Predator Cannon Servo Controller Board
## Hyperdyne Labs, © 2003
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*** DO NOT HOOK UP THE SERVO INCORRECTLY. READ BELOW FIRST ***

Overview

The servo board will fit inside a predator outfit to directly control the shoulder cannon movements using a wired button interface.

The board has 2 inputs to control the up and down motion of the servo. The servo can be controlled to go up and down using a myriad of interfaces, including momentary pushbuttons, voice recognition board, or an IR/radio link. Here is a pic of the unit:
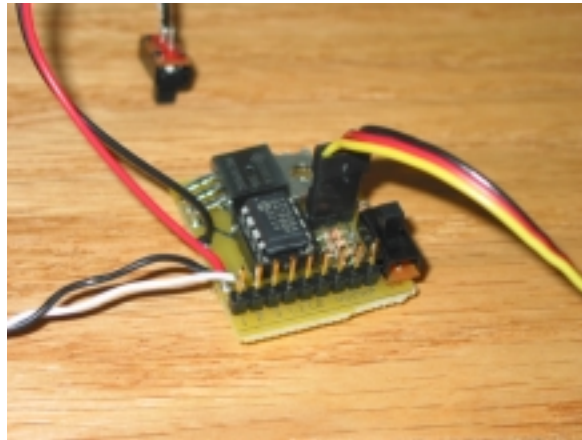

The board has a header of 9 pins that are used to hook up the external "activation" interface, which is used to tell the servo when to go up and down. The board runs of a 9V battery or other DC source < 12V. For heavy servo lifting, you should use AA batteries. You can use a 9V battery with the board if the servo does not need to move a heavy object. The larger batteries will last longer if you are connecting them to a heavy shoulder cannon.

Servo Connections

Any off-the-shelf 4.5-6V servo will work, as long as it has enough torque to lift your rangefinder. You can plug your servo right onto the controller board. A 3-pin header is there to connect the servo. **NOTE THE POLARITY! The servo ground is near the small resistor on the end of the board, and the servo control line is near the main chip. Make sure you plug the servo in correctly or it can be damaged!** The black wire on the servo is GROUND (-). The red is POWER (+). The control wire is typically yellow or white. A picture is shown below.

Top of servo board

C   +   --

- ○

○ ○ ○   +5 ○

Servo header

○ ○ ○ ○ ○   ○ ○ ○ ○
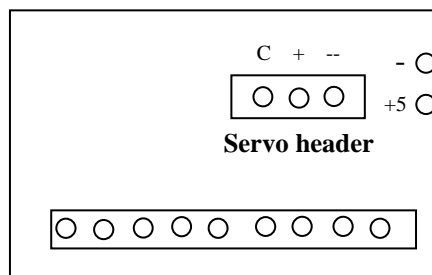
Servos Tested

Here is a list of the tested servos with the board:

Tower Hobbies: Hitec HS-77BBJ, http://www2.towerhobbies.com/cgi-bin/WTI0001P?Q=1&I=LXN620
Jameco: #157067 - HS303 robotic servo, http://www.jameco.com
FMA Direct: PS30, https://www.fmadirect.com/home.htm

NOTE: The tested servos were able to travel 120 degrees with 1-2ms input control pulses. The board is tuned for this, so the servo travels only 90. If you have a servo that travels a maximum of 90 degrees with 1-2ms input pulses, contact us and we will get you a new chip for your board so that the servo will travel all the way up and down.

Button Hookup

Here are the connections for the 2 LEDs and 2 pushbuttons. The pushbuttons are used to control the servo direction.

Top of servo board

header

1 2 3 L1 L2   vcc x 4

up

down
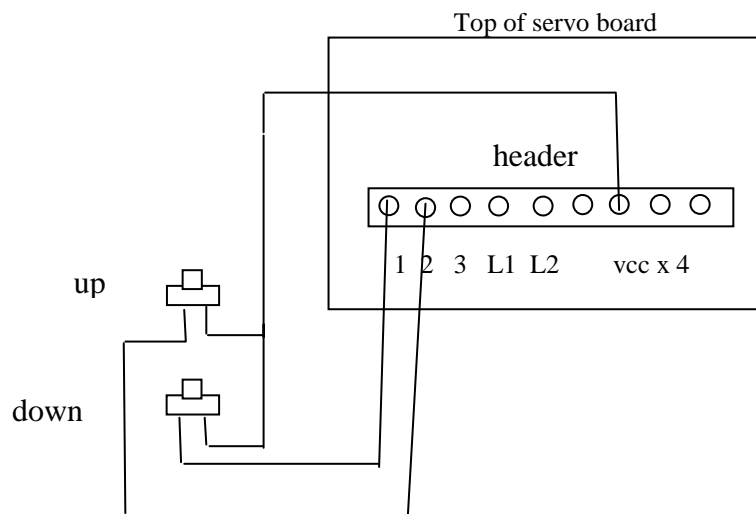
Mode Selection

When the board powers up, it selects the "interface" mode via the onboard slide switch. The 2 inputs on the board respond to high signal, i.e., when a logic "1" is seen on the pin, the servo responds.

The 2 input interface modes are:
1) Normal up/down servo controller mode
2) Automated up/down servo controller mode.

In mode 1), the servo travels up and down as long as the button or other interface input is pushed or activated. This is the mode to use for a pushbutton, IR or RF link, etc. This gives you total control over the final position of the servo by the amount of time the input is active.

In mode 2), the servo goes all the way up or all the way down with just one button press or pulse on the interface pins. This mode is used for other input that only pulses the input pins briefly. The servo will travel a full 90 degrees (up or down) and automatically stop in this mode. In mode 2, the servo board also waits for 4 seconds upon power up before accepting commands, which is used to allow the board time to boot up.

NOTE: Upon powerup, the servo will also reset itself at high speed. The servo will go to the up position automatically, so the board knows where the starting position is. In mode 1), the servo resets right away. In mode 2) the servo waits 4 seconds, then resets itself.

OPERATION

To operate your board, plug in the batteries, plug in the stereo 1/8" jack to the board, and then plug in the servo (note polarity).

Turn the board on and the servo will reset. Now pressing the two buttons will move the servo back and forth through a 90 degree arc. Depending on the selected servo mode (described above) the servo will move with each button press.