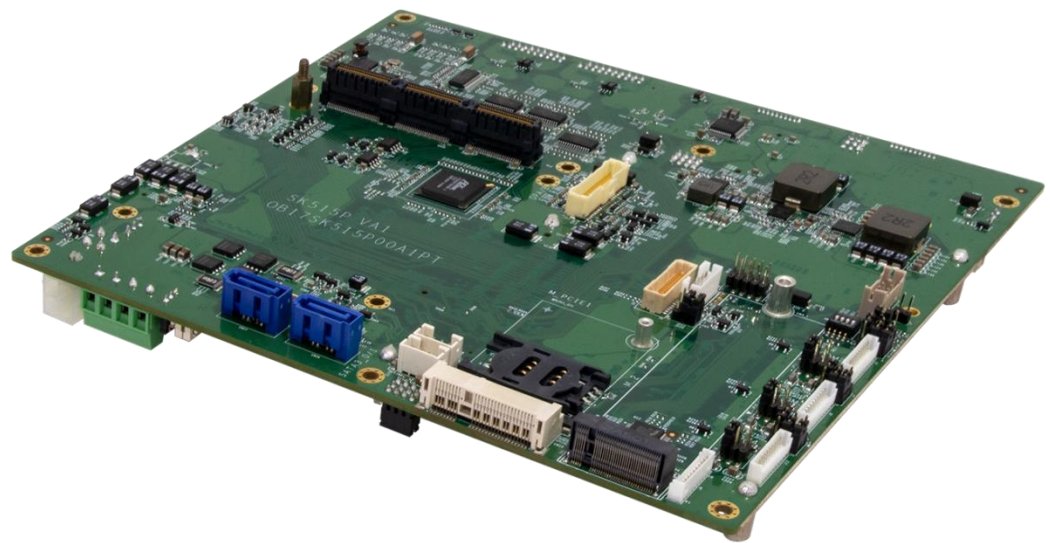




SK515P

COM Express® Type 6 Carrier Board w/PCIe 104



User's Manual

Revision Date: July.15. 2023

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

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- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

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Revision History

Revision	Date (yyyy/mm/dd)	Changes
Version 1.0	2023/07/15	Initial release

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1. CHAPTER 1: PRODUCT INTRODUCTION

1-1. Specifications

System

	Intel® Core™ i7-13800HRE 45W Raptor Lake 13th Gen, 14C, Freq. 2.5 / 5.0GHz, 24MB cache
	Intel® Core™ i7-11850HE 45W Tiger Lake 11th Gen, 8C, Freq. 2.6 / 4.7 GHz, 24MB cache
	Intel® Xeon® W-11865MLE 45W Coffee Lake 11th Gen, 8C, Freq. 1.5 / 4.5 GHz, 12MB cache
COM Express	Intel® Xeon® E-2276ME 45W Coffee Lake 9th Gen, 6C, Freq. 2.8 / 4.5 GHz, 12MB cache
CPU Options (Type 6)	Intel® Xeon® E-2276ML 25W Coffee Lake 9th Gen, 6C, Freq. 2.0 / 4.2 GHz, 12MB cache Intel® Core™ i7-9850HE 45W Coffee Lake 9th Gen, 6C, Freq. 2.7 / 4.4 GHz, 9MB cache Intel® Core™ i7-9850HL 25W Coffee Lake 9th Gen, 6C, Freq. 1.9 / 4.1 GHz, 9MB cache Intel® Core™ i7-7820EQ 45W Kaby Lake 7th Gen, 4C, Freq. 3.0 / 3.7 GHz, 8MB cache Intel® Xeon® E3-1505L v6 25W Sky Lake 6th Gen, 4C, Freq. 2.2 / 3.0 GHz, 8MB cache

COM Express	Intel® Xeon®-D1577 45W Broadwell-DE, 16C, Freq. 1.3 / 2.1 GHz, 24MB cache
CPU Options (Type 7)	Intel® Xeon®-D1559 45W Broadwell-DE, 16C, Freq. 1.5 / 2.1 GHz, 18MB cache (eTEMP)

