Boulder Amateur Television Club
TV Repeater's REPEATER
November, 2020

BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

Jim Andrews, KH6HTV, editor - kh6htv@arrl.net www.kh6htv.com

$42 DVB-T RECEIVER for 70cm & 33cm ATV ! ! !

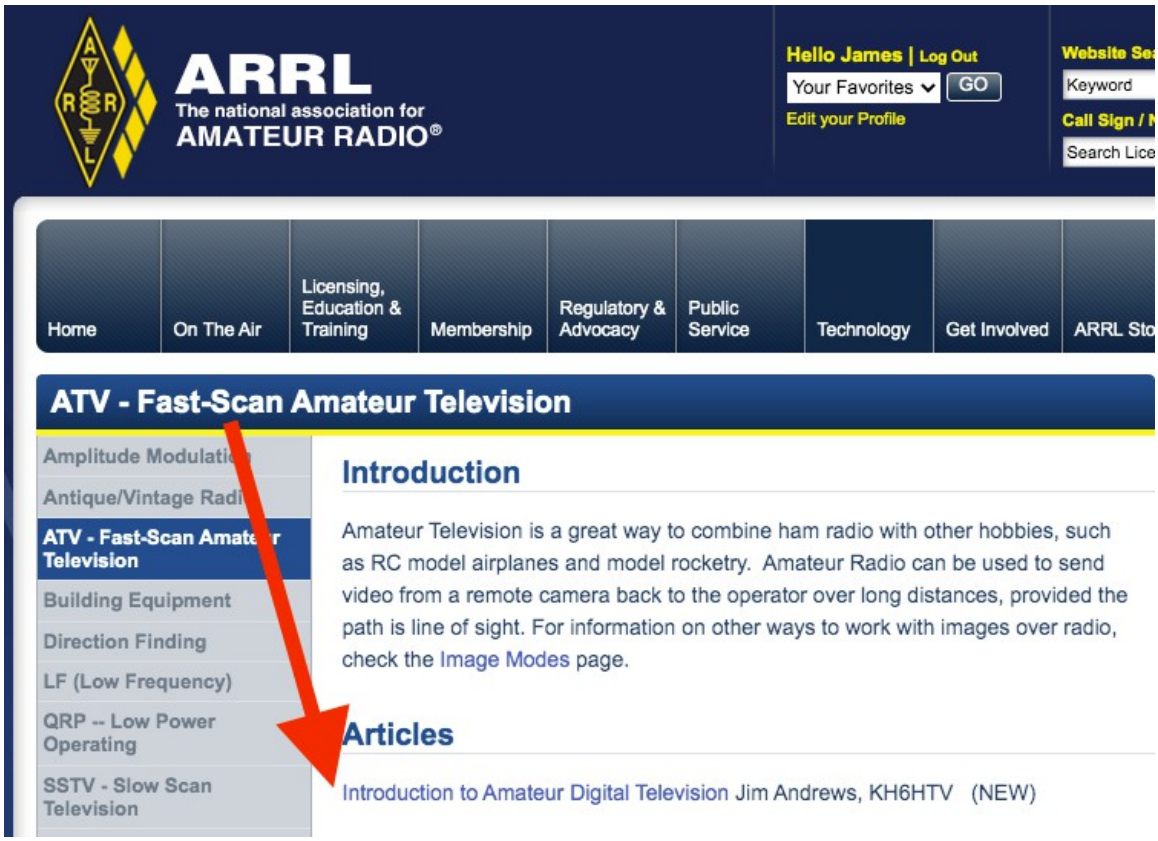
We have good news to share. The barrier to recruiting new folks to enjoy high-definition, digital ATV, has been the high cost of a DVB-T receiver. No more. Thanks to a SWL / SWVer (i.e. short wave listener/viewer), John in Broomfield, CO who discovered a new combo DVB-S & DVB-T box that will work easily on the amateur 70cm & 33cm bands. He is now watching our Boulder ATV repeater, W0BTV, with it.

