

COMBOLOOK

Manual English



Owner's Manual

Thank You for purchasing a Emitter AB COMBOLOOK-instrument.
This manual covers the operation and maintenance of the Emitter AB COMBOLOOK-instrument

All information in this publication is based on the latest product information available at the time of printing.

Emitter AB reserves the right to make changes at any time without notice and without incurring any obligation.

No part of this publication may be reproduced without written permission.

This manual should be considered a permanent part of the instrument and should remain with it if it is resold.

If a problem should arise, or if You have any questions about the instrument, consult an authorized Emitter AB dealer.

! Notice !

Operating a COMBOLOOK-instrument requires special skills. Please read this Owner's Manual thoroughly before operating the instrument.

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1. Description:

The COMBOLOOK is a Swedish made SAT-TV/CATV instrument and spectrum-analyzer.

The unit is made for exact alignment and adjustment of satellite-dishes, aerial antennas.

It is also an excellent tool for working with Cable-TV networks.

It is intended for professional use when high accuracy and precise information are needed.

It's easily operated without a lot of unnecessary buttons and knobs. The basic functions are easy to get a hold on and take only minutes to learn.

The instrument is provided with a 4.5" B/W-monitor which either shows normal TV-channel, the frequency spectrum 2-2150 MHz (or parts thereof) alt. Digital data.

Menus/help-displays are shown on the LCD-screen (64x128) beside the monitor.

Both analog SAT-TV and CATV channels can be tuned in and viewed upon.

The COMBOLOOK is able to work with the return-path signals in Cable-TV networks (5-65 MHz) according to the EN50083 standard.

The TV-part presents the full range spectrum of 2-900 MHz which can be zoomed into smaller parts (min 13 MHz-span).

It is also very sensitive and accurate. It presents signals ± 1 dB (at +20 C).

The SAT-part also got very high resolution and accuracy. It presents measured data ± 2 dB (at around 20 C).

The Sat-TV spectrum can be expanded (zoom in) for correct adjustment of the polarisation ("cross-polarisation").

The SAT- part presents, under one of the sub menus, digital information like BER (bit error rate), constellation-diagram (QPSK) and S/N (signal/noise ratio).

The NIT function of the SAT-part can identify the various TV-satellites by reading out the NIT in the Bitstream (NIT = Network Information Table).

The NIT also contains info about the transponders TV and Radio-channels.

COMBOLOOK can handle a lot of memory-positions and both spectrum-pictures and certain frequencies can be saved (both analog and digital transponders).

The power of the instrument is supplied by a built in and rechargeable battery.

Start-up menu
on the LCD-display



II. Operation:

A. Unpacking.

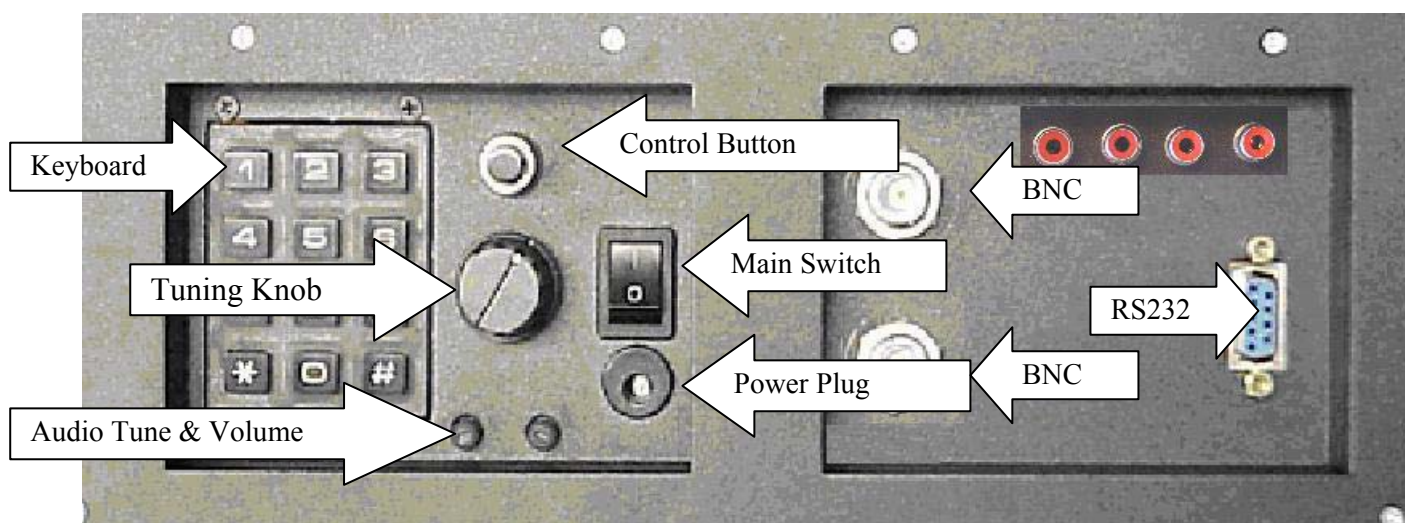
Start with unpacking the instrument and check that the following items are included:

1. COMBOLOOK-instrument.
2. Nylon carrying case with shoulder strap.
3. Power supply 220vAC/13,5v DC, center pin positive.
5. Auto Adapter cord (Car charger) 12v.
6. Adapter BNC-male/F-female.

The instrument's keypad, control knobs and control-button are shown on the picture below, these items control the COMBOLOOK's functions and modes.

The power-plug is used when charging the battery or running the instrument with the COMBOLOOK power supply.

RF-input is made via the BNC-connectors and adapter plug which is provided.
The instrument also has a RS232 (computer interface) connector for software revisions.



