

How to Grind the Back of a Mirror

By Tom Ryan

Let's say you have a mirror blank, and it is rough ground, or perhaps it has been diamond-generated to some curve, and you want to remove the rough grinding marks on the back of the mirror. You might want to do that because rough grinding drives fractures deep into the glass, and if your mirror is going to be subject to thermal or mechanical stresses, it will be much, much stronger if the glass is ground down (and polished) instead of being left in a rough-ground condition. So, how can you do that?



With a mini-grinder, of course. You will also need some medium-grade sandpaper (a lot of sandpaper, actually), some ear plugs (mini-grinders can be loud), some water and a particulate face mask to protect your lungs from glass dust. Glass dust can be very bad for you, especially if it gets into the wrong places.

Glass dust and grit can also harm the front of the mirror, so it is a good idea to cover it with blue tape from Universal Photonics. That won't guarantee that the surface will remain unscratched, but it will help.

You will need a sturdy platform to set the mirror on while you grind it, and you will need to have the mirror well braced. It is very embarrassing to have the mini-grinder fling the mirror off a table onto the floor.

It is also good to surround the work area with plastic sheets to confine the sludge and dust. Grinding things with mini-grinders can make an incredible mess, and you might want your wife or co-workers to allow you to do this again sometime.

The backing plate for the mini-grinder should be flexible enough to conform to any curve that the mirror might have. The water is sprayed onto the surface of the mirror before grinding. If your mirror is not made of Zerodur or fused silica or ULE, then the water is important for cooling, too.

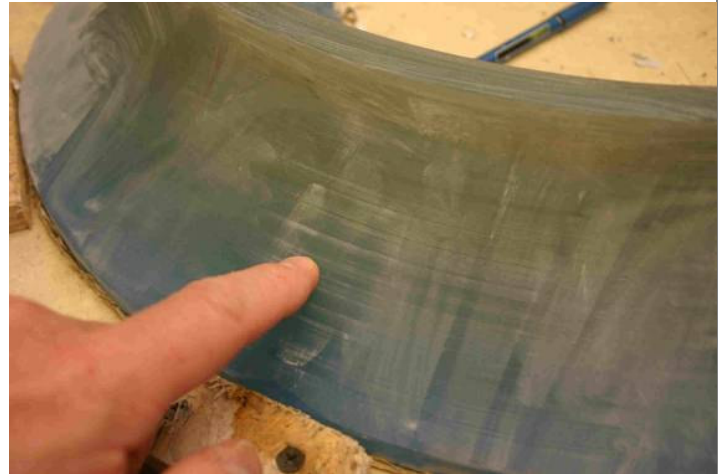


Don't let the surface that you are grinding get hot. Glass will often crack if you heat it locally. (Some parts expand, some parts don't, and the stresses in the area between can be very large.)

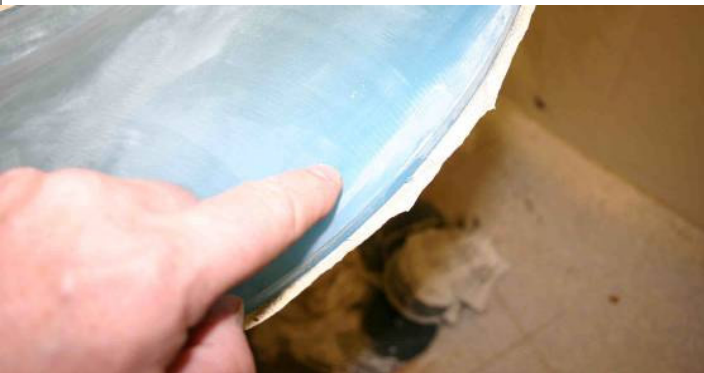
For rough sandpaper, I prefer sheets of 3M's Wet-or-Dry paper in a 120 grade. I cut circles out of the sheets to fit the mini-grinder.



You can cut sandpaper to any desired shape by cutting it from the back (the side that doesn't have the sand glued on) using a boxcutter and lots of razor blade inserts.



