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BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com

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

We are hoping that the recent introduction of the ICOM IC-905 microwave transceiver will kindle a lot of interest in hams in exploring the microwave frontier. To that end we in Boulder are adding 10 GHz capability to our W0BTV-DATV repeater. Hope to see and hear a lot more hams on the 3 cm band.

ICOM IC-905 Microwave Transceiver

FEEDBACK on 10 GHz DTV Frequency:

Hi Jim --- Just looked at the article about your 10 GHz ATV input frequency. It is a big band and it would be nice if you moved a lot further away from the 10368.1 MHz weak signal calling frequency. We all know that no RX equipment for 10 GHz has a narrow front end filter and we can also be very sure that any 10 GHz ATV transmitter will have plenty of modulation products well out from the carrier frequency. I don't expect a LOT of weak signal activity in any area, but California, Colorado, and Texas all have active weak signal operators on 10 GHz. We have our own active 10 GHz weak signal group up in the area around MN-WI-MI-IA-IL and into Canada. During the 10 GHz contests we're out there working stations 200-400 miles away. It wouldn't take much for 10 GHz ATV in an area to mess that up. Good band planning would move your ATV channels well away from existing users. The final operating frequency should not make any significant difference to the Hi-Des RF equipment.

73, Doug Reed, N0NAS, St. Paul, MN

Editor's Reply: *Thanks Doug for the feedback. We only have two 10 GHz SSB micowavers here in Boulder County, Colorado. They are Bill, K0RZ, and Don, N0YE. Both have serious home stations complete with tower mounted, rotatable high gain dish antennas with waveguide feeds. They are both also into DATV. We let the two of them decide what frequency we should use for a DVB-T input to our W0BTV repeater. I have forwarded Doug's email to them and asked them to give us a reply explaining their choice. Here are their replies. The bottom line is 1. They wanted a frequency close enough that hams with existing 10 GHz SSB rigs could use them also for DVB-T and 2. The wanted to adhere to the ARRL Band Plan.*

K0RZ's ham station -- 10 GHz equipment is on the right

K0RZ: Hello Doug --- I am very aware of the 10368 weak signal activity in our area which has diminished to almost no activity. There were about 25 each 10368 stations active 24 years ago in our area, now I can count 5 stations including N0YE and myself K0RZ that with some effort are still capable of operating on 10368.

Bill, K0RZ

My transverter is a home brew unit that I built in 1996 and uses a Hughes TWT 10 Watt as the final RF amplifier. The transverter has an 8 cavity waveguide filter. Retuning the BPF filter to cover 10377 to 10383 with about 1 dB ripple was a real stretch and still have workable insertion loss at 10368. In addition my tower mounted dish has a waveguide tuner at the feed precisely tuned for 10368. The antenna is a 32" dish tower mounted at 30+ feet high and waveguide fed from the transverter to the dish.

K0RZ's VHF/UHF & Microwave Antenna Farm - all on a rotator

Moving much higher in the 10 GHZ band probably requires a totally different setup which at this time is not practical for me to build given the minimal 10368 SSB activity and the expected short transmission times on 10380 DVB-T. A feature of my new setup is I can switch between 10380 DVB-T and 10368.1 SSB by throwing one toggle switch to monitor the calling frequency of 10368.1 The planned 10380 output power is +26 dBm to maintains the low intermodulation products outside of 10377 and 10383.

