

Mini-ITX SBC Supports Intel® Celeron® J6412 on-board SoC with
HDMI, DP, iDPM, 2.5GbE LAN, M.2, PCIe x4 Slot, SATA 6Gb/s,
COM, USB 3.2 Gen 2, iAUDIO, 0°C~60°C and RoHS

KINO-EHL-J6412

Quick Installation Guide

Version 1.0

June 9, 2022

Package List

KINO-EHL-J6412 package includes the following items:

- 1 x KINO-EHL-J6412 single board computer
- 1 x SATA cable
- 1 x I/O shielding
- 1 x QIG



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Specifications

- CPU:
Intel® Celeron® J6412 on-board SoC
(up to 2.6GHz, quad-core, 1.5M cache, TDP=10W)
- Memory:
On-board 8GB 3200 MHz LPDDR4X (system max. 16GB)
- BIOS:
AMI UEFI BIOS
Dual BIOS for boot & recovery
- Graphics Engine:
Intel® Gen11LP Gfx firmware and driver, Media SDK,
OpenCL* 1.2, OpenGL 4.5, OpenGL-ES 3.2, Vulkan v1.1,
DirectX
- Display Output:
Triple independent display
1 x HDMI 1.4 (up to 4096 x 2160@30Hz)
1 x DP 1.4 (up to 4096 x 2160 @60Hz)
1 x IEI iDPM 3040 slot (only for IEI eDP/LVDS/VGA module)
- Ethernet:
2 x PCIe 2.5GbE with Intel® I225V
- External I/O Interface:
2 x USB 3.2 Gen 2x1 Type-A (10Gb/s)
2 x USB 2.0 Type-A
2 x RS-232
- Internal I/O Interface:
1 x SATA 6Gb/s with 5V SATA power connector
4 x USB 2.0 (2x4 pin, p=2.0)
4 x RS-422/485 (1x4 pin, p=2.0)
- I²C:
1 x I²C (1x4 pin, p=1.25)
- SMBus:
1 x SMBus (1x4 pin, p=1.25)

- Audio:
 - 1 x iAUDIO (2x5 pin), supporting IEI AC-KIT-888S kit
- Front Panel:
 - 1 x Front panel (2x7 pin, p=2.54; power LED, HDD LED, power button, reset button)
- Expansions:
 - 1 x M.2 2230 A key
(PCIe x1 / USB 2.0 signal)
 - 1 x M.2 3052/3042/2242/2280 B key with SIM slot
(PCIe x2 / USB 2.0 signal)
 - 1 x PCIe x4, open-ended (PCIe Gen3 x1 signal)
- Digital I/O:
 - 1 x 12-bit digital I/O (2x7 pin, p=2.0)
- TPM: Intel® PTT (TPM 2.0)
- Fan Connectors:
 - 1 x CPU fan connector (1x4 pin, p=2.54)
 - 1 x System fan connector (1x3 pin, p=2.54)
- Power Supply:
 - 12V DC input
 - 1 x Internal power connector (2x2 pin)
 - 1 x External DC power jack (Ø5.5mm)
 - ErP/EuP Compliant
- Power Consumption:
 - 12V@2.78A (Intel® Celeron® J6412 2.0GHz with 8GB 3200MHz LPDDR4X memory and EUP 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
- Certification: CE/FCC compliant

Ordering Information

- **KINO-EHL-J6412-R10:**
-ITX SBC supports Intel® Elkhart Lake Celeron® J6412 onboard SoC with triple independent display, HDMI, DP, iDPM, SATA 6Gb/s, dual 2.5GbE, USB 3.2, M.2, 12V DC input and RoHS
- **CB-USB02A-RS:**
Dual-port USB cable with bracket, 300mm, p=2.0
- **AC-KIT-888S-R10:**
Realtek ALC888S 7.1 Channel HD Audio peripheral board, RoHS
- **32102-000100-200-RS:**
SATA power cable, MOLEX 5264-4P to SATA15P
- **32205-003800-200-RS:**
RS-232/422/485 cable, 200mm, p=2.0
- **iDPM-eDP-R10:**
eDP to eDP converter board (for IEI iDPM slot)
- **iDPM-LVDS-R10:**
eDP to LVDS converter board (for IEI iDPM slot)
- **iDPM-VGA-R10:**
eDP to VGA converter board (for IEI iDPM slot)

