



# CHEESE BITS

**W3CCX**  
CLUB MEMORIAL CALL

ARRL  
Affiliated  
Club



Volume LI

January 2010

Number 1

## PREZ SEZ:

Here we are at the beginning of a new year and a new decade. I hope that your holiday celebrations were blessed and joyous. Hopefully you all received those new ham radio trinkets you were asking for and your are now ready for the rapidly approaching contest season, starting with the **JANUARY VHF SWEEPSTAKES**.

I know there are a lot of unfinished projects in most shacks and that you have the time to get those 2304 transverter conversions and 903 power amps on the air to add lots of new contacts and grids.

Phil K3TUF has been doing his duties as program chairperson to line a series of very interesting programs for the first nine months. To start the year off we have Bob McGwier N4HY promising us a very informative session on the evolution of the **SOFTWARE DEFINED RADIO**. The meeting is the third Thursday of the month; January 21 – just 2 days prior to the big January contest. It will be a welcome break from the late nights spent getting those last minute repairs and improvements in place at your stations and rover vehicles. I know there are a few “loose ends” in my station that still need attention as of this writing.

Speaking of “loose ends” I recently made two errors in the Prez Sez column when referring to the PACKRATS REPEATER. The Repeater frequency is 224.58 MHz and when the PL is turned on it is 136 Hz. The repeater has been linked to the K3ESJ 442.900 (PL 123 Hz) repeater in Hilltown. Just remember when entering the repeater system to pause

for the link to complete before starting to speak or your first word will be chopped off.

The PACKRATS have a few decisions to make this month. Those decisions revolve around the conference and HAMARAMA. E-Bay and the internet in general have greatly altered the nature of HAMARAMA and we are seeking ways to improve the attendance and the resulting income. We also need to enhance the MID-ATLANTIC VHF, UHF, MICROWAVE CONFERENCE to improve attendance there too; while keeping it affordable for both the local hams and those who travel a distance. If you have failed to attend the conferences in the past I know you have missed a big part of the educational aspects of this hobby. This is where you get a lot of “How too” and “See it’s easy” encouragement from those who have “been there and done that”. Plus this is a time when you get a chance to put a face to many of those you have spoken to on the air.

I know Lenny W2BVH, while always looking for new material for Cheese Bits, will also be looking for member support for the **TRENTON COMPUTER FEST**. This year it will also host the **ARRL NEW JERSEY STATE CONVENTION**. Lenny will also have more information and will be recruiting for the two day event at the next few meetings. The TCF is April 24-25, 2010.

The weekend before the Trenton event is the New England Weak Signal groups annual Conference and tailgate hamfest in Enfield Ct. I have attended several in recent years and always enjoyed the programs, and the camaraderie. I always seem to

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**PACKRAT 222 MHz REPEATER - W3CCX/R**

222.98/224.58 MHz (PL 136.5) Hilltown, PA

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**PACKRAT BEACONS - W3CCX/B**

FM29jw Philadelphia, PA  
50.080 144.284 222.064 432.286 903.072 1296.245 MHz  
2304.043 3456.207 5763.196 10,368.062 MHz (as of 1/08)

**MONDAY NIGHT NETS**

TIME	FREQUENCY	NET CONTROL
7:30 PM	50.145 MHz	K3EOD FM29II
8:00 PM	144.150 MHz	N3ITT FN20kl
8:30 PM	222.125 MHz	K3TUF FN10we
8:30 PM	224.58R MHz	W3GXB FN20jm
9:00 PM	432.110 MHz	WA3EHD FN20kd
9:30 PM	1296.100 MHz	K3TUF FN10we
10:00 PM	903.125 MHz	W2SJ FM29LW

Visit the Mt Airy VHF Radio Club at: [www.packratvhf.com](http://www.packratvhf.com) or  
[www.w3ccx.com](http://www.w3ccx.com)

accumulate a few more bits for use in planned developments for my station. These trinkets “fill a few boxes” and once in a while they even get put to use as planned. But, if you don't have all these projects to select from, your station can not grow. As hams, we become complacent and willing to be content with the off the shelf boxes and the limited performance they offer over a true weak signal station. Using off the shelf hardware you also miss out on the experience and satisfaction you can get from a do it yourself project. Once the project is completed get on the air and make some contacts before the contest and keep active through out the year.

