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Sensory rhythms
for mental fitness!

PHOTOSONIX

ultraBass™ Headphones

Ultra Bass Low Frequency Response Headphones and their use with AVS Binaural Beats

by Jeff Labno and Snez'ana Zdravkova

About the authors of this book

Jeff Labno has been in the Light & Sound Industry since 1980, when he founded Altered States MindGym. Currently, he is consulting as a product specialist.
Snez'ana Zdravkova is one of the principal designers of PHOTOSONIX products and written materials.

More information
More information about the Light and Sound industry, PHOTOSONIX products and support is available by visiting our web site information center:
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Room for personal notes of effects and observations

About PHOTOSONIX

Thank you for your interest in Light and Sound Relaxation and our products. You have purchased the utimate LowBass headphones for your light and sound relaxation machine. We hope this booklet helps you understand the features, the benefits and the possibilities. And that you will enjoy your relaxation system for many years to come.

We first began manufacturing electronic equipment in 1981. In 1989, we applied our expertise in microprocessor-embedded technology to manufacturing light and sound systems (also known as AVS "audio visual stimulation" devices). We feel that we have developed the most diverse, and complete line of light and sound relaxation systems. We offer systems for home users who like to keep it simple, for home users who like all the features, for professionals such as therapists, for researchers and for commercial usage.

Our line of relaxation products incorporate many industry firsts, such as: choice of light color for glasses, PVStim glasses for use with eyes open, hemiStim glasses for hemispheric specialization, midiStim for use with brainwave biofeedback, bi-color glasses (using two different colors), downloading sessions from the Internet, units with custom programs for healthcare professionals, dual binaural beats and dual monaural beats, multi-user systems, integrating breath pacing with light and sound, sine wave light technology, and Light Weave™ light technology.

About the ultraBass™ Headphones

After an extensive search and testing of many options, we are pleased to bring to you the ultraBass (Low Bass Frequency Response) headphones. We chose this model because it offers the low frequency response that many other headphones are not sensitive to and are not capable of detecting. In pursuit of excellence in sound quality that the AVS experience needs, and because we offer several AVS models that utilize sessions with low frequencies, notably the Nova Pro 100 and InnerPulse, such quality headphones were needed.

First, let us start by saying that the LowBass haedphones are a great way to enjoy any music or audio stimulation. But for that you need not read this booklet. For that you just put the headphones on and start the music. This booklet is only aimed at helping you use the headphones to expand on the quality of Binaural Beats sound and your AVS experience.

Binaural Beat frequencies in the low pitch ranges can be used in many different ways. Learning the basics of how binaural beats are created will help you even if you are not interested in making your own version of sessions with them. In this booklet we will provide enough information for you to find your way in the enjoyment of the binaural beats. By trial and error you will be able to discover your preferences and enhance your AVS experience.

Enjoy.

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What are Light and Sound systems?

The frequency ranges of Light and Sound sessions are based on basic brainwave states (see page 13). They are general guides and they will not work the same for everyone. This is the reason we offer so many sessions and tone combinations in our systems, the variety helps most find what is suitable and enjoyable for them to use.

Strobe light has long been known to change brainwaves, such as looking at the flickering light of a campfire. The same is true for strobe sound, such as taking a walk on the beach, listening to the sound of ocean waves breaking on the shore. In both situations, the result is a more relaxed state of mind.

Light and sound systems uniquely combine these two sensory stimulations. By combining light with sound, brainwave transformation is much more efficient than by just using one of the senses (light, or sound).

While light stimulates the front of the brain (cortex – logical thought process), sound is processed by the back of the brain (limbic – emotional process). The combination of light with sound stimulates both the front and back of the brain at the same time. This helps to balance the activity of the front with that of the back of the brain by increasing the activity of both at the same time.

Who Uses This Technology, and Why?

Light and sound machines were first used for experimental therapy in the 1970s. Flickering light and sound rather quickly transition people from thinking about their daily to concerns to being in a more deeply relaxed state.

Deep states of relaxation were deemed conducive for therapists to help people make positive changes very quickly. Very much like hi-tech self hypnosis. Light and sound technology is now often used in conjunction with hypnotherapy to augment hypnosis programs.

In the mid 1980's, businessmen in the New Age community began to promote this technology as the "ultimate high", because the lights in the glasses produced an amazing array of colors and patterns, with your eyes closed. Meditators also found the kaleidoscopic light show, at times looks like a mandala (spiraling meditation chart), useful to help "quiet the mind."

In the late 1990's, the use of light and sound once again grew amongst therapists to help patients relax, control their stess, practice breath exercises, meditate and recently to help children and adults who suffer from learning challenges, such as ADD (attention deficit disorder).

