
ASRock[®]

iBOX-210

User Manual

Version 1.0

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Contents

Chapter 1 Introduction	1
1.1 Package Contents	1
1.2 Product Specifications	2
1.3 Block Diagram	3
Chapter 2 Product Overview	4
2.1 Inside View	4
2.2 Front View	5
2.3 Rear View	6
Chapter 3 Hardware Installation	7
3.1 Removing the Chassis Bottom Cover	8
3.2 Installing Memory Modules (SO-DIMM)	9
3.3 Installing the 2.5-inch Hard Drive	10
3.4 Installing the WiFi module and the WiFi antennas (Optional)	12
3.5 Replacing the Chassis Bottom Cover	14
Chapter 4 Motherboard	15
4.1 Motherboard Layout	15
4.2 Motherboard Specifications	17
4.3 Jumpers Setup	19
4.4 Onboard Headers and Connectors	21
4.5 Expansion Slots (mini-PCIe and mini-PCIe/mini-SATA Slots)	26

Chapter 1 Introduction

Thank you for purchasing iBOX-210, a reliable embedded box PC produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.



*Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this product, please visit our website for specific information about the model you are using.
ASRock's Website: www.asrock.com*



The illustrations shown in this manual are examples only, the actual system may differ slightly.

1.1 Package Contents

- iBOX-210
- SBC-210/211 (pre-installed motherboard)
- 1 x SATA 1 to 1 Power Cable
- 4 x HDD Screws (M3x4)
- 1 x WiFi Module Screw (M2x3)
- 1 x Screw for mini-PCIe/mini-SATA slot (M2x3)
- Power Adapter
- User Manual



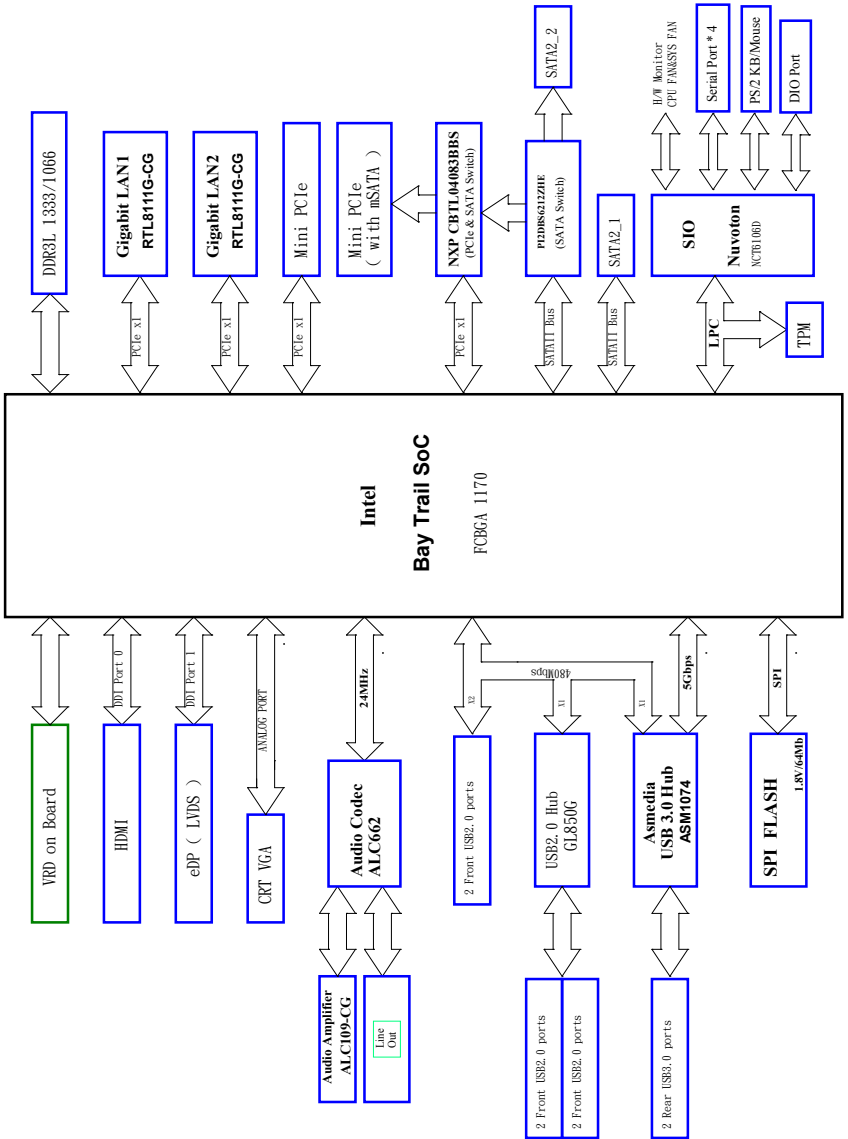
If any items are missing or appear damaged, contact your authorized dealer.

