

Project Proposal

Revenge Of Captain Zilog

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Im still working on this...

Project Abstract

This is a portable, interactive, handheld game. The commercial version will be about 4" wide, 3" deep and 2" thick. It is powered from 4 AA cells. It includes a simple 8x8 bi-color LED display, 4 control buttons, audible feedback (tone or simple music), tactile feedback (through a min-vibrating motor) and the ability to save high scores in non-volatile memory. This user will have the choice of several games: snake, pong, bricks (breakout like), citrus (tetris like, but with limited shapes).

Strategy

Description of the overall design: Above

What platform: based on the Zilog Z8 Encore chip and development platform.

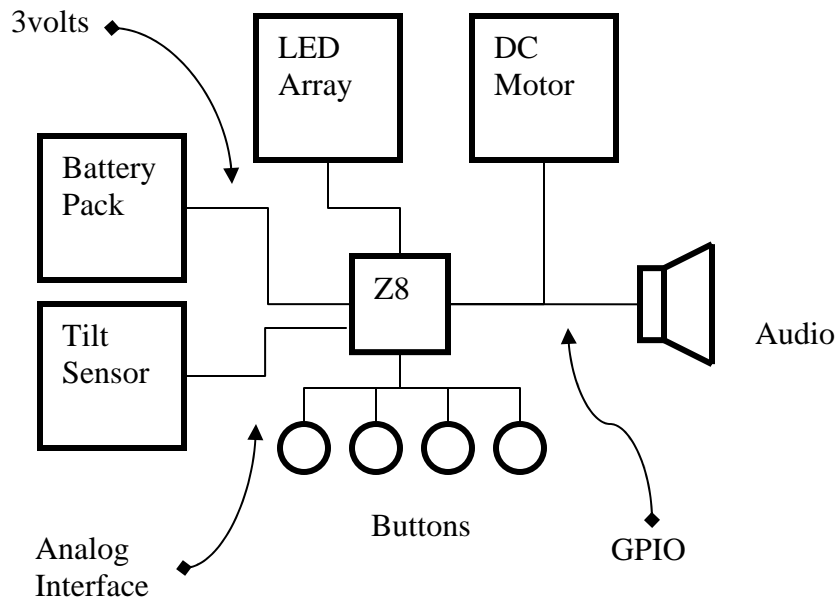
What capabilities: Lots of GPIO, timers, analog inputs, interrupts.

What external: 4 buttons, 8x8x2 LED, DC motor, speaker, tilt-sensor, battery power supply, additional non-volatile memory.

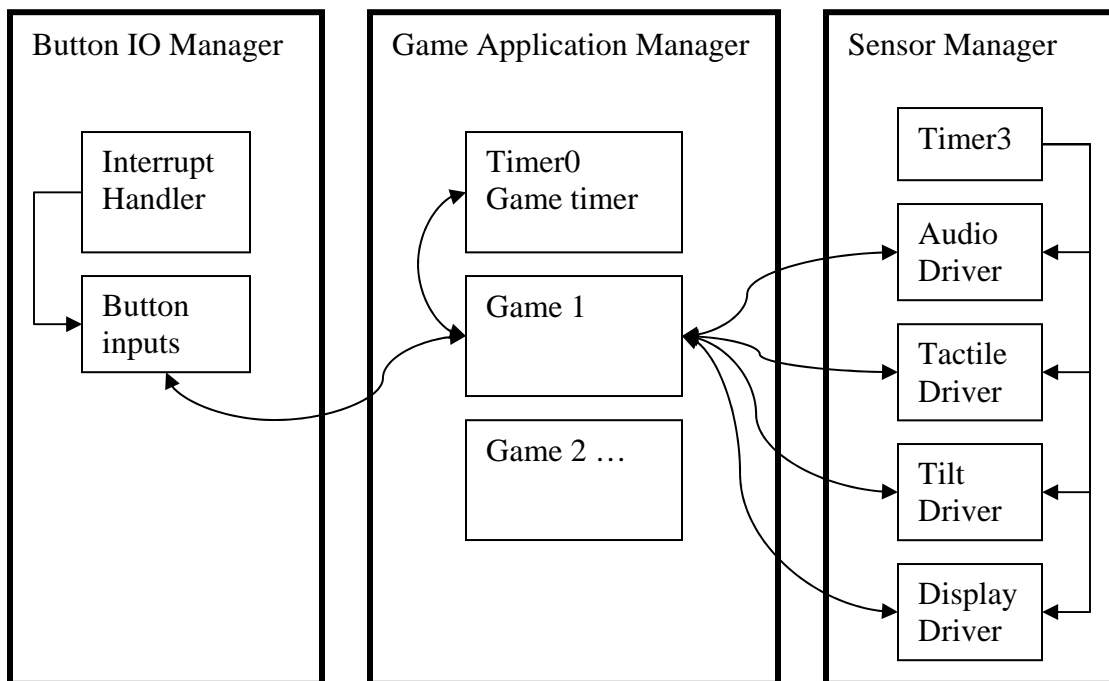
What sort of evaluations. There are several types of Tilt-sensors with different types of interface (analog or PWM). Read data sheets.

What software modules: Tilt sensor, LED manager, button manager, audio manager.

Main control loop. Design goal is to make an abstraction layer for all IO devices so that new games can be written to the abstraction layer rather than repeat the low-level driver in each game. This lets me develop new games more rapidly as well as the possibility of having several games (if small enough) on the platform at the same time and the user can select which to play.



Preliminary hardware block diagram



Preliminary software block diagram

Unknowns

Power consumption may be a problem.

Not sure if one timer is sufficient for managing the feedback devices (audio and tactile) and the display. I may need to use 2 timers or put some sort of priority on the updating. I think having a rapidly updated display is more important than the update time for the feedback devices, but testing will tell.

Motor may draw excessive current (for a Z8 IO pin) and require some sort of current driver. Once I pick the specific motor and read the specs I will know more.

Implementation Plan

Describe how you will build your project, what steps will you need to follow.

Use small Z8 kit, get one from system admin.

Acquire all components (LED, buttons, battery pack, tilt sensor, vibrating motor).

Test motor current draw and build current driver if needed

Build battery pack, test life time (if more than 30 minutes then I'm OK for a demo).

Display driver (memory mapped to bicolor LED)

Audio output driver (takes ringtones and plays them from a buffer).

Tactile driver (takes intensity/duration and maintains that).

Button handler

Tilt sensor driver (reads analog values and stores current position)

High score driver (read/write game & score to I2C memory)

Text display module (scrolls messages across display, like greeting, score, etc).

Test app to verify abstraction layer for everything.

Game 1 – Citrus (tetris-like)

Game 2 – Game of life (with tilt adjustment for fun).

Game 3 – Pac-Man like game

simple milestone chart

Include how you will eliminate any unknowns

verify your hardware components,

test your software components.

What decisions will be necessary later on in the project?

Is there any critical path

Resources

[1 page: Specify what resources you will need for your project and how you will get them. Include all university hardware, borrowed hardware, dependency on special software (compilers or assemblers), or special purpose hardware (like test equipment or network equipment).]