

Thin Mini-ITX SBC supports Intel® Skylake-U Processor, 9~36V DC input, Dual HDMI, LVDS, SATA 6Gb/s, Dual Intel® GbE, USB 3.0, Mini PCIe, eMMC 5.0, HD audio and RoHS

tKINO-ULT3

Quick Installation Guide

Version 1.0

March 28, 2017

Package List

tKINO-ULT3 package includes the following items:

- 1 x tKINO-ULT3 single board computer with CPU cooler
- 2 x SATA cable
- 1 x I/O shielding
- 1 x One Key Recovery CD
- 1 x QIG
- 1 x Utility CD



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Specifications

- CPU:
 - 6th generation Intel® mobile ULT on-board processor
 - Intel® Core™ i7-6600U (up to 3.4GHz, dual-core, 4M Cache, TDP=15W)
 - Intel® Core™ i5-6300U (up to 3.0GHz, dual-core, 3M Cache, TDP=15W)
 - Intel® Core™ i3-6100U (up to 2.3GHz, dual-core, 3M Cache, TDP=15W)
 - Intel® Celeron® 3955U (up to 2.0GHz, dual-core, 2M Cache, TDP=15W)
 - Intel® Celeron® 3855U (up to 1.6GHz, dual-core, 2M Cache, TDP=15W)
- BIOS: AMI UEFI BIOS
- Memory:
 - 2 x SO-DIMM DDR4 2133MHz, system maximum up to 32GB
- Graphics Engine:
 - Intel® HD graphic
- Display Output:
 - 1 x HDMI 1.4 (up to 4096x2160@24Hz)
 - 1 x HDMI/DP (up to 4096x2160@24Hz)
 - 1 x LVDS/eDP (select by switch)
- Ethernet:
 - LAN1: Intel® I219 (with Intel® AMT11.0 support)
 - LAN2: Intel® I211 PCIe controller with NCSI support
- External I/O Interfaces:
 - 4 x USB 3.0
- Internal I/O Interfaces:
 - 1 x eMMC 5.0 (optional, up to 32G)
 - 4 x RS-232 (2x5 pin, P=2.0)
 - 2 x RS-232/422/485 (2x5 pin, P=2.0)
 - 4 x USB 2.0 (2x4 pin, P=2.0)

- 2 x SATA with 5V output
- Audio:
 - Realtek ALC662 HD Audio Codec support 5.1 Channel
 - 2 x Audio jacks (line-out, mic-in) on rear IO
 - 1 x Front audio (2x5-pin)
- Front Panel:
 - 1 x Front panel (2x7 pin, power LED, HDD LED, power button, reset button)
- LAN LED: 2 x LAN LED (1x2 pin)
- SMBus: 1 x SMBus (1x4 pin)
- I²C: 1 x I²C (1x4 pin)
- Digital I/O: 8-bit digital I/O (2x5 pin)
- Expansion :
 - 1 x PCIe x4 slot
 - 1 x Full-size PCIe Mini card slot (support mSATA, colay SATA2)
 - 1 x Full-size PCIe Mini card slot (with SIM holder)
 - (**3855U belongs to Skylake ULT Base series CPU, PCIe signal support only PCIe Gen 2)
- Watchdog Timer:
 - Software programmable supports 1~255 sec. system reset
- Fan Connector:
 - 1 x CPU smart fan (1x4 pin)
 - 1 x System fan (1x3 pin)
- Power supply:
 - 9~36V DC input
 - 1 x Internal power connector (2x2 pin)
 - 1 x External DC power Jackc (Ø5.5mm)
 - Support AT/ATX mode
- Operating Temperature: -20°C ~ 60°C
- Operation Humidity: 5% ~ 95%, non-condensing
- Dimensions: 170mm x 170 mm

