

**3.5" SBC with 22nm Intel® Atom™ on-board SoC Supports  
-40°C ~ 85°C, VGA, LVDS, iDP, Dual PCIe GbE, USB 3.0,  
PCIe Mini, SATA 3Gb/s, mSATA, COM, Audio and RoHS**

# **WAFER-BT-E38001W2**

## **Quick Installation Guide**

Version 1.01

November 24, 2015

### **Package Contents**

WAFER-BT-E38001W2 package includes the following items:

- 1 x WAFER-BT-E38001W2 single board computer
- 1 x Power cable
- 1 x SATA with power cable kit
- 1 x Utility CD
- 1 x One Key Recovery CD
- 1 x QIG (Quick Installation Guide)



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# Specifications

- SoC
  - Intel® Atom™ E3845 on-board SoC  
(1.91 GHz, quad-core, 2 MB cache, TDP=10 W)
  - Intel® Atom™ E3827 on-board SoC  
(1.75 GHz, dual-core, 1 MB cache, TDP=8 W)
  - Intel® Atom™ E3826 on-board SoC  
(1.46 GHz, dual-core, 1 MB cache, TDP=7 W)
  - Intel® Atom™ E3825 on-board SoC  
(1.33 GHz, dual-core, 1 MB cache, TDP=6 W)
  - Intel® Atom™ E3815 on-board SoC  
(1.46 GHz, single-core, 512 KB cache, TDP=5 W)
- BIOS: UEFI BIOS
- Memory: soldered-down 2 GB/4 GB 1066/1333 MHz DDR3L
- Graphics: 7th generation Intel® HD Graphics with 4 execution units, supporting DX11.1, OpenGL 4.2 and OpenCL1.2
- Display Output: Dual independent display
  - 1 x VGA (up to 2560x1600 @ 60Hz)
  - 1 x 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200 @ 60Hz)
  - 1 x iDP interface for HDMI, LVDS, VGA, DVI, DP (up to 2560x1600 @ 60Hz)
- Ethernet:
  - LAN1: Intel® I210-IT PCIe controller
  - LAN2: Intel® I210-IT PCIe controller
- Super I/O: Fintek F81866-I
- Embedded Controller: ITE IT8528E-I
- External I/O Interface
  - 2 x RJ-45 GbE
  - 1 x RS-232
  - 1 x USB 2.0
  - 1 x USB 3.0
  - 1 x VGA

- Internal I/O Interface
  - 4 x USB 2.0 (1x4 pin, p=2.0)
  - 1 x RS-232 (2x5 pin, p=2.0)
  - 1 x RS-422/485 (1x4 pin, p=2.0)
  - 1 x KB/MS (1x6 pin)
- Storage:
  - 2 x SATA 3G/s with 5V SATA power connectors
  - 1 x mSATA slot (half-size PCIe Mini) colay SATA2
  - 1 x microSD socket
  - On-board 4G SSD colay SATA1 (optional)
- Expansion:
  - 2 x Full-size PCIe Mini slot
- Audio: Realtek ALC662 HD Audio codec
  - 1 x Analog audio connector (2x5 pin)
- Front Panel
  - 1 x Power LED & HDD LED (1x6 pin)
  - 1 x Power button (1x2 pin)
  - 1 x Reset button (1x2 pin)
- SMBus: one SMBus (1x4 pin)
- I<sup>2</sup>C: one I<sup>2</sup>C (1x4 pin)
- LAN LED: two LAN LED connectors (1x2 pin)
- Digital I/O: one 8-bit digital I/O (2x5 pin)
- Fan Connectors
  - 1 x Smart fan connector (1x4 pin)
- Watchdog Timer: Software programmable supports 1~255 sec. system reset
- Power Supply
  - 12 V only DC input
  - 1 x Internal power connector (2x2 pin)
  - Support AT/ATX mode
- Power Consumption: 12 V @ 1.32 A (Intel® Atom™ processor E3845)

with on-board 2 GB 1333 MHz DDR3L memory)

