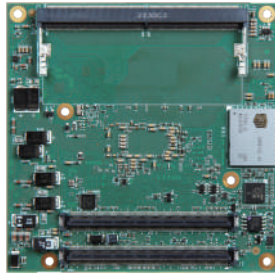
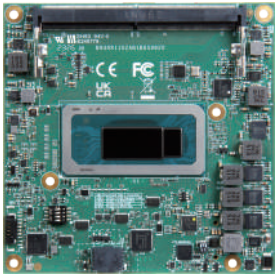


PCOM-B659

COM Express Type 6 Compact size module with 13th Gen Intel® Core™ P/U Processors with DDR5 SO-DIMM, DDI, PCIe Gen 4, USB4, USB 3.2 Gen2, 2.5 Gigabit TSN Ethernet, discrete TPM 2.0, eDP, SATA



FEATURES

- 13th Gen Intel® Core™ Series processors in Intel 7 lithography
- Up to 6x performance core + 8x efficient core, and up to 96x graphic execution units
- 2x DDR5-5200 non-ECC SO-DIMMs up to 96GB, 2x Gen4 x4, and 8x PCIe Gen3 x1
- 4x USB3.2 Gen2, 2x SATA, 3x DDI, VGA, eDP/LVDS
- Options for Industrial Temperature Range -40°C up to +85°C
Options for onboard PCIe NVMe SSD



The Portwell PCOM-B659 is a COM Express Type VI Compact size module designed with the 13th Gen Intel® Core™ P/U-series processors, and based on the PICMG COM Express Module Base Specification Rev 3.1. Specifically, the 13th Gen Intel Core processor platform adopts Intel 7 lithography process and supports AI acceleration with Intel Deep Learning Boost (VNNI) to offer advanced computing performance with 12~28W thermal power for dynamic embedded use conditions. PCOM-B659 features PCIe Gen 4 and 2x non-ECC DDR5 SO-DIMM interfaces, and is suitable for mission critical use cases and AI edge computing. It also provides (up to) 8x PCIe Gen 3 x1 lanes, 2x USB4 (option; default interface DDI), 4x USB 3.2 Gen 2, and 2x SATA III. Moreover, its extensive and flexible I/O capacity makes it ideal for diverse embedded/industrial applications.

General

General		
Product	PCOM-B659	
Form Factor	COM Express Type6 Compact Size (95 X 95mm)	
CPU Series	P series	U series
Cores P+E/Threads	Up to 6P + 8E/16T	Up to 2P + 8E/12T
Frequency	1.7 ~ 1.9 GHz	1.1 ~ 1.7 GHz
Turbo Frequency	Up to 4.8 GHz	Up to 4.9 GHz
Intel® Smart Cache	Up to 24 MB	Up to 12 MB
Intel® Gfx EU	Up to 96 EU	Up to 96 EU
Graphics Max Freq.	Up to 1.40 GHz	Up to 1.30 GHz
Processor TDP (Up / Nominal / Down)	35W / 28 W / 20W	28W / 15 W / 12W
PCH	SoC	
Memory Type/Speed	DDR5 SO-DIMM up to 96GB 5200MT/s	
ECC Memory Support	Non-ECC SO-DIMM (Support IB ECC on industrial SKUs)	

I/O Interface

SATA	2x SATA III share with PCIe lane		
USB	2x USB4 (option) 4x USB 3.2 Gen2 8x USB 2.0		
Ethernet	Intel® I226 series (Support TSN/TCC on industrial SKUs)		
Serial I/O	GPIO	8 bit GPIO (default 4 input/4 output)	
	I ² C	Baud Rate: 400KHz	
	SMBus	Baud Rate: 100KHz	
	UART	TX/RX signal only	
PCI Express Gen4	2x Gen4 x4		
PCI Express Gen3	8x Gen 3.0 x1 (2 lanes share with SATA, 1 lane share with LAN)		
Storage	Up to 1TB onboard NVMe SSD (share with PCIe Gen4 x4 lanes)		
Display	Module display interface	Carrier output options	Resolution
	eDP / LVDS (default eDP)	eDP up to HBR3	3840 x 2160@120Hz
		LVDS (24bit, dual channel)	1920 x 1200@60Hz
	DDI 1/2/3	DP up to HBR3	3840 x 2160@120Hz
HDMI 2.1		3840 x 2160@120Hz	
VGA	VGA	1920 x 1200@60Hz	
Security	TPM 2.0		