GPU Module	NVIDIA® GeForce™ GTX 1660S, 95W, 6GB GDDR6, 1,048 CUDA Cores
Options	NVIDIA® GeForce™ RTX 2060S, 175W, 8GB GDDR6, 2,176 CUDA Cores NVIDIA® Ampere RTX A2000, 80W, 8GB GDDR6, 2,560 CUDA Cores NVIDIA® Ampere RTX A4500, 80W/130W, 16GB GDDR6, 5,888 CUDA Cores

COM Express Compatibility	COM Express® Type 6/7
------------------------------	-----------------------

Expansion

MiniPCIe Expansion	2x Full-size Mini PCIe (1 with mSATA supported)
M.2 Expansion	1x 2280 M-key (SATA only)
PCIe/104 Expansion	4x PCIe x 1、1x PCIe x 4、5x USB 2.0、1x LPC、1x SPI

Display

Display Port	2x Display Port outputs from GPU(Port A/B)
VGA	1x output from COM Express®, 1x output from GPU
LVDS	1x dual channel 18/24bit LVDS
DVI	1

Ethernet

Gigabit Ethernet	2x 10/100/1000/2.5G Ethernet Ports(One from CPU module)
------------------	---

I/O

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USB	4x USB 3.0, 2x USB 2.0
-----	------------------------

COM Port	4x RS232/422/485
----------	------------------

Audio	1x Line-out, 1x MIC-IN
-------	------------------------

SATA Power	2x SATA Power
------------	---------------

SATAIII	2x SATAIII
---------	------------

DI/DO	1x DI/DO (4 in / 4 out)
-------	-------------------------

CPU FAN	1x CPU FAN
---------	------------

MXM FAN	1x MXM FAN
---------	------------

Battery	1x Battery Header
---------	-------------------

Power System

Input Power_SYS	9~36V (4P Terminal Block)
-----------------	---------------------------

Input Power_MXM	12V (ATX 4P)
-----------------	--------------

Power Consumption	Varies per COM Express/ MXM with different CPU and GPU models
-------------------	---

RTC Battery	3V CR2032
-------------	-----------

Mechanical and Environmental

Dimension	190mm x 180mm
-----------	---------------

Operation Temperature	-40 to 85°C
-----------------------	-------------

Storage Temperature	-40 to 85°C
---------------------	-------------

Relative Humidity	10% to 90%, non-condensing
-------------------	----------------------------

