Application Note AN-66

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GT Media V7 Pro, DVB-T, Receiver Instruction Manual

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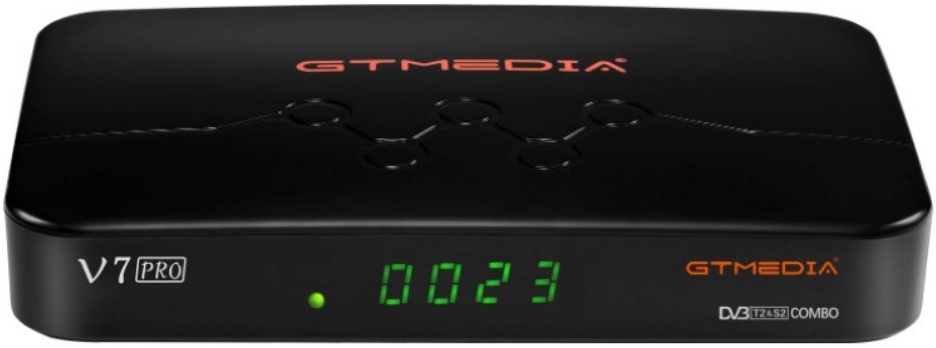


I have recently (2023) discovered another low cost, combo DVB-S & DVB-T set-top box receiver which will tune the amateur 70cm & 33cm bands for DVB-T. It is the **GT Media V7 Pro**. I have been unable to locate any source of detailed instructions for the receiver. The supplied user manual is typical of most Chinese products -- i.e. not worth the paper it is printed on. Thus this instruction manual. The detailed manufacturer's specs. are reprinted at the back of this manual.

As a service to prospective new DATV hams, I am offering to sell these receivers pre-programmed to the standard 70cm and 33cm, 6 MHz, ATV channels. They are: 423,

429, 435, 441, 447, 909, 915 & 921 MHz. Because the PAL antenna connector is non-standard for USA users, I also supply some coaxial adapters.

DVB-T is the European TV standard for terrestrial broadcast digital television. Many amateur TV hams here in the USA have adopted DVB-T as the digital modulation standard of choice for DATV. This receiver will work with either 6, 7 or 8 MHz bandwidths. The historical TV standard in the USA is 6 MHz wide TV channels. USA ATV hams also use this convention. Some USA DATV hams are using narrower bandwidths such as 2 or 4 MHz. This receiver will not work on them.

This receiver is a combination receiver. It can also be used as a digital satellite receiver for DVB-S with an LNB and satellite dish. DVB-S typically uses L band (1-2 GHz) as it's IF frequency. This is an L band receiver. Some ATV hams are also experimenting using DVB-S on the amateur 23 cm band (1240 - 1300 MHz). This receiver will work on the 23cm band. However, KH6HTV has not tested it for such, nor programmed it for this use. DVB-S has not proved to be popular with USA DATV hams. It is the mode of choice for European DATV hams. There are some You-Tube videos on the internet where users have tried to explain how to set up the receiver for DVB-S satellite reception.

The receiver can also function as a DVR (Digital Video Recorder). It records onto a USB memory stick, thumb drive in the DVD, .TS format.

The sensitivity of this receiver for 70 cm DVB-T is approximately -97 dBm. This is when it was tested on 70cm band using a DVB-T signal with the following parameters: QPSK, 6 MHz BW, 8K FFT, 5/6 Code Rate (FEC), 1/16 Guard Interval, H.264 encoding, 1080P & 5.5Mbps. With a good, low noise pre-amplifier, such as the KH6HTV model 70-LNA, the sensitivity is improved to about -99 dBm.

SUPPLIED ACCESSORIES: 12Vdc wall wart power supply, Remote Control, HDMI cable, PAL/F coax adapter & F/SMA coax adapter.

CONTROLS: There are NO front panel controls on this receiver. The only physical control is an On/Off switch located on the rear panel. The supplied Remote Control must be used to control all of the receiver's functions.

DC POWER: The receiver operates on +12Vdc (250mA). A 120/240 Vac wall wart to 12Vdc is included.

