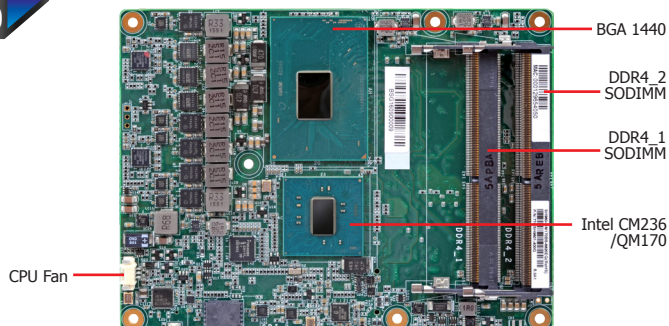


# SH960-CM236/QM170

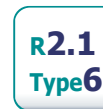
CM236  
QM170



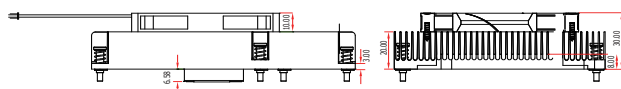
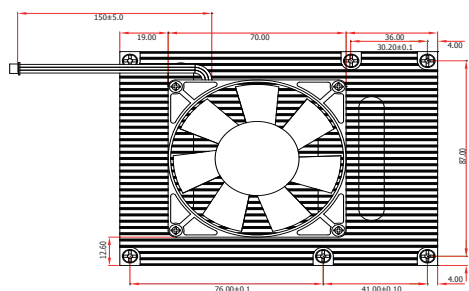
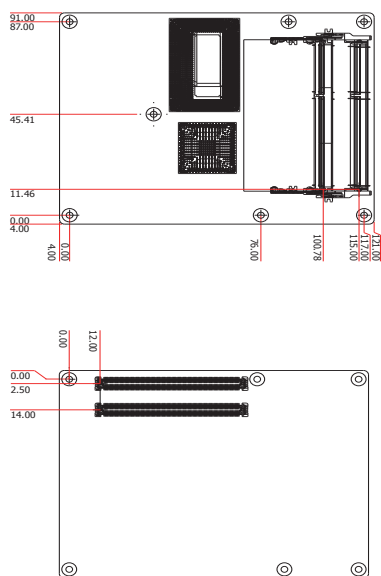
## Features

- Dual channel DDR4 2133MHz SODIMM up to 32GB
- Four display ports: VGA\*/DDI + LVDS\*/eDP + 2 DDI Supports three independent displays
- eDP resolution supports up to 4096x2304 @ 60Hz
- Multiple expansion: 1 PCIe x16, 8 PCIe x1
- Rich I/O: 1 Intel GbE, 4 USB 3.0, 8 USB 2.0

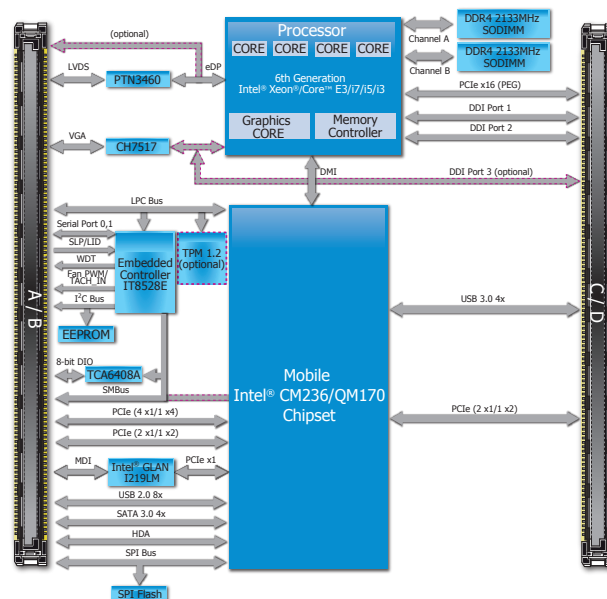
\* Populated by default



## Mechanical Drawing



## Block Diagram



| PCIe L0~3 |    |    |    | PCIe L4~5 |    | PCIe L6~7 |    |
|-----------|----|----|----|-----------|----|-----------|----|
| x4        |    |    |    | x4        |    |           |    |
| x2        |    | x2 |    | x2        |    | x2        |    |
| x1        | x1 | x1 | x1 | x1        | x1 | x1        | x1 |

