

BIGTREETECH Direct SKR Mini E3 V3.0

BIGTREETECH SKR Mini E3 V3.0 32-bit Control Board Instruction Manual

Model: SKR Mini E3 V3.0 | Brand: BIGTREETECH Direct

1. INTRODUCTION

The BIGTREETECH SKR Mini E3 V3.0 is a 32-bit control board designed for 3D printers, offering enhanced performance and silent operation. It features an integrated TMC2209 UART stepper driver and is compatible with popular firmware like Marlin and Klipper. This board is specifically designed as a direct replacement for Creality Ender 3, Ender 3 Pro, Ender 3 V2, and Ender 5 series 3D printers, providing a seamless upgrade experience.

2. KEY FEATURES

- **Main Control Chip:** Utilizes G0 series MCU-STM32G0B1RET6 or STM32G0B0RET6 ARM Cortex for robust processing.
- **Integrated Stepper Drivers:** Features on-board TMC2209 UART silent stepper drivers for quiet and precise motor control.
- **Firmware Compatibility:** Supports both Marlin and Klipper firmware.
- **Enhanced Heat Dissipation:** Upgraded heatsink design significantly improves heat dissipation for the drivers and the motherboard.
- **Multiple Fan Interfaces:** Includes three CNC controllable fan interfaces to manage machine temperature effectively.
- **Expanded Functionality:** Supports BLTouch, MicroProbe, Eddy v1.0, RGB lights, filament runout detection, automatic shutdown, and power-off resume functions.
- **Display Support:** Compatible with TFT35 E3 V3.0.1, TFT35 V3.0.1, TFT28, TFT43, TFT50, TFT70 V3.0 touchscreens, and the Ender 3 original 12864 LCD.
- **Connectivity:** Equipped with a USB Micro B interface for PC communication.
- **Power Outputs:** Provides SPI output port with +3.3V power, and optional +3.3V and +5V for external SPI sensors.
- **Heated Outputs:** Supports two heated rod outputs (hotend and heated bed).
- **Limit Switch Support:** Accommodates four limit switches.
- **RGB Lighting:** Integrated RGB color light strip drive circuit.

Support more function expansion:

Support BLtouch, Power-Off Resume ,
Automatic Shutdown,(PS-ON),Filament Detection etc

