

NN76

1.0.5

User Manual



Acknowledgements

NN76 was made using the open source plugin framework iPlug2. Without this framework NN76 would not have been possible.

<https://github.com/iPlug2/iPlug2>

NN76 would also not have been possible without the Awesome Audio Plugin Framework.

<https://github.com/Tremus/awesome-audio-plugin-framework>

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1 Welcome

1.1 Introduction

NN76 is a neural network model of the renowned FET compressor. At its core, the plugin runs a real-time neural network that has been trained on hundreds of hours of audio processed through famous "Blackface" version. We took extraordinary measures to sample the circuit with meticulous precision, using high-quality hardware and converters. Knob positions were adjusted robotically across their entire range. This enabled us to capture an exceptionally accurate dataset that encompasses the full capabilities of the compressor. The end result is a plugin re-creation of the hardware that truly sounds unlike any other.



Figure 1: Main User Interface

1.2 Neural Network Emulations

Neural networks are a machine learning concept that refers to a specific type of mathematical function. These functions describe a vast web of interconnected nodes, which can be thought of as a network of neurons. Neural networks can be used for various tasks, but they are commonly employed to model complex systems through a technique called supervised learning. In supervised learning, a neural network is trained by feeding it a large set of inputs and corresponding expected outputs. The network then learns the behavior required to produce the expected output given a specific input. Therefore, if we have a large enough dataset of audio inputs and corresponding outputs from a hardware effects unit, we should be able to train a neural network on this data to accurately model the hardware. This is precisely how we developed NN76.

To understand the benefits of this approach, we need to examine the limitations of traditional modeling techniques. Most hardware emulations are currently created using a method called circuit modeling which uses mathematical models to represent individual components in the electrical circuit. In electrical engineering, there is a concept called "ideal behavior," which refers to a simplified mathematical model used to describe the intended behavior of an electrical component—such as a resistor. However, in reality, electrical components have tolerances and often perform within a deviation of this ideal behavior. Additionally, real-life components frequently exhibit other non-linear characteristics that these models do not capture. These tolerances have a cumulative effect across the entire circuit, leading to a digital model that can sound quite different from the hardware. This model often lacks the pleasing distortion and non-linear characteristics inherent in the original hardware's sound.

In contrast, neural networks do not concern themselves with the specifics of the circuit. They focus solely on the input and output, aiming to manipulate the signal in whatever way is necessary to approximate the expected output as closely as possible. The result is a digital model that captures all the nuances and non-linear behavior present in the original hardware, resulting in an emulation that is full of life like the real hardware.

2 Installation

2.1 MacOS

To install NN76 on macOS, run the `NN76 Installer.pkg` file that you downloaded from our website. Follow the installer prompts to complete the installation. Once the installation is complete, you will see a "Installation Successful" screen.

To completely uninstall NN76 delete the following files and folders:

1. `/Library/Application Support/Tree DSP/NN76`
2. `/Library/Audio/Plug-Ins/Components/NN76.component`
3. `/Library/Audio/Plug-Ins/VST3/NN76.vst3`
4. `/Library/Application Support/Avid/Audio/Plug-Ins/NN76.aaxplugin`

2.2 Windows

To install NN76 on Windows, run the `NN76 Installer.exe` file that you downloaded from our website. Follow the installer prompts to complete the installation.

To completely uninstall NN76, click on the Start menu and search for "Add or Remove Programs." Locate NN76 in the list and run the uninstaller. Alternatively, you can manually delete the following files and folders:

1. `C:\Program Data\Tree DSP\NN76`
2. `C:\Program Files\Common Files\VST3\NN76.vst3`
3. `C:\Program Files\Common Files\Avid\Audio\Plug-Ins\NN76.aaxplugin`

3 Activation

3.1 First-Time Activation

After installing NN76, you will need to activate the plugin on your device. To activate, load the plugin in your DAW of choice and log in with the Tree DSP account you used to purchase the plugin or request a free trial.



You will need an active internet connection to complete the activation. Once activated, you can continue to use the plugin offline if you own a full license.

If your account has a valid license, the activation dialog box will disappear, and the plugin will be ready to use.

