PACK RATS'

CHEESE BITS

PACK RATS

CLUB CALL: W3CCX

MT. AIRY VHF RADIO CLUB, INC.

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 APRIL 1990 NUMBER 4

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THE PREZ SEZ

Well, another Homebrew Night meeting has passed and the Rats are still putting out some very interesting projects. We had home-constructed gear operational on every ham band from 144 MHz to 5.7 GHz entered in the event this year. There was even some homebrew laser gear for light communications. Visitors N3EVV and N6JH flew in with their latest design projects. The new no-tune transverters from our friend W3HQT have really turned a lot of attention to the ease of getting on the microwave bands. Let's keep up the building and tinkering.

The June contest is coming up quickly and we need operators and input to make this another success. Contest chairman WA3AXV held a FB preliminary contest meeting on the 22nd and he's looking for a few more good men. Remember, we leave early on June 11 and return on the 14th. We will be at Chestnut Ridge, Pa FN01 again this year. Please, no rain!

That's it for now and hope to see you at the April meeting and in the upcoming VHF/UHF Sprints.

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

**** DUES ARE DUE! - $10.00 FULL MEMBER.....$5.00 - RETIRED MEMBER DUES ARE DUE! ****
*** NEW SUBSCRIPTION RATE FOR "CHEESE BITS" IS $7.00/yr IN EFFECT UPON RENEWAL IN 1990 ***

VISITORS AT THE MARCH 15 GENERAL MEETING

N3IT - HILDA EGNER, BALTIMORE, MD
N6JH - JERRY HINSHAW, TOWSON, MD
KT2B - PETE PUTMAN, BUCKINGHAM, PA
N3EVV - WALT RAUSCHER, NORRISTOWN, PA
N3EXA - BRIAN TAYLOR, DOYLESTOWN, PA
W3ICC - DREX DREXLER, WYCOMBE, PA
KB2ANG - GREGORY A. PIOPPI, EASTON, PA

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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.

SUBSCRIPTION/ADVERTISING MANAGER:
WB2YEH, BOB FISCHER
7258 WALNUT AVENUE
PENNSAUKEN, NJ 08110
(609) 665-8488

EDITOR:
WC2K, RICK CONNOR
412 CARRANZA ROAD
TABERNACLE, NJ 08088
(609) 268-0736

CONTRIBUTING EDITORS:
W3IIT, HARRY BROWN
3012 POTSHOP ROAD
NORRISTOWN, PA 19403
(215) 584-4846

WB3JYO, PAUL DREXLER
73 CHERRY LANE
WYCOMBE, PA 18980
(215) 598-3934

TYPIST/PRODUCTION ASSISTANT:
JANICE CONNOR

AWARDS CHAIRMAN:
W2EIF, JOE KILGORE
(609) 783-9478

CLUB HISTORIAN:
W3CL, HARRY B. STEIN
(215) 887-5052

TRUSTEE OF CLUB CALLSIGN - W3CCX
WA3AXV, RON WHITSEL
(215) 355-5730

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

OFFICERS: 1989 - 1990
PRESIDENT: N3CX DAVE HACKFORD
VICE-PRES: WB3DNI PAT CAWTHORNE
REC. SECY: WA3AQA WALT ZUMBACH
TREASURER: WA3YUE BRUCE LOSS
COR. SECY: WB3JYO PAUL DREXLER
DIRECTORS: WA3AXV RON WHITSEL (1YR)
K3GYS GUS NICOLELLA (1YR)
WA3JUF DAVE MASCARO (2YRS)
WA3NUF PHIL MIGUELEZ (2YRS)

MONDAY NIGHT NETS	NET CONTROL
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

VHF CONFERENCE CHAIRMAN:
KB2XG, JOHN SORTOR
(215) 766-2643

HAMARAMA CHAIRMAN:
W3ZD, DAVE ZIMMERMAN
(215) 675-4539

CALENDAR OF COMING EVENTS

By Harry Brown, W3IIT

APRIL

1 Baltimore ARC Hamfest, Timonium, Md. (2nd day) 146.07/67 talk-in.

7 Appalachian Amateur Repeater Group Hamfest at the Lebanon Fairgrounds, Lebanon, Pa. Talk-in 146.04/.64 and 146.52.

7,8 French international EME contest, 1st weekend.

9 ARRL 144 MHz Spring Sprint contest, 7-11 PM local time.

10 Passover

12 Pack Rat board of directors meeting; location to be announced on Monday night nets. Meeting starts promptly at 8PM. All interested parties invited.

