

BIGTREETECH Direct SKR V1.4 Turbo +TFT35 V3.0.1+5*TMC2209

BIGTREETECH SKR V1.4 Turbo Control Board, TFT35 V3.0.1 Display, and TMC2209 V1.3 Stepper Motor Driver Instruction Manual

1. INTRODUCTION

This manual provides detailed instructions for the BIGTREETECH SKR V1.4 Turbo Control Board, TFT35 V3.0.1 Touch Screen Display, and TMC2209 V1.3 Stepper Motor Drivers. This integrated solution is designed to enhance the performance and capabilities of FDM 3D printers, offering advanced control, silent operation, and versatile connectivity. Please read this manual thoroughly before installation and operation.

Package Contents:

- BIGTREETECH SKR V1.4 Turbo Control Board
- BIGTREETECH TFT35 V3.0.1 Touch Screen Display
- 5 x TMC2209 V1.3 Stepper Motor Drivers

2. SPECIFICATIONS

2.1 SKR V1.4 Turbo Motherboard

- **Appearance Size:** 110mm x 85mm
- **Mounting Size:** 102mm x 76mm
- **Microprocessor:** ARM Cortex-M3 CPU (LPC1769, 120MHz)
- **Input Voltage:** DC 12V-24V (5A-15A)
- **Logic Voltage:** DC 3.3V
- **WIFI Module Support:** ESP-01S (purchased separately)
- **Motor Driver Support:** TMC5161, TMC5160, TMC2209, TMC2225, TMC2208, TMC2130, ST820, LV8729, DRV8825, A4988 (external motor drive supported)
- **Driver Working Modes:** SPI, UART, STEP/DIR
- **Motor Driver Interfaces:** X, Y, Z, E0, E1 (5 ways, each with closed-loop drive interface), up to 256 subdivisions
- **Key Features:** Resume printing while power off, smart filament break detection, automatic shutdown after printing,

BLTouch/microProbe V20 support, eddy auto bed leveling sensor support, RGB light support, dual Z-axis interface.

2.2 TFT35 V3.0.1 Screen

- **Type:** Medium size, dual-mode, ultra-clear 3D printer display
- **Microcontroller:** ARM Cortex-M3 series GD32F205VCT6 (32-bit CPU, 120 MHz)
- **Working Modes:** LCD12864 encoder mode, Serial Touch Screen mode
- **Printing Support:** SD card and USB stick printing

2.3 TMC2209 V1.3 Stepper Motor Driver

- **Type:** Ultra-silent motor driver IC for two-phase stepper motors
- **Continuous Drive Current:** 2A
- **Peak Current:** 2.8A
- **Key Features:** StealthChop2 for silent operation, microPlyer interpolation (up to 256 subdivisions), locked-motor test function.

3. SETUP AND INSTALLATION

3.1 SKR V1.4 Turbo Board Overview

Familiarize yourself with the various interfaces and components of the SKR V1.4 Turbo control board.

