

PACK RATS'

SCANNED TO PDF BY BERT, K3IUV



PACK RATS

CLUB CALL: W3CCX

MT. AIRY VHF RADIO CLUB, INC.

CHEESE BITS



MT. AIRY VHF RADIO CLUB, INC., PHILADELPHIA, PENNSYLVANIA
50.125, 144.150, 220.125, 432.110, 1296.110 Mhz - W3CCX - Repeater 222.98/224.58 Mhz
Affiliated Club: AMERICAN RADIO RELAY LEAGUE
Meetings: Third Thursday of each month at 8:00 P.M.
Southampton Free Library, 947 E. Street Road
Southampton, Pennsylvania 19866

ARNS

VOLUME XXX

APRIL, 1988

NUMBER 4

THE PREZ SEZ

Homebrew Night was very good this year. Eleven Pack-Rats brought projects of every description - from simple to complex. The individual presentations were informative and inspiring. Seeing how someone else has tackled and completed a project is a big help when you start in on one of your own. Everyone that brought a project is to be congratulated and also thanked for sharing it with the club members at the meeting.

Harry Brown, W3IIT, provided Pack-Rat homebrew as prizes. We will have to ask the winners how it was at the next meeting.

I would like to thank the "volunteer" Judges, Dave, KA3KSD, our newest member, and Jim, N6JH, a visitor from the Baltimore area, for their help. In addition, congratulations to each winner in the 5 categories. I'm only sorry that all 11 participants couldn't get a prize, they each deserved one.

This month's Board meeting was held at the home of Rick, WC2K, and Janice, his wife. Thanks for your hospitality. We discussed the programs held at the meetings at the library and are making plans to have regular technical seminars. The Board of Directors also has made plans to have a program committee of 3 Pack-Rats headed by the Vice-President to try and make the job of finding speakers a little easier.

At the April meeting, we are going to have a sample of the type of technical programs we are planning. Listen to the Monday night nets for more specific information on April's program. If you have a program; know of a program you would like to see, or have any ideas, please let me or anyone on the Board of Directors know. We would like the meetings to be as interesting as possible, so if you have an idea, let us know!

For now, I have a new home in need of remodeling and 20 pounds of nails. See ya'all at the next meeting.

73's Bob, N2SB
609-722-0132

* * *

Pack Rats CHEESE BITS is a publication of THE MT. AIRY VHF RADIO CLUB, INC. Philadelphia, Pa. and is published monthly.

SUBSCRIPTION RATE - \$5.00 PER YEAR

We operate on an exchange basis with other publications. Anything that is printed in CHEESE BITS may be reprinted, unless otherwise stated, provided that proper credit is given.

SWAP SHOP ITEMS - NO CHARGE

DEADLINE FOR ARTICLES IS THE GENERAL MEMBERSHIP MEETING: THE THIRD THURSDAY OF THE MONTH.

EDITOR:

W3CL, HARRY B. STEIN
2087 Parkdale Ave.
Glenside, Pa. 19038
215-887-5052

PUBLISHER/SUBSCRIPTION MANAGER:

K3GAS, DOC CUTLER
7815 New Second Street
Elkins Park, Pa. 19117
215-635-1078

PRINTER:

WB2VLA, DAVID POWER
609-882-1040

TYPIST:

WA3TEM, MARSHA LISSAUER

TRUSTEE OF THE CLUB CALL - W3CCX:

WA3AXV, RONALD WHITSEL
215-355-5730

AWARDS CHAIRMAN:

W2EIF, JOSEPH KILGORE
609-783-9478

CLUB HISTORIAN:

W3CL, HARRY B. STEIN

MONDAY NIGHT NETS

<u>MONDAY NIGHT NETS</u>	<u>NET CONTROL</u>
7:30 PM - 50.125 MHz	W3CL
8:00 PM - 144.150 MHz	W2EIF
8:30 PM - 222.98/224.58	K3GAS
8:30 PM - 220.125 MHz	KS2T/WB2NPE
9:00 PM - 432.110 MHz	WA2OMY/K1PXE
9:30 PM - 1296.1 MHz	N3CX/WA3JUF/WA3NUF

PAVK RAT REPEATER 222.98/224.58 MHz -W3CCX
LOCATED IN CHURCHVILLE, PA.

