Futronic MKII
Maritime Communications Test Box
User manual

Version 29 Oktober 2018

This manual supports software version
682.0001.032 (Master)
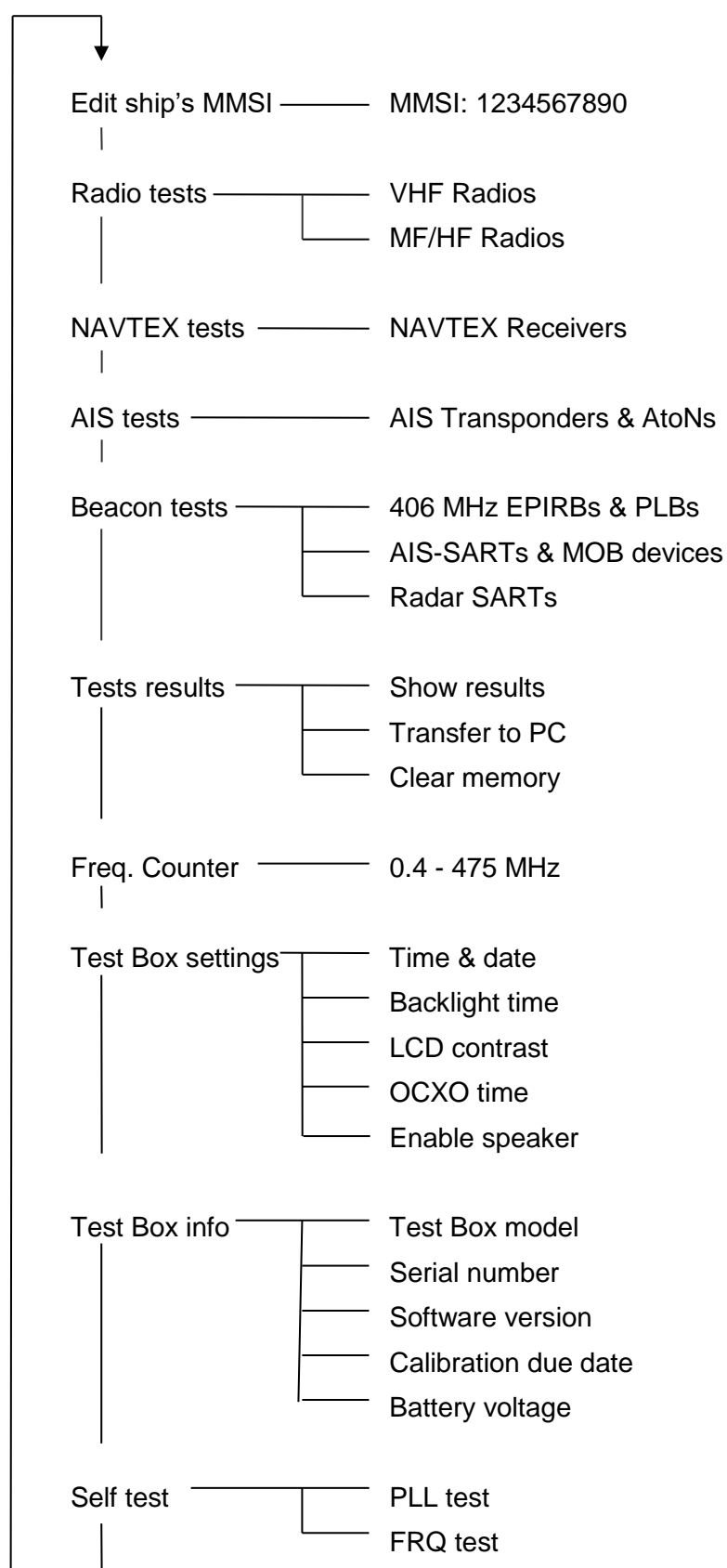682.0002.028 (Application)

DANPHONE

SCROLL MENU SYSTEM - QUICK GUIDE

See detailed menu tree on page 9.

Edit ship's MMSI ——————— MMSI: 1234567890

Radio tests ——————— VHF Radios
                     └——— MF/HF Radios

NAVTEX tests ——————— NAVTEX Receivers

AIS tests ——————— AIS Transponders & AtoNs

Beacon tests ——————— 406 MHz EPIRBs & PLBs
                     ├——— AIS-SARTs & MOB devices
                     └——— Radar SARTs

Tests results ——————— Show results
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Test Box settings ——— Time & date
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Test Box info ——————— Test Box model
                     ├——— Serial number
                     ├——— Software version
                     ├——— Calibration due date
                     └——— Battery voltage

Self test ——————— PLL test
                 └——— FRQ test

INTRODUCTION

This manual covers the full-featured test box model GMDSS-AIS-SART equipped 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.

GMDSS TESTS

For the testing of **VHF and MF/HF radios**, the test box can check DSC signals transmitted on any of the six 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.

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, including CH 70, 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 to check **406 MHz EPIRBs** and **Personal Locator Beacons**, as it can receive and decode test calls on 406.025 / .028 / .031/ .037 /.040 MHz as well as receive the 121.5 MHz homing signal.

AIS TESTS

The test box is capable of testing **AIS Class A transponders** for vessels, aircrafts and shore stations as well as **Class B Transponders** by checking their ability of sending and receiving AIS data and by making frequency measurements and power measurements on CH 70, AIS channel 1 and AIS channel 2.

Furthermore, it is possible to check the GMDSS communication on CH 70 by requesting reports of the ship's call sign, IMO number, name, type, dimensions, draught and destination, etc.

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

The AIS test facility can also be used for the testing of **AIS-SARTs, AtoN devices and Man Over Board devices**, as it can receive and decode test calls from these.

RADAR SART TESTS

For the testing of 9 GHz **Radar SARTs**, the test box measures the frequency of the response signals transmitted from the SART and will display the average frequency.
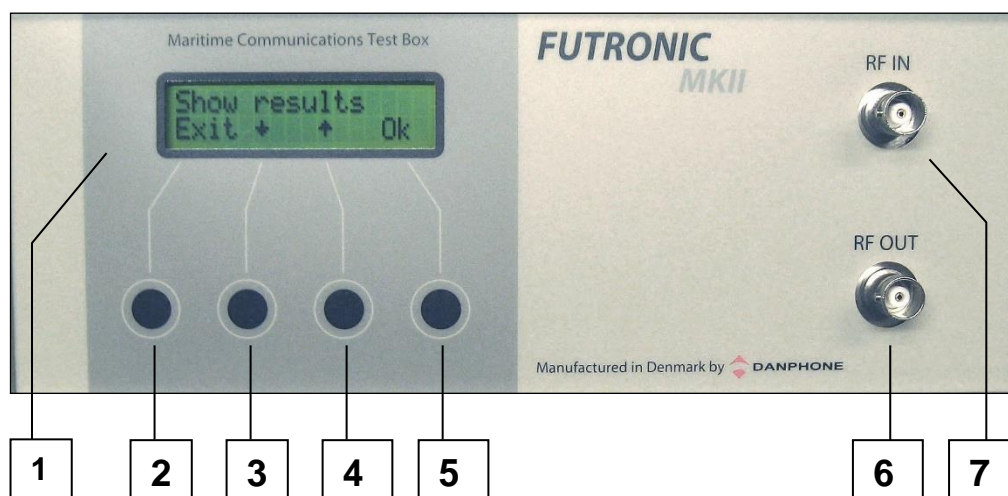
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TEST BOX

Front View

1	Two-Line LCD display
2 – 5	Push buttons
6	BNC socket for signal output
7	BNC socket for signal input

Rear View
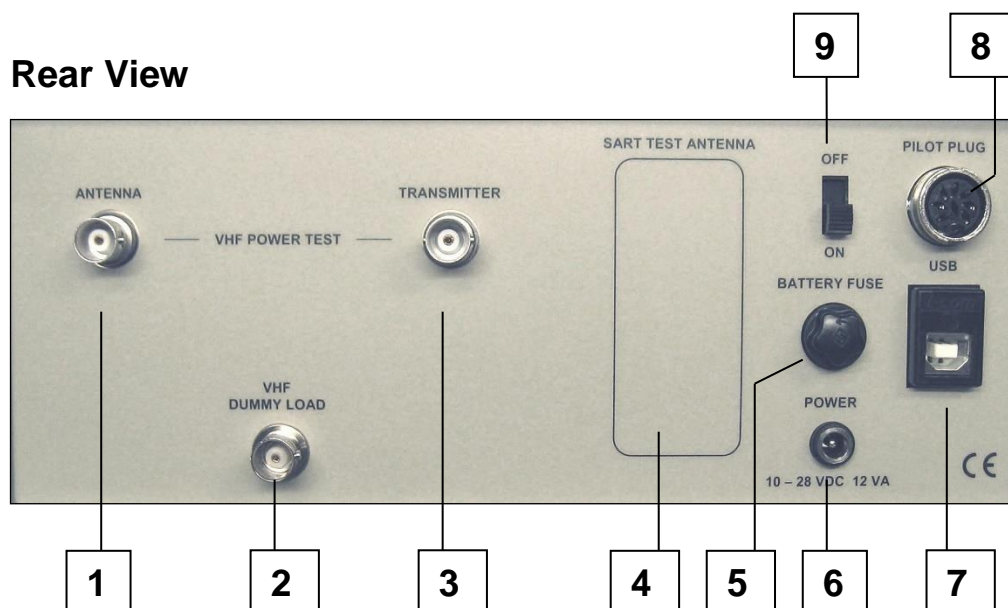
1	BNC socket for connection to VHF antenna
2	BNC socket for connection of VHF dummy load
3	BNC socket for connection to VHF transmitter
4	RADAR-SART Antenna (If installed)
5	Fuse for 12V Battery. To be removed during transportation by air. Type: 5x20mm 250V-2A "T"
6	DC socket for connection to external power supply
7	USB socket
8	8-pin DIN socket for connection to pilot plug
9	Slide switch for switching the test box ON/OFF

ACCESSORIES

The test box comes with the following standard accessories:

1 pcs   Power adapter 100-240 VAC / 13,2 VDC
1 -   Cable for external DC power
                  incl. Cigar lighter plug
1 -   USB cable for connection to PC
1 -   Coax cable, 25 cm, with BNC
2 -   Coax cable, 150 cm, with BNC
1 -   Coax cable, 500 cm, with BNC
1 -   AIS signal combiner / dummy load
1 -   Audio Reference / AF Generator
1 -   Telescopic antenna for VHF/AIS
1 -   Wire antenna for MF/HF/NAVTEX
2 -   UHF plug to BNC socket adapter
1 -   UHF socket to BNC socket adapter
1 -   BNC socket to BNC socket 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 powerful 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: 460 x 360 x 175 mm.

Set of Attenuators
Attenuators are used e.g. with AIS tests and VHF sensitivity tests. The set includes 1x10 dB, 1x20 dB and 1x40 dB attenuators, 2 Watt, with BNC.

Pilot Plug Cable
This cable is used with the testing of pilot plugs onboard ships. The cable is equipped with a jack to fit standard pilot plugs.

POWER SUPPLY

The test box is usually powered by the external power adapter delivered with the test box. The adapter can be connected to 100-240 VAC and will provide DC power to the test box when connected to the POWER socket on the rear panel. However, any power supply providing DC between 10 and 28 VDC can be connected (+ on the center pin). For instance, a car charger can be used, enabling the battery inside the test box to be recharged while driving your car.

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

Before using the test box in the field, make sure that the battery is fully charged. Fully charged, the battery should provide power for at least 8 hours of normal operation.

It is recommended from time to time to charge the battery over a full day and night. Also recommended if the battery has been completely discharged. This will keep the battery fit and fully restore its capacity.

Loss of power will not cause any loss of data in the test box memory.

<u>During transport by air</u> you are advised to remove the battery fuse from the rear panel. With this, the test box is permitted as carry-on and check-in baggage. See declaration on page 58.

POWER-ON AND WARM-UP

When powered on, the tester's model type and serial number is briefly presented the LCD-display. After a few seconds of warming up the test box is ready for use.

PUSH BUTTON CONTROL AND MENU SYSTEM

The test box is controlled by means of 4 push buttons, each of them with a reference to the bottom line of the display.

↓ is used to scroll down to the next menu line, or to decrease numbers, frequencies etc.

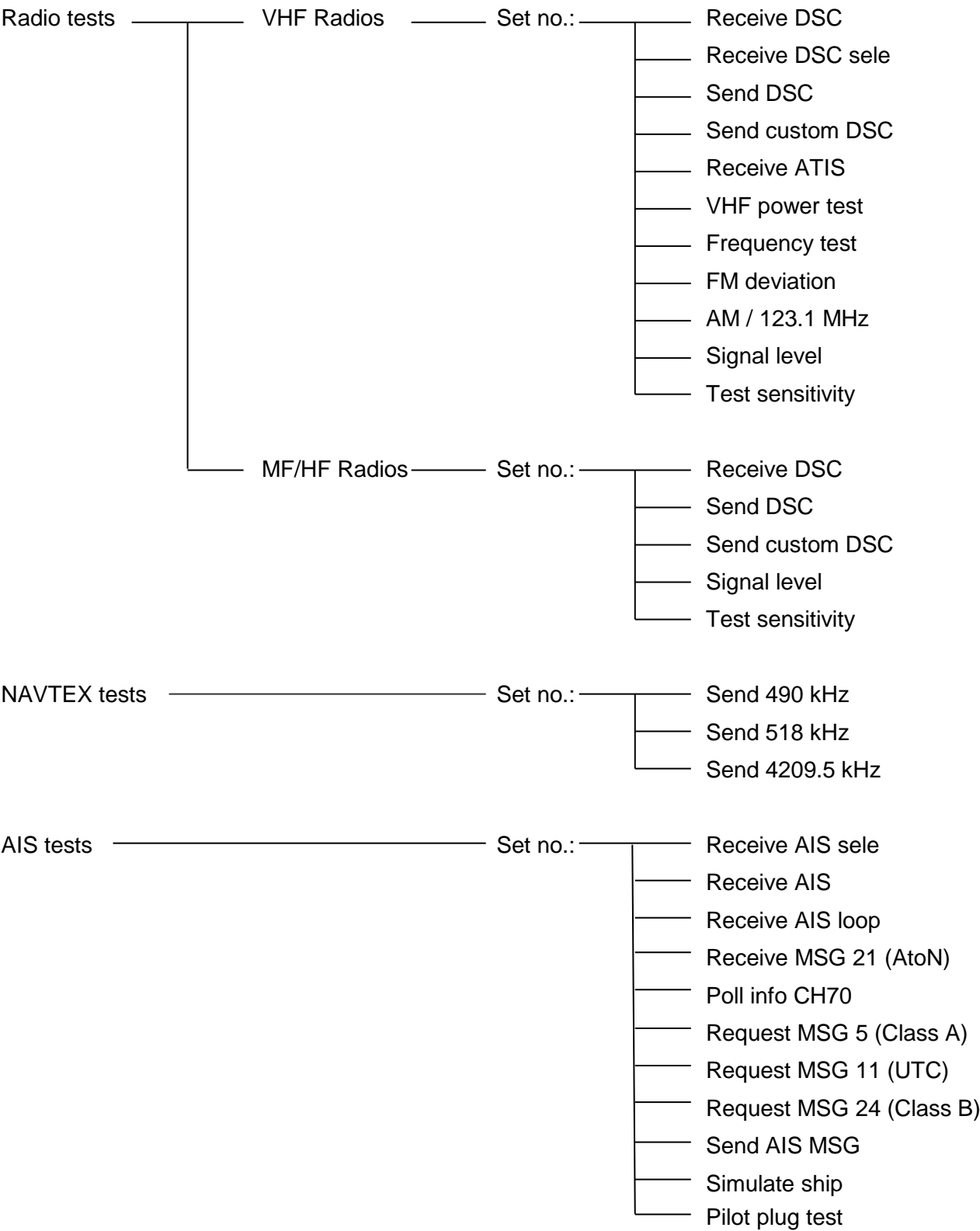↑ is used to scroll up to the previous menu line, or to increase numbers, frequencies etc.

