

**3.5" SBC Supports Intel® Alder Lake-N Processor, LPDDR5, HDMI, DP, iDPM, Dual 2.5GbE, M.2 A Key + M Key, USB 3.2 Gen 2, SATA 6Gb/s, COM, PCIe x4 for Riser Card and RoHS**

# WAFER-ADL-N

## Quick Installation Guide

Version 1.0

June 15, 2023

### Package List

WAFER-ADL-N package includes the following items:

- 1 x WAFER-ADL-N single board computer with heat spreader
- 1 x SATA with power cable
- 1 x Power cable
- 1 x QIG



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## Specifications

- CPU:  
Intel® Alder Lake-N onboard SoC  
Intel® Processor N200 (quad-core, up to 3.7GHz, 6W TDP)  
Intel® Processor N97 (quad-core, up to 3.6GHz, 12W TDP)
- Memory:  
On-board 8GB dual-channel LPDDR5 memory
- BIOS:  
AMI UEFI BIOS
- Graphics Engine:  
Intel® UHD Graphics with 32 or 24 EUs
- Display Output:  
Triple independent display  
1 x HDMI 2.0  
1 x DP 1.4a  
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  
2 x USB 2.0 (2x4 pin, p=2.0)  
2 x RS-232/422/485 (1x9 pin, p=1.25)
- 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 connector (1x2 pin, p=2.0)
- Expansions:  
1 x M.2 2280 M key (PCIe Gen3 x1)

- 1 x M.2 2230 A key for Wi-Fi & BT (PCIe Gen3 x1 & USB 2.0)
- 1 x PCIe x4 slot (PCIe x2 signal, x2 & x1+x1)
- 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 (1x4 pin, p=1.25)
  - 1 x SMBus (1x4 pin, p=1.25)
- LAN LED:
- 2 x LAN LED connector (1x2 pin, p=2.0)
- Fan Connector:
  - 1 x System fan connector (1x4 pin)
- TPM
  - Intel® PTT
- Power Supply:
  - 12V DC power supply
  - Support AT/ATX mode
- Power Consumption:
  - 12V@3.21A  
(Intel® Processor N97 with 8 GB 4800 MHz LPDDR5 memory, max. loading, EuP mode disabled)
  - 12V@2.67A  
(Intel® Processor N200 with 8 GB 4800 MHz LPDDR5 memory, max. loading, EuP mode disabled)
- 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: 146 mm x 102 mm
- Weight: GW:850 g / NW:350 g

## Ordering Information

- **WAFER-ADL-N200C-R10:**  
3.5" SBC with Intel® Processor N200, LPDDR5, HDMI, DP, iDPM, dual 2.5GbE, M.2 A key + M key, USB 3.2 Gen 2, SATA 6Gb/s, COM, PCIe x4 for riser card and RoHS
- **WAFER-ADL-N97C-R10:**  
3.5" SBC with Intel® Processor N97, LPDDR5, HDMI, DP, iDPM, dual 2.5GbE, M.2 A key + M key, USB 3.2 Gen 2, SATA 6Gb/s, COM, PCIe x4 for riser card and RoHS
- **32001-008600-200-RS:** Dual-port USB 2.0 cable, 210mm, p=2.0
- **32205-008000-100-RS:** RS-232/422/485 cable, 250mm, 1x9 pin, p=1.25
- **AC-KIT-888S-R10:** Realtek ALC888S 7.1 Channel HD Audio board
- **CM-WAFER-WF-R10:** Cooler module (with fan), RoHS
- **CM-WAFER-WOF-R10:** Cooler module (without fan), RoHS
- **NWR2-L2S-R10:** PCIe x4 to two PCIe x2 riser card on the left side
- **NWR2-R2S-R10:** PCIe x4 to two PCIe x2 riser card on the right side
- **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)

