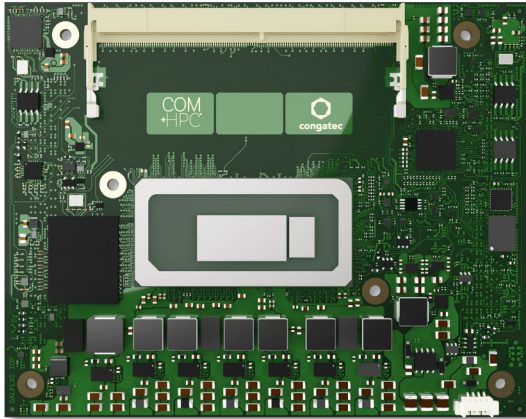# 12th Gen Intel® Core™ Embedded mobile Processors
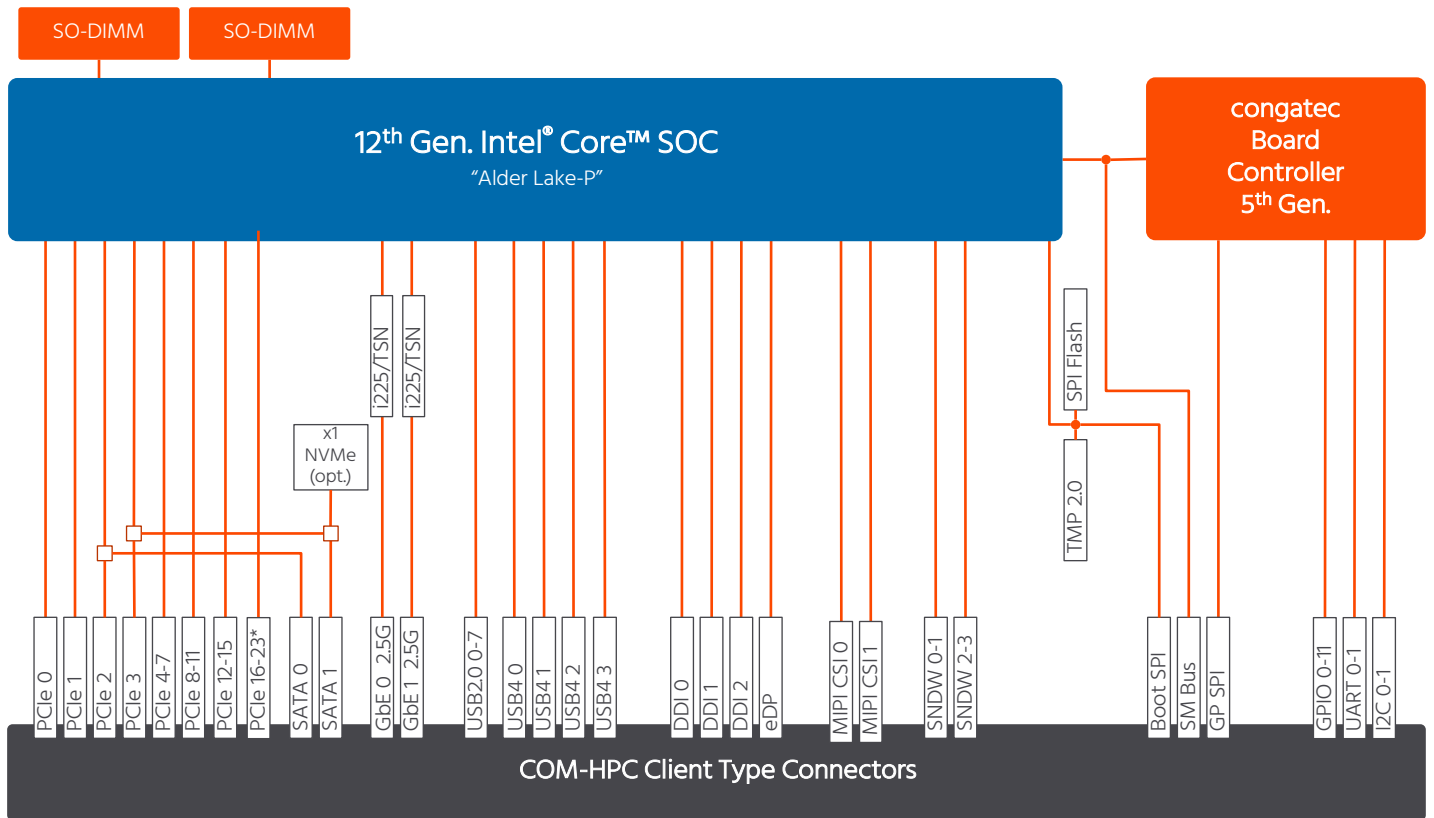
conga-HPC/cALP