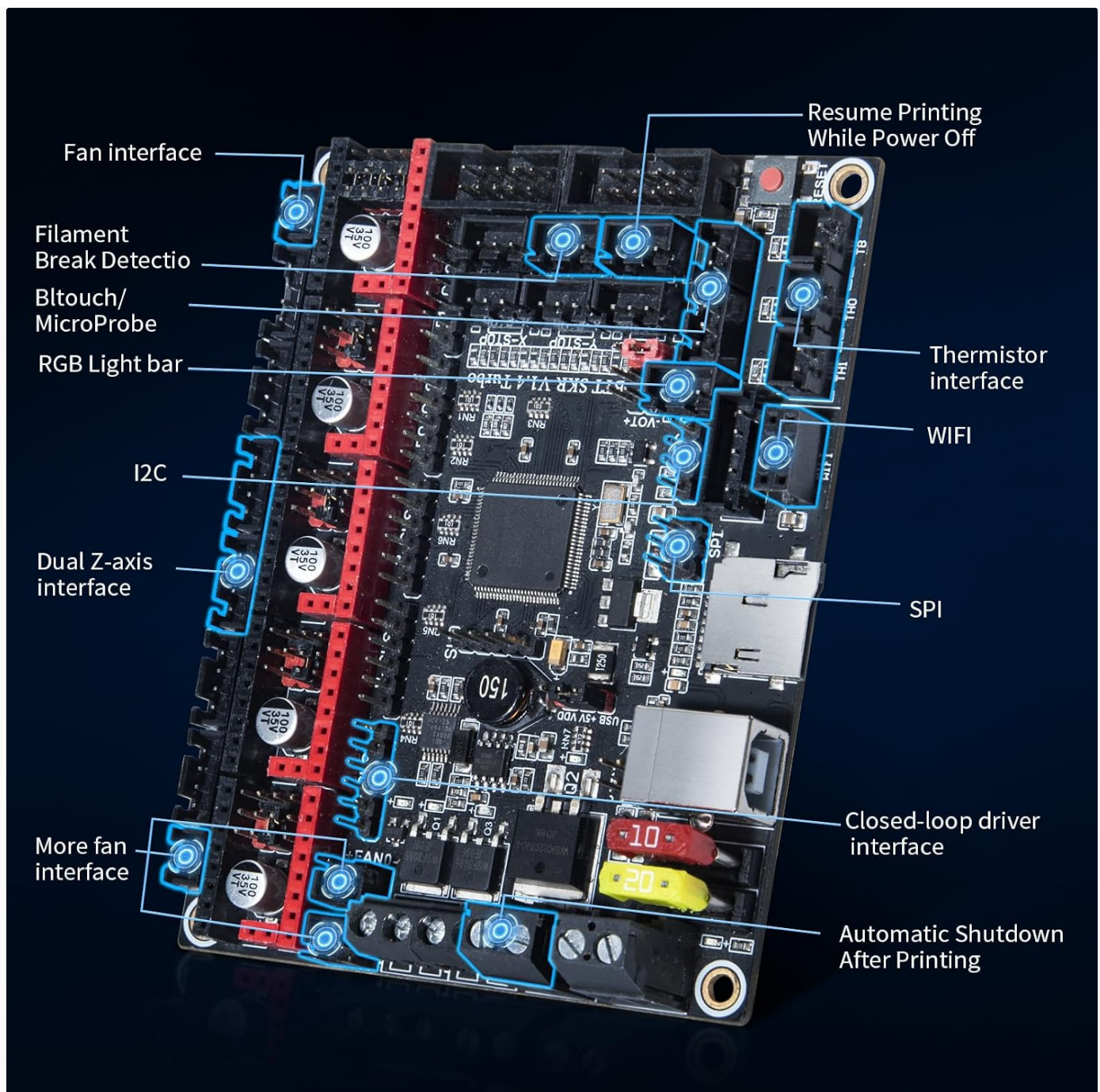


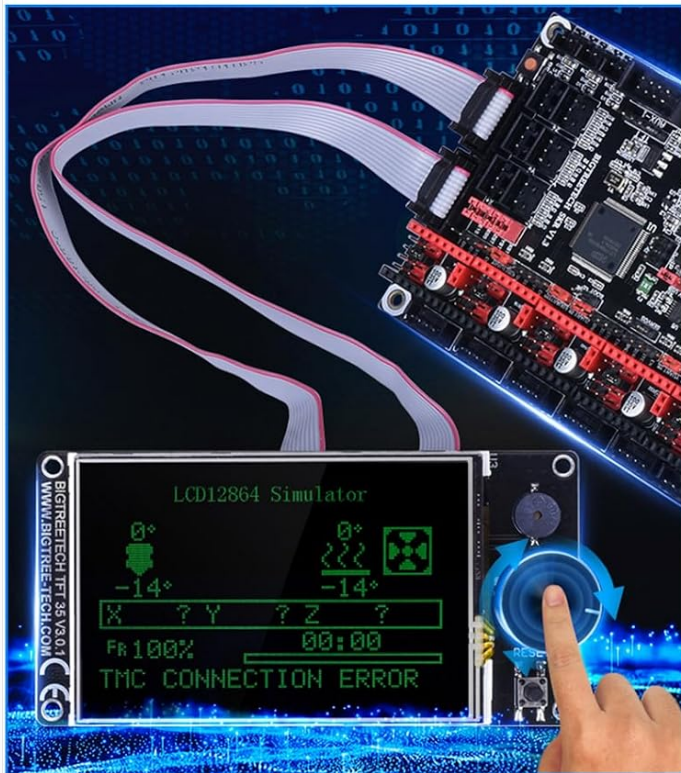
Figure 3.1: SKR V1.4 Turbo Control Board Layout. This image shows the various connection points on the SKR V1.4 Turbo board, including fan interfaces, filament break detection, BLTouch/MicroProbe, RGB light bar, I2C, dual Z-axis interface, thermistor interface, WiFi, SPI, closed-loop driver interface, and automatic shutdown after printing.

