

## Cyclapse Classic Network Options

Harbortronics offers three network connection options in the Cyclapse Classic systems: WiFi, Wired (Ethernet), and Cellular.

Some camera models include WiFi built into the camera, but to date we have not found *any* cameras that will automatically transfer images to a networked storage location without the use of an intermediate desktop or mobile computer. We have also investigated the features of a number of WiFi enabled memory cards, and found that the only one that provides the necessary features for general purpose automated image transfer, the EyeFi Pro X2 card.

The WiFi card acts as the 'manager', connecting to the network and transferring new images as they are taken. By default, images are sent to a computer running the Eye-Fi Helper software on the local network or via the internet. Transfer to an FTP server is also supported. As the card fills with images, the “Endless Memory” feature removes images that have been safely transferred to make room for new images. Some experience with networking is required to properly configure the EyeFi card, the router, and the final image storage server.

## Future Considerations

Each of our current network options are based on the EyeFi Pro X2 WiFi memory card. This card has been discontinued by EyeFi, and no other suitable alternative has yet been found. Currently, we are still able to acquire those WiFi cards, and EyeFi has assured us that they will be supported for some time to come.

Harbortronics is developing a new time-lapse controller that will incorporate networking (DigiSnap Pro). When this controller is available, a wide range of new networking possibilities will be possible.

## WiFi Network Option

The WiFi Network option replaces the standard memory card(s) with a single WiFi enabled memory card. Images may be automatically transferred via WiFi to a local or remote computer running Eye-Fi Helper.

Please note that the WiFi signals from the small memory card are rather weak, and the aluminum base of the Cyclapse may reduce the range further, so an access point or router should be located within about 30 ft of the camera system for proper WiFi operation.

## Cellular Network Option

The Cellular Network option provides a means to transfer images to the internet via a cellular phone network. A WiFi router is installed in the housing which receives the WiFi signal from the WiFi card in

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the camera. A USB port is available on this router, which is used with a compatible USB cell modem that is supplied by the customer. There are a number of USB cell modem models on the market, many of which are compatible with our chosen router. USB cell modems typically require the use of a standard SIM card to operate on the local network. The local cellular network provider can assist with selection of the USB cell modem, installation of a SIM card, and registration with the local network.

Note that if the Wired Network Option is ordered, the same router is included, so nothing more is needed from Harbortronics to implement the Cellular Network Option. The customer would still need to acquire a compatible USB Cell Modem.

### Wired Network Option with PoE

The Wired Network option provides a means to transfer images to a wired network via a standard Ethernet cable to the customer's local area network. A WiFi router is installed in the housing which receives the WiFi signal from the WiFi card in the camera. An Ethernet port is provided on this router, which is then made available at a connector on the outside of the housing.

A watertight 'gland' is provided which will seal the customer supplied Ethernet cable to the housing. The gland is designed to fit over a pre-made cable. (If you have ever tried to assemble and crimp an Ethernet connector to a gel-filled CAT5 cable while on a ladder, you will appreciate our choice of equipment!)

In addition to allowing the camera to connect to a local area network, the Wired Network Option includes a means of providing charge power to the system via the same Ethernet cable. The system does NOT meet IEEE standardized Power-over-Ethernet (PoE) guidelines, instead uses the "Passive PoE" connection similar to other common equipment designs. The required cables and power supply for connection to AC mains is provided. Note that neither a solar panel nor the charge power connector is required when using the Wired Network Option, if you make use of this power scheme.

If an Ethernet cable is not connected to the system, the connector on the housing is not sealed. In this case, a short dowel of aluminum or plastic should be inserted in place of a cable to maintain the seal. The system is shipped with a suitable plug.

### Power over Ethernet (PoE)

The Wired Network Option with PoE can provide charge power to the Cyclapse time-lapse camera

