# Boulder Amateur Television Club
# TV Repeater's REPEATER

**September, 2020**
**3ed edition**

**BATVC web site: www.kh6htv.com**

**ATN web site: www.atn-tv.com**



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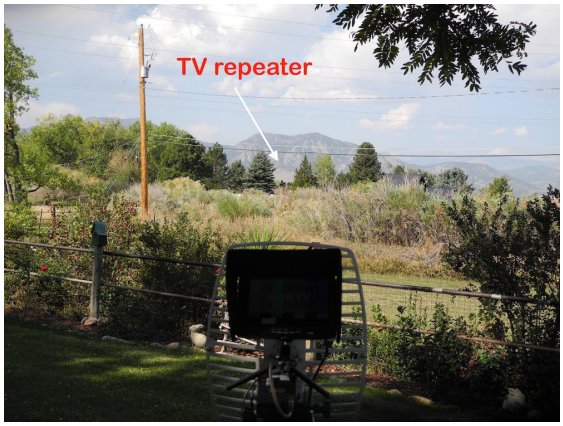
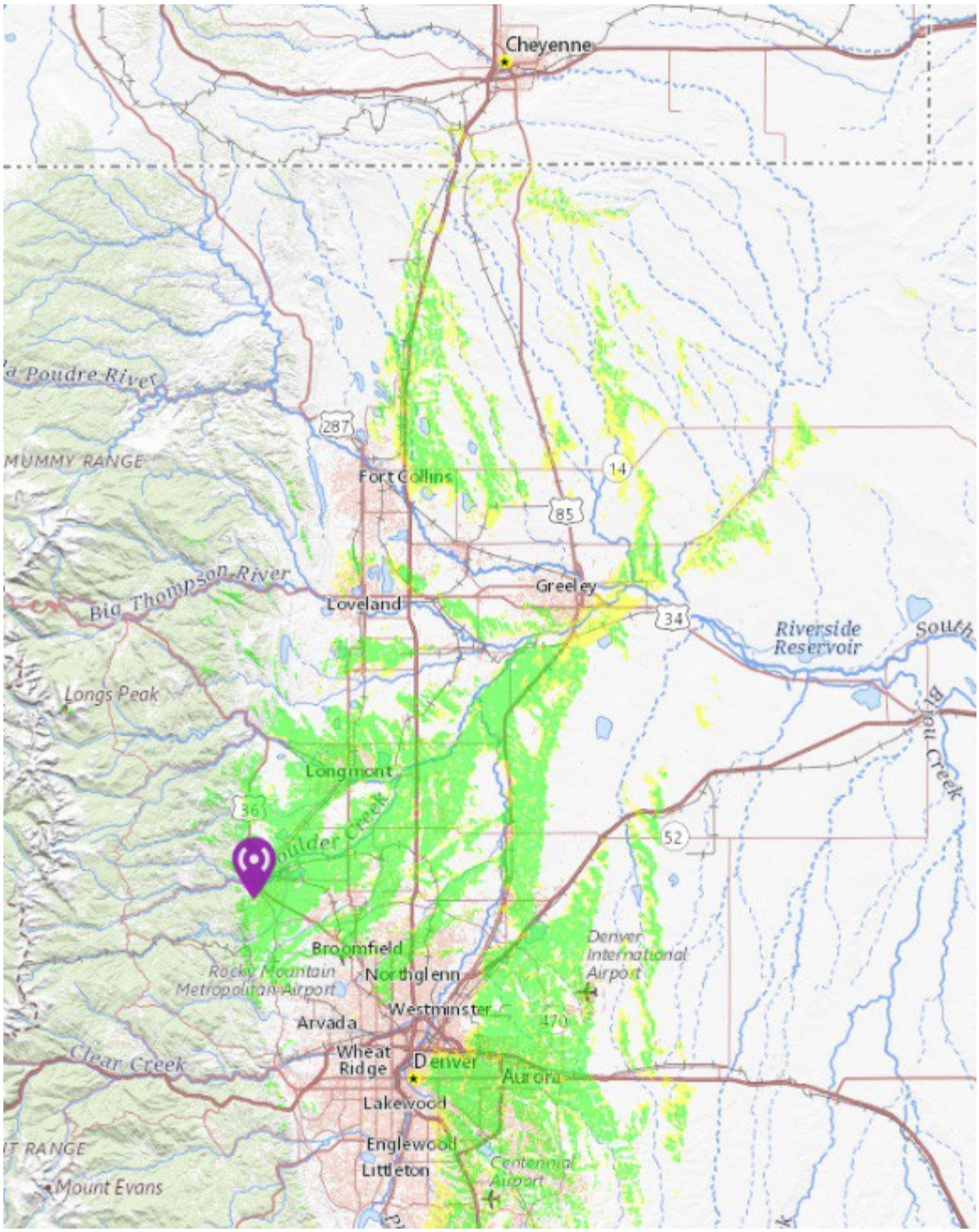



## Finally ! Our 5.9GHz, FM-TV Beacon is On the Air

Last winter, we had built a new FM-TV, Beacon transmitter for our W0BTV, ATV repeater. It was to transmit 24/7 a continuous beacon on 5.9 GHz. A snow storm prevented us from getting on the roof of the govt. building to install it. Then once the snow melted a bigger issue arrived. The corona virus pandemic ! That shut down the govt. building and many, many other things. Finally, Don, N0YE, our asst. trustee, was able to get permission to enter the building and install the beacon. Today, Sept. 22ed, Don, installed the beacon and tested it. It is now fully operational. The photos above show receiving the beacon at KH6HTV's QTH, 5 miles east of the repeater.

