

# ClockAide



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## Presentation Outline

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- Goal
- Deliverables
- Design
- Prototype
- Updated Cost and Budget

## Goal of ClockAide

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- Create an educational learning tool for special needs students at West Springfield Middle School
- Relieve burden of repetition on the teacher
- Solve two problems stated by Megan Ferrari
  - Independently learn how to tell time
  - Entering ID numbers for lunch

# MDR Deliverables at PDR

<b>What we promised</b>	<b>What we delivered</b>
Characterization of Stepper Motor	"Normal Mode" "Set Time"
Record Voices for time playback	Sampled, amplified and processed voice Added logic to speak and enter time
Familiarization with Arduino Uno and keypad	Reverse engineered keypad matrix Serial input / output

## Accomplishment 1 – West Springfield

Observed students (with 2 visits)

- *Morning Routine*

How the students currently learn how to tell time?

- *Lunch Routine*

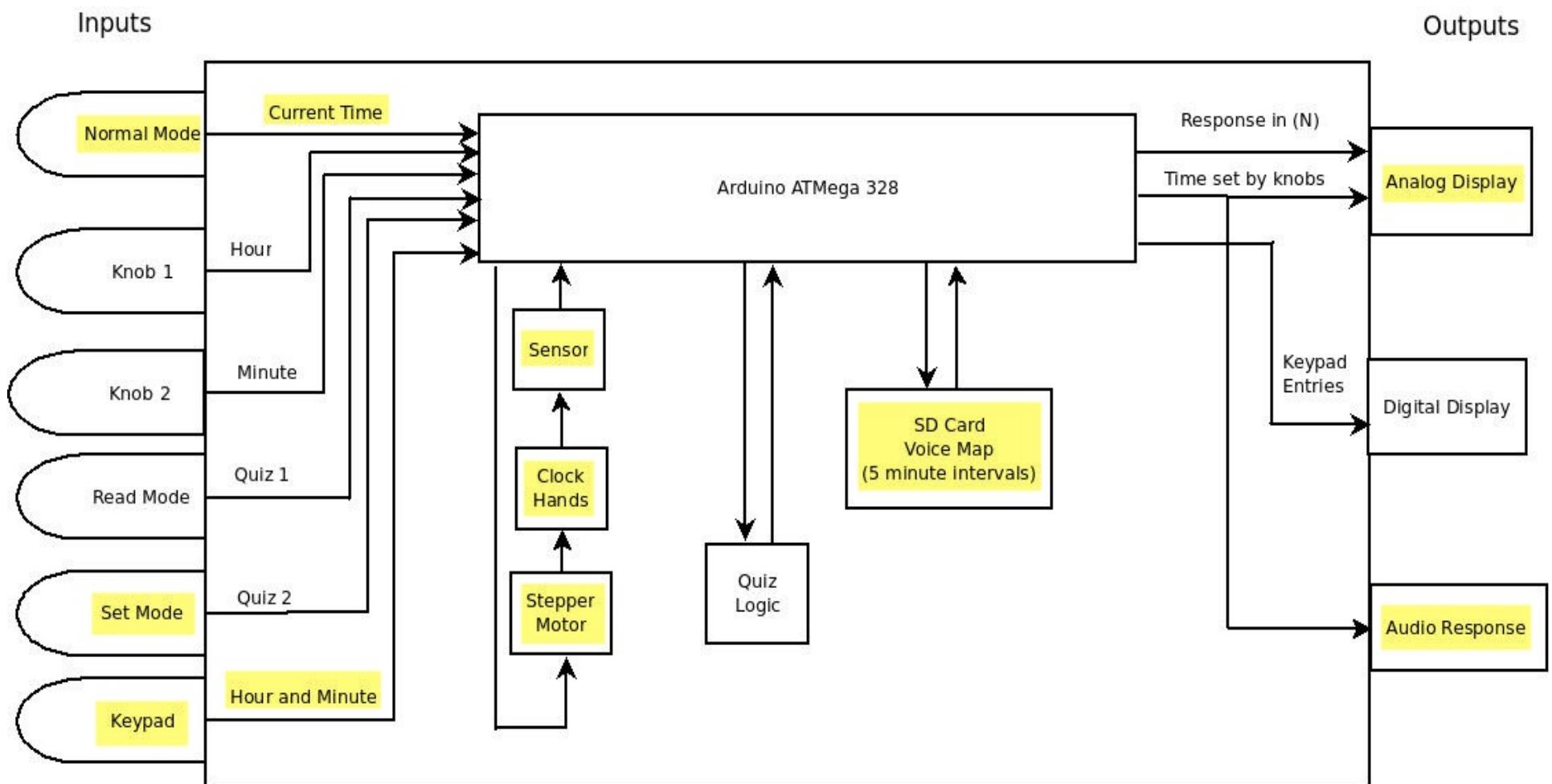
How the students use the keypad to enter their lunch number?