Ordering Information

- **tKINO-ULT3-i7-R10:**
Thin Mini-ITX SBC supports Intel® 6th Generation Mobile Core™ i7-6600U (15W) on-board Processor (ULT), 9~36V DC input, Dual HDMI, LVDS, eDP, SATA 6 Gb/s, Dual Intel® GbE, USB3.0, Mini PCIe, eMMC 5.0, HD audio and RoHS
- **tKINO-ULT3-i5-R10:**
Thin Mini-ITX SBC supports Intel® 6th Generation Mobile Core™ i5-6300U (15W) on-board processor (ULT), 9~36V DC input, Dual HDMI, LVDS, eDP, SATA 6 Gb/s, Dual Intel® GbE, USB3.0, Mini PCIe, eMMC 5.0, HD audio and RoHS
- **tKINO-ULT3-i3-R10:**
Thin Mini-ITX SBC supports Intel® 6th Generation Mobile Core™ i3-6100U (15W) on-board processor (ULT), 9~36V DC input, Dual HDMI, LVDS, eDP, SATA 6 Gb/s, Dual Intel® GbE, USB3.0, Mini PCIe, eMMC 5.0, HD audio and RoHS
- **tKINO-ULT3-C-R10:**
Thin Mini-ITX SBC supports Intel® 6th Generation Mobile Celeron® 3955U (15W) on-board processor (ULT), 9~36V DC input, Dual HDMI, LVDS, eDP, SATA 6 Gb/s, Dual Intel® GbE, USB3.0, Mini PCIe, eMMC 5.0, HD audio and RoHS
- **32205-002700-100-RS:** RS-232 cable, 200mm, P=2.0
- **32205-003700-100-RS:** RS-232/422/485 cable, 230mm, P=2.0
- **34000-000645-RS:** FANLESS heatsink module ; 93.5*84*30mm

Jumpers setting and connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX Power Mode Setting
J_CMOS1	CMOS State Setting
BIOS option: USB Power SW	USB Power Setting
J_HDMI_DP1	HDMI & DP Mode Selection
J_EDP_SEL1	eDP/LVDS Mode Setting
F_PANEL1	PWR & RST Buttons and indicators
PWR1	9~36V Power Connector
PWR2	9~36V Power Connector
HDMI1	HDMI Connector
J1	Display Port /HDMI Combo Connector
LAN1, LAN2	RJ45 LAN Connector
USB1, USB2	Internal USB Connector
COM1-COM4	Internal RS-232 Serial Port Connectors
COM5-COM6	Internal RS-232/422/485 Serial Port Connectors
USB_CON1-2	External USB 3.0 Connector
AUDIO1, MIC1	Audio Line-out and Mic-in Connectors
FRONT-PANEL1	Audio Source Connector
DIO1	Digital I/O Connector
SATA1~2	SATA 6Gb/s Connector
M-PICE1, M-PICE2	M-SATA Card Connector
CPU/FAN1	CPU Fan Connector
SYS_FAN1	System Fan Connector
SIM1	SIM Card Connector
CN2	LVDS Connector
INV1	5-pin Header Inverter Connector
CN10	eDP Connector
CN1	EC Debug Port Connector
JSPI1	Flash SPI ROM Connector
JSPI2	Flash EC ROM Connector
CN5	SMBUS Connector
JP1, JP2	LAN Link LED Connector
SATA_PWR1,SATA_PWR2	SATA Power Connectors

J_ATX_AT1: AT/ATX Power Mode Setting	
PIN NO.	DESCRIPTION
Short 1-2 (Right)	ATX Power Mode (default)
Short 2-3 (Left)	AT Power Mode

J_CMOS1: Clear CMOS Setup	
PIN NO.	DESCRIPTION
NC	Keep CMOS Setup (Normal Operation)
Press	Clear CMOS Setup

USB Power SW: USB Power Setting	
BIOS Option	DESCRIPTION
+5V DUAL	5V DUAL (default)
+5V	+5V

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.

Chipset

Auto Power Button Status	[Disabled(ATX)]	
Restore AC Power Loss	[Last State]	
> PCI Express Configuration		
> HD Audio Configuration		
Power Saving Function(ERP)	[Disabled]	
USB Power SW	[+5V DUAL]	

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J_HDMI_DP1: HDMI/DP Mode Selection	
PIN NO.	DESCRIPTION
Short 1-2 (Right)	HDMI Mode (default)
Short 2-3 (Left)	DP Mode

J_EDP_SEL1: eDP/LVDS Mode Selection	
PIN NO.	DESCRIPTION
Short 1-2 (Right)	LVDS Mode (default)
Short 2-3 (Left)	eDP Mode

