



SPECTRUM QAM
ANALYZER
SM-2008



OPERATOR'S MANUAL

金赛讯(天津)电子技术有限公司

Jinsaixun(Tianjin)electronics technology co., ltd

Please read this manual carefully before using it for the first time.

The technical specifications and operating methods included in this manual are subject to changes without notice. In case of any inquiries after a period of usage, please consult the manufacturer.

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Chapter One, Introduction of the Spectrum QAM Analyzer

The product, which newly researched and developed, is the integrative high-tech measuring instrument for the transformation of CATV .It is the smallest color QAM Analyzer in the world. The main function is to measure QAM digital signal and analogue signal. The measurable item includes: power measurement, MER measurement , BER measurement, constellation, channel measurement, tilt measurement, scan measurement, spectrum analysis, carrier noise ratio measurement, and rail voltage measurement. Make the corresponding choice according to the different occasion. The inside process chip adopts the extensive integrated microprocessor which is special to the most advanced tester in the world at present. It has many characteristics such as: the complete function, the fast processing speed, the low static power consumption, small and the high dependability. The peripheral circuit uses its special integrated package design according to corresponding function. The appearance adopts the human mechanics principle, it can be held firmly by single-hand and operated.

Chapter Two, Panel Function

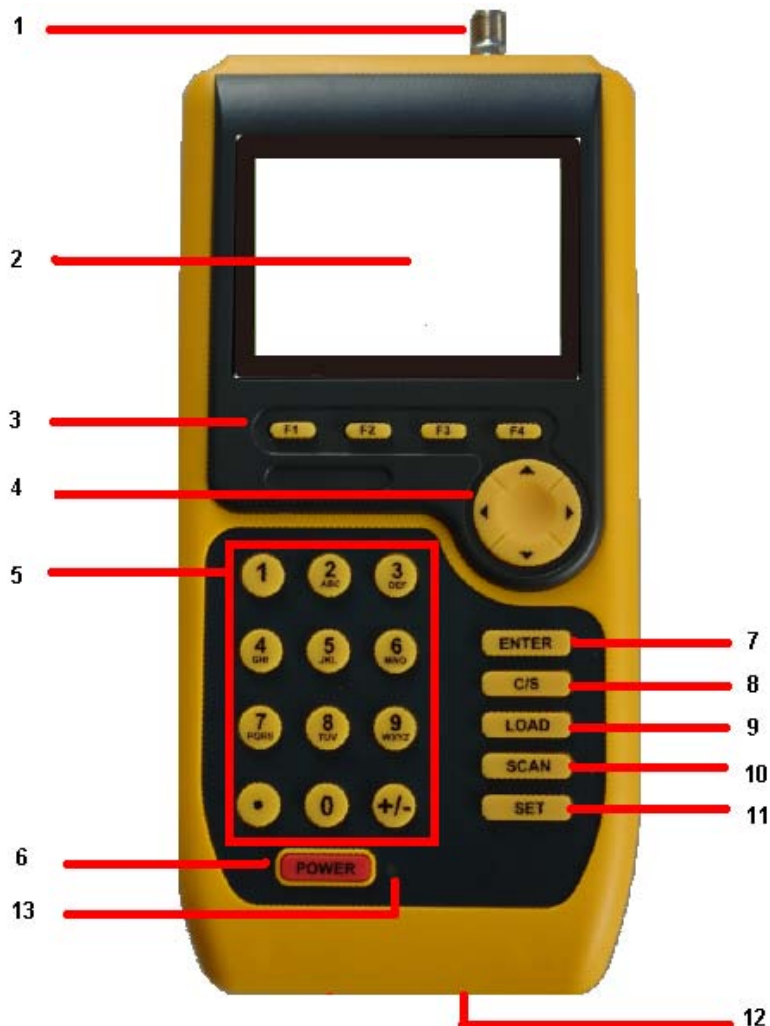


Fig. 1-1

Refer to Fig.1-1 for explanation of the meter panel.

(1) RF INPUT:

It can be changed to BNC or F type as required by the user.

(2) LCD Graphic Display:

It can display various measured parameters for the function you selected. It has LED background light with autoregulation.

(3) Function key:

There are four function keys,  -- , they have different functions in different interfaces.

(4) Direction key:

You can select item with [, [, [, [] keys.

(5) Number key:

Number key is made up of  , and ,  keys so you can type in data conveniently.

Under main menu the function of number keys as follows:

1 : Channel Measurement Function

2: QAM Measurement Function

3 : Tilt Measurement Function

4 : Scan Measurement Function

5 : Spectrum Analysis Function

6 : Carrier Noise Ratio Measurement Function

7 : Rail Voltage Measurement Function

8 : Instrument Setup

(6) key

(7) key

(8) key:

Delete what you type in.

(9) key:

Load record of measurement or configuration

(10) key

Press it to enter 'SCAN' item.

(11) key

- (12) Charge port
- (13) Charge indicator

Chapter Three, Detailed Operation Guide

1. Power On

Press **POWER** key to switch on power. The product model and serial number will be displayed on the screen then it will enter main menu automatically. (as shown in fig 2-1)

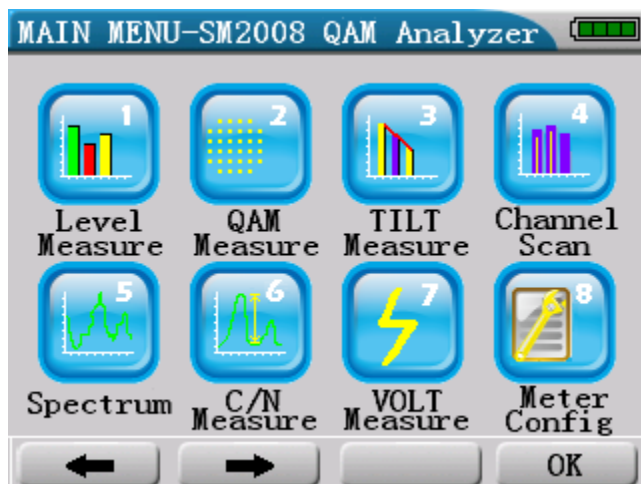


Fig 2-1

2. Channel Measurement Function

When channel table is set to digital channels, under main menu press number key ①, then enter the function of channel measurement. (as shown in fig 2-2)

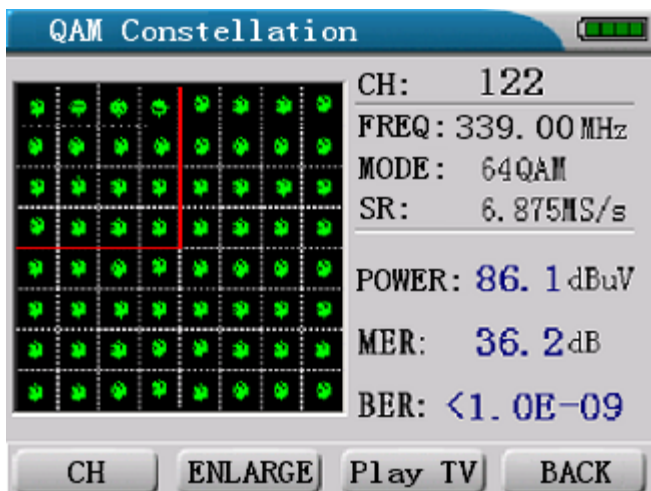


Fig 2-2

Press **F1** key to type in channel number, press **F2** key to amplify or shrink the constellation.

