# Futronic GMDSS-AIS-SART Test Box User's Manual

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# INTRODUCTION

This manual covers the full-featured test box for GMDSS tests, AIS tests and Radar SART tests. If your test box does not include all these features, you are kindly requested to disregard the related sections in this manual.

### AIS Tests

The test box is capable of testing AIS transponders by making frequency measurements and power measurements on CH 70, AIS channel 1 or AIS channel 2.

It is possible to check the GMDSS communication on CH 70 by requesting reporting of Position, Length, Course, Name/Identity, Speed, Power or Ship's beam.

AIS communication is checked by sending data to an AIS transponder or receiving data from an AIS transponder.

The test box is able to simulate a ship appearing at four different positions, relative to the AIS transponder's position.

The test box can also be used for the testing of AIS-SART emergency beacons, as it can receive and decode test calls on AIS channel 1 and 2.

#### **GMDSS** Tests

The test box can check DSC signals transmitted on any of the 6 distress frequencies on MF/HF and on VHF CH 70.

The test box can send either a GMDSS distress signal (all ships call) or a selective test call addressed to a particular MMSI number. The calls can be sent on any of the 6 distress frequencies on MF/HF as well as on VHF CH 70. Furthermore, the test box can send and receive DSC signals on the international calling frequencies 2177.0 and 2189.5 kHz.

The test box measures and displays the mark/space frequencies of the received DSC-signals.

When used as an ordinary frequency counter the test box measures frequencies in the range 0.4 MHz to 475 MHz.

On VHF CH 6 the test box can measure the deviation on a received signal.

The test box is able to measure the transmitted and reflected power on any VHF channel, and also to test the sensitivity of the receiver part.

For the testing of NAVTEX receivers, the test box can send NAVTEX signals on 490 kHz, 518 kHz or 4209.5 kHz.

The test box can also be used for control of signals from EPIRBs, as it can receive and decode test calls on 406.025 / .028 / .037 /.040 MHz as well as receive the 121.5 MHz homing signal.

All measurements can be monitored on the LCD display and results are stored in the test box memory from where it can be transferred to a PC for subsequent printing.

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# **TEST BOX**

Front View

GMD	SS-AIS-SART TEST BOX	RF IN The formation of the second se
1 2		6 7
1 2 – 5 6 7	Two-Line LCD display Push buttons BNC socket for signal output BNC socket for signal input	
Rear View		9 8
OUT OUT OUT OUT OUT OUT OUT OUT OUT OUT	IN IN VHF POWER TEST Optional RS 232 IC 406 IN Optional IS DATA OUT IS Optional IS Optional IS Optional IS Optional IS Optional IS IS Optional IS IS Optional IS IS IS IS IS IS IS IS IS IS	ART TEST ANTENNA WHF DUMMY LOAD OFF BATTERY FUSE EXTERNAL POWER IN EXTERNAL POWER IN 12 - 28 VDC
1	2 3 4	5 6 7

- 8
- Slide switch for switching the test box ON/OFF BNC socket for connection of VHF dummy load 9

# ACCESSORIES

The test box comes with the following standard accessories:

- 1 pcs Power adaptor 100-240 VAC / 15VDC
- 1 Cable for external DC power
- 1 RS232 cable for PC (pin1 to pin1, pin2 to pin2, etc.)
- 1 1 kHz AF generator
- 1 AIS signal combiner / dummy load
- 1 Telescopic antenna for VHF/AIS
- 1 Wire antenna for MF/HF/NAVTEX
- 1 Coax cable, 25 cm, with BNC
- 2 Coax cable, 168 cm, with BNC
- 1 Coax cable, 500 cm, with BNC
- 2 UHF plug to BNC socket adapter
- 1 UHF socket to BNC socket adapter
- 1 BNC female to BNC female adapter
- 1 User's Manual in English
- 1 Calibration Certificate

The following accessories are available as an option:

#### **RF Amplifier**

If the test box signal is not strong enough when testing NAVTEX receivers and MF radios over the air, adding this RF amplifier will increase the output level by 15-20 dB.

### Watertight and Crush Proof Case

This case is specially configured to hold the tester and accessories safe and secure. Weight only 3.9 kgs. External dimensions: 486 x 392 x 192 mm.

# **POWER SUPPLY**

The test box has an internal DC/DC switch mode power supply that can be connected directly to an external DC source of 15 - 28 V (+ on the center pin).

Furthermore, a wall plug power supply allows the test box to be connected to 100 - 240 V AC, 50-60 Hz.

The test box is equipped with an internal rechargeable 12 V battery. Whenever DC is connected to the test box, the battery is charged. If the DC supply is removed, the internal battery delivers DC to the test box and gives an uninterrupted switch between external and internal DC supply.

Before using the test box in the field, make sure that the internal battery is fully charged.

When the internal battery is close to being discharged this is indicated by a blinking on the LCD display and then, shortly after this, the power is cut off so as not to damage the battery.

A power shutdown does not influence data stored in the test box, as the data storage has a separate back up battery.

# POWER ON AND WARM-UP

After power on, the software revision date is shown in the LCD-display. The letter in the end describes the hardware version.

After a few seconds the display switches automatically to time mode. Before moving further on, allow the test box 3 to 10 minutes' warm-up time in order to make the OCXO stable. The warm-up time depends on the temperature of the test box before warm-up. At a temperature of 20°C, 3 minutes should be OK.

# **PUSH BUTTON CONTROL**

The test box is controlled by means of 4 push buttons marked MODE, UP, DOWN and OK.

**MODE** is used to scroll down to the various test modes. UP can be used to scroll up.

**OK** is used to enter the mode being shown in the display.

**UP** and **DOWN** are used if the display offers multiple options, e.g. shifting between various frequencies, setting the time and editing the MMSI number.

Usually, help texts in the display indicate which buttons should be used. Then, use the button located directly under the actual text.

# TIME SETTING

In the time setting mode, accept the date already presented, or set a new date, month and year and press END. When the time is set, the test box will display the status of the internal memory, i.e. how many recordings can still be stored in the test box. Then, press OK and go to the self-test as described below.

# SELF TEST

In the SELFTEST mode it's possible to check the function of some of the circuits in the test box. This should be used to check the test box before it is used for inspection of a GMDSS installation. The following self-test functions can be performed:

**PLL-TEST**: This mode performs an automatic test to assure that the frequency synthesizer controlled oscillator goes into "lock" at all the applied synthesis frequencies. The frequency synthesizer controlled oscillator is programmed to each frequency in turn and then the "lock detect" output is watched for about 1 sec. to check for a correct lock. In case of a lock failure, the test is stopped and the LCD display indicates the frequency out of lock. The test continues when one of the push buttons are activated.

**FRQ TEST**: This mode is used for test of the MARK/SPACE frequencies in the MF/HF range by means of the internal frequency counter.