OFFICERS: 1987 - 1988

PRESIDENT: N2SB, BOB COOK
VICE-PRES: N3CX, DAVE HACKFORD
COR. SECY: W3CXU, JOHN ALLEN
REC. SECY: WA3AQA, WALT ZUMBACH
TREASURER: K3GAS, DOC CUTLER
DIRECTORS:


WA2OMY, GARY HITCHNER (EX OFF)
WB3JYO, PAUL DREXLER (2 Yrs)
WB2NPE, RICK CONNOR (2 Yrs)
WB3DNI, PAT CAWTHORNE (1 Yr)
WB2VLA, DAVE POWER (1 Yr)

VHF CONFERENCE CHAIRMAN:

WA2OMY, GARY HITCHNER
215-539-6409

HAMARAMA CHAIRMAN:

WB3DNI, PAT CAWTHORNE
215-672-5289

THE AMERICAN RADIO RELAY LEAGUEOST

HUGH A. TURNBULL, W3ABC


Director, Atlantic Division

6903 RHODE ISLAND AVE.
COLLEGE PARK, MD. 20740

(301) 927-1797

1-302-478-2757


AMATEUR and ADVANCED COMMUNICATIONS



"Gisele"
K3WAJ

G. B. WALLS

3208 CONCORD PIKE (RT. 202)
WILMINGTON, DEL. 19803



Pennsylvania Institute of Technology

ENGINEERING

PAUL D. MERCADO
Chairperson, Drafting Design Department

215-565-7900

Rose Valley-Notre Dame Campus
800 Manchester Ave., Media, Pa. 19063-4098

CALENDAR OF COMING EVENTS
By Harry Brown, W3IIT

APRIL

- 2 PASSOVER
- 3 EASTER SUNDAY
- 11 ARRL Spring 2 Meter sprint (Monday evenings) 7-11 P.M.
- 13 EME Perigee
- 14 Pack-Rat Board of Directors Meeting at the QTH of Pat Cawthorne, WB3DNI. All interested parties invited. Call 215-672-5289 for directions.
- 16 New Moon
- 19 ARRL Spring 220 Mhz Sprint (Tuesday evening) 7-11 P.M.
- 21 Pack-Rat April general membership meeting at the Southampton Free Library at 8:00 P.M. Bring and/or invite your on the air VHF buddies. All VHFers invited - Even an HFer! Tech Program.
- 21 Predicted peak of the Lyrids meteor shower at 1720 UTC.
- 24 Willingboro Repeater Group Hamfest at the Stardust Ballroom, Rte. 130 and Haddonfield Rd., Pennsauken, N.J. Talk-in on 146.925R and 146.52.
- 27 ARRL Spring 432 Mhz Sprint (Wednesday evening) 7-11 P.M.
- 29-May 1 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 or see it GO.

Dayton Hamvention VHF/UHF Program
April 29,30, May 1, 1988
Sponsored by Midwest VHF/UHF Society
The UHF/VHF Forum starts at 9 A.M. Saturday morning
and will include the following: "Getting started
on Microwaves" by Kent Brittain, WA5UJB
"VHF/UHF Contesting" by Terry Price, WD8ISK
"VHF DXpeditions" by Dr. Rich Dorsch, NE8Z/HCLMD

* * *

The Delaware Valley Sidewinders on Two Net is now meeting on a new night. Effective Feb. 29, 1988, the net will be held on MONDAY nights. The time will remain 9 P.M., and the frequency will remain 144.250 Mhz. You are encouraged to join us on our new night as soon as possible. If you have not checked in for a while, you will find a less formal net, with shortened introductory remarks. We'll be listening for you!!

