

CHEESE BITS



W3CCX

CLUB MEMORIAL CALL



ARRL
Affiliated
Club

SCANNED TO PDF BY BERT, K3HIV, 2013

VOLUME XXXIX

September 1997

Number 9

THE PREZ SEZ

The summer is just about over and prime antenna weather will be here real soon. No, I don't mean mid December when the wind is cold, the RTV doesn't cure and the tape doesn't stretch or stick right. I mean right about now. When everything is just perfect for doing that much needed antenna and tower work. One of the biggest problems, however, is that you may not know that the stuff isn't working until 2 or 3 weeks (and I am being generous here) before the January VHF contest (January 17-19, 1998) and by then we are into mid December or later and well you know the rest. So how about a novel approach to the problem, lets get on the air now and see how the 'stuff' plays! The ARRL September VHF QSO Party is the weekend of September 13-15. This would be a real nice time to check things out under real operating conditions. I know that the January Contest Chairman, AA2UK, is promoting this idea and I could not agree more. Bill is also real serious about organizing help for those that need it to repair, install or test equipment prior to the contest. Contact him, we can't help if we don't know! Don't wait for the January Contest questionnaire. Do it now! Check in to the Monday Night nets and find out what you can hear and what you can't hear. Listen for the Beacons. All the noise figure meters, spectrum analyzers and sundry test equipment in the world won't find a tiny drop of water in the end of your coax. A little operating just might. A few minutes of operating and comparing signals with your buddy down the street can give you a real quick assessment of your station status. You have a lot of time and money in all that 'stuff', so get off the computer, toss the boob tube in the lake and get on the air!

The Mid Atlantic VHF Conference and Hamarama weekend will be here before you know it. Brian, N3EXA, is the chairman this year and will be really looking for support to run the hamfest on Sunday October 5. John, KB3XG, has the conference preparations well under way. There is even a list of probable speakers that promise excellent technical content for a wide variety of backgrounds. Most of the work for the conference goes on well in advance of the event, but I am sure John would not turn down your offer to run a few errands and take care of some of the small details as we get closer to October the 4th. The Hamarama weekend is very important to the club and we need as much help as possible. Turnout for these events has been excellent the last few years. Keep up the good work.

73, Ron, WA3AXV

MEETINGS

Third Thursday each month at 8:00 PM
Southampton Free Library
947 E. Street Road
Southampton, PA 18966

Pack Rats' **CHEESE BITS** is a monthly publication of the
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 Southampton, PA

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DEADLINE FOR ARTICLES AND SWAP SHOP IS THE MONTHLY MEETING DATE. NON-COMMERCIAL SWAP SHOP ITEMS-FREE OF CHARGE.

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MONDAY NIGHT NETS

<u>TIME</u>	<u>FREQ.</u>	<u>NET CONTROL</u>
7:30 PM	50.150 MHz	K3EOD
8:00 PM	144.150 MHz	N3ITT
8:30 PM	222.125 MHz	W2SJ/N3EXA
8:30 PM	224.58R MHz	W3GXB
9:00 PM	432.110 MHz	WA3AXV
9:30 PM	1296.100 MHz	WA3NUF
10:00 PM	903.100 MHz	N3AOG


COMMITTEE CHAIRMEN

LADIES' NIGHT: N3AOG 215-443-9965
 JUNE CONTEST: N3ITT 610-847-5490
 HAMARAMA: N3EXA 215-257-6303
 VHF CONFERENCE: KB3XG 610-584-2489

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432.298 MHz 903.071 MHz
 1296.262 MHz 2304.034 MHz


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By: John Sorter, KB3XG, VHF Conference Chairman

NEW, Bigger Conference LOCATION

Saturday, October 4th, 1997

9:00 AM to 9:00 PM

Benjamin H. Wilson Senior Center

580 Delmont Avenue

Warminster, PA

Exit 27 PA Turnpike 611 North

5 miles to Route 132 East

3rd Traffic Light turn right, Center on Right

Admission: \$18.00 - Lunch and Dinner at extra cost - Banquet Prizes

Hamarama Ticket with Conference admission

VHF CONFERENCE SPEAKERS

(PRELIMINARY LINE UP)

K1WHS will either talk about aurora detection using a home-brew magnetometer and/or talk about a new 2304 looper design that W3HQT has nicknamed "The Blow Torch".

N4EYZ is a professional tower climber and will talk about tower safety and how to mount large dishes.

N4UK will talk about meteor scatter operation.

W1RFI is from the league and will talk about RFI safety standards.

