

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: 50.150, 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 XXXVI

April 1994

NUMBER 4

THE PREZ SEZ

We've often heard it said that hams don't build any of their own equipment anymore, that it's just too difficult these days. That's certainly not true among The Packrats! If you missed this year's homebrew meeting, you missed quite a showing! We actually had to set up more tables to accommodate the myriad of transverters, power amplifiers, and 10 GHz projects that were on display. The simple fact is that with today's technology, these projects are easier than they've ever been. MMIC amplifiers, hybrid amplifier "bricks" and the availability of surplus equipment has made homebrewing far easier than it was just 10 years ago. In fact, there was at least one 10 GHz transverter on display that was constructed entirely using surplus modules gathered at hamfests!

Homebrewing is often the only way to get state of the art equipment on the VHF/microwave bands - even for frequencies thru 1296 MHz the homebrew equipment usually outperforms what's commercially available to the ham. By helping our members with various construction projects we're able to get more people on new bands, and with improved stations. This is just one way we can help to promote activity above 50 MHz. If you haven't built any equipment before, a No-Tune transverter constructed at one of our building sessions might be a good place to start. Call Gary, WA2OMY for more details on the April 9th building session. Even if you're not a Rat but would like to pursue building your own VHF equipment you're welcome to get in touch with us.

There's a lot coming up on the Packrat calendar! Our next meeting will feature a talk by EME'er Al Katz, K2UYH. Al has been a leader in EME for many years and gave us a glimpse of some of his work at our recent conference dinner. At our April 21st meeting, Al will present a talk on how to get on EME with a modest set-up. Visitors are more than welcome.

With the long awaited coming of Spring we can look forward to some improved tropo conditions - although I listen quite a lot I've been trying to give a few more CQ's every now and then. You never know what type of propagation may exist until you get on. Let's try to make our presence known on the bands!

73, Paul Drexler, WB3JYO

Pack Rats **CHEESE BITS** is a publication of
the **Mt. AIRY VHF RADIO CLUB, INC.**
Philadelphia, PA. and is published monthly.

SUBSCRIPTION RATE: \$10.00 PER YEAR (USA)
\$12.00 PER YEAR (CANADA)
\$15.00 PER YEAR (ELSEWHERE)

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(215) 355-5730

PACKRAT 222 MHz REPEATER - W3CCX/RPTR

222.98/224.58 MHz, Churchville, PA

OFFICERS: 1993-1994


PRESIDENT: WB3JYO, Paul Drexler
VICE-PRES: WB2OMY, Gary Hitchner
REC. SECR: WA3AQA, Walter Zumbach
TREASURER: WA3JUF, Dave Mascaro
COR. SECR: N3AOG, Dick Comly
DIRECTORS: N3EXA, Brian Taylor (1 YR)
K3ESJ, Bill Jaxheimer (1 YR)
WA3AXV, Ron Whitsel (2 YRS)
WB2YEH, Bob Fisher (2 YRS)

MONDAY NIGHT NETS

<u>TIME</u>	<u>FREQ.</u>	<u>NET CONTROL</u>
7:30 PM	50.150 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: WB3DNI 215-672-5289
HAMARAMA: WB3JYO 609-538-1687
VHF CONFERENCE: KB3XG 215-270-3158

THE AMERICAN RADIO RELAY LEAGUE**OST**

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WILMINGTON, DEL. 19803

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215 355-5730

Calendar of Coming Events -April 1994

April

- 7 June Contest planning session at the QTH of Pat, WB3DNI at 8 PM.
- 9 Another Tune-up session will be held at Gary, WA2OMY's QTH . Give Gary a call at 610-359-6409 if you plan to attend. Start time will be around 9 AM.
- 10 The Delaware Valley Radio Assn Hamfest will be held at Trenton State College on Rte 31, Ewing Township. TI on 146.071.67.
- 10 The Pen-Del Hamfest will be held at the NUR Temple, 198 DuPont highway (Rte 13 near US40 split), Newcastle DE. Talk-in on 224.220 and 147.225+.
- 12 Physicist John Thompson demonstrated his discovery of a body smaller than the atom, a negative charged he called a corpuscle now known as an electron in 1897.
- 14 Packrat Board of Directors Meeting at the QTH of Bruce, WA3YUE at 8 P.M. All interested parties invited. Call 215-630-1875 for directions.
- 16-17 19 th Annual Trenton Computer Festival at Mercer County Community College, just north of Trenton NJ. This is the longest running computerfest in the world. Several sessions on amateur radio including no-code license cram sessions and exams as well as a separate packet radio conference. VE exams all day Saturday.
- 18 ARRL 144 MHz Spring Sprint (Monday evening) starting at 7-11 PM local time. See March QST, page 120 for rules. Results will be published in the NCJ.
- 21 Packrat Meeting at the Southampton Free Library at 8:00 PM. Bring and/or invite your on the air VHF buddies. All VHFers invited. The speaker will be Al Katz, K2UYH, on Minimum Requirements for EME Operation.
- 22 Lyrids meteor shower peaks at 0309 UTC.
- 25 Italian engineer and inventor Guglielmo Marconi, inventor of the wireless telegraph and Nobel Prize winner was born in 1874.
- 26 ARRL Spring 220 MHz Sprint (Tuesday evening) 7-11 local time. See March QST, page 120 for rules.
- 29-30/ 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 or see it **GO**. The VHF/UHF Forum will include talks on "Current Trends in VHF UHF/Microwave", "VE3ONT EME Operation", "Backpacking a VHF QRP Portable Station". "Taking the Magic out of Microwaves _ Using No-Tune Transverters", and "Spread Spectrum". There will be a preamp gain/noise figure contest on Friday night at 7 PM in the lobby of the Hara Silver Arena.
- 29-30 /May 1 West Coast VHF/UHF Conference at the Sheraton Cerritos Hotel in Cerritos , CA. For info send a SASE to the Southern California Six Meter DX Club, PO Box 10441, Fullerton, CA 92635 or call 714-990-9203, FAX 714-990-1340.

