

**Mini-ITX SBC Supports 11<sup>th</sup> Gen Intel® Core™ i7/i5/i3 or Celeron® Processor (Tiger Lake-UP3 Mobile), 9V~36V DC Input, Quadruple Independent Display, HDMI, DP, iDPM, SATA 6Gb/s, Dual Intel® 2.5GbE, USB 3.2 Gen 2, M.2 and RoHS**

# **KINO-TGL-U**

## **Quick Installation Guide**

**Version 1.0**

July 12, 2022

### **Package List**

KINO-TGL-U package includes the following items:

- 1 x KINO-TGL-U single board computer with CPU cooler
- 1 x SATA cable
- 1 x I/O shielding
- 1 x QIG



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## Specifications

- CPU:
  - 11<sup>th</sup> Gen. Intel® mobile Tiger Lake-UP3 on-board processor:
    - Intel® Core™ i7-1185G7E (up to 4.4GHz, quad-core, 12M cache, TDP=28/15/12W)
    - Intel® Core™ i5-1145G7E (up to 4.1GHz, quad-core, 8M cache, TDP=28/15/12W)
    - Intel® Core™ i3-1115G4E (up to 3.9GHz, dual-core, 6M cache, TDP=28/15/12W)
    - Intel® Celeron® 6305E (up to 1.8GHz, dual-core, 4M cache, TDP=15W)
- Memory:
  - Two 260-pin 3200 MHz DDR4 SDRAM SO-DIMM slots supporting up to 64 GB memory
- BIOS:
  - AMI UEFI BIOS
- Graphics Engine:
  - Intel® HD Graphics Gen 12 Gfx; up to 96EU; 2VDbox; AI (INT8), HDMI 2.0 integrated, 4 display pipes, 8k60210b; AV1 codec, 12b support, E2E compression, IPU6 FF
- Display Outputs:
  - Three 4K independent display
  - 1 x HDMI 2.0b (up to 4096 x 2160 @ 30 Hz)
  - 1 x DP 1.4a (up to 4096 x 2160 @ 60 Hz)
  - 1 x iDPM 3040 slot (only for IEI eDP/LVDS/VGA module)
- Ethernet:
  - LAN1: Intel® I225V 2.5GbE controller
  - LAN2: Intel® I225V 2.5GbE controller
- External I/O Interface:
  - 4 x USB 3.2 Gen 2 (10Gb/s) (Type-A)
- Internal I/O Interface:
  - 2 x USB 2.0 (2x4 pin, p=2.0)
  - 5 x RS-232 (2x5 pin, p=2.0)

1 x RS-422/485 (1x4 pin, p=2.0) (support Auto Flow Control over RS-485)

2 x SATA 6Gb/s

- Audio:  
1 x iAUDIO connector supporting IEI AC-KIT-888S audio module (2x5 pin, p=2.0)
- Front Panel:  
1 x Front panel (2x7 pin, p=2.54; power LED, HDD LED, speaker, power button, reset button)
- LAN LED:  
2 x LAN LED (1x2 pin, p=2.0)
- Expansions:  
1 x PCIe x8 slot (x4 signal, open-ended slot)  
1 x M.2 2242/2280 M-key (PCIe x2)  
1 x M.2 2230 A-key (PCIe x1 & USB 2.0)
- Digital I/O:  
1 x 12-bit digital I/O (2x7 pin, p=2.0)
- TPM  
Intel® PTT (TPM 2.0)
- SMBus:  
1 x SMBus (1x4 pin, p=1.25)
- I<sup>2</sup>C:  
1 x I<sup>2</sup>C (1x4 pin, p=1.25)
- Fan Connector:  
1 x CPU fan connector (1x4 pin)  
1 x System fan connector (1x4 pin)
- Power Supply:  
9V – 36V DC power input  
1 x Internal power connector (2x2 pin)  
1 x External DC jack (Ø5.5 mm)  
Support AT/ATX mode  
ErP/EuP compliant

