

An easy adaptor for connecting your iphone 4 to optical devices

by [rabbitcreek](#) on March 2, 2011

Table of Contents

An easy adaptor for connecting your iphone 4 to optical devices	1
Intro: An easy adaptor for connecting your iphone 4 to optical devices	2
Step 1: Gather Materials	3
Step 2: Attaching spacer to hard case	5
Step 3: Attaching the seat post clamp	7
Step 4: Put it to good use	9
Related Instructables	9
Comments	10

Intro: An easy adaptor for connecting your iphone 4 to optical devices



The iphone 4 with its portability, ease of use, high resolution video camera and linked email upload make it an ideal platform for telemedicine. We adapted a iphone 4 hard case with a attachment device that easily adds video to most slit lamps and probably other optical devices with an ocular. Oculars produce a tiny bundle of light rays called the exit pupil where a recording optical device or your eye must be located. Slit lamps and other optical devices vary in where the exit pupil is located. The principal is to firmly attach the iphone in a steady position where the exit pupil nearly corresponds to the alignment and size of the iphone lens. The attachment device that we use is a bicycle seat post quick release clamp which is ideally suited for this purpose. Cheap, easily removable, multiple sized, and modifiable it affords a perfect stable attachment point for iphone 4 videography.
<http://www.youtube.com/watch?v=uOnoLWm-zJg>





Step 1: Gather Materials

You will need a **iphone 4 plastic hard case** for this modification--the one I used is shown below and works well when modified to allow a secure perch for the iphone and yet allow it to be slipped in easily from above. It has rails that allow the phone to be held in place.

A **wood backer or spacer** that sets the objective lens back from the ocular. The width of this depends on the slit lamp or ocular devise and is dependent on the location of the exit pupil. This distance can be obtained by holding a piece of paper in the focus beam of the ocular and measuring the distance from the ocular rim surface until the beam is **nearly** as small as it gets. This takes a bit of trial and error but the distance for the Haag-Striet BQ 900 spacer is 10 mm. I used poplar and teak wood for no particular reason other than it came in the required thickness. You need enough to cover the back of the hard case.

A **seat post quick release clamp** that corresponds to the size ocular you are dealing with. The Haag-Striet BQ 900 used a Bontrager 40 mm to fit perfectly. The BM 900 used a Tran-X 32 mm. These can be modified with a rotary sander on an electric drill to give you slightly larger diameters. The aluminum is very easy to work with. Make sure they come with "quick release" levers to allow you to put them on without the use of hex screwdrivers. The quick release should be trial fit over the ocular and checked to see when the lever is closed down if it forms a firm but not crushing grip on the end of the barrel.

Glue --I use Gorilla Glue for gluing the spacer to the case, but strong contact cement would also work. I used J/B weld epoxy to cement the quick release clamp to the wood spacer along with a screw.



Step 2: Attaching spacer to hard case

The upper limbs of the hard case have to be modified to allow the iPhone 4 to be slipped down into the sleeve without obstruction. The upper pillars can be cut away using a Dremel tool. The wood spacer stock is cut to the same size and shape as the hard case and then glued with gorilla glue or contact cement to the back of the case. Prior to the glueing a hole is drilled in the spacer board that corresponds to the hole for the lens in the hard case. Make sure this hole is larger than the opening for the lens in the hard case to prevent limiting the rays to the lens. Do not totally cut out this area as you need the light shading to prevent stray light from entering this area.

