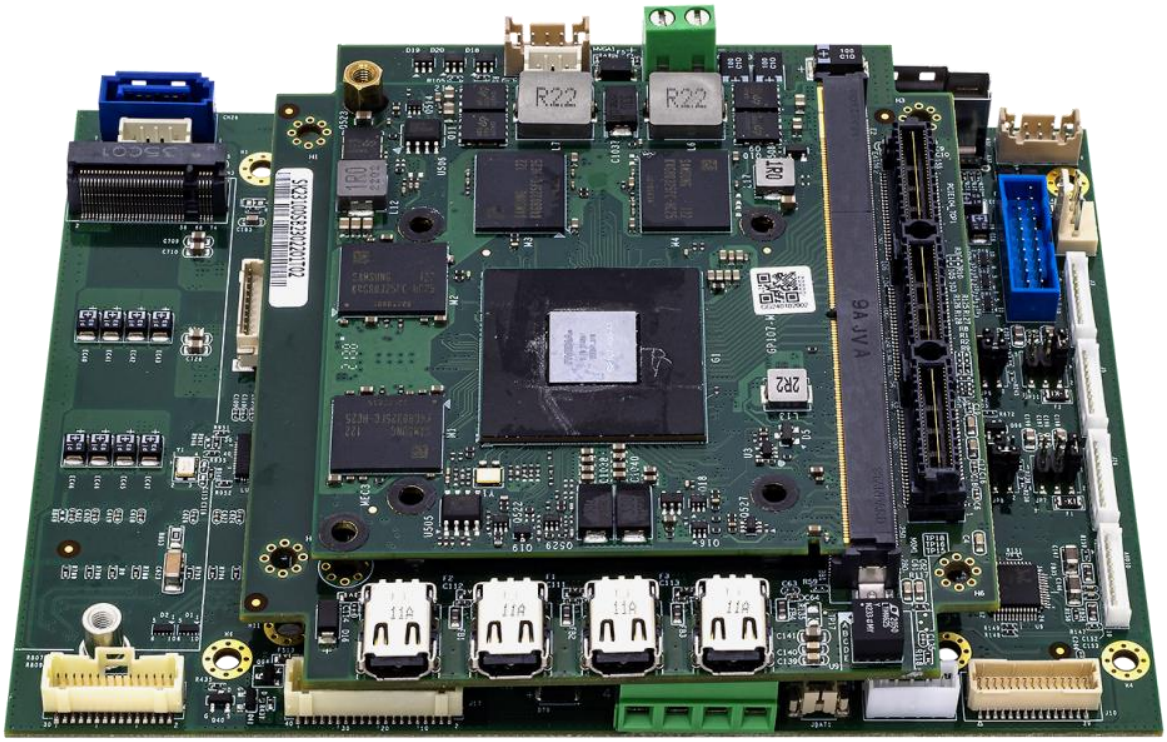
PCIE/104-RH

PCIe/104 Processing Unit Intel 13th Raptor Lake (H)



