



# *Progress Report for the Smart Pet Feeder*

*Wednesday March 5, 2008*

---

Rachel Heil – [heilr@wit.edu](mailto:heilr@wit.edu)

Kristine McCarthy – [mccarthyk8@wit.edu](mailto:mccarthyk8@wit.edu)

Filip Rege – [regef@wit.edu](mailto:regef@wit.edu)

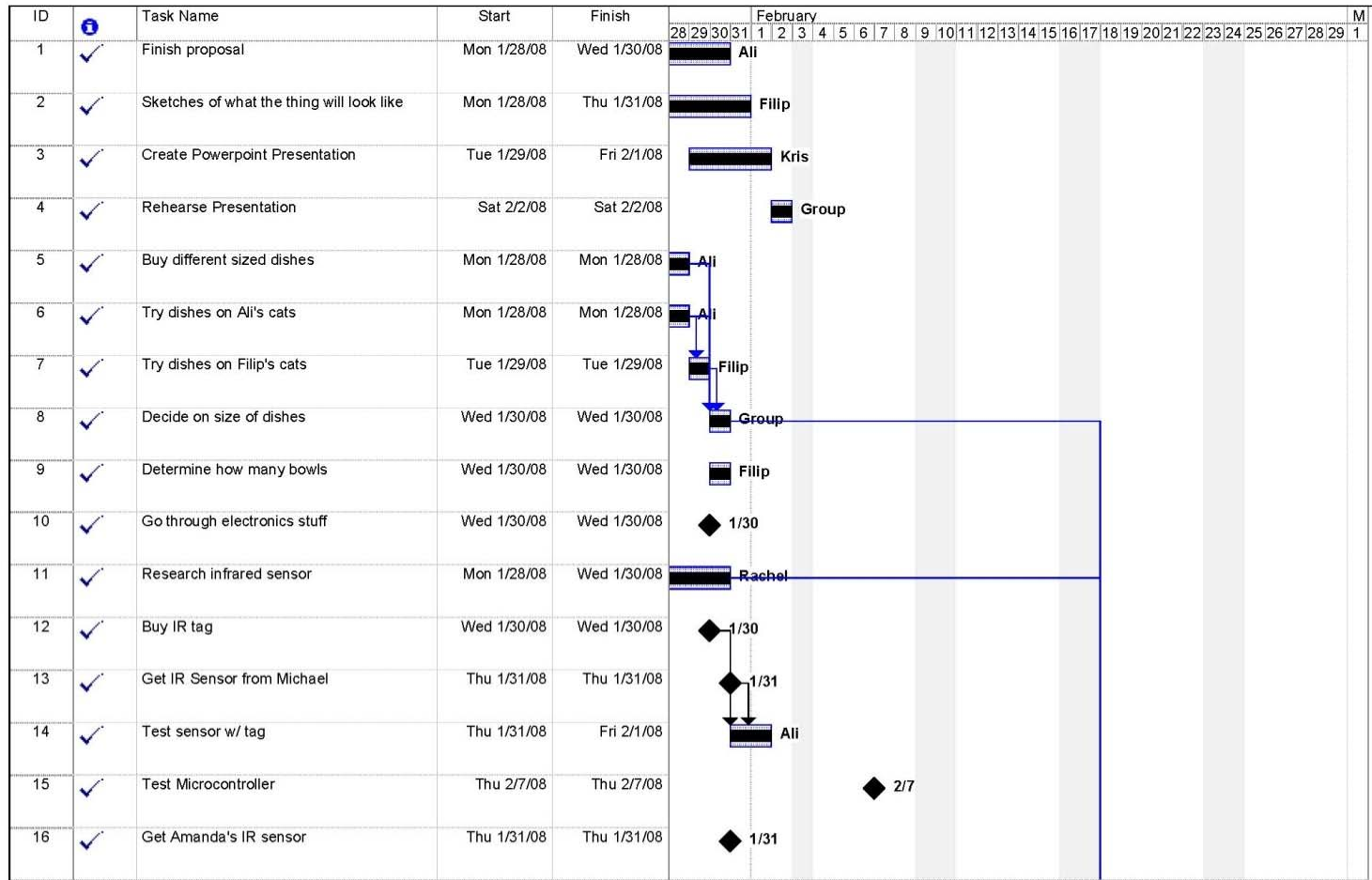
Alexis Rodriguez-Carlson – [rodriguezcarls@wit.edu](mailto:rodriguezcarls@wit.edu)

# Introduction

---

- Automated pet feeder that:
  - Reliably provides food to a pet at the time the owner wishes
  - Keeps the pet from reaching the food stored for later feedings
  - Does not allow a “forbidden pet” to eat from a given feeder

