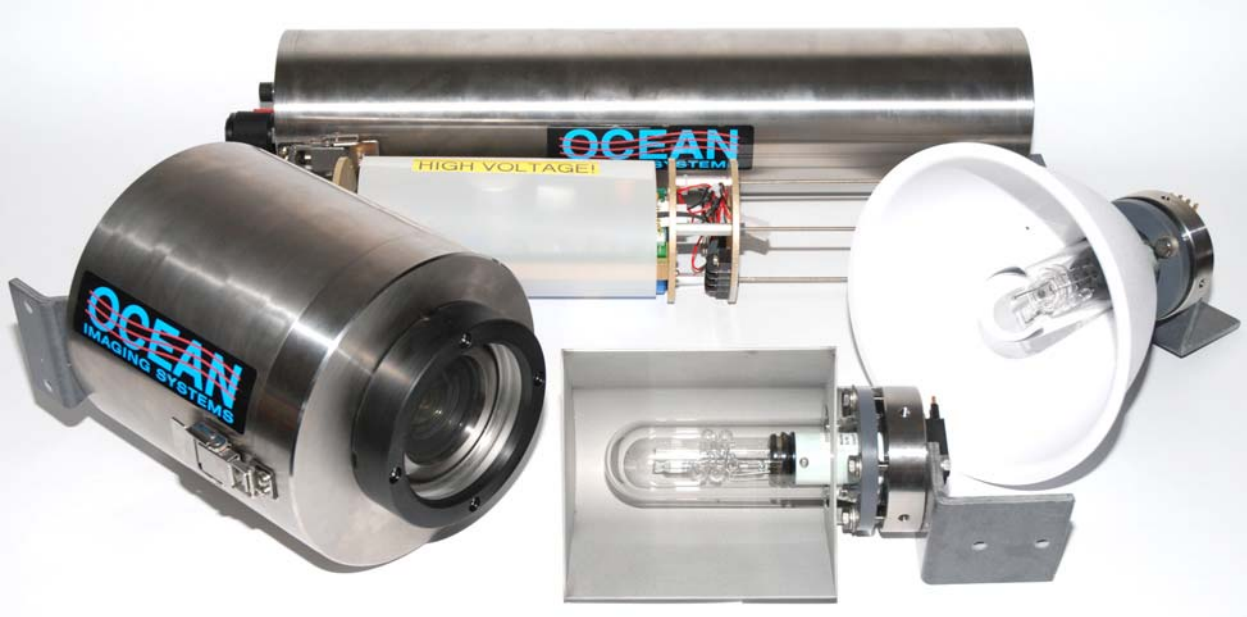
INSTRUCTIONS FOR THE OPERATION AND MAINTENANCE OF THE OCEAN IMAGING SYSTEMS 100/200 W-S REMOTE HEAD STROBE MODEL 3831 -- TITANIUM HOUSING RATED FOR 6000 METERS WITH HIGH POWERED STANDARD CHASSIS AS WELL AS LOW POWER CHASSIS FOR LONG TERM DEPLOYMENTS

M-3831-016

August 9, 2008



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WARNINGS:

DANGER: VERY HIGH VOLTAGES
SERVICE BY PERSONEL TRAINED IN HIGH VOLTAGE EQUIPMENT ONLY !

CAUTION: DO NOT OPERATE ELECTRONICS WITHOUT CAPACITOR BANK ATTACHED . DAMAGE TO ELECTRONICS WILL OCCUR !!

TO PREVENT INJURY: FIRE STROBE IMMEDIATELY AFTER DICONNECTING POWER, AND ALLOW UNIT TO SIT OVERNIGHT TO DISCHARGE DANGEROUS VOLTAGES!

1.0 INTRODUCTION

The Model 3831 strobe described in this manual is a custom strobe featuring a titanium housing. The specifications are outlined in section 2.0 below, and the special features of the strobe are detailed below.

1.1 SPECIAL FEATURES

The system, of which this strobe is a part, was designed with several special elements in order to allow operation for extended deployments, up to 1 year. Two separate internal chassis have been supplied to allow more traditional survey operation as well as long term deployments.

The system changes made to allow for long deployments were mechanical (titanium housing and hardware), electrical and software. The basic electrical modification (when the low powered chassis is installed) was to slow the strobe recycle down to lower the current drain from the battery to a level suitable for the D-Cell alkaline battery pack (~1/2 amp). Thus the software had to be modified to allow 20 seconds for the strobe to charge up (see DSC 10000 manual).

NOTE: These modifications (low powered chassis) limit the system to repetition rates of 30 seconds and longer!

NOTE: The batteries used with the low powered chassis are alkaline batteries and thus NOT rechargeable.

DO NOT attempt to recharge the alkaline batteries as a very dangerous explosive situation will result.

The system is provided with 4 Alkaline batteries, for use with the low powered chassis. Three are new, and the forth was used for testing at the factory. This battery may be used for testing the system, but a new battery should be installed at deployment.

For more traditional operations, a second, high powered chassis has also been supplied. When using this chassis, rechargeable Ni-Cad Batteries (2 supplied) MUST be used.

Figure 1.1 Standard Closure

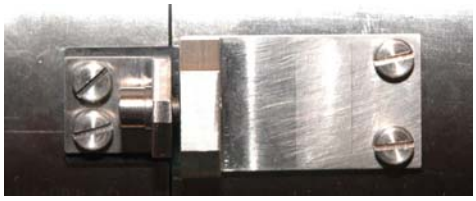
Figure 1.2 Titanium Closure

Note that two methods for securing the housing closure have been supplied. One, the standard stainless steel Nielsen clamps (Figure 1.1 above) should be used for short deployments, while the custom titanium (Figure 1.2 above) clamps should be used for long deployments. Normally, for ease of opening and closing the housing, the Nielsen clamps are used. These (Nielsen) clamps are fabricated of stainless steel, and secured with stainless hardware. Thus, for longer deployments, the custom machined titanium clamps should replace the standard stainless steel

clamps. Note that titanium mounting hardware has been supplied and should be used when using the titanium clamps.

In addition, an extra customer supplied connector has been added to the strobe to allow for external powering of the system, and external triggering of the system.

The connector is a Subconn BH4MTI, and the pin assignments are:

Pin 1: Trigger High (connect to trigger low to take picture)
Pin 2: Trigger low (common)
Pin 3: Power ground (common)
Pin 4: External Power (+24vdc nominal)

Note that pins 2 and 3 are connected together within the strobe.

NOTE: As delivered, the strobe is wired to operate from the internal battery. For external power, re-wire the unit per the wiring diagram, figure 7.5. If in question, consult the factory.

CAUTION: Do not attempt to run the system from the battery AND external power!