73, de WB2BJH, NCS

PROPAGATION REPORT
Paul Drexler, WB3JYO

Activity during the last month has again been fairly sparse, however, there is some news to note. Look for some good six meter openings in the near future - Hal, W3HFY relays the AMSAT Report of March 21st indicates a rapid rise in solar flux activity, which along with several other indicators may point to F2 openings in the very near future. The report also notes that the upcoming sunspot activity peak may well produce all-time record numbers, meaning terrific six meter F2 openings and possibly some good 2 meter openings. The recent increase in solar activity has resulted in good openings on the 28 Mhz band; WC2K reports 'worldwide' conditions on 10 meters on March 19th. Look for good propagation on six in the near future!

The 220 net on March 22nd was blessed with good band conditions. New England and Western NY stations had better than average signals, and KB4XX (N. Cal) checked in. Unfortunately, however, 432 didn't receive any noticeable enhancement the same evening.

Mark your calendar for the upcoming Spring Sprints. These contests are not nearly as grueling as the January, June, or September contests - the Sprints last only 4 hours from 7 to 11 PM local time each week during the activity night for each band. The first sprint is on 144 Mhz on April 11th, followed by the 220 Sprint on the 19th of the following week. The 432, 903, 1296, 2304, and 50 Mhz Sprints will follow in that order - see the Packrat calendar or April QST, Page 97 for the contest dates. See you in the sprints!

* * *

PRESS RELEASE

14th Annual Eastern VHF/UHF/SHF Conference

The 14th Annual Eastern VHF/UHF Conference will be held May 20-22, 1988, at Rivier College, Nashua, New Hampshire. Rivier College is located near Route 3 a short distance north of the Massachusetts border.

The program features a Friday night hospitality room including an informal "Swap-fest", a technical talks by well-known VHFers on Saturday, "rap sessions" for the various VHF/UHF bands, noise figure and antenna gain measurements on Sunday, and other activities of interest to the VHF/UHF experimenter and operator.

Housing will be available in dormitory rooms at the college at a nominal charge. To preregister or reserve a room, contact David Knight, KALDT, 15 Oakdale Avenue, Nashua, NH 03062 before May 14. Registration at the door is \$20. Those wishing accommodations in the dormitory must include payment at the time of preregistration. For those wishing to make their own housing arrangements, there are numerous hotels and motels nearby. A map of the area will be included with registration materials.

The 14th Eastern VHF/UHF/SHF Conference is sponsored by the Northeast VHF Association. The conference chairman is Thomas Kirby, W1EJ, who is ably assisted by a staff of volunteers from the New England VHF Community.

Point of Contact: Lewis D. Collins, W1GXT, Publicity Chairman, Eastern VHF/UHF/SHF Conference, 10 Marshall Terrace, Wayland, MA 01778 617-358-2854 (6 to 10 PM EST)

* * *

SWAP SHOP

FOR SALE: AM Closing out on 2 meters!
2 mtr RCA Commercial VHF Coaxial line
amp. 8122 final - 10W. in - over 300W. out.
Spare final included \$75. (In service now
if you want to observe operation)
Cushcraft 32-19 2 mtr boomer \$50.
220 Cushcraft boomer \$55. 2-33 element 903
loops \$50 each.

CONTACT: Dave Hackford, N3CX
Phone: 215-679-7293 - Home.
215-483-2030 - Work

FOR SALE: Rohn model 25G tower -
48 ft. fold-over - good condx. 15ft.
mast, Rohn winch, cable, base plate,
rotor plate, top thrust bearings. Two
10ft. sections can be added for
additional height. Complete set of Rohn
installation drawings showing location
for adding two 10 ft. sections \$475.

CONTACT: Lee - W2KFC
1904 Prelude Drive
Vienna, VA 22180
Phone: 703-281-2787

FOR SALE: Icom 730 xcvr w/cw filter &
transverter option; mint - \$400. TNC 2A
packet modem \$100.

