

**3.5" SBC supports Intel® 22nm 4<sup>th</sup> / 14nm 5<sup>th</sup> Generation Mobile Core™ i7/i5/i3 and Celeron® on-board Processor (ULT), VGA, LVDS, iDP, Dual GbE, PCIe Mini, USB 3.0, SATA 6Gb/s, Audio, iRIS-1010 and RoHS**

# **WAFER-ULT-i1 WAFER-ULT2-i1**

## **Quick Installation Guide** **Version 1.11**

March 2018

### **Package List**

WAFER-ULT-i1/WAFER-ULT2-i1 package includes the following items:

- 1 x WAFER-ULT-i1/WAFER-ULT2-i1 single board computer with enclosure heatsink
- 2 x SATA with 5V output cable kit
- 1 x Audio cable
- 1 x Dual-port USB 2.0 cable
- 1 x Power cable
- 1 x QIG



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## Specifications

- CPU:
  - >> Intel® 5th generation mobile ULT on-board SoC
    - Intel® Core™ i7-5650U (2.2GHz, dual-core, 4MB cache, TDP=15W)
    - Intel® Core™ i5-5350U (1.8GHz, dual-core, 3MB cache, TDP=15W)
    - Intel® Core™ i3-5010U (2.1GHz, dual-core, 3MB cache, TDP=15W)
    - Intel® Celeron® processor 3765U (1.9GHz, dual-core, 2MB cache, TDP=15W)
  - >> Intel® 4th generation mobile ULT on-board SoC
    - Intel® Core™ i7-4650U (1.7GHz, dual-core, 4MB cache, TDP=15W)
    - Intel® Core™ i5-4300U (1.9GHz, dual-core, 3MB cache, TDP=15W)
    - Intel® Core™ i3-4010U (1.7GHz, dual-core, 3MB cache, TDP=15W)
    - Intel® Celeron® processor 2980U (1.6GHz, dual-core, 2MB cache, TDP=15W)
- Memory:
  - Two 204-pin 1600/1333 MHz dual-channel unbuffered DDR3L SDRAM SO-DIMMs support up to 16 GB
- BIOS: UEFI BIOS
- Graphics:
  - >> Intel® 5th generation mobile ULT on-board SoC
    - Intel® HD Graphics Gen 8 supports DX11.1, OpenGL 4.2 and OpenCL 1.2 Full MPEG2, VC1, AVC decode
  - >> Intel® 4th generation mobile ULT on-board SoC
    - Intel® HD Graphics Gen 7.5 supports DX11.1, OpenGL 4.2 and OpenCL 1.2 Full MPEG2, VC1, AVC decode

- Display Output:
  - Triple independent display
  - VGA (up to 2560x1600@60Hz)
  - 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200@60Hz)
  - iDP interface for HDMI, LVDS, VGA, DVI, DP (up to 3840x2160@60 Hz)
- Ethernet:
  - GbE1: Intel® I218LM PHY with Intel® AMT 9.0 support
  - GbE2: Intel® I210-AT PCIe controller with NCSI support
- Super IO: Fintek F81866
- External I/O Interfaces:
  - 1 x RS-232
  - 2 x USB 3.0
- Internal I/O Interfaces:
  - 1 x KB/MS (1x6 pin)
  - 1 x RS-422/485 (1x4 pin, P=2.0)
  - 2 x RS-232 (2x5 pin, P=2.0)
  - 2 x SATA 6Gb/s with 5V power connector (no RAID)
  - 2 x USB 2.0 (2x4 pin, P=2.0)
- iRIS Remote Management Module: 1 x iRIS-1010 slot
- Expansion:
  - 1 x Full-size/half-size PCIe Mini card slot (mSATA support)
- Audio:
  - 1 x Analog audio (2x5 pin)
- Front Panel:
  - 1 x Power LED & HDD LED (1x6 pin)
  - 1 x Power button (1x2 pin)
  - 1 x Reset button (1x2 pin)
- LAN LED:
  - 2 x LAN LED (1x2 pin)

- Digital I/O: 1 x 8-bit digital I/O (2x5 pin)
- Fan Connector:  
1 x System smart fan (1x4 pin)
- Watchdog Timer:  
Software programmable, supports 1~255 sec. system reset
- Power Supply:  
12V only DC input  
1 x Internal power connector (2x2 pin)  
Support AT/ATX mode
- Power Consumption:  
12V@2.72A (Intel® Core™ i5-4300U CPU with two 8GB  
1600MHz DDR3L memory)
- Operating Temperature: -10°C ~ 60°C
- Storage Temperature: -20°C ~ 70°C
- Operating Humidity: 5% ~ 95%, non-condensing
- Dimensions: 146 mm x 102 mm
- Weight (GW/NW): 600 g/250 g

