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Amateur Television Quarterly

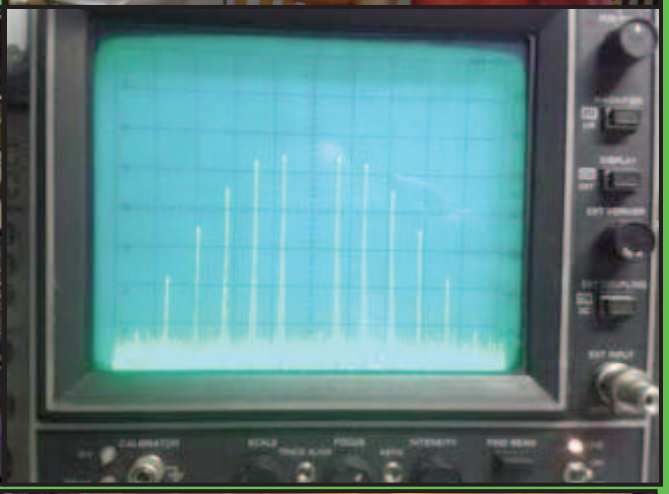
Dayton Hamvention ATV Activities

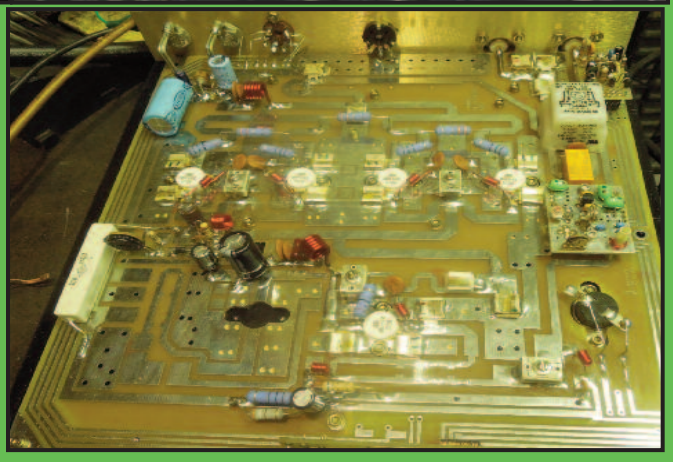
TE Systems 4450G Amplifier ATV Mods

Low Cost Receivers for DVB-T

FM-ATV Alignment

Richard Goode W8RVH SK





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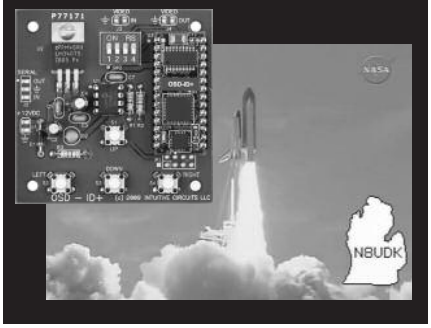

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Publisher/Managing Editor
Bill Brown - WB8ELK
Publisher/Technical Editor
Mike Collis - WA6SVT
Editor
Art Towslee WA8RMC

Webmaster
Don Hill - KE6BXT

Subscriptions / Advertising
Mike Collis WA6SVT
P.O. Box 1594
Crestline, CA 92325
(909) 338-6887 - voice
email: wa6svt@atvquarterly.com

Article Submissions
Mike Collis WA6SVT
P.O. Box 1594
Crestline, CA 92325
email:
wa6svt@atvqwuarterly.com

Website:
http://www.atvquarterly.com

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Amateur Television Quarterly

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Sync Buzz Editorial

Bill Brown WB8ELK & Mike Collis WA6SVT

Spring is here!

It's time to get your ATV station back in shape for Summer ATV DX season. Lots of new ATV gear is available too, see our advertisers's ads in this issue for more details! Art Towslee WA8RMC is proposing a DVB-S/S2 ATV receiver see page 23-24 for details.

Dayton Hamevention

Spring is also time for the Dayton Hamvention, this year Art Towslee WA8RMC has a great line up of speakers, see page 6-7 for details about Dayton Hamvention ATV activities. Our ATV dinner location has changed this year as Roush's has closed and it's owner retiring, see page 7 for the map to the new location.

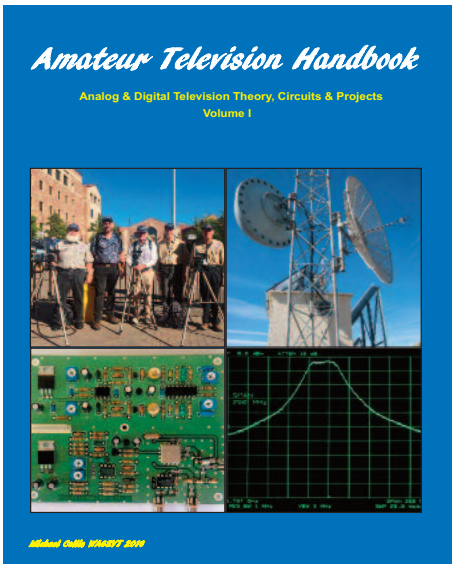
Articles

Please keep those articles coming! Our subscribers have commented about the good ATV activity news and technical articles.

If you are not sure you can put an article together, do not let that stop you. We will be glad to help you put it together. Suggestions about what you would like to see in ATVQ is welcome and helps us make ATVQ a great magazine.

New ATV Secrets Book?

Mike Collis WA6SVT has proposed a new ATV book, below is



a concept of the front cover. A few of you have commented and made suggestions. If there is enough interest, the project will proceed. Your comments and suggestions are welcome. Please contact Mike Collis WA6SVT at wa6svt@aol.com

Stay tuned - Bill & Mike

ATV Activities Schedule for Dayton Hamvention 2016

-ATVQ Staff

ATV Dinner

Friday Night dinner will be held on Friday May 20th at a new location; China Garden Buffet, 112 Woodman Way, Dayton, OH. 937-781-9999 This is near the southwestern tip of Wright Patterson AFB. Time will be 6:30 PM till 9:30 PM See map on page 7 for details to our new location. The buffets price is $11.99 per person. Come join us for dinner and catch up on what is happening in ATV across the country!

ATN Booth

We will have a booth sponsored by ATN again this year in our regular spot in the North Hall, booth number 0236. We plan on a demo of ATV Friday and Saturday during the convention. ATVQ Magazine will also be there handing out magazines to those interested and we can take renewals or new subscriptions.

ATV Forum

The forum will be held Saturday May 21st in room 2 starting at 12:15 PM. Art Towslee WA8RMC will be our moderator again this year. Art has a great line up of speakers this year!

Schedule:

12:15-12:20 “Introductions” by Art Towslee WA8RMC

12:22-1232: ”Gordo on Tropo” Gordon West WB6NOA describes his tropo ATV experiences from California to Hawaii.

12:34-1259: “High Definition ATV the Easy Way” Mel Whitten K0PFX shows the easy way to create high definition ATV.

1:02-1:32: “ATV uses and ATN Update” Mike Collis WA6SVT and Dan Bozin KB8RCU will show how fun ATV can be. Update on the Amateur TV Network including drone video site views.

1:35-2:00: “DATV Repeater Design” Grant Taylor VE3XTV (ZL1WTT) Will show the results of his experimenting with possible ways to create a DATV repeater.

Friday Night ATV Dinner 6:30-9:30 PM

Address: 112 Woodman Way, Dayton, OH in the Airway Shopping Center near the southwestern tip of Wright Patterson AFB.
Phone: 937-781-9999

Directions

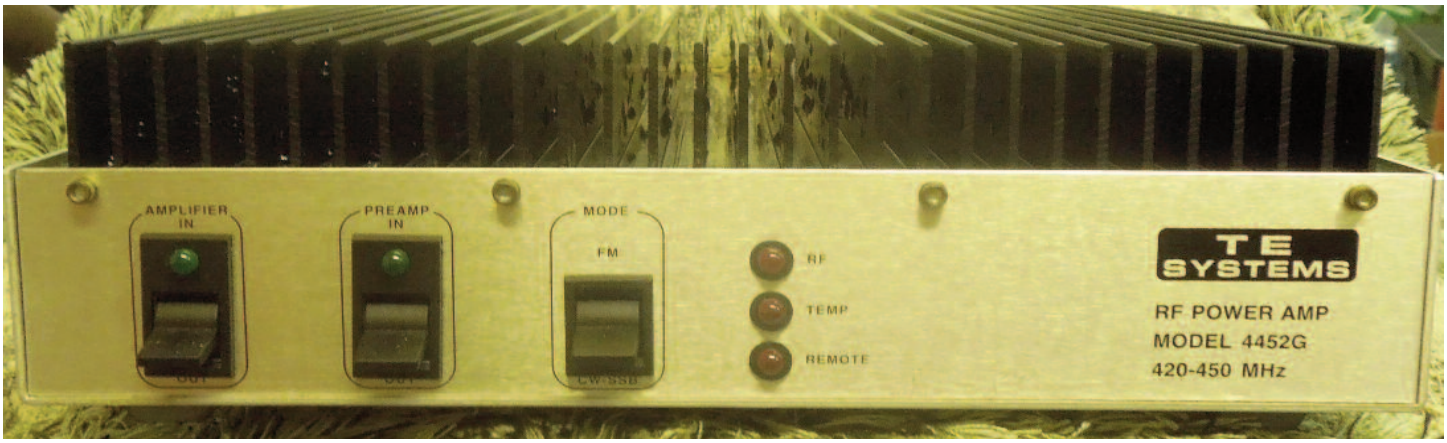
From the Hara Arena take Wolf Road south to Turner Road turning left (east). Go past State Route 48, Turner then becomes Shoup Mill for a couple of miles then becomes Needmore and crosses I-75 heading east for a few miles.

After crossing Brandt Pike 201 the road turns south and becomes Old Harshman Road. Continue south past Wright Patterson AFB on the left then cross Airway Road, Old Harshman becoming Woodman Road, at the next intersection turn left into the Airway Shopping Center.

China Garden Buffet is on the left next door to Firestone Tire. Distance from the Hamvention to the dinner is 13 miles.

TE Systems 4450G 70 cm 180 watt RF Power Amplifier ATV Modifications

- Mike Collis WA6SVT

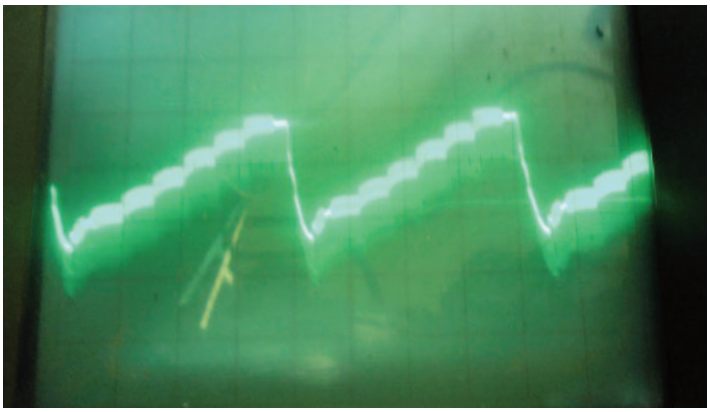


Background

Last month Merv Hecht KO6E and I were talking about the poor performance he was having with his ATV picture when running his power amplifier.