CONTACT: Bill, K3ZMA
Phone: 215-822-0749 evenings

FOR SALE: National NC303 Rcvr - excel.
condx. \$65. Good 5 in. scope leader \$35;
Heath Commanche rcvr; Cheyenne xmtr &
Pwr sply \$50. Heath DX 60 xmtr, Hallicrafter
VFO \$25. spkrs, var. caps, feed thrus.
Standoffs, tubes, 8 trk and cassette
tapes, reel to reel concord player -
recorder. TRS 80 all models, programs cheap
Heath 19 in color tv - free if picked up;
all manuals. TRS 80 color computer .2,
CGR 81 computer cassette recorder; Tandy
RGB color - monitor CM8 (needs some work),
programs - all the computer stuff \$50.

CONTACT: Doc Cutler, K3GAS
Phone: 215-635-1078

FOR SALE: AM 6154 amp. modified for 2
mtrs - 450W. output, new 8930 \$325.

CONTACT: Scotty, KI3W
Phone: 717-626-0991

FOR SALE: 6 mtr. brick amp. linear, 2 in.
60W. out (VHF Engineering) \$50.

CONTACT: Mark Adams, WB2JHG
Phone: 609-654-4441

FOR SALE: 100 W. solid state mobiles
36-42 Mhz. conversions possible or pwr.
amp. could be used as final for QRP rig.
Complete w/accs. \$45 (Will consider swap)

CONTACT: Tom, WA2RUG
Phone: 609-779-8833 before 10 PM

COMMERCIAL ADS

FOR SALE/TRADE: Yaesu (Ft - 1 xcvr - immaculate, \$1499; FT - 620B xcvr.
Kenwood TS 530SP - 160 thru 10 mtrs - incl. WARC band \$650; TS820S - HF Xcvr \$520;
TS520SE - HF Xcvr \$475; TR 7730 Xcvr 2 mtr. FM \$225;
CONTACT: Tony Musero, K3UKW, 1609 So. Iseminger St., Phila., Pa. 19148
Phone: 215-271-8898

LOOP YAGIS: 902 Mhz 33 element \$80 kit, \$97 assembled and tested. 1296, 45 element
\$80 kit, \$97 assembled and tested. 1296 - 55 element (New "Super Looper") \$95 kit,
\$119 assembled and tested. 2304 - 45 element \$70 kit, \$89 assembled and tested. Also,
available: Element & hardware kits for above, 2 and 4 way power dividers, stacking frames
and power dividers. Discount on complete arrays. Solid State Linear Amplifiers, 13.8
V.D.C.: 1296 Mhz 8W in 35W out \$305 (\$210 in kit form) 1 watt in 18 w out \$255. 902 Mhz
10W in 40W out \$305, 1 watt in 20W out \$255. Coming soon: 65 watts solid state linear
for 1296. GAAS FET PREAMPS: Under 1dB N.F. 902 \$80, 1296 \$80, 2304 \$139. LMW
Microwave Transverter Kits: 1296 1 watt \$170. 2304 0.4 watt \$219. 2304 preamp \$63.
Universal 1 Ghz L.O. kit \$44 less xtal 700-800 Mhz L.O. kit \$47. Xtals available.
Write for complete catalog: DOWN EAST MICROWAVE, Bill Olson, W3HQT, Box 2310, R.R.1,
Troy, ME 04987 (207) 948-3741.