KB3XG / WB3JYO will do a talk on the 24 GHz No-tune Transverter boards

Dinner Speaker: Paul Shuch, N6TX - Will speak on a new receiver design to receive deep space radio signals.

SWAP SHOP:

(send all ads to the editor)

WANTED: Looking for a Looper for 3 Ghz and a 1296 Amp, 15 watts or better. I can be reached by e-mail at K3EOD@JUNO.COM or by phone at 215-742-3312.

For Sale: Kenwood TS520 in good cond. 80-10 meters @ 100w. Comes with hand mike, owners manual, copy of service manual, optional 500 Hz cw filter. \$250. Call Chuck, WA2ONK at 609-586-7180 or email c310508@aol.com

FOR SALE: Kenwood TS940S Transceiver with antenna tuner and service manual. Like new condition. Asking \$1175. Contact Jack, W2AXU at 609-882-8811.

Free: Astronomy Magazine and Sky and Telescope. Almost complete Astronomy. To anyone. Pick-up. Contact Jack, W2AXU at 609-882-8811.

For Sale Cheap: PC Modems - get on the Packrat Reflector. 2400 baud - free, 14.4 K external, \$15.00, 14.4 K internal - \$15.00. Monochrome Hercules monitor - free. Dual mode monitor, CGA and monochrome - free. Contact: Harry, W3IIT, at 610-584-4846 or e-mail at hbrown@voicenet.com.

CHEESEBITS SUBSCRIPTIONS

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- CALENDAR EVENTS SEPTEMBER 1997**
- 1 **Labor Day**
- 2 Birthday on Hiram Percy Maxim, W1AW on Sept. 2, 1869.
- 11 Mt. Airy VHF Radio Club **Board of Directors meeting** will be held at the QTH of Bob, W2SJ. Call 609-665-8488 for directions. Directors and all interested parties are welcome.
- 13-15 **September VHF QSO Party.** Starts 1800 UTC Sat. and continues thru 0300 UTC Mon. See Aug. QST, page 101 for rules. Get on and at least give out a few points. Participation Pins available for everyone making 25 or more contacts.
- 14 **Delaware Valley Radio Assn. Hamfest** will be held at Tall Cedars of Lebanon picnic grove on Sawmill Rd. in Hamilton Township NJ. TI on 146.67-. Check: <http://www.slac.com/w2zq> for details.
- 18 **First indoor meeting** of the fall season of the Mt. Airy VHF Radio Club will be held at the Southampton Free Library on Street Road in Southampton, Pa. Dennis Silage, K3DS, will talk on the biological effects of RF. All members and interested VHFers are invited to meet and share with us.
- 20 **48th Annual SJRA Hamfest** at the Mt. Holly Armory, Exit 40A off I-295N, E on Rte 38 in Mt Holly NJ. VE Sessions. Talk-in on 144.69/145.29.
- 20-21 **ARRL 10 GHz and UP Cumulative Contest.** See June QST, page 104 for the rules.
- 25 **LEAP INTO THE MICROWAVES with the Packrats!** 903 and above. Every 4th Thursday of the month operate from 8 to 10 PM local time on any band 903 MHz and above. For coordination on those difficult long haul contacts 144.260 MHz is the suggested liaison frequency. So here's your chance to fix what broke in the contest and work all those stations you missed.
- 27 **Delaware-Lehigh ARC Hamfest** at the Schnecksville Fire Co. 4 miles N on Rte 22 on Rte 309 N of Allentown, PA. TI on 146.7.
- Oct.
- 4 The **21th Annual Mid-Atlantic VHF Conference** will be held at the Benjamin H. Wilson Senior Center, 580 Delmont Avenue, Warminster, PA. See map and further information elsewhere in this issue.
- 5 **Hamarama 97** will be held at the Bucks County Drive-In on Rte. 611, In Warrington, Pa.

I PROPOSE THAT 144.250 BECOME THE OFFICIAL NORTH AMERICA METEOR SHOWER CALLING FREQUENCY

By: Ken, N4UK KRAMIREZ@intermedia.com

This frequency will be used as such only during the meteor showers where enough activity warrants such a calling frequency. I.E. during the Perseids, Leonids, Geminids, etc. 144.200 will still be used for random Ms calling during other periods, etc. I know this may not be a great choice for everyone BUT if we don't pick a frequency then the discussion will die just like it did last year and not a doggone thing will get done and we'll have to endure more periods of bickering over where to put a calling frequency for the showers. I also propose that 144.250 start being used as the meteor shower calling frequency during the possible Leonids early storm period this November. I'm taking the BULL by the horns since nobody else seems to want to do it.

