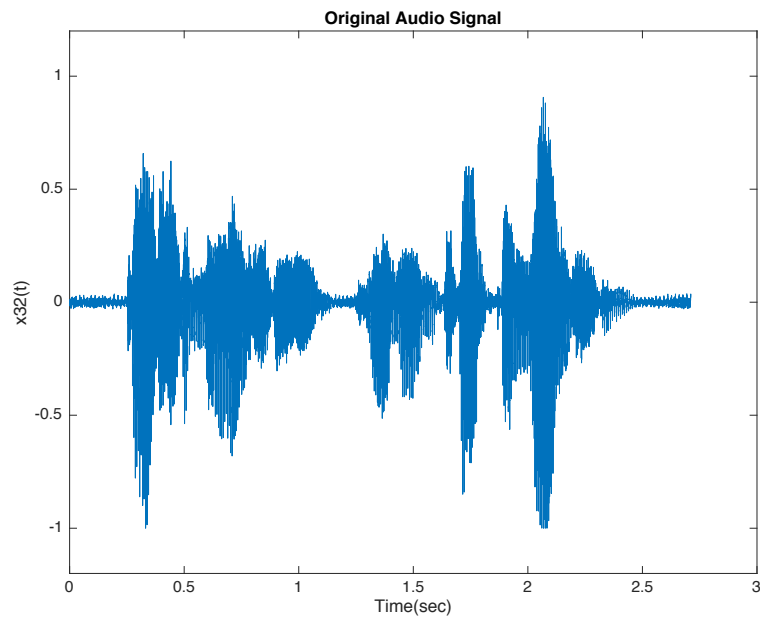John Dokoupil
ECE 714 – Fall '16
MatLab Assignment 6

1. [attached audio sample]
2.

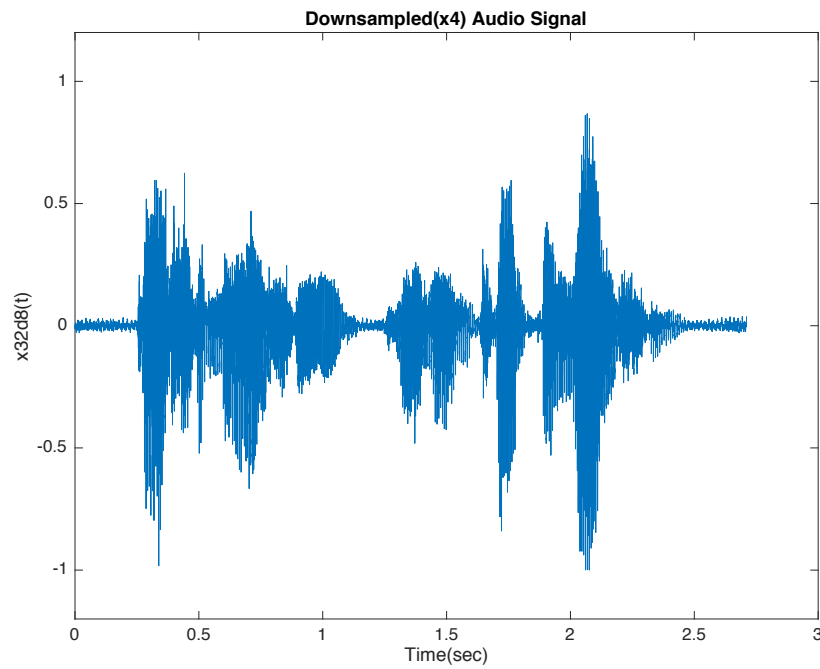**Original Audio Signal**

3.

