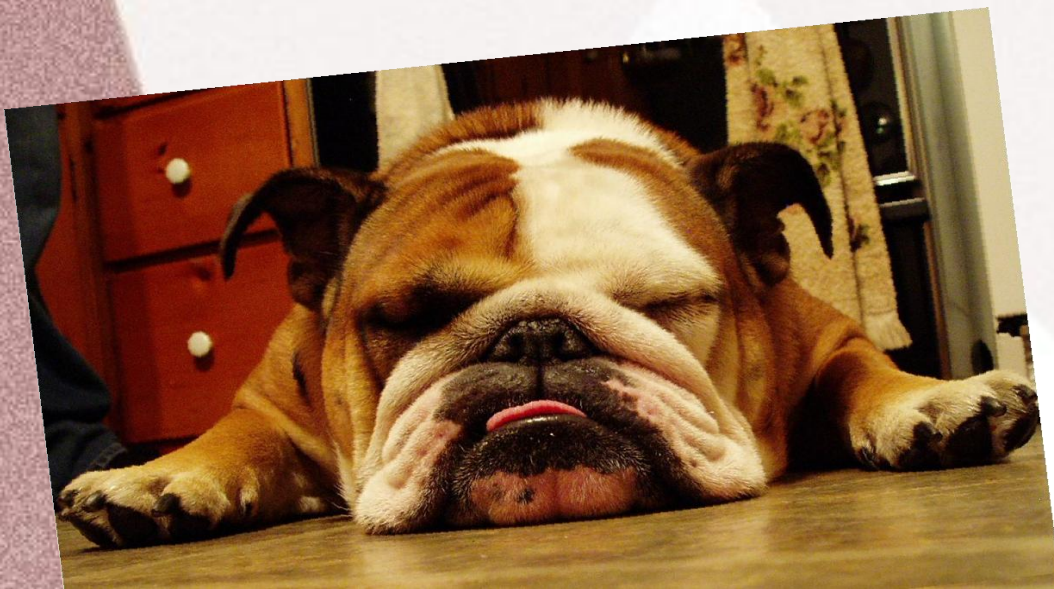


# Initial Design Review: **M.A.D. Dog**



*Nicholas Maddy  
Timothy Dayley  
Kevin Liou*

# Project Description

- What will it do?

M.A.D. Dog is an autonomous robot that will map and patrol an office space. If it detects an intruder then it will attempt to deter them with light and sound while sending a notification to a main security station.

# Project Description

- How will it work?

It will be a motorized wheel driven robot which will use a compass, IR sensors, and sonar to navigate a floor. It will use an array of PIR sensors to detect an intruder at which point it will begin an alarm sequence.

# Project Description

## Purpose: Security

- The primary usage for our design will be in buildings with large floors where human guards and other security systems might be too costly.



# Initial Specifications

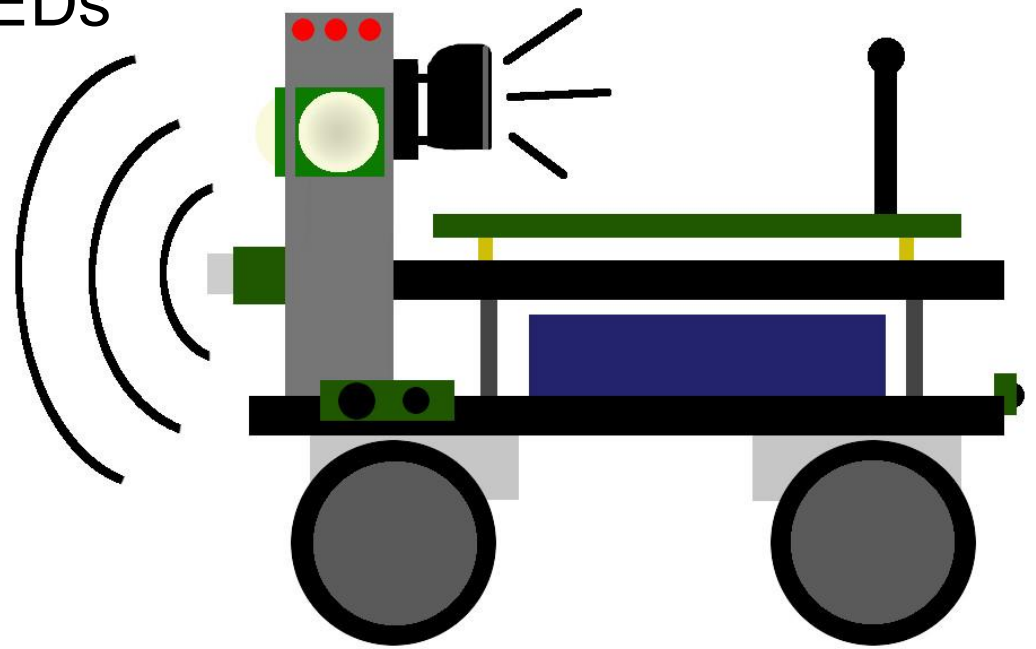
## Navigation:

- (2) Gear motors with built in Hall Encoders
  - Will have a separate battery to power motors to deal with voltage differences and power capacity
  - Using Solarbotics L298 Motor Controller
- (3) IR sensors
  - Sharp GP2D120: 4 cm - 30 cm
- (1) Ultrasonic range detector
  - Devantech SRF05: 1 cm - 4 m
- (1) Digital Compass
  - Devantech CMPS03: 0.1° res, 3-4° accuracy

# Initial Specifications

## Detect and react:

- (3) PIR sensors
  - ZEPIR0AAS02MODG: 5 m/ 3 m
- Wi-Fi Module
  - RN121XVW
- High luminosity LEDs
- Speakers



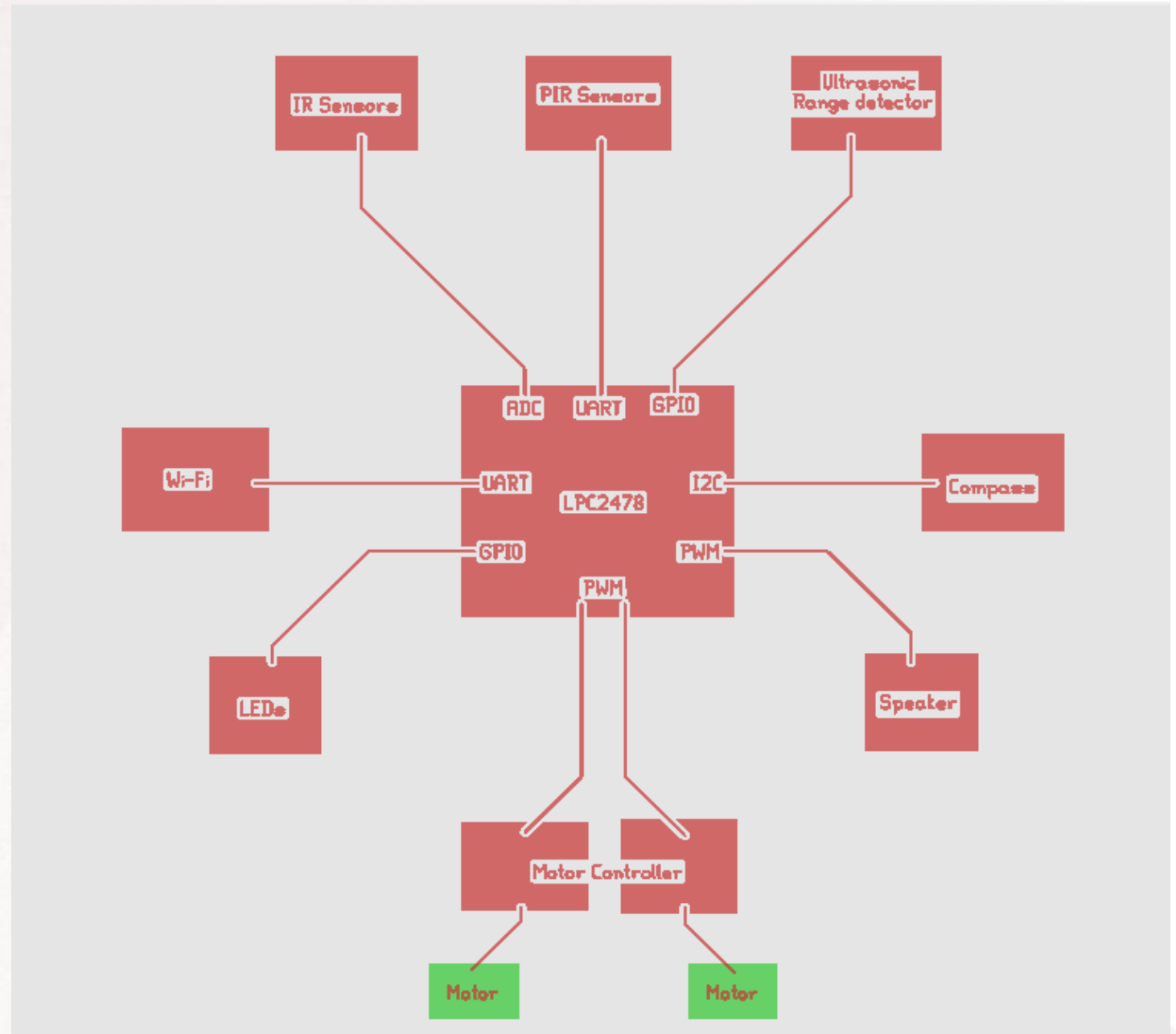
# Initial Specifications

## The Processor: LPC2478!!

- Interfaces to be used:
  - PWM
  - A/D Converters
  - GPIO
  - RS-232
  - I2C



# Block Diagram





# Additional Goals

- A Camera to add capture image of intruder.
  - Would be sent with alarm notification
- Microphones to add noise awareness to the device.
  - Have it investigate the source

# Individual Roles

Nicholas:

- Leader, Software and Controls

Tim:

- Robotics and Electrical

Kevin:

- Networking and Interfaces

# Schedule: M.A.D. Dog

Wed, 10.24.2012

#	Milestone	Tasks	Req.	Deadline	Start Date	Completed	Assigned to:
1	Project Idea / Team Choice						
2		Choose group and idea	N/A	10.08.2012	10.01.2012	10.08.2012	All
3	Refine Project Idea						
4		Annotated Block Diagram	1	10.15.2012	10.10.2012	10.14.2012	Kevin
5		External Behavior Specification	1	10.15.2012	10.10.2012	10.14.2012	Tim
6		Project role assignment	1	10.15.2012	10.10.2012	10.14.2012	Nick
