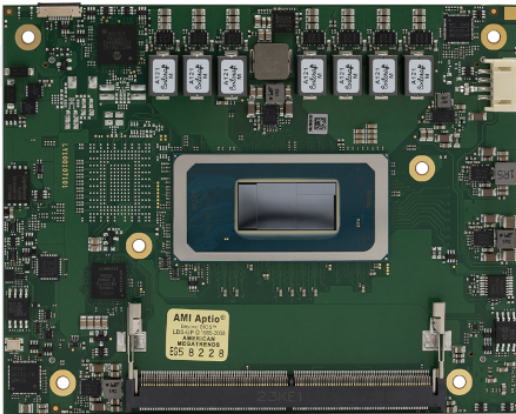


## TRIA HCA-MLH

Intel® Core™ Ultra Processors

120 x 95



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🌡️ 0 +60

COM+HPC®



## Highlights

- COM-HPC Client, Size A module
- Intel® Core™ Ultra Processors Series 1 and 2
- Up to sixteen cores, twenty-two threads
- Integrated AI accelerator (NPU) Intel® AI Boost
- Up to 96GB DDR5-6400 SDRAM, dual channel, IB-ECC
- Intel® Arc™ Graphics, up to 8 Xe cores (128 EUs)
- Three DisplayPort/HDMI interfaces
- Embedded DisplayPort interface
- Four independent display streams
- Up to sixteen PCI Express® Gen 4 lanes
- PEG 1×8, PCIe Gen 4/5 (optional)
- Two USB4, two USB 3.2 Gen1/2 and eight USB 2.0 ports
- Two UARTs
- Optional on-board NVMe SSD, up to 256GB
- Up to two SATA 6Gb/s mass storage interfaces
- Two 1 / 2.5 Gb Ethernet ports (Intel® i226)
- Trusted Platform Module TPM 2.0
- Long-term product availability for selected variants

## Technical Data

<b>Technology</b>	x86
<b>Formfactor</b>	COM-HPC Size A
<b>CPU</b>	<p>Intel® Core™ Ultra Processors Series 2:</p> <p>Intel® Core™ Ultra 9 processor 285H 6P+8E+2LPE/22T, 2.9GHZ, 8Xe/128EUs, 24MB L3, vPRO®, 45W BP</p> <p>Intel® Core™ Ultra 7 processor 265H 6P+8E+2LPE/22T, 2.2GHZ, 8Xe/128EUs, 24MB L3, vPRO®, 28W BP</p> <p>Intel® Core™ Ultra 7 processor 255H 6P+8E+2LPE/22T, 2.0GHZ, 8Xe/128EUs, 24MB L3, 28W BP</p> <p>Intel® Core™ Ultra 5 processor 235H 4P+8E+2LPE/18T, 2.4GHZ, 8Xe/128EUs, 18MB L3, vPRO®, 28W BP</p> <p>Intel® Core™ Ultra 5 processor 225H 4P+8E+2LPE/18T, 1.7GHZ, 7Xe/112EUs, 18MB L3, 28W BP</p> <p>Intel® Core™ Ultra 7 processor 265U 2P+8E+2LPE/14T, 2.1GHZ, 4Xe/64EUs, 12MB L3, vPRO®, 15W BP</p> <p>Intel® Core™ Ultra 7 processor 255U 2P+8E+2LPE/14T, 2.0GHZ, 4Xe/64EUs, 12MB L3, 15W BP</p> <p>Intel® Core™ Ultra 5 processor 235U 2P+8E+2LPE/14T, 2.0GHZ, 4Xe/64EUs, 12MB L3, vPRO®, 15W BP</p> <p>Intel® Core™ Ultra 5 processor 225U 2P+8E+2LPE/14T, 1.5GHZ, 4Xe/64EUs, 12MB L3, 15W BP</p> <p>Intel® Core™ Ultra Processors Series 1:</p> <p>Intel® Core™ Ultra 7 processor 165H 6P+8E+2LPE/22T, 1.4GHZ, 8Xe/128EUs, 24MB L3, vPRO®, 28W BP</p> <p>Intel® Core™ Ultra 7 processor 155H 6P+8E+2LPE/22T, 1.4GHZ, 8Xe/128EUs, 24MB L3, 28W BP</p> <p>Intel® Core™ Ultra 5 processor 135H 4P+8E+2LPE/18T, 1.7GHZ, 8Xe/128EUs, 18MB L3, vPRO®, 28W BP</p> <p>Intel® Core™ Ultra 5 processor 125H 4P+8E+2LPE/18T, 1.2GHZ, 7Xe/112EUs, 18MB L3, 28W BP</p> <p>Intel® Core™ Ultra 7 processor 165U 2P+8E+2LPE/14T, 1.7GHZ, 4Xe/64EUs, 12MB L3, vPRO®, 15W BP</p> <p>Intel® Core™ Ultra 7 processor 155U 2P+8E+2LPE/14T, 1.7GHZ, 4Xe/64EUs, 12MB L3, 15W BP</p> <p>Intel® Core™ Ultra 5 processor 135U 2P+8E+2LPE/14T, 1.6GHZ, 4Xe/64EUs, 12MB L3, vPRO®, 15W BP</p> <p>Intel® Core™ Ultra 5 processor 125U 2P+8E+2LPE/14T, 1.3GHZ, 4Xe/64EUs, 12MB L3, 15W BP</p> <p>Note: P core base frequency at processor base power (BP) shown, other clock frequencies at different power levels supported</p>
<b>Chipset</b>	Integrated into SoC
<b>RAM</b>	2x 262-pin SO-DIMM socket for up to 2x 48GB DDR5 SDRAM; DDR5-6400 Series 2 processors; DDR5-5600 Series 1 processors; dual channel operation; minimum capacity 1x 8GB single channel operation; inband ECC (IB-ECC) option (OS dependent)
<b>Storage Interfaces</b>	2x SATA channels (up to 6Gb/s), optional Optional on-board NVMe, 128GB, 256GB
<b>USB</b>	2x USB4 on COM-HPC USB[0:1]_SSTX/RX 2x USB 3.2 (Gen 1 & 2) on COM-HPC USB[2:3]_SSTX/RX 8x USB 2.0 on COM-HPC USB[0:7]
<b>Serial Interfaces</b>	2x high-speed serial ports
<b>Bus Interfaces</b>	PCI Express® Graphics (PEG) 1x8, PCIe Gen 4/5 on COM-HPC PCIe[16:23] <sup>1</sup> PCI Express® Gen 4, up to 2x4 on COM-HPC PCIe[8:15] PCI Express® Gen 4, up to 8 lanes, flexible bifurcation options on COM-HPC PCIe[0:7] <sup>1</sup> Available on H-series processors
<b>Display Controller</b>	Intel® Arc™ Graphics, up to 8 Xe cores / 128 execution units (EU) H.264/AVC, H.265/HEVC, AV1, MJPEG encode/decode/transcode
<b>Display Interfaces</b>	Four independent display streams 2x USB4/USB-C ports (DP tunneling) 3x Digital Display Interface (DP 2.1, HDMI 2.1) 1x Embedded DisplayPort 1.4b
<b>Network Interface</b>	Two 10/100/1000Base-TX, 2.5G <sup>2</sup> based on Intel i226-LM <sup>2</sup> Available bandwidths depending on carrier design
<b>Audio Interface</b>	High Definition Audio
<b>Security Device</b>	TPM 2.0