* * *

HOME BREW NIGHT

by BOB COOK, N2SB

A. JUDGES: Dave, KA3KSD (new member)
Jim, N6JH (Visitor from Baltimore area)
Bob, N2SB (Unknown origin)

B. THE PROJECTS & THEIR BUILDERS:

K3GAS - Doc = Magnetics & practical applications
W2EIF - Jo = 2 tube (2C39) 1296 Mhz amp - air-cooled & latest improvements
for stable hi-power operation
K3GYS - Gus = 903 xvtr in the works - looks like a good start on 1st project.
WA3JUF - Dave = 100W 903 solid-state amp & 1.2W class C amp for 3456 rover
units.
WA3NUF - Phil = 903 xvtr put together in 4 days before contest (10W)
WA3AXV - Ron = 903 xvtr & technical discussion of construction practices
W3NSI - Lyn = new deck on home w/provision for ease of antenna work.
Nice photos & display of "components" - possibly first use of
galvanized hardware on homebrew night.
WB3JYO - Paul - 23 Ghz 7W xvtr w/double decker construction.
KB3XG - Jon = Power meters & couplers to 100 watts & 50 - 220 Mhz FET
power amp P/P w/feedback for gain flatness
WA3IWT - Rich = 1N23 noise source and noise meter (RSGB VHF Manual)
WB3DNI - Pat = 1296 xvtr in box complete with power supply.

C. THE CATEGORIES & WINNERS:

Best Construction = Paul, WB3JYO - Beautiful attention to details.
Most Ambitious - Jon, KB3XG - I-built test equip. before building FET amp
(Un-heard of!!)
Most Unusual (Speedy) = Phil "Speedy" Miguez, WA3NUF - Fastest 903 xvtr in
the East!
Best Science Project = Doc, K3GAS - Magnetics & practical? application
Most Interesting Technical Presentation = Ron, WA3AXV - Rack mounted 903 xvtr &
discussion of construction practices.

D. PRIZES AT MEETING: Pack - Rat Homebrew by Harry Brown, W3IIT - Raspberry Wine.

* * *

VISITORS March 18, 1988 MEETING

John Ferrante - Cherry Hill, N.J.
N6JH, Jerry Hinshaw - Frederick, MD
KA3KSD, Dave Mueller - Pittsburgh, Pa.

VOTED TO MEMBERSHIP

KA3KSD - David A. Mueller
New Address Will Follow

CHANGE OF PHONE NUMBER

N2SB - Bob Cook, 609-722-0132

NEW NET CONTROL FOR THE MONDAY
NITE NET

432.110 Mhz net at 9 P.M.
WA3AXV - Ron Whitsel

We sadly report the following who passed away recently:
Gracie Van Dyke, WA3BJQ - Wife of George Van Dyke, W3HK
Susie Kilgore, Wife of Jo Kilgore, W2EIF
Erna, Sister of Ernie Kenas, W3KKN
OUR CONDOLENCES TO THEIR FAMILIES.

* * *

TID BITS

Sunspot No. for February 1988 - 40.2 - Smoothed No. for September 1987 = 34.9.

Received a letter from Randy Bynum our West Coast Pack-Rat. Reports a recent family trip to New Zealand and Australia. Sends 73.

Had a FB telcon with John Tate, K3KTY our Florida Pack-Rat - John reports that his 50ft, tower is up - will be back on all bands soon. Sends his 73.

Bob Bennett, W3WCQ of the VUCC will be the ARRL guest speaker at the ARRL Nite meeting on May 19th.

The 1296.1 Mhz Monday Nite Net temporarily off the air until our primary net control station WA3NUF repairs his antenna system.

Carl Croce, K3DLS off the sick list. Good news.

Charles Lustick, K3HSS underwent exploratory surgery - a speedy recovery, Charley.

K3VIT, Tom Jenkins reports a new repeater on 220 will be in operation soon.
(224.82/223.22) K3VIT control.

Doc, K3GAS, received a letter from Rich Subin, K2EVW who is flitting about in Japan - expects to be back in the States in April, but perhaps as late as July!

