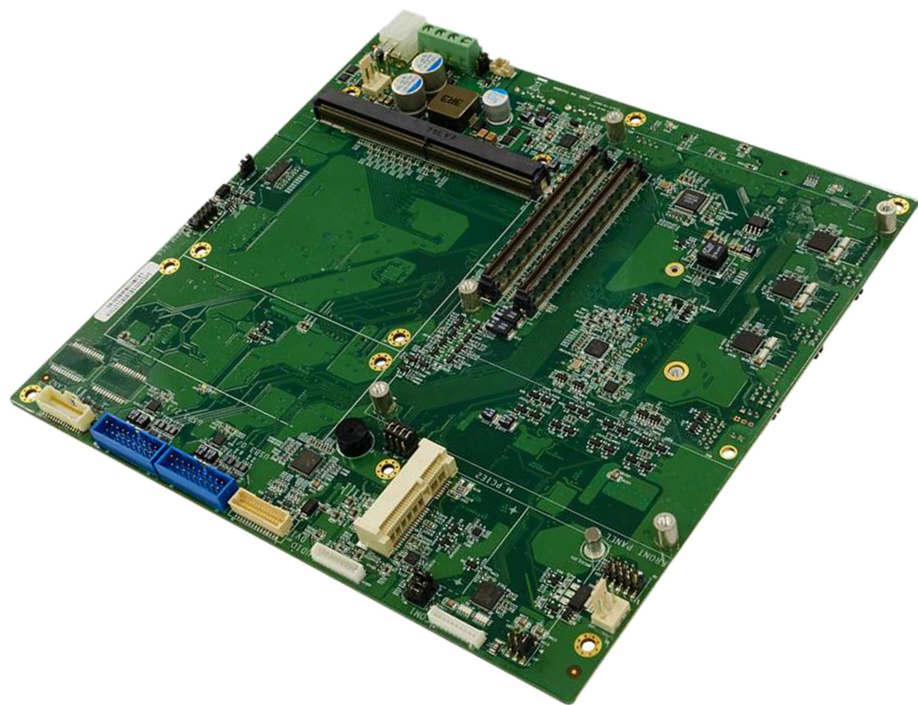




SK515

COM Express® Type 6 Carrier Board w/PCIe 104



User's Manual

Revision Date: March 15 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 trademarks are the properties of the respective owners.
- 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

Table of Contents

Safety Information	1
Electrical safety.....	1
Operation safety.....	1
Statement.....	1
Revision History.....	2
Packing list.....	2
Ordering Information	2
Chapter 1: Product Information.....	6
1.1 Key Features	6
1.2 Block Diagram	9
1.3 Connector & Pin Header	10
Chapter 2: Jumpers and Connectors.....	11
2.1 Connector & Pin Definitions	11
J26:COM1	11
AUDIO.....	11
JUSB3_1:USB 3.0 Port	12
JUSB3_2:USB 3.0 Port.....	12
J27:DVI	12
JP7:COM1 Pin9 Select	13
JP8,JP9:COM1 Mode Select.....	13
JP10:Enable COM1 RS-485/422 Receiver Termination	13
J22:CPU FAN Connector	13
J25:MXM FAN Connector.....	14
J23:Front Panel.....	14

CN1,CN2:COM Express Connector.....	14
CN15: M_PCl e2 (Mini PCl e Slot).....	14
JP6:Mini PCl e 1 Function Select.....	14
J20:MXM_VGA.....	15
JP30:MXM Type Select.....	15
MXM1:MXM Socket.....	15
CN21:MXM DC-IN.....	15
JP28:Clear CMOS.....	15
DC-IN:System DC-IN.....	15
LAN1: LAN1/LAN2.....	16
J18: MXM_DP(C/D).....	16
J17: MXM_DP(A/B).....	17
J10:LVDS.....	17
SIM_CARD1.....	17
JUSB2: USB2.0(USB4/USB5).....	17
J8:VGA.....	18
J9:DIO.....	18
J11:LVDS Backlight.....	18
JP23:LVDS Backlight Power Select.....	18
J24:LVDS Signal Power Select.....	19
No31: LPC/COM2/3/4.....	19
J4:LPC.....	19
J5: COM2 / J6: COM3 / J13: COM4.....	20
JP12, JP13:COM2 Mode Select.....	20
JP14:Enable COM2 RS-485/422 Receiver Termination.....	20
JP11:COM2 Pin9 Select.....	20

