

# DIY Laser Collimator

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RASC Toronto Centre  
Member's Night  
July 24th, 2002, 7:30pm

Vincent Chan

<http://www.pathcom.com/~vhchan>

# Outline

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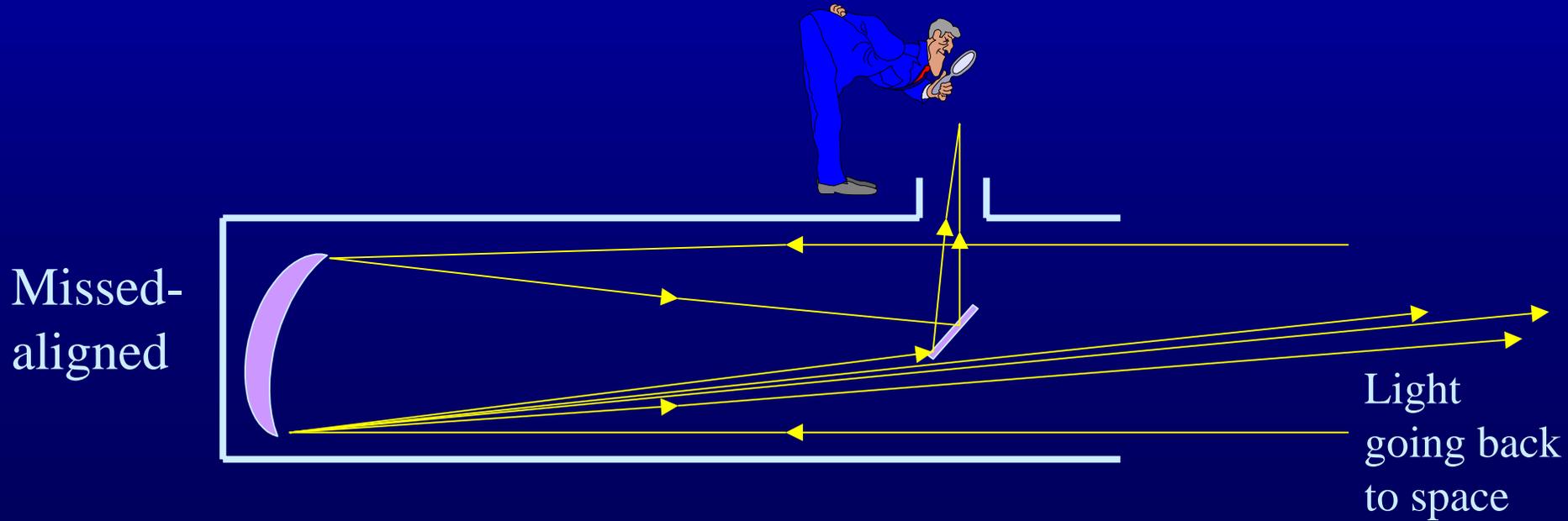
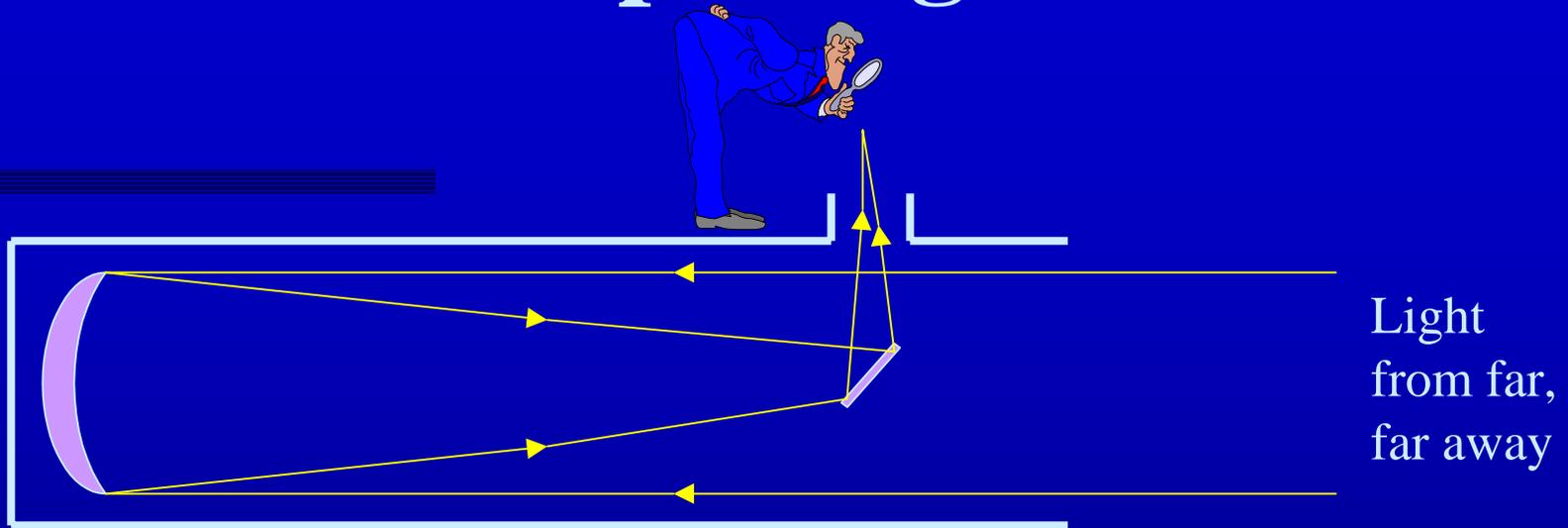
- What is collimation?
- Telescope alignment
- Procedure
- Other designs
- No tools collimator
- Wood collimator
- Aluminum collimator
- Adjusting the collimator