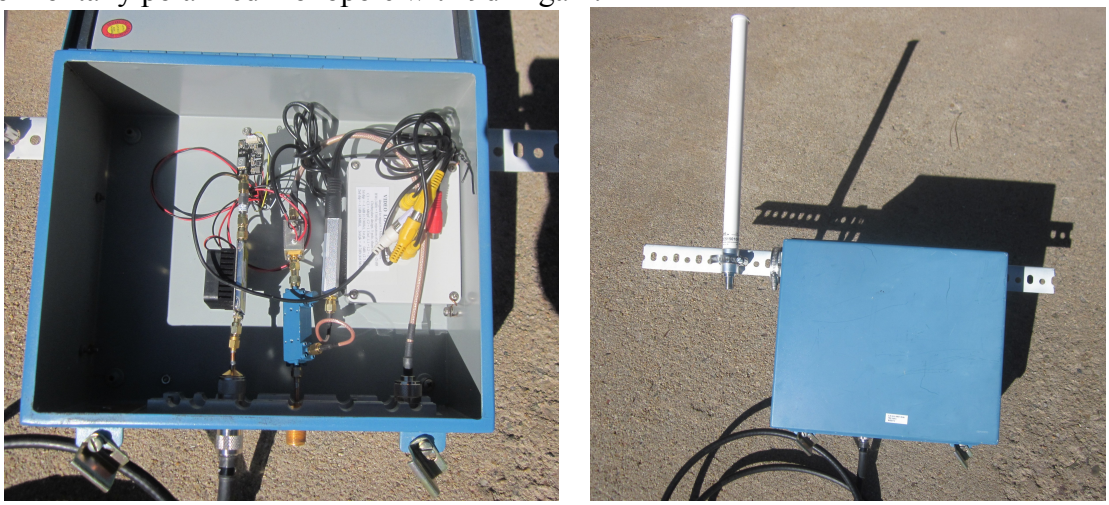
When the repeater is not actively repeating, the beacon transmits the video ID slide show. Whenever the repeater is keyed up, the 5.9 GHz, FM-TV transmitter then re-broadcasts the incoming analog or digital ATV signals. The beacon's transmitter is on 5.905 GHz. The antenna is an omni-directional, horizontally polarized monopole. The map on the following page shows the predicted rf coverage area.




Predicted coverage area of new 5.9 GHz, FM-TV beacon transmitter. This assumes the receiving station is using a +23dBi dish antenna at 2 meter height. Green shaded areas are for a P4+ to P5 picture (> -90dBm). Yellow shaded areas are for weak signals of P2 to P3 (-100dBm to -90dbm).

This transmitter uses the new, low cost transmitters and receivers marketed for the drone market. They are available from many sources on the internet, including Amazon, E-

Bay, etc. The transmitter is analog, transmitting standard definition, NTSC, 480i video and mono audio. It uses FM-TV modulation with a 6.5 MHz sound sub-carrier. The transmitter consists of a TX-35, mini-xmit module. It is frequency synthesized with 40 channels. It then drives a 2 Watt power amplifier. The transmitter's frequency is 5.905 GHz and it's rf output power is +33dBm ( 2 Watts). The antenna is an omni-directional, horizontally polarized monopole with 9dBi gain.

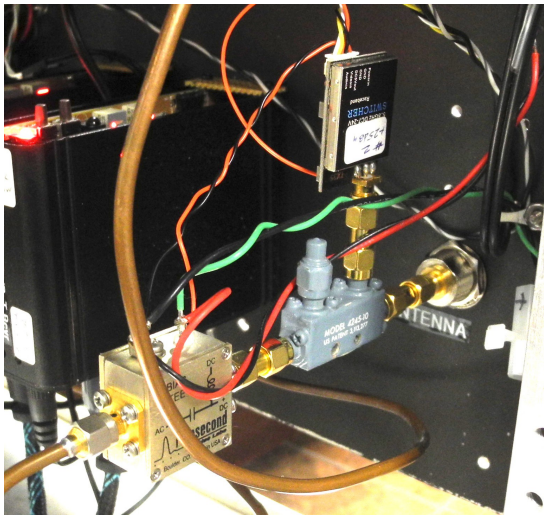


5.9GHz, FM-TV Transmitter enclosure & antenna -- roof top mounted.

The actual transmitter is separate from the rest of the 19" rack mounted repeater. It is housed in a weather-proof enclosure and mounted on the roof of the repeater site's south tower building at about 100 ft above ground level.

