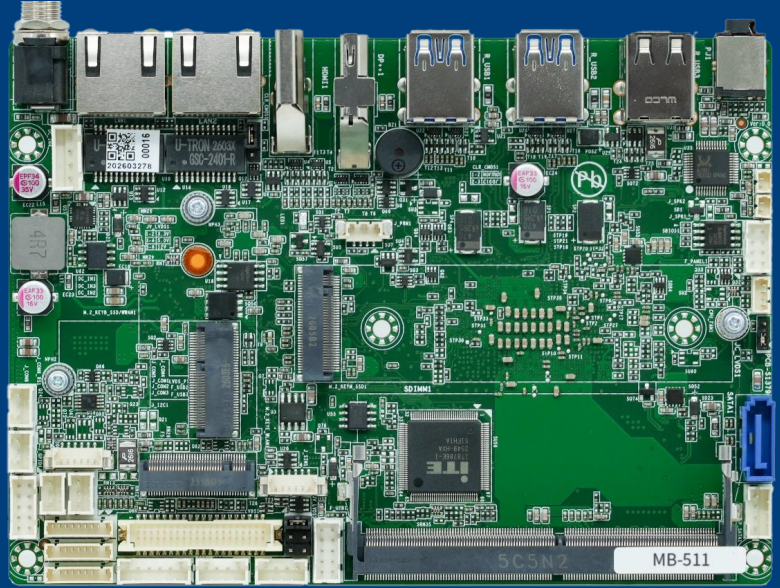




User Manual

Aicotek Motherboard | MB-511 User Manual



Empowering the world with AI solutions

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Revision History

Revision	Description	Date	Revised by
Ver 00.1.1	● Initial release	2026.4.8	Wuyangkai

1 Models and Attentions

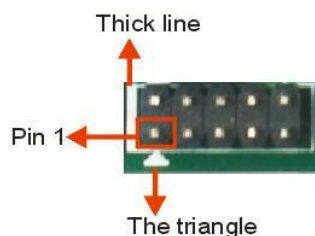
1.1 Models

This manual is applied to following models:

Model	Chipset	Memory	Storage	Display	Expansion	LAN	USB	I/O
MB-511	R2314	1*DDR4	1*SATA 1*M.2 Key-M	1*DP 1*HDMI 1*LVDS	1*M.2 Key-E 1*M.2 Key-B	2*GbE	4*USB3 6*USB2	6*RS232 1*RS485