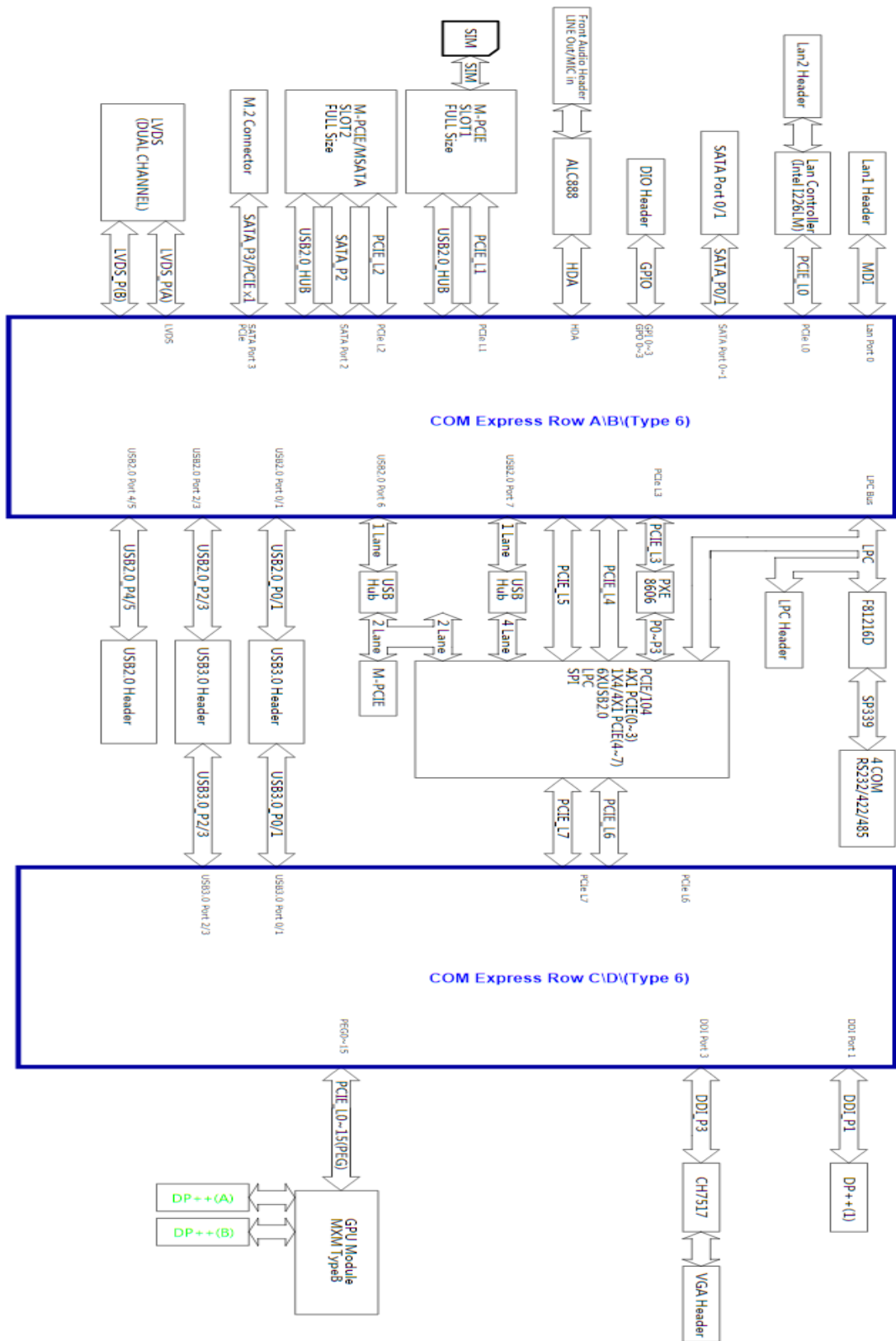
Standard Compliance

Standard Compliance	CE / FCC
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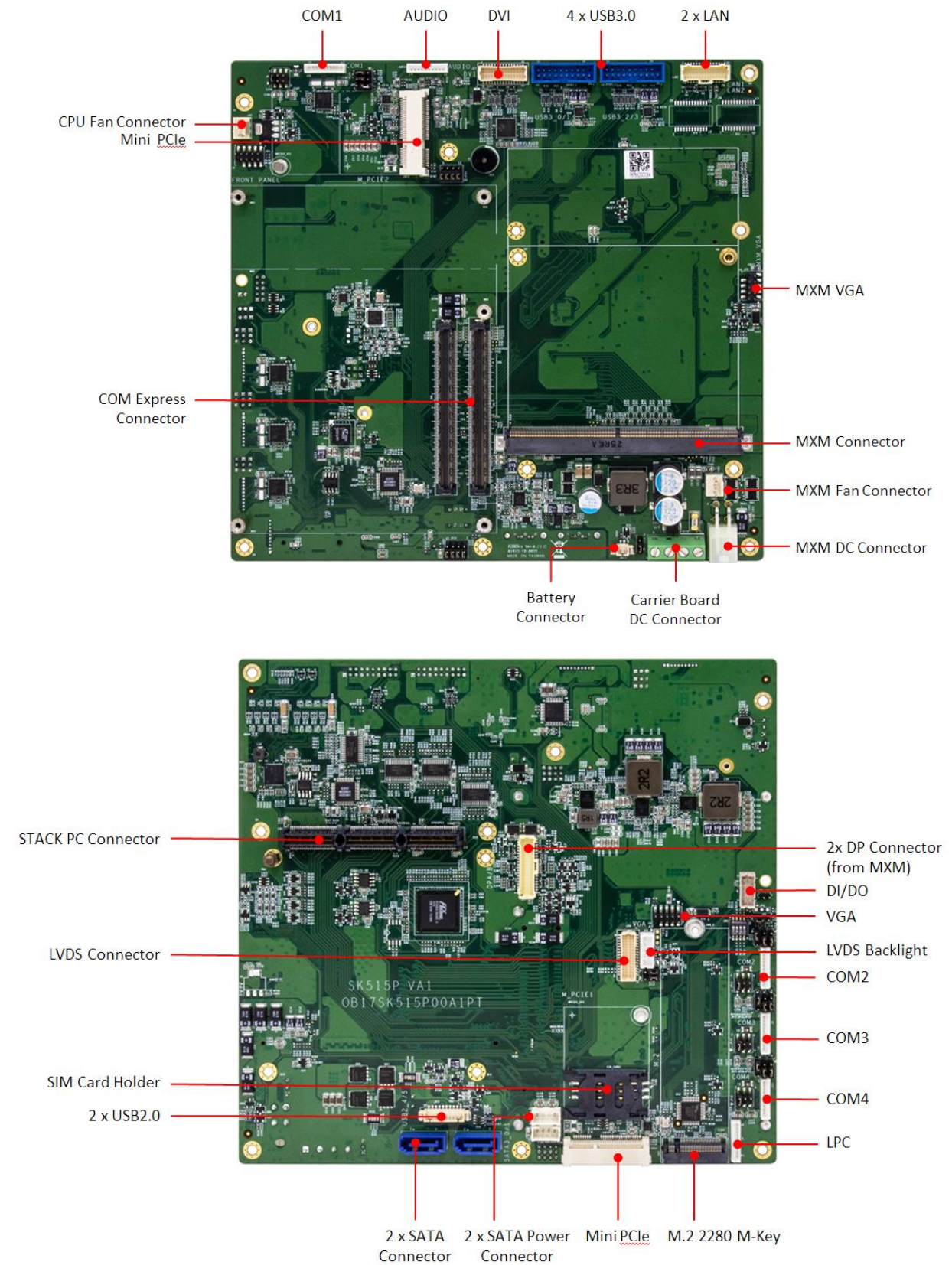
OS

