FCC Information and Copyright

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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CE

Dichiarazione di conformità sintetica

Ai sensi dell'art. 2 comma 3 del D.M. 275 del 30/10/2002

Si dichiara che questo prodotto è conforme alle normative vigenti e soddisfa i requisiti essenziali richiesti dalle direttive

2004/108/CE, 2006/95/CE e 1999/05/CE

quando ad esso applicabili

Short Declaration of conformity

We declare this product is complying with the laws in force and meeting all the essential requirements as specified by the directives

2004/108/CE, 2006/95/CE and 1999/05/CE

whenever these laws may be applied

Table Of Contents

Chapter 1: Introduction

1.1 Before You Start

Thank you for choosing our product. Before you start installing the motherboard, please make sure you follow the instructions below:

- Prepare a dry and stable working environment with sufficient lighting.
- Always disconnect the computer from power outlet before operation.
- Before you take the motherboard out from anti-static bag, ground yourself properly by touching any safely grounded appliance, or use grounded wrist strap to remove the static charge.
- Avoid touching the components on motherboard or the rear side of the board unless necessary. Hold the board on the edge, do not try to bend or flex the board.
- Do not leave any unfastened small parts inside the case after installation. Loose parts will cause short circuits which may damage the equipment.
- Keep the computer from dangerous area, such as heat source, humid air and water.
- The operating temperatures of the computer should be 0 to 60 degrees Celsius.
- To avoid injury, be careful of:
  Sharp pins on headers and connectors
  Rough edges and sharp corners on the chassis
  Damage to wires that could cause a short circuit

Note

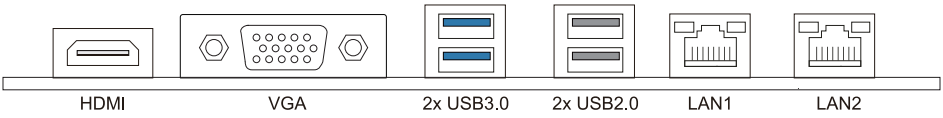
» *The package contents may be different due to the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.*

1.2 Specifications

Dimensions	148 x 102 x 1.6 mm	
Processor	Intel® Celeron® Processor J6412/X6413E, TDP 10W (Wide range temperature: X6413E)	
Chipsets	EDP to LVDS : CH7513A-BFI DDI to VGA (No support wide range temperature): RTL2166 LAN controller: I226V colay I226-IT (I226-IT for wide range temperature.) Audio Codec (No support wide range temperature): ALC897 Audio Amplifier(No support wide range temperature): ALC105 Super IO: IT8786	
System Memory	2 x 260-pin socket support DDR4 3200MHz SO-DIMM, up to 32 GB	
Graphic	Intel® Integrated Graphics	
	HDMI	1. 1 x HDMI connector 2. Support HDMI2.0
	VGA (No support wide range temperature)	DDI to VGA: RTL2166 1 x VGA connector
	LVDS/eDP	1. Chipset: CH7513A-BFI 2. Support LVDS 18/24bit dual channels 3. Support eDP two channel 4. 1 x 2*15 wafer box pin-header for LVDS connector (eDP and LVDS share with the same connector) 5. eDP and LVDS switch mode by BIOS setting
Ethernet	Support 2 x GbE LAN: (1) 2 x Intel I226V colay I226-IT 2.5G LAN, RJ45 connector. (I226-IT for wide range temperature) (2) 1 x 2*4-Pin 2.0-pitch wafer box pin-header for front LAN LED	
SATA	Support 2 x SATA3 (1) 1 x SATAIII7pin connector with 1 x 1*4-pin Power connector for HDD (Support 5V and 12V) (2) support PCIe x2 NVMe storage.	
Universal Serial Bus & PCIe	USB3.1 Gen1 (1) 2 x USB3.1 for 1x dual-stack I/O connectors (2) 1 x USB3.1 for M.2 B key ,Integrate SIM Card slot (3) 1 x 1*3-pin pin-header for select Rear USB3.0 Power w/ 5V/5VSB (5VSB support wake on USB function) USB2.0 Gen1 (1) 2 x USB2.0 for 1 x dual-stack I/O connectors. (2) 1 x USB 2.0 for Mini-PCIe (3) 2 x USB2.0 for 1 x 2*5pin header (4) USB2.0 voltage support 5V only.	
Super IO	Controller : IT8786 Support 4 x COM Port, DIO,	
Serial Port	Support 4 x COM port, define as below, 2 x RS232/422/485 (COM1/2) (1) 2*5 pin header (2) Mode selection by BIOS control. (3) Support Auto flow control. (4) 2 x 1*3 PIN header support 0/5/12V by jump selection, default 0V. 2 x RS232 (COM3-4) (1) 2 x 2*5 Header	
Expansion Slot	(1) 1 x M.2 key B 3042/3052 slot with SIM card connector, support PCIe and USB3.0 interface. (2) 1 x Full Size Mini-PCIe, support USB2.0 and PCIe interface. (3) 1 x M.2 Key-M Slot, support PCIe x 2 NVMe storage.	
Audio (No support wide range temperature)	Audio Codec: ALC897+ ALC105 (1) Support 1 x 2*4pin Audio header, support Line-out/MIC. (2) 1 x 1*4pin 2.0-pitch speaker header, support 2 x 2W speaker.	
Digital I/O	1 x 2*5-pin 2.0-pitch header, support 8-Bit GPIO.	
Front Panel	1 x 2*5-pin 2.0-pitch Front panel header	
Indicator	1 x Power LED for motherboard Power-on display	

