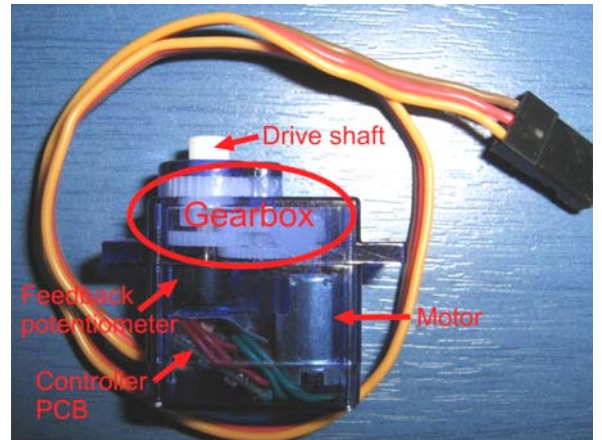
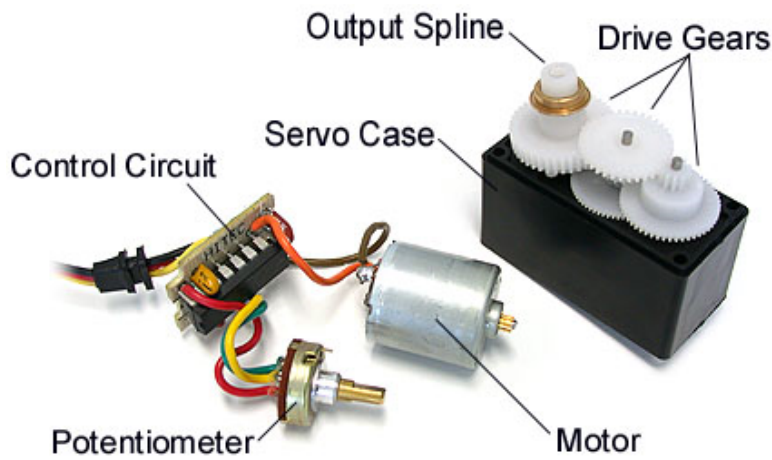


# RC Servos

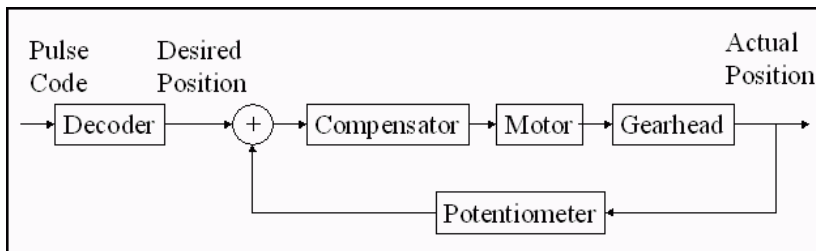
## RC Servo Internals



[http://pcbheaven.com/scripts/imagepresent.php?filename=%2Fwikispaces%2Fimages%2Fhowservoswork\\_1245415989.jpg](http://pcbheaven.com/scripts/imagepresent.php?filename=%2Fwikispaces%2Fimages%2Fhowservoswork_1245415989.jpg)

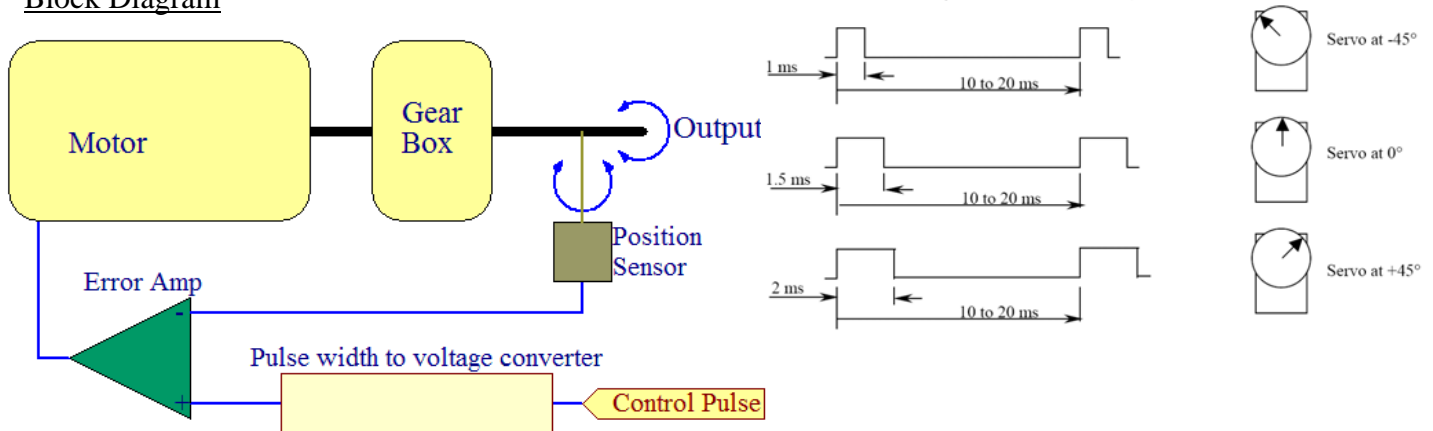
[http://www.servocity.com/assets/images/Servo\\_Breakdown.jpg](http://www.servocity.com/assets/images/Servo_Breakdown.jpg)