73 de Bill, K0RZ, Boulder, Colorado

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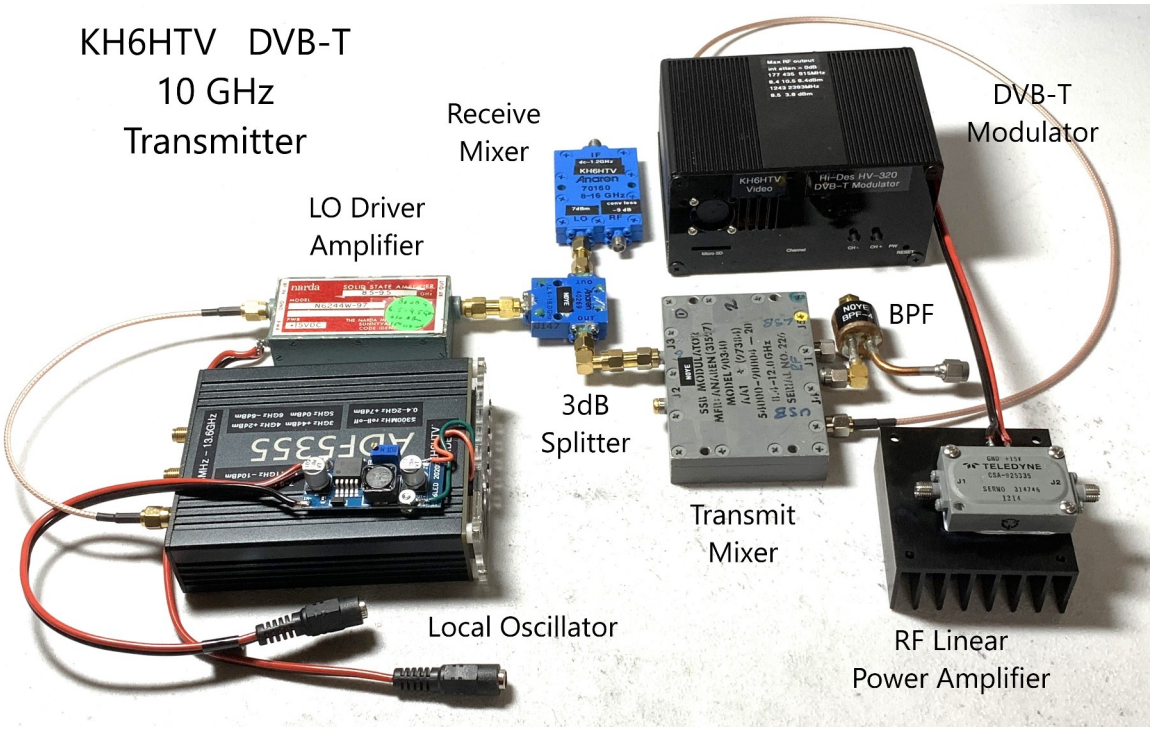
N0YE: Doug - I do not understand the issue that you seem to be posing here. When we work on 10 GHz with DVB-T, we need to work at a frequency far enough away from 10368.1 MHz, the weak signal SSB calling frequency, to not interfere. Hopefully the frequency chosen will not require the band pass filter in a transverter to be retuned to be able to work on the frequency chosen for DVB-T operation.

Don, N0YE

I have been told the ARRL band plan indicates the spectrum above 10375 MHz has been chosen to be uses for DVB-T types of signals. I take that as a given. So 10380 MHz has been chosen as the center frequency for the 6 MHz bandwidth we will be using. So be it. Does the band pass filter in a given rig have to be retuned? It depends on the rig. At this point the DEMI transverter I have has NOT been tested to see if the band pass filter in it needs to be retuned. The home brew transverter I am using for DVB-T now does not need to be retuned.

73 de Don, N0YE, Boulder, Colorado



10 GHz, DVB-T Transmitter

10 GHz DVB-T TRANSMITTER & RECEIVER

Jim, KH6HTV

As an encouragement to other hams to get on the 3 cm band with digital TV, the above photo shows the minimal amount of extra gear required. If you are already doing DATV on the 70 cm, or 23 cm bands, you have a lot of what is already required in the way of your expensive DVB-T modulator, plus a set-top box receiver. To get up to the higher microwave bands, then you need at a bare minimum a Local Oscillator (LO) and a Mixer. Granted this will not give you much rf power, but it is a start. Then you start to add refinements of band-pass filter(s) and rf amplifiers.

