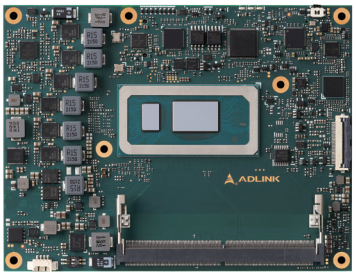
Express-RLP

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



Features

- Performance hybrid architecture (P-core, E-core)
- Up to 14 cores, 20 threads at 15W/28W/45W TDP
- Up to 96GB DDR5 SO-DIMM at max. 5200MHz, IBECC (selected SKUs)
- 4 displays via DDI/LVDS (opt. eDP, VGA) and USB4/Thunderbolt 4 (TBC)
- 1 PCIe x8 Gen4, 2 PCIe x4 Gen4, 2.5GbE (selected SKUs)
- Extreme Rugged operating temperature (selected SKUs)

Specifications

Core System

SoC

13th Gen Intel® Core™ mobile processors (formerly Raptor Lake-P)

Processor	Cores/Threads	Cache	TDP	Graphics
Core™ i7-13800HE	6P+8E/20T	24MB	45W(35W cTDP)	Iris Xe GPU
Core™ i5-13600HE	4P+8E/16T	18MB	45W(35W cTDP)	Iris Xe GPU
Core™ i3-13300HE	4P+4E/12T	12MB	45W(35W cTDP)	UHD GPU
Core™ i7-13800HRE	6P+8E/20T	24MB	45W(35W cTDP)	Iris Xe GPU
Core™ i5-13600HRE	4P+8E/16T	18MB	45W(35W cTDP)	Iris Xe GPU
Core™ i3-13300HRE	4P+4E/12T	12MB	45W(35W cTDP)	UHD GPU

Note:
1. Raptor Lake-P 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 2.0, 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 96GB (2x 48GB) DDR5, IBECC (selected SKUs), SO-DIMM memory, max. 5200MHz
2 memory channels with 1DPC design

Embedded BIOS

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

Cache

Core™ i7-13800H(R)E / i7-1370P(R)E :	24MB
Core™ i5-13600H(R)E / i5-1250PRE :	18MB
Core™ i7-1365PE / i7-1365URE / i5-1350PE / i5-1340PE / i5-1345U(R)E / i5-1335UE /i3-13300H(R)E / i3-1320P(R)E:	12MB
Core™ i3-1315URE :	10MB

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

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Specifications

	Expansion Busses	8 PCIe x1 Gen3: Lanes 0/1/2/3 (configurable to x1, x2, x4) and 4 PCIe x1 Gen3: Lanes 4/5/6/7 LPC bus (via ESPI-to-LPC bridge IC), SMBus (system), I²C (user), GP_SPI(TBC)
	SEMA Board Controller	Supports: Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, genral 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
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 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	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) Extreme Rugged: -40°C to 85°C (storage: -40°C to 85°C, TBC, build option, selected SKUs)
	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, Windows 11 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-RLP-i7-13800HE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i7-13800HE 2.5GHz/14C 45W
Express-RLP-i5-13600HE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i5-13600HE 2.7GHz/12C 45W
Express-RLP-i3-13300HE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i3-13300HE 2.1GHz/8C 45W
Express-RLP-i7-1370PE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i7-1370PE 1.9GHz/14C 28W
Express-RLP-i7-13800HRE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i7-13800HRE 2.5GHz/14C 45W, -40 to 85°C
Express-RLP-i5-13600HRE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i5-13600HRE 2.7GHz/12C 45W, -40 to 85°C
Express-RLP-i3-13300HRE	Basic size COM Express Type 6 module based on Intel Raptor Lake-P i3-13300HRE 2.1GHz/8C 45W, -40 to 85°C