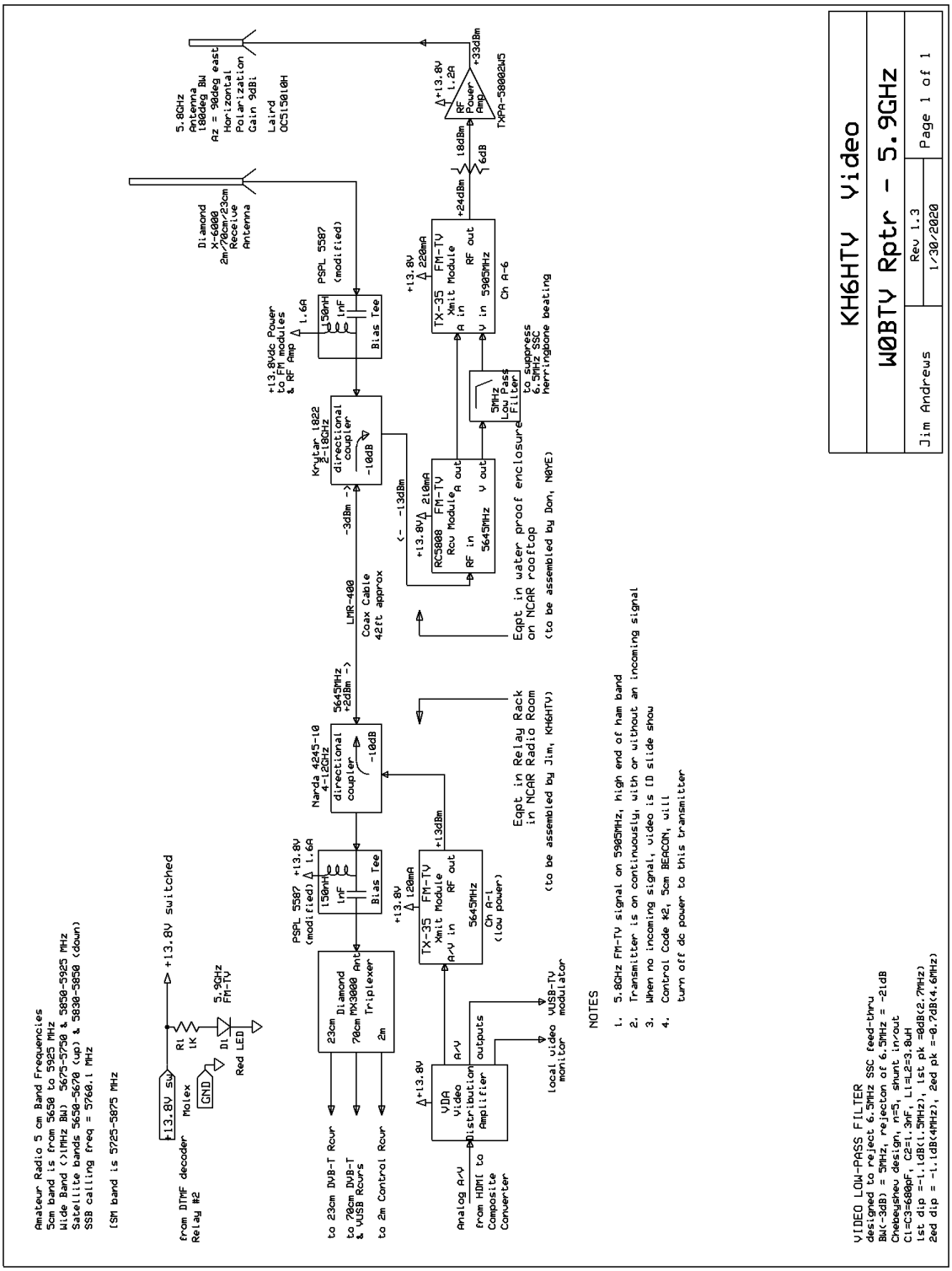
+13.8Vdc power for the transmitter is fed up to it from the radio room using the repeater's receive antenna's coaxial cable. There are Bias Tees in the repeater rack and also in the 5.9 GHz transmitter box to insert and pick-off the dc power.

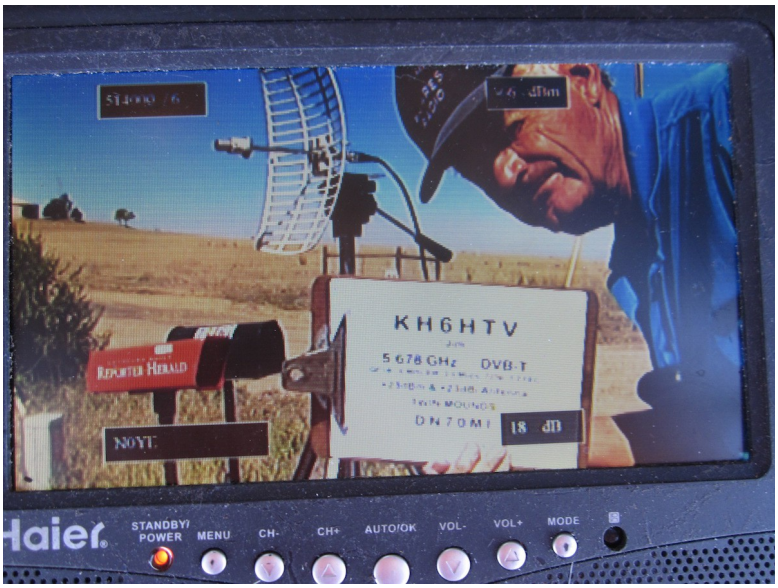
The A/V modulation for the FM-TV transmitter is also fed up the receive antenna's coaxial cable. It is done in a unique, "repeater within a repeater" scheme. Down in the radio room, in the repeater rack, we have a mini FM-TV transmitter module which is driven by the same analog A/V signals which drive the 70cm analog transmitter. This mini transmitter module is on 5.645 GHz and puts out +13dBm of rf. This is then coupled onto the receive antenna coaxial cable using a 10dB directional coupler. Up on the roof-top, in the transmitter box, there is another 10dB directional coupler to pick off this 5.645 GHz FM-TV signal. It is then demodulated by an FM-TV receiver



FM-TV Up-Link showing mini transmitter module, directional coupler & bias tee.

tuned to 5.645 GHz. The composite video plus audio from this receiver then is used to again modulate the 5.905 GHz FM-TV transmitter. Using this scheme, we are able to get multiple service out of the repeater's receive antenna coaxial cable. Plus, our repeater site host, would not allow us to install more cables.






## 5.7 GHz, DVB-T SUCCESS !

For our first real, serious, attempt at sending high-definition, digital TV on the 5cm band, we had great success. 51km ( ≈ 32 miles). At 32 miles, we beat our own 10 GHz, DVB-T record of 23 miles. This was reported in the previous newsletter (issue # 57).