3.2 TFT35 V3.0.1 Display Connection

The TFT35 V3.0.1 display supports two working modes: 12864 LCD mode and Serial Touch Screen mode. The connection method varies depending on the chosen mode.

BIGTREETECH TFT35 V3.0.1

Two working mode,Ultral clear,Upgrade firmware through SD card, one click switch



12864 LCD mode

when using class 12864 LCD mode, it connects with EXP1 and EXP2 of the motherboard, which has no touch function

Serial Touch Screen Mode

when using serial touch screen mode, it connects with TFT or AUX-1 on the motherboard through RS232, which has touch function



Figure 3.2: TFT35 V3.0.1 Display Modes. This image illustrates the two operational modes of the TFT35 V3.0.1 display: the traditional 12864 LCD mode and the modern Serial Touch Screen mode, along with their respective connection methods.

- **12864 LCD Mode:** Connect the EXP1 and EXP2 ports of the display to the corresponding ports on the motherboard. In this mode, touch functionality is not available.
- **Serial Touch Screen Mode:** Connect the TFT or AUX-2 port on the motherboard via RS232. This mode enables touch functionality.

3.3 TMC2209 V1.3 Stepper Motor Driver Installation

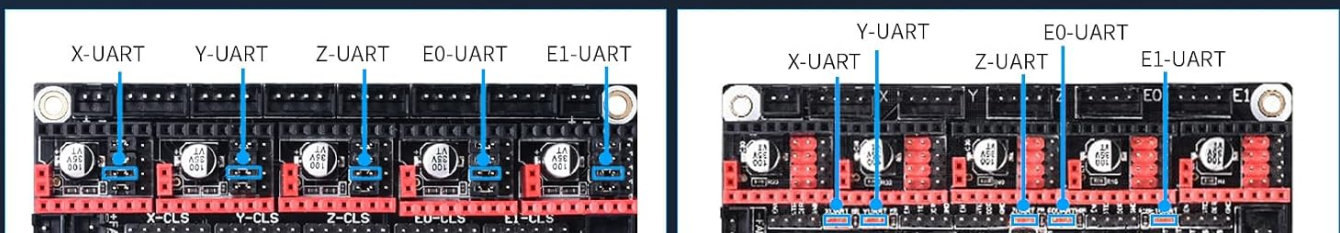
Install the TMC2209 V1.3 stepper motor drivers into the designated slots on the SKR V1.4 Turbo board. Ensure correct orientation. The drivers can operate in STEP/DIR, SPI, or UART modes.

