

Rhotheta RT-600_Gen2 Quick Reference Guide

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Rhotheta RT-600 Quick Reference Guide

Turn on RT 600

1. Turn on mission master first
2. Push black button (lower center of Unit)
3. Note unit as it comes on stating Rhotheta RT 600



Power-On Screen

Fig. 1

4. Page 1 is now displayed. Note (if you turn off the unit while the Memory Page is showing, the Unit will come on showing the Memory Page. Always turn off unit with Pg. 1 showing.

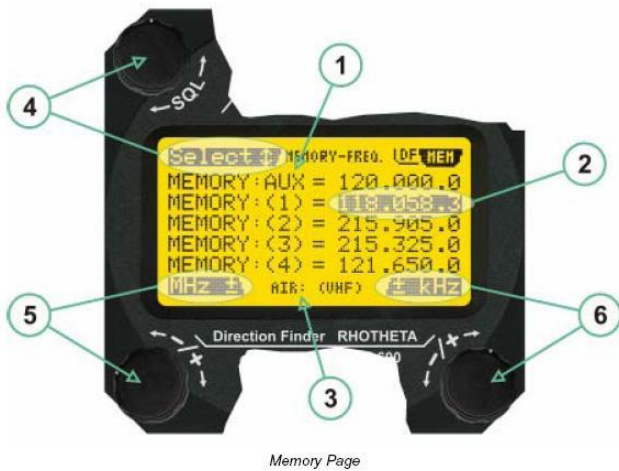


Operational Elements in Bearing Mode

Fig. 2

Select and Store User Frequencies

1. Rotate Page Knob 7 Counter Clockwise (CCW) one click then CW 1 Clk for the Memory Screen Fig.3
2. Rotating Squelch Kb (upper left) takes you through the five listed user frequencies.
3. Rotate the Squelch Kb CW to the desired user frequency.
4. Turn the Page Kb (7) CCw to put the selected freq. on Pg 1 or let the unit sit for a few seconds and unit returns to Pg1.



Memory Page

Fig 3

Changing User Memory Frequencies.

1. Rotate Page Kb (7) CCW 1 Click (Clk) then rotate Kb (7) CW 1 Clk to display Memory Page
2. Rotate Squelch Kb (4) to highlight desired memory frequency
3. Using Kb (5) changes Mhz and Kb (6) changes the Khz.
4. When desired frequency is selected, rotate the Page Kb CCW one Clk to put the adjusted freq. on Page 1
5. Pushing the Stor Btn steps you through the five stored frequencies
6. Selecting one of the five frequencies using the Stor Btn and rotating the Pg. Btn CCW one Clk will place that Freq. on Page 1

Display All Frequencies on the RT 600

1. Rotate Kb (6) CW 1 Clk and this will display the DF MEM Pg.
2. See Fig. 4
3. 5 User stored Frequencies are located over MEM.
4. 3 fixed Pre-programmed Frequencies are located over Fix. (121.500, 156.800, 243.000)

Display All Frequencies on the RT 600 (Continued)



Frequency Selection Page and Operating Elements

Fig. 4

5. 7 CosPas-SarSat are over CpSAR, (406.025.0, 406.033.3,
6. 406.041.6, 406.050.0, 406.058.3, 406.066.6, 406.075.0)
7. To Scan the CpSAR freqs. Place the cursor 2 over SCN and rotate Pg Kb CCW to Pg 1 and unit will start scanning
8. Once a Freq. has been selected using the Black triangle cursor 2, rotating the Pg. Kb CCW will place that freq. back on Pg 1

Changing a DF MEM Frequency

1. Rotating the Pg Kb 1 CW moves the black triangle pointer over the four MEM frequencies. Use the Volume Kb 2 to adjust the Mhz and Kb 1 to adjust the Khz value. Turning the Pg Kb 1 CCW will place this new freq. on page 1.
2. Another way to change a MEM freq. is to place the Blk pointer over a MEM freq. and push the STORE button. Repeated pushing of this button will take you through the five freqs. Listed in Fig. 3. When a desired freq. is reached, rotate the Pg Kb 7 to place this freq. on page 1.