Now you are ready to put on the face mask, insert the ear plugs, apply water, and start smoothing out those grinding marks.



While you are grinding, check the surface to make sure you don't change any curve that the glass might have. It was probably put there originally for a reason. The mini-grinder can remove glass surprisingly fast, and it will leave its own grinding marks, which have to be removed with subsequent fine grinding using finer grades of sandpaper



Also, check the sandpaper frequently. It disintegrates pretty easily, and spinning the plastic backing plate against the mirror is not good for either the plate or the mirror.

With a little care, you can remove all of the rough grinding marks without breaking the mirror or wrecking your lungs with the flying glass dust.



Now, if only there were some way to fix up faces as easily as mirrors. *Finis* •

Stepping up the Focal Length

By Clayton Kessler

Over the last few years I have written several articles for the newsletter documenting my switch from film astrophotography to DSLR astrophotography. I have been happily working the last few years with a pair of small APO refractors, shooting through one and guiding through another, and I have been getting a fair number of satisfactory photos. I have learned better and more consistent guiding techniques and increased my processing skills as well as upgrading my equipment as necessary.



Refractor Setup. (left)

Typical astrophoto using the refractors. (right)

You would think I would be satisfied and just continue to shoot the objects that fit my existing FOV's..... NAH!!



A year or so ago the infamous “Enabler” (John at Riders Hobbies) had an 8” f5 Newtonian tube assembly that was returned for a slight “ding” on the tube. I am... what is the word... “thrifty”...”frugal”... no...”cheap” – that’s it – “cheap” and I was able to procure that tube at an attractive price. This actually gave me a nice additional focal length to work with. The ZS66 is about 364mm with the flattener, the Megrez 90 is about 500mm and the new 8” Newtonian is right at 1000mm. The tube languished in the barn for a while as I continued to shoot with the refractors. I needed to devise a way to attach the tube to my existing mount. Eventually I banished my laziness and finished up a set of aluminum clamshell rings for the new tube. This allowed me to mount things up this fall in preparation for the upcoming spring galaxy season.



Current imaging setup



First Light Astrophoto – M16 The Eagle Nebula 9-10-09

This mates up to the mount fairly well, and I am still using the ZS66 as a guide scope. There several things to improve and I wanted to get them done before I loose the winter sky to clouds. The Newtonian exhibits a fair amount of coma on the APS size camera sensor. This can be reduced by cropping the image but that will not work all the time – I like shooting objects that fill the frame. I also wanted to upgrade the focuser. The Crayford focuser that was supplied with the tube was OK for visual use but somewhat “mushy” in feel for critical astrophoto focusing. The first thing that I changed was the focuser. I added the Orion “low profile” dual speed Crayford focuser and it seems to be a very nice unit (John at Riders was able to order one for me). I am quite satisfied with it. At the same time I completely disassembled the telescope, cleaned and aligned all the optics and added Protostar flocking material to the inside of the tube. Jeff Thrush made me a “secondary dew heater” from resistors and this was attached to the back of the secondary mirror with RTV adhesive. The increase in contrast due to the flocking material was very satisfying!

I researched coma correctors and settled on the Baader MPCC. John at Riders was kind enough to get me one and for the last several weeks I have been good to go. I have been taking astrophotos at every opportunity with this new setup as I work out the bugs and learn how to deal with the increased mass and area on the mount as well as the increased focal length. I have noticed the breeze has a great deal of effect on the scope. The system weight is well within the ability of my G11 mount but the scope has quite a bit of area exposed to the breeze. Fortunately most nights are quite still. I am thinking of some kind of wind break for the pier area. I have been really quite pleased with the system.

As a comparison, the following shots are full frames taken using the ZS66SD and the 8” f5 Newtonian. They are of the same object – IC1396 and VDB-142.



(above) IC 1396 taken with ZS66 SD – note VDB 142 in the low center of the nebula.



(left) VDB 142 taken with the 8" Newtonian. Rotated 90 degrees in relation to the IC1396 photo above.

