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Introduction

This document is intended to help diagnose problems with your Cyclapse Classic.

Harbortronics has been designing and manufacturing time-lapse camera systems since 2004, and we have shipped about 4500 of our systems in use all over the planet as of early 2016. While the Cyclapse Classic system design was introduced in 2015 the fundamentals of long term digital time-lapse have not changed significantly over time. The “Classic” refers to the use of the DigiSnap 2700 controller... the DigiSnap 2000 series has been in production since 2000. While our systems are quite reliable, there have been enough failures and configuration problems over the years that we can suggest how to isolate the most common problems.

The problems can be lumped into 3 categories, power, camera, or DigiSnap controller. Let's walk through some quick tests, and try to isolate the problems you may be having.

We spend time on the phone with people all over the world that run into one problem or another, and these will be the same tests we will talk you through if you call with a problem.

Power

The most common problem we've encountered is lack of power somewhere in the system. Later in this document there is a detailed description of the power scheme in the system, which may be of use when doing more detailed testing. For now however, please refer to the '**Debug Flow Chart - Power**', and perform some simple tests. If power is flowing properly, you should be able to tell very quickly.

Camera

The next thing to check is the camera itself. We have been using Canon Rebel series cameras for years, and are delighted with their reliability. The Cyclapse housing allows use of a wider range of cameras that haven't been proven in years of field operation. In general, there have been very few outright camera failures in the field, and we only infrequently hear about shutter life limitations. Modern digital cameras are quite reliable! Please refer to the “**Debug Flow Chart - Camera**” to check out the camera.

There are a lot of menus and buttons on the camera. Most of them are already set properly, but in case you aren't familiar with SLR cameras, this discussion may help. There are three basic goals to setting up the camera for a long term time-lapse project:

- Minimize the power drawn (power off, stabilizer, image review, distortion)
- Maximize consistency to the image (manual focus, lighting optimizer)
- Maximize exposure adaptability (program mode, auto white balance)

There are a lot of cameras that are compatible with the Cyclapse, and we cannot address the detailed menu setup of each one. For this discussion, we presume use of the standard camera, the Canon T6i/750D.

First change all the settings to factory default: Menu / Tools 4 / Clear Settings. Then, here are the changes to make or verify:

- 1) Lens
Manual Focus (MF)
Stabilizer Off
- 2) Top Dial
P (Program Mode – auto exposure, flash off)
If the camera is within 30 ft of your intended scene, you might consider using Av (Aperture priority), to maintain a constant depth of field.
- 3) Top Buttons
AF Selection: Ignore, you'll be using Manual Focus eventually
ISO: AUTO
DISP: Ignore
- 4) Navigation Buttons (on back)
WB (Up Arrow): Auto, or set per the lighting conditions

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Drive Mode (Left Arrow): Single Shooting

AF Mode (Right Arrow): One Shot

Picture Style (Down Arrow): Auto, or Landscape

- 5) Menus (Menu button on back)
 1. Camera 1
 - Quality: Smooth L (24 Mpixels, low compression JPEG)
 - Image Review: Off
 - Red Eye Reduction: Off
 - Flash Control
 - Flash Firing Disable
 2. Camera 2
 - Auto Lighting Optimizer Disable
 3. Camera 3
 - ISO Auto: Max 800
 4. Tools 1
 - Auto Rotate: Off
 - File Numbering: Continuous
 5. Tools 2
 - Auto Power Off: 30 sec**
 - Date/Time: Set to local time
 6. Tools 3
 - Touch Control Disable

DigiSnap Controller

The time-lapse controller in the system is the DigiSnap 2700. We've been making the DigiSnap 2000 series controllers since 2000! They have been great workhorses, and there are tens of thousands of them in use all over the world. The legacy Time-Lapse Package originally used the DigiSnap 2100 controller, which achieved close to 100% reliability. The short power connection cable would occasionally fail, but other than this mechanical issue, they were great!