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 and Interface

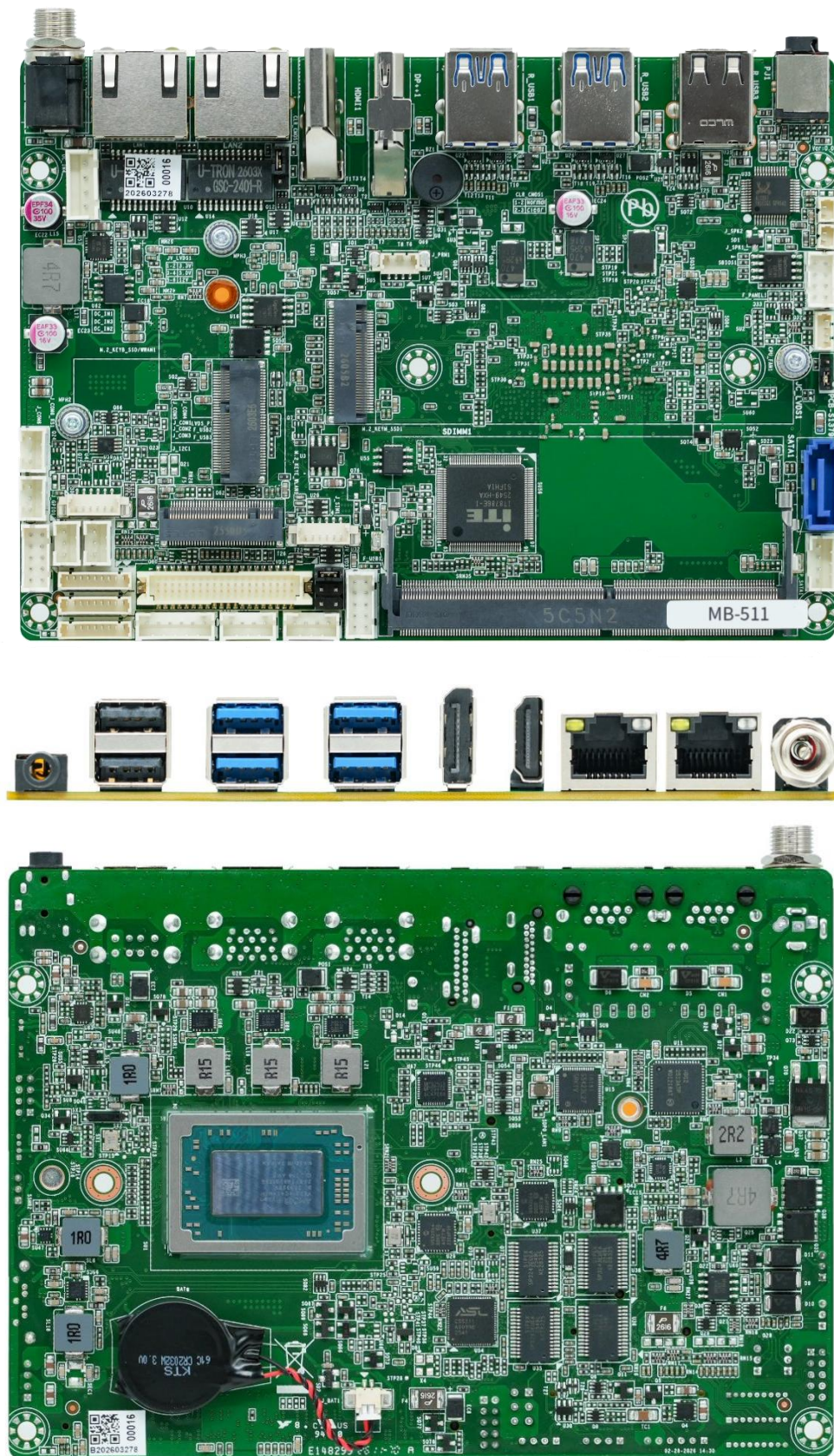
2.1 Specification

Specification		
Model	Model	MB-511
Processor System	Processor	AMD Ryzen™ Embedded R2000 Series Processor R2314
	Clock Speed	2.1GHz, up to 3.5GHz
	Core/Tread	4/4
	TDP	15W
	GPU	Integrated AMD Radeon Graphics, 8 Computing Units (CUs)
	BIOS	AMI UEFI BIOS
Memory	Memory Type	ECC DDR4 2667MT/s
	Slot Type	1, SO-DIMM
	Max Memory	32 GB
Display	VGA	1, max 1920*1080@60Hz
	HDMI	1, max 4096*2160@30Hz <i>Note: SI test no support.</i>
	eDP/LVDS	1, LVDS, max 1920*1080@60Hz <i>Note: BOM option support eDP max 4096*2160@60Hz.</i>
	Multi-Display	Triple <i>Note: The BIOS interface defaults to single display. The BIOS interface defaults to single display.</i>
Audio	Codec	Realtek ALC897 HDA codec
	Audio	1, Line-Out & MIC, Rear
	Amplifier	2, L+R, 3W4Ω/CH
Storage	SATA	1, SATA3.0 <i>Note: SATA signal colay with M.2 Key-B PCIe signal</i>
	M.2 SSD	1, M.2 Key-M 2280, PCIe4.0 x4, NVMe <i>Note: BOM option support SATA SSD.</i>
Expansion Slot	M.2 Key-E	1, M.2 Key-E 2230, PCIe x1+USB2.0, WiFi + Bluetooth
	M.2 Key-B	1, M.2 Key-B 3052, PCIe x1/USB3.0/USB2.0, 5G/4G/NVMe <i>Note: USB3.0 signal colay with R_USB2 UP</i>
	SIM	1, for M.2 Key-B
Ethernet	Chipset	1, Intel® i226V GbE Controller