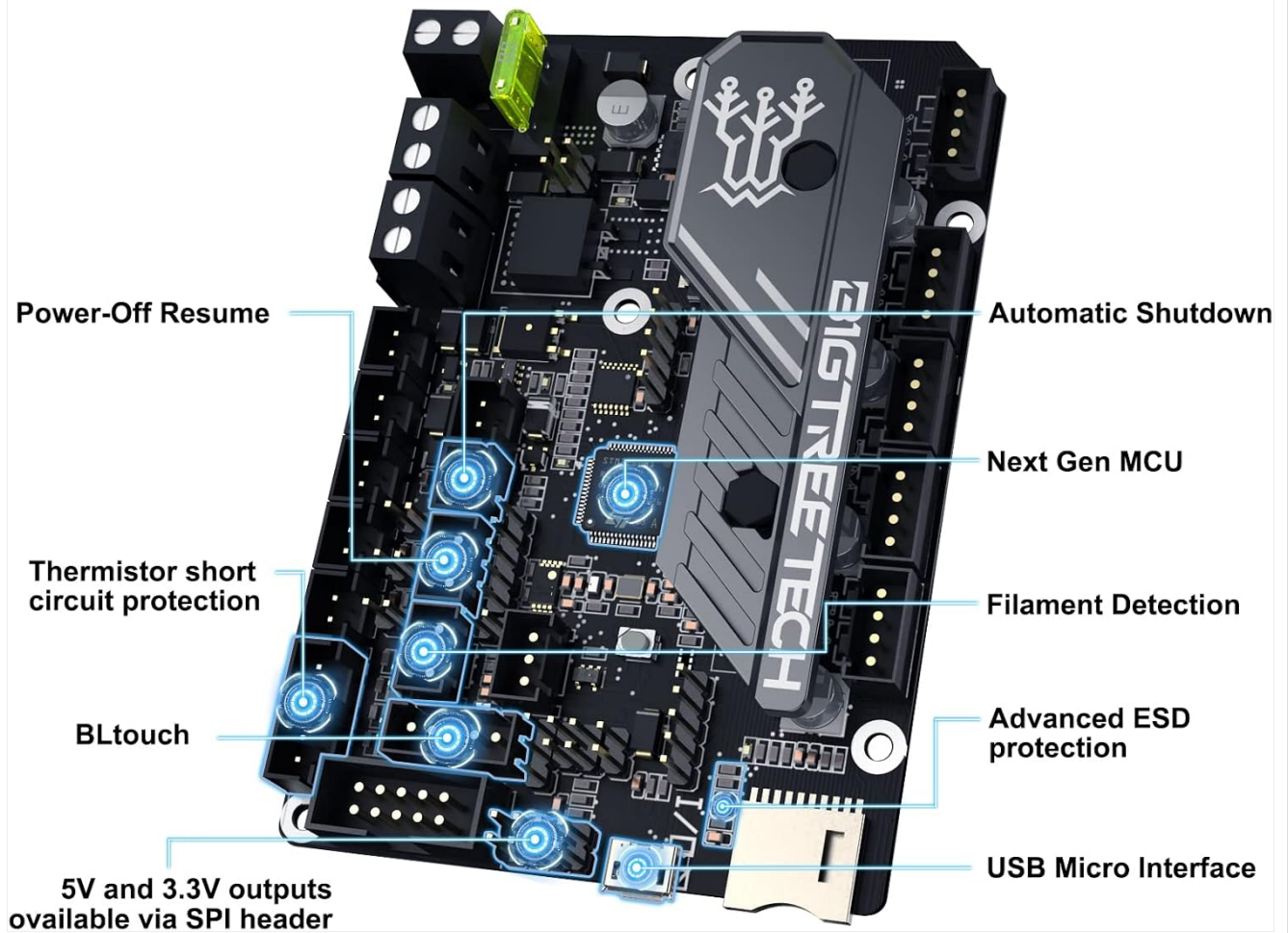


Figure 2.1: Overview of the SKR Mini E3 V3.0 control board with key features and expansion options labeled.