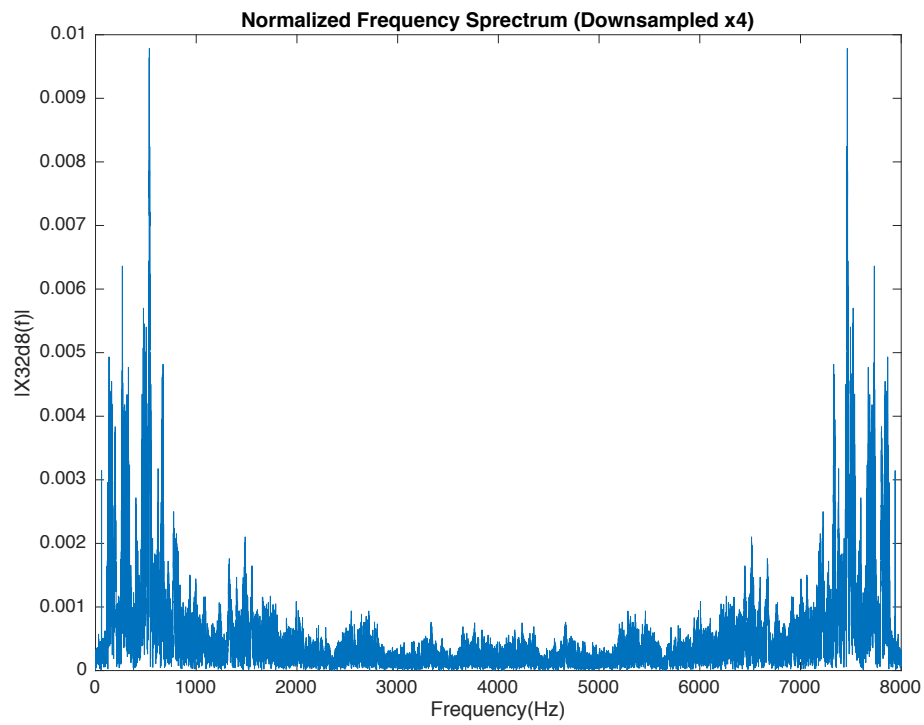**Normalized Frequency Spectrum**
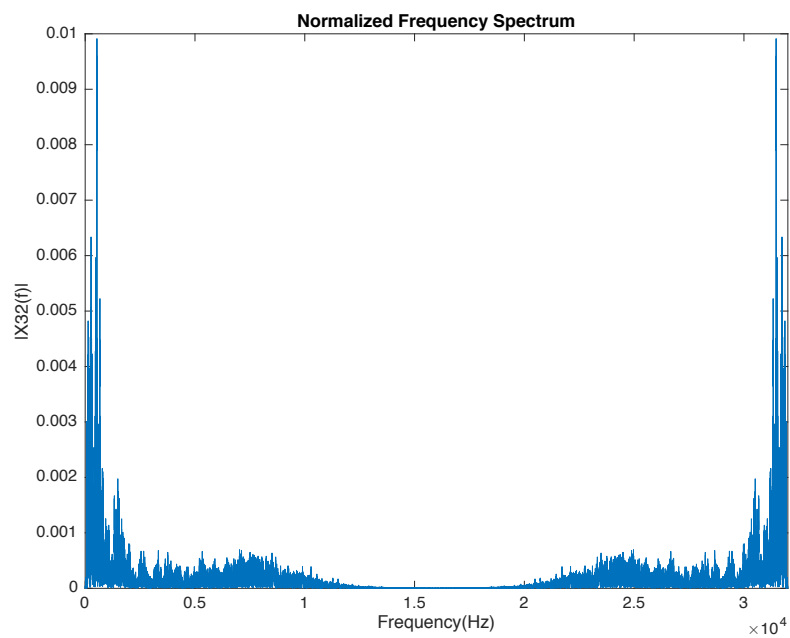
4. [attached audio signal]

       The downsampled audio signal sounds muffled compared to the original.

5.

6.

7.

