BIGTREETECH SKR V1.4 Turbo

BIGTREETECH SKR V1.4 Turbo 32-bit Control Board User Manual

Brand: BIGTREETECH | **Model:** SKR V1.4 Turbo

1. Introduction

The BIGTREETECH SKR V1.4 Turbo is an advanced 32-bit control board designed for 3D printers, offering enhanced performance and versatility. It features a 120MHz ARM-class Cortex-M3 series LPC1769 main control chip, significantly improving processing capabilities.

This board supports various stepper motor drivers, including TMC2209, TMC2208, TMC5160, and TMC2130, and is compatible with TFT35 E3 V3.0.1/TFT70 touch screens. It incorporates on-board TMC-driven SPI and UART working modes, along with convenient DIAG function pins for simplified setup.

The included TMC2209 V1.3 silent stepper drivers utilize stealthChop2 Mute technology for quiet operation and efficient motor torque, generating lower heat compared to other drivers. With passive cooling, these drivers maintain optimal temperatures even during extended printing sessions.

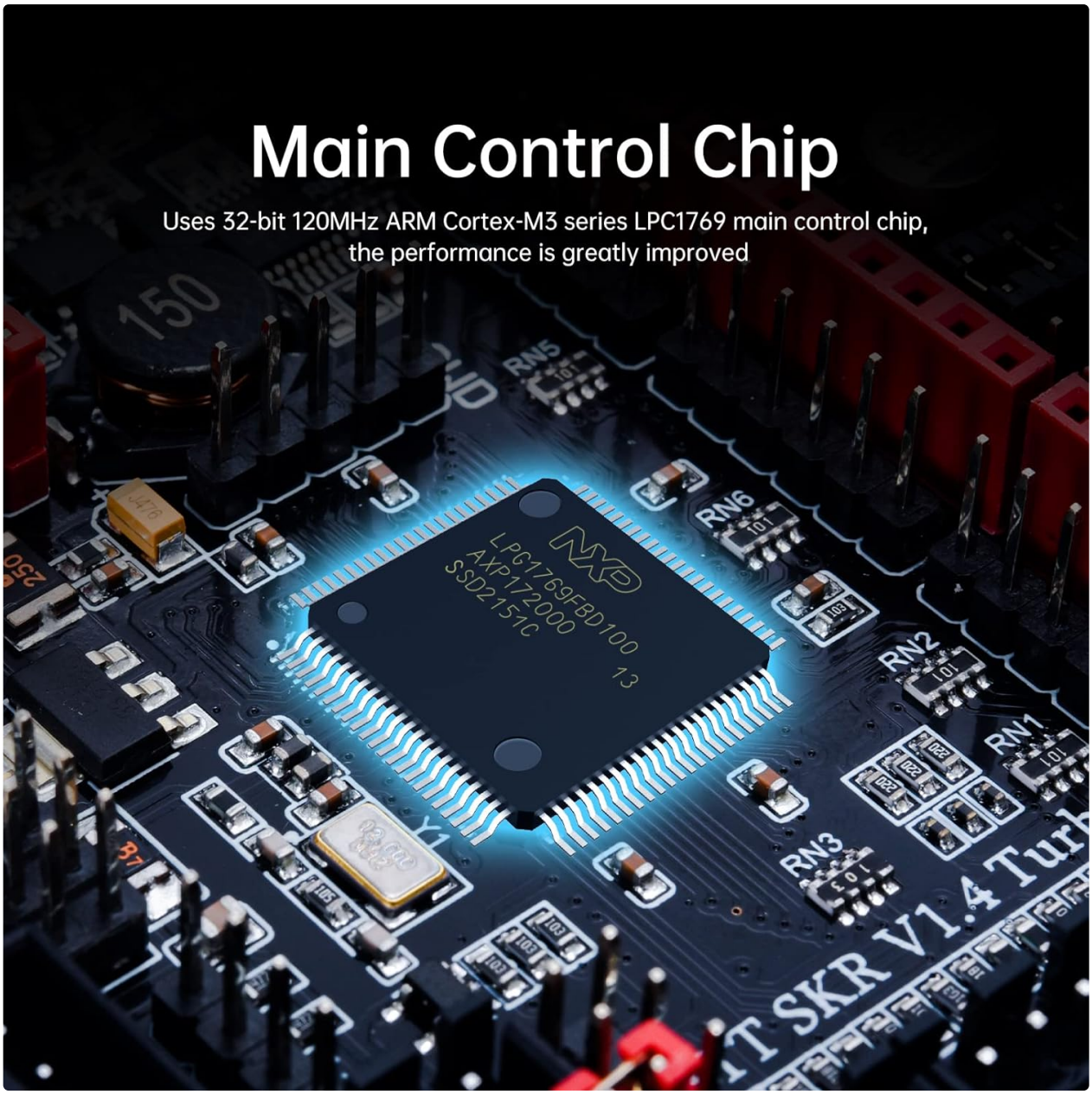

Figure 1.1: Main Control Chip (NXP LPC1769FBD100) on the SKR V1.4 Turbo board.

Figure 1.2: Visual comparison of print quality with and without losing steps, demonstrating the precision of the drivers.

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2. Setup and Installation

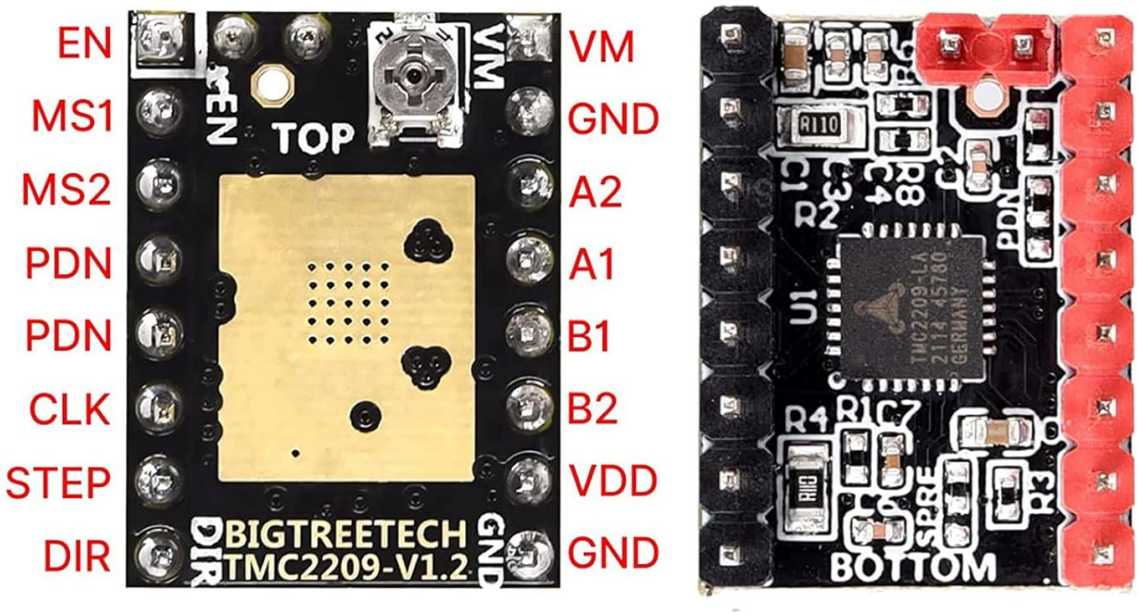
2.1 Power Supply and Peripherals

The SKR V1.4 Turbo control board can power TFT screens, BLTouch sensors, and Neo-pixel LEDs by connecting an external DC5V power module. Dedicated I2C, SPI, and WIFI interfaces are reserved for custom modifications and expansions.

