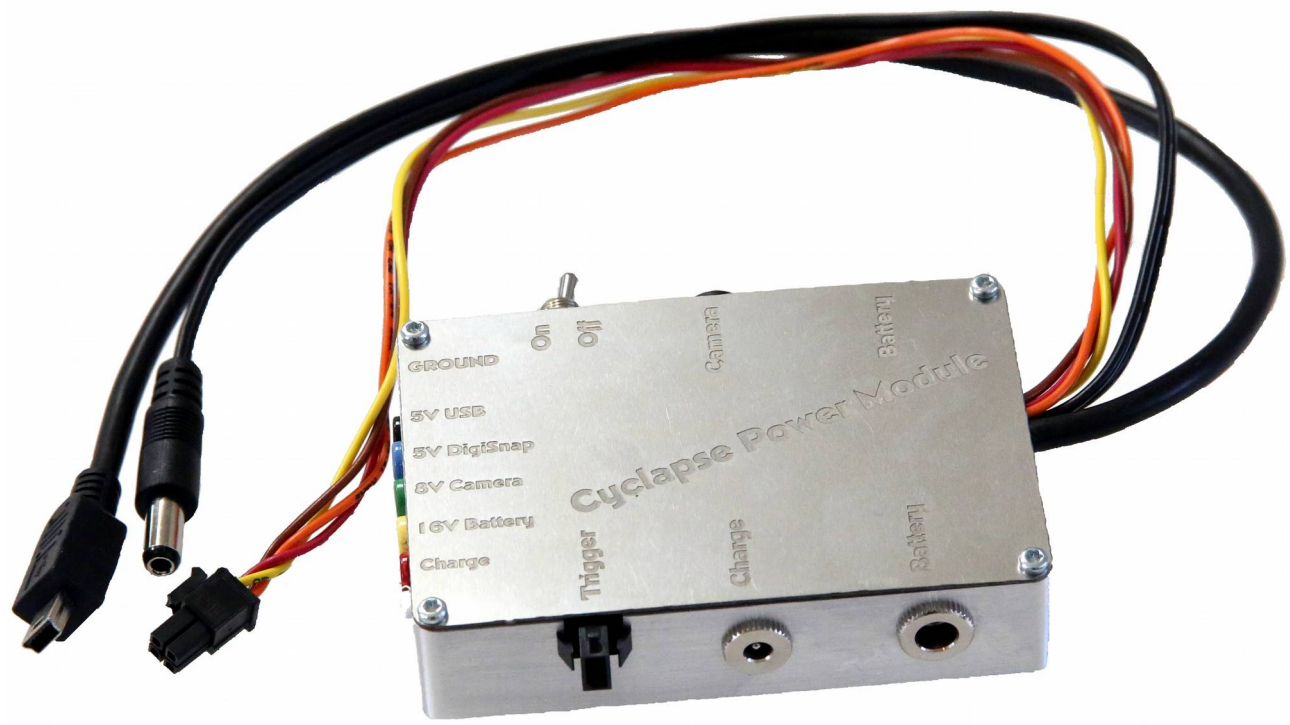
Cyclapse Power Module

Harbortronics Inc
7103 County Road 86
Fort Collins, CO 80524
970-232-9619 (Phone)
970-672-8729 (Fax)
http://www.harbortronics.com/

Sales & Service: Sales@Harbortronics.com
Technical & Customizing: Mark@Harbortronics.com



Overview

The Cyclapse Power Module manages the power for the Cyclapse Time-Lapse Package – Classic.

Features

- Battery Charger
- 5V Power source for an intervalometer, such as the DigiSnap 2700, and auxiliary devices.
- 8V Power source for an SLR camera.
- Accommodates dual batteries, with hot-swap capability.
- Integral test points for easy troubleshooting in the field.
- Metal case: aluminum body with stainless steel lid. Reduces RFI concerns.
- Curved case with integral magnets attach to inside wall of Cyclapse housing, allowing adjustable positioning and sheds excess heat to Cyclapse housing walls.