What I am showing above was accumulated from Amazon, E-Bay, my favorite microwave surplus house Western Test Systems and Don, N0YE's microwave junk box. I used an LO of 9.750 GHz to match that of my receive BullsEye LNB. For operating on 10.380 GHz, the resultant IF is 630 MHz. The DVB-T modulator is a Hi-Des, model HV-320 ($400). The LO is an Analog Devices ADF5355 Frequency Synthesizer from E-Bay ($200). The LO was designed to be powered with +9Vdc. So I added a +12 to +9 V switcher on top of it. The rf output from the ADF5355 is only about -10dBm and is too low to drive any diode mixer. I thus needed an RF amplifier. I found a suitable Narda amp at Western Test for about $40. It had more than enough gain and power output to drive a typical +7dBm mixer. I got about +14dBm from the LO amp. So this gave me the opportunity to drive not one, but two mixers, one for transmit and the other one for receive test purposes. So from Don's junk box came a 3dB power splitter. I now have +10 dBm of LO drive for both mixers. The blue Anaren receive mixer came from Western Test ($40). The transmit mixer was a very nice find in N0YE's junk box. It

was actually a single sideband up-converter mixer. It had two IF ports. One labeled USB. The other LSB. The unused IF port was terminated in 50 Ω. Normally one would have just used an ordinary mixer, but having this SSB mixer resulted in a cleaner rf spectrum with the opposite sideband suppressed already. The 10.380 GHz RF output from the SSB mixer as then filtered with an N0YE home-brew, copper pipe cap, single pole, band-pass filter. The BPF had about -3 dB insertion loss and 300 MHz band-width. The final frosting on the cake was provided by an RF Linear Power Amplifier. This was a Teledyne 10 GHz amp again from Western Test ($125). The amp runs hot, so I mounted it on a small heat sink. The amp was specified to work from 4-10 GHz with 34dB gain, +23dBm max. output and draw 1/2 Amp at +15Vdc. I found that it worked well at lower voltages down to 12Vdc. At 10.38 GHz, I measured 34 dB gain, +25dBm max. saturated rf output. I then tested it for DVB-T service and got +17 dBm (avg.) (i.e. 50 mW) rf output power with -33 dB out of channel shoulder break-points. In actual service, I plan to mount the rf power amplifier directly on the antenna and use a low loss coax cable running from the rest of the gear up to the amplifier.

For my 10 GHz, DVB-T receiver, it couldn't be any simpler. This photo shows it. Plus very low cost of less than $100. All from Amazon or E-Bay. It consists simply of a Bulls-Eye LNB 10 GHz to UHF antenna & down-converter. A bias tee to insert 12Vdc power into the IF interconnecting coax cable. Then a low cost, set-top box, DVB-T receiver. The LNB's LO is at 9.750 GHz. Thus for our RF input of 10.380 GHz, the resultant IF to the receiver is 630 MHz.

10 GHz, DVB-T Receiver

73 & hope to see more of you hams on 10 GHz soon -- Jim, KH6HTV, Boulder, Colorado

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Feedback on 3LNC70 Down-Converter:

We received the following letter from the designer of the Hi-Des model 3LNC70 Down-Converter

.....with an LO frequency offset error of about 150kHz too low. Quite poor for SSB service. Still for DVB-T service, good enough..... When designing the converter, we had to decide whether to use a quartz crystal with a low ppm in the 3LNC70 with a resultant very high price --- or --- to use a quartz crystal with a higher ppm and keep the final price much lower and add the option of 3.3V for a TCXO. We decided on the lower cost option. We only made thirty of the 3LNC70 as a market launch series.

For hams who want more stability and accuracy, you could unsolder the original quartz crystal and install your own. Other options which we provided for are to install a TCXO with 0.5ppm , or external GPS referenced oscillator.

73 de Darko Banko, OE7DBH, 9A6RZN, Pians, Austria

FEEDBACK on DVB-T Sideband Issue:

Hello Jim .. Re Sidebands and DVB-T frequency conversion.
Before any actual implementation, I assumed that when frequency converting DVB-T you would need to run the local oscillator below the centre frequency so to not invert sidebands. Imagine doing that with an analogue signal ... you would end up with the 2 sound carriers at the wrong end of the vision carriers.

At the Melbourne ATV VK3RTV we use 'Combo Receivers' with both tuners in use, satellite and domestic. The domestic input is connected to a down converter. So, for example 1246 Mhz DVB-T will need a local oscillator in the downconverter of 1246 - 536.5 = 709.5 Mhz (536.5 = Ch 29, unused in Melbourne). However after a bit of experimentation by others in our group, we now use 1246 + 536.5 = 1782.8 and all versions of the 'Combo' still work ! (about 3 different models for 4 input frequencies.). The advantage here is that 1782.5 puts any related signals hopefully way out of contention .

