散热选项
- 全天候运作
- 陶瓷电容延长使用寿命
- 适合艰困环境的宽温选项
- 超过10年的长期供货
- 可定制硬件和BIOS/UEFI

工业用单板(SBC)是首选

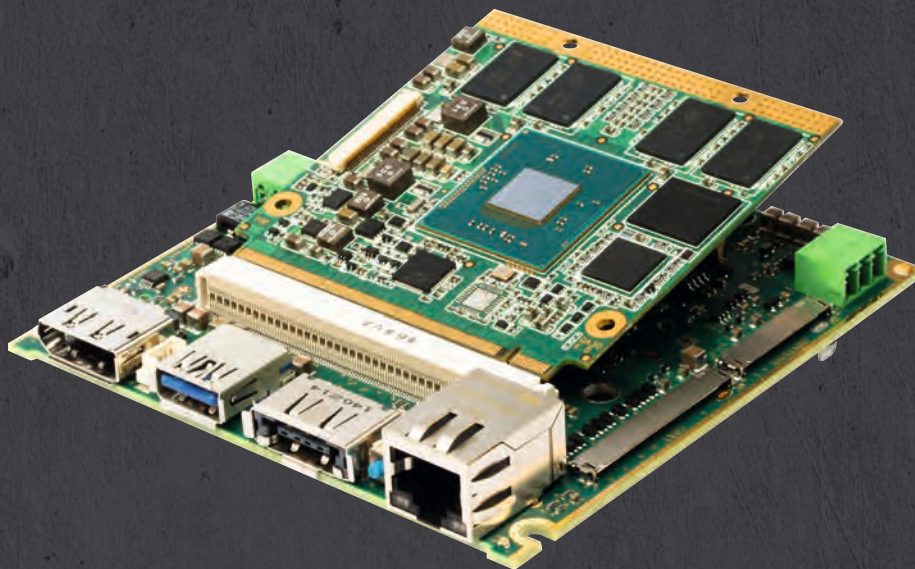
当台式主板无法满足您的需求时。

使用单板是最简单及快速的方法来打造没有特殊需求或仅有些许特殊功能需求的工业计算运用。

单板的设计相对快速, 定制化功能可通过扩充卡来增加且不需设计定制载板。

计算机模块(COM)

概念 & 优势



概念

- 具备标准PC核心功能的CPU模块
- 搭配客户特定功能&尺寸的载板
- 合理的简化设计流程

降低成本

计算机模块(COM)能降低成本。开发与成品的费用显著减少, 这适用产品的整个生命周期。计算机模块(COM)从专案初期就提供成本优势。

- 降低工程造价
- 降低产品成本
- 降低产品生命周期管理成本

提高灵活性

计算机模块(COM)具有灵活性且能满足各种性能需求。模块可支持从NXP i.MX6到Intel® Xeon® 处理器的广泛性能, 以及未来架构。计算机模块(COM)标准已经相当成熟且已为未来做好准备。

- 可扩展性
- 可简易升级性能
- 可简易升级技术

优点

- 缩短上市时程
- 降低开发成本
- 可扩展的产品系列
- 客户可更专注于系统功能
- 快速反应市场趋势
- 第二供应商哲学
- 降低库存成本

降低风险

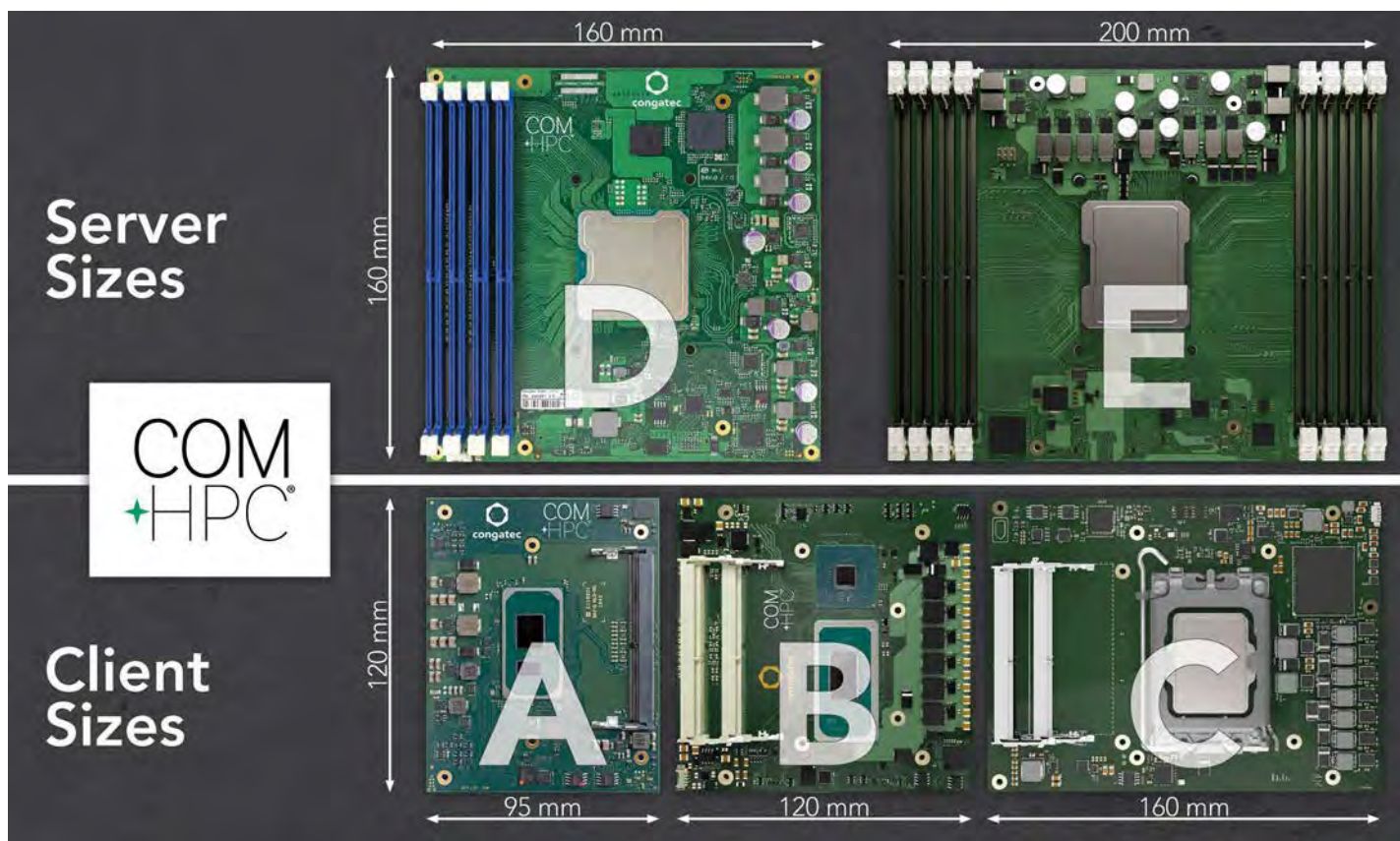
计算机模块(COM)能最小化风险。于设计阶段或产品生命周期中间阶段的基本改变是可以轻易管理的。采用计算机模块(COM)可让系统轻易升级, 只需置换下一代COM模块便可轻松完成升级。

- 降低设计风险
- 降低产品转换期风险

上市时程优势

计算机模块(COM)让您居于领导地位。透过分开您的设计与嵌入式PC技术, 定制化载板的使用可减少必要的工程工作。于您的设计中采用计算机模块(COM), 将可使您专注于自家核心技术。

- 缩短上市时程
- 加速产品开发
- 更快反应市场变化



类型

COM-HPC定义了两类引脚类型。服务器类型最多可包含65个PCI Express通道，8个25Gb以太网端口，但不包含显示或音频功能。客户端类型可支持4个视频输出和多个音频端口，例如SoundWire和I2S。其只有2个25Gb以太网端口和49个PCI Express通道。

COM HPC Client

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	2x 25GBE KR
eDP	
Power 8-20V DC	

COM HPC Server

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	

COM-HPC

COM-HPC是PICMG正在制定的全新嵌入式计算机模块标准。康佳特是该协会的创始方之一，也担任了技术委员会的主席。

为何制定新标准？

PCI Express Gen 4和Gen 5、USB 4、25Gb以太网和其他新的技术急需新的标准来支撑。嵌入式计算机模块必须为载板提供此类高速端口。此前的标准无法支持全新的数据带宽水平。

I/O性能的提升也需要更出色的计算性能和更大的内存容量，而这两者需要更高的能耗。COM-HPC考虑了全部条件，打造出新一级的嵌入式服务器模块。

带外管理

COM-HPC也定义了完整的功能集，可轻松配置带外管理功能。该功能可用于实现高效的边缘服务器配置。

尺寸

COM-HPC标准定义了5个不同的尺寸。A、B和C类小型尺寸是使用客户端引脚的理想选择，而较大的D和E类尺寸可支持最大的内存容量，尤其适合服务器引脚配置。

连接器

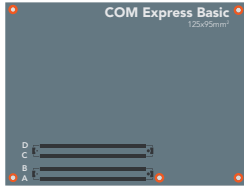
由多家供应商提供的两个400引脚高速BGA连接器可提供充足的高速端口，并可为模块提供最多300瓦电力。这款指定的连接器集低成本、高性能、堆积高度灵活、牢固耐用和规格小巧等优点于一身。

散热

COM-HPC也指定了散热器，以便在多家模块供应商之间轻松更换模块。

COM Express®

服务器等级



性能等级



低功耗等级



COM Express Type 7

Gigabit Ethernet	4x USB 3.0
LPC / eSPI	
32x PCIe	
2x SATA	4x 10GBaseKR
4x USB 2.0	
8x GPIO / SDIO	
2x SER / CAN	
SPI & I2C	
Power	Power

COM Express Type 6

Gigabit Ethernet	4x USB 3.0
LPC	
8x PCIe	
HDA	PEG x16
LVDS / eDP	
ExpressCard	
4x SATA	3x DDI
8x USB 2.0	
8x GPIO / SDIO	
2x SER / CAN	
SPI & I2C	
Power	Power

Type 10

Gigabit Ethernet
LPC
4x PCIe
HDA
LVDS 1x24 / eDP
DDI
2x SATA
8x USB 2.0 / 2x USB 3.0
8x GPIO / SDIO
2x SER / CAN
SPI & I2C
Power

接口

COM Express定义了计算机模块跟载板之间连接的220/440引脚信号。Type2模块支持传统接口如PCI，仍可供货，但不议新设计采用。

服务器模块

最新推出的Type7引脚是因应Headless服务器类别的应用而生。它支持高达4个10 Gb 以太网网络接口，带外管理，和最多32 PCI Express 通道。

