

HV-122-DCA

DVB-T 2-Way Diversity Receiver Box

Quick Installation Guide

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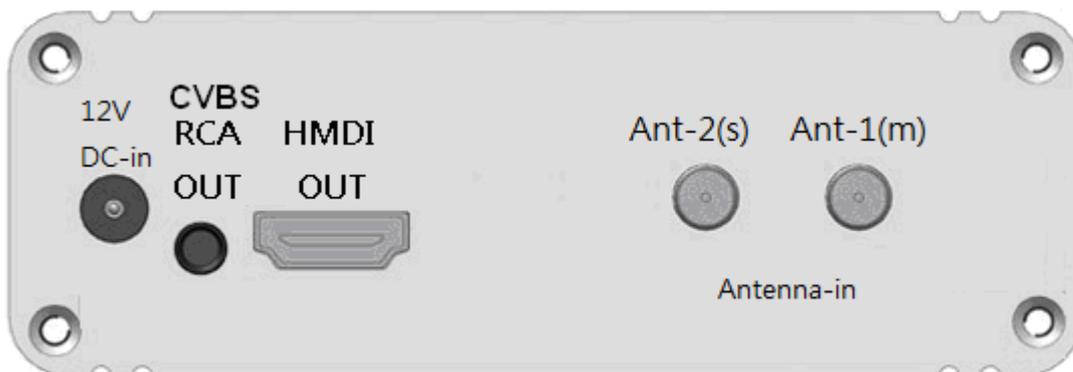
Package Contents

- HV-122 Diversity Receiver Box
- 12V DC adapter
- CVBS & Line-out cable
- Remote Controller (type A, B, or C)
- Firmware version code:
 - V0.0.6.72.149
 - Low latency firmware for HV-310Tx/HV-320Tx: V0.0.6.79.96

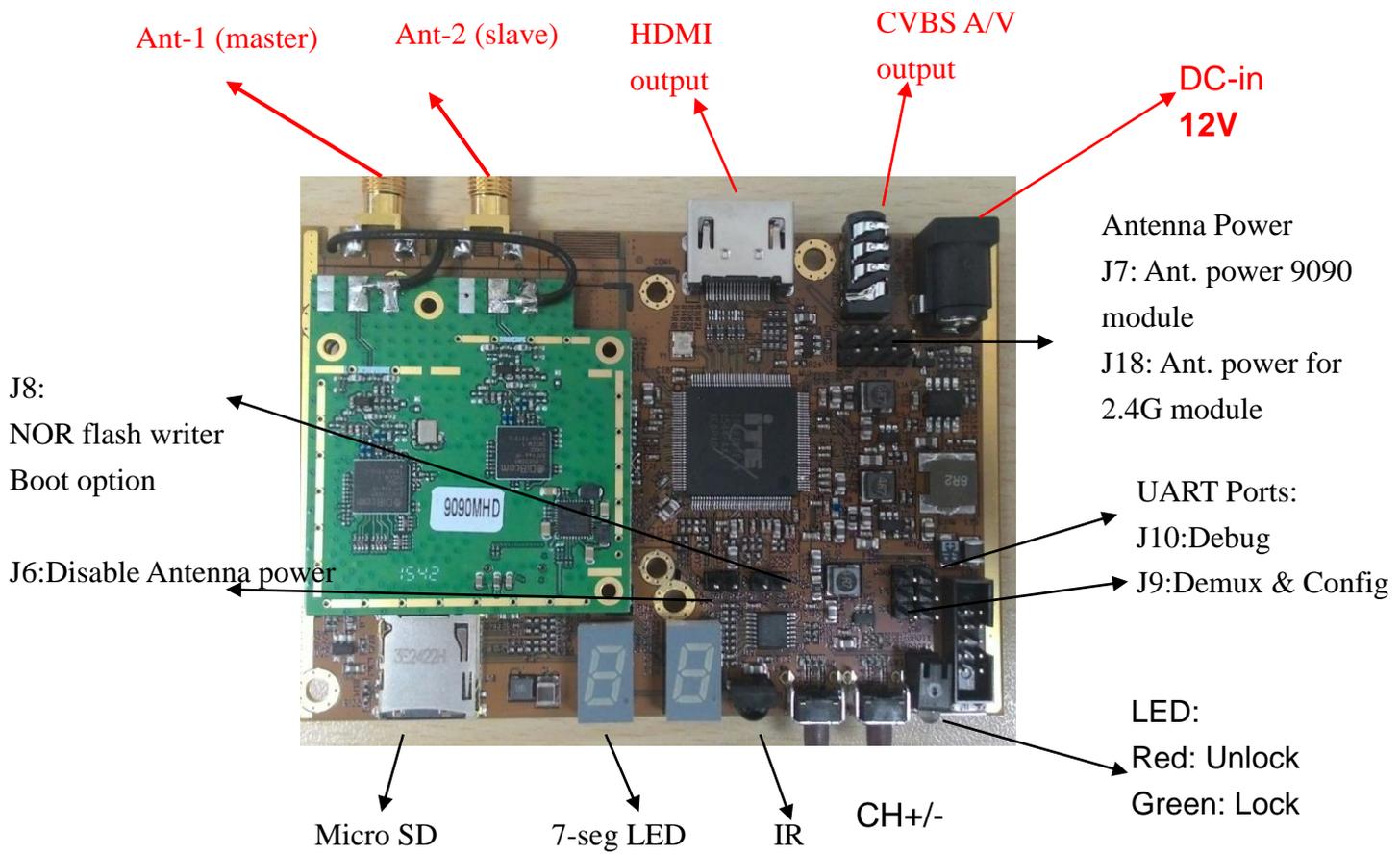
Front Panel View



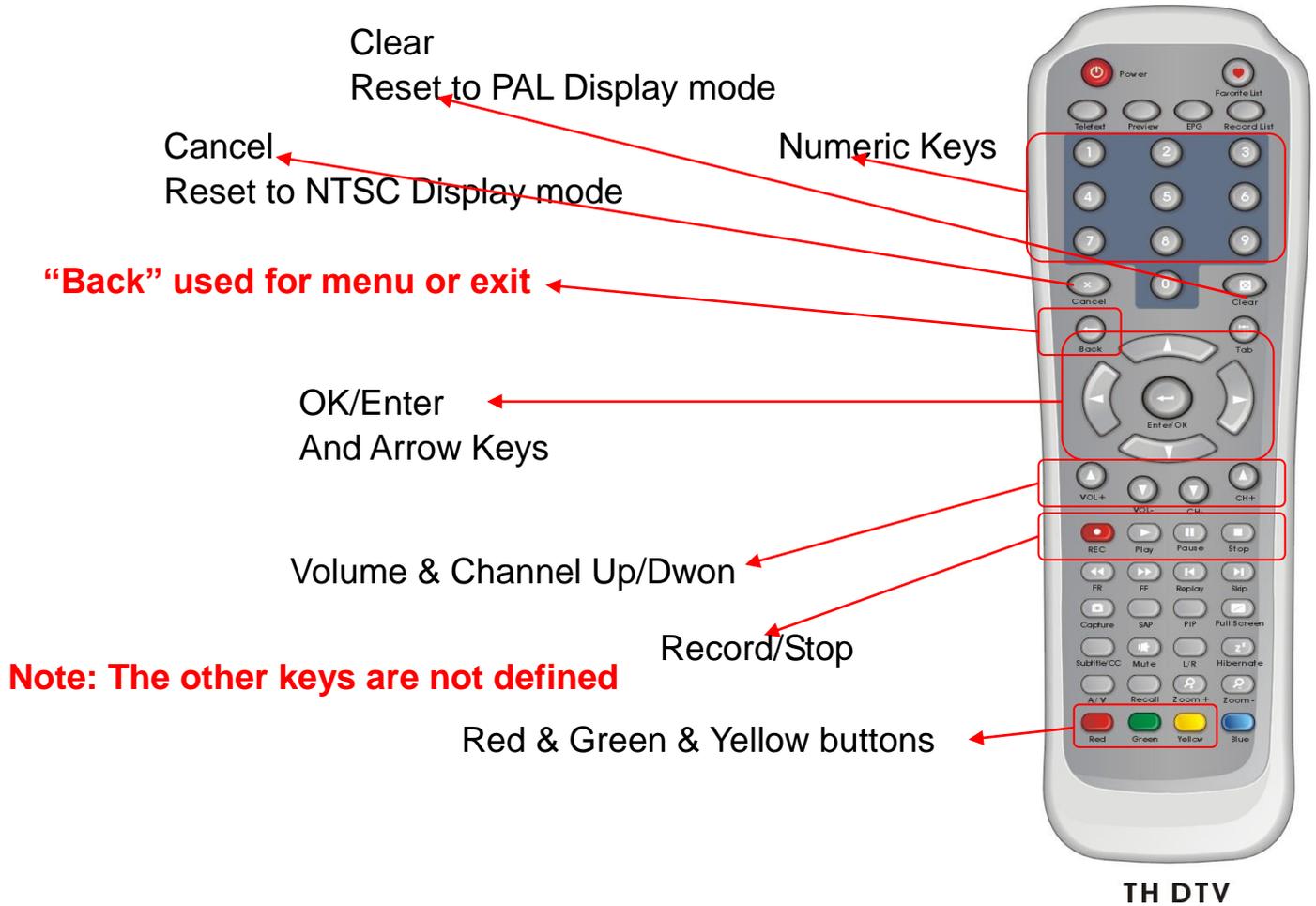
Back Panel View



Board View



IR Remote Controller-TYPE A



Fill Battery to IR Controllers: AAA x 2 pcs



IR Remote Controller-TYPE B

Power button
Reset to PAL CVBS display mode

F1 button
Reset to NTSC display mode

OK/Enter
And Arrow Keys

menu and exit keys

Note: The other keys are not defined

Red & Green & Yellow buttons

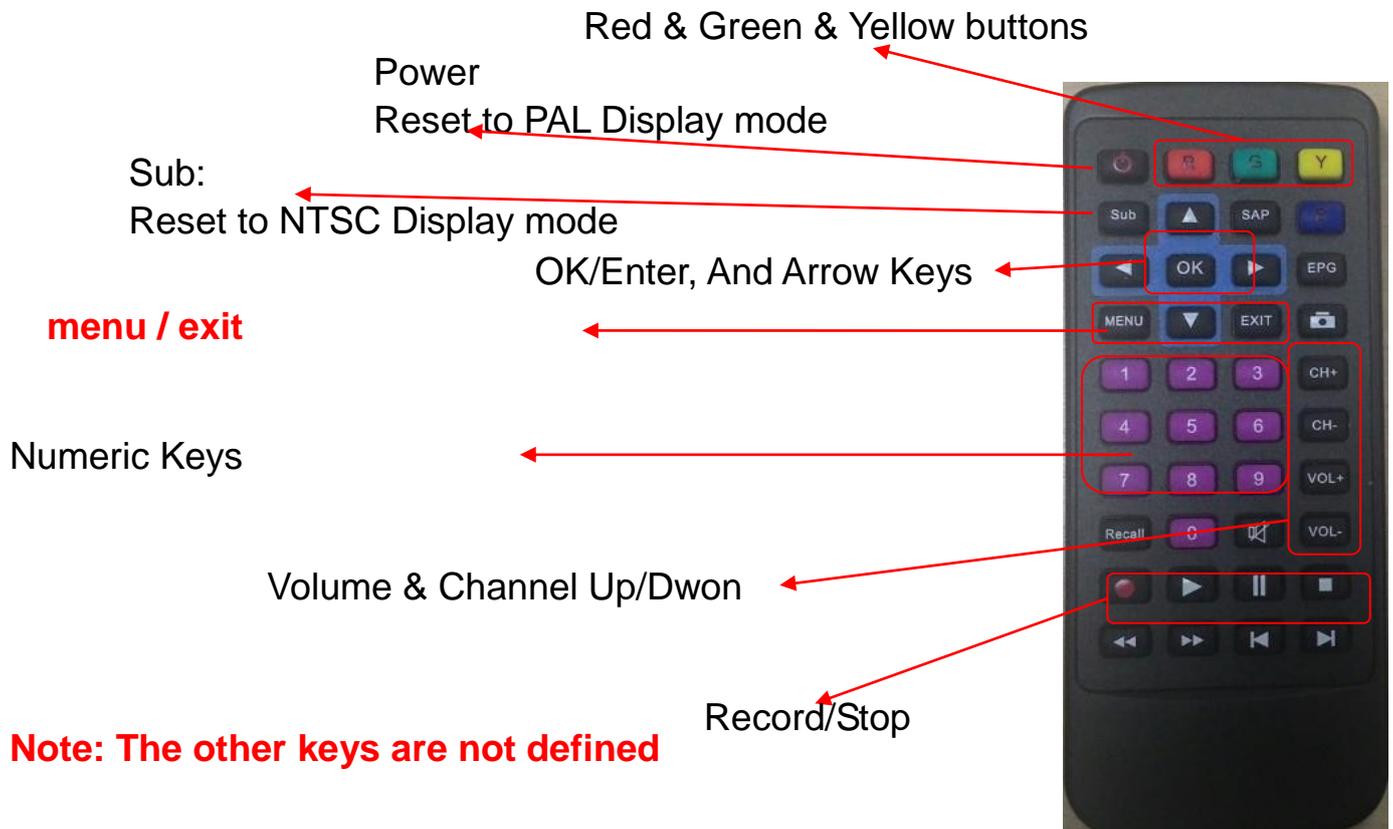


Remove Battery Protector

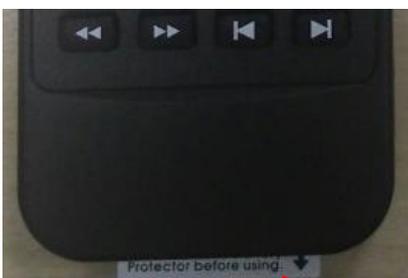


Remove the thin plastic film

IR Remote Controller-TYPE C



Remove Battery Protector



Remove the thin plastic film

Power on

HV-122-DCA can support 1/1.5/2/2.5/3/4/ 5/6/7/8 MHz bandwidth DVB-T signal automatically, and there no need to set bandwidth mode switch as HV-110.

