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› BIGTREETECH SKR Mini E3 V2.0 Control Board User Manual

BIGTREETECH Direct ZZB000412

BIGTREETECH SKR Mini E3 V2.0 Control Board User Manual

Model: ZZB000412

INTRODUCTION

The BIGTREETECH SKR Mini E3 V2.0 is a highly integrated, silent 32-bit control board designed as a direct replacement for Creality Ender 3 series and CR-10 3D printers. This manual provides comprehensive instructions for setup, operation, maintenance, and troubleshooting to ensure optimal performance and longevity of your control board.

PRODUCT OVERVIEW

The SKR Mini E3 V2.0 features an ARM Cortex-M3 series STM32F103RCT6 main control chip, integrated TMC2209 UART stepper motor drivers for silent operation, and enhanced thermal dissipation. It supports various advanced functions for 3D printing.

Key Features

- Silent Control Board: Integrated TMC2209 UART stepper motor drivers for quiet operation.
- Better Thermal Dissipation: WSK220N04 hot-bed MOS tube and enlarged heat dissipation area.
- Support Various Functions: Compatible with BLTouch, filament detection, power-off resume, and automatic shutdown.
- 4-Layer PCB: Improved heat dissipation, signal function, and anti-interference.
- Onboard EEPROM (AT24C32): For stable data storage.
- Double Z-axis Interface: Supports printers with single or dual Z-axis configurations.