User's Manual

Revision Date: Mar. 13. 2024

Safety Information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

Statement

Revision History

Revision	Date (yyyy/mm/dd)	Changes
V1.0	2024.03.13	Initial Release

Table of Contents

Chapter 1 : Product Introduction

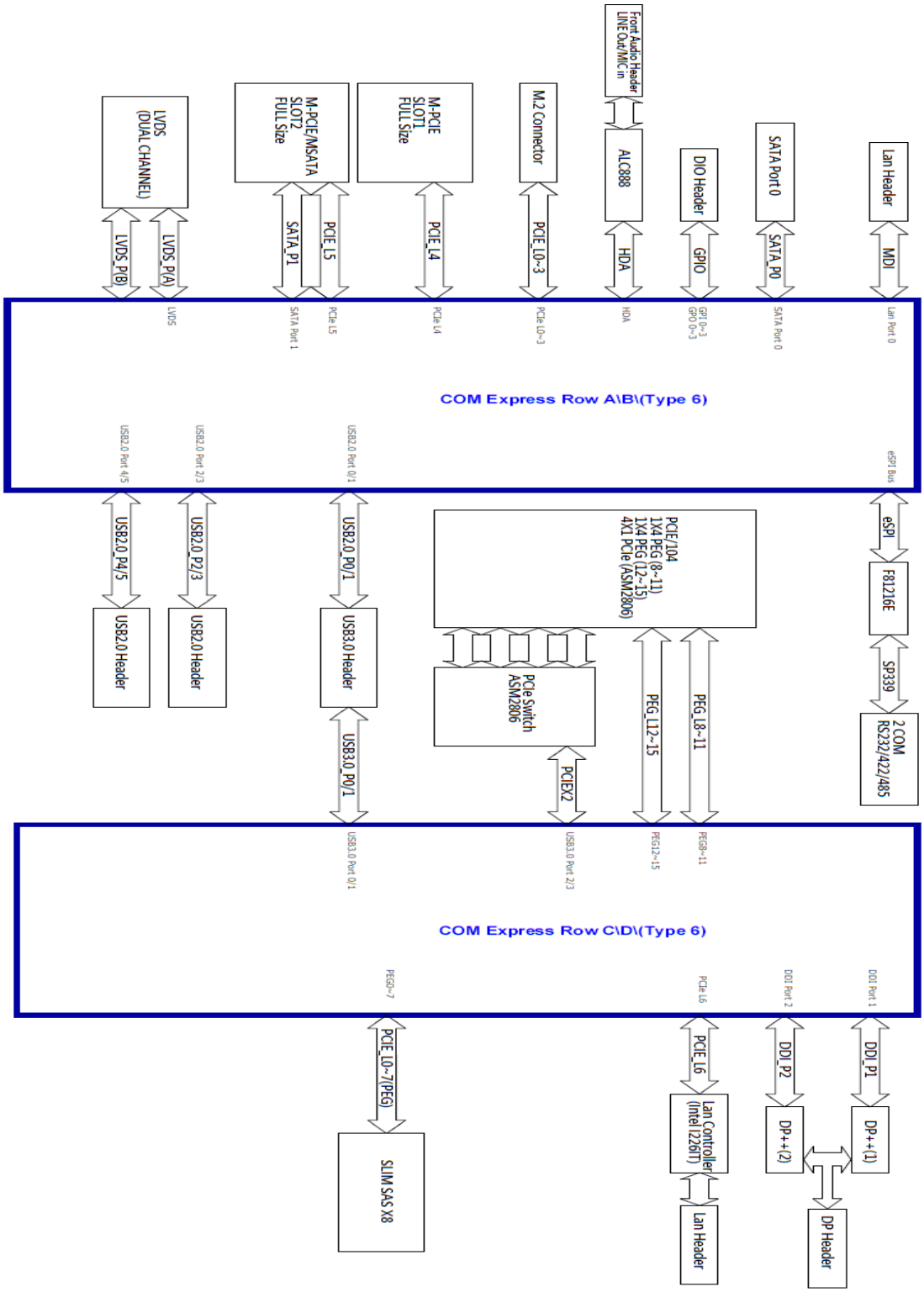
1.1 Specifications

System	
COM Express CPU Options (Type 6)	Intel® Core™ i7-13800HRE 45W Raptor Lake 13th Gen, 14C , Freq. 2.5 /5.0 GHz, 24MB cache Intel® Core™i5-13600HRE 45W Raptor Lake 13th Gen, 12C, Freq. 2.7/4.8GHz, 18MB cache Intel® Core™ i3-13300HRE 45W Raptor Lake 13th Gen, 8C , Freq. 2.1/4.6 GHz, 12MB cache Intel® Core™ i7-1365URE 45W Raptor Lake 13th Gen, 10C , Freq. 1.7/4.9 GHz, 12MB cache Intel® Core™ i7-11850HE 45W Tiger Lake 11th Gen, 8C , Freq. 2.6 /4.7 GHz, 24MB cache Intel® Xeon® W-11865MLE 25W Tiger Lake 11th Gen, 8C , Freq. 1.5 /4.5 GHz, 24MB cache
COM Express Compatibility	COM Express® Type 6
Memory type	Based on CPU module
Chipset	Based on CPU module
Expansion	
MiniPCIe Expansion	2x Full-size Mini PCIe (1 with mSATA supported)
M.2 Expansion	1x 2280 M-key support PCIe x4
PCIe/104 Expansion	Type 2, 4x PCIe x1、2x PCIe x4
SlimSAS	1x SlimSAA 8i connector
Display	
Display Port	2x Display Port outputs from CPU module
LVDS	1x dual channel 18/24bit LVDS from CPU module
Ethernet	
Gigabit Ethernet	1x Intel® I226-LM GbE LAN (10/100/1000Mbit /2.5G) Ethernet ports
	1x GbE LAN from CPU module
Storage	
SATA	1x SATA III
Internal I/O	
USB	1x 20Pin (2x USB 3.0)

