

# 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: 50.125, 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

FEBRUARY 1993

NUMBER 2

## THE PREZ SEZ

The January Sweepstakes contest is now history. Now is the time to make a list of what went well and what must be fixed in order to improve your score for next years contest. I hope all of you have completely recovered and will attend the Crying Towel meeting. This is a great chance to tell stories about the contest and is the highlight of the year for me. So try to be present to hear all the tall tales.

I have been invited to be the guest speaker at the Delaware Lehigh Amateur Radio Club (DLARC) for their monthly meeting. This is a local general interest radio club in my area. My presentation will be all about grid squares and what can be expected to be worked on VHF, UHF and Microwave bands. It seems that there is a lot of interest in our part of the hobby. As this club has over 350 members I will hopefully inspire a few to get on VHF. This may not mean that they will become Pack Rat's but at least they will be on VHF and who knows what that will lead too.

So lets all try and get the word out about VHF and get some new blood into our end of the hobby. All of you have local Radio Club's in your area that will be interested in what you have to say. And if you are approached by some one interested in getting into our club all the better.

73's

William T. Murphy  
W4RSJ FN2OJR

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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DEADLINE FOR ARTICLES AND SWAP SHOP IS THE MONTHLY MEETING DATE. NON-COMMERCIAL SWAP SHOP ITEMS-FREE OF CHARGE.

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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: W4RSJ, Bill Murphy  
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WA3NUF, Phil Miguez (1 YRS)  
N3EXA, Brian Taylor (2 YRS)  
K3ESJ, Bill Jaxheimer (2 YRS)

MONDAY NIGHT NETS

<u>TIME</u>	<u>FREQ.</u>	<u>NET CONTROL</u>
7:30 PM	50.125 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: N3CX 215-679-7293  
HAMARAMA: K3EOD 215-742-3312  
VHF CONFERENCE: KB3XG 215-270-3158



THE AMERICAN RADIO RELAY LEAGUE

OST

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Director, Atlantic Division

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WILMINGTON, DEL. 19803

Graphic Design Illustration Production



Lynne D. Whitsel

209 Frog Hollow Road  
Churchville, PA 18966.  
215 355-5730

Calendar of Coming Events -February 1993

- 6 January Contest wrapup session at the QTH of Bob, WB2YEH starting at 10 AM. Get your logs and checksheets to your contest coordinator so they can be checked and submitted.
- 6 Dutch County Computer and Communications Show will be held at the Lancaster Host Golf Resort and Conference Center in Lancaster Pa.
- 7 Full moon and perigee.
- 9 Birth of Brendan Behan, Dublin 1923
- 15 Presidents Day.
- 11 Packrat board of directors meeting at the QTH of Bruce, WA3YUE at 8:00 P.M. Call 215-630-1875 for directions.
- 14 St. Valentine's Day. Remember your sweetie.
- 20-21 ARRL International DX Contest-CW. See Dec. QST page 125 for rules.
- 18 Packrat meeting at the Southampton Free Library on Street Road in Southampton, Pa. at 8:00 PM. The theme of the evening will be our annual "Crying Towel" session. The best story of what went wrong during or in preparation for the January contest wins the coveted "Crying Towel". All friends and interested parties are welcomed to come enjoy the evening with us.
- 27 Annual AARG Hamfest and Computer Show at the Lebanon Fairgrounds in Lebanon, Pa. Talk-in on 146.04/64. VE exams will be given.

TID BITS:

New work phone number for Phil, WA3NUF: 215-270-3163.

Dave, N3CX, has accepted the job of June Contest Chairman.

Preliminary results from the January SS has many scores much higher than last year with some scores running 150% to 400% higher than last year.

WB6IGP's "Above & Beyond" column of the Feb 93 issue of 73 Magazine has a good article on mixers. Info on modifying a surplus 12 GHz unit for 10 GHz is also given. The same issue has an article by Bob, W3RW on a 6 meter transverter using a 2 Meter rig as the IF.

W6CL's "VHF PLUS" column in the Feb issue of CQ has info on an FCC NPRM concerning 222 MHz and the 1296 bands. Due date for comments is unknown.