2.0 SPECIFICATIONS

Depth Rating:	6000 meters
Battery:	30 VDC, 15 Amp-Hour Alkaline battery for low powered chassis
	24VDC, 5 Amp-Hour Ni-Cad battery for high powered chassis
Battery Capacity:	Approximately 1000 flashes
Strobe Energy	200 joules (100 joules with low powered chassis)
Recycle Time:	3 seconds (20 seconds with low powered chassis)
Dimensions:	
Electronics Bottle:	5” Dia x 22” long (excluding connectors)
	5” Dia. x 25” long including mounting brackets
Flash Head:	3.35” Dia x 9-1/4” long
	8.25” Dia Reflector or
	5.5” x 6” trough reflector (stainless steel for short deployments)
Weights:	
Electronics Bottle (air):	39.5 Lbs (17.9 Kg)
Electronics Bottle (water):	23.5 Lbs (10.7 Kg)
Flash Head (air):	2.2 Lbs (1.0 Kg)
Flash Head (water):	1.2 Lbs (0.54 Kg)

2.1 UNDERWATER CONNECTORS

Electronics housing power/sync bulkhead:	Impulse MCBH(WB)-5-FS, TI w/ ½" thread
Electronics housing power/sync mate:	Impulse MCIL-5-MP w/DCDLS-F
Electronics housing remote head bulkhead:	Impulse BH-4-FS TI, w/ ½" thread, w/DLAS-F
Electronics housing remote head mate:	Impulse IL-4-MP, w/DLSA-M
Remote head bulkhead:	Impulse LPBH-4-MP TI w/ ½" thread
Remote head mate:	Impulse LPIL-4-FS

2.2 O-RINGS

Electronic housing end cap O-Rings:	2x #2-240, 1x #2-243, 2x #2-010
Remote Head O-Rings:	#2-225

3.0 INSTALLATION

CAUTION: HIGH VOLTAGES PRESENT. EXERCISE EXTREME CAUTION

Mount the electronics bottle and the remote flash head by the fiberglass mounting brackets. Connect the remote flash head to the bottle exercising care, as high voltages may be present on the remote head connector..

Figure 3.1 Remote Flash Head With Standard And Trough Reflector

3.1 REMOTE HEAD AND CAMERA CONNECTIONS

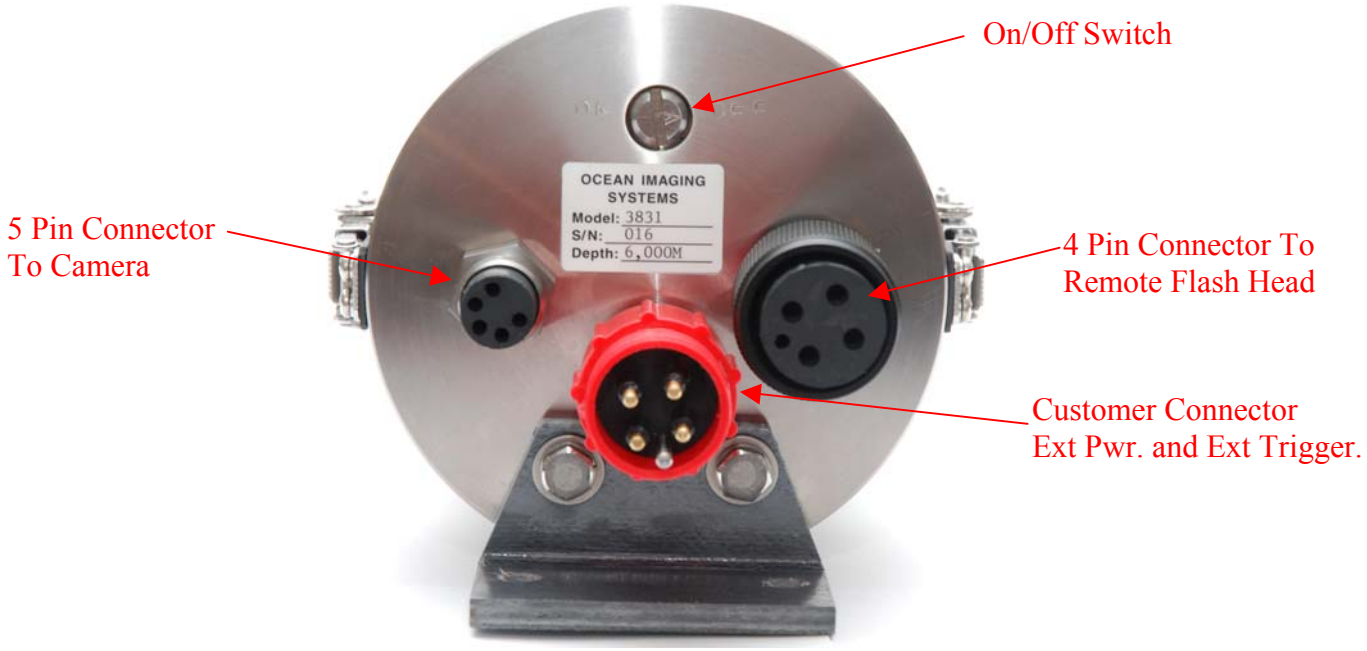

Figure 3.2 Housing – View of Input/Output Connectors

Connection between the camera and strobe is made by means of the single Impulse MCBH(WB)-5-FS bulkhead connector. Pin assignments are:

Pin 1	Power return (**C**ommon)
Pin 2	+ 24 vdc output power (**B**attery)
Pin 3	Control input (**P**rogram)
Pin 4	Sync (**S**ync)
Pin 5	External Trigger

The control line (P) is used to enable and disable the strobe. To continuously enable the strobe, it can be connected to the incoming power, or it can be switched on and off as required. The sync line (S) is a negative going signal that causes the flash to fire and the external trigger pin is pulled low (to common) to take a picture.

4.0 ELECTRONIC CIRCUITRY

All the flash electronic circuitry is contained on one flash board within the electronics housing. Repair at the component level is NOT recommended. Repair of the electronics is limited to the replacement of the electronic PC Board(s) and energy storage capacitors. The PC board schematic is included for informational purposes only. The high voltage section of the 3831 is covered with a Mylar sheet to help prevent shock. This protective sheet should only be removed by trained personnel.

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Before working on unit, make certain that the capacitor bank is fully discharged. Measure voltage at capacitor bank connector J3 – See Below.

