

Boulder Amateur Television Club TV Repeater's REPEATER

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BATVC web site: www.kh6htv.com

ATN web site: www.atn-tv.com



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Where Was ARES for the Maui Fires ?

An Editorial ---- Jim, KH6HTV, Boulder, Colorado

I may be wrong, but I feel that something serious was missing from the emergency response to the recent, devastating Fire Storm which destroyed the entire town of Lahaina on the Island of Maui, in Hawaii. What was it you say ? -- it was ARES ! Where were they when the "#^T@%R hit the fan" ??? The press releases sent out by the ARRL section manager, Joe, AH0A, and ARRL headquarters simply talked platitudes. Only talking about the available amateur repeater network available on Maui for use by later, after the fact, relief personel. No mention anywhere of ARES. Why? -- Because it really didn't exist on Maui. It was there in name only, a paper organization. A paper tiger with no teeth.

You say, how can you a fella in Colorado point your finger at them? I speak from first hand experience having lived on Maui. Note my KH6 call sign. Our son, Steve, lives and has worked on Maui since 1995. After retiring in 2001, Janet and I became "snow-birds" living on the island of Maui for six months every year. We owned a home there on the island. I was a member of the Maui Amateur Radio Club (KH6RS) and attended regularly their meetings and also gave several technical talks to the club. We really felt like residents of Maui, not tourists. We actually had a much larger circle of friends on Maui, than we did in our original home of Boulder, Colorado. In 2019, we sold our Maui home and left the island for good. Why? I had some serious medical issues and the deciding factor was the lack of quality medical care on the island.

The ARRL prides itself to the general public as being a viable emergency communications service. This is done via ARES. However, it is really up to the local radio amateurs to actually make ARES

work - or not. The national ARRL can't force it to work without the locals. It works in Boulder, Colorado --- It didn't work on Maui.

I know from personal experience that ARES can be effective locally. My background in ARES dates back almost 50 years to the founding in Boulder, Colorado of our local ARES group, BCARES (Boulder County Amateur Radio Emergency Services). BCARES became a real organization with lots of active members, required member approval from the Sheriff, actual meetings and training sessions, field exercises --- and most importantly -- We actually were called upon (via Sheriff's pager) to respond to real bonafied emergencies. When we were called, we came. We actually have an office of our own in the county emergency operations center (EOC) and a storage cache there for a lot of specialized communication equipment with 24/7 access. Plus a 2 meter repeater using the Sheriff's radio sites and their microwave network for a back-bone from remote receivers. In addition to the normal 2 meter FM voice gear and HF voice, BCARES also had capabilities for digital messaging via packet radio, more recently Win-Link, and (important for this newsletter) -- Amateur Television (ATV). We added ATV capability in 1991, including an ATV repeater at a Sheriff's radio site. Analog NTSC TV in the early days. We converted to hi-def. digital DATV in 2016. ATV was the most requested communication service BCARES provided.

BCARES' (and most ARES groups) biggest problem now is the aging population of radio amateurs. At BCARES meetings now, it is mostly a lot of gray (or bald) heads present. Many of us, myself included, are no longer physically able to do the out in the field emergency response work anymore. I actually recently felt I had to resign and turn in my Sheriff's ID badge because I was no longer able to perform the required duties. I told our E.C. that I would no longer respond to emergency calls, but I would continue to provide behind the scenes, technical assistance.

But even having a well run ARES group with lots of active volunteers will not always assure you of having them available when the BIG ONE hits. Some of your most valued members may in fact be victims themselves, not responders. I can speak from direct experience of being in that situation twice in the last ten years. First in 2013 when Colorado experienced major floods, BCARES called but I was unable to respond because I was dealing with my own flooded basement. That ended up being a \$50K loss. The second time it was far worse. In Dec. 2021, I had to emergency evacuate with my dog from a rapidly advancing prairie fire. That fire ended up destroying 1000+ houses, including ours and our neighboring daughter's.

