APHEX®

EX•BB 500®

AURAL EXCITER® & OPTICAL BIG BOTTOM®
500 SERIES MODULE

OWNER'S MANUAL

a DWV ENTERTAINMENT company

SAFETY DECLARATIONS

CAUTION: For continued protection against risk of fire, replace only with the same type and rating of fuse.

ATTENTION: pour une protection continue contre les risques d'incendie, ne remplacer qu'avec la même valeur et même type de fusible.

WARNING: Do not place objects containing liquid on this unit as it is not designed to protect against spillage. Do not expose this unit to dripping or splashing of liquids as the unit is not designed to protect against these occurances.

WARNING: This unit must be connected to a mains socket outlet with a protective earthing connection.

WARNING: The EX·BB 500 has been tested and meets the FCC, CE and European Union rules, regulations, and guidlines for use. Do not attempt to modify or change the EX·BB 500, as this could void the regulatory compliance, which would place you at risk of losing your authority to operate the EX·BB 500.

WARNING: Do not place objects on top of this unit if they weigh more than 10 pounds.

SAFETY DECLARATIONS

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

1. Reorient or relocate the receiving antenna.

2. Increase the separation between the equipment and receiver.

3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

4. Consult the dealer or an experienced radio/TV technician for help.

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INSTALLING THE EX·BB 500 IN A 500 SERIES RACK

1. Turn off and unplug your 500 series rack frame. Inspect the card slot you intend you use to make sure that it is clean and free of any debris.

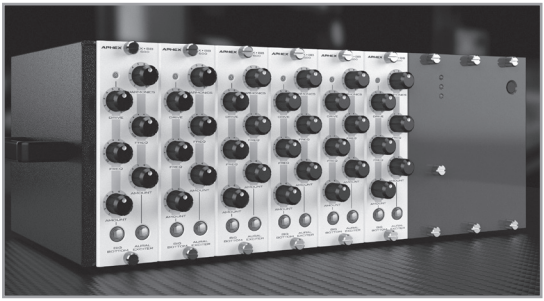
2. Before removing your EX·BB 500 from its box, discharge any static electricity buildup you may have by touching your 500 series rack.

3. Pull your EX·BB 500 module out of its box and carefully slide it into place in the designated opening. Sight down the back of the module (use a flashlight if necessary) and ensure the card edge connector is aligned to seat into the card slot of the frame.

4. Firmly and evenly push the EX·BB 500 module into place until its is positively seated in the card slot.

5. Use the 2 thumb screws in the module to mount the EX·BB 500 front panel to the 500 series rack. These screws have a pretty tight fit; please be careful not to cross thread.

6. Plug your 500 series rack back into the AC source and power up your rack. Your EX·BB 500 will automatically power up with your 500 series rack.



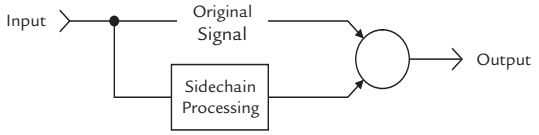
2.0 INTRODUCTION

2.1 THE AURAL EXCITER® AND BIG BOTTOM® TECHNOLOGIES EXPLAINED

The Aural Exciter is an audio processor that recreates and restores missing harmonics. Harmonics are musically and dynamically related to the original sound, revealing the fine differences between voices and various instruments. Reproduced sound is audibly different than the original live sound because of the loss in harmonic detail, often sounding dull and lifeless. The Aural Exciter adds harmonics, restoring natural brightness, clarity, and presence, effectively improving detail and intelligibility. Using the Aural Exciter on specific instruments or in the final mix brings life back to the recording.

The original Aural Exciter patent disclosed a method for generating sonic harmonics which was amplitude dependent. In nature, generally speaking, the higher the amplitude, the higher the amount of harmonics. However, there are instances where there are high level sinusoidal waveforms, most of which should not have harmonics added, and other instances where there are waveforms which have low level transients, which could be enhanced by additional harmonics. Our latest patent, the Transient Discriminate Harmonics Generator, can recognize transients (transient discriminate) over a wide dynamic range and generate harmonics on them. The result is a more predictable and natural sounding enhancement over a wider range of inputs.

