

# **Sea Scan® PC Centurion**

## **Operation, Troubleshooting and Maintenance**

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# Operation, Troubleshooting and Maintenance Manual

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## 1.0 General.

The *Centurion* Splash Proof Sea Scan<sup>®</sup> PC system consists of three basic components - *Splash Proof Computer Unit*, one or more *Towcables* and one or more *Towfish*. This Manual describes the basic operation, handling and maintenance of these components but not the Sonar Operations and Software features which are fully described in the Sea Scan<sup>®</sup> PC Operators Manual. All components are as maintenance free as possible. Most routine maintenance items are common sense items such maintaining all components clean, handling them properly and replacing broken items as soon as possible.



The Centurion Splash Proof Computer Unit is a rugged industrial computer unit designed for practical use aboard small vessels. It is a second generation computer system which replaces an earlier design. Like all computers and highly technical equipment it contains precision components which must remain dry at all times. The unit is designed to prevent spray and light rain from entering the case. It is not designed for immersion in water and it is not indestructible. Reasonable care should be exercised to prevent sudden shocks and maintain the watertight integrity of the unit.

The Towcable is a high technology component of the system. It must be handled carefully to prevent damage to the cable. Replacement cables are expensive.

The Towfish is constructed of durable materials and under most normal conditions requires no maintenance. There are no serviceable parts in the towfish.

## 2.0 Unpacking and Setup

The Centurion Sea Scan<sup>®</sup> PC system comes packed in three or more rugged shipping cases.

- Computer and Computer accessories
- Towcables and Depressor vane
- Towfish

These cases are provided to provide maximum protection for all components. Remove only the components necessary for operations at the time. When not in use, the components should be stored in their cases.

Remove the computer unit, power cable, Towcable interconnecting cable, mouse and GPS unit and cable.

*Note: All connectors are unique such that it is unlikely that any cable can be connected to the incorrect connector.*

Remove protective cap and connect Power cable to the 3 Pin at the lower left (Silver colored cap).

Remove the protective cap and connect the selected pointing device to the small four socket connector in the middle of the top row.

*Note: Two pointing devices are supplied with the Centurion System. A water proof device and an conventional PS-2 mouse when the system is operated in dry conditions. The pointing devices may be shifted without shutting the computer system down due to a "hot swap" feature built into the Centurion system.*

Connect the power cable to a 12 VDC source ensuring that the Red (+) connector is connected to the (+) terminal and the Black (-) connector is connected to the (-) terminal. The computer system is now ready for use.

If the system is being readied for sonar data collection continue the following steps.

Remove the protective cap and connect the Towfish Interconnecting ("Pigtail") cable to the larger 6 socket connector at the lower right.

Remove the protective cap and connect the GPS cable to the small six socket connector at the top left.

The sonar system is now ready for operation with a towcable and towfish.

### **3.0 Operation**

Sea Scan<sup>®</sup> PC operations are conducted using the pointing device only and do not normally require use of a keyboard. If a keyboard is desired a compact keyboard is available. A waterproof keyboard is also available.

When the ON/Off Button is turned ON the following activities should follow in sequence.

- Backlight on the display should come on immediately
- A quiet single slight beep may be heard
- Text should appear on the display indicating normal computer startup
- Normal Windows Desktop should result

Operation of the Sonar System using the Sea Scan® PC Software is described in the Sea Scan® PC Operator Manual.

The sonar system draws approximately 36-40 watts of electrical power during operation (3-4 amps at 12 VDC). A separate battery (or Centurion Battery Box Option see Appendix E) provides the cleanest source of power. Many boats have a built in 12 VDC system but the charging system may add excessive noise to the system and result in disappointing images.

There is one external fuse holder installed in the Centurion case. The fuse holder nearest the sonar connector (200 ma Slo Blo) is to provide over current protection for the Sea Scan® PC electronics. External power to the JRC DGPS is fused inside the water proof case with a 2 amp fuse.

During computer operations the computer case will become slightly warm as excess heat is transferred through the plastic case. Normal air currents should remove this heat without operator action. The computer unit should not be operated in a confined space (e.g. shipping case) or in direct, very bright sunlight which may heat the interior of the computer even further. Operating the system in the shade and with minor consideration for heat removal will prolong the life of all computer components.

When operations are complete, shutdown the computer using standard Windows® procedures. Turn off the computer with the On/Off switch.

When cables are disconnected, replace the protective caps to keep all terminals clean and dry.

### ***Centurion Accessories and Accessory cables.***

The Splash Proof Centurion system is intended to be a portable, easy to use utilitarian system to collect sonar data even in adverse weather conditions. Normally only a pointing device is used to control the operation as a keyboard is not required to collect sonar data. If desired a waterproof keyboard is also available.

When used with the GPS system and waterproof mouse supplied with the Centurion system all components are splash proof except for the battery or power source. The operator must take reasonable precautions to protect the power source if wet conditions are anticipated.

After data collection at sea, the system can be used in a variety of different configurations which are not necessarily splash proof.

The following accessories and accessory cables are supplied with the Centurion system. Most of these are stored in the Accessory Case provided.

Power Cable- (MSTL part # 4240-03) A 12' AWG 16 three wire cable which connects to the Power Input connector on the Centurion case and to a power source with battery clamps or ring terminals. If ring terminals are preferred the battery clamps may be removed with a screwdriver.

Sonar Interconnecting cable- (MSTL part # 4050-02 ) ("Pigtail") A short flexible cable assembly which connects to the Centurion case and the towcable in use. Since the towcable has a minimum 5" bend radius, this assembly allows more flexible positioning of the towcable relative to the computer case and an emergency break away if the towcable is jerked suddenly.

GPS and associated cable. Two GPS systems are supplied with Centurion systems. A water proof hand held Garmin eTrex unit and a JRC DGPS unit. The JRC system is equipped with a waterproof connector that supplies 12 VDC power and transmits data from the GPS to the sonar system. The smaller, black, Garmin data cable connects GPS data to the sonar system but does not supply power to the hand held unit. The Garmin GPS requires two AA batteries.

Auxiliary Serial Port cable. (MSTL part #4242-03 ) When the GPS normally supplied with the Centurion system is not used, this cable assembly provides access to both Comm 1 and Comm 2 with standard serial port (DB-9) connectors. This assembly is not waterproof and no power is supplied via these connectors.

Water Proof Mouse and cable (MSTL part #4209-03) Each Centurion system is provided with a waterproof mouse and cable which connects to the mouse connector on the case.

