Using DC FIVE or DC LIVE/Forensics To Create 3 Audio Test CD's

Diamond Cuts DC FIVE and DC LIVE/Forensics offers a broad suite of real time audio tools including noise reduction, audio enhancement, audio measurement and signal generation. This application note describes the use of these programs to create Audio Test CD's containing signals useful for audio system electrical and acoustical evaluation.

This document assumes that the software is installed and working in your system. For help with installation or to get started with the software, refer to the product manual.

Basic Requirments:

DC FIVE or LIVE/Forensics Software Win 98SE, Win ME, Win 2000 or Win XP 200 MHz or faster PC with Pentium or AMD processor

Other Requirements:

CD ROM Burner 3 Blank CD ROMS Microphone (Optional) Soundcard (Optional) CD Player

Overview:

Described here are the parameters required to make three separate audio test CD's. CD #1 is optimized for Stereo System Testing, CD #2 is for testing and calibrating your Real Time Acoustical Analyzer, while CD #3 is optimized for Audio System Acoustical Calibration utilizing any of a number of measurement techniques.

You will be using the Make Waves generator found under the Edit menu to make the signals for your Audio Test CD(s). You must set up the Make Waves generator for the following parameters:

| Sample Rate: | 44.1 KHz |
|--------------|----------|
| File Type: | Stereo |
| Resolution: | 16 Bits |

These will not change for any of the signals that you will be creating. These parameters are global for creating Wave Files, which will be compatible with conversion to Red Book Audio when you burn your test CD ROMs:

None of the 3 CD's contains more than 50 tracks. Since CD's allow for up to 100 tracks, each signal track can be announced via a microphone and separate .wav file explaining the properties of the signal track that follows. Specific applications examples involving the use of these CD's is beyond the purview of this document. So specific applications will be covered in future Application Notes.

Applications:

- 1. Sound Card Performance Testing
- 2. CD and DVD Player Performance Testing
- 3. Stereo Amplifier and Pre-Amplifier Testing
- 4. Loudspeaker Testing
- 5. Real Time Analyzer Calibration
- 6. Equalizer Calibration
- 7. Sound System Room Acoustical Balancing.
- 8. etc.

Measurements Capabilities with the Test CD's:

1. Frequency Response

- 2. Frequency Accuracy
- 3. Signal to Noise Ratio
- 4. Total Harmonic Distortion vs Frequency
- 5. Intermodulation Distortion
- 6. Acoustical Room Response and Resonance

CD Making Procedure:

- 1. Choose which CD you want to make
- 2. Set up a sub directory under the name of the CD to be made
- 3. Launch the Diamond Cut Software program
- 4. Bring up the Make Waves Generator found under the Edit Menu.
- 5. Choose Track 01
- 6. Set the Make Waves Generator to all of the parameters found in the CD parameter matrix for the CD you desire to make
- 7. Click "OK"
- 8. The resulting Wave file will appear in the Source Window after some processing time.
- 9. If there are no Special Processing Notes, name the Source File the same as that which is shown in the Column called "Track Name" in the CD parameter matrix.
- 10. If there are Special Processing Notes, perform those procedures on the Wave file.
- 11. After the Special Processing procedures have been performed, name the final resultant Wave file the same name as that which is shown in the column called "Track Name" in the CD parameter matrix.
- 12. Choose the next track.
- 13. Go to step 6
- 14. Repeat till all tracks in the matrix have been created.
- 15. Optional Steps to Annunciate Each Track:
 - a. Connect a Microphone to the Mic Input of your sound card
 - b. In a quiet room (like a clothing closet), record a descriptive for each Signal Track for the Test CD of Interest. (i.e. Track 01 follows and is a 1 KHz, 0 dB Reference Sine Wave). It is also recommended that the first track be reserved to identify the Title of the CD.
 - *c.* Name each Wave file with an appropriate descriptive (i.e., Announce in this manner: "Track One is a 1 Kilo Hertz Sine Wave at a 0 dB Reference Level") Use the table of descriptions as your script.
- 16. Exit the Diamond Cut Software Program and Launch your CD ROM burning Audio Software.
- 17. Create the appropriate playlist as per the CD matrix that you are making.
- 18. Burn the CD ROM.
- 19. Label the CD Appropriately,
- 20. Done

DANGER! When playing the first track on the Test CD's, keep the volume on your sound system all the way down. Slowly rotate the volume control upwards until the volume is at the desired level. The reason for this DANGER warning is that the first signal is always at 1 Kilo Hertz 0 dB (Maximum Output) Reference Level and can damage your ears and/or sound system.

