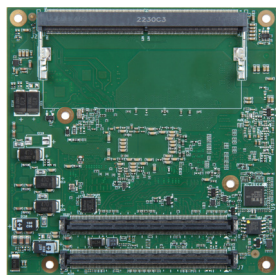
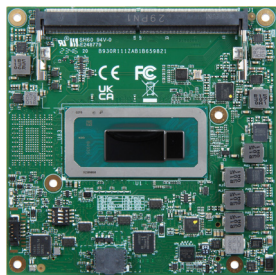


# PCOM-B659

COM Express Type6 Compact size module with Intel® 13<sup>th</sup> Gen P/U Processor DDR5 SO-DIMM, DDI, PCIe Gen 4, USB4, USB 3.2 Gen2, 2.5 Gigabit TSN Ethernet, discrete TPM 2.0, eDP, SATA



## FEATURES

- 13<sup>th</sup> 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



PCOM-B659 is COM Express module based on Intel® 13<sup>th</sup> Gen P/U platform. It is compatible with COM Express Rev3.1 standard. The platform adopt Intel 7 lithography and VNNI instruction set, offers advance computing power with 15~28W thermal and embedded use condition for wide range application. PCOM-B659 supports PCIe Gen4 lanes, and 2x Non-ECC DDR5 SO-DIMM, which is suit for mission critical use conditions and AI edge computing. This module also provides (up to) 8x PCIe Gen3 x1 lanes, 2x optional USB4(alternative with DDI), 4x USB 3.2 Gen 2, and 2x SATA . The complete and flexible I/O capacity also mapped to wide range of embedded/industrial applications.

## 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<br>(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<br>(Support IBEC on industrial SKU) |                   |

## I/O Interface

| I/O Interface    |                                                            |                                       |                   |
|------------------|------------------------------------------------------------|---------------------------------------|-------------------|
| SATA             | 2x SATA III share with PCIe lane                           |                                       |                   |
| USB              | 2x USB4 (option)<br>4x USB 3.2 Gen2<br>8x USB 2.0          |                                       |                   |
| Ethernet         | Intel® I226 series (Support TSN/TCC on industrial SKU)     |                                       |                   |
| Serial I/O       | GPIO                                                       | 8 bit GPIO (default 4 input/4 output) |                   |
|                  | I²C                                                        | 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)                    |                                       |                   |
| 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<br>(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<br>(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<br>(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<br>AT/ATX mode               |
| Storage Temperature   | -40°C to 85°C                                |
| Operation Temperature | 0°C to 60°C<br>-40°C to 85°C(Industrial SKU) |
| Certification         | Contact us                                   |
| MTBF                  | TBD                                          |
| Vibration             | TBD                                          |
| OS                    | Windows 10/11<br>Ubuntu                      |

## ORDERING GUIDE

| Product          | Ordering P/N | Status    |
|------------------|--------------|-----------|
| PCOM-B659-1370PE | AB1-3R62     | Available |
| PCOM-B659-1340PE | AB1-3S45     | Available |
| PCOM-B659-1320PE | AB1-3S46     | Available |
| PCOM-B659-1365UE | AB1-3S47     | Available |

## BLOCK DIAGRAM

| Product           | Ordering P/N | Status    |
|-------------------|--------------|-----------|
| PCOM-B659-1335UE  | AB1-3S55     | Available |
| PCOM-B659-1315UE  | AB1-3S54     | Available |
| PCOM-B659-U300E   | AB1-3S12     | Available |
| PCOM-B659-1370PRE | AB1-3S53     | Available |
| PCOM-B659-1350PRE | AB1-3S52     | Available |
| PCOM-B659-1320PRE | AB1-3S51     | Available |
| PCOM-B659-1365URE | AB1-3S50     | Available |
| PCOM-B659-1345URE | AB1-3S49     | Available |
| PCOM-B659-1315URE | AB1-3S48     | Available |

| Accessory                           | Ordering P/N | Status    |
|-------------------------------------|--------------|-----------|
| Cooler (copper elastic pad)         | B9972210     | Available |
| Cooler (aluminum)                   | B9972240     | Available |
| Heat Sink (copper elastic pad)      | B830C220     | Available |
| Heat Sink (aluminum)                | B830C210     | Available |
| Heat Spreader (Heatpipe)            | B830C191     | Available |
| Heat Spreader (aluminum)            | B830C200     | Available |
| PCOM-C605R<br>Mini-ITX Carrier      | AB1-3P78     | Available |
| PCOM-C60B<br>ATX Evaluation Carrier | AB1-3G22     | Available |

# PCOM-B659

COM Express® Type 6  
Compact Size 95x95mm

-40°C ~ 85°C

PCIe Gen5 Lane  
PCIe Gen4 Lane  
PCIe Gen3 Lane

AT / ATX  
Mode

12v input