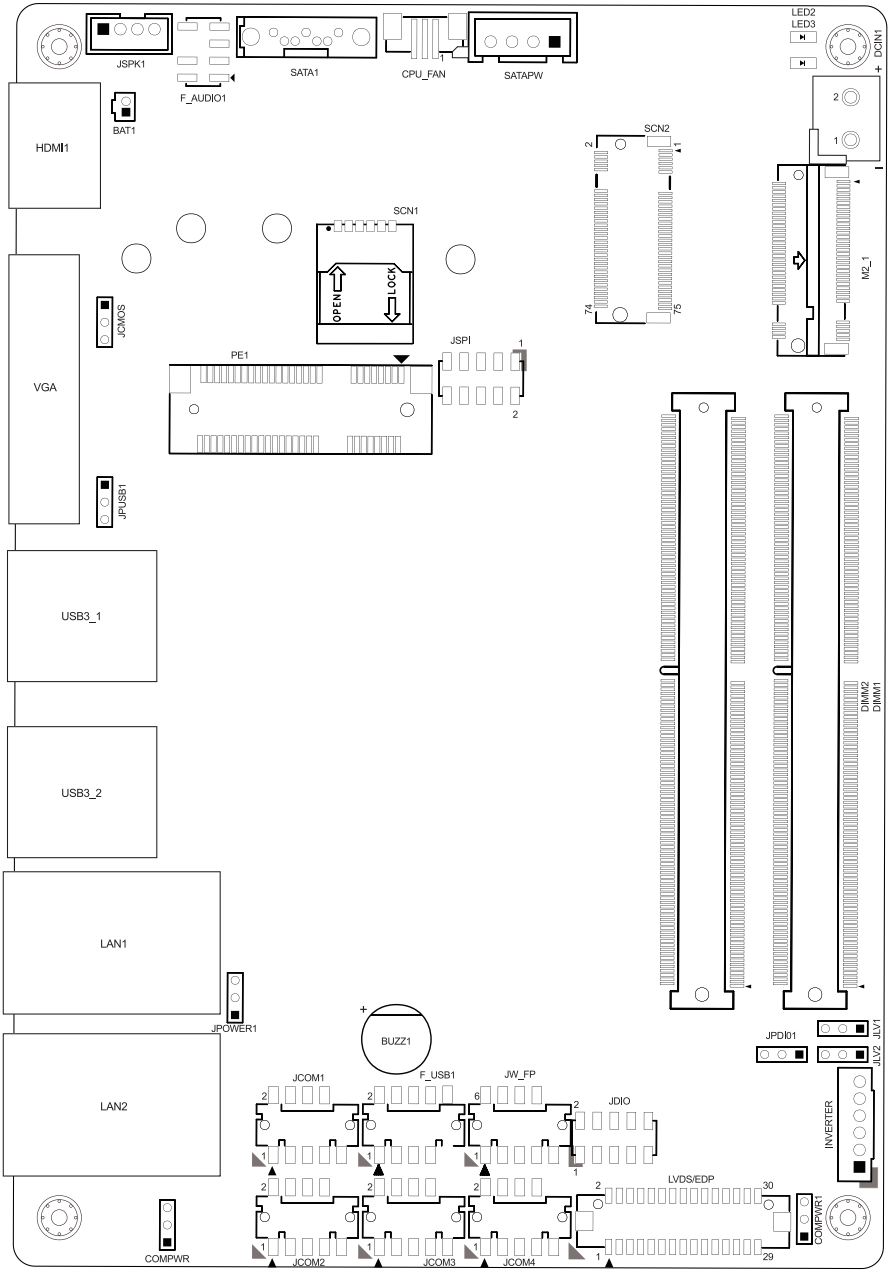
Buzzer (No support wide range temperature)	1 x Buzzer
Power Input	DC-IN 9 ~ 24V , 2pin phoenix connector.
Edge IO	1 x HDMI connector
	1 x Dual-Stack USB3.0 connectors
	1 x Dual-Stack USB2.0 connectors
	2 x RJ45 connectors, support 2.5G GbE.
	1 x VGA connector
Onboard pin-header	Expansion slots 1 x M.2 key B slot, with SIM Card slot 1 x Full size Mini-PCIe 1 x M.2 Key-M Slot
	SATA 1 x SATA3 7pin connector with 1 x 1*4-pin Power connector for SATA power (support 5V and 12V power switch)
	Display 1 x 2*15 wafer box pin-header for LVDS connector 1 x 1*3-pin 2.0-pitch wafer box pin-header for 3.3V/5V for LCD power select jumper 1 x 1*6-pin 2.0-pitch connector for LCD Backlight Inverter 1 x 1*3-pin 2.0-pitch wafer box pin-header for 5V/12V for LCD Backlight Inverter
	Audio 1 x 1*4-pin 2.0-pitch wafer box pin-header for 2x 2W speaker 1 x 2*4pin 2.0-pitch wafer box pin-header for Line-out/MIC 1 x Buzzer
	USB 1 x 2*5-pin 2.0-pitch wafer box pin-header, support 2x USB2.0 1 x 1*3-pin pin-header for select Rear USB3.0 Power w 5V/5VSB
	Power 1 x 1*2-pin Phoenix-type power connector for DC-in 9 ~ 24V
	Serial Port 2 x 2*5 Header for RS232/422/485 (COM1/2) 2 x 2*5 Header for RS232 (COM2/3) 2 x 1*3-pin 2.0-pitch wafer box pin-header for COM1/2 Serial Port Power Select Jumper (Select 0/5/12V)
	Others 1 x 2*5-pin 2.0-pitch GPIO header (4*GPI, 4*GPO) 1 x 1*3 pins, support 5V/3.3V header for 5V/3.3V GPIO switch 1 x 3-pin 2.0-pitch pin-header for Clear CMOS Jumper 1 x 1*3-pin 2.0-pitch pin-header for select AT/ATX mode 1 x 2*5-pin 2.0-pitch wafer box pin-header for Front panel. 1 x 1*2-pin 1.0-pitch connector for Battery (cable Length 130mm) 1 x Power LED for motherboard Power-on display 1 x 1*3-pin Wafer connector Smart DC FAN for system
O.S. support	Windows 10 IoT Enterprise 2019 1809 64-bit Linux Ubuntu 20.04
BIOS	Support UEFI only
ESD/ EMI	Contact with 4Kv, Air with 8Kv. EMI class A
Operation Temp.	-40ºC ~ 85ºC (Wide range temperature) Humidity : 10% ~ 90% (X6413E CPU) 0ºC ~ 60ºC Humidity : 10% ~ 90% (J6412 CPU)
Storage Temp.	-40ºC ~ 85ºC Humidity : 10% ~ 90%

