

RA2009

TV SIGNAL LEVEL METER

USER MANUAL

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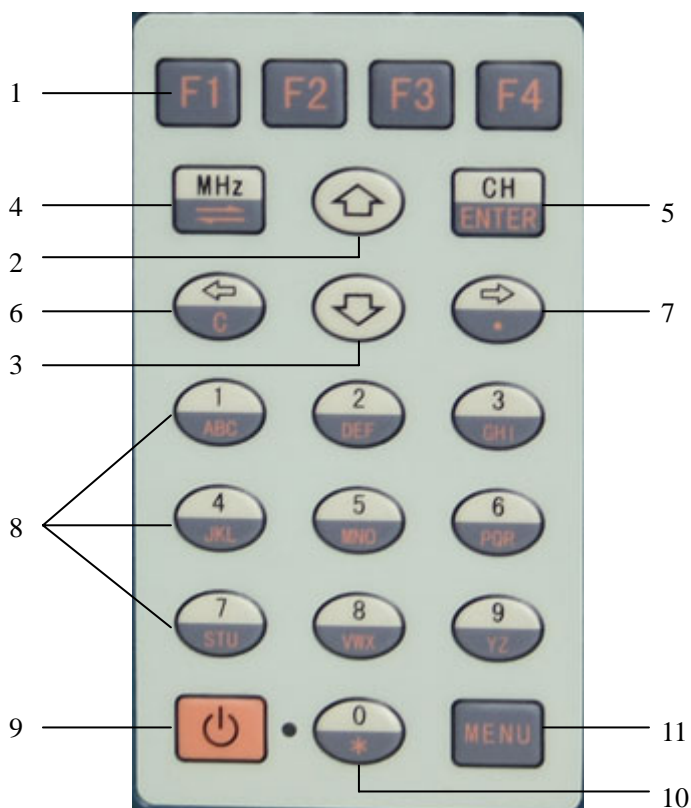
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Overview

1. RF Signal Input Port
2. Rubber Jacket
3. Color LCD Display
4. Charge Indicator (RED/GREEN)
5. RS232 Communication Port
6. Charger Plug-in



Definition of Key Functions

The following provides quick identification of key functions.

- 1 Soft Function Keys
- 2 Up Arrow Key
- 3 Down Arrow Key
- 4 MHz Key: Frequency key uses for direct frequency input, enter frequency number and then press frequency key in single frequency measurement mode. The cursor key uses for moving the cursor to the frequency number digit which you can turn up or turn down by pressing the arrow keys in the single frequency and channel measurement mode.
- 5 Channel/Enter Key: Channel key uses for direct channel number input, enter channel number and then press channel key in single channel measurement mode. It also acts as the ENTER key for most functions.
- 6 Left Arrow Key and Clear Key. Clear key uses for deleting any keyed input made prior to pressing the ENTER key.
- 7 Right Arrow Key and Decimal Key: Decimal key uses for entering decimal point in direct frequency input.

- 8 1-9 Numeric button and Letter Input Key. The key toggles between numeric key and appropriate English letters.
- 9 Power Key
- 10 0/* Key. Numeric key "0" and channel setting shortcut key in single channel measurement mode.
- 11 Menu Key. Uses for entering the main menu in any mode.

