



# SK515

COM Express® Type 6 Carrier Board w/PCIe 104



**User's Manual**  
Revision Date: Nov 24 2022

## 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 product specifications are subject to change without prior notice.

## Revision History

Revision	Date (yyyy/mm/dd)	Changes
V1.0	2019.11.01	Initial Release
V1.1	2022.03.04	Add Standard Compliance · OS
V1.2	2022.03.15	1.Modify COM ExpressCPU Options(Type 6/7) 2.Modify GPU Module Options
V1.3	2022.11.24	Modify RS485 Pin define
V1.4	2023.09.05	Update COMe module list – Add 13 <sup>th</sup> Raptor lake , remove 6/7 <sup>th</sup> Sky/Kaby lake Remove COMe Type 7

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## Chapter 1: Product Information

### 1.1 Key Features

System	
COM Express CPU Options(Type 6)	<p>Intel® Core™ i7-13800HRE 45W Raptor Lake 13th Gen, 14C , Freq. 2.5 /5.0 GHz, 24MB cache</p> <p>Intel® Core™ i7-13800HE 45W Raptor Lake 13th Gen, 14C , Freq. 2.5 /5.0 GHz, 24MB cache</p> <p>Intel® Core™ i7-11850HE 45W Tiger Lake 11th Gen, 8C , Freq. 2.6 /4.7 GHz, 24MB cache</p> <p>Intel® Xeon® W-11865MLE 45W Coffee Lake 11th Gen, 8C , Freq. 1.5 /4.5 GHz, 12MB cache</p> <p>Intel® Xeon® E-2276ME 45W Coffee Lake 9th Gen, 6C , Freq. 2.8 /4.5 GHz, 12MB cache</p> <p>Intel® Xeon® E-2276ML 25W Coffee Lake 9th Gen, 6C , Freq. 2.0 / 4.2 GHz, 12MB cache</p> <p>Intel® Core™ i7-9850HE 45W Coffee Lake 9th Gen, 6C, Freq. 2.7 / 4.4 GHz, 9MB cache</p> <p>Intel® Core™ i7-9850HL 25W Coffee Lake 9th Gen, 6C, Freq. 1.9 / 4.1 GHz, 9MB cache</p>
GPU Module Options	<p>NVIDIA® GeForce™ GTX 1660S, 95W, 6GB GDDR6, 1,048 CUDA Cores</p> <p>NVIDIA® GeForce™ RTX 2060S, 175W, 8GB GDDR6, 2,176 CUDA Cores</p> <p>NVIDIA® Ampere RTX A2000, 80W, 8GB GDDR6, 2,560 CUDA Cores</p> <p>NVIDIA® Ampere RTX A4500, 80W/130W, 16GB GDDR6, 5,888 CUDA Cores</p>
COM Express Compatibility	COM Express® Type 6
Expansion	
MiniPCIe Expansion	2 x Full-size Mini PCIe (1 with mSATA supported)
M.2 Expansion	1 x 2280 M-key (SATA only)
PCIe/104 Expansion	4 x PCIe x 1 、 1 x PCIe x 4 、 5 x USB 2.0 、 1 x LPC 、 1 x SPI
SATAIII	2 x SATAIII
Display	
Display Port	<p>4 x Display Port outputs from GPU(Port A/B/C/D)</p> <p>2 x Display Port outputs from GPU(Port E/F)(By option)</p>