To check the generation and measurement of MF/HF mark/space frequencies, connect a coax cable from RF IN to RF OUT, choose the MF/HF frequency to be checked and select MARK or SPACE:

 $\Theta \Theta \Theta \Theta$ 

FRQ TEST gives the possibility for control of MF/HF MARK/SPACE frequencies as well as the frequency counter as the chosen MARK/SPACE frequency is available at the RF OUT socket and can be measured via RF IN. The result is shown on the LCD display. The SPACE frequency should be 85 Hz higher than the centre frequency. The MARK frequency should be 85 Hz lower than the centre frequency.

# **OVERVIEW OF TEST MODES**

The table below shows the mode and menu tree. Modes and menus, test setups and measurements are explained in more detail on page 12 and onwards.

Mode	Main Menu	Sub Menu 1	Sub Menu 2
SELF TEST	FRQ	FREQUENCY	MARK SPACE
	PLL-TEST		
	FRQ MEASUREMENT	CH70 AIS 1 AIS2	
	PWR MEASUREMENT	CH70 AIS 1 / 2	
		ОК	CH 70
	GMDSS COMM. CH 70	NEXT	CH 06 CH 15 POLL DATA
	AIS RECEIVE	DATA	LCD CLR RS232
		AIS 1 AIS 2	
	AIS REC. LOOP	DATA	LCD CLR RS232
AIS TEST		AIS 1 AIS 2	
	AIS-SART TEST	DATA	LCD CLR RS232
		AIS 1 AIS 2	
		PC	DATA FROM PC
	AIS TEST SEND	AIS 1 AIS 2	
	REQUEST MSG 5	AIS 1 AIS 2	
		LONG RANGE	AIS 1 AIS 2
		SHORT RANGE	AIS 1 AIS 2
	NMEA TEST	CUST	PC SEND
		HDG	SEND

Mode	Main Menu	Sub Menu 1	Sub Menu 2
	CARRIER AMPL.	2187.5 kHz 16804.5 kHz 156.300 MHz 156.525 MHz	
	SENSITIVITY TEST	CH 06 CH 13 CH 16 CH 67	
	EDIT MMSI NR.	MMSI Number	Hour/Date/Month/Year
		DISTR	VHF MF/HF
	SEND DSC	TEST	VHF TFC MF/HF
		GET	DATA FROM PC
GMDSS TEST	CUSTOM MESSAGE	SEND	VHF TFC MF/HF
	SEND NAVTEX	490 kHz 518 kHz 4209.5 kHz	
	RECEIVE DSC	VHF TFC MF/HF	
	RECEIVE ATIS	CH 06 CH 15	
	VHF PWR MEASURE	CONT MEAS	
	FM DEVIATION	CAL MEAS	
	AM / 123.1 MHZ	IMG	FRQ AF
		ORD	FRQ AF
	MEMORY FUNCTION	CLR SELE RS232	
	EPIRB TEST	406.025 MHz 406.028 MHz 406.037 MHz 406.040 MHz 121.5 MHz	DATA FRQ MEAS
RADAR SART TEST	SART TEST	SART NO.	
FREQUENCY COUNTER	FRQ COUNT	0.4 to 475 MHz	MEAS CONT

# **TESTING AIS TRANSPONDERS**

Go to the AIS TEST mode and scroll through the various sub modes by pressing the MODE button or the UP button.

Before you start testing, remember to enter the AIS transponder's MMSI number into the test box.

You can check the actual number registered by the test box in the EDIT MMSI menu as shown on page 20. In this menu you can also edit the number or enter a new one, if required.

The MMSSI number can also be automatically transferred to the test box by receiving an AIS1 or AIS2 call from the transponder. Use the setup shown on page 16: AIS RECEIVE.

Some approved AIS transponders do not facilitate communication on CH70. In this case the testing of frequency, output power and polling information are not applicable for CH70.

#### **Frequency Measurement**

Pressing OK in the frequency measurement mode gives you a choice between frequency measurements on CH 70, AIS1 or AIS2.

For frequency measurements on the AIS1 and AIS2 channels, use this setup:





Frequency measurement on CH 70 requires the use of the signal combiner delivered with the test box and this setup:



Example of Printout from the Memory:

```
CONTROL MEASUREMENT ON MMSI NO.: 0036699900 - HOUR:04 DATE:03-08-2005
AIS - AIS1: 161,975.0KHZ, LEVEL: 178
AIS - AIS2: 162,025.0KHZ, LEVEL: 176
AIS – CH 70: 156,525.2KHZ, LEVEL: 171
```

#### **Power Measurement**

For measuring the output power on **AIS channel 1 or 2**, use the setup below and wait for the automatic transmission from the AIS transponder.

The test box must receive a trigger signal on RF IN in order to start the power measurement. If the test box waits for more than 20 seconds, the trigger signal level might be too low. Then connect a VHF antenna to RF IN (dotted figure):



For measuring the output power on **CH70**, use the setup below.

The antenna on RF OUT is used for the test box to send a request to the AIS transponder to do a transmission on CH70.

The test box must receive a trigger signal on RF IN in order to start the power measurement. If the test box waits for more than 20 seconds, the trigger signal level might be too low. Then connect a VHF antenna to RF IN (dotted figure):



#### GMDSS Comm. CH 70

With the GMDSS COMM. CH 70 mode and the setup below, the test box can be used to poll AIS information from the transponder on CH70 or on the alternative channels 06 and 15.



The AIS transponder can be polled for information on position, length, course, name/identity, acknowledge message, speed and VTS expansion.

In the GMDSS COMM. CH 70 mode, press OK.

In the SWITCH VHF CH 70 mode:

- press OK if you wish to set the transponder to CH 70,

- press NEXT and OK if you wish to set the transponder to CH 06,
- press NEXT again and OK if you wish to set the transponder to CH 15.
- press NEXT again and OK to poll position,
- press NEXT again and OK to poll length,
- press NEXT again and OK to poll ... etc.

After each polling, wait for the transponder to respond and check the polling data appearing on the test box display. Upon your OK, the test box will return to the SWITCH VHF CH 70 mode, from where you can scroll down to the next polling, and so on.

Note, that the VTS EXPANSION mode has two sub modes: TRANSMITTER POWER LEVEL and SHIPS BEAM.

If you select the alternative channels 06 or 15, remember to switch back to CH 70 later on using the SWITCH VHF CH 70 menu.

Example of Printout from the Memory:

MEASUREMENT MADE BY GMDSST SERIAL NUMBER: 20091013 SW: Rev 1.Feb.2010I

CONTROL MEASUREMENT ON MMSI NO .: 2195576240 - HOUR:05 DATE:01-02-2010

CH70-156.525MHZ FORMAT: 120 ADR.:9999999990 CAT.: 103 SELFID.:2195576240 POSITION: 57d12.3827' N 009d40.6788' E TIME: 14:04:50

CH70-156.525MHZ FORMAT: 120 ADR.:9999999990 CAT.: 103 SELFID.:2195576240 LENGTH OF SHIP: 70M

CH70-156.525MHZ FORMAT: 120 ADR.:9999999990 CAT.: 103 SELFID.:2195576240 MESSAGE ACKNOWLEDGED

# **AIS Receive**

This setup is used for AIS RECEIVE and AIS REC. LOOP:



In the AIS RECEIVE mode you have a choice between DATA, AIS1 and AIS2.