Soft Keys Introduction



Up Arrow Key



Down Arrow Key



Left Arrow Key



Right Arrow Key



Enter Key



Return Key



Video Measurement



V/A measurement



Single Frequency Measurement



QAM Analysis Measurement of Digital Channel



Spectrum Analysis Measurement










Speaker Volume Key



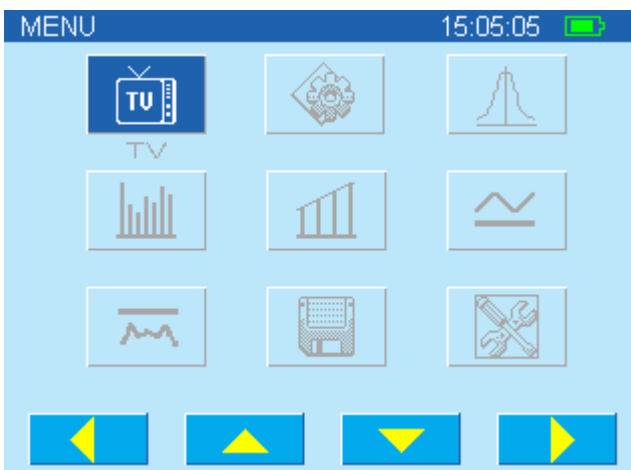
Delete Key



Load File Key

-  Save File Key
-  Edit Key
-  “Start to Test” Key in Auto Test Measurement
-  Zoom In
-  Zoom Out
-  Amendment Value Adding
-  Amendment Value Deducing

Main Menu



1. LEVEL (Keypad “1”) - Signal level measurement of both analog channel and digital channel.
2. AUTO (Keypad “2”) - Auto measurement
3. SPECT (Keypad “3”) – Spectrum analysis
4. SCAN (Keypad “4”) –Scan measurement
5. TILT (Keypad “5”) – Tilt measurement
6. VOLT (Keypad “6”) – Voltage measurement
7. C/N (Keypad “7”) – Carrier to noise ratio measurement

8. FILE (Keypad “8”) – File management
9. SETUP (Keypad “9”) – Setup menu

Quick Guide

- Make certain that the battery is fully charged.
- Turn the unit **ON** by pressing the Power key.
- The unit will “buzz” and enter the main menu after displaying the logo and model number.
- Press the Arrow key to highlight the **SETUP** menu.
- Press the **CH/ENTER** key, the meter will enter **SETUP** menu and display setting items.
- Using the arrow keys, select an “**SHUTDOWN TIME**” mode of your choice, and then press the **CH/ENTER** key, you will return to the **SETUP** menu.
- Using the arrow keys again, select “**DATE AND TIME**” and press the **CH/ENTER** key. In the pop-up menu, enter the date and time using numeric keys, and press **CH/ENTER** key to confirm or press **F4** key to escape. You will return to the **SETUP** menu.
- Enter **VOLUME SETTINGS** and use **LEFT ARROW** OR **RIGHT ARROW** to adjust the speaker volume.
- Enter **LEVEL UNITS**, the display shows three available units of measure, “**dB μ V**” “**dBmV**” and “**dBm**”. It is common in the industry to refer to RF signal strength as dB. In reality, the unit of measure is dB μ V or dBmV varying from different countries. Using the arrow keys, select the desired unit and press the **CH/ENTER** key, returning you to the previous menu.
- Using the arrow keys, select the “**SELECT CHANNEL PLAN**” option and press the **CH/ENTER** key to display channel plan list, select the desired channel plan and press **CH/ENTER** key, then return to the previous menu.
- Press the **F4** key or **MENU** key to return to the main menu.
- Using the arrow keys to select **LEVEL** and press the **CH/ENTER** key, or directly press numeric “**1**” key, you will enter the signal level test menu.
- The display will show the channel number, video frequency and video carrier signal strength.
- Using a supplied “F” coupler, connect the CATV signal lead to the input located at the top of the instrument.
- The unit should immediately display the video carrier signal strength of current channel.
- Press the arrow keys to move to the next or previous channel.
- Direct channels may be entered by pressing appropriate number keys, then pressing “**CH/ENTER**”
- Direct single frequency may be entered by pressing appropriate number keys, then

pressing “**MHZ**” key, the meter will enter single frequency test mode.