1.3 Rear Panel Connectors

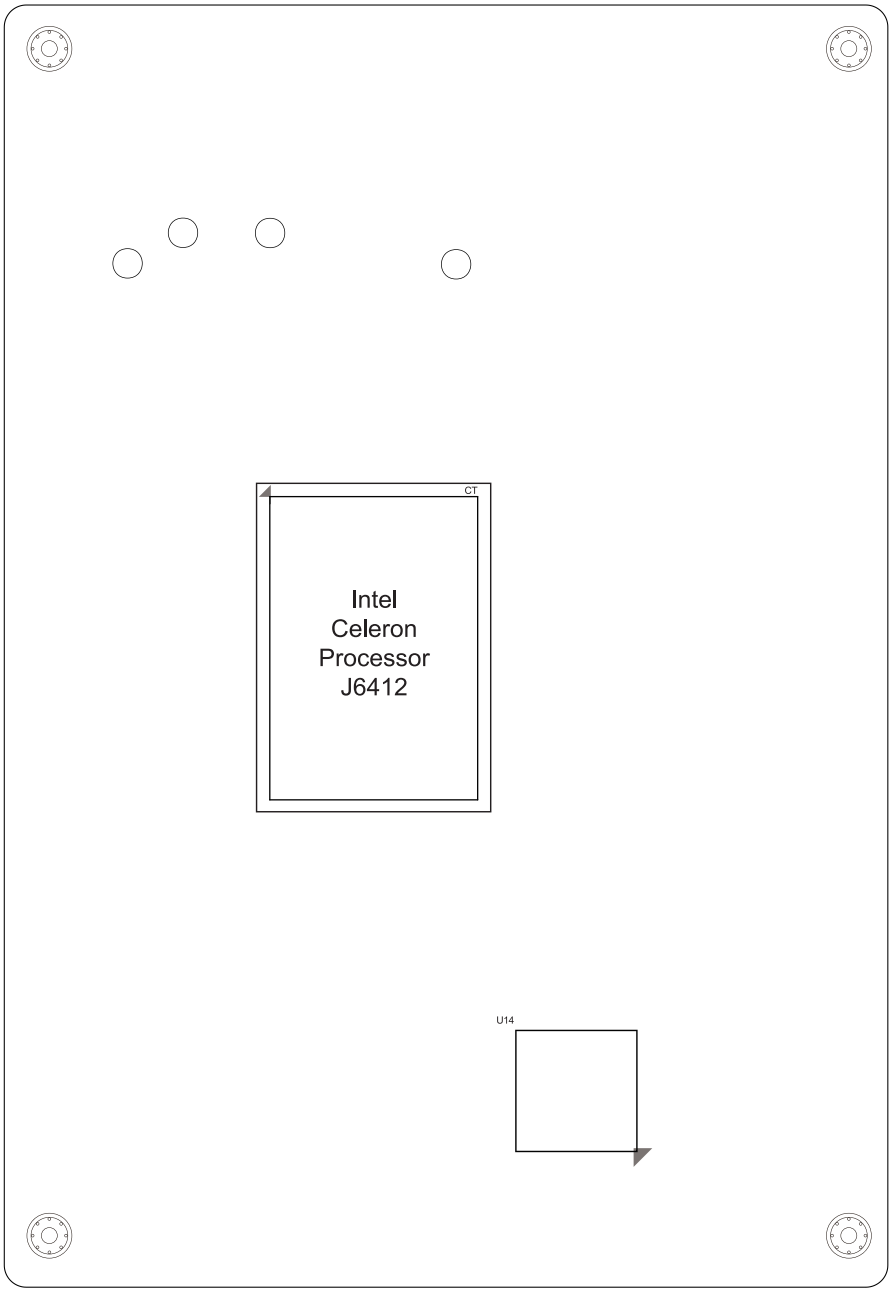


1.4 Motherboard Layout

Top View



Back View



» ■ *represents the 1st pin.*

Chapter 2: Hardware installation

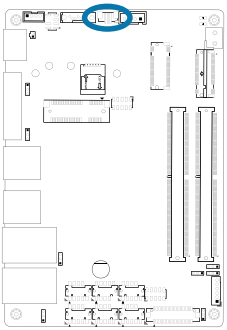
2.1 Central Processing Unit (CPU)

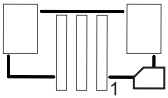
The mainboard includes an Intel® Celeron processor, and a cooler has been installed to provide sufficient cooling

2.2 Fan Headers

These fan headers support cooling-fans built in the computer. The fan cable and connector may be different according to the fan manufacturer. Connect the fan cable to the connector while matching the black wire to pin#1.

CPU_FAN: CPU Fan Header



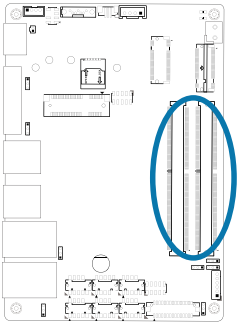


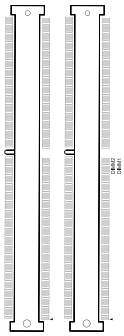
CPU_FAN

Pin	Assignment