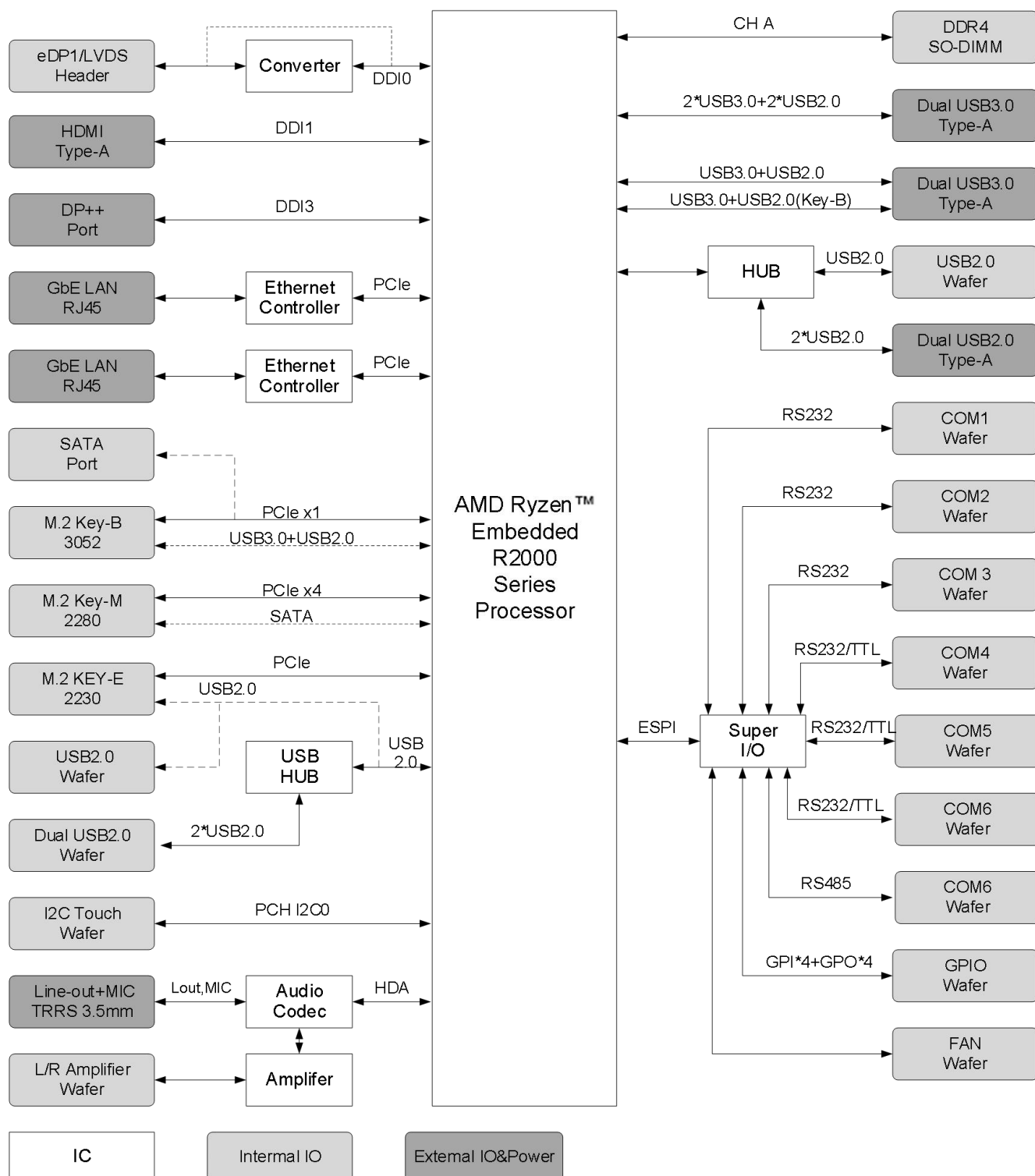
		1, Intel® i210AT GbE Controller
	PXE/RPL Boot	Yes
	Wake On LAN	Yes
USB	USB3.0	4, USB3.2 5Gbps
	USB2.0	6, USB2.0 <i>Note: BOM option support 3*USB2.0</i>
I/O	Serial	3, RS232, COM1/2/3, support 5V@1A/12V@1A 3, RS232, COM4/5/6 1, RS485, <i>Note: COM4/5/6 BOM option support 3.3V/5V TTL</i>
	Front Panel	1, Power on + Reset + Power LED + HDD LED
	FAN	1, CPU FAN, 12V with PWM + Detect <i>Note: BOM option support 5V.</i>
	Power Monitor	1
	GPIO	8, 4* GPI+ 4* GPO, non-isolated 3.3V <i>Note: BOM option support 5V.</i>
Others	Jumper	1, CMOS Clear
	RTC	1, CR2032 Li Battery
	Buzzer	1
	HW Monitor	System-temp, CPU-temp, Voltage-12V,5V,3.3V, Vcpu, Vddr
	Watch Dog Timer	System reset, Programmable 1-255 sec or min
	TPM	fTPM2.0
Power	Power in	DC 12/19/24V 1, Rear IO, 12/19/24V 1, Internal, 12/19/24V
OS	OS Supported	Windows 10/11 64bit
Mechanical	PCB form	146.0mm * 105.1mm, δ 1.6mm
Environment	Temperature	Operation: 0 ~ 60°C Storage: -20 ~ 75°C
	Humidity	Operation: 10 ~ 90%, Non-condensing Storage: 5 ~ 95%, Non-condensing