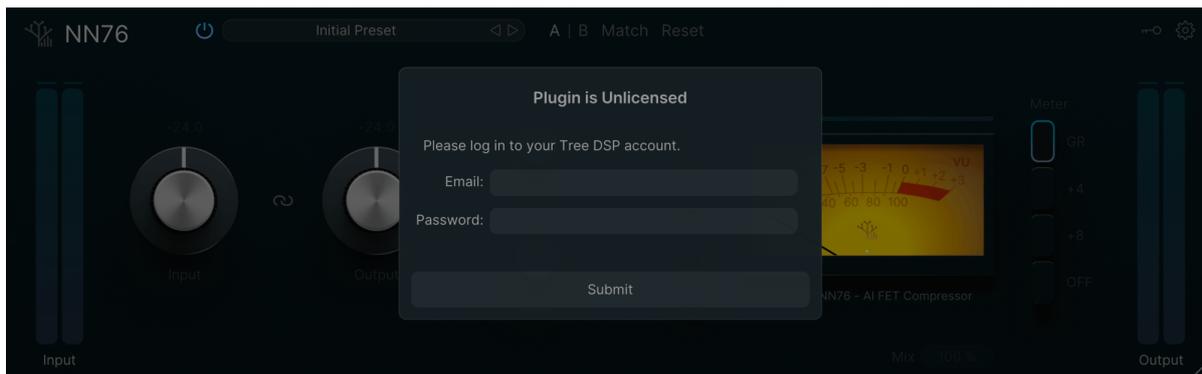


Figure 2: Plugin Activation

3.2 Viewing Activation Status

You can view your device's activation status by clicking the small key icon in the top right corner of the plugin interface. This will display a popup window with your account and license details.

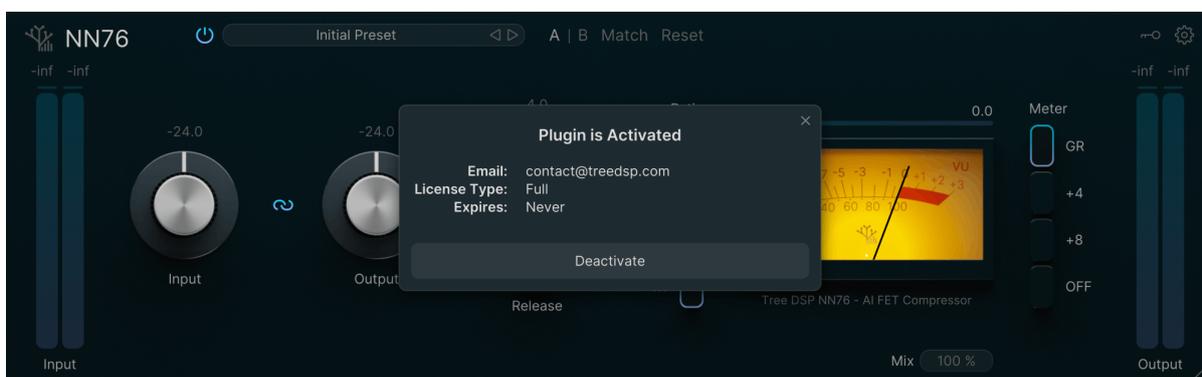


Figure 3: View Activation Status

3.3 Deactivating a Device

You can activate NN76 on up to three devices simultaneously. If you wish to use the plugin on a new device, you must first deactivate one of the existing devices. This can be done in two ways:

1. Deactivate through the plugin interface: Click the key icon in the top right corner and select "Deactivate." The plugin will temporarily wait, and once the device has been deactivated, the activation screen will appear. Note that your device will need an active internet connection.
2. Deactivate through our website: Log in to your account and navigate to the Licenses tab on your account page. You will see a list of currently activated devices. Find your device on the list and click "Deactivate." After a few seconds, the device will be removed from the list.

4 User Interface

NN76 features an intuitive and modern user interface with GPU-accelerated graphics and a 60Hz refresh rate. We have taken every measure to ensure the interface is smooth and visually appealing, all while maintaining full functionality and usability.

4.1 Overview

The interface is designed logically, closely resembling the original hardware while incorporating many useful features. Input and output meters are located on either side, while the main compressor controls are displayed in the center section of the plugin. Additional controls are conveniently placed in the top and bottom menu bars.

4.1.1 Resizing the Interface

You can resize the entire user interface by dragging the two lines in the bottom right corner. To reset the interface to its original size, simply double-click on these two lines.