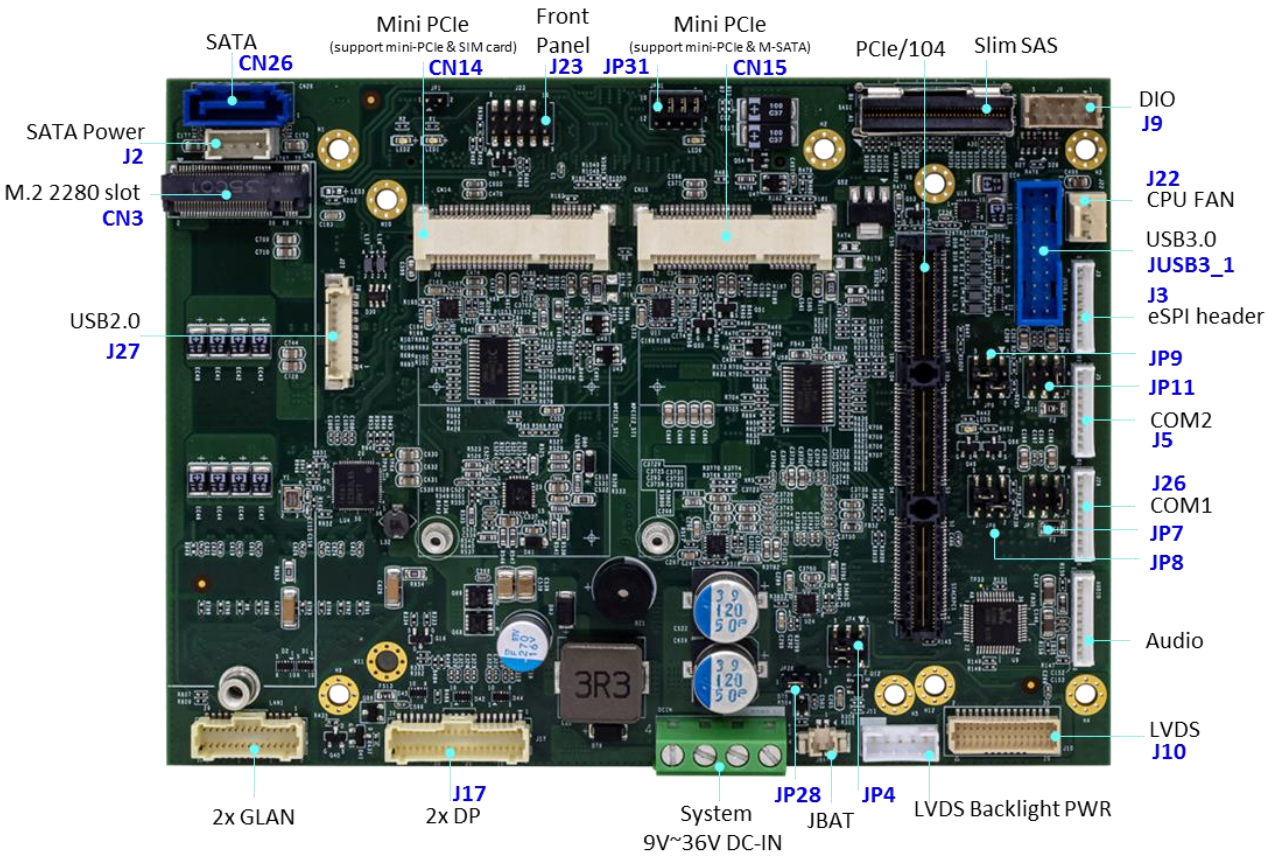
	1x 10Pin (2x USB2.0)
COM Port	2x 10Pin (2x RS232/422/485)
Audio	1x 10Pin (1x Line-out,1x MIC-IN)
SATA Power	1x SATA Power
eSPI	1x 10Pin
DIO	1x DI/DO (4 in / 4 out)
CPU FAN	1x CPU FAN
Front Panel	2x 5Pin (Power Button, Reset, SSD LED)
Battery	1x Battery Header
Power System	
Input Power_SYS	9V~36V DC-IN (4P Terminal Block)
Power Management	ACPI3.0
RTC Battery	3V CR2032
Mechanical and Environmental	
Dimension	146mm x 110mm
Operation Temperature	-40 to 85°C
Storage Temperature	-40 to 85°C
Relative Humidity	10% to 90%, non-condensing
Standard Compliance	
Standard Compliance	CE / FCC
OS	
OS Support	Windows®10 64bit, Linux(Support by request)