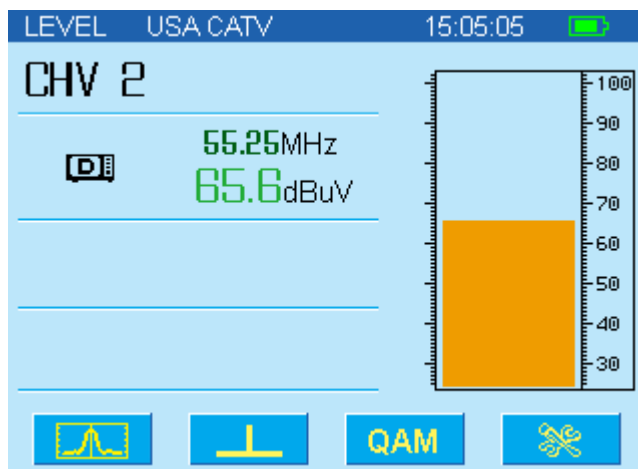
- To test the digital channel, using the arrow keys, move to a digital channel and press **F4** or “**0/***” to show channel setting window.
- Using the arrow key, move the cursor to “**TYPE**”. Pressing **LEFT** or **RIGHT** arrow, the channel type will change to “**DIGI**” and show options of digital channel. Enter correct parameters and move the cursor to “**SAVE&RETURN**” using the arrow keys, then press the “**CH/ENTER**” key.
- The channel number will become “**CHD**” instead of “**CHV**”. The unit will show readings of “**BW**”, “**MODE**”, “**SR**”.
- Press **F3**, the display enter QAM analysis menu and show the results of “**MER**”, “**BER**” as well as the graphics of constellations.
- The instrument will now display the video carrier strength of the selected channel on the display. It is this carrier signal that is critical. Typical cable company requires this signal be within $\pm 5\text{dB}$ of 0, at the demarcation point outside the structure, as well as all cable outlets within.
- Note that signal strength of considerably lower than $55\text{dBuV}/-5\text{dBmV}$ may still provide satisfactory reception, depending upon the quality and size of the connected television receiver.
- Note four Function Keys on the top of the keypad.

Start to Use

LEVEL MEASUREMENT

Single Channel Measurement

Using arrow keys highlight **LEVEL** and press **CH/ENTER** key, the unit will enter single channel measurement mode.



At first set the current channel type. Press "0/*" to display channel setting window.

If the channel type is digital channel, it will display:

Channel – channel number

Select – Marked "√" if the current channel is available.

Type – Digital or analog channels

Freq – Center frequency.

BW – Bandwidth of digital channel.

Mode – Modulation type.

SR – Symbol rate

Save & Return

If the channel type is analog channel, it will display:

Channel – channel number

Select – Marked "√" if the current channel is available

Type – Digital or analog channel

Freq – Video carrier frequency

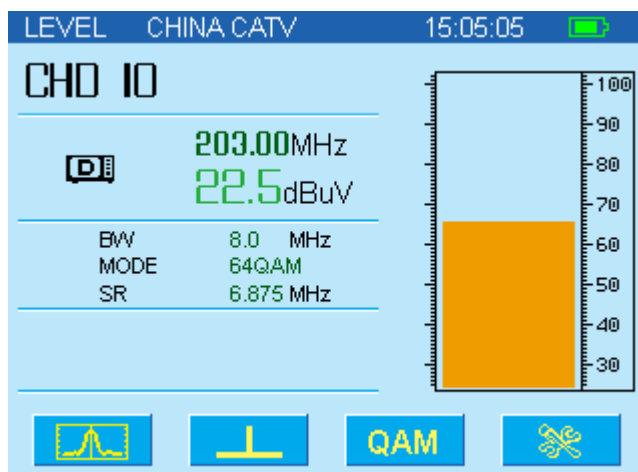
AIF – Audio IF

Save & Return

Using **UP/DOWN** arrow key move the cursor and using **LEFT/RIGHT** arrow key toggle options or directly enter parameter using keypad. Move the cursor to "**Save & Return**" and press **F3** or **CH/ENTER** key after setting the parameters.

In the single digital channel measurement mode, the channel number is shown "CHD" instead of

“CHV” that the analog channel number is shown.



Press **UP/DOWN** or **LEFT/RIGHT** arrow key to change the testing channel.

To directly enter desired channel, input channel number using keypad and press **CH/ENTER** key.