F_PANEL1: PWR & RST Buttons and Indicators					
	PIN	DESCRIPTION	PIN	DESCRIPTION	
PWR LED	1	+5V	2	BEEP_PWR	SPKR
	3	NC	4	IPMI ID_LED+	IPMI LED
	5	GND	6	IPMI ID_LED-	
PWR BTN	7	PWRBTN_SW#	8	PC_BEEP	SPKR
	9	GND	10	NC	RESET
HDD LED	11	+5V	12	EXTRST-	
	13	SATA_LED#	14	GND	

PWR1: Internal Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	PWR	4	PWR

PWR2: External Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	PWR	2	GND
3	GND		

HDMI1: HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2	2	GND
3	HDMI_DATA2#	4	HDMI_DATA1
5	GND	6	HDMI_DATA1#
7	HDMI_DATA0	8	GND
9	HDMI_DATA0#	10	HDMI_CLK
11	GND	12	HDMI_CLK#
13	N/C	14	N/C
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	+5V
19	HDMI_HPD	20	HDMI_GND
21	HDMI_GND	22	HDMI_GND
23	HDMI_GND		

J1: Display Port /HDMI Combo Connector		
PIN	HDMI	Display Port
1	TMDS DATA2+	L0P
2	GND	GND
3	TMDS DATA2-	L0N
4	TMDS DATA1+	L1P
5	GND	GND
6	TMDS DATA1-	L1N
7	TMDS DATA0+	L2P
8	GND	GND
9	TMDS DATA0-	L2N
10	TMDS CLK+	L3P
11	GND	GND
12	TMDS CLK+	L3N
13	CEC	GND
14	NC	GND
15	SCL	AUXP
16	SDA	GND
17	GND	AUXN
18	HDMI PWR	HPD
19	HPD	PWR RTN
20	NC	DP PWR
21	HDMI/DP Det	HDMI/DP Det

LAN1, LAN2: RJ45 LAN Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN_MDI0+	7	LAN_MDI2+
2	LAN_MDI0-	8	LAN_MDI2-
3	LAN_MDI1+	9	LAN_MDI3+
4	LAN_MDI1-	10	LAN_MDI3-

USB1, USB2: Internal USB Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	USB_DATA-	4	USB_DATA+
5	USB_DATA+	6	USB_DATA-
7	GND	8	VCC

COM1-COM4: Internal RS-232 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

COM5-COM6: Internal RS-232/422/485 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

USB_CON1-2: External USB 3.0 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	10	VCC
2	D-	11	D-
3	D+	12	D+
4	GND	13	GND
5	RX-	14	RX-
6	RX+	15	RX+
7	GND	16	GND
8	TX-	17	TX-
9	TX+	18	TX+

AUDIO1, MIC1: Audio Line-out and Mic-in Connectors	
PIN NO.	DESCRIPTION
AUDIO1 (Green)	Connect this port to headphone or speaker
MIC1 (Pink)	Connect this port to microphone

FRONT-PANEL1: Audio Source Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MIC2-L	2	GND
3	MIC2-R	4	Presence#
5	LINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LINE2-L	10	LINE2-JD

DIO1: Digital Input / Output Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

SATA1~2: Serial ATA 3.0 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	SATA_RX-
2	SATA_TX+	6	SATA RX+
3	SATA_TX-	7	GND
4	GND	8	N/C

M-PICE1: M-SATA Card Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	PCIE_WAKE#	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	MSATA_CLK#	12	N/C
13	MSATA_CLK	14	N/C
15	GND	16	N/C
17	PLTRST_N	18	GND
19	N/C	20	+3.3V
21	GND	22	PLTRST_N
23	SATA_RX+	24	+3.3V
25	SATA_RX-	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	SATA_TX-	32	SMB_DATA
33	SATA_TX+	34	GND
35	GND	36	USB_DATA-
37	GND	38	USB_DATA+
39	+3.3V	40	GND
41	+3.3V	42	N/C
43	+3.3V	44	N/C
45	CLINK_CLK	46	N/C
47	CLINK_DATA	48	1.5V
49	CLINK_RST#	50	GND
51	MSATA_DET	52	+3.3V