1.2 Product Specifications

iBOX-210	
Processor System	
CPU	Intel® Atom™ Baytrail SoC processor J1900/N2930/E3845/ E3815 Quad/Single Core up to 2GHz
Memory	1 x DDR3L 1333MHz SO-DIMM up to 4 GB
Chipset	N/A
Graphic	Intel Gen7
LAN Chipset	Realtek RTL8111G
Watch Dog	256 Segments,0,1,2,...255sec/min
Rear I/O	
Serial Port	1 x RS232/485/422, 1 x RS232
USB	2 USB 3.0 ports/2 USB2.0 ports
LAN	1 RJ45 Port for Gbe
Vedio output	1 x VGA output/ 1 x HDMI
Audio	Line out
Expansion	1 x mini PCIe /1 x mSATA
Storage	
Type	1 x 2.5" HDD/ SSD
OS Support	
Window 8/7 Linux	
Certifications	
CE, FCC, Class A	
Environmental	
Operating Temp	0°C~50°C
Storage Temp	-20°C~80°C
Humidity	10%~90%
Mechanical	
Material	Top cover -aluminum extrusion/ Base- metal
Dimension	200x134.5x 39mm
Weight	1.3 kg
Mounting	mounting bracket (optional)

* For detailed product information, please visit our website: <http://www.asrock.com>

