Boulder Amateur Television Club
TV Repeater's REPEATER

April, 2020
**2ed edition**

BATVC web site: www.kh6htv.com

ATN web site:
www.amateurtelevisionnetwork.org

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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.
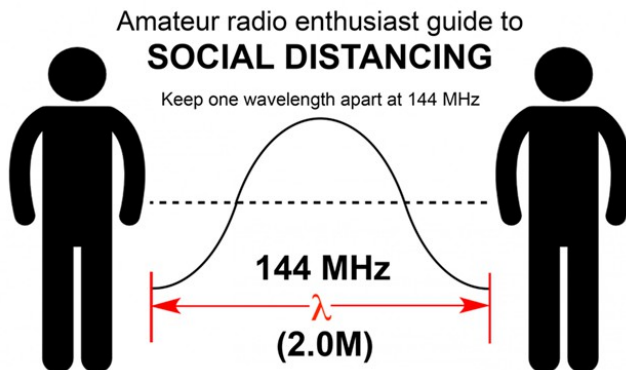
Tnx to Gary, KB9VGD, Burlington, Wisconsin, for this advice

REVISED ATV REPEATER DOCUMENTATION: Our Boulder, ATV Repeater, W0BTV, recently was upgraded and the procedure for using it modified.   All of the changes have been documented in two application notes.   AN-51a gives all of the operational details about the repeater, including coverage area maps. AN-53a gives all of the technical details on the new, modified repeater.   It should however, be noted that the documentation also included the addition of a new 5.9 GHz, FM-TV transmitter to the repeater. The installation of this new transmitter and antenna was first delayed by snow on the roof-top of the repeater site, and more recently by the world-wide pandemic. It is unknown now when it will eventually be installed and it's coverage area verified. AN-51a & AN-53a are available to be down-loaded as .pdf files from: https://kh6htv.com/application-notes/   ---- kh6htv

NEWS from Oceanside & San Diego, CA:

1-The Oceanside & San Diego DATV Repeater Group, for the past two weeks since the stay in place order by our CA Governor, Gavin Newsom our group have been conducting nets twice a day. 9 AM PDT and 5 PM PDT. We conduct group business, technical matters concerning ATV, training on our RMS- Remote Management System and health and welfare checks of our group members. We had planned mobile and portable operations this month, but cancelled till we can conduct the exercise as a team together for the newest members of our group.

2- Hawaiian Laulima - ATV Group {Affiliate} ---- Two(2) THOR, Model: H-THUNDER-4 Input HDMI Digital RF Encoder Modulators were sent to my sister's home on Oahu, to be installed at a future date. Thanks to donations from our members and those in Hawaii, we managed to acquire these units as we use the same units for our San Diego and Oceanside network. Other components are being sent to Hawaii {via Hawaiian Airlines} as our orders are filled.

    from Mario, KD6ILO, | San Diego |Oceanside DATV Group (3/29/20)

ATV in MICHIGAN: The K8DMR, 70 cm in-band analog repeater (439.25 in and 421.25 out) transmits from the Grand Rapids, Michigan, Red Cross 150' tower site. The repeater uses separate rib cages for Tx and Rx, auxiliary yagi beams (switchable remotely) to the north and SE, and a commercial Comark 100 watt sync tip class A amplifier. The repeater features extremely sensitive reception due to the cascaded filters on Tx (13 poles) and Rx (8-13 poles).

Ron, K8DMR also has a remote receive site, crossband repeater linking to his home QTH.   Remote site 70cm ATV Rx video is linked via a 23 cm FM ATV.   The remote receive site is at John, K8IHY's ridge site SW of Grand Rapids (400 ft above the home QTH). The remote DX site includes a NE facing 70 cm rib cage antenna and a 6 element yagi pointed at the Central and Southern Ohio ATV operators.   These ATVers can be found on an 75 meter, ATV net, on 3930 kHz every morning.