Figure 4: Resize Interface

4.2 Compressor

4.2.1 Input and Output Gain

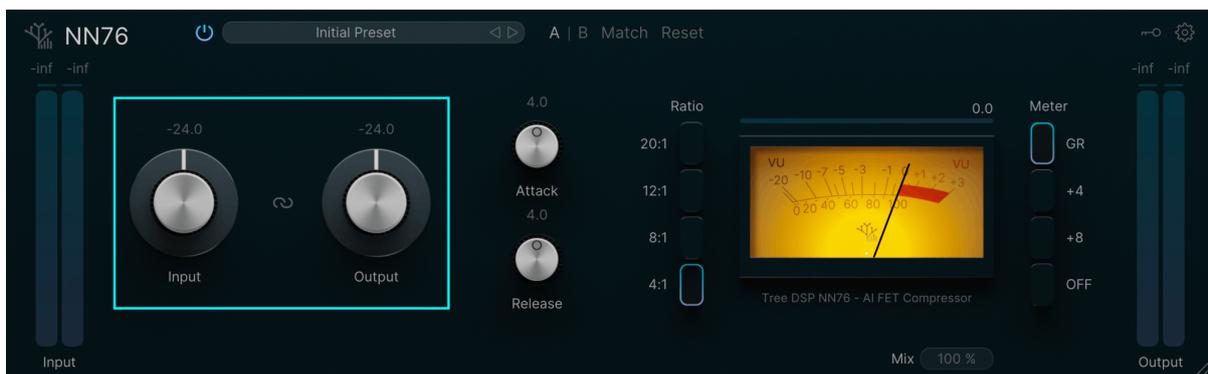


Figure 5: Input and Output Gain

Like the original hardware, NN76 has a fixed threshold level. To achieve the desired amount of gain reduction, you'll need to adjust both the input and output gain together. Increase the input gain to boost the amount of gain reduction, and decrease the output gain accordingly to maintain the desired output level.

To adjust the levels, click and drag each knob to rotate and change its gain value. You can also hover over a knob and use your mouse scroll wheel to make adjustments. Alternatively, you can click on the text value above the knob to type in a specific value directly, which will open a small text field. To reset a knob to its default value, double-click on it.

NN76 also features a convenient link option that synchronizes the input and output gain adjustments. When activated, this feature allows you to change the amount of gain reduction without altering the overall volume of the source material. Simply click the small chain icon between the knobs to activate or deactivate the link feature. The icon will be colored when the link is active. Note that the link feature is not affected by preset recalls, A/B testing, or resetting individual knobs.

4.2.2 Attack and Release

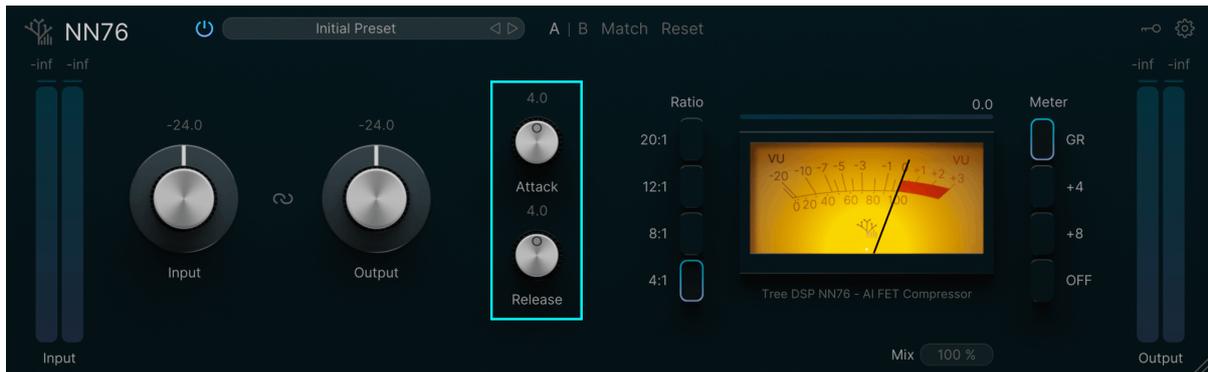


Figure 6: Attack and Release

NN76 includes both attack and release controls. The attack control adjusts how quickly the gain reduction is applied to the source material after the threshold is exceeded, while the release control determines how quickly the gain reduction decreases once the level drops back below the threshold.

The attack time can be set between 20 and 800 microseconds, and the release time can be set between 50 milliseconds and 1.1 seconds. Like the original hardware, the attack and release controls are somewhat counterintuitive: increasing the attack/release value actually decreases the corresponding time.