- Recorded Voices

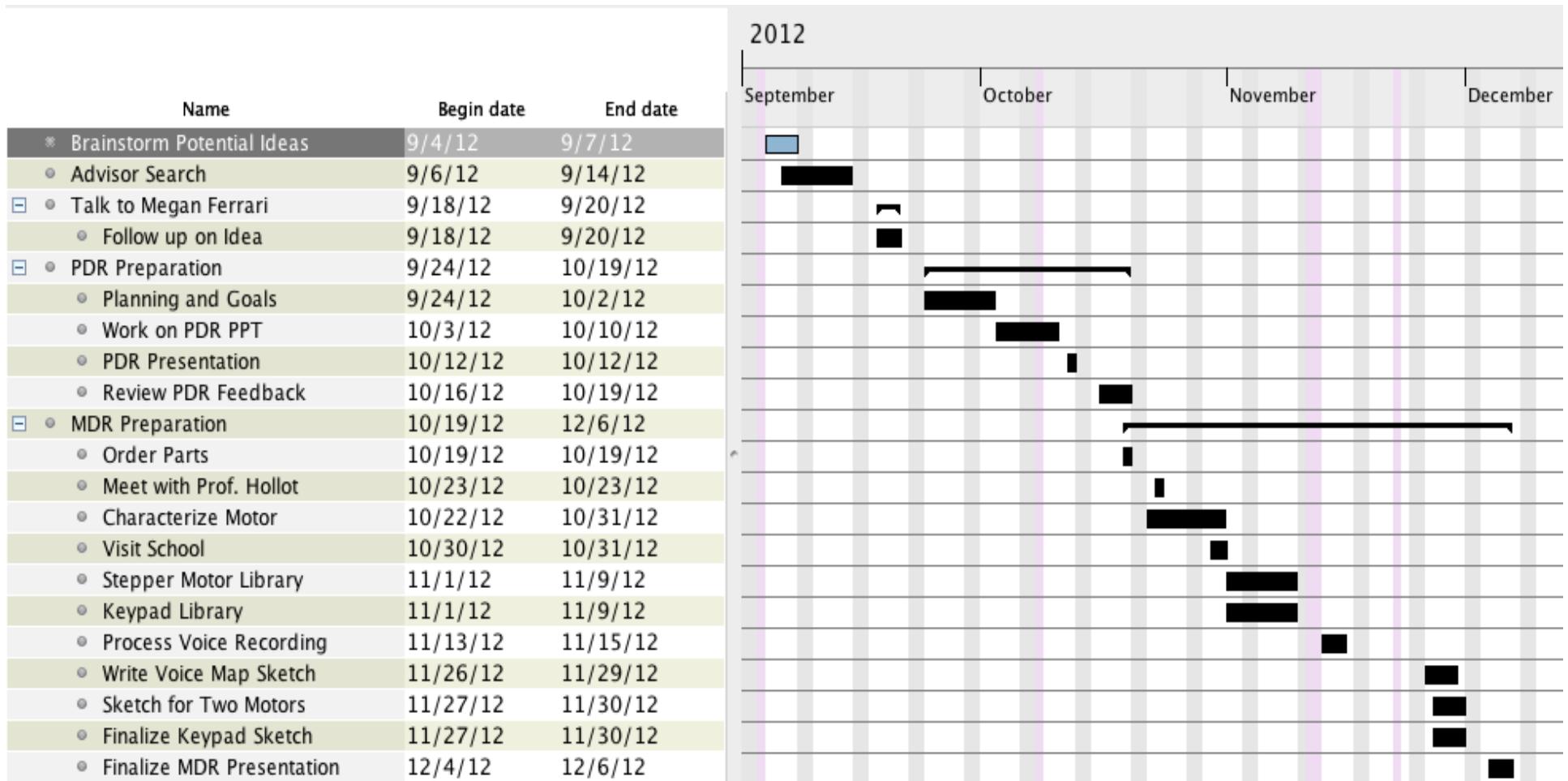
- Got feedback on design considerations



# Block Diagram



# What we have accomplished



## Keypad

- Reverse engineered keypad matrix
- Connected pins to Arduino
- Confirmed serial transmission from keypad through Arduino



## Demo of Keypad

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## MP3 Shield and Voice Maps (and Playback)

