Digital Percussion and Entertainment System

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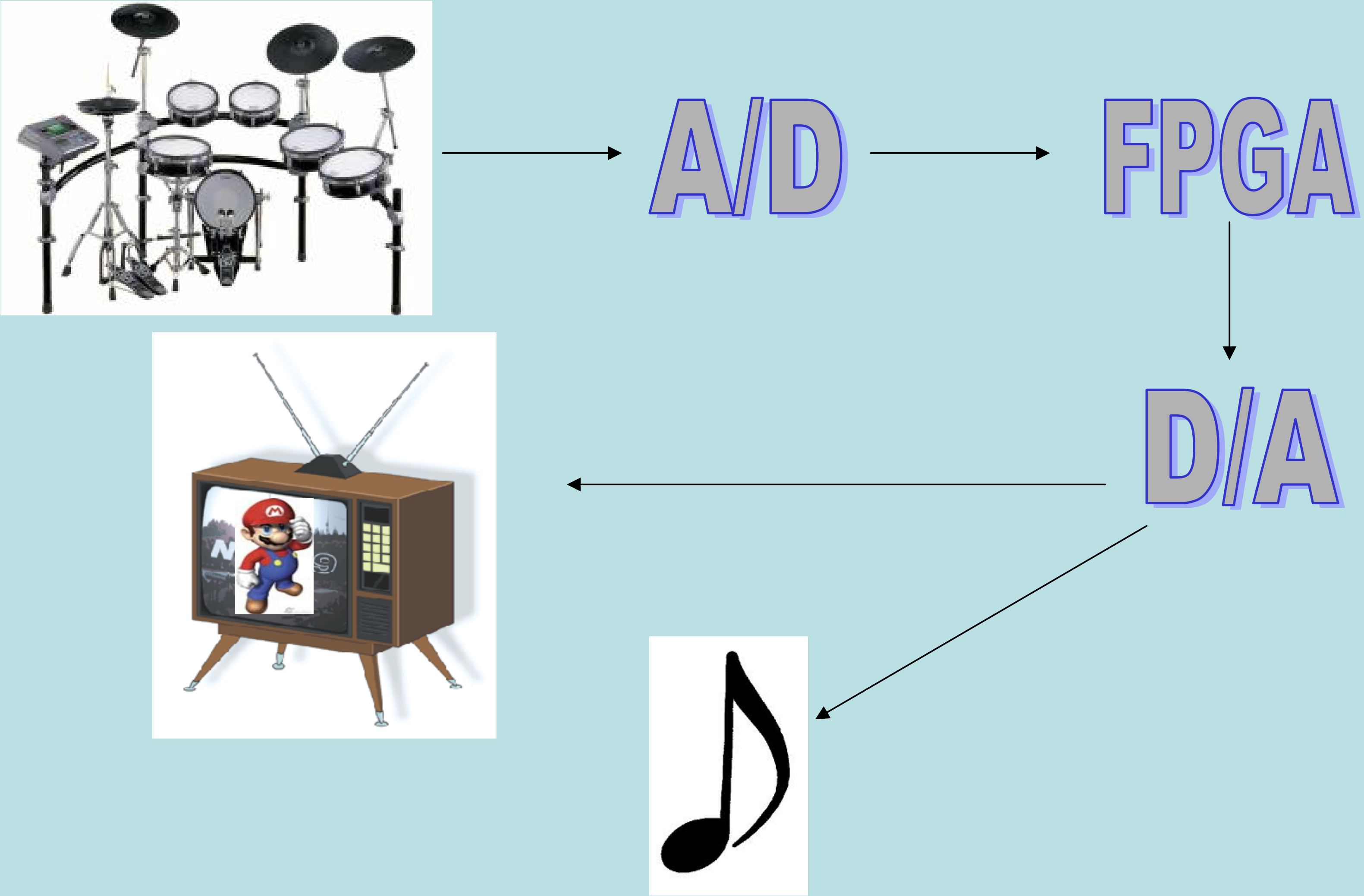
Overview

