

Instruction Manual

omegon



AC 70/700 AZ-2

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The Omegon® AC 70/700 AZ-2

Congratulations on the purchase of the new Omegon® AC 70/700 AZ-2. This small telescope will give you hours of fun, with its all optical glass lens and super compactness, and it is the ideal companion to start in the world of amateur astronomy. With this telescope, you will be able to see the craters on the Moon, star clusters, some nebulae and a glimpse of Jupiter's disc features and its Galilean moons and the rings of Saturn. We have included many accessories so it will be easy to use this telescope.

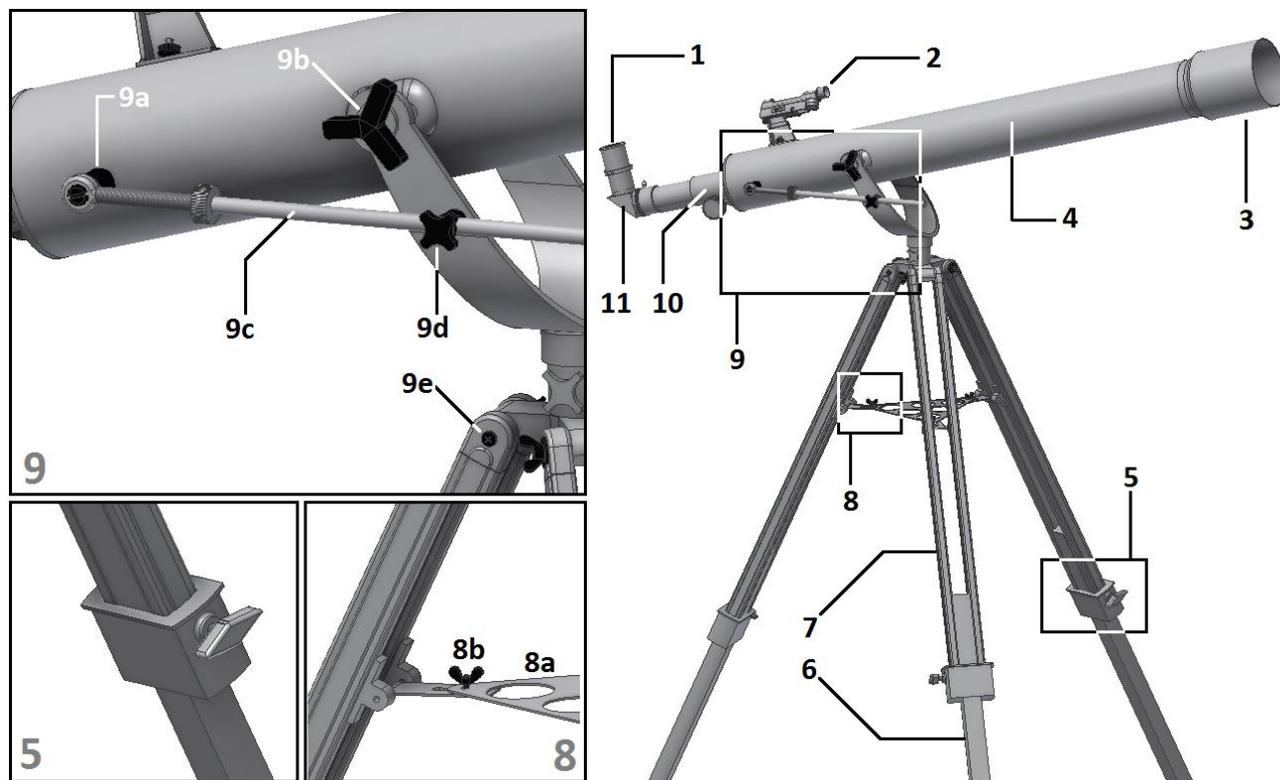


Figure 1. Telescope Parts.

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|------------------|---------------------|---------------------------------|----------------------------------|
| 1. Eyepiece; | 5. Leg fixing knob; | 8b. Tray fixing screw set; | 9d. Altitude fixing knob; |
| 2. LED finder; | 6. Leg; | 9a. Fine-movement shaft holder; | 9e. Tripod leg fixing screw set; |
| 3. Dew-shield; | 7. Two section leg; | 9b. Tube's fixing knob; | 10. Focuser; |
| 4. Optical Tube; | 8a. Accessory Tray | 9c. Fine movement shaft; | 11. Diagonal mirror. |

1. Included parts. We have included several accessories that will make the use of the telescope easier and fun:
- 2 Kellner Eyepieces 20mm and 10mm, a 2x Barlow lens, a LED finderscope and a diagonal mirror.

