

# PACK RATS'



**PACK RATS**

CLUB CALL: W3CCX

MT. AIRY VHF RADIO CLUB, INC.

# CHEESE BITS



MT. AIRY VHF RADIO CLUB., "THE PACK RATS", PHILADELPHIA, PA.

W3CCX

NET FREQUENCIES: 50.150, 144.150, 222.125, 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 18966

SCANNED TO PDF BY BERT, K3IUV, 2013

VOLUME XXXV

October 1993

NUMBER 10

## THE PREZ SEZ

Many thanks to Tony Souza, W3HMU for an excellent presentation of the historic Packrat EME expedition to Colombia by W3HMU, W3HQT, K3BPP, WA3NFV, and K3JJZ. In 1976 these men activated HK1TL on 432 EME to provide the first South American EME station. Using their portable EME station, 16 EME contacts were made around the world including the last contact necessary for Al Katz, K2UYH to achieve the first WAC award above 50 MHz! These men made personal sacrifice and surmounted enormous technical and logistics details to make Amateur Radio history. We can all be proud of this piece of our Packrat past!

By the time you've read this Hamarama '93 will probably be behind us. Thanks to all of the hard working members who have made both the conference and fleamarket possible. With our Hamarama responsibilities completed we can now direct our full attention to the upcoming January Contest! The competition is as fierce as ever and Rochester is out for the #1 position this year.

But just as our HK1TL EME team saw a challenge, we've accepted the challenge. The Packrats simply will not give up! Each and every member needs to give very serious thought to how he can improve his station and increase his score by at least 50% this year. Every member's efforts are vital to winning the contest. To be successful we have to set goals NOW and then work towards accomplishing these goals. As president my goal for us this year is to get EVERY MEMBER ON A NEW BAND! It's surprising how many Rats aren't on 222, 432, or 903, for example. Commercial equipment is available and it's easier than ever to construct equipment for these bands using the "no-tune" transverters and hybrid power amplifier modules. The time to start is NOW. Start gathering parts and give a yell on the Packrat repeater when you need a hand. Chairman WA3NUF, WA3AKV, WA2OMY, and myself have made technical assistance yours for the asking. If we use our resources and talents to their fullest there's no reason why we can't achieve this goal!

Bring your ideas and projects-in-progress to the October meeting!

73

Paul Drexler, WB3JYO

Pack Rats CHEESE BITS is a publication of the Mt. AIRY VHF RADIO CLUB, INC. Philadelphia, PA. and is published monthly.

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Ron Whitsel, WA3AXV  
 (215) 355-5730

PACKRAT 222 MHz REPEATER - W3CCX/RPTR

222.98/224.58 MHz, Churchville, PA

OFFICERS: 1991-1992


PRESIDENT: WB3JYO, Paul Drexler  
 VICE-PRES: WB2OMY, Gary Hitchner  
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 DIRECTORS: N3EXA, Brian Taylor (1 YR)  
 K3ESJ, Bill Jaxheimer (1 YR)  
 WA3AXV, Ron Whitsel (2 YRS)  
 WB2YEH, Bob Fisher (2 YRS)

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	W2EIF
8:30 PM	222.125 MHz	WB2YEH
8:30 PM	224.58R MHz	K3ACR
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: WA3YUE 215-666-1558  
 JUNE CONTEST: WB3DNI 215-672-5289  
 HAMARAMA: WB3JYO 609-538-1687  
 VHF CONFERENCE: KB3XG 215-270-3158