# Progress-to-Date (1 of 20)

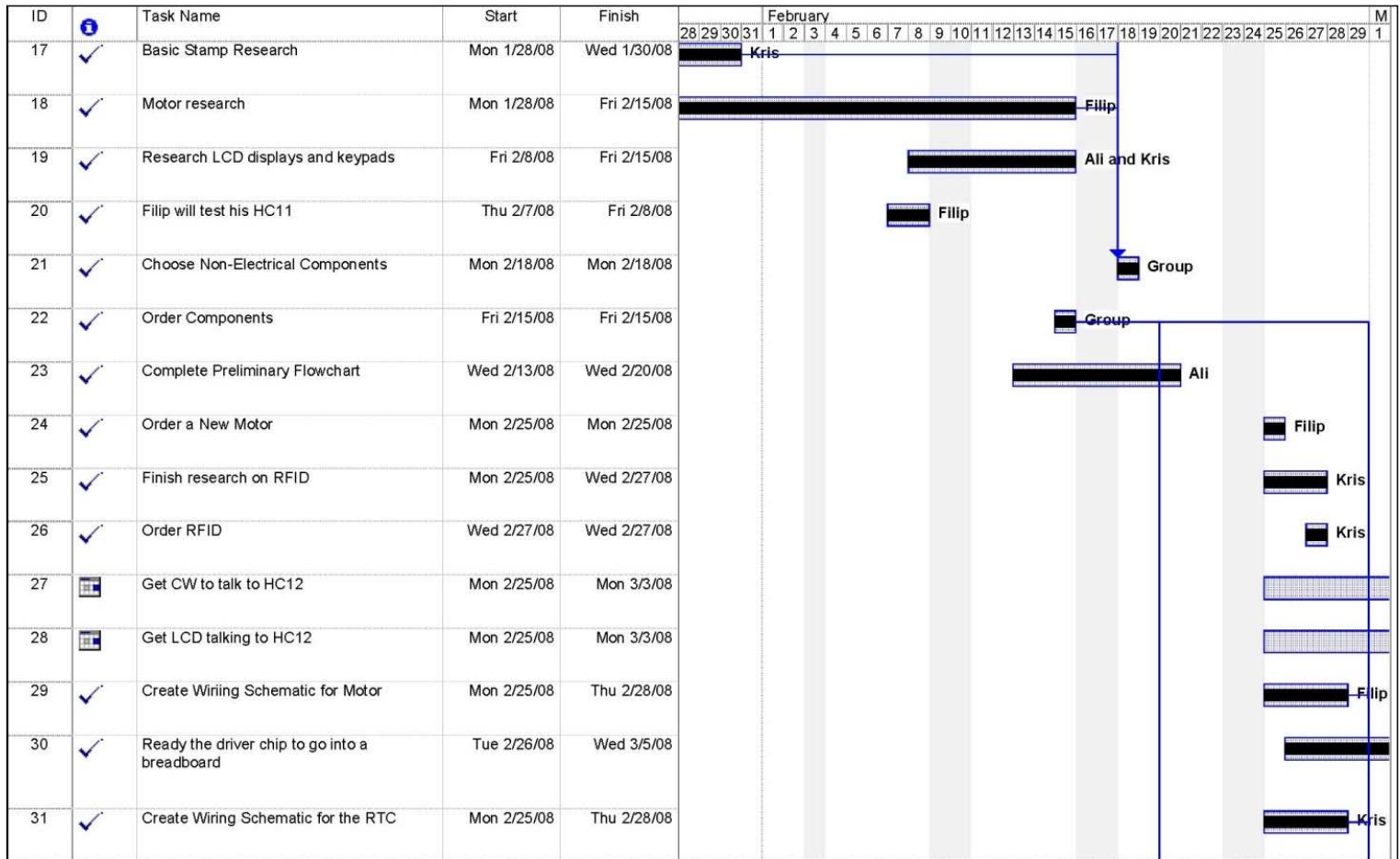


Project: Gantt Chart 20080302.mpp  
Date: Sun 3/2/08

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

Page 1

# Progress-to-Date (2 of 20)

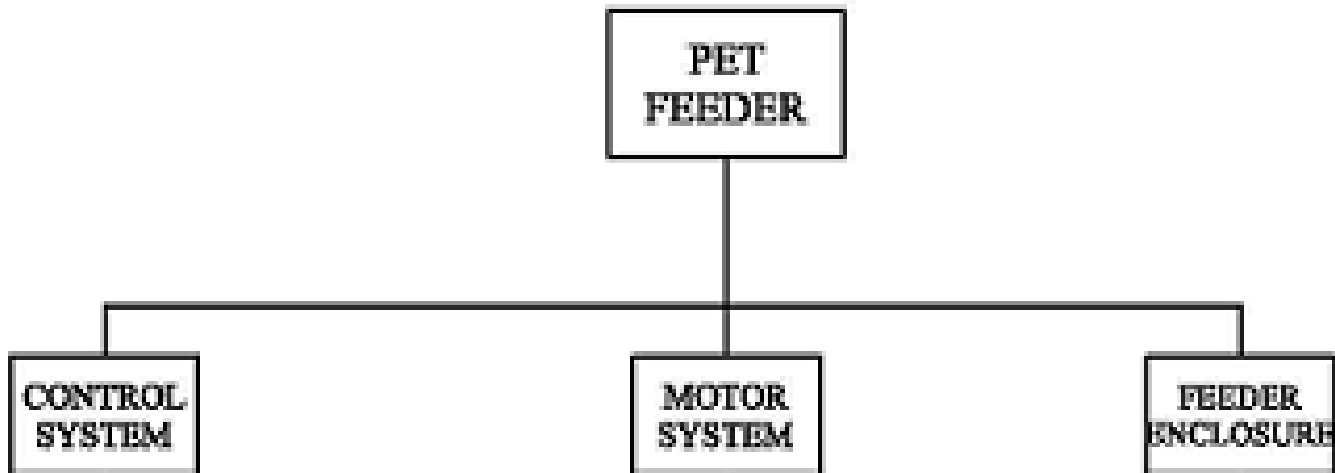


Project: Gantt Chart 20080302.mpp Date: Sun 3/2/08	Task		Milestone		External Tasks	
	Split		Summary		External Milestone	
	Progress		Project Summary		Deadline	

