

Aphex Aural Exciter Type III and Big Bottom Pro Plug-Ins Guide

Version 2.2 for TDM Systems on Windows or Macintosh

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chapter 1

Introduction

The Aural Exciter® Type III and Big Bottom Pro plug-ins are real-time TDM plug-ins that retain the look and sound of Aphex Systems' renowned hardware units. Aural Exciter makes it possible to recreate and restore missing harmonics.

The Aural Exciter® Type III and Big Bottom Pro plug-ins provide support for 192 kHz, 176.4 kHz, 96 kHz, 88.2 kHz, 48 kHz, and 44.1 kHz sessions.



On 192 kHz or 176.4 kHz stereo tracks, Aural Exciter is only available as a multi-mono plug-in.

Your Aphex Aural Exciter Type III and Big Bottom Pro plug-in package contains the following components:

- Installation CD-ROM
- License Card (for installing both Aphex plug-ins with an iLok Smart Key, not supplied)
- *Aphex Aural Exciter and Big Bottom Plug-Ins Guide* (electronic PDF guide)
- Registration Card

System Requirements

To use Aural Exciter III and Big Bottom Pro, you need:

- ◆ A Digidesign-qualified Pro Tools TDM system

For the latest compatibility information, contact your local Digidesign dealer or visit our Web site (www.Digidesign.com/compato).

Register Aural Exciter III and Big Bottom Pro

Make sure to complete and return the registration card included with your plug-in. Registered users will receive periodic software update and upgrade notices. Refer to the registration card for information on technical support.

Working with Plug-Ins

Besides the information provided in this guide, refer to the *Pro Tools Reference Guide*, the *Digi-Rack Plug-Ins Guide*, or the electronic PDF copy of the *Digidesign Plug-Ins Guide* for general information on working with plug-ins, including:

- Plug-Ins as Inserts
- The Plug-In Window
- Editing Plug-In Parameters
- Automating Plug-Ins
- Using the Librarian

Conventions Used in This Guide

All Digidesign guides use the following conventions to indicate menu choices and key commands:

| Convention | Action |
|-----------------------|--|
| File > Save Session | Choose Save Session from the File menu |
| Control+N | Hold down the Control key and press the <i>N</i> key |
| Control-click | Hold down the Control key and click the mouse button |
| Right-click (Windows) | Click with the right mouse button |

The following symbols are used to highlight important information:

 *User Tips are helpful hints for getting the most from your Pro Tools system.*

 *Important Notices include information that could affect your Pro Tools session data or the performance of your Pro Tools system.*

 *Shortcuts show you useful keyboard or mouse shortcuts.*

 *Cross References point to related sections in the Pro Tools Guides.*

Installation

Installing Aural Exciter III and Big Bottom Pro

To install Aural Exciter III and Big Bottom Pro, use the Installer CD-ROM.

To install Aural Exciter III and Big Bottom Pro:

- 1 Insert the Installer CD-ROM in your CD-ROM drive and double-click the Installer.
- 2 Click Install.
- 3 When installation is complete, click Finish (Windows) or Quit (Macintosh).

When you open Pro Tools, you will be prompted to authorize your new plug-in.

Authorizing Aural Exciter III and Big Bottom Pro

The Apex plug-ins are authorized using the iLok USB Smart Key from PACE Anti-Piracy. The iLok is similar to a dongle, but unlike a dongle, it is designed to securely authorize multiple software applications from a variety of software developers.

One iLok USB Smart Key is included with Pro Tools|HD Core systems. This key can hold over 100 authorizations for all your iLok-enabled software. Once a software authorization is added to an iLok USB Smart Key, you can use the iLok to authorize that software on any computer.

Authorizations are added to an iLok using License Cards that have a small punch-out GSM plastic chip. License Cards are specific to each plug-in. You will receive the appropriate License Cards for the plug-ins that you purchase.

 *For additional information about iLok technology and authorizations, see the electronic PDF of the iLok Usage Guide.*

To add an authorization to an iLok:

- 1 Insert the iLok into an available USB port on your computer.
- 2 Launch Pro Tools. You will be prompted to authorize any installed unauthorized plug-ins.

 *If you are already using a demo version of the plug-in, launch Pro Tools before you insert the iLok, then insert the iLok into any available USB port when prompted by Pro Tools.*

- 3 Follow the on-screen instructions until you are prompted to insert the License Card into the iLok.
- 4 Separate the License Card—the smaller GSM cutout—from the larger protective card by pulling the cutout up and out with your thumb.
- 5 Insert the License Card into the iLok. Visually verify that the License Card makes contact with the iLok's metal card reader.



iLok with License Card

- 6 Follow the on-screen instructions to complete the authorization process.
- 7 After authorization is complete, remove the License Card from the iLok. (If you have to remove the iLok to remove the License Card, be sure to re-insert the iLok in any available USB port on your computer.)

Removing Expired Plug-Ins

If you let a demo version of a plug-in expire, you should remove it from your system. Otherwise, each time you open Pro Tools you will be prompted with a message that the plug-in has expired.

Windows

To remove an expired plug-in:

- 1 From the Start menu, choose Settings > Control Panel and double-click Add or Remove Programs.
- 2 Select the expired plug-in from the list of installed applications and click the Change/Remove button.
- 3 When removal is complete, click OK to close the window.

Mac OS X

To remove an expired plug-in:

- 1 Open the Plug-Ins folder or Plug-Ins (Unused) folder on your Startup drive (Library/Application Support/Digidesign).
- 2 Drag the expired plug-in to the Trash.
- 3 Empty the Trash.

Mac OS 9

To remove an expired plug-in:

- 1 Open the DAE folder inside your System Folder.
- 2 Open the Plug-Ins folder or Plug-Ins (Unused) folder and drag the expired plug-in to the Trash.
- 3 Empty the Trash.

Allocating Additional Memory to Pro Tools

(Mac OS 9 Only)

If you plan to use a large number of TDM plug-ins, in addition to the DigiRack TDM plug-ins included with Pro Tools, allocating additional memory to Pro Tools will help ensure reliable system performance.