2. Getting Started. It is very simple to get started. Here is how the telescope works. The telescope main lens should point to the object being observed. This lens will gather the light coming from the object and sends it through the telescope tube to the back of the telescope. At the back, there is the focuser. The focuser moves in and out to get a precise focused image. At the focuser one can use the supplied accessories. Different accessories combinations give different results, such as different image magnifications. All is explained in detail in the next pages.

3. Assembly. Start by setting the tripod. Match the tripod legs as shown (fig. 1), use the supplied screw set to fix the leg. Next, place the tripod tray and thread it (fig. 4). You can use the tray to store your eyepieces or other observing accessories. The optical tube is placed in the fork mount (fig. 5). Use the two supplied hand knobs to secure the telescope to the fork mount, turn this knobs gently, the tube should freely move up and down with light friction. Make sure that the telescope is pointing to the right direction. Now slide the chromed shaft in the fork chromed support (on the side of the fork mount – figure 6). Then thread the shaft to the optical tube chromed support. Moving the telescope up and down slides the chromed shaft on the fork chromed support. Place the tube horizontally (figure 7) and tighten the hand knob on the chromed support. Figure 9 shows the locking hand knobs for Alt and Az movement. The turtle symbol shows that by rotating the kurlled knob (on the shaft) small adjustments can be done in Alt. Next step is to attach the finderscope (fig. 9). The finderscope base fits the two protruding screws on the telescope tube (figure 9). Affix the finderscope with the two supplied knurled thumbnuts (fig. 9). Insert the diagonal mirror and the 20mm eyepiece in the focuser's tube (fig. 10). Use the focuser's thumbscrew and the diagonal thumbscrew to get all parts securely tightened. The diagonal with the eyepiece should be pointing up (figure 8). Use the focuser's knob (fig.11) to achieve a sharp image – focus. For close objects, the focuser tube comes further out while for astronomical objects it goes further in. Congratulations! You are almost ready to use the telescope!



Figure 2. Tripod assembly.

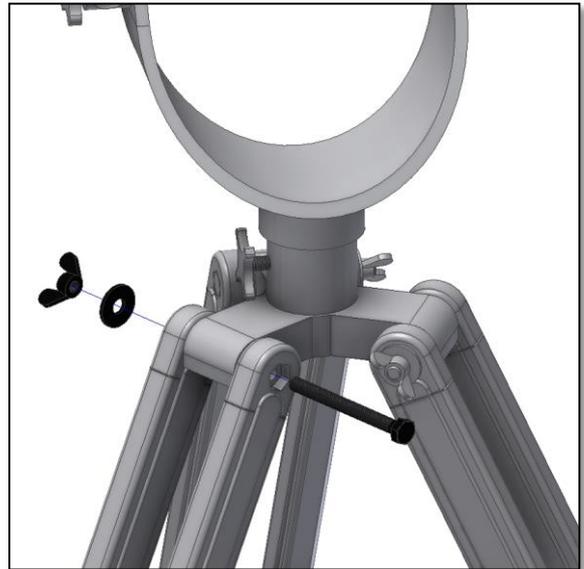


Figure 3. Insert the supplied screw, washer and nut.

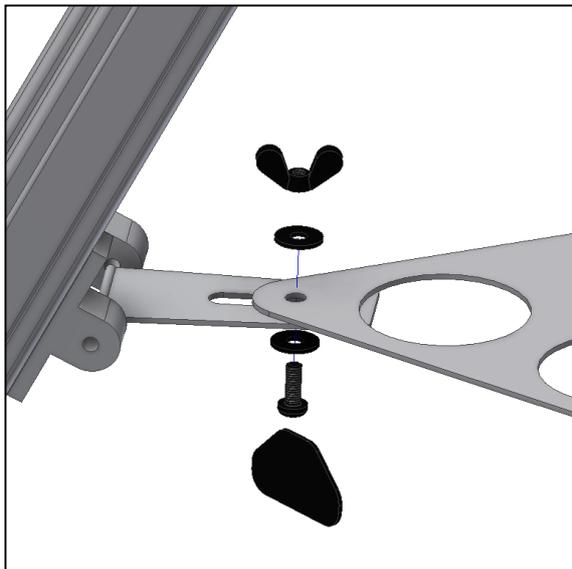


Figure 4. Place and fix accessory tray.