M-PICE2: M-SATA Card Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	PCIE_WAKE#	2	+3.3V
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	SIM_VCC
9	GND	10	SIM_IO
11	MSATA_CLK#	12	SIM_CLK
13	MSATA_CLK	14	SIM_RST
15	GND	16	SIM_VPP
17	PLTRST_N	18	GND
19	N/C	20	+3.3V
21	GND	22	PLTRST_N
23	SATA_RX+	24	+3.3V
25	SATA_RX-	26	GND
27	GND	28	1.5V
29	GND	30	SMB_CLK
31	SATA_TX-	32	SMB_DATA
33	SATA_TX+	34	GND
35	GND	36	USB_DATA-
37	GND	38	USB_DATA+
39	+3.3V	40	GND
41	+3.3V	42	N/C
43	+3.3V	44	N/C
45	CLINK_CLK	46	N/C
47	CLINK_DATA	48	1.5V
49	CLINK_RST#	50	GND
51	MSATA_DET	52	+3.3V

CPU/FAN1: CPU Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+12V
3	FANIO	4	PWM

SYS_FAN1~2: System Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FANIO	2	+12V (PWM)
3	GND		

SIM1: SIM Card Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	RST
3	CLK	5	GND
6	VPP	7	I/O

CN2: LVDS Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	LVDS_DATA0	4	LVDS_DATA0#
5	LVDS_DATA1	6	LVDS_DATA1#
7	LVDS_DATA2	8	LVDS_DATA2#
9	LVDS_CLK	10	LVDS_CLK#
11	NC	12	NC
13	GND	14	GND
15	LDDC_DATA	16	LDDC_CLK
17	VCC_LCD	18	VCC_LCD
19	VCC_LCD	20	VCC_LCD

INV1: 5-pin Header Inverter Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCD_BKLTCTL	2	GROUND
3	+12V	4	GROUND
5	BACKLIGHT ENABLE		

CN10: eDP Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	NC	21	VCC_LCD
2	GND	22	NC
3	(eDP_TX3-)	23	GND
4	(eDP_TX3+)	24	GND
5	GND	25	GND
6	(eDP_TX2-)	26	GND
7	(eDP_TX2+)	27	eDP_HPDP
8	GND	28	GND
9	(eDP_TX1-)	29	GND
10	(eDP_TX1+)	30	GND
11	GND	31	GND
12	(eDP_TX0-)	32	(eDP_BKLT_EN)
13	(eDP_TX0+)	33	(eDP_BKLT_CRTL)
14	GND	34	NC
15	(eDP_AUX+)	35	NC
16	(eDP_AUX-)	36	BKLT_PWR
17	GND	37	BKLT_PWR
18	VCC_LCD	38	BKLT_PWR
19	VCC_LCD	39	BKLT_PWR
20	VCC_LCD	40	NC

CN1: EC Debug Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

JSPI1: Flash SPI ROM Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+1.8V	2	SPI_CS#
3	SPI_SO	4	SPI_CLK
5	SPI_SI	6	GND

JSPI2: Flash EC ROM Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+1.8V	2	SPI_CS#
3	SPI_SO	4	SPI_CLK
5	SPI_SI	6	GND