A/V CONNECTION: The receiver provides two separate A/V outputs. HDMI with up to 1080P high definition resolution, and also composite analog video with NTSC or PAL standard definition of 480i, plus line level stereo audio outputs. Both A/V outputs are available simultaneously with independent video resolutions.

The analog A/V output is available from a 1/8" jack found on the rear panel. Unfortunately, not all manufacturers following the same wiring convention of these 3 wire A/V (video + stereo audio) 1/8" jacks. Thus, not all 1/8" A/V plugs will work with

this receiver. Unfortunately, the manufacturer, GT-Media, did not supply an analog A/V cable. They only supplied an HDMI cable. What I did find to work was a Canon camcorder A/V cable wired as follows:

Tip = Audio, Left (white)
Ring #1 = Video (yellow)
Ring #2 = Ground Shield
Sleeve = Audio, Right (red)

ANTENNA CONNECTION: The antenna connector to be used for DVB-T is the European cable TV connector called a PAL. See the photo on page 1. It is the second from the left connector labeled as "Ant In". Note on the combo receiver there are two antenna connectors. One is the European cable TV, PAL connector while the other is the USA cable TV connector called a type F. We will use the PAL connector for DVB-T. We will not use the F connector as it is for connecting an LNB and satellite dish for DVB-S. Included in the carton, we have added some PAL coaxial adapters. Hopefully one of them works with your available antenna.

ANTENNA: You will need to connect an amateur, 70 cm band antenna to the PAL connector on the combo receiver. Please consult your local ATV community to determine what polarization they are using and what antennas they recommend you use. For recommendations on suitable 70 cm ATV antennas, see the KH6HTV Video application note, AN-40, *"70cm Antennas for ATV"*.

FREQUENCY COVERAGE: The manufacturer's specs. are 174 to 862 MHz. I have tested the receiver and found that it could actually be programmed for DVB-T as low as 100 MHz and up to 999 MHz. 100 MHz was the lower limit on my Hi-Des HV-320 modulator. The receiver might go even go below 100 MHz? Many similar receivers do go down to channel 2 (54 MHz).

INITIAL TURN-ON: The receiver operates on +12Vdc power. Use the supplied AC wall-wart for power. Plug it into the rear panel. The power switch is located on the rear panel.

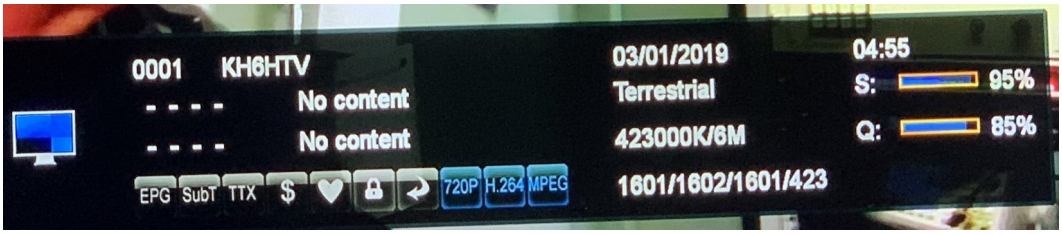
When your first power up the combo receiver, it will take a few moments while it boots up. It will display on the front panel "Boot", then "Load". During initial boot-up, it will briefly display "GT-Media" on the video monitor screen.

After boot-up, if the receiver is tuned to a vacant TV channel with no valid signal present, it will display the words "No Signal" on a black screen. This will verify to you that the receiver is in fact working, but not presently receiving a TV signal.

CHANNEL SELECT: To set the desired TV channel, you must use the supplied remote control. On the remote control you can enter a channel number with the numeric keys, such as "01", or use the Ch Up/Down button. These are the up/down arrows on the large, center orange button. When the channel is changed, the receiver will momentarily

flash on the screen the INFO display. It gives you the channel number and the call sign of the station that was originally used to program the receiver.

INFO BUTTON: On the remote control you will find a button labeled "INFO" Push it once and you get the above screen briefly displayed. This gives you a lot of info about the incoming signal, including the frequency of the channel.

