

SEFRAM 7861 – 7862 – 7861HD – 7862HD field strength meters enable the configuration of a terrestrial or satellite TV reception system. This application note is dedicated for people who use the field strength meter for the first time. This manual provides an application to setup an individual TV terrestrial (DVB-T) reception system correctly.

Note : Our examples concern France, so it is necessary to adapt the device settings according to the country where you are.

1) Configuration

Antenna

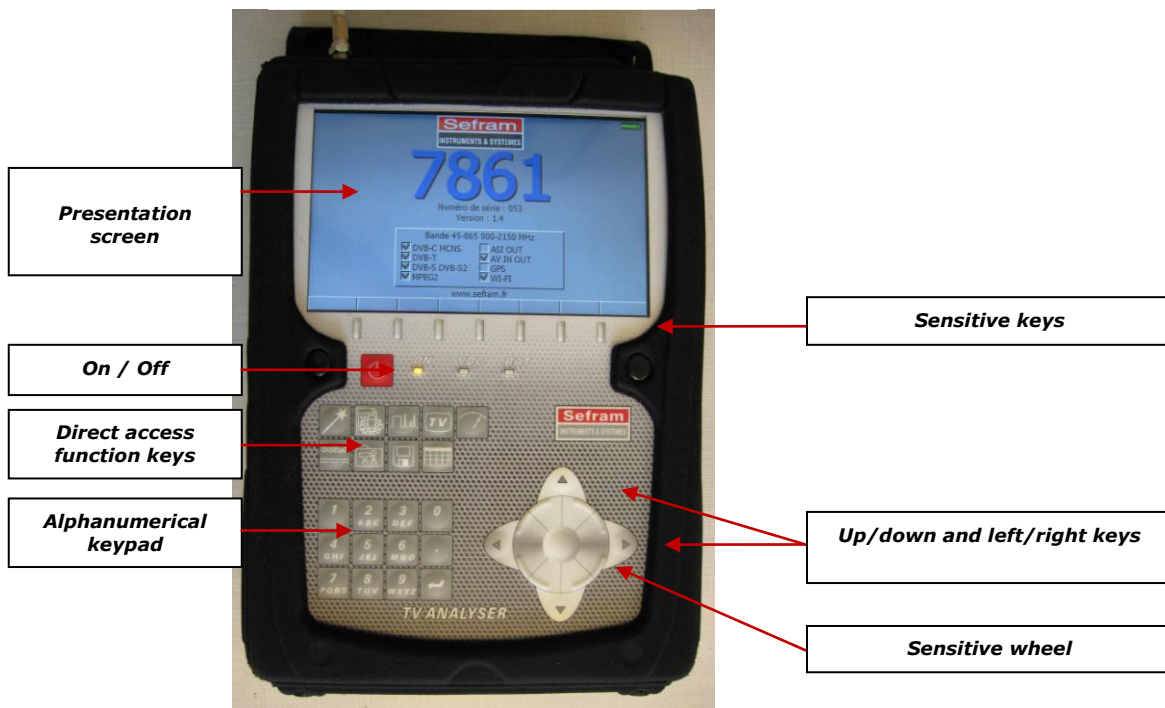


Terrestrial antenna

BNC input



Meter front panel



Operating the instrument step by step

- Plug the antenna cable into the appliance.

- Switch the field strength meter on by pressing the



key and wait that the presentation screen appears (screen with the product reference number and its serial number).

-Press the Parameter key :



, the following window appears on the display.

**Parameter window**

**Highlight line** →

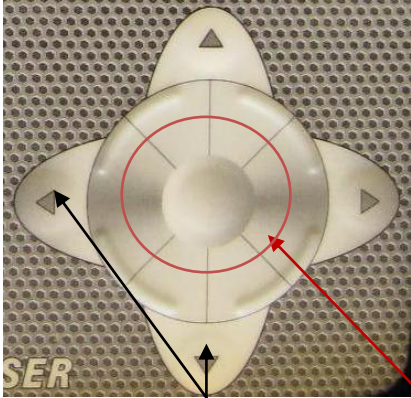
Parameters 0 (0123456789)

Place # : 0 (0123456789)  
 Frequency band : 45-865 MHz  
 Frequency map : Europe  
 Thresholds  
 Messages

#	name	freq.	chan.	standard	const.	rate
0	----					
1	----					
2	----					
3	----					
4	----					
5	----					
6	----					
7	----					
8	----					

Name List \*.ini

**Navigation**





Direction keys      Sensitive wheel

**Menu for sensitive keys** →

**Sensitive keys** →

**Sensitive keys**



 **The menu for sensitive keys changes according to the line which is highlight. It enables modifying the selected parameter.**

- Highlight the « Place # » line with the up and down keys.
- Put the field strength meter on the 7<sup>th</sup> place with the right and left keys or with the sensitive wheel. By default, this place is without any content.
- Highlight the « Frequency band » line (up / down keys) and press « Ter » with the sensitive keys. This instruction allows changing the bandwidth in 45-865MHz (means terrestrial bandwidth).

