

Boulder Amateur Television Club TV Repeater's REPEATER

April, 2020

BATVC web site: www.kh6htv.com

ATN web site:

www.amateurtelevisionnetwork.org

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



Future Newsletters: If you have contributions for future newsletters, please send them to me. We also welcome news from other ATV groups around the USA. We encourage you to forward this newsletter on to other ATV ham friends in your clubs.

Quote from John - WB0CMC: *"If you have a good comb generator would that help if you're having a bad AIR day?"*

NEW 2ed WEEKLY ATV NET: Due to the pandemic, and everyone being required to stay at home, we are all getting "Cabin Fever" and missing our social interactions with friends and society in general. Thus, the consensus of most of the BATVC members, is that we should hold two ATV nets each week for the duration. Our regular net has been on Thursday afternoons at 3pm local time, with Don, N0YE, as net control. Colin, WA2YUN, has suggested we do the second net on Sunday afternoons. So, let's do it starting this Sunday, the 29th, at 3pm local time. I propose we use a different format with a round table discussion of various topics. Our Thursday nets, seem to be for one ham to talk for several minutes on one or more subjects. For the new Sunday net, let's try making much shorter TV transmissions and expressing our thoughts on a particular subject and then turning it over to another for their comments. We will still have a net control station on 2 meters (146.76 repeater, - offset, 100 Hz tone required) to direct who transmits next. ---- kh6htv

BCARES Amateur Television Equipment Give-Away

The Boulder County Amateur Radio Emergency Services (BCARES) Board of Directors recently decided they wanted to donate all of their old analog ATV equipment to another ARES group that does not have any ATV capability, or perhaps very limited capability.

Pete, WB2DVS, and Jim, KH6HTV, were directed to find an ARES group that was interested in acquiring the ATV equipment. The following e-mail letter was sent to all of the ARES groups in the Front Range of Colorado offering to give away **FREE** our analog ATV gear.

The Boulder, Colorado ARES (BCARES) group has used successfully for the past thirty years, Amateur TeleVision (ATV) in support of our local Sheriff, Police and Fire departments. ATV has been the #1 communications services requested by our served agencies. BCARES had it's own ATV pack-sets, fixed and portable ATV repeaters, and ATV receivers in the 911/EOC and also in public safety mobile command posts.

The BCARES ATV equipment operated primarily on the amateur 70 cm (420-450MHz) band with some operation also on the 23 cm (1240-1300 MHz) band. The ATV adhered to commercial, analog, NTSC, broadcast TV standards. It operated on standard, 6 MHz, cable channels 57, 58, 59 & 60 which are in the amateur 70 cm band. The 70 cm transmitters were Vestigial Upper Side-Band (VUSB-TV). The BCARES, 70 cm ATV signals were received on conventional, home TV receivers. On the 23 cm and 13 cm bands, BCARES ATV used FM-TV transmitters and receivers.

Starting in 2014, BCARES started transitioning over to the new, high-definition, digital TV (DTV). This transition is now complete. All of BCARES' current ATV operations are now in DTV. As a result, all of BCARES' older, analog ATV equipment is now surplus.

If your ARES group is interested in obtaining **FREE**, BCARES' analog ATV equipment -- please contact: Jim Andrews, KH6HTV at kh6htv@arrl.net - or - 303-594-2547

For more information about BCARES ATV and this equipment -- see the attached article "Add Television to Your ARES Tool Kit". It is also available to be down-loaded free in .pdf from: <https://kh6htv.files.wordpress.com/2014/10/an-9-ares-tool-kit.pdf>

The analog ATV equipment, to be donated by BCARES includes;

ATV Pack-Sets: including 70cm, 1 watt, VUSB-TV transmitter, hi-8mm camcorder, plus misc. accessories

ATV Transmitter: 70cm, 10 watt, VUSB-TV, frequency synthesized all channels

ATV Portable Repeater: 70cm, 10 watt, VUSB-TV 439.25 MHz input, 421.25 MHz output, included hi-8mm camcorder & 7" color, flat-screen video monitor.

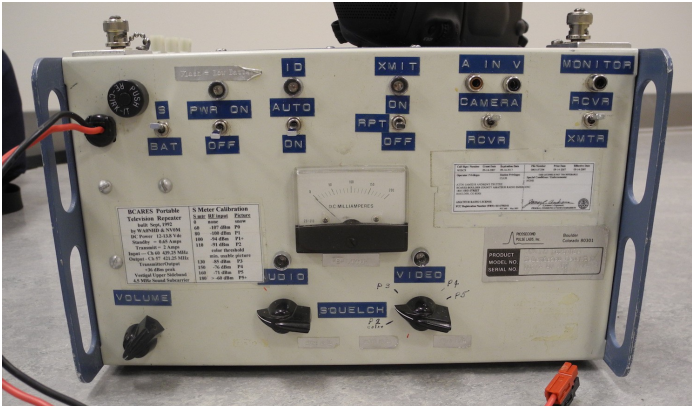
EOC ATV Receivers: 19" rack panel with Pico-Macom CATV 70cm receivers & 23cm FM-TV receiver, and VDA. Was used in Boulder 911 / EOC

Field IC ATV Receivers: portable ATV receiver package complete with triplexer, (4) 70cm, Pico-Macom CATV receivers, 23cm FM-TV receiver, Quad Processor and ICOM 2m FM voice radio Was used for field operations and set up in the Incident Command Posts.