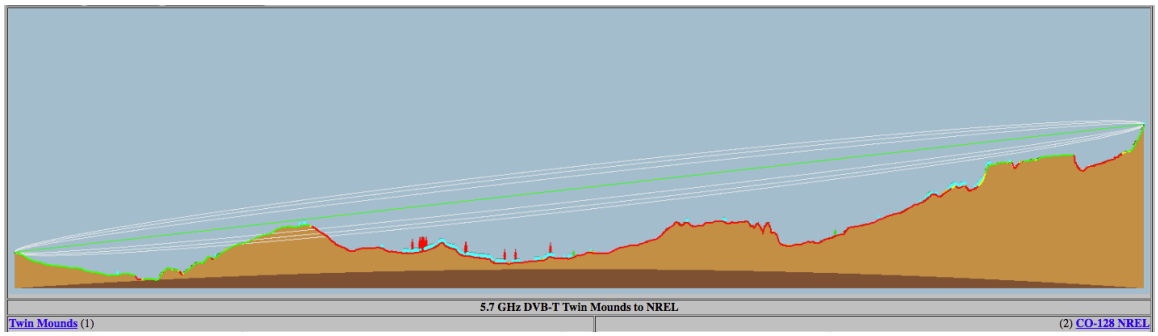
On Sunday, September 13th, Jim, KH6HTV, Larry, K0PYX, Don, N0YE, Pete, WB2DVS & Debbie, WB2DVT again headed out onto the Colorado prairies with their 5 GHz, BBQ grill dish antennas and transverters to see what records they could set. Don, Pete & Debbie headed to their favorite hang-outs on CO-128 south of Boulder near the Rocky Flats NREL windmills. (39° 54' 50.31" N x 105° 12' 33.24"W) Jim & Larry first headed north to previously used site at Rabbit Mtn open space north-west of Longmont. (75th St & Woodland Rd.). Pointing their dish antenna due south along 75th St. for 22 miles to where Don, Pete & Debbie were set up. They had success with two way DTV QSOs. So, Larry & Jim then packed up their gear and moved further north-east. They tried out a new site never used before for ham microwaves. Jim had discovered it by carefully studying USGS topo maps. It is called Twin Mounds, north-east of Berthod, and west of I-25 ( 40° 20' 33.39"N x 104° 59' 56.83"W). They found a commanding view from there, especially to the south-west. Pointing their dish to about 200 degrees and turning on their transmitter, they immediately got P5/Q5 signal reports from Don, Pete & Debbie. This time the distance was 50.9 km ( 31.6 miles). Antenna alignment was then peaked up. They then exchanged two way DTV, QSOs over this new path. Coordination was done using the BARC, 146.70 MHz FM voice repeater.

**Technical Details:** Jim was using his new, home-brew, 5 GHz transverter which has been described in earlier newsletters. It puts out +23dBm rms of DVB-T power. The receiver has a 1.1dB noise figure. It's sensitivity is about -99dBm for normal coding and about 3dB better with "aggressive" coding parameters. He used the L-Com model HG5822EG, BBQ grill, dish antenna with +23dBi of gain. His coax feedline was 40" of 1/4" heliax with -1dB of loss.

Don was using his home-brew 5 GHz transverter which was described in the previous newsletter (issue #57). It consisted of a single mixer and amplifier with a transfer, coaxial relay. His DVB-T output was +17dBm rms. He also was using the L-Com BBQ grill dish antenna and had -1dB of coax loss. In the previous week, Don had also whipped together another similar transverter for Pete & Debbie. Their rig put out +13dBm rms to another L-Com BBQ grill antenna and had about -2dB of coax loss.

We have standardized on using 5.678 GHz for DVB-T and 5.685 GHz for FM-TV. We are using horizontal polarization. For DVB-T, we are running high-definition video and CQ quality audio with 6 MHz bandwidth and QPSK modulation. For our long distance experiments, we have been using "aggressive" coding parameters of: 720p resolution, 3.5 Mbps, 8K FFT, 1/2 code rate (i.e. FEC) and 1/16 guard. "Normal" QPSK parameters are 1080P, 6 Mbps, 8K FFT, 5/6 FEC & 1/16 guard. We are using either Hi-Des, HV-100EH or HV-320E modulators on our IF frequencies.

For receiving, we all are using Hi-Des receivers on our IF frequencies. Don, Pete & Debbie were using HV-110s, while Jim was using an HV-120A. These Hi-Des receivers include a built-in RF power meter (i.e. S meter) which provides an on screen display that reads out directly in dBm. The HV-100 reads correctly. The HV-120A has a built-in offset in it's reading which needs to be corrected for in measurements. Then knowing each transverter's receiver gain, it is possible to obtain true received signal power levels in dBm at the transverter antenna input.




**RESULTS:** When KH6HTV transmitted with +23dBm from Twin Mounds to the CO-128 NREL site, N0YE reported receiving the signal at -84dBm with a 17dB s/n. WB2DVS reported -77dBm with a 12dB s/n. Radio Mobile computer rf path prediction for this was -85dBm.

Next when N0YE transmitted with +17dBm back to KH6HTV -- Jim reported P5/Q5 reception and a received signal strength of -91dBm with a 10dB s/n. Radio Mobile prediction was also -91dBm.

