

Returning Lost Frequencies to Mary Lou Song

Introduction

When I was a teenager, I listened to a song titled “Mary Lou” by Duke Yellman and his orchestra played on an Edison Amberola model 30 phonograph. The music was recorded in 1926 and the version I heard was recorded without any electrical devices. The record was in the shape of a cylinder and was played back using mechanical means. Refer to figure one.



Figure 1 Edison Amberola Phonograph

The source of this early music came from a large collection of early phonographs that my father had collected. For many years I enjoyed this song and other Edison four-minute Blue Amberola Records played on early Edison cylinder machines.

After a long career as an Electrical Engineer, I bought some Edison Diamond Disc Flat Records and a Sheraton Model Edison phonograph. In one collection of records, I found the same recording of “Mary Lou” but now on a flat record (Figure Two). I learned that the original recording of the song was on this flat record and was dubbed onto the cylinder record via mechanical means. When the same song was played back on a Diamond Disc Phonograph (figure three), the sound was much more natural sounding.



Figure 2 Edison Diamond Disc Song “Mary Lou”



Figure 3 Edison Sheraton Diamond Disc Phonograph.

In my retirement years, I have been researching methods to improve the song “Mary Lou” and other early music that was recorded solely using the music power from their voices and instruments. This music era, when Acoustic Recording was used, contains a wonderful collection of historical music encompassing early jazz and other types of music. The sound from these antique phonographs, while enjoyable, always lacked many frequencies due to the technology used at the time.

After developing the best method to convert the mechanical motion from the record groove to a digital music file, I tried to further improve the sound by boosting the low and high frequencies using tone controls and then multi-band equalizers. This technique failed to improve the music but did increase the record noise due to the fact that desired musical frequencies were recorded at similar levels to the background mechanical noise present during the early days of recording. The mechanical playback period phonographs did not reproduce the lower frequencies so that the listening public enjoyed music without rumble or noise while at the same time missing out on many fundamental music tones. You cannot modify the music’s tonal frequencies if they are not present. A new method was needed to improve the sound from these Acoustic Recordings.

New Enhancement Method

After a number of years of research, I developed this *new method* specifically for Acoustical Recorded Music that uses a special type of dynamic frequency modification that takes advantage of the ***Harmonic Relationship of Music from Instruments***. All musical instruments produce a fundamental note with various harmonic frequencies that are related to the fundamental in exact multiples. Many low frequency instruments that are heard on acoustic recorded music are missing the fundamental note, but do contain the various harmonics. The method uses the harmonics of these instruments to *create* new fundamental notes which provides a significant improvement in the sound.

The core of the method is to create new low frequencies over a limited range lacking in the original recording. These newly created low frequencies are then merged into a limited range of the original music where the recording was accurate. The resultant combination of new low frequencies and the good part of the original music now contain a balanced range of music from low to high notes. Since the new

low frequencies have been derived from harmonics of the various instruments the previous instruments that did not record well, now sound normal.

The purpose of this modification is to bring the overall music experience back to what was originally heard in the recording studio by placing in the song additional new frequencies, that were present in the recording studio, but were not recorded in the original records. With new frequencies added, the music can take advantage of traditional tone controls to further improve the sound of these wonderful songs, many close to or over 100 years old. The method is known as *Acoustic Enhancement*.

Listening Results

All of the files contain the same song, “Mary Lou” by Duke Yellman and his orchestra.

1. Song played on an Edison Amberola Phonograph using a microphone and conversion to a wav type file (44.1 K Samples per second and 16 Bits). During the beginning of the recording, note how the background noise changes just before the music starts. This change in background noise represents the start of the mechanical dubbing from the Diamond Disc recording.
2. Song played on an Edison Sheraton Diamond Disc Phonograph using a microphone and conversion to a wav type file (44.1 K Samples per second and 16 Bits).
3. Song recorded (96 K Samples per second and 16 Bits) with magnetic cartridge and turntable, after software cleanup of groove distortions.
4. Song from file three after the use of my Acoustic Enhancement Method.

Frequency Spectrum Results

Frequency Spectrums of the music files are shown. The file is an average amplitude of all frequencies from 20 Hz to 20,000 Hz.