Press **F3** key, then enter the video player function, press **F4** key to return to main interface. Press **SET** key to enter “EDIT” interface to edit channel information. See P18. “Edit Channel”

Press **C/S** key to enter the store measurement results function, press direction keys **▲** **▼** to choose channel to be saved and press **ENTER** key to save the measurement results. For example, 1 is analogue channel measurements results, V94.4 means video carrier level is 94.4dBuV, A76.1 means audio carrier level is 76.1 dBuV, 5 is digital channel measurement results, P89.6 means average power is 89.6 dBuV, M37.7 means MER is 37.7 dB, B<1.0E-9 means BER<1.0 E-9, you can store 150 measurement results. (as shown in fig 2-3)

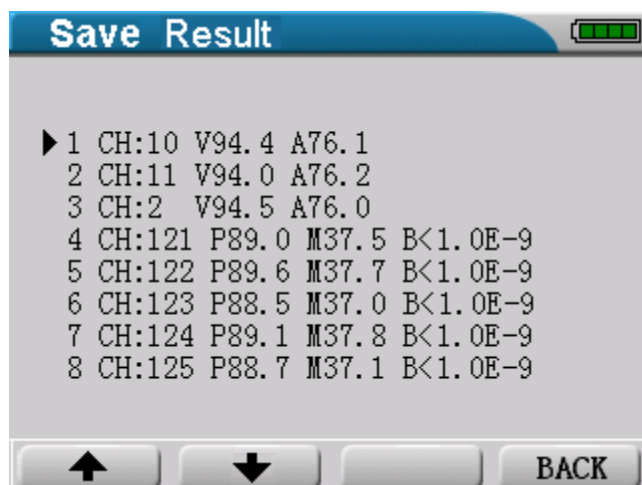


Fig 2-3

Press **C/S** key again, the user can delete stored records. There will be a dialogue box as shown in fig 2-4. If you want to delete the channel to press **ENTER** key, or press the other key to return to previous interface.

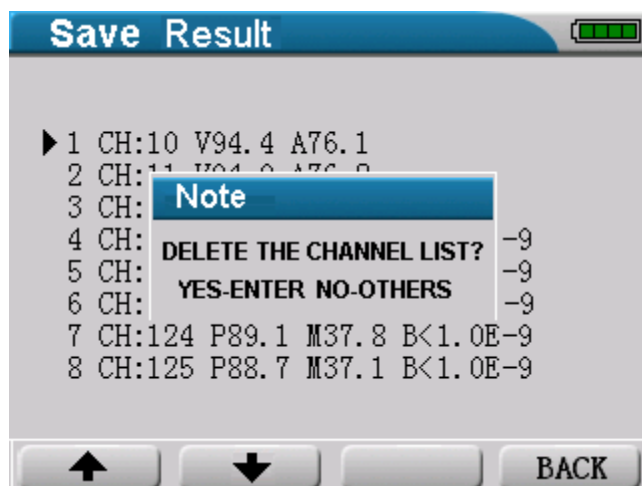


Fig 2-4

When channel table is set to analogue channels, under main menu press number key ①, then enter the function of channel measurement. (as shown in fig 2-5)

Press **F1** key, it appears the input box in the position of channel number. Press number keys to input channel number, press **ENTER** key to confirm. The percentage on the left of the screen displays video and audio signal strength. On the right is measurement result. Press **F3** key to enter TV playing function. If the channel which you choose is analogue, you can see analogue TV, if it is digital channel, you can see digital TV.

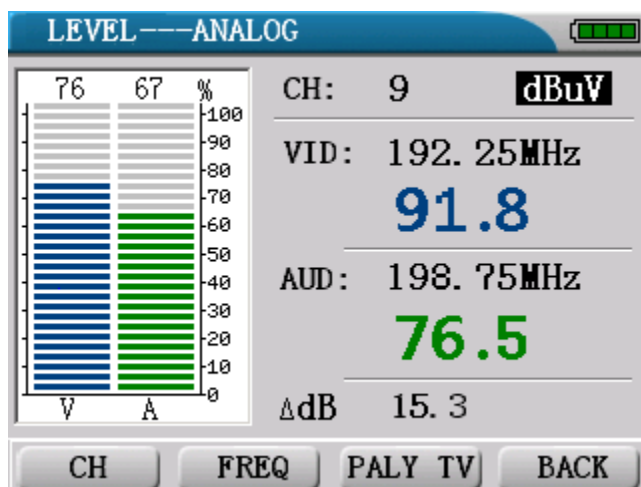


Fig 2-5

Press **F2** key to enter single frequency level measurement, as shown in fig 2-6. Press **F1** to return to the interface of analogue channel measurement. Press **F3** key to adjust volume between off, low, middle and high. Press **F4** to return to main menu.

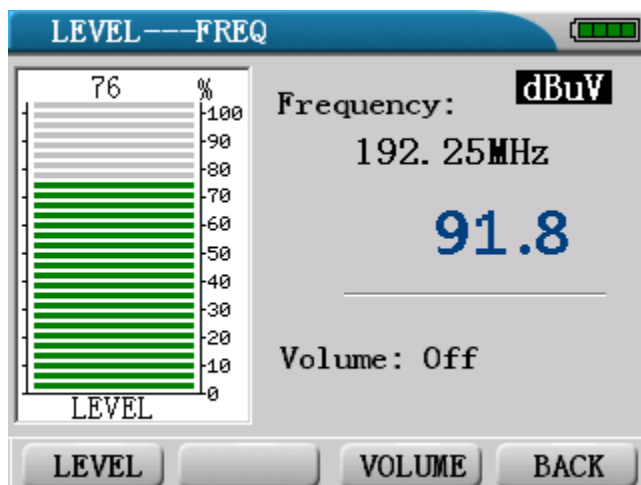


Fig 2-6

3. QAM Measurement Function

Under main menu press number key **2**, then enter QAM measurement function. It uses graphic constellation to show signal quality and measurement.(as shown in fig 2-7).

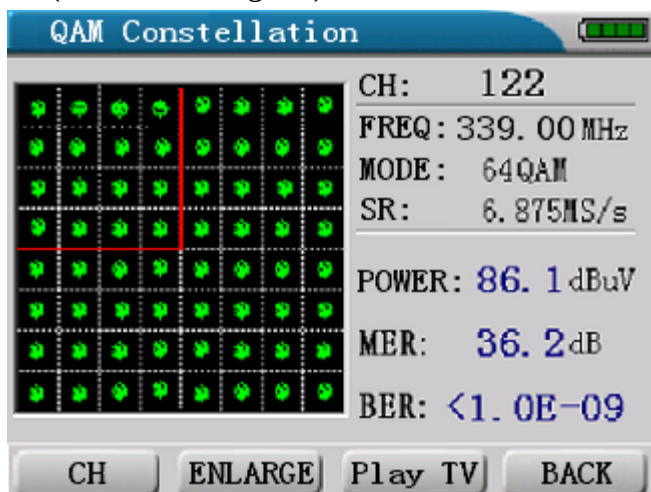


Fig 2-7

4. Tilt Measurement Function

Under main menu press number key **3** to enter the function of tilt measurement. (as shown in fig 2-8) Press **F4** key to return to main menu.