Components

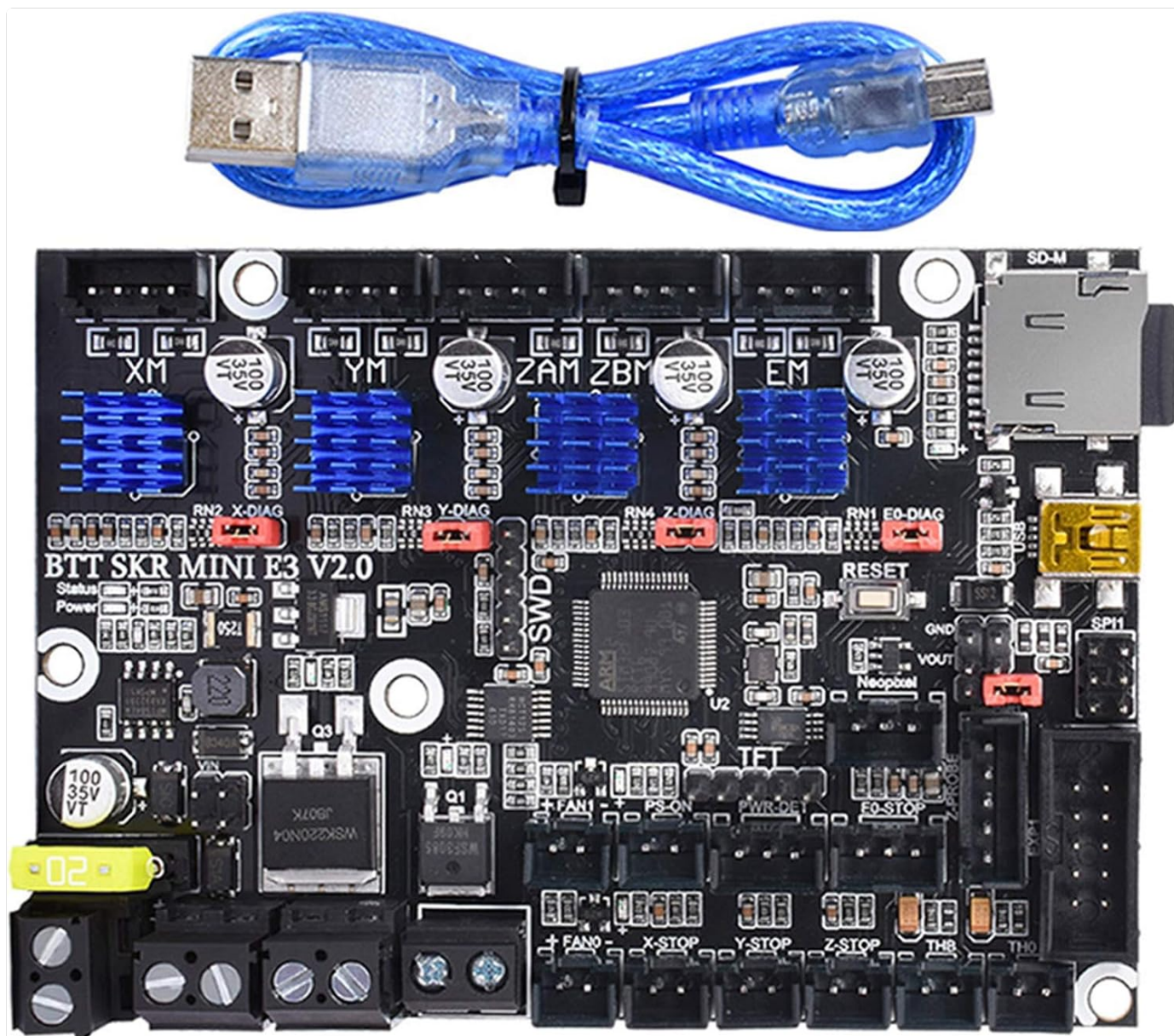


Figure 1: BIGTREETECH SKR Mini E3 V2.0 Control Board with included USB cable. This image shows the compact design of the motherboard, highlighting its various ports and components.

BIGTREETECH SKR MINI E3 V2.0

A motherboard specially tailored for Ender3 printers, perfectly replacing the original Ender3 printer motherboard