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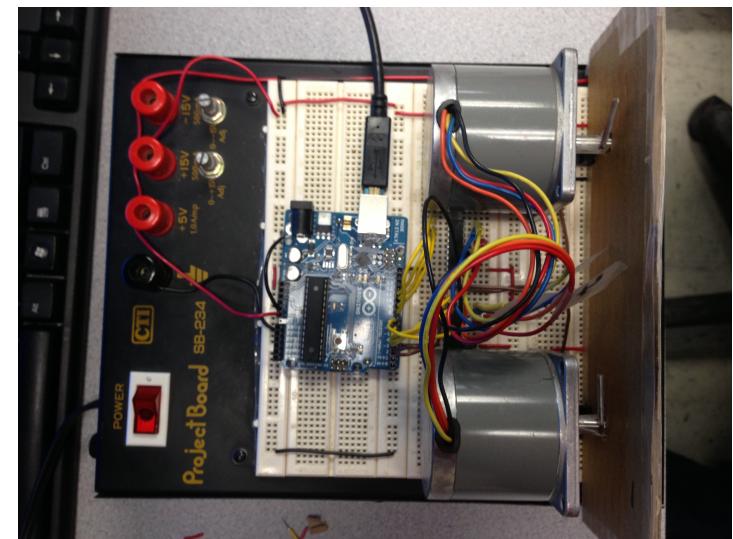
- Recording the voice map
- Processing the voice recording
- Noise reduction
- Amplification
  
- Playback logic
- Serial entry

# Demo of Audio Output



# Stepper Motor

- 2 Unipolar Stepper Motors
- IR Emitter/Detector Pair as limit switches
- Stepper Motor Library
  - Wrote library to compensate for the motion of the hands