Another plus. You don't have to wait for the slow boat from China for delivery. It is available in stock in the USA and Amazon Prime gets it to you in one or two days. So what is this magic box ? It is the GT Media V7 Plus. For details on how to easily program it to receive our 70cm & 33cm ham ATV signals, see the new Application Note, AN-58 attached to this newsletter.

We are going to make an offer to all the members of both the Boulder & Longmont Amateur Radio Clubs (BARC & LARC) to purchase these receivers and then program them for all the 70cm & 33cm ATV channels, and sell them at cost for $42.

For serious ATVers, the Hi-Des receiver, model HV-110, at $99 is still the receiver of choice. It's advantages over this new GT Media receiver are:
1. It is capable of receiving much lower bandwidths, down to 2 MHz. The GT Media will only work with commercial broadcast bandwidths of 6, 7 or 8 MHz.
2. The HV-110 has an accurate S meter reading out directly in dBm along with a s/n meter reading in dB. The GT Media only has uncalibrated bar graphs of signal strength and quality which give meaningless displays

Jim, KH6HTV



Making Progress with ARRL: The 2021 edition of the ARRL Handbook was just released. I was pleasantly surprised as I received a complimentary copy.. Opening it up on page 1, I found an acknowledgement with my name listed as being among 20 hams listed as "contributors". Also the Preface acknowledges "Updates to the material on analog and digital amateur television by Jim, KH6HTV and Tom, W6ORG."

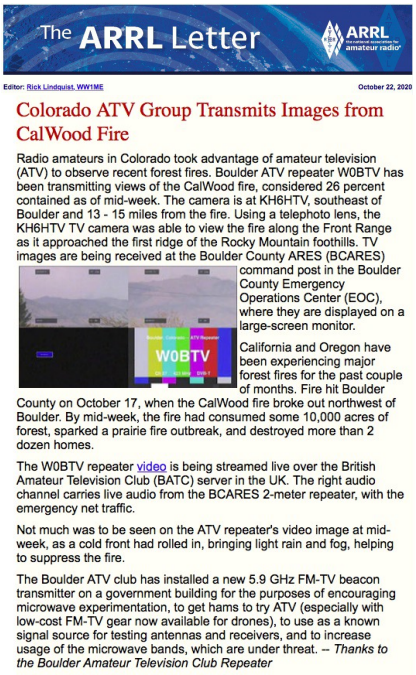
Starting back in 2017, Tom, W6ORG, asked me to review what he had written for the "Image Communications" part of the handbook and make comments about DATV. It has been a long time since I saw a current issue of the handbook. I typically would buy a new handbook every 10 years, as the content never changed much from year to year. Bill, AB0DH, loaned me his 2018 edition and I was disappointed in it's coverage of ATV. So, I started corresponding with Ward Silver, N0AX, the handbook editor. I offered to rewrite the chapter on ATV and I actually submitted to him a couple of drafts. Ward took some suggestions, but overall it didn't seem to go anywhere. So, taking Larry's, K0PYX, suggestion I took the material I had offered to the ARRL and re-wrote it as my own ATV hand-book on the subject and posted it as a free, .pdf download on my web site (www.kh6htv.com) as my application note, AN-55. Now, almost everyday, at least one or more hams are downloading AN-55 and / or AN-45 on DATV from my web site.

So, back to the new 2021 Handbook. The section on ATV is found in chapter 11, Modulation, "Image Communications", pages 11.19 - 11.21. But it only consists of a very brief, two pages, plus another 2/3eds of a page for SSTV. The ATV section deals mainly with NTSC, analog TV with a very brief mention of FM. It devotes 1/3 of a page to digital TV discussing 8-VSB, cable TV and DVB-S with no mention at all of DVB-T. DVB-T now seems to be the modulation of choice of USA ATV hams switching to DATV. In the handbook's introduction chapter one, page 1.13, there is another section 1.45 "Image Communications" which does give 1/3ed of a page to discussing ATV including DATV and mesh networking. The handbook's table of contents does list supplimental "Downloadable Content & Tools" with seven catagories. They are not in the printed book, but book purchasers can download them as .pdf files. They are not available on the ARRL web site, unless you purchase the handbook. One of the downloads is in fact "Image Communications". This is a very complete coverage of ATV and SSTV. The 24 page section on ATV was written by Tom, W6ORG. Tom tells me that he has been writing this section for the past 40 years ! Thank You Tom, for your many years of devotion to ATV, both as the major supplier of ATV gear and your publications.