Well, time is getting short and we need to get back to the improvements needed before this years' contest. Wishing you all great success in 2010.

Listen for the Weak Ones  
Doc W3GAD



**Editors Column**

**Our next meeting** will be at our usual meeting site, the Ben Wilson Senior Center, 580 Delmont Avenue, Warminster PA., on January 10, 2010. The meeting starts at 7:30 pm with a pre-meeting dinner around 6:00 pm for anyone who cares to attend. Dinner is at Giuseppe's Pizza 1523 West Street Road, Warminster, PA 18974 (at the shopping center diagonally across from our meeting site). The Packrats usually are in the back dining room.

This month we feature the much anticipated Software Defined Radio (SDR) review presentation given by Bob, N4HY. Come listen to the absolute latest in what is happening in the world of SDR.

My **SINCERE THANKS** to many Packrats who took the time and effort to come up with articles and pictures for Cheese Bits over the last month. We have very interesting material to present over the next month or so from 'Rats for 'Rats. **More material is vital; see what YOU can write!**

Wishing you health, happiness and prosperity and multipliers in the New Year!

73, Lenny W2BVH

# Building Simple and Cost Effective Microwave Transverters

By Randy Bynum NR6CA

*Randy, NR6CA prepared this very informative article on making microwave transverters from material available at hamfests and from the internet. While it was in preparation we received the sad news of the clubs loss of founding member Ernie Kenas W3KKN. Here are a couple of excerpts of correspondence between Randy and your editor:*

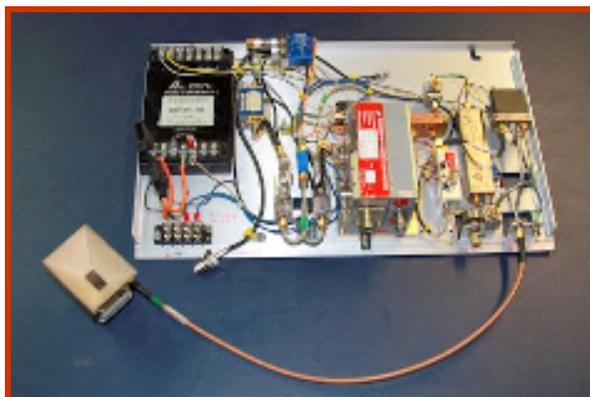
I really appreciate the effort, Randy. This will be a very popular article, I can tell. I'm sad that Ernie will not be reading it. We all ought to try and get it done now (whatever it is) while we have the time and enthusiasm. I was out on my 45 deg (very scary) roof this afternoon decked out in safety equipment, permanently installing 432 & 222 yagis that Bill K3EGE gave me. Only half done so far. Done with the kind help and assistance and expertise of Warren WB2ONA. That's what Packrats are about more than anything else: people helping people, just out of kindness. --Lenny

I couldn't agree more on your other comments. That's why I decided to build the loaner transverters, help out folks who can't afford one, don't want to spend the money, or don't have, well you get the point. They were an awful lot of work (especially the 6 band) but worthwhile. --Randy

Having had the experience of building a number of UHF through microwave transverters over the last year or so it seemed appropriate that I share some of my "tricks" for acquiring parts and putting the equipment together.

First let me say that no two of the transverters that I have provided to the Pack Rats are alike. Rick Rosen summed it up nicely in an e-mail to me saying they were built with "just parts." This is quite

accurate and an appropriate description since there is not much common to any of them other than the local oscillators used in most of them.



A 10 GHz Transverter and horn antenna made from "just parts" by Randy NR6CA. Photo courtesy Mike WB2RVX

Over the past couple of years I have acquired any number of different mixers, amplifiers, power splitters, etc. Most on eBay but I have found several other sources as well.

I also tend to look for a seller that is offering a larger quantity of a particular part as bidding is generally lighter. For example, I might buy twenty 6 GHz RF mixers from a seller and be the only bidder. It seems that few people will bid on large quantities of something since they only need one. I might use 3 of the 20 and sell 10 and make my money back and still have the rest of the parts to use for another project.

