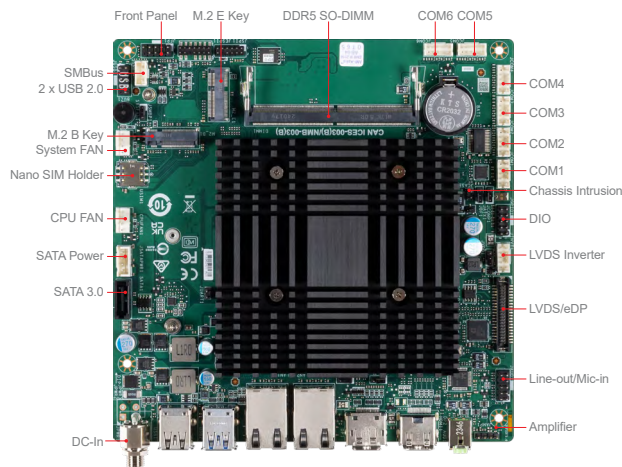
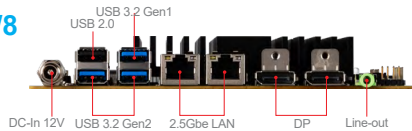


# MS-CF13

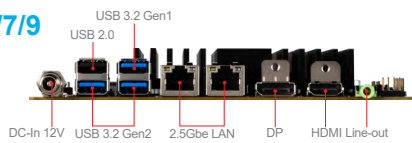
Mini-ITX with Intel® Alder Lake-N & Twin Lake-N SoC Series for Fanless, Low-Profile, Ultra Low-Power & Multi-Displays Solution



## SKU1/5/6/8



## SKU2/3/4/7/9



## Packing List

| Part Number     | Description                  | Quantity |
|-----------------|------------------------------|----------|
| K1D-1012115-V03 | SATA Cable with Power, 230mm | 1        |
| E21-CF13010-C22 | I/O SHIELDING For DP+HDMI    | 1        |
| E21-CF13020-C22 | I/O SHIELDING For DP+DP      |          |

## Optional Item

| Part Number     | Description           |
|-----------------|-----------------------|
| K14-1009062-V03 | COM Port Cable, 250mm |
| K14-1018003-V03 | COM port cable, 300mm |
| K1B-3008012-E06 | USB 2.0 Cable, 330mm  |

## Features

- Intel® Alder Lake-N & Twin Lake-N PC Client & Embedded Series SoC
- DDR5 4800 MHz SODIMM Slot up to 16GB
- Triple independent displays: DP, HDMI/DP, LVDS/eDP
- 2 2.5 GbE LAN with RJ-45
- 1 M.2 E Key Slot, 1 M.2 B Key (with SIM Holder)
- 1 M.2 B key, 1 SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 1 USB 3.2 Gen 1, 3 USB 2.0, 6 COM, GPIO, Audio, Amplifier-3W
- Onboard TPM 2.0
- DC-IN 12V

