

**3.5" SBC with Intel® 22nm dual Atom™ 1.5GHz on-board SoC with  
VGA/LVDS/iDP, Dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s,  
mSATA , COM, Audio and RoHs**

# **WAFER-BT**

## **Quick Installation Guide**

**Version 2.0**

Jul 25, 2019.

### **Package List**

WAFER-BT package includes the following items:

- 1 x WAFER-BT single board computer
- 1 x Power cable (P/N: 32100-087100-RS)
- 1 x SATA with power cable kit (P/N: 32801-000201-100-RS )
- 1 x Audio cable (P/N: 32000-072100-RS)
- 1 x QIG (Quick Installation Guide)



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## Specifications

- SoC:
  - Intel® Celeron® J1900 on-board SoC (2GHz, quad-core, 2MB cache, TDP=10W)
  - Intel® Celeron® N2807 on-board SoC (1.58GHz, dual-core, 2MB cache, TDP=4.3W)
- BIOS: AMI UEFI BIOS
- Memory:
  - One 204-pin 1066/1333 MHz single-channel DDR3L SO-DIMM slot supports up to 8 GB (J1900) or 4 GB (N2807)
- Graphics Engine:
  - 4th Gen 7 Graphics Engines with 4 execution unit, DX11, OGL 4.0, ES 2.0, OpenCL 1.2 support
- Display Output:
  - Dual Independent Displays
  - 1 x VGA (Resolution: 2560x1600@60Hz)
  - 1 x dual channel 24bit LVDS connector (1920x1200@60Hz)
  - 1 x iDP
- Ethernet:
  - 1 x PCIe GbE by Intel I210 controller (LAN1)
  - 1 x PCIe GbE by Intel I211 controller (LAN2)
- Super IO: Fintek F81866
- Embedded Controller: ITE IT8528E
- I/O Interface:
  - 1 x PS/2 KB/MS
  - 2 x SATA 3Gb/s with 5V SATA power connector (no RAID)
  - 1 x USB 3.0 (on rear I/O)
  - 5 x USB 2.0 (1 on rear I/O, 4 by pin header)
  - 1 x RS-422/485 (by pin header)
  - 3 x RS-232 (1 on rear I/O, 2 by pin header)
- SMBus: 1 x 4-pin (1x4) wafer
- Audio:

Realtek ALC662 HD codec

1 x Analog audio by 10-pin (2x5) header

- Front Panel:

1 x 6-pin (1x6) wafer for power LED & HDD LED

1 x 2-pin (1x2) wafer for power button

1 x 2-pin (1x2) wafer for power reset

- LAN LED: 2 x 2-pin (1x2) header

- Expansion:

1 x full-size PCIe Mini card slot with mSATA support (SATA2 and mSATA share SATA signal)

1 x Half-size PCIe mini card slot (support PCIe signal)

- Digital I/O: 8-bit digital I/O (4-bit input, 4-bit output)

- FAN:

1 x 4-pin CPU fan connector

1 x 4-pin system fan connector

- Power supply:

12V DC input only (AT/ATX support)

- Watchdog Timer:

Software programmable support 1~255 sec. system reset

- Power Consumption:

12V@1.45A (Intel® Celeron® J1900 with 8GB 1333MHz DDR3 memory)

- Operating Temperature: -20°C ~ 60°C (WAFER-BT-R10)

- Storage Temperature: -20°C ~ 85°C

- Operation Humidity: 5% ~ 95%, non-condensing

- Dimensions: 146mm x 102mm

- Weight: GW:600g/NW:250g

## Ordering Information

- **WAFER-BT-J19001-R20:**

3.5" SBC supports Intel® 22nm Quad-Core Celeron™ J1900 2.0GHz

(10W) on-board SoC with VGA/LVDS/iDP, Dual PCIe GbE, USB 2.0, PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS

- **WAFER-BT-N28071-R20:**

3.5" SBC supports Intel® 22nm Dual-Core Celeron™ N2807

1.58GHz (4.5W) on-board SoC with VGA/LVDS/iDP, Dual PCIe GbE, USB 2.0, PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio and RoHS

