

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, K3JUV, 2013

VOLUME XXXV

MAY 1993

NUMBER 5

THE PREZ SEZ

I'm afraid I have some bad news. It now appears that the Pack Rat's have lost the January VHF S/S Contest for the first time ever. No gavel this year, for us.

We congratulate the Rochester VHF Group who have reported to have out-scored the Rat's. As a club Rochester has worked hard for years to accomplish this task.

Now that we have lost, we all need to double our effort to recapture the gavel next year. We have set a record of wins that speaks for itself and we still have a heck of a batting average.

As a club we use Rovers and I have personally operated as a rover in the September 92 contest. Do the rules need to be changed? If you think so, it may be a good time to send a letter to the ARRL and let them know how you feel. Don't forget to include a copy to the Division Director and your CAC representative.

It was good to see all of you at the Ladies Night outing this year. Our turnout was a little down due to a date conflict with other important activities like the opening of Trout Season. We will attempt to rectify this next year. I want to thank Bruce and his wife Becky for their hard work in running the event.

73

William T. Murphy
W0RSJ FN20JR

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PACKRAT 222 MHz REPEATER - W3CCX/RPTR

222.98/224.58 MHz, Churchville, PA

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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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Calendar of Coming Events -May 1993

- 1 ARRL 902, 1296, and 2304 MHz Spring Sprint Contest, 7-11 P.M. (Saturday Evening). These sprints will be held simultaneously. See March QST, page 110 for rules.
- 6 ETA Aquarid meteor shower predicted peak at 0304 UTC.
- 8 Greater South Jersey Spring Hamfest will be held at the National Guard Armory on Haddonfield Road in Cherry Hill, NJ. TI on 147.345R, 147.15R and .52.
- 9 Mothers Day.
- 13 Packrat Board of Directors meeting at 8:00 PM. Location to be announced.. All interested Parties invited.
- 15 Armed Forces Day
- 16 Warminster Amateur Radio Association Hamfest at the Grange Fairgrounds in Wrightstown, Pa. Talk-in on 146.69/.09 and 146.52.
- 20 ARRL Night. Packrat general membership meeting at the Southampton Free Library on Street Road in Southampton, Pa. at 8:00 PM. All club members and VHFers invited. "meet the speaker" dinner will be held at Village Inn at 6 PM. Call Paul, WB3JYO for reservations. Nominations for the election of officers in June will be accepted.
- 21-23 West Coast VHF/UHF Conference at the Holiday Inn in Ventura, CA. For info send a SASE to West Coast VHF Conference, PO Box 2103, Oxnard, CA. 93033.
- 21-23 Atlantic Division Convention at the Monroe County Fairgrounds near Rochester, NY. Talk-in on 146.28/.88.
- 22 The Lancaster County Hamfest will be held at the Ephrata Senior High School, Ephrata, PA. Talk-in on 144.85/145.45. VE Exam at 9 AM.
- 22-23 ARRL 50 MHz Spring Sprint Contest 2300Z May 22 (Saturday Evening) until 0300Z May 23. See March QST, page 110 for rules.
- 30 Maryland FM Association Annual Memorial Day Hamfest at the Howard County Fairgrounds in West Friendship, MD. Talk-in on 146.16/76 and 223.16/224.76. VE Exams at 9 AM.
- 31 Memorial Day.

TID BITS:

The Mar/Apr 93 issue of NCJ has a good article by Stan, W7NI, titled "Selecting a Mast Material". It tells the pros and cons of aluminum vs steel tower masts. It's must reading for those of you that had bent masts (or worse) after the winter winds.

The Jan/Feb issue of NTMS "Feedpoint" has articles on rewinding coax relays for 12 v operation by Paul, N1BWT, Hints and Kinks by Al. WB5LUA covering MMIC's, Ramsey 30 MHz Ft receivers, and 24 MHz Transverters Modulating "Brick" sources for use as beacons by Dave, N4MW.

