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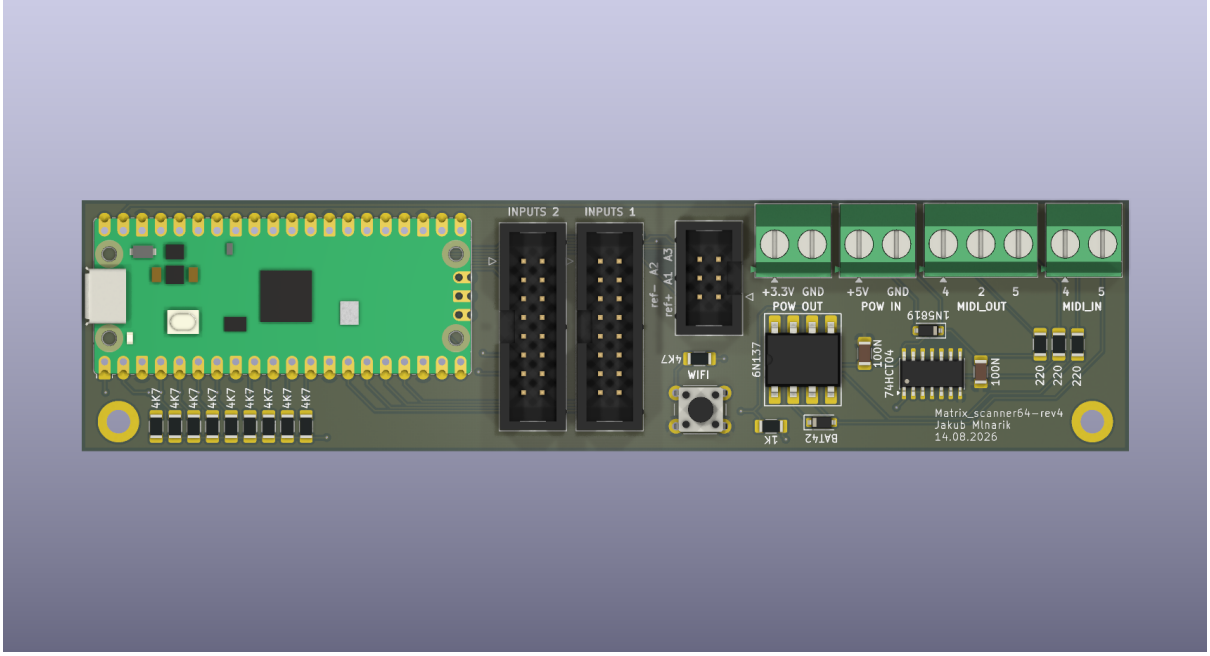
MATRIX–SCANNER64: User Manual

August 2026
Applicable to: Firmware Version 1.0



1 Overview

MATRIX–SCANNER64 reads up to 64 keys via a diode matrix (8 column strobes × 8 data lines) and generates MIDI NOTE ON/OFF or PROGRAM CHANGE messages. It also has 3 analog inputs for potentiometers (foot controller, expression pedal, etc.). The module is fully compatible with FATAR keyboards. Note that FATAR keyboards use two switches per key for velocity sensing; on this board, the both signals are connected together, so both contacts are treated as a single switch.
It supports both traditional 5-pin DIN MIDI and USB-MIDI output with automatic merging of incoming MIDI data. In addition to standard MIDI capabilities, the module introduces several advanced features such as a High-Speed Analog MIDI Bus and an easy-to-use Wi-Fi configuration interface accessible via a web browser.

2 Features

- Board dimensions 141×34 mm
- Powered via 5 V DC / 0.1 A
- Reads up to 64 keys via diode matrix scanning
- Compatible with FATAR keyboards
- MIDI IN (5-pin DIN)
- MIDI OUT (5-pin DIN) with automatic merging of MIDI IN and internal messages
- USB MIDI output (class-compliant)
- 3 analog inputs for potentiometers
- Optional High-Speed Analog MIDI Bus – supports up to 4× the standard MIDI baud rate for expanded bandwidth
- Wi-Fi Configuration Interface – configure module settings via a web browser by connecting to the module's built-in Wi-Fi access point

3 Introduction to MIDI Device Connectivity and Latency Considerations

In practical applications, it is common to use multiple MIDI modules in a setup, often combining devices from various manufacturers. There are two basic approaches to connecting input MIDI devices to an end device such as a computer or Digital Audio Workstation (DAW).