\* 8 x PCIe x1 or 2 x PCIe x4 or 4 x PCIe x2

## Specifications

|                       |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                |
|-----------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SYSTEM</b>         | <b>Processor</b>             | 6th Generation Intel® Core™ Processors, BGA 1440<br>Intel® Xeon® E3-1515M v5 Processor, Quad Core, 8M Cache, 2.8GHz (3.7GHz), 45W<br>Intel® Core™ i7-6820EQ Processor, Quad Core, 8M Cache, 2.8GHz (3.5GHz), 45W<br>Intel® Core™ i7-6822EQ Processor, Quad Core, 8M Cache, 2.0GHz (2.8GHz), 25W<br>Intel® Core™ i5-6440EQ Processor, Quad Core, 6M Cache, 2.7GHz (3.4GHz), 45W<br>Intel® Core™ i5-6442EQ Processor, Quad Core, 6M Cache, 1.9GHz (2.7GHz), 25W<br>Intel® Core™ i3-6100E Processor, Dual Core, 3M Cache, 2.7GHz, 35W<br>Intel® Core™ i3-6102E Processor, Dual Core, 3M Cache, 1.9GHz, 25W<br>Intel® Celeron® Processor G3900E, Dual Core, 2M Cache, 2.4GHz, 35W<br>Intel® Celeron® Processor G3902E, Dual Core, 2M Cache, 1.6GHz, 25W |                                                                                                                                                                                                                                                                |
|                       | <b>Chipset</b>               | Intel® CM236 Chipset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Intel® QM170 Chipset                                                                                                                                                                                                                                           |
|                       | <b>Memory</b>                | Two 260-pin SODIMM up to 32GB Dual Channel DDR4 2133MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                |
|                       | <b>BIOS</b>                  | Insyde SPI 128Mbit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                |
|                       | <b>Controller</b>            | Intel® HD Graphics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                |
| <b>GRAPHICS</b>       | <b>Feature</b>               | OpenGL up to 4.4, DirectX 12, OpenCL 2.1<br>HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9<br>HW Encode: AVC/H.264, MPEG2, JPEG, HEVC/H265, VP8, VP9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                |
|                       | <b>Display</b>               | 1 x VGA/DDI (DDI available upon request)<br>1 x LVDS/eDP (eDP available upon request)<br>2 x DDI (HDMI/DVI/DP++)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | VGA: resolution up to 2560x1600 @ 60Hz<br>LVDS: dual channel 24-bit, resolution up to 1920x1200 @ 60Hz<br>HDMI: resolution up to 4096x2160 @ 24Hz or 2560x1600 @ 60Hz<br>DVI: resolution up to 1920x1200 @ 60Hz<br>DP++/eDP: resolution up to 4096x2304 @ 60Hz |
|                       | <b>Triple Displays</b>       | VGA + LVDS + DDI or VGA + DDI1 + DDI2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | eDP + 2 DDI (available upon request)                                                                                                                                                                                                                           |
|                       | <b>Interface</b>             | 1 x PCIe x16 or 2 x PCIe x8 (Gen 3)<br>8 x PCIe x1 or 2 x PCIe x4 or 4 x PCIe x2 (Gen 3)<br>1 x LPC<br>1 x I <sup>2</sup> C<br>1 x SMBus<br>2 x UART (TX/RX)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                |
| <b>EXPANSION</b>      | <b>Interface</b>             | HD Audio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
| <b>AUDIO</b>          | <b>Controller</b>            | 1 x Intel® I219LM with iAMT11.0 PCIe (10/100/1000Mbps)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                |
| <b>ETHERNET</b>       | <b>USB</b>                   | 4 x USB 3.0<br>8 x USB 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                |
|                       | <b>SATA</b>                  | 4 x SATA 3.0 (up to 6Gb/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | RAID 0/1/5/10                                                                                                                                                                                                                                                  |
|                       | <b>DIO</b>                   | 1 x 8-bit DIO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                |
|                       | <b>Output &amp; Interval</b> | System Reset, Programmable via Software from 1 to 255 Seconds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                |
| <b>WATCHDOG TIMER</b> | <b>TPM</b>                   | Available Upon Request                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                |
| <b>SECURITY</b>       | <b>Type</b>                  | 12V, 5VSB, VCC_RTC (ATX mode)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 12V, VCC_RTC (AT mode)                                                                                                                                                                                                                                         |
| <b>POWER</b>          | <b>Consumption</b>           | Typical: i7-6820EQ: 12V @ 2.39A (28.62Watt)<br>Max.: i7-6820EQ: 12V @ 5.84A (70.10Watt)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                |
| <b>OS SUPPORT</b>     |                              | Windows 8.1 64-bit<br>Windows 7 (/WES7) 32/64-bit<br>Windows 10 IoT Enterprise 64-bit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Debian 8 (with VESA graphic driver)<br>CentOS 7 (with VESA graphic driver)<br>Ubuntu 15.10 (Intel graphic driver available)                                                                                                                                    |
|                       | <b>Temperature</b>           | Operating: 0 to 60°C<br>-40 to 85°C (with heat spreader)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Storage: -40 to 85°C                                                                                                                                                                                                                                           |
|                       | <b>Humidity</b>              | Operating: 5 to 90% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Storage: 5 to 90% RH                                                                                                                                                                                                                                           |
| <b>ENVIRONMENT</b>    | <b>MTBF</b>                  | 663,394hrs @ 25°C; 334,612 hrs @ 45°C; 193,307 hrs @ 60°C excluding accessories<br>Calculation Model: Telcordia Issue 2, Method Case 3<br>Environment: GB, GC – Ground Benign, Controlled                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                |
|                       | <b>Dimensions</b>            | COM Express® Basic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 95mm (3.74") x 125mm (4.9")                                                                                                                                                                                                                                    |
|                       | <b>Compliance</b>            | PICMG COM Express® R2.1, Type 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                |
| <b>MECHANICAL</b>     |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                |

