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BKHD

BKHD-1338NP-20-6LAN Motherboard User Manual

VER 1.3

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Safety Guide

To ensure optimal performance of BKHD products, please read the user manual in its entirety. Before checking product-specific details, we kindly ask that you carefully read these safety instructions.

Product Version Identification

You can find the version of this motherboard on the motherboard itself, marked as "REV: X.X". X.X represents numbers, for example, "REV: 1.0" means the motherboard version is 1.0. When updating the motherboard's BIOS, drivers, or referring to other technical data, please pay attention to the product version marking.

Catalog

Product Profile

The 1338NP-20-6LAN is a compact industrial network motherboard for embedded networking, edge gateways, firewalls, routing, and multi-LAN applications. Powered by the Intel Celeron N Series platform, it features 6x Intel I226V 2.5GbE controllers for fast and reliable connectivity. With up to 16GB DDR4 SO-DIMM memory, SATA 6Gb/s, mSATA, rich expansion interfaces, and a 180 × 200 mm form factor, it is built for industrial control, security, monitoring, and edge computing in -20°C to 55°C environments.

Main features:

Compact and Efficient Embedded Platform Design

Powered by an Intel Celeron Processor N Series platform, the 1338NP-20-6LAN delivers a reliable balance of computing performance and power efficiency for embedded networking applications. It supports DDR4 SO-DIMM memory up to 16GB with a maximum frequency of 2933 MHz, providing stable system performance for firewall, routing, gateway, and edge communication workloads. With SATA 6Gb/s and mSATA storage interfaces, the board can meet both operating system installation and local data storage requirements.

Six-Port 2.5GbE High-Speed Networking Architecture

Equipped with six 2.5GbE RJ45 Ethernet ports powered by Intel I226V controllers, the motherboard provides high-bandwidth, low-latency network connectivity for multi-LAN and multi-WAN applications. This design makes it ideal for network security appliances, edge routers, firewalls, VPN gateways, industrial gateways, and multi-segment data forwarding systems.

Flexible Expansion and Wireless Connectivity Support

The board provides two mPCIe slots with USB 2.0 signal support, offering flexible expansion options for wireless communication modules or specialized function cards. An onboard SIM card slot further enhances wireless communication capability, making the platform suitable for industrial IoT gateways, remote network devices, and cellular communication applications when paired with compatible modules.

Industrial-Oriented Reliability and Flexible Power Input

Designed for demanding embedded environments, the motherboard supports an operating temperature range of -20°C to 55°C and relative humidity from 0% to 95% non-condensing. It supports DC 12V input through either an ATX 4-pin connector or a DC jack, providing flexible power supply options for different chassis and deployment environments. The compact 180x200 mm form factor makes it suitable for industrial network equipment, rackmount appliances, and custom embedded systems.

Motherboard Specifications

Processor	Product Collection	Intel Celeron Processor N Series
	Sockets Supported	FCBGA1338
Memory specifications	Memory Type	DDR4 SO-DIMM
	Maximum Capacity	16GB
	Maximum Frequency	2933 MHz
Storage specifications	SATA	1*SATA 6Gb/s
	mSATA	1*mSATA
Network features	Ethernet	6*2.5GbE
	Controller	6*Intel I226V
Extension interface	mPCIe	2*mPCIe (USB2.0 signal)
Display functions	Pins	1*J_VGA/1*J_HDMI
	Chip	Intel UHD Graphics
Backplane I/O	USB	2*USB-A 3.0
	Console	1*RJ45 COM
	Ethernet	6*RJ45
	Button	1*Power button, 1*Reset button
	Power supply	1*Jack DC 5.5/2.5mm
Onboard I/O	SATA	1*SATA Data connector, 1*SATA Power socket
	Display	1*J_VGA/1*J_HDMI
	SIM	1*SIM Card solts
	Fan	1*CPU_FAN, 1*SYS_FAN
	Pins	1*F_PANEL
		1*J_COM
		2*F_USB 2.0 (can expand 4x USB2.0 ports)
		1*J_KM (Mouse/Keyboard)
Power supply mode	Power	1*ATX 12V 4-pin Connector or 1*Jack DC 12V
Motherboard size	Specification	180*200 (mm)
Work Environment	Temperature	-20~55℃ (Operating); -20℃~60℃ (Storage)
	Humidity	0%~95% (Relative humidity, no condensation)

