Work Completed

This past week, I completed the acceleration and braking system. My first task was to integrate the PIC with the braking actuator. Previous plans included opamps to modify the 0-5V PWM signal coming out of the PIC. I realized that this is not necessary and that the 0-5V analog signal will be suitable to control the bidirectional motor speed kit. The braking actuator is now properly interfaced to the PIC through the bidirectional. Speed control kit. The code for this part of the project is mostly finished. With the help of Dave Price and Dave Kaputa, I realized that there is a current spike when the braking actuator is first engaged. This current spike is very quick but goes above 5A (limit on our power source). We found a power source with a 10A limit and this fixed the problem. We are not sure if this will be a problem when the circuit is run off the 12V accessory battery. We need to investigate this as soon as we receive the 12V accessory battery. The other bug with this system is the code for the brake. After debugging with Dave Price, I realized that this problem with within the code. I was using a do/while loop to control the braking output if the brake button is held in the on position. The code has to be slightly modified to fix this problem.

Also, I have to add an output from this system to send to the controller on the kart. The as received go kart had a switch that was engaged when the brakes were pulled. I will simulate the same switch using the microprocessor. The output signal will be 0V or 5V (brake engaged) and will be sent to the karts controller.

All other bugs in this program has been fixed. The main part of the code is seen below:

```c
for(;;)
{
    while (mode_choose==1)
    {

        if (acc_w==1)
        {

            for(dc = 0 ; dc < 128 ; dc++)
            {
                CCPR1L = dc;
                CCPR2L = 128;
                DelayMs(10);
                if (acc_w==0)
```
if (brake_w==1)
{
    CCPR1L = 0;
    CCPR2L = 0;
    DelayMs(20);
    if (brake_w==1)
        CCPR2L = 77;
    else
        break;
}

if (brake_w==1 && acc_w==1)
{
    CCPR1L = 0;
    CCPR2L = 128;
}

if (brake_w==0 && acc_w==0)
{
    CCPR1L = 0;
    CCPR2L = 128;
}

mode_choose = WIP_switch();
}

while (mode_choose==0)
{
    init_a2d();
    vertical_j=read_a2d(1);  // sample the analog value on RA0
    if (vertical_j<140)
        diff = 140-vertical_j;
duty = 128*(diff/88.);
my_duty=(int)duty;
CCPR1L = my_duty;
CCPR2L = 128;
}
if (vertical_j>=140)
{
CCPR1L = 0;
CCPR2L = 0;
DelayMs(20);
doi
{
    CCPR1L = 0;
    CCPR2L = 64;
    vertical_j=read_a2d(1);
}while (vertical_j>=140);
}
mode_choose = WIP_switch();
}

The highlighted part of the code is where the do/while loop was that caused the braking actuator problem. This part of the code is still being modified and corrected.

The rest of the code is working properly. Switching between modes is no longer a problem and the analog bugs have been corrected.

**Future Work**

1. Fix last bug in braking system. I have to fix the highlighted part of the code to solve this problem
2. I have to interface the steering pic to the computer. I will use the same design as I used for the braking/acceleration PIC.
3. Write the code for the steering actuator.
4. Test the steering system with the steering actuator
5. Test entire control system and prepare for on kart test using 12V accessory battery.
Hours Worked

Time spent on the project 3/5/2008 – 3/19/2008 (including vacation hours): 22