Please pass this info on to all active Ms ops., the VHF newsletters, CQ VHF, CQ, QST, N6CL, W3EP, etc., etc., etc. 144.250 will be used ONLY for random calling during the showers. Net operators using 144.250 PLEASE do not panic! A shower falling on your net day is not an everyday occurrence. If this is a bad frequency for anyone please try to accommodate!!! Let's all cooperate on this issue!

REALITY CHECK:

If you have read the last two 24 GHz articles, you probably realize that Paul, WB3JYO and I had quite a difficult time jury rigging a narrowband system together using some surplus and some "borrowed" parts and components. Paul works at a company that has done some 28 GHz receiver proto-types on a very thin Duroid type PC board material. We briefly experimented with tuning the 28 GHz receiver down to 24.2 GHz. The conversion gain at 24 GHz after tuning was much less than the conversion gain at 28 GHz before tuning. We suspected that the main contributor to the high loss was the mixer. Paul and I agreed that if we were to build a serious narrowband rig, we would have to pursue our own design on a single board from scratch.

SYSTEM DESIGN:

Paul and I originally discussed a modular hybrid design, ie: The System would include both coaxial and waveguide components. The original design included a single doubler, single mixer, an iris type waveguide filter, and a 90 deg hybrid at the RF port of the mixer. (See Single Mixer Xverter diagram.) We did this to minimize the number of waveguide to microstrip transitions. This design still requires 3 transitions per system and did not seem to be the best approach.

The mm-Tech 28 GHz receiver did not have a bandpass filter in the lineup. This would probably work fine for receive, but a filter on the transmit side is required to avoid losing 3 dBm of power to the unwanted mixer spur. The bandpass filter was a stumbling block for a short period of time until Paul came up with a printed edge coupled bandpass filter design. This made a single PC board design realizable. (See No-Tune Xverter diagram) The single board advantages are:

- 1) Easier to split LO at 11 GHz than RF at 24 GHz.
- 2) Easy to DC switch between TX & RX.
- 3) Separate RX & TX IF ports. No IF switching required.
- 4) Separate RX & TX PC boards allows minimum cable length to antenna relay.
- 5) Easy to interface with existing no-tune Xverters.
- 6) Could add more than 1 bandpass filter if necessary.

Disadvantages are:

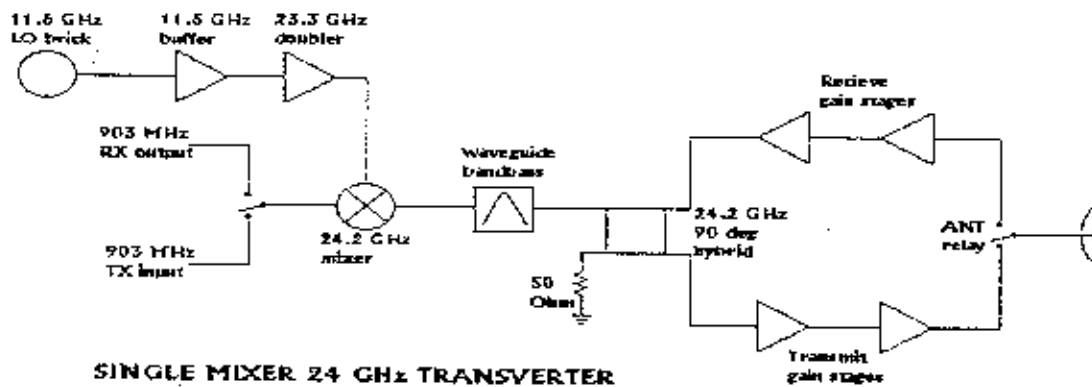
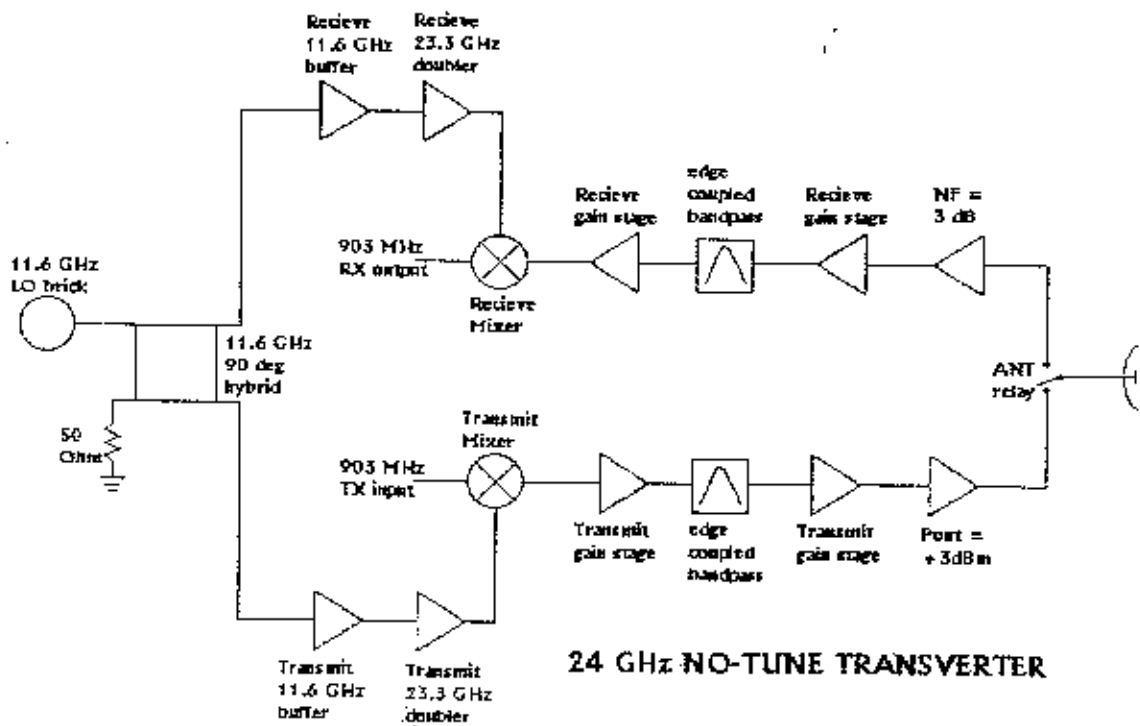
- 1) Need to buy twice as many GaAs FET's.
- 2) Tougher to trouble shoot a single board.