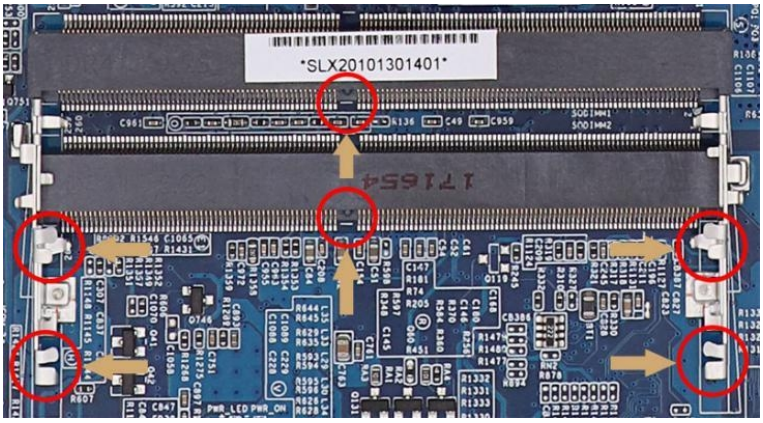
Motherboard Installation

Safety Note

- Please do not remove the serial number and agent warranty sticker from the motherboard prior to installation. Doing so may affect the product's warranty recognition standard.
- Prior to installing or removing the motherboard or other hardware devices, please ensure that the power is turned off and the power cord is unplugged from the socket.
- When installing additional hardware devices on the motherboard interfaces, please ensure that the connectors and sockets are securely fastened.
- When handling the motherboard, please avoid contact with the metal wiring components to prevent the risk of short circuits.
- It is recommended that an anti-static wrist strap be worn when handling the motherboard, central processing unit (CPU), or memory. In the absence of an anti-static wrist strap, it is advisable to ensure that your hands are dry and to touch a metal object first in order to eliminate static electricity.
- Before installing the motherboard, we kindly request that place it on an antistatic mat or in an antistatic bag.
- Make sure the power adapter is turned off before unplugging the motherboard power connector.
- Before turning on the power, make sure the voltage of the adapter is within the standard voltage range.
- Before turning on the power, make sure all hardware device cables and power cords are properly connected.
- Do not allow the fixing screws to collide with the circuits or parts on the motherboard to avoid damage or malfunction of the motherboard.
- Make sure there are no loose screws or metal parts on the motherboard or inside the computer case before using the unit.
- Please secure the computer host in a stable location before starting the device.
- To prevent system failure, do not place the unit in an environment where the temperature is excessive.
- Turning on the power before installation is complete may damage the motherboard, other equipment, or yourself.
- If you are unfamiliar with how to perform the installation, or if you have any technical problems using this product, please contact a professional technician.

Memory Installation

The motherboard provides DDR4 SODIMM memory slot.



Before installing memory:

1. Please confirm that the memory you purchased is compatible with the specifications supported by this motherboard.

2. Before installing or removing the memory, please make sure that the power of the computer is turned off to avoid damage.

3. The memory design has a foolproof mark. If you insert the memory in the wrong direction, the memory cannot be installed. Please change the direction.

When installing memory:

1. Before installing or removing memory, please turn off the power and unplug the power cord.

2. Carefully hold the two ends of the Memory Stick and do not touch the metal contacts on the Memory Stick.

3. Align the metal contacts of the memory with the memory slot, making sure that the concave hole is aligned with the convex point of the upper slot.

4. Insert the memory into the slot at an angle of 30 degrees, then press the Memory Stick down until you hear a "click," indicating that the memory has been successfully installed and is ready to use. (Note: Do not press the Memory Stick too hard to avoid damaging the memory).