To adjust the attack and release values, click and drag each knob to rotate and change its setting. You can also hover over a knob and use your mouse scroll wheel for adjustments. Alternatively, you can click on the text value above the knob to enter a specific value directly, which will open a small text field. To reset a knob to its default value, simply double-click on it.

4.2.3 Ratio



Figure 7: Ratio

NN76 offers four ratio modes: 4:1, 8:1, 12:1, and 20:1. The higher the first number in the ratio, the more gain reduction is applied to the signal when it exceeds the threshold. As with the original hardware, the threshold level increases with higher ratio settings.

To change the ratio, simply click on the button corresponding to your desired ratio mode.

4.3 Metering

NN76 is equipped with modern and precise metering to aid in dialing in a great sound.

4.3.1 Input and Output Metering



Figure 8: Input and Output Meters

NN76 features two prominent meters on either side of the main interface—the input meter on the left and the output meter on the right.

The input meter displays the level of the signal before any processing, unaffected by the input gain knob. The output meter shows the final processed signal, influenced by the output gain knob. Both meters indicate three levels: small rectangles represent peak indicators, holding the highest peak within the last 1500ms; a duller bar tracks the signal's peak in real-time, and a brighter bar reflects the RMS value, calculated over a 500ms window. The numbers at the top of the meters show the held peak level in decibels.

Each meter also has a clipping indicator at the top, which lights up if the signal exceeds 0dB. The clipping indicator can be reset by clicking anywhere within the meter area. Although the signal might exceed 0dB, it won't clip, thanks to the plugin's floating point processing.

4.3.2 Gain Reduction Metering

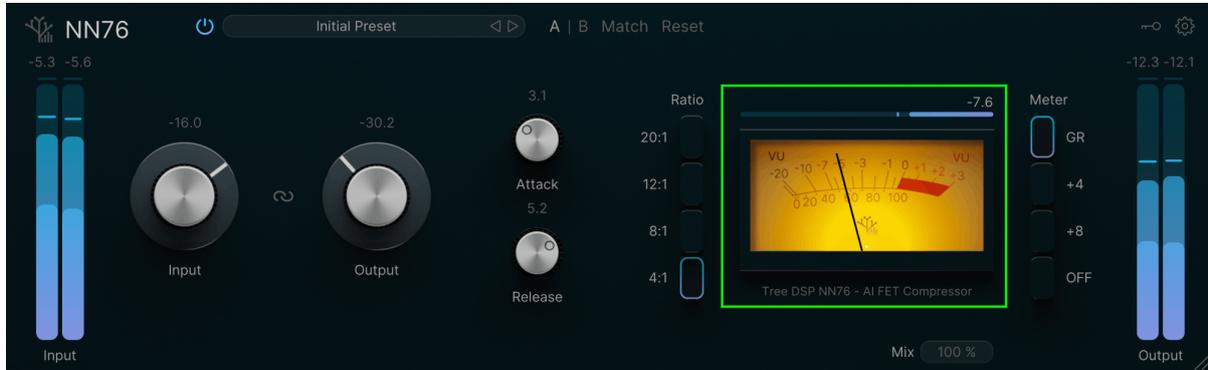


Figure 9: Gain Reduction Meters

NN76 includes two gain reduction meters, both located in the right-center area of the interface.

The first meter is an analog-style meter with a needle indicator, faithfully replicating the look and behavior of the original hardware. While this meter responds more slowly and less accurately than the true gain reduction level, it provides a familiar and authentic experience faithful to the hardware. The analog meter offers four modes: GR, +4, +8, and OFF. By default, the GR mode displays the gain reduction in decibels. The +4 and +8 modes monitor the output signal at different levels, and the OFF mode disables the meter.

Above the analog meter, the digital gain reduction meter provides a more precise measurement. The small rectangle represents a peak hold indicator, capturing the highest gain reduction within the last 1500ms. The main bar shows the current peak gain reduction level, while the number in the top right corner displays the held peak gain reduction in decibels.

4.4 A/B Testing



Figure 10: A/B Testing

NN76 includes an A/B testing feature that lets you effortlessly compare two different configurations and hear the difference in sound. By default, the plugin operates in the A state. To switch to

a different set of settings, simply click the B button. Initially, parameters in B will match those in A. After making adjustments in state B, you can toggle back to A to review your previous settings. This allows you to compare and fine-tune settings across both configurations seamlessly.