Figure 5. Insert the tube in the fork mount and fix it.

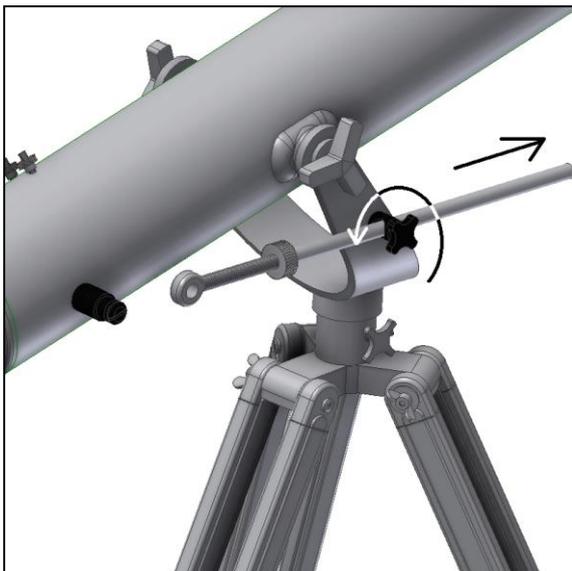


Figure 6. Insert fine focusing shaft.



Figure 7. Fine focusing shaft in place.

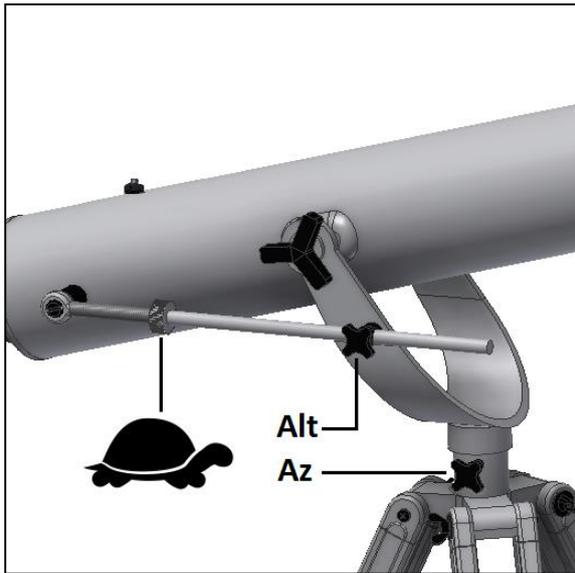


Figure 8. The knobs to fix the Alt and Az axis.

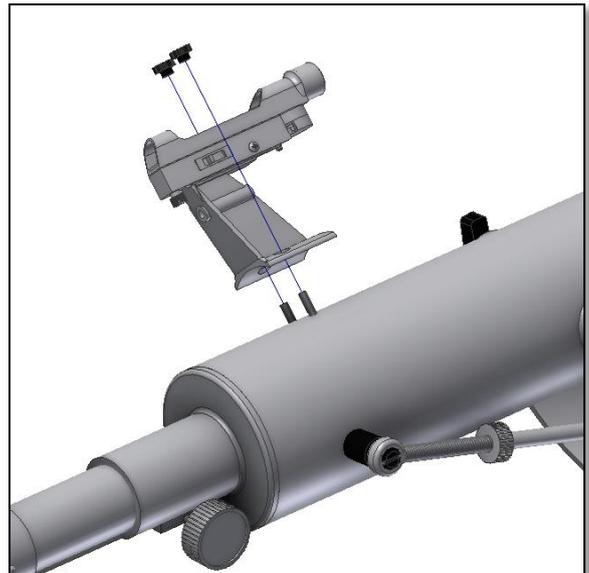


Figure 9. Placement of the LED finderscope.

