

**Mini-ITX Motherboard Supports LGA1700 12<sup>th</sup>/13<sup>th</sup> Gen. Intel® Core™  
i9/i7/i5/i3, Pentium® and Celeron® Processor, DDR4,  
Triple Independent Display, Dual 2.5GbE LAN,  
USB 3.2, SATA 6Gb/s, and RoHS**

# **KINO-ADL-H610**

## **Quick Installation Guide** **Version 1.0**

January 11, 2023

### **Package List**

KINO-ADL-H610 package includes the following items:

- 1 x KINO-ADL-H610 single board computer
- 1 x SATA cable
- 1 x I/O shielding
- 1 x QIG



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## Specifications

- CPU:  
LGA1700 12<sup>th</sup>/13<sup>th</sup> Generation Intel® Core™ i9/i7/i5/i3, Celeron® and Pentium® processors (up to 65W TDP)
- Chipset:  
Intel® H610/H610E
- Memory:  
Two 260-pin 3200 MHz dual-channel unbuffered DDR4 SDRAM SO-DIMM slots supporting up to 64 GB memory
- BIOS:  
AMI UEFI BIOS
- Graphics Engine:  
New Intel® Xe Graphics architecture with SRIOV, Genlock
- Display Output:  
Triple independent display  
1 x DP (up to 4096 x 2304 @ 60Hz)  
1 x HDMI 2.0b (up to 4096 x 2304 @ 60Hz)  
1 x IEI iDPM 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:  
2 x USB 3.2 Gen 2 (Type-A) (10Gb/s)  
2 x USB 3.2 Gen 1 (Type-A) (5Gb/s)  
2 x USB 2.0 (Type-A)  
2 x RS-232/422/485 (RS-485 support AFC)
- Internal I/O Interface:  
2 x SATA 6Gb/s  
2 x USB 2.0 (2x4 pin, p=2.0)  
4 x RS-232 (2x5 pin, p=2.0)
- Audio:  
1 x Analog audio (2x5 pin, p=2.0) supports 7.1 channel HD audio by IEI AC-KIT-888S audio kit

- Front Panel:
  - 1 x Front panel (2x5 pin, p=2.54; HDD LED, speaker, power button, reset button)
- LAN LED:
  - 2 x LAN LED (1x2 pin, p=2.0)
- Expansions:
  - 1 x PCIe Gen4 x16 slot\*
  - 1 x M.2 2242/2280 M key (PCIe Gen3 x4)
  - 1 x M.2 2230 A key (PCIe Gen3 x1 & USB 2.0 for Wi-Fi/Bluetooth)

\*Intel recommends that Alder Lake-S CPU PCIe ports are only used for discrete graphics and storage devices
- Digital I/O:
  - 1 x 12-bit digital I/O (2x7 pin, p=2.0)
- I<sup>2</sup>C/SMBus:
  - 1 x I<sup>2</sup>C/SMBus (1x4 pin, p=1.25)
- Fan Connector:
  - 1 x CPU fan connector (1x4 pin)
  - 2 x System fan connector (1x4 pin)
- Chassis Intrusion:
  - 1 x Chassis intrusion connector (1x2 pin, p=2.54)
- TPM
  - Intel® PTT (TPM 2.0)
- Power Supply:
  - Support AT/ATX mode
  - ErP/EuP compliant
- Power Consumption:
  - 3.3V@0.96A, 5V@6.49A, 12V@5.95A, 5VSB@1.05A
  - (Intel® Core™ i9-12900E CPU with two 16 GB 3200 MHz DDR4 memory, max. loading, EuP mode enabled)
- 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

## Ordering Information

- **KINO-ADL-H610-R10:**  
Mini-ITX motherboard supports LGA1700 12th/13th Generation Intel® Core™ i9/i7/i5/i3, Pentium® and Celeron® processor, DDR4, triple independent display, dual 2.5GbE LAN, USB 3.2, SATA 6Gb/s, and RoHS
- **AC-KIT-888S-R10:**  
Realtek ALC888S 7.1 Channel HD Audio board, RoHS
- **CB-USB02A-RS:**  
Dual-port USB cable with bracket, 300mm, p=2.0
- **32102-000100-200-RS:**  
SATA power cable, MOLEX 5264-4P to SATA15P
- **32205-000702-100-RS:**  
RS-232 cable, 230mm, p=2.54
- **iDPM-eDP-R10:**  
eDP to eDP converter board (for IEI iDPM connector)
- **iDPM-LVDS-R10:**  
eDP to LVDS converter board (for IEI iDPM connector)
- **19100-000323-00-RS:**  
LGA1700 CPU cooler, 65W

