

**3.5" SBC with Intel® 14nm Pentium®/Celeron® on-board SoC with
Dual HDMI and LVDS, Dual PCIe GbE, USB 3.0, PCIe Mini,
SATA 6Gb/s, mSATA, COM, Audio and RoHS**

WAFER-BW

Quick Installation Guide

Version 1.1

Aug 26, 2016.

Package List

WAFER-BW package includes the following items:

- 1 x WAFER-BW single board computer
- 1 x Audio cable
- 1 x Power cable
- 1 x RS-232/422/485 cable
- 2 x SATA with power cable kit
- 1 x One Key Recovery CD
- 1 x QIG (Quick Installation Guide)
- 1 x Utility CD



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Specifications

- SoC:
 - Intel® Pentium® N3710 on-board SoC
(up to 2.56GHz, quad-core, 2MB cache, TDP=6W)
 - Intel® Celeron® N3160 on-board SoC
(up to 2.24GHz, quad-core, 2MB cache, TDP=6W)
 - Intel® Celeron® N3060 on-board SoC
(up to 2.48GHz, dual-core, 2MB cache, TDP=6W)
 - Intel® Celeron® N3010 on-board SoC
(up to 2.24GHz, dual-core, 2MB cache, TDP=4W)
- BIOS: AMI UEFI BIOS
- Memory:
 - One 204-pin 1333/1600 MHz single-channel DDR3L SDRAM unbuffered SO-DIMM slot supports up to 8 GB
- Graphics Engine:
 - Intel® HD Graphics Gen 8 Engine with 16 low-power execution units, supporting DX11.1, OpenGL 4.2 and OpenCL 1.2
- Display Output:
 - Triple independent display
 - 2 x HDMI (up to 3840x2160@30Hz)
 - 1 x 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200@60Hz)
- Ethernet:
 - LAN1: Realtek RTL8111GN controller
 - LAN2: Realtek RTL8111GN controller
- External I/O Interfaces:
 - 1 x RS-232
 - 2 x USB 3.0 (on rear I/O)
- Internal I/O Interfaces:
 - 1 x 8 GB eMMC (optional)
 - 2 x SATA 6G/s with 5V SATA power connector (no RAID)
 - 1 x KB/MS (1x6 pin)

- 3 x RS-232 (1x9 pin, P=1.25)
- 1 x mSATA
- 4 x USB 2.0 (2x4 pin, P=2.0)
- 2 x RS-232/422/485 (2 by pin header) (1x9 pin, P=1.25)
- SMBus: 1 x SMBus (1x4 pin)
- I²C: 1 x I²C (1x4 pin)
- Audio:
 - Realtek ALC662 HD codec
 - 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)
- Expansion :
 - 2 x Full/Half-size PCIe Mini card slot (1 w/ SIM holder) (1 w/ mSATA support: share SATA signal from SATA2)
- Digital I/O: 1 x 8-bit digital I/O (1x10 pin, P=1.25)
- Fan Connector:
 - 1 x Smart fan connector (1x4 pin)
- Power supply:
 - 12V only DC input
 - 1 x Internal power connector (2x2 pin)
 - Support AT/ATX mode
- Power Consumption:
 - 12V@1.52A (Intel® Pentium® processor N3710 with 8 GB 1600 MHz DDR3L memory)
- Watchdog Timer:
 - Software programmable supports 1~255 sec. system reset
- Operating Temperature: -20°C ~ 60°C
- Storage Temperature: -30°C ~ 70°C
- Operation Humidity: 5% ~ 95%, non-condensing