All the drivers and utility for the KINO-EHL-J6412 are available on IEI Resource Download Center. Type KINO-EHL-J6412 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_CMOS2	Clear CMOS button
J_ATX_AT1	AT/ATX power mode setting switch
J_BIOS1_1	BIOS1/BIOS2 select jumper
J_DNX1	DNX mode setting jumper
J_FLASH1	Flash descriptor override setting jumper
IAUDIO1	Audio connector for IEI AC-KIT-888S kit
CN3	ATX 12V power connector
BAT1	Battery connector
BZ1	Buzzer connector
DIO1	Digital I/O connector
CPU_FAN1, SYS_FAN2	Fan connectors
F_PANEL1	Front panel connector
PWR_SW1	Onboard power button
COM3, COM4, COM5, COM6	RS-422/485 serial port connectors
S_ATA1	SATA 6Gb/s connectors
SATA_PWR1	SATA power connector
I2C1	I ² C connector
SMB1	SMBus connector
JBIOS1	Flash SPI ROM connector
JEC2	Flash EC ROM connector
J_CONSOLE1	BIOS debug connector
DEBUG_SPI1	EC debug connector
DBG_PORT1	EC SMBus debug port connector
EC_UART1	EC UART debug port connector

JUSB3, JUSB4	Internal USB 2.0 connectors
M2_A_KEY	M.2 A-key slot
M2_B_KEY	M.2 B-key slot
PCIEX4_1	PCIe x4 slot (x1 signal)
CN4	SIM slot (solder side)
IDPM1	IEI iDPM slot
CN2	External 12V DC input jack
J_LAN1_USB1	External 2.5GbE and USB 3.2 Gen 2 combo connector
J_LAN2_USB2	External 2.5GbE and USB 2.0 combo connector
COM1	External dual RS-232 connector
HDMI_DP1	External HDMI and DP combo connector

J_CMOS2: Clear CMOS Button	
PIN NO.	DESCRIPTION
NC (default)	Keep CMOS Setup (Normal Operation)
Press button	Clear CMOS Setup

J_ATX_AT1: AT/ATX Power Mode Setting Switch	
PIN NO.	DESCRIPTION
Short A - B	ATX Power Mode (default)
Short B - C	AT Power Mode

J_BIOS1_1: BIOS1/BIOS2 Select Jumper	
PIN NO.	DESCRIPTION
Short 1 - 2	BIOS1 (default)
Short 2 - 3	BIOS2

J_DNX1: DNX Mode Setting Jumper	
PIN NO.	DESCRIPTION
Open	Normal (default)
Short	Enable DNX Boot

J_FLASH1: Flash Descriptor Override Setting Jumper	
PIN NO.	DESCRIPTION
Short 1 - 2	Disable (default)
Short 2 - 3	Enable

IAUDIO : Audio Connector for IEI AC-KIT-888S Kit			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_CLK
3	HDA_SDOOUT	4	HDA_SPKR
5	HDA_SDIN	6	HDA_RST#
7	+5V	8	GND
9	+12V	10	GND

CN3: ATX 12V Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	+12V
2	GND	4	+12V

BAT1: RTC Battery Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	VBATT	2	GND

BZ1: Buzzer Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	PC_BEEP

DIO1: Digital Input/Output Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	DOUT5	4	DOUT4
5	DOUT3	6	DOUT2
7	DOUT1	8	DOUT0
9	DIN5	10	DIN4
11	DIN3	12	DIN2
13	DIN1	14	DIN0

CPU_FAN1: Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	FANIO
2	+12V	4	PWM