Other Stuff: plus an assortment of other analog ATV gear, including TV cameras, lenses, CATV receivers, CRT monitors and ATV transmitters for 70cm, 23cm & 13cm bands



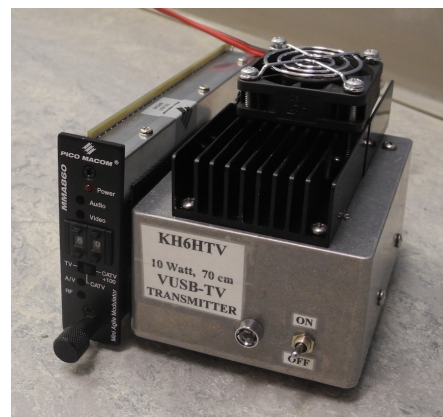
BCARES - 70cm ATV Pac-Set



BCARES - Portable, 70cm, 10 Watt, ATV Repeater



EOC -- ATV receivers



70cm, 10 Watt, ATV Transmitter



BCARES -- Portable 70cm & 23cm Receivers & 2m FM radio

Two ARES groups have expressed an interest in obtaining the gear. Thus the dilemma of who gets what? In the meantime, Pete is trying to round up some additional analog ATV gear, including VideoLynx transmitters, that was previously in the CU-PD cache, plus personal, analog ATV gear some BCARES members are also willing to donate. Then it will be up to the BCARES board to decide how to divvy up the stuff between the two ARES groups. In the meantime, with the pandemic raging -- the whole project is on hold.

ATV-101 - An Introduction to Fast Scan Amateur Television (FSTV) **Bil Munsil, K1ATV, Mesa, Arizona, wmunsil@cox.net**

NOTE from Bil: "This was originally written in 2006 - long before Digital TV." Bil was licensed in late 70s, and immediately became active in ham TV on 70cm using W6ORG's gear. Bil's slogan is -- "Hams should be SEEN as well as heard."

This article will not deal with the video part of the TV signal but only with the RF part. It will not deal with HDTV or stereo sound either. It will deal with the RF parts of the old-fashioned TV signal only.

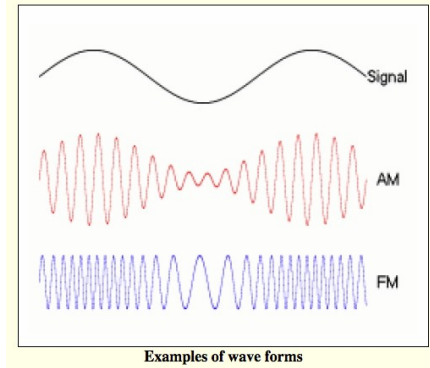


Amplitude & Frequency Modulation:

There are two basic types of RF - AM and FM. There are others but they will not be dealt with here. FM will be dealt with very briefly in passing.

Difference between AM and FM:

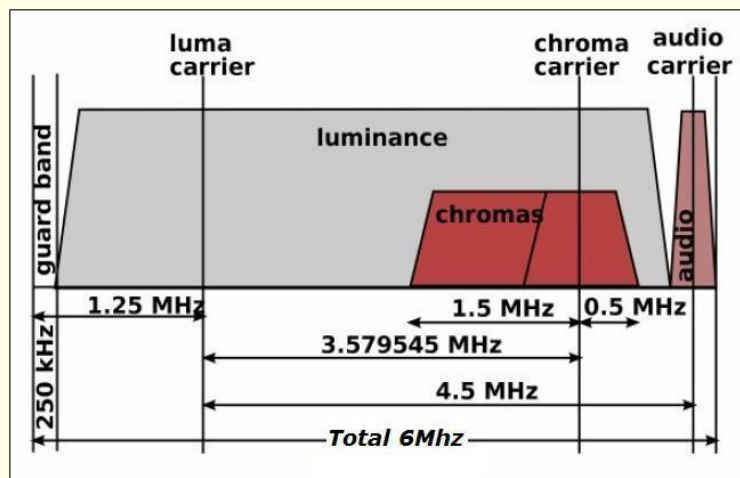
AM consists of a constant frequency carrier modulated by mixing audio (as in the standard AM radio band) or video (as in television) or, in a few cases, both. The amplitude of the result varies with the input signal. This mixing results in three outputs: the carrier itself and two sidebands - upper and lower - which carry identical mirror images of the modulating signal. For example, assume an AM station on 1000 KHz. When an audio frequency - say 1000 Hz - is mixed with the carrier we get the original 1000 KHz and 1000 KHz minus 1000 Hz (999 KHz) and 1000 KHz plus 1000 Hz (1001 KHz). In the case of AM radio the frequencies can be up to about 5000 Hz or more. In the case of television the modulating signal will be a band of frequencies up to about 4 MHz wide. Therefore, the video signal created could be up to 8 MHz wide - carrier minus 4 MHz and carrier plus 4 MHz. Color and audio can increase this up to 9 MHz wide. More on this later.



