



# Electronic Search with the Becker and G1000





# Becker SAR DF 517 System Components

Two Primary components

Control-Display Unit (CDU)



Antenna-Receiver Unit (ARU)



# Becker SAR DF-517

- The Becker SAR DF-517 is an automatic direction finder. It supports 121.5, 156.8, 243 and 406 MHz frequencies
- The DF unit will display a bearing relative to the nose of the aircraft for signals received
- There are two sets of frequencies that may be selected. These are Emergency Mode or Training Mode frequencies
- The Emergency Mode or Training Mode can only be selected at power up



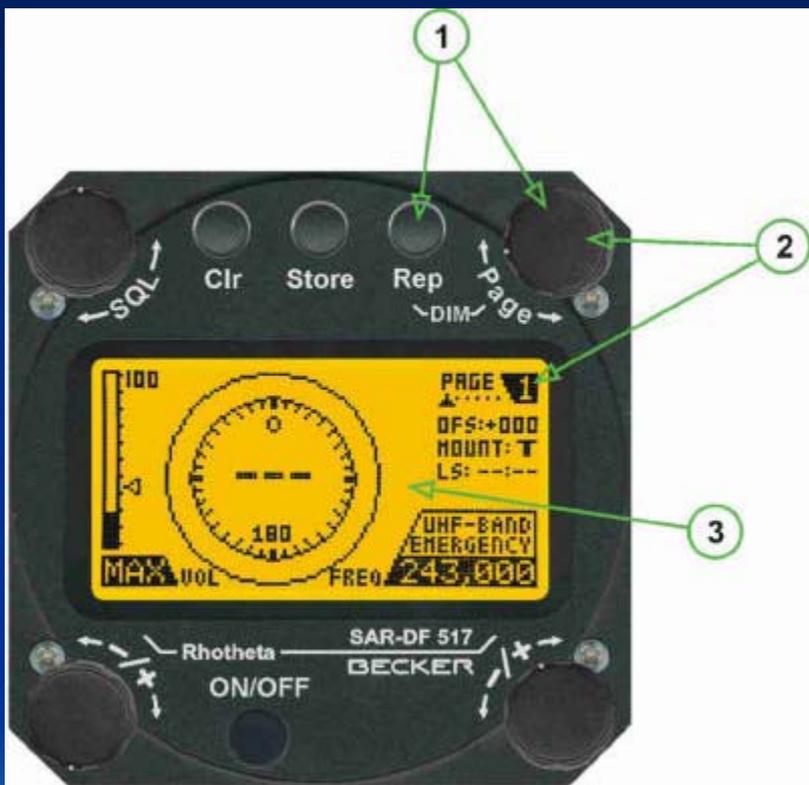
# Power Up



- If your aircraft is equipped with Mission Master it must be on for DF to operate
- On power up (1), verify Emergency or Training mode. To change the setting, turn the page dial (2) and select the appropriate mode (3). Note: this option is only available for the first 10 seconds after power up



