PORTABLE DDR

Gabriel Ha, Daniel Kim

Massachusetts Institute of Technology

Department of Electrical Engineering and Computer Science

Background and Motivation

- Dance Dance Revolution (released 1999)
  - Music video game (arcade and home systems)
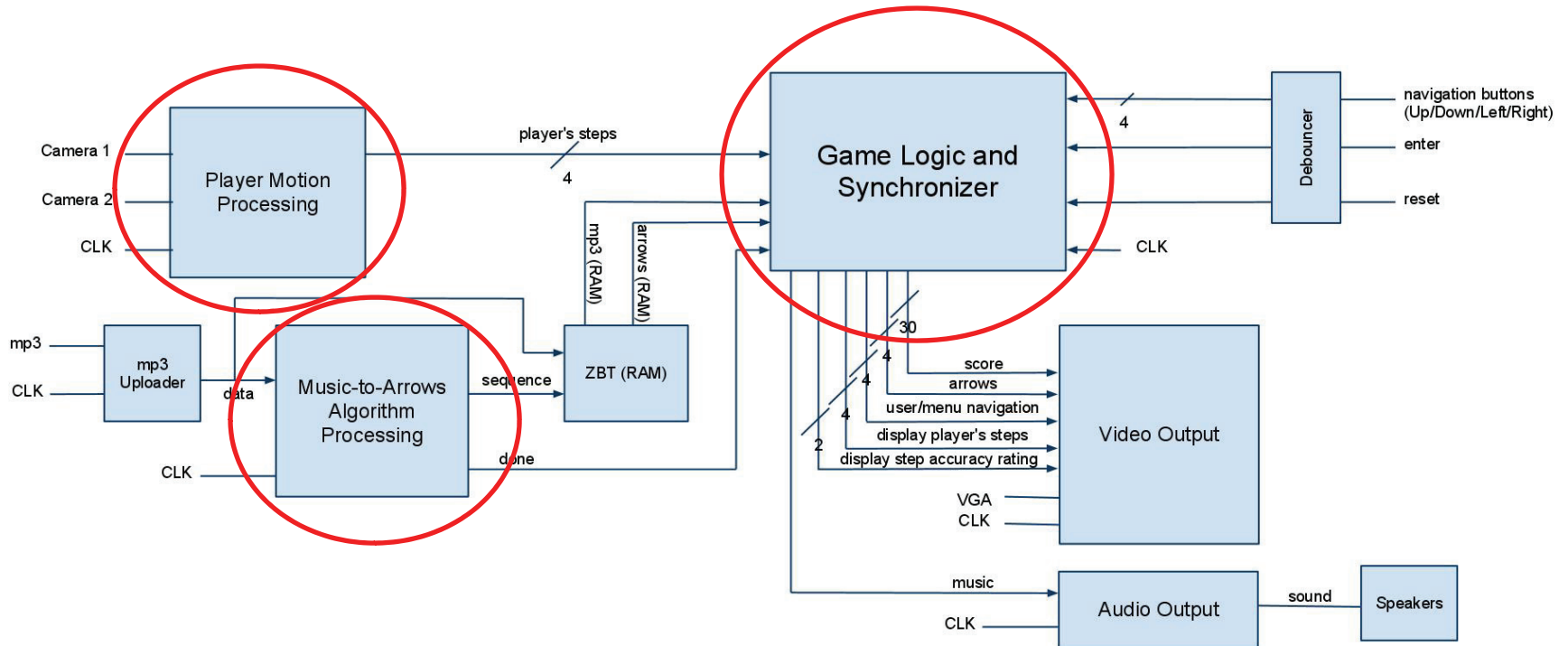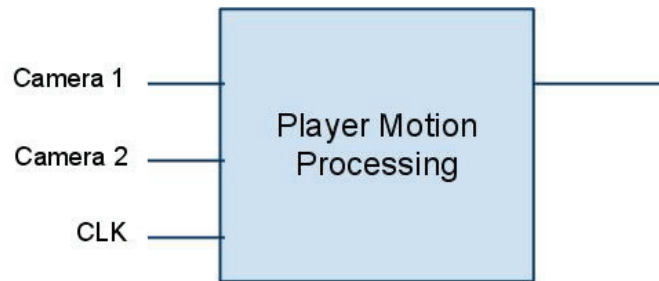 - Some limitations – pad and song choice