Changing a DF MEM Frequency (Continued)

3. Placing the triangle cursor over one of the three FIX freqs. (which can not be changed) and rotating the Pg Kb CCW will place the selected Freq. on Pg 1.
4. Placing the triangle cursor over one of the CpSAR Freqs. and rotating the Pg Kb CCW will place the selected Freq. on Pg 1.
5. Placing the triangle cursor over SCN marker and rotating the Pg Kb CCW will place the Becker RT600 into the CpSAR scan mode. This will allow the Becker to search each one of the seven CpSAR freqs. (listed on pg. 3).

2 Operation from Manual

Operating the direction finder is deliberately very simple with its clearly arranged layout. Except the upper page rotary switch and the ON/OFF pushbutton, the function of the operating elements always depends on the active page. All relevant adjustments can be controlled on the display. Figure 1 shows the general layout of the control unit's surface.

2.1 General Operating Principles



Fig. 5

(1) **>LC Graphic Display<** (128 x 64 dots dot-matrix display, dark blue on yellow-green background) showing all relevant operational information depending upon the selected page.

(2) **>Menu<** options for rotary and push buttons: If a field with dark background and bright text is shown below a button or switch, the function described in this field may be selected through the operational element above or below this menu field. In case of the Page Menu, the active page is high-lighted with dark background, while the inactive page is in black letters.

(3) **>ON/OFF<** Push-button to switch on / off the system.

(4) **>Volume<** Rotary Switch, used, depending on the active page, to adjust the volume of the audio output or to select frequency values (MHz steps).

(5) **>SQL<** Rotary Switch, used, depending on the active page, to adjust the squelch function or to select specific functions on a page depending upon the interactive menu on the display.

(6) **>CLR / F1<** Push-button. If pushed for a short time, this button activates the function F1 described in the interactive menu on the display below. If pushed for a longer time (ca. 3 seconds), this button activates the CLEAR function.

(7) **>STORE / F2<** Push-Button. If pushed for a short time, this button activates the function F2 described in the interactive menu on the display below.

(8) **>Rep / DIM<** Push-Button. If pushed for a short time, this button activates the setup of the display dimming function. If pushed for a longer time (ca. 3 seconds), this button activates the repetition of the last valid bearing and signal level information.

(9) **>Page<** Rotary Switch to select displayed main pages ("DF" or "MEM"). Together with the DIM button, it is used to set the display brightness (dimming function).

(10) **>Frequency<** Rotary Switch to select frequencies.

2.1.1 Power-On procedure

After switching on the unit through the ON/OFF Push-Button, a start screen is shown on the LC-Display for five seconds:



Fig. 6

(1) **The upper line** is showing the name of the product, RT-600 / SAR-DF 517

(2) **The second line** is showing the sub-version of the equipment, that means either "LE Version" for the Law Enforcement version, or "Standard Version" for the standard version.

(3) **The fourth line** is showing the web address of the manufacturer, RHOTHETA Elektronik GmbH.

(4) **The lowest line** displays software version and serial number information for the antenna unit and (5) for the display control unit.

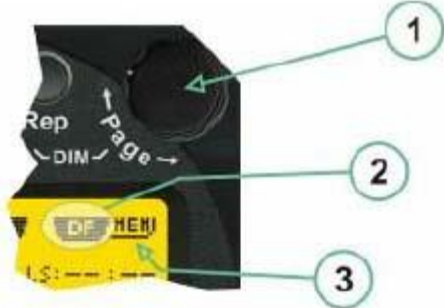
After five seconds, the equipment switches into the operational mode by displaying the last active main page before having been switched off, that means either the DF (Direction Finder) or the MEM (Memory)

2.1.2 Main Pages Selection

There are two main pages which can be selected:

The **DF** (Direction Finder) Page is the page in which all relevant operational information is shown, depending on the kind of signal which shall be received.

The **MEM** (Memory) Page is the page in which memorized operational frequencies can be modified.



