JIANGFAN NVCM V2.1

JIANGFAN NVCM V2.1 MACH3 USB Motion Control Card (4 Axis) Instruction Manual

Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the JIANGFAN NVCM V2.1 MACH3 USB Motion Control Card. This 4-axis controller is designed for use with CNC routers, stepper motors, and servo motors, offering precise motion control via a USB interface. Please read this manual thoroughly before using the product to ensure safe and efficient operation.

Safety Information

- Always disconnect power to the control card and CNC machine before performing any installation, wiring, or maintenance procedures.
- Ensure proper grounding of all components to prevent electrical shock and damage to equipment.
- Operate the control card in a well-ventilated, dry environment, free from excessive dust, moisture, and corrosive gases.
- Keep the device out of reach of children and unauthorized personnel.
- If you are unsure about any installation or operation steps, consult a qualified technician or the manufacturer's support.

Product Overview

The NVCM V2.1 is a high-performance 4-axis motion control card designed for CNC applications. It features multiple input/output terminals for connecting various components of a CNC system, including motors, limit switches, and emergency stop buttons.

Figure 1: Top view of the NVCM V2.1 control card, showing the USB port, power input, and various axis output terminals (X, Y, Z, A).

Figure 2: Bottom view of the NVCM V2.1 control card, illustrating additional input/output pins and communication ports.

Key Features

- 4-axis control capability for versatile CNC applications.
- High pulse output frequency of up to 200KHz for precise motor control.
- USB communication interface for easy connectivity to a computer.
- Compatible with MACH3 software for comprehensive CNC control.

- Supports both stepper and servo motors.

Setup

1. Hardware Installation

1. **Power Connection:** Connect a stable DC power supply (typically 12-24V) to the designated power input terminals on the control card. Ensure correct polarity to prevent damage.
2. **USB Connection:** Connect the control card to your computer using a standard USB cable.
3. **Motor Connections:** Connect your stepper or servo motor drivers to the X, Y, Z, and A axis output terminals. Refer to your specific motor driver's manual for detailed wiring diagrams and pin assignments.
4. **Limit Switches & E-Stop:** Connect limit switches, home switches, and the emergency stop button to the appropriate input terminals as labeled on the control card.
5. **Spindle Control:** If applicable, connect spindle control signals (e.g., PWM, direction) to the designated output terminals on the card.

2. Software Installation (MACH3)

1. **MACH3 Installation:** Install the MACH3 CNC software on your computer. Follow the software's installation wizard and accept all default settings unless otherwise specified.
2. **Driver Installation:** After installing MACH3, install the NVCM V2.1 USB motion card plugin/driver. This is typically provided by the manufacturer or found on their official support website. Ensure the driver is compatible with your operating system.
3. **Restart Computer:** Restart your computer after driver installation to ensure all system changes take effect and the driver is properly loaded.

3. Initial Configuration

1. **Launch MACH3:** Open the MACH3 software on your computer.
2. **Port and Pins Settings:** Navigate to the "Config" menu, then select "Ports and Pins."
3. **Motor Outputs:** Configure the motor output pins (Step/Dir) for each axis (X, Y, Z, A) according to the NVCM V2.1 pinout diagram. Set the correct pulse width and direction for your motor drivers.
4. **Input Signals:** Configure input signals for limit switches, home switches, and the E-Stop button. Ensure they are correctly assigned and active.
5. **Spindle Setup:** If a spindle is connected, configure the spindle control settings within MACH3.
6. **Motor Tuning:** Go to "Config" > "Motor Tuning" and set the steps per unit, velocity, and acceleration for each axis. These values depend on your motor, lead screw pitch, and micro-stepping settings.
7. **Save Settings:** Save your configuration profile in MACH3 to apply the changes.

Operating Instructions

1. Power On Sequence

1. Ensure all hardware connections are secure and correct.
2. Power on the CNC machine's main power supply.
3. Power on the NVCM V2.1 control card (if it has a separate power switch).
4. Launch the MACH3 software on your computer.

2. Homing the Machine

Before starting any machining job, it is recommended to home the machine to establish a known reference point. Click the "Ref All Home" button in MACH3 or use the designated hotkey to initiate the homing sequence.

3. Loading G-Code

1. In the MACH3 interface, click the "Load G-Code" button.
2. Select your desired G-code file (typically with .nc, .tap, or .gcode extensions).
3. Verify the tool path and program details in the MACH3 display window.

4. Running a Job

1. Set the workpiece zero point according to your G-code program.
2. Ensure the Emergency Stop (E-Stop) is disengaged and the machine is ready.
3. Click the "Cycle Start" button in MACH3 to begin the machining process.
4. Monitor the machine closely during operation for any unexpected behavior.

5. Emergency Stop

In case of any malfunction, unexpected movement, or unsafe condition, immediately press the physical E-Stop button on your CNC machine or click the "Stop" button in the MACH3 software to halt all operations.

Maintenance

- **Cleaning:** Regularly clean the control card and its connectors with a soft, dry brush or compressed air to remove dust and debris. Do not use liquid cleaners or solvents.
- **Connection Check:** Periodically inspect all wiring connections for looseness or damage. Tighten any loose terminals to ensure reliable operation.
- **Environmental Conditions:** Ensure the control card is operated within its specified temperature and humidity ranges. Avoid exposure to moisture, corrosive gases, or excessive vibrations, which can degrade performance and lifespan.
- **Software Updates:** Keep your MACH3 software and NVCM V2.1 drivers updated to the latest versions for optimal performance, compatibility, and security.

Troubleshooting

Common Issues and Solutions

- **Card Not Detected by Computer:**
  - Check the USB cable connection and try a different cable.
  - Ensure the USB drivers for the NVCM V2.1 are correctly installed.
  - Try connecting to a different USB port or another computer.
  - Verify that the control card is receiving power.
- **Motors Not Moving:**
  - Check the power supply and connections to the motor drivers.
  - Verify motor tuning settings (steps per unit, velocity, acceleration) in MACH3.
  - Ensure the E-Stop is not engaged and no limit switches are active.
  - Confirm that MACH3 is in "Run" mode and not paused.

- **Incorrect Axis Movement:**
  - Check motor direction settings in MACH3 "Ports and Pins" configuration.
  - Verify the steps per unit in "Motor Tuning" for accuracy.
  - Ensure motor wiring to the drivers is correct according to the driver's manual.
- **Communication Errors:**
  - Restart MACH3 and your computer.
  - Reinstall the NVCM V2.1 plugin/driver.
  - Check for potential USB interference from other devices connected to the computer.

Specifications

Feature	Specification
Model	NVCM V2.1
Axis Support	4-Axis
Pulse Output Frequency	Up to 200KHz
Interface	USB
Software Compatibility	MACH3
Motor Type	Stepper Motor, Servo Motor
Item Weight	50 Grams

Warranty and Support

This product is covered by the standard manufacturer's warranty. For specific warranty details, including duration and coverage, please refer to the documentation provided with your purchase or contact the seller directly.

For technical support, driver downloads, or further assistance with the JIANGFAN NVCM V2.1 MACH3 USB Motion Control Card, please contact your product vendor or the JIANGFAN customer service department. Provide your product model and purchase details when seeking support.