Upon checking the video waveform from his transmissions through the Mt. Wilson ATV repeater with and without the amplifier I suggested he send me the amplifier for evaluation and possible modifications. Upon opening up the otherwise well built amplifier I saw why the video was distorting greatly. I do want to say that TE Systems did not specify ATV as a supported mode, the amplifier does work well for FM, CW and SSB.

Photo 1. Below is a demodulated 434 MHz modulation waveform at 10 watts output.



I used a AEA VSB-70 transmitter running 1 watt driving the amplifier with a clean properly modulated signal. Remembering the ATV modification to Mirage's D1010 that Tom O'Hara W6ORG did back in the 1980's, I decided to use it as a guideline for the modifications. Before diving into the modifications, an explanation about why a typical Ham Radio RF power amplifier causes this condition.

Bipolar Class AB RF amplifier operation

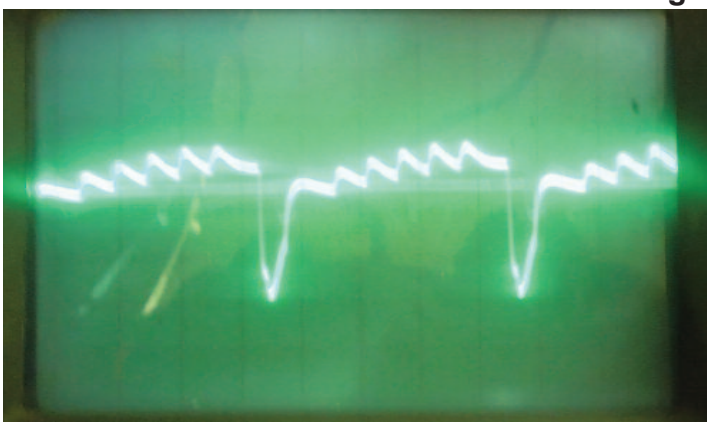
Most Bipolar RF power amplifiers use NPN transistors. They are actually several transistors in parallel within the case and as such have a very low impedance. Bipolar transistors are a current amplifier as opposed to FETs Tubes etc. This requires a stiff bias that should not change with different RF drive levels. We also are fighting RF rectification in the base-emitter junction that pushes the bias negative. The bias supply must hold the RF transistor bias point or distort the signal.

Typical ham RF (so called) linear amplifiers commonly use a resistor from the +VCC power rail to a combination of a diode (forward biased) and a resistor to ground. The diode helps to regulate the current to provide a near constant 0.6 volt to bias the RF power transistor on slightly (quiescent collector current). An RF choke separates the RF from the DC and a small RF bypass capacitor on the bias side of the choke removes most of any remaining RF. Either resistor value can be changed to adjust the quiescent collector current. Usually the diode is thermally connected to the transistor case or heat sink next to the transistor. This is desirable because as the transistor heats up, the junction resistance decreases and more current flows. When the diode is in thermal connection with the RF transistor, the diode junction

resistance also decreases and lowers the bias voltage and that reduces the collector current to reduce thermal run away, providing a stable DC amplifier.

This is the bias method used on the MRF-648 driver stage on the 4450G amplifier. An improvement to the basic diode regulated bias is adding an emitter follower to the diode to provide a much stiffer current for the RF transistor. A second diode is added in series with the first diode to compensate for the emitter follower's base emitter junction voltage drop. Usually just one diode is thermally connected to the RF transistor. The emitter follower bias is what is done for the final stage on the 4450G amplifier with its four MRF-648 transistors. The ultimate bias system is the current mirror but requires a couple more transistors and a few extra resistors. I will not discuss this more as it could be an article on it's own.

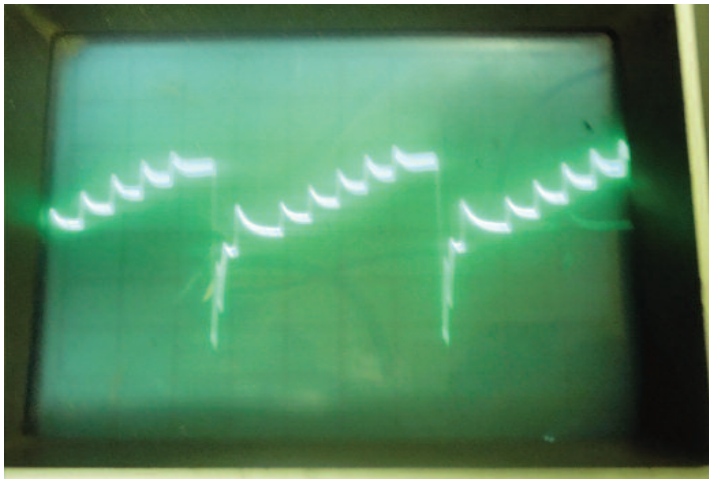
Photo 2. Below is the bias on the driver stage



RF induced modulation of the DC bias supply distorts the video. The negative swing shown above nearly cuts off the RF transistor and squashes the sync as seen in photo 1. By adding a couple of bypass capacitors to stiffen bias at all the video frequencies greatly eliminates the sync compression and video distortion. A 220 uF electrolytic capacitor takes care of the lower frequencies and a 0.1uF disk capacitor the higher ones.

After adding the bypass capacitors the bias is flatten down to just DC. The final stage has it's bias circuit built with an added emitter follower, this provides a stiffer bias but the bias still is modulated by the RF as shown in photo 3.

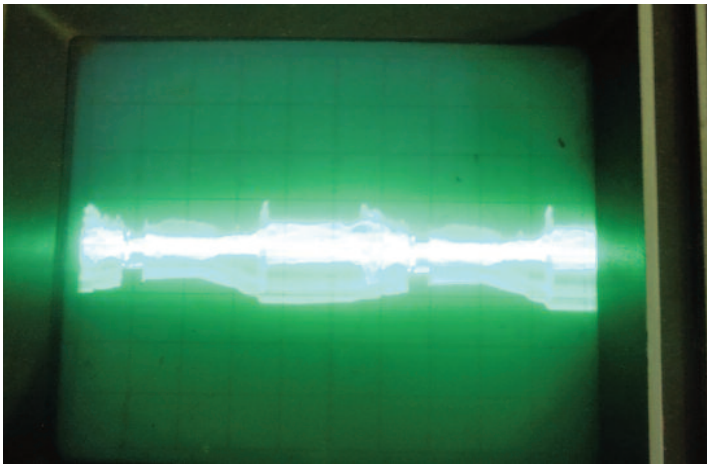
Photo 3. Below is the bias on the final stage



Bypass capacitors were added to the output of the emitter follower and the base of the emitter follower to fully flatten the bias down to just DC.This greatly improved performance but we still had some sync compression and video distortion. This was caused by modulation on the collector supply rails.

The circuit board traces and wire leads to the power supply will cause some voltage drop. Depending on how much output filtering is done in the power supply output to keep up with the fluctuating power needs of the RF transistors, modulation of the collector supply will occur. Adding bypass capacitors to the collector supply cleans this up.

Photo 4. Below modulation on the DC power input of the amplifier



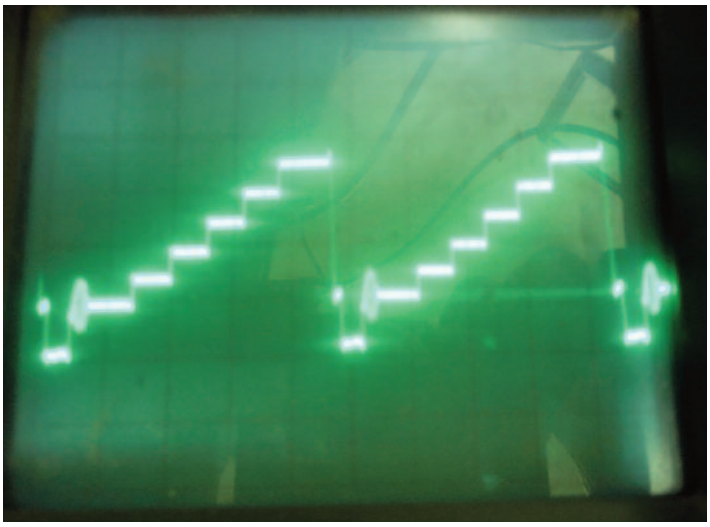
After bypassing the bias and collector supplies the signal was much better. The DC bias is adjusted for 120 mA per MRF-648.

This is slightly higher than the stock amplifier bias at 100 mA per device but insures no cutoff during higher RF drive levels. Remember that the capacitors smooth out the bias but the average DC bias will be somewhat different depending on RF drive level, the more drive the lower the bias. This is where a current mirror bias circuit (active bias) would help.

Most power transistors have a lot more gain at low frequencies than at UHF. This is usually in the HF to low VHF area and can cause parasitic oscillation of the amplifier stage(s). The common solution for bipolar amplifiers is adding a unilateral equalization circuit between the collector and base of each RF transistor. This causes issues at our video modulation frequencies with phase shift and lower high frequency video response. In the Mirage D1010 ATV modification, that circuit is removed and a 51 ohm 10 watt power resistor with a DC blocking capacitor is added to provide a load at HF to the amplifier output. In the case of the 4450G its driver stage was unstable. Recalling a couple of articles about a wide bandwidth bench RF amplifier using a resistor and blocking capacitor to stabilize and flatten the gain on the amplifier but at a cost of reduced gain was thought about. Back to the drawing board.

I contacted Jim Klitzing W6PQL who is one of the best RF amplifier designers around for some advice on alternatives for stability. He suggested a reduced amount of feedback using just a resistor and capacitor should stabilize the amplifier. I tried different resistor values and found that 220 ohms in series with the original 0.047uF disc capacitor worked well. No more phase shift and only very slight reduction in high frequency response of about 1/2 db. The stiffer bias and reduced feedback also increased the UHF gain by nearly a 1 dB. All the bias and supply lines are flat DC and the amplifier checked at the 30% power level into reactive loads with the amplifier remaining stable with no oscillations. The next photo shows the demodulated five step linear ramp test signal (no color on the bars) with sync and color burst shows a proper response.

Photo 5. Demodulated video after the amp



It should be noted that MRF-648 (60 watts) MRF -646 (50 watts) MRF-644 (35 watts) and MRF-641 (15 watts) are very popular and found in various Ham Radio UHF amplifiers to this day. These devices were designed back in the early 1970's for land mobile radio, class C service and were never intended for class AB service. They do a fair job in this service however. Broadcast TV UHF bipolar transistors that were developed in the late 1970s and 1980's were much better suited for class A and AB service and usually using a 28 volt collector supply. Now even these very linear bipolar transistors have fallen out of favor of LDMOS transistors that are linear as a tube amplifier and have more gain with drain supplies of 28, 32 and even 50 volts. Below is a demodulated 434 MHz ATV picture with aural carrier. Color vs aural carrier (AKA 920 Hz beat) is only slightly noticeable. No phase shift issues and rock solid sync!

