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› SWTHM 3 Axis GRBL Grbcontrol Stepper Motor 32-Bit CNC Engraving Machine Controller User Manual

SWTHM zg453140839

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Model: zg453140839

1. INTRODUCTION

This user manual provides comprehensive instructions for the SWTHM 3 Axis GRBL Grbcontrol Stepper Motor 32-Bit CNC Engraving Machine Controller. This high-performance controller is designed to provide precise positioning and movement for CNC engraving and cutting tasks, utilizing a 32-bit processor and GRBL firmware for enhanced speed and accuracy.



Figure 1: SWTHM 3 Axis GRBL CNC Engraving Machine Controller.

2. KEY FEATURES

- **High Performance:** Utilizes a 32-bit processor and GRBL firmware for higher computing power and faster response times, enabling faster movements and more precise positioning.
- **Ease of Use:** The Gbrcntrl software offers an intuitive interface for easy setup and control, allowing adjustment of motion parameters, speed, acceleration, and real-time monitoring.
- **Multifunctional:** Includes features such as limit switch inputs, PWM outputs, and manual control buttons for enhanced control and equipment protection.
- **Stability:** Built with GRBL firmware, a widely used open-source firmware known for its stability and reliability. Requires a computer connected to a Windows 10 system for operation.
- **Applicability:** Suitable for a wide range of engraving and cutting tasks, controlling stepper motor movement for precise X, Y, and Z axis positioning in woodworking, metalworking, and other applications.

3. SPECIFICATIONS

The following table details the technical specifications of the SWTHM 3 Axis GRBL CNC Controller:

Parameter	Value
Processor Architecture	ARM 32-Bit
Firmware	GRBL 1.1F
Drive Unit	A4988
Input Voltage	12-24V DC 5A
Current Specifications	Standard: 1.042A; Maximum: 2.083A
Supported System	Windows (Windows 10 recommended)
Firmware Modification	Not supported (This control board is not a development board and the firmware cannot be customized and modified.)
Supported Software	LaserGRBL/Lightburn/Candle (3-axis)/General Gcode Sender
Package Dimensions	8.11 x 5.31 x 2.4 inches
Item Weight	10.2 ounces (0.29 Kilograms)
Model Number	zg453140839
Color	Blue
Display Type	LCD or LED (for external display, if connected)

