

Date: 3/10/2014

Group Number and Name	DEC14-08 / PUMA ROBOT
Client/Advisor	Dr. Greg R. Luecke
Attendees/Role	Alex Grieve / Webmaster Matt Bogenschultz / Lead Nhat Pham / Communications Zeyu Zhang/ Key idea holder

Past week accomplishments

What was done, who did it, and when it was done

A: Alex, Nhat, Matt, and Zeyu discovered how to unlock the brakes on the 3 base DC motors. The brake release pins require at least 24V to release the brake so the DC motor can spin.

B: Nhat refined the H-bridge design to insure that both sides of the H-bridge cannot be activated at the same time. He did this using diodes.

C: Alex, Nhat, and Matt researched on closing the servo control loop. We found pre-built solutions offered by Advanced Motion Controls that cost \$500 per motor. $\$500 \times 6 \text{ motors} \times 2 \text{ robots} = \6000 which is over our budget. We are going to have to close the feedback loop with our own custom circuit.

D: Matt and Alex researched possible control circuits. We are thinking we need to use a PID control circuit.

E: Alex looked at possible alternatives to the MicroZed board. He's waiting for the others to determine what type of input they expect from the Linux PC/controller so he can choose an appropriate controller. Alex is currently looking at Arduino boards as a potential substitute.

F: Zeyu did research on PWM Servo Amplifier, and knows the parts of pins worked on. It required only a single DC power supply. The loop gain, current limit, input gain and setoff can be adjusted using 14 turn potentiometers .

Plan for coming week

What to do, who, and when should it be done

A: Nhat will post his H-bridge design to the design document Google doc

B: Matt will contact Dr. Luecke and design a control circuit to match his expectations and post it to the design document Google doc.

C: Alex will post the basic state diagram/program flow of the controller to the design document Google doc.

D: Alex will turn in the completed design document.

E: Zeyu will still research on PWM servo amplifier.

Pending Issues

A: We are lacking technical knowledge about PID controllers - will need to do research on these.

B: We also need advisor to gives instruction and approval to order parts so we can begin building and testing our H-bridge design.

C: We will try to gather documentation from the advisor's previous student who did work on the PUMA robot.

Individual Contributions

A: See “Past Week Accomplishments” section
B:
C:

Individual hourly Contributions

<u>NAME</u>	<u>Hours this week</u>	<u>HOURS Cumulative</u>
Matthew Bogenschutz/ Leader	8	23
Nhat Pham / Communication	7	24
Alex Grieve / Webmaster	8	38
Zeyu Zhang / Key-Idea-holder	6	20

Comments and extended discussions:

We are hung up on PID controller design and likely will not have a detailed entry in the design document for it. We will update the design document once we have a better idea of how our controller will work.

Our biggest issues was mapping the pins and understand each motor works. As of right now we were able to get each motor to works and have better knowledge of the motors. However, to get further we will need to understand its encoder. The encoder feedback is one of the most important inputs that we will need to determine direction and position, therefore knowing what type of signal the encoder outputs is very important.

The PWM servo amplifier is a great solution, not only is pre-built but its allow use to cut down our design time significantly. However, the cost and orders duration (6 weeks) may not work with our schedule.