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MAKE MP3S SOUND BETTER THAN CDS

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This is the first of a series of recordings on HOW TO ACHIEVE HIGH FIDELITY SOUND. These recordings will apply at various times to your home stereo system, your car stereo, your iPod or cell phone or even a concert hall or movie theater. This first recording deals with how to make your MP3s sound better than the CDs from which they were originally made.

MY BACKGROUND

First I want to give you a little background on how I got started in all this. Back when I was 14 years old, I was an avid ham radio operator. I built my own station WINMG and I even held commercial radiotelephone and radiotelegraph operator licenses. When the United States entered World War II, the government shut down ham radio for national security reasons. That is when I got interested in high fidelity audio, and I've been at it ever since. Over the years I've designed and built several audio systems for my own enjoyment and each one has been better than the last.

You can see pictures of my first system in my biography at my web site www.burwenaudio.com. That system in 1945 had colored lights, just like my present system. The first system used Christmas tree lamps. My current system has 120 V colored lamps totaling 6,000 watts and the colors vary with the music. My home is designed around my hi-fi audio system and was built for 5-channel sound in 1966. 34 amplifier channels deliver the equivalent of 20,000 W of sound to 169 speaker drivers all in one room. There is a page on my sound system and PDF copies of Audio magazine technical articles on it also at www.burwenaudio.com. My first system, used fewer speakers, and wasn't as powerful. A single 6L6G tube delivered only 3 W through an output transformer to a 15-inch coaxial speaker plus two 5-inch tweeters. The Audax phono pickup arm employed the first diamond stylus. Before that I used sapphire styli, and they wore out in only 25 plays of the gritty 78-rpm phonograph records.

FREQUENCY RESPONSE

What I learned from designing my first audio system was that you could greatly improve the sound by using equalization to compensate the frequency response for speaker and program deficiencies. Frequency response is a measure of how much your system amplifies tones at different audio frequencies. It is usually shown as a graph of decibels (dB) vs. frequency. Decibels vary logarithmically with the gain (output/input), and frequency is usually shown on a logarithmic scale. The audible frequency range for me ranges from 15 Hz to 20,000 Hz. 15 Hz is slightly below the frequency of a 32-foot organ pipe and a bass drum has some energy

content down to 15 Hz. Each piece of equipment in your signal chain has its own frequency response and generally an attempt is made to obtain flat response over the entire range. That means the same amplification of all frequencies; so a plot of the frequency response is a horizontal straight line.

The second recording in “How to Achieve High Fidelity Sound” will deal more in detail with frequency response which I consider to be *the* most important aspect of a sound reproduction system.

There are two types of frequency response I want to talk about. Most frequency response curves are gradual. They tilt only very gradually without any significant ripples in the curve. That's what most equipment looks like. A loudspeaker has an irregular response with a lot of peaks and valleys due to imperfections. There is a type of frequency response that has a lot of desirable peaks and valleys. It is caused when sound bounces back and forth among the various surfaces of a room to produce reverberation. If you play a particular tone in a live room, the addition and subtraction of sound reflections produces standing waves. There some places in the room where the sound is loud and some places where it is very soft. You can detect them just by walking across the room. It is something like plucked a violent string, but it occurs in three dimensions. If you vary the frequency of the tone and listen at a fixed position, the standing wave pattern moves, producing alternate peaks and valleys in what you hear – ripples in the frequency response.

YOUR LISTENING SPACE

What is the desired frequency response for your room? Well, I can tell you it is not flat response or a straight line, which is what some engineers are trying to achieve. Did you ever listen to a trumpet played outdoors? When it's really blasting, and the trumpet is aimed right at your head, it sounds awful. To hear the trumpet sounding really good, listen to it played in a live room, at 45° or so off its axis. Reverberation is what makes it musical.

What you heard outdoors is flat response where there is no reverberation to produce ripples in the frequency response. Indoors in a live room the frequency response is full of peaks and valleys as the sound waves at various frequencies add and subtract at any particular point in space where you happen to be listening. So, in your sound system at home or in your iPod, you don't want to hear perfectly flat response; you want some ripples in the frequency response caused by reverberation. The other important aspect of frequency response is its general trend. Flat response may sound good, or a somewhat gradually tilted trend line may sound better.

MP3 SOUND

Now let's consider what's wrong with MP3s. There are a number of engineers in the recording field who really hate the sound of MP3s, because they are somewhat degraded from the original CDs. MP3s save file space and are made by compressing the WAV file from the original CD in a codec that discards a little of the music information that you supposedly don't notice. Your player continuously reconstructs the original waveform and delivers it in analog form to your speakers or headphones, but only approximately.

I find most original CDs are not so hot either. There's a lot of bad sound available, especially from older CDs made on inferior or poorly operated recording equipment. I attribute a lot of the bad sound on CDs to poor taste and lack of skill on the part of the engineers who recorded them. Now I have a pretty good sound system in my home and when I listen to all the recordings in my collection, especially CDs, I don't enjoy them, unless I reprocess them to change the tonal balance and add my unique high frequency reverberation. It makes the sound smoother, fuller, and more musical. This applies even to my own 30 years of live concert recordings, which I considered very high fidelity at the time when I recorded them.

HIGH FREQUENCY REVERBERATION

The simplest solution I have for dealing with a collection of recordings is my BURWEN BOBCAT TR audio software. TR stands for True. Bobcat stands for BURWEN OPERATING SYSTEM – BEST COMPUTER AUDIO TECHNOLOGY. This software plugs into the Windows Media Player. So it works only on PCs or Apple computers that have the Windows Operating System. The unique feature of BURWEN BOBCAT TR is high-frequency reverberation.

