JIANGFAN NVCM V2.1

JIANGFAN NVCM V2.1 MACH3 USB Motion Control Card User Manual (3-Axis)

Model: NVCM V2.1

1. Introduction

This manual provides detailed instructions for the installation, setup, operation, and maintenance of the JIANGFAN NVCM V2.1 MACH3 USB Motion Control Card. This device is designed to interface with MACH3 software, enabling precise control of CNC routers, stepper motors, and servo motors for 3-axis applications. Please read this manual thoroughly before operating the device to ensure safe and efficient use.

2. Product Overview

The JIANGFAN NVCM V2.1 is a high-performance USB motion control card specifically engineered for CNC applications. It acts as a bridge between your computer running MACH3 software and the motor drivers of your CNC machine, translating G-code commands into precise pulse signals for motor control. This version supports 3-axis motion control and features a 200KHz pulse output frequency for smooth and accurate operation.

Figure 1: Top view of the NVCM V2.1 Motion Control Card. This image displays the various terminal blocks for connecting stepper or servo motors, limit switches, and other peripherals. The board is black with green terminal blocks.

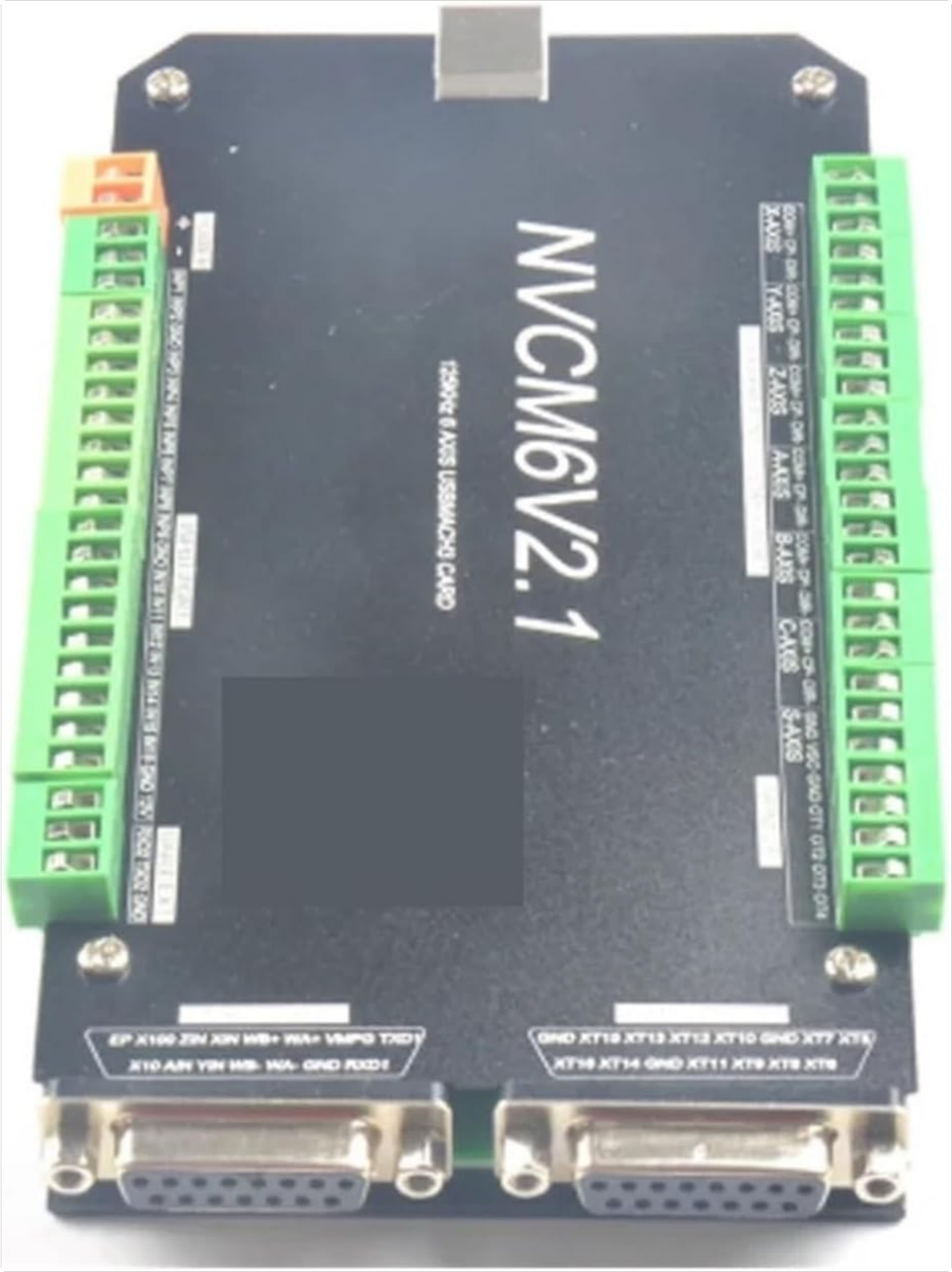

Figure 2: Bottom view of the NVCM V2.1 Motion Control Card. This image highlights the USB connection port for communication with the computer and two DB9 connectors, typically used for external control signals or additional I/O.

3. Features

- **Axis Support:** Supports 3-axis motion control for various CNC applications.
- **High Pulse Frequency:** Up to 200KHz pulse output for precise and smooth motor control.

- **USB Connectivity:** Standard USB interface for easy connection to a computer.
- **MACH3 Compatibility:** Fully compatible with MACH3 CNC control software.
- **Versatile Motor Control:** Suitable for controlling stepper motors and servo motors.
- **Wide Application:** Ideal for CNC routers and other automated machinery.

4. Specifications

Brand	JIANGFAN
Model	NVCM V2.1 (3-Axis)
Axis Support	3-Axis
Pulse Output Frequency	200 KHz
Interface	USB
Software Compatibility	MACH3
Motor Type Compatibility	Stepper Motor, Servo Motor
Item Weight	50 Grams
