

# PACK RATS'

SCANNED TO PDF BY BERT, K3HUV



**PACK RATS**

CLUB CALL: W3CCX

# CHEESE

# BITS



MT. AIRY VHF RADIO CLUB, INC.

MT. AIRY VHF RADIO CLUB, INC., PHILADELPHIA, PENNSYLVANIA

ARNS

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

VOLUME XXVI

JUNE, 1987

NUMBER 6

## THE PREZ SEZ

I am happy to report this month that the annual ARRL night was a great success. I was glad to be able to attend the "Meet the Speaker" dinner and meet John Lindholm, Kay Craiggie and Jim Mozley all representing the ARRL at our meeting. Kay mentioned that the Pack Rats was one of the best clubs and ham organizations of which to be a member. Jim was also very pleased at our performance in VHF and the contributions that we have made to the VHF community. John Lindholm gave an excellent slide show and presentation on Mountain Top VHF Contesting. It sure made me think about what 50 watts can do from the right location. In the end, John presented the club with our 27th Gavel. It is definitely an accomplishment of which all of the contest participants can be proud. We thank John, Kay and Jim for coming out and making the evening a success.

June will also be a busy month for the club. The Spruce Knob gang has made final plans for a maximum effort for the contest. We may be able to see pictures and get a good report for the June club meeting. Above all, I wish the group good luck with weather and equipment. If you are not going, please make an effort to work the expedition on as many bands as you have. That is on June 13/15 during the ARRL June VHF QSO Party.

June will also mean an election and a new president. I have enjoyed serving as your president and look back on it as quite a learning experience. My hope is for the club to expand, with active members on the UHF and VHF frequencies, along with growth in the world above 50MHz. Good luck.

73, Gary Hitchner, WA2OMY

\* \* \*

## ARRL VHF SWEEPSTAKES: EASTERN PA DOMINATES!

Eastern Pennsylvania clubs won all 3 categories in the 1987 ARRL VHF Sweepstakes! Murgas ARC won the local category, Delaware Valley VHF took the medium title, and Mt. Airy VHF ("Pack Rats") topped the unlimited group. And that's not all! Suburban ARC, Warminster ARC, Mobile Sixers RC, and Penn Wireless Assn, rounded out our Section's entries, giving us exactly 25% of the clubs participating in the 'test'! Congratulations to these ARRL Affiliated Clubs and all their operators, from Eastern PA Section leadership!

(Tnx Kay Craige, KC3LM)

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SWAP SHOP ITEMS - NO CHARGE

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

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609-783-9478

CLUB HISTORIAN:

W3CL, HARRY B. STEIN

MONDAY NIGHT NETS

7:30 PM - 50.125 MHZ  
8:00 PM - 144.150 MHZ  
8:30 PM - 222.98/224.58 MHZ  
8:45 PM - 220.125 MHZ  
9:00 PM - 432.110 MHZ  
9:30 PM - 1296.1 MHZ

NET CONTROL

W3CL  
W2EIF  
K3GAS  
KS2T  
K3IUU/K1PXE  
- - -

PACK RAT REPEATER 222.98/224.58 MHZ/ W3CCX  
LOCATED IN CHURCHVILLE, PA.

OFFICERS: 1986-1987

PRESIDENT: WA2OMY, GARY HITCHNER  
VICE-PRES: N2SB, BOB COOK  
COR. SECY : W3CXU, JOHN ALLEN  
REC. SECY : WA3AQA, WALT ZUMBACH  
TREASURER: K3GAS, DOC CUTLER  
DIRECTORS: WB2RVX, MIKE GULLO (EX-OFF)  
WB3DNI, PAT CAWTHORNE (2 Yrs)  
WB2VLA, DAVE POWER (2 Yrs)  
N3CX, DAVE HACKFORD (1 Yr)  
WA3JUF, DAVE MASCARO (1 Yr)



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TID BITS

Sunspot No. for April 1987 = 39.3. Smoothed No. for October 1986 = 15.5.

Thanks to Ed Noll, W3FQJ, for a contribution to our repeater operations.

The 6 meter band openings on Monday evenings has allowed John, K3KTY to check in the past few weeks. Will keep looking for you, John. He also worked K3ACR on 10 meters.

Our Indiana member WB9PUJ, Dick Bokern will be in the Spruce Knob area during the June VHF QSO Party. Looking forward to making contact with W3CCX/8.

An FB write-up appeared in the neighbors issue of the Phila. Inquirer on Thursday, May 21, 1987 with interviews made at the Warminster ARC at their Hamfest on Sunday May 17, 1987.

Hy Ecksel, WA3NDE went in for eye surgery the end of May. A speedy recovery, Hy.

On the same note, our past Prez, K3HSS, Charley Lustick underwent eye surgery also. He is coming along fine.