Upgraded the driver heat sink

increase heat dissipation capacity of the driver

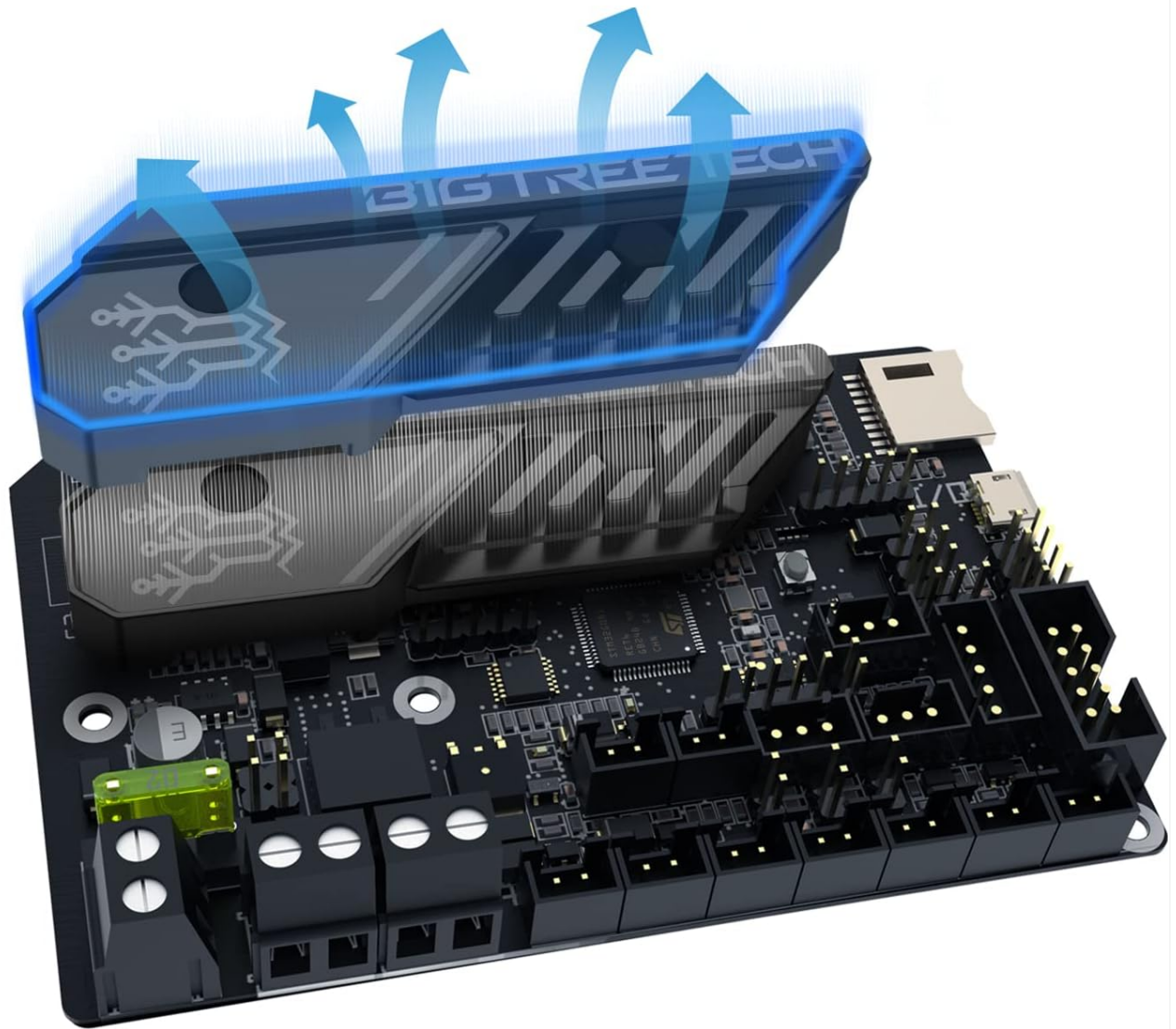


Figure 2.2: The upgraded driver heatsink on the SKR Mini E3 V3.0, designed for improved thermal performance.

