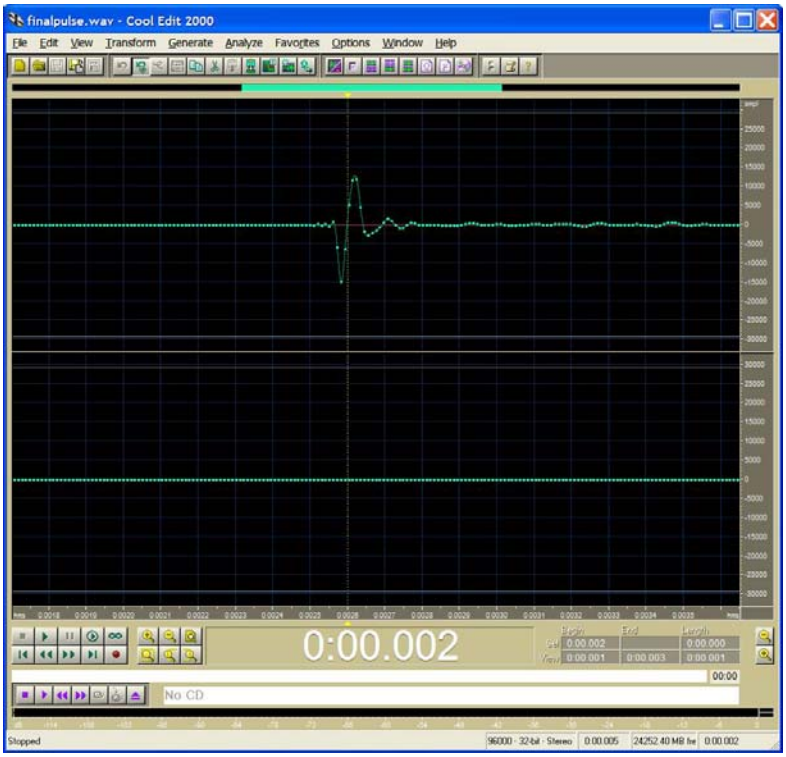
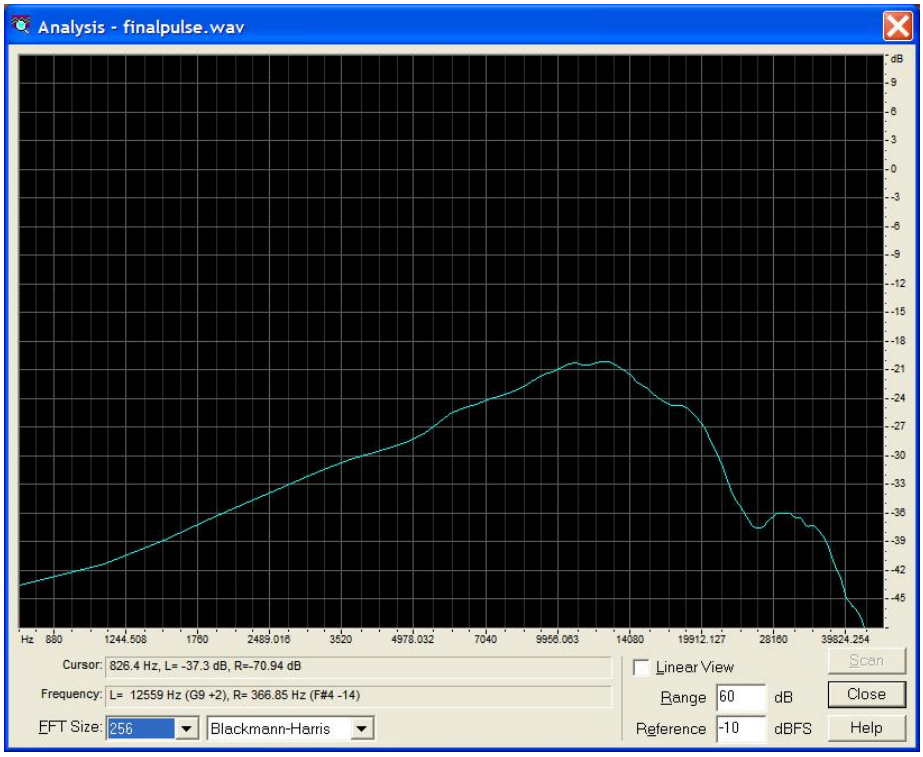
Here's my procedure for DIY microphone cal. I use a spark discharge from a grill igniter. The trick is to make the spark almost "float" in space with no objects to reflect off of for 5 feet or so before the initial arrival at the mic. The second trick is to keep the trigger button as far away as possible so its noise also does not interfere. I made a gap (~5mm) out of two sewing needles attached to two ~1 meter long thin dowels and stretched the wires as far away as possible behind the gap after taping the dowels to the edge of a table sticking out toward the mic. I hope this is a good enough explanation.

1) I record and isolate the response of the test mic. I used a Nakamichi CP3 pin point omni to try out this method. I had a response plot for it that was relatively flat so any errors would show up more easily.
2) The spark creates a doublet (20dB/decade rising response) intuitively you can imagine that it can't have DC response so that is the only physically sensible alternative ☺. You can also find that answer in several texts.
3) Flatten the response with an integration filter (-20dB/decade)
4) This should be the mic response to direct 0 degree incident spl.
5) Unfortunately there is mention on the Earthworks site of special care needed to get the high end right. Everything was almost perfect up to 10kHz but there was some high frequency rolloff. I created a "fudge factor' filter (+.9dB @12kHz, +6dB @20kHz, and +15dB @22.5kHz). I can only guess that because my spark gap is not much smaller than a wavelength at the high frequencies or some other factor like the shape of the electrical excitation from the clicker there is this discrepancy. The correction from 10k-20k is smooth and pretty small so I don't see that much of a problem. Maybe some day I'll have a chance to make an absolute cal. Here's some pictures with the final plot a direct comparison. Below 1k or so almost any mic will show ideal behavior (omni is flat).

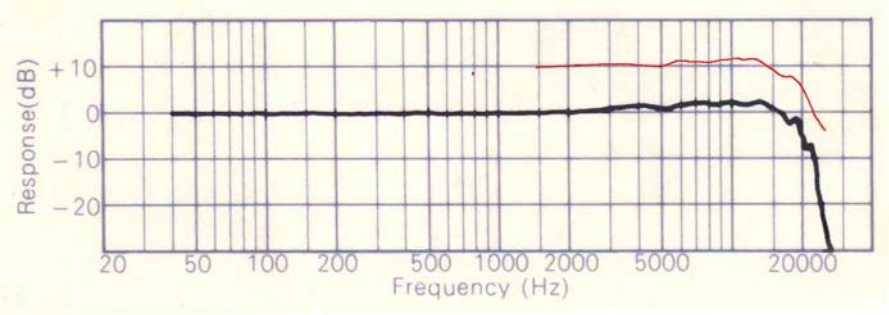
I keep the FFT's below 512 points to avoid false detail. This technique is for relative response, absolute spl cal is difficult without a reference. This test has been very repeatable certainly +-1dB and could be improved with a little averaging. In practice varying the gap width made only trivial differences in the response so I still need an argument for the highend rolloff.



The pulse



Uncorrected spectrum



Comparison (offset by 10dB)