A note from Jay, KS2T, our 220 low-end net control has been confined to bed for over a month with a bad leg problem. Recover quickly Jay.

It saddens us to report the recent passing of Ruth Ann, the daughter of Bert & Ernie Kenas (W3TNP, W3KKN). Our condolences to the Kenas family.

Congrats to Paul, WB3JYO on receiving his B.S. Degree in Electrical Engineering from Drexel University.

\* \* \* \*

A MESSAGE FROM THE EPA SM

I'd like to thank the officers and members of the Pack Rats for the excellent dinner and very friendly reception at the meeting last night. I thought W1XX's talk on mountain-topping was very informative, and it helped me understand better what you guys are up to. I have written to Bernice Dunn, K1KXQ at ARRL Headquarters, asking her to send the forms to you for having the Ham-A-Rama granted ARRL Sanction. I am sure that W3ABC will be pleased to see this very large, well-run hamfest interested in sanction. It would certainly be my pleasure to attend the hamfest "officially," though you know I always attend it no matter what. And congratulations again on the contest victory and the newsletter award.

73/88 Kay, KC3LM

\* \* \*

CALENDER OF COMING EVENTS

by Harry Brown, W3IIT

JUNE

- 4 Pack-Rat Board of Directors meeting at the QTH of N3CX at 8 P.M. Phone 215-679-7293
- 7 Manassas, VA (Ole VA Hams) Hamfest
- 14 Milton, PA Hamfest
- 13-15 ARRL June VHF QSO Party, See p. 86, May QST
- 18 June Pak-Rat meeting, Southampton Free Library. Election of officers. Spruce Knob expedition results. Marios Raffle, Frankies Silent Auction, Refreshments. Visitors
- 19-21 SMIRK QSO Party
- 20 Raritan Valley, NJ Hamfest
- 21 Frederick, MD Hamfest
- 27-28 FIELD DAY - See May QST, P. 87 for rules

Note: June meeting last indoors for season. The July meeting "The White Elephant Sale" will be held at W3ZD QTH (Zimmermans Gulch) the evening of July 17, 1987

A REPORT ON THE ARRL NITE

The "Meet the Speaker Dinner" had ten attendees to greet W1XX, John Lindholm. From ARRL headquarters, Atlantic Division Vice-Director Jim Mosley, W2BCH, and Kay Craige, KC3LM, SM - EPA. Pack-Rat KFJAJ, Steve Simons came down from Connecticut to join the group. At the meeting, W1XX presented an excellent slide talk of his mountain hopping VHF activities. W2BCH and KC3LM spoke briefly also.

January VHF SS Gavel number 27 was presented by Jim Mosley to our Prez, WA2OMY with contest chairman N2SB and W1XX looking on.

Some of the members stayed on until after midnight with John Lindholm continuing discussions.

We had a large attendance and a good time was had by all.

\* \* \*

VISITORS MAY 21, 1987 MEETING

W2BCH - Jim - Camillus, N.Y.  
K3CLM - Kay - Devon, Pa.  
W1XX - John, Hartford, CT.

WA3IAC - Chuck, Phila., Pa.  
N3EXA - Brian, Doylestown, Pa.  
W3BSI - Bill, Holland, Pa.

APPLICATIONS FOR MEMBERSHIP

WA3IAC - Charles Steer - (Chuck) XYL - Ida  
7148 Montague Street  
Phila., Pa. 19135  
215-335-0637

LAST CALL FOR DUES

WB3CPW, W3FEY, KA2JKI, NF2L, W3RZU, AC3T

NOMINEE SELECTIONS FOR 1987-1988

President - N2SB, Bob Cook  
V. President - N3CX, Dave Hackford  
Cor. Sec'y - W3CXU, John Allen  
Rec. Sec'y - WA3AQA, Walt Zumbach  
Treasurer - K3GAS, Doc Cutler  
Board of Directors for a 2 year term!  
WB2NPE, Rick Connor  
WB3JYO, Paul Drexler

NOTE: Nominations remain open until the general meeting on June 18, 1987 when an election will be held.

\* \* \*

CQ WORLD-WIDE VHF WPX CONTEST - JULY 18 - 19

The well travelled W1XX multi-op VHF contesting team will activate the United Nations Station 4U1UN during the CQ WPX Contest ... on all bands, 50 through 2304 Mhz, SSB, CW, FM. 4U1UN is a separate DXCC country and the 4U prefix counts as a multiplier in the contest.

Good antennas atop the 40-story UN building in Manhattan should produce good signals on all bands. Good power (6m KW, 2m KW, etc) to short coax runs will be used.

Operators: John, W1GNC - John, W1XX - Rus, NJ2L - Karl, W3UBQ - John, KA3V - Bart, KB9NM

Tnx to the United Nations Staff Recreation Council Amateur Radio Club for making this operation possible.