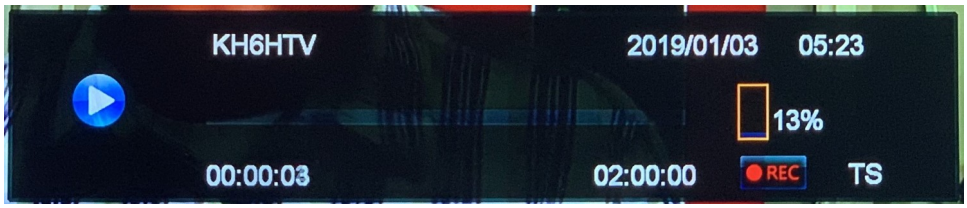


S-METER: Of particular interest are the two bar graphs at the right of the info display. The top S bar is Signal Intensity (i.e. S meter). The lower Q bar is Signal Quality, or S/N. These two meters are very non-linear and really only useful for antenna alignment on very weak signals. They saturate out at signal levels only a few dB above the lower receiver sensitivity threshold. With no rf input signal, both meters will read 0%. The signal intensity will read 5%. As the signal level increases you will see these meters start to rise. It can thus be used to orient an antenna even without seeing a picture. When the intensity meter (blue) reaches about 60%, with quality of about 25%, a picture with audio will suddenly appear. This is the lowest signal level digital threshold of the receiver.

DISPLAY RESOLUTION: Using the HDMI output, display resolution up to 1080P is possible. The possible resolutions are: 480i, 480p, 720p, 1080i & 1080p. You can also have either 4:3 or 16:9 aspect ratio. For receivers which I have pre-programmed, I have set them to 1080P & 16:9. If you want to change these settings, you do it via the remote control. Go to the Menu --> System --> A/V Setting.

DIGITAL VIDEO RECORDER (DVR):

The combo receiver has a nice, added feature. It can also function as a Digital Video Recorder. To use this feature, you need to plug a USB memory stick (thumb drive) into the USB socket on the rear panel.



1. **To Record:** To start the DVR recording what ever is being received at the time, simply push the RED button on the remote control. This black info box will appear briefly on the screen when recording starts. A small red DOT will also appear in the upper-right corner of the video monitor screen. This red dot will remain as long as you continue recording.

2. **To Stop Recording:** To stop the DVR recording, you must push the Stop button to the left of the Red record button. This button has a White Square symbol on it. However, before stopping, the receiver flashes on the monitor screen the message "Are you sure to exit Recording ? Yes or No" You must make a choice and then push "OK"

3. **Recordings:** Your recorded video will be put in a file labeled "PVRS" on the USB memory stick. You can play this later on your PC computer. The video files are recorded as TS (.ts) files. These are the same as used on DVDs. The file details are: video = 1280x720, 30fps audio = 2 channel (stereo), 96kbps, 48kHz sample rate.

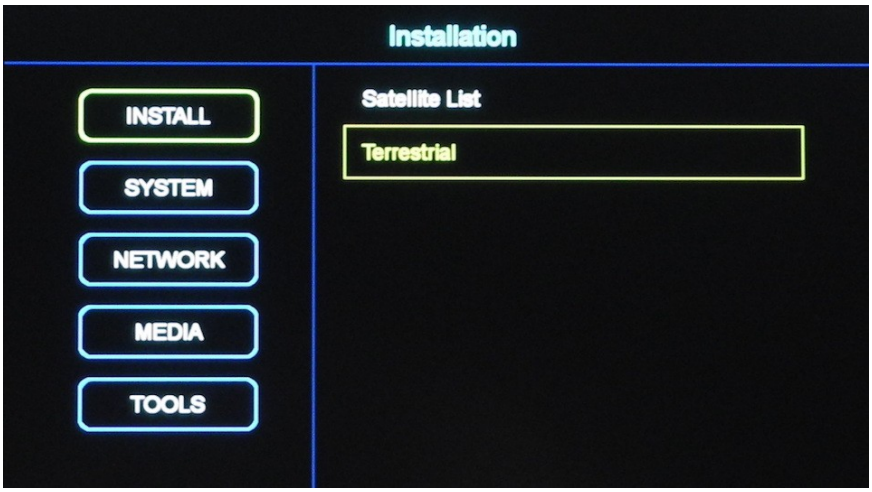
HOW to ADD ADDITIONAL CHANNELS:

CHANNEL PROGRAMMING: Like all other modern, digital TV receivers, such as you might buy at Wal-Mart, Best-Buy, etc. they come from the factory "dumb". They have to be auto-scanned (i.e. programmed) to receive the available TV signals. To do this, they must be exposed to valid DATV signals in the auto-scan process.