Auxiliary Mouse cable (MSTL part #4244-03)- A short cable which connects to the Centurion mouse connector and a standard PS-2 mouse connector to attach other PS-2 pointing devices (track balls etc.)

Water Proof Keyboard and cable (MSTL part #) - The waterproof keyboard is available for Centurion systems. The connecting cable has a connector which mates with the keyboard connector.

Auxiliary Keyboard Cable (MSTL part #) - This is a short cable which connects to the keyboard connector on the case and a standard keyboard connector to attach non-waterproof keyboards.

Data Output cables (MSTL part #4245-03) - Each Centurion system is provided with a data output assembly which mates with the connector on the case to provide both a network (LAN) output and two USB outputs for peripheral devices.

External CD-RW unit (brands may vary)- Each Centurion system is provided with an external CD-RW unit to add new software to the system or to transfer sonar data from the Centurion computer to other computers. These are USB devices which

may be connected directly to the USB cable from the Data Output connector or via the supplied USB hub.

Optional USB devices - There are many other USB devices that may be used with the Centurion system. These include the Imation® Super Disk which uses standard 3.5" floppy disks or Imation® 120 MB disk media and USB Zip® drives that can store up to 200 MB of data.

Portable Test Unit (MSTL part #2033-01) - Each Centurion System is equipped with a small test device to simply trouble shooting in the field. It can be used to test fuses and Towcables as well as verify that Sonar electronics inside the computer case is working properly.

## **4.0 Maintenance and Repair**

### **4.1 Towcable**

**4.1.1 General.** The Towcable used by all Sea Scan® PC systems consists of three coaxial cables twisted and wrapped to provide 6 separate conductors. The coaxial elements are similar to RG-174 cables with a characteristic impedance of 50 ohms. The inner coaxial cables are covered with a thin protective layer of polyethylene and jacketed with a Kevlar® strength member (1250 lb. (568 kg) breaking strength) and an outer Polyurethane or Polyethylene cover.

The minimum bend radius of the Towcable is 5 inches (12.7 cm) when under strain. Mishandling the cable will result in broken or shorted conductors and loss of system operation. Proper handling of the cable is required to prevent kinks and small loops from damaging the cable.

New cables should be “figure eighted” to remove the natural twist from the cable coil. Using the cable directly from the coil retains the natural twist of the cable and frequently creates small loops that can be easily kinked.

### **4.1.2 Maintenance of the Towcable.**

4.1.2.1 After use the cable should be carefully re-coiled and properly stored. During handling it should be inspected for damage and abrasion. Periodically the cable should be rinsed with fresh water to remove salt buildup.

4.1.2.2 Any breaks in the outer covering must be inspected very carefully. If it is apparent that no damage has occurred to the electrical conductors, the outer covering can be repaired as follows:

- Clean area to be repaired with soap and water and thoroughly dry.
- Wrap section of cable with linerless rubber splicing tape (Scotch 130C or equivalent).
- Wrap repaired area with water proof Vinyl Electrical tape (Scotch Super 33+ or equivalent).
- Monitor repaired area during subsequent operations.

4.1.2.3 Breaks in the outer covering of the cable may lead to salt water incursion inside the cable and electrical problems at a later date.

4.1.2.4 There is no practical method of spicing pieces of the Towcable together while maintaining the overall strength of the cable.

4.1.3 Replacement of Towcable Connectors. Defective cables can be repaired by cutting out the defective area and installing a new wet or dry end connector. Installation of new dry end connectors involves standard solder methods, maintaining the pin connections listed in paragraph 5.1.5. MSTL back fills the connectors with hot melt glue. Installation of the wet end connector requires special crimping tools and a mold for potting the completed connector.

## **4.2 Towfish**

4.2.1 General. Marine Sonic Technology, Ltd. towfish have no replaceable electronics components. Most repairs are cosmetic in nature. Transducer replacement and bulkhead connector repairs can only be performed at the factory.

4.2.2 Maintenance of the Towfish. After use the towfish should be inspected for external damage and steps taken to prevent future occurrence. Worn paint and minor scratches are generally not a problem except that they indicate the towfish was in contact with something other than water.

- Inspect the towing hardware for wear and damage. The shear pin should be replaced if worn or bent.
- Insure the stainless steel shackles are intact and the threaded pins tight.
- Periodically wash the towfish in fresh water and closely inspect for damage.

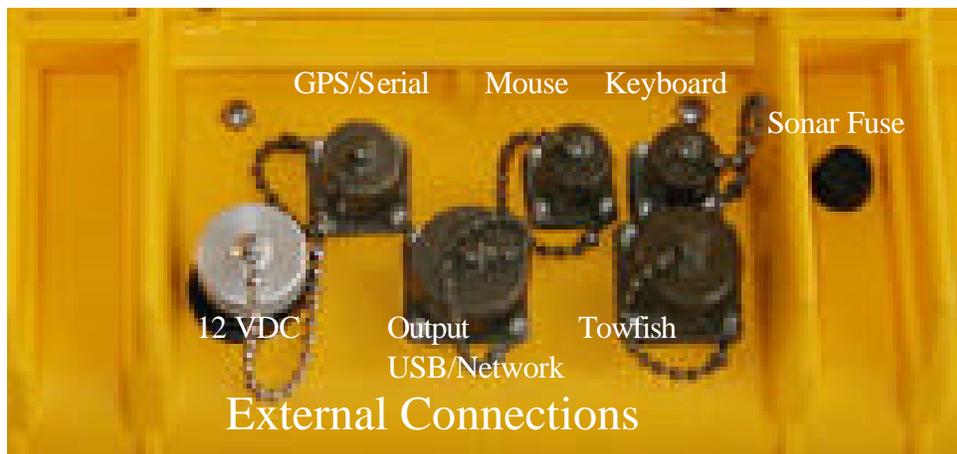
4.2.3 Replacement of Tow Fins. Broken fins can be replaced with new fins made from sheet (0.25 “) PVC. All portions of the old fin must be removed on a milling machine or carefully with a router. New fins are bonded in place using PVC cement. After repairs, the exterior surface should be thoroughly cleaned, lightly sanded and given a fresh coat of durable paint.

### 4.3 Centurion Splash Proof Computer

4.3.1 General. During the warranty period no repairs should be attempted inside the case of the computer. Opening the case invalidates the warranty. All operations and most performance tests can be performed without opening the case.

4.3.2 Exterior checks.

4.3.2.1 Verify that all dust covers are in place. Replace if missing or damaged. Watertight integrity is not guaranteed if caps are missing or connecting cables are not attached.