- Dimensions: 146mm x 102mm
- Weight(GW/ NW): 600g/ 250g

Ordering Information

- **WAFER-BW-N4-R10:**
3.5" SBC supports Intel® Pentium® quad-core processor N3710 up to 2.56GHz (6W) with dual HDMI and LVDS, Dual PCIe GbE, PCIe Mini, USB 3.0, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **WAFER-BW-N3-R10:**
3.5" SBC supports Intel® Celeron® quad-core processor N3160 up to 2.24GHz (6W) with dual HDMI and LVDS, Dual PCIe GbE, PCIe Mini, USB 3.0, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **WAFER-BW-N2-R10:**
3.5" SBC supports Intel® Celeron® dual-core processor N3060 up to 2.48GHz (6W) with dual HDMI and LVDS, Dual PCIe GbE, PCIe Mini, USB 3.0, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **WAFER-BW-N1-R10:**
3.5" SBC supports Intel® Celeron® dual-core processor N3010 up to 2.24GHz (4W) with dual HDMI and LVDS, Dual PCIe GbE, PCIe Mini, USB 3.0, SATA 6Gb/s, mSATA, COM, Audio and RoHS
- **32000-070301-RS:** Dual-port USB 2.0 cable, 210mm, P=2.0
- **32006-000300-100-RS:**
PS/2 KB/MS Y-cable without bracket, 140mm/120mm

Jumpers setting and connectors

LABEL	FUNCTION
J_ATX_AT1	Select ATX or AT mode
J_CMOS1	CMOS state setting
J_PW1	LVDS1 Voltage Selection
HDMI1	Dual HDMI Connector
LAN1	LAN1 Connector
LAN2	LAN2 Connector
USB1	External 2 Port USB3.0 Connectors
USB2 USB3	External 2 Port USB2.0 Connectors
COM1	External Serial Port Connector
COM2 COM3 COM4 COM5 COM6	Internal Serial Port Connectors
AUDIO1	HD Audio Connector
SATA1 SATA2	Serial ATA Connectors
SATA_PWR1 SATA_PWR2	SATA Power Connector
LVDS1	LVDS1 Panel Connector
INV1	LVDS1 Panel Backlight +12V Power Source
CN1	Power & HDD LED Connector
RST_BTN1	Reset Button Connector
PWR_BTN1	Power Button Connector
PWR1	Power Source Connector
MINI_PCIE1 MINI_PCIE2	Mini PCI-E Card Connector
DIO1	Digital I/O Connector
J_KB/MS1	KEYBOARD & MOUSE Connectors
J_I2C1/J_SMB1	I2C / SMBUS Connector
CPU_FAN1	CPU Fan Connector
SIM1	SIM Card Connector

J_ATX_AT1: AT/ATX Power Mode Setting	
PIN NO.	DESCRIPTION
Short 1 - 2	ATX Power Mode (default)
Short 2 - 3	AT Power Mode

J_CMOS1: Clear CMOS Setup	
PIN NO.	DESCRIPTION
Open	Normal Operation (Default)
Push	Clear CMOS Setup

J_PW1: LVDS1 Voltage Selection	
PIN NO.	DESCRIPTION
Short 1 - 2	+3.3V LVDS (default)
Short 2 - 3	+5V LVDS

LAN1: RJ45 LAN Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN1_MDI0+	7	LAN1_MDI2+
2	LAN1_MDI0-	8	LAN1_MDI2-
3	LAN1_MDI1+	9	LAN1_MDI3+
4	LAN1_MDI1-	10	LAN1_MDI3-

LAN2: RJ45 LAN Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN1_MDI0+	7	LAN1_MDI2+
2	LAN1_MDI0-	8	LAN1_MDI2-
3	LAN1_MDI1+	9	LAN1_MDI3+
4	LAN1_MDI1-	10	LAN1_MDI3-

USB2 & USB3: Internal USB Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	USB_VCC