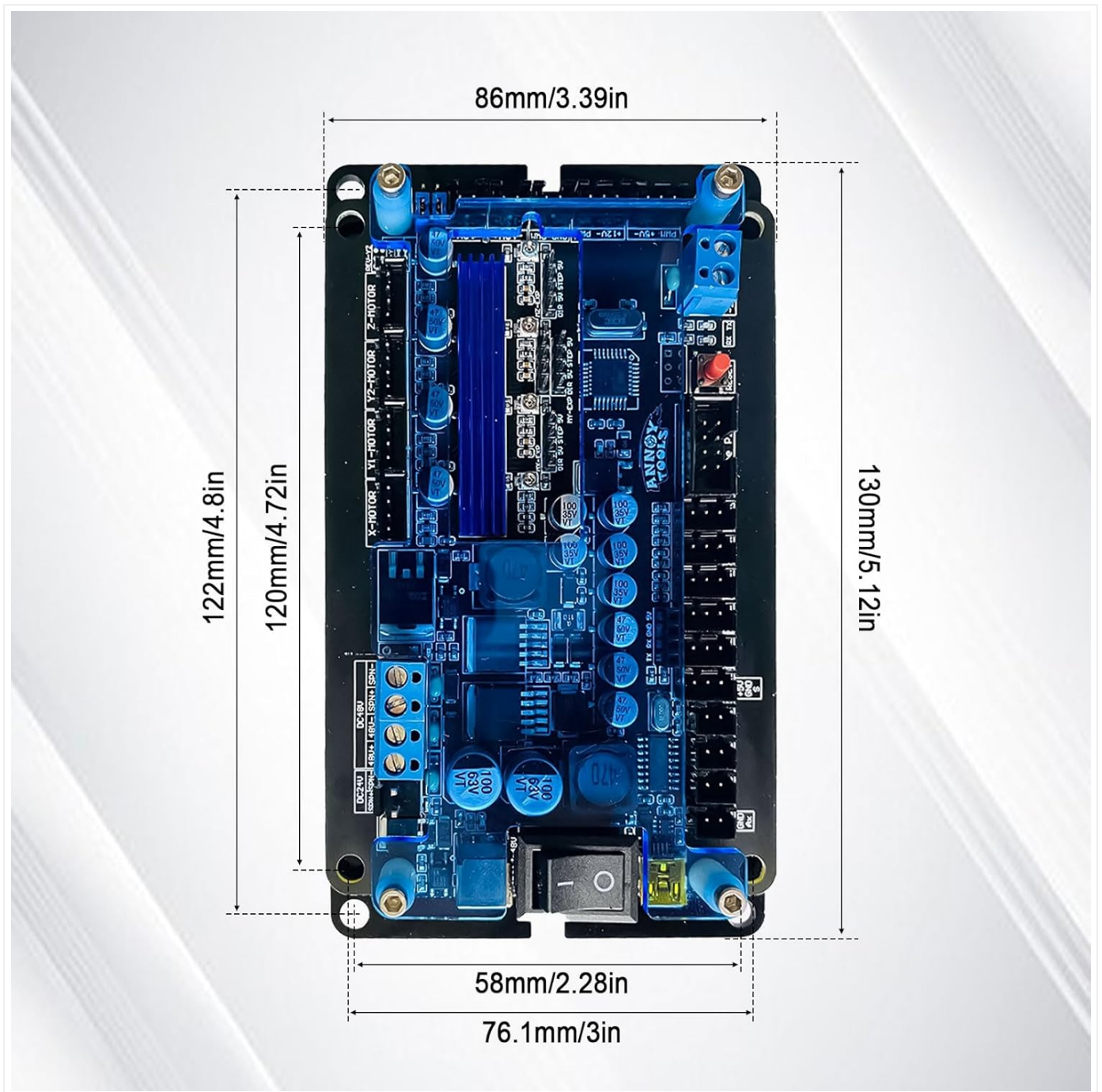


Figure 2: Controller dimensions (86mm x 130mm).

4. SETUP AND CONNECTIONS

Proper connection of the controller is crucial for safe and effective operation. Refer to the wiring diagram below for detailed connection points.



Figure 3: Detailed Wiring Diagram.

4.1 Connection Points Overview

- **Power Input:** DC 12-24V (ensure power supply is >5A).
- **USB Connection:** For connecting to a computer (Windows 10 required).
- **Stepper Motor Connections:** X-MOTOR, Y1-MOTOR, Y2-MOTOR, Z-MOTOR. Ensure correct motor line sequence (1A, 1B, 2A, 2B).

- **Spindle Output:** 24V Spindle, Spindle 0-500W.
- **Laser Output:** 3P Laser (12V +/-PWM), 4P Laser (12V 2P:PWM, 24V 2P:PWM).
- **Limit Switches:** X Limit, Y Limit, Z Limit.
- **Probe:** Z Probe.
- **Control Buttons:** Start, Pause, Reset, E-Stop.
- **Offline Controller:** Dedicated port for offline control.
- **Fan:** Fan connection.
- **Servo:** Servo connection.

4.2 Important Precautions

- Always ensure the line sequence matches before connecting the control board. Incorrect connections can damage the board.
- This control board is not a development board; the firmware cannot be customized or modified.
- The offline controller and computer data cable cannot be connected simultaneously. This can lead to a connection conflict and prevent the control board from functioning properly.

5. OPERATING INSTRUCTIONS

The GRBL control board is operated using compatible software on a Windows 10 computer. Supported software includes LaserGRBL, Lightburn, Candle (3-axis), and other general Gcode senders.

5.1 Software Operation

- Install the necessary drivers for the control board on your Windows 10 system.
- Launch your preferred GRBL-compatible software (e.g., LaserGRBL).
- Connect the control board to your computer via USB. Ensure no offline controller is connected simultaneously.
- Select the correct COM port within the software settings.
- Load your G-code file for engraving or cutting.
- Adjust motion parameters, speed, and acceleration as needed through the software interface.
- Utilize real-time monitoring and debugging features to ensure proper operation.

5.2 Manual Control

The board features manual control buttons for Start, Pause, Reset, and E-Stop, allowing for direct interaction during operation.

6. MAINTENANCE

To ensure the longevity and optimal performance of your GRBL control board, follow these general maintenance guidelines:

- Keep the board clean and free from dust and debris. Use compressed air or a soft brush for cleaning.
- Ensure all connections (power, motor, limit switches, USB) are secure and free from corrosion.
- Operate the board within its specified voltage and current limits to prevent overheating or damage.
- Store the board in a dry, cool environment when not in use.
- Regularly check for any loose components or signs of wear.

7. TROUBLESHOOTING (FAQ)

This section addresses common issues and their solutions:

Q: Why does my CNC machine move inaccurately during operation?

A: It may be necessary to recalibrate the control board's stepper motor. Check limit switch and acceleration settings. Also, inspect the mechanical parts to ensure there are no loose or damaged components.

Q: What do the red and green LED indicators on the GRBL control board mean?

A: Typically, a red LED indicates power connection, and a green LED indicates control board status (such as ready or running).

Q: After my CNC machine is started, the stepper motor makes abnormal noise. What should I do?

A: This may be caused by incorrect current settings. Readjust the current settings on the stepper motor driver to ensure proper motor operation.

Q: The control software I am using cannot connect to the GRBL control board correctly. What should I do?

A: Check whether the COM port settings are correct and ensure that the driver of the control board has been installed correctly. Try using different control software if the issue persists.

Q: My GRBL control board cannot connect to the computer, what should I do?

A: Make sure the USB connection or serial port connection is normal, check whether the COM port settings are correct, and use appropriate control software to connect to the control board.

8. WARRANTY AND SUPPORT

For further assistance, usage tutorials, and after-sales support, please refer to the following resources:

- Scan the QR code below for usage tutorials and after-sales support.
- Visit the support link: <http://qr61.cn/oB9mCc/qOFfw8>
- Contact support via email:
 - Amazon: Amazon@lunyee.com
 - eBay: ebay@lunyee.com
 - AliExpress: AliExpress@lunyee.com

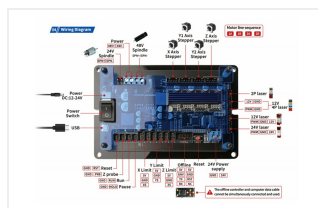


Figure 4: QR Code for Usage Tutorials and After-Sales Support.