The Aural Exciter extends the high frequencies, unlike EQ's and other brightness enhancers which only boost the high frequencies and often alter the overall tonal balance. The stereo image is enhanced with the Aural Exciter, resulting in a greater perceived loudness without an introduction of noise into the audio path. It should be pointed out that the Aural Exciter is a "single-ended" process that can be inserted at any point within the audio chain. "Single-ended" means that the unit will receive the incoming audio signal, process the program material through Aphex's patented Aural Exciter/Big Bottom technology, then output the effected signal with no further processing required to achieve the desired aural signal qualities. Even though the added information is low in level, the perception is a dramatic increase in mid and high frequencies.



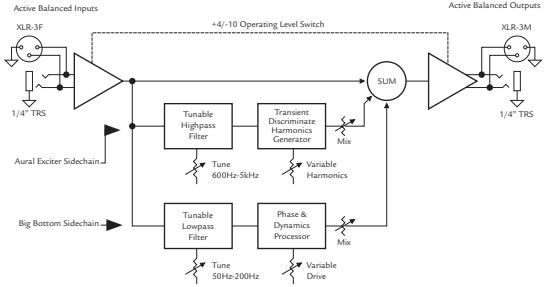
SIMPLIFIED SIDECHAIN DIAGRAM

As illustrated above, the unit splits the input signal into two paths. One path goes directly to the output unmodified, while the other path, known as a sidechain, goes through the Aural Exciter circuit which is comprised of a tunable high pass filter and a harmonics generator. The Aural Exciter circuit applies frequency dependent phase shift and transient discriminate harmonics. The output of the Aural Exciter's harmonic circuit is mixed back with the unmodified signal but much lower in level. When used at nominal settings, the Aural Exciter circuit does not add significant level to the original signal. Even though the added information is low in level, the perception is a dramatic increase in mid and high frequencies.

The EX·BB 500 also incorporates another exclusive Aphex patent, Big Bottom, providing a stronger, more powerful bass, increased sustain and density without an increase in the peak output. While static bass-boost EQ's and subharmonic generators will increase the bass energy level, the resultant large boost in peak level often increases overload distortion. Big Bottom resembles the Aural Exciter in that a processed signal is mixed back into an unmodified signal to produce an enhanced output signal. The sidechain path goes through the Big Bottom circuitry, comprised of a variable low-pass filter and a phase and dynamics processor.

Big Bottom circuitry dynamically contours the bass response of a complex range of shapes in the 50Hz to 200Hz range. Big Bottom increases the perception of low frequencies without significantly increasing the maximum peak output. The bass frequency response is dynamically optimized to isolate and enhance the lowest bass frequencies to provide a deeper and more resonant bass.

2.2 SIMPLIFIED BLOCK DIAGRAM



Effects are created through dynamic phase, frequency, and amplitude modification and recombination.

3.0 CONTROLS & INDICATORS

3.1 BIG BOTTOM DRIVE CONTROL & INDICATOR

This control allows you to adjust the input signal to optimum levels required for Big Bottom to work effectively. To find the optimum level, turn the control clockwise until the green LED at the right of the Drive control pulses on the bass peaks. Longer and brighter pulsation means a longer bass sustain is being created. You will find a range of settings that yields very musical and powerful bass.

Please note there are valid reasons for why the green LED may not pulse by the time this control reaches 2 o'clock. The input signal may be too low to trigger the Big Bottom processor. On the other hand, if the green LED is pulsing strongly at settings as low as 9 or 10 o'clock, the input signal may be too hot. This can cause overload distortion.

Additionally, the LED may not pulse when the incoming audio does not have significant low frequency content.

3.2 BIG BOTTOM FREQUENCY CONTROL

This control lets you optimize the bass enhancement frequency band. Where this is set depends upon your sound system and the type of music being played. Typically, 12:00 is a universal position. However, you may want to experiment with other settings. The range is from 50Hz to 200Hz. At center, you are tuned to about 80Hz.

3.3 BIG BOTTOM AMOUNT CONTROL

This control adjusts the amount of Big Bottom enhancement being added to the original signal. The lower the setting, the subtler the effect until there is no effect at all. The higher the setting, the more dramatic the effect.

One of the benefits of the Big Bottom is that it can increase the bass power without greatly increasing the peak output level. That means that loudspeakers and amplifiers will not be over driven even though the bass has been extended and increased in power. Extreme settings of the Big Bottom Amount control, however, will increase the peak output level significantly, so we recommend staying within some reasonable limits.

Generally, the best results are found between the 9 and 2 o'clock settings. Try working the Big Bottom Tune, Drive, and Mix controls when maximizing the bass enhancement.