Ok is used to select or accept what's in the upper line of the display

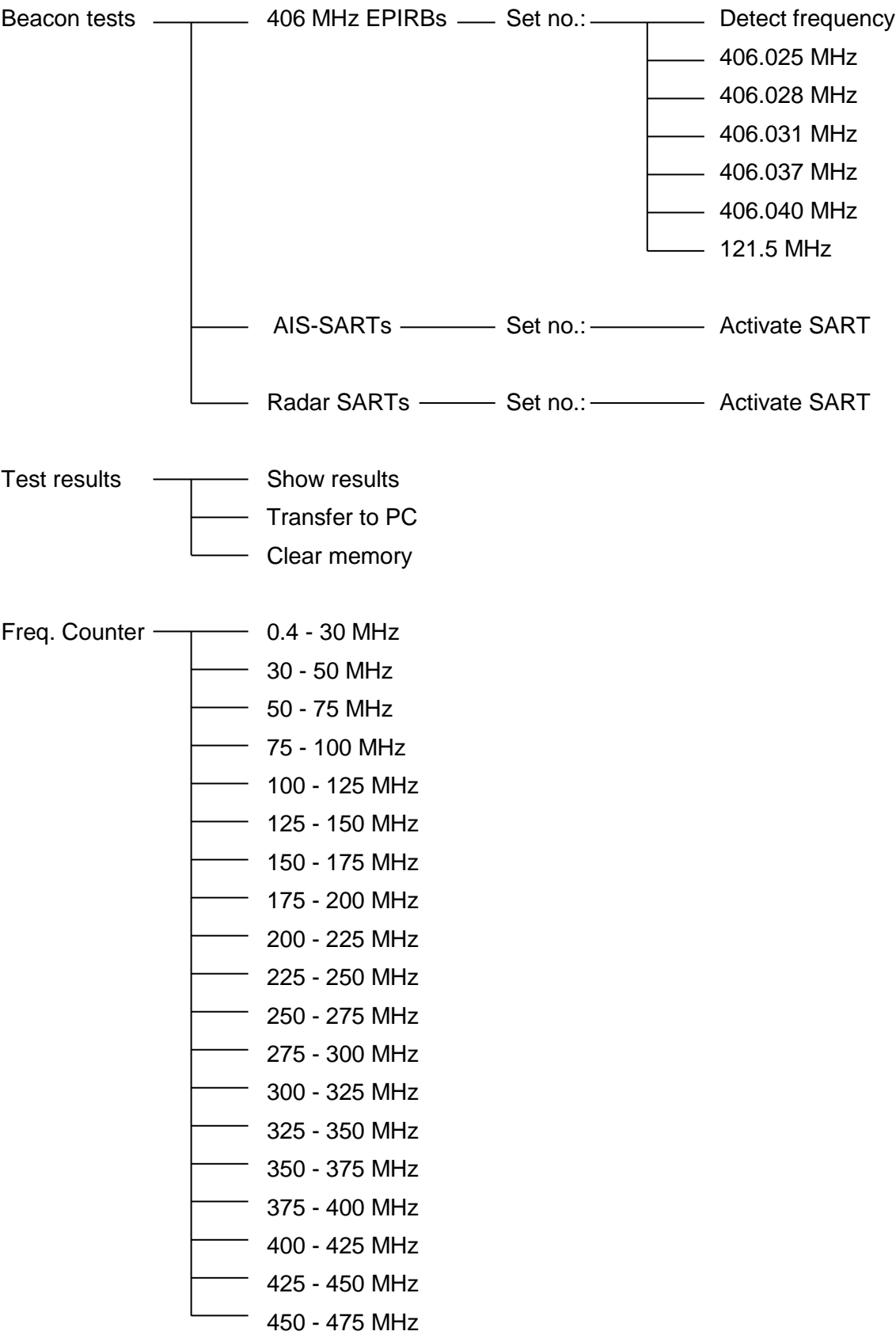**Exit** is used to move one step back in the menu system.

MENU TREE

The figure below gives you an overview of the menu tree. Modes and menus, test setups and measurements are explained in more detail on page 13 and onwards.
As you may wish to test several sets in a row, for instance several radios under the same MMSI, each set can be given its own individual number for recognition, for instance VHF no. 3
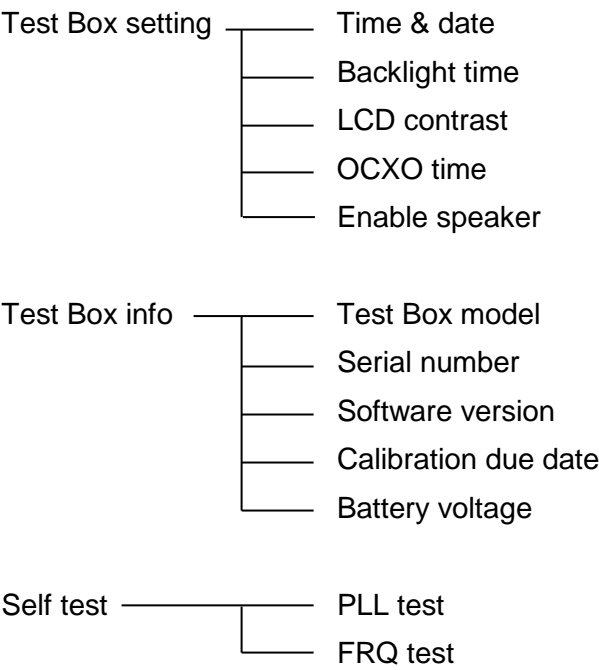
Edit ship's MMSI ———— MMSI: 1234567890

Radio tests ———— VHF Radios ———— Set no.: ———— Receive DSC
———— Receive DSC sele
———— Send DSC
———— Send custom DSC
———— Receive ATIS
———— VHF power test
———— Frequency test
———— FM deviation
———— AM / 123.1 MHz
———— Signal level
———— Test sensitivity

———— MF/HF Radios ———— Set no.: ———— Receive DSC
———— Send DSC
———— Send custom DSC
———— Signal level
———— Test sensitivity

NAVTEX tests ———— Set no.: ———— Send 490 kHz
———— Send 518 kHz
———— Send 4209.5 kHz

AIS tests ———— Set no.: ———— Receive AIS sele
———— Receive AIS
———— Receive AIS loop
———— Receive MSG 21 (AtoN)
———— Poll info CH70
———— Request MSG 5 (Class A)
———— Request MSG 11 (UTC)
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———— Send AIS MSG
———— Simulate ship
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MENU TREE (CONTINUED)

Beacon tests ——— 406 MHz EPIRBs —— Set no.: ——— Detect frequency
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                      —— 406.028 MHz
                      —— 406.031 MHz
                      —— 406.037 MHz
                      —— 406.040 MHz
                      —— 121.5 MHz

    —— AIS-SARTs ——————— Set no.: ——————— Activate SART

    —— Radar SARTs ——————— Set no.: ——————— Activate SART

Test results ——— Show results
    —— Transfer to PC
    —— Clear memory

Freq. Counter ——— 0.4 - 30 MHz
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    —— 100 - 125 MHz
    —— 125 - 150 MHz
    —— 150 - 175 MHz
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    —— 225 - 250 MHz
    —— 250 - 275 MHz
    —— 275 - 300 MHz
    —— 300 - 325 MHz
    —— 325 - 350 MHz
    —— 350 - 375 MHz
    —— 375 - 400 MHz
    —— 400 - 425 MHz
    —— 425 - 450 MHz
    —— 450 - 475 MHz

MENU TREE (CONTINUED)

Test Box setting ———— Time & date
———— Backlight time
———— LCD contrast
———— OCXO time
———— Enable speaker

Test Box info ———— Test Box model
———— Serial number
———— Software version
———— Calibration due date
———— Battery voltage

Self test ———— PLL test
———— FRQ test

EDIT SHIP'S MMSI

You can check the current MMSI number registered by the test box in the Edit ship's MMSI menu. In this menu you can either accept the current number or enter a new MMSI, if required. Press → to move the cursor. Press ↑ to change the digit. Press OK to accept and store the number.

The test box is prepared for 10-digit numbers. If you enter a 9-digit number, add "0" in the end.

The MMSI number can also be automatically entered in the test box by performing the Receive DSC test for VHF radios described below.

RADIO TESTS

VHF Radios

Set Number

As you may wish to test several radios under the same MMSI, each radio can be given its own individual set number for recognition. Default number is 1. Press OK to confirm or press ↑ or ↓ to change to another number. Then, press OK and go to the test you wish to perform.

Receive DSC

In the Receive DSC test mode, the test box will receive and display the radio's MMSI number and DSC data transmitted, and at the same time measure the frequency and the forwarded and reflected power.

Use this setup with the Receive DSC test:

The test 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:
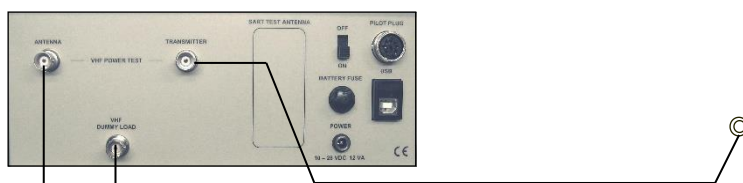
To perform the test, select **Receive DSC** and press OK. Following this, the DSC frequency will appear in the display. Press OK again and activate the transmitter to send a DSC call.

The received MMSI number, DSC data and the measured frequency and power values will be stored in the test box memory and at the same time appear in the LCD display, line by line. You may toggle between the lines using ↑ and ↓ to view all the results.

Example of Printout from the Memory:

VHF # 1   Time/date: 08:16:03 / 21-11-2011
DSC DATA: CH70-156.525 MHz   RX MMSI: 2190123450 Format 120 Cat.: 100
TX MMSI: 2195576240 Telecommand: 100 126 90 00 16 126 126 126
EOS: 117 ECC: 113 Status: OK
Freq.: 156,525.2 kHz Fwd.: 19.8 Watt Rev.: 0.2 Watt

If you only want to check DSC data and frequency (no power measurement), connect the telescopic VHF antenna to RF IN and use this setup:
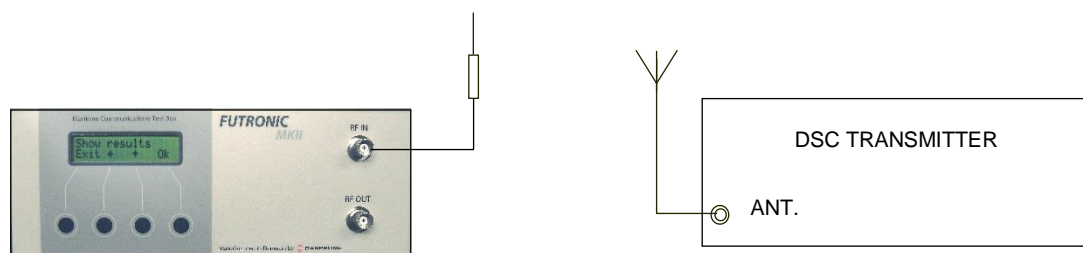
If there are DSC transmissions from more than one radio in the area – for instance in ports with many ships – the test box will receive data from the radio <u>first</u> detected.

To make sure that the test box will be receiving data from one particular radio, use the test mode "Receive DSC sele" below.

Receive DSC sele

In the Receive DSC sele mode, the test box will receive data from the radio having its MMSI number currently registered in the test box. So, please check and change number, if required, using the Edit ship's MMSI menu on page 12.

Use the same setup as above.

Example of Printout from the Memory:

VHF # 1   Time/date: 08:16:03 / 21-11-2011
DSC DATA: CH70-156.525 MHz RX MMSI: 2190123450 Format 120 Cat.: 100
TX MMSI: 2195576240 Telecommand: 100 126 90 00 16 126 126 126
EOS: 117 ECC: 113 Status: OK
Freq.: 156,525.2 kHz

Send DSC

In the Send DSC mode, the test box will transmit a DSC call for you to check on the DSC receiver accordingly.

It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the radio to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

With selective calls, connect the telescopic VHF antenna to RF OUT and use this setup:
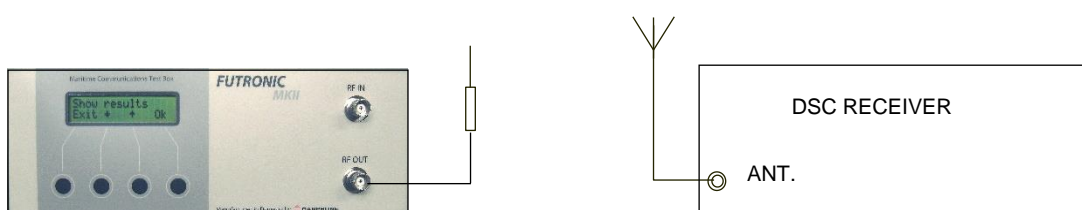
With distress calls, it is important to use a coax cable for the connection between the test box and the DSC receiver. This will prevent other ship stations to be alerted.