B. Connection:

Use the main switch to turn the instrument On and connect a signal-source to one of the two inputs (SAT-TV) via the BNC/ F-connector adapter. After a few seconds to warm-up the COMBOLOOK will ask You to select what part of the instrument You will work with (TV or SAT).

Select with nr 1 or nr 2 button on the keyboard.

The instrument will display the frequency spectrum of 2-900MHz (TV) or 920-2200 MHz (SAT) on the picture-screen and the main-menu on the LCD-display.

C. Knob and control-button:

SAT-part: Start by pushing the control-button. The text on the front panel LCD-display (upper row) will change from **FREQ** (frequency) to **SPAN** (frequency-span). Another push and the display returns to the **FREQ**-mode.

TV-part: Start by pushing the control-button. The text on the LCD-display (upper row) change from **FREQ** (frequency) to **SPAN** (frequency-span). Another push on the button and the LCD shows **ATTEN** (attenuation). One more push and the display is back in the **FREQ**-mode.

The control-button handles a few important functions . It is important to learn how to use the control-button in order to correctly access the COMBOLOOK's various functions. The functions of the control-button in the different modes (**when in SAT-mode**).

**Spectrum:
mode:**

Frequency
Bandwidth(span)

Picture-mode:

Frequency
Memory

Digital-

Frequency
Memory

When the COMBOLOOK is in Frequency-mode, the cursor is controlled by the tuning knob. Move the cursor up/down by turning the knob left or right.

D. Information:

The cursors position (frequency), the spectrums start frequency (920 MHz), the spectrums stop frequency (2150 MHz) and bandwidth (1231 MHz) can be read out on the monitor -screen.

The most important measured data, the dB-value, is shown in the middle of the monitor.

Measurement of the tuned frequency is continuous with the presentation being updated a couple of times per second.

III. SAT-TV Functions MAIN MENU

When the instrument is initially powered up, you will see the following display:



1. Picture.

After choosing a specific frequency; access the TV-mode by pressing button # 1 or "Picture" in the Main Menu. The tuning knob controls the frequency-position in this mode but the function changes when the control button is pushed. The chosen function is displayed at the top of the LCD display; in this example FREQ is selected.

The function switches between **Frequency** and **MEMORY**.

Measuring a specific frequency can be executed in the "Picture" mode (dB-value is shown in the LCD-display).

Other functions in the Picture-mode:

1. Invert Switch between normal video (KU-band) and inverted Video (C-band). Selected position is displayed in the LCD-display.
2. Sound For listening to analog audio. Audio volume and frequency (5.5 - 8.5 MHz) are adjusted with the two small knobs just under the main-knob.
3. Memory For storing the different analog and digital channels (frequencies). Tune in the "right" frequency before entering this function (ex. 1720 MHz).
Enter the Memory function (button nr 3) and push Save (button nr 1).
The instrument asks: -"SAVE. ARE YOU SURE ?"

Check that the Memory position is the right one (displayed at the right bottom on the LCD-display). If not, chose a new one with the knob (0-99). Free positions are named: Pos free

After selecting a position, push button nr 1 (YES).

Notice that even the pre-selected 13V/18V, 22 kHz on/off will be memorized.



Text-editor:

When the channel (frequency) is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. CNN).

Use the knob to select the first letter (ex. C) and save it with the control-button. Move to the next letter (ex. N) and so on. If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

- | | |
|-----------|--|
| 4. Atten: | Attenuation. Manuel attenuation 15dB on/off.
Selected position is displayed in the LCD-display. |
| 0. 13/18V | Selection of 13V alt. 18V. Selected position is displayed at the top of the LCD-display. |
| #. 22kHz | 22 kHz on/off. Selected position is displayed at the top of the LCD-display. |

2. Digital

COMBOLOOK can easily and very accurate measure at digital transponders (MPEG-streams).

This kind of measuring is very good to do when an installation is done, to control and verify that the installation is correct performed (fingerprint of the installation).

It is less accurate when trying to find a satellite and adjusting the cross-polarisation.

Therefore, start with finding the "right" satellite with the spectrum-function. Check and adjust the cross-polarisation with the "Max zoom in" function.

* Test the maximum with the **X-pol function** (button nr 4 in the main menu). The instrument will measure the strength of the selected peak and then automatically "jump" to the other polarisation and measure there as well (same frequency and settings).

The difference (for ex. -7dB) is presented on the right hand side of the display.

Chose a suitable transponder (put the cursor on top of a "peak") and select function 2 in the Main menu (Digital).

- The monitor displays, in the left upper corner, the so called, constellations diagram (QPSK).
- To the right of it, four "lock-parameters" and a time counter (that shows the "lock-time" on a bit-stream") are shown.
These "lock parameters" should be turned ON (become white) and the clock should start counting as soon as a Digital transponder is found.
If not, or if the signal "comes and goes" then the signal is very poor and/or weak.
Try to adjust the dish better and/or check the setting of the LNB to improve the signal.
- The other measured data like the S/N-ratio (signal/ noise ratio) and BER (bit error rate) are displayed just under the constellation diagram in the shape of Bar-graph's (thermometer-scales). The higher level, the better signal!

A locked frequency can look like this.



The window also displays the following Digital readout:

- Freq:** The tuned in frequency.
- AFC:** Automatic frequency control -the instrument automatically adjust the frequency and tells the offset frequency from centre of carrier.
- SR:** Symbol rate. The instrument readout, automatically, the correct symbol rate of the transmission.
- FEC:** Forward Error Correction. The instrument readout, automatically, the correct FEC.