If enough RAM is available in your computer, allocate 1–2 megabytes of additional RAM to Pro Tools for each non-DigiRack plug-in installed on your system.

To allocate additional memory to Pro Tools:

- 1 Start Pro Tools so that it can calculate its basic memory allocation.
- 2 Go to the Finder and choose About This Computer from the Apple menu.
- 3 If you have 3 MB or more of memory available (as indicated in the Largest Unused Block portion of this window), go to step 4. If you have less than 3 MB of free memory, stop here: Do not allocate additional memory to Pro Tools unless you install additional RAM in your computer.

4 Quit Pro Tools.

5 Open the Pro Tools folder, select the Pro Tools application, and choose Get Info from the Finder's File menu.

6 Choose Memory from the Show menu.

7 Enter the desired amount of memory *above the minimum requirement* in the Preferred Size field. For example, if the Preferred Size field currently says "30410" k and you want to allocate an additional 3 MB of memory (1 megabyte equals 1,024 kilobytes), enter "33482" k into the Preferred Size field.

8 Close the Get Info dialog.

The next time you start Pro Tools, it will use this new memory allocation.

Aural Exciter Controls

Aphex Aural Exciter Type III Overview

Aphex Systems, Inc. first introduced Aural Exciter in 1975. Since then, several refinements and improvements have been incorporated into its original design. The Aural Exciter plug-in is modeled after the TYPE III Aural Exciter. Aural Exciter has become a standard in the professional audio industry, and has been used on many albums, CDs, movies, broadcast productions, commercials, and concerts. The Aural Exciter plug-in for Pro Tools TDM systems continues this tradition of success, and is ready for use with the latest cutting edge music productions.

Harmonics are musically and dynamically related to the original sound, and reveal the fine differences between voices and various instruments. Reproduced sound is audibly different from the original live sound because of the loss in harmonic detail, often sounding dull and lifeless.

Aural Exciter is an audio process that recreates and restores missing harmonics. It actually adds harmonics, restoring the sound's natural brightness, clarity and presence, effectively improving detail and intelligibility. Use Aural Exciter on specific instruments or in the final mix to bring life back to recordings.

Unlike EQs and other brightness enhancers which only boost the high frequencies that often alter the overall tonal balance, Aural Exciter extends the high frequencies. The stereo image is enhanced with Aural Exciter. This results in a greater perceived loudness without an introduction of noise into the audio path, commonly caused by increased gain.

Aural Exciter is a single-ended process which can be inserted at any point within the audio chain (see Figure 1 on page 9). The input signal is split into two paths. One path goes to the output unmodified, while the other path, known as a side-chain, goes through the Aural Exciter, which includes a tunable high-pass filter and a harmonics generator. Aural Exciter applies frequency-dependent phase shift and amplitude-dependent harmonics. The output of the Aural Exciter's harmonic generator is mixed back with the unmodified signal, lower in level.

When used at nominal settings, Aural Exciter does not add significant average level to the original signal. Even though the added information is low level, the perception is a dramatic increase in mid and high frequencies.

The Aural Exciter is patented in the United States, Japan and most of Europe. Others may claim they are doing the same thing, but they can only resort to some form of EQ (amplitude

correction or expansion), phase scrambling and/or filtering. They can only increase peak levels causing clipping, feedback, tape distortion and listener fatigue.

Adjusting Parameters

Editing Parameters Using a Mouse

You can adjust rotary controls with a mouse by dragging horizontally or vertically. Parameter values increase as you drag upward or to the right, and decrease as you drag downward or to the left.

Editing Parameters Using a Computer Keyboard

Each rotary control has a corresponding parameter text field directly below it. This displays the current value of the parameter. You can edit the numeric value of a parameter with your computer keyboard.

To type a parameter value:

- 1 Click on the parameter text that you want to edit.
- 2 Change the value.
 - Type the desired value.
 - or –
 - To increase a value, press the Up Arrow on your keyboard. To decrease a value, press the Down Arrow on your keyboard.
- 3 Press Enter on the numeric keyboard to input the value and remain in keyboard editing mode.
 - or –

Press Enter on the alpha keyboard (Windows) or Return (Macintosh) to enter the value and leave keyboard editing mode.

Enabling Switches

To enable a switch, click on the switch.

Meters

Drive Meter

The Drive meter monitors the peak level to the harmonic generator. It works in conjunction with the Drive switch. A red LED at the top of the meter indicates if there is clipping.

For optimal performance keep the peak hold meter of the Drive meter inside the yellow area. The harder you drive the Exciter, the more Exciter enhancement you generate. If you cannot get the Drive meter to register in the yellow area, try setting the Drive switch to High (Drive switch enabled).

Out Meter

The Out meter lets you monitor the output level after Aural Exciter processing. A red light at the top of the meter indicates if there is clipping.

▲ *If your input material has a peak level, be careful to prevent clipping when setting the Mix control.*

BLOCK DIAGRAM OF AURAL EXCITER TYPE III

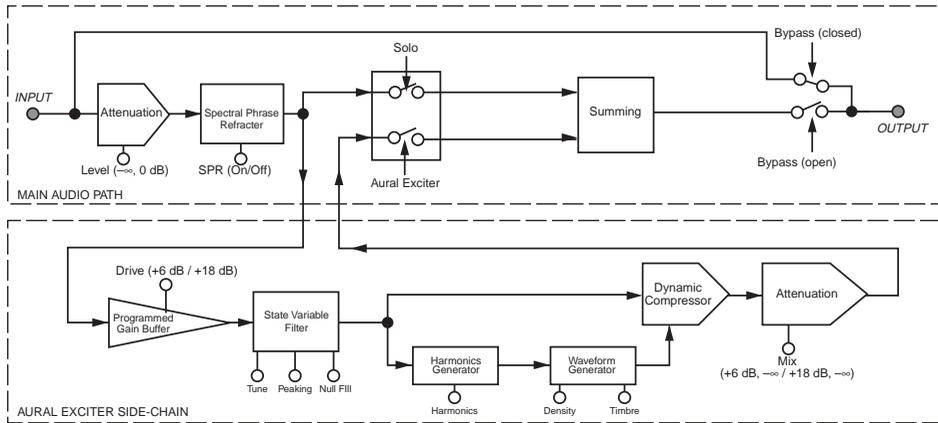


Figure 1. Block Diagram of Apex Aural Exciter, Type III



Figure 2. Apex Aural Exciter, Type III

Rotary Controls

Level Control

The Level control sets the attenuation of the input signal. For normal operation set the Level control on Max (no attenuation).