Manufacturer	JIANGFAN
ASIN	B0DRD2L76S

5. Safety Information

Always observe the following safety precautions to prevent injury or damage to the equipment:

- **Electrical Safety:** Ensure all power connections are made correctly and securely. Disconnect power before making or changing any wiring connections.
- **Professional Installation:** Installation and setup should ideally be performed by individuals with experience in CNC systems and electrical wiring.
- **Environment:** Operate the control card in a clean, dry environment, free from excessive dust, moisture, and extreme temperatures.
- **Grounding:** Ensure your CNC machine and all associated electrical components are properly grounded.
- **Emergency Stop:** Always have an accessible emergency stop button for your CNC machine.
- **Read Documentation:** Refer to the MACH3 software documentation for specific software-related safety guidelines.

6. Setup and Installation

6.1. Hardware Connections

Before connecting the control card, ensure all power to your CNC system is off. The NVCM V2.1 card requires connections for power, USB communication, motor drivers, and optional inputs/outputs (e.g., limit switches, emergency stop).

1. **Power Supply:** Connect a suitable DC power supply to the designated power input terminals on the NVCM V2.1 card. Refer to the card's markings for voltage requirements (typically 12-24V DC).
2. **USB Connection:** Connect the control card to your computer using a standard USB cable. This provides the communication link for MACH3.

3. **Motor Driver Connections:** Connect the PUL (Pulse), DIR (Direction), and ENA (Enable) signals from the NVCM V2.1 card to the corresponding inputs on your stepper or servo motor drivers for each axis (X, Y, Z). Ensure proper common ground connections.
4. **Limit Switches & E-Stop:** Connect limit switches, home switches, and the emergency stop button to the designated input terminals on the control card. Consult the wiring diagram provided with your specific NVCM V2.1 model for exact pin assignments.
5. **Spindle Control (Optional):** If your system includes spindle control, connect the relevant output signals from the NVCM V2.1 to your spindle VFD or relay.

