




## **Field Service Spares Replacement Procedure – Terminal Mounting Strip Kit**

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### Revision History

Rev.	ECO	Description of Change	Date
A	9145	Initial release	03-02-2012

# ***Field Service Procedure – Replacement Terminal Mounting Strip Kit***

## **1. Brief Summary:**

Troubleshooting document for diagnosing a fault with and replacing the terminal mounting strip.

## **2. Checklist:**

- Configuration
- Jumper Settings
- Test Pin to Pin

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

The terminal mounting strip is provided to interface the vessels inputs into the DAC-2202, this can be a NMEA GPS input should you not want to use the one installed on the pedestal (in which case you'll need to disconnect the RJ-45/BNC connector from the PCU). As well as a NMEA gyro compass, step-by-step gyro compass or synchro gyro compass input to provide the antenna with a heading reference from north for targeting and stabilization purposes.

On a VSAT antenna the terminal mounting strip will also interface into the satellite modem for functions such as external modem lock where the DAC will use the satellite modems RX lock to identify the correct satellite and retarget the antenna if necessary. As well as the TX inhibit function where the DAC will inhibit the transmit function of the satellite modem if the system is searching, targeting, flags a stability limit error or enters a preset radiation hazard zone/blockage zone.

An arbitrator switch can also be connected to the terminal mounting strip to run dual antennas for both TVRO and VSAT antennas if blockage is an issue. So if one antenna enter a blockage zone the arbitrator will switch to the other antenna to offer a seamless transition of service. The arbitrator would also switch to the other antenna if the system in service performs an unwrap, drops it's AGC below threshold, is targeting, starts a search pattern or flags a stability limit error.

## **4. Modem Configuration:**

Below describes the terminal mounting strip connections and system type settings for the different types on satellite modem.

**\*Note:** System types are default settings for each modem, your airtime provide will give you the correct setting based on your systems configuration.

### **4.1. iDirect Modems.**

Infinity 3100 - Use an RJ-45 straight serial cable connected from the terminal mounting strip "console port" connector to the console port connector on the rear panel of the modem.

Infinity 5100 - Use an RJ-45 straight serial cable connected from the terminal mounting strip "console port" connector to the console port connector on the rear panel of the modem.

**\*Note:** JP4 on the terminal mounting strip must be removed when using iDirect 3000 and 5000 series modems.

Model	Lock output	Mute input	Recommended SYSTEM TYPE	GPS Input
Infinity 3100	LOW = Lock	HIGH to Mute	23	GGA string
Infinity 5100	LOW = Lock	HIGH to Mute	23	GGA string

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### 4.2. Hughes Modems.

A serial cable (Hughes drawing 1502273) should be provided with the modem. Connect the 15 pin to the serial port on the HX-150 or HX-200 modem and the RJ-45 connector to the terminal mounting strip "console port". Refer to instructions from your service provider for specific setting requirements.

Model	Lock output	Mute input	Recommended SYSTEM TYPE	GPS Input
HX-150	HIGH = Lock	HIGH to Mute	151	GLL string
HX-200	HIGH = Lock	HIGH to Mute	151	GLL string

### 4.3. Comtech Modems.

Connect the 126877 harness assembly provided with the terminal mounting strip from the 15 pin serial port on the 570L or 600L modem to the terminal mounting strip screw terminals.

1. Assure that a jumper is installed at JP4 on the terminal mounting strip.
2. Cut the resistor/yellow wire off of the pin on the white wire (do not cut the pin off of the white wire).
3. Connect the pin on the black and green wire to the GND terminal of the terminal mounting strip.
4. Connect the pin on the red wire to the SW2 terminal of the terminal mounting strip.
5. Connect the pin on the white wire to the EXT AGC terminal of the terminal mounting strip.