The Aural Exciter TDM plug-in has an internal gain structure that boosts +6 dB of the output from the high-pass filter into the side-chain. The Drive switch further boosts the signal level

fed into the harmonics generator. When Drive is set to Normal, you obtain a boost of +6 dB; in the High position you can get an additional 6 dB of gain, for a total maximum boost of +18 dB. You can also generate a boost in the high-pass filter section by setting Peaking to Max. If the Drive signal runs into clipping, use the Level control to adjust the Drive level.

If you run into headroom problems when adjusting the Mix control, adjust the Level control to generate the necessary headroom.

Tune Control

The Tune control sets the bandwidth (corner frequency) of the second order high-pass filter in the side-chain prior to the harmonics generator. The range of the control extends from 700 Hz to 7 kHz.

Figure 3 demonstrates the range of the Tune control from 700 Hz to 7 kHz with Null Fill set near Min and Peaking set at the mid-point position. As you read the following sections on Peaking and Null Fill, notice the interaction these controls have on Tune, as well as on each other.

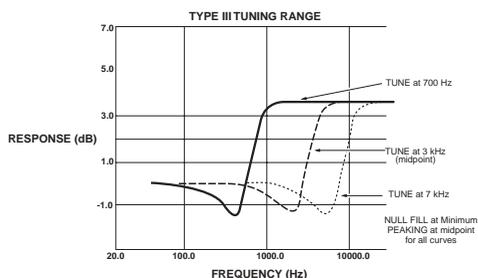


Figure 3. Tune control

Peaking Control

The Peaking control provides a damping effect on the leading frequency edge of the high-pass filter controlled by Tune. As you vary this control from Min to Max, the Tune frequency becomes more accentuated, as demonstrated in Figure 4. However, at the same time, a dip is created just before the accentuated Tune frequency. This dip or null becomes larger as Peaking is increased.

Underneath the control, the amount of Peaking is displayed as a percentage.

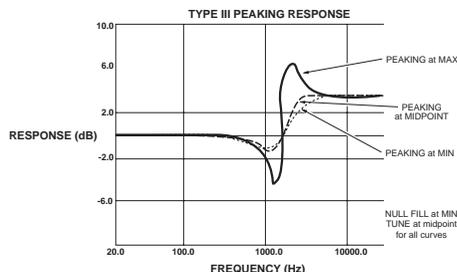


Figure 4. Peaking control

Null Fill Control

The Null Fill control adjusts the curve of the high-pass filter to “fill in” the null caused by the summing of the side-chain return signal and the input signal.

Underneath the control, the amount of Null Fill is displayed as a percentage.

This control compensates for “phase pulling,” which occurs as a side effect of the time delay present in the side-chain signal, an important part of the Aural Exciter operating theory. As the time delay “stretches” transient waveforms to create a perception of louder sound, a “dip” or “null” also occurs in the output equalization curve at the Tune frequency. As a result, the “null” frequencies are de-emphasized, thus giving even more emphasis to the higher frequencies. Although this often is a desirable effect, the Null Fill control was created to allow the user to fill-in the null by a selectable amount for any applications requiring less emphasis.

Figure 5 shows three different Null Fill settings with Tune set at the mid-point position. With the Null Fill control set at Min, there is a noticeable drop in the frequency response, just before the start of the high-pass shelf boost. At this setting, program material under enhancement

would lose some presence. When the Null Fill control is set at Max, the frequency dip is filled, but the frequencies associated with the shelf top become accentuated. Also notice the shift in the Tune frequency (0 dB axis) for the range of Null Fill settings.

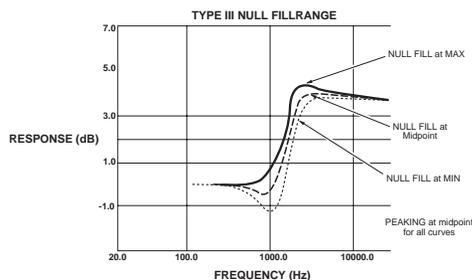


Figure 5. Null Fill control

Harmonics Control

The Harmonics control adjusts the amount of harmonics being generated, which is displayed as a percentage underneath the controls.

The harmonic generator produces harmonic components according to a complex set of laws, including considerations for transient and steady-state qualities, as well as relative amplitude of the original audio signal.

As you move the control up, harmonic content increases proportionally as it works in conjunction with the Timbre control. Moreover, the amount of harmonics generated is dependent on the input level. The gain of the harmonics automatically increases as the input level increases.

The generated harmonics are not products of harmonic distortion, since they are intelligently produced and formed into a power envelope that enhances rather than distorts the final audio signal.

Timbre Control

The Timbre control sets the order or type of harmonic signal being generated by way of the Harmonics control. The control can be varied from all Even harmonics in the Min position, to all Odd harmonics at the Max position. Odd order harmonics will sound softer to your ear, while even harmonics will sound harsher.

Varying the Timbre control between the two extremes will provide you with a mix of both Even and Odd harmonics in proportion to the control position. To emphasize the effect of the Timbre control, set the Density switch to High.

The display underneath the controls reads from +100% (all Odd) to -100% (all Even).

Mix Control

The Mix control determines the amount of Aural Exciter enhancement mixed into the original signal. The control ranges from Min (no enhancement), up to Max, representing approximately a 6 dB boost when the Drive switch is set to Normal, and approximately an 18 dB boost when it is set to High.