Use this setup with distress calls:

Select **Send DSC** and press OK. The DSC frequency will appear in the display. Press OK again and select **Dis** to send a distress call or **Sele** to send a selective call.

Following the DSC call, the test box will display **Received status**. Press **OK** if the call was successfully received. Press **Fail** if the call was not well received. The answer will be stored in the test box memory for your test report.

The 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 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

Send custom DSC

The Send custom DSC mode enables the test box to send a custom-made DSC call composed in advance on a PC. For the purpose of composing, a free PC software TEST BOX MANAGER can be downloaded from Danphone's website. See page 48.

Once downloaded, connect your PC to the test box via the USB cable supplied. Follow the instructions of how to compose a new custom-made call and transfer it to the test box accordingly.

To make the test box transmit the custom-made call, select **Send custom DSC** on the test box. The DSC frequency will appear in the display. Press OK again to send the call.

Following the DSC call, the test box will display **Received status**. Press **OK** if the call was successfully received. Press **Fail** if the call was not well received. The answer will be stored in the test box memory for your test report.

Receive ATIS

ATIS (Automatic Transmitter Identification System) is a signaling protocol used on the inland waterways of Europe that enables the authorities to identify each transmission by a short data burst sent when the PTT key is released.

In the Receive ATIS mode, keying of an ATIS equipped VHF on CH 6 or CH 15 will enable the test box to receive the station's ID.

Use this setup:
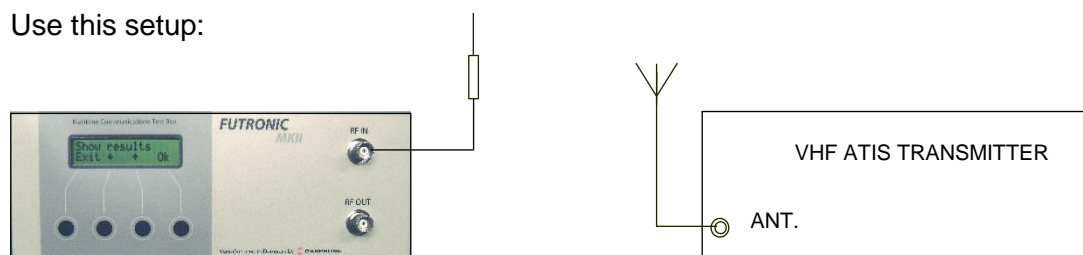
Select **Receive ATIS** on the test box and press OK. Select channel and press OK. Then, activate the ATIS transmitter.

The test box will receive and display the transmitter's ID and at the same time store it in the test box memory.

VHF power test

The VHF power test mode is used to measure the transmitted and the reflected power from non-DSC VHF radios.

Use this setup with the VHF Power test:

The test 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:
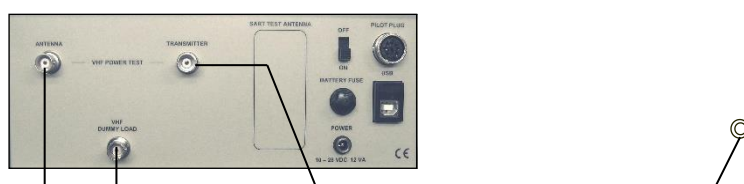
Select **VHF power test** on the test box and press OK.

Then, activate the transmitter and keep it activated while selecting **Meas** or **Cont**.

In the Meas (= Measure) mode, the test box will perform and display a single power measurement and store it in the memory.

In the Cont (= continue) mode, the test box will continue taking measurements until pressing the EXIT button stops it. Cont readings are not stored, but the feature can be used e.g. for checking/adjusting the antenna.
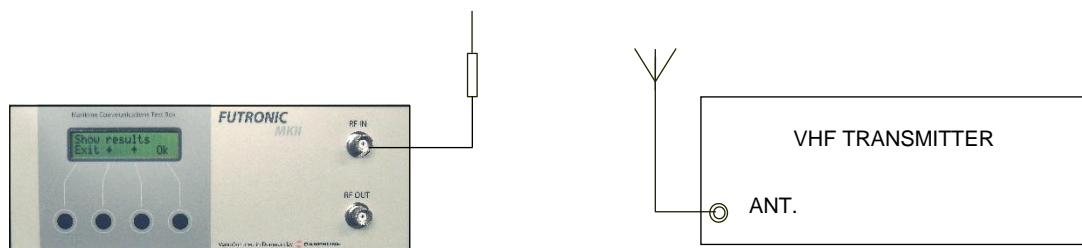

Example of Printout from the Memory:

VHF # 1   Time/date: 08:18:16 / 21-11-2011
Power Measure Fwd: 20.3 Watt Rev: 0.1 Watt VSWR 1.16

VHF Frequency test

In this mode you can decide whether you wish to perform a frequency test only or a simultaneous frequency and power test.

If you wish to measure the frequency only, use this setup:

On the test box, select **Frequency test** and the preferred frequency range. Then press OK and activate the transmitter. Select **Meas** or **Cont** to start measuring.

In the Meas (= measure) mode the test box will perform and display a single frequency measurement and store it in the memory.

In the Cont (= continue) mode the test box will continue taking measurements until pressing the EXIT button stops it. Cont readings are not stored, but the feature can be used e.g. for checking/adjusting the antenna.

*Example of Printout from the Memory:*

VHF # 1 Time/date: 15:00:52 / 22-11-2011
Frequency measure: 156,300,128 Hz

If you wish to perform a simultaneous frequency and power test, use this setup:
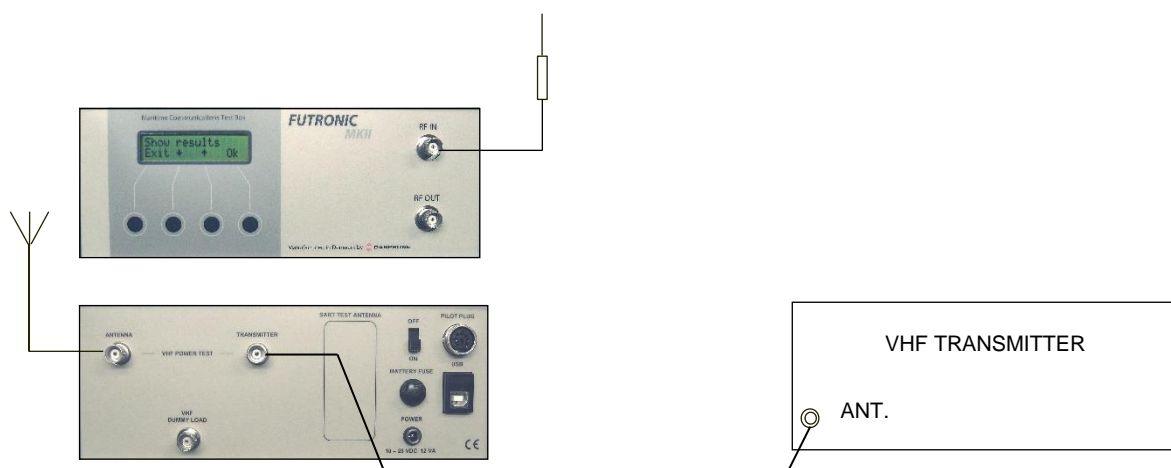
The test can also be performed over the dummy load inside the test box. If so, use the short coax cable supplied with the test box and connect like this:
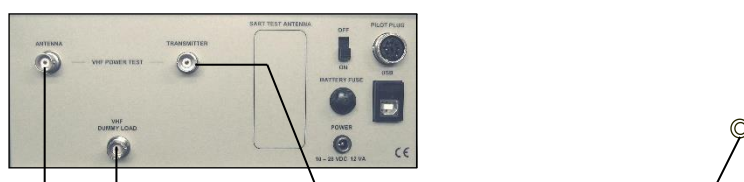
On the test box, select **Frequency test** and the preferred frequency range. Then press OK and activate the transmitter. Select **Meas** or **Cont** to start measuring.

In the Meas (= measure) mode the test box will perform and display a single frequency and power measurement and store it in the memory.

The test box displays the result in two lines. Scroll down to read line two.

In the Cont (= continue) mode the test box will only take frequency measurements and continue until pressing the EXIT button stops it. Cont readings are not stored, but the feature can be used e.g. for checking/adjusting the antenna.

Example of Printout from the Memory:

VHF # 1 Time/date: 18:11:42 / 22-01-2018
Frequency Measure: 156,300,008 Hz Power Fwd.: 19.4 Watt Rev.: 0.1 Watt VSWR: 1.16

FM Deviation

The audio reference device for use with this test offers three tone frequencies (500 Hz, 1 kHz and 2 kHz) and two volume levels.

On/off switch → [device] ← Selector
Long press: Change frequency
Short press: Change volume
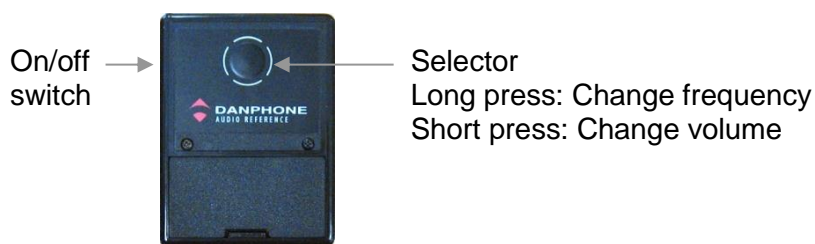
The single-tone 1 kHz AF generator previously supplied with the test box can also be used.

The illustration below shows how to set up for measuring the VHF FM Deviation on CH 6:
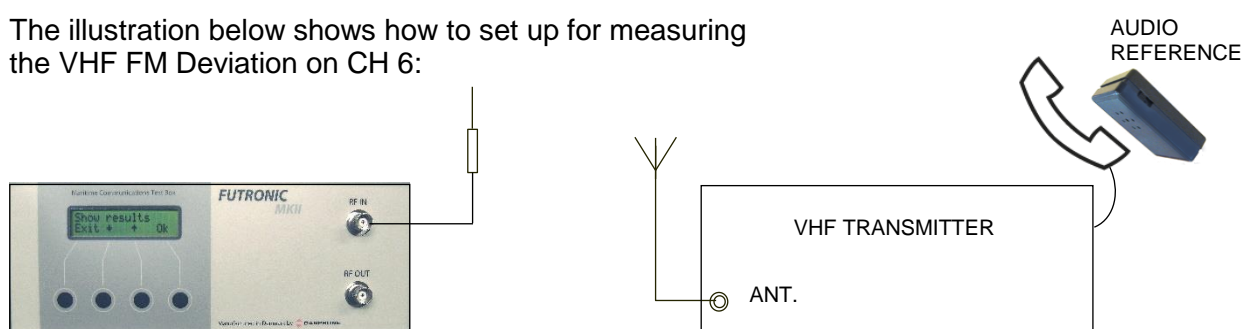
The test procedure is as follows:

1) Select **FM Deviation** on the test box,
2) Hold the audio reference device / AF generator close to the transmitter's microphone and activate the tone,
3) Activate the transmitter on CH 6,
4) Press OK on the test box. Maximum deviation and actual deviation are shown on the LCD display,
5) Press OK on the test box, and the maximum deviation value will be stored in the memory,
6) Stop the transmitter.

Example of Printout from the Memory:

VHF # 1   Time/date: 08:22:24 / 21-11-2011
Maximum deviation: 1.1 kHz

AM / 123.1 MHz

The AM / 123.1 MHz test mode allows you to measure the frequency and to check the modulation of an AM signal transmitted on 123.1 MHz.

Use the same setup as with measuring the FM deviation above.

Select **AM / 123.1 MHz** on the test box and press OK. Then, select either **Img** (= Image) or **Ord** (= Ordinary). In both modes there is a choice to measure the Frequency or check the AF modulation.

If you wish to measure the **frequency**, activate the transmitter WITHOUT modulation and press **Frq** on the test box. Frequency and signal level are shown on the LCD display and are also stored in the memory.

If you wish to check the **AF modulation**, activate the transmitter WITH modulation and press **AF** on the test box. The AF signal can be heard in the test box loudspeaker.

When checking the AF modulation, please note that the test box will limit a strong input signal in order to protect the loudspeaker.

Signal level

This mode can be used to check the signal strength level of the received signals at 156.300 MHz and 156.525 MHz transmissions respectively.

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.

Use this setup:
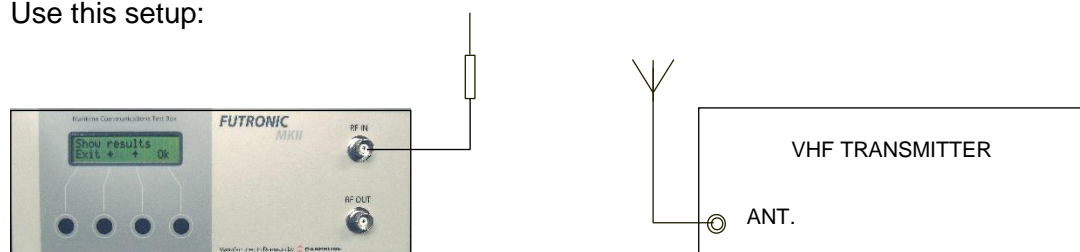
For an indication of the actual signal strength level, select **Signal level** on the test box and press OK. Select frequency. Then, press OK and start transmission from the radio. The level figure appears in the test box display. A figure of 70 or higher is advisable.

Test sensitivity

In the Test sensitivity mode, the test box outputs a modulated signal on VHF channels 6, 13, 16 and 67 respectively. With an external attenuator (not supplied with the test box) 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 as a 1 kHz tone.

Use the setup below. It is very important to use coax cables for the connection of the equipment.
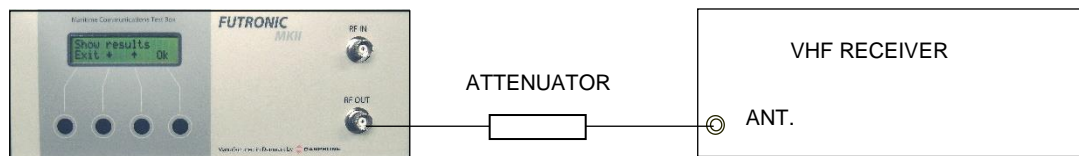
Select **Test Sensitivity** and press OK. CH 06 will appear as the default channel in the display. Other channels can be selected by pressing ↑ or ↓.