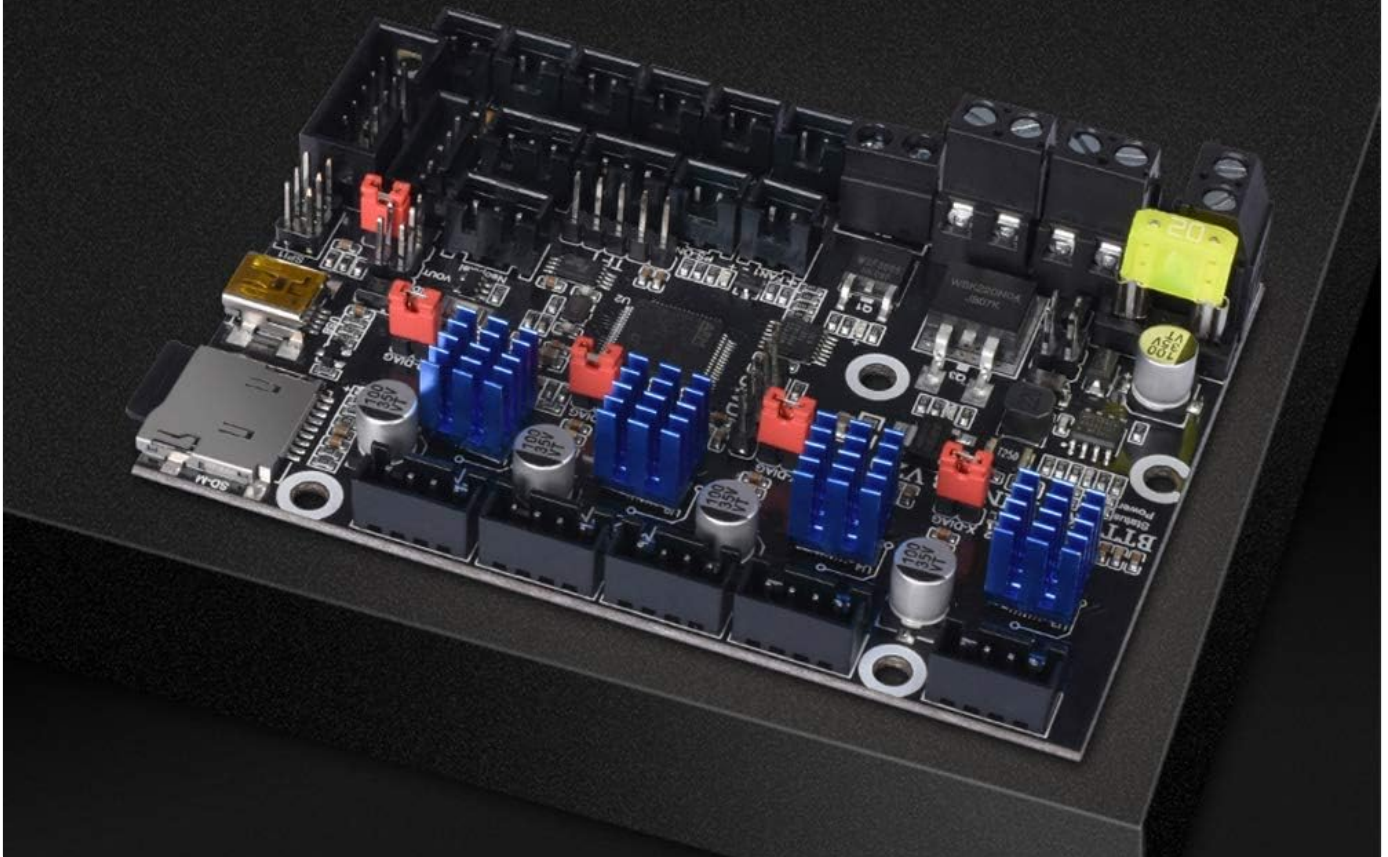


Figure 2: The SKR Mini E3 V2.0 motherboard, specifically designed as a perfect replacement for original Ender 3 printer motherboards.