CPU SKU List

CPU Series	P series Embedded			
	i7-1370PE	i5-1350PE	i5-1340PE	i3-1320PE
Cores P+E/Threads	6P + 8E/16T	4P + 8E/16T	4P + 8E/16T	4P + 4E/12T
Frequency	1.9 GHz	1.8 GHz	1.8 GHz	1.7 GHz
Turbo Frequency	4.8 GHz	4.6 GHz	4.5 GHz	4.5 GHz
Intel® Smart Cache	24 MB	12 MB	12 MB	12 MB
Intel® Gfx EU	96 EU	80 EU	80 EU	48 EU
Graphics Max Freq.	1.40 GHz	1.40 GHz	1.35 GHz	1.35 GHz
Video Decode Boxes	2	2	2	1
Processor TDP (Up / Nominal / Down)	35W / 28 W / 20W			
IBECC	No			
TSN/TCC	No			
Support Temperature	0°C to 60°C			

CPU Series	U series Embedded				
	i7-1365UE	i5-1345UE	i5-1335UE	i3-1315UE	U300E
Cores P+E/Threads	2P + 8E/12T	2P + 8E/12T	2P + 8E/12T	2P + 4E/8T	1P + 4E/5T
Frequency	1.7 GHz	1.4 GHz	1.3 GHz	1.2 GHz	1.1 GHz
Turbo Frequency	4.9 GHz	4.6 GHz	4.5 GHz	4.5 GHz	4.3 GHz
Intel® Smart Cache	12 MB	12 MB	12 MB	10 MB	8 MB
Intel® Gfx EU	96 EU	80 EU	80 EU	64 EU	48 EU
Graphics Max Freq.	1.30 GHz	1.25 GHz	1.25 GHz	1.20 GHz	1.10 GHz
Video Decode Boxes	2	2	2	1	1
Processor TDP (Up / Nominal / Down)	28W / 15 W / 12W				
IBECC	No				
TSN/TCC	No				
Support Temperature	0°C to 60°C				

CPU Series	P series Industrial			U series Industrial		
	i7-1370PRE	i5-1350PRE	i3-1320PRE	i7-1365URE	i5-1345URE	i3-1315URE
Cores P+E/Threads	6P + 8E/16T	4P + 8E/16T	4P + 4E/12T	2P + 8E/12T	2P + 8E/12T	2P + 4E/8T
Frequency	1.9 GHz	1.8 GHz	1.7 GHz	1.7 GHz	1.4 GHz	1.2 GHz
Turbo Frequency	4.8 GHz	4.6 GHz	4.5 GHz	4.9 GHz	4.6 GHz	4.5 GHz
Intel® Smart Cache	24 MB	12 MB	12 MB	12 MB	12 MB	10 MB
Intel® Gfx EU	96 EU	80 EU	48 EU	96 EU	80 EU	64 EU
Graphics Max Freq.	1.40 GHz	1.40 GHz	1.35 GHz	1.30 GHz	1.25 GHz	1.20 GHz
Video Decode Boxes	2	2	1	2	2	1
Processor TDP (Up / Nominal / Down)	35W / 28 W / 20W			28W / 15 W / 12W		
IBECC	Yes			Yes		
TSN/TCC	Yes			Yes		
Support Temperature	-40°C to 85°C			-40°C to 85°C		

PCOM-B659

MECHANICAL & ENVIRONMENT

Dimension	95 x 95mm
Power DC IN	Normal: +12V DC AT/ATX mode
Storage Temperature	-40°C to 85°C
Operation Temperature	0°C to 60°C -40°C to 85°C (Industrial SKUs)
Certification	Contact us
MTBF	TBD
Vibration	TBD
OS	Windows 10/11 Ubuntu

ORDERING GUIDE

Product	Ordering P/N	Status
PCOM-B659-1370PE	TBD	In Development
PCOM-B659-1340PE	TBD	In Development
PCOM-B659-1320PE	TBD	In Development
PCOM-B659-1365UE	TBD	In Development

Product	Ordering P/N	Status
PCOM-B659-1335UE	TBD	In Development
PCOM-B659-1315UE	TBD	In Development
PCOM-B659-U300E	TBD	In Development
PCOM-B659-1370PRE	TBD	In Development
PCOM-B659-1350PRE	TBD	In Development
PCOM-B659-1320PRE	TBD	In Development
PCOM-B659-1365URE	TBD	In Development
PCOM-B659-1345URE	TBD	In Development
PCOM-B659-1315URE	TBD	In Development