- **WAFER-BT-J19001-ECO-R20:**

3.5" SBC supports Intel® 22nm Quad-Core Celeron™ J1900 2.0GHz (10W) on-board SoC with VGA/LVDS/iDP, Dual PCIe GbE, USB 2.0, PCIe Mini, SATA 6Gb/s, mSATA, COM, Audio, ECO packing and RoHS

- **19800-000300-100-RS:** RS-232 cable, 300mm, P=2.0

- **32000-023800-RS:** PS/2 KB/MS cable, 135mm/110mm, P=2.0

- **32001-008600-200-RS:** Dual-port USB cable, 210mm, P=2.0

- **32205-003800-300-RS:** RS-422/485 cable, 200mm, P=2.0

*Note: Models with other CPUs not listed in the table are requested by MOQ - 100 pcs/lot.*

## Jumpers setting and connectors

LABEL	FUNCTION
PWR_BTN1	Power On/Off button pin header
RST_BTN1	System Reset button pin header
J_ATX_AT1	AT/ATX mode select switch
J_CMOS1	Clear CMOS button
COM1, COM2, COM3	Serial port, RS-232
COM4	Serial port, RS-422/485
CN4	Front Panel Pin Header
D-SUB	VGA connector
USB1, USB4	USB2.0 Port Pin Header
USB2	USB2.0 Port connector
USB3	USB3.0 Port connector
DIO1	8 Bits Digital I/O Pin Header
JSPI1	BIOS SPI ROM Programming Pin
JSPI2	EC SPI ROM Programming Pin
CPU_FAN1	CPU smart FAN connector
SYS_FAN1	System smart FAN connector
JP2, JP3	LAN link LED connector
KB_MS1	Keyboard & mouse pin header
CN5	+12V DC power input connector2
CN2	SMBUS connector
DP1	DP port internal pin header
SATA_PWR1, SATA_PWR2	SATA power connectors (5 V)
SATA1, SATA2	SATA 3Gb/s drive connectors
AUDIO1	Audio pin header
INV1	LCD panel backlight power connector
LVDS_PWR1	LCD voltage selection
LVDS1	LVDS panel Connector
SW1	LVDS panel resolution selection
J_FLASH1	Flash Descriptor Security Override/ TXE

<b>PWR_BTN1: Power On/Off button pinheader</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	Normal Operation (Default)
Short	Power on/off

<b>RST_BTN1: System Reset button pinheader</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	Normal Operation (Default)
Short	Reset

<b>J_ATX_AT1: AT/ATX mode select switch</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	ATX Mode (Default)
Short B - C	AT Mode

<b>J_CMOS1: Clear CMOS button</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	Normal Operation (Default)
Push	Clear CMOS Setup

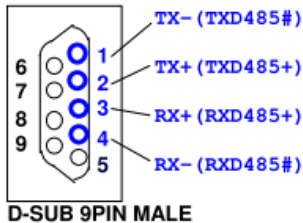
<b>COM1: (RS-232) Rear Port Define</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	NDCD1#	6	NDSR1#
2	NRXD1	7	NRTS1#
3	NTXD1	8	NCTS1#
4	NDTR1#	9	NRI1#
5	GND		

COM2: (RS-232) Pinheader			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD2	6	NDSR2
2	NRXD2	7	NRTS2
3	NTXD2	8	NCTS2
4	NDTR2	9	NRI2
5	GND	10	GND

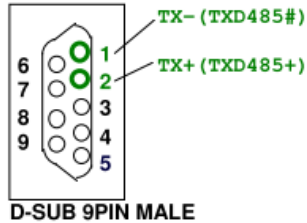
COM3: (RS-232) Pinheader			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD3	6	NDSR3
2	NRXD3	7	NRTS3
3	NTXD3	8	NCTS3
4	NDTR3	9	NRI3
5	GND	10	GND

COM4: RS-422/485 serial port connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	RXD485#	2	RXD485+
3	TXD485+	4	TXD485#

