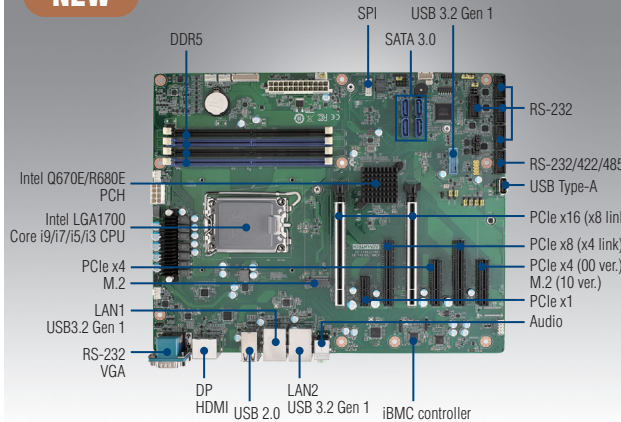


# AIMB-788E

## LGA1700 12<sup>th</sup>/13<sup>th</sup>/14<sup>th</sup> Generation Intel® Core™ i9/i7/i5/i3 & Intel® Core™ Processor Series 2 ATX Motherboard with DP/HDMI/VGA, DDR5, USB 3.2, M.2

NEW



### Features

- Intel® 12<sup>th</sup>/13<sup>th</sup>/14<sup>th</sup> generation Core™ i9/i7/i5/i3 & Pentium®/Celeron® & Intel® Core™ Processor Series 2 processor with Q670E/R680E chipset
- Dual PCIe x16 expansion slots
- DDR5 UDIMM up to 48GB per slot; 192 GB total
- Seven PCIe slots or Dual M.2 M Key for NVMe RAID
- Triple display DP/HDMI/VGA and dual GbE LAN
- M.2, SATA RAID 0, 1, 5, 10, USB 3.2 Gen 1
- Advantech iBMC remote out-of-band power management solution on DeviceOn

Note 1: Legacy platform is not supported.

Note 2: dTPM 2.0 module is required to enable TPM technologies.

Note 3: Intel® Platform Trust Technology (Intel® PTT) ready for Windows 11.

