ATN
The Amateur Television Network

ATN Winter 2020 Newsletter

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The future of ATV in the 3.3 GHz to 3.5 GHz band may be over soon. The FCC released an Notice of Proposed Rule Making (NPRM) WT docket 19-348 that proposes to remove all non federal secondary users in the band, Amateur Radio is a secondary user. The ARRL, ATN, AREDN and others are opposing this action. Mike WA6SVT is working with the League's legal counsel Dave Siddall K3ZJ to help with ATN's comments and has provided the League with documents that show the use of the band by the ATV community. The deadline to file comments is February 21st and reply comments is March 23rd. The League and ATN both plan to fight to keep the amateur service as secondary users in the band and document ham radio usage within the band. Our secondary position is replacement spectrum just above and or below our existing secondary status in the 3.3 to 3.5 GHz band.

Another docket ET-19-138 affecting the upper 5 GHz band 5850-5925 MHz. Is not as much of a threat to Amateur Radio but proposes to upgrade the current part 90 and 95 Dedicated Short Range Communications (DSRC) usage in the band from an older technology 2G and 3G to a new service Cellular Vehicle to Everything (C-V2X) using 4G and later perhaps 5G cellular technology.

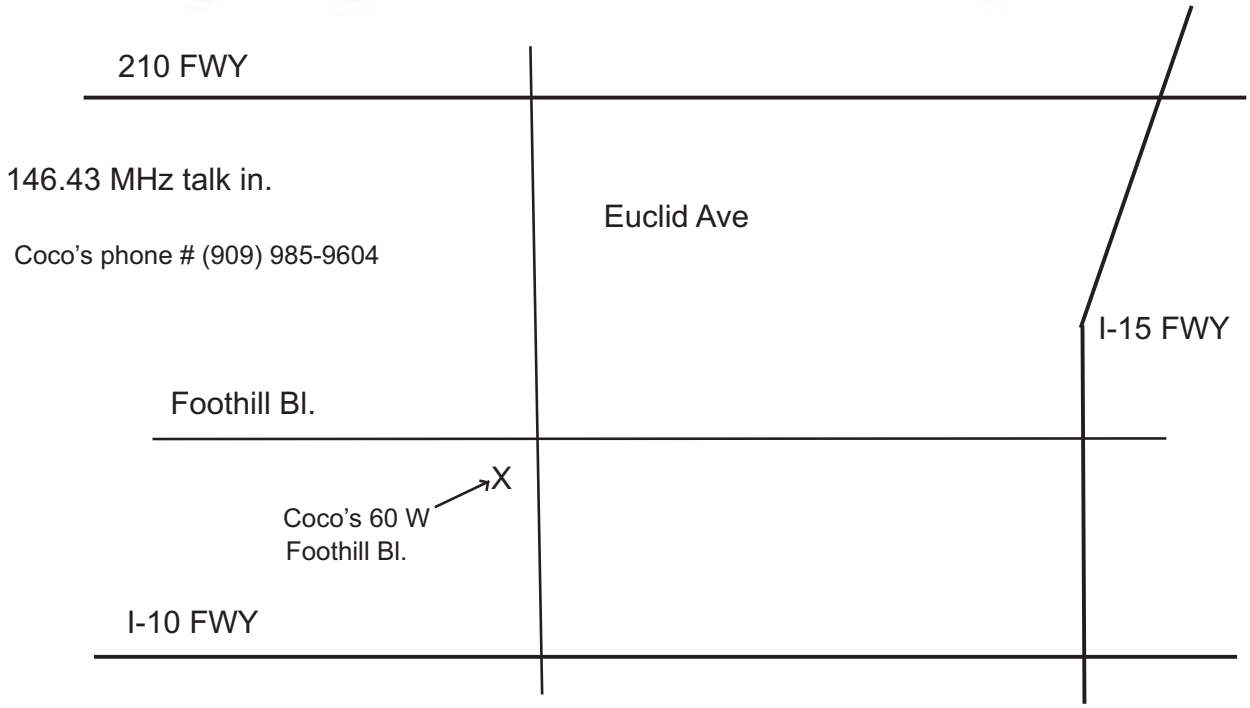
The docket proposes to reduce the band for this use from the entire 5850 to 5925 MHz to either 5905-5925 or 5895-5925 as well as allow part 15 WiFi extend from 5850 MHz up to 5895 or 5905 MHz. ATN is working with the League and other groups on this as well. Deadline to file comments is March 6th and reply comments is April 6th.

Both dockets affect ATV as well as Mesh systems. Mike has been in discussions with the ATN officers in each chapter as well as most of the other ATV clubs about submitting a comment for each docket. Our best option is to work with the League and other affected ham radio groups so we can all have a response that will sing in harmony.

ATN
The Amateur Television Network

ATN WINTER MEETING 2020 ANNOUNCEMENT

Saturday, February 22 at Noon at Cocos, 60 W. Foothill Bl, Upland, CA



Please join us for lunch about 11:30 in Cocos private dinning and meeting room. We have the room reserved between 11:15 AM until 2 PM. ATN winter business meeting will start at 12 noon.

1. 12:00 Nathan AG6AV, our president will open the meeting
2. 12:05 The technical committee will update us with the latest news about our repeaters
3. 12:30 Mike WA6SVT will give the financial report
4. 12:40 Discussion of microwave ATV and recent frequency issues.
5. 01:00 Discussion of adding more DVB-T to our repeaters.
6. 01:20 Break and renewing your dues
7. 01:35 Nominations followed by election of officers followed by any new business
8. 2 PM wrap up the meeting

SLATS-ATN Set up an ATV & Technology booth at Winterfest - ARRL Mid-West Convention in Collinsville IL (St. Louis)

By Mel Whitten K0PFX

SLATS-ATN members manning the ATV and technology booth at Winterfest/ARRL Mid-west Convention. (rear) W0NZG John, N0GL Gary, (front) Ron KO0Z, Earle WD0FCH

Our presentation consists of three DVB-T demo stations we had running live video including a CrowdCam HV-103 running in a QRP booth.