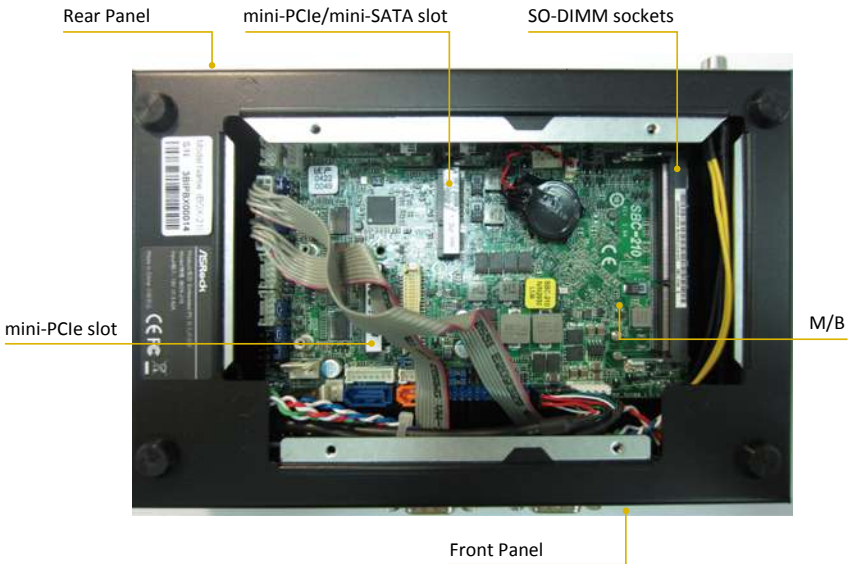
1.3 Block Diagram



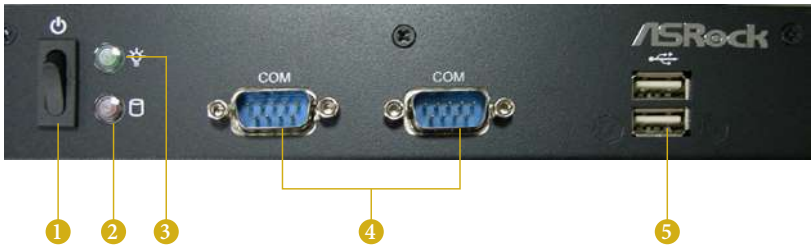
Chapter 2 Product Overview

This chapter provides diagrams showing the location of important components of the iBOX-210.

2.1 Inside View



2.2 Front View



No.	Description
1	On-/off Switch
2	HDD LED
3	Power LED
4	2 x COM Ports
5	2 x USB 2.0 Ports

Status LED Definitions

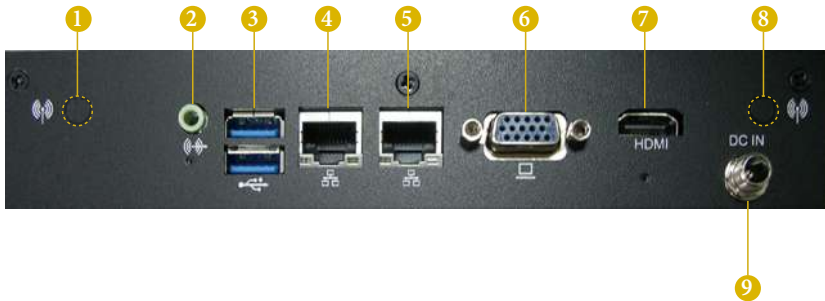
Power LED

Status	Description
Solid Green	Power on
Off	Power off

HDD Status LED

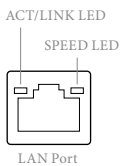
Status	Description
Red	HDD installed
Off	HDD uninstalled

2.3 Rear View



No.	Description	No.	Description
1	Antenna Port	6	VGA Port (VGA1)
2	Line out (Lime)	7	HDMI Port (HDMI1)
3	2 x USB 3.0 Ports (USB01)	8	Antenna Port
4	LAN RJ-45 Port (LAN1)*	9	DC Jack (DC IN)
5	LAN RJ-45 Port (LAN2)*		

* There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Off	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

Chapter 3 Hardware Installation

This chapter provides step-by-step procedures on how to install components.

Installation Procedures

- 1 Removing the chassis bottom cover
- 2 Installing the memory modules (SO-DIMM)
- 3 Installing the 2.5-inch hard drive
- 4 Installing the WiFi module and the WiFi antennas (**Optional**)
- 5 Replacing the chassis top cover

After making sure that you have properly connected the power supply and all the necessary peripherals, power on the system.

3.1 Removing the Chassis Bottom Cover

1. Remove the four screws on the bottom case.
2. Lift up and remove the top cover.

1



3.2 Installing Memory Modules (SO-DIMM)

This motherboard provides two 204-pin DDR3 (Double Data Rate 3) SO-DIMM slots. Please install the SO-DIMM module into the DDR3_A2 for the first priority.

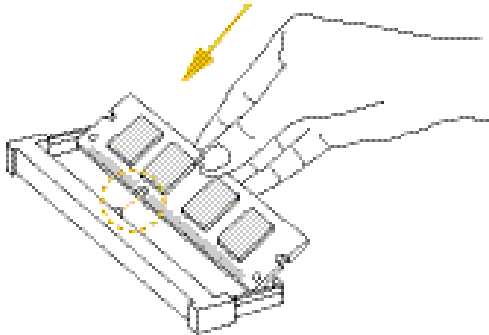


It is not allowed to install a DDR or DDR2 memory module into a DDR3 slot; otherwise, this motherboard and SO-DIMM may be damaged.