Model	Lock output	Mute input	Recommended SYSTEM TYPE	GPS Input
570L	LOW = Lock	LOW to Mute	7	Not Used
600L	LOW = Lock	LOW to Mute	7	Not Used

## 5. Jumper Settings:

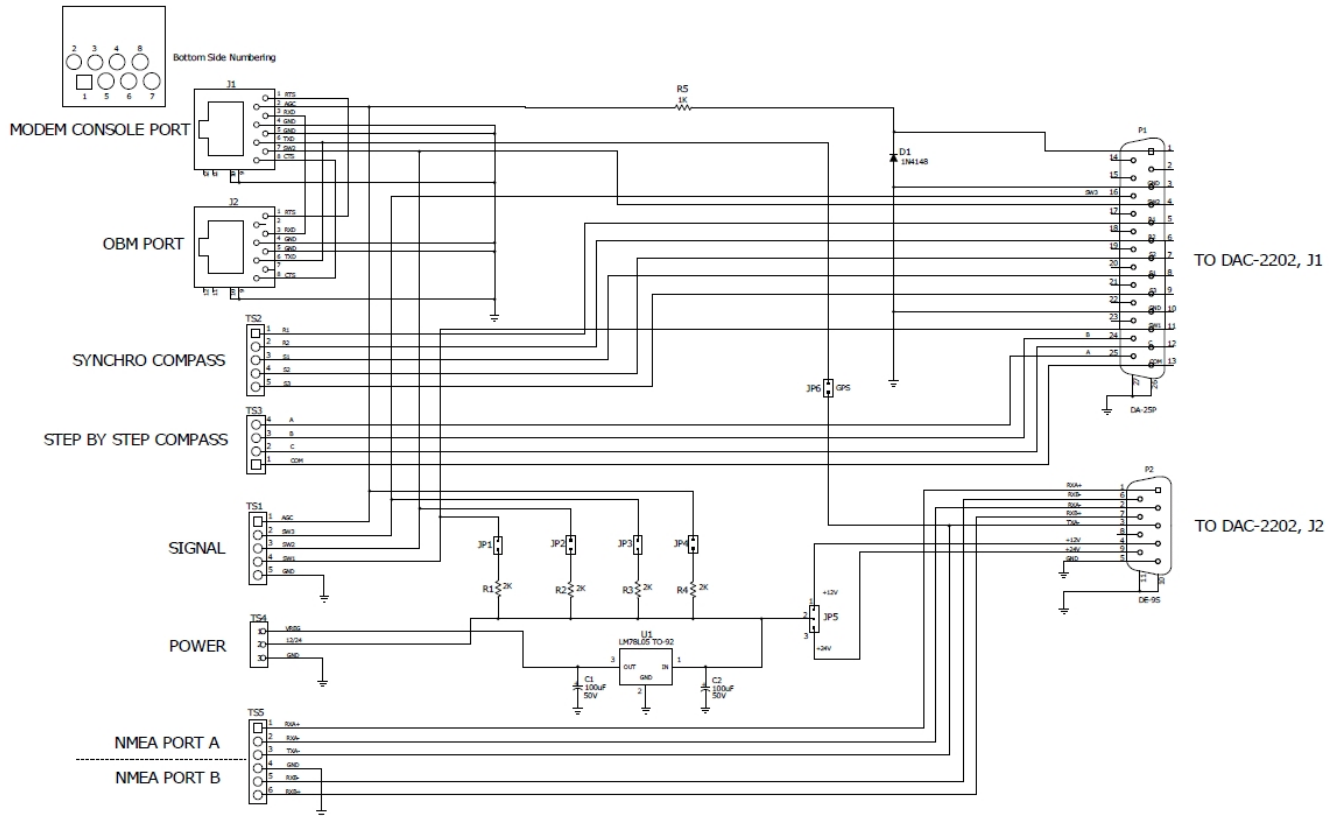
JP1 – JP4 are to couple in pull-up resistors for the below listed functions. JP5 selects the DC voltage output on TS4.

