ADLINK
LEADING EDGE AI COMPUTING

cExpress-PTL

Preliminary

COM Express COM.0 Rev. 3.1 Type 6
Compact Module Based on the Intel®
Panther Lake-H Platform

Features

- New NPU provide 50 TOPS AI performance
- Xe3 Intel GPU up to 1.5x improvement over the last generation
- Up to 128GB DDR5 SO-DIMM, IBECC
- Up to 4x SATA gen3 ports
- Extreme rugged operating temperature (selected SKUs)

Specifications

Core System	SoC	Intel® Core™ Ultra Series 3 processors (Panther Lake-H)

Processor	Cores/Threads	Cache	TDP	Graphics
Core™ Ultra X7 358H	4P+8E+4LPE	18MB	25W/15-65W	12 Xe3
Core™ Ultra 7 356H	4P+8E+4LPE	18MB	25W/15-65W	4 Xe3
Core™ Ultra 5 338H	4P+4E+4LPE	18MB	25W/15-65W	10 Xe3
Core™ Ultra 5 336H	4P+4E+4LPE	18MB	25W/15-65W	4 Xe3

1. Panther Lake supports Embedded and Industrial SKUs.
2. Some processor SKUs are supported by project basis only. Please see the user's manual for details.

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
Note: Availability of features may vary between processor SKUs.

Memory	Up to 128GB (2x 64GB) DDR5, non-ECC/IBECC, 1x SO-DIMM (top) and 1x SO-DIMM (bottom), max.7200MT/s 2 memory channels with 1DPC design
Embedded BIOS	AMI UEFI with CMOS backup in 32 SPI BIOS (dual BIOS opt.) Capsule update supported for CRA compliance
Cache	X7 358H / 7 356H / 5 338H / 5 336H: 18MB
Expansion Busses	-PCIe x8 Gen4 (H484 SKU only), lanes 0-7 + PCIe x4 Gen4. Max. 9 PCIe-based devices (H484 SKU) / max. 7 PCIe-based devices (H12Xe, H404 SKU), including GbE and SATA IC -6x PCIe x1 default, up to 8x PCIe x1 (build option, removes GbE and SATA bridge chip) — configurable to 4x1, 2x2 or 1x4 at lane 0-3 and 4x1, 2x2, or 1x4 at lane 4-7 -LPC (via eSPI-to-LPC bridge), SMBus (system), I2C (user), GP_SPI

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.

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Specifications

	SEMA Board Controller	Supports: Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, general purpose I^2C, 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 test points, SMB, debug LEDs
Video	GPU Feature Support	Intel® Xe3 Graphics Core Architecture, max. 196EUs, supporting 4 concurrent displays. Supports display resolutions of up to 8K60 for a single output and 6K60 for four simultaneous displays. Hardware Codecs decode VVC 8K60 8/10-bit 420 and AVC 4K60 8/10-bit 420/422 Encode AVI/VP8 8K30 10-bit 420/422/444 DirectX 12, OpenGL 4.6 Graphics Hardware Virtualization (SRIOV)
	Digital Display Interface	DDI 1/2/3 supporting DP 2.1, HDMI® 2.1, DVI
	VGA	Supported by build option via DP-to-VGA IC (in place of DDI 3; under discussion), max. resolution 1920x1200@60Hz
	LVDS	Dual channel 18/24-bit LVDS from eDP-to-LVDS IC. Max. resolution 1920x1200@60Hz in dual mode
	eDP	Build option in place of LVDS, 4 lanes, eDP 1.4b
	USB4	Max. 2x USB4 in place of DDI 1/2, supports DP 2.1 by DP alternative mode, Thunderbolt 4 capable (TBC) Requires BIOS code modification by project basis, re-timer with PD on carrier.
Audio	Chipset	Integrated on SoC
	Codec	On the carrier Express-BASE6 R3.1 (ALC888 standard support)
Ethernet	Intel® MAC/PHY	Intel® Ethernet Connection I226 series. (I226-IT supports TSN by build option)
	Interface	2.5GbE and 1000/100/10 Mbit/s Ethernet connection GbE0_SDP if TSN support enabled (TBC)
Multi I/O and Storage	USB	3x USB 3.2/2.0 (USB 0-2), 5x USB 2.0 (USB 3-7) 4x SATA 6Gb/s (via PCIe-to-4x SATA IC, consumer temp grade) Max. 2x USB4 in place of DDI 1/2, Thunderbolt 4 capable (TBC)
	On-board Storage	NVMe Gen4 SSD (build option, project basis, removes PCIe lanes 24-27)
	Serial	2x UART ports with console redirection
	GPIO	8x GPIO (GPI with interrupt)
Super I/O	Supported on carrier if needed (standard support W83627DHG-P, other Super I/O supported by project basis)	
TPM	Chipset	STMicroelectronics / Infineon
	Type	TPM 2.0 (SPI based)
Power	Standard Input	ATX: 12V±5% / 5Vsb ±5%; or AT: 12V±5%
	Wide Input	ATX: 8.5-20V / 5Vsb ±5%; or AT: 8.5-20V
	Management	ACPI 5.0 compliant, Smart Battery support (TBC)
	Power States	C1-C6, S0, S1, S3, S4, S5 , S5 ECO mode (Wake on USB S3/S4, WOL S3/S4/S5) (TBC)
	ECO Mode	Supports deep S5 mode for power saving (TBC)

