

CHEESE BITS



W3CCX

CLUB MEMORIAL CALL



ARRL
Affiliated
Club

SCANNED TO PDF BY BERT, K3IUV, 2013

VOLUME XLII

May 2000

Number 5

The PREZ SEZ

The most recent problem is that the Prez hasn't been Sez'ing much on the radio. I have been in the shack, mostly at the computer, but the radio is at finger tip distance. I turn on the station and usually listen to 144.2 while doing other work on the computer. A whole lot of white noise comes out of the speaker. (we could get rich if we could bottle and sell that stuff) No wonder everyone is after our spectrum! So where is everyone? I think I found some answers. The DX'ing is shifting to other modes while waiting for the great tropo and skip. (or listening like me)

A couple members were trying out PSK31 after the introduction to this mode by Dan Henderson of "the league" at our last club meeting. I won't mention who was making these "computer contacts", but it sounded like they were having fun and getting on the air. I may resurrect my failed first attempt at an interface to try out the other busy application of high speed meteor scatter. I say busy, because there are a lot of internet coordinated contact attempts that appear to make that part of the transaction easy and impulsive.

The interface to the computer is simple if you don't have much else going on with your computer sound card. I have a big mess going on back there already without hooking the radio in. It may be worth the effort, since I appear to like DX'ing more than rag chewing lately. No DX, no Ed! It may be time to try. (If I turn the soldering iron on now, the bands will open)

I know the real answer is that spring, (or summer), is here. The good part is that the Pack Rat summer activities are getting underway. I am looking forward to a long weekend of radio up at our mountain top location on Camelback. I am not sure conditions let us "feel" the full potential of the location last year, and am anxious to try again. I know the other distractions at home would carve into the operating time, so it is good to get away. Also, it's time to start cleaning out the junk piles so we can redistribute the white elephants in July. See you up at the mountain!

73, Ed, WA3DRC

MEETINGS

Third Thursday each month at 8:00 PM
Southampton Free Library
947 E. Street Road
Southampton, PA 18966

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Pack Rat WEB Site: <http://www.ij.net/packrats>

SUBSCRIPTION/ADVERTISING MANAGER:

Bob Fischer, W2SJ
7258 Walnut Avenue
Pennsauken, NJ 08110
(609) 665-8488
bobw2sj@prodigy.com

EDITOR:

Harry Brown, W3IIT
3012 Potshop Road
Norristown, PA 19403
(610) 584-4846
hbrown@voicenet.com

CLUB TREASURER:

Dave Mascaro, W3KM
1603 Mink Road
Ottsville, PA 18942
(215) 795-2648
dmascaro@gi.com

AWARDS CHAIRMAN:

Bob Fox, W3GXB
(610) 346-8698

TRUSTEE OF CLUB CALL - W3CCX

Ron Whitsel, W3RJW
W3RJW@aol.com
(215) 355-5730

PACKRAT 222 MHz REPEATER - W3CCX/R

222.98/224.58 MHz, Churchville, PA FN20LE

OFFICERS: 1998-1999

PRESIDENT:	WA3DRC	Ed Finn, ed_finn@ustc.vlsi.com
VICE PRES:	WA3EHD	Jim Antonacci, jantonacci@worldnet.att.net
REC. SECR:	WA3AQA	Walt Zumbach, wzumbach@bellatlantic.net
TREASURER:	W3KM	Dave Mascaro, dmascaro@gi.com
COR. SECR:	AA3GN	Joe Landis, landisj@nad.com
DIRECTORS:	N3EVV	(1 Yr) Walt Rauscher
	N3EXA	(1 Yr) Brian Taylor
	N3ITT	(2 Yrs) Al Sheppard, alitt@epix.net
	N3XEM	(2 Yrs) Bob Minch, raminch@bellatlantic.net

PACK RAT BEACONS - W3CCX/B

FM29JW Philadelphia, PA
50.080 144.284 222.065 432.295 903.072 MHz
1296.251 2304.037 3456.220 5760.190 10,368.170 MHz

MONDAY NIGHT NETS

TIME	FREQUENCY	NET CONTROL
7:30 PM	50.150 Mhz	WA3EHD/K3EOD
8:00 PM	144.150 MHz	N3ITT
8:30 PM	222.125 MHz	W2SJ/N3EXA
8:30 PM	224.58R MHz	W3GXB
9:00 PM	432.110 MHz	W3RJW/WA3DRC
9:30 PM	1296.100 MHz	WA3NUF
10:00 PM	903.100 MHz	N3AOG

COMMITTEE CHAIRMEN

LADIES' NIGHT:	N3AOG	215-443-9965
JUNE CONTEST:	N3ITT	610-847-5490
HAMARAMA:	NK8Q	610-847-2285
VHF CONFERENCE:	KB3XG	610-584-2489



THE AMERICAN RADIO RELAY LEAGUE



KAY C. CRAIGE, WT3P
DIRECTOR, ATLANTIC DIVISION

5 Faggs Manor Lane
Paoli, PA 19301-1905
610-993-9623

wt3p@arri.org

THE AMERICAN RADIO RELAY LEAGUE



BERNIE FULLER, N3EFN
VICE DIRECTOR, ATLANTIC DIVISION

17668 Price Road
Saegertown, PA 16433
814-763-1529

n3efn@arri.org

JUNE CONTEST COUNTDOWN!!

