ADLINK
LEADING EDGE COMPUTING

cExpress-RLP

COM Express Compact Size Type 6 Module based on 13th Gen Intel® Raptor Lake platform

Preliminary

Features

- LPDDR5 soldered memory for mission-critical applications
- Longevity Core i3/i5/i7 SKU
- Additional Real-time / Industrial SKUs (14C/20T)
- PCIe Gen4, 4x displays / 2x USB4 (optional)
- AI inference (AVX-512 VNNI, INtel Iris Xe GPU)
- Extreme Rugged operating temperature (-40°C to 85°C, optional)

Specifications

Core System	SoC	13th Gen Intel® i7/i5/i3 at 45W/28W/15W For more detailed information, please refer to the CPU SKUs section.
		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	Dual-channel LPDDR5 non-ECC/IBECC at max. 5600 MHz 8GB/16GB/32GB/64GB memory capacity IBECC (build option. selected SKU)
	Embedded BIOS	AMI EUFI with CMOS backup in 32MB SPI BIOS (dual BIOS by build option)
	Cache	Refer to the CPU SKUs section
	Expansion Busses	PCIe x8 Gen4, lanes 16-23, available for 45W SKU) PCIe x4 Gen4, lanes 24-27 PCIe x4 Gen4, lanes 28-31 (build option for NVMe SSD) 8 PCIe x1 Gen3: Lanes 0/1/2/3 (configurable to x1, x2, x4); Lanes 4/5/6/7 (configurable to x1, x2, x4); Lanes 6/7 muxed with SATA 1/0 LPC bus (via ESPI-to-LPC bridge IC), SMBus (system), I²C (user), GP_SPI(TBC) Note: A maximum of 7 PCIe devices are supported, including the onboard LAN controller (TBC).
	SEMA Board Controller	Supports: Voltage/current monitoring, power sequence debug support, AT/ATX mode control, logistics and forensic information, flat panel control, general purpose I²C, watchdog timer, fan control, and failsafe BIOS (dual BIOS by a build option)
	Debug Headers	30-pin multipurpose flat cable connector for use with DB30-x86 debug module providing BIOS POST code LED, EC access, SPI BIOS flashing, power testpoints, debug LEDs