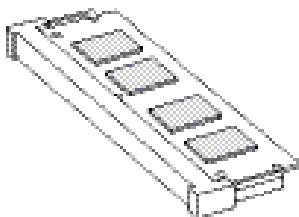


The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the slot at incorrect orientation.

1



2



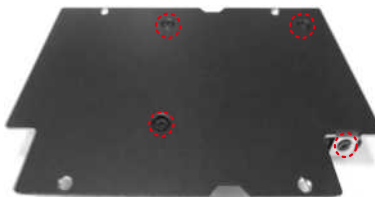
3.3 Installing the 2.5-inch Hard Drive

1. Attach the HDD onto the bottom cover with the printed circuit board side facing down.
Carefully align the mounting holes in the hard drive and the bottom cover.
2. Secure the hard drive into the place using the four screws.
3. Attach one end of the SATA 1 to 1 Power Cable to the hard drive.

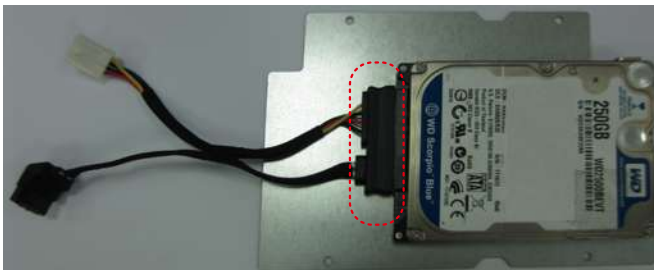
1



2

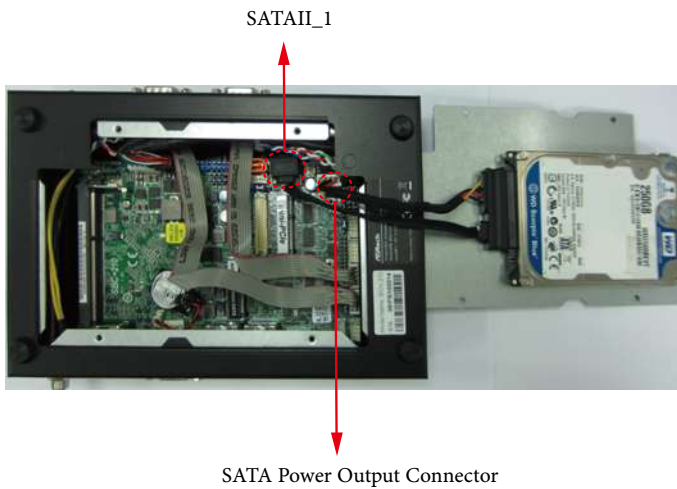


3



4. Attach the SATA data cable and power cable to the motherboard.

4



3.4 Installing the WiFi module and the WiFi antennas (Optional)

1. Insert the WiFi Module Card into the mini PCI Express slot (MINI_PCIE1).
2. Tighten the screw that holds the card in place.
3. Attach the SMA Wi-Fi Antenna Cables to the WiFi Module.

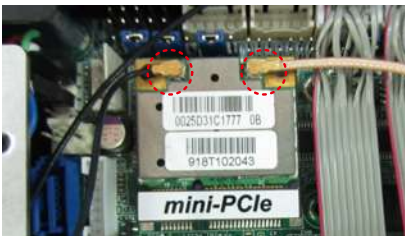
1



2



3



4. Insert the RP-SMA Wi-Fi Antenna Connectors to the antenna ports on the rear panel. Then fasten the screw nuts to secure the antenna connectors.
5. Connect the two WiFi 2.4/5 GHz Antennas to the antenna connectors. Turn the antenna clockwise until it is securely connected.
6. Set the WiFi 2.4/5 GHz Antenna at 90-degree angle.
*You may need to adjust the direction of the antenna for a stronger signal.