3.4 AURAL EXCITER HARMONICS CONTROL

This control adjusts the amount of harmonics being generated by the exciter. It controls the texture and detail of the effect. The MIN position is generally considered NORMAL, and is useful for voices and total mixes. The MAX position is most useful on specific tracks, especially percussive instruments, horns, guitars and digital instruments.

3.5 AURAL EXCITER FREQUENCY CONTROL

The Aural Exciter Frequency control adjusts the corner frequency of the high pass filter, thus setting the range of frequencies being enhanced by the Aural Exciter. The range of the corner frequency is 600Hz (fully counter clockwise) and 5kHz (fully clockwise). The 12 o'clock setting is approximately 3kHz. As the tune control is adjusted clockwise, less and less mid-frequency enhancement will take place.

3.6 AURAL EXCITER AMOUNT CONTROL

This control varies the amount of enhancement mixed back into the original signal from the sidechain.

3.7 PROCESS ON/OFF BUTTONS

These lighted Process On/Off buttons allow you to turn each processor on and off individually. The buttons glow green when processing is on. They are dark when processing is off. Switching the button back and forth offers a quick A/B comparison, allowing you to hear the enhancements from the Aural Exciter and/or Optical Big Bottom separately in your program content.

Note: This is not a hard wired bypass. The audio still passes through the input and output stages but enhancement sidechains are turned off.

4.0 OPERATION & APPLICATIONS

4.1 OPTIMIZING AURAL EXCITER EFFECTS

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

1. Make sure the Process Switch is IN.

2. Put the Aural Exciter Amount control at 12 o'clock, to make it easy to hear the effect as it changes.

3. Vary the Tune control and listen for the frequency range that's being enhanced. The Tune control can be used to enhance a particular instrument so it stands out in the mix.

4. Go between MIN and MAX Harmonics and listen for the change in harmonics being added to the original audio signal.

5. After your experimental tour, set the Amount control to taste. Keep in mind that a little Aural Exciter goes a long way.

4.2 OPTIMIZING BIG BOTTOM EFFECTS

The Drive control needs to be set at a point where the processor receives the optimum level required for Big Bottom to work effectively. The Amount control adjusts the amount of Big Bottom enhancement being added to the unmodified signal. The Frequency control sets the frequency below which the bass enhancement effects are generated.

Above the Drive control is a green LED indicator. This LED should illuminate on bass peaks.

BIG BOTTOM EXPERIMENTING

1. Make sure the Process Switch is IN.

2. Set the Tune and Amount controls to 12:00.

3. Vary the Drive control and listen to how the bass gets fuller. Start by adjusting the Drive control until the green LED just flashes on bass peaks, then advance the Drive incrementally.

4. Vary the Amount control and listen for how subtle or dramatic you can make the effect.

5. Vary the Tune control to find what point gives you the most powerful or most pleasing effect.

4.3 RECORDING: TRACKING AND MIXING

The Aural Exciter restores presence and clarity, improving transient response of individual tracks or whole mixes. Increased harmonic detail enables specific instruments to stand out in the mix, offering a more “live” or spacious sound. Imaging is improved with an open “airy” quality.

Any instrument, such as a guitar, processed through the Aural Exciter circuit will have greater penetration, crispness and clarity. Specific instruments pop out in the mix, giving the instrument its own sonic identity without raising the volume of the instrument in the mix.

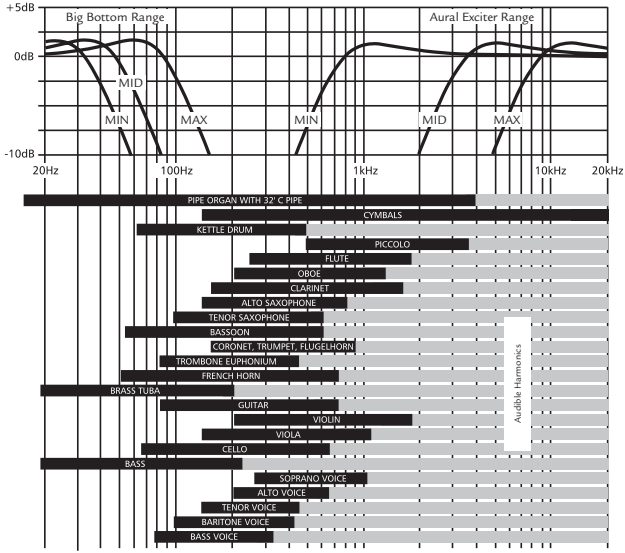
Using Big Bottom on bass instruments tightens the sound, allowing individual notes to be more articulated and recognizable. Big Bottom provides more feeling, resembling a “live” sound.