May

- 14 Packrat **Ladies Night** will be held at the Mill Race Inn, Holland in Warrington, Pa. starting at 6:30 PM.

BUILD SESSION REPORT

By Gary, WA2OMY

The last build session was held at the QTH of Bruce, WA3YUE, on February the 12th. The turnout and interest in these sessions continues to be very good. Participants included WA3YUE, WB3DNI, WA2OMY, WB8ZAR, N3NGE, and W3IIT. Among the projects completed was the repair of two AM6155's and the conversion of a 2 meter ID rig for a low level drive to converters. The next session is scheduled at the QTH of Gary, WA2OMY, on April 9th starting around 9 AM. If you have trouble with something during the contest or want to start some construction on a new band or want to help out, plan on coming out. Give me a call at 610-539-6409.

TID BITS

In the Feb. issue of 2 Meter EME News, K6QXY reported that W6JKV/KP2 operated 6 Meter EME over the New Year's weekend from St. Croix in the Virgin Islands. The Antenna was a modified single 10 element M with an estimated gain of 12.5 dBd and 800 watts output over a salt water about 150 ft. below the QTH. Worked were K6MYC and K6JKV with signals heard on both ends but no QSO with WA4NJP. W6JKV/KP2 was able to hear his own echoes every night. K6QXY also reported that W7HAH in Montana worked an SM7 station both using single yagis.

The April issue of 73 Magazine has articles by Steve Katz, WB2WIK/6 on a 2 Meter Half Kilowatt Amplifier and Using International 9096-IIA low loss coax. Chuck, WB6IGP column focuses on the conversion of old HF SSB rigs as the heart of multimode VHF rigs.

A Wind Profiler is reported to be operating in the NH area right on 1296 MHz.

N3CX has his new beacon on the bench operating at 2304.140 MHz with 4 watts into a dummy load. He's looking for a good horizontally polarized omni antenna.

Pat, WB3DNI in the new June Contest Coordinator. The next planning meeting is scheduled for 31 March. Pat also has reprints of a complete set of conversion articles, schematics and portions of tech manuals on AM -6154/6155 amplifier.

The Upper Midwest VHF/UHF Newsletter reports that good conditions existed in the midwest (some of us made it out there on a good but short 6M opening). High grid count/contacts were 63/152 on 6M by W0UC/9, 60/186 on 2M by WR0G, 22/37 on 222 by KB0ZQ, 26/80 on 432 by W0UC/9

Herb, W3IWU reports working LW5EJU and LU3DEK on 6 meters on Friday, March 18. Also heard were LU3DGA and the LU3EMK Beacon om 50.0815 MHz. In this area, the opening lasted for 30 to 40 minutes. K1TOL was reported to have heard 4 or 5 other stations.

The March 94 issue of QEX has an article by Zach, KH6CP/1 describing a low 3rd order intercept driver to be used instead of a MMIC to drive Hybrid Power Modules. It seems that our favorite MMIC 's are great and easy to use except they can be very "dirty". A MAV-11 running at +20 dBm output tested at an IMD of -26 dB. A discrete MRF 581 stage resulted in an IMD of -46 dB, a 20 dB improvement. The article includes a layout and parts list. It's "no-tune" for 50 thru 222 MHz.

Some FCC information is now available via Intelnet. Included are the FCC daily digest, news releases and some public notices. The FCC Intelnet address is ftp.fcc.gov.

Mail. can be sent to the CAC (and forwarded to members having e mail capability be sending the mail to cac@arrl.org.

VISITORS AT THE MARCH MEETING

WA3RTL, Ben Kekall, Unionville, Pa.
K3LIC, Ron Dudek, King of Prussia, Pa.
N3JHX, Dan Farrell, Elverson, Pa.
N3FTJ, Steve Kerns, Reading, Pa.
N3LJK, Warren Zibgenfus, Allentown, Pa.
K3YWY, Chuck Pearce, Emmaus, Pa.
N3FUS, Jason Gorodetzer, Holland, Pa.
N3RIA, John D'OnoFrio, Warminster, Pa.
KB3ANO, Denise Burstein, Warminster, Pa.
KA3YVR, Rocky Sheppard, Warminster, Pa.