4



5



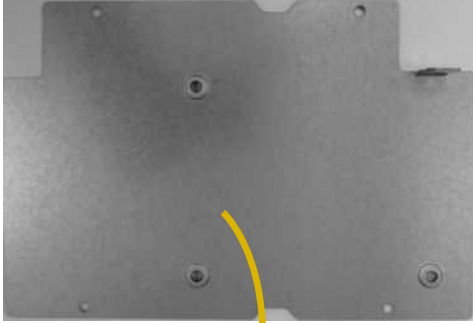
6



3.5 Replacing the Chassis Bottom Cover

1. Replace the top cover.
2. Secure the four screws at the bottom.

1

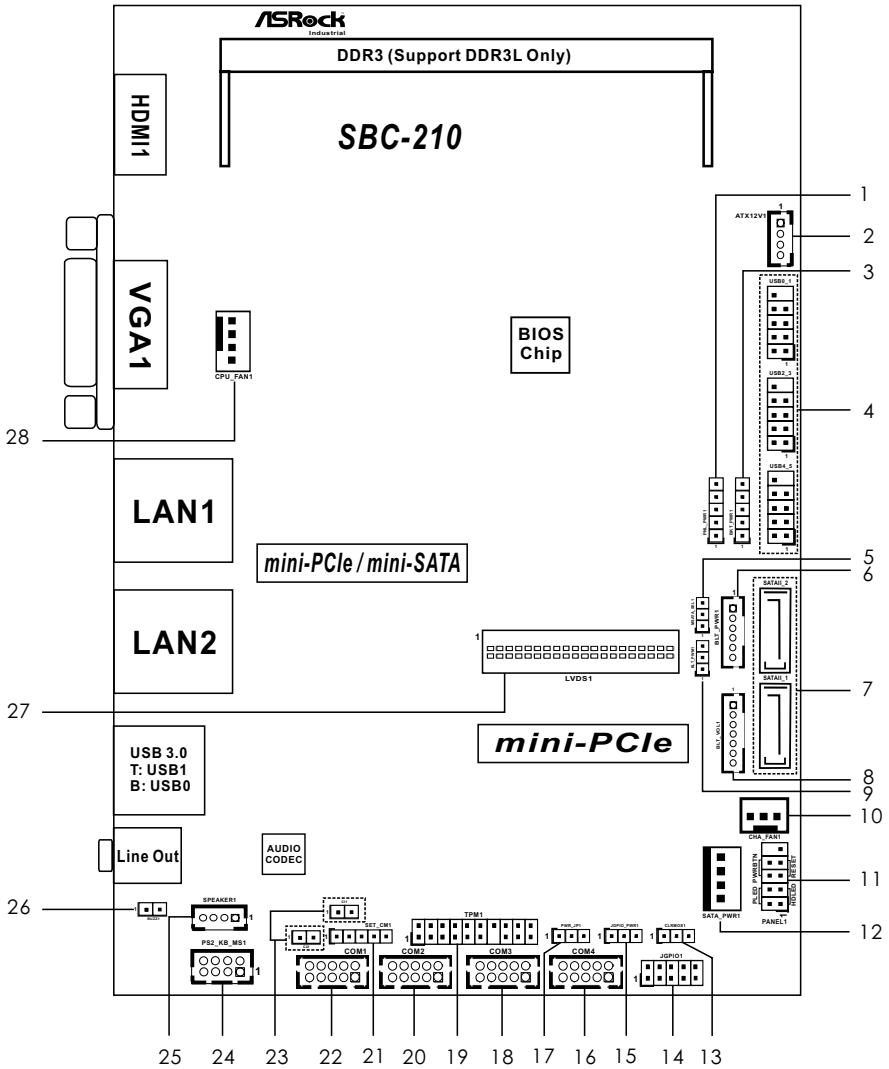


2



Chapter 4 Motherboard

4.1 Motherboard Layout



No.	Description
1	Panel Power Selection (PNL_PWR1)
2	ATX Power Connector
3	Backlight Power Selection (BKT_PWR1)
4	USB2.0 Headers (USB0_1, USB2_3, USB4_5)
5	mSATA Selection
6	Inverter Power Control Wafer (BLT_PWR1)
7	SATA2 Connectors (SATAII_1, SATAII_2)
8	Backlight & Amp Volume Control (BLT_VOL1)
9	Backlight Control Level (BLT_PWM1)
10	3-Pin Chassis FAN Connector
11	System Panel Header
12	SATA Power Output Connector
13	Clear CMOS Header
14	Digital Input / Output Pin Header
15	Digital Input / Output Power Select
16	COM Port Header (COM4)
17	ATX/AT Mode Selection
18	COM Port Header (COM3)
19	TPM Header
20	COM Port Header (COM2)
21	SET_CM1
22	COM Port Header (COM1)
23	Chassis Intrusion Headers (CI1, CI2)
24	PS2_KB_MS1
25	3W Audio AMP Output Wafer
26	2-Pin Buzzer Header
27	LVDS Panel Connector
28	4-Pin CPU FAN Connector

4.2 Motherboard Specifications

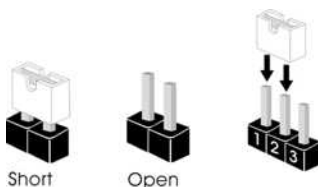
Form Factor	Dimensions	3.5" SBC (5.8-in x 4.0-in) / (146 x 102 mm)
Processor System	CPU	Intel [®] new Atom™ Baytrail-M/D/E Series
	Core Number	4
	Max Speed	(By CPU)
	Cache	(By CPU)
	Chipset	N/A
Expansion Slot	BIOS	UEFI
	PCI	0
	Mini-PCIe	1 (Half Size) + 1 (Full Size) shared with mSATA
	mSATA	1 (Full Size) shared with SATAII_2
	PCIe	0
Memory	CFast Card Socket	0