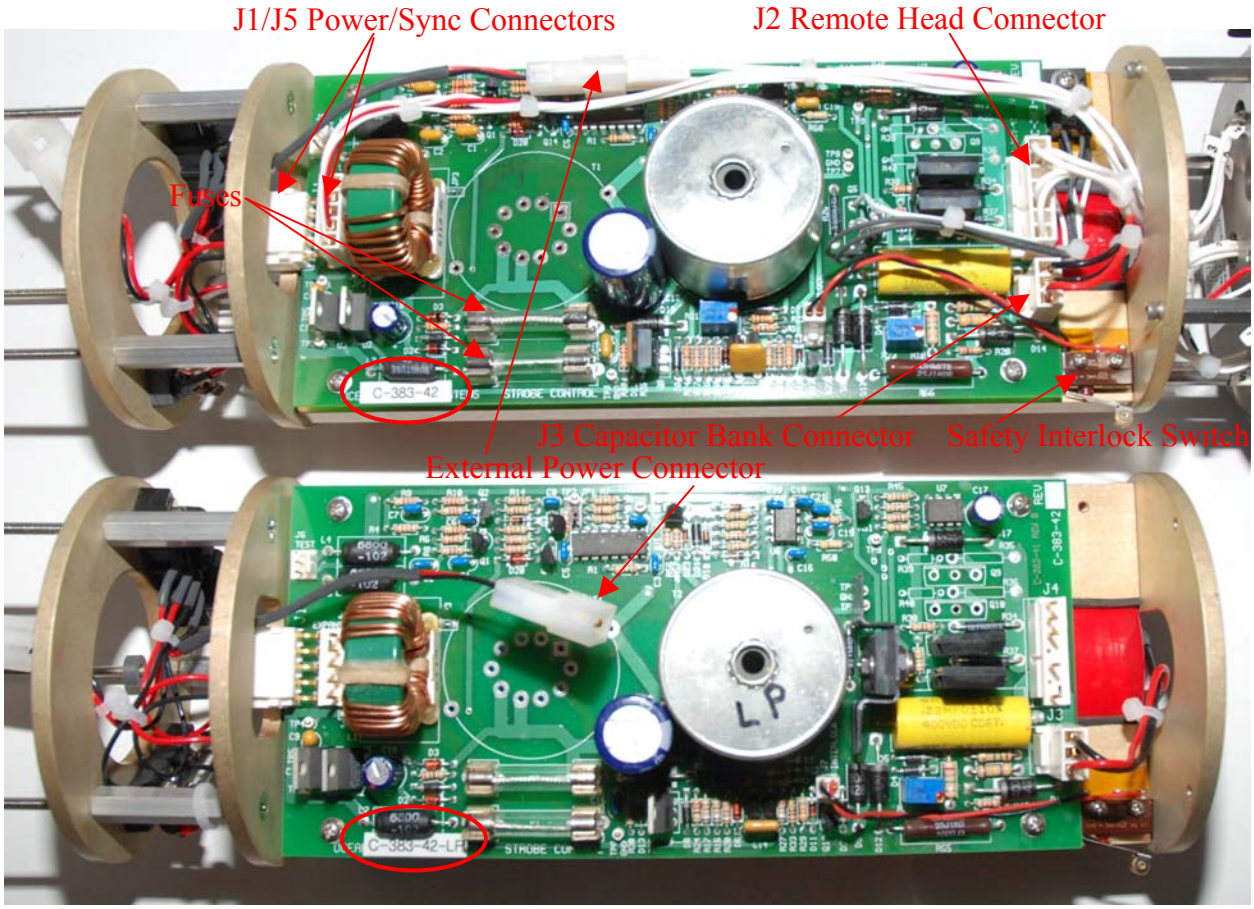

Figure 4.1 Electronics PC Boards and Wiring Showing the High Powered (Top) and Low Powered (Bottom) Chassis (note circled part number for each PC Board).

CAUTION:

Operation of the electronics with the capacitor bank disconnected WILL cause damage to the electronics!

5.0 MAINTENANCE

The electronics and capacitor bank do not require maintenance and should provide long- term reliable service without any attention. Repair of the electronics should be limited to replacement of the PC board and capacitors. For board level repairs, return the faulty board to the factory.

Be sure to turn the power switch OFF before working on the strobe. The safety interlock switch should disable the strobe and discharge the capacitor bank when the chassis is removed from the housing. However, VERIFY that the capacitors are discharged by checking the voltage on (J3). The voltage should be less than 30 VDC before proceeding.

5.1 OPENING STROBE HOUSING

When using the Nielsen clamps, the strobe housing is opened by unclipping the two spring loaded clamps on the side of the housing, and using them to gently "jack" the end cap out of the housing as shown below.

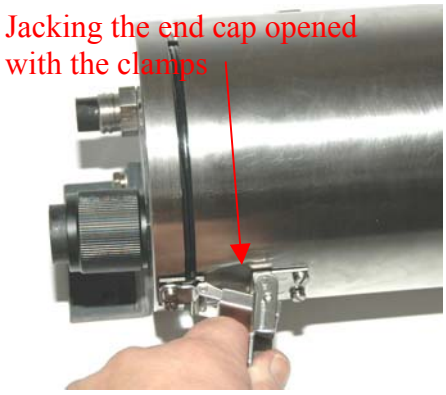

Figure 5.1A

Using clamp to open housing

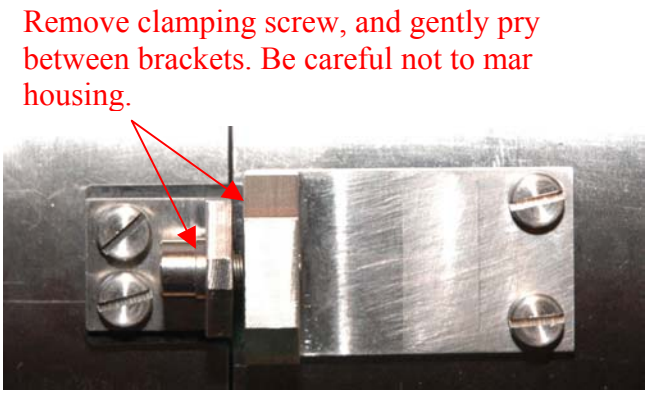

Figure 5.1B

Opening housing with titanium clamps

When using the titanium clamps, open the housing by removing the clamping screw (see 5.1B above). If necessary, use a screwdriver to gently wedge the housing open. Be sure to wedge the clamps only! DO NOT wedge the end cap or housing!

The complete flash chassis is attached to the removable end cap and can be slid out of the housing once the two clamps are released and the end cap unseated. The chassis and housing are shown below.

Figure 5.2 Chassis Shown Removed From Housing

The fixed end cap is attached to the housing with four screws and need only be removed to replace the O-Rings.

5.2 BATTERY REMOVAL

Remove the battery by first opening the housing as described above. Disconnect the battery as shown below, and the remove the four retaining nuts seen in figure 5.2 above.

Figure 5.3 Disconnecting The Battery

Slide the battery plate off the four rods, and then slide the battery off, as shown below.

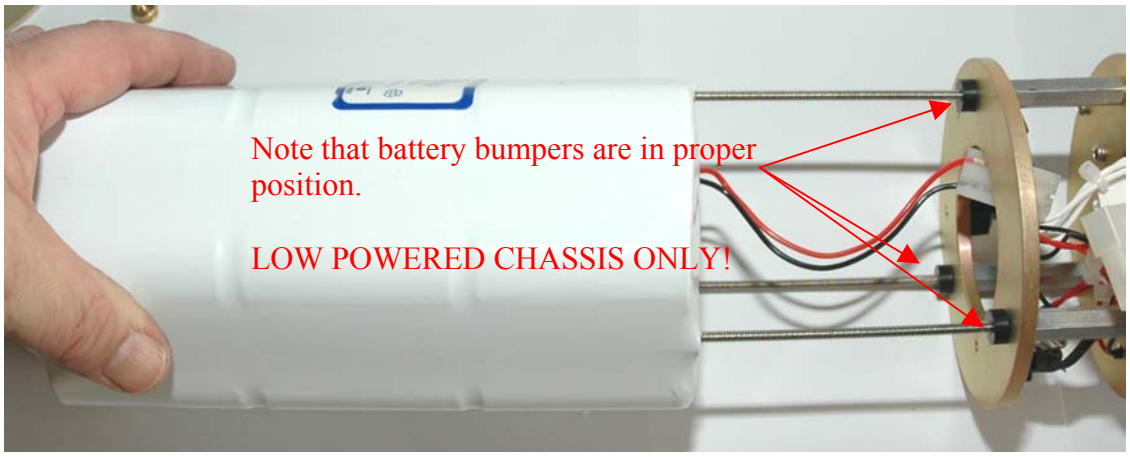

Figure 5.4 Removing Battery Pack

Replace the battery by reversing the removal process. Note that when the battery connector is mated there will be a momentary spark as the input filter capacitors are charged. Make the connection as quickly and firmly as possible.

5.3 FLASH CHASSIS SWAP OUT

In order to allow for both long term deployments, as well as survey applications, this strobe was supplied with two internal chassis assemblies. For normal operation, use the high powered chassis with Ni-Cad batteries. For long term deployments, use the low powered chassis with alkaline batteries.