Tech stuff in the Nov/Dec issue of NTMS "Feedpoint": A 12/20 volt converter from a Radio Shack 6-12 volt converter by Dick, N5NCR and Ben, N05K. For powering up those -20 v brick oscillators. More mods to the 540 MHz LO Modules by Al, WB5LUA and Bryan, N5QGH. A dual band 902/1296 antenna by Kent, WA5VJB (10 dB gain on both bands on a 10 inch 1/8 in square boom).

Health and Welfare

Johnny Allen, W3CXU, is out of the Abbington Hospital and was able to operate during a portion of the January Contest after getting a second hip replacement.

Joe, W2EIF, underwent minor surgery just before the contest and was in there as usual in the contest. How many Jan contests has it been Joe?

Note to Cheesebits Readers: It is the policy of Cheesebits to NOT print articles from unknown sources. After receiving this note and determining that it doesn't insult too many of us and noting that it contains some good info, it's being included. Thanks to Anuna for the input.

The Editor

FROM THE TEST BENCH OF.....ANUNA MOSS, NOONE

You've seen the ad in the club paper: a guy in MD has TWTAs complete with power supplies, add -24VDC and a couple milliwatts of RF and get lots of watts output; complete PA for about \$125. Is it for real? I acquired and fired up one such beast, spec'd for 5.9-6.2 GC. I won't go into details as to how one puts together the test equipment to check out such a beast, 'cause you probably can't do it if'n you don't know already. But it don't take much to USE this kind of amp, once you know that you can buy one without much likelihood of being ripped-off.

These units are made by Siemens, over in Europe, and there is little or no data floating around on them; you don't need much, anyway. If Jeff Kruth, the seller, says he's tested your unit, his results are probably okay (tho there's always some chance of problems in shipping, even tho he packs 'em pretty good). It's an absolute must to heatsink the tube, especially at its collector (output) end; that's where almost all the heat dissipation takes place. Be careful in trying to screw mount a heatsink to the tube; the screwholes are tapped for metric threads!! It's not that big a deal these days, as metric screws, taps and dies are fairly common - not like back in the old days, etc. etc. Use lots of heatsink glop and spend the time you're going to save on not building a power supply in figuring out how to get rid of a couple hundred watts of heat (air flow?, direction?, etc. etc.). The power supply may need some heatsinking, but it appears that securing the baseplate (the surface with screwholes and traces of heatgrease) to a chassis may be adequate. Plan on connecting up at least 8 amps of -24VDC (more on this later) and using the connections shown on the supply case for checking the cathode and helix currents; nice voltage analogs at the test points.

RF results:

Frequency	2304	3456	5760	10368
Pin (dBm/W)	+12 (15mw)	+12.5 (17.8mw)	+3 (2mw)	+13
Pout (dBm/W)	+30 (1W)	+44.6 (29W)	+45.3 (34W)	+23
Gain, lrg sig	N/G!!	+32.1 dB	+42.3 dB	N/G!!

So, this beastie is good for 3456 and 5760 (okay, gain IS down a bit at 3456, but it should be no problema to boost the output of your no-tune with any one of several MMICs, to get at least +13 dBm (if ya can't figure out HOW to do it, ya shouldn't be blowing' this kinda power out ya feed, either!)).

Looking at the 5760 operation:

Pin (dBm)	-60	-4	+2.4	+3
Pout (dBm)	-16	+40 (10W)	+44.8 (30W)	+45.3 (34W)
Gain (dB)	44	44	42.4	42.3
I helix (ma)	0.32	2.0	2.4	2.5- (2.50=trip)
I DC (Amp)	2.8			7.2

The 1 dB compression point, if you want to transmit SSB or AM, is about 25W, but CW/FM is okay to 35W. Notice the high Idc current change from no-signal to full-output! we don't KNOW why, but suspect that the collector is operated in depressed mode and that the PS changes the collector voltage, and therefore dissipation, with helix current (which is input signal responsive). That's over 70 extra watts of dissipation to be provided, almost all at the tube collector.