Room for personal notes of effects and observations

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Quick Start

Low Frequency Binaural Beat using ultraBass Headphones

The ultraBass headphones enable you far superior use of the low binaural beats frequencies (and sessions designed with them) that our machines are capable of. The headphones can add a great enhancement of the Audio Visual Stimulation Light and Sound experience in the low frequency binaural beats. Try it, you will not be disappointed.

1. Turn your system on.
2. Press the down button until the display reads oPc (operator control).
3. Press play, and wait for the countdown (10, 9, 8…).
4. Press the select button (8 times) until you access the tone selection (display reads PFr).
5. Press the up button (3 times) until the display reads bb for binaural beats.
6. Press the select button (once) until the display reads 7.81 (for Frequency 1 [F1] selection).
7. Press the up button until the display value reads 30 (30 Hertz).
8. Press the Select button (once), the display will read 128 (128 Hertz [P1} setting).
9. Press the down button until the value (128) lowers to 40 Hertz.
10. Wearing your headphones, manually change F1 and P1 up and down until you get the desired result, based on how it makes you feel.
11. Suggestion: have a pen and paper nearby to record the F1 and P1 values, take notes as to their effect on how you feel, for future sessions.

What Are Binaural Beats?

Binaural beats are auditory brainstem responses which originate in the superior olivary nucleus of each hemisphere. They result from the interaction of two different auditory impulses, originating in opposite ears, below 1000 Hz and which differ in frequency between one and 30 Hz. For example, if a pure tone of 400 Hz is presented to the right ear and a pure tone of 410 Hz is presented simultaneously to the left ear, an amplitude modulated standing wave of 10 Hz, the difference between the two tones, is experienced as the two wave forms mesh in and out of phase within the superior olivary nuclei. This binaural beat is not heard in the ordinary sense of the word (the human range of hearing is from 20-20,000 Hz). It is perceived as an auditory beat and theoretically can be used to entrain specific neural rhythms through the frequency-following response.

Various Uses Of Audio With Embedded Binaural Beats

Uses of audio with embedded binaural beats that are mixed with music or various pink or background sound are diverse. They range from relaxation, meditation, stress reduction, pain management, improved sleep quality, decrease in sleep requirements, super learning, enhanced creativity and intuition, remote viewing, telepathy, and out-of-body experience and lucid dreaming. Audio embedded with binaural beats is often combined with various meditation techniques, as well as positive affirmations and visualization.

Where to find additional information and learn more

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Choices of binaural beats in PHOTOSONIX Systems

bb (binaural beats) waver up and down in volume, and, as such, are much more relaxing than strobe tones. Pioneering researchers, investigating the impact of sound on human behavior, developed beat frequencies for precisely that reason.
Beat frequencies happen when two sound waves of different pitches occur at the same time. The two pitches of sound interact with each other, and the result is a new pattern, a sound wave which wavers up and down in volume at the frequency that represents the difference in pitch between the two sounds.
bbS (binaural beats with surf) Many people have told us that it is one of their favorite tones, because it is quite pleasing to the ear, and deeply relaxing. You are mixing two of the most relaxing tones.
dbb (dual binaural beats) dual binaural beats were first experimented with by Robert Monroe. He used them to induce "out-of-body" experiences. His main formula was to use combine a beta frequency to keep you alert, with a theta wave, to induce a dream state. The idea was to induce a state of "mind awake, body asleep."

When it comes to dual binaural beats no one is exactly sure what state of mind the combination of two brainwave states will actually produce. Different people will have very different experiences with the same combination. For that reason, Robert Monroe used a whole lot of different combinations in his signature series, "The Gateway Experience", so that just about anyone would find a combination that work well for them.
You can do the same. If you experiment with dual binaural beats, you will see what combinations work well for you.

Choices of binaural beats in PHOTOSONIX Systems

dSb (dual monaural binaural beats) This tone allows you to create a different brainwave frequency in each ear. Sound heard in the left ear is processed by the right side of the brain, and sound heard in the right ear stimulates the left side of the brain.

The left side of the brain is responsible for analytical thinking, math, and logic; whereas the right side deals with abstraction, art, and creativity. Using dual monaural beats, you can adjust the activity in each side of the brain, or hemisphere, to either be more logical, or creative.

If you want to be more analytical, then you would adjust the beat frequencies in the right ear so that they are faster than the frequency in the left ear. To be more creative, you then want the frequency in the left ear to be faster than the right ear. Faster beat frequencies would be in the alpha and beta ranges, above 8 Hertz. Slower frequencies would be in the theta and delta brainwave states, below 7 Hertz.

The use of dual monaural beats is quite new to the field of light and sound, therefore, there is not a lot of documentation on exactly how it's effects really work. There also is not an exact science as to what each side of the brain really does. While the right brain pertains to creativity, such as processing music, many trained musicians use the left brain when playing music. This highlights the fact that the brain is much more complex than any "model" can define, and that you will need to experiment in order to find out what actually works for you.