- CB: Corrected Bits –Bits that have been corrected in Viterbi.
Should be as low as possible.
- UCB: Uncorrected Blocks – Blocks unable to be repaired. Value should be zero.
Very small numbers of uncorrected block will result in loss of picture (mosaic).

NIT - Network Information Table.

The word "searching" will lit on right hand side of the picture as soon as a digital transponder is found. After about 5-10 seconds, if the satellite is transmitting NIT, the satellite position will appear (and in some cases the satellite name also), for ex Astra 19.2 Pressing button nr 4 "Channels" will show a list of the present TV- and Radio-channels on that certain transponder/frequency.

```

TV:      ProSiebenSat.1
        Kabel 1 Austria
        Kabel 1 Schweiz
        ProSieben Austria
        ProSieben Schweiz
        SAT.1 A

RADIO:  XtraMusic
        Acid Jazz
        Beautiful Instruments
        Contemporary Jazz
        Dutch Hits
        Euro Hits
        French Hits
        German Folk
        German Hits
        German Rock
        German Schlager
        Indian Pop
        Italian Contemporary
        Modern Country
        New Age
        Opera

```

When performing Digital installations, please notice:

- The constellation diagram is like "a shower of hail". No signal will spread out the noise over the window. The better signal, the more concentrated and focused "hailstorms" in the windows.
- SNR. The signal/noise ratio should be as high as possible. A good signal should have at least 8.0 dB S/N-ratio.
- BER. The Bit Error Rate should be as low as possible.
As the values are really small, on the other side of zero (presented as something raised to minus something), they should be as high as possible.
A BER at 5.00 -05 is therefore better than 9.00 -04.
A BER at 4.00 -05 is therefore better than 5.00 -05.
It can be said, in general, that a signal should be at least x.xx -04 to be accepted.

Other Digital functions:

1. Search + Automatically search for the next digital transponder higher in frequency. Searching is displayed at the bottom of the monitor.
2. Search - Automatically search for the next digital transponder lower in frequency. Searching is displayed at the bottom of the monitor

3. Memory

For storing **digital transponders** (digital channels - frequencies). Tune in the "right" frequency before entering this function (ex. 1650 MHz).

Enter the Memory function (button nr 3) and push Save button nr 1).

The instrument asks: -"SAVE. ARE YOU SURE ?"

Check that the Memory position is the right one (displayed at the right bottom on the monitor). If not, chose a new one with the knob (0-99). Free positions are named: Pos free

After selecting a position, push button nr 1 (YES).

Notice that even the pre-selected 13V/18V, 22 kHz on/off will be memorized.

- Load a memory-position by pushing the control-button - "Memory" will appear on top of the LCD and a memory-position will be shown in the bottom of the LCD-display. Step between the stored memory-positions with the knob.

Text-editor:

When the channel (frequency) is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. Digital).

Use the knob to select the first letter (ex. D) and save it with the control-button. Move to the next letter (ex. i) and so on.

If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

4. Channels

Shows a list of the present TV- and Radio-channels on that certain transponder/frequency (if the satellite is transmitting NIT).

5. DiSEqC

Chose between the different DiSEqC commands by using the buttons on the side of the instrument.

Submenu 7 (SWx) shows the extended DiSEqC-commands (DiSEqC 1.1). Submenu 8 (Motor) shows the command-list for DiSEqC actuator-control (DiSEqC 1.2). Even 13/18V and 22 kHz can be adjusted under the DiSEqC-menu.

7. Beeper

It might be tricky to install a Sat-dish and, at the same time, try to watch the signal-level on the instrument.

Therefore the instrument has a very useful "beeper"-function to help finding the max-strength signal. It works with a pitch tone that gets higher and higher the better the signal gets.

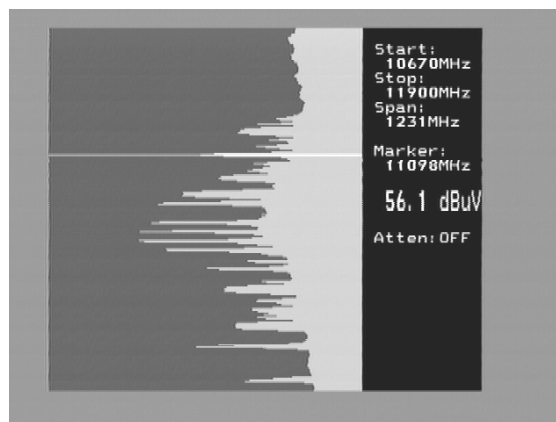
The beeper is turned on and off with button nr 7.

0. 13/18V Selection of 13V alt. 18V. Selected position is displayed at the top of the LCD-display.
- #. 22kHz 22 kHz on/off. Selected position is displayed at the top of the LCD-display.

3. Full spectrum -"Max zoom in" - Span Min/Span Max.

This function makes it easy to "jump" between full spectrum (920-2150 MHz) to "Max zoom in" (250 MHz bandwidth).

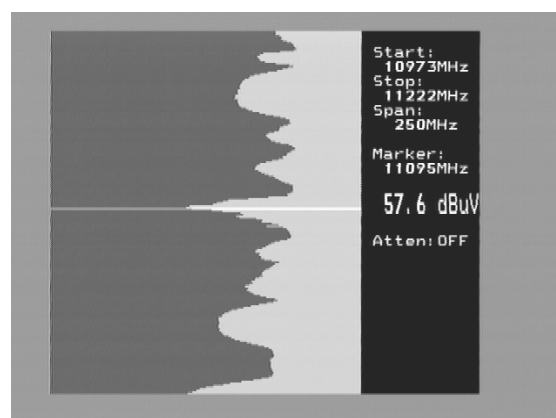
The "Max zoom in"-function is very good to use when adjusting the cross-polarisation.