- Power Consumption:  
9V@9.19A, 12V@7.768A, 28V@3.119A, 36V@2.459A  
(Intel® Core™ i7-1185G7E CPU with one 8 GB 2933 MHz DDR4 SO-DIMM)
- Watchdog Timer:  
Software programmable support 1–255 sec. system reset
- Operation Temperature: 0°C – 60°C
- Storage Temperature: -30°C – 70°C
- Operation Humidity: 5% – 95%, non-condensing
- Dimensions: 170 mm x 170 mm
- Weight: GW:900 g / NW:400 g
- Safety: CE/FCC compliant

All the drivers and utility for the KINO-TGL-U are available on IEI Resource Download Center. Type KINO-TGL-U and press Enter to find all the relevant software, utilities, and documentation. To install software from the downloaded ISO file, mount the file as a virtual drive to view its content.

IEI Resource Download Center

<https://download.ieiworld.com>



## Ordering Information

- **KINO-TGL-U-i7-R10:**  
Mini-ITX SBC supports 11th Gen Intel® Core™ i7-1185G7E processor, DDR4 SO-DIMM, 9V~36V DC input, quad display, SATA, dual Intel® 2.5GbE, USB 3.2, M.2, and RoHS
- **KINO-TGL-U-i5-R10:**  
Mini-ITX SBC supports 11th Gen Intel® Core™ i5-1145G7E processor, DDR4 SO-DIMM, 9V~36V DC input, quad display, SATA, dual Intel® 2.5GbE, USB 3.2, M.2, and RoHS
- **KINO-TGL-U-i3-R10:**  
Mini-ITX SBC supports 11th Gen Intel® Core™ i3-1115G4E processor, DDR4 SO-DIMM, 9V~36V DC input, quad display, SATA, dual Intel® 2.5GbE, USB 3.2, M.2, and RoHS
- **KINO-TGL-U-C-R10:**  
Mini-ITX SBC supports Intel® Celeron® 6305 processor, DDR4 SO-DIMM, 9V~36V DC input, quad display, SATA, dual Intel® 2.5GbE, USB 3.2, M.2, and RoHS
- **AC-KIT-888S-R10:**  
Realtek ALC888S 7.1 Channel HD Audio peripheral board, RoHS
- **32001-008600-200-RS:**  
Dual-port USB cable, 210mm, p=2.0
- **32102-000100-200-RS:**  
SATA power cable, MOLEX 8981-4M to SATA15P, 150mm
- **32205-002700-200-RS:**  
RS-232/422/485 cable, 200mm, p=2.0

## Jumpers Setting and Connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX power mode setting
J_CMOS1	Clear CMOS jumper
ME_FLASH1	Flash descriptor security override jumper
BAT1	RTC battery connector
IAUDIO	Internal audio connector for IEI audio module
IDPM	iDPM slot (for IEI eDP/LVDS/VGA module)
DIMM1, DIMM2	DDR4 SO-DIMM slots
CN1	Internal power input connector
DIO1	Digital I/O connector
DEBUG_SPI1	EC debug connector
CPU/FAN1, SYS/FAN1	Fan connectors
F_PANEL1	Front panel connector
J12C1	I <sup>2</sup> C connector
JP1	LAN1 link LED connector
JP2	LAN2 link LED connector
COM1, COM2, COM3, COM4, COM5	RS-232 serial port connectors
COM6	RS-422/485 serial port connector
SATA1, SATA2	SATA 6Gb/s connectors
SATA_PWR1, SATA_PWR2	SATA power connectors
JSMB1	SMBus connector
JBIOS1	Flash SPI ROM connector
JEC2	Flash EC ROM connector
USB2_CN1	Internal USB 2.0 connector
M2_AE1	M.2 A-key slot
M2_M1	M.2 M-key slot
PCIE1	PCIe x8 slot (x4 signal)
PWR_SW1	Onboard power button
PWR1	External power jack
LAN1, LAN2	External 2.5GbE RJ-45 connectors
USB_CON1, USB_CON2	External dual USB 3.2 Gen 2 connectors
HDMI1	External HDMI connector

DP1	External DisplayPort connector
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<b>J_ATX_AT1: AT/ATX Power Mode Setting</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short 1 - 2	ATX Power Mode (default)
Short 2 - 3	AT Power Mode