2.2 Interface

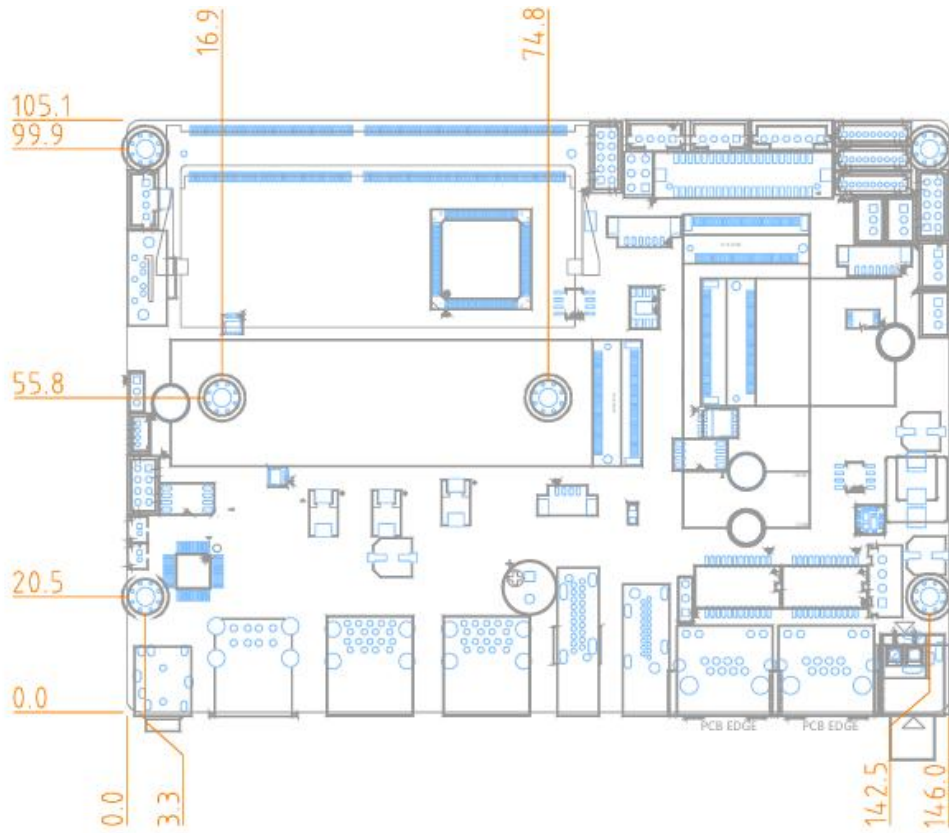
Interface		
Model	Model	MB-511
Rear I/O	Power in	1, Φ 2.5mm Jack
	HDMI	1, Type-A
	DP++	1, DP Port
	LAN	2, RJ45
	USB3.0	4, Type-A
	USB2.0	2, Type-A
	Audio	1, Line-Out + MIC Φ 3.5mm Jack
Internal I/O	Power in	1, Wafer
	eDP/LVDS	1, DF13
	Amplifier	1, Wafer
	Storage	1, SATA 7P Port 1, M.2 Key-M 2280, PCIe4.0 x4
	Expansion	1, M.2 Key-E 2230, PCIe + USB2.0 1, M.2 Key-B 3052, PCIe + USB3.0 + USB2.0
	SIM	1, Wafer
	USB2.0	4, Wafer
	Serial	7, Wafer
	GPIO	1, Wafer, 4*GPI + 4*GPO
	Front Panel	1, Wafer
	FAN	1, Wafer
	Buzzer	1
	Power Monitor	1, Wafer