CONCLUSION:

Now that the fun part is over (System Design / Drawing little RF boxes on pieces of paper.), the hard part of the job must commence. All designs work perfectly on paper. Getting everything to play together is another story. Over the next few months Paul and I will explain each piece of our design in detail. A list of topics is listed below. Stayed tuned. 73 XG/JYO

DISCUSSION TOPICS:

- 1) Active Device Selection. Including S-parameters at 24 GHz.
- 2) Gain Stage Design. Including MIM cap description and ATC-A performance at 24 GHz.
- 3) Buffer Amp Design.
- 4) Doubler Design.
- 5) Branch Hybrid Design. Also discussion of effective dielectric constant.
- 6) Mixer Design. Discuss mm-Tech type & DownEast type mixers.
- 7) Waveguide Iris Filter Design.
- 8) Edge Coupled Filter Design.
- 9) Power Amplifier Design.
- 10) Estimation of Cascaded Receive Noise Figure.
- 11) PC Board Selection and PC Board Vendor Selection.
- 12) Individual Circuit Testing Techniques
- 13) PC Board Assembly Techniques
- 14) System Performance.



The Mt. Airy VHF Radio Club, Inc.

The Pack Rats

HAMARAMA 97'

SUNDAY, OCTOBER 5th, 1997

Rain or Shine

Gates Open: Buyers at 0700 Sellers at 0600

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Warrington, PA

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21st Annual Mid-Atlantic States VHF Conference

