DSA-500

USER'S GUIDE
& NAVIGATION MENUS

Combined Digital & Analog TV-SAT Analyzer,
COFDM & QPSK demodulation (47-2250 MHz)

IKUSI

Subject to change without notice

USER'S MANUAL CODE: UG-DSA-500-1.51-1.0-EN-1.00

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INDEX

APPENDIX

USEFUL SUGGESTIONS

Thank you for choosing our measurement equipment, which is currently used and appreciated by the most important service providers, broadcasters and by many installers because it is very user-friendly and provides complete and accurate measurements. On our part we will do our very best to fulfil your requirements now and in the future.

This manual is a new concept quick User's Guide, which is easy to read. Select the function/measurement you need directly from the index and on the respective page you will find useful information to start the specific function or a required measurement.

Every section that describes a specific measurement is divided into three parts:

a. **Measurement/Function brief description**: provides a high level description of the specific measurement or function.
b. **Measurement start-up**: is a list of steps to be followed in order to start the specific measurement.
c. **Push buttons and displays**: graphic description of the push buttons that need to be used and relevant displays that will result during the measurement exercise.

The meter is very user-friendly. Just press the MEAS key to start the analog or digital measurements of any specified satellite transponder or TV channel. The DSA-500 analyzer has a vast memory, which is structured in memory plans in which 199 programmes may be stored. These programmes may be in the satellite or TV band and may be analog or digital. You can also build your own plan with any TV program list using the MEMORY function or using the SMART PC optional programme. Finally, it is possible to generate a TV memory plan automatically, using the auto-memory feature (see. Par. 8.0)

IMPORTANT: the meter is delivered with some default settings.

a. The meter turns off after 5 minutes' inactivity to optimize battery duration and also for air transportation,
b. "EUROPE" standard plan: make sure that you are using the meter with the proper TV standard, relevant to your geographical area (Italy, Euro-ind, UK etc.),

c. Satellite "ASTRA 19": select the satellite to which you want to aim the list from the prememorized list (see Par. 9.0)

d. Three "MANU" plans, which contain analog and digital transponder and TV channels used for in-factory testing. These plans can be used as examples.

- MANU 1: contains only analog and digital transponders
- MANU 2: Lists analog and digital TV channels for different standards
- MANU 3: This plan lists a combination of satellite transponders and TV channels

USEFUL SUGGESTIONS

Analyzer's prememorized channel plans

name	standard	channel plan description
EUROPE	PAL BG	CCIR Europe
UK HK	PAL I	England
AUST.A	PAL B	Australia terrestrial transmissions
CHINA	PAL D	China
CEPOOI	PAL D	Eastern countries
FOXTEL	QAM - PAL B	Australia CATV Foxtel
FRANCE	SECAM	France
NEW ZE	PAL B	New Zealand
RUSS.A	SECAM B	Russia terrestrial transmissions
RUSS.B	PAL	Russia terrestrial transmissions
USABRO	NTSC	USA terrestrial transmissions
USACAB	NTSC	USA CATV Network (Cable)
USAHRC	NTSC	USA HRC
USAIRC	NTSC	USA IRC
AUST.D	PAL B	Australia digital
ITALY	PAL BG	Italy
INDIA	PAL BG	India

USEFUL SUGGESTIONS

Analyzer's Pre-memorized ST-4 Transponder list

Satellite	Plan name	Satellite	Plan name	Satellite	Plan name
ASTRA 28	ASTR28	TELS 15	TELS15	Panamsat 72	PANS72
ASTRA 23	ASTR23	TELEC 8	TELEC8	LMI 75	LMI75
ASTRA 19	ASTR19	ATLNB 12	ATLB12	NILES 07	NILES57
Hotbird 13	HBIR13	Hispasat 30	HISP30	Intesat 18	INTE18
HotbirdName	HBIRna	Eutelsat 21	EUTE21	NSS 22	NSS22
Eutelsat 07	EUTE07	Arabsat 25	ARAB25	Intelsat 27	INTE27
Eutelsat 10	EUTE10	Arabsat 26	ARAB26	Panamsat 43	PANS43
AMOS 4	AMOS4	EBIR 28	EBIR28	Panamsat 45	PANS45
SIRIUS 4	SIRIU4	Ebir 33	EBIR33	Panamsat 58	PANS58
SIRIUS 5	SIRIU5	Expr 53	EXPR53	Asia 105	ASI105
INTEL 1	INTEL1	NSS 57	NSS57	INSAT4A	INSA83
HELLAS 39	HELL39	Panamsat 68	PANS68	NSS 6	NSS95
Turksat 42	TURK42	Eutelsat 70	EUTE70	Asia Sat 2	ASI100

Menu navigation is carried out using the encoder knob:

The encoder may be used to highlight the selectable fields, which will appear with a black background (e.g. Channels, Frequency etc.)

The highlighted field may be a value (frequency) or a status to be changed (e.g. START? or STORE?). If you press the encoder, the highlighted field will start blinking and can be changed with a subsequent rotation to the required value or status.

The meter's keys, as shown in the next section, have a double function that can be enabled by pressing the key for more than two seconds. The description of this double function is written on the front panel label immediately above the main key.

MAIN KEYS

- Select all menu fields that can be changed (selected fields have a black background).
- By pressing and rotating the ENCODER, all possible values or meter settings will be listed.

- Provides the list of memory plans

- Enables the automatic satellite search function.
- If pressed for 2" it will start the Dual Feed dish alignment feature.

- Spectrum analysis of the RF input signal.
- If pressed twice the spectrum Max Hold will be activated.
- If pressed for 2" the SAT POINT function will adjust the spectrum setting for dish alignment.

- Provides analog or digital transponder measurements.
- By pressing this key more than once, all the menus will appear in sequence showing all the provided measurements.
- If pressed for 2" it will allow you to escape from any active function.

- Reads all the services transmitted by the digital signal. In this list all the video and audio PIDS are shown. The digital picture of the selected program is also displayed on the color TFT for all free-to-air signals.
- If pressed for 2" the TFT colour display may be switched ON/OFF.

- Starts the automatic measurement procedure (Data Logger) and memorizes the measurement results for all transponders or channels in the active memory plan.

- Recalls the summary results of a previously executed SAVE test

- Key to start the automatic tuning of a digital signal.
- If pressed for 2" this key turns on the Buzzer function, based on the Noise Margin measurements.

- Starts the Memory function to generate a custom memory plan. A memory plan can contain up to 199 different programs.
- If pressed for 2", you can store the tuned signal directly in the first available program in the memory plan.

- Displays the graphic Level/Power TV channels bars.
- If pressed for 2" it will enable or remove the RF power feed.

2"LNB ON-OFF

LEVEL/PWR

- ON / OFF switch.
- If pressed briefly it will show the Level/Power of the signal under test.
- If pressed for 10" the meter will reset.

- Volume and TFT settings (Bightness, Colour etc.) adjustment.
- If pressed for 2" the configuration menu is displayed.

- Start the DiSEqC motor function to drive a motorized dish.
- If pressed twice, the spectrum will be shown while moving the dish.

2"DUAL LNB

- Starts the S.C.R. protocol for single cable distribution systems.
- If pressed for 2" the dual LNB dish alignment feature is enabled.

- Will zoom on the colour TFT display, the measurements and spectrum showing on the graphics display.

- Automatic TV memory plan allocation.

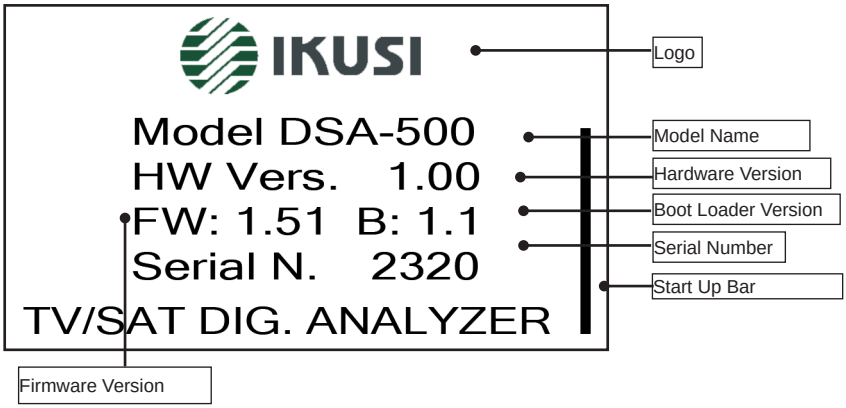
NOTE:
To enable the numeric keyboard press the encoder for 2 seconds. The numeric encoder will give the user the possibility to directly change the values for the frequency, Symbol Rate and Local Oscillator.

METER POWER UP

To power up the meter press the [20] key.

On the meter's display [2] a welcome screen will show for about 6". This display provides all the detailed identification data for the meter.

DISPLAY LAYOUT.



DSA-500 Model name, Firmware Version and Serial Number.

CONFIGURATION MENU

Brief description

The configuration menu allows you to set the main, working parameters that will be applied during meter operation. This menu also enables some special functions, such as the "FILE MANAGER" (to cancel memory plans),

Measurement start up

- Press the "VOLUME" [19] key for 2 seconds,
- The Configuration Menu is shown on display [2],
- Select "METER SET UP" to access the typical meter settings,
- Select "TV CONFIG & COUNTRY" to set the channel plan and TV standard to be used during all measurements,
- Select "SAT CONFIG." to choose a SAT standard,
- Select "FILE MANAGER" to delete memory plans.

Push buttons and displays

Press key 

for 2" to display the configuration menu

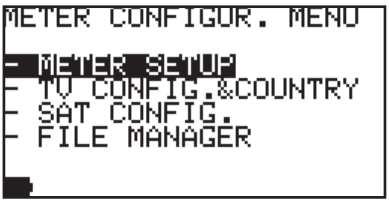
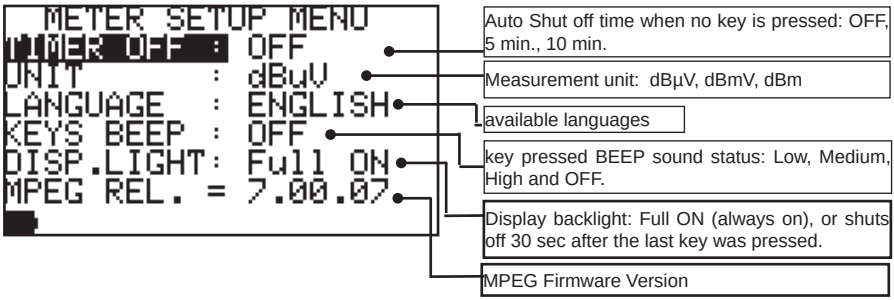


Fig. 1.1 Configuration Menu

continuation: CONFIGURATION MENU

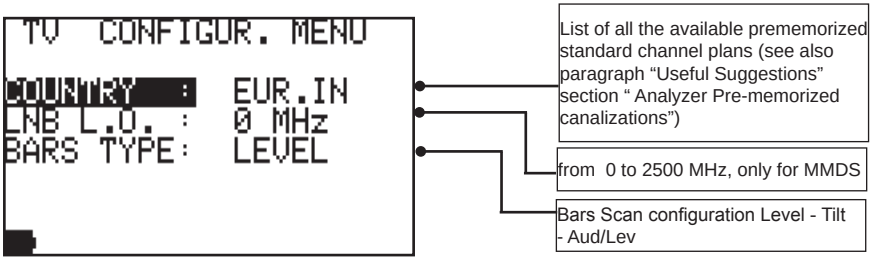
"METER SET UP" :

With reference to fig. 1.1, press the encoder  to choose the "METER SETUP" menu entry



"TV CONFIGUR. COUNTRY" (TV channel plan and standard):

With reference to Fig. 1.1, rotate the ENCODER  to select the "TV CONFIG. & COUNTRY" menu entry and press it  to access the menu.

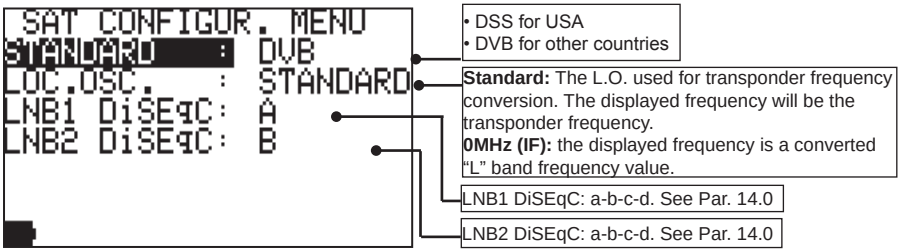


continue: CONFIGURATION MENU

"SAT CONFIGUR." :

Referring to fig. 1.1, rotate the encoder to choose "SAT CONFIGUR & SCR"

and press to access the "SAT CONFIGUR. MENU":



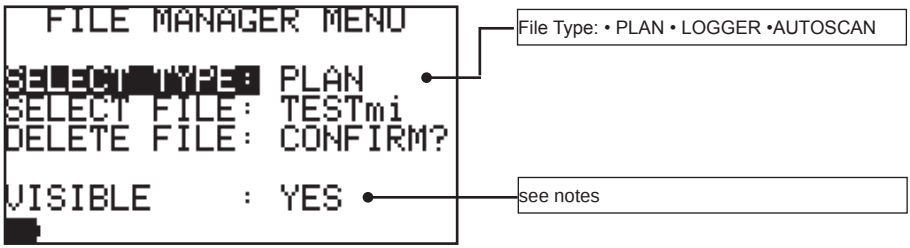
"FILE MANAGER" :

The File Manager function allows only some PLAN, LOGGER or AUTOSCAN file deletion from the main meter's memory. If the type of file selected is "PLAN" the displayed file list will be relevant to the active plan (press the "PLAN" key to determine the active plan type).
If the active plan is:

- SATELLITE: all satellites are listed
- TELEVISION: the active STANDARD channel plan and all the manually generated memory plans (MANU) are listed
- MANUAL MEMORY: all existing files are listed

If an "AUTOSCAN" or "LOGGER" file is selected, all automatically allocated files through an AUTOMEMORY (see Par. 7.0) or Logger files (Log.), generated by a SAVE (Ref. Par. 25.0) function, are listed.

With reference to fig. 1.1, rotate the ENCODER to choose the "FILE MANAGER" menu entry and to access the menu:



After selecting a file type and name, the selection has to be confirmed by highlighting the "DELETE FILE" command and confirming this selection with the encoder.

NOTA:

1) It is not possible to delete the factory pre-memorized files, which contain satellite transponders and channel plans, relevant to all world-wide standards. These may be removed only using a PC and the SMART interface application programme. For example "EUROPE". If you attempt to remove these channel plans, the meter will respond with the message "VOIDED!".