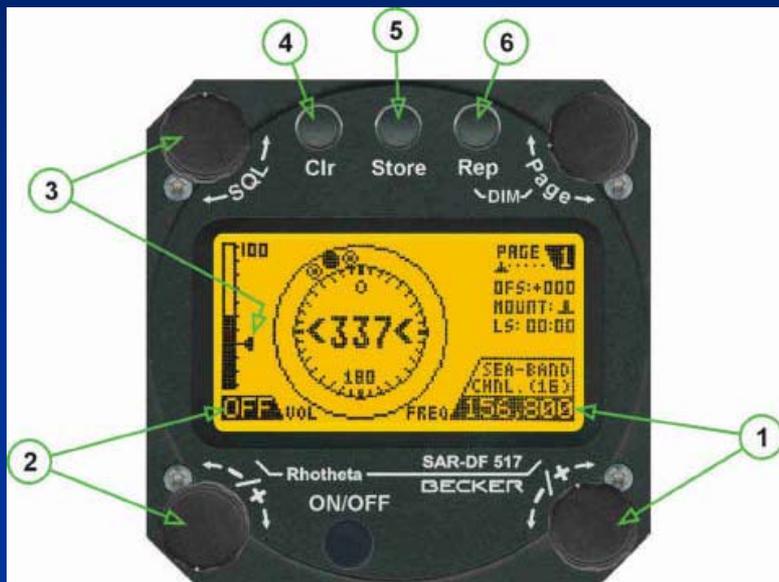
# Initial Setup



- The Page dial (2) is used to switch the DF-517 between the different pages
- By holding the Rep button and rotating the page dial (1) the brightness can be adjusted



# DF-517 DFing



- Select the desired frequency to DF by using the bottom right rotary dial (1) to select the desired preprogrammed frequency
- Use the volume (2) rotary dial to set the volume level
- Once the desired frequency is selected, use the SQL (3) dial to select the squelch level



# DF-517 DFing cont.

- The DF signal can be heard by selecting the AUX monitor toggle on the audio panel
- DFing is done using Page 1 or Page 2
- Page 1 displays a full circle with the signal and bearing in 360° (this page is preferred)
- Page 2 displays a 90° window with the relative bearing and signal



# DF-517 DFing cont.

## DF-517 Page 1 Display

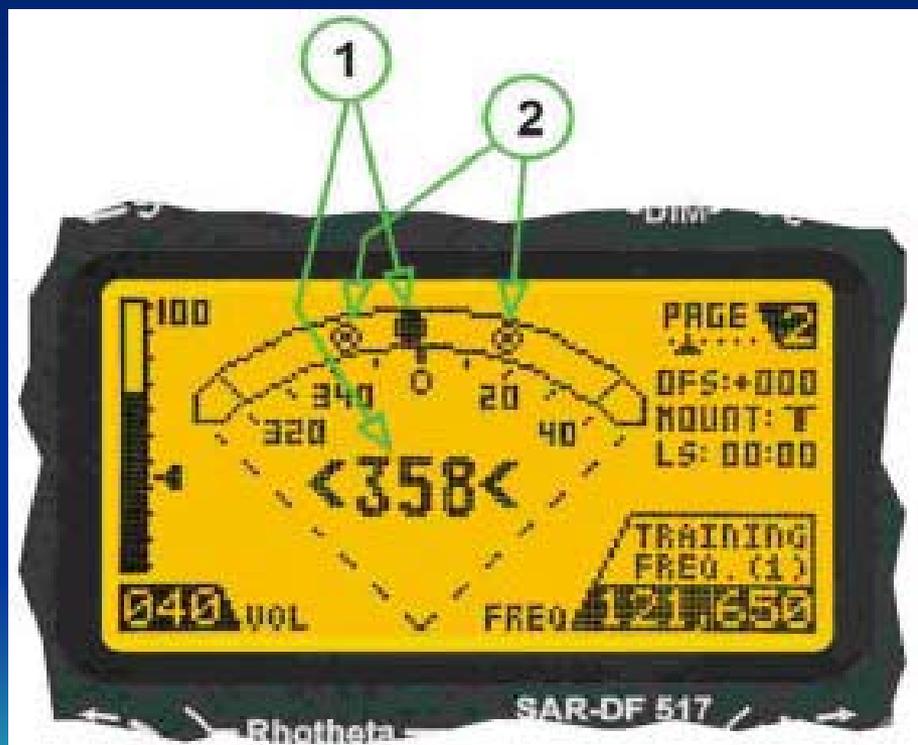


- (1) The signal and relative bearing
- (3) Signal Strength
- (4) Squelch level
- Tracking frequency 406.025 in Emergency mode
- Note that to DF a signal, the squelch level must be below the maximum signal strength



# DF-517 DFing cont.

## DF-517 Page 2 Display



- (1) Signal level and relative bearing
- (2) Position error
- Tracking Freq. 121.650 in Training Mode