Novel Features

- Use of camera tracking instead of a game pad
- Song upload capability
  - Music processing
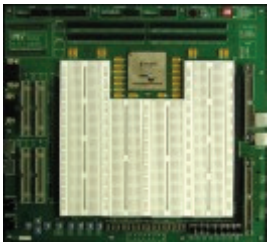
OVERVIEW: BLOCK DIAGRAM
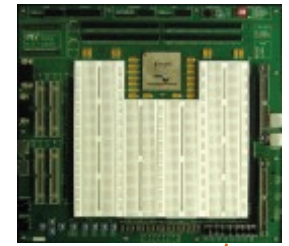
PLAYER MOTION PROCESSING

- Determine the steps gestured by the player
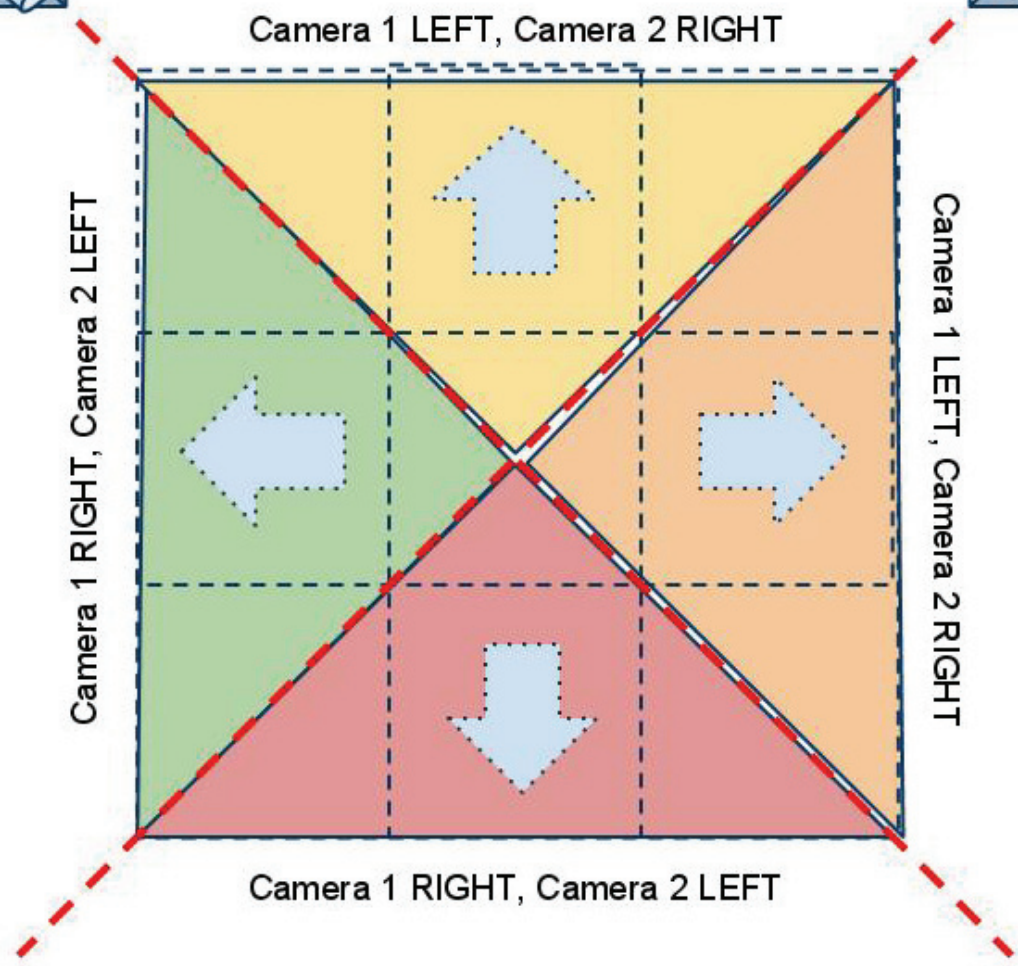- One Labkit per Camera

