
NF
NF575
Flexible Noise Filtering
User Manual
McDOWELL SIGNAL PROCESSING, LLC

McDSP NF575 Noise Filter Plug-In Manual

McDSP
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Technical Support: help@mcdsp.com

World Wide Web: www.mcdsp.com

Special Thanks to:

- Rob Barrett Jr., our #1 customer
- All those folks who asked for a noise filter from McDSP

from the entire McDSP development team.

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Getting Started with the NF575

Each McDSP plug-in is delivered inside an installer application, and uses the Interlok copy protection software to authorize each plug-in. This section describes how to install and authorize a McDSP plug-in. General system requirements are also described.

System Requirements

McDSP HD, Native, and LE plug-ins are compatible with Pro Tools™ HD, HD Accel TDM systems, as well as Pro Tools™ LE and Pro Tools™ M-Powered host based systems. McDSP plug-ins support Mac OS 10.4.x (Tiger), 10.5.x (Leopard), Windows XP and Vista and require Pro Tools 7.x, 8.x or greater. McDSP plug-ins require an iLok USB Smart Key.

Configurations

McDSP plug-ins are available in TDM, RTAS, and AudioSuite configurations. See individual products for specific available configuration sets.

Applications

Pro Tools™ 7.x, 8.x or higher is required for TDM, LE, and M-Powered systems. Additionally, a third party software application that supports the Digidesign TDM, RTAS, or AudioSuite plug-in standard may be supported. See http://www.digidesign.com/developers/plugin_info/ for more information.

McDSP plug-ins are compatible with the entire Pro Tools™ 7 and 8 product line.

Hardware

McDSP plug-ins support any Digidesign or approved third party hardware supported in Pro Tools™ 7.x and 8.x. This includes HD, HD Accel, 003, and Mbox host based systems. All McDSP HD plug-ins, except Synthesizer One, also support the Digidesign VENUE D-SHOW systems. See http://www.digidesign.com/compato/ for more specific information.

The McDSP Mac versions are compatible with both Intel and PowerPC based computers. The McDSP Windows versions require an Intel Pentium 4 or greater processor.*

** McDSP Windows test machines are chosen to follow the Digidesign recommended systems guide, which currently is the Dell Precision™ Workstation 670 with 2.79 GHz Xeon processor. All products are guaranteed to run on that system. Older Intel processors (i.e. Pentium III and predecessors) and AMD processors are not officially supported, although some users have had limited success with newer AMD processors (i.e. Dual Opteron 1.79 GHZ, Athlon 64 2.20 GHz, and Athlon 64 XP 3700). None of McDSP Windows product line will work with Pro Tools™ 5.x. Also note the McDSP Windows product line does not support MIX, although RTAS versions will work if they exist and the rest of your system (i.e. Pro Tools™ version and processor) is compatible.*

Please visit mcdsp.com for the latest information about compatibility.

Installing the NF575 Plug-In

Installation on Mac OS X

The NF575 plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the NF575 plug-in, and the NF575 plug-in. Two copies of the NF575 Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The NF575 plug-in manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a NF575 installer that will automatically install the NF575 plug-in and its presets on your system. The authorization of the NF575 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the NF575 plug-in and presets with the Installer:

The online version of the package has been prepared for Internet delivery, and is transmitted as a compressed file in zip format (.zip). In Mac OS X 10.4.x or 10.5.x, simply double click the *.zip file to unpack the installer. The boxed plug-in package purchased at your local dealer will be on CDROM. As with the online version, these 'physical' versions of the NF575 plug-in package should be copied into a local folder on your system.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the NF575 plug-in folder on the CDROM - the installer application is contained therein.
- Run the NF575 plug-in Installer application to install (copy) the NF575 plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the NF575 plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the NF575 plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the 'Plug-in Settings' folder:
- Root->Library->Application Support->Digidesign->Plug-in Settings
- If Pro Tools™ has not already done so for you, create a folder called 'NF575'.
- Place a copy of the folder from the NF575 plug-in package called 'Presets' into the 'NF575' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the NF575 plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the NF575 plug-in window toolbar.

Installation on Windows XP and Vista

The NF575 plug-in Package includes this manual, ReadMe and Release Notes, a folder of presets for the NF575 plug-in, and the NF575 plug-in. Two copies of the NF575 Licensing Agreement are included - one in this pdf manual and a second as a separate text file. The NF575 manual requires that Adobe Acrobat reader (or similar .pdf reader) is installed.

Both online and boxed version will come with a NF575 installer that will automatically install the NF575 plug-in and its presets on your system. The authorization of the NF575 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Installing the NF575 plug-in and presets with the Installer:

The NF575 plug-in package purchased at your local dealer will be on CDROM and contain a Windows self extracting executable (.exe) similar to the online NF575 plug-in package prepared for Internet delivery. Both the boxed and online versions the NF575 plug-in executable file will automatically install the plug-in and its presets on your system. Double click the file to launch the installer which will install the NF575 plug-in, presets, and documentation. At any time after installation, you may access the documentation from the Windows 'Start Menu' under the 'McDSP' group.

Authorization of the NF575 plug-in is still required after running the installer, and those steps are detailed in the following sections. Note that after installing new versions of the PACE iLok drivers with the NF575 plug-in installer, you will be prompted by the NF575 plug-in installer to reboot your system. If you are not prompted by the installer, there is no need to reboot.