# DF-517 frequencies

Mode: **Emergency** (all international emergency/distress)



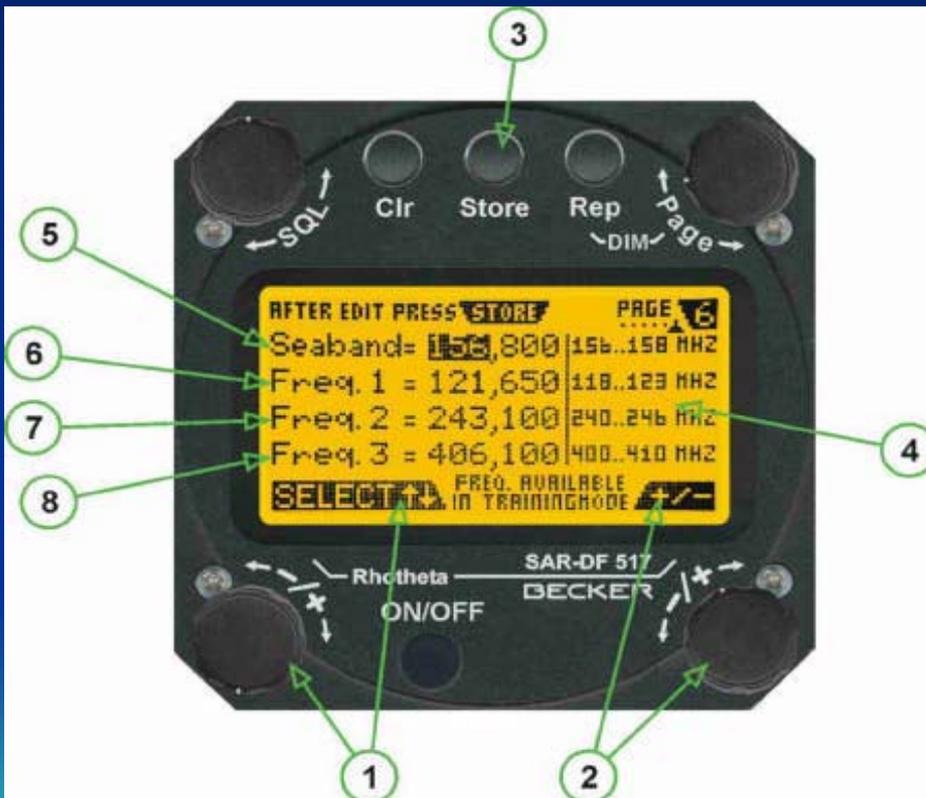
Mode: **Training** (with free adjustable test/trainings-frequencies)





# DF-517

## Adjusting Frequencies



- Page 6 enables you to adjust the training frequencies
- (1) **>±Select<** rotary switch selecting the trainings-frequency (MHz/kHz)
- (2) **>±<** rotary switch changing the frequency. Confirm the changed value by pressing pushbutton **>STORE<**
- (3) **>STORE<** Pushbutton to confirm changed values



# DF-517

- The backlight is controlled by adjusting the top panel light adjustment and setting the annunciator panel switch in the “Night” position
- Additional information on the Becker DF-517 can be found in the manual
- Link at: [http://www.becker-avionics.de/666571\\_C/Images/ImgProductsUSA/ProductsUSAPDF/ACF564.pdf](http://www.becker-avionics.de/666571_C/Images/ImgProductsUSA/ProductsUSAPDF/ACF564.pdf)



