倍控®
BKHD

BKHD-1356-15-4L6C Motherboard Manual

VER 1.0

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Safety Guide

To ensure optimal use of Beikong products, please review the user manual in its entirety. Before reviewing product-specific information, we kindly request that you carefully read the safety instructions.

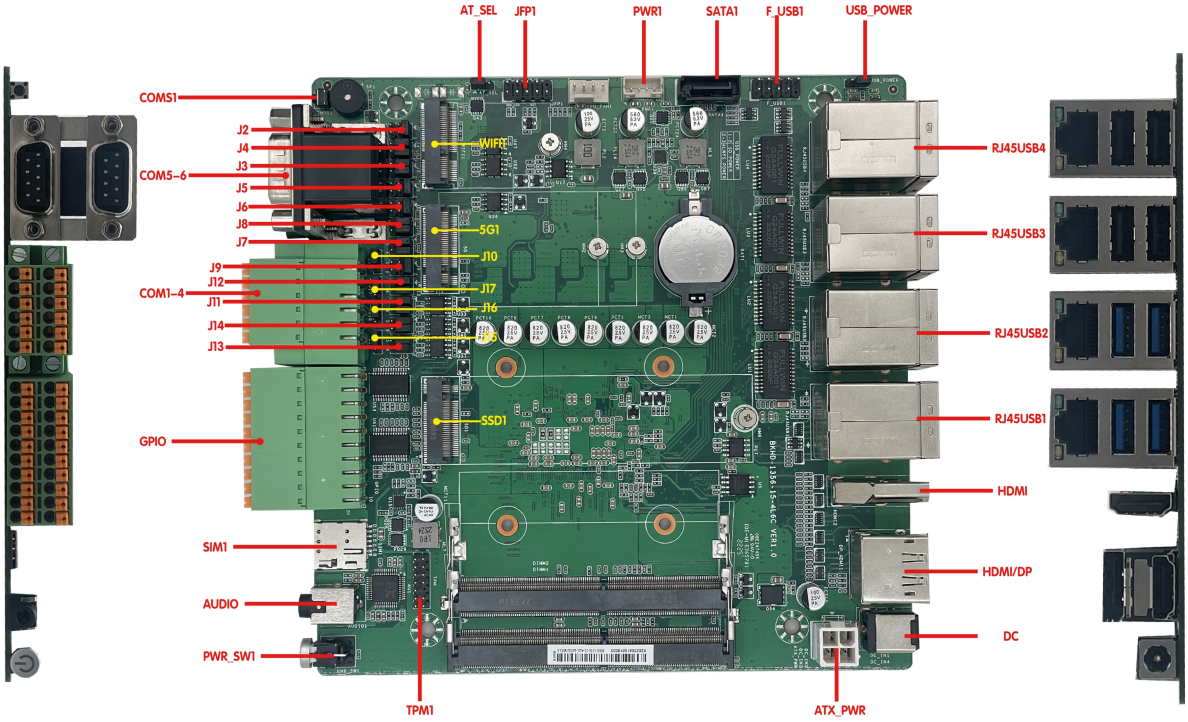
Product Version Identification

The product version number can be found on the motherboard, where X.X represents a number. For example, if the version is indicated as [VER1.0], it signifies that the current version of the motherboard is 1.0. The BIOS interface homepage provides information such as [XXXXNP-XXXX], which denotes the BIOS version number utilized by the current product. When updating the motherboard's BIOS, driver, or referencing other technical documents, please refer to the product version label for the most up-to-date information.

Catalog

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.



Product Profile

1356-15-4L6C is a compact industrial embedded motherboard designed for automation control, industrial communication, IoT gateway, machine vision, and multi-interface embedded applications. Based on 6th / 7th / 8th Generation Intel processors, the board combines stable computing performance, 4x Intel i210 Gigabit Ethernet, multiple COM interfaces, 16-channel GPIO, triple display output, and flexible M.2 expansion in a compact 155x155 mm form factor. With rich industrial I/O, wide operating temperature support, and flexible 12V DC power input, the 1356-15-4L6C is suitable for long-term deployment in industrial control cabinets, equipment controllers, edge gateways, and customized embedded systems.