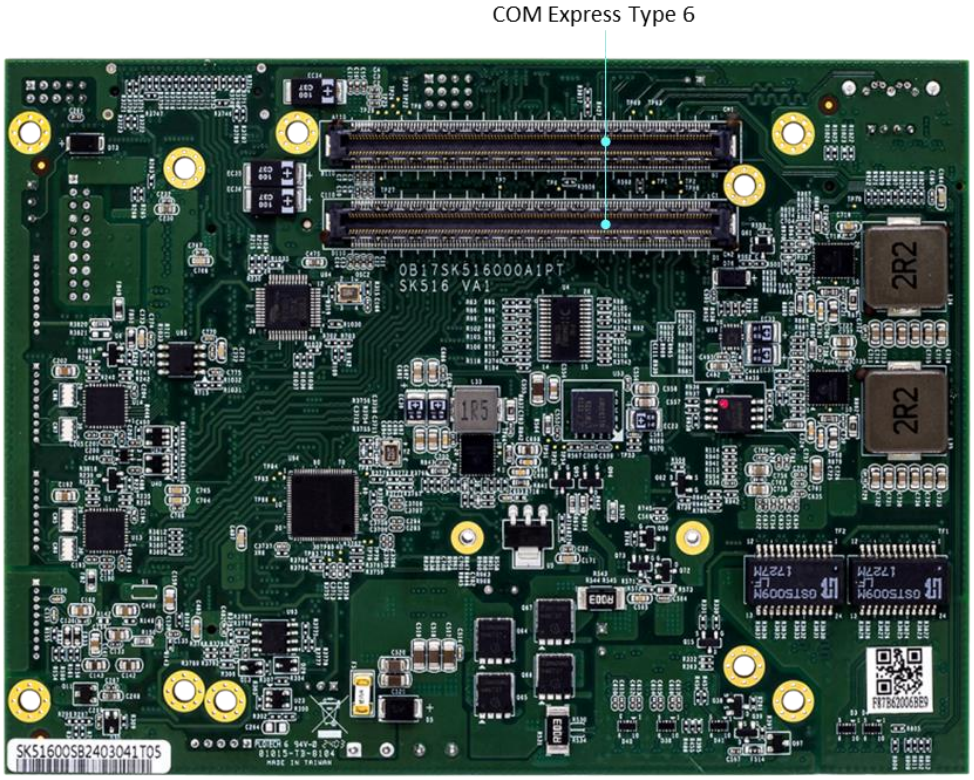
*All specifications and photos are subject to change without notice.