### Quiet Specifications

CE FCC

| Intel® Core™ Processors Series 2 (Bartlett Lake-S) (P-Core Only) | CPU                   | Core 9 273PE                                                                          | Core 9 273PTE | Core 7 253PE | Core 7 253PTE | Core 5 223PE | Core 5 223PTE | Core 5 213PE | Core 5 213PEF | Core 5 213PTE |                |                 |                |                 |
|------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|---------------|----------------|-----------------|----------------|-----------------|
|                                                                  | P-core Base Frequency | 2.3 GHz                                                                               | 1.4 GHz       | 2.5 GHz      | 1.8 GHz       | 2.9 GHz      | 2.3 GHz       | 2.7 GHz      | 2.7 GHz       | 2.1 GHz       |                |                 |                |                 |
|                                                                  | L3 Cache              | 36 MB                                                                                 | 36 MB         | 33 MB        | 33 MB         | 24 MB        | 24 MB         | 24 MB        | 24 MB         | 24 MB         |                |                 |                |                 |
|                                                                  | Cores                 | 12                                                                                    | 12            | 10           | 10            | 8            | 8             | 8            | 8             | 8             |                |                 |                |                 |
|                                                                  | Processor Base Power  | 65W                                                                                   | 45W           | 65W          | 45W           | 65W          | 45W           | 65W          | 65W           | 45W           |                |                 |                |                 |
| Intel® Core™ Processors Series 2 (Bartlett Lake-S)               | CPU                   | 251E                                                                                  | 251TE         | 221E         | 221TE         | 211E         | 211TE         | 211EF        | 201E          | 201TE         | 300            | 300T            |                |                 |
|                                                                  | P-core Base Frequency | 2.1 GHz                                                                               | 1.4 GHz       | 2.7 GHz      | 1.8 GHz       | 2.7 GHz      | 1.7 GHz       | 2.7 GHz      | 3.6 GHz       | 2.9 GHz       | 3.9 GHz        | 3.4 GHz         |                |                 |
|                                                                  | L3 Cache              | 36 MB                                                                                 | 36 MB         | 24 MB        | 24 MB         | 20 MB        | 20 MB         | 20 MB        | 12 MB         | 12 MB         | 6 MB           | 6 MB            |                |                 |
|                                                                  | Cores                 | 24                                                                                    | 24            | 14           | 14            | 10           | 10            | 10           | 4             | 4             | 2              | 2               |                |                 |
|                                                                  | Processor Base Power  | 65W                                                                                   | 45W           | 65W          | 45W           | 65W          | 45W           | 65W          | 60W           | 45W           | 46W            | 35W             |                |                 |
| 14th Generation Processors                                       | CPU                   | i9-14900                                                                              | i9-14900T     | i7-14700     | i7-14701E     | i7-14700T    | i5-14500      | i5-14501E    | i5-14500T     | i5-14400      | i5-14400T      | i5-14400F       | i3-14100       | i3-14100T       |
|                                                                  | P-core Base Frequency | 2.0 GHz                                                                               | 1.1 GHz       | 2.1 GHz      | 2.6GHz        | 1.3GHz       | 2.6 GHz       | 3.3GHz       | 1.7 GHz       | 2.5 GHz       | 1.5 GHz        | 2.5 GHz         | 3.5 GHz        | 2.7 GHz         |
|                                                                  | L3 Cache              | 36 MB                                                                                 | 36 MB         | 33 MB        | 16MB          | 33 MB        | 24 MB         | 24MB         | 24 MB         | 20 MB         | 20 MB          | 20 MB           | 12 MB          | 12 MB           |
|                                                                  | Cores                 | 24                                                                                    | 24            | 20           | 8             | 20           | 14            | 6            | 14            | 10            | 10             | 10              | 4              | 4               |
|                                                                  | Processor Base Power  | 65 W                                                                                  | 35 W          | 65 W         | 65W           | 35 W         | 65 W          | 65W          | 35 W          | 65 W          | 35 W           | 65 W            | 60 W           | 35 W            |
| 13th Generation Processors                                       | CPU                   | i9-13900(E)                                                                           | i9-13900TE    | i7-13700(E)  | i7-13700T(E)  | i5-13500(E)  | i5-13500T(E)  | i5-13400(E)  | i3-13100(E)   | i3-13100T(E)  |                |                 |                |                 |
|                                                                  | P-core Base Frequency | 2.0 GHz                                                                               | 1.1 GHz       | 2.1 GHz      | 1.4 GHz       | 2.5 GHz      | 1.6 GHz       | 2.5 GHz      | 3.4 GHz       | 2.5 GHz       |                |                 |                |                 |
|                                                                  | L3 Cache              | 36 MB                                                                                 | 36 MB         | 30 MB        | 30 MB         | 24 MB        | 24 MB         | 20MB         | 12 MB         | 12 MB         |                |                 |                |                 |
|                                                                  | Cores                 | 24                                                                                    | 24            | 16           | 16            | 14           | 14            | 10           | 4             | 4             |                |                 |                |                 |
|                                                                  | Processor Base Power  | 65 W                                                                                  | 35 W          | 65 W         | 35 W          | 65 W         | 35 W          | 65W          | 60 W          | 35 W          |                |                 |                |                 |
| 12th Generation Processors                                       | CPU                   | i9-12900(E)                                                                           | i9-12900TE    | i7-12700(E)  | i7-12700TE    | i5-12500(E)  | i5-12400      | i5-12500TE   | i3-12100(E)   | i3-12100TE    | Pentium G7400E | Pentium G7400TE | Celeron G6900E | Celeron G6900TE |
|                                                                  | P-core Base Frequency | 2.4 GHz                                                                               | 1.1 GHz       | 2.1 GHz      | 1.4 GHz       | 3.0 GHz      | 2.5 GHz       | 1.9 GHz      | 3.3 GHz       | 2.1 GHz       | 3.6 GHz        | 3.0 GHz         | 3.0 GHz        | 2.4 GHz         |
|                                                                  | L3 Cache              | 30 MB                                                                                 | 30 MB         | 25 MB        | 25 MB         | 18 MB        | 18 MB         | 18 MB        | 12 MB         | 12 MB         | 6 MB           | 6 MB            | 4 MB           | 4 MB            |
|                                                                  | Cores                 | 16                                                                                    | 16            | 12           | 12            | 6            | 6             | 6            | 4             | 4             | 2              | 2               | 2              | 2               |
|                                                                  | Processor Base Power  | 65 W                                                                                  | 35 W          | 65 W         | 35 W          | 65 W         | 65 W          | 35 W         | 60 W          | 35 W          | 46 W           | 35 W            | 46 W           | 35 W            |
| Processor System                                                 | Socket                | LGA 1700                                                                              |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | Chipset               | Q670E/R680E                                                                           |               |              |               |              |               |              |               |               |                |                 |                |                 |
| Expansion Slot                                                   | BIOS                  | AMI 256Mbit SPI Flash                                                                 |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | PCIe x1               | 1 (Gen 4)                                                                             |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | PCIe x4               | 2 (1 x Gen 4 x4 link, 1 x Gen 3 x4 link); 1 (AIMB-788E-10 version, 1 x Gen 4 x4 link) |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | PCIe x8               | 2 (1 x Gen 4 x4 link, 1 x Gen 3 x4 link)                                              |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | PCIe x16*             | 2 (1 x Gen 5 x8 link, 1 x Gen 4 x8 link)                                              |               |              |               |              |               |              |               |               |                |                 |                |                 |
| Memory                                                           | Technology            | Dual Channel DDR5** Non-ECC UDIMM; Dual Channel DDR5 ECC UDIMM (AIMB-788E-0R version) |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | Max Capacity          | 48GB per slot; 192 GB total                                                           |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | Sockets               | 4 x 288-pin DIMM                                                                      |               |              |               |              |               |              |               |               |                |                 |                |                 |
| Graphics                                                         | Controller            | Chipset integrated Intel UHD Graphics                                                 |               |              |               |              |               |              |               |               |                |                 |                |                 |
|                                                                  | VRAM                  | Shares system memory is subjected to OS                                               |               |              |               |              |               |              |               |               |                |                 |                |                 |

