



Manuals.plus /

› HBFEYSZY /

› HBFEYSZY MKS Gen_L 2.1 3D Printer Control Board with TMC2208 User Manual

HBFEYSZY MKS Gen_L 2.1

HBFEYSZY MKS Gen_L 2.1 3D Printer Control Board with TMC2208 User Manual

Model: MKS Gen_L 2.1-TMC2208

1. INTRODUCTION

This manual provides essential information for the installation, operation, and maintenance of the HBFEYSZY MKS Gen_L 2.1 3D Printer Control Board, specifically the variant equipped with TMC2208 stepper drivers. The MKS Gen_L 2.1 is designed to offer a versatile and reliable control solution for various 3D printer configurations, supporting advanced stepper drivers for enhanced performance and quieter operation, particularly in UART mode.

2. SAFETY INFORMATION

- **Power Supply:** Always ensure the power supply is disconnected before making any electrical connections or disconnections to the control board. Use a power supply that matches the board's voltage requirements (typically 12V/24V).
- **Static Electricity:** Electronic components are sensitive to static discharge. Handle the board by its edges and consider using anti-static precautions.
- **Wiring:** Double-check all wiring connections for correct polarity and secure fit before applying power. Incorrect wiring can damage the board and connected components.
- **Heat:** Stepper drivers and other components can generate heat during operation. Ensure adequate ventilation and consider heatsinks where necessary.
- **Environment:** Operate the board in a dry, dust-free environment. Avoid exposure to moisture or extreme temperatures.

3. PRODUCT OVERVIEW

The MKS Gen_L 2.1 is an integrated control board designed for 3D printers, combining the features of an Arduino MEGA2560 and RAMPS 1.4 into a single, compact unit. This version includes TMC2208 stepper drivers, known for their

silent operation and advanced features when configured in UART mode.

Key Features:

- Integrated design, simplifying wiring and improving stability.
- Supports various stepper drivers, including TMC2208/TMC2209 in UART mode.
- Compatible with Marlin firmware.
- Multiple interfaces for motors, heaters, fans, and endstops.
- Durable construction for long-lasting performance.

Board Layout:

Below are images illustrating the various components and connection points on the MKS Gen_L 2.1 board.



Figure 3.1: Top view of the MKS Gen_L 2.1 control board, showing main chip, stepper driver slots, and various connectors (X, Y, Z, E0, E1 motor outputs, fan, heater, and endstop connections).