So now back to Maui. Maui always had an ARES emergency coordinator (EC) and a VHF/UHF radio in the EOC. I know the EC would man by himself the radio position at times of emergencies. He also conducted a monthly net for reports of the tests of the emergency sirens. But to my knowledge, he really didn't have any real members, nor a real live organization. Nothing like Boulder's BCARES.

Even within the Maui ham club, there really wasn't a good emergency comms base. We really only had a small handful of really good operators. Now today, most of them are old and in poor health. We did have one ham who stood out way above everyone else. I knew even if no one else responded to the Lahaina fire, he would. It was **Tom, NH6Y**. Tom did provide assistance on his own for the Lahaina fire relief efforts. The following article was provided to us by Tom relating his experiences. Thank You Tom for your being there when needed ! Tom was really Mr. Maui Ham. He served as the

club president for many terms. He was also the driver behind getting the Maui Field Day operation going and successful. He had perhaps the best ham station on the island working most all bands HF to microwave. He was always elmering new hams. He worked with the Red Cross/Red Crescent in Bangladesh. There, they rebuilt a combination HF/VHF radio network that served remote coastal hurricane shelters. He hosted the HF DX beacon transmitter, KH6RS (<https://www.ncdxf.org/beacon/>). He and his wife, Leslie, hosted the MARC picnics many times. etc. --- There isn't enough praise I can give to Tom.

73 de Jim, KH6HTV



Relief Supply Distribution Center
Napilli Park, West Side, Maui



Tom, NH6Y's, mobile ham station
at Napilli Park

A Maui Ham's Experiences Relative to the Lahaina Fire **Tom Worthington, NH6Y, Kula, Maui, Hawaii**

I was called at 5 am on August 9th (*the fire occurred on August 8th*) by the local head of the Red Cross. She was unable to contact any of her volunteers on the Lahaina side of the island and was trying to get some information about how many were in the Red Cross shelter. I tried calling the only active ham on that side of the Island thru the linked repeater system, but he in fact had just managed to escape the flames. When I was finally able to make contact almost two weeks after the fire, he told me that he and his aunt, who owned a home in the fire area, had managed to get out just in time and spent that night in their car, the next two nights in a Red Cross shelter, then another two nights in a Wailuku hostel before flying back to Ohio. After the fire and before the road to Lahaina was opened a week later, local people started ferrying supplies by boat from Maalaea, Molokai and even O'ahu. This effort was independent from the Red Cross shelters and the FEMA response. The Red Cross had more than 2,000 people in congregate shelters but there were many residents on the west side who were without power, communications and access to food. Volunteers went to Costco and bought water, SPAM, diapers etc., loaded them into small boats and headed to Kahana Boat Ramp (not really a ramp, the supplies were hand carried thru the water to the shore) and set up impromptu distribution sites. A ham, who had not even turned his Baofeng HT on since moving to Maui a couple of years ago managed to find a repeater on Molokai that was still linked into the Maui repeater system. He asked for some help with

communications, and I got permission to get through the police roadblocks and went over to the West side on Wednesday, a week after the fires. They were using marine VHF radios to coordinate with the boats and the distribution sites. We deployed another ham to the harbor at Maalaea to try to get information on when boats were leaving and what they had on them. I installed a VHF marine radio at a distribution site that was starting up at Napili Park (note to self – never go to a disaster without the tools to install coax connectors and a couple of extra 12 V power supplies). I also helped with some power issues and getting their Starlink terminal operating. A couple of local companies installed a large solar microgrid but for several days were unable to get it working reliably. I went over early each morning and charged up their 3 kWh secondary backup battery and helped keep their growing array of computers and printers running. The road opened on Thursday and most of the supplies started to come by road. This local response is really quite amazing, it grew each day. More containers, more tents, more NGO's, organized activities for children, hot meals along with continuing distribution of food and donated supplies. There is even a refrigerated container full of beef, direct from Molokai and fresh produce from local farms. After two weeks most of the cell service is back and Spectrum and Hawaiian Telcom have restored service to all but the heart of the burned area that is still inaccessible. The people who run this site expect to be there for a long time.