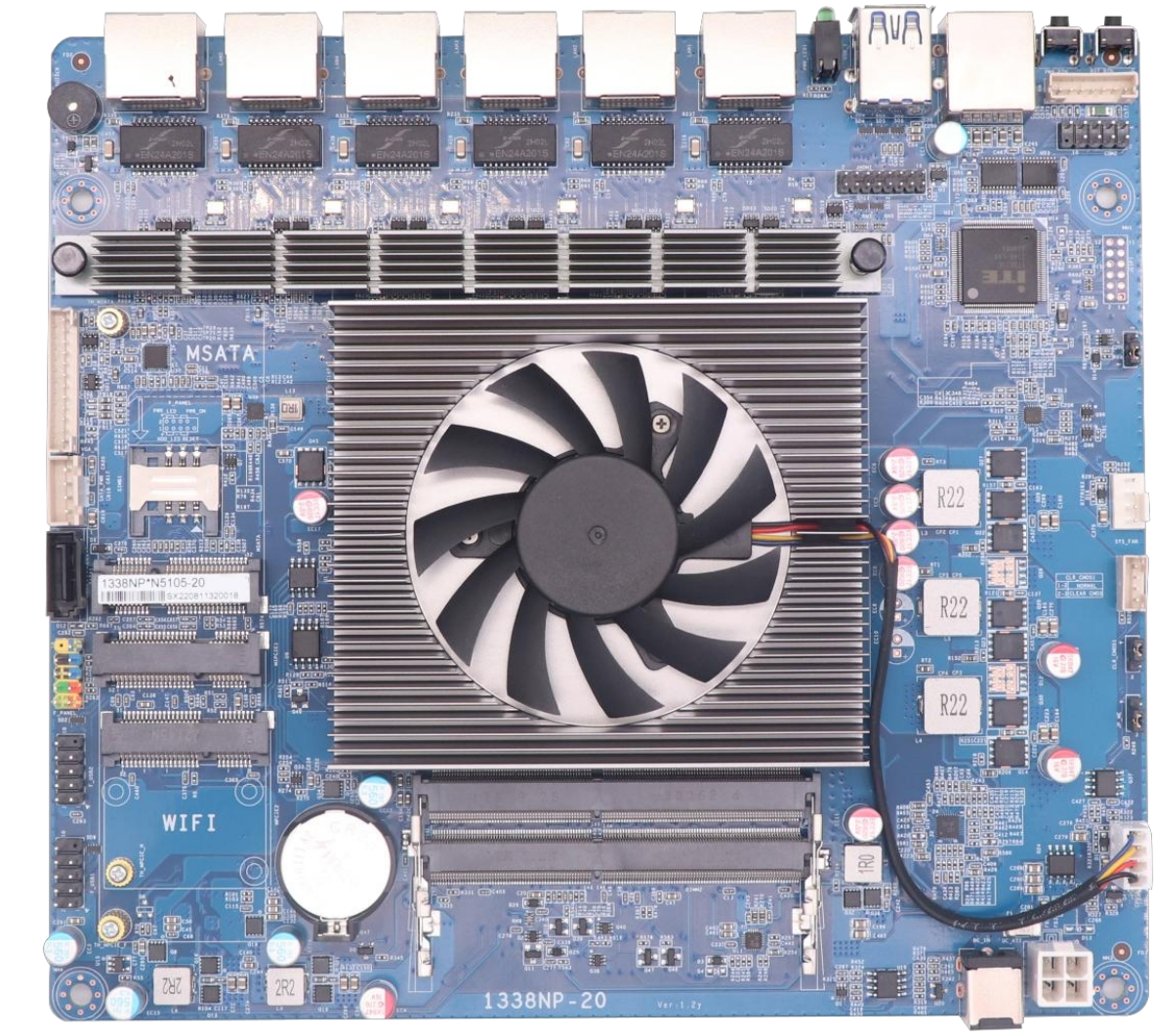
5. To remove the Memory Stick, push out the tabs at both ends of the memory slot simultaneously, and then remove the Memory Stick.