Underneath the controls, the amount of enhancement mixed into the original signal is displayed as a percentage.

Switches

Drive Switch

The Drive switch offers two settings, Normal (+6 dB) and High (+18 dB). This sets the input sensitivity to the harmonics generator. In general, this switch will be left in the Normal position. However, weak signals may require more gain, in which case you should place this switch in the High position.

Use the Drive meter to determine if the signal gain needs to be increased. When the meter level stays in the green area (never rising into the yellow area), then the input signal is too low. Raise the input sensitivity by toggling the Drive switch to High.

The switch illuminates when Drive is set to High.

▲ *If your input signal is in the yellow area of the Drive meter, this indicates you are receiving an acceptable signal level. Switching the Drive switch to High in this instance could cause clipping.*

Density Switch

The Density switch determines the amount of harmonics generated by choosing one of two different harmonics generator algorithms. When set on High, the output from the harmonic generator expands low level signals and compresses the highest peaks. This setting provides a higher density of harmonics with better control of peak levels.

If you have problems with clipping when setting the Mix control, switch Density to High for better peak level control.

Since the amount of harmonics is dependent on the input level, start with the switch set to Normal. Switch to High if you still want a greater density of harmonics after the input level is set.

The switch illuminates when Density is set to High.

Ax Switch

The Ax switch gives you the choice of turning the Aural Excitement process On or Off. The Ax switch illuminates when Ax is engaged, confirming that the effect is On.

Unlike the Bypass switch, the audio signal from the input does travel through the DSP algorithm on the way to the output whenever Ax is Off. This means that the SPR effect can still be active, by switching Ax Off and SPR On.

Solo Switch

When engaged, the Solo switch gives you a choice of auditioning the Aural Excitement signal without the main audio. The switch illuminates when Solo is active.

As an application for the Solo switch, select Solo to return the pure effect back to the mixing console for precise memory control of the Aural Excitement signal only.

SPR Switch

The SPR switch controls the Spectral Phase Refractor effect. This effect is independent of all other controls or switches, except Bypass. The switch illuminates when SPR is engaged, confirming that SPR is On. SPR processes the main audio signal in such a way that bass frequencies (up to 150 Hz) lead phase in relation to the rest of the spectrum.

Through the many steps of recording, duplicating, distributing, and reproducing sound, the phase of the low frequency audio spectrum becomes delayed compared to mid and high frequencies. SPR corrects the bass delay anomaly to restore clarity and openness and significantly increases the apparent bass energy level without adding any amplitude equalization or bass boost.

To audition the effect of SPR on the audio signal, turn the Ax switch Off and turn SPR On. Then alternately turn the Bypass switch On and Off to hear the SPR effect on incoming audio.

The SPR function is depicted in Figure 6, which shows the frequency dependent time delay that is produced. Note that this is not the same as a group delay. Group delay is a constant time delay at all frequencies.

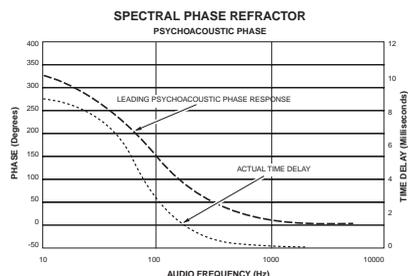


Figure 6. SPR switch

Bypass Switch

The Bypass switch allows the main audio signal to bypass the Aural Exciter plug-in completely.

The indicator switch illuminates when Bypass is engaged.

The Bypass switch on the plug-in provides the same function as the Bypass command on the Pro Tools Plug-Ins window, on a per-channel basis.

Link Switch

The Link switch is for stereo operation only. It links the left and right controls so they work as one. Grab the control on one page with the cursor and move it to the required position. The control on the other page automatically updates. In this way both controls can be set to the exact same position. Stereo controls may be linked temporarily by holding down the Shift key while adjusting the control.

The switch illuminates when Link is activated.

LR (Left/Right) Switches

The LR switch is for stereo operation only. It allows you to view or change parameters on one channel at a time.

The switch for the currently displayed channel illuminates. Choosing the unlit switch, changes the display to the other channel.

To edit both channels simultaneously, click on the Link switch.

Using Aural Exciter III

In the recording studio, post production suite, or similar environment, post-processing of previously recorded audio tracks with Aural Exciter can restore lost vibrance and realism, even to the extent of saving dialogue or sound effects which were thought to be unusable. Instruments and vocals can be made to stand out in the mix without substantially increasing the mix levels or using equalization.

The TDM mixing environment is very flexible, offering several ways to route and use Aural Exciter in a session. This section provides some suggestions for efficient use of Aural Exciter in your TDM setups. The exact steps you take to use Aural Exciter's TDM capabilities will differ depending on the nature of your session and your specific Pro Tools mixer setup.

Inserting Aural Exciter on a Track

To use Aural Exciter in a Pro Tools session, insert it on a track. Before doing so, make sure the Inserts View is shown in the Mix window.



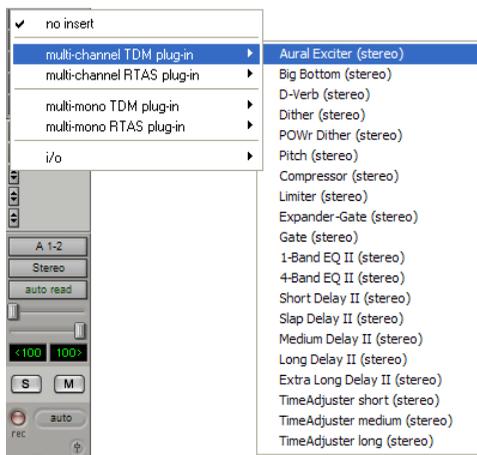
Although Aural Exciter is typically used as an insert on a track (in the same manner compressors and equalizers are used), it can also be used in a send and return arrangement. Refer to the Pro Tools Reference Guide, the DigiRack Plug-Ins Guide, or the electronic PDF copy of the Digidesign Plug-Ins Guide.