Finally WB2DVS/WB2DVT transmitted with their +13dBm back to KH6HTV -- Jim reported receiving a freeze framing image and broken audio. The received signal strength was -95dBm with 7dB s/n. Radio Mobile's prediction was -96dBm

One conclusion drawn from these 5cm propagation experiments was that the computer program Radio Mobile is quite accurate in most all cases. To read more about Radio Mobile, we refer you to the KH6HTV Video application note, AN-33a, "TV Propagation". It is available at: https://kh6htv.com/application-notes/

Debbie at CO-128 NREL site


Larry at Twin Mounds site



WB2DVS/WB2DVT (left) & N0YE (right) images received by KH6HTV, Twin Mounds

# N8ZM's QRP Experiment through the Dayton W8BI Repeater

Recently, Tom Holmes, N8ZM configured his new HV-310 transmitter and ran a quick check to determine whether a really weak, QRP, +14 dBm (25 milliwatts) RF output signal level would bring up the Dayton, Ohio, W8BI, ATV repeater. Tom was transmitting on the repeater's input at 439 MHz with 2 MHz bandwidth. Tom has an excellent path into the repeater from his Tipp City, Ohio QTH (approximately 6 miles). Consequently, he was able to bring the ATV repeater up while operating with this extremely low power level. Once his antenna was aligned with the ATV repeater site, his 25 milliwatt, DVB-T, ATV signal was being received by the ATV repeater at -89 dBm with an SNR of 15 dB with "zero" frame drops. Provided below are a few snapshots of his initial attempts. His current plan is to next put a small amplifier in-line with the HV-310 for some additional headroom.

The ATV repeater was in QUAD Screen Mode during his initial transmission and as you can see, the HV-110 receiver at the ATV repeater site captured his "last frame received".


Here is one other snapshot I took of N8ZM's live video being transmitted through the ATV repeater prior to N8ZM's optimization of his antenna beam heading. The ATV repeater was receiving his signal at -93 dBm prior to correction of his antenna heading.

73 de Dave, AH2AR

## ARRL 10 GHz & Up Contest:

The second weekend of this annual ARRL contest was held this past weekend on Sept. 19th & 20th. Don, N0YE, organized several of the BATVC members to participate with him doing DATV. The

contest has historically been one for just SSB & CW contacts. Don wanted to make an impression on the ARRL that ATV also has a place in the contest. Full details about the BATVC contributions will be published in detail in the next newsletter.

## VIDEO SQUELCH - VOR:

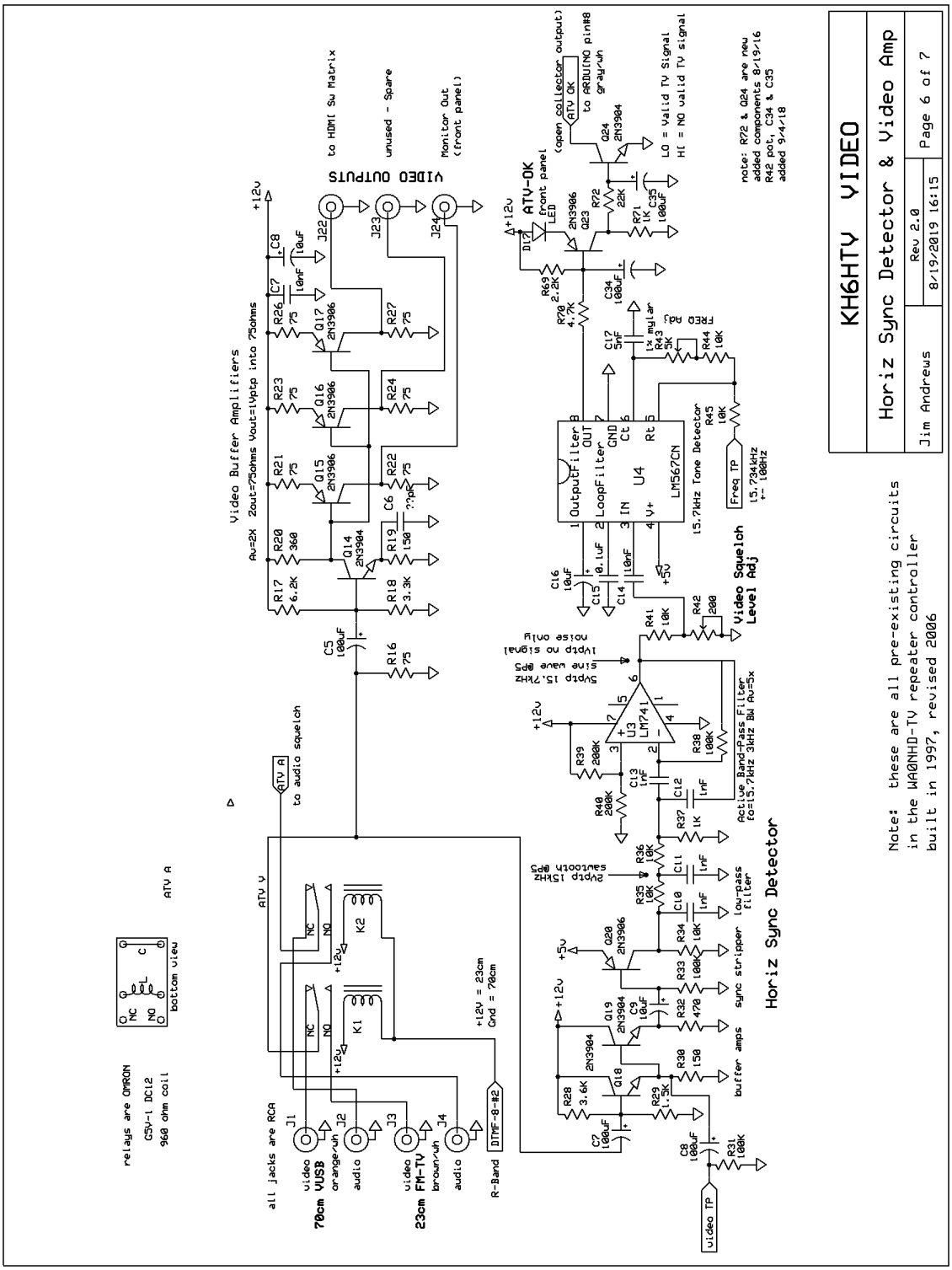
I recently received an e-mail from Ron, K8DMR. Ron was trying to find an NTSC based VOR (i.e. Video Operated Relay) such as PC Electronics used to sell. I didn't have one, but I sent Ron the schematics for the one I had designed many years ago (1997) for our Boulder ATV repeater. We are still using it today in our ATV repeater as the detector of incoming 70cm analog ATV signals. It worked quite well in 1997 and still works great today. It will detect really weak, noisy (P2 or less) analog ATV signals. Thus, I got to thinking it might be worthwhile to share the circuit with readers of our ATV newsletter.