However, most of my purchases are one or two at a time. If you keep track of what is being offered for a long enough period of time, and make wise bidding decisions then all of a sudden you have sufficient parts to build a project and make it work. That being said, it is safe to say that parts acquisition is the first priority. Design can follow once you know what you have to work with.

Now going this route results in transverters (or many other types of

projects) that may not be the neatest looking, or the smallest package, but they work and often require much less test equipment access.

Of course there is no replacing a printed hairpin filter nicely laid out on the PC board. No tuning required! But then if you have all the parts, including a tunable SMA filter, it should be simple to find someone who can tune it for you before you mount it in your project transverter. If everything else is "just parts" there is not that much additional testing to do.

So, once I got to a point where I had a good supply of "parts", I'd start going through them and sorting them into frequency ranges.

For example, I have a box for small amplifiers up to 1 GHz, another for 1-2 GHz, and so on. I also test every part I have so that I know they work, and I record the gain and power output levels at different frequencies in their range.

I have purchased "mystery parts" that appeared to be RF amps and wound up with high gain amplifiers good for 1296 and 2304 that would output 75 milliwatts. I keep the complete listing of the part numbers, serial numbers, test frequencies, gain, power levels and DC test voltage and current in a handy notebook.

The testing also allows me to determine the actual useful frequency ranges the parts are good for. For example, I recently bought some amplifiers that were specified for operation from approximately 6.8 GHz to 7.2 GHz. Guess what? They work great at 5760 and even down at 3456 plus, they even have useable gain at 10 GHz.

So don't look only for parts that are labeled for the frequency range you need. Keep in mind that a manufacturer takes a customer's order for a specific part and then makes every attempt to use a stock design that meets the customer specification.

Another example; I bought an

amplifier specified for 6-8 GHz and it works not only for 5760 but also out beyond 14 GHz, making it a nice building block for a 12 GHz (½ frequency for 24 GHz) local oscillator chain.

Nearly all of the parts will have female SMA connectors so keep your eye out for short SMA male to male cables. Again, think quantity to get a better price per piece. You can always sell the extra or split the cost between 2 or more people who also are working on collecting parts for a project.

I have seen a 6" SMA cable sell for nearly \$10.00 including shipping. I have also purchased 50 at a time and got them for around \$.50 each. Try to stick with Teflon cables as they don't deteriorate much compared to other dielectrics.

Of course having the test equipment to verify operation yourself is a real plus, but don't let the lack of it slow you down. There are



A 2304 Transverter (left) and 1296 Transverter (right) made from "just parts". Photo courtesy of Mike, KB3GJT

always people around that can assist with some testing. There are other less accurate methods of testing besides signal generators and spectrum analyzers but I'll not delve into them in this article and save that for another article. However, these two pieces of test equipment, in my opinion, are the most useful. That makes going to Microwave Update, the Mid-Atlantic VHF Conference or another similar conference an even better bargain as this equipment is usually there complete with people trained to use it.

There are just a few basic parts you need to build a transverter that will get you on the air on a new band at a (relatively) low cost.

It is likely you will spend the most money to purchase the local oscillator, especially if it is a phase locked oscillator. There is always the "brick" oscillator that has been a common LO source. But they generally run from a negative supply voltage (see the last paragraph regarding DC-DC converters) and use expensive crystals.

There are also bricks with an external RF input allowing less expensive crystals to be used in an external oscillator that is easy to build since it is low VHF. For SSB and digital modes you want a rock solid local oscillator.

The small PLL VCO boards I used in the 6 band transverter are about \$57.00 each delivered. They are not the very best PLL units available but I have not found a better value anywhere. So the tradeoff with them is higher phase noise, a bit less frequency accuracy but at a much lower cost.

Although I did not pursue it, the onboard 10 MHz reference could be disabled and an external 10 MHz high accuracy signal could be substituted. That should correct the frequency errors in the PLL. Every one of them I have used has been on average, 7 KHz low. A couple of them were worse and some were better.

My counters are both locked to a Rubidium standard and both read within half a hertz of each other so I am confident of my measurements.