OS Support	Windows®10 64bit, Linux(Support by request)
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1-2. Board Diagram



1-3. Connector & Pin Header



2. CHAPTER 2: JUMPERS AND CONNECTORS LOCATIONS

2.1. Connector & Pin Definitions

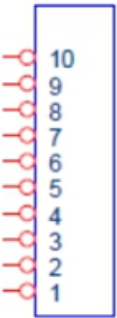
J26: COM1

Pin	RS232	RS422	RS485
1	5V	NC	NC
2	GND	GND	GND
3	COM P9	NC	NC
4	DTR-	RX-	NC
5	CTS-	NC	NC
6	TXD	RX+	NC
7	RTS-	NC	NC
8	RXD	TX+	Data+
9	DSR-	NC	NC
10	DCD-	TX-	Data-



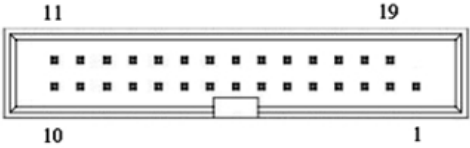
AUDIO

Pi	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		

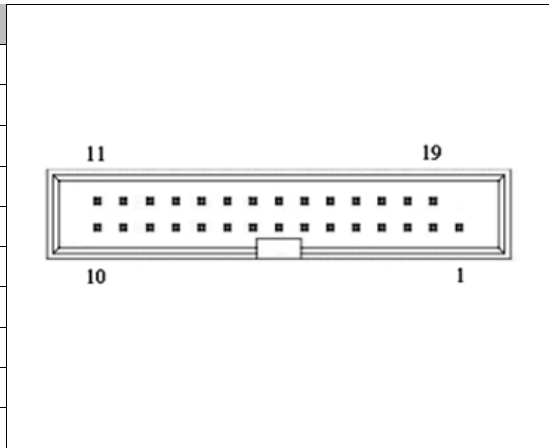


JUSB3_2: USB 3.0 Port

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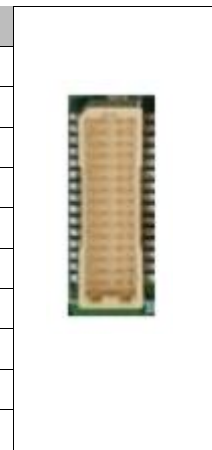
Revision Date: July.15.2023