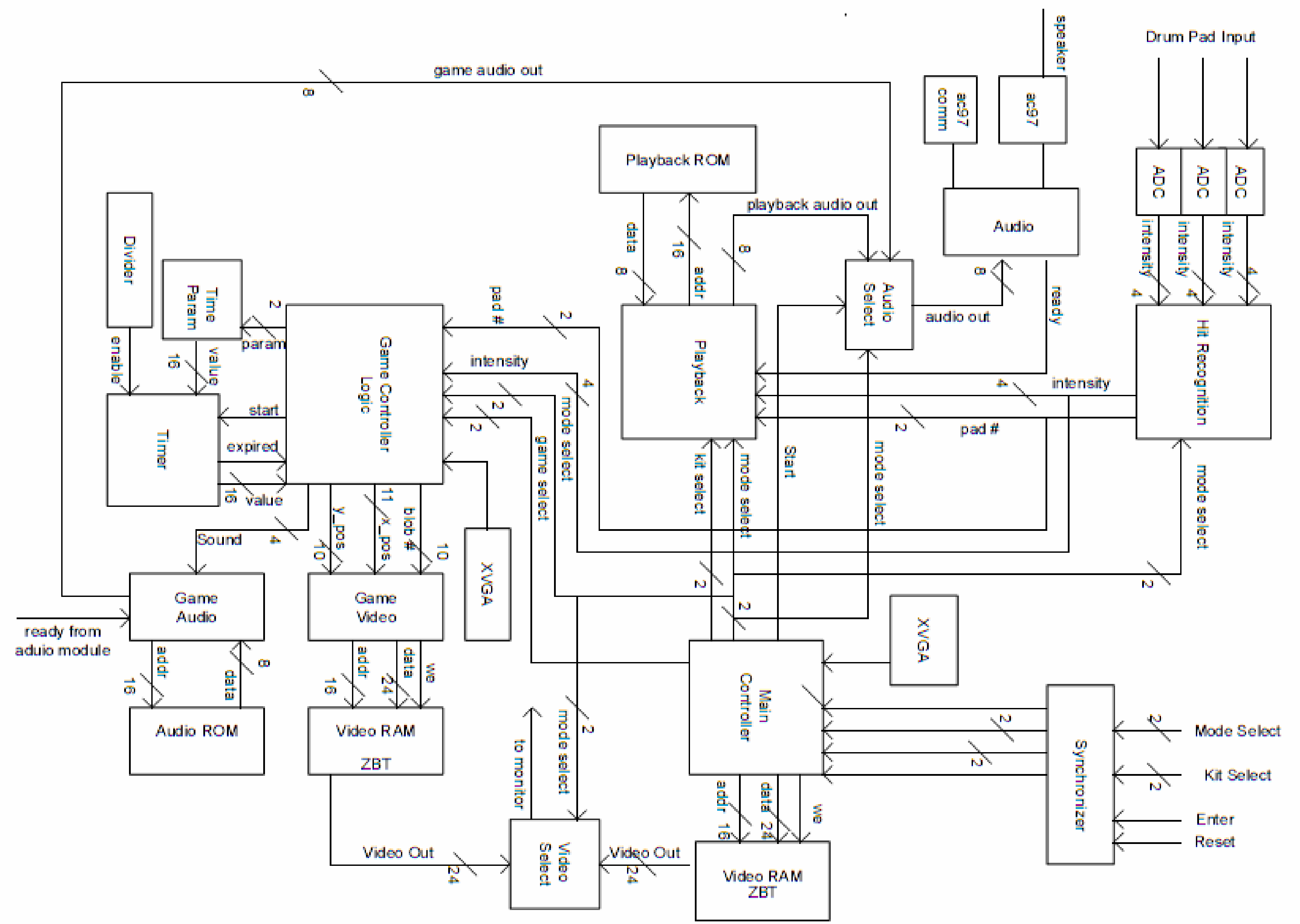


A/D

FPGA

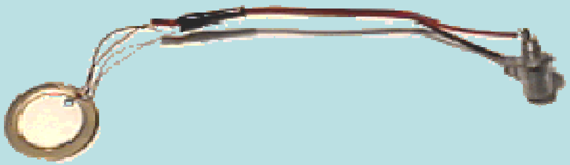
D/A

Block Diagram

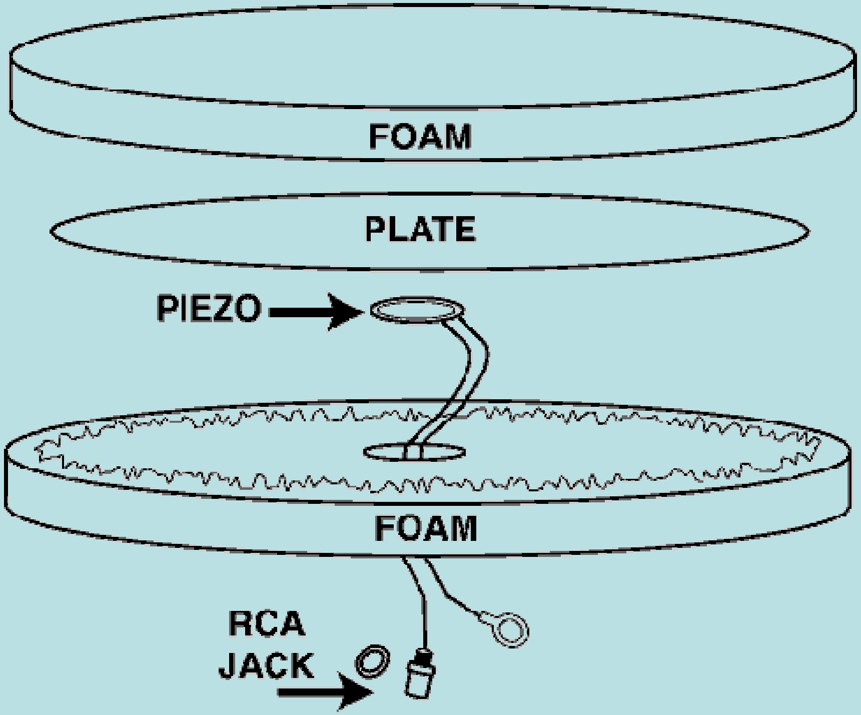


Drum Pads

Practice Drum Pads

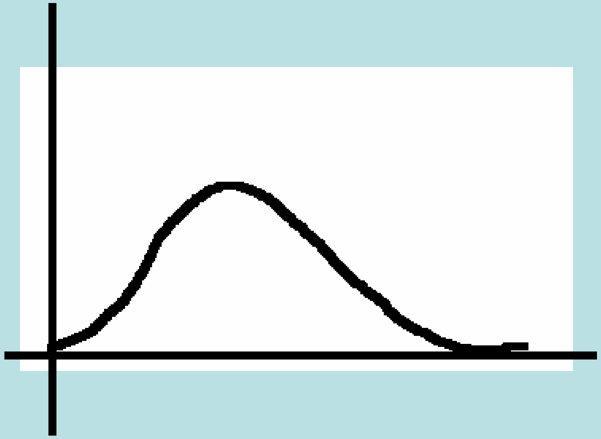


Piezo Transducer

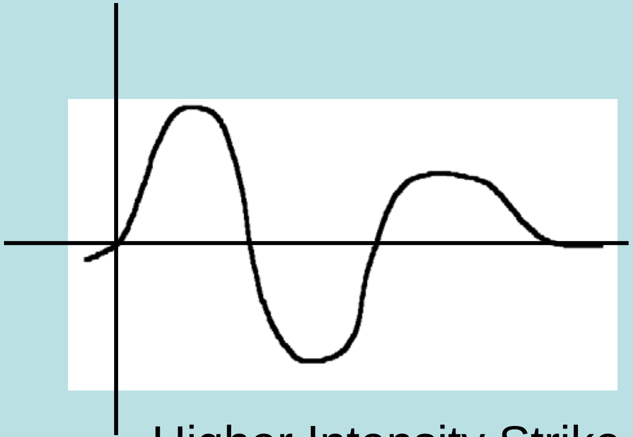


Hit Recognition

- Input from Drum pad needs to be assigned an intensity
- There also may be resonance from drum pad
- Assign four bit intensity as highest output from AD670. Wait approx 5-10 ms after assigning intensity to allow for ringing to die out so there is no false hit



Lower Intensity Strike



Higher Intensity Strike

Playback

- Convert .wav files of drum sounds to .coe files to load into ROM
- Use matlab functions to convert .wav pcm data to binary coefficients
- Modulate outgoing sound output by incoming intensity
- There will be several kits which the user can select from

