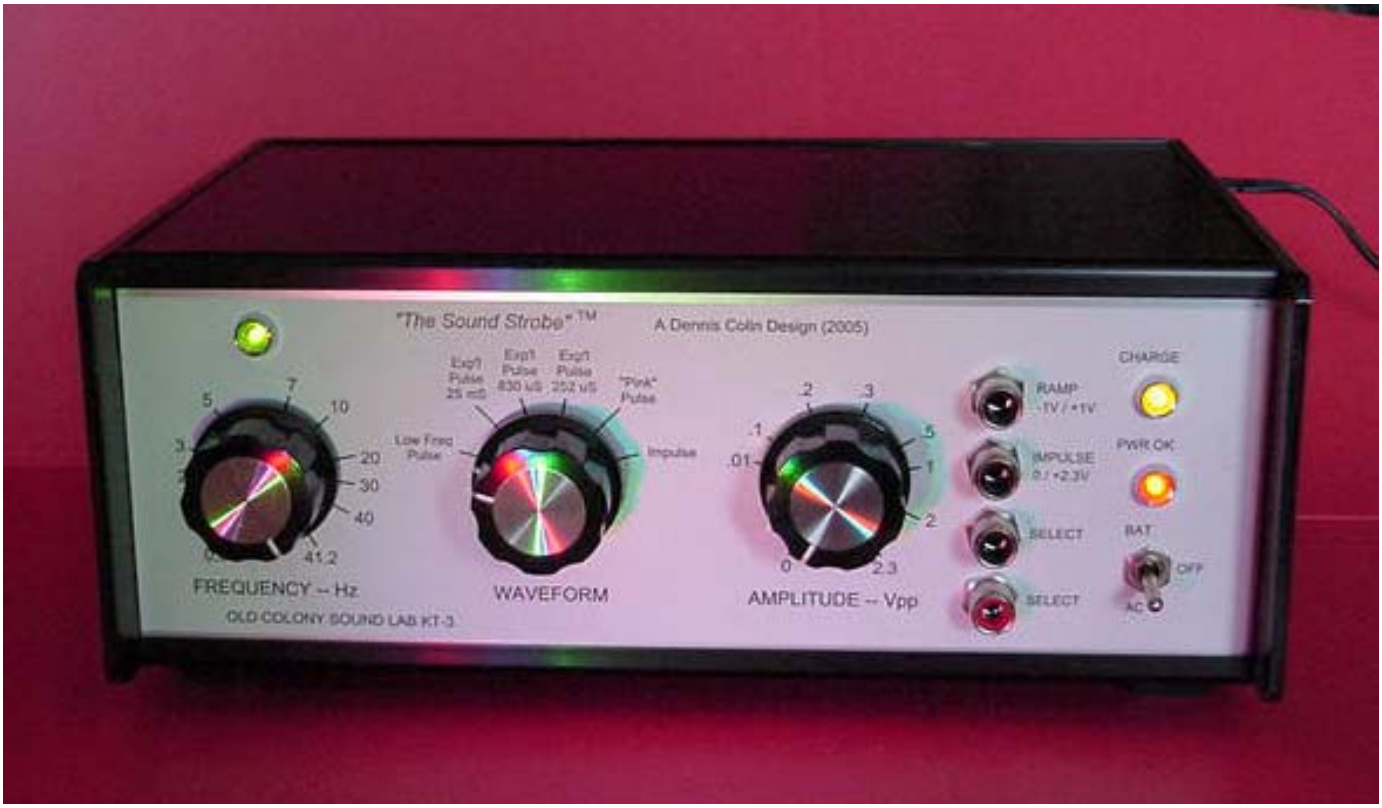
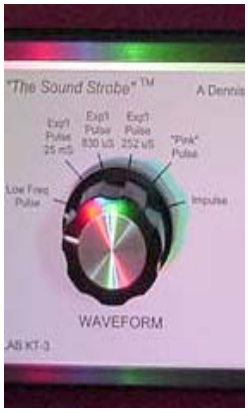
The Sound Strobe™

User Manual





The Sound Strobe

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Section 1

Concept

The Sound Strobe is a uniquely precise instrument that produces six selectable spectrum shape pulse signals to help you identify problems with your speakers and their interactions with your listening room. You can listen to your speaker's degree of image focus, transient precision, and tonal neutrality.

