

We Have Lift-off!!



THE SOUND OF LIFTOFF!

Thanks to the help of a friend at NASA, I was able to record the liftoff of the Space Shuttle Discovery on March 8, 2001 from the Kennedy Space Center VIP viewing site at 3.1 miles from the launchpad (as close as they let anyone get during the launch except for crew members). Also with the courtesy and help of Gary Baldassari, Mike Morgan, and Andy DeGanahl, who supplied some of the equipment used. Andy and I braved the all-nighter and captured the launch at 6:42:09.059 am EST.

10/20/06

We are very pleased to present to you a quick time video of the shuttle launch with 16 bit 48 K Apple Lossless Sound. PC Users: If the movie will not run when you click on it, then download Quicktime 7. The music is provided by Orlando's superb [Sovereign Brass](#), whose album I mastered. Audio engineer Andy DeGanahl took the images with his trusty 8mm handcam, Andy, don't quit your day job! Maybe shortly I'll upload a 96 kHz/24 bit stereo audio only of the last 10 seconds of the launch. Write if you'd like me to do that.

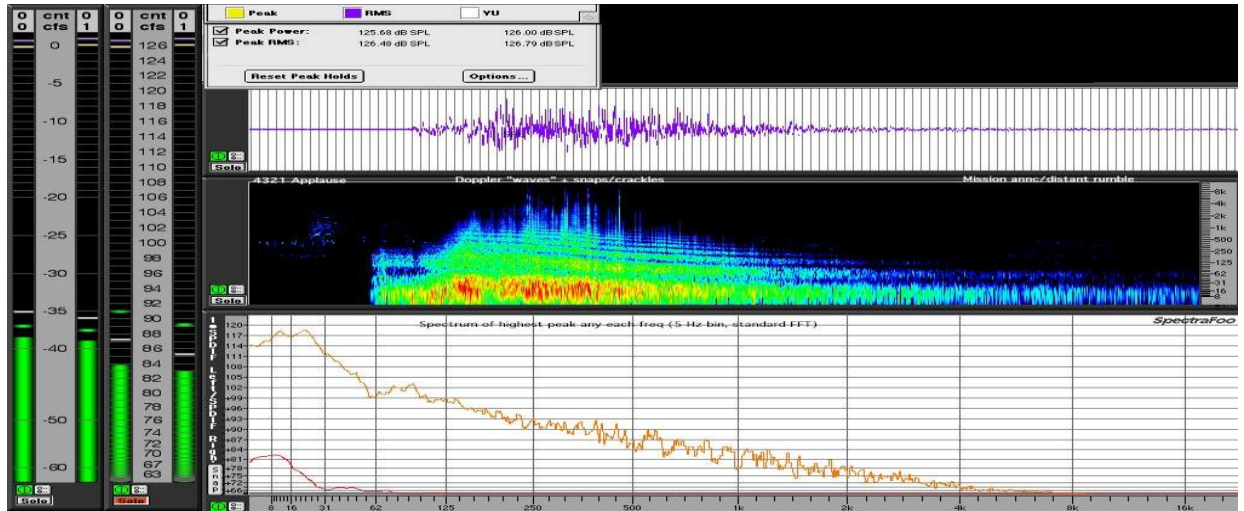
Technical specs of the recording

Four microphones and two independent hard disc recorders at 24 bits, 96 kHz were used, which were sync'd up later to produce a fantastic surround recording. Two spaced omnis at 6 foot left and right distance were DPA 4041s, and on the same stands, "synchronous" Sennheiser MKH-30 figure 8's. When decoded via dual MS decoders to surround, the outdoor enthusiastic audience should subtend an angle from about 45 degrees left or right all the way around and behind the listener, with the NASA announcements to the right and behind you. The shuttle liftoff commands stage front center, but with doppler waves and echos throughout the front soundstage and distant echoes behind you. Playing this back in surround is a true "environmental experience."

On the Spectrafoo Audio Analysis

Through the magic of [Spectrafoo's](#) audio analysis tools, the audio "portrait" below demonstrates that there's nothing like being there. The spectrogram runs from T minus 4 seconds to about T plus 2 minutes. I don't think there's anything on earth that compares with the sound and sight of that fire-breathing monster on liftoff. If you study these incredible specs, including a spectrogramic timeline of the liftoff, you will see that to do justice to the experience, you will need a low-distortion subwoofer system capable of producing up to ~119 dB SPL on peaks at 25 Hz and ~116 dB SPL at 16 Hz and below! If not, then you will not be able to feel the chest-thumping, clean solid bottom that is produced. Ironically, the shuttle liftoff from the VIP site is "just loud enough" in person, a pleasant and not ear-damaging experience. Think of it as an 8.3 GWatt amplifier/loudspeaker with zero percent distortion and response down to DC! Running at say, 40% efficiency, that would take 20 thousand megawatts from the breaker box! Those figures are calculated by Dick Pierce from the comparable Saturn 5 moon rocket. These are the figures at 0 foot distance. Of course, some power has been dissipated at 3.1 miles, but examine the astonishing figures below.

By the way, the accompanying FFT illustrates that a point 1 (0.1) channel will serve well. Because in my standard stereo system, the woofers are properly calibrated, but the FFT shows there is far more peak energy below 100 Hz than I can achieve with a stereo system calibrated to Dolby standard level at 1 kHz. If I engineer a surround version of this, I will cross over the bass so that an ordinary system can allow bringing up the dialogue and mid frequency material to Dolby standard gain (as it stands, I can only reproduce this recording at levels about 20 dB below the actual measured acoustic levels without damaging my satellite speakers with too much low frequency information). But if I cross over the excess bass to a .1 channel with 10 dB more headroom, and then raise the gain of the recording, we should get a reasonable result with Dolby Standard monitor gain.



Thanks for reading!

Bob Katz

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