At the desired frequency, press OK and the test box will keep sending the modulated signal. To stop the transmission, press EXIT.

For reference, the test box RF output level is approx. -45 +/- 2 dBm. In order to match with the sensitivity of a ship's radio (approx. -115 dBm), the attenuator to be used should be approx -70 dB.

To simply check if the 1 kHz-modulated signal is well received over the air, use this setup:
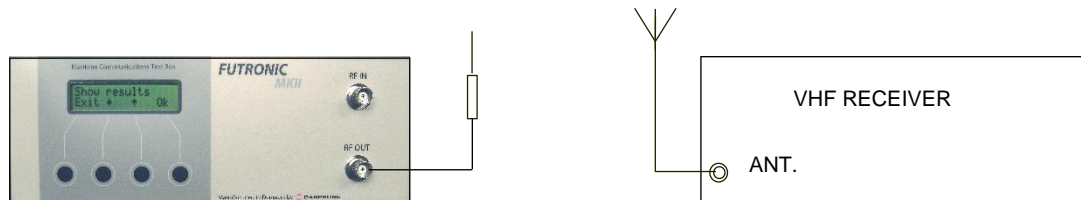
MF/HF Radios

Set Number

As you may wish to test several radios under the same MMSI, each radio can be given its own individual set number for recognition. Default number is 1. Press **OK** to confirm or press ↑ or ↓ to change to another number. Then, press **OK** and go to the test you wish to perform.

Receive DSC

In the Receive DSC test mode, the test box will receive the radio's MMSI number and DSC data transmitted, and at the same time measure the frequency of the transmission.

Connect the wire antenna supplied with the test box and use the setup below. The test box antenna should be able to "see" the transmitter's antenna.
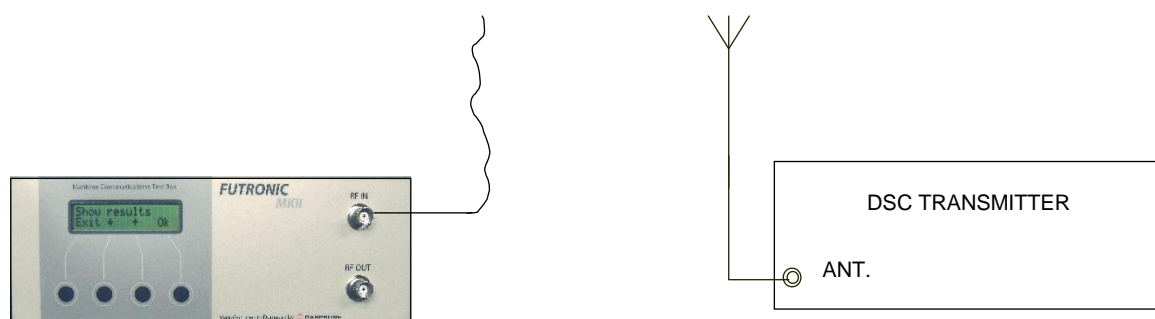
Select **Receive DSC** and press OK. Then select whether the test box is going to receive the call on one of the **TFC** channels or **MF/HF** distress channels. Press OK and select frequency. Finally, press OK again and activate the transmitter.

The test box remains in receive mode until a DSC call is received. A press on the EXIT button can interrupt the mode, provided that the test box has not started to receive a call, in which case you have to wait for a few seconds. MMSI number, data and the MARK/SPACE frequencies are presented in the display and stored in memory, provided that the checksum is OK.

Test results are displayed line by line. Press ↓ or ↑ to toggle between the lines.

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 the signal was unstable during the header or that the header was too short (less than 11 bit). If data are shown as 255, it's because they were received in error.

Example of Printout from the Memory:

MF/HF # 1   Time/date: 08:25:18 / 21-11-2011
DSC DATA: 2187.5 kHz RX MMSI: 2195576240 Format 120 Cat.: 108
TX MMSI: 9999999990 Telecommand: 118 126 126 126 126 126 126 126
EOS: 117 ECC: 86 Status: OK
Mark: 2187414 Hz Space: 2187584 Hz

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/HF 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 must be within 1615 +/-15 Hz and 1785 +/-15 Hz respectively to be accepted.
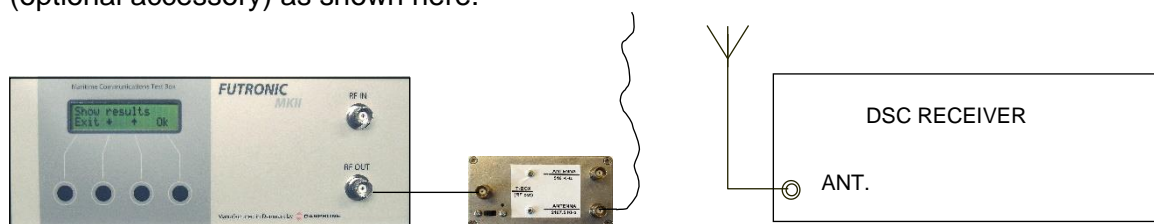
Send DSC

In the Send DSC mode, the test box will transmit a DSC call for you to check on the DSC receiver accordingly.

It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the radio to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

With selective calls, connect the relevant antenna supplied with the test box to RF OUT and use the setup below. The test box antenna should be able to "see" the transmitter's antenna.
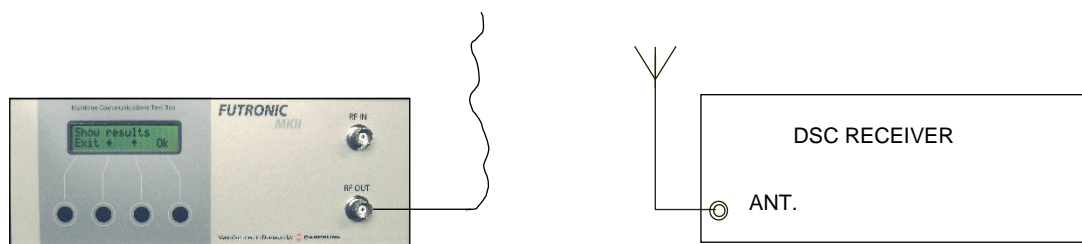
If the transmission signal is not strong enough to enable the test, you may use the RF Amplifier (optional accessory) as shown here:

With distress calls, it is important to use a coax cable for the connection between the test box and the DSC receiver. This will prevent other ship stations to be alerted.

Use this setup with distress calls:

To send a DSC call, select **Send DSC** and press OK. Then, select **TFC** or **MF/HF** respectively.

With **TFC**, select frequency and press OK. Select **Normal** or **Reduced** output power. Usually, normal power is recommended to send the call.

With **MF/HF**, select frequency and press OK. Select **Dis** to send a distress call or **Sele** to send a selective call. Select **Normal** or **Reduced** output power. Usually, normal power is recommended to send selective calls. Distress calls are always sent at reduced power.

Following the DSC call, the test box will display **Received status**. Press **OK** if the call was successfully received. Press **Fail** if the call was not well received. The answer will be stored in the test box memory for your test report.

Please note: Some DSC receivers have a built-in delay of 1-2 minutes before they acknowledge distress calls.

The TFC 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".
109	First telecommand
126	Second telecommand
126 126 126 126 126 126	Frequency or channel 126 transmitted six times
117	Ack. RQ End of sequence
69	Modulus-2 checksum

The 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 MF/HF distress call transmits the following information:

112,112	Format specifier - Distress call
99,99,99,99,90	Address - Testbox "MMSI No".
107	Category - Undesignated distress
99,99,99,99,99	Co-ordinates - 99 99 99 99 99 at test.
88,88	Time - 88 88 at test.
109	First telecommand
127	EOS - End of sequence
48	Modulus-2 checksum

Send custom DSC

The Send custom DSC mode enables the test box to send a custom-made DSC call composed in advance on a PC. For the purpose of composing, a free PC software TEST BOX MANAGER can be downloaded from Danphone's website. See page 48.

Once downloaded, connect your PC to the test box via the USB cable supplied. Follow the instructions of how to compose a new custom-made DSC call and to transfer it to the test box accordingly.

To make the test box transmit the custom-made call, select **Send custom DSC** on the test box and press OK. Then, select **TFC** or **MF/HF** respectively.

With **TFC**, select frequency and press OK. Select **Normal** or **Reduced** output power. Usually, Normal is recommended to send the call.

With **MF/HF**, select frequency and press OK. Select **Normal** or **Reduced** output power. Usually, Normal is recommended to send the call.

Following the DSC call, the test box will display **Received status**. Press **OK** if the call was successfully received. Press **Fail** if the call was not well received. The answer will be stored in the test box memory for your test report.

If there is no custom made call in the test box, the display will say **No custom data**.

Signal level

This mode can be used to check the signal strength level of the received signal at 2187.5 kHz.

The level figure is used to indicate if the signal strength is sufficient to ensure proper radio communication between the test box and the radio during the following tests.
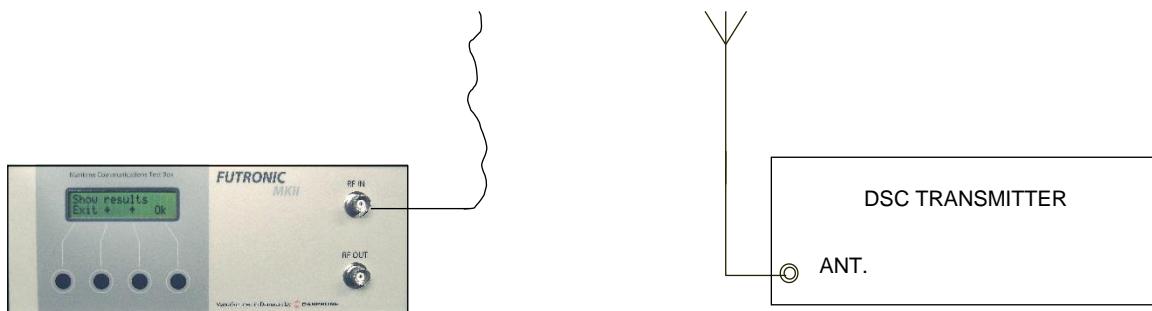
For an indication of the actual signal strength level, select **Signal level** and press OK. Following this, the frequency will appear in the display. Then, press OK and start transmission from the radio. The level figure appears in the test box display. A figure of 70 or higher is advisable.

Test Sensitivity

This test mode enables you to check the sensitivity of a MF/HF receiver.

Use this setup:

1) Set the receiver to 21,000 kHz.
2) Select **Test Sensitivity** on the test box and press OK.
3) Select **High** to send a test signal at -90 dBm, or **Low** to send the signal at -110 dBm. With this, the test box transmits 21,001 kHz modulated with 1 kHz at the requested level.
4) Check that a 1 kHz tone can be heard in the radio's speaker.

NAVTEX TESTS

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

Set Number

As you may wish to test several NAVTEX receivers, each receiver can be given its own individual set number for recognition. Default number is 1. Press **OK** to confirm or press ↑ or ↓ to change to another number. Then, press OK and go to the test.

Connect the wire antenna supplied with the test box to RF OUT and use this setup:
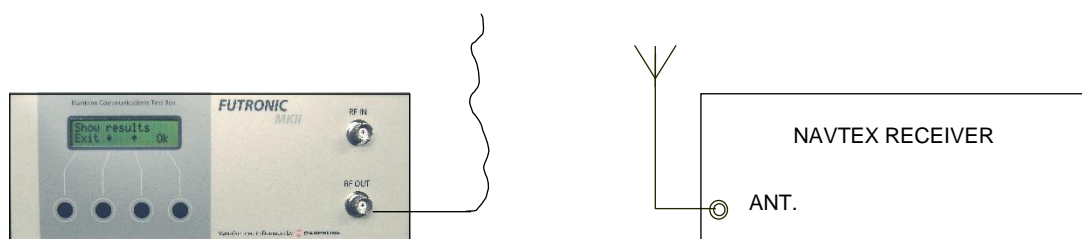
If the signal is not strong enough to enable the test, you may connect the RF Amplifier (optional accessory) as shown below.
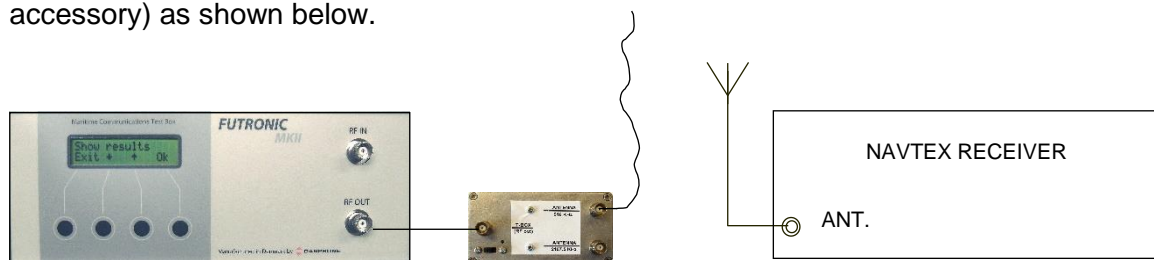
1) In the **Send** mode, select frequency and press OK.
2a) Select **Carr** if you wish to send the un-modulated carrier. Press EXIT to stop transmission.
2b) Select **Msg** to send a pair of test messages – a navigational warning and a SAR message.
3) Use ↑ or ↓ to set the number of times you wish to transmit the test messages.
4) Use ↑ or ↓ to set the transmitter site letter in your NAVTEX message.
5) Press OK to send. The display will count down for every pair of test messages being sent.
6) Check that the NAVTEX receiver receives/prints the following messages:

NAVTEX MESSAGE   XZ01 *
0123456789ABCDEFGHIJKLMNOPQRSTU
NAVTEX TEST SEQ BY FUTRONIC
GMDSS TEST BOX

NAVTEX MESSAGE   XD00 *
0123456789ABCDEFGHIJKLMNOPQRSTU
NAVTEX TEST SEQ BY FUTRONIC
GMDSS TEST BOX
SECOND TIME
FIRST MESSAGE ID 01

*) Transmitter site letter (X) may vary. Depends on your own setting.
The messages are identified by X = Transmitter site, Z = "No messages on hand" (for test purposes), D = SAR message, 00-99 = 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 signal from the test box may also be neglected. In order to solve this problem, the test box automatically adds 09 to every routine message number being sent.

