NiftyDrum

Official Documentation

Ronna Technologies

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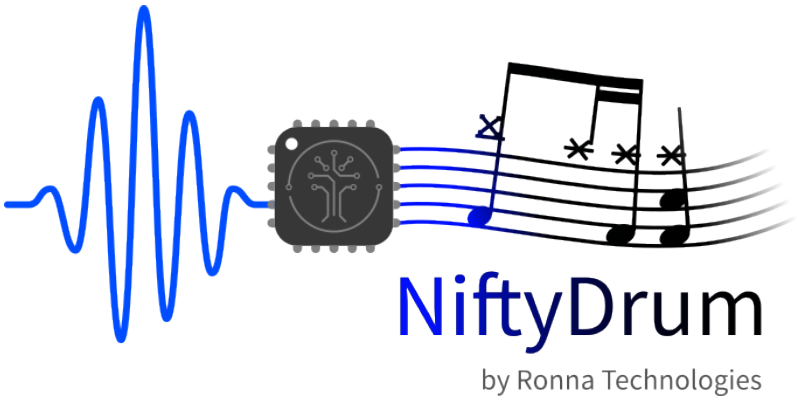
1. About NiftyDrum



1.1 Description

NiftyDrum is a trigger-to-MIDI conversion module that transforms piezo and FSR sensor inputs into MIDI messages. Connect up to 9 piezo sensors and 1 FSR (Force Sensing Resistor) to the dedicated terminal blocks, then receive MIDI data via USB-C connection.

1.2 How It Works

NiftyDrum delivers high-level MIDI performance in 4 easy steps:

- Connect sensors: Attach up to 9 piezo sensors and 1 FSR to the terminal blocks
- Plug in: Connect to your DAW, Raspberry Pi, or drum module via USB
- Configure: Use the web-based GUI to adjust trigger parameters, MIDI mapping, and velocity curves
- Play: Notes are transmitted instantly with imperceptible latency

1.3 Specifications

1.3.1 Hardware

- Piezo inputs: 9 channels
- FSR input: 1 channel (hi-hat controller)
- Connector type: Terminal blocks
- USB interface: Type-C
- Dimensions: 65 × 56.5 mm

1.3.2 Performance

- Latency: <2.5 ms
- Sample rate: >10 kHz
- Velocity resolution: 127 levels (full MIDI range)

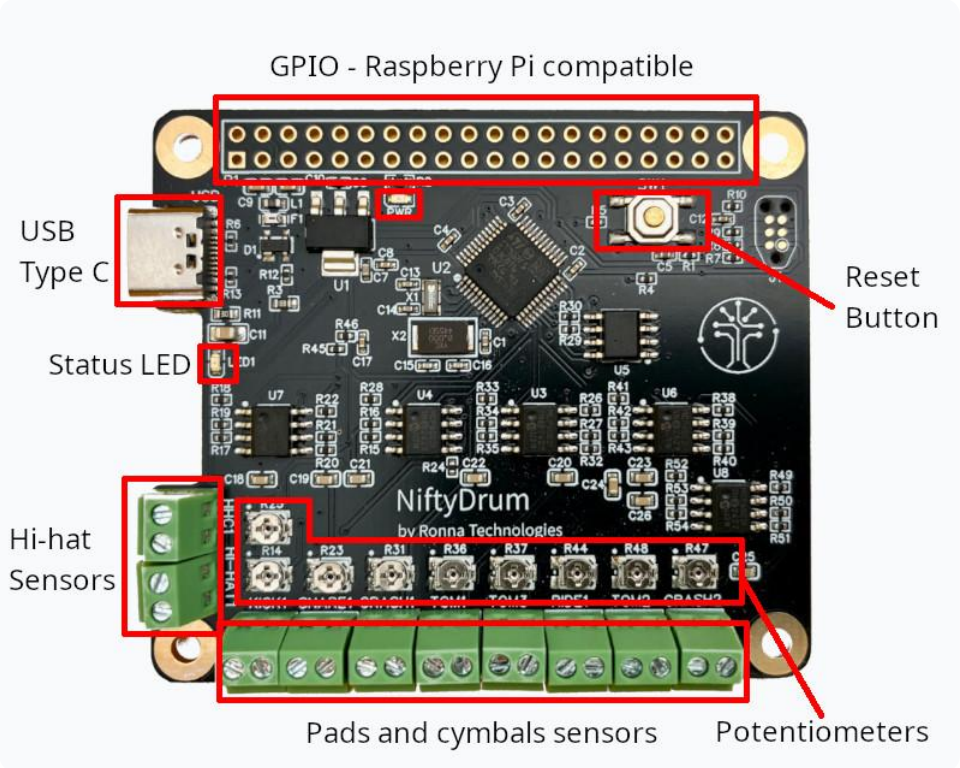
1.3.3 Software

- Platform support: Windows, macOS, Linux
- User interface: Web-based application
- Firmware updates: Via USB
- MIDI output: Note messages and Control Changes (CC)

2. The Board

2.1 Description

The NiftyDrum board is shown in the following image.