1. **JP1 SW1** – This output would be used for below decks band select - to control a band selection switch or tone generator. Default is open.
2. **JP2 SW2** (blockage and RF radiation hazard output) - Used to control dual antenna arbitrator, in dual antenna configurations, and provide TX mute control to the satellite modem. Default is shorted to ground when blocked.
3. **JP3 SW3** (reserved) - Reserved for future use.
4. **JP4 AGC** (external AGC input) - Pull-up for external AGC input from satellite modem which is used to a positive satellite Network ID when the modem is on the correct network (therefore the antenna is on the correct satellite). Default is shorted to ground. **\*Note:** This jumper JP4 must be removed when using iDirect 3000 and 5000 series modems.
5. **JP5 Voltage Output Select** - Select 12VDC or 24VDC. Default is 12VDC. If your modem is Open AMIP compatible and you wish to use it in an Open AMIP configuration you will use an Ethernet patch or cross-over cable as is appropriate to connect to your LAN.

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## 6. Test the TMS Pin to Pin:

If the DAC isn't receiving an update then the function of the terminal mounting strip can be verified by measuring continuity from pin to pin as per the below schematic, the schematic will also highlight any jumpers which if removed would cause a break in the connection.



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### **7. Verify The Switching Function of SW2:**

The blockage/TX mute control output is driven by blockage and RF radiation hazard functions. This output will short to ground whenever the antenna is within the programmed azimuth limit zone(s) or is searching, targeting or is mispointed 0.5 degrees from the satellite (stability limit error). This output is commonly used to drive:

1. When used as simple blocked logic output for a single Sea Tel antenna, this is used to alert the user that their antenna has entered a blockage zone and that the signal has been lost.
2. Dual antenna arbitrator coax switch configurations - The coax switches select which antenna is feeding RF signal to the below deck equipment.
3. Mute the transmit output of the satellite modem used in VSAT antenna configurations when the antenna is positioned where people may be harmed by the transmit power emanating from the antenna (RF radiation hazard).
4. Mute the transmit output of the satellite modem used in VSAT antenna configurations when the antenna is mispointed by 0.5 degrees, or more (stability limit error), and keep it muted until the antenna has been within 0.2 degrees of peak pointing to the satellite for a minimum of 5 seconds (FCC requirement).

**\*Note:** If your modem cannot use the modem console port connection you will have to provide a transmit inhibit output from the ACU by connecting a SW2 wire connection to the modem to comply with FCC Order 04-286 and WRC-03 Resolution 902.

To Test the blockage function:

1. Press the next key until you are at the status window of the DAC ("Sea Tel – Remote" will be displayed). Press the enter key to access the tracking menu.
2. Press the right arrow key to activate the cursor and then continue to press the right arrow to scroll the cursor along as far as possible. Now press the up arrow key followed by the enter button. The system will now be in simulated blockage mode and "BLOCKED" will now be displayed on the tracking window of the DAC.
3. Verify that the SW2 terminal shorts to ground (you should now be able to measure continuity between SW2 and ground on the terminal mounting strip). If the logic state of SW2 has been reversed by adding "16" to the system type you will now have an open circuit (no continuity between SW2 and ground on the terminal mounting strip). If the antenna is on the desired satellite and you have receive lock, also verify that the satellite modems transmit function is disabled (TX LED off).
4. Press the right arrow key to activate the cursor and then continue to press the right arrow key to scroll the cursor to the end of the window. Now press the left arrow key once followed by the up arrow key then press the enter button. This will disable the simulated blockage mode and "BLOCKED" will no longer be displayed on the tracking window of the DAC.
5. Verify that the SW2 terminal is open circuit (no continuity should be able to be measured between SW2 and ground on the terminal mounting strip). If the logic state of SW2 has been reversed by adding "16" to the system type you will now have a short to ground (you should now be able to measure continuity between SW2 and ground on the terminal mounting strip). If the antenna is on the desired satellite and you have receive lock, also verify that the satellite modems transmit function is enabled (TX LED on).

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### **8. Testing the Satellite Modem Lock (Network ID) Function:**

The input connections from the modem can be tested by selecting the external AGC input and monitoring the displayed value. To test the external AGC, set the tuning frequency to 0000. Normally, AGC readings below 800 are considered a low condition and indicate modem lock and AGC readings above 800 are considered a high condition and indicate modem unlock.