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. The terms HDMI, HDMI High-Definition Multimedia Interface, HDMI trade dress and the HDMI Logos are trademarks or registered trademarks of HDMI Licensing Administrator, Inc.

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Specifications

Mechanical and Environmental	Form Factor	PICMG COM Rev 3.1 Type 6 Compact
	Dimension	Compact size: 95 mm x 95 mm
	Operating Temperature	Standard: 0°C to 60°C (storage: -20°C to 80°C) Extreme Rugged: -40°C to 85°C (storage: -40°C to 85°C) (Build option, selected SKUs, TBC)
	Humidity	5-90% RH operating, non-condensing 5-95% RH storage (and operating with conformal coating)
	Shock and Vibration	IEC 60068-2-64 and IEC-60068-2-27 MIL-STD-202F, Method 213B, Table 213-I, Condition A and Method 214A, Table 214-I, Condition D (TBC)
	HALT	Thermal Stress, Vibration Stress, Thermal Shock, and Combined Test
Operating Systems	Standard Support	Windows 11 IoT Enterprise LTSC 2024, Ubuntu 2024 64-bit, Yocto project-based Linux 64-bit

Ordering Information

Starter Kit	
COM Express Type 6 Starter Kit Plus	Starter kit for COM Express Type 6
Module	
cExpress-PTL-358H	Compact COM Express Type 6 module with Panther Lake Ultra X7 358H, 16 core, Intel 12 Xe-core graphics
cExpress-PTL-356H	Compact COM Express Type 6 module with Panther Lake Ultra 7 356H, 16 core, Intel 4 Xe-core graphics
cExpress-PTL-338H	Compact COM Express Type 6 module with Panther Lake Ultra 5 338H, 12 core, Intel 10 Xe-core graphics
cExpress-PTL-336H	Compact COM Express Type 6 module with Panther Lake Ultra 5 336H, 12 core, Intel 4 Xe-core graphics

Note:
Special SKUs support Embedded and Industrial SKUs. Module part numbers above follow the naming convention of the Express-PTL (basic-size) family and are provided for reference only; please confirm official part numbers with your ADLINK representative before ordering. Additional H404 and native extended-temperature SKUs are supported by project basis only.