* * *

THE FOLLOWING ARE DELINQUENT IN THEIR DUES

\$8.00 Full Members

N3AHI
KF6AJ
N3AOG
N2AQJ
N2ASC
WB2BJH
WB3CDE
N2CG
W3CJU
WB3CPW
WB3CTP

N3EAX
K3EOD
K3EPB
WA3EPS
K3ESJ
W3FEY
W3FQD
WB2GEZ
K3GFF
WA3HIT

\$4.00 Retired Members

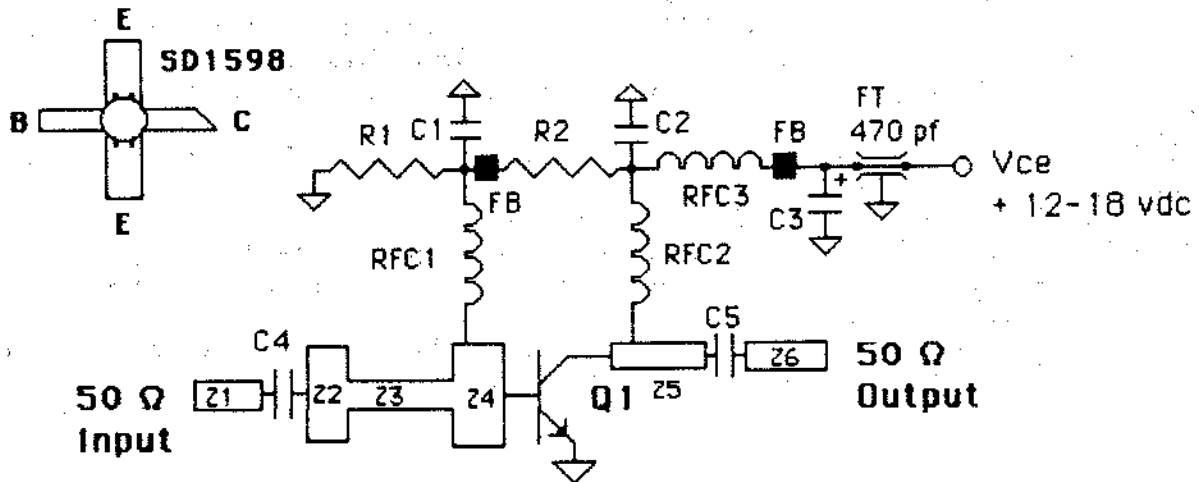
W3HMU
K3HW
WB3IGR
K3IGX
K3IPM
KD6KD
WB3KES
NF2L
WA3NDE
WA3NFV

KB3QM
WB2RVX
W3RZU
WB2SZK
AC3T
WA3TSE
K3VEQ
AA2Z
WB8ZAR
K3ZPN

(I Apologize if there are errors. Doc K3GAS)

* * *

800-950 MHz Linear Amplifier



Gain 10-12 dB up to 350 mw Pout
 Gain 7-9 dB gain up to 1 watt Pout

Adjust Vce and bias for the Pout level being used. Use an LM317T regulator for the supply voltage.

RFC1 0.03" X 1.3" microstrip
 RFC2 0.03" X 1.5" microstrip
 Z1,Z6 0.11" X any length 50 Ω
 Z2 0.32" X 0.6" microstrip
 Z3 0.15" X 0.5" microstrip
 Z4 0.40" X 0.5" microstrip
 Z5 0.15" X 1.0" microstrip
 FB Ferrite beads
 R1 100 Ω 1/2 watt
 R2 ≈ 1.5 K Ω 1/2 watt
 Adjust R2 for Icq 20-40 ma.
 depending on gain or Pout

Q1 Thomson/Mostek SD1598
 C1,2,4,5 100 pf chips
 C3 10 ufd/35 vdc electrolytic
 RFC3 8t, #26, 0.1" ID

Trim Z2 and Z4 for Input RTL and width of Z5 for maximum Pout.

Board material is 1/16" G-10 fiberglass double sided. Ground plane side is unetched. Use rivets at all dc and RF grounds.

WA3JUF
 D. Mascaro 1986

Hints And Bits

IF feedthru is a real problem when using VHF/UHF transverters. A typical situation involves using a 10 Watt 2 meter Rig as the IF for 1296 MHz. The feedthru from the 2 meter radio is sufficient to make QSO's on 144 MHz when you are operating on 1296.