Above we have a UT-100B with a Darko Amp that can be assembled and on the air in 30 minutes or less and another station with the HIDes HV-202E and K0PFX DVB-T Interface controller/ 10w Amp. In the middle, a simple DVB-T Interface Controller for Jim's KH6ATV 10 w Class A amplifier. On the right, a SM-1000 HF Digital Voice adapter.

We also had New Packet Radio NPR-70 (Hackaday project) (TDMA at 220k/bs) Client/Server running on 434.500 across the booth and a demo of the HF Digital Voice adapter SM-1000 FreeDV/Codec2.

ATN-DARA's New ATV Station at the Clubhouse

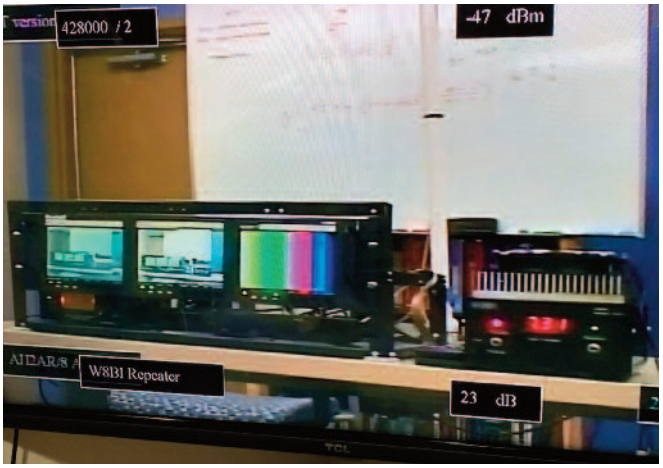
By Dave Palaez

W8GUC finished the integration of the K0PFX ATV interface for the Dayton Amateur Radio Association today. Mel Whitten built the interface controller for the club last year. Instead of setting up the new W8BI ATV station in the DARA van, we decided to set the ATV station inside the clubhouse.

We are using a unique crossed dipole antenna inside the clubhouse and it works great. Top photo is showing the live transmission from the K0PFX interface, going thru the atv repeater, and being received in my ham shack in Vandalia.

W8GUC used the open frame bitcoin mining fixture that I acquired last year to house most of the gear needed for this project. It is the correct size (19 inches) to hold the three video monitors to include the HiDes transmitter, receiver and power supply.

Also pictured is W8GUC Reuben Meeks with the completed station in the DARA classroom.



Cheers, Dave AH2AR

ATN-AZ Winter Meeting 2020

By Mike Collis WA6SVT

Our meeting was held January 11th and hosted by Kevin AD7OI and Tammy KI7GVT Jacobson at their ICS facility in Phoenix. Thanks to Tammy and Kevin for providing a first class lunch and a great place for the meeting.Turn out was much better this year and we now have two new members, Frank WA6CWN and Emil W1GGM, welcome to ATN! We had several hams from the weak signal community attend and it was nice to hear about their activities.

After our lunch, Ed K5OLA our chapter president opened the meeting. Lee K0CCU gave the financial report. Rod WB9KMO and Bob W8ARZ talked about the steps needed if we ant to hold a hamfest in Superize during the spring. Roland KC6JPG gave a report on IP video used for the nets and the new updated ATN website.

Mike WA6SVT gave a report about the two FCC dockets affecting the 3.3 and 5.9 GHz microwave bands and the affect this would have on our ATV links and FM repeater output on White Tank. Mike then gave a report on the ATV repeaters in the south west area ATN chapters.

Nominations followed by election was held with the existing officers winning election for 2020. Ed K5OLA President, Rod WB9KMO VP, and Lee K0CCU as Secretary Treasurer.

ATV News from our Delaware Chapter

By Dave Stepnowski KC3AM

Hello all from ATN Delaware. Winter has finally arrived here in late January and temperatures are now in the 30's which is a bit too cold to do much outside work. All is well with the Ebright & Darby repeaters for the most part and they are operating just fine independently. There is still some work to be done to get the Comtech 1.255 MHz receiver board on the correct frequency. I have found that the dip switch settings sometimes are not correct for the desired frequency. These receivers seem to be quite wide and will receive a strong enough signal even if it is off frequency. I have been told of another way to verify the desired frequency and will try that soon. Remodeling the kitchen and master bathroom is happening now and that is the priority.

I am part of the Amateur Radio club BNJARS, NJ2BB, on the Battleship New Jersey which is berthed in Camden New Jersey as a museum ship. NJ2BB.ORG. With the help of Vince, N3BFZ, we have the ATV station in the shack working again and use it on the weekends when we are working with the Boy Scouts on Sunday mornings.