Selecting AIS1 or AIS2 enables the test box to receive and store one set of data on AIS1 or AIS2. Note, that it may take up to 20 seconds until the AIS transponder transmits its data.

Selecting DATA offers three further options:

LCD displays the list of received AIS messages by MMSI number and message type. The messages are displayed in order of time as received with the latest message first. You may toggle between the messages and then press OK repeatedly to view the encoded data.

CLR clears the test box memory of old AIS data.

RS232 sends the received AIS data out on the RS232 connector, from which the data can be transferred to your PC via the RS232 cable supplied with the test box. See page 34.

Example of Printout from the AIS Memory:

\$AIS2 04 1A 9F 3F 2E 20 3F F3 3C 8D 60 34 12 14 0E 10 FF F8 06 70 F0

Coded AIS data can be decoded and viewed by using the decoding option of the Custom Message Software available for download at Danphone's website. See page 37.

#### AIS Rec. Loop

In this mode you also have a choice between DATA, AIS1 and AIS2.

Selecting AIS1 or AIS2 enables the test box to continuously receive data on AIS1 or AIS2.

Selecting DATA offers three further options:

LCD displays the list of received AIS messages by MMSI number and message type. The messages are displayed in order of time as received with the latest message first. You may toggle between the messages and then press OK repeatedly to view the encoded data.

CLR clears the test box memory of old AIS data.

RS232 sends the AIS data to the RS232 connector, from which the data can be transferred to your PC via the RS232 cable supplied with the test box. See page 34.



When performing AIS-SART tests, always use the <u>test mode</u> on the device. Doing so, the beacon will radiate an AIS message of type 14 with the text "AIS TEST" along with an AIS message of type 1 containing the beacon's actual position and other AIS data. By receiving these two messages the test box confirms that the AIS SART is working all right.

If the AIS-SART is accidentally activated in the emergency transmission mode, it will radiate the text "AIS ACTIVE". This will alert nearby ships and coast stations. Then, the device should be turned off at once and the false alert reported to the nearest coast guard station or Search and Rescue centre.

When performing AIS-SART tests, do NOT use an antenna with the test box. Place the beacon within a range of 0.5 - 1 meter and do as follows:

1) On the test box, select AIS-SART TEST and AIS channel 1 or 2. Then the display will show "Waiting for AIS TX" on the actual AIS channel.

2) Activate the AIS-SART in test mode. It may take several minutes until the AIS-SART has found its position and will transmit the messages accordingly.

3) As soon as the AIS Message 1 and Message 14 are both received, the display will change from "Waiting" to presenting the messages. This also confirms that they are now stored in the test box AIS memory.

4) Press PREV or NEXT to toggle between the received messages. Please note, that there might be old AIS messages as well in the list. The messages are displayed in order of time as received with the latest message first.

5) Under each message, press OK repeatedly to view the encoded data.

Received AIS messages can also be accessed from the AIS-SART TEST entry mode. Selecting DATA here offers these three options:

LCD displays the list of received AIS messages.

CLR clears the test box memory of old AIS data.

RS232 sends the received AIS data to the RS232 connector, from which the data can be transferred to your PC via the RS232 cable supplied with the test box. See page 34.

# **AIS Test Send**

This setup is used for AIS TEST SEND, REQUEST MSG5 and SIMULATE SHIP:



Performing the AIS TEST SEND requires that a test message has been loaded into the test box AIS memory. Such message can be either a custom-made message prepared on a PC, or a fixed default message 1 available from the test box.

To prepare a custom made AIS message on a PC, make use of the Custom Message Composer software that can be downloaded from Danphone's website. See page 37.

Once composed, the message can be transferred from the PC to the test box via the RS232 cable supplied with the test box. Connect the cable and select AIS TEST SEND on the test box and press OK. Then press PC and the display shows RECEIVE DATA FROM PC. Press "Transfer" on the PC. This will load the message into to the test box.

If you do not wish to load a custom-made message, the test box enables you to load a fixed default message 1. The method of loading the default message into the test box is as follows: Select AIS TEST SEND and press OK. Then select PC and press END. Please note, that the fixed default message 1 includes a vessel position of 45°N 45°W.

To transmit a test message from the test box, select AIS TEST SEND and press OK. Then press either AIS1 or AIS2 and the test box will automatically synchronize with the AIS transponder. Waiting for synchronization may take up to 20 seconds. However, pressing the OK button during "waiting" will start the transmission immediately.

The test message will be kept in the test box memory. Next time you wish to transmit the message, just select AIS TEST SEND and press either AIS1 or AIS2.

#### **Request Message 5**

The mode REQUEST MSG 5 uses the MMSI number from the last received AIS message. Press OK and select AIS channel, and the test box will automatically synchronize with the AIS transponder, transmit the request and then switch to receiving mode.

Example of Printout from the AIS Memory:

\$AIS1 14 1A 9F 3F 2C 1A 76 E7 00 60 D3 80 94 C0 19 55 12 3C E2 43 00 00 00 00 00 00 00 00 00 00 14 02 81 8D 24 2D 8C 01 91 00 4E 11 25 50 00 00 00 00 00 00 00 00 00 00 00\*

Coded AIS data can be decoded and viewed by using the decoding option of the Message Composer and Decoder Software available for download at Danphone's website. See page 37.

#### Simulate Ship

The SIMULATE SHIP is a mode in which a virtual ship is placed at four different positions relative to the position of the AIS transponder being tested.

Using the SIMULATE SHIP mode requires that the test box has received a position from the transponder, for instance via MSG1 or 3.

If an AIS transponder does not register its own position, for instance due to a broken or missing GPS antenna, it will transmit an invalid position of 91 °N 181 °E. Please note, that some transponders do not accept invalid positions and will consequently not display them.

In the SIMULATE SHIP mode, press **Short** or **Long** to initiate transmissions from the test box. Select **Short** if you wish to have the virtual ship placed at a short distance (~50 meter) around the transponder. Select **Long** if you wish to have the ship placed at a longer distance (~800 meter).

After transmission of the first position, the test box waits for response from the AIS transponder before the next position is transmitted, and so on.

#### **NMEA** Test

With the NMEA TEST mode, the test box can transmit NMEA signals via the RS232 port (B-signal on pin no. 1, Ground on pin no. 5 and A-signal on pin no. 9).

The NMEA test mode offers you a choice between CUST. and HDG.

Select HDG. (= Heading) in order to transmit a standard NMEA heading signal.

Select CUST. (= Custom sub mode) in order to transmit a custom-made NMEA string. You can compose and store the string yourself using the Message Composer and Decoder Software available for download at Danphone's website. See page 37.