The schematic diagram is shown on a following page. This was taken from our application note, AN-53a, "W0BTV Boulder, Colorado Digital ATV Repeater Technical Details". This app. note gives all the gory details about what went into designing and building our ATV repeater.

The basic concept for an analog video detector to be used as a video squelch or drive a relay is to detect the presence of horizontal sync pulses. In a sense, this is much like using PL tones for 2 meter FM voice radios. Except that PL tones are very low frequencies of the order of 50-150 Hz, whereas we are going to be looking for a very high frequency tone. For USA, NTSC video, the horizontal sync occurs at a 15.7 kHz rate. In the schematic diagram, the incoming analog video was selected by relay K1 and it then was routed to a video distribution amplifier (VDA), which is the circuit on the top of the schematic. This was a discrete amplifier consisting of transistors Q14 - Q17.

Also bridging off of the input 75 Ω terminating resistor, R16, was a hi-Z buffer amplifier, Q18 to pick-off the sync pulses. Q19 & Q20 then served to strip off the sync from the composite video. They were followed by an R-C low pass filter. The filter output was a 2Vptp sawtooth waveform at 15 kHz. This was then applied to an active, band-pass filter, U3. This filter was tuned to 15.7 kHz. It has a gain of 5X and a 3 kHz bandwidth. On the output of this U3 filter, there is a 5 Vptp sine wave when a P5 video is present. With no video present, the U3 output is just noise at about 1 Vptp. The U3 signal levels are too high for the next stage, so they are attenuated by the resistor divider, R41 & R42. R42 is an adjustable pot which is used as a squelch level control. The signal from R42 is then feed into an LM567 tone decoder IC, U4. The 567 is tuned to 15.734 kHz. The output, pin 8, from the 567 is now a logic signal indicating the presence or absence of valid NTSC, composite video. Resistors, R70 & R72 and capacitors, C34 & C35 are included as low pass filters to stop chattering of a relay if the incoming video is very weak and right at squelch threshold. The filtered logic signal then goes to Q23 which turns on/off an indicator LED, D17 and also drives the relay driver transistor, Q24. The output of Q24 is an open collector. It can be used to drive a relay, or key a PTT transmitter line, or other logic circuits.

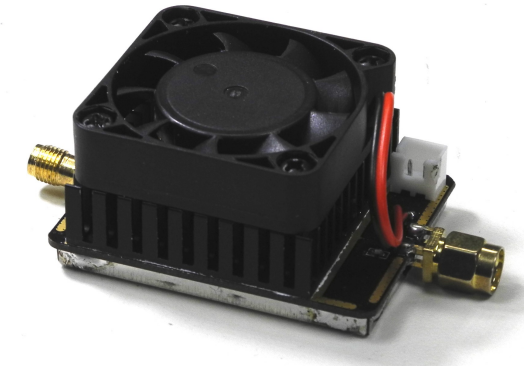
73 de Jim, KH6HTV -- designer, builder & trustee of W0BTV, DATV repeater


KH6HTV VIDEO
Horiz Sync Detector & Video Amp
Jim Andrews
Rev 2.0
8/19/2019 16:15
Page 6 of 7
Horiz Sync Detector
Video Buffer Amplifiers
VIDEO OUTPUTS
to HDMI Sw Matrix
unused - Spare
Monitor Out (front panel)
ATV-OK
front panel LED
(open collector output)
ATV OK
to ARDUINO pin#8
gray-wh
LO = valid TV Signal
HI = NO valid TV signal
note: R72 & Q24 are new
added components 8-19-16
R42 pot, C34 & C35
added 9-4-18
Video Squelch Level Adj
LM567CN
15.734kHz +- 100Hz
Freq TP
Active Band-Pass Filter
fo=15.7kHz 3kHz BW Av=5x
sync stripper
low-pass filter
buffer amps
all jacks are RCA
video 70cm VUSB orange-wh
audio
video 23cm FM-TV brown-wh
audio
R-Band
DTMF-8-#2
video TP
to audio squelch
ATV A
ATV V
+12v = 23cm
Gnd = 70cm
relays are OMRON
G5V-1 DC12
960 ohm coil
bottom view
NC
NO
C
Note: these are all pre-existing circuits
in the WA0NHO-TV repeater controller
built in 1997, revised 2006

# ZERO QUALITY CONTROL - 5 GHz, 2 Watt Amplifiers

**The Chinese have gotten the quality to zero but not quite the price ($25).**

Following what we have written in the previous newsletter (issue #56, pp. 7-11), I have made the suggested modifications. The heat sink now has thermal grease added. There are now four 2-56 screws holding the heat sink to the board. There were a number of problems in adding the grease and then testing the amplifier. The four fan screws would not reattach. The original application of those screws simply bent the heat sink fins and so the screws would not take hold again.. The screws probably were not holding well originally.