13 Good Friday

15 Easter

17 ARRL 220 MHz Spring Sprint contest, 7-11 PM local time.

19 Pack Rat general membership meeting at the Southampton Free Library, Street Road, Southampton, Pa. Meeting begins at 8PM. Program to be announced on the club nets. Bring a buddy interested in VHF/UHF/SHF.

21,22 Trenton Computer Festival at Mercer Community College. This is the same event as in past years, but in a new location - not at Trenton State College this year.

25 ARRL 432 MHz Spring Sprint contest, 7-11 PM local time.

28-29 French EME contest, 2nd weekend.

27-29 Dayton Hamvention. If you've never been there, you've never seen anything like it. If you're looking to buy it or sell it, GO!

MAY

4 ARRL 902 MHz Spring Sprint contest, 7-11 PM local time.

10 ARRL 1296 MHz Spring Sprint contest, 7-11 PM local time.

17 ARRL 2304 MHz Spring Sprint contest, 7-11 PM local time.

18-20 16th annual VHF/UHF/SHF Conference at Rivier College, Nashua, New Hampshire

26-27 ARRL 50 MHz Spring Sprint contest 2300-0300Z.

JUNE

2 Pack Rat Ladies' Night banquet

PROPAGATION REPORT

Paul Drexler, WB3JYO

The solar cycle has taken a slight turn for the better during the past month, producing several short 50 MHz openings and several auroras. The solar flux index was as high as 229 on February 29th, with a K index of 3. The SFI fell to 166 by March 6th, and didn't climb much higher for the rest of the month.

On February 23, a brief aurora was reported, but no details were reported. On the 26th, with a SFI over 200 and a K of 1, N2WK and others in WNY caught a 50 MHz opening to VK land. Nice going, Wayne! The brief opening was also in to the Md/DC and New England areas; it reportedly "skipped over the heads of EPA and SNJ stations". WC2K ran into a rare one on March 2. FR5EL, Reunion Is., was worked by Rick and a few others in W1, W2, and W3 land during a very brief 6-meter opening between 1405 and 1425Z. 9L1US was in on his 50.031 CW frequency on the 3rd and 4th. Pack Rats who worked Dave should QSL via WA8JOC.

On March 12th, starting at 2030Z, a strong aurora gave local VHFers almost 4 hours propagation to New England, Canada, and the Midwest from 50 - 432 MHz! K5CM had a good signal on 2-meters from Oklahoma, and 220 and 432 were good to W8 and W9 land. Of course 6 meter range was best of all; signals from as far as Nebraska and Minnesota were 59A.

Start to look for some springtime tropo - watch for lingering high pressure weather systems, and the conditions for ducting: warm morning temperature following a cool evening, and warm evening temperatures following a relatively cool daytime temp. Keep a look-out for some more F-2 also. April 3-8 and 15-16 are dates which could produce some 50 MHz DX. Sporadic E season will pick up as the thunderstorm season arrives in late April and will provide good DX opportunities throughout the summer, especially on 6 and 2. And, don't forget the upcoming VHF/UHF sprints. See the calendar, page 3, for dates and times.

CU on the bands.

DAYTON HAMVENTION VHF/UHF PROGRAM

The VHF/UHF program starts Friday evening, April 27, with the preamp and converter noise figure measurements, right at the Hamvention site. Steve Whitefield, WA3OJX, and Norm Alred, WA8EUU, will perform the measurements on 144 through 1296 MHz. Door prizes will be awarded for top homebrew entries. Also enjoy the B*A*S*H food and entertainment in the adjoining area.

The VHF/UHF program resumes on Saturday morning at 0900 in room 5. A variety of subjects are scheduled; one or more should be of interest to most enthusiasts:

- "VHF & Above Contesting"	by Rick Connor, WC2K
- "ACSSB: Spectrum Efficiency for Amateur Radio"	by Jim Hendershot, WA6VQP
- "Simple 903/1296 MHz Transverters"	by Richard Campbell, KK7B
- "50 MHz DXing - An Update" plus "SMIRK International Awards of Merit"	by Ray Clark, K5ZMS Tex Kennedy, N5TX
- "QRP Portable VHF/UHF Operation - a la backpacking"	by Pete Putman, KT2B

The VHF/UHF program concludes on Sunday with the antenna gain measurements scheduled from 0600 till 1200. The measurements will be conducted on 144 - 1296 MHz by Joe Burke, WA8OGS and Terry Price, WD8ISK, at the Meadowdale High School (about 1/2 mile south of Hara Arena -free shuttle bus service provided. There are homebrew and commercial categories for each band. Prizes will be awarded to selected homebrew entries. Suggestions for the 1991 Dayton VHF/UHF program may be sent to Joe Burke, WA8OGS.