NOTE: The chassis type must be set in the camera setup menu. See camera manual.

To replace the chassis, follow the procedure below:

a) Turn off strobe power
b) Remove strobe chassis from housing
c) Remove the battery
d) Check that there is no high voltage present on J3
e) Disconnect J4, J5 and the Remote Power connector J10 (5.5 see below)

J10

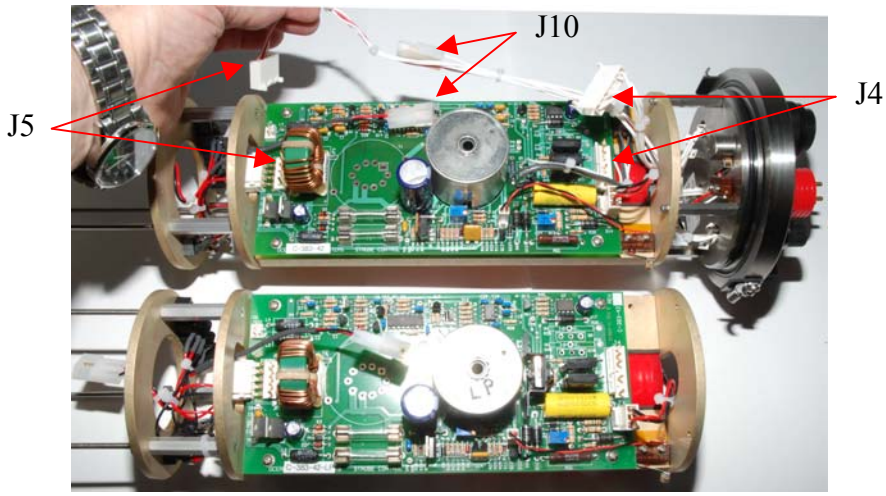

Figure 5.5 Disconnected Wiring

f) Unbolt the four mounting screws with a 3/32" HEX Wrench (see 5.6 below)

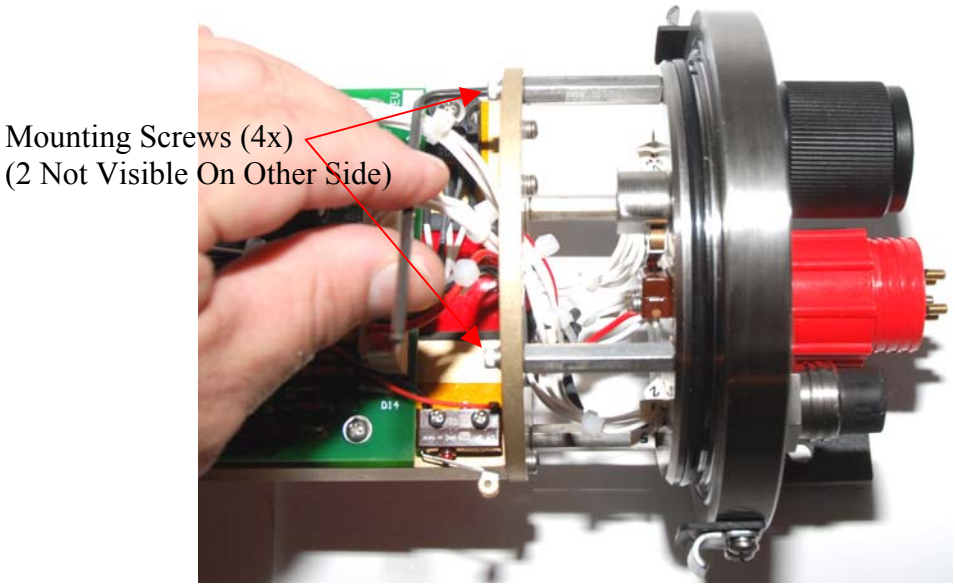

Figure 5.6 Unbolting Chassis

g) Remove the chassis, carefully passing the wires and connectors through the hole in the front plate of the chassis.

h) Select the chassis appropriate for the intended application. HIGH POWER for normal short term and survey applications. LOW POWERED for long term applications. (see 5.7 Below)

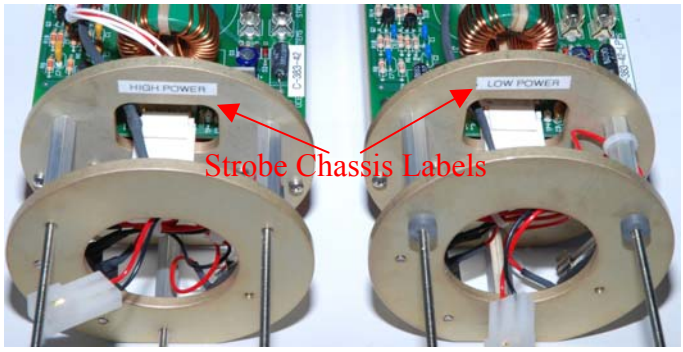

Figure 5.7 Both Strobe Chassis – Note Labels

5.4 REMOTE FLASH HEAD MAINTENANCE

The only maintenance that should be required for the remote head is the replacement of the flashtube. To replace the flashtube, remove the four dome retaining screws as shown in 5.8 below. Relieve the pressure of the four bolts evenly, moving from one to the next.

Figure 5.8 Flash Head Retaining Bolt Removal

Remove the dome, exercising care to avoid chipping the glass. Remove the flashtube retaining screw, and extract the flashtube from the socket. See figure 5.9 below.

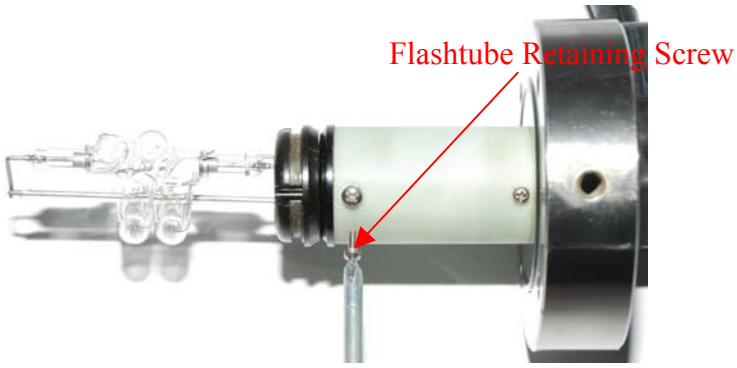

Figure 5.9 Flashtube Retaining Screw Removal

Install a new flashtube (note that the pin 1 of the flashtube must have a .093 drill thru it to allow for the retaining screw), and install the #2 retaining screw. Carefully clean the tube with alcohol to removal all fingerprints and grease that would cause reduced tube life.

Clean the end cap surface, o-ring and dome, and re-install the dome retainer. Tighten the four screws evenly until the split lock washers are fully compressed. Make sure that the retainer is level. When tightening the screws, be sure to do it evenly, alternating from one screw to the next.

5.4.1 REMOTE FLASH HEAD REFLECTORS

The remote heads for this system have been supplied with two reflectors. The standard forward looking reflectors are made of plastic and retained with titanium hose clamps, making them the appropriate choice for long term deployments. The optional trough reflectors are made of 300 series stainless steel and retained with 2 stainless cap screws. They are only suited for shorter term deployments.

