Keytar Hero

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6.1111 Final Project
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On a ready signal, the current state of notes is queried and stored in a register. Each of those frequencies is queried for its amplitude first. The amplitudes of the higher harmonics are then queried. Finally, all of those values are summed and sent to the DSP chain as a 20-bit signal.
So we pick our input frequency so that we can downsample it and avoid frequency in the Kocho’s range.

$$f_{\text{(read)}} = 48\text{kHz}$$

$$\text{lowest } f_{\text{m}}\text{ } G = 150.8\text{Hz}$$

$$f_{\text{m}} = 1046.5\text{Hz}$$
ECHO: \[ f[x(t)] = x(t) + \alpha x[t-\beta] \]

\[ \alpha = \text{amplitude ratio} \ll 1; \beta = \text{time offset} \]
Use an array of push buttons to model a keyboard.

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

Button caps may not be this elaborate.

Buttons with +/− terminals

Wood or PVC base board

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button height

button height

10 cm

15 cm

20 mm

160 mm

4 inches
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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
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**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