Apply DC **12V** to the power jack.

Note:

In Single antenna mode, the bandwidth support is 1/1.5/2/2.5/3/4/ 5/6/7/8 MHz

In Diversity antenna mode, the bandwidth support is 2.5/3/4/ 5/6/7/8 MHz

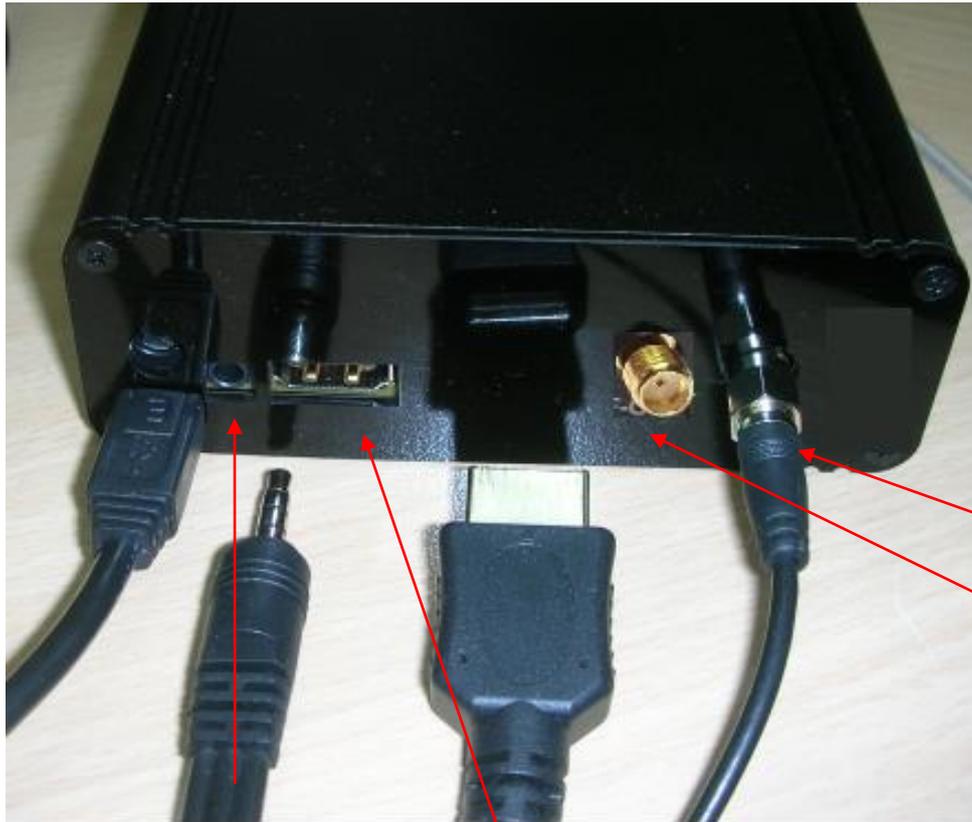
Connect RF-in and the display output

There are two antenna ports for diversity reception; one is master while the other is slave.

To get the best performance, please install both antennas.

Active antenna (12V power) is also supported, but you need to install a jumper on the board and enable it in the menu. More details described later.

Both HDMI and CVBS output are supported simultaneously, but the mechanical design allows only one to be connected.



Antenna-in

Master

Slave

CVBS and Line-out

HDMI output

Channel Scan

It's necessary to do channel scan in the first time usage.

When the box is powered on well, click on the IR "Back"/"Menu" key to popup the menu



Select Installation. There are three modes to scan channel, auto scan, manual scan and manual input.

The auto scan mode will scan a predefined channel frequency list to find TV service.

The manual scan mode scans a channel specified by the user input.

The manual input mode allow user to specify the program channel frequency, bandwidth and audio/video/PMT/PCR PID's directly..

Channel Scan-Auto mode



1. You may select a Country to do auto scan
2. Country: ATV-2/3/4M is for Europe DATV 2/3/4 MHz BW channel list auto scan
3. Country: ATV-6M is for Europe DATV 6 MHz BW channel list auto scan
4. Country: ATV(US)-2/3/4M is for USA DATV 2/3/4 MHz BW channel list auto scan
5. Country: ATV(US)-6M is for USA DATV 6 MHz BW channel list auto scan
6. Click on Remote Controller “Red” button to start auto scan.

ATV-2/3/4M Channel list

Frequency(MHz)	Bandwidth(MHz)
423.000	2
423.000	3
434.000	2
434.500	2
436.000	2
436.000	3
436.500	2
437.000*	2
440.000	3



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440.000	2
515.000	2
560.000	2
604.000	2

* 437/2M is added from version V0.0.1.71.4

ATV-6M BW Channel list

Frequency(MHz)	Bandwidth(MHz)
515	6
525	6
535	6
560	6
580	6
604	6
612	6
624	6

ATV(US)-6M BW Channel list

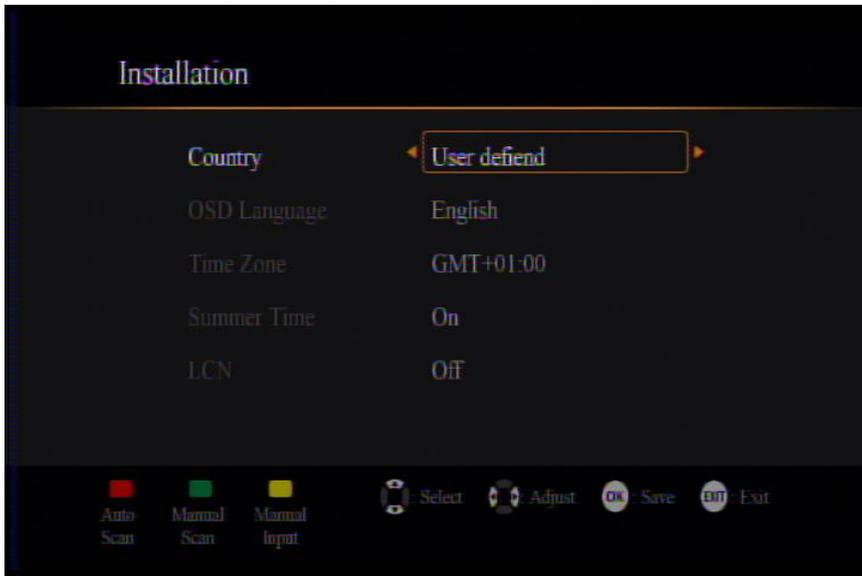
Frequency(MHz)	Bandwidth(MHz)
423	6
429	6
435	6
441	6

ATV(US)-2/3/4M BW Channel list

Frequency(MHz)	Bandwidth(MHz)
423	2
423	4
429	2
434	2
434	4
435	2
438	2
438	4
439	2
439	4
441	2

User Defined Channel List

In “Auto scan”, you may select the country “User Defined”, which is user configurable.



You may define your own channel list by modifying a text file, named “CustomChannelTable.txt”. A sample “CustomChannelTable.txt” is included with this release for reference.

To load the new user defined channel list, please

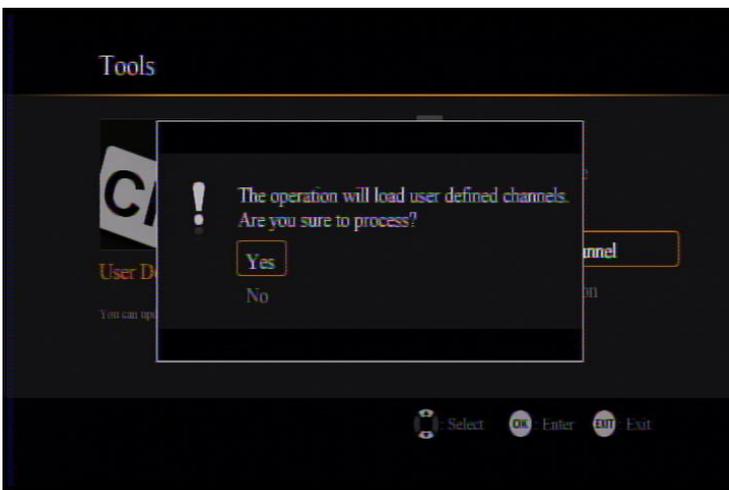
1. copy the file to an SD card.
2. Put the SD card in the SD card



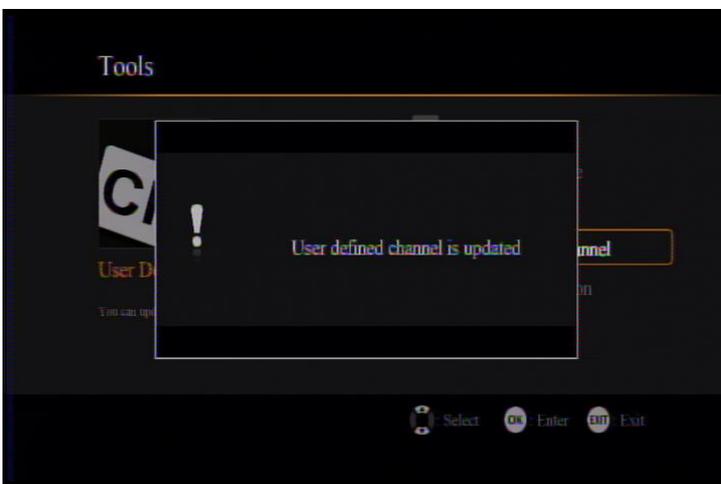
3. Enter Menu -> Tools, Select “User Defined channels”



4. Select "Yes" to update the channel list.



5. If "CustomChannelTable.txt" is read successfully from the SD card, it will show the following message to inform successful update.



Channel Scan-Manual mode



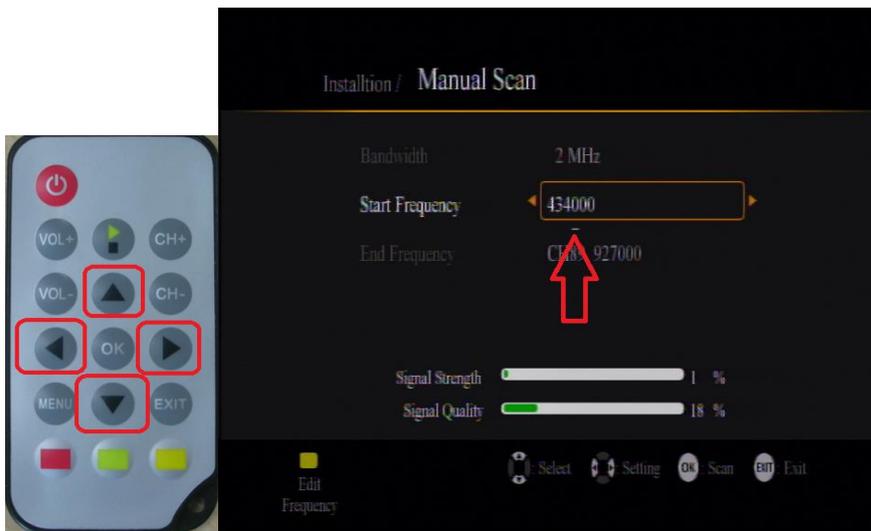
1. In installation menu, if click on Remote controller “Green” button, Manual Scan menu pops up.
2. Select the bandwidth by arrow keys
3. Specify the channel frequency manually,
 - A. Type-A RC, you may input with numeric keys (0~9)



