Field Service Spares Replacement Procedure – DAC-2X02 Motherboard Kit

Approval:

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Revision History

Rev.	ECO	Description of Change	Date
A	8798	Initial release	08-12-2011
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Field Service Procedure – Replacement DAC-2X02 Motherboard PCB Kit

1. Brief Summary:

Troubleshooting document for diagnosing a fault with and replacing the DAC-2X02 motherboard PCB.

2. Checklist:

- Verify the Heading Updates Correctly
- Verify Target Calculations
- Verify SW2 Switch Function
- Verify NV-RAM Saves Settings
- Verify ADE - BDE Communications

3. Theory of Operation:

The DAC motherboard calculates the target azimuth, elevation, and polarity angles of the desired satellite based on the vessels GPS position and heading input. The internal tuner provides a DC voltage output that is directly proportional to the level of the satellite signal input. The receiver output will be positive going (voltage increases as satellite signal level increases) between 0.00-5.00 VDC. This output is converted from the analogue voltage to a digital value by a 4096 bit A/D converter on the ACUs Main PCB. The L-Band tracking receivers (DVB and SCPC) produce approximately 20 counts of AGC per dB of satellite signal. Tracking signals are sent between the motherboard and PCU based on the highest AGC value from each dishscan revolution, commands are sent to the PCU to point the antenna accordingly and keep the receive signal optimised.

The comm IF module controls all the communications through the M&C, NMEA and Ethernet ports, including gyro compass and GPS updates as well as allowing local and remote monitoring via the Ethernet or serial M+C ports.

The motherboard has an internal FSK modem which is typically used with the xx04 and USAT configurations to multiplex the RS422 data and supply 24VDC power the pedestal. There is a jumper on the motherboard (JP3), which controls whether J4A or J4B is used for communication with the above decks equipment. J4B is the F type connection typically used with the xx04 and utilizing the DACs internal MUX, where as J4A is the 9 wire connection used in conjunction with an external below decks MUX.

The motherboard is universal between the different configurations of the DAC-2202 and 2302. However the software for the 2202 and 2302 are different and the jumpers must be correctly configured.

4. Verify the Heading Updates:

First check the gyro connections on the TMS and the connection into the DAC. Take caution as Electrical Shock Potentials exist on the Gyro Compass output lines. Assure that the Gyro Compass output is turned OFF when handling and connecting wiring to the Terminal Mounting Strip or the boards inside the ACU.

If the connections are correct verify the Gyro Type setting is correct for the provided gyro feed.

If you experience suspected failure of the NMEA, serial M+C, and Ethernet ports then this is likely a failure of the rabbit module and the motherboard needs replacing. If you experience what you believe is a failure of just one port then verify that the port is not locked. To do this web browse into the DACs built in HTML page and check the port settings.

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5. Calculations:

The internal look up table in the DAC calculates the target angles of the satellite based on the vessels GPS position. If the DAC is displaying incorrect target values (AZ and EL) the most likely cause is an incorrect GPS position creating an error in the target calculation. Therefore first the GPS should be verified. You can verify the target position of the DAC by entering the relevant coordinates into the Satellite Calculator spreadsheet (satpos1.xls; this can be downloaded from the PC software utilities section of the support site) to compare if the DAC's readings are correct.

6. SW2:

If the antenna enters a blockage zone, goes into search mode, or flags a stability limit error the DAC motherboard will provide a contact closure to ground on the SW2 output of the ships gyro port. This is typically used to switch arbitrators or to mute the TX of a satellite modem. The logic can be reversed by using the system type function; this may be necessary for correct switching of an arbitrator or for the TX inhibit to function correctly.

With the 25 pin ribbon cable connected between the ships gyro port of the DAC and the TMS you can verify the functionality of the transistor at SW2 on the motherboard. You should see a 0-12VDC change or vice versa depending on logic selection. To test this activate a blockage output from the tracking display window; when in the window scroll the cursor all the way to the right and then press the down arrow key. The tracking window should now display "blocked" and the voltage should have changed on SW2. If the voltage doesn't change the SW2 transistor of the motherboard has failed.