**7<sup>th</sup> Place configured**

Parameters 7 (NAME)

Place # : 7 ( )  
**Frequency band** : 45-865 MHz  
 Frequency map : Europe  
 Thresholds  
 Messages

#	name	freq.	chan.	standard	const.	rate
0	----					
1	----					
2	----					
3	----					
4	----					
5	----					
6	----					
7	----					
8	----					

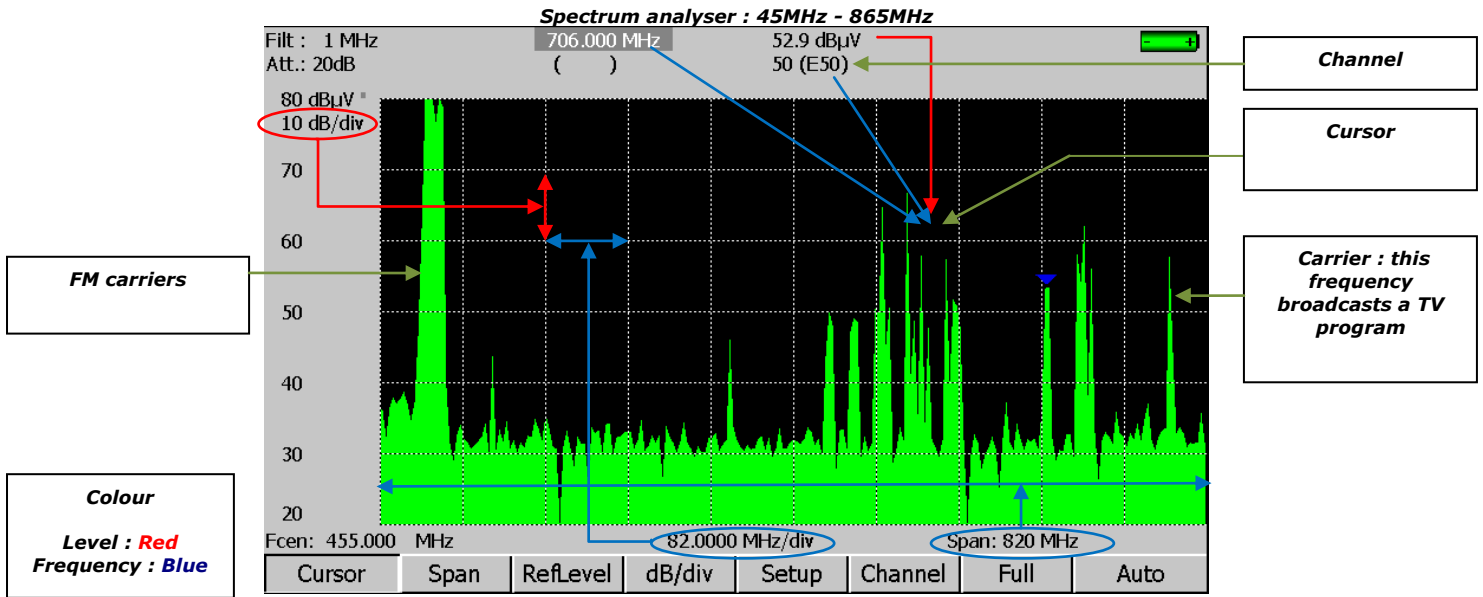
Ter. Sat. Wi-Fi

- Check that the « Frequency map » menu is on Europe. If an other map frequency is selected, press « List », choose « Europe » and validate.
- The « Thresholds » allow defining the limits for the level measurements. Their setups have already been installed but it is possible to modify them (reserved to advanced users).