1	VCC12
2	GND
3	CPU_FAN_TACH

2.3 Installing System Memory

DIMM1: DDR4L Memory Module (260pin SO-DIMM)





Note

» *If the DIMM does not go in smoothly, do not force it. Pull it all the way out and try again.*

1. Align a DIMM on the slot such that the notch on the DIMM matches the break on the slot.
2. Insert the DIMM firmly into the slot until the retaining clips snap back in place and the DIMM is properly seated.

Memory Capacity

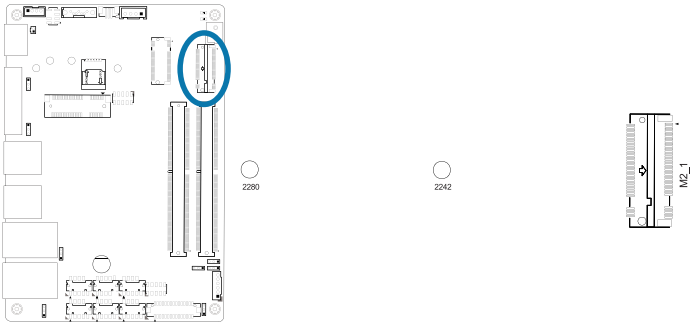
DIMM Socket Location	DDR4L Module	Total Memory Size
DIMM1	4GB/8GB/16GB/32GB	Max is 32GB

2.4 Expansion Slots

M2_1: M.2 (Key M) Slot

NGFF CONN H8.5XL80MM KEY M

- The M.2 slot supports M.2 Type 2242 module. When installing M.2 module, please place the screw and hex pillar to correct position.