Main features:

6th / 7th / 8th Gen Intel Processor Platform

The board supports 6th, 7th, and 8th Generation Intel processors with FCBGA1356 package, delivering stable performance for industrial control, data processing, communication management, and embedded software applications.

DDR4 SO-DIMM Memory

Supports 2x DDR4 SO-DIMM memory, with a maximum capacity of 32GB and frequency up to 2133 MHz, providing reliable memory performance for multitasking and industrial applications.

Intel Gigabit Ethernet

Equipped with 4x RJ45 Gigabit Ethernet ports powered by Intel i210 controllers, the board is ideal for industrial networking, multi-LAN segmentation, machine communication, and network gateway applications.

Rich Serial Communication Interfaces

The board provides multiple serial communication options: 1x Phoenix Terminal for COM 1–4, 2x DB9 RS-232 ports. This makes it suitable for connecting PLCs, sensors, meters, barcode scanners, motion controllers, and other industrial serial devices.

16-Channel GPIO via Phoenix Terminal

The onboard 16-channel GPIO Phoenix terminal supports digital input/output control, making the board useful for signal acquisition, device triggering, relay control, and automation system integration.

Motherboard Specifications

Processor	Product Collection	6th/7th/8th Generation Intel processors
	Sockets Supported	FCBGA1356
Memory specifications	Memory Type	DDR4 SO-DIMM 260Pin 1.2V
	Maximum Capacity	2*16GB
	Maximum Frequency	2133 MHz
Storage specifications	SATA	1*SATA 3.0 (6Gb/s)
	M.2	1*M.2 Key B+M (SATA/PCIe) SSD
Network features	Ethernet	4*1GbE
	Controller	4*Intel i210
Extension interface	M.2	1*M.2 Key-E 2230 (PCIe)
		1*M.2 Key-B 3052 (USB 3.0)
Display functions	Port	1*DP, 2*HD
	Chip	Intel HD Graphics
Backplane I/O	Ethernet	4*RJ45
	USB	4*USB-A 3.0, 4*USB-A 2.0
	COM	1*Phoenix Terminal (COM 1-4), 2*DB9 RS-232
	GPIO	1*Phoenix Terminal (16-channel GPIO)
	Audio	1*Jack 3.5mm
	Display	1*DP, 2*HD
	Power supply	1*Jack DC 5.5/2.5mm
Onboard I/O	SATA	1*SATA Data connector/1*SATA Power socket
	Fan	1*Fan power socket
	Power supply	1*ATX 4-Pin Connector
	Pins	1*F_PANEL
		1*F_USB (Expandable USB 2.0 ports)
		1*J_TPM
Power supply mode	DC	Jack DC 12V or ATX 4-Pin
Motherboard size	Specification	155*155 (mm)
Work Environment	Temperature	-10~60℃(Work), -20~70℃(Storage)
	Humidity	5%~95% (Relative humidity, no condensation)

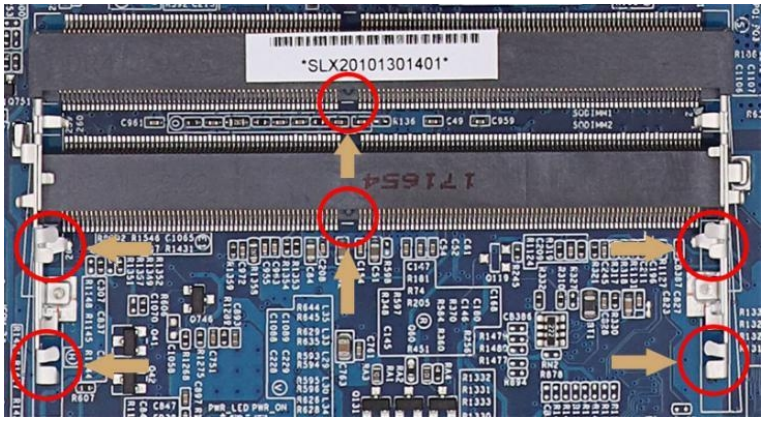
Motherboard Installation

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.

