

# PAN AND TILT SERVO CONTROLLER

Servo motors are an ideal choice for implementing animated camera mounts. In a pan and tilt arrangement, the camera can be pointed side-to-side and top-to-bottom. Making a controller is a simple task when a microcontroller is used.

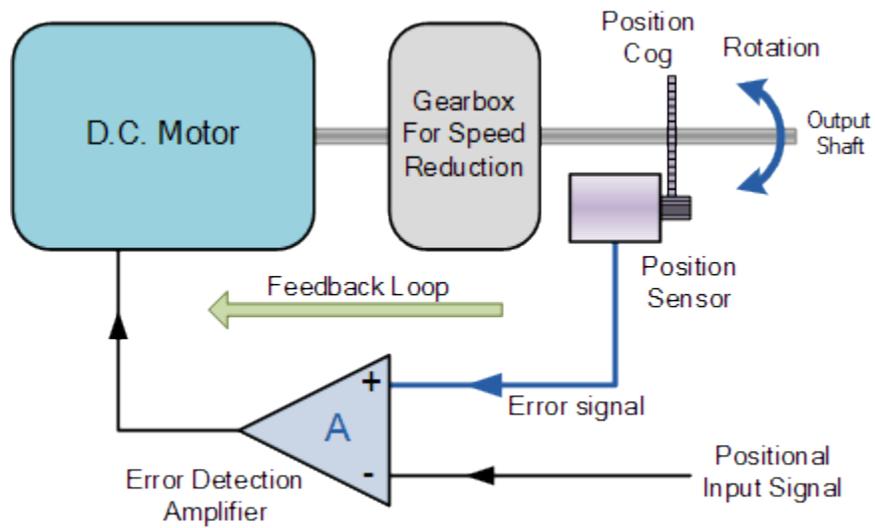
*Pan & Tilt Servo*

# Pan and Tilt Servo Controller

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HS-85BB Servo Motor

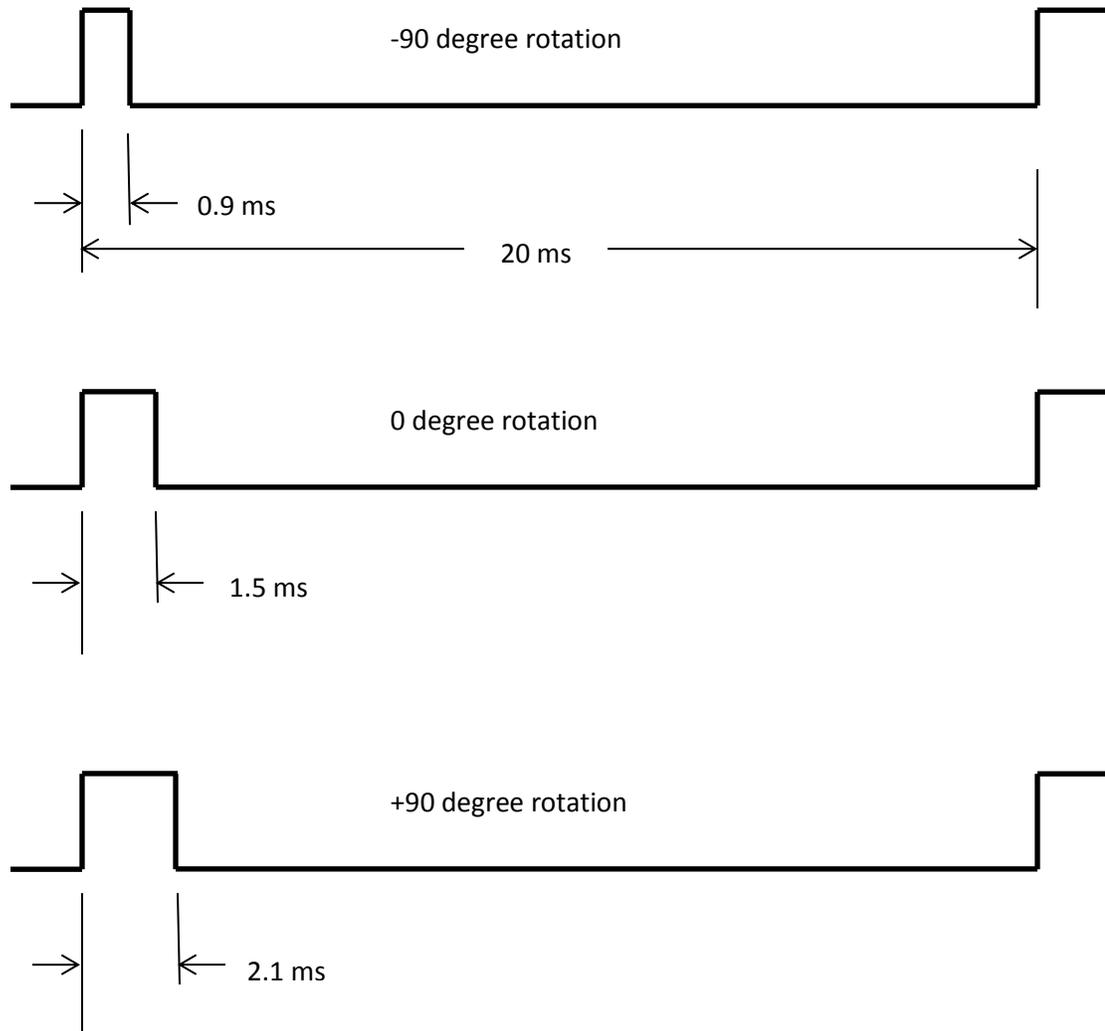


Servo Motor Schematic

## Pan and Tilt Servo Controller

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Servo motors have internal electronic circuits that respond to pulse width modulation as shown in the following drawings.