ATLANTIC DIVISION ADVISORY COMMITTEE MEMBERS

Contest AC: Tim Duffy, K3LR, 44 Elliot Road, West Middlesex, PA. 16159.
DXAC: Tony Gargano, N2SS, 26 Winchester Drive, Sewall, NJ. 08080
Public Service AC: Bob Josuweit, WA3PZO, 3341 Sheffield Ave., Philadelphia, PA. 19136
Spectrum Committee: Robert Bennett, W3WCQ, 1006 Green Acre Road, Towson, MD. 21204
William Van Aller, K3CZ, 7623 Old Washington Road, Woodbine, MD. 21797
John Hansen, WA0PTV, 49 Maple Avenue, Fredonia, NY, 14063

SWAP SHOP

(send all ads to the editor:

FOR SALE: SSB Electronics LT-6 Xvtr, 20 watts, \$400.00, Mirage A-1015-6 Amplifier with preamp, 160 watts output, \$300.00, both for \$650.00. 50 ft. Rohn 45G Tower with AG-4 top section that accommodates the TB-3 thrust bearing, house bracket, guy bracket, rotator shelf and work platform, \$750.00. Tower is in excellent condition, disassembled, in storage and ready for pickup at my QTH. Contact Harry Price, K3HZO at 610-796-8543.

WANTED: 10 Meter module for a Yaesu FT-726R. Contact Chuck, WA2ONK at 609-586-7180.

WANTED: 1296 MHz schedules from Delaware. Phil, KB3PD, is now on 1296 with 80 watts at the antenna and looking for any skeds around 0000Z on Sat./Sun. morning. Give him a call at 302-737-7966 or drop a line to 402 Durso Dr., Newark, DE. 19711.

WANTED: Icom 38A 222 MHz FM Transceiver, 1P3T+ Manual Coax Switch. Contact: Geoff Krauss, WA2GFP at 610-354-5915(W) or 215-643-2031(H).

FOR SALE: HP 302 Wave Analyzer, like new, \$50.00, Tektronix 585 Oscilloscope with 82 plug-in, 80 MHz response, with manuals, \$75.00. Contact Gary, WA2OMY at 610-539-6409.

New Microwave Devices

By Harry, W3IIT

A new company, Stanford Microdevices, is marketing GaAs devices that may be of interest to VHF/UHF/ Microwave hams and those involved in the commercial area. I recently saw an ad for Stanford Microdevices and received some data sheets on their devices. A brief listing of their existing product line follows. The data sheets that I received were for PHEMT GaAs FETs, all low noise except for the SMM-210 1 watt MMIC. I do not have prices except for their designer kits which are attractively priced (they are meant for the commercial OEM market but then aren't we all involved in it? You can call them to receive data sheets. They are offering designer kits for \$99.00 for 25 devices with any combination of devices in a kit. They will accept VISA, Mastercard or American Express with the designer kit offer good until 31 March 1994. To place a designer kit order, call Customer Services at 408-730-2614 between 8 am and 5 P.M. PST.

<u>Device</u>	<u>Description</u>	<u>NF (typ)</u>	<u>Gain (typ)</u>	<u>Misc. Info</u>
SPF-284	1-6 GHz PHEMT GaAs FET	0.8 at 2 GHz	16 dB at 2 GHz	12 dBm (1dB comp.) at 2 GHz
SPF-484	1-6 GHz PHEMT GaAs FET	0.5 at 2 GHz	16 dB at 2 GHz	0.7 dB NF max.
SPF-684	2-12 GHz PHEMT GaAs FET	0.7 at 4 GHz	15 dB at 4 GHz	1.5 dB NF at 12 GHz
SPF-884	2-12 GHz PHEMT GaAs FET	0.5 at 4 GHz	15 dB at 4 GHz	1.2 dB NF at 12 GHz
SPF-1076	2-20 GHz PHEMT GaAs FET	0.4 at 4 GHz	16 dB at 4 GHz	10 dBm (1dB comp.) at 4 GHz
		1.2 at 12 GHz	11 dB at 12 GHz	0.6 dB NF at 4 GHz
SPF-1276	2-20 GHz PHEMT GaAs FET	0.35 at 4 GHz	16 dB at 4 GHz	1.0 dB NF at 12 GHz
SPF-1376	2-20 GHz PHEMT GaAs FET	0.30 at 4 GHz	16 dB at 4 GHz	0.8 dB NF at 12 GHz
SPF-1476	2-20 GHz PHEMT GaAs FET	0.25 at 4 GHz	15 dB at 4 GHz	0.7 dB NF at 12 GHz
SMM-210	1.5-2.5 GHz 1 Watt GaAs MMIC		30 dB at 2 GHz	28 dBm (1dB comp.) typ at 2.4 GHz

HOME BREW NIGHT

The March Home Brew Night again demonstrated that ham brewing is still very much alive and well. Thirteen brought out their wares to demonstrate their abilities. They all were non-trivial requiring a lot of effort in scrounging up the designing, parts, packaging, testing, fixing in various degrees. The judges again had difficulty in making their selections with the following winners selected. In reality, everyone that entered were winners by tackling and succeeding at these projects.