Ron laments that -- "For some time I have realized the 15 watts I have been putting out on FM ATV on 1252 MHz is not enough to reliability eliminate serious sparkles on the 23 cm link back to my home QTH from a remote 70 cm DX ATV site I put up at John, K8IHY's, ridge top site some distance away. I have hard-line fed Yagis pointed SSE towards Cincinnati/Dayton/KY and NNE towards me and the Grand Rapids area ATVers on John's 100' tower with separate sensitive GaAs-FET receivers.   Separate interdigital filters and channel 3-baseband converters along with a 4 channel VOR round out the DX site receiving line-up (I use one of the channels for an in-building camera that I can control with my 2 meter control link. . The site is 8 miles from me and some 400' above my QTH but another hill on the path about 2 miles from K8IHY presents an obstacle at least half the time to receiving a sparkle free signal.   I use 14 element loop Yagis at both ends and a DownEast amp with 100 mw drive putting out ~ 15 watts to the Tx hard-line

feed loop Yagi.   I think I am only 1-3 dB below the required FM path SNR at my QTH in Jenison MI where I am able to stream the 23 cm link signal from the DX site out on BATC or ZOOM. At the home QTH I receive on another 14 element loop Yagi with a roof mounted DownEast Rx preamp and semi-hard line to my downstairs QTH I use a Bensat receiver purchased from Tom, W6ORG, long ago along with a 2nd DownEast preamp just ahead of it. Recently I also added an in-line high-pass filter I found on the internet for $22 that has an 850 MHz cutoff (low loss, sealed for outdoor use). It works great so I am able to transmit on 439.25 up to the DX site and see my own video coming back with no desense even though the 70 cm and 23 cm antennas are on the same mast and rotor. The antennas are cross polarized of course with 70 cm horizontal and 23 cm vertical as per the Midwest standard for cross-band repeaters although here the antennas are all directional, not omni-directional."

73 de Ron, K8DMR, Ron_fredricks@att.net

DATV MICROWAVE NEWS de JAPAN

My name is JA0RUZ Fumio in Japan. I saw CQ-DATV82. The configuration of the 5.8 GHz Transverter is similar to our 5.7GHz, ISDB-T full HD, DATV transmitter! .

Also, in Japan, we have been experimenting little by little since Full HD DATV in the 10 GHz and 24 GHz bands was licensed last year. Authorities have finally issued a license for the 10GHz band and we have built a transceiver (with a Full HD recording and playback device). The 10G / 24G transmission / reception video is also shown on YouTube. (https://www.youtube.com/watch?v=HhPqEWiqUaI)

There are many articles on Full HD DATV microwave on the following West Niigata, JH0YQP website (https://jh0yqp.org/kosin.htm) If you search with JA0RUZ, JA0RGP, JA3CVF etc., you will get hits.