I couldn't help but notice that Starlink has completely taken over emergency communications. When I first went out, there were a few terminals, a week later they were everywhere. At each parking lot there was a van with a Starlink on top offering free Wi-Fi and phone charging. It takes about 15 minutes to commission one and it can be done by anyone with some IT skills or a akamai teenager. The fact that you can turn on and off the service by the month makes it an attractive alternative for emergency communications.

73, Tom, NH6Y

Band-Pass Filter for 70cm, Narrow-Band, DATV

Jim, KH6HTV, Boulder, Colorado

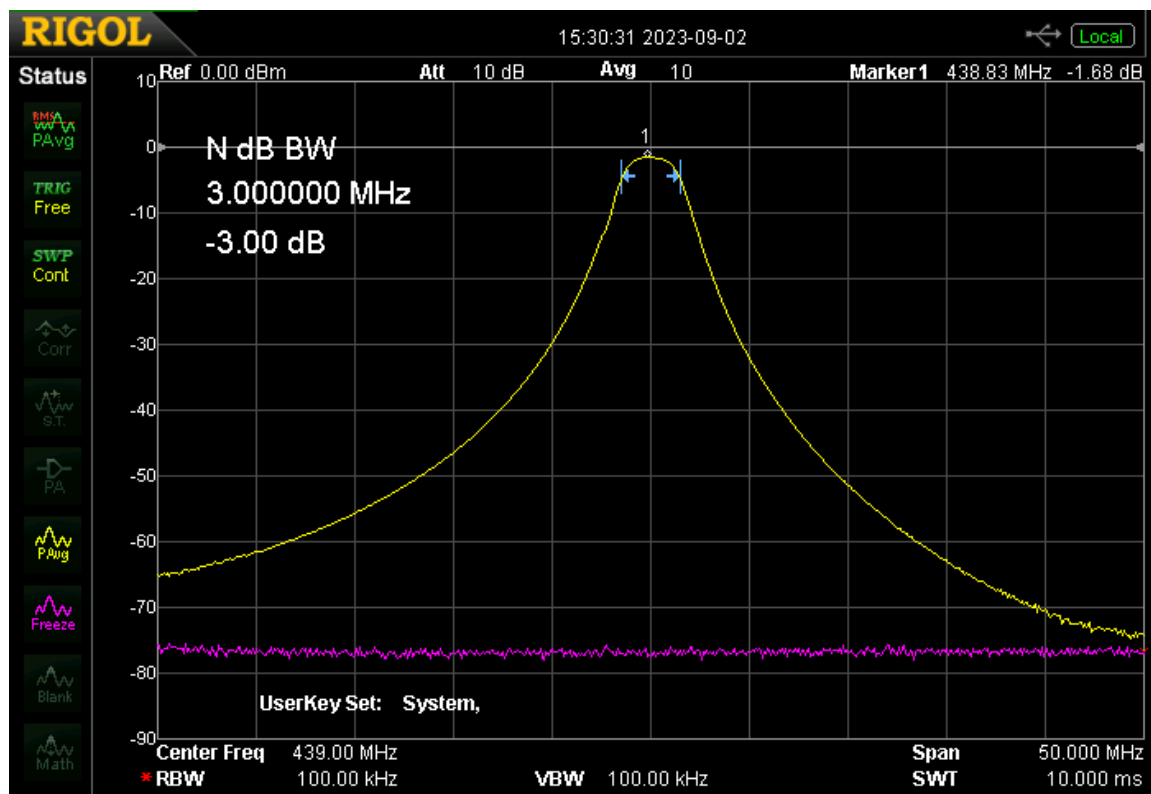
In a previous ATV newsletter (issue #91), John, K0ZAK, had called our attention to an interesting Band-Pass Filter he had found while surfing the internet. I had purchased one for evaluation just prior to the Boulder fire storm in December, 2021, and then lost it (along with everything else !) in the resulting fire. I had not gotten a chance to completely evaluate it and publish the results here in our newsletter. See also issue #96. Well, I had remembered the basics that the filter was a three pole, cavity filter with a -3dB band-width of the order of about 2.5 MHz. The specs. were typical Chinese, claiming a tunable bandwidth from 0.6 to 8 MHz -- FALSE ! But still, it was otherwise a nice filter.