Why not just use music to evaluate speakers?
Of course you should as the final judge. But music has immense variability, and unless you made the recording yourself, you don't know what studio "tricks" were used. The Sound Strobe's signals, on the other hand, are perfectly repeatable and smoothly cover the entire audio frequency range of hearing.

Fig. 1 in the enclosed AudioXpress article shows the various pulse spectrum shapes; that is, the low-to-high frequency (tonal pitch) balance. These allow focusing on various tonal ranges; response or imbalance problems can be identified and room-position located. Then corrective measures can be implemented (crossover changes, driver replacement, vented cabinet tuning, sealed cabinet damping material added or removed, and speaker re-positioning).

Often these problems are heard (and therefore correctible) more readily than with music listening, due to the Sound Strobe's precision, speed, and repeatability. With music, you hear imperfect music reproduction, but the Sound Strobe lets you hear the imperfections themselves.

The last page of the AudioXpress article ("Using the Sound Strobe") explains what to listen for (what the six pulse signals should sound like) by easily building up an "experience base". This then allows you to correlate the pulse sounds with a variety of musical reproduction problems. Then corrective action can be implemented with the pulse sounds "leading the pathway" quickly; with great speed and precision, the best reproduction of a wide variety of music will be obtained.

Powering the Sound Strobe

The instrument can be powered by either a 110 - 125V 60Hz AC line (using the supplied wall adaptor) or the internal 9V NiCd batteries (2)

The power switch selects battery power (up position) or AC (down Position). In either case, the light labeled "PWR OK" will glow red unless (in "Batt" position of power switch) the batteries are completely discharged.

Battery operation will last at least 10 hours from a full charge; as the batteries run down the red light will gradually get dimmer, serving as a " fuel gauge". When using AC power, the batteries will charge; to fully charge the batteries from complete discharge, leave or use the unit connected to an AC line for 24 hours.

Note: to extend the life of the batteries, and condition them to accept the maximum charge, it's recommended to occasionally (once a month or so) allow the batteries to completely discharge. This is done by (1) not connecting the AC adaptor, and (2) turning the power switch to "BATT"; leave it so until the red "PWR OK" light goes fully out. It is not recommended to leave AC adaptor connected continuously when not using the unit. When using the Sound Strobe from an AC line for an extended time period (for example all day long), and if the batteries are initially fully charged, it's recommended to have the power switch in the "BATT" position even though it's being fed AC power. This will reduce the battery charging current to a "trickle", prolonging battery life.

Replacing Batteries

They should last many years: But when they start to wear out (evidenced by a full charge not running the unit for a long enough time), replace as follows:

1. Remove the 4 small screws (2 each side) from the side panels, located near the upper corners.
2. Slide the top cover out from one side.
3. Disconnect the two battery connectors.
4. Remove and replace batteries (9V Nicd). **Do not use ordinary non-rechargeable batteries.**
5. Plug the connectors onto the batteries. **Connecting them backwards even momentarily can damage the unit and will void the warranty.**
6. Re-install the cover.