Power Converters

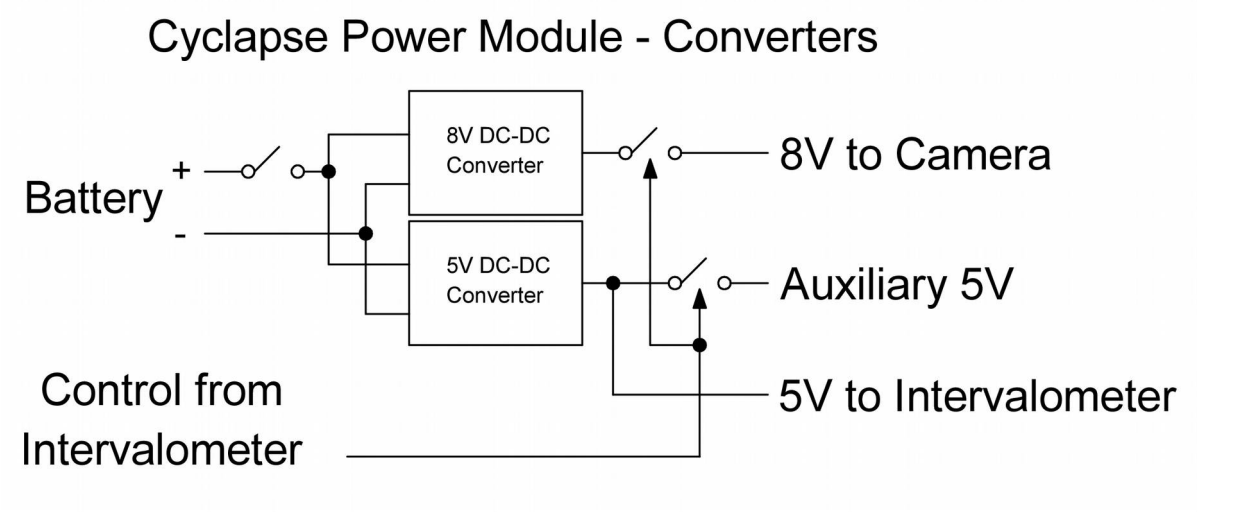
Two power outputs are included in the Cyclapse Power Module: 5VDC, and 8VDC. Power can be manually controlled by a switch on the case. In most applications, the power will not need to be turned off except when storing the system for long periods of time. The high efficiency of the power converters permit the power to be left on during configuration, test, transport, and installation of the complete time-lapse system.

The 5V supply is intended to power an intervalometer such as the DigiSnap 2700, as well as an auxiliary device, a network router for instance.

The 8V power output is designed to power a camera in place of its battery pack. Most SLR cameras use a two-cell lithium ion battery pack whose nominal voltage is 7.4V. The Cyclapse Power Module supplies 8V, which is a typical voltage on a charged battery pack.

There are a few SLR cameras which require a different power supply voltage. Harbortronics can adjust the output voltage to accommodate most available cameras.

The power to the camera may be controlled by the intervalometer, to minimize power draw, or to periodically reset the camera for various reasons. The auxiliary 5V power is controlled synchronously with the power to the camera.



Camera Power

In short term applications (for instance time-lapse photography of clouds, fireworks, etc.) the internal battery of the camera may be sufficient. For long term time-lapse applications (days, or even years), providing power to the camera from an external source is an essential component of time-lapse equipment. The Cyclapse Power Module is designed to provide power for a digital stills camera. The camera power voltage is normally set to 8V at the factory, but can be configured for any voltage from 3V to 10V, which is sufficient range to cover all digital cameras on the market.