To directly enter single frequency measurement mode, input frequency number using keypad and press **MHz** key.

Soft key function definition

F1: Enter the spectrum measurement mode

F2: Enter the single frequency measurement mode

F3: QAM, enter QAM analysis mode

F4: Setup of channel type

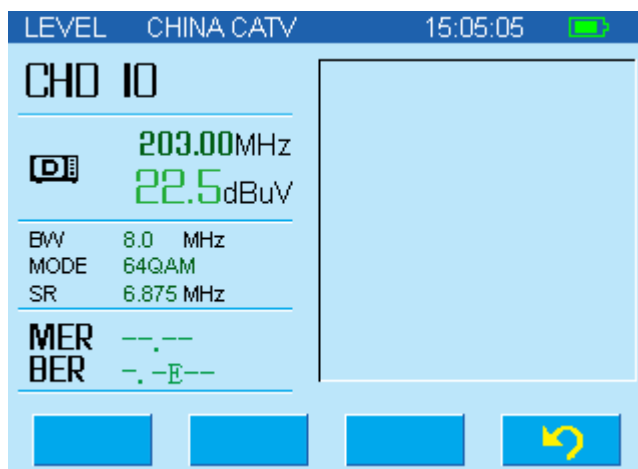
In single digital channel measurement mode, press **F3** to enter the QAM measurement.

The measurement of MER and BER display in the low left, the constellation displays in the right.

Note:

MER and BER measurements are for RA2009C and RA2009D only.

Constellations measurement is for RA2009D only.



Press **F1** to save the current measurement result.

Press **F2** to load the saved files.

Press **F3** to fresh the measurement.

Press **F4** to return to previous menu.

The single analog channel measurement mode

In this mode there is a mark “CHV” in front of the channel number

Soft keys definition:

F1: Enter channel spectrum measurement mode

F2: Enter single frequency measurement mode

F3: Enter V/A measurement mode

F4: Next menu

V/A

Press the **F3** key to simultaneously display the channel video and audio carrier frequencies and signal strength, as well as the relative difference between the two.

Channel Audio Carrier Signal Strength

Press the **CH/ENTER** key to shift the unit between video carrier frequency mode (shows CHV in the channel number) and Audio carrier Frequency mode (shows “CHA” in the channel number).

The unit will display the following, with the audio carrier frequency and signal strength. If an

audio carrier exists on this frequency it will be heard through the speaker. As this unit is equipped with an FM demodulator, this will measure signal strength of any transmitted FM signal, and play the audio.

Press **F3** to adjust the speaker volume.

Press **F4** to enter channel setup menu.

Single Frequency Measurement Mode

In the analog channel measurement mode, press the **F2** key to place the unit in Channel / Video Frequency mode.

Or in both channel and frequency measurement modes, using keypad manually input any desired frequency and press **MHz** key. If an audio carrier exists on this frequency it will be heard through the speaker. As this unit is equipped with an FM demodulator, this will measure signal strength of any transmitted FM signal, and play the audio.

In frequency measurement mode, press the **MHz** key continuously, the cursor blinks indicating the step of 100MHz, 10MHz, 1MHz, 100KHz, 10KHz, you can increase or decrease the frequency by pressing LEFT/RIGHT keys in the step where the cursor located.

F1: Spectrum

In the channel or video frequency mode, using the keypad, directly input the desired frequency to be measured, and press **MHz** key.

In the Video Frequency mode, press **F3** to adjust the speaker volume.

Press **F4** to return to channel measurement mode.

Press **F2** to enter the single frequency measurement mode, showing the frequency of the last tested frequency before powering off and signal strength.

AUTO MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon "AUTO" and press the **CH/ENTER** key, or press numeric "**2**" key, the meter enters Auto measurement mode.