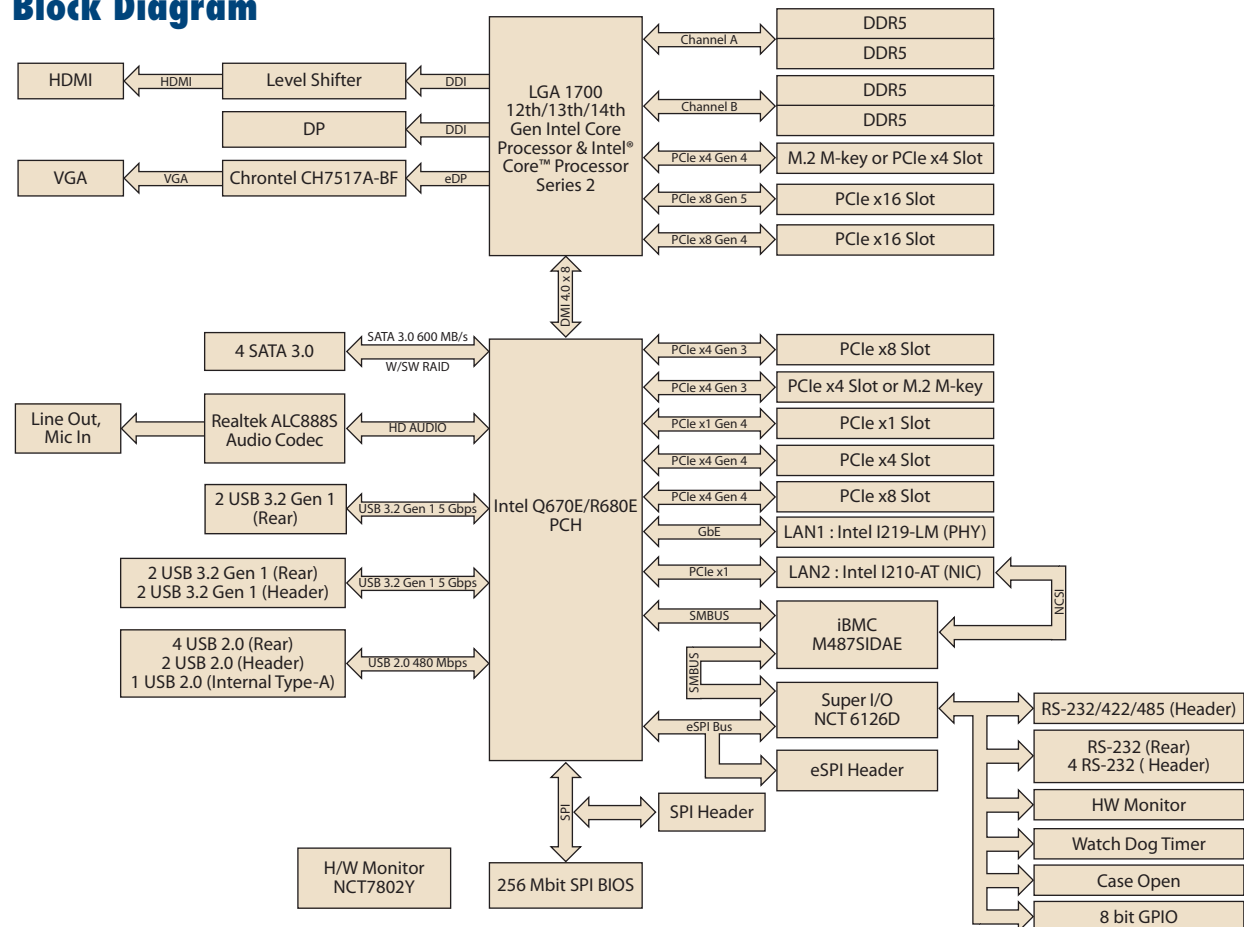
\* The PCIe x16 slot, from CPU, can only support graphic cards and storage cards according to the specification recommended by Intel. Other types of add-on cards might not work properly. For the compatible device list validated on the PCIe x16 slot, please refer to the user manual.