As I explained, reverberation is a series of reflections of sound from the boundaries of a room. Because of physical dimensions and sound absorption there is very little reflected sound at the extreme high frequencies, practically nothing above 5000 Hz. BURWEN BOBCAT TR provides reverberation to beyond 20,000 Hz. That is unlike natural reverberation. It is also unlike every other company's artificial reverberation. Generally artificial reverberation rolls off the high frequencies in an attempt to make it like real reverberation.

I found that the missing high frequencies in real reverberation are what your ears really like to listen to. My high-frequency reverberation doesn't sound hollow or like an echo. It is a very subtle effect. What it does is produce ripples in the frequency response or very narrow resonances - thousands of them. Ordinary reverberation may have only hundreds of resonances. The smaller high-frequency resonances produced by BURWEN BOBCAT TR tend to remove the imperfections that occur in MP3s and other recordings. High-frequency reverberation actually makes sound reproduction more natural, and as I mentioned, it does not make it sound hollow like ordinary artificial reverberation.

It is a subtle effect that makes everything smooth and musical. When I say subtle, I mean musicians hear it immediately and love it, but you may not notice much at first. If you listen with it for two or three weeks and then shut off, you will find you don't want to live without it.

USING BURWEN BOBCAT TR

BURWEN BOBCAT TR is a very simple product to use. It has three buttons, Pure, Smooth, and No Bobcat which is the same as Bypass, giving you the original unprocessed sound. Pure adds the extreme high-frequency reverberation. It is a 400 millisecond long reverb, that does not sound hollow, and adds subtle ambiance that audiophiles call "air". A small amount of equalization makes the extreme low bass more solid and sweetens violins and other instruments. The effect of the high frequency reverberation and the slight equalization is just enough to make everything more pleasing and easier to listen to - it reduces listening fatigue.

The Smooth button adds more ambiance from a 600-millisecond reverb and changes the tonal balance to deliver a bit more bass and reduced shrillness in the treble. When reproduced from

a very accurate speaker system, most recordings have too much high frequency content. This is inherent because close microphone placement picks up high frequencies better than the audience hears them. Smooth is optimized for poorer recordings, and it incorporates new technology called NO SCREECH that fixes screechy vocals. This is a dynamically varying equalizer that tames a singer's loudest high notes with no noticeable effect on the rest of the music. For example, if you are a Beatles fan, but never enjoy their old songs played loud because the high frequencies melt your ears, SMOOTH will fix their recordings.

Most of my life, I avoided listening to vocals because the occasional high notes that singers yell out were very irritating to my ears. Turning down the treble to make these few notes listenable ruined the rest of the music. So I developed an automatically variable equalizer that attenuates the 4000 Hz region, where your ears are most sensitive, only during the loudest high notes. At the same time NO SCREECH boosts the 600 Hz region so the voice is fuller and does not lose impact. Now I enjoy vocals.

NO SCREECH and actually the entire BURWEN BOBCAT TR are directly derived from my professional AUDIO SPLENDOR remastering software, described at www.burwenaudio.com. As a plug-in for the Windows Media Player you can process music files when you listen, rip, or burn. Just keep Bobcat open and select Pure or Smooth.

BOBCAT PROCESS YOUR LIBRARY

BURWEN BOBCAT processing will improve all music files. MP3s actually sound better than the CDs from which they were originally made.

Use the high-speed file converter in BURWEN BOBCAT TR to convert your music files to BURWEN BOBCAT processed MP3 or lossless WMA files for your portable player, cell phone, home player, or computer. The input type can be MP3, WMA, or WAV. Convert a single track, or convert all in one batch, a whole album of tracks, or even your entire library. Simply drop your music files or the folders containing them onto the Bobcat window, and it will make new files processed by Pure or Smooth depending upon which button you selected.

First use Windows Explorer to make a new destination folder for the processed files. Then select the original files or folders and drag and drop them on the BURWEN BOBCAT window. You can copy the processed files to your iPod a cell phone or just listen to them and they will all sound smoother, more musical, and generally more pleasing. Bobcat detects processed files and avoids double processing by automatically playing them via No Bobcat.

SUMMARY

To summarize, frequency response is *the* most important characteristic of music reproduction. There are two types of curves - one, made by tone controls, shows smooth gradual changes over the audio range; the other caused by reverberation shows hundreds or thousands of resonances. High frequency reverberation, unlike that in real rooms or electronic reverberators, produces thousands of resonances and is what your ears really like to hear. It actually makes recordings seem more natural and musical. Use BURWEN BOBCAT TR to apply high frequency reverberation and slight equalization to all types of recordings. It will make MP3s sound better than the original recordings from which they were made.

Get my next recording in two weeks, "FREQUENCY RESPONSE IS MOST IMPORTANT". This will explain how making gradual changes in frequency response can make a huge improvement in music reproduction, and how extremely sensitive your ears are to tonal balance. While I urge using BURWEN BOBCAT TONE BALANCER software for fine frequency response control, if you cannot or do not want to use it, then use someone else's equalizer. BURWEN BOBCAT TONE BALANCER changes the sound of included BURWEN BOBCAT TR to produce glorious 2-channel or 5-channel sound from ordinary CDs or MP3s by adding ambiance into the rear and front channels.

At www.burwenbobcat.com listen to a demonstration of how BURWEN BOBCAT TR can make an MP3 sound better than an original live recording, and how BURWEN BOBCAT TONE BALANCER can live remaster your music and your sound system. Instructions for the two programs provide more details on making processed music files.



BURWEN BOBCAT TR