#### RS422 Pin define



#### RS485 Pin define



CN4: Front Panel Pin Header			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	PWR_LED+	4	PWR_LED-
5	HDD_LED+	6	HDD_LED-

<b>D-SUB: VGA connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	VGAVCC	10	HOTPLUG
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

<b>USB1: USB 2.0 Port Pin Header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	GND
3	-DATA_USB1	4	-DATA_USB2
5	+DATA_USB1	6	+DATA_USB2
7	GND	8	+5V

<b>USB4: USB 2.0 Port Pin Header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	GND
3	-DATA_USB3	4	-DATA_USB4
5	+DATA_USB3	6	+DATA_USB4
7	GND	8	+5V

<b>USB2: USB 2.0 Port connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	DATA1_N
3	DATA1_P	4	GND



<b>USB3: USB 3.0 Port connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	USB2P0-
3	USB2P0+	4	GND
5	USB3P0_RXDN1	6	USB3P0_RXDP1
7	GND	8	USB3P0_TXDN1
9	USB3P0_TXDP1		

<b>DIO1: 8 Bits Digital I/O Pin Header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

<b>JSPI1: BIOS SPI ROM Programming Pin</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+1.8V	2	SPI_CS#0_SW
3	SPI_SO_SW	4	SPI_CLK_SW
5	SPI_SI_SW	6	GND

<b>JSPI2: EC SPI ROM Programming Pin</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	2	SPI_CS0#_CN_EC
3	SPI_SO0_CN_EC	4	SPI_CLK0_CN_EC
5	SPI_SI0_CN_EC	6	GND

<b>CPU_FAN1: CPU smart FAN connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	FANIO1	4	FANOUT1

<b>SYS_FAN1: System smart FAN connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	FANIO2	4	FANOUT2

<b>JP2: LAN1 link LED connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VLAN	2	LAN1_LED_LINK#

<b>JP3: LAN2 link LED connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VLAN	2	LAN2_LED_LINK#

<b>KB_MS1: Keyboard &amp; mouse pin header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC5_KBMS	2	MDAT
3	MCLK	4	KDAT
5	KCLK	6	KBGND

<b>CN5: +12V DC power input connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	GND
3	+12V	4	+12V

<b>CN2: SMBUS connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	SMBDATA
3	SMBCLK	4	+5V

<b>DP1: DP port internal pin header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	DP_HPD#	2	DPD_AUX_CTRL_P2
3	GND	4	DPD_AUX_CTRL_N2
5	AUX_CTRL_DET_D	6	GND
7	GND	8	C_DPD_LANE2_P
9	C_DPD_LANE3_P	10	C_DPD_LANE2_N
11	C_DPD_LANE3_N	12	GND
13	GND	14	C_DPD_LANE0_P
15	C_DPD_LANE1_P	16	C_DPD_LANE0_N
17	C_DPD_LANE1_N	18	3.3V
19	5V	20	NC

<b>SATA_PWR1, SATA_PWR2: SATA Power Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	GND

<b>SATA1, SATA2: SATA 3Gb/s Drive Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	SATA_TX+
3	SATA_TX-	4	GND
5	SATA_RX+	6	SATA_RX-
7	GND		

<b>AUDIO1 : Audio pin header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LINE_OUTR	2	LINEIN_R
3	Analog_GND	4	Analog_GND
5	LINE_OUTL	6	LINEIN_L
7	Analog_GND	8	Analog_GND
9	LMIC1-R	10	LMIC1-L

<b>INV1: LCD panel backlight power connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PWM	2	GND
3	12V	4	GND
5	ENABKL		