Onto testing the amplifier: There was a very weak signal on the output when a signal was applied to the input. Low and behold the center pin on the input RP SMA was gone. When I put a piece of UT141 center conductor wire into the RP SMA to make it an SMA connector, it pushed the center pin into the amplifier inside the shield. The RP SMA resisted accepting the wire because the center pin construction was faulty. And the center pin was not firmly attached to the RP SMA housing. Fortunately the center pin rattling around inside the amplifier did not short anything and cause a failure. A picture of the failed RP SMA and center pin is in the attached photo. The RP SMA has now been replaced with a SMA connector. Pete also reported that his most recently purchased amplifier had a dead cooling fan. The fan on my amplifier does work.

This now being my third amplifier purchased, and the only one that worked, I am cautious and have so far gotten the amplifier up to +28 dBm of rf power of a 5.7 GHz, FM-TV signal. Currently I have a 12 dB attenuator on the 600mW transmitter output into the amplifier. I have been reluctant to push it farther. Should I ?

73 de Don, N0YE

## Digital ATV World Records:

Ken, W6HHC, for several years now has been compiling a list of world distance records for DATV on the various ham bands from 50 MHz up to 76 GHz. Ken has just updated his list to include JA0RUZ, Fumio's latest achievements of 115 km on the 5, 10 & 24 GHz bands with ISDB-T. We first reported these in our June, 2020 newsletter, issue # 48. Ken has kindly given us permission to reprint his record list here.

## Known Digital-ATV DX Records

updated 2020-09-19

by Ken W6HHC

### 76 GHz

**12 KM** G8GTZ/P & G4LDR/P 2018-06-10
DVB-S at 250 KS/s RB-DATV.
Locations IO90LX and IO90LU

### 47 GHz

**115 KM** JA0RGP/0 & JA0RUZ/0 2015-06-07
DVB-S protocol - each station SR-Systems excitor SR=6000KS/s - 150 mw final out
Locations PM97MT (Niigata City) and PM96FV (Nozawa Onsen Ski Resort)

### 27 GHz

**35.6 KM** G8GTZ/P & G4LDR/P 2019-01-28
DVB-S2 at 333 KS/s RB-DATV.
Locations IO91GI and Cheesefoot head (IO90LU?)

### 24 GHz

**124 KM** JA6DME & JA6EES 2011-11-12
Locations Mont Ten-Zan and Mont Ge-Zan

**113 KM** JA0RGP to JA0RUZ 2020-06-20
ISDB-T JA0RUZ EMB220 TX at 150mw out JA0RGP HV-320J at 300 mw final out
Locations PM97LU (Niigata City) and PM96FV (Nozawa Onsen Ski Resort)

**85 KM** G8GTZ/P & G4GKQ/P 2018-06-10
RB-DATV using DVB-S protocol at 333 KS/s.
Locations IO90LX and IO80WP

### 10 GHz

**463 KM** JA0RUZ & JA0DAE 2012-07-28
DVB-S protocol SR-Systems excitor SR=6000 KS/s
Locations Akita prefecture (Cold Wind Mt) and Toyama prefecture (Mt.Iozan)

**450 KM** HB9JBC & F4CXQ 2005-06-21
Locations JN40CT (Sardinia) and JN12OH (Spain)

**407 KM** M0DTS/P & G4UVZ 2018-10-24
Intense tropo-ducting all bands. RB-DATV using DVB-S at 125 KS/s & 333 KS/s
Locations IO94MJ (Danby Head) and IO80KX (Hollybank Blagdon Hill)

**258 KM** F1MPE/P & HB9AFO 2019-09-14
DVB-S at 333kS/s using Portsdown exciter - HB9AFO w/ 8W out and 1M dish
Locations JN26JL and JN36GN reflections against Mont Blanc

**167 KM** JA0RGP/0 & JA0RUZ/0 2020-08-10
ISDB-T protocol - 64QAM OFDM FHD with self-made TX at 500mw final out
Locations PM96FV (Nozawa Onsen Ski Resort) and PM98RE (Murikami City)

### 5.7 GHz

**464 KM** JA0DAE/9 & JA0RUZ/7 2012-07-28
Locations PM86JM and PM99WW - DVB-S - AR Sys and SR-Sys excitors

**341 KM** JL1BLF & JH1GED 2011-08-06
Locations Mont Chokai-san and Mont Kashimayari-gatake - DVB-S SR-Systems

**287 KM** JA0RUZ/9 & JA4JKE/4 2018-06-02
ISDB-T - JA0RUZ using XHAED-2 TX - JA4JKE use HV-320J - at 500mw final out
Locations PM86JS (Tottori City) and PM75AM (Mt Hodatsu)

**167 KM** JA0RUZ to JA0RGP 2020-08-10
ISDB-T protocol - 64QAM OFDM FHD with self-made TX at 500mw final out
Locations PM96FV (Nozawa Onsen Ski Resort) and PM98RE (Murikami City)

### 3.4 GHz

**154 KM** GW4CBW/P & G3NWR/P 2018-06-10
DVB-S at 333 KS/s RB-DATV. Locations IO83FD and IO84ML

### 2.4 GHz

**~ 1000 KM** OR4ISS to IØKPT (one-way) 2014-03-08
**~ 1000 KM** OR4ISS to IK1SLD (one-way) 2014-03-08
Initial DVB-S protocol live video transmissions from HamTV in orbit aboard ISS
SR = 1.34 MSymb/sec and 2.0 MSymb/s using SR-Systems exciter & MPEG2
Locations Orbit to Matera, Italy and also Orbit to Casale Monferrato, Italy

**252 KM** JA6SPI & JA5MFY 2009-11-03
Locations PM63LN and PM51PS SR-Systems exciter and loop-yaggi

### 1.2 GHz

**440 KM** G4KLB to G1LPS 2010-11-11
Locations IO90BR and IO94EQ
(tropospheric ducting - one-way DATV)

## Known Digital-ATV DX Records - Page 2

updated 2020-09-19

by Ken W6HHC

### 1.2 GHz - continued

**419 KM** G4KLB & MØDTS 2010-10-11
Locations Bournemouth, England and Yarm, England

**379 KM** VK3RTV(Repeater) & VK7EM 2011-02-23
(operators VK3BFG, VK3DQ , VK3WWW and VK3TRX)
Locations Mount Dandenong, Victoria and Penguin, Tasmania

