

Keytar Hero



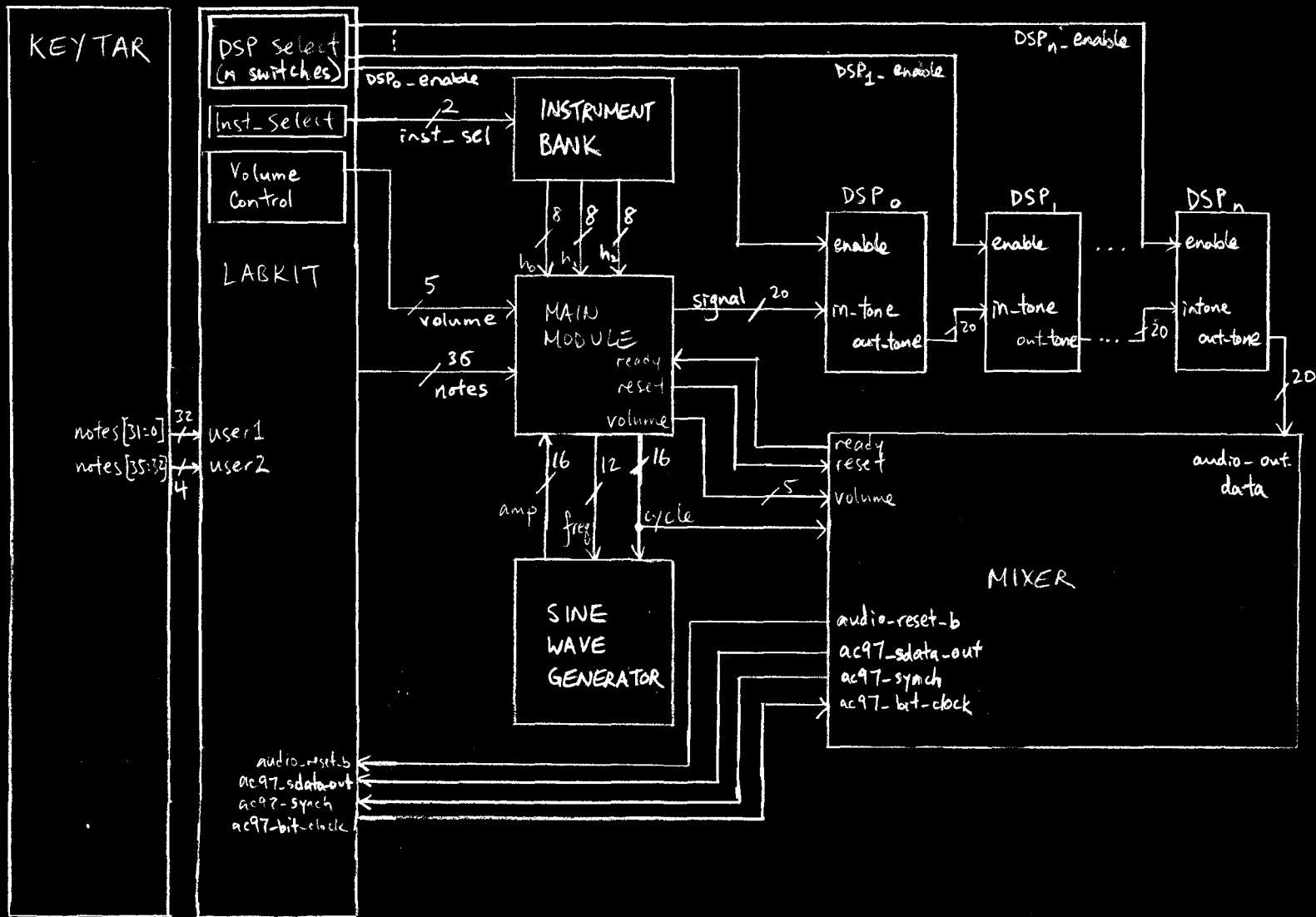
Hubert Hwang

Hui Tang

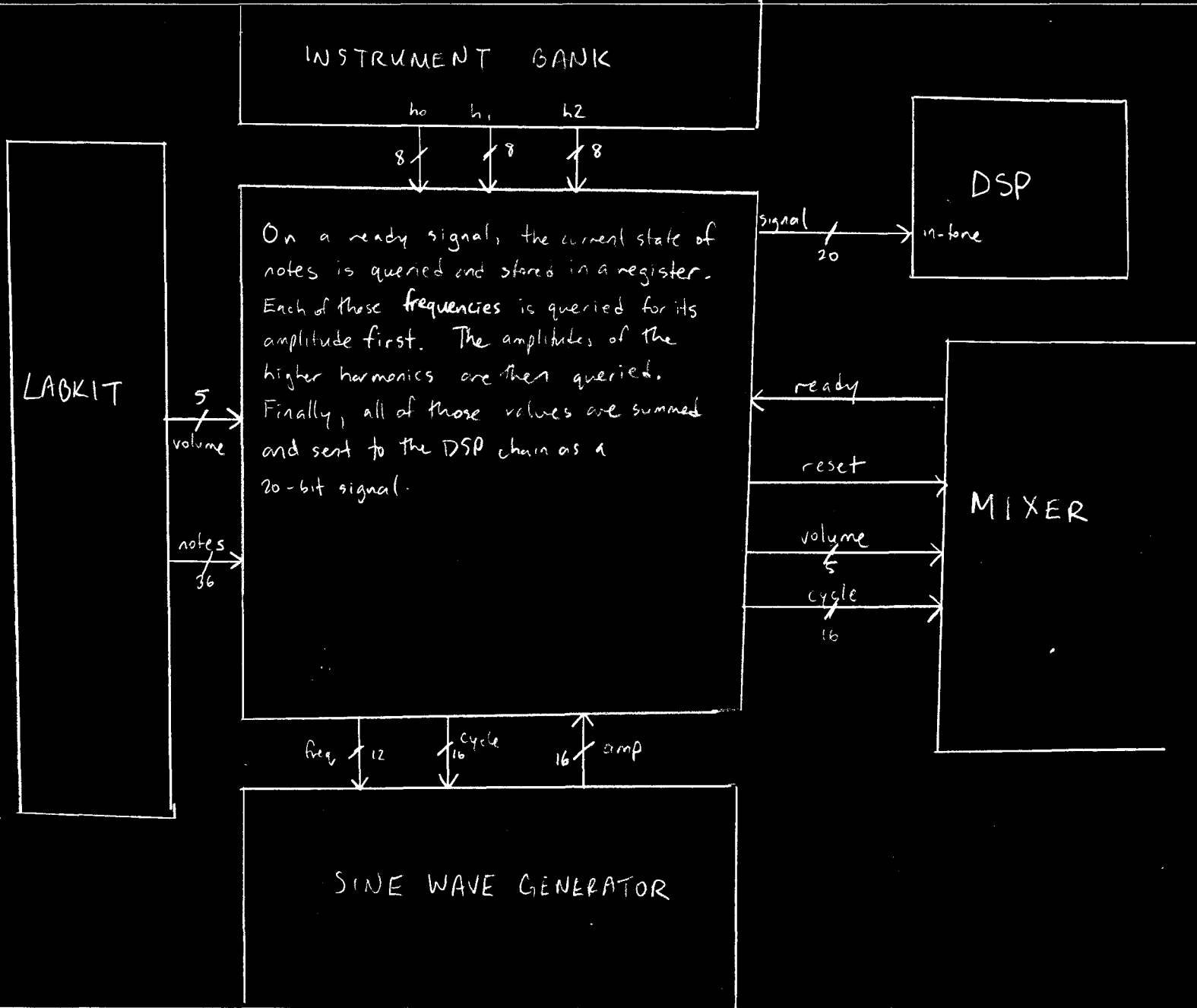