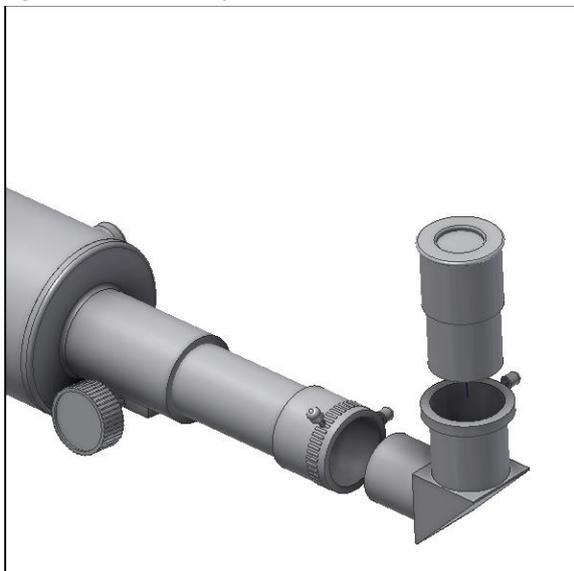


Figure 10. Place diagonal mirror and eyepiece in the focuser's barrel (tube). Make sure to use the thumbscrews so that they do not fall.

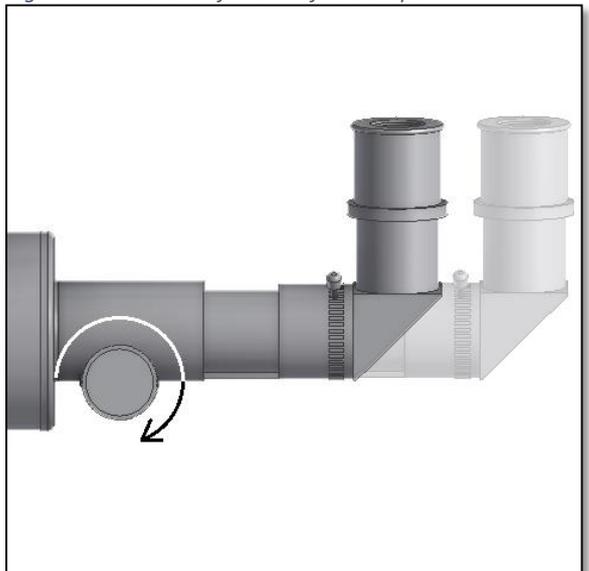


Figure 11. Use the focuser's knob to focus.

4. Start using your Omegon AC 70/700 AZ-2

telescope. Point the telescope to a distant object during the day. It is important to do this during daylight so that you get familiarized with the telescope operation. A good target is a church tower a chimney or a distant mountain peak.

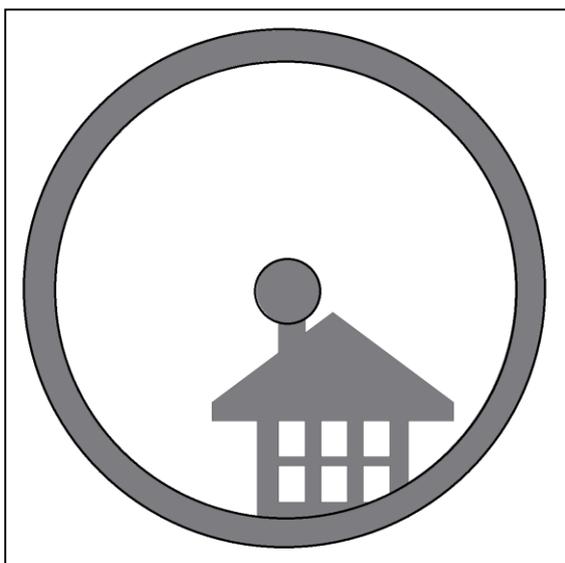
Rotate the focuser's knob so that the focuser tube moves in and out. Do this slowly. We suggest that you start by racking the focuser all the way in and slowly move it out. With the 20mm eyepiece, you should be able to get a focused image easily. **4.1. The**

Finderscope. The Finderscope is a valuable tool to point the telescope at an object. To operate properly, the telescope and the finderscope, should be aligned. The image obtained through the finderscope has a much broader field of view than that of the telescope. Aligning means matching the telescope's image, as seen through

the eyepiece, to the image of the centre of the finderscope. This way when looking through the finderscope one knows that the telescope is pointing exactly to the same point as the finderscope. This is very useful to point to different objects.