The Mar/April issue of NTMS "Feedpoint" has articles on Metal Lens Antennas by Paul, N1BWT, Improved Battery Regulation for No-Tune Transverters by Paul, N1BWT and a 2C39 Control Board by KE7CX.

A Solid State 6 Meter Amplifier

Motorola has recently released a new Power Field Effect Transistor, the MRF 157 that has a power output capability of 600 watts that is good to 80 MHz. It is similar to the MRF 154 but has approximately 3 dB more gain at 50 MHz. The spec sheet shows the schematic (copy attached) for a two device amplifier that is capable of over 1 Kw output at 50 MHz. The typical gain vs frequency and input/output characteristics are also attached so you can get an idea of the linearity of the devices. For the lucky guy able to buy or scrounge a couple of devices, Motorola Application Note AR176/D describes a MRF154 amplifier whose layout and construction should aid in layout. The primary difference the input circuitry. I believe that there has been an article in QST and one of the VHF conference proceedings on a solid state amp using the MRF 154,

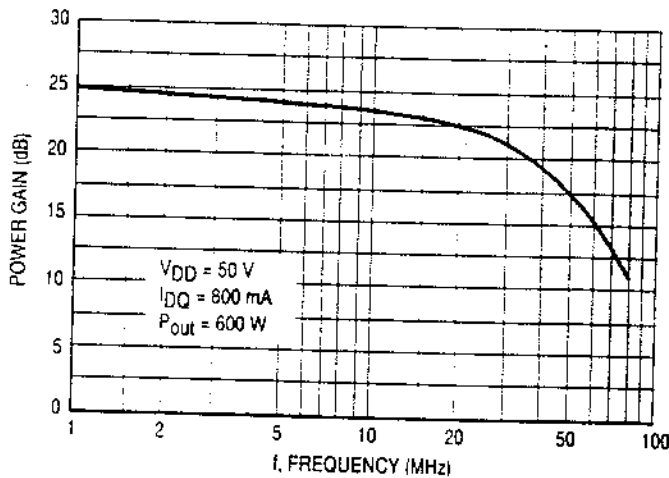