4.3.2.2 With 12 VDC connected to the power receptacle start up the computer and verify normal computer operation.

*Note: The power supply inside the computer requires 9-18 VDC. A 12 VDC source and the standard 12' (4 meter) power cable will provide approximately 11 VDC to the power supply. Lower battery voltage or longer extension cords may result in lower voltages being supplied to the computer. At approximately 10 VDC the computer will shut down.*

When the ON/Off Button is turned ON the following activities should follow in sequence.

- Backlight on the display should come on immediately
- A quiet single slight beep may be heard
- Text should appear on the display indicating normal computer startup
- Normal Windows Desktop should result

### **4.3.3 Removing Computer Unit from the Case.**

*Note: Opening the case during the warranty period will invalidate the warranty. Marine Sonic Technology, Ltd. must make all repairs inside the case during the warranty period.*

4.3.3.1 Disconnect all exterior cables and lay unit on suitable workbench.

4.3.3.2 Remove all 10 bezel screws and save for reinstallation.

4.3.3.3 Tilt the Bezel/display upward and disconnect the data and power cables from the Display and backlight inverter respectively.

4.3.3.4 Remove four flat head screws which attach the top cover to the chassis inside the case.

*Note: Three of these screws are 0.5" long and one is 0.375" long. The shorter screw must be used in upper left hand corner to prevent damage to the hard drive.*

4.3.3.5 Remove the top cover plate and set aside with the four screws.

4.3.3.6 Disconnect the various cable harnesses as follows:

- Power - 3 pin Molex connector in upper right hand corner
- GPS power- 2 pin Molex connector near power connector
- Data output- 10 pin connector on motherboard
- Comm Port - 3 pin Molex connector
- Comm Port - 2 pin Molex Connector
- Sonar - 12 pin mini connector on system board
- Sonar fuse - 8 pin mini connector on system board
- Keyboard- 4 pin Molex connector
- Mouse- 4 pin Molex connector
- Network - RJ-45 connector (press release under connector)

*Note: The entire chassis can be tilted up and out of the case while some of these cables are disconnected as long as no strain is placed on any individual cable.*

4.3.3.7 Lift the computer chassis out of the case by tilting it up and lifting clear.



4.3.3.8 Inspect the entire assembly for loose pieces and missing fasteners.



#### **4.3.4 Replacement of Computer System Components.**

4.3.4.1 Sea Scan<sup>®</sup> PC System Board.

***Note: No repairs are authorized on the Sea Scan<sup>®</sup> PC board at any time. All repairs must be made at Marine Sonic Technology, Ltd.***

To remove, take precautions for handling static sensitive components and remove the four 4-40 cap screws in the corners. Gently extract the board from the PC-104 connectors nearest the Power Supply end of the chassis. Place the card inside a static protective wrapper and return to Marine Sonic Technology, Ltd. for replacement or repairs.

4.3.4.2 Power Supply. The Sea Scan<sup>®</sup> PC system requires the following voltages from the power supply to operate properly- +12 VDC, -12 VDC, and + 5 VDC. All must be present. The power supply wiring color code employed is:

Yellow	+ 12VDC
Red	+ 5 VDC
Brown	- 12 VDC
Black	Ground

To remove the power supply, disconnect the connectors and remove the four flat head screws from the bottom of the chassis. Cut the wires connecting the Chassis Fan. Remove the two remaining flat head screws on the end of the chassis and lift off the auxiliary chassis plate.

4.3.4.3 Replacing the Power (On/ Off) Switch. Unplug the single Black wire connector and remove the Red wire from the 3 socket Molex socket using the insertion tool. Remove switch. Replace with a new switch (Otto P5 311322 21649 9502) MSTL part number 4027-02. Install with a thin film of Silicon under the flange of the switch.

4.3.4.4 Replacing the Hard Drive. Observe precautions for handling static sensitive components. Disconnect the ribbon cable connecting the hard drive to the computer. Remove four metric flat head screws from the end of the chassis. Carefully remove the old hard drive and replace with a new one.

4.3.4.5 Replacing the Flat Screen Display Unit. Remove the four flat head screws which attach the display to the underside of the bezel. Replace with a new display AND 10C209A (MSTL part #4203-03). Clean the underside of the polycarbonate cover prior to installing the new display.

#### **4.3.5 Reinstalling the computer unit inside the case**

Prior to installing the assembled unit into the water proof case check the following items.

- Case clean, no particles.
- Wiring harnesses free, pins in connectors properly.
- External case connectors complete, all lock nuts in place, dust caps chains
- Top shelf clean, o-ring in place
- Cable harnesses in chassis unit neat and tied down. Cooling fan clear.

Lift the connector cable assemblies up and tilt the back edge of the chassis down and slide the chassis partially into the case. Connect the power connector and complete placing the chassis into the case.

Connect the following cable assemblies:

- Power (Red, Green and White wires 3 pin Molex connector)
- Power to GPS ( Black and Yellow, 2 pin Molex connector)
- Comm 1 (Black, Blue and white, 3 pin Molex connector)
- Comm 2 ( Black and White , 2 pin Molex connector)

- External Mouse (Yellow, Black, Blue, Green wires 4 pin Molex connector. Verify PS-2 plug is plugged into small circuit board on top of power supply.
- External keyboard (Yellow, Brown, Orange, Green wires 4 pin Molex connector)
- SSPC Fuse ( small 8 pin connector to Sea Scan<sup>®</sup> PC board)
- SSPC Towfish connector (small 12 pin connector to Sea Scan<sup>®</sup> PC board)
- Network output (RJ-45 connector to motherboard)
- USB output (9 pin dual row connector to mother board)

Install a new O-ring in the groove in the panel mounting ring.

Pass the display cable assemblies (2) through the slot in the Top Plate and install the Top Plate with four flat head 6-32 screws.

*Note: The screw in the back left hand corner must be no longer than 3/8" long or damage to the hard drive may occur.*

Connect the data and back light cable assemblies to the display and align the cables to allow the bezel to set flat on the Top Plate.

Fasten the bezel assembly into the case with ten Stainless Steel 6-32 cap screws and flat rubber washers. Note that there are three lengths of screws used to account for the slope of the bezel.

Test computer and all external connections.

## **5.0 Troubleshooting**

### ***5.1 Towcable Trouble shooting.***

Any Towcable which is suspected of having a problem should be first checked electrically and any problems noted.

The quickest way to analyze a towcable is to use the Portable Test Unit supplied with the Sea Scan<sup>®</sup> PC system (Available early 2001). This unit will detect cable shorts and other possible malfunctions.