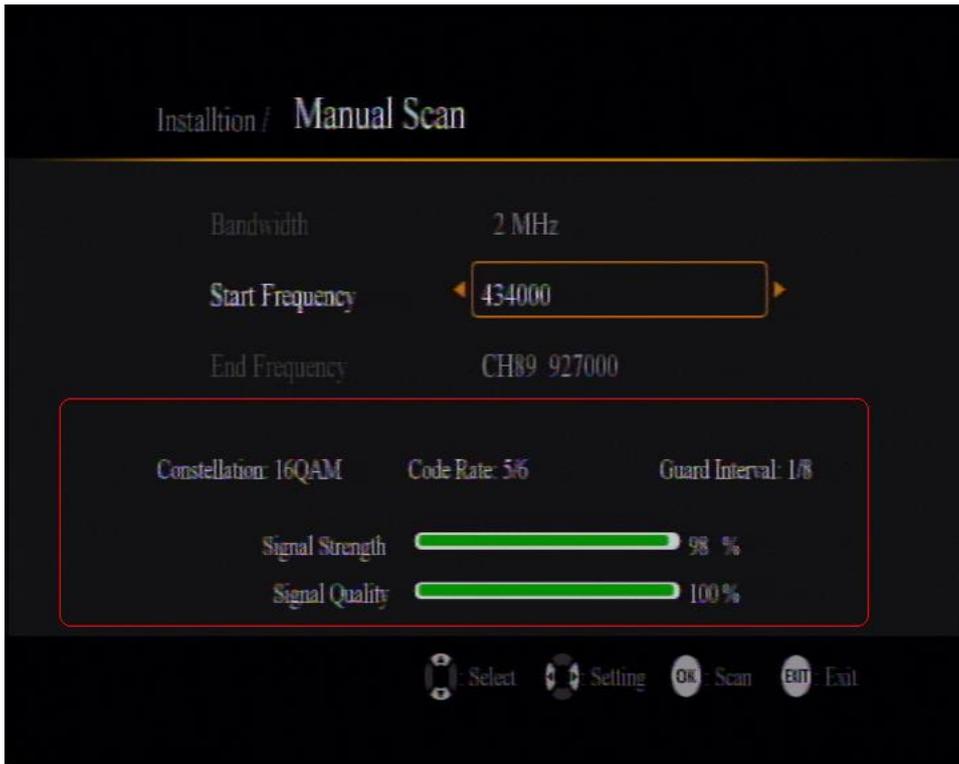
- B. Type-B RC,
 - i. please click on Yellow key first



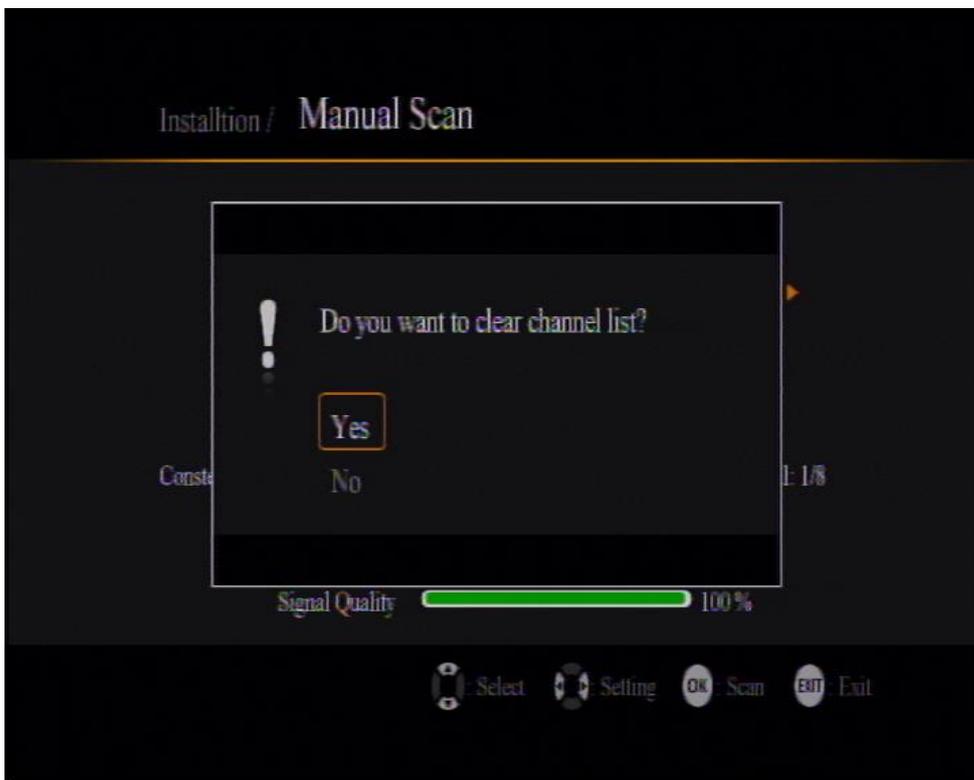
- ii. use arrow keys to edit the start channel frequency.



- 4. Don't care about "End Frequency" , which will be ignored
- 5. If the input channel frequency can be locked well, the transmission parameters (TPS), signal quality and strength will be shown, as show below. **You may adjust antenna direction to optimize the reception here.**



- Press "Enter/OK" to scan the specified channel, it will prompt a message to clear the old program list. You may select "Yes" to continue.



When scan is done and a service is found, it will start to play the first service found.



Channel Scan-Manual Input



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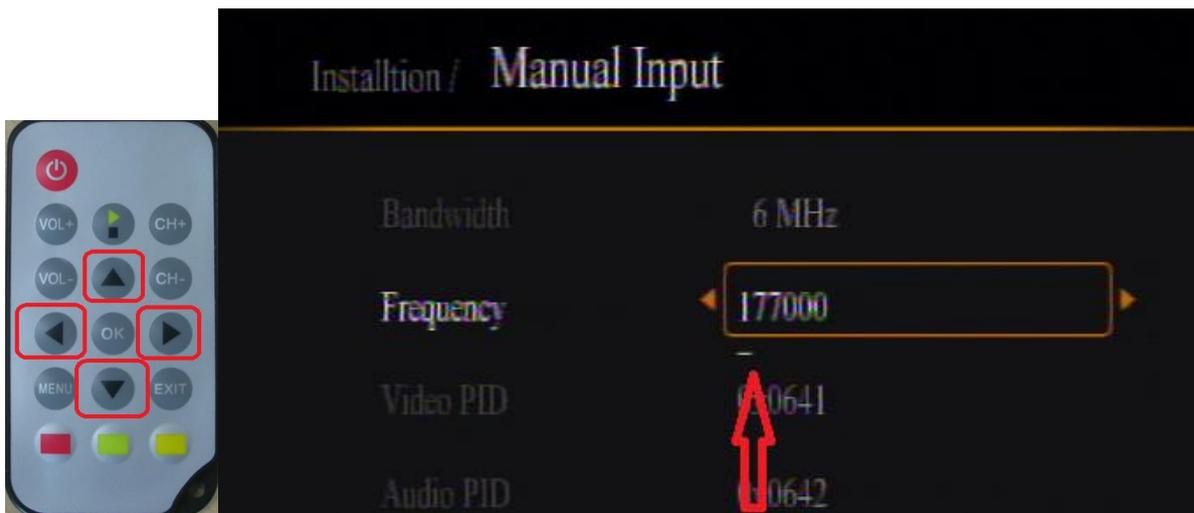
1. In installation menu, if click on Remote controller “Yellow” button, Manual Scan menu pops up.
2. Select the bandwidth by arrow keys
3. Specify the channel frequency manually,
 - A. Type-A RC, you may input with numeric keys (0~9)



- B. Type-B RC,
 - i. please click on Yellow key first



- ii. use arrow keys to edit the start channel frequency.



iii. Click “OK” button when the frequency input is done.

4. Video/Audio PID’s are specified in HEX, and please click on “Yellow” button to edit the PID’s with arrow keys, as described above.

Note:

- A. The default PID’s (video: 0x641, audio: 0x642) are set to the same as HV-10x and HV-20x. (and HV-310 with firmware 0.0.2.4.56 or later)
- B. In “Manual Input” mode, PAP/PMT mismatch handling mechanism is disabled.

(Hint: While a service/program is tuned and played well, you may click on “Yellow” button to learn the signal statistics and the PID’s of current service/program.)

Channel Switch in Manual Input mode

When you use “Manual Input” mode to specify the channel frequency, bandwidth and PID’s. You may switch channel by CH+/CH- keys. It will change the channel the channel frequency, bandwidth according to the channel table specified in “Channel Scan-Manual Input” menu. There are 5 channel tables, “6MHz”, “7+8MHz”, “7MHz”, “8MHz”, and “User Defined”. When you select “User Defined” channel table, the table is user configurable. Please refer to previous paragraph “User Defined Channel List” for more details.

Channel PAT Changed

When the source video of the channel is changed and if the PAT version code is different from the

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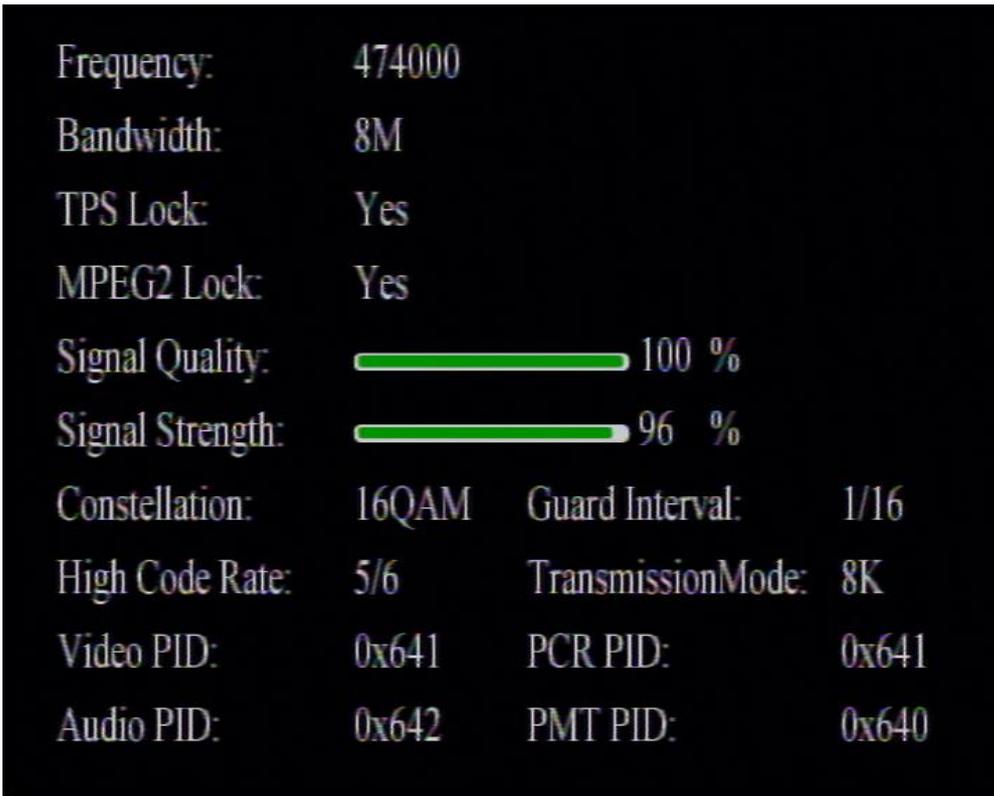
previous one, you may need to do channel scan again. Typical example is that the transmitter is changed from HV-100 to DC-101 or any other Tx devices.

If you start to play TV, and the following message pop up, please click on “OK” to do channel scan. (PAT is short for Program Association Table in a video transport stream.)



Show Signal Statistics

When watching TV, you may click on “Yellow” Key to pop up simple signal statistics for checking the transmission parameters or optimizing antenna direction.



You click on “Back”/”Exit” or “Yellow” key to close the signal statistics display, and show Signal OSD only service name (call sign), signal strength and SNR

You click on “Back”/”Exit” or “Yellow” key to close Signal OSD and return to TV only.