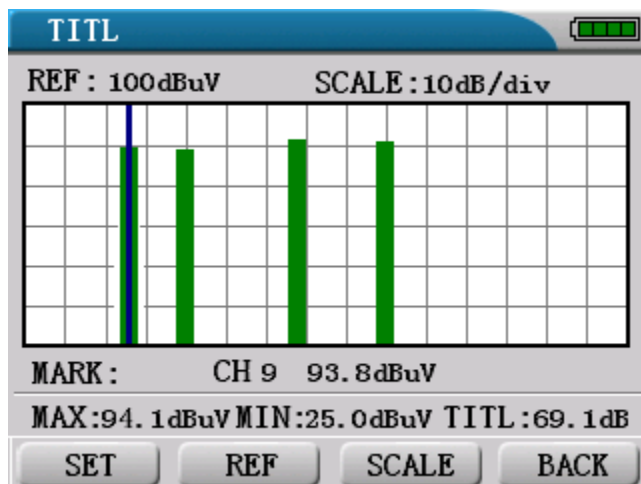


Fig 2-8

There is histogram in the middle side of the screen to display channel level value. It will display maximum level, minimum level, the difference between maximum level and minimum level, Marked where the blue line shows the current channel number and level value.

Press direction key **◀**[**▶**] to move arrow to point to the channel wanted to be displayed.

Press **F1** key to set channel number, and at most 10 channels can be set. Press direction keys **▲**[**▼**] [**◀**][**▶**] to choose channel to be set, then press number keys to input channel number and press **ENTER** key to confirm.

5. Scan Measurement Function

Under main menu press **4** key to enter scan measurement function (as shown in fig 2-9). Press **F4** key to return to main menu.

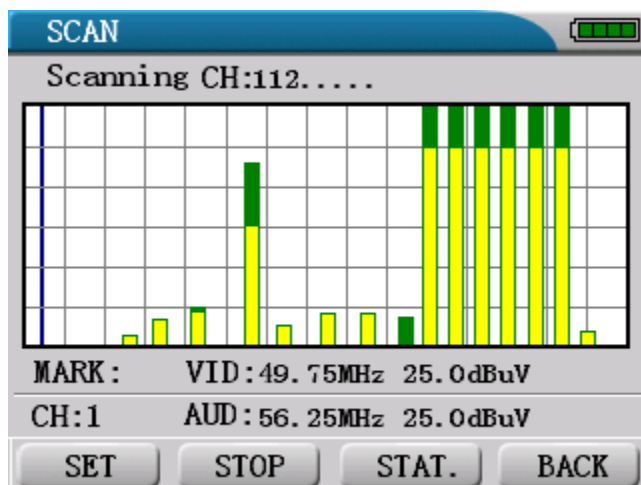


Fig 2-9

Press **F1** to enter scan set interface. There are Start Frequency, End Frequency, Max Video, Min Video, Max Δ Video, Max Δ V/A, Min Δ V/A, Max Δ ADJ, Max Power and Min Power. (as shown in fig 2-10)

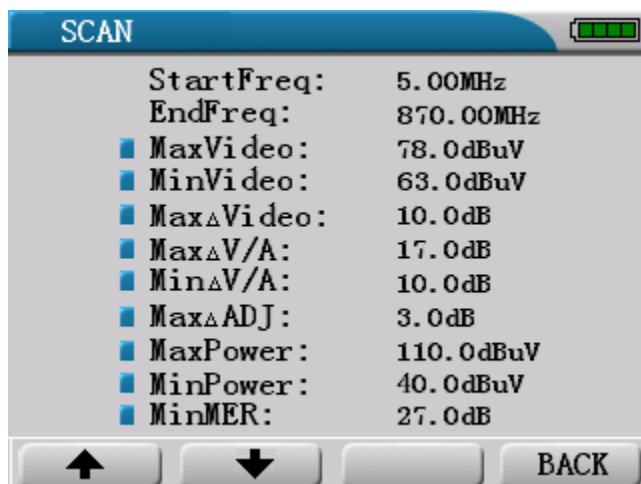


Fig 2-10

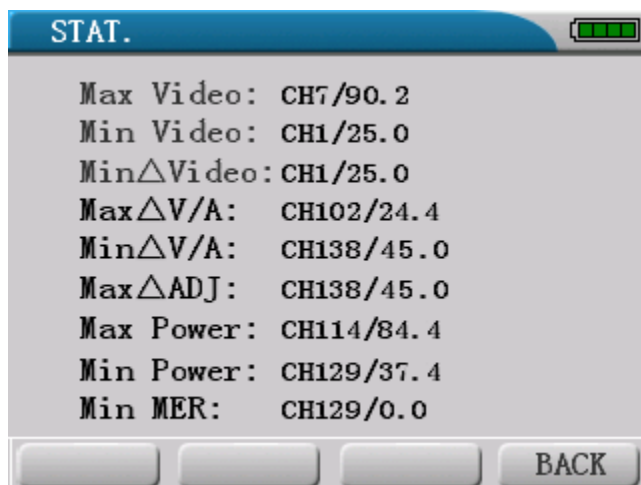


Fig 2-11

Press **F3** to display measurement result (as shown in fig 2-11). For example, Max Video: CH7/90.2 means max video level is 90.2dB and the channel number is 7.

6. Spectrum Analysis Function

Under main menu press number key **5** to enter spectrum analysis function. Press **F4** to return to main menu. (as shown in fig 2-12)

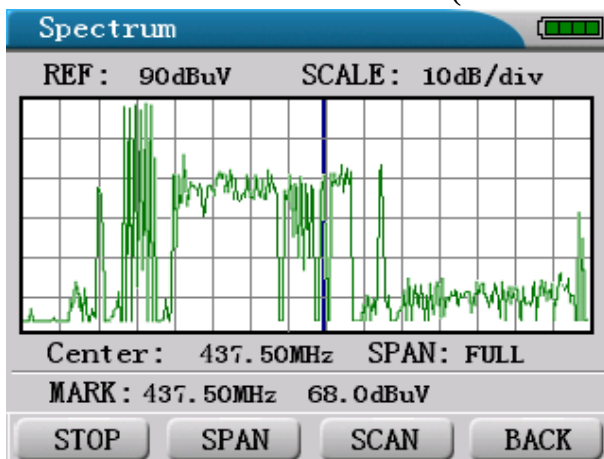


Fig 2-12

C: Center frequency measurement. Press number key to input the frequency value, press **ENTER** key to confirm.

SP: Bandwidth measurement. Press **F2** can change the bandwidth between 4.0M, 8.0M, 20.0M, 40.0M.