WOW, The contest is almost upon us! Seems like it was February, and I blinked and here we are in the middle of May.

I'm happy to report that things are shaping up nicely for the club's annual June contest multi-op. We now have enough Pack Rats signed up to pull this off again, but a few more wouldn't hurt! Things have been incredibly busy here so I'll have to keep it short, but just wanted to remind everyone that the June contest is June 10 and 11, with load up, and set up on the 9th and tear down on the 12th. If you have signed up for any part or all of the contest, PLEASE try to make it, we're counting on you! If you are not one of the Rats on the mountain, try to make all attempts possible to work W3CCX on Camelback Mt., If you are going to rove let me know your plan.

Well that's about it for now, much to do before it's time to load 'em up and move 'em out!!

GO PACK RATS!!!

Following is a list of band captains and co-captains. Please contact them if you wish to help out on a particular band.

50 MHz	K1JT/WA1YHO, Back up NE3I	432 MHz	W3RJW
144MHz	W3KM/WA3NUF	Micro.	KB3XG
222 MHz	WA3DRC/AA3GN		

Calendar of Coming Events - May 2000

- 6 **ARRL 902, 1296, and 2304 MHz Spring Sprint**, 6 PM to 11 PM. These sprints will be held simultaneously. See April 2000 Cheesebits for rules. E-mail logs to: vhfdx@etdxa.org. Paper Logs to: ETDXA / NJ4I, 1620 Hidden Hills Drive, Clinton, TN 37716.
- 7 **Warminster Amateur Radio Association Hamfest** at the Middletown Grange Fairgrounds in Wrightstown, Pa. Talk-in on 146.69/.09 and 146.52. VE Testing.
- 11 **Packrat Board of Directors Meeting** at the QTH of Jim Antonocci, WA3EHD. All interested parties welcome. Call 215-659-4359 for directions.
- 13 **Packrat Ladies Night** will be held at the Mill Race Inn, Holland in Warrington, Pa. starting at 6:30 PM.
- 13-14 **50 MHz Spring Sprint** 2300Z May 13 (Saturday Evening) until 0300Z May 14. See April 2000 Cheesebits for rules. E-mail logs to: vhfdx@etdxa.org. Paper Logs to: ETDXA/NJ4I, 1620 Hidden Hills Drive, Clinton, TN 37716.
- 14 **Mothers Day**.
- 16 **Armed Forces Day**
- 18 **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. Nominations for the election of officers in June will be accepted. Ben, WA3RLT, will talk on the analysis of January Contest Logs. Find out which ways are the best to point your antennas during the contest. Nominations for officers.
- 19-21 **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. The VHF/UHF Forum will include talks on both Saturday and Sunday. There will be a preamp gain/noise figure contest on Sunday morning.
- 19 **Dayton Weak Signal Banquet** at the Holiday Inn North, Wagner Road, Dayton, Ohio.
- 25 **LEAP INTO THE MICROWAVES** with the Packrats! 903 and above. Every 4th Thursday of the month operate from 8 to 10 PM local time on any band 903 MHz and above. For coordination on those difficult long haul contacts 144.260 MHz is the suggested liaison frequency. So here's your chance to fix what broke in the contest and work all those stations you missed.
- Sept.
- 28-30 **Microwave Update 2000** hosted by the Mt. Airy VHF Radio Club will be held at the Holiday Inn Select, Bucks County, 4700 Street Road, Treose, PA 19053, (215) 364-2000, (800) HOLIDAY. For more information contact John Sortor, KB3XG at JohnKB3XG@aol.com, or <http://www.ij.net/packrats/mud.html>.