	Technology	Single Channel DDR3L 1066/1333 MHz SDRAM
	Max.	4GB
Graphics	Socket	1 x SO-DIMM
	Controller	Intel [®] Gen7 Intel Graphics DX 11, OGL3.2
	VRAM	Shared Memory
	VGA	Supports max. resolution 1920 x 1200
	LVDS	Dual channel 24-bit, max resolution 1920 x 1200 @60Hz
	HDMI	Supports HDMI 1.4a, max resolution 1920 x 1200
	DVI	N/A
	DisplayPort	N/A
Ethernet	Multi Display	Yes (Dual Display)
	Ethernet	10/100/1000 Mbps
	Controller	GbE LAN: Realtek RTL8111G-CG
SATA	Connector	2 x RJ-45
	Max Data Transfer Rate	SATA2 (3.0Gb/s)
Rear I/O	VGA	1
	DVI	0
	HDMI	1
	DisplayPort	0
	Ethernet	2
	USB	2 x USB 3.0 compliant
	Audio	1 (Line out)
	Serial	0
PS/2	0	

Internal Connector	USB	6 (3*2.54 pitch header USB 2.0 compliant)
	LVDS/Inverter	1/1
	VGA	0
	Serial	4 (RS-232)
	SATA	2x SATA2 (3.0Gb/s) (SATAII_2 is shared with mSATA)
	Parallel	0
	IrDA	0
	GPIO 8-bit	4 x GPI + 4 x GPO
	SATA PWR Output Con	1
	Speaker Header	1
	Watchdog Timer	Output
Interval		256 segments, 0,1,2...255sec/min
Power Requirements	Input PWR	9-36V DC-In using 4-pin ATX PWR Con
	Power On	AT/ATX Supported AT: Directly PWR on as power input ready ATX: Press button to PWR on after power input ready
Environment	Temperature	0°C – 60°C

* For detailed product information, please visit our website: <http://www.asrock.com>

4.3 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.



Clear CMOS Jumper
(CLRCMOS1)
(see p.15, No. 13)



CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, and user default profile will be cleared only if the CMOS battery is removed.