Frequency/Bandwidth



Master/Slave

MER

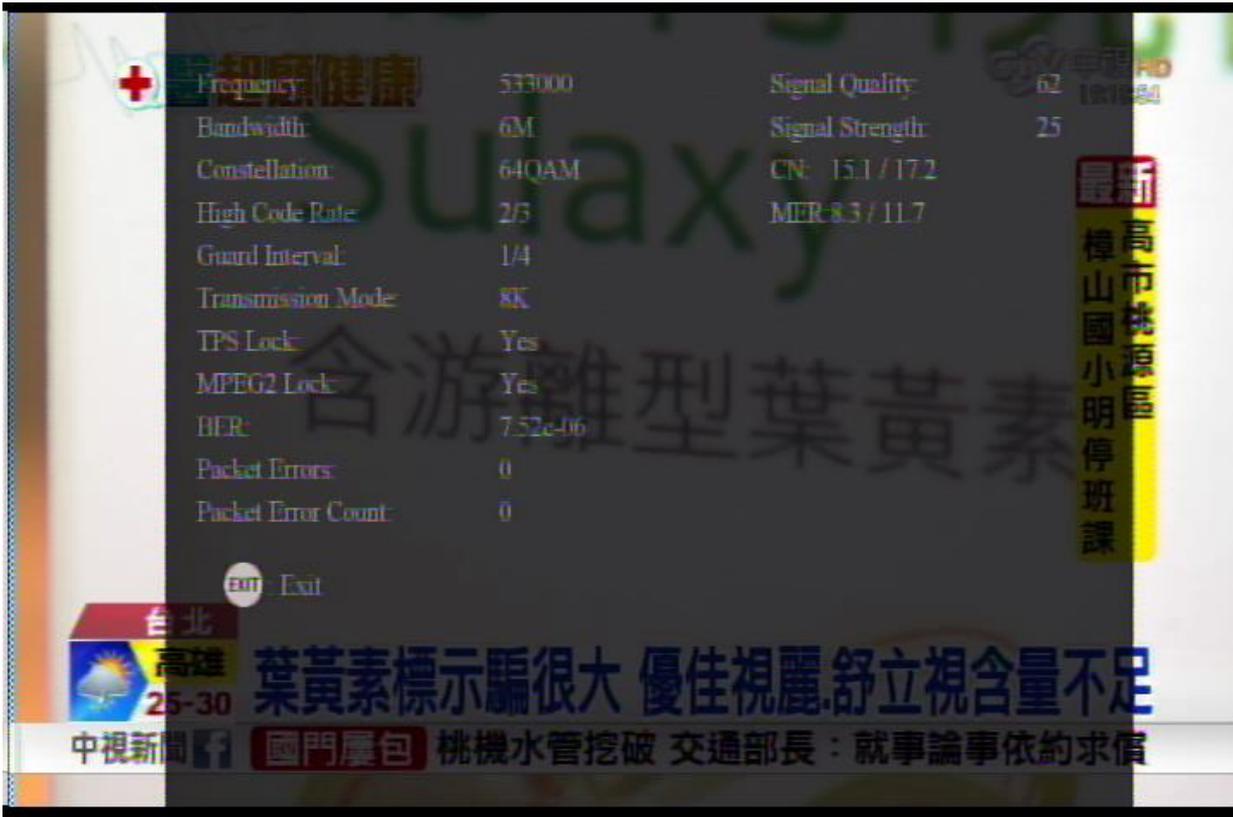
Service Name

Master/Slave

CNR

You may also click on “Green” Key to pop up detailed signal statistics info, as shown below. “Back”/”Exit” or “Green” key will switch to show OSD, then click again to return to TV only.

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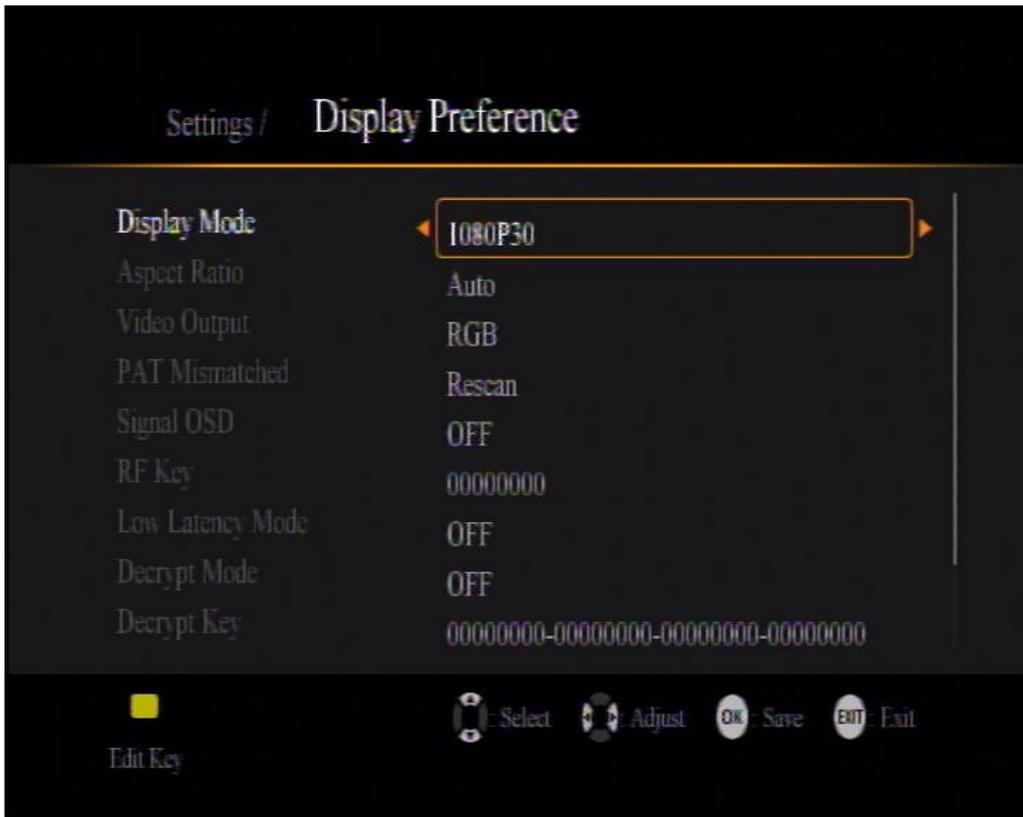


When signal statistics OSD is enabled, there might be snow noise sometimes, with HD service and HDMI display output specifically.



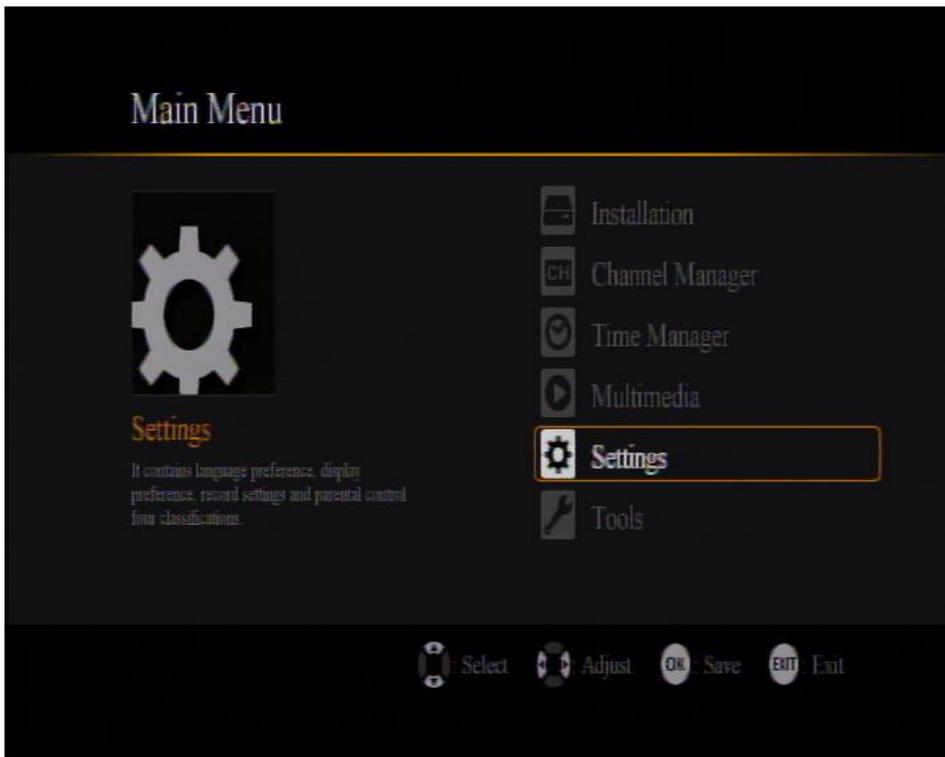
The problem is caused by the bottleneck of DDR memory access. You may minimize this problem by lowering display memory access.

In Menu-> Settings-> Display Preference, please set the display mode to 1080P30 or 1080P25 if the service is 1080P, and set to 720P30 or 720P25 if the service is 720P.

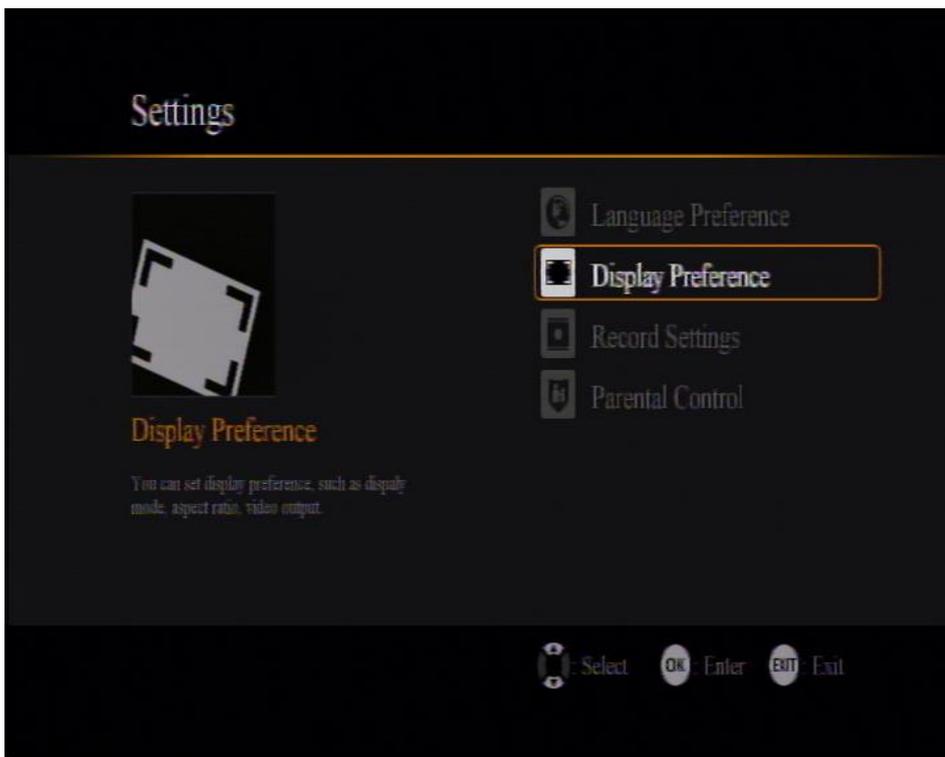


Set Display Preference: Display Mode

You may set the display output resolution and aspect ratio in this configuration option. Click on the IR "Back"/"Menu" key to popup the menu



Select Settings



Select Display Preference



When using CVBS AV, the display mode should be 576i50(PAL) or 480i60(NTSC)

The video output should be “CVBS”

If only HDMI output is used, you may set any Display Mode which is supported by the HDMI display.

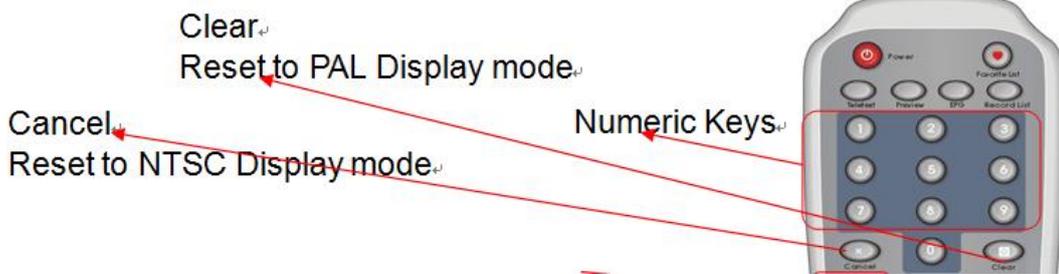
Note 1:

For firmware version from 5.72.104 (released on 2016/5/9):

If the display mode is set incorrectly, and the display is out of order, please

- A. click on the “Clear” key of the Type-A RC or “Power” key of the Type-B RC or “Power” key of the Type-C RC to reset the display mode to 720i50 PAL mode.**
- B. click on the “Cancel” key of the Type-A RC or “F1” key of the Type-B RC or “Sub” key of the Type-C RC to reset the display mode to 720i60 NTSC mode.**

Type-A:



Type-B:

Power button

Reset to PAL CVBS display mode

F1 button

Reset to NTSC display mode



Type-C:

Power

Reset to PAL Display mode

Sub

Reset to NTSC Display mode



Note 2:

Because your HDMI display may not support CVBS display modes, like 720x576i/720x480i, you may fail to set HV-110 720x576i/720x480i mode if your HDMI display attached.

You may change another HDMI display. Or, you can try in this way,

a. remove HDMI cable, and connect CVBS cable to CVBS display.

b. power on HV-110

c. press **the “Clear” key of the Type-A RC or “Power” key of the Type-B/Type-C RC** to set the display to PAL 576i for CVBS.