## Ordering Information

| Part Number  | Description                                                                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 916-CF13-005 | MS-CF13/606-CF13-120/806-CF13-007 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel                 |
| 916-CF13-006 | MS-CF13/606-CF13-130/806-CF13-008 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel          |
| 916-CF13-007 | MS-CF13/606-CF13-160/806-CF13-009 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel        |
| 916-CF13-008 | MS-CF13/606-CF13-140/806-CF13-010 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel |
| 916-CF13-009 | MS-CF13/606-CF13-150/806-CF13-011 10 Fanless, Intel ADL-N Atom X7425E, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC 12V, Single 12-PACK For Channel     |
| 916-CF13-010 | MS-CF13/606-CF13-190/806-CF13-003 10 Fanless, Intel TWL N150, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel                  |
| 916-CF13-011 | MS-CF13/606-CF13-200/806-CF13-004 10 Fanless, Intel TWL N150, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel           |
| 916-CF13-012 | MS-CF13/606-CF13-210/806-CF13-005 10 Fanless, Intel TWL Core 3 N355, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel           |
| 916-CF13-013 | MS-CF13/606-CF13-220/806-CF13-006 10 Fanless, Intel TWL Core 3 N355, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, Single 12-PACK For Channel    |
| 916-CF13-107 | MS-CF13/606-CF13-120/806-CF13-103 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                           |
| 916-CF13-108 | MS-CF13/606-CF13-130/806-CF13-104 10 Fanless, Intel ADL-N N97, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                    |
| 916-CF13-109 | MS-CF13/606-CF13-160/806-CF13-103 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                  |
| 916-CF13-110 | MS-CF13/606-CF13-140/806-CF13-104 10 Fanless, Intel ADL-N Core i3-N305, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel           |
| 916-CF13-111 | MS-CF13/606-CF13-150/806-CF13-104 10 Fanless, Intel ADL-N Atom X7425E, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC 12V, BULK For Channel               |
| 916-CF13-112 | MS-CF13/606-CF13-190/806-CF13-103 10 Fanless, Intel TWL N150, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                            |
| 916-CF13-113 | MS-CF13/606-CF13-200/806-CF13-104 10 Fanless, Intel TWL N150, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                     |
| 916-CF13-114 | MS-CF13/606-CF13-210/806-CF13-103 10 Fanless, Intel TWL Core 3 N355, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 2*DP+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel                     |
| 916-CF13-115 | MS-CF13/606-CF13-220/806-CF13-104 10 Fanless, Intel TWL Core 3 N355, 1*DDR5 SO-DIMM, 3*USB 3.2, 3*USB 2.0, 6*COM, 1*DP+1*HDMI+1*LVDS/eDP, 2*M.2, 2*2.5GbE LAN, 1*SATA 3.0, DC-in 12V, BULK For Channel              |