2) The "VISIBLE" option will hide a file (without deleting it) from the list displayed by the PLAN [13] key. This option shows on the display when the selection type is "SATELLITE" or "MANU" and can be set to YES (visible file) or NO (hidden file).

TV MODE (ANALOG AND DIGITAL)

1.0 TV MEMORY PLAN MENU: PLAN

Brief description

The PLAN [13] key allows the user to choose a pre-memorized channel plan for signal measurements and antenna alignment. When the meter is turned on, the last selected Memory Plan will be set.

Measurement start up

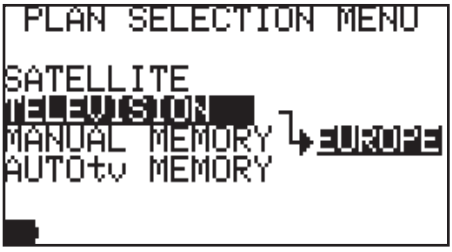
- Press the PLAN [13] key to select a memory plan (channel list),
- Select the required Memory Plan using the encoder [3],
- The highlighted list will have a dark background,
- Press any key, for example the MEAS [7] key, to start measurements on the selected channel plan.

Push buttons and displays

Press the PLAN SAT·TV 1 key and select the required plan using the

The active memory plan will always be the highlighted one with a black background.

Press the MEAS 4 key to start measuring.



NOTES:

There are 4 kinds of memory plans:

1) SATELLITE: Satellite Factory Prememorized plans (see the SAT section of this manual),
2) TELEVISION: Standard TV channel plans,
3) MANUAL MEMORY: custom made Memory Plans (MANU),
4) AUTOtv MEMORY: memory plans automatically generated by the Automemory (autoscan) feature in the TV band

2.0 AUTODISCOVERY FEATURE

Brief description

The AUTODISCOVERY feature will automatically start when in measurement mode on the standard memory plan (i.e. ITALY).
During channel navigation the meter will automatically identify the incoming signal modulation : ANALOGUE, COFDM, DVB-H or QAM.

Measurement start up

• Select the standard memory plan, ref. Par. 1.0, (TV channel plan, i.e. : Europe).

• Press the MEAS 4 key.

• Vary the channel number.

Push buttons and displays

Press the PLAN SAT-TV 1 key, use the navigation encoder [3] to select the TELEVISION memory plan.
The active field will always be highlighted with a black background; press the MEAS 4 key to start the measuring the TV signals relevant to the selected memory plan. While navigating by channel number the meter will automatically recognize the signal channel modulation.

Fig. 2.1 channel 41 Autodiscovery.

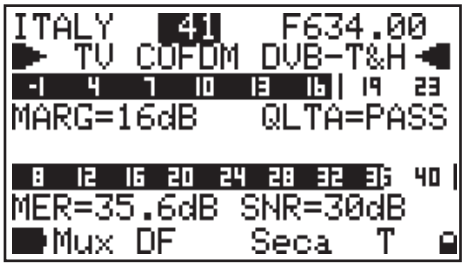


Fig. 2.2 channel 41 locked.

3.0 BUZZER (DIGITAL TV ONLY)

Brief description

The buzzer is a beep sound, which varies its speed in proportion to the Noise Margin of the input signal. This is particulary useful for antenna alignment. Press the HELP [12] key for 2 seconds to enable this feature. The meter will display the noise margin measurement, the quality analysis (PASS, MARGINAL, FAIL) and the network data (NIT table's data). These measurements are shown only if the COFDM mux is locked.

Measurement start up

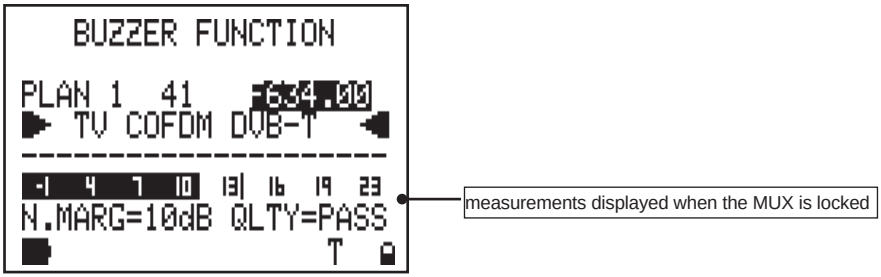
- Select a digital Multiplex,
- Press the HELP [12] keys for 2",
- The meter will start the BUZZER Function: an audible tone related to the noise margin measurement.
- The Buzzer starts only when the MULTIPLEX is locked.
- Press any key to disable this function.

Push buttons and displays

Press the 

for 2" to start the BUZZER FUNCTION.

The channel of the active memory plan is displayed on the first line of the display. The channel frequency may be changed and, if the frequency association to the channel name is lost, three horizontal lines are shown. When the Multiplex is locked the meter starts the buzzer and the relevant measurements are shown (see fig. below) .



NOTE:
1) The buzzer function starts only when a digital TV channel is locked.

4.0 ANALOG TV SIGNAL MEASUREMENT: MEAS

Brief description

The MEAS key starts the measurements on the selected channel. In this section we describe all the measurements available for an analog TV channel. Press repeatedly the "MEAS" key to display, in sequence, all the possible measurements on the selected channel. These are displayed as a numerical value and with a graphic bar that varies its length proportionally according to the measurement. This bar memorizes the peak measured value with a vertical line.

Measurement start up

Tuning:
The upper part of the display shows the TV channel tuning parameters. The displayed parameters are those of the selected channel. Use the Encoder [3] to highlight and change the tuning. The following parameters can be modified in the user generated memory plans: channel number, frequency, signal modulation (FM Radio, analog or digital TV), audio carrier and the input RF power feed. It is possible to modify all the tuning parameters only in the first measurement level (see notes at the end of this section).

Measurements:
The bottom part of the display shows all the measurements available for the tuned channel. Refer to the "Useful Suggestions" section at the beginning of this User's Guide for more details.
Repeatedly press the "MEAS" [7] key to display the two measurements levels available for analog signals:

- **Measurement level 1**: Analog video carrier level (see par. 4.1),
- **Measurement level 2**: Measures the V/A ratio (the difference in dB between the video and audio carrier level) and the C/N measurement (see par. 4.2).

NOTES:

1) The memory plan, channel number, frequency and modulation (FM Radio, analog or digital TV) can only be changed in the first measurement level. The channel and frequency values can be changed only in the second measurement level.

2) If a "Television" plan (standard channel plan) is selected, only the channel number and the input RF power feed may be changed (ON/OFF).

continuation: ANALOG TV SIGNAL MEASUREMENTS: MEAS

Push buttons and displays

4.1 Analog level measurement (Level 1)

Press the ESCAPE MEAS 4 key and then use the encoder to choose the field to be modified. Press and rotate the encoder to modify the channel, frequency or the power RF feed.

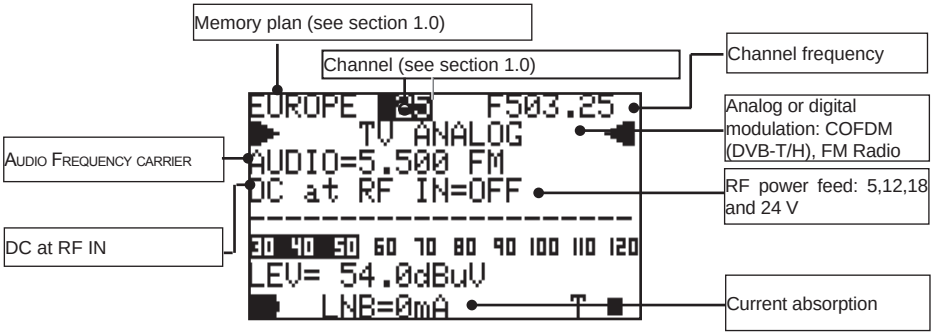


Fig. 4.1 Analog signal First Measurement Level

NOTES:

1) It is only possible to change all the tuning parameters in the first mesurement level, shown in fig. 4.1 and only for the user generated plans (MANU).

2) You can return to the first measurement level at any time by briefly pressing the ON/OFF key.

continuation: ANALOG TV SIGNAL MEASUREMENTS: MEAS

4.2 A/V and C/N analog measurement (Level 2)

Press the ESCAPE MEAS 4 key again to display the second measurement level:

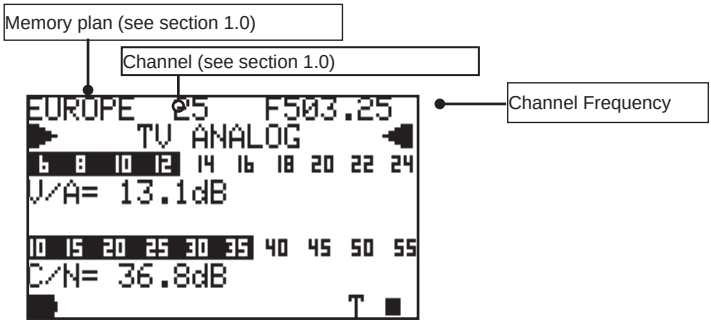


Fig. 4.2 Second Measurement level: V/A and C/N ratio.

NOTES:

1) To listen to the TV audio, make sure that the volume is not set to 0 (see Par. 23.0).

2) If there is no signal, or if the signal level is below the meter's dynamic range, the string **PWR_TOO_LOW** is shown.

3) The meter always shows a graphic bar proportional to the measured signal level.

4) The graphic bar memorizes the peak signal level or power value. This is represented by a vertical line on the display.

5) To display all the available signal measurements, the MEAS key has to be pressed repeatedly.

6) Press briefly the "POWER ON" key [20] to return to the first measurement level shown in Fig. 4.1 .

7) The second measurement level will only allow channel and frequency changes.

5.0 TV DIGITAL SIGNAL MEASUREMENTS: MEAS

Brief description

The MEAS key starts measurements on the tuned channel. In this section we describe all the measurements available for a digital TV channel. If you repeatedly press the MEAS key, the display shows, in sequence, (see next paragraph) all the measurements carried out on the selected Channel as a numerical value and with a graphics bar that varies its length proportionally to the represented measurement. This bar memorizes the peak measurement value (Max Hold).

Measurement start up

Tuning:

The upper part of the display shows the TV channel tuning parameters for the TV channel. The displayed parameters are those of the selected channel. Use the ENCODER [3] to highlight and change the tuning. The parameters that can be modified in the user's generated memory plan are: the channel number, frequency, signal modulation (FM Radio, analog or digital TV) and power feed at the RF input. It is only possible to modify all the tuning parameters in the first measurement level (see notes at the end of this section).

Measurements:

The lower part of the display shows all the measurements available for the tuned channel. Refer to the "Useful Suggestions" section, at the beginning of this User's Guide, for more details.

Repeatedly press the "MEAS" [11] key to see the following live measurement levels:

- **Measurement level 1:** measures the digital power (PWR) (see par. 5.1),
- **Measurement level 2:** measures the Noise Margin (N. MARG.), the signal quality (QLTY), the MER and SNR with a relevant graphic bar (see par. 5.2),
- **Measurement level 3:** measures the bBER (Pre BER) and aBER (Post BER) with relevant graphic bars (see par. 5.3),
- **Measurement level 4:** Eye Constellation diagram and all the basic tuning parameters are displayed (see par. 5.4).
- **Measurement level 5:** Impulse responde (ECHO) (see par. 5.5).
- **Measurement level 6:** all data provided by the NIT card: FEC, Network name, (NETW NAME), bouquet name (BOUQ. NAME), and DATE (see par. 5.6).

NOTES:

1) It is only possible to vary all the tuning parameters: channel number, frequency and modulation type (FM Radio, analog or digital TV) in the first measurement level display. In all other measurement levels only the memory plan number, the channel or the frequency and the RF in power feed may be changed.

2) The status bar at the bottom of the display always shows the basic information regarding the measured signal. For a digital MUX: the network name, the encryption system and a lock icon that indicates if the digital MUX is locked. If the active channel is digital, a "D" will be displayed on top of the "DIG" writing on the display front panel label.

3) To display all the signal's available measurements, the MEAS key has to be pressed repeatedly (see next paragraphs in this section for more details),

4) In the custom memory plan "MANU" and on measurement level "1" the following tuning parameters may be changed: Channel, Modulation (Radio FM, Analog or Digital TV) and the power at RF IN. In all the other measurement levels the memory plan, the channel and frequency can be changed. For the standard channel plan memory plans only the channel an frequency can be modified.

5) If you press briefly the "HOME" key [23], the meter automatically returns to the first measurement level shown in Fig. 5.1, regardless of the active measurement level.

continuation: DIGITAL TV SIGNAL MEASUREMENTS: MEAS

Push buttons and displays

5.1 COFDM Digital multiplex Power Measurement COFDM (Level 1)

Press the ESCAPE MEAS 4 key and use the encoder to choose the field to be modified. Press and rotate the encoder to modify the displayed value.

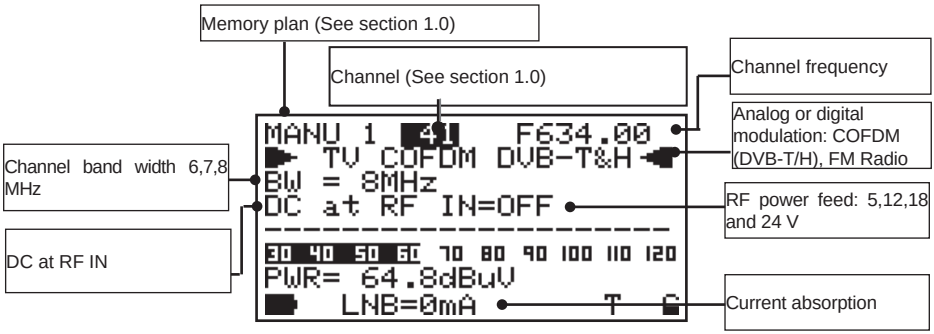


Fig. 5.1 Digital signals first measurement level.

NOTES:

1) If there is no signal or if the signal level is below the meter's measurement dynamic range, the string **PWR_TOO_LOW** (power too low) is shown.

2) The meter always shows a graphic bar proportional to the signal level or power measurement.

3) The graphic bar memorizes the peak signal level or power value. This is represented by a vertical line on the display.

4) To display all the signal's available measurements, the MEAS key has to be pressed repeatedly (see next paragraphs in this section for more details).