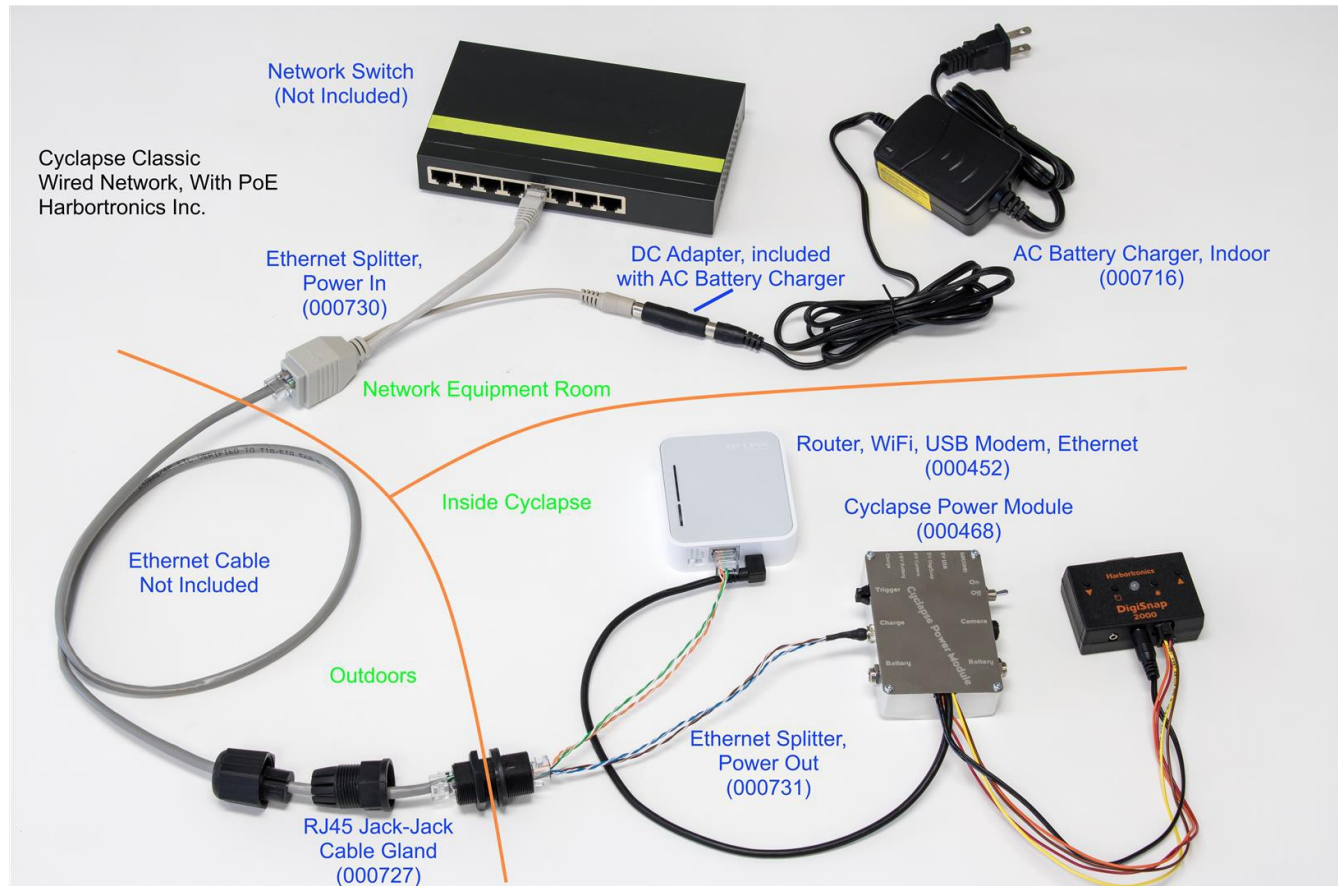


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system using the same Ethernet cable as is used for data transfer.

There are a number of recognized implementations of PoE, the most common being IEEE Standards 802.3af-2003 and 802.3af-2009. This implementation is used by typical PoE switches and other networking equipment. A simpler implementation, "Passive PoE", is also quite common.

The Cyclapse Wired Network Option uses Passive PoE. Several components are included with this option to provide charge power to the system.



In this picture, the connections for the optional Wired Network, with PoE are shown. There are three 'locations' shown, the Network Equipment Room, the inside of the Cyclapse housing, and the Outdoors. It looks complicated, but if you follow the picture, it should be very easy to install.

### Network Equipment Room

An AC battery charger converts AC mains power to a 16.8V DC, current limited output. The AC Battery charger is connected to the Ethernet Splitter Cable (also called a power injector cable).

The Ethernet cable coming from the camera system is connected to the female jack of the splitter cable, and the male Ethernet end of the splitter cable is connected to the network switch.

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The network switch is not provided by Harbortronics. A 10/10MBPS switch speed is fine. The PoE power is injected via the cabling, so there is no need for a PoE switch.

### **Outdoors**

An Ethernet cable is connected between the camera system and the Network Equipment Room. A CAT5 or CAT6 cable is recommended, with a maximum length of 100 meters.

A watertight connection is made to the cable at the Cyclapse housing by assembling the cable with the provided connector pieces. Take care to tighten enough to seal the cable and to the connector body, but not so tight as to damage the threads.

### **Inside Cyclapse**

The Ethernet Splitter cable has two RJ45 Ethernet connectors. One has all wires connected, and is plugged into the watertight jack on the housing wall. Please plug this connector in fully!

The other Ethernet plug on the splitter cable has only half the wires installed, and is connected to the router.

The DC jack on the splitter cable is connected to the Charge port on the Cyclapse Power Module.

The Cyclapse Power Module has a USB Mini plug, which provides power to the router.