JP16,JP17:COM3 Mode Select..... 20

JP18:Enable COM3 RS-485/422 Receiver Termination..... 21

JP15:COM3 Pin9 Select.... 21

JP20,JP21:COM4 Mode Select..... 21

JP22:Enable COM4 RS-485/422 Receiver Termination..... 21

JP19:COM4 Pin9 Select.... 21

CN26,CN27:SATA..... 22

J2, J3:SATA Power..... 22

CN14: M_PCl e1(Mini PCl e Slot)..... 22

CN3: M.2(2280 M-key, SATA Only).... 22

CN36:Stack PC1.... 23

Chapter 1: Product Information

1.1 Key Features

System	
COM Express CPU Options(Type 6)	Intel® Core™ i7-12800HE 45W Alder Lake 12th Gen, 14C , Freq. 3.5 /4.6 GHz, 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 Intel® Xeon® E-2276ME 45W Coffee Lake 9th Gen, 6C , Freq. 2.8 /4.5 GHz, 12MB cache 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 CPU Options(Type 7)	Intel®Xeon®-D1577 45W Broadwell-DE, 16C, Freq. 1.3 / 2.1 GHz, 24MB cache Intel®Xeon®-D1559 45W Broadwell-DE, 16C, Freq. 1.5 / 2.1 GHz, 18MB cache (eTEMP)
GPU Module Options	NVIDIA® GeForce™ GTX 1050Ti, 60W, 4GB GDDR5, 768 CUDA Cores NVIDIA® GeForce™ RTX 2060S, 175W, 8GB GDDR6, 2176 CUDA Cores NVIDIA® Quadro™ RTX 5000, 150W, 16GB GDDR6, 3072 CUDA Cores NVIDIA® Quadro™ RTX 3000, 80W, 6GB GDDR6,1920 CUDA Cores
COM Express Compatibility	COM Express® Type 6/7
Expansion	
MiniPCle Expansion	2 x Full-size Mini PCle (1 with mSATA supported)
M.2 Expansion	1 x 2280 M-key (SATA only)