The trough reflector is supplied unpainted with a bead blast matt finish. It may be painted with a flat white paint if desired. The painted surface will be more reflective, but will also require more maintenance and periodic touch up.

Figure 5.10 Reflector Options

The forward looking reflector should have electrical tape wrapped around it's neck, under the hose clamp to reduce slipping. Tape may also be wrapped on the glass itself to prevent the reflector from sliding up or down the lamp cover when under tow.

6.0 BATTERY CHARGING AND CARE

Figure 6.0 Ni-Cad Battery Above, and Alkaline Battery Below

CAUTION: CHARGE NI-CAD BATTERIES ONLY!!

This system has been supplied with both Alkaline Batteries (for long term deployments with the low powered chassis ONLY!) as well as rechargeable Ni-Cad batteries (for normal operations with the high powered chassis). This section on battery charging applies to the Ni-Cad Batteries ONLY --- ***Charging Alkaline Batteries poses a very severe explosion risk!!***

Follow the guidelines below for maximum battery performance and life.

1) Always remove the battery from the strobe when not in use.
2) Store the battery in a charged state
3) Every few months, discharge and recharge the battery
4) Never allow the battery to be fully discharged by the strobe

The strobe has been supplied with a general purpose battery charger/discharger that will not only work with the Ni-Cad battery that powers this system (25.2V, 5 Amp-hours), but most any other rechargeable battery that the user may have need to charge or discharge. The usefulness of having the ability to discharge the battery, results from the characteristic of Ni-Cad batteries called “memory”. The term “memory” describes the characteristic of Ni-Cad batteries where if the battery is only partially discharged and then re-charged over and over, the battery will “remember” the typical usage and will no longer be able to supply it’s full specified capacity. To avoid this problem, it is recommended that Ni-Cad batteries be stored charged, and that every few months that the battery be fully discharged and then recharged at least once (more cycles will provide even better results). The manual for the battery charger is supplied with the system, but we will describe here how to charge and discharge the battery used in this strobe.

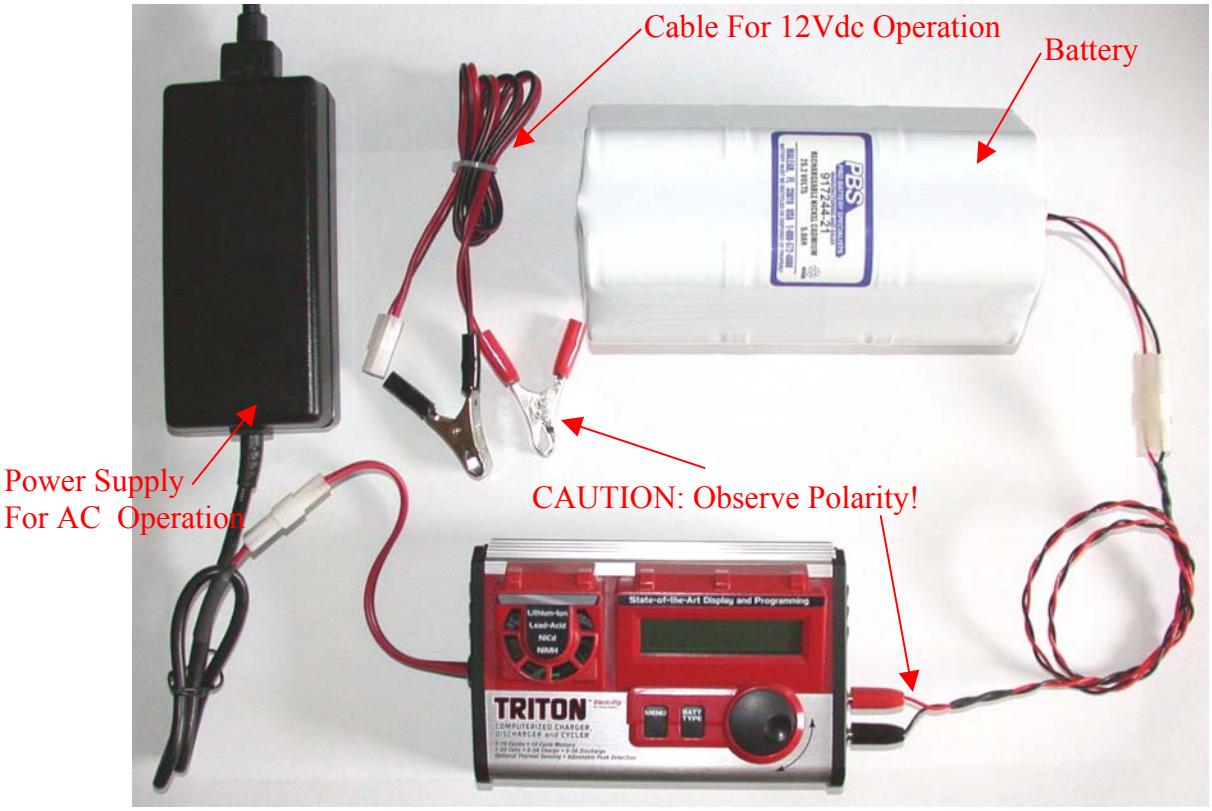

Figure 6.1 Battery Charger Connected Using An AC Power Source

6.1 CHARGING THE BATTERY

Connect the battery charger components as shown in figure 6.1 for operation from AC power (100-240 vac, 50/60 hz). If it is desired to use a 12 vdc car battery as the power source, replace the AC power supply shown with the cable that has alligator clips on it. CAUTION: be sure to observe proper polarity (blank is negative, red is positive) when connecting the DC cable to the battery. In addition, observe the proper polarity when connecting the battery charging cable to the charger (the red banana plug is positive and goes to the red banana jack on the charger, while black goes to black).

When the charger is connected to a power source, the LCD screen on the front panel will display the opening screen, followed in a few seconds by the default charging screen shown below.

Figure 6.2 Opening Screen

Set the safety timer (see below):

Press the MENU button twice
Rotate the knob until the safety timer function is displayed
Press the knob
Rotate the knob until 480 minutes is displayed
Press the knob to store the new safety timer setting

Figure 6.3 Setting the Safety Timer

Set the charge current (see below):

Press the MENU button
Press the BATT TYPE button until “NiCd Charge” appears
Briefly press round dial and the current should start blinking
Rotate knob until 1.3A appears
Briefly press the knob again, the charge current is now set to 1.3 amps

Figure 6.4 Setting the Charge Current

Once the screen appears as above, press the round knob and hold it for a few seconds. The charger will first perform a battery check (looking for shorted battery etc) and then initiate the charging process displaying the screen below:

Figure 6.5 Display During Charge

At this point, the battery can be left to charge. The charger will automatically terminate the 1.3 amp charge when it senses that the battery is charged. When this occurs, the battery is ~95% charged, and the charger will go into a "trickle" charge mode that will "top off" the battery. Charge time varies with battery condition, but will take approximately 5 hours for a fully discharged battery.