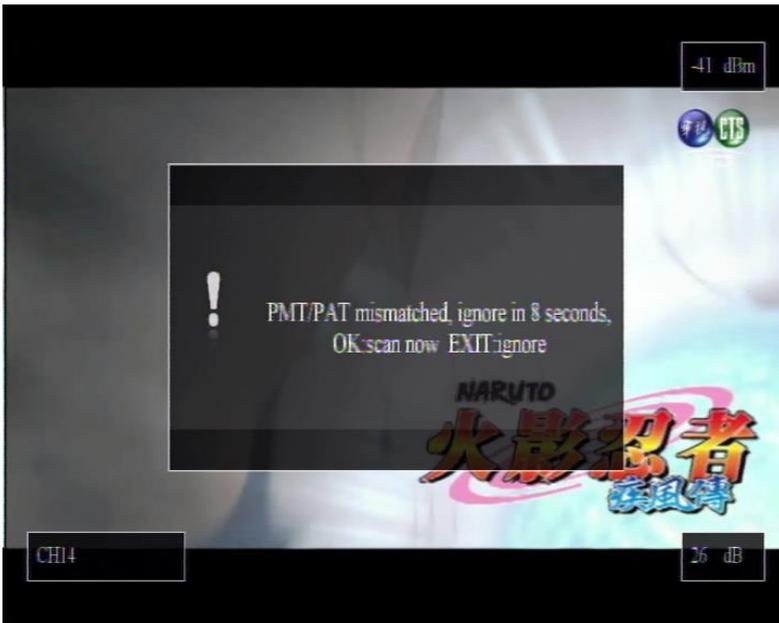
press **the “Cancel” key of the Type-A RC or “F1” key of the Type-B RC or “Sub” key of the Type-C RC** to set the display to NTSC 480i for CVBS.

Set Display Preference: PAT Mismatch

The setting is related to the default behavior when the channel’s PAT version code is changed.

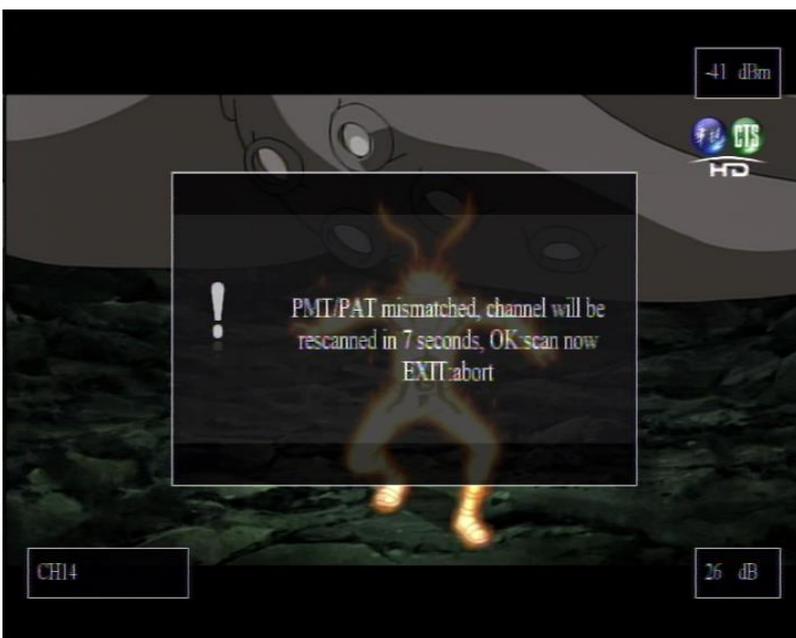
If the setting is OFF, it will pop up the following warning message.

If no user input, the message will disappear in 10 seconds and nothing is changed.



If the setting is ON, it will pop up the following warning message.

If no user input, the system will erase all channels and rescan the current channel automatically.



Set Display Preference: Signal OSD

If it's on, the signal OSD will be shown by default when power on.
 You may switch it off by clicking Green or Yellow key.

Frequency/Bandwidth

MER

Service Name

CNR



Record and Playback

From V0.0.1.72.10 on, "Record" feature is supported.

Note: the PVR feature is a trial release and provided as it is.

You may need to open the front panel to plug in a micro-SD card.

The micro-SD card should be formatted in FAT.

NTFS or other formats are not supported.



Click on the "Red" button to start recording.

In the upper-left corner, an OSD pops up to show the recording time.

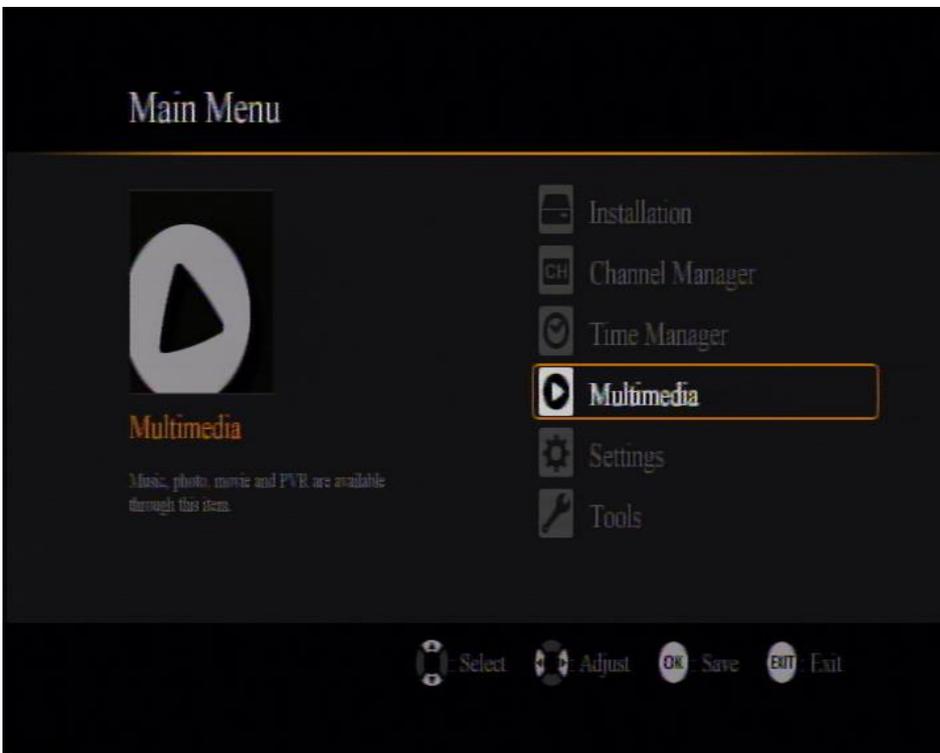


Click on the “Red” button again to stop recording.

The file recorded can be played in the main menu “Multimedia”.

Click on the IR “Back”/”Menu” key to popup the menu.

Select “Multimedia”.



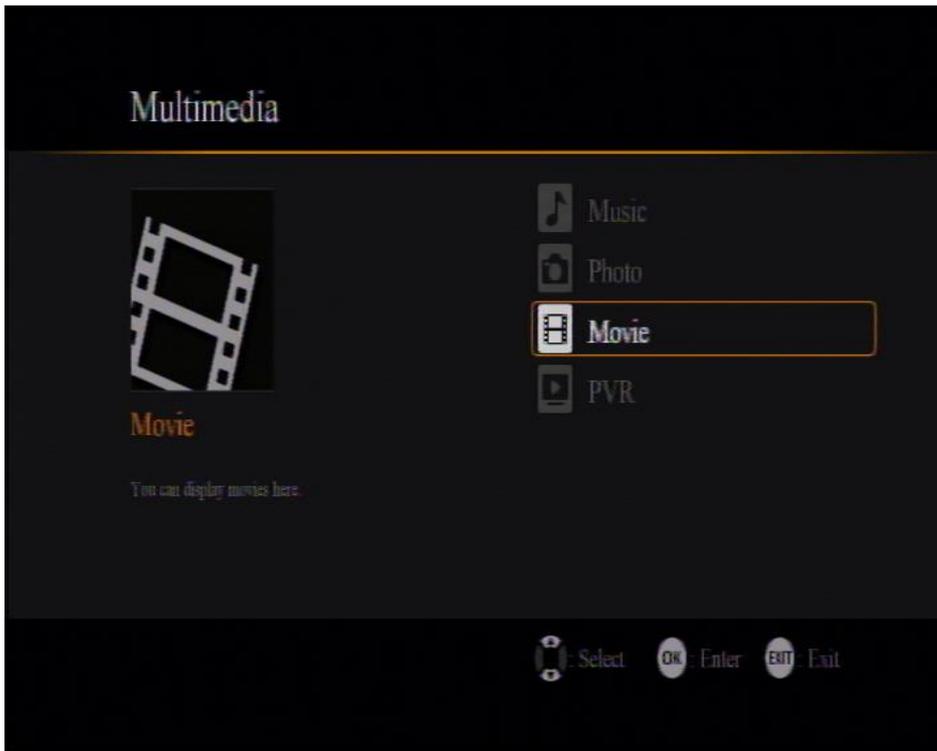
Select “PVR”.



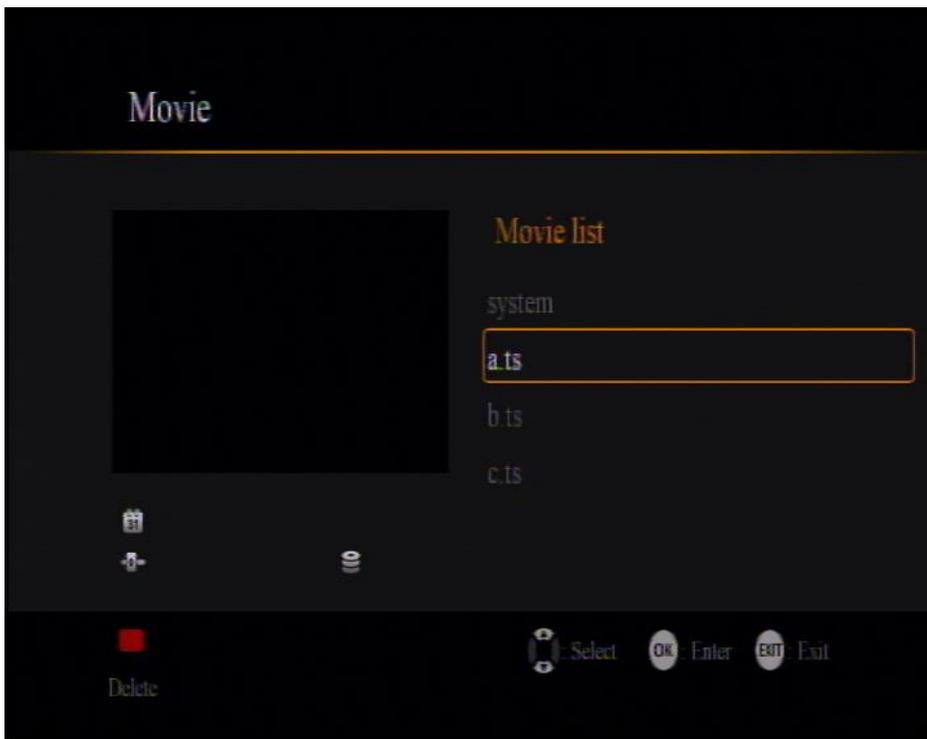
The file recorded is in TS format. If you want to play it in Windows environment, it's recommended to install VLC(<http://www.videolan.org/>) or MPC-HC (<http://mpc-hc.org/>).

Delete Recordings

Menu-> Multimedia->Movie



Click on "Red" Key to delete the selected file.

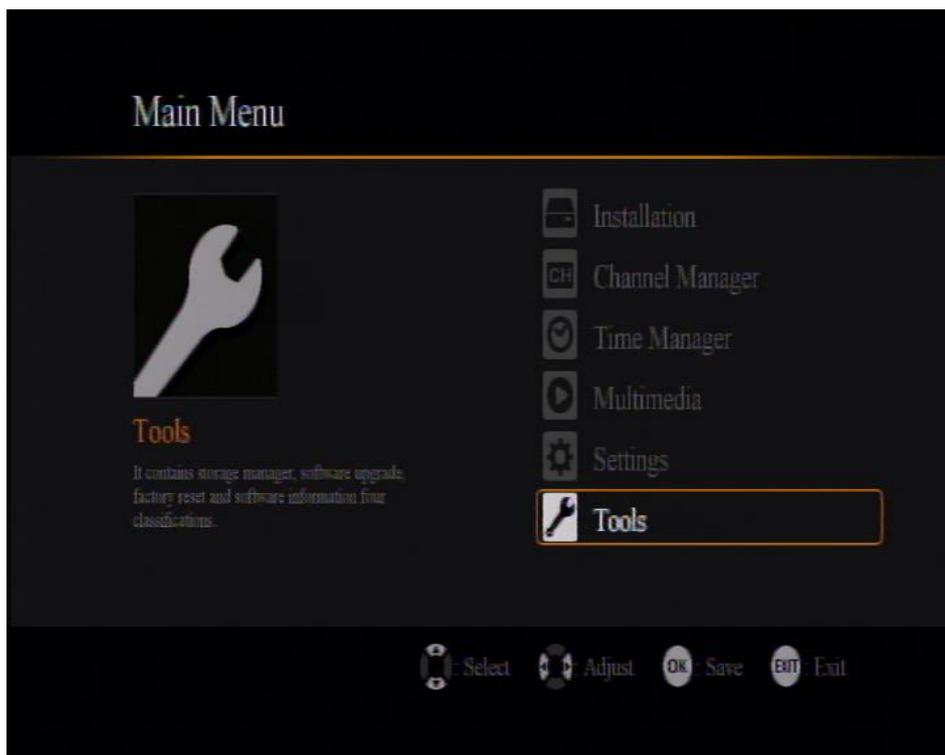


Reset System to Factory Default in Menu

If necessary, you can reset the receiver box to factory default.

