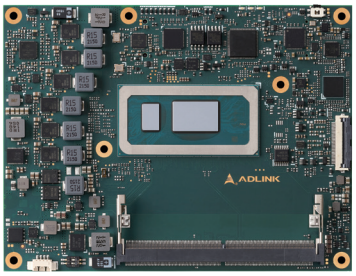
Express-ADP

COM Express COM.0 R3.1 Type 6 Module based on Intel® Alder Lake-P platform



Features

- Performance hybrid architecture (P-core, E-core)
- Up to 14 cores, 20 threads at 15W/28W/45W TDP
- Up to 64GB DDR5 SO-DIMM at max. 4800MT/s, non-ECC
- AI inference (AVX-512 VNNI, Iris Xe GPU 96EUs)
- 4 displays via DDI/LVDS (opt. eDP, VGA) and USB4/Thunderbolt 4 (TBC)
- 1 PCIe x8 Gen4, 2 PCIe x4 Gen4, 2.5GbE (TSN opt.)

Specifications

Core System

SoC

12th Gen Intel® Core™ processors (formerly Alder Lake-P)

Processor	Cores/Threads	Cache	TDP	Graphics
i7-12800HE	6P+8E/20T	24MB	45W(35W cTDP)	Iris Xe, 96EUs
i5-12600HE	4P+8E/16T	18MB	45W(35W cTDP)	Iris Xe 80EUs
i3-12300HE	4P+4E/12T	12MB	45W(35W cTDP)	UHD 48EUs
i7-1270PE	4P+8E/16T	18MB	28W(20/35W cTDP)	Iris Xe, 96EUs
i5-1250PE	4P+8E/16T	12MB	28W(20/35W cTDP)	Iris Xe 80EUs
i3-1220PE	4P+4E/12T	12MB	28W(20/35W cTDP)	UHD 48EUs
i7-1265UE	2P+8E/12T	12MB	15W(12/28W cTDP)	Iris Xe, 96EUs
i5-1245UE	2P+8E/12T	12MB	15W(12/28W cTDP)	Iris Xe 80EUs
i3-1215UE	2P+4E/8T	10MB	15W(12/28W cTDP)	UHD 64EUs
Celeron 7305E	1P+4E/5T	8MB	15W(12/28W cTDP)	UHD 48EUs

Note: 28/15W SKUs are supported by project basis only. Please consult your ADLINK representative.

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 2.0, 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 64GB (2x 32GB) DDR5 non-ECC SO-DIMM memory, max. 4800MT/s
2 memory channels with 1DPC design

Embedded BIOS

AMI UEFI with CMOS backup in 32 SPI BIOS (dual BIOS opt.)

Cache

See above

Expansion Busses

PCIe x8 Gen4, lanes 16-23, available for 45W(35W cTDP SKUs)
PCIe x4 Gen4, lanes 24-27
PCIe x4 Gen4, lanes 28-31
8 PCIe x1 Gen3: Lanes 0/1/2/3 (configurable to x1, x2, x4) and 4 PCIe x1 Gen3: Lanes 4/5/6/7 (via PCIe switch) (depopulate PCIe switch by project basis)
LPC bus (via ESPI-to-LPC bridge IC), SMBus (system), I2C (user), GP_SPI(TBC)
Note: PCIe 16-23, 24-27, and 28-31 are recommended to be used for discrete graphics and storage purposes only.

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, genral 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 testpoints, debug LEDs
Video	GPU Feature Support	Intel® Iris Xe or UHD Graphics Core Architecture, max. 96EUs, supporting 4 concurrent display combinations of DisplayPort/HDMI/LVDS/eDP/VGA and Display alternative mode through USB4/Thunderbolt4 outputs 1x 8K30 or 4x 4K60 Hardware video encode/decode, up to 8K60 HEVC DirectX 12, OpenGL 4.6, Vulkan 1.2, Mesa 3D support OneVPL HDCP 2.3 Graphics Hardware Virtualization (SRIOV)
	Digital Display Interface	DDI 1/2/3 supporting DP 1.4a, HDMI 2.1, DVI
	VGA	Supported by build option via DP-to-VGA IC (in place of DDI 3), max. resolution 1920x1200@60Hz
	LVDS	Single/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 1.4a 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 carrier Express-BASE6 (ALC886 standard support)
Ethernet	Intel® MAC/PHY	Intel® Ethernet Connection I225 series (I225-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	4x USB 3.2/2.0/1.1 (USB 0-3), 4x USB 2.0/1.1 (USB 4-7) 2x SATA 6Gb/s (SATA 0-1) Max. two USB4 (in place of DDI 1/2) by project basis, Thunderbolt 4 capable (TBC)
	On-board Storage	NVMe SSD in place of PCIe lanes 28-31 (build option, project basis)
	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	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

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Specifications

Mechanical and Environmental	Form Factor	PICMG COM.0: Rev 3.1 Type 6
	Dimension	Basic size: 125 mm x 95 mm
	Operating Temperature	Standard: 0°C to 60°C (storage: -20°C to 80°C)
	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 10 IOT Enterprise LTSC, Ubuntu 64-bit, Yocto project-based Linux 64-bit (TBC), VxWorks (TBC)