To show inserts in the Mix window:

- Choose Display > Mix Window Shows > Inserts View.

To insert Aural Exciter on a track:

- Click the Insert Selector on the track and select the plug-in that you want to use.



Inserting a plug-in

To remove Aural Exciter from a track:

- Click the Insert Selector and choose No Insert.

Setting the Gain Structure

If the input material has a very high peak-to-peak level and no additional headroom for Exciter effects, use the Level fader to adjust the signal level to avoid clipping.

When using digital audio as a sound source, such as a CD Player with S/PDIF outputs, there is a very high peak-to-peak level because the material on the CD is optimized for the best signal-to-noise performance. In this situation the Level fader can be used to adjust the signal level to gain additional headroom.

In an analog based system you will have the same headroom problem when using a very high peak-to-peak level signal.

Using the Level fader to adjust for more headroom is also useful when restoring older recordings.

For optimal performance keep the peak hold meter of the Drive meter inside the yellow area. The harder you drive the Exciter, the more Exciter enhancement you generate. If you cannot get the Drive meter to register in the yellow area, try setting the Drive switch to High.

Information on Clipping

Your ears are usually a better judge of when a signal is clipping than the VU meter. Non-periodic clipped transients have to be driven extremely hard for it to be heard as clipping. Do not assume that if your drive signal is “too high” the Drive meter indicates brief moments of clipping.

The Exciter’s harmonics generator has a “masking effect” on a clipped drive signal. You would have to drive the harmonic generator very hard before you would actually hear clipping.

Optimizing Aural Exciter Effects

When using Aural Exciter, the output signal level has to be equal to the input signal level plus the enhanced Exciter effect. The dynamic characteristics of the harmonic generator used in the Aural Exciter plug-in are based on a complex algorithm that includes the signal peak level, the averaged steady state level, and the dynamic characteristics.

Unlike an EQ, which adds a constant boost in the high end, Aural Exciter enhancement is added into the input signal in such a way that the average signal level will be virtually unchanged.

The Level, Tune, Peaking, Null Fill, Harmonics, Timbre and Mix faders provide separate left and right faders when in stereo. For stereo, a separate set of switches for independent control of the left and right channels is provided for Ax, Solo, SPR, Bypass, Drive and Density.

The Tune fader adjusts the corner frequency of the high pass filter and the Mix fader varies the amount of Aural Exciter enhancement that is mixed with the unmodified signal.

Experiment with the Aural Exciter controls to hear how each one enhances the original audio signal.

To experiment with Aural Exciter:

- 1** Set the Level fader on Max.
- 2** Set the Drive switch to reflect the current nominal level.
- 3** Make sure the Bypass switch is deactivated (Bypass light off).
- 4** Make sure the Ax switch is activated (Ax light on).
- 5** Set Density to Normal. (Density light off). As you make the following adjustments, alternate the Density switch between Normal and High to hear the change in the Aural Exciter effect.
- 6** Put the Aural Exciter Mix fader on Max, making it easier to hear the effect as it changes.
- 7** Vary the Tune fader and listen for the frequency range that is being enhanced. The Tune fader can be used to enhance a particular instrument so it stands out in the mix.
- 8** Adjust the Harmonics fader and listen for the change in harmonics being added to the original audio signal.
- 9** When finished experimenting, set the Mix control to taste. Keep in mind that a little Aural Exciter goes a long way.

Using the Tune Fader

After a while you'll get a sense of where you like your Tune setting when using Aural Exciter on individual tracks. It's best not to process the same range of frequencies with the Tune fader during the final mix. If you already processed individual tracks with Aural Exciter, try starting the final mix with the Tune fader in the maximum position which is approximately 7 kHz. You should get a spacious, three-dimensional mix with an open "airy" quality.

Using the SPR Switch

The SPR function can produce a useful effect with solo voices (human and instrumental) or mixed programs (such as drama and music). There is no specific time when SPR should or shouldn't be used. Experiment with it on various types of material until you get used to the effect. Listen carefully as you operate the SPR switch. The effect may be noticed only at certain times (such as specific modulations of a voice or during a particular instrumental playing style or passage). Don't expect to hear the sound change radically. The SPR is usually subtle, adding a certain beauty and good feeling to the sound. In time you will find that the SPR does indeed produce demonstrable results. For instance, the SPR effect can:

- Drop pitch of ultra low bass
- Increase apparent bass power
- Unmask instruments or sonic details hidden in the mix
- Improve definition of high frequency sounds (such as on cymbals and bells)
- Improve speech articulation and presence
- Increase depth and clarity of male voices

Successful use of the SPR depends on the character of the original sound. It is hard to predict in advance what will be the effect of the SPR. Typically, you may find it useful about 50% of the time. At other times, there will be little or no discernible effect. Seldom does the effect damage good audio, so it could be left on as a matter of course. A few examples of audio material likely to be helped by the SPR are:

- Highly overdubbed tape tracks
- Live acoustic recordings
- Electronic keyboards
- Productions composed from tape cartridge and cassette sources
- Material recorded with transformer coupled mic preamps
- Vocals recorded with dynamic microphones
- Reverberant live sound or recordings
- Highly equalized material
- Delayed, flanged, or digitally processed material
- Material from broadcast audio reception (such as store casting and muzak)

Using Aural Exciter on 192 kHz or 176.4 kHz Stereo Tracks

On 192 kHz or 176.4 kHz stereo tracks, Aural Exciter is only available as a multi-mono plug-in.

Parameters for all channels are linked by default so that you can adjust them in tandem. You can unlink parameter controls for independent adjustment using the Master Link button.

Refer to the *Pro Tools Reference Guide*, the *Digi-Rack Plug-Ins Guide*, or the electronic PDF copy of the *Digidesign Plug-Ins Guide* for information on working with multi-mono plug-ins.