Figure 2.1: DC5V Power Module connection point for TFT, BLTouch, and Neo-pixel.

2.2 Stepper Driver Configuration

The board features on-board TMC-driven SPI and UART working modes. The integrated DIAG function pins simplify configuration; users can enable these functions by simply removing or inserting jumper caps, eliminating complex wiring.



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 2.2: Microstep resolution settings for TMC2209 drivers using MS1/MS2 jumpers.

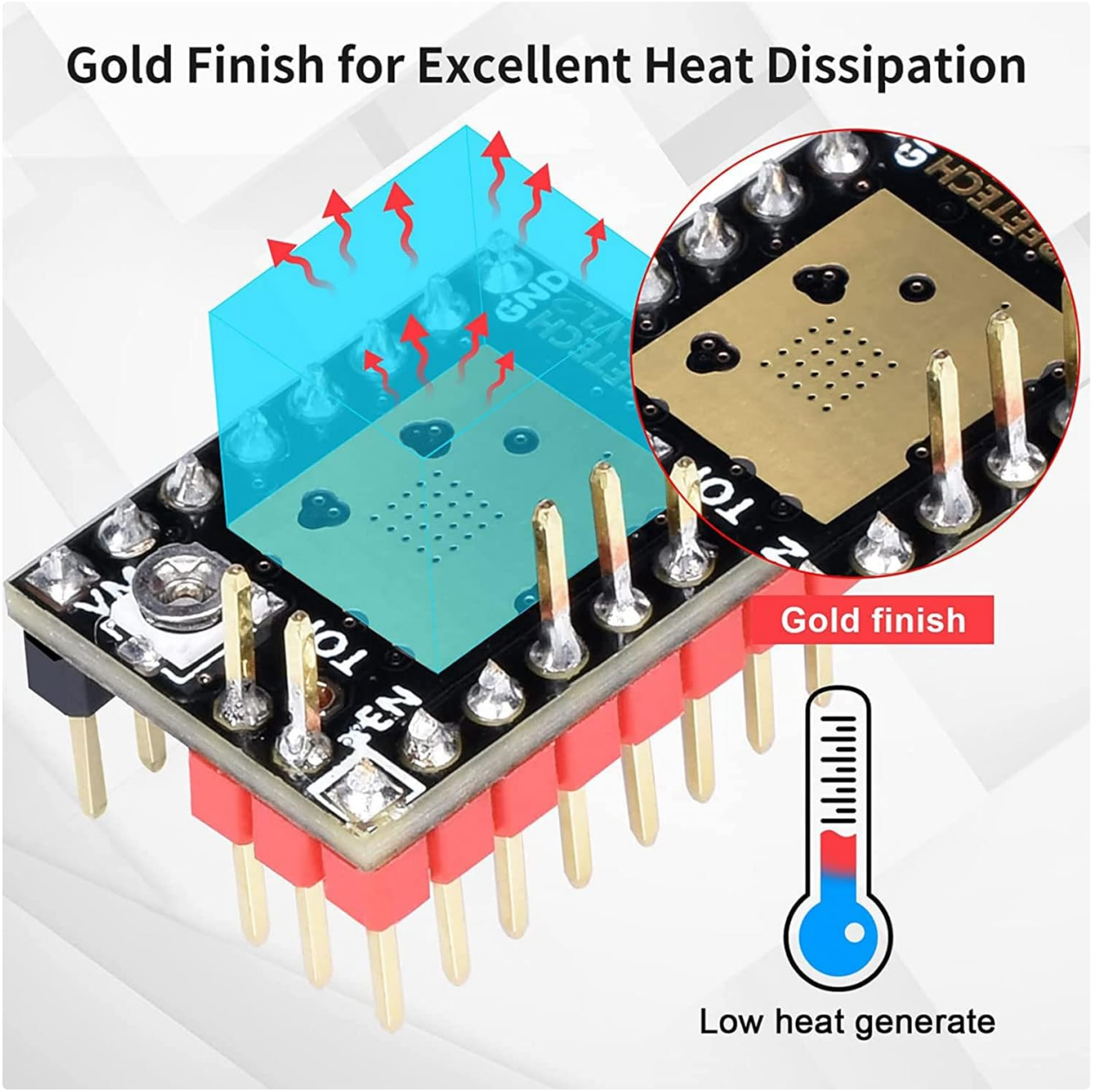


Figure 2.3: Gold finish on stepper drivers for enhanced heat dissipation.