Figure 2. Power Gain versus Frequency

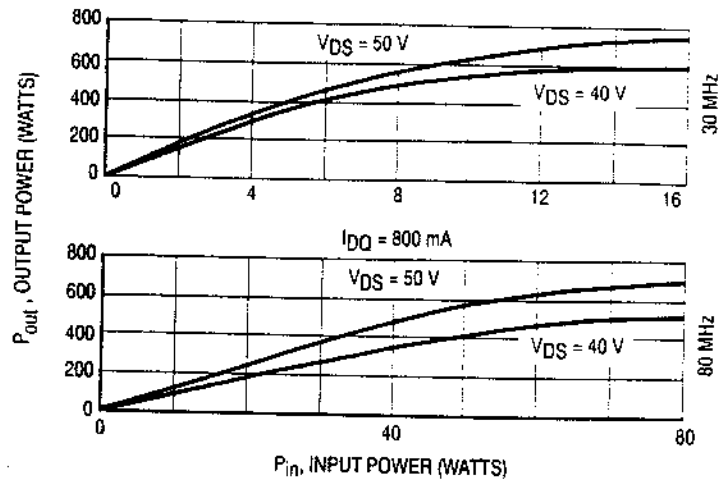
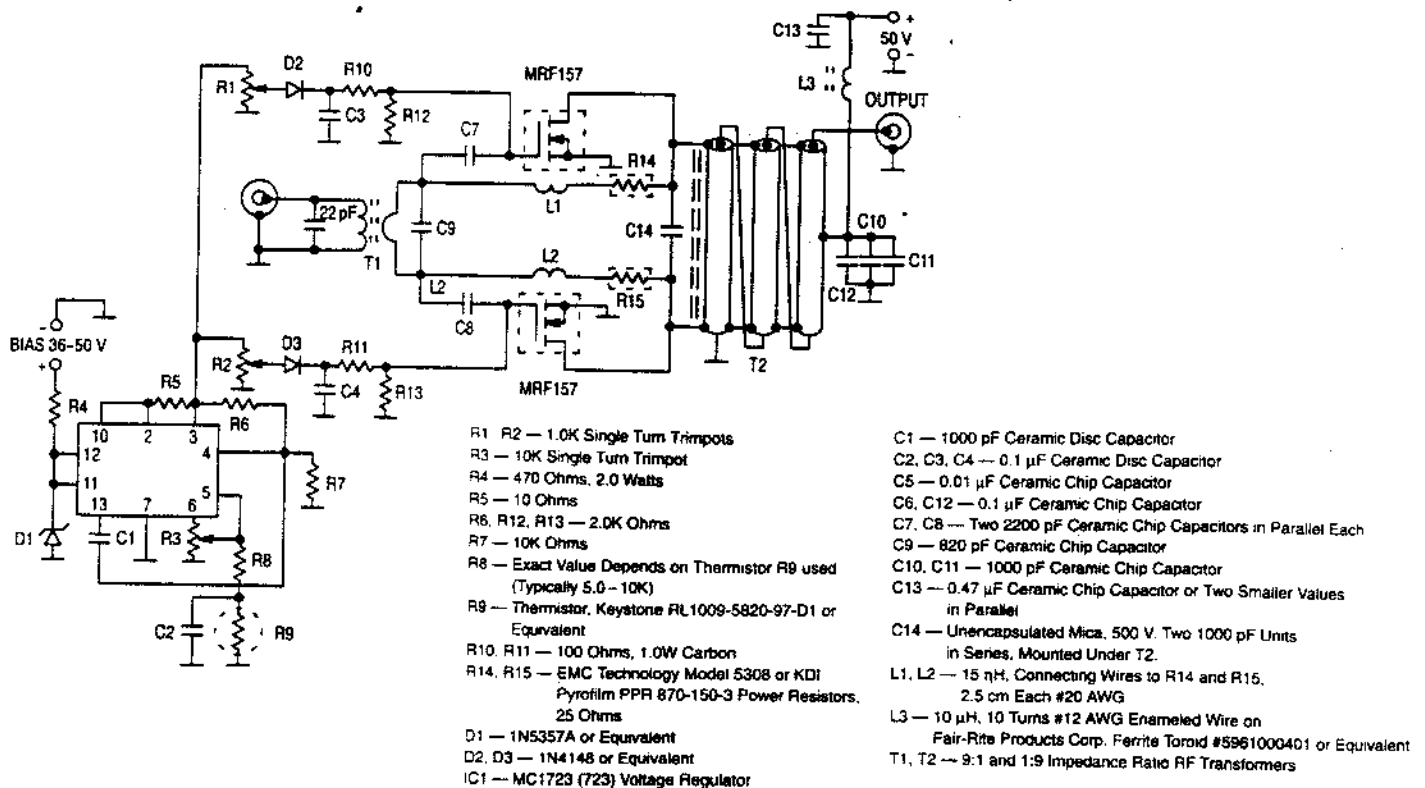


Figure 3. Output Power versus Input Power



Unless otherwise noted, all resistors are 1/2 watt metal film type. All chip capacitors except C13 are ATC type 100/2008 or Dielectric Laboratories type C17.

Figure 11. 2.0-50 MHz, 1.0 kW Wideband Amplifier

Another successful Ladies Night Banquet was held with all attendees having a good time, enjoying the good food, and music. The awards were presented to:

Phil Migiles, WA3NUF, for Packrat of the Year
Ron Whitsell, WA3AXV's group for 1st Place Multiop in January
Bill Murphy, W0RSJ's group for 2nd Place Multiop in January
Bob Cook, N2SB, for 1st Place Single Operator in January and Best Construction at Homebrew Night

ARRL CAC Address Correction

The address for Dave Halliday, KD5RO, the Atlantic Division CAC representative was incorrectly listed in the April issue of Cheesebits. Based on the address in the Rochester VHF Group Newsletter the correct address is:

Dave Halliday, KD5RO, 8747 Tabors Corner Road, Wayland, NY 14572.

