



BKHD-1851NP-OCP Motherboard User Manual

VER 1.0

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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

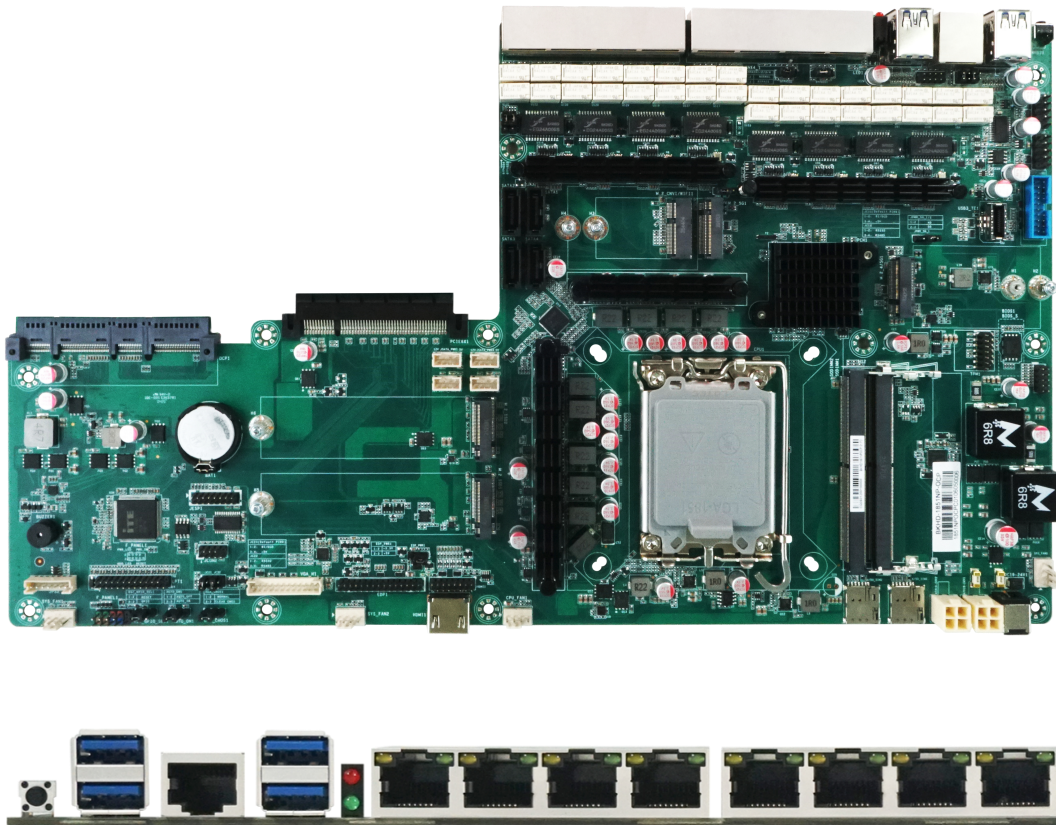
You can find the version of this motherboard on the motherboard itself, marked as "REV: X.X". X.X represents numbers, for example, "REV: 1.0" means the motherboard version is 1.0. When updating the motherboard's BIOS, drivers, or referring to other technical data, please pay attention to the product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

