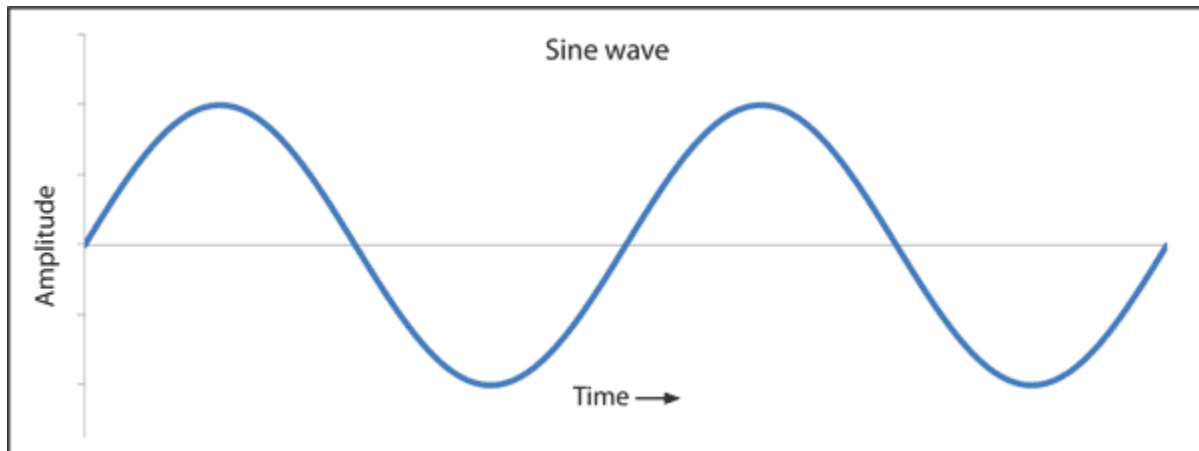*Use pencil!*

Let's talk a bit about sound. When we hear a "pure tone", what we are hearing is a sine wave at a certain frequency. Humans can generally hear tones up to 20KHz (generally only younger females can hear quite that high of a pitch).

The way a speaker generates sound is to push and pull, causing sound waves to be generated. Our speaker driver is set up so you specify the displacement of the diaphragm of the speaker. You must provide a new value at a rate of 8,000 samples/sec. We use values that fit in a 32-bit two's complement number.
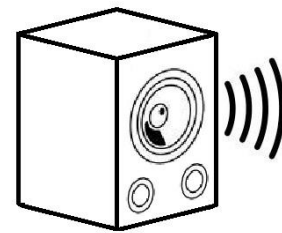
0x80000040	write	bit 0: speaker_command	
0x80000041	read	bit 0: speaker_response	speaker
0x80000042	write	bits 31-0: speaker_sample	

Learning by answering questions.

1. So if you wanted to generate a pure tone at 500Hz, how would you do it?

2. Now, how would you generate a 1000Hz tone?

3. How about if you wanted to generate both a 500Hz and 1000Hz tone (at the same time)?

Now, one tricky part is generating relatively arbitrary frequencies. The idea is to index into a table. Say we have a 16 entry sine table in memory. Let's write pseudo code that generates a 1Hz signal (too low to hear btw).

Now let's think about how to use this to generate an arbitrary frequency…

Further reading:

- http://www.joelstrait.com/blog/2009/10/12/a_digital_audio_primer
- http://www.maths.gla.ac.uk/~fhg/waves/waves1.html