This board features the following interfaces:

- Terminal blocks for sensor inputs
- USB Type-C port for laptop or PC connectivity
- 9 potentiometers for sensitivity adjustment
- 2 LEDs
- Reset button
- Raspberry Pi-compatible GPIO header
- 4 mounting holes

2.2 Connecting Sensors

The board provides 9 piezo inputs, supporting up to 9 single-zone pads, as well as 1 FSR input.

2.2.1 Hi-Hat Sensors

On the left side of the board, two dedicated terminal blocks are reserved for hi-hat sensors:

- Top terminal block: Connects to an FSR (Force Sensing Resistor) sensor for hi-hat controller input
- Bottom terminal block: Connects to a piezo sensor for hi-hat cymbal trigger

2.2.2 Standard Pads and Cymbals

The remaining eight terminal blocks, located at the bottom of the board, are for connecting regular pads and cymbals. While the board labels indicate the default firmware assignments, these inputs are fully customizable.

2.2.3 Important Notes

- For all terminal blocks, the ground pin is positioned on the left-hand side
- Nine onboard potentiometers enable hardware-level sensitivity adjustments for maximum flexibility
- If unsure about sensitivity settings, leave potentiometers at their midpoint for balanced performance

2.3 MIDI Outputs

The board offers two methods for transmitting MIDI notes and Control Changes:

- USB-C port: Outputs USB MIDI messages
- GPIO UART pins: Raspberry Pi GPIO-compatible interface

2.4 USB-C Port

Using NiftyDrum as a USB device is the recommended method for receiving MIDI messages. This configuration enables:

- Integration with DAW software for high-quality sound output from your laptop
- Control and configuration via the official app

2.5 Raspberry-Pi hat form factor

The board is designed with a Raspberry Pi 4 HAT form factor, ensuring seamless integration.

2.6 App Features

The official app provides comprehensive control over your NiftyDrum board:

- Customize MIDI note assignments for each trigger
- Design custom velocity curves per trigger
- Adjust advanced parameters including gain, threshold, scan time, mask time, and decay
- Update board firmware to the latest version

3. The App

3.1 Configure NiftyDrum

NiftyDrum is fully configurable, allowing you to adjust parameters like scan time, mask time, decay, threshold, etc. To simplify customization, a dedicated desktop application is available, compatible with Windows, Linux, and macOS.

Below are all the different commands the app can send to the board.

3.1.1 General Board Commands

Command	Description
Reset	Restart the board in bootloader mode
Serial number	Retrieve the board’s unique serial number
Version	Retrieve the current firmware version
Save current parameters	Persist current settings to the board
Load parameters	Load previously saved board parameters
Factory reset	Reset all parameters to factory defaults

3.1.2 Trigger Parameters (Per Trigger, Including Hi-Hat Cymbal)

Parameter	Description
Set/get velocity curve	Adjust or retrieve the velocity response curve
Set/get threshold	Configure the trigger activation threshold
Scan time	Set/get the trigger scan time
Mask time	Set or adjust the trigger mask time
Decay time	Adjust the decay time of the trigger
Gain	Adjust the gain level of the trigger
MIDI Note	Assign the MIDI note for the trigger

3.1.3 Hi-Hat Pedal Parameters

Parameter	Description
Update interval	Set the hi-hat pedal update frequency
Noise threshold	Ignore pedal changes below this value
Pedal offset	Determine if the hi-hat is fully closed
Velocity threshold	Set the velocity threshold for foot chick

3.1.4 How the app works

The app simplifies customization by organizing everything logically: instruments are selected via a drop-down, while MIDI notes and velocity curves are managed separately from trigger settings for a cleaner, more efficient setup.

3.2 How to install the app

he app is available for Windows, macOS, and Linux and can be downloaded directly from the official NiftyDrum.com website. Follow the OS-specific instructions provided on the site.

3.2.1 Windows

On Windows, the app is distributed as a `.zip` file, so no installation is required, simply extract and run it. Note that, if that's not already done, you will have to install the Microsoft Visual C++ Redistributable package.