# Introduction (3 of 20)

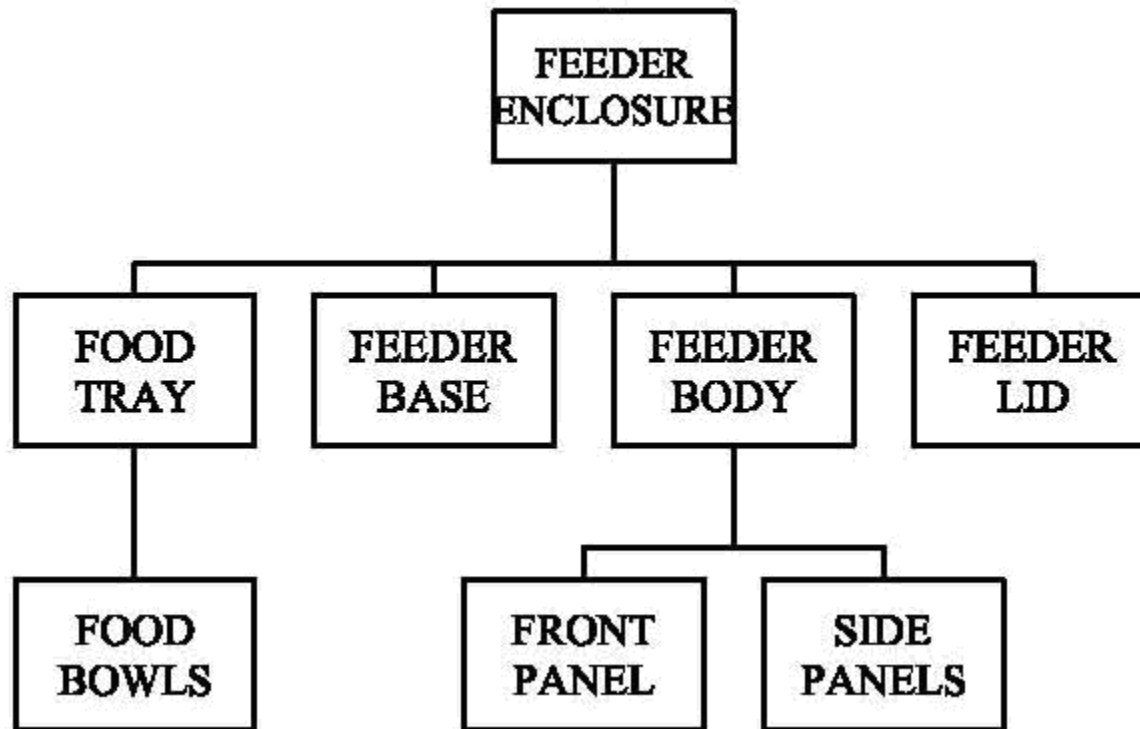
---

Three main modules:



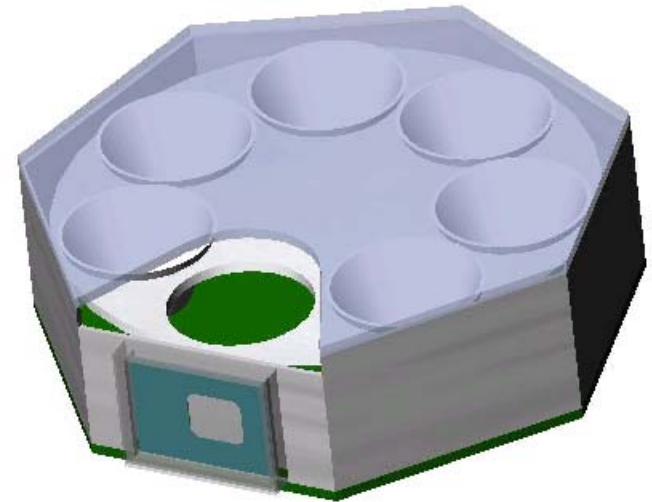
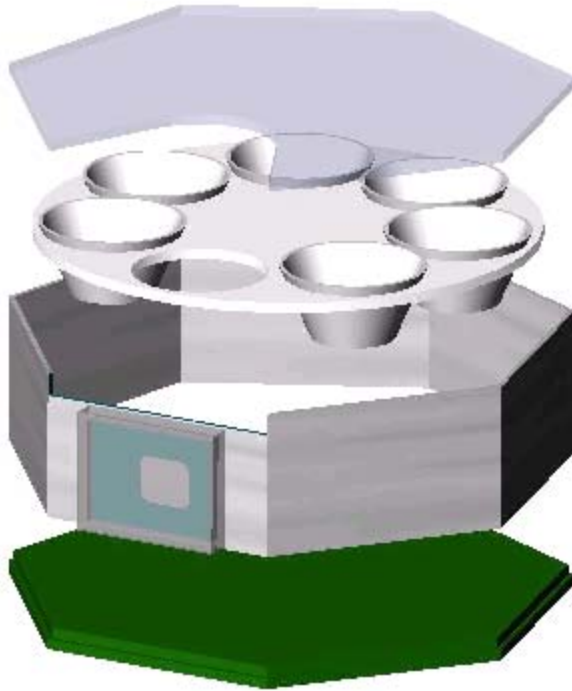
# Progress-to-Date (4 of 20)