1.2 Board Diagram

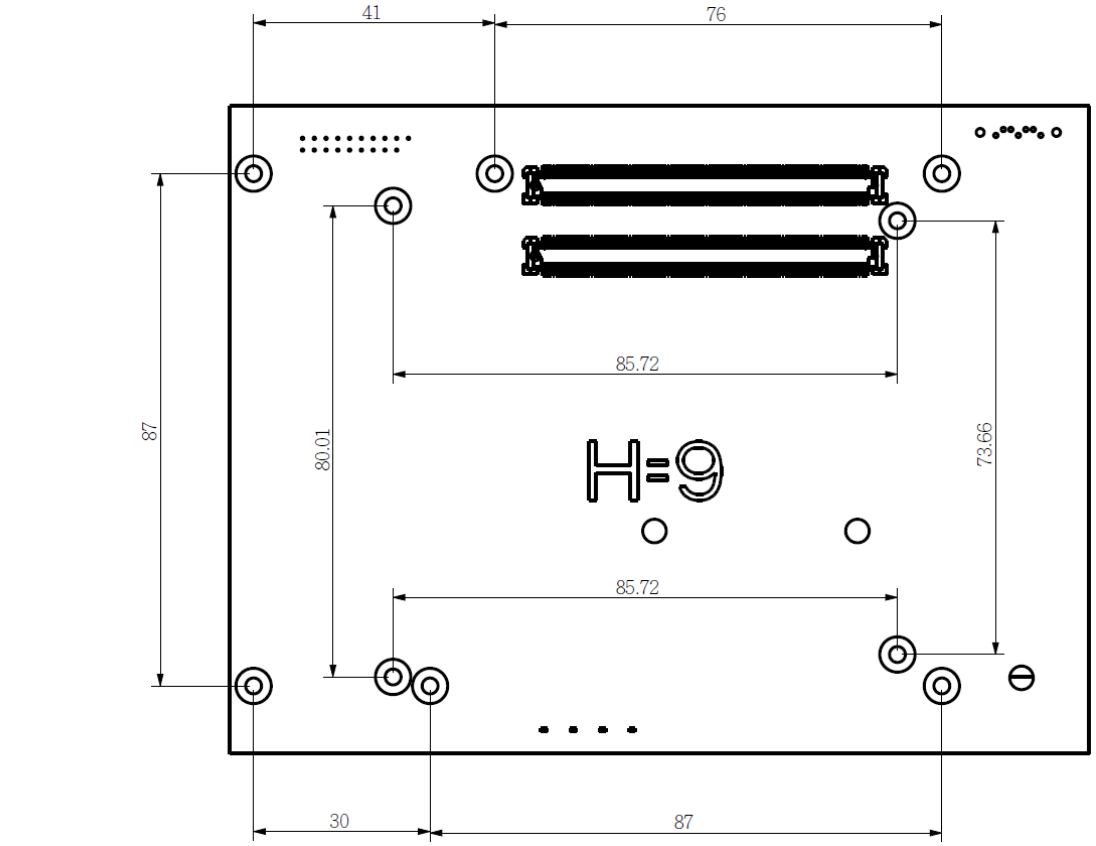


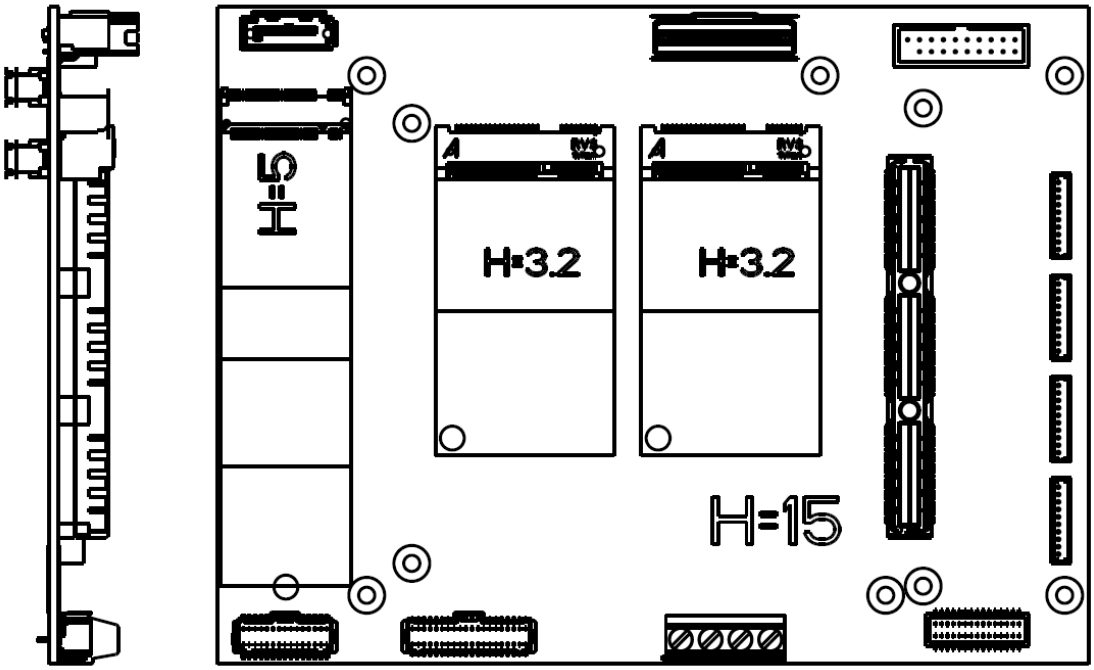
1.3 Connector & Pin Header





1.4 Dimension



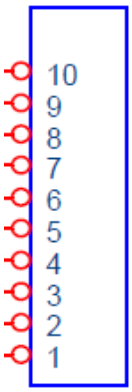


Chapter 2 : Jumpers and Connectors

2.1 Connector & Pin Definitions

J5/J26: COM2/COM1

	RS232	RS422	RS485
Pin1	DCD	TX-	DATA-
Pin2	RXD	TX+	DATA+
Pin3	TXD	RX+	NC
Pin4	DTR	RX-	NC
Pin5	GND	GND	GND
Pin6	DSR#	NC	NC
Pin7	RTS#	NC	NC
Pin8	CTS#	NC	NC
Pin9	RI#	NC	NC