The program list will be cleared and the display mode will be set to 720i50 PAL mode.

Click on the IR “Back”/”Menu” key to popup the menu



Select Tools.



Select Factory Reset.

If reset successfully, all channels will be cleared and it pops up channel scan menu.



Reset System to Factory Default by Hardware Buttons

When the system is configured wrongly, and cannot be reset to factory default in menu, you may reset it by hardware buttons.

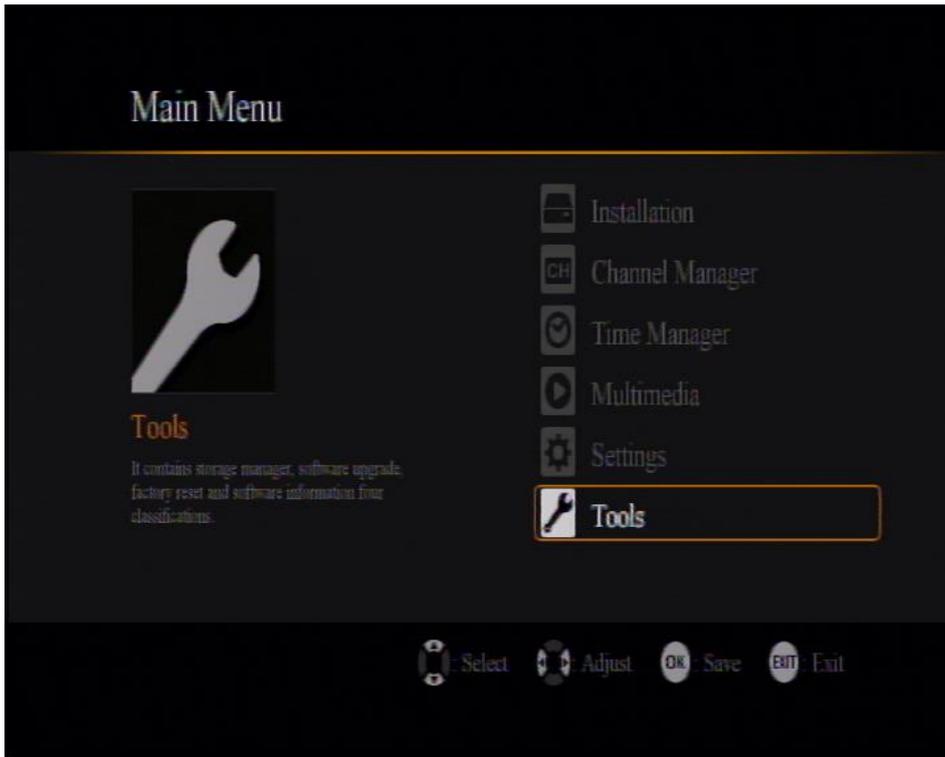


While pressing CH+ and CH- buttons on the front panel simultaneously for 3 seconds, the LED display will show “99”, reset to factory default and the configurations and program list will be cleared.

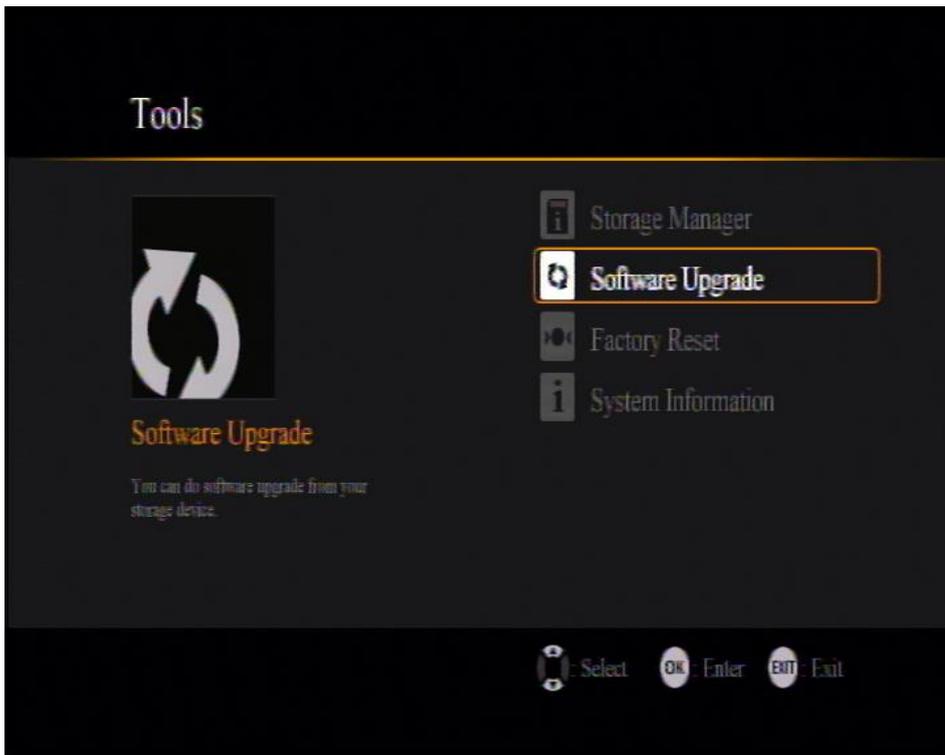
Firmware Update-SD card Method 1

There are two ways to update the firmware with SD card. You can choose either one to update the firmware of the box. If you cannot control HV-122 well with remote controller or the display is not normal, please use Method 2.

1. Copy the firmware image file “dtv.img” to the root directory of a micro SD card.
Note 1: the micro SD card should be formatted in FAT32 or FAT16.
Note 2 Please delete the file dtv_temp.img on the SD card if it exists.
Note 3 the firmware image file “dtv.pkg” is used with a flash kit, described below.
2. Click on the IR “Back”/“Menu” key to popup the menu, and select “Tools”



3. Select "Software Upgrade"



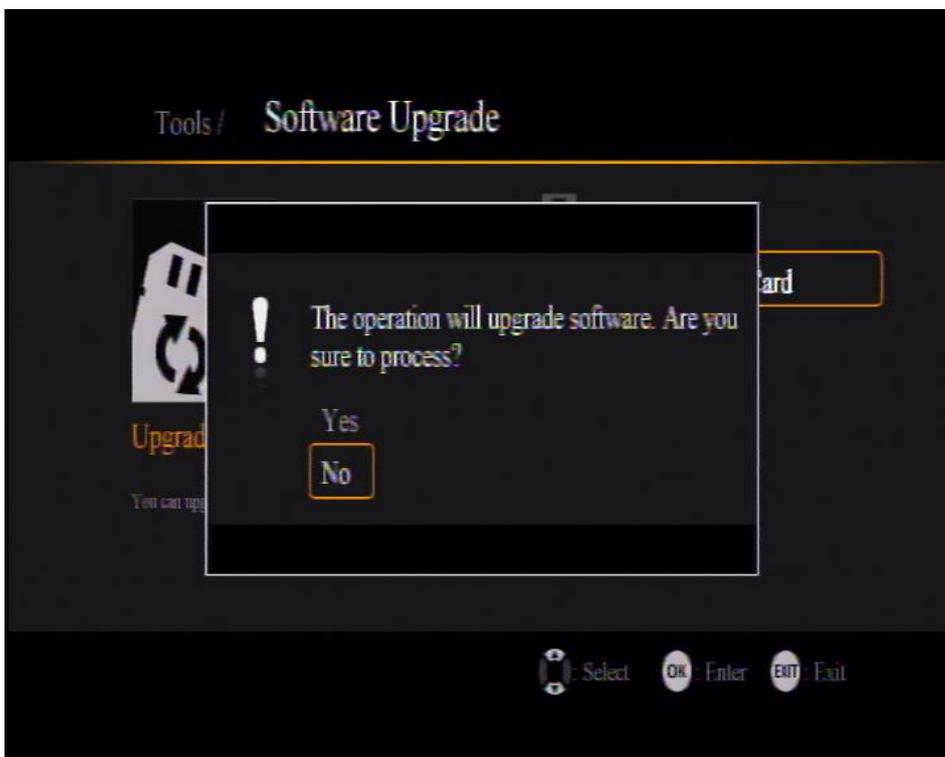
4. Plug in the micro SD card.



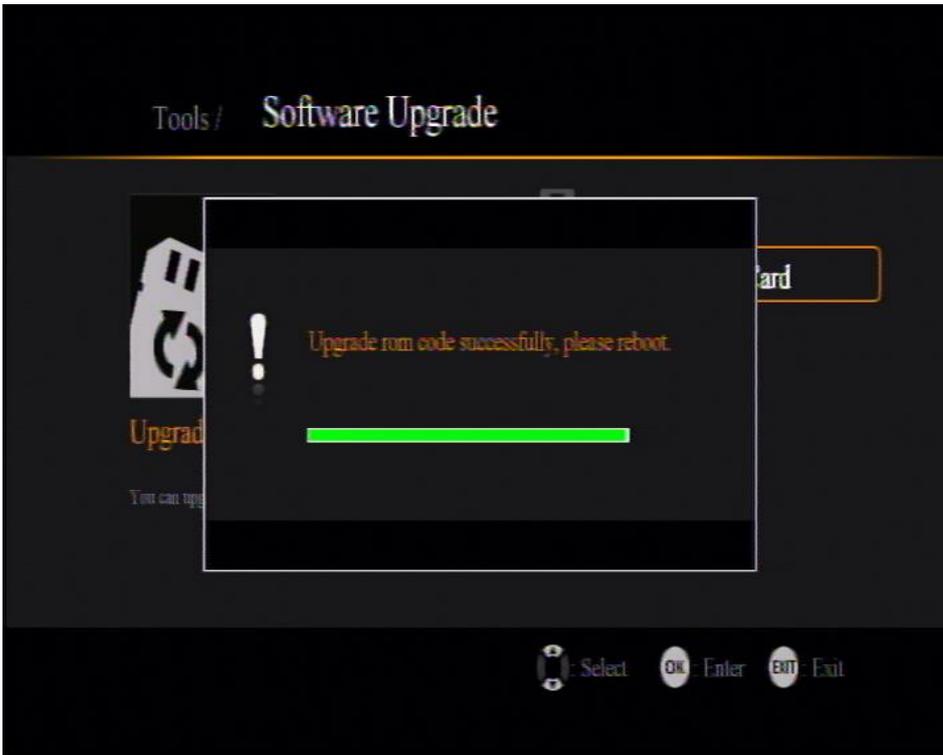
5. Select "Upgrade by SD Card"



6. Select "Yes"



- When the progress bar reaches the end, the update is done.



- Remove the micro SD card, power off, then power on the receiver box.**

Note: If you do not remove SD card, the reboot will fail!

Firmware Update- SD card Method 2

There are two ways to update the firmware . You can choose either one to update the firmware of the box. If you can control HV-122 well with remote controller and the display is normal, please use Method 1.

- Copy the firmware image file “dtv.img” to the root directory of a micro SD card.
Note 1: the micro SD card should be formatted in FAT32 or FAT16.
Note 2 Please delete the file dtv_temp.img on the SD card if it exists.
Note 3 the firmware image file “dtv.pkg” is used with a flash kit, described below.
- Power the receiver box down.
- Plug in the micro SD card.



4. Power on the receiver box and wait for about 60 seconds.

If the SD card is detected properly and DTV.IMG is found, the update progress will be started.

When the update is on going, it's possible there is no display or the display freezes and no response with remote controller.

If you can connect to the UART debug port (refer to next chapter), you will see the debug messages, "sd upgrade start" and "sd upgrade finish"

Note: the 7-SEG LED shows "88" when updating, and turns off when update is done.