定制化

可在相容于COM Express 模块的定制化载板上制作定制化功能。

尺寸

COM Express计算机模块有三种不同尺寸。低功耗Type10模块采用 Mini尺寸。Type6模块使用Compact和 Basic规格尺寸。Type7模块目前只有Basic的尺寸。

散热设计

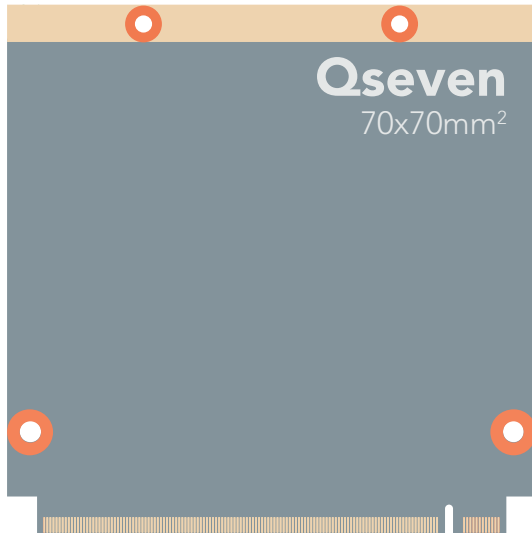
与Qseven®和SMARC一样，COM Express模块规范定义包括导热片，为COM Express模块跟该系统冷却解决方案之间的散热传导接口。所有发热的原件都将热量传导至导热片上来避免热点。高功耗模块使用的导热片和散热解决方案利用康佳特专利的高效扁平热管来达到最佳散热与最高可靠性。

PCI Express

COM Express 提供最多32个 PCI Express通道。这让客户可以用下一代PC的性能，应用至其嵌入式PC应用程序。PCI Express 是一种少数引脚的接口且每个引脚具备大带宽。PCI Express3.0 -定义每个通道和方向可支持最大带宽8 GBit/s。

视频输出

COM Express模块常见的视频输出为可直接支持平板显示器的LVDS和多达3个DDIs (Digital Display Interface)。每一个DDI皆可切换至TMDS (支持DVI 或HDMI)或DisplayPort。Type6模块也支持eDP。Type7 模块是专为headless使用而设计并不直接支持视频输出。



Qseven

Gigabit Ethernet
LPC
4x PCIe
HDA / I2S
LVDS 2x24 / eDP
2x MIPI CSI (Flatfoil)
DDI
2x SATA
8x USB 2.0 / 2x USB 3.0
8x GPIO / SDIO
2x SER / CAN
SPI / I2C
Power

Qseven支持 x86和 ARM 处理器

Qseven亦支持ARM处理器, 适用于移动和超低功耗应用。不像COM Express局限于x86处理器技术。同一个载板可支持基于x86 或 ARM处理器的Qseven模块。

灵活度

Qseven® 支持非x86处理器架构, 也支持低功耗移动ARM处理器架构。客户可以自由的使用各种Qseven® 模块, 无需更换载板。

移动式应用

Qseven® 是针对低功耗和可携式/超移动式应用所设计的优化标准规范。

低功耗

Qseven®模块规范定义最大12W的耗电量, 单5伏 DC启动电源, 且提供所有额外信号给电池管理。这让小型移动式解决方案可以使用简单电源, 并且透过两个单位电池就能启动。

连接器

Qseven® 不需昂贵的板对板连接器。相反的, 它采用了相非常实惠的 MXM2卡槽 带有 230 针 0.5毫米配置。

省略传统接口

Qseven®是不含传统接头的标准规范, 且专注于高速串行接口如PCI Express®和Serial ATA。Qseven®省略了对传统接口EIDE和PCI的支持, 故能为现今和未来的移动式CPU及芯片提供理想的支持。

超薄设计

与COM Express Basic, Compact & Mini和SMARC相比, Qseven可满足超薄机械外壳的设计。

小巧尺寸

它的模块尺寸只有70x70mm²。这意味着它能轻易集成到有空间尺寸限制的系统里。

SGeT e.V.

Qseven标准规范于由SGeT标准协会制定。康佳特是SGeT的创始成员, 董事会成员及Qseven发展团队成员。

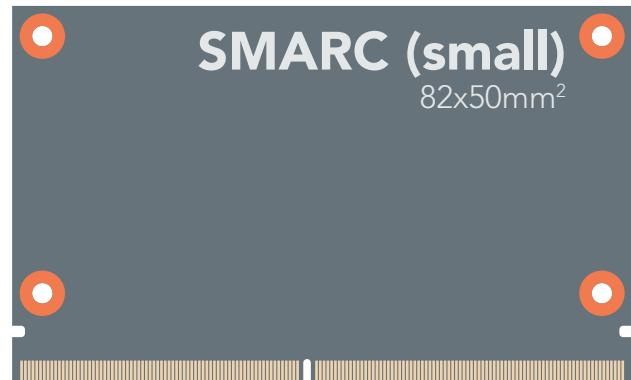


SMARC 2.1

4x Gigabit Ethernet ¹
4x PCIe ¹
4x MIPI CSI ²
HDA + 2x I2S
2x LVDS/eDP/MIPI DSI
DP++/HDMI + DP++
1x SATA
6x USB 2.0 + 2x USB 3.0
14x GPIO + 1x SDIO
4x SER + 2x CAN
eSPI + QSPI
SPI + I2C
Power

¹ 2x ETH & 4x PCIe or 4x ETH & 2x PCIe

² 2x Flatfoil Connector



SMARC2.1 技术亮点

SMARC 2.1接口的314个针脚, 也是MXM 3.0显卡标准的接口, 提供了最多四个视频输出的空间, 凸显了SMARC 2.1对多媒体应用的特殊适用性。

连接器

SMARC2.1采用可靠性高, 具备高速认证且经济实惠的314引脚, 0.5mm间距的 MXM 3连接器。

广泛的视频接口选项

SMARC2.1提供丰富的内部与外部扩展视频接口选项。通过DisplayPort, HDMI或VGA可支持两种模式的DisplayPorts(DP++), 提供灵活的外部显示屏连接。内部显示器方面, 配置了2x24位LVDS可替换为支持两个独立eDP或MIPI DSI。

最多4个以太网端口 并且更精准

SMARC 2.1实现了2个千兆以太网端口以及另外两个可由PCIe通道转接而成的以太网端口。前2个以太网端口提供SDP (软件定义引脚), 以符合硬件层的IEEE 1588精确时间协议(PTP)。

无线

SMARC2.1模块提供了一个特殊区域装置小型RF连接器, 面向无线接口(如: WLAN和蓝牙)。

摄像头接口

SMARC 2.1提供了支持数码相机的所有必要信号。为此, 在模块连接器上实现了两个串行的MIPI CSI(Camera Serial Interface)接口, 另外两个接口采用了平口连接器在模块上实现。

低功耗

SMARC2.1规范只定义低功耗应用。它可由3.3V或5V 直流电源操作且提供所有额外信号给电池管理。

小尺寸

模块的尺寸仅有82 x 50 mm², 可轻易的集成至尺寸狭窄的系统。

康佳特定制化服务

嵌入式设计服务

康佳特具备的既有知识和架构能承接客户委托的外包设计。康佳特提供经济实惠的标准解决方案到定制化专案的一站式服务，并支持各种技术平台——从x86到ARM架构，标准工业主板到定制单板计算机与计算机模块皆能提供。在定制项目中，康佳特将扮演支持客户特殊系统设计的服务供应商。



康佳特的定制化服务

康佳特的嵌入式定制服务支持整体专案，包括项目管理、特殊硬件和软件开发、生产控制、系统集成、全球物流和技术规范支持。

定制化

单板计算机
计算机模块
设计
载板
全定制化硬件
散热解决方案
机构

修改

特殊 BIOS/UEFI/固件 功能或设置

系统集成

包含测试和认证

制造

高效率的高品质生产服务



康佳特扮演外包合作夥伴的角色

概观

- 共同定义系统需求
- 创造产品概念
- 提供详细设计, 包括供应链
- 支持完整的产品生命周期

优势

- 康佳特丰富的嵌入式技术支持
- 缩短上市时程和降低研发成本
- 简化客户供应链
- 康佳特管理整个产品生命周期
- 客户保有知识产权



康佳特透过定制化服务支持客户完整的产品生命周期开发。客户受益于康佳特制造高质量计算机模块的丰富经验，可同时缩短研发时间并降低研发成本。

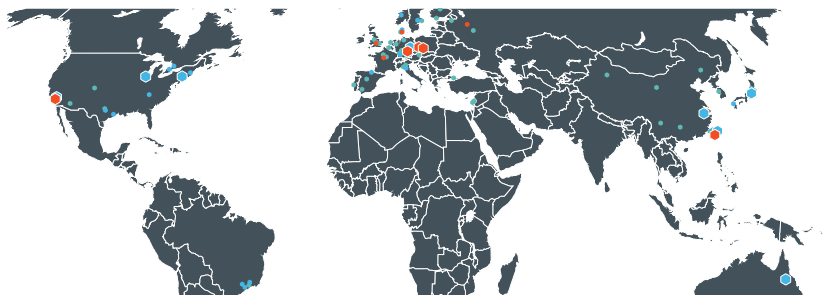
康佳特技术服务

嵌入式定制化服务



全球支持

在全球主要地区提供标准和定制化产品工程支持



项目定义阶段的服务

产品选择支持

单板(SBC), 计算机模块(COM) 或全定制设计服务?
进一步的I/O 接口选择..等等

设计培训

载板设计所需的各种工程培训



设计阶段的服务

设计指南

具深度的最佳实践解决方案

参考原理图

自行设计时最好的参考

零部件选择

协助寻找符合所需功能, 成本, 供货期...等等

信号完整性仿真

高速仿真可协助在第一批样品生产前修正设计

电路原理图检视

检视电路原理图设计以便在设计初期发现问题

设计蓝图检视

专业人员仔细检视并提供最具体的建议

定制 BIOS/UEFI/固件

自定义功能或设置的实现

提升支持

康佳特工程团队可协助快速生产第一个原型样品



验证阶段的服务

合规性测量

透过最大36 GHz的Rx和Tx信号路径来做信号完整性的量测

散热解决方案

优化的散热解决方案功能, 如热堆, 热管或真空腔均热板散热技术(vapor chambers)

定制产品处理

处理生产和物流需求

支持EMC 测量

工程支持优化设计, 符合EMC要求

平均故障间隔时间(MTBF)

基于不同标准的可靠性测量

如: Telcordia 3, SN 29500, IEC 61709, ...



