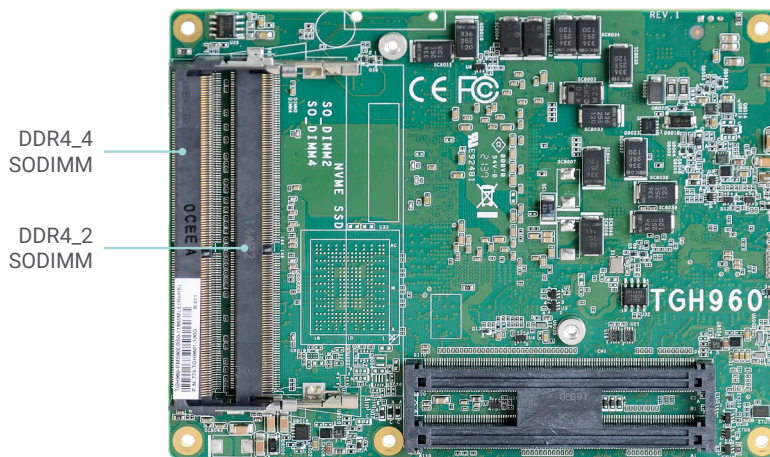
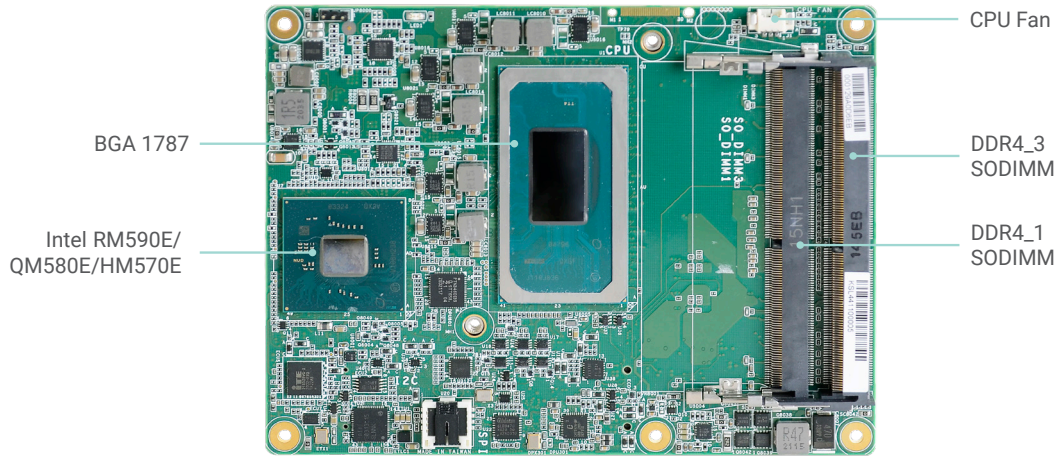