SWAP SHOP

Send non commercial swap shop items to the editor.

WANTED: WR 42 Waveguide. Contact: Ed Barbacow, K3ZCY, at 330 Celon Rd., Carmichaels, Pa. 15320-1354.

FOR SALE: 5.7 GHz, 25 watt TWT, -24v, 7 amp, fully metered, \$125.00. 5.7 to 6.3 GHz Microwave sources with internal oven, \$30.00. Various isolators and filters for 5.7 GHz, 2 ft. GG214 cables with N conn, 6x8x1 in and 3x8x1 in sealed boxes and 15 dB, 1watt coax attenuators with N connectors. Call Pat, WB3DNI at 215-672-5289.

FOR SALE: 70 cm WA7CJO type Cavity Preamps with N conn input and BNC output. Without GaAs FET or torroid. Contact Tom, KB2AH at 908-223-5067.

FOR SALE: RF Concepts 3-312 120 w. linear with 1.2 dB preamp, \$225.00, Yaesu FT-290R MK II all mode 2 m transceiver with FBA-8 battery pack and case, \$550.00, Yaesu FT-690R MK II all mode 6m transceiver, \$500.00, TE Systems 0510G Amplifier, 10w/170 Watts with 0.6 dB preamp, \$ 225.00. Call John, WA2FUZ at 518-966-8654.

FOR SALE: AIL Type 74 ANFI with 07403 30 MHz IF and tunable 07422 tunable 20 to 60 MHz IF (needs work) \$100.00, AIL Type 71 Noise Generator P.S. \$25.00, AIL Type 07049 and 07050 W/G Noise Sources \$25.00 each, and AIL UHF Noise Source \$25.00. Contact Harry, W3IIT, 215-584-4846.

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.

Contest Advisory Committee Report

by Dave Hallidy KDSRO
ARRL Atlantic Division CAC Member

As many of you know, I was recently appointed to the ARRL Contest Advisory Committee, representing the Atlantic Division. I feel that in order to bring you (the members of the Atlantic Division and more specifically the RVHFG) up to speed on what's happening in the world of VHF/UHF contesting, I will periodically write a column for inclusion in the Journal. This will NOT necessarily be a regular column, since not everything that happens in the CAC is related to VHF/UHF. But when there are significant developments in the field of VHF/UHF contesting, I'll report them here. By the way, if you have suggestions or comments on ANY facet of Amateur Radio contesting, you may direct them (in writing) to me or directly to the League. Your letters will be answered and your suggestions/comments considered. Now, let's get on with this month's report.

1. New Bonus Points for Field Day

"An additional 100 bonus points can be earned by qualified participants in Field Day for completing at least ten VHF/UHF QSOs (excluding packet contacts). Also, a 'free' VHF/UHF transmitter has been added for Class A and Class B stations. This station can operate the entire Field Day period, just like the 'free' packet and satellite transmitters. Take a few minutes to look at VHF/UHF (item 9) under the bonus points in the official Field Day Rules in May QST. It's an ideal station for Technicians to operate since they have full privileges on these bands. Make sure your club or group invites everyone to fully participate in Field Day!"

2. Rule Change for Rover Entries in ARRL VHF Contests

"The Awards Committee has changed the rules for Rover entries starting with the 1993 ARRL June VHF QSO Party, to be held on June 12-14. The new definition for the Rover category is below.

Rover: One or two operators of a single station that moves among two or more grid squares during the course of the contest, and making contest contacts, using the same equipment and antennas at each site, will be considered a rover. Rovers sign 'rover' on phone and /R on CW after their call sign. The intent of the Rover category prohibits fixed station scores to be included with Rover operations; stations may however, enter the Rover category with a separate log for Rover activities. All

Rovers are encouraged to adopt operating practices that allow as many stations as possible to contact them.

This new change will be in effect in all ARRL VHF contests that include a Rover category."