Changing the Transmitter ID letter in the test message may also solve the problem.

SAR messages are always received, even if they are transmitted repeatedly.

AIS TRANSPONDER TESTS

Set Number

As you may wish to test several transponders under the same MMSI, each transponder can be given its own individual set number for recognition. Default number is 1. Press **OK** to confirm or press ↑ or ↓ to change to another number. Then, press **OK** and go to the test you wish to perform.

Receive AIS sele

The test box is capable of decoding the following AIS messages:

MSG No.	Name of message	MSG No.	Name of message
1	Position report (Scheduled)	12	Safety related addressed msg.
2	Position report (Assigned)	14	Safety related broadcast msg.
3	Position report (Interrogated)	18	Class B position report
4	Base Station report	19	Class B extended pos. report
5	Static and voyage related data	21	Aids-to-Navigation (AtoN) report
9	SAR Aircraft position report	24	Class B Static data
11	UTC/Date response		

In the Receive AIS sele test mode, the test box will receive the selected transponder's MMSI number and AIS data, and at the same time measure the frequency and the forwarded and reflected power. The test can be performed on AIS1 and AIS2 respectively.

It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the AIS transponder to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

Select **Receive AIS sele** on the test box and press OK. Select AIS channel and press OK again to request for data. It may take up to 20 seconds until the AIS transponder transmits its data.

Test results are displayed line by line. You may toggle between the lines using ↑ and ↓ to view all the results. Results are also stored in the test box memory.

Use this setup:
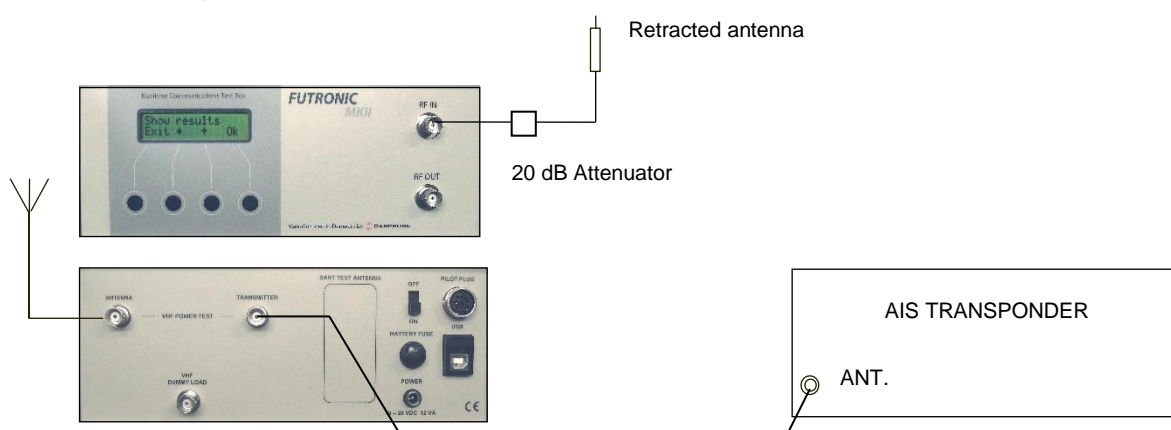
The test box must receive AIS data on RF IN in order to start the power measurement. If the test box keeps waiting to receive for some time, it is likely because the AIS transponder is still waiting to transmit its data. Please note the transponder's reporting interval depends on the ship's speed. The lower speed, the longer interval. Reporting Intervals for ships at anchor or moored may be up to 3 minutes for each AIS channel.

You can check that the test box is able to receive AIS data from the actual transponder by requesting a Message 5. See page 33. Upon this request the transponder should respond within a few seconds.
Alternatively, use this setup:
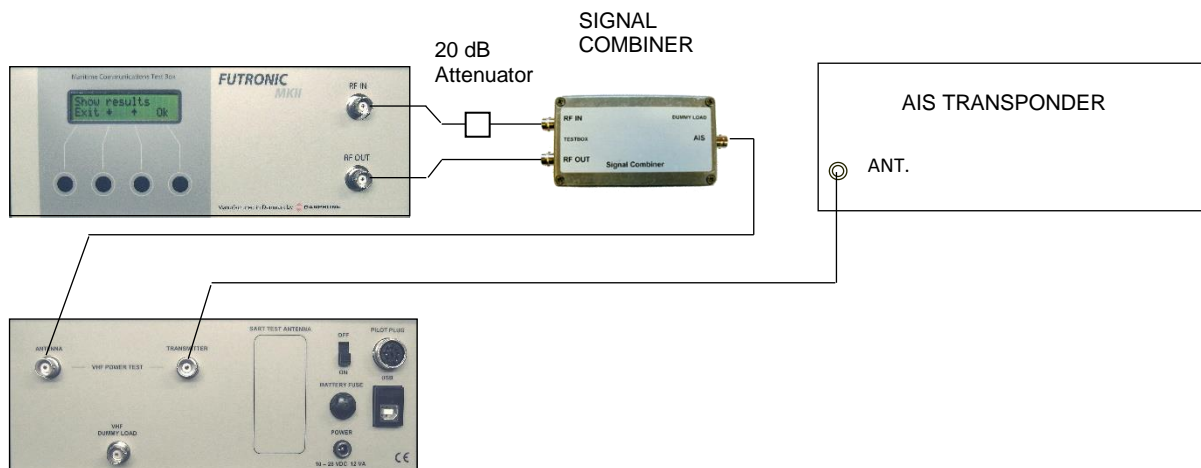
Examples of Printout from the Memory:

AIS # 1,   Time/date: 07:25:56 / 26-09-2017
Message ID: 1 MMSI: 219557624
Position: 57d12.3732 N   9d41.0067 E   Pos. accuracy: 0   Navigational status: 0
COG: 321.2d   SOG: 0.1 Knots   ROT: N/A True Heading: N/A Time stamp: 01
AIS1 Freq.: 161,975.2 kHz   Fwd.: 11.7 Watt   Rev.: 0.6 Watt   VSWR: 1.59

AIS # 1,   Time/date: 07:26:26 / 26-09-2017
Message ID: 1 MMSI: 219557624
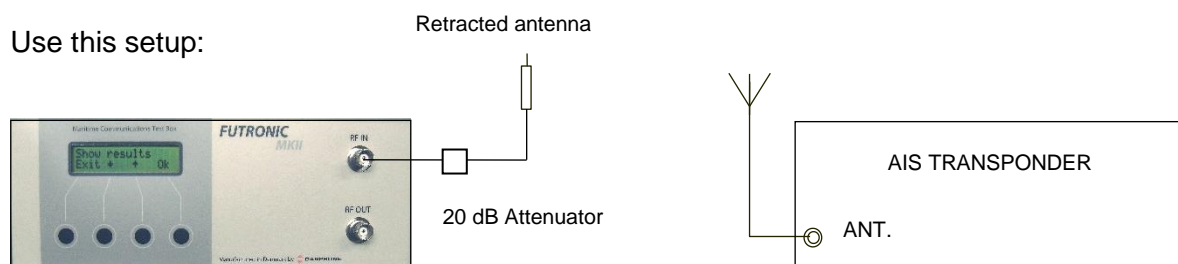Position: 57d12.3730 N   9d41.0060 E   Pos. accuracy: 0   Navigational status: 0
COG: 341.8d   SOG: 0.1 Knots   ROT: N/A True Heading: N/A Time stamp: 31
AIS2 Freq.: 162,025.6 kHz   Fwd.: 11.7 Watt   Rev.: 0.6 Watt   VSWR: 1.59

Receive AIS

In the Receive AIS mode, the test box will receive the MMSI number, AIS data and frequency of the <u>first</u> transponder being detected by the test box.

Use this setup:

Select **Receive AIS** on the test box and press OK. Select AIS channel and press OK again to request for data. It may take up to 20 seconds until the AIS transponder transmits its data.

Test results are displayed line by line. You may toggle between the lines using ↑ and ↓ to view all the results.

Example of Printout from the Memory:

AIS # 1, Time/date: 08:26:12 / 14-09-2017
Message ID: 1 MMSI: 219023274
Position: 57d35.6062 N   9d57.5732 E Navigational status: 15
COG: 293.8d   SOG: 0.0 Knots ROT: 0d True Heading: 159 Time stamp: 09
AIS2 Freq.: 162,025.1 kHz

Receive AIS loop

In the Receive AIS loop mode the test box will receive and display the MMSI number and message ID continuously from all AIS transponders within reach – one at a time. The result is kept in the display until the next is received. Results are displayed only, not stored in the memory.

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

Use the same test setup as with Receive AIS.

Receive Message 21 (AtoN)

The Receive Message 21 mode enables you to test Aids to Navigation devices. The tests can be performed on AIS1 and AIS2 respectively.

If you wish to include power measurements in the AtoN test, use the same setup as with AIS Receive Sele. Then, the test box will receive the AtoN's MMSI number and AIS data, and at the same time measure the frequency and the forwarded and reflected power.

If the power test is not required, you may use the same setup as with AIS Receive (over the air).

Select **Receive Message 21** on the test box and press OK. Select AIS channel and press OK again to wait for data to be received. Since AtoN information is transmitted with 3-minute intervals on each frequency, it may take up to 6 minutes until the AtoN transmits its data on the AIS frequency requested.

Examples of Printout from the Memory:

AIS # 1,   Time/date: 05:21:01 / 25-09-2017
Message ID: 21 MMSI: 3405
Position: 63d25.6830 N   10d06.4266 E
Name of AtoN: ATON_TEST@@@@@@@@@@
Type of AtoN: 7   Type of position fixing device: 1   Time stamp: 61
AIS1 Freq.: 161,975.0 kHz   Fwd.: 3.2 Watt   Rev.: 0.2 Watt   VSWR: 1.67

AIS # 1,   Time/date: 05:24:01 / 25-09-2017
Message ID: 21 MMSI: 3405
Position: 63d25.6830 N   10d06.4266 E
Name of AtoN: ATON_TEST@@@@@@@@@@
Type of AtoN: 7 Type of position fixing device: 1 Time stamp: 61
AIS2 Freq.: 162,025.0 kHz Fwd.: 10.7 Watt Rev.: 0.6 Watt VSWR: 1.62

Poll info CH70

*Please note: According to ITU Recommendation 1371-5, page 63, section 1.1,
AIS transponders are no longer required to act in response to DSC messages, except for the purpose of AIS channel management. All other DSC messages, including polling requests, are disregarded. Therefore, you may not get any response from the CH70 tests below, and you are advised to write "Not Applicable" (N/A) in this line of your test report.*

For AIS transponders with the facility to transmit on CH70 and/or the alternative channels 06 and 15, the test box can be used to poll AIS information.

It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the AIS transponder to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

Use this setup:

Select **Poll info CH70** on the test box and press OK. The AIS transponder can be polled for information on name/identity, position, course, speed, heading, beam, draught and length, etc. Press ↓ and ↑ to toggle between the various polling modes.

Once the polling mode has been selected, press OK. The test box will automatically synchronize with the AIS transponder; transmit the request and then switch to receiving mode. Wait for the transponder to respond and check the polled information appearing on the test box display. The polled information will also be stored in the test box memory.

The polling mode also offers the opportunity of shifting to the alternative channels 06 and 15. If you select the alternative channel, remember to switch back to CH 70.

Example of Printout from the Memory:

AIS # 1   Time/date: 10:57:22 / 26-09-2017
VTS DATA: CH70-156.525 MHz RX MMSI: 9999999990 Format 120 Category: 103
TX MMSI: 2195576240
Position: 57d12.3735 N   009d41.0096 E   Time: 08:57:22
EOS: 122 ECC: 119   Status: OK
Freq.: 156,525.5 kHz   Fwd.: 10.9 Watt Rev.: 0.6 Watt   VSWR: 1.60

Request Message 5 (Class A)

In this mode you can request a Message 5 from Class A transponders. MSG 5 provides information of the ship's MMSI, call sign, IMO number, name, type of ship and dimensions, etc.

Use this setup:
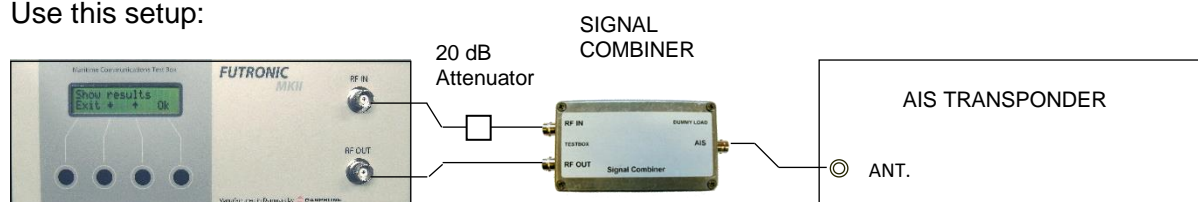
Use this setup if you wish to include a power measurement with the test:
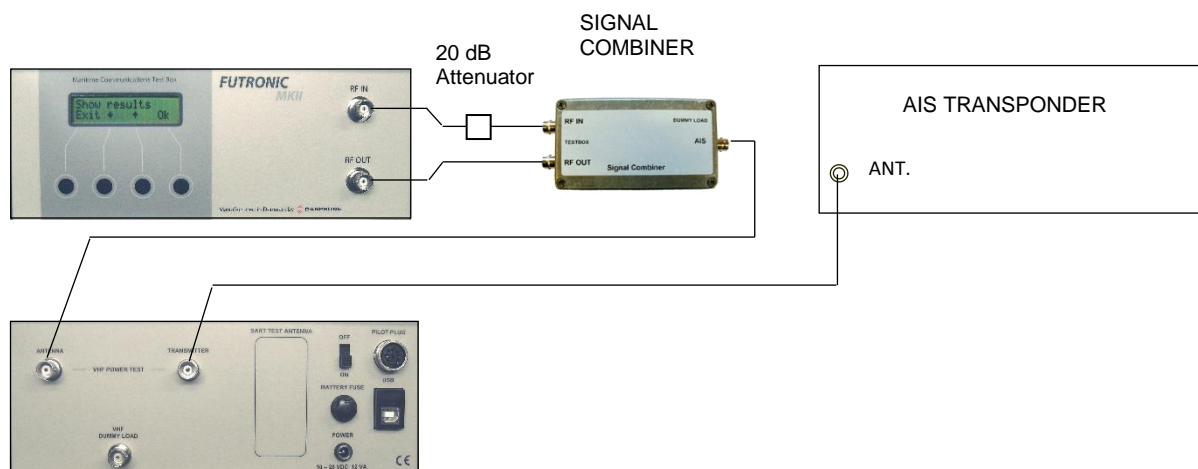
It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the AIS transponder to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

Select **Request MSG 5** and press OK. Then, select AIS frequency and press OK again.