---



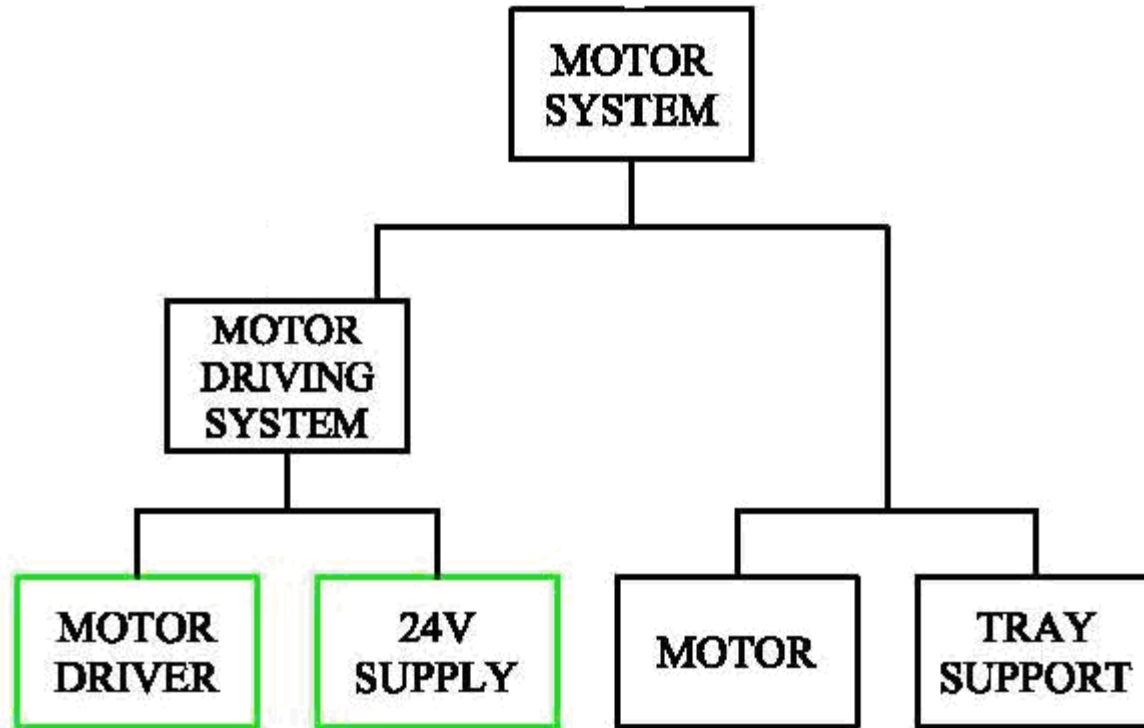
# Progress-to-Date (5 of 20)

---



# Progress-to-Date (6 of 20)

---





# Progress-to-Date (7 of 20)

---

- NEMA 17 Stepper Motor
  - Unipolar
  - 1 revolution per second
  - 1.8° step size
  - Maximums: 24VDC, 4.5 Amps

Frame Size 17  
STEP SIZE 1.8°



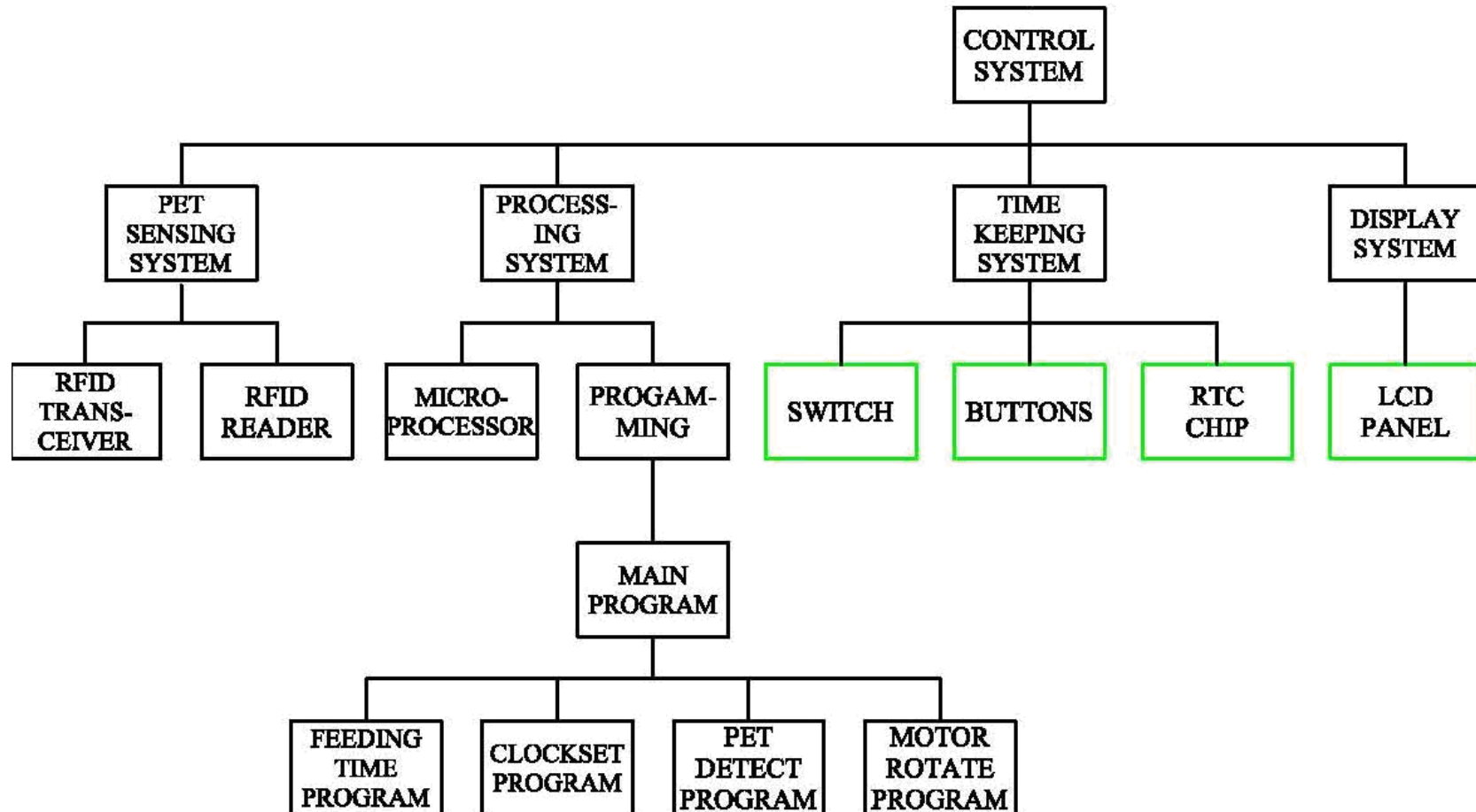
# Progress-To-Date (8 of 20)

---

- Driver Chip
  - Supplies power to motor
  - Isolates current from entering microprocessor