THE AMERICAN RADIO RELAY LEAGUE

**HUGH A. TURNBULL, W3ABC**  
 Director, Atlantic Division



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Illustration

Production



**Lynne D. Whitsel**

299 Frog Hollow Road  
 Churchville, PA 18966  
 215 355-5730

Calendar of Coming Events -October 1993

- 2     The 17th Annual Mid-Atlantic VHF Conference will be held at the Quality Inn in Horsham, PA. Admission \$10 in advance or \$10 at the door (includes HAMARAMA). For further info, contact the Conference Chairman, John Sortor, KB3XG, 215-354-1635.
- 2     Canada 50 MHz Sprints, 1900 to 2300 local time. See 2 Sept.
- 3     Mt. Airy VHF Radio Club "HAMARAMA 93" is back at the Bucks County Drive In Theater on Rte 611, 5 miles north of PA Turnpike exit 27 in Warminster, Pa. TI on 146.52 and 223.5
- 3     The Hall of Science ARC Hamfest will be held at the New York Hall of Science parking lot, Flushing Meadow Park in Queens, NY. Talk-in on 146.52.
- 7-9   AMSAT Annual Conference & Space Symposium will be held at the La Quinta Inn in Arlington, Texas. Contact AMSAT at 301-589-6062 for more info.
- 9     Draconids meteor shower peak.
- 9-11   ARRL International EME Competition. See Sept. QST page 93.
- 10    Garden State ARA/Neptune ARA/Monmouth-Ocean State ARC/Jersey Shore ARC Hamfest will be held in Wall Township, NJ at Garden State Tpk exit at Rte 34, then north on 34 to the hamfest. TI on 145.110.
- 11    Columbus Day
- 14    Board of directors meeting for the Mt. Airy VHF Radio Club will be held at the QTH of Gary, WA2OMY at 8:00 PM. All interested parties welcome. Call 215-538-6409 for directions.
- 16    Radio Amateurs of Syracuse Hamfest at the Academy Green American Legion Hall in Syracuse, NY. TI on 146.31/.91.
- 16    Tri-County Radio Association Hamfest at Park Ave. and Martine Street in Scotch Plains, NJ. VE exams will be held. Talk-in on 147.255/855 and 146.52.
- 16-17 Simulated Emergency Test (SET). See Sept. QST, page 114.
- 17    Columbia ARA Hamfest at the Howard County Fairgrounds in W. Friendship, MD. TI on 147.735/.135. VE Session.
- 17    Penn Wireless Association Tradefest-93 at the Robert Yezzi Fairgrounds, Rt. 513, 1 mile south of Rte. 132 in Bensalem, Pa. Admission: \$5 each or \$10 per carload. VE exams will be held. Talk-in on 145.52 or 146.25/(-600).
- 21    Regular meeting of the Mt. Airy VHF Radio Club at the Southampton Free Library on Street Rd. in Southampton, Pa. All VHFers are encouraged to come and enjoy the evening with us. You need not be a member to attend.
- 22    Predicted peak of the Orionids meteor shower at 0023 UTC.
- 24    RF Hill ARA Hamfest at the National Guard Armory in Sellersville, PA. Note the return to the old location. VE exams will be given. TI on 144.710/145.310.
- 30-31 CQ World-Wide DX Contest. See Oct. QST, page 124 for rules or CQ magazine.
- 31    Halloween

HEALTH AND WELFARE

Dave, N3CX was in the hospital for some surgery. He's out now (was at the conference), is recuperating and has some therapy ahead.

EASTERN PA SECTION ELECTION NOMINATIONS NOTICE

Petitions for nominations of the Eastern Pa. Section Manager can be made by requesting petition form FSD-129 from the ARRL. Nominations must be received by the ARRL by 10 Dec. See the Oct issue of QST, page 83 for more details.

TID BITS:

NCJ has a new editor for the VHF-UHF Contesting! Column. Jon Jones, N00Y, 1116 Gatewood Ct, Wichita, KS has been active in QRP portable activity and is the principal operator of the 6 meter position of the WB0DRL station active in the midwest as a multiop.

The September issue of "The VHF-UHF DXer" has an article by Sam, G4DDK on the receive portion of a 6 meter transverter project. It uses a Minicircuits TAK1H high level mixer. The British term for "dead bug" construction is "ground plane" construction. It may be more accurate but I like our term is more descriptive to the casual observer. To those desiring to build a real crunch resistant transverter, Paul, WB3JYO provided a series of articles in Cheesebits in 1991-92 that used a high level mixer and also GaAs FET preamps with IP3 values of 22 and 26 dBm. Paul's 28 MHz low-distortion post amplifier was reprinted also. In this issue, Andy, G4PIQ, reports that the Perseids was about average in conditions in the UK and Europe although all of the publicity resulted in a very large amount of activity (seems like a happy ending to me). The same issue lists two new beacons: SV9SIX on 50.00105 MHz and ES0SIX on 50.038 MHz. There was no mention on power levels, antennas or direction of the antennas.