# **TESTING GMDSS EQUIPMENT**

Before you start testing, remember to enter the GMDSS station's MMSI number into the test box.

You can check the current MMSI number registered by the test box in the EDIT MMSI menu as described below. In this menu you can also edit the number or enter a new one, if required.

The MMSSI number can also be automatically entered in the test box by receiving a DSC call from the GMDSS station. Use the setup shown on page 25: RECEIVE DSC.

### Edit MMSI Number

By pressing the OK button in this menu, the display will show the current MMSI number registered by the test box. The number can also be edited: Pressing UP or DOWN changes the digit marked by the cursor. Pressing OK moves the cursor to the next digit.

*In the editing mode, the number displayed is a 10-digit number. It is the 9-digit MMSI number followed by an extra digit that is usually set to 0.* 

When editing is completed, press MODE.

After editing the MMSI number it is possible to set the time and date (hour/date/month/year).

When the time and date setting is completed, press the MODE button. Then the display shows how many free records are left in the memory. Initially, there are 719 records available.

### Carrier Ampl.

The CARRIER AMPL. mode can be used to check the signal strength level of the received signals at the following frequencies: 2187.5 kHz, 16804.5 kHz, 156.300 MHz and 156.525 MHz.



¥	
	GMDSS TRANSMITTER
	O ANT.

The level figure is used to indicate if the signal strength is sufficient to ensure proper radio communication between the test box and the GMDSS station during the following tests.

To measure the actual signal strength level, select CARRIER AMPL. and frequency. Then, press OK and start transmission from the GMDSS station. The signal strength level appears in the test box display. A figure of 70 or higher is advisable.

Press OK again to leave the CARRIER AMPL. mode again.

# Sensitivity Test

In the sensitivity test mode, the test box outputs a modulated signal on VHF channels 6, 13, 16 and 67 respectively. With an external attenuator this test can be used to check the sensitivity of a ship's VHF radio. The modulated signal can be heard and checked in the radio's speaker.

With sensitivity tests, use this setup:



Select SENSITIVITY TEST and press OK. CH06 will appear as the default channel in the display. Other channels can be selected by pressing the UP or DOWN button. At the desired frequency, press SEND and the test box will keep sending the modulated signal. To stop the transmission, press END.

In the sensitivity test mode, it is very important to use coax cables for the connection of the equipment.

For reference, the test box RF output level is approx. -36 +/- 2 dBm.

This test mode can also be used to simply check if the modulated signal is well received over the air:





# Send DSC

In preparation of making DSC test calls, the first choice is to decide if a distress call (DISTR) or a selective test call (TEST) is to be transmitted.

In the DISTR mode, there is a choice between VHF and MF/HF.

At VHF the frequency for CH 70 is shown, and pressing OK initiates a transmission.

At MF/HF, select the desired frequency with the UP/DOWN buttons. Press OK at the desired frequency, and the call sequence will be transmitted.

In the TEST mode, there is a choice between **VHF** on 156.525 MHz, **TFC** on 2177.0 kHz or 2189.5 kHz, and **MF/HF** on 2187.5 kHz, 4207.5 kHz, 6312.0 kHz, 8414.5 kHz, 12577.0 kHz or 16804.5 kHz.

At MF/HF and TFC TEST calls, there is a choice between reduced power (-70 dBm) and normal power (-15 dBm).

Send a DSC Distre	ess Call	
GMDSS-AIS TEST BOX	RFIN	GMDSS RECEIVER
	Change of the second se	ANT.

In the SEND DISTRESS mode, it is important to use a coax cable for the connection between RF OUT on the test box and the antenna connector on the GMDSS receiver that is to be tested. This will prevent other ship stations to be alerted. Then select frequency and press OK to send the call.

### Send a DSC Selective Call

To send a selective DSC call, connect the relevant antenna supplied with the test box to RF OUT. At VHF, use the telescopic antenna. At MF/HF, use the wire antenna. Make sure that the test box antenna can "see" the receiver's antenna. In the SEND TEST mode, select frequency and press OK.



In the MF/HF and TFC mode, select NORMAL or REDUCED output power. Usually, NORMAL is recommended. Press OK to send the call. If the transmission signal is not strong enough to enable the test, you may use the RF Amplifier (optional accessory) as shown below.



### **Custom Message**

The CUSTOM MESSAGE mode enables the test box to send custom-made messages composed on a PC. The Message Composer software can be downloaded to the PC from Danphone's website. See page 37. For the composition of a DSC call, see next page.

Once composed, the message can be transferred from the PC to the test box via the RS232 cable supplied with the test box. Select CUSTOM MESSAGE / GET on the test box and then press "Transfer" on the PC. This will transfer the message to the test box.

To transmit the custom-made message from the test box, press CUSTOM MESSAGE / SEND and select band and frequency.

#### **Composition of DSC Calls**

DSC calls are composed as shown below. VHF calls start with a 20 bits header, i.e. 5 times 1010 MF/HF calls start with a 200 bits header, i.e. 25 times 10101010.

#### **Distress Calls**

#### A VHF distress call transmits the following information:

112, 112	Format specifier - Distress call
99,99,99,99,90	Testbox "MMSI no".
107	Category - Undesignated distress
99,99,99,99,99	Coordinates - 99 99 99 99 99 at test.
88,88	Time - 88 88 at test.
100	First telecommand
127	EOS - End of sequence
57	Modulus-2 checksum
The call is only send once.	

#### A MF/HF distress call transmits the following information:

5
Format specifier - Distress call
Address - Testbox "MMSI no".
Category - Undesignated distress
Co-ordinates - 99 99 99 99 99 at test.
Time - 88 88 at test.
First telecommand
EOS - End of sequence
Modulus-2 checksum

#### **Test Calls**

#### A VHF selective call transmits the following information:

120,120	Format specifier - individual call.
21,95,57,62,40	Address - 2195576240
100	Category - Routine
99,99,99,99,90	Self identification = Testbox "MMSI no".
100	First telecommand
126	Second telecommand
90 0 6 90 0 6	Frequency or channel
117	Ack. RQ End of sequence
76	Modulus-2 checksum
The call is only sent once.	

#### A **MF/HF selective call** transmits the following information:

120,120	Format specifier - individual call.
21,95,57,62,40	Address - 2195576240
108	Category - safety
99,99,99,99,90	Self identification = Testbox "MMSI no".
118	First telecommand
126	Second telecommand
126 126 126 126 126 126	Frequency or channel 126 transmitted six times
117	Ack. RQ End of sequence
86	Modulus-2 checksum
The call is only sent once.	