# Operation

## Power-On and operation modes emergency or training

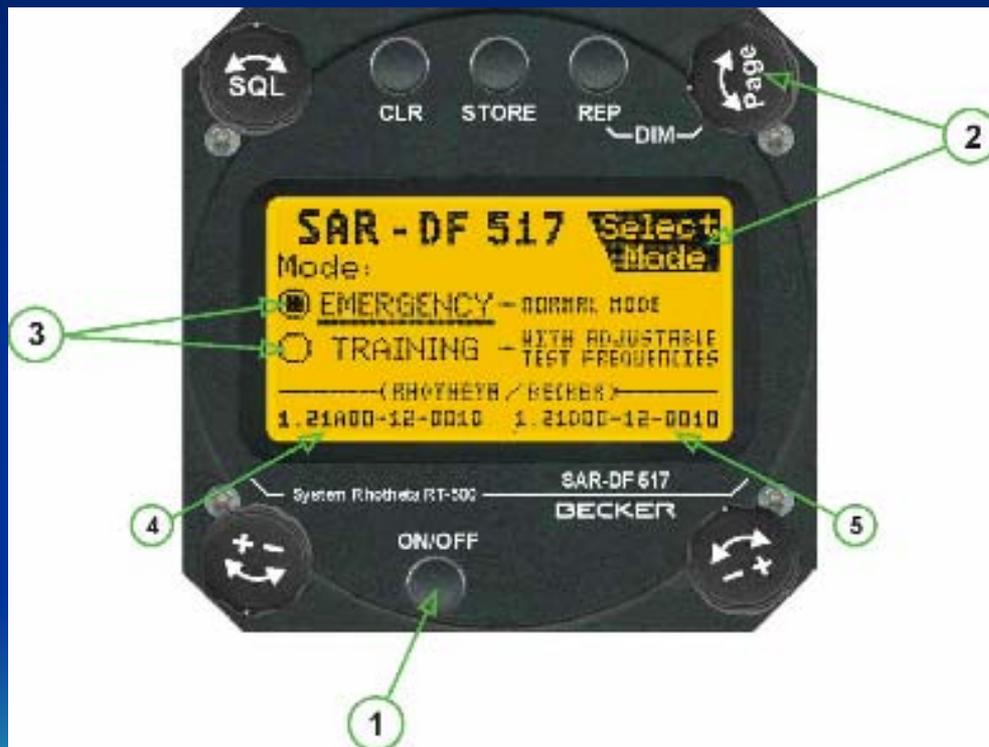
(1) ON/OFF

(2) PAGE

(3) **MODE** Indication of the actual operation mode

(4) **ARU Version** Software version and serial number of antenna-receiver Unit

(5) **CDU Version** Software version and serial number of control-display Unit

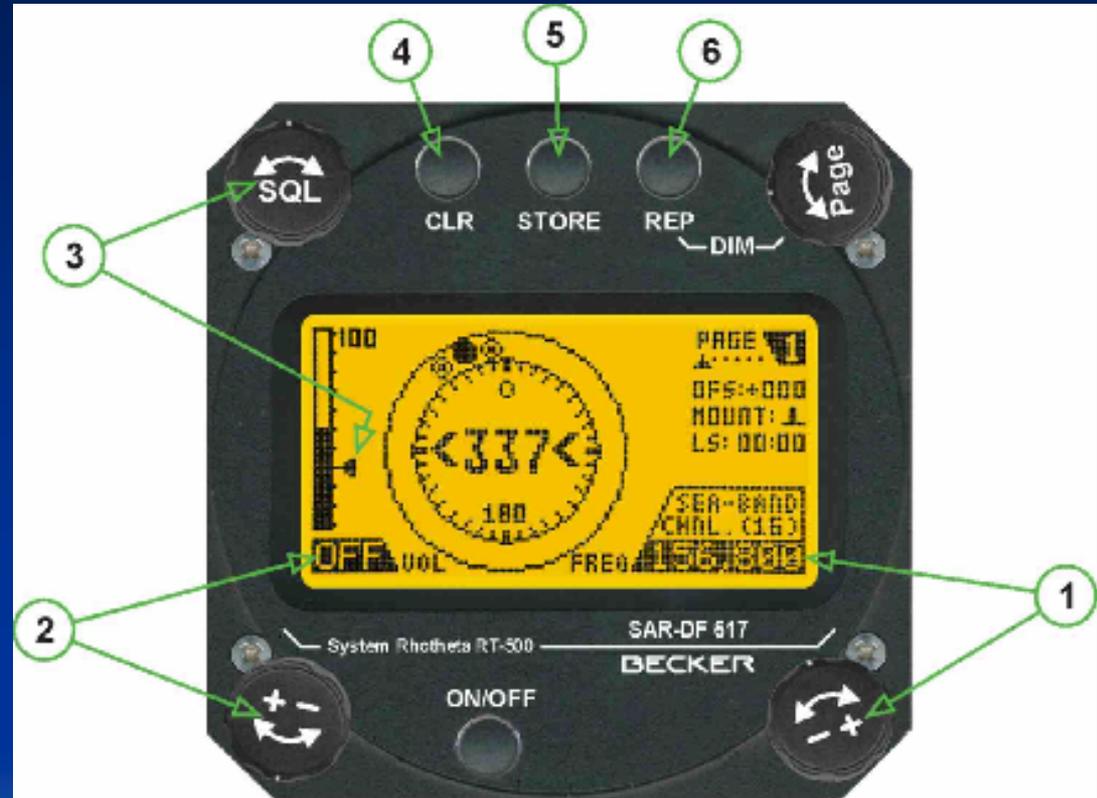




# Bearing mode

(pages 1 to 3)

- (1) FREQUENCY Selected
- (2) VOLUME
- (3) SQL Should be below the noise level
- (4) CLR For erasing the stored bearing value
- (5) STORE While bearing an AM signal a 3 kHz sound is superimposed to the audio signal for technical reasons
- (6) REPEAT Displays the last valid bearing value with the corresponding receive level

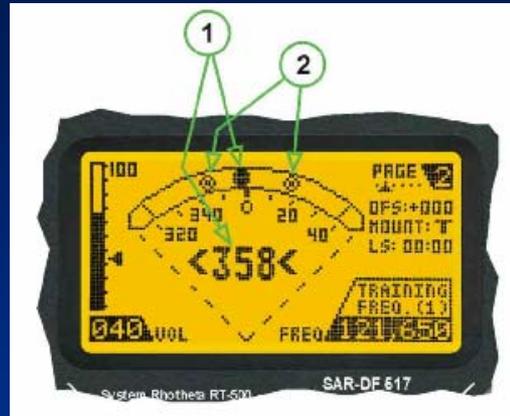




# Display Readings



**Page 1: 360° bearing**



**Page 2: expanded 90°**



**Page 3: bearing text**

- (1) **Bearing value**
- (2) **Spread** Maximum deviation of unaveraged bearing. Good bearing results even with a spread of 45° as a result of the averaging procedure
- (3) **Receive level** Field strength
- (4) **Squelch level** Squelch level must be below the noise level. Learn to recognize valid signals using the marbles.
- (5) **Offset** Corrects for antenna alignment (adjusted in the edit-menu)
- (6) **Mounting** TOP mounted or BOTTOM mounted antenna
- (7) **LS: ---:---** Internal timer (LS meaning last signal) indicating the time since the last signal was received, displayed in min /sec



# Using the SCAN Mode

The COSPAS/SARSAT signal on 406,025 MHz is only transmitted every 50 sec (Pulse length of 400ms)

The scanning mode is possible with frequencies 406,025MHz or 121,500/243,000MHz or the matching training frequencies

The **LS**: ---:--- timer (LS meaning last signal) always displays the time since last COSPAS/SARSAT signal was received in 406.025 MHz

Frequency displayed in scanning mode





# Becker Antenna

- Antenna mounted on bottom of aircraft
- Solid one piece unit
- This ELT does not use wing null method





# Mission Flow





# Prerequisites

- ***Know your equipment.***
  - Be able to quickly set a user waypoint on the G1000 at your current position.
  - Be able to set a user waypoint based on a lat-long.
  - Know how to use OBS mode.
    - Understand that the Becker will give you a best guess direction even with NO signal. Don't get fooled, use the marbles.
  - Understand how to go split on comms.