| | Stereo System Test CD (CD # 1) Parameters | | | | | |
|-------|-------------------------------------------|-----------|-----------|---------------|--------|---------------|
| Track | Track Name | Waveshape | Frequency | Amplitude | Length | Special |
| # | (.wav) | | (Hz) | (dB) | (Sec) | Processing |
| | | | | | | Notes |
| 01 | 1 KHz 0 dB | Sine Wave | 1000 | 0 | 120 | None |
| | Reference1.wav | | | | | |
| 02 | Silence1.wav | Sine Wave | 0.01 | -97 | 120 | Note 1 (Mute) |
| 03 | 10 Hz –3 dB Sine.wav | Sine Wave | 10 | -3 | 30 | None |
| 04 | 20 Hz – 3 dB Sine.wav | Sine Wave | 20 | -3 | 30 | None |
| 05 | 30 Hz – 3 dB Sine.wav | Sine Wave | 30 | -3 | 30 | None |
| 06 | 40Hz – 3 dB Sine.wav | Sine Wave | 40 | -3 | 30 | None |
| 07 | 50 Hz – 3 dB Sine.wav | Sine Wave | 50 | -3 | 30 | None |
| 08 | 60 Hz – 3 dB Sine.wav | Sine Wave | 60 | -3 | 30 | None |
| 09 | 80 Hz – 3 dB Sine.wav | Sine Wave | 80 | -3 | 30 | None |
| 10 | 100 Hz – 3 dB Sine.wav | Sine Wave | 100 | -3 | 30 | None |

| 11 | 125 Hz – 3 dB Sine.wav | Sine Wave | 125 | -3 | 30 | None |
|----|--------------------------|--------------|----------------|-----|-----|---------------|
| 12 | 250 Hz – 3 dB Sine.wav | Sine Wave | 250 | -3 | 30 | None |
| 13 | 400 Hz – 3 dB Sine.wav | Sine Wave | 400 | -3 | 30 | None |
| 14 | 800 Hz – 3 dB Sine.wav | Sine Wave | 800 | -3 | 30 | None |
| 15 | 1 KHz – 3 dB Sine.wav | Sine Wave | 1000 | -3 | 30 | None |
| 16 | 2 KHz – 3 dB Sine.way | Sine Wave | 2000 | -3 | 30 | None |
| 17 | 3 KHz – 3 dB Sine.way | Sine Wave | 3000 | -3 | 30 | None |
| 18 | 4 KHz – 3 dB Sine.way | Sine Wave | 4000 | -3 | 30 | None |
| 19 | 5 KHz – 3 dB Sine.way | Sine Wave | 5000 | -3 | 30 | None |
| 20 | 6 KHz – 3 dB Sine.wav | Sine Wave | 6000 | -3 | 30 | None |
| 21 | 7 KHz – 3 dB Sine.wav | Sine Wave | 7000 | -3 | 30 | None |
| 22 | 8 KHz – 3 dB Sine.wav | Sine Wave | 8000 | -3 | 30 | None |
| 23 | 9 KHz – 3 dB Sine.wav | Sine Wave | 9000 | -3 | 30 | None |
| 24 | 10 KHz – 3 dB Sine.wav | Sine Wave | 10000 | -3 | 30 | None |
| 25 | 11KHz – 3 dB Sine.wav | Sine Wave | 11000 | -3 | 30 | None |
| 26 | 12 KHz – 3 dB Sine.wav | Sine Wave | 12000 | -3 | 30 | None |
| 27 | 13 KHz – 3 dB Sine.wav | Sine Wave | 13000 | -3 | 30 | None |
| 28 | 14 KHz – 3 dB Sine.wav | Sine Wave | 14000 | -3 | 30 | None |
| 29 | 15 KHz – 3 dB Sine.wav | Sine Wave | 15000 | -3 | 30 | None |
| 30 | 16 KHz – 3 dB Sine.wav | Sine Wave | 16000 | -3 | 30 | None |
| 31 | 17 KHz – 3 dB Sine.wav | Sine Wave | 17000 | -3 | 30 | None |
| 32 | 18 KHz – 3 dB Sine.wav | Sine Wave | 18000 | -3 | 30 | None |
| 33 | 19 KHz – 3 dB Sine.wav | Sine Wave | 19000 | -3 | 30 | None |
| 34 | 20 KHz – 3 dB Sine.wav | Sine Wave | 20000 | -3 | 30 | None |
| 35 | 21 KHz – 3 dB Sine.wav | Sine Wave | 21000 | -3 | 30 | None |
| 36 | 440 Hz – 10 dB ASine.wav | Sine Wave | 440 | -10 | 30 | None |
| 37 | 1 KHz – 10 dB Sine.wav | Sine Wave | 1000 | -10 | 30 | None |
| 38 | 1 KHz – 10 dB Right | Sine Wave | 1000 | -10 | 30 | Note 2 (Right |
| | Sine.wav | | | | | Channel Only) |
| 39 | 1 KHz – 10 dB Left | Sine Wave | 1000 | -10 | 30 | Note 3 (Left |
| | Sine.wav | | | | | Channel Only) |
| 40 | 200Hz -10 dB Sine.wav | Sine Wave | 200 | -10 | 30 | None |
| 41 | 200 Hz - 10 dB Invert | Sine Wave | 200 | -10 | 30 | None |
| | Sine.wav | | | | | |
| 42 | 20 Hz – 20 KHz Sweep.wav | Sine Wave | 20 - 20000 | -10 | 60 | Note 4 |
| 43 | Whitenoise.wav | White | N/a | -10 | 600 | None |
| 44 | Pinknoise1.wav | White | N/a | -10 | 600 | Note 5 |
| 45 | PinknoiseRight.wav | White | N/a | -10 | 120 | Note 6 |
| 46 | PinknoiseLeft.wav | White | N/a | -10 | 120 | Note 7 |
| 47 | PinknoiseInvert.wav | White | N/a | -10 | 120 | Note 8 |
| 48 | 1 KHz – 10 dB Square.wav | Square | 1000 | -10 | 120 | None |
| 49 | 1 KHz – 10 dB | Triangle | 1000 | -10 | 120 | None |
| | Triangle.wav | | | | | |
| 50 | 50 Hz & 7 KHz 4-1 | Sine | 60 and | -10 | 60 | Note 14 |
| | Intermodulation.wav | | 7000 | | | |
| | | Total Time = | = 55.5 Minutes | | | |

