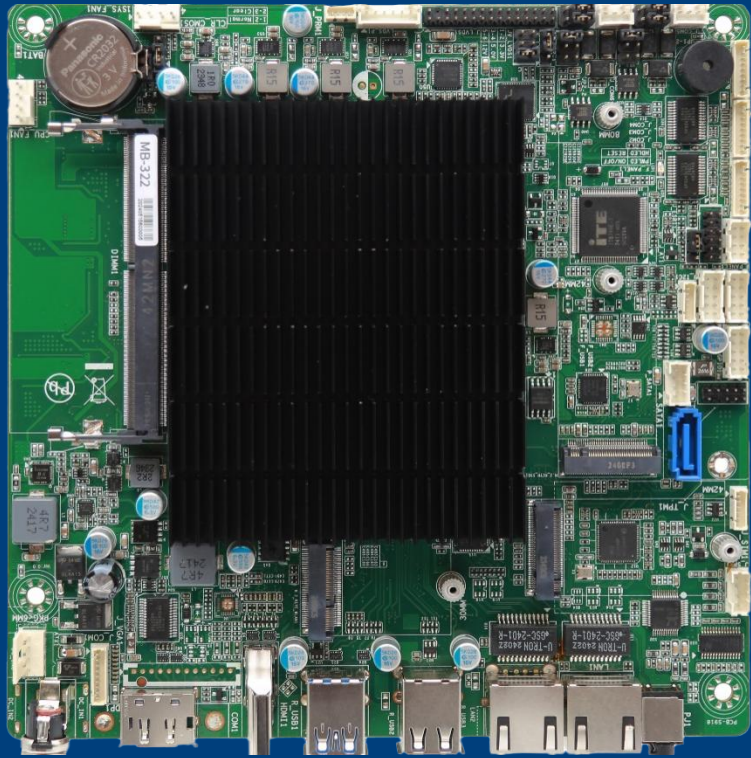


User Manual



Aicotek Motherboard | MB-322 User Manual



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1 Models and Attentions

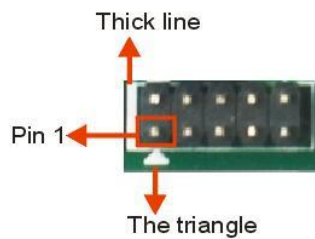
1.1 Model

This manual is applied to following models:

Model	CPU	COM	LAN	HDMI	DP/ VGA	eDP/ LVDS	USB	M.2 KEY-M	M.2 KEY-E	M.2 KEY-B
MB-322-N95	N95	6	2	1	DP	LVDS	8	PCIe x2	PCIe x1+ USB2.0	USB3.0+ USB2.0
MB-322-N97	N97	6	2	1	DP	LVDS	8	PCIe x2	PCIe x1+ USB2.0	USB3.0+ USB2.0
MB-322-N100	N100	6	2	1	DP	LVDS	8	PCIe x2	PCIe x1+ USB2.0	USB3.0+ USB2.0

1.2 Attentions

- 1) Notes under a table or figure indicate the difference of models, or alternative definition of specific pin of the header (jumper/connector).
- 2) How to identify the first pin of a header or jumper
 - Usually, there is a thick line or a triangle near the header's or jumper's pin 1.



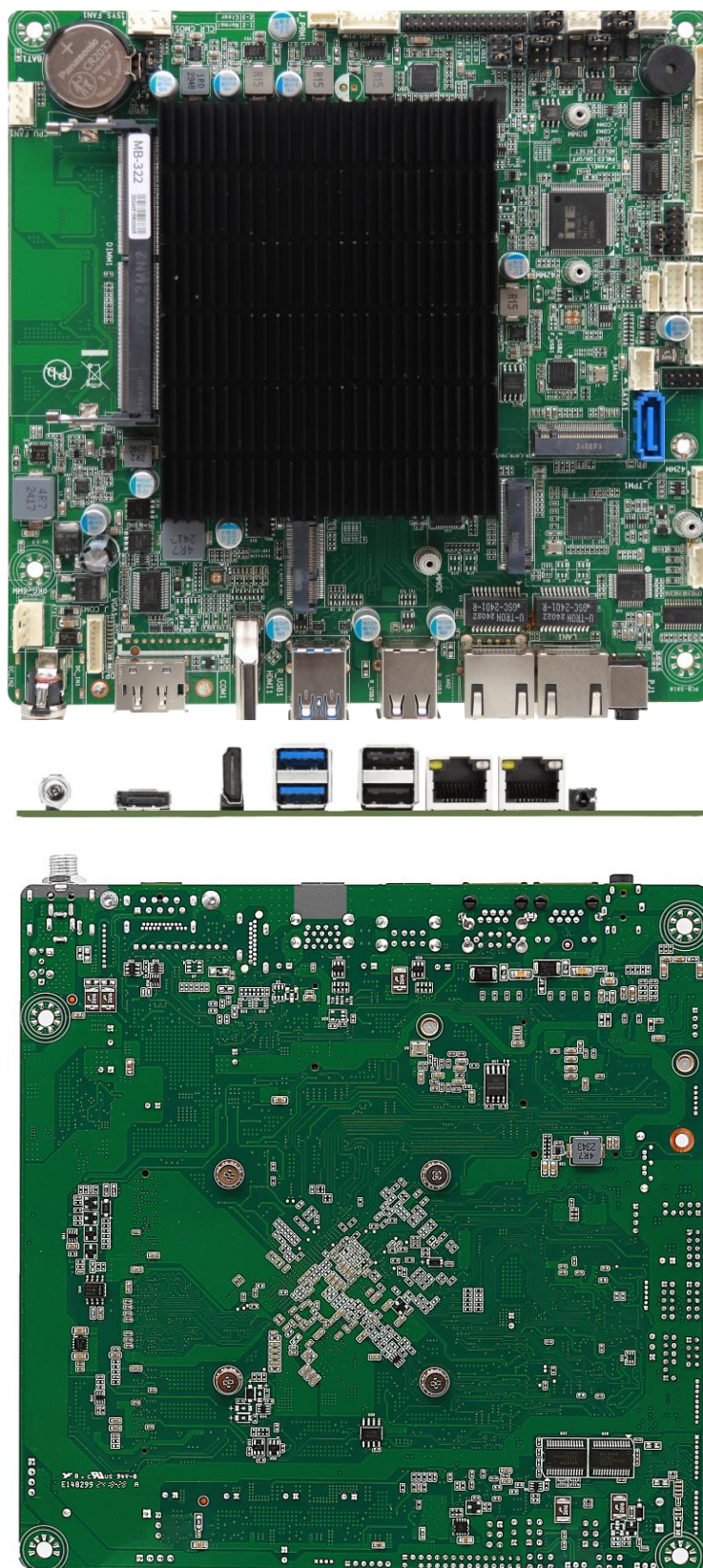
- Square pad, which you can find on the back of the motherboard, is usually used for pin 1.