- Move the cursor to any desired frequency (peak).

Push the nr 3 button (**span Min**) on the keyboard.

The instrument will "zoom in" max. at that selected frequency (250 MHz bandwidth).



Rotate the LNB so that either the Horizontal or Vertical polarisation will be in its max-position –adjusting the **cross-polarisation**.

Pressing the nr 3 button again (span Max), gets You back to "Max zoom out".

4. X-pol Test the maximum Cross-pol setting with the X-pol function.

The instrument will measure the strength of the selected peak and then automatically "jump" to the other polarisation and measure there as well (same frequency and settings).

The difference (for ex. -7dB) is presented on the right hand side of the display.

The function is very useful for checking the correct setting of the LNB cross-polarisation.

5. DiSEqC

Chose DiSEqC command with the keypad.

Submenu 7 (SWx) shows the extended DiSEqC 1.1 commands.

Submenu 8 (Motor) shows the DiSEqC actuator-control commands (DiSEqC 1.2).

Even 13/18V and 22 kHz on/off can be adjusted in this mode.

6. Setup

Basic-operation setup:

1. **LNB L.O.** Select the LNBs L.O. for showing the correct LNB frequency. Default setting is button nr 9 (IF).
2. **Analog.** Chose between Normal (KU-band) or Inverted (C-band) video.
3. **Motor.** Chose the type of actuator to be used; standard DiSEqC 1.2, SatSelect or SATSCAN.
4. **Display.** submenu **units:** Select dB-presentation: dbuV, Dbm or dBmV. Under submenu LCD can contrast (level) and Backlight (on/off) be set.
5. **AutoOff.** Chose between some automatic turn-off alternatives (timer).
6. **Version.** Tells about the units series-nr and manufactured date.
7. **Keyclick.** On or off.

7. Beeper

It might be tricky to install a Sat-dish and, at the same time, try to watch the signal-level on the instrument. Therefore the instrument has a very useful "beeper"-function to help finding the max-strength signal. It works with a pitch tone that gets higher and higher the better the signal gets. The beeper is turned on and off with button nr 7.

Notice that the function works with a narrow bandwidth (one transponder) and not with the full bandwidth. To use the function: put the cursor on top of a selected "peak" and align the dish.

8. Spec

Special-functions. Select with button nr 8 in the Main menu.

1. Max hold

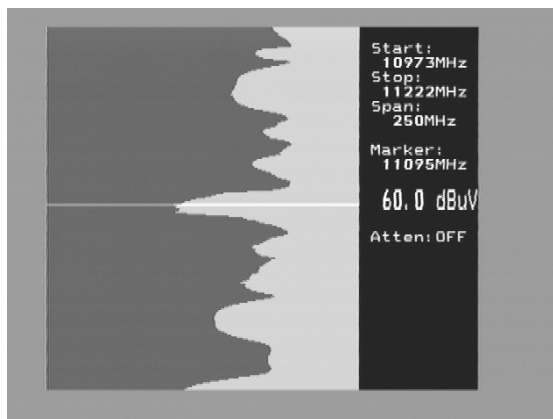
Max hold is a very good function for, over a longer time period, watch a certain frequency-range. This to see how/if temporary signals/disturbances can affect the picture quality.

Adjust the frequency-bandwidth (see Function 3) and put the cursor on the frequency (peak) to watch. Chose with button nr 1 the "Max hold"-function. The instrument starts to sample all top-values in the shown bandwidth and only updates the presentation if there's any new measured

data with higher dB-values than the previous measured.

Turn off the function by pressing the button nr 1 again (No hold).

Measured data can be stored. Read more about the Memory-function under section 4 below.



2. Reference cursor and signal to noise ratio.

COMBOLOOK has the capability to perform measuring of the signal/noise alt. Picture-carrier/audio-carrier ratio.

The function is relatively difficult to implement fully automatic and a more simple, manual, tool is used in this instrument.

Do like this:

- * Select function 2 Refmrkr
- * Tune in the "right" frequency with the cursor (so it stands on the "top" of the signal to measure on).
- * Push button nr 1 (Ref set) and a new cursor appears on top of the earlier.
- * Turn the knob and place the cursor on another carrier or on the noise-floor.
- * The relation between cursor nr 1 and cursor nr 2 is presented in the lower right hand corner of the picture-screen

Notice that 13/18V and 22 kHz on/off can be adjusted in this mode with the "0" resp. "#" buttons.

3. Span Min – Span Max

This function is described under "Main menu" section 3 above.

Push button nr 3 (**span Min**) on the keypad.

The instrument "zoom in" max. at the chosen frequency (250 MHz bandwidth).

Another push on the nr 3 button (span Max) takes the instrument back to "Max zoom out".

4. Memory

Memory positions. Same function as described under Main menu section 9, below.

5. Multichannel

Channels (frequencies) that have been memorized under Main menu section 1 and 2 are displayed and measured at, together here.

Up to 10 channels can be measured at simultaneous.

Notice that all the channels can have individual setup of 13/18V resp. 22 kHz on/off.

The function is very useful when "scanning" a satellite and see that all parameters are right/max values received on both V/H and low/high.

Pg down To step down the pages. 10 pages with 10 frequencies per page can be stored (10 analog + 10 digital = 200 frequencies).

Pg down To step up the pages.

Max hold "Locks" the dB-values and will only change when higher values are received.
Turn off the function by pressing the button again (no hold).

6. Attenuator

Attenuation 15dB. manual on/off with button nr 6.

Selected position is displayed at the right hand side of the monitor.