Modification Procedure

It should be noted that if your 4450G is still under warranty, it most likely will not be after modification. If you still decide to do the modification on a new amplifier out of the box, check it out fully for at least a few days use just in case of infant mortality. The DC power and RF input must be disconnected prior to pulling off the cover. As with any tinkering inside ham equipment it is at your own risk.

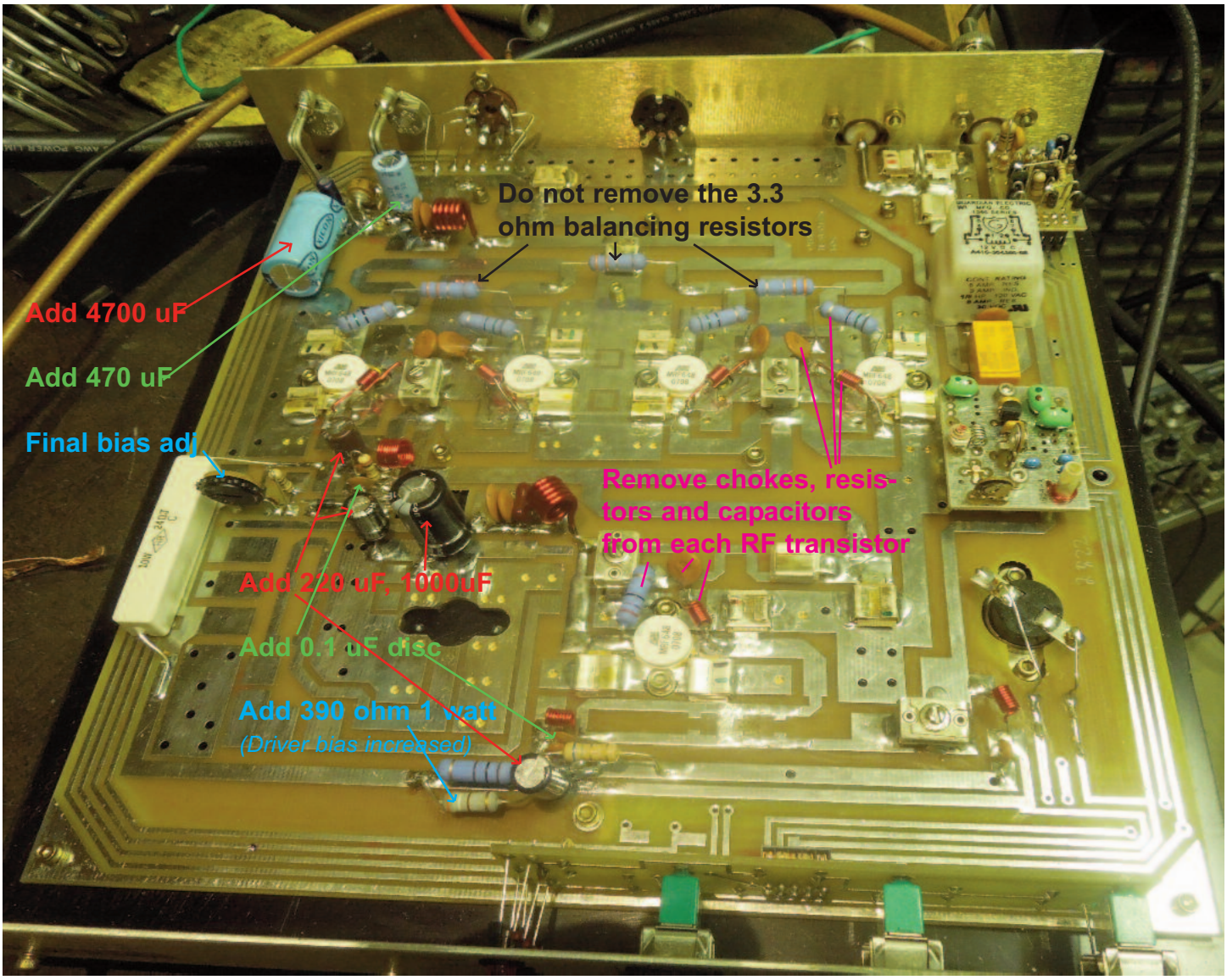
Step 1: Remove the four screws on each side of the cover then remove cover. Check the circuit board for any signs of bad solder connections and damaged components before proceeding.

Step 2: Add a 220 uF 16 volt capacitor with the positive lead to the driver bias at the junction of the diode (anode side) resistors and RF choke. Ground the negative lead. Also add across the bias RF bypass a 0.1 uF disc capacitor.

Step 3: Add a 1000 uF 25 volt capacitor with positive lead to the DC side of the collector's RF choke (red # 16 coil), ground the negative lead. Add a 0.1 uF disc across the collector's RF bypass disc cap.

Step 4: Add a 390 to 470 ohm 1 watt resistor across the 100 ohm 2 watt bias resistor to increase the idle current by about 20 to 30 ma. This completes the driver bias and collector circuit modification.

Photo 7. 4450G bias modifications



Step 5: Add a 220 uF 16 volt capacitor with the positive lead to the junction of the final bias RF choke and emitter follower emitter. Ground the negative lead. Add another 220 uF 16 volt capacitor to the junction of the base and diode junction with the positive lead. Ground the negative lead. Add a 0.1 uf disc capacitor across the bias RF bypass disc.

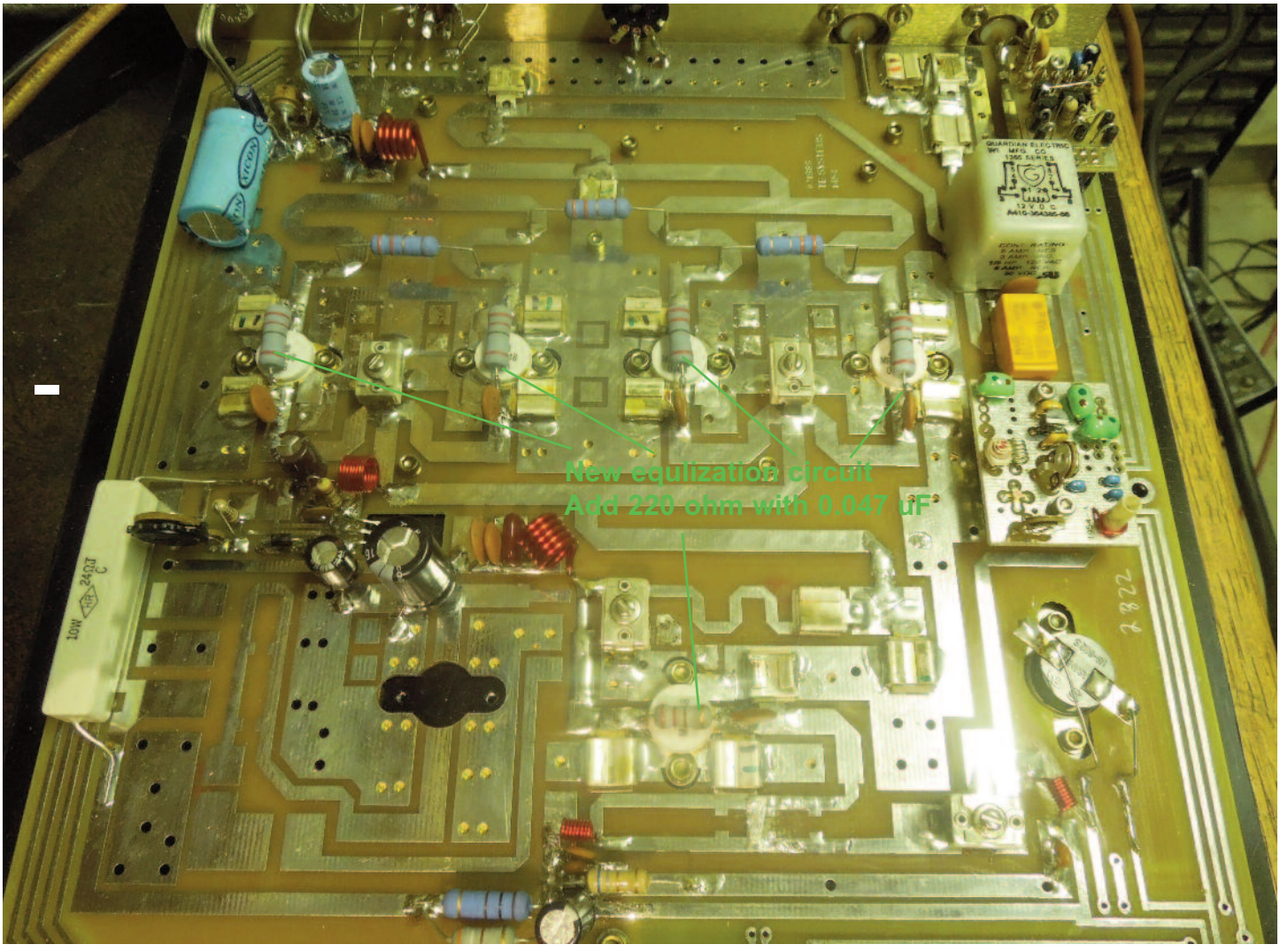
Step 6: Add a 470 uF 25 volt capacitor with positive lead to the junction of the final RF bypass cap and red # 16 RF choke (coil) and ground the negative lead. Add a 4700 uF 25 volt capacitor with the positive lead to the pad where the 13.8 volt power lead attaches to the board. Ground the negative lead to the pad where the negative power lead attaches to the board. There should be two RF bypass capacitors of different values so adding another 0.1 uF disc may not be needed. This completes the final bypass circuit.

Step 7: Referring to photo 7, remove the 15 ohm 2 watt resistors, 0.047uF capacitor and small red RF choke from the final amplifier transistors but keep the capacitors as we will reuse them.

Step 8: Add a 2 watt 220 ohm flame proof resistor in series with the previously removed 0.047 uF disc capacitor and install it across the transistor case (about 1/8" above the case) with the resistor to the collector and capacitor to the base of each final MRF-648 transistor. Do the same for the driver stage. Check your work then connect the amplifier up but start with low drive of less than 5 watts. Then test at 10 to 15 watts drive to reach about 100 to 120 watts peak sync output. This will run the amplifier in it's linear region. The amp can still be used for FM mode at 180 watts. If all is good, re-install the case.