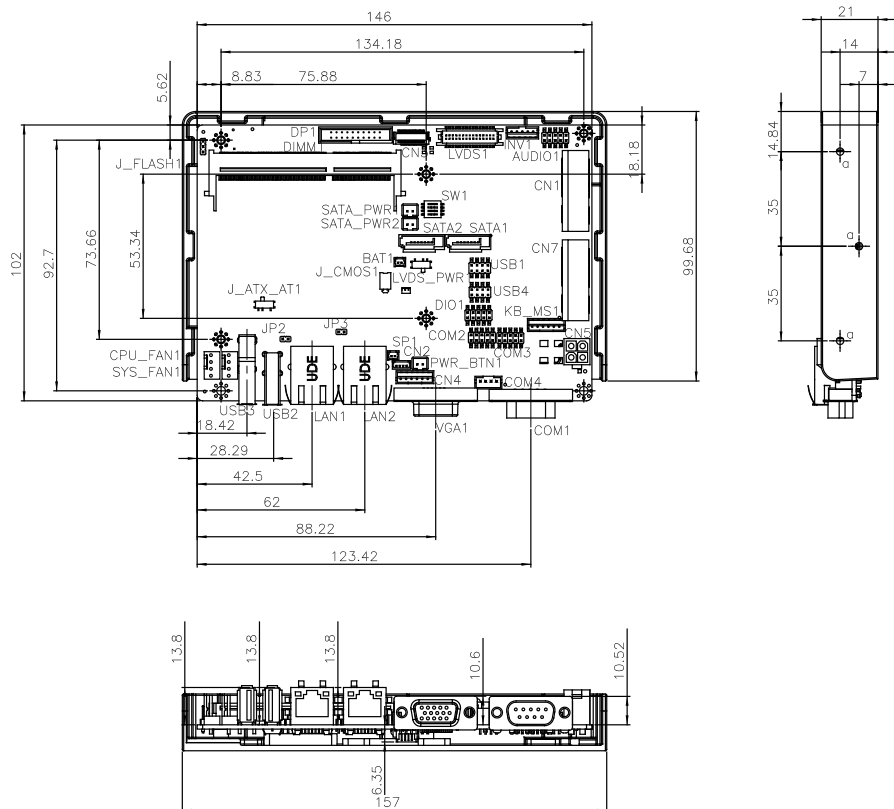
<b>LVDS_PWR1: LCD voltage selection</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A- B	+3.3 V (Default)
Short B- C	+5 V

<b>LVDS1: LVDS panel Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	16	LVDSB_DATA0#
2	GND	17	LVDSB_DATA1
3	LVDSA_DATA0	18	LVDSB_DATA1#
4	LVDSA_DATA0#	19	LVDSB_DATA2
5	LVDSA_DATA1	20	LVDSB_DATA2#
6	LVDSA_DATA1#	21	LVDSB_CLK
7	LVDSA_DATA2	22	LVDSB_CLK#
8	LVDSA_DATA2#	23	LVDSB_DATA3
9	LVDSA_CLK	24	LVDSB_DATA3#
10	LVDSA_CLK#	25	GND
11	LVDSA_DATA3	26	GND
12	LVDSA_DATA3#	27	+3.3V
13	GND	28	+3.3V
14	GND	29	+3.3V
15	LVDSB_DATA0	30	+3.3V

<b>SW1: LVDS panel resolution selection</b>	
* ON=0, OFF=1; Single=S, Dual=D	
<b>4-3-2-1</b>	<b>DESCRIPTION</b>
0000	800x600 18-bit Single (Default)
0001	1024x768 18-bit Single
0010	1024x768 24-bit Single
0011	1280x768 18-bit Single
0100	1280x800 18-bit Single
0101	1280x960 18-bit Single
0110	1280x1024 24-bit Dual
0111	1366x768 18-bit Single
1000	1366x768 24-bit Single
1001	1440x960 24-bit Dual
1010	1400x1050 24-bit Dual
1011	1600x900 24-bit Dual
1100	1680x1050 24-bit Dual
1101	1600x1200 24-bit Dual
1110	1920x1080 24-bit Dual
1111	1920x1200 24-bit Dual

<b>J_FLASH1: Flash Descriptor Security Override/ TXE</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short 1-2	No override Mode (Default)
Short 2-3	Override Mode

# Board Layout: Jumper and Connector Locations



(Unit: mm)