SYS_FAN2: Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	FANIO	3	GND
2	PWM		

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

COM3, COM4, COM5, COM6: RS-422/485 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RX-	3	TX+
2	RX+	4	TX-

S_ATA1: SATA 6Gb/s 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

SATA_PWR1: SATA Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND

I2C1: I²C Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	I2C_CLK
2	I2C_DATA	4	+5V

SMB1: SMBus Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	SMB_CLK
2	SMB_DATA	4	+5V

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

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

J_CONSOLE1: BIOS Debug Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3V	4	PSE_UART4_CTS
2	PSE_UART4_TX	5	PSE_UART4_RTS
3	PSE_UART4_RX	6	GND

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

DBG_PORT1: EC SMBus Debug Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V5A	4	SMDAT0_EC
2	SMCLK0_EC	5	GND
3	NC	6	PLT_RST_N

EC_UART1: EC UART Debug Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	UART_TX	3	UART_RX
2	+3.3V	4	GND

JUSB3, JUSB4: Internal USB 2.0 Connectors			
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

M2_A_KEY: M.2 A-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V3.3A
3	USB+	4	+V3.3A
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	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_TX4+	36	GND
37	PCIE_TX4-	38	NC
39	GND	40	NC
41	PCIE_RX4+	42	NC
43	PCIE_RX4-	44	NC
45	GND	46	NC
47	CLK_M2_A+	48	NC
49	CLK_M2_A-	50	BTWIFI_SUS_CLK

51	GND	52	WLAN_PERST#
53	NC	54	+V3.3A_WLAN
55	+V3.3A_WLAN	56	+V3.3A_WLAN
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	PEWAKE#
71	NC	72	+V3.3A
73	NC	74	+V3.3A
75	GND		

M2_B_KEY: M.2 B-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	WWAN_CONFIG3	2	+3.3V_WWAN
3	GND	4	+3.3V_WWAN
5	GND	6	WWAN_FCP_OFF
7	USB_D+	8	WWAN_DISABLE
9	USB_D-	10	NC
11	GND	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	PSE_I2S1_SCLK
21	WWAN_CONFIG0	22	PSE_I2S1_TXD
23	PCIE_WAKE#	24	PSE_I2S1_RXD
25	SAR_DPR_WWAN	26	GNSS_DISABLE_N
27	GND	28	NC
29	PCIE_RXN7	30	WWAN_UIM_RST
31	PCIE_RXP7	32	WWAN_UIM_CLK
33	GND	34	WWAN_UIM_DATA
35	PCIE_TXN7	36	UIM_PWR

37	PCIE_TXP7	38	SSD_DEVSLP
39	GND	40	NC
41	PCIE_RXN6	42	NC
43	PCIE_RXP6	44	NC
45	GND	46	NC
47	PCIE_TXN6	48	NC
49	PCIE_TXP6	50	WWAN_PERST#
51	GND	52	N/C
53	CLK_M2_B_N	54	WWAN_WAKE#
55	CLK_M2_B_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	WWAN_SIM1_DET
67	WWAN_RST	68	WWAN_SUSCLK
69	DET_OS-PCIE/ GND-SATA	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	WWAN_CONFIG2		

CN4: SIM Card Slot (on solder side)			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
C1	SIM_VCC	C5	GND
C2	SIM_RST	C6	NC
C3	SIM_CLOCK	C7	SIM_DATA

J_LAN1_USB1			
External USB 3.2 Gen 2 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
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+
2.5GbE RJ-45 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
20	LAN1_MDI0P	24	LAN1_MDI2P
21	LAN1_MDI0N	25	LAN1_MDI2N
22	LAN1_MDI1P	26	LAN1_MDI3P
23	LAN1_MDI1N	27	LAN1_MDI3N