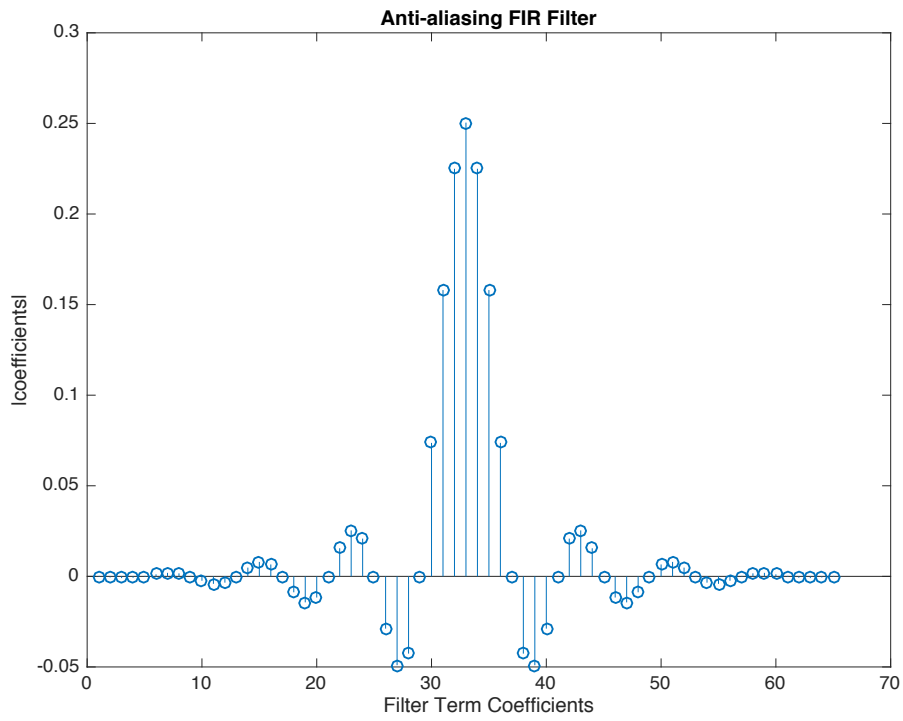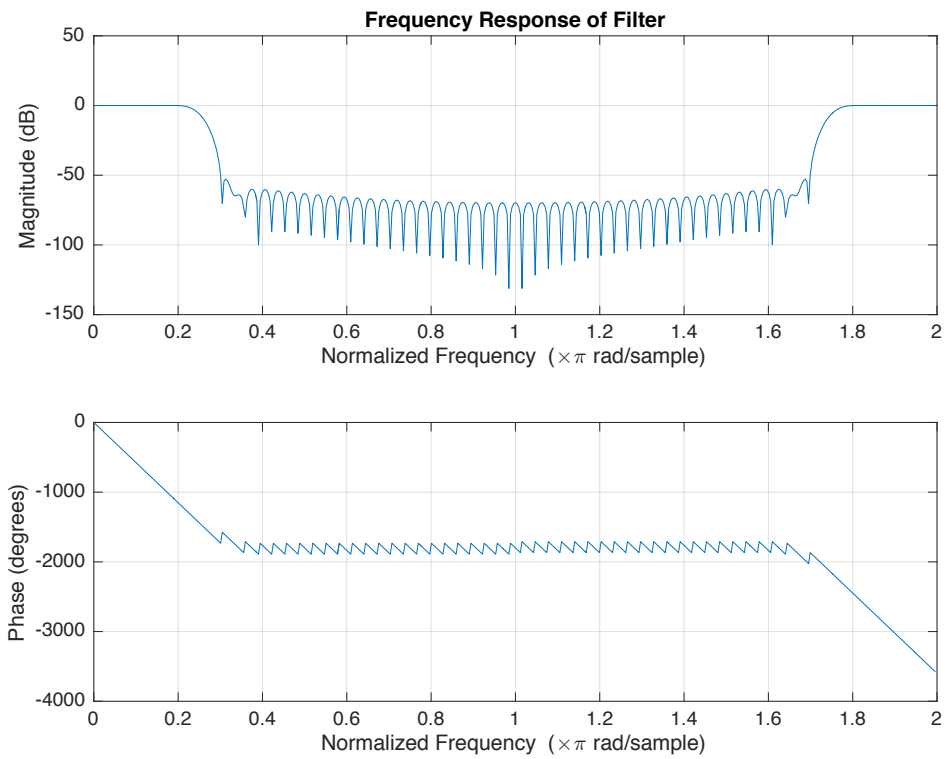**Anti-aliasing FIR Filter**
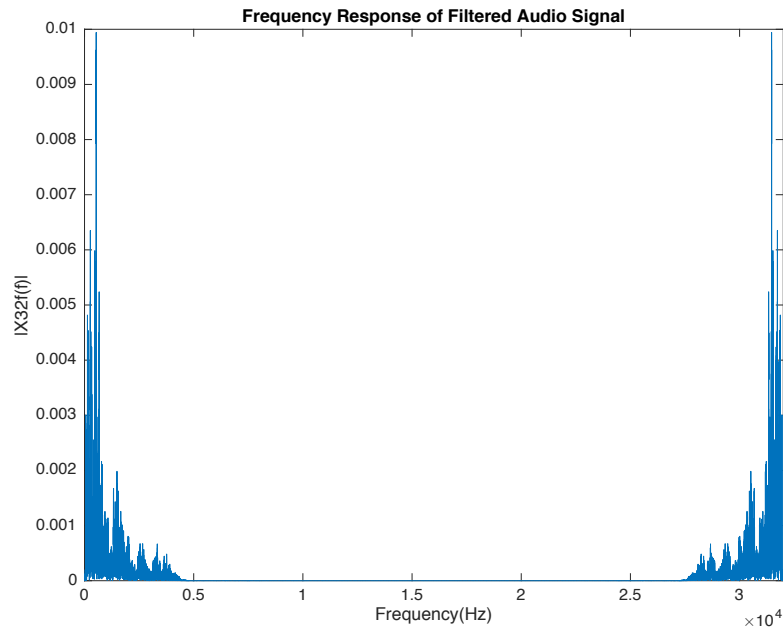

8.