See you again, de JA0RUZ, Fumio

Editor's Note's: Fumio's YouTube video documents successful DATV transmissions on 5/12/2019, on 5, 10 & 24 GHz over an 85 km path. They were between Fumio and JA0RGP and JR0YGW. Fumio also included in his e-mail a block diagram of his new, 10 GHz transmitter along with photos. Quite impressive !
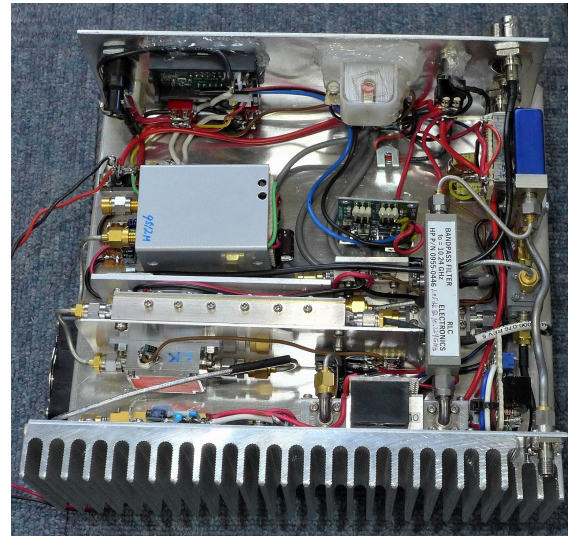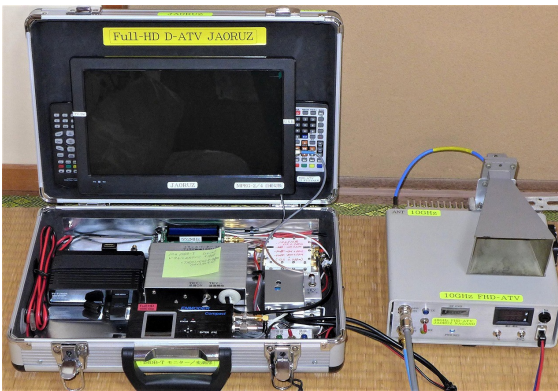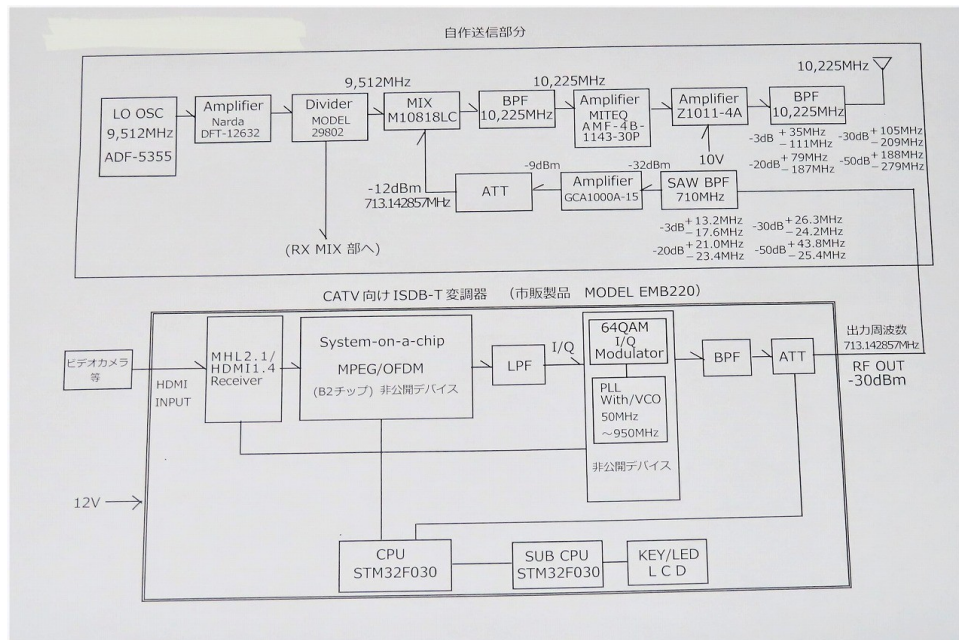
HI-DES HV-110 RECEIVER STATUS:

Dave, AH2AR, in Dayton, Ohio had been concerned about not finding the HV-110 receiver listed on Hi-Des's E-Bay store web site. So he sent an inquiry to Hi-Des.   He got this encouraging reply back.

"HV-110 is still an active product. It's almost the most hot-sale product for Hides. The ebay site will be updated soon."

So, bottom line, if you want an HV-110, and can't find it or other products you are interested in on their ebay site, then send an email directly to Hi-Des.

KD6ILO Mobile TV Transmitter Unit [70cm Analog] 8-Input - XBand | Inputs 5cm, 23cm, IPTV & local cam | Rf Out: 10 watts

NTSC, VUSB-TV in San Diego

I'd thought I'd share this simple, but really reliable Mobile/Portable base unit using a Holland 550H television modulator. Operational on HAM TV, Channels 57 = 421.25 MHz, 58 = 427.25 MHz, 59 = 433.25 MHz and 60 = 439.25 MHz. I'm using CH58 for this unit along with Jim's {KH6HTV} 70-7B, rf power amplifier, putting out 10 watts to a U200 70cm/23cm vertical dual-band base antenna at 20' above my roof line. I have members in my group that also use analog on {5cm | 23cm |70cm} in Vista, CA just 10 miles SE line-of-sight to my QTH. They do relay their rf signal to my system and then to the Oceanside DVB repeater than to the City of San Diego DVB repeater. It can handle 8 inputs, but I'm just using 4. 5cm, 23cm, IPTV Ethernet input, 70cm DVB-T Receiver. I use this unit for the Oceana CERT Team for close image communications support installed in my Jeep when needed. All powered off 13.8 VDC. There is a small media player on input 5 for ID, recorded programs etc.