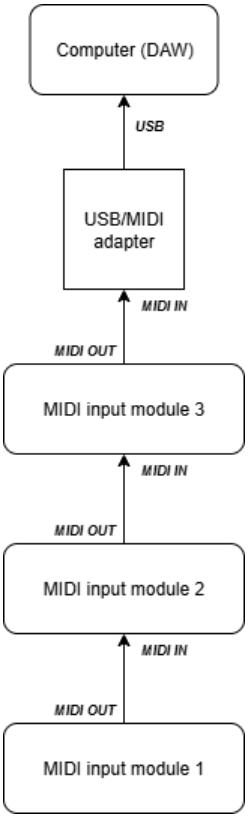


Figure 1: Chaining via the analog MIDI bus – this typically involves using traditional 5-pin DIN connectors (though other connectors may also be used).

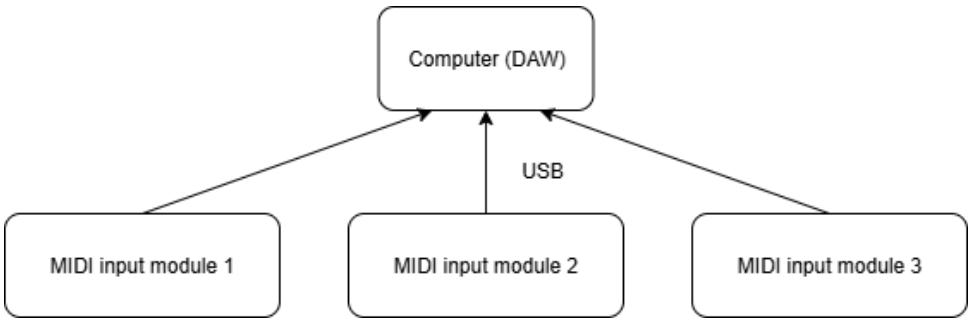


Figure 2: Connecting in a "star" topology via USB.

Note: Latency considerations If you prefer chaining via the analog MIDI bus and use many MIDI devices, latency can become a significant issue. The transmission of a single standard MIDI message takes approximately 1 ms. As MIDI data is passed through multiple devices in the chain, this latency can accumulate and become noticeable.

One of the key features of the MATRIX–SCANNER64 module is its optional High-Speed Analog MIDI Bus mode. When activated, MIDI messages are transmitted at four times the standard MIDI speed. However, please note that this high-speed mode is not compatible with third-party MIDI devices, as they are designed to operate at the standard MIDI baud rate.