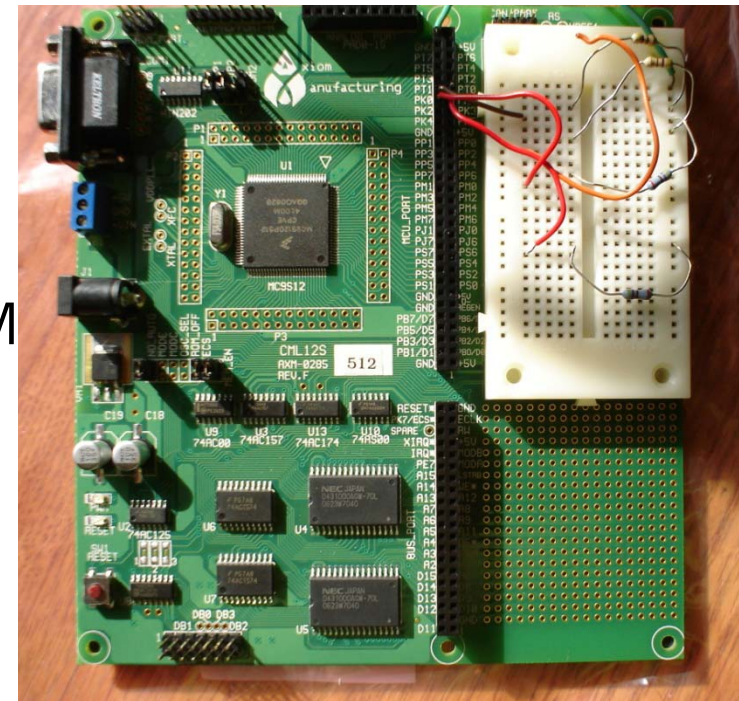


# Progress-to-Date (9 of 20)



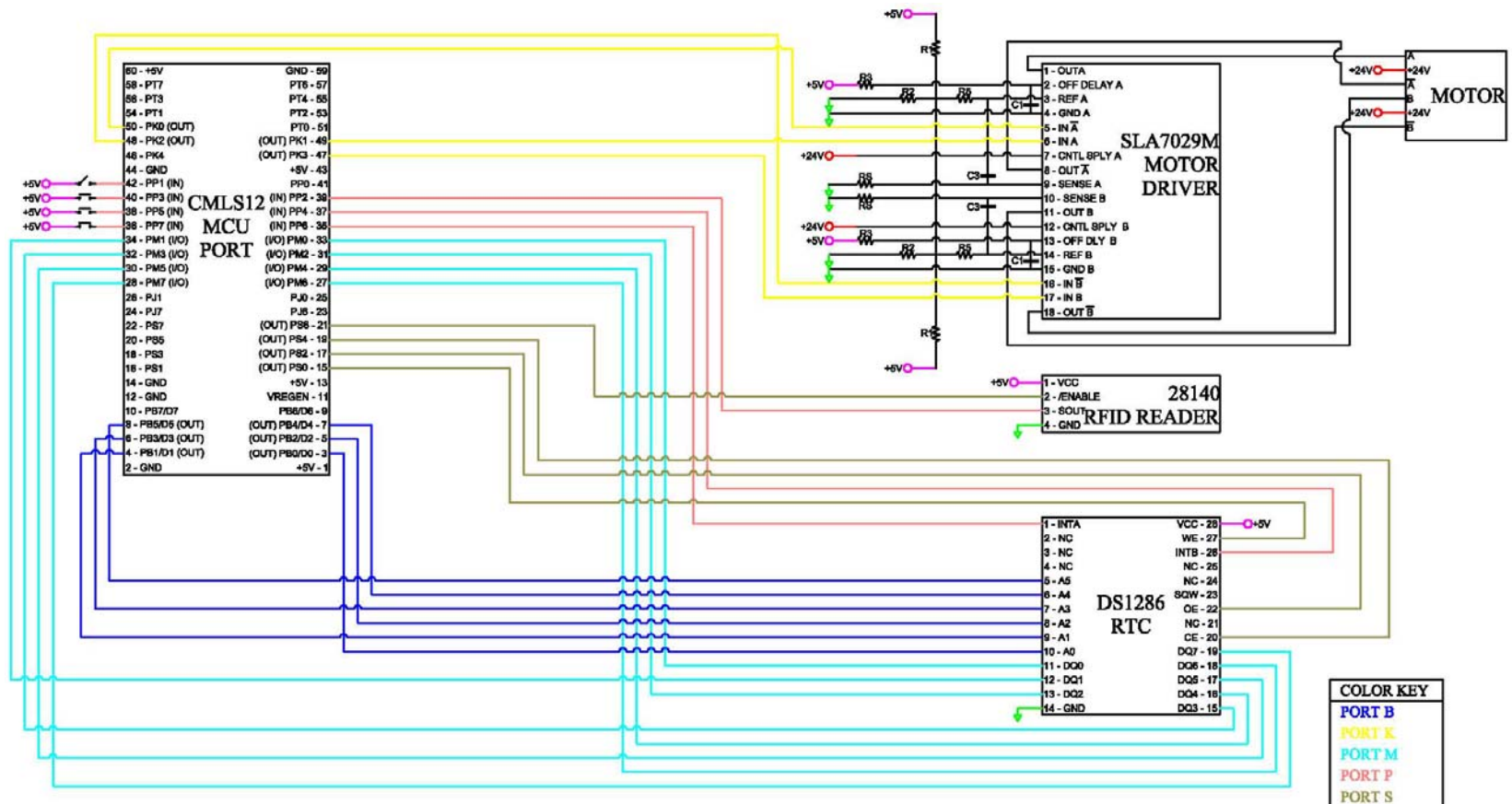
# Progress-to-Date (10 of 20)

- CML12S Microcontroller
  - Up to 91 I/O ports
  - Storage
    - 4 kB of EEPROM
    - 512 kB of Flash EEPROM
  - 14 kB of SRAM available



