

**Mini-ITX SBC Supports LGA1200 10th Gen. Intel® Core™ i9/i7/i5/i3,
Pentium® or Celeron® CPU with Intel® H420E, DDR4, Dual
Independent Display, Triple GbE LAN, M.2, SATA 6Gb/s,
HD Audio and RoHS**

KINO-DH420

Quick Installation Guide

Version 1.0

June 30, 2022

Package List

KINO-DH420 package includes the following items:

- 1 x KINO-DH420 single board computer
- 2 x SATA cable
- 1 x I/O shielding
- 1 x QIG



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Specifications

- CPU:
LGA1200 10th Gen. Intel® Core™ i9/i7/i5/i3, Pentium® and Celeron® processors
- Chipset:
Intel® H420E
- Memory:
Two 260-pin 2933 MHz dual-channel DDR4 SO-DIMM slots supporting up to 64 GB memory
- BIOS:
AMI UEFI BIOS
- Graphics Engine:
Intel® HD Graphics Gen9 Engines with 16 low-power execution units, supporting DX11.3/12, OpenGL 4.3/4.4/4.5 and OpenCL 1.2/2.0/2.1
- Display Output:
Dual independent display
1 x DP (up to 4096 x 2304 @ 60 Hz)
1 x HDMI (up to 4096 x 2160 @ 30 Hz)
- Ethernet:
LAN1: Intel® I225-LM GbE controller
LAN2: Intel® I225V GbE controller
LAN2: Intel® I225V GbE controller
- External I/O Interface:
2 x RS-232
2 x USB 2.0
4 x USB 3.2 Gen 1 (5Gb/s) (Type-A)
- Internal I/O Interface:
2 x USB 2.0 (2x4 pin, p=2.0)
1 x RS-232 (2x5 pin, p=2.0)
1 x RS-422/485 (1x4 pin, p=2.0)
2 x SATA 6Gb/s with 5V/12V power support (no RAID)

- Audio:
 - Realtek ALC888S HD Audio codec
 - 2 x Audio jack (line-out, mic-in)
 - 1 x Front audio (2x5 pin, p=2.54)
- Front Panel:
 - 1 x Front panel (1x10 pin, p=2.54; power LED, HDD LED, power button, reset button)
- LAN LED:
 - 3 x LAN LED (1x2 pin, p=2.0)
- Expansions:
 - 1 x PCIe Gen3 x16
 - 1 x M.2 2230 A key (PCIe Gen3 x1, USB 2.0)
 - 1 x M.2 3042/3052/2242/2280 B key with SIM holder (PCIe Gen3 x2, USB 2.0)
- Digital I/O:
 - 1 x 8-bit digital I/O (2x5 pin, p=2.0)
- SMBus:
 - 1 x SMBus (1x4 pin, p=1.25)
- I²C:
 - 1 x I²C (1x4 pin, p=1.25)
- TPM
 - Intel® PTT (TPM 2.0)
- Fan Connector:
 - 1 x CPU fan connector (1x4 pin)
 - 1 x System fan connector (1x4 pin)
- Power Supply:
 - 12V DC input
 - 1 x ATX power connector (2x4 pin)
 - 1 x 4-pin DIN DC jack
 - Support AT/ATX mode
 - ErP/EuP compliant

- Power Consumption:
12V@12.408A (Intel® Core™ i9-10900E CPU with two 32 GB 2933 MHz DDR4 memory, EuP/ErP 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: 170 mm x 170 mm
- Weight: GW:900 g / NW:400 g
- Safety: CE/FCC compliant

All the drivers and utility for the KINO-DH420 are available on IEI Resource Download Center. Type KINO-DH420 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>



Ordering Information

- **KINO-DH420-R10:**
Mini-ITX SBC supports LGA1200 10th Gen. Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® CPU with Intel® H420E, DDR4, dual independent display, triple GbE LAN, M.2, SATA 6Gb/s, HD Audio and RoHS
- **19800-000300-100-RS:**
RS-232 cable with bracket, 300mm, p=2.0
- **32205-003800-300-RS:**
RS-422/485 cable, 200mm, p=2.0
- **32801-000703-500-RS:**
SATA cable, 500mm
- **CF-115XA-R10:**
High performance LGA1155/1156 cooler kit, 1U chassis compatible, 73W
- **CF-1156C-R20:**
LGA1155/LGA1156 cooler kit, 1U chassis compatible, 45W
- **CF-1156D-R30:**
LGA1155/LGA1156 cooler kit, 1U chassis compatible, 65W
- **CF-115XE-R10:**
High-performance LGA1155/1156/1200 cooler kit, 95W