Wandering Richard, K2EVW reports in mid September of being back the gulf of Mexico loading rice, beans and soy oil (sounds exciting doesn't it?) for a second trip to Croatia this year.

Sabah, 9M6 is now on 6 meters. Look for a beacon at 50.014 signing 9M6SCM.

Congratulations to Paul Such, N6TX for bring awarded the Chambers Award for his many accomplishments in the field of weak signal VHF communications.

Congratulations to Herb, W3IWU for getting his Extra Class license.

Congratulations to the Rochester VHF Group operating KD5RO in the UHF Contest. They reported 498 QSO's and 165 grids operating from 222 MHz thru 10 GHz and laser.

VE3ONT MOONBOUNCE

On Oct. 9-10 and Nov. 6-7, The Toronto VHF Society will operate VE3ONT on 144, 432 and 1296 MHz. They will be operating using the 46 meter diameter radio telescope at the Algonquin Provencial Park in grid FN05XW, They will use full legal power on 144 and 432 MHz and 100 watts on 1296. If conditions are poor they will transmit on the first 30 seconds and receive on the second 30 seconds of each minute. HF liaison will be on 14.345 MHz during daylight hours and 3.818 MHz at night. It is expected that they will be able to work OSCAR class stations that have 100 watts of output power on 144 MHz, 25 watts on 432 MHz and 25 watts on 1296 MHz. Operating times are as follows:

<u>Date</u>	<u>Operating Time</u>	<u>VE3ONT Transmit Freq</u>	<u>VE3ONT Recv. Freq</u>
9 Oct.	0445-1830 Z	432.050	432.050-.060
10 Oct.	0550-1900 Z	144.029	144.025-.030
6 Nov.	0340-1700 Z	432.050	432.050-.060
7 Nov.	0450-1730 Z	1296.050	1296.050-.060

### SILENT KEYS

We're saddened to announce that three Packrats have become silent keys this last month. All have been long time members of the club although they have been inactive recently due to illness or being out of the area. Carl Croce, K3DLS, Hy Ecksel, WA3NDE, and Dick Boyle, K3IGX are no longer with us.

### NEW MEMBERS

Bill Scott, KU3A  
Box 151, Rte 611  
Pipersville, PA. 18947  
215-766-7217 (H)  
215-766-0340 (W)

Don Schwartzkopf, N3OZO  
329 Maple Street  
Warminster, PA. 18974  
215-674-0405 (H)

### VISITORS AT THE SEPTEMBER MEETING

Ken Bromberger, N3PER, Buckingham, Pa.

### GRID EXPEDITION AND ROVER WINDOWS

By John Godwin, KB5IUA

While on the last grid trip to a semi-rare grid and to be sure semi-arid region this idea started to form.

#### Background:

During the July 4th weekend, W5OZI and I were in DM90, and XE2LQB and XE2AWK were in northern Mexico on a grid expedition. At times there was propagation into our respective areas. Which put Pat and I into somewhat of a dilemma. Namely, being on the same frequency as the XE's (50.125). While we had planned on staying on 125 or wherever and had hoped the XE's would park on 115, this did not happen.

During the summer of 1992, W5OZI, W5FUA and I set up on the intersecting lines of four grids. While the propagation did not favor us very much that weekend, some disconcerting things did happen. One in particular was that once we had made a contact with certain stations, they continued on with their ragchew or calling CQ on the frequency we were on.

During our trip to DL88 in the summer of 1991, we were blessed with some pretty impressive band conditions and we were able to monopolize 50.125.

When W5OZI was in Mexico with XE2LQB and XE2AWK in May 1993, N6CL was also in Mexico in DL79. Both were on 50.125. It was not a big problem then but it could have been.

Together, Pat and I now have three grid expeditions under our belts, along with individual trips and others with different operators. So as ya'll can tell, we have been there!

#### Food for thought and/or course of action:

What I am looking from ya'll and others in the grid expedition business is what to do about the use of a particular frequency or frequencies for such grid expeditions. Is there a need or would it make our job easier if there was a window (say 50.170 to 50.185) for grid hoppers to use? Since most rigs have dual vfo's, one could be set on 50.125 and the other on the window frequency.