If the above tester is not available proceed as follows:

*Required Test equipment: Continuity detector or multimeter.*

5.1.1 Test for Shorts between conductors. From either end of the Towcable, check for shorts between any two of the six conductors. Any connection between any two conductors indicates a problem.

5.1.2 Test for Continuity of each Conductor. Using the continuity meter or a multimeter test for continuity from one end of the cable to the other. Each of the six conductors must be continuous.

5.1.3 Determination of the precise location of any detected shorts or opens may be done using Time Domain Reflectometry (TDR) using a fast Oscilloscope and a fast pulse generator. Description of TDR methods is outside the scope of this manual.

5.1.4 Obvious kinks and damaged areas on the cable should also be immediately suspected to be the source of the shorts or opens.

5.1.5 Cable/connector pin out.

Wet End connector (DGO Part Number <u>1281241-101</u> 3xx)	<u>Function</u>	Dry End Connector Conxal Part Number <u>5282-6PG-</u>
A	28 VDC power & Left channel data	A/1 (spot)
B	Power and left channel return	B/2
C	Right Channel Data	C/3
D	Right Channel return	D/4
E	+5 VDC control voltage*	E/5
F	Control Voltage return*	F/6

*Note: \* Control Voltage is only required for use with Dual frequency towfish to shift between frequencies. It has no function with single frequency towfish. Towcables with shorts or opens in conductors E and F can be used with single frequency towfish without problems.*

**5.2 Towfish Trouble Shooting.** The best overall test of a towfish is an in water test and comparison of image data. Bench tests include a “rub test” and a reverberation test, which provides comparative data.

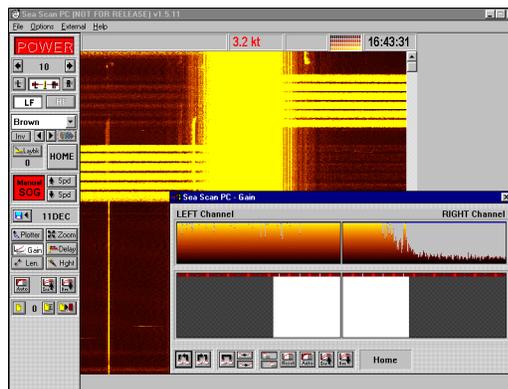
5.2.1 Rub test. Perform as described below as the final test before placing the towfish in the water. This test requires a complete Sea Scan<sup>®</sup> PC system and Towcable. Rub the transducer faces vigorously with the fingertips and observe bright lines on the Computer screen. Compare intensity of the rub test on each side of the towfish.

If the “Rub Test” is not satisfactory follow the trouble shooting guide on page 23.

**Perform a “Rub Test” as follows:**

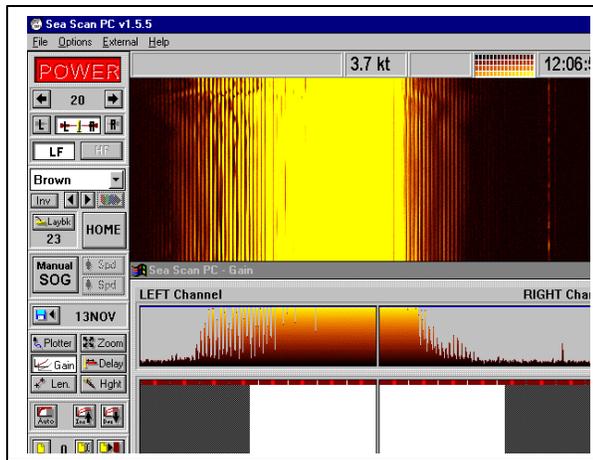
1. Connect towfish to a towcable and towcable to Sea Scan<sup>®</sup> PC computer. Ensure all connections are clean and fully engaged.
2. Turn on the Computer and start Sea Scan<sup>®</sup> PC Program in active mode.
3. Select 10 meter range scale and Manual Speed Over Ground (SOG).
4. Set speed to 3-4 knots.
5. Open Gain Window and set Gains to maximum.
6. Move Gain Window down the screen so the incoming data is visible.
7. Placing the fingertips of one hand directly on the transducer, rub each side, briskly, one at time. On a 600 or 1200 kHz towfish, place fingertips inside the narrow groove on the transducer surface. Most people can hear the transducers in operation (a clicking sound).
8. If all systems are working correctly, the rub test should display bright lines on the acoustic display. The rub test confirms that the towfish has electrical power and is sensitive to incoming signals and that these signals reach the Sea Scan<sup>®</sup> PC electronics and are processed by the Sea Scan<sup>®</sup> PC software. It is an end to end confirmation that the towfish is ready to be placed in the water and the system is ready for operation.

**Figure 1. Example of Successful Rub Test**



Note: The same individual should perform each test to obtain comparative results. High frequency 1200 kHz towfish are slightly more difficult to rub test. Sometimes a crumpled sheet of paper works better than bare finger tips.

**5.2.2 Reverberation Testing.** Place the towfish on machinist blocks approximately 3” (7-8 cm) above a hard flat (tabletop ) surface. The towfish must be parallel to the flat surface. The machinist blocks should support the towfish at the ends of the transducer faces but not cover up any portion of the transducer. Connect the Towcable to the towfish and to the Sea Scan® PC computer. Activate the towfish with maximum gain and a short (5-20 meter ) range scale. Count the number of reflections displayed and compare to the opposite side transducer. Weak transducers produce fewer reverberations. Higher frequency transducers produce fewer reverberations than lower frequency transducers.



Computer Screen Image During Reverberation Testing (150 kHz)  
Note that the side facing the flat surface has more reverberations.

Towfish which appear to be damaged or not performing properly should be returned to Marine Sonic Technology, Ltd. for repair or replacement.

## 5.3 Splash Proof Computer

**5.3.1 General.** Troubleshooting the computer portion is similar to techniques used to investigate problems with any Windows® based computer. If the computer fails to start up properly, the power source and power cable must be examined. If the computer starts up but does not operate normally both software and hardware areas must be examined. If the computer appears normal but the sonar does not work properly, then the problem must be isolated to inside or outside the computer case.

*Note: Repairs to the inside of the Waterproof case during the warranty period must be made by Marine Sonic Technology, Ltd. or an authorized*

*MSTL agent. Customer repairs inside the computer case may invalidate the warranty.*

### **5.3.2 Computer fails to start (no display or computer sounds).**

- Verify that the power source is 12 VDC and that the Red battery clamp is connected to the +12 VDC terminal and the Black battery clamp is connected to the (-) terminal.
- Measure the voltage at the connector end of the power cable. It must be 12-18 VDC.
- If the correct power is available and the computer does not start, the problem must be internal to the case and repairs should be deferred to MSTL.