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:

Name: _____ Call: _____

Street Address: _____

Town: _____ State: _____ ZIP: _____

Subscription Rate: \$10.00 per year (USA), \$12.00 (Canada), \$15.00 (Worldwide)

May 2000

Send to: SUBSCRIPTION/ADVERTISING MANAGER:

Bob Fischer, W2SJ, 7258 Walnut Avenue, Pennsauken, NJ 08110

BANDPASS FILTERS DO MAKE A DIFFERENCE

Here at W3SZ I have been bothered with a very variable noise floor on 144 MHz. I felt that some of this was power-line noise, but I was concerned that some of it represented IMD. When my antennas are aloft, they have a clear view for 10's of miles in all directions, and as I live in a suburban area, there are innumerable commercial/cellular transmitters within view. I have until recently used SSB Electronics mast-mounted preamps with helical filters before the preamp input. Still I felt there was IMD entering the system in spite of the helical filters, and producing problems. I have KA0RYT cavity-filter-input preamps waiting to go on the tower in place of the SSB preamps, to help with this problem. But I wanted to look into things more closely. So, I put two ARR 144 MHz GaAsFET preamps on the mast in place of the SSB preamps. These preamps do not have helical filters, and so should be more prone to out of band interference. I mounted them at the feed points of my M2 2MXP20 2 x 2 EME array (one preamp for each polarity, so I can later do dual receive and synthesize any desired angle of rotation on receive) and ran them to a testbed receiver consisting of a Q-Bit RF amplifier followed by a TUF-1H mixer, a BR-90 IF amp, an 8 KHz filter at the IF of 40.455 MHz, a second mixer to take the signal down to audio frequency, and then an audio amp. I fed all of this to the soundboard on the computer, so that the test signals could be recorded digitally for later comparison.

Please note that the system was NOT set up to minimize IMD; otherwise, I would have had additional filtering before the mast-mounted preamps to improve the selectivity of the ARR's, used an active first mixer with a higher I_{p3} , etc. What I wanted to do was to set up a system that WOULD be susceptible to IMD, to see if it WAS really a problem here, and then to try the "cure", i.e. a bandpass filter, and see what difference the filter made.

I used the W3CCX beacon, 49.4 miles distant, for my test signal, with the EME array pointed about 40 degrees away from the beacon (this is where the antennas must sit when the tower is down, to keep from hitting the house). I listened to (and recorded) the audio signal from the W3CCX beacon at 144.283 MHz with and without a DCI 144 MHz 4-pole bandpass filter before the Q-Bits RF amplifier. The results are impressive. The IMD here TOTALLY obliterates the signal from the W3CCX beacon 50 miles away when the filter is not in place; the beacon is Q5 when the filter is in place. I recorded both sets of conditions with my horizontal and my vertical antennas (all part of the EME array). The signals are in the wave files at the URL below.

The gains were all kept constant for these recordings, and there was NO AGC: <http://home.epix.net/~rrehr/filtersFrame1Source1.htm>. I am rebuilding the shack here, and hope to try all of this out back "on the moon" soon.

Any comments are welcome. 73 from Roger Rehr, W3SZ, ex-AA3QK ex-WA3JYM

Silent Key - Wilmer T. Burns - K3PHY

By: Ernie Kenas, W3KKN

Wil died April 3, 2000. He was an active, popular Pack-Rat. He is survived by his wife, Pearl and a son, Kenny. He and Pearl were married 53 years. Wil spent most of his life in the Philadelphia area, except during the war. He was in the Army Air Force and was mostly in Italy. An electrical engineer, he worked for Amtrak. He started with the Pennsylvania Railroad and was with them through all the changes up to their present level. He was highly respected in his work to keep the trains running.

Wil was a life member of the ARRL. He was active in Air Force Mars and also in Montco County Races.

He was a builder of rigs or else modifying them in his workroom. He loved the hobby, a true Pack-Rat, and spent much time in his shack. He always had a project in the works.

Wil enjoyed the Club activities, especially the Conference and the Flea Markets, selling tickets or working the Hospitality Room.

We will all miss this quiet man and his gentlemanly ways. Good Bye and thanks for the memories.

Perl, Wil's wife said she thanks the Packrats for the beautiful flower arrangement that was sent to the funeral home. She said that Wil enjoyed being with the Packrats very much.

Packrat Happenings

YES, WHO WAS THAT MASKED MAN? After much pondering, decided to make the change because I need a call without a "T", "M", or "O" in it for EME. Plus a two letter suffix is better than three letters. Had a bit of fun calling folks I knew by their first names (mostly on cw) and listening to them struggle to come up with a name. Talk about being called everything in the book. Mostly I was called "Steve", wonder why?

I had the K3HZO call 43 years.

Primary kicker in changing was this new licensing structure. I wanted to be known as a proper extra class (having passed the 20 WPM) instead of being qualified to fill out a form in order to get an amateur license.

By the way, in Cheesebits sometime back mentioned I had 57 initials on 23CM or something like that. Actually, I had 81 initials at that time. I finished up 2M EME (FM18/FN20) with 243 initials and, 70CMS (FN20) with 82 initials. I guess I need to keep the ARRL better informed. Goal here is 100 initials on 23Cm and then we go to 2.3GHz EME. That's a hard one because you need three different downconverters 2304, 2320, and 2420 to work people. Please note page 82 of May QST under Single Op 1296 results for the International EME Competition. 200W only. All others listed in this category are 500W+.