73 Mario, KD6ILO

Editor's Note: Mario is doing exactly what I have been preaching to the ATV community for the past 20-25 years.   **Don't use AM-TV !**   For analog ATV, follow the TV broadcasters lead, plus what the FCC mandates — use VUSB-TV in a 6 MHz channel.   Don't pollute with double side-band AM.   I even finally was able to get an article published in QST back in 2013 preaching this sermon.   The article is still relevant, except, I no longer suggest using CATV 64-QAM DTV, nor the Drake modulator mentioned in the article. DVB-T works far better.   I am making a separate attachment to this mailing of a .pdf copy of my 2013 QST article for further reading.

There are also much smaller CATV modulators than the 19" rack, Holland unit Mario is using. I have used for many years the Mini-Mod series as shown in the article. They are still available from ATV Research in Nebraska. (www.atvresearch.com) All channel, synthesized units are still available from Pico-Macom, Drake, Holland & Blonder-Tongue. They sell for typically $170 to $275. My personal favorite was the Pico-Macom MPCMA for $210. Single channel units can be purchased for about $110 - $125.

Before I got into DATV, I sold a complete 70 cm, 10 watt, VUSB-TV transmitter. It was my model 70-10AD.   It used a Pico-Macom MPCMA modulator and my 70-9B, rf linear amplifier.   These CATV modulators only cover broadcast and CATV channels 2-135 (54 - 860 MHz).   They can also be used on higher ham bands, such as the 23cm (1240-1300MHz) band, but need to have a mixer up-converter.   I offered for several years an up-converter for the 23 cm band for use with these modulators. It was my model 23-6, but I finally pulled it from my catalog due to no sales or interest.

SLOW-SCAN TV on HF

The exact opposite of our Live, fast-scan TV can be found on HF. Tune your SSB rig to 14.230 MHz and just leave it there. You eventually will hear some funny warbling tones. That is a Slow Scan TV (SSTV) picture being painted out. Whereas our FSTV is live, moving pictures, SSTV is the transmission of a single frame of video, i.e. a slide show, one slide at a time.

In years past, it took dedicated equipment to decode or transmit SSTV. No longer. Your PC will do it for you very easily. The "de-facto" program most SSTV hams are using is **MMSSTV**. The MM stands for Makoto Mori, JE1HHT, who wrote the program. You can download MMSSTV free from the MM HAMSOFT web site: (https://hamsoft.ca/pages/mmsstv.php). If all you want to do is decode & watch, then simply connected the audio out from your HF rig and plug it into your PC's sound card. To also be able to transmit, you use the same in/out connections between your PC and your rig as you use for all of the other digital modes, such as PSK-31, FT-8, RTTY, etc. I found the setup of MMSSTV for my Icom IC-7300 to be very easy. MM HAMSOFT also has available a SSTV Primer to help you get started.

SSTV is basically an FSK audio tone transmitted over your SSB rig. With a 1200 Hz tone being sync, a 1500 Hz tone being black and a 2300 Hz tone being white. Over the years, there have been several different variations of SSTV developed, but MMSSTV supports them all and does it automatically for you. The time to transmit an image varies with the particular mode selected, ranging from perhaps 10-15 seconds to a minute or two. The above photo is an example of a 20 meter, SSTV QSO I had with K4XTT, in Virginia. It actually includes down in the lower left corner a copy of my previous picture to him, which he then pasted onto the photo he wanted to send me along with my call