This shows up usually in the contest and means you have a station in your 1296 LOG and he has you in his 144 MHz LOG. Then the "worked B4" situation occurs when you really want to work him on 2 meters.

The isolation of the coax relays used to switch from the 2 meter system to 1296 allows signals to be received and transmitted on both bands. This happens easily because the activity is at XXX.100 MHz on each band. The feedthru problem is amplified in the RX and TX modes by the 2 meter Linear Amplifier brick. The GaAsFET preamp is **ON** and the hard keying line to the 2 meter brick may not be disabled by proper switching. This means the RX signals move the S-meter and you can actually be transmitting **mw's** on 2 meters.

The feedthru problem can also exist when using a 28 MHz IF and wafer type switching to change bands. The RX signals from other transverters can feedthru the switching system on both RX and TX. It is possible to work someone on the 28 MHz IF. This is very confusing during a contest.

The fixes:

1. Open the 2 meter rig and use the driver power (mw) to drive the XVTR. Disable the final amplifiers.
2. Change the L.O. crystal in the transverter so the IF is increased to 144.300 or higher. (1296.100 will be 144.400 instead of 144.100)
3. Make sure the 2 meter preamp is **OFF** and the hard keying line disabled.
4. Increase the isolation of the switching system by using good relays, and eliminating wafer switches for RF.
5. Use dual conversion on the higher bands. Use an HF rig on 29 MHz (not with 100 watts into a load) to drive a simple 2 meter VXTR (mw's output) which will then drive the 1296 or 2304 XVTRs with 145 MHz.
6. Turn off the IF post amplifier stages in the transverters not being used at the time, so signals at the IF don't come thru the switching system.
7. If the feedthru occurs only with the stronger locals, then simply momentarily turning off one transverter at a time will indicate feedthru.
8. All of the above, #2 being the easiest and probably can be done by just plugging in the new crystal and checking the frequency.

The feedthru is far less a problem on 2304 MHz because the activity being 2304.075 MHz or lower, which is below the CW activity on the 2 meter dial.

Feedthru can occur on any band, with any IF, where "the dials read the same." Knowing who is on the higher bands can help eliminate the problems of feedthru. If you hear a station on 1296 and you know he doesn't have 1296 gear, then you know it's feedthru. Get on the air between contests and work the locals and clean up your feedthru problems before the next contest.

de WA3JUF

HINTS and BITS

Besides Radio and TV stations, there are many other communications systems on the air. With all these RF signals criss-crossing thru the airwaves, there are other signals that are generated. These are the result of frequency mixing, images and other products. Various types of modulation can be heard, a few have steady carriers. Many of these signals are on the air all the time.

Some of these "signal sources" are within Amateur bands and can be used to determine propagation and equipment operation. These can be used in addition to the VHF/UHF Amateur beacons that many of us use now.

On the 70cm band, there are two unmodulated signals that I use to determine that my receiver is working. One at 431.291 MHz that peaks north-northeast from Ottsville, Pa. The other is 432.180 MHz peaking west from my QTH. I have no idea where these signals originate.

Radar systems are interesting "signal sources" also. While working in the shack in the wee hours of the morning, many Pack Rats have used the sweeping radar signals on 1296 MHz to keep us company. Keep in mind that hearing radar real good does not necessarily mean you have a good receive system. Usually selectivity in your front end will reduce the broad radar signals. Using a normally S6 radar signal for example, not hearing it at all could indicate a receive problem.

