

PACK RATS'



PACK RATS

CLUB CALL: W3CCX

MT. AIRY VHF RADIO CLUB, INC.

CHEESE BITS



SCANNED TO PDF BY BERT, K3RUV

MT. AIRY VHF RADIO CLUB., "THE PACK RATS", PHILADELPHIA, PENNSYLVANIA 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 19866

VOLUME XXXIII

MAY 1991

NUMBER 5

THE PREZ SEZ

Well, that time of the year is here again... **IT'S TIME FOR NOMINATIONS OF OFFICERS FOR THE CLUB.** Please come out to the meeting this month to voice your opinions for the future of the Pack Rats, and put forth your input to the ARRL officials, especially concerning the upcoming WARC. Bob, WB2YEH, has secured a visit to our meeting by David Sumner, K1ZZ, Executive Vice President of the ARRL and our primary representative at the upcoming WARC. **COME OUT AND PUT YOUR IDEAS UP FRONT.** Now is the time for lip service!

The JUNE CONTEST chairman would like to have your help this year and Dave, WA3JUF, will be calling on you for your assistance. We are not going to be far from the Philadelphia area; we'll be operating from Camelback Mountain, near Scranton, Pa. Come out and have a nice weekend on the mountain with your fellow club members. Enjoy the view, the good weather (I hope!), and operate the hardware of W3CCX. Come for a visit and bring a pencil.

As the good weather approaches, maybe some of you in the club have antenna projects with which you need help. Please give me a call and we'll try to get a work party together to give you a hand.

I'll let you know now that HAMARAMA will not be held at the 611 Drive-In this year. The owners informed me that due to their future plans, it's out of the question. So, standby for up-to-date information on our move to a new location.

Well, that's it for now and I hope that the tropo reaches your QTH this summer. 73, and listen for the weak ones! I'll be looking for a super hatch of Lightcahills.

David Hackford, N3CX

MAY MEETING PROGRAM: Annual Pack Rat ARRL Night. Featured speaker will be David Sumner K1ZZ, ARRL Executive Vice President and publisher of QST Magazine. Atlantic Division Director Hugh Turnbull, W3ABC and the results of club competition in the VHF SS.

CALENDAR OF COMING EVENTS

By Harry Brown, W3IIT

MAY

- 3 West Coast VHF Conference at the Holiday Inn in Ventura, California. For info, send a SASE to West Coast VHF Conference, PO Box 178, Somis, California, 93066-0178.
- 3 ARRL 903 MHz Spring Sprint Contest, 7-11 PM, Friday evening. See March QST, page 87 for rules.
- 4 Pack Rat Ladies Night will be held at the Mill Race Inn on Buck Road in Hatboro, Pa. See Cheese Bits, April 1991 for directions. Bring your best gal and show her that hams do more than talk on the radio... they talk about radio at banquets too.
- 6 ETA Aquarids meteor shower at 1446 UTC.
- 9 ARRL 1296 MHz Spring Sprint contest, 7-11 PM, Thursday evening. See March QST, page 87 for rules.
- 10 Pack Rat Board of Directors meeting at location to be announced. Meetings start at 8 PM. All interested parties invited.
- 12 Mothers Day
- 16 ARRL 2304 MHz Spring Sprint contest, 7-11 PM, Thursday evening. See March QST, page 87 for rules.
- 17 Pack Rat general membership meeting at the Southampton Free Library on Street Road in Southampton, Pa. Meeting starts at 8 PM. All club members and VHF/UHFers encouraged to attend. Nominations for the election of officers will be accepted. Annual ARRL Night with heavy-weight ARRL representatives. Come out and voice your opinions concerning 222 MHz band plan and future of VHF/UHF and Microwave amateur band allocations.
- 17-19 ARRL Atlantic Division Convention at the Monroe County Fairgrounds near Rochester, NY. Talk-in on 146.28/.88
- 17-19 1991 Eastern VHF Conference will be held at Rivier College in Nashua, NH. For details, call Lew Collins, W1GXT, at 508-358-2854 between 6 and 10 PM Eastern time.
- 18 Ephrata Area Repeater Society Hamfest will be held at the Ephrata Senior High School. Talk-in on 144.85/145.45.
- 18 Armed Forces Day
- 19 Warminster Amateur Radio Association Hamfest at the Grange Fairgrounds in Wrightstown, Pa. Talk-in on 146.09/.69 and 146.52.
- 25 ARRL 50 MHz Spring Sprint contest, 2300z-0300z, Saturday evening. See March QST, page 87 for rules.
- 27 Memorial Day

JUNE 8-9 ARRL JUNE VHF QSO PARTY. SEE MAY QST, PAGE 94 FOR RULES AND NEW CLASSES.