**2) Adjust the antenna**

Press the Spectrum key : 

A new window appears, it represents the spectrum analysis from 45MHz up to 865MHz. The abscissa axis represents the frequencies and the ordinate axis the reception levels (in dBµV). The spectrum analysis enables adjusting the antenna on the transmitter. Align the antenna in order to see some carriers on the display like in the following example.



**Procedure :**

- Press the « Full » key to see the complete bandwidth (45MHz-865mhz).
- Adjust the antenna and observe the level variations of the different carriers. When the carriers reach their highest point, the antenna is well set.



**Advice :** sometimes the FM radio carriers (on the left) are too powerful and prevent measuring the TV carriers correctly. In this case, lower the level axis scale : press « RefLevel » with the sensitive keys and reduce the scale with the sensitive wheel. A 20 to 80 dBµV scale ( on the left axis) allows a correct display of the TV carriers.



Each Europe transmitter has its own characteristics. Therefore the spectrum picture on your screen can be different from the example one.

Now it is possible to operate some measurements to check the reception quality.

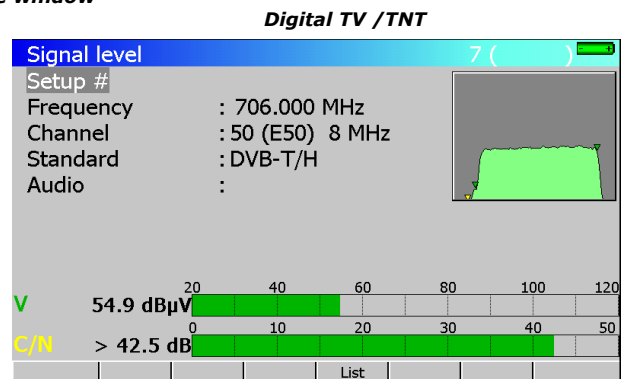
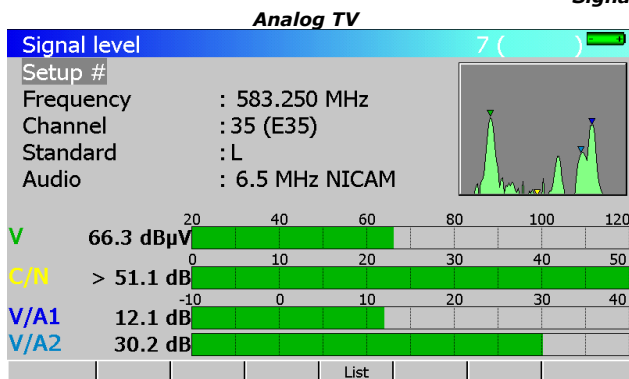
**3) Measurements**

Press the « Channel » key with the sensitive keys. Scroll through the channels with the sensitive wheel : the blue cursor is moving itself, at any change, on the corresponding channel. So put the blue cursor on a channel that involves an analog or digital carrier.

- Press the « Measurement » key : 

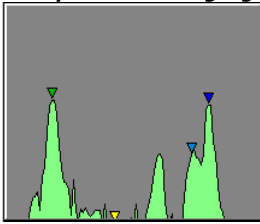
A new window appears on the screen. According to the selected channel, two cases are possible : it is either a multiplex (TNT program) or an analog TV carrier. You can easily determine what sort of program it is.

**Signal level measure window**

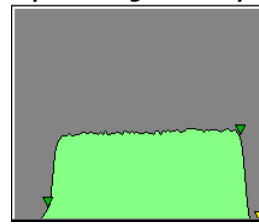


- Analyse the mini-spectrum in the top right-hand corner of the screen.

Typical shape of an analog signal



Typical shape of a digital multiplex



According to the signal nature, there are two measurement methods :

- **1<sup>st</sup> case : analog spectrum analysis**

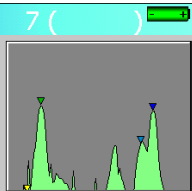
**Signal level measurement**

**Channel characteristics**

**Signal level measure**

**Signal/noise ratio measure**

Signal level	7 ( )
Setup #	
Frequency	: 583.250 MHz
Channel	: 35 (E35)
Standard	: L
Audio	: 6.5 MHz NICAM



20 40 60 80 100 120

65.9 dBμV

0 10 20 30 40 50

> 50.3 dB

-10 0 10 20 30 40

11.0 dB

29.9 dB

BG DK I L MN FM Carrier Digital

maybe  
« Analog »

- Check that the « L » SECAM standard is selected. If not, highlight the « Standard » menu, press « Analog » and « L ».