Cameras typically use one of two means of connecting to external power, via the battery compartment using a 'dummy battery', or through a dedicated connector on the camera. Most manufacturers have moved to the use of dummy battery packs, with a cable entering the battery compartment. Harbortronics can supply dummy battery packs with appropriate cabling for the Cyclapse Power Module, in addition to dedicated camera power cables.

Connector: DC Power Jack, 1.7/4.75mm
Mating Connector: 1.7/4.75mm barrel plug
Function: Power supply for digital camera
Typical Use: External power for camera
Rating: 3 Amps maximum

Pin	Name	Description
1	Center	Positive voltage to camera, 8V DC
2	Outside	Power return, circuit ground

Battery Packs

Providing reliable power is not a trivial undertaking for equipment intended to be located anywhere on the planet. In order to work with charge power sources that may be often interrupted, high capacity battery packs may be used with the Cyclapse Power Module. These battery packs should be of sufficient size to allow operation without charging for long periods, such as a week or more of rainy weather when using a solar panel.

The Cyclapse Power Module is designed to work with 4-cell Lithium Ion rechargeable battery packs, with a nominal voltage of 14.8V. Two battery connections are provided. The connections are isolated from each other, allowing one or two battery packs to be installed, and swapped at any time without concern for matching the charge states. Any reasonable capacity battery pack can be used. For instance, one or two 92-watt hour battery packs are provided with the Cyclapse Time-Lapse Package.

2 Connectors: DC Power Jack, 2.1/5.5mm
Mating Connector: 2.1/5.5mm barrel plug
Function: Battery power for the system
Typical Use: Connection to one or more battery packs
Rating: 14.8V Lithium Ion rechargeable battery pack

Pin	Name	Description
1	Center	Positive voltage from battery pack
2	Outside	Power return, circuit ground

Charge Power

There are a variety of power sources that can be installed with a time-lapse camera system for battery charging, depending on the local environment, accessibility to the system, and available utilities.

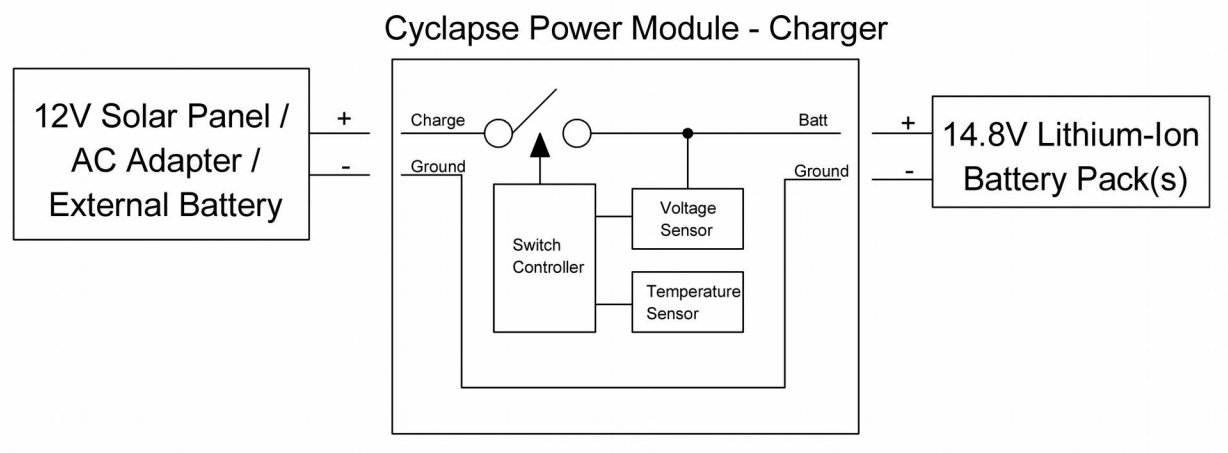
In the majority of outdoor locations on the planet, solar power is clearly the easiest, lowest cost, and most reliable power available. The battery charger in the Cyclapse Power Module is designed to be a good match with standard 12V solar panels. When paired with the Harbortronics DigiSnap 2700, the system power needs are quite low, and a small solar panel may be used. For instance, if there is no network connection to the system, a tiny 5 watt solar panel can keep a battery charged when taking 100 pictures per day, even in areas with limited sunshine such as London or Seattle.