The test box will automatically synchronize with the AIS transponder; transmit the request and then switch to receiving mode. Wait for the transponder to respond and check the MSG 5 information appearing on the test box display.

The received MSG 5 information will also be stored in the test box memory.

Example of Printout from the Memory:

AIS # 1,   Time/date: 08:26:25 / 14-09-2017
Message ID: 5 MMSI: 231774000
C.SIGN: OZ2101   IMO: 007922166   Name: EYSTNES
Type of ship: 70   Dimension of ship: A: 10 m B: 93 m C: 3 m D: 13 m
Electronic position fixing device: 1
Draught of ship: 5.0 m   Destination: HIRTSHALS
ETA: MMDD 9-12 HHMM 18:00
AIS1 Freq.: 161,975.0 kHz   Fwd.: 10.1 Watt   Rev.: 0.4 Watt   VSWR: 1.49

Request Message 11 (UTC)

Using the same setup as with Request Message 5, you can request the UTC time. Select **Request AIS Message 11** and press OK. Then, select AIS frequency and press OK again.

The test box will automatically synchronize with the AIS transponder; transmit the request and then switch to receiving mode. Wait for the transponder to respond and check the MSG 11 information appearing on the test box display.

The received MSG 11 information will also be stored in the test box memory.

Example of Printout from the Memory:

AIS # 1,   Time/date: 13:06:06 / 22-01-2018
Message ID: 11 MMSI: 111661003
Position: 57d12.3745 N   9d41.0067 E Electronic position fixing device: 1
Date: 22-01-2018 Time: 12:05:58
AIS1 Freq.: 161,974.7 kHz Fwd.: 11.6 Watt Rev.: 0.6 Watt VSWR: 1.59

Request Message 24 (Class B)

Using the same setup as with Request Message 5, you can request a Message 24 from Class B transponders. MSG 24 is divided in two: MSG 24A presenting the ship's MMSI and name - and MSG 24B providing information of the ship's MMSI, type of ship, call sign and dimensions.

It is a requirement that the MMSI number registered in the test box is identical with the MMSI of the AIS transponder to be tested. Please check and change number, if required, using the Edit ship's MMSI menu. See Page 12.

Select **Request MSG 24** and press OK. Then, select AIS frequency and press OK again.

The test box will automatically synchronize with the AIS transponder; transmit the request and then switch to receiving mode. Wait for the transponder to respond and check the MSG 24 information appearing on the test box display.

The received MSG 24 information will also be stored in the test box memory.

Example of Printout from the Memory:

AIS # 1,   Time/date: 14:41:30 / 19-04-2017
Message ID: 24 MMSI: 219015583
Name: LIMFJORD PILOT 1@@@@
AIS1 Freq.: 161,975.1 kHz Fwd.: 1.9 Watt Rev.: 0.0 Watt VSWR: 1.00

AIS # 1,   Time/date: 14:41:31 / 19-04-2017
Message ID: 24 MMSI: 219015583
Type of ship: 50 C.SIGN: OX2520@
Dimension of ship: A: 7 m B: 5 m C: 1 m D: 3 m
AIS1 Freq.: 161,975.1 kHz Fwd.: 1.9 Watt Rev.: 0.0 Watt VSWR: 1.00

Send AIS message

The test box can transmit a fixed default AIS message or a custom-made message. Following the transmission, you can check that the AIS transponder receives the AIS message correctly.

Use this setup:
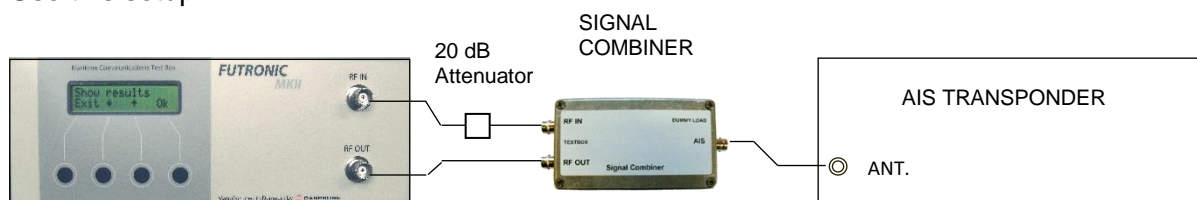
The default AIS message already loaded in the test box is a MSG 1 that includes a vessel position of 45°N 45°W.

To transmit the message, just select **Send AIS MSG** on the test box and press OK. Then, select AIS frequency and press OK again.

Following this, the test box will await a response from the transponder and then automatically send the message.

After the transmission, the test box will display **Received status**. Press **OK** if the call was successfully received. Press **Fail** if the call was not well received. The answer will be stored in the test box memory for your test report.

Example of Printout from the Memory:

AIS # 1 Time/date: 13:11:25 / 22-11-2011
AIS2 162.025 MHz. Received OK

For the purpose of composing a customized message, a free PC software TEST BOX MANAGER can be downloaded from Danphone's website. See page 48.

Once composed, the message can be transferred from the PC to the test box via the USB cable supplied with the test box. When connected, follow the instructions on the screen, and the custom-made AIS message will replace the default MSG 1.

If the custom-made AIS message is removed from the test box later on, the default MSG 1 will automatically load again.

Simulate Ship

Using the same setup as with Send AIS Message, the test box can also simulate a ship being located at four different positions around the AIS transponder to be checked. Following the transmissions from the test box, you can check that the AIS transponder receives the four positions correctly.

Since the virtual ship (= the test box) will simulate its positions relative to the position of the AIS transponder being tested, the test box must first receive position data from the AIS transponder.

The required position data may be registered in the test box already, for instance if you have made other AIS tests prior to Simulate ship. Check this out in the **Test results / Show results** menu, looking for the latest position data received.

If you prefer not to use these data, perform a new Receive AIS test that includes the receipt of position data. The test box will always use the latest received position data for the Simulate ship test.

With the correct position data in place, select **Simulate ship** and press OK. Then, select AIS frequency and press OK again.

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).

Following this, the test box will await a response from the AIS transponder and then automatically send the first position. After transmission of the first position, the test box waits for a new response from the AIS transponder before the second position is transmitted, and so on.

Pilot Plug Test

This test is to check that the pilot plug provides information from the AIS transponder onboard.

Use this setup:
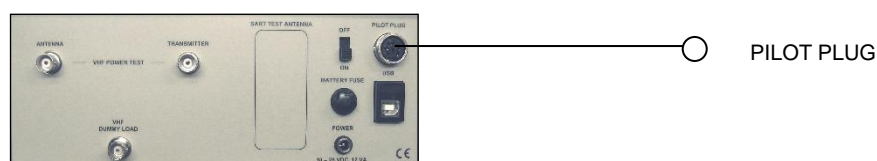
Select **Pilot plug** and press OK.

The test box will receive 10 NMEA messages from the plug.

If the test result shows OK/FAIL: 10/0, it means that the test box received 10 messages and 0 of them were failing.

Example of Printout from the Memory:

AIS # 1   Time/date: 08:03:22 / 21-11-2011
Pilot plug data packet status Ok/Fail: 10/0

Please note that a pilot plug cable is not supplied as a standard with the test box. Can be supplied as an optional extra.

The pilot plug on the test box pilot connects as follows:
pin 1 = Input A
pin 4 = Input B

BEACON TESTS

406 MHz EPIRBs and Personal Locator Beacons

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

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

Use this setup:
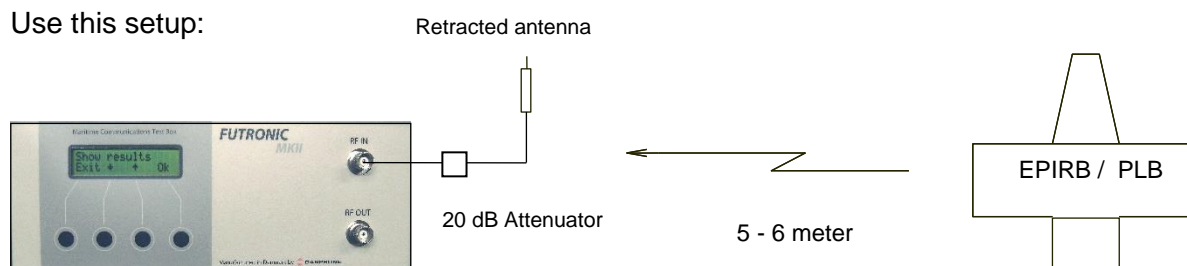
The test box is very sensitive to receiving signals from emergency beacons. If the display shows "Please wait", the test box has detected the transmission but is still waiting for the rest to follow. If nothing happens, it is usually because the signal is too strong. Then, try to move the beacon further away or replace the 20 dB attenuator by a 40 dB.

1) Select the 406 MHz EPIRB test mode and press OK.

2) Set Number.
As you may wish to test several beacons in a row, each beacon can be given its own individual set number for recognition. Default number is 1. Press **OK** to confirm or press ↑ or ↓ to change to another number.

3) Press OK and "Detect freq." will appear in the display.

406 MHz beacons are available for transmitting at various frequencies. If the beacon does not provide any printed information of its frequency, select **Detect freq**. and the test box will automatically detect the frequency and set itself for testing here. If the beacon provides information of its frequency, you are advised to select the frequency manually. Press ↑ in order to go to 406.025 MHz and further on to 406.028, 406.031, 406.037 and 406.040 MHz. Press ↓ to go to 121.5 MHz.

4a) In the manual mode, select frequency and press OK. The display will show "Waiting…" for transmission. Then activate the beacon in its test mode, and the test box will perform a full test, measuring the frequency and signal strength level during the test transmission and recording the data strings contained in the transmission.

4b) In the automatic Detect freq. mode, press OK and the test box will show "Detecting..." in the display. Then activate the beacon and wait for the detected frequency to appear in the display. Upon this, press OK and re-activate the beacon in order to perform the full test.

"Received OK" in the display confirms successful test.

Test results are automatically stored in the memory and presented on the display where they can be viewed line by line. Use ↓ and ↑ to toggle between the lines.

In the 121.5 MHz test 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.

Examples of Printout from the Memory:

EPIRB 406.028 MHz # 1   Time/date: 11:53:24 / 22-11-2011
Country Code: 219 ON-AIR TEST MODE Short
User protocol code: Maritime   Id: 999999, Specific beacon: 0
Aux. device type 121.5 MHz
B.107:National use, undefined - Manual activation only
Bit 109-112: 0000
Programmed Message (Bit 25-112): 4DB418618618668CD35900
Programmed Identifier (Bit 26-85): 9B6830C30C30CD1
Freq:406,027.5 kHz   Level: 236

EPIBB 406.028 MHz # 2   Time/date: 12:37:48 / 22-11-2011
Country Code: 211 ON-AIR TEST MODE
Standard Location Protocol
MID: 123456 Beacon no: 0
N 53 deg 30' +4'32 E 10 deg 00' -6'40
Internal Navigation Device, 121.5MHz Homing B112 = 1/Yes
Programmed Message (Bit 25-144): 8D321E240035814786AB779206A979
Programmed Identifier (Bit 26-85): 1A643C48006B028
Freq:406,028.8 kHz   Level: 222

The level figure is only an indication of the signal strength – not an exact measurement. The purpose of this figure is to ensure a reliable test. A level figure of 140 or more is advisable.

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 www.cospas-sarsat.org / Beacons / Beacon Message Decode Program.

Please note that it may not be possible to make 121.5 MHz frequency measurements of all 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.

AIS-SARTs and Man Over Board Devices

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

If the beacon 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.

Use this setup:
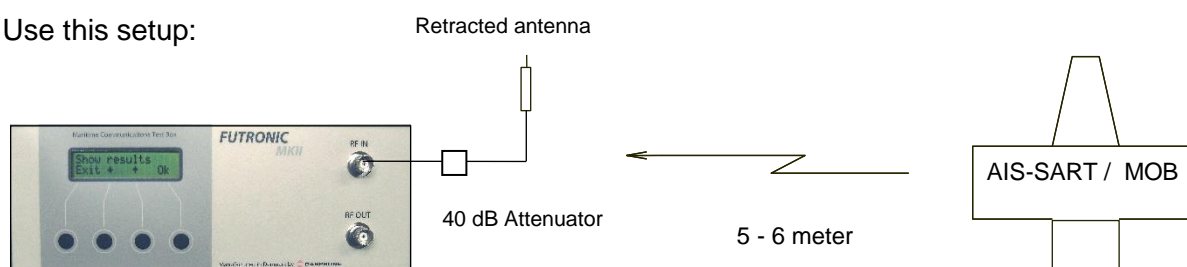
1) Select the AIS-SARTs test mode and press OK.

2) Set number.
As you may wish to test several beacons in a row, each AIS-SART can be given its own individual set number for recognition. Default number is 1. Press **OK** to confirm, or press ↑ or ↓ to change to another number. Then, press **OK** and go to the test.

3) Press OK and the display will show "Waiting…" for transmission.

4) Activate the beacon in its test mode. As soon as the beacon has found its position, it will start transmitting. A complete transmission includes one Message 14, six Message 1 and finally one Message 14 again, covering both AIS 1 and AIS 2 frequencies. The test box will change to display the eight messages being received one by one at 2-second intervals.

5) Following the last transmission, press ↓ to view the received data in detail. The data are automatically stored in the test box memory as well.

