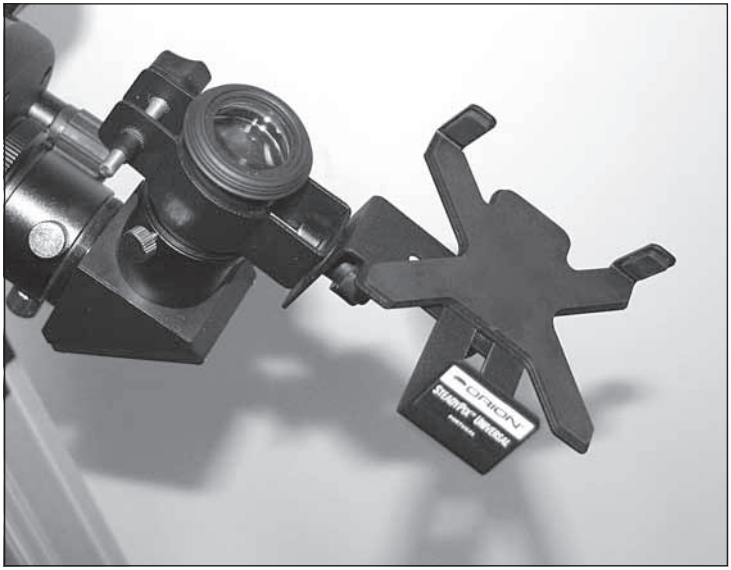
INSTRUCTION MANUAL

Orion® SteadyPix™ Universal Smartphone Telescope Photo Adapter

#5337



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Introduction

Congratulations on your purchase of the Orion SteadyPix Universal Telescope Photo Adapter for Smartphones! This second-generation universal adapter securely couples an even greater variety of smartphone models to a standard 1.25" telescope eyepiece, enabling the capture of high-magnification digital photographs through the telescope using the smartphone's built-in camera – in daytime or at night. The technique of afocal, or "eyepiece projection," photography has been used for decades with standard cameras. The new wrinkle is that now you can do it with a smartphone! With the "SteadyPix Universal" to precisely and consistently position the smartphone's camera lens over the center of telescope's eyepiece, you can achieve astounding results shot after shot!

The SteadyPix Universal also lets you display a live view of the image projected by your telescope on your smartphone screen, which is perfect for sharing real-time views of the night sky with friends and family. The smartphone becomes a mini display monitor!

We hope you have fun taking pictures with your smartphone using the SteadyPix Universal Telescope Photo Adapter for Smartphones!

Compatibility

The Orion SteadyPix Universal Telescope Photo Adapter for Smartphones is designed to fit slate style smartphones measuring up to 3.4" (87mm) in width. The phone's camera lens should be oriented near the top of the back side for unobstructed alignment with a telescope eyepiece. The higher the camera sensor's resolution, i.e., the more megapixels, the better your smartphone photos are likely to be. That is, a 5MP camera should produce a sharper, more resolved image than a 2MP camera.

The SteadyPix Universal was designed with an adjustable bracket to allow compatibility with most currently available smartphones, including Apple iPhones up to and including the iPhone 6 models (both); Samsung Galaxy S3, S4, S5, Note 2 and 3; and most smartphones from other manufacturers. The bracket also works with camera-equipped versions of Apple's iPod touch mobile device.

You may or may not have to remove your smartphone from any external protective case or "bumper" to allow it to seat properly in the SteadyPix bracket. For relatively slim bumpers you will probably be able to just leave it on. Bulkier bumpers may be too big to fit in the adjustable bracket even at its widest setting, or may not allow the camera lens to be positioned close enough to the telescope eyepiece to achieve a proper image.

WARNING: Never look directly at the Sun through your telescope or its finder scope – even for an instant – without a professionally made solar filter that completely covers the front of the instrument, or permanent eye damage could result. Young children should use this telescope only with adult supervision.

