

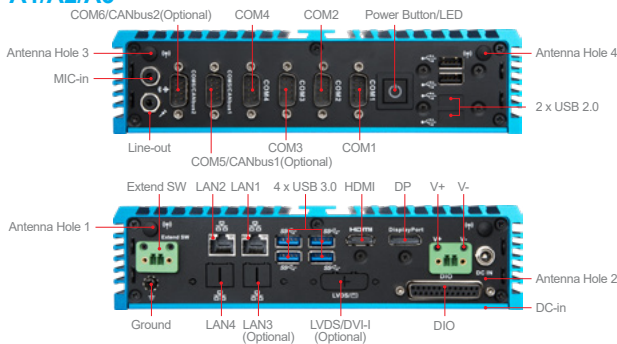
# MS-9A89

Compact-Size Box PC with Intel® Kaby Lake-U/Skylake-U or Apollo Lake-I Series Processor for Ultra Low-Power Fanless Solution

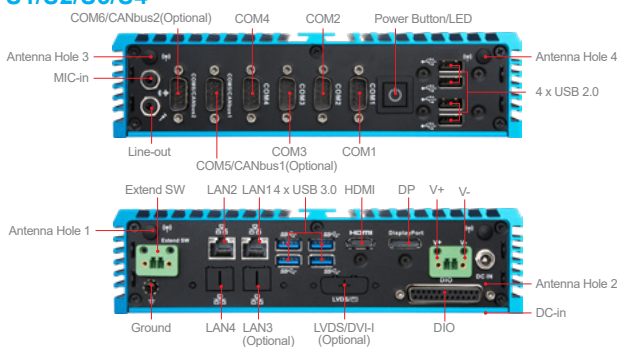
NEW



## A1/A2/A3



## U1/U2/U3/U4



## Features

- Ultra low power 9.5 with fanless design
- SO-DIMMs, DDR4 2133MHz, up to 16GB (For KBL-U Series)
- SO-DIMMs, DDR3L 1866/1600MHz, up to 8GB (For APL-I Series)
- 3 independent displays: HDMI, DP & LVDS/DVI-I(Optional)
- Dual Intel® GbE LAN
- Dual Mini-PCIe for expansion, 1x SATA, 1x mSATA
- KAB/SKL Series: 8 USB ports (4x USB 2.0, 4x USB 3.1 Gen 1), 6 COM ports & 16-bit GPIO
- APL-I Series: 8 USB ports (4x USB 2.0, 4x USB 3.1 Gen1) & 6 COM ports
- 4 openings reserved for antennas
- Power input DC-in 12~24V
- Wide operating temperature: -20~70°C (MS-9A89-A1 SKU)
- Anti-Vibration & Shockproof Design
- EN50155 Compliance

## Ordering Information

| Part Number                                                                                      | Description |
|--------------------------------------------------------------------------------------------------|-------------|
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## Specifications