Example of Printout from the Memory:

AIS-SART # 1,   Time/date: 05:01:05 / 25-09-2017
Message ID: 14 MMSI: 970010136
Text: SART TEST
AIS1 Freq.: 161,975.8 kHz

AIS-SART # 1,   Time/date: 05:01:07 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS2 Freq.: 162,024.8 kHz

AIS-SART # 1, Time/date: 05:01:09 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS1 Freq.: 161,974.8 kHz

AIS-SART # 1, Time/date: 05:01:11 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS2 Freq.: 162,024.9 kHz

AIS-SART # 1, Time/date: 05:01:13 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS1 Freq.: 161,974.8 kHz

AIS-SART # 1, Time/date: 05:01:15 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS2 Freq.: 162,024.8 kHz

AIS-SART # 1, Time/date: 05:01:17 / 25-09-2017
Message ID: 1 MMSI: 970010136
Position: 57d12.3722 N   9d40.6770 E   Navigational status: 15
COG: 0.0d   SOG: 0.0 Knots   ROT: N/A   True Heading: N/A   Time stamp: 49
AIS1 Freq.: 161,974.9 kHz

AIS-SART # 1, Time/date: 05:01:19 / 25-09-2017
Message ID: 14 MMSI: 970010136
Text: SART TEST
AIS2 Freq.: 162,025.5 kHz

Radar SARTs

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

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 indicating the signal strength level.

Test setup and procedure

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.
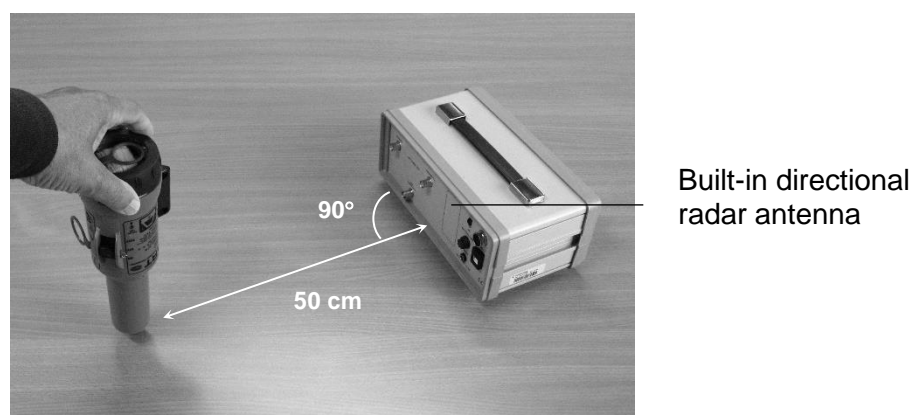
1) Select the Radar SARTs test mode and press OK.

2) Set number.
As you may wish to test several Radar SARTs in a row, each Radar SART can be given its own individual set number for recognition. Default number is 1. Press OK to confirm or press ↑ or ↓ to change to another number. Then, press OK and go to the test.

3) In the Activate SART mode, 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. The test box carries out the SART test within two seconds following the control burst.

5) A double tone confirms that the test box has completed the test, and the SART can be deactivated accordingly.

The test box will display the average frequency of the response signal transmitted by the SART – along with a figure indicating the signal strength level. A level figure of 150 or higher should be obtained in order to ensure a reliable test.

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:

Radar SART # 1 Time/date: 15:07:49 / 22-11-2011
9.376 GHz Level: 166

TEST RESULTS

Test results are automatically stored in the test box memory with the facility of transferring them to a PC or printer. The test result memory can contain a total of 600 measurements. If more measurements are done, the oldest will be deleted.

Show results

Test results can be retrieved from the memory and viewed on the display. Select **Show results** and press **OK**. Every test recorded is organized with a header under which the various test results are displayed line by line. Press ↓ and ↑ to toggle between the lines.

Transfer to PC

USB Cable

Test results can be transferred to your PC via the free PC software program TEST BOX MANAGER that is available for download from Danphone's website. See page 48.

Alternatively, any serial software set for 38,400 Baud N81 (No parity 8 data bit and 1 stop bit) should be able to receive the data and test results from the test box.

Here is how to use a HyperTerminal program within Windows. Usually the program can be found on your PC under Start/Accessories/Communications. If not, we advise you to download a HyperTerminal program from the Internet.

1) Connect your test box to the PC, using the USB cable supplied with the test box.

2) Create a HyperTerminal connection on your PC; select COM port and do the following settings:

    Bits per second = 38,400
    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

3) On your test box, select **Transfer to PC** and press OK.

4) Press **Sele**, and you may select each individual test result you wish to transfer. The latest result is displayed first – or press **All**, and all test results in the memory will be transferred

Clear Memory

This will clear all test results store in the test box memory.

FREQUENCY COUNTER

The frequency counter enables you to measure any frequency between 0.4MHz to 475 MHz.

1) Select **Frq. Counter** on the test box and press OK.
2) Press ↑ and ↓ to select frequency range and press OK.
3) Choose between **Meas** and **Cont**. Then, activate the transmitter.

In the Meas (= measure) mode the test box will perform and display a single frequency measurement and store it in the memory.

In the Cont (= continue) mode the test box will continue taking measurements until pressing the EXIT button stops it. Cont readings are not stored, but the feature can be used e.g. for checking/adjusting the antenna.

TEST BOX SETTINGS

Time & date
In the Set Time & Date mode, press → to move the cursor and ↑ to change the digit.
Press **OK** to store.

Backlight time
The backlight time can be adjusted from 0 to 200 seconds. Default is 60 seconds.
Press ↑ or ↓ to adjust and **OK** to store.

LCD contrast
The LCD contrast can be adjusted from 0 to 100%. Default is 90%. Press ↑ or ↓ to adjust and **OK** to store.

OCXO time
The Oven-Controlled Crystal Oscillator (OCXO) may not be active all the time, only when required during tests etc. In order to save battery and thereby increase operation time with battery power, the OCXO can be set to go to sleep after a adjustable time between 0 and 99 minutes. Default is 10 minutes. Press ↑ or ↓ to adjust and **OK** to store.

Enable speaker
Audio can be heard in speaker when receiving VHF DSC signals, measuring deviation and measuring signal level. Default setting is speaker off. Press ↑ or ↓ to enable speaker and **OK** to store.

Return to Default Settings
Turn the test box off and keep the **OK** button down while turning on again.

TEST BOX INFO

This menu presents the following information in the test box display. The information may consist of two or more lines. Press ↑ or ↓ to toggle between the lines.

Test box model
Serial number
Software version
Calibration due date
Battery voltage
Battery capacity indication (for guidance only):
13.0 V = 100%, 12.2 V = 50%,11.9 V = Needs charging now.

SELF TEST

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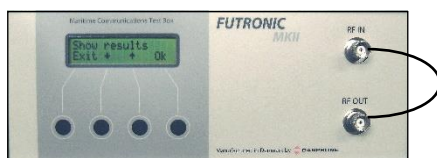
FRQ TEST gives the possibility for control of MF/HF MARK/SPACE frequencies as well as the frequency counter as the chosen MARK/SPACE frequency is available at the RF OUT socket and can be measured via RF IN. The result is shown on the LCD display. The SPACE frequency should be 85 Hz higher than the center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

TECHNICAL SPECIFICATIONS

Size (HxWxD):   103x258x140 mm
Weight: 2.8 Kg
Power supply: 10 - 28 VDC
Power consumption: max. 12 VA
Ambient temperature: 0 to 50 Deg. C
Storage temperature: -30 to +60 Deg. C

Measurement Accuracy:
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
Freq. 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 0-5 W

PERFORMANCE CHECK

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

Check output level at the following frequencies
518 kHz: -15 dBm +/- 3 dBm
2.1875 MHz: -13 dBm +/- 3 dBm
16.804,5 MHz: -15 dBm +/- 3 dBm
156.525 MHz: -46 dBm +/- 3 dBm.

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: <= +/- 0.1 ppm with -30 dBm >= Pin <= 0 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

RE-CALIBRATION SCHEDULE

In order to maintain proper functioning, Futronic MKII test boxes must be re-calibrated at Danphone for the first time after one year and then every two years. Please contact Danphone for further information, email: danphone@danphone.com

TEST BOX MANAGER PC SOFTWARE
The free PC software TEST BOX MANAGER allows you to

- View all test results and save them to a PC
- Compose custom-made DSC messages
- Compose custom-made AIS messages
- Perform test box settings that cannot all be done on the test box itself
- Perform PC-controlled EPIRB tests
  and generate complete finished EPIRB Test Reports
- Upgrade your test box with new facilities purchased from Danphone

How to download and install

1) Download the PC software from Danphones' website:
   http://danphone.com/futronic-gmdss-testers/futronic-mkii/

2) Open the zipped file.

3) Double click on the file **Installation guide** and follow the instructions.

4) Once installed, the PC program will open a 6-tabbed dialogue box on your PC screen:

   Test Results - **DSC Composer** - **AIS Composer** - **Settings** - **EPIRB** - **Upgrade**

   The tabs are explained on the following pages.

Test results
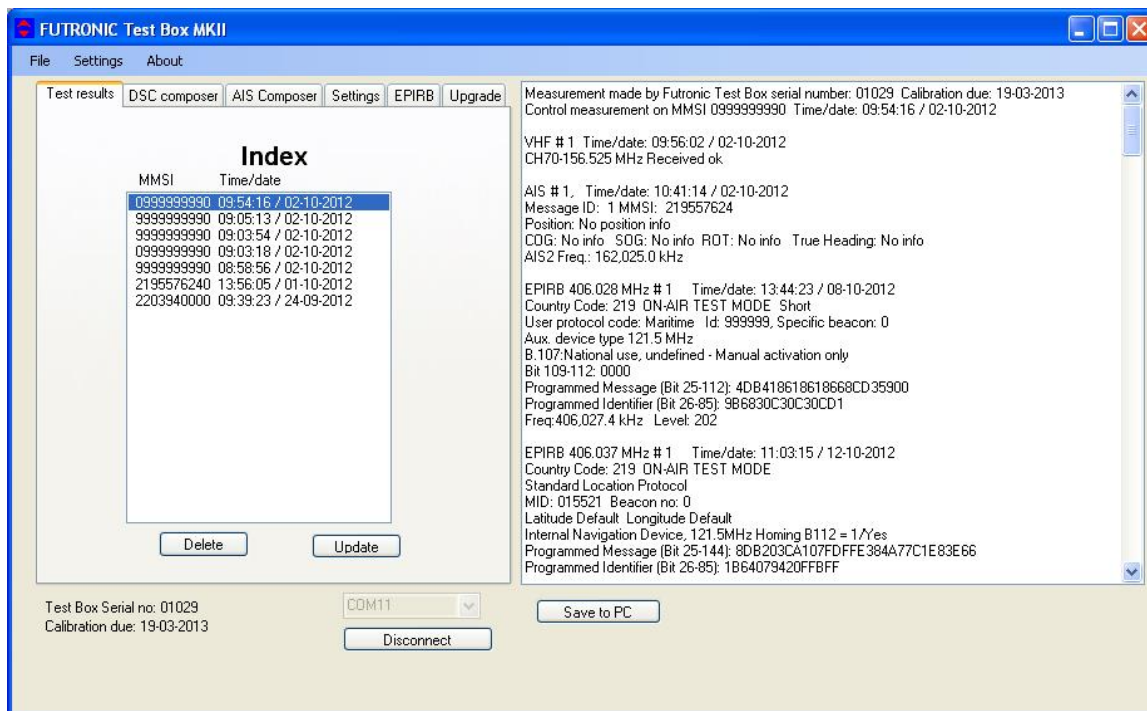
The "Test Results" tab provides access to all the tests and test results stored in the test box.

Tests are organized with a header in the Index window to the left, under which the individual test results are displayed in the window at the right hand side.

Headers are indexed in time order with the latest test on top.

Please note: In order to view a test result, you must select its header first.

Press **Save to PC** in order to save the test results on your PC and to bring them into your own test report format, if so wished.

Press **Update** to update the Index list with new tests performed after you opened the PC program.

Press **Delete** to delete a test from the Index list.

Press **Disconnect** to disconnect the test box from your PC.

DSC Composer
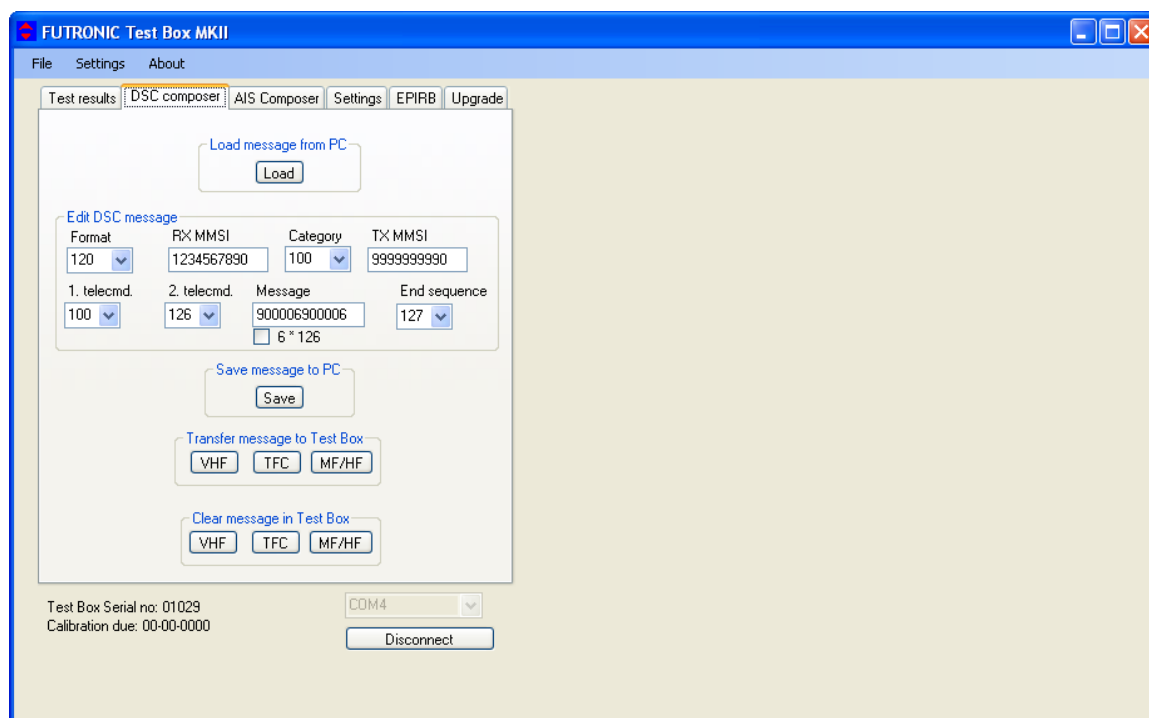
Under the "DSC Composer" tab you can compose your own custom-made DSC messages and transfer them to the test box accordingly.

