

*Monitoring Large Nest Boxes
Using a Pole-mounted
Digital Camera*



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Introduction

Since the year 2004 I've used several variations of cameras to inspect the contents of large nest boxes that were not easily accessible without the use of a ladder. Without a means to inspect the interiors of these boxes, it is often unknown if the box has ever been used, is currently being used, and, if so, by whom.

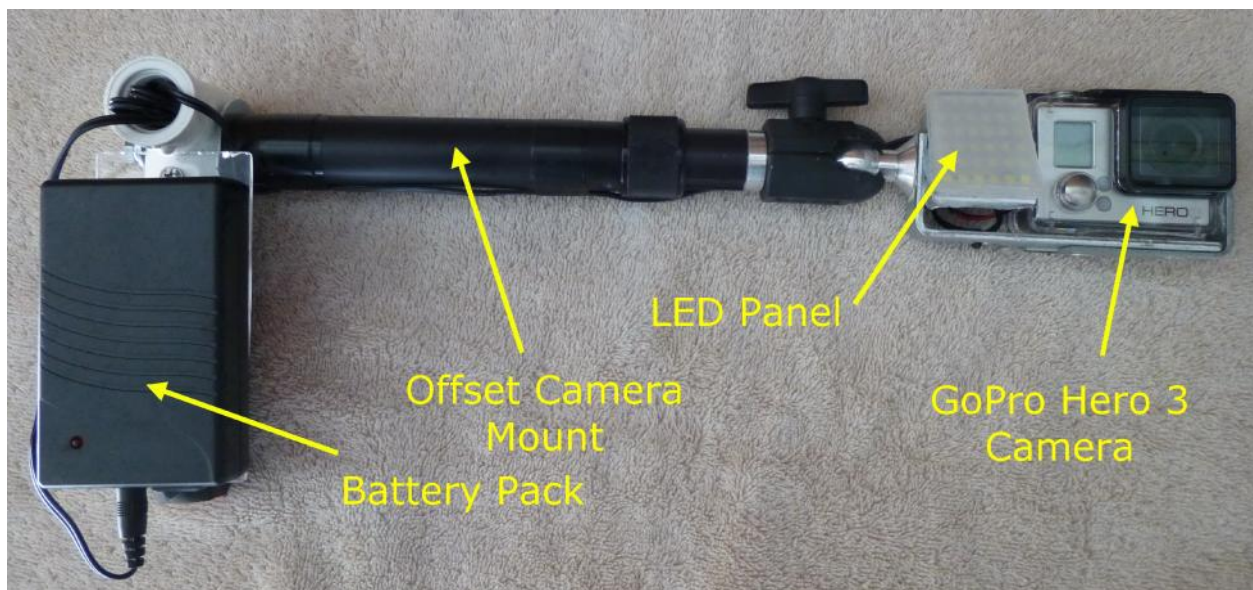
This document provides details on using a GoPro Hero 3 camera to monitor nest boxes. The advantages of such a camera include:

1. High definition wide-angle color photos and videos with sound can be captured.
2. The camera assembly and pole are lightweight and portable.
3. Photos and videos can be easily transferred to a computer for processing and archival.
4. Wireless control of the camera, and somewhat delay real-time video using a smart phone or tablet.
5. GoPro's LCD Touch BacPac provides for on-camera LCD viewing.

Other small and less expensive digital cameras such as a Nikon CoolPix could be used instead of the GoPro.

Overview

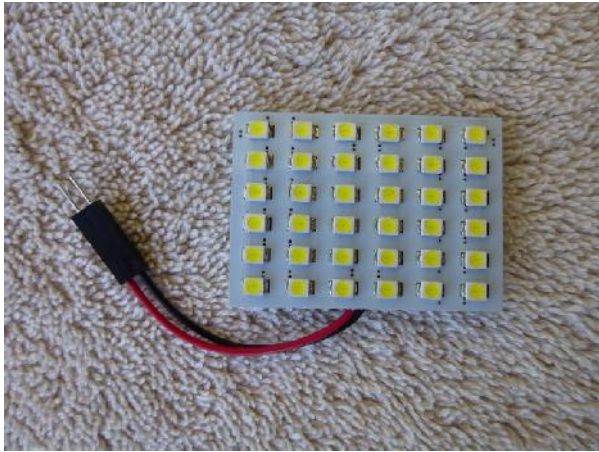
Pictured below are the system's major components. As pictured, the camera will fit into a 3" hole or larger.



The major components are:

1. A GoPro Hero 3 camera.

2. LED panel which provides the necessary light. The image below is of a 36 SMD 1210 LED Festoon Dome-Door-Box Light Panel Interior Bulb. I found these being sold on E-Bay.