So fast forward to summer, 2023. In the meantime, we have modified our Boulder, Colorado ATV repeater, W0BTV, to replace the 439.25 MHz analog NTSC receiver with a 439 MHz, 2 MHz band-width, DVB-T receiver. We were attempting to get away from some nasty RFI. So, we thought why not add this three pole Chinese filter in front of our new NB receiver. So we ordered one. Here now is the results of our evaluation.

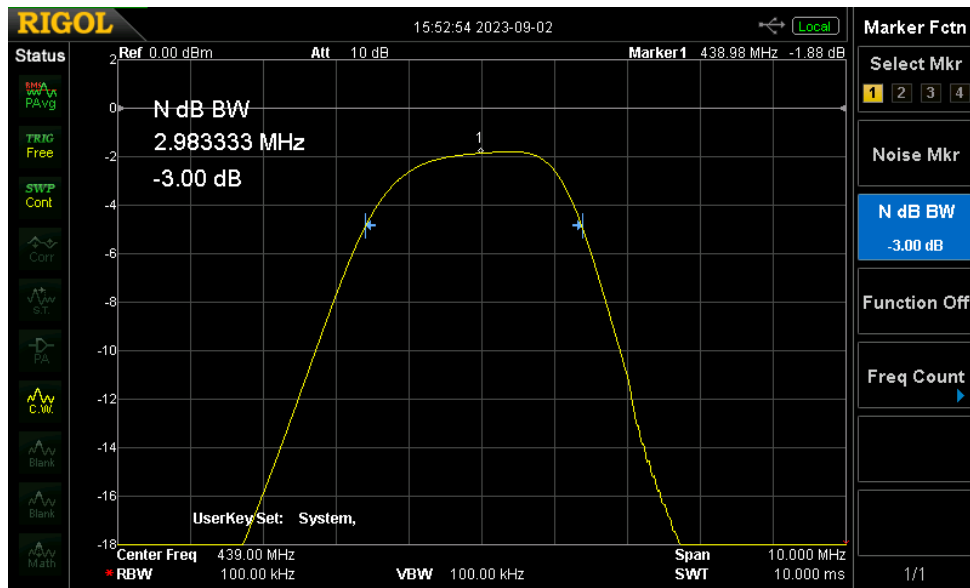
The filter is sold under the model number LBQ-450. No manufacturer's name on it. It does say made in Guangzhou, China. It is sold by several Chinese vendors. The prices range all over the place. I found the best deal was from a ham radio store in Hong Kong called **409shop** (www.409shop.com). I paid \$89 + \$20 shipping. Today (9/2), they are listing the price as \$99. It took right at a month for the mailman to deliver the filter. When you place your order with 409, they ask you to also specify the desired frequency. They pre-tune the filter for you before shipping.



