

# NiftyDrum

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## Official Documentation

Ronna Technologies

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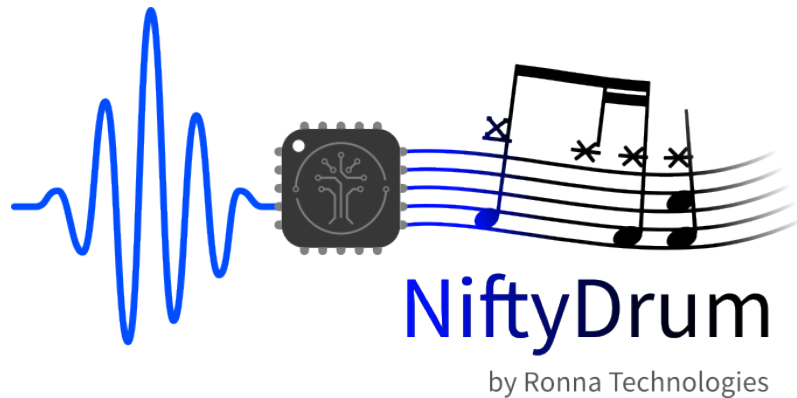
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# 1. About NiftyDrum

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## 1.1 Description

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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

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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

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### 1.3.1 Hardware

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- 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

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

### 1.3.3 Software

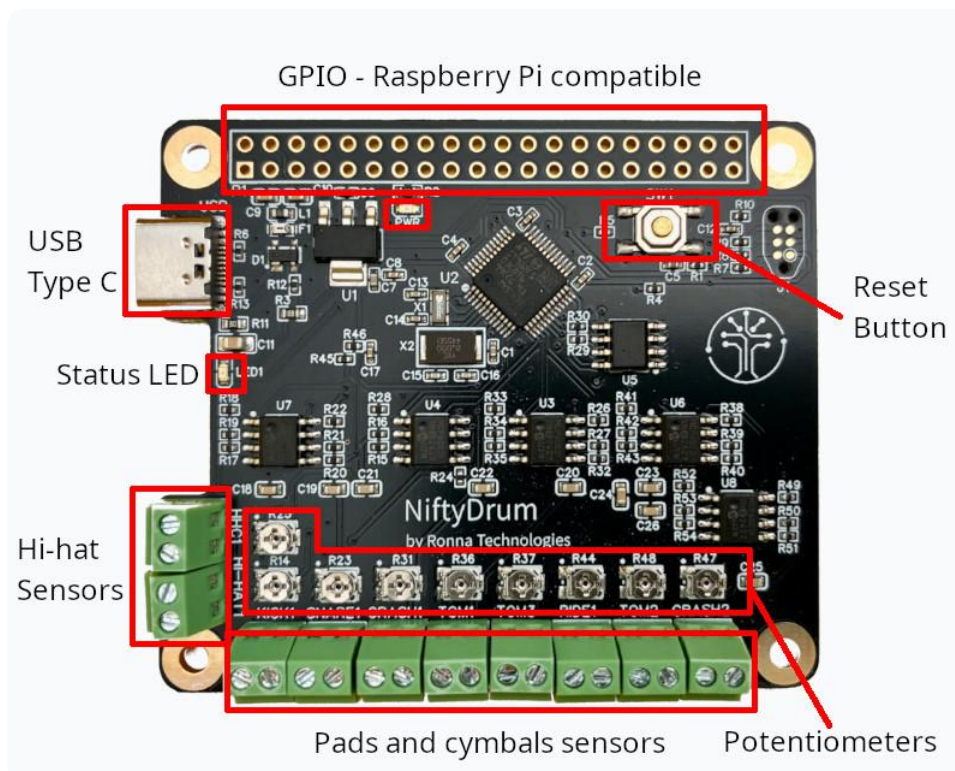
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- Platform support: Windows, macOS, Linux
- User interface: Web-based application
- Firmware updates: Via USB
- MIDI output: Note messages and Control Changes (CC)

## 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

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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

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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

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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

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- 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

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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

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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

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

## 2.6 App Features

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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

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### 3.1 Configure NiftyDrum

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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

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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