2.3 Wiring Diagram

Refer to the detailed wiring diagram below for connecting all components to the SKR V1.4 Turbo board. Ensure all connections are secure and correctly oriented to prevent damage.

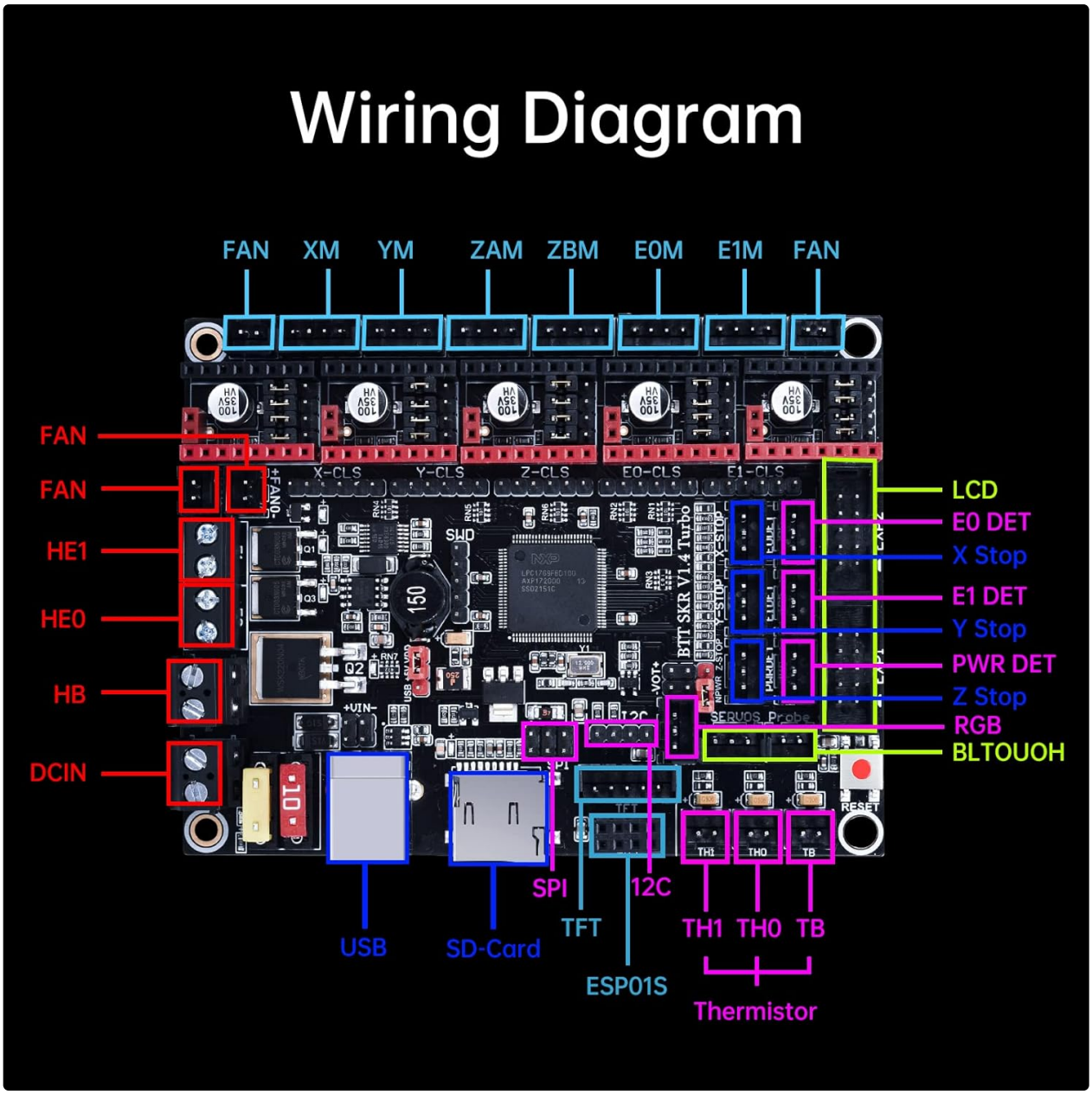


Figure 2.4: Complete wiring diagram for the SKR V1.4 Turbo board.

2.4 Fan Interfaces

The board provides multiple fan interfaces for efficient cooling of your 3D printer components.