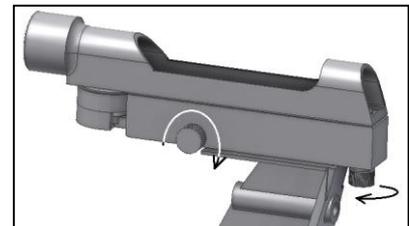
4.2. How to align de finderscope with the telescope? You have the target object – house's chimney (example mentioned before) centered at the telescope's eyepiece field of view. Now look through the LED finderscope. The small dot (recticle) at the center of the finderscope's field of view should overlay the object has seen through the telescope. If not, adjust the two finderscope's adjusting screws to get the red point to move and to overlay to the object as seen through the telescope. The LED point must be at the center of the object seen through the telescope's eyepiece.

4. How to use and how to align the finderscope?



4.1. A distant object is centered with an eyepiece. This as seen through the telescope's eyepiece. In this example we have a house with a chimney. The chimney is the reference point. The LED finder point should point exactly at the center. We first look through the telescope with the lowest magnification possible (a 20mm eyepiece should be used) so we have the widest field of view possible and make sure the object is really centered.

4.2. Looking through the finderscope (it should be powered on) we see the same building but in this case the red dot and chimney are not centered. We adjust the finderscope using the two thumbscrews (figure below) so that the finderscope's red point moves slightly until it matches the chimney. This is enough to correct the objects position in the finderscope. Trial and error is required to get a satisfactory result.



4.3. After playing with the two finderscope's thumbscrews and some trial and error we get the finderscope recticle close to the center (in this case the chimney). The finderscope is now ready to use!

5. Using the accessories, a bit of math to understand how all it works.

Using the accessories is easy and fun. To change magnification simple swap eyepieces. To get more magnification simply use the barlow lens. But how all of this work?

5.1. Power (magnification)

Your telescope as a focal length of 700mm. This is approximately the distance between the telescope lens to its focal point (very similar to the distance between the focus point of a loupe and the loupe lens). This is a very important feature that allows to determine several interesting facts such as magnification.

The magnification is determined by the telescopes focal length and the used eyepiece. You probably noticed that the two supplied eyepieces are 20mm and 10mm. This means that the 20mm is a 20mm focal length eyepiece while the 10mm is a 10mm focal length eyepiece.

To determine the magnification just divide the telescope's focal length by the eyepiece's focal length. Lets give an example for our telescope and the supplied eyepieces:

Telescope focal length is 700mm
20mm eyepiece focal length is 20 mm

$$\frac{700mm}{20mm} = 35 \text{ power}$$

Some possible accessory combinations

	Terrestrial View	Moon	Deep Sky	Jupiter and Saturn
Diagonal Mirror	Yes	Yes	Yes	Yes
Barlow Lens 2x				Yes
10mm Eyepiece		Yes		Yes
20mm Eyepiece	Yes		Yes	
Power	35x	70x	35x	140x

This means that the 20 eyepiece provides a 35x power (magnification). This seems low but try it, you will see a a bright image with some very good detail.

5.2. Barlow Lens

The barlow lens is a very interesting device. It is a negative lens that multiplies the telescopes focal length. So a 2x Barlow multiplies the original focal length by 2x, in this case $700mm \times 2 = 1400mm$.

A 3x Barlow lens multiplies by 3x.

Your telescope is supplied with a 2x Barlow lens. When used with the 20 eyepiece you get 2x the power obtained before

$$35power \times 2x \text{ Barlow} = 70 \text{ power.}$$

the barlow lens is sandwiched between the eyepiece and the focuser.

5.3. Erecting lens (not included)

The erecting lens provides an upright image view with the telescope. It also adds some power like the barlow lens.

5.4. Diagonal Mirror

This diverts the light coming from the telescope to an angle of 90 degrees. It is useful because it provides a more comfortable position when observing.

Here are some examples on how to use the accessories.

6. What can be seen with this telescope?



Below you will find some examples of what you can expect to see when using this telescope.

6.1. The Moon is one of the most spectacular objects to be seen through a telescope. Even a small telescope will reveal high detail of the Moon's surface. You will be able to see the craters on the Moon's surface and other features like the Mare. The moon is a very bright object. It is better observed when the Moon is not full. Try the crescent Moon and look for features along the terminator (between illuminated and dark surfaces).