The judges, after much deliberation, declared the following winners:

Best Technical Project: a three way tie of Phil, WA3NUF, Ron, WA3AXV, and Dick, N3AOG

Most Ambitious Project: Dave, WA3JUF

Best First Time Project: Ken, N3PER

Best Construction: Paul, WA3JYO

<u>ENTRANT</u>	<u>PROJECT</u>	<u>DESCRIPTION</u>
Phil, WA3NUF	10 GHz Transverter	Finished just before the June contest last year working W2SZ with it's then capability of 50 mw output over a 130 mile path. Now upgraded to 8 watts out. The LO source is a typical microwave brick at 10 GHz, uses two separate mixers, HB WG filters, all operating on 12 volt power for portable operation. 2 stage WB5LUA preamp

HOME BREW NIGH T contd.

- Scott, N3GSA** 2 Meter Transverter
- Al, N3ITT** 903 MHz Transverter 10 watts out using a DEM transverter board, JUF brick amp, GaAs Fet preamp and switching board.
- Steve, N3FTI** 222 MHz Transverter Handbook design using a Ga As Fet preamp. LO changed to one from the ARRL Microwave manual.
- Paul, WB3JYO** 6M Transverter New design using high level mixers on both receive and transmit to give others a little break. Thompson devices on the output.
222 MHz Transverter New design using SD 1458 in the output.
- Len, N3NGE** 2M/6M Transverter Two complete transverters in one chassis. WB3JYO design. High level mixers for both tx and rcv. 12 watts out on 6M and 2 watts out on 2M.
- Chuck, K3YWY** 1296 HB Transverter No Tune design using home brew boards made by scanning magazine article drawings into a PC to create the artwork for etching the boards and then editing the scanned images to remove extraneous parts outlines that were in the article.
1296 HB Preamp Similar approach to generating the master to etch the boards as for the transverter.
- Chuck, WA3IAC** "No-Tune" 2 M Xverter Almost no-tune uses high level mixers, pin-diode switching with a 0 dBm output. Under construction since 1986. Components used came from several previous places of employment.
- Ron, WA3AXV** 10 GHz Transverter Complete transverter with a 10 watt TWTA. Ron claims that it's easier to HB as you get higher in frequency with all of the microwave components that are available at hamfests these days.
- Gary, WA2OMY** 222 FM Amplifier 90 watt 222 MHz FM power amp. This project was an example of what can be done to convert an existing commercial amplifier to a completely different band. The amp started out as a 450 MHz commercial amp that by merely changing the matching circuitry on the last two stages converted it to a completely different application. It looked like there were enough stages left for a couple of new bands.
450 MHz Linear this was another conversion resulting in a very linear 5 watt 20 dB gain amp.
- Dave, WA3JUF** 1296 Transverter Complete new design. Uses a microwave "brick" oscillator with the multiplier removed. 70 watts output. Built for attic operation where there are extremes in operating temperature over the year. 28 volt operation.
Log Book Program Complete logging program allowing sorting by grids and countries and country to prefix conversion.
- Dick, N3AOG** 10 GHz Transverter Another 10 GHz transverter (all 3 were of completely different design using discrete microwave components such as mixers, etc. as opposed to a PC board design). 10 watt TWTA output, WB5LUA preamps.
- Ken, N3PER** 903 MHz Transverter First home brew attempt. 10 watts out using a JUF brick amp and a DEM no-tune kit. worked 20 contacts in 4 grids using an in the attic antenna during the January contest

CHEESEBITS SUBSCRIPTIONS

Cheesebits subscriptions are available to everyone interested in activities and information from the VHF through the microwave frequencies. Subscriptions are for 1 year of 12 issues. For a subscription, send the following information:

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April 94 Send to: SUBSCRIPTION/ADVERTISING MANAGER:
Bob Fischer, WB2YEH
7258 Walnut Avenue
Pennsauken, NJ 08110

Last month we talked about some wattmeters which can be used to monitor the output of your transmitter or other high level vhf source up to approximately 1000 MHz. However these meters display power output on a linear scale or on a meter calibrated in watts. A serious UHF or microwave experimenter will eventually have a need for a wideband power meter, which will display power referenced to 1 milliwatt or dBm, on a log scale.

Some applications for such a meter around the hamshack would include:

1. Measuring the output of your homebrew or surplus local oscillators.
2. Measuring the input and output power of amplifiers from HF through microwave frequencies. Most output measurements will require the use of RF couplers or other samplers. (will cover in a future installment).
3. Checking the linearity of your exciter and amplifiers.
4. If you are fortunate to have more than one power meter it can be left in line for power monitoring. I use one meter on a wide band coupler on my feedline which is in use on several bands through switches.
5. These power meters also can be used for field strength and antenna measurements.

Here is a chart summarizing some models to look for on the used market. The dates are shown to point out the age of which some of this equipment is approaching.

	<u>Model</u>	<u>Year</u>	<u>Specifications and Notes</u>
HP	430C	Prior 1965-72	10 MHz to 10 GHz w/ 477B Mount (tube design)
	477B	Prior 1965	10 MHz to 10 GHz Thermistor mount- 430C
	431A	Prior 1965	10 MHz to 10 GHz w/ 478A Thermistor mount
	431B	1965-1967	10 MHz to 10 GHz w/ 478A Thermistor mount
	431C	1967-1969	10 MHz to 10 GHz w/ 478A Thermistor mount
	432A	1969- PRESENT!	10 MHz to 10 GHz w/ 478A Thermistor mount
	478A	Prior 1965 to Present	10 MHz to 10 GHz
	8478	Prior 1965 to Present	10 MHz to 18 GHz
General Microwave	460	Approx. 1971	Used with General Microwave power heads N420, thru N432. Different models cover different power ranges. 10 MHz thru 12.4GHz.