Ordering Information

Starter Kit	
COM Express Type 6 Starter Kit Plus	Starter kit for COM Express Type 6
Module	
Express-ADP-i7-12800HE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i7-12800HE 3.5GHz/14C 45W
Express-ADP-i5-12600HE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i5-12600HE 3.3GHz/12C 45W
Express-ADP-i3-12300HE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i3-12300HE 3.3GHz/8C 45W
Express-ADP-i7-1270PE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i7-1270PE 3.3GHz/12C 28W
Express-ADP-i5-1250PE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i5-1250PE 3.2GHz/12C 28W
Express-ADP-i3-1220PE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i3-1220PE 3.1GHz/8C 28W
Express-ADP-i7-1265UE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i7-1265UE 3.5GHz/10C 15W
Express-ADP-i5-1245UE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i5-1245UE 3.3GHz/10C 15W
Express-ADP-i3-1215UE	Basic size COM Express Type 6 module based on Intel Alder Lake-P i3-1215UE 3.3GHz/6C 15W
Express-ADP-7305E	Basic size COM Express Type 6 module based on Intel Alder Lake-P Celeron 7305E 1.0GHz/5C 15W

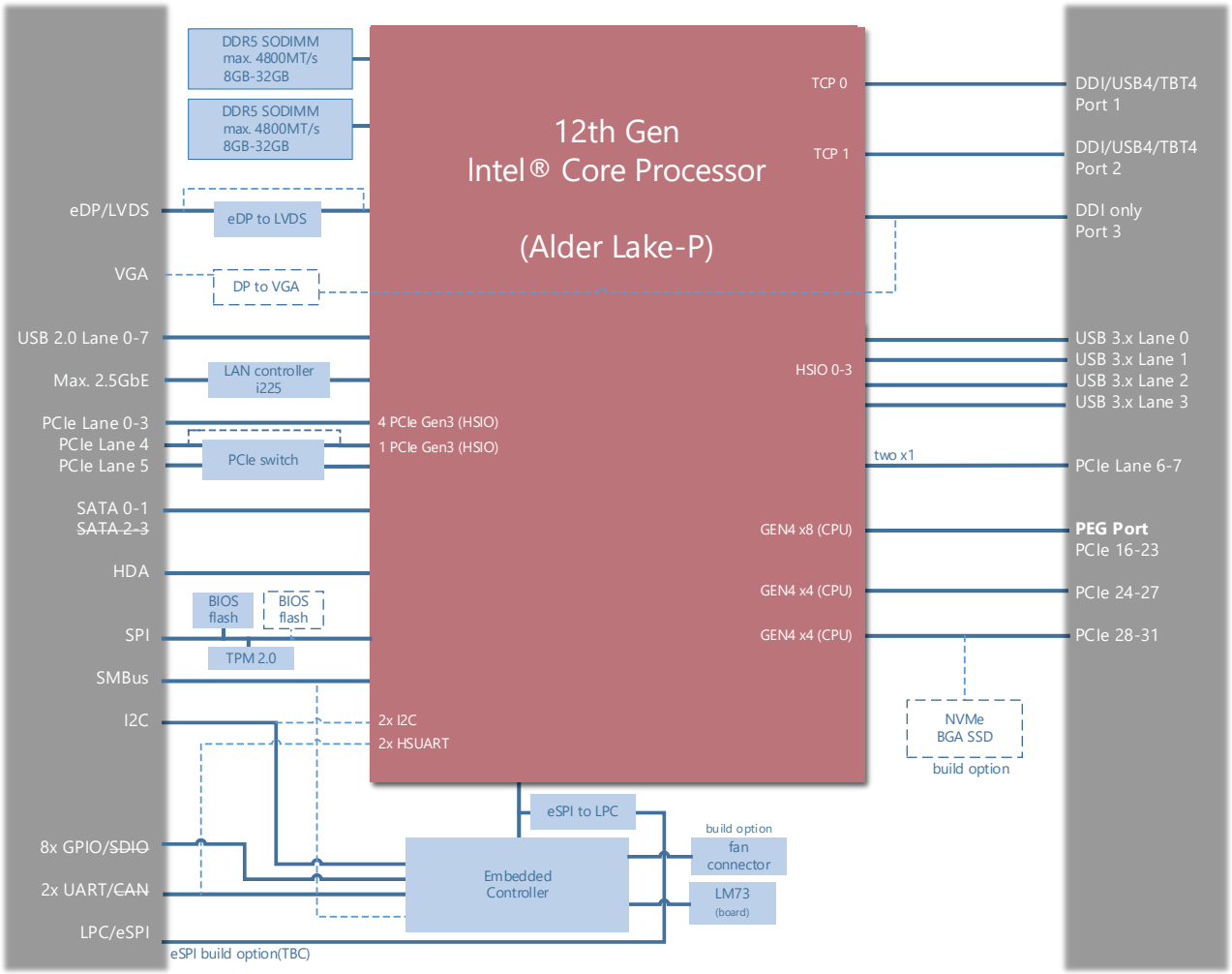
Accessories

Heat Spreaders	
HTS-ADP-B	Heatspreader for Express-ADP with threaded standoffs for bottom mounting
HTS-ADP-BT	Heatspreader for Express-ADP with through-hole standoffs for top mounting
Passive Heatsinks	
THS-ADP-BL	Low-profile Heatsink for Express-ADP with threaded standoffs for bottom mounting
THS-ADP-BTL	Low-profile Heatsink for Express-ADP with through-hole standoffs for top mounting
THSH-ADP-BL	High-profile Heatsink for Express-ADP with threaded standoffs for bottom mounting
Active Heatsinks	
THSF-ADP-BL	High-profile Heatsink with Fan for Express-ADP with threaded standoffs for bottom mounting

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Block diagram



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