In 2011, we developed the DigiSnap 2700 controller, which added an internal Real-Time clock, simplifying programming Advanced Time-Lapse sequences. We also redesigned the interfaces to simplify connections to the camera and power. Unfortunately, we have experienced hardware problems at various times with the DigiSnap 2700, where the Real-Time clock would sometimes reset when powered on (very early models), and increased sensitivity to nearby electric field events, such as lightning strikes and welding. We have also experienced rare, random occurrences of the DigiSnap 2700 controller locking up for no known cause. Over time we have addressed these issue through firmware changes, and additional protective circuitry. If you are a customer that has experienced any of these problems, we can appreciate that your confidence in our system was shaken. This is the 'bad news', which we report here to be completely open. The good news is that out of the

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thousands of DigiSnap 2700 controllers in the field, very few have experienced any problems, and we believe these issues have been addressed.

OK, enough background... please refer to the “**Debug Flow Chart - DigiSnap 2700 Operation**” to test your controller in the system.

Here are the recommended DigiSnap configurations (access via a computer terminal).

1) Main Menu

Verify the firmware version is 4.50 or higher.

Set clock to local time.

Camera Release Time: 2 seconds

Power Control: Toggle Power Off Daily,

Operating Mode: Advanced Time-Lapse (daily schedules)

2) Switch Menu

#1, #2, #4, #5 – Do Nothing

#3 – Take Picture Immediately

3) ATL Menu

Default Settings for sequence #

#1 – Enabled, Starting 7:30, 12 Pics, Interval 1 Hr

#2..#8 – Disabled

Please reconfigure the schedule to your project needs!

Power Details

Everything in the Cyclapse is powered by one or two large Lithium-Ion Polymer battery packs, made specifically for Harbortronics. They should last for a number of years before the capacity degrades significantly. We hear from customers whose Time-Lapse Package systems are still working after 5-6 years (different battery pack, but same chemistry). The battery pack is large enough to power the system for a month or more without any sunlight or other charging, depending of course on the number of pictures taken per day and whether networking is used.

The Cyclapse Classic system includes a 'Cyclapse Power Module', which includes a battery charge controller and power converters. There are power connections for the DigiSnap 2700 controller, the camera, as well as accessories such as a networking router. The Cyclapse Power Module includes test points on the top of the case, allowing quick and easy verification of all of the voltages used in the system.

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The very best way to troubleshoot power problems is with a DC voltmeter, generally called a multi-meter. If you don't have access to one, they are very inexpensive, and available at any hardware store, auto parts store, or at electrical or electronics supply companies. Set the meter to DC volts. If you must select a voltage range, try a lower range... 20 volts for instance. The test probes that come with the voltmeter can plug into the test points of the Cyclapse Power Module. The black probe should connect to the COMMON test point on the voltmeter, and its tip to the black test point on the Cyclapse Power Module. The Red probe should plug into the VOLTS/AMPS/OHMS test point on the voltmeter.

For more info on the Cyclapse Power Module, please refer to [Cyclapse Power Module Website](#). There is a separate [Product guide](#) which has additional detail.

Battery Pack

The red test point on the Cyclapse Power Module will indicate the voltage on the battery packs. If two battery packs are connected, the voltage will be of the higher charge pack.

Battery Pack Voltage Range:

- 0 volts: Very odd! There is apparently no charging power (i.e. from solar panel), and the battery doesn't have any charge. There's something amiss! Perhaps the Solar Charger circuit, wiring, or solar panel has failed.
- 0-12 volts: The protection circuits within the battery pack may have disconnected the battery. It may be discharged too low, or too much current may have been drawn. Try charging it again using the supplied AC charger. The charge power source (solar panel?) is apparently providing some juice, but not enough to charge the battery.
- 12-13 volts: The battery pack is drained... the circuits may shut down soon. There may not be enough sunlight to keep the battery charged, or too much power is being drawn.

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- 15-16.1 volts: The battery pack is charged.
- 16.2-16.8 volts: The battery appears to be freshly charged using an external battery charger. If this isn't the case, the internal charger circuit may be out of tolerance.

Charge Power

You can test the charging power (i.e. solar panel) by touching the probe to the white test point on the Cyclapse Power Module.

Charge Voltage Range:

- 0 volts: There is no charge power. (Solar panel is receiving no light, or failed.)
- 16-30 volts: Charge power source seems to be OK. The battery appears to be fully charged, and is not presently drawing current from the charge source.
- About the same as the Battery Pack voltage: The charger source is working fine, and is presently charging the battery pack.
- Less than the Battery Pack voltage: There isn't enough charge power to charge the battery pack. (Insufficient light on the solar panel?)

