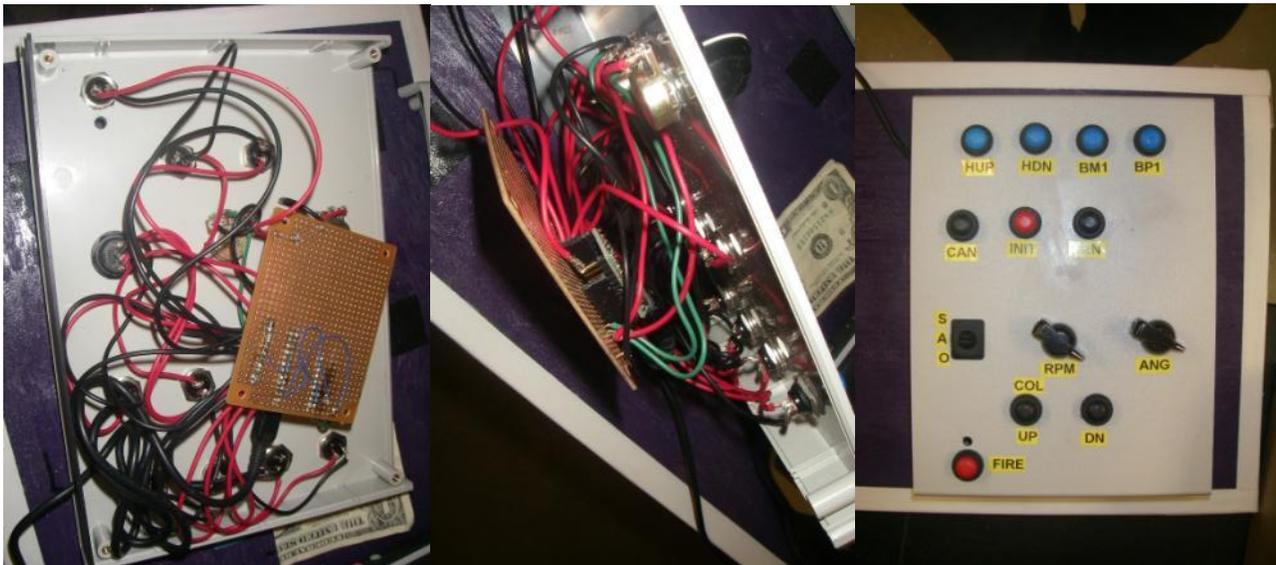


# SPECTRUM 3847

## Teensy Control Board

Our control board consists of a \$16 AVR USB microcontroller (Teensy) enumerating as a joystick to our classmate. This allows us to easily use the joystick libraries present in the FRC WPI Java library with our custom control board; instead of using the Cypress IO board. It's programmed with a modified Arduino IDE for atmega32u development available at [http://www.pjrc.com/teensy/td\\_download.html](http://www.pjrc.com/teensy/td_download.html)



We have two potentiometers controlling speed and hood angle, with other buttons for misc. uses such as firing and collector control. It reads analog inputs for the potentiometers (which are setup as voltage dividers) and the buttons are read by being connected to ground lowering an internal pullup to avoid accidental switching.

### LINKS

1. Teensy 2.0: <http://www.pjrc.com/store/teensy.html>

```
const int numButtons = 13;

byte allButtons[numButtons];
byte prevButtons[numButtons];

void setup()
{
    Joystick.useManualSend(true);
    for (int i=0; i<numButtons; i++)
    {
        pinMode(i, INPUT_PULLUP);
    }
}

void loop()
{
    // read 3 analog inputs and use them for the joystick axis
    Joystick.X(analogRead(0));
    Joystick.Y(analogRead(1));
    Joystick.Z(analogRead(2));

    // read digital pins and use them for the buttons
    for (int i=0; i<numButtons; i++)
    {
        if (digitalRead(i))
        {
            // when a pin reads high, the button is not pressed
            // the pullup resistor creates the high signal
            allButtons[i] = 0;
        }
        else
        {
            // when a pin reads low, the button is connected to ground.
            allButtons[i] = 1;
        }
        Joystick.button(i + 1, allButtons[i]);
    }

    // Because setup configured the Joystick manual send,
    // the computer does not see any of the changes yet.
    // This send_now() transmits everything all at once.
    Joystick.send_now();

    // check to see if any button changed since last time
    boolean anyChange = false;
    for (int i=0; i<numButtons; i++)
    {
        if (allButtons[i] != prevButtons[i])
            anyChange = true;
        prevButtons[i] = allButtons[i];
    }

    // a brief delay, so this runs approximately 200 times/sec
    delay(5);
}
```