信息资源

用户指南

准确和详细的产品相关信息

应用操作说明书

详细描述具体的解决方案 如: 基准, 不同芯片使用情况的功耗量测, 和详细的康佳特BIOS功能增进

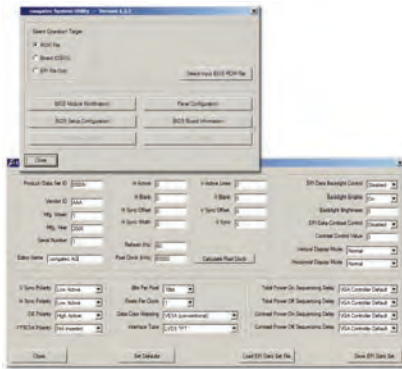
设计指南

深入的技术指导有关设计载板, 电池管理, 或更多

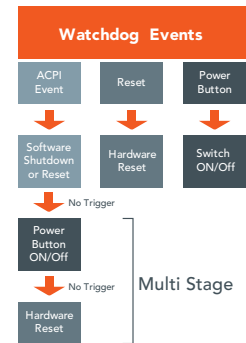
参考原理图

电路原理图和设计布局档案可用为载板设计的蓝图

康佳特嵌入式 BIOS/UEFI



congatec System Utility



Multi Stage Watchdog Timer

嵌入式计算机使用者经常需要除了计算机基本性能之外的其它功能。康佳特已在设计BIOS/UEFI 时将此需求列入考虑。基于我们丰富的BIOS和UEFI经验，我们已实现将嵌入式需求集成于强大的康佳特BIOS/UEFI平台。



康佳特板控制器

此板载微型控制器将一些嵌入式功能，如系统监控，多阶段看门狗或I²C总线，由x86核心运算架构中独立出来，因而能产生更高且更可靠的嵌入式功能性能。



信息

板信息

康佳特板控制器提供完整的制造和板信息数据集：序号，产品编号，EAN代码，制造和维修日期，运行时间计，启动计数器。



设置

用户定制菜单控制设定

用户可隐藏或显示设置节点来变更BIOS 设置屏幕的描述。可提供OEM厂完全定制的设置屏幕。

用户定制Verb Table

用户可透过BIOS初始化载板上的HDA代码。

用户数据内存

康佳特模块在EEPROM中提供32位的非易失性存储并在BIOS闪存中提供64K位的存储区域。这可用于存储重要的系统资讯，如系统ID，IP地址，软件密钥等等。用户数据内存可锁定避免被篡改。

UEFI 屏幕截图驱动

可储存现有BIOS设置画面至U盘，以.png档案格式归档。

开机侦错码重新导向

BIOS开机侦错码(Port 80h)可转向到I²C总线、SMBus或UART，支持更佳的系统除错。

用户定制BIOS代码

用户可定制专属的BIOS传统代码(legacy code)进入到开机流程中，康佳特嵌入式BIOS会在“OpROM scan前后”“setup前”“开机完成前”这几个指定的时间呼叫OEM代码。这可用于初始化客户载板上的硬件，增加PCI/PCIe OpROMs和开机loader，提供Windows SLP字串和SLIC表单让OEM系统自动激活，建立HAD codec的verb table或其它专属的自定义功能。

用户定制 BIOS 默认值设定

康佳特嵌入式BIOS允许用户在闪存里存储自我定制的默认值。

BIOS设置数据备份

康佳特嵌入式BIOS CMOS的设置存储在闪存中，可支持无电池的应用。



接口

快速模式I²C总线

I²C总线为低速总线接口，通常被使用于嵌入式应用如传感器、转换器和数据存储。所有康佳特模块皆支持最大400kHz带宽的多主控I²C总线。

更多康佳特BIOS/BC功能特色

康佳特BIOS/BC支持基于类型的开机装置选择，传统USB装置，USB大容量存储装置开机以及通用LPC解码。更多特点包括AT模式关机设置(halt, restart)，阖盖支持& 睡眠支持和P-State降低。有些平台允许在GPIO接口上通过SERIRQ来驱动任意IRQ。



监控

多阶段看门狗定时器

所有康佳特模皆配置多阶段看门狗定时器支持不同事件，如ACPI事件，NMI，硬件重置或电源键，可判断单一事件或多个事件的任一组合。

Post看门狗定时器

此功能可监控BIOS POST过程。系统通电后启动，并在超出可调适时间(256ms ~4.5 h)时，触发硬件重置。



显示

自动侦测显示器

BIOS通过EPI提供内建平板面板的自动侦测和配置。EPI是开放式标准，可方便且直接的操控所有的数字平板显示屏，具有强大的可互换性。

可定制化的启动屏幕

用户可直接设置开机画面，在POST过程中，显示全黑画面，定制的启动画面或用户标志。



安全性

采用TPM2.0 Measured Boot(量测启动)

BIOS提供完整的TPM芯片支持，以支持Bitlocker 和Measured Boot (量测启动) 等功能。

BIOS 写入与更新保护功能

当BIOS密码设置好后，BIOS写入与更新保护功能便可使用。启动后，无法更新或修改BIOS，但可透过康佳特System Utility (CGUTIL) (需要输入BIOS 密码) 短暂解除保护功能。康佳特BIOS密码是由SHA256加密的。



操作系统支持

32/64位标准OS API

通过标准APIs EAPI (一种PICMG®的定义) 和CGOS, 可取得康佳特嵌入式BIOS功能。

用户定制SMBIOS/DMI 信息

用户可自行更新SMBIOS字符串，并直接对DMI桌面内容进行控制，不需借助其它第三方的工具。

优化电源管理

基于ACPI规范，康佳特BIOS/UEFI可支持ACPI电源管理和系统配置。

用户定制UEFI DXE Driver / Bootloader

用户可集成专属的UEFI DXE driver和bootloaders。其内建的CGOS DXE 支持UEFI架构下的CGOS。(例如: 使用I²C总线或初始化看门狗)

断电(Power Loss)和上电(Power-up)控制

此功能在AC交流电断电和回复供电后控制操作模式，有Turn on, remain off和last state 三种模式。此功能无需安装CMOS电池。

ACPI电池管理

康佳特ACPI BIOS 和板控制器专为支持CMB (Control Method Battery) 子系统而设计。透过康佳特CMB设计指南也可实现定制化的电池解决方案。该解决方案还支持常用的智能电池充电器和仅使用电池的解决方案。

硬件状况监测

康佳特BIOS和板控制器具备监测关键部件执行的例行程序。可监测风扇、CPU的标准温度传感器、模块及电压，且灵活的传感器/执行器配置使定制化更简易。

LVDS背光控制器

系统运作期间，可使用操作系统的CGOS API 和ACPI方法，在BIOS设置或修改背光强度。提供外部DACs和电位器且支持I²C或PWM信号的连接。

为LVDS面屏创建的定制EDID

为LVDS平板面屏创建您专属的EDID数据，并可将EDID数据增加到BIOS设置中的预先设定时序清单。

使用用户定制平台密钥进行安全启动

UEFI Secure Boot(安全启动)是关于确保只执行正确签名和经验证的图像。采用UEFI Secure Boot(安全启动)的主要原因是为了防止任何未经授权的软件加载到pre-boot空间中。透过康佳特嵌入式BIOS可集成用户定制平台密钥，在平台拥有者和平台固件之间建立信任关系。

优化实时操作

康佳特BIOS/UEFI包含优化模块行为使其更适用于实时操作。CPU和GPU clocks可以被固定也可以关闭turbo modes / SpeedStep / C-states。更可进一步关闭PCIe/ DMI ASPM省电和被动式冷却效果，并支持IRQ独占。

板级支持包

康佳特提供先进的板级支持包(BSP)，包括芯片供货商提供的最新测试过的驱动程序以及康佳特特定的驱动程序，并且以此来存取所有附加的嵌入式BIOS和模块功能。

康佳特系统工具

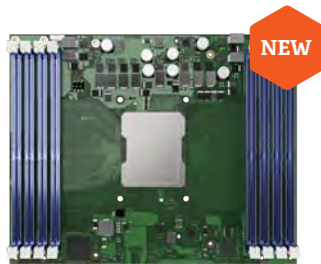
通过使用康佳特Windows工具，可取得所有嵌入式BIOS功能，包括所有的制造及统计信息，如序号、运行时间及启动计数器等。BIOS预设值，开启标志和平板面板设置，可通过此强大工具轻松编程。

服务器模块

嵌入式高性能运算



全新节能英特尔® 至强处理器和AMD EPYC® 系列处理器使COM Express 模块能支持服务器性能。虽然COM Express Type7 模块扩展了这个既定的产品线，但全新的COM-HPC服务器模块创建了一个新的性能等级。更多和更快的I/O端口，服务器等级以太网，更大的DRAM容量以及更高的计算性能，面向坚固型服务器应用。

**conga-HPC/sILH****conga-HPC/sILL****conga-B7XI**

Formfactor	COM-HPC Server Size E (Size D optional)			COM-HPC Server Size D			COM Express Basic Type 7
CPU	Intel® Xeon® D-2700 processors			Intel® Xeon® D-1700 processors			
	Operating temperature industrial: -40 .. +85°C						
	Intel® Xeon® D-2796TE 20x Cores 30MB Cache 100G Eth 118W TDP			Intel® Xeon® D-1746TER 10x Cores 100G Eth 15MB Cache 67W TDP			
	Intel® Xeon® D-2775TE 16x Cores 25MB Cache 100G Eth 100W TDP			Intel® Xeon® D-1732TE 8x Cores 50G Eth 15MB Cache 52W TDP			
	Intel® Xeon® D-2752TER 12x Cores 20MB Cache 50G Eth 77W TDP			Intel® Xeon® D-1715TER 4x Cores 50G Eth 10MB Cache 50W TDP			
	Operating temperature commercial: 0 .. +60°C						
DRAM	Intel® Xeon® D-2733NT 8x Cores 15MB Cache 50G Eth 80W TDP			Intel® Xeon® D-1735TR 8x Cores 50G Eth 15MB Cache 59W TDP			
	Intel® Xeon® D-2712T 4x Cores 15MB Cache 50G Eth 65W TDP			Intel® Xeon® D-1712TR 4x Cores 50G Eth 10MB Cache 40W TDP			
	8x DIMM sockets for DDR4 memory modules Max. capacity = 1TB			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	DIMM Capacity	Max. DIMM Speed	Memory Type	DIMM Capacity	Max. DIMM Speed	
	RDIMM	8GB - 64GB	2933 MT/s	RDIMM	8GB - 64GB	2933 MT/s	
	LRDIMM	64GB - 128GB	2933 MT/s	VLP RDIMM	8GB - 64GB	2666 MT/s	
VLP RDIMM	8GB - 64GB	2400 MT/s	UDIMM (ECC)	8GB - 32GB	2666 MT/s		
UDIMM (ECC)	8GB - 32GB	2666 MT/s	UDIMM (Non-ECC)	4GB - 32GB	2666 MT/s		
UDIMM (Non-ECC)	4GB - 32GB	2666 MT/s					
Ethernet	1x 2.5GbE TSN Ethernet 2x 40G 4x 25G 8x 10G/2.5G/1G/100M lanes Maximum total bandwidth 100Gb*						1x 2.5GbE TSN Ethernet 4x 10GbE CEI/KR/SF
Serial ATA	2x SATA III (6Gb/s)						
PCI Express Gen	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						
Other	2x UART 12x GPIO 2x SM Bus 2x I²C						2x UART 8x GPIO SPI
congatec Board Controller	Multi-stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I²C 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 10 Microsoft® Windows 10 IoT Enterprise Microsoft® Windows IoT 10 Core Linux Android Yocto RTS Hypervisor						
Temperature	Commercial: Operating Temperature: 0°C to +60°C* Storage: -20°C to +80°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 200 mm (Optional 160 x 160 mm)			160 x 160 mm			125 x 95 mm