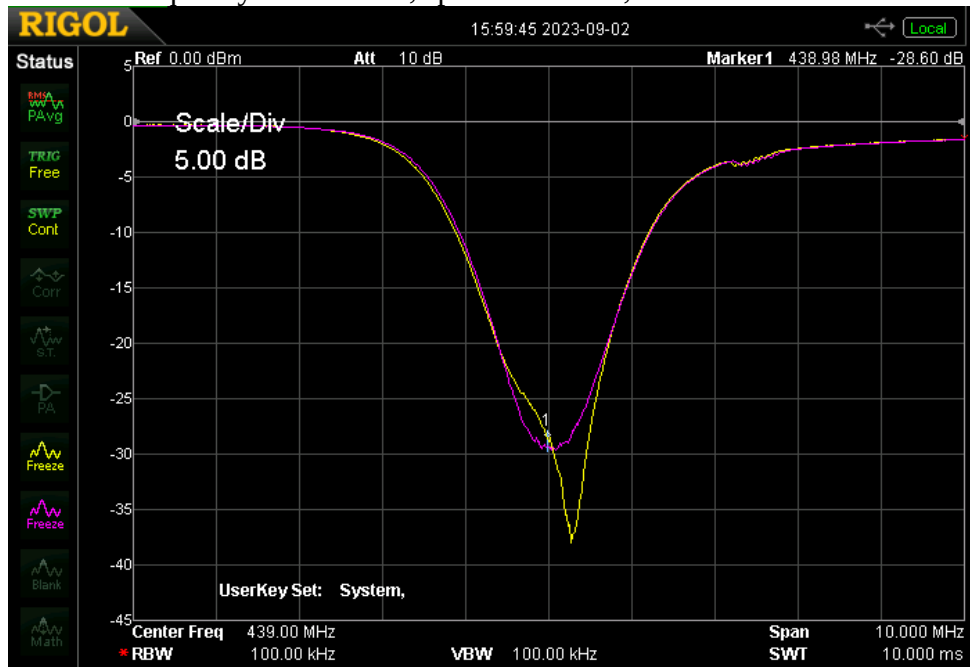
The specs. say it is tunable from 400 to 520 MHz. I was able to tune mine over the whole 70cm band from 420 to 450 MHz. Here are the results of my measurements of S21, S11 & S22 on the filter as it arrived, factory tuned to 439 MHz.



LBQ-450 BPF Filter: S21 Insertion Loss showing pass and stop band --- center frequency = 439 MHz, span = 50 MHz, 10dB/div & 5 MHz/div. Magenta trace is the resolution limit of the measurement, i.e. -75dB down.



LBQ-450 BPF Filter: S21 Insertion Loss Pass Band
center frequency = 439 MHz, span = 10 MHz, 2dB/div & 1 MHz/div.



LBQ-450 BPF Filter: Return Loss Pass Band S11 (yellow) & S22 (magenta)
center frequency = 439 MHz, span = 10 MHz, 5dB/div & 1 MHz/div.

The insertion loss of -1.9dB was a bit higher than the Chinese spec. of < 1.5dB. The -3dB BW was 3 MHz. This should work well with a 2 MHz NB DVB-T transmitter or receiver. The return loss was quite good showing well in excess of -20dB over much of the pass band. The skirts on the stop band looked nice. The filter should work well in a 70cm, in-band, repeater. The stop band rejections were seen to be about -30dB (± 5 MHz), -48dB (± 10 MHz), -56dB (± 15 MHz), >-60dB (± 20 MHz)



NEW COMBO DVB-T & DVB-S RECEIVER for Amateur 70cm & 33cm Bands

Jim, KH6HTV

We have recently discovered still another low cost, consumer grade, DVB-T receiver which will in fact easily tune both our 70 and 33 cm amateur radio bands. We DATV hams here in Boulder, Colorado for several years now have been using as our primary receivers some "combo" boxes. Combo meaning they were dual DVB-T for VHF/UHF terrestrial broadcast and DVB-S for L-band, IF use with LNBS and satellite dishes. We have written about them in previous issues of this newsletter. Over the years we have had to change suppliers as they sometimes changed the firmware to versions which would no longer tune the 70cm band, and also sometimes simply disappeared from the market. We have warned our readers in the past "**Buyer Beware**" -- not all of these consumer grade receivers would work on 70cm, even if their advertized specs. for frequency coverage implied they would. Best to only buy what other hams have found actually works.

So, this past spring, once again our favorite combo receiver was no longer available, so I searched the internet and found a new one listed which actually was available in stock in the USA for immediate delivery. So, I bought one for evaluation. I found that it worked not just on 70cm band, but also the 33cm band. So, I have since purchased ten more of them and am offering them for resale to other ATV hams. (already sold 4 of them !) To make it easy for newcomers, I am pre-programming the receiver to tune the standard, 6 MHz, ATV channels on both 70 and 33cm bands. Because the antenna

connector is "weird" and not commonly found in the USA, I am also including a couple of coaxial adapters to provide either F or SMA input.