5) If you briefly press the "HOME" key, the meter automatically returns to the first measurement level shown in Fig. 5.1, regardless of the active measurement level.

continuation: DIGITAL TV SIGNAL MEASUREMENTS: MEAS

5.2 N. MARG, QLTY, MER and SNR measurements (Level 2)

Press the ESCAPE MEAS 4 key again to start the second measurement level:

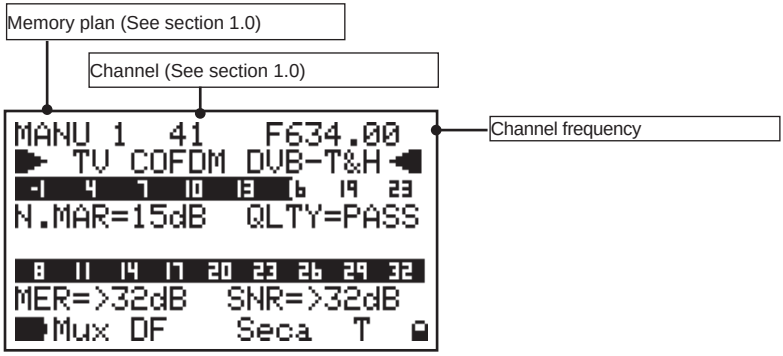


Fig. 5.2 The second level measurement provides the Noise Margin and the MER (modulation error rate) with their relevant graphic bars. It also provides the SNR measurement as well as the quality analysis (PASS, MARGINAL FAIL).

NOTES:

1) There are only two modifiable fields in this measurement levels: channel and frequncy

5.3 BER measurement before and after error correction (Level 3)

Press the ESCAPE MEAS 4 key again to start the third measurement level:

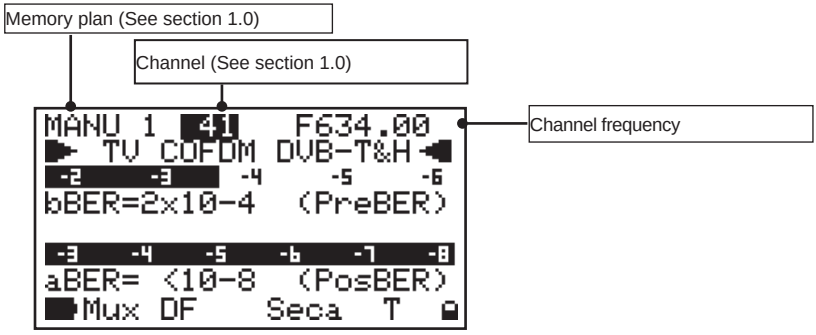


Fig. 5.3: The third measurement level provides the BER (Bit Error Rate) before and after the error correction algorithms. The aBER (after Viterbi) shows the $<10^{-8}$ value for signals that can be considered error free after the correction algorithms.

NOTES:

1) There are only two modifyiable fields in this measurement level: channel and frequency.

continuation: DIGITAL TV SIGNAL MEASUREMENTS: MEAS

5.4 Eye constellation display (Level 4)

Press the ESCAPE MEAS 4 key again to start the third measurement level:

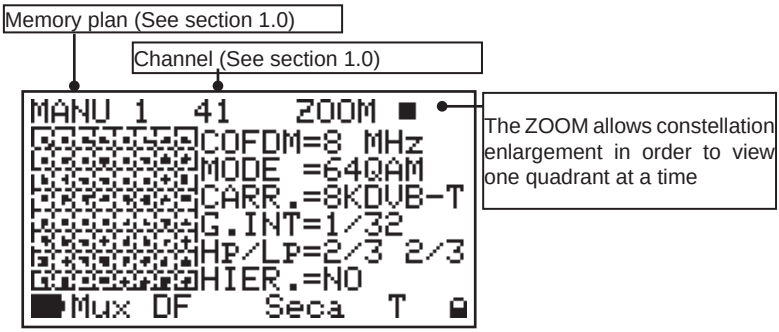
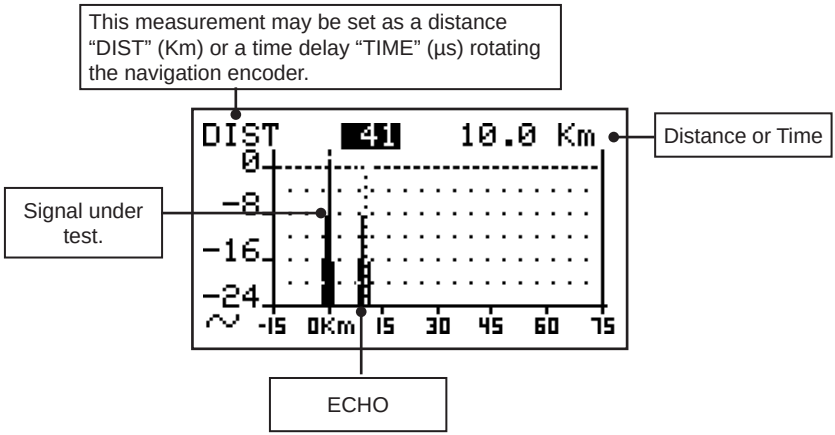


Fig.5.4 the 4th level provides the constellation display.

5.5 Impulse Response (ECHO) - (Level 5)

Press the ESCAPE MEAS 4 again to start the fifth measurement level:



This feature will display an eventual ECHO signal being received at the RF input.

5.6 Net-ID data (Level 5)

Press the 

key again to start the fifth level measurement:

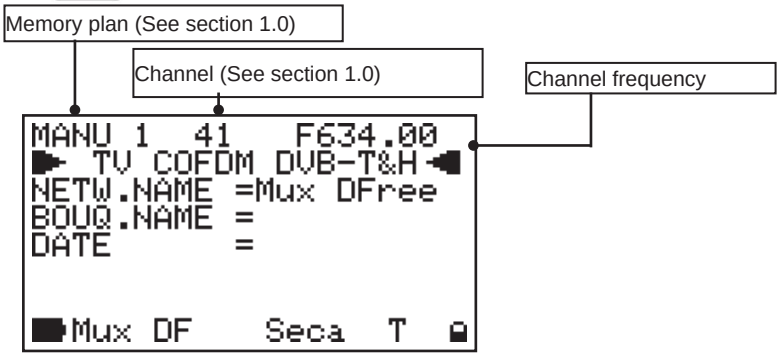


Fig. 5.6 This display shows the Network name, the bouquet and date.

6.0 SPECTRUM MEASUREMENTS: SPECT

Brief description

The SPECT [11] key gives you access to the meter's spectrum analysis measurements.
When accessing this measurement mode, the meter automatically sets the reference level in order to show all the detected carriers within the screen display for the selected SPAN value.

Measurement start up

- Select a Memory Plan (see section 1.0),
- Connect the antenna or TV outlet to the meter's RF input,
- Press the SPECT [11] key,
- Use the ENCODER to select the spectrum variable fields (see Fig. 6.1): SPAN, channel or programme number, frequency and reference level. The chosen field is highlighted with a dark background,
- Rotate the ENCODER to change the chosen field,
- Press the SPECT [11] key again to enable the Max Hold feature. With this feature the meter memorizes the RF input signal's maximum value, this is shown as a profile that overlaps the real time spectrum curve.

NOTES:

1) If you vary the channel or programme name, the spectrum marker moves to the video carrier or center frequency depending on the signal modulation.

2) If you vary the marker frequency, it will move gradually on the spectrum.

3) If you vary the displayed frequency, the channel or programme name will be replaced by horizontal lines. This is because the correspondence between the frequency value and the transponder or programme name is lost.

continuation: SPECTRUM MEASUREMENTS: SPECT

6.1 Spectrum analysis of a digital signal

Press the SPECT 2 key and use the encoder to select the fields to be modified.

Press and rotate the encoder to vary the selected value.

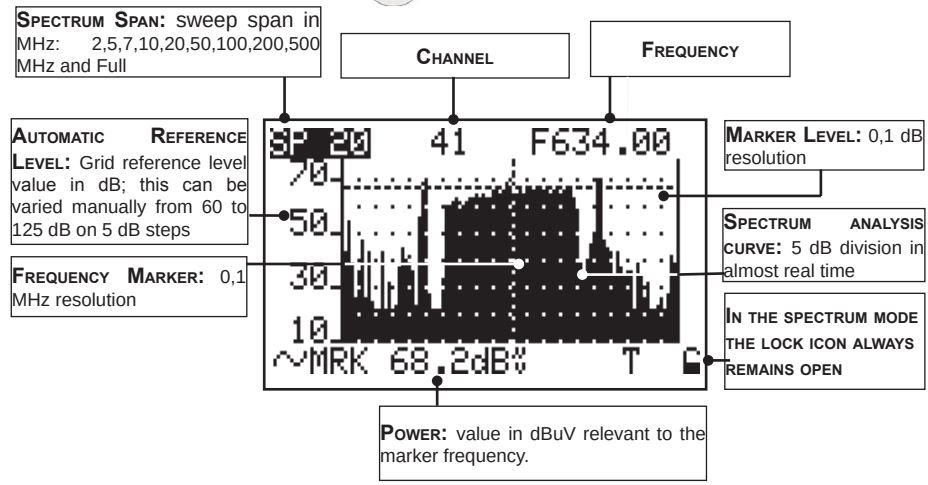


Fig. 6.1 COFDM MUXLTIPLEX spectrum with 20 MHz SPAN.

6.2 Analog signal spectrum analysis

Example of a analog signal spectrum display

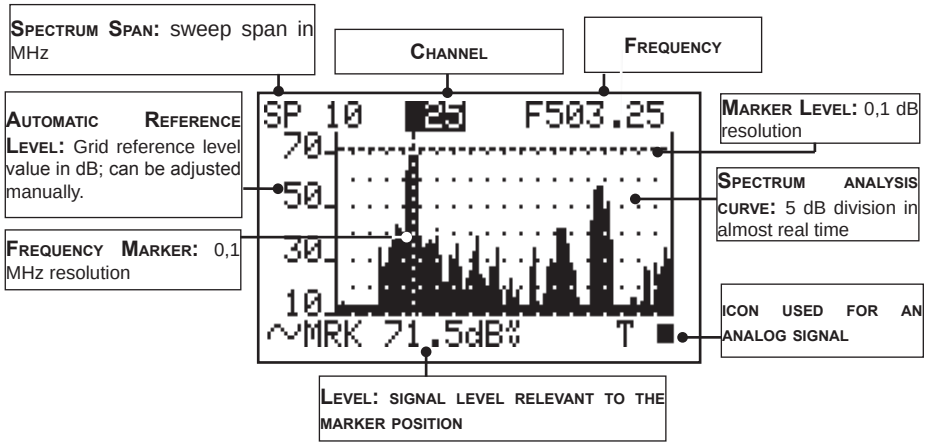


Fig. 6.2 Analog channel spectrum with a 10 MHz span

continuation: SPECTRUM MEASUREMENTS: SPECT

6.3 Digital signal spectrum analysis: Max Hold

Press the  key again to enable the spectrum MAX HOLD feature.

Fig. 6.3 COFDM multiplex spectrum with active max hold feature.

NOTES:

1) The BuzOn feature is used to assist the antenna alignment procedure by generating a tone which is proportional to the segnal strength displayed on the spectrum. When using this feature make sure that the volume is on (Per. 23.0)

7.0 HELP: DISCOVERING

Brief description

The "Discovering" function automatically identifies the channel modulation and retrieves all the tuning parameters.

Measurement start up

a) From spectrum mode: "SPECT"

- Use the ENCODER [3] to select the channel to be measured.
- Press the "MEAS" [7] key.
- The meter automatically identifies the signal and provides the relevant measurement.

b) From measurement mode: "MEAS"

- Use the ENCODER [3] to select the channel to be measured.
- The meter automatically identifies the signal and provides the relevant measurement.

Push buttons and displays

Channel navigation automatically starts the "Discovering" feature and identifies the channel modulation (Analog or Digital). If Help is needed to lock a digital multiplex (i.e. a digital mux transmitted with a frequency off set) press the HELP key

The meter will start an automatic tuning search for the missing parameter.

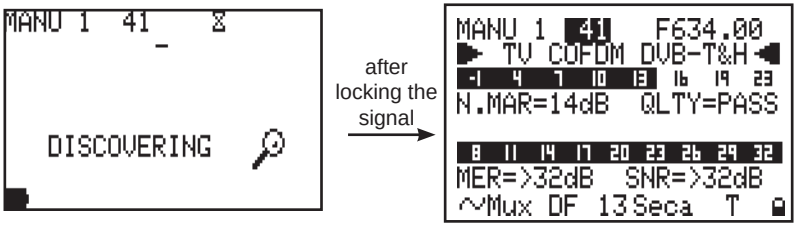


Fig. 7.1 Start the automatic search for the tuning parameters of a digital Multiplex.

NOTES:

1) When the MUX is locked, the meter will return to the measurement menu. If this channel is not memorized it can be stored in a MANU memory plan.

8.0 AUTOMEMORY: AUTOMATIC CHANNEL SEARCH

Brief description

The Autoscan function will automaticaly search for analog and digital channels, above a settable level/power threshold. These channels can be stored in a plan called Auto1 up to Auto 10.

Measurement start up

- Press the AUTOMEMORY [10] key for two seconds.
- Press the ENCODER [3] to choose the destination memory plan (Auto1 to Auto10) and the threshold values for the level/power of the analog/digital channels to be detected.
- Start the automatic search function moving the cursor to SCAN? and press the ENCODER [3] to start searching.

Push buttons and displays

Press the 

key for 2" to start the Autoscan feature.

Use the  to highlight the fields to be changed and modify the thresholds.

Rotate and press the encoder.

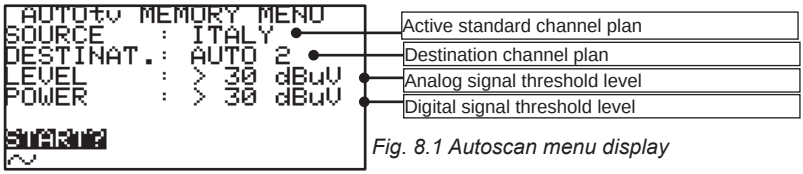


Fig. 8.1 Autoscan menu display

Press the encoder  to start channel scanning

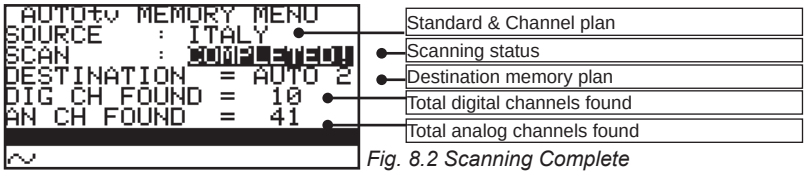


Fig. 8.2 Scanning Complete

NOTES:

1) During the scanning process the meter finds and recognises the digital and analog TV channels.