0. 13/18V

Adjusting of 13V alt. 18V. Selected position is displayed up to the left in the LCD-display.

#. 22 kHz

Adjusting of 22 kHz on/off. Selected position is displayed up to the left in the LCD-display.

9. Memory Storing spectrum-pictures.

All spectrum-pictures can be stored in the COMBOLOOK.

This is very useful for documentation and to use later on for recognizing/identifying of that satellites characteristic spectrum

The Mix-function helps to identify and “find the way back” to already known (and previously stored) satellites.

The function places a previous memory in the background of the spectrum.

When the “right” satellite is found it will be like “fitting a hand to a glove”

To store measured-data, do like this:

- * Chose the spectrum to store (i.e. exactly as displayed on the monitor) and push button nr 9 in the Main menu (Memory).
- * Select “Save” button nr 2.
- * The instrument asks: -“SAVE. ARE YOU SURE ?”
- * Check that the Memory position is the right one (shown down to the right in the monitor).
If not, chose one with the main-knob (Pos free: 00-99).
- * Having select a position, press button nr 1 (YES).
- * Notice that the setup of 13V/18V, 22 kHz on/off will be stored to.

Text-editor:

When the spectrum is saved, the Text-editor appears on the monitor which makes it possible to enter a name for that memory-position (ex. ASTRA 1D).

Use the knob to select the first letter (ex. A) and save it with the control-button.

Move to the next letter (ex. S) and so on.

If a mistake is made and wrong letter is saved, simply correct by pushing button nr 1 (Delete) and the cursor will jump one position backward.

To collect a stored spectrum:

- * Enter the “Memory”-function with button nr 9 in the Main menu.
- * Select the spectrum to load (use the main-knob: pos 00-99 displayed down to the right in the monitor).
- * Load the spectrum to the monitor with button nr 1.

Notice that the function **Reference cursor**, Ref mrkr, is enabled when a stored spectrum is loaded.

To mix a stored spectrum with an ongoing measuring, do like this:

- * Enter the "Memory"-function with button nr 9 in the Main menu.
 - * Select the spectrum to load (use the main-knob: pos 00-99 displayed down to the right in the monitor).
 - * Mix the spectrum with the ongoing measuring with button nr 4.
- Turn off the Mix-memory by pushing the nr 4 button again.

TV-part of the instrument

The control-button handle a few important functions (only controlled by this button and not via the LCD's menu system). It is important to learn how to use the control-button in order to handle the COMBOLOOK easy and correct.

The functions of the control-button in the different modes (**when in TV-mode**).

Spectrum:

Frequency
Bandwidth(span)
Attenuation

Picture-mode:

Frequency
Channel
Favourite

Ceefax (text-TV):

Page

When COMBOLOOK is in Frequency-mode, the cursor is controlled by the knob. Try to move the cursor up/down by turning the knob left/right.

IV. Information:

The cursors position (frequency), the spectrums start frequency (2.00 MHz), the spectrums stop frequency (902 MHz) and bandwidth (900.00 MHz) can be read out on the picture-screen.

The dB attenuation value is shown with actual value (ATT:).

VBW and RBW stands for Video-Bandwidth and Resolution-Bandwidth of which will be told later in this manual.

The perhaps most important information, the dB-value, is showed in the middle of the info-picture.

Measuring of the measured frequency is done continues and the presentation is being updated a couple of times per second.

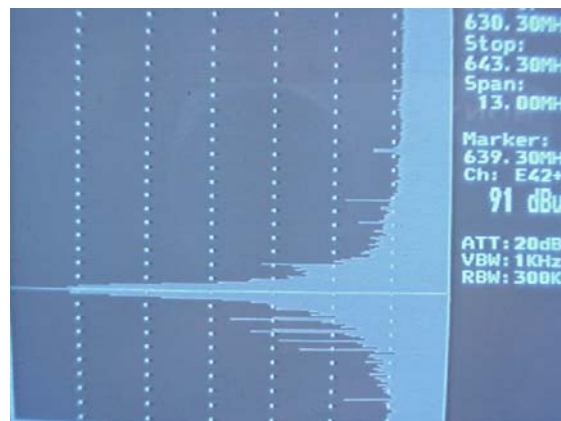
3. CATV-functions.

A. Full spectrum, span 13, centre and SPAN

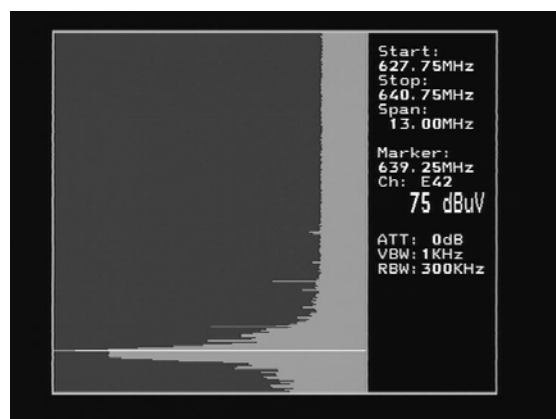
- Tune in the cursor on any signal-peak.



- Push the nr 3 button (**span 13**) on the keypad.
 The instrument "zooms in" max .on the chosen frequency (13 MHz bandwidth).



Use the *-button (exit) to get backwards in the menu-system.