To find the PLL VCO boards on eBay do a search on "VCO PLL" to see if any of the 3 different user ID's have any listed. They may or may not be the same person but they are all in Israel.

I have done business with all 3 and have had no trouble with them. Out of about 15 of the boards I had one fail to lock after I had used it for a while. In fact, that problem was the final part for the 6 band transverter I

had to wait for. The seller replaced it right away and shipped a new one before the bad one got back to him, so I was happy. You can trust both the seller and the PLL.

So what else is really needed to build a transverter for a new band using "just parts?" First you need the local oscillator, possibly a small signal amplifier for it, a 1:2 power splitter for the LO frequency, two RF mixers (RX & TX) a filter to clean up the signal out of the TX mixer, an LNA, at least one stage of TX RF gain and maybe even 2 or 3 if you want reasonable RF output power.

You will also need an good quality SMA relay for the antenna switching and an OK RF relay for the IF frequency which is generally 2 meters. However, you could also use 432 or some other IF frequency. A simple attenuator for the IF transmit radio output is easy to build and not at all critical.

You can't drive one of the SMA mixers with 10 watts of 2 meter RF! Most of them will want to see something on the order of 5-10 milliwatts. You will want an IF amplifier to follow the RX mixer in order to get the RX signal level up to a reasonable level for the IF radio. Some interconnecting cables, connectors, etc, some wire and tools and you can get to work.

All of the above parts can generally be found for around \$150, or less, if you look carefully and buy selectively. Remember, buying selectively includes buying in quantity to share the cost with others as well as looking carefully for bargains.

At times it's even worth taking a risk that a part will work (for example) on 3456 even though it is specified for 6 GHz. If it does not work at 3456 then you can put it aside and have your first part for a 5760 project. So get together with a couple people and start buying your components. You just might be able to assemble a microwave transverter for \$100. It is not out of the question and going this way eliminates the need for PC boards. The trade off is generally that you need a larger box compared to compact PC boards.

..Microwave Transverters continued

The last thing you might look for are small DC-DC converters. These little devices can be really useful. Sure you can build a small voltage multiplier circuit to generate 24 VDC from the 12 VDC power source (or purchase one from DEMI or others) but you just might find a DC-DC converter that is a 12 VDC to 12 VDC that can be wired in series with your battery voltage to generate 24 VDC for your surplus relays.

Again, in quantity, I have purchased them for a buck. You can use all kinds of combinations of DC-DC converters to make various voltages at very low cost, unless you need a lot of current. Then they can get pricey.

**Good luck** with your construction projects. Go ahead and add additional microwave bands to your station. **Your personal contest score, and that of the Club, will surely prosper.**

73, Randy, NR6CA

## A Great Holiday Gift

by Rick K1DS

I had 2 more PTO (paid-time off) days to use before the year was up, so I scrambled and found 2 days in the week before Xmas that were available. I avoided the malls and traffic and planned to relax and spend the few days at home, cleaning out the shack (it's been 10 years). Much to my surprise, I was reunited with things that I could use, that I hadn't seen in quite a while—yes, a holiday gift to myself. As a side benefit, the XYL can now occasionally pass by the shack and workshop door without turning aside. I'll try to keep it this way

for at least a few months....and perhaps I should take a picture and post it so that I can remember what the workbench surface really looks like!

Hobby brass, copper and aluminum are now neatly stacked in a recycled holiday popcorn tin. U-bolts of all dimensions are in a #10 can. Wires of every gauge and color are stuffed neatly in a box. The tools that fell off the rack and were unreachable behind a shelf were restored to their rightful places. Three hundred 8" ty-wraps were freed from their hiding places,

Six incomplete projects were lined up for reconsideration. I'm certain the projects were incomplete for a reason—like maybe I don't really need them?

Five ½ pound spools of different solder gauges were returned to the soldering station. I filled my big 60 gallon trash barrel with detritus and also filled another box of "stuff" for the Mario Raffles. Yes, I remember one man's trash is another man's treasure.