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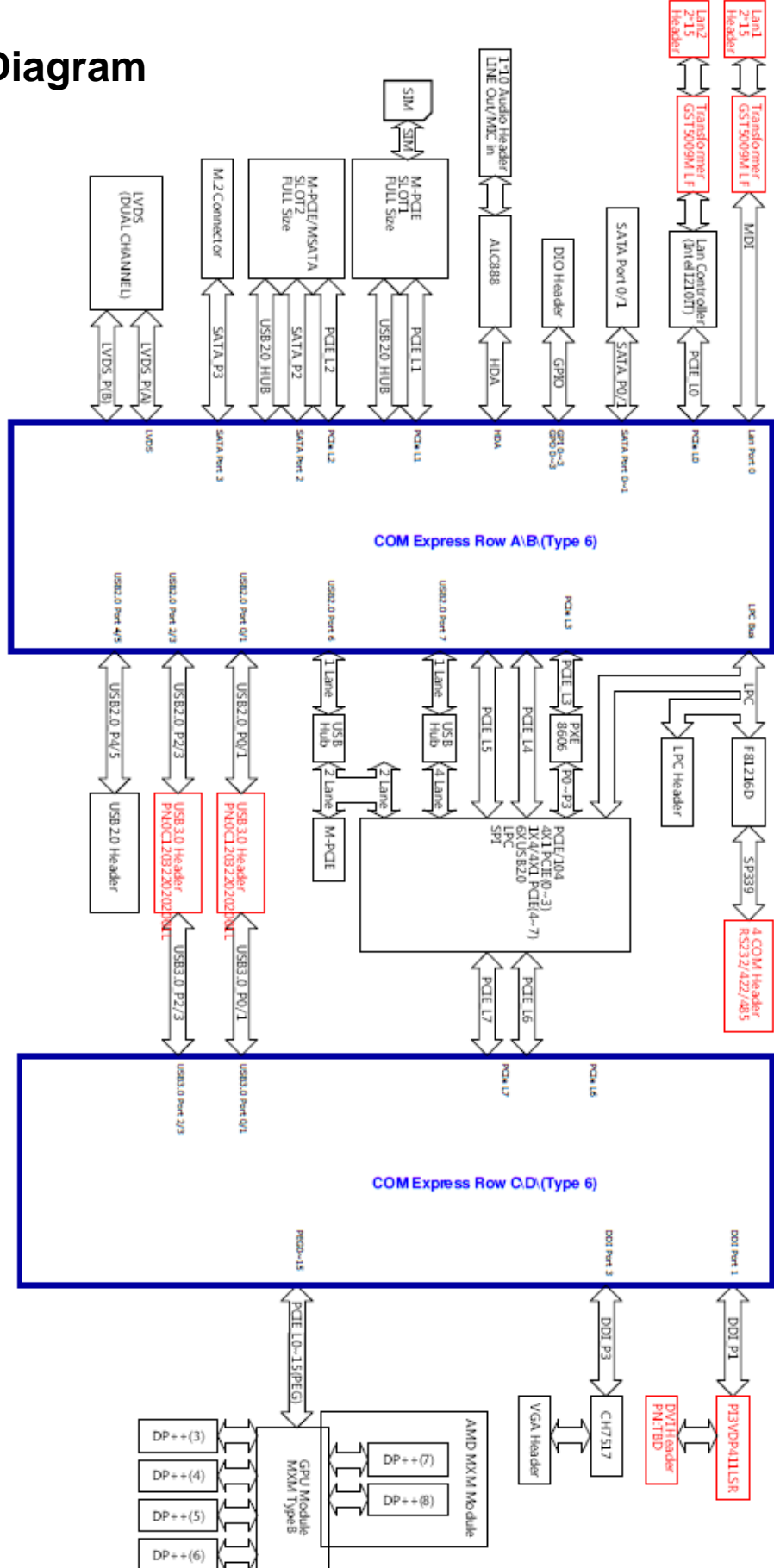
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VGA	1 x output from COM Express®, 1 x output from GPU
LVDS	1 x dual channel 18/24bit LVDS
DVI	1
<b>Ethernet</b>	
Gigabit Ethernet	2 x 10/100/1000 Ethernet Ports
<b>I/O</b>	
USB	4 x USB 3.0, 2 x USB 2.0
COM Port	4 x RS232/422/485
Audio	1 x Line-out, 1 x Mic-in
SATA Power	2 x SATA Power
DI/DO	1 x DI/DO (4 in / 4 out)
CPU FAN	1 x CPU FAN
MXM FAN	1 x MXM FAN
Battery	1 x Battery Header
<b>Power System</b>	
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
<b>Mechanical and Environment</b>	
Dimension	190mm x 185mm
Operating Temp.	-40 to 85°C
Storage Temp	-40 to 85°C
Relative Humidity	10% to 90%, non-condensing
<b>Standard Compliance</b>	
Standard Compliance	CE/FCC
<b>OS</b>	
OS Support	Windows®10 64bit , Linux(Support by request)