- Insert the McDSP 'HD Disk,' 'Native Disk,' or 'LE Disk' CDROM onto an available CDROM drive.
- Navigate to the NF575 plug-in folder on the CDROM - the installer application is contained therein.
- Run the NF575 plug-in Installer application to install the NF575 plug-in, presets, and documentation to a local folder on your system. The plug-in will be placed in the 'Plug-Ins' folder, and the presets will be placed in the 'Plug-Ins Settings' folder.
- If a previous version of the NF575 plug-in (or other HD, Native, or LE version) was already in the plug-ins folder, it will automatically be updated (or replaced) by the installer.

Re-installing the NF575 plug-in presets manually:

In you wish to restore the factory default presets, it may be useful to know how to manually re-install only the presets.

- Go to the Plug-In Settings folder:
- C:\Program Files\Common Files\Digidesign\DAE\Plug-In Settings\
- If Pro Tools™ has not already done so for you, create a folder called 'NF575'.
- Place a copy of the folder from the NF575 plug-in package called 'Presets' into the 'NF575' folder. The presets are now viewable (after restarting Pro Tools™) from the settings popup menu from the NF575 plug-in.

Note it may be necessary to re-start Pro Tools™ in order for the newly added 'Presets' folder to be viewable from the Settings popup inside the NF575 plug-in window toolbar.

Installation on VENUE D-SHOW systems

The NF575 plug-in Package for VENUE D-SHOW systems includes presets for the NF575 plug-in and the NF575 plug-in. The NF575 Licensing Agreement is displayed when installing the product on D-SHOW. The pdf manual can be obtained by running the Mac OS X or Windows XP/Vista version of the NF575 Pro Tools plug-in installer on any available computer.

Both online and boxed versions will come with a VENUE compatible installer that will automatically install the NF575 plug-in and its presets on your system. The authorization of the NF575 plug-in is still required after running the installer, and those steps are detailed in the following sections.

Note that all McDSP HD plug-ins, except Synthesizer One support the Digidesign VENUE D-SHOW system.

Installing the NF575 plug-in and presets on VENUE with the 'HD Disk':

The boxed NF575 plug-in package purchased at your local dealer will contain a CDROM titled 'HD Disk' that is specially formatted to work with your VENUE console. The VENUE installers are also available online as a compressed zip file download, however you will have to take additional steps to create your own VENUE installer CD-R, see additional instructions below before proceeding with these instructions. Both the boxed and online versions of the NF575 installer are the same and will install both the plug-in and its presets on your system.

Note that after installing new versions of the PACE iLok drivers with the NF575 plug-in installer, you will need to reboot your system. You will not be prompted to reboot, and if you don't you may see an error message saying "TPkd driver required, and a reboot. Please reboot or reinstall the software.' If you see this message, simply reboot the console and try again.

- Insert the McDSP 'HD Disk' CDROM onto the CD drive. Note that neither the McDSP 'Native Disk' nor the 'LE Disk' contains VENUE compatible installers.
- Ensure your system is in 'CONFIG' mode, you cannot install plug-ins in 'SHOW' mode.
- Navigate to the 'OPTIONS' page and then select the 'PLUG-INS' tab.
- You should now see the NF575 plug-in available on the left hand side.
- Select the NF575 plug-in and select 'INSTALL.'
- If a previous version of the NF575 plug-in was already installed, it will be updated by the installer.

***Important note** for FilterBank HD and CompressorBank HD on VENUE D-SHOW consoles: The first time you instantiate either of these plug-ins, a dialog box will appear asking you to choose a user interface preference. Choose the Knobs interfaces, as some of the Slider interfaces are too large for the VENUE display.*

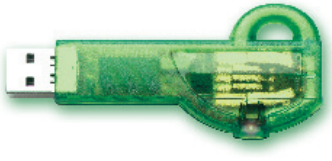
Creating a VENUE D-SHOW Installer CD-R from the online zip file:

If you do not have a boxed copy of NF575 with the included 'HD Disk' CDROM, you can still obtain a copy of the VENUE compatible installers from the www.mcdsp.com website. Once you have located and downloaded the latest VENUE compatible installers from the McDSP website, you will have to take several additional steps to create a VENUE compatible Installer CD-R. For your convenience, all VENUE compatible products are located in the same downloadable zip file, so you will only have to create one CD-R to install all compatible McDSP products.

- Unzip the downloaded file and locate the folder named "TDM Plug-Ins" inside the unpacked folder.
- Using any CD-R burning application, burn this folder and its contents to an ISO format CD-R. It is recommended that you use a brand new CD-R for this, and do not rewrite an older CD-R.
- Once you have burned this folder to a CD-R, you should see it at the root level of the disk (i.e. "D:\TDM Plug-Ins"). Important: If the "TDM Plug-Ins" folder is not located at the root level of the CD-R or has been renamed, the VENUE console may not properly recognize the installer disk.
- At this point, you can follow the 'HD Disk' installation instructions above to complete the installation.

