

EPIC SBC Supports Intel® Celeron® J6412 Processor, HDMI, DP, iDPM, M.2 A Key, M.2 B Key, USB 3.2, SATA 6Gb/s, COM, Dual 2.5GbE, iAUDIO, PCIe x4 for Riser Card and RoHS

NANO-EHL

Quick Installation Guide

Version 1.0

April 12, 2023

Package List

NANO-EHL package includes the following items:

- 1 x NANO-EHL single board computer with heat spreader
- 1 x SATA cable
- 1 x iSATA cable
- 1 x Power cable
- 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 dual-channel LPDDR4x memory, up to 16GB
- BIOS:
AMI UEFI BIOS
- Graphics Engine:
Intel® UHD Graphics (Gen11)
- Display Output:
Triple independent display
1 x HDMI 1.4a (up to 4096 x 2160 @ 30Hz)
1 x DP 1.4a (up to 4096 x 2160 @ 60Hz)
1 x IEI iDPM slot (only for IEI eDP/ LVDS/ VGA module)
- Ethernet:
2 x Intel® I225V 2.5GbE controller
- External I/O Interface:
2 x USB 3.2 Gen 2 (Type-A) (10Gb/s)
2 x USB 2.0 (Type-A)
- Internal I/O Interface:
1 x SATA 6Gb/s with 5V SATA power connector
1 x iSATA connector
2 x USB 2.0 (2x4 pin, p=2.0)
2 x RS-232/422/485 (2x5 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 (1x6 pin, p=2.0; power LED, HDD LED)
 - 1 x Power button connector (1x2 pin, p=2.0)
 - 1 x Reset button (on solder side)
- Expansions:
 - 1 x M.2 2230 A key (PCIe Gen3 x1 & USB 2.0)
 - 1 x M.2 2280/2242 B key (PCIe Gen3 x2 & USB 2.0)
 - 1 x PCIe x4 slot (PCIe Gen3 x2 signal, x2 or x1+x1)
- Digital I/O:
 - 1 x 8-bit digital I/O (2x5 pin, p=2.0)
- I²C/SMBus:
 - 1 x I²C (1x4 pin, p=1.25)
 - 1 x SMBus (1x4 pin, p=1.25)
- Fan Connector:
 - 1 x System fan connector (1x4 pin)
- TPM: Intel® PTT (TPM 2.0)
- Power Supply:
 - 12V DC power supply
 - 1 x Internal power connector (2x2 pin)
 - Support AT/ATX mode
- Power Consumption:
 - 12V@2.75A
 - (Intel® Celeron® J6412 CPU with 8 GB 3200 MHz LPDDR4x memory, max. loading, EuP mode disabled)
- Watchdog Timer:
 - Software programmable support 1–255 sec. system reset
- Operation Temperature: 0°C – 60°C
- Storage Temperature: -20°C – 70°C
- Operation Humidity: 5% – 95%, non-condensing
- Dimensions: 115 mm x 165 mm
- Weight: GW:850 g / NW:350 g

Ordering Information

- **NANO-EHL-J6412C-R10:**
EPIC SBC supports Intel® quad-core Celeron® J6412 2.0GHz on-board SoC with 8GB LPDDR4x memory on board, HDMI, DP, iDPM, M.2 A key, M.2 B key, USB 3.2, SATA 6Gb/s, COM, iAUDIO, PCIe x2 for riser card 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
- **32205-002700-200-RS:**
RS-232/422/485 cable, 200mm, p=2.0
- **iDPM-eDP-R10:**
eDP to eDP converter board (for IEI iDPM connector)
- **iDPM-LVDS-R10:**
eDP to LVDS converter board (for IEI iDPM connector)
- **iDPM-VGA-R10:**
eDP to VGA converter board (for IEI iDPM connector)
- **NWR-L2S-N-R10:**
PCIe x2 to two PCIe x1 riser card on the left side
- **NWR-R2S-N-R10:**
PCIe x2 to two PCIe x1 riser card on the right side