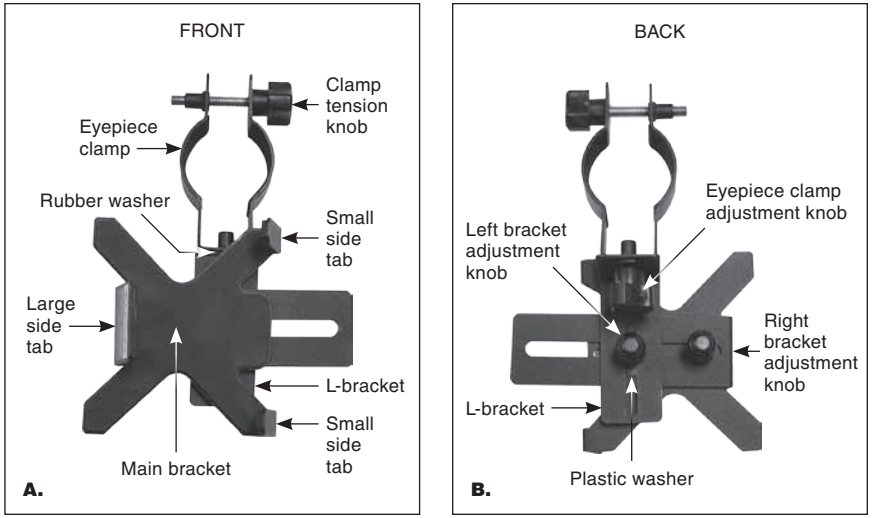


Figure 1. Front (**A**) and back (**B**) views of the SteadyPix Universal Smartphone Telescope Photo Adapter

The SteadyPix Universal can be used with virtually any size or type of telescope – refractor, reflector, or Cassegrain-type – that utilizes a standard 1.25"-diameter telescope eyepiece. The included eyepiece clamp fits eyepieces with housing diameters up to 1.5".

Assembly

The SteadyPix Universal smartphone adapter comes pre-assembled in the box. It should appear as shown in **Figure 1**. If the L-bracket is installed under the RIGHT bracket adjustment knob instead of the LEFT one, that's OK. The SteadyPix Universal can be used with the L-bracket installed in either position.

Getting Started

Before assembling and using the SteadyPix Universal adapter, please familiarize with its features and parts, referring to **Figure 1**.

To capture images afocally through your telescope, the smartphone's camera lens must be carefully aligned over the center of the telescope's eyepiece and the two properly spaced apart. The following steps will help you achieve the necessary alignment and positioning of the SteadyPix bracket**.**

For installation, we've found it easiest to insert an eyepiece into the bracket and align it with the phone's camera lens first. Once that is done, the eyepiece – with SteadyPix and smartphone assembly attached, can be installed in the telescope. Here's the procedure step by step:

1. Loosen the two bracket adjustment knobs and open the bracket to its maximum width.
2. With the bracket facing up, insert your smartphone into the bracket with screen side up. Then, with your right hand push the side clamps inward until they are snug against

the smartphone**.** To do this you should have your thumb on the large side tab and a fingertip on each of the two small side tabs as shown in **Figure 2**. Then squeeze. While holding the bracket tight against the phone, tighten the RIGHT bracket adjustment knob (when viewed from the back) to secure the phone in place. Check to make sure that the phone is snug in the bracket. If it can still slide up and down with only a slight force, loosen the right adjustment knob a bit, squeeze the opposing side tabs against the phone again, then retighten the right adjustment knob.

3. Now, place the installed smartphone face down so the eyepiece clamp is facing up. Using a fairly low-power (long focal length) eyepiece to start with, like a 25mm, insert it into the eyepiece clamp and tighten the clamp tension knob **(Figure 3).**
4. Rotate the eyepiece clamp so that the lens of the eyepiece is facing the phone's camera lens (**Figure 4A**).
5. Loosen the left bracket adjustment knob and slide the L-bracket up or down to roughly position the center of the eyepiece lens over the phone's camera.

NOTE: ***If you've moved the L-bracket as far down as it can go and the eyepiece is still too high above the camera lens, you***

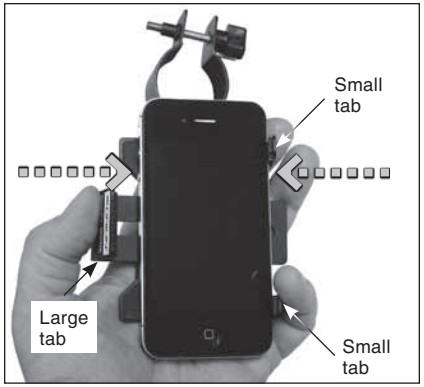


Figure 2. Squeeze the side tabs inward to clamp the bracket securely around the phone, then tighten the right bracket adjustment knob on the back.

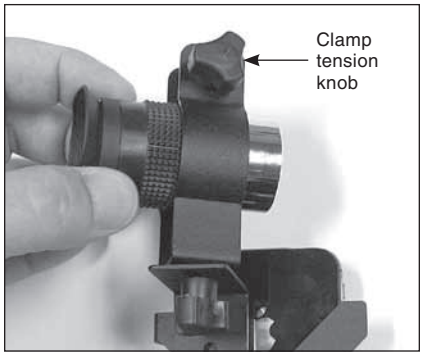
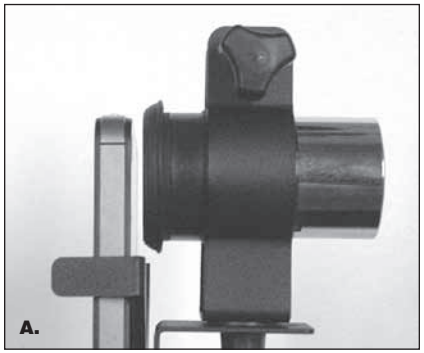


Figure 3. Rotate the eyepiece clamp and insert a 1.25" eyepiece, then tighten the clamp around the housing with the clamp tension knob. You may have to loosen the knob before inserting the eyepiece into the clamp.