3. Date and Time Change for the 902 MHz, 1296 MHz and 2304 MHz Spring Sprints

"Activity in the Spring Sprints has been slumping over the last few years, especially on the microwave bands. In the hope of boosting activity in the 902 MHz, 1296 MHz, and 2304 MHz Spring Sprints, we have rescheduled the times and dates. The three Sprints (902 MHz, 1296 MHz and 2304 MHz) are scheduled to run simultaneously on a single Saturday (May 1, 1993). You may work any five consecutive hours from 6 AM until 1 PM local time. The individual Sprints will remain separate for scoring, but will take place at the same time. The other Spring Sprints (50 MHz, 144 MHz, 222 MHz, and 432 MHz) will remain on their respective activity nights.

This change should give members the opportunity to make more contacts during the Sprints and at the same time promote activity. It does not discriminate against entrants who have equipment for only one of the bands. They can still compete on an equal basis with their peers. Members who wish to enter all three Sprints, have the opportunity to pass contacts from one band to another. Three simultaneous Sprints, rather than one, should prove to be more of an incentive for people to go mountaintopping or go to rare grid squares. We want to make the Sprints more fun by creating more activity on the microwave bands during the contest."

That's the list for this time. I'll write again when there is some more VHF/UHF contest news to report. Again let me reiterate- you can direct comments on any topic relating to contesting to me, but do it **IN WRITING**. That way, we all have documentation we can refer to as we work to improve contest rules. Write to me at : 8747 TABORS CORNERS RD., WAYLAND, NY 14572.

73 for now and happy contesting!

From the April 93 issue of the Rochester VHF Group Newsletter

Phase Lock Loop Source modifications

by Dave Mascaro, WA3JUF

Due to the demise of analog microwave systems, the Phase Lock Loop (PLL) microwave frequency sources are showing up on the surplus market. These units make excellent local oscillator (LO) sources for microwave transverters. The stability is good enough for CW/SSB work. Some units have built-in ovenized crystal oscillator references and others require an external reference. Both are usable.

Surplus units that cover the 3.4, 5.7 and 10 GHz bands are available. A unit that can be used for a 5760 MHz transverter was listed in April 1993 Cheese Bits for \$30. Just buy a crystal and tune the filter for the desired frequency and you have a stable LO for your transverter. The reference crystal is usually in the 90-110 MHz range.

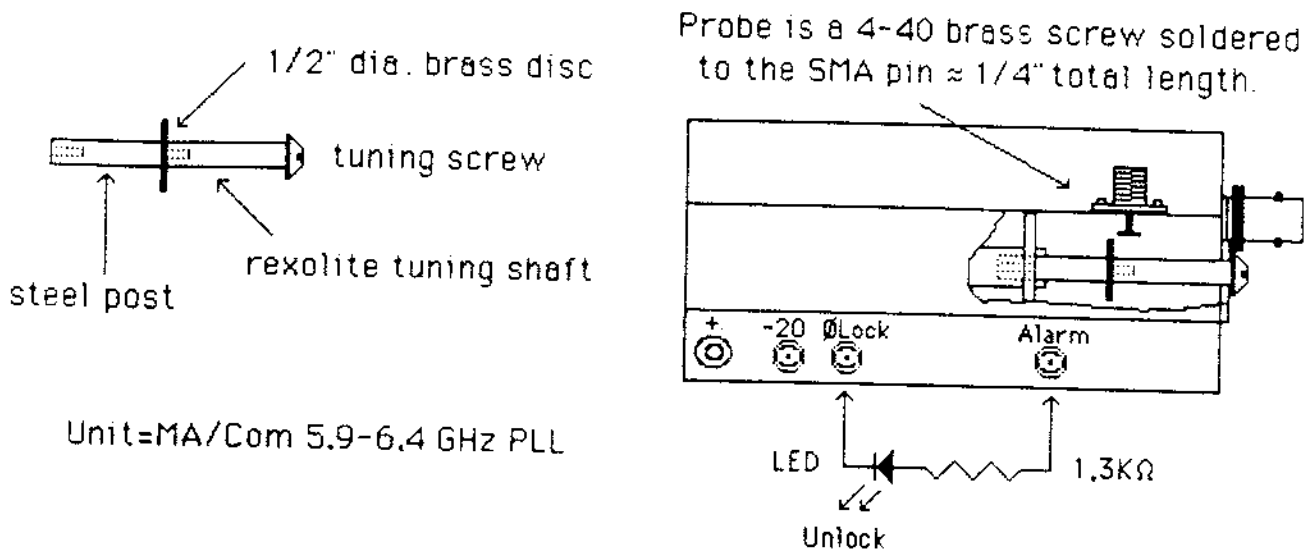
The PLL sources can be used for bands other than for which they were intended. Ron, WA3AXV uses a PLL source in his 1296 MHz transverter. The basic unit (be it a Frequency West source or MA/Com source) has an oscillator that runs usually between 1 GHz and 1.5 GHz. This oscillator output, which is phase locked to a crystal oscillator reference, drives a step recovery diode multiplier/filter assembly. The resultant 10-100 mW output is used as the RF source for a microwave system.