Blue Mark: Scale adjustment. Press the direction key **◀▶** can move around the scale and show the frequency value and the level measurement value of the frequency pointed by the scale.

REF: level value of measured spectrum

SCALE: the unit value of each grid

When measure analogue channel, press **F3** key to enter analysis menu, as shown in fig 2-13. Press **F1** to measure, press **F2** to return. When measure digital channel, press **F3** to enter analysis menu, as shown in fig 2-14.

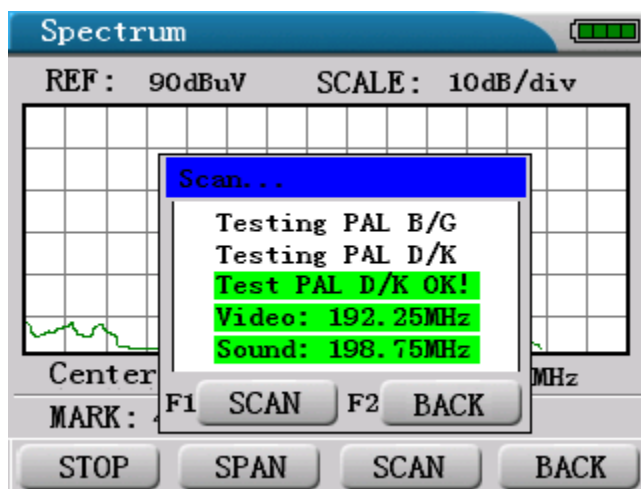


Fig 2-13

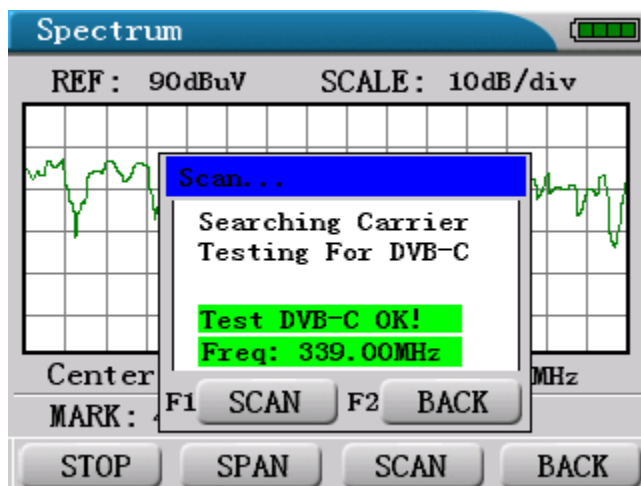


Fig 2-14

7. Carrier Noise Ratio Measurement Function

Under main menu press number key **6** to enter carrier noise ratio measurement function. Press **F4** key to return to main menu. (as shown in fig 2-15)

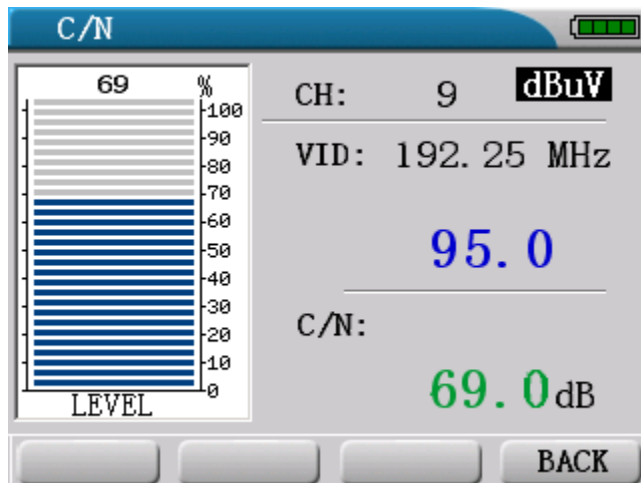


Fig 2-15

Channel number, frequency, level value and carrier noise ratio will be displayed on the screen. Press number keys to input channel number for changing channel. Press **ENTER** to confirm.

Note : Only when level value is more than 50dB μ V, C/N can be measured.

8. Rail Voltage Measurement Function

Under main menu press number key **7** to enter rail voltage measurement function. It will display the value of rail voltage and show the AC or DC in front of it. Press **F4** to return to main menu. (as shown in fig 2-16)

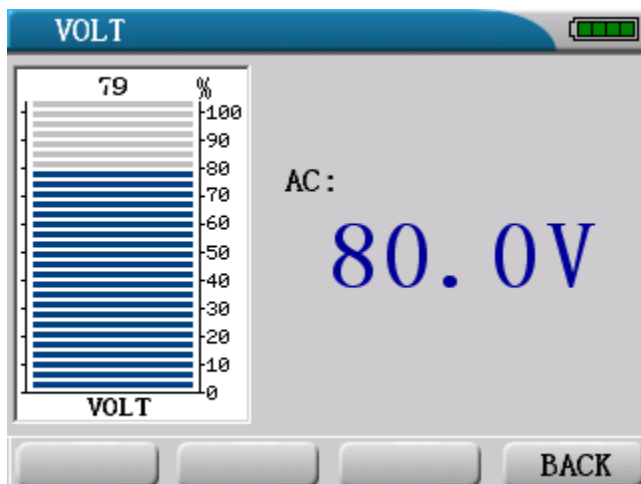


Fig 2-16

9. Instrument's Basic Parameters Setup

Under main menu press number key **8** to enter tools for instrument's basic parameters setting. Press **F4** to return to main menu. (as shown in fig 2-17)

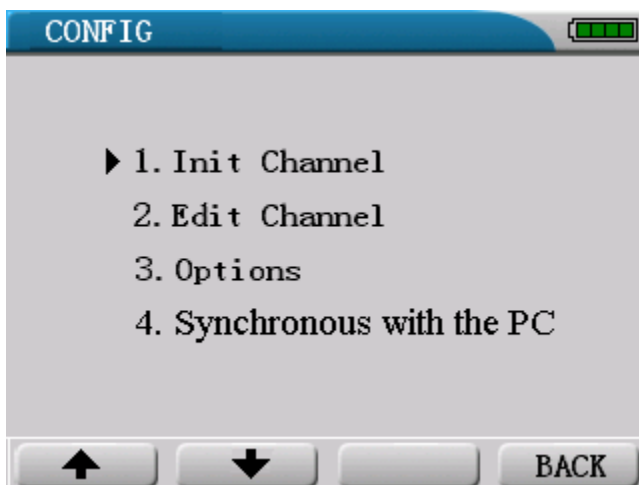


Fig 2-17

There are four functions: initiate channel, edit channel, options and synchronous with the PC.

(1)“Init Channel” initiate channel

Under [CONFIG] interface press **F1**、**F2** or direction keys [**▲**][**▼**] to choose “Init Channel”. Press **ENTER** key to confirm and enter (as shown in fig 2-18) Press direction keys [**▲**][**▼**] to choose the needed channel plan, then press **ENTER** key to confirm. There will be a dialogue box as shown in fig 2-19. If you want to use the channel to initiate channel press **ENTER** key, or press the other key to return to previous interface.