The first requirement to program the receiver for ATV use is to have available an RF signal source with the correct frequency and bandwidth. The ideal situation is to hard wire a direct connection from a DVB-T modulator to the antenna input on the receiver. Suitable modulators include the Hi-Des model HV-320E as your signal source. Either set the internal modulator attenuator to -20dB or greater, or use an external coaxial attenuator of at least 20dB. This will prevent the high rf level from the modulator from overdriving the receiver. Before proceeding with the following channel programming instructions, use a coaxial cable to connect the modulator antenna output directly to the receiver antenna input. Set the modulator to the desired frequency and bandwidth. It is helpful to also have "live" video playing into the modulator, such as a DVD player. Still images are worthless as video source material. This is because many receivers retain the last received image even after losing signal lock. In this situation, it is difficult to know when the receiver lost the signal.

Connect the A/V output (either HDMI or Composite) to a suitable video monitor. Turn on the power. The receiver's front panel display will initially show "BOOT".

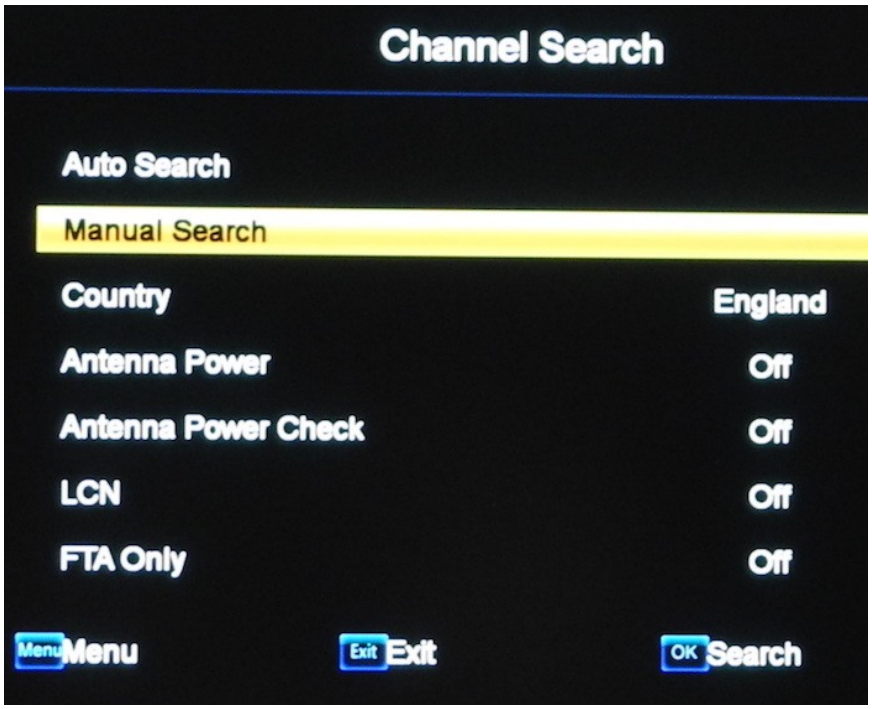
Programming of the receiver is done using the supplied Remote Control.