73, Harry K3AX

K3EOD Activity on 6M. Just a little note if you want to use it. 6 Meters was open tonight. I had 17 DX stations check in on the 6 meter net. and worked 35 stations in addition to those that checked into the net till 11:00pm when I had to quit. I worked stations from Illinois to Florida EM 09,10,18,19, 28, 29, 30, 34, 38, 39, 40, 42, 45, 48, 49, 50, 51, 52, 60, 61, 63, 79, EN 40, 43, 50, 51, 60, 61, 63, 73, EL 40, 49. Total of 32 new grids. Al K3EOD

License Updates: K3HZO is now K3AX (see above note from Harry). Chris, N3PLM is now General Class. Bill, W0RSJ is a General, and Lloyd, K3ZPN is a General. Congratulations Guys. Who did I muss?

SWAP SHOP

(send all ads to the editor)

FOR SALE: CALLSIGN HISTORY. Name and address of each holder since 1912. Cost \$20 plus SASE for printed CERTIFICATE. Wanted CallBooks before 1970 and QST's before 1940 will buy or trade. Also looking for 1x2 Ham Radio License Plates for my collection. Ron Allen W3OR, PO Box 73, Bethel, De. 19931-0073 or call 302-875-1100.

FOR SALE: 903 amp, MMIC supposedly class C but seems to do SSB OK. 1W in 10W out. BNC connectors. 12 VDC fully assembled with heat sink. \$50.00 WeatherGuard Rooftop Van Rack pair. Heavy Duty. White, gutter mounts. Perfect for any contractor's van. \$50 Rick Rosen, K1DS, 610-270-8884. K1DS@hotmail.com.

WANTED: 3.4 GHz xmt amp. 20 mw input, 5GHz gear--for the rover. Rick Rosen, K1DS, 610-270-8884, K1DS@hotmail.com.

FREE: The Antenna/Tower party at Wil's place left a tower available for any Packrat. It is constructed a little like a Rohn 6 except the horizontal pieces are about twice the Rohn 6. One section is pretty rusted and is likely not usable. There are 4 sections of approx. 10 ft each for a total of 40 ft. A house bracket is included. Contact Wil's widow, Pearl if interested. Her phone number is 215-659-2259.

ROVER VAN PROGRESS REPORT

Since purchasing the '94 Ford Econoline Van, I have spent a few weekend days putting in the necessities for roving. A trip to the mechanic for new brakes, wires, distributor cap and tune-up, and then to Sears for a new battery. After cleaning out the electrician's wooden racks, removing the WeatherGuard roof racks, throwing out the old floor mats, and pulling out vintage cell-phone electronics, and a thorough hosing down, the rover van was ready for input.

I started at Home Depot with an 8' X 10' bound carpet and padding. After removing all the molded rubberized step panels, cleaning and respraying them with black bumper paint, they look great. The padding and carpet went down easily, with large cuts made to cover the wheel wells, and self-tapping oval screws and finish washers to fasten down most edges. Now for a trip to Shorty and Dave's boneyard to pick through the vans there, and I was able to find a fold-down bench seat and a swivel-based captain chair with reasonable looking upholstery. The trick was getting them removed--and luckily I was prepared with extra sets of wrenches, and my father-in-law to hold the top end steady, while I did the work from underneath to free them from the bodies. A little extra force was needed to break the friction nuts and road grit and rust, but luckily the tools withstood the pressure, as did the bolt hardware, and everything came off intact. I also managed to get a rear door ladder and some overhead lamps for the grand total of \$50. Everything seemed to clean up very nicely, and I spent several hours drilling the holes for the new seat and bench mounts and their seatbelt anchors--just in case there is a passenger in those spots while we're underway.

Next item was an operating table, and with a few of the plywood scraps and framing lumber scraps, I put together a 4' X 2' desk and shelf, and screwed it to the driver's sidewall. The three storage batteries fit comfortably underneath, the brick amps are on the lower shelf, and the FT736, computer and key are on the desktop. I haven't yet added the UHF gear, but am planning space for the 903 and up stuff now. I need to add a 12 VDC bus line and appropriate fuse and circuit breakers, but for now everything uses large terminal lugs, battery clips, and marine-type screw terminals on the batteries.

For the first few trips out for the sprints, I used a single yagi on about 12' of mast and an under-the-rear tire base plate mount. I stabilized the upper section to the van by putting a C-clamp on the gutter, and using a bungee cord to tie the mast steady, while padding the mast against the wheel flare. I used a U-100 rotator, with inverter power for it. Now I have drilled a few 1 3/4" diameter holes in the roof--one for the mast and another for the feedlines. They are both fitted with PVC threaded collars and I have threaded caps when not in use to keep the elements out. There is a threaded pipe flange and 8" of pipe to support the mast and enable me to use armstrong rotation now. I mounted the van lamps on the support struts for the roof, and it's generally comfy inside while operating, cycling the engine periodically for heat when needed for the cool damp sprint nights.