# What is collimation?

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- Collimation is the process of aligning the optics of a telescope.
- All telescopes require collimation. How often is dependant on the type and mechanical construction of your telescope.
- I will be focusing on Newtonian (or Dobsonian) telescopes.

# Telescope Alignment



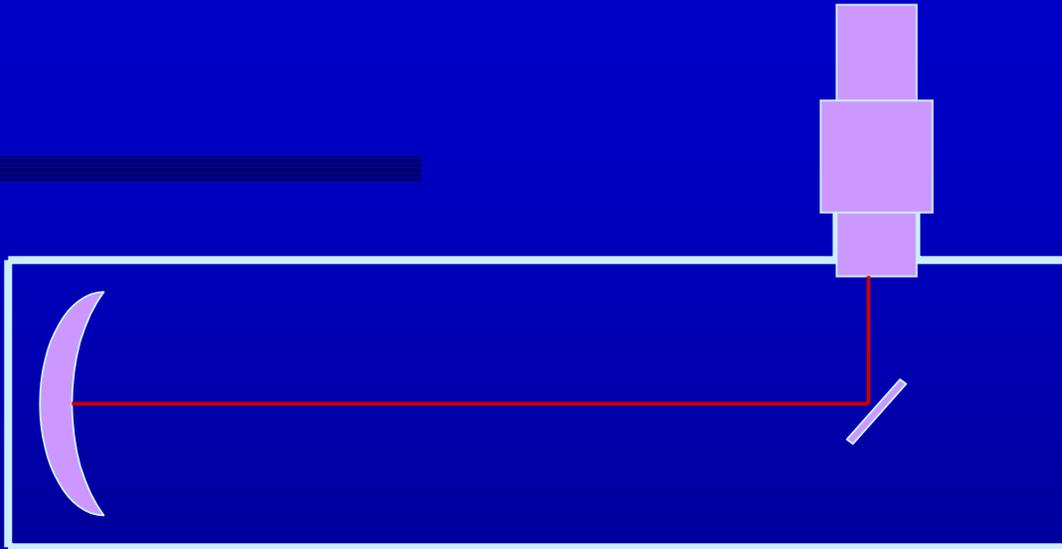