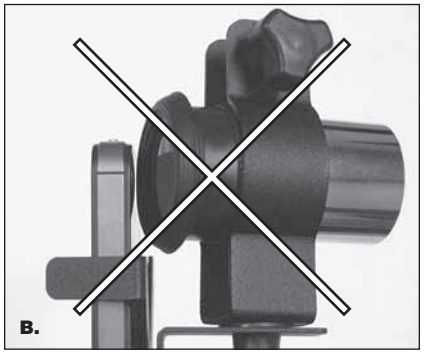


Figure 4. The eyepiece lens should be flat relative to the smartphone (**A**), not skewed at an angle (**B**).

Figure 5. A) The telescope eyepiece is too high to align with the phone's camera. Sliding the phone upward in the bracket allows the eyepiece to align with the camera (**B**).

should move your *phone* ***down within the bracket, as shown in*** **Figure 5.**

6. Loosen the eyepiece clamp positioning knob and lower the eyepiece clamp until the eyepiece lens is ¼" or less from the phone's camera lens. Then re-tighten the eyepiece clamp positioning knob.
7. Looking through the bottom end of the eyepiece barrel, move the eyepiece until the lens of the phone's camera appears approximately centered in the lens of the eyepiece **(Figure 6).** You will have to loosen the left bracket adjustment knob and the eyepiece clamp positioning knob to do this. Make sure the eyepiece is flat relative to the phone **(Figure 4A)**, not skewed as in **Figure 4B.** Re-tighten all knobs and you're ready to proceed.

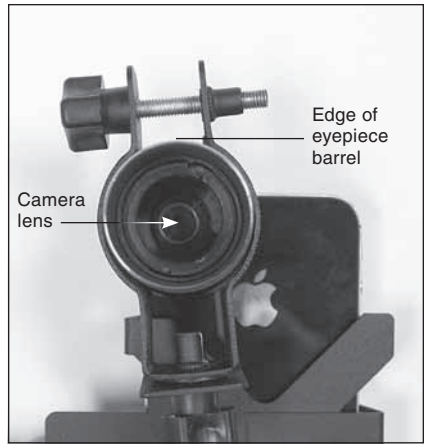


Figure 6. Look through the bottom of the eyepiece barrel to roughly center the eyepiece over the phone's camera lens.

You can check the alignment by turning on the camera app in your phone to view through the camera lens and the attached telescope eyepiece. You should see a distinct, round (but possibly clipped on the sides) "field of view" centered on the phone's display **(Figure 7).** If

needed, you can adjust the position of the L-bracket and eyepiece clamp, or the tilt of the eyepiece relative to the plane of the camera lens, until the field of view appears centered in the display. (Any objects in the field of view will *not* be in focus.)

8. Now you're ready to install the eyepiece and phone assembly into the telescope's focuser or diagonal. Carefully insert the eyepiece into the focuser or diagonal and secure it firmly with the locking thumbscrew(s) **(Figure 8).**
9. With the telescope aimed at a fairly bright object and with the camera app turned on, use the telescope's focuser to bring the object into focus on the smartphone's display.
10. If you have trouble achieving focus, you may have to adjust the spacing between the smartphone's camera lens and the eyepiece. This is done by adjusting the eyepiece clamp positioning on the slotted L-bracket arm. If the slot on the L-bracket does not provide enough travel, the height of the eyepiece can be adjusted further by sliding it forward or back inside eyepiece clamp, and tightening with the eyepiece clamp tension knob.

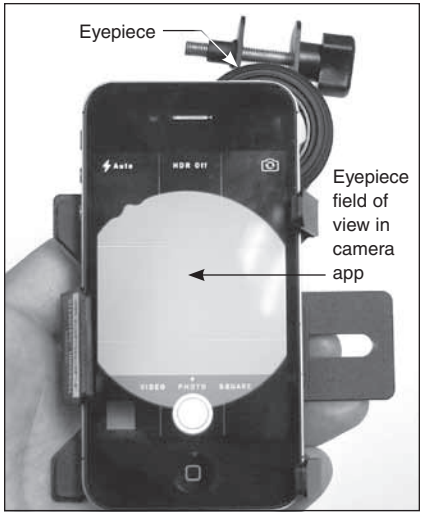


Figure 7. Position the telescope eyepiece so that its field of view appears roughly centered on the phone's screen. If it's not centered, try rotating the eyepiece clamp slightly.