*Depending on CPU



conga-B7AC



conga-B7XD



conga-B7E3

Formfactor	COM Express Basic 95 x 125 mm ² , Type 7		
CPU	Intel® Atom™ Processor C3000 Family ("Deverton")	Intel® Xeon® Processor D-1500 Family ("Broadwell DE")	AMD EPYC™ Embedded 3000 Series
	Operating temperature commercial: 0 .. +60°C		
	Atom C3958 16x2.0 GHz Cache 16MB 31W Atom C3858 12x2.0 GHz Cache 12MB 25W Atom C3758 8x2.2 GHz Cache 16MB 25W Atom C3558 4x2.2 GHz Cache 8MB 16W Atom C3538 4x2.1 GHz Cache 8MB 15W Atom C3308 2x1.6 GHz Cache 4MB 9.5W	Xeon D-1577 16x1.3/2.1 GHz Cache 24MB 45W Xeon D-1567 12x2.1/2.7 GHz Cache 18MB 65W Xeon D-1548 8x2.0/2.6 GHz Cache 12MB 45W Xeon D-1527 4x2.2/2.7 GHz Cache 6MB 35W Pentium D-1509 2x1.5/2.7 GHz Cache 3MB 19W Pentium D-1508 2x2.2/2.6 GHz Cache 3MB 25W	EPYC3451 16x2.1/3.0 GHz Cache 32MB 100W EPYC3351 12x1.9/3.0 GHz Cache 32 MB 80W EPYC3251 8x2.5/3.1 GHz Cache 16MB 55W EPYC3201 8x1.5/3.1 GHz Cache 16MB 30W EPYC3151 4x2.7/2.9 GHz Cache 16MB 45W EPYC3101 4x1.2/2.9 GHz Cache 8MB 35W
	Operating temperature industrial: -40 .. +85°C		
	Atom C3808 12x2.0 GHz Cache 12MB 25W Atom C3708 8x1.7 GHz Cache 16MB 17W Atom C3508 4x1.6 GHz Cache 8MB 11.5W	Xeon D1559 12x1.5/2.1 GHz Cache 18MB 45W Xeon D1539 8x1.6/2.2 GHz Cache 12MB 35W Xeon D1529 4x1.3 GHz Cache 6MB 20W Pentium D1519 4x1.5/2.1 GHz Cache 6MB 25W	EPYC 3255 8x2.5/3.1 GHz Cache 32MB 55W
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 48 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	4x 10GBe with KR Interface support 1x GbE Intel I210 Ethernet Controller	2x 10GBaseKR 1x GbE Intel I210 Ethernet Controller	4x 10GBaseKR 1x GbE Intel I210 Ethernet Controller
Serial ATA	2x	2x	2x
PCI Express Gen 3.0 2.0	12x 8x	24x 8x	up to 32x Gen 3.0, depending on CPU version
USB 3.1 3.0 2.0	- 2x 4x	- 4x 4x	4x - 4x
Other	LPC, SPI, I ² C, 2xUART, SMBus, NC-SI		
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 I ² C bus (fast mode, 400 kHz, multi-master) 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 64b 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		Microsoft® Windows 10 Enterprise Windows Server 2016 Real-Time Hypervisor Yocto Linux (Ubuntu, Red Hat Enterprise Linux Server)
Temperature	Operating commercial: 0 .. +60°C Operating industrial: -40 .. +85°C Storage: -40 .. +85°C		
Humidity	Operating: 10 .. 90°C r. H. non cond Storage: 5 - 95% r.H non cond.		

直接从康佳特买 DRAM?

仅仅选择已知的DRAM供应商并不能帮助你建造一个高可靠性的计算平台。要创建一个最佳的解决方案，仍有许多参数需要确认。

在康佳特，我们有一套详细的鉴定程序，以确保我们提供的内存模块提供最高的可靠性。



技术规格检查

检查潜在新内存模块技术规格上的所有机械和电子数值。若符合我们的要求，就会进行进一步的样品测试。

机械检查

与康佳特产品相关的尺寸、厚度和装配都会进行测试。

电子检查

- 安装Windows作业软件
- S3状态和重启循环测试
- 有13种自动测试序列的测试周期

可靠性检查

在规定温度范围内进行3-5天的电子测试

- 10°C to +70°C 为商业等级内存
- 50°C to +90°C 为工业等级内存

兼容性检查

透过不同的作业系统测试其在康佳特相关产品的性能表现。

测试报告

创建详细的测试报告，记录所有测试步骤。

认证

通过所有测试的内存模块，康佳特模块才会采用。

采用经过康佳特测试的内存模块能确保提供最佳的内存/CPU组合，以获得最高可靠性的解决方案。

节能技术



conga-SMX8-Mini



conga-SMX8-Plus



conga-SMX8



conga-SMX8-X

Formfactor	SMARC 2.1, 82 x 50 mm ²			
CPU	NXP processor with commercial operating temperature 0°C .. +60°C			
	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 8 QuadMax 2x Cortex A72 + 4x A53 + 2x M4F i.MX 8 QuadPlus 1x Cortex A72 + 4x A53 + 2x M4F	i.MX 8X QuadXPlus 4x Cortex-A35 1.2 GHz + 1x M4F DualXPlus 2x Cortex-A35 1.2 GHz + 1x M4F
	NXP processor with industrial operating temperature -40°C .. +85°C			
	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 8 QuadMax 2x Cortex A72 + 4x A53 + 2x M4F i.MX 8 QuadPlus 1x Cortex A72 + 4x A53 + 2x M4F	i.MX 8X QuadXPlus 4x Cortex-A35 1.2GHz + 1x M4F DualXPlus 2x Cortex-A35 1.2GHz + 1x M4F
DRAM	max. 4 GByte LPDDR4 3000 MT/s	max. 6 GByte LPDDR4x 4000 MT/s with Inline ECC	max. 8 GByte LPDDR4 3200 MT/s	max. 4 GByte LPDDR4 2400 MT/s
Ethernet	1x 1 Gb	2x 1 Gb with IEEE 1588 (1x TSN)	2x 1 Gb with IEEE 1588	2x 1Gb with IEEE 1588
Serial ATA	-	-	1x	-
PCI Express	1x Gen 2	1x Gen 3	2x 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)	1x 3.0 / 5x 2.0 (shared with 1x USB OTG)	1x 3.0 / 5x 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 SPI 4x UART GPIO I ² C 2x CAN FD WiFi/BT module optional	SDIO I ² C SPI ESPI 4x UART 2x CAN FD GPIO WiFi/BT module optional
Mass Storage	Onboard Solid State Drive eMMC 5.1 up to 128 Gbyte		Onboard Solid State Drive eMMC 5.0 up to 128 Gbyte	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	1x 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 up to dual-core GPU GC7000XSVX up to 16 Vec4 shaders 4K h.265 dec / 1080p h.264 enc	Integrated in SOC GT7000Lite 3D GPU up to 4 Vec4 shaders and 16 execution units VPU up to 4K h.265 dec / 1080p h.264 enc
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	2x LVDS (2x 24 bit) 1x MIPI-DSI 2x MIPI-CSI DP 1x HDMI 2.0a up to 3 simultan displays	2x LVDS (1x 24 bit) optional HDMI 1.3 2x MIPI-DSI 1x MIPI-CSI up to 2 simultan displays
Boot loader	U-Boot boot loader			
Power Management	NXP Power Management IC (PMIC)			
Operating Systems	Linux, Yocto, Android			
Temperature Range	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.			

低功耗等级

低功耗产品类别支持最新恩智浦(NXP)高性能ARM处理器，英特尔® 凌动™处理器。

提供多种规格尺寸，包含Qseven，SMARC，COM Express Mini / Compact 和单板 Pico-ITX 及 Thin Mini-ITX。



conga-QMX6



conga-QMX8-Plus

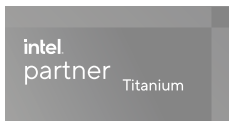
Formfactor	Qseven, 70 x 70 mm ²	Qseven, 70 x 70 mm ²
CPU	NXP processor with commercial operating temperature 0°C .. +60°C	
	i.MX6 Solo, 1GHz i.MX6 Dual Lite, 1GHz i.MX6 Dual , 1GHz i.MX6 Quad, 1GHz	i.MX 8M Plus Quad 4x Cortex-A53 1.8 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU
	NXP processor with industrial operating temperature -40°C .. +85°C	
	i.MX6 Solo, 800MHz i.MX6 Dual Lite, 800MHz i.MX6 Dual , 800MHz i.MX6 Quad, 800MHz	i.MX 8M Plus Quad 4x Cortex-A53 1.6 GHz + 1x M7 NPU up to 2.3 Tops (optional) + GPU
DRAM	max. 2 GByte DDR3 1066 MT/s	max. 6 GByte LPDDR4x 4000 MT/s with Inline ECC
Ethernet	1x 1 Gb	1x 1 Gb with TSN support
Serial ATA	1x (Dual & Quad CPUs)	-
PCI Express	1x Gen 2	1x Gen 3
USB	5x 2.0 (shared with 1x OTG)	2x 3.0 / 3x 2.0 (shared with 1x USB OTG)
Other	SPI UART CAN SDIO I ² C MIPI-CSI on extra connector	SDIO I ² C SPI UART GPIO CAN FD
Mass Storage	Onboard Solid State Drive eMMC 5.0 up to 128 Gbyte	Onboard Solid State Drive eMMC 5.1 up to 128 Gbyte
Sound	I ² S	I ² S optional 1x Tensilica® HiFi 4 DSP
Graphics	Integrated VPU GPU2D GPU3D 4 shaders	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	2x LVDS (2x 24 bit) HDMI	1x 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	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.	