## LOOKING FOR NEW PACKRATS

By Bill Murphy, W0RSJ

The history of the Pack Rat's is rich with the contributions of former members. As club members move out of the area or, retire or loose interest, we have openings in our club for new people. Now is such a time in history.

A new candidate must have a Pack Rat sponsor who invites them to join the club. After filling out the club membership form the potential member is reviewed by the Board of Directors. We then vote to install a member after they have been present at two general membership meetings at which the membership form is read to those in attendance. The criteria for qualification are important. They are listed in Article III of the club's Constitution. Basically, the applicant: **MUST BE ACTIVE ON THE VHF (weak signal) BANDS** and must also be aware of the club objectives. Please see the attached sheet that is given out to prospective new members that explains our objectives.

So listen around. There are excellent hams out there that should be invited to our club meetings. When they get to know us better, they can't help but like us, and want to join!

We may get involved in helping the new candidate become active on the VHF bands. This will be necessary if they are to meet the qualification criteria set forth by the club's founders. In the long run it will benefit all parties involved and will sure be fun.

## JANUARY CONTEST REPORT

By Phil, WA3NUF

The 1993 VHF Sweepstakes is now history. Judging by the constant QRM at my station, I'd say that the Packrats produced another great effort. In the Above and Beyond the Call of Duty category, John, W3CXU, who just returned from hip surgery had his family help him downstairs to the shack so he could work the contest for a few hours and give out points to all of the Rats. The early reports that I've received indicates that scores are generally up this year with many new stations breaking the 100K point barrier. Congratulations to all.

Remember that the job is not finished until the paperwork is done. Get your duped logs to WA3NUF, WB2YEH or your team captain before the log wrapup session on Saturday, Feb. 6.

## SWAP SHOP

Send non commercial swap shop items to the editor.

FOR SALE: Trontech 903 Amp, +24 V. Class A, 2 watts out/5 mw in, \$25.00. DB Products 100 watt dummy load, \$35.00. ARR commercial GaAsFet Preamp, 903 MHz, SMA connectors, .6 dB NF, 18 dB gain, \$45.00. Call Gary, WA2OMY, 215-539-6409.

FOR SALE: Sinclabs ST220 222 MHz 10 watt Transverter, new in box, \$250.00. RF Concepts RFC 3-312 222 MHz Amp. 120 watts out with GaAsFET preamp \$265.00. Kenwood TS-690S/AT, 160-6 meters, 150 kHz-60 MHz Rcv, like new, \$1175.00. Call John, WA2FUZ, 518-966-8654.

## COMMERCIAL AD

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 "Sooper Looper" \$99 kit, \$124 assembled and tested. 2304 MHz 45 element \$75 kit, \$89 assembled and tested. Also available: element and hardware kits for the 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: 903 MHz .8dB NF \$90, 1296 MHz .8 dB, 2304 MHz 1 dB max NF \$140. SHF SYSTEMS No-tune Transverter kits, w/144 MHz IF now available for 903 through 3456 MHz. Write or call for complete catalog. **DOWN EAST MICROWAVE**, Bill Olson, W3HQT, Box 2301 RR-1, Troy, Maine. For information and orders telephone (207) 948-3741.



## THE MOUNT AIRY VHF CLUB, INC.

(The Pack Rats)

The Mount Airy VHF Radio Club, Inc. was started on May 15, 1956 by a group of amateurs interested in VHF activities. The basic rules were established at the first meeting, and they have not changed except where it has been found to be for the best interest of the club to do so, and, of course, by a vote of the membership.

The overall club membership, by present rules, is limited to 90 members with a minimum age of 18. Membership is by invitation only and is not concerned with the race, creed or politics of its individual members.

The purpose of the club is to promote interest and activity on the VHF/UHF bands and to improve operation and equipment.

To qualify for membership, the amateur must be active on the VHF bands (50 MHz and up). He must be able to help fellow club members when called upon and join in club activities and sponsored events to the best of his ability. The member must also keep his dues paid up.