Pin	Function	Pin	Function
1	+5V USB2	11	USB2 DP3
2	USB3 RXN2	12	USB2 DN3
3	USB3 RXP2	13	GND
4	GND	14	USB3 TXP3
5	USB3 TXN2	15	USB3 TXN3
6	USB3 TXP2	16	GND
7	GND	17	USB3 RXP3
8	USB2 DN2	18	USB3 RXN3
9	USB2 DP2	19	+5V USB3
10	N/C		



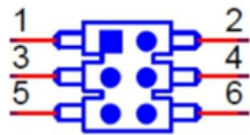
J27: DVI

Pin	Function	Pin	Function	Pin	Function
1	VCC5	11	TMDSD DATA1-	21	GND
2	GND	12	N/C	22	N/C
3	GND	13	TMDSD DATA1+	23	TMDSD CLK
4	TMDSD_SCL	14	N/C	24	N/C
5	TMDSD_DATA2-	15	GND	25	TMDSD_CLK+
6	TMDSD_SDA	16	N/C	26	N/C
7	TMDSD_DATA2+	17	TMDSD_DATA0-	27	GND
8	GND	18	N/C	28	N/C
9	GND	19	TMDSD_DATA0+	29	N/C
10	TMDSD_HPD	20	N/C	30	N/C



JP7: COM1 Pin9 select

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



JP8/ JP9: COM1 Mode select

JP8	JP9	Mode
(2-3)	(1-2)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

JP10: Enable COM1 RS-485/422 Receiver Termination

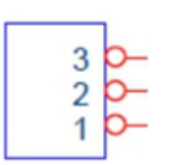
Pin	Function
(1-2) Closed	High
(2-3) Closed	Low

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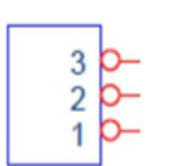
J22: CPU FAN Connector

Pin	Function
1	GND
2	CPUFANOUT
3	+12V



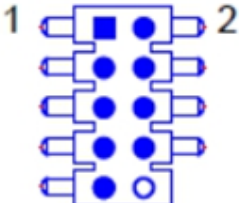
J25: MXM FAN connector

Pin	Function
1	GND
2	
3	+12V



J23: Front Panel

Pin	Function
1	HDLED+
2	PWLED+
3	HDLED-
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


CN15: M_PClE 2 (Mini PCIe Slot)




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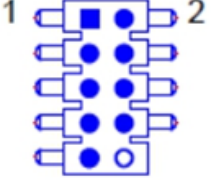
JP31: Mini PCIe 1 function select

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

JP32: M.2 function select

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

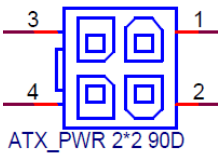
J20: MXM_VGA

Pin	Function	
1	MVGA VS	
2	MVGA SCL	
3	MVGA HS	
4	MVGA_SDA	
5	GND	
6	MVGA VCC	
7	MVGA R	
8	MVGA_B	
9	MVGA_G	

MXM1: MXM socket

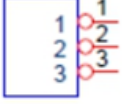


CN21: MXM DC-IN

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

ATX_PWR 2*2 90D

JP28: Clear CMOS

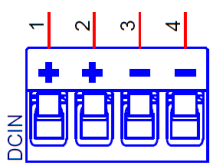
Pin	Function	
(1-2) Closed	Normal(default)	
(3-4) Closed	Clear CMOS	

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DC-IN: System DC-IN

Pin	Definition
1	12V
2	12V
3	GND
4	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: MXM_DP(A/B)

Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	GND	11	DPA TN1	21	DPA TP3	31	DPA AUXP CLK
2	GND	12	DPB TN1	22	DPB TP3	32	DPB AUXP CLK
3	DPA TP0	13	GND	23	DPA TN3	33	DPA AUXN DAT
4	DPB TP0	14	GND	24	DPB TN3	34	DPB AUXN DAT
5	DPA TN0	15	DPA TP2	25	GND	35	GND
6	DPB TN0	16	DPB TP2	26	GND	36	GND
7	GND	17	DPA TN2	27	DPA AUX SEL	37	DPA DET
8	GND	18	DPB TN2	28	DPB AUX SEL	38	DPB DET
9	DPA TP1	19	GND	29	GND	39	DPA PWR
10	DPB TP1	20	GND	30	GND	40	DPB 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