Camera 1

Camera 2

Camera 1 LEFT, Camera 2 RIGHT

Camera 1 RIGHT, Camera 2 LEFT
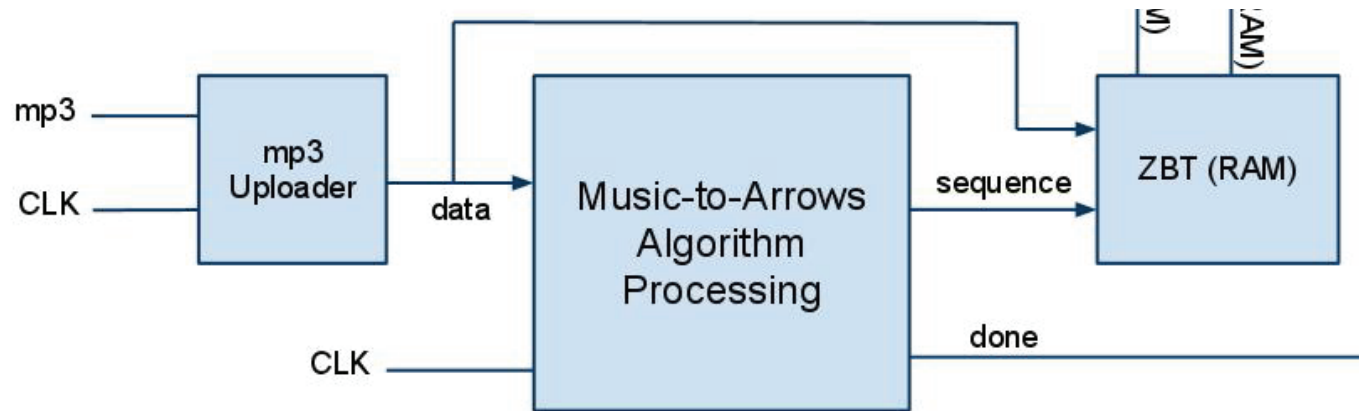
Camera 1 RIGHT, Camera 2 LEFT

Camera 1 LEFT, Camera 2 RIGHT

Music to Arrows Algorithm

- Amplitude and frequency analyses
- Step sequence stored in RAM
- "Done" signal sent to Game Logic & Synchronizer module

MUSIC TO ARROWS ALGORITHM

- Figure out Beats Per Minute (BPM) for song

- 1000* x 6 array of registers
  - *whatever necessary for a 20-second sample of music
- 4 registers to indicate which arrows are present
- 2 registers to identify the arrow type
  - On beat, off beat, tuplet, silent
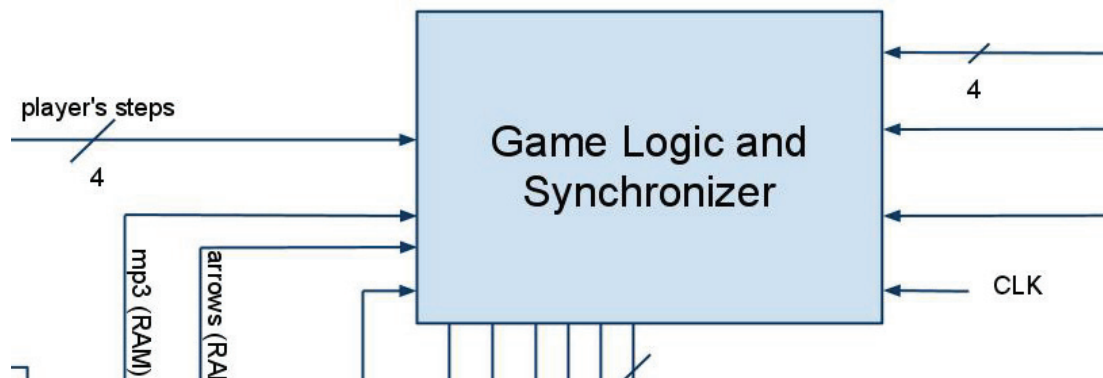
- Reconstructed by Game Logic & Synchronizer