WIRING DIAGRAM

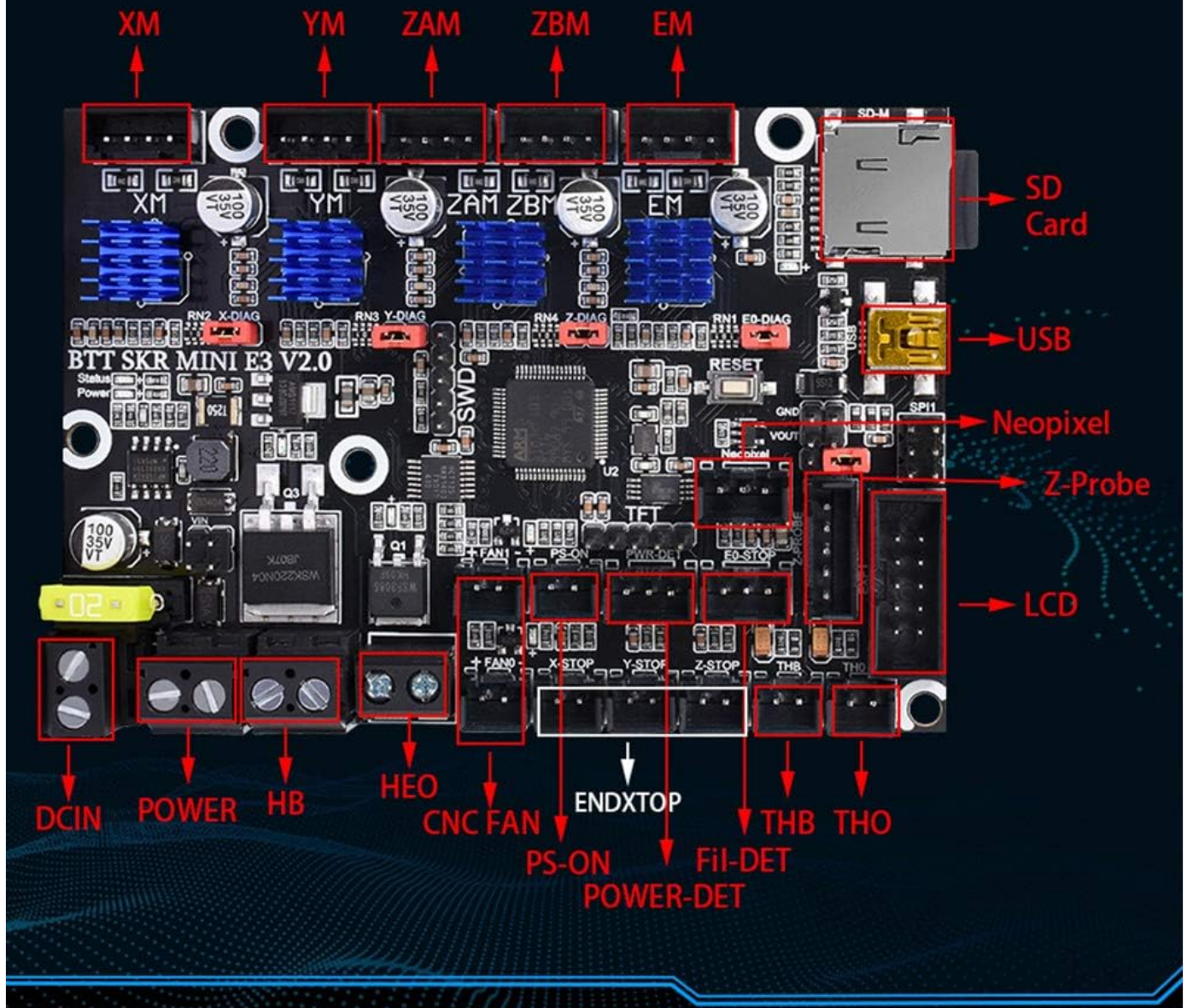


Figure 3: Detailed wiring diagram of the SKR Mini E3 V2.0 board, indicating connections for DCIN, Power, Hot Bed (HB), Hot End (HE0), CNC Fan, Endstops (X, Y, Z), Thermistors (THB, TH0), Filament Detection (FIL-DET), Power-Off Detection (POWER-DET), USB, SD Card, Neopixel, Z-Probe, and LCD.

SETUP AND INSTALLATION

The SKR Mini E3 V2.0 is designed for easy drop-in replacement for compatible 3D printers.

Before Installation

- Ensure your printer is powered off and unplugged from the mains.
- Discharge any static electricity from your body before handling the board.
- Familiarize yourself with your printer's existing wiring. It is recommended to take photos of current connections for reference.

Installation Steps

1. **Access the Mainboard:** Carefully open the control box of your 3D printer to expose the existing mainboard.
2. **Disconnect Wiring:** Systematically disconnect all wires from the old mainboard. Pay close attention to the labels and types of connectors (e.g., stepper motors, endstops, heaters, fans, power).
3. **Remove Old Board:** Unscrew and remove the old mainboard from its mounting points.
4. **Install New Board:** Place the BIGTREETECH SKR Mini E3 V2.0 in the control box and secure it with screws.
5. **Connect Wiring:** Refer to the wiring diagram (Figure 3) and your reference photos to connect all wires to the corresponding ports on the new SKR Mini E3 V2.0 board.