**252 KM** JA5GYU & JA6JNR 2009-11-03
(1 Watt)

### 70 CM

**696 KM** F1FY to G8GTZ 2013-09-24
(DVB-S 2MS/sec FEC=1/2 - - one way reception)
**696 KM** G8GTZ to F1FY 2013-09-25
(DVB-S 2MS/sec FEC=1/2 - - one way reception reported by FM)
Locations IO91KH (near Basingstoke) and JN16VB (near Roanne, France)

**600 KM** DBØTAN (repeater) to F9ZG 2014-11-28
DVB-S - one-way DATV - Tropospheric ducting (signal 25 dB S/N over ca)
Locations Wasserkuppe (Germany Hesse state) to IN99KC (Normandy France)

**528 KM** G3PYB & F5AGO 2013-09-24
(DVB-S 2MS/sec)
Locations near W YORKSHIRE and JN06DP (near Poitiers, France)

**501 KM** W4HTB & WB8LGA 2014-07-26
(DVB-T QPSK FEC=1/2 2 MHz Bandwidth) - Tropospheric ducting
Locations Bowling Green, KY and Marengo, OH

**235 KM** G8GTZ & F9ZG 2016-06-12
H.264 video - DVB-S protocol at 125 KSymb/s using DATV-Express w/ 19-ele yagi
Locations JO00HU (Fairlight near Hastings) and IN99KC (near Cherbourg)

**121 KM** KH6HTV to KØRZ 2011-11-21
(video resolution HDTV 1080i - protocol ITU-T/J.83B QAM-64 - one-way DATV)
Locations Cheyenne, Wyoming and Boulder, Colorado

### 144 MHz

**407 KM** M0DTS/P & G4UVZ 2018-10-24
DVB-S at 333 KS/s RB-DATV.
Locations IO94MJ (Danby Head) and IO80KX (Hollybank Blagdon Hill)

**403 KM** PI4D to G4YTV (one way) 2020-08-22
DVB-S2 at 125 KS/s using H265 with FEC=1/2 on 144.600 MHz. (100W into Yagi)
Locations Dordrecht , Netherlands and IO93UU82FR (East Yorkshire , England)

**380 KM** PA0JCA to G4YTV (one way) 2020-08-22
DVB-S at 125 KS/s using H264 with FEC=1/2 on 145.300 MHz. (80W into 4el Yagi)
Locations Amstelveen Netherlands and IO93UU82FR (East Yorkshire , England)

**313 KM** GI7UGV & G4CBW 2018-07-14
tropo-ducting - H.264 video - 8W DVB-S protocol at 333 KSymb/s with Portsdown tx & MiniTiouner rx with 7-ele yagi at GI7UGV. G4CBW used DATV-Express tx (7W) & MiniTiouner with 5-ele beam. - on 146.5 MHz - UK temporary band allocation
Locations IO74AU93XP (Larne, N. Ire) and IO83UB93 (Newcastle-Under-Lyme)

**294 KM** G0MJW/A & G8LES 2016-12-29
tropo-ducting - H.264 video - DVB-S protocol at 125 KSymb/s with DATV-Express and 9-ele yagi at GØMJW. G8LES also used DATV-Express with 10-ele X-yagi. Both produced 25W ERP. - on 146.5 MHz - UK temporary band allocation
Locations IO83RO (Winter Hill) and IO91LC (Four Marks)

**50 KM** MØDTS & G1LPS 2015-02-21
H.264 video - protocol DVB-S at 333 KSymb/s using experimental DATV-Express transmitters & MiniTiouner RB-DATV receivers. 146.5MHz UK temp band allocation
Locations North York Moors, England and Spennymoor (County Durham), Eng

### 70 MHz

**136.6 KM** G8VPG & G4BVK 2018-09-14
H.265 video - DVB-S protocol at 333 KSymb/s with DATV-Express transmitter, MiniTiouner receiver and 3-ele yagi at both stations
Both transmitted 20W - on 71.0 MHz - UK temporary 4M band allocation
Locations IO81FD19QU (Dunkery Beacon) and IO81XW90 (Cleeve Hill)

### 50 MHz

**64 KM** G8ADM to G8LES 2015-02-10
DVB-S protocol at 1.133 MSymb/Sec with FEC=3/4 (one-way)
on 51.2 MHz using 200W avg Pwr Out and BW approx 1.5 MHz
Locations North of Harrow (IO91TO) to North of Alton in Hampshire

See more details (including analog-ATV and SSB, etc) at **https://www.hb9afo.ch/records/default.htm**

Ken posts these records on the Orange County, California ham club and BATC web sites. They are: http://www.w6ze.org/DATV/Known-DATV-DX-Records.pdf
& https://wiki.batc.org.uk/Known_DATV_DX_Records
Ken also requests -- "Please send me an e-mail if you know of a DATV QSO that should be added to this list ( W6HHC@arrl.net )

**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.**

## DISH ANTENNA For Sale

**45 dBi Gain**

**5.925 - 7.125 GHz, 0.9º beamwidth, 12 ft.**

**Andrew model HP 12-59W-P1M**

New condition, never used. Still in original packing crate. New it cost $12K. Willing to sell it for $3K. Shipping not included. Purchaser to arrange for pick up and shipping from Boulder, CO. For more details, contact Dave, KG0EW, d.patton@radiometrics.com or -- 303-319-9848