All the drivers and utility for the KINO-ADL-H610 are available on IEI Resource Download Center. Type KINO-ADL-H610 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>



## Jumpers Setting and Connectors

LABEL	FUNCTION
J_AT_ATX1	AT/ATX power mode setting
J_CMOS1	Clear CMOS jumper
ME_FLASH1	Flash descriptor security override jumper
J_AUDIO1	Audio connector for IEI AC-KIT-888S kit
ATX1	ATX power connector
CPU12V1	ATX CPU 12V power connector
BAT1	RTC battery connector
SP1	Buzzer connector
CHASSIS1	Chassis intrusion connector
DIMM1, DIMM2	DDR4 SO-DIMM slots
J2	Digital I/O connector
DEBUG_SPI1	EC debug connector
CPU_FAN1, SYS_FAN1	Fan connectors
F_PANEL1	Front panel connector
I2C1	I <sup>2</sup> C/SMBus connector
JP2	LAN1 link LED connector
JP3	LAN2 link LED connector
COM1, COM2, COM3, COM4	RS-232 serial port connectors
S_ATA1, S_ATA2	SATA 6Gb/s connectors
JSPI1	Flash SPI ROM connector
EC_SPI1	Flash EC ROM connector
USB_CN4	Internal USB 2.0 connector
J1	VR power IC debug connector
IDPM	IEI iDPM slot
PCIE4	PCIe x16 slot
M2_A1	M.2 2230 A key slot
NGFF1	M.2 2242/2280 M key slot
COM56	External dual RS-232/422/485 connector
HDMI_DP1	External HDMI and DP combo connector
LAN1_USB1	External 2.5GbE RJ-45 and dual USB 3.2 Gen 2 (10Gb/s) combo connector

LAN2_USB1	External 2.5GbE RJ-45 and dual USB 3.2 Gen 1 (5Gb/s) combo connector
USB_CN3	External quad USB 2.0 connector

<b>J_AT_ATX1: AT/ATX Power Mode Setting</b>	
<b>PIN NO.</b>	<b>DESCRIPTION</b>
Short A - B	ATX Power Mode (default)
Short B - C	AT Power Mode

<b>J_CMOS1: Clear CMOS Button</b>	
<b>Status</b>	<b>DESCRIPTION</b>
NC	Keep CMOS Setup (Normal Operation)
Press	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>J_AUDIO1: Audio Connector for IEI AC-KIT-888S kit</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	HDA_SYNC_R	2	HDA_BCLK_R
3	HDA_SDO_R	4	HDA_PCBEPC
5	HDA_SDI_0_R	6	HDA_RST_R
7	+5V	8	GND
9	+12V	10	GND

<b>ATX1: ATX Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	GND	13	GND
4	+5V	14	PS_ON
5	GND	15	GND
6	+5V	16	GND
7	GND	17	GND
8	Power good	18	NC
9	5VSB	19	+5V
10	+12V	20	+5V

<b>CPU12V1: ATX CPU 12V Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

<b>BAT1: RTC Battery Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VBATT	2	GND

<b>SP1: Buzzer Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	2	PC_BEEP_N

<b>CHASSIS1: Chassis Intrusion Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	CASEOPEN_N	2	GND

<b>J2 : Digital Input/Output Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	VCC
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	4	EDICK
2	EDICS	5	EDIDI
3	EDIDO	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	3	FANIO
2	+12V	4	PWM (+5V)

<b>SYS_FAN1: System Fan Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	FANIO
2	+12V	4	PWM (+5V)

<b>J1: VR Power IC Debug Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	MP2960_SCL	4	MP2940_SDA
2	MP2960_SDA	5	MP2940_SCL
3	GND		