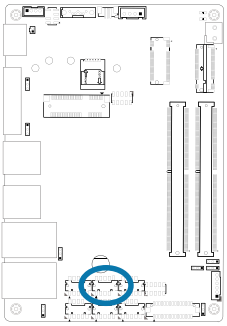


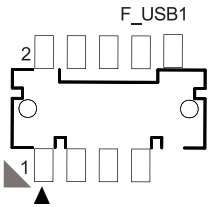
Pin	Assignment	Assignment	Pin
1	GND	+V3.3S	2
3	GND	+V3.3S	4
5	NC	NC	6
7	NC	NC	8
9	GND	M2_DAS	10
11	NC	+V3.3S	12
13	NC	+V3.3S	14
15	GND	+V3.3S	16
17	NC	+V3.3S	18
19	NC	NC	20
21	GND	NC	22
23	NC	NC	24
25	NC	NC	26
27	GND	NC	28
29	PCIE_RX7_DN	NC	30
31	PCIE_RX7_DP	NC	32
33	GND	NC	34
35	PCIE_TX7_DN	NC	36

Pin	Assignment	Assignment	Pin
37	PCIE_TX7_DP	NC	38
39	GND	NC	40
41	SELOUT1_RXN	NC	42
43	SELOUT1_RXP	NC	44
45	GND	NC	46
47	SELOUT1_TXN	NC	48
49	SELOUT1_TXP	PCIRST1_N	50
51	GND	PCIE_CLKREQ2_N	52
53	PCIE_REFCLK2_DN	WAKE_N	54
55	PCIE_REFCLK2_DP	NC	56
57	GND	NC	58
67	NC	NC	68
69	NC	+V3.3S	70
71	GND	+V3.3S	72
73	GND	+V3.3S	74
75	GND		

2.5 Headers / Connectors

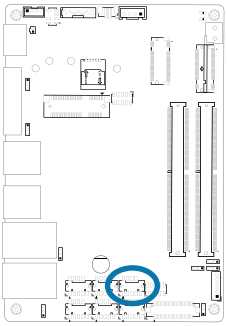
F_USB1: WAFER 2X5 2MM N9-S

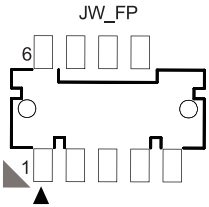




Pin	Assignment
1	VCC5
2	VCC5
3	HUB2_USBN4
4	HUB2_USBN5
5	HUB2_USBP4
6	HUB2_USBP5
7	GND
8	GND
9	NC
10	NC

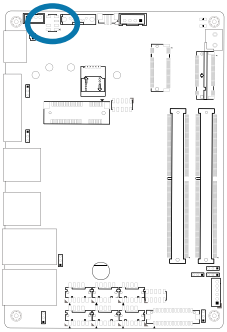
JW_FP: WAFER 2X5 2MM N10-S

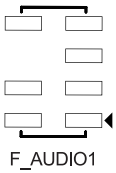




Pin	Assignment
1	HDD_LED+
2	HDD_LED-
3	GND
4	SYS_RST_N
5	VCC5
6	POWER_LED+
7	POWER_LED-
8	PWRBTN
9	GND
10	NC

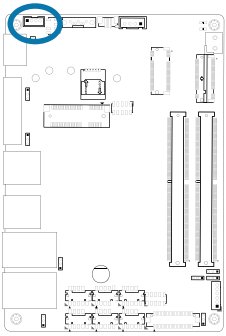
F_AUDIO1: HEADER 2X4 N6

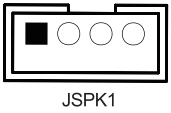




Pin	Assignment
1	MIC1_L2
2	GND
3	MIC1_R2
4	NC
5	LINEOUT_R2
6	NC
7	LINEOUT_L2
8	GND

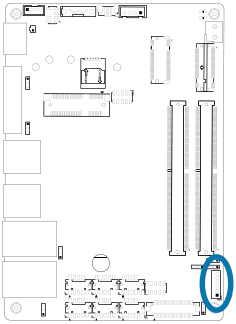
JSPK1: BOX 1X4 2mm





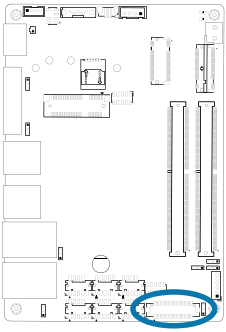
Pin	Assignment
1	SPKLN
2	SPKLP
3	SPKRP
4	SPKRN

