

# PACK RATS'



**PACK RATS**

CLUB CALL: W3CCX

# CHEESE BITS



MT. AIRY VHF RADIO CLUB, INC.

SCANNED TO PDF BY BERT, K3IUV,

MT. AIRY VHF RADIO CLUB., "THE PACK RATS", PHILADELPHIA, PENNSYLVANIA W3CCX  
NET FREQUENCIES: 50.125, 144.150, 220.125, 224.58/222.98, 432.110, 903.100, 1296.100 MHz  
AFFILIATED CLUB: AMERICAN RADIO RELAY LEAGUE ARNS

Meetings: Third Thursday of each month at 8:00 PM  
Southampton Free Library, 947 E. Street Road  
Southampton, Pennsylvania 19866

VOLUME XXXII

DECEMBER 1990

NUMBER 12

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## THE PREZ SEZ

Boy it sure looks like the club enthusiasm is starting to come to life again! If you missed the last meeting, you missed an excellent get-together and K3HW's FB talk on riding around in a submarine for his US Navy tour as Sub Communications Specialist was just great. Ah yes, I can remember chasing those guys around in a P2V and some of the first P3's in the service of ASW. I forgot to ask Howard if he bounced around as much as I did for 12 hours. The last meeting made me feel like the club came back to life and I'm sure that everyone else felt the same way. It was nice to hear everyone talking about their latest projects and nice to see new faces. We have two new members that were voted in last meeting - N3FWV and N3EXA - we welcome them aboard. Also, WA3EHD and WA2GFP have applied for membership.

Please contact Bob, WB2YEH, if you need any help with projects. Put the word out early if you're having problems; let's help you out before the snow flies and January Contest weekend arrives.

Congratulations to Dave Mascaro, WA3JUF, for his Cover Award from the ARRL/QST technical committee. Dave sure contributes a lot to our hobby and it's nice to have a Pack Rat receive some well deserved recognition.

I hope that everyone faired well in those bad winds we had a few weeks ago. I lost a few antennas on my microwave tower, so it looks like I'll be working in the cold to get a few things back together again. I hope you and your families had a nice Thanksgiving, and we're wishing you all the best for the upcoming holiday season.

73, and listen for the weak ones,  
Dave, N3CX

**DECEMBER MEETING PROGRAM: Annual PACK RAT CONTEST STRATEGY AND LOGISTICS PLANNING.**  
This is a closed, secret meeting of paramount importance to all club members. Talks and tips will be given by January VHF Sweepstakes veterans.  
**\*CLUB MEETING WILL NOT BE AT THE LIBRARY. MEMBERS WILL BE NOTIFIED OF LOCATION BY MAIL\***

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DEADLINE FOR ARTICLES AND SWAP SHOP IS THE 20TH DAY OF THE MONTH. NON-COMMERCIAL SWAP SHOP ITEMS - FREE OF CHARGE.

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PACK RAT 220 FM REPEATER - W3CCX/RPTR  
222.98/224.58 MHz, CHURCHVILLE, PA

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WA3AXV RON WHITSEL (2 YRS)  
K3EOD AL BOBLITT (2 YRS)


<u>MONDAY NIGHT NETS</u>	<u>NET CONTROL</u>
7:30 PM - 50.125	W3CL
8:00 PM - 144.150	W2EIF
8:30 PM - 220.125	WC2K
8:30 PM - 224.58/R	K3ACR
9:00 PM - 432.110	WA3AXV
9:30 PM - 1296.100	WA3NUF
10:00 PM - 903.100	N3CX

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## CALENDAR OF COMING EVENTS

By Harry Brown, W3IIT

### DECEMBER

- 8-9 ARRL 10-Meter Contest. 0000 UTC Saturday until 2400 UTC Sunday. See November QST, page 84 for rules.
- 12 Chanukah
- 13 Pack Rat Board of Directors meeting at the QTH of Bob Fischer, WB2YEH. All interested parties invited. Meeting starts at 8PM. Call Bob at 609-665-8488 for directions.
- 14 Predicted peak of the Geminids meteor shower at 0013 UTC. This is a very productive shower. Monitor 3.818 MHz for schedules and info.
- \* 20 Regular meeting of the Mt Airy VHF Radio Club at an alternate location to be announced. The library is under major construction again and we have temporarily lost our room. All members will be notified by mail as to the meeting location. This will be a closed contest meeting for club members only.
- 22 Predicted peak of the Ursids meteor shower at 1640 UTC.
- 25 Merry Christmas to all.