Jumper Setting

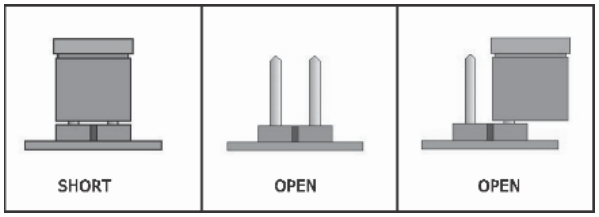
Before installing the hardware device, you can set the corresponding jumpers according to your needs based on the following table.

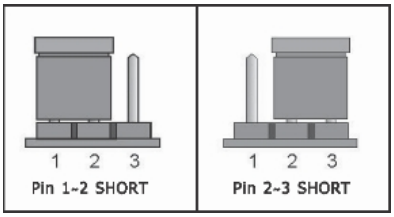
To identify the first pin of a jumper or connector

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 (AT-SEL)

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

USB Standby Power (USB_POWER)

USBG pins support standby power. USB ports above LAN1–LAN4 support keyboard wake-up from sleep/hibernation.

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

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 (COM)

Supports up to 6x COM ports (2x standard DB9 ports by default).

COM1–COM4: Support RS232 or RS485, COM5–COM6: Support RS232 or RS485 or RS422.

COM1–COM4: Support RS232 by default. RS485 Switching: V1.0: Requires both jumper cap and BIOS configurations. V2.0: Requires jumper cap adjustments only.

Interface	Definition	J11 Status	J10 Status	Definitions
COM 1	RS-232 (Default)	1-3, 2-4	1-2	PIN 1 is (TXD) PIN 2 is (RXD)
	RS-485	3-5, 4-6	2-3	PIN 1 is (B) PIN 2 is (A)

Interface	Definition	J12 Status	J17 Status	Definitions
COM 2	RS-232 (Default)	1-3, 2-4	1-2	PIN 1 is (TXD) PIN 2 is (RXD)
	RS-485	3-5, 4-6	2-3	PIN 1 is (B) PIN 2 is (A)

Interface	Definition	J13 Status	J15 Status	Definitions
COM 3	RS-232 (Default)	1-3, 2-4	1-2	PIN 1 is (TXD) PIN 2 is (RXD)
	RS-485	3-5, 4-6	2-3	PIN 1 is (B) PIN 2 is (A)

Interface	Definition	J14 Status	J16 Status	Definitions
COM 4	RS-232 (Default)	1-3, 2-4	1-2	PIN 1 is (TXD) PIN 2 is (RXD)
	RS-485	3-5, 4-6	2-3	PIN 1 is (B) PIN 2 is (A)

COM5–COM6: Support RS232 by default. RS485 Switching: V1.0: Requires both jumper cap and BIOS configurations. V2.0: Requires jumper cap adjustments only.

COM 5-6 Status RS232

Interface	PIN	Definition	PIN	Definition
COM 5 / COM 6	1	DCD (B)	2	RXD (A)
	3	TXD	4	DTR
	5	GND	6	DSR
	7	RTS	8	CTS
	9	RI	10	NC

Interface	Definition	J3/J4 Status	J2 Status	Definitions
COM 5	RS-232 (Default)	1-3, 2-4	1-2	Standard
	RS-485	3-5, 4-6	3-4	PIN 1 is (B) PIN 2 is (A)
	RS-422	3-5, 4-6	5-6	“Note”

Interface	Definition	J8/J7 Status	J6 Status	Definitions
COM 6	RS-232 (Default)	1-3, 2-4	1-2	Standard
	RS-485	3-5, 4-6	3-4	PIN 1 is (B) PIN 2 is (A)
	RS-422	3-5, 4-6	5-6	“Note”

Note: Pins 1–4 on the DB9 connector are designated for RS485 signals. For detailed information, please consult our technical support team.