7. Verify the Settings Save:

All of the DAC settings including the tracking parameters and setup menu are saved on the motherboards NV-RAM (remote parameters are saved in the PCU). Once calibrated make a note of the settings for future reference, save the parameters and cycle the power to the DAC. Verify the setting have saved once the DAC powers up, failure to store the parameters is a failure of the NV-RAM on the motherboard. Should you find that your settings are not saving it is recommended you try a re-flash of the ACU software.

8. Verify FSK Modem Operation:

If no comms are present verify that jumper JP3 is in the correct position for your system configuration. For the XX04 and USAT series antennas using the internal FSK modem the jumper should be across pins 2 and 3, for a system with an external below decks FSK modem such as an XX06, XX09 or XX97 series antenna the jumper should be across pins 1 and 2.

If the system is having communication problems replacement FSK modems can be connected to quickly verify if the comms return and isolate whether the issue is caused by the above decks or below decks (also take into account the communications coax path and pedestal interface harness between the ADE modem and PCU).

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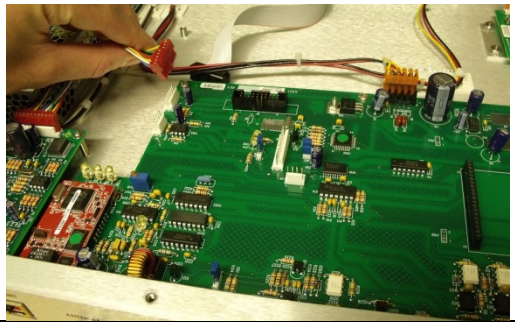
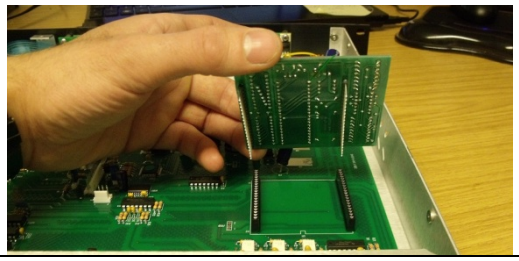
9. Replacing the DAC-2X02 Motherboard:

9.1. Tools.

- #1 Phillips Screwdriver
- ½" Wrench/Spanner
- 3/16" Wrench/Spanner
- Loctite 242

9.2. Procedure.

Procedure for replacing the DAC-2X02 motherboard, Sea Tel kit part number: 135370 (motherboard PCB part number: 124813-1).

***Caution:** Disconnect the AC Voltage to supply to control unit prior to performing the below procedure. ***Note:** PCB components are static sensitive and correct handling procedures must be adhered to. 1. Using a #1 Phillips screwdriver undo the 6 screws retaining the DAC lid and remove it.	
2. Now disconnect the 3 IDC cables from the DAC motherboard and the ribbon cable from the LCD Display.	
3. Remove the Synchro to Digital convertor (SDC) from the defective motherboard, noting how it fits and set aside.	

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4. Using a ½" wrench or socket undo the nut from the F-connector, J4B and remove the lock washer.	
5. Using a 3/16" wrench or socket undo the jack screws from the D-sub connectors in the rear panel of the DAC and set aside.	
6. Using a #1 Phillips screwdriver remove the 3 screws securing the motherboard, to the DAC shell and remove it.	
7. Remove the ½" nut from the J4B F-connector of the defective motherboard and install it on the replacement PCB.	

8. Install the replacement motherboard into the DAC by slotting the D-sub and Ethernet connectors through the back case of the DAC.

9. Loosely install the jack screws into the D-sub connectors.

10. Install the 3 screws to secure the motherboard into the DAC shell using Loctite 242 and then tighten the jack screws.

11. Then install the lock washer on the J4B F-connector and tighten the 1/2" nut.

12. Now connect the IDC and ribbon cables to the replacement motherboard and Install the Synchro to Digital convertor, taking care not to bend any of the pins.

13. Reinstall the lid and secure with the 6 screws removed in the first step of this procedure, apply Loctite 242 to the threads.

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