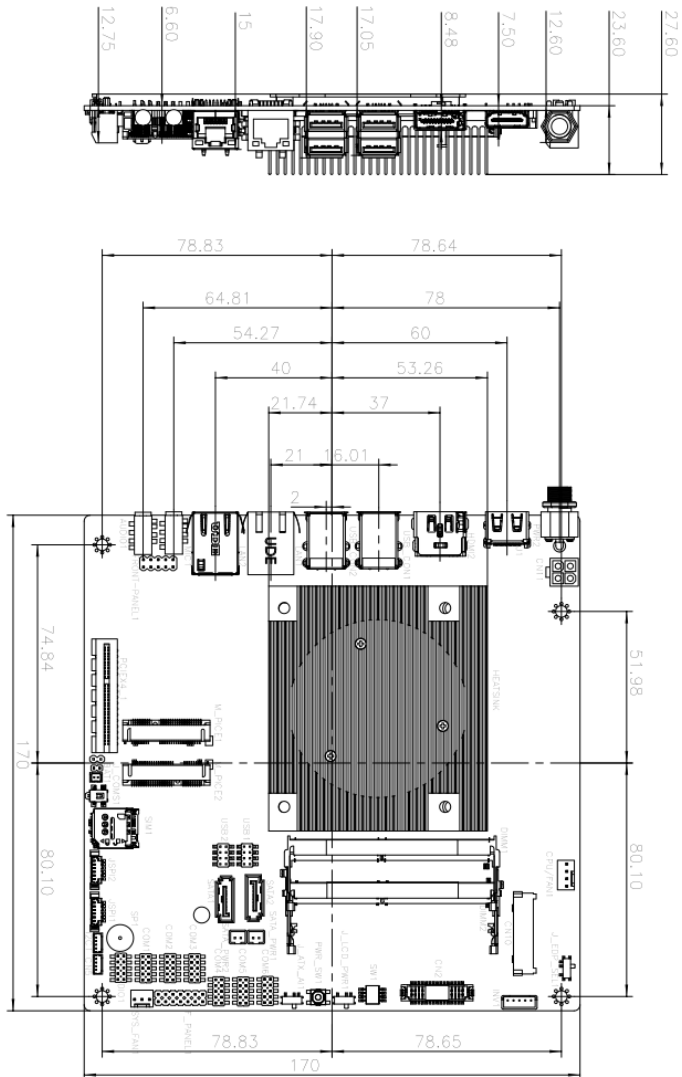
CN5: SMBUS Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	SMB_DATA
3	SMB_CLK	4	+5V

JP1: LAN Link LED Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	LAN1_LED_LNK#_ACT

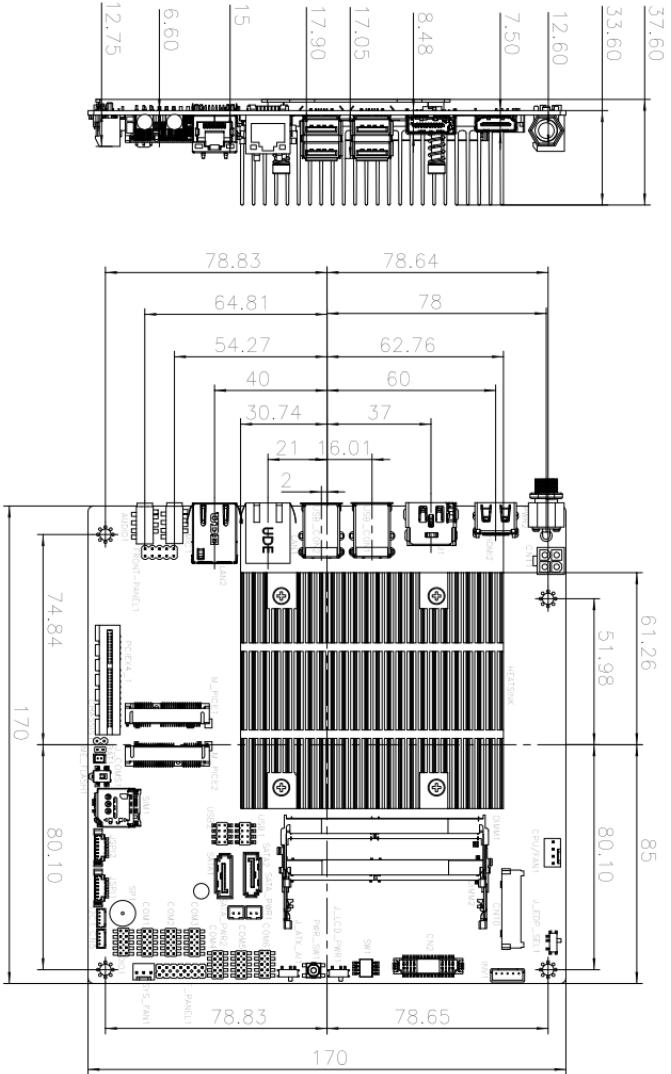
JP2: LAN Link LED Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	2	LAN2_LED_LNK#_ACT

SATA_PWR1, SATA_PWR2: SATA Power Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	12V	2	GND
3	GND	4	5V

Board Layout: Jumper and Connector Locations



Heatsink with Fan



Fanless
 (optional, PN:34000-000645-RS)

(Unit: mm)