PROPAGATION REPORT
By Paul Drexler, WB3JYO

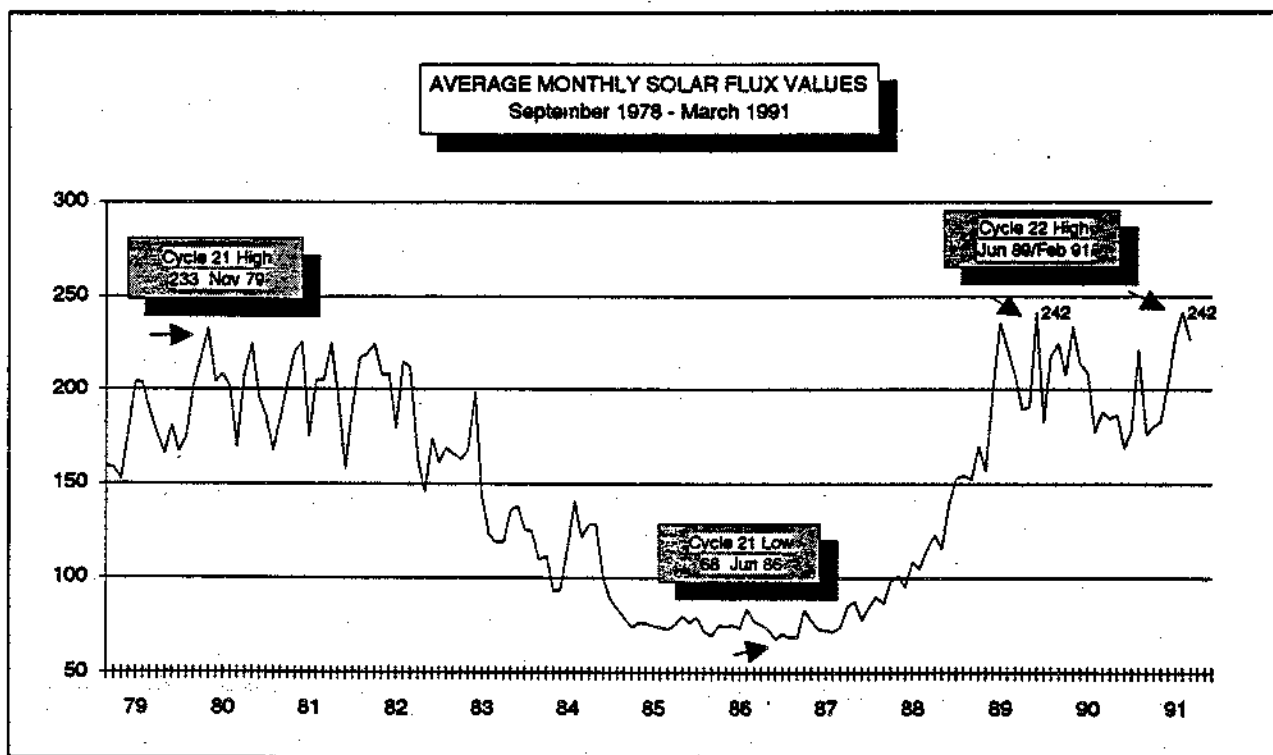
Propagation during the month of April has been poor. The Sunspot Cycle has taken a significant slide with solar flux dipping to a low value of 135 on April 25 and only rebounding to 160 as I write this column, April 30. This condition has caused a lack of propagation on 6 meters and 28 MHz has not been open much past sunset. KA3B, who DXpeditioned to Bolivia early in the month had only fair propagation to the world on 6 and heard no signals from the East Coast other than some meteor scatter to Southern Florida. The F2 "good times" on 50 MHz may be over for while. However, as Cycle 22 declines, look for improved meteor scatter as well as E-skip on 6 and 2 meters.

Tropo propagation has been about average for the ARRL Spring Sprints. The 220 Sprint activity was somewhat fragmented, however, due to the split operation between 220 and 222 MHz. WC2K and N2SB worked 24 and 28 QSO's respectively at the 222 MHz segment of the band, while N3CX reports a "last hurrah" at the low end with good activity and sporadic conditions to EN83, EN91, and EN92. Missing were the usual WNY contacts to FN12, FN13, FN03, FN02 etc - where were you Rochester guys?