MP3 UPLOADER

- Controls the uploading of the mp3 file
- AC97 Audio Codec chip (LM4550)
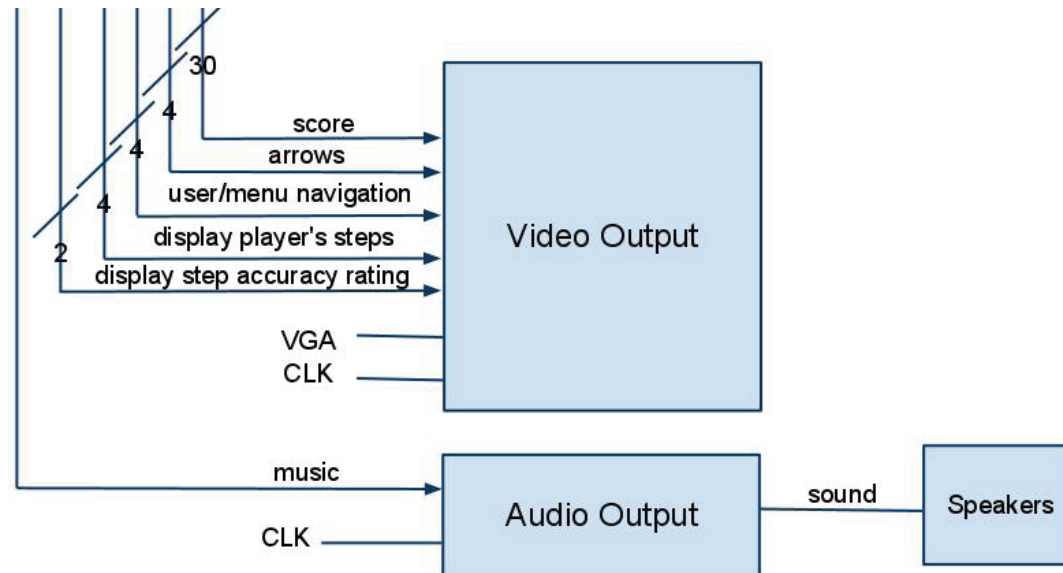- 8-bit audio samples
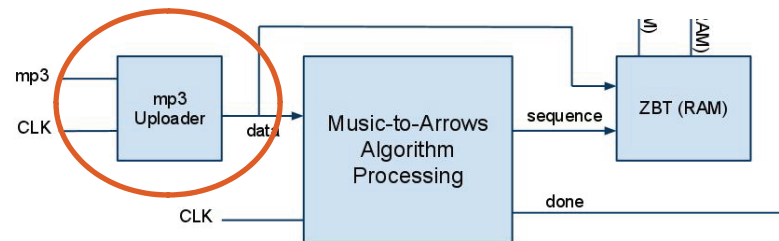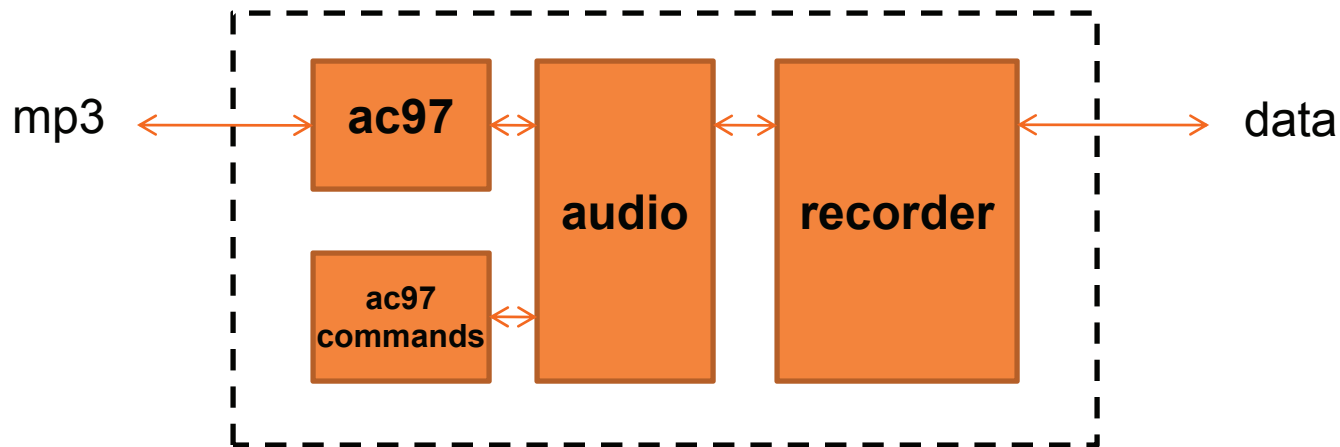
GAME LOGIC AND SYNCHRONIZER

- Integration of input signals and game control
- Main states: setup, play, end
- *Setup:* select difficulty, upload mp3, sync cameras
- *Play:* standard DDR rules
- *End:* scoring, reset to play again

VIDEO AND AUDIO OUTPUT

- Video: display scores, arrows, navigation
- Audio: read sound data from ZBT RAM and send to speakers

Timeline

Week:

- 11/22
  - DK – mp3 uploader, begin game logic
  - GH – music to arrows algorithm
- 11/29
  - DK – game logic, video and audio
  - GH – camera processing
- 12/6
  - DK/GH – debug and testing