9.0 BAR SCAN

Brief description

This feature displays a graphic BAR representation of all the analog and digital channels. The bars show the video carrier level or the Mux power of up to 100 channels at once, on one display. The reference level is automatic, but can be changed manually. This feature can be used to equalize a channel head-end.

Measurement start up

- Press the PLAN [13] key and use the ENCODER [3] to choose a memory plan with TV channels.
- Press the BAR SCAN [6] key to start the memory plan sweep.

Push buttons and displays

Press the 

key to start the bar scan feature.

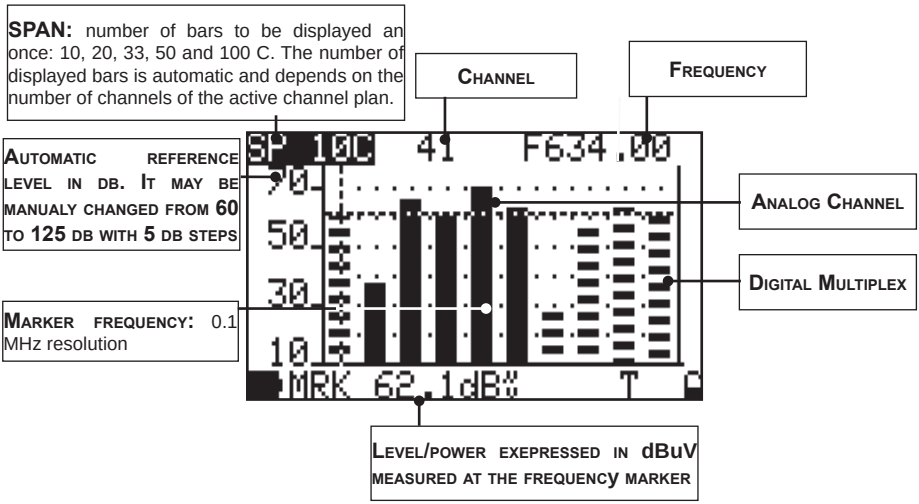


Fig. 9.1 Bar Scan Feature

SAT MODE (ANALOG AND DIGITAL)

10.0 SAT MEMORY PLAN MENU

Brief description

The Memory Plan menu provides a list of all the available transponder files, which can be selected to be used for measurements or dish alignment tasks. Upon meter power on, the last selected Memory Plan will be active.

Measurement start up

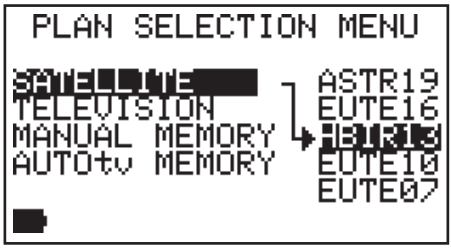
- To select a Memory Plan (transponder list) press the PLAN [13] key.
- Use the ENCODER [3] to highlight a "Satellite" menu entry group, all the factory prememorized transponder lists or, highlight the "MANUAL MEMORY" menu entry if you have generated a custom satellite trasponder list, stored in a "MANU".
- Select the required memory plan using the ENCODER [3].
- The active memory plan will have a dark background.
- Press any key to quit the menu, for example the "MEAS" [7] or "SPECT" [11] key to start measuring.

Push buttons and displays

Press the PLAN SAT·TV 1 key and use the encoder  to choose one of the available menu entries and press and rotate the encoder  to select a memory plan.

The active plan will always be the one highlighted with the black background.

Press MEAS 4 or SPECT 2 to start measuring.



NOTES:

There are 4 kinds of Memory plans:

1) SATELLITE: Satellite Factory Prememorized plans
2) TELEVISION: Standard TV channel plans
3) MANUAL MEMORY: custom made Memory Plans.
4) AUTOMEMORY: memory plans automatically generated by the Auto-memory (autoscan) feature in the TV band (see Par. 8.0).

11.0 DISH ALIGNMENT: SAT FINDER

Brief description

This function allows a Dish Alignment based on the identification of three reference transponders. The satellite is identified by simply rotating the dish around its axis. When the satellite is recognised by the meter, it will automatically display the fine alignment display that will also allow cross-pol adjustments.

Measurement start up

- Press the PLAN [13] key only if the transponder list needs to be changed (see sec. 11.0).
- Press the SAT FINDER [15] key to access the menu function.
- Use the ENCODER [3] to choose 3 transponders for satellite identification (the 3 transponders may be the same),
- Use the ENCODER [3] to highlight the START? command and press it to start searching.
- A rotating bar will indicate that the function is active. Start the dish alignment task until the buzzer is enabled by the meter. This tells you that the satellite has been identified.
- The display will change and will show the Noise Margin measurement with a graphic bar and a numeric value. See fig. 11.1.
- Proceed with the fine alignment until the bar length has been maximised. Go to Section 14.0 "MISURE: MEAS" .

Push buttons and displays

Press the 

key and use the encoder  to select the field to be changed and the transponder required for satellite identification,

Rotate and press the encoder  to change them.

Use the encoder  to highlight "START?" and press it to start the sat search.

Fig. 11.1 Sat Finder: when the satellite is found a buzzer sound will start.

12.0 DUAL LNB: DUAL FEED DISH ALIGNMENT

Brief description

This special function allows the alignment of a dual feed satellite dish by making simultaneous measurements for both LNBs (without moving the RF feed between LNBs and without changing frequency values). Furthermore it allows SKEW adjustment (polarization plan).

Measurement start up

- Press the SAT FINDER [15] key for 2 seconds.
- Choose the memory plans relevant to the satellites to which the dish is to be aligned.
- Connect a DiSEqC Switch model DiSEqC-SWI-2-01 (included accessory see appendix 2) to the RF meter input.
- Connect the DiSEqC switch to the LNBs coax cables (See drawing at the and of this section.
- Start dish alignment.

Push buttons and displays

Press the SAT FINDER key for 2 seconds to start the DUAL LNB feature.

Select the Memory Plans relevant to the satellites to which the dish is to be pointed. Rotate the encoder to highlight the Memory Plan and Transponder fields to be modified and press it to apply the required values.

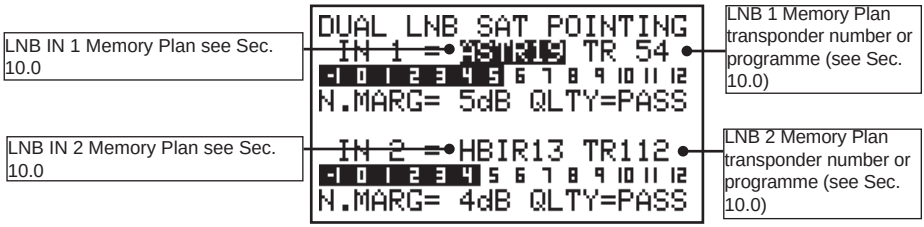


Fig. 12.1 Dual LNB.

NOTES

1) The graphic bars represent the Noise Margin measurements for both satellites.

2) As a reference and to help optimize dish alignment, both bars have a maximum Max Hold indication. This is a vertical line which represents the maximum Noise Margin value obtained for each LNB during the dish alignment process.

DiSEqC-SWI-2-0-1 to align a Dual LNB dish:

- Connect the "Out" side of the switch to the DSA-500 RF-INPUT.
- Connect the coax cables from the two LNBs to "IN1" and "IN2".
- Power on DSA-500 analyzer.
- Press the "DUAL LNB" key and follow the instructions provided witch this user's Manual relevant.

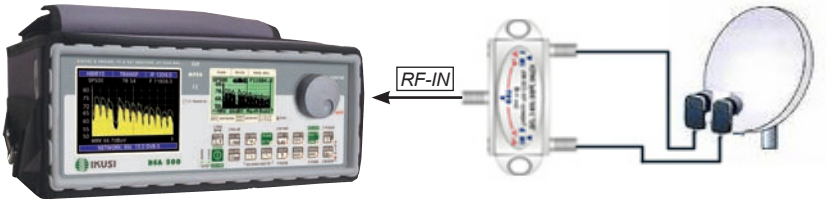


Fig. 12.2 DiSEqC-SWI-1-0-1 schematic connection drawing.

13.0 BUZZER SAT

Brief description

The Buzzer is a tone which varies proportionally to the signal's Noise Margin measurement. This is a dish alignment aid feature. Press the HELP [12] key for 2" to start this function. When the satellite transponder is locked (satellite is found) the meter will start the Buzzer and at the same time show the Noise Margin measurement, the quality analysis (PASS, MARGINAL, FAIL) and the Network data (NIT tables).

Measurement start up

- Select the Memory plan and the required transponder (see sec. 10.0).
- Press the HELP [12] key for 2 seconds.
- The meter will show the BUZZER FUNCTION menu.
- The Buzzer will be heard only when the selected transponder is locked.
- Press any key to disable this function.
- It is possible to modify the transponder frequency when the meter is in this mode.

Push buttons and displays

Press the HELP key for 2" to start the BUZZER FUNCTION.

The active memory plan transponder or program name is shown on the first line of the display. The transponder's relevant frequency value can be changed. If this is done, the transponder name will be replaced by three Horizontal lines. When the digital transponder is locked, the meter will start the Buzzer and display the measurements shown here below.

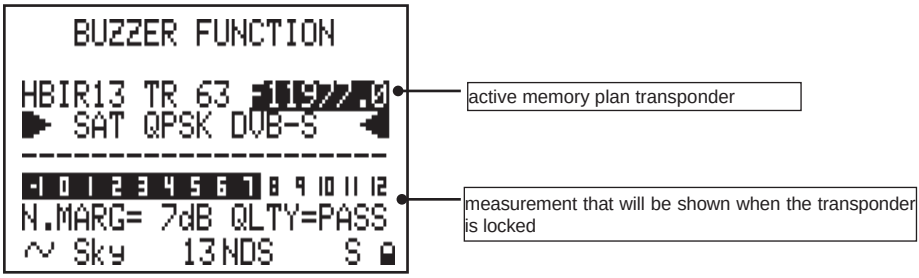


Fig. 13.1 Buzzer.

14.0 SATELLITE SIGNAL MEASUREMENTS: MEAS

Brief description

"MEAS" [7] starts the measurements on the tuned transponder. By repeatedly pressing the "MEAS" [7] key, the display will show in sequence (see next paragraph) all the measurements made on the selected transponder as a numerical value and with a graphic bar that varies its length proportionally to the represented measurement. This bar memorizes the peak measurement value.

Measurement start up

Tuning:
The upper part of the display shows the transponder tuning parameters. These parameters are those of the active transponder. To change them rotate and press the ENCODER [3]. The tuning parameters that may be changed are: Transponder number, frequency, Symbol Rate and Standard. See "Push buttons and displays" in this section for more information.

Measurements:
The lower part of the display shows measurements only if the transponder is locked. See section "Useful Suggestions" at the beginning of this User's Manual for more details.
By pressing repeatedly the "MEAS" [7] key the following measurements will be displayed (for analog signals only the level measurement is shown):

- **Measurement level 1:** displays the average power (PWR) for a digital signal or the level measurement in case of an analog signal (see par. 14.1),

- **Measurement level 2**: displays the Noise Margin (N. MARG.), the signal quality (QLTY), the MER and EVM measurements with a relevant graphic bar (see par. 14.2),

- **Measurement level 3**: displays the bBER (Pre BER) and aBER (Post BER) measurements with relevant graphic bars (see par. 14.3),

- **Measurement level 4**: data obtained from the NIT tables: FEC, Network name(NETW NAME),bouquet name (BOUQ. NAME) & DATE (see par. 14.4)

NOTES:

1) The status line and the transponder's main information is always shown on the lower part of the display. For digital transponders the display shows: the network name, orbital position, encryption system and a lock that is closed if the signal is locked. For analog transponders, a square is placed on top of the "AN" writing of the front panel.

continues: SATELLITE SIGNAL MEASUREMENTS: MEAS

Push buttons and displays

14.1 Power measurement (digital) or Level measurement (analog) (Level 1)

Press the ESCAPE MEAS 4 key and use the  to select the field in the display and press and rotate the encoder  to modify the displayed value.

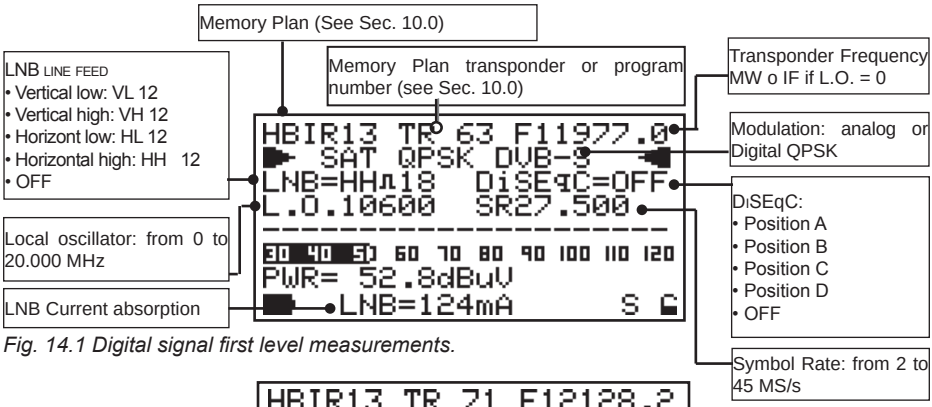


Fig. 14.1 Digital signal first level measurements.

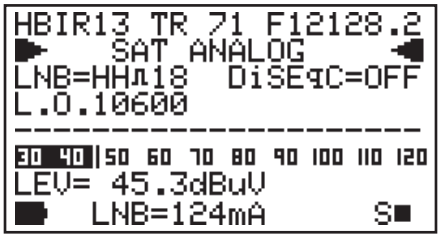


Fig. 14.2 Analog signal first level measurements.