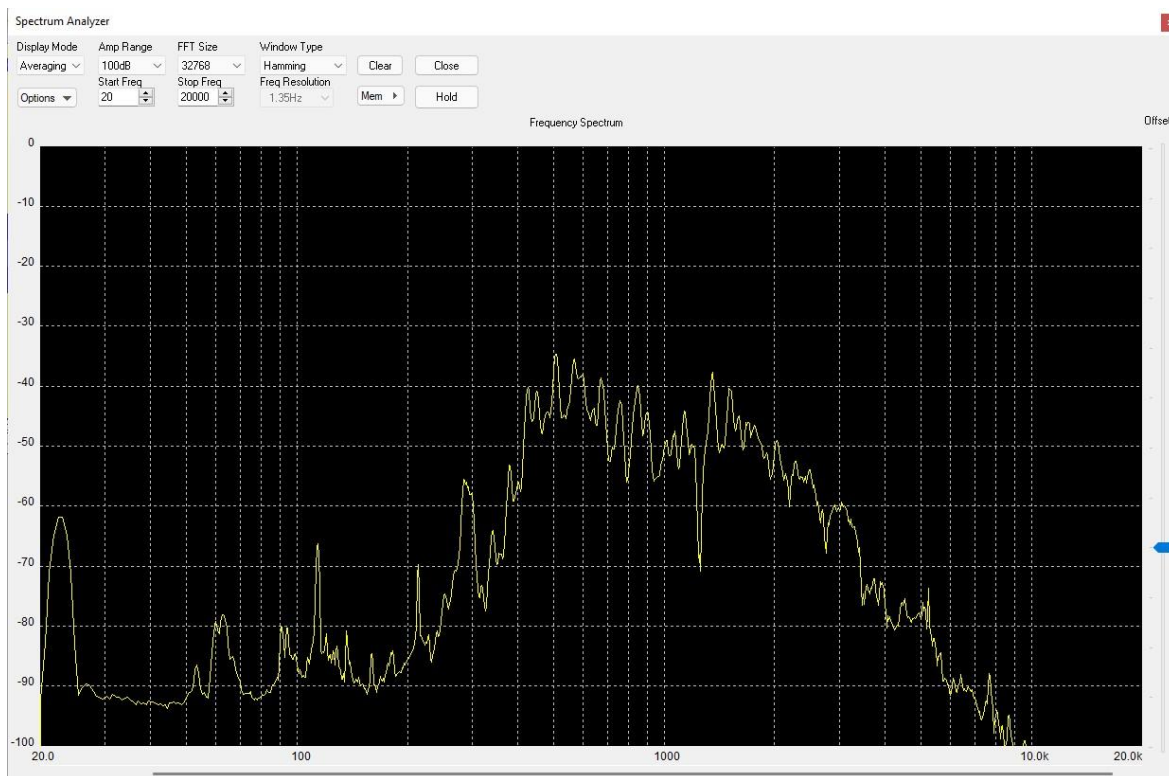


Figure 4 Music Spectrum Edison Amberola 30

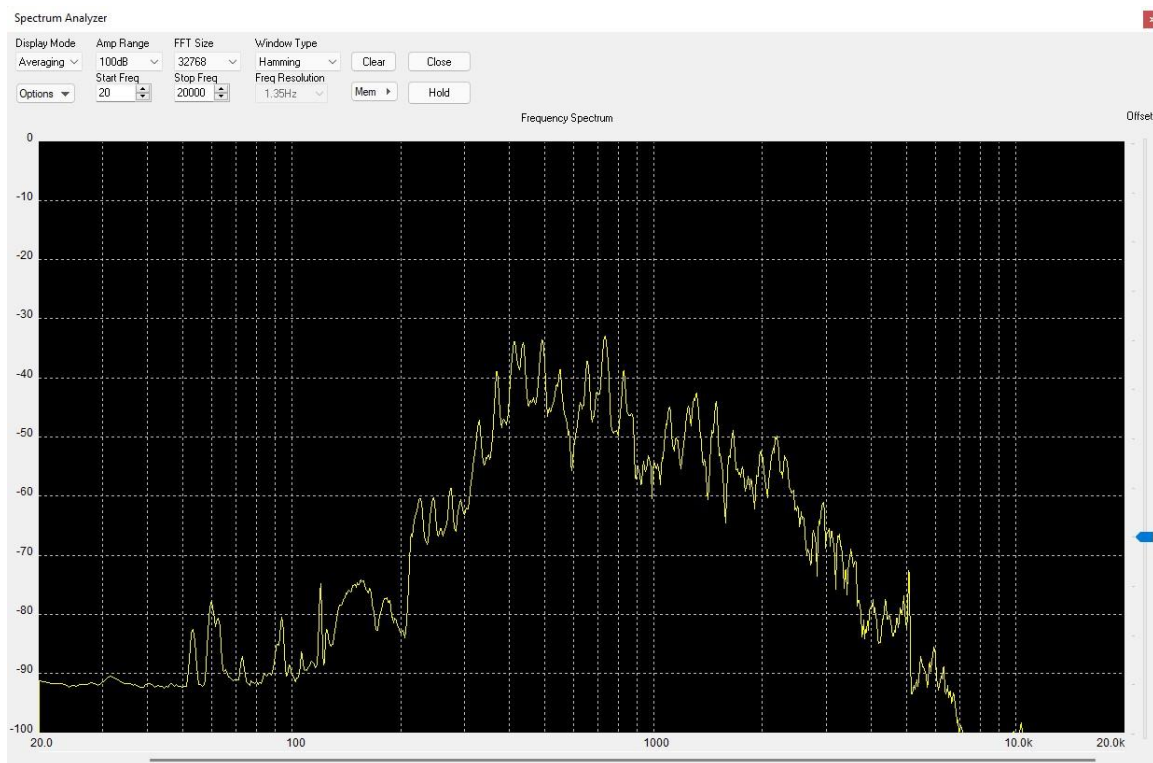


Figure 5 Music Spectrum from Edison Sheraton

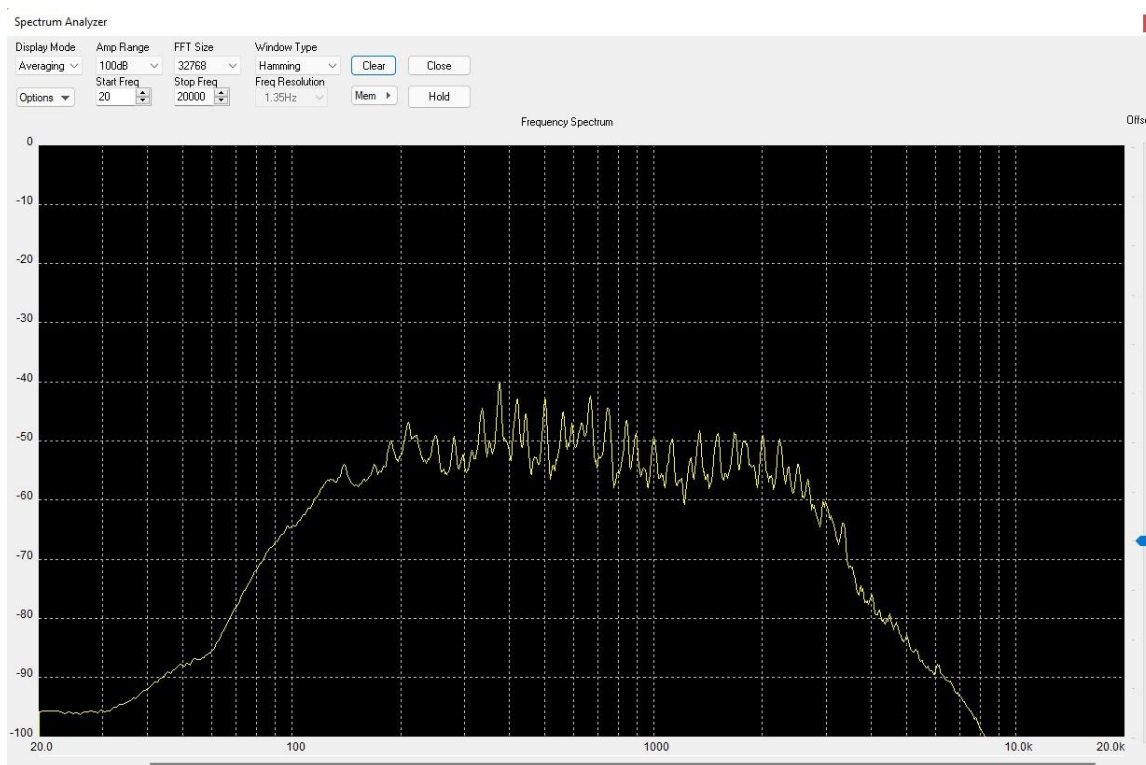


Figure 6 Enhanced Spectrum Result

Conclusion

The music spectrum in figure four corresponds to the song I heard first as a teenager. The low and high end are missing many music frequencies and the curve has many “dips” and “bumps”. The song is still fun to hear at this limited