4 Setup and installation

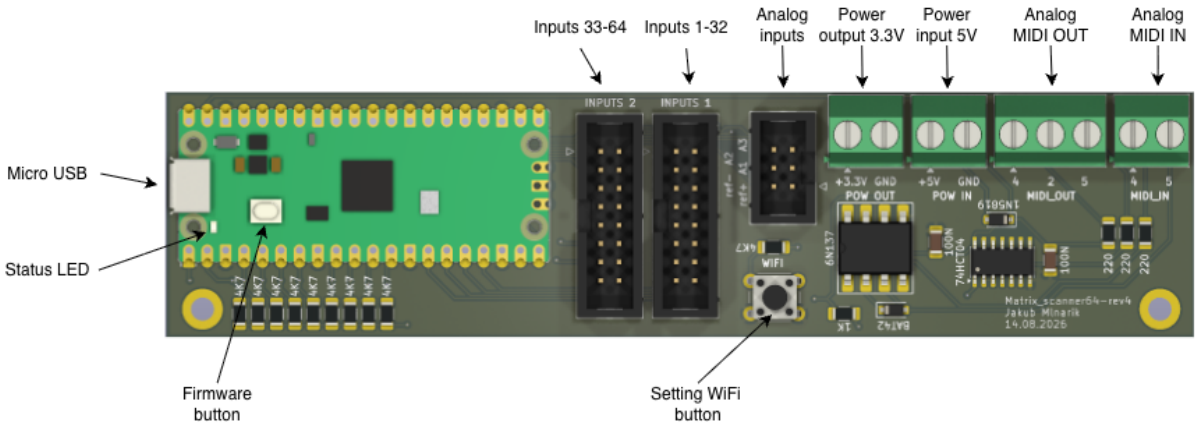


Figure 3: Overall layout of the board

4.1 Power

- Voltage: 5 V DC (regulated)
- Current Consumption: 0.1 A max

The module can be powered directly via USB. A dedicated external power supply is only required when powering multiple modules together.
The board also provides a 3.3 V output on a screw terminal for powering external peripherals (e.g., opto switch boards). This output is commonly not needed.

> **Note:**
>
> - Use a regulated 5 V supply. Do not exceed 5.3 V. Reverse polarity can damage the device.
> - When powering many modules together, use a dedicated power supply with sufficient current capacity or a suitable powered USB hub.

4.2 Matrix Inputs (keyboard connection)

The board reads keys via a diode matrix with 8 column strobe outputs and 8 data inputs, supporting up to 64 keys. It is fully compatible with FATAR keyboards.

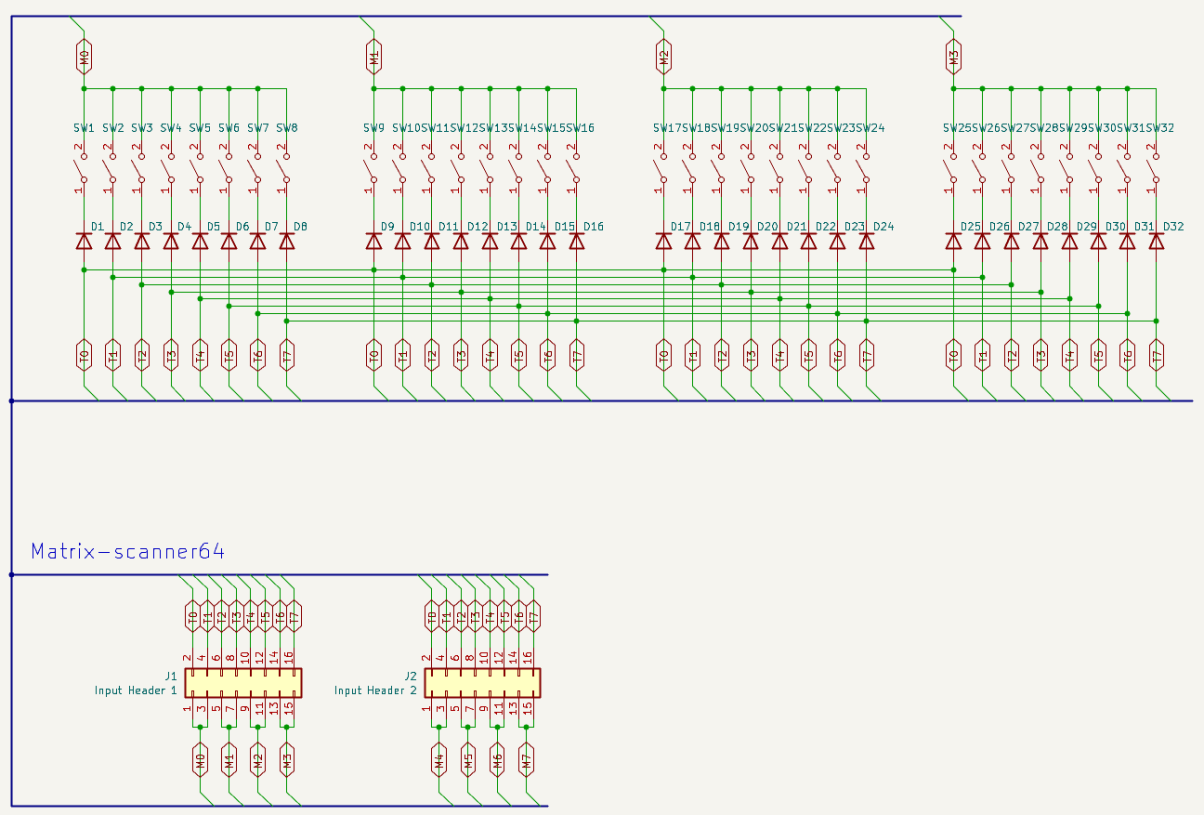


Figure 4: Diode matrix wiring diagram

FATAR compatibility note: FATAR keyboards use two switches per key (BR and MK) for velocity sensing. On this board, the BR and MK contacts are connected together, so activating either contact produces a signal. The board treats the two switches as a single contact — velocity data is not generated.