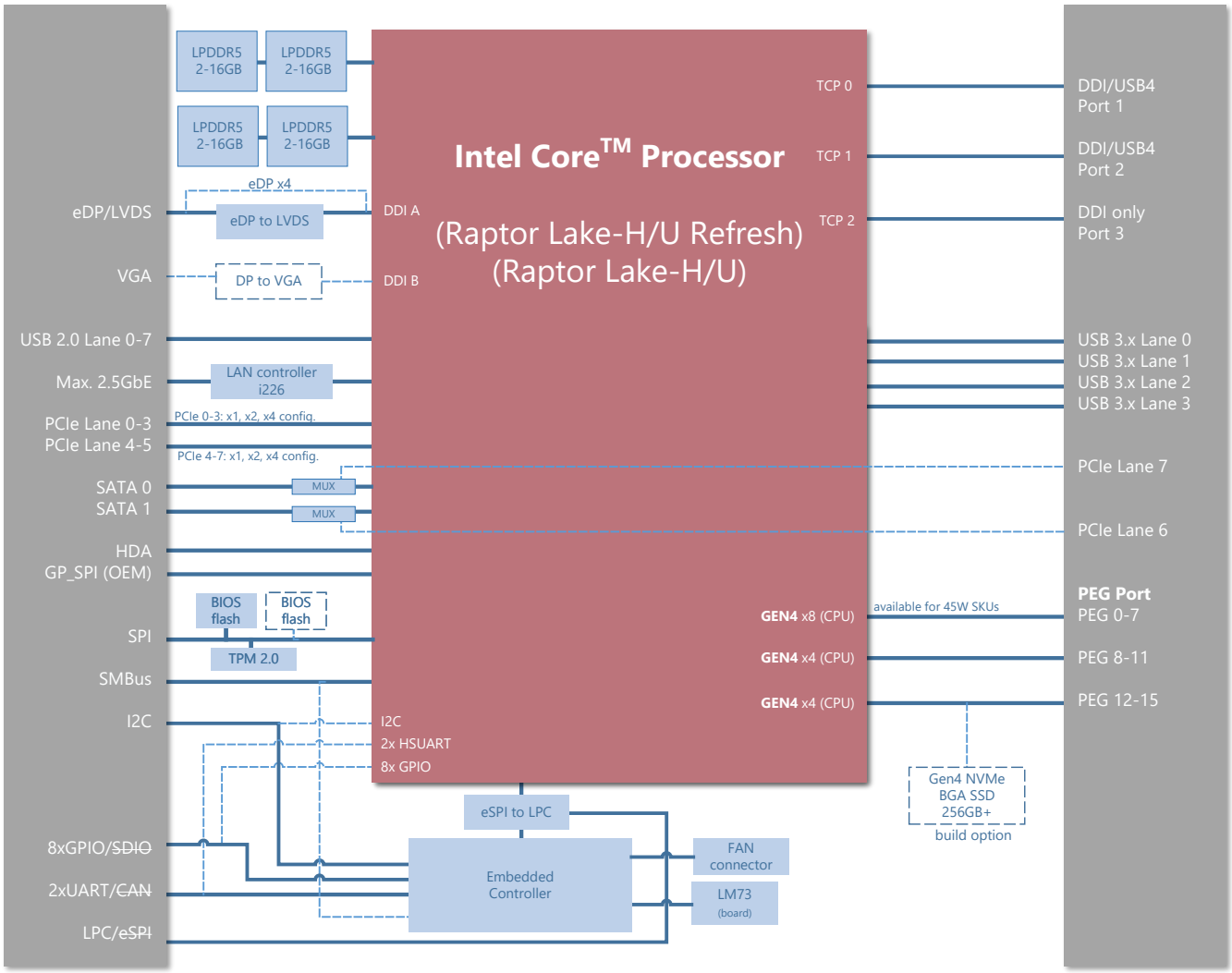
Specifications

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 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, HDMI, 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	Intel® HD Audio integrated in SoC
	Codec	On carrier Express-BASE6 R3.1 (ALC888 standard support)
Ethernet	Intel® MAC/PHY	Intel® Ethernet Connection I226 series (I226-IT supports TSN in Linux OS by build option)
	Interface	2.5GbE and 1000/100/10 Mbit/s Ethernet connection
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) USB 3.2 depends on the carrier design
	USB4	Max. 2x USB4 (in place of DDI 1/2) by project basis depends on the carrier design
	SATA	2x SATA 6Gb/s (SATA 0,1) SAT 0/1 muxed with PCIe lane 7/6. SATA function as default
	On-board Storage	PCIe Gen4 NVMe SSD in place of PCIe lanes 28-31 (build option, 256GB+ capacity)
	Serial	2x UART ports with console redirection
	GPIO	4x GPIO and 4x GPI from EC (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
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
	Power States	C1-C6, S0, 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

Specifications

Mechanical and Environmental	Form Factor	PICMG COM.0: Rev 3.1 Type 6
	Dimension	Basic size: 95 mm x 95 mm
	Operating Temperature	Standard: 0°C to 60°C (storage: -20°C to 80°C) Extreme Rugged: -45°C to 85°C (storage: -40°C to 85°C, 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
	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, and VxWorks (by project basis)

Block diagram



CPU SKUs

Processor	Cores	Frequency(P-core)	Cache	TDP	GPU Cores
i7-13800HRE	6P+8E	2.5(5.0) GHz	24MB	45W	Iris Xe 96EU
i5-13600HRE	4P+8E	2.7(4.8) GHz	18MB	45W	Iris Xe 80EU
i3-13300HRE	4P+4E	2.1(4.6) GHz	12MB	45W	UHD 48EU
i7-1370PRE	6P+8E	1.9(4.8) GHz	24MB	28W	Iris Xe 96EU
i5-1350PRE	4P+8E	1.8(4.6) GHz	18MB	28W	Iris Xe 80EU
i3-1320PRE	4P+4E	1.7(4.5) GHz	12MB	28W	UHD 48EU
i7-1365URE	2P+8E	1.7(4.9) GHz	12MB	15W	Iris Xe 96EU
i5-1345URE	2P+8E	1.4(4.6) GHz	12MB	15W	Iris Xe 80EU
i3-1315URE	2P+4E	1.2(4.5) GHz	10MB	15W	UHD 64EU
i7-13800HE	6P+8E	2.5(5.0) GHz	24MB	45W	Iris Xe 96EU
i5-13600HE	4P+8E	2.7(4.8) GHz	18MB	45W	Iris Xe 80EU
i3-13300HE	4P+4E	2.1(4.6) GHz	12MB	45W	UHD 48EU
i7-1370PE	6P+8E	1.9(4.8) GHz	24MB	28W	Iris Xe 96EU
i5-1350PE	4P+8E	1.8(4.6) GHz	12MB	28W	Iris Xe 80EU
i5-1340PE	4P+8E	1.8(4.5) GHz	12MB	28W	Iris Xe 80EU
i3-1320PE	4P+4E	1.7(4.5) GHz	12MB	28W	UHD 48EU
i7-1365UE	2P+8E	1.7(4.9) GHz	12MB	15W	Iris Xe 96EU
i5-1345UE	2P+8E	1.4(4.6) GHz	12MB	15W	Iris Xe 80EU
i5-1335UE	2P+8E	1.3(4.5) GHz	12MB	15W	Iris Xe 80EU
i3-1315UE	2P+4E	1.2(4.5) GHz	10MB	15W	UHD 64EU
U300E	1P+4E	1.1(4.3) GHz	8MB	15W	UHD 48EU

Note:

1. Raptor Lake-P supports Embedded and Industrial SKUs.
2. Some processor SKUs are supported by project basis only. Please consult our ADLINK representative.

Ordering Information

Module Number	Description/Configuration
To be announced (TBA)	

Note:

1. For processor SKUs that are not listed, please contact our ADLINK representative.

Accessories

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