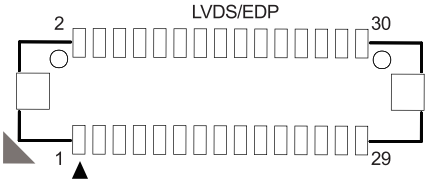
INVERTER: WAFER 1X6 2mm W



Pin	Assignment
1	VCC_BL
2	VCC_BL
3	ENABKL_
4	LBKLT_CTL
5	GND
6	GND

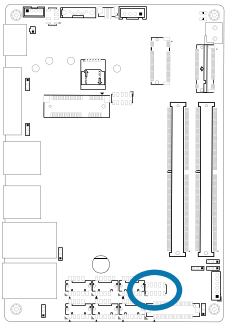
LVDS/EDP: SMD WAFER 2X15 1.25MM

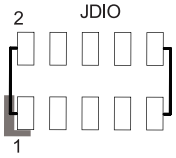




Pin	Assignment
1	LVDSB_DATA3_N
2	LVDSB_DATA3_P
3	LVDSB_CLK_N
4	LVDSB_CLK_P
5	LVDSB_DATA2_N
6	LVDSB_DATA2_P
7	LVDSB_DATA1_N
8	LVDSB_DATA1_P
9	LVDSB_DATA0_N
10	LVDSB_DATA0_P
11	NC
12	NC
13	GND
14	GND
15	GND
16	GND
17	LVDSA_DATA3_P
18	LVDSA_DATA3_N
19	LVDSA_CLK_P
20	LVDSA_CLK_N
21	LVDSA_DATA2_P
22	LVDSA_DATA2_N
23	LVDSA_DATA1_P
24	LVDSA_DATA1_N
25	LVDSA_DATA0_P
26	LVDSA_DATA0_N
27	PVDD2
28	PVDD2
29	PVDD2
30	PVDD2

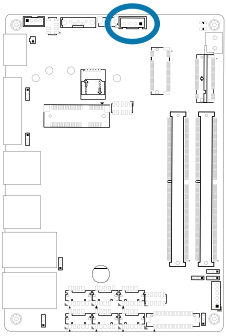
JDIO: HEADER 2X5 2MM S

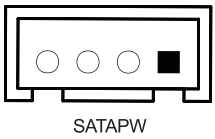




Pin	Assignment
1	FIFO_DO01
2	FIFO_DI01
3	FIFO_DO02
4	FIFO_DI02
5	FIFO_DO03
6	FIFO_DI03
7	FIFO_DO04
8	FIFO_DI04
9	GND
10	VCCDIO

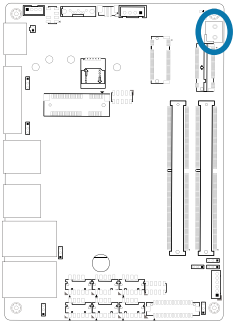
SATAPW: BOX 1X4 2.5MM

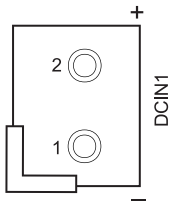




Pin	Assignment
1	VCC5
2	GND
3	GND
4	VCC12

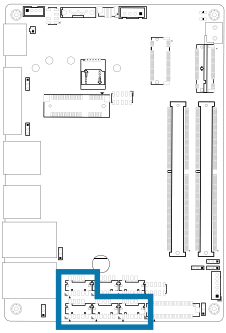
DCIN1: PHOENIX CONN 2P

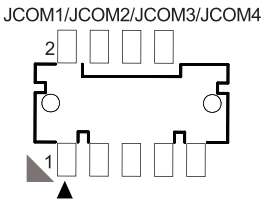




Pin	Assignment
1	GND
2	VCC(9V ~ 24V)

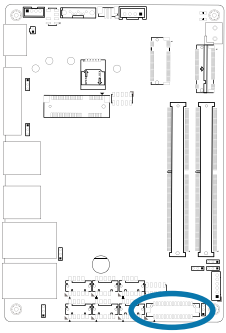
JCOM1, JCOM2, JCOM3, JCOM4: WAFER 2X5 2MM N10-S

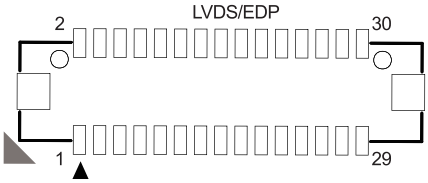




Pin	Assignment
1	COM1C_DCD
2	COM1C_RXD
3	COM1C_TXD
4	COM1C_DTR
5	GND
6	COM1C_DSR
7	COM1C_RTS
8	COM1C_CTS
9	COM1C_RI
10	NC

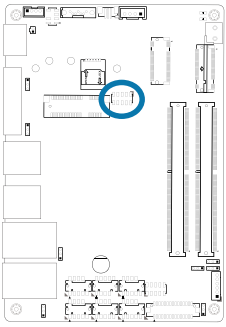
Edp(eDP and LVDS share with the same connector): SMD WAFER 2X15 1.25MM

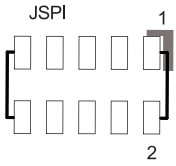




Pin	Assignment
1	NC
2	NC
3	NC
4	NC
5	NC
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC
18	NC
19	eDP_AUXP
20	eDP_AUXN
21	eDP_TX0P
22	eDP_TX0N
23	eDP_TX1P
24	eDP_TX1N
25	EDP_HPD
26	NC
27	PVDD2
28	PVDD2
29	PVDD2
30	PVDD2

JSPI: HEADER 2X5 2MM N10 S





Pin	Assignment
1	NC
2	SPI_WP_N
3	VCC3.3
4	GND
5	SPI_CS0_N_R
6	SPI_CLK_R
7	SPI_MISO_R
8	SPI_MOSI_R
9	SPI_HD
10	NC

2.6 Jumpers / Slot

Jumper Setting

The illustration shows how to set up jumpers. When the jumper cap is placed on pins, the jumper is “close”, if not, that means the jumper is “open”.