sign, signal report and his call sign.   MMSSTV also can work in the background on your PC, simply listening and decoding pictures as they come in and then storing them in a file. You can then easily go back by clicking on "History" and review all of the day's SSTV activity on 20 meters.
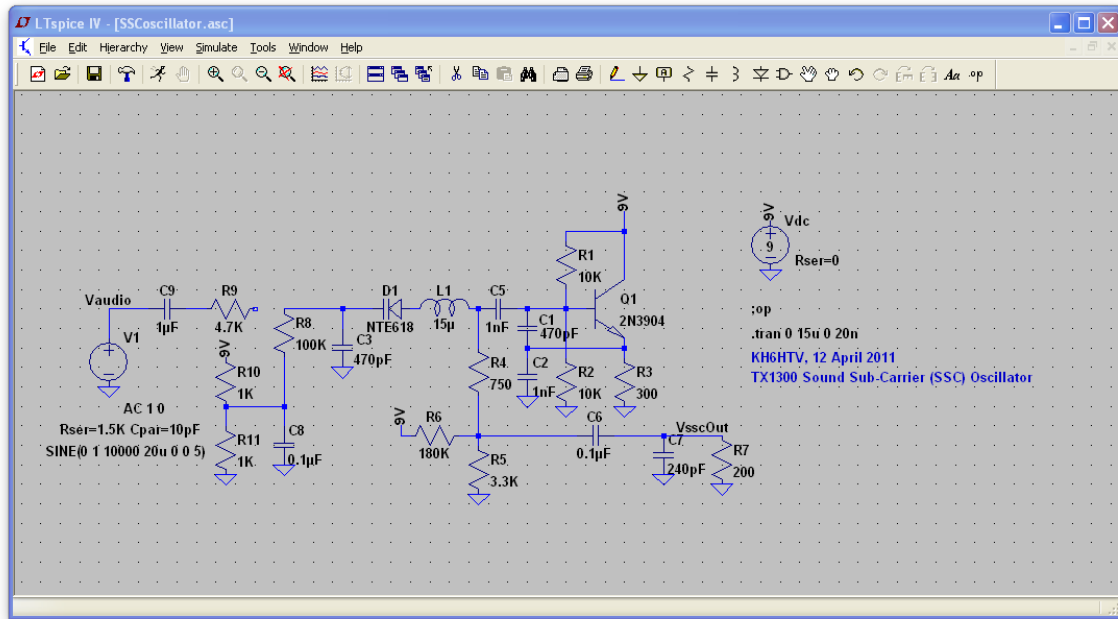
LT-SPICE example: a 4.5 MHz, Sound-Sub Carrier (SSC), varactor tuned oscillator

LT-SPICE: SPICE is a very powerful, analog electronic circuit simulator.   It was originally developed in the early 70s at the University of California - Berkeley. Over the years, it has been marketed in various versions by commercial software companies.   In the mid 80s, my company, Picosecond Pulse Labs, bought our first P-SPICE program to run on our first IBM PC. We paid several thousand dollars for it at the time.   Big money then, even bigger today with inflation.   But it was well worth it. It allowed us to design and debug all sorts of electronic circuits. Wikipedia has a good summary of the history of SPICE. In the 80s, with my first P-SPICE program, I had to design the circuit by writing a text file, with each line of code describing a single component and the nodes it was connected to.   Today, more modern versions of SPICE give you a graphical interface to design with your mouse an actual schematic diagram, such as shown in the above figure.

Today, there are still software companies selling their versions of SPICE for big bucks. -- But you really do not need to pay a single dime !   Several years ago, the semiconductor company, Linear Technology, made available **FREE** ! !, their version of SPICE.   It is called *LT-SPICE*.   Note: Linear Technology is now part of Analog Devices, so you will find it now on the AD web site. Go to:
https://www.analog.com/en/design-center/design-tools-and-calculators/ltspice-simulator.html#
From there you can download the FREE program to either your Windows or Mac computer.   Also download their Getting Started Guide.