Digital Input/Output
PWR Select
(3-pin JGPIO_
PWR1)
(see p.15, No. 5)



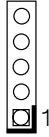
1-2 : +12V
2-3 : +5V

ATX/AT Mode
Selection
(3-pin PWR_JP1)
(see p.15, No. 17)



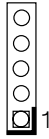
1-2: AT Mode
2-3: ATX Mode

Panel Power
Selection (LCD_
VCC)
(5-pin PNL_PWR1)
(see p.15, No. 1)



Use this to set up the VDD
power of the LVDS connector.
1-2: +3V
2-3: +5V
3-4: +5V
4-5: +12V

Backlight Power Selection
(LCD_BLT_VCC)
(5-pin BKT_PWR1)
(see p.15 No. 3)



Use this to set up the backlight
power of the LVDS connector.
1-2: +5V
2-3: +12V
3-4: +12V
4-5: DC_IN Power

Backlight Control Level
(3-pin BLT_PWM1)
(see p.15 No. 9)



1-2: +3V
2-3: +5V

COM Port PWR Setting
Header
(5-pin SET_CM1)
(see p.15 No. 21)



1-2: +12V
2-3: +5V
3-4: +5V
4-5: N/A

mSATA Selection
(3-pin MSATA_SEL1)
(see p.15 No. 5)



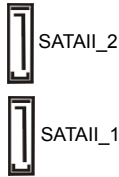
1-2: SATAII_2 + mini-PCIe
2-3: mSATA, SATAII_2 no
function

4.4 Onboard Headers and Connectors



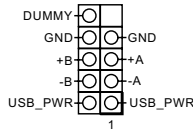
Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

SATA2 Connectors
(SATAII_1, SATAII_2)
(see p.15, No. 7)



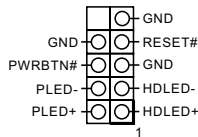
These two Serial ATA2 (SATA2) connectors support SATA data cables for internal storage devices. The current SATA2 interface allows up to 3.0 Gb/s data transfer rate.

USB 2.0 Headers
(9-pin USB0_1, USB2_3,
USB4_5)
(see p.15 No. 4)



There are three USB 2.0 headers on this motherboard.

System Panel Header
(9-pin PANEL1)
(see p.15 No. 11)



This header accommodates several system front panel functions.



PWRBTN (Power Switch):

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch):

Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):

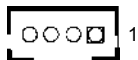
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED):

Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

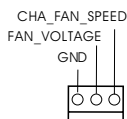
The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

3W Audio AMP Output
Wafer
(4-pin SPEAKER1)
(see p.15 No. 25)



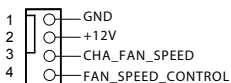
PIN	Signal Name
1	SPK L-
2	SPK L+
3	SPK R+
4	SPK R-

Chassis Fan Connector
(3-pin CHA_FAN1)
(see p.15 No. 10)



Please connect the fan cable to the fan connector and match the black wire to the ground pin.

CPU Fan Connector
(4-pin CPU_FAN1)
(see p.15 No. 28)



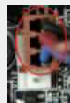
Please connect the CPU fan cable to the connector and match the black wire to the ground pin.



*Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function.
If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.*

Pin 1-3 Connected ←

3-Pin Fan Installation

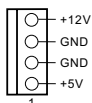


ATX Power Connector
(Input 9V-36V)
(4-pin ATX12V1)
(see p.15 No. 2)



Please connect a DC power supply (9V-36V) to this connector.
1-4 : GND
2-3 : DC Input

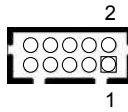
SATA Power Output
Connector
(4-pin SATA_PWR1)
(see p.15 No. 12)



COM Port Headers

(10-pin COM1)

(see p.15 No. 22)



(10-pin COM2)

(see p.15 No. 20)

PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
10	DUMMY	8	CCTS#	6	DDSR#	4	DDTR#	2	RRXD
9	DUMMY	7	RRTS#	5	GND	3	TTXD	1	DDCD#

(10-pin COM3)

(see p.15 No. 18)

(10-pin COM4)

(see p.15 No. 16)



This motherboard supports RS232/422/485 on COM1 port. Please refer to below table for the pin definition. In addition, COM1 port (RS232/422/485) can be adjusted in BIOS setup utility > Advanced Screen > Super IO Configuration. You may refer to page 29 for details.