\*\* DDR5 runs at 4400 MT/s with one DIMM per channel, 4000 MT/s with two DIMMs in one channel, and 3600MT/s with two DIMMs per channel.

## Specifications (Cont.)

|                          |                   |                                                                                                                   |        |        |        |                             |        |
|--------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------|--------|--------|--------|-----------------------------|--------|
| Ethernet                 | Interface         | 10/100/1000 Mbps                                                                                                  |        |        |        |                             |        |
|                          | Controller        | GbE LAN1: Intel I219-LM (PHY); GbE LAN2: Intel I210-AT                                                            |        |        |        |                             |        |
|                          | Connector         | 2 x RJ-45                                                                                                         |        |        |        |                             |        |
| SATA                     | Channel           | 4                                                                                                                 |        |        |        |                             |        |
|                          | RAID              | 0, 1, 5, 10                                                                                                       |        |        |        |                             |        |
| Rear I/O                 | VGA               | 1 (Resolution up to 1920 x 1200 @ 60Hz)                                                                           |        |        |        |                             |        |
|                          | HDMI              | 1 (Resolution up to 3840 x 2160 @ 60Hz)                                                                           |        |        |        |                             |        |
|                          | DisplayPort       | 1 (Resolution up to 4096 x 2304 @ 60Hz)                                                                           |        |        |        |                             |        |
|                          | Ethernet          | 2                                                                                                                 |        |        |        |                             |        |
|                          | USB               | 8 (4 x USB 3.2 Gen 1, 4 x USB 2.0)                                                                                |        |        |        |                             |        |
|                          | Audio             | 2 (Line-out, Mic-in)                                                                                              |        |        |        |                             |        |
| Watchdog Timer           | Serial            | 1 (RS-232)                                                                                                        |        |        |        |                             |        |
|                          | Output            | System reset                                                                                                      |        |        |        |                             |        |
|                          | Interval          | Programmable 1 ~ 255 sec                                                                                          |        |        |        |                             |        |
| Power Requirement        | Power On          | Intel Core i 65W , DDR5 32 GB x 4                                                                                 |        |        |        |                             |        |
|                          | Voltage           | +3.3 V                                                                                                            | +5 V   | +12 V  | +5 Vsb | -12 V                       | -5 V   |
|                          | Current           | 1.54 A                                                                                                            | 1.96 A | 0.07 A | 0.08 A | 0.04 A                      | 0.01 A |
| Internal Connectors      | USB               | 5 (2 x USB 3.2 Gen 1 via pin header, 2 x USB 2.0 via pin header, 1 x USB 2.0 type A connector)                    |        |        |        |                             |        |
|                          | Serial            | 5 (4 x RS-232, 1 x RS-232/422/485)                                                                                |        |        |        |                             |        |
|                          | SATA              | 4                                                                                                                 |        |        |        |                             |        |
|                          | M.2               | 1 (PCIe x4 Gen 4 M-key 2280 type); 2 (AIMB-788E-10 version, 1 x PCIe x4 Gen 4, 1 x PCIe x4 Gen 3 M-key 2280 type) |        |        |        |                             |        |
|                          | SPI               | 1 (Optional dTPM 2.0 module available)                                                                            |        |        |        |                             |        |
|                          | GPIO              | 8-bit                                                                                                             |        |        |        |                             |        |
| Environment              | Operating         |                                                                                                                   |        |        |        | Non-Operating               |        |
|                          | Temperature       | 0 ~ 60 °C (32 ~ 140 °F), depends on CPU loading and system thermal solution                                       |        |        |        | -40 ~ 85 °C                 |        |
|                          | Humidity          | 95%@ 40 °C, non-condensing                                                                                        |        |        |        | 95% @ 60 °C, non-condensing |        |
| Physical Characteristics | Dimension (L x H) | 304.8 x 244 mm (12" x 9.6")                                                                                       |        |        |        |                             |        |