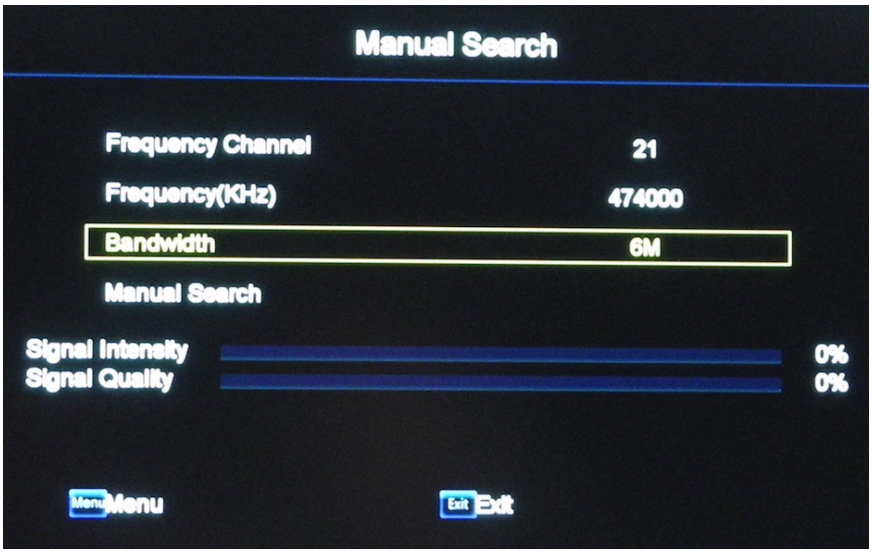
Step 1 - On the remote control, push the "Menu" key

Step 2 - Use the up/down buttons to select "INSTALL", click OK.

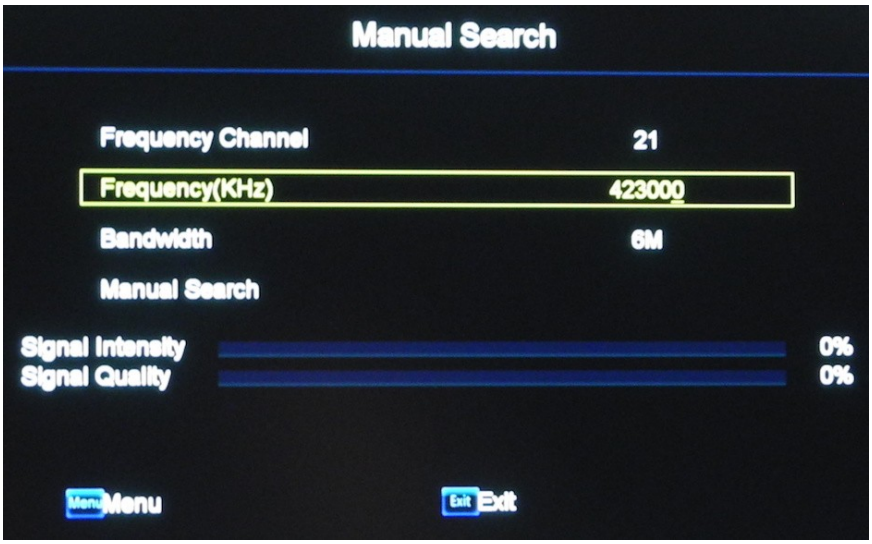
Step 3 - Use up/down buttons to select "Terrestrial", click OK. The Channel Search sub-menu then appears.



Step 4 - Use up/down buttons to select "Manual Search", click OK. The Manual Search sub-menu then appears.