Conditions during the 432 Sprint on April 24 were about average. WB3JYO worked 43 contacts and 15 grids. No real enhancement was observed; again, the WNY contacts were nowhere to be found.

Let's hope for some better Springtime propagation in the days to come. TNX to KA3B's 50 MHz DX Bulletin and the FRC Newsletter for info this month.

CU on the bands!



TNX N2SS/FRC NL

SWAP SHOP

WANTED: Fair Radio AM6154 RF amplifier,
any condition; or other 432
high power amplifier.

CONTACT: Dave Hackford, N3CX
215-483-2030 (w)
215-679-7293 (h)

FOR SALE: 2 RIW-19 432 Yagis, \$35ea.
4-way 432 power divider \$30.
Both yagis + power divider \$90

CONTACT: Gary Hitchner, WA2OMY
connectors, new + used.

FOR SALE: HARDLINE, 1/2" and 7/8"
Andrew, new and used, N and
UHF connectors.

CONTACT: Rick Connor, WC2K
609-268-0736

WANTED: Telescopes - looking for a
used reflector telescope.

CONTACT: Dave Hackford, N3CX

WANTED: QRO (400-500W) class linear
amplifier for 222 MHz band.

CONTACT: WZ20, Arn
via Pack Rat 222 net or WC2K

AVAILABLE: Parabolic dishes - 6', 10',
50, 90, 100 deg LNA's (we
have over 125 of them!);
tripod dish mounts, etc.

CONTACT: Rick Connor, WC2K
609-268-0736

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

TID BITS

- Congratulations to Pack Rats WA3IAC, WA3JUF, and N3AOG.** They each had technical articles published recently in major amateur publications. Chuck, WA3IAC, wrote a paper on a 10.368 MHz transverter for CQ Magazine, December 1990. Dave, WA3JUF and Dick N3AOG had back-to-back articles on UHF/microwave techniques published in May 1991 QST. This is great PR for the Pack Rats and a job well done for the world of VHF/UHF/SHF amateurs. Nice going guys!
- Dick Comly, N3AOG,** was a feature speaker in the VHF forum at the Dayton Hamvention. Dick presented slides and a talk on his super rover. That pick-up truck's getting a lot of mileage, Dick! Hi.
- Pack Rat Rover tests** will be conducted on May 11. This will be a try-out session to test the rover-to-Camelback paths in preparation for the June Contest. Want to participate? Contact Contest Chairman WA3JUF.
- Thanks to Jim Malone, WA3LBI,** for an outstanding program on microwave news gathering techniques which was the April meeting program.
- 220 MHz band weak signal advocate Tom Richmond, WB2IEY,** has circulated his idea of a reasonable 222-225 MHz band plan. It appears on page 6. Now is the time for the Pack Rats to take a position and cast a vote of decision collectively and individually concerning the new band structure. WLEJ's proposal appeared in a recent issue of QST, World Above 50 Mhz Column. Form your opinion and advise Corresponding Secretary WB3JYO of your recommendation or write directly to your VUAC rep. You should be interested even if you're not active on the band. It was a lack of response that contributed to the loss of the low end of the band.

222 - 225 MHz bandplan

222.000 to 222.025 EME
222.025 to 222.099 Weak Signal CW
222.100 CW and SSB calling frequency
222.101 to 222.154 Weak Signal CW and SSB

222.155 to 222.170 Beacon Allocation

222.171 to 222.175 GUARD BAND

222.180 to 223.380 FM Repeater Inputs (60 Channels)

223.400 National FM PACKET Simplex Calling Channel (Q)

223.450 CENTER FREQUENCY, HIGH SPEED DATA CHANNEL '1', 100 KHz Wide.

223.500 NATIONAL FM PHONE SIMPLEX CALLING FREQUENCY (channel 'A')
223.520 FM Phone Simplex (channel 'B')
223.540 FM Phone Simplex (channel 'C')

223.590 CENTER FREQUENCY, HIGH SPEED DATA CHANNEL '2', 100 KHz Wide

223.640 (R) FM PACKET CHANNELS (7, plus calling channel) are
.660 (S) designated by letter for ease of identification
.680 (T) in this document.
.700 (W)
.720 (X)
.740 (Y)
.760 (Z)

223.780 to 224.980 FM Repeater Outputs (60 Channels)

224.985 to 224.999 Band edge Guard Band
.....