<b>F_PANEL1: Front Panel Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PWR_BTN_N	2	GND
3	EXRST_N	4	GND
5	+5V	6	GND
7	+5V	8	SATA_LED#
9	BEEP_PWR	10	PC_BEEP_N

<b>I2C1: I<sup>2</sup>C/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>JP2: 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>JP3: 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: 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>S_ATA1, S_ATA2: 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		

<b>JSPI1: 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>EC_SPI1: Flash EC ROM Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	EC_SPI_CS#_R	2	+3.3V
3	EC_SPI_MISO_R	4	NC
5	EC_DET_FLASH	6	EC_SPI_CLK_R
7	GND	8	EC_SPI_MOSI_R

<b>USB_CN4: 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>M2_A1: M.2 2230 A Key Slot</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+3.3V
3	USB2_DP	4	+3.3V
5	USB2_DN	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	NC	24	GND
25	NC	26	NC
27	NC	28	NC
29	NC	30	GND
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX_DP5	36	GND
37	PCIE_TX_DN5	38	NC
39	GND	40	NC
41	PCIE_RX_DP5	42	NC
43	PCIE_RX_DN5	44	NC
45	GND	46	NC
47	PCIE_CLK+	48	NC
49	PCIE_CLK-	50	NC
51	GND	52	PLT_RST
53	SRCCLKREQB_15#	54	BT_ON
55	PCH_WAKE_N	56	WLAN_OFF
57	GND	58	M2_DAT
59	NC	60	M2_CLK
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>NGFF1: M.2 2242/2280 M Key Slot</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+V3P3S_SSD
3	GND	4	+V3P3S_SSD
5	PCIE_4_RX_DN	6	NC
7	PCIE_4_RX_DP	8	NC
9	GND	10	NGFF1_ACT_N
11	PCIE_TX_DN4	12	+V3P3S_SSD
13	PCIE_TX_DP4	14	+V3P3S_SSD
15	GND	16	+V3P3S_SSD
17	PCIE_3_RX_DN	18	+V3P3S_SSD
19	PCIE_3_RX_DP	20	NC
21	GND	22	NC
23	PCIE_3_TX_DN	24	NC
25	PCIE_3_TX_DP	26	NC
27	GND	28	NC
29	PCIE_2_RX_DN	30	NC
31	PCIE_2_RX_DP	32	NC
33	GND	34	NC
35	PCIE_2_TX_DN	36	NC
37	PCIE_2_TX_DP	38	M_1_SSD_SLP
39	GND	40	M.2_SMCLK
41	PCIE_1_RX_DN	42	M.2_SMDAT
43	PCIE_1_RX_DP	44	NC
45	GND	46	NC
47	PCIE_1_TX_DN	48	NC
49	PCIE_1_TX_DP1	50	PLT_RST_N
51	GND	52	SRCCLKREQB_13_N
53	PCIE_CLK_DN13	54	NC
55	PCIE_CLK_DP13	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	+V3P3S_SSD
71	GND	72	+V3P3S_SSD
73	GND	74	+V3P3S_SSD
75	GND		

<b>COM56: External RS-232/422/485 Connectors</b>			
	<b>RS-232</b>	<b>RS-422</b>	<b>RS-485</b>
1	DCD	TXD422-	TXD485-
2	RXD	TXD422+	TXD485+
3	TXD	RXD422+	--
4	DTR	RXD422-	--
5	GND	--	--
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--

<b>HDMI_DP1</b>			
<b>External DP 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	CONFIG_A_1
4	LANE1P	14	CONFIG_A_2
5	GND	15	AUXP
6	LANE1N	16	GND
7	LANE2P	17	AUXN
8	GND	18	HPD
9	LANE2N	19	GND
10	LANE3P	20	+5V