....And he did take a picture; in time for this month's issue

# SOME MEMBER PIX



**Marc, N2UO** reports that his **20 ft. 1296 EME** dish is almost complete. This photo taken on December 31 2009 shows him mounting the homebrew feed. All that remains is to attach the wire mesh to the ribs. Note the near-shirtsleeve weather down in Summerfield (Greensboro area) NC. He, Patty and baby Eric are doing well and he sends regards to fellow Packrats

**Steve W1SMS** sent this picture of his visit to **ARRLHQ** at the end of December.

"I drove up with Lou W1QJ who was delivering a **modified SB220** (to 50MHz) amplifier for use at the League's club station: W1HQ. After it was hooked up and operational, he and Lou & I were treated to lunch by W1RFI and KX9X."

Pictured from left to right are Lou W1QJ, Sean KX9X, Ed W1RFI, Steve W1SMS and Bob WB1GCM (kneeling).

Look for an article by Steve in an upcoming issue of Cheese Bits.



# SOME MEMBER PIX

I thought you'd might appreciate a photo of the equipment that many club members lent me or sold me for this month's contest.

The rack is courtesy of Chuck WA2ONK. The XYL really likes the feature that I can shut the door on the front when not in use. I like the feature that the door comes off when it is in use.

From bottom to top:

Astron 35 amp power and Paul Wade PowerPole buss bar is on loan from Phil K3TUF. Teletec DXP-V220 really is happy to have enough power. Next up: The 1296 MHz transverter from the White Elephant Auction. A couple of years ago I added a toggle switch to manually key the transverter for transmit because my alligator clip hack was getting old. A DEMI 65 watt power amp, is peeking out from the 1296 transverter. Next the 903 MHz transverter, also obtained at the White Elephant Auction; and a Marlin Jones 24 VDC 12.5 amp switching power supply to power a 150 watt power amp removed from cellular phone service. Next is the DEMI TIB interface and the DEMI 222 MHz transverter which I bought from Chuck WA2ONK last year. On the 51 cent plywood shelf from Home Depot is the Teletec DXP-V220 150

watt power amp for 222 MHz that I also bought from Chuck WA2ONK and another Marlin Jones 24 VDC switching power supply (6.5 amp) that works the relays on the 1296 MHz transverter. Sitting on top of the rack on the left is an ICOM IC-7000 that Paul WA3QPX lent me. The ICOM covers 432 MHz and is the 10 meter IF rig for the 222 MHz DEMI transverter. On the right is a Yaesu FT290R. It is the IF rig for the 903 and 1296 transverters. Switching is done the manual way by plugging in the BNC connector for the microwave transverter in use. One of my post-contest projects is to set up the transverters for remote switching and automatic keying for transmitting in preparation for the



permanent tower this Spring. Six meters and 2 meters are covered by my ICOM IC-746 and 222 MHz FM is now accomplished using an ADI-247 that I purchased from Joe K1JT a few months ago. I hear the W3CCX beacon on all bands and am measuring RF output as well.

So I'm pretty much all set for the contest. --Michael, KB1JEY

# Ernie Kenas W3KKN, SK

The Packrats lost founding member Ernest L. Kenas this past December 11. His liveliness, spirit and humor will be missed by all Packrats. Herewith are some remembrances and tributes from his fellow 'Rats:



My dad W3EFH asks about Ernie - dad enjoyed sitting next to Ernie and talking to him at the meetings when dad was able to attend.

I remember working Ernie back in the late 50's and the 60's in the Jan Contest with me using a Gonset Communicator II Crystal controlled rig on AM. He and one of our then local Havertown emergency radio net guys Hal W3HFY (SK) always battled it out for top spot in EPA and Ernie would always beat Hal every January. My condolences to his family. Bill - K3EGE

I fondly remember coming to meetings in the early 80's with Ernie, Joe Kilgore - W2EIF, and Jack Power - W2AXU, who would be sitting in the second row at the front left side. When introductions started, one of them would announce that their row represented abt 200 years of ham radio. It was always funny.

After many on and off the air conversations with Ernie, I will surely miss W3 King King Nellie. Mike WB2RVX

Ernie was in my very first VHF Contest Log in 1959 and I have fond memories of talking with him on the air over the years. It was not until I joined the PACKRATS in 1990 that I finally met Ernie face to face.