SWAP SHOP

FOR SALE: Two 50' lengths of 7/8" hardline with female N connectors each end. Good condx. $80/ea.
WANTED: 40 ft fold-over tower
CONTACT: Bob Fox, W3GXB
(215) 523-7766

WANTED: Help with some equipment troubles, IC-260 + 80W PA; have no test equipment.
CONTACT: Russ Edmunds
(215) 643-2353

WANTED: TOWER DEMOLITION CREW to remove 70 ft. crank-up near Valley Forge, Pa. Tentative date: 5/5. Free hoagies, unlimited beer provided.
CONTACT: John Sorter, KB3XG
(215) 766-2643

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. DOWNEAST MICROWAVE, Bill Olson, W3HQT, Box 2301 RR-1, Troy, Maine 04907. For information and orders telephone (207) 948-3741.

TID BITS

-**WA3FOF, Ralph,** has recently upgraded to Advanced Class. Congratulations!
-**N3IT, Hilda Egner,** flew in from Baltimore, Md in a rented plane with N6JH as co-pilot... Jerry flew the plane back. Al, K3EOD, piloted the airport to library shuttle.
-**Our Prez, N3CX,** is on the fast road to recovery from arthroscopic knee surgery and should be off the crutches in time for his busy fresh-water fishing schedule
-**KB2ANG, Greg,** visited our Homebrew Night and described his project. CU again soon, Greg!
-**6-meter DXCC** forms and QSL's have been submitted by VE1YX, W5FF, and K5FF. SMIRK representatives will be at the Dayton Hamvention to present an award to the first official recipient of the coveted 50 MHz DXCC.
-**FCC has relocated automatic beacon** operation in the 144 and 432 MHz bands. On 2-meters, the segment has been changed from 144.05-144.06 MHz to 144.275-144.300 MHz. On 432, the segment has been changed from 432.07-432.08 to 432.300-432.400.
-**Bob Stanhope, KB3YS,** has been elected as the EPa SCM. He replaces KC3LM, Kay, who has moved up to Vice Director of the Atlantic Division.

NEW MICROSAT AMATEUR SATELLITE OVERVIEW

		DOWNLINK		UPLINK
MICROSAT	FUNCTION	MHz	MODE	MHz & MODE
-PACSAT	Packet Radio BBS	437.050	SSB/BPSK	145.900, 145.920, 145.940 145.960 FM/FSK
-LUSAT	Packet Radio BBS	437.150	SSB/BPSK	145.840, 145.860, 145.880 145.960 FM/FSK
-WEBERSAT	Color TV camera	437.100	SSB/BPSK	Unannounced control link
-DOVE	Digitalker	145.825	FM/Voice	Unannounced 2-meter link
-UOSAT D,E	Experimental Packet	TBA	9600 baud	Unannounced contorl link

PACK RAT 1990 HOMEBREW NIGHT

Homebrew Night 1990 was a great success with over 40 persons attending and a fine display of home-constructed amateur gear. TNX to KT2B, K3IUV, and K3BPP who served as judges for the following entries:

N6JH - 903 transverter updated design to fit into a IC-202 transceiver
N3CX - 3456 MHz transverter with 5 watt PA and 144 MHz IF
N3AOG - 1296 and 2304 MHz no-tune transverter kits
WB3DNI - 903 MHz no-tune transverter kit
WA3JUF - Presentation on new watertight, low-cost enclosers for the homebrewer
WA3AXV - 3456 MHz no-tune transverter with PWRFET and IMFET PA's, rover-ready
WA3NUF - 1296 MHz 100 watt, 12VDC, solid state power amplifier
WB3JYO - 220 MHz 8877 triode power amplifier with driver stage
WA3YUE - Laser transmitter/recveiver
N3EVV - 903 and 1296 MHz transverters
WA2OMY - 5760 MHz transverter with 220 IF
KB3XG - 13dB gain, broadband log amplifier for 1 - 200 MHz

AND THE WINNERS ARE:

MOST UNIQUE - **WA3YUE** BEST CONSTRUCTION TECHNIQUES - **WB3JYO**
BEST TECHNICAL - **WA3AXV** and **WA2OMY** (tie) MOST HUMOROUS - **KB3XG**

ALL OTHER ENTRIES RECEIVE HONORABLE MENTION. HOMEBREWING IS ALIVE! NICE WORK!!!