5. Remove the micro SD card, power off, then power on the receiver box.

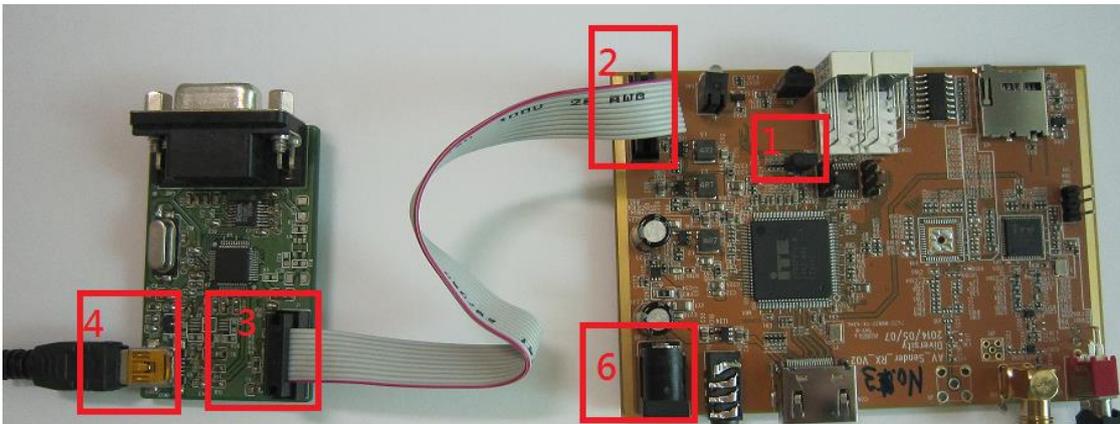
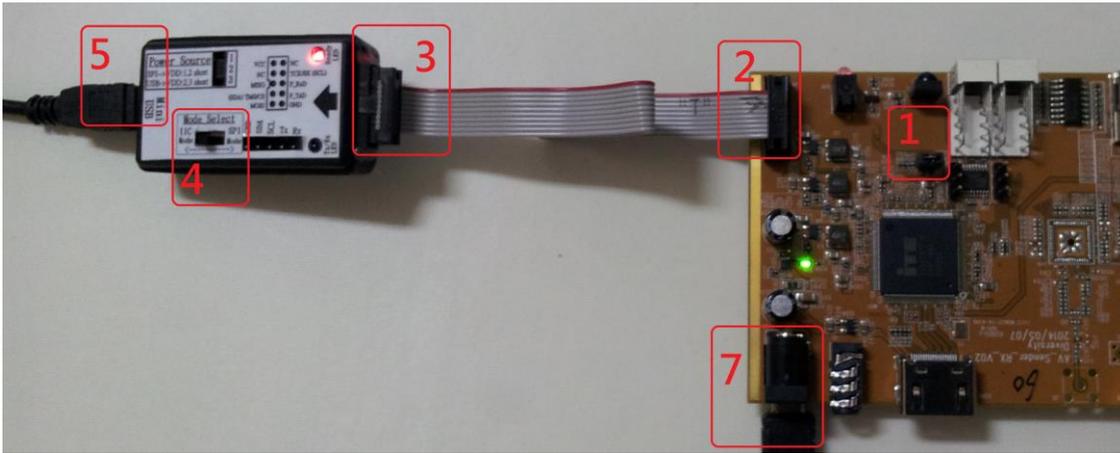
Note:

- 1. If you do not remove SD card, the reboot will fail!**
- 2. dtv.img will be rename to dtv_tmp.img when update is done.**

Firmware Update- Flash kit

In case the boot code is corrupt due to failure of SD card update, HV-122 will fail to boot and cannot be updated with SD card any more. The only way to recover the boot code and firmware is to re-flash the NOR with a flash kit. The firmware for a flash kit is named "dtv.pkg", instead of "dtv.img".

Consult Hides for details about the flash kit.



UART Debug Messages

The UART debug port is located in J10.

You may dump debug messages from this J10 pin2 UART Tx.

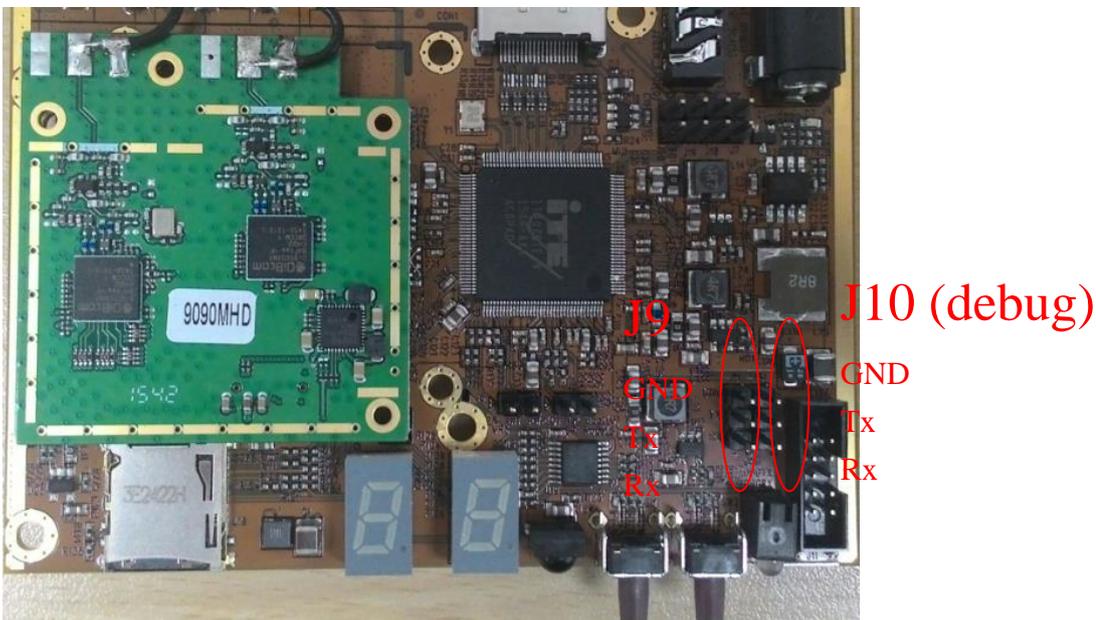
J10:

Pin 1: Ground

Pin 2: UART Tx

Pin 3 :UART Rx

The communication parameters are 115200,n,8,1.



UART Control & Demux

The other UART port on J9 can be used as a control interface or UART data demux output.

While used as a control interface, an external host controller can control HV-122 thru this UART port.

Refer to ITEU2-AN-IT9070-16001 UART Control Protocol.PDF for more details.

While used as a data demux output, it can output the mux'ed the UART data in the received TS(transport stream),

Refer to ITEU2-AN-IT9070-16002 TS UART Data Demux for AV Sender.pdf for more details.

Shorten receiver latency

You may enable “Low Latency Mode” in menu “Settings”->”Display Preference”.

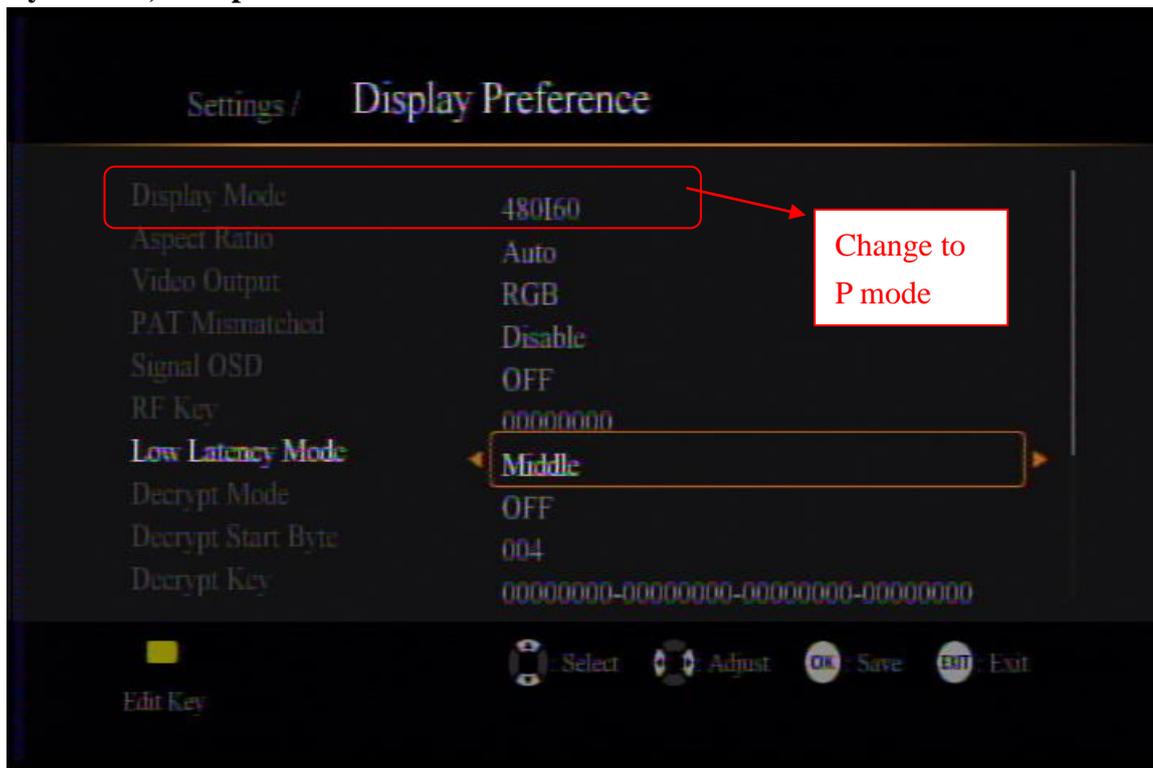
There are three options for low latency mode,

OFF: latency is about 1~1.5 second

Middle: latency is about 250ms (for SD) ~300ms (for 1080P Full HD)

Low: latency is about 200ms (for SD) ~250ms (for 1080P Full HD)

By default, the option is “Middle”



The latency is decreased gracefully. In the beginning the latency is longer, and reduces to the lowest value after 10~30 seconds.

The Display mode must be set to P (progressive) mode for the low latency algorithm to work properly, for example

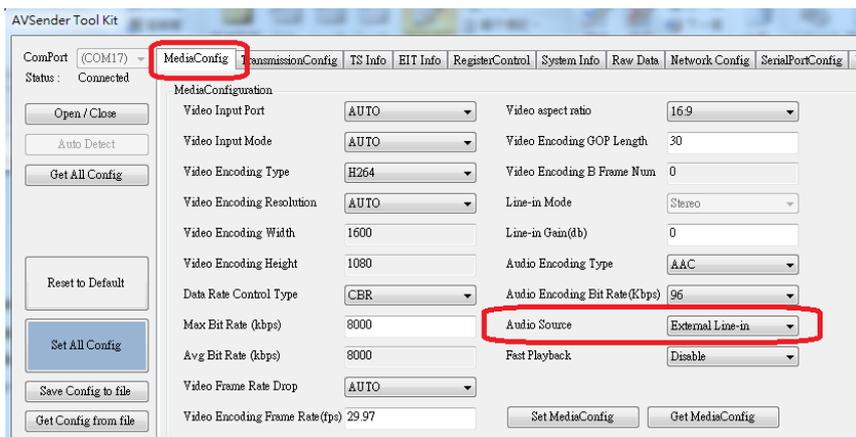
1080p60, 1080p50, 720p60, 720p50, 576p60, 480p60.

If the transmitter source is from HV-310 or HV-320, you may use the special firmware in the folder <Firmware\Low Latency Firmware for HV310&320 _xxx>. This special firmware’s latency is constantly low from the beginning.

Long latency problem with HV-10X/HV-20X transmitter

While using HV-110/HV-12x with HV-10x/HV-20x transmitter, if the latency is still very long (>1 sec) even low latency mode enabled, there might be no audio packets in the received stream.