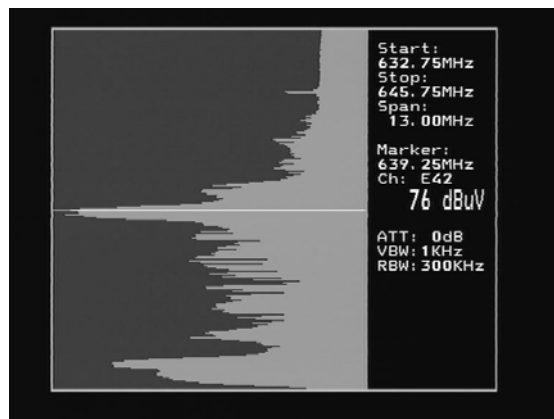


- Tune in any signal-peak and push button nr 5 (**centre**). The instrument centres on the cursor position..
- Push button nr 3 (span 900) to get back to the original (full) bandwidth.
- Where ever You may be in the spectrum-mode, You can always adjust the bandwidth with the "**span**" function. Use the control-button and step to the "**span**"-mode. Change the bandwidth by turning the knob left/right. This "zoom in" is measured from the cursor position and the bandwidth is reduced from, so to say, both ends. Max. "zoom in", most narrow bandwidth, is 13 MHz and full bandwidth is 900 MHz.

B. Max hold

Max hold is a very good function for, over a longer time period, watch a certain frequency-range. This to see how/if temporary signals/disturbances can affect a networks quality.

- Adjust the frequency-bandwidth (see above "**span**") and put the cursor on the frequency (peak) to watch. Chose with button nr 6 the "**Max hold**"-function. The instrument starts to sample all top-values in the shown bandwidth and does only update the presentation if there's any new measured data with higher dB-values than the previous measured.



All measured data can be memorized and transferred to a computer. More of this later in this manual and in the attached COMBOLOOK-software manual.

C. Reference cursor and signal to noise ratio.

COMBOLOOK has the capability to perform measuring of the signal/noise alt. Picture-carrier/audio-carrier ratio.

The function is relatively difficult to implement fully automatic and a more simple, manual, tool is used in this instrument.

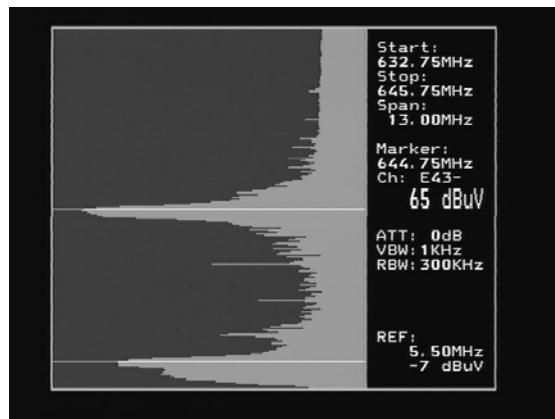
Do like this:

- Put the cursor on any signal carrier and "zoom in" with the "span 13" button (button nr 3).
- Push button nr 7, reference cursor (ref mrkr).
- Tune in the "right" frequency with the cursor (so it stands on the "top" of the signal to measure on).

Push button nr 1 (Ref set) and a new cursor appears on top of the earlier.

Turn the knob and place the cursor on another carrier or on the noise-floor.

- The relation between cursor nr 1 and cursor nr 2 is presented in the lower right hand corner of the picture-screen.



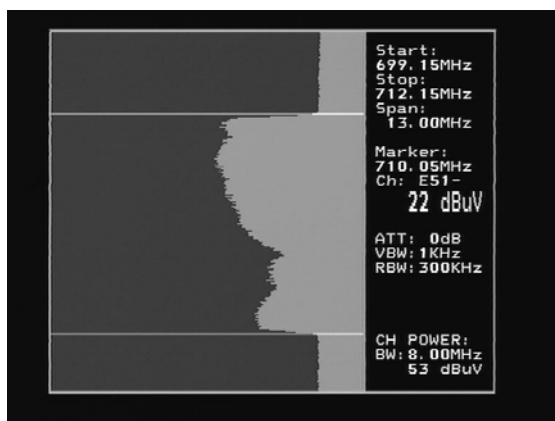
D. Digital measuring.

COMBOLOOK can also measure, so called, Digital dB i.e. the output-level of Digital transponders (like Digital terrestrial transmissions).

Simply input the start and stop frequencies of the transponder to measure on (a Digital transponder is normally 8 MHz wide) and COMBOLOOK presents the measured and corrected value (dBuV) in the picture-screens lower right hand corner.

Do like this:

- Put the cursor on the digital signal and "zoom in" with the "span 13" button (button nr 3).
- If needed, increase the shown bandwidth with the "span"-function.
- Push button nr 0, Digital.
- Tune in the start frequency with the cursor (so the cursor stands in the beginning of the signal to measure on).
- Push button nr1 (Set str) and a new cursor appears on top of the earlier.
- Turn the knob and place the new cursor at the end of the carrier (stop frequency) .
- The measured result (and the adjusted bandwidth -BW) is shown in the picture-screens lower right hand corner.



E. Memory.

All spectrum-pictures can be saved (memorized) in the COMBOLOOK. This is very useful as new installations, service and maintenance work can be documented. Later on, the memory-positions can be easily transferred to a standard PC (with help of the attached PC-software) and written out on the PC's printer.

To save measured data, do like this:

- * Tune in a spectrum of Your choice and push button nr 9 in the main menu (Memory).
- * Push button nr 1 "Spectrum" (for button nr 2 "User span", see later on in this manual).
- * Chose the memory-position You want to use (00-99). The position is shown in the lower right hand corner of the picture-screen and change position by turning the knob.
- * Push the "Save"-button (button nr 1) and the position is saved.

To load saved data (memory-positions), do like this:

- * Chose "Memory", button nr 9 in the main-menu..
- * Chose "Spectrum" button nr 1.
- * Chose the memory-position You want to retrieve by turning the knob.
The position is shown in the lower right hand corner of the picture-screen.
- * Push the "Load"-button (button nr 2) and the memory-position is brought to the picture-screen.