To remove the memory:

Use two fingers to push the latches at either end of the slot outward, the memory will pop up, then remove the memory.

Product Images

Please be advised that products manufactured in different batches may exhibit slight variations in appearance. To ensure the most accurate representation, please refer to the actual received goods.



Jumper Setting

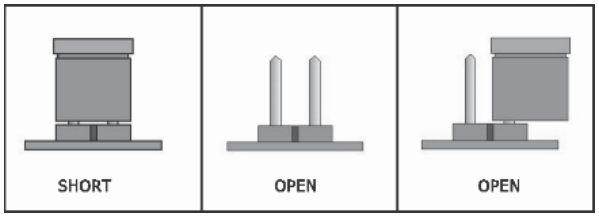
Before installing the hardware device, you can set the corresponding jumpers according to your needs based on the following table.

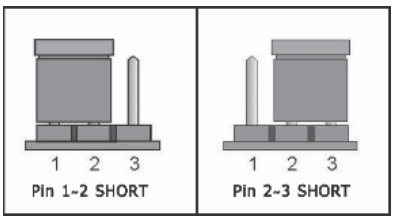
To identify the first pin of a jumper or connector

Look at the marking next to the jumper or connector. The triangle symbol "▲" or "1" or a bold line indicates the first pin; check the pad on the back of the motherboard. The square pad is the first pin. When connecting the connector to the device, be careful to distinguish the first pin. Mixing the pins will damage the motherboard.

2-pin headers: Insert a jumper cap into both pins turns them off (short).

3-pin headers: Insert a jumper cap into pins 1-2 or pins 2-3 to off (short) them.





Restore on AC/Power Loss (AUTO_ON)

Image	Status	Setting
	1-2	Automatic power on (Default)
	2-3	Normal

ME Flashing Selection Jumper (J_ME)

Image	Status	Setting
	1-2	Disable
	2-3	Enable (Default)

CMOS Clear Selection Jumper (CLR_CMOS)

Image	Status	Setting
	1-2	Normal (Default)
	2-3	Clear CMOS settings

This jumper can clear the motherboard's BIOS settings, restoring them to factory default values. If you need to clear CMOS settings, use a metal object such as a screwdriver to simultaneously touch the two pins for a few seconds.

Important:

Before clearing CMOS settings, be sure to shut down the computer.

After booting, enter BIOS and load Optimized Defaults (Load Optimized Defaults) or manually enter the desired settings.

Motherboard Pin Definition

SATA Data

The motherboard provides 7-pin SATA data socket

Image	PIN	Definition	PIN	Definition
	1	GND	2	SATA_TXP
	3	SATA_TXN	4	GND
	5	SATA_RXN	6	SATA_RXP
	7	GND	-	

SATA PWR

The motherboard provides 4-pin SATA power socket

Image	PIN	Definition
	1	+12V
	2	GND
	3	GND
	4	+5V

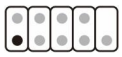
Tip: The 1st pin of the SATA_PWR hard disk power supply interface is +12V output, and the 4th pin is +5V output.

Serial Port Header (COM)

The motherboard provides RJ45 COM port

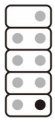
Image	PIN	Definition	PIN	Definition
	1	RTS#	2	DTR#
	3	TXD	4	N/A
	5	GND	6	RXD
	7	DSR#	8	CTS#

The motherboard provides COM pins (2*5-pin, 2.54 mm pitch, 10th pin is empty)

Image	PIN	Definition	PIN	Definition
	1	DCD#	2	RXD
	3	TXD	4	DTR#
	5	GND	6	DSR#
	7	RTS#	8	CTS#
	9	RI#		

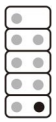
Front Panel Connectors (F_PANEL)

The motherboard provides F_PANEL pins (2*5-pin, 2.54 mm pitch, 10th pin is empty)