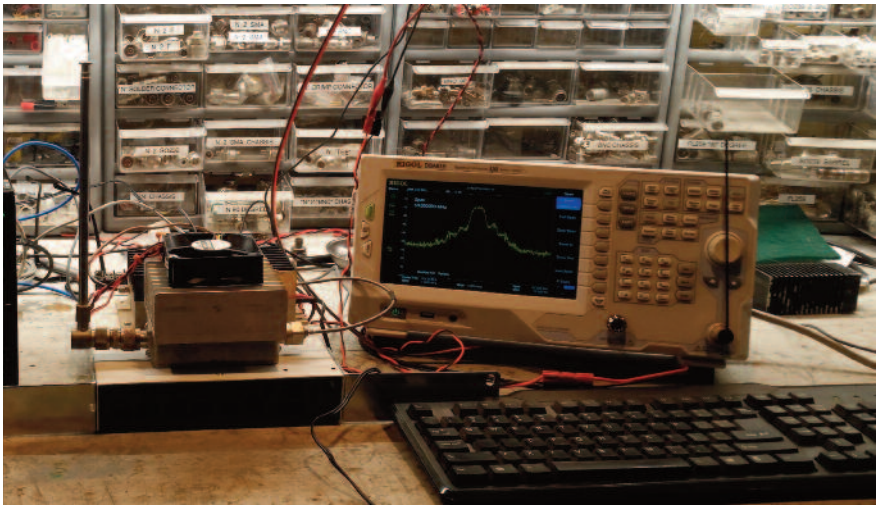
We have had some strange things popping up on the Ebright 434.0 analog input that we were not able to identify. We knew that it must be a video signal since it was satisfying the ATVC-4 controller but it was not a strong enough signal to make out what it was. Last Wednesday night while on the DARA weekly net I was talking about it and Fred, K3TAZ, from Baltimore was on the net and it got his interest. He mentioned that the CATS weekly ATV net was on at this same time and he was watching it. As strange things happen we noticed that the Ebright signals were happening at the same time as some of the guys were checking into the CATS ATV net. Further questioning by Fred and we determined that two of the CATS users were in fact the source of the unidentified signals getting into the Ebright repeater!

The interesting part is that the users were not pointed directly at Ebright, they are about 70 miles away from Ebright and they are Vertical and Ebright is Horizontal. I know this is winter and there is no foliage to deal with so I am not expecting that this will still happen in the summer. With this happening though I have started to look at past experiences with RF linking to Baltimore.

At the Ebright site I have added a HiDes receiver on 438.0 4 MHz and now need to get my home transmitter up and running and try to encourage others to do the same.

I have picked up a 'mini computer' to see what could be done with it. This thing is about 6” x 8” x 1”, 1.6 GHz processor, has 4 USB2, 2 USB3 ports with an HDMI output, 32G ram and 320G storage. I found an adapter that converts HDMI to VGA so I can use a regular monitor with it. This piece was used for $38 with no operating system. It was originally a Win 7 machine and I have learned how to load Ubuntu 12.04 on it.

This is running great with the DATV-Express board and will be dedicated as a 924.0 4 MHz DVB-S signal from the Ebright repeater site to my house. New, these mini computers are on Amazon starting about $150 with Win 10 installed.



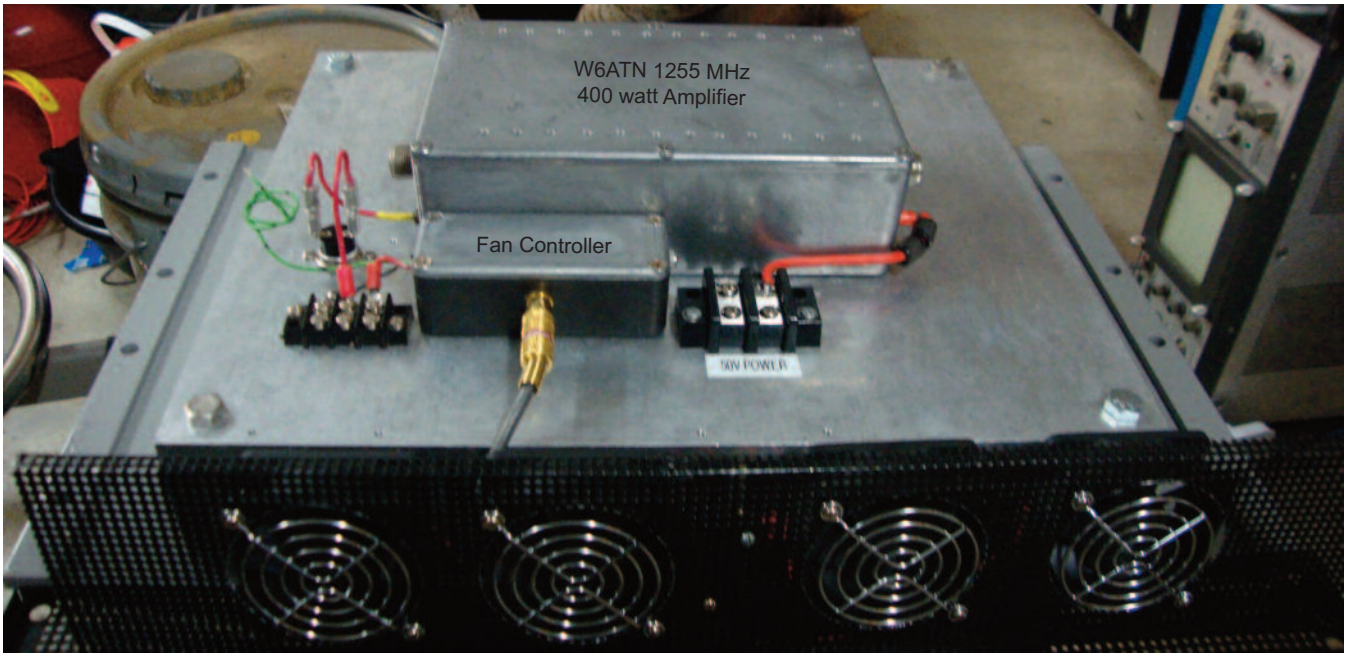
We are also trying to build some Rib Cage antennas for our repeaters. Vince has the construction down pat for the most part and I need to learn how to make the Balun resonate where we need it to be.

We have a weekly meeting on ZOOM Sunday nights 2000 EST 0100 UTC. Open up ZOOM and use room # 9466348755.