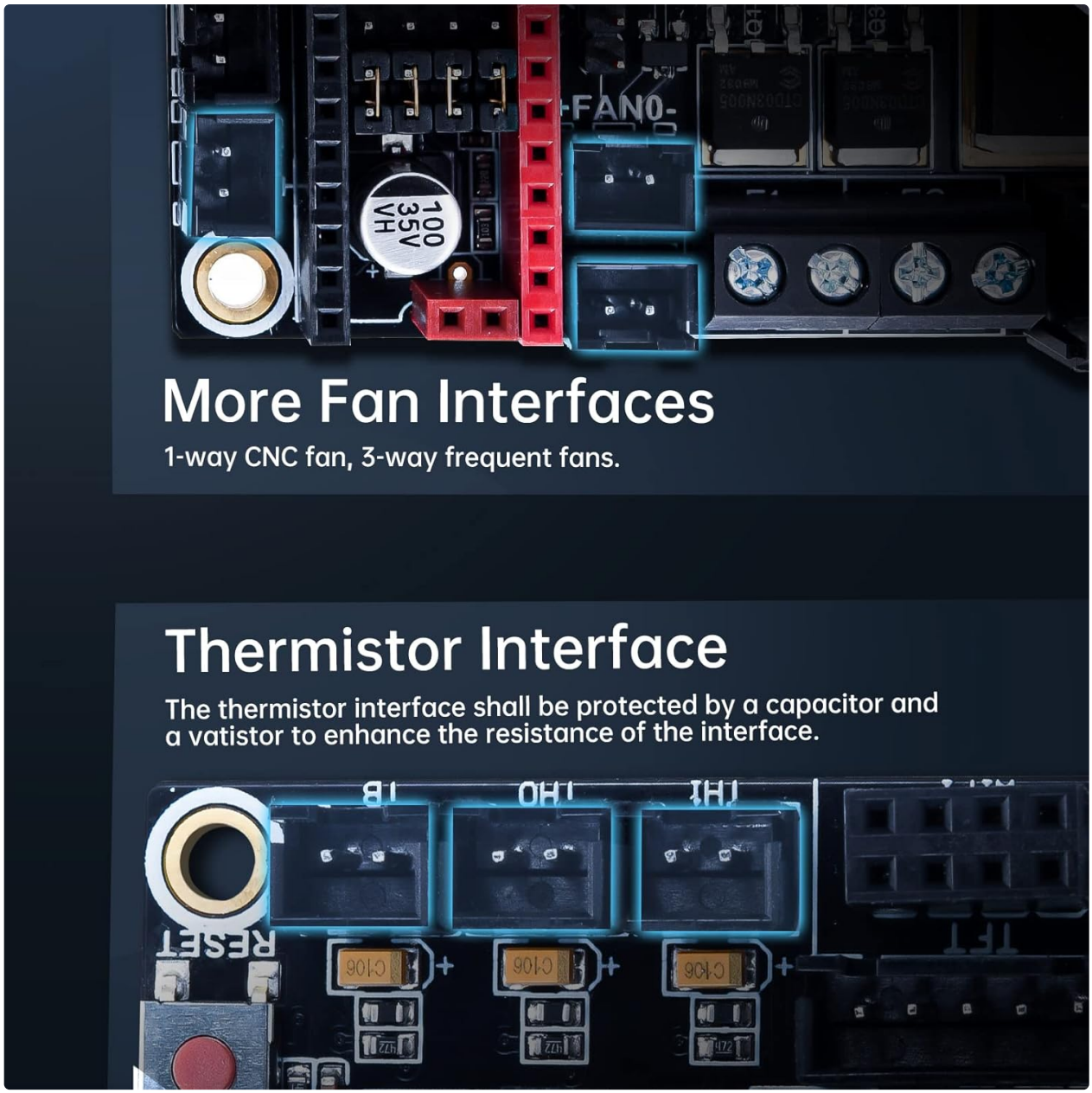


Figure 2.5: Fan interfaces on the SKR V1.4 Turbo board.

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3. Operating Instructions

Once the board is correctly installed and wired, ensure the appropriate firmware (e.g., Marlin or RepRapFirmware) is loaded onto the board. Detailed instructions for firmware compilation and flashing can be found on the BIGTREETECH GitHub page or community forums.

The board supports various display options, including TFT touch screens, for intuitive control and monitoring of your 3D printer.

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4. Maintenance

To ensure optimal performance and longevity of your SKR V1.4 Turbo board, follow these maintenance guidelines:

- Regularly inspect all wiring connections for looseness or damage.
- Keep the board free from dust and debris. Use compressed air or a soft brush for cleaning.

- Ensure adequate ventilation around the board and stepper drivers to prevent overheating.
- Periodically check for firmware updates from BIGTREETECH to benefit from new features and bug fixes.

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5. Troubleshooting

This section provides solutions to common issues you might encounter:

5.1 TMC Connection Error

If your display shows a "TMC CONNECTION ERROR", verify that all stepper drivers are correctly inserted and oriented. The board includes integrated anti-reverse driver protection, which prevents damage if a driver is inserted incorrectly. If a driver is inserted reversely, the indicator light for that driver will be off.