| | Stereo System Test CD (CD # 1) Descriptions | | |
|-------|--------------------------------------------------|--|--|
| Track | Description of Track | | |
| # | | | |
| 01 | 1 Kilo Hertz Sine Wave at a 0 dB Reference Level | | |
| 02 | Silence | | |
| 03 | 10 Hertz Sine Wave at a – 3 dB Level | | |
| 04 | 20 Hertz Sine Wave at a – 3 dB Level | | |
| 05 | 30 Hertz Sine Wave at a – 3 dB Level | | |

| 06 | 40 Hertz Sine Wave at a – 3 dB Level |
|----|---------------------------------------------------------------------------------------------------------|
| 07 | 50 Hertz Sine Wave at a – 3 dB Level |
| 08 | 60 Hertz Sine Wave at a – 3 dB Level |
| 09 | 80 Hertz Sine Wave at a – 3 dB Level |
| 10 | 100 Hertz Sine Wave at a – 3 dB Level |
| 11 | 125 Hertz Sine Wave at a – 3 dB Level |
| 12 | 250 Hertz Sine Wave at a – 3 dB Level |
| 13 | 400 Hertz Sine Wave at a – 3 dB Level |
| 14 | 800 Hertz Sine Wave at a – 3 dB Level |
| 15 | 1 Kilo Hertz Sine Wave at a – 3 dB Level |
| 16 | 2 Kilo Hertz Sine Wave at a – 3 dB Level |
| 17 | 3 Kilo Hertz Sine Wave at a – 3 dB Level |
| 18 | 4 Kilo Hertz Sine Wave at a – 3 dB Level |
| 19 | 5 Kilo Hertz Sine Wave at a – 3 dB Level |
| 20 | 6 Kilo Hertz Sine Wave at a – 3 dB Level |
| 21 | 7 Kilo Hertz Sine Wave at a – 3 dB Level |
| 22 | 8 Kilo Hertz Sine Wave at a – 3 dB Level |
| 23 | 9 Kilo Hertz Sine Wave at a – 3 dB Level |
| 24 | 10 Kilo Hertz Sine Wave at a – 3 dB Level |
| 25 | 11 Kilo Hertz Sine Wave at a – 3 dB Level |
| 26 | 12 Kilo Hertz Sine Wave at a – 3 dB Level |
| 27 | 13 Kilo Hertz Sine Wave at a – 3 dB Level |
| 28 | 14 Kilo Hertz Sine Wave at a – 3 dB Level |
| 29 | 15 Kilo Hertz Sine Wave at a – 3 dB Level |
| 30 | 16 Kilo Hertz Sine Wave at a – 3 dB Level |
| 31 | 17 Kilo Hertz Sine Wave at a – 3 dB Level |
| 32 | 18 Kilo Hertz Sine Wave at a – 3 dB Level |
| 33 | 19 Kilo Hertz Sine Wave at a – 3 dB Level |
| 34 | 20 Kilo Hertz Sine Wave at a – 3 dB Level |
| 35 | 21 Kilo Hertz Sine Wave at a – 3 dB Level |
| 36 | 440 Hz A above Middle C Sine Wave at a – 3 dB Level |
| 37 | 1 Kilo Hertz Sine Wave at a – 10 dB Level |
| 38 | 1 Kilo Hertz Sine Wave at a – 10 dB Level Right Channel Only |
| 39 | 1 Kilo Hertz Sine Wave at a – 10 dB Level Left Channel Only |
| 40 | 200 Hertz Sine Wave at a – 10 dB Level |
| 41 | 200 Hertz Sine Wave at a – 10 dB Level with One Channel Phase Inverted |
| 42 | 20 Hertz to 20 Kilo Hertz Swept Sine Wave at – 10 dB |
| 43 | White Noise at a – 10 dB Level |
| 44 | Pink Noise at a – 10 dB Level |
| 45 | Pink Noise at a – 10 dB Level Right Channel Only |
| 46 | Pink Noise at a – 10 dB Level Left Channel Only |
| 47 | Pink Noise at a – 10 dB Level with One Channel Phase Inverted |
| 48 | 1 Kilo Hertz Square Wave at a – 10 dB Level |
| 49 | 1 Kilo Hertz Triangle Wave at a – 10 dB Level |
| 50 | Dual tones of 60 Hertz & 7 Kilo Hertz with a 4:1 amplitude ratio for Intermodulation Distortion Testing |
| | Total Time = $(approximately)$ 10 minutes |