QSLs (SASE pse) go to: H.A. Bohning, W2MZV  
145Troy Meadow Road  
Parsippany, NJ 07054

## SWAP SHOP

### FOR SALE:

Model 32 TN-five level Baudot teletype; Model-33 ASR teletype; Model 15 teletype w/pwr sply; 500 speed ticker w/stand; Halicrafter HT37-xmtr 80 thru 10-SS B&CW highest bidder.

CONTACT: Rich Pattison, K3ACR  
Phone: 215-885-6557

FOR SALE: Model 15 teletype converted w/paper - \$20; TV alignment generators Hickok-&Heath - \$15@; TRS 80 books 50¢. Tubes, parts.

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

FOR SALE: Commodore 64 - 1541 disc drive; CN2 cassette; 1702 monitor \$400.

CONTACT: George, WB3IGR  
Phone: 215-576-1897 after 7 PM

FOR SALE: 2 mtr Mirage B1016 amp. SSB & FM mint \$150.

CONTACT: Hy Ecksel - WA3NDE  
Phone: 215-677-7986

FOR SALE: Dentron-Clipperton V 2 mtr amp. w/spare 4C X 250 \$300 or best offer.

WANTED: Cable & thermistor mount for HP431B microwave pwr. meter.

CONTACT: Bob Cook, N2SB  
Phone: 609-234-3041 after 7 P.M.

FOR SALE: Yaesu FT-757GX. Easily used with transverters. \$600; Microwave Modules MMT 144/28R \$300. MMT 220/28 \$150. MMT 432/28S \$250. Mirage C1012 \$220, D1010N \$240. AEA The Interface cw/rtty w/software on disk for Commodore 64, NEVER USED. \$160. TELREX two 2 meter 2M814 w/phasing harness \$200.

WANTED: 551 or IC-560 or similar 10 watt rig or a 551D not more than \$475.

CONTACT: Jay Miller, KS2T  
527 Woodview Road,  
Toms River, N.J. 08753  
Phone: 201-244-7623

\* \* \* \* \*

## COMMERCIAL AD

LOOP YAGIS: 902 Mhz and 1296 Mhz \$77 kit, \$93 assembled and tested. 2304 Mhz \$67 kit and \$80 assembled. Also, 2 and 4 way power dividers and stacking frames. LINEAR AMPLIFIERS: 1296 10W in 35 watts out \$295, 1W in 18W out \$245. Call for special Pack Rat discounts and prices on complete arrays! New!!! Microwave Transverters and preamps by LMW ELECTRONICS. 2304 Mhz deluxe transverter Model 2304 TRV2D; 144 Mhz I.F. Power out 2 watts, includes separate GaAs FET preamp, NF 1 dB and built in T/R sequencing circuit, relative output meter and built in I.F. Attenuator to match inputs from 100 MW to 10 watts. Price complete \$569; 1296 Mhz deluxe transverter, model 1296TRV6D similar to 2304 unit 6-7 watts out, .7dB N.F. price: \$489. Stripped down versions available at lower cost also available in kit form. 902 Mhz version coming soon. Universal Local Oscillator Kit model ULO. Multiple outputs in 1 and 1.2 Ghz range depending on xtal. \$33.75 less xtal. Write to obtain complete catalog. DOWN EAST MICROWAVE, Bill Olson, W3HQT, Box 1655A, RFD #1, Bernham, ME 04922. Phone: 207-948-3741.

\* \* \*

## A SPRINT REPORT

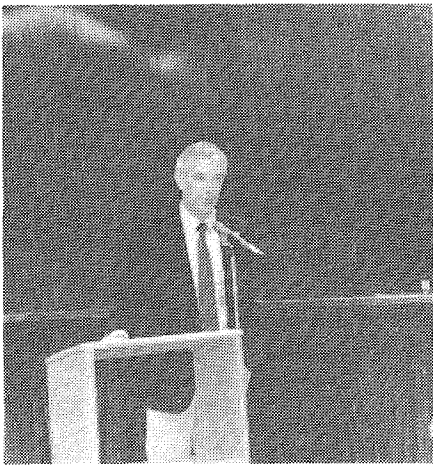
Where were you during the 50Mhz Sprint the evening of May 23, 1987 - the band opened sporadically with signals coming from the central states, the south and southwest. K3LOM worked 68 contacts and 22 grids. K3ACR, WA3AQA, W3CL, AC3T and W2EIF were the active Pack Rats heard that night. WLXX put a good signal down this way. W3CL worked W5NZS, Larry Hazelwood of Oklahoma City, who used to live in our local area.

\* \* \*

## THE SPRUCE KNOB SAFARI

At least 12 Pack-Rats will be leaving for SPRUCE KNOB, WVA (FM 08) on June 11 to set-up for the VHF QSO PARTY on the week-end of June 13/15, 1987.