NEW, Bigger Conference LOCATION

Saturday, October 4th, 1997

9:00 AM to 9:00 PM

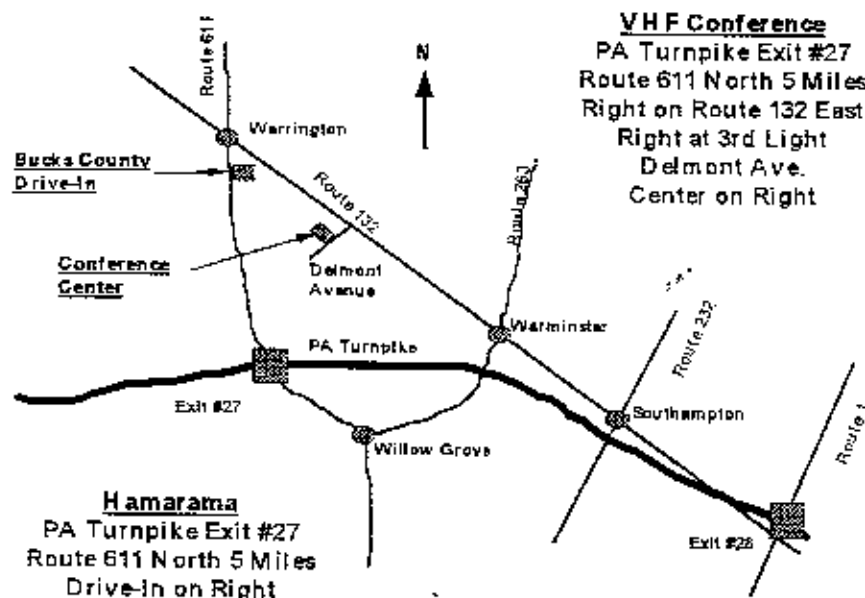
Benjamin H. Wilson Senior Center

580 Delmont Avenue

Warminster, PA

Admission: \$18.00 - Lunch and Dinner at extra cost - Banquet Prizes

Conference Contact: **KB3XG** johnkb3xg@aol.com 1-610-584-2489



Hamarama Information

N3EXA
Brian Taylor
1634 N. 5th Street
Perkasie, PA 18944

215-257-6303
After 7 PM

Pack Rats

HAMARAMA 97' and Mid Atlantic VHF Conference Hotel Information

(1) Hampton Inn
Easton Road (611)
Exit 27 PA Turnpike
Willow Grove, PA
215-659-3535

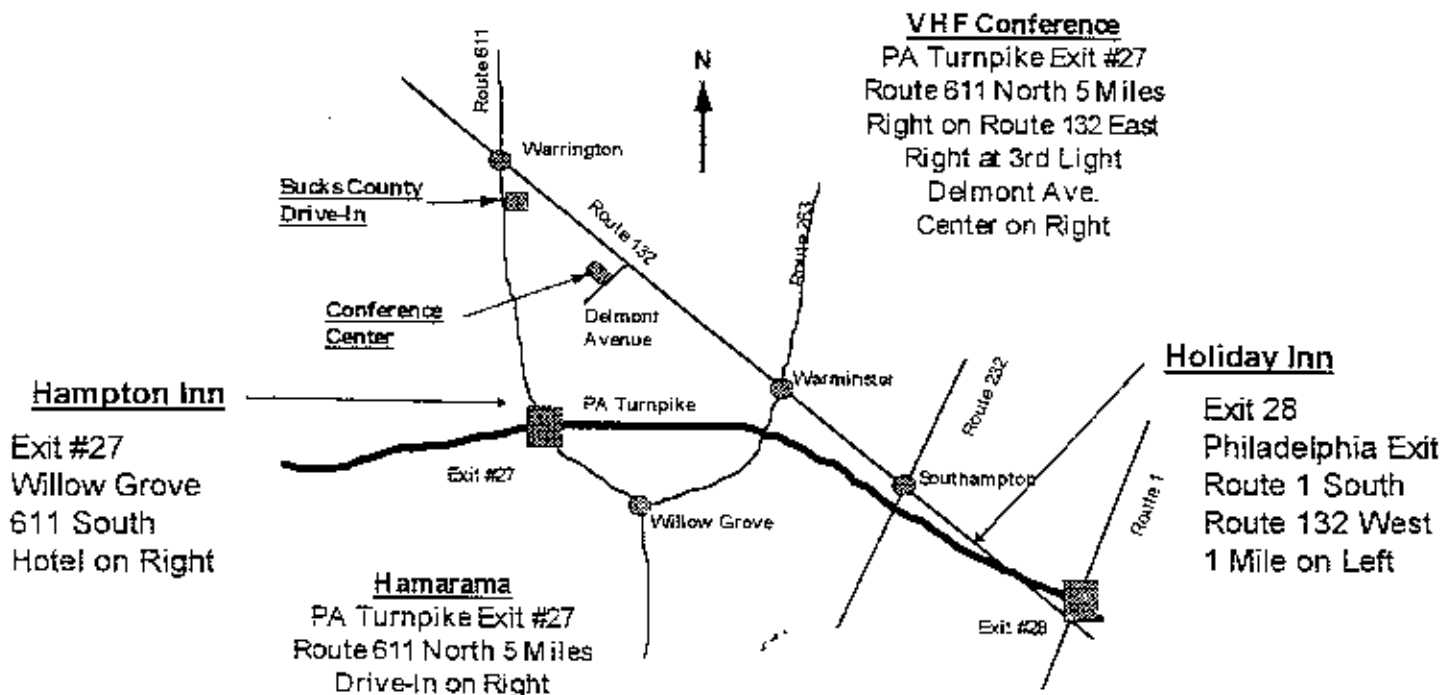
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(2) Holiday Inn
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Exit 28 PA Turnpike
215-364-2000