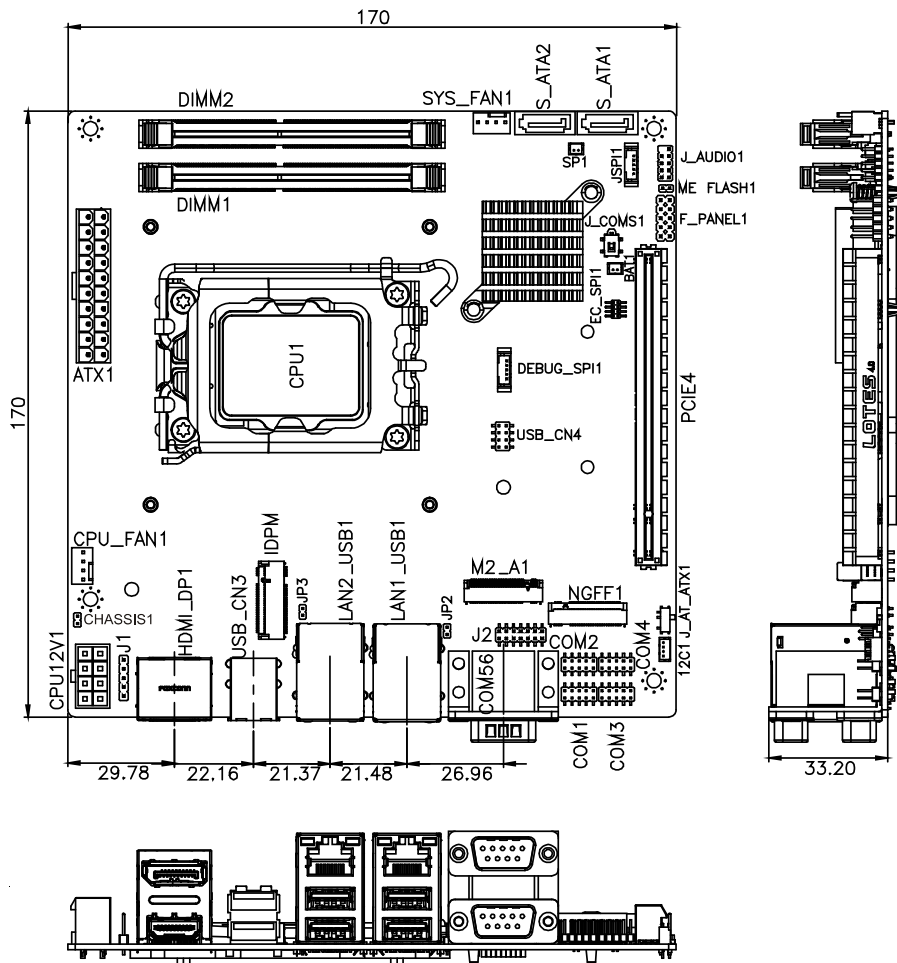
<b>External HDMI Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
21	HDMI_DATA2P	31	GND
22	GND	32	HDMI_CLKN
23	HDMI_DATA2N	33	N/C
24	HDMI_DATA1P	34	N/C
25	GND	35	HDMI_CLK
26	HDMI_DATA1N	36	HDMI_SDA
27	HDMI_DATA0P	37	GND
28	GND	38	+5V
29	HDMI_DATA0N	39	HDMI_HPD
30	HDMI_CLKP		

<b>LAN1_USB1</b>			
<b>External Dual USB 3.2 Gen 2 Connector</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+
<b>2.5GbE RJ-45 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
20	LAN1_MD0+	26	LAN1_MD3+
21	LAN1_MD0-	27	LAN1_MD3-
22	LAN1_MD1+	29	VCC
23	LAN1_MD1-	30	ACT
24	LAN1_MD2+	31	100-
25	LAN1_MD2-	32	1000-

<b>LAN2_USB1</b>			
<b>External Dual USB 3.2 Gen 1 Connector</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+
<b>2.5GbE RJ-45 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
20	LAN2_MD0+	26	LAN2_MD3+
21	LAN2_MD0-	27	LAN2_MD3-
22	LAN2_MD1+	29	VCC
23	LAN2_MD1-	30	ACT
24	LAN2_MD2+	31	2500-
25	LAN2_MD2-	32	1000-

<b>USB_CN3: External Dual USB 2.0 Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
11	USB_VCC	31	USB_VCC
12	D-	32	D-
13	D+	33	D+
14	GND	34	GND
21	USB_VCC	41	USB_VCC
22	D-	42	D-
23	D+	43	D+
24	GND	44	GND

# Board Layout: Jumper and Connector Locations



(Unit: mm)