The HP 430C power meter with the 477B Thermistor mount is an early tube design using a bridge with a thermistor to detect power. Don't expect to have to pay much for a meter or a mount. The 430 series of meters should be available at give-away prices, with the cost of a known good mount a little more. The meters drift rapidly with temperature changes making repeatable measurements on the lowest scales of -10 dBm or less very difficult. One use would be to put one on a line coupler in a permanent position on your microwave setup and leave it there for output monitoring.

A later design and much more successful product from HP was the introduction of the 431 series of meters with the 478A dual thermistor RF sensor. In the 478A a pair of thermistors are matched to cancel drift with temperature change. Some problems still plagued the combination though, and the 432 power meter was introduced in 1969 to replace the 431. The 431 meter used a 10 KHz signal through the bridge circuit to the mount. This caused the effect of zero balance in the bridge to change when the mount was connected and disconnected from the load. In addition the capacitance of the cable from the meter to the mount changes slightly when moved around, also affecting meter zero. The 432 uses a dc current through the mount and an auto zero circuit to make repeatable measurements much easier.

The 431 series of meters should be well suited for ham use. The price of this series of meters at flea markets and on the used market has fallen to just a few dollars. The 431C may bring a little more since HP added a thermistor mount efficiency switch to increase accuracy. However rarely do hams need the few tenths of a dB change this feature provides. Most measurements in our microwave setups are made on the higher scales of -5 through +10 dBm. On these scales the effects of meter zero is reduced. Although a meter may be available at a low cost, you will also need a power sensor and a cable to make a system. Unfortunately the cable may be the most difficult part of the system to find. If you find a system available (meter, head, cable) at a combined price you may want to consider it. Don't count on making your own cable, it is a special coax with a shield.

A few notes on the 478 heads. These heads are very susceptible to burnout. The spec. is 30 mw, maximum. They mean it! If you come home with a sensor and find it will not zero or drifts rapidly around zero the sensor is probably bad. Unfortunately there isn't much you can do to fix it. In the 60's, HP made field replacement kits for the 478 in order to rebuild them. You may still be able to find them.

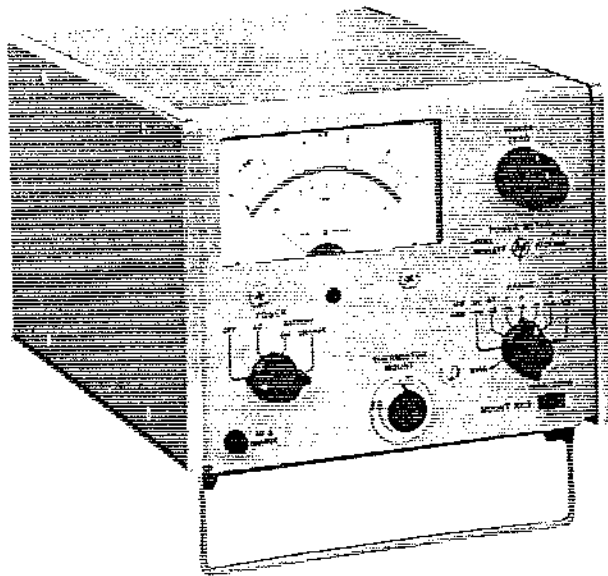
The 432A power meter should command a much higher price for one in good condition, compared to the 431. In some cases expect to pay over \$100.00. Don't forget this is a current production item in the 1994 catalog. Hewlett Packard changed their color scheme from a Blue-Grey to a light tan approximately 1972. Equipment manufactured after this change generally brings a higher price. The 478A power head for example has gold plated pins in the connector with the color change. One way to find a lower cost power sensor would be to look for one of the manufactured clones. PRD corporation and Sthruthers are a couple of manufactures which produced 478A replacement heads. Since the name HP is not on it, they generally bring a lower price.

If you are concerned about the age of a certain piece of equipment you are considering, the serial number can be a clue. On HP equipment the first 3 digits of the number indicate the most recent drawing release. The first digit is the year, the next two is the week.

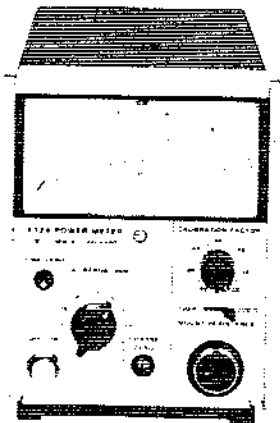
The last item on the above list is equipment made by General Microwave. I have seen several units on the surplus market however I have not used their power meters. If one was available which was known good it may be worth considering, but remember a parts unit may be hard to find compared to an HP.