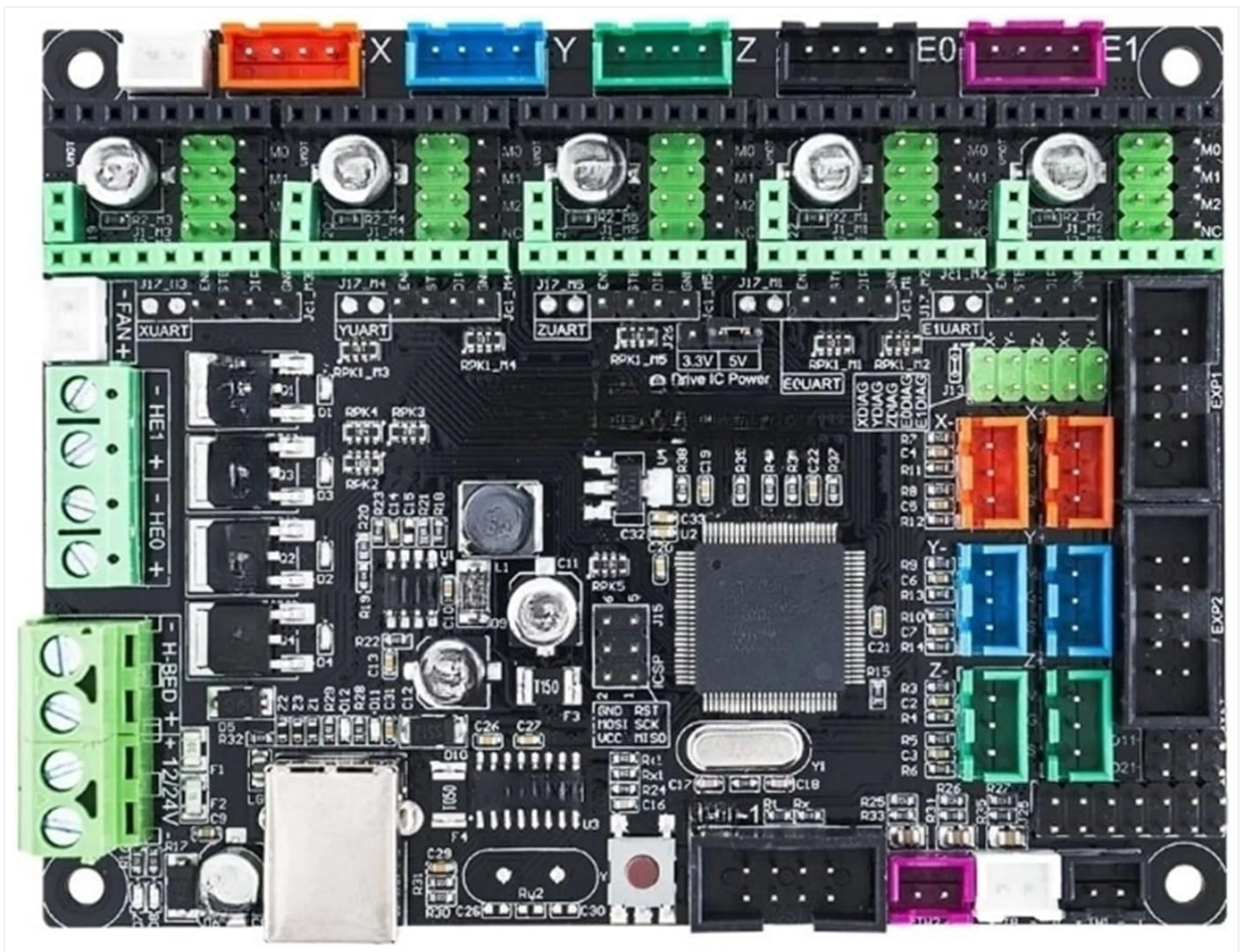


Figure 3.2: Angled view of the MKS Gen_L 2.1 board, highlighting the numerous pin headers for expansion, display, and sensor connections, along with the power input terminals.