*Note: There is an internal 6 amp fuse but it is only accessible by removing the display and top plate.*

### **5.3.3 Computer starts but does not operate normally.**

- If the problem appears software related either the Windows® software or Sea Scan® PC software may be corrupted and require re-loading.
- If the problem appears to be hardware related (e.g. hard drive) repairs should be deferred to MSTL.

### **5.3.4 Computer operates normally but the sonar does not operate properly.**

- Using the MSTL supplied Portable Test Unit verify the presence of +28 VDC at the towcable connector. If this voltage is present the problem is most likely external to the computer case.
- If the Portable Test Unit is not available, use a multimeter to verify the presence of +28 VDC between pins A (spot) and B at the end of the Towcable Interconnecting Cable ("pigtail").
- If the +28 VDC is not present outside the computer case. Remove and test the Towfish Fuse with either the Portable Test Unit or a multimeter. A visual test is not adequate!
- If the fuse is blown, the problem is usually caused by a problem (short) in the towcable. Test the towcable in use before replacing the towfish fuse.

*Note: Replace the Towfish fuse only with a 5 x 20 mm, 200 ma Slo Blo fuse. Incorrect fuses may cause damage to expensive internal electronics.*

- If the fuse is not blown and 28 VDC is not present, repairs must be deferred to MSTL.

### **5.3.4 GPS Does Not Operate Properly Or GPS Data Not Displayed in Sea scan PC**

- Check GPS fuse in external fuse holder
- If GPS is operating but data not received
  - Confirm that GPS output is selected to NMEA Out
- Verify Comm Port Settings in Sea Scan<sup>®</sup> PC Program
  - External devices- Navigation-Settings  
COMM 1, 4800 Baud , 8, N,1
  - External Devices- Navigation - Test Communications  
NMEA sentences should be readable as they are received from the GPS
  - If GPS fields are present but data not filled in, settings are correct but GPS is not outputting information

### **5.3.5 Excessive Noise in Images**

- Try alternate power source. A separate battery is the best and cleanest. Ensure that no charger is also connected as they are a principle source of electrical/RF noise.
- Ground the green wire of the power cable to the best ground available on the vessel, a through hull, engine mount, bonding plate etc. *Do not connect the Green wire to the Positive Terminal or damage will result.*
- Identify source of Noise by turning off engines, radios, echo sounders etc. Computer CRT Monitors are a common source of RF noise.
- Re-route towcable away from potential noise sources, such as chargers, alternators or other electrical equipment.

## 6.0 Precautions to Prevent Damage

- Keep the computer case dry whenever possible. If it gets wet do not let water stand or collect in crevices or flat surfaces.
- Never attach the connectors when the power is on.

**Do NOT plug in or unplug the Tow Cable when the Sea Scan PC power is on. This may result in damage to the Towfish and/or the Sea Scan<sup>®</sup> PC board.**

- Inspect the connectors before and after every use for the presence of water.

**Never connect a dry connector into a wet connector.**

- Ensure the connectors are clean before they are mated.

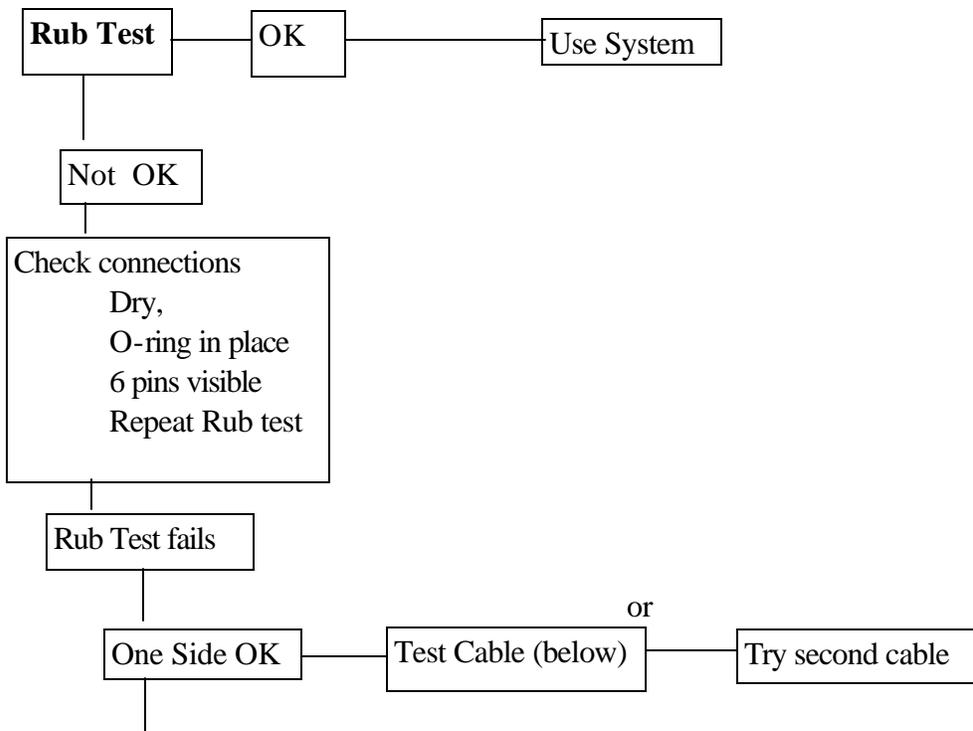
**To clean (and dry) the Tow Cable connector:**