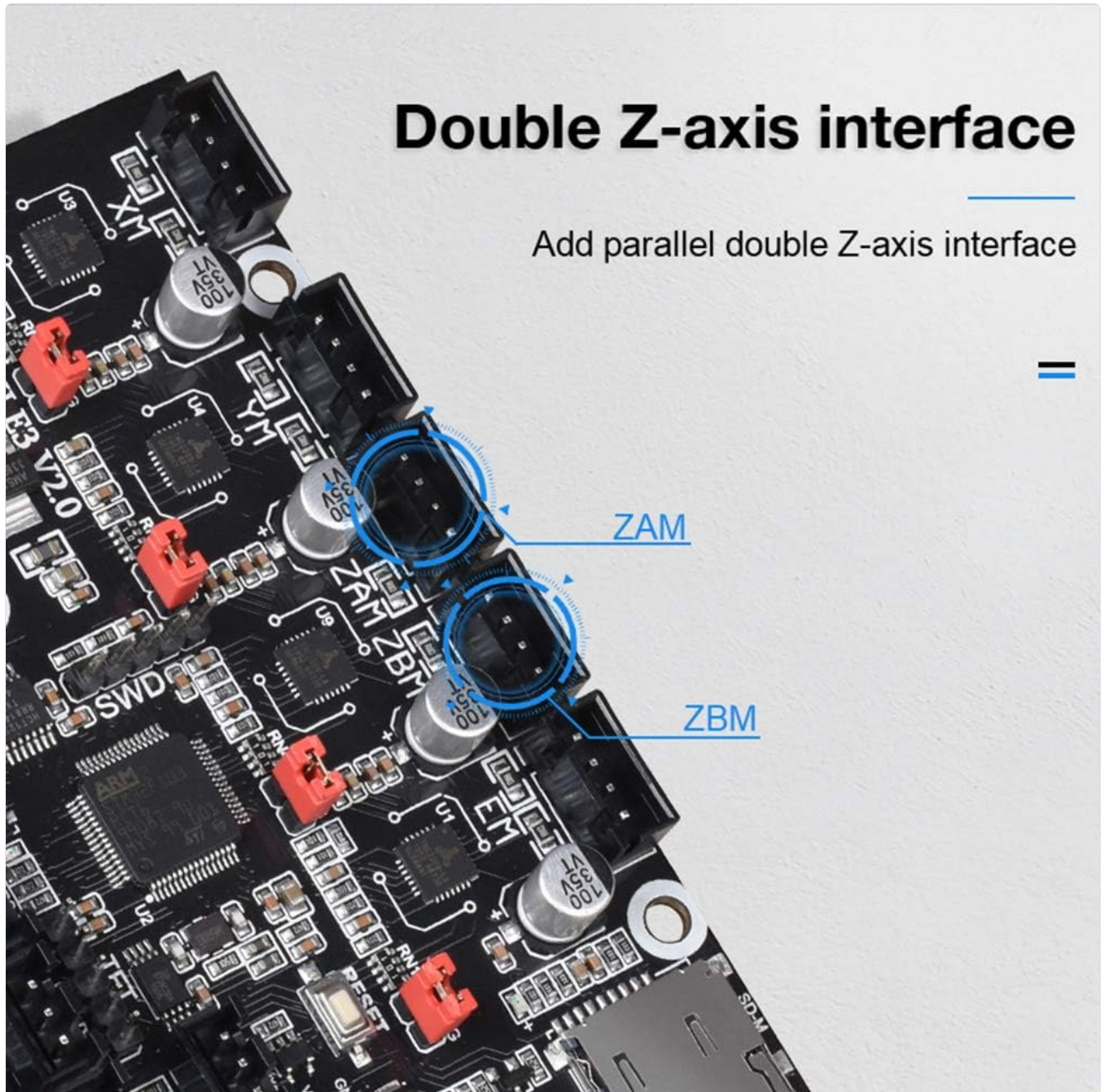


Figure 4: The double Z-axis interface (ZAM, ZBM) on the SKR Mini E3 V2.0, allowing for dual Z-axis motor configurations.