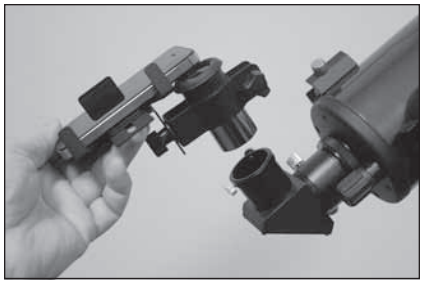
If the image is not centered in the eyepiece or the image does not appear clearly, try re-adjusting the telescope focus and the SteadyPix adjustment points. It takes a little time initially to get everything adjusted just right, so be patient. After a couple of sessions, you'll get the hang of it.

Taking Photographs with the SteadyPix Universal Adapter and Your Smartphone

If your phone has a flash, make sure the flash is turned off when shooting through a telescope eyepiece!

Moon: Our closest neighbor in the solar system is dazzling through even a very small telescope. The SteadyPix will allow you to take beautiful images of the whole Moon or close-ups that showcase the craters, mountains, or maria (**Figure 9**). Single snapshots work well and multiple shots can be stacked later in a program such as Registax to increase the signal-to-noise ratio and dynamic range of the image. Also, you can take video and then stack a series of the sharpest individual video frames.

Bright Planets: The bright planets Venus, Mars, Jupiter and Saturn also make excellent targets for afocal photography. Try using a higher power eyepiece and maybe a Barlow lens



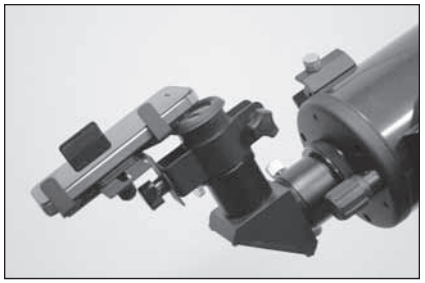


Figure 8. Inserting the eyepiece with adapter and phone attached into the star diagonal. Before doing this be sure that the diagonal is tightly secured in the telescope focuser!

to boost the magnification – planets are tiny objects in the sky! You'll need a steady atmosphere, i.e., good "seeing," to get sharp planetary images. The smatphone's display will allow you to show off your target object to friends and passers-by – no waiting in line at the eyepiece!

No need to stop at Saturn, though. At least one amateur astronomer has captured the distant planet Neptune with his iPhone and an 8" Schmidt-Cassegrain telescope!

Deep-sky Objects: Most deep-sky objects are extremely difficult to photograph using afocal photography. Try working with brighter objects such as M42 (Orion Nebula) or M13 (Hercules Cluster). You will likely need a mount that tracks the motion of the sky so that you can take "long" exposures using a 3rd-party app that offers that capability (try Slow Shutter by Tomoki Kobayashi), and you will have to stack multiple images to get a good final image.

Figure 9. An iPhone afocal close-up image of the lunar surface captured with an Orion StarMax 90mm Maksutov-Cassegrain at 62x magnification.

Sun: If – and only if! – you have a proper solar filter to cover the front of your telescope, you can get terrific images of sunspots on the surface of our nearest star in the daytime with your smartphone. Sunspots are constantly changing, so shooting them is always interesting and a lot of fun.

Nature/Terrestrial: The SteadyPix Universal can be used to take through-the-telescope photos and videos of distant subjects in daylight.

Camera Apps

The native camera apps on most smartphones are adequate, but may not be terribly versatile. There are other, 3rd party camera apps available that offer additional features and

settings that you may find useful, such as shutter delay (or self-timer), burst mode, and the ability to take “long exposures” (really probably just multiple exposures digitally stacked).

Exposure delay is nice to have. Taking the iPhone as an example, with its native camera app, when you tap the camera icon on the screen to take the picture, the exposure commences immediately. The vibration from the tap is enough to cause blurring of the image in many instances. Having a delay of a few seconds between the screen tap and the onset of exposure eliminates the problem by allowing any vibration to dissipate prior to image capture.

Two iPhone camera apps that offer exposure delay are Camera Plus (by Global Delight Technologies) and Slow Shutter (by Tomoki Kobayashi). For more 3rd party camera apps, type “camera apps” in the search field on the iTunes App Store or the app marketplace for your particular brand of smartphone.

Have fun!

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