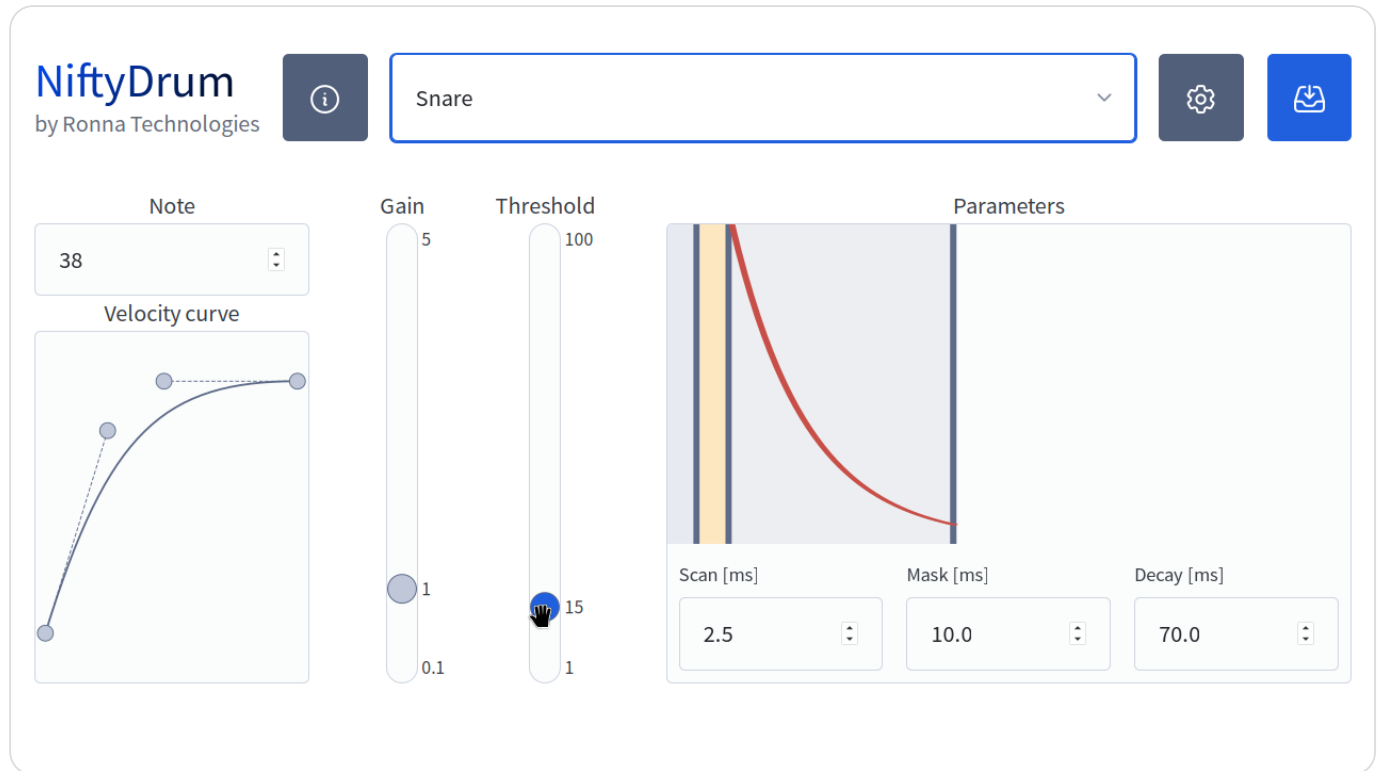
Parameter	Description
Update interval	Set the hi-hat pedal update frequency
Noise threshold	Ignore pedal changes below this value
Pedal offset	Determine if the hi-hat is fully closed
Velocity threshold	Set the velocity threshold for foot chick