Camera Power

A switching power supply inside the Cyclapse Power Module converts the battery power to 8 volts, to power a camera. As long as the battery pack has 10 volts or more, the supply should be able to power a camera.

The yellow test point on the Cyclapse Power Module will indicate the output voltage of the camera power supply.

Camera Power Supply Voltage Range:

- 0 volts: There is no output from the camera power supply. The DigiSnap 2700 has the ability to control this power supply output. Try disconnecting the square 4 pin cable at the DigiSnap, and see if the camera power supply voltage 'turns on'.
- 0-7.5V: The power supply voltage is out of tolerance, and may not be sufficient to power a camera.
- 7.5-8.5V: The camera power supply is working fine.
- >8.5V: The power supply voltage is out of tolerance, and may possibly damage a camera.

Power is applied to a camera via a cable from the Cyclapse Power Module. In most cases this cable is connected to a dummy battery pack also called a DC Coupler, which then plugs into the battery compartment of the camera. The contacts on the dummy battery are very hard to probe, as they are recessed. If you need to verify power on these contacts, you may have to find some fine wire to stick into the slots, or sand the tips of the probes to a sharp point.

DigiSnap Power

A switching power supply inside the Cyclapse Power Module converts the battery power to a 5V power supply, to power the DigiSnap 2700 intervalometer and accessories. As long as the battery pack has 10 volts or more, the supply should be able to power the DigiSnap.

The green test point on the Cyclapse Power Module will indicate the output voltage of the 5V power supply.

DigiSnap Power Supply Voltage Range:

- 0 volts: There is no output from the 5V power supply! The Cyclapse Power Module may have failed.
- 0-4.5V: The power supply voltage is out of tolerance, and may not properly power the DigiSnap and accessories.
- 4.5-5.5V: The camera power supply is working fine.
- >5.5V: The power supply voltage is out of tolerance, and may possibly damage the DigiSnap.

USB Power

An auxiliary 5V power supply output is available for network accessories such as a router. The DigiSnap 2700 controls this 5V output, turning it on & off. This 5V output power is available on the Mini-USB cable coming from the bottom of the Cyclapse Power Module.

The blue test point on the Cyclapse Power Module will indicate the USB power output.

USB Power Voltage Range:

- 0 volts: There is no auxiliary output power. The DigiSnap 2700 has the ability to control this output. Try disconnecting the square 4 pin cable at the DigiSnap, and see if the USB power supply voltage turns back on.
- 0-4.5V: The power supply voltage is out of tolerance, and may not properly power network equipment.
- 4.5-5.5V: The output is turned on, and the voltage is correct.
- >5.5V: The power supply voltage is out of tolerance, and may possibly damage network equipment.

Most Common Problems

#1 Cannot connect to the DigiSnap

The interface to the DigiSnap 2700 is the same as used for all of the DigiSnap 2000 series controllers, designed in 1999. It's actually a very simple interface, and is completely usable today. However simple it is, there are several steps to follow to establish communication on your computer or mobile device.

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Please refer to the “**Debug Flow Chart - DigiSnap 2700 Terminal**” for additional help. There are also discussions of the terminal connection on our website support pages, as well the user guides.

#2 The system sometimes misses pictures

There are a few things that can cause it to take some pics, and miss others.

Shutter Release Timing

Each time the DigiSnap commands the camera to take a picture, it's electronically pressing the shutter release button on the camera. When the camera is asleep between pics, it can take up to 2 seconds to wake and SLR camera, set the exposure, and take the picture, assuming the camera is set to manual focus. If set to auto focus, it can take many more seconds! The DigiSnap has a setting for the amount of time it holds the shutter “Camera Release Time”... it's normally set for 2 seconds. Some cameras, such as the Sony A7RII require a 3 second release time. If you really must use auto focus, please increase this time to 10 seconds. You may still miss many pictures, as auto-focus doesn't always succeed, and it will generally focus on the nearest object in the scene, such as a bug walking across the window.