NOTES:

1) If there is no signal or if the signal level is below the measurement dynamic range, the string **PWR_TOO_LOW** will be shown,
2) The meter always shows a graphic bar proportional to the signal level or power measurement,
3) The graphic bar memorizes the peak signal level or power value and this is represented by a vertical line on the display,
4) To display all the signal available measurements, the MEAS key has to be pressed repeatedly (see next paragraphs in this section for more details),
5) Regardless of the measurement level, when pressing the "Power On" key [14], the meter will always return to the First Level or Power measurement display (see fig. 14.1 or 14.2) depending on the type of transponder being measured (Digital or Analog).

continue: SATELLITE SIGNAL MEASUREMENTS: MEAS

14.2 Noise Margin, Quality, MER and SNR measurements (Level 2)

Press the ESCAPE MEAS key again to display the second measurement level:

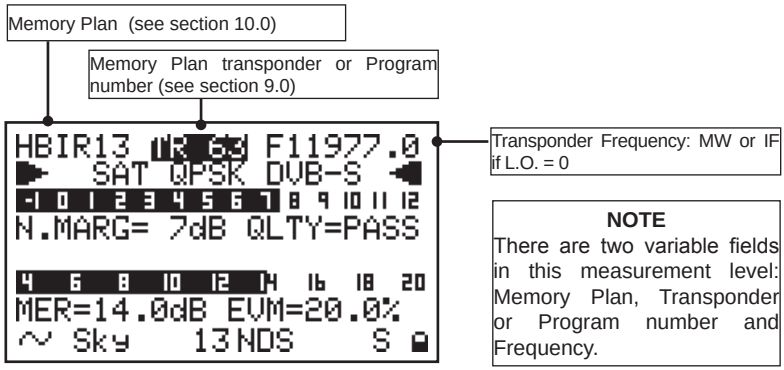


Fig. 14.3 The second measurement level provides the Noise Margin and the MER (modulation error) measurements with the relevant graphic bars. The instrument also displays the EVM measurement and quality analysis (PASS, MARGINAL, FAIL).

14.3 BER before and after error correction Viterbi (Level 3)

Press the ESCAPE MEAS key again to display the third measurement level:

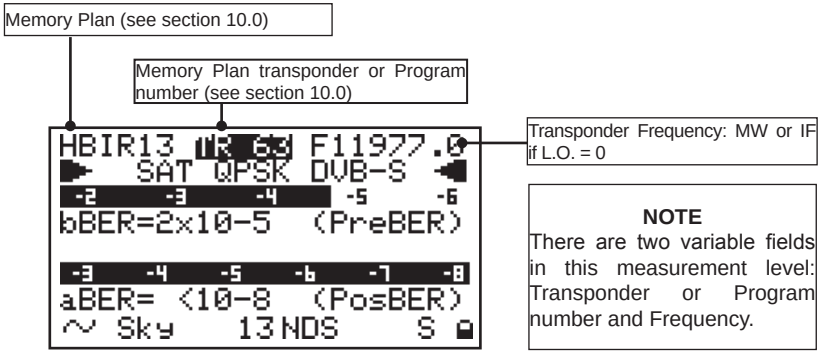


Fig. 14.4 The third measurement level provides the BER (Bit Error Rate) before and after error correction. The aBER (post Viterbi) shows a value of "<10^{-8}" for signals that may be considered as error free after the error correction process.

continues: SATELLITE SIGNAL MEASUREMENTS: MEAS

14.4 FEC, NETW. NAME and BOUQ. NAME (Level 4)

Press the MEAS key again to display the fourth measurement level:

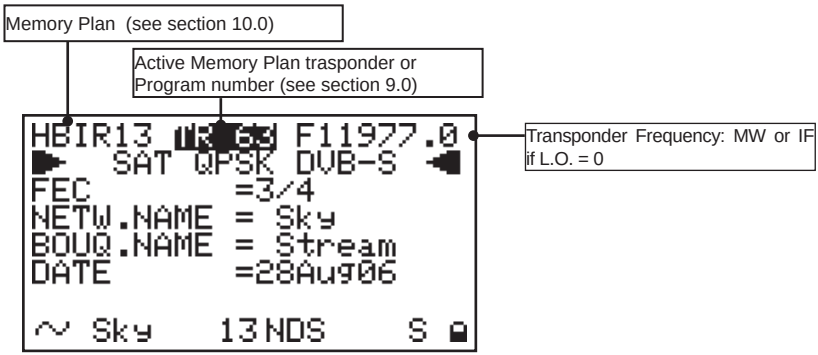


Fig. 14.5 This display shows the network name, the bouquet, the data and the FEC (forward error correction) value for the measured digital transponder.

NOTES:

1) If there is no signal or if the power measurement is below the meter's dynamic range or when the signal is not locked, the measurements will show only horizontal lines,

2) From the second to the fourth measurement levels the variable fields are only the Transponder or Program number and the signal frequency value,

3) When the signal frequency value is changed, the Transponder or Program number is replaced by three horizontal lines, this is because the correspondence between the memory location and the new frequency is lost,

4) From any measurement level, by pressing briefly the HOME [20] key, the meter will return to the first measurement level shown in fig. 14.1 or fig. 14.2,

5) On the bottom line of the display and starting from the measurement level 2, the NIT readings are displayed: network name, orbit position, encryption system, "S" letter to indicate that this is a satellite signal and a lock that will be closed when the digital signal is locked.

15.0 SAT SPECTRUM MEASUREMENTS: SPECT

Brief description

The SPECT [11] key gives access to the spectrum analysis measurements. When starting this measurement mode, the meter will automatically set the reference level in order to show all the detected carriers within the screen display for the selected SPAN value.

Measurement start up

- Select a Memory Plan (see section 10.0),
- Connect the LNB to the RF input [23],
- Press the "SPECT" [11] key,
- Use the ENCODER [3] to change the spectrum variable fields as shown in fig. 14.1: SPAN, transponder or program number, Frequency, Reference level. The chosen field will be highlighted with a dark background,
- Press and rotate the ENCODER [3] to modify the selected field,
- Press the "SPECT" [11] key again in order to enable the Max Hold feature. With this feature the meter memorizes the RF input signal maximum value, this will be shown as a contour that overlaps the real time spectrum curve.

NOTES:

1) If you vary the transponder or program number, the spectrum marker will move to the selected carrier center frequency,

2) If you vary the marker frequency, it will move gradually on the spectrum. The speed of this displacement will automatically increase by simply increasing the encoder rotation speed.

3) If you vary the displayed frequency, the transponder or program name will be replaced by horizontal lines. This is because the correspondence between the frequency value and the transponder or program name is lost,

4) If during the dish alignment process, the Spectrum displays a transponder pattern of an unknown Satellite, it is possible to tune these carriers by simply pressing the HELP [12] key (see section 16.0).

continues: SPECTRUM MEASUREMENTS: SPECT

15.1 Measured Signal Spectrum analysis

Press the SPECT 2 key and use the encoder to select the field to be modified press and rotate the encoder to modify the selected value.

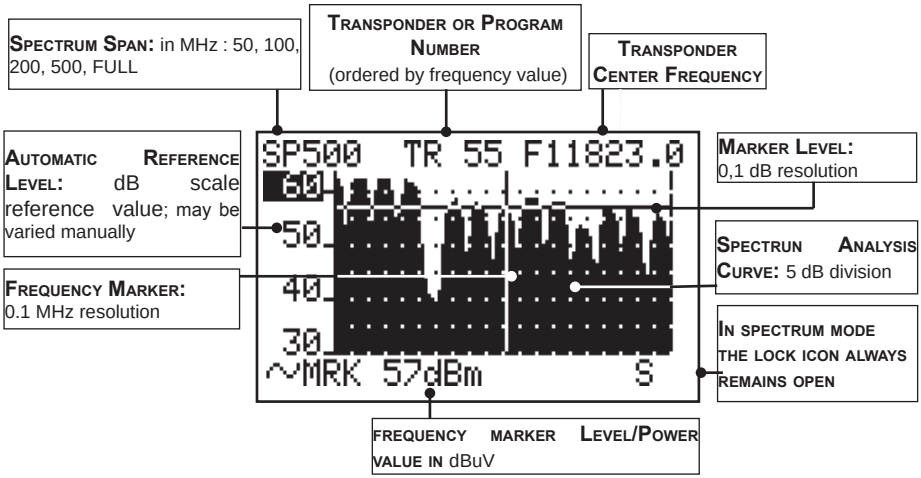


Fig. 15.1 ASTRA transponder spectrum with a 500 MHz SPAN.

15.2 Measured Signal Spectrum analysis with Max Hold

Press the SPECT 2 key again to enable the signal max hold feature.

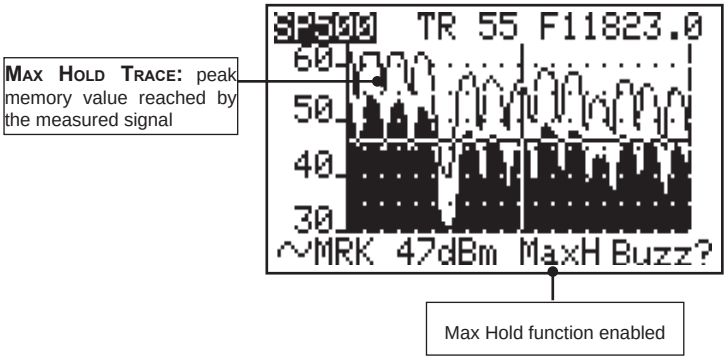


Fig. 15.2 ASTRA transponder spectrum with the Max Hold Function enabled

16.0 HELP: AUTOMATIC TUNING FUNCTION

Brief description

The "HELP" [12] key will start an automatic search for all the tuning parameters of a selected transponder. This function is particularly useful if you need to recognize a transponder found in "SPECTRUM" or "MEAS" mode, which has not been pre-memorized in any Memory Plan and of which we only know its frequency.

Measurement start up

a) **From spectrum measurement mode:**
Press the "SPECT" [11] key and place the frequency marker on the centre of the digital carrier shown on the display (see section 15.0)

b) **From "MEAS" measurement mode:**
Press the "MEAS" [7] key to set the transponder center frequency, Local oscillator, the polarization and band of the transponder you want to tune (see section 14.0).

Press the "HELP" [12] key to start the auto-tuning function

Push buttons and displays

When help is need to lock a digital signal press the HELP key,

the meter will start an automatic search of all the missing tuning parameters.

(signal standard: DSS or DVB and Symbol Rate).

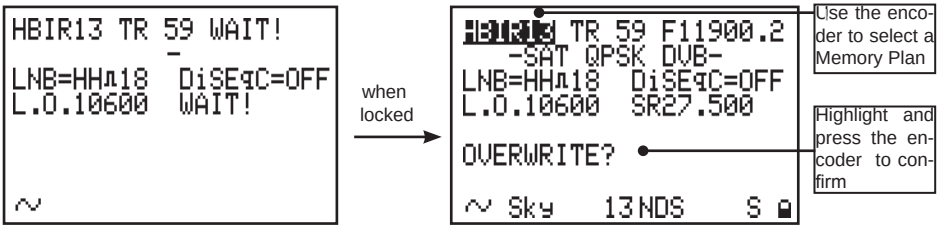


Fig. 16.1 Automatic search of a transponder tuning parameters

NOTES:

1) When the transponder is locked, the meter will display a memorization menu to store the transponder in the first available memory location of the active memory plan (fig, 16.1),
2) In this menu it is possible to choose a different memory plan,
3) If the memory location is already used, the meter will display "OVERWRITE?" otherwise it will show "SAVE?".

17.0 SCR LNB

Brief description

The meter implements the SCR communication protol to drive an LNB that supports this standard. This feature can be used to check satellite single cable distributions.

Measurement start up

- Select a Satellite memory plan (see section 10.0)
- Press the S.C.R. LNB [17] key,
- Use the encoder [3] to set the "USER" sat SCR (uggested) or the sat SCR frequency,
- Start testing by moving the cursor to "Sat SCR CABLE TEST", and pressing the encoder [3] to confirm.

Push buttons and displays

Select the satellite memory plan by pressing the PLAN SAT·TV 1 key.

Press S.C.R. LNB 1..8 key to start this feature. Use the encoder to highlight the fields to be modified. Press and rotate the encoder to change them.

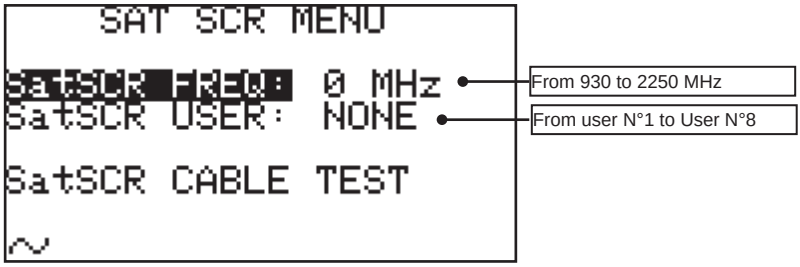


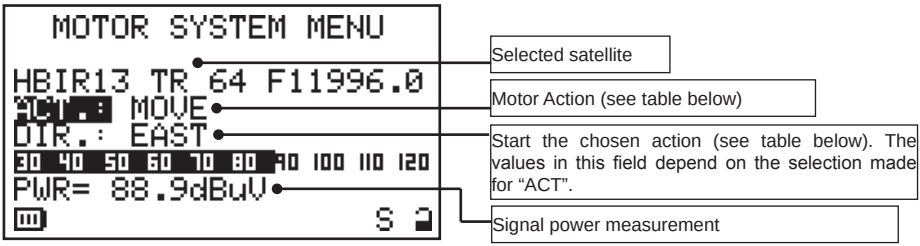
Fig. 17.1 SCR setting example

18.0 DISEQC MOTOR

"DiSEqC MOTOR" (menu to hand a motorized dish):

Press the 

key to start the "DiSEqC Motor" feature.



The first display line shows the satellite to which we want to aim the motorized dish (i.e. Hot Bird 13° E). The satellite can be selected using the "PLAN" [17] key (see section 10.0).
The motor action is called "ACT", depending on the chosen action (by means of the encoder [3]) sub fields will be displayed (see table below) that will complete the setting of the required action. Once the above described action has been properly configured, to perform it, move to the following display line and change its status with the encoder [3], refer to the "ACT enable" in the table below.

DiSEqC MOTOR TABLE

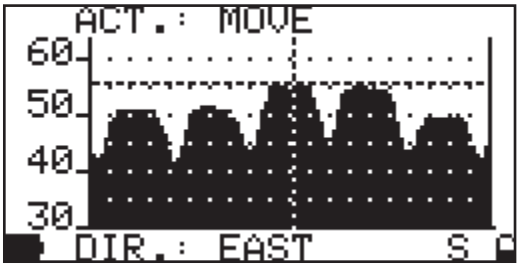
ACT	ACT sub fields	Description	ACT enabling
MOVE	none	Will move the motor EAST or WEST	DIR: • EAST • WEST
GOTO	from POS 1 to POS 99	selects one of the 99 motor pre-memorized positions	APPLY? (move to the selected position)
STORE	from POS 1 to POS 99	memorizes the current motor position in one of the 99 possible memory locations.	STORE? (stores the current motor position)
RESET	none	removes any eventual rotational preset EAST or WEST motor movements limits.	APPLY? (reset the motor rotation limits)

During dish movement, the only displayed measurement is for digital power. When the satellite is found (transponder is locked), the meter will show the Noise Margin, the quality analysis (PASS, MARGINAL, FAIL) and the network data.