The constitution provides means to remove members automatically if they are not active on the air, or no response to dues notices is received. The reason for this is obvious. Because the club maintains a limited membership, we must press for maximum activity in order to maintain the organization in vigorous condition and promote its purpose.

All club members are encouraged and expected to participate in the club-sponsored activities which include signing in on club nets, attending club meetings and club-sponsored events, and, of course, taking an active part in the January contest. Club members are required to assign their contest score to the Mt. Airy VHF Club, Inc.

The main club-sponsored events of the year are,

- (1) January VHF contest,
- (2) Ladies Night (to reward the XYL and YL for their patience during the contest),
- (3) Summer VHF/UHF contests (in lieu of Field Day),
- (4) Hamarama (held the first Sunday in October),
- (5) VHF/UHF Conference (held the day before Hamarama),
- (6) Monthly meetings (held the 3rd Thursday of each month at the Southampton Free Library, Street Road, Southampton, PA).

There are club opportunities for any particularly talented members of the club to make presentations before the membership. We encourage members to discuss interesting personal VHF/UHF projects or activities. Prospective members must be sponsored by at least two club members. They shall be reviewed by the membership committee and the board of directors before being upon by the membership.

MAIL TO: Richard E. Comly N3AOG  
56 Home Road  
Hatboro, PA 19040

APPLICANT- PLEASE RETAIN THIS PAGE

## Let's Build a High Performance 222 MHz Transverter

By Dave Hackford, N3CX

### Part 2, 28 MHz IF/GaAsFET Preamp/28 MHz Post Amp

I hope your local oscillator chain worked out well for you. In this month's installment, we will be concentrating on the RX mixer, 222 MHz GaAsFET Preamp, and 28 MHz Post Amp. First off, the circuits that I have used are proven designs and I have used them over the years with good success. The 28 MHz Post Amp was published by Pack Rat Paul, WB3JYO, in his transverter articles (1) and was written up by Pack Rat Dave, WA3JUF in a few instances. This is a nice design and I highly recommend it. There are many preamp designs around and I have used one that was published in the Eimac EME Notes(4) and there are many circuits published that are very close in layout -it works fine with about 22 dB gain and 0.8 dB NF. The only added part I used is a TOKO (50 ohm in/out) bandpass filter(2), P/N TK3501-ND, after the preamp to clean up the input to the mixer. With UPS around, this filter works really well and with the gain of the preamp a little loss won't hurt the performance one bit. All you have to do is peak up the filter on a relatively weak signal. You will still have 15 to 18 dB of gain ahead of the mixer which is fine for weak signal work. The receiver mixer is a Mini Circuits SRA-1H (3) and it's IF output is terminated in a simple 28 MHz diplexer circuit. This circuit was described in the March issue of ham radio magazine by Joe Reisert, W1JR. All of the circuits are constructed "dead bug" style built on G10 double sided glass circuit boards and mounted in die cast boxes or home brewed ones. Next month we will get into the transmitter low level stages and an 8 watt linear final. For now, listen for the weak ones and get on 222 MHz low end.

- (1) 1988 ARRL Handbook. 144/220 MHz Transveter by Paul Drexler, WB3JYO.
- (2) Digi-Key Corp. 1-800-344-4539 for the Toko filter.
- (3) Available from M. Lader Co, Conshohocken, Pa. 1-800-442-3177.
- (4) Eimac Power Tubes, 1-415-592-1221.

### SCHOLARSHIPS AVAILABLE

The Foundation for Amateur Radio is planning to administer 47 scholarships for 1993-94. Licensed amateurs may compete for awards from \$500 to \$2000. Additional information and an application form can be obtained prior to April 30 from:

FAR Scholarship  
6309 Rhode Island Avenue  
College Park, MD 20740

The Dayton ARA also has 8 scholarships available for \$2000 each. Applications must be postmarked by May 15, 1993. For an application contact:

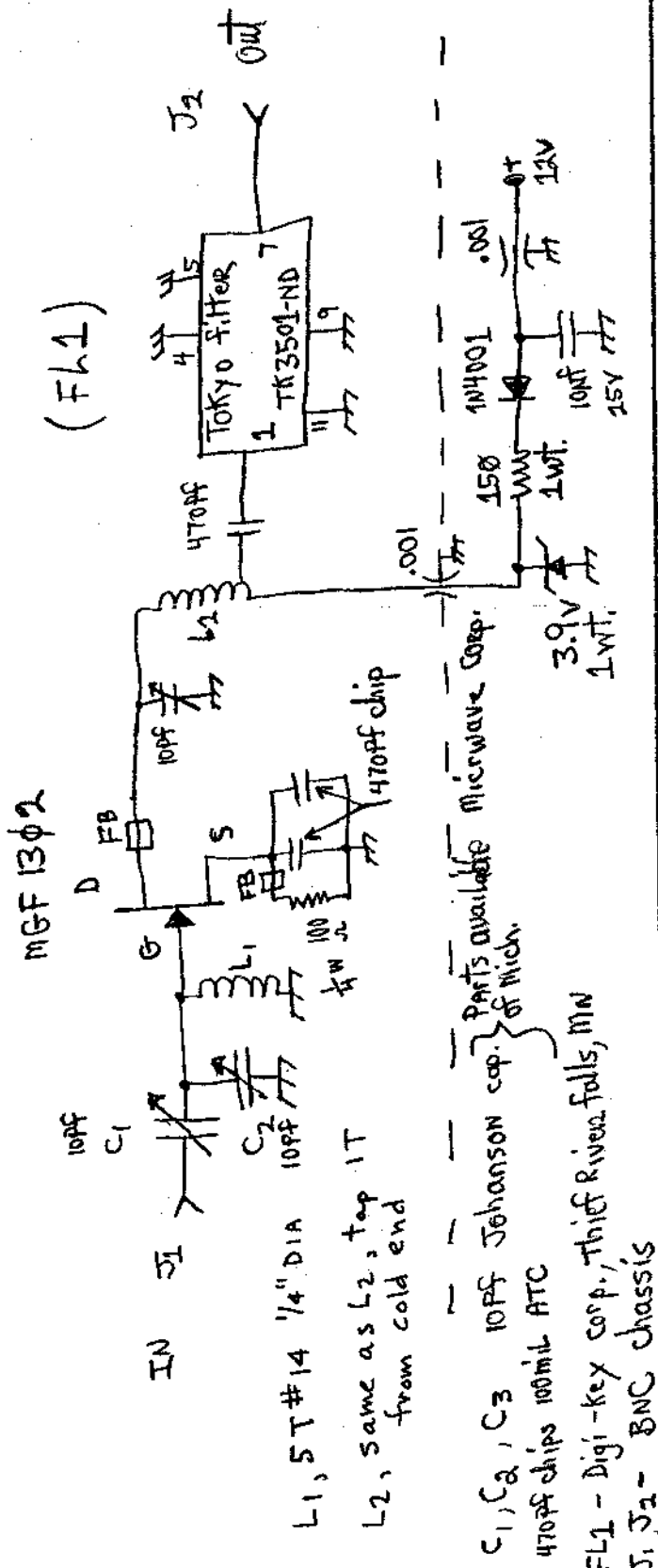
DARA Scholarship Committee  
45 Cinnamon Court  
Springboro, OH 45066-1000

### VUCC CARD CHECKING

By Harry, W3IIT

In last months Cheesebits, copies of the VUCC Award rules, award application form and form for listing cards for each grid field. With all of the work and expense in getting QSL cards, I'm sure that some of you are reluctant in sending them to someone to be checked. Well, you don't have to mail them. The ARRL has appointed volunteers to perform the checking and the responsibility for checking that the forms are filled in correctly. I am authorized to do this and will be glad to verify your entry. Give them to me at any club meeting, drop them off at my house or even mail them to me if you like. If you want them mailed back to you include an envelope and postage. This service is available to any ARRL member.