<b>Miscellaneous</b>	<p>Watchdog Timer: Initiates system reset, programmable</p> <p>Fan Supply: 4-pin header for CPU fan, PWM speed controlled and PWM speed control for system fan supported</p> <p>RTC battery: external</p> <p>System Monitoring: voltage, temperature, CPU fan, system fan</p>
<b>Feature Highlights</b>	COM-HPC Client
<b>Firmware</b>	<p>UEFI Firmware: AMI Aptio® V</p> <p>Security: TPM 2.0 support, TCG compliant</p> <p>Power Management: ACPI Active fan control</p> <p>USB: USB legacy support (keyboard, mouse, storage)</p> <p>Monitoring: System Monitoring Health Monitoring</p> <p>Tria Adv. Boot Device Selection: Boot device priority setting based on physical interfaces</p>
<b>OS Support</b>	<p>Windows 11 IoT Enterprise LTSC BSP for Linux (Yocto)</p>
<b>Power Requirement</b>	<p>Voltage: +8V to +20V, +5V Stby optional, +3V RTC voltage</p> <p>Power Consumption: tbd W to tbd W (typ.)</p>
<b>Environment</b>	<p>Ambient Temperature: 0° ... 60°C (operating) -25° ... 85°C (storage)</p> <p>Humidity: 5 ... 95% (operating, non-condensing), 5 ... 95% (storage, non-condensing)</p>
<b>Dimensions</b>	120 x 95