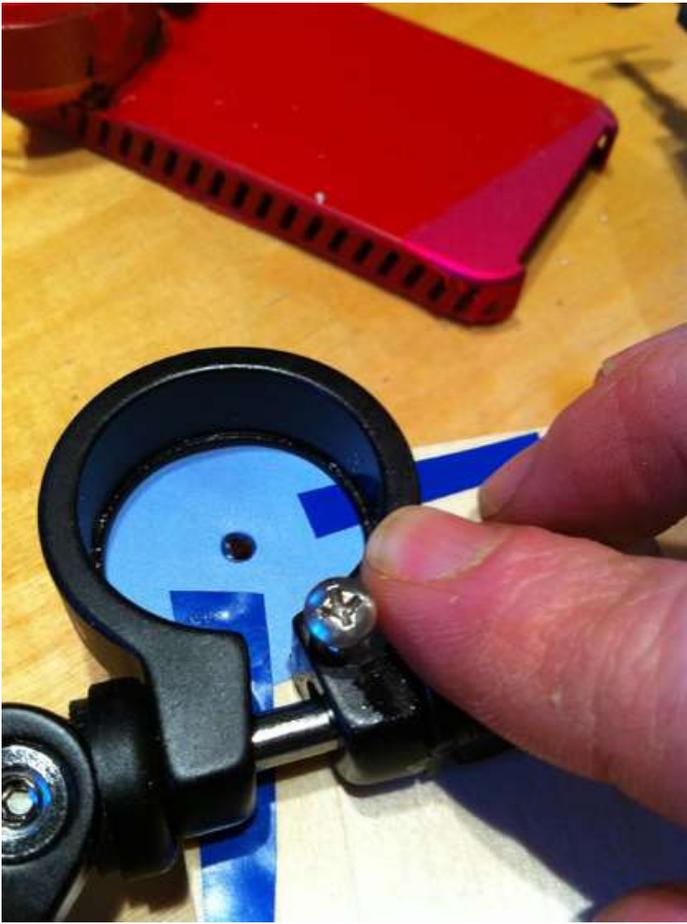




Step 3: Attaching the seat post clamp

This is the most important step and must be done with some care. I have used several methods of centering but the best relied on fitting the clamp on the ocular and then adjusting the position of the glued case with the iphone in position until a perfectly centered video image was obtained and then either hot gluing the seat post clamp to it temporarily or marking it very carefully to be certain of its permanent positioning. You want the quick release in the upper unobstructed position on the set-up. Although some other variation may serve you better. The other thing to take into consideration is part of the clamp has to be mobile to afford the quick release lever function. You can see from the photos the way I have done mine. To hold it in position I also drilled a hole through the clamp and screwed it with a safety screw to make sure there would be no problem if the glue failed. This would result in a \$600 disaster--and you are warned to be careful with your construction and use it at your own risk. I hate disclaimers on these DIY projects but it is fairly obvious that if the parts fail you iphone 4 will be toast. We have used several variations on this holder over many months and feel safe there is no risk if made well. If you feel nervous you could put a safety tether line from a small suction cup on the iphone glass around the ocular. The safety screw as well as the section of the clamp that is to be immobile is glued with epoxy--I use J/B bond for this.





Step 4: Put it to good use



The detail views of the eye that we can now record and easily email have made a big difference in student education and consultation. I have included some recent cases in a Youtube video that gives you some idea of the quality of the camera set up. After you have attached it to the slit lamp you can either use the room lights on or just the slit to give a very good view of the anterior segment of the eye. Focus adjustment is done on the touch screen after initial alignment of the slit lamp image. Adjustment for exposure is perfect and all part of the wonder of Apple products--they just work. It is also perfect for educating patients on their condition--you can instantly show them the pathology and they are very impressed. You can even email them the video.
http://www.youtube.com/watch?v=-Pmv_3vZTe0

I have not tried this setup on anything but a slit lamp but I don't doubt this same thing can be done with microscopes, telescopes, and binoculars without too much trouble. Please have fun with the design and add comments if you have found it helpful.



Related Instructables



Cheap and easy iPhone video camera mount
by jwilson27



iPhone 4 tripod mount
by deafanimator



How to Disassemble the iPhone 3G
(video) by powerbookmedic



DIY portable sound booth
by JetCityOrange



How to make a vinyl flower lamp.
by aroundthefur77



Nearly Free iPhone Tripod Adapter
by Doug Paradis

Comments

1 comments [Add Comment](#)



zazenergy says:
Wow this is pretty ingenious!

Mar 3, 2011. 12:35 PM [REPLY](#)