I can truly say that I always enjoyed Ernie's company. I will miss his always joyful attitude and his comic phonetics.

73 good friend.  
Doc Whitticar W3GAD

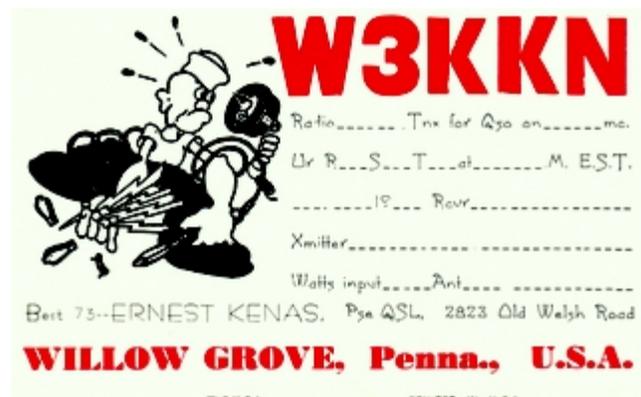
I first met Ernie in 1967 when I joined the Pack Rats. I got to know him pretty well and can honestly say he was a real asset to the Club.

He will be missed. Please pass my condolences on to his family.

Randy Bynum, NR6CA

I am very sorry to hear of Ernie's death. He was a faithful friend, a wonderful amateur, and a stalwart Packrat. I first knew him in 1956, when I was a beginning high school student. Ernie was a helpful mentor even then, helping my brother and me to improve our station performance on 2 meters.

- Joe Taylor



# Ernie Kenas

Well with Ernie as others have mentioned his station and his advice was always available.

The thing I will remember most was his voice on 20m when we were in Colombia for the HK1TL expedition. Either he or his wife Bert W3TNP were always available while we were down there.

There aren't many like him around anymore. El K3JJZ

The date was 5/16/68 and Stan's daughter Betsy was born in Abington Hospital. Stan ran across Ernie in the hospital and told him he had a new baby daughter Ernie related that his mother had just passed away. Then Ernie said "One goes out and another one comes in". Typical Ernie. Stan K3IPM via K3JJZ

I certainly didn't know Ernie as long as the rest of you but he would make the new guy feel just as welcome at his home as the rest. It didn't take long to find that he was a prince among men.

Rich, KB3NRL

W3 King King Nellie was always there to check in, give you a contest QSO, or go out of his way to greet you on the radio or at a meeting. He welcomed me as a friend from the first time we met, in the early 90's when I got involved with the Rats.

And I always got a little smile thinking of the Bert and Ernie thing, even after she passed. Now they are together again.

There are not many of the great ones around anymore. Ernie was one of the last. I'll miss him. God bless! 73 Joe, AA3GN

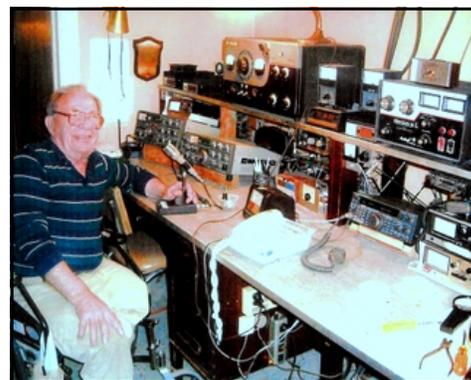
In the 70s when I worked for GE repairing home appliances, I would often stop at the Kenas home to visit, have lunch, fix radios or whatever. Ernie would hear me on the 220 repeater as I drove between service calls and would invite me to stop by. One hot summer day Bert called me on the repeater saying that their air conditioner broke, would I look at it. Sure I would. I replaced the `run` capacitor and the house started cooling down. Anyway, I replaced the cap with one of many used capacitors that I carried on the truck and I insisted the service call was a `free-bee`. Bert and Ernie thanked me profusely then and every time I visited afterwards, and they would always tell the story to others. Bert and Ernie were such great people. We will all miss Ernie - as we missed Bert.