4.3 Analog Inputs

The board provides 3 analog inputs for connecting potentiometers (e.g., foot controllers, expression pedals). Each input can be independently enabled, assigned to a MIDI channel, and mapped to a MIDI Control Change (CC) number (0–127).

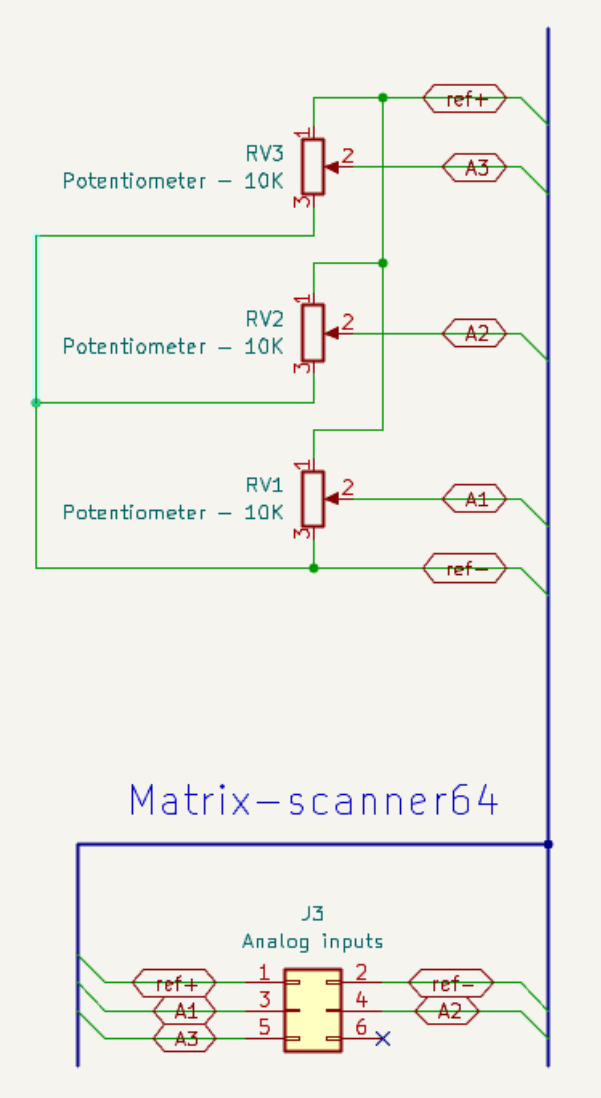


Figure 5: Potentiometer wiring for analog inputs

5 Analog MIDI Connection

The image below shows how to connect to the analog MIDI bus using DIN-5 connectors. However, it is not necessary to use connectors between the modules — you can also use wires connected directly to the screw terminals. Shielded cables are recommended.

