ADLINK
LEADING EDGE COMPUTING

# cExpress-MTL

COM Express COM.0 R3.1 Type 6
Compact size Module based on
Intel® Core™ Ultra Processors

## Features

- Intel Core Ultra processor, Intel XᵉLPG GFX integration and up to 8 Xᵉ-Cores
- New integrated NPU for dedicated AI acceleration
- All PCIe signals upgraded to Gen4
- 2.5GbE Ethernet, with optional TSN
- Up to 96GB DDR5 at 5600MT/s, in-band ECC/non-ECC
- SoC power reduction
- 2x USB4 support (BOM option)

## Specifications

| | | |
|---|---|---|
| Core System | SoC | Intel® Core™ Ultra 7/5 at 28W/15W.<br>For more detailed information, please refer to the SKU section.<br>Supports: Intel® VT (including VT-x, VT-d, VT-x with Extended Page Tables), Intel® HT Technology, Intel® SSE4.2, Intel® 64 Architecture, Intel® Turbo Boost Technology 3.0, Intel® AVX512-VNNI, Intel® TXT, Execute Disable Bit, Intel® Data Protection Technology with Intel® Secure Key, Intel® AES-NI<br>Note: Availability of features may vary between processor SKUs. |
| | Memory | Up to 96GB DDR5, in-band ECC/non-ECC in two SO-DIMM, max. 5600MT/s |
| | Embedded BIOS | AMI UEFI with CMOS backup in 32 or 16MB (TBC) SPI BIOS with Intel® AMT 12.x support |
| | Cache | Ultra 7 165H/155H 24MB<br>Ultra 5 135H/125H 18MB<br>Ultra 7 165U/155U 12MB<br>Ultra 5 135U/125U |
| | Expansion Buses | PCIe x8 Gen4, lanes 16-23, available for 28W SKUs<br>PCIe x4 Gen4, lanes 24-27<br>PCIe x4 Gen4, lanes 28-31<br>Up to 8 PCIe x1 Gen4 lanes (AB): Lanes 0/1/2/3 and Lanes 4/5/6/7 (configurable to 4 x1, 2 x2, 1 x4, 2 x1 + 1 x2, 1 x2 + 2 x1, lanes 6/7 by option) |
| | SEMA Board Controller | Supports: Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, general purpose I²C, UART, GPIO, watchdog timer, fan control |
| | Debug Headers | 30-pin multipurpose flat cable connector for use with DB30-x86 debug module providing BIOS POST code LED, SEMA Board Controller access, SPI BIOS flashing, power testpoints, debug LEDs |
| | Management Bus | I2C, SMBus |

Note: "Build option""indicates an alternative BOM configuration to support additional or alternative functions that are not available on the standard product. Be aware that these "build option" part numbers will need to be newly created and this will result in production lead times.