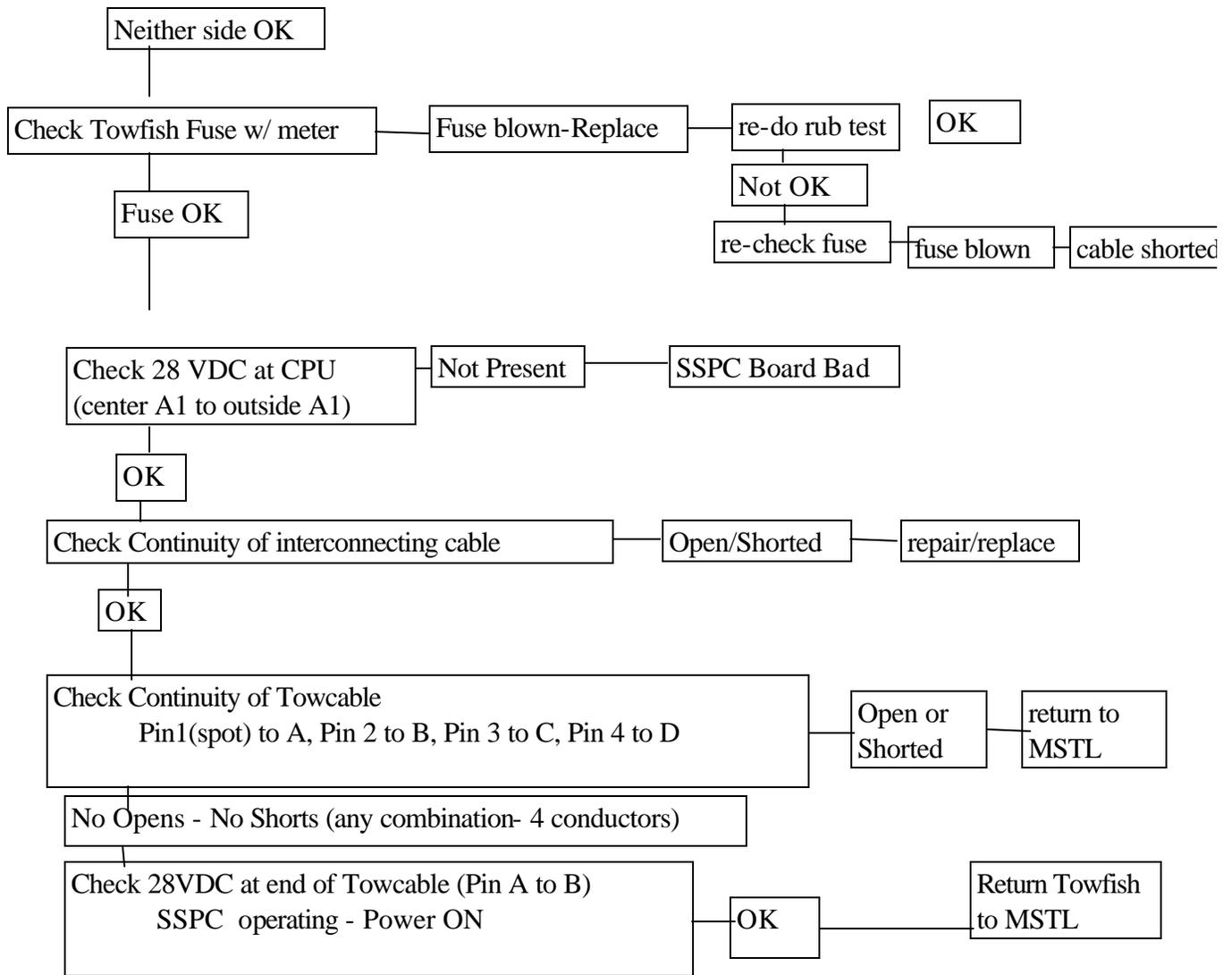
- Soak the connector in distilled water or alcohol.
- Blow the connector clear and dry with compressed air, such as an aeroduster.
- Use WD-40 as a preventative lubricant and drying agent

- Take care of your Tow Cable. Do not step on it, roll heavy equipment over it or press it between hatch covers since this may damage the cable.
- Clean the Tow Cable at the end of each use. If the system has been used in salt water, wash the Towfish and Tow Cable (still connected to the Towfish) with fresh water to prevent corrosion of the stainless steel components.
- To store the Tow Cable, coil it loosely and store it in the cable box provided or hang it off the floor.
- Check the Tow Cable periodically for visible breaks and damage. Run your fingers along the length of the cable to feel for breaks in the shielding and punctures through the jacket.
- Do not bend the Tow Cable beyond its minimum (5" or 13cm) bend radius. This will cause the internal shielding to rupture, puncture the jacket and expose the internal conductor to the sea water.
- New Towcables should be first un-coiled and "figure eighted" to remove the natural twist of the cable. If used directly from the coil the cable has a strong tendency to develop small loops which can damage the cable under strain.
- Stow all components in cases provided when not in use.

**Sea Scan® PC Trouble Shooting Procedures**

**Start**





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## **Appendix A**

### **Centurion Sea Scan® PC Computer System Parts List**

All parts are available from:

Marine Sonic Technology, Ltd.  
5508 George Washington Memorial Highway  
PO Box 730  
White Marsh, Virginia 23183-0730

(804) 693-9602  
(804) 693-6785 fax

[www.marinesonic.com](http://www.marinesonic.com)

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# Centurion Sea Scan<sup>â</sup> PC System



Computer



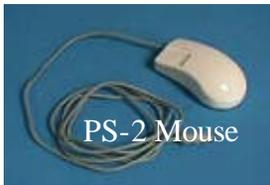
Power Cable



Shipping Case



Software



PS-2 Mouse



Waterproof Mouse



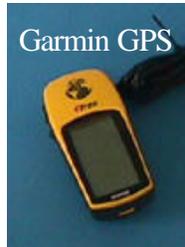
Accessory Case



Accessory Cables



Compact Keyboard



Garmin GPS



Tool Pallet



Portable Test Unit



DGPS



Zip CD-RW



Imation Super Disk (Optional)



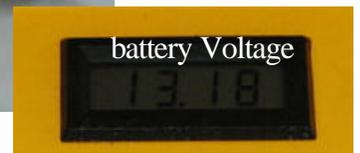
Sunhood



Battery Box (Optional)



Battery packs



battery Voltage

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**Centurion Part Numbers**

<b><u>Computer</u></b>		<b>4200-03</b>
<u>Description</u>	<u>Mfg #</u>	<u>MSTL Part #</u>
Motherboard	Advantech PSM 5820	4201-03
Display cable harness	Advantech	4202-03
Back Light Inverter	ERG L2333	4250-03
Display	AND 10C209A	4203-03
Power Supply	IPC1205-12	4204-03
	Calex 12T5.12K	4204-04
Pwr Supply filter board	MSTL	4205-03
Hard drive	Toshiba HDD2144	4206-03
Dual Mouse	Y-Mouse Dual PS-2 adapter	4208-03
Water proof case	Pelican 1400 (Yellow) w/ ring	4210-03
Plastic Bezel	Polycraft	4211-03
Base Plate	MSTL	4212-03
O-ring (case)	Pelican	4213-03
O-ring (lid)	Pelican	4214-03
Bezel screws (set)	MSTL	4215-03
 <u>Internal Cable assemblies (w/connector)</u>		
Sonar	MSTL	4221-03
Cap		4222-03
Power	MSTL	4223-03
Cap		4224-03
Nav/Serial	MSTL PT02E-10-6S	4225-03
Cap	Amp 10-101960-103	4226-03
Data Output	MSTL PT02E-14-19S	4227-03
Cap	Amp 10-101960-143	4228-03
External Mouse	MSTL PT02E-8-4S	4229-03
Cap	Amp 10-101960-083	4230-03
External Keyboard	MSTL PT02E-8-4P	4251-03
Cap	Amp 10-101960-083	4230-03
Towfish fuse holder	MSTL	4232-03
GPS Fuse Holder	MSTL	4233-03
On/Off Switch -	Otto	4234-03