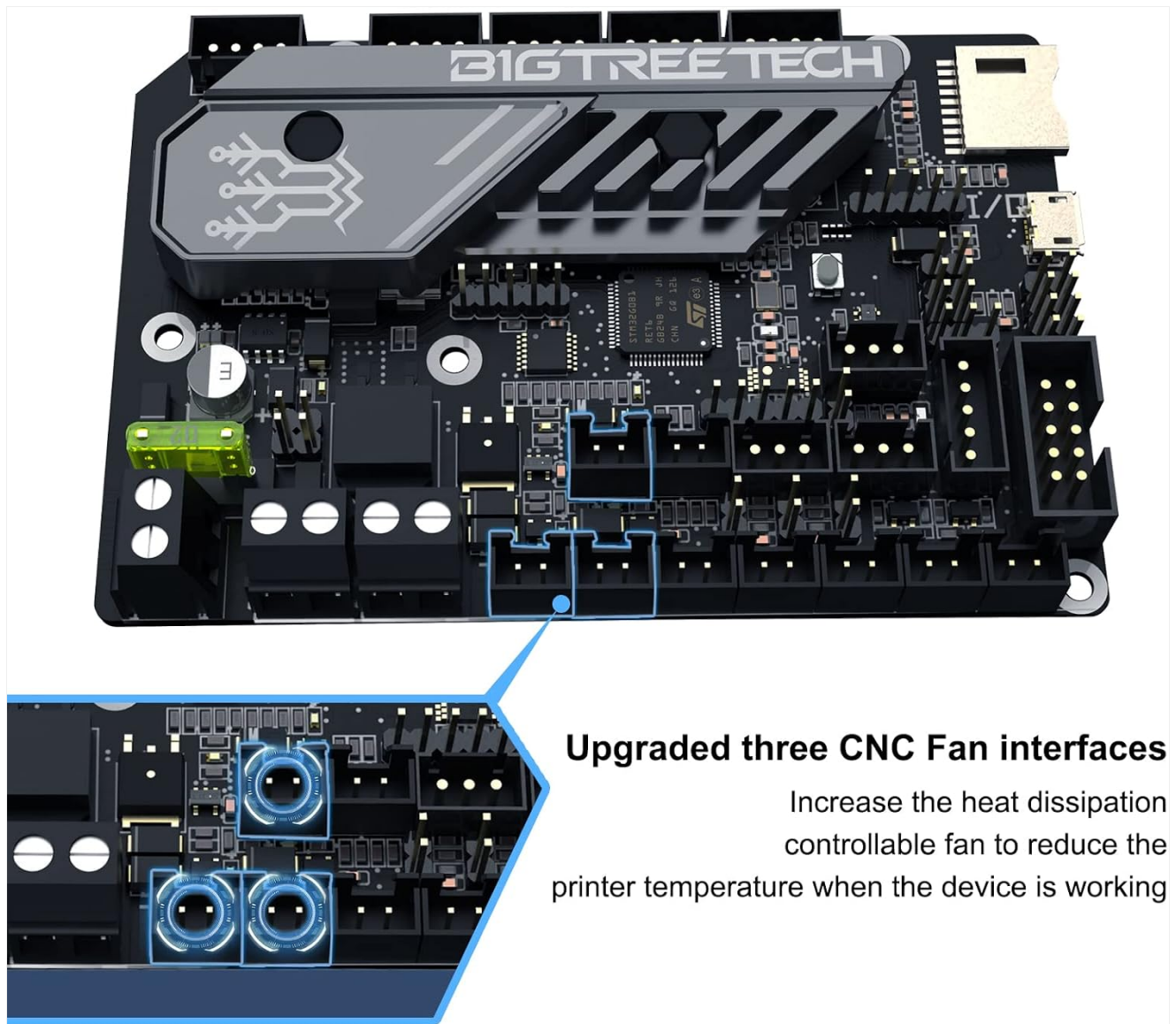


Figure 2.3: The three CNC fan interfaces on the SKR Mini E3 V3.0, allowing for flexible cooling solutions.

Support add 5V Power Supply

Increase the output current of the 5V port on the motherboard, can expand more 5V modules, such as NEOPIXEL RGB



Notes: Need to extra purchase BIGTREETECH DCDC5V V1.0 Module

Figure 2.4: The 5V power supply expansion capability of the SKR Mini E3 V3.0, useful for additional modules like NEOPIXEL RGB.

3. SPECIFICATIONS

Parameter	Value
External Size	103.75 x 70.25 mm
Input Voltage	DC12-28V
Motor Driver	On-board TMC2209 UART mode
Motor Interfaces	XM, YM, Dual Z-axis (ZAM, ZBM), EM
Temperature Sensor Interfaces	TH0, THB, 2-channel 100K NTC (thermal resistance)
Display Support	2.4-inch TFT, 3.5-inch TFT, Ender 3 original LCD12864 screen
PC Communication Interface	USB Micro B type, baud rate 115200

Parameter	Value
Expansion Interfaces	Filament runout detection, power-off resume, shutdown after printing, BL_Touch
Supported File Format	G-code
Recommended Software	Cura, Simplify3D, Pronterface, Repetier-host, Makerware
Offline Printing	SD card supported
Online Printing	Supported
Raspberry Pi Connection	SPI, UART, USB (Type-C) virtual serial port
Heated Outputs	2 (heated rod, hotbed)
Controllable Fan Outputs	3
Limit Switch Support	4
RGB Light Strip Circuit	Integrated

4. SETUP

4.1 Compatibility

The SKR Mini E3 V3.0 control board is designed for direct compatibility with Creality Ender 3, Ender 3 Pro, Ender 3 V2, and Ender 5 3D printers. It is a plug-and-play solution for these models, often fitting directly into the existing motherboard enclosure.