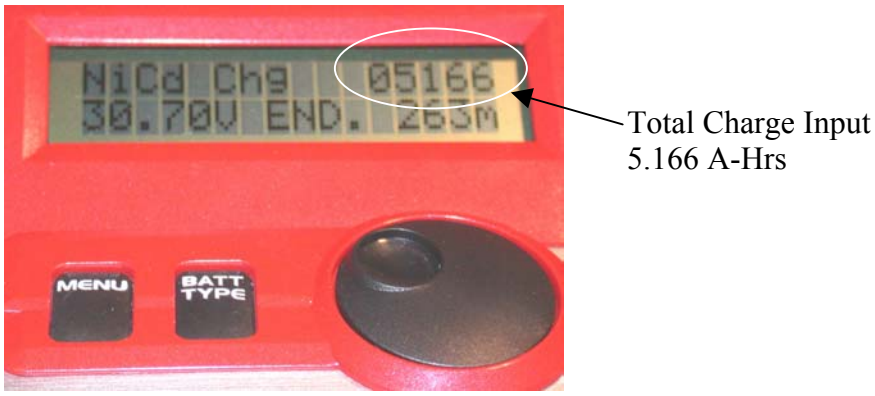

Figure 6.6 Display At End Of Charge

6.2 DISCHARGING THE BATTERY

To discharge the battery, connect as described above. When the opening charge screen appears:

Press the MENU button once
Rotate to knob to NiCad discharge
Press the knob once
The discharge current should blink
Rotate the knob until the discharge current read 0.5A, press the knob
The cutoff voltage should blink, rotate until 18.9V appears, press the knob

Figure 6.7 Discharge Screen

Once the screen appears as above, press the round knob and hold it for a few seconds. The charger will first perform a battery check (looking for shorted battery etc) and then initiate the discharge process displaying the screen below:

Figure 6.8 Display During Discharge

As with the charge sequence, the battery and charger can be left to run the discharge process. Of particular note is the Total Discharge Capacity. When the discharge is complete, this number will indicate the capacity of the battery (see figure below), which in this case should be approximately 5 amp-hours (5000 mAh). If this measurement is drastically low, charge the battery and repeat the discharge process. With each charge-discharge cycle, the capacity measured should gradually increase.

Figure 6.9 Display After Discharge

Always leave the battery in a fully charged state.

The above describes the basic operation of the Triton battery charger. For further operating information, refer to the Triton instruction manual. There, more advanced operations like charge-discharge cycling, and operation with other types of batteries is explained.

6.3 ALKALINE BATTERY PACK

This strobe has been supplied with 4 alkaline battery packs. One has been used for factory testing, and should only be used for bench testing the system (it is marked "TEST"). The other three are new. When deploying the system, always use a new battery pack. Additional battery packs can be purchased from Ocean Imaging Systems, refer to part number B-383-24.

USE ALKALINE BATTERIES WITH THE LOW POWERED CHASSIS ONLY!!

NEVER ATTEMPT TO RECHARGE THE ALKALINE BATTERY PACKS. A VERY DANGEROUS EXPLOSIVE SITUATION WILL RESULT.