<b>J_CMOS1: Clear CMOS Jumper</b>	
<b>Status</b>	<b>DESCRIPTION</b>
N/C	Keep CMOS Setup (Normal Operation)
Press button	Clear CMOS Setup

<b>ME_FLASH1: Flash Descriptor Security Override Jumper</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Open	Disabled (default)
Short	Enabled

<b>IAUDIO: Internal Audio Connector for IEI Audio Module</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	HDA_SYNC	2	HDA_BIT_CLK
3	HDA_SDOUT	4	HDA_SPKR
5	HDA_SDIN	6	HDA_RST#
7	HDA_VCC	8	HDA_GND
9	HDA_+12V	10	HDA_GND

<b>CN1: Internal Power Input Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	VIN
2	GND	4	VIN

<b>DIO1 : Digital Input/Output Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+5V
3	Output 5	4	Output 4
5	Output 3	6	Output 2
7	Output 1	8	Output 0
9	Input 5	10	Input 4
11	Input 3	12	Input 2
13	Input 1	14	Input 0

<b>DEBUG_SPI1: EC Debug Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	NC	2	EDICS
3	EDIDO	4	EDICLK
5	EDIDI	6	GND

<b>CPU/FAN1: CPU Fan Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	Rotation Signal	4	PWM Control Signal

<b>SYS/FAN1: System Fan Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+12V
3	Rotation Signal	4	PWM Control Signal

<b>JI2C1: I<sup>2</sup>C Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	I2C_CLK
2	I2C_DATA	4	+5V



<b>JSMB1: SMBus Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	SMB_CLK
2	SMB_DATA	4	+5V

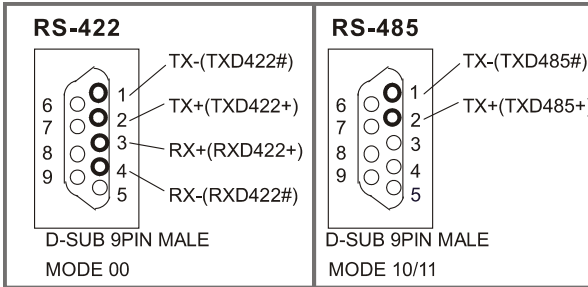
<b>F_PANEL1: Front Panel Connector</b>					
	<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>	
PWR LED	1	PWR_LED+	2	BEEP_PWR	SPKR
	3	NC	4	NC	
	5	PWR_LED-	6	NC	
PWR BTN	7	PWR_BTN+	8	PC_BEEP	
	9	PWR_BTN-	10	NC	
HDD LED	11	HDD_LED+	12	Reset+	RESET
	13	HDD_LED-	14	Reset-	

<b>JP1: LAN1 Link LED Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	+3.3V	2	LAN1_LED_LNK#_ACT

<b>JP2: LAN2 Link LED Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	+3.3V	2	LAN2_LED_LNK#_ACT

<b>COM1, COM2, COM3, COM4, COM5: RS-232 Serial Port Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

<b>COM6: RS-422/485 Serial Port Connector</b>		
<b>PIN NO.</b>	<b>RS-422</b>	<b>RS-485</b>
1	RXD-	-
2	RXD+	-
3	TXD+	DATA+
4	TXD-	DATA-



<b>SATA1, SATA2: SATA 6Gb/s Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	5	SATA_RX-
2	SATA_TX+	6	SATA_RX+
3	SATA_TX-	7	GND
4	GND	8	N/C

<b>SATA_PWR1, SATA_PWR2: SATA Power Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	GND

<b>JBIOS1: Flash SPI ROM Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	4	SPI_CLK
2	SPI_CS#	5	SPI_SI
3	SPI_SO	6	GND

<b>JEC2: Flash EC ROM Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	SPI_CS#	2	+3.3V
3	SPI_SO	4	NC
5	EC_DET_FLASH	6	SPI_CLK
7	GND	8	SPI_SI

<b>USB2_CN1: Internal USB 2.0 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC

<b>IDPM: iDPM Slot (for IEI eDP/LVDS/VGA Module)</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+3.3V
3	GND	4	+3.3V
5	GND	6	+3.3V
7	GND	8	+3.3V
9	GND	10	+3.3V
11	+5V	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	Module Key
17	Module Key	18	Module Key
19	Module Key	20	+3.3VS
21	DISPLAY_DETECT_ PIN21	22	+3.3VS
23	DISPLAY_DETECT_ PIN23	24	+3.3VS
25	GND	26	+3.3VS
27	GND	28	GND
29	EDP_TX3_DN	30	+12VS
31	EDP_TX3_DP	32	+12VS
33	GND	34	+12VS

35	EDP_TX2_DN	36	+12VS
37	EDP_TX2_DP	38	GND
39	GND	40	SMB_CLK
41	EDP_TX1_DN	42	SMB_DATA
43	EDP_TX1_DP	44	GND
45	GND	46	EC_BKLT_CTRL
47	EDP_TX0_DN	48	EDP1_BKLT_CTRL
49	EDP_TX0_DP	50	EDP1_BKLT_EN
51	GND	52	EDP1_VDD_EN #
53	EDP_AUX_DN	54	EDP_HPD_R
55	EDP_AUX_DP	56	BUF_PLT_RST#
57	GND	58	LVDS_EN
59	GND	60	+V5S
61	GND	62	+V5S
63	GND	64	+V5S
65	GND	66	+V5S
67	GND	68	+12VA
69	GND	70	+12VA
71	GND	72	+12VA
73	GND	74	+12VA
75	GND		

<b>M2_AE1: M.2 A-key Slot</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+3.3V
3	USB+	4	+3.3V
5	USB-	6	NC
7	GND	8	Module Key
9	Module Key	10	Module Key
11	Module Key	12	Module Key
13	Module Key	14	Module Key
15	Module Key	16	NC
17	NC	18	GND
19	NC	20	NC

21	NC	22	NC
23	GND	24	GND
25	NC	26	NC
27	NC	28	NC
29	GND	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX+	36	GND
37	PCIE_TX-	38	CL_RST#
39	GND	40	CL_DATA
41	PCIE_RX+	42	CL_CLK
43	PCIE_RX-	44	NC
45	GND	46	NC
47	PCIE_CLK+	48	NC
49	PCIE_CLK-	50	NC
51	GND	52	BUF_PLT_RST
53	NC	54	Pull up +3.3V
55	NC	56	Pull up +3.3V
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	+3.3V
73	NC	74	+3.3V
75	GND		

<b>M2_M1: M.2 M-key Slot</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+3.3V
3	GND	4	+3.3V
5	NC	6	NC
7	NC	8	NC

9	GND	10	+3.3V
11	NC	12	+3.3V
13	NC	14	+3.3V
15	GND	16	+3.3V
17	NC	18	+3.3V
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE_RXN1	30	NC
31	PCIE_RXP1	32	NC
33	GND	34	NC
35	PCIE_TXN1	36	NC
37	PCIE_TXP1	38	DEVSLP
39	GND	40	NC
41	PCIE_RXN0	42	NC
43	PCIE_RXP0	44	NC
45	GND	46	NC
47	PCIE_TXN0	48	NC
49	PCIE_TXP0	50	PERST#
51	GND	52	CLKREQ
53	REFCLKN	54	PEWAKE
55	REFCLKP	56	NC
57	GND	58	NC
59	Module Key	60	Module Key
61	Module Key	62	Module Key
63	Module Key	64	Module Key
65	Module Key	66	Module Key
67	NC	68	NC
69	PEDET	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

<b>LAN1, LAN2: External 2.5GbE RJ-45 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+-
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