Press the 

key again to replace the measurements display with the moving dish input signal spectrum vision.

The notes in the "DiSEqC Motor Table" also apply in this mode.



NOTES:

1) To quit the "DiSEqC Motor" feature, press any key on the front panel of the meter

TV AND SAT FEATURES

19.0 DC ON/OFF: LINE FEED COMMAND

Brief description

The DC ON/OFF feature allows you to remove or add the LNB line feed.

Measurement Start up

18.1 Remove LNB line feed

- Check that the DC at RF IN [5] LED is on (power feed at the RF input "F" connector),
- Press the "BAR SCAN" [6] key for two seconds,
- Checkthat the DC at RF IN [5] LED is off (no power at the RF input "F" connector).

18.2 Turn on the LNB line feed

- Check that the DC at RF IN [5] LED is off (no power at the RF input "F" connector),
- Press the BAR SCAN [6] key for two seconds,
- Check that the DC at RF IN [5] LED is on (power feed at the RF input "F" connector).

Push buttons and display

Press the 

key for two seconds and check that the yellow DC at RF IN [9] LED status changes :

- LED ON: line feed is active.
- LED OFF: no line feed.

20.0 MPEG PROG SERVICE

Brief description

Every transponder carries a given number of TV and Radio programs. This function displays the full program list of the broadcasted program. As well as the services names, the audio and video PID values and the encryption status (Y/N) are also provided. Rotate the ENCODER [3] to select up to 64 programs. Radio programs are only displayed as an AUDIO PID non-encrypted selected TV program.

Measurement Start up

- Tune COFDM Mux or a digital satellite transponder (see section 4.0 - 14.0).
- Press the MPEG [4] key,
- After some seconds a full list of transmitted services contained in the specific digital signal will be displayed,
- Rotate the ENCODER [3] to go through the full list,
- The pictures of the selected program are shown on the color TFT (if not encrypted) and also the audio can be heard.

Push buttons and display

Lock a digital signal (see section 4.0, 5.0, 14.0 or 15.0) and press the

key to get the full program list and relevant audio and video PIDs as shown in the figure below.

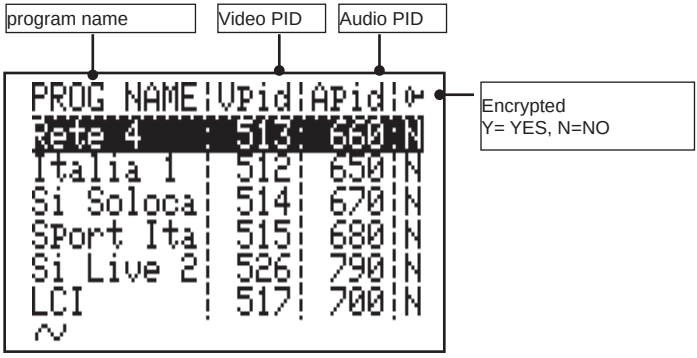


Fig. 20.1 MPEG Program Services

NOTES:

1) If the value in the key icon field shows on "N", the TFT display will show the relative TV picture.

2) If the key icon field shows a "Y", the TFT display will show the "ENCRYPTED" message.

21.0 ZOOM FUNCTION

Brief description

This feature will replicate, on the TFT color display, the measurements or spectrum shown on the green graphic display.

Measurement Start up

- Press the ZOOM [9] key when the meter is in measurement or spectrum mode. On the TFT monitor the measurement or spectrum on the graphic green display will be shown.
- If in measurement mode, press repeatedly the ZOOM [9] key to vary the TFT displayed measurement.

Push buttons and display

Press the ZOOM TFT 3 key to display in the TFT monitor the measurement (eg. Fig. 21.1) or spectrum (eg. Fig. 21.2).

If the meter is in measurement mode press repeatelly the ZOOM TFT 3 key to change the zoom measurement.

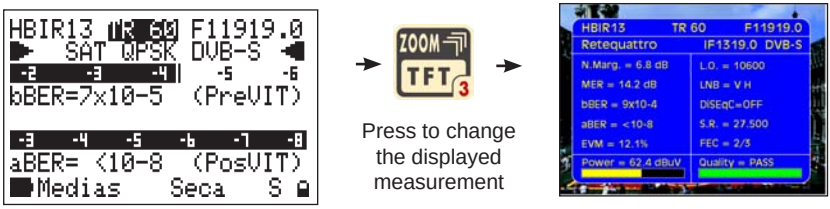


Fig. 21.1 Example of the simultaneous display of the noise margin on both the graphic display and TFT monitor

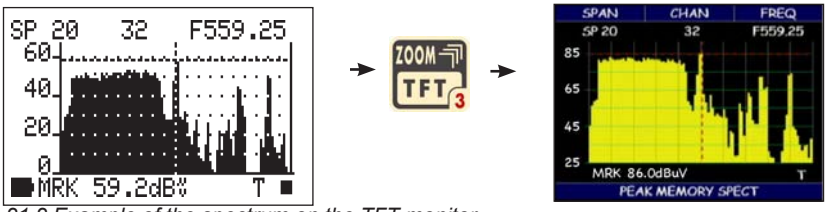


Fig. 21.2 Example of the spectrum on the TFT monitor

NOTES:

1) The zoomed spectrum on the TFT monitor is not in real time, it represents the peak values spectrum

22.0 TFT ON/OFF

Brief description

The TFT ON/OFF feature turns the TFT monitor on and off.

Measurement Start up

• If the TFT is OFF press the MPEG [4] key for two seconds to turn it on

Push buttons and display

Press 

for two seconds to turn on or off the TFT color monitor.

23.0 TFT AND VOLUME SETTING

Brief description

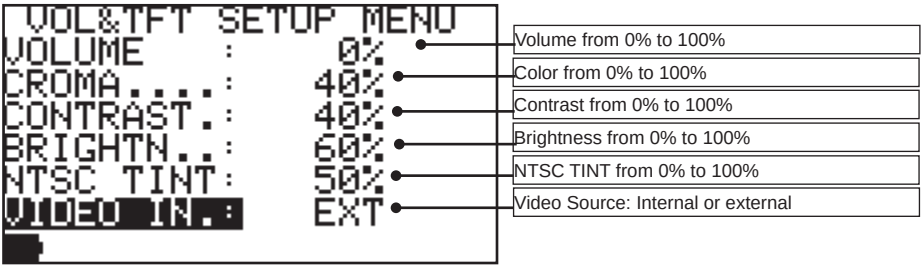
This function allows volume and TFT setting.

Measurement Start up

- Press the VOLUME [19] key,
- Rotate the ENCODER [3] to choose the setting to be changed,
- Press and rotate the ENCODER [3] to select the required value.

Push buttons and display

Press the VOLUME / VIDEO IN key and rotate the encoder to select the setting to be changed, press and rotate the encoder to modify this value.



23.1 Volume and TFT adjustments menu

24.0 MEMORY: MEMORIZATION FUNCTION

Brief description

The Memory function allows you to modify an existing Memory Plan or to generate a new one. Only the "MANU" memory plans may be handled by this function.

Measurement start up

24.1 How to create a new memory plan:

- Press the MEMORY [8] key,
- Use the ENCODER [3] to choose a new memory plan (see Fig. 24.1), the PLAN name is automatically assigned by the meter and will be the word "MANU" followed by the first available number (i.e. MANU1),
- Use the ENCODER [4] to modify the tuning fields for the channel to be memorized (See Fig. 24.1 and Notes),
- Rotate the ENCODER [4] to highlight the Save? option and press it to memorize.

24.2 How to modify an existing memory plan:

- Press the Memory [8] key,
- Use the ENCODER [3] to an existing memory plan (See Fig. 24.1),
- Use the ENCODER [3] to highlight the tuning field that needs to be modified (See notes),
- Rotate to ENCODER [3] to highlight the OVERWRITE? option and press it to memorize.

24.3 How to add a program to an existing memory plan:

- Press the MEMORY [8] key,
- Follow the procedure described in point 24.2 with the only difference that you must select a new program number (see Fig. 24.1),
- The status line on the bottom part of the display will show the string SAVE?, use the ENCODER [3] to highlight this string and press it to save the new program in the memory plan.

continuation: MEMORY: MEMORIZATION FUNCTION

Push buttons and displays

Press the MANUAL MEMORY 9 key to start a memory task

Use the encoder to highlight the memory fields that need to be changed and set the new values applying one of the three procedures described in the "MEASUREMENT START UP" section.

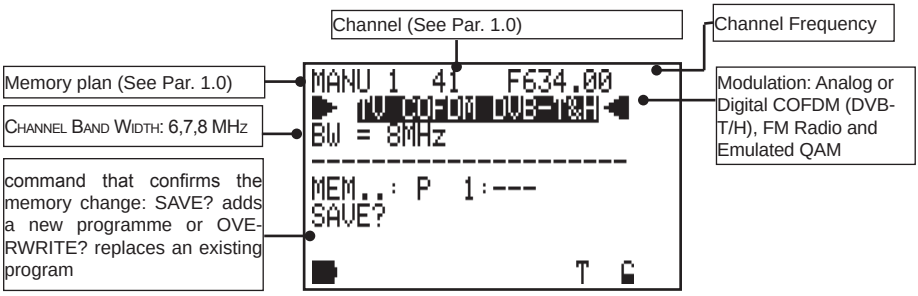


Fig. 24.1 MEMORY : creating or modifying a Memory Plan ***Digital TV****.*

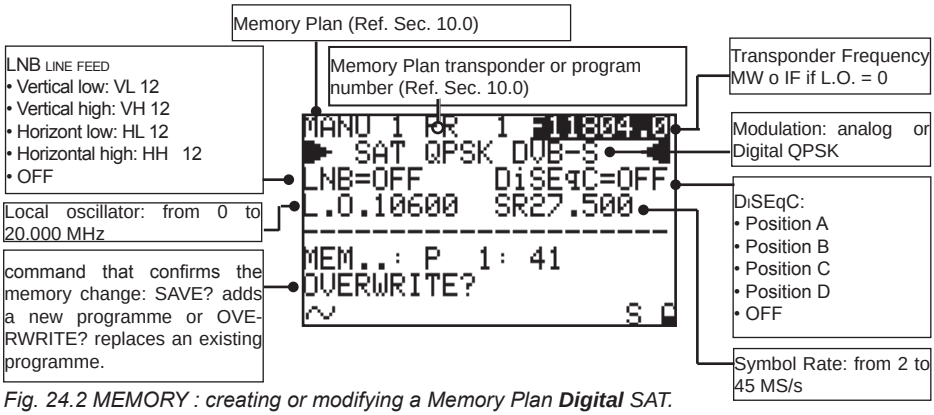


Fig. 24.2 MEMORY : creating or modifying a Memory Plan ***Digital*** *SAT.*

NOTES:

1) If a manual tuning is performed in any MEAS menu (see par. 4.0, 5.0 and 14.0) all these values are carried on to the Memory menu.
2) If a manual tuning is made in spectrum mode (see Section 6.0, 15.0) all these new values are carried on to the Memory menu.
3) The "MANU" files may be renamed using the optional "SMART" program.

25.0 STORE: FAST MEMORY KEY

Brief description

The STORE or fast memorization key allows you to add a signal in a new program location of the active Memory Plan.

Measurement Start up

- Tune analog or digital channels/transponders (See sections 4.0, 5.0, 14.0, 15.0),
- Press the MEMORY [8] key for two seconds,
- The channel/transponder is automatically stored in a new memory location of the active Memory Plan.

Push buttons and display

Press the MEMORY [8] key for 2 seconds to start the fast memorization function. The meter updates the memory program number to the first available location in the active Memory Plan and stores it.
Once this task is completed the meter shows the Memory Menu so that to you allow further changes to the newly memorized program.

From any mode the meter is: Measurement or Spectrum, if the new tuning parameters need to be stored, press the 

key for two seconds.

26.0 SAVE DATA LOGGER

Brief description

The Data Logger function will perform automatic measurements on all channels/Transponders in a given Memory Plan. These measurements can be made at the antenna or at any installation outlet (see also the RECALL function, see par 27.0).

Measurement Start up

- Press the SAVE [16] key,
- Use the ENCODER [3] to select:
  a) the Memory Plan to be used for automatic measurements,
  b) the LOGGER file, where the measurements will be stored (from 1 to 99),
- Start the Logger function, highlighting with the ENCODER the command SAVE? and pressing the ENCODER [3] to confirm.
- A status bar indicates that the task is in progress. When the measurements are completed the display shows the message "DONE!".

NOTES:

1) All the automatic measurements are carried out on the selected Memory Plan,
2) The maximum number of logger files is 99,
3) The logger files can be exported to EXCEL® spread sheets using the optional SMART program,
4) The meter shows the OVERWRITE command if the chosen logger file already exists.

Push buttons and display

Press the SAVE key to start the save procedure.

Use the encoder to highlight the fields to be changed and set the required values by rotating and pressing the encoder

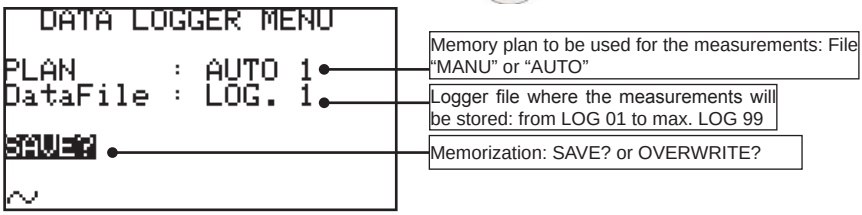


Fig. 26.1 Data Logger display

27.0 RECALL: SMATV TEST

Brief description

The RECALL feature provides a summary of the measurement results obtained running the SAVE feature (see par. 26.0). For every program in the recalled "LOG" file, the meter will show, not only the level/power, but also a test quality indication (PASS, MARGINAL, FAIL) relevant to the signal under test. This feature allows a quick and automatic check to be carried out on SAT/TER signals in a SMATV distribution.

Measurement Start up

- Press the RECALL [14] key,
- Use the ENCODER [3] to select the logger file to be displayed:
- Rotate the ENCODER [3] to highlight the "RECALL?" field on the name and press it to display the logger file content.

Push buttons and display

Press the RECALL key to display a logger file previously saved (see section 26.0), see fig. 27.1. Rotate and press the encoder to select and enable the "RECALL?" feature

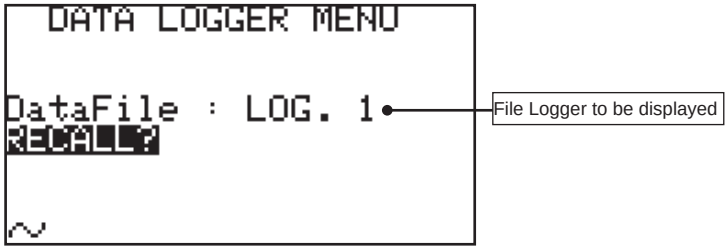


Fig. 27.1 Recall feature

RECALL provides a measurement summary table of a Logger file by a SAVE (see Par. 26.0).
The display (see fig. 27.2) shows the channel or program name, signal modulation: Analog TV, DVB-T, DVB-H, Analog SAT or QPSK, Level or Power value and the signal quality analysis.