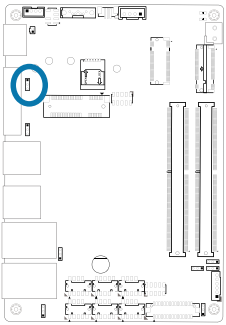
Pin opened

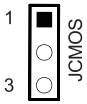
Pin closed

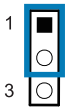
Pin 1-2 closed

JCMOS: Clear CMOS Jumper

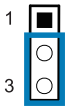
Placing the jumper on pin2-3 allows user to restore the BIOS safe setting and the CMOS data. Please carefully follow the procedures to avoid damaging the motherboard.







Pin 1-2 Close: Normal Operation (Default)

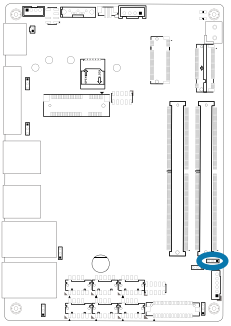


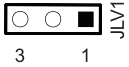
Pin 2-3 Close: Clear CMOS data

Clear CMOS Procedures:

1. Remove AC power line.
2. Set the jumper to “Pin 2-3 close”.
3. Wait for five seconds.
4. Set the jumper to “Pin 1-2 close”.
5. Power on the AC.
6. Reset your desired password or clear the CMOS data.

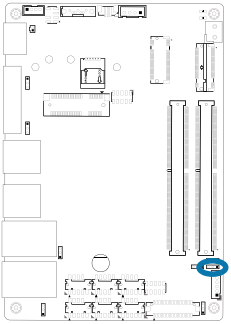
JLV1

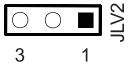




JLV1		
VCC5	JLV1(1-2)	
VCC3_3	JLV1(2-3)	(Default)

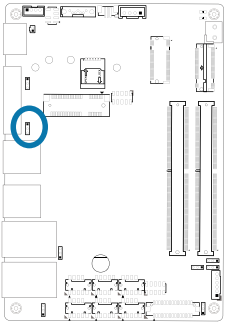
JLV2





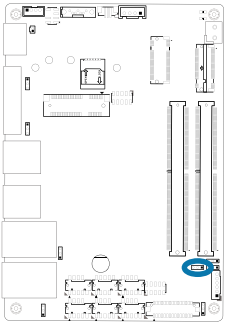
JLV2		
VCC12	JLV2(1-2)	(Default)
VCC5	JLV2(2-3)	

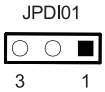
JPUSB1



JPUSB1		
VCC5	JPUSB1(2-3)	(Default)
VCC5A	JPUSB1(1-2)	

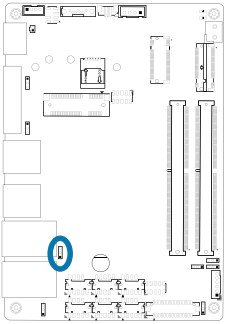
JPDIO1





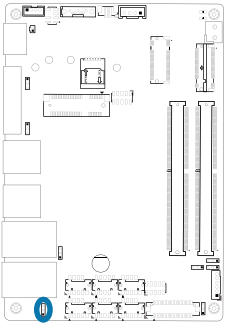
JPDIO1		
VCC5	JPDIO1(1-2)	(Default)
VCC3_3	JPDIO1(2-3)	

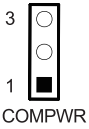
JPOWER1



JPOWER1		
ATX	JPOWER1(1-2)	(Default)
AT	JPOWER1(2-3)	

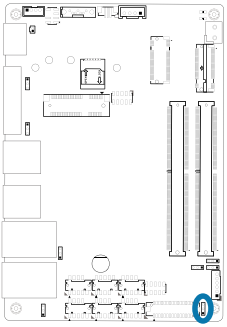
COMPWR

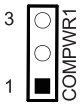




COMPWR	
VCC12	COMPWR(1-2)
VCC5	COMPWR(2-3)

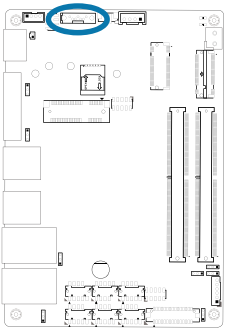
COMPWR1

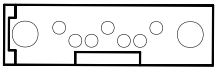




COMPWR1	
VCC12	JLV1(1-2)
VCC5	JLV1(2-3)

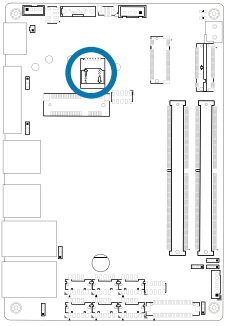
SATA1: SATA CONNECTOR-B

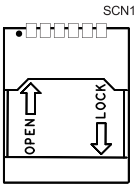




Pin	Assignment
1	GND
2	SSATA_TXP1
3	SSATA_TXN1
4	GND
5	SSATA_RXN1
6	SSATA_RXP1
7	GND