6.2. Jupiter is the biggest planet of our solar system. It is also one of the favorite targets for beginners. Galileo was able to discover that the four tiny dots that turn around the planet were in fact part of Jupiter's system of moons. With this telescope you will be able not only to see Jupiter's planet disc with its two major discernible bands but also its biggest moons, Io, Europa, Ganymedes and Callisto.



6.3. The "lord of the rings" of the night skies, Saturn is by far the most popular target for small telescopes. Saturn's rings are discernible even at 60x magnification. In a very good night you will be able to see the Cassini's division (the darker band on the Saturn's rings).

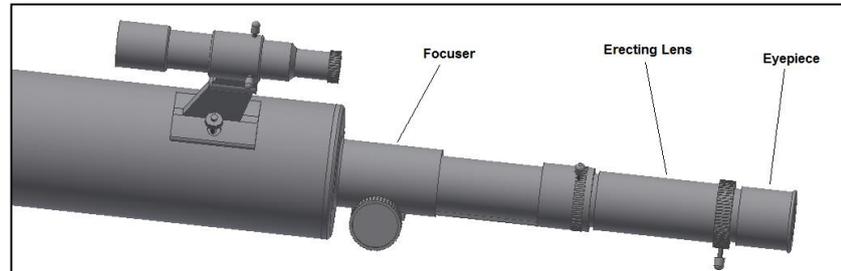
7. Troubleshooting and frequently asked questions

Q: I can't get to focus my telescope, only get a bright circle.

R: Make sure you have inserted the diagonal mirror and an eyepiece (start by the lowest power eyepiece – 20mm). Point to a distant object during the day and proceed as described in 4.

Q: I get a mirrored view of the objects. Like if they were reversed, and R show up like Я

R: This is caused by the diagonal mirror. It has a mirror inside. To get a corrected image it is necessary to use the Erecting Lens (not supplied) and the eyepiece as shown below.



Q: I use the finderscope to point to objects but I always miss the target.

A: You probably need to realign the finderscope. Please proceed as described in 4.2.

Q: When I use the barlow lens and the 10mm eyepiece the image is so dark I can't hardly see anything.

A: Power should be used with moderation. It depends on how stable the atmosphere is, too much turbulence causes image distortion. Usually the limit is 2x for each millimeter of the telescope aperture. In this case this telescope, the telescope has an aperture of 70mm so in a very good night you should be able to reach 140x. The more magnified the image is the darker it gets.

Q: Is my telescope compatible with other eyepieces ?

A: Omegon telescopes are compatible with all telescope eyepieces from different manufacturers as long as the eyepiece is a 1.25" (or 31.75mm) size eyepiece. If you would like to test an eyepiece from a fellow astronomer go ahead. Different eyepieces provide different visual experiences.

Q: I want to use my telescope to take pictures. Can I use it?

A: This telescope is designed for visual use. It doesn't mean it can't be used for photography, however it will be hard to get high quality pictures with this telescope. If you have a smartphone you can shoot the Moon or some terrestrial objects. Search online for digiscoping and afocal photography.

Q: The stars only appear as points in the telescope, is this normal?

A: Stars will always appear only as points, even in the largest telescopes in the world. It is more interesting for beginners to observe two-dimensional objects, such the moon or planets. Once you find these, you will be able to start learning about the astronomical calendar.

Q: I would like to observe the Sun. How can I do it?

A: An appropriate solar filter, placed over the objective, is essential for observing the sun. These are available as plastic foil or glass filters. They allow only a tiny and harmless fraction of sunlight into the telescope's aperture. When securely positioned over the objective, they allow observation of the sun in complete safety. Eyepiece solar filters (not available from us) should be avoided at all costs as they are considered unsafe. **Note: Never look directly at the sun through a telescope without an objective solar filter!**

Q: I can't see anything when I look through my telescope. Did I do something wrong?

A: The telescope is only suitable for astronomical observing and when used outside at night.

Observing from a balcony or inside a house or during the day is not usually possible.

The dust caps must first be removed and an eyepiece inserted before you can start observing. Are you sure you have removed all the dust caps, not just the small ones? If you have not, then no light will enter the telescope and everything will appear black.