To test the satellite modem lock function:

1. Verify that the satellite modem currently has receive lock (RX LED on).
2. Press the track button to turn tracking off so the antenna stays pointed on satellite.
3. Press the next button until the satellite window is displayed and press the enter button three times to display the frequency window. Record the frequency that the tracking receiver is currently tuned to. Press either the left or right arrow keys to activate the cursor and use the up and down arrow keys to alter the digits and the left and right arrow keys to scroll the cursor along until the frequency is set to 0000 and press the enter button to tune the tracking receiver to this frequency.
4. View the current on satellite locked AGC value in the lower right corner of the display and measure the DC voltage from the EXT AGC (+) terminal to the GND (-) terminal on the terminal mounting strip. The iDirect and Comtech modems should have an AGC readings below 800 (lock = low conditions) and 0 VDC across the EXT AGC (+) and GND (-) terminals on the terminal mounting strip. The Hughes modem will have an AGC reading above 800 (lock = high condition) and 12VDC across the EXT AGC and GND terminals on the terminal mounting strip.
5. Disconnect the receive input coax from the rear of the satellite modem. It should lose receive lock (RX LED off).
6. View the current on satellite unlocked AGC value in the lower right corner of the display and measure the DC Voltage from the EXT AGC (+) terminal to the GND (-) terminal. The iDirect and Comtech modems should have an AGC readings above 800 (un-locked = high condition) and about +12 VDC across the EXT AGC (+) and GND (-) terminals. The Hughes modem will have an AGC reading below 800 (un-locked = low condition) and 12VDC across the EXT AGC (+) and GND (-) terminals.
7. Reconnect the receive input coax to the rear of the satellite modem. It should regain receive lock (RX LED on).
8. Press either the left or right arrow keys to activate the cursor and use the up and down arrow keys to alter the digits and the left and right arrow keys to scroll the cursor along until the frequency is set to the value recorded in step 3 is displayed and press the enter button to re-tune the tracking receiver.

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## 9. Replacing the Terminal Mounting Strip:

### 9.1. Tools.

- Small Phillips Screwdriver
- 2mm flat blade (Terminal) Screwdriver
- #2 Phillips Screwdriver

### 9.2. Procedure.

Procedure for replacing the terminal mounting strip, Sea Tel kit part number: 136432 (terminal mounting strip assembly part number: 121628-4). **\*Note:** Tools may vary depending on the hardware used to install the system.

**\*Caution:** Isolate the power to the rack before following this procedure. Verify if the vessel has a synchro gyro and if so have the voltage isolated.

1. Using a small Phillips screw driver loosen the retaining screws securing the NMEA and Ships Gyro connections from the DAC.



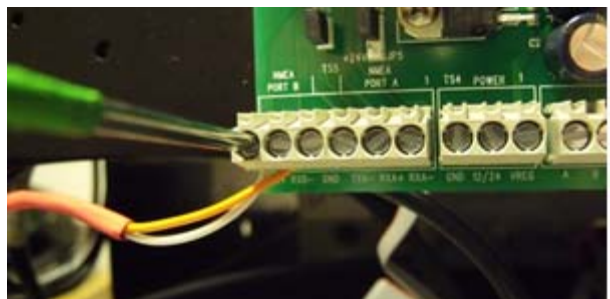
2. Disconnect the RJ-45 connector from the satellite modem.

**\*Note:** connection may vary depending on the installation configuration.



3. Disconnect the vessels gyro (and possibly GPS) connection from the TMS using a 2mm flat blade screwdriver. Make a note of their orientation.





**\*Note:** If the gyro has 5 connections it is a synchro gyro and outputs AC voltage. Have the vessel isolate the power and verify no AC voltage can be measured across the pins on the TMS before disconnecting.



4. Remove the 4 screws mounting the TMS to the rack. Save the hardware for future use.



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<p>5. Before installing the replacement TMS verify the jumper connections are configured correctly for your systems configuration (as per section 5 of this document).</p>	
<p>6. Apply Loctite 242 to the threads and install the replacement TMS using the hardware removed in step 4.</p>	
<p>7. Reconnect the gyro (and possibly GPS) connections to the TMS using a 2mm flat blade screwdriver.</p>	
<p>8. Connect the NMEA and Gyro connections to the rear of the DAC.</p>	
<p>9. Reconnect the RJ-45 cable to the satellite modem.</p>	