73, Mike WA6SVT

Photo 8. Completed 4450G modifications



Low Cost Receivers for DVB-T

-Jim Andrews, KH6HTV

In the 2015 winter issue of ATVQ, Don, N0YE, and I discussed how to receive the DVB-T, digital TV transmissions from other amateur TV operators. Most serious DTVers are using the fine receivers from Hi-Des (www.hides.com.tw). Their model HV-110 covered both the 70cm and 33cm bands. Early in 2016, Hi-Des has also introduced an updated, improved version, the model HV-120A, which now also includes the 23cm and 13cm bands, along with other enhancements. However, to get other amateurs interested in joining our ATV / DTV ranks, the need is there for a really low cost (<$50) receiver for them to get their feet wet by first simply watching our transmissions. With us USA TV amateurs using the European DTV standard of DVB-T, they are not able to watch our TV signals directly on their home TV receivers. There are however a couple of low cost solutions.

$10 USB TV Tuner Dongle Solution

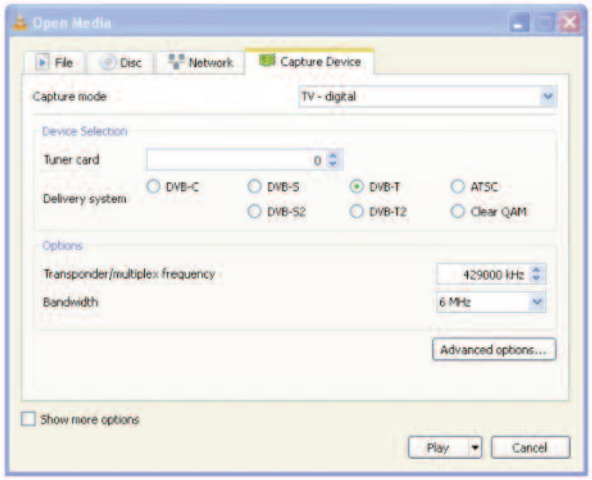
The really low cost approach is to buy a DVB-T TV Tuner USB dongle for your PC computer. Most of the "hits" from a Google search for "DVB-T receivers" will in fact be these dongles. They are found from many sources on www.ebay.com and www.amazon.com among others. Most of these seem to use the same basic design with an R820T DTV tuner IC (www.rafaelmicro.com)and an RTL2832U DVB-T COFDM demodulator IC with a USB interface (www.realtek.com) The tuner's frequency range is 42 to 1002 MHz with a 3.5 dB noise figure. These same dongles have been used by amateurs as generic software defined radio (SDR) receivers for many other RF applications, such as a spectrum analyzer, with appropriate software.

These dongles typically come with a small magnetic mount whip antenna, remote control and a mini-CD disc with TV tuner software. The RF connectors vary and sometimes are not what are shown in the internet advertisement photos. The antenna connector is usually a small MCX or a larger European TV antenna connector, called the Belling-Lee (IEC 61169-2). Most USA amateurs are not using MCX or Belling-Lee connectors. We have made our own adapters by simply cutting off a connector pigtail from the supplied mini antenna and installing another connector of our own choice on the other end of the pig-tail. Suitable coax adapters are also available at low cost on the internet.

This is not a simple KISS, turn-key, solution. A PC computer, and attendant computer skills are required to use this approach. All of the cheap, USB TV tuner dongles seem to come with free TV tuner software by Blaze Video (www.blazevideo.com) It only runs on Windows PC computers. It seems to be supplied as a "teaser" and they really want you to purchase their $50 upgrade software. I have heard very mixed reviews from other hams about Blaze. I myself have had all sorts of issues trying to get it to work on several computers and with several dongles. It seems to work or not work depending upon which version of Windows one is using. Some hams have had it work for a couple of weeks and then lock up and never work again. Others have reported it to work fine for over a year or more. Some hams have reported that the software is extremely slow in responding to commands. Others are very happy with it.

VLC Works !Steve, WB0NFQ, has discovered that the general purpose video processing software called ***VLC*** (www.videolan.org) works great with these USB TV Tuner dongles. ***VLC*** is a free and open source cross-platform multimedia player. ***VLC*** is available for Windows, Mac OS X, Linux and Unix. The Windows version does work with these dongles. The Mac version does not support these cheap, generic dongles. It only supports expensive Eye TV tuner dongles (https://www.elgato.com/en/eyetv).

Several Boulder, CO amateurs are using ***VLC*** successfully on older Windows PCs. I personally have not been able to get it to work with my HP laptop, Windows 10, PC, but do have it working on a Windows XP computer.



To use ***VLC*** with a TV tuner dongle, first attach the dongle to a USB port. Attach an antenna to the dongle and make sure it is close to a strong DVB-T signal on the desired frequency. Next, launch the ***VLC*** program. On the upper task bar, click on "Media" and select "Open Capture Device". This will open the above page. For Capture Mode, select "TV - digital". For Tuner Card, select "0". For Delivery System, select "DVB-T". (note: VLC's menu also offers all other major DTV standards of DVB-S, DVB-C, ATSC and QAM). Under Options, enter the desired frequency and bandwidth. Frequency is to be entered in kHz and must be the center frequency of the desired channel. For the example shown above, the channel was 58 (426-432 MHz) with a center frequency of 429 MHz (429000 kHz) and 6 MHz bandwidth. Note: ***VLC*** is nice in that any arbitrary frequency within the tuning range of the R820T tuner IC is acceptable. This is an extremely nice feature of ***VLC***. It is the equivalent of the old "random access" with analog TV. ***VLC*** does not have to be "trained" (auto scanned) like most DTV receivers. ***VLC*** offers a wide selection of bandwidths from 5 to 10MHz, plus an Auto search mode. It is best to not use Auto as it takes a lot longer to find a signal. Select "6 MHz" bandwidth. Do not use any of the Advanced Options. The final step is to click on the "Play" button at the bottom of the page.

If a DVB-T signal is present at the antenna input on the desired frequency, you should now see a live video picture complete with audio. The photo below is an example of ***VLC*** receiving an amateur DVB-T signal on 429MHz.

$30 KISS Set Top Box TV Tuner Solution

This is a good, potentially low cost ($30), solution. It is the true KISS ("Keep It Simple Stupid") solution. It is to use a set-top box TV tuner, much like the digital converter boxes supplied by the cable TV companies. They are engineered to be simple to use for the ordinary consumer. No computer skills are required.

Doing a Google search on the internet for "DVB-T Receivers" will bring up a lot of "hits". Most of the hits will be for the USB dongles, but some will be actual set-top boxes. Some set-top boxes are found with very attractive prices in the $30 to $100 range. You need to find one that is advertised to cover the 70cm band (420-450MHz) with bandwidth of 6 MHz.

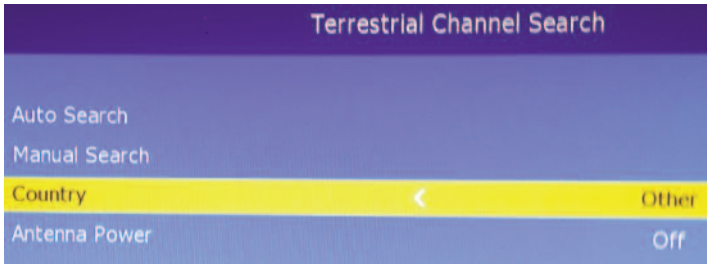
However, ***BUYER BEWARE !***. There are many receivers on the internet advertising to cover from 48 to 862 MHz with bandwidths of 6, 7 & 8 MHz, but many of them omit the amateur 70cm band and only cover the commercial broadcast TV frequencies. I have purchased some, only to find that they didn't actually work on the 70cm amateur band. It is also questionable, if you do find a suitable receiver as to how long it really will be available for purchase over the internet. Some items appear and then disappear within weeks, or even hours.

Most of them come from China from unknown manufacturers with no brand name, nor model number. Warranty ? -- forget it.

However, I recently lucked out with a receiver I found on www.ebay.com It was advertised to work for both terrestrial (DVB-T & DVB-T2) and satellite (DVB-S & DVB-S2) See above photo. There was no manufacturer's name nor model number identified. It was simply labeled as HD DVB-T2&S2 COMBO. The price was $31 which included a remote control and free shipping via ordinary mail (1 month delivery) from Hong Kong. It actually shipped from an unknown company, GOHUI in Shantou City, Guangdong, China. (email= ynaan_lus4755pdj@members.ebay.com.hk).

The good news is that it actually worked on the amateur 70cm band. Be advised that these receivers will have European, Belling-Lee, antenna connectors and AC power plugs. This box works on 100-250 Vac, 50/60 Hz.

To receive 70cm DVB-T, in the Search menu, select Terrestrial. The key trick to using this box was to not select a particular country in the Country menu, but rather "Other" when initially doing the programming. Then select Manual Search. In the next menu to appear, enter channel 00, the desired 70cm frequency and 6 MHz bandwidth.



Then scroll down to "Manual Search" and click on it. The receiver will scan and find your transmission and immediately start displaying a live image on the monitor screen. The photo below shows an actual 70cm (429 MHz), DVB-T transmission being received, along with the INFO display box. This is the internet link where I found this particular receiver. Note: this particular link was still active on 1 March 2016, but it is not guaranteed to still be there in the future. Good Luck ! ! !

http://www.ebay.com/itm/EU-UK-Full-HD-1080P-DVB-T2-S2-Video-Broadcasting-Satellite-Receiver-Box-TV-HDTV/381479856820?_trksid=p2141725.c100338.m3726&_trkparms=aid%3D222007%26algo%3DSIC.MBE%26ao%3D1%26asc%3D20150313114020%26meid%3D247392b3275b4fc89578a24ea6414d3a%26pid%3D100338%26rk%3D1%26rkt%3D22%26sd%3D221681368143 73, Jim KH6HTV

ATN-CA Winter Meeting 2016

-Roland Hoffman KC6JPG

This year's ATN California Chapter meeting 2016 was held at Sizzler Restaurant in Corona CA. on Saturday February 20th. It is a new location for us with better food and room size. Many thanks to Gary W6KVC who arranged for our new location. We had lunch then our president, Norm Hill KD6OMV called the meeting to order at 12:30.

Our new site at Ord Mountain with its links between Jobs Peak and Mt Potosi was presented to the group. This new link connects the ATN-CA chapter in Southern California to the ATN-NV chapter in the Las Vegas area.

An update of the other ATN repeaters were discussed and included new equipment and other changes made since last year. All of our sites received new 434 MHz AM/VSB receivers. These are the Tektronix DS-1000 demodulators replacing several different 434 MHz receivers we had on different sites over the years. The new receivers feature a high end broadcast quality PLL demodulator stage, multichannel audio. Many of the sites have upgraded tower mounted filter and LNA for 2441.5 MHz FM input. We discussed the new HiDes DVB-T receivers going up soon at Mt. Wilson, Santiago Pk., Snow Pk., Jobs Pk and Oat Mt. We discussed the expedition to Hayden Pk in Arizona were we were able to pick up White Tank ATV repeater near Phoenix (ATN-AZ chapter) and Snow Pk. in California. Gary Heston W6KVC and Mike Collis WA6SVT discussed their trip to Mt. Potosi in Nevada to install the new ATV link equipment and sent a snow free picture all the way from Nevada to the Los Angeles area via the link.