COM1 Port Pin Definition

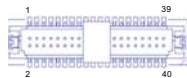
PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	RX+	N/A
3	TXD	TX+	RTX+
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	NA/+5V/+12V	N/A	N/A

LVDS Panel

Connector

(40-pin LVDS1)

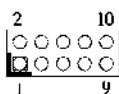
(see p.15, No. 27)



PIN	Signal Name	PIN	Signal Name
2	LCD_VCC	1	LCD_VCC
4	LDDC_CLK	3	+3V
6	LVDS_A_ DATA0#	5	LDDC_DATA
8	GND	7	LVDS_A_ DATA0
10	LVDS_A_ DATA1	9	LVDS_A_ DATA1#
12	LVDS_A_ DATA2#	11	GND

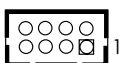
PIN	Signal Name	PIN	Signal Name
14	GND	13	LVDS_A_ DATA2
16	LVDS_A_ DATA3	15	LVDS_A_ DATA3#
18	LVDS_A_CLK#	17	GND
20	GND	19	LVDS_A_CLK
22	LVDS_B_ DATA0	21	LVDS_B_ DATA0#
24	LVDS_B_ DATA1#	23	GND
26	GND	25	LVDS_B_ DATA1
28	LVDS_B_ DATA2	27	LVDS_B_ DATA2#
30	LVDS_B_ DATA3#	29	DPLVDD_EN
32	GND	31	LVDS_B_ DATA3
34	LVDS_B_CLK	33	LVDS_B_CLK#
36	CON_LBKLT_ EN	35	GND
38	LCD_BLT_VCC	37	CON_LBKLT_ CTL
40	LCD_BLT_VCC	39	LCD_BLT_VCC

Digital Input/Output Pin Header
(10-pin JGPIO1)
(see p.15 No. 14)



PIN	Signal Name	PIN	Signal Name
1	SIO_GP24	2	SIO_GP20
3	SIO_GP25	4	SIO_GP21
5	SIO_GP26	6	SIO_GP22
7	SIO_GP27	8	SIO_GP23
9	JGPIO_PWR	10	GND

PS2_KB_MS1
(8-pin PS2_KB_MS1)
(see p.15 No. 24)



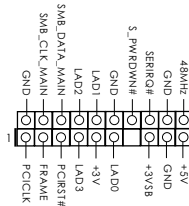
PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
8	GND	6	GND	4	+5V STANDBY	2	+5V STANDBY
7	MSCLK	5	MSDATA	3	KBDATA	1	KBCLK

Backlight & Amp Volume
Control
(7-pin BLT_VOL1)
(see p.15 No. 8)



PIN	Signal Name
1	GPIO_VOL_UP
2	GPIO_VOL_DW
3	PWRDN
4	GPIO_BLT_UP
5	GPIO_BLT_DW
6	GND
7	GND

TPM Header
(17-pin TPM1)
(see p.15 No. 19)



This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Chassis Intrusion Headers
(2-pin CI1, CI2)
(see p.15 No. 23)



This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

Buzzer Header
(2-pin BUZZ1)
(see p.15 No. 26)



4.5 Expansion Slots (mini-PCIe and mini-PCIe/mini-SATA Slots)

There is 1 mini-PCIe slot and 1 mini-PCIe/mini-SATA slot on this motherboard.



Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

mini-PCIe slot:

MINI_PCIE1 (mini-PCIe slot; half size) is used for WiFi module.

mini-PCIe/mini-SATA slot:

MINI_PCIE2 (mini-PCIe/mini-SATA slot; full size) is used for PCI Express mini cards or mSATA cards.