## Specifications

| | | |
|---|---|---|
| Video | GPU Feature Support | Intel® Xe LPG, HW AV1 encode/decode, DX12.1, OpenGL4.6, H.265 (HEVC) 8- bit codec, OneAPI |
| | Digital Display Interface | 3x DDI (DP 1.4/HDMI 2.0b, VGA build option) |
| | LVDS | 1x LVSD (or eDP1.4b) |
| | USB | 2x USB4 in place of DDI 1/2, supports DP 2.1 by DP alternative mode, Thunderbolt 4 capable (requires BIOS code mod., by project basis) |
| Camera | MIPI CSI | 4 lanes and support MIPI CSI2.0 DPHY at 2.5Gbps |
| Audio | Chipset | Integrated on SoC |
| | Codec | On carrier Express-BASE6 (ALC886 standard support) |
| Ethernet | Intel® MAC/PHY | Intel® Ethernet Connection I226 series (I226-IT/V supports TSN by build option) |
| | Interface | 2.5GbE and 1000/100/10 Mbit/s Ethernet connection<br>GbE0_SDP if TSN support enabled (TBC) |
| Multi I/O and Storage | USB | 2x USB 3.2/2.0/1.1, 2x USB 3.2 (BOM option), 6x USB 2.0/1.1 |
| | SATA | 2x SATA 6Gb/s (SATA 0-1) |
| | Serial | 2x UART with console redirection |
| | GPIO | GPIO: 8 xGPIO from EC (GPI with interrupt) |
| | On-board Storage | NVMe SSD in place of PEG lanes 12-16 (build option, project basis) |
| Super I/O | Supported on carrier if needed (standard support W83627DHG-P, other Super I/O supported by project basis) | |
| TPM | Chipset | Infineon |
| | Type | TPM 2.0 (SPI based) |
| Power | Standard Input | ATX: 12V±5% / 5Vsb±5%; or AT:12V±5% |
| | Management | ACPI 5.0 compliant, Smart Battery support |
| | Power States | C1-C6, S0, S1, S3, S4, S5 , S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/S5) |
| | ECO Mode | Supports deep S5 mode for power saving |
| Mechanical and Environmental | Form Factor | PICMG COM.0: Rev 3.1 Type 6 |
| | Dimension | Compact size: 95 mm x 95 mm |
| | Operating Temperature | Standard: 0°C to 60°C |
| | Humidity | 5-90% RH operating, non-condensing<br>5-95% RH storage (and operating with conformal coating) |
| | Shock and Vibration | IEC 60068-2-64 and IEC-60068-2-27<br>MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D |
| | HALT | Thermal Stress, Vibration Stress, Thermal Shock and Combined Test |
| Operating Systems | Standard Support | Windows 10 Enterprise LTSC 2021, Yocto Linux 64-bit, VxWorks 64-bit (TBC), Ubuntu 24.04 |

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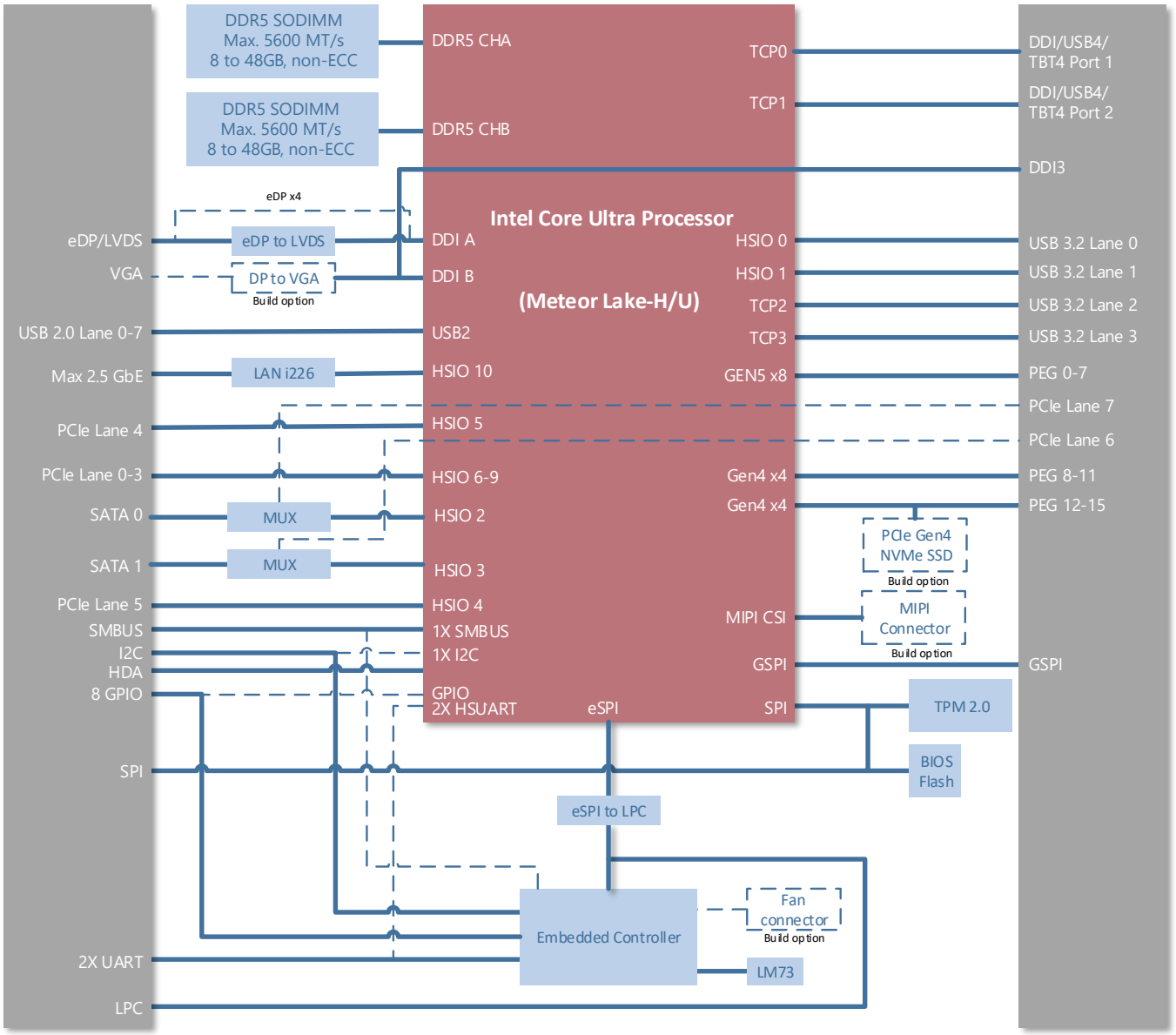
## Block diagram