FM varies the carrier frequency itself and the amplitude remains the same. The modulating signal can be as high as 100 KHz since an FM radio channel is at max, 200 KHz wide - as opposed to 10 KHz for AM radio.

Types of Amplitude Modulation:

There are several types of AM - Double Sideband with Carrier (commonly known as AM radio), Double Sideband with reduced or suppressed carrier (which is rarely used), Single Sideband with carrier (rarely used), Single Sideband with reduced - or usually suppressed - carrier (known as SSB), Vestigial Sideband with carrier (VSB - as is used in American TV), and Independent Sideband with carrier. I dare say that we are all familiar with SSB since almost all ham HF operation is of this type. The carrier and one sideband are suppressed. Independent Sideband has different information on each sideband - unlike "regular" AM which has, as described above, the same information in mirror image on each sideband.



Television uses VSB. A full 9 MHz wide signal is created but all of the lower side band (LSB) except for 1.25 MHz below the video carrier is truncated. Thus, all that is left is a vestige - hence the term "vestigial" - of the LSB. Some LSB must be left so that the TV receiver can lock on to the carrier. As been said above - the LSB information is a mirror image of the USB information so no information is lost. Except for the two ATV channels at the band edges - 421.25 MHz and 1241.25 MHz where VSB is mandatory - VSB is not required for HAM TV. VSB filters are expensive.

Audio in TV and HAM TV:

Standard American TV has separate video and audio transmitters 4.5 MHz apart with the audio transmitter "above" the video transmitter. HAM TV uses one of two methods for audio transmission: subcarrier audio or on-carrier audio. On-carrier audio is probably the older of the two methods stemming from the use - early on - of converted UHF commercial two-way radios. The radios were modified to run wideband video and the video was AM'ed on to the carrier. The audio was left basically unchanged.

As equipment was designed and built specifically for HAM TV a separate 4.5 MHz FM subcarrier was used. The audio is carried on the FM subcarrier and then the resultant FM signal is AM'ed on to the video carrier. The TV receiver cannot tell the difference. Because DSB is used and we don't usually use the VSB filters the ATV signal is a little over 9 MHz wide. As in American TV the color information is generated in the video source itself so no external circuitry is required. Up until about ten years ago some new ATV transmitters were still available with on-carrier sound but it is not used much out west.

73 de Bil Munsil, K1ATV

ATV HAM ADS

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

For Sale: 20 Watt, 23cm AMPLIFIER -- home built, uses Mitsubishi M57762, class A-B, brick amp module. For AM-TV service, for 250mW in, you get 10 Watts (pep) output. For FM-TV service, for 1 W input, you get 20 W output -- 4 Amps at 12Vdc. Not recommended for DVB-T service. I am asking \$50 plus shipping. If interested, contact, Jim, KH6HTV, e-mail = kh6htv@arrl.net

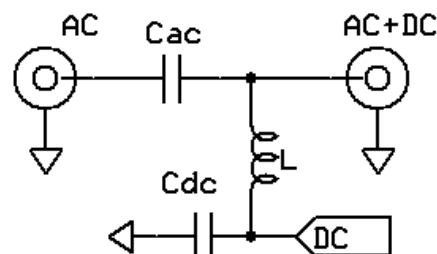
NEW PRODUCT ANNOUNCEMENT:

BIAS TEE, Model BT-UHF, 144-2400 MHz, 50V, 2 Amps --- \$50 each



Model BT-UHF

BIAS TEE



The KH6HTV VIDEO Model BT-UHF is a Bias Tee with a useful frequency response covering from 2m to 13cm bands (144 MHz to 2.4 GHz) with less than 0.5 dB insertion loss. It is rated to 50 Vdc and 2 Amps. A Bias Tee is used to either insert or extract DC power to/from a coaxial cable. It can be used to send dc power up a cable to an antenna mounted pre-amp or coax relay.

Typical Performance

Parameter	"S"	144MHz	430MHz	915MHz	1.27GHz	2.4GHz
Insertion Loss	S21	0.35dB	0.1dB	0.2dB	0.3dB	0.5dB
Return Loss	S11	12dB	>20dB	>20dB	17dB	15dB

Parameter	Value	Notes
Capacitors	100 pF & 0.1 uF	DC block & DC by-pass
Inductor	80 nH	shunt inductor
Low Frequency Cut-Off	50 MHz	S21 = -3 dB
Resonances	230 MHz & 3 GHz	-1.5 dB & -7 dB notches
Max. RF Power	TBD	see below note
DC Ratings	50 Vdc & 2 Amps dc	
RF Connectors	SMA	female, jacks
DC Connector	feed-thru capacitor	solder terminal
Dimensions	1.5"x3.6"x1.25"	die-cast enclosure

Note: The prototype has been tested successfully with: 50 W (2m), 20 W (70cm), 35 W (23cm) & 10 W (13cm).
These were the max. powers available at the time in the test lab.

KH6HTV-VIDEO www.kh6htv.com e-mail: kh6htv@arri.net Boulder, Colorado, USA