Mention "Pack Rats"
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Also: Comfort Inn, Trevoze, PA
Exit #28 215-245-0100

Days Inn, Horsham, PA
Exit #27 215-674-2500



THE SUMMER OF 1997 PROPAGATION HIGH-LIGHTS**"KANSAS CITY"**

I GOING TO WORK KANSAS CITY, KANSAS CITY HERE I COME.
 I GOING TO WORK KANSAS CITY, KANSAS CITY HERE I COME.
 THEY GOT SOME REALLY GREAT E SKIP NOW, AND I AM GOING TO WORK ME SOME.

144 MHz E SKIP! Thursday - 7/26/97. - between 2300 - 0100Z, there was E Skip from Minnesota to Louisiana. Larry - N0LL from EM09, Kansas led the way. I heard but did not work stations in Iowa, Minnesota, Nebraska, and Louisiana. I worked stations in Missouri, Arkansas, and Illinois. Packrats AA2UK and N3ITT were in there. Who else?? Six meters was wide open at the time, with double hop to 7 land. Jim, WA3EHD, had a bonanza on 6 meters working dozens of grids and contacts all over the map.

Keep you eye on the 432 MHz and higher. Contrary to popular belief, they will very often be 'wide open' while 144 MHz is experiencing average conditions. If you live by the move-up from 144 MHz sword, you will die by it. Listen for beacons on 432, 903, 1286 and call CQ when the bands up. Someone might come back to you!

"I LIKE THE SMELL OF TROPO IN THE MORNING - IT SMELLS LIKE VICTORY"

7/11/97 saw great tropo to the midwest. Bill, AA2UK worked KOMQS - EN31, K0WR - EM49, N9PEZ - EN50, W8MM - EM79. Russ, K2TXB got into the act on 8/1/97. Russ worked several stations in IOWA and MISSOURI. Russ wasn't finished, he went to W2DRZ's and worked EN33 from FN02 and AA2UK on 10 GHz!

On August 26th - 28th, there was a great coastal opening. AA2UK and K2SMN worked into FLORIDA. Everyone who was around at least worked Alex, W4FSO in FM 14. AA2UK worked W4VHH - EM95 from 144 - 2304 Mhz on several occasions.

THE 'BAD-TO-THE-BONE' TROPO AWARD:

On 8/27/97, AA2UK was so strong on 2304 Mhz at WA1MBA that he still could be heard with a 'paper clip' in WA1MBA's antenna port from his ground level ham shack!!

STATION WATCH:

'Activity Warriors'. Len, N3NGE, has proposed to me a very simple, but effective way to increase activity on the Tuesday, Wednesday, and Thursday activity nights. I have expanded the theme somewhat and will present a full proposal by the next 'CHEESEBITS' issue. Randy - KB2ZVP has put the often allusive FN22 on the 'duck soup' list for grid hunters and testers. Randy is on almost every night and week end mornings. He runs 2 x 36 ft yagis on 144 MHz, with 1 kw or more of power. I believe he has plans for getting on 432 and 1296 MHz.

LET LOOSE THE DOGS OF WAR:

Russ, K2TXB is finishing a complete overhaul of his antenna system. Russ now has a 100 ft tower, with a 52 ft boom yagi. The 'EME' array was taken down. Russ's antennas will now clear the trees by a wide margin. Russ will be really loud! Bill, AA2UK, a man know for his belief in using QRP whenever possible, will be sporting a 300-400 watt 903 MHz amp to pump power to his stacked loopers. The receive end will get a mast-mounted preamp with separate feed line. Anyone for micro-waved Squab? Gary, KE8FD, is sporting a new 800+ watt amp to go with his 30+ ft yagi on 222 MHz.

SB OST ARL ARLB049ARLB049 RF EXPOSURE UPDATE

The FCC has revised the power level thresholds to trigger a routine Amateur Radio station RF exposure evaluation, and the changes will be welcome news for most hams. When the FCC first decreed a year ago that ham radio stations would have to comply with RF exposure guidelines, it set a 50-W threshold level. The updated guidelines, announced August 25, increase that threshold level on all HF bands except 10 meters, where it remains at 50 W. The FCC made no changes in the RF exposure limits it announced last year.