- Analyse the measures :

- **V** : represents the received signal level
- **C/N** : means carrier/noise ratio
- **V/A** : both measures stand for the video/audio ratio

For an analog signal, the V and C/N measures define the transmission quality.

Thanks to different colors, a threshold system enables seeing the signal quality easily. On the display digital values and bargraphs appear.



The thresholds are set up according to reference values. For an analog signal, the channel measures have to correspond to the next data.

**Analog standard : SECAM L**

**Signal level at the antenna plug**  
57dBμV < V < 74dBμV

**Signal/ noise ratio**  
C/N > 45dB

If the measures are correct, a TV picture can appear.

**TV display**

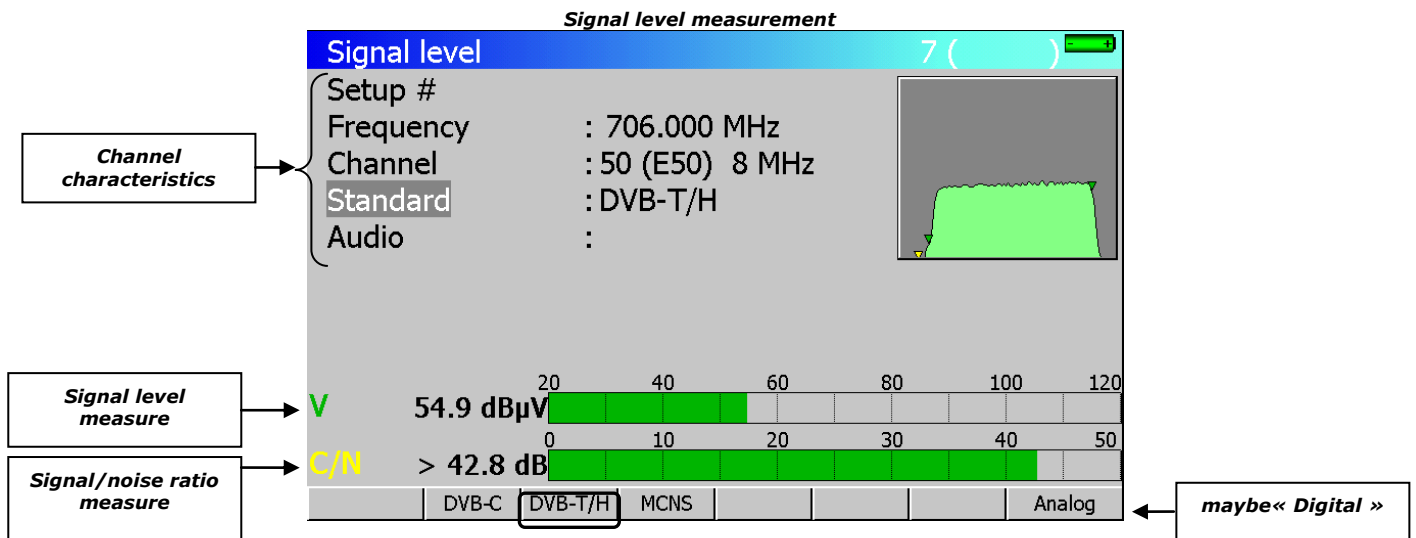
Caution : if you rely only on the picture, without taking the measures into account, you won't have a correct system adjustment.

Press the  key. The screen displays the channel which corresponds to the current measures.

Analog TV : channel 35 – TV program : TF1 – Saint Etienne (France) transmitter



• **2<sup>nd</sup> case : digital spectrum analysis**



- Check that the « DVB-T/H » standard is selected. If not, highlight the « Standard » menu, click on « Digital » and on « DVB-T/H ».

-Analyse the measures :

➤ **Signal level**

For a digital signal, the V and C/N measures are only quality indications. The measure principle is the same as in the analog mode, but the thresholds are different. The multiplex data have to correspond to the following norms.