This problem happens when the video input source of HV-10x/HV-20x is either HDMI or HDSDI, and there is no embedded audio in the video source. In such a case, please set the audio source to "External line-in" in the MediaConfig Page for HV-10x/HV-20x with AVSenderUARTGUI.exe



Specify RF key for protected signal

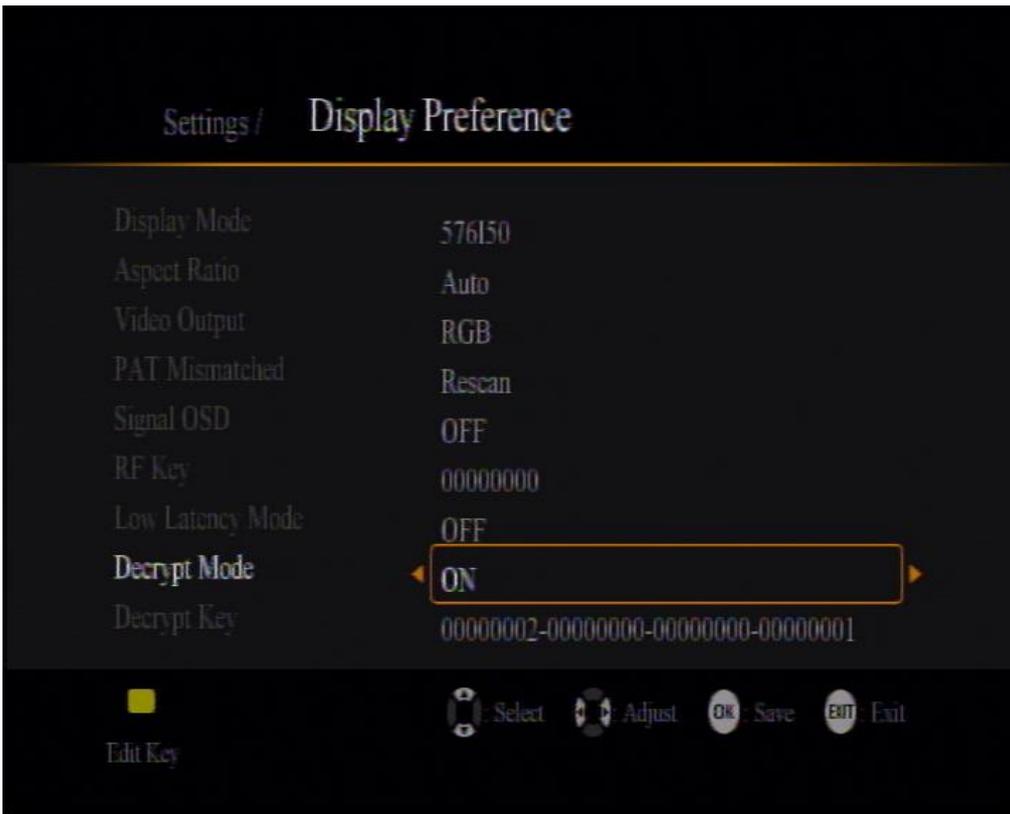
HV-122-DCA does not support RF key decryption.

Decrypt Encrypted Streams

If you are tuning a transmitter with TS data encrypted, you should enable the decrypt function and specify the decrypt key.

You may edit RF key in menu "Settings" -> "Display Preference".

Enable the "Decrypt Mode"



Specify the decrypt key, which is a 32-digit HEX number.



Then, use arrow keys to change the key.



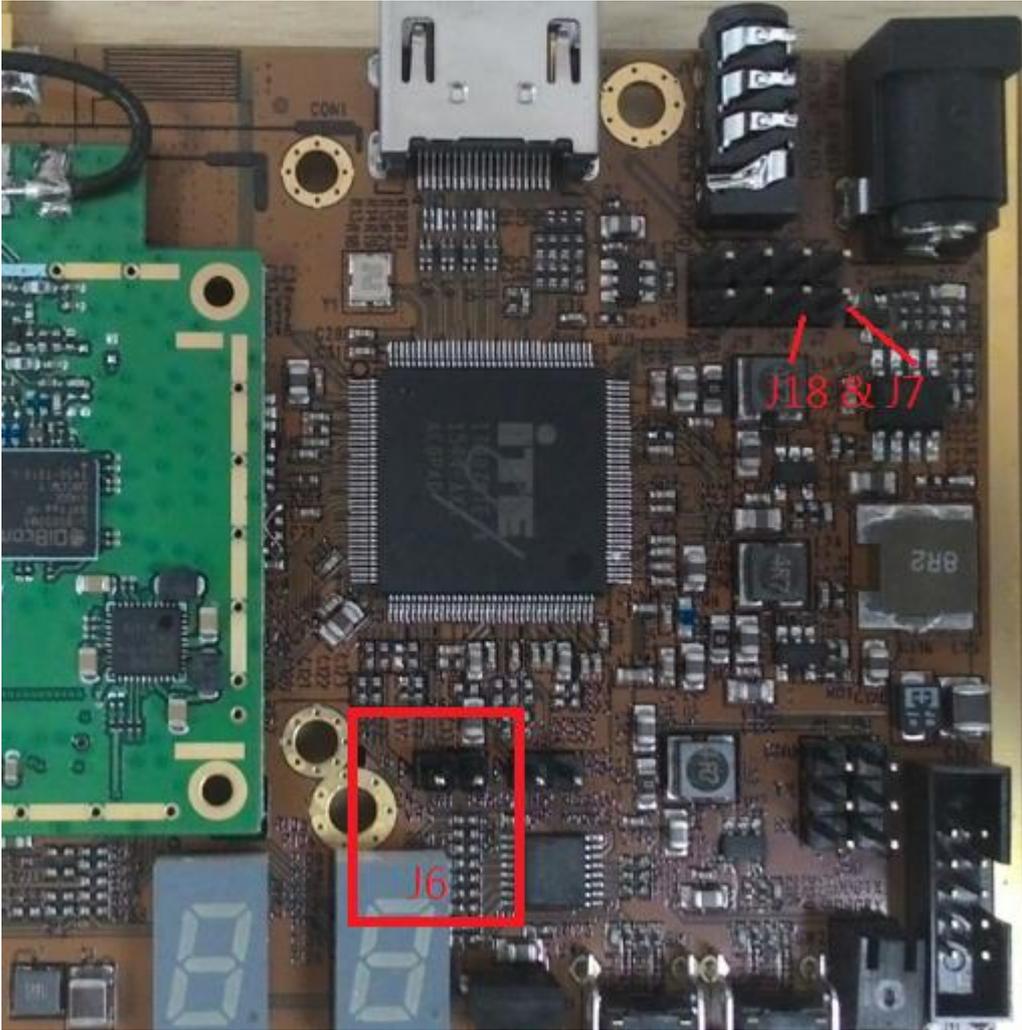
Active Antenna

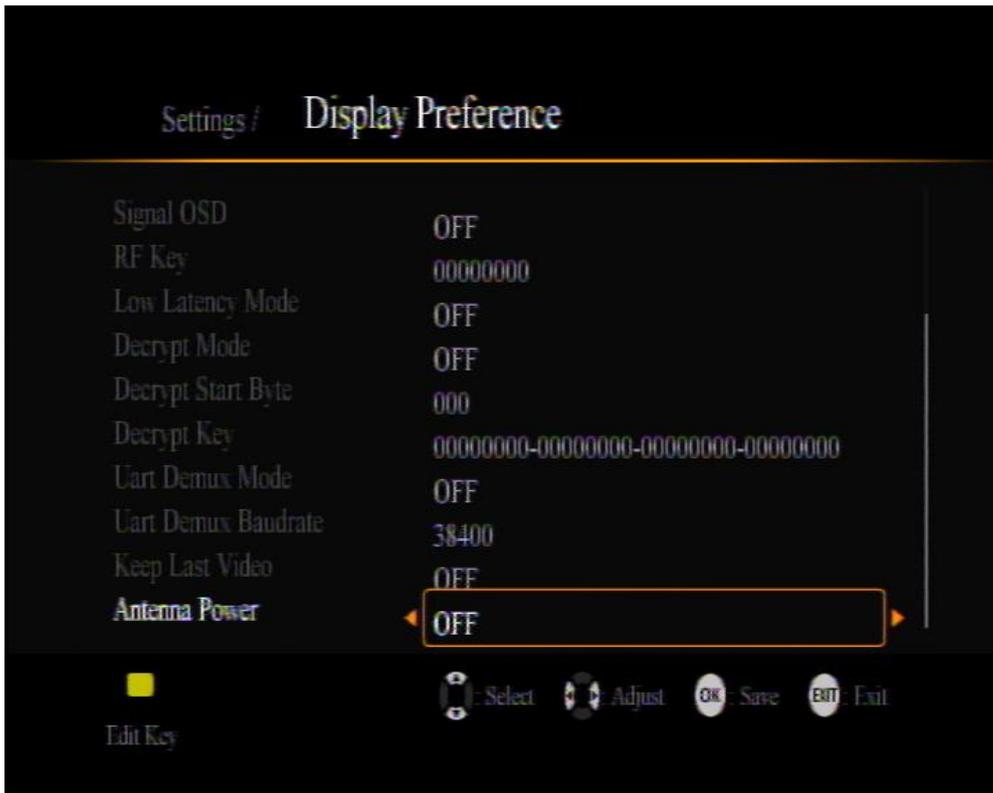
HV-122 supports active antenna on the SMA RF connectors.

The supplied power current is 12V DC, 500mA maximally.

To enable power for active antenna,

1. Please remove J6 jumper if any; J6 should be open.
2. HV-122-TV, install a jumper on J7; J7 should be shorted and leave J18 open.
3. HV-122-2.4G and HV-122-A, install a jumper on J18; J18 should be shorted and leave J7 open.
4. Enable the active antenna in menu “Settings”->”Display Preference”.





Channel switch buttons

There are CH+/CH- buttons on the front panel and the remote controller.

You may switch channel with the two buttons.

For “Auto scan” and “Manual scan” modes, it works only if there are multiple services in the service list scanned.

In “Manual Input” mode, it switches the channel frequency and bandwidth according to the channel table specified in the “Manual Input” page.





DVB-T Channel Frequency Table: 7+8MHz Bandwidth

DIP Switch Settings (0-99) Channel ID	Band	Center Frequency [MHz]	BW [MHz]
0		Configured by SW	7
1	Special (VHF low band)	142.5	7
2	Special (VHF low band)	149.5	7
3	Special (VHF low band)	156.5	7
4	Special (VHF low band)	163.5	7
5	VHF III	177.5	7
6	VHF III	184.5	7
7	VHF III	191.5	7
8	VHF III	198.5	7
9	VHF III	205.5	7
10	VHF III	212.5	7
11	VHF III	219.5	7
12	VHF III	226.5	7
13	Special (UHF hyper band)	410	8
14	Special (UHF hyper band)	418	8
15	Special (UHF hyper band)	426	8
16	Special (UHF hyper band)	434	8
17	Special (UHF hyper band)	442	8
18	Special (UHF hyper band)	450	8
19	Special (UHF hyper band)	458	8
20	Special (UHF hyper band)	466	8
21	UHF IV	474	8
22	UHF IV	482	8
23	UHF IV	490	8
24	UHF IV	498	8
25	UHF IV	506	8
26	UHF IV	514	8
27	UHF IV	522	8

28	UHF IV	530	8
29	UHF IV	538	8
30	UHF IV	546	8
31	UHF IV	554	8
32	UHF IV	562	8
33	UHF IV	570	8
34	UHF IV	578	8
35	UHF IV	586	8
36	UHF IV	594	8
37	UHF IV	602	8
38	UHF V	610	8
39	UHF V	618	8
40	UHF V	626	8
41	UHF V	634	8
42	UHF V	642	8
43	UHF V	650	8
44	UHF V	658	8
45	UHF V	666	8
46	UHF V	674	8
47	UHF V	682	8
48	UHF V	690	8
49	UHF V	698	8
50	UHF V	706	8
51	UHF V	714	8
52	UHF V	722	8
53	UHF V	730	8
54	UHF V	738	8
55	UHF V	746	8
56	UHF V	754	8
57	UHF V	762	8
58	UHF V	770	8
59	UHF V	778	8
60	UHF V	786	8
61	UHF V	794	8
62	UHF V	802	8
63	UHF V	810	8
64	UHF V	818	8

65	UHF V	826	8
66	UHF V	834	8
67	UHF V	842	8
68	UHF V	850	8
69	UHF V	858	8
70	UHF V	866	8
71	UHF V	874	8
72	UHF V	882	8
73	UHF V	890	8
74	UHF V	898	8
75	UHF V	906	8
76	UHF V	915	8
77	UHF V	924	8
78	UHF V	930	8
79	UHF V	938	8
80	DATV	436	2
81	DATV	436	3
82	DATV	1265	2
83	DATV	1265	3
84	DATV	1265	8
85	DATV	1280	4
86	DATV	1280	8
87	DATV	2334	3
88	DATV	2350	3
89	DATV	2360	4
90	DATV	2380	3
91	DATV	2385	8
92	DATV	2395	2
93	DATV	2395	4
94	DATV	2395	8
95	DATV	2402	3
96	DATV	2406	8
97	DATV	2420	6
98	DATV	2443	6
99(0x99)	UHF IV	474	8

Note: HV-122-DCA does NOT support CH70~CH98.

Trouble Shooting

Q: Why the video is not smooth when playing HD video service specifically?

A:

1. Disable low latency mode in Menu-> Settings-> Display Preference
2. Set the display mode to the same as the video service, 1080P30 or 1080P25 if the service is 1080P, and set to 720P30 or 720P25 if the service is 720P.

Q: The video is noisy when signal statistics OSD enabled.

A:

The problem is caused by the bottleneck of DDR memory access. You may minimize this problem by lowering display memory access.

In Menu-> Settings-> Display Preference, please set the display mode to 1080P30 or 1080P25 if the service is 1080P, and set to 720P30 or 720P25 if the service is 720P.

Contact Information

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