After the 144 and 220 Sprints, I noticed that I felt a bit cramped, since the captain chair was setting low to the ground. I added a 4" frame between the seat and the swivel mount, and now I feel more comfortable sitting upright, and using the computer to log. Swivel seats are no longer pass current safety standards, so I was lucky to pull this one from the junkyard. As I have experienced and said before, comfort is important when roving, as the environmental issues are not easy to control when you're on the road. I think that ongoing experimentation and feedback and others' construction and operation experience has helped me get to the current state, and I hope that I can add the UHF gear to easily run the bands. Between now and the June QSO Party, I'll be working on the installation and antenna tree. Rick, K1DS (& Leon, N1XKT)

BUCK COUNTY ARES TO BECOME RADIO-ACTIVE

(JOIN the BUCKS COUNTY AMATEUR RADIO EMERGENCY SERVICE!)

After a two year hiatus, the Bucks County ARES is reforming and reorganizing. Mike Patton, W3MJP of Warrington Township in Bucks County, has been appointed Emergency Coordinator (EC) for the Bucks County ARES Unit. The Unit is looking for amateur radio operators who are interested in putting their radio knowledge and skills to good use. In particular, in the areas of emergency communications and public service. The ONLY requirements for membership in ARES are a current amateur radio license and a willingness to serve!

ARES is presently in the formative stages. Mike is in the process of forming an ARES planning committee. This committee will consist of six to ten Assistant Emergency Coordinators (AEC), one from each of the three Bucks County sectors, and several others with special knowledge in VHF/UHF communications, HF communications, packet radio, CW, APRS, Repeater systems, EMS/Fire Services. In addition, Mike expects to appoint a RACES Liaison, SKYWARN Liaison, and an ARESMAT (ARES Mutual Assistance Team) Liaison. If you might be interested in any one of these positions and you have the requisite background (or think you might), please contact Mike.

In addition to AEC's, the unit will need a complement of enthusiastic radio operators to perform the real ARES duties of providing emergency and non-emergency communications. Serving clients such as local government agencies, PEMA, FEMA, American Red Cross, NWS, and various community organizations will require an organized team of dedicated personnel willing to volunteer their time and resources. The Bucks County ARES team is looking for a few (or more) good people willing to be involved in public service by using their communications skills to benefit their local communities as well as the amateur radio hobby.

ARES membership transcends the jurisdiction of RACES regulations, promulgated by the FCC, which strictly limits RACES' radio-communication service to official civil- preparedness activity which can be authorized ONLY by local emergency management officials. Ideally, an amateur radio operator interested in using amateur radio in public service activities should be a member of BOTH organizations. Dual membership will allow the radio operator to function in a variety of situations under the aegis of the appropriate organization (s). As of March 11th, the Bucks County ARES Unit and the Bucks County RACES Unit have agreed, in principle, to integrate their membership in order to foster an efficient and effective amateur radio response within the County. Amateur radio operators interested in this dual membership are requested to complete an application for each service so a database can be composed for ARES and RACES. In addition, members will be requested to subscribe to the ARES-RACES eGroup on ONelist at: BUCKS-ARES-RACES@onelist.com.

IF YOU ARE INTERESTED IN JOINING, PLEASE CONTACT W3MJP via E-MAIL OR VISIT THE BUCKS COUNTY ARES WEBSITE AT: www.voicenet.com/~w13z/ares.htm, Mike Patton, W3MJP, P.O. Box 36, Warrington, PA 18976, w3mjp@arrl.net.

REPAIR OF BIRD WATTMETER ELEMENTS

Editor's Note: These comments are from the Moon Net Reflector on the repair of Bird Model 43 Wattmeter Plug-Ins. The call next to each comment is from the person posting the comment. No claim is made to the accuracy of all comments. The post triggering the discussion is the first one below.

Grant Furnald, I have a bird element that has failed recently. Wonder if anyone on the reflector can tell me how to repair them? I seem to vaguely remember an article about it a few years ago but cannot find it in my library.

Mark GM4ISM, Bird Elements are fairly simple devices to repair, but you may have fun calibrating the thing properly. They are supposed to be flat (ish) in power response over their nominal bandwidth, and you will probably not be able to verify this. Never mind, so long it is for use on amateur bands only! The other important parameter is Directivity. When the coupler is measuring reverse power into a 'perfect' load, the reading should be Zero, despite lots of forward power. Directivity is a measure of how well the coupler ignores forward power. This also helps to remove variations in indicated forward power that occur when the load impedance varies from 50 Ohms.