The marked difference in the field of view is very useful to me as an astrophotographer. I can shoot an object at the focal length that best displays its features.

A few of my recent astrophotos taken with this setup:



M33



IC 1805 – Central Region



NGC 7023 – The Iris Nebula



NGC 896

I must say that I am quite happy with how this has worked so far. The increased focal length will let me target objects that were too small for my other instruments and re-visit some objects in search of increased fine detail. In addition, I can start to try lunar photography with a web cam. I anticipate leaving this setup on the mount for at least a year as I explore the possibilities.

Remote Astrophotography

By Mark S Deprest

Since Clayton Kessler decided to show us what he does with his imaging set-up. I thought I might show you some of the images I have taken over the past few years using remote / rental equipment. Through the internet to places around the world using the scopes and imaging equipment of Slooh, MyTelescope and Global Rent A Scope. I have taken over 500 images of astronomical objects like planets, galaxies, star cluster and comets. From mountain tops in the Canary Islands to the flat lands in southern Australia and from the deserted back country of New Brunswick, Canada to the high desert of New Mexico the following pictures are a brief sample of what can be done online with just a few mouse clicks:



Mark S Deprest - NGC 2024 Flame Nebula - GRAS 013 - 11/09/09



<-----IC 1295

Mark S Deprest - IC 1295 Planetary Nebula & NGC 6712 Globular Cluster - GRAS 003 - 11/09/09



Mark S Deprest - ARP 319 - MyTelescope.com - 11/18/09



The Flame Nebula & IC 1295 / NGC 6712 images on the previous page, The Helix Nebula and NGC 1365 (top row) were taken with the Global Rent A Scope system.

The image of Jupiter with Io and Europa was taken with the Slooh system.

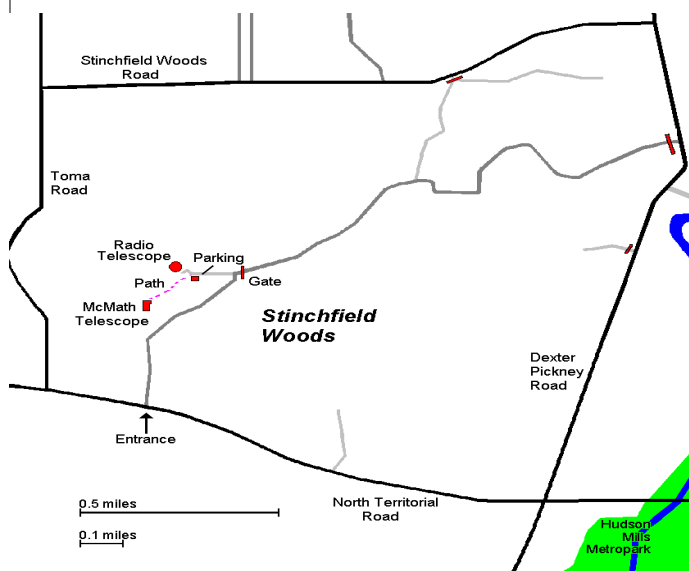
Arp 319 (Stephan's Quintette) was done using the scopes & equipment of MyTelescope.com

Additional processing and labeling was done with Thumbs Plus 7.0

Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory will follow the meeting.

Peach Mountain Observatory is the home of the University of Michigan's 25 meter radio telescope as well as the University's McMath 24" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.



Membership

Membership dues in the University Lowbrow Astronomers are \$20 per year for individuals or families, \$12 per year for students and seniors (age 55+) and \$5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional \$12 annual fee to cover printing and postage. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers

c/o Liz Calhoun

P.O. 4465

Ann Arbor, MI 48106

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - \$32.95 / year

Astronomy - \$34.00 / year or \$60.00 for 2 years

For more information contact the club Treasurer. Members renewing their subscriptions are reminded to provide the renewal notice along with your check to the club Treasurer. Please make your check out to: "University Lowbrow Astronomers"

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.