Image	PIN	Definition	PIN	Definition
	1	HDD_LED+	2	PWR_LED+
	3	HDD_LED-	4	PWR_LED-
	5	GND	6	POWER-SW
	7	RESET	8	GND
	9	GND		

USB Connectors Pins (F_USB1/F_USB2)

The motherboard provides F_USB pins (2*5-pin, 2.54 mm pitch, 9th pin is empty)

Image	PIN	Definition	PIN	Definition
	1	+5V	2	+5V
	3	USB1_DATA-	4	USB2_DATA-
	5	USB1_DATA+	6	USB2_DATA+
	7	GND	8	GND
			10	GND

- This header supports USB 2.0 specifications. Through a USB expansion bracket, one header can provide two USB ports. USB expansion brackets are optional accessories; please contact your local dealer for purchase.
- **Important**: Before connecting the USB expansion bracket, be sure to turn off the computer's power and unplug the power cord from the outlet to avoid damaging the USB expansion bracket.

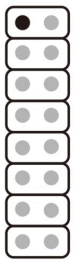
VGA Header (J_VGA)

The motherboard provides VGA_H pins (1*12-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	GND	2	VGA_VSync
	3	VGA_HSync	4	GND
	5	VGA_Red	6	GND
	7	VGA_Green	8	GND
	9	VGA_Blue	10	GND
	11	VGA_5V DDA	12	VGA_5V DDCLK

HDMI Header (J_HDMI)

The motherboard provides JHDMI pins (2*8-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	TMDS_TX2P	2	DCC_Clk
	3	TMDS_TX2N	4	DCC_Data
	5	TMDS_TX1P	6	N/A
	7	TMDS_TX1N	8	HPD_HDMI
	9	TMDS_TX0P	10	+5V
	11	TMDS_TX0N	12	GND
	13	TMDS_TXCP	14	GND
	15	TMDS_TXCN	16	GND

Keyboard And Mouse Interface (KM)

The motherboard provides Keyboard and Mouse Connectors (1*7-pin, 2.00 mm pitch)

Image	PIN	Definition
	1	KB_DATA
	2	KB_CLK
	3	GND
	4	MS_DATA
	5	MS_CLK
	6	GND
	7	+V5

Cooling Fan Power Socket (CPU_FAN/SYS_FAN)

The motherboard provides CPU/SYS_FAN pins (1*4-pin, 2.54mm pitch)

Image	PIN	Definition
	1	Ground
	2	+12V
	3	FAN_TAC
	4	FAN_PWM

- Be sure to connect the fan header to avoid the CPU and system operating in an overheated environment. Excessive temperature may cause the system to crash.
- These fan headers are not jumpers; do not place jumpers on the pins.

ATX Power Connector (DC power supply)

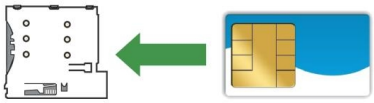
Before connecting the power cord to the outlet, ensure the power supply is turned off and all components are properly installed. The connector features a mistake-proof (keyed) design; please verify the correct orientation before plugging it in.

(Note: Do not use this power supply and the panel's DC IN connector to power the motherboard simultaneously.)

Image	PIN	Definition
	1	Ground
	2	Ground
	3	+12V
	4	+12V

SIM Card Slot (SIMB)

The motherboard features a SIM card slot for cellular connectivity, which can be used in combination with an LTE module.



Note: When inserting the SIM card, ensure the gold contacts are facing downward (facing toward the motherboard).

BIOS User Guide

BIOS Description

This motherboard features an AMI BIOS (Basic Input/Output System). Stored on a ROM chip on the motherboard, the BIOS contains essential low-level programs, including the power-on self-test (POST), system boot routines, and basic I/O configurations. It reads and writes system setting data via the CMOS, with the primary function of providing immediate, fundamental hardware control for the computer.