A TFC call transmits the following information:120, 120Format specifier -21,95,57,62,40Address - 219557100Category - Routin99,99,99,99,90Self identification109, 126First telecomman126 126 126 126 126 126Frequency or cha127EOS - End of seq79Modulus-2 checksThe call is only sent once.First telecomman

Format specifier - Individual call. Address - 2195576240 Category - Routine Self identification = Testbox "MMSI No". First telecommand and Second telecommand Frequency or channel 126 transmitted six times EOS - End of sequence Modulus-2 checksum

# Send NAVTEX

In this mode the test box can send a NAVTEX test message on 490 kHz, 518 kHz or 4209.5 kHz to a NAVTEX receiver in order to check the NAVTEX receiver/printer.

Connect the wire antenna supplied with the test to RF OUT. Select SEND NAVTEX and frequency, and press OK to send the NAVTEX test message.

If the signal is not strong enough to enable the test, you may connect the RF Amplifier (optional accessory) as shown below.



Two different NAVTEX messages are being sent – a navigational warning and a SAR message. Check that the NAVTEX receiver prints the following messages:

NAVTEX MESSAGE XA00 0123456789ABCDEFGHIJKLMNOPQRSTU NAVTEX TEST SEQ BY FUTRONIC GMDSS TEST BOX

NAVTEX MESSAGE XD00 0123456789ABCDEFGHIJKLMNOPQRSTU NAVTEX TEST SEQ BY FUTRONIC GMDSS TEST BOX SECOND TIME

X = Transmitter ID, A = Navigational warning, D = SAR message, 00 = Message No

Please note that the NAVTEX receiver may have been set to neglect routine messages with a transmitter ID letter and message number already received within a certain period of time. If so, a test message from the test box may also be neglected by the receiver.

# **Receive DSC**

In order not to disturb other ships' GMDSS equipment, make the calls to the ship's own MMSI number, if possible. If this is not possible, maybe a 999999999 number can be used.

When operating on MF or HF frequencies, the test box's antenna should be able to "see" the transmitter's antenna.



In the RECEIVE DSC mode, the first choice is whether to receive on VHF, MF/HF or MF.

At VHF there is a choice between frequency measurements (FRQ) and receiving of DSC data.

At FRQ, the test box waits until the VHF set is activated. The frequency is measured and shown on the LCD display. The frequency measurement can be used both for measurement of the DSC signals frequency and for measurement of un-modulated signals. Channels that are close to CH 70 can also be measured in this mode, provided that the signals have enough amplitude (approx -10 dBm). The measured frequencies are stored in the memory.

At DSC, the test box will wait for a DSC call. A short press on any of the buttons can interrupt the waiting state.

Received DSC data is collected and a check is made to assure that the checksum is OK. Status and MMSI number is shown on the LCD display and is also stored in memory, provided that the checksum is OK.

At MF/HF, the receive frequency is selected by UP or DOWN. Pressing OK will start the reception of DSC data.

The test box remains in receive mode until a DSC call is received. The mode can be interrupted by a press on any of the buttons, provided that the test box has not started to receive a call, in which case one has to wait for approx. 10 seconds.

When a DSC call is received, status for the receiving and the MARK and SPACE frequencies are shown on the LCD display.

When one of the buttons is activated, the MMSI number associated with the received call and the received data is shown on the LCD display. If data are shown as 255, it's because they are received in error.

It is possible to read forward or backwards by using the UP and DOWN buttons.

MMSI number, received data, and the MARK/SPACE frequencies are stored in memory, provided that the checksum is OK. If the MARK/SPACE frequencies do not appear on the LCD display, the signal is most likely outside the limits 1770-1800 Hz / 1600-1630 Hz or that the signal was unstable during the header or that the header was too short (less than 11 bit).

When MF is chosen, the frequency 2189.5 kHz is indicated on the LCD display. Pressing UP or DOWN toggles the frequency between 2189.5 kHz and 2177.0 kHz. Pressing OK switches the test box to a receive mode similar to that of MF/HF receiving.

#### **Measurement of MARK/SPACE Frequencies**

The SPACE and the MARK frequencies are measured during the initial part of the DSC call.

The measurements are done by means of a time measurement on an AF signal (1700 Hz +/- 85 Hz) derived from the MF/RF MARK/SPACE signal.

The time measurements for MARK and SPACE respectively are converted to frequency and the calculated values are added to an offset frequency for the actual MF/HF frequency. By adding the offset frequency to the measured/calculated frequencies the actual MF/HF MARK/SPACE frequencies are obtained.

The AF signal used for calculation of the MARK/SPACE frequencies has to be within 1615 +/-15 Hz and 1785 +/-15 Hz respectively to be accepted.

Example of Printout from the Memory:

CONTROL MEASUREMENT ON MMSI NO: 2734742100 - HOUR:12 DATE:21-06-2006

2187.5KHZ FORMAT: 120 ADR:2734742100 CAT: 100 SELFID:2734742100 109 126 126 126 126 126 126 126 126 117 122 SPACE/MARK FRQ: 2,187,588HZ, 2,187,417HZ



In RECEIVE ATIS mode keying of an ATIS equipped VHF on CH 6 or CH 15 will enable the test box to receive and display the station's ID. The data will be stored in the test box memory accordingly.

### VHF Power Measurement

In the VHF PWR MEASURE mode, the test box will automatically measure the forwarded and reflected power. There is a choice between CONT and MEAS. In the MEAS mode the test box will take one measurement and store it in the memory. In the CONT mode the test box will continue taking measurements until it is stopped by pressing and holding the OK button. CONT readings are not stored, but the feature can be used e.g. for checking/adjusting the antenna.



Use this setup for power measurements. Then activate the transmitter and press CONT or MEAS on the test box after approx. one second. The measured values for FWD and REF will appear in the LCD display.

If REF power > 10% of FWD power, the display will start blinking.

Power measurements can also be performed over the dummy load inside the test box. If so, use the short coax cable supplied with the test box and connect like this:



Example of Printout from the Memory:

MEASUREMENT MADE BY GMDSST SERIAL NUMBER: 11112006 SW: Rev 11.Nov.2006H

CONTROL MEASUREMENT ON MMSI NO: 2195576240 - HOUR:13 DATE:12-07-2002

FORWARD: 23.5W REFLECT: <0.5W



The test procedure is as follows:

- In the FM DEVIATION mode, select the sub mode MEAS,
- Take the 1 kHz AF generator supplied with the test box close to the transmitter's microphone and activate the tone,
- Start TX on the transmitter on CH6,
- Press OK on the test box. Maximum deviation (FM DEVI) and actual deviation (ACT DEVI) are shown on the LCD display,
- Press OK on the test box, and the maximum deviation value will be stored in the memory,
- Stop TX on the transmitter.

If the message NOT CALIBRATED is displayed, the test box needs calibration. See page 36.

Example of Printout from the Memory:

CONTROL MEASUREMENT ON MMSI NO: 3538410000 - HOUR:14 DATE:09-09-2006

FM DEVIATION: 4.5KHZ

# AM / 123.1 MHz

Using the same set-up as with measuring the FM deviation, it is also possible to measure the frequency and modulation of an AM signal transmitted on 123.1 MHz.