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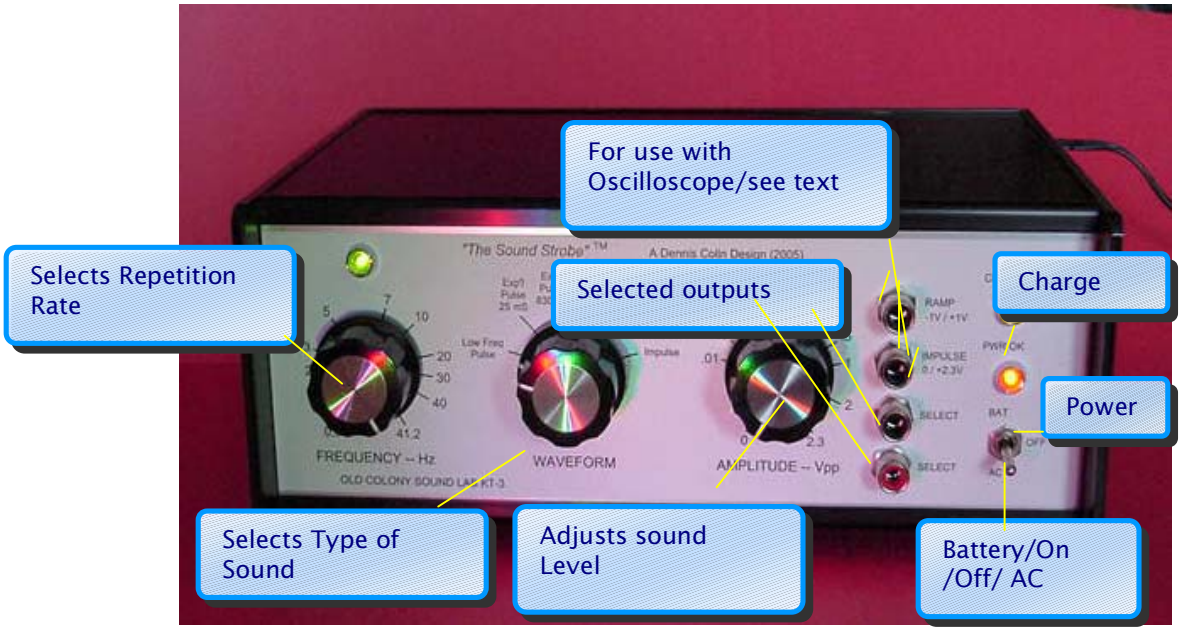
How to set-up the Sound Strobe

User Manual

A handy guide to get you started to quickly hear your speaker's degree of image focus, transient precision, and tonal neutrality.

This document contains information on setting up and diagnosing your sound system. We've included examples of features that you might typically use when creating a test. We've described our specific test examples in the following pages.



Dial 1 Frequency (Selects Repetition Rate) referred to as Freq. in examples.

Dial 2 Waveform (Selects type of sound) referred to as Wav in examples.

Dial 3 Amplitude (Adjusts sound level) referred to as Amp in examples.

Test Examples

The following 5 tests address some of the most common problems with speakers and room interactions. However, these is simply a guide to get started. As you use the Sound Strobe and experiment with all of the settings, you'll quickly become familiar with its range of applicability to improve your sound system.

Caution

As with any electronic test signals, excessively high amplitude levels can damage speaker drive units. However, the short duration and low frequency of the signals makes damage unlikely. With all tests, start with the Amplitude (Amp.) dial at zero (full left) and gradually increase it for a comfortable listening volume. If you hear a sudden change in the sound quality, this indicates amplifier overload; immediately back off the Amp. control.

Test 1: Bass Response Evenness

Conventional sine wave frequency response measurements don't relate well to the sound in a room, because various instrument overtones reflect around the room differently. This test, by contrast, uses a bass tone rich in overtones, allowing you to hear your speaker's bass coherence.

Bass Response Evenness Test

1. Connect an RCA cable to line level input on your amplifier.
2. Plug into one of select jacks in front of Sound Strobe.
3. Turn Freq. dial all way to right.
4. Turn Wav. full left. (LF Pulse)
5. Turn Amp. full left.
6. Flip-up Battery switch (Red light goes on above switch and green light goes on above Freq.)
7. Turn Amp. to the right. (Adjust for comfortable volume). Note where this is. "Example: .01"

8. Walk around the room areas of listening to hear evenness.
9. Adjust Freg. up and down slowly between 20 and 41 Hz.
10. As the tone's pitch varies, you can evaluate three aspects of bass reproduction: (1) bass depth-the LF pulse has a fundamental tone of 20-41Hz (as used here). This is the lowest octave of hearing, and most small speakers won't reproduce it. If your speaker does, you'll hear a very deep tone varying in pitch. (2) Coherence- if the speaker (and room) preserve the timing and balance of the tone's harmonics, the sound will maintain it's "pulsiness". (3) Room distribution- as you walk around the rooms listening area, the sound ideally should stay fairly constant: in many rooms it won't. Moving the speaker can often help bass performance.