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Binaural beats experience and music

While light stimulates the front of the brain (cortex – logical thought process), sound is processed by the back of the brain (limbic – emotional process). The combination of light with sound stimulates both the front and back of the brain at the same time. This helps to balance the activity of the front with that of the back of the brain by increasing the activity of both at the same time. Using the Nova Pro 100, or the InnerPulse to generate binaural beat frequencies, you can add your own music of choice to augment the experience. Here are some tips to help you augment the effectiveness of doing a program using different types of music and sound.

Binaural beats experience and music

Types of Music

Beta Programs Radio shows, Baroque music, jazz, information tapes, acting tapes (learning lines)
Alpha Programs Foreign language tapes, classical era, romantic era, popular music, new age, ethnic music
Theta Programs Radio dramas, behavioral modification, Gregorian chants, renaissance era, impressionistic era, hypnosis tapes
Delta Programs Nature sounds (ocean, wind, waterfalls, rain…), Tibetan bowls

Types of Tapes

Listening to behavioral modification tapes or CDs has always been very popular with light and sound systems because the session quickly takes you into a deep relaxed state, one that is conducive to absorb information, and suggestions for making positive changes - such as similar to hypnosis. Theta programs are the best, because they produce a mind state such that you can more readily visualize, or see clearly the suggestions you are listening to.

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History of Pulsed Beats Frequencies and the PHOTOSONIX binaural beats experience

The Monroe Institute experimented with beat frequencies, realizing rather quickly that the same patterns produced variations in results on different people. Robert Monroe in his Gateway Series thus produced a sequence of different variations of beat frequency combinations because eventually, just about anyone would have profound results. He trademarked his technology Hemi-Sync.

Centerpointe uses low pitches, per the study in Scientific American Magazine along with variations of different sounds. Again, low pitches entrain faster and deeper than higher pitches. They trademarked their technology as Holosync.

With the use of the ultraBass headphones with the PHOTOSONIX Nova Pro 100, or InnerPulse you can generate your own low frequency bass experience. Without spending lots of money on binaural beat CDs you can generate the same or better results yourself.

How The Brain Generates Binaural Beats

When signals of two different frequencies are processed, one to each ear, the brain detects phase differentials between these signals. The brain processes these sounds differently producing the sensation of a third “beat” frequency.

The difference between the signals waxes and wanes as the two different input frequencies mesh in and out of phase. As a result of these constantly increasing and decreasing differences, an amplitude-modulated standing wave -the binaural beat- is heard. The binaural beat is perceived as a fluctuating rhythm at the frequency of the difference between the two auditory inputs.

Altered States

Binaural beats can easily be heard at the low frequencies (< 30 Hz). This perceptual phenomenon of binaural beating, or entrainment of brain waves and altered states of consciousness result in stimulation, relaxation, meditative, and creative states, and help to fall asleep.

Sound with embedded binaural beats alters the electrochemical environment of the brain which allows your mind-consciousness to have different experiences. When the brain is entrained to lower frequencies, this state is often referred to as hypnogogia “mind awake/body asleep.” Higher-frequencies lead to more suggestive states of consciousness.

Creating Your Own Binaural Beat Frequencies

When working with binaural beat frequencies, there is no true and tried method or best program or sequence, only when you experiment and see what works for you via trial and error will you get the best of the experience.

When using your PHOTOSONIX light and sound system, you have the option to choose binaural beat frequencies from the menu of pre-existing programs, or create your own.

Creating your own beat frequencies allows you to quickly determine the real and actual effect that the binaural beats frequencies are having on your mind/body connection. All PHOTOSONIX light and sound systems utilize binaural beats; however to set your own beat frequencies manually, you will need to use the Nova Pro 100, or the InnerPulse.

Older PHOTOSONIX systems also allow you to manually set beat frequencies such as the Muse, Muse #, Nova, Nova Pro, Galaxy, and Galaxy Pro; but do not have low frequency pitches that make beat frequencies a powerful tool for affecting consciousness.

Regular headphones do not process pitches below 60 Hertz, this is the reason you will need broad frequency headphones like the ultraBass Headphones tested for PHOTOSONIX systems.

History of Pulsed Beats Frequencies

In experimental psychology and medical research communities; there has been a fascination concerning repetitious sound waves, such as drums. It is an anthropological observation that repeated drum beats, for example, can quickly induce deep trance states, particularly at night next to a camp fire where the flickering light of the flames creates its own trance-type state.

Since the 1930's, researchers have investigated the impact of pulsed tones to better understand their impact on brainwave states. Repeating tones, however, can be annoying. Binaural beat patterns arose as an option because they were more palatable to the ear, versus a constant beat in that beat frequencies wavered up and down in volume, making it a gentler experience for the brain to process.

Oster published a study in 1973 in Scientific American which promoted the use of low pitches, saying that they were more efficient to entrain brainwaves. Low pitches mean, tones that are several octaves below middle C on the piano.