# Progress-To-Date (11 of 20)

## Electrical Control Schematic



\*\*\*NOTE: LCD PANEL IS PATCHED INTO LCD PORT OF CML12S

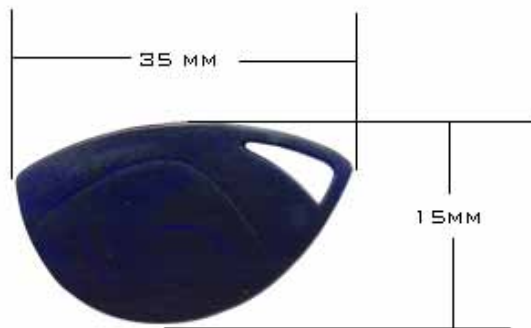
# Progress-To-Date (12 of 20)

---

## •RFID Tags

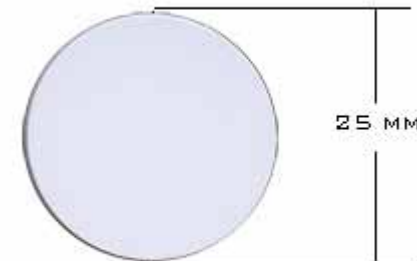
### Active Tag

- Onboard Power Source
- Range: > 4 inches



### Passive Tag

- No power source
- Range: Around 4 inches

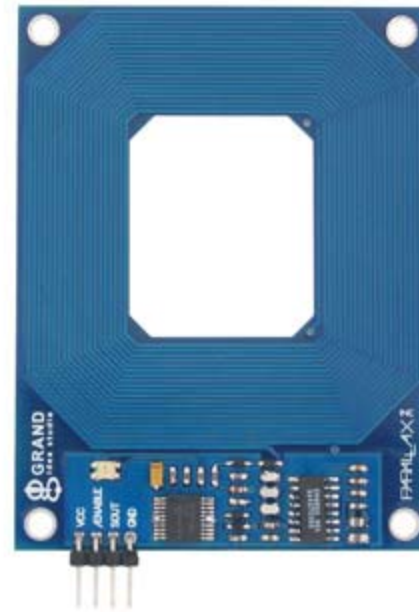


# Progress-To-Date (13 of 20)

---

## ○ RFID Reader

- Powered by single +5V DC supply
- 2.5" x 3.5"
- Logic device



# Progress-To-Date (14 of 20)

---

- Timing System

- DS1286 Watchdog Timekeeper

- RTC chip
    - Keeps time to the hundredth of a second
    - Outputs 2 types of alarms
    - Accurate to  $\pm 1$  minute/month
    - Onboard power





# Progress-To-Date (15 of 20)

---

- Timing system (con't)
  - Push Buttons
    - Used to program the time to the RTC
  - Toggle switch
    - System override
    - Allows user to suspend the unit's operation



# Progress-to-Date (16 of 20)

---

- LCD display
  - Made to work with the CML12S
    - Plugs straight into the LCD port on the board
  - 4 x 20 character display



# Progress-To-Date (17 of 20)

---

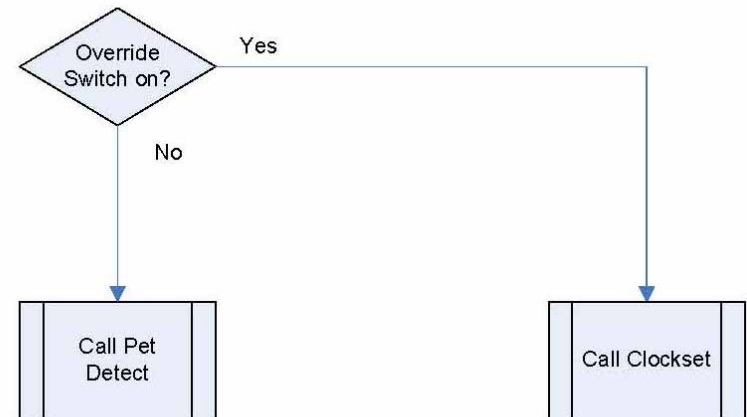
- IDE: “Embedded GNU”
  - Open source software
  - Verified to be working with our microcontroller
  - Works similarly to the IDEs that we are used to working with
  - Allows us to program in C