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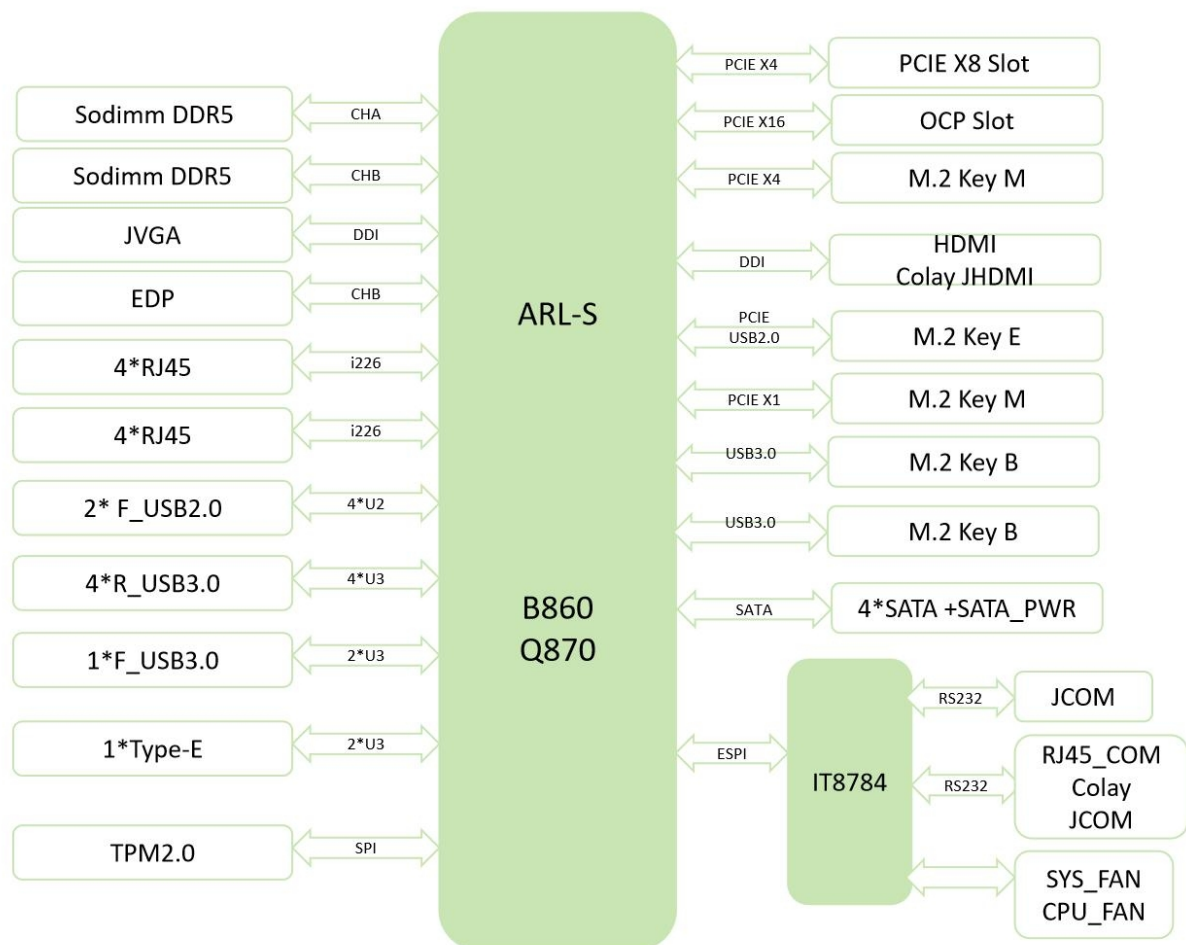
Product Images

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.



Motherboard Block Diagram

The following block diagram illustrates the hardware architecture and signal routing of the motherboard.



Product Profile

The 1851NP-OCP is a high-performance industrial network motherboard based on Intel Core Ultra Processors Series 2 and the FCLGA1851 socket. Designed for next-generation firewalls, routers, security appliances, edge computing, industrial gateways, and AI-enabled network systems, it supports up to 96GB DDR5 memory and integrates 8× Intel I226V 2.5GbE LAN ports. With SATA, dual M.2 SSD, PCIe x8, OCP PCIe x16, M.2 Key-E/B, optional bypass, dual SIM, TPM, rich USB//O headers, and DC 19V–24V input, it offers strong expansion for professional network and edge deployments.

Main features:

Intel Core Ultra Series 2 Platform

The 1851NP-OCP is based on Intel Core Ultra Processors Series 2 and the FCLGA1851 socket, delivering a modern computing platform for advanced network appliances and edge systems. It is suitable for applications requiring stronger CPU performance, improved platform scalability, and support for next-generation network and edge workloads.

8-Port Intel 2.5GbE Network Architecture

Equipped with 8x Intel I226V 2.5GbE controllers, the board provides eight RJ45 LAN ports for high-speed network communication. It is suitable for multi-WAN routing, LAN segmentation, WAN/LAN isolation, traffic forwarding, gateway services, network monitoring, and multi-zone firewall applications.

Optional Bypass Function for Network Reliability

The board supports optional 4x bypass segments with I226-LM, providing a reliability option for network security systems. This feature is valuable for firewall, UTM, IDS/IPS, and inline security appliances where network continuity is important during system failure, maintenance, or power interruption scenarios.

OCP and PCIe Expansion Capability

The board provides 1x OCP interface and 1x PCIe slot, enabling flexible expansion for network cards, acceleration cards, storage controllers, or application-specific add-on modules. The OCP interface makes the board especially suitable for scalable network appliance designs and customized high-performance network platforms.