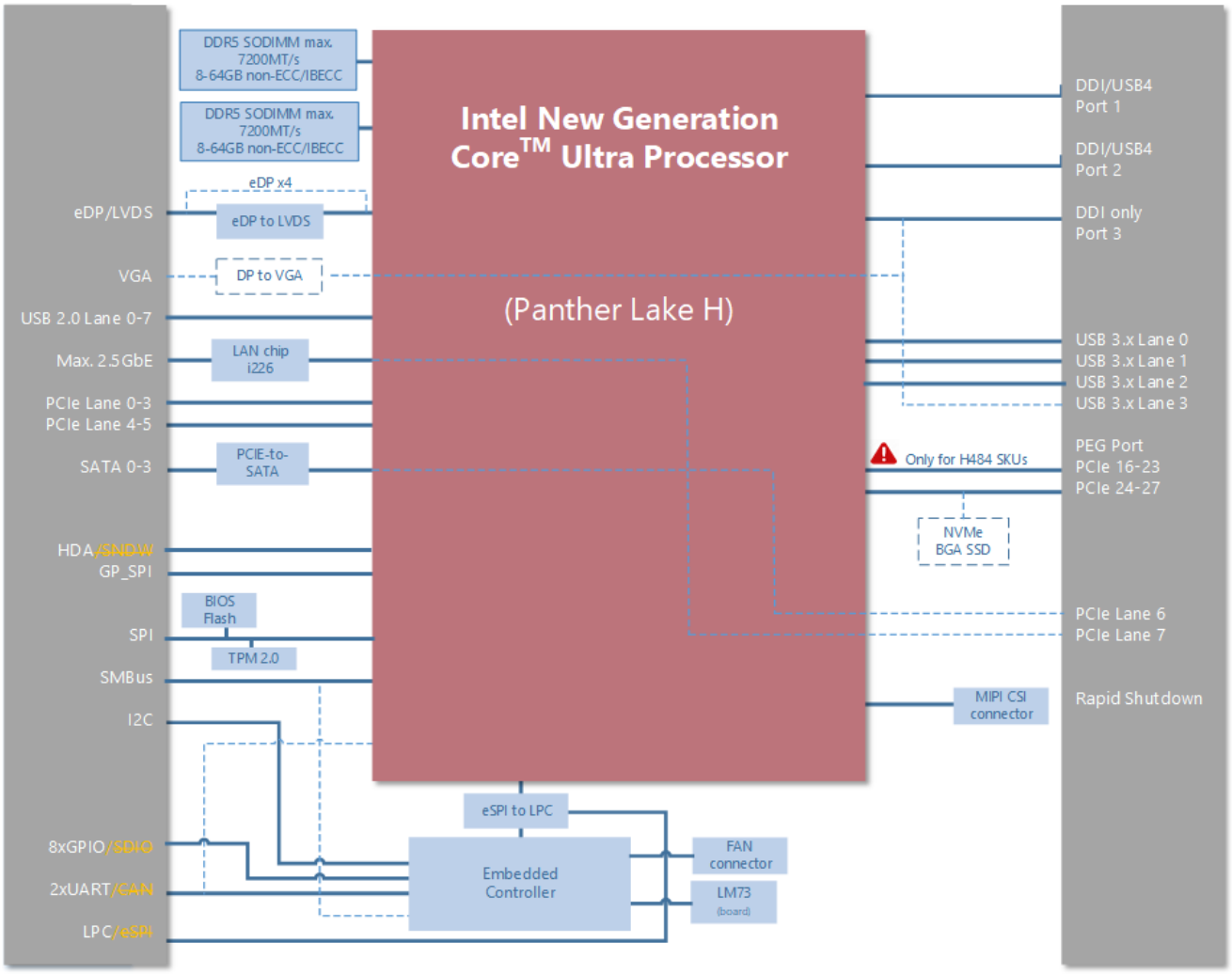
Accessories

Heat Spreaders	
HTS-cPTL-B	Heatspreader for Express-PTL, bottom mounting
HTS-cPTL-BT	Heatspreader for Express-PTL, top mounting
Passive Heatsinks	
THS-cPTL-B	Low-Profile Heatsink for Express-PTL, bottom mounting
THS-cPTL-BT	Low-Profile Heatsink for Express-PTL, top mounting High-profile
THSH-cPTL-B	Heatsink for Express-PTL, bottom mounting
Active Heatsinks	
THSF-cPTL-B	High-profile Heatsink with active Fan for Express-PTL, bottom mounting

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Block Diagram



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