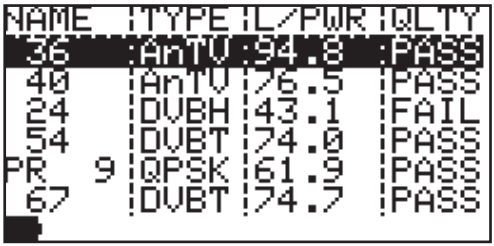


Fig. 27.2 Summary of Logger file display optained with a "SAVE" action (see Par. 25.0) and memorized in a "LOG" file.

NOTES:

1) To obtain all the measurements contained on a "LOG." file use the "SMART" Pc interface program (see Appendix A3)

APPENDIXES

APPENDIX

A1 - MAIN TECHNICAL SPECIFICATIONS

ANALOG TV

- Frequency band: 47–870 MHz
- Direct selection of: custom memory plan, program, channel, frequency, dc at RF IN, with front panel keyboard
- Memorization of: plan, program, channel, frequency, audio carrier, standard, freq. offset
- Frequency resolution: 62.5 KHz
- Input impedance: 75 ohm
- Interchangeable input connector: "F" ("IEC" or "BNC" or "N" optional)
- Power supply at RF IN: OFF, + 5 V (0.2 A)
- Analog measurement dynamic range at RF input: from 25 to 116 dBuV, from –35 to + 56 dBmV (selectable), with limit indication: level too low, level too high
- Measurement resolution: 0.1 dB
- Level measurement accuracy: 1.5 dB typ. (2 max) with SW correction (after 5 minutes warm–up)
- Measurement filter bandwidth: 130 KHz at –3 dB
- Measurement stability versus temperature between –10 and 50°C: 0.03 dB/°C
- Multi–standard: M–N–B–G–I–D–K PAL–NTSC–SECAM.

FM RADIO

- Frequency band: tunable from 47 to 870 MHz (default 88–108)
- Memorization of: memory plan, program, channel, frequency
- Frequency resolution: 62.5 KHz
- Audio demodulation: FM
- Demodulation filter bandwidth: 100 KHz @ –3 dB. Audio heard with built–in loudspeaker: 0.5 W adjustable volume
- For all other specifications see ANALOG TV

COFDM Demodulated

(Digital or analog fully automatic selection also in channel navigation)

- COFDM frequency band: 47–870 MHz
- Direct selection of: memory plan, program, channel, frequency, dc at RF IN, with front panel keyboard
- Memorization of: memory plan, program, channel, frequency, channel bandwidth, offset–frequency
- Frequency resolution: 62.5 KHz
- Offset frequency 166 KHz: automatic
- Input impedance: 75 ohm
- Interchangeable input connector: "F" ("IEC" or "BNC" or "N" optional)
- Power supply at RF IN: OFF, +5 V (0.2 A)
- Power measurement dynamic range at the RF input: from 30 to 120 dBuV, from –25 to + 60 dBmV (selectable) with limit indications: level too Low, level too high
- Power measurement resolution: 0.1 dB
- Power measurement accuracy: 1.5 dB typ. (2 dB max.) with software correction (after 5 minutes' warm-up)
- MER & SNR measurement accuracy: 1 dB typ. (1.5 dB max), with > 45 dBuV power
- Measurement filter BW: 130 KHz at –3 dB
- Measurement stability versus temperature between –10 and 50°C: 0.03 dB/°C
- Noise Margin Measurement accuracy: 0.5 dB

  BER measurement before and after Viterbi:
  - bBER up to 2 x 10–5 (Pre BER)
  - aBER up to 2 x 10–8 (Post BER)

- Automatic recognition & visualization of: HP/LP rate, guard interval, constellation
  - Rate: 1/2, 2/3, 3/4, 5/6, 7/8
  - Guard interval: 1/4, 1/8, 1/16, 1/32
  - Constellation: QPSK, 16 QAM, 64 QAM
- Automatic Digital signal quality TEST on channel: PASS–MARG–FAIL
- Spectrum inversion: automatic

TV SPECTRUM ANALYSIS

- Frequency band: 47–870 MHz
- Span in TV band: 2–5–7–10–20–50–100– 200–500–FULL
- dB/div: 10
- Dynamic range on the display: 60 dB
- MRK Measurement resolution: 0.1 dB
- Measurement filter bandwidth: TV 130 KHz at –3 dB
- Reference level: from 0 to 120 dBµV, from –50 dBmV to +70 dBmV
- Reference level setting: automatic, and manual adjustable
- Frequency/level marker position:
  - For digital signals in channel centre
  - For analog signals on video carrier
- Other spectrum selections:
  - MAX HOLD

ANALOG SAT

- **Frequency Band:** 930–2250 MHz
- **Direct selection of**: memory plan, program, frequency, LNB, DiSEqC, with front panel key board
- **Memorizaton of:** plan, program, transponder, frequency, LNB, DiSEqC, local oscillator frequency
- **Frequency resolution:** 0,1 MHz
- **Input impedance:** 75 ohm
- **Interchangeable input connector:** "F" ("IEC" or "BNC" or "N" optional)
- **Power Supply at RF input:** OFF, +13, +18 V, 22 kHz (0,3 A) (with ON/OFF key)
- **DiSEqC 1,1:** 4, 8, 12 or 16 polarizations, DiSEqC "a.b.c.d" already pre-programmed in sequence and very easy to use. IT can power any type of LNB (analog or DiSEqC, single or dual feed) and any type of multiswitch (analog or DiSEqC con 4, 8, 12, 16 inputs and SCR LNB)
- **Analog level measurement dynamic range at the RF input:** from 35 to 120 dBuV, from –25 to +60 dBmV (selectable) with limit indications: level Too Low, level Too High
- **Measurement resolution:** 0,1 dB
- **Level measurement accuracy:** 1.5 dB typ. (2.5 dB max.) with software correction (after 5 minutes warm-up)
- **Measurement filter bandwidth in SAT mode:** 4 MHz at –3 dB
- **Measurement stability versus temperature between –10 and 50°C:** 0,1 dB/°C
- **LNB L.O. frequency selection:** continuous from 0 to 20.000 MHz, for "L" bands (direct IF–SAT reading), "S", "C", "KU", "KA".

QPSK (Demodulated)

- **Frequency band:** 930–2250 MHz
- **Direct selection of:** memory plan, program, frequency, LNB, DiSEqC, with front panel keyboard
- **Memorization of:** plan, program, transponder, frequency, LNB, DiSEqC, local oscillator frequency, standard, symbol rate
- **Frequency resolution:** 0,1 MHz
- **Input impedance:** 75 ohm
- **Interchangeable input connector:** "F" ("IEC" or "BNC" or "N" optional)
- **Power Supply at RF input:** OFF, +13, +18 V, 22 kHz (0,3 A) (with ON/OFF key)
- **DiSEqC 1,1:** 4, 8, 12 or 16 polarizations, DiSEqC "a.b.c.d" already pre-programmed in seuqence and very easy to use. It can power any type of LNB (analog or DiSEqC, single or dual feed) and any type of multiswitch (analog or DiSEqC with 4, 8, 12, 16 inputs and SCR LNB)
- **Digital power measurement dynamic range at RF input:** from 35 to 120 typ. dBuV, from –30 to + 60 dBmV (seelctable) with limit indications: level Too Low, level Too High
- **Power Measurement Resolution:** 0,1 dB
- **Power Measurement accuracy:** 1,5 dB typ. (2.5 dB max.) with software correction (after 5 minutes warm up)
- **Noise Margin Measurement accuracy:** 0,5 dB typ. (1 dB max) with software correction
- **Measurement filter bandwidth in SAT mode:** 4 MHz at –3 dB
- **Measurement stability versus temperature between –10 and 50°C:** 0,1 dB/°C
- **QPSK Symbol Rate setting:** 2–45 MS/s, in 1 kS/s steps
- **BER measurement before and after Viterbi:**
  - bBER up to 2x10–5
  - aBER up to 2x10–8
- **FEC, automatic recognition and visualizaton of value:** FEC 1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8, 8/9
- **Automatic quality test:** FAIL, MARGINAL, PASS
- **Noise Margin Measurements:** from –1 to 12 dB with special algorithm which automatically takes

continue: A1 - MAIN TECHNICAL SPECIFICATION

into account the FEC value
- **LNB L.O. frequency selection:** continuous from 0 to 20.000 MHz, for "L" bands (direct IF–SAT reading), "S", "C", "KU", "KA".
- **QPSK standard selection:** DVB/DSS

NET. ID. and MPEG Service/Program list

• Provides the name of the programmes (Services) the bouquet and transponder names the encryption system, orbitall position and date.

SAT SPECTRUM ANALYSIS

- **Frequency band:** 930–2250 MHz
- **Span:** 50–100–200–500–FULL
- **dB/div:** 5
- **Display dynamic range:** >30 dB
- **Marker measurement resolution:** 0.1 dB
- **Measurement filter bandwidth:** 4 MHz at –3 dB
- **Reference level:** from 0 to 120 dBµV, from –60 dBmV to +60 dBmV
- **Reference level settings:** automatic and manual adjustable
- **Other selectable spectrum modes:**
  - MAX HOLD (peak hold)
  - SAT POINTING: automatic optimum setting for satellite dish alignment

OTHERS

- **Buzzer:** Level or Quality according to measurement mode (with on/off Key)
- **Power Supply:**
  - Built in rechargeable batteries: 7,2 V x 2,5 Ah (Ni–MH)
  - Volage load: 12 Vca or 12 Vcc (1 A), (connector: Ø 5,5 x 2,2)
  - AC/AC adapter : 230 Vac, output: 12 Vac (supplied)
- **Battery duration at 25°C:** 4 hours depending on LNB consumption (9 hours optional)
- **Low Battery indicator:** with acoustic signalling and visual indication on graphic display and automatic meter power down by microcontroller
- **Indication of battery status charge:** always shown on display
- **Battery recharge time:** 1 hour for approx 50% capacity, 3/6 hours for full charge
- **Instrument size:** H 80 x L 225 x DD 215 mm
- **Instrument weight:** 1.3 kg with batteries, bag and accessories
- **Casing structure:** ABS plastic housing rain-dust and shock proof
- **USB interface:** for PC interfacing; possibility of SW up-grades downloaded from internet, (memory plan configuration, printouts etc optional)
- **B/W graphic display:** 64 x 128 pixel
- **Auto-Off timer:** after 5 or 10 min without use (selectable on/off, always re-starts from last function)
- **RF input overload protection:** electronic, up to 60 Vac

IMPORTANT:

Please kindly note that if there are pixels turned off on the 4.5" TFT Monitor, fitted in IKUSI instruments, the tollerance indicated by the manufacturer is 1 pixel in the centre area and 2 pixels around the parameter.

A2 - ACCESSORIES

INCLUSIVE ACCESSORIES

• TRASF-CP97A0180: Adapter input 100-240 Vac, output 18 V, 1,6 A

• CNN-F-0150: interchangeable F - F double female input connector

• BAG - DSA500: soft carying bag for DSA500

• CAVO-USB-AM-BM: USB cable to connect DSA-500 to PC for software up-grades via Internet. Length 180 cm

• CA-12: Vehicle cigarette lighter adapter (Input 12 Vdc, output 12 Vdc)

• TRA-FFEM-CEIFEM: Interchangeable "F" female/ "IEC" female input connector

• TRA-BNCF-FFEM: Interchangeable "F" female/ "BNC" female input connector

• DiSEqC-SWI-2-01: Two way DiSEqC switch for dual LNB dish pointing provided with fast "F" adapter

OPTIONAL ACCESSORIES

• 1BAT-PACK-DSTEX: Extra power Ni - MH 4,5 A battery pack

• TRA-FFEM-NFEM: Interchangeable "F" female/ "N" female input connector

• RIGHTS-SMART-1: Authorisation code for SMART PRO PC management SW

A3 - TROUBLE SHOOTING

For all faults always call the manufacturer or the service center in your country. Never return the analyzer to the manufacturer before approval and obtaining his specific instructions.
Please find below the most common problems that could occur and which can easily be solved:

PROBLEMS AND SOLUTIONS:

P: The analyzer does not work or works incorrectly, even if it is connected to the mains:
S: Check that the green "MAINS" LED is on. If it is off, check the supplied AC/AC adapter.

P: The batteries can not be charged:
S: Check that, when the meter is off, the "MAINS" LED is on. Check the internal battery status.

P: The meter does not respond to any command:
S: In the rare cases that the analyzer does not respond to the front panel commands, keep the HOME [23] key pressed for about 10 seconds. This will reset the meter without any memory loss (i.e. Memory Plans, Data Loggers etc).

NOTES:

- To identify and report any faults photocopy and fill in the attached "FAULT IDENTIFICATION FORM". See Appendix A10.

- As the meter is very complex, we strongly suggest that repairs should be carried out only by expert staff, authorized by IKUSI.

- The analyzer is built almost completely using SMD components and therefore it is not easy to repair: for this reason IKUSI does not provide any circuit diagrams.

- If IKUSI decides that the meter should be returned for repair, photocopy and fill in the "EQUIPMENT REPAIR and/or Service form" and attach it to the meter when returning it. Appendix A9.