To Repair, Remove the PTFE cup from the back. Try by hand. After a little work you can usually remove it without damage. Remove the front label and undo the central screw. This allows the front brass section to come off. To completely dismantle, unsolder the pot that sits across the terminals, and remove the 2 small screws from the bottom and slid out the coupler assembly. There are only 3 components that might fail. The ballast load resistor at the end of the coupling loop (82 OHMS in my 1000B) may need to be replaced. Use a Carbon - non inductive type. This component is critical for good directivity. It adsorbs coupled forward power when the probe is used to measure reverse power. Use an adequately rated component - especially if you are going to up the power range. The diode appears to be Germanium and is located inside the post attached to the decoupling capacitor. Type is unknown, but you could try almost any RF diode. Bearing in mind that you will probably affect the calibration if you use a silicon or Shottky type. If the feedthrough capacitor is damaged, it may be possible to find something that will do, but I have not seen anything like it anywhere else. It is the least likely component to fail! When dismantling the actual coupling loop, try to preserve it's shape. you may find that your calibration is not too far off when you re-assemble the coupler.

Calibration. You will need another way of measuring your power... as accurately as possible, and a known good load capable of the full power. Set the pot about halfway. Adjust the coupling loop shape for minimum reading in reverse position, whilst getting the desired forward reading on reverse. This will be an iterative process and may take a while. Don't blow up the PA!! Most amateur PAs don't like key down for an hour.... If you have achieved a good null on the reverse reading, you can then finalize the forward reading with the pot. Hope that helps. I have no connection with Bird, and the above info is purely for guidance. I have repaired one of my

REPAIR OF BIRD WATTMETER ELEMENTS Continued

own probes, long ago. But can accept no liability for any damage to your equipment if you try this. Good luck. Mark GM4ISM gm4ism@bigfoot.com

Keith Naylor, G4FUF. The most common failure mechanism on modern slugs is the trim pot itself. On older versions this is a precision 15 PPM SOT resistor. Obviously it's cheaper to put a pot in..... However the fundamental accuracy of the instrument is now dependent on the pot itself.

If you have trouble removing the metal plate use a small amount of Acetone carefully around the edge. This will dissolve the glue used on the "double sided" film securing it to the body. The plate can be remounted in the same manner using thin adhesive drafting film.

I have also purchased brand new slugs which are intermittent. Internal inspection reveals swarf floating around inside.... so much for quality control. 73. Keith G4FUF, naylork@SH.BEL.ALCATEL.BE.

Pollert Wolf, DK9ZY As far as I remember the Teflon "cup" is screwed. First the aluminum label has to be removed to reach the screw which holds the Teflon "cup" in place. BTW one of the biggest disadvantages of the bird slugs/wattmeter is their high sensitivity to harmonics due to the short mechanical (electrical) length of the directional coupler. If harmonic suppression is poor (say -20dB) the risk to measure "house numbers" is pretty high. So it's necessary in most cases to use a low pass filter. Otherwise the power reading is too high! 73, Wolf

Steve Harrison, K0XP. The Teflon "cup" can be pried off and you can then see and get at the works. However, you might not be able to get the cup back in place properly, as it tends to distort when pried with small tools.

If it were simply a calibration problem, there is a hole underneath the circular label which you will have to pry off, then glue back in place. Inside, there's an adjustment. I forget whether a trimmer cap or pot.

<As far as I remember the Teflon "cup" is screwed. First the aluminum label has to be removed to reach the screw which holds the Teflon "cup" in place. One of mine appeared to fit into a lip in the aluminum cup. It was the very devil to get apart but went back together OK. It's been ten years and looking at it now, I can't tell I ever had it apart; the Teflon "flowed" back into place.

BTW one of the biggest disadvantages of the bird slugs/wattmeter is their high sensitivity to harmonics due to the short mechanical (electrical) length of the directional coupler. If harmonic suppression is poor (say -20dB) the risk to measure "house numbers" is pretty high. So it's necessary in most cases to use a low pass filter. Otherwise the power reading is too high !>

This is one excellent reason why a power oscillator using a tunable cavity is used for testing RF amplifiers and wattmeters: the inherent harmonic generation is typically lower than -40 dBc without a harmonic filter, and a simple AGC loop can be used to adjust grid bias to keep output power constant across the band (usually an octave or so). The meter on a Bird barely deflects with 1 watt and a 100 watt slug; so -40 dB harmonic suppression is more than sufficient for a fairly accurate power reading.

However: N1BUG and I were just discussing the 4CX1xxx 144 MHz amplifier in the ARRL Handbooks of the last decade, and remarking on the spectrum photographs showing the third harmonic at just -12 dBc. At 1500 watts output, this would be 95 watts at 432 MHz, more than 5% of the full-scale reading on a Bird 43!