* * * * *

RECEIVER STANDARDS NEEDED

The National Public Radio network criticised the FCC's reluctance to establish minimum RFI/TVI standards for radio and TV sets. NPR pointed out that the Communications Act gives the FCC authority to set such standards: "This provision was added in 1982 in an effort to encourage the Commission to adopt standards for television sets and home audio systems [which are] unduly susceptible to receiving 'interference' from amateur transmissions that meet all technical standards. The Commission, to date, has not acted on this authority. "Remedying this fundamental flaw in spectrum management by designating basic receiver standards would be of tremendous benefit to all users of electromagnetic services, particularly consumers, who are typically at a loss to identify the cause of such 'interference'", NPR said. TNX W5YI.

WHAT! NO ACSSB AFTER ALL?

United Parcel Serice may be on the verge of dropping ACSSB and going to FM in its recently purchased 220-222 MHz band. A regular listener of the Amateur Radio Newsline who is also a two-way radio serviceman called [our] radio news service with a story that the land mobile industry is buzzing with a rumor that II-Morrow the UPS subsidiary which is supposed to build the ACSSB gear, is having trouble making it work properly. The problem appears to be with the pilot tone that locks the system. It reportedly will not accept a 200 cycle drift. The rumor continues that II-Morrow will soon announce that the radios to be supplied will be FM and designed for 2.5 KHz channel spacing. One of the primary reasons given by the FCC for reallocating the 220-222 MHz band was for its use in the development of new, narrow band technologies. If this story holds, it would seem that the FCC has been duped by UPS and their radio boys. Seems that the whole proceedure should be reexamined by Congress. TNX WESTLINK.

PACK RAT EME PRIMER

EME is said to provide the radio amateur with the ultimate challenge in strengthening communications systems and demanding operator skill, patience, and all-out effort. The moon has been used as a reflector for signals from 50 MHz through at least 10 GHz. Contacts are possible between any two stations separated by as many as 12,500 miles as long as the two can simultaneously "see" the moon. EME was used for radio communications by the US Navy prior to the first amateur QSO which occurred on 1296 MHz in 1960. In July, 1976, the Pack Rats sponsored an EME expedition to South America to activate that continent for the first time with signals bounced off of the lunar surface. Several of today's active Rats participated in that expedition to Barranquilla, Columbia, where a portable station on 432 MHz was errected to work stations and allow K2UYH to become the first amateur to achieve WAC on 70cm. Today, at least two club members, WB2JHG and WC2K, pursue the challenge of EME on VHF/UHF.

EME operations and station requirements have become easier and more achievable over the past 10 years due to advances in receiver and antenna technology, and the activation of several super stations around the globe. The fundamental rule of EME is that since all earthly stations are located roughly equidistant from the moon, it is the size and capablility of the station being worked which determines the degree of success. W5UN in Mainville, Texas, can be worked by stations around the world with as little as 80 watts and a single yagi on 144 MHz. ZS3ALE, in South Africa, running 1500 watts and eight long-boom yagis will be easier to work for WB2JHG than a US station running the same power to 4 long-boom yagis. There are at least a dozen stations around the world on 432 and 144 who are workable by stations with moderate TX/RX systems and single yagis. The capabilities of EME-equipped stations are increasing constantly.

The following is an article submitted for Cheese Bits by Pack Rat Mark Adams, WB2JHG:

TWO METER EME ON A SHOESTRING BUDGET

After helping another ham, KI3W, to engineer and construct a two meter EME array two years ago, I decided to try some 2-meter moonbounce myself. I worked two stations with my single Cushcraft 4218 and about 800 watts output. The bug bit and I wanted to be able to track the moon, rather than wait for convenient moon-rise and set times. [Using a yagi with only azimuth rotor control, stations can be worked for about one hour each on rise and set by aiming at the moon.]

A pair of 4218's were soon put up, mounted side by side and with the ability to elevate. Ten additional stations were worked on schedules, but random QSO's were still not possible. Since I was relly enjoying moonbounce, I decided to build a new array from scratch with certain objectives in mind:

1) Antennas to be mounted low to the ground so I could erect them and service the array myself.

2) Array to have sufficient gain to allow me to hear my signal echoes and work random QSO's.

3) Array to be of clean mechanical construction to minimimize metal structures in antenna apertures.