JP8: COM1 Mode select

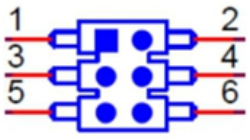
MODE[1,0]	JP8	JP8	Function
00	3-5	4-6	Loopback
01	3-5	2-4	RS-232
10	1-3	4-6	RS-485 Half Duplex
11	1-3	2-4	RS-485/422 Full Duplex

JP9: COM2 Mode select

MODE[1,0]	JP9	JP9	Function
00	2-3	2-3	Loopback
01	2-3	1-2	RS-232
10	1-2	2-3	RS-485 Half Duplex
11	1-2	1-2	RS-485/422 Full Duplex

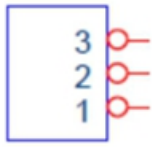
JP7/JP11: COM1/COM2 Pin select

Pin	Function
(1-2) Closed	RI
(3-4) Closed	+5V
(5-6) Closed	+12V



J22: CPU FAN Connector

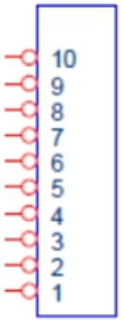
Pin	Function
1	GND
2	CPUFANOUT
3	+12V



JBAT1

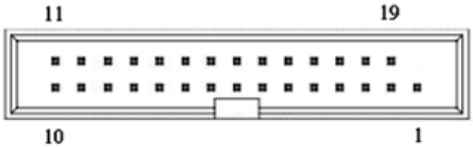
AUDIO

Pin	Function
1	GND
2	MIC_JD
3	MIC_R
4	MIC_L
5	FRONT_JD
6	FRONT_R
7	FRONT_L
8	N/C
9	N/C
10	N/C



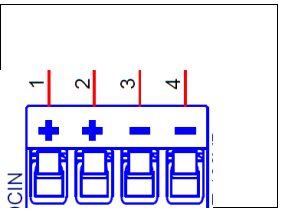
JUSB3_1: USB 3.0 Port

Pin	Function	Pin	Function
1	+5V_USB0	11	USB2_DP1
2	USB3_RXN0	12	USB2_DN1
3	USB3_RXP0	13	GND
4	GND	14	USB3_TXP1
5	USB3_TXN0	15	USB3_TXN1
6	USB3_TXP0	16	GND
7	GND	17	USB3_RXP1
8	USB2_DN0	18	USB3_RXN1
9	USB2_DP0	19	+5V_USB1
10	N/C		



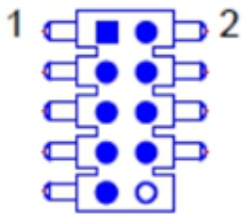
DC-IN: System DC-IN

Pin	Definition
1	9V~36V
2	9V~36V
3	GND
4	GND



J23: Front Panel

Pin	Function
1	HDLED+
2	PWLED+
3	SATALED-
4	GND
5	GND
6	PWRBTN#
7	RESET
8	GND
9	NC

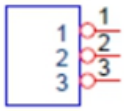


CN1, CN2: COM Express Connector

Support COM Express Basic Size Type 6 Module

JP28: Clear CMOS

Pin	Function
(1-2) Closed	Normal(default)
(2-3) Closed	Clear CMOS



CN15: M_PCIe 2 (Mini PCIe Slot)

JP31: Mini PCIe 1 function select

PCIe x 1	SATA
(1-2) Closed	(2-3) Closed

CN14: M_PCIe 1 (Mini PCIe Slot)

J15: USB2.0 (USB2/USB3)

Pin	Function	Pin	Function
1	5V_USB2	6	5V_USB3
2	USB2_DN2	7	USB2_DN3
3	USB2_DP2	8	USB2_DP3
4	GND	9	GND
5	GND	10	GND

LAN : LAN1/LAN2

Pin	Function	Pin	Function	Pin	Function
1	MDI2_0PX	12	MDI1_2NX	23	3V3SB
2	MDI1_0PX	13	MDI2_3PX	24	3V3SB
3	MDI2_0NX	14	MDI1_3PX	25	LAN2_LED_100#
4	MDI1_0NX	15	MDI2_3NX	26	GBE_LED_100-
5	MDI2_1PX	16	MDI1_3NX	27	LAN2_LED_1000#
6	MDI1_1PX	17	GND	28	GBE_LED_1000-
7	MDI2_1NX	18	GND	29	GND
8	MDI1_1NX	19	VCC_1V5	30	GND
9	MDI2_2PX	20	GB0_CTREF	31	GND
10	MDI1_2PX	21	LAN2_LED_ACT#	32	GND
11	MDI2_2NX	22	GBE_ACT-		