# TGH960- RM590E/QM580E/HM570E

11th Gen Intel® Core™



## KEY FEATURES



### DDR4

4 DDR4-3200 SODIMM up to 128GB



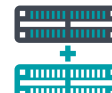
### 4K High Resolution

DP++ resolution supports up to 4096x2304 @ 60Hz



### Multiple Displays

Five display ports: VGA + LVDS\*/eDP + 3 DDI



### Multiple Expansion

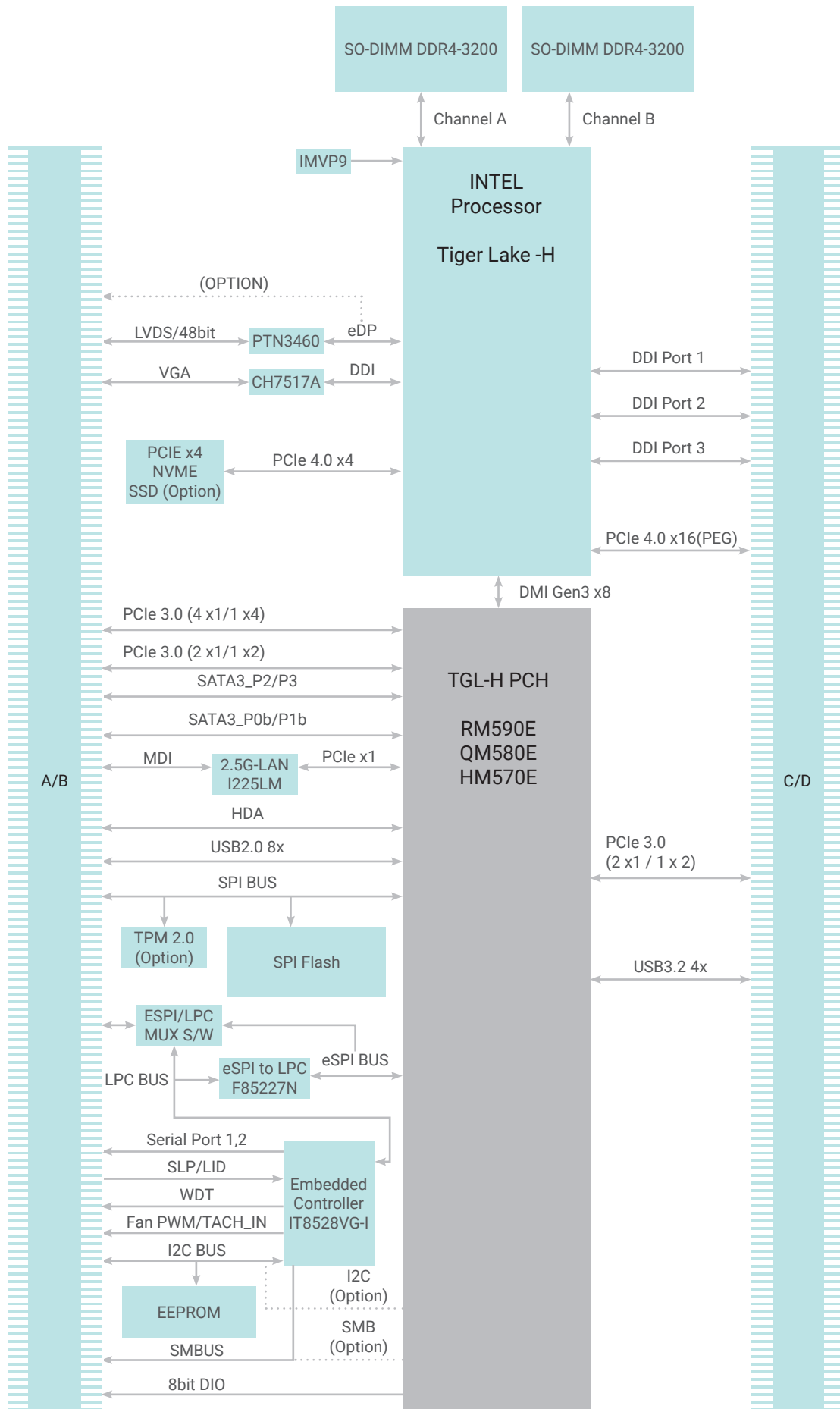
1 PCIe x16, up to 8 PCIe x1



### Rich I/O

1 Intel 2.5GbE, 4 USB 3.2 Gen2, 8 USB 2.0

# BLOCK DIAGRAM



## SPECIFICATION

|                       |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |  |
|-----------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--|
| SYSTEM                | <b>Processor</b>             | 11th Gen Intel® Core™ Processors, BGA 1787<br>Intel® Xeon® W-11865MRE, 8 Cores, 24M Cache, 2.6GHz (4.7GHz), 45W (RM590E)<br>Intel® Xeon® W-11865MLE, 8 Cores, 24M Cache, 1.5GHz (4.5GHz), 25W (RM590E)<br>Intel® Core™ i7-11850HE, 8 Cores, 24M Cache, 2.6GHz (4.7GHz), 45W (RM590E/QM580E)<br>Intel® Xeon® W-11555MRE, 6 Cores, 12M Cache, 2.6GHz (4.5GHz), 45W (RM590E)<br>Intel® Xeon® W-11555MLE, 6 Cores, 12M Cache, 1.9GHz (4.4Hz), 25W (RM590E)<br>Intel® Core™ i5-11500HE, 6 Cores, 12M Cache, 2.6GHz (4.5GHz), 45W (RM590E/QM580E)<br>Intel® Xeon® W-11155MRE, 4 Cores, 8M Cache, 2.4GHz (4.4GHz), 45W (RM590E)<br>Intel® Xeon® W-11155MLE, 4 Cores, 8M Cache, 1.8GHz (3.1GHz), 25W (RM590E)<br>Intel® Core™ i3-11100HE, 4 Cores, 8M Cache, 2.4GHz (4.4GHz), 45W (RM590E/QM580E/HM570E)<br>Intel® Celeron® 6600HE, 2 Cores, 8M Cache, 2.6GHz, 35W (RM590E/QM580E/HM570E) |                                                     |  |
|                       | <b>Chipset</b>               | Intel® RM590E/QM580E/HM570E Chipset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |  |
|                       | <b>Memory</b>                | 3pcs DDR4 3200MHz SO-DIMM up to 96GB,<br>4th DIMM by request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Dual Channel DDR4 3200MHz<br>ECC support by request |  |
|                       | <b>BIOS</b>                  | AMI SPI 256Mbit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |  |
|                       | GRAPHICS                     | <b>Controller</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Intel® Iris® Xe Graphics                            |  |
| <b>Feature</b>        |                              | OpenGL 4.5, DirectX 12, OpenCL 2.1<br>HW Decode: MPEG2, WMV9, AVC/H264, JPEG/MJPEG, HEVC/H265, VP9, AV1<br>HW Encode: AVC/H264, JPEG, HEVC/H265, VP9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                     |  |
| <b>Display</b>        |                              | 1 x VGA<br>1 x LVDS/eDP (eDP available upon request)<br>3 x DDI (HDMI/DP++)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                     |  |
| <b>Multi-displays</b> |                              | VGA + LVDS + 2 DDI or<br>VGA + 3 DDI or<br>LVDS + 3 DDI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                     |  |
| EXPANSION             | <b>Interface</b>             | 1 x PCIe x16 (Gen 4)<br>8 x PCIe x1 (Gen 3)<br>1 x LPC<br>1 x I2C<br>1 x SMBus<br>2 x UART (TX/RX)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |  |
| AUDIO                 | <b>Audio Codec</b>           | HD Audio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                     |  |
| ETHERNET              | <b>Phy</b>                   | 1 x Intel® I225 series (10/100/1000Mbps/2.5G)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |  |
| I/O                   | <b>USB</b>                   | 4 x USB 3.2 Gen2<br>8 x USB 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |  |