## Specifications

| Processor         | CPU                   | SKU1                                                                                                                                         | SKU2                                                                                                                      | SKU3                                                    | SKU4                                          | SKU5                                                                                                                      | SKU6                                      | SKU7                                                                                                                      | SKU8                                             | SKU9                                                                                                                      |                                                                                                                           |
|-------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                   |                       | Intel® IOTG Alder Lake-N Processor N97, QC, 12W                                                                                              |                                                                                                                           | Intel® IOTG Alder Lake-N Core i3-N305, QC, 9W up to 15W | Intel® IOTG Alder Lake-N Atom x7425E, QC, 12W | Intel® IOTG Alder Lake-N Core i3-N305, QC, 9W up to 15W                                                                   | Intel® Twin Lake-N Processor N150, QC, 6W |                                                                                                                           | Intel® Twin Lake-N Core 3 N355, OC, 9W up to 15W |                                                                                                                           |                                                                                                                           |
|                   | Frequency             | N97, 2.0GHz, up to 3.6GHz                                                                                                                    |                                                                                                                           | i3-N305, 1.8GHz, up to 3.8GHz                           | x7425E, 1.5GHz, up to 3.4GHz                  | i3-N305, 1.8GHz, up to 3.8GHz                                                                                             | N150, 0.8GHz, up to 3.6GHz                |                                                                                                                           | N355, 1.9GHz, up to 3.9GHz                       |                                                                                                                           |                                                                                                                           |
|                   | L2 Cache              | 6MB                                                                                                                                          |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | CPU Type              | BGA                                                                                                                                          |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Chipset               | Integrated in SoC                                                                                                                            |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| BIOS              | AMI UEFI              |                                                                                                                                              |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Memory            | Technology            | Single Channel for DDR5 4800MHz                                                                                                              |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Max. Capacity         | Up to 16GB                                                                                                                                   |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Socket                | 1 x 262-pin DDR5 SO-DIMM                                                                                                                     |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Display           | Controller            | Intel® UHD Graphics                                                                                                                          |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Graphic Memory        | Depends on CPU                                                                                                                               |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | LVDS                  | 1 x Dual channel 18/24-bit (Connector shared with eDP)                                                                                       |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | eDP                   | 1 (Connector shared with LVDS)                                                                                                               |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | HDMI                  | N/A                                                                                                                                          | 1                                                                                                                         |                                                         |                                               | N/A                                                                                                                       |                                           | 1                                                                                                                         |                                                  | N/A                                                                                                                       | 1                                                                                                                         |
|                   | DisplayPort           | 2                                                                                                                                            | 1                                                                                                                         |                                                         |                                               | 2                                                                                                                         |                                           | 1                                                                                                                         |                                                  | 2                                                                                                                         | 1                                                                                                                         |
|                   | Multiple Display      | 3 independent displays                                                                                                                       |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Display Interface     | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>DP up to 4096 x 2304 @60Hz                                                    | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2304 @60Hz |                                                         |                                               | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2304 @60Hz |                                           | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2304 @60Hz |                                                  | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2304 @60Hz | LVDS up to 1920 x 1200 @60Hz<br>eDP up to 1920 x 1080 @60Hz<br>HDMI up to 3840 x 2160 @30Hz<br>DP up to 4096 x 2304 @60Hz |
|                   |                       |                                                                                                                                              |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Ethernet          | Controller            | 2 x Intel® I226-V 2.5GbE LAN                                                                                                                 |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Audio             | Controller            | Realtek® ALC897 Audio Codec (Co-lay ALC88S)                                                                                                  |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Super I/O         | Controller            | Fintek F81966AB-I                                                                                                                            |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| H/W Monitor       | Watchdog Timer        | 256-level Watchdog Timer                                                                                                                     |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Smart Fan             | Yes                                                                                                                                          |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| TPM               | Controller            | Infineon® SLB 9672VU2.0                                                                                                                      |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| I/O Interface     | USB                   | 2 x USB 3.2 Gen 2 (rear)<br>1 x USB 3.2 Gen 1 (rear)<br>1 x USB 2.0 (rear)<br>2 x USB 2.0 (internal)                                         |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   |                       | 6 x COM ports (internal)<br>COM1: RS-232/422/485, 0V/5V/12V<br>COM2~6: RS-232                                                                |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Serial                |                                                                                                                                              |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | GPIO                  | 8-bit (4 x GPI; 4 x GPO), 5V                                                                                                                 |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Storage           | M.2                   | 1 x M.2 B key (SATA/PCIe x1, USB 3.2 Gen 2 x 1, USB 2.0 w/NANO SIM-Holder), 2242/3042/2280<br>1 x M.2 E key (PCIe x1, USB 2.0), 2230         |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | SATA                  | 1 x SATA 3.0                                                                                                                                 |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | DC                    | DC-in 12V                                                                                                                                    |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | ATX                   | N/A                                                                                                                                          |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Environment       | Operating Temperature | 0 ~ 60°C<br>Note: Thermal w/ Airflow:0.7m/s                                                                                                  |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Operating Humidity    | 10 ~ 90%, non-condensing                                                                                                                     |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Storage Temperature   | -20 ~ 80°C                                                                                                                                   |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Storage Humidity      | 10 ~ 90%, non-condensing                                                                                                                     |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Form Factor       | Dimensions            | 170 x 170 mm (Mini-ITX)                                                                                                                      |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
|                   | Weight                | 0.51 kg                                                                                                                                      |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Certification     | EMC                   | CE, FCC Class B, BSMI, RCM, VCCI, UKCA                                                                                                       |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |
| Software Platform | OS Support            | Windows 10 IoT Enterprise LTSC (64-bit, 21H2, only for ADL-N)<br>Windows 11 IoT Enterprise LTSC (64-bit, 24H2)<br>Linux (Support by request) |                                                                                                                           |                                                         |                                               |                                                                                                                           |                                           |                                                                                                                           |                                                  |                                                                                                                           |                                                                                                                           |

## Block Diagram