**Digital standard : DVB-T/H**

**Signal level at the antenna plug**  
35dBμV < V < 70dBμV

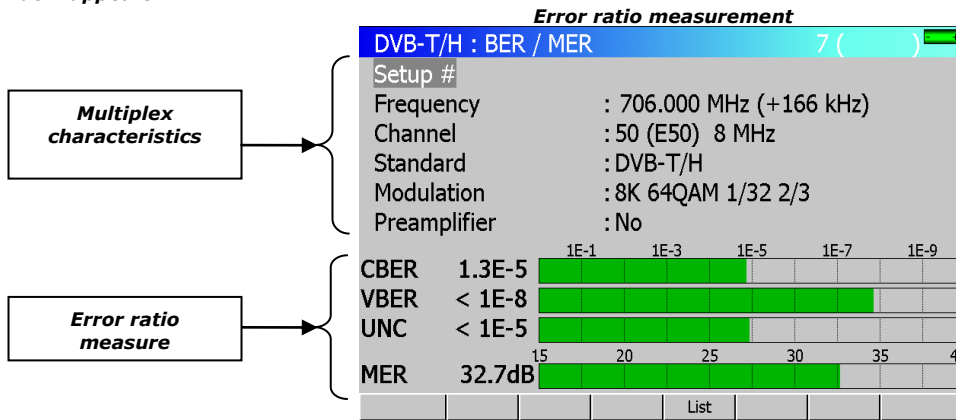
**Signal/noise ratio**  
C/N > 26dB

For a digital signal, it is necessary to use the error rate measures (BER/MER) to fully characterise the reception quality.

➤ **Error rates**

➔ Press for the second time the « Measurement » key : 

This window appears :

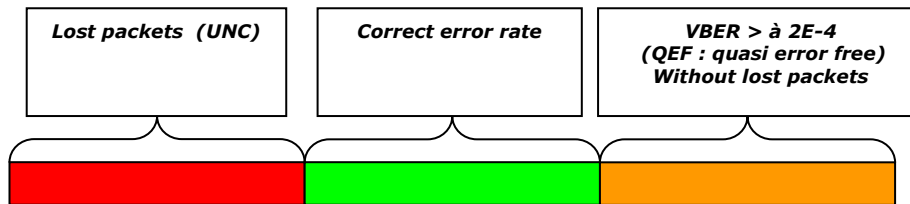


- Analyse the measures:

The BER (Bit Error Ratio) and MER (Modulation Error Ratio) measures are very important to qualify a digital signal.

- CBER : error rate before the Viterbi correction ;
- VBER : error rate after the Viterbi correction ;
- UNC : lost packet number after the Reed Salomon decoder ;
- MER : modulation error rate ( generally equivalent to the C/N measure).

The bargraphs appears in colour according to the measured error ratio:



For an installation of quality, follow the next reference values. Check that the measurements operated on the multiplex correspond to them.

**Error ratios**

	Order of magnitude for a correct signal Ordre de grandeur pour un signal correct
<b>CBER</b>	From 5.00 E-3 up to 1.00 E-6
<b>VBER</b>	< 2.00 E-4
<b>UNC</b>	<1.00 E-6
<b>MER</b>	>26dB



The sign « < » before an error ratio value shows that there has not been any error (for example « <1E-8 » indicates an error rate less than 1E-8).

➤ **TV display**

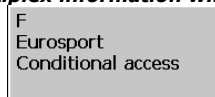
Caution : if you rely only on the picture, without taking the measures into account, you won't have a correct system adjustment.



Press the  key to display the channel which corresponds to current measures.

If the screen remains black, but the multiplex information window appears in the top right-hand corner of the screen, it means that the channel is well synchronised. Nevertheless, a subscription is necessary to see this not free TV program. The term « Conditional access» indicates that the program can't appear.

**Multiplex information window**



A multiplex contains many TV programs. To access to a channel that is broadcasting in clear on the multiplex, press the sensitive key