So what can you do with LT-SPICE.   Well for starters, you are given a schematic
drawing worksheet (see the above figure).   You select various components from the top
task bar, and then click and paste them onto your worksheet. You then drag connecting
wires between your components.   Each component is automatically assigned a unique
designator, such as R1, Q3, etc. You then select each component and give it the desired
numerical value, such as 1K, 10uF, 1nH, 2N3904, etc.   You do usually need to add some
input excitation source such as a signal generator.   You then determine what kind of
analysis you want to do. It can either be a frequency response plot, like using a network
analyzer, -- or -- a transient response in the time domain.   With the frequency response,
a small signal analysis is performed using a sine wave of varying frequency as excitation.
For the transient response, it can simply be just turning on the DC power -- or -- the
power can already be applied and you apply some other type of waveform as an input.
You have a selection of various waveforms, such as a pulse, step, pulsed RF, or you can
create your own waveform.
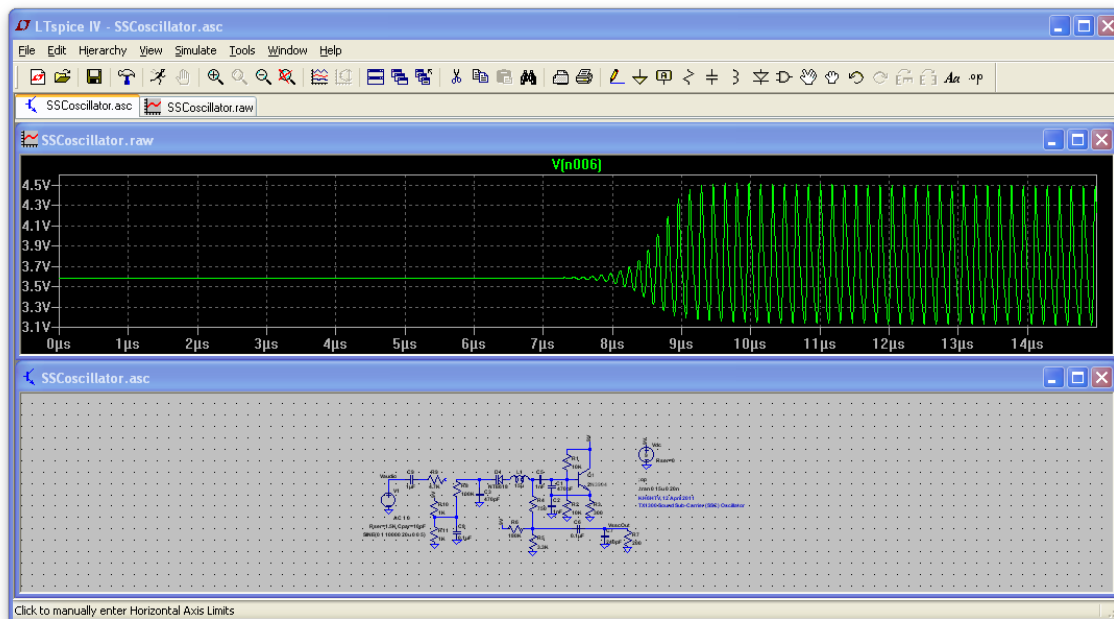
LT-SPICE example: Transient DC power turn-on analysis of the 4.5 MHz SSC
oscillator. Voltage probe on the emitter of Q1.

After creating your schematic, etc. -- the last thing to do is execute the analysis of your
new circuit. This is done simply by clicking on the little figure of a Runner on the top
task bar. After running the analysis, the program then reduces the size of your schematic
and displays a graph (either with a frequency or time axis, depending upon the type of
computation).   Now you then proceed to look at your circuit's responses using an
oscilloscope probe.   You will see on your schematic a small red symbol of either an
o'scope's voltage probe, or a clamp-on amp meter probe. You move this around with your
mouse.   If you rest the voltage probe on a wire or connecting node and click on it, the
program will then display the voltage at that point.   If you move your cursor to a
particular component, it will become a clamp-on amp meter probe, and when you click

on the component, it will then display the current flowing through that device.   The above example shows the DC power turn-on transient analysis of the SSC oscillator.
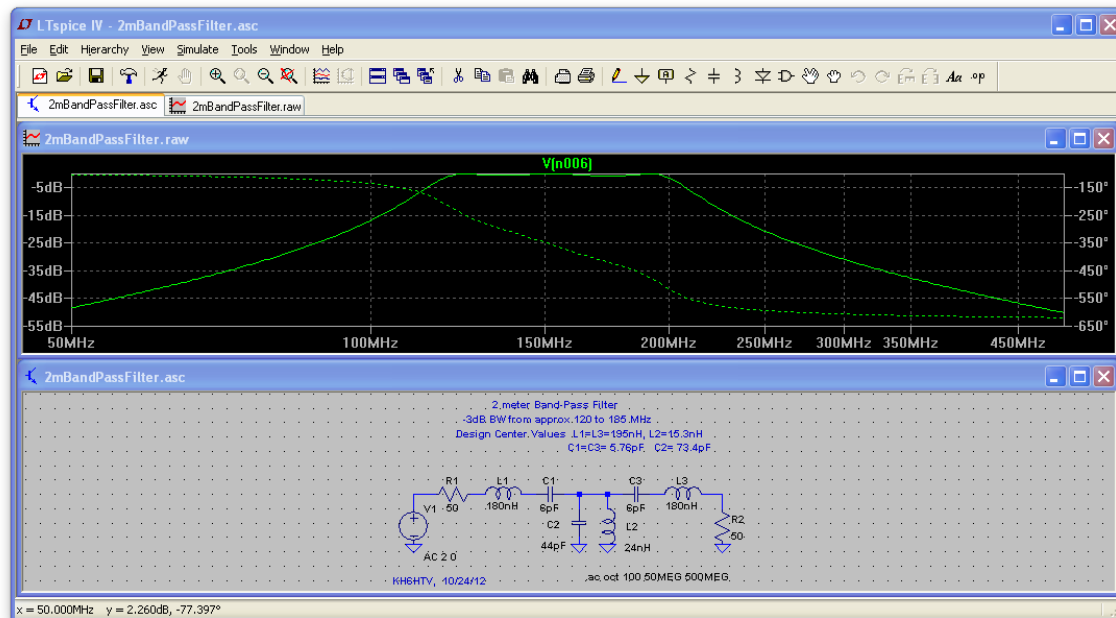
LT-SPICE example: The design of a 2 meter, Band-Pass Filter