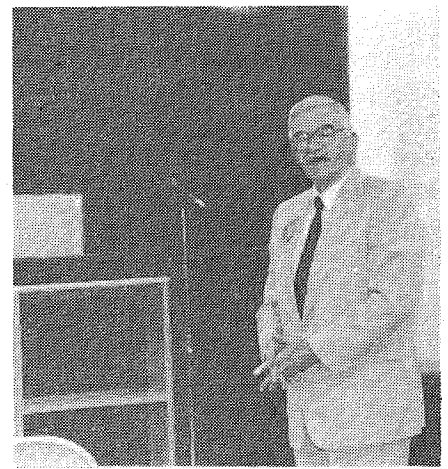
Operations will be on all VHF/UHF bands from 50 through 10Ghz. Pack-Rats and friends please be sure to work W3CCX/8 and stay on for the contest. Good luck.



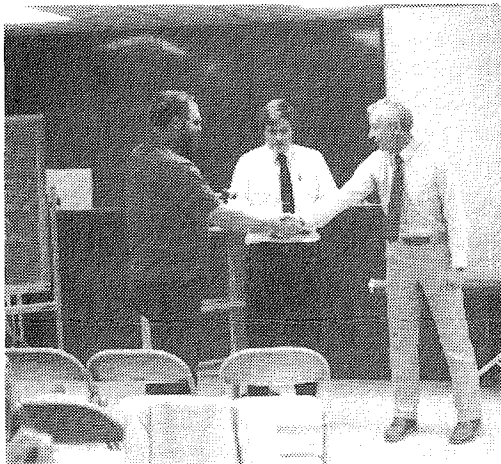
ARRL REPRESENTATIVE JOHN LINDHOLM, W1XX



EPA SECTION MANAGER KAY CRAIGE, KC3LM



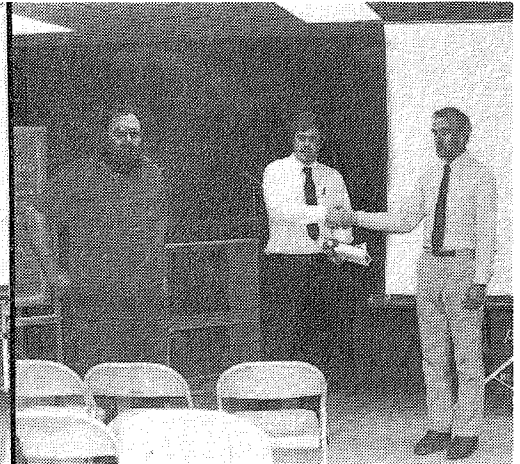
ATLANTIC DIVISION VICE-DIRECTOR  
JIM MOZLEY, W2BCH



W1XX CONGRATULATES BOB COOK, N2SB



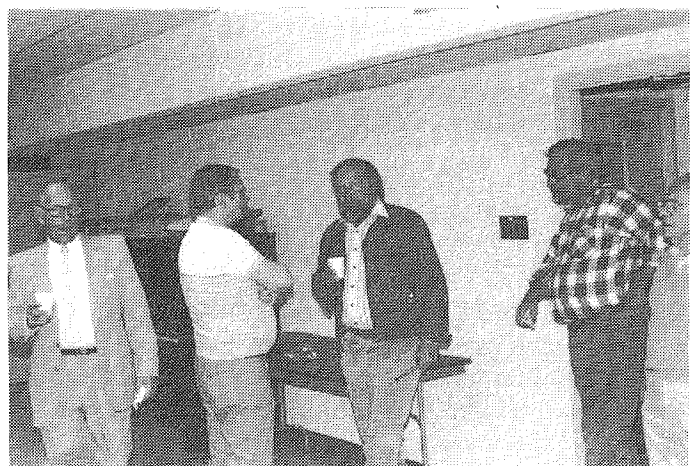
JANUARY VHF SS GAVEL #27 PRESENTED BY  
W2BCH TO PREZ, WA2OMY AND CHAIRMAN N2SB



W1XX CONGRATULATES GARY HITCHNER, WA2OMY



HORACE DEACON, W3AJF TELLS W1XX HOW IT  
WAS DONE ON 5 METERS IN THE OLD DAYS



THE "KING"-WA3AXV DISCUSSES THE GAVEL  
WITH AK30, K3ESJ, WA3TSE AND VISITOR W3BSI

## RONBO's 903 MHZ TRANSVERTER

by WA3AXV

The advent of inexpensive broadband amplifiers has made possible the design of relatively simple VHF-UHF-SHF transverters. The idea is not really very new. The military has been using the concept for many years. Basically, the technique is to use broadband amplifiers for gain and then put a filter anywhere you need selectivity. The problem was that the cost of broadband gain was rather high and only the government could afford to use this method. Enter the Monolithic Microwave Integrated Circuit (MMIC).