- Storage Temperature: -40°C ~ 85°C
- Operating Temperature: -40°C ~ 85°C
- Humidity: 5% ~95%, non-condensing
- Vibration: 3G
- Dimensions: 146 mm x 102 mm
- Weight:  
GW:1000g  
NW:250g

## Ordering Information

- **WAFER-BT-E38451W2-R10:**  
3.5" SBC with 22nm Intel® Atom™ quad-core E3845 1.91GHz (10W) on-board SoC supports -40°C ~ 85°C, 4GB DDR3L on-board memory, VGA, LVDS, iDP, dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s, mSATA, COM, audio and RoHS
- **WAFER-BT-E38251W2-R10:**  
3.5" SBC with 22nm Intel® Atom™ quad-core E3825 1.33GHz (6W) on-board SoC supports -40°C ~ 85°C, 2GB DDR3L on-board memory, VGA, LVDS, iDP, dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s, mSATA, COM, audio and RoHS
- **WAFER-BT-E38151W2-R10\*\*:**  
3.5" SBC with 22nm Intel® Atom™ quad-core E3815 1.46GHz (5W) on-board SoC supports -40°C ~ 85°C, 2GB DDR3L on-board memory, VGA, LVDS, iDP, dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s, mSATA, COM, audio and RoHS
- **WAFER-BT-E38271W2-R10\*\*:**  
3.5" SBC with 22nm Intel® Atom™ quad-core E3827 1.75GHz (8W) on-board SoC supports -40°C ~ 85°C, 2GB DDR3L on-board memory, VGA, LVDS, iDP, dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s,

mSATA, COM, audio and RoHS

- **WAFER-BT-E38261W2-R10\*\*:**

3.5" SBC with 22nm Intel® Atom™ quad-core E3826 1.46GHz (7W) on-board SoC supports -40°C ~ 85°C, 2GB DDR3L on-board memory, VGA, LVDS, iDP, dual PCIe GbE, USB 3.0, PCIe Mini, SATA 3Gb/s, mSATA, COM, audio and RoHS

**\*\*By order production, MOQ 100**

- **19800-000300-100-RS:** RS-232 cable with bracket, 300 mm, P=2.0
- **32205-003800-300-RS:** RS-422/485 cable, 200 mm
- **32000-070301-RS:** Dual port USB cable, 210 mm, p=2.0
- **32006-000300-100-RS:** PS/2 KB/MS Y-cable without bracket
- **32000-072100-RS:** Audio cable, 300 mm, p=2.0
- **DP-DVI-R10:**  
DisplayPort to DVI-D converter board (for IEI iDP connector)
- **DP-HDMI-R10:**  
DisplayPort to HDMI converter board (for IEI iDP connector)
- **DP-LVDS-R10:**  
DisplayPort to LVDS converter board (for IEI iDP connector)
- **DP-VGA-R10:**  
DisplayPort to VGA converter board (for IEI iDP connector)
- **DP-DP-R10:**  
DisplayPort to DisplayPort converter board (for IEI iDP connector)

## Jumpers and Connectors

<b>LABEL</b>	<b>FUNCTION</b>
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	Serial port, RS-232
COM3	Serial port, RS-422/485
CN4	Front panel pin header
VGA1	VGA connector
USB1_2, USB3_4	Internal USB 2.0 port
CON1	USB 2.0 and USB 3.0 ports
DIO1	8-bit digital I/O connector
JSPI1	BIOS SPI ROM programming connector
JSPI2	EC SPI ROM programming connector
CPU_FAN1	CPU smart fan connector
JP1, JP2	LAN link LED connector
KB_MS1	Keyboard & mouse pin header
POWER1	+12V DC power input connector
CN2, CN9	SMBus connector
DP1	Internal display port connector
SATA_PWR1, SATA_PWR2	SATA power connectors (5 V)
SATA1, SATA2	SATA 3Gb/s drive connectors
AUDIO1	Audio pin header
INV1	LCD backlight inverter connector
JP3	LCD voltage selection
LVDS1	LVDS connector
SW1	LVDS panel resolution selection

<b>JP3: LVDS Panel Voltage Select Jumper</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short 1-2	+V3.3S (Default)
Short 2-3	+V5S