Please note there are other devices needed inside the Cyclapse housing to complete the system, such as a camera and a battery pack. The picture is simplified to reduce confusion.

## **Configuration**

There are several devices which need to be configured to communicate with each other, designate the place to store the images, and to minimize the power drain.

### **Router**

The TP Link TL-MR3020 router is used for both the Cellular Network Option, and the Wired Network Option. In most cases, this router can be configured simply by moving the mode switch to the appropriate position. For more advanced configuration, a web interface is available.

### **3G/4G Mobile Network (Cellular Network Option only)**

If you have purchased the Wired network option, you do not need to install a USB cell modem. The discussion in this section is only for the Cellular Network option.

Your local mobile network operator can help you purchase and activate a compatible USB modem. A

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list of USB modems known to be compatible with the TL-MR3020 can be found here:

<http://www.tp-link.com/en/support/3g-comp-list/?model=TL-MR3020>

Many customers have reported modems not listed here working just fine. If your modem is not listed, try it and report back! You may need to use the router's web interface to select the appropriate APN for your mobile network operator if it is not automatically detected. Your mobile network operator should be able to assist you with this step.

Once your USB modem is activated, use the following procedure to test the router:

1. Insert your USB 3G/4G modem into the USB port on the TL-MR3020.
2. Place the switch on the side of the TL-MR3020 to the “3G/4G” position.
3. Provide power to the TL-MR3020 with the supplied USB Mini-B cable.

*Note: while testing, it may be helpful to temporarily disable the DigiSnap's power control. This can be accomplished by reconfiguring the DigiSnap, or simply by disconnecting the square 4 pin connector from the DigiSnap (orange/yellow wires).*

You should see the power LED on the router immediately light green. After about 30 seconds, the second LED will light to indicate a working Internet connection.

### **Wired Ethernet Network**

For use with an existing wired Ethernet network (no USB Cell modem), place the switch on the side of the TL-MR3020 to the “AP” position. This disables the internal DHCP server to avoid conflicts with your existing local network.

Write down the KEY and SSID printed on the side of the router. You will need these values when configuring the Eye-Fi Pro X2 card. You can use these values in your smartphone or computer to test the wifi network, if you wish.

### **EyeFi Pro X2 WiFi card**

In the previous section, we powered and tested the TL-MR3020 wifi router. Please keep it powered while completing the following steps.

1. Plug the Eye-Fi card into your SD card reader (or use the included one).
2. Navigate to its folder on your computer and open the START HERE folder.
3. Install the Windows or OS X software in this folder and follow the on-screen instructions.

For more detailed instructions on installing Eye-Fi Center, see:

<https://x2help.eyefi.com/hc/en-us/articles/200334506-Install-Eyefi-Center>

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4. When prompted for your Wi-Fi network details, enter the SSID and KEY you wrote down in the previous section.
5. Enable [Relayed Transfer](#).
6. Enable [Endless Memory](#).

By default, Eye-Fi Center will store transferred photos in the Eye-Fi folder on this computer. From the Photos tab, you can choose alternative storage destinations, such as your Dropbox folder, an external hard drive, or network-attached drive. Regardless of the storage destination, you must turn on the computer with Eye-Fi Center installed at least every 7 days of shooting to download the images.

## Canon EOS camera

Now we're ready to install the Eye-Fi card in the camera. Insert it into the SD slot like you would any memory card. By default, it will work like a standard memory card. Next, we need to enable the wifi features:

1. Press the Menu button
2. Go to the first wrench/spanner menu tab.
3. Select "Eye-Fi Settings" at the bottom of the list.
4. Select "Eye-Fi trans." and choose "Enable."

Now take a photo. If everything is working, the photo will appear on your computer in 1-2 minutes.

## DigiSnap 2700

Follow these instructions to configure the DigiSnap2700 to turn off power to the camera/Wi-Fi card & router when not actively taking or transferring an image. When the system is powered from a solar panel, the amount of time the equipment is powered should be set as low as possible to save power.

1. Follow the standard DigiSnap Terminal instructions to connect to the DigiSnap.
2. Type "P" to Configure Power for Camera.
3. Type the menu number that corresponds to "Set Pre & Post Snap Times."
4. Seconds On Before Pic: 60
5. Seconds On After Pic: 180
6. Output Polarity: 1 (not required in the latest DigiSnap firmware)
7. Output Type: 0 (not required in the latest DigiSnap firmware)

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These timing settings are very dependent on the mobile network speed at your installation site. It will require some testing to find the ideal values. If your system is failing to upload photos, you may need to add time to the "seconds on after pic" setting. If this value is approaching your time-lapse interval and still failing to upload images, you may need to set the camera to take lower resolution or higher compression images or lengthen your time-lapse interval. In some cases, the network speed in your area may not be sufficient for transferring even small images.