Upgraded Design for Ender 3 3D Printer Plug and Playing

Compatible with Ender 3 Pro, Ender 5, Ender 3 V2 ...ect

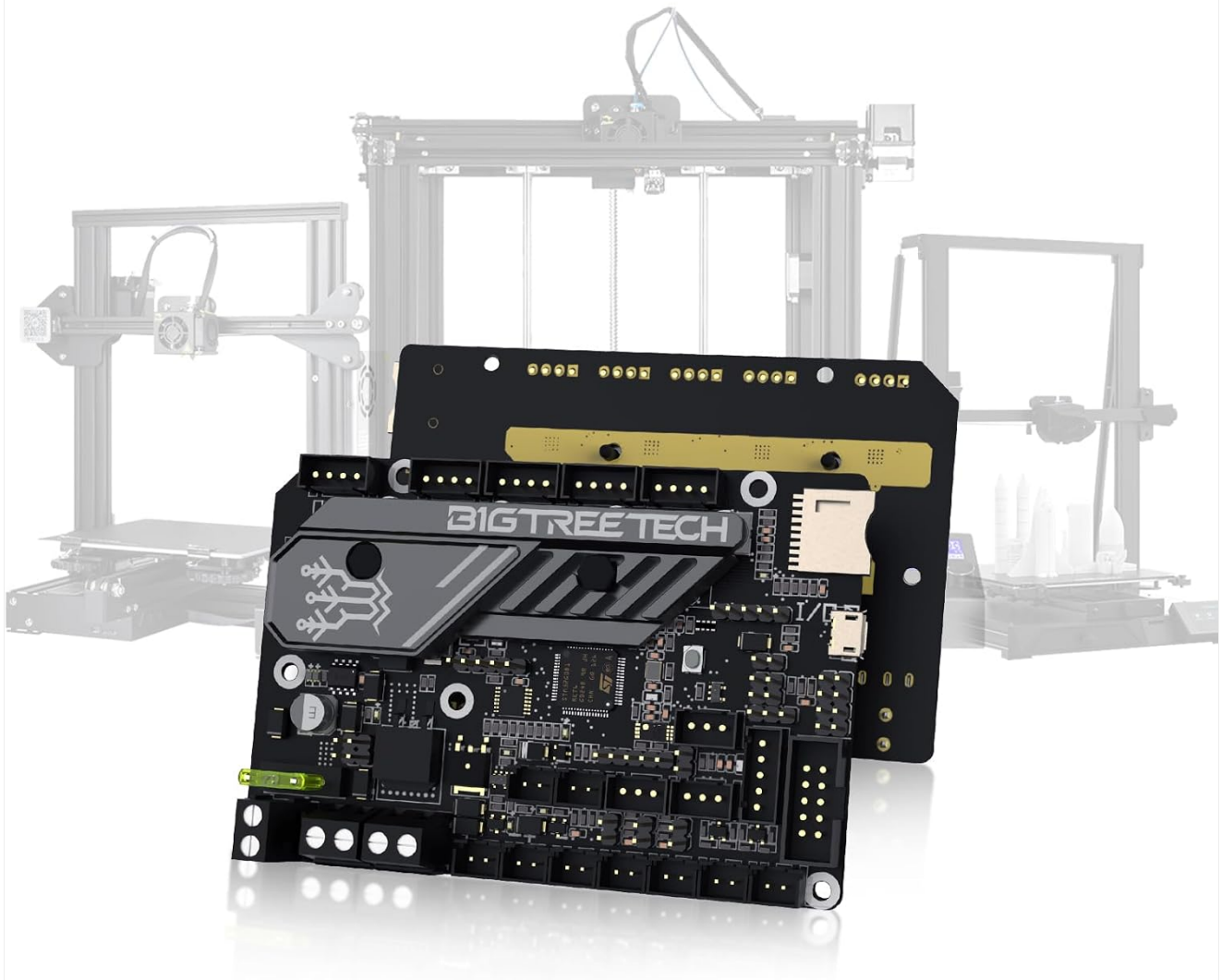


Figure 4.1: The SKR Mini E3 V3.0 board is designed for easy integration with Ender 3 series 3D printers.