Frequency Response of Filter

9.	[attached audio sample]
	The filtered audio signal sounds very clear, but with background noise and ringing eliminated from the original sample.
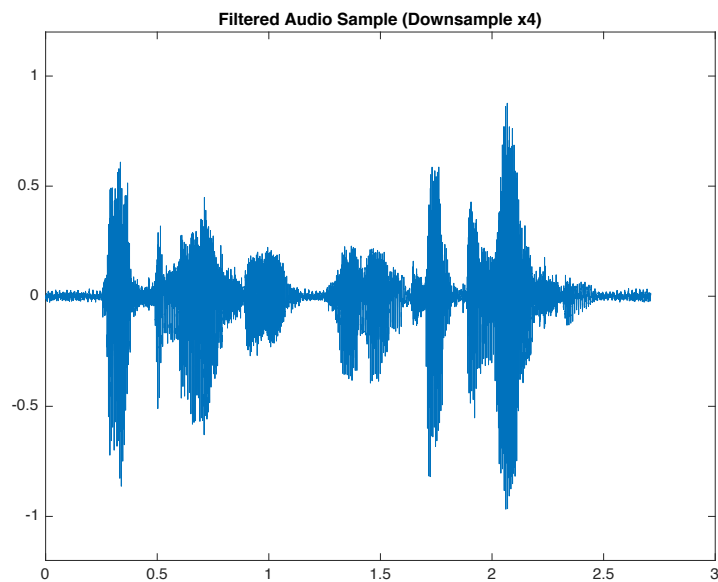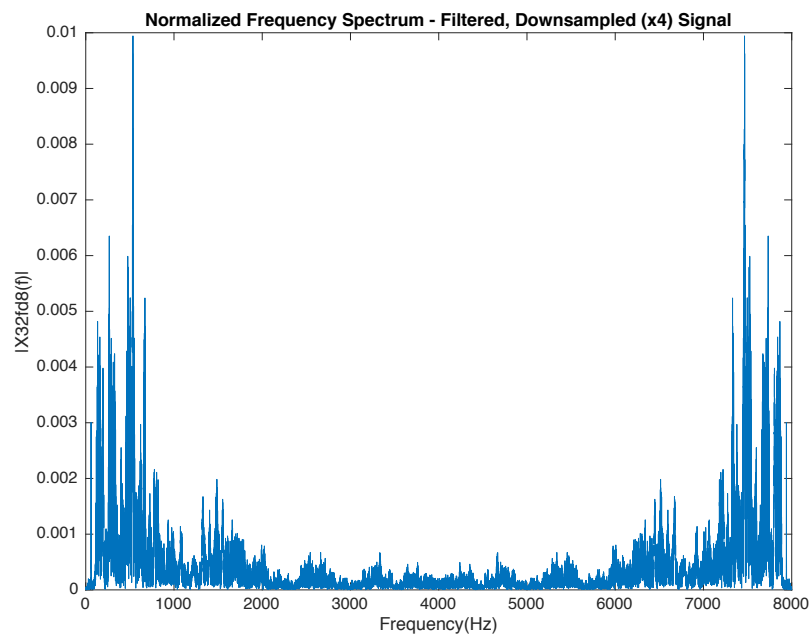
10.

Frequency Response of Filtered Audio Signal

11.	[attached audio sample]
	The sample sounds clear, with background noise eliminated from the original audio sample.

12.

Filtered Audio Sample (Downsample x4)

13.