Support more function expansion

Support BLTouch, filament detection, power-off resume, automatic shutdown (PS-ON), etc

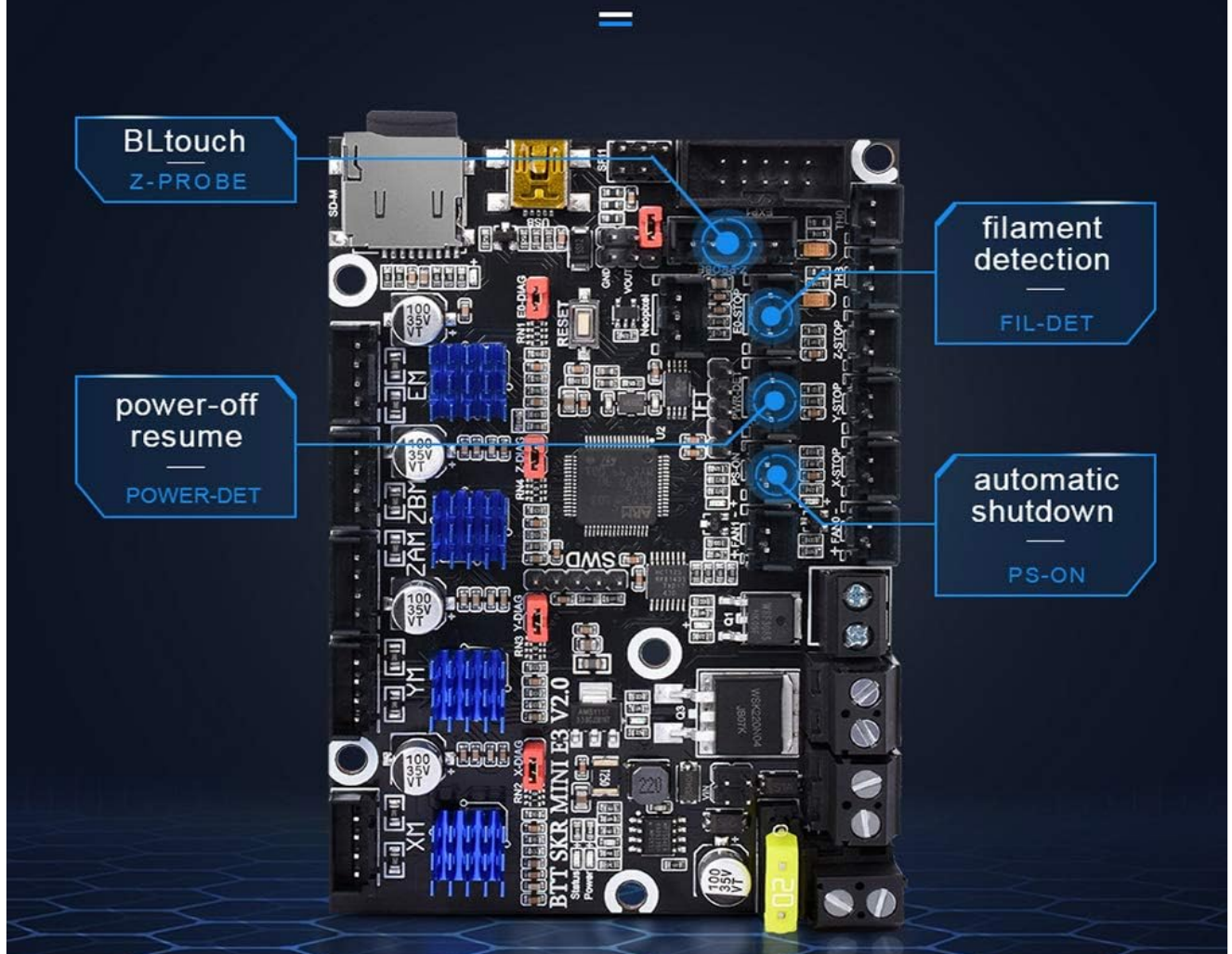


Figure 5: Ports for function expansion on the SKR Mini E3 V2.0, including BLTouch, filament detection, power-off resume, and automatic shutdown.