Authorizing your McDSP Plug-Ins

Authorizing with a pre-programmed iLok Smart Key



McDSP bundles such as the Emerald Pack come with a pre-programmed iLok Smart Key. Simply insert the iLok into any available USB port on your computer. The iLok's indicator light will illuminate when the iLok has a proper connection. The Plug-Ins included in the bundle require no further authorization steps. As with any iLok on your system it is recommended that your iLok be registered and synchronized with iLok.com

Authorizing with an iLok License Card

All McDSP Plug-Ins require that a valid authorization is present on your iLok USB Smart Key. McDSP Plug-ins that are purchased individually provide this authorization on a plastic License Card (about the size of a credit card), with a small punch-out iLok License Chip. After being separated from the License Card, this iLok License Chip is to be inserted into the 'key slot' of the iLok USB Smart Key in order to transfer the authorization from the License Card to the iLok USB Smart Key. Note that each License Card holds ONE Plug-In authorization. The following instructions detail this process

Important Note: The Authorization Wizard will prompt the user to register their iLok USB Smart Key at iLok.com. iLok.com is a service offered by PACE Anti-Piracy, Inc. and this step is recommended but NOT REQUIRED by McDSP to complete the authorization of the Plug-In. If you choose to register your iLok USB Smart Key at iLok.com, care must be taken to record your ilok.com account information (i.e. write down your User ID and Password in a safe place). If your iLok.com account information is lost, the iLok cannot be registered to another account and unfortunately there is nothing McDSP can do to help you. See iLok.com for more details about the benefits of using PACE's iLok.com service.

Note: Images in this section are for illustration only, the actual product and screens will be the name of the product you are authorizing.

Authorizing a McDSP Plug-In from a License Card with the Authorization Wizard:

The Authorization Wizard is used to install an authorization from a License Card to the iLok USB Smart Key. To use the Authorization Wizard for the Plug-In you purchase, perform the following steps:

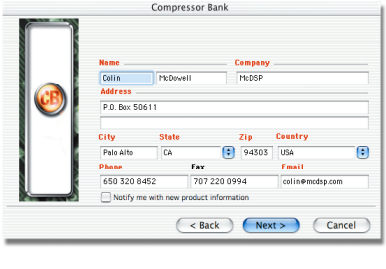
- Insert your iLok USB Smart Key into an available USB port.
- On a Mac :Locate and launch the 'Authorizer' application found in the 'Authorize' folder in the Plug-In package for the McDSP Plug-In you purchased on the CD-ROM.
- On Windows XP or Vista, just launch Pro Tools™ to authorize the individual McDSP Plug-In you purchased.

Note: When authorizing the Plug-In on Windows XP or Vista with a new iLok USB Smart Key, you must insert the iLok USB Smart Key and complete the Windows 'Found New Hardware Wizard' before attempting to authorize the Plug-In.

- Select the 'Authorize' button to be guided through the Authorization Wizard.

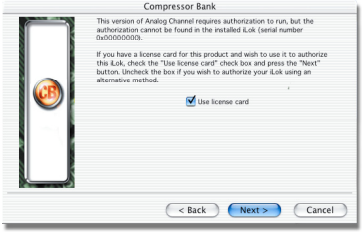
Note: Selecting the 'Quit' button at any time will not authorize the Plug-In or allow it to be used for a trial period. If 'Quit' is selected, the Plug-In will not be available in the Pro Tools™ insert menu.

- McDSP Plug-Ins require that the user personalize their copy of the Plug-In. A dialog is displayed soliciting this information.



Note that the product registration card enclosed with the Plug-In MUST ALSO be filled out as well and returned to McDSP via mail (or fax to 707-220-0994). This additional mail-in registration will entitle the user to future upgrades and advance information from McDSP.

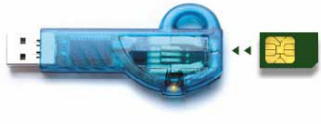
- Once the Plug-In is personalized, click the 'Next' button to continue.
- Check the 'Use License Card' box and press the 'Next' button (figure 2.3).



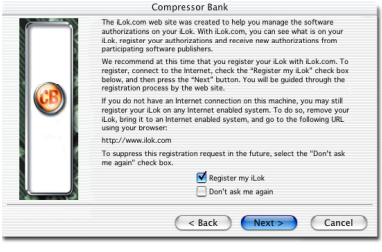
Note: Although the Authorization Wizard may appear to allow authorization by challenge/ response, that method is currently NOT SUPPORTED McDSP Plug-Ins.

- Separate the small punch-out iLok License Chip (the removable metal and plastic tab) from the License Card by pushing the cutout up and out with your thumb. Do not force your finger downward.

- The iLok License Chip may now be inserted into the 'key slot' of the iLok USB Smart Key (figure 2.6). If the iLok USB Smart Key does not appear to be present on the system, ensure the iLok USB Smart Key is connected to a valid USB port and that the green LED is lit inside the iLok USB Smart Key. To insert the License Chip into the iLok USB Smart Key, orient the iLok USB Smart Key's USB end to the left, and the loop end to the upper right. Insert the metal chip end of the iLok License Chip (the License Chip tab should have the metal chip side facing up towards you, not down). You should be able to visually verify that the License Chip makes contact with the iLok USB Smart Key metal card reader.