Call or Email the Newsletter Editor: **Mark S Deprest (734)223-0262 or msdeprest@comcast.net** to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

Telephone Numbers

President:	Charlie Nielsen	(734) 747-6585
Vice Presidents:	Jim Forrester	(734) 663-1638
	Ken Cook	(734)769-7468
	Bob Gruszczynski	
	Belinda Lee	(313)600-9210
Treasurer:	Liz Calhoun	
Observatory Director:	Mike Radwick	
Newsletter Editor:	Mark S Deprest	(734) 223-0262
Key-holders:	Jim Forrester	(734) 663-1638
	Fred Schebor	(734) 426-2363
	Charlie Nielsen	(734) 747-6585
	Dave Snyder	(734) 747-6537
Webmaster		

Lowbrow's Home Page

<http://www.umich.edu/~lowbrows/>

Email at:

Lowbrow-members@umich.edu

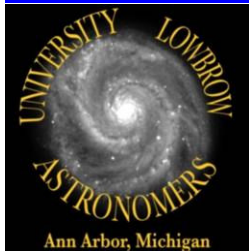


University Lowbrow Astronomers

University Lowbrow Astronomers
c/o Liz Calhoun
P.O. Box 4465
Ann Arbor, MI 48106

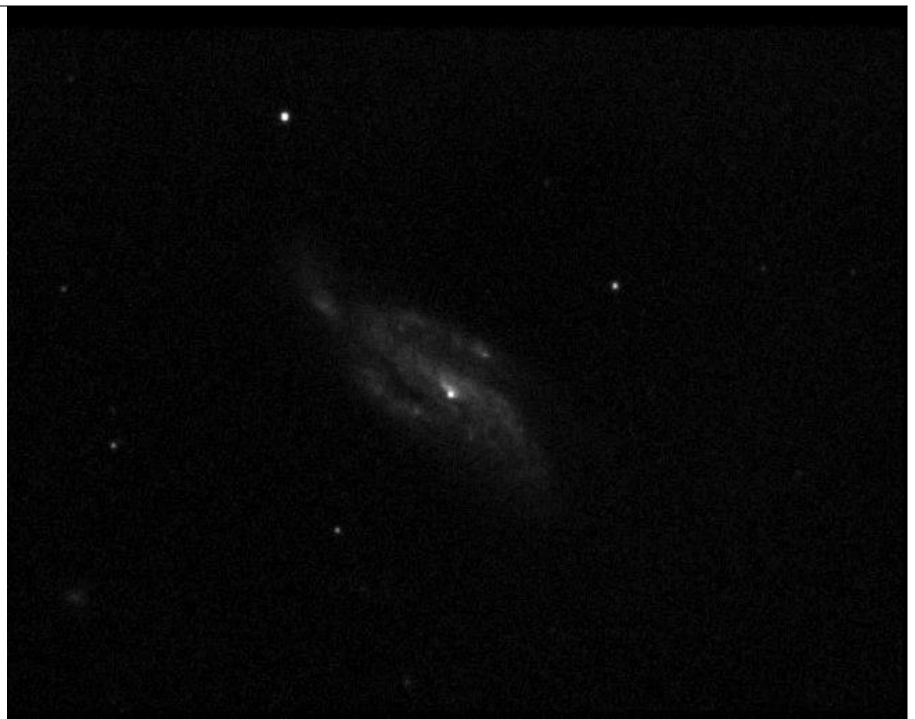
lizcal@umich.edu

Reflections & Refractions

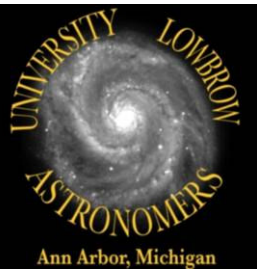


Website

www.umich.edu/~lowbrows/



NGC 4088 and Super Nova 2009dd was taken using the telescope and CCD equipment of MyTelescope.com. Some additional processing and digital image clean-up was done with Thumbs Plus 7.0



University Lowbrow Astronomers
P.O. Box 4465
Ann Arbor, MI 48106

Check your membership expiration date on the mailing label