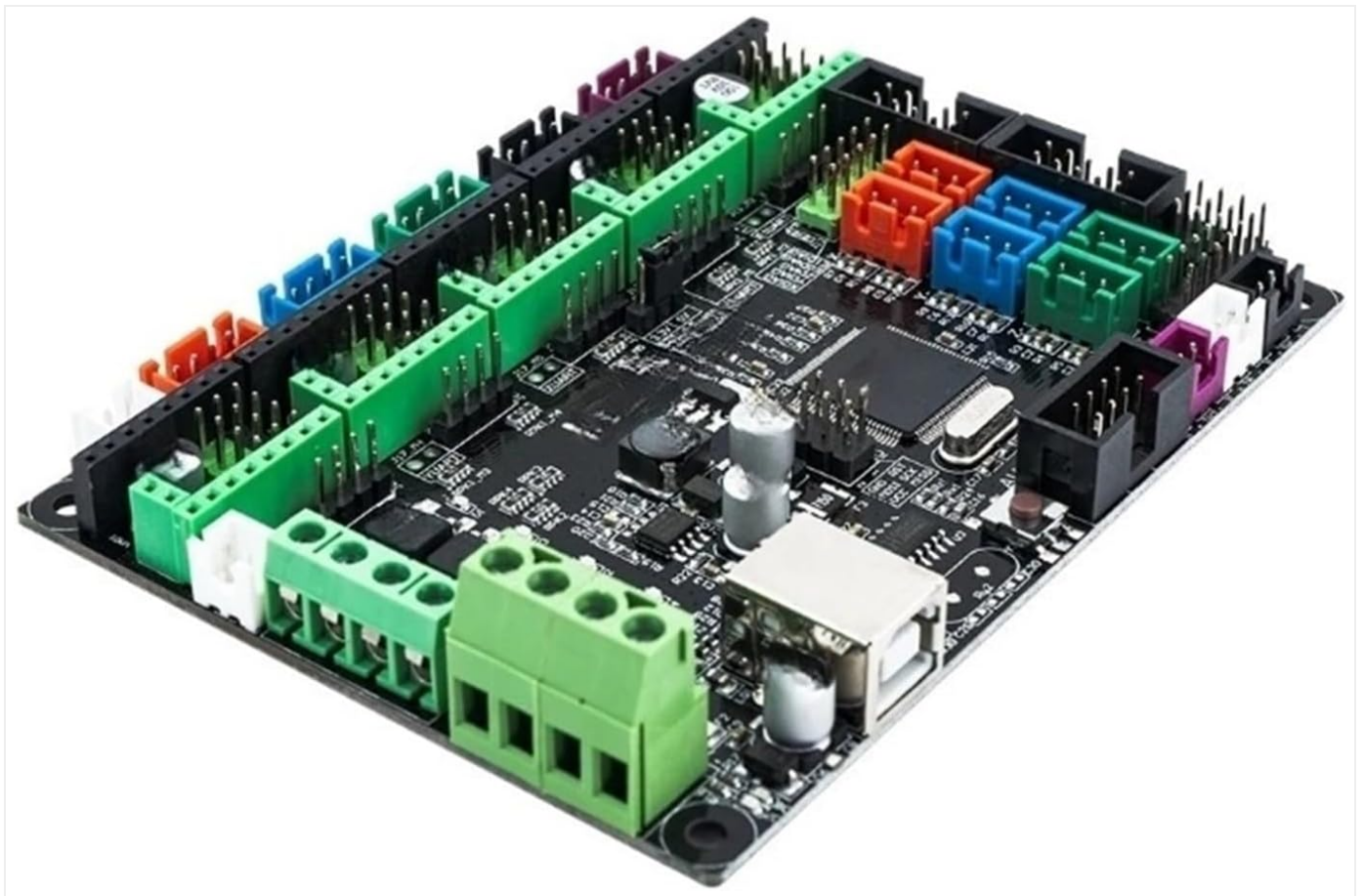


Figure 3.3: Side view of the MKS Gen_L 2.1 board, clearly showing the USB port for computer connection and firmware flashing, as well as the main power input terminal block.

4. SETUP

4.1. Stepper Driver Installation (TMC2208 UART Mode)

1. **Identify Driver Slots:** Locate the five stepper driver slots (X, Y, Z, E0, E1) on the MKS Gen_L 2.1 board.
2. **Insert Drivers:** Carefully insert the TMC2208 stepper drivers into their respective slots, ensuring correct orientation (refer to the silkscreen on the board for pin alignment).
3. **Configure Jumpers:** For UART mode, specific jumpers need to be set. Consult the MKS Gen_L 2.1 schematic or official documentation for the exact jumper configuration for TMC2208 in UART mode. Typically, this involves setting jumpers to enable the UART communication pins.
4. **Connect Motors:** Connect your stepper motors to the corresponding X, Y, Z, E0, E1 motor output headers. Ensure correct wiring for each motor phase.

4.2. Wiring Connections

- **Power Input:** Connect your 12V/24V DC power supply to the main power input terminal block (H-BED +12/24V). Observe polarity.
- **Heated Bed:** Connect your heated bed to the H-BED terminals.
- **Hotends:** Connect your hotend heaters to the HE0 and HE1 terminals.
- **Fans:** Connect cooling fans to the FAN terminals.
- **Endstops:** Connect X, Y, Z, E0, E1 endstops to their respective signal pins. Ensure correct wiring for normally open (NO) or normally closed (NC) configurations as per your firmware settings.
- **Display:** Connect your LCD display (e.g., 12864 LCD) to the EXP1 and EXP2 headers.