Jumpers Setting and Connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX power mode setting jumper
J_CMOS1	Clear CMOS button (solder side)
CHASSIS1	Chassis intrusion jumper
J_FLASH1	Flash descriptor security override jumper
AUDIO1	Audio connector for IEI AC-KIT-888S kit
CN1	12V power input connector
BAT2	RTC battery connector
SP1	Buzzer connector
DIO1	Digital I/O connector
EC_DEBUG1	EC debug connector
CPU_FAN1	Fan connector
F_PANEL1	Front panel connector
I2C1	I ² C connector
PWR_BTN1	Power button connector
RST1	Reset button (solder side)
COM1, COM2	RS-232/422/485 serial port connectors
COM3, COM4, COM5, COM6	RS-232 serial port connectors
ISATA1	iSATA connector with 5V power
SATA2	SATA 6Gb/s connector
SATA2_PWR	SATA power connector
SMB1	SMBus connector
JBIOS1	Flash SPI ROM connector
EC_SPI1	Flash EC ROM connector
USB2_1	Internal USB 2.0 connectors
IDPM	IEI iDPM slot
IP2EHL_XC	PCIe x4 slot
M2_AE1	M.2 2230 A key slot
M2_B_KEY	M.2 2242/2280 B key slot
HDMI1	External HDMI connector

DP1	External DP connector
LAN1, LAN2	External 2.5GbE RJ-45 connectors
USB20_CON1	External dual USB 2.0 connector
USB30_CON1	External dual USB 3.2 Gen 2 connector

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

J_CMOS1: Clear CMOS Button	
Status	DESCRIPTION
NC	Keep CMOS Setup (Normal Operation)
Press	Clear CMOS Setup

J_FLASH1: Flash Descriptor Security Override Jumper	
PIN NO.	DESCRIPTION
Open	Disabled (default)
Short	Enabled

CHASSIS1: Chassis Intrusion Jumper	
PIN NO.	DESCRIPTION
Open	Chassis close (default)
Short	Chassis open

AUDIO1: Audio Connector for IEI AC-KIT-888S kit			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDA_SYNC	2	HDA_BIT_CLK
3	HDA_SDOUT	4	HDA_PCBEEP
5	HDA_SDIN	6	HDA_RST#
7	+5V	8	GND
9	+12V	10	GND

CN1: 12V Power Input Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	+12V
2	GND	4	+12V

BAT2: RTC Battery Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBATT	2	GND

SP1: Buzzer Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	PC_BEEP_N

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

CPU_FAN1: CPU Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	FANIO
2	+12V	4	PWM (+5V)

EC_DEBUG1: EC Debug Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NC	4	EDICLK
2	EDICS	5	EDIDI
3	EDIDO	6	GND

F_PANEL1: Front Panel Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	4	PWR_LED-
2	GND	5	HDD_LED+
3	PWR_LED+	6	HDD_LED-

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

PWR_BTN1: Power Button Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	PWR_BTN+	2	PWR_BTN-

COM1, COM2: 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

COM3, COM4, COM5, COM6: 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

ISATA1: iSATA 6Gb/s Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	11	+5V
2	GND	12	N/C
3	GND	13	N/C
4	GND	14	GND
5	GND	15	SATA RX+
6	GND	16	SATA_RX-
7	+5V	17	GND
8	+5V	18	SATA_TX-
9	+5V	19	SATA_TX+
10	+5V	20	GND

SATA2: 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		

SATA2_PWR: SATA Power Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC5V	2	GND

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

EC_SPI1: Flash EC ROM Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	CS#_EC	2	+3.3V
3	SO_EC	4	HOLD#_EC
5	EC_DET_FLASH	6	SCK_EC
7	GND	8	SIO_EC

USB2_1: Internal USB 2.0 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

M2_AE1: M.2 2230 A Key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
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	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_DP	36	GND
37	PCIE_TX_DN	38	NC
39	GND	40	NC
41	PCIE_RX_DP	42	NC
43	PCIE_RX_DN	44	NC
45	GND	46	NC
47	PCIE_CLK+	48	NC
49	PCIE_CLK-	50	SUSCLK
51	GND	52	PLT_RST
53	NC	54	+3.3V
55	+3.3V	56	WLAN_EN_EC
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	WIGIG_PE_WAKE_N
71	NC	72	+3.3V
73	NC	74	+3.3V
75	GND		

M2_B_KEY: M.2 2242/2280 B Key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+V3.3
3	GND	4	+V3.3
5	GND	6	WWAN_FCP_OFF_N
7	USB2_DP	8	WWAN_DISABLE_N
9	USB2_DN	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	NC
21	NC	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE_1_RX_DN	30	NC
31	PCIE_1_RX_DP	32	NC
33	GND	34	NC
35	PCIE_1_TX_DN	36	NC
37	PCIE_1_TX_DP	38	SSD_DEVSLP
39	GND	40	NC
41	PCIE_0_RX_DN	42	NC
43	PCIE_0_RX_DP	44	NC
45	GND	46	NC
47	PCIE_0_TX_DN	48	NC
49	PCIE_0_TX_DP	50	PLT_RST_N
51	GND	52	NC
53	PCIE_CLK_DN	54	PCIE_WAKE#
55	PCIE_CLK_DP	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SUSCLK