Flexible Storage and Wireless Expansion

The motherboard includes 4x SATA 6Gb/s ports, 1x M.2 Key-M PCIe x4 SSD slot, and 1x M.2 Key-M PCIe x1 SSD slot for flexible storage deployment. It also provides 1x M.2 Key-E 2230 and 2x M.2 Key-B 3052 slots, supporting compatible wireless, cellular, or communication modules. Dual SIM card slots further support cellular gateway and remote communication applications.

Motherboard Specifications

Processor	Product Collection	Intel Core Ultra Processors (Series 2)
	Sockets Supported	FCLGA1851
Memory specifications	Memory Type	2*DDR5 SODIMM
	Maximum Capacity	96GB
	Maximum Frequency	6400 MT/s
Storage specifications	SATA	4*SATA 6Gb/s
	M.2 SSD	1*M.2 Key-M (PCIe x4), 1*M.2 Key-M (PCIe x1)
Network features	Ethernet	8*2.5GbE
	Controller	8*Intel I226V Optional 4 x Bypass segments (i226-LM)
I/O Chip		ITE IT8784
Extension interface	PCIe	1*PCIe x8 (x4 rate)
	OCP	1*PCIe x16
	M.2 Key-E	1*M.2 Key-E 2230 (PCIe/USB2.0 Signal)
	M.2 Key-B	2*M.2 Key-B 3052 (USB3.0 Signal)
Display functions	Pin Header	1*VGA, 1*HD, 1*eDP
	Chip	Intel Graphics (Depends on the processor)
Backplane I/O	Ethernet	8*RJ45
	USB	4*USB-A 3.0
	Console	1*RJ45 COM RS232
	Button	1*Power Button
	SIM	2*SIM Card Slots
	Power socket	2*ATX 4-pin Connector or 1*Jack DC 5.5/2.5mm
Onboard I/O	SATA	4*SATA Data connector, 4*SATA Power socket
	USB	1*USB Type-E
	Fan	1*CPU_FAN, 3*SYS_FAN
		1*F_PANEL
		1*J_COM
		2*F_USB 2.0, 1*F_USB 3.0
	Pins	1*TPM
		1*LPT
		1*PS/2
Power supply mode	DC	19V~24V
Motherboard size	Specification	375*220 (mm)
Work Environment	Temperature	0℃~60℃;
	Humidity	0%~90% (Relative humidity, no condensation)

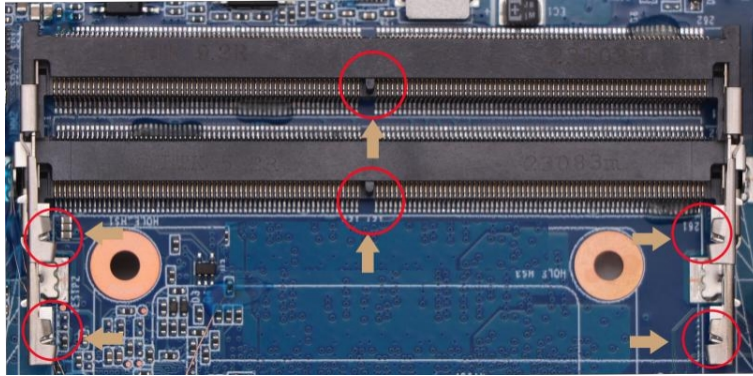
Motherboard Installation

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 DDR5 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.

Jumper Setting

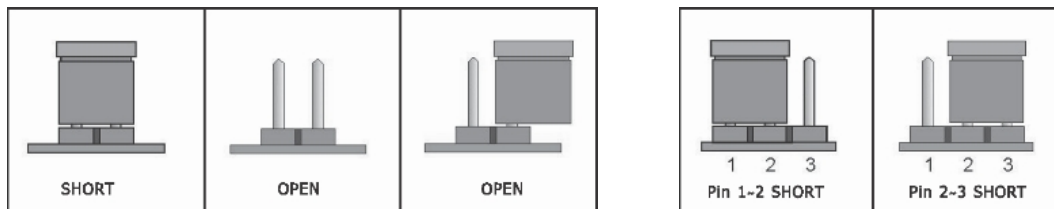
Before installing the hardware device, you can set the corresponding jumpers according to your needs based on the following table.

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.