6.111 Final Project

Fall 2006

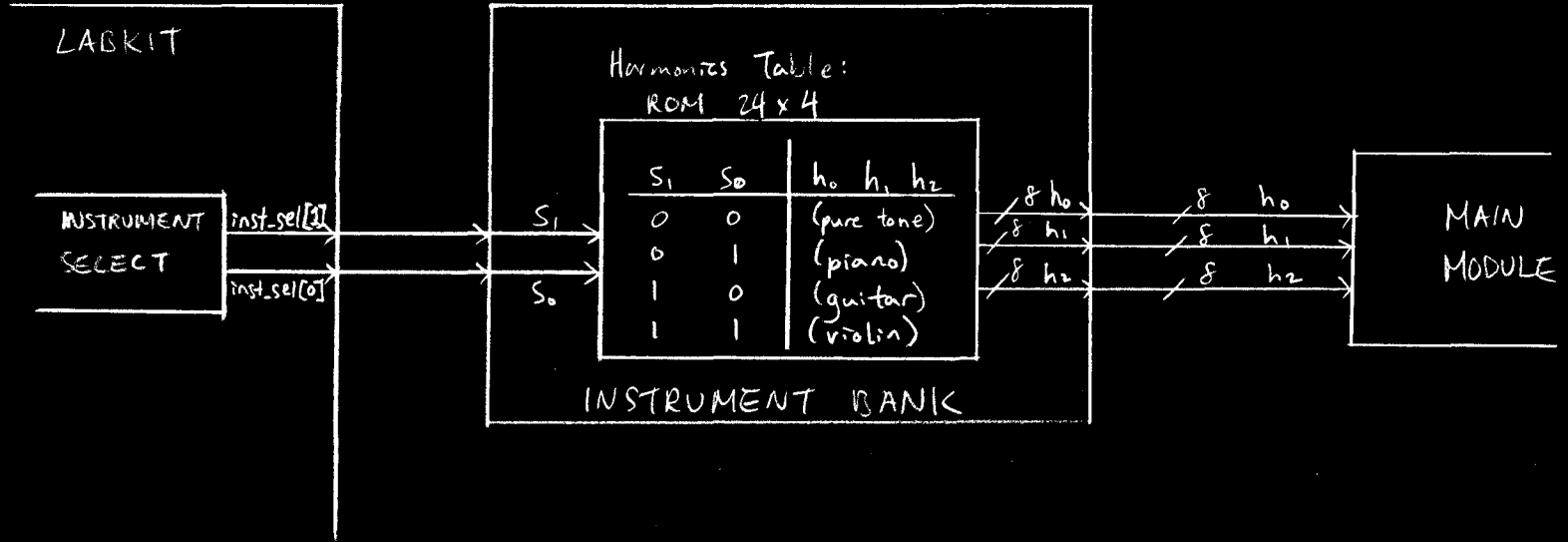
OVERVIEW