The new RF safety guidelines are scheduled to become effective January 1, 1998, for Amateur Radio stations. The FCC went along in part with a request by the ARRL to establish a sliding scale for threshold levels, depending upon frequency. The revised thresholds are 500 W for 160 through 40 meters, 425 W on 30 meters (where the maximum permissible power is 200 W), 225 W on 20 meters, 125 W on 17 meters, 100 W on 15 meters, 75 W on 12 meters and 50 W on 10 meters. The threshold for all VHF bands is 50 W. On UHF, the threshold level is 70 W on 70 cm, 150 W on 33 cm, 200 W on 23 cm, and 250 W on 13 cm and above. Stations operating at or below these respective power levels are categorically excluded from having to perform a routine RF radiation evaluation. However, all stations, regardless of power level, still must comply with the RF exposure limits.

Along with its August 25 Second Memorandum Opinion and Order announcing the changes, the FCC released the "core" text of its long-awaited Office of Engineering and Technology (OET) Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. The bulletin contains generic equations that can be used to analyze fields due to almost all antennas, although the FCC warns that "the resulting estimates for power density may be overly conservative in some cases." Hams leery of formulas might opt to wait for the easier-to-use Supplement B to OET Bulletin 65, which will include information designed specifically for evaluating Amateur Radio installations. The supplement promises to detail how hams can determine more simply if their individual stations comply with the new regulations. The FCC says the supplement will contain "information on projected minimum exclusion distances from typical amateur antenna installations."

The FCC said it would issue Supplement B "as soon as a review of the current draft is complete." When it's ready, Supplement B will be available to download from the FCC's Web site, <http://www.fcc.gov/oct/rfsafety>. The FCC directed inquiries as to the availability of the supplement and other RF-related questions to its RF Safety Program, 202-418-2464; e-mail rfsafety@fcc.gov.

Last year, the FCC established time-averaged maximum permissible exposure (MPE) limits for RF fields in two tiers—for controlled environments (i.e., a ham's immediate household, including visitors) and uncontrolled environments (i.e., neighbors, the general public). If a routine evaluation of a ham station indicates that human exposure to RF fields could be in excess of the FCC's MPE limits, the licensee must act to correct the problem and ensure compliance. This could include changing operating patterns, relocating antennas, restricting access, changing frequency, output power or emission type or any combination of these and other remedies. The FCC says that ham radio facilities "represent a special case for determining exposure, since there are many possible antenna types that could be designed and used for amateur stations."

The revised regulations categorically exclude most mobile installations, including those in the Amateur Radio Service, from having to comply with the RF-exposure or station evaluation guidelines. Since the FCC issued its guidelines, additional questions on RF safety have been added to the Amateur Radio examination question pool.

OET Bulletin 65 and the FCC Second Memorandum Opinion and Order are available at <http://www.fcc.gov/oet/dockets/et93-62/>. More details on the FCC's latest announcement on RF safety will appear in the October issue of QST.

TID BITS

Dave, W3SK, is back in operation after successful surgery for minor repairs.

Goodby and Farewell to Steve, KF6AJ. Around this time of the year, we usually have to say good-bye to a few rats that are off doing other things. Dues are due on January 1 at the start of each year so after many notices and phone calls, some depart from our close company.

Who gets Cheesebits? Cheesebits goes out to members and subscribers in 28 states, 3 Canadian Provinces and 3 other countries. We exchange newsletters with many weak signal VHF and Microwave groups and many of the articles written by Cheesebits authors are reprinted in their newsletters.

THANKS TO THE PACKRATS

By: Bob Applegate, K2UT

I would like to thank the Packrats for their excellent presentation last night at the SJRA (South Jersey Radio Association) meeting. You were very well represented by Phil, WA3NUF, Bob, W2SJ, and Al, N3ITT.

Unfortunately, they had several things working against them:

1. Nobody could get their calls right.
2. The business meeting ran exceptionally long, so they didn't get started until slightly after 9 PM.

SJRA meetings normally end at 10 PM or else many of the members leave to go home and climb into bed. When last night's program finished after 11, most of our members were still there. Phil, Bob and Al gave a good presentation that kept everyone's attention. Even though we have members with varied technical expertise, some of the basic technical details were talked about the most on the air after the meeting and this morning on our repeater. Things like waveguides, TWTs, 48 dB gain dishes, 45 element beams that are six feet long, and other UHF/microwave hardware were good topics. Many of our members had never seen stuff like that before! Phil's 10 GHz transverter was also a big hit. Hopefully the presentation last night will spark a few of our members to get a transverter on the air, or at least put up a horizontal beam to plug into their IC-706s by the contest, HI!

Thanks again, and please let us know if we can ever do anything to help the Packrats!