Clear CMOS Jumper (CLR_CMOS)

The motherboard provides one Clear CMOS header (1*3-pin, 2.54 mm pitch)

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

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.

Restore on AC Power Loss (AUTO_ON)

The motherboard provides one auto power-on jumper (1*3-pin, 2.54 mm pitch)

Image	Status	Setting
	1-2	Normal (Default)
	2-3	Auto Power-On

Function Selection Jumper (RST_GPIO_SEL)

The motherboard provides one function selection jumper (1*3-pin, 2.54 mm pitch)

Image	Status	Setting
	1-2	Reset (Default)
	2-3	GPIO

4G/5G Selector Jumpers (J_PWR_5G_1/2)

The motherboard provides two jumpers (1*3-pin, 2.54 mm pitch)

Image	Status	Setting
	1-2	4G (Default)
	2-3	5G

BYPASS Function Selection Jumpers (BYPASS 1/2/3/4)

These jumpers configure the BYPASS modes when the optional BYPASS feature is selected.

The motherboard provides four jumpers (1*3-pin, 2.54 mm pitch)

Image	Status	Setting
	1-2	Normal (Default)
	2-3	BYPASS

Motherboard Pin Definition

SATA Data

The motherboard provides 7-pin SATA data socket

Image	PIN	Definition	PIN	Definition	
	1	GND	2	TX+	
	3	TX-	4	GND	
	5	RX-	6	RX+	
	7	GND	-		

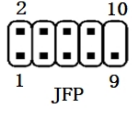
SATA PWR

The motherboard provides SATA power socket (1*4-pin, 2.00 mm pitch)

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

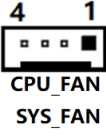
Front Panel Connectors (F_PANEL)

The motherboard provides F_PANEL header (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	PWR_ON
	7	RESET	8	GND
	9	GND		

Cooling Fan Power Socket (CPU_FAN/SYS_FAN)

The motherboard provides cooling fan header (1*4-pin, 2.54mm pitch)

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

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 header (2*5-pin, 2.54mm 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		

COM1/2 Power Selection (JC11/JC21)

The motherboard provides two powered jumpers (2*2-pin, 2.00mm pin pitch) for COM port voltage configuration.

Image	Status	Definition
	1-2	RI/DCD
	3-4	+5V

COM1/2 RS232/485 Selection Setting

Configured via JC12, JC22, JC13, JC23, JC14, and JC24 jumpers on the motherboard

Jumpers	PIN	Definition
JC 12/13/14	1-2	RS 232 (COM1)
	3-4	RS 485 (COM1)
JC 22/23/24	1-2	RS 232 (COM2)
	3-4	RS 485 (COM2)

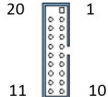
USB Connectors (J_USB1/J_USB2)

CAUTION: Turn off the computer and unplug the power cord from the wall outlet before installing the USB expansion card to prevent damage.

The motherboard features F_USB 2.0 headers (2x5-pin, 2.54 mm pitch, with pin 9 serving as the empty pin)

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

The motherboard features F_USB 3.0 headers (2x10-pin, 2.00 mm pitch, with pin 20 serving as the empty pin)

Image	PIN	Definition	PIN	Definition
	1	VCC	11	USB2_TP3 D2+
	2	USB3_RN4 RX1-	12	USB2_TN3 D2-
	3	USB3_RP4 RX+	13	GND
	4	GND	14	USB3_TP3 TX2+
	5	USB3_TN4 TX1-	15	USB3_TN3 TX2-
	6	USB3_TP4 TX1+	16	GND
	7	GND	17	USB3_RP3 RX2+
	8	USB2_TN4 D1-	18	USB3_RN3 RX2-
	9	USB2_TP4 D1+	19	VCC
	10	NC		

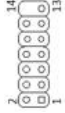
Programmable Input And Output (J_GPIO)

The motherboard provides GPIO header (2*5-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	GPIO	2	GPIO
	3	GPIO	4	GPIO
	5	GPIO	6	GPIO
	7	GPIO	8	GPIO
	9	GND	10	+5V

Trusted Platform Module (J_TPM)

The motherboard provides TPM header (2*7-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	VCC	2	S_SPI_TPM_IRQ#
	3	S_PLTRST#	4	S_SPI_TPM_CS2#
	5	F2_SPI_CS1#_R	6	F_BOIS_WP#_R
	7	+3V_SPI	8	GND
	9	F_SPI_CSO#_R	10	T_SPI_CLK
	11	T_SPI_MISO	12	T_SPI_MOSI
	13	F_SPI_HOLD#_R	14	