At frequency measurements, take care not to modulate the transmitter, and when checking the modulation (AF) be aware that a strong input signal will be limited in the test box and thus reduce the amplitude of the AF signal coming from the internal loudspeaker.

The first sub mode choice is between IMG and ORD. Same measured frequency in both sub modes indicates that it is not a mirror frequency.

The next sub mode choice is between FRQ (frequency measurements) and AF (audio mode).

At FRQ, the frequency is measured when the transmitter is activated. FRQ and LEVEL are shown on the LCD display and are also stored in MEMORY.

At AF, the internal loudspeaker is activated and the AM modulated signal can be heard.

Pressing any of the buttons will terminate the test.



When performing EPIRB tests, always use the <u>test mode</u> on the EPIRB. Doing so, the EPRIB will radiate a single burst that is specially coded to be ignored by the COSPAS-SARSAT system.

If the EPIRB is accidentally activated in the emergency transmission mode, the test box will display WARNING ALARM. Then, the EPIRB should be turned off at once and the false alert reported to the nearest coast guard station or Search and Rescue centre.

The test box is very sensitive to receiving EPIRB signals, so in most cases you should not use an antenna when testing EPIRBs. If the display shows "Please wait", the test box has detected the transmission but is still waiting for the rest to follow. If nothing happens, it is usually because the signal is too strong or too week. Then, move the EPRIB closer or further away.

EPIRBs are available for transmitting at various frequencies. So, in the EPIRB test mode the first step is to select frequency mode. Starting with 406.025 MHz, press OK to prepare for tests at this frequency, or press UP in order to move to 406.028 MHz and further on to 406.037 and 406.040 MHz. Pressing DOWN takes you to 121.5 MHz.

If the EPIRB does not provide any information of the frequency, you are advised to begin with a frequency measurement = FRQ (can be done at any of the frequency modes available) and then select the correct frequency mode for the full EPIRB test.

In the 406 MHz frequency modes there are the following sub modes: FRQ, MEAS and DATA.

In sub mode FRQ, only frequency and signal level are measured.

In sub mode MEAS the test box performs a full test, measuring frequency and signal level during the test transmission and recording the data strings contained in the transmission. All data are automatically stored in the memory. Pressing the DOWN button repeatedly, the data can also be viewed in the display, line by line.

In sub mode DATA you can choose whether the last received EPIRB data are to be displayed as HEX data or as ordinary text. Then, press DOWN to view the data line by line.

In the 121.5 MHz mode there is a choice between ORD (Ordinary) and IMG (Image). First, select ORD and FRQ to measure the frequency. Then select IMG and FRQ to measure the frequency again. Same result from both tests proves that the measured frequency is correct and not just an image frequency.

Please note that it may not be possible to make frequency measurements of all 121.5 MHz EPIRBs, as the AM modulation in some cases will prevent this. If so, select AF instead of FRQ. In the AF mode the internal loudspeaker is switched on and the AM modulated signal can be heard during transmission. This proves that the EPIRB is transmitting on the correct frequency. Pressing any of the buttons terminates the AF mode.

#### Examples of Printout from the Memory:

Short message:

406.025MHZ: 406,025.2KHZ, LEVEL: 255, COUNTRY CODE: 538 ON-AIR TEST MODE, SHORT MESSAGE, BCH CHECK OK USER PROTOCOL: SERIALIZED USER, BEACON TYPE: NON FLOAT FREE, SN: 194348 NATIONAL USE B.64-83: 11110100000100110100 AUX. DEVICE TYPE: 121.5MHZ NATIONAL USE, UNDEFINED, AUTOMATIC AND MANUAL ACTIVATION TYPE OF BEACON BIT 109-112: 0000 PROGRAMMED IDENTIFIER (BIT 26-85): C34E4BDCB3D04D1 PROGRAMMED MESSAGE (BIT 25-112): 61A725EE59E8268872CC90

Long message w/o position:

406.025MHZ: 406,025.3KHZ, LEVEL: 255, COUNTRY CODE: 219 ON-AIR TEST MODE, LONG MESSAGE, BCH CHECK OK LOCATION PROTOCOL, MMSI: 999999 SPECIFIC BCN: 1 POSITION: DEFAULT DEFAULT INTERNAL NAVIGATION DEVICE 121.5MHZ HOMING B112 = 1 / YES LATITUDE OFFSET: -0.0 LONGITUDE OFFSET: -0.0 PROGRAMMED IDENTIFIER (BIT 26-85): 1B65E847E2FFBFF PROGRAMMED MESSAGE (BIT 25-144): 8DB2F423F17FDFFF810B700005BF

Long message w/ position:

406.025MHZ: 406,024.8KHZ, LEVEL: 255, COUNTRY CODE: 366 ON-AIR TEST MODE, LONG MESSAGE, BCH CHECK OK LOCATION PROTOCOL, EPIRB SN: 021148 POSITION: NORTH 126.48 EAST 254.60 INTERNAL NAVIGATION DEVICE 121.5MHZ HOMING B112 = 1 / YES LATITUDE OFFSET: -2.0 LONGITUDE OFFSET: -2.40 PROGRAMMED IDENTIFIER (BIT 26-85): 2DD4294E3F61FDE PROGRAMMED MESSAGE (BIT 25-144): 96EA14A71FB0FEF75BF8B740AAAAAA

Bit 26-85 (15 Hexadecimal), Bit 25-112 (22 Hexadecimal) and Bit 25-144 (30 Hexadecimal) can be decoded by using the decode program made available by Cospas-Sarsat on the website <u>www.cospas-sarsat.org</u> / Beacons / Beacon Message Decode Programme.

# **RADAR SART Test (Optional)**

When testing Radar Search And Rescue Transponders (Radar SART), always use the transponder's <u>test mode</u>. *Do not activate the real emergency mode*!

SARTs are used onboard ships or survival crafts to locate them, when they are in distress.

Radar SARTs are activated and located by radar signals in the 9 GHz frequency band. When activated, the radar SARTs will respond with a signal consisting of 12 sweeps between 9.2 and 9.5 GHz.

For the purpose of testing radar SARTs, the Futronic test box has been equipped with two directional radar antennas situated behind the rear panel. One is for transmitting a simulated radar signal to trig the SART, and one for receiving the response signal from the SART.

The test box will display the test result in the form of the average frequency of the 12 response sweeps transmitted by the SART – along with a figure representing the output power level.

#### **Test Setup**

For the testing of radar SARTs, place the test box on a table or other surface that does not reflect radio waves.

Make sure that there are no reflecting items or surfaces such as metal floors or metal walls within a distance of at least 70 cm around the test setup.

Put a mark on the table where the SART is to be positioned during the test, which is 50 cm from the radar antenna on the rear panel of the test box.