Figure 1. shows a basic up-down frequency conversion system for a 903 MHz transverter. With a little imagination one can see that this circuit is quite generic in nature and relies on only L.O. frequency and bandpass filters to fix the operating band of interest. By selecting an appropriate L.O. generator and filters, this basic circuit can be used from 50 MHz to 1296 MHz. The only reason I stop at 1296 MHz is that one would most likely not want to use a 28-29 MHz I.F. at higher frequencies. The principle, however, is equally applicable for any conversion scheme. This is the basic design philosophy for all transverters in use at WA3AXV. I know, Big deal!

One GaAsFET preamp<sup>1</sup> in front of the receive filter is all that is needed to complete the "receive" or down conversion half of the transverter. The post-amp shown has the potential for up to 25 dB of gain at the I.F. frequency specified. Coupled with the 15-20 dB of gain from the preamp, more than sufficient conversion gain is available. In fact, the 47K pot in the gate of the 3N204 was added so that the total conversion gain could be reduced to a more manageable level. The system Noise Figure is established by the preamp, so use as little gain as possible in the postamp. I know you S-Meter hounds like those 40 dog Biscuits over 9 signals, but the endless stream of preamps (I have seen as many as three in use at local stations) only serve to degrade the strong signal capability of your receiving system. After all, you have already thrown 20 to 40 dB of gain in front of your poor H.F. radio that was designed to have only antenna gain in front of the first R.F. stage. Have a heart.

The up conversion half of the transverter ends with about 10 mW of very clean 903 MHz energy. The 10 mW output is a good level to drive a chain of linear amplifiers to a more usable power level. Three stages will get you in the 8-10 watt range. WA3JUF has some ideas for modifying our old friend the SD1520 1296 MHz amp for use on 903 MHz (Dave has Info). Two stages will get you to the one watt level. A brand new design using the SD1418 will appear on your news stand soon. This device will yield 7-10 watts (linear) when driven with one watt.

The L.O. circuit I used for 903 MHz is a configuration put together by WA3JUF. The design uses the W1JR crystal oscillator<sup>2</sup> stage, a buffer/amplifier stage, a microstrip multiplier/filter, and two plastic cased MMIC's to bring the output level to +10 dBm (10 mW). Any L.O. that is clean and stable can be used. However, experience has shown that the W1JR oscillator circuit works extremely well and it is easy to buy "on frequency" crystals that work with a minimum of trouble. Other circuits I have tried over the years are difficult to put on frequency and tend to want to oscillate everywhere but where you want. Amen.

## CONSTRUCTION

The entire circuit shown in figure 1. can be built on a 5x7 inch piece of single sided, 1/16 inch epoxy-glass printed circuit board. This fits neatly into the opening of a 5x7x2 inch aluminum chassis. Single sided PC board is recommended to minimize RF ground problems. All components are mounted by their leads in the traditional "dead roach" construction technique. A suggested layout is shown in figure 2. This is just a rough diagram of parts placement to get you started in the right direction. Everyone always asks me "well where do I start?". Start with figure 2.

50 ohm interconnections can be made with miniature (.085") coax or 0.10 x 1/16 inch strips of PC board, "super glued" to the "mother" board so as to form microstrip transmission lines. The filters<sup>3</sup> are soldered directly to the copper clad surface and small tabs used to attach the 50 ohm tap point to the transmission line. External connections to the filters are made by soldering the connector thru the PC board and soldering the connector center conductor directly to the filter tap point.

Components such as the mixers are mounted thru the board such that the pin side of the mixer is flush with the copper clad side of the board. Any mixer that covers the frequency range can be used. The Mini-Circuits<sup>4</sup> mixers specified were chosen for their small size and relatively inexpensive price tag (\$12.00). The balun that connects the L.O. ports of the mixers is a cheap and dirty power divider. The circuit shown will have a 2:1 mismatch built in. If this really bothers you then use 75 ohm coax and a 100 ohm resistor in the familiar Wilkenson configuration. Packaged power divider circuits are also available from Mini-Circuits and other manufacturers. Works fine as shown. Lets not get hung up on 1:1 matches.

The MMIC amplifier stages have been well documented.<sup>5</sup> The point I want to make here is that it is not necessary to use etched PC boards to use these components. The circuits shown here, and others I have constructed using this technique, all perform as well, if not better, than etched circuits. Solder the "ground" pins of the MMIC directly to the copper clad. Bend the leads slightly to get the bottom of the package off the board. Solder the interstage chip caps to the floating input-output leads. The RF chokes can be supported by a chip bypass cap soldered to the board. The series dropping resistors go to the B+ feedthru capacitor. The post amplifier is constructed in much the same fashion.