Regards, Peter, VK3BFG, Melbourne, Australia

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Assortment of ATV Repeaters Darko, OE7DBH, has been involved with in the past





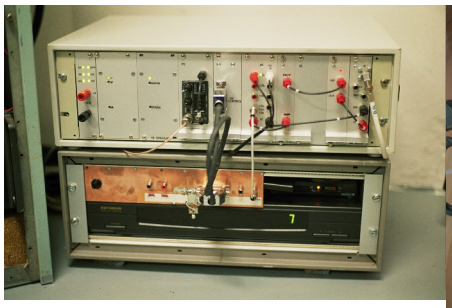


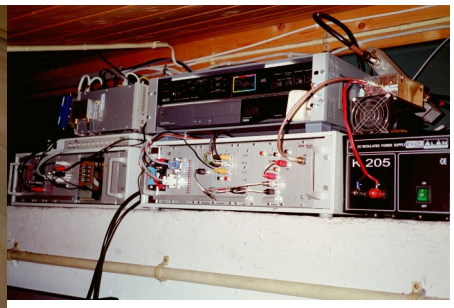


25.5°C
3.5°C
OE7XLT
via OE7XSI


TX Unit
23cm RX Ant.
für OE7XLT



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ATV QSO Party

Peter, VK3BFG, Coordinator

was held on Friday evening, August 30th. It included APCO in Ohio, and ATN chapters in S. California, Silicon Valley, Arizona and Boulder, Colorado in the USA plus many stations in Australia. There were lots of ATV hams participating. Here are screen grabs of some of the coordinators. We saw some very impressive ham shacks with lots of ATV goodies in them. Also some great antenna farms. Sorry I missed the AO-100 ATV from Europe, but unable to stay up till the wee hours of the morning.

Art, W8RMC, ATCO-Ohio

Roland, KC6JPG, ATN S. California

Jim, K6SOE, ATN N. California

Lee, K0CCU, ATN Arizona

This event once again made me appreciate what we take for granted from the true Broadcast TV PROFESSIONALs. i.e. perfect video and audio. Again, we proved that we deserve the name AMATEURs. In general we had great video images, thanks to digital TV -- but again our audio suffered lots of problems. Inconsistant audio levels, poor audio quality and most annoying lots of total loss of audio for extended periods of time. Not pointing the finger at anyone in particular. We ourselves here in Boulder suffer from our #1 technical problem area routinely, i.e. poor or no audio through our W0BTV - TV repeater. But the event still was worth-while. This note from Don, N0YE, is a good summary of the value of holding this QSO party. ***"Thank You Again -- My bottom line is the value of this annual get together is hearing what others are doing with DTV. There are a lot of***

creative hams doing quite a variety different things. In particular I am delighted to hear other3 doing DVB-T or S on 10 GHz etc. Please send this appreciation to the host of this QSO party. --- Don, N0YE, Boulder, Colorado, USA"

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W0BTV Details:

Inputs: 23 cm Primary (CCARC co-ordinated) + 70 cm secondary all digital using European Broadcast TV standard, DVB-T 23cm, 1243 MHz/6 MHz BW (primary), plus 70cm (secondary) on 441 MHz with 2 receivers of 6 & 2 MHz BW
Outputs: 70 cm Primary (CCARC co-ordinated), Channel 57 -- 423 MHz/6 MHz BW, DVB-T
Also, secondary analog, NTSC, FM-TV output on 5.905 GHz (24/7 microwave beacon).
Operational details in AN-51c Technical details in AN-53c. Available at: ***https://kh6htv.com/application-notes/***

W0BTV ATV Net:

We hold a social ATV net on Thursday afternoon at 3 pm local Mountain time (22:00 UTC). The net typically runs for 1 to 1 1/2 hours. A DVD ham travelogue is usually played for about one hour before and 1/2 hour after the formal net. ATV nets are streamed live using the British Amateur TV Club's server, via: ***https://batc.org.uk/live/*** Select ***ab0my or n0ye***. We use the Boulder ARES (BCARES) 2 meter FM voice repeater for intercom. 146.760 MHz *(-600 kHz, 100 Hz PL tone required to access*).