Built-in directional radar antenna

#### How to perform the test

- 1) On the test box, select SART TEST and press OK.
- 2) As you may wish to test several SARTs in a row, each SART can be given its own individual number for recognition. Default number is 1. Press UP or DOWN to change to another number and press OK to confirm. Following this, the display will show "Press OK and turn on SART".
- 3) Press OK and the test box will emit a 10-second audible control burst prior to the actual test. The burst consists of tone pulses with increasing frequency.
- 4) During the control burst, activate the SART in test mode and keep it activated whilst placing it on the mark on the table with the antenna part pointing down.

- 5) The test box carries out the SART test within two seconds following the control burst.
- 6) A double tone confirms that the test box has completed the test, and the SART can be deactivated accordingly.
- 7) The test box will display the average frequency of the response signal transmitted by the SART along with a figure representing the output power level.
- 8) A power level figure of 150 or higher must be obtained in order to ensure a reliable test.

If you wish to repeat the test of this particular SART, go to item 1).

If you wish to test another SART, remember to change the SART recognition number in item 2).

The test results are automatically stored in the test box memory with the facility of transferring them to a PC at a later date.

Example of Printout from the Memory:

MEASUREMENT MADE BY FUTRONIC GMDSS-AIS-SART SN.: 29062010 SW.: Rev 29.Mar.2011

CONTROL MEASUREMENT ON MMSI NO.: 2997531999 - HOUR:12 DATE:29-03-2011

SART UNIT # 01: 9.356 GHZ LEVEL 167

SART UNIT # 02: 9.356 GHZ LEVEL 162



This mode is a frequency counter function. The UP/DOWN buttons shift between the frequency ranges. Press OK to select the actual range.

Having selected the frequency range there is a choice between two trigger modes: CONT and MEAS.

With the CONT mode, the frequency measurement will be updated and displayed continuously, but not stored in the memory. Start VHF transmission and keep it on while selecting trigger mode CONT on the test box.

The CONT mode may be useful for checking if the signal strength is too weak or too strong to perform a correct frequency measurement. If so, the distance between the antennas should be adjusted.

If you want to perform an actual frequency measurement and have it stored in the memory as well, start VHF transmission and keep it on while selecting trigger mode MEAS.

The frequency is measured twice with a 1 sec. pause in between. If the difference between the measured frequencies is more than 5 Hz, two frequencies are shown on the LCD display. The latest measurement is shown on the top-line. This is also the one that is automatically stored. On printouts such measurements are marked by a star \* in order to indicate a dubious result.

If a measurement is attempted at a frequency outside the frequency range selected or if the signal strength is too low or too high, then "MEASURE FAILED!" will be written on the LCD display.

Example of Printout from the Memory:

CONTROL MEASUREMENT ON MMSI NO.: 2592730000 - HOUR:10 DATE:24-07-2006

FRQ. MEASURE: 156,499,556HZ

FRQ. MEASURE: 156,799,553HZ

#### Frequency measurements on VHF ch70

By choosing RECEIVE DSC / VHF / FRQ it is possible to measure the frequency of a DSC signal on CH 70. The result is automatically stored in the memory.

# **MEMORY FUNCTION**

Test results and received AIS data are automatically stored in the test box memory with the facility of transferring them to a printer or a PC using a HyperTerminal program.

There are two separate memory positions in the test box - one containing received AIS data only, and one containing all the other test results.

The test box memory can contain a total of 719 test results and 50 AIS records. If more measurements are done, the oldest will be deleted first.

### How to transfer test results and AIS data to a PC



RS232 Cable supplied with test box

1) Connect your test box with the COM port of your PC, using the RS232 cable supplied with the test box.

If your PC does not have a COM port, we advise you to insert a Serial-to-USB converter and connect with a USB port.

2) Create a HyperTerminal connection on your PC.

Any HyperTerminal program set for 2400 Baud N81 (No parity 8 data bit and 1 stop bit) should be able to receive the test results from the test box. In Windows based computers, the program can usually be found under Start/Accessories/Communications. If not found, we advise you to download a HyperTerminal program from the Internet.

3) Within the HyperTerminal program, select COM port and do the following settings: Bits per second = 2400 Data bit = 8 Parity = None Stop bit = 1 Flow control = Hardware Press OK, and the PC is now ready to receive data from your test box.

#### Transfer of test results

4) On your test box, select MEMORY FUNCTION and press OK

5.a) If you select SELE, you may toggle between the test results you wish to transfer. The latest result is displayed first. Once selected, press OK > PC > Date of printout, and confirm with OK.

5.b) If you select RS232 > PC, all test results in the memory will be transferred.

#### **Transfer of AIS data**

4) On your test box, select AIS RECEIVE and press OK.

5) Select DATA and RS232, and all AIS data in the memory will be transferred, the latest first.

If you want to save the test results and AIS data on your PC, choose Edit > Select All > Copy in the HyperTerminal program. Then, start a word processing program and paste the information into this program.

# **TECHNICAL SPECIFICATIONS**

Frequency measurements general:	+/- 0.2 ppm +/- 1 digit
Frequency measurements at CH70	
EPIRB, AIS1 AND AIS2:	+/- 0.2 kHz
Output signals:	Nominal frequency +/- 0.2 ppm
Frequency deviation measurements:	+/- 0.1 kHz at 5 kHz
	+/- 0.5 kHz at 1-6 kHz
Power measurements:	+/- 2 W at 5-30 W
	+/- 0.5 W at 0-3 W
Ambient temperature:	0 to 50 Deg. C
Storage temperature:	-30 to +60 Deg. C
Size (LxHxW):	220x103x258 mm
Weight:	3.8 Kg
Power consumption	max. 12 VA (800 mA at 15V DC)

# **PERFORMANCE CHECK**

Check mark/space frequencies in SELFTEST mode. Specification: fnom. +/- 0.1 ppm +/- 1 digit.

Check output level for MF/HF frequencies. Specification: -15 dBm +/- 3 dB.

Check sensitivity at MF/HF DSC receiving. Specification: <= -30 dBm for correct frequency measurements.

Check sensitivity on CH 70 via frequency measurements. Specification: <= -30 dBm for correct frequency measurements.

Check sensitivity on EPIRB (406.025 MHz) via frequency measurements. Specification: <= -30 dBm for correct frequency measurements.

Check sensitivity on 121.5/123.1 MHz via frequency measurements. Specification: <= -30 dBm for correct frequency measurements.

Check accuracy for frequency measurements.

All band (0.4 - 475 MHz). Specification:  $\langle = +/- 0.1 \text{ ppm}$  with -30 dBm  $\rangle = \text{Pin} \langle = 0 \text{ dBm}$ 

VHF channel 70. Specification: <= +/- 0.2 kHz with -30 dBm >= Pin <= 0 dBm

AM 123.1 MHz. Specification: <= +/- 0.1 ppm with -30 dBm >= Pin <= 0 dBm

AM 121.5 MHz. Specification: <= +/- 0.2 kHz with -30 dBm >= Pin <= 0 dBm

# CALIBRATION

### General

In order to maintain the high standards of measuring accuracy, Futronic test boxes must be recalibrated for the first time after one year and then every two years. We advise you to have the tester calibrated at the manufacturer Danphone A/S in Denmark. Calibrated here, the test box software will automatically be updated to the latest version.