I feel that a window or set of frequencies would be advantageous. I also feel that some thought and the cooperation of fellow grid expeditioners this would be relatively easy to accomplish. We would not need a consensus from the whole ham community that uses the VHF bands, just the consensus of fellow grid hoppers.

Input would surely be appreciated. So if you would just put your thoughts down of paper, and return them, I will see if there is a consensus of some sort on this idea. Thanks for ya'll time.

John Godwin, KB5IUA  
PO Box 475  
Sweeny, TX 77480  
409-345-5041

PROPAGATION REPORT, 8/11/93 to 9/14/93

By: Bill Murphy, WORSJ FN20JR

I will again begin to write the monthly propagation report. Please try to provide information for the column by calling me at the home or leave me a message on my voice mail at work. The phone numbers are as follows: Home 215 252-3956, Work 908 234-3888. I have noted the following conditions since 8/11/93. I took some time off from work during the Perseids to listen to the Meteor Shower. I say listen because over the past 15 years I have worked this shower from both Kansas and Pennsylvania. This year and last I decided to just listen to the other skeds and see how the meteors peaked. The shower this year was supposed to be a major one and possibly even a meteor storm. This was not born out by my observation, I counted lower than normal meteors over a four day period and very few big meteors called blue whizzers. Hopefully this means that next year will be the big one. However there was plenty of activity on the 144.200 calling frequency for those hardy souls trying to work random meteors. I also heard at least 15 to 20 schedules on other frequencies. In most cases the exchanges indicated only marginal success. This is the third year in which the shower has failed to live up to my expectations. This is most likely due to comet Swift-Tuttel's recent appearance.

About the same time the East coast had some tropo On 8/11/93 I worked K00U/4 in FM26 on 50,144 and 432 MHz. VE1MA in FN65 was also worked on 144. On 8/30/93 I worked KN4SM in grid FM ???. This period from 8/30 to 9/7/93 showed enhanced propagation on the east coast due to a Hurricane that just brushed the outer bank of North Carolina and then went out to sea. Two meters was open into North and South Carolina as the storm hit, from this area and closer to the coast the ducting extended into New England. There was a report of some work into Florida but not from this area.

The September VHF contest conditions were poor and activity levels were generally down. A cold front dropped temperatures to the upper forties with a day time high of 70. The good weather in the east meant fewer people on the air. An aurora started on 9/12/93 at about 23:00 Z. It propagated on 6,2 and 220 MHz. I worked about 6 new grids on 6 meters and 4 on 144 before it faded. In all we worked 116 grids and 370 QSO's 6, 2, 222, 432, 903, 1296 & 2304.

Don't forget get on the air and have fun during the fall tropo season.

Dave, N3CX reports working W2YVL in FN23 on 432 early in September and working WD8ISK on bands up to 2304 in the Sept. contest.

INPUT FOR ADVISORY COMMITTEES

Another item from Hugh Turnbull's' Sept. Newsletter: How can clubs and individual League members offer comments, questions, and suggestions to the Advisory Committees? It's easy. Simply write a letter to the Division's representative. Another way is to send your letter to the specific Advisory Committee, c/o Lisa DeLude, Administrative Liaison, ARRL HQ, 225 Main Street, Newington, CT. Either way, be sure to ask that your letter be circulated to the entire committee.

ATLANTIC DIVISION COMMITTEE REPRESENTATIVES

CONTEST: Dave Halliday, KD5RO, 8747 Tabors Corner Rd., Wayland, NY, 14572.

DX: Tony Gargano, N2SS, 26 Winchester Drive, Sewell, NJ 08080.

PUBLIC SERVICE: Bob Josuweit, WA3PZO, 3341 Sheffield Street, Philadelphia, PA, 19136.

DROPPED FROM MEMBERSHIP

Paul Rilling, WA3HIT

Mark Adams, WB2JHG

N2MVP

## A 144 MHz PREAMPLIFIER

By: Paul, WB3JYO

The overall sensitivity of a receiver is defined by the noise figure of the receiver, and the detector bandwidth. In most amateur receiver designs below 2304 MHz, the first receiver stage, the preamplifier, sets the overall receiver noise figure. Some care must be exercised when using a preamp however, particularly if the receiver is to function well in a strong signal environment. The preamp itself should be able to withstand strong signals without producing distortion, and conversion gain must be held to a reasonable minimum to avoid driving other stages, including the IF receiver, into distortion.