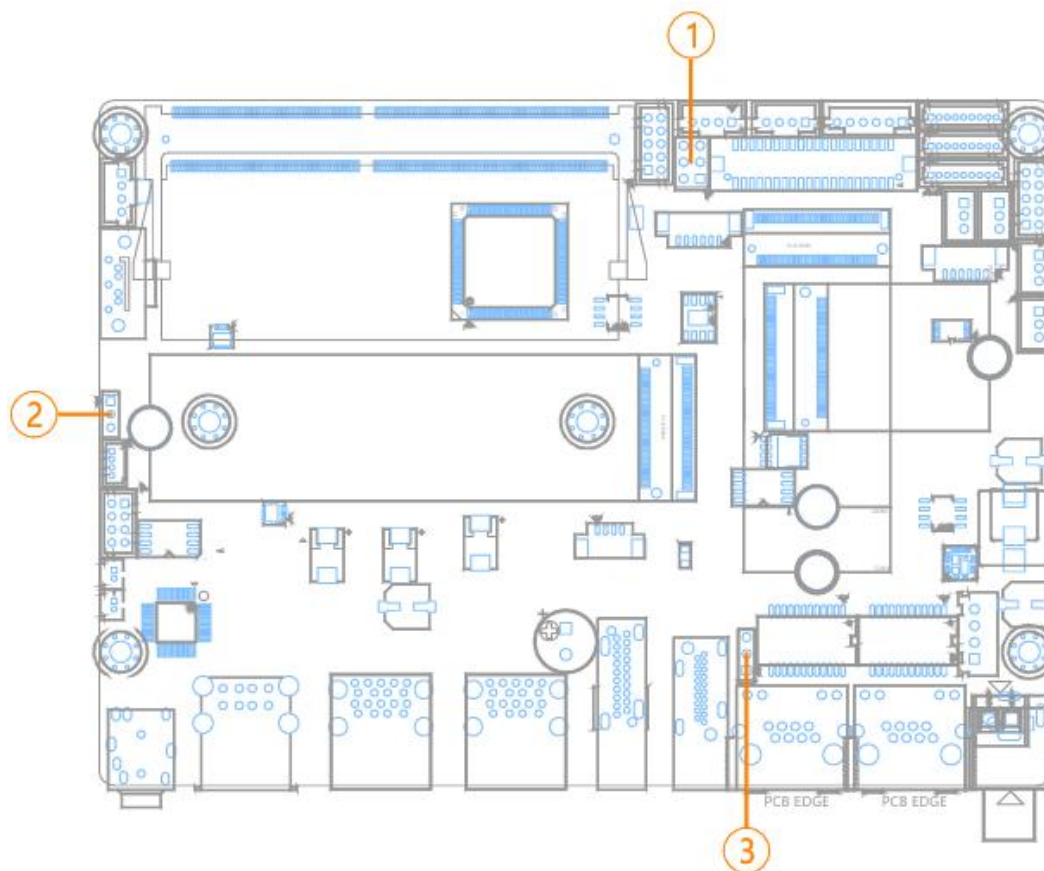
3 Block Diagram



4 Mechanical Drawing



5 Jumper



Jumpers		
①	JV_LVDS1	LVDS Power VCC3.3/VCC5/VCC12 Select Jumper
②	JC_LVDS1	LVDS Reset enable/disable Select Jumper
③	CLR_CMOS1	CMOS Clear 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