AUTO CHINA CATV 16:30:18 		
File	Date	Time
A01	09/06/16	08:38
A02	09/06/17	09:30
B01	09/06/17	09:35
B02	09/06/17	09:35
B03	09/06/17	09:38
C01	09/06/17	09:50
-----	--/--/--	--:--
-----	--/--/--	--:--


EDIT





STAR


The unit will show the list of files in storage. Using **UP/DOWN** arrow key select an empty file and press **F1** to create a new auto test file. Using keypad enter file name, using **UP/DOWN** arrow key move the cursor, using **LEFT/RIGHT** key select the channel number of No.1 to No.5 channels; Select “Save & Return” and press **F3**.

Using **UP/DOWN** arrow key select an existing file and press **F1** to edit the saved auto test file.

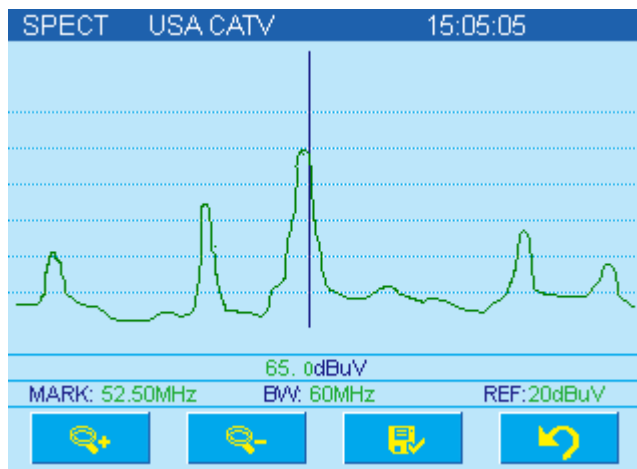
Using **UP/DOWN** arrow key select an existing file and press **F3** to implement the auto test. After the test is finished, press **F3** to save the tested result. The saved file can be viewed in the “FILE MANAGEMENT” mode.

AUTO CHINA CATV 16:30:18 							
NO.	CH	FREQ	A/D	DIGI	MER	BER	ANAL
1	3	61.25	A				77.5
2	2	55.25	A				78.6
3	4	67.25	A				77.2
4	5	77.25	A				79.2
5	95	91.25	A				79.8

SPECTRUM MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon “SPECT” and press the **CH/ENTER** key, the meter enters spectrum measurement mode.



Soft key definitions:

F1: zoom in

F2: zoom out

F3: Save file

F4: back to the previous screen

Using keypad input center frequency and press **MHz** key, or input channel number and press **CH/ENTER**, the unit will show spectrum analysis.

Press **F1** to zoom in and press **F2** to zoom out, the BW (bandwidth) toggles among 15MHz, 30MHz, 150MHz.

Press **LEFT/RIGHT** key to move the cursor to see the tested signal strength.

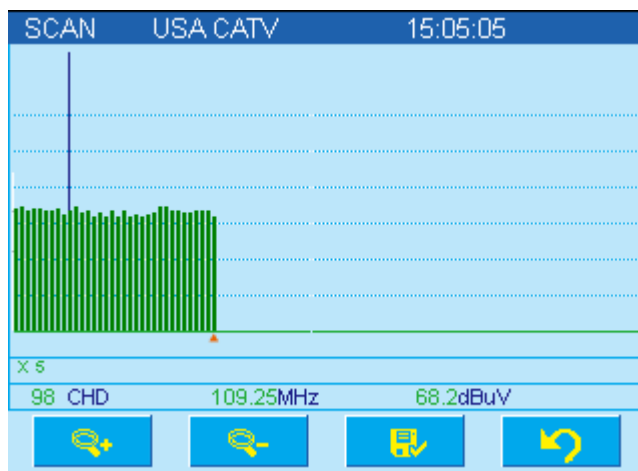
Press **UP/DOWN** arrow key to change the reference level by 5dB step.

Press **F3** to save file.

Press **F4** to return to the main menu.

SCAN MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon “SCAN” and press the **CH/ENTER** key, the meter enters SCAN measurement mode.



Soft key definitions:

F1: Zoom in

F2: Zoom out

F3: Save file

F4: Back to the previous screen

Press **F1/F2** KEY to change the display scale.