Page Selection

Fig. 7

- (1) The **>Page<** rotary switch is used to select the active page.
- (2) The **active page** is highlighted with dark background
- (3) The **inactive page**, which may be selected, is written in dark letters on bright background.

2.1.3 Dimming function

The background of the LC-graphic display is equipped with a LED-array, whose brightness may be adjusted continuously (from 5 to 100%). Dimming will be performed in an exponential curve, thus allowing very accurate adjusting under night-conditions



Dimming Setup

Fig. 8

- (1) Pressing the **>Rep/DIM<** button for a short time is activating the dimming setup mode.
- (2) **Brightness** information, as percentage value from 5 % to 100 % in steps of 5 % is displayed instead of the "Page" field in the upper right corner of the display.
- (3) The **>Page<** rotary switch can be used to adjust the display brightness. Right-hand turn will increase the value in steps of 5 percent, while a left-hand turn will reduce the value in steps of 5 percent.

After ca. 3 seconds of user inactivity, the display falls back into the prior main page. The adjusted brightness of the display will remain stored after switching off the unit.

Dimming of legends may be performed in two ways, using the internal dimming settings as for the LC-display itself, or using an external (remote) dimming voltage provided by the aircraft.

Internal dimming (on display unit) of legends:

Internal dimming is always active, if the external dimming input is not connected, or if applied voltage is below 1 V DC. (Refer to the wiring plan). The legends are dimmed in the same manner as the LC display.

External (remote) dimming of legends:

As soon as there's a voltage >1 V DC at the dimming input, the brightness of legends is controlled externally by an analog signal. (Refer to the wiring plan and to the operating/setup-menu description).

2.2 Direction Finder Mode

Generally, the direction finder mode is used to track bearing information towards a transmitter. It shows all basic information depending of the kind of signal to be tracked. Mainly, differences in how information is displayed are related to the information content of tracked signals. Basic information and basic operational possibilities are applicable for signals with no additional information content, such as 121.500 MHz sweep-tone modulated SAR beacon signals. In case of signals with additional information content, such as COSPAS-SARSAT data messages, additional sub-pages may be activated.

Operating Elements in Bearing Mode



Operational Elements in Bearing Mode

Fig. 9

The picture above shows the state of the display while the equipment is operated on the international emergency frequency 121.500 MHz with an active signal being received.

(1) **>FREQUENCY<** Rotary switch selecting the active frequency. The last selected frequency remains stored after switching off/on the device. The selected frequency is shown on the graphic display bottom right. Above, additional information for the selected frequency is displayed. The use of the rotary switch activates a sub-page. Please refer to the Frequency Selection section for details.

(2) **>VOLUME<** Rotary switch to adjust the audio output level. The volume of a linked external speaker or amplifier can be adjusted in a range from 0 (off) to 99 (maximum loudness). The selected volume is shown in the bottom left corner of the graphic display. The volume remains stored after switching off/on the device.

(3) **>Squelch Level<** adjusts the squelch level. The squelch level has to be above the receiving level without signal (noise). Only signals above the squelch level are audible in the loudspeaker and used by the direction finder for bearing indication. The **>SQL<** rotary switch allows to select the squelch threshold, i.e. a minimum signal strength of an incoming signal to be processed. The current settings on a signal level scale from 0 % to 60 % is shown in bright letters on dark background below the SQL rotary switch and as an arrow beside the signal Strength Bar-Graph.

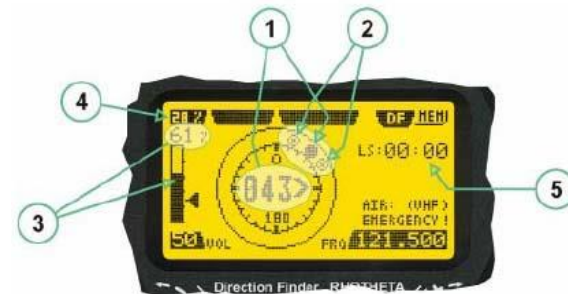
(4) The **>CLR<** Push-button is used for erasing the internal bearing value averaging store and the Last Signal Timer. To activate this function, the push-button has to be hold down for a minimum of circa three seconds. The sophisticated averaging store increases bearing precision and enables at all an usable bearing display in case of bad receiving signals (if there is a far away transmitter and/or temporary complete loss of a receiving signal). Caused by the averaging procedure, a drag error may occur, which might be disturbing the bearing indication after a quick change of course of the aircraft or vehicle. In this case, the indicated bearing value lags by the real bearing value for about two seconds (for very weak signals even longer). By pressing this push-button after a quick change of course, the display will show the new bearing value without drag error. Additionally, the CLR Push-Button is used to activate specific functions high-lighted in the menu below the button:

(5) **>STORE<** push-button: Without function except if a special function is high-lighted in the menu line of the display.

(6) **>REPEAT<** Push-button, when pressed, showing the last valid bearing value with corresponding receiving level.

(7) **>PAGE<** Rotary switch to leave the DF mode in order to switch to the MEMORY (MEM) Page / Mode.

2.2.2 Standard Display in Bearing Mode



Display in Bearing Mode

Fig. 10

(1) **>Relative Bearing value<**, by means of a sophisticated averaging procedure, a steady display is accomplished, either as graphic display or as text in the range of 0°... 359°. (0° corresponds to bearing direct ahead).

(2) **>Spread<**, maximum deviation of un-averaged bearing values. This is an indicator of bearing quality. The wider the range between the directions of maximum deviation, the worse the received signal is. As a result of the excellent averaging procedure, even with a spread of 45°, good bearing results are achieved.

(3) **>Receiving level<** (field strength) of the signal as a relative percentage value, visualized as bar-graph indication and as decimal value. Even without a received signal a certain noise level may be displayed.

(4) **>Squelch level<** (independently adjustable and stored for each frequency). Squelch level is indicated as marker at the Signal Strength Bar-Graph or as direct relative level value. A usable bearing analysis can only be achieved if the squelch level is above the noise level (without received signal). If the antenna unit is placed close a heavily disturbing electronic devices, the squelch level has to be raised, thus making the direction finder being less sensitive. In receive modes where the squelch level is set automatically, an "A" above the marker indicates the "Autosquelch" functionality.

(5) **>Last Signal<** timer showing the time since a signal has been received for the last time (i.e. since a signal has been stronger than the squelch level). Values are "minutes:seconds".

2.2.3 Special Options in COSPAS-SARSAT Bearing mode

Especially for the use together with beacons transmitting a data signal according to COSPAS-SARSAT specifications in the 406-MHz-Band, special functionalities and pages are being provided. After selection of a COSPAS/SARSAT Frequency (Refer to the chapter "Frequency selection Page"), the bearing page provides additional information and operating options.

(1) **>Auto Squelch<** indication, indicating that the squelch level is set automatically to be close to the noise floor. It is recommended to always use the Auto Squelch during COSPAS-SARSAT operation. This can be achieved by manually selecting 0 % (lowest possible value) or 60 % (highest possible value) as squelch level. During COSPAS-SARSAT-Operation, this will force the automatic setting of the level.

(2) **>Decode<** menu option, allows to open the COSPAS/SARSAT Decode sub-page by shortly pushing the F1 push-button above the menu option.

(3) **>>121.500<** menu option. The COSPAS-SARSAT signal in the 406 MHz band is transmitted only every 50 seconds in form of a short data burst of 440 or 520 ms. Approaching the transmitter, it will be received earlier than the 121.500 MHz continuous signal due to its high transmitter power. However, in a lower distance to a transmitter, bearing on 121.500 MHz is faster thanks to the continuous or rapidly intermittent signal. The 121.500 MHz menu option allows a direct switch-over to 121.500 MHz.

Direct return back from 121.500 to the COSPAS-SARSAT band is possible from the 121.500 MHz bearing Window in COSPAS-SARSAT mode. Please refer to the chapter "121.500 MHz bearing Window in COSPAS-SARSAT mode" for details.