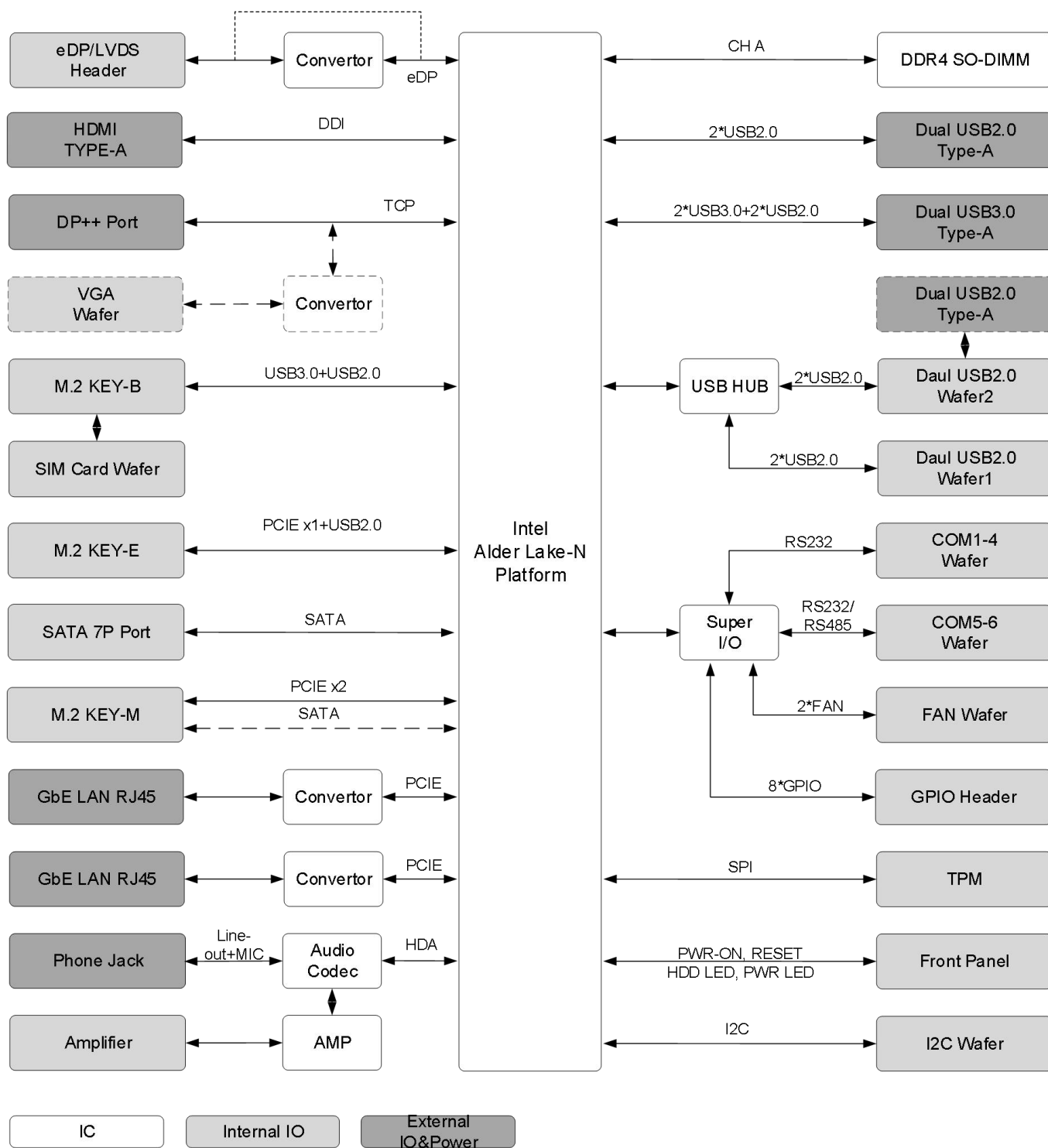
2 Specification

Specifications				
Model	Model	MB-322-N95	MB-322-N97	MB-322-N100
Processor System	Processor	Intel® Alder Lake-N processors		
		N95	N97	N100
	Clock Speed	Up to 3.40GHz	Up to 3.60GHz	Up to 3.40GHz
	Multi-Core	4	4	4
	TDP	15W	12W	6W
	BIOS	AMI UEFI		
	Graphics	Intel® UHD Graphics		
		Up to 1.20GHz	Up to 1.20GHz	Up to 750MHz
Memory	Slot Type	1, DDR4 SO-DIMM		
	Memory Type	DDR4 3200MT/s		
	Max Memory Size	16GB		
	Channels	Single		
Display	HDMI	1, HDMI, max 3840x2160@30Hz		
	DP/VGA	1, DP++: max resolution up to 4096*2160@30Hz <i>Note: BOM Options support VGA, max 1920x1200@60Hz.</i>		
	eDP/LVDS	1, LVDS max 1920x1200@60Hz <i>Note: BOM Options support eDP, max 4096*2160@60Hz</i>		
	Multi-Display	Triple		
Audio	Audio	Realtek Audio HDA codec		
	Phone Jack	1, Line-Out + MIC, CTIA <i>Note: BOM Options support OMTP.</i>		
	Amplifier	1, L/R Amplifier, 5W8 Ω /CH		
Storage	SATA	1, SATA Gen3 6Gbps		
	M.2	1, M.2 M-Key 2242/2280, PCIe x2 Gen3, support NVMe SSD <i>Note: BOM Options support SATA.</i>		
Expansion	M.2	1, M.2 E-Key 2230, PCIe x1+USB2.0, support WIFI+ Bluetooth		
		1, M.2 B-Key 3042, USB3.0+USB2.0, support 5G/4G		
Ethernet	SIM	1		
	Chipset	1, Intel i226 GbE Ethernet Controller 1, Intel i210AT GbE Ethernet Controller		
	PXE/RPL Boot	Yes		

	Wake On LAN	Yes
USB	USB3.0	2, USB3.2 5Gbps
	USB2.0	6, USB2.0
I/O	Serials	4, RS232, COM1-4 <i>Note: COM1-4 can support DCD/5V+RI/12V, default DCD+RI.</i> 2, RS232, 2-wire, COM5-6 <i>Note: BOM Options support RS485.</i>
	PANEL	1, PWR On +Reset +PWR_LED +HDD_LED
	FAN	1, CPU FAN 1, System FAN
	I2C Touch	1
	Debug	1, ESPI
	AT/ATX Select	1, default ATX mode
	CMOS Clear	1, default normal
GPIO	GPIO	8, 4* GPI, 4* GPO, non-isolated 5V or 3.3V
Power	Power in	DC 12/19/24V, Auto Detect 1, Rear IO DC-IN 1, Internal DC-IN
Others	TPM	fTPM2.0 <i>Note: BOM optional support dTPM2.0.</i>
	Watch Dog Timer	System reset, programmable 1-255 sec or min
	HW Monitor	System-temp, CPU-temp, Voltage-12V,5V,3.3V, Vcpu, Vddr
OS	OS Supported	Windows 10 IoT Enterprise 2021 LTSC, Windows 10 (21H2), Windows 11 (21H2) or later, Linux Kernel 5.17 or later
Environment	Temperature	Operation: 0 ~ 60°C Storage: -20 ~ 75°C
	Humidity	5 ~ 95%, non-condensing
Mechanical	PCB form	170*170mm
	Height	PCB: 1.6mm