At 144 MHz atmospheric and man-made noise are usually present but aren't as troublesome as at 50 MHz. This presents an opportunity to optimize circuits for lowest distortion without being overly concerned about noise figure. Serious terrestrial weak signal work at 144 MHz dictates a receiver noise figure of say, less than 2 dB. Operating in a populated area, perhaps anywhere in the Eastern Pennsylvania/ Southern New Jersey area dictates a "crunch-proof" front-end. The preamp presented here was designed and optimized for best compression point (P1dB) and third-order intercept point (IP3). Work at 50 MHz has shown the inexpensive NEC NE72084 GaAs FET to be a good choice for this application(1). Other GaAs FET's may be found to perform equally well with a little optimization. This design uses a toroidal inductor at the input match for a slightly lower Q network, resulting in a more acceptable input match.

Circuit construction is not particularly critical however all components should have minimum lead lengths. This is best accomplished using the "dead-bug" construction technique, building the circuit on PC board serving as a common ground plane(2). The GaAs FET source bypass capacitors (470 pf) are ATC "B" or equivalent chip capacitors. Mount the GaAs FET using full length source leads, with the 470 pf capacitors soldered at the end of each source lead. Use ceramic trimmer or piston type capacitors for the input matching network. The FET's may be purchased from local sales reps. It is recommended that the entire circuit be built into an enclosure, such as a BUD CU-123 diecast box or a box made from PC board.

Once the circuit is constructed it will be necessary to verify the required drain to source voltage (Vds) and drain current (Id). Drain current may be determined by measuring the voltage across Rd, however Vds must be measured directly across the source and drain of the device. With VDS and ID set correctly, all that is necessary is to peak both input capacitors for best gain using a weak signal. The match, or tuning for best noise figure will be very close to the maximum gain condition.

### References:

1. "A 50 MHz Preamplifier", Paul Drexler, WB3JYO, Packrat "Cheesebits", April 1991.
2. See "Transverters for 144 and 220 MHz", Paul Drexler, WB3JYO, ARRL Handbook

### CHEESEBITS SUBSCRIPTIONS

Cheesebits subscriptions are available to everyone interested in activities and information from the VHF through the microwave frequencies. Subscriptions are for 1 year of 12 issues. For a subscription, send the following information:

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October 93

Send to:

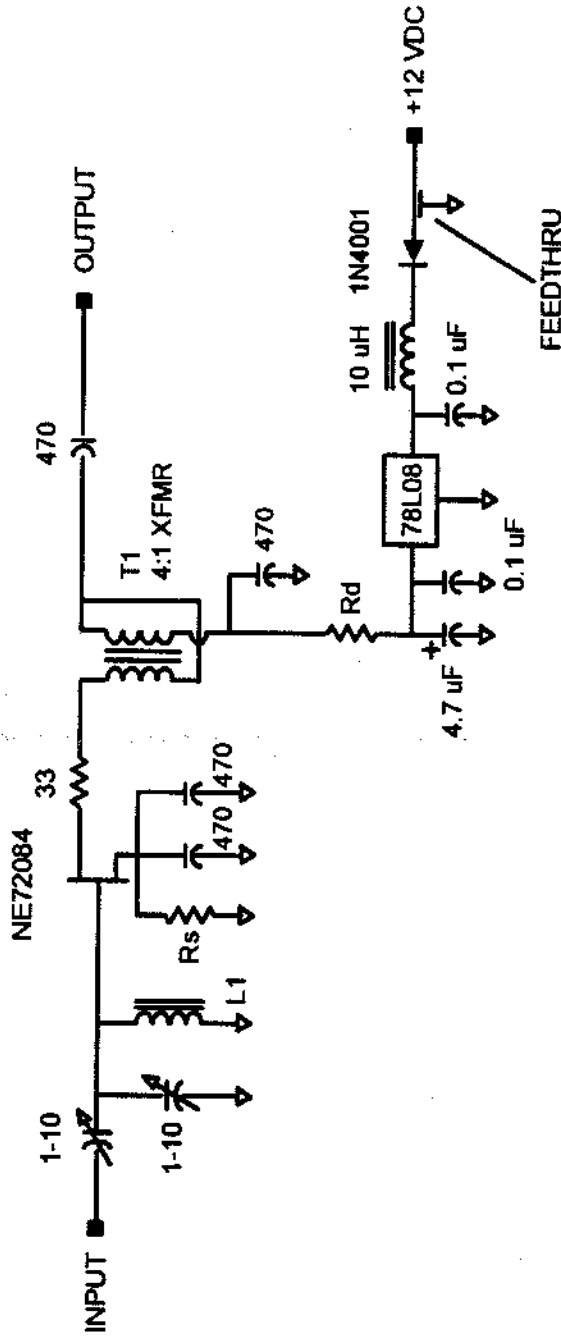
SUBSCRIPTION/ADVERTISING MANAGER:

Bob Fischer, WB2YEH

7258 Walnut Avenue

Pennsauken, NJ 08110

# 144 MHz LOW DISTORTION PREAMP



## NOTES

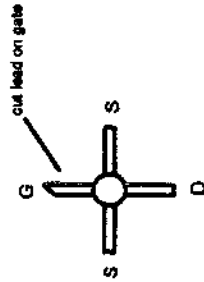
L1 8t #26 enamel on T16-12 toroid

T1 8t #32 enamel, bifilar wound on T16-12 toroid

Mount NE72084 GaAs FET using full length source leads, with 470 pF ATC "B" under each lead.

Bias has been optimized for low distortion in the above circuit. Use  $R_d=47$  ohms,  $R_s=22$  ohms as starting point values and adjust for 30-40 mA quiescent current (IDS) and approximately 4 V drain-source voltage (VDS).

## NE72084 TOP VIEW



## 144 MHz LOW DISTORTION PREAMP

USING NE72084

VDS	4 V
IDS	40 mA
P1dB	+18 dBm
IP3	+26 dBm
GAIN	25 dB
NF	0.7 dB

WB3JYO 10-93



## MID ATLANTIC VHF CONFERENCE REPORT

By Harry, W3IIT

The 17th Annual Mid Atlantic VHF Conference was a great success with a large turnout of hams from the Mid-Atlantic and New England states and Canada. The banquet resulted in a door prize for practically everyone. Al, K2UYH was the banquet speaker, giving us a tour of his EME exploits starting with giant dishes up to his present 28 foot dish that had it's 20th birthday in July. Al showed slides of the series of dishes that have been up starting with homebrew dishes even larger than his present one. His early dishes (shown on black and white slides) had a difficult time surviving the series of Atlantic hurricanes that came up the coast in the early 60's.

The technical talks started with Tom Williams, WA1MBA, showing us how to put together a 145 GHz rig and why it's difficult to work over much distance at these frequencies due to atmospheric absorption. Tom's charts of attenuation vs frequency, with varying amounts of moisture in the air accentuated the problems of rf power generation and receiver noise figure. Antenna gain at these frequencies does make moderate distances possible. Tom showed us his ideas on other frequencies that show promise and described a low cost 79 GHz Transverter that he is thinking of producing if there is sufficient interest; the target price is around \$500 including the antenna. Contact Tom for further information if you are interested.

Stan Hilinski, KA1ZE, was the next speaker. Stan told us why and how two complete Rover stations were put together on all bands from 50 MHz thru 10 GHz to break the previous January VHF Sweepstakes records for a single station, Rover station and club score. Stan described how he reviewed the contest rules to determine that his planned operation would not violate the rules for Rover operation. Stan's primary reason for this effort was to point out by example that the contest rules allowing Rovers to count the same grid from each location resulted in a scoring advantage that was greatly out of proportion to the effort involved. Stan said that if his score was calculated based on normal scoring (i.e. only counting a grid once on a band no matter how often it was worked from his Rover), then the score would have been around 250 K points. Stan's opinion is that this is more in proportion to the effort involved.