|                   |                       | MS<br>-9A89-A1                                                                                                                                                                      | MS<br>-9A89-A2                                | MS<br>-9A89-A3                           | MS<br>-9A89-U1<br>Intel® Kaby<br>Lake-U<br>Core™<br>i3-7100U<br>Processor,<br>DC, 15W                                                                                                   | MS<br>-9A89-U2<br>Intel®<br>Skylake-U<br>Core™<br>i5-6300U<br>Processor,<br>DC, 15W | MS<br>-9A89-U3<br>Intel®<br>Skylake-U<br>Core™<br>i3-6100U<br>Processor,<br>DC, 15W | MS<br>-9A89-U4<br>Intel®<br>Skylake-U<br>Core™<br>i7-6600U<br>Processor,<br>DC, 15W |
|-------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Processor         | CPU                   | Intel® Atom™ x7 Processor E3950, QC, 12W                                                                                                                                            | Intel® Atom™ x5 Processor E3940, QC, 9.5W     | Intel® Celeron® Processor J3455, QC, 10W |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Frequency             | 1.6 GHz up to 2.0 GHz                                                                                                                                                               | 1.6 GHz up to 1.8 GHz                         | 1.5 GHz, up to 2.3 GHz                   | 2.4 GHz                                                                                                                                                                                 |                                                                                     |                                                                                     |                                                                                     |
|                   | L2 Cache              | 2MB                                                                                                                                                                                 |                                               |                                          | 3MB                                                                                                                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|                   | CPU Type              |                                                                                                                                                                                     |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Chipset               | Integrated in SoC Process                                                                                                                                                           |                                               |                                          |                                                                                                                                                                                         | Integrated in Process                                                               |                                                                                     |                                                                                     |
| Memory            | BIOS                  |                                                                                                                                                                                     |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Technology            | Single-channel DDR4 1866/1600 MHz                                                                                                                                                   |                                               |                                          | Single-channel DDR4 2133 MHz                                                                                                                                                            |                                                                                     |                                                                                     |                                                                                     |
|                   | Max. Capacity         | Up to 8GB                                                                                                                                                                           |                                               |                                          | Up to 16GB                                                                                                                                                                              |                                                                                     |                                                                                     |                                                                                     |
| Display           | Socket                | 1 x 204-pin SO-DIMMs                                                                                                                                                                |                                               |                                          | 1 x 260-pin SO-DIMMs                                                                                                                                                                    |                                                                                     |                                                                                     |                                                                                     |
|                   | Controller            | Intel® HD Graphics                                                                                                                                                                  |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Graphic Memory        | Shared system memory up to 1.7 GB SDRAM                                                                                                                                             |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Multiple Display      | 3 independent displays                                                                                                                                                              |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Display Interface     | HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2160 @60Hz<br>LVDS up to 1920 x 1200 @60Hz (optional by cable)<br>DVI-I up to 1920 x 1200 @60Hz (optional by MS-9900)<br>2 x Intel® |                                               |                                          | HDMI1.4 up to 4096 x 2160 @24Hz<br>DP up to 3840 x 2160 @60Hz (Support DP++)<br>LVDS up to 1920 x 1200 @60Hz (optional by cable)<br>DVI-H up to 1920 x 1200 @60Hz (optional by MS-99C0) |                                                                                     |                                                                                     |                                                                                     |
| Ethernet          | Controller            | I210-AT GbE LAN                                                                                                                                                                     | 2 x Intel® I210-AT GbE LAN                    |                                          | 1 x Intel® I210-AT GbE LAN<br>1 x Intel® I219-LM GbE LAN PHY                                                                                                                            |                                                                                     |                                                                                     |                                                                                     |
| Audio             | Controller            | Realtek® ALC887-VD2-CG HD Audio Codec                                                                                                                                               |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| H/W Monitor       | Watchdog Timer        | 256-level Watchdog Timer                                                                                                                                                            |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| TPM               | Controller            | N/A                                                                                                                                                                                 |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Expansion Slot    | Mini-PCIe             | 2 x Full-size (Mini-PCIe1 Slot w/ NANO SIM-Holder)<br>(Mini-PCIe2 Slot w/ mSATA)                                                                                                    |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Storage           | SATA                  | 1 x 2.5" HDD/SSD Bay                                                                                                                                                                |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | mSATA                 | 1 x Full-size                                                                                                                                                                       |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| I/O Interface     | RJ-45                 | 4 (LAN1/2 Standard, LAN3/4 by Option)                                                                                                                                               |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | PoE                   | 2 x 802.11af (Option by Request)                                                                                                                                                    |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Audio                 | 1 x Line-out<br>1 x Mic-in<br>4 x USB 2.0                                                                                                                                           |                                               |                                          |                                                                                                                                                                                         | 4 x USB 2.0                                                                         |                                                                                     |                                                                                     |
|                   | USB                   | 2 x USB 3.1 Gen 1<br>6 x COM ports                                                                                                                                                  |                                               |                                          |                                                                                                                                                                                         | 4 x USB 3.1 Gen 1                                                                   |                                                                                     |                                                                                     |
|                   | Serial                | COM1: RS-232/422/485, 0V/5V/12V<br>COM2~6: RS-232, 0V/5V/12V                                                                                                                        |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | GPIO                  | 16-bit (8*GP; 8*GPO), 5V                                                                                                                                                            |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | CANbus                | 2 x CAN 2.0B (Option)                                                                                                                                                               |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | HDMI                  | 1                                                                                                                                                                                   |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | LVDS                  | 1 (optional)                                                                                                                                                                        |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | DVI                   | 1 (DVI-I by option)                                                                                                                                                                 |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | DisplayPort           | 1                                                                                                                                                                                   |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Antenna               | 4 openings reserved for antennas                                                                                                                                                    |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Power Supply      | DC Input              | DC-in 12V~24V                                                                                                                                                                       |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Operating Temperature | -10~45°C (HDD)<br>-20~70°C (w/ WT SSD/ mSATA)                                                                                                                                       | -10~45°C (HDD)<br>-10~60°C (w/ WT SSD/ mSATA) |                                          | -10~45°C (HDD)<br>-10~60°C (w/ WT SSD/mSATA)                                                                                                                                            |                                                                                     |                                                                                     |                                                                                     |
| Environment       | Operating Humidity    | 10 ~ 90%, non-condensing                                                                                                                                                            |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Storage Temperature   | -20 ~ 80°C                                                                                                                                                                          |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Storage Humidity      | 10 ~ 90%, non-condensing                                                                                                                                                            |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Vibration             | IEC61373 Category 1, Class B                                                                                                                                                        |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Shock                 | IEC61373 Category 1, Class B                                                                                                                                                        |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Form Factor       | Dimensions (Wx DxH)   | 215 x 155 x 55 mm                                                                                                                                                                   |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Weight                | 1.55 kg                                                                                                                                                                             |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Mounting              | Wall mount (STD)/DIN-rail mount(STD)/VESA mount(by BOM option)                                                                                                                      |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Certification     | EMC                   | CE, FCC, VCCI, RCM, BSMI, EN50155                                                                                                                                                   |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | Safety                | BSMI                                                                                                                                                                                |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
| Software Platform |                       | Windows 10 IoT Enterprise (64-bit, RS5)<br>Linux Fedora 25 (by request)<br>Linux Ubuntu 16.04 (by request)                                                                          |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |
|                   | OS Support            |                                                                                                                                                                                     |                                               |                                          |                                                                                                                                                                                         |                                                                                     |                                                                                     |                                                                                     |

## Packing List

| Part Number                                                                                      | Description |
|--------------------------------------------------------------------------------------------------|-------------|
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## Optional Item

| Part Number                                                                                      | Description |
|--------------------------------------------------------------------------------------------------|-------------|
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