## Jumpers Setting and Connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX power mode setting
J_CMOS1	Clear CMOS button
ME_FLASH1	Flash descriptor security override jumper
J_AUDIO1	Audio connector for IEI AC-KIT-888S kit
PWR1	12V power input connector
BAT1	RTC battery connector
DIO1	Digital I/O connector
CPU_FAN1	Fan connector
F_PANEL1	Front panel connector
I2C1	I <sup>2</sup> C connector
JLAN_LED1, JLAN_LED2	LAN LED connectors
PWR_BTN1	Power button connector
RST_BTN1	Reset button connector
COM1, COM2	RS-232/422/485 serial port connectors
S_ATA1	SATA 6Gb/s connector
SATA_PWR1	SATA power connector
J_SMB1	SMBus connector
JBIOS1	Flash SPI ROM connector
USB_CN2	Internal USB 2.0 connector
J1	MP2940CGRT firmware flash connector
J_HDMI1	HDMI firmware flash connector
PCIEX4_1	PCIe x4 slot (x2 signal)
M2_A1	M.2 2230 A key slot
M2_SSD1	M.2 2280 M key slot
IDPM1	IEI iDPM module slot
J_HDMI2	External HDMI connector
J_DP1	External DP connector
J_LAN1, J_LAN2	External 2.5GbE RJ-45 connectors
USB_CN1	External dual USB 2.0 connector
J_USB1	External dual USB 3.2 Gen 2 connector

<b>J_ATX_AT1: 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>PWR1: 12V Power Input Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	+12V
2	GND	4	+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>DIO1 : 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>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>F_PANEL1: Front Panel Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+5V	4	PWR_LED-
2	GND	5	HDD_LED+
3	PWR_LED+	6	HDD_LED-

<b>I2C1: I<sup>2</sup>C Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	3	SMB_CLK_EC
2	SMB_DATA_EC	4	+5V

<b>JLAN_LED1: LAN1 LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	2	I225_LINK_ACT_N_1

<b>JLAN_LED2: LAN2 LED Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	+3.3V	2	I225_LINK_ACT_N_2

<b>PWR_BTN1: Power Button Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	PWR_BTN+	2	PWR_BTN-

<b>RST_BTN1: Reset Button Connector</b>			
<b>PIN</b>	<b>DESCRIPTION</b>	<b>PIN</b>	<b>DESCRIPTION</b>
1	RESET+	2	RESET-

<b>COM1, COM2: RS-232/422/485 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		



<b>S_ATA1: SATA 6Gb/s Connector</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>SATA_PWR1:SATA Power Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC5V	2	GND

<b>J_SMB1: 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>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>USB_CN2: 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>J1: MP2940CGRT FW Flash Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	PM_SCL	2	PM_SDA
3	GND		

<b>J_HDMI1: HDMI Firmware Flash Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	HDMI_SDA	2	HDMI_SCL
3	GND		

<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	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	PCIE_TX_DP	36	NC
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	NC
51	GND	52	NC
53	NC	54	BT_RF_KILL_N
55	M.2_A_WAKE	56	WIFI_RF_KILL_N
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		

<b>M2_SSD1: M.2 2280 M Key Slot</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	GND	2	+V3.3
3	GND	4	+V3.3
5	NC	6	NC
7	NC	8	NC
9	GND	10	NGFF1_ACT_N
11	NC	12	+V3.3
13	NC	14	+V3.3
15	GND	16	+V3.3
17	NC	18	+V3.3
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC

25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	M_2_SSD_SLP
39	GND	40	NC
41	PCIE_RX_DP	42	NC
43	PCIE_RX_DN	44	NC
45	GND	46	NC
47	PCIE_TX_DN	48	NC
49	PCIE_TX_DP	50	NC
51	GND	52	NC
53	PCIE_CLK_DN	54	NC
55	PCIE_CLK_DP	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	M2_SUS_CLK
69	M2_SSD_PEDET	70	+V3.3
71	GND	72	+V3.3
73	GND	74	+V3.3
75	GND		

<b>USB_CN1: USB 2.0 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	VCC	5	VCC
2	USB_N	6	USB_N
3	USB_P	7	USB_P
4	GND	8	GND