67	NC	68	NC
69	NC	70	+V3.3
71	GND	72	+V3.3
73	GND	74	+V3.3
75	GND		

DP1: External DP Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
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

HDMI1: External HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	HDMI_DATA2P	11	GND
2	GND	12	HDMI_CLKN
3	HDMI_DATA2N	13	N/C
4	HDMI_DATA1P	14	N/C
5	GND	15	HDMI_CLK
6	HDMI_DATA1N	16	HDMI_SDA
7	HDMI_DATA0P	17	GND
8	GND	18	+5V
9	HDMI_DATA0N	19	HDMI_HPD
10	HDMI_CLKP		

LAN1, LAN2: 2.5GbE RJ-45 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LAN1_MD0+	5	LAN1_MD2+
2	LAN1_MD0-	6	LAN1_MD2-
3	LAN1_MD1+	7	LAN1_MD3+
4	LAN1_MD1-	8	LAN1_MD3-

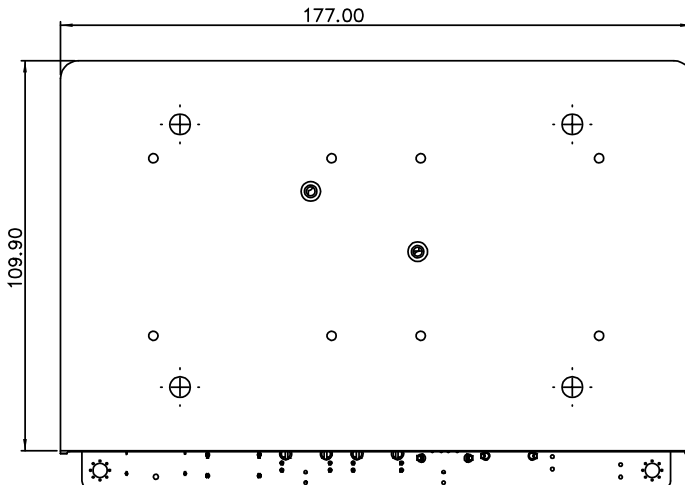
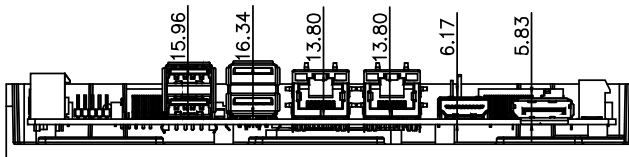
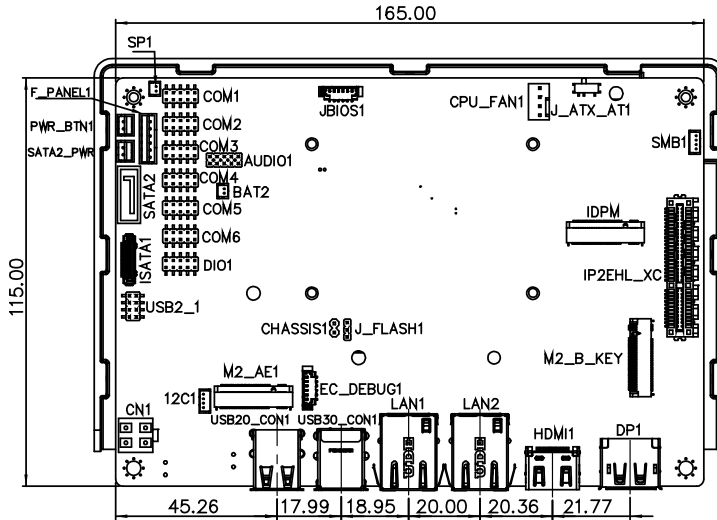
All the drivers and utility for the NANO-EHL are available on IEI Resource Download Center. Type NANO-EHL and press Enter to find all the relevant software, utilities, and documentation. To install software from the downloaded ISO file, mount the file as a virtual drive to view its content.

IEI Resource Download Center

<https://download.ieiworld.com>



Board Layout: Jumper and Connector Locations



(Unit: mm)