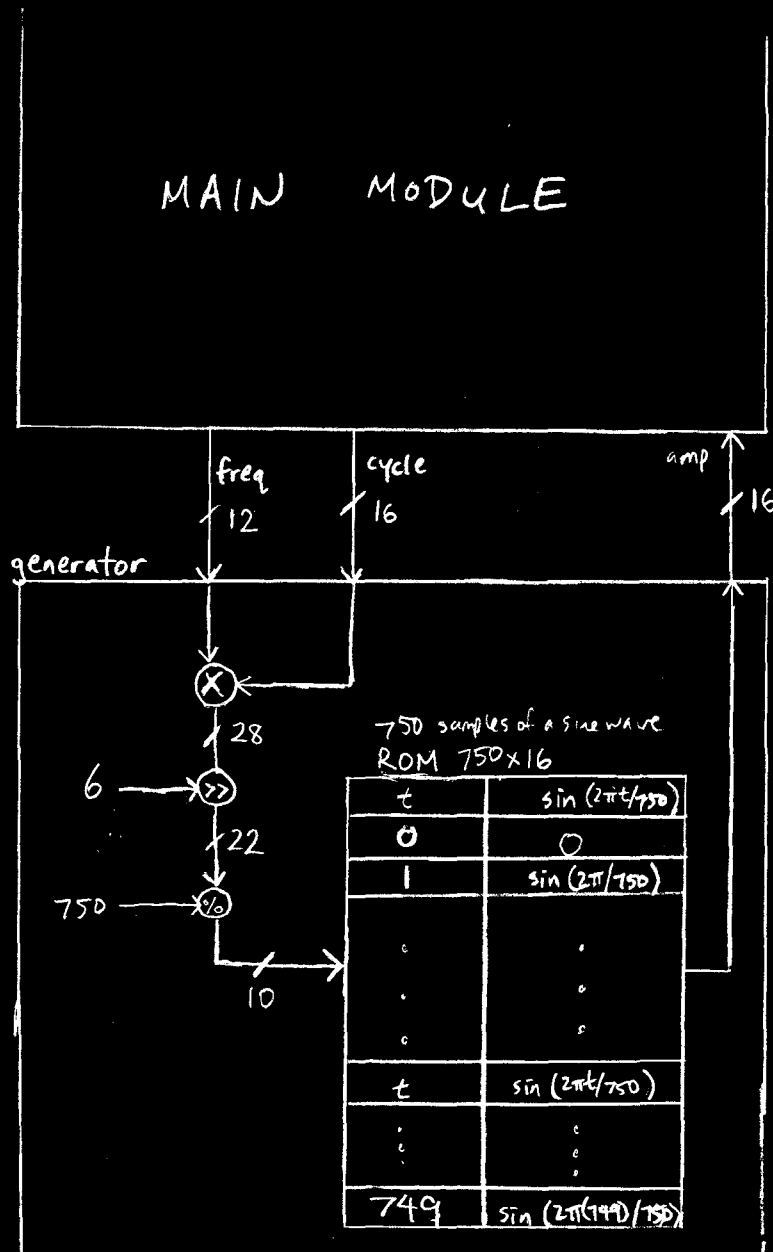
MAIN MODULE



INSTRUMENT BANK



SINE WAVE GENERATOR



$$f(\text{ready}) = 