Troubleshooting the SeaBird CTD system

MW 1 December 1998

NOTE: Much of this procedure applies to most any equipment using a conducting cable. The failure points and troubleshooting steps are similar for a wide variety of lowered and towed equipment.

The entry point for this troubleshooting procedure is NO SIGNAL FROM CTD. It is assumed that you have ruled out the computer as the problem.

Rule to Live By: 90% of the problems will be with cables, connectors and splices.

1. Check for voltage:

1.1 BE SURE THAT THE CORRECT DECK UNIT IS BEING USED !!!

1.2 Measure voltage at the fish: At the fish end (unplug 2-pin SEA CABLE connector from the CTD, turn on the deck unit, and check for 270 VDC between the pins. NOTE: the larger pin is ground (tied to the cable armor) and the smaller one is signal (+270 VDC relative to the armor). BE SURE THAT THE POLARITY IS PROPER (GROUND ON THE ARMOR, VOLTAGE ON THE CONDUCTOR).

1.3 If 270 V is present - the problem is probably the fish or deck unit. You may have to switch deck units and/or fish to find the problem.

1.4 If 270 V is absent - there is a break in the wire train, or a blown deck unit sea cable fuse. Continue.

1.4.1 Measure voltage at the deck unit: Leaving the fish unplugged, turn off the deck unit. Unplug the 2-pin Sea Cable ("cannon") connector from the back of the deck unit. Check for 270 VDC directly out of the back of the deck unit.

1.4.2 If 270 V is absent, turn off the deck unit and check the Sea Cable fuse.

1.4.2.1 If the deck unit fuse is not blown, the problem is probably the power supply in the deck unit. Switch to the other deck unit, plug everything back in, and try it again.

1.4.2.2 If the deck unit fuse is blown, ***THERE IS A SERIOUS SHORT IN THE SEA CABLING SYSTEM. DO NOT ENERGIZE THE DECK UNIT TO THE SEA CABLE UNTIL THE SHORT HAS BEEN FOUND AND RESOLVED. CONTINUING TO FEED FUSES INTO THE DECK UNIT IS STUPID AND NON-PRODUCTIVE. FIND THE PROBLEM!*** The sea cable supply of the CTD is fused at 500 mV, and the CTD runs at around 300 mV, so the deck unit is fused quite low. Even a high-resistance short in the cabling will cause the fuse to blow - it is very sensitive to shorts. Continue with **step 1.4.4**

1.4.3 If 270 V is present at the deck unit, proceed to Section 2.

1.4.4 Shorted Sea Cable: Before proceeding to find the short, be sure that the connector is still unplugged from the CTD endcap, and that the sea cable is unplugged from the deck unit. You now have essentially a "dead" cable from the lab to the CTD.

1.4.4.1 Check continuity from one end of the cable to the other. This is best done by jumpering the pins together at one end or the other, and measuring resistance at the other end. You will read the one-way resistance of the overboarding cable plus the ground resistance. The reading should be somewhere around 50-100 ohms. A very large reading indicates an open - be sure that your jumper is in place and secure. A small reading indicates a short somewhere.

1.4.4.2 Check for short: Remove the jumper you used for continuity check. Using the MEGGER, check the resistance between the conductor and armor of the cable (signal and ground). This reading should be in the range of 3-7 Megohms, and may fluctuate (get smaller) with time due to the capacitive effect between the armor and conductors. If this reading is large, then you do not have a short. If this reading is below 1 Megohm, then there is a short in the cabling system.

1.4.4.3 Break down the system to locate the short: Referring to the accompanying diagram, break the connections one at a time, checking each leg for continuity and shorts. Most shorts can be found in the wiring harness on the Rosette frame or in the underwater splice. Occasionally, the cable between the deck unit and slip rings will be crushed on deck, resulting in a short.

1.4.4.4 Once the shorted section has been located: Try to identify the source of the short, and resolve it. This may involve retermination of the cable, replacing one part of the harness, installing a new cable from the deck unit, cutting off some of the overboarding cable, etc. Once repairs are completed, check again for shorts and continuity before plugging everything back together.

2. Deck Unit fuse is not blown, there is 270V at the deck unit, but no 270V at the fish, and no signal

2.1 Cable is probably open: Before proceeding to find the open, be sure that the connector is still unplugged from the CTD endcap, and that the sea cable is unplugged from the deck unit. You now have essentially a "dead" cable from the lab to the CTD.