Remove the SRD/filter module and add an RF output connector and you have the basis for an 1152 MHz LO for a 1296 MHz transverter. The unit I modified is a \$5 hamfest MA/Com 5.9-6.4 GHz unit, but the same idea applies to all units. Without a reference oscillator, the output frequency will shift 10-20 MHz or more while the unit tries to find phase lock. At this point the RF output is measured and monitored on a spectrum analyzer. The oscillator would tune 1.3-1.5 GHz, but not down to 1152 MHz.

I added a small brass disc capacitor to the tuning inductor to bring the tuning range down to 1152 MHz. The disc is press fit on the steel tuning shaft and epoxied in place. Using an RF generator I applied 10 mW of 96 MHz into the reference input and tuned the oscillator for a lock at 1152 MHz ($96 \times 12 = 1152$). The power output was 300 mW. RF is easily attenuated, HI. The $1/2 F_0$ and harmonics were already down 40 dB. Adding a small interdigital filter produced a real clean LO source for my new 1296 MHz transverter. I ordered a crystal from International Crystal and I was in business.

It would be nice to know when the unit is locked, unlocked or on the hairy edge even. Connecting a voltmeter between the Lock terminal and the Alarm terminal showed 0 volts when phase locked, around 8 volts when unlocked and about 1 volt when the unit was on the verge of being unlocked. A simple LED monitor tells all three situations.

The 1 GHz oscillator was connected to my SRD multiplier/filter and it works real good for a 3312 MHz LO used in a 3456 MHz transverter. The 1 GHz can be applied to an SRD/filter for a 2160 MHz LO. After building many transverters using many frequency multiplying stages for the LO, it is nice to use something as simple and stable as the PLL source. These PLL units are great for my new transverters which use SMA connectorized mixers, interdigital filters, attenuators and power dividers. Just as MMICs made building projects easier, so does the PLL source.



EDITORS NOTE

By Harry, W3IIT

This issue is the start of the second year that I have been editing Cheesebits. Like many jobs we volunteer for, it has been a bit larger than I expected. I sometimes think that it's a mistake to know too much about what you're getting into or you might not volunteer and you'd miss out on a lot of fun and rewards that come with the job.

I continue to solicit material for Cheesebits from any source. If you're generating it using an IBM compatible wordprocessor, I'd appreciate getting it on a floppy disk. The format isn't important- I'll convert it to what I use. It keeps me from adding my typo mistakes to yours. Other newsletters do "steal" our stuff and they're welcome to do so. We only request that they give the author the credit and or give credit to those that we steal from.

I also solicit comments on what you want to appear and what you don't want. Feedback is necessary to me or you'll only get what interests me.