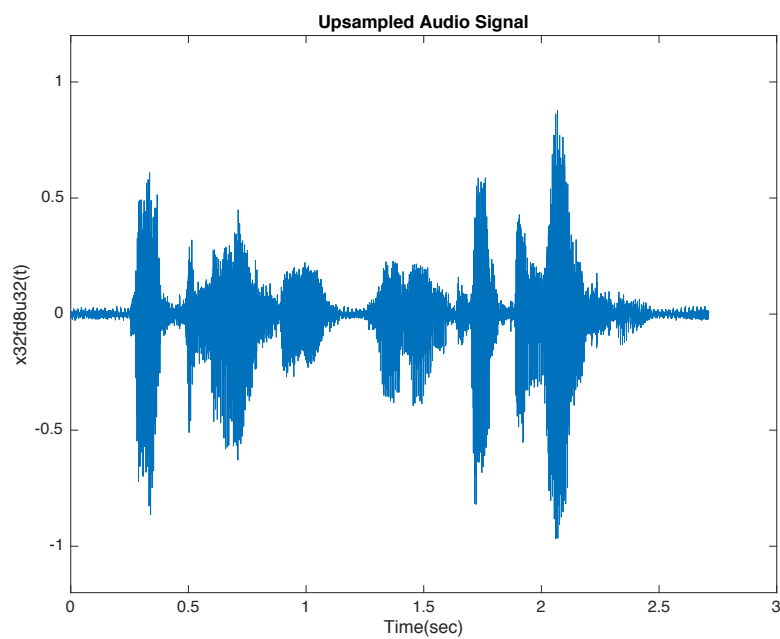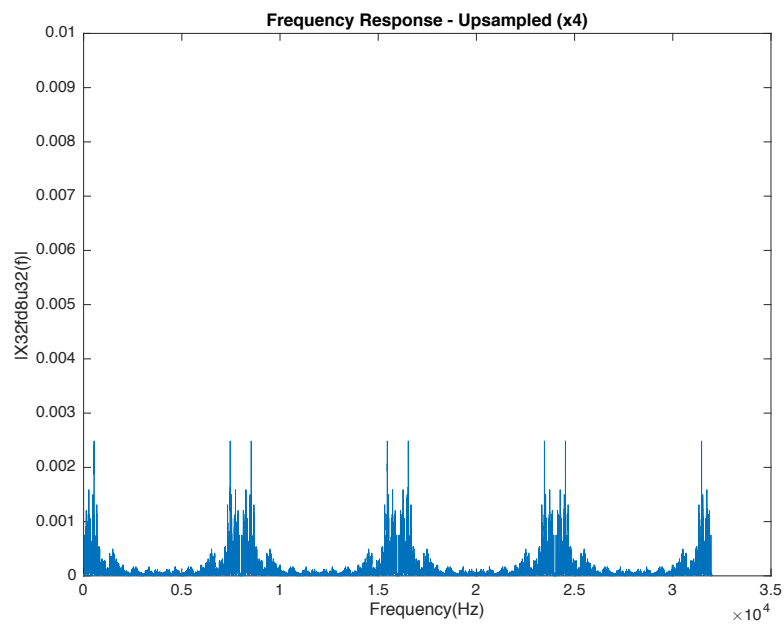Normalized Frequency Spectrum - Filtered, Downsampled (x4) Signal

14.   [attached audio sample]
        The upsampled version of the audio sample sounds grainier than the original
with a loud ringing.

15.

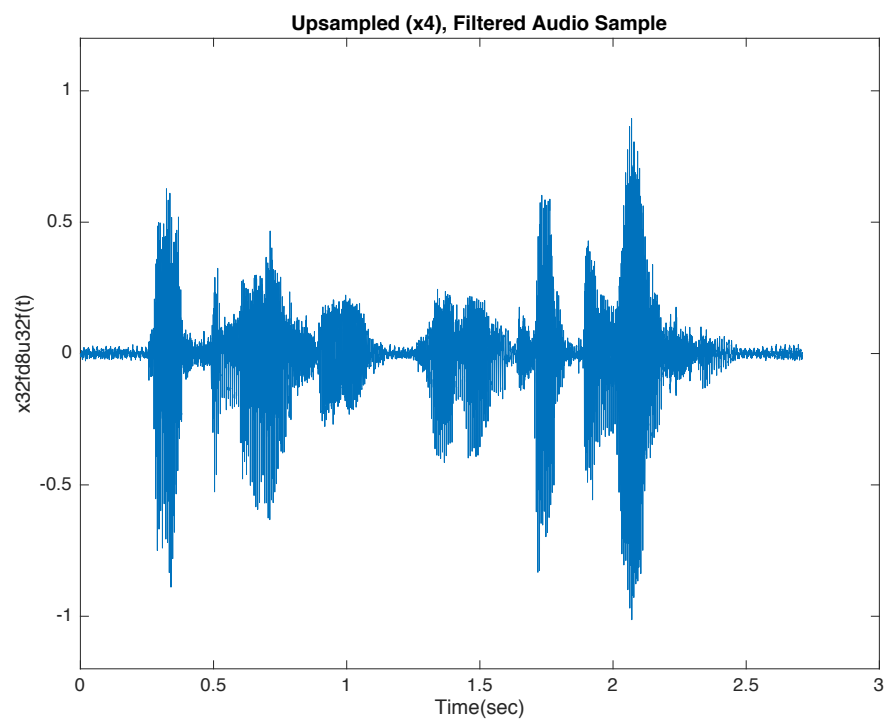Upsampled Audio Signal

16.

Frequency Response - Upsampled (x4)

17. [attached audio sample]

The filtered version of the signal sounds clear, with no background noise and none of the ringing apparent in the upsampled version.

18.

Upsampled (x4), Filtered Audio Sample

19.

Frequency Response of Filtered, Upsampled (x4) Audio Sample

Frequency(Hz)