There is not much difference between the minimum pulse width and the maximum pulse width. The microcontroller should have high resolution to interpolate between these two extremes.

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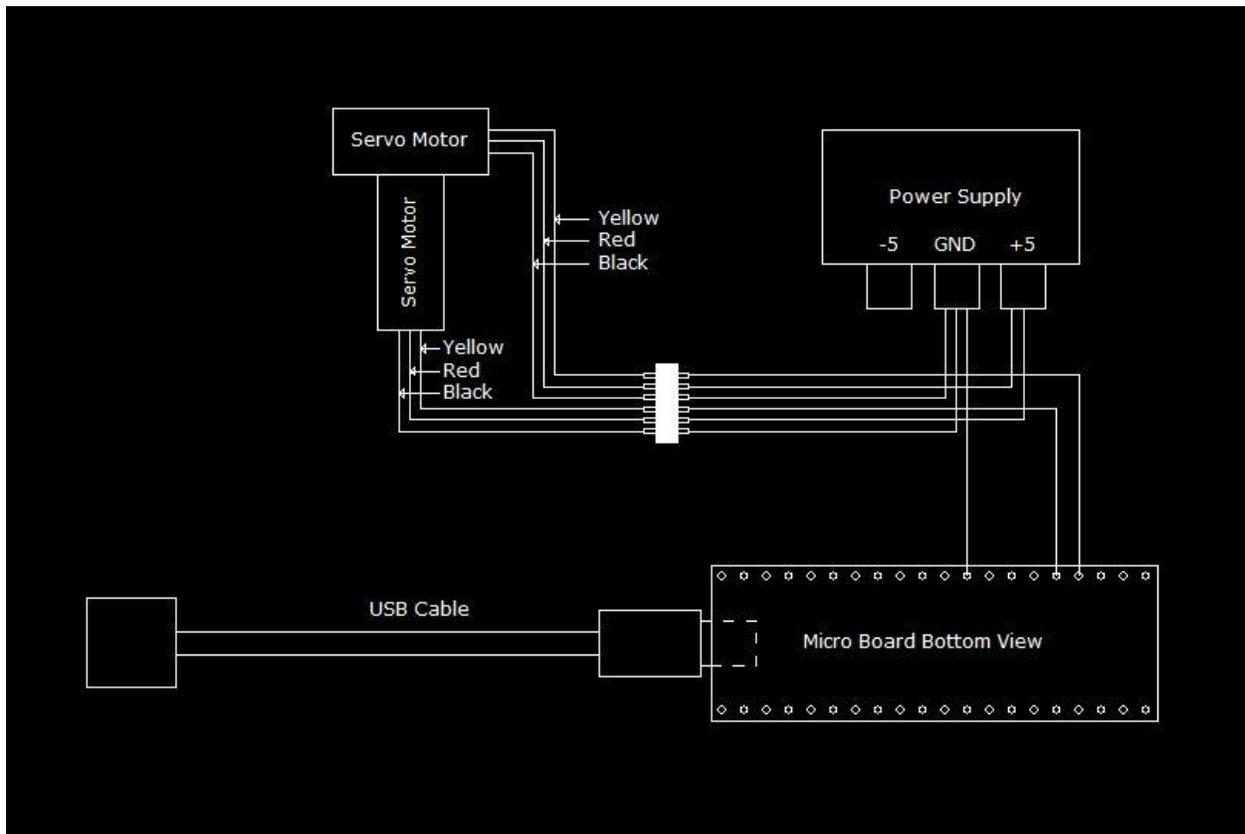


The Lynxmotion RB-Lyn-316 has 2 servo motors in order to implement 2-axis movement. See <http://www.robotshop.com/ca/en/lynxmotion-micro-pan-and-tilt-kit-with-servos-black.html>

# Pan and Tilt Servo Controller

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The configuration is using Mikroelektronika MINI-M4 development board for STM32 with USB HID bootloader. The micro board is powered by the USB cable.



Wiring Diagram

## Test Program

The test program was written in Delphi 7.

Hovering the cursor over the purple square will send seek commands to the servos. Moving the cursor side-to-side runs the Pan servo from -90 degrees to +90 degrees. Moving the cursor up-and-down runs the Tilt servo.

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Test Program Window

### **Firmware**

The PC test program sends seek commands in the form of:

```
SendStr := 'm' + IntToStr(A) + ' ' + IntToStr(B) + ' ' + CRLF;
```

Integer A is for the Pan servo, and integer B is for the Tilt servo. The values are in degrees and can be positive or negative.

The firmware extracts these values and multiplies them by 28 before sending them to the respective servo driver functions. The firmware returns these values back to the test program where they are displayed.