Breakdown of space allotted by use and/or mode:

FM repeaters: 2400 KHz (60 Channels).....	80% of band
High Speed Data: 200 KHz (2 Channels).....	6.67% of band
FM PACKET: 160 KHz (8 Channels).....	5.33% of band
CW/SSB Weak Signal: 154 KHz (equiv. to 7.75 Channels)	5.13% of band
FM SIMPLEX: 60 KHz (3 Channels).....	2% of band
Guard bands: 18 KHz (equiv. to .90 Channel).....	0.60% of band
Beacons: 15 KHz (equiv. to 0.75 Channel).....	0.50% of band

NOTE: Numbers do not add up perfectly due to rounding of digits during calculations.

Explaining the suggested IEY 222 bandplan

This plan was devised after reference to the ARRL bandplan, W1EJ's proposed bandplan, and actual usage of the band as it stands today in the region around the NYC metropolitan area. The author is well versed in operations on cw/ssb on the low end of 220, and operates one of the only two east coast beacons on the band. This bandplan is written with the knowledge that everyone on the band will need to sacrifice a little, to maintain peaceful co-existence (or, at least, an uneasy truce).

FM operators seem to have little grasp of the power levels and operating habits of the weak signal operators. Weak signal operators remotely located away from major metropolitan areas have no idea of the crowding on the FM repeater portion of the band. The resulting disturbance on a repeater input from a high ERP CW or SSB station hundreds of miles away, *without propagation enhancement*, makes a *national* bandplan with little room for 'local options' imperative at this time. After all, even if local CW/SSB ops in a densely packed area work closely with the FM ops to avoid interference, this goodwill can be destroyed in an instant by an opening, or a national contest, or a net, or just plain activity that the locals have no control over.

We cannot design our bandplan as if we live in a vacuum. We are a community, almost family because of our devotion to 220 over the years. Just as in any family, some cousins are more distantly related than others, some relations live far afield, some have different interests. Just because we are related doesn't mean we are homogeneous- but families pull together in times of crisis. When families split over an issue, the resulting repercussions reach into the world beyond, affecting the lives of everyone around them. A rift on 220 will do nobody any good, and will certainly give the FCC, the Citizen Band ops, and other groups a good chance to point and laugh. I don't like it when people do that to my family, and you shouldn't either.

222.000 to 222.154 *weak signal*

This bandplan isn't perfect. One of the self-imposed limitations was placing the weak signal portion at the low end of the band. For Auroral and other propagation, you need to get as low as possible in case an opening is frequency dependent (which most are). Just as 50 and 144 MHz open under the right conditions, so does 220. As we have been under siege for nearly 15 years, growth on all portions of the band have been stunted. This will no longer be the case after the band reduction, because of primary assignment of the band to the amateur service. I look forward to encountering Novice operators on the low end of the band, just like we used to on two meters years ago.

The standard separations occur on the low end. (222.000 to 222.025 EME; 222.026 to 222.100 CW; 222.100 calling frequency CW and SSB; 222.100-222.154 SSB and CW.)

222.155 to 222.170 *beacons*

Placing the beacons at the high end of this proposed bandplan is an approach similar to that of the national ARRL bandplan: Unfortunately, the idea that most beacons are a nuisance is the impression one gets

when looking at the allocations. In this plan, the beacon band is expanded by 5 khz over the current allocation, and placed at the uppermost reaches of the ssb/cw weak signal operating area. There, they act not only as a band marker or buffer between wideband and narrowband modes, but also place them within reach of *both* communities, for the use of all operators on the band.

222.171 to 222.175 *guard band*

To prevent beacons from interfering with repeater input frequencies, a 4 KHz guard band is provided. No operations should take place in this region on a regular basis on CW, SSB or FM, as sidebands will interfere with adjacent allocations.

222.180 to 223.300 *FM repeater inputs*

The repeater community loses 8 channels from current usage in this bandplan. This is not the time or place to debate right-or-wrong. Use it or lose it is the saying for the day, and the 222 MHz allocation for SSB has never been widely used. No claim other than frequency actually needed for operations is reasonable, and therefore the FM repeater ops should be given a share of the band in line with that currently in use.

CTCSS use should be encouraged to prevent interference between systems on the same frequency. There are no 'local option' channels available in this plan, for reasons outlined in paragraphs 2 and 3. Any additional FM repeater pairs assigned outside of the parameters of this plan will affect *at least TWO* other operating communities (SSB and packet, beacons and packet, etc.). This is an attempt at a 'balance of powers' for the 222 MHz band, and should provide a self-policing aspect, as it will be in everyone's best interest to keep violations of everyone's allocations from occurring.