Indoor sites often have AC mains power available. A small AC battery charger is typically provided with battery packs compatible with the Cyclapse Power Module, and that battery charger can be used as a power source. Alternative AC charge sources would include small chargers for lead-acid batteries, such as for motorcycle batteries used world-wide. Large chargers for car batteries should not be used directly, as the current is too high, which could damage the circuitry or battery packs.

Some sites do not have enough sunshine, nor AC mains power. Many indoor sites don't have access to AC power, nor do caves, subway tunnels, mines, etc. In these sites, the best form of power may be battery power. Larger batteries may be placed with the camera system, and removed periodically to be charged. The internal battery packs will provide power for operation during those periods of time. As with large car battery chargers, the current capacity of an external battery may be so high as to damage the circuitry or internal battery packs. Harbortronics can provide cables with in-line resistors to limit the charge current if needed.

The charge controller in the Cyclapse Power Module will connect the battery pack to the charge input voltage until the battery voltage rises to 16.2V, at which time the charge input will be disconnected. When the battery then falls below 15.5V, it will then be connected again.

Note that the charge controller will not charge battery packs when the temperature is above 45C, or below 0C. Lithium-Ion battery packs can be damaged if charged below 0C, but they are able to provide power at much lower temperatures. In many cases, even if the temperature is below 0C, when the sun is shining the housing may be warmed sufficiently to accept additional charge.



Connector: DC Power Jack, 1.3/3.5mm
Mating Connector: 1.3/3.5mm barrel plug
Function: Charge power source
Typical Use: Connection to solar panel
Rating: 3 amps maximum charge current

Pin	Name	Description
1	Center	Positive voltage from power source
2	Outside	Power return, circuit ground

Auxiliary Power

Some systems require the use of networking equipment to transfer images from the camera to a remote server or computer. The Cyclapse Power Module provides an auxiliary 5V power source which can be used with devices like a network router.

Networking equipment draws a high amount of power relative to the camera system. If charge power is provided via AC mains this may not be an issue, but for solar or battery powered sites minimizing power draw is essential. The auxiliary power output can be controlled (turned on and off) by a time-lapse controller such as the Harbortronics DigiSnap 2700. The router may be powered a brief period before taking a picture, and then left on for a duration after the picture has been taken to allow image transfer, but left off between pictures to save power.

In addition to networking devices, the auxiliary 5V output signal may be used to control lighting via a relay, or even power up to about 10 watts of LED lighting for applications that require minimal power draw and supplied light.

Connector: USB mini plug, on a cable
Mating Connector: USB mini jack, on auxiliary device
Function: Network equipment power source
Typical Use: Connection to TP-Link MR3020 router
Rating: 3 amps maximum current

Pin	Name	Description
1	VBus	+5V Power
2	Data -	USB Data line, not used. Shorted to Data +
3	Data +	USB Data line, not used. Shorted to Data -
4	ID	Not connected
5	Ground	Power Return

Intervalometer Connections

Intervalometers designed for short term time-lapse operations are widely available, low cost, and include their own tiny batteries. For intended purposes, they are perfectly fine. However, they have many glaring limitations when considering a project that may last years.

Small coin-cell batteries do not last forever. Some may last many months, giving the impression that they may be ignored but eventually they will fail, typically with no warning. A blinking warning on an intervalometer in a housing on the side of a building is of no help.

Short term intervalometers are designed to take pictures on a set basis... a constant interval operating 24 hours a day. Many projects only require pictures during construction hours, during daylight hours, etc. The other limitation with common intervalometers is the lack of ability to

synchronize power control to the camera and other devices, and a lack of an external trigger input for specialized applications.