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conga-PA7

Formfactor	Pico-ITX, 72 x 100 mm²
CPU	Intel Atom® x6000E, Intel® Pentium® and Celeron® J Series processors ("Elkhart Lake")
	embedded and commercial versions 0 .. +60°C operating temperature
	Intel® Celeron® J6413 10W 4x 1.8 - 3.0 GHz 16 EU PC Client Intel® Pentium® J6426 10W 4x 2.0 - 3.0 GHz 32 EU PC Client Intel Atom® x6211E 6W 2x 1.3 - 3.0 GHz 16 EU Embedded Intel Atom® x6413E 9W 4x 1.5 - 3.0 GHz 16 EU Embedded Intel Atom® x6425E 12W 4x 2.0 - 3.0 GHz 32 EU Embedded
	industrial operating temperature -40°C .. +85°C
	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 M.2 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 M.2 2280 key B (2x PCIe/SATA/USB 2.0) 1x M.2 2230 key E (1x PCIe, USB 2.0)
Other I/O	Internal: 2x UART (RS242/422/485), 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
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 Linux Android Yocto RTS Hypervisor
Humidity	Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond.



conga-SA7

conga-QA7

conga-MA7

conga-TCA7

Formfactor	SMARC 2.1, 82 x 50 mm²	Qseven, 70 x 70 mm²	COM Express Mini, 55 x 84 mm² Type 10 Connector Layout	COM Express Compact, 95 x 95 mm² Type 6 Connector Layout
CPU	Intel Atom® x6000E, Intel® Pentium® and Celeron® J Series processors ("Elkhart Lake")			
	embedded and commercial versions 0 .. +60°C operating temperature			
	Intel® Celeron® J6413 10W 4x 1.8 - 3.0 GHz 16 EU PC Client Intel® Pentium® J6426 10W 4x 2.0 - 3.0 GHz 32 EU PC Client Intel Atom® x6211E 6W 2x 1.3 - 3.0 GHz 16 EU Embedded Intel Atom® x6413E 9W 4x 1.5 - 3.0 GHz 16 EU Embedded Intel Atom® x6425E 12W 4x 2.0 - 3.0 GHz 32 EU Embedded			
	industrial operating temperature -40°C .. +85°C			
	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	max. 16GB onboard LPDDR4x with up to 4.267 MT/s			2x SO DIMM socket (dual channel DDR4 3.200 MT/s) max. 32 GB system capacity
Ethernet	2x GbE with TSN support and Out-Of-Band Management 2x real- time trigger M.2 WiFi/BT	1x GbE with TSN support and Out-Of-Band Management real-time trigger		
Serial ATA	1x SATA III	2x SATA III		
PCI Express	4x Gen. 3			6x Gen. 3
USB	2x 3.1G2 (1xOTG) / 6x 2.0 (1xOTG)	2x 3.1G2 / 8x 2.0		
Other I/O	SDIO, 2xI2C, SPI, eSPI, 4xUART, GPIO, 2xCAN, I2S	SDIO, I2C, SM, SPI, UART, CAN, LPC	SDIO, 2xUART, CAN, GPIO, I2C, SM, SPI, SPC	2xUART/CAN, GPIO, I2C, SM, SPI, LPC
Mass Storage	UFS 2.0 onboard flash up to 64 Gbyte (optional up to 512 Gbyte)			
Sound	HD Audio Intel® LPE Audio via I2S			
Graphics	Intel® UHD Graphics			
Video Interface	2x24 Bit LVDS (opt. eDP or MIPI-DSI) 1x DP 1.4 or HDMI 2.0	1x24 Bit LVDS (shared with eDP) 1x DP 1.4 or HDMI 2.0		2x24 Bit LVDS (opt. eDPI) 2x DP 1.4 or HDMI 2.0
congatec Board Controller	Multistage watchdog non-volatile user data storage manufacturing and board Information board statistics fast mode and multi-master I²C bus power loss control			
Embedded BIOS Feature	AMI Aptio® UEFI firmware 32 Mbyte serial SPI with congatec Embedded BIOS feature OEM Logo OEM CMOS Defaults LCD Control Display Auto Detection Backlight Control Flash Update			
Power Management	ACPI 5.0 compliant Smart Battery Management			
Operating Systems	Microsoft® Windows 10 Microsoft® Windows 10 IoT Enterprise Linux Android Yocto RTS Hypervisor			
Humidity	Operating: 10 .. 90 % r. H. non cond. Storage: 5 .. 95 % r. H. non cond.			



conga-PA5

conga-IA5

Formfactor	Pico-ITX, 72 x 100 mm ²	Thin Mini-ITX, 170 x 170 x 20 mm ³
CPU	Intel Atom® / Celeron® / Pentium® processors ("Apollo Lake")	
	commercial operating temperature: 0 .. +60°C	
	Intel Atom® x7-E3950 4x1.6/2.0 GHz L2 2MB 12W TDP Intel Atom® x5-E3940 4x1.6/1.8 GHz L2 2MB 9.5W TDP Intel Atom® x5-E3930 2x1.3/1.8 GHz L2 1MB 6.5W TDP Intel® Pentium® N4200 4x1.1/2.5 GHz L2 2MB 6W TDP Intel® Celeron® N3350 2x1.1/2.4 GHz L2 2MB 6W TDP	
	Intel® Celeron® J3455 4x 1.5/2.3 GHz L2 2MB 10W TDP	
	industrial operating temperature: -40°C .. +85°C	
	Intel Atom® x7-E3950 4x1.6/2.0 GHz L2 2MB 12W TDP Intel Atom® x5-E3940 4x1.6/1.8 GHz L2 2MB 9.5W TDP Intel Atom® x5-E3930 2x1.3/1.8 GHz L2 1MB 6.5W TDP	Intel Atom® x7-E3950 4x1.6/2.0 GHz L2 2MB 12W TDP
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	1x SATA III 1x SATA II
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/RS485 1x micro SD slot Feature connector MIPI-CSI 2.0	1x RS232 1x RS232/RS422/RS485 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 Series	
Video Interface	1x DisplayPort++ 1x 24-bit Dual Channel LVDS (optional eDP) 1x Backlight (power, control)	2x DisplayPort++ 1x 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 I²C bus (fast 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). 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 internal DC-In (12-24V) 1x external DC-In (12-24V) 1x opt. battery header for battery manager (SBM3)
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

conga-QA5

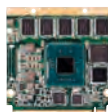
conga-MA5

conga-TCA5

Formfactor	SMARC 2.0 82 x 50 mm²	Qseven 70 x 70 mm²	COM Express Mini 55 x 84 mm² Type 10 Pinout	COM Express Compact, 95 x 95 mm² Type 6 Pinout
CPU	Intel Atom® / Celeron® / Pentium® processors ("Apollo Lake")			
	commercial versions 0 .. +60°C operating temperature			
	Intel Atom® x7-E3950 4x1.6/2.0 GHz L2 2MB 12W TDP Intel Atom® x5-E394 4x1.6/1.8 GHz L2 2MB 9.5W TDP Intel Atom® x5-E3930 2x1.3/1.8 GHz L2 1MB 6.5W TDP Intel® Pentium® N4200 4x1.1/2.5 GHz L2 2MB 6W TDP Intel® Celeron® N3350 2x1.1/2.4 GHz L2 2MB 6W TDP			Intel® Pentium® N4200 4x1.1/2.5 GHz L2 2MB 6W TDP Intel® Celeron® N3350 2x1.1/2.4 GHz L2 MB 6W TDP Intel® Celeron® N3350 2x1.1/2.4 GHz L2 cache 1MB 6W TDP
	Intel® Celeron® J3455 4x1.5/2.3 GHz L2 cache 2MB 10W TDP			
	industrial operating temperature -40°C .. +85°C			
	Intel Atom® x7-E3950 4x1.6/2.0 GHz L2 2MB 12W TDP Intel Atom® x5-E3940 4x1.6/1.8 GHz L2 2MB 9.5W TDP Intel Atom® x5-E3930 2x1.3/1.8 GHz L2 1MB 6.5W TDP			
DRAM	max 8GByte onboard LPDDR4 2400 MT/s	max 8GByte onboard DDR3L 1866 MT/s		
Chipset	Integrated in SoC			
Ethernet	2x 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
USB 3.0 / 2.0	2x 4x	1x 5x	2x 6x	4x 8x
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 500 Series			
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 I²C bus (fast 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.			

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conga-QA3

conga-QA3E

conga-MA3E

conga-MA3

Formfactor	Qseven, 70 x 70 mm²	Qseven, 70 x 70 mm²	COM Express Mini, 55 x 84 mm² Type 10 Connector Layout	COM Express Mini, 55 x 84 mm² Type 10 Connector Layout
CPU	Intel Atom® / Celeron® processors ("Bay Trail")			
	commercial versions 0 .. +60°C operating temperature			
	Intel Atom® E3845 4x1.91 GHz L2 cache 2MB 10W TDP			
	Intel Atom® E3815 1x1.46 GHz L2 cache 512kB 5W TDP		Intel Atom® E3826 2x1.46 GHz L2 1MB 7W TDP	
	Atom® E3827 2x1.75 GHz L2 1MB 8W TDP		Atom® E3827 2x1.75 GHz L2 1MB 8W TDP Celeron® N2930 1.83 GHz L2 2MB 7.5W TDP Celeron® N2807 1.58 GHz L2 1MB 4.5 TDP	
	Atom® E3826 2x1.46 GHz L2 1MB 7W TDP			
	Atom® E3825 2x1.33 GHz L2 1MB 6W TDP			
	Atom® E3805 2x1.33 GHz L2 1MB 3W TDP			
	Celeron® J1900 4x2.0 GHz L2 2MB 10W TDP			
	Celeron® N2930 1.83 GHz L2 2MB 7.5W TDP			
	Celeron® N2807 1.58 GHz L2 1MB 4.5 TDP			
industrial operating temperature -40°C .. +85°C				
Atom® E3845 4x1.91 GHz L2 2MB 10W TDP		Atom® E3845 4x1.91 GHz L2 2MB 10W TDP Atom® E3827 2x1.75 GHz L2 1MB 8W TDP		
Atom® E3827 2x1.75 GHz L2 1MB 8W TDP		Atom® E3815 1x1.46 GHz L2 512kB 5W TDP		
Atom® E3825 2x1.33 GHz L2 1MB 6W TDP				
Atom® E3815 1x1.46 GHz L2 512kB 5W TDP				
Atom® E3805 2x1.33 GHz L2 1MB 3W TDP				
DRAM	max. 8 GByte dual channel DDR3L 1333MT/s	max. 8 GByte onboard ECC DDR3L 1333 MT/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	2x	2x	2x
PCI Express Gen 2.0	3x	3x	3x	4x
USB 3.0 / 2.0	1x 6x	1x 6x	1x 7x	1x 7x
Other I/O	SDIO, GPIO, SPI, LPC, I²C			
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 1x HDMI/DisplayPort		LVDS 1x 24 bit 1x DisplayPort/HDMI	
congatec Board Controller	Multi Stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I²C bus (fast 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	LPC interface for TPM on Carrier Board		Optional discrete "Trusted Platform Module" (TPM)	
Power Management	ACPI 5.0 compliant, Smart Battery Management			
Operating Systems	Microsoft® Windows 10 Microsoft® Windows 10 IoT Core Microsoft® Windows 10 IoT Enterprise Microsoft® Windows 8 Microsoft® Windows Embedded Standard 8 Microsoft® Windows 7 Microsoft® Windows Embedded Compact 7 Microsoft® Windows Embedded Standard 7 Linux Yocto			
Temperature	Operating commercial: 0 .. +60°C Operating industrial: -40 .. +85°C Storage: -40 .. +85°C	Operating commercial: 0 .. +60°C Storage: -40 .. +85°C		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.			