- The green LED in the iLok USB Smart Key will light when it is ready to receive and transmit data.
- Upon inserting the iLok License Chip, a message will be displayed indicating the authorization was installed successfully. Click 'Ok' in the message dialog.



- Once the authorization is installed on the iLok USB Smart Key, a dialog is displayed prompting the user to register their iLok USB Smart Key at the www.ilok.com website. The iLok.com website was created to allow users to manage the software authorizations on their iLok USB Smart Key. THIS STEP IS NOT REQUIRED TO COMPLETE THE AUTHORIZATION OF MCDSP SOFTWARE. The registration of the iLok USB Smart Key to an iLok.com account can be bypassed by clearing the checkbox. The user may also choose to not be asked to register again. While iLok.com is a great resource for the iLok USB Smart Key, your iLok USB Smart Key may only be linked to one iLok.com account. That is, an individual iLok USB Smart Key can only be registered to one account at a time--but a single account can have multiple iLok USB Smart Keys. If the iLok.com account information is lost, the iLok USB Smart Key cannot be registered to another account. However, an iLok USB Smart Key may be transferred between accounts if all the authorizations have been transferred off the iLok USB Smart Key. Register the iLok USB Smart Key to an iLok.com account only when you are ready to retain all the needed iLok.com account information (User ID and Password).
- A 'Finished' dialog is displayed showing what authorization method was used.
- Click 'Finish' to exit the Authorization Wizard.

Authorizing with iLok.com

Required for demo, upgrade, and replacement authorizations only

iLok.com can be accessed from any Macintosh or PC with an Internet connection. You can do this at home, a friend's, or at the office as long as there is an internet connection to access iLok.com--note that you don't have to use your ProTools system computer! You simply use this computer to connect to iLok.com and transfer authorizations to your iLok Smart Key. The iLok Smart Key can then be moved to your ProTools system to complete authorization of your Plug-In.

You will need:

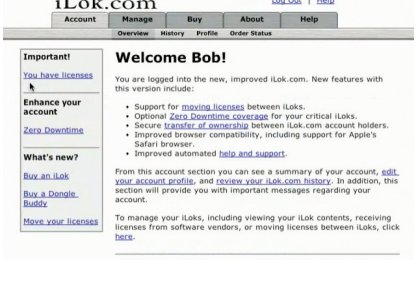
- A computer with an Internet connection. Either a Macintosh running OS 9.2 to OS 10.3 or a PC running Windows 98, ME, 2000, XP, or Vista
- An iLok USB Smart Key
- A valid iLok.com account. Visit www.iLok.com and set up a free account, if you have not already done so.

1) Download and install the required client software from iLok.com.

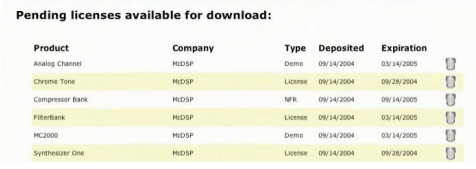
2) Download the desired McDSP Plug-In Installer from:
http://www.mcdsp.com/support/updating.html

3) To receive an upgrade or replacement authorization, send email your iLok.com account information to: support@mcdsp.com
To receive a demo authorization, email your iLok.com account information to: authorize@mcdsp.com

Insert your iLok Smart Key into an available USB port and ensure that the indicator light is lit. Once your demo, upgrade, or replacement authorization is available for transfer, your iLok.com account will display the notice saying "You have licenses" on the upper left. Begin by selecting that link.

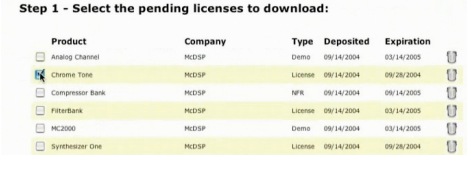


The next page will display the pending licenses available for download. This page will also display the name of the Plug-In, its manufacturer, the type of authorization (demo, Not For Resale, or License), the date the authorization was deposited, and the date when the authorization will no longer be available for download from the server.

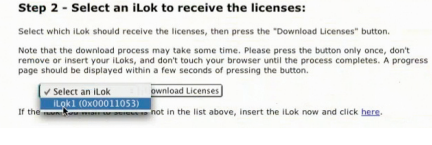


Before any transfer of authorizations can take place, you must synchonize your iLok Smart Key with iLok.com. This may take a moment to process depending on your internet connection.

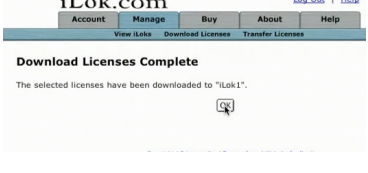
Once you have synchronized your iLok, you can select the authorization(s) you wish to transfer to your iLok.



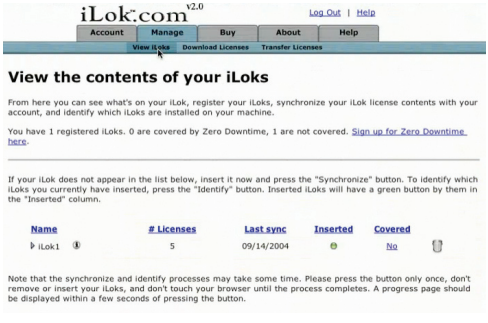
If you have multiple iLoks connected to your computer, it is important to select the correct iLok you wish the authorizations to be transferred to. Then click "Download Licenses" to begin the process. Again, this may take a moment depending on your internet connection.