F. Picture, TV, CEEFAX (Text-TV).

After choosing a certain TV-carrier, it is very easy to go over to picture-mode. Simply push the picture-button (button nr 1 in the main-menu) and COMBOLOOK turn into

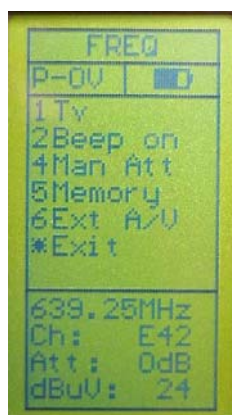
picture-mode.

The knob controls the frequency tuning but the function change to, **Channel**, then to; **Favourite** (favourite-channels), then to; **Volume** and then back to **Freq** (frequency) when stepping with the control-button (indication is shown on top of the LCD-display).



- Measuring on a TV-channel is normally done in the "**Picture-mode**" (Picture and dB-level is shown at the same time). A more thorough check of the picture quality can be done in the TV- mode (TV-menu, below) as the picture wont be disturbed by the measuring filter in that mode (no measuring).

To get into the TV-mode push button nr 1.



The LCD-display shows the TV-mode sub-menus.
Select Text-TV (CEEFAX) with button nr 1.



- If the selected TV-channel transmits Text-TV (CEEFAX) it will now be displayed on the picture-screen.
Chose page, between 100-899, by turning the knob.
The picture and Text-TV (CEEFAX) can be mixed with button nr 2.
Hidden text can be displayed with button nr 1 (reveal).

G. Attenuation - automatic and manual.

COMBOLOOK is normally using automatic attenuation when in TV-mode (the signal is always attenuated manually in spectrum-mode).

This to make sure that the measuring-devices in the instrument works in the best way.

However, under some circumstances, it might be better to attenuate manually in order to be able to view/measure on a certain carrier.

The manual attenuation is controlled like this:

- In spectrum-mode: push the control-button so "Atten" shows on top of the LCD-display. Select suitable attenuation-value by turning the knob left/right for lower/higher value.(the attenuation value is shown in the middle of the info-window on the picture- screen).

- In Picture- and TV- mode: push button nr 4 "Man att" (manual attenuation) and select suitable attenuation-value with the knob (is shown in the LCD-display).

Returning to automatic attenuation:

In Picture/TV-mode: Push the button nr 4 "Auto att".

H. Audio.

This version of the COMBOLOOK can select between and work with the three most common TV-sound systems in Europe (tune in the distance between the picture-carrier and sound carrier). The selektion is made under "sound" in the TV-menu. Select with button 1-3 any of the three versions.

- Beeper.

It might be tricky to install normal TV-antennas and, at the same time, try to watch the signal-level on the TV-instrument. Therefore COMBOLOOK has a very useful "beeper"-function to help finding the max-strength signal. It works with a pitch tone that gets higher and higher the better the signal.

This function is also accessed via "sound" in the main-menu starts by pushing button nr 3 "beeper".

The beeper is turned Off when choosing "Beep off" (button nr 2).

I. External Video/Audio.

External Video and Audio signal can be presented on the COMBOLOOK (for ex. TV-signals from a head-end).

This is made by first connecting the Video/Audio signals via the Phono-jacks on the side of the instrument.

The function is turned On by choosing "Picture" in the main-menu and thereafter pushing button nr 6 "Ext A/V" and button nr 2.

J. Favourite channels.

Thanks to the powerful processor, COMBOLOOK can easily remember and measure at up to 100 favourite channels (easy select of channels).

This is done by choosing the channels (frequencies) to measure on and programme them in the favourite channel memory.

Programming of favourite-channels:

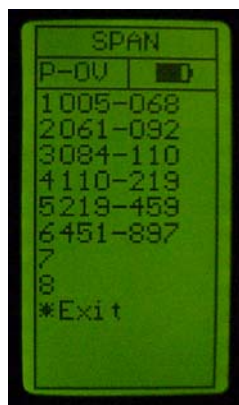
- * Put the cursor in spectrum-mode on the frequency to programme (ex. 125 MHz).
- * Chose Picture (button nr 1).
- * Chose Memory (button nr 5).
- * Chose the memory position (00-99) to place this frequency with help of the knob. The position is shown at the bottom at the LCD-display (ex. turn to pos. 03). On the row above it is shown if the position already is occupied (used) or free to be programmed (free).
- * Repeat as above with the other channels (frequencies) to be programmed. The channels are thereafter permanently stored in the COMBOLOOK (until deleted).

Measure on favourite-channels:

Measuring on the favourite-channels is easily done once they have been programmed. **This is done in picture mode.**

Chose "Favourite" with the control-button ("Favourite" is displayed on top of the LCD-display).

The favourite-channels are shown in sequence order on the picture-screen when turning the knob.



K. User Span (individual setup of frequency-bands).

COMBOLOOK TV-part works when being selected in the start-up menu with the whole frequency-range of 2-900 MHz. That makes it very easy to get an overview over the whole spectrum and makes it simple to find all signals within this area.

In many cases, however, it might be better to divide the frequency-spectrum in the working-areas in which installation and service works are normally being done (for ex in the return path, in FM, in UHF etc.).

These working-areas might differ a lot depending on where the instruments are being used (geographically) or by whom.

For that reason the COMBOLOOK has the unique possibility to do a individual setup of such frequency-bands.

Programming the frequency-bands, do like this:

* Chose a frequency-band to programme (for ex. 5-65 MHz) and put the cursor in the middle of that area (aprox. 31 MHz).