stage. Figure five shows an improvement in the shape of the music and represents the best that the Acoustic recording and playback was capable of from the inventor of the phonograph.

Figure six demonstrates a major improvement in more low-end frequencies (that were missing), high end frequencies, and a much smoother curve void of large changes.

Figure seven contains an overlay of the original song on the Amberola and the enhanced song.

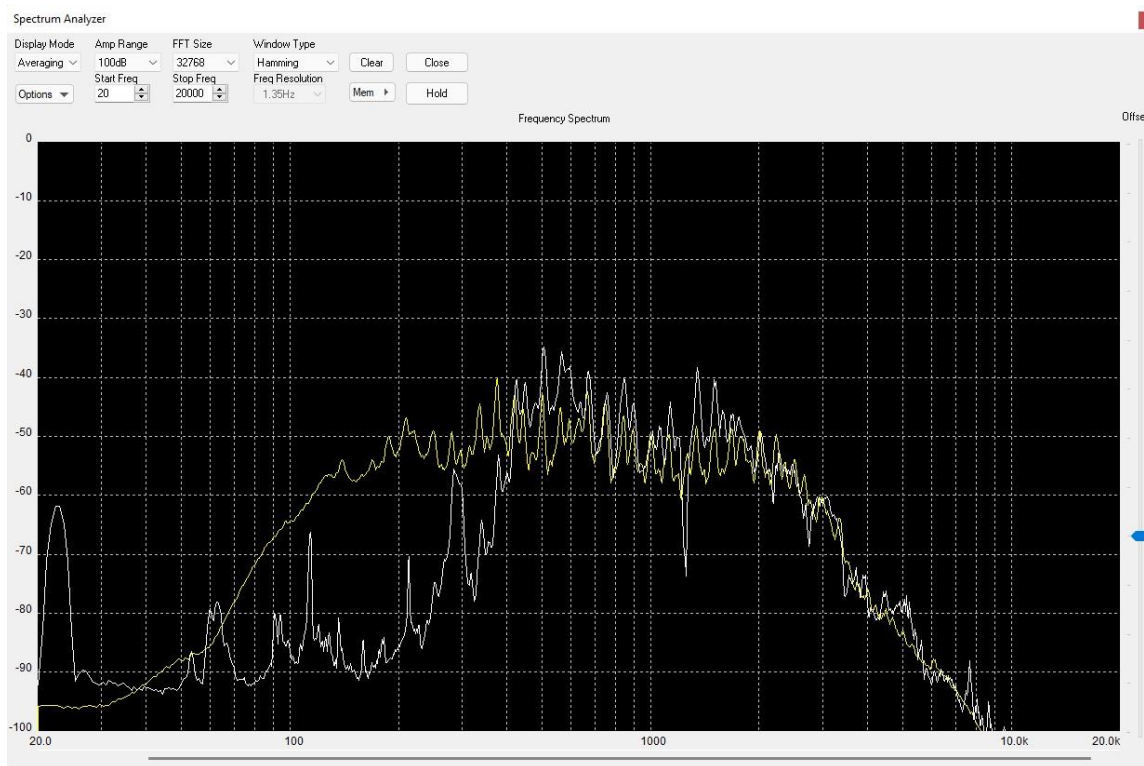


Figure 7 Yellow Enhanced, White Amberola Cylinder

My goal was to bring back the sound from these priceless music recording , many of which are close to 100 years old; “Restored To Sound the Way It Was Recorded”.

These records preserve an important time in our history of music. This modification to the music will make it sound as if you were in the studio when originally recorded and in turn appeal to a wide audience of music lovers.

Contact Information

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