You can reset all parameters to their default values in either state by clicking the reset button. Additionally, the match button enables you to synchronize the parameters of the current state with those of the non-current state. For example, if B is active, pressing the match button will copy the parameters from A to B, and vice versa if A is active.

4.5 Preset Browser

NN76 features a sleek and intuitive preset browser that allows you to store and load different presets effortlessly.

4.5.1 Overview

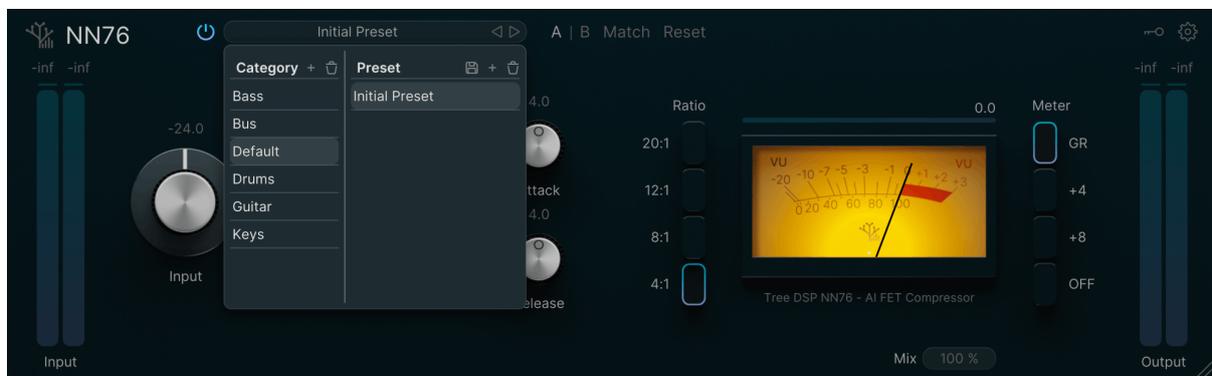


Figure 11: Preset Browser

The preset bar is located at the top of the plugin. You can navigate through presets using the left and right arrows, or click the center of the bar to open the preset browser. The browser is divided into two columns: **Category** and **Preset**. Categories act as folders to organize your presets. To open a category, simply click on it. The presets within that category will be displayed in the preset column. To select a preset, click on it once; to load it, double-click.

4.5.2 Saving a New Preset

To save a new preset, click the plus icon in the top-right corner of the preset column. Ensure that you are in the correct category and that your plugin settings are configured as desired. A text field will appear, allowing you to enter a name for the new preset. Press `Enter` to save it.

4.5.3 Saving an Existing Preset

You can modify and save changes to an existing preset. After adjusting the plugin parameters, select the preset you wish to overwrite by clicking on it. Then, click the save icon in the top-right corner of the preset column. A confirmation dialog will appear; click **Yes** to overwrite the preset.

4.5.4 Deleting a Preset

To delete a preset, select it by clicking on it (the preset will be highlighted). Then, click the trash can icon in the top-right corner of the preset column. A confirmation popup will appear; click **Yes** to delete the preset.

4.5.5 Renaming a Preset

To rename a preset, right-click on it and select **Rename** from the dropdown menu. A text field will appear where you can enter the new name.

4.5.6 Creating a Category

To create a new category, click the small plus icon below the **Category** heading. Enter a name for the new category and press **Enter**.

4.5.7 Deleting a Category

To delete a category, click on the category name to highlight it, then click the trash can icon below the **Category** heading. A confirmation window will appear.



Deleting a category will also remove all presets within it. This action cannot be undone, so proceed with caution.

4.5.8 Renaming a Category

To rename a category, right-click on it and select **Rename** from the dropdown menu. A text field will appear where you can enter the new name.

4.6 Other Controls

4.6.1 Mix



Figure 12: Mix Control

The **Mix** control lets you adjust the balance between the original dry signal and the processed signal. This can be used to create the popular parallel compression effect. Click and drag the text field up or down to set the mix level. 100% represents only the processed signal, while 0% represents the unprocessed signal.

4.6.2 Bypass



Figure 13: Bypass Control

To bypass all audio processing, click the small power button in the top-left corner of the user interface. The icon will turn grey, and the interface will stop updating until the button is clicked again.