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conga-TCA3



conga-PA3

Formfactor	COM Express Compact 95 x 95 mm ² , Type 6	Pico-ITX, 72 x 100 mm ²
CPU	Intel Atom® / Celeron® processors ("Bay Trail")	
	commercial versions 0 .. +60°C operating temperature	
	Intel Atom® E3845 4x1.91 GHz L2 2MB 10W TDP Intel Atom® E3826 2x1.46 GHz L2 1MB 7W TDP Intel® Celeron® J1900 4x2.0 GHz L2 2MB 10W TDP Intel® Celeron® N2930 4x1.83 GHz L2 2MB 7.5W TDP	Intel Atom® E3845 4x1.91 GHz L2 2MB 10W TDP Intel Atom® E3826 2x1.46 GHz L2 cache 1MB 7W TDP
	Intel Atom® E3827 2x1.75 GHz L2 1MB 8W Intel Atom® E3825 2x1.33 GHz L2 1MB 6W Intel Atom® E3815 1x1.46 GHz L2 512kB 5W Intel® Celeron® N2807 2x1.58 GHz L2 1MB 4.5W	
	industrial operating temperature -40°C .. +85°C	
	Intel Atom® E3845 4x1.91 GHz L2 2MB 10W TDP Intel Atom® E3826 2x1.46 GHz L2 1MB 7W TDP	
	Intel Atom® E3827 2x1.75 GHz L2 1MB 8W Intel Atom® E3815 1x1.46 GHz L2 512kB 5W	
	Support for 2x SODIMM Socket, max. 8GB dual channel up to DDR3L-1333	max. 4 GByte on board DDR3-1333
DRAM	Integrated in SoC	
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, I ² C	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 I ² C 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	Microsoft® Windows 10 Microsoft® Windows 10 IoT Core Microsoft® Windows 10 IoT Enterprise Microsoft® Windows 8 Microsoft® Windows Embedded Standard 8 Microsoft® Windows 7 Microsoft® Windows Embedded Compact 7 Microsoft® Windows Embedded Standard 7 Linux Yocto WindRiver IDP Android	
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.	

性能等级



快速且节能

高性能产品类别支持多代英特尔®酷睿™处理器和AMD最新图形处理器，包括多种规格尺寸，如:COM Express Compact/Basic, Thin Mini-ITX 和 JUCK 3.5" 单板。

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conga-HPC/cALS

conga-HPC/cALP

conga-TC670

Formfactor	COM HPC Client Size C	COM HPC Client Size A	COM Express Compact
CPU	12 th Gen Intel® Core™ processors (Alder Lake)		
	Intel® Core™ i9 12900E 8x 2.3/5.0 GHz P-Cores 8x 1.7/3.8 GHz E-Cores 30MB Smart Cache 65W TDP	Intel® Core™ i7 12800HE 6x 2.4/4.6 GHz P-Cores 8x 1.8/3.5 GHz E-Cores 24MB Smart Cache 45W TDP	
	Intel® Core™ i7 12700E 8x 2.1/4.8 GHz P-Cores 4x 1.6/3.6 GHz E-Cores 25MB Smart Cache 65W TDP	Intel® Core™ i5 126000HE 4x 2.5/4.5 GHz P-Cores 8x 1.8/3.3 E-Cores 18MB Smart Cache 45W TDP	
	Intel® Core™ i5 12500E 6x 2.9/4.5 GHz P-Cores 18MB Smart Cache 65W TDP	Intel® Core™ i3 12300HE 4x 1.9/4.3 GHz P-Cores 4x 1.5/3.3 GHz E-Cores 12MB Smart Cache 45W TDP	
	Intel® Core™ i3 12100E 4x 3.2/4.2 GHz P-Cores 12MB Smart Cache 65W TDP		
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	
Ethernet	2x 2.5 GbE TSN Ethernet (via Intel® i225 LM)		2.5 GbE TSN Ethernet (via Intel® i225 LM)
Serial ATA	2x SATA III (6Gb/s)		
PCI Express Gen 3.0	1x16 PCIe Gen 5 (PEG port) 1x 4 PCIe Gen 4 2x 4 PCIe Gen 3	Up to x8 PCIe Gen4 2x 4 PCIe Gen4 8x PCIe Gen3 8x PCIe Gen3	8x PCIe Gen4 (PEG Support) 8x 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 up to 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	2x UART CAN (opt.) GPIOs SPI LPC SM Bus I ² C
Sound	2x Soundwire HDA I2S (opt.)	2x Soundwire 2x Soundwire or HDA or I2S (opt.)	HDA
Graphics	Intel® UHD Graphics 770 with XeArchitecture up to 32 EU	Intel® Iris XeGraphics 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 11 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		
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



NEW

**conga-TC570****conga-TC570r****conga-HPC/cTLU****conga-TS570****conga-HPC/cTLH**

Formfactor	COM Express Compact Type 6		COM HPC Client Size A	COM Express Basic Type 6	COM HPC Client Size B
CPU	11th Gen Intel® Core™ / Celeron® processors (Tiger Lake UP3)			11th Gen Intel® Xeon® W / Core™ / Celeron® processors (Tiger Lake H)	
	commercial versions 0 .. +60°C operating temperature				
	Core i7-1185G7E 4x1.8/4.4 GHz 12-28W cTDP Core i5-1145G7E 4x1.5/4.1 GHz 12-28W cTDP Core i3-1115G4E 2x2.2/3.9 GHz 12-28W cTDP Celeron 6305E 2x1.8 GHz 15W TDP			Xeon W-11865MLE 8x1.5/4.5GHz 25W TDP Xeon W-11555MLE 6x1.9/4.4GHz 25W TDP Xeon W-11155MLE 4x1.8/3.1GHz 25W TDP Core i7-11850HE 8x2.6/4.7GHz 45W/35W cTDP Core i5-11500HE 6x2.6/4.5GHz 45W/35W cTDP Core i3-11100HE 4x2.4/4.4GHz 45W/35W cTDP Celeron 6600HE 2x2.6GHz 35W TDP	
	industrial operating temperature -40°C .. +85°C				
	Core i7-1185GRE 4x1.8/4.4 GHz 12-28W cTDP Core i5-1145GRE 4x1.5/4.1 GHz 12-28W cTDP Core i3-1115GRE 2x2.2/3.9 GHz 12-28W cTDP			Xeon W-11865MRE 8x2.6/4.7GHz 45W/35W cTDP Xeon W-11555MRE 6x2.6/4.5GHz 45W/35W cTDP Xeon W-11155MRE 4x2.4/4.4GHz 45W/35W cTDP	
DRAM	Up to 2x DDR4 SO-DIMM 3200 MT/s 64 GByte total	Up to 32 GByte LPDDR4X 4266MT/s soldered IB ECC	Up to 2x DDR4 SO-DIMM 3200 MT/s 64 GByte total IB ECC	Up to 3x DDR4 ECC SO-DIMM 3200 MT/s 96 GByte total	Up to 4x DDR4 ECC SO-DIMM 3200 MT/s 128 GByte total
Chipset	integrated in SOC			RM590E QM580E HM570E	
Ethernet	1x 2,5GbE TSN Ethernet		2x 2,5 GbE TSN Ethernet	1x 2.5 GbE TSN Ethernet	2x 2.5 GbE TSN Ethernet
Serial ATA	2x SATA III (6Gb/s)			4x SATA III (6Gb/s)	2x SATA III (6Gb/s)
PCI Express Gen 3.0	4x PCIe Gen4 8x PCIe Gen3			16x PCIe Gen4 8x PCIe Gen3	20x PCIe Gen4 20x PCIe Gen3
USB	4x USB 3.2 Gen2 8x USB 2.0		2x USB 4.0 2x USB 3.2 Gen2 8x USB 2.0	4x USB 3.1 Gen 2 8x USB 2.0	2x USB 4.0 2x USB 3.2 8x USB 2.0
Other	SPI 2x UART 8x GPIO		2x SATA III (6Gb/s) SPI 2x UART 12x GPIO 8x MIPI-CSI	SPI 2x UART 8x GPIO LPC I2C	eSPI 2x UART 12x GPIO I2C 4x MIPI-CSI
Mass Storage	-			Optional onboard NVMe SSD up to 1TB capacity	-
Sound	HDA interface		1x I2S 2x Soundwire	HDA interface	1x I2S 2x Soundwire
Graphics	Integrated Xe (Gen 12) graphics engine with up to 96 EU (Execution Units) Supporting 4 independent display units (4x 4k/2x 8K) Enhanced media (AV1/12b) with up to 2 Vdbox Next Gen IPU6 with DPHY2.1 HDMI 2.0/2.1 DP 1.4			Integrated Xe (Gen 12) graphics engine with up to 32 EU (Execution Units) Supporting 4 independent display units (4x 4k/2x 8K) Enhanced media (AV1/12b) with up to 2 VDBox Next Gen IPU6 (Image Processing Unit) with DPHY2.1 DP 1.4	
Video Interface	3x DP/DP++ 1x eDP/LVDS				
congatec Board Controller	Multi Stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I²C 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 Microsoft® Windows IoT 10 Core Linux Yocto RTS Hypervisor				
Temperature	Industrial: Operating Temperature: -40°C to +85°C Storage: -40°C to +85°C Commercial: Operating Temperature: 0°C to +60°C Storage: -20°C to +80°				
Humidity	Operating: 10 .. 90°C r. H. non cond Storage: 5 - 95% r.H non cond.				