External Cables/Accessories

Power cord 12' w/ plug	Conxal	4240-03
DGPS antenna and Receiver	JRC	4241-03
GPS (eTrex)	Garmin	4241-04
Garmin Power/data cable	Garmin	4247-03
Water proof mouse	Tuffy mouse	4209-03
Waterproof Keyboard	(no longer available)	4207-03
Optional serial Comm 1 and 2 MSTL		4242-03
PS-2 Mouse	Microsoft	4243-03
Auxiliary Mouse connector	MSTL	4244-03
Auxiliary keyboard Connector	MSTL	4246-03
Data Output Cables	MSTL	4245-03
USB hub	USB UH-144	4248-03
Network inline connector		4249-03
Portable Test unit	MSTL	2033-01
Miscellaneous Tool Kit	MSTL	2031-01

### Options

USB Imation Floppy drive/Super Disk Drive

### **Centurion Battery Box Option**

Complete Battery Box option                    4270-99  
(specify 115 or 230 VAC)  
Includes 2 battery packs, charger,  
line cords and shipping case).

Single Battery Pack (28 AH)                    4270-88

### Individual parts and pieces

Case (Pelican 1400)	4270-02
Outlet Connector w/ fuse holder	4271-02
Bottom Foam 1/2"	4272-02
Middle Foam 1.67"	4273-02
Top Foam 1.67"	4274-02
Gel Cells 7 AH (4 required)	4275-02
Positive Bus Harness	4276-02
Negative Bus Harness	4277-02

Digital Voltage meter w/wiring	4280-01
Battery Charger 115 VAC/5 amp	4278-01
Battery Charger 230 VAC/5 amp	4278-02
Line Cord 115 VAC	4279-01
Line Cord 230 VAC	4279-02
Output cord ( battery pack to Centurion)	4240-04

## **Appendix B**

### **Centurion Single Board Computer**

Advantech PCM-5820

A complete Users manual is available at [www.advantech.com](http://www.advantech.com)

#### **Features:**

Onboard Cyrix GXM-233 CPU  
64 MB SDRAM  
On-board VGA/LCD controller  
On-Board 100 Base T Ethernet Interface  
Supports Compact Flash Card  
Built in Enhanced IDE hard drive interface  
ON board mini-DIN PS-2/Keyboard connector  
Two serial Ports  
Single +5 VDC power supply

Hard Drive:

Toshiba          HDD2144

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## **Appendix C**

### **Operation of Portable Test Unit (MSTL part # 2033-01)**

#### **Test 1 Towcable Verification**

1. Connect Test Unit to Towcable dry end.

*Note: Towcable must not be connected to a towfish!*

2. Press Test Button and note LEDs on test unit.

If any Red LED is energized, one of the Coaxial elements in the towcable is shorted.

*Note: The left channel (which also provides electrical power) must be OK for any operation of the towfish. If the right channel is shorted, operations can continue on the left channel only. For single frequency towfish only the first two coaxial elements (Right and Left channels) are required. The third coaxial element (E and F) is only required with dual frequency towfish.*

#### **Test 2 Confirm 28 VDC Output from Sonar**

1. Connect Test unit to end of sonar interconnecting cable ("pigtail"). The towcable may or may not be connected to the test unit.

2. Turn on the Computer and start the Sea Scan<sup>®</sup> PC program.

3. Select **Power On** in the Sea Scan<sup>®</sup> PC program.

*If the Green LED is energized on the Test Unit the sonar system is providing the correct power to the towable.*

If the Green LED is not energized, test the sonar output fuse. Replace the fuse if blown and repeat the above test.

### **Test 3 Fuse Tests**

1. Remove suspect fuse and hold between brass contacts on side of tester. Use the outside buttons for long fuses and the inside buttons for shorter fuses. The metal ends of the fuse must be in contact with both buttons.

2. Press the test button.

If the fuse is good, the Green LED will be energized. If the fuse is blown, the Green LED will not be energized.

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## Appendix D

### **Networking Setup For Communications With "Centurion"**

**Note:**

*Centurion Systems are equipped for network operations via 10/100 based T networks. As installed, Centurion is equipped to participate in a "peer to peer" network using common Windows® 98 software. If you already have a network setup, it may be necessary to re-configure Centurion to match your system. If you do not already have a Network system, this the following procedure is intended to assist you in using this capability. Network connection is an excellent way to rapidly transfer large amounts of data to another computer.*

#### ***Procedure to Set Up a "Peer to Peer Network"***

What you will need:

- 1) Computer with Windows 98 and a 10 Base T or 100 Base T Ethernet card installed and operational.
- 2) An Ethernet hub or crossover networking cable.

The "Centurion" networking system comes pre-setup from MSTL, so all you need to do is setup your computer to talk to the "Centurion".

In order to allow your computer to talk to the "Centurion" over the network connection your computer will have to have installed:

- 1) TCP/IP Protocol
- 2) File and Printer Sharing for Microsoft Networks Service
- 3) Client for Microsoft Networks Client

To install these:

- ✓ Right click on the **Network Neighborhood** icon on your desktop and select **Properties** from the menu. A **Network** window will now appear on your screen.
- ✓ If you do not see **TCP/IP** under the installed components list:
  - 1 Click on the **Add** button. The **Select Network Component Type** window will now appear.
  - 2 Select **Protocol** and then click the **Add** button. The **Select Network Protocol** window will now appear.
  - 3 Under **Manufacturers**, select **Microsoft**. Under **Network Protocols**, select **TCP/IP** (if you don't see it, try scrolling down). Click the **OK** button.
- ✓ If you do not see **File and printer sharing for Microsoft Networks** under the installed components list:
  - 1 Click on the **Add** button. The **Select Network Component Type** window will now appear.
  - 2 Select **Service** and then click on the **Add** button. The **Select Network Service** window will now appear.
  - 3 Select **File and Printer Sharing for Microsoft Networks** and then click the **OK** button.
- ✓ If you do not see **Client for Microsoft Networks** under the installed components list:
  - 1 Click on the **Add** button. The **Select Network Component Type** window will now appear.