HDMI1: Dual 19-pin HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
A1	HDMI_A_DATA2P	B1	HDMI_B_DATA2P
A2	GND	B2	GND
A3	HDMI_A_DATA2N	B3	HDMI_B_DATA2N
A4	HDMI_A_DATA1P	B4	HDMI_B_DATA1P
A5	GND	B5	GND
A6	HDMI_A_DATA1N	B6	HDMI_B_DATA1N
A7	HDMI_A_DATA0P	B7	HDMI_B_DATA0P
A8	GND	B8	GND
A9	HDMI_A_DATA0N	B9	HDMI_B_DATA0N
A10	HDMI_A_CLKP	B10	HDMI_B_CLKP
A11	GND	B11	GND
A12	HDMI_A_CLKN	B12	HDMI_B_CLKN
A13	N/A	B13	N/A
A14	N/A	B14	N/A
A15	HDMI_A_SCL	B15	HDMI_B_SCL
A16	HDMI_A_SDA	B16	HDMI_B_SDA
A17	GND	B17	GND
A18	+5V	B18	+5V
A19	HDMI_A_HPD	B19	HDMI_B_HPD

USB1: External USB3.0 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB_VCC	2	USB2_D0-
3	USB2_D0+	4	GND
5	USB3_RXD0-	6	USB3_RXD0+
7	GND	8	USB3_TXD0-
9	USB3_TXD0+	10	USB_VCC
11	USB2_D1-	12	USB2_D1+
13	GND	14	USB3_RXD1-
15	USB3_RXD1+	16	GND
17	USB3_TXD1-	18	USB3_TXD1+

COM1: External Serial Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI		

COM2/3/5: Internal Serial Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND		

COM4/6: Internal Serial Port Connector			
Mode	RS232	RS422	RS485
PIN NO.	DESCRIPTION	DESCRIPTION	DESCRIPTION
1	DCD	TXD-	DATA-
2	DSR	N/A	N/A
3	RXD	TXD+	DATA+
4	RTS	N/A	N/A
5	TXD	RXD+	N/A
6	CTS	N/A	N/A
7	DTR	RXD-	N/A
8	RI	N/A	N/A
9	GND	N/A	N/A

AUDIO1: Audio Line-In/Out MIC Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINE-OUT_R	2	LINE-IN_R
3	AUD_GND	4	AUD_GND
5	LINE-OUT_L	6	LINE-IN_L
7	AUD_GND	8	AUD_GND
9	MIC1_R	10	MIC1_L

SATA1/2 : Serial ATA Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND	8	N/C

SATA_PWR1/2: SATA Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	Ground

LVDS1: LVDS Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND	14	GND
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND	26	GND
27	VCC/VCC3	28	VCC/VCC3
29	VCC/VCC3	30	VCC/VCC3

INV1: 5-pin Header Inverter Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCD_BKLTCTL	2	GROUND
3	+12V	4	GROUND
5	BACKLIGHT ENABLE		

CN1: Power LED & HDD LED connector		
	PIN NO.	DESCRIPTION
+5V	1	VCC
	2	GND
Power LED	3	PWR_LED+
	4	PWR_LED-
HDD LED	5	HDD_LED+
	6	HDD_LED-

RST_BTN1: Reset Button Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET+	2	RESET-

PWR_BTN1: Power Button Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PWR_BTN+	2	PWR_BTN-

PWR1: +12V Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

CPU_FAN1: CPU Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V12S
3	Rotation Signal	4	PWM Control Signal

SIM1: SIM Card Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SIM_VCC	2	SIM_RST
3	SIM_Clock	5	GND
6	SIM_VPP	7	SIM_DATA

MINI_PCIE1: Mini PCI-E Card Connector(Support SIM Card)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	UIM_PWR
9	GND	10	UIM_DATA
11	PCIE_CLK#	12	UIM_CLK
13	PCIE_CLK	14	UIM_RST
15	GND	16	UIM_VPP
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PCIRST#
23	PCIE_RXN	24	N/C
25	PCIE_RXP	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIE_TXN	32	SMBDATA
33	PCIE_TXP	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