### 3.1.4 How the app works

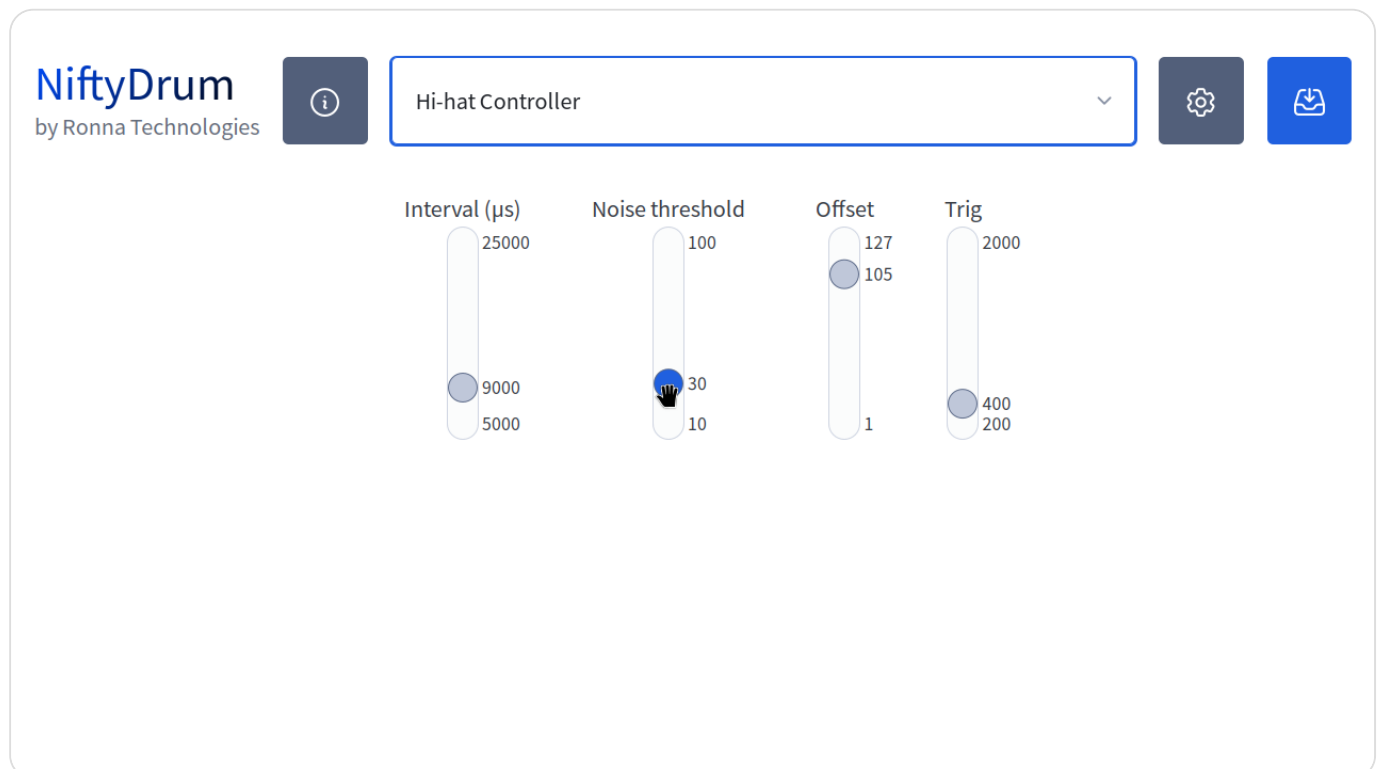
The app simplifies customization by organizing everything logically: instruments are selected via a drop-down, while MIDI notes and velocity curves are managed separately from trigger settings for a cleaner, more efficient setup.

## 3.2 How to install the app

The app is available for Windows, macOS, and Linux and can be downloaded directly from the official [NiftyDrum.com](https://niftydrum.com) website. Be sure to follow the OS-specific installation instructions provided on the site.



The screenshot shows the NiftyDrum interface for the 'Snare' instrument. The top bar includes the NiftyDrum logo, an information icon, a dropdown menu set to 'Snare', a settings gear icon, and a download icon. The main interface features a 'Note' section with a value of 38 and a 'Velocity curve' graph. The 'Gain' slider is set to 1, and the 'Threshold' slider is set to 15. The 'Parameters' section includes a graph and three input fields: 'Scan [ms]' set to 2.5, 'Mask [ms]' set to 10.0, and 'Decay [ms]' set to 70.0.



The screenshot shows the NiftyDrum interface for the 'Hi-hat Controller' instrument. The top bar includes the NiftyDrum logo, an information icon, a dropdown menu set to 'Hi-hat Controller', a settings gear icon, and a download icon. The main interface features four sliders: 'Interval (μs)' set to 9000, 'Noise threshold' set to 30, 'Offset' set to 105, and 'Trig' set to 400.

## 4. Serial Protocol

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# 5. Arduino

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