## Ordering Information

- **WAFER-ULT-i1-i7-R11:**  
3.5" SBC with Intel® 22nm 4th Generation ULT Mobile Core™ i7-4650U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT-i1-i5-R11:**  
3.5" SBC with Intel® 22nm 4th Gen ULT Mobile Core™ i5-4300U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT-i1-i3-R11:**  
3.5" SBC with Intel® 22nm 4th Gen ULT Mobile Core™ i3-4010U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT-i1-C-R11:**  
3.5" SBC with Intel® 22nm 4th Gen ULT Mobile Celeron® 2980U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT2-i1-i7-R11:**  
3.5" SBC with Intel® 14nm 5th Gen ULT Mobile Core™ i7-5650U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT2-i1-i5-R11:**  
3.5" SBC with Intel® 14nm 5th Gen ULT Mobile Core™ i5-5350U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS

- **WAFER-ULT2-i1-i3-R11:**  
3.5" SBC with Intel® 14nm 5th Gen ULT Mobile Core™ i3-5010U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **WAFER-ULT2-i1-C-R11:**  
3.5" SBC with Intel® 14nm 5th Gen ULT Mobile Celeron 3765U processor (ULT), VGA, LVDS, iDP, Dual GbE, USB 3.0, PCIe Mini, SATA 6Gb/s, iRIS-1010 and RoHS
- **iRIS-1010-R10:**  
IPMI 2.0 adapter card with AST1010 BMC chip  
(w/o KVM over IP function) for PCIe Mini socket interface
- **32000-023800-RS:** PS/2 KB/MS cable
- **19800-000300-200-RS:** RS-232 cable
- **32205-003800-300-RS:** RS-422/485 cable, 200mm
- **DP-LVDS-R10:**  
DisplayPort to 24-bit dual-channel LVDS converter board  
(for IEI iDP connector)
- **DP-HDMI-R10:**  
DisplayPort to HDMI converter board (for IEI iDP connector)
- **DP-DVI-R10:**  
DisplayPort to DVI-D converter board (for IEI iDP connector)
- **DP-VGA-R10:**  
DisplayPort to VGA converter board (for IEI iDP connector)
- **DP-DP-R10:**  
DisplayPort converter board (for IEI iDP connector)

## Jumper Settings and Connectors

<b>LABEL</b>	<b>FUNCTION</b>
J_ATX_AT1	AT/ATX mode select switch
J_CMOS1	Clear CMOS button
JP1	LVDS1 voltage selection
LVDSBL_DC5V1	DC 5V jumper for LVDS backlight
SW1	LVDS panel resolution selection
FAN1	CPU fan connector
DIO1	Digital I/O connector
DP1	Internal DisplayPort connector
AUDIO1	HD audio connector
IPMI1	IPMI iRIS-1010 module slot
KB_MS1	Keyboard and mouse connector
LVDS1	LVDS1 panel connector
INV1	LVDS1 panel backlight +12V power source
LVDSBL_DC5V1	LVDS backlight to 5V DC
M_PCIE2	PCIe Mini card slot with mSATA support
CN2	Power & HDD LED connector
RST_BTN1	Reset button connector
PWR_BTN1	Power button connector
CN1	DC power input connector
COM2, COM3	RS-232 serial port connectors
COM4	RS-422/485 serial port connector
SATA1, SATA2	SATA 6Gb/s drive connectors
SATA_PWR1, SATA_PWR2	SATA power connectors
CN3	SMBus connector
LED_LAN1, LED_LAN2	LAN Link LED connector
CN5	EC debug port connector
CHASSIS1	Chassis status connector
ID_LED1	ID LED Connector
USB1	Internal USB 2.0 connectors
LAN1, LAN2	RJ-45 LAN connectors