223.400 *National FM packet simplex calling frequency (Q)*

Per the ARRL bandplan now in place. Too high in the band to act as a repeater input. Too low in the band to be a repeater output.

223.450 *High speed data channel '1'*

This channel is for high baud rate information, long distance links for inter-city information transfer. It would occupy 50 KHz down and 50 KHz up from this frequency. Yes, it is a non-standard frequency on 222 (not a 20 Khz step), but it evenly uses 5 channels, and the stations using this mode will no doubt be 'super-stations', using higher power, sophisticated gear, etc. Joe Ham will link up to one of these high-speed stations through a regular slow-speed packet net on another frequency, not on this special reserved frequency. Too high to be re-allocated to FM repeater operations.

223.500, 223.520, 223.540 *FM Phone Simplex Channels 'A,B,C'*

Similar to today's ARRL national bandplan, with 223.5 being the calling frequency.

223.590 *High speed data channel '2'*

Same use as channel '1'. If the re-assignment of this channel to FM repeater operation was attempted, then serious interference would be had on the repeater input (222.000 to 222.040) from high power, high E.R.P. CW stations (300 to 1500 watts output, E.R.P. from 3,000 to 300,000 watts), which could affect repeaters within 300 miles of their operation. High power data transmission operations in areas outside of the local repeater coordinator's jurisdiction would also add to the interference problem on the repeater output frequency.

223.640 to 223.760 *Packet allocation, channels 'R,S,T,W,X,Y,Z'*
These packet channels would be used for local mailbox and BBS operations, as well as backbone setups. An initial suggestion would be to put major inter-city operations (such as 221.0 and 221.1 now) on channels R,S and T, and local operations on W, X, Y and Z.

Repeater operation on channel Z would be undesirable, as beacons operating 24 hours a day would probably cause serious interference on the input frequency of 222.160 MHz. As beacons operate on narrow bands set by the FCC, moving a beacon to avoid interfering with a repeater with an output of 223.760 (Packet channel 'Z') would not be possible. Therefore, the packet operation would protect the beacon sub-band, and the beacons would protect the packet from re-allocation on a local level to FM repeaters.

223.780 to 224.980 *FM repeater outputs*
Sixty channels. See "inputs" above for notes on this allocation.

224.985 to 224.999 *band edge guard band*
Who in their right mind would operate this close to the band edge on 222 MHz FM, Packet or High speed data, anyway?

Please send comments to:

Tom Richmond, WB2IEY, 56 Woodland Rd, Pleasantville, NY, 10570
(914) 769 - 4723

A 50 MHz PREAMPLIFIER

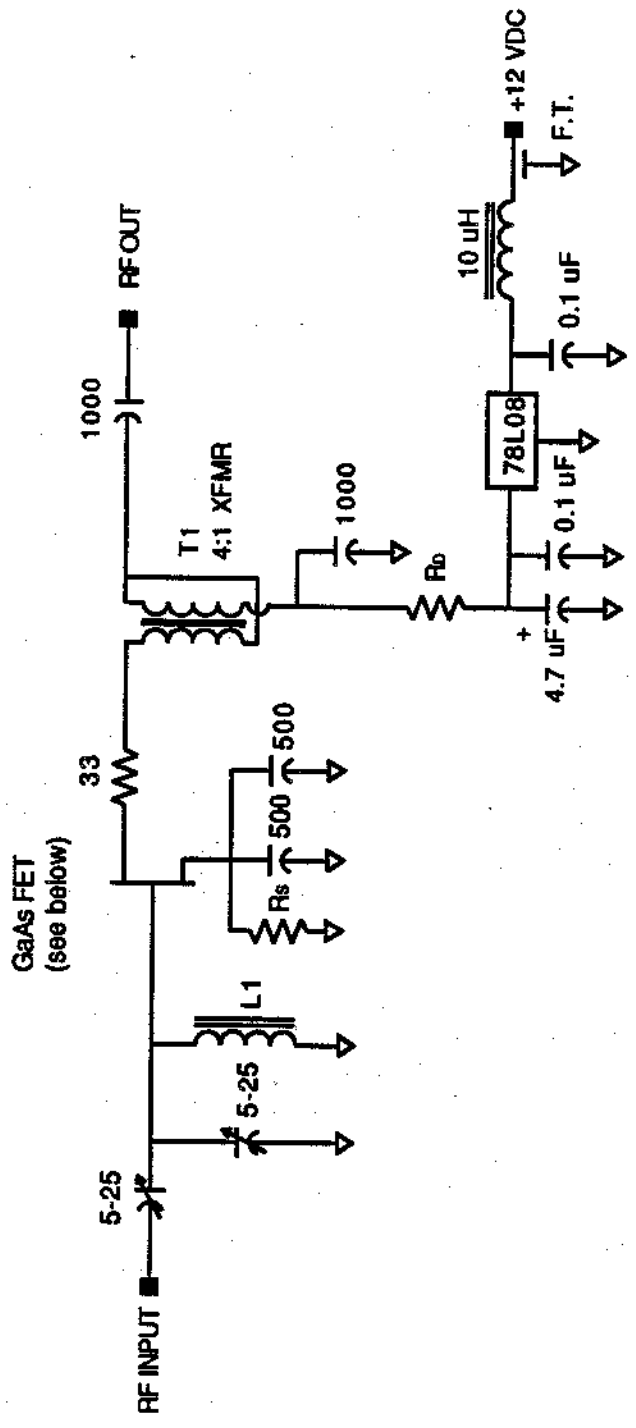
The function of a preamplifier is to overcome the losses of the mixer to improve the receiver's sensitivity. Additionally, the preamp's noise figure will usually define the receiver's sensitivity. Some care must be exercised when using a preamp however, particularly if the receiver is to function well in a strong signal environment. Not only should the preamp itself be able to withstand strong signals without producing distortion, but conversion gain must be held to a reasonable minimum to avoid driving other stages (including the IF receiver) into distortion.