Because there have many incomplete, incorrect or misinterpreted reports about his operation, you would have to hear Stan's presentation to fully understand the complete operation. While most of the Rover station's contacts were between the two Rover stations (1440 contacts out of 1864 contacts for one of the stations), there were a considerable number of contacts made to other stations (424 for one of the stations). Although most of his contacts were of a short distance between the two Rovers, the stations had a fairly good capability with several watts of power on some bands and loop yagis. He was worked by some stations in the Philadelphia area which is a 100 miles or so from most of his roving area.

Stan described several options for Rover operation, ranging from: no Rover; no Rover to Rover contacts allowed; or changing the rules so that grids are counted only once, just like fixed stations (which still allows Rovers to work a station from several grids and to add up the contacts when calculating the score). During the discussion period, there was a "straw" vote on the possible rule changes that Stan considered. There were no votes for doing away with Rovers, eliminating Rover-to-Rover contacts, removing Rovers from club competition, requiring minimum distances for a contact, etc. I believe that everyone at the conference agreed that reducing grid counting procedure so that a grid can only be counted once per band (no matter how many grids that a Rover operates in) is the best method to make the scoring equitable when comparing efforts of Rovers and fixed stations, while giving an incentive to Rovers to operate from multiple grids.

MID ATLANTIC VHF CONFERENCE REPORT Contd.

Warren Stankiewicz, NF1J, from the ARRL contest operation at headquarters was our next speaker. Warren explained how the contest operation works and how rules are made (the contest people at headquarters do not make the rules- at most they advise). The role of the CAC was explained with the key word of CAC being "Advisory". My understanding is that the rule making really falls on the ARRL directors - they get advised by the CAC, and they may ask the headquarters group for their ideas (especially in the area of how to administer the rules) and the rules are made. If you don't like the rules write your director (these are my words-not Warren's). Needless to say there was a lot of discussion on the subject of Contesting, Rovers, Club Competition, and what the purpose of the contests were. Some suggested that a VHF CAC be formed since there was not a lot of confidence that the low band members of the CAC understand what VHF contests are about (I'm not sure that this is true but it was a common impression).

Bill Slack, N2XP, gave us a summary of what's available in Propagation software. Bill showed slides of a variety of plotting software to show terrain between locations, overall signal levels over areas based on typographic map data including shadowing. Field strength Contour plots, Path Profile plots, 3-D Terrain plots, and Shadowing Study plots were shown. Although this information is more often used in the commercial area, it is not so expensive to purchase or to have special plots made for amateur purposes.

Paul Shuch, N6TX, was next, giving us the secrets on how to win a Nobel Prize. I think Paul was serious and I took notes that I won't share since I'm going for the prize myself. Paul received the 1993 John Chambers Award at the Central States Conference for his contributions to amateur microwave communications. Paul's talk revolved around the finding of "dark matter" that astrophysicists believe must be in the universe but have not yet been able to identify. The key to detection is the invention of measuring equipment- why not by an amateur?

The last talk/demo was by John Sorter, KB3XG and Paul Drexler, WB3JYO on the use of FETs in Linear VHF Power Amplifiers. They reviewed the advantages and problems involve with the use of Power FETs. Practical hints and the reasons for the design decisions were presented, not just construction information. While John was doing most of the talking, Paul was busy at the bench at the side of the room busily assembling a broad band linear amplifier capable of delivering over 100 watts output on the bands from 50 MHz thru 222 MHz. John kept pace with Paul to attempt a common ending with the last word ending when the last solder connection was made. There was a slight disconnect, however the point that was made is that it's easy to build broadband power amps in this range of the VHF spectrum. Look for a complete article on the amplifier in Cheesebits soon.

SWAP SHOP

Send non commercial swap shop items to the editor.

WANTED: Microwave Modules (or Equiv.) 220/222 MHz Transverter with 28 MHz IF. Contact Sam Neil, N5AF, at Box 152, Cleveland, TX 77327, phone (713) 592-2257.

WANTED: Manual, schematic or technical data on a Servo Engineering TWTA model 3005-2 and Singer model 504 TWTA. Contact: Harry, W3IIT at 215-584-4846. Address on page 2.

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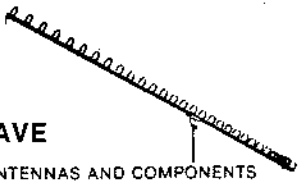
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