While surfing the ARRL web site (www.arrl.org), I did a search for ATV. The screen grab shown above is what I found. Lo & behold, they had in fact, just recently added my application note, AN-45, "Introduction to Amateur Digital Television". Some of their other references on the ATV page are woofully out of date, dating way back to 1993 ! They do have a link to ATCO's web site (www.atco.tv) and also a DATV link to a very up-to-date site at RSGB. (https://rsgb.org/main/technical/amateur-television/)

The other progress with the ARRL recently appeared in their ARES electronic newsletter of October 21st. In it they reprinted the text from the previous (issue #61) BATVC newsletter about the Cal-Wood fire and our using ATV to send video images of the fire to the Boulder EOC. It included a link to our BATC internet stream. In the newsletter, the editor, Rick Palm, K1CE, also had an editorial about ... Use or Lose the SHF Bands. He included our new 5.9GHz, FM-TV beacon as an example.

This was then followed up on October 22ed, with the ARRL's national weekly newsletter sent to all members. It again gave us headline, top billing with a write-up about the Cal-Wood fire. It also included a link to our BATC internet stream. This time, they included a screen grab of the repeater's quad display
. 73 de Jim, KH6HTV



The ARRL Letter

Editor: Rick Lindquist, WW1ME October 22, 2020

Colorado ATV Group Transmits Images from CalWood Fire

Radio amateurs in Colorado took advantage of amateur television (ATV) to observe recent forest fires. Boulder ATV repeater W0BTV has been transmitting views of the CalWood fire, considered 26 percent contained as of mid-week. The camera is at KH6HTV, southeast of Boulder and 13 - 15 miles from the fire. Using a telephoto lens, the KH6HTV TV camera was able to view the fire along the Front Range as it approached the first ridge of the Rocky Mountain foothills. TV images are being received at the Boulder County ARES (BCARES) command post in the Boulder County Emergency Operations Center (EOC), where they are displayed on a large-screen monitor.

California and Oregon have been experiencing major forest fires for the past couple of months. Fire hit Boulder County on October 17, when the CalWood fire broke out northwest of Boulder. By mid-week, the fire had consumed some 10,000 acres of forest, sparked a prairie fire outbreak, and destroyed more than 2 dozen homes.

The W0BTV repeater video is being streamed live over the British Amateur Television Club (BATC) server in the UK. The right audio channel carries live audio from the BCARES 2-meter repeater, with the emergency net traffic.

Not much was to be seen on the ATV repeater's video image at mid-week, as a cold front had rolled in, bringing light rain and fog, helping to suppress the fire.

The Boulder ATV club has installed a new 5.9 GHz FM-TV beacon transmitter on a government building for the purposes of encouraging microwave experimentation, to get hams to try ATV (especially with low-cost FM-TV gear now available for drones), to use as a known signal source for testing antennas and receivers, and to increase usage of the microwave bands, which are under threat. -- *Thanks to the Boulder Amateur Television Club Repeater*

More DATV DX Records:

Ken, W6HHC, writes --- "After the update of KNOWN DATV DX was published on 2020-09-15, I received an e-mail from Dave G4FRE identifying more DATV efforts at DX for 50 MHz, 70 MHz, and 24 GHz."

24 GHz DVB-S2 QSO by G8GTZ and G4FRE on 2019-06-09 138 km
70 MHz DVB-S one-way by G4FRE (remotely controlled) to G4FRE/P on 2018-12-27 230 km
70 MHz DVB-S QSO by G8GTZ and G4FRE on 2018-12-09 160 km
50 MHz DVB-S one-way by G4FRE (remotely controlled) to G4FRE/P on 2018-12-26 228 km
50 MHz DVB-S2 QSO of G4FRE and G8GTZ on 2019-04-06 140 km

Feedback on New, 12Vdc, HV-110 Receiver:

In the Oct. 1st issue #59, we passed on the good news from Calvin at Hi-Des, that they were again producing the original model HV-110, DVB-T receiver and that it had been modified to now work on 12Vdc. Plus they lowered the price to $99.