HP 478A Power Sensor



HP 431 Power Meter



432A

HP 432A Power Meter



478A



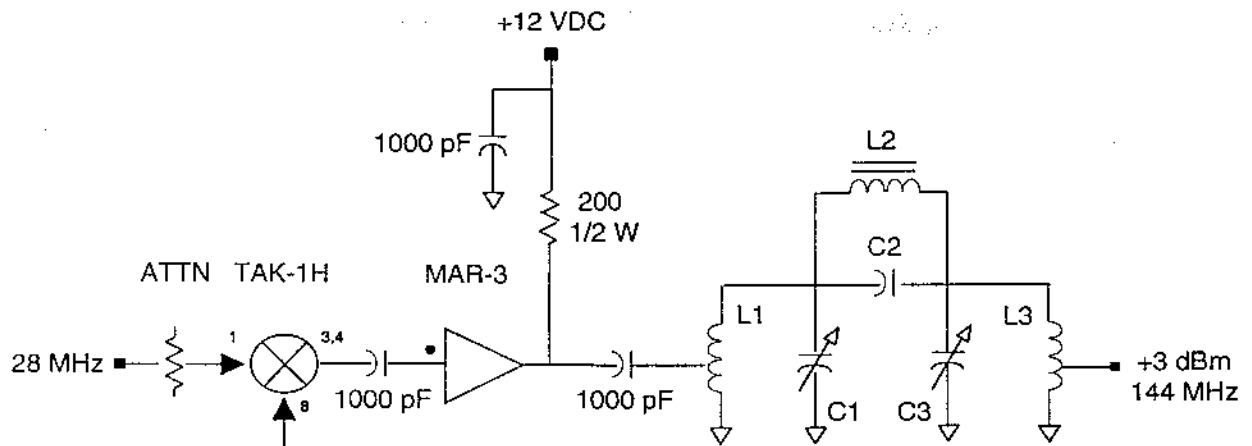
8478B

HP 478A and 8478B Power Sensors

144 MHz TRANSMIT MIXER

The first several stages of the 144 MHz transmit converter may be constructed together to form a convenient module. The circuitry shown can be built on a solid ground plane PC board and bolted to the inside lid of an appropriately sized enclosure such as a BUD CU-123 die cast box. The high-level mixer used is a Mini-Circuits TAK-1H; for pin-out information consult the **RECEIVE MIXER** schematic published in Nov 92 *Cheesebits*. Inductors L1 and L3 are made by winding #18 gauge wire on the shank of a drill bit; L2 is a toroidal type inductor. All 1000 pF capacitors may be ceramic - value is not critical. Capacitors C1 and C3 may be pistons or ceramic variables. For best filter response C2 should be a 2% tolerance silvered-mica capacitor. As in all VHF construction projects, keep lead lengths to a minimum.

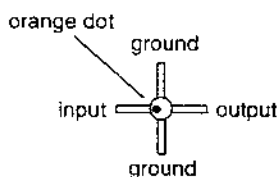
Begin construction by mounting the PC board using 4-40 hardware. Drill mounting holes to accommodate the RF and LO input connectors (BNC or SMA) at one end of the enclosure lid. Solder the TAK-1H mixer to the board in dead-bug fashion adjacent to the connectors. Next mount the Mini-Circuits MAR-3 MMIC. Carefully bend one of the ground leads close to the MMIC body and solder to ground, forming a short connection. Connect mixer pins 3 and 4 together by soldering one end of the 1000 pF capacitor to both pins. A feed-thru capacitor serves as a convenient tie-point to bring 12V into the module. Mount the filter components in the remaining space, making certain to space L1 and L3 approximately 1/2" apart. If the inductors are mounted in this fashion no shielding is necessary between them. A resistive attenuator will likely be required at the 28 MHz input. Calculate it's value so that the mixer is fed with 0 dBm (1 mW) of 28 MHz energy at pin 1. Output from this module should be +3 dBm (2 mW) at 144 MHz.



- | | |
|--------|---|
| C1,C3 | 1-10 pF |
| C2 | 1 pF |
| L1, L3 | 7 turns #18 AWG solid wire on
1/4" ID. Tap @ 1 1/2 turns from ground |
| L2 | 27 turns enameled on T37-10 toroid |

144mixer.drw

MAR-3 MMIC



WB3JYO 3-94

6 Meter Beacons

Tim Marek (NC7K)