So what is this new receiver? It is the **GT-Media, model V7-PRO**. Detailed specs. are available from GT-Media web site:

<https://gtmedia.en.made-in-china.com/product/zZHTdfsPnoka/China-Gtmedia-V7-PRO-DVB-S2X-T2-Hevc-Multi-Stream-Satellite-Receiver.html>

The manufacturer's specs. for DVB-T are 174 to 862 MHz. I have tested the receiver and found that it could actually be programmed for DVB-T as low as 100 MHz and up to 999 MHz. 100 MHz was the lower limit on my Hi-Des HV-320 modulator. It only works with 6, 7 or 8 MHz band-width signals. This receiver will not work for any repeaters using narrower band-widths. The antenna connector is the European cable TV connector called a PAL. I have tested the sensitivity of the receiver and actually found it to be more sensitive than the older combo receivers or the Hi-Des receivers. I measured it to be about -97dBm. Adding a low noise preamp improved this number by a couple of dB. Dual, independent A/V outputs are provided, HDMI and analog composite video. The receiver also has a nice digital video recorder (DVR) capability. It will record incoming video onto a USB memory stick (thumb drive). I have not tested the receiver for L-band, DVB-S, operation as I do not have any DVB-S equipment in my ham shack.

The instruction manual provided with the receiver "sucks". Typical Chinese manual, not worth the paper it is printed on. Therefore, because I am reselling pre-programmed receivers, I felt it was important to also provide the user with a good instruction manual. I have thus written up a new manual as my app. note, AN-66 and posted it on my web site, www.kh6htv.com

73 de Jim, KH6HTV, Boulder, Colorado

W0BTV - ATV Repeater Status Update:

The repeater has been repaired and is ready to be transported back to the repeater site. A new LBQ-450, narrow-band, band-pass filter has finally arrived from Hong Kong. It was retuned to 441 MHz and is now installed in the repeater. It has -1.7 dB insertion loss and 3 MHz BW. (*See the previous article in this newsletter for more details about this filter*) The last remaining item was for Don, NOYE, to squirt some magic RAID on the remaining buggy lines of firmware code for the Arduino micro-computer. He was successful on Wed. Sept. 6th. All functions now seem to be operating normally.

With the newly, reconfigured repeater again functional, we have updated all of the documentation. It is now available on line at www.kh6htv.com The new relevant app. notes are:

- AN-51d "W0BTV Boulder, Colorado - Digital Amateur Television Repeater"
(*basically operational details for users, including new rf coverage maps*)
- AN-52a "Boulder, Colorado ATV Repeater - History" (*updated now to 2023*)
- AN-53d "W0BTV Boulder, Colorado Digital ATV Repeater Technical Details"

Don, N0YE, has made an appointment with our contact at the repeater site for us to gain access next Wednesday (9/13) to re-install the repeater. Everyone is anxiously awaiting it's return to the air ! Using the BCARES 70cm only, in-band, portable repeater has been less than satisfactory in the interium due to the serious, broad-band, RFI on the input frequency.

HDMI QUAD VIEWERs

A very simple DATV repeater can be put together almost instantly. Especially if it is a cross-band repeater. The KH6HTV application notes, AN-23e & AN-48, discuss DATV repeaters. For a simple one, simply patch the HDMI output from your receiver into the HDMI input of your



transmitter. Add an on-site control operator to manually switch the transmitter on/off and your are on the air as a repeater.

If you want a more sophisticated DATV repeater, the complexity then starts to go up exponentially. Our Boulder, Colorado, W0BTV repeater is an example. It is documented in our app. notes, AN-51d & AN-53d. (*all app. notes available at www.kh6htv.com*) If you are going to add additional receivers, or a local camera, and/or also want to add a video IDer, then you will be needing a means of automatically switching your video sources. Perhaps the easist method is to use what used to be called a "Quad Processor", or today's



preferred internet search term "Quad Viewer". For digital video with HDMI, they used to be extremely expensive, costing well over \$1K. But today, their prices now are dirt cheap. A quick google search will come up with a whole lot of "hits". I even found one listed for as low as \$30 bucks (but with no audio).