222 MHz Preamplifier



MGF 13φ2

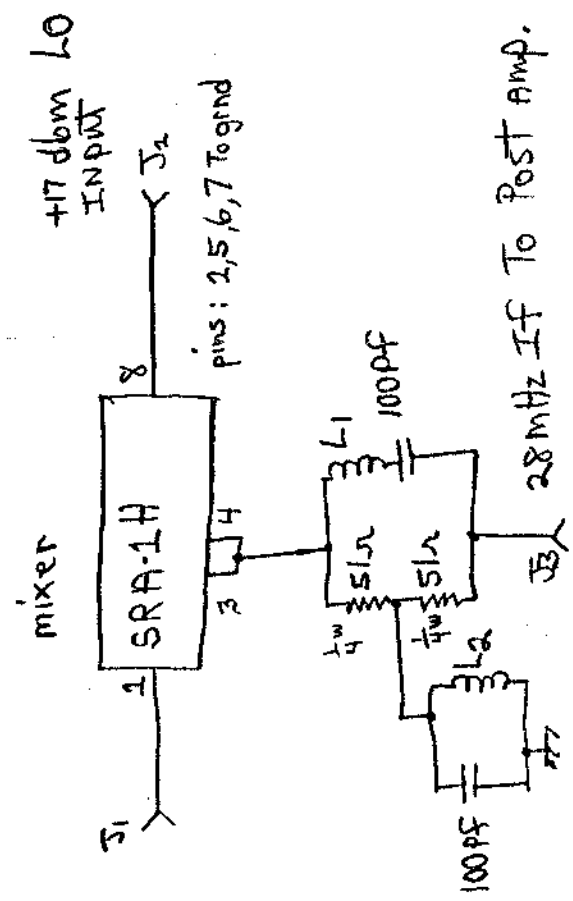
(FL1)

L1, 5T #14 1/4" DIA  
L2, same as L1, top 1T from cold end

C1, C2, C3 10PF Johanson cap. } Parts available Microwave Corp. of Mich.  
470PF chips 100mil ATC