If calibration is performed at a local test and calibration house, see the following instructions. Further information can be found in the Futronic SERVICE MANUAL that is available upon request.

Calibrations should be performed at an ambient temperature of 20-25 degrees and after a 24-hour stabilization period (power on).

### **OCXO** frequency

Measure the OCXO's frequency after the doubler circuit and adjust the OCXO's multi turn potentiometer until the measured frequency is 20,000,000 Hz +/- 1 Hz.

As reference for the frequency measurement a frequency standard with an accuracy of at least +/- 10 exp-8 should be used.

### FM deviation

The calibration is initiated by choosing the sub mode CAL. To prevent accidental loss of calibration, the LCD display asks: ARE YOU SURE? If you want to proceed, press CAL once more and then the UP and DOWN buttons simultaneously.

Connect a signal generator to the test box's RF input and set the generator for -30dBm at 156.300 MHz modulated with 1 kHz and a frequency deviation of 5 kHz.

Press OK on the test box and a signal number will appear on the display.

Press OK again. The test box is now calibrated for the purpose of testing VHF FM deviation.

Still connected with the signal generator, check the calibration by running a test in MEAS mode.

Specification: +/- 0.1 kHz at 5 kHz and +/- 0.5 kHz within the range 1- 6 kHz.

### Power measurement

Connect RF power/dummy load to the test box's TX/ANT sockets and check that the test box indicate forward/reflected power at an accuracy of +/- 2 W within the range 5 - 30 W and +/- 0.5 W within the range 0.5 - 3 W. If necessary adjust the potentiometers marked F and R respectively in the antenna coupler until the specifications are met.

# MESSAGE COMPOSER AND DECODER SOFTWARE

The Message Composer and Decoder Software allows you to prepare custom made messages on a PC and then download them to the test box for later transmissions. The software also enables you to decode and view messages transmitted from AIS transponders.

The Message Composer and Decoder Software can be downloaded from Danphone's website <u>http://www.danphone.com/Default.aspx?ID=54</u>

### Manual

First, select com port and function:

Futronic Testbox							
Select comport and_function							
Select comport: 🔟 💌							
DSC AIS AIS data	NMEA						
09-08-2010	Exit						

Functions available:

DSC = DSC message composer
 AIS = AIS message composer
 AIS data = Decode and view messages from AIS transponder
 NMEA = NMEA string composer

### **DSC Message Composer**

DSC Message Composer								
Format Cate-								
100 100 100 100 100 100 100 100 100 100								
00 00 00 00 00 00 00 00 00 00 00 00								
00 00 00 00 00 00 00 00 00 00 00 00								
00 00 00 00 00 00 00 00 00 00 00 00								
Use 117, 122 or 127 as last digits to send.								
Load 1 Load 2 Load 3 Load 4 Transfer								
Save 1 Save 2 Save 3 Save 4	Close							

Select Format for the DSC message.

Fill in the DSC information you want to transmit. See examples in chapter COMPOSITION OF THE DSC CALL of test box manual. Also, refer to Rec. ITU-R M.493 and Rec. ITU-R M.825 for more information.

It is possible to save and reload four DSC messages.

Select CUSTOM MESSAGE - GET on the test box and then click "Transfer" to transfer the DSC string to the test box.

Press CUSTOM MESSAGE - SEND on the test box in order to transmit the DSC string.

If the DSC string is an AIS-VTS command, press AIS TEST > GMDSS COMM.CH70 > SEND CUSTOM MSG > OK for transmitting and receiving the answer from an AIS.

#### AIS Message Composer

AIS Message Composer	
Msg.       MMSI nr.       ROT       Pos.acc.       57       12       3833       North       True Heading       RAIM         1       0       123456789       15       -128       1023       0       9       6791       East       3600       90       60       0       0         Repeat indicator       Nav.status       SOG       Longitude       COG       Time stamp	Comm.state
Load 1 Load 2 Load 3 Load 4	Transfer
Save 1 Save 2 Save 3 Save 4	Close

Write the Latitude and Longitude position in the fields. It's only MSG 1, 2 or 3 which are available. Please note, that the MMSI number is not the MMSI of the actual AIS transponder but the MMSI number sent out from the test box.

Select AIS TEST SEND > PC on the test box, then click "Transfer" in order to transfer the string to the test box.

Press AIS1(2) on the test box in order to transmit the string, via AIS OUT on the test box.

It's possible to save and reload four AIS messages.

# AIS Monitor / Message Decoder

AIS	Mor	nitor										460					
										Read TB	dump file	Sav	e as text	Stop	receive	Close	
	Message type 1, 2, 3 and 18.																
sg.	Rep	beat	MMSI	: Nav	v. status	: ROT	SOG:	Pos.	A.: Latitude	Long	itude	COG:	True Hea	d. UTC	: RAIM	Communica.	
1 1 1 1 1 1		0 97 0 97 0 97 0 97 0 97 0 97	200101: 200101: 200101: 200101: 200101: 200101: 200101:	36 36 36 36 36 36 36 36	15 15 15 15 15 15	Na Na Na Na Na		0 Lov 0 Lov 0 Lov 0 Lov 0 Lov 0 Lov 0 Lov	v 5712365 v 5712365 v 5712365 v 5712362 v 5712362 v 5712362 v 5712362 v 5712378 v 5712378 v 5712378	3N 94 3N 94 3N 94 3N 94 3N 94 3N 94 3N 94 3N 94	0'6666E 0'6666E 0'6666E 0'6681E 0'6681E 0'6681E 0'6630E 0'6630E		0 Na 0 Na 0 Na 0 Na 0 Na 0 Na 0 Na	43 43 49 49 39 9	Not in use Not in use Not in use Not in use Not in use Not in use		
								N	lessage tv	e 4 and	111.	Туре	of				
Msg.Repeat MMSI: YYYY:MM:DD:hh:mm:ss Pos.A.: Latitude Longitude device RAIM Communica.																	
Ms	sg. R	epea	MMS	51:	Sa	fety relate	ed text:		Message	type 14	-						
	14 14	0	9700 9700	010136 010136	5 S/ 5 S/	ART TES' ART TES'	T										
Message type 5.																	
		14114		a.muiCa													

Receive = Receive AIS data from the test box Save as text = Save AIS data on your PC Read TB dump file = Reload and view AIS data stored on your PC

### **NMEA String Composer**

NMEA string Composer		
NMEA string, max 45 chr.		
* [-HD I,009.0,I	Transfer	Close

Write the NMEA string you want to transfer to the test box.

Click "Generate check" to add checksum.

Select NMEA > CUST > PC on the test box,

Click "Transfer" to transfer the NMEA string to the test box.

Press SEND on the test box to transfer the string to the RS232 D-sub on the test box.

# **USER'S OWN NOTES:**

