Network Photo Transfer with a Harbortronics Time Lapse Package

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Many of our customers have requested a way to upload images from their Time Lapse Package automatically over a network. While we are hard at work on a new DigiSnap that integrates this feature, it may not be ready for some time to come, and we'd like to provide a stop-gap solution that works with our existing system.

Some clever customers found that installing an Eye-Fi card in the camera and a MiFi device in the Time Lapse Package allowed them to upload photos over a mobile network. I set out to replicate this setup, documenting implementation details and any trouble I encountered.

I found that the Eye-Fi card works great, and a Wi-Fi hotspot device without an internal battery works better than a MiFi. Harbortronics now offers this hardware as an optional upgrade to the Time Lapse Package, called the Cellular Network option. Skip to the appendix to get started, or keep reading for the details.

Eye-Fi SD Card

Eye-Fi is a company that manufactures SD cards with built-in Wi-Fi chips. They sell two versions. The Eye-Fi Mobi transfers photos directly to a nearby phone, tablet, or computer—useful in a studio setting to let the client see the photo. Their other model, the Eye-Fi X2 Pro, connects to your home, office, or mobile Wi-Fi network and uses the internet to relay photos to your computer. I ordered the 16 GB X2 Pro for this experiment.

The Eye-Fi card was painless to set up. After taking it out of the package, I inserted it into my computer's SD card reader. (It also comes with its own card reader.) Saved on the card was a “START HERE” folder containing software for Mac OS X and Windows. I installed the software and it walked me through configuring the card. After entering the details for my Wi-Fi network, I popped it out of the computer and into my camera. I took a test shot and after a few seconds it showed up in the Eye-Fi folder on my computer.

The Eye-Fi card works by uploading your photos temporarily to Eye-Fi's servers (free accounts must sync images at least once every 7 days; paid accounts provide permanent storage). The Eye-Fi application on your computer then downloads the file from Eye-Fi's server. Once you configure the card and create an account, this process is all automatic. They support some other destinations, including Facebook, Flickr, or an FTP server. These destinations are used in addition to transferring the files to your computer via Eye-Fi's servers, not as alternatives. The default option to transfer images to your computer works well and I did not find the need to seek alternatives. You can point it to any folder accessible from your computer, including external hard drives and network attached storage. Note: Eye-Fi doesn't support direct upload to Dropbox, but if you set the Dropbox folder on your computer as the destination, the files will be transferred to Dropbox after they are downloaded to your computer.

Mobile Wi-Fi Network

The Eye-Fi card requires a Wi-Fi network. If you do not have access to a Wi-Fi network at the site where you will be installing your Time Lapse Package, you will need to create one. One option is to purchase service at the location from a local ISP. Assuming this isn't available, you can purchase data service from a mobile cellular network.

MiFi or Jetpack devices are popular for allowing Wi-Fi devices to connect to the internet via a 3G/4G mobile network. Unfortunately, I was not able to find one that works well with the Time Lapse Package. MiFi devices are designed to be powered on, run for some time on their internal battery, then be powered off. Power is controlled by holding a button on the device, but the Time Lapse Package has no way to hold this button.

Without a way to power off the MiFi when not in use, the MiFi will exceed the charging capacity of the Time Lapse Package solar panel, drain the battery, and the camera will stop taking pictures—not good! We have two options: reduce the power requirements of the MiFi, and increase the size of the solar panel.

Since most of the power is spent recharging the MiFi's internal battery, I tried removing it. Unfortunately, without its internal battery, the MiFi will not power up. (This may not be true for all MiFi—I tested a Novatel MiFi 5510L.)

A better solution is a hotspot device designed to run from external power with no internal battery. The TP-LINK TL-MR3020 is a perfect fit. It's a Wi-Fi Access Point with a USB port that will accept USB 3G/4G modems. It is powered via a mini USB port which the DigiSnap can switch off when not in use.

The TL-MR3020 supports a huge variety of USB modems. Use their compatibility list to find one that is also supported by your local mobile network:
http://www.tp-link.com/en/support/3g-comp-list/?model=TL-MR3020

Your carrier should be able to help you configure the TL-MR3020 to work with your USB modem; in my case, it worked automatically out of the box.

Time Lapse Package with Cellular Network Option

We now offer a Time Lapse Package option that includes the Eye-Fi card and TP-LINK hotspot device, called the Cellular Network option. This adds an auxiliary power supply, controlled by the DigiSnap, with a mini-USB power output to power the TP-LINK TL-MR3020.

Previously, we offered a "MiFi power option" with micro-USB cable.

Configuring the DigiSnap

When you order a Time Lapse Package with the Cellular Network option, the included DigiSnap 2700 will be upgraded with some extra configuration options to allow controlling power to the Wi-Fi hotspot device. Note: the camera power is tied to the same control circuit, so the camera will turn on and off with the schedule you program for the Wi-Fi hotspot device.