FL1 - Digi-key corp, Thief River Falls, MN  
J1, J2 - BNC chassis

222MHz Rx Mixer - Ham Radio - 84 WJTR



mixer

+17 dBm LO INPUT

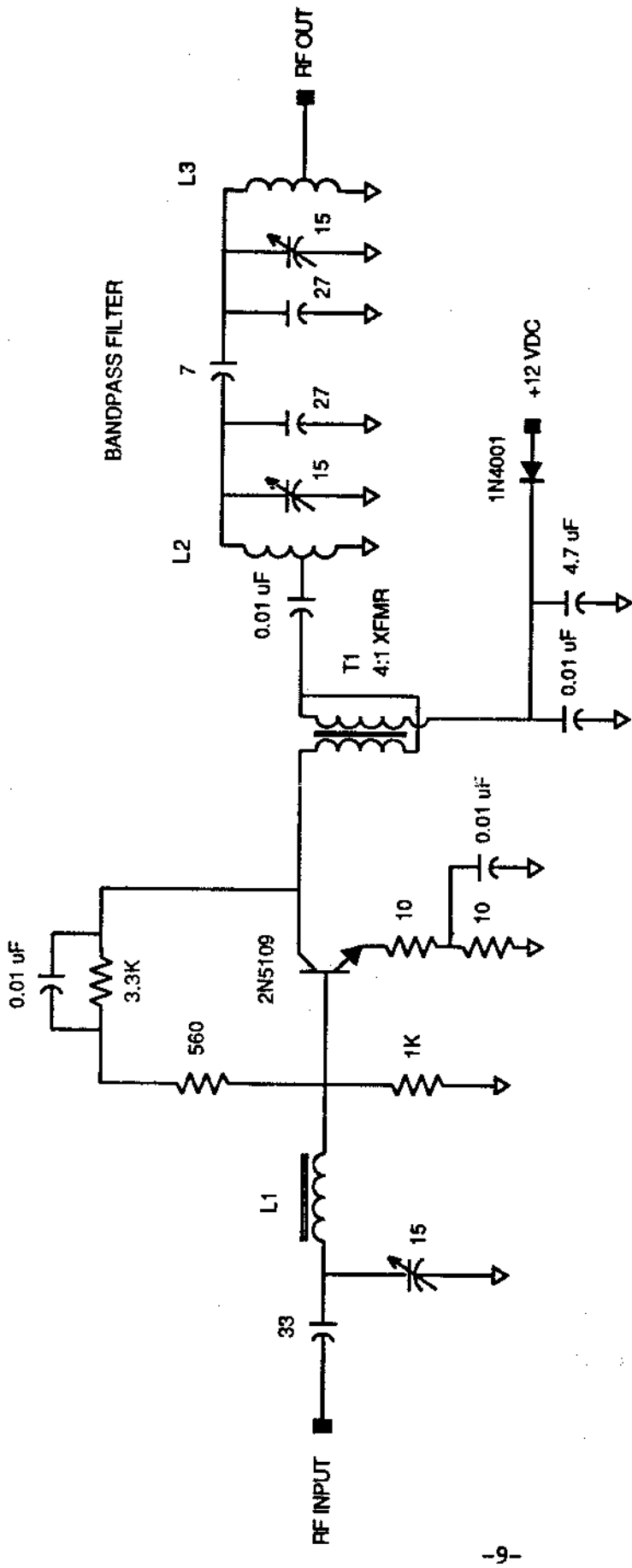
pins: 2,5,6,7 to ground

L1, L2 - .29 μhy  
Q TRNS #24 ON T-50-10 Toroid  
C1, C2, C3 chassis BNC

SRA-1H/Mini ckt corp  
FM: M. Loder Comp.  
Conshohocken, Pa.  
800-442-3177



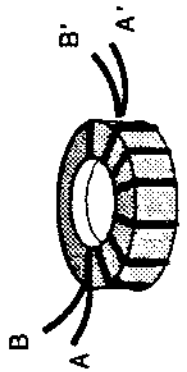
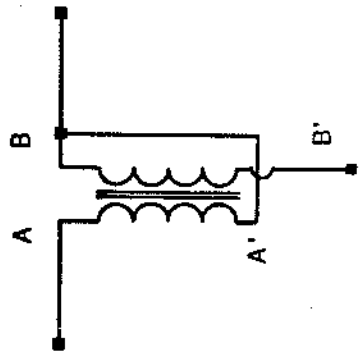
# 28 MHZ LOW-DISTORTION POST AMPLIFIER



**NOTE**

- CAPACITANCE IN pF UNLESS NOTED.
- USE PUSH-ON TYPE HEATSINK ON 2N5109
- L1 15# #26 ENAMEL ON T37-6 TOROID
- L2, L3 15# #26 ENAMEL ON T37-6, TAP AT 4I FROM GROUND
- T1 20# #30 BIFILAR ON T37-10 TOROID. CONNECT TRANSFORMER AS SHOWN.

2N5109



HEATSINK MADE FROM COPPER

GAIN = 15 dB @ 28 MHz  
 I<sub>cc</sub> = 60 mA  
 P<sub>1</sub> dB = +23dBm  
 Third Order Intercept Point = +32 dBm  
 STABLE INTO 10:1 VSWR