4) Project to be completed on a low budget.

Since the development of commercial high gain long yagis (greater than 3.2 wavelengths), a four long-yagi array has become the norm for beginning EME stations. But for my puposes, this type of array was too expensive to construct and difficult for me to erect alone. I finally decided on an eight short-boom (1.4 wavelength) array. The yagis are each seven elements on a ten foot wooden boom. Gain is about 11.5 dBd each and weight per yagi including feedline is about 2 pounds. The eight beams are stacked two high and four wide. Elevation is accomplished by a TVRO "jackscrew" positioner with homebrew contol box.

(continued)

The crossboom of the H-frame is a 2" OD by 1/4" wall aluminum tubing. It tilts by rotating within four U-bolts which are tensioned with self-locking nuts to eliminate binding. With this set-up, the entire array can be tipped 180 degrees (upside down) to permit servicing of the upper yagis from the ground. The crossboom is only eleven feet above the ground. With the help of a well-stocked junk box and careful shopping, the entire antenna system including yagis, feedlines, azimuth rotor, elevation motor, power dividers, and tower was constructed for approximately $250.00.

I am very please with the results; I have had over 40 QSO's via EME and worked two 2-yagi stations and one single-yagi station. I copy my echoes regularly with one KW output.

Anyone with a single long yagi or even two short-boom yagis and roughly 500 watts should try 144 or 432 EME. It is a great way to check station performance and sharpen weak-signal operating skills. I will gladly help anyone who is interested in trying moonbounce by arranging skeds, printing moonrise and set times, and assisting in system planning.

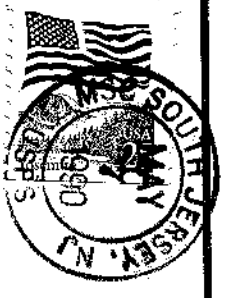
See you on the moon!
Mark, WB2JHG

There is an excellent section on EME written in the ARRL Handbook. Some of the peculiar phenomena which is encountered with moonbounce propagation is explained in detail. Antenna designs involving yagis and parabolic dishes are covered in the ARRL Antenna Book. There are several EME newsletters published which report operating news from active stations and equipment designs. Much of the mechanical and electrical equipment used for EME is best acquired through inovative homebrewing. There's always potential for improvement and development of new designs.

Moonbounce involves literally reflecting a signal off of the passive lunar surface and therefore signals are often very weak and CW is required. Strict QSO operating procedure by recognized sequence is recommended. There are optimum, good, fair, and poor periods for EME each month. Current computer programs provide tracking data as well as information concerning usable lunar periods. EME can be accomplished with great sophistication or as simple as "armstrong" aiming with portable arrays and modest gear. Most Pack Rats are capable of completing several EME contacts with their existing stations. As with all operation on VHF/UHF, more experience is required for success on the higher frequencies. Each initial QSO with a new EME station provides the thrill of the first novice contact! Consider the trip your signal makes... 250,000 miles to a rough celestial surface and then back to earth - with no help from repeaters or transponders. For this reason, EME QSO's are accepted for WAS and WAC awards as well as valid contest QSO's. It's a terrific way, once you're experienced, to pick up some long-haul grid square multipliers during the VHF contests.

If you're interested in learning more, read the material in the ARRL publications. On April 7,8 weekend and again on April 28,29 the French amateurs sponsor their REF EME contest. The bottom 50 - 100 KHz of 144 MHz and up will be buzzing with moonbouncers from the U.S. and DX land. Nets for the purpose of coordinating schedules and reporting are in session each Saturday and Sunday at 1600 - 1800Z on 14.345 MHz. K2UYH and his crew will be hosting an international EME conference at Trenton State College in August 1990. WB2JHG and WC2K can assist in answering most questions you may have concerning EME operation. Moonbounce is no longer an activity to be shy or discouraged about trying. You can really get your feet wet with a modest 144 or 432 MHz station. So put the cans on and carefully tune the bottom 20 KHz of the bands on these dates/times/headings:
4/6 moonrise: 2030-2200Z 83-98 degs; 4/7 moonset: 0745-0900Z 260-270 degs.
4/7 moonrise: 2145-2300Z 93-105 degs; 4/8 moonset: 0800-0930Z 250-265 degs.

Cheese Bits
2087 Parkdale Ave.
Glenside, Pa. 19038



W3FQD M 12/ 1990
DICK HUNTZINGER
130 FAIRHILL DR.
CHURCHVILLE, PA. 18966

FIRST CLASS