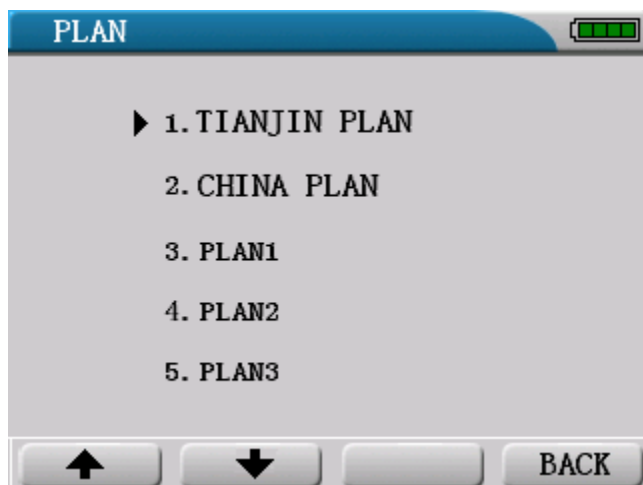


Fig 2-18

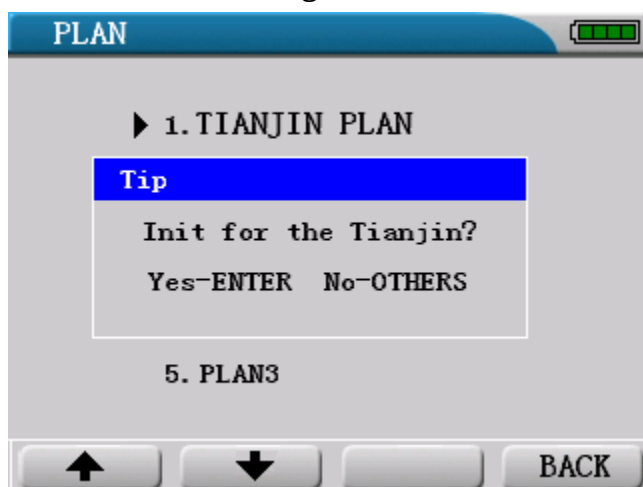


Fig 2-19

(2) “Edit Channel”

Under [CONFIG] interface press **F1**、**F2** or direction keys [**▲**][**▼**] to choose “Edit Channel”. Press **ENTER** key to confirm and enter. (as shown in fig 2-20)

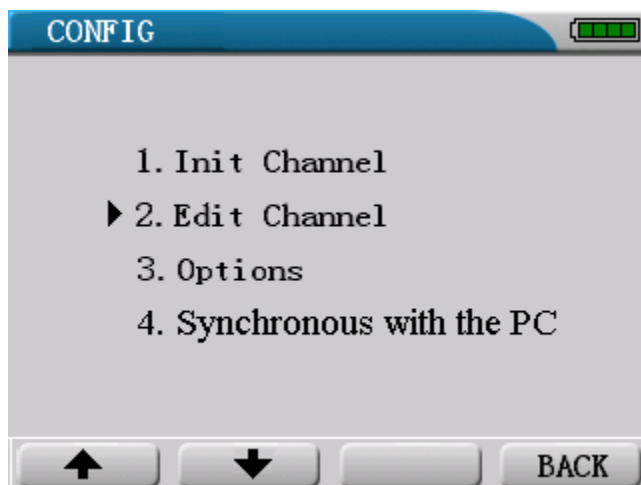


Fig 2-20

Press **F1**、**F2** or direction keys **[▲]****[▼]** to choose channel to be edited (as shown in fig 2-21) then press **ENTER** key to confirm and enter edit channel parameter interface. (as shown in fig 2-22)

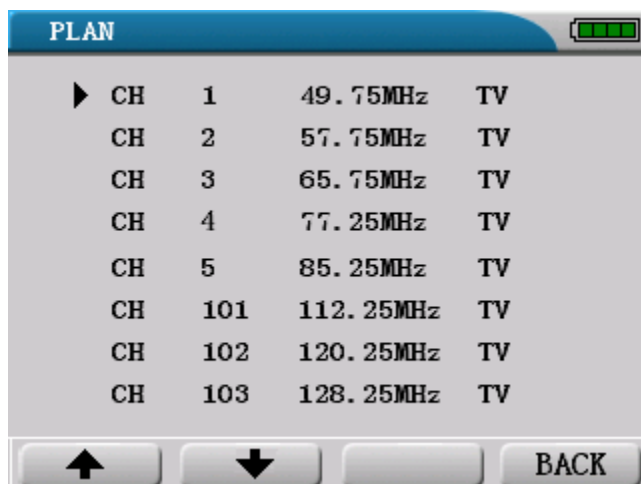


Fig 2-21

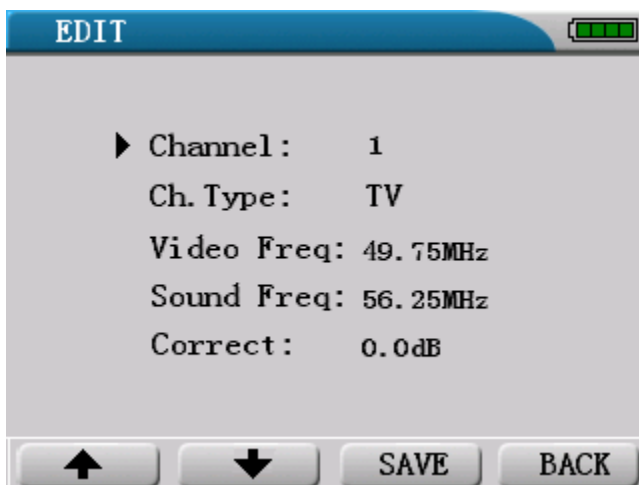


Fig 2-22

a. “Channel” channel number

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Channel’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input channel number and press **ENTER** key to confirm. (If the inputted channel number is the same as prestored channel number in the instrument, there will be a dialogue box to tell you channel number repeated.) (as shown in fig 2-23)

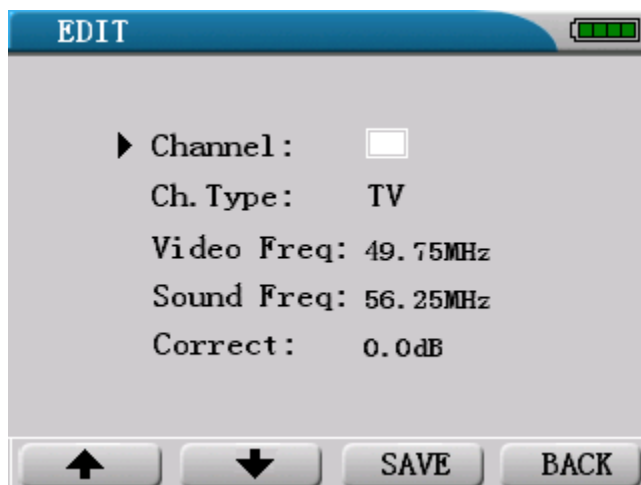


Fig 2-23

b. “Ch. Type” channel type

Press **F1**、**F2** or direction keys [▲][▼] to make arrow point to ‘Ch. Type’, then press **ENTER** key to switch between “TV”(analogue) “DIGI”(digital). (as shown in fig 2-24)]