Since then several hams have already purchased and received some of the new HV-110s. However, there was confusion as the rear panels were still marked as 5V on the DC input port. They were however now supplied with 12Vdc wall warts. Using old silk screened panels seems to be a problem with Hi-Des. We have encountered the same issue with their newer model HV-122 arriving with panels mis-labeled as a model HV-120-DCA. They should at least add an extra sticker over the old label to correctly ID their products.

On the 12V vs. 5V issue, hams have written us ---

Dave, AH2AR writes -- "Just a note... the new HV110 comes with 12vdc wall warts, but are marked as showing a 5Vdc input on their silk screened backplates. I trust that we can ignore that 5Vdc label ?" -- he then follows up with another e-mail --- "I already confirmed that they run off of 12 volts, as both came with 12 volt supplies."

Mel, W0PFX writes -- "Yes, it will boot up on 5V. 12V draws about 270mA decoding a pic and around 600mA on 5V. That "5V" on rear plate just means that is the "minimum'" voltage."

Unfortuately, Mel also writes about another ***firmware issue with his new HV-110***. "Mine had what appeared to be a very old (maybe?) version of firmware (0.0.1.79.103) which would not decode the picture with green LED (different colors of what looks like snow) I have seen this problem before when firmware was not compatible. So I installed the latest firmware (which Calvin said it used 0.0.6.72.157). This resulted in a red only LED with a valid signal! No decode. On boot up (both versions of firmware) displays channel 00, then counts 10, 20, 30,40...90 then back to 01. After a minute or so, it 'counts' again. I never saw a HV-110 do this.

Downgraded firmware to 0.0.6.72.156 and now receiver decodes/works FB. Display operates normal (channel 00) and no counting 10 thru 90 channels.

I'll try 157 later... maybe it was corrupted but no indication. Calvin sent me this .157 a few months ago and it does work on several other older HV0-110s in use. So ??

Feedback:

Thank you. Great ATV support --- Glenn, WA6GNB, Simi Valley, CA

Forest Fire Feedback:

Take care Jim! --- I have several ham friends now homeless in CA and several others who just got lucky as the fires came too close for comfort.

With Aloha, Alan AD6E / KH6TU

Wow! Looks bad. --- We have had smoke here in St. Louis carried by the jet stream (I assume) from forest fires out west. Some morning skies were really “hazy” and the sun’s rays were dim. Dry as a bone here now… about 4 inches behind on rain fall. Some wild fires here in MO which is fairly rare. ---- Mel, K0PFX

I just saw your post in the ARRL letter Jim. Great job W0BTV! --- 73 Mark, K5MGK

I gather the fire went the other way and you are not in any danger. I'm certainly glad for that. I am very much aware of the dangers you face living in mountains. If it isn't fire, it's flash floods, mud slides, or earth quakes. However, the view more than makes up for it. I know because I was born in Utah and lived there until I graduated from college. Now I'm one of those flat landers. Thank you again for all your work and information.

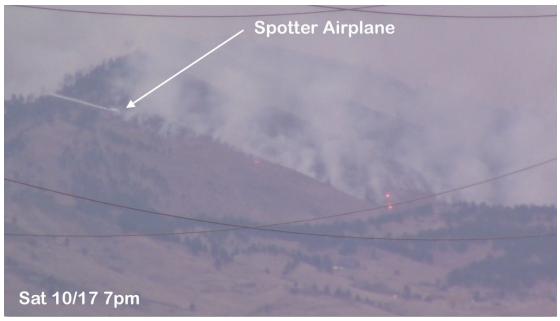
73... de...W8IMA, Richard

Lets hope the fog slows down the fire. Our Bobcat fire is finally out, I have not seen any more hot spots on the fire map. It got very close to burning Mt. Wilson with all the Broadcast stations, observatory and one of the ATN ATV repeaters. Most all the trails will be closed until April 2022 the USFS says which means no trail runs. My running club/and ham sub club does aid station, sweep and trail work for a couple of these ultra trail runs. Tom, W6ORG