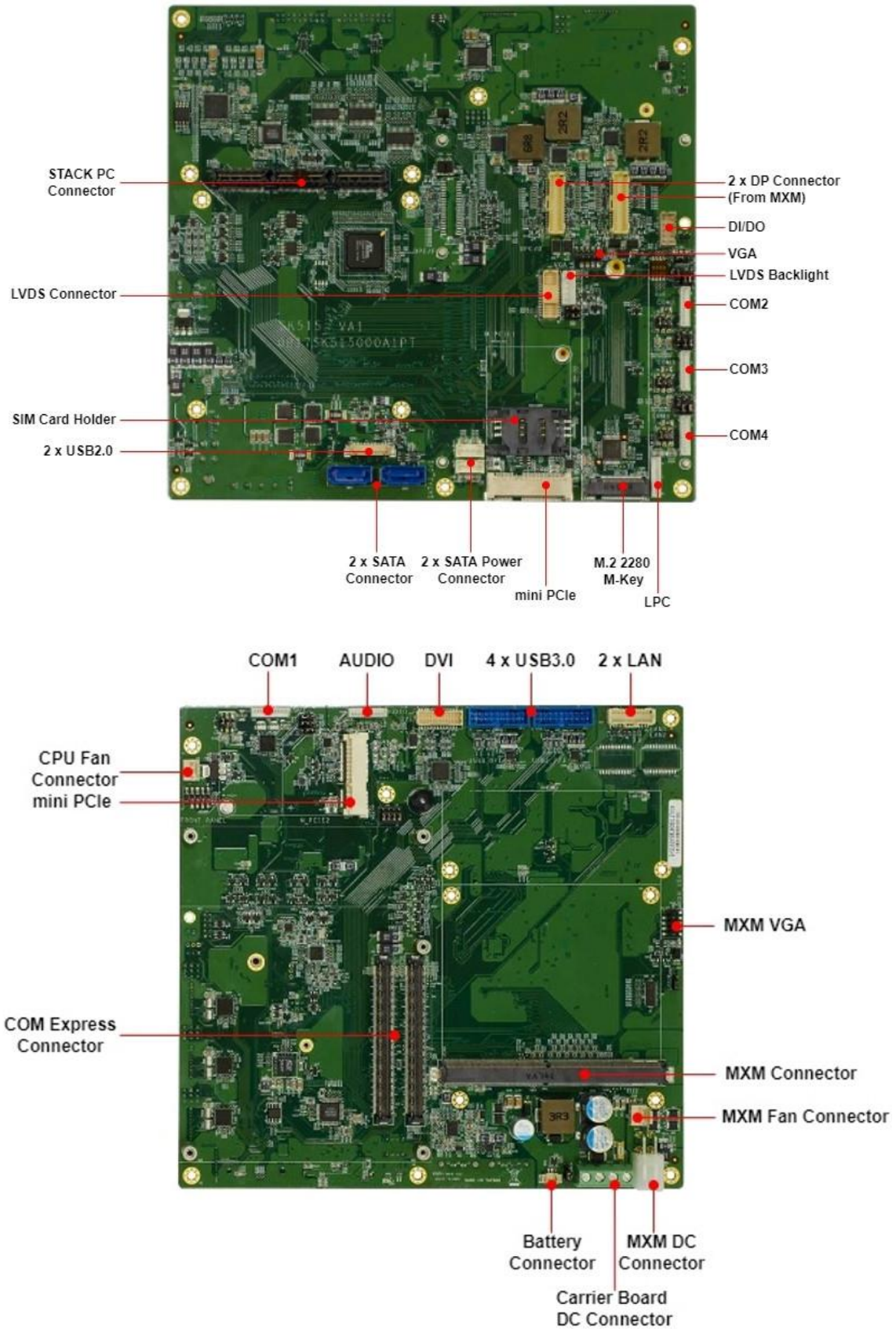
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## 1.2 Board Diagram