J17: DDI1/2_DP1/2

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	GND	11	DP1_TN1	21	DP1_TP3	31	DP1_AUXP_CLK
2	GND	12	DP2_TN1	22	DP2_TP3	32	DP2_AUXP_CLK
3	DP1_TP0	13	GND	23	DP1_TN3	33	DP1_AUXN_DAT
4	DP2_TP0	14	GND	24	DP2_TN3	34	DP2_AUXN_DAT
5	DP1_TN0	15	DP1_TP2	25	GND	35	GND
6		16	DP2_TP2	26	GND	36	GND
7	GND	17	DP1_TN2	27		37	DP1_DET
8	GND	18	DP2_TN2	28		38	DP2_DET
9	DP1_TP1	19	GND	29	GND	39	DP1_PWR
10	DP2_TP1	20	GND	30	GND	40	DP2_PWR

J10: LVDS

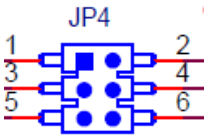
Pin	Function	Pin	Function	Pin	Function
1	LVDSB_CLK+	11	LVDSB2+	21	LVDSB0-
2	GND	12	LVDSA_CLK-	22	LVDSA1-
3	LVDSB_CLK	13	LVDSB2-	23	GND
4	LVDSA3+	14	GND	24	LVDSA0+
5	GND	15	LVDSB1+	25	LVDS_SCLK
6	LVDSA3-	16	LVDSA2+	26	LVDSA0-
7	LVDSB3+	17	LVDSB1-	27	LVDS_SDATA
8	GND	18	LVDSA2-	28	GND
9	LVDSB3-	19	LVDSB0+	29	LVDS_VCC
10	LVDSA_CLK+	20	LVDSA1+	30	LVDS_VCC

J11: LVDS Backlight

Pin	Function
1	BKL_VOL
2	LBKLT_CTRL
3	GND
4	GND
5	LCD_BKLTEN

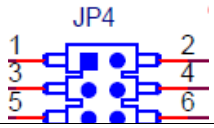
JP4: LVDS Backlight Power select

Pin	Function
(1-3) Closed	5V
(3-5) Closed	12V(Default)



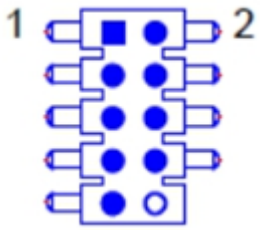
JP4: LVDS Signal Power select

Pin	Function
(2-4) Closed	5V
(4-6) Closed	3.3V(Default)



J9: DIO

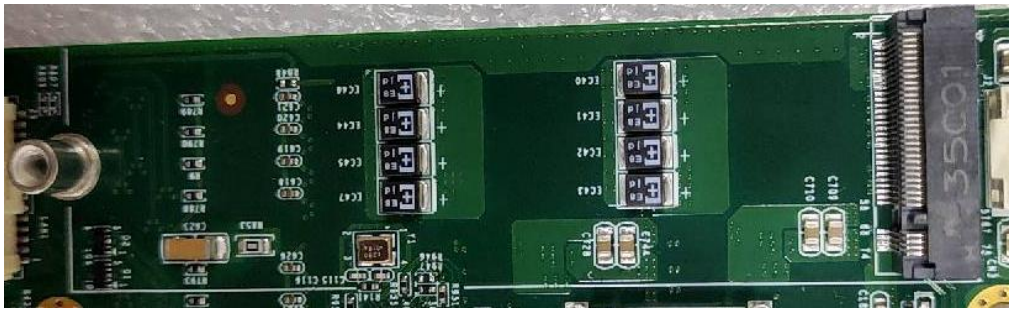
Pin	Function
1	GPI0
2	GPO0
3	GPI1
4	GPO1
5	GPI2
6	GPO2
7	GPI3
8	GPO3
9	5V
10	GND



J3: eSPI Header

Pin	Function
1	ESPI_CLK
2	GND
3	ESPI_CS-
4	ESPI_IO0
5	81216_RST#
6	ESPI_IO1
7	ESPI_IO3
8	ESPI_IO2
9	3V3
10	GND

CN3: M.2 (2280 M-key, PCIe x4)