## Block Diagram



## Ordering Information

| Part number     | Chipset | Memory                          | Display         | USB 3.2 Gen 1 | USB 2.0 | COM | GbE LAN | AMT | M.2 | SATA 3.0 | SW RAID | iBMC |
|-----------------|---------|---------------------------------|-----------------|---------------|---------|-----|---------|-----|-----|----------|---------|------|
| AIMB-788E-00A1  | Q670E   | Non-ECC UDIMM DDR5 up to 192 GB | VGA + HDMI + DP | 6             | 7       | 6   | 2       | Yes | 1   | 4        | Yes     | Yes  |
| AIMB-788E-10A1  | Q670E   | Non-ECC UDIMM DDR5 up to 192 GB | VGA + HDMI + DP | 6             | 7       | 6   | 2       | Yes | 2   | 4        | Yes     | Yes  |
| AIMB-788E-0RA1  | R680E   | ECC UDIMM DDR5 up to 192GB      | VGA + HDMI + DP | 6             | 7       | 6   | 2       | Yes | 1   | 4        | Yes     | Yes  |
| AIMB-788E-00A1U | Q670E   | Non-ECC UDIMM DDR5 up to 192 GB | VGA + HDMI + DP | 6             | 7       | 6   | 2       | Yes | 1   | 4        | Yes     | Yes  |

## Packing List

| Part Number    | Description                                 | Qty |
|----------------|---------------------------------------------|-----|
| 1700003194     | SATA data cable                             | 2   |
| 1960104181T051 | I/O port bracket (for 2U chassis or higher) | 1   |
| 2041078800     | Startup manual                              | 1   |

Note: Driver CD is not provided. Please visit Advantech support website for driver download.

## Embedded OS

| Part Number    | Description                         |
|----------------|-------------------------------------|
| 20706WLE1S0070 | img W11 24EL AIMB-788E 64b 24H2 ENU |
| 20706WLH1S0070 | img W11 24HL AIMB-788E 64b 24H2 ENU |
| 20706WLV1S0070 | img W11 24VL AIMB-788E 64b 24H2 ENU |
| 20706WX1ES0136 | img W10 21EL AIMB-788E 64b 21H2 ENU |
| 20706WX1HS0136 | img W10 21HL AIMB-788E 64b 21H2 ENU |
| 20706WX1VS0136 | img W10 21VL AIMB-788E 64b 21H2 ENU |

## Optional Accessories

| Part number                                       | Description                                                              |
|---------------------------------------------------|--------------------------------------------------------------------------|
| 1700002204                                        | 2-port USB 2.0 cable w/ BKT(27 cm)                                       |
| 1700028292-01                                     | 2-port USB 3.0 cable w/ BKT(30 cm)                                       |
| 1970005349T000                                    | CPU cooler for 2U, 4U, and wallmount chassis (for CPU Base Power=35~65W) |
| 1970005436T001                                    | CPU cooler for 2U, 4U, and wallmount chassis (for CPU Base Power=125W)   |
| 1970005934N001                                    | CPU cooler for 4U chassis (for CPU Base Power = 125W)                    |
| 1701090401                                        | Single COM port cable(40 cm)                                             |
| 1701092300                                        | Dual COM port cable(28.5 cm)                                             |
| 1700022749-11/<br>1700022749-12/<br>1700022749-13 | SATA power cable                                                         |
| PCA-TPMSPI-00A1                                   | dTPM 2.0 SPI module to enable TPM and vPro technologies                  |

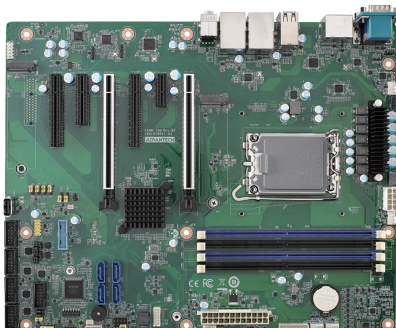
Note: Purchasing AIMB-788's proprietary CPU cooler from Advantech is highly recommended. Other brands' CPU coolers are NOT compatible with AIMB-788. Especially the cooler type with fan aside is not allowed to use on AIMB-788 due to heat dissipation on MOSFET.

## I/O View



AIMB-788E-00A1  
AIMB-788E-10A1  
AIMB-788E-0RA1

## Front View



AIMB-788E-10A1