The last example is showing the network analysis in the frequency domain of the design of a 2 meter, Band-Pass Filter.   The swept frequency plot is of the transmission, insertion loss, S21. It shows both the S21 magnitude and also the phase.

LT-SPICE -- try it, you will fall in love with it and say "I can't live without it !"

FREE SCHEMATIC SOFTWARE: Several years ago, Tommy Thompson, W0IVJ, introduced me to Express PCB as a source for getting printed circuit boards at a reasonable cost.   Their web site is: www.expresspcb.com   I have used them ever since for all of my KH6HTV Video products.   But what I want to write about is their free PCB CAD software.   You do not have to be a customer of PCB-Express to download and use their **FREE** software.   It consists of two programs, one for drawing schematic diagrams and the other for laying out printed circuit boards.   Whenever you have seem me include in this newsletter a schematic diagram, or block diagram of a circuit, I have used the Express-PCB program to draw it.   So instead of scratching your schematic on the back of an envelope, upgrade to the digital era and use Express-PCB. It is very easy to use.   I have also found their PC board layout program to be a useful 2-D, CAD program for laying out mechanical drawings, and also drilling templates for small size objects. This is in addition to laying out pc boards.   I have found that the drawings print out on both my Brother laser printer and my Epson ink jet printer in exactly 1:1 ratio. i.e. if I draw an item on the PCB program to be exactly 1.00" in length, it then also prints to be exactly 1.00" on the paper printout coming from my printer.

Jim, KH6HTV

ATVQ Status ? -- What Happened ?

For many years, ATVers enjoyed reading the publication Amateur Television Quarterly, or ATVQ.   The very first issue came out in the summer of 1988. It was first published by Bill Brown, WB8ELK & Henry Ruh, KB9FO. They said they wanted to follow the example set then by the BATC CQ-TV magazine, but oriented to USA ATVers.   Their first advertiser was Tom, W6ORG, & Mary Ann, WB6YSS, O-Hara, with their ATV company, P.C. Electronics. Note: Tom has since retired, but his web site, www.hamtv.com, is still up and running.

The magazine underwent changes over the years in ownership and evolved from a cheap newsprint mag. to a very slick, color publication.   In recent years, the main editor was Mike Collis, WA6SVT, (of ATN fame). with assistance from Bill, WB8ELK, Art, WA8RMC, (ATCO guru), Rod, WB9KMO & Don, KE6BXT.   Mike did a great job with it, but it consumed an awful lot of his "spare ?" time. More recently, Mike passed the baton on to Rod, WB9KMO, in Mesa, Arizona.

Rod soon fell behind in producing ATVQ due to health issues.   Then the reality stuck home to Rod of publishing a slick, colorful magazine to a limited number of subscribers in today's rising postal costs and competition from the free stuff on the internet.   He was losing a lot of $$ with each issue.   Thus ATVQ died a slow, quiet death. The ATVQ web site: www.atvquarterly.com now no longer exists and if you try to go to it, you will automatically be directed to the BATC site batc.org.uk

From Rod's, WB9KMO, www.qrz.com posting, he says " Rod owns and published Amateur Television Quarterly (ATVQ) magazine, which is now evolving into a website under the new name of Amateur Television Quest (still ATVQ). The new website is called TheNewATVQ.com. Check it out...   TheNewATVQ.com promotes international Video on Amateur Radio (VOAR), including analog and digital television, ATV repeaters, ATV linking, mesh networking (mesh video), drone video and other video creation, editing and transmission. It's a work in progress that strives to be the best resource in the world for Video on Amateur Radio information and equipment."