|                       | <b>SATA</b>                  | 4 x SATA 3.0 (up to 6Gb/s)<br>support RAID 0/1/5/10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |  |
|                       | <b>DIO</b>                   | 1 x 8-bit DIO (Default 4 inputs and 4 outputs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |  |
| WATCHDOG TIMER        | <b>Output &amp; Interval</b> | System Reset, Programmable via Software from 1 to 255 Seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |  |
| STORAGE (Option)      | <b>NVMe SSD</b>              | PCIe x4 Gen4, 64GB~1TB<br>SSD and 2nd DDR4 SO-DIMM(DIMM2) is alternative function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |  |
| SECURITY              | <b>TPM</b>                   | TPM2.0 (Available Upon Request)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |  |
| POWER                 | <b>Type</b>                  | 8.5V~20V, 5VSB, VCC_RTC (ATX mode)<br>8.5V~20V, VCC_RTC (AT mode)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |  |
|                       | <b>Consumption</b>           | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |  |
| OS SUPPORT            | <b>Microsoft</b>             | Windows 10 IoT Enterprise 64-bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |  |
|                       | <b>Linux</b>                 | Ubuntu 20.04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |  |
| ENVIRONMENT           | <b>Temperature</b>           | Operating: 0 to 60°C, -40 to 85°C<br>Storage: -40 to 85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                     |  |
|                       | <b>Humidity</b>              | Operating: 5 to 90% RH<br>Storage: 5 to 90% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |  |
|                       | <b>MTBF</b>                  | TBD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |  |
| MECHANICAL            | <b>Dimensions</b>            | COM Express® Basic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 95mm (3.74") x 125mm (4.9")                         |  |
|                       | <b>Compliance</b>            | PICMG COM Express® R3.0, Type 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                     |  |
| CERTIFICATIONS        | <b>Certifications</b>        | CE, FCC, RoHS, UKCA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                     |  |

## ORDERING INFORMATION

| Part Number      | Model Name                 | CPU            | PCH    | LVDS/<br>eDP | USB3.2<br>Gen2 | TPM2.0 | Thermal | Operating<br>temp. |
|------------------|----------------------------|----------------|--------|--------------|----------------|--------|---------|--------------------|
| 770-TGH9601-000G | TGH960-QM580E-BS0-11850HE  | i7-11850HE     | QM580E | LVDS         | 4              | N/A    | Cooler  | 0~60°C             |
| 770-TGH9601-100G | TGH960-RM590E-BS0-11865MLE | W-11865MLE     | RM590E | eDP          | 4              | N/A    | Cooler  | 0~60°C             |
| 770-TGH9601-200G | TGH960-RM590E-TS0-11865MRE | W-11865MRE     | RM590E | LVDS         | 4              | N/A    | Cooler  | -40~85°C           |
| 770-TGH9601-300G | TGH960-HM570E-BS0-6600HE   | Celeron 6600HE | HM570E | LVDS         | 4              | N/A    | Cooler  | 0~60°C             |
| 770-TGH9601-400G | TGH960-RM590E-TS0-11865MRE | W-11865MRE     | RM590E | LVDS         | 4              | Yes    | Cooler  | -40~85°C           |
| 770-TGH9601-500G | TGH960-QM580-BS0-11100HE   | i3-11100HE     | QM580E | LVDS         | 4              | N/A    | Cooler  | 0~60°C             |

## OPTIONAL ITEMS

|                          |                 |
|--------------------------|-----------------|
| COM335 carrier board kit | 770-CM3351-000G |
|--------------------------|-----------------|