# Progress-to-Date (18 of 20)

---

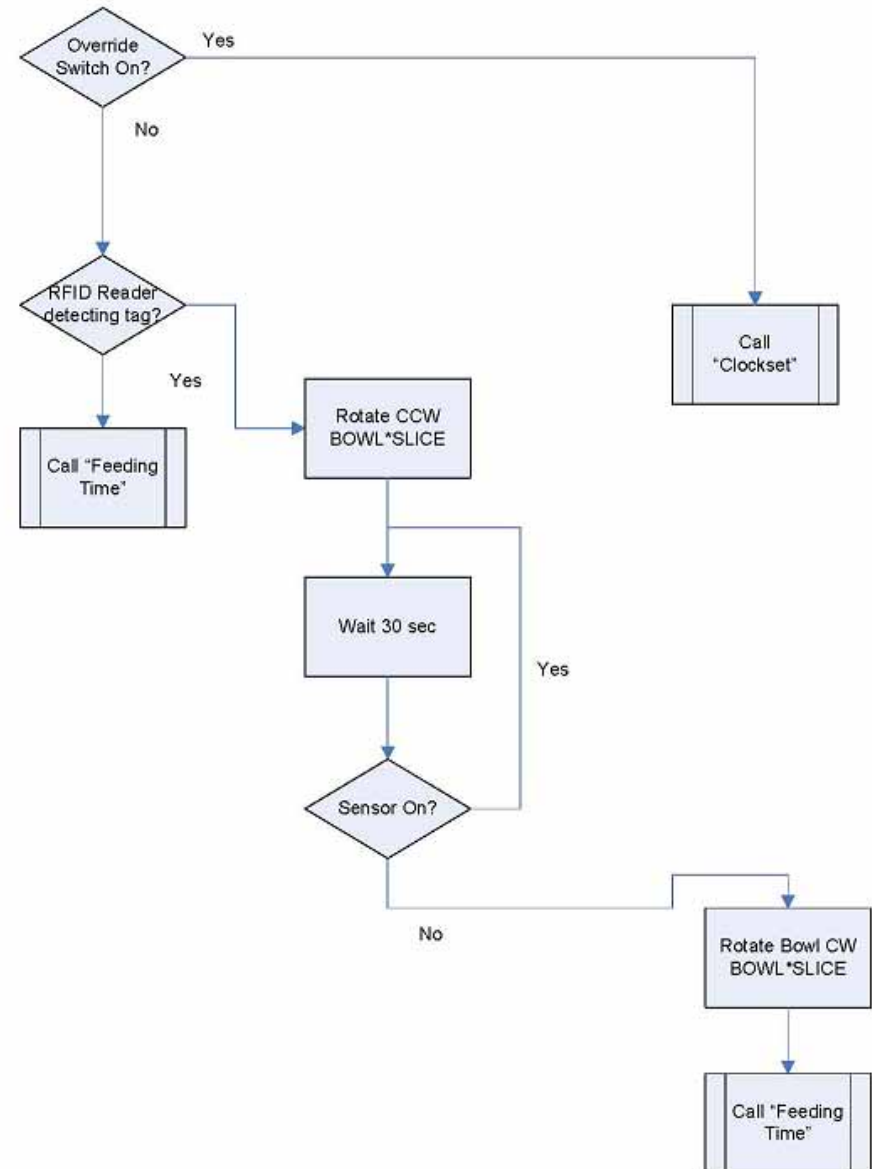
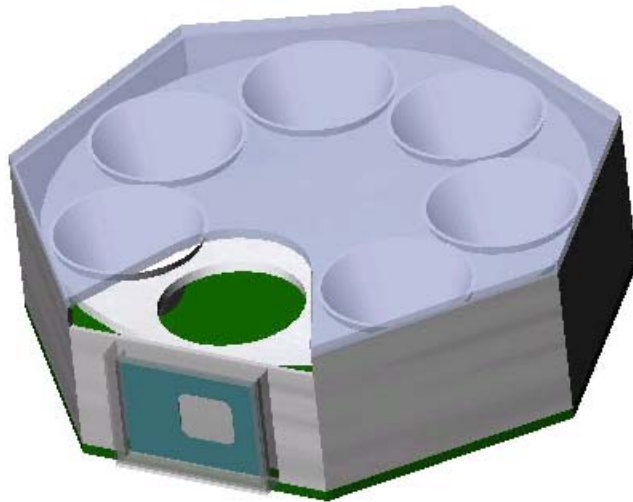
- Program
  - 5 subprograms in main program
    - Clockset
    - Pet detect
    - Motor Rotate
    - Feeding time
    - Countdown

Main Program



# Progress-To-Date (19 of 20)

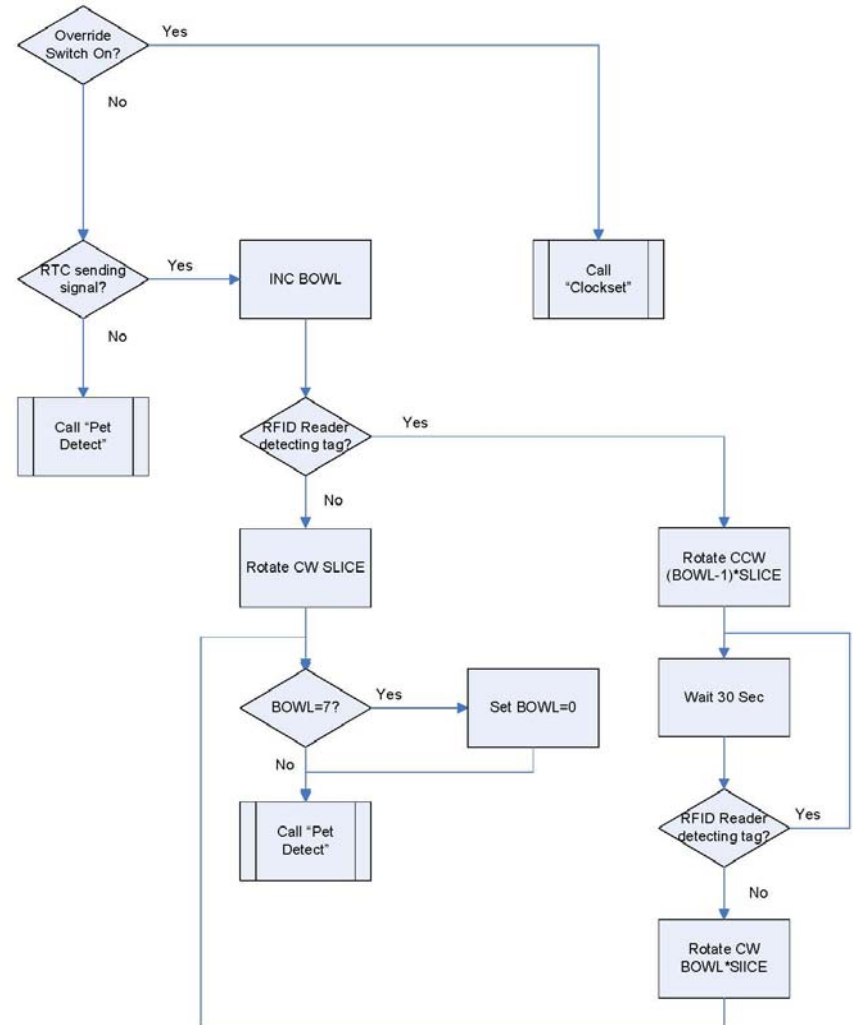
## Pet Detect Subprogram



# Progress-To-Date (20 of 20)

## Feeding Time Subprogram

Feeding Time Subprogram



# Problem Areas (1 of 3)

---

- Group member absence
  - One less person to contribute to presentation
  - Slightly behind schedule