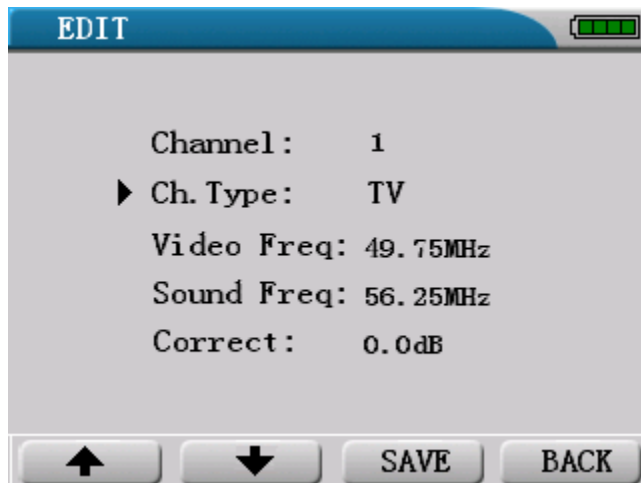


Fig 2-24

When the channel is “TV” namely analogue channel, parameters as follows:

c. “Video Freq” video frequency

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Video Freq’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input video frequency, and press **ENTER** key to confirm. (as shown in fig 2-25)

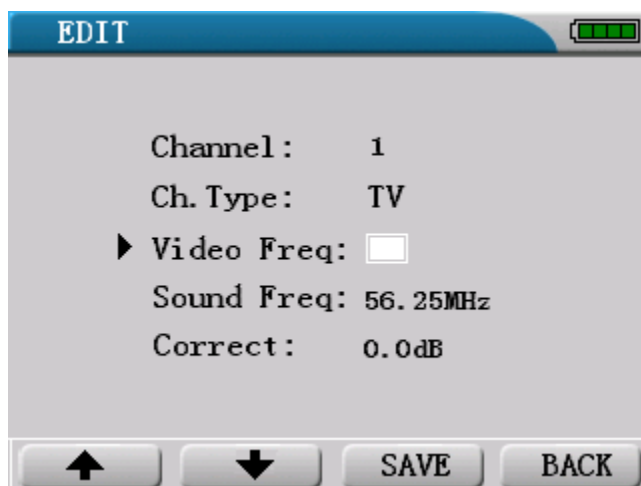


Fig 2-25

d. “Sound Freq” sound frequency

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Sound Freq’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input sound frequency, and press **ENTER** key to confirm. (as shown in fig 2-26)



Fig 2-26

If the channel is “DIGI” namely digital channel, parameters as follows:

e. “Freq” frequency

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Freq’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input frequency, and press **ENTER** key to confirm. (as shown in fig 2-27)

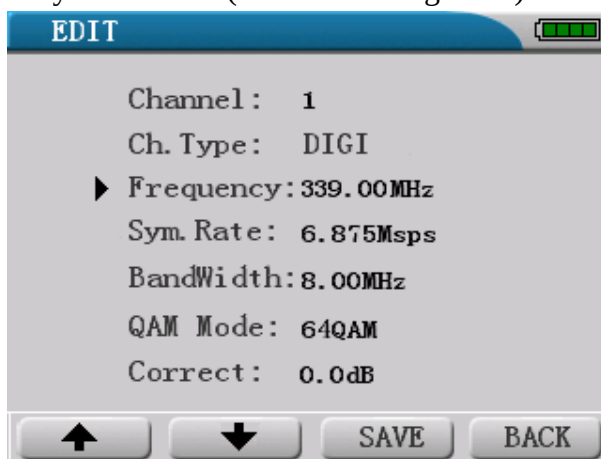


Fig 2-27

f. “Sym. Rate” symbol rate

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Sym. Rate’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input symbol rate, and press **ENTER** key to confirm. (as shown in fig 2-28)

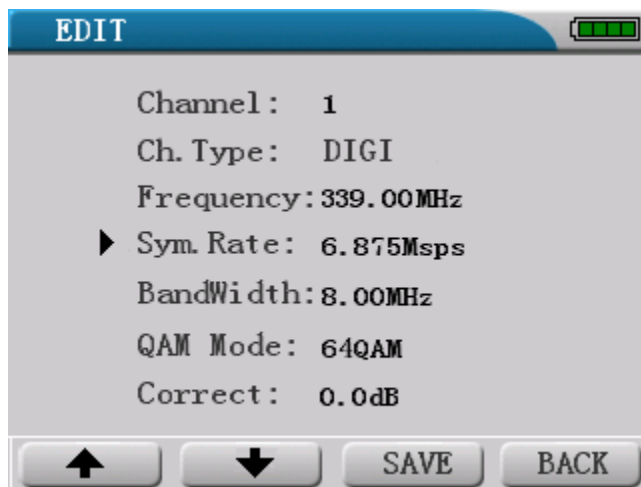


Fig 2-28

g. “Band Width”

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Band Width’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input bandwidth, and press **ENTER** key to confirm. (as shown in fig 2-29)

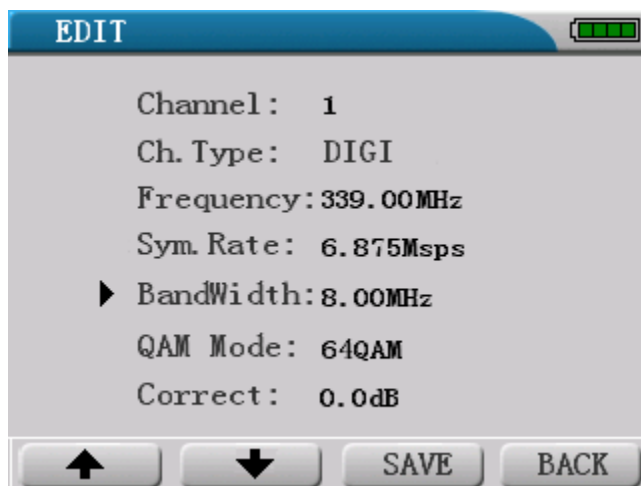


Fig 2-29

h. “QAM Mode”

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Mode’, then press **ENTER** key to switch between 16QAM, 32QAM, 64QAM, 128QAM and 256QAM. (as shown in fig 2-30)

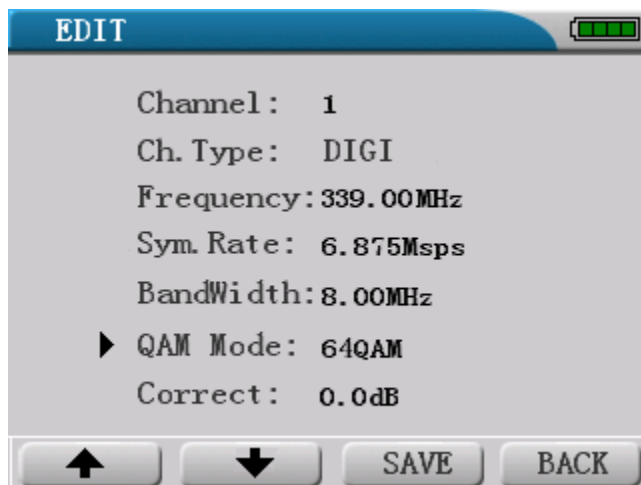


Fig 2-30

i. “Correct”