## SUMMARY

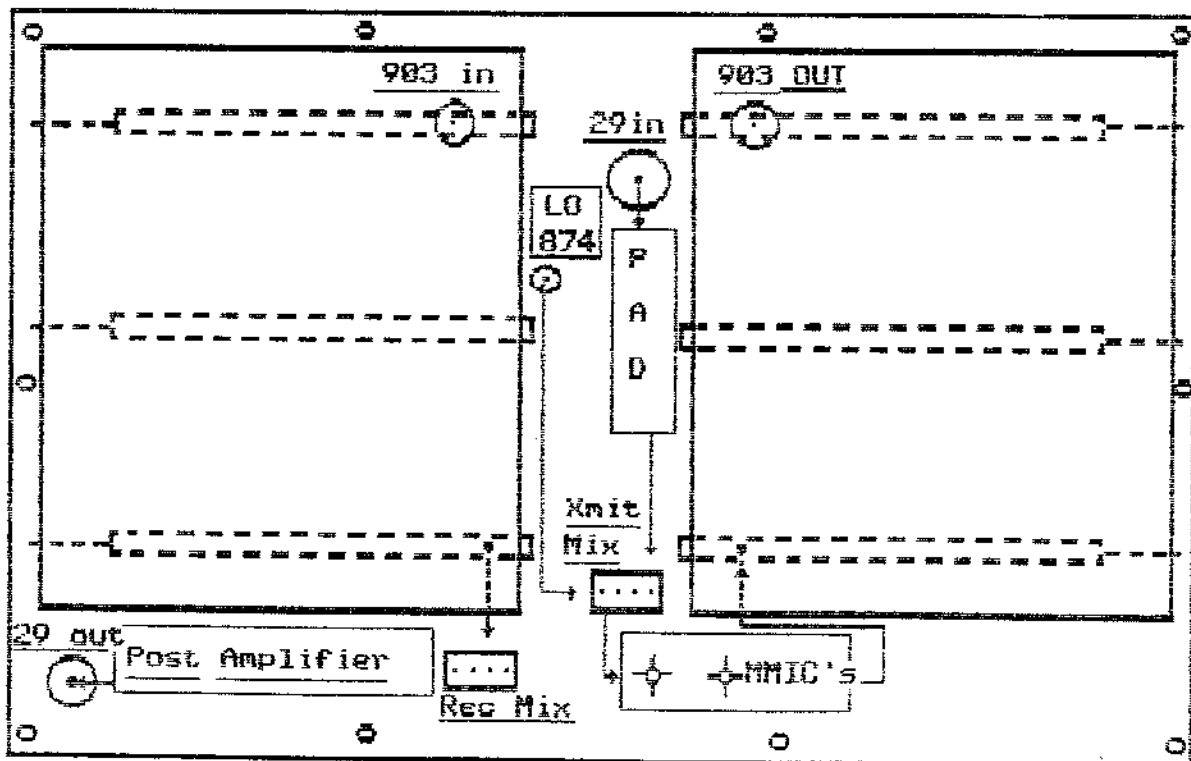
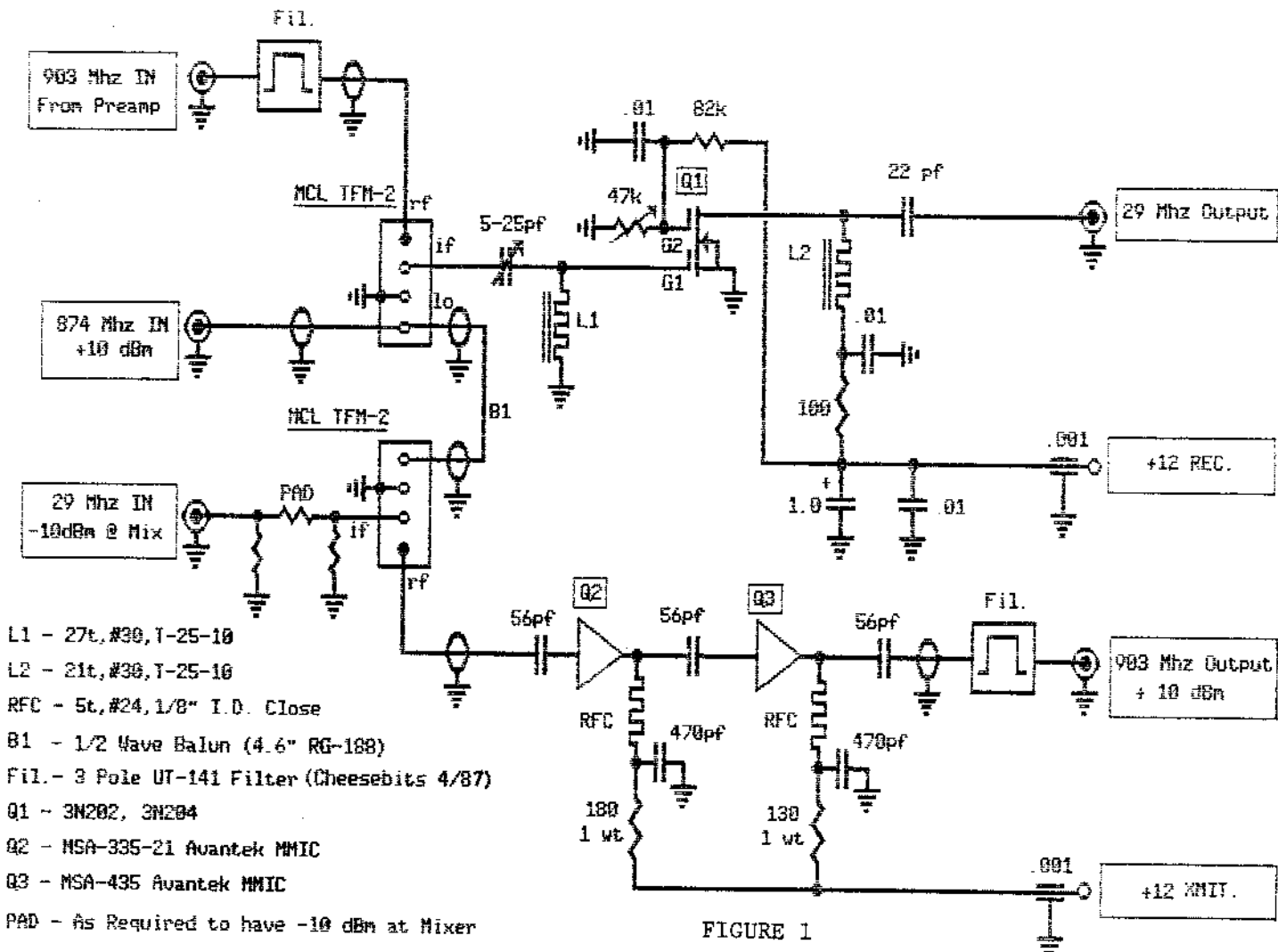
Do you want to get your feet wet with a little UHF construction project. This would be a good place to start. There is not anything described above that could not be accomplished by even the most inexperienced fumlbers (or you may be of the experienced variety). Besides, even if it doesn't work you will learn some things along the way that will make the next one work. There is an awesome array of expert technical help all around you. All you you have to do is swallow real hard (pride lumps are known to be quite large) and pick up the communications instrument of your choice, and yell - HELP! There is nothing like the smell of hot rosin in the basement. Yo!