* Step with help of the control-button so "SPAN" (bandwidth) lit on top of the LCD-display. Retract the spectrum by turning the knob so only the wanted frequency-band (5-65 MHz) is shown in the picture-screen. Notice! It might take a little effort to get the exact frequency-band wanted (it is sometime necessary to step a couple of times between "FREQ" and "SPAN"). It is, however, well spent time as this programming is only needed to be done once - these frequency-bands are thereafter permanently programmed (until chosen to be deleted).

* When the "right" frequency-band is tuned in, push the "Memory"-button (nr 9).

* Push button nr 2 "User span" and thereafter the "Save"-button (nr1).

* Chose the memory-position this frequency-band should have (for ex. nr 1) and push that button. The chosen frequency-area is shown at the chosen place in the LCD-display.

- Repeat the above steps to memorize more frequency-bands (up to 8 bands).

Watch the frequency-bands, do like this:

* Chose "User span" in the main-menu (button nr 2).

* Chose any of the previous (see above) programmed frequency-bands in the list.

L. Set (personal setup).

The COMBOLOOK-instrument can be setup for a better individual performance and to do special kind of measuring.

These kind of setups are done under the menu nr 6 (SET) in the main-menu.

The following parameters can be adjusted:

Button nr 1: "Vid BW" (Video Bandwidth filter).

The Video filter is placed **after** the measuring chip-set in the instrument and is used for, with different resolution, present the frequency-spectrum. The resolution of the details of a signal-carrier gets finer the more narrow filter being used (but the sweep-time gets longer instead).

The different Video filters are: auto-mode (default), 100 kHz, 10 kHz, 1 kHz or 100 Hz.

Button nr 2: "Res BW" (Resolution Bandwidth).

The resolution bandwidth shows the incoming signal **before** the measuring chip-set in the instrument. Chose between the narrow 300 kHz or the wider 1 MHz resolution. The instrument is normally working in the "auto" mode.

Button nr 3: "P-insert" (Power insert).

This function is used to run external active accessories (like antenna-amplifiers) which needs a power-source to operate.

The output voltage can be adjusted between 12-24 volt DC and is fed via the BNC-connector.

The chosen output voltage is always shown in upper left hand of the LCD-display (next to the battery-symbol).

Default setting of the instrument is power-off (0 volt). **Notice!** Remember that miss-use of this function may cause irreparable damage to all connected equipment not made to be power-fed.

Button nr 4: Set up, with sub-menu:

Button nr 1: LCD -Contrast and "Backlite" On/Off can be adjusted.

Button nr 2: Screen-saver On/Off. Default setting is On.

Button nr 3: Display and sub-menu 1, **S-cursor** (Scan-cursor). Shows how fast the instrument "scans" a certain frequency-band. Default setting is Off.

Sub-menu 2, **Grat.** (grating) shows a grating-net which can make the signal-readout more easy under some circumstances. Default setting is Off.

Sub-menu 3, **Units**, chose between the signal-readouts of dBuV, dBm or dBmV

Sub-menu 4, **TV level**, the level which the automatic attenuation uses for

the picture-presentation (should be between 53-63 dB).

Button nr 4: **Version**. Shows for ex. the instruments serial number, date of manufacturing, software-version etc.

Button nr 5: **CH-Table**. Chose between different (countries) channel-plans.

Button nr 5: _____ FM/AM mrkr:

Chose between FM or AM marker.

FM = Normal spectrum measuring.

AM = Peak spectrum measuring (preferred when measuring at TV-signals as it faster detects the max value).

Button nr 6: _____ SAT/TV:

Chose if You want the instrument to start-up in SAT or TV mode (always, without asking).

IV. Maintenance.

The instrument is equipped with a rechargeable battery and it is important that the battery is maintained.

Recharging should be done with the, enclosed car-adaptor or external power supply of 220v/13.5v DC, centre-pin -plus and chassis -earth.

Note, the instrument can be operated, for shorter periods of time, by the external power supply. However, the COMBOLOOK is not made for permanent operation. Contact Your dealer for more information.

Adjustments for vertical hold, brightness and contrast are located under the instrument.

Contact Your dealer for proper adjustments.

The battery needs recharging when the battery-symbol at the top of the LCD-display is empty.

Remember that a cold battery has much lower capacity than a warm one.

COMBOLOOK is designed for outside use in rough conditions but it should not be exposed for rain or snow as this can damage or shorten the lifetime of the instrument.

Checking/charging the battery.

As the instrument has been stored for some time before transportation it is important to check the battery-condition. To do this, turn the main switch On.

When starting the instrument, the monitor and LCD-display turns On.

Picture-screen:	4.5"-monitor, B/W
Menus:	On LCD 64x128.
Memory:	Lots of spectrum pictures can be stored with name. Stored spectrum can be mixed for easy identification of satellite. -"Maxhold"-function.
Favorite channels	Both analog and digital frequencies can be stored (with name).
PC-connection:	RS232-output and PC-software.
Sat-TV power out:	Yes, 13-18V.
CATV power out:	On/off. 15-24 volt.
Sat-TV control:	22 kHz, DiSEqC, DiSEqC/SatScan/SatSelect-positioner.
DiSEqC	Yes, all 1.0 and 1.1. Also Toneburst on/off.
DiSEqC actuator:	Built in positioner for DiSEqC 1.2, SatScan and SatSelect.
Battery:	Rechargeable 12v, 7 amp/hour.
Weight:	About 7 kg incl.battery.
Accessories:	Nylon carrying-case. Power-supply of 220v/13.5v, 1.7amp. Car-charger, BNC/F-adapters.