I saw the write up in the ARES email. I don't think ATN did any of that. There are good web cams on most of the comm site mountain tops here we can watch. Also there are web sites to show the aircraft radar, Forest radio command channel and other resourses. Interesting seeing where the water dropping helicopters and aircraft were hitting the fire and scooping up water on the Flight Radar web site and listening in on the comms. I have a web page with all these links for my running club - http://www.foothillflyers.org/bobcat.html You can click on Flight Radar and move it to your area if you want to take a look at the activity. ---- Tom, W6ORG

CAL-WOOD FOREST FIRE PHOTOS

from video shot by KH6HTV and transmitted over W0BTV repeater
17 - 21 October 2020


Spotter Airplane
Sat 10/17 7pm


Sat 10/17 7pm


Sat 10/17 7:10pm


Sat 10/17 7:15pm

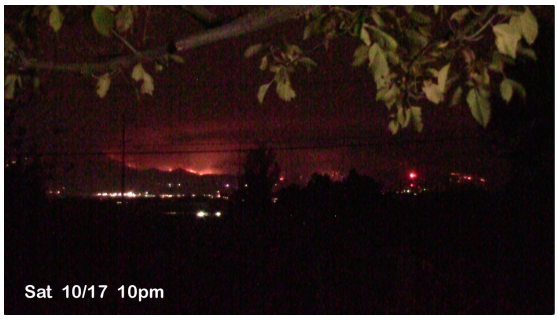

Sat 10/17 7:20pm


Sat 10/17 7:30pm


Sat 10/17 7:40pm


Sat 10/17 7:50pm


Sat 10/17 9:45pm


Sat 10/17 10pm


Sat 10/17 10pm


Mon 10/19 8am


Mon 10/19 11:30pm


Tues 10/20 7:15am


Tues 10/20 7:45am

To All BCARES Members:

I want to extend a thank you from Mike Chard (Director of the Office of Emergency Management) who called to extend his personal thank you for all that BCARES has contributed during the past several days in support of the emergency efforts on the fires in Boulder County.

During my call with Mike he said that with the fires lack of expansion and the fact that the snow has provided a significant lowering of the fire danger, he feels BCARES can take a breath for the foreseeable future. However, as the temperatures begin to return to normal and the possibility of winds increasing, the danger has not gone away. The need for BCARES services may return at any time.

Allen, K0ARK, BCAREDS, R1/D3, Emergency Coordinator

W0BTV Details: Inputs: 439.25MHz, analog NTSC, VUSB-TV; 441MHz/6MHz BW, DVB-T & 1243MHz/6MHz BW, DVB-T Output: 423MHz/6MHz BW, DVB-T, or optional 421.25MHz, analog VUSB-TV. Operational details in AN-51a Technical details in AN-53a. Available at: https://kh6htv.com/application-notes/ We hold an ATV net on Thursday afternoon at 3 pm local Mountain time. ATV nets are streamed live using the British Amateur TV Club's server, via: https://batc.org.uk/live/kh6htvtvr or n0ye.

Newsletter Details: This is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 400. News and articles from other ATV groups are welcomed. Permission is granted to re-distribute it and also to re-print articles, as long as you acknowledge the source. All past issues are archived at: https://kh6htv.com/newsletter/

ATV HAM ADS

Free advertising space is offered here to ATV hams, ham clubs or ARES groups. List here amateur radio & TV gear **For Sale - or - Want to Buy.**

Application Note AN-58

web = www.kh6htv.com email = kh6htv@arrl.net

Programming for ATV the GT Media V7+, DVB-T, Receiver

Jim Andrews, KH6HTV

We have recently discovered a new, low cost, combo DVB-S & DVB-T set-top box receiver which will also tune the amateur 70cm & 33cm bands for DVB-T. It is the GT Media V7+. It is available in stock in the USA from Amazon Prime and sells for $42.