Keep warm this season, 73, Dave KC3AM

ATN-CA Repeater Projects - New 1255 MHz Power Amplifier

By Mike Collis WA6SVT



ATN-CA's hub repeater at Santiago Peak is a mixture of new digital (DVB-T) as well as multi decade old analog equipment. Over the last several years we have updated the repeater by replacing the 434 MHz analog receiver that was 1980's technology with a Tektronics DS-1000 broadcast analog demodulator-receiver, adding a HiDes HV-110 DVB-T digital receiver. 25 years ago we upgraded the transmitter to a VSB CATV professional modulator exciter to replace the old AM transmitter. A few years ago we built up a class A predriver and driver amplifier.

The power amplifier is currently two Downeast Microwave four brick amplifiers phased together delivering about 80 watts peak sync.

This design was one of the best solid state designs 27 years ago. At best the M57762 RF modules (bricks) had 22% efficency and this near saturation. Used in the linear region efficency drops to about 15%. Power supply is an Astron 60 amp linear regulated.

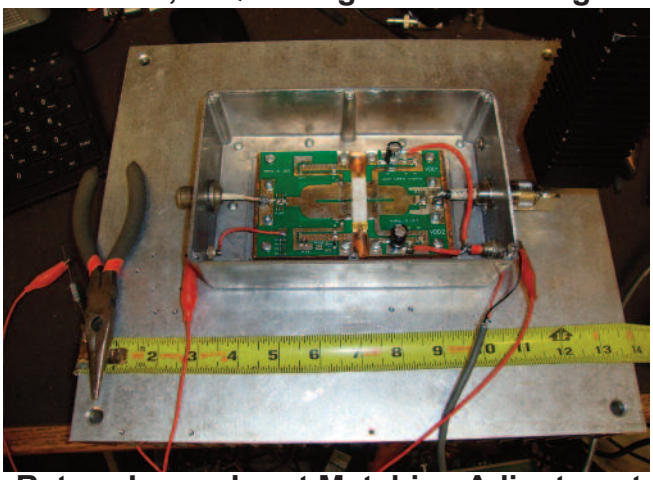
Needless to say the DC to RF conversion is about 10 to 12 %, very poor by todays standards. Some sync stretching is also needed because of the RF modules' transfer curve.

About five years ago we started replacing our 1.2 GHz output repeater's single four brick amplifiers with the XRF-286 150 watt amplifier pallets built by Jim Klitzing W6PQL. These newer design amplifiers are based on 28 volt LDMOS transistors. The amplifier is very linear up to 100 watts peak sync or 22 watts DVB-T digital. Santiago Peak is one of the last repeaters in our network to receive a new amplifier. We had planned to phase two of these amplifiers together for 200 watts peak sync or 44 watts DVB-T. The rack space is tight as is and the space needed required us move equipment as we needed 2RU (3.25") more space.

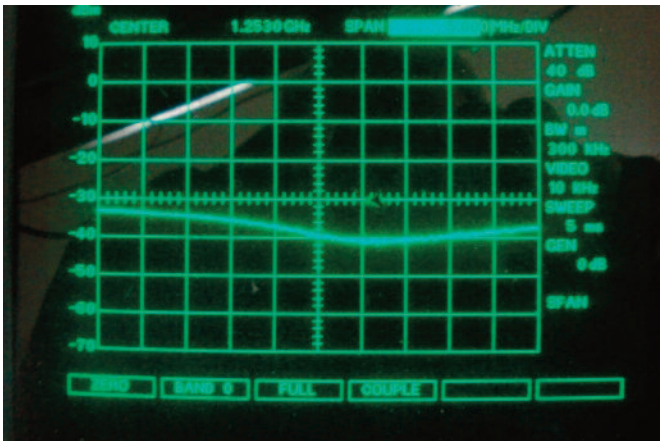
Jim is always looking to build state of art amplifiers and RF pallets. About two years ago he designed a new amplifier based on the 50 volt 750 watt LDMOS transistor. The amplifier is rated at 600 watts linear service. Kevin AD7OI had received one of these RF pallets recently but did not need that much power. So we traded the two XRF-286 amplifier pallets for the new 600 watt one. I grabbed a 14" x 12" x 2.5" heat sink and built up a complete amplifier centered around the pallet. (*See top photo)*

Well how does this new amplifier work? Very well after retuning from 1296 to 1255 MHz. Gain is 20.5 db, 800 milliwatts gives us 85 watts output.

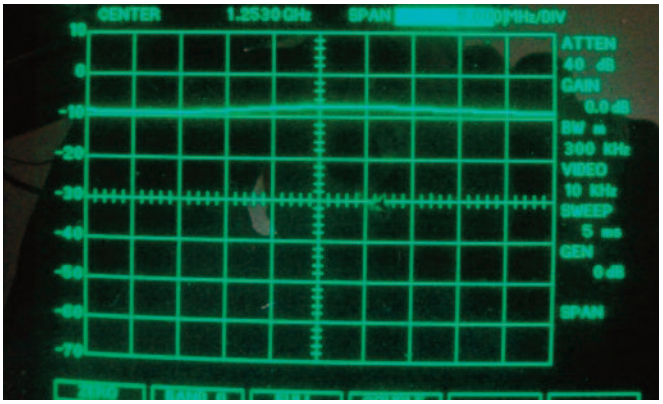
Below, IDQ setting and DC testing



Return Loss - Input Matching Adjustment

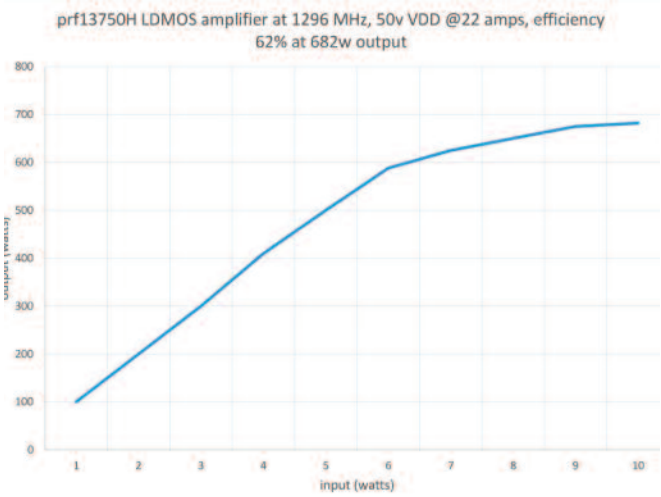


It should be noted that -30 db on the analyzer is -11 db, add the additional dip at 1255 MHz and we have -22 db return loss. At 1296 MHz part of the band the RF pallet from Jim had nearly 30 db return loss that was only a few MHz wide. **Gain flatness - Output Match**



Gain is flat from 1248-1260 MHz, this was done after the input match was set then adjusting the output match.