When the transfer finishes you will be asked to confirm the completition of the transaction, thereby letting you know that the transfer was successful.



If you wish to go back into your account and visually confirm the transaction for yourself, select “View iLoks” Then select the iLok you had the authorizations transferred to.



That’s it! Dont forget to logout and move the iLok Smart Key to your ProTools System if you are using another computer for Internet access. Also, you may need to install a different version of the Plug-In if you are upgrading or replacing.

Transferring Authorizations with iLok.com

You may freely transfer any authorization within your iLok.com account between any of your registered iLok Smart Keys. If you wish to transfer an authorization out of your iLok.com account to a different user, it will require additional support from PACE Anti-Piracy, Inc and may be subject to a service fee or limited by manufacturer restrictions. Check the www.ilok.com website for updates and developments regarding iLok USB Smart Keys and the Pace Interlok Copy Protection system.

Registering your McDSP Plug-In

To register your McDSP Plug-In, fill out and return the product registration card enclosed with the boxed Plug-In package by mail or fax 707-220-0994. Registering your product entitles you to future upgrades and advance information from McDSP. Each individual product must be registered (even if you have multiple copies), and the product must be registered to an individual, not an entity. If you represent a company it is your company's responsibility to notify McDSP in writing if the individual who registered the Plug-In is no longer with the company. The Company must also be able to supply matching registration information to successfully transfer ownership of the Plug-In.

Using your McDSP Plug-Ins

Starting a McDSP Plug-In:

Follow the installation, authorization, and registration instructions above, Launch Pro Tools™, and the McDSP Plug-In and its presets are ready for use. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation such as automation.

Exiting a McDSP Plug-In

A McDSP Plug-In is exited by clicking on the desktop or other window in the DAE application running the Plug-In, closing the Plug-In window, or de-instantiating the Plug-In. Pro Tools™ sessions will save instantiated Plug-In configurations and their settings. Refer to the Digidesign™ Pro Tools™ Reference Guide for details on general Plug-In operation.

NF575 Noise Filter

The NF575 is the most precise noise filter available for any digital audio workstation. The NF575 Noise Filter is a high-resolution filter set designed to remove a wide variety of noise types from audio.

Accurate high pass and low pass filters reduce low frequency rumble and high frequency hiss. Selectable slopes of 6, 12, 18, 24, 30, and 36 dB/Oct and frequency control range covering the entire audible spectrum make the NF575 filters extremely flexible.

Advanced notch filters allow the user to select the amount of signal cut, cut frequency, and width (Q). All five NF575's notch filters can be linked harmonically to remove common cyclical noise.

Features:

- High Pass Filtering (HPF) with slopes up to 36 dB/Oct
- Low Pass Filtering (LPF) with slopes up to 36 dB/Oct
- Five bands of Notch filtering with linkable frequency control
- Analog Saturation Modeling
- Double precision processing
- Ultra low latency
- Mono and stereo versions
- Supports up to 96 kHz sample rates

The Quick Start Tour: The NF575 Plug-In

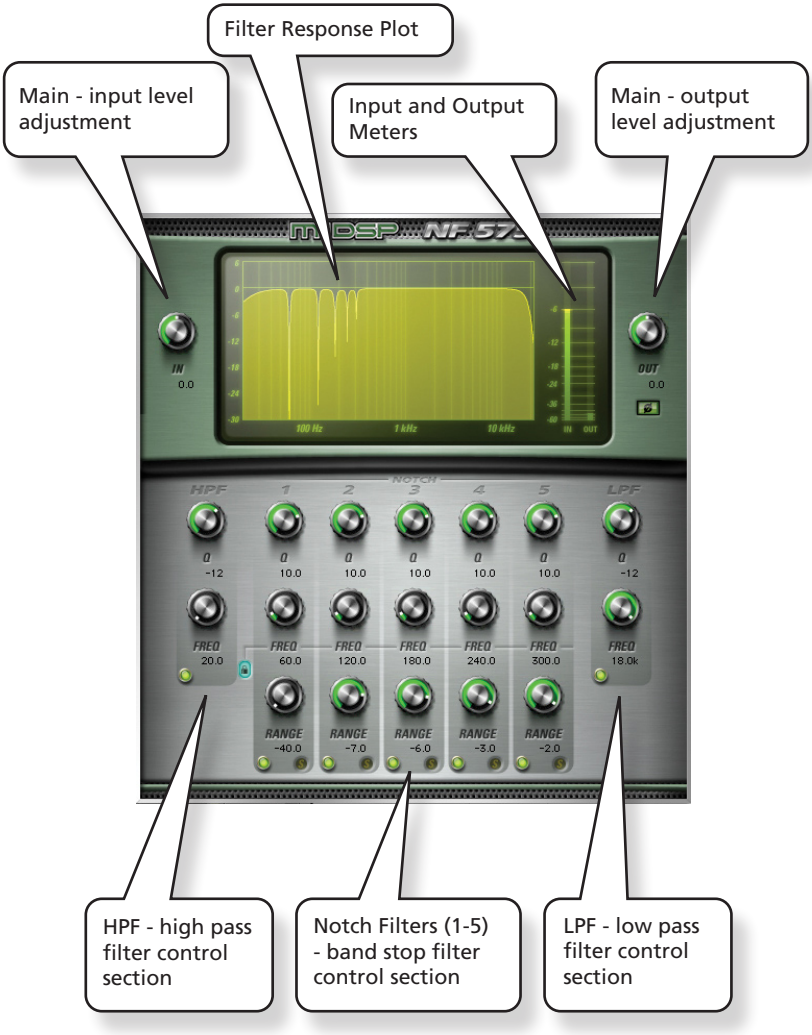
Start Pro Tools™ and Instantiate the NF575 plug-In