<b>J_ATX_AT1: AT/ATX Mode Select Switch</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	AT Mode
Short B - C	ATX Mode (default)

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

<b>PWR_BTN1: Power Button Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PWRBTN_SW#	2	GND

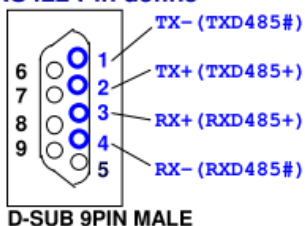
<b>RST_BTN1: Reset Button Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PM_SYSRST_R#	2	GND

<b>COM1: RS-232 DB-9 External Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	DCD1	6	DSR1
2	SIN1	7	RTS1
3	SOUT1	8	CTS1
4	DTR1	9	RI1
5	GND		

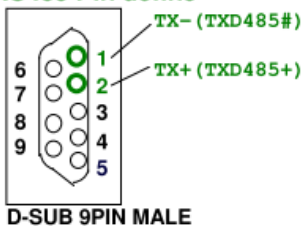
COM2: RS-232 Internal Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	SIN	4	RTS
5	SOUT	6	CTS
7	DTR	8	RI
9	GND	10	GND

COM3: RS-422/485 Internal Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	RXD422-	3	TXD422+/TXD485+
2	RXD422+	4	TXD422-/TXD485-

#### RS422 Pin define



#### RS485 Pin define



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

USB1_2: USB 2.0 Port Pin Header			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	DATA1-	4	DATA2+
5	DATA1+	6	DATA2-
7	GND	8	+5V



<b>USB3_4: 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	DATA3-	4	DATA4+
5	DATA3+	6	DATA4-
7	GND	8	+5V

<b>CON1: External USB 2.0 Port</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	DATA-
3	DATA+	4	GND

<b>CON1: External USB 3.0 Port</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: 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 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+1.8VA	4	SPI_CLK_SW
2	SPI_CS	5	SPI_SI_SW
3	SPI_SO_SW	6	GND

<b>JSPI2: EC SPI ROM Programming Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VA	4	SPI_CLK_SW_EC
2	SPI_CS#0_CN_EC	5	SPI_SI_SW_EC
3	SPI_SO_SW_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	3	FANIO1_EC
2	+12V	4	FANOUT1_EC

<b>JP1: LAN1 LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VLAN	2	LAN1_LINK_ACT-

<b>JP2: LAN2 LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3VLAN	2	LAN2_LINK_ACT-

<b>KB_MS1: Keyboard &amp; Mouse Pin Header</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V_KBMS	4	KBDATA
2	MSDATA	5	KBCLK
3	MSCLK	6	GND

<b>POWER1: +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, CN9: SMBUS Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	SMBCLK
2	SMBDATA	4	+5V

<b>DP1: Internal Display Port 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	+V3.3S
19	+V5S	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	MICIN1	10	MICIN1