Some of our ATN members inquired if we are able to provide live coverage of the meeting. I was honored to provide live streaming to those members who could not join us. Utilizing the BATC video streaming system under the W6ATN link, our "out of town" members were able to watch and interact with us. Our net is on Tuesday evening at 7:30 PDT, I am also honored to be our net control.

Norm Hill KD6OMV presented awards to some of our members for helping above the call of duty. Details below.

Earl Haltman KJ6DQR Site construction, equipment donation and repeater work on site.

Nathan Haltman AG6AV for site construction and tower installation help and antenna work on site.

Bob Miller W6KGE for design and construction of PIC frequency control and amplifier driver boards.

Roger Berchtold WB6HMW for site construction and donations.

Gary Heston W6KVC for site work and construction.

Steve Noll WA6EJO for Site construction, site maintenance, building microwave filters and dish feed horns for the links.

Mark Fischer W6MAF for Tower donation and tower installation help, cable tray and other site hardware.

Norm Hill received a Trustee's award for his help in site construction, tower installation and site work.

The president's award was also presented to following member who were not able to attend.

Ron Hill KD6NIZ for major donation of funding for Ord Mt. site materials and a new 434 MHz antenna and 1265 MHz VSB filter at Mt. Wilson.

Bruce Porter WA6LIG for major financial donation to the club not only for 2015 but each year as far back as I can remember.

Perry Locke AE6GQ and Norm Musselman KN6CV for design, building and programming Multiple Raspberry Pi based telemetry and video slide show system for multiple repeaters.

It should be noted that many other members have helped over the years and many of them have received awards in prior years. ATN California chapter would not be where it is today if it was not for the generosity of so many members!

Bob Miller W6KGE got up at the end of the awards and thanked Mike Collis WA6SVT for all the years of his efforts, time and money helping ATN grow to where it is today. The rest of the group agreed. Mike Collis WA6SVT took care of membership renewals and ATVQ subscriptions.

Norm Hill KD6OMV then thanked the current officers for there service and asked us for nominations for the 2016 year officers. Elections were held and our new officers for 2016 year are:

President is Roger Berchtold WB6HMW (last years VP) was elected. Roger is a retired aerospace antenna engineer. He has a background in management and engineering.

Vice President is Nathan Haltman AG6AV. Nathan is a field engineer for Verizon with several years experience in radio site design, systems integration. He is one of our younger members full of great ideas for the repeaters and sites. His father Earl Haltman is a member too. Nathan's Mom Julie KJ6FYY is an active member.

Officers that do not change every year are:

Mike Collis WA6SVT, Trustee of W6ATN and Secretary/Treasurer. Mike has been around a long time and the reason we have ATN in my opinion!

Don Hill KE6BXT webmaster for ATN (all chapters). Don has been past ATN President for several years and has built and maintained the ATN and ATVQ websites for years. Don's brother Norm was last year's president and his other brother Ron KD6OMV is an active member too.

DVB-T update:

Mike Collis WA6SVT and I have been running tests with DVB-T on 434 MHz at 2 MHz bandwidth with good results. We found that the data size had to be set to 2 MB to work within the 2 MHz bandwidth. h.264 (MPEG-4) provided much smoother video when motion was involved. 3/4 FEC seemed to be the best compromise between video and weak signal performance.

So far we have tried using the DVB-T receiver on the Jobs Peak repeater and currently we are running tests at Mt. Wilson. Both of these sites are manned sites (Mike's work at Mt. Wilson and Home QTH at Jobs Peak). We tried mobile tests in Summit Valley about 8 miles from Jobs peak and found DVB-T works well and in some locations with hills blocking the direct path the receiver remained locked onto the signal.

We used my HiDes HV-100EV modulator and KH6HTV Video 70-12C Amplifier into Mike's Diamond X6000 tri-band vertical omni at 120 ft.

Our receive station was my Tri-band Comet omni and mag mount antenna and Mike's 70cm LNA feeding my HiDes HV-110 receiver.

73, Roland KC6JPG

Richard Goode W8RVH SK

-Farrell Winder W8ZCF, Hank Cantrell W4HTB

[*Intro by Bill Brown WB8ELK*]: Last September we lost Richard Goode W8RVH who was one of the true pioneers of Amateur Television. Richard's distinctive ATV logo never changed over the decades and was viewed by many. He was one of the very first ATV contacts I made when I first got involved with ATV in 1969. He lived in New Carlisle, Ohio and at 60 miles distance from my home, Richard was just beyond my local reception range. However with his amazing array of homebuilt high-gain antennas, I could always see his ATV image no matter what the band conditions. He even could rotate the whole array by 90 degrees to accommodate horizontal or vertical polarization.

Before his retirement, he worked at WPAFB in Dayton, Ohio engineering Airborne Radar systems. He applied his engineering techniques throughout his amazing ham shack. It was always a treat to visit him to see what new innovations he was working on. Those of you who have attended the annual ATV dinner at the Dayton Hamvention know that he usually found a way to attend and was a fixture at these events for many years. He will be greatly missed by all the many ATVers that held a daily sked with him spanning decades.

Farrell Winder W8ZCF and Hank Cantrell W4HTB wanted to share the following two stories about Richard that really show his ability to engineer a solution to tough problems and really highlight his innovations.

Remarkable ATV Operation in a Restrictive Location

It is remarkable what can been accomplished by an Amateur Radio Operator moving from his home base farm to a part time residence. This was the case with Richard Goode, W8RVH who moved to his part time location, a Senior living facility which was 11 miles SE of his farm home location at New Carlisle, Ohio. In this instance, the plan was to set up the inside radios and connect to outside antennas in a "stealth" arrangement. This arrangement was finished in December, 2011 and demonstrated some remarkable operational results.

For HF, 2 antennas, a 160 meter and a 75 meter were constructed with the help of Dave Pelaez, AH2AR using a "sling shot", to establish a "stringer" over limbs of a 50-60 ft tree. A #22 copper wire with an insulator was then put in place covering a distance of about 130 feet. These antennas operate as basic long-wire sloppers. It was nearly impossible to spot their existence. The antennas could be relay switched on the outside of the residence. They were fed with an older model Clipperton L Amplifier with four 572B tubes feeding an MFJ tuner providing 300-350 watts output.

W8RVH's ATV (Fast Scan) setup consisted of only 1/3 (11 elements) of a K1FO antenna. The shortened length was done to conceal the presence at a location on the outside of the building. The antenna was mounted on a rotatable pole only 17 feet high.

The ATV transceiver was a PC Electronics unit with 3 watts out which fed a surplus TV line type distribution amplifier providing 22 watts output. With this setup, the W8BI Dayton repeater could easily be worked with a display of W8RVH's callsign transmitted to any station receiving W8BI, normally out to about 70 miles. A 439.25 MHz input yields a 421.25 Repeater Output.

The most notable achievement is that W8RVH managed to exchange 2 way contact with stations such as WB8LGA, W8URI and KA8MFD in the Columbus, Ohio area, at distances up to 70 miles. Contacts have also been made with W8PU, Midland Ohio, 42 miles, and KB8GUE Leesburg, Ohio, 43 miles.

This achievement shows what can be done with Amateur Radio type innovation using limited equipment and restricted outside equipment.

Photos courtesy of Mike Bowlus, K8KDM, St. Paris, Ohio

One Event in the History of W8RVH

From the many of us who were in regular contact with Dick Goode, W8RVH it was apparent that he was never one to brag or write much about his many innovative accomplishments and technical assistance to many other Amateur Radio Operators.

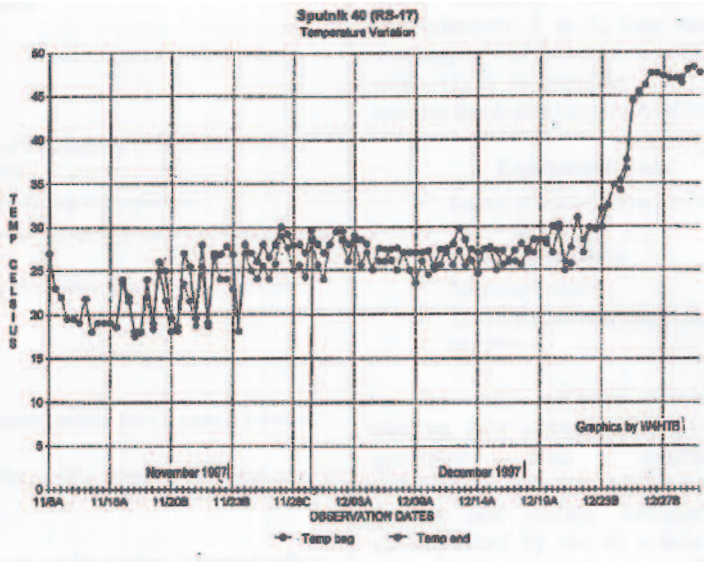
However, there was one Outer Space event in November, 1997 to which W8RVH contributed much innovative analysis. This event was the launching of Sputnik 40, a 1/3 size replica of the original Sputnik 1 launched in October 1957. The replica was hand launched from the MIR Space Station to celebrate the 40th anniversary of the first earth artificial satellite, Sputnik 1. Both W8RVH and W8ZCF had listened to the beeps of Sputnik 1.

Sputnik 40 also named RS 17 was built by two groups of high school students, one from Reydellet School on Reunion Island (French) for the radio transmitter, and the other from Naltchik in Russia that supplied the mechanical structure with antennas. The radio was set up to issue beeps and also had provision for tone modulation to convey day to day internal temperature of the satellite.

W8RVH became immediately interested in the event and set up to measure temperatures of the audio beeps from the satellite beginning November 3, 1997 through December 30, 1997. W8ZCF also listened each day and compared notes with W8RVH.

A contact was made with F6FAO in France, who provided detail of the satellite electronics along with a frequency vs temperature chart which could be used to measure accurate temperatures from the beep tones. W8RVH proceeded with a unique technical arrangement to make temperature measurements. He observed some 200 readings over the life of the satellite. On December 27, 1997 the beep tones ceased as the satellite entered the earth's atmosphere to an extent that the electronics at the acquired high temperature became electronically dead.

The Miami University Twelfth Annual South West Ohio Digital Symposium learned of W8RVH's Beep Recordings and Analysis and persuaded him to give a presentation on January 17, 1998. In W8RVH's words this is some of the details of his presentation:



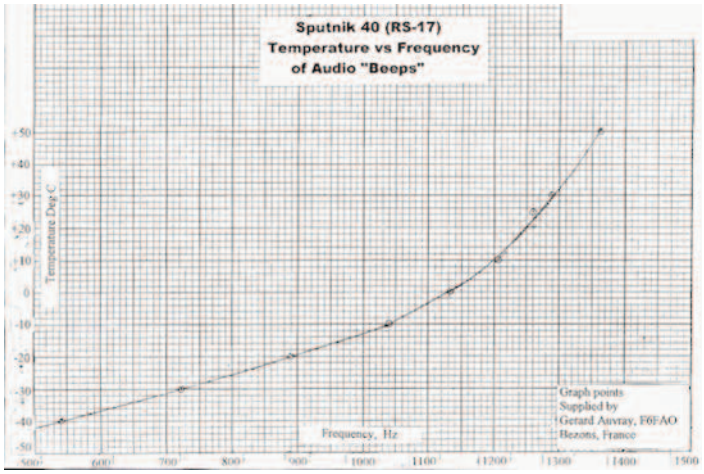
RS-17's temperatures from November 6 to December 28, 1997.