### JANUARY

- 1 HAPPY NEW YEAR!
- 19-20 The Contest. Everyone's help in getting at least 51 logs submitted this year is necessary to qualify the club in its rightful category of club competition, Unlimited. See December QST page 101 or consult your contest package for the rules.
- 27 NFL Superbowl XXV
- 30 The Microwave Update Conference scheduled in Denver has been cancelled due to the death of Don Lund, WA0IQN.

### VOTED TO MEMBERSHIP

N3EXA, BRIAN TAYLOR  
4621 Cold Spring Creamery Road  
Doylestown, Pa. 18901  
215-340-9467

N3FWV, JOHN KEDZIORIA  
2424 Jericho Drive  
Jamison, Pa. 18929  
215-343-9272

### 2-METER MILESTONE

Dave Blaschke, W5UN, completed the first ever 144 MHz DXCC on October 27 by working VS6BI. Each of the 100 countries was worked on 2-meter EME. Dave runs 1.5 KW to a 48-yagi array which is described in the January 1989 QST. Many of the stations worked for DXCC credit were HF DXpeditions which had Oscar satellite equipment along. In many cases, these expedition stations were using 150 watts and a single circular polarity yagi! Congratulations W5UN, from the Pack Rats!

PROPAGATION REPORT  
By Paul Drexler, WB3JYO

The active 6-meter enthusiast has had a little more action this month! As 10 meters continues to remain HOT, the solar flux index has occasionally crept above the 190-200 mark to provide some 50 MHz F2 propagation.

Mike, N3BBI has become more active on the band again just in time to work some excellent 6-meter contacts - Mike is running his usual power level but now runs a PAIR of 6 element "boomer" yagis up at his mountaintop QTH! On November 2nd, Mike pulled several HC's (Ecuador) out of a brief opening. The next day, however, Mike snagged PY0FF (Fernando de Noronha) and a long list of LU's (Argentina). Then, on the 4th, Mike worked several HC's and a TI2 (Costa Rica).

The band remained quiet until the 9th when a good opening to Europe occurred from 1300-1430 UTC. WC2K reports working 11 G's (Britain), 2 GI's (Ireland), and CULEZ (Azores). The band again opened on the 10th to Europe with much more to be worked. Rick was ready for the opening and worked stations including F's (France) ZB2EO (Gibraltar), CT1QP (Portugal), 9H1BT (Malta), and IK2GSO for his first Italian QSO.

On the morning of the 11th, the 6-meter band opened briefly despite a rather high K index (absorption) of 4. At 1300 UTC, several G's were worked by area VHFers, however the New England boys clearly had the advantage being a little closer to the action. N3BBI did manage to work an OT1 (Belgium) operating with special privileges. WC2K noted strong meteor bursts on Europeans - a rather long haul for meteor bursts!

Several more short openings occurred on the 17th and 18th to South America, Portugal, and the Azores. On the 17th N3BBI reports hearing TR8CA (Gabon) but couldn't make the contact due to QRM. The next day, WC2K had a QSO with 9LIUS (Sierra Leone) for a rare contact these days. The HC8SIX (Galapagos) beacon was solid into the Philadelphia area on the 17th through 20th, however lack of an operator at HC8 produced no QSO's. Since the 20th, the MUF has been wandering to around 48 MHz, not quite high enough for 6-meter propagation. The WWV numbers for the last week of November have taken a slow tumble to SFI values around 150 - 160 with A and K indices remaining near quiet levels. It's hard to determine whether the DX which has been worked during the past week was F2 or Es. Other than some Caribbean QSO's, the band has been dead to our area.

Have any Rats been working the higher bands? Please advise me of your observations of even local propagation on the microwave bands. How do you find the 2.3 and 3.4 GHz bands on local paths during varying weather conditions?

CJ on the bands!

TID BITS

**Listened to the Pack Rat repeater lately?** It's been quite active with members discussing projects, operating, etc. Join in for some fun and say hi to the guys.

**Congratulations to Dave Mascaro, WA3JUF**, who was presented with the ARRL/QST **Cover Award** by Kay Craigie, KC3LM, Atlantic Division Vice Director. The award recognizes Dave for his outstanding technical articles published in QST.

**K3ACR climbed the tower of K3LOM** and completed rotator and other repairs to put Harry in good shape for the contest. A crew is now preparing to restore K3EOD's antenna system to operating order. The work performed by club members at KS2T's station has sure paid off... Jay has been very active on the bands and has a FB signal into the club repeater. Need help? Want to learn how to help? Speak up!

**Congratulations to Ron (WA3AXV) and Lynn Whitsel** on the recent marriage of their daughter, Kimberly. Imagine having RONBO for a father-in-law... yo, lucky guy!