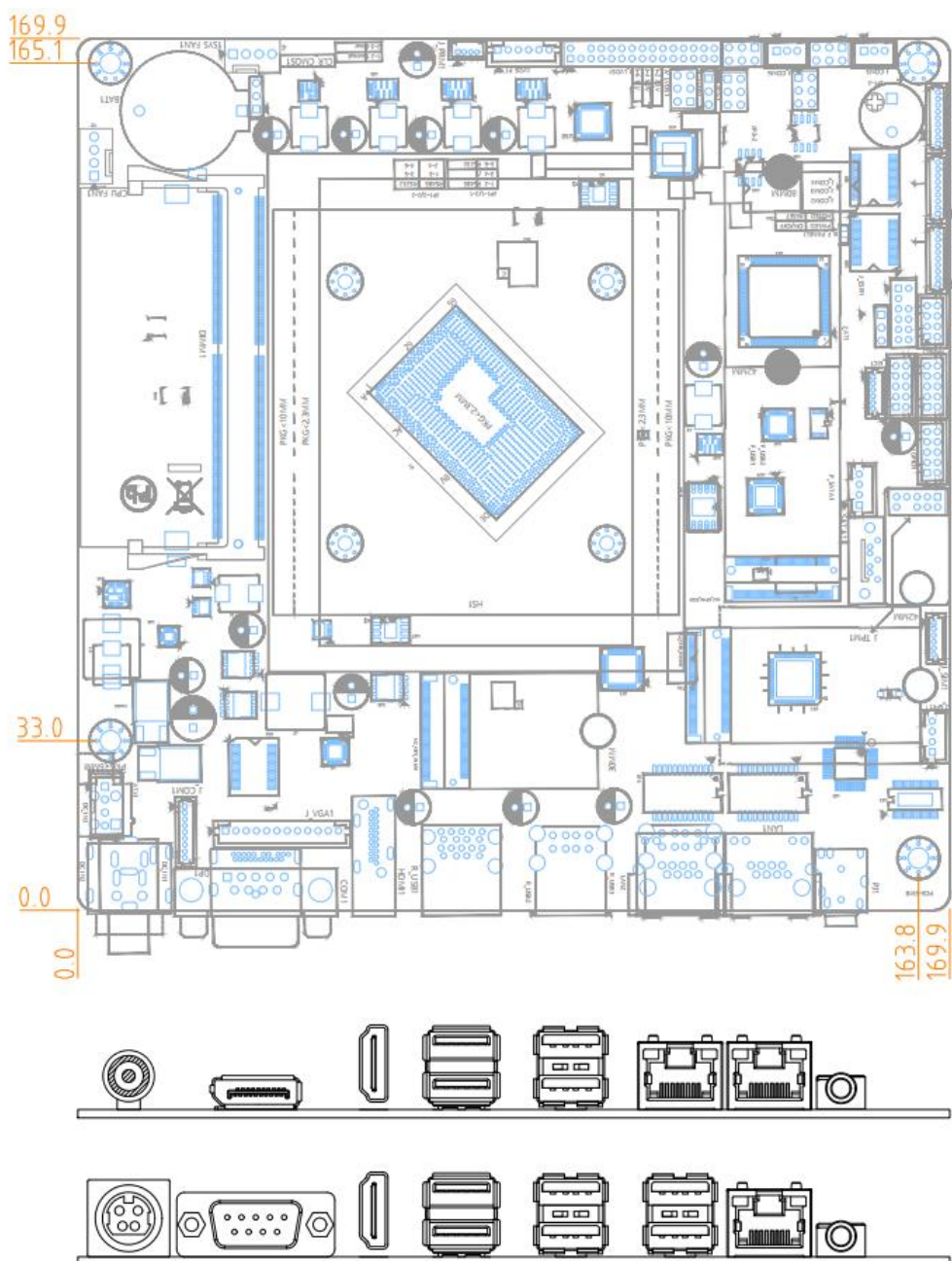


3 Block Diagram

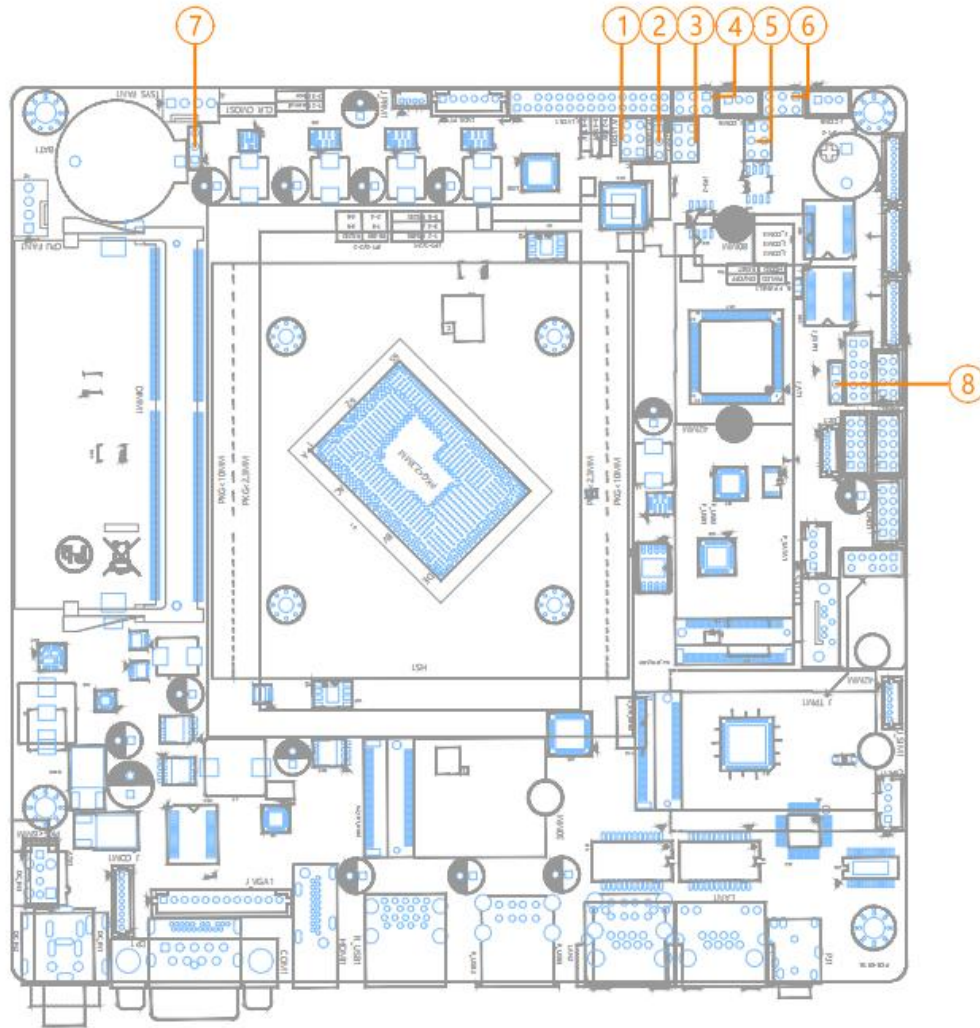


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4 Mechanical Drawing



5 Jumper



Jumpers / Headers and Connectors

①	JV_LVDS1	LVDS1 Power VCC3.3/VCC5/VCC12 Select Jumper
②	JC_LVDS1	LVDS1 Backlight PWM/CCFL Select Jumper
③	JP2-1	COM6 RS232/RS485 Select Jumper1
④	JP2-2	COM6 RS232/RS485 Select Jumper2
⑤	JP1-1	COM5 RS232/RS485 Select Jumper1
⑥	JP1-2	COM5 RS232/RS485 Select Jumper2
⑦	CLR_CMOS1	CMOS Clear Jumper
⑧	J_AT1	AT or ATX Select Jumper