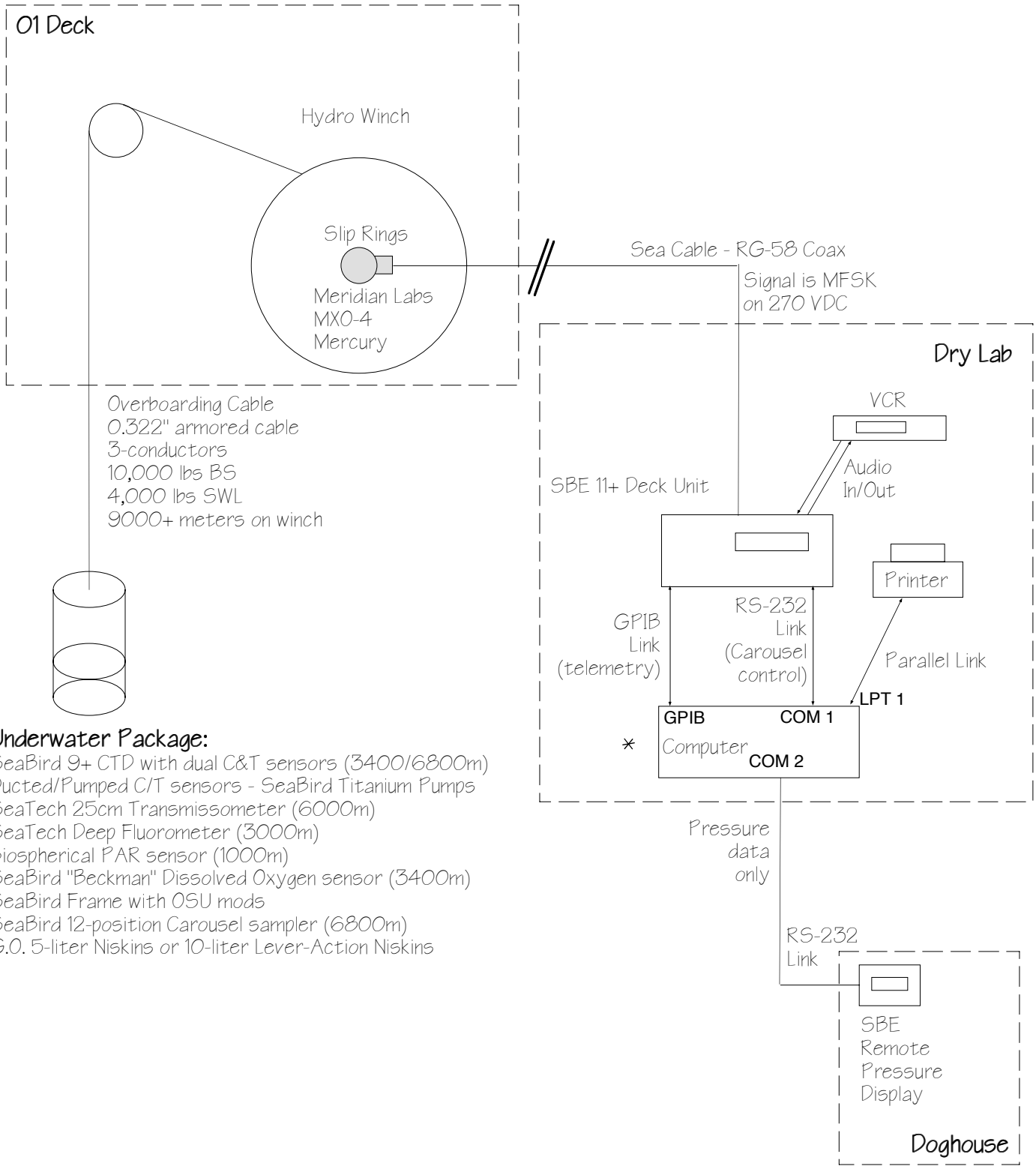
2.2 Check continuity from one end of the cable to the other. This is best done by jumpering the pins together at one end or the other, and measuring resistance at the other end. You will read the one-way resistance of the overboarding cable plus the ground resistance. The reading should be somewhere around 50-100 ohms. A very large reading indicates an open - be sure that your jumper is in place and secure. A small reading indicates a short somewhere.

2.3 Break down the system to locate the open: Referring to the accompanying diagram, break the connections one at a time, checking each leg for continuity. Most opens can be found in the wiring harness on the Rosette frame or in the underwater splice. Occasionally, the cable between the deck unit and slip rings will be crushed on deck, resulting in an open.

2.4 Once the open section has been located: Try to identify the source of the open, and resolve it. This may involve retermination of the cable, replacing one part of the harness, installing a new cable from the deck unit, cutting off some of the overboarding cable, etc. Once repairs are completed, check again for *shorts and continuity* before plugging everything back together.

OSU-COAS R/V WECOMA SeaBird CTD System

M.Willis, 4 Nov 98



Underwater Package:

SeaBird 9+ CTD with dual C&T sensors (3400/6800m)
Ducted/Pumped C/T sensors - SeaBird Titanium Pumps
SeaTech 25cm Transmissometer (6000m)
SeaTech Deep Fluorometer (3000m)
Biospherical PAR sensor (1000m)
SeaBird "Beckman" Dissolved Oxygen sensor (3400m)
SeaBird Frame with OSU mods
SeaBird 12-position Carousel sampler (6800m)
G.O. 5-liter Niskins or 10-liter Lever-Action Niskins

* Running DOS 6.X, SeaSoft Ver. 4.225

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