| Audio Real Time Acoustical Analyzer Test CD (CD # 2) Parameters | | | | | | |
|-----------------------------------------------------------------|------------------------------|-------------|------------|-----------|--------|---------------|
| Track | Track Name | Waveshape | Frequency | Amplitude | Length | Processing |
| # | | C'a Miran | (HZ) | (0B) | (Sec) | Notes |
| 01 | I KHZ 0 dB Reference2.way | Sine Wave | 1000 | 0 | 120 | None |
| 02 | Silence2.way | Sine Wave | 0.01 | -97 | 120 | None |
| 03 | 20 Hz - 6 dB Sine.way | Sine Wave | 20 | -6 | 30 | None |
| 04 | 25 Hz – 6 dB Sine.way | Sine Wave | 25 | -6 | 30 | None |
| 05 | 31.5Hz - 6 dB Sine.way | Sine Wave | 31.5 | -6 | 30 | None |
| 06 | 40 Hz - 6 dB Sine.way | Sine Wave | 40 | -6 | 30 | None |
| 07 | 50 Hz - 6 dB Sine.way | Sine Wave | 50 | -6 | 30 | None |
| 08 | 63 Hz – 6 dB Sine.way | Sine Wave | 63 | -6 | 30 | None |
| 09 | 80 Hz – 6 dB Sine.wav | Sine Wave | 80 | -6 | 30 | None |
| 10 | 100 Hz – 6 dB Sine.wav | Sine Wave | 100 | -6 | 30 | None |
| 11 | 125 Hz – 6 dB Sine.wav | Sine Wave | 125 | -6 | 30 | None |
| 12 | 160 Hz – 6 dB Sine.wav | Sine Wave | 160 | -6 | 30 | None |
| 13 | 200 Hz – 6 dB Sine.wav | Sine Wave | 200 | -6 | 30 | None |
| 14 | 250 Hz – 6 dB Sine.wav | Sine Wave | 250 | -6 | 30 | None |
| 15 | 315 Hz – 6 dB Sine.wav | Sine Wave | 315 | -6 | 30 | None |
| 16 | 400 Hz – 6 dB Sine.wav | Sine Wave | 400 | -6 | 30 | None |
| 17 | 500 Hz – 6 dB Sine.wav | Sine Wave | 500 | -6 | 30 | None |
| 18 | 630 Hz – 6 dB Sine.wav | Sine Wave | 630 | -6 | 30 | None |
| 19 | 800 Hz – 6 dB Sine.wav | Sine Wave | 800 | -6 | 30 | None |
| 20 | 1.0 KHz – 6 dB Sine.wav | Sine Wave | 1000 | -6 | 30 | None |
| 21 | 1.25 KHz – 6 dB Sine.wav | Sine Wave | 1250 | -6 | 30 | None |
| 22 | 1.6 KHz – 6 dB Sine.wav | Sine Wave | 1600 | -6 | 30 | None |
| 23 | 2.0 KHz – 6 dB Sine.wav | Sine Wave | 2000 | -6 | 30 | None |
| 24 | 2.5 KHz – 6 dB Sine.wav | Sine Wave | 2500 | -6 | 30 | None |
| 25 | 3.15 KHz – 6 dB Sine.wav | Sine Wave | 3150 | -6 | 30 | None |
| 26 | 4.0 KHz – 6 dB Sine.wav | Sine Wave | 4000 | -6 | 30 | None |
| 27 | 5.0 KHz – 6 dB Sine.wav | Sine Wave | 5000 | -6 | 30 | None |
| 28 | 6.3 KHz – 6 dB Sine.wav | Sine Wave | 6300 | -6 | 30 | None |
| 29 | 8.0 KHz – 6 dB Sine.wav | Sine Wave | 8000 | -6 | 30 | None |
| 30 | 10 KHz – 6 dB Sine.wav | Sine Wave | 10000 | -6 | 30 | None |
| 31 | 12.5 KHz – 6 dB Sine.wav | Sine Wave | 12500 | -6 | 30 | None |
| 32 | 16.0 KHz – 6 dB Sine.wav | Sine Wave | 16000 | -6 | 30 | None |
| 33 | 20.0 KHz – 6 dB Sine.wav | Sine Wave | 20000 | -6 | 30 | None |
| 34 | 20 Hz – 20 KHz | Sine Wave | 20 - 20000 | -6 | 60 | Note 4 |
| | Sweep2.wav | | | | | |
| 35 | 20 Hz – 20 KHz | Square Wave | 20 - 20000 | -6 | 60 | Note 4 |
| | Sweepsquare.wav | | | - | | |
| 36 | 20 Hz – 20 KHz | Triantle | 20 - 20000 | -6 | 60 | Note 4 |
| | Sweeptriangle.wav | Wave | 0.01 | | | |
| 37 | Silence3.wav | Sine Wave | 0.01 | -97 | 30 | Note 1 (Mute) |
| 38 | 1.0 KHz 0 dB Cal.wav | Sine Wave | 1000 | 0 | 30 | None |
| 39 | 1.0 KHz – 1 dB Cal.wav | Sine Wave | 1000 | -1 | 30 | None |
| 40 | 1.0 KHz - 2 dB Cal.wav | Sine Wave | 1000 | -2 | 30 | None |
| 41 | 1.0 KHz – 3 dB Cal.wav | Sine Wave | 1000 | -3 | 30 | None |
| 42 | 1.0 KHz – 4 dB Cal.wav | Sine Wave | 1000 | -4 | 30 | None |
| 43 | 1.0 KHz – 5 dB Cal.wav | Sine Wave | 1000 | -5 | 30 | None |
| 44 | 1.0 KHz – 6 dB Cal.wav | Sine Wave | 1000 | -6 | 30 | None |
| 45 | 1.0 KHz – 7 dB Cal.wav | Sine Wave | 1000 | -7 | 30 | None |
| 46 | 1.0 KHz – 8 dB Cal.wav | Sine Wave | 1000 | -8 | 30 | None |
| 47 | 1.0 KHz – 9 dB Cal.wav | Sine Wave | 1000 | -9 | 30 | None |
| 48 | 1.0 KHz – 10 dB Cal.wav | Sine Wave | 1000 | -10 | 30 | None |
| 49 | Pinknoise2.way | White | N/a | 1 -10 | 600 | Note 5 |

