
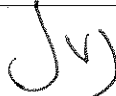



**Field Service Spares Replacement Procedure – 13V/18V ADE MUX,  
XX06RZA**

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Approval:

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Revision History

Rev.	ECO	Description of Change	Date
X1	8872	Initial release	08-18-2011
A	9059	Clerical revisions	10-30-2011

# ***Field Service Procedure – 13V/18V ADE MUX, XX06RZA***

## **1. Brief Summary:**

Troubleshooting document for diagnosing a fault with and replacing ADE MUX on the XXo6RZA series antennas.

## **2. Checklist:**

- Verify Harness and Coax connections
- Verify System Configuration
- Frequency Drift
- Verify LNB Voltage Switching

## **3. Theory of Operation:**

Pedestal communications are used so that target calculations, tracking decisions, drive commands and pol position updates can be sent from the DAC to the PCU, in turn the PCU will send the command to drive the relevant axis. The PCU will also communicate with the DAC for dishscan feedback and error information.

Commands are sent from the DAC as RS-422 (serial) data, which are then multiplexed into a frequency by the below decks FSK Modem. The comms signal is then passed along a coax cable to the pedestal where the above decks modem converts the communications frequency back into RS-422 and feeds it into the PCU. On unlimited azimuth systems the pedestal communications will be multiplexed onto an RF channel meaning no additional coax for the pedestal communications will need to be installed. VSAT systems with Codan RF equipment will use an additional pair of FSK Modems for communications with the BUC from the below decks.

A communication error (error 4) will be raised when a number of checksums that are sent from the DAC aren't returned by the PCU, its common to see this error displayed as an error 20 as if communications are down the DAC doesn't receive the dishscan pulse from the PCU so the dishcan error (error 16) is also flagged ( $4 + 16 = 20$ ). If no communications are established the DAC will display "Remote Not Responding".

## **4. Troubleshooting:**

A communication error could be caused by any component in between the DAC and PCU, this includes a damaged harness, damaged coax cables, loose connectors, a bad contact patch in the rotary joint, hardware failure of the FSK Modem(s) or possibly a power failure to the pedestal causing the PCU to not be energised.

## **5. System Connections and Configuration:**

Jumper JP3 on the DAC-2Xo2 motherboard is used to switch between the internal FSK modem and coax connection and the 9-pin D-sub connector for use with an external below decks modem. For use with an external below decks modem jumper JP3 should be between pins 1 and 2 (if using the internal FSK modem on the DAC motherboard for the XXo4 or USAT series antennas the jumper should be between pins 2 and 3).

Check all connections on the comms path between the ACU and the PCU. This includes the interface connection between the PCU and above deck FSK modem, the coax cable between the modem and rotary joint, the rotary joint and the connection in the radome base. Check the rotary joint by switching channel 1 and channel 2 for diagnostic purposes (always use the center channel for the transmit path). Next check the ACU-MUX harness is correctly installed the end marked "TAC-92" should go to "J4A" of the DAC-2202, "Radio M+C" should connect to MUX p/n: 117611-4 and "Ped M+C" should go to MUX p/n: 117168-2.

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If using a Codan system with dual muxes (117168-1/127169-5 and 117168-2 for pedestal comms and 117611-3 and 117611-4 for RF comms), which has a pedestal communications error the pair of RF modems can be switched with the pedestal modems to verify the communications path (they need to be switched as a pair as they transmit and receive on a different frequency to the pedestal modems).

### 6. Frequency Drift:

In extreme temperature conditions FSK modems have been known to overheat, causing the receive and transmit frequencies to drift. Try removing the above decks MUX and cooling it if you believe this to be a potential problem. Re-install the MUX and see if the comms return. If so then a solution will need to be found.

### 7. FSK Modem Failure:

Once it's been verified that the system is correctly configured, the installation is wired correctly and that the PCU is energised then the next step should be to look at them modems. Replacement modems should be used for diagnostics purposes to verify which modem is causing the communication failure.

### 8. Voltage Switching:

Sea Tel modem part number: 127169-5 outputs either 13VDC or 18VDC to switch between different bands of the LNB. A tone generator is installed on the pedestal to switch bands. Commands are sent from the tracking window of the DAC-2202 by selecting the relevant band of the LNB (1, 2, 3 or 4) to switch the modem voltage & tone generator to the below settings.

	Frequency Range	LO	Tone	Voltage
Band 1	10.95-11.70GHz	10.00GHz	No Tone	13V
Band 2	11.70-12.25GHz	10.75GHz	22Khz Tone	13V
Band 3	12.25-12.75GHz	11.30GHz	No Tone	18V
Band 4	10.70-11.70GHz	9.75GHz	22Khz Tone	18V

**\*Note:** Hot-plugging the LNB may cause damage to it, power down the system before disconnecting the LNB / modem.

To verify if the modem is switching the voltage correctly disconnect the coax cable from the tone generator & measure the voltage between the outer shell & center pin. If bands 1 or 2 are selected on the tracking window of the DAC the voltage should be 13VDC, if bands 3 or 4 are selected. Now change the tracking window of the DAC to an opposite band and verify the voltage switches from either 13VDC to 18VDC, or 18VDC or 13VDC.

If no voltage is present either the coax can be pinned out or the voltage can be measured directly on the F-connector of the modem by inserting a paper clip into the center channel & measuring between this and the outer edge of the connector.

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### 9. Replacing the 13V/18V FSK Modem:

#### 9.1. Tools.

- 2mm Flat Blade (Terminal) Screwdriver
- #1 Phillips Screwdriver
- 5/16" Wrench/Spanner
- 1/4" Wrench/Spanner
- Loctite 222.

#### 9.2. Procedure.

Procedure for replacing the 13VDC/18VDC ADE modem on the XXo6RZA antenna, Sea Tel kit part number: 135402 (modem assembly part number: 127169-5).

<p><b>*CAUTION:</b> Power down the pedestal before following this procedure.</p> <p>1. Using a 2mm flat blade screwdriver remove the harness connections from the pol aux relay.</p>	
<p>2. Now using a #1 Phillips screwdriver remove the 4 screws securing the pol aux relay to the assembly and remove it.</p>	
<p>3. Using a 7/16" wrench undo the coax cable from the pedestal modem to the tone generator.</p> <p>4. Now using a 5/16" wrench remove the SMA from the pedestal modem to the RF modem.</p>	

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5. Using a 2mm flat blade screwdriver disconnect the harness connection from the modem.



6. Using a 1/4" wrench undo the standoffs to remove the modem.



7. Install the replacement modem and reinstall the hardware, applying Loctite 222 to the standoffs and screws.  
8. Reconnect the harnesses D-sub connector.  
9. Reconnect the coax cable from the tone generator.  
10. Reconnect the SMA cable to the RF modem.  
11. Reinstall the pol aux relay applying Loctite 222 to the screws & reconnect the harness connections.