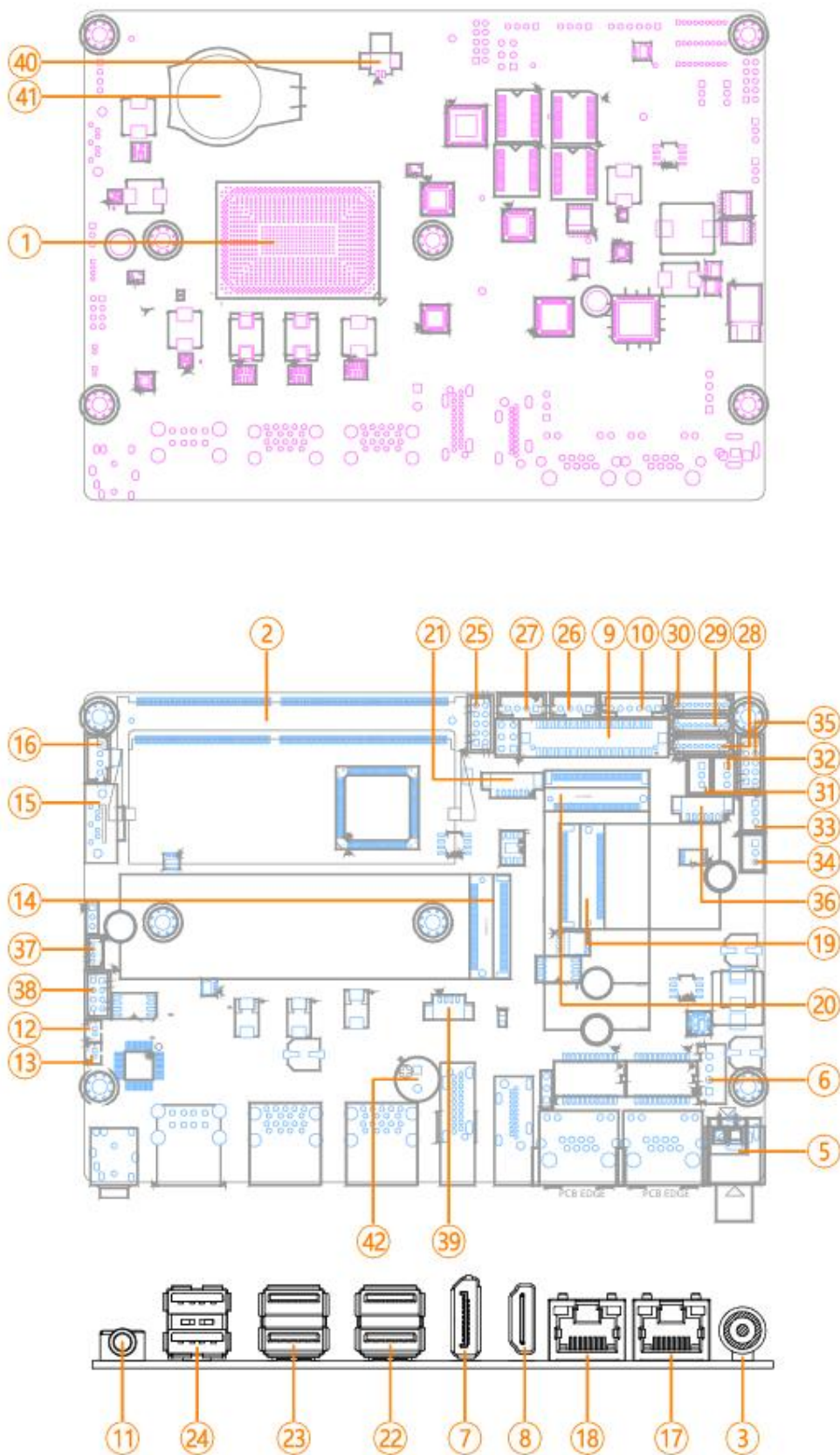
6.2 LVDS Reset enable/disable Select: Jumper, 3*1P, 2.54mm (Mark No.2, JC_LVDS1)

Graphic	Setting	Function
	1-2 (Default)	Enable
	2-3	Disable

6.3 CMOS Clear Select: Jumper, 3*1P, 2.54mm (Mark No.3, CLR_CMOS1)

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

7 Headers / Wafers and Connectors



Headers / Wafers and Connectors		
①	SU1	CPU
②	SDIMM1	DDR4 SO-DIMM Slot
③	DC_IN1	DC 12/24V Power Input Φ 2.5mm Thread Jack
④	DC_IN3	DC 12/24V Power Input 5.08mm 2P Terminal Block
⑤	DC_IN2	DC 12/24V Power Input 3.5mm 2P Terminal Block
⑥	DC_IN4	DC 12/24V Power Input Wafer
⑦	HDMI1	HDMI Type-A Connector
⑧	DP++1	DP++ Port Connector
⑨	LVDS1	eDP/LVDS Signal DF13 Connector
⑩	LVDS_P1	eDP/LVDS Backlight Control Wafer
⑪	PJ1	Line-Out + MIC 2in1 3.5mm Jack
⑫	J_SPK1	Left Amplifier Wafer
⑬	J_SPK2	Right Amplifier Wafer
⑭	M.2_KEYM_SSD1	M.2 Key-M Slot (PCIe x4, 2280)
⑮	SATA1	SATA3.0 7P Connector
⑯	P_SATA1	SATA Power Wafer
⑰	LAN1	GbE LAN RJ45 Connector
⑱	LAN2	GbE LAN RJ45 Connector
⑲	M.2_KEYE_WLAN1	M.2 Key-E Slot (PCIe+USB2.0, Support WIFI+BT, 2230)
⑳	M.2_KEYB_SSD/WWAN1	M.2 Key-B Slot (PCIe, Support NVME, 3052)
㉑	J_SIM1	SIM Wafer
㉒	R_USB1	Dual USB3.0 Type-A Connector
㉓	R_USB2	Dual USB3.0 Type-A Connector
㉔	R_USB3	Dual USB2.0 Type-A Connector
㉕	F_USB1	Dual USB2.0 Wafer
㉖	F_USB2	USB2.0 Wafer
㉗	F_USB3	USB2.0 Wafer
㉘	J_COM1	COM1 RS232 Wafer
㉙	J_COM2	COM2 RS232 Wafer
㉚	J_COM3	COM3 RS232 Wafer
㉛	J_COM4	COM4 RS232/TTL Wafer
㉜	J_COM5	COM5 RS232/TTL Wafer