Due to my bench power supply limitations, I did not try driving the amplifier past 85 watts. A new 1KW 48 volt power supply was ordered and should arrive in two more days.



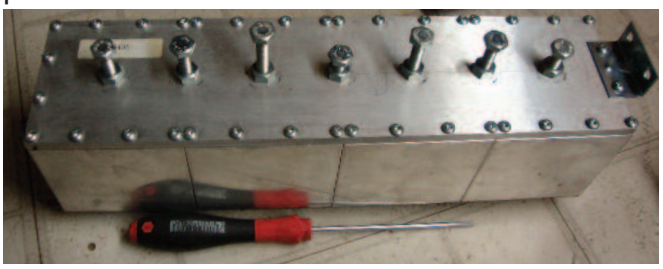
Above is the transfer curve of RF input vs RF output. As noted on the graph above efficiency is tripple that of the old brick amplifier. Our new power supply is switching regulated, further improving DC to RF efficency. Using the same DC power consumption as we do now, we can run four times the output power. This is about 350 to 400 watts peak sync, as can be seen above, this amp is able to run up to 600 watts before the transfer starts to curve over (compression).

Now our limiting factor is our output mask filter and antenna. The antenna is rated at 350 watts RMS and the filter at 200 watts RMS.

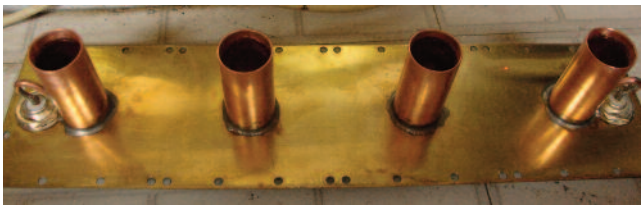
Saturday February 8th, Mark Fischer W6MAF and Mike Collis WA6SVT drove to Santiago Peak to install the amplifier.

The photo above, old PA is in upper right rack.

After removing the old power amplifier and replacing it with the new amplifier we turned down the output power via the exciter control so the IPA put out 1 watt peak sync. We then fired up the new amplifier and the output was about 100 watts. Turning up the power and checking for arcing in the filter that point was reached at about 190 watts peak sync. Our filter is a four pole 6 MHz wide filter from DCI.

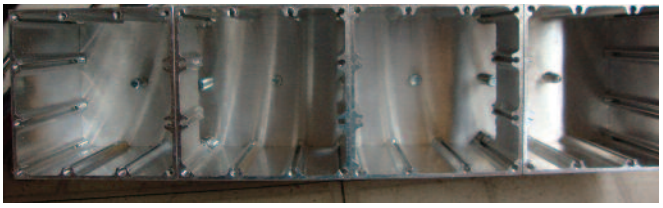


After opening the filter, we found the top of the resonators had not been deburred when cut to length. DCI already suggested to us to round off the ends of the tuning screws to reduce sharp points at the high voltage points that attract arcs. Below is the back plate with the res-



onators and N female connectors. The ends have been deburred and next item is polishing the plate and resonators to reduce insertion loss.

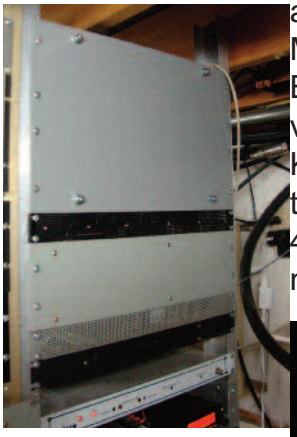
Photo to the right shows the stock screw on the left and a rounded and polished stainless steel screw on the right. Below are the four 3" square aluminum cubes welded into a cavity case.



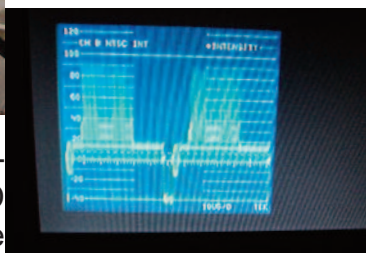
The filter was tuned for flat bandpass as well as low return loss. The results were fantastic. insertion loss dropped from 0.48 db to 0.3 db, skirts were steeper than before too. Now power vs arc test, 400 watts and no arcing!.

Heating was slight and primarily near the middle of the filter near resonators 2 and 3. At this level we still had 40 units of sync and no visible distortion or phase shift on color bars. The power was turned down to 250 watts peak sync because we did not want to push too hard breaking in the amplifier.

Using the Bird 100E slug, the true power is a few percent higher than indicated. The forward power reading is pegged with the wattmeter in the average power position. Note the low reflected power on the right. Using a 250D and 1000D slugs with an additional 25 percent lower reading than true is how we determined the 400 watt test. Lower left is the new amplifier



at the top of the 1253.25 MHz transmitter rack. Below is the demodulated video taken from KC6JPG's QTH, Roland transmitted via DVB-T on 434 MHz his waveform monitor to us and I took



the photo at Santiago Peak's LCD input monitor. The PA and IPA can support DVB-T format should we choose to upgrade to that format.