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SIM_CARD1

Pin	Function	Pin	Function
1	UIM_PWR	4	GND
2	UIM_RESET	5	UIM_VPP
3	UIM_CLK_R	6	UIM_DATA



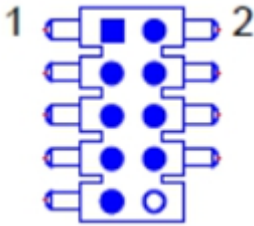
J15: USB2.0 (USB4/USB5)

Pin	Function	Pin	Function
1	5V_USB4	6	5V_USB5
2	USB2_DN4	7	USB2_DN5
3	USB2_DP4	8	USB2_DP5
4	GND	9	GND
5	GND	10	GND



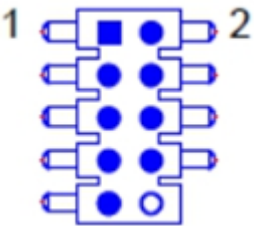
J8: VGA

Pin	Function
1	VGA VS
2	VGA_SCL
3	VGA_HS
4	VGA_SDA
5	GND
6	VGA_VCC
7	VGA_R
8	VGA_B
9	VGA_G



J9: DIO

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




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J11: LVDS Backlight

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



JP23: LVDS Backlight Power select


Pin	Function
(1-2) Closed	5V
(2-3) Closed	12V

JP24: LVDS Signal Power select

Pin	Function
(1-2) Closed	5V
(2-3) Closed	3.3V

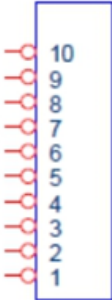
J4: LPC

Pin	Function
1	GND
2	GND
3	3V3
4	LPC_ADO
5	LPC_AD1
6	LPC_AD2
7	LPC_AD3
8	LPC_FRAME-
9	LPC_RST#
10	CLK_DBG



J5: COM2 / J6: COM3 / J13: COM4

Pin	RS232	RS422	RS485
1	5V	NC	NC
2	GND	GND	GND
3	COM_P9	NC	NC
4	DTR-	RX-	NC
5	CTS-	NC	NC
6	TXD	RX+	NC
7	RTS-	NC	NC
8	RXD	TX+	Data+
9	DSR-	NC	NC
10	DCD-	TX-	Data-



JP12, JP13: COM2 Mode select

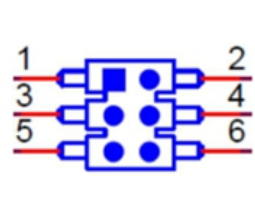
JP12	JP13	Model
(2-3)	(1-2)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

JP14: Enable COM2 RS-485/422 Receiver Termination

Pin	Function
(1-2) Closed	High
(2-3) Closed	Low

JP11: COM2 Pin9 select

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



JP16, JP17: COM3 Mode select

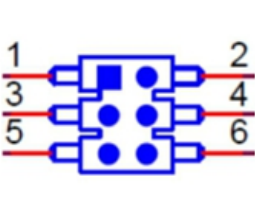
JP16	JP17	Model
(2-3)	(1-2)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

JP18: Enable COM3 RS-485/422 Receiver Termination

Pin	Function
(1-2) Closed	High
(2-3) Closed	Low

JP15: COM3 Pin9 select

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



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JP20, JP21: COM4 Mode select

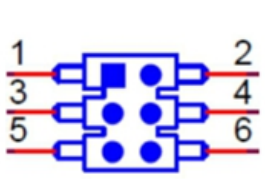
JP20	JP21	Model
(2-3)	(1-2)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

JP22: Enable COM4 RS-485/422 Receiver Termination

Pin	Function
(1-2) Closed	High
(2-3) Closed	Low

JP19: COM4 Pin9 select

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




CN26, CN27: SATA

Pin	Function
1	GND
2	SATA TP
3	SATA TN
4	GND
5	SATA RN
6	SATA RP
7	GND



J2, J3: SATA Power

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



CN14: M_PClE 1 (Mini PCIe Slot)



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CN3: M.2 (2280 M-key, SATA/ PCIe x1)



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