Freq	Call	Grid	Duty	Pwr	Antenna	Comments	Freq	Call	Grid	Duty	Pwr	Antenna	Comments
							50.070	N4NW	EM55	100%	40W	Squalo	W (901)382-4919
							50.070	W0BJ	DN91	100%	5W	Turnstile	W
							50.070	W2CAP	FN41	?	?	?	W
							50.070	W4HHK	EM55	100%	2 W	Dipole	W
							50.070	WA7ECY	CN85	100%	30W	Vert	W
46.170	TV Video ?		100%	?	?	VK	50.070	WB0CGH	EM13	100%	1.5W	Halo	W
46.240	TV Video ?		100%	?	?	VK	50.070	WB4GJG	FM06	50%	1 W	Ringo Vert	W
50.003	7Q7SIX			5w			50.071	VK4SIX	PG99				
50.005	ZS1SIX	?	?	10W	Omni	ZS ?	50.071	W9KFO	?	?	?	?	W
50.008	DX1HB	PK04		20W	Jpole		50.072	KH6HI	BL01	100%	80W	Dipole	KH6
50.008	PY1RO	?	?	?	?	PY	50.072	KW2T	FN13	100%	.25W	Squalo	W
50.009	JA2IGY			10W	GP		50.072	VE1CCP	?	?	?	?	VE
50.010	SV9SIX	KM25		30W			50.072	WA2TYM	FN12	100%	15W	Turnstile	W
50.010	ZS6STB	?	?	?	?	ZS	50.073	VE1MQ	FN65		2W	Dipole	
50.011	ES6SIX	KO37					50.073	W9???	?	?	?	?	W
50.015	PJ2B	?	?	15W	?	PJ	50.073	ZS4SA	KG33	40%	20W	Yagi	ZS
50.017	JA6YBR	PM51			Turnstile		50.074	WB5DSH	EM15	50%	30W	Halo	W
50.019	P29BPL	QI30		12W	GP		50.075	EA8SIX	IL28		10W		
50.020	CX1CCC		5W		GP		50.075	K7IHZ	DM43	50%	20W	Squalo	W
50.020	GB3SIX	IO73	?	25W	3ele	G	50.075	KP4EKG	FK68	50%	10W	vert	KP4
50.020	SZ2DH	?	?	?	?	SV	50.075	LU1DMA	FF57	100%	10W	2 ELE Quad	LU
50.023	HH2PR	?	?	?	?	HH	50.075	PY2AMI	GG67	100%	10W	GP	PY
50.023	LX0SIX	JN39	5W		Dipole		50.075	VS6SIX	OL72	100%	30W	GP	VS6
50.025	S24YV	?	?	?	?	SZ	50.075	WB4WTC	FM06	100%	10W	2 Loops	W
50.025	6Y5RC	?	?	?	?	6Y	50.077	N0LL	EM09	100%	20W	2 Halos	W
50.025	OH1SIX	KP11			2xTurnstile		50.077	N5JM	EL49	50%	3W	Vert	W
50.025	ZS6SIX	?	?	?	?	ZS	50.077	VE3DRL	?	?	?	?	VE
50.027	JA7ZMA	QM07	50W		2xTurnstile		50.077	WB2CUS	FN30	50%	1W5ELE	Yagi	W ?
50.029	ZS6PW	?	?	?	?	ZS	50.077	WB2CUS/3	FN21	50%	3W	Squalo	W
50.032	JR0YEE	PM97		2W	Loop		50.077	VK4BRG	QG48		1W	Vert. Dipol	
50.033	LU8YYO	?	?	?	?	LU	50.077	W8UR	EN75	100%	2W	Dipole	W
50.035	ZB2VHF	IM76	?	35W	5ELE	ZB	50.078	PT7AAC	HI06	100%	5W	GP	PY
50.037	ES0SIX	KO18		15W	Dipole		50.078	TI2NA	EJ79	100%	20W	Dipole	TI
50.037	V73AT					Soon V73AX?	50.078	OD5SIX	KM75		10W	GP	
50.038	FY7THF	?	?	100W	Vert	FY	50.079	W6SKC	DM41	100%	50W	5/8 Vert	W
50.040	ZS6VHF	?	?	?	?	ZS	50.080	W1AW	FN31	50%	80W	Yagi to W	W
50.041	WABKGG	?	?	?	?	W	50.080	WB400J	EL87	100%	10W	Vert	W
50.043	ZL3MHP	RE66		20W	Vert	?	50.082	HC8SIX	EI59	100%	4W	Vert	HC8
50.045	JR6YAG						50.085	3D2FJ	?		20W	2ELE	
50.045	OX3VHF	GP60	100%	20W	GP	OX OX3RA	50.085	9H1SIX	JM75	100%	25W	5ELE yagi	9H
50.048	VE6ARC	DO65	100%	50W	GP	VE	50.086	VE2STL	FN46	100%	1.5W	Dipole	VE VE2YB
50.050	GB3NHO	?	?	?	?	G	50.086	VE2TH	FN46	?	3W	Dipole	VE
50.050	ZS6LN	?	?	10W	?	ZS	50.086	VP2MO	FK86	50%	10W	6ELE Yagi	VP2
50.053	VK3SIX	QF02	50/10	9ELE			50.089	FC1MKY	JN33	50%	10W	1/4 GP	F
50.054	OZ6VHF	JO57		25W	Turnstile		50.090	KJ6BZ	AK56	100%	10W	6ELE Yagi	W
50.055	WA9FEF	?	?	?	?	W	50.090	WA6JRA	?	?	?	?	W
50.057	VK8VF	PH57		20W	GP		50.091	9L1US	IJ38	50%	?	?	9L
50.058	VK4RGG			6W			50.092	W5GTP	EM40	50%	30W	3ELE Yagi	W
50.059	JH0ZPI	PM96					50.093	CN6VHF	IM64		8W5/8	GP	
50.059	VE3UBL	FN03		10W	Turnstile		50.094	TU2VHF	EJ76				
50.060	GB3RMK	IO77	?	15W	Beam to USA	G	50.099	KG6DX	QK23	50%	20W	6ELE Yagi	KH2
50.060	KH6EQI	?	?	?	?	KH6	50.100	VP5D	FL31	50%	6W	Ringo	VP5
50.060	PY2AA	?	?	25W	GP	PY	50.110	SSB	ALL				DX
50.060	WA8QNQ	EM79	100%	2W	Turnstile	W	50.112	JD1YAA	?	?	?	?	JA
50.061	KH6HME	BK29		20W	Dipole		50.112	W7KNP	?	?	?	?	W
50.062	K1NFE	FN31	100%	15W	Turnstile	W	50.120	4S7EA	MJ96	50%	50W	6ELE Yagi	4S7
50.062	W3VD	FM19	100%	10W	Vert Dipole	W	50.321	ZS5SIX	KG50	100%	10W	Halo	ZS
50.063	N4PZ	EL87	100%	400MW	1/4 Vert	W	50.480	JH8ZND	QN02		10W	GP	
50.064	KH6HI	BL01		10W	Turnstile	?	50.490	JG1ZGW	PM95	100%	10W	Dipole	JA
50.064	N7DB	CN85	100%	30W	?	W	50.500	5B4CY	KM64	100%	15W	GP	5B
50.065	KA0CDN	DM79	100%	20W	2 Halos	W	50.551	LA7SIX	JP99		20W	4ELE	
50.065	W0IJR	DM79	100%	20W	2 Halos	W	50.740	TV Audio		100%	KW's		ZL
50.065	W5VAS	EL59	100%	1 W	Halo	W	50.750	TV Audio		100%	KW's		ZL
50.066	WD7Z	DN24	100%	?	?	W	50.760	TV Audio		100%	KW's		ZL
50.067	KD4LP	?	?	?	?	W	50.904	ZS1STB	KF05	100%	25W	5/8 GP	ZS
50.067	OH9SIX	KP36			2xTurnstile		50.945	ZS1SIX	JF98	?	16W	GP	ZS
50.067	W7US	?	?	?	?	W	51.002	ZL1BPW	?	?	?	?	ZL
50.067	WA6IJZ	DM04	100%	70 W	Vert	W	51.020	ZL1UHF	?	?	?	?	ZL
50.067	WB8IGY	EM79	100%	2 W	Vert	W	51.030	ZL3MHB	RF80	100%	10W	Vert	ZL
50.068	K6FV	CM87	100%	?	?	W	51.199	VE7BEE	DN09	100%	50W	Vert	VE
50.070	KA4VEY	EM64	100%	10W	Vert	W							
50.070	K52T	FM29	100%	?	?	W							
50.088	VE1SIX	?	?	?	?	VE							
							51.225	ZL2VHT	RF80	100%	30W	?	(604)492-6129 ZL