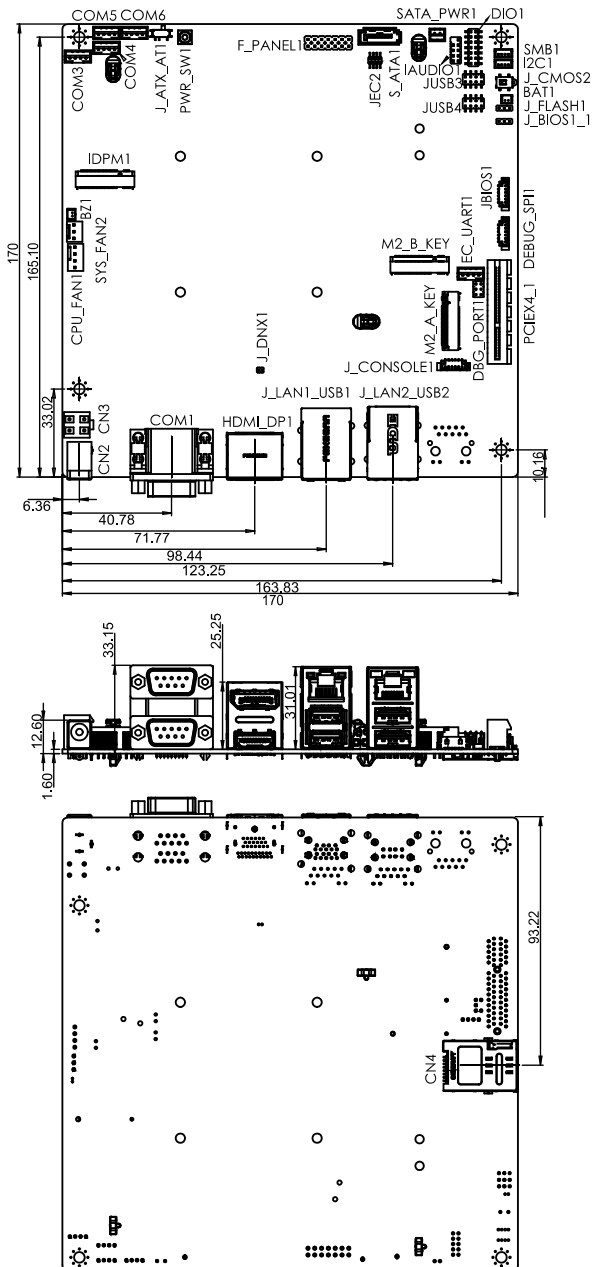
J_LA2_USB2			
External USB 2.0 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND
2.5GbE RJ-45 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
P2	LAN1_MDI0P	P6	LAN1_MDI2P
P3	LAN1_MDI0N	P7	LAN1_MDI2N
P4	LAN1_MDI1P	P8	LAN1_MDI3P
P5	LAN1_MDI1N	P9	LAN1_MDI3N

COM1: External Dual RS-232 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	10	DCD2
2	RXD1	11	RXD2
3	TXD1	12	TXD2
4	DTR1	13	DTR2
5	GND1	14	GND2
6	DSR1	15	DSR2
7	RTS1	16	RTS2
8	CTS1	17	CTS2
9	RI1	18	RI2

CN2: External 12V DC Input Jack			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+12V	3	GND
2	GND		

HDMI_DP1			
External DP Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA_0P	11	GND
2	GND	12	DATA_3N
3	DATA_0N	13	CONFIG1
4	DATA_1P	14	CONFIG2
5	GND	15	AUX_P
6	DATA_1N	16	GND
7	DATA_2P	17	AUX_N
8	GND	18	DP HPD
9	DATA_2N	19	GND
10	DATA_3P	20	DP PWR
External HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI2_DATA2	2	GND
3	HDMI2_DATA2#	4	HDMI2_DATA1
5	GND	6	HDMI2_DATA1#
7	HDMI2_DATA0	8	GND
9	HDMI2_DATA0#	10	HDMI2_CLK
11	GND	12	HDMI2_CLK#
13	N/C	14	N/C
15	HDMI2_SCL	16	HDM2I_SDA
17	GND	18	+5V
19	HDMI2_HPD		

Board Layout: Jumper and Connector Locations



(Unit: mm)