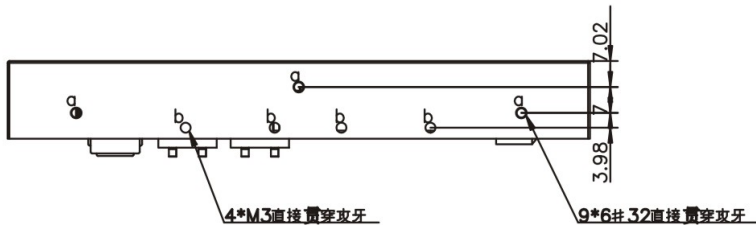
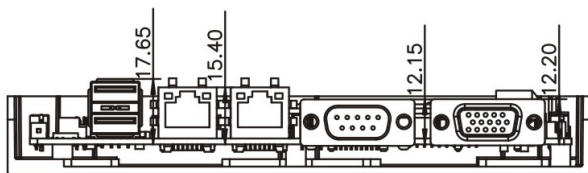
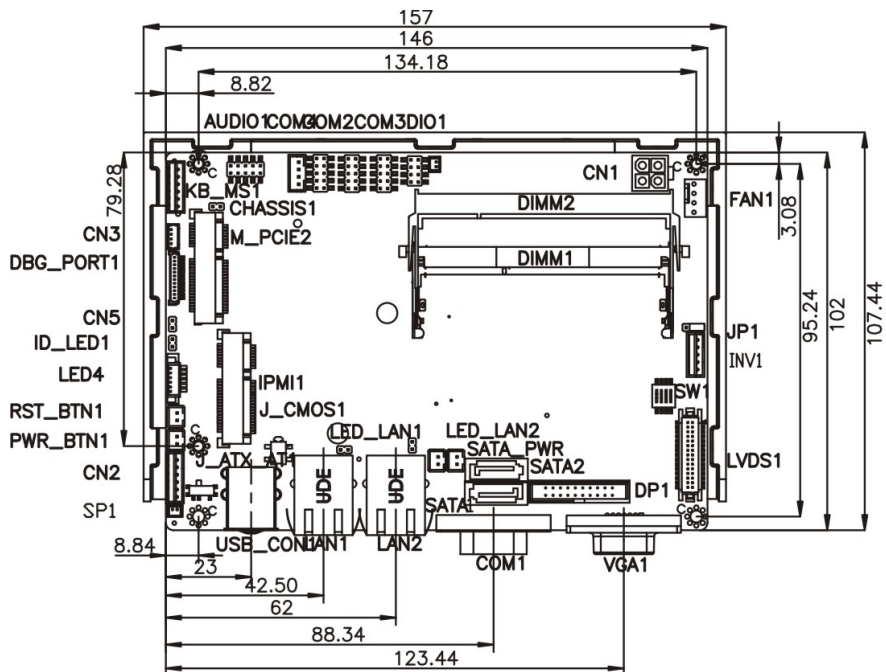
<b>LABEL</b>	<b>FUNCTION</b>
USB_CON1	External USB 3.0 ports
COM1	External RS-232 serial port connector
VGA1	VGA connector

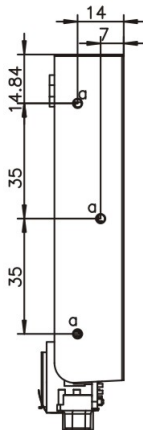
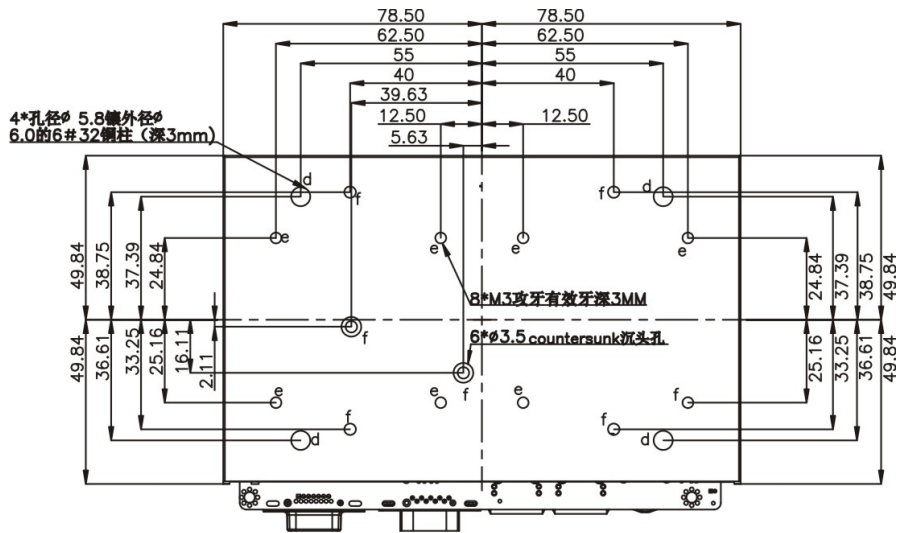
<b>LVDSBL_DC5V1: DC 5V jumper for LVDS backlight</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	By BIOS Setting (Default)
Short 1 - 2	Locked to DC 5V

<b>LVDSBL_DC5V1:LVDS backlight to 5V DC</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	EC_BKLT_DC5V	2	GND



# Board Layout: Jumper and Connector Locations





(Unit: mm)