Pre-snap Time

I found image uploads to be most reliable if I configured the power circuit to come on 60 seconds before taking the picture. 60 seconds gives the Wi-Fi hotspot device enough time to boot up and connect the USB modem to your cellular network.

Post-snap Time

The post-snap time is going to depend on the speed of your network and the size of your image files. Large or RAW files require more time to upload than Medium or Small. A poor network signal will also require more time to upload. In a city with strong LTE signal, I found that 3 minutes is enough time to consistently upload a 1 MB image. Test your network on-site and adjust this time accordingly.

Configuring the Camera

The Eye-Fi card should work with any camera that accepts an SD card. Some cameras can detect the Eye-Fi card and provide minimal control. The Canon Rebel T3 has the ability to enable/disable image Wi-Fi uploads from the camera menu. This defaults to Off, so be sure to enable this setting if you want

it to upload. It also shows an icon on the camera LCD that indicates that an image is currently being uploaded and keeps the camera powered until the upload completes. Other recent Canon cameras have similar Eye-Fi support.

Depending on the mobile data plan you purchase from your local carrier, you may want to change the image size the camera is storing or subscribe to a larger plan. Take some test shots and do a little math to figure out how much data you will use over the course of the project (100 images per day * 5 MB per image * 30 days = about 15 GB).

Power Considerations

The Time Lapse Package's battery and solar panel were sized to power a camera and DigiSnap only. Adding Wi-Fi will decrease the battery life and increase the time to recharge via solar. If you have access to AC mains lines, you might consider the AC power adapter option to keep your Time Lapse Package battery topped-off.

In my test setup, I found I could take and upload about 70 shots per day while just breaking even with the Time Lapse Package's standard 5-watt solar panel on a cloudy day. One or two sunny days fully recharged the battery. I had the power configured to come on 1 minute before and stay on 3 minutes after snap, for a total of 4 minutes per shot. That adds up to 4.67 hours of runtime per day.

Conclusions

With proper accessory equipment selection, the Time Lapse Package can be upgraded to upload photos over a network. Although I set out to do this with a MiFi-brand device, power requirements led me to choose the TP-LINK TL-MR3020 instead, coupled with a USB 3G/LTE model from my local cellular carrier. Harbortronics now sells a package with everything required to upload time-lapse photos over a cellular network, except for the cellular modem. Order the Time Lapse Package with Cellular Network option from Harbortronics, and purchase a USB cellular modem and data plan from your local carrier.

Appendix A – Shopping List

Here's what you need to upload time-lapse photos over a mobile network:

- Harbortronics Time Lapse Package with:
  - Cellular Network option
    - Comes with Eye-Fi X2 Pro and TP-LINK TL-MR3020 Wi-Fi hotspot device
  - If you have AC power on site, order the AC power adapter cable option
- Compatible 3G/4G USB modem from your local cellular carrier

Appendix B – Setup and Configuration

- TP-LINK TL-MR3020:
  - Plug a compatible 3G/4G USB modem into the USB port.
  - Place the switch on the side of the device into the "3G/4G" position.
  - Write down the SSID and KEY printed on the side of the device. Save for later.
- Eye-Fi X2 Pro:
  - Plug the Eye-Fi card into your SD card reader (or use the included one).
  - Navigate to its folder on your computer and open the START HERE folder.
  - Install the Windows or OS X software in this folder and follow the on-screen instructions.
  - When prompted for your Wi-Fi network details, enter the SSID and KEY you wrote down in the previous section.
  - Enable Relayed Transfer.
  - Enable Endless Memory. More information: https://x2help.eyefi.com/hc/en-us/articles/200051666
- Canon EOS camera:
  - Press Menu button.
  - Go to first wrench/spanner menu tab.
  - Select "Eye-Fi Settings" at the bottom of the list.
  - Select "Eye-Fi trans." and choose "Enable."
- Harbortronics DigiSnap 2700:
  - Follow the standard DigiSnap Terminal instructions to connect to the DigiSnap.
  - Type "P" to Configure Power for Camera.
  - Type the menu number that corresponds to "Set Pre & Post Snap Times."
  - Seconds On Before Pic: 60
  - Seconds On After Pic: 180
  - Output Polarity: 1
  - Output Type: 0
    You may need to adjust this timing depending on your network speed.

Appendix C – External Resources

1. TP-LINK TL-MR3020 USB modem compatibility list: http://www.tp-link.com/en/support/3g-comp-list/?model=TL-MR3020
2. Enable Endless Memory mode on Eye-Fi: https://x2help.eyefi.com/hc/en-us/articles/200051666