## Ordering Information

| Model Name           | P/N             | Processor   | Memory   | VGA/DDI | LVDS/eDP | GbE | USB 3.0 | USB 2.0 | Power  | Thermal | Temp.     |
|----------------------|-----------------|-------------|----------|---------|----------|-----|---------|---------|--------|---------|-----------|
| SH960-CM236BS-1515M  | 770-SH9601-D00G | E3-1515M v5 | 2 SODIMM | VGA     | LVDS     | 1   | 4       | 8       | ATX/AT | Cooler  | 0 to 60°C |
| SH960-QM170BS-6820EQ | 770-SH9601-400G | i7-6820EQ   | 2 SODIMM | VGA     | LVDS     | 1   | 4       | 8       | ATX/AT | Cooler  | 0 to 60°C |
| SH960-QM170BS-6822EQ | 770-SH9601-500G | i7-6822EQ   | 2 SODIMM | VGA     | LVDS     | 1   | 4       | 8       | ATX/AT | Cooler  | 0 to 60°C |
| SH960-QM170BS-6440EQ | 770-SH9601-600G | i5-6440EQ   | 2 SODIMM | VGA     | LVDS     | 1   | 4       | 8       | ATX/AT | Cooler  | 0 to 60°C |
| SH960-QM170BS-6442EQ | 770-SH9601-700G | i5-6442EQ   | 2 SODIMM | VGA     | LVDS     | 1   | 4       | 8       | ATX/AT | Cooler  | 0 to 60°C |

Note: Core i3 and Celeron are supported upon request with MOQ requirement.

## Packing List

|                              |                 |
|------------------------------|-----------------|
| • 1 SH960-CM236/QM170 board  |                 |
| • 1 DVD                      |                 |
| • 1 Cooler (Height: 36.58mm) | A71-111026-000G |

## Optional Items

|                                |                 |
|--------------------------------|-----------------|
| • COM332-B carrier board kit   | 770-CM3321-000G |
| • Heat spreader (Height: 11mm) | A71-011073-000G |