Quote:
A method of measuring the frequency of the transmitted beep was required. While expensive laboratory equipment might do the job, no equipment was available. Therefore an innovative method of using Amateur Radio equipment was devised.

Since direct readout by a frequency counter failed due to the intermittent nature of the beeps, it was decided to try to synchronize a locally generated audio signal with the beeps and then measure the frequency of the local signal. Aural attempts to establish a zero-beat did not deliver the necessary accuracy.

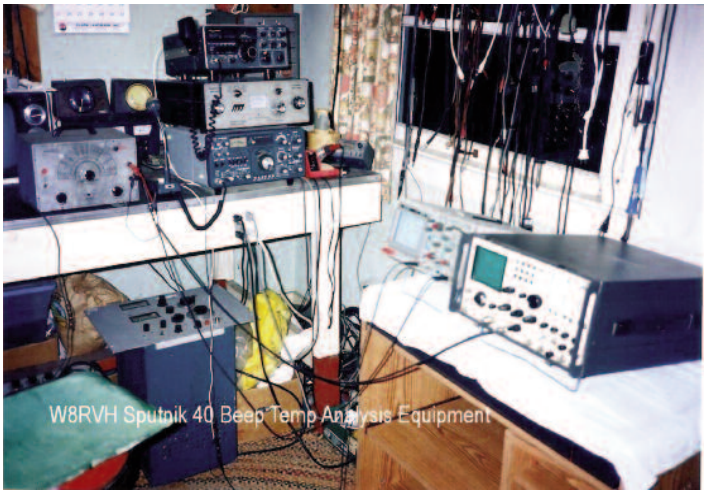
As a result a third method which compared the beep signals and the audio fed to an oscilloscope proved to be very satisfactory. The classic Lissajous patterns of 2 frequency comparisons allowed easy and steady synchronization of the 2 audio tones. (See Picture on next page).

The ratio of temperature change to audio frequency was established as approximately 3 to 1, thus a temperature accuracy of 1/3 degree C would be possible if the audio frequency could be resolved to 1 Hz.



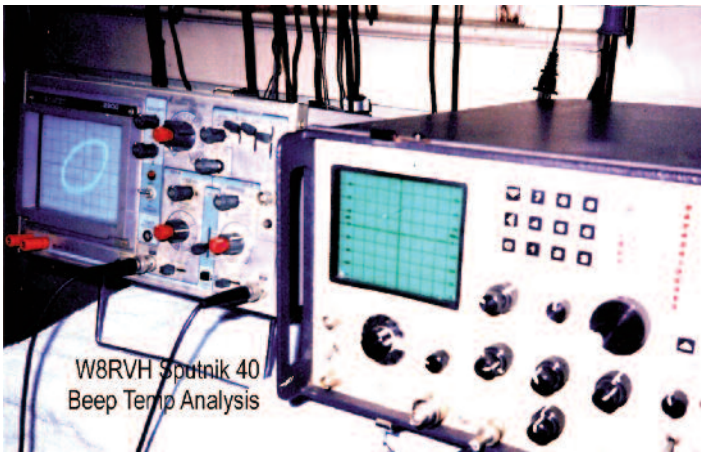
Equipment used:

2 meter all-mode receiver with an 11 element Yagi, stable audio generator, frequency counter and an oscilloscope with vertical and horizontal inputs.



The audio generator was a vacuum tube capacity-type Wein Bridge generator with constant-current stabilization of the oscillating circuit. Further line voltage stabilization was accomplished by use of a Sola constant voltage line transformer. The only modification needed was to install a small capacitor vernier to the audio oscillator which allowed 180 degree angle rotation to sense a 20 Hz change in audio frequency. This made the setting to 1 Hz easy and practical.

The frequency counter was a Motorola Model 2006 service monitor, chosen because the internal time base is an oven controlled 10 MHz crystal which could be adjusted exactly zero beat with WWV, insuring accuracy to 1 Hz with sampling time set to 1 second.



A 5 inch dual 20 MHz oscilloscope was used allowing the operator to observe the scope while adjusting the frequency vernier for the Lissajous circle. After holding this pattern steady for 1 second or more, a reading could be made of the incoming frequency to within 1 Hz! Incremental changes were readily detectable. *End of Quote*

P. S.

A note of humor emerged while Dick, W8RVH and I were originally reviewing the temperature data plot. Since the dinosaurs all disappeared from Earth, with a little imagination the temperature plot takes on a definite image of a Dinosaur skeleton. We had in our group, Don Miller, W9NTP, a renowned archaeologist who did examine the plot and confirmed that it indeed resembles a Dino skeleton. So perhaps some of the Dinosaurs went to Outer Space?!

Richard will be sorely missed.

73,
Farrell Winder W8ZCF
Hank Cantrell W4HTB
Bill Brown WB8ELK

ATVQ

NEW DVB-S/S2 RECEIVER DESIGN CONCEPT

-Art Towslee WA8RMC

I'm Art Towslee, WA8RMC, hardware designer of the DATV-Express DVB-S transmitter PCB. Jean-Pierre, F6DZP and I propose we design and build a DVB-S/S2 receiver module that connects to the USB computer port for use with his Minitioune PC software program. It will be basically an enhancement of his existing MiniTiouner receive module kit. The design is in the concept stage now while we decide on needed features and see if there is sufficient interest to go into production. We would like to hear comments on the proposal as well as ideas for additional features.

The product would be a small assembled and tested module that converts a DVB-S/S2 signal into a serial transport stream for connection directly to a Windows PC USB port.

We selected special tuner/demodulator IC's to eliminate the need for a NIM tuner. The guaranteed operation is from 250MHz to 2.1GHz but will still operate 144MHz to 2.4GHz. The 2.4GHz upper frequency limit allows ISS reception directly eliminating the need for a downconverter, at 70cm it becomes a highly sensitive DVB-S receiver and at 144MHz it can be used for experimental low symbol rate operation in Europe. The finished product will consist of a small PCB approximately 2" x 5" (50mm x 125mm) completely assembled, tested and optionally mounted in an enclosure.

The main features are:

RF input: 144MHz to 2400MHz.

4 inputs multiplexed into 2 independent receivers. SMA connectors on first 2 inputs. Input sensitivity: -65dBm minimum. (It is expected that an external preamp will be used at antenna).

Power requirements: +10 to +20VDC (~0.7A @ 12vdc). (Cannot source power from USB port).

Output: USB type B connector to go to Windows USB2 port. (Should a type A connector be used here?)

Parallel transport stream PC pads from demodulator IC for optional connections bypassing USB port.

Custom low pass filters to optimize low symbol rate and for better S/N operation.

LNB power: 12 to 18vdc current limited for external preamp on input connectors. The voltage is controlled by input voltage selection. Jumper to disable DC power on input connectors.

Logic output for "signal present" or "signal locked". Signal also carried through to PC. DiSEqC not supported. Chip set supports this but adds $10 to board cost. PC pads to add this circuit externally will be provided.

Target selling price is ~$120 USD. (This is a not-for-profit effort). Plastic enclosure is option. Extra SMA input connectors are option.

Let us know what you think of the idea. We need feedback about features and expected volume. If we cannot justify builds of at least 100 units at a time, we question it as a worthwhile project.

73,
Art Towslee
WA8RMC

ATVQ

Translations TV-AMATEUR 179

-Klaus Kramer DL4KCK

From TV Amateur page 6:

FM-ATV alignment - a new approach

-Tom Altinger, DL1MFK, from Munic

Background

Watching the output spectrum of FM-ATV transmitters there are more peaks at high video frequencies, the deviation is dependable on pre-emphasis effects. Line frequency in Europe is 15625 Hz and was used in old Rhode&Schwarz test generators for AM-TV alignment. According to german ATV repeater sys-ops some telecom authority controllers have employed small generator boxes with 15625 Hz - 1 Vpp output to check the ATV-TX rf output.

FM-ATV repeater license regulations are limiting the deviation to 3.5 MHz when using 13 and 23 cm bands. Citing the license document: "For transmissions on bands between 1240 and 2450 MHz the maximum bandwidth is 16 MHz at -40 dBc. Above 3400 MHz the maximum bandwidth is 18 MHz at -40 dBc. A sound sub-carrier at 5.5 MHz is recommended, more sub-carriers are allowed, but in total not extending the maximum bandwidth."

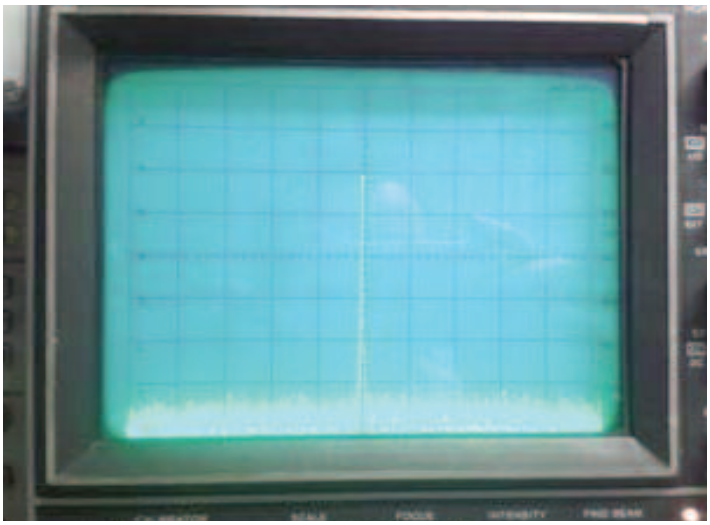
Now using Carson functions the FM signal bandwidth B is set by Fmax and the modulation index M: B = 2 x Fmax x (M+1). The maximum deviation D = Fmax x M.