48 \text{ kHz}$$

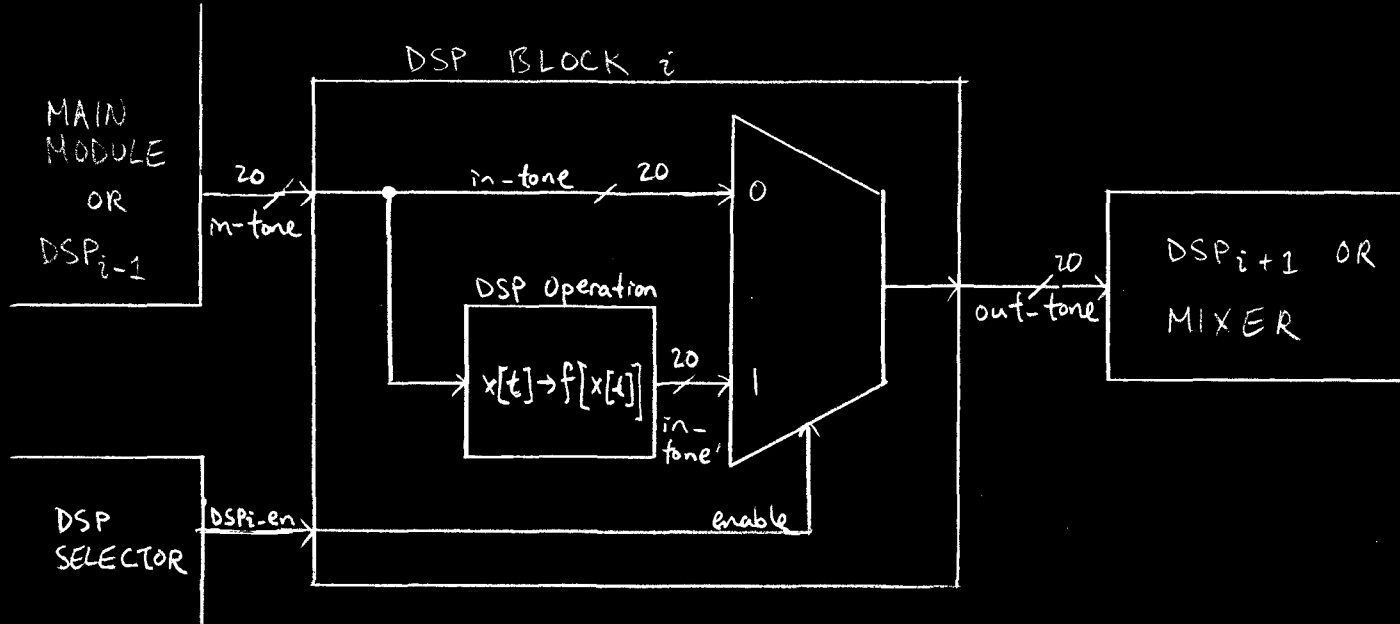
$$\text{lowest note } C_3 = 130.81 \text{ Hz}$$