# Problem Areas (2 of 3)

---

- IR sensors
  - Range too small
  - Sensing angle too small
- RFID tags/receiver
  - Out of manufacturer's stock
    - Won't be shipped until about March 14<sup>th</sup>



# Problem Areas (3 of 3)

---

- Stepper motor
  - Bipolar
    - No experience
    - More complicated circuitry
    - Driver purchased wouldn't work
  - Resolution
    - New motor ordered
      - Shipped in the next week or so
    - Old motor returned

# Plan for the Next Reporting Period

---

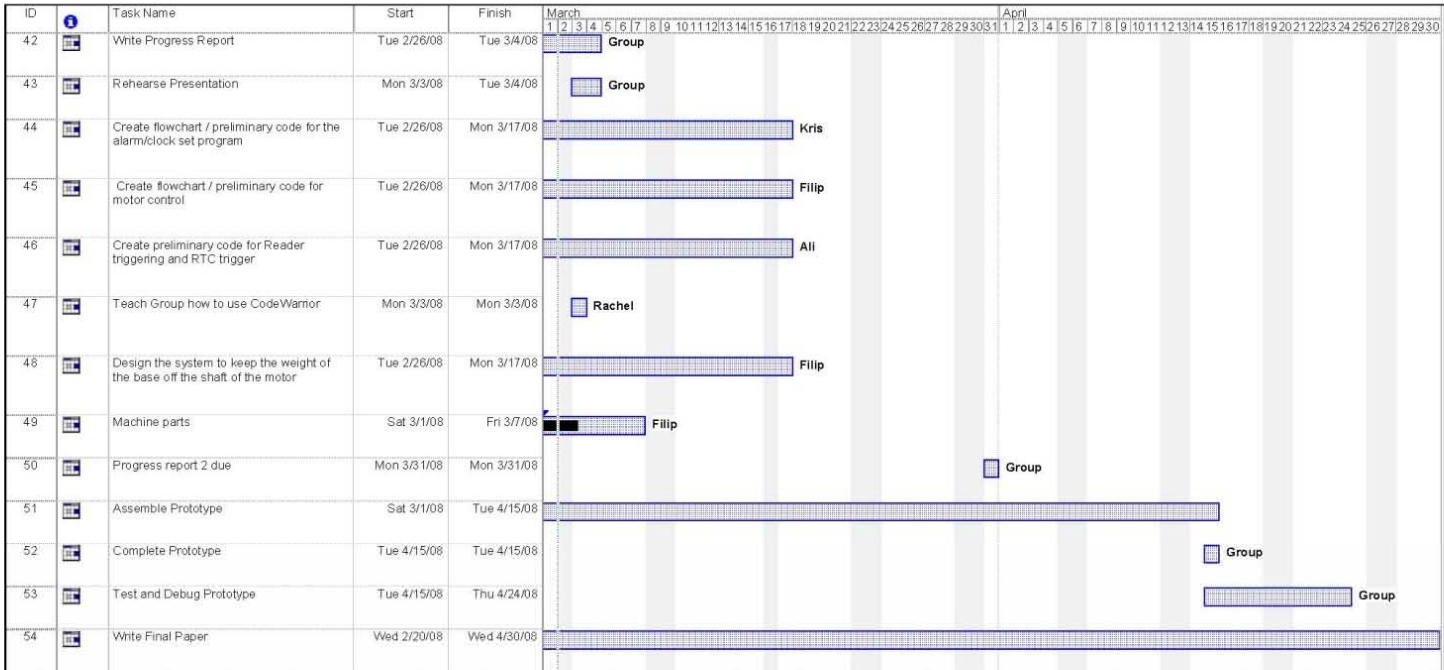
## ○ Programming

- Preliminary code/flow charts for all programs
- Understand how to use the RTC to perform specific tasks
- Become familiar with IDE

## ○ Design

- Purchase base and cover materials
- Machine cover and base
- Weight distribution system

# Schedule Status



Project: Gantt Chart 20080302.mpp  
Date: Sun 3/2/08

Task Progress Summary External Tasks Deadline

Split Milestone Project Summary External Milestone

# Conclusion

---

- In recap we have designed our system to:
  - Provide food to a pet at a user programmed time
  - Keep the pet from eating later servings
  - Does not allow a “forbidden pet” to eat from the feeder



# Thank you!

---

Questions?  
Comments?

# Bibliography

---

- "RFID Reader Module (#28140)." Parallax, Inc. Rocklin: 2005.
- "Radio-Frequency Identification." Wikipedia. 2 Mar. 2008. Wikimedia Foundation, Inc. 20 Feb. 2008
- "Full size Toggle Switch." Jameco.com. 03 Mar. 2008.
- "CML-9S12DP512." Axman.com. 1 Mar. 2008.
- "CML-9S12DP256." Axiom Manufacturing. Garland: 2004.
- "MC9S12DP512 Device Guide V01.25." Freescale Semiconductor, Inc. Chandler: 2005
- "DS1286 Watchdog Timekeeper." Dallas Semiconductor.

# Contact Information

---

Rachel Heil

[heilr@wit.edu](mailto:heilr@wit.edu)

802-338-0165

Alexis Rodriguez-  
Carlson

[alis\\_address@hotmail.com](mailto:alis_address@hotmail.com)

617-359-9019

Kristine McCarthy

[mccarthyk8@wit.edu](mailto:mccarthyk8@wit.edu)

508-280-2562

Filip Rege

[filiprege@gmail.com](mailto:filiprege@gmail.com)

617-230-0196