| 50 | 262 Hz & 2 KHz 4-1 | Sine | 262 and | -10 | 60 | Note 14 |
|----|---------------------|--------------|--------------|-----|----|---------|
| | Intermodulation.wav | | 2000 | | | |
| | | Total Time = | 39.5 Minutes | | | |

| | Audio Real Time Acoustical Analyzer Test CD (CD # 2) Descriptions |
|-------|-------------------------------------------------------------------|
| Track | Description of Track |
| # | |
| 01 | 1 Kilo Hertz Sine Wave at a 0 dB Reference Level |
| 02 | Silence |
| 03 | 20 Hertz Sine Wave at a – 6 dB Level |
| 04 | 25 Hertz Sine Wave at a – 6 dB Level |
| 05 | 31.5 Hertz Sine Wave at a – 6 dB Level |
| 06 | 40 Hertz Sine Wave at a – 6 dB Level |
| 07 | 50 Hertz Sine Wave at a – 6 dB Level |
| 08 | 63 Hertz Sine Wave at a – 6 dB Level |
| 09 | 80 Hertz Sine Wave at a – 6 dB Level |
| 10 | 100 Hertz Sine Wave at a – 6 dB Level |
| 11 | 125 Hertz Sine Wave at a – 6 dB Level |
| 12 | 160 Hertz Sine Wave at a – 6 dB Level |
| 13 | 200 Hertz Sine Wave at a – 6 dB Level |
| 14 | 250 Hertz Sine Wave at a – 6 dB Level |
| 15 | 315 Hertz Sine Wave at a – 6 dB Level |
| 16 | 400 Hertz Sine Wave at a – 6 dB Level |
| 17 | 500 Hertz Sine Wave at a – 6 dB Level |
| 18 | 630 Hertz Sine Wave at a – 6 dB Level |
| 19 | 800 Hertz Sine Wave at a – 6 dB Level |
| 20 | 1 Kilo Hertz Sine Wave at a – 6 dB Level |
| 21 | 1.25 Kilo Hertz Sine Wave at a – 6 dB Level |
| 22 | 1.6 Kilo Hertz Sine Wave at a – 6 dB Level |
| 23 | 2 Kilo Hertz Sine Wave at a – 6 dB Level |
| 24 | 2.5 Kilo Hertz Sine Wave at a – 6 dB Level |
| 25 | 3.15 Kilo Hertz Sine Wave at a – 6 dB Level |
| 26 | 4 Kilo Hertz Sine Wave at a – 6 dB Level |
| 27 | 5 Kilo Hertz Sine Wave at a – 6 dB Level |
| 28 | 6.3 Kilo Hertz Sine Wave at a – 6 dB Level |
| 29 | 8 Kilo Hertz Sine Wave at a – 6 dB Level |
| 30 | 10 Kilo Hertz Sine Wave at a – 6 dB Level |
| 31 | 12.5 Kilo Hertz Sine Wave at a – 6 dB Level |
| 32 | 16 Kilo Hertz Sine Wave at a – 6 dB Level |
| 33 | 20 Kilo Hertz Sine Wave at a – 6 dB Level |
| 34 | 20 Hertz to 20 Kilo Hertz Swept Sine Wave at – 6 dB |
| 35 | 20 Hertz to 20 Kilo Hertz Swept Square Wave at – 6 dB |
| 36 | 20 Hertz to 20 Kilo Hertz Swept Triangle Wave at – 6 dB |
| 37 | Silence |
| 38 | 1 Kilo Hertz Sine Wave at a 0 dB Level |
| 39 | 1 Kilo Hertz Sine Wave at a –1 dB Level |
| 40 | 1 Kilo Hertz Sine Wave at a –2 dB Level |
| 41 | 1 Kilo Hertz Sine Wave at a –3 dB Level |
| 42 | 1 Kilo Hertz Sine Wave at a –4 dB Level |
| 43 | 1 Kilo Hertz Sine Wave at a –5 dB Level |
| 44 | 1 Kilo Hertz Sine Wave at a –6 dB Level |
| 45 | 1 Kilo Hertz Sine Wave at a –7 dB Level |
| 46 | 1 Kilo Hertz Sine Wave at a –8 dB Level |
| 47 | 1 Kilo Hertz Sine Wave at a –9 dB Level |
| 48 | 1 Kilo Hertz Sine Wave at a –10 dB Level |
| 49 | Pink Noise at a – 10 dB Level |