Power Drop-Out

If the battery pack is mostly discharged, it might run for a while, then stop, charge up some more, take a few more pics, etc. You might check the voltage on the battery pack!

If it's low, take it out of the housing, and use the AC charger included with the system to charge it up. It may take up to 9 hours for a fully drained battery pack. Solar panels are sized to keep up with the power draw from the system, not to charge the battery quickly.

The 'standard' 10 watt solar panel is sufficient to keep the battery charged when taking about 200 pics per day over the long term. In particularly sunny locations, you might be able to take 2-3x this many, and in cloudy areas about half of this.

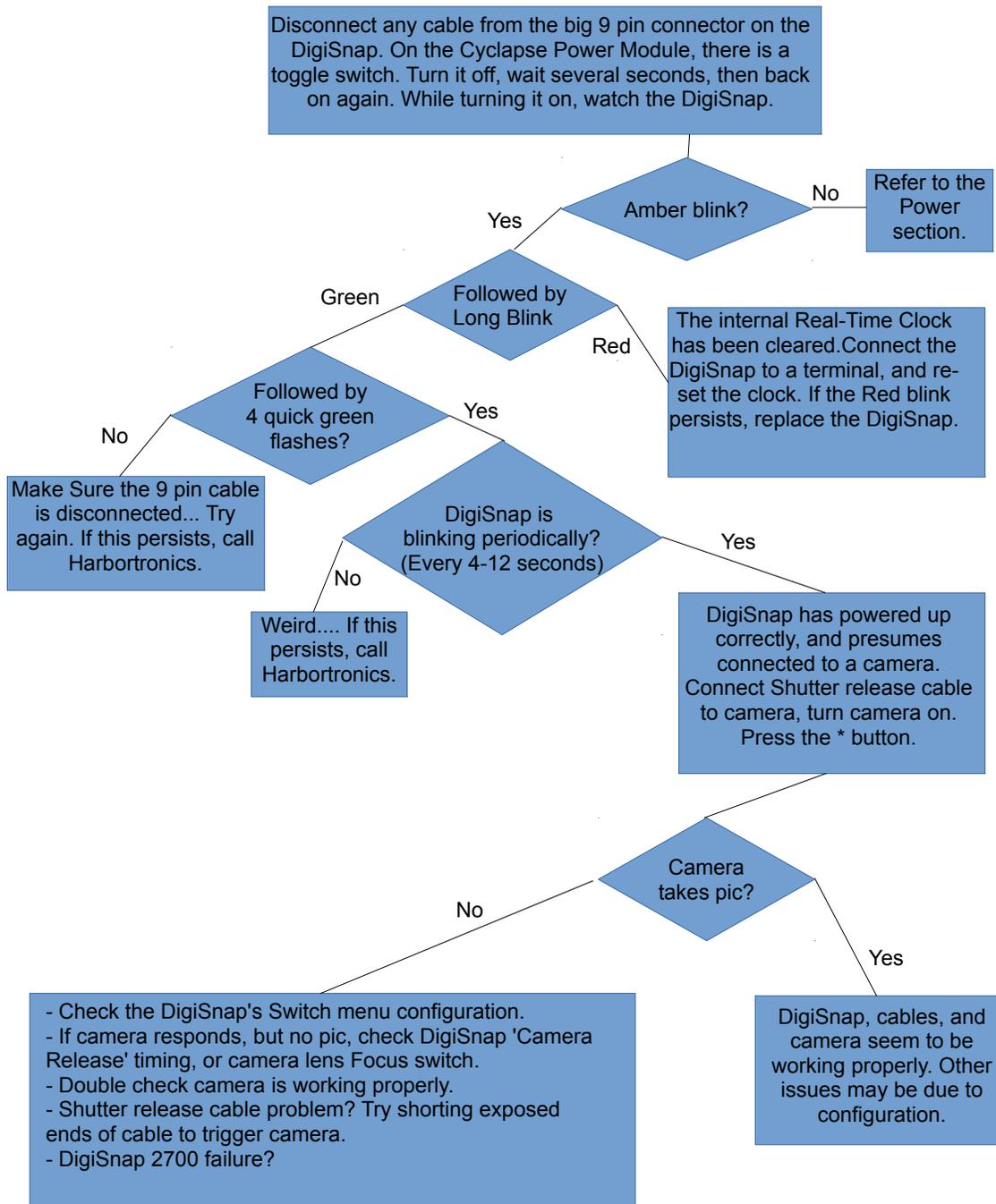
Camera Power Timing

The DigiSnap 2700 has the ability to control the camera power, via a connection to the Battery Converter circuit.