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to ‘Correct’, then press **ENTER** key to confirm. There will be an underline under current numbers. Then press number keys to input correct level value(the range is -9.9dB~9.9dB), and press **ENTER** key to confirm. Press **F3** to save.(as shown in fig 2-31)

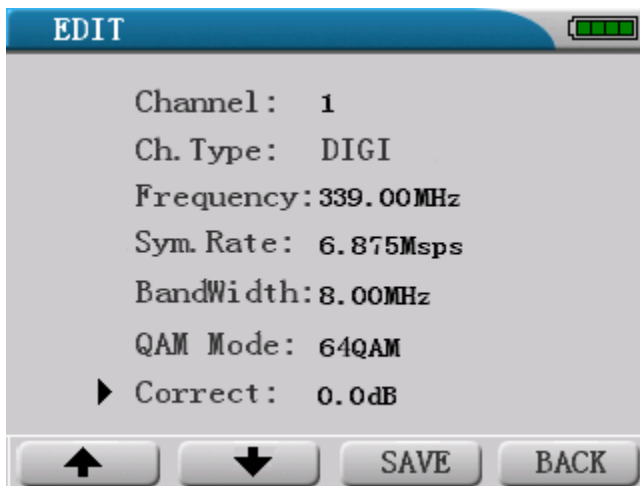


Fig 2-31

(3) “Options”

Under [CONFIG] interface press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to “Options” ,then press **ENTER** key to confirm and enter options function. (as shown in fig 2-32)

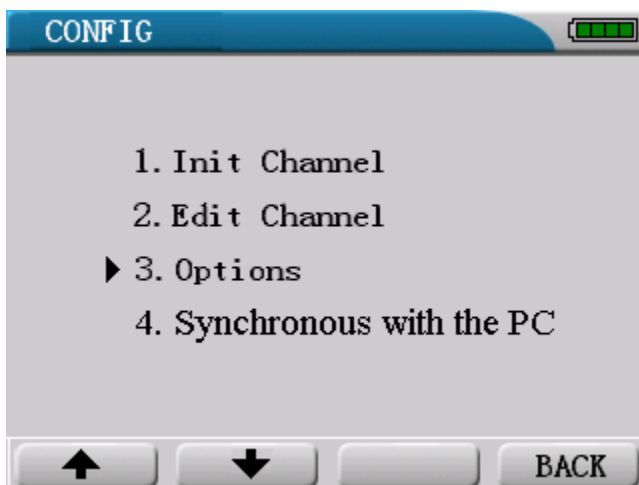


Fig 2-32

a. “Standard”

Press **F1**、**F2** or direction keys **▲**][**▼**] to make arrow point to “Standard”, then press **ENTER** key continuously to switch between J.83 A/C and J.83 B. J.83 A/C is the European standard which is suitable in mainland China and Europe's user, J.83 B is the North America standard which is suitable for North America's user. (as shown in fig 2-33.)

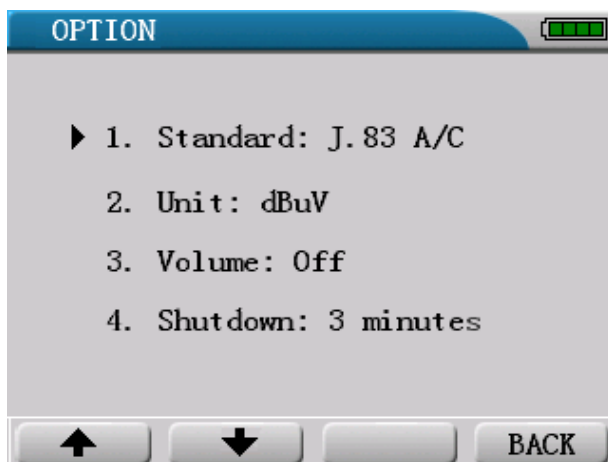


Fig 2-33

b. “Unit”

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to “Unit”, then press **ENTER** key continuously to switch between dBuV、dBmV and dBm. (as shown in fig 2-34)

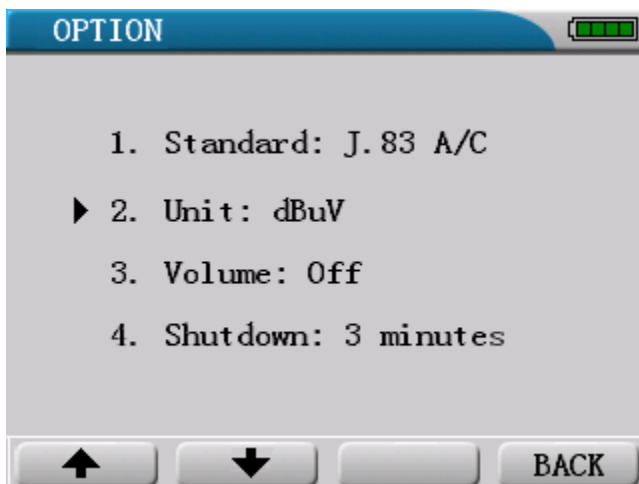


Fig 2-34

c. “Volume”

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to “Volume”, then press **ENTER** key continuously to switch between ‘Low’, ‘Middle’, ‘High’ and ‘Off’. (as shown in fig 2-35)

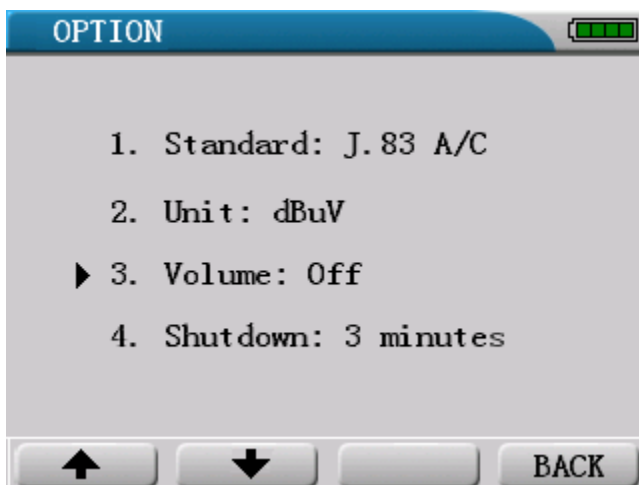


Fig 2-35

d. “Shutdown” automatic shutdown

Press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to “Shutdown”, then press **ENTER** key continuously to switch between ‘3m’(3 minutes) ‘10m’(10 minutes) ‘30m’(30 minutes) and ‘always’(always on). (as shown in fig 2-36)