Accessory	Ordering P/N	Status
Cooler (Heatpipe)	TBD	In Development
Heatsink (Heatpipe)	TBD	In Development
Heatspreader (Heatpipe)	TBD	In Development
PCOM-C605R Mini-ITX Carrier	AB1-3P78	Available
PCOM-C60B ATX Evaluation Carrier	AB1-3G22	Available

BLOCK DIAGRAM

PCOM-B659

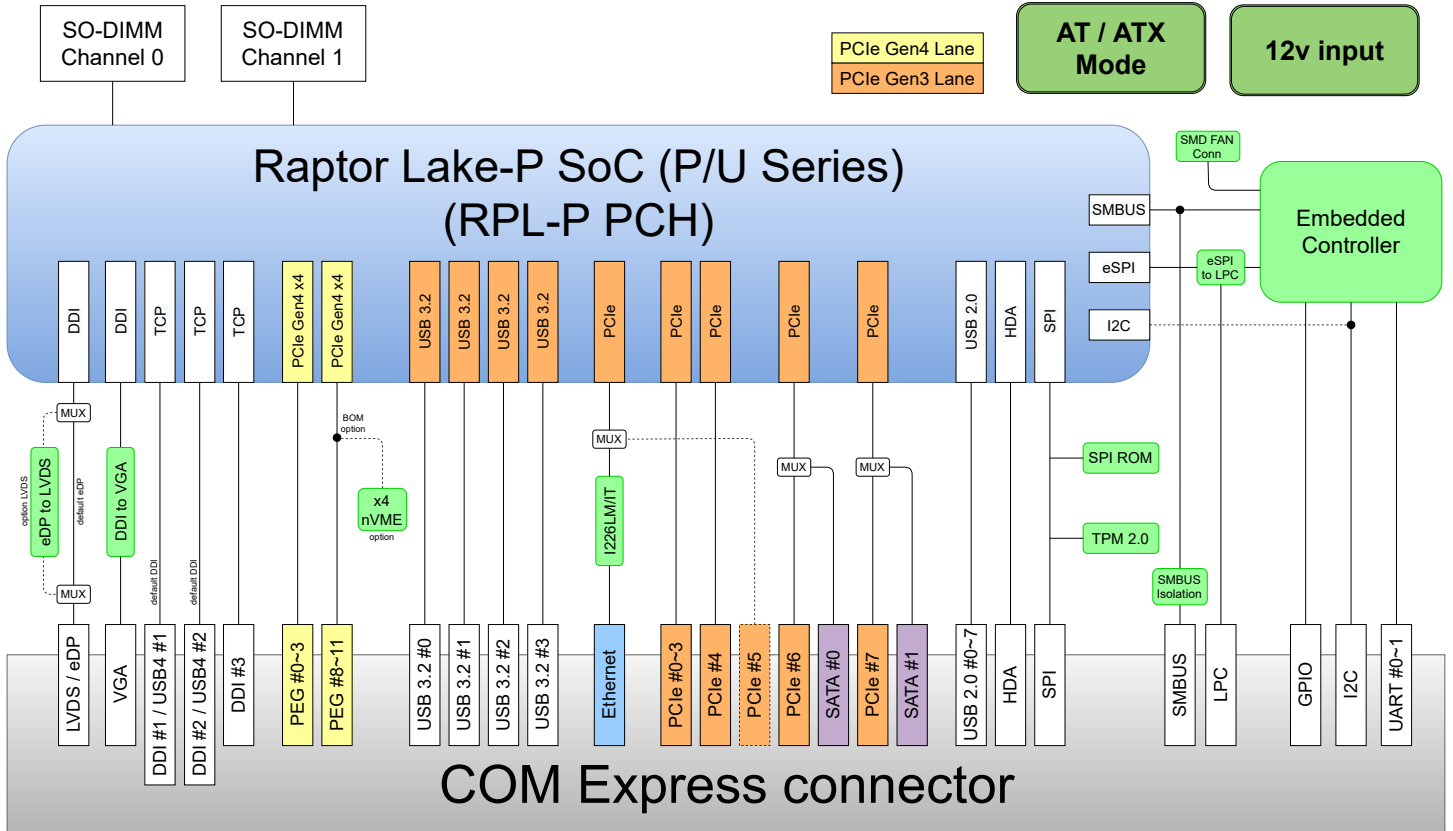
COM Express® Type 6
Compact Size 95x95mm

-40°C ~ 85°C

AT / ATX
Mode

12v input

PCIe Gen4 Lane
PCIe Gen3 Lane



COM Express connector