# Advantages to Laser Collimation

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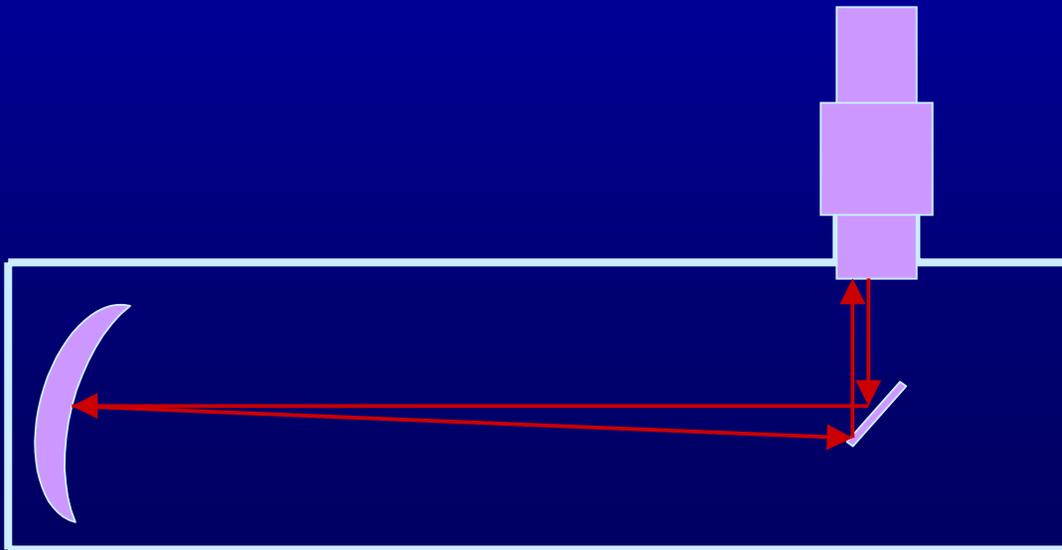
- Can be done in the dark.
- Its fast.
- Its easy
- Leaves out the guess work. (Not reliant on your “judgement”)

# Laser Collimation

Ideal



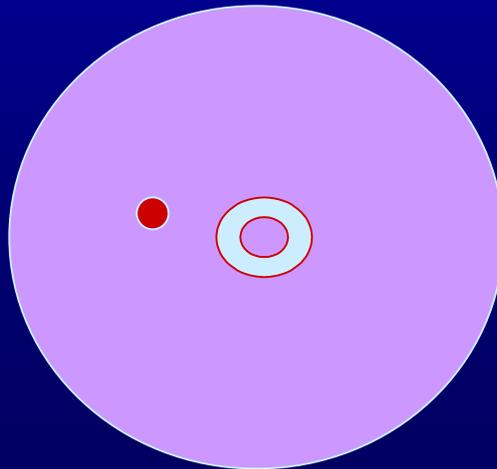
Missed-aligned



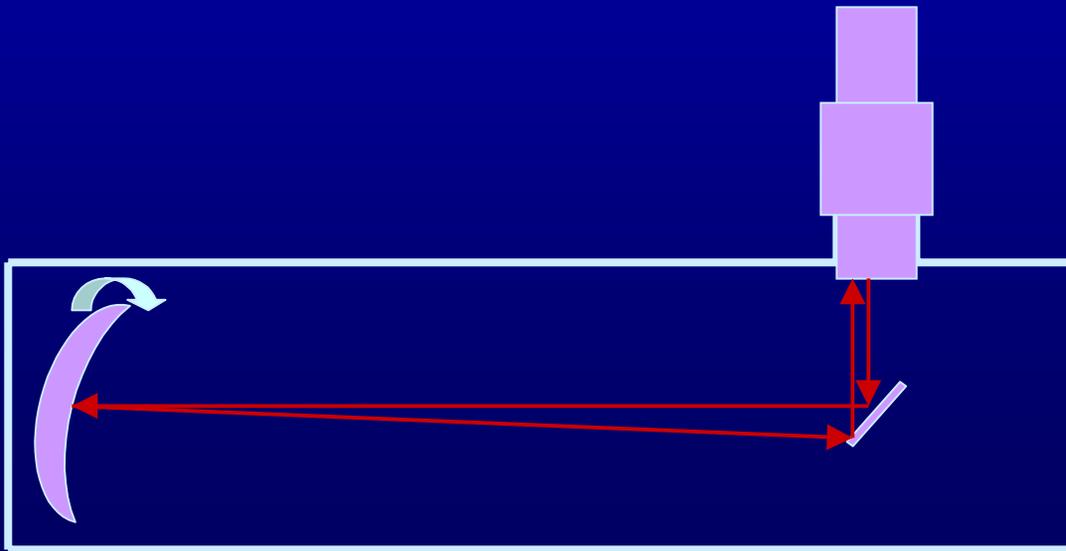
The laser spot lands on the bottom of the collimator, instead of coming back on itself.