The receiver is specified to cover from 950 to 2150 MHz for DVB-S and 50 to 868 MHz for DVB-T. However, I have tested it and found that it could be programmed as low as 50 MHz, but also to receive higher than specified to include the amateur 33cm band (902 - 928 MHz). It provides simultaneous digital and analog A/V outputs. They are 1080P HDMI and 480i composite video plus stereo audio. The receiver also includes a digital video recorder (DVR) function. To use this, a USB memory stick needs to be plugged into the USB port on the rear panel. The video is recorded as a .TS file, the same as used for DVDs. The receiver operates on +12Vdc. It draws 0.4 Amps at +13.8Vdc

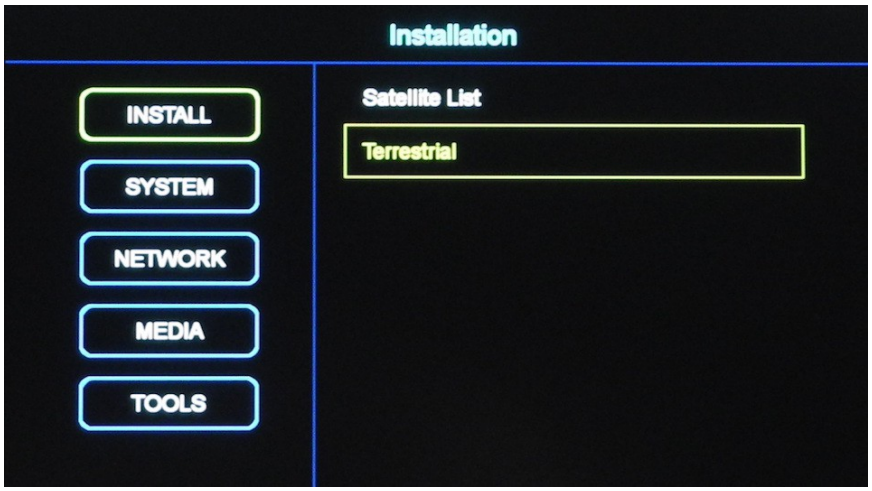
I also measured the sensitivity of the receiver. On the 70cm band it was -96dBm. On the 33cm band it was -95dBm. This was measured using "normal" parameters of 1080P, QPSK, 5/8 FEC, etc. I then added a low noise, 70cm preamp and it improved the 70cm sensitivity from -96dBm to -99dBm. The preamp I used was my own KH6HTV model 70-LNA-1 with 21dB gain and 0.5dB noise figure.

The instruction manual supplied with the receiver is very skimpy and essentially useless. There are some You-Tube videos on the internet where users have tried to explain how to set up the receiver, mainly for DVB-S satellite reception.

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 are the Hi-Des model HV-100EH or 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, connect the modulator directly to the receiver and 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.

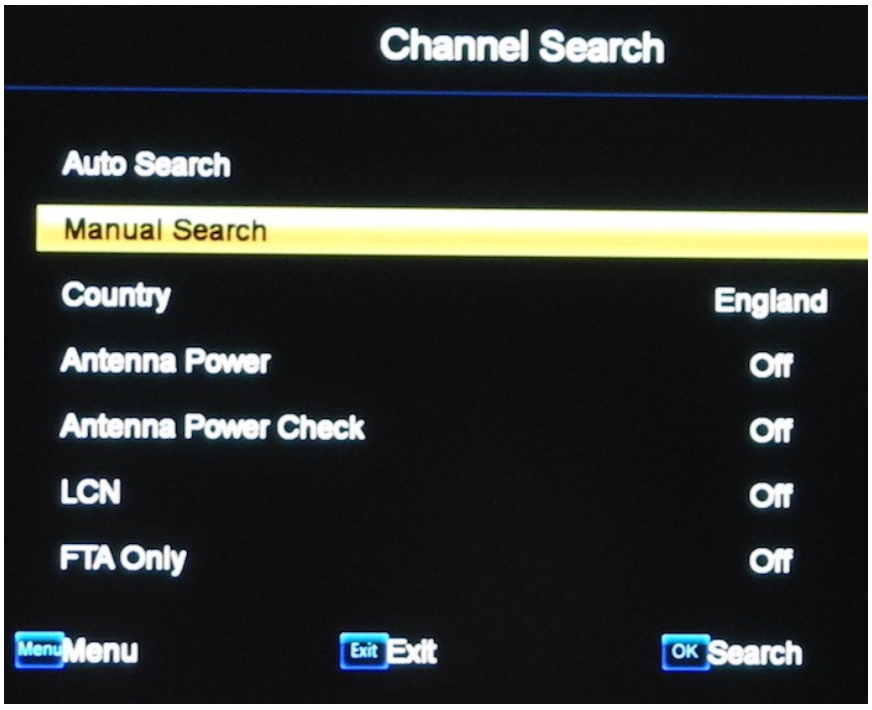
Programming of the receiver is done using the supplied Remote Control.



