

# How to make a MPG (Manual Pulse Generator) for CNC

Design by Bob Adams 11.5.09

## Project Materials:

Disk Shaft 1/4" (.250) Dia. Drill Rod x 1.5 long  
Base Plastic 3/8" x 2 x 4 (also use for the Shaft bearing)  
Disk (Aluminum) 2.250 Dia. x 5/8"  
IR Block (Plastic) 3/4" Square x 2" long

## Tools needed:

1/16" (.0625 Dia.) Endmill  
5/8" (.625 Dia.) Endmill  
#32 (.116 Dia.) Drill  
#43 (.089 Dia.) Drill  
4-40 Tap  
1/4" (.250 Dia.) Reamer

## Hardware:

4-40 Nuts  
4-40 Flat head x 1 1/2" long  
4-40 Flat head x 3/4" long  
Dial Knob (Radio Shack)  
Small limit switch (Radio Shack) use for detent arm

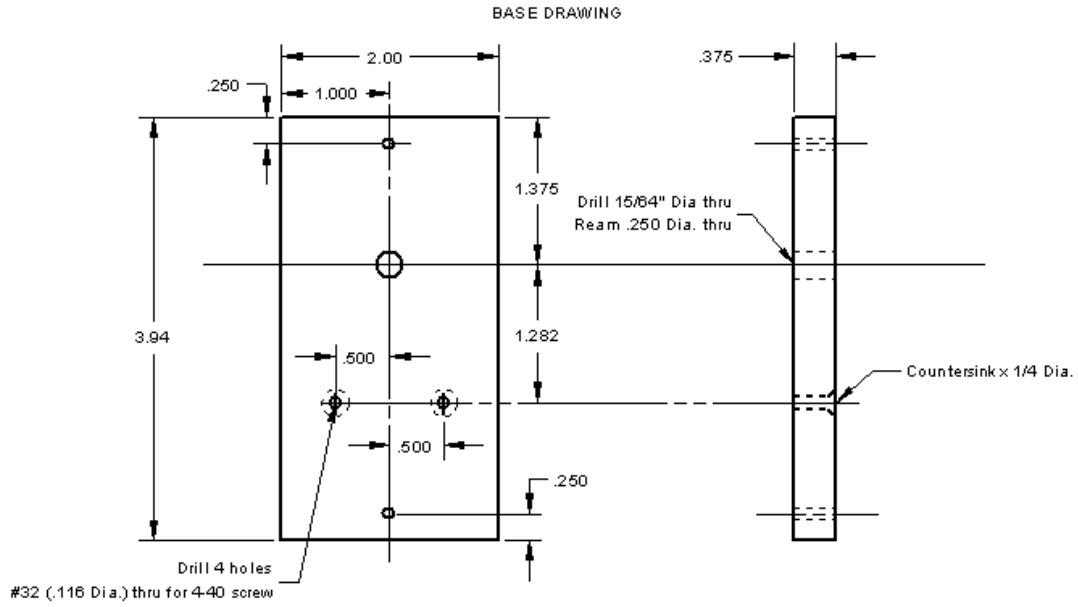
## Electronics:

R1, R2 = 2.7K 1/4 w resistor (2)  
P1, P2 = 220 ohms 1/4 w resistor (2)  
IC 14pin socket (1)  
74HC14N14 (1) IC  
Photo Detector Digi-key # 160-1030-ND (2) Black Color  
Infrared Emitter Digi-Key #160-1028-ND (2) Clear Color  
PCB (Printed Circuit Board) See Note

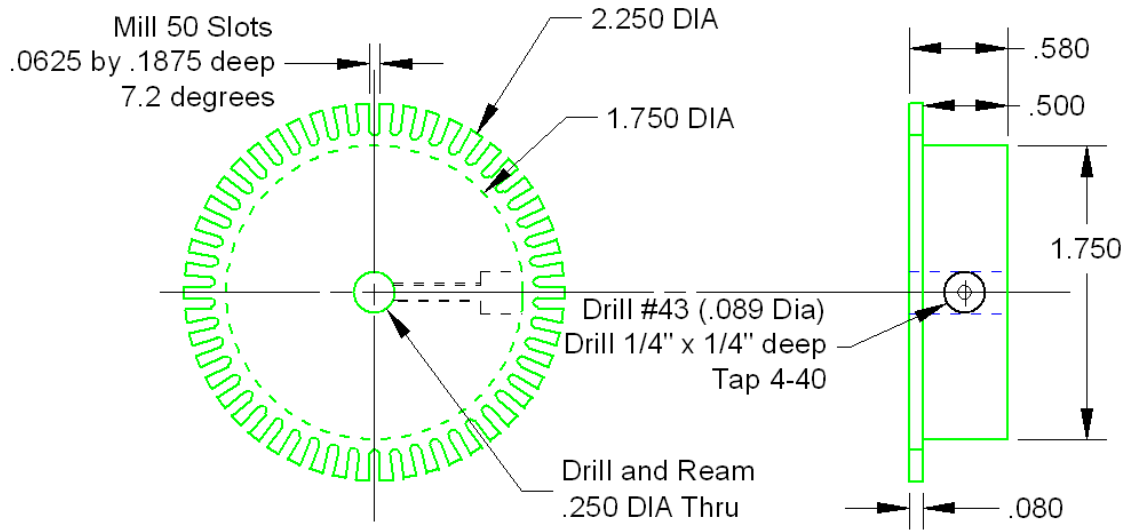
## Assembly Notes:

Install in the Base two 4-40 x 1 1/2" long screws with two nuts on each screw.  
Place the IR Block on the screws and set the Disk on the 1/4" hole.  
Put the Shaft thru the Disk and into the 1/4" hole.  
Push the Disk against the Base then set the 4-40 x 3/4" long screw.  
Next adjust the two nuts for clearance in the IR Block.

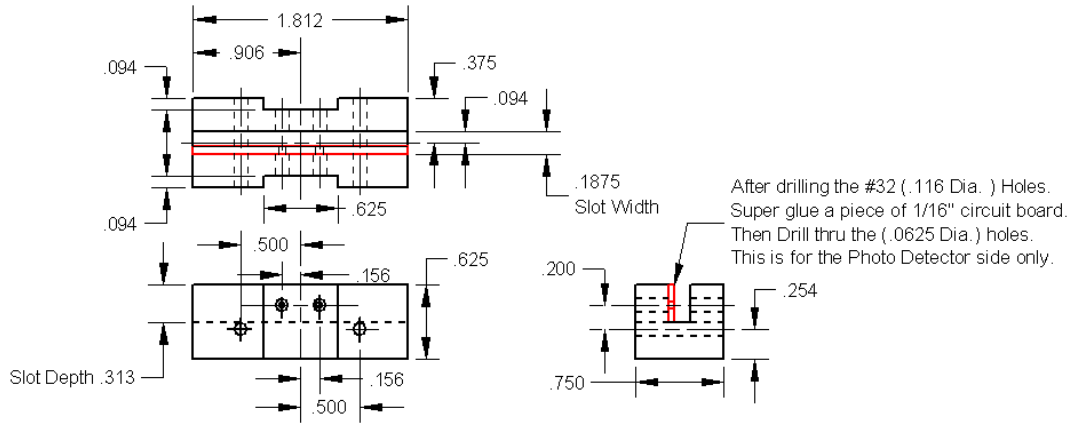
# Base Print



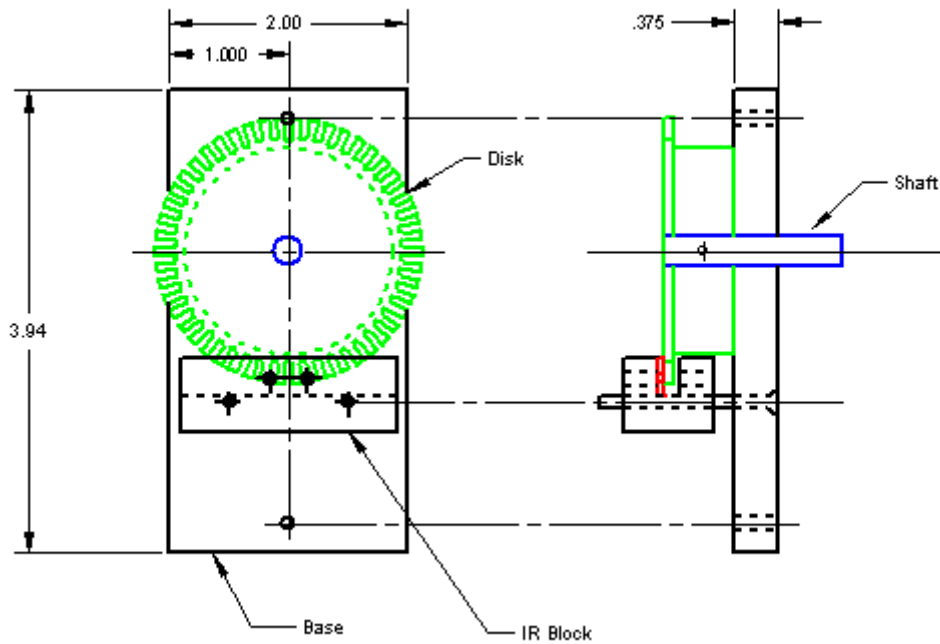
# Disk Print



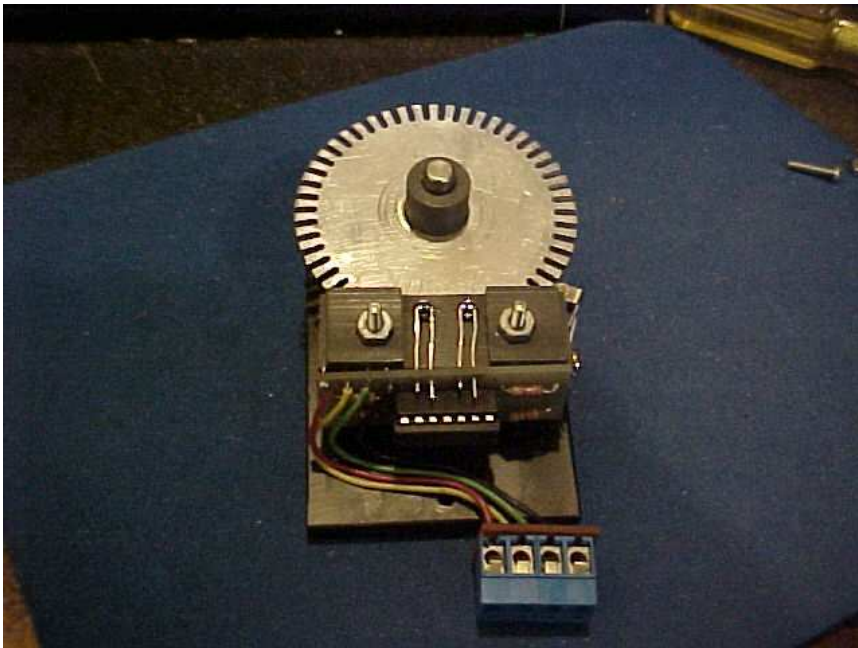