However, for a repeater, you will need to have some means of automatically controlling the Quad Viewer. All of them come standard with an IR remote control. But if that is the only way to control the box, that means you then need to start hacking the remote to operate it automatically by your repeater's controller. What is more elegant is to find a Quad Viewer which provides a true computer control input port, such as USB or RS-232. Be careful however, when shopping, the photos of some boxes show a USB connection, but they most times are not actually for computer control, but simply for the factory to install the firmware, or they advertise as "fireware up-grade capability". Careful shopping, (i.e. google surfing), and you will find some boxes which in fact have an RS-232 interface. They typically will be a bit more expensive, but not a deal breaker and definitely easier than trying to

hack an IR remote control. A quick google search and I found right away three quad boxes with RS-232 or USB ranging in price from \$90 to \$190.

Way back in 2018, when we built our W0BTV repeater, the quad viewer with RS-232 we used then was made by the OREI company and was their model HD-401MR and cost us \$90. OREI still sells that model, but it no longer includes the RS-232 interface. Plus, then OREI did not supply as part of the documentation how to use the RS-232 port. We had to beg the factory to provide us the code and then Don, N0YE, had to figure out how to proceed from there. OREI does now sell a similar unit with RS-232 for \$200. It is their model UHD-401MV.

OK, there comes the rub --- documentation. When selecting a quad viewer with RS-232 (or USB) interface control capability, make sure first before ordering that they will also supply you with the appropriate documentation on how to use not just the front panel buttons, but also the RS-232 or USB commands.

The first box I found at www.parts-express only cost \$90, but no documentation included. The next box I found at www.gofranco.com (also Amazon) cost \$115. It had a micro USB port to be used for either software control or firmware update. Their web site does provide a downloadable USB driver for either Windows, Mac or Linux. The most expensive box I found was \$189 from Amazon was made by Yinker with RS-232. It did in fact have a downloadable manual which included the RS-232 commands. (*Disclaimer: ---- I have not purchased, nor evaluated any of these mentioned items. So I can't vouch for their performance, or lack thereof.*)

Another nice, but not mandatory feature for a quad viewer is what is the power source? Most A/V gear seems to all like to be powered by USB, 5 Vdc wall warts. For our repeaters and other DATV ham gear, we like to use 12Vdc. So finding a 12Vdc quad viewer is a plus.

73 de Jim Andrews, KH6HTV, Boulder, Colorado

Haswell **BIG** Antenna Open House

The Deep Space Exploration Society will hold its annual open house on September 16, 2023, at the Plishner Radio Telescope Site near Haswell, Colorado. Visitors will be able to hear their voices bounce off the moon using a 60-foot dish antenna operating on the 1296 MHz band. There will be tours of the new building, the communications trailer, and the HF/6-meter remote station in the underground bunker. There will also be a science, technology, engineering, mathematics (STEM) and amateur radio event with several optical telescopes on site for viewing the skies during the day and night. More information is available at



<http://dses.science/>

OE7forum: Darko, OE7DBH, writes --- "Forum operator has announced that OE7forum will be removed on January 1st, 2024, so all of my entries will no longer be accessible. If you think that one or the other information published there will be of interest to you in the future (e.g. BU500 UPconverter , 3LNC70, DVB-T topic and other my projects), please download it immediately and save it on your computer." www.oe7forum.at

WOBTV 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/>

WOBTV 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 is a free newsletter distributed electronically via e-mail to ATV hams. The distribution list has now grown to over 500+. 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.**



SLATS

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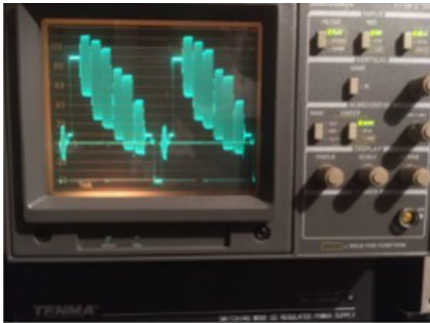
(web site: http://www.slatsatn.net/?page_id=713)
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Millen Antenna Bridge