- 2 Select **Client** and then click on the **Add** button. The **Select Network Client** window will now appear.
- 3 Select **Microsoft** from the **Manufacturer** list and **Client for Microsoft Networks** from the **Network Clients** list and click the **OK** button.

Once the required items are installed they must be configured properly in order to work.

\* Note: if you also have the Dial-Up Adapter also installed, when noted to, select the item that points to your network card and not the Dial-Up Adapter.

- ✓ Select **TCP/IP** under the installed components and click the **Properties** button. The **TCP/IP Properties** window will now pop up.
- ✓ Select the **IP Address** tab.
- ✓ Select the **Specify an IP Address** radio button. **IP Address** and **Subnet Mask** will now become ungreyed.
- ✓ In the **IP Address** entry type **192.168.0.1**
- ✓ In the **Subnet Mask** entry type **255.255.255.0**
- ✓ Click the **OK** button.
- ✓ Under the **Primary Network Logon** select **Windows Logon**.
- ✓ Click the **File and Print Sharing** button. The **File and Print Sharing** window will now appear.
- ✓ Click the **I want to be able to give others access to my files** check box so it is checked. Click the **OK** button.
- ✓ Click the **Identification** tab, under **Computer Name** type **Desktop** and under **Workgroup** type **OFFICE**.
- ✓ Click the **Access Control** tab and make sure **share-level access control** is selected.
- ✓ Click the **OK** button.
- ✓ Windows might ask you for your Windows 98 CD. Place it in the CD drive and proceed.

- ✓ Once this is complete, Windows will ask you if you want to reboot. Reboot now.  
If it does not ask you reboot anyway.
- ✓ While the computer is rebooting, plug the computer and the "Centurion" into our network.
- ✓ Once the computer has completed booting, double click on the **Network Neighborhood** icon. The **Network Neighborhood** window will now appear.
- ✓ You should now see **Entire Network, Desktop, and Centurion**.
- ✓ You can now access the Centurion file system by double clicking on **Centurion**.

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## ***Appendix E***

### **Centurion Battery Box (Optional Item)**

Description: The Centurion battery box option includes the following items:

Two Battery Packs w/ 56 AH (total) of Gel cells and digital Voltage Displays

- each battery pack is in a Pelican case similar to Centurion Computer
- external connection for power cord to Centurion Computer
- internal charging connection (must be open during charging)
- digital voltage display on exterior of case indicates current battery voltage
- case can be used in any position and in wet locations

Professional Model Battery Charger w/micro processor specifically designed for gel cells

Line cord for Battery charger (115/230 VAC 50/60 Hz)

Power cord to connect to Centurion computer

Rugged shipping case for all items



**Warning:** Each Battery Pack will operate the Centurion System about eight hours under normal conditions. The power supply inside the Centurion Computer will operate as low as 9 VDC but with losses the external battery voltage should not under any circumstances be below 10.0 VDC. Operators should change to a fully charged battery pack when the Battery Voltage reaches approximately 11.5 VDC.

**Warning:** A fully Charged Battery Pack will indicate approximately 13.65 VDC on the external display. During operation voltage will drop quickly to less than 13 VDC but remain above 10 VDC for many hours. See graph below of typical performance.



The case can be used in any position and the cover can be open or shut during discharge. If the area is wet, the lid should be closed.

## Charging

When a battery pack requires charging, the charger must be removed from the shipping case and operated in a dry location. Connect the charging cable to the connection located inside the battery pack and connect the Charger to an electrical source (115/230 VAC 50/60 Hz). A switch located under the charger must be aligned to the correct voltage (115 or 230 VAC).

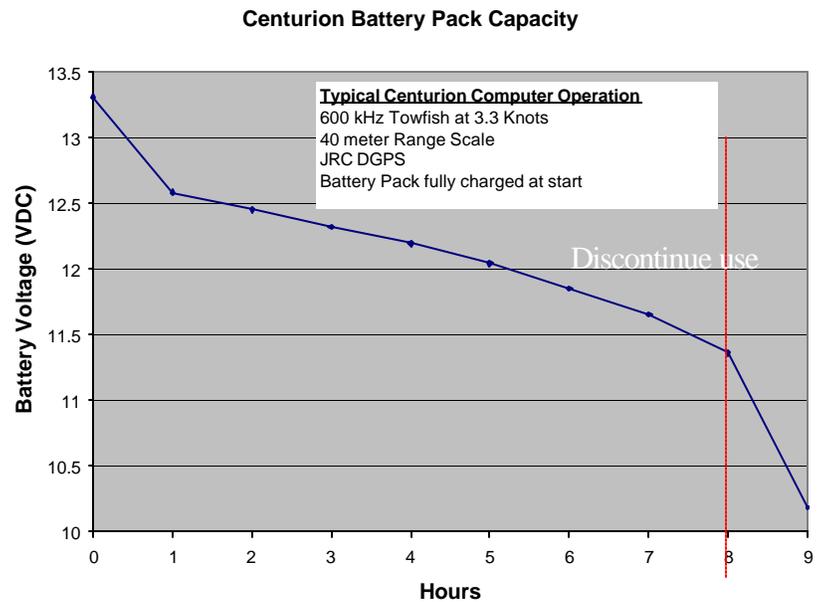
The lid of the battery pack must remain open during Charging!



Read and follow the Battery Charger Manufacturer's instructions and precautions prior to using the charger!



LED's on the front of the charger indicate the charging rates and will indicate when the battery is fully charged ("Ready").



### Storage/Maintenance

When not in use, all items should be kept clean and dry inside the shipping case. Both battery packs should be periodically charged to be ready for use.

The Battery charger may be left connected and on charge for long periods of time if desired but a better practice is to charge both packs once per week and store them inside the shipping case when not in use.

Before and after use and before charging check that all terminals are tight and clean. Replace any terminals that show signs of corrosion or damage. Use only marine grade materials for any replacements.

### Fuses

There are two fuses inside the battery box. The output positive lead has a 10 Amp

mini-spade fuse to protect against shorts and damage in the exterior cabling. There is also a small 200ma (5 x 20 mm) fuse (same as used in Sonar system) in the leads connecting the Digital Voltage display to protect against damage to the leads.