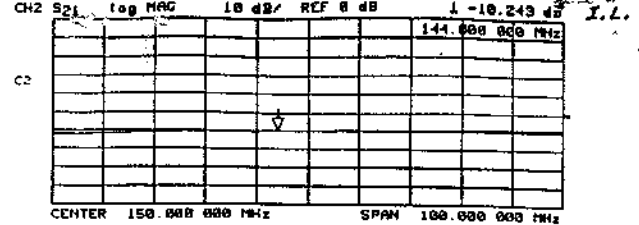
## 2 Meter IF Load/Attenuator

by D. Mascaro, WA3JUF 11/92

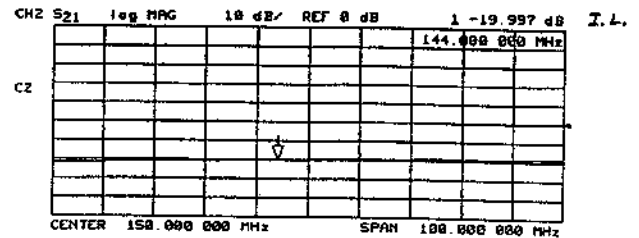
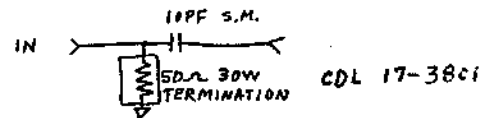
Transverter transmit mixers require 1 to 10 mW of IF power. When the low level stage of a 10 watt transceiver can not be tapped into, then a suitable 50 ohm load and attenuator is required.

A flanged mounted 50 ohm load of 10-30 watts is used to dissipate the power. Then a small value variable cap couples off a small amount of power. A fixed value attenuator will provide the required attenuation and 50 ohm match to drive the transmit mixer. The circuit below will provide >35 dB of attenuation at 144 MHz. Additional fixed attenuation can be accomplished with 1/8w chip resistors at the mixer part.

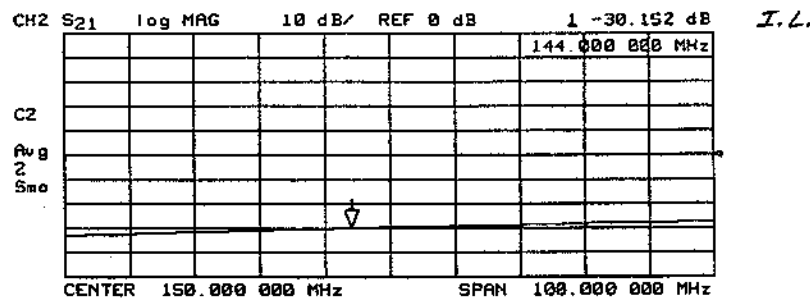
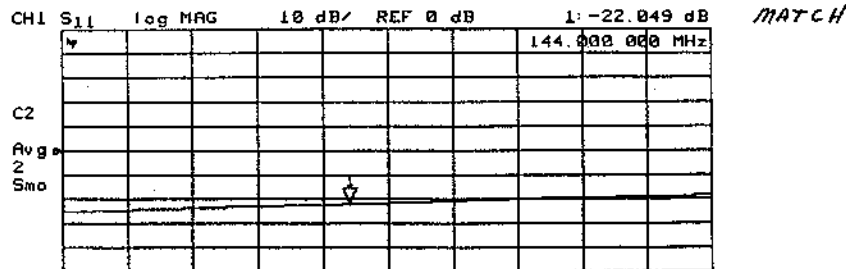
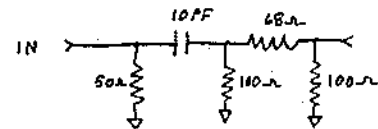
This circuit should be built into a metal enclosure. Even so, it is still possible to work a strong station on the IF frequency. Good coaxial relays should be used for switching and the 144 MHz GaAsFET preamp must be turned off during transverter operation.



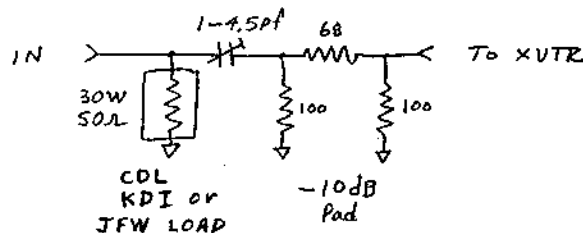
2 M I.F. LOAD



2 M I.F. LOAD w/10dB PAD



2 M I.F. LOAD

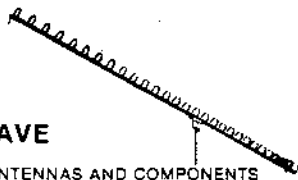


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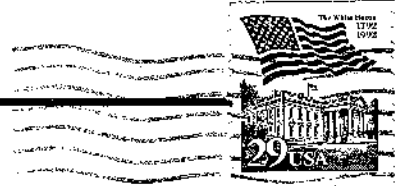
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