And yes, they are together now. Dave, W3KM

This is very sad news. May he rest in peace. And may we all remember the great things he has done for us as Packrats. He is now in Packrats heaven in the cosmos with other members of our club, may we all be lucky enough to live and teach others as Ernie has. ... \_.\_

My thoughts go out to his family and close friends.  
Ed WA3BZT

Ernie You are in all our thoughts...The Packrats



## Ham Radio URL of the Month

In just a few days we'll be marking the 64th anniversary of the first EME radio transmission. On January 10, 1946 the US Army successfully bounced a radio signal off the moon and received the return echoes at the "Project Diana" site at Camp Evans, Wall Twp NJ. It was accomplished with a 3KW radar set on 2.5 meters and used a "bedspring array" with an estimated gain of 24 dB.

This same site is now used for the annual OMARC Hamfest (see a future issue of Cheese Bits for date). As of a year ago, the site also held the equipment used for the first 1296 MHz EME contact: a huge klystron with hand wound magnet. I believe it's still there out in the open for you to see. Check out [http://en.wikipedia.org/wiki/Project\\_Diana](http://en.wikipedia.org/wiki/Project_Diana) for additional details

ENJOY!

— Lenny W2BVH

## Events

For inclusion, please direct event notices to the editor.

**Harrisburg RAC Winterfest Hamfest**— Jan 16, 2010. See [http://hrac.tripod.com/Winterfest\\_2010\\_flyer1.pdf](http://hrac.tripod.com/Winterfest_2010_flyer1.pdf) for details

**ARRL VHF Sweepstakes Contest** - Jan 23-25, 2010. Details to follow at <http://www.arrl.org/contests/rules/2010/jan-vhf-ss.html>, when available. See email reflector message from Bill K3EGE January Contest Chairman for additional information

**JCDXA Hamfest** - April 10 and Sept. 11, 2010. Details to follow. See <http://nadxa.org> when available.

**Eastern VHF/UHF Conference** - Sponsored by the Eastern VHF/UHF Society and the North East Weak Signal Group. Tentative date April 16-18 2010. Details to follow.

**Trenton Computer Festival / NJ State ARRL Convention**— April 24-25, 2010. A combined event. Computer and ham radio presentations, hamfest and computerfest. Details to follow. Don't miss this one!

**Dayton Hamvention Convention / Hamfest** - May 14-16, 2010 One of the largest ham events in the US. See <http://www.hamvention.org/> for details.

**ARRL June VHF QSO Party Contest** - Jun 13-14, 2020 Details to follow at <http://www.arrl.org/contests/rules/2010/june-vhf.html>, when available