6 Definition of Jumpers

6.1 LVDS Power VCC3.3/VCC5/VCC12 Select: Jumper, 3*2P, 2.54mm (Mark No.1, JV_LVDS1)

Graphic	Setting	Function
	1-2(Default)	VCC3.3
	3-4	VCC5
	5-6	VCC12

6.2 LVDS Backlight PWM/CCFL Select Jumper: 3*1 Pin, 2.54mm (Mark No.2, JC_LVDS1)

Graphic	Setting	Function
	1-2(Default)	Controlled by PWM
	2-3	Controlled by CCFL ^[1]

Notes:

[1]: Controlled by CCFL by default, PWM# optional. (resistor selectable)

6.3 COM6 RS232/RS485 Select Jumper1: 3*2 Pin, 2.54mm (Mark No.3/No.4, JP2-1/JP2-2)

Graphic	Setting	Function
	JP1: 1-2 JP2: 1-3,2-4	RS485
	JP1: 5-6 JP2: 3-5,4-6(Default)	RS232

6.4 COM5 RS232/RS485 Select Jumper1/2: 3*2 Pin, 2.54mm (Mark No.5/No.6, JP1-1/JP1-2)

Graphic	Setting	Function
	JP1: 1-2 JP2: 1-3,2-4	RS485
	JP1: 5-6 JP2: 3-5,4-6(Default)	RS232

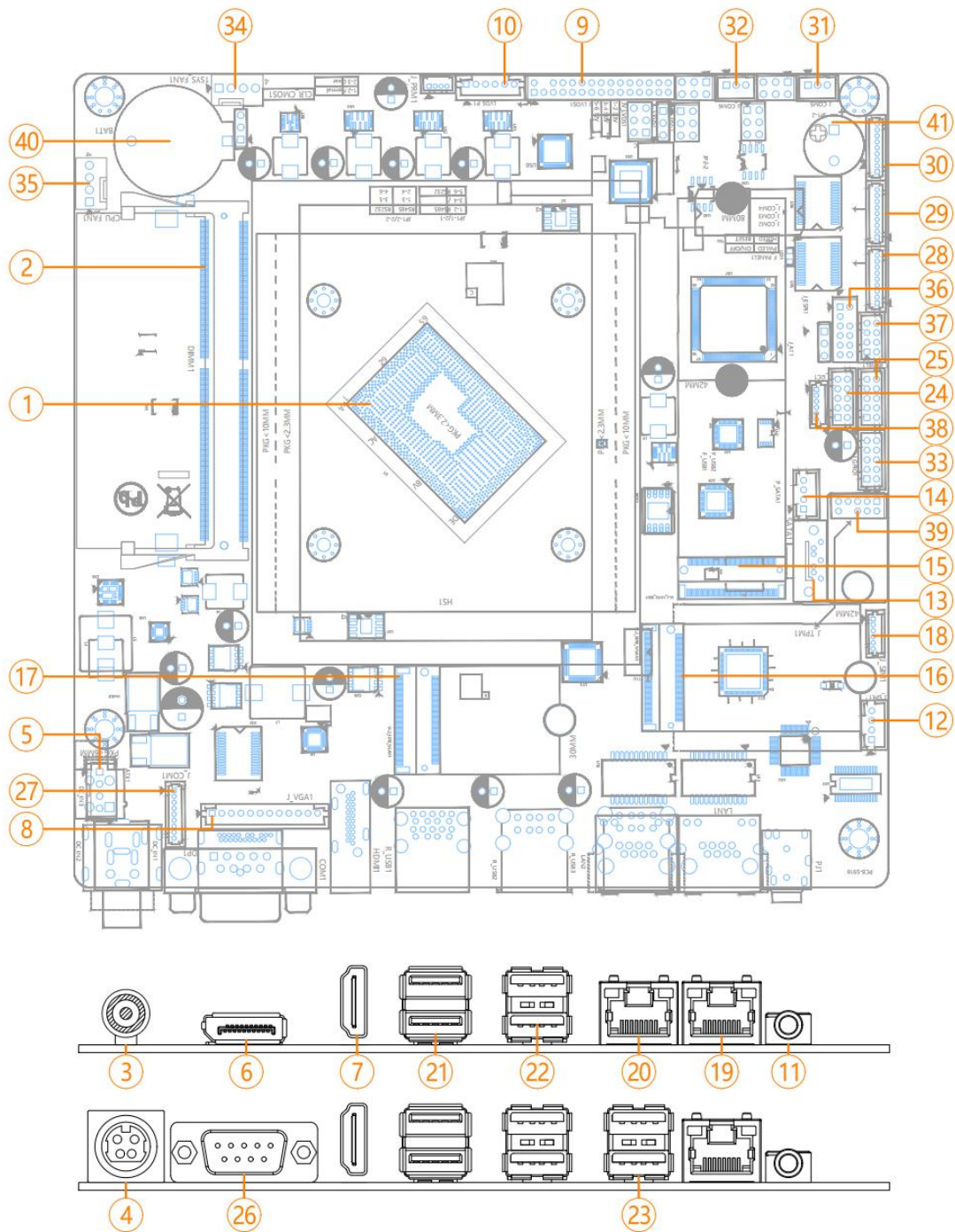
6.5 CMOS Clear Select: Jumper,3*1 Pin,2.54mm (Mark No.7, CLR_CMOS1)