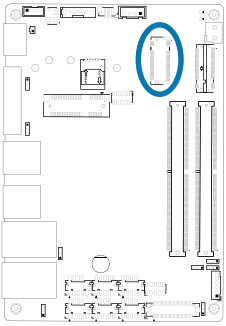
SCAN1: NANO SIM 6P Lift

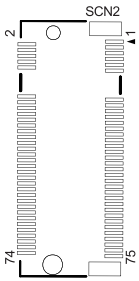




Pin	Assignment
C1	SIM_PWR_B
C2	UIM_RESET
C3	UIM_CLK
C5	GND
C6	SIM_VPP
C7	UIM_DATA

SCAN2: M.2 H4.8MM KEY B

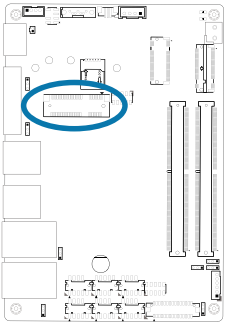


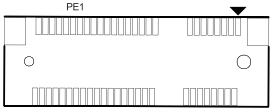


Pin	Assignment	Assignment	Pin
1	M2_B_CFG3	+V3.3A	2
3	GND	+V3.3A	4
5	GND	FULL_CARD_PWROFF	6
7	USB2_P3_DP	NC	8
9	USB2_P3_DN	NC	10
11	GND		
21	M2_B_CFG0	NC	20
23	NC	NC	22
25	NC	NC	24
27	GND	NC	26
29	USB3_P3_RX_DN	NC	28
31	USB3_P3_RX_DP	UIM_RESET	30
33	GND	UIM_CLK	32
35	USB3_P3_TX_DN	UIM_DATA	34
37	USB3_P3_TX_DP	SIM_PWR_B	36
39	GND	M2_B_DEVSLP	38
41	PCIE_RX2_DN	NC	40
43	PCIE_RX2_DP	NC	42
45	GND	NC	44
47	PCIE_TX2_DN	NC	46
49	PCIE_TX2_DP	NC	48
51	GND	PLTRST_N	50
53	PCIE_REFCLK1_DN	PCIE_CLKREQ1_N	52
55	PCIE_REFCLK1_DP	WAKE_N	54
57	GND	NC	56
59	NC	NC	58
61	NC	NC	60
63	NC	NC	62
65	NC	NC	64
67	M2_WWAN_RST_N	SIM_DET	66
69	M2_B_CFG1	SUSCLK_M2B	68
71	GND	+V3.3A	70
73	GND	+V3.3A	72
75	M2_B_CFG2	+V3.3A	74

PE1: Mini PCIe Connector

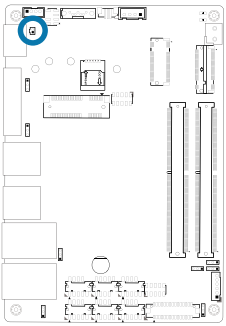
MINI PCIE 9.9H SLOT





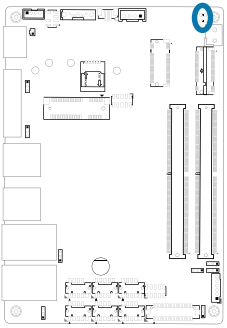
Pin	Assignment	Assignment	Pin
1	WAKE_N	+V3.3A	2
3	NC	GND	4
5	NC	+V1P5A	6
7	NC	SIM_PWR_B1	8
9	GND	UIM_DATA1	10
11	PCIE_REFCLK3_DN	UIM_CLK1	12
13	PCIE_REFCLK3_DP	UIM_RESET1	14
15	GND	SIM_VPP1	16
17	NC	GND	18
19	NC	3G_DISABLE	20
21	GND	PCIRST1_N	22
23	PCIE_RX3_DN	+V3.3A	24
25	PCIE_RX3_DP	GND	26
27	GND	+V1P5A	28
29	GND	SMB_CLK_MAIN	30
31	PCIE_TX3_DN	SMB_DATA_MAIN	32
33	PCIE_TX3_DP	GND	34
35	GND	USB2_P6_DN	36
37	GND	USB2_P6_DP	38
39	+V3.3A	GND	40
41	+V3.3A	NC	42
43	GND	NC	44
45	NC	NC	46
47	NC	+V1P5A	48
49	NC	GND	50
51	NC	+V3.3A	52

BAT1: WAFER 1X2 1.25MM



Pin	Assignment
1	BAT_IN
2	GND

LED2/LED3: Power LED



LED2
LED3

LED No.	Function	LED Color
LED2	Standby	Red
LED3	Power On	Blue