**CQ WW VHF Contest**— 3rd full weekend in July. Details to follow.

... Events continued

**ARRL UHF Contest** - Aug 1-2, 2010. Details to follow

**ARRL 10 GHz and Up Contest**—Aug 15-16, 2010. Details to follow

**ARRL September VHF QSO Party Contest** - Sept 12-13, 2010. Details to follow

**ARRL 10 GHz and Up Contest**— Sept 19-20, 2010. Details to follow

**ARRL International EME Competition Contest**— Oct 10-11, 2010. Details to follow.

**ARRL International EME Competition Contest**— Nov 7-8, 2010. Details to follow.

**VHF Spring & Fall Sprints Contest** - Dates and rules to be announced

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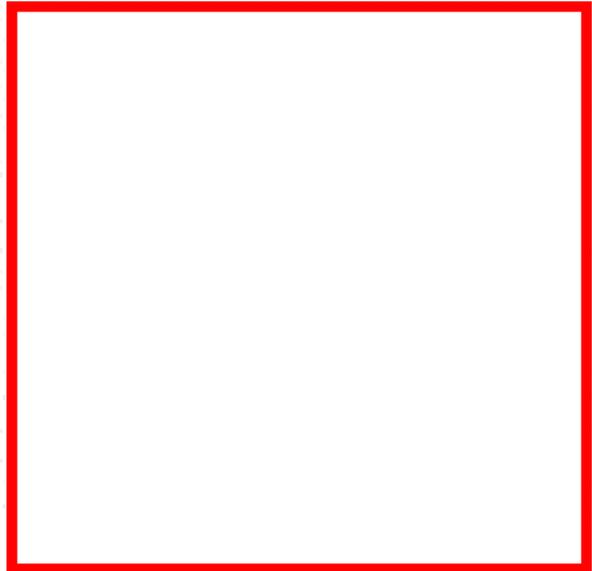
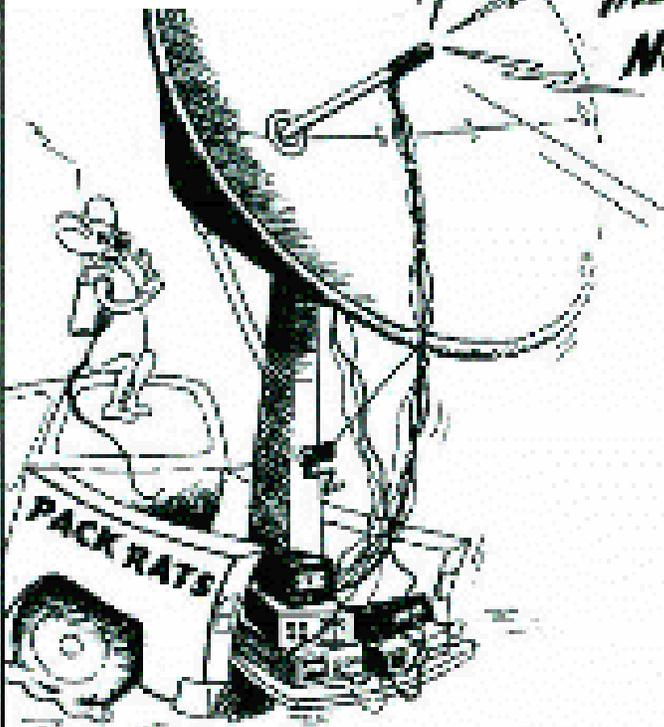
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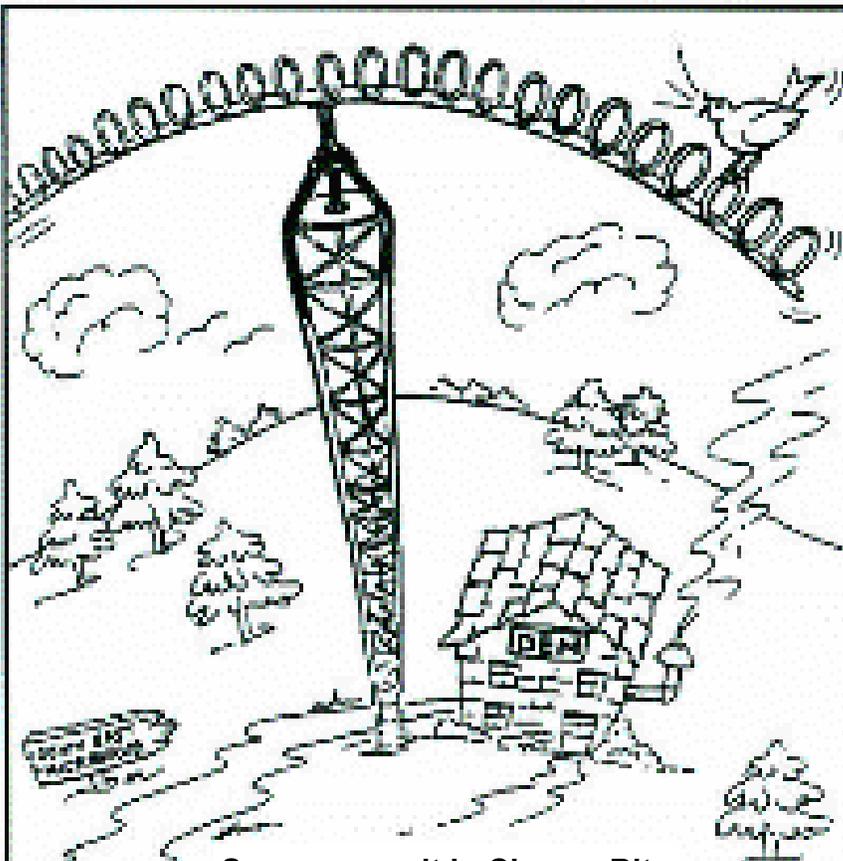
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