## REFERENCES

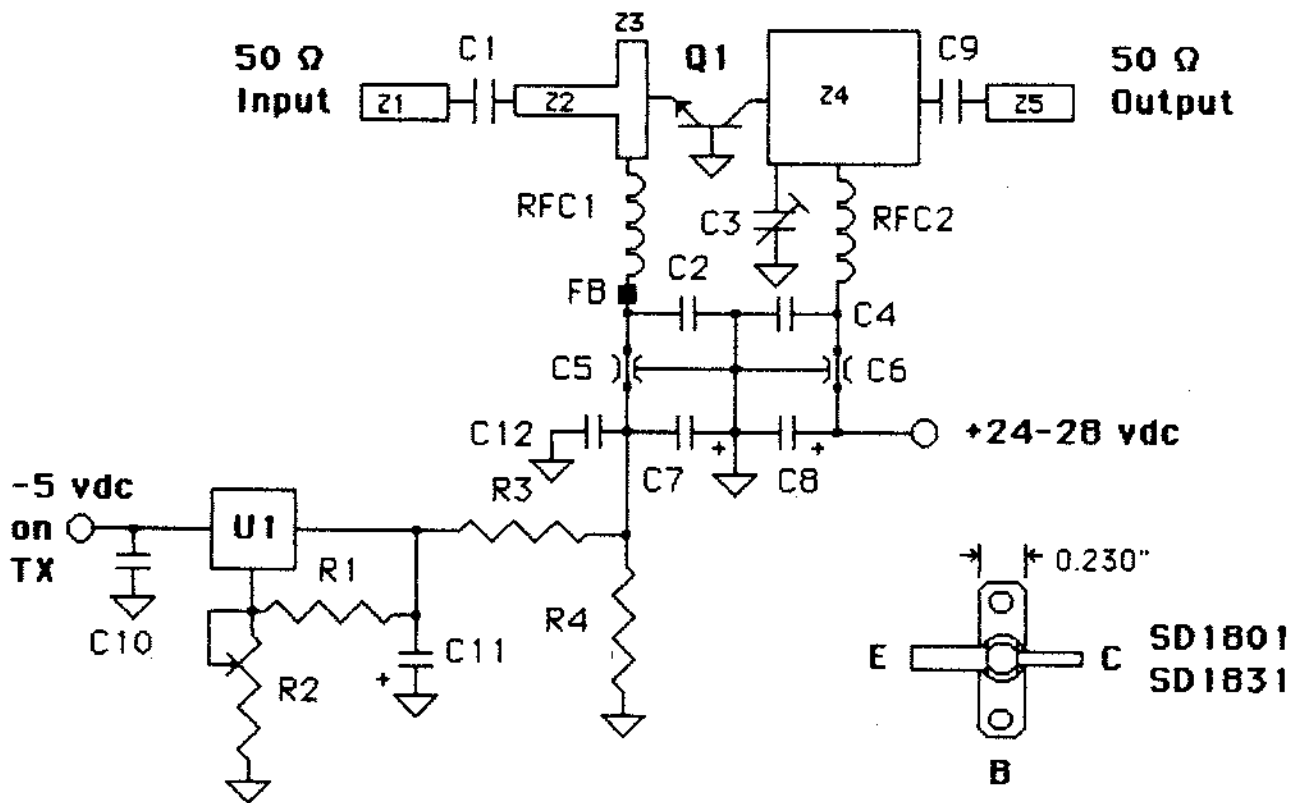
1. W6PO, Eimac Note AS-49-36
2. W1JR, Ham Radio Magazine, March 1976
3. WA3AXV, Cheesebits, April 1987
4. Mini-Circuits Inc., Brooklyn, NY
5. WB5LUA, QST, February 1987