BTT SKR V1.3 and BTT SKR V1.4 Turbo Drive Wiring Mode

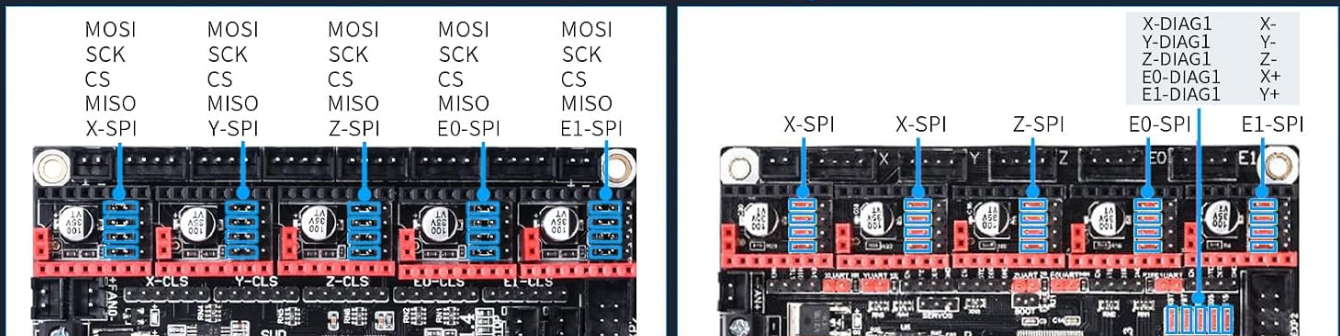
STEP / DIR Mode



SPI Mode driver by TMC



UART Mode driver by TMC



SKR V1.4 V1.4 Turbo

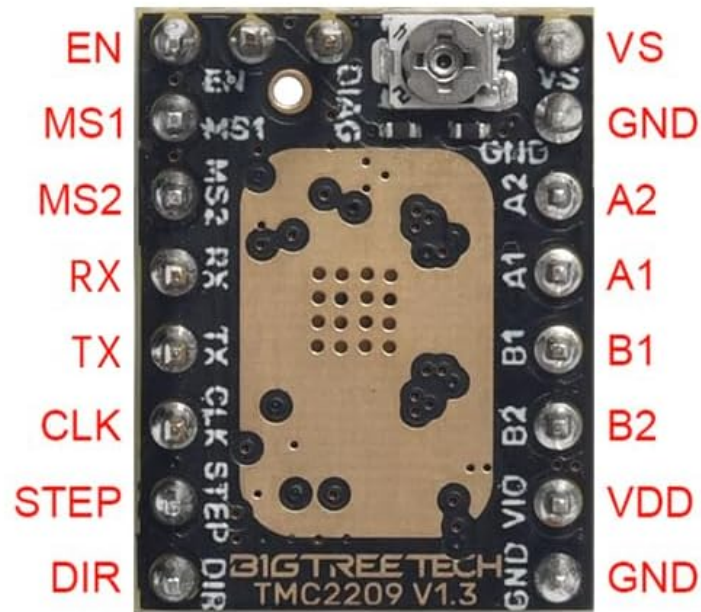
SKR V1.3

Figure 3.3: Drive Wiring Modes. This diagram shows the different wiring configurations for stepper drivers on the SKR V1.4 Turbo board, including STEP/DIR, SPI, and UART modes, highlighting the pin connections for each.

3.3.1 STEP/DIR Mode Configuration

In STEP/DIR mode, microstep resolution is configured using the MS1 and MS2 pins. Refer to the table below for settings.

STEP/DIR Mode



Choice of working mode: MS1、MS2

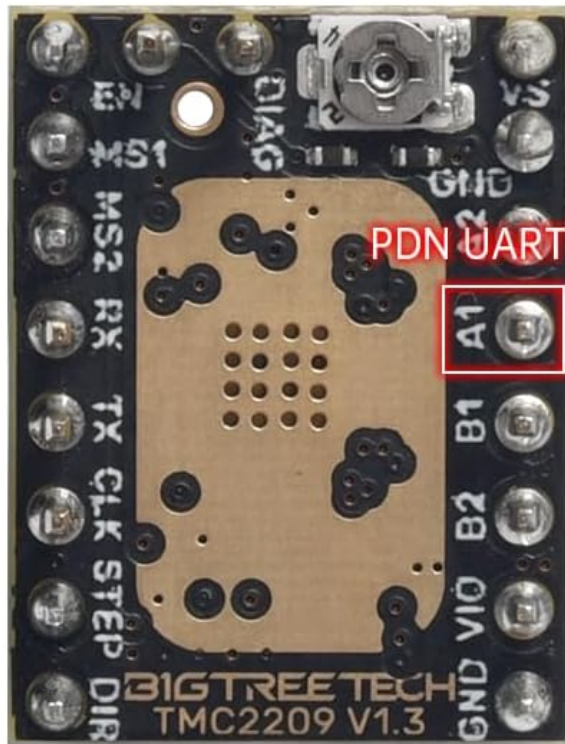
MS1/MS2: Configuration Of Microstep Resolution For STEP Input		
MS2	MS1	Microstep Setting
GND	GND	8 microsteps
GND	VCC_IO	2 microsteps (half step)
VCC_IO	GND	4 microsteps (quarter step)
VCC_IO	VCC_IO	16 microsteps

Figure 3.4: TMC2209 STEP/DIR Mode. This image details the pinout for the TMC2209 V1.3 driver in STEP/DIR mode and provides a table for configuring microstep resolution using MS1 and MS2 pins.