Press the **LEFT/RIGHT** arrow key, you can move the cursor to specific channel and see the tested signal strength.

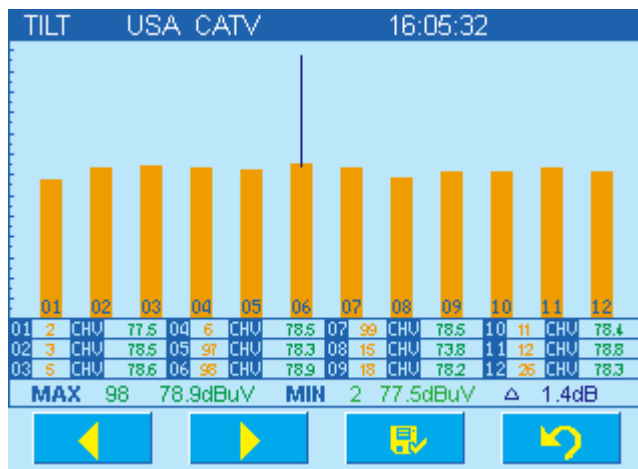
Press **F3** to save file.

Press **F4** to return to the main menu.

TILT MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon "TILT" and press the **CH/ENTER** key, the meter enters TILT measurement mode.

The unit will display the max channel number and signal strength; the min channel number and the signal strength; the difference between the max and the min.



Move cursor to select a channel and press **UP/DOWN** key to change the channel number.

Press **F3** to save file.

Press **F4** to return to the main menu.

Signal strengths of 12 channels display in the screen simultaneously.

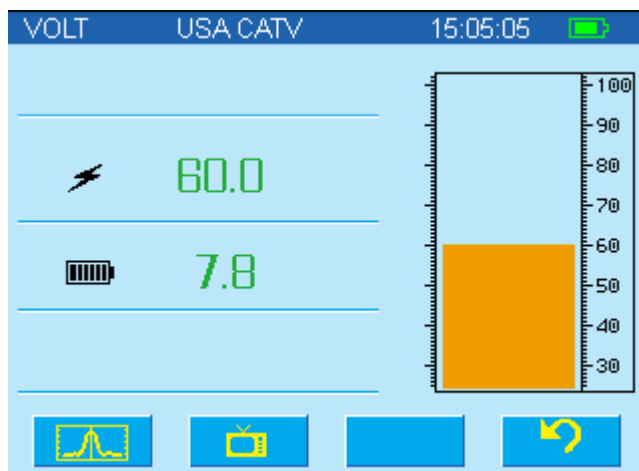
Press **F1** or **F2** to select the channel in TILT measurement and press the **LEFT** or **RIGHT** arrow key to change the channel number of selected channel.

The max signal strength, min signal strength and their difference display on the screen.

Press **F4** to return to the main menu.

TRUNK VOLTAGE MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon “**VOLTAGE**” and press the **CH/ENTER** key, the meter enters the voltage measurement mode.



The meter will automatically identify “AC” or “DC” of the trunk voltage, and display on the screen. The battery voltage also display on the bottom.

Typically at the cable demarcation point outside the structure, there will be no trunk voltage.

Press **F4** to return to the main menu.

SIGNAL NOISE RATIO MEASUREMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon “C/N” and press the **CH/ENTER** key, the meter enters the C/N measurement mode.

Directly input channel number and press “**CH/ENTER**” key to select the channel to be tested.

Note:

The function affects when the signal input level is greater than 60 dBuV.

FILE MANAGEMENT

In the main menu, using the **LEFT/RIGHT** key highlight the icon “FILE” and press the **CH/ENTER** key, the meter enters the FILE menu.

FILE	CHINA CATV	16:30:18	
File	Date	Time	Type
• L01	09/06/16	08:38	Digi
• P02	09/06/17	09:30	Spect
• *AUTO*	09/06/17	09:35	Auto
• T03	09/06/17	09:38	Tilt
• S01	09/06/17	09:50	Scan






All the files saved in different measurement modes will be listed.