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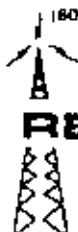
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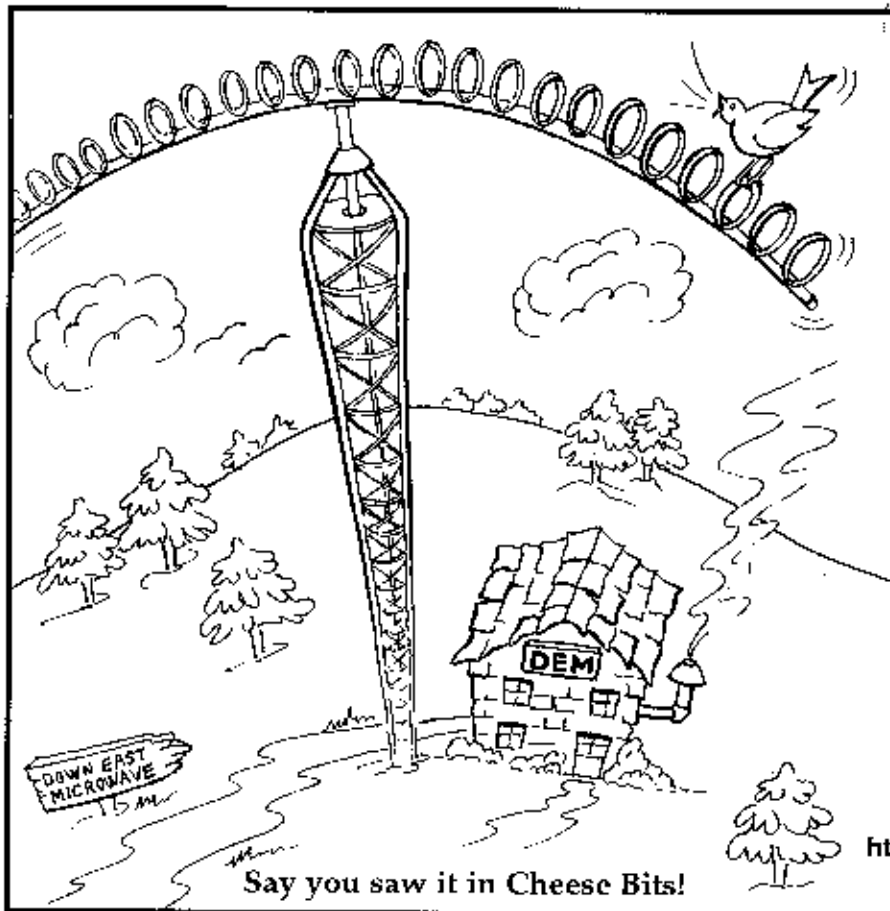
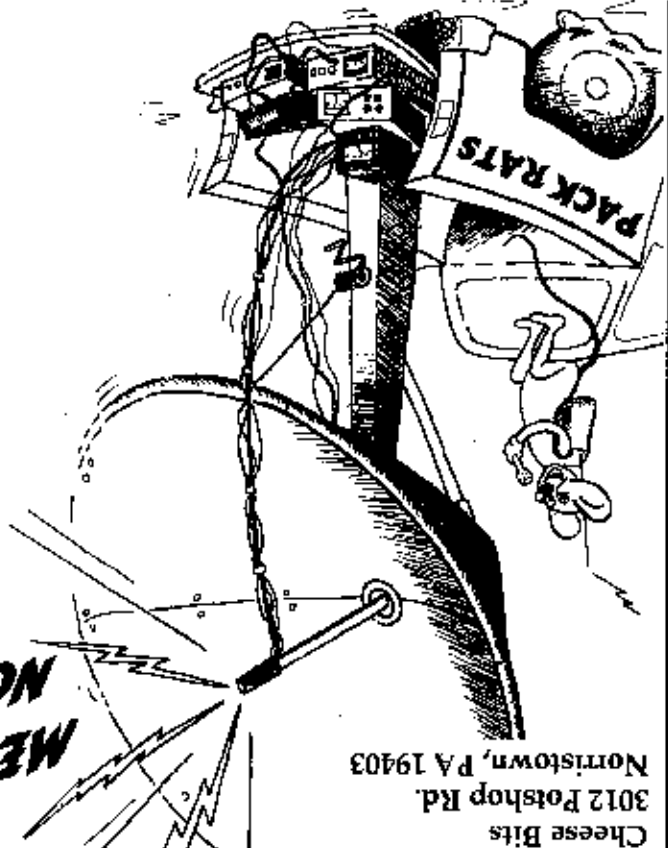
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