The Cyclapse Power Module is designed to work with the DigiSnap 2700 intervalometer from Harbortronics, which has none of these limitations. 5V power is supplied to the intervalometer, as well as control signaling. The DigiSnap has an external trigger input signal located on the same connector as the power control signal. A connector is located on the case of the Cyclapse Power Module for a trigger input signal, which is passed directly through to the DigiSnap 2700. This signal is not used by the Cyclapse Power Module.

Connector: DC power barrel plug, 2.5/5.5mm, on a cable
Mating Connector: 2.5/5.5mm jack
Function: 5V Power for the intervalometer
Typical Use: Connection to the center (power) jack on DigiSnap2700
Rating: 3 amps maximum

Pin	Name	Description
1	Center	Positive 5V power source
2	Outside	Power return, circuit ground

Connector: Molex MicroFit-3.0, 43025-0400, on a cable
Mating Connector: Molex MicroFit-3.0, 43020-0400
Function: Signalling for the intervalometer
Typical Use: Connection to square 4 pin jack on DigiSnap 2700

Pin	Name	Description
1	Trigger	Trigger signal, passed through to intervalometer
2	Ground	Power return, circuit ground
3	Control	Power Control to Power Module Open (5V) : Power is applied to camera, auxiliary 5V Closed (0V): Power is removed from camera, auxiliary 5V
4	Ground	Power return, circuit ground

Connector: Molex MicroFit-3.0, 43020-0200
Mating Connector: Molex MicroFit-3.0, 43025-0200
Function: Input trigger signal for the intervalometer
Typical Use: Remote switch, to wake the system / take picture

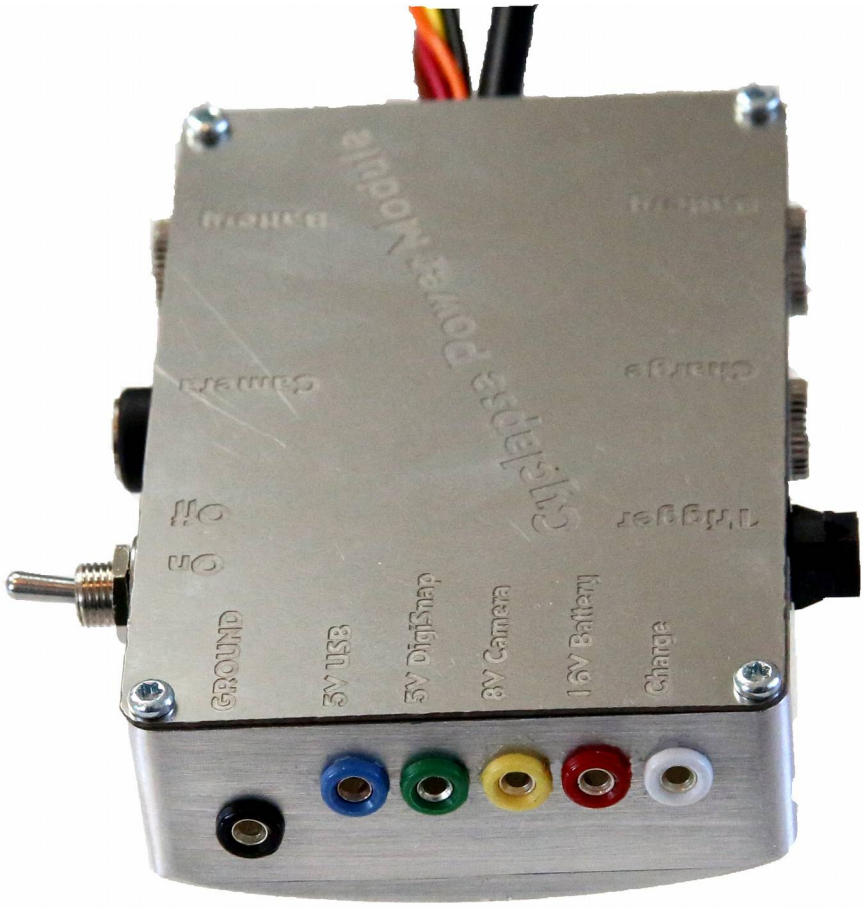
Pin	Name	Description
1	Trigger	Trigger signal (short to ground momentarily to activate)
2	Ground	Power return, circuit ground