## 1.3 Connector & Pin Header




## Chapter 2: Jumpers and Connectors

### 2.1 Connector & Pin Definitions

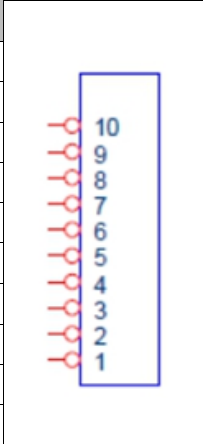
#### J26: COM1

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-



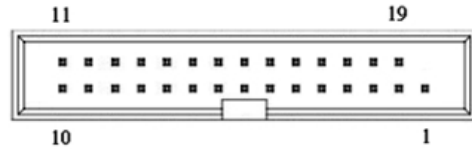
#### AUDIO

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



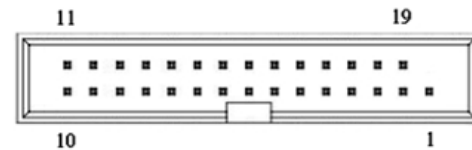
## JUSB3\_1: USB 3.0 Port

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		



## JUSB3\_2: USB 3.0 Port

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_HPDP	20	N/C	30	N/C

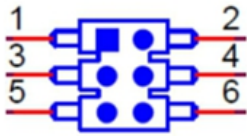


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## JP7: COM1 Pin9 select

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

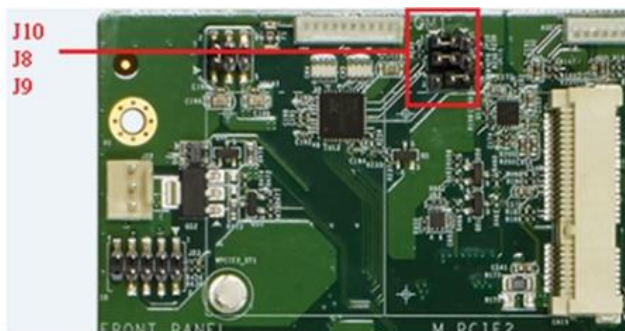


## JP8, JP9: COM1 Mode select

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

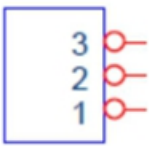
## JP10: Enable COM1 RS-485/422 Receiver Termination

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



## J22: CPU FAN Connector

Pin	Function
1	GND
2	CPUFANOUT
3	+12V

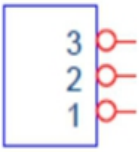


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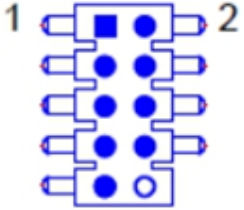
## J25: MXM FAN connector

Pin	Function
1	GND
2	
3	+12V



## J23: Front Panel

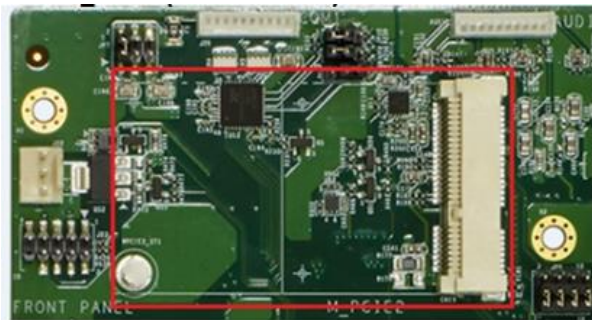
Pin	Function
1	HDLED+
2	PWLED+
3	HDLED-
4	GND
5	GND
6	PWRBTN#
7	RESET
8	GND
9	NC




## CN1,CN2: COM Express Connector

Support COM Express Basic Size Type 6 Module

## CN15: M\_PcIe 2 (Mini PCIe Slot)



## JP6: Mini PCIe 1 function select

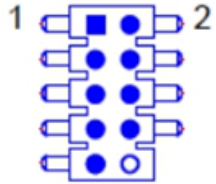
PCIe x 1	SATA	
(1-2) Closed	(2-3) Closed	

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## 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



## JP30: MXM Type select

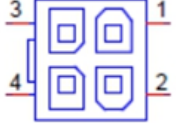
Pin	Function
(1-2) Closed	MXM v3.0
(2-3) Closed	MXM v3.1