- Launch Pro Tools™ and Open a Pro Tools™ Session.
- Verify the Display-> Mix Window Shows->Inserts View option is checked.
- In one of the inserts of a stereo master fader, select the NF575 plug-in. Note the NF575 plug-in will operate on master or regular audio tracks in mono or stereo versions.
- If the insert selection does not show the NF575 plug-In, verify that the NF575 plug-in has been installed correctly.
- For more information on starting Pro Tools™ and working with Plug-Ins, see Digidesign's™ Pro Tools™ Reference Guide

NF575 Overview

The NF575 Noise Filter is a specially designed set of algorithms for removing unwanted noise from audio, with as little effect on the original audio as possible. Five linkable notch filters are complimented by steep high pass and low pass filters. There are Q/Slope adjustments for each filter band, and frequency control ranges cover the entire audible spectrum. Each notch filter has an adjustable notch cut, and the frequency controls of all notch filtered can be linked at any frequency interval (harmonic or other relative offset).

The NF575 is the ideal choice for noise filtering.


Filter Response Plot
Main - input level adjustment
Input and Output Meters
Main - output level adjustment
IN
0.0
OUT
0.0
100 Hz
1 kHz
10 kHz
HPF
1
2
NOTCH
3
4
5
LPF
Q
-12
10.0
10.0
10.0
10.0
10.0
-12
FREQ
20.0
60.0
120.0
180.0
240.0
300.0
18.0k
RANGE
-40.0
-7.0
-6.0
-3.0
-2.0
HPF - high pass filter control section
Notch Filters (1-5) - band stop filter control section
LPF - low pass filter control section

Controls

Main

The Main section controls input and output levels, along with phase control over the output stage.

- **In** - input signal level adjustment (-24 to +24 dB)
- **Out** - output signal level adjustment (-24 to +24 dB)

HPF (High Pass Filter)

The HPF section controls affect filter frequency and slope. The high pass filter is useful for removing low rumble, vocal/dialog track plosives, and other low frequency noise.

- **Freq** - high pass filter frequency
- **Q** - filter slope (6 to 36 dB/Oct)

Notch Filters (1 - 5)

The Notch filter section has 5 fully adjustable notch filters for removing cyclical noise like 60 Hz hum. Each notch filter has a range control for adjusting the amount of signal reduction at the notch filter frequency. The bandwidth (Q) of the notch filter can be extremely narrow to remove the noise while affecting the remaining audio as little as possible.

- **Freq** - notch (band stop) filter frequency
- **Q** - bandwidth of notch filter
- **Range** - amount of signal reduction at notch filter frequency
- **Solo** - pass signal blocked by notch filter (flips filter shape from bandstop to bandpass shape). Useful for identifying cyclical noise.
- **Link** - slave notch filter frequencies 2 - 5 to the frequency of notch one. All relative frequency offsets between notch 1 and notches 2 - 5 are retained when the Link control is enabled.

LPF (Low Pass Filter)

The LPF section controls affect filter frequency and slope. The low pass filter is useful for removing background hiss, wind, and other high frequency noise.

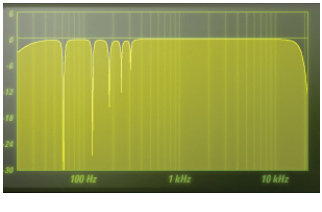
- **Freq** - low pass filter frequency
- **Q** - filter slope (6 to 36 dB/Oct)

Displays

Meters

The NF575 Noise Filter has meters showing input signal output signal levels. These meters are useful for confimring the amount of unwanted noise being filtered (removed). These meters also can be used to confirm relative input and output levels are the same if desired.

Filter Response Plot



The NF575 frequency response plot shows the total shape of the high pass, notch, and low pass filters. This plot provides visual confirmation of the control settings in each filter section.

General Information

To adjust any of the NF575 controls the user can:

- Hold the <Command> key while dragging the slider for fine control, or
- Click on the text box to highlight and edit the numeric value to get precise control (if a value outside the valid range is input, the control will default to the nearest allowed value when enter is hit) and hit <Enter>, or

- Click on the text box to highlight the numeric value and then use the arrow keys to increase or decrease the numeric value, or
- Use the <Option> key to bring all the controls to their default values, or
- Use hardware controller surfaces supported by the NF575 plug-in including the Mackie HUI and Digidesign's ICON™, ProControl™ and Control 24.

Control Linking

The NF575 Noise Filter allows the frequency controls of its five notch filters to be linked at any frequency interval. By clicking the link button located just to the left of the notch 1 frequency controls, all frequency controls will be updated when the notch frequency control in notch 1 is updated.