<b>J_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	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>J_HDMI2: External HDMI Connector</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
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		

<b>J_USB1: 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>J_LAN1, J_LAN2: 2.5GbE RJ-45 Connectors</b>			
<b>PIN NO.</b>	<b>DESCRIPTION</b>	<b>PIN NO.</b>	<b>DESCRIPTION</b>
1	LAN1_MD0+	5	LAN1_MD2+
2	LAN1_MD0-	6	LAN1_MD2-
3	LAN1_MD1+	7	LAN1_MD3+
4	LAN1_MD1-	8	LAN1_MD3-

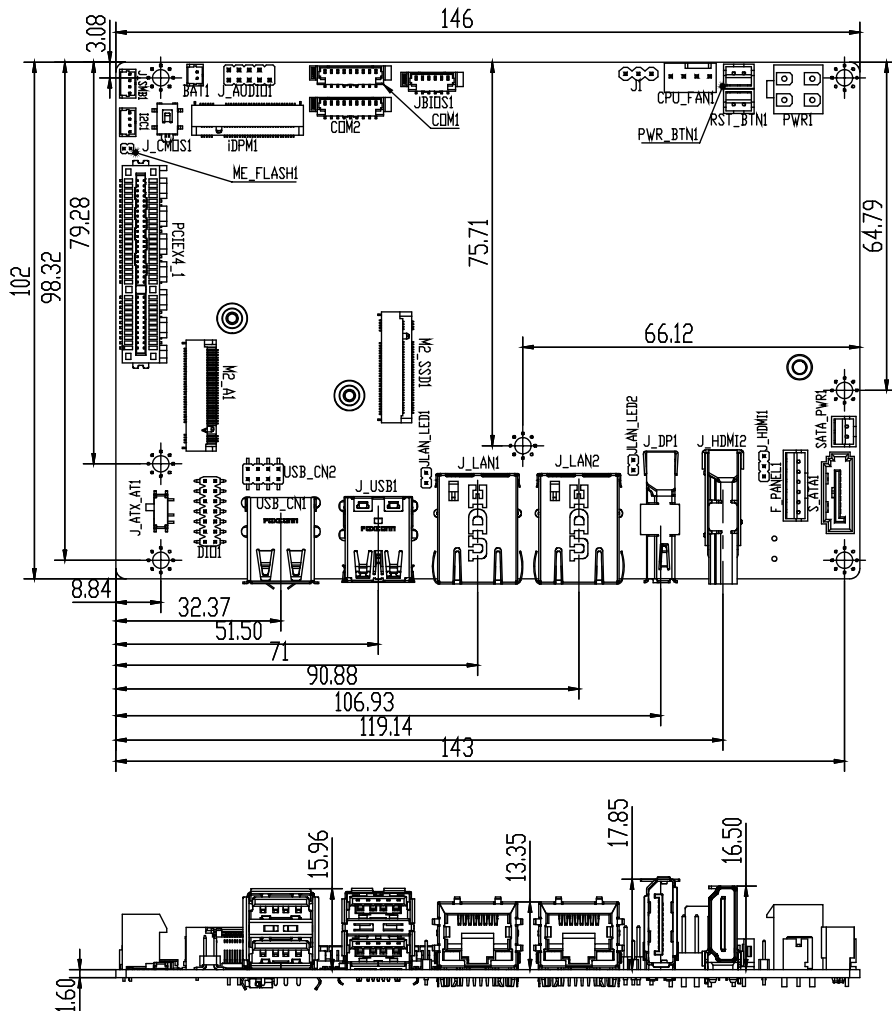
All the drivers and utility for the WAFER-ADL-N are available on IEI Resource Download Center. Type WAFER-ADL-N and press Enter to find all the relevant software, utilities, and documentation. To install software from the downloaded ISO file, mount the file as a virtual drive to view its content.

IEI Resource Download Center

<https://download.ieiworld.com>



# Board Layout: Jumper and Connector Locations



(Unit: mm)