$$\text{highest } C_6 = 1046.5 \text{ Hz}$$

So we pick our base frequency to be
64 Hz \Rightarrow 750 samples

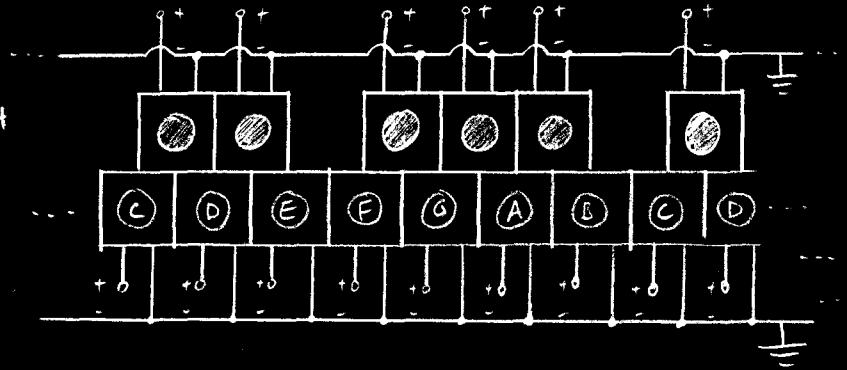
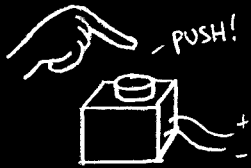
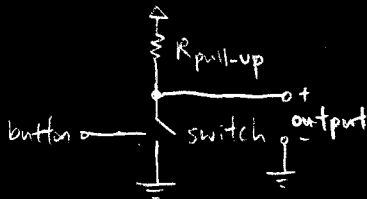
so that we can downsample to any
desired frequency in the keyboard's range

DIGITAL SIGNAL PROCESSING (ONE BLOCK)

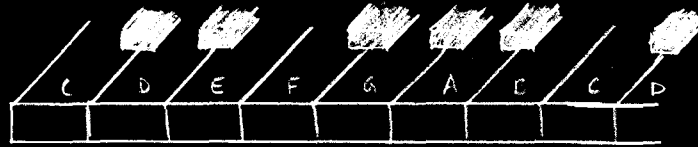


ECHO: $f[x[t]] = x[t] + \alpha x[t-\beta]$;
 $\alpha = \text{amplitude ratio} \ll 1$; $\beta = \text{time offset}$

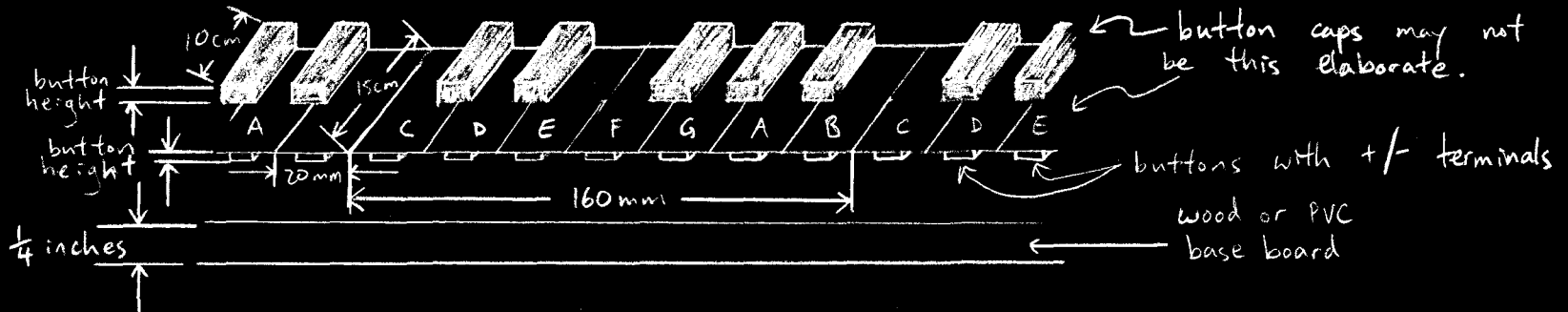
KEYTAR



Use an array of push buttons to model a keyboard.



This is a keyboard that we are trying to model using the button array.



Keytar Project Time Line

External Hardware

- (11.14)** Decide on type of switches
- (11.14 – 11.21)** Order switches (~50), base board, key caps (~30 white, ~20 black)
- (11.21 – 11.23)** Assemble test key
- (11.23 – 11.24)** Verify test key functionality
- (11.24 – 12.04)** Assemble keyboard
- (12.04 – 12.06)** Debug keyboard
- (12.06 – 12.10)** External hardware integration

Keytar Project Time Line

Verilog-ware

(11.13 – 11.20) Main Module

(11.20 – 11.23) Instrument Bank

(11.23 – 12.02) Sine Wave Generator

(12.02 – 12.04) Mixer

(12.04 – 12.06) DSP – Echo

(12.06 – 12.10) External hardware integration