Last but not least, I'd like to give some credit to the busy beavers that help in getting Cheesebits out each month. Bob, WB2YEH is Subscription/Advertising Manager. He keeps the address labels up to date to the extent that you keep him aware of your address changes. The job of collating, stapling, folding, stapling again, sticking, and stamping goes to Bruce, WA3YUE, Gary, WA2OMY, John, KB3XG, and Walt, N3EVV. And we wouldn't have much to publish either if our fellow Rats didn't take the time to write-up the big and little projects that they share with us. How about thanking them the next time you see them or talk to them on the air?

50/70 MHz Crossband Tests

John, WA2FUZ, reports that Bill, GW6ZMN, is looking for US amateurs interested in running crossband tests during this summers sporadic E season. Bill is running 100 watts to a 4 element yagi on 70 MHz and is also on 50 MHz. Only a 70 MHz converter and small beam for 70 MHz should be required. If interested, contact John, WA2FUZ, at 518-966-8654, or GW6ZMN, W. J. McDowall, 36 Adenfield Way, Rhoose, Barry, South Glamorgan, Wales, U. K.

DJ9BV 144 MHz Yagis

The following info from an article by Ranier, DJ9BV, appeared in the 1st Quarter of 1990 issue of DUBUS. It describes a series of 2 meter yagi's based on the design of DL6WU with additional computer enhancements. The design uses insulated elements via nylon rivets thru the boom. The design center frequency for these antennas is 145 MHz. This results in the gain at 144 MHz being down .15 dB from the design center frequency. The dimensions shown in the table cover antenna boom lengths from 1.8 thru 4.8 wavelengths. The table is fairly simple to use. If you want a 1.8 wavelength antenna you look at the table and see that the largest element is D7. You use the dimensions shown for cutting the element lengths from the reflectors thru D7. Note that some configurations use a dual reflector. See the figures for the reflector configuration and the folded dipole feed details. The original dimensions are in mm and I have converted them to inches. With aluminum available in a large range of sizes, it should not be too difficult in obtaining a close equivalent to the mm dimensions.

Elem	Length		Elem. Spacing		Position		Remarks
	mm	inch	mm	inch	mm	inch	
R1/R2	1083	42.63					2 el Refl (4.8)
R1/R2	1053	41.45					2 el Refl (1.8, 3.2)
R	1030	40.55					1 el Refl (2.1, 3.6, 4.0, 4.4)
DE	990	38.97	360	14.17	360	14.17	Folded Dipole: 8mm diameter
D1	950	37.40	165	6.49	525	20.66	
D2	940	37.00	375	14.76	900	35.43	
D3	930	36.61	450	17.71	1350	53.15	
D4	920	36.22	525	20.66	1875	73.82	
D5	915	36.02	585	23.03	2460	96.85	
D6	910	35.82	630	24.80	3090	121.65	
D7	905	35.63	660	25.98	3750	147.63	DJ9-2-1.8
D8	900	35.43	690	27.16	4440	174.80	DJ9-2-2.1
D9	895	35.23	720	28.34	5160	203.15	
D10	890	35.04	750	29.53	5910	232.67	
D11	885	34.84	780	30.70	6690	263.38	DJ9-2-3.2
D12	880	34.64	810	31.89	7500	295.27	DJ9-2-3.6
D13	875	34.45	840	33.07	8340	328.34	DJ9-2-4.0 , 27ft. 4.34 in.
D14	870	34.25	840	33.07	9180	361.42	DJ9-2-4.4 , 30ft. 1.42 in.
D15	865	34.05	840	33.07	10020	394.49	DJ9-2-4.8 , 32ft. 10.48 in.