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conga-TC370

conga-JC370

conga-IC370

Formfactor	COM Express Basic 95 x 95 mm², Type 6	3.5" Juke Board 146 x 102 mm²	Thin Mini-ITX 170 x 170 x 20 mm³
CPU	8th Generation Intel® Core™ Mobile Low Power U-Processors with up to 4 cores ("Whiskey Lake")		
	Intel Core i7-8665UE 4x1.7/4.40 GHz L2 cache 8MB 15W TDP 12.5W/25W cTDP Intel Core i5-8365UE 4x1.6/4.10 GHz L2 cache 6MB 15W TDP 12.5W/25W cTDP Intel Core i3-8145UE 2x 2.2/3.90 GHz L2 cache 4MB 15W TDP 12.5W/25W cTDP Intel Celeron 4305UE 2x 2.2 GHz L2 cache 2MB 15W TDP		
	Dual channel DDR4 up to 2,400 MT/s 2x SO-DIMM max. 2x 32 Gbyte		
	Integrated Intel® 300 Series		
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 i219LM (with AMT support) Intel® 2.5 Gigabit Ethernet i225 (with opt. TSN support under Linux)
Serial ATA	3x	1x	2x
PCI Express Gen 3.0	8x	see expansion sockets	
USB 3.1 / 2.0	4x Gen 2 8x	3x Gen. 2 2x	2x Gen. 2 4x
Other	LPC bus (no DMA) I²C 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 B size 2242/3042 with microSIM M.2 key E size 2230 miniPCIe full/half-size	PCIe x4 miniPCIe full/half-size M.2 key B size 2242/3042/2280 with microSIM slot M.2 key E size 2230 microSD card
Internal Connectors		SATA/eSATA/SATADOM + power Dual USB 2.0 Audio (HPout/MIC/LINE/DMIC) RS232/422/485 2x RS232 opt. CAN 8 GPIO Management I/O (opt. 8 GPIO) I²C/SM Bus Front panel DC-In (12-24 V) RTC battery socket Case open Fan	2x SATA/eSATA/SATADOM + power 2x USB 2.0 USB 3.1 Gen. 2 (Key-A) monitor off Audio (front panel / internal stereo/ SPDIF) 2x RS232/422/485 2x RS232 opt. 2x CAN 2x 8 GPIO opt. feature connector I²C/SM Bus Front panel Case open 2x Fan DC-In (12-24 V)
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 LAN RJ45 RS232/422/485	1x DC-In (12-24 V) 2x USB 3.1 Gen.2 (10 Gbs) 2x DP++ 2x LAN (1+2.5 Gbit) 2x USB 2.0 Audio (In/Out)
Sound	Intel® High Definition Audio	High Definition Audio Interface Realtek Audio Codec	
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)	2x DP++ LVDS 24bit Dual / . eDP opt. 2nd internal display Backlight (power/control)
congatec Board Controller	Multi Stage Watchdog non-volatile User Data Storage Manufacturing and Board Information Board Statistics I²C bus (fast mode, 400 kHz, multi-master) 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.		



conga-TS370

conga-TS175

conga-TC175

conga-IC175

Formfactor	COM Express Basic 95 x 125 mm², Type 6		COM Express Compact 95 x 95 mm², Type 6	Thin Mini-ITX 170 x 170 x 20 mm³
CPU	8 th Gen. Intel® Core™ Xeon® processors ("Coffee Lake")		7 th Gen. Intel® Core™ Celeron® processors ("Kaby Lake")	
	Core™ i7-9850HE 6x2.7/4.4 GHz Cache 9MB 45W TDP Core™ i7-9850HL 6x1.9/4.1 GHz Cache 9MB 35W TDP Core™ i3-9100HL 4x1.6/2.9 GHz Cache 6MB 25W TDP Xeon® E-2276ME 6x2.8/4.5 GHz Cache 12MB 45W TDP Xeon® E-2276ML 6x2.0/4.2 GHz Cache 12MB 35W TDP Xeon® E-2254ME 4x2.6/3.8 GHz Cache 8MB 45W TDP Xeon® E-2254ML 4x2.7/4.4 GHz Cache 8MB 35W TDP Core™ i7-8850H 6x2.6/4.3 GHz Cache 9MB 45W TDP Core™ i5-8400H 4x2.5/4.2 GHz Cache 8MB 45W TDP Core™ i3-8100H 4x3.0 GHz Cache 6MB 45W TDP Xeon® E-2176M 6x2.7/4.4 GHz Cache 12MB 45W TDP Celeron® G4932E 2x1.9 GHz Cache 2MB 25W TDP Celeron® G4930E 2x2.4 GHz Cache 2MB 35W TDP		Xeon® E3-1505MV6 4x3.0/4.0 GHz Cache 8MB 45/35W TDP Xeon® E3-1505LV6 4x2.2/3.0 GHz Cache 8MB 25W TDP Core™ i7-7820EQ 4x3.0/3.7 GHz Cache 8MB 45/35W TDP Core™ i5-7440EQ 4x2.9/3.6 GHz Cache 6MB 45/35W TDP Core™ i5-7442EQ 4x2.1/2.9GHz Cache 6MB 25W TDP Core™ i3-7100E 2x2.9 GHz Cache 3MB 35W TDP Core™ i3-7102E 2x 2.1 GHz Cache 3MB 25W TDP	Core™ i7-7600U 2x2.8/3.9 GHz Cache 4MB 15W TDP 7.5W/25W cTDP Core™ i5-7300U 2x2.6/3.5 GHz Cache 3MB 15W TDP 7.5W/25W cTDP Core™ i3-7100U 2x2.4 GHz Cache 3MB 15W TDP 7.5W cTDP Celeron® 3965U 2x2.2 GHz Cache 2MB 15W TDP 10W cTDP
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® PCH-H QM/HM370 CM246 for Intel® Xeon® Processor		Mobile Intel® 100 Series Chipset	Integrated PCH-LP
Ethernet	Intel® I219LM GbE Phy.			Dual Gbit LAN 1x Intel® i219LM GbE AMT 11 supported 1x Intel i211
Serial ATA	4x		4x	3x up to 3x
PCI Express Gen 2.0	8x PCIe Gen. 3.0, 1x 16 (PEG)			8x PCIe Gen. 3.0 PCIe x4 Slot (Gen.3) 1x Full/Half-size Mini PCIe Slot with micro SIM slot
USB 3.0 / 2.0	4x USB 3.1 Gen 2 10 GBs 8x		4x 8x	4x 8x externally 4x 4x internally - 4x
Other I/O	SPI, LPC, SM, 2xSerial, GPIO/SDIO, I²C			MIPI-CSI (Flatfoil), SM, I²C, GPIO/SDIO, 2xSerial, LPC RS232 internal 8 Bit GPIO internal M.2 Type B (2230/2242) Integrated Sensor Hub
Sound	Digital High Definition Audio Interface with support for multiple audio codecs			Audio In/Out 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) / Embedded DisplayPort 1x Backlight (power, control) 1x opt. CEC
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	TPM 2.0 installed		Optional "Trusted Platform Module" (TPM)	
Power Management	ACPI 4.0 with Battery support			internal/external DC-In (12-24V) 1x opt. battery header for battery manager (SBM3)
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. non cond Storage: 5 .. 95% r.H non cond.			



conga-TCV2

conga-TR4 (V Series)

conga-TR4 (R Series)

Formfactor	COM Express® Compact, (95 x 95 mm), Type 6	COM Express® Basic, (95 x 125 mm), Type 6 Connector Layout	
CPU	AMD® Embedded Ryzen V2000 Processors	AMD® Embedded V1000 Processors	AMD® Embedded V1000 Processors
	V2516 6 x 2.1/3.95 GHz Cache 3MB 10/25W TDP V2546 6 x 3.0/3.95 GHz Cache 3MB 35/54W TDP V2718 8 x 1.7/4.15 GHz Cache 4MB 10/25W TDP V2748 8 x 2.9/4.25 GHz Cache 4MB 35/54W TDP	V1807B 4x3.35/3.75 GHz Cache 2MB 11 CU 35/54W V1756B 4x3.25/3.6 GHz Cache 2MB 8 CU 35/54W V1605B 4x2.0/3.6 GHz Cache 2MB 8 CU 12W/25W V1202B 2x2.5/3.4 GHz Cache 1MB 3 CU 12W/25W V1404I 4x2.0/3.6 GHz Cache 2MB 8 CU 15W	R1606G 2x2.6/3.5 GHz Cache 1MB 3 CU 12/25W R1505G 2x2.4/3.3 GHz Cache 1MB 3 CU 12/25W
DRAM	max. 64 GByte DDR4 ECC and non-ECC	max. 32 GByte DDR4 with ECC	
Chipset	Integrated in SOC (single-chip)		
Ethernet	2.5GbE with TSN via Intel® i225	Intel GbE Controller i211	
Serial ATA	2x		
PCI EXPRESS® Gen. 3.0 / 2.0	8x -	4x 4x	3x 4x
PEG	1x (x8)		1x (x4)
USB 3.1 2.0	2x 8x	4x 8x	3x 8x
Other	I²C 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	Radeon™ Vega Graphics Core (GFX9)	
Video Interface	3x DP/HDMI/DP++ eDP /LVDS	LVDS 2x 24 bit, 3x DisplayPort HDMI DVI	LVDS 2x 24 bit, 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 Backlight		
Embedded BIOS Feature	AMI-AptioV® UEFI BIOS		
Security	“Trusted Platform Module” (TPM)		
Power Management	ACPI 5.0 with Battery support		
Operating Systems	Microsoft® Windows 10 10 IoT Enterprise Linux	Microsoft® Windows 10 10 IoT Enterprise Linux opt. Microsoft® Windows 7	
Temperature	Operating: 0 .. +60°C Storage: -20 .. +80°C	Operating commercial: 0 .. +60°C Operating industrial: -40 .. +85°C (V1404I) Storage: -20 .. +80°C	Operating commercial: 0 .. +60°C Storage: -20 .. +80°C
Humidity	Operating: 10 .. 90% r. H. non cond. Storage: 5 .. 95% r. H. non cond.		