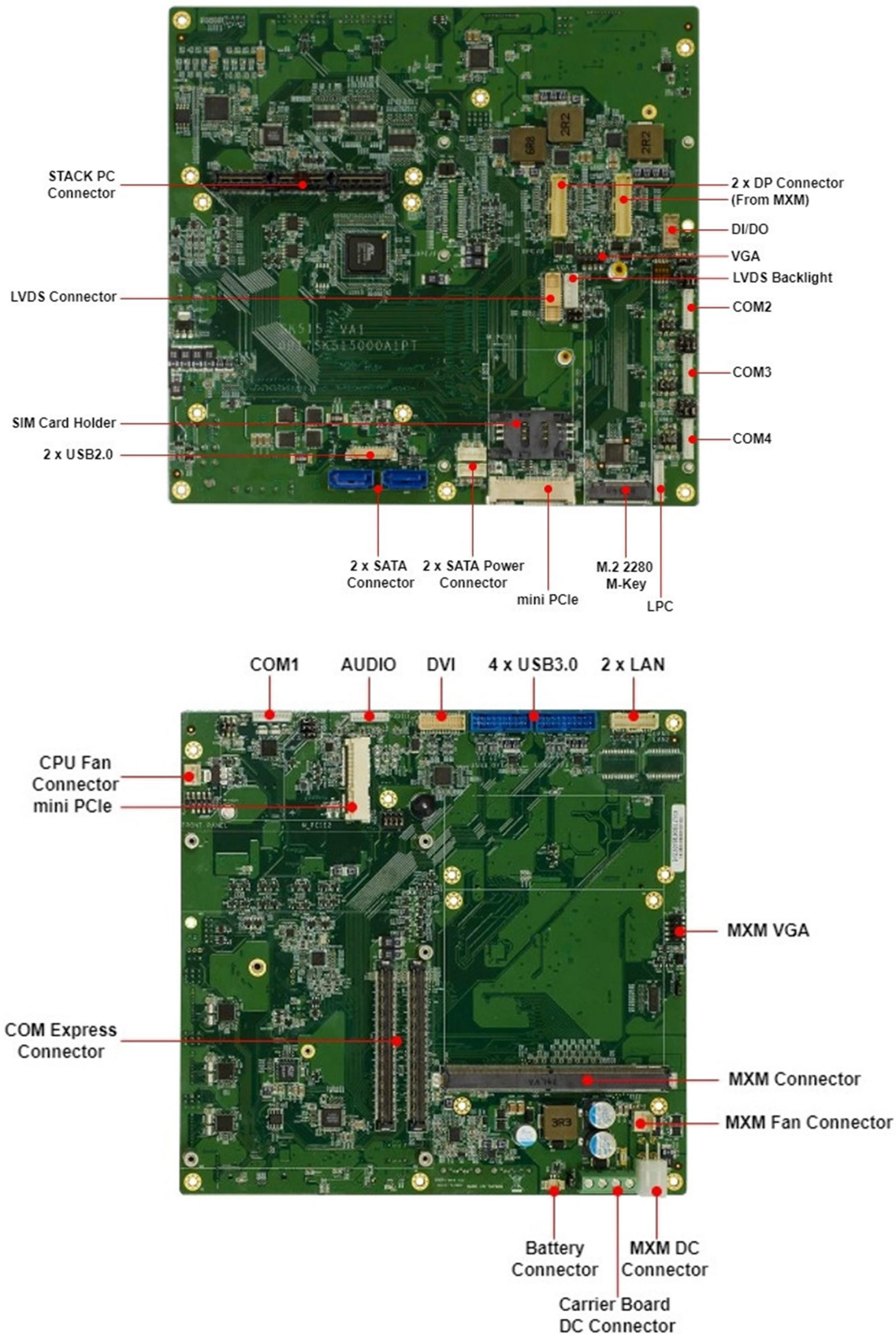
SK515 User's Manual

Revision Date: March 15 2022

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	4 x Display Port outputs from GPU(Port A/B/C/D) 2 x Display Port outputs from GPU(Port E/F)(By option)
VGA	1 x output from COM Express®, 1 x output from GPU
LVDS	1 x dual channel 18/24bit LVDS
DVI	1
Ethernet	
Gigabit Ethernet	2 x 10/100/1000 Ethernet Ports
I/O	
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
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 Environment	
Dimension	190mm x 185mm
Operating Temp.	-40 to 85°C
Storage Temp	-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.**

1.3 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-	Data-
5	CTS-	NC	NC
6	TXD	RX+	Data+
7	RTS-	NC	NC
8	RXD	TX+	NC
9	DSR-	NC	NC
10	DCD-	TX-	NC



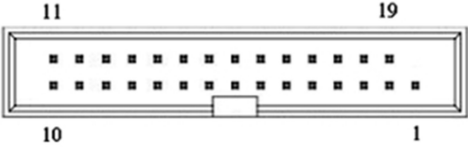
AUDIO

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



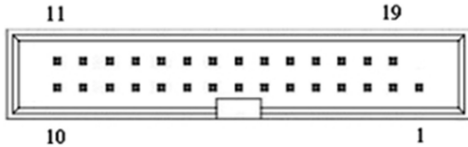
JUSB3_1: USB 3.0 Port

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



JP7: COM1 Pin9 select

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

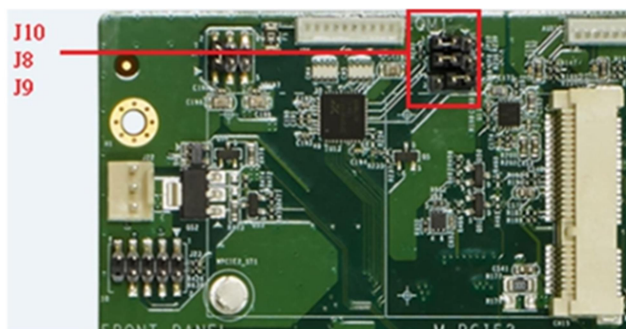


JP8, JP9: COM1 Mode select

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

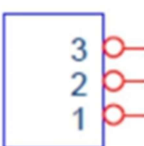
JP10: Enable COM1 RS-485/422 Receiver Termination

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



J22: CPU FAN Connector

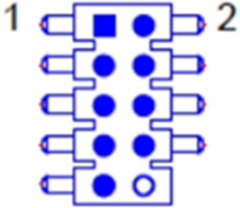
Pin	Function
1	GND
2	CPUFANOUT
3	+12V



J25: MXM FAN connector

Pin	Function	
1	GND	
2		
3	+12V	

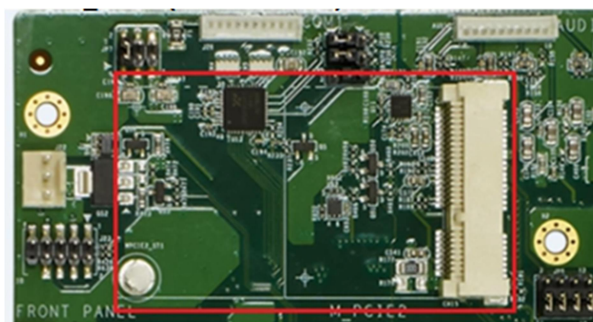
J23: Front Panel

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)

