

# The JJMO Micrometer Eyepiece

## Dr. Parker Moreland

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For the JJMO Mars Parallax measurement project (see separate JJMO Journal article) we need a precision micrometer eyepiece capable of measuring star separations to a precision of 1 arc-second. We have met this requirement by modifying the commercially available Meade Instruments Corp. # 07068 9 mm Illuminated Reticle eyepiece, which incorporates “micrometric” X-Y positioning of the double-crosshair reticle. (See Photo 1, left eyepiece). This latter feature makes it possible to smoothly move the reticle of the eyepiece about  $\frac{1}{2}$  the field of view in two mutually perpendicular axes using knurled knobs. However, there is no way to quantify the amount of movement.

To incorporate true, quantitative micrometer adjustment of the crosshair in one axis, we simply remove the adjustment screw provided, then use an attachment mount to add a machinists micrometer head (Starrett #T463P) and push-rod actuator that transfers micrometer motion to the reticle, through the threaded hole vacated by the original adjustment screw. This assembly (see photo 1, right eyepiece) attaches to the eyepiece with one screw (metric, M3, 0.50 mm pitch) into an unused threaded hole on the eyepiece. Thus the Meade eyepiece can be restored to its original format very quickly and simply. Photo 2 shows an exploded view of the four parts added – the attachment mount, the push-rod, a micrometer-head mount, and the Starrett micrometer head. Machinists drawings of the three homemade parts are in Sketches 1 – 3,

The micrometer head chosen has a vernier scale permitting readings to 0.0001”. With our 0.530 m focal length telescope, this corresponds almost exactly to an angular resolution of 1 arc-second.