Big Bottom Pro Controls

Aphex Big Bottom Overview

Aphex Systems, Inc. first introduced Big Bottom Pro in 1992 as part of the Model 104. Since then, Big Bottom Pro has become a standard in the professional audio industry, and has been used on numerous albums, CDs, movies, broadcast productions, commercials, and concerts. The Big Bottom Pro plug-in for Pro Tools TDM systems continues this tradition of success, and is ready for use with the latest cutting edge music productions.

Big Bottom Pro provides more energy to the bass (increasing its sustain and density). It dynamically contours the bass response of a complex range of shapes in the 40 to 400 Hz range, isolating and enhancing the lowest frequencies to provide a deeper, more resonant bass. Big Bottom increases the perception of low frequencies without significantly increasing the maximum peak output.

Big Bottom Pro is a single-ended process which can be inserted at any point within the audio chain (see Figure 1 on page 20). The input signal is split into two parts. One part goes to the output unmodified, while the other part, known as a side-chain, goes through Big Bottom Pro. The side-chain consists of a tunable low pass filter followed by a dynamic processor.

Big Bottom Pro is patented in the United States, Japan and most of Europe. Big Bottom Pro is a unique bass enhancement that cannot be achieved by any other technique.

Adjusting Parameters

Editing Parameters Using a Mouse

You can adjust rotary controls with a mouse by dragging horizontally or vertically. Parameter values increase as you drag upward or to the right, and decrease as you drag downward or to the left.

Editing Parameters Using a Computer Keyboard

Each rotary control has a corresponding parameter text field directly below it. This displays the current value of the parameter. You can edit the numeric value of a parameter with your computer keyboard.

BLOCK DIAGRAM OF BIG BOTTOM PRO

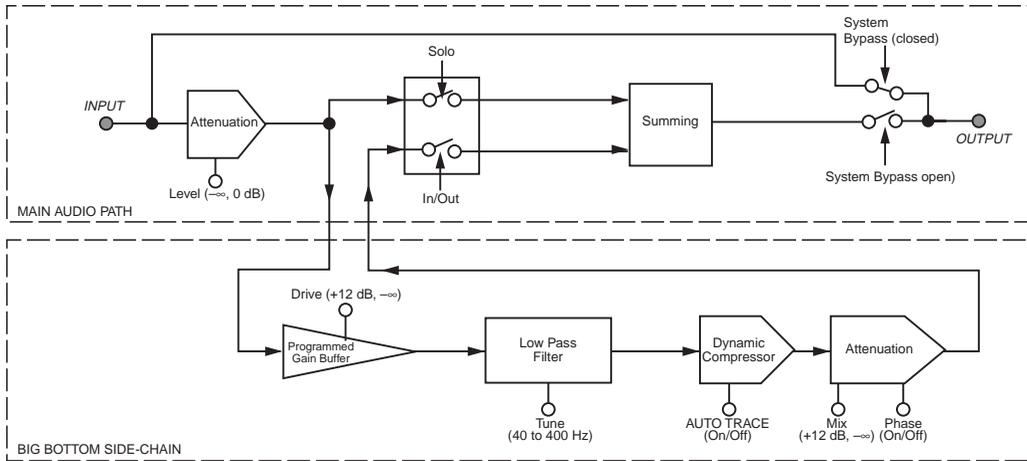


Figure 1. Block Diagram of Aphex Big Bottom Pro

To type a parameter value:

- 1 Click on the parameter text that you want to edit.
- 2 Change the value.
 - Type the desired value.
 - or –
 - To increase a value, press the Up Arrow on your keyboard. To decrease a value, press the Down Arrow on your keyboard.
- 3 Press Enter on the numeric keyboard to input the value and remain in keyboard editing mode.
 - or –

Press Enter on the alpha keyboard (Windows) or Return (Macintosh) to enter the value and leave keyboard editing mode.

Enabling Switches

To enable a switch, click on the switch.

Meters

Drive Meter

The input Drive peak meter indicates the actual peak level to the Big Bottom Pro side-chain.

A red LED at the top of the meter indicates if there is clipping.

Compression Meter

The Compression (Comp) meter indicates the actual amount of compression taking place in the Big Bottom Pro side-chain. If the Comp meter is not showing any activity the input level is too low. Adjust the Level and Drive controls accordingly.



Figure 2. Apex Big Bottom Pro

Out Meter

The Output peak meter indicates the actual peak level after mixing the Big Bottom Pro side-chain with the original input signal.

A red light at the top of the meter indicates if there is clipping.

 *Audition the loudest or peak sections of your audio material to avoid Big Bottom Pro output clipping: Use the Out Meter to check for clipping.*

Rotary Controls

Level Control

The Level control sets the attenuation of the input signal. For normal operation set the Level control on Max (0 dB).

In the event you are not generating enough bass enhancement (even when the Mix control is also set on Max), lower the Level control. This will give the plug-in more headroom by generating less compression in the dynamic proces-

sor, resulting in a more powerful side-chain signal. If you need more headroom when adjusting the Mix control, lower the input Level and re-tune the Mix control.

Drive Control

The Drive control sets the sensitivity to the bass generating side-chain. The corresponding Drive meter shows the actual peak level of the side-chain input. There is a boost in the side-chain signal of +12 dB, when the Drive control is set to Max.

The Drive control needs to be set at a point where the dynamic processor receives the optimum level required for Big Bottom Pro to work effectively. To find the optimum level, adjust the Drive control until the Comp meter displays in the yellow area. Make sure the Drive meter does not indicate clipping.

If the Comp meter is not showing any activity, the input level is too low. Adjust the Level control accordingly. When the AutoTrace switch is set to the On position, the setting of the Drive control is less sensitive, and the Big Bottom Pro side-chain affects a wider input range.

In general, higher Drive settings to the side-chain provide better control over peaks, while lower Drive settings tend to produce a more open sound.

By adjusting both the Drive and Mix controls, you can experiment with the different “colors” or timbral modifications Big Bottom Pro is able to generate.