Automation

All NF575 Noise Filter controls are completely automatable. See the Digidesign™ Pro Tools™ Reference Guide, Automating Plug-Ins section.

Presets: Using the Presets and Making Your Own

The NF575 Noise Filter preset library demonstrates the wide range of applications the NF575 can be used. No preset will suit every application, and they have been provided as a guide for the user, and will hopefully inspire new ideas and ways to use this sophisticated plug-in.

The presets can be accessed from the Pro Tools™ "Plug-In Librarian" and "Plug-In Settings" pop-up menus.

To make and save your own presets, see the "Plug-In Librarian Functions" section of Digidesign's DigiRack Plug-Ins Guide.

A Word on Preset Compatibility

Presets for the NF575 configurations are interchangeable.

Using the NF575 Plug-In

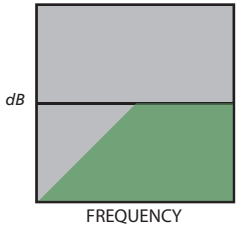
The NF575 Noise Filter is a specially design set of algorithms used to remove noise (but not music!) from the audio signal. The following sections cover basic operations of the algorithms in the NF575 Noise Filter, provide a more in depth description of some of the features of the NF575, and outline some applications of the NF575 plug-in.

Basics

Filters can be broken down into 4 general categories - high pass, low pass, band stop (notch), and band pass.

High Pass Filter (HPF)

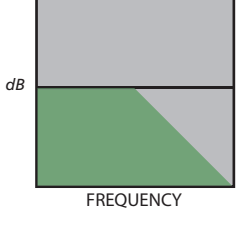
High pass filters remove signals below the selected frequency, and pass the signals above the selected frequency unaffected (hence the term high pass). High pass filters have a slope measured in the amount of signal reduction (in dB) per frequency octave. Typically these values are in multiples of 6 dB / Oct. At the exact selected frequency of the high pass filter the signal reduction is usually - 3dB, however this can change based on filter design.



A high pass filter is useful for removing low frequency rumble, unwanted vocal plosives, and dc offsets.

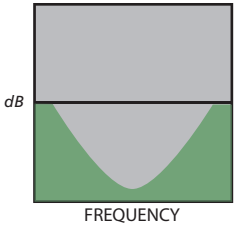
Low Pass Filter (LPF)

Low pass filters remove signals above the selected frequency, and pass the signals below the selected frequency unaffected (hence the term low pass). Low pass filters have a slope measured in the amount of signal reduction (in dB) per frequency octave. Typically these values are in multiples of 6 dB / Oct. At the exact selected frequency of the low pass filter the signal reduction is usually - 3dB, however this can change based on filter design.



A low pass filter is useful for background noise such as tape hiss, waterfalls and general ambient background noise.

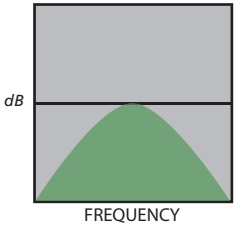
Band Stop Filter



Band stop filters, or notch filters, are designed to remove a specified amount of signal at exactly the selected frequency. Band stop (notch) filters have a slope, or Q control, that determines the width of the actual notch shape. A Q of 1.0 is about one frequency octave. A Q of 12.0 is about 1/12 a frequency octave, or one semi-tone. At the exact selected frequency of the band stop (notch) filter the signal reduction is maximum. Some band stop (notch) filters, like those found on the NF575, allow user adjustment of the amount of signal reduction.

A band stop (notch) is useful for removing cyclical noise like 60 Hz hum and camera shutter noise.

Band Pass Filter



Band pass filters only pass signal at the exact selected frequency. Signal levels are reduced for frequencies above and below the selected frequency. Band pass filters have a slope, or Q control, that determines the width of the actual band pass shape. A Q of 1.0 is about one frequency octave. A Q of 12.0 is about 1/12 a frequency octave, or one semi-tone.

A band pass filter is useful for auditioning narrow segments of the audio spectrum to monitor cyclical noise and other audio signal problems.

A Closer Look at the NF575 Plug-In

Filter Slopes

Although there are several filtering options available for the Pro Tools™ platform, few, if any, have the precision of the NF575 Noise Filter. Not only designed for the ultimate in filtering accuracy, the high pass and low pass filters included in the NF575 have slopes up to 36dB/Oct. Because of the steepness of the NF575 Noise Filter high pass and low pass filters, even greater amounts of noise reduction are possible. The transition (slope) between unaffected and filtered frequencies allows even tighter control over audio signals and the noise removal process.

Notch Filter Soloing

Great notch filtering is nearly useless if the cyclical noise cannot be monitored accurately. The notch filter solo buttons use band pass filters in place of the notch filters, so the user can audition cyclical noise sources over a selectable frequency bandwidth. When a notch filter band is soloed, the Q control still affects the filter, and the filter is the exact opposite of the notch. The user is effectively listening to the removed signal when a notch filter is soloed.

Note the Solo control only solos the filter band by as much as the Range value. When the Range control is at its maximum reduction, the band will be soloed the most. When the Range control is at its minimum reduction (no reduction) the Solo control has no effect.