4.2 Installation Steps

1. **Power Disconnection:** Ensure your 3D printer is completely powered off and unplugged from the mains before beginning installation.
2. **Access Motherboard:** Open the control box of your 3D printer to access the existing motherboard.
3. **Disconnect Components:** Carefully disconnect all wires and connectors from the old motherboard. It is recommended to take photos for reference during reassembly.
4. **Remove Old Board:** Unscrew and remove the old motherboard from its mounting points.
5. **Install New Board:** Place the SKR Mini E3 V3.0 board into the enclosure and secure it with screws.
6. **Reconnect Components:** Reconnect all wires and connectors to the corresponding ports on the new SKR Mini E3 V3.0 board. Pay close attention to motor, endstop, heater, thermistor, and fan connections.
7. **Firmware Flashing (if necessary):** While the board comes with pre-installed firmware, it is often recommended to update to the latest version or a custom configuration. This typically involves placing a compiled firmware file (e.g., `firmware.bin`) onto an SD card and inserting it into the board's SD card slot. The board will automatically flash the firmware upon power-up.
8. **Close Enclosure:** Once all connections are secure and firmware is flashed, close the control box.
9. **Power On and Test:** Reconnect power to your printer and perform initial tests, such as homing axes and checking

heater functionality, before attempting a print.

5. OPERATING

5.1 Firmware Configuration

The SKR Mini E3 V3.0 supports both Marlin and Klipper firmware. For optimal performance and to enable specific features (like BLTouch, filament detection, or custom fan settings), you may need to compile or configure the firmware to match your printer's setup. Numerous online guides and community resources are available for compiling Marlin or setting up Klipper configurations for this board.

5.2 Printing

The board supports both offline printing via SD card and online printing through a PC connection (USB Micro B). Prepare your G-code files using recommended slicing software such as Cura, Simplify3D, Pronterface, Repetier-host, or Makerware.

5.3 Display Usage

Connect your compatible display (e.g., TFT touchscreens or the original 12864 LCD) to the appropriate ports on the motherboard. Ensure your firmware is configured to support the specific display model you are using.

6. MAINTENANCE

6.1 Heat Management

The SKR Mini E3 V3.0 features an upgraded heatsink and multiple fan interfaces to manage heat. Ensure that the heatsink remains free of dust and debris. Utilize the three CNC fan interfaces to connect cooling fans for the motherboard and the overall machine. Connecting a fan to FAN2 can help achieve comprehensive machine cooling.

Note: The operating voltage for the fans connected to the board is the same as the input power supply voltage. Ensure your fans are rated for the correct voltage to prevent damage.

6.2 Firmware Updates

Regularly check for firmware updates from BIGTREETECH or the Marlin/Klipper communities. Keeping your firmware updated can provide new features, performance improvements, and bug fixes.

7. TROUBLESHOOTING

7.1 Common Issues

- **Printer Not Responding:** Verify all wiring connections are secure. Check if the firmware has been flashed correctly.
- **Motor Issues (Skipping, Noise):** Ensure motor current (Vref) is correctly set in firmware. Check motor wiring.
- **Display Not Working:** Confirm display is correctly connected and firmware supports your specific display model.
- **Heater/Thermistor Errors:** Check thermistor and heater wiring for shorts or disconnections. Ensure thermistor type is correctly configured in firmware.
- **Firmware Flashing Failure:** Ensure the firmware file is named correctly (e.g., `firmware.bin`) and is the only `.bin` file on the SD card. Use a properly formatted SD card.

7.2 Seeking Assistance

For detailed firmware configuration and advanced troubleshooting, refer to the extensive online communities and documentation for Marlin and Klipper. These resources often provide solutions to specific issues and guidance for customization.

8. WARRANTY AND SUPPORT

If you encounter any issues with the BIGTREETECH SKR Mini E3 V3.0 control board not functioning as expected, please contact the seller directly via Amazon. Our support team is available to assist you with resolving any problems you may experience.

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ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question