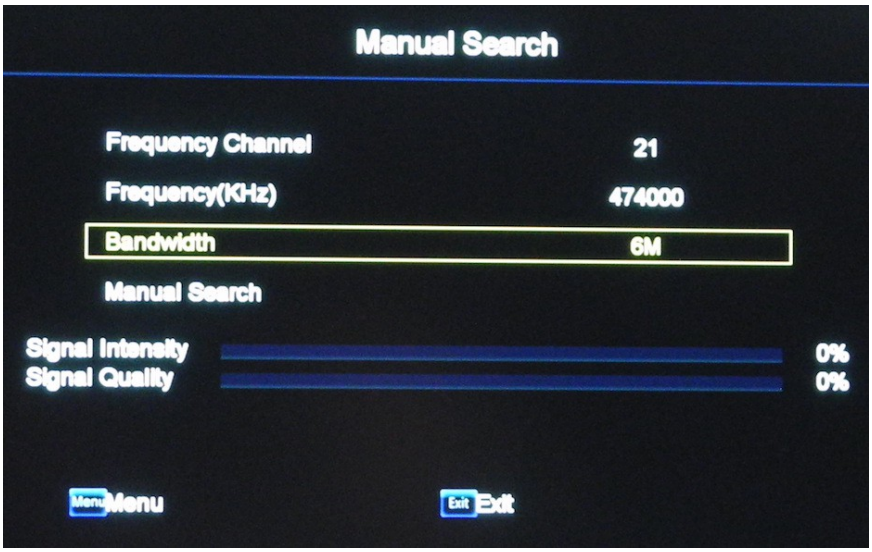
Step 1 - On the remote control, push the "Menu" key

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

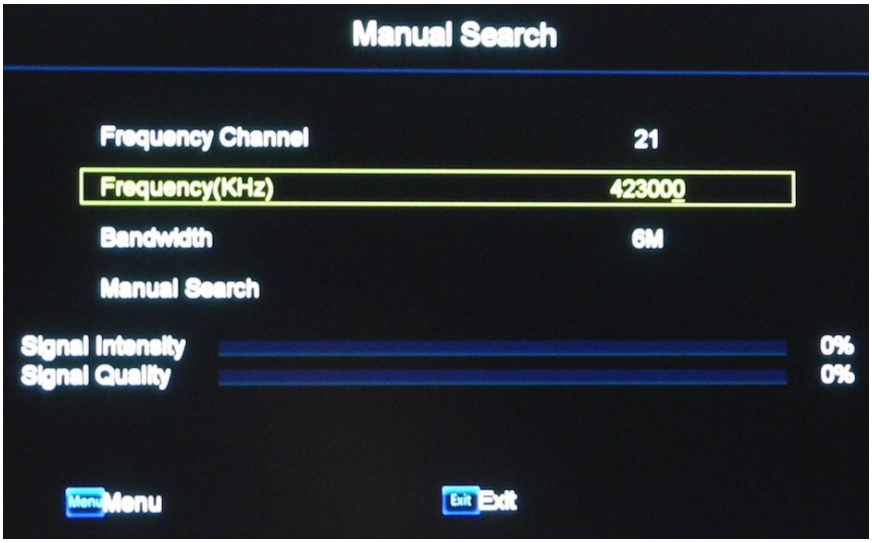
Step 3 - Use up/down buttons to select "Terrestrial", click OK. The Channel Search sub-menu then appears.