### SWAP SHOP

**FOR SALE:** 2-meter KW amplifier w/4CX1000.  
4 - F9FT 1296 yagis w/H-frame and  
phasing lines.

**CONTACT:** Andy, WA2FGK  
201-722-0205 after 9PM

**WANTED:** Schematic or manual of Midland  
13-509 220 MHz FM xcvr. Will cover the  
copy and postage costs.

**CONTACT:** Ron Lawson, NA2O  
4966 Bat-Elba T.L. Road  
Batavia, NY 14020

**WANTED:** HyGain 4-element 6-meter yagi.

**CONTACT:** Rick, WC2K  
609-268-0736

### COMMERCIAL ADS

LOOP YAGIS: 902 MHz 33 element \$89 kit, \$109 assembled and tested. 1296 MHz 45 element \$89 kit, \$109 assembled and tested. 1296 MHz 55 element "Super Looper" \$99 kit, \$124 assembled and tested. 2304 MHz 45 element \$75 kit, \$89 assembled and tested. Also available: element and hardware kits for above. 2 and 4-way power dividers. Discount on complete arrays. Solid state linear power amps, 13 VDC: 1296 - 8W in 35W out \$315, 1W in 20W out \$265, 4W in 70W out \$695. GaAs FET preamps: 902 MHz .8dB NF \$90, 1296 MHz .8dB \$90, 2304 MHz 1 dB max NF \$140. SHF SYSTEMS no-tune transverter kits, w/144 MHz IF now available for 903 through 3456 MHz. Write or call for complete catalog. DOWN EAST MICROWAVE, Bill Olson, W3HQT, Box 2301 RR-1, Troy, Maine 04907. For information and orders telephone (207) 948-3741.

HELP WANTED: Engineers, Technicians, and Technical Support. Several openings in the following areas: UHF Circuit Design, Digital Signal Processing, Datacommunications Systems (like packet), and change control. If you would like to put your Ham skills to work for you full time, in a professional atmosphere, then call Woody Peitzer, AK2F, at HEPCO Inc. (201)-992-8660 between 7:30 to 5:30 PM.

### JANUARY VHF CONTEST ANNOUNCEMENT

The 1991 ARRL January VHF Sweepstakes contest will occur on the weekend of January 19,20,21, 1991. It is an important Pack Rat tradition to not only participate as a club, but to win the Unlimited Category gavel. Last year, we as a club conceded that coveted award to our old rivals, the Rochester VHF Group. We lost not by total score, but by number of entries. Are you ready to play for the Pack Rats this year? Remember, you must have attended at least 2 club meetings since January 1990 in order to qualify your score with the club. There is time remaining to make your quota.

1991 VHF Contest Chairman is Bob Fischer, WB2YEH. Contest questionnaires will hit the streets this week; **please complete and return.** They will play an important role this year in planning to make best use of our resources. Would you like to be a roving station? Can you expand your station to multiop? How about guest-operating or joining a multiop station. Every able operator and each and every station should be pressed into service for the event.

### FUTURE OF 220 -222 MHz TO BE DECIDED

The final effort to overturn the FCC decision to usurp 220 - 222 MHz for commercial use took place on Friday, November 16. I had a conversation with Perry Williams, W1UED, ARRL Washington DC Area Coordinator, on Monday November 19. Perry was present for the oral argument hearing held in the DC circuit of the US Court of Appeals. His reaction from what he witnessed was not favorable. Final decision on the matter will be released from the court in a few weeks.

## DIODE TRICKS

By Ron Lawson, NA20

Recently I had occasion to troubleshoot the front end of a 3456 MHz single board transverter. Missing from my workbench was a source of low level signal at the proper frequency. The idea of using a second transverter as a source was discarded without picking up a single cliplead; both units had the same IF and it would have been difficult to separate the RF and IF signals. The next choice was to look for the harmonics of my VHF boat anchor generator set to 384 MHz. No dice, although at that point I wasn't sure if the problem was a lack of harmonics (a clean generator) or a lack of stability (harmonics drifting at 9X the generator drift). To find out, I stuck a 1N34 across the end of the output cable, leaving about a quarter inch of lead on either end. With perhaps -3dBm drive at 384, I had all the signal that I wanted, but not so much as to be unusable. I did not try to couple this to the input port, instead using the loop to couple to the microstrip. Signal strength was a very strong function of coupling distance, with the signal almost non-existent at an inch or so. The really useful part of this fooling around was that for a given spacing, stage gain was very evident when moving from the input to the output side of the device. As the loop was moved along the amplifier chain from mixer toward the front end it was apparent that the amplifier chain was functioning to a great degree than could be determined with a VOM. Note that this technique is not necessarily suited to all signal source needs. It was applicable here only because of the filtering present in this application, and the fact that I knew only one harmonic of 384 MHz could mix with the 3312 MHz LO and come out at 144 MHz. Using this same technique for an unfiltered, straight through amplifier chain might demonstrate gain, but likely as not the fundamental present would saturate the amplifier and reveal nothing of the workings at the harmonic of interest. This is quite a limitation, but is still useful for the application described. For those without access to a VHF boat anchor, there is always the "paperweight" route. Buy a 96 MHz crystal for a few dollars and build an oscillator to drive the diode. This is not a new trick either, as I've seen it described many other places in applications as high as 10 GHz. It also has the further advantage of not being nearly so drifty. Stay tuned and keep an eye out for old 220 MHz LO crystals - I'm trying an enhancement to this idea which will increase its utility a zillion fold. TNX RVHFG JOURNAL.