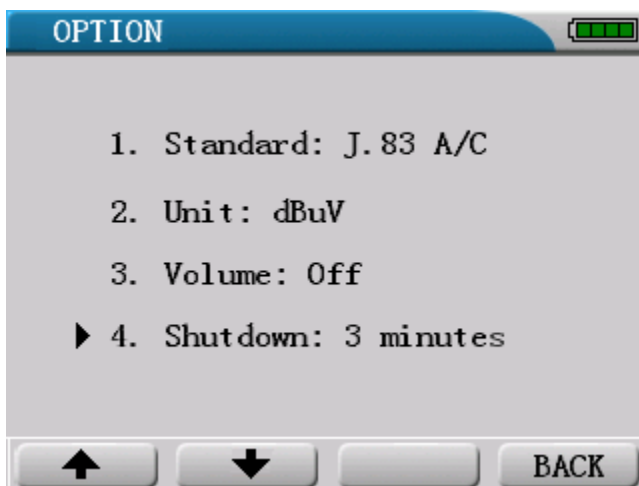


Fig 2-36

(3) “Synchronous with the PC”

Under [CONFIG] interface press **F1**、**F2** or direction keys [**▲**][**▼**] to make arrow point to “Synchronous with the PC” ,then press **ENTER** key to confirm and enter synchronous with the PC function. (as shown in fig 2-37)

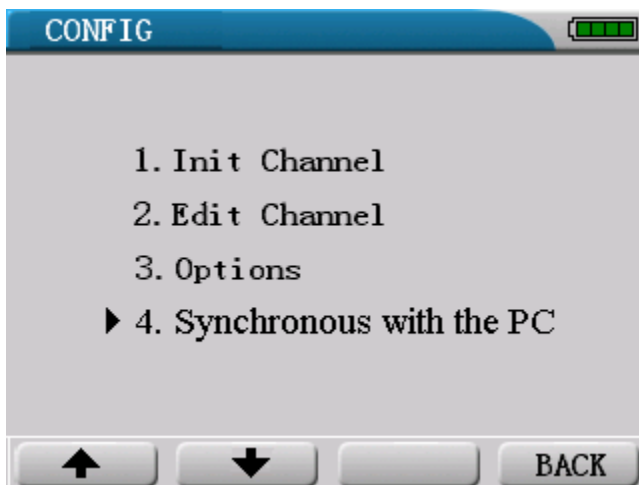


Fig 2-37

This feature allows instruments and computers synchronization. Connect the PC with a data cable, as shown in Figure 2-38. Insert the CD-ROM, double-click the PCsyn.exe to enter [Synchronization Software] menu, select the COM port that is used for connecting with PC, click [synchronous] button simultaneously to achieve synchronization with the computer, click the [Save] button, the measurement can be saved as a text file for the user to print. As shown in Figure 2-39,2-40,2-41.

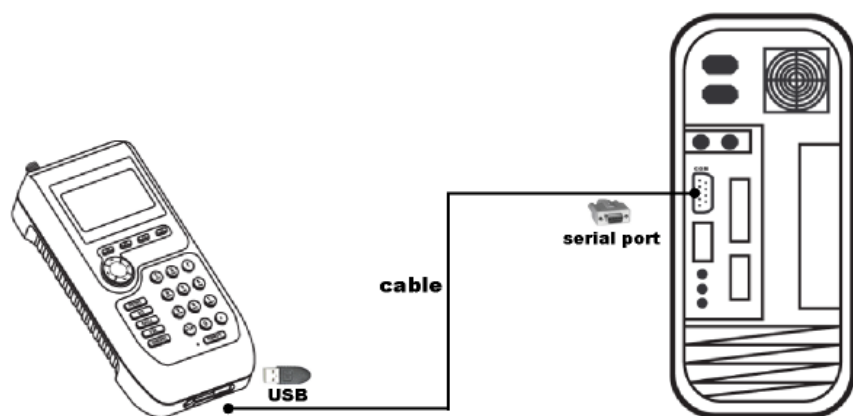


Fig 2-38



Fig 2-39

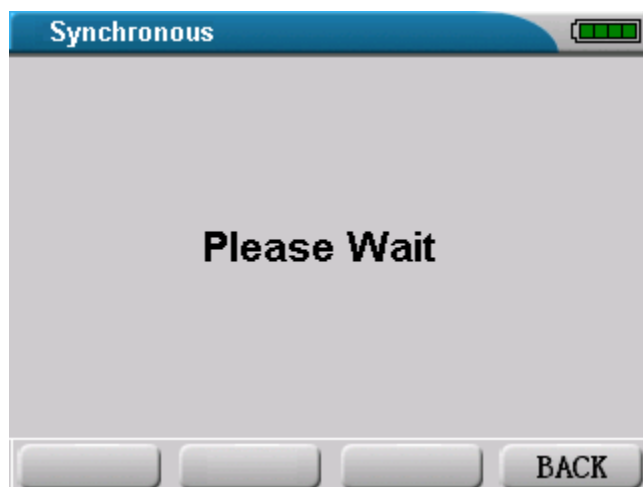


Fig 2-40

Chapter Four, Power Supply

A piece of high performance built-in battery (6V MH-Ni battery) supplies the power of this instrument. The power supply adapter can supply power also. This instrument can be used 4 hours continuously if fully charged.

Note :

1. The instrument has an automatic saving power unit. When there is no operation on the keyboard close to the time which it was set for an automatic turning off, the instrument will make “beep” sound. If beyond that time it will make another “beep” sound and then automatically shut off the instrument.
2. The instrument has an automatic battery voltage test function. Users can estimate the consumption of battery voltage by checking the volt of battery displayed on the upper right corner of screen. It also has a lack of voltage alarm function. When the voltage of the battery is below $5.8V \pm 0.2$, it will make a “beep” sound. That could tell user needs to charge battery in time. Or else, it'll automatically turn off.
3. Please charge the battery as soon as possible with the special power supply adapter that we provided. When you use the power supply adapter, please insert its direct current plug into the DC socket which is at the bottom of the instrument and insert its other alternating current plug into the power-outlet. When the red light is on, that means the instrument is connected with the power supply adapter and is charging.
4. The instrument should be turned off while charging for the protection of the battery and instrument. The time to fully charge the battery is approximately 10 hours. When fully charged, please pull out the power supply plug and store it carefully for the next time use.

Since the battery is specially customized for our instrument, please ensure to use it only for charging. The company will not be responsible for the repairs and will not compensate for any loss or damage caused by using other power supply adapters.

Chapter Five, Technical Data

Frequency range: form 5MHz~870MHz

A: Analogue television channels Measurement

Bandwidth: 280kHz $\pm$ 50kHz

Input impedance: 75 Ω

Range: 25dB μ V~120dB μ V

Accuracy: 1.5 dB (At 25 $^{\circ}$ C)

B: Digital television channels Measurement

MER: 19~40dB

BER: 1.0E-2 to 1.0E-8

Symbol rate: 1MS/S-7MS/S

Demodulation: 16/32/64/128/256QAM

DVB-C/ITU-T J.83-Annex A/B/C

Digital power: 40dB μ V-110dB μ V

Accuracy: 2dB

金赛讯(天津)电子技术有限公司

Jinsaixun(Tianjin)electronics technology co., ltd

+86-22-28244556

www.tjjinsaixun.com