Graphic	Setting	Function
	1-2(Default)	Normal
	2-3	Clear CMOS

6.6 AT/ATX Mode Select Jumper: 3*1 Pin, 2.54mm (Mark No.8, J_AT1)

Graphic	Setting	Function
	1-2(Default)	ATX MODE
	2-3	AT MODE

7 Headers / Wafers and Connectors



Headers / Wafers and Connectors		
①	U1	CPU
②	DIMM1	DDR4 SO-DIMM Slot
③	DC_IN1	DC 12/19/24V Power Input Φ 2.5mm Jack
④	DC_IN2	DC 12/19/24V Power Input Mini-din 4P Jack
⑤	DC_IN3 (ATX1)	DC 12V/24V Power Input Wafer (DC 12V/24V ATX 4P Power Input Connector)
⑥	DP1	DP TYPE-A Connector
⑦	HDMI1	HDMI TYPE-A Connector
⑧	J_VGA1	VGA Singal Wafer
⑨	J_LVDS1	eDP/LVDS Signal Header
⑩	LVDS_P1	eDP/LVDS Backlight Control Wafer
⑪	PJ1	Line-Out + MIC 2in1 3.5mm Jack
⑫	J_SPK1	Amplifier Wafer
⑬	SATA1	SATA3.0 7P Connector
⑭	P_SATA1	SATA Power Wafer
⑮	M.2_KEYM_SSD1	M.2 M-Key Slot (PCIe x2/SATA, 2242/2280)
⑯	M.2_KEYB_WWAN1	M.2 B Key Slot (USB3.0 + USB2.0, 3042)
⑰	M.2_KEYE_WLAN1	M.2 E Key Slot (PCIE+USB2.0, 2230)
⑱	J_SIM1	SIM Card Wafer
⑲	LAN1	GbE LAN RJ45 Connector
⑳	LAN2	GbE LAN RJ45 Connector
㉑	R_USB1	Dual USB3.0 TYPE-A Connector
㉒	R_USB2	Dual USB2.0 TYPE-A Connector
㉓	R_USB3	Dual USB2.0 TYPE-A Connector
㉔	F_USB1	Front Dual USB2.0 Wafer
㉕	F_USB2	Front Dual USB2.0 Wafer
㉖	COM1	COM1 DB9/M Connector
㉗	J_COM1	COM1 Wafer
㉘	J_COM2	COM2 Wafer
㉙	J_COM3	COM3 Wafer
㉚	J_COM4	COM4 Wafer
㉛	J_COM5	COM5 Wafer
㉜	J_COM6	COM6 Wafer
㉝	J_GPIO1	GPIO Wafer

③④	SYS_FAN1	System FAN Wafer
③⑤	CPU_FAN1	CPU FAN Wafer
③⑥	J_ESPI1	ESPI Debug Header
③⑦	F_PANEL1	Front Panel Wafer
③⑧	J_I2C1	I2C Wafer
③⑨	J_TPM1	TPM Header
④⑩	BAT1	CMOS Battery Holder
④⑪	BZ1	Buzzer

8 Definition of Connectors

8.1 DC 12/19/24V Power Input: Wafer, 4*1Pin, 2.54mm (Mark No.5, DC_IN3)

Graphic	Pin	Definition	Pin	Definition
	1	VCC_IN	3	GND
	2	VCC_IN	4	GND

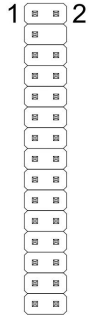
8.2 DC 12/19/24V Power Input: ATX, 4P (Mark No.5, ATX1)

Graphic	Pin	Definition	Pin	Definition
	1	GND	2	GND
	3	VCC_IN	4	VCC_IN

8.3 VGA: Wafer, 12*1P, 2.00mm (Mark No.8, J_VGA1)

Graphic	Pin	Definition	Pin	Definition
	1	SCL	7	GND
	2	SDA	8	Red
	3	GND	9	GND
	4	Blue	10	HSYNC
	5	GND	11	VSYNC
	6	Green	12	GND

8.4 eDP/LVDS Signal: Header, 15*2 Pin, 2.00mm (Mark No.9, J_LVDS1)

Graphic	Pin	Definition	Pin	Definition
	1	VCC3.3/VCC5/VCC12 ^[1]	2	VCC3.3/VCC5/VCC12 ^[1]
	3	VCC3.3/VCC5/VCC12 ^[1]		
	5	EDP1_HPD/ LVDS_PRSENT ^[2]	6	EDP1_HPD/ LVDS_PRSENT ^[2]
	7	LVDS_A_DATA0-	8	LVDS_A_DATA0+
	9	LVDS_A_DATA1-	10	LVDS_A_DATA1+
	11	LVDS_A_DATA2-	12	LVDS_A_DATA2+
	13	GND	14	GND
	15	LVDS_A_CLK-	16	LVDS_A_CLK+
	17	LVDS_A_DATA3-	18	LVDS_A_DATA3+
	19	LVDS_B_DATA0-/ EDP1_TX0- ^[2]	20	LVDS_B_DATA0+/ EDP1_TX0+ ^[2]
	21	LVDS_B_DATA1-/ EDP1_TX1- ^[2]	22	LVDS_B_DATA1+/ EDP1_TX1+ ^[2]
	23	LVDS_B_DATA2-/ EDP1_TX2- ^[2]	24	LVDS_B_DATA2+/ EDP1_TX2+ ^[2]

		EDP1_TX2- ^[2]		EDP1_TX2+ ^[2]
	25	GND	26	GND
	27	LVDS_B_CLK-/ EDP1_TX3-	28	LVDS_B_CLK+/ EDP1_TX3+ ^[2]
	29	LVDS_B_DATA3-/ EDP1_AUX- ^[2]	30	LVDS_B_DATA3+/ EDP1_AUX+ ^[2]

Note:

[1]: Panel Power VDD is 3.3V by default, 5V/12V is selectable by “LVDS1 Power VCC3.3/VCC5/VCC12 Select Jumper” (JC_LVDS1).