A4 - BATTERIES MAINTENANCE AND RECHARGE

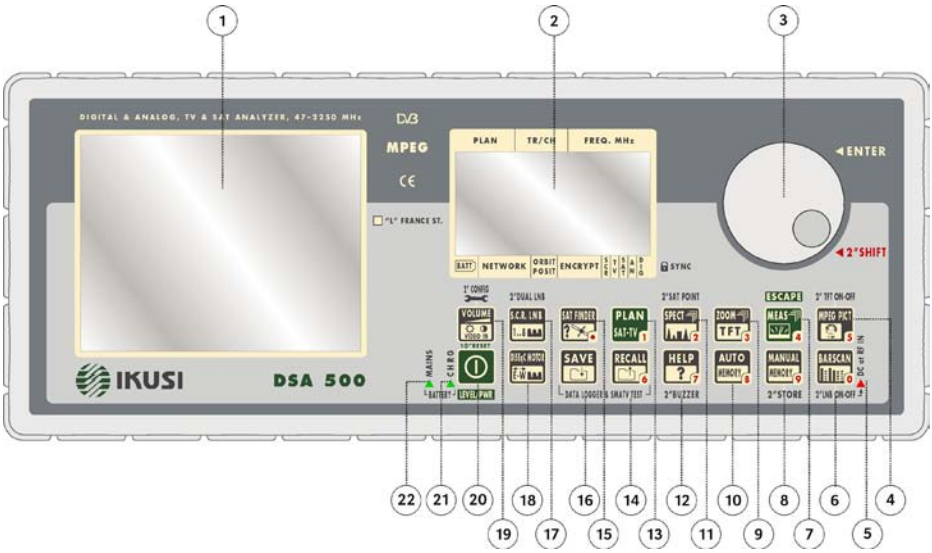
a) In normal operational conditions the battery duration is 4 hours. This time depends on the LNB current absorption.

b) The meter provides a visual indication on the battery charge status. In almost dry battery conditions, this indication remains on the display. This indication is shown with an icon on the bottom left side of the display.

c) The ac/ac adapter power socket [27] is located on the left side of the meter. The meter also works when it is being charged.
Always recharge the batteries using the supplied AC/AC adapter. The use of a different AC/AC adapter may cause permanent battery damage.

d) In order to preserve the battery change, it is possible a to activate a shut down timer to automatically turn off the meter when it is not used for more than 5 or 10 minutes. For more details on this configuration possibility see the "Menu Configuration" of this User's Manual.

A5 - FRONT PANEL DESCRIPTION



1 • 4" colour TFT

2 • GRAPHIC Display

3 • ENCODER

4 • MPEG PICT (If pressed for 2", the colour monitor is switched on or off)

5 • LED Dc at RF in

6 • Bar Scar (If pressed for 2", it will enable or remove the power feed.)

7 •"MEAS"

8 • MEMORY (If pressed for 2", it memorizes the channel directly to the first free program of the active plan.)

9 • ZOOM

10 • AUTOMEMORY

11 • "SPECT" (Spectro) (If pressed twice, the spectrum Max Hold will be activated.)

12 • HELP (If pressed for 2", it activates the BUZZER)

13 • PLAN

14 • RECALL

15 • SAT FINDER

16 • SAVE (

17 • SCR (If pressed for 2", it activates the DUAL LNB)

18 • DiSEqC Motor.

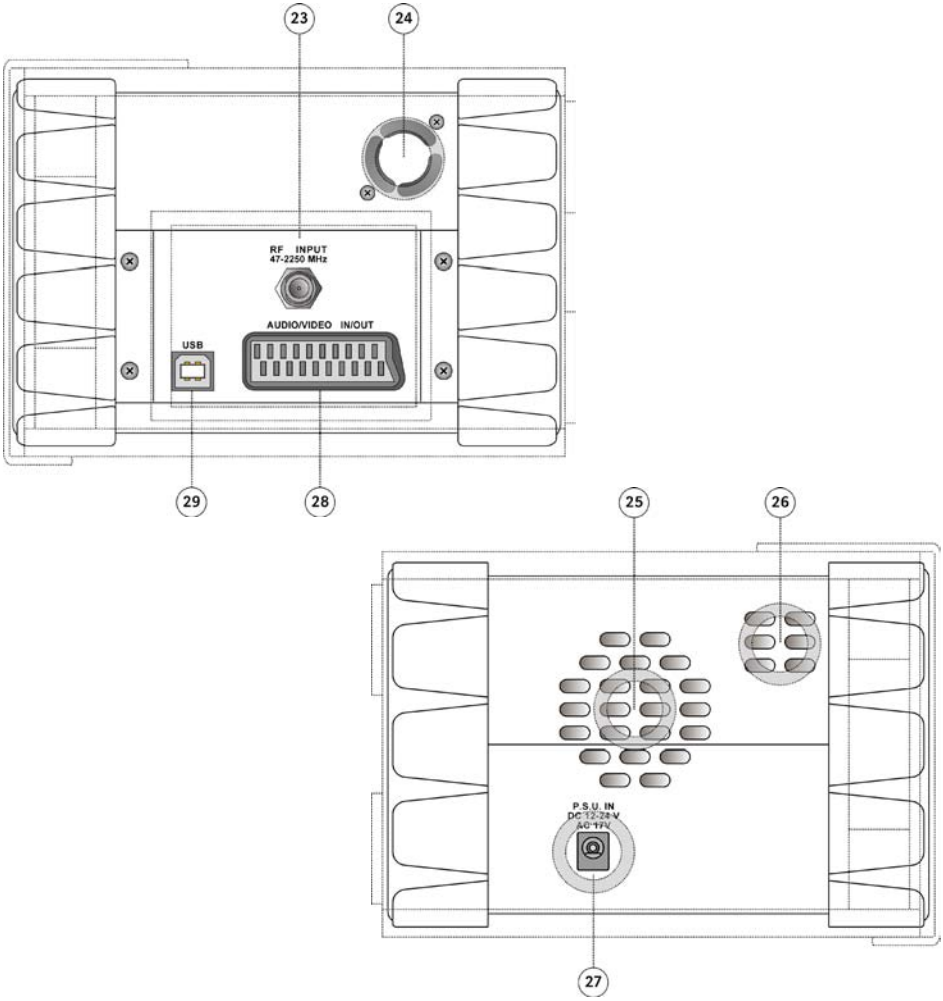
19 • VOLUME (If pressed for 2", you enter the unit configuration menu)

20 • HOME

21 • LED to show the unit is recharging

22 • Mains voltage presence LED

A6 - SIDE PANEL DESCRIPTION



23 RF Input "F" connector

24 Fan

25 Loudspeaker

26 Extractable foot rest

27 Power supply ~ AC 12V - 17V DC 12V - 24V

28 Serial USB PC port

29 Video input

A7 - MAINTENANCE OF YOUR ANALYZER

CLEANING

Cleaning the unit is easy, provided that you follow the following warning. Do not use chemical solvents or rough or abrasive cloths. Instead, use a soft cloth, dampened with water mixed with alcohol or degreasing non-abrasive cleanser.

UNIT MAINTENANCE AND CARE :

Avoid leaving the unit at extreme temperatures for long periods of time. If the unit is exposed to temperatures over 60°C for a long time, the display might be damaged. Also, the batteries could become damaged if the instrument is exposed to high or low temperatures for long periods of time. In particular, high temperatures accelerate the natural exhausting time of batteries. Charge the batteries by keeping the network transformer uncovered and out of its transport case. Do not immerse the unit in water or the electrical circuit could be damaged. In this event, let the unit dry completely before switching it on and contact IKUSI technical service.
The graphic display is covered by a special transparent protection glass. If, because of an impact, the glass adheres to the display by causing a "stain" effect, solve this problem by applying a piece of adhesive paper tape on the glass and lift it upwards.

NOTE:

1) do not use adhesive tapes that are overly strong because they could leave traces of glue on the glass and they are hard to remove.

A8 - SERVICE NOTES AND GUARANTEE REGULATIONS

1) IKUSI guarantees the repair of its manufactured equipment for a period of 24 months.

2) IMPORTANT: the guarantee becomes valid when an invoice or receipt is presented to IKUSI, clearly showing the date of purchase.

3) The guarantee covers the replacement, free of charge, of all parts, which are not functioning correctly due to manufacturing faults. The part not covered by guarantee are the aesthetic parts. Faults due to deteriorated or aged equipment, or caused by improper use because the user's manual suggestions have not been followed or caused by atmospheric phenomena or accidents or catastrophes or because the meter is used in dusty or not adequate environment.

4) The guarantee is voided if:
   a. the equipment is tampered with or repaired by non-authorized personnel;
   b. damage is found, caused by the incorrect use of the equipment, without following the advice explained in the User's Guide accompanying the equipment;
   c. damage is found caused by the use of the equipment in unsuitable working environments.

5) The following parts are not covered by the guarantee:
   a. Parts subject to wear, such as aesthetic ones;
   b. Batteries;
   c. Bags.

6) The equipment can only be repaired by the manufacturer or by an authorized IKUSI service center in your country.
   a. Before returning the meter for repair, always contact IKUSI service center to obtain the return procedure for your analyzer.
   b. When returning the meter, always send it with the following documentation attached: the fully-compiled FAULT IDENTIFICATION FORM, a transport document and the eventual request for an estimate of repair costs.
   d. Please note that the request for an estimate of repair costs must be submitted upon return of the analyzer with a written note. If the repair cost estimate is not accepted, IKUSI reserves the right to charge the customer for the estimate analysis costs.

7) The guarantee will not apply if the equipment is manipulated by unauthorized personal.

8) Risks and costs for transport to and from IKUSI must be sustained by the buyer.

9) The equipment can not be replaced and the guarantee extended after the repair of a fault.

10) The guarantee does not cover compensation for direct or indirect damages of any kind to people or goods caused by the use of the equipment and/or compensation caused by the suspension of use due to eventual repairs.

11) IKUSI is not responsible for eventual tampering and/or modifications that may cause the goods to no longer adhere to the European "CE" regulations, especially regarding EMC and safety.

12) IKUSI instruments are recognised and are fully compliant with DVB regulations and specifications (ETS 300 421 –12 / 94) and are consequently marked with the DVB logo and registered with id. N. 3088.

A9 - MAINTENANCE AND REPAIR FORM

• Fill section A of this form and attach to the faulty equipment to be part to Ikusi. This will facilitate the repair of your equipment.

FILLED BY CUSTOMER Date: ...../...../.....

• Company or person name: ..... • VAT. .....

• Street ..... • No .....

• Province ..... • Tel. .....

• Fax ..... • Contact Person ..... • Return of the meter with full ensurance (Value: 1% declared value) • declared value = ... • NO

• Model ..... • Serial Number .....

• Guarantee Repair: • YES (Attach guarantee or envoice) • NO

• Accessories included details • Quantity ..... • Description .....

.....

• Fault or Problem description by customer:

.....

.....

.....

NOTES AND GUARANTEE REGULATIONS

Hereafter are detailed our Guarantee rules and regolation of our measurement equipment. IKUSI guarantees the manufactured equipment for a period of 24 months.

Guarantee is intends the free of charge replacements of all factory defective parts excluding the aesthetic parts and faults caused by improper use of the meter, dirtiness, erroneous manipulation of the meter and batteries.

1. The guarantee is voided if the meter is manipulated or repaired by unauthorized not official IKUSI service centre.
2. The equipment will not be replaced and the guarantee extended after repair.
3. If the repair a guarantee repair, contact IKUSI for shipment authorization and indicate clearly the guarantee has not expired.
4. Attach to the shipment: the copy of the guarantee coupon, copy of the invoice and fault identification form or a detailed description for shipment approval.
5. If the repair is out of guarantee. contact IKUSI for shipment approval.

NOTES:

The goods may be refused if the shipment is made not accordingly to what is described above. The cost of the repair will be paid by the customer upon return of the meter together will all costs thet will derive from this handling.

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A10 - STANDARD IKUSI EQUIPMENT REPAIR & OR SERVICE FORM

• Customer:..... • Contact person:.....
• Tel. No.:..... • Fax No:.....
• Instrument Mod.:..... • Serial No:.....
• Software version:..... *(shown on the display when the instrument is turned on)*

Please would you kindly answer the following questions to facilitate fault identification (tick the appropriate boxes)

IN WHICH CONDITION DID THE FAULT OCCUR?
❑ Instrument turned off & being recharged ❑ When the instrument was cold ❑ After an accidental fall
❑ Whilst turning on the instrument ❑ When the instrument was hot ❑ Other.....

IS THE FAULT ALWAYS PRESENT OR DOES IT ONLY OCCUR IN THE FOLLOWING CONDITIONS?
❑ When tapping on the casing ❑ When the Instrum. is powered using internal batteries ❑ When the instrument is cold
❑ When the instrum. is powered using the AC adapter ❑ When the instrument has just been turned on ❑ When the instrument is hot

HAS THE INSTRUMENT HAD ANY MECHANICAL BREAKAGES?
❑ To the front panel ❑ To the back panel ❑ Dents in the casing

TURN OFF THE INSTRUMENT & POWER IT USING THE AC/AC ADAPTER, WHICH OF THE FOLLOWING LEDS ARE ON?
❑ The "MAINS" LED in the front panel ❑ NO LEDs

TURN ON THE INSTRUMENT & POWER IT USING THE AC/AC ADAPTER, WHICH OF THE FOLLOWING FAULTS OCCUR?
❑ The keys do not push down well ❑ The LEDs do not light up with the correct luminosity, etc. (please specify fault in the space below)

WHEN DOES THE FAULT OCCUR? ❑ With all the channels ❑ With only some channels, e.g.....
❑ During the analog C/N measurement ❑ During the analog level measurement ❑ In spectrum mode
❑ During the digital C/N measurement ❑ During the digital power measurement ❑ During the A/V ratio measurement

PLEASE INDICATE IN THE SPACE PROVIDED WHAT IS SHOWN ON THE ALPHANUMERICAL DISPLAY:
❑ If the error occurs when turning on the instruments ❑ If the error occurs at another stage

DO THE KNOBS FUNCTION CORRECTLY WHEN ADJUSTING THE PARAMETERS
❑ yes ❑ NO (If "NO" please clearly specify the fault in the space provided below)

ARE THERE PROBLEMS WITH THE LOUDSPEAKER? ❑ There is no sound ❑ The sound is distorted ❑ The sound is disturbed

ARE THERE ANY OF THE FOLLOWING PROBLEMS WITH THE MONITOR SREEN (if present)?
❑ There is no picture ❑ The monitor screen is white ❑ There is a lot of interference on the picture
❑ The picture is distorted ❑ The monitor screen is black ❑ Other (clearly specify in the space provided below)

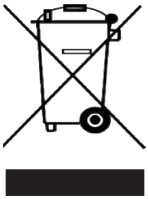
ARE THERE ANY OF THE FOLLOWING PROBLEMS WITH THE SCART SOCKET (if present)?
❑ The video or audio outputs are not present ❑ The video and audio inputs are not functioning

ARE THERE PROBLEMS WITH THE RS 232 -USB SOCKET (if present))? ❑ It does not print ❑ It does not connect to the PC

IMPORTANT: *Please clearly describe any further information which may be useful to us in order to identify the fault:*
.....
.....
.....

Send to IKUSI
(Copy and keep the original. Send with the analyzer to be repaired)

A11 - DISPOSAL OF ELECTRONIC EQUIPMENT RULES



Disposal of Old Electrical & Electronic Equipment (Applicable in the European Union and other European countries with separate collection system.)

The symbol on the product or on its packaging indicates that this product shall not be treated as standard waste. Instead it shall be handed over the applicable collection points for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to preserve natural resources. For further detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

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