| 49 | Dual tones of 262 Hertz & 2 Kilo Hertz with a 4:1 amplitude ratio for Intermodulation Distortion |
|----|--------------------------------------------------------------------------------------------------|
| | Testing |
| | Total Time = (approximately) 10 minutes |

| Audio System Acoustical Testing CD (CD # 3) Parameters | | | | | | |
|--------------------------------------------------------|--------------------------|-----------|--------------|---------------|--------|------------|
| Track | Track Name | Waveshape | Frequency | Amplitude | Length | Processing |
| # | (.wav) | | (Hz) | (dB) | (Sec) | Notes |
| 01 | 1 KHz 0 dB | Sine Wave | 1000 | 0 | 120 | None |
| | Reference3.wav | | | | | |
| 02 | Silence3.wav | Sine Wave | 0.01 | -97 | 120 | None |
| 03 | 20 Hz – 6 dB Random.wav | White | 20 | -6 | 30 | Note 9 |
| 04 | 25 Hz – 6 dB Random.wav | White | 25 | -6 | 30 | Note 9 |
| 05 | 31.5Hz – 6 dB Random.wav | White | 31.5 | -6 | 30 | Note 9 |
| 06 | 40 Hz - 6 dB Random.wav | White | 40 | -6 | 30 | Note 9 |
| 07 | 50 Hz - 6 dB Random.wav | White | 50 | -6 | 30 | Note 9 |
| 08 | 63 Hz – 6 dB Random.wav | White | 63 | -6 | 30 | Note 9 |
| 09 | 80 Hz – 6 dB Random.wav | White | 80 | -6 | 30 | Note 9 |
| 10 | 100 Hz – 6 dB Random.wav | White | 100 | -6 | 30 | Note 9 |
| 11 | 125 Hz – 6 dB Random.wav | White | 125 | -6 | 30 | Note 9 |
| 12 | 160 Hz – 6 dB Random.wav | White | 160 | -6 | 30 | Note 9 |
| 13 | 200 Hz – 6 dB Random.wav | White | 200 | -6 | 30 | Note 9 |
| 14 | 250 Hz – 6 dB Random.wav | White | 250 | -6 | 30 | Note 9 |
| 15 | 315 Hz – 6 dB Random.wav | White | 315 | -6 | 30 | Note 9 |
| 16 | 400 Hz – 6 dB Random.wav | White | 400 | -6 | 30 | Note 9 |
| 17 | 500 Hz – 6 dB Random.wav | White | 500 | -6 | 30 | Note 9 |
| 18 | 630 Hz – 6 dB Random.wav | White | 630 | -6 | 30 | Note 9 |
| 19 | 800 Hz – 6 dB Random.wav | White | 800 | -6 | 30 | Note 9 |
| 20 | 1.0 KHz – 6 dB | White | 1000 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 21 | 1.25 KHz – 6 dB | White | 1250 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 22 | 1.6 KHz – 6 dB | White | 1600 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 23 | 2.0 KHz – 6 dB | White | 2000 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 24 | 2.5 KHz – 6 dB | White | 2500 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 25 | 3.15 KHz – 6 dB | White | 3150 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 26 | 4.0 KHz – 6 dB | White | 4000 | -6 | 30 | Note 9 |
| | Random.wav | | | | | |
| 27 | 5.0 KHz - 6 dB | White | 5000 | -6 | 30 | Note 9 |
| • | Random.wav | **** | 10 00 | | 20 | |
| 28 | 6.3 KHz - 6 dB | White | 6300 | -6 | 30 | Note 9 |
| • | Random.wav | **** | 0000 | | 20 | |
| 29 | 8.0 KHz - 6 dB | White | 8000 | -6 | 30 | Note 9 |
| 20 | Kandom.wav | XX 71 · 4 | 10000 | 6 | 20 | NL (O |
| 30 | 10 KHz - 6 dB | White | 10000 | -6 | 30 | Note 9 |
| 21 | | W7h: | 12500 | 6 | 20 | Note 0 |
| 51 | 12.3 KHZ – 6 dB | white | 12500 | -0 | 30 | Note 9 |
| 20 | | White | 16000 | 6 | 20 | Note 0 |
| 32 | 10.0 MHZ = 0 GB | white | 10000 | -0 | 50 | mole 9 |
| 22 | | White | 10000 | 6 | 30 | Nota 0 |
| 33 | 17.0 NFIZ = 0 UD | w me | 19000 | -0 | 50 | INDIE 9 |
| 34 | 20 Hz = 20 KHz | Sine Wave | 20 - 20000 | -6 | 60 | Note 9 |
| <i></i> | | Sinc man | | | | |