③③	J_COM6	COM6 RS232/TTL Wafer
③④	J_COM6_RS1	COM6 RS485 Wafer
③⑤	J_GPIO1	GPIO Wafer
③⑥	J_I2C1	I2C Touch Wafer
③⑦	CPU_FAN1	CPU FAN Wafer
③⑧	F_PANEL1	Front Panel Wafer
③⑨	J_PRM1	Power Monitor Wafer
④①	J_BAT1	CMOS Battery Wafer
④①	BAT	CMOS Battery Holder
④②	BZ1	Buzzer

8 Definition of Connectors

8.1 DC 12/24V Power Input: Terminal Block, 2*1P, 5.08mm (Mark No.3, DC_IN3)

Graphic	Pin	Definition	Pin	Definition
1 	1	DC_IN	2	GND

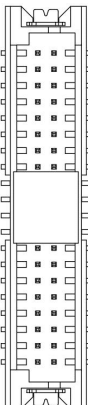
8.2 DC 12/24V Power Input: Terminal Block, 2*1P, 3.50mm (Mark No.4, DC_IN2)

Graphic	Pin	Definition	Pin	Definition
1 	1	DC_IN	2	GND

8.3 DC 12/24V Power Input: Wafer, 4*1P, 2.50 mm (Mark No.5, DC_IN4)

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

8.4 eDP/LVDS: DF13, 20*2P, 1.25mm (Mark No.9, LVDS1)

Graphic	Pin	Definition	Pin	Definition
1 	1	VCC3.3/VCC5/VCC12 ^[1]	2	VCC3.3/VCC5/VCC12 ^[1]
	3	LVDS_PRSENT	4	GND
	5	VCC3.3/VCC5/VCC12 ^[1]	6	VCC3.3/VCC5/VCC12 ^[1]
	7	LVDS_A_DATA0-	8	LVDS_B_DATA0- /EDP1_TX0- ^[2]
	9	LVDS_A_DATA0+	10	LVDS_B_DATA0+ /EDP1_TX0+ ^[2]
	11	GND	12	GND
	13	LVDS_A_DATA1-	14	LVDS_B_DATA1- /EDP1_TX1- ^[2]
	15	LVDS_A_DATA1+	16	LVDS_B_DATA1+ /EDP1_TX1+ ^[2]
	17	GND	18	GND
	19	LVDS_A_DATA2-	20	LVDS_B_DATA2- /EDP1_AUX-
	21	LVDS_A_DATA2+	22	LVDS_B_DATA2+ /EDP1_AUX+
	23	GND	24	GND
	25	LVDS_A_CLK-	26	LVDS_B_CLK- /EDP1_TX3- ^[2]
	27	LVDS_A_CLK+	28	LVDS_B_CLK+ /EDP1_TX3+ ^[2]

	29	GND	30	GND
	31	N/C	32	EDP1_HPD
	33	GND	34	GND
	35	LVDS_A_DATA3-	36	LVDS_B_DATA3- /EDP1_TX2- ^[2]
	37	LVDS_A_DATA3+	38	LVDS_B_DATA3+ /EDP1_TX2+ ^[2]
	39	N/C	40	GND

Notes:

[1]: Panel Power VDD is 3.3V by default, 5V or 12V is selectable by “eDP/LVDS Power VCC3.3/VCC5/VCC12 Select Jumper”. (JV_LVDS1).