Using **UP/DOWN** arrow key highlight the file and press **F1** to select one or more files, press **F2** to delete selected files.

Using **UP/DOWN** arrow key highlight one file and press **F3** to read the file.

Press **F4** to return to the main menu.

SETUP

SHUTDOWN TIME

You can select the auto shutdown time among below options:

3MIN

5MIN

10MIN

ALWAYS ON

DATE & TIME

Set the date & time of the meter.

VOLUME SETTINGS

Set the sound volume of the speaker.

LEVEL UNITS

You can select the unit of the meter among:

dBuV

dBmV

dBm

SELECT USER PLAN

Using **LEFT/RIGHT** key highlight the icon “SELECT USER PLAN” and press the **CH/ENTER** key, the meter enters the “SELECT USER PLAN” menu.

Using **UP/DOWN** key select the user plan you want and press **CH/ENTER** to confirm.

EDIT USER PLAN

In the main SETUP menu, using the **LEFT/RIGHT** key highlight the icon “EDIT USER PLAN” and press the **CH/ENTER** key, the meter enters the “EDIT USER PLAN” menu.

Using **UP/DOWN** arrow key highlight the channel and press **F3** to enter the CHANNEL SETUP menu.

Disable the checkbox of “Select” of the channel if you want to omit the channel in test.

Select “Save & Return” after setting up.

LEARN USER PLAN

In the main SETUP menu, using the **LEFT/RIGHT** key highlight the icon “LEARN USER PLAN” and press the **CH/ENTER** key, the meter enters the “LEARN USER PLAN” menu.

Select “USER PLAN 1” or “USER PLAN 2” that you want to create to fit your CATV system.

The unit will show below content:

1: Please connect to CATV

2: Select channel plan

...

3. Press F3 to Start

Using the F1, F2 keys to select the channel plan of your TV system and then press **CH/ENTER** key to start. After finished select “YES” and press **CH/ENTER** key to confirm in the pop-up menu.

Note:

The unit needs to access cable television system.

The unit will automatically select the channels which signal strength is greater than 40dBuV and collect them in to user channel plan, recognizing analog or digital channel. However, due to the complexity of the actual signal, the user may also need to re-edit it. **(This function is option)**

You can edit the user channel plan in the menu of “EDIT USER PLAN”.

PROBE COMPENSATION

The probe compensation value shows in the bottom of the screen, press F3 to enter. Using **LEFT** key or **RIGHT** key move the cursor and using **F1/UP** key or **F2/DOWN** key to increase or decrease the value. Press **F3** to save and return.

VALUE AMENDMENT

The meter is well calibrated at the factory, while after long-term use or with the aging of electronic components there may be some measurement error.

The meter supplies you such a function to calibrate it manually. The user just needs a accurate meter or signal generator to compare the measurement value and save calibration value.

This feature can also meet the user's specific requirements.

In the SETUP menu, select the "VALUE AMENDMENT" and press **F3**.

The unit enters value amendment menu.

On the lower left of the screen it displays the amendment value of current channel as "Single Amend: +0.0" press **F1** or **F2** to adjust the amendment value and press **F3** to save. When saved successfully, the green value number turns black.

When you adjust the amendment value the displayed video carrier strength also changes accordingly.

In this mode you can change the channel number using **LEFT/RIGHT** arrow key or directly input the channel number using keypad.

Continue to adjust the amendment value of other channels until finished.

LIMIT SETUP

In the SETUP menu select LIMIT SETUP and press F3 to enter, it displays the max value and min value of limitation.

Max

Min

Save&Return

The set Limit value will reflect in the SCAN test result. (This function is option)

LOAD DEFAULT

If the settings are unexpected and you want to restore the initial settings, select this item and press F3. The unit will display a confirmation menu:

Are you sure?

YES NO

Using the arrow keys select YES to confirm and select NO to escape, and then press **F3**.

SYSTEM INFORMATION

In this menu, you can check the information of Hardware version, software version, and serial number.