[2]: It supports LVDS by default and can support eDP if specified. (resistor selectable)

8.5 eDP/LVDS Backlight Control: Wafer 6*1 Pin, 2.00mm (Mark No.10, LVDS_P1)

Graphic	Pin	Definition	Pin	Definition
 1	1	GND	4	LVDS_BKLT_EN
	2	GND	5	VCC12
	3	LVDS_BKLT_CTL ^[1]	6	VCC12

Notes:

[1]: VDS_BKLT can be controlled by PWM(Default) /PWM#, selectable by “eDP/LVDS Backlight PWM/PWM# Select Jumper”. (JC_LVDS1).

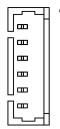
8.6 Amplifier: Wafer 4*1Pin, 2.00mm (Mark No.12, J_SPK1)

Graphic	Pin	Definition	Pin	Definition
 1	1	SPK_OUT_L-	3	SPK_OUT_R-
	2	SPK_OUT_L+	4	SPK_OUT_R+

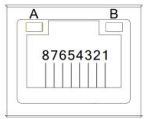
8.7 SATA Power: Wafer, 4*1 Pin, 2.00mm (Mark No.14, P_SATA1)

Graphic	Pin	Definition	Pin	Definition
 1	1	VCC12	3	GND
	2	GND	4	VCC5

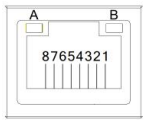
8.8 SIM Card: Wafer, 6*1P, 1.25mm (Mark No.18, J_SIM1)

Graphic	Pin	Definition	Pin	Definition
 1	1	UIM_PWR	4	UIM_CLK
	2	UIM_DATA	5	UIM_RST
	3	GND	6	UIM_VPP

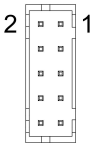
8.9 GbE LAN: RJ45, 8P (Mark No.19, LAN1)

Graphic	Pin	Definition		Pin	Definition	
	1	MDI0+		5	MDI2-	
	2	MDI0-		6	MDI1-	
	3	MDI1+		7	MDI3+	
	4	MDI2+		8	MDI3-	
	A	Active LED	ACT: Twinkling Yellow	B	Speed LED	1000M: Turn Yellow
			Only LINK: Lights On			100M: Turn Green
			Stop: Lights Off			10M: Lights Off

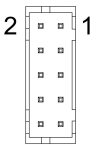
8.10 GbE LAN: RJ45, 8P (Mark No.20, LAN2)

Graphic	Pin	Definition		Pin	Definition	
	1	MDI0+		5	MDI2-	
	2	MDI0-		6	MDI1-	
	3	MDI1+		7	MDI3+	
	4	MDI2+		8	MDI3-	
	A	Active LED	ACT: Twinkling Yellow	B	Speed LED	1000M: Turn Yellow
			Only LINK: Lights On			100M: Turn Green
			Stop: Lights Off			10M: Lights Off

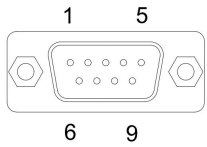
8.11 Front Dual USB2.0: Wafer, 5*2P, 2.00mm (Mark No.24, F_USB1)

Graphic	Pin	Definition		Pin	Definition	
	1	VCC5		2	VCC5	
	3	USB2.0_1-		4	USB2.0_2-	
	5	USB2.0_1+		6	USB2.0_2+	
	7	GND		8	GND	
	9	GND		10	GND	

8.12 Front Dual USB2.0: Wafer, 5*2P, 2.00mm (Mark No.25, F_USB2)

Graphic	Pin	Definition	Pin	Definition
	1	VCC5	2	VCC5
	3	USB2.0_1-	4	USB2.0_2-
	5	USB2.0_1+	6	USB2.0_2+
	7	GND	8	GND
	9	GND	10	GND

8.13 COM1: DB9/M (Mark No.26, COM1)

Graphic	Pin	Definition	Pin	Definition
	1	DCD/VCC5/VCC12 ^[1]	6	DSR
	2	RXD	7	RTS
	3	TXD	8	CTS
	4	DTR	9	RI/VCC12 ^[2]
	5	GND		

Notes:

[1]: PIN1 can be DCD/5V/12V SEL by RES, support DCD by default.

[2]: PIN9 can be RI/12V SEL by RES, support RI by default.

8.14 J_COM1: Wafer, 9*1P, 1.25mm (Mark No.27, J_COM1)

Graphic	Pin	Definition	Pin	Definition
	1	DCD/VCC5/VCC12 ^[1]	6	CTS
	2	DSR	7	DTR
	3	RXD	8	RI/VCC12 ^[2]
	4	RTS	9	GND
	5	TXD		

Notes:

[1]: PIN1 can be DCD/5V/12V SEL by RES, support DCD by default.

[2]: PIN9 can be RI/12V SEL by RES, support RI by default.

8.15 J_COM2: Wafer, 9*1P, 1.25mm (Mark No.28, J_COM2)

Graphic	Pin	Definition	Pin	Definition
	1	DCD/VCC5 ^[1]	6	CTS
	2	DSR	7	DTR
	3	RXD	8	RI/VCC12 ^[2]
	4	RTS	9	GND
	5	TXD		

Notes:

[1]: PIN1 can be DCD/5V SEL by RES, support DCD by default.