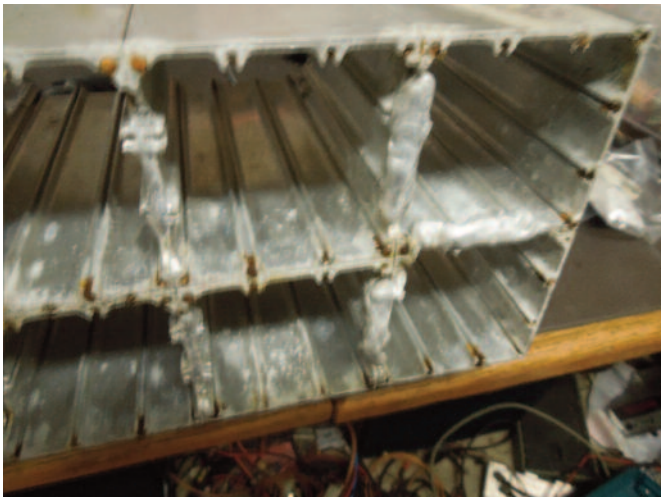
73, Mike WA6SVT

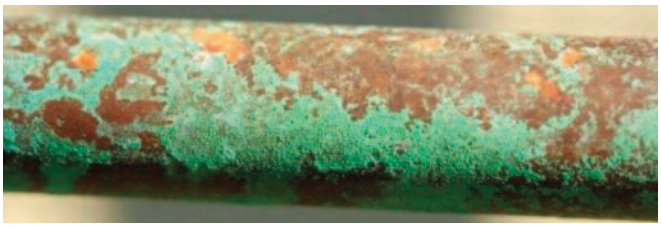
ATN-CA Repeater Projects - 70 cm Filter Rebuild

By Mike Collis WA6SVT

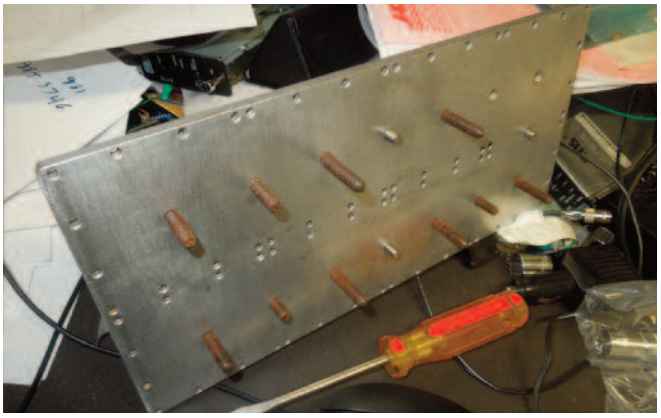
This project was thanks to Dave Pelaez AH2AR and the ATN-DARA chapter donation of their original 428 MHz 2 MHz bandwidth TX mask filter that suffered water damage. They replaced their filter and received permission to donated the old filter to ATN-CA chapter.

At first glance, the outside of the filter did not look to bad but the inside was another matter, RF mixed with water causes corrosion on each and every part inside. Most of the screws broke off during disassembly. Below is the end view of the cavities and one of the 3/4" resonators.

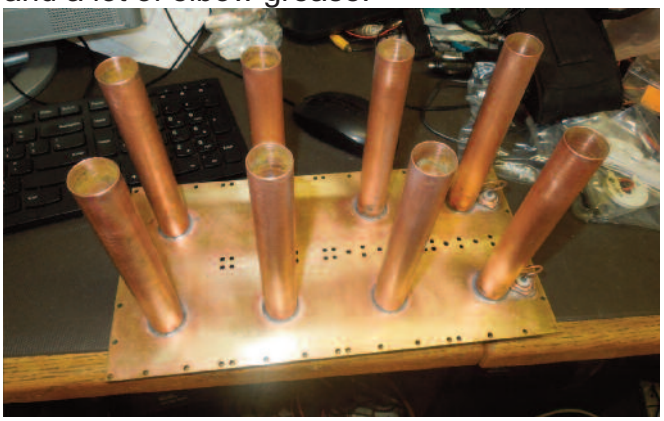




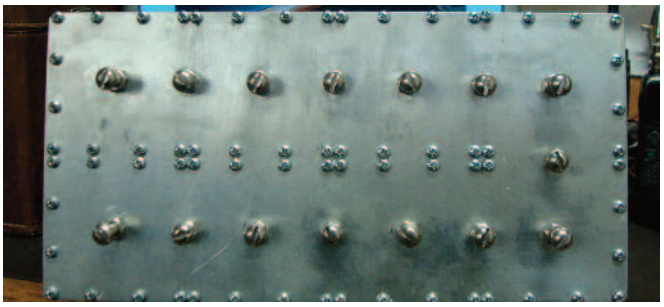
The cleaning process begins. First was the top plate (below) after wire brushing the plate and old tuning screws, cleaning out the threads and the start of replacing the tuning screws.

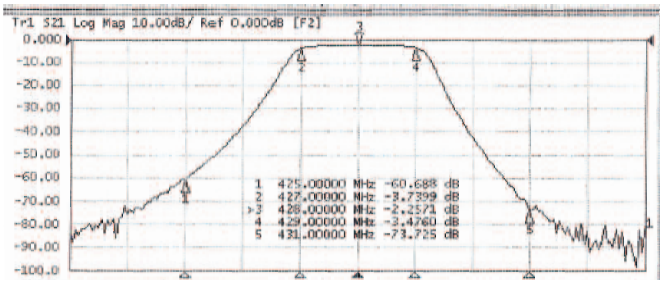


Bottom plate and resonator rods after acid bath and a lot of elbow grease.



The most difficult part of the restoration was the removal of the broken rusted #6 screws. A Dremel drill and small cutting blade was used to cut out most of the rusted screw, then a small pick to pry out the remaining screw. A lot more elbow grease, aluminum cleaning gel and wire brushing. There are about 140 of those #6 screws that had to be removed. After all new hardware and alignment, the results below.