When the computer is powered on, the BIOS is the first program to run, performing the following core functions:

- Executes the Power-On Self-Test (POST): Checks and verifies that all essential hardware components are functioning properly.
- Initializes System Hardware: Tests peripheral devices and loads the operating system during bootup.
- Provides Low-Level Control: Delivers the most fundamental, direct control over the computer hardware.
- Manages Configuration: Allows users to configure and customize system parameters via the BIOS Setup utility.

BIOS data is stored in the CMOS RAM chip on the motherboard and maintained by a 3.3V coin cell battery (CR2032). It contains critical system configuration and the BIOS Setup utility used to adjust system parameters. Under normal operating conditions, modifying the BIOS is unnecessary. However, if CMOS data is lost or corrupted due to unforeseen factors, the BIOS settings must be reconfigured.

Note:

Incorrect BIOS configurations can cause severe hardware damage or motherboard failure. Users unfamiliar with system settings are strongly advised to proceed with caution. Because the motherboard BIOS is continuously updated, the screenshots and descriptions in this manual are for reference only. We cannot guarantee that the information herein will perfectly match your motherboard's actual BIOS version.

BIOS Settings

When the computer powers on or reboots, the following prompt will appear on the POST screen: Press "DEL" to enter BIOS Setup.

If the prompt disappears before you can respond, you may restart the system to try again by using one of the following methods:Press <Ctrl> + <Alt> + <Del> simultaneously.Press the Reset button on the chassis.Power off the system and turn it on again.

Keyboard keys	Functional Description
← / →	Move the Left and Right arrows to select the screen.
↑ / ↓	Move the Up and Down arrows to select the item.
+ / -	Increase/Decrease value or Change selection
<Enter>	Select, Confirm this option or Enter the submenu
<ESC>	Return to Main page, or End the setup process from Main page
<F1>	Show related Help instructions
<F2>	Restore previous settings
<F9>	Load the optimized settings (BIOS defaults)
<F10>	Save the changed settings and reboot

Common fault analysis and solutions

We have compiled some frequently asked questions for your reference. Please check https://bkminipc.com/frequently-asked-questions-and-answers/

Error	Inspection Method
Unable to start after power on	Make sure the power cord is properly connected. Make sure that the power supply you are using meets the power supply requirements of the motherboard. Try to reinsert the Memory Stick. Try to replace the Memory Stick. Try to clear the CMOS of the main board. Please confirm if there is an external expansion card and if it is normal after removing the external card.
Unable to display after power on	Make sure the monitor is turned on. Make sure the monitor and host power cables are properly connected. Make sure the monitor and host cables are properly connected. Check to see if the monitor is in "Sleep" mode. Try changing the monitor interface or replacing the monitor.
BIOS Setup cannot be saved	Check that the CMOS battery is installed Try to replace the CMOS battery (CR2032) Adjust the time and date in BIOS setup
Unable to find a bootable device	Make sure the drive's power and data cables are properly connected. Make sure the operating system is installed on the drive. Make sure the hard drive is not physically damaged.
Blue screen or freeze when logging on to the system	Check if the Memory Stick and External Card are loose. Try removing the newly installed hardware and uninstalling the newly installed driver or software. Try replacing the memory with a different specification.
Slow entry into the operating system	Check if the CPU cooling fan is running normally. Check if the remaining space of the system partition is insufficient. Use software to check for bad sectors on the hard drive.
System restarts automatically	Confirm that the CPU cooling fan is rotating normally. Confirm that the switch/reset button has not been accidentally touched. Confirm that the Memory Stick and external card are loose. Confirm that the power supply has sufficient load capacity, try to replace the power supply Check if the system is infected with viruses.
Unable to detect USB device	Confirm that the USB device requires separate power. Confirm that the USB interface has poor contact. Confirm that the USB controller is enabled in the BIOS setup.

Useful Links

Submit your suggestions and ideas in the community	https://www.reddit.com/r/bkminipc/	
Watch our new product demos	https://www.youtube.com/@BKHD-PCs	
Corporate News and Cooperation	https://www.linkedin.com/company/beikong/	
Get our latest news on Meta	https://www.facebook.com/people/%E5%80%8D%E6%8E%A7/61558406109357/	