[2]: PIN9 can be RI/12V SEL by RES, support RI by default.

8.16 J_COM3: Wafer, 9*1P, 1.25mm (Mark No.29, J_COM3)

Graphic	Pin	Definition	Pin	Definition
 1	1	DCD/VCC5 ^[1]	6	CTS
	2	DSR	7	DTR
	3	RXD	8	RI/VCC12 ^[2]
	4	RTS	9	GND
	5	TXD		

Notes:

[1]: PIN1 can be DCD/5V SEL by RES, support DCD by default.

[2]: PIN9 can be RI/12V SEL by RES, support RI by default.

8.17 J_COM4: Wafer, 9*1P, 1.25mm (Mark No.30, J_COM4)

Graphic	Pin	Definition	Pin	Definition
 1	1	DCD/VCC5 ^[1]	6	CTS
	2	DSR	7	DTR
	3	RXD	8	RI/VCC12 ^[2]
	4	RTS	9	GND
	5	TXD		

Notes:

[1]: PIN1 can be DCD/5V SEL by RES, support DCD by default.

[2]: PIN9 can be RI/12V SEL by RES, support RI by default.

8.18 COM5: Wafer, 3*1P, 2.00mm (Mark No.31, J_COM5)

Graphic	Pin	Definition	Pin	Definition
 1	1	RXD/RS485_A ^[1]	3	GND
	2	TXD/RS485_B ^[1]		

Notes:

[1]: J_COM5 can be selected by “COM5 RS232/RS485 Select Jumper”.

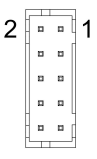
8.19 J_COM6: Wafer, 3*1P, 2.00mm (Mark No. 32, J_COM6)

Graphic	Pin	Definition	Pin	Definition
	1	RXD/RS485_A ^[1]	3	GND
	2	TXD/RS485_B ^[1]		

Notes:

[1]: J_COM6 can be selected by “COM6 RS232/RS485 Select Jumper”.

8.20 GPIO: Wafer, 5*2P, 2.00mm (Mark No.33, J_GPIO1)

Graphic	Pin	Definition	Pin	Definition
	1	SIO_GPI71 (0xA06 Bit1, H ^[1])	2	SIO_GPI70 (0xA06 Bit0, H ^[1])
	3	SIO_GPI73 (0xA06 Bit3, H ^[1])	4	SIO_GPI72 (0xA06 Bit2, H ^[1])
	5	SIO_GPO75 (0xA06 Bit5, H ^[1])	6	SIO_GPO74 (0xA06 Bit4, H ^[1])
	7	SIO_GPO77 (0xA06 Bit7, H ^[1])	8	SIO_GPO76 (0xA06 Bit6, H ^[1])
	9	GND	10	VCC3.3/VCC5 ^[2]

Notes:

[1]: “H” or “L” means the default voltage is High or Low level (5V GPIO).

[2]: Power on this Pin is 5V by default, 3.3V is available if specified. (resistor selectable)

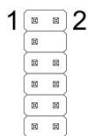
8.21 System FAN: Wafer 4*1P, 2.54mm (Mark No.34, SYS_FAN1)

Graphic	Pin	Definition	Pin	Definition
	1	GND	3	FAN Speed Detection
	2	VCC12	4	FAN Speed Control

8.22 CPU FAN: Wafer 4*1P, 2.54mm (Mark No.35, CPU_FAN1)

Graphic	Pin	Definition	Pin	Definition
	1	GND	3	FAN Speed Detection
	2	VCC12	4	FAN Speed Control

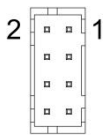
8.23 ESPI: Wafer, 6*2P, 2.00mm (Mark No.36, J_ESPI1)

Graphic	Pin	Definition	Pin	Definition
	1	ESPI_IO0	2	VCC3.3
	3	ESPI_IO1		
	5	ESPI_IO2	6	ESPI_CLK
	7	ESPI_IO3	8	GND
	9	ESPI_CS0-	10	VCC3.3
	11	ESPI_ALERT0_N	12	PLTRST_N ^[1]

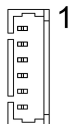
Notes:

[1]: Signal on this Pin is PLT_RST_N by default, ESPI_RST0_N is available if specified. (resistor selectable).

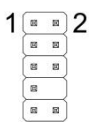
8.24 Front Panel: Wafer, 4*2P, 2.00mm (Mark No.37, F_PANEL1)

Graphic	Pin	Definition	Pin	Definition
	2	HDD_LED+	1	PWR_LED+
	4	HDD_LED-	3	PWR_LED-
	6	RESET-	5	PWR_ON+
	8	RESET+	7	PWR_ON-

8.25 I2C Touch Screen: Wafer, 6*1 P, 1.25mm (Mark No.38, J_I2C1)

Graphic	Pin	Definition	Pin	Definition
	1	VCC3.3	4	TCH_RST-
	2	GND	5	TCH_I2C_SCL
	3	TCH_INT-	6	TCH_I2C_SDA

8.26 TPM: Header, 5*2P, 2.00mm (Mark No.39, J_TPM1)

Graphic	Pin	Definition	Pin	Definition
	1	VCC3.3	2	SPI_CS2-
	3	TPM_PLT_RST-	4	SPI_MISO_TPM
	5	SPI_CLK_TPM	6	GND
	7	SPI_MOSI_TPM		
	9	TPM_PP	10	TPM_RIRQ

【End】



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