Wake Up Your Way
Alarm Clock

6.111 Final Project
Eleanor Foltz
Jon Spurlock
• The problem with most alarm clocks:
  – Too abrupt!
  – Single environment variable (sound, either buzzer or music)
  – Promote bad ‘snoozing’ habits

• Goals of our project:
  – Make waking up a more gradual, pleasant experience
  – Use a combination of environment variables… sight and sound
  – ‘alarm’ should be a gradual build-up
ALARM FSM
- GO light
- GO music
- GO voice
- GO buzzer
- buzzer length
- light rate

MENU FSM
- RegisterFSM: light
- RegisterFSM: buzz
- RegisterFSM: music
- RegisterFSM: voice

RecorderFSM
- Controls signal from microphone generates signal for storage in SRAM.

LIGHT
- BUZZER
- MUSIC
- VOICE

TOTAL AUDIO OUTPUT
- Volume combine and amplify

10 MHz
- Divider 1 Hz

“I’m Up!” button
- Master: On/Off

DPad Edge Detector
- DPad
- light
- music
- voice
- buzzer
- select
- next

Synchronizer

CurrentTimeCalculator
- D-pad
- SetTime

ALARM
- GO light
- GO music
- GO voice
- GO buzzer
- buzzer length
- light rate
Alarm Module
Clock Module
Buzzer Module

buzzer module & output format

BUZZING
count = count + 1
go_buzzer = 1

go_buzzer = 0

IDLE
count = 0
reset

digital output from
voice message
triangle wave
digital output from
music player
digital addition
digital output to DAC
will be amplified for speaker
Voice Memo Module
Light Module

Light Module

@posedge clk:

if (i == duty period)
    i = 0;
else if (i >= duty ratio)
    light signal = low;
    i ++;
else
    light signal = high;
    i ++;
If there’s time…

• Read MP3’s from a directory/file structure on a Flash card
• Provide fade-in/fade-out for individual audio sources to prevent overlap
• Add additional options for each alarm function
• Multiple alarms
• Gradually increasing rate of change for menu parameters
QUESTIONS?