COM-HPC®

- Intel® hybrid design combines Performance-cores with Efficient–cores
- UP to Intel® Iris® Xe Graphics architecture with up to 96 EUs
- PCI Express Gen 4 | USB 4
- AI Acceleration with Intel® Deep Learning Boost (VNNI)
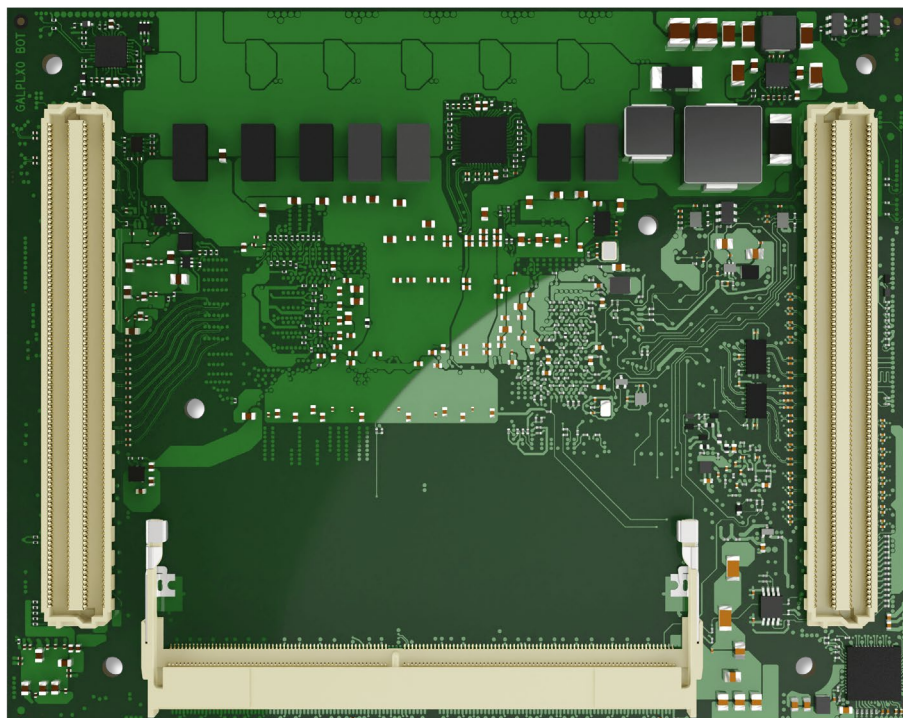- Embedded Use Condition SKUs

Form factor	COM-HPC Client Size A | Client Connector Pinout						
CPU	CPU	TDP Target	Cores count (P+E)	Processor Threads	P-cores Freq. GHz	E-cores Freq. GHz	Gfx Execution Units
	i7-12800HE	45W	14 (6+8)	20	2.4 / 4.6	1.8 / 3.5	96
	i5-12600HE	45W	12 (4+8)	16	2.5 / 4.5	1.8 / 3.3	80
	i3-12300HE	45W	8 (4+4)	12	1.9 / 4.3	1.5 / 3.3	48

DRAM	2 SO-DIMM sockets for DDR5 memory modules up to 32 GByte each (max. 64 GByte system capacity) | up to 4800 MT/s
Mass Storage	NVMe x1 SSD (optional)
Graphics	Intel® UHD Graphics or Intel® Iris® Xe Graphics architecture | up to 96 EUs
Display	3x DDI (up to 8K support) | eDP
Ethernet	2x 2.5 GbE TSN Ethernet (via Intel® i225 LM)
I/O Interfaces	Up to x8 PCIe Gen4 | 2 x4 PCIe Gen4 | up to 8 PCIe Gen3 | up to 2x Thunderbolt | 2x USB 3.2 Gen2x1 | 8x USB2.0 | up to 2x SATA | 2x UART | 2x MIPI-CSI | 12x GPIO | eSPI | SM Bus | I2C | GSPI
Audio	2x Soundwire fixed | 2x Soundwire or HDA or I2S (opt.)
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 11 | Microsoft® Windows 10 | Microsoft® Windows 10 IoT Enterprise | Linux | Yocto | Real Time Systems Hypervisor
Temperature	Operating.: 0°C … +60°C	Storage.: -20°C … +70°C
Humidity	Operating.: 10% … 90% r. H. non cond.	Storage.: 5% … 95% r. H. non cond.
Size	120 x 95 mm	

conga-HPC/cALP | Block Diagram

SO-DIMM SO-DIMM

12th Gen. Intel® Core™ SOC
"Alder Lake-P"

congatec Board Controller 5th Gen.

i225/TSN
i225/TSN

x1 NVMe (opt.)

SPI Flash

TMP 2.0

PCIe 0
PCIe 1
PCIe 2
PCIe 3
PCIe 4-7
PCIe 8-11
PCIe 12-15
PCIe 16-23*
SATA 0
SATA 1
GbE 0 2.5G
GbE 1 2.5G
USB2 0-7
USB4 0
USB4 1
USB4 2
USB4 3
DDI 0
DDI 1
DDI 2
eDP
MIPI CSI0
MIPI CSI1
SNDW 0-1
SNDW 2-3
Boot SPI
SM Bus
GP SPI
GPIO 0-11
UART 0-1
I2C 0-1

COM-HPC Client Type Connectors

* available on selected SKUs

conga-HPC/cALP | Bottom Side View

Original Size

Article	PN	Description
conga-HPC/cALP-i7-12800HE	049500	COM-HPC Size A module based on Intel® Core™ i7-12800HE processor with 6 P-cores 2.4GHz up to 4.6GHz and 8 E-cores 1.8GHz up to 3.5GHz	24MB Intel® Smart Cache	Intel® Iris® Xe Graphics architecture with 96 EUs	Dual channel DDR5 4800 MT/s memory interface	Intel® code name Alder Lake-P (H-Series)
conga-HPC/cALP-i5-12600HE	049503	COM-HPC Size A module based on Intel® Core™ i5-12600HE processor with 4 P-cores 2.5GHz up to 4.5GHz and 8 E-cores 1.8GHz up to 3.3GHz	18MB Intel® Smart Cache	Intel® Iris® Xe Graphics architecture with 80EUs	Dual channel DDR5 4800 MT/s memory interface	Intel® code name Alder Lake-P (H-Series)
conga-HPC/cALP-i3-12300HE	049506	COM-HPC Size A module based on Intel® Core™ i3-12300HE processor with 4 P-cores 1.9GHz up to 4.3GHz and 4 E-cores 1.5GHz up to 3.3GHz	12MB Intel® Smart Cache	Intel® UHD Graphics with 48EUs	Dual channel DDR5 4800 MT/s memory interface	Intel® code name Alder Lake-P (H-Series)