In several documents for Fmax the PAL colour sub-carrier frequency 4.433 MHz is used. But the video signal can extend to 6 MHz, only limited by an input video filter at 5 MHz threshold value. Knowing the maximum deviation we can employ the Bessel functions with an interesting effect included. Transmitter power is shared between carrier and sidebands, but there is a special deviation value where the carrier power is zero! Taking Fmax = 5.5 MHz and modulation index of the first zero point at 2.4 MHz deviation we get:

Bandwidth	Mod. Index	Deviation	Mod. Freq.
12 MHz	0.0909	0.5 MHz	0.208333 MHz
16 MHz	0.4545	2.5 MHz	1.041666 MHz
18 MHz	0.6363	3.5 MHz	1.458333 MHz
27 MHz	1.4545	8.0 MHz	3.333333 MHz
20 MHz	*(US standard)*	*4.0 MHz*	*2.33 MHz Ed.*

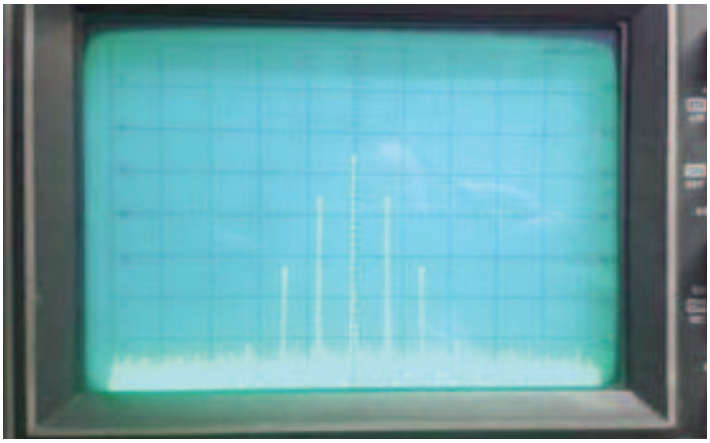
Setting video deviation

Step 1: Before beginning adjustments we are selecting the wanted modulation (CW) frequency from the table above for the desired video deviation into the trnsmitter video input (75 Ohm) at 1 Vpp. Starting with the modulation set to zero, the spectrum analyzer shows just the carrier

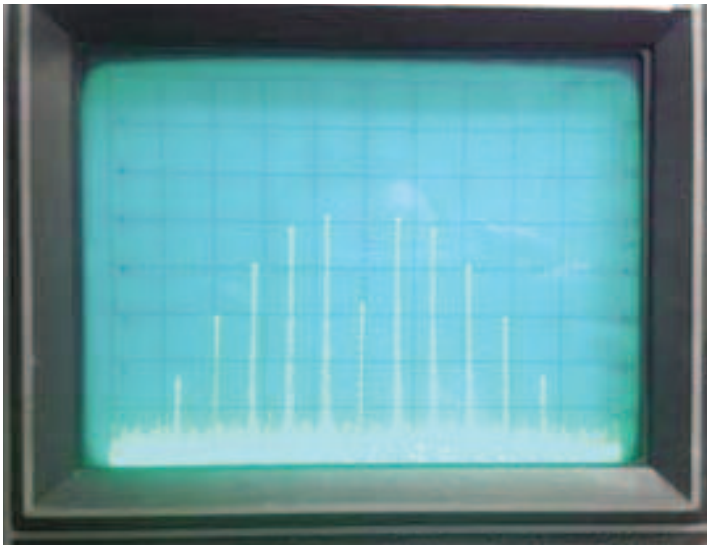


Video carrier with modulation set to zero

Step 2: Now turn up the modulation the spectrum analyzer will soon show 3 peaks then more peaks (sidebands), and at one point the carrier peak in the middle begins to decrease - go on cranking up the modulation value until the carrier peak is gone below noise level. You are finished!



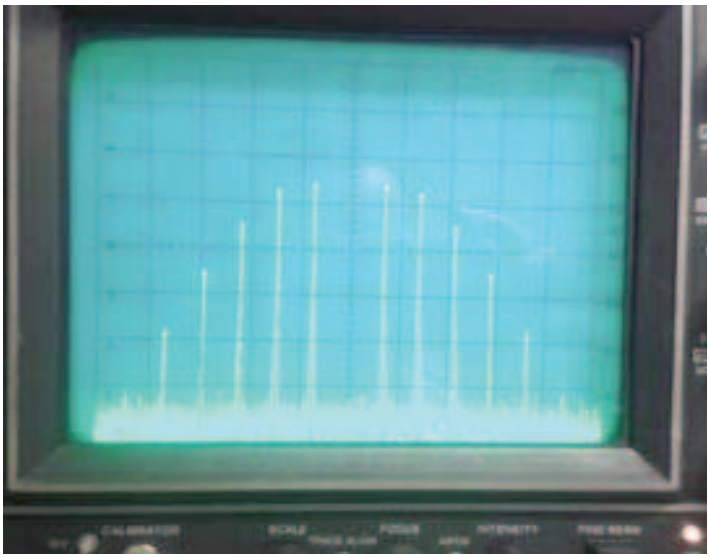
Starting to turn up the modulation



Modulation is almost set to the correct level

This adjustment feels like a "dip" control - getting near the zero carrier point this peak is moving faster. Turning modulation up too much, the carrier peak comes back again. This way any FM-ATV station is set up to license conditions very easily - the modulation level is always 1 Vpp, but the output bandwith is limited by lower deviation than in broadcast installations.

Ed. In USA and Canada, we are not limited and use 4 MHz microwave standard in most cases. With the test carrier removed, audio subcarrier(s) injection level adjustment from a separate control is set for -23-25 dBc.



Deviation is properly adjusted

Video AGC for ATV

Employing a video AGC (automatic gain controller) chip like MAX7452 is a simple solution to limit the TX output bandwidth. But - an incoming ATV signal with the wrong video level gets "leveled" without letting that ATV station known that the level is wrong. I think this "automatic leveling" is only suitable on ATV links. On ATV repeater outputs it is better to "clip" any signals above 1 Vpp.

The chip MAX7452 shows a problematic performance with deviation adjustments - the input level 1 Vpp at 16 KHz gets leveled to 0,3 Vpp, switching off the AGC function it is 0,6 Vpp. Only with much higher input levels the AGC chip gives out 1 Vpp at 16 KHz. Please be aware of this behaviour to avoid a surprise...

From TV Amateur page 16:

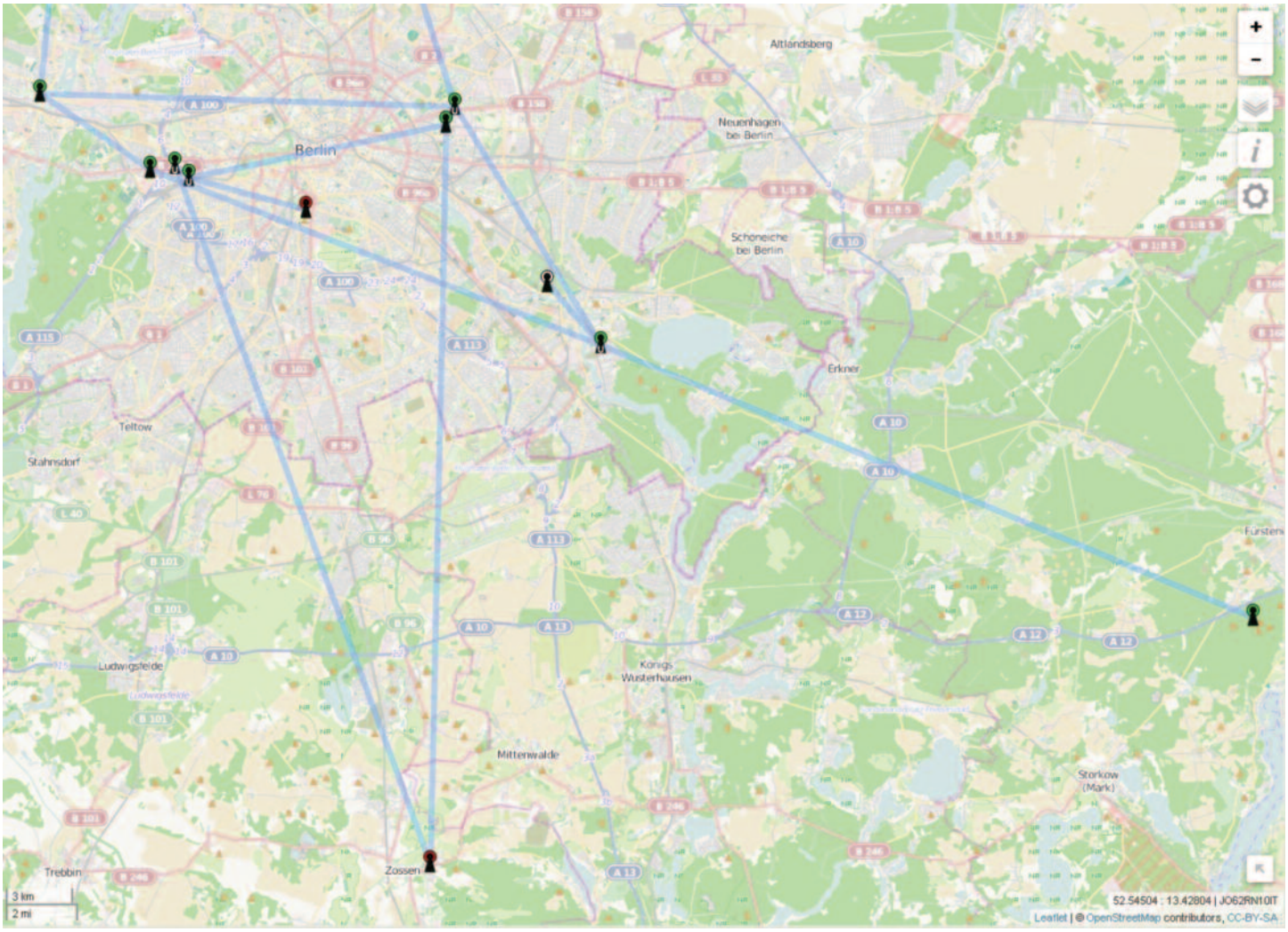
HAMNET cooperation in Berlin

-Jörg Hedtmann, DF3EI

Berlin is an island - that was true in "Cold War" times, and it is true still for digital amateur radio UHF contacts. For instance the Highspeed Amateur Radio Multimedia Network (HAMNET) in Berlin was connected to the german and european HAMNET via ISDN lines. So multimedia modes like ATV have been impossible to transfer, even more several Berlin HAMNET nodes were connected via web tunneling to nodes in Nuremberg or Duisburg, not to each other.

In a joint action of AGAF members and DARC district Berlin this situation got improved in November 2015. Thomas, DC7YS, Peter, DH7TV and Jörg, DF3EI, mounted a GHz linking device "Mikrotik Sextant" at ATV repeater DB0KK together with cable connections there. The same evening we activated the opposite side of the GHz link at ATV repeater DB0BC in Charlottenburg, 13 km away, and the broadband connection worked like a charm. The Charlottenburg site is connected via telecom cable (100 MBit/s download - 12 MBit/s upload) with VPN tunneling to DB0GW-2 at Duisburg University and the german HAMNET.

DB0BC is also connected to HAMNET node DC7YS, that site shall get a new call soon to complete the Berlin HAMNET.



Berlin HAMNET Map

For the next project in Berlin Kreuzberg GHz linking devices are ready to install. Any interested HAMNET users should know that at each reported site HAMNET inputs on 13 cm and/or 6 cm bands are planned.