| | Sweep3.wav | | | | | |
|-----------------------------|--------------------------|-----------|----------|-----|-----|---------|
| 35 | 1 KHz Quadrature.wav | Sine Wave | 1000 | -6 | 30 | Note 13 |
| 36 | 1.0 KHz – 6 dB Cal | Sine Wave | 1000 | -6 | 30 | None |
| 37 | 1.0 KHz – 5 dB Cal | Sine Wave | 1000 | -5 | 30 | None |
| 38 | 1.0 KHz – 4 dB Cal | Sine Wave | 1000 | -4 | 30 | None |
| 39 | 1.0 KHz – 3 dB Cal | Sine Wave | 1000 | -3 | 30 | None |
| 40 | 1.0 KHz – 2 dB Cal | Sine Wave | 1000 | -2 | 30 | None |
| 41 | 1.0 KHz – 1 dB Cal | Sine Wave | 1000 | -1 | 30 | None |
| 42 | 1.0 KHz 0 dB Cal | Sine Wave | 1000 | 0 | 30 | None |
| 43 | Pinknoise3.wav | White | N/a | -10 | 600 | Note 5 |
| 44 | PinknoiseRight3.wav | White | N/a | -10 | 120 | Note 6 |
| 45 | PinknoiseLeft3.wav | White | N/a | -10 | 120 | Note 7 |
| 46 | Whitenoise3.wav | White | N/a | -10 | 600 | None |
| 47 | Brownnoise.wav | White | N/a | -10 | 120 | Note 10 |
| 48 | Seismicnoise.wav | White | N/a | -10 | 120 | Note 11 |
| 49 | Subsonicseismicnoise.wav | White | N/a | -10 | 120 | Note 12 |
| 50 | 15 Hz & 16 KHz 1-1 | Sine | 1500 and | -10 | 60 | Note 15 |
| | Intermodulation.wav | | 1600 | | | |
| Total Time = 55.5 Minutes | | | | | | |

| | Audio System Acoustical Testing CD (CD # 3) Descriptions |
|-------|----------------------------------------------------------------------------|
| Track | Description of Track |
| # | |
| 01 | 1 Kilo Hertz Sine Wave at a 0 dB Reference Level |
| 02 | Silence |
| 03 | 20 Hz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 04 | 25 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 05 | 31.5 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 06 | 40 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 07 | 50 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 08 | 63 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 09 | 80 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 10 | 100 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 11 | 125 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 12 | 160 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 13 | 200 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 14 | 250 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 15 | 315 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 16 | 400 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 17 | 500 Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 18 | 630 Hz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 19 | 800 Hz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 20 | 1 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 21 | 1.25 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 22 | 1.6 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 23 | 2 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 24 | 2.5 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 25 | 3.15 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 26 | 4 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 27 | 5 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 28 | 6.3 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 29 | 8 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 30 | 10 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 31 | 12.5 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
| 32 | 16 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |

| 33 | 19 Kilo Hertz Centered Narrowband Random Noise at a – 6 dB Average Level |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------|
| 34 | 20 Hertz to 20 Kilo Hertz Swept Sine Wave at a – 6 dB |
| 35 | 1 Kilo Hertz Sine Waves in Quadrature at a- 6 dB |
| 36 | 1 Kilo Hertz Sine Wave Reference at a – 6 dB |
| 37 | 1 Kilo Hertz Sine Wave Reference at a- 5 dB |
| 38 | 1 Kilo Hertz Sine Wave Reference at a – 4 dB |
| 39 | 1 Kilo Hertz Sine Wave Reference at $a - 3 dB$ |
| 40 | 1 Kilo Hertz Sine Wave Reference at $a - 2 dB$ |
| 41 | 1 Kilo Hertz Sine Wave Reference at $a - 1 dB$ |
| 42 | 1 Kilo Hertz Sine Wave Reference at a 0 dB |
| 43 | Pink Noise at a – 10 dB Average Level |
| 44 | Pink Noise Right Channel Only at a – 10 dB Average Level |
| 45 | Pink Noise Left Channel Only at a – 10 dB Average Level |
| 46 | White Noise at a – 10 dB Average Level |
| 47 | Brown Noise at a – 10 dB Average Level |
| 48 | Seismic Noise at a – 10 dB Average Level |
| 49 | Sub-Sonic Noise at a – 10 dB Average Level |
| 50 | Dual tones of 15 Kilo Hertz & 16 Kilo Hertz with a 1:1 amplitude ratio for Intermodulation Distortion |
| | Testing |
| Total Time = (approximately) 10 minutes | |

Special Processing Notes:

Note 1: Highlight the entire Wave file and apply the Mute function found under the Edit menu.

Note 2: Highlight the entire Wave file and apply the File conversion Filter found under the Filter Menu. Set the File Conversion filter as follows:

From Stereo to Stereo Left Channel Amplitude set to – 96 dB Run the Filter and assign the resultant file to its sources name.

Note 3: Highlight the entire Wave file and apply the File conversion Filter found under the Filter Menu. Set the File Conversion filter as follows:

From Stereo to Stereo Right Channel Amplitude set to – 96 dB Run the Filter and assign the resultant file to its sources name.

Note 4: In the Make Waves Generator, set up the following additional parameters: Check the Linear Sweep Checkbox Set the Frequency for 20 Hz Set the Stop Frequency for 20000 Hz

Note 5: Bring up the Multi filter. Find the "White to Pink Noise Converter, 20 KHz" preset. Click on it. Run the Filter and assign the resultant filter to its sources name.

Note 6: Bring up the Multi filter. Find the "White to Pink Noise Converter, 20 KHz" preset. Click on it. Make the Destination the Source. Next, bring up the File Conversion Filter and set it as follows:

From Stereo to Stereo Left Channel Amplitude set to – 96 dB Run the Filter and assign the resultant file to its sources name.

Note 7: Bring up the Multi filter. Find the "White to Pink Noise Converter, 20 KHz" preset. Click on it. Make the Destination the Source. Next, bring up the File Conversion Filter and set it as follows:

From Stereo to Stereo Right Channel Amplitude set to – 96 dB Run the Filter and assign the resultant file to its sources name.

* See Warning Below

Note 8: Bring up the Multi filter. Find the "White to Pink Noise Converter, 20 KHz" preset. Click on it. Make the Destination the Source. Next, bring up the File Conversion Filter and set it as follows:

Find preset called "Stereo Phase Inversion." Click on it Run the Filter and assign the resultant file to its sources name

* See Warning Below!

Note 9: Bring up the Multi filter found under the Filter menu. Find the "White Noise to 1-3rd Octave Bucket Converter. Click on the Notch Filter on the Multi filter signal line. Adjust the Center Frequency to the Frequency in Hz as shown on the Track Matrix. Close the Notch Filter. Run the Multi filter and assign the resultant file to its sources name.

* See Warning Below!

Note 10: Bring up the Multi filter found under the Filter menu. Find the "White (Random) to Brown Noise Converter." Run the Multi filter and assign the resultant file to its sources name.

*See Warning Below!

Note 11: Bring up the Multi filter found under the Filter menu. Find the "White to Seismic Noise Converter 50 Hz." Run the Multi filter and assign the resultant file to its sources name.

*See Warning Below!

Note 12: Bring up the Multi filter found under the Filter menu. Find the "White to Seismic Noise Converter 20 Hz." Run the Multi filter and assign the resultant file to its sources name.

*See Warning Below!

Note 13: Bring up the File conversion Filter. Find and set up the Preset called "1000 Hz, = 90 degree phase shift converter" (This is nothing more than a setting of 0.25 on the Time Offset parameter). Run the Filter and assign the resultant file to its sources name.

Note 14: Paste Mix the two signals with 4:1 Amplitude Ratio (12 dB difference)

Note 15: Paste Mix the two signals with 1:1 Amplitude Ratio (0 dB difference)

*Warning: Do not change any of the parameters on any of the filters in the "White Noise to 1-3rd Octave Bucket Converter"! Doing so will destroy the accuracy of the resultant Test Wave files that you will be creating!

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