Test Points

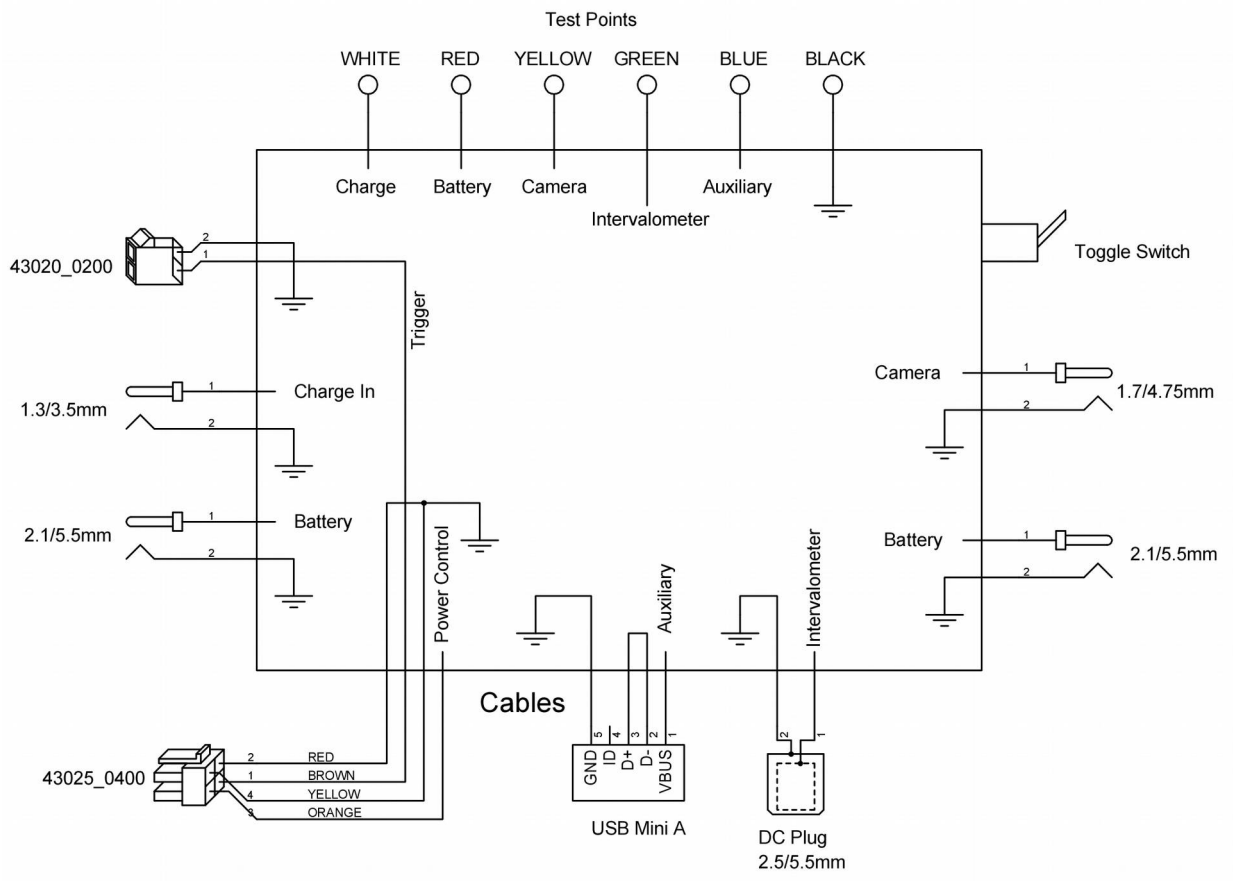
Time-lapse camera systems are often installed in difficult to access locations, which makes it doubly frustrating if something goes wrong with the camera system. Isolating a problem can be extremely trying when working on a ladder or reaching out over the parapet of a high-rise building.