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

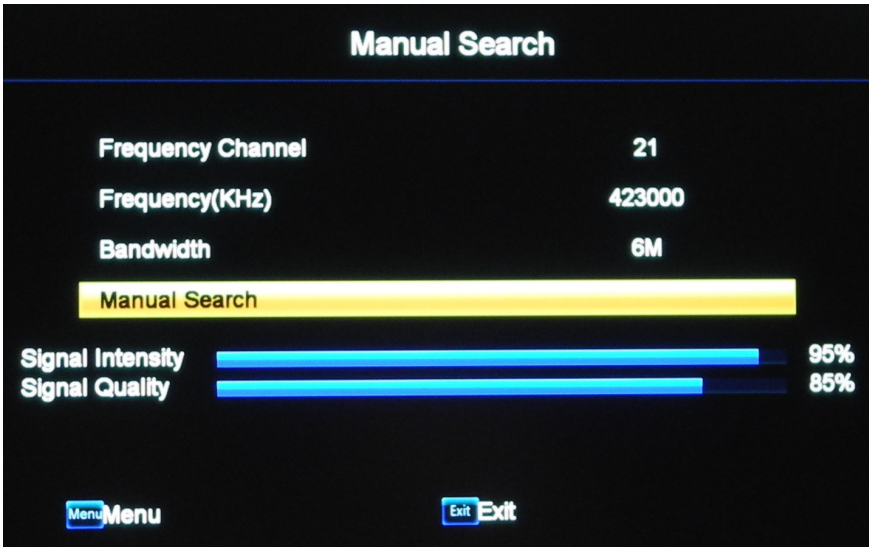


Step 5 - Use up/down buttons to select Bandwidth. Use right/left buttons to set bandwidth to 6 MHz.



Step 6 - Use up button to select Frequency

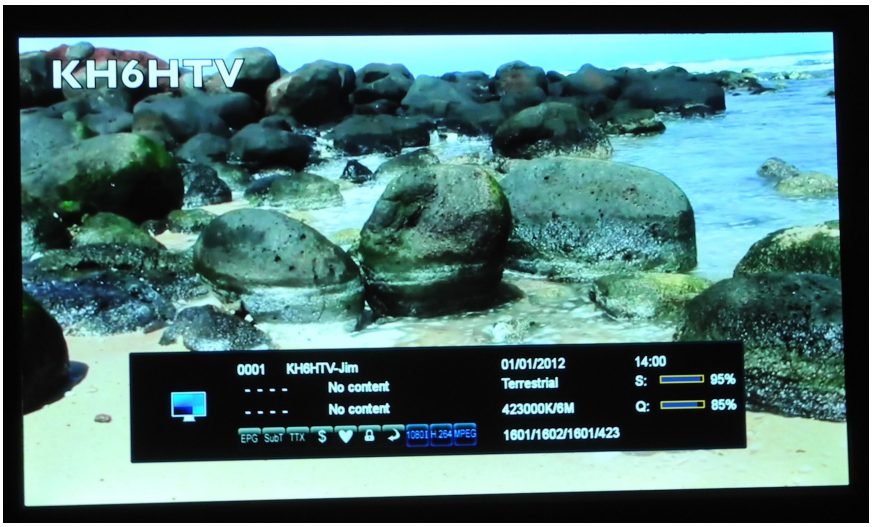
Step 7 - Use the numeric keys on the remote control to enter the desired frequency. For example, for the W0BTV, ATV repeater, enter 423000. As you enter each number, an underscore will appear in the Frequency box indicating that digit is entered.



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.

FIRMWARE: The unit tested had the following versions of hardware and firmware:
Hardware V2.10 Firmware V4.2.81.46.414
Other versions of firmware may - or may not tune the amateur bands.

The receiver has two USB slots on the rear panel. The "Menu" in the "Tools" section allows for firmware backup and upgrade. This is done by plugging into the USB port, a USB memory stick. It is highly recommended that one do a backup of the firmware by copying it onto a memory stick for storage elsewhere, in the event the receiver's firmware ever becomes corrupted. The firmware is a big 4.2GB file