(4) **>Frequency range<** indication. COSPAS-SARSAT is using a channel spacing of 3 kHz for its beacons. Due to the internal architecture of the direction finder, it is possible to receive more than one channel in the same time. Thus, frequency steps of the direction finder are 8.33 kHz instead of 3 kHz. The receive frequency covered by the current receive frequency setting is shown in the display line above the receive frequency indication.

Important:

If the exact frequency of the COSPAS-SARSAT beacon is unknown, it is strongly recommended to use the COSPAS-SARSAT scanning functionality for detecting the correct frequency (Refer to the chapter "Frequency selection Page" & "COSPAS-SARSAT Scan Mode")

2.2.4 COSPAS-SARSAT Decode Window

The COSPAS-SARSAT Decode Window allows decoding incoming COSPAS-SARSAT data messages.

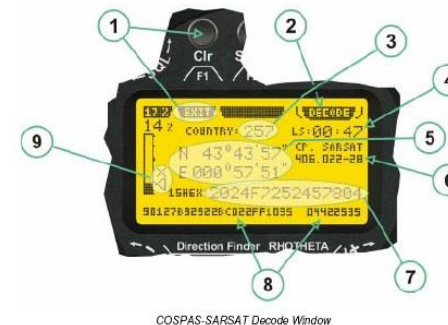


Fig. 11

(1) **>Exit<** push button (F1 button) allows to leave the decode window and to go back to the COSPASSARSAT bearing mode window.

(2) **>Decode<** in the upper right corner of the display indicates that the decode function is activated.

(3) **>Country<** displays the COSPAS-SARSAT Country Code coded into the received data message.

(4) **>Last Signal<** time since the last COSPAS-SARSAT message has been received in minutes:seconds format.

(5) **>Position<** field showing, in case of location protocols being used by the beacon, the encoded GNSS position data (latitude / longitude) transmitted by the beacon.

(6) **>Range<** field showing the range of COSPAS-SARSAT channels covered by the actual receive frequency setting.

(7) **>15-HEX-ID<** 15-HEX-ID of the beacon in hexadecimal format.

(8) **>Data string<** of the bits 25 to 112 of the COSPAS-SARSAT data burst in case of short messages, and bits 25 to 144 in case of a long message format. The last 8 Hex Values are separated by a blank. Bit- and Frame-synchronization hex values (Bits 1 to 24) are suppressed to increase the readability of the data message.

(9) **>X<** sign to indicate that the Squelch is controlled by the antenna unit for optimum sensitivity. The user has no access to the Squelch setting.

2.2.5 121.500 MHz bearing Window in COSPAS-SARSAT mode

While being in the 121.500 MHz bearing window activated through the COSPAS-SARSAT Bearing Mode subpage, the bearing window is slightly different to the normal bearing window:



121.500 MHz Bearing Window in COSPAS-SARSAT Mode

Fig. 12

Differences are:

(1) **>406.xxx<** push button (F2 button) allows to switch back to the last used 406 MHz frequency. This allows to quickly check on 121.500 MHz if a beacon can already be received on VHF and, in the case that this is not possible, to cycle back to 406 MHz quickly.

(2) **>CP-SAR-SAT<** indication shows that the actual page belongs to the COSPAS-SARSAT page section.

2.2.6 COSPAS-SARSAT Scan Mode



Display in COSPAS-SARSAT Scan Mode

Fig. 13

If the COSPAS-SARSAT scan mode has been selected, the COSPAS-SARSAT channels, as selectable manually from the Frequency Selection Page, are scanned. After reception of a valid COSPAS-SARSAT Signal, the COSPAS-SARSAT bearing mode is activated. Due to the fast scanning – the complete COSPAS-SARSAT sub-band is scanned within less than 400 ms – detection of a receivable COSPAS-SARSAT signal is possible within one COSPAS-SARSAT repetition cycle.

(1) **>SCAN<** flashing indication notifying the user that the equipment is operating in scan mode.

(2) **Frequency** display indicating the COSPAS-SARSAT scanning frequency range.

(3) **>X<** sign showing that squelch settings are controlled autonomously by the receiver.

Scan mode can be left by entering a new frequency through the frequency or memory setup.