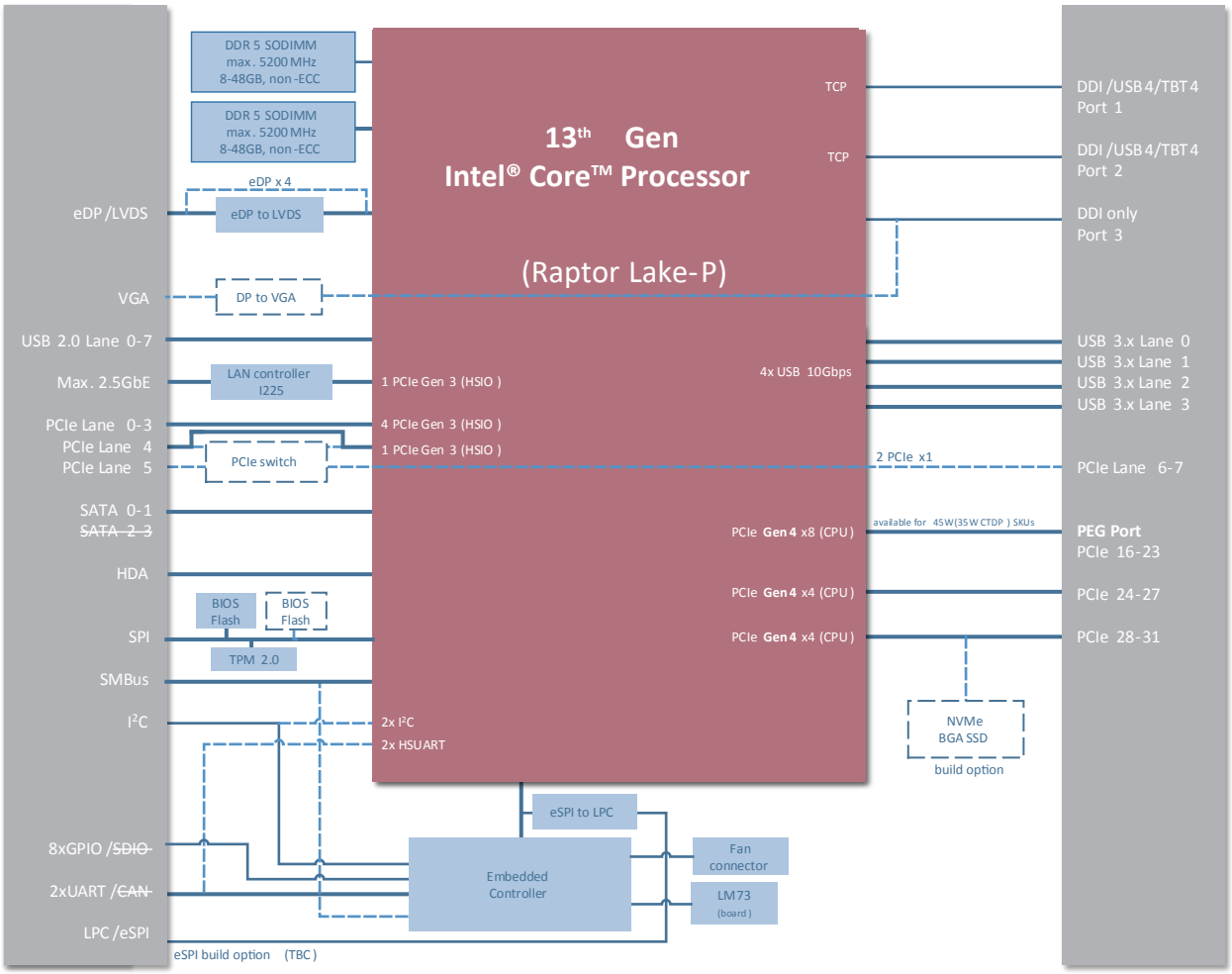
Note:
1. Raptor Lake-P supports Embedded and Industrial SKUs.
2. Some processor SKUs are supported by project basis only. Please see the user's manual for details or consult an ADLINK representative.

Accessories

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

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Block diagram



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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