## Demo of Stepper Motors

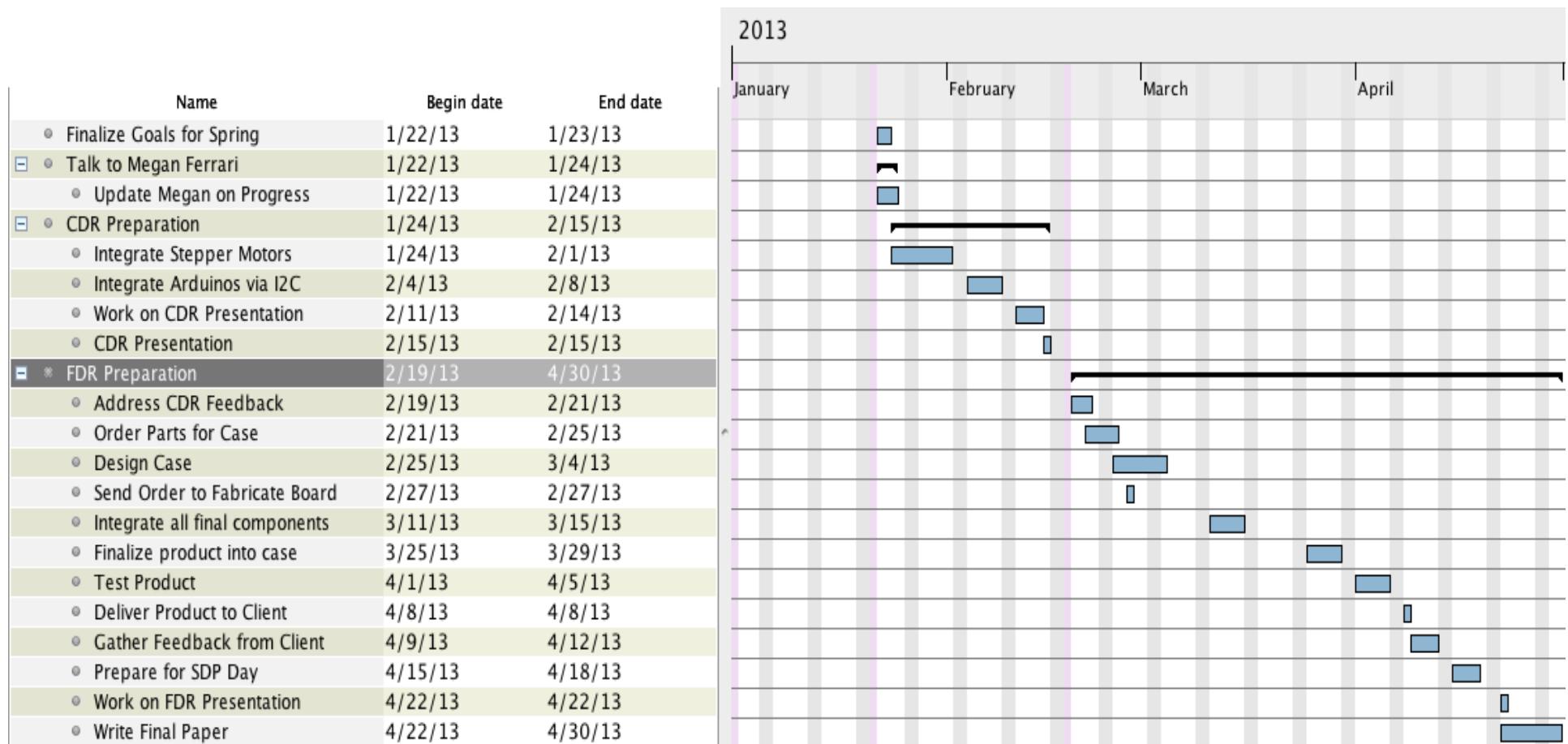
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- Observe current time being displayed on table
- Show movement to arbitrary time
- Demo of zero position
- Demo of setting time
- Normal Mode / Set Mode

## Deliverables for CDR

- All components working together
  - Type a time on the keypad, see it on the display, stepper motors will move to the position
- Quiz Modes 1 and 2 will be working
- Normal mode will speak the current time
- Knobs
- Determine quiz/tutor logic

# CDR Timeline



# Updated Cost & Budget

## Current

8GB SD cards (2)	\$12.38
Arduino MP3 Shield	\$39.95
Raspberry Pi	\$69.85
RTC	\$21.73
LCD Screens (2)	\$27.90
(Keypads - 2)	(\$96.49)
Subtotal	\$171.81
Shipping	\$38.90
Total	\$210.71
Percentage	42%

## Projected

Item	Description	Price
Stepper Motors	Smaller motors (5V)	\$100
Casing	Enclosure	\$150
PCB	Custom Circuit Board	\$60
Gears	Hardware to control hands	\$25
	Total	\$335
	Aggregate Total	\$546
	Overage	(\$46)

## Questions?

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