At 50 MHz receiver noise figure is not as important as at higher frequencies since atmospheric and man-made noise dominate; this presents an opportunity to optimize circuits for lowest distortion without being overly concerned about noise figure. Although a variety of transistors could be effectively used, inexpensive GaAs FET's were chosen. The preamps presented here were designed and optimized for best compression point (P1dB) and third-order intercept point (IP3). While the Avantek ATF13484 and NEC NE72084 may both be used in the circuit shown, the NE72084 compression point in this circuit is 5 dB higher, resulting in slightly better signal handling characteristics. It's interesting to note that the ATF13484 is most linear at a relatively low current, while the NE72084 works best at a higher current. You have to measure the circuit's performance to know what it's doing!

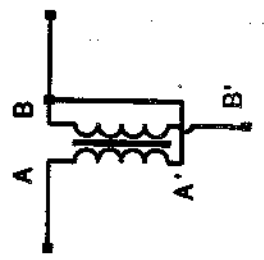
Circuit construction is not particularly critical however all components should have minimum lead lengths. This is best accomplished by using a "dead-bug" construction technique built on PC board serving as a ground plane. The GaAs FET source bypass capacitors (500 pF) are ATC "B" or equivalent chip capacitors. The FET's may be purchased from local sales reps. It is recommended that the entire circuit be built into an enclosure, such as a BUD CU-123 or similar.

Once the circuit is constructed it will be necessary to verify the required drain to source voltage (V_{ds}) and drain current (I_D). Drain current may be measured by measuring the voltage across R_D , however V_{ds} must be measured directly across the source and drain of the device.

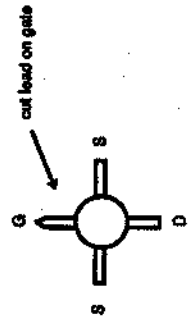
50 MHZ LOW DISTORTION PREAMP



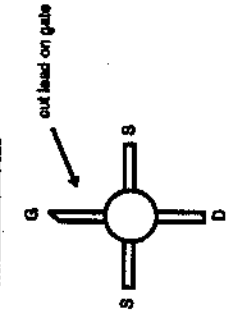
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 L1 12#28 ENAMEL ON T44-10 TOROID
 T1 6#32 ENAMEL BIFILAR WOUND ON T26-4 TOROID
 CONNECT TRANSFORMER AS SHOWN



A1E13484 TOP VIEW



NE72084 TOP VIEW



TYPICAL BIAS VALUES
 Biasing for each transistor has been optimized for lowest distortion in the above circuit. Use the resistor values as a starting point and adjust for the recommended VDS and ID.

RS	47	220	A1E13484	NE72084
RD	47	39		

Vos	3.5V	4V	A1E13484	NE72084
Ibs	15 mA	40 mA		
P1dB	+9 dBm	+14 dBm		
P3	+22 dBm	+24 dBm		
GAIN	22 dB	26 dB		
NF	0.7 dB	0.5 dB		

WB3JYO 4-91

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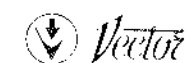


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