So, tune around. Some of these bothersome "birdies" are away from the normal operating frequencies and are actually useable signals. Let me know what you hear.

de WA3JUF

**DOWN
EAST
MICROWAVE**

MICROWAVE ANTENNAS AND COMPONENTS

BILL OLSON
W3HQ7

BOX 2310 RR1
TROY, ME 04987
(207) 948-3741

**73 Amateur Radio's
Technical Journal**
PO BOX 931
FARMINGDALE, NY 11737

\$25 one year \$53 three years

NE 7-6329

GEORGE S. VAN DYKE, JR., P.E.
CONSULTING ENGINEER

W3HK

4607 CONVENT LANE
PHILA., PA. 19114

High-Tech Electronics

939 Township Line Road
Elkins Park, PA 19117
(215) 886-5100



ELECTRONIC PARTS DISTRIBUTOR FOR:
RCA • PHILLIPS ECG • AMP • UNGER • QUAM SPEAKERS
TECH SPRAY • SAMS PHOTO • WINEGUARD ANT. • FACTS
PRB VCR BELTS • LITLIFUSE FUSES • TRW

(302) 328-7728
ORDER LINE 800-441-7008



Delaware Amateur Supply

"AMATEUR SALES AND SERVICE"

PAUL WA3QPK
KATHY KA31Y0

71 MEADOW ROAD
NEW CASTLE, DELAWARE 19720

AMATEUR
SALES & SERVICE

(215) OL 9-5900

"HAM" BUERGER INC.

Communication Specialists

BOB HERSHMAN
WA3ZID

68 N. YORK RD.
WILLOW GROVE, PA. 19090

215-342-5982

WA3HIT

Paul and Betty Rilling

INCOME DIVERSIFICATION

5830 Weymouth Street -Phila., Pa.19120

The Ham Radio Publishing Group



Greenville, NH 03048 (603) 878-1441

HAM RADIO - the Technical Ham's
Magazine. Ask for a free sample
copy or our Book Catalog.

CALL DOC CUTLER (K3GAS)
FOR YOUR ELECTRONIC NEEDS

NEW, RECONDITIONED, OR AS IS.

LOW PRICES

by appointment 215-635-1078

**BARISH
SALES
ASSOCIATES**

Carl Barish

P.O. Box 4247 • Bellevue, Washington 98009

(206) 746-6000

TELEPHONE PRODUCTS FOR THE INDUSTRY



**NESHAMINY
TRAVEL
SERVICE**

Harriet Soltoff
Home: (215) 947-4483

xy1 K3IUV

2337 Neshaminy Blvd.
Bensalem, PA 19020

BROWSING - THURS. 7^{PM} to 9^{PM}
SAT. 8^{AM} to 4^{PM}

Day-Nite (215) 455-2121

FERTIK'S ELECTRONICS

Components & Equipment

LEON FERTIK

5400 ELLA STREET
PHILADELPHIA, PA. 19120



52 Stonewyck Drive
Belle Mead, New Jersey 08502
(201) 874-6013
Telex 5108014312 (PX Shack)
Easylink 62930060

IVARS LAUZUMS
Director KC2PX

MICROWAVE MODULES LIMITED

TONNA F9FT

(215) 747-5052

W3CL

HARRY B. STEIN ASSOCIATES

COMMUNICATIONS CONSULTANTS

HARRY B. STEIN

2087 PARKDALE AVE.
GLENSIDE, PA. 19038

(302) 326-7728
ORDER LINE 800-441-7008



Delaware Amateur Supply

"AMATEUR SALES AND SERVICE"

ROB WA3QLS
GAIL KA317N

71 MEADOW ROAD
NEW CASTLE, DELAWARE 19720

(215) 745-6173
(302) 875-4142
(215) 342-8832



COMPU-SIMPLE
COMPUTER APPLICATIONS FOR SMALL BUSINESS

ELLIOTT T. WEISMAN
Consultant

P.O. BOX 7161
WILMINGTON, DELAWARE 19803



Jenkintown & Glenside Electric Co.

220 YORK ROAD
JENKINTOWN, PA
Turner 4-0375 - 4-1050
WA 7-4326



**JUDGE
INC.**

HOWARD WEINSTEIN
K3HW
DoD Tech Recruiter

THE EXECUTIVE MEWS
SUITE G-37
1930 E. MARLTON PIKE
CHERRY HILL, NJ 08003
609-424-8600