Technical Data for TRIA HCA-MLH

## Order Reference

Order No.	Description	Reference	Status*
121611	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 7 255H 16C/22T, 2.0GHz, 28W BP; Graphics: Intel Arc 128 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PEG Gen 5 x8; PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-255H-NN0101C PCBFTX	OR
121613	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 5 225U 12C/14T, 1.5GHz, 15W BP; Graphics: Intel 64 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-225U-NN0101C PCBFTX	OR
121599	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 7 165H 16C/22T, vPro 1.4GHz, 28W BP; Graphics: Intel Arc 128 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4; 2x SATA, 2x USB3, 8x USB2, PEG Gen 5 x8; PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-165H-NN0101C PCBFTX	PV
121601	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 7 155H 16C/22T, 1.4GHz, 28W BP; Graphics: Intel Arc 128 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4; 2x SATA, 2x USB3, 8x USB2, PEG Gen 5 x8; PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-155H-NN0101C PCBFTX	PV
121603	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 5 135H 14C/18T, vPro 1.7GHz, 28W BP; Graphics: Intel Arc 128 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PEG Gen 5 x8; PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-135H-NN0101C PCBFTX	OR
121605	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 5 125H 14C/18T, 1.2GHz, 28W BP; Graphics: Intel Arc 112 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PEG Gen 5 x8; PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-125H-NN0101C PCBFTX	PV
121607	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 7 155U 12C/14T, 1.7GHz, 15W BP; Graphics: Intel 64 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-155U-NN0101C PCBFTX	PV

# COM-HPC Client



Order No.	Description	Reference	Status*
121609	COM-HPC Client Size A module (120mm x 95mm); CPU: Intel Core Ultra 5 125U 12C/14T, 1.3GHz, 15W BP; Graphics: Intel 64 EUs; 3x DP/HDMI; 1x eDP; Ethernet: 2x Intel i226-LM Gbit, TSN; HD audio; TPM 2.0; 2x USB4 2x SATA, 2x USB3, 8x USB2, PCIe Gen 4 3x4 + 1x1; 2x socket for DDR5; 0...+60°C.	MSC HCA-MLH-125U- NN0101C PCBFTX	PV

Ordering Information for TRIA HCA-MLH

\*PV = Preferred variant; OR = on Request (in OEM quantities only)

## Accessories

### Carrier Options

Order No.	Description	Reference
114609	COM-HPC Client Carrier Board with 1x PEG x16, 1x PCIe x16, 3x PCIe x4 slots; 2x USB 4 Gen 2x2, 2x USB 3.2 Gen 2x1, 2x 1G/2.5G/10GBASE-T, 2x SATA; 3x DisplayPort, 1x eDP; audio module socket; 1x M.2 socket; 24pin ATX and ATX12V power connectors; Dimensions: 305mm x 244mm (ATX form factor);	MSC HC-MB-EV BRDFTX

Carrier Options for TRIA HCA-PLH/MLH/RLP/ALP

### Cooling Options

Order No.	Description	Reference
114469	Passive Heatsink for HCA-MLH consisting of a singlepiece aluminum profile with fins, standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU, chipset, NVMe.	MSC HCA-MLH-01 HSI-001
114471	Heatspreader for HCA-MLH. Single-piece aluminum profile, standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU, chipset, NVMe.	MSC HCA-MLH-01 HSP-001
114482	Heatspreader / heat pipe for HCA-MLH. Singlepiece aluminum profile with embedded heat pipe, standoffs without thread (2.7mm inner diameter), screws and thermopad for the thermal contact to CPU, chipset, NVMe.	MSC HCA-MLH-01 HSP-HP-001
114470	Passive heatsink / heat pipe for HCA-MLH consisting of a single-piece aluminum profile with fins and embedded heatpipe, standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU, chipset, NVMe.	MSC HCA-MLH-02 HSI-HP-001
114483	Heatspreader for HCA-MLH. Single-piece aluminum profile, standoffs with M2.5 thread, screws and thermopads for the thermal contact to CPU, chipset, NVMe.	MSC HCA-MLH-02 HSP-001

Cooling Options for TRIA HCA-MLH

Order No.	Description	Reference
79809	Fan kit for Heatsink MSC HCA-ALP/RLP/MLH/PLH-0x HSI-xxx, MSC C6B-TLH/ALP/RLP/MLH-0x HSI-xxx, MSC C6C-WLU/TLU/ALP/RLP/PLH-0x HSI-xxx, MSC C6C-EL/ALN/ASL-0x HSI-xxx, MSC C6C-RYZx-0x HSI-xxx, PWM fan 80x80x15mm.	MSC C6C-FANKIT-01-HSF-001

Fan Kit for COM-HPC Heatsinks

### Memory Options

Order No.	Description	Reference
115233	8GB DDR5-5600 SO-DIMM, commercial temperature	MOD SODIMM DDR5 8GB PC5-44800 CL22 1B

Order No.	Description	Reference
115234	16GB DDR5-5600 SO-DIMM, commercial temperature	MOD SODIMM DDR5 16GB PC5-44800 CL22 1B
115235	32GB DDR5-5600 SO-DIMM, commercial temperature	MOD SODIMM DDR5 32GB PC5-44800 CL22 2B

Memory Options for TRIA HCA-RLP

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