# Procedure

- Step 1 - Adjust the secondary so that the laser spot lands in the middle of the primary. (this assumes that you have a the middle of your primary marked)



- Step 2 - adjust the collimating screws on your primary mirror such the the laser spot reflected on to your collimator goes back through the same hole the laser light comes out.



# Building a laser collimator

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- Basically, you need to build a holder that will position the laser pen in the centre of your focuser tube and parallel to your focuser's axis.

# Other People's Design

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- Dragon Works:
- <http://pw1.netcom.com/~mady>
  
- R. Wood:
- <http://www.astronomynv.org/members/laser/>

■ Les Hildenbrandt:

■ <http://www.frii.com/~lesh/colum.html>

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■ Nils Carlin:

■ <http://w1.411.telia.com/~u41105032/yacht/yacht.htm>

- Taxy's

- <http://www.btinternet.com/~taxy/laser.htm>
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- Thomas Dean

- <http://www1.kingston.net/~rasc/collim.htm>

# Commercial Laser Collimators

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- Kendrick Astro-Instruments
- <http://www.kendrick-ai.com/laser.html>

- Howie Glatter

- <http://www.collimator.com/>

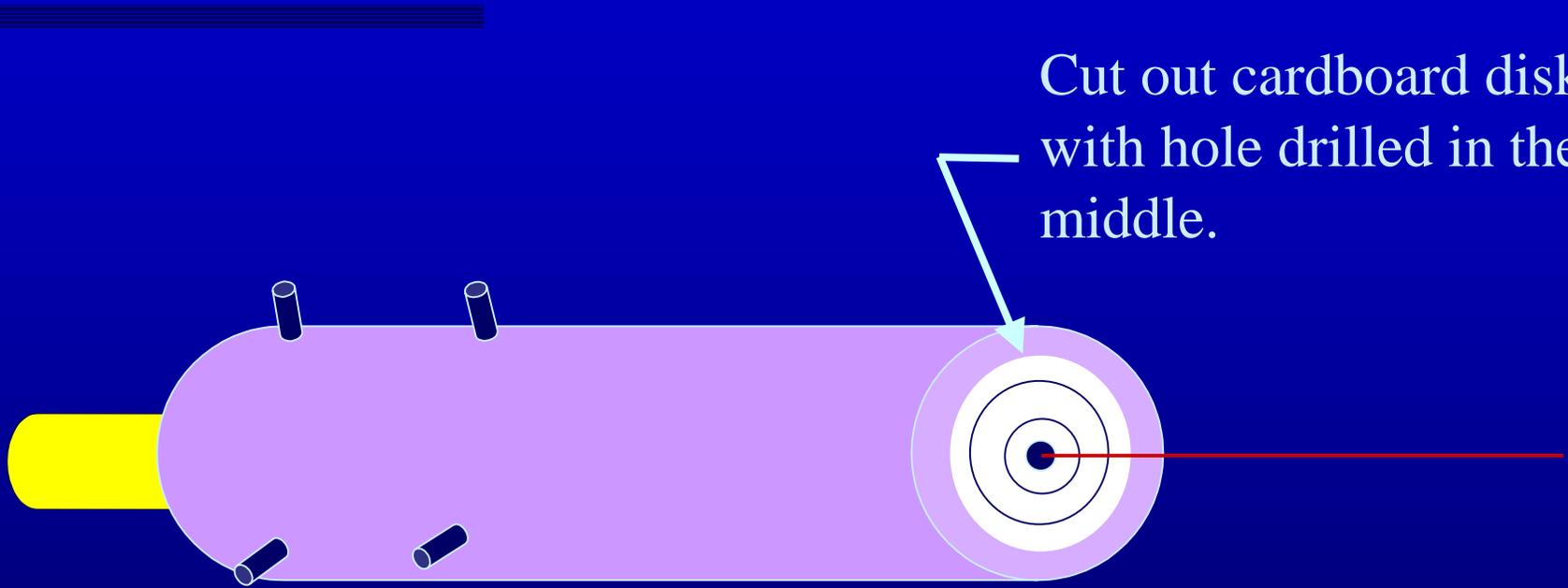
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- EZTelescope

- <http://www.sunflower.com/~clafever/ezt/index.html>

# If all you own is a hand drill

- Use a piece of 1-1/4" OD plumbing pipe.
- Drill six holes around the perimeter of the pipe. These will be used to align the laser pen. Use self tapping screws in the holes.
- Ensure that the pipe is long enough to reach the bottom of our focuser tube.
- Cut out a piece of cardboard to cap the bottom. Drill a small hole in the center of the cap.