7	Initial Design Review						
8		Processor Selection	3	10.24.2012	10.15.2012	10.17.2012	Nick
9		Peripheral Design	3	10.24.2012	10.10.2012	10.22.2012	Tim
10		Interface Design	8	10.24.2012	10.18.2012	10.22.2012	Kevin
11		Initial Parts selection	3	10.24.2012	10.10.2012	10.22.2012	All
12		Logic Design	9	10.26.2012			Nick
13		Analog Design	9	10.26.2012			Tim
15		Wireless design	11	10.27.2012			Kevin
16		Software Structure	15	10.28.2012			Nick
17		Schematic Capture	13	10.28.2012			All
18		Printed Circuit Board layout	13	10.28.2012			All
19		Power Supply and Distribution	13	10.29.2012			Tim
20		Mechanical Design	13	10.29.2012			Tim
21		Memory design	16	10.29.2012			Kevin
22	System Level Design						
25				10.29.2012			
26	Detailed Design						
27				11.26.2012			
28	Implement HW Design						
29				12.07.2012			

# ***Technology and IP Reuse***

**ZEPIR0AAS02MODG: (PIR sensor)**

It has settings for sensitivity which might allow for configurable detection capabilities.

**Hall Encoders: (built into motors)**

Will be used to determine distance traveled

**All of the previously listed sensors and modules.**

# Critical Elements

- Navigation

- Needs to be able to tell where it is, where it should go next, and be able to go there.

- Detection

- If the motion detection doesn't work then it fails as a security device.

Without either, this is just a large paperweight that isn't very nice to look at. At least the Wi-Fi would still work...

# Peer I/O

Are there any:

- Questions
- Comments
- Suggestions