Normally we recommend setting the Power Control Mode on the DigiSnap to 'Toggle Off Daily', where power is applied to the camera all the time, save a few seconds once a day, to reset the camera in case of a lock-up (something that is less frequent on recent camera models).

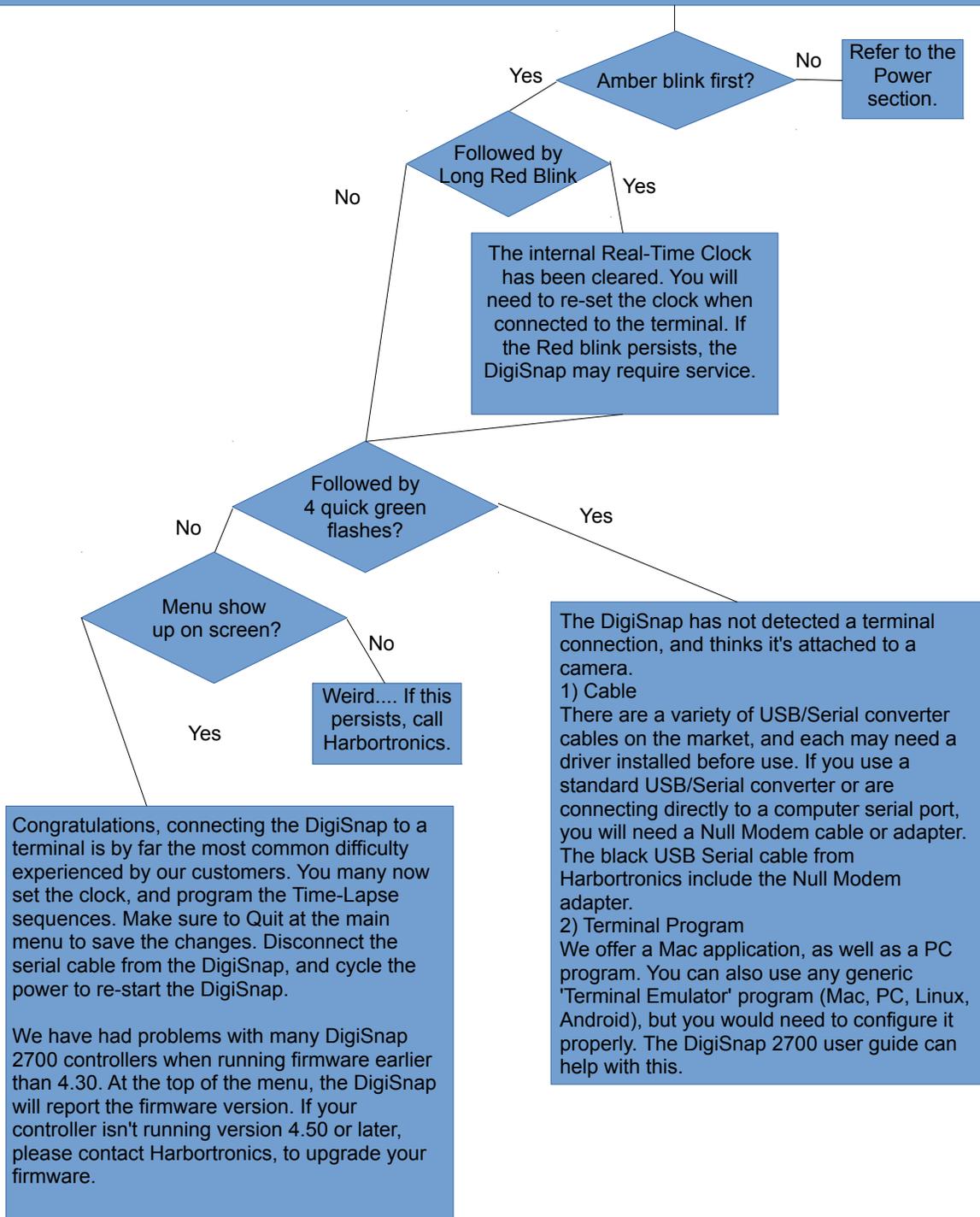
You may also set the Power Control Mode to turn the power to the camera on a few seconds before the snap, and a few seconds after to save the image. However, if taking pictures in low light, the camera may need a long exposure, such as 20 seconds... if the camera power is removed before the camera has finished, that picture will not be saved. This power control mode is always recommended when using networking, as network equipment draws significantly more power than the camera alone.