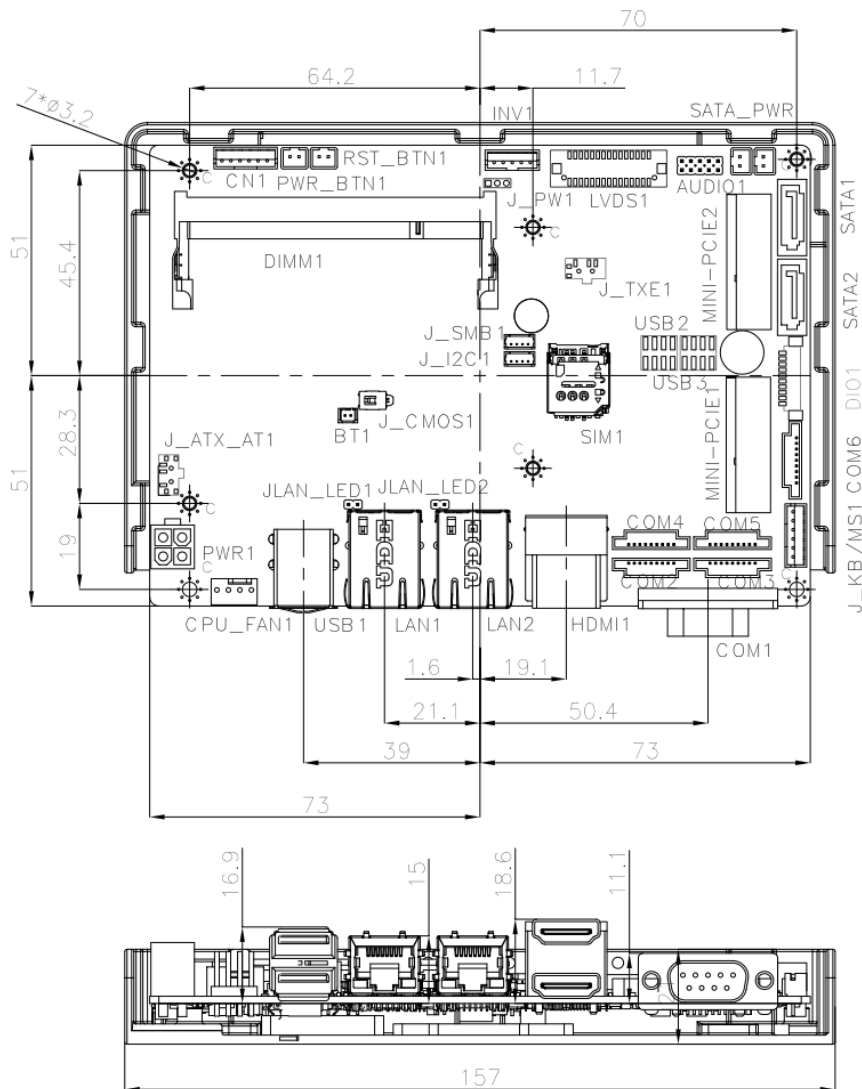
MINI_PCIE2: Mini PCI-E Card Connector(Support mSATA)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	PCIE_CLK#	12	N/C
13	PCIE_CLK	14	N/C
15	GND	16	N/C
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PCIRST#
23	PCIE_RXN(SATA_RX+)	24	N/C
25	PCIE_RXP(SATA_RX-)	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PCIE_TXN(SATA_TX-)	32	SMBDATA
33	PCIE_TXP(SATA_TX+)	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

DIO1 : Digital Input / Output Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	+5V
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

J_KB/MS1: 6-pin header Keyboard/Mouse Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	Mouse Data
3	Mouse Clock	4	Keyboard Data
5	Keyboard Clock	6	GND

J_I2C1/J_SMB1 : 4-pin Header SMBUS Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	SMBUS(I2C) DATA
3	SMBUS(I2C) CLK	4	+5V

Board Layout: Jumper and Connector Locations



(Unit: mm)