Notes: Spacing refers to the distance between this element and the previous element. Position is the distance from the reflector. The 2.1 , 3.6 , 4.0 , and 4.4 have a single reflector. The 1.8 , 3.2 , and 4.8 have a double reflector, which has a computer optimized length to maintain a F/B of better than 20 dB. Please notice the different lengths of the various reflectors depending on the antenna size.
 Boom: 20x20x2 mm (0.787x0.787x0.079 inch) square aluminum tubing. For larger boom material, the length of each element must be increased. Add 1 mm(0.0393 in.) for 25 mm(0.984 in.) booms, add 3 mm(0.118 in.) for 30 mm(1.18 in.) and add 6 mm(0.236 in.) for 40mm(1.574 in.) booms. Boom may be tapered.
 Elements are 4mm (0.157 inch) Aluminum welding rod.
 Driven element is a folded dipole 8x1 mm (0.315x0.04 inch) aluminum tubing.
 Balun: 750 mm (29.52 inch) Teflon cable RG142B/U. The sleeve should be 720 mm (28.35 inches) in length.
 Element mounting: Nylon rivets 61PR800000 from Heyman Manufacturing (P/N unknown for nearest inch equivalent but if it is a standard diameter, Rutland Arrays may have them)

Simulated Antenna Performance at 144.5 MHz

Type	Gain dBD	F/B dB	1st Side- lobe dB	E Angle deg.	H Angle deg.	E Stack meters	H Stack meters
DJ9-2-1.8	11.2	20.2	19.2	39.0	44.0	3.10	2.77
DJ9-2-2.1	11.8	24.2	19.2	36.8	40.5	3.29	3.00
DJ9-2-3.2	13.25	20.0	17.3	31.2	33.5	3.86	3.60
DJ9-2-3.6	13.6	20.8	16.8	30.0	31.75	4.00	3.79
DJ9-2-4.0	14.0	24.3	17.0	29.0	30.5	4.14	3.94
DJ9-2-4.4	14.3	21.0	17.0	28.0	29.5	4.29	4.07
DJ9-2-4.8	14.6	22.0	17.2	27.5	28.8	4.36	4.17

Technical Reports: Yagi-Antennas for 144 MHz by DJ9BY

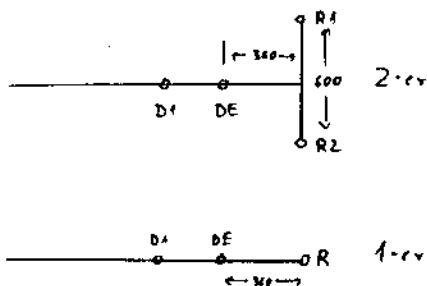


Bild2/Figure 2: (Reflector arrangement)

Technical Reports: Yagi-Antennas for 144 MHz by DJ9BY

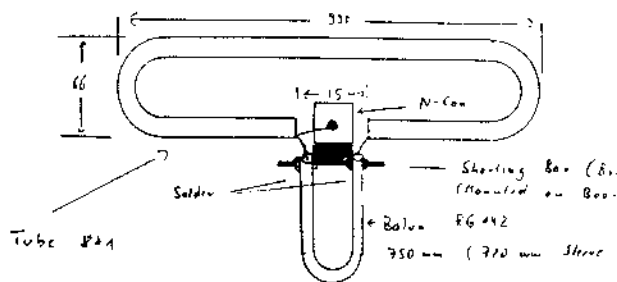


Bild 3/Figure 3: (Folded Dipole)

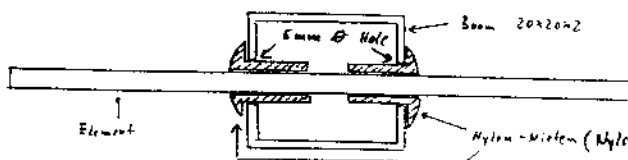


Bild 4/Figure 4: (Element Mounting)

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May 93

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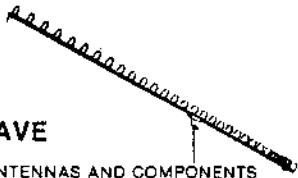
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Pennsauken, NJ 08110

**DOWN
EAST
MICROWAVE**

MICROWAVE ANTENNAS AND COMPONENTS

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W3HQT

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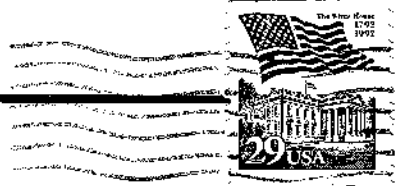
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