I tuned the filter first to the 428 MHz center channel to compare against the above response and we had a near perfect match. Loss was 2.48 db instead of the 2.25 db. I then tuned to 427 MHz (old 426.25 MHz) center channel to use as DVB-T RX filter to test that frequency for use at our repeater sites.

73, Mike WA6SVT

News from our Florida Chapter

By Wolfgang KV4ATV

ATN-FL is working with the The American Legion Amateur Radio Club (TALARC) post 392 introducing them to Amateur Television.

ATN-FL and TALARC worked on jointly on the ARRL Kids Day, January 4th, an event to introduce kids to ham radio.

We used our ATV station at the post and another station located down the road allowing kids and their parents to communicate between the two stations. WMBB News channel 13 and Miss Florida, Carlie Bass-Gintoli was there too.

Taking turns manning the post station: Daniel (in the photo with the grey shirt), Wolfgang KV4ATV (in the blue ATN shirt and Ron KK4YZE (taking the photos). Manning the station down the street: Ron KK4YZE.

We used 434 MHz simplex for our ATV communications, our talk back frequency was 146.52 simplex as we do not have a dedicated 2 meter talk back channel.

Wolfgang has tricked out Mike WA6SVT and Laura KJ6GFI's old 2005 Suburban he purchased last summer and transformed it into an fully equipped mobile ham radio station with ATV for use for emergencies including storm reporting.

Wolfgang plans on installing a Raytheon weather radar unit to the Suburban later this year.

73, Wolfgang KV4ATV

ATN-KY News

By Hank Cantrell W4HTB

Our ATN chapter is headquartered in Bowling Green, Kentucky with four active members:

KJ4GL Freddy Brown

WT5K Mike Smith

AJ4KR Kevin Raymer

W4HTB Henry Cantrell

Our ATV repeater call is KY4TV and is located atop Cherry Hall on Western Kentucky University campus .

We are presently working to add digital mode to the existing analog repeater.

We are planning to add a digital input mode using the DVB-T format and 2 MHz bandwidth.

Our current analog inputs are 439.25 MHz (A5) and 1280 MHz (FM) .

Kevin AJ4KR standing next to the repeater

The video from these receivers will feed the existing ATV4+ controller whose video output is split between a cable modulator (analog) on 421.25 MHz VSB and HV-310 Hides RF modulator (digital) on 423.0 MHz.

The RF path from each of these modulators will be DTMF control switched to allow selection of A5 or D2 mode and drive the final RFamplifier system. The average output power will be approximately 30 watts. D2 power is about 15 watts.

The A5 421.25 MHz and D2 423.0 MHz output is within the pass band of our TX/RX ATV duplexer.

Mode selection analog (default) or digital will be via 2 meter DTMF on 144.340 MHz .

Future plans will be to add a HiDes HV-110, digital DVB-T receiver using the analog video output initially.

KY4TV ATV Repeater Antennas

Our antennas are horizontal polarity on the 70 cm band input and output using and vertical for the 1280 MHz FM input and 144.34 MHz NBFM ATV talk back channel.

73, Hank W4HTB

Saturday
March 14, 2020
7:30 AM – 12:00 PM

12983 W Grand Ave
Surprise, Arizona
85374

ATN Surprise Hamfest

Talk-in is on 448.400 MHz FM PL 100.0 Hz

Space & Booth Reservations: Bob Minnick W8ARZ (623) 910-6448
Call at least a day ahead to arrange camping and early arrival (before 6:30 AM)
Camping & early arrival fees are $10 for cars and $20 for RVs

Car Sellers: $10/Space, RV Sellers: $20/Double Space – Opens at 6:30 AM
Additional Seller Spaces and Spaces for Booths are available for $10

General Admission: $1/Person – Opens at 7:30 AM
Free parking is available on the street and in the Iglesia Church lot

Direct General Questions to Rod Fritz at wb9kmo@gmail.com

Snacks and beverages will be available for purchase
Raffles are planned, details will be announced later
Kindly donate equipment for our ATN Swap Table

No Firearms, Alcohol or Drugs are Allowed
Excellent weather is expected but be prepared in case it is less than ideal

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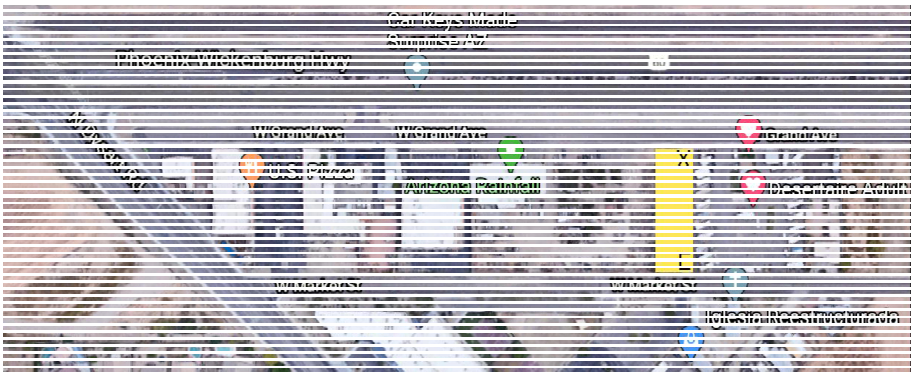


12983 W Grand Ave, Surprise, AZ 85374
Directions: Drive to Surprise on Hwy 60. Turn south on N Dysart Rd and turn left onto W Market St. The yellow rectangle is the Hamfest. Sellers should enter at the gate labeled E (not X), then park as directed. Buyers should park along W Market St or in the Iglesia Church parking lot. See you there!