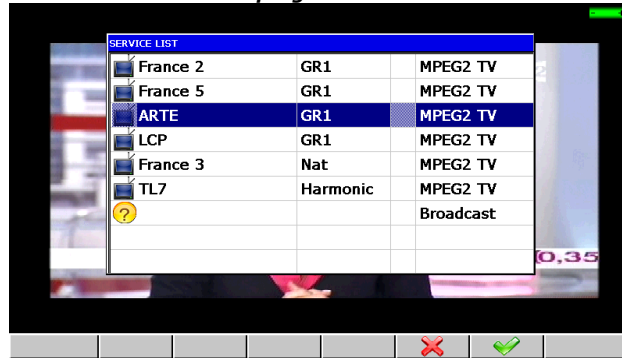


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**TV program choice**



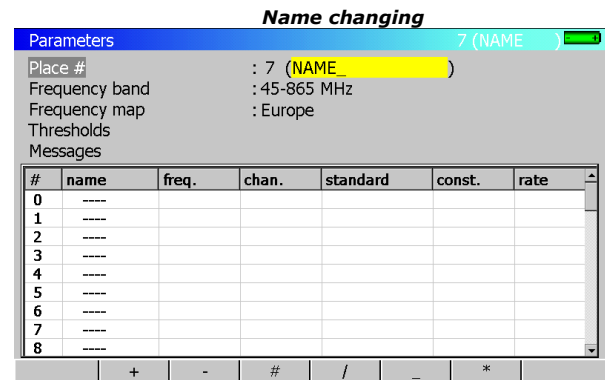
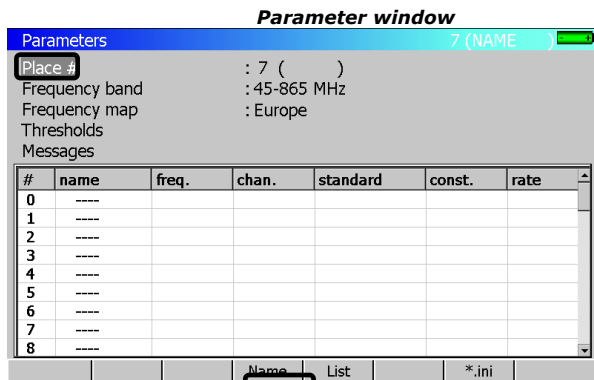
**Digital TV : Channel 50 multiplex – TV Program : ARTE - Saint-Etienne (France) transmitter**



**Practical tool : program save**

The field strength meter enables saving analog and digital channels, therefore it is not necessary to research the carriers manually at each use. Follow the next instructions.

- Press the « Parameter » key : . The 7<sup>th</sup> place, previously configured, appears on the display.
- Highlight the « Place # » menu and press the « Name » key. Enter a name with the alphanumeric keypad ; the best thing is to choose a name that corresponds to the transmitter or the geographical area.



- Move the cursor inside the program table with the direction keys (see the next example).

**Program table**

Parameters 7 (NAME)

Place # : 7 (NAME )  
 Frequency band : 45-865 MHz  
 Frequency map : Europe  
 Thresholds  
 Messages

#	name	freq.	chan.	standard	const.	rate
0	----					
1	----					
2	----					
3	----					
4	----					
5	----					
6	----					
7	----					
8	----					

**Programm table**

- Press « **Modify** » with the sensitive keys to setup a program and save it in the place.

SETUP MODIFICATION

Name : R1  
 Frequency : 706.000 MHz  
 Channel : 50 (E50) 8 MHz  
 Standard : DVB-T/H  
 Audio :  
 Modulation : auto  
 Symbol rate

- On the « **Channel** » line, enter the channel number to save (in the example, channel 50). Check the « **Standard** » line out and correct it if necessary. It is possible to name a program on the « **Name** » line.

- Press again the **Parameter** key : the program appears on the table.

- Repeat the operation for each program to save (in the following example, the analog TV program : channel 35). Do not forget to set up the standard.

SETUP MODIFICATION

Name : TF1  
 Frequency : 583.250 MHz  
 Channel : 35 (E35)  
 Standard : L  
 Audio : 6.5 MHz NICAM  
 Modulation  
 Symbol rate

- Press again the **Parameter** key : the second program is saved in the table.

**Parameter window with saved program table**

Parameters 7 (NAME)

Place # : 7 (NAME )  
 Frequency band : 45-865 MHz  
 Frequency map : Europe  
 Thresholds  
 Messages

#	name	freq.	chan.	standard	const.	rate
0	R1	706.000	E50 8M	DVB-T/H	auto	
1	TF1	583.250	E35	L NICAM		
2	----					
3	----					
4	----					
5	----					
6	----					
7	----					
8	----					

Modify Delete Reset S ^ S v Init.

Afterwards, the memorization of the most used transmitter programs allows saving a considerable amount of time. In fact, it is possible to recall the saved programs in the level and error rate measurement menus, on the spectrum and on TV.

Different application notes can be downloaded on our website ; they allow understanding more in details some functions of the field strength meters ([http://www.sefram.com/wwwFR/F\\_download.asp](http://www.sefram.com/wwwFR/F_download.asp)).

Product link : [http://www.sefram.com/wwwFR/F\\_quick\\_search.asp?st=7861](http://www.sefram.com/wwwFR/F_quick_search.asp?st=7861)



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