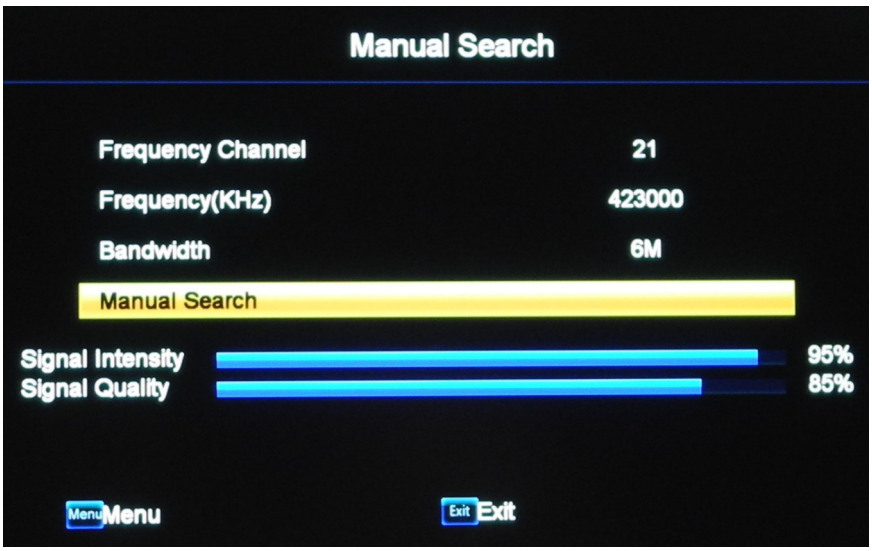


Step 5 - Use up/down buttons to select Bandwidth. Use right/left buttons to set bandwidth to 6 MHz.



Step 6 - Use up button to select Frequency

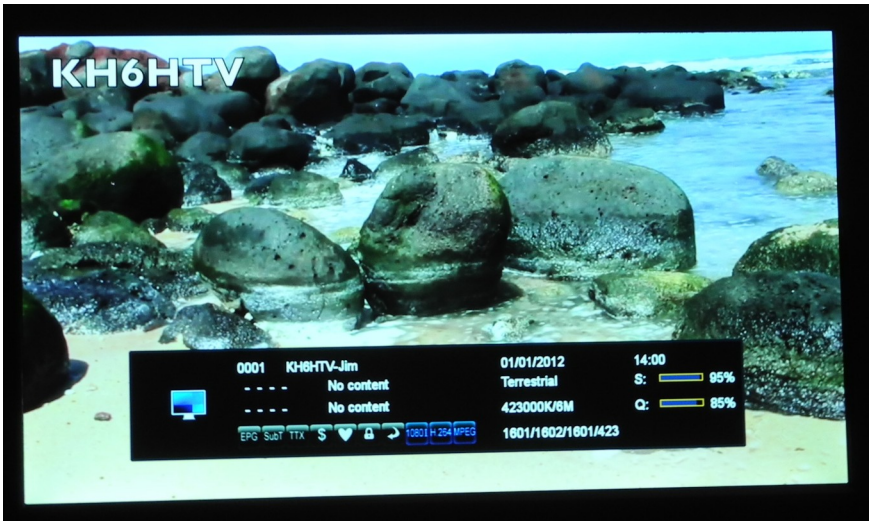
Step 7 - Use the numeric keys on the remote control to enter the desired frequency. For example, for the Boulder, Colorado, W0BTV, ATV repeater, enter 423000. As you enter each number, an underscore will appear in the Frequency box indicating that digit is entered.



Step 8 - Use the down button to select "Manual Search" - do not push OK yet.

Step 9 - Wait until the receiver finds the rf input signal. This happens when the Signal Intensity and Signal Quality bar graphs turn blue and the % values no longer read 0%. Now press the OK button.

Step 10 - If successful, the above message will be displayed.. Press the OK button. You will now see displayed on the video monitor the live TV image with audio.



Step 11 - Congratulations ! You have now programmed the receiver to receive a DATV signal.

LIMITATIONS found for Receiver:

1. No front panel controls. Remote control needed for all functions.
2. No front panel Red/Green, "Valid Signal" LED indicator. Thus, can not be used as a repeater receiver with auto detection of incoming signal.
3. Slow initial signal acquistion. Typically requires about 5 seconds before displaying a picture upon initial key-up of a DVB-T transmitter. Thus, I don't recommend using this receiver for use with drones or balloon flights where the signal will encounter a lot of fluctuation in power level.