Cut out cardboard disk with hole drilled in the middle.

Make tube long enough to fit reach the bottom of your focuser tube.

# If all you own a wood lathe

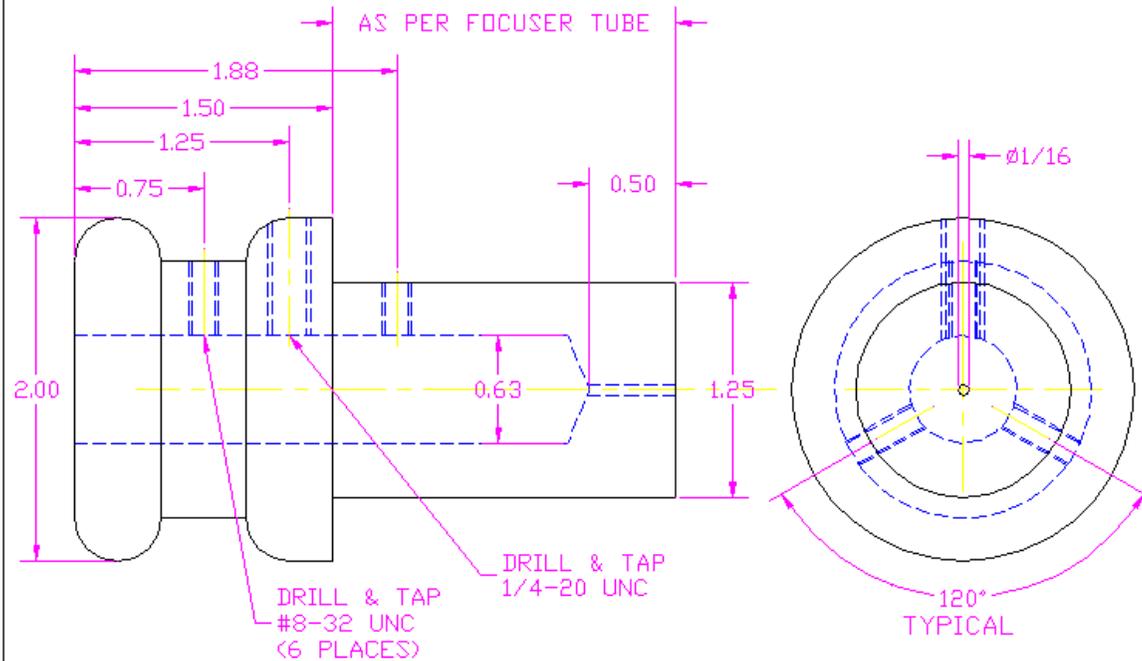
- This will test your skill at turning a perfect cylinder!
- Turn a cylinder 1.24” in diameter. Make the cylinder as long as your focuser tube.
- Face off the bottom end, and drill a 1/16” diameter hole.
- Drill out the body of the cylinder to a diameter slightly larger than your laser pen.
- Drill & tap for six alignment screws.



DATE:

APPROVED:

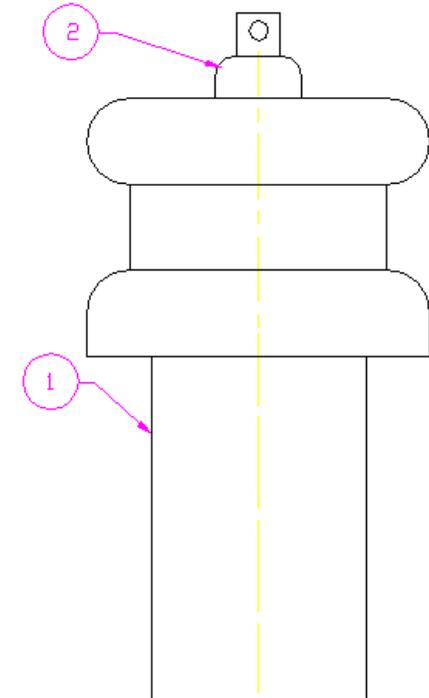
QTY:



1 LASER HOLDER  
MATL: HARD WOOD  
REQ'D: 1

NOTE:  
IF YOU DON'T HAVE  
A TAP, DRILL THRU:  
13/64" FOR 1/4 SCREW  
9/64" FOR #8 SCREWS  
AND USE A SCREW TO  
"TAP" THE HOLES

LASER PEN  
"BULLET"  
STYLE



LASER COLLIMATOR  
ASSEMBLY

LASER COLLIMATOR

WOOD

REQ. UNLESS OTHERWISE SPECIFIED  
DIMS. ARE IN INCHES  
TOLERANCES: DECIMALS .XX +/- .010  
DECIMALS .XXX +/- .005  
ANGLES +/- 0.5°  
ECCENTRICITY .010 MAX.  
REMOVE SHARP CORNERS .010 MAX.  
SURFACE ROUGHNESS 125 MAX.

DRAWN BY : V CHAN  
DATE : JULY 19, 2002  
SCALE : 1:1  
MATERIAL : HARD WOOD  
SHEET : 1  
REV : 1  
QTY : 1

# If all you own a metal lathe

- The drawing for the metal lathe collimator includes a peep window, to allow alignment from the bottom end of your scope. This may be possible in wood.

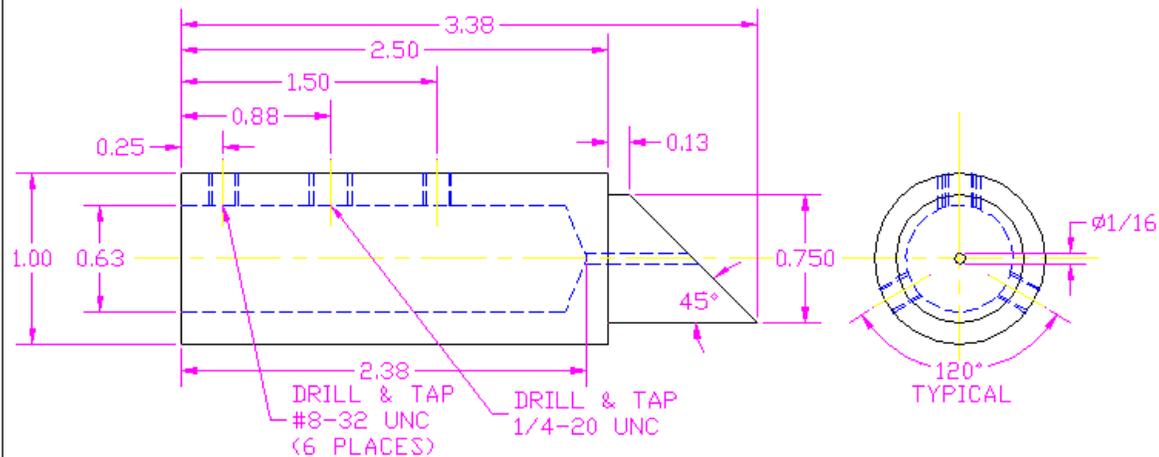
# Aluminum Collimator



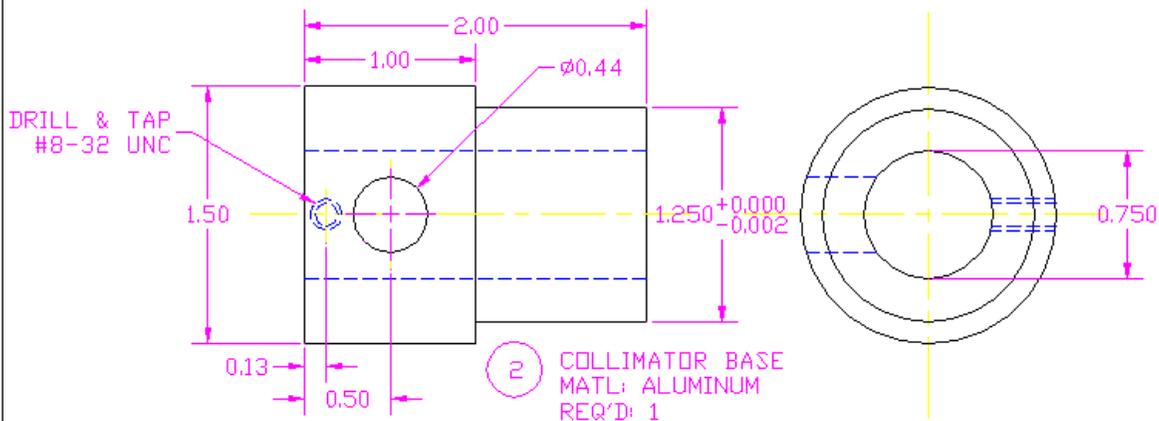
DATE:

APPROVED:

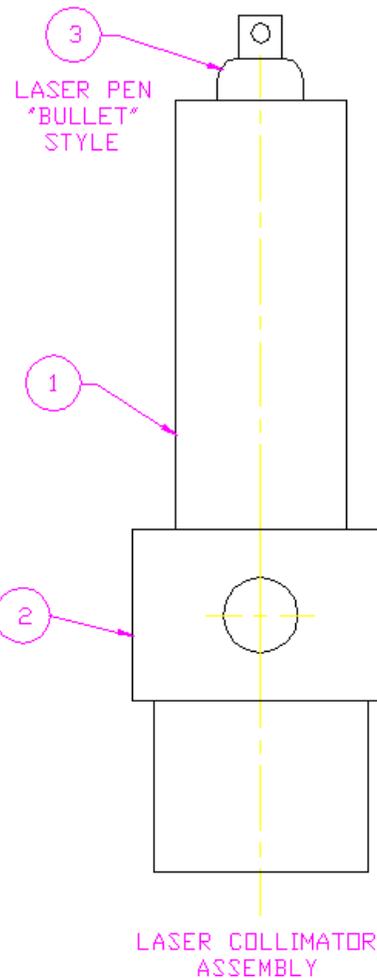
QTY:



1 LASER HOLDER  
MATL: ALUMINUM  
REQ'D: 1



2 COLLIMATOR BASE  
MATL: ALUMINUM  
REQ'D: 1



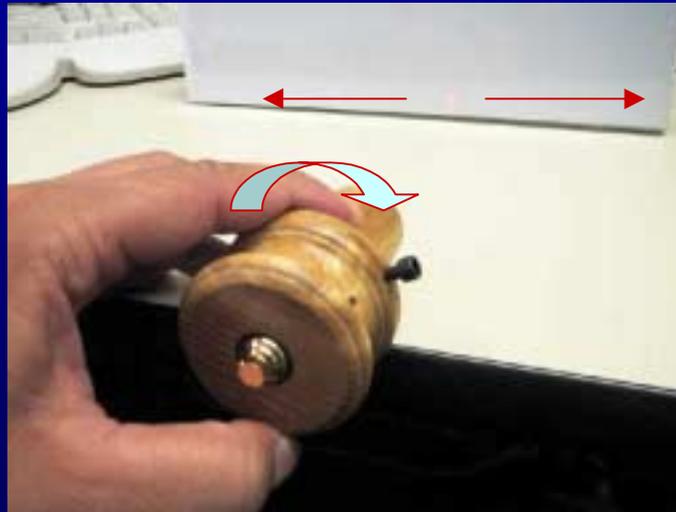
## LASER COLLIMATOR

REQ. UNLESS OTHERWISE SPECIFIED  
DIMS. ARE IN INCHES  
TOLERANCES: DECIMALS .XX +/- .010  
DECIMALS .XXX +/- .005  
ANGLES +/- 0.5°  
ECCENTRICITY .010 MAX.  
REMOVE SHARP CORNERS .010 MAX.  
SURFACE ROUGHNESS 125 MAX.

DRAWN BY : V CHAN  
DATE : JULY 19, 2002  
SCALE : 1:1  
MATERIAL : 6061 AL  
SHEET : 1  
REV : 1  
QTY : 1

# Alignment of the Collimator

- **ROLLING METHOD** - If you roll your collimator on the table, it should trace out a straight line on the wall. If the screws are protruding, use two metal bars as “tracks”.



- **V-BLOCK METHOD** - use a V-block and slowly turn you collimator. It should trace out a dot on the wall, not a circle.



- **LATHE METHOD** - chuck you collimator. Turn the lathe on to its slowest speed. The laser should trace out a dot.



slow shutter photo

# Questions?

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