7.0 DRAWINGS

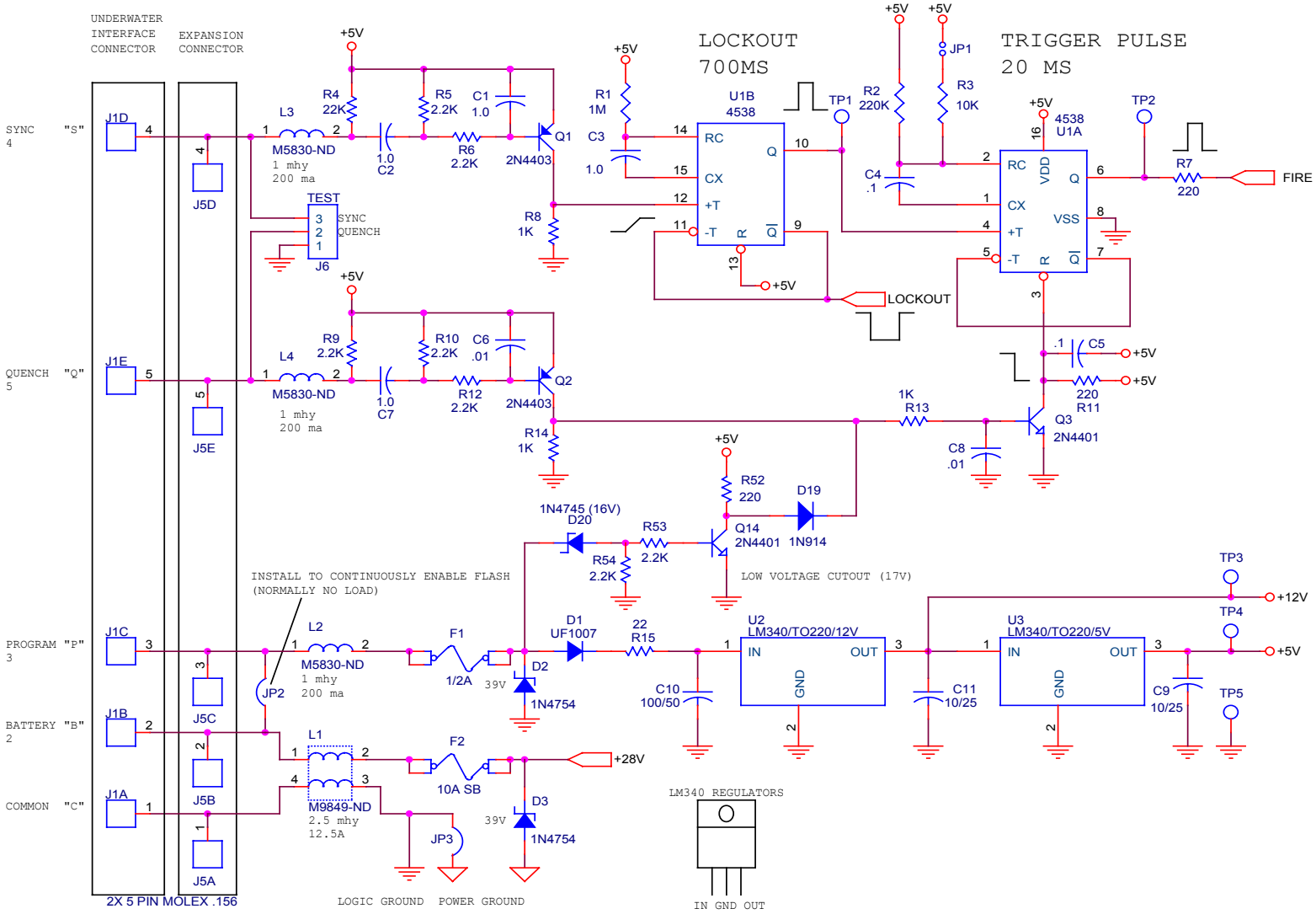

Figure 7.1 Schematic - Interface Section – Low Powered Chassis

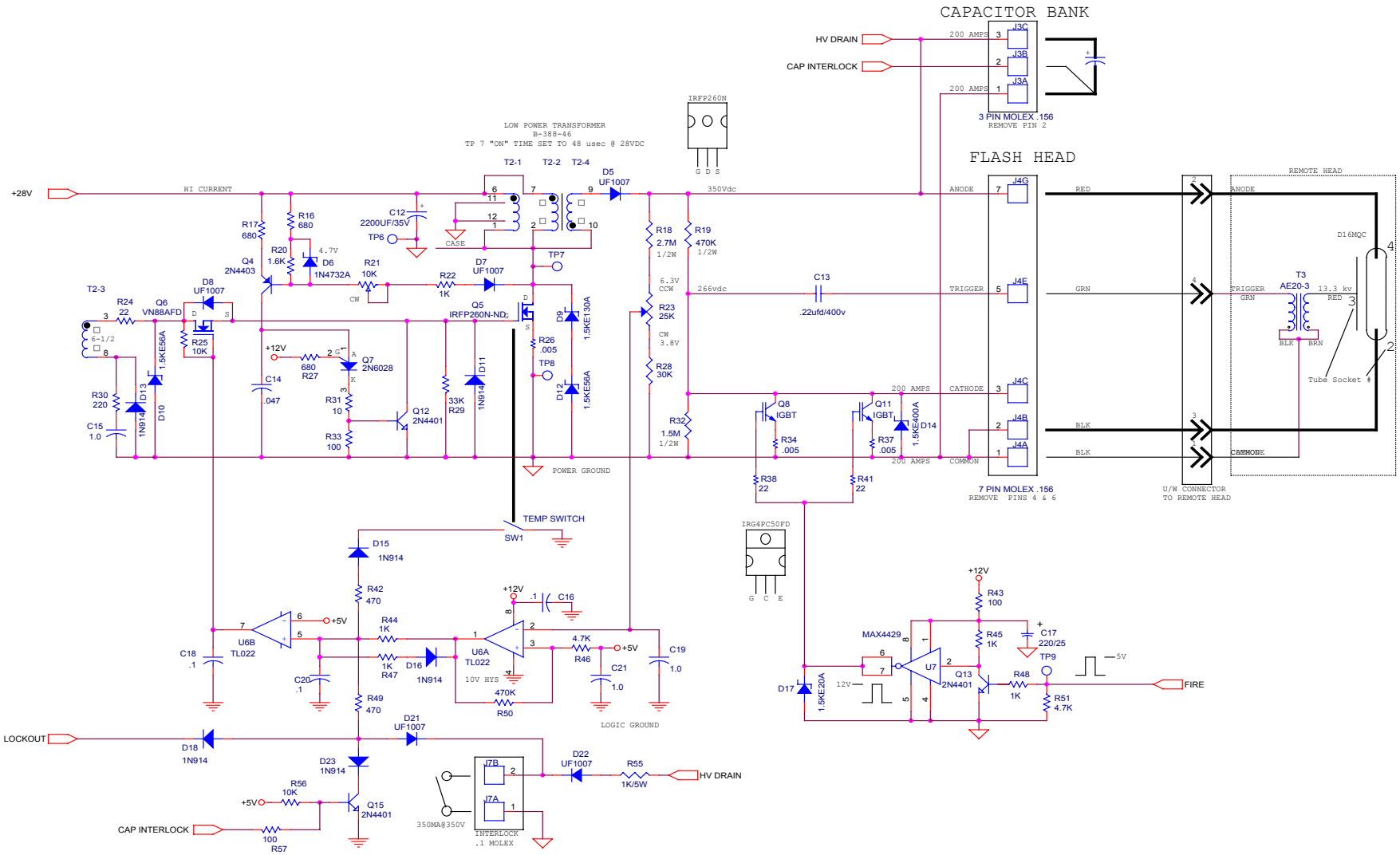

Figure 7.2 Schematic - Power Section – Low Powered Chassis

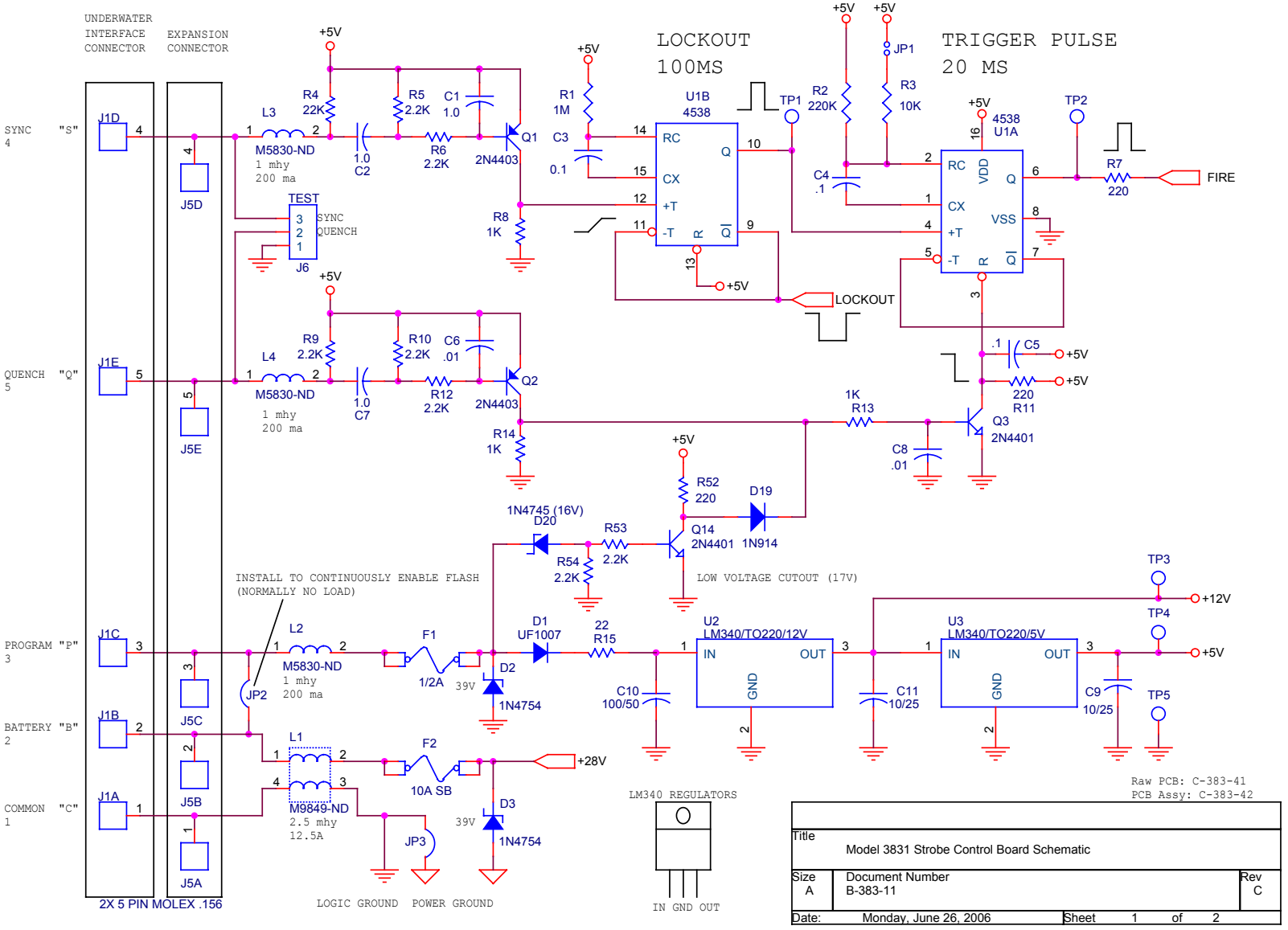