To date, however, checking out Rod's new ATVQ web site, one will not yet find much there.   So, it obviously still is ... *a work in progress......*

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.**
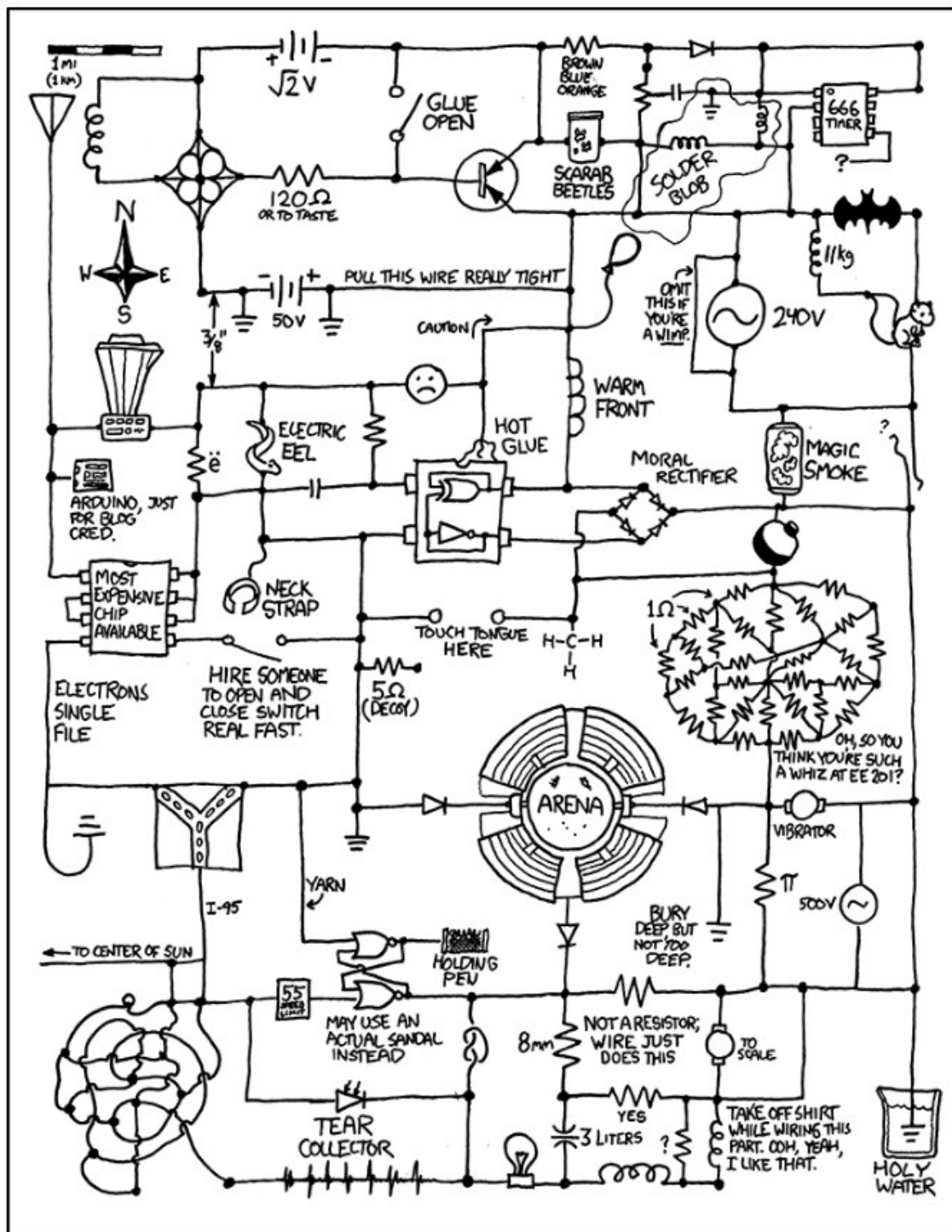
Doshia, KB0NAS, & George's, N0RUX -- latest circuit design for ATV -- tnx Doshia
(Are you really going to build it Doshia ?)