New web page: www.agaf-ev.org

Translations from Klaus Kramer, DL4KCK
www.agaf.de

HAMNET Link Antenna

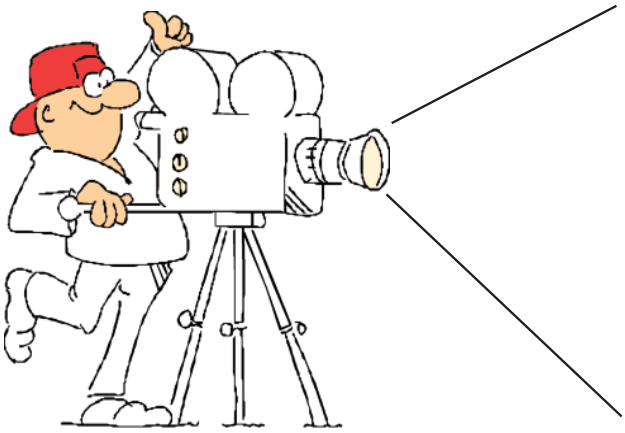
Improvements to the DARA ATV Repeater part 2

-Dave Pelaez AH2AR

Last issue we covered the new FM exciter. I thought you would like to see what is happening in DARA's ATV repeater this issue. The first photo shows our old CRT monitor still functional, but obviously obsolete in cabinet #1.

The second photo is the first pair of replacement Liliput LCD monitors I installed recently. The plan is that the DARA site will have a total of four separate in-rack monitors that will allow simultaneous checking of the analog and digital video sources at the site. Currently the DARA ATV repeater has inputs AM and DVB-T inputs on 70cm, FM 23 cm input and 70cm AM (VSB) output and FM on 23cm. In the future we plan on adding a DVB-T output.

Cheers, Dave Pelaez AH2AR



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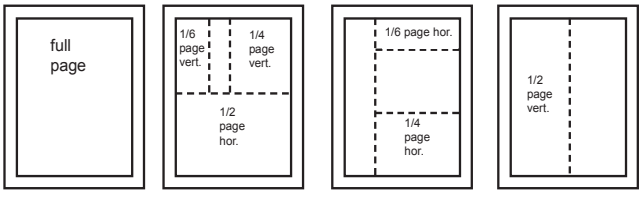

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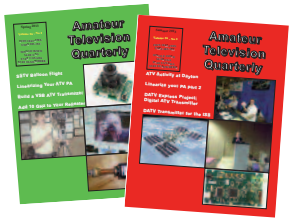

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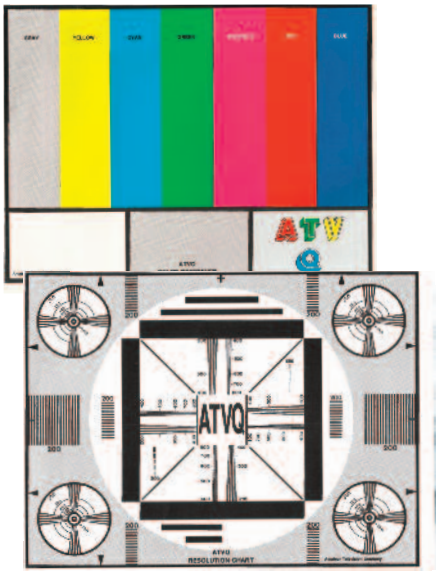

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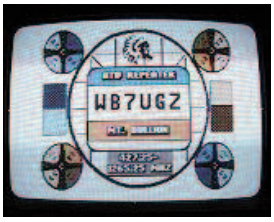


$20 EPROM includes 4 screens

DATV-Express Project February Update Report

-Ken Konechy W6HHC

Charles G4GUO has made good progress on a new piece of Windows software for the DATV-Express board that is called Express_DVB-S_Transmitter.

(a) The main difference from the DatvExpressServerApp is that the user does NOT have to install-or-configure utilities like GraphStudioNext to create a graph by configuring the "filters".

(b) many video capture devices can now be used (including support for professional capture devices like the Blackmagic Decklink mini recorder or the Magewell USB3 dongles) to connect your camera.

(c) the new software will extract the video and audio streams from the capture devices and encode them in software.

(d) the ZADIG software is used to simplify the loading of drivers in Windows.

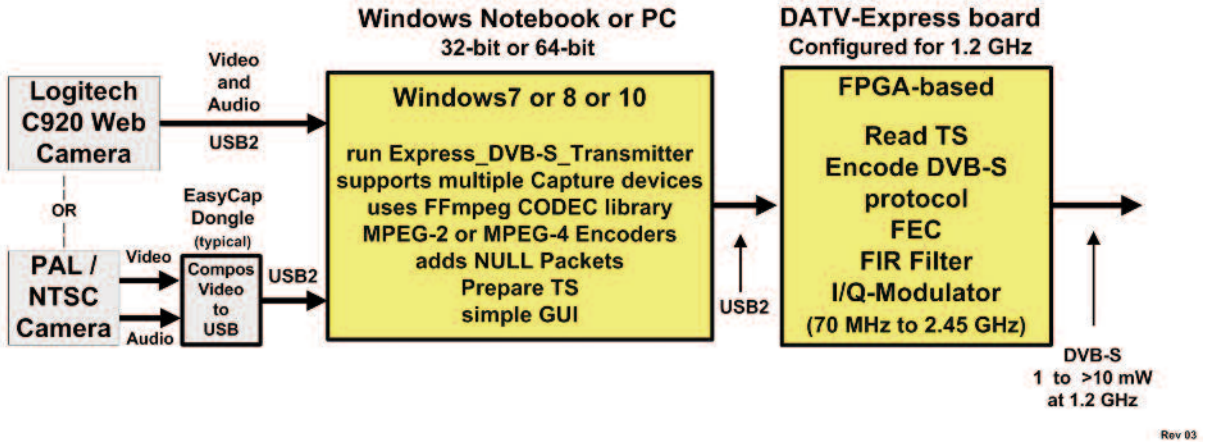
[img]http://www.W6ZE.org/DATV/BATC/Windows_Express_DVB-S_Transmitter_BlockDiagram.jpg[/img]

The Express_DVB-S_Transmitter software is still in a highly "experimental stage" without any user guide yet….but has been successfully installed and used by several "early adopter" hams. The software has been now tested on Window10 and on a PIPO Windows tablet. The current build of the software can be downloaded at: https://www.dropbox.com/s/97f5g8n9nw3bdmo/setup_datv_express_transmitter.zip?dl=0

Art WA8RMC had difficulty sending another batch of DATV-Express hardware boards to the project's distribution center in England. Between the US Postal Service and the Royal postal office in UK and the customs people, the in route box of boards sat idle from Feb 04 until Feb 22. The team expects the new batch of boards to be in England inventory this week.

Frank DL2JFL was very kind to translate the current ODROID User Guide for the DATV Express board into the German language. This German translation is now available for from the project team's web site www.DATV-Express.com on the **DOWNLOADS** page. Frank explained that the PDF will also be available on his club webpage http://dk0gno.dnsuser.de. (sorry…but that site is only in German).

"project is set to slow speed"....de Ken W6HHC



Block Diagram of typical set-up for Express_DVB-S_Transmitter software on Windows

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Article submissions can be sent to:

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or to our email address: **wb8elk@atvquarterly.com**
Also note our web page address: **http://www.atvquarterly.com**

Payment for Technical Articles

ATVQ will pay for certain articles that it publishes. I will outline the policy here, but it will be subject to change as needed to make sure that ATVQ continues to be an ongoing publication. ATVQ will pay $25.00 for technical articles that are published and are a minimum of 2 pages. While this is not a great amount, I hope it will encourage more technical type articles to be written. Exceptions will be articles that are written by a manufacturer/seller of equipment that is being written about. While I do not want to discourage this type of article, the article itself is an advertisement of the product. Articles from clubs will be encouraged, and I would expect they would like to share their information with the ATVQ readership. Information gathered from the Internet will not be paid for and is mostly small filler items.

Ideas

Do you have an idea for an article that you've said to yourself that you wanted to write, but never did. Feel free to check with us to see if it is of interest, or write and send it in. No guarantees that it will get published, but if you don't try, you will never know. I'll be looking to see what you can do!

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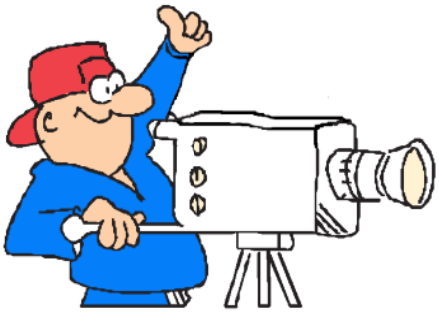
ATV In **C**entral **O**hio is an ATV club in Columbus and our repeater WR8ATV was the first in the USA to add DATV. The club newsletter is sent not only to the local area but to several ATVers across the country. Check out our website www.atco.tv



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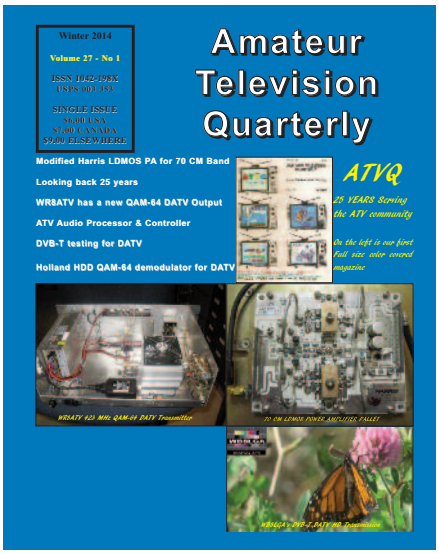

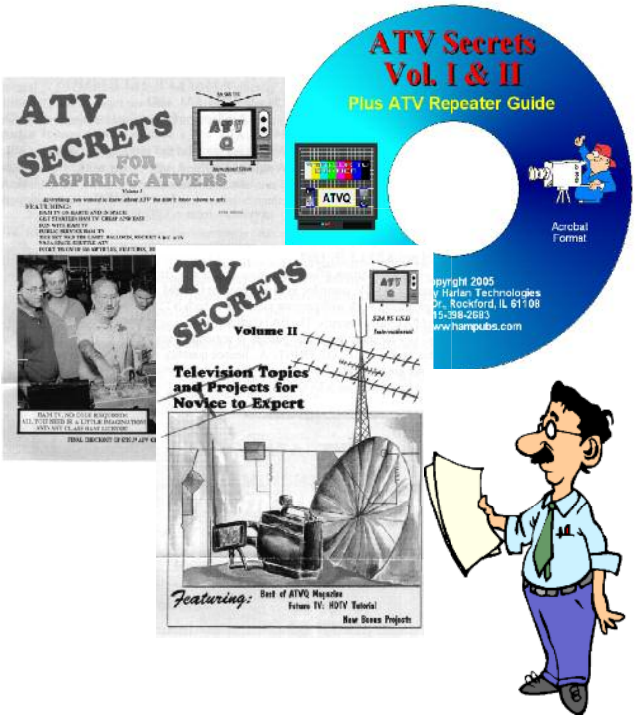

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