Debug Flow Chart: DigiSnap 2700 – Operation

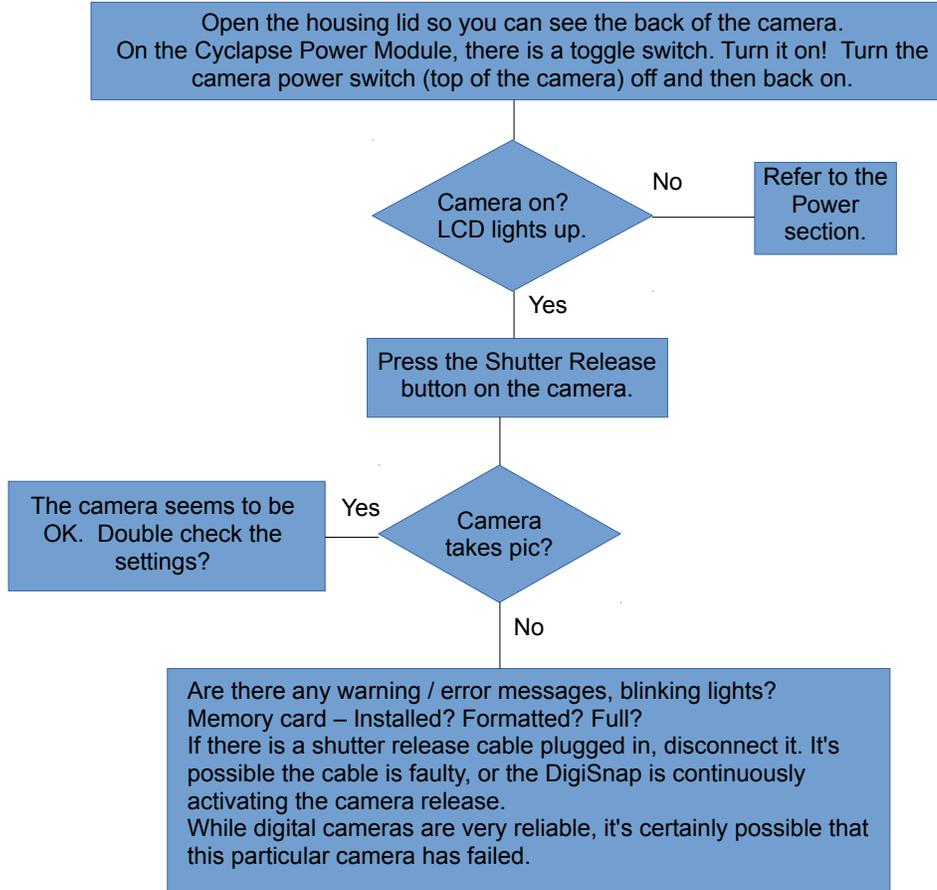


Debug Flow Chart: DigiSnap 2700 – Terminal

Install the driver for the USB/Serial cable (black color cable provided with each Cyclapse Classic), from the included Harbortronics CD-Rom, or from <http://www.ftdichip.com/Drivers/VCP.htm>. Connect the USB/Serial cable to the 9 pin connector on the DigiSnap. Connect the other end to the USB port of a computer (Mac, PC, Linux, Android). Run the supplied terminal program (Mac or PC) available on the CD-Rom, or from <http://www.harbortronics.com/Support/DigisnapProgramming>. Once the terminal is open, you can power up the DigiSnap. On the Turn off the switch on the Cyclapse Power Module for several seconds, then back on again. While turning it on, watch the DigiSnap.



Debug Flow Chart: Camera



Debug Flow Chart: Power