## Servo Control Loop



<http://www-cdr.stanford.edu/dynamic/servo/servoloop.gif>

## Block Diagram

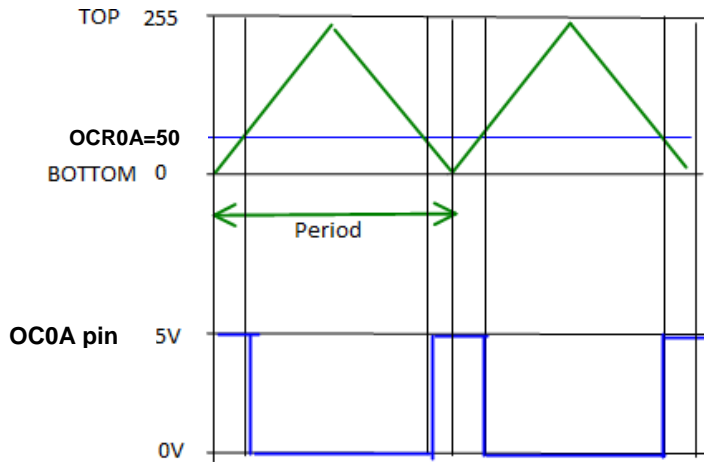


<http://www.digitalnemesis.com/info/docs/rcservo/resources/servodiagram1.png>

# RC Servos

## Generating the RC Servo Control Signal (PWM waveform)

Using the ATmega328 timer/counter 0



**How OCR0A Controls Duty Cycle.** The figure demonstrates how the OCR0A value is used to control the duty cycle for Phase Correct PWM. The OC0A pin (PD6) is initially at 5V, and once the counter reaches the OCR0A value, the OC0A pin is set to low. OC0A is pulled high when the counter reaches the OCR0A value again.

## Timer-Counter Control Register A (TCCR0A) initialization example

```
void init() {
//Initialize Timer0
//WGM00 set= phase-correct PWM
//COM0A1 set = clear OCOA on up-count match; set on down-count match
    TCCR0A = _BV(WGM00) | _BV(COM0A1);
//Set the clock pre-scaler, fo=f/(N*510)
    TCCR0B = _BV(CS02) //256 pre-scale
//Enable output
    DDRD |= _BV(PD6);
}
// Set the TOP value - ex. 50/255 = 20% duty cycle
OCR0A = 50; //same as 0x32
```

Bit	7	6	5	4	3	2	1	0	
0x24 (0x44)	<b>COM0A1 COM0A0 COM0B1 COM0B0 - - WGM01 WGM00</b>								<b>TCCR0A</b>
Read/Write	R/W	R/W	R/W	R/W	R	R	R/W	R/W	
Initial Value	0	0	0	0	0	0	0	0	
Bit	7	6	5	4	3	2	1	0	
0x25 (0x45)	<b>FOC0A FOC0B - - WGM02 CS02 CS01 CS00</b>								<b>TCCR0B</b>
Read/Write	W	W	R	R	R/W	R/W	R/W	R/W	
Initial Value	0	0	0	0	0	0	0	0	
Bit	7	6	5	4	3	2	1	0	
0x27 (0x47)	<b>OCR0A[7:0]</b>								<b>OCR0A</b>
Read/Write	R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W	
Initial Value	0	0	0	0	0	0	0	0	

CS02	CS01	CS00	Description
0	0	0	No clock source (Timer/Counter stopped)
1	0	0	clk <sub>IO</sub> /256 (From prescaler)