## CPU SKUs

| Processor | Frequency | Cache | TDP | CPU/GPU Cores |
|---|---|---|---|---|
| Ultra 7 165H | 1.4(5.0)GHz | 24MB | 28W | 14C/8Xᵉ |
| Ultra 7 155H | 1.4(4.8)GHz | 24MB | 28W | 14C/8Xᵉ |
| Ultra 5 135H | 1.7(4.6)GHz | 18MB | 28W | 12C/8Xᵉ |
| Ultra 5 125H | 1.2(4.9)GHz | 18MB | 28W | 12C/7Xᵉ |
| Ultra 7 165U | 1.7(4.9)GHz | 12MB | 15W | 10C/4Xᵉ |
| Ultra 7 155U | 1.7(4.8)GHz | 12MB | 15W | 10C/4Xᵉ |
| Ultra 5 135U | 1.6(4.4)GHz | 12MB | 15W | 10C/4Xᵉ |
| Ultra 5 125U | 1.3(4.3)GHz | 12MB | 15W | 10C/4Xᵉ |

## Ordering Information

| **Module** | |
|---|---|
| cExpress-MTL-165H | Compact COM Express Type 6 module with Meteor Lake Ultra 7 165H 14 core, Intel 8 core Xᵉ LPG graphics |
| cExpress-MTL-155H | Compact COM Express Type 6 module with Meteor Lake Ultra 7 155H 14 core, Intel 8 core Xᵉ LPG graphics |
| cExpress-MTL-135H | Compact COM Express Type 6 module with Meteor Lake Ultra 5 135H 12 core, Intel 8 core Xᵉ LPG graphics |
| cExpress-MTL-125U | Compact COM Express Type 6 module with Meteor Lake Ultra 5 125U 12 core, Intel 4 core Xᵉ LPG graphics |

Note: For certain processor or memory capacity SKUs not listed, please contact our ADLINK representative.

## Accessories

| **Heat Spreaders** | |
|---|---|
| HTS-cMTL-B | Heatspreader for cExpress-MTL with threaded standoffs for bottom mounting |
| HTS-cMTL-BT | Heatspreader for cExpress-MTL with through-hole standoffs for top mounting |
| **Passive Heatsinks** | |
| THS-cMTL-B | Low-profile Heatsink for cExpress-MTL with threaded standoffs for bottom mounting |
| THS-cMTL-BT | Low-profile Heatsink for cExpress-MTL with through-hole standoffs for top mounting |
| THSH-cMTL-B | High-profile Heatsink for cExpress-MTL with threaded standoffs for bottom mounting |
| **Active Heatsinks** | |
| THSF-cMTL-B | High-profile Heatsink with Fan for cExpress-MTL with threaded standoffs for bottom mounting |

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