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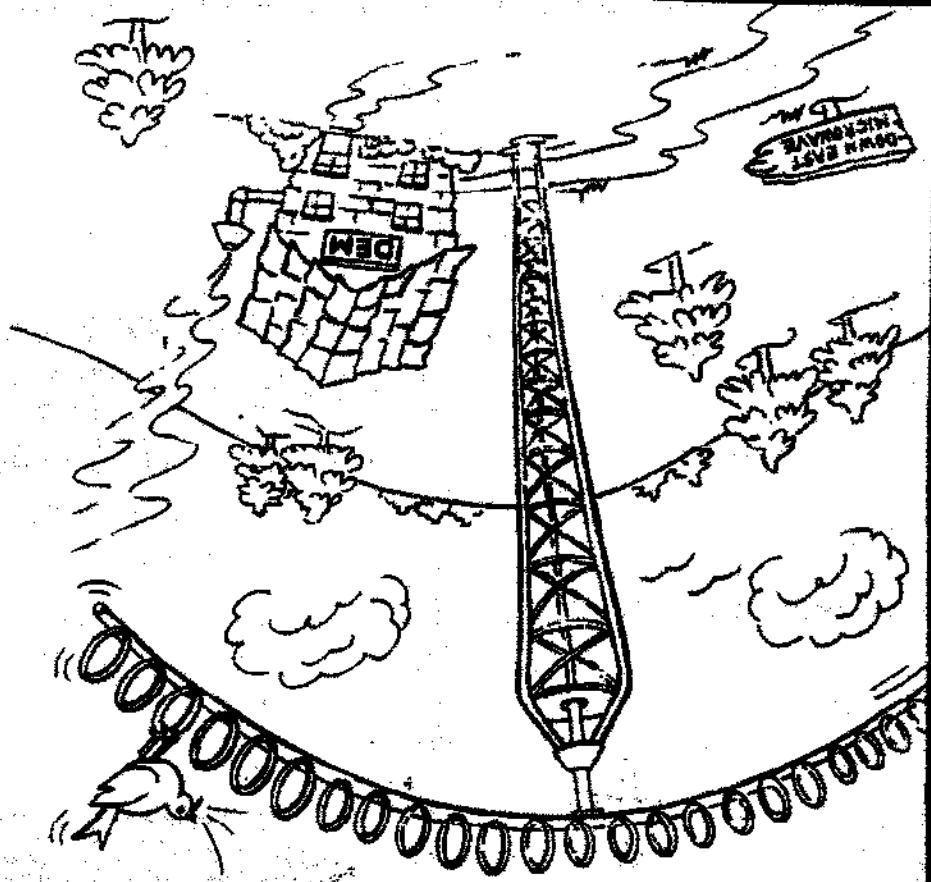
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