6.2. Software Installation and Configuration

After hardware connections are complete, install and configure the necessary software:

1. **MACH3 Installation:** Install MACH3 CNC software on your computer if not already present.
2. **NVCM Plugin:** Install the specific NVCM plugin for MACH3. This plugin is essential for MACH3 to communicate with the NVCM V2.1 control card. The plugin typically comes with the control card or can be downloaded from the manufacturer's support website.
3. **MACH3 Configuration:**
    - Open MACH3 and navigate to *Config > Ports and Pins*.
    - Under *Motor Outputs*, enable and configure the Step/Dir pins for X, Y, and Z axes according to your wiring diagram.
    - Under *Input Signals*, configure your limit switches, home switches, and E-Stop.
    - Under *Motor Tuning*, set the steps per unit, velocity, and acceleration for each axis. This is crucial for accurate movement.
    - Ensure the NVCM plugin is selected as the motion control device.
4. **Testing:** After configuration, perform basic tests such as jogging each axis to verify correct movement and direction.

7. Operating Instructions

Once the NVCM V2.1 card is installed and configured, you can begin operating your CNC machine with MACH3.

1. **Power On:** Turn on the power to your CNC machine and the NVCM V2.1 control card.
2. **Launch MACH3:** Start the MACH3 software on your computer. Ensure the NVCM plugin initializes correctly.
3. **Homing:** Perform a homing sequence (if configured) to establish the machine's absolute zero position.
4. **Jogging:** Use the keyboard arrows or MACH3's on-screen controls to manually jog each axis and confirm smooth movement.
5. **Load G-Code:** Load your desired G-code file into MACH3 (*File > Load G-Code*).
6. **Set Work Offset:** Set your work offset (G54, etc.) and zero the axes at your desired starting point on the workpiece.
7. **Start Operation:** Click the "Cycle Start" button in MACH3 to begin the CNC program. Monitor the machine closely during operation.
8. **Pause/Stop:** Use the "Feed Hold" button to pause the program or the "Stop" button to halt it completely. In an emergency, press the physical E-Stop button.

8. Maintenance

The JIANGFAN NVCM V2.1 control card is designed for reliable operation with minimal maintenance. However, regular checks can help ensure longevity and performance:

- **Keep Clean:** Periodically clean the control card and its enclosure to prevent dust and debris buildup, which can affect cooling and electrical conductivity. Use a soft, dry brush or compressed air.
- **Check Connections:** Regularly inspect all wiring connections for tightness and signs of wear or corrosion. Loose connections can lead to intermittent operation or damage.
- **Environmental Control:** Ensure the operating environment remains within specified temperature and humidity ranges.
- **Software Updates:** Keep your MACH3 software and NVCM plugin updated to the latest stable versions to benefit from bug fixes and performance improvements.

9. Troubleshooting

This section addresses common issues you might encounter. For more complex problems, refer to the MACH3 documentation or contact technical support.

Problem	Possible Cause	Solution
Motors not moving.	No power to control card or motor drivers. Incorrect wiring to motor drivers. MACH3 not configured correctly (e.g., pins disabled, E-Stop active). NVCM plugin not loaded or faulty.	Verify all power connections and indicators. Check motor driver wiring against the diagram. Review MACH3 *Ports and Pins* and *Motor Tuning* settings. Ensure E-Stop is released. Reinstall NVCM plugin or check MACH3 diagnostics.
Incorrect axis movement or direction.	Incorrect steps per unit in Motor Tuning. Direction pin inverted in MACH3. Motor wiring incorrect (e.g., stepper phases reversed).	Recalibrate steps per unit for the affected axis. In MACH3 *Ports and Pins > Motor Outputs*, toggle the "Dir LowActive" setting. Check motor wiring to the driver.
USB connection issues.	Faulty USB cable or port. Driver issues on the computer. Interference.	Try a different USB cable or port. Check Device Manager for USB driver status. Reinstall NVCM drivers if necessary. Ensure USB cable is shielded and away from power cables.

10. Warranty and Support

For warranty information, please refer to the terms and conditions provided at the time of purchase or contact your retailer. For technical support, assistance with setup, or troubleshooting beyond the scope of this manual, please contact JIANGFAN customer service or the seller from whom you purchased the product. Provide your product model (NVCM V2.1) and ASIN (B0DRD2L76S) when seeking support.
Manufacturer: JIANGFAN
ASIN: B0DRD2L76S

© 2023 JIANGFAN. All rights reserved.