Figure 7.3 Schematic - Interface Section – High Powered Chassis

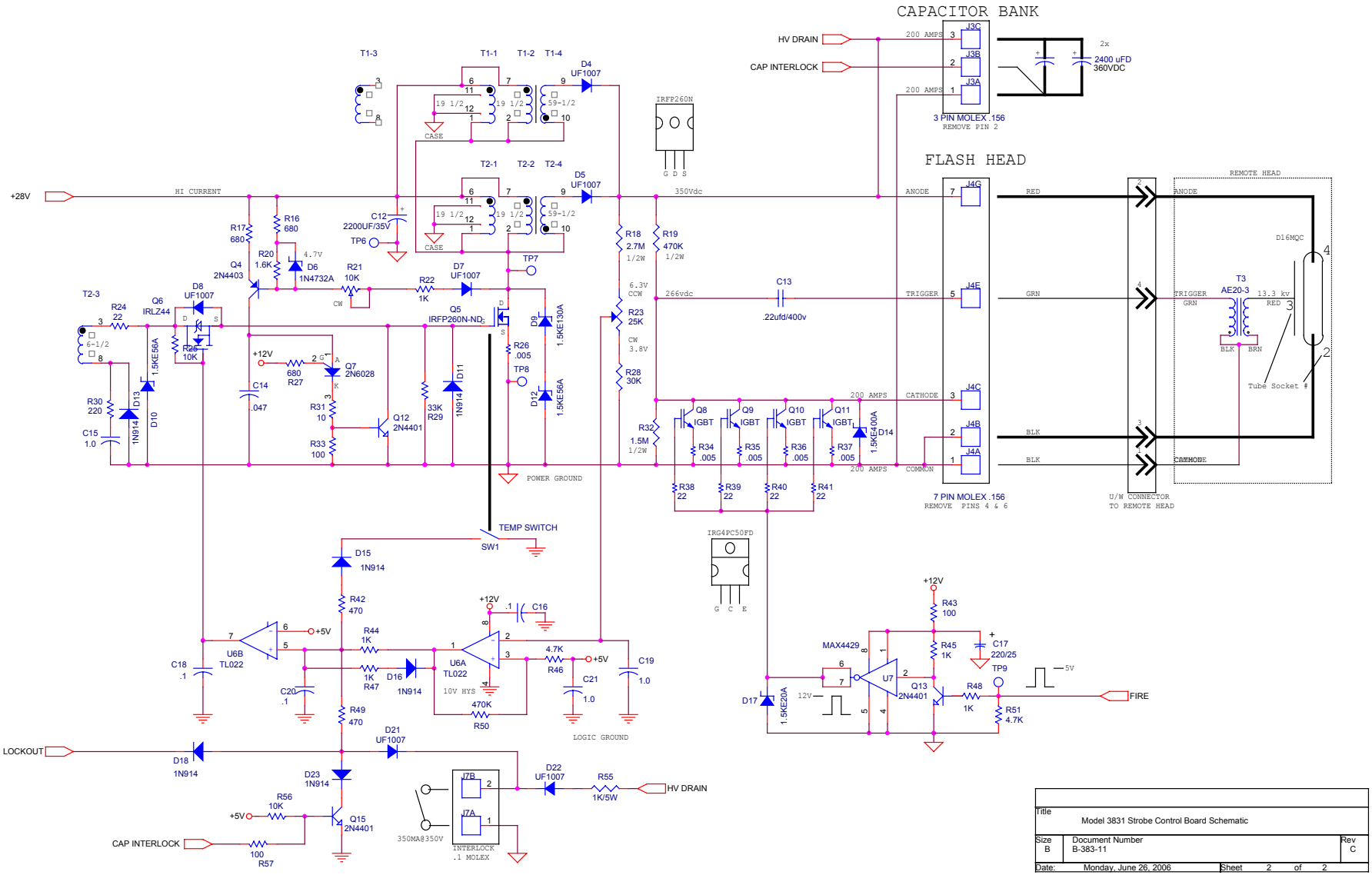

Figure 7.4 Schematic - Power Section – High Powered Chassis

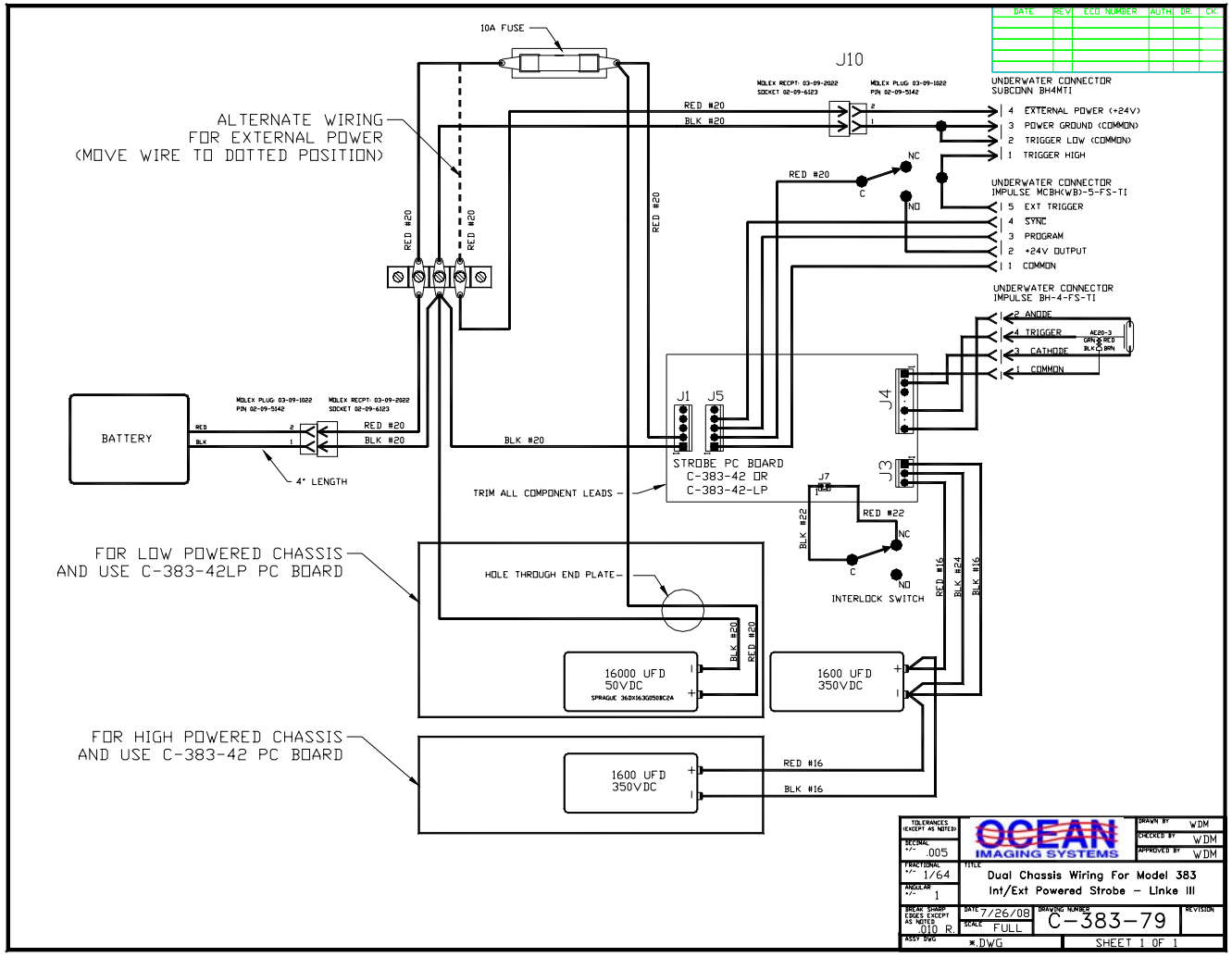

Figure 7.5 Wiring Diagram