Please refer to ITU-R M.493 for composing of DSC messages.

The test box can contain one DSC message for VHF, TFC and MF/HF respectively.

Custom-made DSC messages can also be saved on your PC for later use.

AIS Composer

Under the "AIS Composer" tab you can compose and save your own custom-made AIS messages.

 When transferred to the test box, the AIS message will be transmitted on both AIS channels, AIS1 and AIS2.

Settings
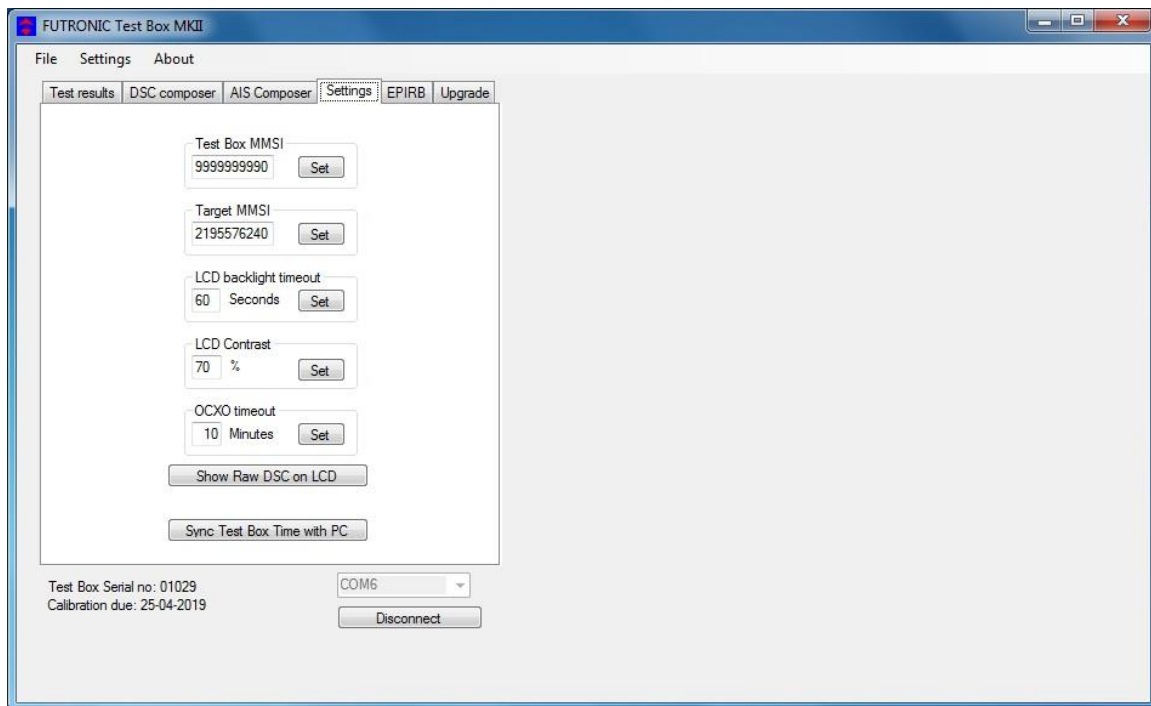
The "Settings" tab allows you to change the test box settings.

Test box MMSI: Write and set new MMSI number for the test box here.

Target MMSI: Write and set MMSI number of the device to be tested here.

LCD backlight time out: Write and set backlight time out between 0 and 200 seconds here.

LCD contrast: Write and set contrast between 0 and 100% here.

OCXD time out: Write and set OCXO time out between 0 and 99 minutes here.

Show raw DSC on LCD: Click here to have raw DSC data presented in the display along with clear text.

Sync Test Box Time with PC: Click here to synchronize the current date and time in the test box with the date and time in your PC.

EPIRB Test Report Generator

The "EPIRB" tab offers two options:
1. Generation of complete EPIRB test reports out of test results from the test box,
2. PC-controlled EPIRB testing and simultaneous generation of test reports.

1. Generating reports out of stored test results

This window allows you to generate complete EPIRB test reports out of the test results stored in the test box.

1) Select the EPIRB test from the list at the right hand side. If there is no list,
   go to the "Test results" tab and select from the Index a header that contains the relevant EPIRB test. Then return to the "EPIRB" tab.
2) Fill in the beacon information form in the EPIRB dialogue box at the left hand side.
3) Press "Generate Report" to create the EPIRB Test Report (HTML format).

See example of an EPIRB Test report on the next page.

During the installation of the Test Box Manager PC software, a default report template has been placed in C:\EPIRB\ on your PC. Feel free to use this HTML document as the basis for creating your own layout or design, if so wished. Then, press "Get template" and select the new one from your file system instead of the default template.

Please note: Default limits of the frequency tolerance and minimum signal level are +/- 5 kHz and 190 respectively. Other limits may be inserted in accordance with specifications. Should the limits be exceeded during test, the report will write "Failed" in the status line.

Example of Test Report based on the default HTML design:

EPIRB Test Report

Beacon Data

Beacon manufacturer:	Litebeacon Ltd.
Beacon name:	Litebeacon
Beacon model:	L-987
Beacon serial number:	123456
Beacon frequency:	406.028 MHz
Bracket type:	Fix
Bracket serial number:	6789
Hydrostatic release expiry:	13 June 2014
Battery expiry:	26 August 2015
Attached lanyard test	ok

Beacon Location

Vessel name:	Mary Celeste

Test Results

Frequency measured:	406.027,4 MHz
RF level measured:	202
Status:	Passed
Message decoding:	BCH code check ok
Hex message:	FFFED04DB418618618668CD35900
Message format:	Short format
Protocol:	Maritime User Protocol
Country code:	219
Unique ID:	9B6830C30C30CD1
Decoded message:	MID: 999999 Specific beacon: 0 Aux. device type: 121.5 MHz

Test Instrument

Serial number:	01029
Calibration due:	19-03-2013

Futronic MKII Test Box

Test Performed

Time / Date:	13:44:23 08-10-2012
Company:	Testco
Test responsible:	Martin Smith
Signature:	M. Smith

Futronic MKII Maritime Communications Test Box manufactured by ◆ **DANPHONE**

2. PC-controlled EPIRB tests

In addition to generating test reports from EPIRB tests stored in the memory, this window also enables you to perform PC-controlled EPIRB tests generating test reports automatically. With this, the system will not transfer the test results to the test box, but still generate finished test reports that can be stored in your PC.

1) Turn the test box on. No need to select EPIRB tests, your PC will take control.
2) Deselect all tests from the header list at the right-hand side, if any.
3) Select frequency in the EPIRB dialogue box at the left-hand side and fill in the beacon information form.
4) Press "Start PC-controlled Test" and then activate the EPIRB.
5) Wait for the EPIRB Test Report to be automatically generated (HTML format).

See example of an EPIRB Test report on the previous page.

Upgrade
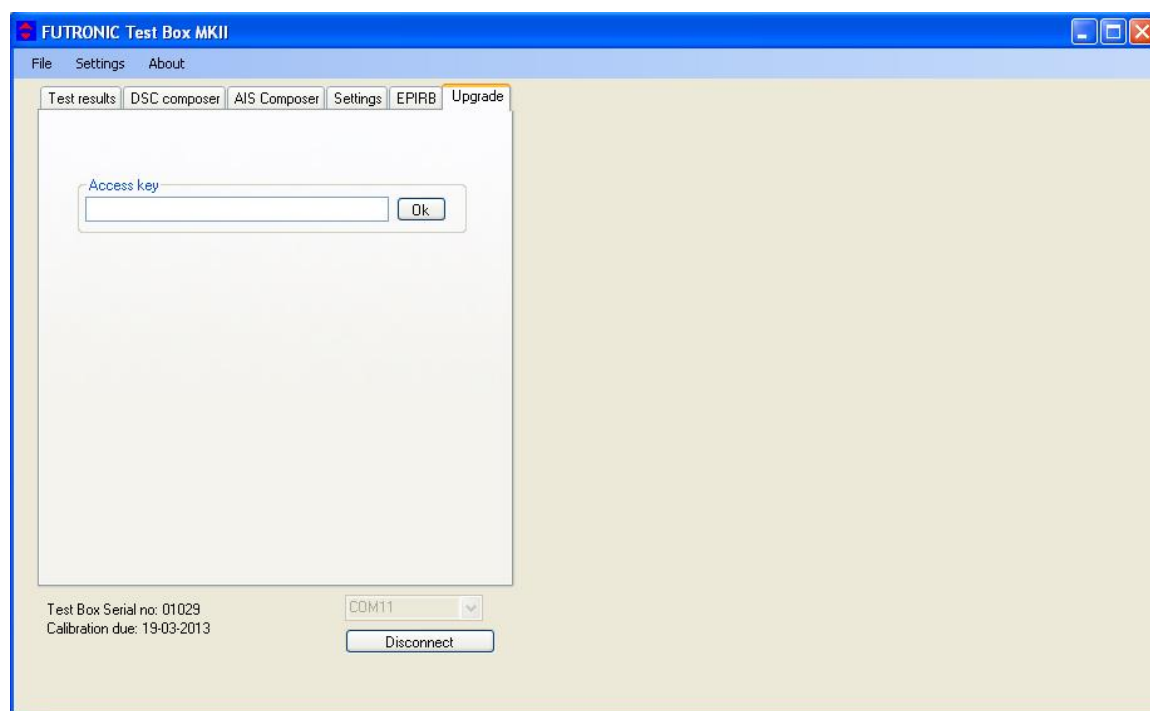
The "Upgrade" tab is used if you are going to upgrade your test box with new additional test software. For instance, if your test box is a GMDSS-only model and you have purchased the additional AIS test facility from Danphone, you will be given an access key to be entered, and the new facility will work immediately.

DECLARATIONS

- Declaration of Conformity to EMC Directive
- Declaration of the Built-in Battery
- Declaration of Battery Conformity to IATA Regulations

Declaration of Conformity

DANPHONE

Declaration of Conformity to the European EMC Directive 2004/108/EC

Equipment Name: FUTRONIC MKII Test Box

Equipment Category: Test Instrument
                            for the testing of maritime communications equipment

Manufacturer: Danphone A/S
                            Klokkestoebervej 4
                            DK-9490 Pandrup
                            Denmark

Declaration Statement: I hereby declare that the above mentioned
                            test instrument conforms to the requirements
                            given in relevant articles of the European EMC Directive
                            2004/108/EEC

Date: 19th December 2011

DANPHONE A/S
Klokkestoebervej 4 · DK-9490 Pandrup · Danmark
Tel.. +45 96 44 44 44 · Fax +45 96 44 44 45

Signature:

Ove Jensen
Managing Director
Danphone A/S

DANPHONE

DANPHONE A/S
Klokkestoebervej 4 · DK-9490 Pandrup · Denmark
Tel. +45 96 44 44 44 · Fax +45 96 44 44 45
E-mail: info@danphone.com
www.danphone.com
Co. Reg. No. 13640378

Quality System
according to
DS/EN ISO 9001:2008

To whom it may concern

Your reference: Our reference: JS   Date: 20 August 2018

Letter of Declaration

I hereby declare that we - Danphone A/S, Klokkestoebervej 4, DK-9490
Pandrup, Denmark - are the manufacturers of the **Futronic MKII Test Box.**

I also declare that the above-mentioned test instrument is used for the testing
of maritime communications and navigations equipment and conforms to the
requirements given in relevant articles of the European EMC Directive
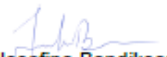2004/108/EEC.

The Futronic Test Box does not contain any dangerous materials.

The built-in battery is a rechargeable, valve regulated, sealed Lead-Acid
battery classified as "Class 8, Group III UN No. 2800 Battery, wet, non-
spillable electric storage, special provision A67".

The Futronic MKII test box is permitted as carry-on and check-in baggage on
aircrafts, as the battery's voltage and watt-hour rating does not exceed 12V
and 100Wh and the battery terminals are protected against short circuits in
accordance with provision A67.

If the fuse is removed there is no connection between the the battery and the
unit.

On behalf of
DANPHONE A/S

Josefine Bendiksen
Sales and Marketing

js@danphone.com

YUASA

DOCUMENT: QAT02-B

TRANSPORTATION OF YUASA BATTERIES (TYPES NP, NPH, NPC, NPL, RE, REL, UXL, ENDURANCE) BY AIR, SEA OR ROAD

1. AIR TRANSPORT

Under IATA Dangerous Goods Regulations, the subject batteries are classified as:

> **"Class 8, Group III UN No. 2800 Batteries, wet, non-spillable, electric storage, special provision A67."**

These batteries are classified as **non-spillable** because they have been shown to meet the requirements of Packing Instruction 806.

Special Provision A67, contained in IATA Dangerous Goods Regulations and the ICAO publication, Technical Instructions for the Safe Transport of Goods by Air and states that:

> **"Non-spillable batteries are not subject to these Instructions if, at temperature of 55° C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow and if, when packaged for transport, the terminals are protected from short circuit."**

These batteries were classified as meeting the A67 requirement after testing by PIRA, who stated that the batteries may be regarded as non-dangerous. Several other independent internationally recognised laboratories are also in agreement that these battery types are non-dangerous.

In meeting the requirements of packaging instruction 806 and Special Provision A67 the subject batteries may be regarded as **non-dangerous**

2. TRANSPORT BY ROAD AND AS SEA FREIGHT

The International Maritime Dangerous Goods (IMDG) code states that to be classified as **non-spillable and non-dangerous**, "The battery must be able to satisfactorily withstand without leakage the vibration and attitude tests described below.......". (Refer to IMDG Code on Batteries, Wet, Non-Spilable Electric, Storage, Class 8, Stowage Category A, UN2800, Special Provision A67). These Yuasa battery types have satisfactorily completed these tests as certified by Giltspur Packaging Ltd. Certificate of Test Serial No RDT3330/45/2, Job No 4000/0775 issued under Ministry of Technology Authority Ref. No 30260. They have also satisfied the requirements of Special Provision A67 as described above

3. PACKAGING - GENERAL

These batteries can be shipped in any quantity by air, road and sea. They are exempt from any special packing requirement other than to ensure that the battery terminals are protected from short circuit. **TREM cards are not required**

The normal packaging provided is suitable in this respect for batteries not secured in equipment. If in equipment, the batteries must be securely fastened in the battery compartment of the equipment.

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