### SOUTH JERSEY RADIO ASSOCIATION OFFERS VHF CHALLENGE

In 1991 the South Jersey Radio Association (SJRA) will celebrate a 75th anniversary coincident with the BiCentennial Year commemorating the adoption of the Bill of Rights by the 13 original states. To further commemorate these occasions, the SJRA will sponsor a "VHF Challenge" achievement award. A certificate suitable for framing will be awarded to the operator of any amateur radio station in the US and Canada who during the year 1991, meets the VHF criteria established by the SJRA, and successfully communicates with each of the 13 original states on frequencies of 50 MHz or higher. All contacts must be made between January 1, 1991 and December 31, 1991 and must be complete two-way QSO's made from the same location, by the same operator. Use of all natural means of propagation are permitted; no active satellite or repeater contacts permitted. VHF contacts must be made with New Hampshire, Massachusetts, New York, Rhode Island, Connecticut, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia. Send a copy of your log with the entries that are pertinent along with an SASE to: The VHF Challenge - SJRA, P.O. Box 1021, Haddonfield, NJ, 08033.

The SJRA sponsored the "VHF Challenge" in 1976 to celebrate their 60th anniversary and America's BiCentennial. Five stations met the challenge: W2BV, WB2MTU, WB4WXE, W1JAA (now W1JR), and W2IDZ. It would be great to have some Pack Rats qualify this time around.

## MORE COMPONENTS FOR THE 50 MHz TRANSMIT CONVERTER

By Paul Drexler, WB3JYO

A 22 MHz LO chain was presented last month for the 50 MHz transverter. This month, circuits are presented for an LO power splitter and the Mini-Circuits SRA-1H mixer. Refer to page 8 for diagrams.

The LO power is split to provide injection to separate mixers for transmit and receive. Resistive power splitters are often used for their simplicity, however they are quite lossy. The splitter shown in figure 1 (page 8) is a novel alternative having a very low insertion loss. The splitter contributes less than 0.2 dB additional insertion loss and provides an excellent match having better than a 20dB return loss. Toroids may be purchased from Circuit Specialists - see November 1990 Cheesebits for more information. Follow the winding instructions shown in figure 1, keeping lead lengths to a reasonable minimum. The capacitor may be ceramic or silver mica. The splitter may be housed together with the LO, or perhaps with one of the mixers.

Figure 2 shows the outline for the Mini-Circuits SRA-1H double balanced mixer (DEM). A commercially available DEM was chosen for ease of construction and for superior distortion-free characteristics. As mentioned earlier, the higher LO power required by this mixer (50mW or +17dBm) allows a greater IF drive level to be used while maintaining low distortion. Consequently, only 3 amplification stages are needed following the mixer to generate 10 watts at 50 MHz. The additional cost of this type mixer is easily offset by a simpler amplifier chain.

Mount the SRA-1H on a PC board as described in figure 2. The mixer may be mounted in a small enclosure with a resistive attenuator for the 28 MHz IF input. A low power attenuator may be built from the table found in the ARRL Handbook. Choose the closest value to attenuate your 28 MHz transverter output power to give -5dBm at the mixer.