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

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

Graphic	Pin	Definition	Pin	Definition
	1	GND	4	LVDS_EN_BKLT
	2	GND	5	VCC12
	3	LVDS_BKLTCTL	6	VCC12

8.6 Left Amplifier: Wafer, 2*1P, 2.00mm (Mark No.12, J_SPK1)

Graphic	Pin	Definition	Pin	Definition
	1	SPK_OUT_L-	2	SPK_OUT_L+

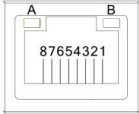
8.7 Right Amplifier: Wafer, 2*1P, 2.00mm (Mark No.13, J_SPK2)

Graphic	Pin	Definition	Pin	Definition
	1	SPK_OUT_R-	2	SPK_OUT_R+

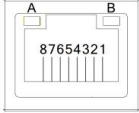
8.8 SATA Power: Wafer, 4*1P, 2.00mm (Mark No.16, P_SATA1)

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

8.9 GbE LAN: RJ45, 8P (Mark No.17, 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	B	Speed LED
		ACT: Twinkling Yellow		1000M: Turn Yellow
		Only LINK: Lights On		100M: Turn Green
		NO LINK: Lights Off		10M: Lights Off

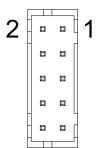
8.10 GbE LAN: RJ45, 8P (Mark No.18, LAN2)

Graphic	Pin	Definition	Pin	Definition
	1	MDI0+	5	MDI2-
	2	MDI0-	6	MDI1-
	3	MDI1+	7	MDI3+
	4	MDI2+	8	MDI3-
	A	Active LED	B	Speed LED
		ACT: Twinkling Yellow		1000M: Turn Yellow
		Only LINK: Lights On		100M: Turn Green
		NO LINK: Lights Off		10M: Lights Off

8.11 SIM Card: Wafer, 6*1P, 1.25mm (Mark No.21, J_SIM1)

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

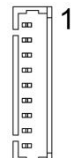
8.12 Front Dual USB2.0: Wafer, 5*2P, 2.00mm (Mark No.25, F_USB1)

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

8.13 Front USB2.0: Wafer, 4*1P, 2.0mm (Mark No.26-27, F_USB2/3)

Graphic	Pin	Definition	Pin	Definition
	1	VCC5	3	USB2.0+
	2	USB2.0-	4	GND

8.14 COM1/2/3: Wafer, 9*1P, 1.25mm (Mark No.28/29/30, J_COM1/2/3)

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]: PIN8 can be RI#/12V SEL by RES, support RI# by default.

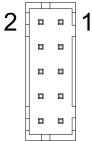
8.15 COM4/5/6: Wafer, 3*1P, 2.00mm (Mark No.31/32/33, J_COM4/5/6)

Graphic	Pin	Definition	Pin	Definition
	1	RXD	3	GND
	2	TXD		

8.16 COM6 RS485: Wafer, 3*1P, 2.00mm (Mark No.34, J_COM6_RS1)

Graphic	Pin	Definition	Pin	Definition
 1	1	RS485+	3	GND
	2	RS485-		

8.17 GPIO: Wafer, 5*2P, 2.00mm (Mark No.35, J_GPIO1)

Graphic	Pin	Definition	Pin	Definition
 2 1	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 (3.3V GPIO).

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

8.18 I2C Touch Screen: Wafer, 6*1P, 1.25mm (Mark No.36, J_I2C1)

Graphic	Pin	Definition	Pin	Definition
 1	1	VCC3.3	4	TCH_RST_N_R
	2	GND	5	TCH_I2C_SCL
	3	TCH_INT_N	6	TCH_I2C_SDA

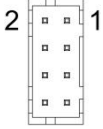
8.19 CPU FAN: Wafer 4*1P, 2.54mm (Mark No.37, CPU_FAN1)

Graphic	Pin	Definition	Pin	Definition
 1	1	GND	3	FAN Speed Detection
	2	VCC5/VCC12 ^[1]	4	FAN Speed Control

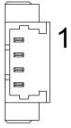
Notes:

[1]: Power on this Pin is 12V by default, 5V is available if specified. (resistor selectable)

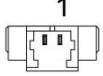
8.20 Front Panel: Wafer, 4*2P, 2.00mm (Mark No.38, F_PANEL1)

Graphic	Pin	Definition	Pin	Definition
	1	PWR LED+	2	HDD_LED+
	3	PWR LED-	4	HDD_LED-
	5	PWR On+	6	RESET-
	7	PWR On-	8	RESET+

8.21 Power Monitor: Wafer, 4*1P, 1.25mm (Mark No.39, J_PRM1)

Graphic	Pin	Definition	Pin	Definition
	1	GND	3	VCCIN_SCL
	2	N/C	4	VCCIN_SDA

8.22 CMOS Battery: Wafer, 2*1P, 1.25mm (Mark No.40, J_BAT1)

Graphic	Pin	Definition	Pin	Definition
	1	VCC_BAT	2	GND

【End】



Empowering the world with AI solutions

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