I was telling Paul that he could measure the insertion loss of a harmonic filter simply by comparing the power before to the power after the filter; but obviously, with that amount of harmonic energy flowing through the wattmeter BEFORE the filter, the insertion loss can appear to be quite high when, in reality, it's well within specification due to suppressing 95 watts of harmonic energy!

Clearly, high harmonic levels from stripline amplifiers can make almost any broadband RF power meter APPEAR to be out of calibration. The best method to measure insertion loss of a high power filter AT high power, then, would be to filter the RF power source BEFORE the wattmeter and filter.

On the other hand, the excellent broadband performance of most Bird slugs allows their use at higher frequencies than their calibration, such as the use of E-series (400-1000 MHz) slugs in 1296 MHz systems, where the reading typically is about 10% high. I imagine the reason that Bird doesn't market broadband, high power slugs covering the 1296 MHz band (besides relatively-low market demand) is likely because the directivity probably becomes fairly poor. Their high-power slugs for higher microwave bands, on the other hand, are calibrated over a much narrower bandwidth where they can be optimized more easily and consistently during manufacturing calibration.

Similarly, BECAUSE of that excellent higher-frequency performance, one can easily understand how easy it would be to be misled by a wattmeter placed after an RF amplifier that generates copious amounts of harmonic energy! 73. Steve K0XP

Piero Moroni, I5TDJ. I believe the diode is likely the weakest part of the plug; maybe this is the part which failed in the VE6TA unit. The diode mounted by Bird is the germanium 1N82A. Maybe this diode has become a "rare bird" now! i5tdj@IOL.IT

TID BITS

The Packrat Tower/Antenna crew had the unfortunate job of taking Wil, K3PHY's antenna, tower down and the taking his equipment apart on Saturday, May the 6th. The crew lead by Phil, WA3NUF included Dave, W3KM, Ed, WA3DRC, Joe, K1JT, and Walt, N3EVV. See the Swap Shop if you are interested in a tower.

ARRL invites input: A Web-based forum now is "live" to collect member input on how the new ARRL Certification and Continuing Education Program should be designed and what it should include. ARRL Educational and Technical Advisor L. B. Cebik, W4RNL, is serving as interim forum moderator-facilitator. The forum site is <http://www.arrl.org/members-only/forums/index.php3>. Members are invited to suggest specific programs and areas of study or skills development they would like to see as part of the

TID BITS Continued

Certification Program. (Participants are requested to direct comments concerning ARRL policy to their respective ARRL Directors, listed on page 10 of any issue of QST.) The ARRL Board of Directors approved the development and implementation of the self-education program, aimed at inspiring amateurs to continue acquiring technical knowledge and operating expertise beyond that required to become licensed. The League will roll out the initial phase of the Certification and Continuing Education Program later this year.

1999 ARRL EME Competition results in the May issue of QST show Packrat Roger, W3SZ with 23 contacts and 14 multipliers on 144 MHz. K3HZO (now K3AX) had 40 contacts and 24 multipliers on 1296 MHz.

New Dish Antenna Feed Info on PA3CSG Web Page. This week I added the third chapter of the EME newsletter collection on my webpage. This chapter has all the articles on antennas, feeds and feedhorns for 432,1296,2304MHz. Also some very interesting comparison between several feeds and tune up notes for the W2IMU horn. You also find some dish mount ideas or elevation drive hints. The articles about the beam forming ring written by Per Simon Kildal are not published. I had permission to publish these articles for the book but not for the webpage. Sorry! I hope you like it, it was a lot of work. <http://members.xoom.com/PA3CSG/>. Best regards, Geert, PA3CSG.

KD9JQ GG Triode Program. If you are considering building a triode power amplifier, check out the program written by KD9JQ.

Triode Amplifier Program found at <http://www.mbn.net/kd9jq/hamradio/tap.html>

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Theory 1989 Central States VHF Conference Proceedings Page 102

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Misc Ham Utilities at <http://www.mbn.net/kd9jq/hamradio/util.html>

BroadBand Matching Design

Lowpass, Highpass Filter Design

Transistor Compression Point Calculation

Tee or Pi Attenuator Calculation

Download Program 137K

Station Setup. Have you ever wondered how others set up their station? Especially for operating several different modes such as meteor scatter, EME, and 6 ms scatter/DXing. Check Lance, W7GJ's web page describing his station's setup and more importantly why it is setup. Check: <http://missoula.bigsky.net/cr/w7gj/station.htm>

The **May/June issue of QEX** has a short note by Zack, W1VT on an **N0-Tune 10 GHz waveguide filter** for use in a 10 GHz Transverter. The filter is sharp enough to use 144 MHz as the IF. All dimensions are provided for the filter as well as a block diagram of the complete transverter using hamfest parts.