# IR Block Print

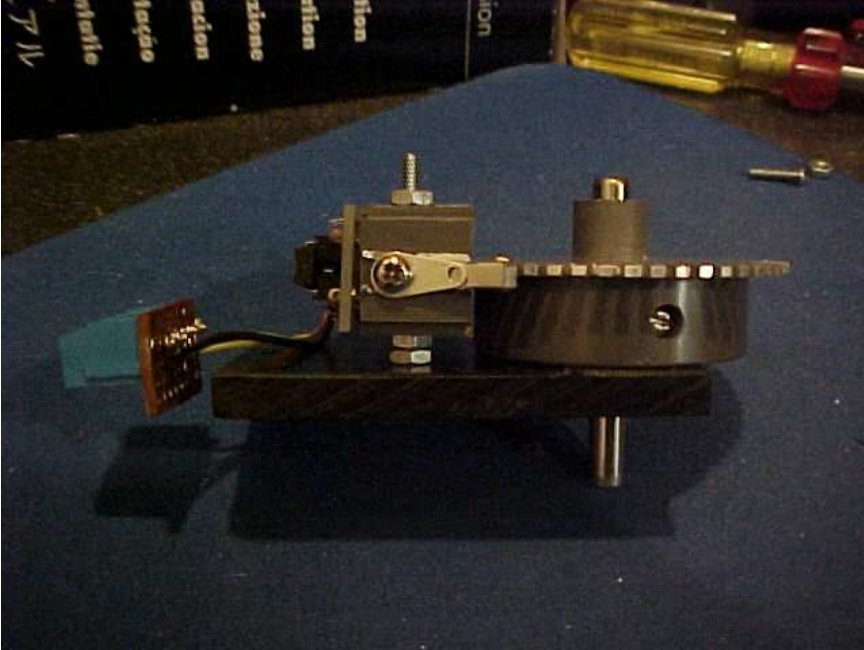


# Assembly Detail



I used a Ball Bearing.  
But the plastic would make a good bearing too.  
Less parts to get.





Note:

The PCB for the MPG can be purchase for \$5.00 + \$2.00 USD postage thru Pay Pal.

Just use my Email address and how many you are buying.

<mailto:thinkcnc@hotmail.com>

The PCB can also be used for Home Limit Switches and Spindle RPM.

More Info at:

<http://www.cad2gcode.com/cncprojects>