Test 2: Full range pulse test (step response).

This test applies a repeated step pulse- a sudden impact sound, both sharp and powerful down to the deepest bass. Use caution when advancing the level (Amp.) ; excessive power can damage small speakers. You should hear a sharply-focussed pulse followed by the room reverberation. The room response should be smooth, but poor acoustics will show up as boominess, ringing, or excessive echoes. Speaker coherence problems such as time smear, resonance, and sound break-up are readily apparent.

Full Range Test

1. Turn Amp. down.
2. Turn Freq. down to 1Hz (about 1 per second).
3. Turn Wav. click one to right (exp. l" pulse 25mS).
4. Turn Amp. back up to where it had been in 1st test (our example was .01)
5. Listen for sharp pulsing sound. You should not hear tones, ringing, "hang-over" or suck out sounds.
6. Switch Wav. to right and listen to each position on waveform. Note 2 things: sound volume decreases when turning dial to the right; you may want to increase amplitude (Amp.). As you switch to right sounds get thinner with less bass content or more trebly.
7. Coherence – If the speaker (and room) preserve the timing and balance of the tone's harmonics, the sound will maintain its "pulsiness" – a "raspy" sense of vibration. Otherwise, the sound can be blurry, with an indistinct mix of detached overtones.

Test 3: Pink pulse test. (Perfectly even frequency balance across the range of hearing).

Pink Pulse Test

1. Turn Wav. to "Pink Pulse".
2. Slowly turn-up Amp. dial until you hear a change in the sound.

3. Turn back down to point before the change. This should be a sharp and clean sound.
4. Walk around the listening area.
5. Ideal for sound to stay constant without any change.
6. Sound should appear to be well focused- coming from speaker and not scattered.
7. Room distribution – As you walk around the room's listening area, the sound ideally should stay fairly constant; in many rooms it won't. Moving the speaker, sometimes by only one foot, can often help bass performance.

Test 4: Impulse test.

Impulse Test

1. Turn Amp. off.
2. Turn Freq. to 2Hz.
3. Turn Wav. to right
4. Slowly turn up Amp as high as possible without changing sound quality.
5. Sound should be snappy with no tonality, somewhat like a spark.
6. Walk around the listening area.
7. Sound should be even and focussed.
8. This is a good test revealing high frequency accuracy, focus and precision.

Test 5: Bass Impact Clarity.

Bass Impact Clarity

1. Turn Amp. down to left.
2. Turn Wav. left (low frequency pulse)
3. Turn Freq. to 2Hz.
4. Slowly turn up Amp. to fairly high volume, but not enough to change sound.
5. Sound should be clean and precise without sharp edge, similar to bass drum.

Additional / Advanced Tests

Advanced Tests

1. Safe High Power Distortion Test

The enclosed AudioXpress article demonstrates use of the impulse signal to test a fragile ribbon tweeter for compression at 450 peak watts, whereas the average (heating) power is completely safe 0.5W max. The other 5 Sound Strobe signals can also be used (for example, the 25mS Exp'l pulse shows step response).

Be sure to consult the average power table in the article, keeping it well below the driver's rating

2. The Ramp Output Jack

Provides a -1V to +1V linear waveform, independent of the amplitude setting. This can be used as an oscilloscope sweep input (fed to the scope's X, or horizontal, input). Then a microphone output fed to the scope's Y or vertical, input will show both the direct speaker output and the delayed room reflections. The scope's total sweep time is the inverse of the Sound Strobe's frequency; e.g., 40 Hz gives a sweep time of 25mS. Since the speed of sound is 1128 feet per second, or 1.128 feet per millisecond (mS), the scope's full sweep represents 25 mS (1.128f/mS) = 28.2 feet of air path delay, or 2.82 ft per scope div.

3. The Impulse Output Jack

Provides a 0 to plus 2.3V impulse, independent of the Amp. setting. This is useful for triggering a scope's internal sweep when observing waveforms from a microphone.