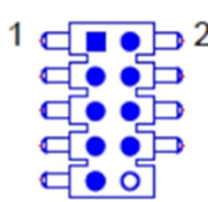


JP6: Mini PCIe 1 function select

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

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

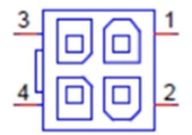
Pin	Function
(1-2) Closed	MXM v3.0
(2-3) Closed	MXM v3.1

MXM1: MXM socket



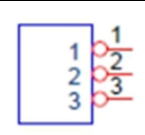
CN21: MXM DC-IN

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



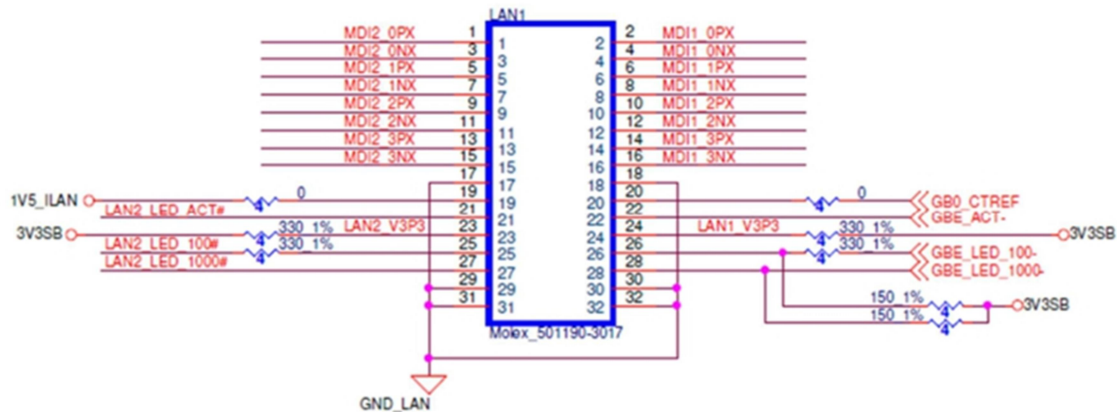
DC-IN: System DC-IN

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



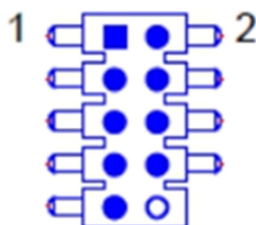
JUSB2: USB2.0 (USB4/USB5)

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



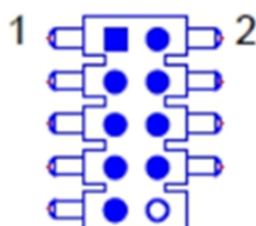
J8: VGA

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



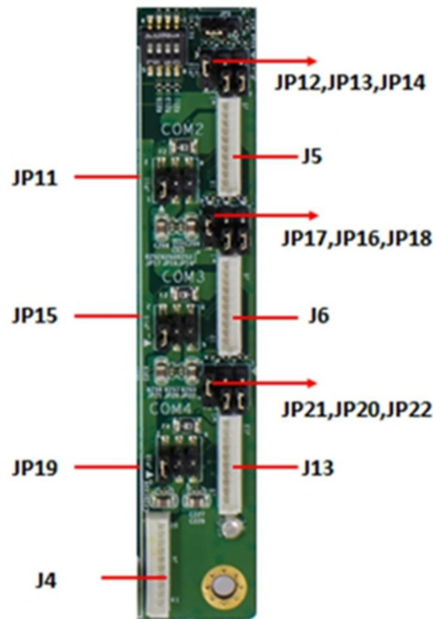
JP23: LVDS Backlight Power select

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-	Data-
5	CTS-	NC	NC
6	TXD	RX+	Data+
7	RTS-	NC	NC
8	RXD	TX+	NC
9	DSR-	NC	NC
10	DCD-	TX-	NC



JP12, JP13: COM2 Mode select

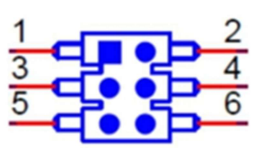
JP8	JP9	Model
(2-3)	(2-3)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

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

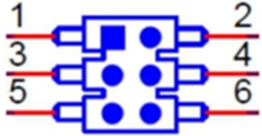
JP8	JP9	Model
(2-3)	(2-3)	RS232
(1-2)	(2-3)	RS485 Half Duplex
(1-2)	(1-2)	RS485/422 Full Duplex

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



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_PCl_e 1 (Mini PCIe Slot)



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



CN36: Stack PC1