The Cyclapse Power Module was designed to allow quick testing of the various voltages in the system. An array of test points are provided, which can be directly used with any DC voltmeter/multimeter. Test point leads on a meter may be inserted into the test point jacks.

Color	Signal	Voltage Range	Notes
Black	Ground	Reference	Negative lead on meter
White	Charge	+13.2 / +22V	Charge power source. If charging battery, the voltage will be the same as the lower voltage battery. If batteries are charged, the voltage may float higher. A solar panel in direct sun may be as high as 22V.
Red	Battery	+13.2 / +16.8	Battery voltage. This will be the higher of the two battery connections. A battery that has been charged via the internal charger will be about +16.2V.
Yellow	Camera	8V nominal	Please note that the camera power can be disabled by the intervalometer! If unsure, disconnect the 4 pin cable from the intervalometer, and the power will be enabled.
Green	Intervalometer	5V nominal	Power to the intervalometer.
Blue	Auxiliary	5V nominal	Please note that the auxiliary power can be disabled by the intervalometer! If unsure, disconnect the 4 pin cable from the intervalometer, and the power will be enabled.



Wiring Diagram



Specifications

Weight:	178 grams (0.39 lbs)
Case Dimensions	2.3” wide, 3.4” tall, 0.925” deep
Harbortronics Part Number	000468
Price for 1 Cyclapse Power Module	USD $285

The shipping price varies from month to month, and obviously varies significantly with the destination. We normally use Federal Express (FedEx) for delivery. We can and have shipped almost everywhere in the world! We are happy to provide a quote upon request for the equipment and delivery.

Service / Warranty

Philosophy:

Harbortronics is a small private company, and has been in business since 1998, starting in a small basement office, and now operating out of a 3000 square foot facility with several employees. All of our sales have been derived from word-of-mouth and internet searches. We realized early that customer feedback, either directly to us or to other people on the internet, is stimulated by one of two reasons... either the customer is irritated by a problem, or they are excited about their experience. One of my goals as the Chief Engineer of the company is to reduce the irritations, and try to stimulate excitement! Given the growth of the company, and high number of repeat purchases, I'm encouraged that we may be doing things fairly well.

If you have a problem with our equipment, if you have difficulties getting things to work, or have any complaints about how we have treated you, my philosophy is to do my absolute best to find a way to satisfy you. That may mean going beyond the legal obligations of our warranty, suffer complete loss of profit on an occasional sale, or whatever it takes. It's been immensely satisfying to find that over the last 17 years, this philosophy has created such satisfaction in our customers. We take great pride that of the countless comments on the internet about Harbortronics, there are almost no negative comments! That's not to say that we haven't had our share of problems with our equipment, but again, I will do my best to make it right in the end! -Mark Roberts

Legal:

All products manufactured at Harbortronics are warranted against any manufacturing defects for a period of one (1) year from the date of purchase. Cameras and lens warranty service may be provided by Harbortronics, but Harbortronics does not warrant these devices beyond the manufacturer's own warranty. Defective products should be returned prepaid to Harbortronics. Harbortronics will at its discretion, repair or replace such products without charge, and will return to the customer prepaid. Except as mentioned above, no other warranty expressed or implied, applies to this Harbortronics product. All other claims, of any nature, including but not limited to camera damage are not covered. This warranty does not cover damage caused by misuse, accident, or abuse. This warranty does not cover consequential damages or other incidental damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusions may not apply to you. Contact Harbortronics at www.Harbortronics.com for service instructions.