For each notch filter band, soloing that band and sweeping it across its available frequency control range will reveal at what frequency the noise source is the loudest. Upon finding this loudest frequency location, un-solo the notch filter, and that cyclical noise is now absent from the audio signal. Adjust the Q control as tightly as possible to remove only the noise and not the desired audio data. Repeat this process for all notches, or until all audible cyclical noise is removed.

Notch Filter Linking

Sometimes the cyclical noise has a fundamental frequency, but the harmonics of the periodic noise also contaminate the audio. By linking all the notch filter frequencies to the first notch filter band in the NF575, cyclical noise can be quickly removed. Default settings put the notch filter frequencies at harmonic intervals automatically (ex: 60, 120, 180, 240, 300 Hz). And if the noise does not contain harmonics, but rather seemingly unrelated cyclical noises at various frequencies, the NF575 notch filters can be linked at any frequency interval (ex: 120, 168, 240, 328, 400 Hz).

Applications

60 Hz Buzz Removal

Cyclical noise like AC power hum is all too common in audio production. While a simple notch filter may remove some of this kind of noise, there are often several harmonics of noise that require multiple notch filters, often with varying amounts of reduction. The NF575 notch filters are extremely narrow and linkable, so the removal of cyclical (and harmonic) noise is possible, without affecting the desired audio.

Camera Shutter Noise

Camera noise can sometimes generate cyclical (and harmonic) noise problems as well. The use of the NF575 notch filters and their linking capability can make quick work of this kind of noise problem.

Low Frequency Rumble

Often a well recorded track can still have unwanted signal content; the singer's plosives (ex: a really loud 'buh' sound when screaming 'baby' at the top of your lungs), the rumble from a mic stand, wind, or other low frequency signals that spoil the quality of the audio. Using the NF575 high pass filters, these types of sounds can be easily removed. The steeper slopes can remove more of these unwanted sounds, while preserving the real content in the track.

Phasor Effects

While the NF575 is really designed for noise reduction, the NF575 notch filters can create some pretty drastic phasor like effects. Link all 5 notch filters to the first notch using the link control, select a wide Q setting, and then vary the frequency control in the first notch filter (band 1). The effects are interesting, and by automating the frequency control of the first notch filter, the phasor sweep can be made into a consistent effect during playback (instead of locking to the rate of an LFO, which could produce different phasor effects each playback pass).

NF575 Plug-In Reference Guide

NF575 Specifications

Parameter	Range	Function
IN	-24 to +24 dB	Input signal level adjustment
OUT	-24 to +24 dB	Output signal level adjustment
PHASE	ON / OFF	Inverts the phase of the audio waveform
HPF - (HIGH PASS FILTER)		
Q	-6dB / Oct to -36dB / Oct	High pass filter steepness
FREQ	20Hz to 20kHz	High pass filter frequency below which signal levels are reduced
LPF - (LOW PASS FILTER)		
Q	-6dB / Oct to -36dB / Oct	Low pass filter steepness
FREQ	20Hz to 20kHz	Low pass filter frequency above which signal levels are reduced
FILTERS		
Q	1.0 - 20.0	Notch filter bandwidth
RANGE	0 to -40 dB	Amount of signal reduction at selected frequency for each notch filter
LOCK	ON / OFF	Lock relative positions and control all 5 notch filters from notch 1
SOLO	ON / OFF	Monitor only the portion of the audio passing through a single notch filter
FREQ (FILTERS 1-5)		

FILTER	1	2	3	4	5
FREQ	40Hz to 4kHz	80Hz to 8kHz	120Hz to 12kHz	160Hz to 16kHz	200 to 20kHz

DSP Delay

The delay incurred by any of the NF575 plug-in configurations is 3 (THREE) samples on HD systems. This is the absolute minimum number of delay samples a TDM plug-in can have. The McDSP plug-ins are designed in this manner to provide the user with the closest analog mixing console experience possible (analog inserts such as EQ and compression do not cause a processing delay when inserted into a track).

DSP Usage

HD and HD Accel DSP hardware

The TDM versions of the NF575 Noise Filter plug-in configurations use a varying amount of DSP resources for each NF575 Noise Filter configuration. The table below is a listing of these DSP usages. DSP usage is shown in the Pro Tools™ System Usage window.

Maximum Instantiation Counts at 48kHz

Configuration	NF575 Mono	NF575 Stereo
# INSTANTIATIONS PER DSP ON HD SYSTEMS	5	3
# INSTANTIATIONS PER DSP ON HD ACCEL SYSTEMS	10	6

All of the NF575 Noise Filter plug-in configurations can operate on the same DSP, depending on the configuration's DSP requirements. See below for the percentages of a HD or HD Accel DSP used by a single instantiation of a NF575 Noise Filter plug-in.

Percentage of DSP used by one instantiation at 48kHz

Configuration	NF575 Mono	NF575 Stereo
% OF DSP USED ON HD SYSTEMS	18%	36%
% OF DSP USED ON HD ACCEL SYSTEMS	9%	18%

Using the data provided in the above chart, the NF575 (stereo) and NF575 (stereo) plug-in configurations can share the same DSP.

The NF575 Noise Filter supports some higher sample rates (88.2 kHz and 96 kHz). For 88.2 kHz and 96 kHz operation the dsp usage is roughly doubled (2x).

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