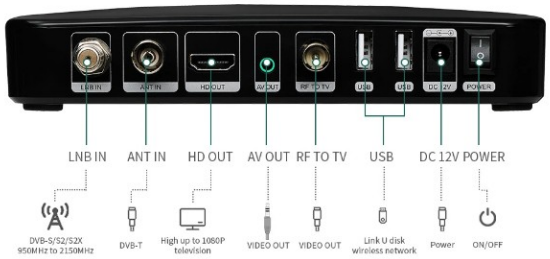
DETAILED SPECIFICATIONS for GT-Media V7 PRO Receiver

from GT-Media web site:
https://gtmedia.en.made-in-china.com/product/zZHTdfsPnoka/China-Gtmedia-V7-PRO-DVB-S2X-T2-Hevc-Multi-Stream-Satellite-Receiver.html

Specification

Video Decode	Video Decode	HEVC main profile@level 4.1 and main10 profile@L4.1,High tier MPEG-2 MP@ML H.264 BP,MP&HP@L3/L4.1/L4.2 AVS Jizhun profile and broadcast profile MPEG-4 SP profile, advanced simple profile@L5 VC1 SP@ML, MP@HL, AP@L0-3 H263 baseline profile JPEG decoder
	PAL/NTSC	Automatic PAL/NTSC conversion
	Aspect Ratio	Auto, 16:9 Pillar box, 4:3 Pan & Scan, 4:3 Letter Box
	Video effects	Standard, Default, Vivid.
	Video Resolution	1080P, 1080I, 720P, 576P, 480P, 576I, 480I
	HDMI Color Space	RGB, YUV422, YUV444, Auto
Audio Decode	Audio Decode	MPEG-1/2 Layer 1/2/3, MPEG-2/4 LC-AAC, MPEG-4 HE-AAC, Dolby AC3/AC3+, DRA CH/5.1CH
	Sound Mode	LEFT/RIGHT/STEREO/MONO
	Sampling Frequency	32KHz,44.1KHz,48KHz
	Audio Out	LPCM Out, BS Out

USB Decode	USB 2.0	capacity hard disk
	PVR Option	USB 2.0 for PVR,TIMESHIFT,media files playback
	Media Codec	TS,mkv, mp4, avi, flv, f4v, ts, m2ts, mov, 3gp files
	Audio Codec	WMA,MP3
	Photo Codec	JPG, BMP, PNG, GIF
Hardware specifications	RF TO TV	RF TO TV (CH11:209.5MHZ)
	Panel display	4-digit LED display
	LED Indicator	Power ON :Green; Standby :Red
	Button	NC
	Wifi	Support USB Wifi dongle (MTK7601/RT5370)
	IR	Exit IR for 38KHz,Infra Remote control
	Rear Panel	LNB IN (Frequency Range950MHz to 2150MHz DVB-S/S2/S2X)
		ANT IN (IEC-type IEC169-2 Female DVB-T/T2 for 174-862M)
		HD OUT(up to 1080P)
		AV OUT (3.5MM*18MM Jack/4-Pin:Red-White-Yellow-GND)
		RF TO TV (CH11:209.5MHZ)
		2*USB 2.0 HOST
		RS232
		CA card slot
		Power (DC 12V/1.5A)



Sortware Features

Standard: Fully comply with DVB-S/S2 (SCPC and MCPC receivable from C/Ku band satellite), DVB-T/T2, MPEG-2/4 H.265 Standard
Channels Number:6000+ channels TV and Radio programmable
Favorites:16 different favorite groups selection
OSD Language:OSD Multi-language for options(English, Spanish, French, Russian, Portuguese, Polish, Indonesian, Arabic, Turkish, German, Italian, Persian, Thai)
EPG:Fully support to 7 days Electronic Program Guide(EPG)
OSD Color: 16-bit OSD with anti-flickering
Channel Search:Supports NIT Search ,Automatic network search for newly added transponders
Channel Edit:Various channel editing function(favorite,move,lock,skip, delete,rename,find,sort)
Parental Ctrl:Parental control for channels
Easy Menu:Plug and Play installation, with an easy to use Menu System
SoftUpgrade:Software upgrades through USB port and RS232 upgrade
Channel:Recording one channel, can view another channel under the same TP,Various channel editing function(favorite,move,lock,skip,delete,rename,find,sort)
Subtitle:support DVB EN300743 and EBU
Teletext:support DVB ETS300472 by VBI and OSD
Time Set:Time set by GMT offset automatic and manual,Summer Time support
Timer:5 event timers,off/Once/Daily/Weekly Mode