Tune Control

The Tune control sets the bandwidth (corner frequency) of the low pass filter in the side-chain prior to the dynamics processor. The range of the Tune control is from 40–400 Hz.

Aside from the Mix control, this is the most important control on the Big Bottom Pro plug-in.

The Tune control is used to isolate the range of frequencies being enhanced by Big Bottom Pro.

Mix Control

The Mix control adjusts the amount of the Big Bottom Pro enhancement signal being added to the original signal. The lower the setting the subtler the effect. The higher the setting, the more dramatic the effect. It’s important to note that higher settings may increase the peak output.

Switches

In/Out Switch

The In/Out switch gives you the choice of turning the Big Bottom Pro process On or Off. When the switch is set to the On position, Big Bottom Pro enhancement is sent to the outputs.

The switch illuminates when the Big Bottom Pro effect is activated.

Unlike system bypass, the audio from the input travels through the DSP algorithm on the way to the output whenever the In/Out switch is set to Off.

Switching back and forth from On to Off provides a quick A/B comparison, allowing you to hear the enhancements from the Big Bottom Pro effect in your program content.

Solo Switch

When engaged, the Solo switch allows you to audition the Big Bottom Pro side-chain effect without the main audio signal. The switch illuminates when the Solo switch is activated.

Phase Switch

The Phase switch allows you to alter the phase of the side-chain signal, which contains the Big Bottom Pro effect, before it is mixed with the original input signal. This function is used as an optional way to change the “quality” of the Big Bottom Pro effect.

The switch illuminates when the Phase switch is activated.

Altering the side-chain signal’s phase dramatically effects the sound of the Big Bottom Pro enhancement. With the Phase switch turned Off, you will recognize the Big Bottom Pro effect found in the Aphex Model 104.

As an exclusive feature for this TDM plug-in, we have added the Phase switch. When activated, the Phase switch alters the Big Bottom Pro effect by setting the side-chain in-phase with the main signal. This increases the output peak level. Use the Mix or Level controls to restore the output peak level if the Drive meter indicates clipping.

AutoTrace Switch

Activating the AutoTrace switch enables an automatic threshold function for the compressor within the Big Bottom Pro side-chain. The AutoTrace function enables the dynamic processor to self-optimize during normal operation. The switch illuminates when the AutoTrace switch is activated.

This control is particularly useful when you want a subtle Big Bottom Pro effect, or when the peak level of the input material varies over time. The AutoTrace feature is also ideal for changing the sound characteristics of the Big Bottom Pro effect. Drive control adjustments will be reduced when the AutoTrace switch is activated.

Link Switch

The Link switch is for stereo operation only. It links the left and right controls so they work as one. Grab a control on one page with the cursor and move it to the desired position. The control on the other page automatically updates. In this way both controls can be set to the exact same position. Stereo controls may be linked temporarily by holding down the Shift key while adjusting the control.

The switch illuminates when Link is activated.

LR (Left/Right) Switches

The LR switch is for stereo operation only. It allows you to view or change parameters on one channel at a time.

The switch for the currently displayed channel illuminates. Clicking the unlit switch changes the display to the other channel.

To edit both channels simultaneously, click on the Link switch.

chapter 6

Using Big Bottom Pro

By putting Big Bottom Pro to use in a Pro Tools session you will find many creative uses for its powerful processing capabilities.

The remaining sections provide instructions on how to get the most out of Big Bottom Pro.

Inserting Big Bottom Pro on a Track

To use Big Bottom Pro in a Pro Tools session, insert it on a track. Before doing so, make sure the Inserts View is shown in the Mix window.



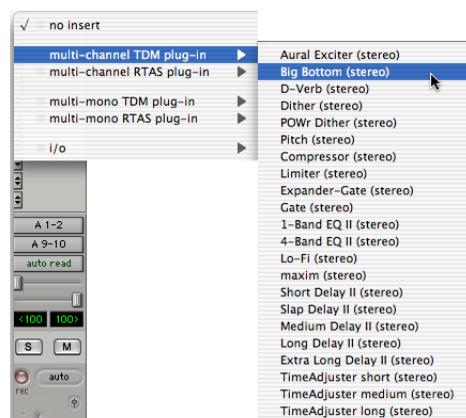
Although Big Bottom is typically used as an insert on a track (in the same manner compressors and equalizers are used), it can also be used on busses and sends. Refer to the Pro Tools Reference Guide, the DigiRack Plug-Ins Guide, or the electronic PDF copy of the Digidesign Plug-Ins Guide.

To show inserts in the Mix window:

- Choose Display > Mix Window Shows > Inserts View.

To insert Big Bottom Pro on a track:

- Click the Insert Selector on the track and select the plug-in that you want to use.



Inserting a plug-in

To remove Big Bottom Pro from a track:

- Click the Insert Selector and choose No Insert.

Setting the Gain Structure

If the desired amount of Big Bottom Pro effect is limited by a lack of headroom in the input material, use the Level control to adjust the signal level to avoid clipping. When using Big Bottom Pro with the Phase switch in the Off position, it is possible to achieve a substantial increase in bass energy without significantly increasing the peak level output.

For optimal performance keep the peak hold meter of the Drive meter inside the yellow area.

Optimizing Big Bottom Pro Effects

When using Big Bottom Pro, the output signal level is equal to the input signal levels plus the bass enhanced Big Bottom Pro effect. The dynamic characteristics of Big Bottom Pro are based on a complex algorithm that includes the signal peak level, the average steady state level as well as the dynamic characteristics. Unlike a bass EQ, which adds a constant boost in the low end, Big Bottom Pro enhancement is added into the input signal dynamically.

Starting with the factory settings, experiment with the controls on Big Bottom Pro to hear how this plug-in effects the low-end frequencies of your source material.