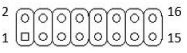
VGA Header (J_VGA)

The motherboard provides J_VGA header (1*12-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	GND	2	CRT_VSYNC
	3	HSync	4	GND
	5	Red	6	GND
	7	Green	8	GND
	9	Blue	10	VGA_DET_N
	11	DCC_Data	12	SCL

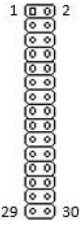
HDMI Header (J_HDMI)

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

Image	PIN	Definition	PIN	Definition
	1	HDMI_TXD2_P	2	HDMI_DDC_CLK_R-
	3	HDMI_TXD2_N	4	HDMI_DDC_DATA_R
	5	HDMI_TXD1_P	6	NC
	7	HDMI_TXD1_N	8	HPD_CONN
	9	HDMI_TXD0_P	10	+5V_HDMI
	11	HDMI_TXD0_N	12	GND
	13	HDMI_TXC0P	14	GND
	15	HDMI_TXC0N	16	GND

eDP Expansion (J_eDP)

The motherboard provides eDP header (2*15-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	VCC_EDP	2	VCC_EDP
	3	GND	4	GND
	5	TX0_DP0	6	TX0_DN
	7	GND	8	GND
	9	TX1_DP	10	TX1_DN
	11	GND	12	GND
	13	TX2_DP	14	TX2_DN
	15	GND	16	GND
	17	TX3_DP	18	TX3_DN
	19	GND	20	GND
	21	AUX_DP	22	GND
	23	GND	24	HPD_EDP
	25	EDP_BKLT_CTL	26	EDP_BKLT_EN
	27	GND	28	GND
	29	BLPWR	30	BLPWR

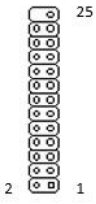
EDP Voltage Selection (EDP_PWR)

The motherboard provides one header (1*3-pin, 2.54mm pitch)

Image	Status	Definition
	1-2	+3.3V (Default)
	2-3	+5V

Line Print Terminal (LPT)

The motherboard provides one internal parallel header (2*13-pin, 2.00 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	STB	2	AFD
	3	PD0	4	LPT_ERR
	5	PD1	6	INIT
	7	PD2	8	SLIN
	9	PD3	10	GND
	11	PD4	12	GND
	13	PD5	14	GND
	15	PD6	16	GND
	17	PD7	18	GND
	19	LPT_ACK-	20	GND
	21	LPT_BUSY	22	GND
	23	LPT_PE	24	GND
	25	LPT_SLCT	26	

Keyboard And Mouse Interface (J_PS/2)

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

BIOS User Guide

BIOS Description

This motherboard uses AMI BIOS. BIOS stands for (Basic Input Output System). It is a set of programs stored on a ROM (Read Only Memory) chip on the computer's motherboard. It stores the computer's most important basic I/O programs, the power-on self-test program, and the system startup program. It can read and write specific information about system settings from the CMOS. Its primary function is to provide the most basic and immediate hardware settings and control for the computer.

When you turn on your computer, the BIOS is the first program to run. It has the following main functions:

- The Power-On Self-Test (POST) checks whether the computer is functioning properly.
- It initializes and tests some external devices and loads your operating system.
- It provides the lowest-level, most basic control of your computer hardware.
- You manage your computer through the SETUP function in the BIOS.

The BIOS data is stored in a CMOS/RAM chip on the motherboard, maintained by a 3.3V button battery. It contains important system information and the BIOS Setup program for setting system parameters. When the system is operating normally, the BIOS does not need to be modified. However, if the CMOS data is lost due to other reasons, the BIOS must be reset.

Note:

Incorrect BIOS settings can directly damage the computer hardware and even burn out the motherboard. Those unfamiliar with the system are advised to modify the settings with caution. Because the motherboard BIOS is constantly being updated, the BIOS information in this manual is for reference only. We cannot guarantee that the BIOS information in this manual will be consistent with the actual BIOS information on the motherboard.

BIOS Settings

When the motherboard is powered on or the system is restarted, the following prompt will appear on the display screen in the Post interface. Press "DEL" on the keyboard to enter BIOS Setup.



If this message disappears before you respond, you can press <Ctrl> + <Alt> + at the same time to restart the computer, or shut down and then restart the computer, or press the power button on the case to restart the computer.

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/	