## MXM1: MXM socket



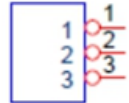
## CN21: MXM DC-IN

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




## JP28: Clear CMOS

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



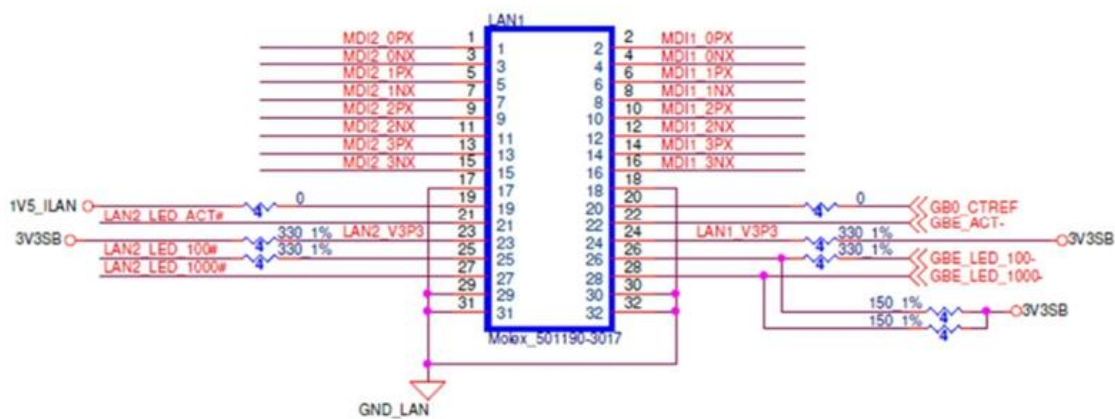
## DC-IN: System DC-IN

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



## LAN1: 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-		



## J18: MXM\_DP(C/D)


Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	GND	11	DPC_TN1	21	DPC_TP3	31	DPC_AUXP_CLK
2	GND	12	DPD_TN1	22	DPD_TP3	32	DPD_AUXP_CLK
3	DPC_TP0	13	GND	23	DPC_TN3	33	DPC_AUXN_DAT
4	DPD_TP0	14	GND	24	DPD_TN3	34	DPD_AUXN_DAT
5	DPC_TN0	15	DPC_TP2	25	GND	35	GND
6	DPD_TN0	16	DPD_TP2	26	GND	36	GND
7	GND	17	DPC_TN2	27	DPC_AUX_SEL	37	DPC_DET
8	GND	18	DPD_TN2	28	DPD_AUX_SEL	38	DPD_DET
9	DPC_TP1	19	GND	29	GND	39	DPC_PWR
10	DPD_TP1	20	GND	30	GND	40	DPD_PWR






## 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




## SIM\_CARD1

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



## JUSB2: 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

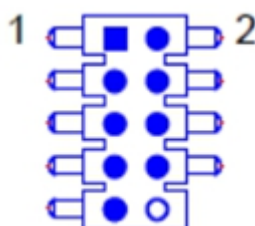


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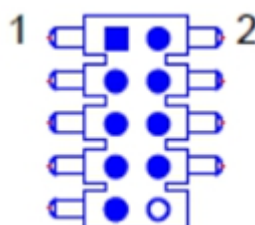
## J8: VGA

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



## J11: LVDS Backlight

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



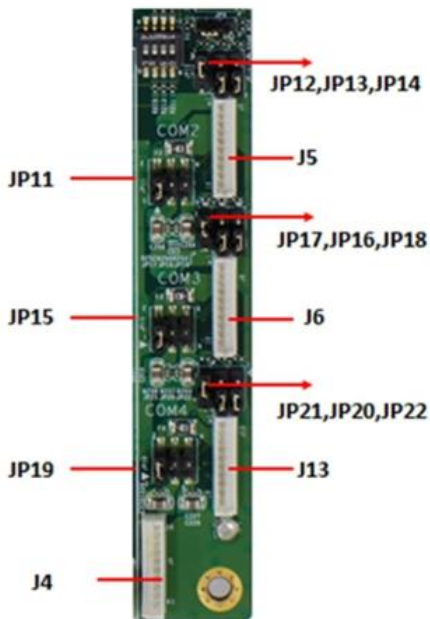
## JP23: LVDS Backlight Power select

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

## JP24: LVDS Signal Power select

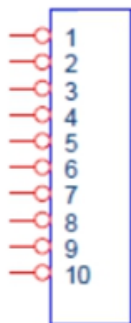
Pin	Function
(1-2) Closed	5V
(2-3) Closed	3.3V

## No31: LPC/COM2/3/4



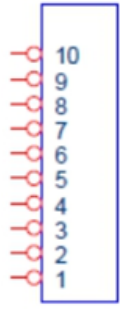
## J4: LPC

Pin	Function
1	GND
2	GND
3	3V3
4	LPC_AD0
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

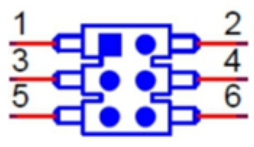
JP8	JP9	Model
(2-3)	(2-3)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

## 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

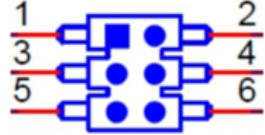
JP8	JP9	Model
(2-3)	(2-3)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