ARCA

Amateur Television Network
On the Air to Everywhere

ARRL The national association for AMATEUR RADIO

70 cm & 23cm RF LINEAR POWER AMPLIFIERS

for both analog, NTSC, and digital ATV

Model 70-7B (70cm)

Models 70-9B (70cm) & 23-11A (23cm)

KH6HTV Video's most popular products are our 70cm and 23cm Linear Amplifiers. They work well for both analog and digital ATV service. The models 70-7B & 23-11A put out 10 W(pep) for analog ATV and 3 W(rms) for DATV. The 70-9B is higher power with 25 W(pep) for analog and 10 W(rms) for digital. They have 50 dB + gain and thus work directly with low level (< 0dBm) modulators. For analog ATV, the mini-mod CATV modulators are ideal. We recommend the Hi-Des DVB-T modulators for DATV. The model 70-7B was designed for portable service where battery current drain is an issue. The Boulder, Colorado ARES uses four of them for it's portable, back-pack, DVB-T transmitters and oftentimes has four of them transmitting simultaneously on the 70cm band on channels 57, 58, 59 & 60. The models 70-9B & 23-11A are primarily used for base station, mobile and repeater service. Most all of the Boulder ATV hams are using them for their base stations. The 70-9B is also the heart of the Boulder DATV repeater. For detailed spec. sheets, other ATV products, and a large assortment of ATV application notes, check out the web site: www.kh6htv.com

For Sale -- 23cm FM-TV Receiver $300

KH6HTV Video model 23-7 Down-Converter & model 23-5 70MHz IF Amplifier & De-Modulator. These units were recently pulled from the W0BTV ATV Repeater when the FM-TV feature was removed. Perfect working condition. The only cosmetic defects are extra mounting holes which have been drilled in the cabinets. The down-converter can be reprogrammed to any desired 23cm frequency. The de-modulator can be easily modified to meet any local FM-TV standards, such as SSC frequencies, polarity, de-emphasis, etc. Detailed spec. sheets available on the web site: https://kh6htv.com/products/ Instruction manuals included. If interested, contact -- Jim, KH6HTV at kh6htv@arrl.net

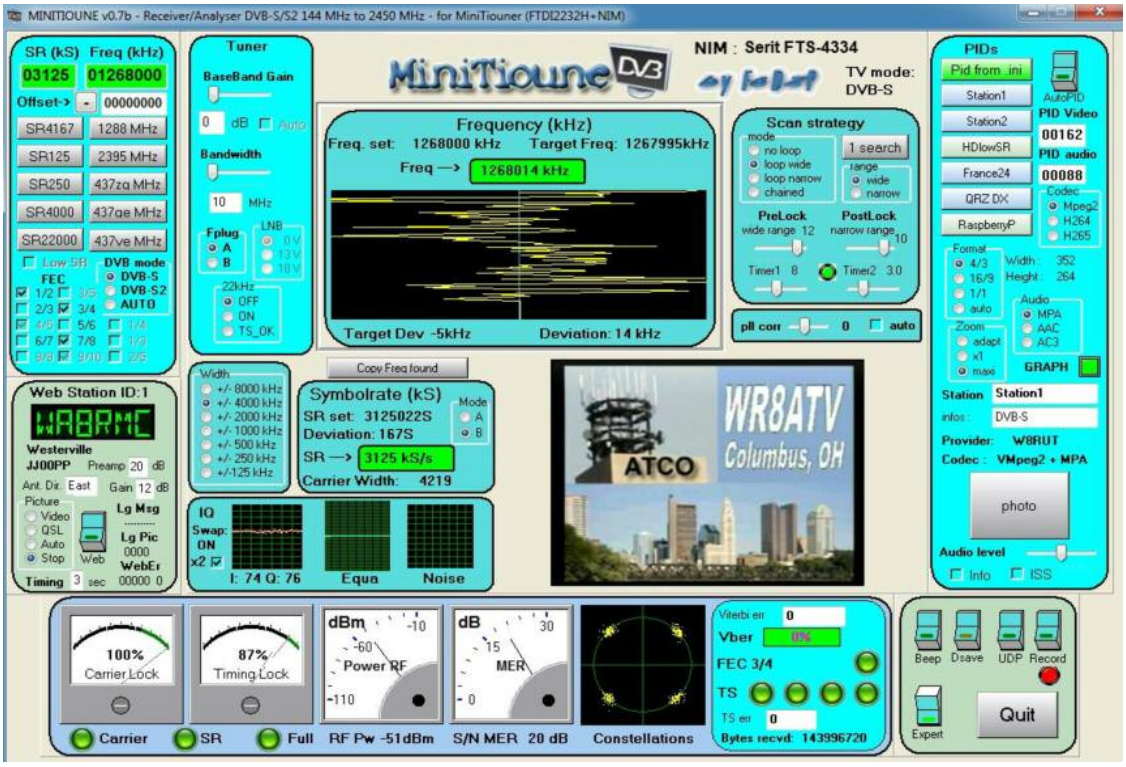
“MiniTiouneExpress”

Digital Amateur Television DVB-S/S2 Receiver/Tuner/ An

Available at DATV-Express.com

- Smaller than a stack of 2 decks of cards (picture above is full size)
- Two independent simultaneous RF inputs with internal preamps
- High sensitivity -100dBm @1288MHz – 1/2 FEC
- Fully assembled/tested in aluminum enclosure
- Covers 144-2420MHz (ideal for Space Station DATV reception)
- Symbol rates from 100KHz to >10Meg Symbols
- Operates with Windows PC using Tutioune software from F6DZP
- Uses external 8-24VDC supply or +5V power from USB3 port
- Real time signal constellation & dBm signal strength display
- Price: US $75 + shipping, order with PayPal

For details & ordering go to www.DATV-Express.com



(MiniTiouneDisplay above ATCO DVB-S 1268MHz DVB-S repeater signal WA8RMC QTH 15 miles away)