3. Offset camera mount allowing the camera to be inserted into a box/cavity. The mount has a universal joint allowing the camera and light to be properly oriented. In this case, the mount is a Panavise 883-T Dual Option Telescoping Mount.
4. Battery Pack which powers the LED panel. The battery pack pictured is a HitLights Rechargeable 3800mAh Lithium Ion Battery Pack with DC Connector, 12VDC Output.

Assembly

If everything looks pieced together, it's because it is—I only build a prototype. The assembly discussion that follows is merely a guide.

1. The LED panel was attached to a metal bracket using a silicon sealant. The bracket with panel pivots and is pointed upward to increase indirect lighting.



2. A U-shaped bracket was made by pop-riveting two angle brackets together. Its width is sufficient to contain the LED panel and camera.
3. Felt bumpers are adhered to the outside end of the U-shaped bracket to dampen the noise should the assembly hit the back side of a nest box.
4. Both the panel's bracket and U-shaped metal bracket is attached to the offset mount using a bolt screwed onto the mount's camera mounting bolt.
5. A small piece of acrylic was sanded, and sealed onto the LED panel using the silicone sealant to diffuse the panel's light.
6. The camera's case mount was cut off to make the case bottom flat, and the case was then epoxied to the U-shaped bracket
7. The handle of a paint roller was cut off, and attached to a right angled PVC connector.
8. A hole was drilled through the PVC connector, and a carriage bolt inserted through the hole attached the assembly to the offset mount. A fender washer is placed between the two.
9. A piece of acrylic was screwed to the paint rollers handle for mounting of the battery pack using Velcro.



10. A two-wire cable was made to attach the battery pack to the LED panel's connector. Make certain that the proper polarity is maintained.

Using the Camera System

- First, do no harm.
- I believe that it is better generally to not surprise the occupants of the boxes, so I talk to the birdies as I approach the box making them aware of my presence.
- To the occupants the camera and light is a foreign intruder, so keep your visit brief.
- Depending upon the size of the entrance hole, there may be enough ambient light to not require that the LED light be turned on.
- Instead of pointing the LED light directly at subjects, adjust it to provide indirect light by tipping it upward. This will light up other areas of the interior for examination.
- Use the minimum amount of lighting necessary by placing an opaque tape (such as painter's tape which can be easily removed and reused) over the unneeded LEDs.
- Be aware that you will not always see everything that is in the box—you will only see what is in front of the camera, and is not being hidden by other occupants.

Common Occupant Reactions

Like humans, the birdies have different personalities, and some react differently. In my experience, I have noted the following reactions which are common.

- American Kestrels – Young chicks appear curious, while older chicks and adults assume a defensive position—beak open, wings spread, and sometimes even flipping on their back with claws open. A female on eggs once exited the box afterwards, but later returned. I do not use the camera to peek into a box once the chicks are 3 weeks or older.
- Barn Owls – If the box is empty except for stacked prey, you have a male that is trying to attract a female to the box. If you discover a pair of owls, you will likely be blessed with eggs soon afterwards. If you see a reclining hen, she is likely incubating eggs or owlets. Some hens appear to almost sleep through the encounter while other hens enter a defensive stance swaying back and forth, and hissing and clacking her beak. Some young owlets are curious, and even peck the camera. As owlets age they also take a defensive posture. It is rare that a hen on eggs exits the box when the camera was removed, and if she does, she always returns. The hen remains in the box from the time just before laying her first egg until the youngest owlet is 12 days old. Roosting males often prance about, and sometimes exit the box after the camera is removed. Some owlets that have fledged return to the box for a period of several weeks before they are not seen again.

- Western Screech Owls – The adults and owlets are unperturbed, and most appear to sleep through the encounter. None have ever exited the box afterwards.
- Wood Ducks – The female freezes with a wide-eyed look.

How Often Should You Check the Box?

It depends. How much do you want to know? Things in the larger boxes happen on a more drawn out schedule than say that of a Western Bluebird.

A single visit to a box could provide a wealth of information. If while checking the box you notice 5 Barn Owl owlets, and the oldest is about 4 weeks old, you would know that there were at least 5 eggs. You can then approximate the dates that the first egg was laid and hatched, and when the owlets should fledge.

What you might have missed is counting any eggs that didn't hatch, and owlets that may have already expired and disappeared. Not all eggs hatch—they can break or get buried in the debris. Not all owlets fledge—some young owlets simply disappear, while the remains of older owlets may remain visible. Additionally, you may not be able to see what the hen is on because she may not rise.

So, if you want to know more information, more frequent visits are needed. If the date that the first egg was laid, and the final clutch size if known, you may choose to visit the box after all of the eggs are expected to be hatched to obtain a count of owlets. Once this is known, another visit when the oldest owlet is 6 weeks old will give you a count of owlets that have so far survived, and have a seemingly good chance of fledging. Owlets fledge around 7 1/2 to 8 weeks after which they may return to the box for a period of several weeks.



Remember, do no harm.