3.2.2 Linux

For Linux, the app is packaged as a `.deb` file. You can install it using your preferred package manager or by running the following command in a terminal:

Ubuntu 22.04 Ubuntu 24.04 debian

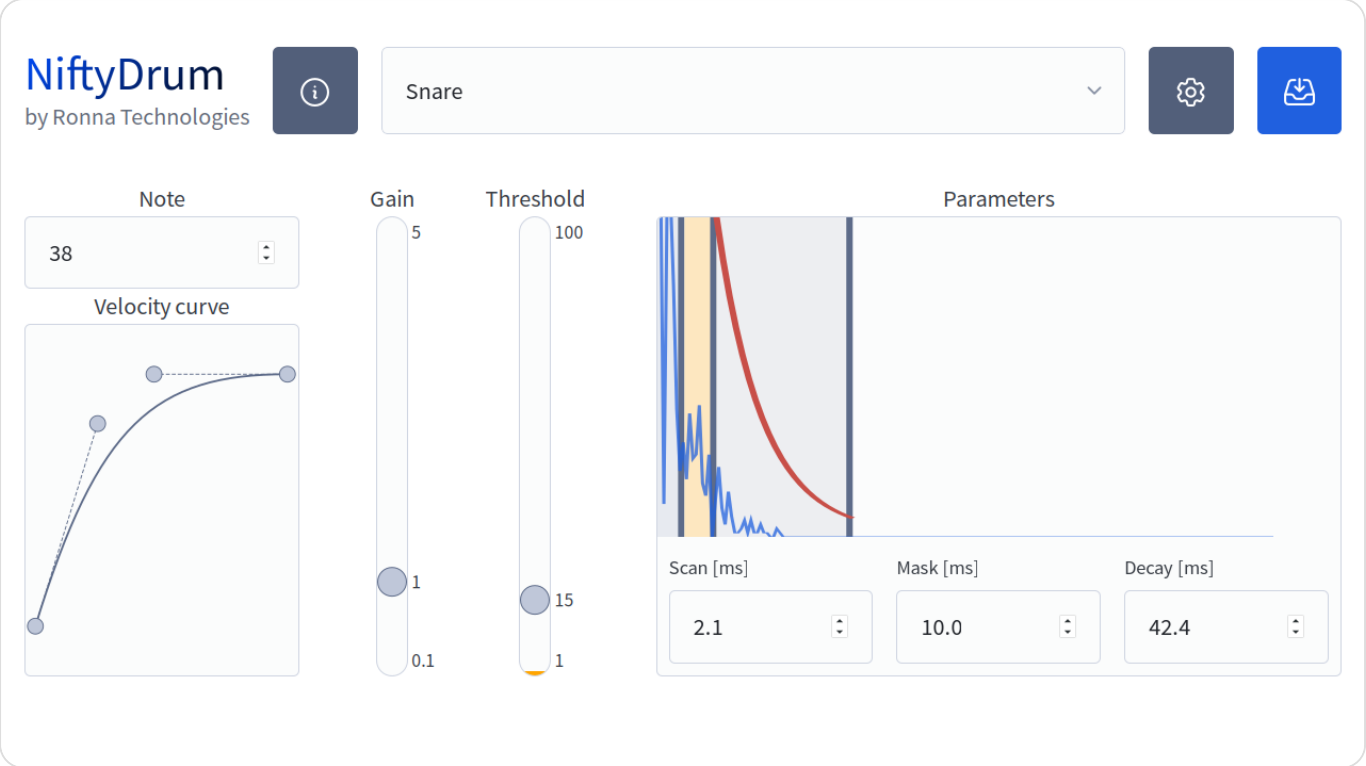
```
sudo apt install --reinstall ./NiftyDrum-1.0.0-Ubuntu-22.04.deb

sudo apt install --reinstall ./NiftyDrum-1.0.0-Ubuntu-24.04.deb

sudo apt install --reinstall ./NiftyDrum-1.0.0-Linux.deb
```

3.2.3 macOS

The macOS version of the app is provided as a `.zip` file. Just extract it and run the application. If you're using an Apple Silicon Mac, you may be prompted to install Rosetta the first time you launch the app.

3.3 Piezo trigger configuration

Customize each piezo trigger by selecting your desired instrument from the dropdown menu. The screenshot below illustrates the process for configuring the snare drum.



On the left side, you can assign the MIDI note for the pad—such as note 38 for the snare. Below the note input, you'll find the velocity curve editor, which uses Bézier controls for precise adjustments. You can drag and drop the endpoints and the two middle control points to shape the curve according to your needs. The horizontal axis reflects the raw MIDI velocity detected by the sensor, while the vertical axis shows the velocity value transmitted over USB. This setup lets you fine-tune the responsiveness and dynamics of your triggers.

Moving from left to right, you can adjust the trigger gain within a range of 0.1 to 5. This allows you to boost the input sensitivity of the trigger, enhancing the volume of ghost notes when the velocity curve alone isn't sufficient. It's important to note that the gain is applied after a strike has been detected, so it doesn't impact the threshold setting.

Next is the threshold setting, which sets the minimum signal level the piezo must exceed for a hit to register. This ensures only intentional strikes are detected, effectively filtering out unwanted noise and preventing false triggers.

3.4 Hi-hat pedal configuration

The last item of the dropdown menu is the hi-hat pedal configuration. It is a bit different from the other inputs.

4. Serial Protocol

5. Arduino