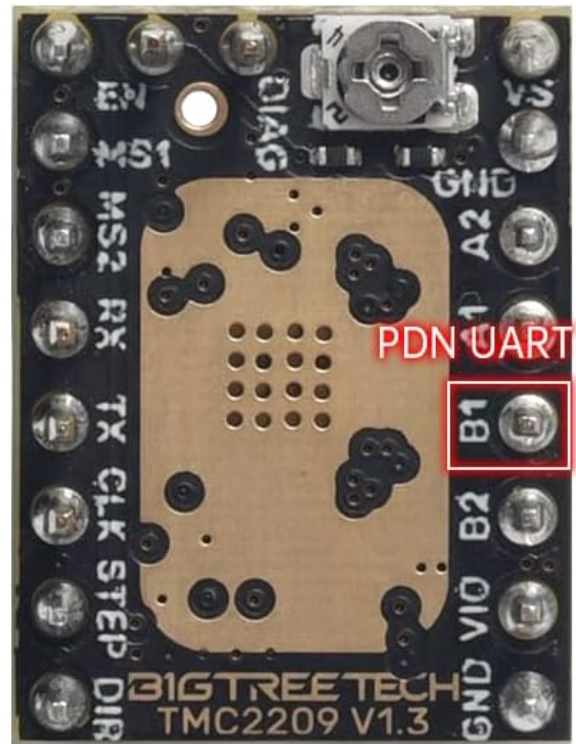
3.3.2 UART Mode Configuration

For UART mode, the 5th pin is used as the UART pin. This typically requires removing a resistance and welding it to specific pads on the driver board, as shown in the diagram.

UART Mode



Factory default



The 5th pin is used as the UART

UART Mode, had soldered

As shown in the figure to the right, if the 5th Pin is used as the UART Pin, the resistance shall be removed and welded to the following two pads.

Figure 3.5: TMC2209 UART Mode. This image illustrates the modification required for UART mode on the TMC2209 V1.3 driver, specifically how the 5th pin is configured for UART communication.

3.4 Firmware Configuration

The SKR V1.4 Turbo board is compatible with open-source firmware such as Marlin2.0 and Klipper. Firmware flashing is typically done via an SD card. Detailed instructions for firmware compilation and flashing can be found on the BIGTREETECH GitHub repository.

- Download the appropriate firmware for your printer model and desired features.
- Configure the firmware settings (e.g., stepper drivers, endstops, display type).
- Compile the firmware and save the resulting .bin file to the root directory of an SD card.
- Insert the SD card into the SKR V1.4 Turbo board and power on the printer. The board will automatically flash the new firmware.

4. OPERATING INSTRUCTIONS

4.1 TFT35 V3.0.1 Display Operation

The TFT35 V3.0.1 display allows for easy switching between its two operating modes.

- **Mode Switching:** Press and hold the rotary encoder for approximately 3 seconds until the mode selection page appears. Select your desired mode (12864 LCD or Serial Touch Screen) and press the encoder to confirm.
- **Printing:** The display supports printing directly from an SD card or a USB stick. Insert the storage device into the appropriate slot on the display and navigate the menu to select your print file.

4.2 Advanced Features

The SKR V1.4 Turbo board supports several advanced features that can be enabled through firmware configuration:

- **Resume Printing While Power Off:** In the event of a power interruption, the printer can resume printing from where it left off once power is restored.
- **Smart Filament Break Detection:** The printer will pause operation if it detects that the filament has run out or broken, allowing for filament replacement.
- **Automatic Shutdown After Printing:** The printer can be configured to automatically power down after a print job is completed.
- **BLTouch/MicroProbe V20 & Eddy Auto Bed Leveling:** Integrate these sensors for automatic bed leveling, improving first layer adhesion and print quality.

5. MAINTENANCE

Proper maintenance ensures the longevity and optimal performance of your BIGTREETECH components.

- **Cleaning:** Keep the control board and display free from dust and debris. Use a soft, dry brush or compressed air for cleaning. Avoid using liquids.
- **Cooling:** Ensure adequate airflow around the stepper motor drivers and the main control board. The TMC2209 drivers feature a large-area fan thermal pad for heat dissipation, but additional cooling may be beneficial in enclosed environments.

Large-area fan thermal pad reduces the heat dissipation temperature of the driver