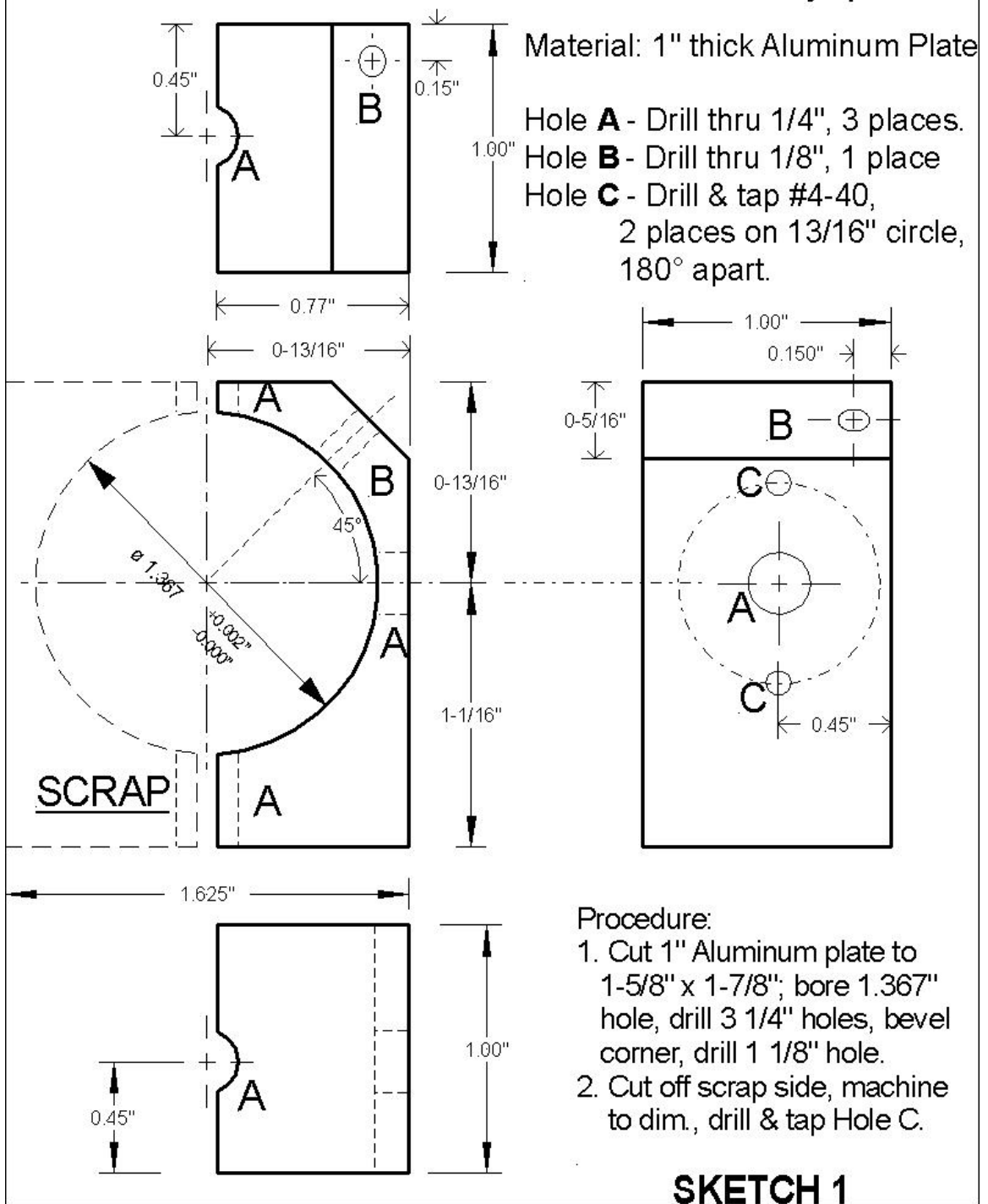


Photo 1



Photo 2

# ATTACHMENT BRACKET for Meade 9 mm Eyepiece

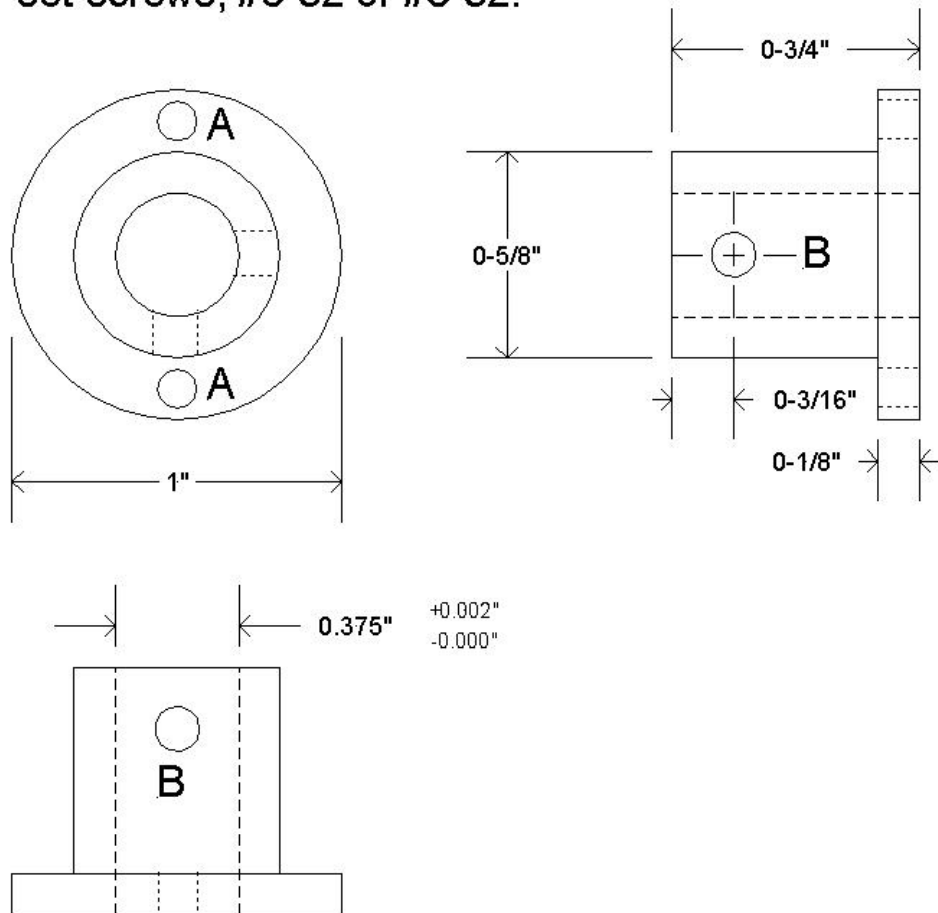


**Mount for Starrett Micrometer Heads with a 0.375" ferrule.**

Material: 1" Aluminum rod.

Hole A: Two holes 180° apart on a 13/16" circle,  
~ 1/8" diam. (for #4-40 mounting screw).

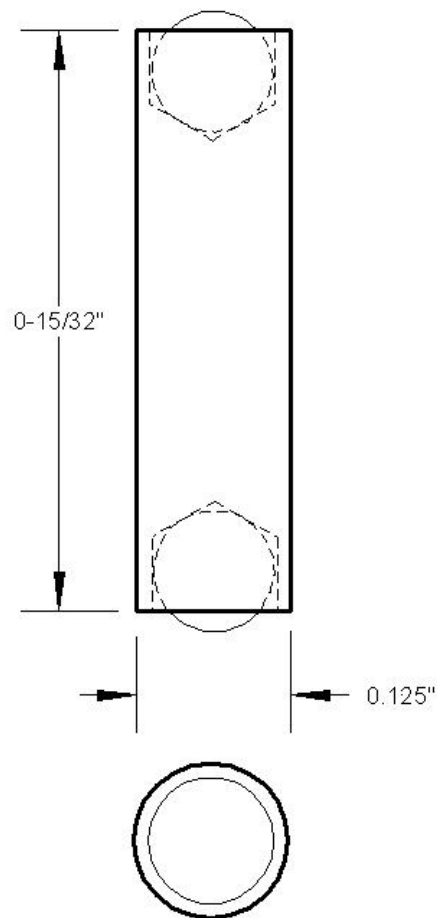
Hole B: Two holes at 90°, drilled and tapped for soft-tipped  
set-screws, #6-32 or #8-32.



**SKETCH 2**

## Micrometer-to-Reticle Push Rod

Material: 1/8" round brass rod  
Two stainless-steel balls, ~ 0.10" diameter  
(e.g., Salem Specialty Ball Co., Inc. part no. 3168  
(877) 844-4885  
[www.salemball.com](http://www.salemball.com) )



Procedure: Drill pockets for balls to depth such that balls extend about 1/64" to 1/32" beyond end of rod. With balls in pockets, prick-punch four places equally spaced around end of rods to retain balls in place.

**SKETCH 3**