In the recording studio, post production suite or similar environment, post processing of previously recorded sound tracks can restore lost vibrancy and realism, even to the extent of saving dialog 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.

Use the Aural Exciter and Big Bottom in place of equalization whenever possible.

4.4 FREQUENCY CHART

RELATING THE FREQUENCY RANGES OF THE
BIG BOTTOM AND AURAL EXCITER
TO THE FUNDAMENTALS AND HARMONICS OF SOUND



5.0 SERVICE & WARRANTY

5.1 LIMITED WARRANTY

PERIOD
One year from date of purchase

SCOPE
All defects in workmanship and materials. The following are not covered:
a. Voltage conversions
b. Units on which the serial number has been defaced, modified, or removed
c. Damage or deterioration:
1. Resulting from installation and/or removal of the unit.
2. Resulting from accident, misuse, abuse, neglect, unauthorized product modification or failure to follow instructions contained in the User's Manual.
3. Resulting from repair or attempted repair by anyone not authorized by Aphex Systems.
4. Occurring from shipping (claims must be presented to shipper).

WHO IS PROTECTED
This warranty will be enforceable by the original purchaser and by any subsequent owner(s) during the warranty period, so long as a copy of the original Bill of Sale is submitted whenever warranty service is required.

WHAT WE WILL PAY FOR
We will pay for all labor and material expenses for covered items. We will pay return shipping charges if the repairs are covered by the warranty.

LIMITATION OF WARRANTY
No warranty is made, either expressed or implied, as to the merchantability and fitness for any particular purpose. Any and all warranties are limited to the duration of the warranty stated above.

EXCLUSION OF CERTAIN DAMAGES
Aphex Systems' liability for any defective unit is limited to the repair or replacement of said unit, at our option, and shall not include damages of any other kind, whether incidental, consequential, or otherwise.

Some States do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

5.2 SERVICE INFORMATION

If it becomes necessary to return this unit for repair, you must first contact Aphex for a Return Authorization (RMA number), which will need to be included with your shipment for proper identification. If available, repack this unit in its original carton and packing material. Otherwise, pack the equipment in a strong carton containing at least 2 inches of padding on all sides. Be sure the unit cannot shift around inside the carton. Include a letter explaining the symptoms and/or defect(s). Be sure to reference the RMA number in your letter and mark the RMA number on the outside of the carton. If you believe the problem should be covered under the terms of the warranty, you must also include proof of purchase. Insure your shipment and send it to:

APHEX
3500 N. San Fernando Blvd. Burbank, CA. 91505 USA
PH: 818.767.2929 FAX: 818.767.2641

6.0 SPECIFICATIONS

OPERATING LEVEL
Switch Setting: +4dBu

INPUT

Type:	Transformerless, active balanced
Impedance:	40KΩ
Unbalanced:	20KΩ
Nominal Level:	+4dBu
Maximum Level:	+24dBu
CMRR:	>40dB

OUTPUT

Impedance:	110Ω
Nominal Level	+4dBu
Maximum Level:	+24dBu Unloaded

AUDIO

Frequency Response:	+0.5dB 10Hz-38KHz
Dynamic Range:	120dB
THD:	10Hz - 22kHz @ max output,
IMD:	.0003%
	10Hz - 22kHz 0 max output,
	.0007%

CONNECTOR PINOUT

1	CHASSIS GROUND
2	OUTPUT + (+4 LEVEL)
3	(unused)
4	OUTPUT - (+4 LEVEL)
5	COMMON
6	(unused)
7	(unused)
8	INPUT- (+4 LEVEL)
9	(unused)
10	INPUT+ (+4 LEVEL)
11	(unused)
12	+16VDC
13	POWER SUPPLY COMMON
14	-16VDC
15	(unused)

APHEX®

This product is protected under one or more of the following Aphex patents.

4578648, 4633501, 4843626, 4939471, 5115471, 5155769, 5334947, 5359665
5422602, 5424488, 5450034, 5463695, 5483600, 5485077, 5612612, 5737432
5848167, 5896458, 5898395, 5930374

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