- **Thermistors:** Connect thermistors for the heated bed and hotends to the T0, T1, TB terminals.

4.3. Firmware Configuration and Upload

1. **Download Marlin:** Obtain the latest stable version of Marlin firmware from the official Marlin GitHub repository.
2. **Configure Marlin:** Edit the Configuration.h and Configuration_adv.h files to match your printer's specific hardware, including:
 - Board type (e.g., BOARD_MKS_GEN_L).
 - Stepper driver type (TMC2208_STANDALONE or TMC2208_UART, depending on your jumper settings).
 - Motor steps per millimeter (steps/mm).
 - Thermistors and heated bed settings.
 - Endstop logic.
 - Enable UART communication for TMC2208 if configured.
3. **Compile and Upload:** Use an IDE like PlatformIO (recommended) or Arduino IDE to compile the firmware. Connect the MKS Gen_L 2.1 board to your computer via the USB cable and upload the compiled firmware.

5. OPERATING

Once the MKS Gen_L 2.1 board is correctly installed and firmware is uploaded, you can begin operating your 3D printer.

- **Power On:** Connect the power supply and turn on your 3D printer. The display should initialize, and the board will perform its startup sequence.
- **Homing:** Use the printer's control interface (LCD or host software) to home all axes (X, Y, Z). This calibrates the printer's position.
- **Temperature Control:** Monitor and set the hotend and heated bed temperatures. Ensure they reach and maintain the desired temperatures.
- **Printing:** Load your G-code file via SD card or a connected host computer. Initiate the print job from the printer's interface.
- **Monitoring:** During printing, observe the printer's movements, temperature stability, and print quality.

6. MAINTENANCE

- **Regular Inspection:** Periodically inspect all wiring connections for looseness or damage.
- **Dust Removal:** Keep the control board free from dust and debris using compressed air or a soft brush.
- **Firmware Updates:** Consider updating firmware periodically to benefit from new features, bug fixes, and performance improvements.
- **Component Check:** Visually inspect components for any signs of overheating or damage.

7. TROUBLESHOOTING

Problem	Possible Cause	Solution
Board does not power on	Incorrect power wiring, faulty power supply, blown fuse	Check power supply connections and voltage. Verify power supply functionality. Inspect board fuses.
Motors not moving or moving erratically	Incorrect motor wiring, incorrect stepper driver installation, wrong firmware configuration, faulty motor/driver	Verify motor wiring and driver orientation. Check firmware settings for steps/mm and driver type. Test with known good motor/driver.
Temperature readings are incorrect or stuck	Faulty thermistor, incorrect thermistor wiring, wrong thermistor type in firmware	Check thermistor wiring for shorts or breaks. Ensure thermistor is correctly seated. Verify thermistor type in Marlin firmware.
Endstops not triggering	Incorrect endstop wiring, wrong endstop logic in firmware, faulty endstop switch	Check endstop wiring (NO/NC). Adjust ENDSTOP_INVERTING in firmware. Test endstop switch functionality.
USB connection issues	Faulty USB cable, missing drivers, incorrect port selection	Try a different USB cable. Install necessary CH340/FTDI drivers for your operating system. Select the correct COM port in your software.

8. SPECIFICATIONS

- **Model:** MKS Gen_L 2.1
- **Brand:** HBFEYSZY
- **Compatible Stepper Drivers:** TMC2208 (UART mode supported), TMC2209, A4988, DRV8825, etc.
- **Input Voltage:** 12V/24V DC
- **Logic Voltage:** 3.3V/5V (selectable via jumper)
- **Microcontroller:** ATmega2560
- **Interfaces:** 5 motor outputs, 2 heated bed outputs, 2 hotend outputs, 3 fan outputs, 6 endstop inputs, SPI, I2C, UART, USB.
- **Weight:** Approximately 50 Grams

9. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the seller's policies or contact the manufacturer directly. Keep your purchase receipt as proof of purchase. Online resources, community forums, and the official Marlin firmware documentation are also valuable sources of information and assistance for 3D printer control boards.