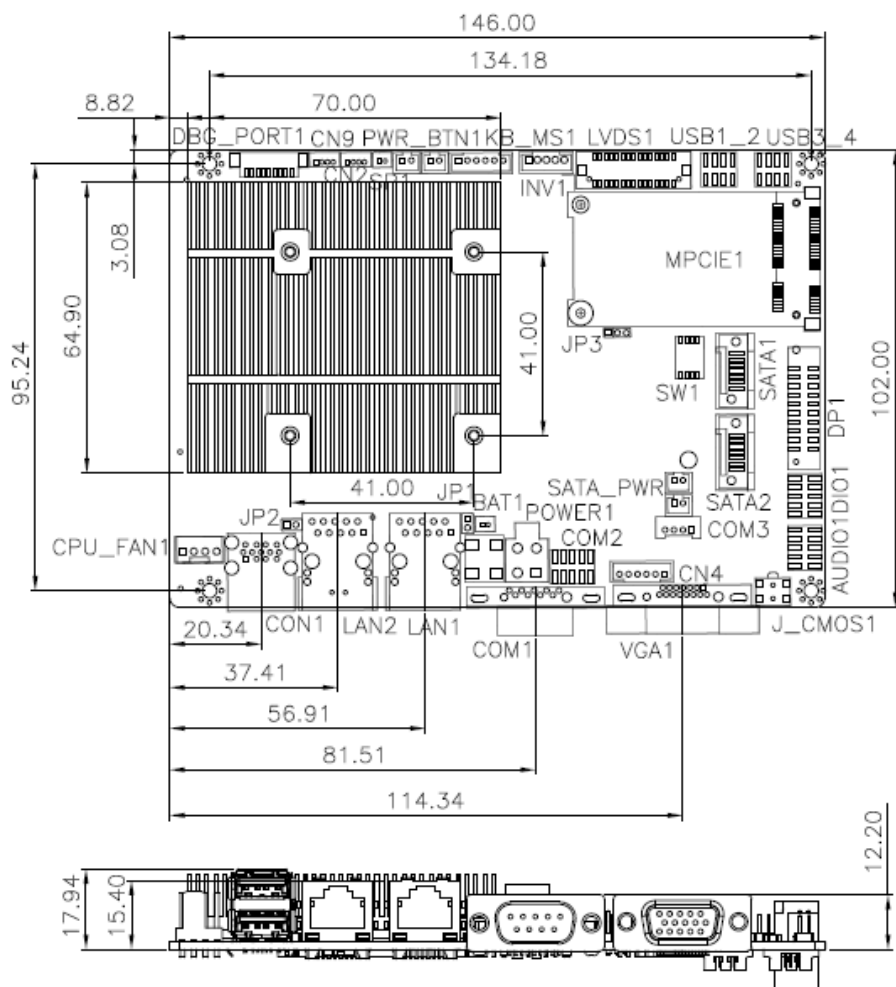
<b>INV1: LCD Backlight Inverter Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	Brightness	4	GND
2	GND	5	ENABKL
3	VCC		

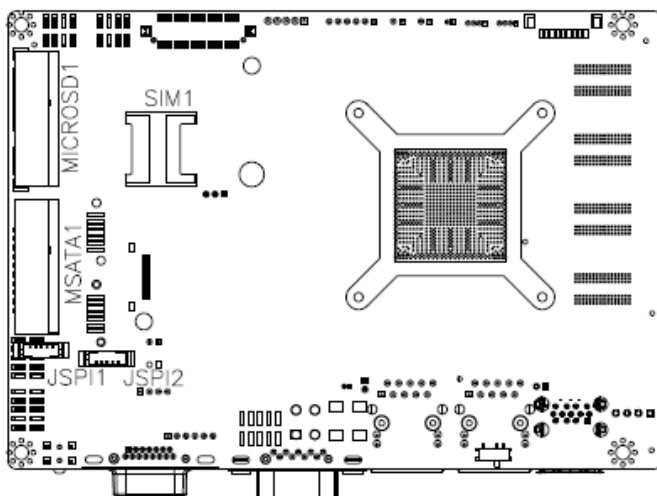
<b>LVDS1: LVDS Panel Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GROUND	2	GROUND
3	LVDS_A_TX0-P	4	LVDS_A_TX0-N
5	LVDS_A_TX1-P	6	LVDS_A_TX1-N
7	LVDS_A_TX2-P	8	LVDS_A_TX2-N
9	LVDS_A_TXCLK-P	10	LVDS_A_TXCLK-N
11	LVDS_A_TX3-P	12	LVDS_A_TX3-N
13	GROUND	14	GROUND
15	LVDS_B_TX0-P	16	LVDS_B_TX0-N
17	LVDS_B_TX1-P	18	LVDS_B_TX1-N
19	LVDS_B_TX2-P	20	LVDS_B_TX2-N
21	LVDS_B_TXCLK-P	22	LVDS_B_TXCLK-N
23	LVDS_B_TX3-P	24	LVDS_B_TX3-N
25	GROUND	26	GROUND
27	+LCD VCC	28	+LCD VCC
29	+LCD VCC	30	+LCD VCC

<b>SW1: LVDS Panel Resolution Selection</b>	
* ON=0, OFF=1	
<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>VGA1: VGA Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	Red	9	VGAVCC
2	Green	10	Display_GND
3	Blue	11	NC
4	NC	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

# Board Layout: Jumper and Connector Locations





(Unit: mm)