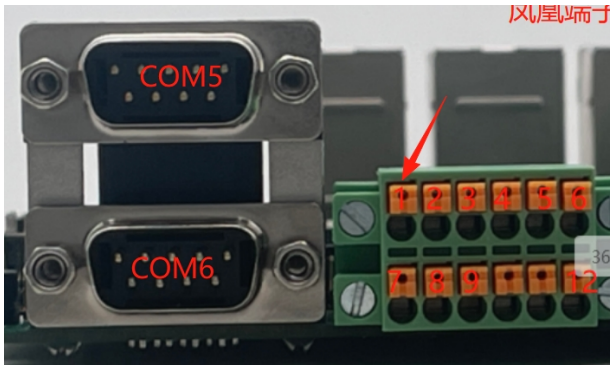
JCOM5 & JCOM6 PIN 9 Voltage Selection (J5/J9)

Interface	J5 Status	Definition
COM 5	1-2	RI (Default)
	3-4	+5V
	5-6	+12V

Interface	J9 Status	Definition
COM 6	7-8	RI (Default)
	9-10	+5V
	11-12	+12V

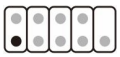
Pin definitions for motherboard serial ports (**Phoenix terminals**) COM1–COM4 are as follows

Interface	PIN	Definition	PIN	Definition
COM 1-4	1	COM1-RXD (B)	2	COM1-TXD (A)
	3	GND	4	COM3-RXD (B)
	5	COM3-TXD (A)	6	GND
	7	COM2-RXD (B)	8	COM2-TXD (A)
	9	GND	10	COM4-RXD (B)
	11	COM4-TXD (A)	12	GND



Front Panel Connectors (JFP1)

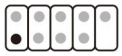
The motherboard provides JFP pins (2*5-pin, 2.54 mm pitch)

Image	PIN	Definition	PIN	Definition
	1	HDD LED+	2	PWR LED+
	3	HDD LED-	4	PWR LED-
	5	GND	6	PWR BTN#
	7	RESET BTN#	8	GND
	9	NC	10	

USB Expansion pin (F_USB)

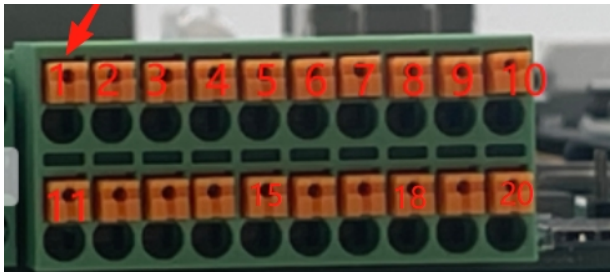
Before connecting the USB expansion board, be sure to turn off the computer and unplug the power cord from the socket to avoid damaging the USB expansion board.

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

General-Purpose Input/Output Phoenix Terminals (GPIO)

Interface	PIN	Definition	PIN	Definition
GPIO	1	VCC5	2	GPO70
	3	GPO71	4	GPO72
	5	GPO73	6	GPO74
	7	GPO75	8	GPO76
	9	GPO77	10	SW+
	11	GND	12	GPI80
	13	GPI81	14	GPI82
	15	GPI83	16	GPI84
	17	GPI85	18	GPI86
	19	GPI87	20	GND



Trusted Platform Module (TPM)

The motherboard provides TPM 2.0 pins (2*7-pin, 2.00mm pitch)

Interface	PIN	Definition	PIN	Definition
TPM 2.0 **v1**	1	CLK	2	3.3V
	3	PLTRST	4	3.3V
	5	LAD0	6	SERIRQ
	7	LAD1	8	VCC5
	9	LAD2	10	NC
	11	LAD3	12	GND
	13	-LFRAME	14	GND

Interface	PIN	Definition	PIN	Definition
TPM 2.0 **v2**	1	LAD1	2	3.3V
	3	LAD2	4	3.3V
	5	LAD3	6	CLK
	7	LAD4	8	GND
	9	-LFRAME	10	NC
	11	SERIRQ	12	PLTRST
	13	3.3V TTL	14	3.3V

Cooling Fan Power Socket (CPU_FAN)

The motherboard provides Cooling fan power socket (1*4-pin)

Image	PIN	Definition
	1	GND
	2	+12V
	3	DET
	4	PWM

Power Socket (ATX PWR)

The motherboard provides ATX power socket (2*2-pin)

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

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/R 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> + <Del> 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/