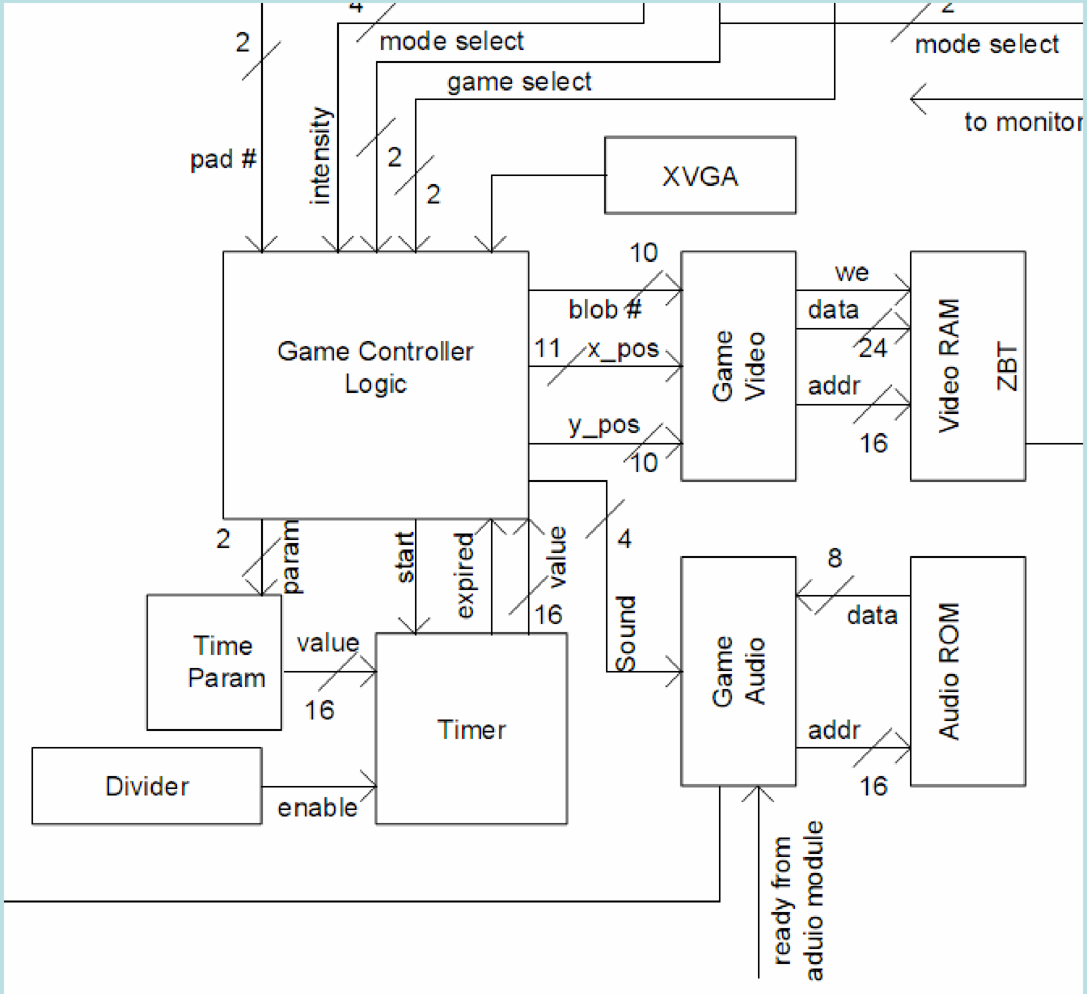
Game Logic

- The video game will be a Mario-type game that involves a race
- The character’s velocity will depend on the rate of drumming
- Character will be able to jump
- Will use same timing setup from lab 2

Game Video

- 24 bit rgb
- ZBT RAM as frame buffer
- Will use sprites to draw characters and backgrounds
- Will assign a “z-value” to each sprite to allow for stacking
- Video output will run through video select module

Video Block


4
2
mode select
2
mode select
game select
to monitor
pad #
intensity
2
2
XVGA
Game Controller Logic
10
blob #
11
x_pos
y_pos
10
Game Video
we
data
24
addr
16
Video RAM
ZBT
2
param
start
expired
value
16
4
Sound
8
data
Game Audio
Audio ROM
addr
16
Time Param
value
16
Timer
Divider
enable
ready from aduio module

Main Controller

- All inputs go through this module
- Start screen
- Has its own memory for character display
- User will select which mode to run system in and hit “enter” to start

Milestones

- Playback Module (11/15)
- Hit Recognition and Drum Input (11/17)
- Video Sprite Design (11/22)
- Game Logic (11/29)
- Game Audio (12/5)
- Main Controller (12/7)
- Kits and Finalization (12/10)
- Second Game (TBD)