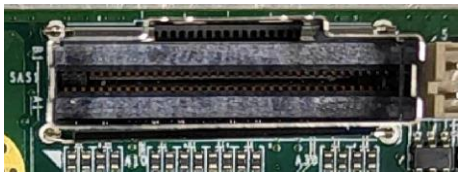
CN26: SATA3

Pin	Function
1	GND
2	SATA_TX0P
3	SATA_TX0N
4	GND
5	SATA_RX0N
6	SATA_RX0P
7	GND

J2: SATA Power

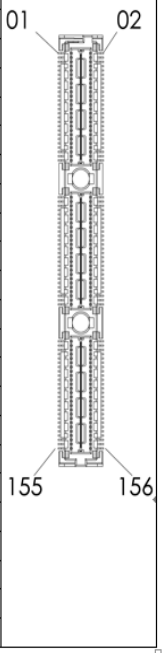
Pin	Definition
1	12V
2	GND
3	GND
4	5V

SAS1: SlimSAS 8i



STACKPC1:

PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION	PIN	DEFINITION
1	USB_HUB_OC#	2	Stack_RST#	53	STK0	54	STK1	105	STK2	106	STK_LPC
3	3V3	4	3V3	55	TYPE_DET#	56	GND	107	GND	108	GND
5	USB_HUB_DIN_P	6	USB_HUB_DIN1_P	57	N/A	58	PCIE_TX4P	109	N/A	110	PCIE_RX4P
7	USB_HUB_DIN_M	8	USB_HUB_DIN1_M	59	N/A	60	PCIE_TX4N	111	N/A	112	PCIE_RX4N
9	GND	10	GND	61	GND	62	GND	113	GND	114	GND
11	PEx1_TX_DP	12	PEx0_TX_DP	63	N/A	64	PCIE_TX5P	115	N/A	116	PCIE_RX5P
13	PEx1_TX_DN	14	PEx0_TX_DN	65	N/A	66	PCIE_TX5N	117	N/A	118	PCIE_RX5N
15	GND	16	GND	67	GND	68	GND	119	GND	120	GND
17	PEx2_TX_DP	18	PEx3_TX_DP	69	N/A	70	PCIE_TX6P	121	N/A	122	PCIE_RX6P
19	PEx2_TX_DN	20	PEx3_TX_DN	71	N/A	72	PCIE_TX6N	123	N/A	124	PCIE_RX6N
21	GND	22	GND	73	GND	74	GND	125	GND	126	GND
23	PEx1_RX_DP	24	PEx0_RX_DP	75	N/A	76	PCIE_TX7P	127	N/A	128	PCIE_RX7P
25	PEx1_RX_DN	26	PEx0_RX_DN	77	N/A	78	PCIE_TX7N	129	N/A	130	PCIE_RX7N
27	GND	28	GND	79	GND	80	GND	131	GND	132	GND
29	PEx2_RX_DP	30	PEx3_RX_DP	81	N/A	82	N/A	133	N/A	134	N/A
31	PEx2_RX_DN	32	PEx3_RX_DN	83	N/A	84	N/A	135	N/A	136	N/A
33	GND	34	GND	85	GND	86	GND	137	GND	138	GND
35	CK_PEx_100M_SLT1	36	CK_PEx_100M_SLT0	87	USB_HUB_DIN4_P	88	USB_HUB_DIN3_P	139	N/A	140	N/A
37	CK_PEx_100M_SLT1-	38	CK_PEx_100M_SLT0-	89	USB_HUB_DIN4_M	90	USB_HUB_DIN3_M	141	N/A	142	N/A
39	+5V_SB	40	+5V_SB	91	GND	92	GND	143	GND	144	GND
41	CK_PEx_100M_SLT2	42	CK_PEx_100M_SLT3	93	USB_HUB_DIN6_P	94	USB_HUB_DIN5_P	145	LPC_AD0	146	LPC_DRQ#
43	CK_PEx_100M_SLT2-	44	CK_PEx_100M_SLT3-	95	USB_HUB_DIN6_M	96	USB_HUB_DIN5_M	147	LPC_AD1	148	LPC_SERIRQ
45	N/A	46	PWRGOOD	97	GND	98	GND	149	GND	150	GND
47	SMB_DAT	48	CK_PEx_100M_SLT4	99	N/A	100	N/A	151	LPC_AD2	152	LPC_FRAME-
49	SMB_CLK	50	CK_PEx_100M_SLT4-	101	N/A	102	N/A	153	LPC_AD3	154	N/A
51	SMB_ALERT	52	PSON-	103	GND	104	GND	155	GND	156	GND



Chapter 3 : Cable Kit