5.2 Heating Issues

The board features an advanced thermistor protection circuit to prevent short circuits between the heater cartridge and the bed heating element. It also includes an additional heater protection circuit (MOSFET) to guard against runaway heating. If heating issues occur, check the thermistor connections and the MOSFET for any visible damage or incorrect wiring.

Figure 5.1: General setup for troubleshooting or configuration.

6. Specifications

- **Main Control Chip:** LPC1769 (ARM-class Cortex-M3, 120MHz)
- **Operating Temperature:** 37 Degrees Celsius (typical for TMC2209 with passive cooling)
- **Voltage:** 5 Volts (control board), 4.75V-29V (TMC2209 driver)
- **Driver Current (TMC2209):** 2A (Drive), 2.8A (Peak)
- **Microstep Subdivision (TMC2209):** 256
- **Display Type Support:** TFT35 E3 V3.0.1/TFT70 Touch Screen
- **Interfaces:** I2C, SPI, WIFI (external module required), USB, SD Card
- **Item Model Number:** ZZB000385+UUU001791
- **UPC:** 778416922796
- **Package Dimensions:** 7.09 x 4.45 x 2.13 inches
- **Item Weight:** 7.4 ounces (0.21 Kilograms)
- **Color:** Black

7. What's in the Box

The package includes:

- 1 x BIGTREETECH SKR V1.4 Turbo Control Board
- 5 x TMC2209 V1.3 Stepper Drivers

8. Warranty and Support

For warranty information, technical support, and additional resources, please refer to the official BIGTREETECH website or contact their customer service directly. Product documentation and firmware updates are often available on the manufacturer's GitHub repository.