conga-TS170

conga-TC170

conga-IC170

Formfactor	COM Express® Basic 95 x 125 mm², Type 6	COM Express® Compact 95 x 95 mm², Type 6	Thin Mini-ITX 170 x 170 x 20 mm³
CPU	6 th Gen. Intel® Core™ / Celeron® processors ("Skylake")		
	Intel® Xeon® E3-1578LV5 4x 2.0/3.4 GHz, 8MB, 45W Intel® Xeon® E3-1558LV5 4x 1.9/3.3 GHz, 8MB, 45W Intel® Xeon® E3-1515MV5 4x 2.8/3.7 GHz, 8MB, 45W Intel® Xeon® E3-1505MV5 4x 2.8/3.7 GHz, 8MB, 45W Intel® Xeon® E3-1505LV5 4x 2.0/2.8 GHz, 8MB, 25W Intel® Core™ i7-6820EQ 4x 2.8/3.5 GHz, 8MB, 45W Intel® Core™ i7-6822EQ 4x 2.0/2.8 GHz, 8MB, 25W Intel® Core™ i5-6440EQ 4x 2.7/3.7 GHz, 6MB, 45W Intel® Core™ i5-6442EQ 4x 1.9/2.7GHz, 6MB, 25W Intel® Core™ i3-6100E 2x 2.7 GHz, 3MB, 35W Intel® Core™ i3-6102E 2x 1.9 GHz, 3MB, 25W Intel® Celeron® G3900E 2x 2.40 GHz, 2MB, 35W Intel® Celeron® G3902E 2x 1.6 GHz, 2MB, 15W	Intel® Core® i7-6600U 2x 2.6 /3.4 GHz, Cache 4MB, 15W TDP Intel® Core® i5-6300U 2x 2.4/3.0 GHz, Cache 3MB, 15W TDP Intel® Core® i3-6100U 2x 2.3 GHz, Cache 3MB, 15W TDP Intel® Celeron® 3955U 2x 2.0 GHz, Cache 2MB, 15W TDP	
DRAM	max. 32 GByte DDR4 Intel® Xeon® and Intel® Core™ with E CC optional	Up to 32 Gbyte dual channel DDR4 memory	
Chipset	Mobile Intel 100 Series Chipset	Integrated PCH-LP	
Ethernet	Intel® I219LM GbE Phy		Dual Gbit LAN 1x Intel® i219LM GbE AMT 11 1x Intel i211
Serial ATA	4x	3x	3x
PCI Express	8x PCIe Gen. 3.0, 1x 16 (PEG)	8x PCe Gen. 3.0	PCIe x4 Slot (Gen.3) 1x Full/Half-size Mini PCIe Slot with micro SIM slot
USB	4x 3.0 8x 2.0	4x 3.0 8x 2.0	externally 4x 3.0 - internally - 4x 2.0
Other I/O	SPI, LPC, SM, 2xSerial, GPIO/SDIO, I²C	MIPI-CSI (Flatfoil), SM, I²C, GPIO/SDIO, 2xSerial, LPC	RS232 internal 8 Bit GPIO internal M.2 Type B (2230/2242) Integrated Sensor Hub
Sound	Digital High Definition Audio Interface with support for multiple audio codecs		Audio In/Out 1x Internal stereo speaker 1x Digital Microphone (SPDIF) 1x Front Panel HD Audio
Graphics	Intel® Gen9 HD Graphics		
Video Interface	LVDS 2x 24 bit/eDP, VGA 3x DisplayPort/HDMI/DVI	LVDS 2x 24 bit/eDP, VGA 2x DisplayPort/HDMI/DVI	LVDS 1x 24 bit/eDP, 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		internal/external DC-In (12-24V) 1x opt. battery header for battery manager SBM3
Operating Systems	Microsoft® Windows 10 Microsoft® Windows 10 IoT Enterprise Microsoft® Windows 8 Microsoft® Windows Embedded Standard 8 Microsoft® Windows 7 Microsoft® Windows Embedded Standard 7 Linux		
Temperature Range	Operating: 0 .. +60°C Storage: -20 .. +80°C		
Humidity	Operating: 10 .. 90°C r. H. non cond Storage: 5 .. 95% r.H non cond		

模块散热解决方案

COM-HPC, COM Express, Qseven 和SMARC标准规范中包含导热片的定义, 也就是散热接口的机构规范。所有如处理器及芯片组等元器件产生的热, 会透过导热片被传导到系统的散热解决方案。这可藉由它跟机壳, 导热管或散热器的导热接触来实现。

主动式散热解决方案



导热片



被动式散热解决方案



热管衔接器



康佳特智能散热管为COM Express®模块提供无限的性能增长

高效能散热

高性能模块的康佳特导热片和散热解决方案都具备热管, 以提高性能和可靠性。组裝於芯片上的铜块会吸热并减轻导热块的影响。芯片和铜块中间会置放相变化材料来提高热传导。考虑到不同元器件的高度与制造公差, 附有弹簧螺丝的铜块可适当调整接触芯片的压力。铜块与散热鳍片或热板透过弹性的扁平热管相互连接。

不像传统的设计, 扁平热管是用来将热从芯片传到导热片, 而热管是直接安装在芯片的冷却块或导热片上。结果, 有更多的热从处理器环境被传输到导热片上, 使热点更快速的冷却且优化处理器的散热。

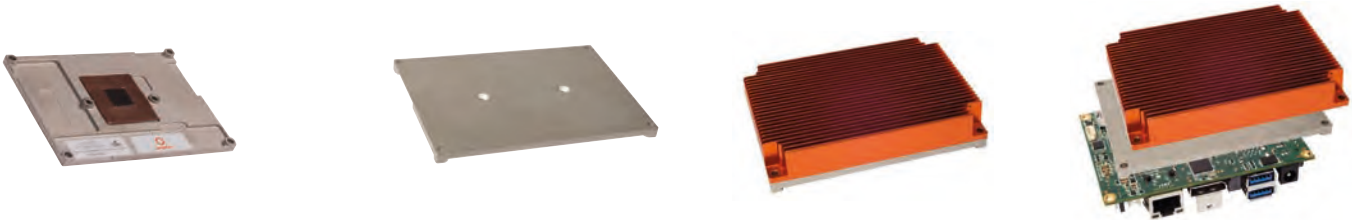
热管衔接器采用与上述相同的原理, 但将模块产生的热直接传输到直径8毫米的标准热管。这种方法可以实现成本优化, 超扁平的系统解决方案, 例如: 1U 机架单元。



服务器等级COM Express Type7高性能主动散热解决方案

Pico-ITX单板的导热片和被动散热解决方案

- 用于传导冷却的导热片
具备铜块和相变材料
- 扁平介面 使热传导到金属
外壳更佳容易
- 导热片上面的优化冷却器
- 冷却器和导热片是安装在
Pico-ITX板子的底部



完全符合Thin Mini-ITX最高20mm标准的主动散热解决方案。高可靠性, 伺服马达控制的风扇。弹簧叶片是连接CPU的最佳热传导。用于优化热传递所安装的相变材料支持最佳的涡轮加速性能。安装在板后侧的保持框架符合固体力学能承受高冲击和震动水平。

完全符合Thin Mini-ITX最高20mm标准的被动散热解决方案。用于优化热传递所安装的相变材料支持最佳的涡轮加速性能。弹簧螺丝是CPU与散热器间的最佳热传导。安装在板后侧的保持框架符合固体力学能承受高冲击和震动水平。没有可移动部件, 提供最高的可靠性。

Qseven和SMARC散热解决方案

- 导热片
- 导热片内测
- 鳍片散热解决方案
- 导热片安装



应用案例

- 这个例子展示了一个具有被动散热功能的1U机架式服务器。安装的COM-HPC服务器模块 (尺寸为E) 将CPU和DC/DC转换器产生的热量传输到热管衔接器上。
- 六根8毫米热管快速且有效的将热量从热管衔接器传递到机壳侧面的散热鳍片。这一概念有助于在恶劣环境中被动散热式服务器的实现。



入门开发工具包

包含所有所需工具助力模块评估



conga-QKit

该完整套件能够立即对Qseven®模块进行评估。支持ARM架构(基于conga-QMX6)和x86架构(基于conga-QA5)



conga-SKit

该完整套件能够立即对SMARC 模块进行评估。支持ARM架构(基于conga-SMX8)和x86架构(基于conga-SA5)



conga-CAM/MIPI ARM

该完整套件能连接至基于conga-i.MX8 的Basler MIPI 摄像头



conga-CAM/MIPI 开发工具包

该完整套件能连接至基于 Pico-ITX单板 conga-PA5的2个MIPI摄像头

开发板

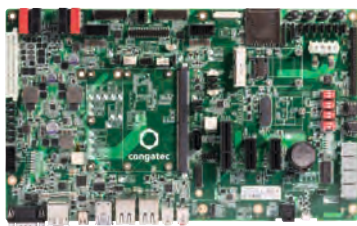
您专属载板的基础设计

评估载板

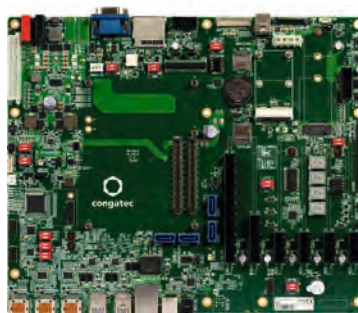
康佳特提供所有计算机模块的评估载板, 协助快速启用最新设计。这些载板将所有COM信号连接到标准接口连接器。

文档

评估载板的原理图和电路板数据是免费的且可当做创建专属定制化设计的蓝图。



conga-SEVAL
SMARC2.0模块评估载板



conga-TEVAL
COM Express Type 6模块评估载板



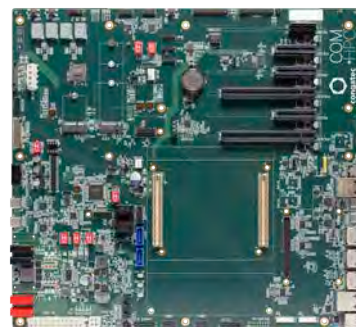
conga-MEVAL
COM Express Type 10模块评估载板



conga-X7EVAL
COM Express Type 7模块评估载板



conga-HPC/EVAL-Server
COM-HPC Server模块评估载板



conga-HPC/EVAL-Client
COM-HPC Client模块评估载板

应用载板

测试计算机模块 最简单的方法

文档

应用载体板的原理图和电路板数据可根据客户的要求提供，并可作为专属定制化设计的蓝图。

应用载板

应用载板不仅规格尺寸优化，且具备最常见的I/O端口。这些现成的载板可作为快速定制和中小型项目的平台。康佳特应用载板显著缩短上市时程。



conga-STX7/Carrier
COM Express Type7模块
mini-STX评估载板



conga-MCB/Qseven
小尺寸(95x140mm)载板, 支持
基于x86的Qseven 模块



conga-SMC1/SMARC-x86
支持基于x86架构 SMARC2.0模块的
载板



conga-MCB/ARM
小尺寸(95x140mm)载板, 支持
基于ARM的Qseven 模块



conga-SMC1/SMARC-ARM
支持基于ARM架构 SMARC2.0模
块的载板



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