# Before Launch

- ***Prepare***

- What is the terrain in the area of the merge?  
What direction and altitude gives the best chance to pick up the signal.
- Have a plan of attack. Consider airspace, terrain, weather, and other issues for safe flight



# Setup

- *Center console*
  - FM/UHF switch to FM
  - Comm seat 2/3 switch to 2 (so observer uses the radio)
- *Becker*
  - in EMERGENCY mode, 121.5MHz.
  - Use Becker page with full ring (not arc).
- *G1000*
  - Clear all user waypoints
  - Use AUX audio to listen to Becker



# Before the Signal is Acquired

- Go high. You're not going to out-climb the satellite! Think 8,500 or higher. If the target may be in terrain, go as high as you can legally go.
- Set a waypoint ("M1") on the G1000 at the first merge. As new merges are received, add "M2", etc.
- Always listen to Com2 on 121.5. De-squelch and set volume so hiss is audible. The aircraft com radio is often more sensitive than the Becker.



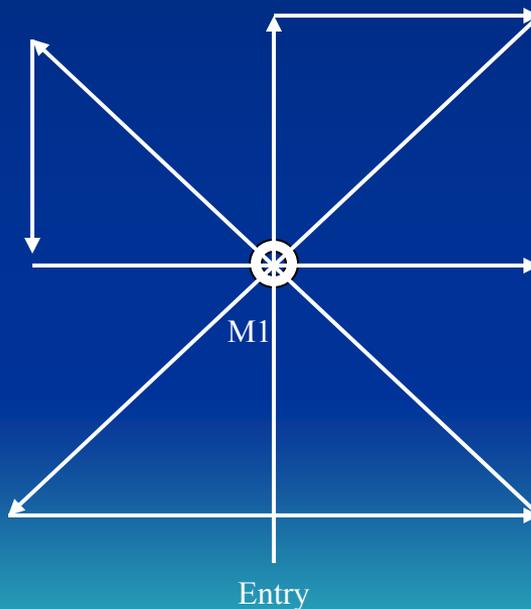
# Before the Signal is Acquired

- Set the squelch on the Becker slightly below the noise level. Ignore the direction info until the clear “marbles” are within about +/-30 degrees of solid marble.
- Periodically check 243MHz. If signal is detected on 243, you may get better direction information due to the shorter wavelength.
- Beware that the signal may be carrier only. No problem! The Becker can't tell the difference.



# Signal NOT Acquired

- *If signal is not detected by the merge, use OBS mode off the merge waypoint to fly 30 mile passes (15 miles from the merge) across the merge at 45 degrees.*





# Signal IS Acquired

- When the signal is heard, use wing shielding to determine direction until the signal strength is high enough for the Becker. If signal is carrier only, listen for the hiss to go away.
- Once the Becker is locked in – just follow it!



# End Game

- Keep the relative bearing 001-005 degrees. When passing the signal, set a waypoint (“A”).
- Use OBS mode off of “A” and re-approach target 180 degrees off first pass. Again, keep 001-005 relative bearing and mark a waypoint on passing.
- Repeat from various directions and mark position on each passing (“B”, “C”, etc.) until confident in location.
- If terrain allows, getting lower (as low as 1000 AGL) will give you a better position.
- If you are correct, you should be able to circle the position and the Becker should show it continuously to the inside of the turn.



# Other Thoughts

- The signal will ebb and flow, so look for the big trends. You may see the signal strength rise, and then drop off. Keep going a while; it may come back even stronger.
- Initial direction indications can be way off because of terrain masking and reflections. If you keep getting higher signal strength, you will eventually get there



# QUESTIONS