In the **June issue of QST** the **Ten-Tec 1210 2m transverter** is reviewed. This transverter in its original configuration has a very poor noise figure (7.6dB). I modified the front end of this transverter about two years ago and managed to bring its NF down to about 2.5dB (measured at the 1998 MidAtlantic VHF/UHF conference). A brief description of this simple modification and other useful mods can be found on my web page. <http://home.sprintmail.com/~mabu>. 73 Maarten, W1FIG, FN41gv, Rhode Island, ex PE1FIG, PA3EFA, KD1DZ

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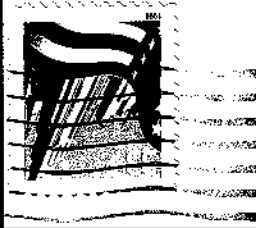
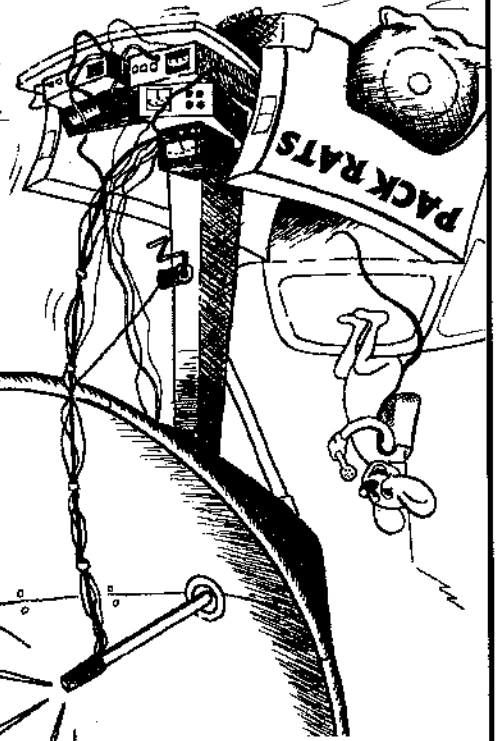
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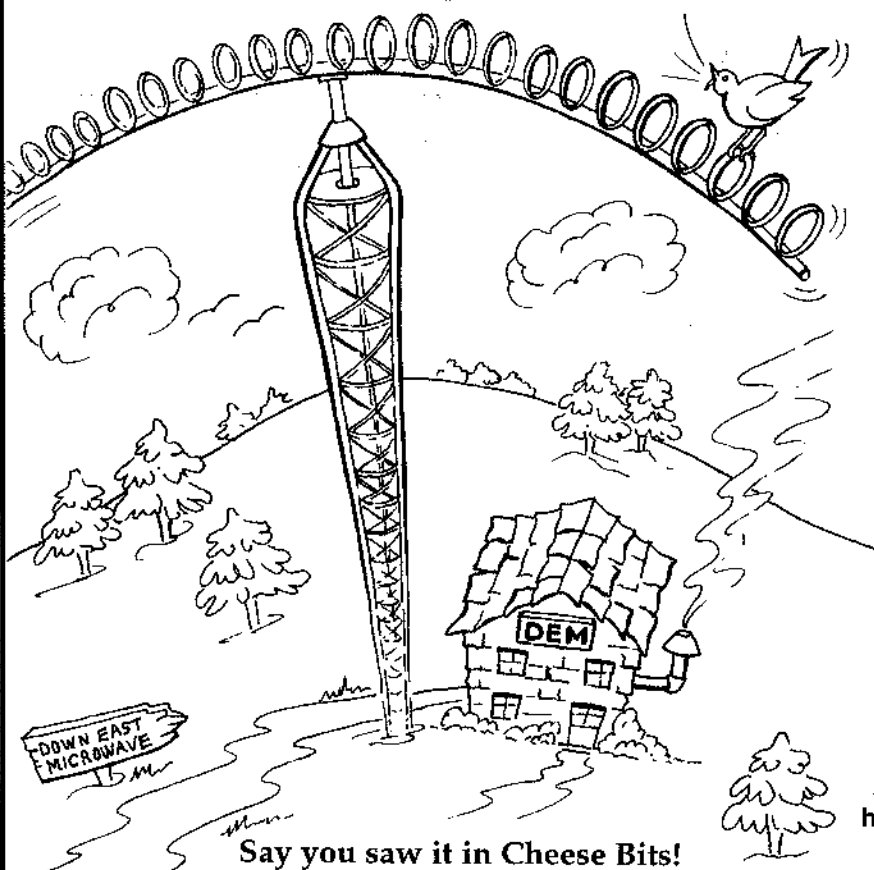
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