## 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



## JP20, JP21: COM4 Mode select

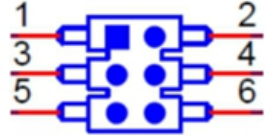
JP8	JP9	Model
(2-3)	(2-3)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

## 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




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## 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)



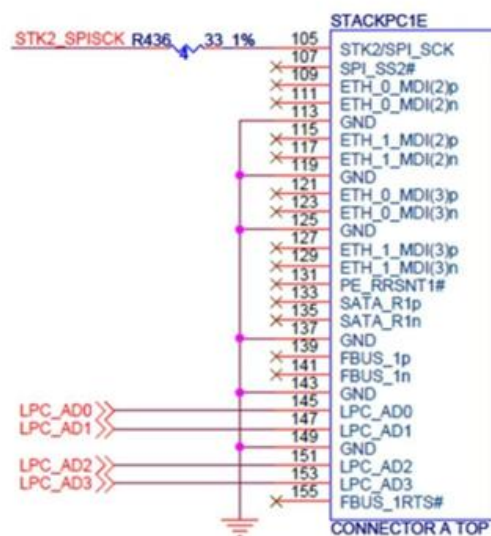
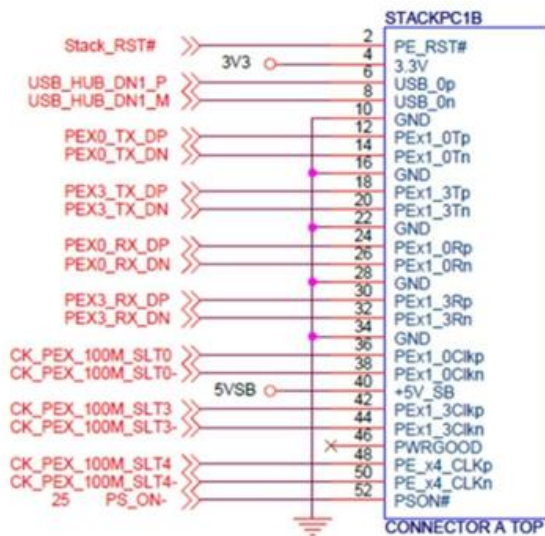
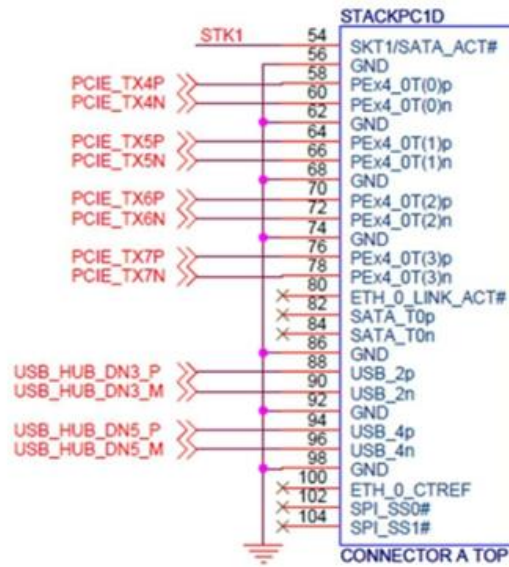
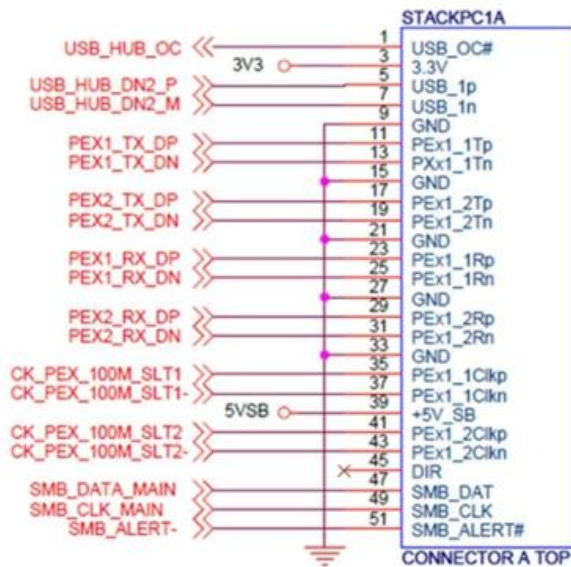
## CN3: M.2 (2280 M-key, SATA only)



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## CN36: Stack PC1



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