Newsletter Details:

This newsletter was started in 2018 and originally published under the title "*Boulder Amateur Television Club - TV Repeater's REPEATER*" Starting with issue #166, July, 2024, we have changed the title to "*Amateur Television Journal.*" This reflects the fact that it has grown from being simply a local club's newsletter to become the "de-facto" ATV newsletter for the USA and overseas hams. This is a free ATV newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 800+, both in the USA and overseas. 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

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NEW PRODUCT ANNOUNCEMENT

from KH6HTV Video

New RF Linear Power Amplifier for the 33 cm (900 MHz) Band

Model 33-5, $325

Model 33-5
33 cm, 47 dB, 15/10/3 Watt
RF LINEAR
POWER AMPLIFIER

optional rear panel connections, front view

optional rear panel connections

The KH6HTV-VIDEO Model 33-5, RF Power Amplifier is for use in the amateur radio 33 cm (900 MHz) band. It is a Class A-B amplifier designed for linear service. It can produce a 3 Watt, high-definition (1080P), digital TV (DTV) signal. It can also be used to produce an 10 Watt (pep), analog TV or SSB signal, or 15 Watts for FM/CW service. For DTV service with it's low DC current draw of only 1.3 Amp at 13.8 Vdc, it is ideal for in the field battery operations, such as for ARES emergency operations. With it's heat sink and fan it is rated for 100% duty cycle.

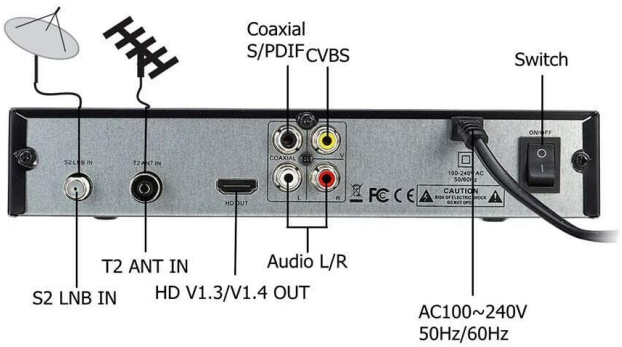
PARAMETER	Typical Performance	Notes
Output Power (Digital TV)	3 Watts, +35 dBm	average power
Output Power (analog TVor SSB)	10 Watts PEP, +40 dBm	peak power on sync tips
Output Power (FM, CW)	15 Watts, +42 dBm	saturated output
Output Power (-1 dB comp)	12 Watts, +41 dBm	
Output Power (-1/2 dB comp)	10 Watts, +40 dBm	
RF Power Amplifier Gain	47 dB, nominal	
Amplifier Gain Flatness	± 0.5 dB	902 - 928 MHz
Gain Band-Width	200 MHz	-3 dB
Amplifier Max Input Power	10 mW, 10 dBm	
Spectrum Regrowth (Digital TV)	-30 dB at +35 dBm (3 Watts)	-35 dB at 1.5 W
LSB Rejection (analog VUSB)	better than -20 dB	at 10 W peak sync
Duty Cycle	100 %	
DC Supply Voltage	13.8 Vdc	10 to 15 Vdc
DC Current	1.3 Amp (3 W DTV), 0.6A idle 3.0 Amps (15 W FM/CW)	@ 13.8Vdc
RF Connectors	SMA input & N output	
Dimensions & Weight	4.2" x 3.5" x 7.4"	1.5 lbs
Accessories Included	instruction manual & test report	

Note 1 - Rear panel connectors option available. No extra cost.

KH6HTV-VIDEO Boulder, CO USA www.kh6htv.com kh6htv@arrl.net **303-594-2547**

NOTICE: This linear amplifier is not FCC type accepted. Therefore, the use of this amplifier is only legal in the USA, amateur radio, 33 cm band (902-928 MHz). Owners and operators of this amplifier must be licensed amateur radio operators.

For Sale:
DVT-T2-S2 Combo Receiver, in original box: $40
pre-programmed for 70cm ATV channels
Larry Nussbaumer - N8GGG
lfn3@comcast.net
or 303-255-2199



Editor's Note: For a complete instruction manual for Larry's receiver, go to www.kh6htv.com and down-load app. note AN-65a.