6. **Firmware Update (if necessary):** The board typically comes with pre-installed firmware. However, for specific printer models or advanced features, you may need to update the firmware.
 - Download the appropriate firmware from the [BIGTREETECH GitHub repository](#).
 - Copy the firmware file (e.g., firmware.bin) to the root directory of a formatted SD card.
 - Insert the SD card into the board's SD card slot.
 - Power on the printer. The board will automatically flash the new firmware. Once complete, the firmware.bin file will be renamed to firmware.cur.
7. **Initial Power On and Test:** Close the control box. Connect the power cable and turn on the printer. Verify that all components (fans, motors, heaters) are functioning correctly.

Once installed, the SKR Mini E3 V2.0 operates similarly to your original mainboard, but with enhanced performance and reduced noise.

Silent Operation

The integrated TMC2209 drivers significantly reduce stepper motor noise. The loudest components will now typically be the cooling fans.

Advanced Features

If you have enabled features like BLTouch, filament detection, or power-off resume in your firmware, ensure the corresponding sensors are correctly installed and calibrated according to their specific instructions.

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Video 1: An overview of the BIGTREETECH SKR Mini E3 V2.0 32Bit Silent Control Board, demonstrating its features and benefits.

MAINTENANCE

- **Keep Clean:** Regularly clean the board and surrounding area to prevent dust and debris buildup, which can affect performance and heat dissipation. Use compressed air or a soft brush.
- **Check Connections:** Periodically inspect all wiring connections to ensure they are secure and free from corrosion.
- **Thermal Management:** Ensure adequate airflow around the board. The enlarged heat dissipation area helps, but proper ventilation within the control box is crucial.
- **Firmware Updates:** Check the official BIGTREETECH GitHub repository for the latest firmware versions. Updates can provide new features, bug fixes, and performance improvements.

TROUBLESHOOTING

Common Issues and Solutions

Problem	Possible Cause	Solution
Printer not powering on after installation.	Incorrect power wiring, loose connections, or short circuit.	Double-check all power connections. Ensure correct polarity. Verify no metal objects are touching the board.
Stepper motors not moving or making grinding noises.	Incorrect motor wiring, incorrect current settings in firmware, or faulty driver.	Verify motor wiring matches the diagram. Check firmware motor current settings. If a specific axis fails, try swapping motor connections with a working axis to diagnose.
Fans not spinning.	Incorrect fan wiring, fan port configuration in firmware, or fan only spins when motors are active (e.g., mainboard fan).	Check fan connections. Some fans are controlled by temperature or motor activity. Verify firmware settings for fan control.

Problem	Possible Cause	Solution
Firmware not flashing.	Incorrect firmware file name, corrupted SD card, or incompatible firmware.	Ensure the firmware file is named firmware.bin and is in the root of a FAT32 formatted SD card. Try a different SD card. Download firmware from the official source.

SPECIFICATIONS

- **Main Control Chip:** ARM Cortex-M3 series STM32F103RCT6 (32-bit CPU, 72MHz)
- **Stepper Motor Drivers:** Integrated TMC2209 UART
- **PCB Layers:** 4
- **Product Dimensions:** 4 x 2.8 x 0.39 inches (10.16 x 7.11 x 0.99 cm)
- **Item Weight:** 4.2 ounces (0.12 Kilograms)
- **Voltage:** 24 Volts
- **Material:** PCB
- **Compatible Printers:** Ender 3, Ender 3 Pro, Ender 5, CR-10 (and variants)
- **Supported Functions:** BLTouch, Filament Detection, Power-Off Resume, Automatic Shutdown, Double Z-axis
- **Onboard EEPROM:** AT24C32

WARRANTY AND SUPPORT

BIGTREE TECH Direct offers customer support for the SKR Mini E3 V2.0 control board.

Customer Service

If you encounter any issues or require further information, please contact BIGTREE TECH Direct through the Amazon platform.

Important Notes

- Pay attention to correct wiring to avoid damage.
- Prevent the motherboard from contacting metal objects.
- Implement electrostatic protection measures during handling and installation.

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.

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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

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