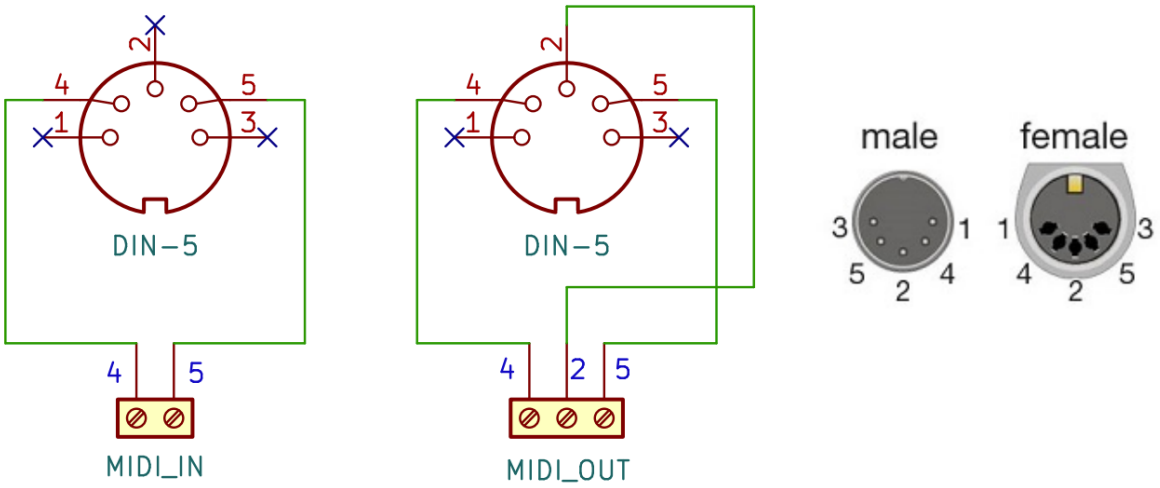


Figure 6: Connection analog MIDI bus

Note: Galvanic isolation and USB power considerations
The MIDI analog bus is galvanically isolated, so the power source can be common or separated per module without any trouble.
However, when a board is connected to both USB and an external power supply simultaneously, the device may sometimes not be recognized properly by the computer during the initialization phase. This is not dangerous — nothing will burn out — but it can cause connectivity issues.
You have two options to avoid this:

1. Power the boards connected to USB only via USB.
2. Power by an external power supply, but use a **data-only USB cable** that lacks the 5 V power line. Such cables can be purchased or made.

When multiple modules are chained together, this applies only to the last module that communicates with the PC. The other modules in the chain can be powered from the external power source without restriction.

6 Setting Up the Module - Wi-Fi Access Point Mode

You can conveniently set up the module using any web browser on your computer or mobile phone. The module can start in a special mode where it creates a Wi-Fi access point that you can connect to.

1. Unplug the module from any power source (USB and external power).
2. Press and hold the WiFi button.
3. Continue holding the button while powering on the module (e.g., by connecting an external power source).
4. The Status LED will light up steadily, indicating that the module is now in Wi-Fi access point mode.
5. On your computer (with a Wi-Fi adapter) or smartphone, go to the Wi-Fi settings. You should see a new Wi-Fi network named "Matrix Scanner64". Connect to it.

   Note: While connected to this network, your device will lose access to the internet.

6. Open a web browser (such as Google Chrome) and enter the following IP address in the address bar: `192.168.4.1` – the fixed IP address of the MIDI module's web server. You should now see the settings page, as shown in the image below.

7. Use the dropdown menus to configure all the necessary settings, then press the "Save Settings" button. If needed, you can restore the factory default values by pressing the "Reset to Defaults" button.

8. Once you're done, disconnect the module from the power source. Your settings will be saved and automatically applied the next time the module starts.

   ℹ **Note**: While in Wi-Fi access point mode, the module does not transmit MIDI data. MIDI communication is disabled during setup.

The firmware provides a minimal HTTP-based settings page when the unit runs in Wi-Fi Access Point mode. The page allows configuring the following properties:

MIDI serial bus rate Toggle between the standard MIDI baud rate (31250) and a higher UART rate (115200). High-speed mode is not compatible with third-party MIDI equipment.

Digital inputs All 64 matrix inputs share a single set of parameters:

- **MIDI channel** (range: 1–16)
- **Base MIDI number** (range: 0–64). The first input maps to this note; subsequent inputs increment the note number.
- **Message type**: NOTE ON/OFF or PROGRAM CHANGE.
- **Invert inputs**: NOTE ON/PROGRAM CHANGE when an input is activated or deactivated.

Analog inputs A1–A3 Three independent analog inputs for potentiometers. Each can be:

- **Enabled** or disabled.
- Assigned to a **MIDI channel** (range: 1–16).
- Mapped to a **controller number** (range: 0–127, e.g. Modulation Wheel, Breath Controller, Foot Controller).

If an analog input is not used, it should be disabled (the default setting). An enabled input with nothing connected ("wired to air") can generate random Control Change data.

7 Status LED behavior

- Startup: brief blink sequence
- MIDI activity: short blink when MIDI bytes are transmitted
- AP mode: LED remains steadily lit while the AP is active