- If the Drive meter is clipping (in the yellow area), adjust the Drive control for optimal operation.
- Activate the Solo switch to listen to only the Big Bottom Pro side-chain effect.
- Vary the Tune control to hear the low-pass filter isolate the low-end bandwidths of the original input signal.
- De-activate the Solo switch and continue to vary the Tune control until you find the optimal setting.
- Adjust the Mix control to set the amount of Big Bottom Pro effect.
- Use the In/Out switch for an A/B comparison with the output signal and the original input signal.
- Activate the Phase switch and observe the change in the sound characteristics of the Big Bottom Pro effect. For most applications, leave the Phase switch in the Off position.
- Activate the AutoTrace switch and observe the change in the sound characteristics. Also notice that the compression level in the dynamic processor, shown by the Comp meter, is affected as well.
- Readjust the Mix control as desired, to experience the benefits of the Big Bottom Pro TDM plug-in. Remember that a little Big Bottom Pro effect goes a long way.

appendix a

DSP Requirements

The number of TDM plug-ins you can use at one time depends on how much DSP power is available in your system. Since the TDM hardware on Pro Tools cards provide dedicated DSP for plug-ins, plug-in performance isn't limited by CPU processing power.

The tables in this appendix show the total number of instances of each plug-in that can be powered by a single DSP chip on Pro Tools|HD and Pro Tools|24 MIX cards. DSP usage differs according to card type.

There are a total of nine DSP chips on a Pro Tools|HD card (HD Core, HD Process, and HD Accel). HD Core and HD Process cards provide identical chip sets. HD Accel cards provide newer, more powerful DSP chips (making the HD Accel card ideal for DSP-intensive plug-ins, and for high sample rate sessions). There are six DSP chips on a Pro Tools|24 MIX card.

Not all plug-ins are supported on all types of chips. The following tables indicate the number of compatible chips per card.

⚠ *The tables show theoretical maximum performance when no other plug-ins are sharing available DSP resources. You will typically use more than one type of plug-in simultaneously.*

Plug-ins used in multi-mono format on greater-than-stereo tracks require one mono instance per channel of the multi-channel audio format. For example, a multi-mono plug-in used on a 5.1 format track, requires six mono instances since there are six audio channels in the 5.1 format.

 *On 192 kHz or 176.4 kHz stereo tracks, Aural Exciter is only available as a multi-mono plug-in.*

Monitoring DSP Usage

The System Usage window (Windows > Show System Usage) shows how much DSP is available in your system and how it is being used in the current Pro Tools session.

 *For more information about DSP usage and allocation, see the Pro Tools Reference Guide.*

Aphex Aural Exciter and Big Bottom DSP Requirements

The Aphex plug-ins have the following DSP requirements:

HD Accel Card

Table 2. Maximum instances of plug-ins per DSP chip for an HD Accel card, at different sample rates (mono and stereo).

| Sample Rate: | 44.1/48 kHz | | 88.2/96 kHz | | 174.6/192 kHz | | Compatible DSP Chips per HD Accel Card |
|---------------|-------------|--------|-------------|--------|---------------|--------|--|
| Plug-In | Mono | Stereo | Mono | Stereo | Mono | Stereo | |
| Aural Exciter | 16 | 8 | 8 | 4 | 4 | 0 | 9 |
| Big Bottom | 24 | 12 | 10 | 5 | 4 | 2 | 9 |

HD Core and HD Process Cards

Table 3. Maximum instances of plug-ins per DSP chip for an HD Core or HD Process card, at different sample rates (mono and stereo).

| Sample Rate: | 44.1/48 kHz | | 88.2/96 kHz | | 174.6/192 kHz | | Compatible DSP Chips per HD Core or HD Process Card |
|---------------|-------------|--------|-------------|--------|---------------|--------|---|
| Plug-In | Mono | Stereo | Mono | Stereo | Mono | Stereo | |
| Aural Exciter | 8 | 4 | 4 | 2 | 2 | 0 | 9 |
| Big Bottom | 12 | 6 | 5 | 2 | 2 | 1 | 9 |

Pro Tools|24 MIX Card

Table 4. Maximum instances of plug-ins per DSP chip for a Pro Tools|24 MIX card

| Sample Rate: | 44.1/48 kHz | | Compatible DSP Chips per MIX Card |
|---------------|-------------|--------|-----------------------------------|
| Plug-In | Mono | Stereo | |
| Aural Exciter | 6 | 3 | 6 |
| Big Bottom | 9 | 4 | 6 |

appendix b

DSP Delays Incurred by TDM Plug-Ins

Virtually all TDM plug-ins incur some amount of signal delay.

If you are working with mono tracks, or are processing all channels with the same plug-in, the signal delays are not long enough to be significant and should not be a concern.

This signal delay is significant only if you use a plug-in on one channel of a stereo or multi-channel signal but not the others, since this can cause the channels to be slightly out of phase.

Table 3 on page 30 shows the delays inherent in each plug-in.

Channel Delay Indicator

The Channel Delay Indicator in the Mix window displays the total delay, in samples, incurred on the track from the use of any TDM plug-in on that channel.

To see the amount of time delay on a track that uses plug-in inserts.

- In the Mix window, Control-click (Windows) or Command-click (Macintosh) the track's Volume Indicator to toggle between Volume ("vol"), Peak ("pk") and Channel Delay ("dly") indications.

Compensating For Delays

If it becomes necessary to compensate for plug-in delay, use the TimeAdjuster plug-in included with Pro Tools. See the *DigiRack Plug-Ins Guide* or *Pro Tools Reference Guide* for more information on TimeAdjuster.



For a comprehensive guide to calculating DSP-induced delays, see the Pro Tools Reference Guide.

Aphex Aural Exciter and Big Bottom DSP Delay

Table 3. Samples of delay incurred by each TDM plug-in on HD, MIX, and DSP Farm cards

| Plug-In | Samples of Delay on HD cards | Samples of Delay on MIX cards | Samples of Delay on DSP Farm Cards |
|------------------------|------------------------------|-------------------------------|------------------------------------|
| Aural Exciter Type III | 14 | 14 | 14 |
| Big Bottom | 3 | 3 | 3 |

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