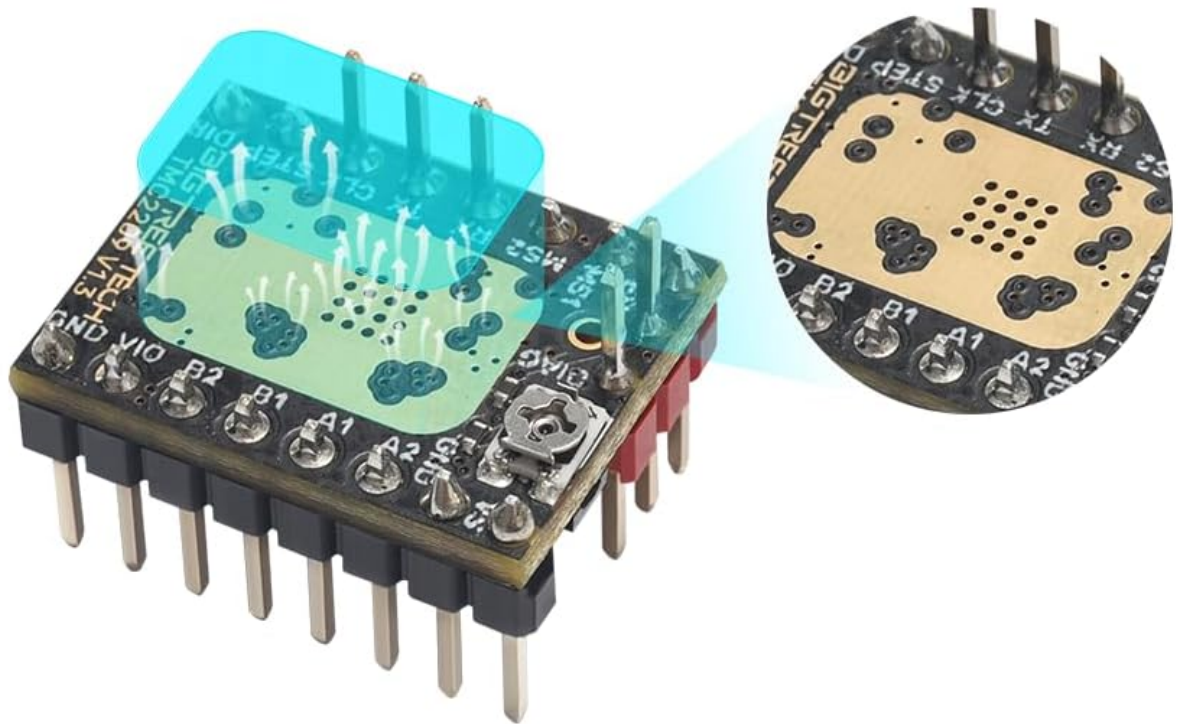


Figure 5.1: TMC2209 Thermal Management. This image highlights the large-area fan thermal pad on the TMC2209 driver, designed to reduce heat dissipation temperature, along with thermal imaging examples.

- **Connections:** Periodically check all wiring connections to ensure they are secure and free from corrosion.
- **Firmware Updates:** Regularly check the official BIGTREETECH GitHub for firmware updates, which may include bug fixes, performance improvements, and new features.

6. TROUBLESHOOTING

This section addresses common issues you might encounter.

6.1 General Issues

- **Printer Not Powering On:**
 - Verify power supply connections and ensure the input voltage is within the specified range (DC 12V-24V).

- Check for any blown fuses on the control board.

- **Display Not Working:**

- Ensure the display cables (EXP1/EXP2 for 12864 mode, RS232 for serial mode) are correctly connected.
- Confirm the display mode is correctly selected on the TFT35 V3.0.1.
- Verify firmware configuration for the display type.

6.2 Stepper Motor Issues

- **Motors Not Moving or Stuttering:**

- Check motor wiring for correct polarity and secure connections.
- Verify stepper driver installation and orientation.
- Ensure the correct driver mode (STEP/DIR, SPI, UART) is configured in firmware and on the driver itself.
- Check Vref (voltage reference) settings for the stepper drivers; incorrect Vref can lead to overheating or insufficient current.
- Inspect drivers for signs of damage or overheating.

- **Excessive Motor Noise:**

- Ensure TMC2209 drivers are operating in StealthChop2 mode (configured via UART/SPI).
- Check for mechanical issues with the printer axes.

6.3 Firmware Related Issues

- **Firmware Not Flashing:**

- Ensure the .bin file is correctly named (e.g., firmware.bin) and placed in the root directory of a FAT32 formatted SD card.
- Try a different SD card.
- Verify the firmware is compiled for the correct board (SKR V1.4 Turbo).

- **Unexpected Behavior After Flashing:**

- Review your firmware configuration for any incorrect settings (e.g., pin assignments, thermistor types, driver types).
- Perform a factory reset if possible, or re-flash with a known good firmware configuration.

7. WARRANTY AND SUPPORT

BIGTREETECH products are designed for reliability and performance. If you encounter any issues or have questions regarding the SKR V1.4 Turbo Control Board, TFT35 V3.0.1 Touch Screen Display, or TMC2209 V1.3 Stepper Motor Drivers, please contact BIGTREETECH customer support.

Our technical support team is available to assist you and will respond to inquiries within 24 hours. Please provide your product model and a detailed description of the issue when contacting support to facilitate a quicker resolution.

For the latest documentation, firmware, and community support, please visit the official BIGTREETECH GitHub page or website.

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