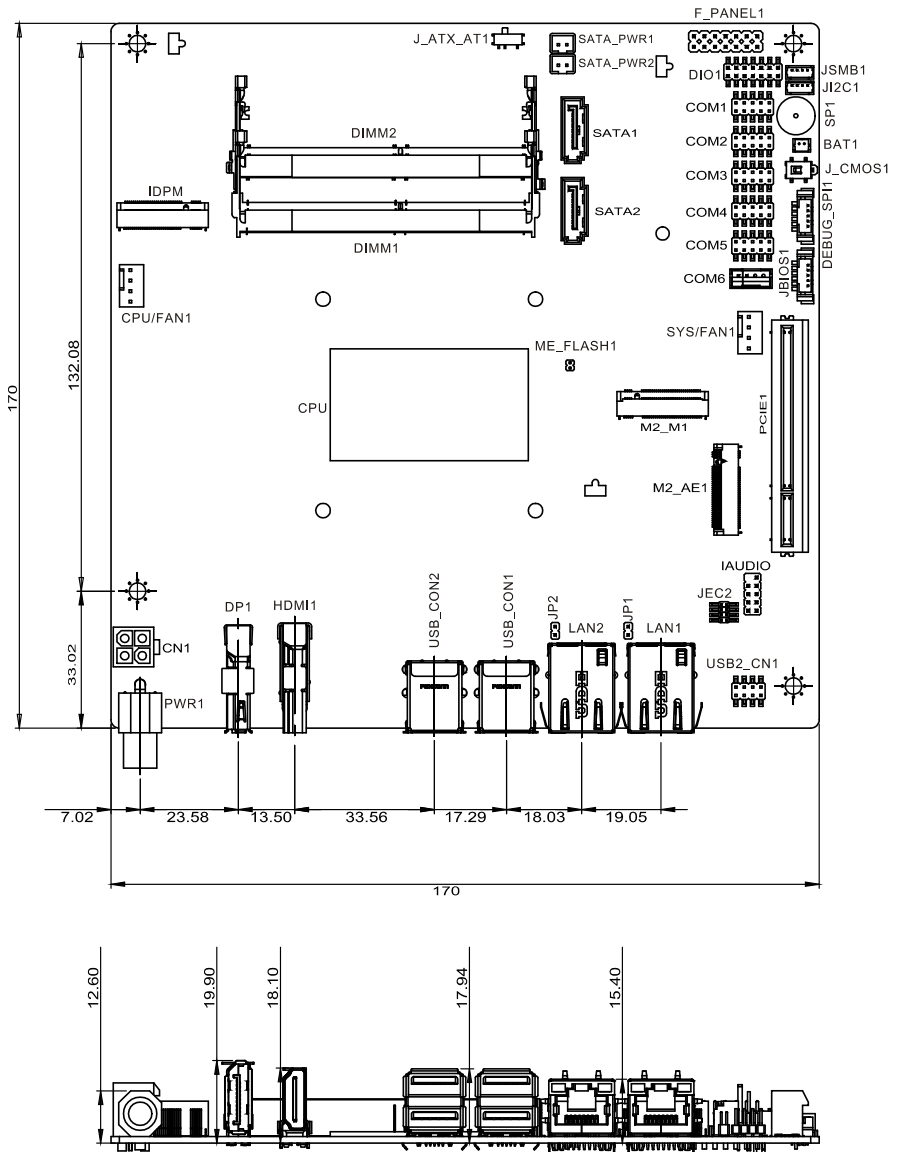
<b>DP1: External DisplayPort Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LANE0P	11	GND
2	GND	12	LANE3N
3	LANE0N	13	AUX_CTRL_DET_C
4	LANE1P	14	GND
5	LANE1N	15	AUXP
6	GND	16	GND
7	LANE2P	17	AUXN
8	GND	18	HPD
9	LANE2N	19	GND
10	LANE3P	20	+5V

<b>HDMI1: External HDMI Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
21	HDMI_DATA2	31	GND
22	GND	32	HDMI_CLK#
23	HDMI_DATA2#	33	N/C
24	HDMI_DATA1	34	N/C
25	GND	35	HDMI_SCL
26	HDMI_DATA1#	36	HDMI_SDA
27	HDMI_DATA0	37	GND
28	GND	38	+5V
29	HDMI_DATA0#	39	HDMI_HPD
30	HDMI_CLK		

<b>USB_CON1, USB_CON2: External USB 3.2 Gen 2 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	10	VCC
2	USB_DATA-	11	USB_DATA-
3	USB_DATA+	12	USB_DATA+
4	GND	13	GND
5	USB3_RX-	14	USB3_RX-
6	USB3_RX+	15	USB3_RX+
7	GND	16	GND
8	USB3_TX-	17	USB3_TX-
9	USB3_TX+	18	USB3_TX+



# Board Layout: Jumper and Connector Locations



(Unit: mm)