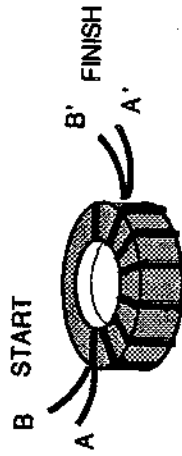
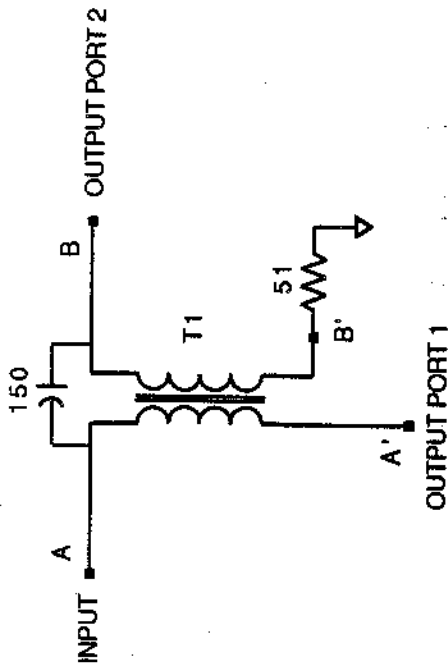
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JULY	BIPOLAR TRANSISTOR BASE BIAS W/THERMAL COMP	WA3IWT
AUGUST	VHF/UHF AMPLIFIER MATCHING NETWORK COCKBOCK	WB3JYO
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A complete index of CHEESE BITS technical articles dating back to 1983, appeared in the March 1990 issue.

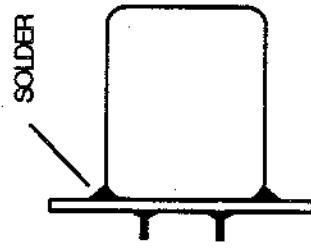
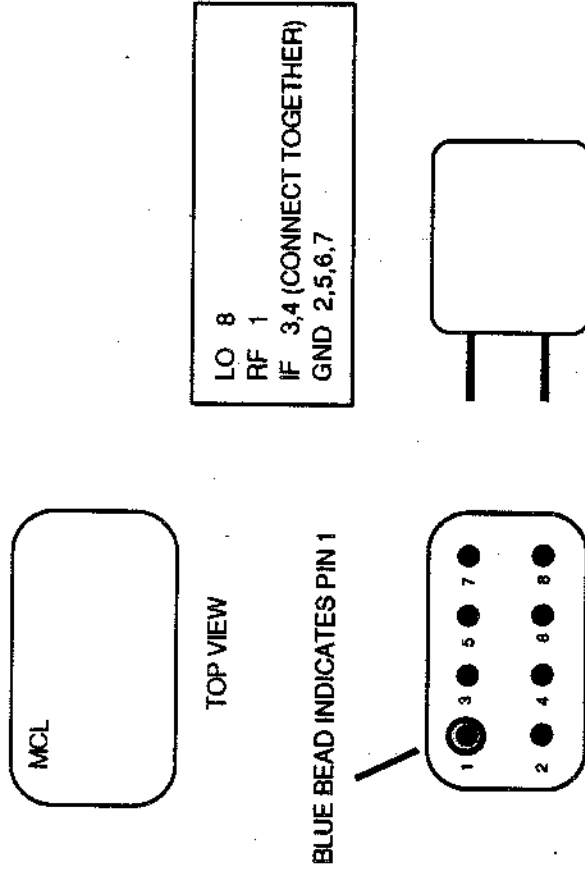
Thanks to all of the contributors of technical articles this year. I'd like to receive even more next year. These inputs can come in the form of complete how-to-make project details or as simple as construction hints which you may discover on your workbench. We all get involved in projects during the year. In the course of our work, we run into success and failure. Readers can benefit from descriptions of your work, no matter how big or small. Scratch the details out and leave the editing up to me. Thank-you, WC2K, Editor.

FIG. 1 LOW LOSS POWER SPLITTER



T1 IS MADE FROM 7 TURNS #28 ENAMEL WIRE WOUND BIFILAR ON AN AMIDON T37-2 TOROID. THREAD TWO PIECES OF WIRE THRU THE TOROID AND, WHILE HOLDING THESE PARALLEL, WIND 7 TURNS. USE AN X-ACTO KNIFE TO STRIP THE INSULATION FROM EACH END. LABEL THE WIRES ON ONE END AND THEN USE AN OHM METER TO IDENTIFY THE OPPOSIT ENDS. CONNECT THE SPLITTER AS SHOWN.

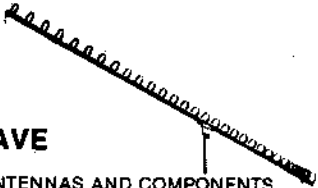
FIG. 2 MINI-CIRCUITS SRA-1H



MOUNT MIXER THRU DOUBLE SIDED PC BOARD, WITH THE CASE SOLDERED TO THE GROUND PLANE. DRILL CLEARANCE HOLES FOR ALL PINS AND USING A LARGE DRILL BIT BY HAND, COUNTERSINK EACH HOLE ON THE GROUND SIDE OF THE BOARD.



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