# WA3AXU 903MHz TRANSVERTER



**3456 MHz Linear Amplifier**  
**500 mw Pout @ 1 dBc**  
**9-10 dB gain**  
**12 dB gain @ +10 dBm Input**



- |         |                         |   |                                      |
|---------|-------------------------|---|--------------------------------------|
| C1,9    | 10 pf chip              | Q1  | Thomson SD1801,SD1831                |
| C2,4    | 20 pf chip              | U1  | LM337K (or T) with heatsink          |
| C3      | 3 pf Johanson Gigi-trim | Z1,5  | 0.080" X any length 50 $\Omega$ line |
| C5,6    | 470 pf Feedthru         | Z2  | 0.060" X 0.350"                      |
| C7,8,11 | 1 ufd Tantalum          | Z3  | 0.100" X 0.350"                      |
| C10     | .22 ufd                 | Z4  | 0.375" X 0.375"                      |
| C12     | 0.1 ufd                 | Adjust length of Z3 for Input RTL   |                                      |
| R1      | 120 $\Omega$ 1/4 watt   | Adjust Icq for 20-50 ma. (peak idling current for gain @ low Pin, and for Pout on the 500 mw stage) |                                      |
| R2      | 50 $\Omega$ mini-pot    |   |                                      |
| R3,4    | 1-2 $\Omega$ /2 watt    |   |                                      |
| RFC1,2  | 3t, #24, 0.1" ID        |   |                                      |
| FB      | Ferrite bead            | Board material is 1/32" Teflon Er=2.5   |                                      |

**WA3JUF**

**D. Mascaro 1987**

**DOWN  
EAST  
MICROWAVE**

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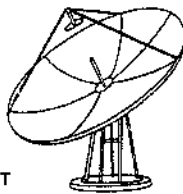
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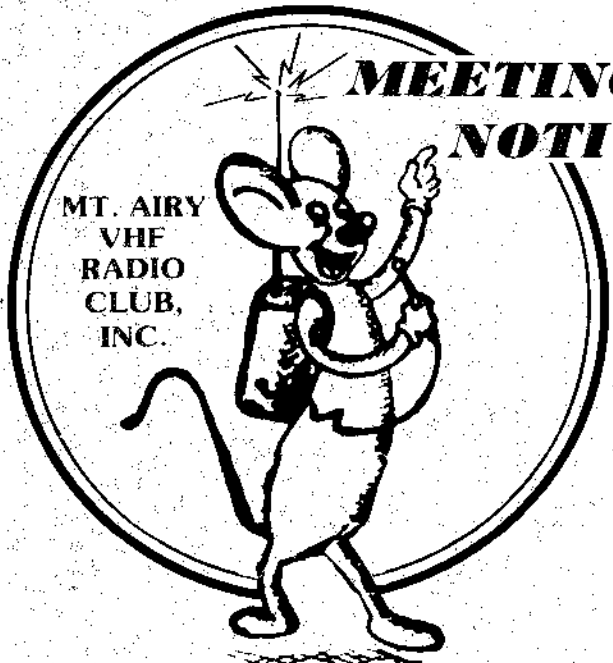
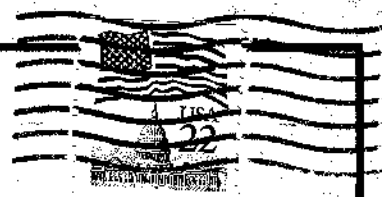
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