Jumpers Setting and Connectors

LABEL	FUNCTION
J_ATX_AT1	AT/ATX power mode setting
J_CMOS1	Clear CMOS jumper
J_FLASH1	Flash descriptor security override jumper
PWR2	12V power input connector
AUDIO1	Audio connector
BAT1	RTC battery connector
SP1	Buzzer connector
DIMM1, DIMM2	DDR4 SO-DIMM slots
DIO1	Digital I/O connector
DBG_PORT1	Debug port connector
CPU_FAN1, SYS_FAN1	Fan connector
JSPI1	Flash SPI ROM connector
EC_SPI1	Flash EC ROM connector
F_PANEL1	Front panel connector
I2C1	I ² C connector
JP1	LAN1 link LED connector
JP2	LAN2 link LED connector
JP3	LAN3 link LED connector
M2_A1	M.2 A-key slot
M2_B1	M.2 B-key slot
PCIEX16_1	PCIe x16 slot
COM3	RS-232 serial port connector
COM4	RS-422/485 serial port connector
S_ATA1, S_ATA2,	SATA 6Gb/s connectors
SATA_PWR1, SATA_PWR2	SATA power connectors
SMB1	SMBus connector
USB2	USB 2.0 connector
AUDIO_CV1	External HD Audio jack

LAN1_USB1, LAN2_USB2	External GbE RJ-45 and USB 3.2 Gen 1 combo connectors
LAN3_USB2	External GbE RJ-45 and USB 2.0 combo connector
HDMI_DP1	External HDMI and DP combo connector
PWR1	External power input connector
COM1	External dual RS-232 connector

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

PWR2: 12V Power Input Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

AUDIO1 : Internal Audio Connector for IEI Audio Module			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LMIC2-L	2	AUD_GND
3	LMIC2-R	4	PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LLINE2-L	10	LINE2-JD

BAT1: RTC Battery Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBATT	2	GND

SP1: Buzzer Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+V5S	2	PC_BEEP

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

DBG_PORT1: Debug Port Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	SMCLK_EC
3	NC	4	SMDAT_EC
5	GND	6	PLTRST_N

CPU_FAN1, SYS_FAN1: CPU/System Fan Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	3	FANIO
2	+12V	4	PWM

JSPI1: 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	VCC
3	SO_EC	4	HOLD#_EC
5	EC_GPG	6	SCK_EC
7	GND	8	SIO_EC

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

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

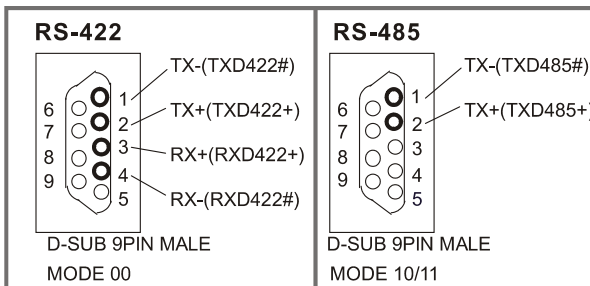
JP1: LAN1 Link LED Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+3.3V	2	LAN1_LED_LNK#_ACT

JP2: LAN2 Link LED Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+3.3V	2	LAN2_LED_LNK#_ACT

JP3: LAN3 Link LED Connector			
PIN	DESCRIPTION	PIN	DESCRIPTION
1	+3.3V	2	LAN3_LED_LNK#_ACT

COM3: RS-232 Serial Port Connector			
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

COM4: RS-422/428 Serial Port Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RXD422-	3	TXD422+/TXD485+
2	RXD422+	4	TXD422-/TXD485-



S_ATA1, S_ATA2: SATA 6Gb/s Connectors			
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_PWR2: SATA Power Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+12V	3	GND
2	GND	4	+5V

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

USB2: 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_A1: M.2 A-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	USB+	4	+3.3V
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	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+	36	GND
37	PCIE_TX-	38	NC
39	GND	40	NC
41	PCIE_RX+	42	NC
43	PCIE_RX1	44	NC
45	GND	46	NC
47	PCIE_CLK+	48	NC
49	PCIE_CLK-	50	NC
51	GND	52	PLT_RST
53	CLKREQ0#	54	Pull up +3.3V
55	PCIE_WAKE	56	Pull up +3.3V
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	NC
71	NC	72	+3.3V
73	NC	74	+3.3V
75	GND		

M2_B1: M.2 B-key Slot			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+3.3V
3	GND	4	+3.3V
5	GND	6	NC
7	USB+	8	NC
9	USB-	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	PCH_WAKE_N	24	NC
25	DPR	26	NC
27	GND	28	NC
29	PCIE_RX1-	30	SIM_RST
31	PCIE_RX1+	32	SIM_CLK
33	GND	34	SIM_IO
35	PCIE_TX1-	36	SIM_VCC
37	PCIE_TX1+	38	NC
39	GND	40	NC
41	PCIE_RX0-	42	NC
43	PCIE_RX0+	44	NC
45	GND	46	NC
47	PCIE_TX0-	48	NC
49	PCIE_TX0+	50	M2_RST
51	GND	52	CLKREQ0#
53	PCIECLK-	54	PCH_WAKE_N
55	PCIECLK+	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC

67	LTE_RST	68	NC
69	PEDET	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

AUDIO_CV1: External Audio Jacks	
Jack Color	DESCRIPTION
Green	Line-out: connect this port to headphone or speaker
Pink	Microphone: connect this port to microphone

LAN1_USB1, LAN2_USB2			
External GbE RJ-45 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+
External USB 3.2 Gen 1 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+

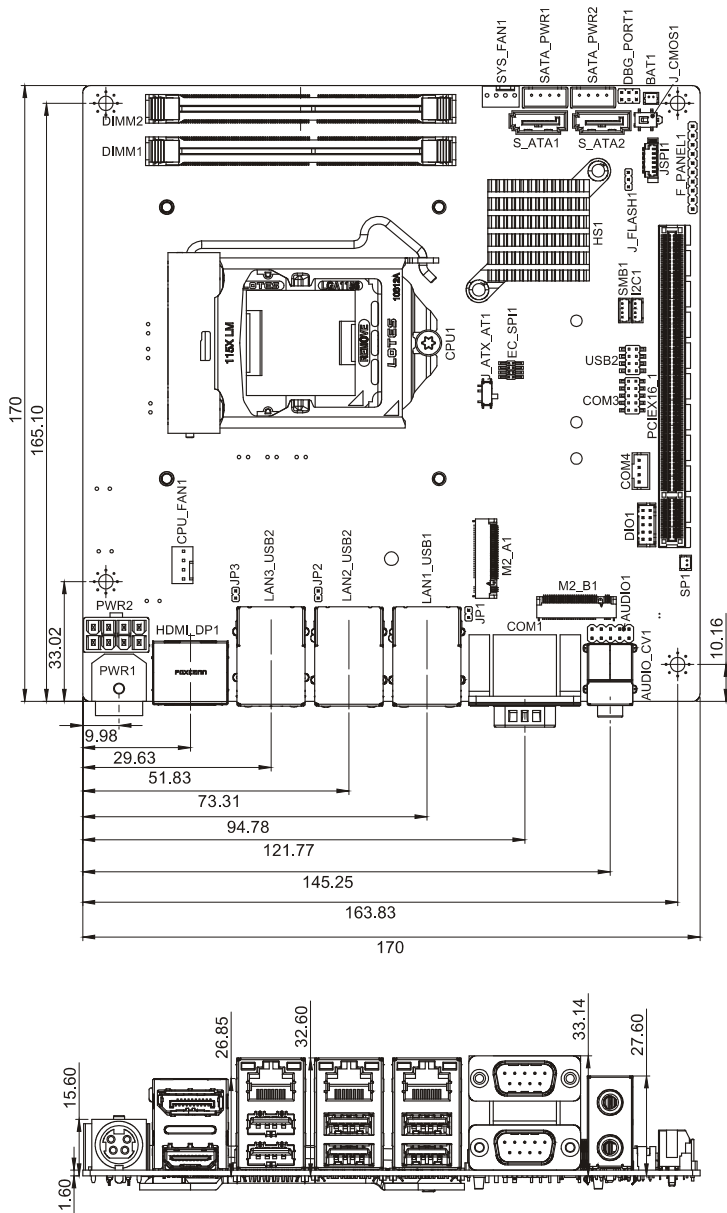
LAN3_USB2			
External GbE RJ-45 Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+
External USB 2.0 Connectors			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	VCC
2	USB_DATA-	6	USB_DATA-
3	USB_DATA+	7	USB_DATA+
4	GND	8	GND

PWR1: External Power Input Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+12V	2	GND
3	+12V	4	GND

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

HDMI_DP1			
External DP Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LANE0P	11	GND
2	GND	12	LANE3N
3	LANE0N	13	AUX_CTRL_DET_C
4	LANE1P	14	GND
5	LANE1N	15	AUXP
6	GND	16	GND
7	LANE2P	17	AUXN
8	GND	18	HPD
9	LANE2N	19	GND
10	LANE3P	20	+5V
External HDMI Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
21	HDMI_DATA2	31	GND
22	GND	32	HDMI_CLK#
23	HDMI_DATA2#	33	N/C
24	HDMI_DATA1	34	N/C
25	GND	35	HDMI_SCL
26	HDMI_DATA1#	36	HDMI_SDA
27	HDMI_DATA0	37	GND
28	GND	38	+5V
29	HDMI_DATA0#	39	HDMI_HPDP
30	HDMI_CLK		

Board Layout: Jumper and Connector Locations



(Unit: mm)