Mt. AIRY V.H.F. RADIO CLUB, INC.

CHEESE BITS

W3CCX
CLUB MEMORIAL CALL

ARRL Affiliated Club

Volume LI | August 2010 | Number 8

PREZ SEZ:

Well the "Dog days of summer" are upon us. They have been really hot but, until very recently, not too humid, so the temperatures have been tolerable.

With the Spring/Summer schedule behind us we look forward to the next major events in the PACKRAT calendar. The family picnic the first weekend in August promises to be a well fed event with lots of time for visiting, swimming and helping Host KB1JEY get his new tower into a vertical position. Bring your spouse and/or your children and plan to take advantage of the beautiful in ground pool. Contact Michael about side dishes and other ways you can help make the day a success.

The next major event will be the September meeting with Ron Whitsel W3RJW (formerly WA3AXV) with an excellent presentation on tower safety and antenna installation do's and don'ts.

Just one week later, September 25th, is the Mid-Atlantic VHF/UHF/Microwave Conference. That program starts Friday evening with the PACKRATS Hospitality Suite. The Conference on Saturday has many terrific presentations including the Introduction to the Microwaves Program, followed that same evening by the banquet, door prize drawing and a guest program.

October 3rd brings the PACKRATS HAMARAMA at the Grange Fairgrounds in Wrightstown, PA. Talk-in will be on 146.52 Simplex with a commanding signal from the site.

We need your assistance and participation to make all these events a success. HAMARAMA has been the one major source of funding to keep the treasury healthy, These funds help pay for the June VHF Contest, the sponsorship of national awards, meetings and guest speaker expenses, picnics, the Technical and Educational Conference and other club activities. Dues will not cover these expenses alone. Your smiling face and willing hands helping at one or more of these major events and attending the conference and meetings are what make this a successful club.

The second major interest for the PACKRATS is weak signal work and contesting. Well August delivers a lot in this area. First is the UHF Contest covering 220 MHz and up. Later in August is the first weekend for the 10GHz and up competition.

All this is mixed in with the wiley ways of Mother Nature, who has been throwing a mix of tropospheric ducting, rain scatter and very recently aurora into the operating opportunities. If these continue, the late summer and early fall contest seasons should offer a bountiful harvest of new contacts, and

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PACKRAT BEACONS - W3CCX/B
FM29jw Philadelphia, PA
50.080 144.284 222.064 432.286 903.072 1296.245 MHz
2304.043 3456.207 5763.196 10,368.062 MHz (as of 1/08)

MONDAY NIGHT NETS

TIME	FREQUENCY	NET CONTROL
7:30 PM	50.145 MHz	K3EOD FM29ll
8:00 PM	144.150 MHz	N3ITT FN20kl
8:30 PM	222.125 MHz	K3TUF FN10we
8:30 PM	224.58R MHz	W3GXB FN20jm
9:00 PM	432.110 MHz	WA3EHD FN20kd
9:30 PM	1296.100 MHz	K3TUF FN10we
10:00 PM	903.125 MHz	W2SJ FM29LW

Visit the Mt Airy VHF Radio Club at: www.packratvhf.com or www.w3ccx.com

grids for those pursuing DXCC on the various bands.

I have not been very active in recent months, the work schedule has been laced with overtime dictated by the many interruptions for doctors visits and physical therapy from the encounter in March. All that should be ending soon and I will be better able to focus on amateur radio.

The next Board meeting is the all important mailing party for the HAMARAMA flyers. All board meetings are open and there will be call in available starting at 8PM.

With all that on the schedule hopefully you and I find that time to
"LISTEN FOR THE WEAK ONES"

73 de W3GAD

Editors Column

So far this year, Cheese Bits has been fortunate to have dozens of interesting and informative articles submitted for your enjoyment by your fellow 'Rats. We've had coverage of club news, contest reports, operating hints, some truly excellent technical submissions (see part 3 of KB3XG's 6 Meter Power Amp article in this month's issue) and recently we've had Bert, K3IUV's ongoing series of looks way back in time at Cheese Bits from 50 years ago.

Many thanks to all the contributors! The articles you provide to your fellow members is very much appreciated. I hear it quite often from many of you.

Sadly, my articles folder for Cheese Bits lately has grown rather thin. YOU can contribute material that will be of interest to our membership. Please consider doing it. We'll all get something out of it.

Enjoy this months Cheese Bits!

73, Lenny W2BVH

Packrat Tower Month

Last month we featured a photo spread showing the work done this spring taking down towers at the estate of Ernie W3KKN. Now, this summer is working out to be a banner season for tower **construction** projects by several Packrats. Last month Michael; KB1JEY made major progress in building his free standing tower. Phil, K3TUF started decorating his tower with NEMA boxes full of important electronics and mounting antennas, and our associate editor, Ed, WA3BZT got the foundation set for his **monster** tower. Here, in words and pictures, is a report on their progress.

KB1JEY

It takes a lot of steel and cement to hold up a free standing tower

… and lots of work to make the hole …

Michael did a super job digging it. (Actually Michael admits it was a backhoe that made the hole. But he couldn't resist trying to take the credit)

As Michael explains it: "The pix with the reinforced steel tower base employs George KA3WXV's old picnic table for the wooden forms, bolts that Paul WA3QPX obtained for me from a salvage yard, and a steel u-channel that Al N3ITT fashioned for me so the bolt heads do not turn in the concrete when the layover attachment is bolted to the concrete tower base.

There was no documentation from Hy-Gain on the layover attachment so Rick K1DS and I took careful measurements from the previous base, which we employed when setting the steel in the correct positions. Hy-Gain made the TB-54 base for me last year. I picked it up at the Timonium Hamfest and followed the instructions in the manual.

George KA3WXV, Rich KB3NRL, Joe WA3SRU, and Guy Gibbs WA3JZN came over Saturday July 3rd (4th of July weekend) and worked with me from 10 am to about 4:30 pm to make the wooden forms and get the steel set into position. I have some really devoted ham radio friends! "

The base after the concrete pour on July 8th

And on July 24th the tower was set onto the base along with the tiltover crane and winch.

KB1JEY Cont'd…

Here is how Michael describes the tower mounting: "Here are the results of our "Sunday Service" today, July 24th. George KA3WXV and Guy WA3JZN were kind enough to come over at 6:30 am. We were able to roll the 600 lb tower to the base without too much difficulty over a plywood path on two dollies and "persuade" it into position with an automobile floor jack and a mallet. We were done by 8 am.

Tuesday, I take a trip to The Henry Stewart Company in downtown Philly to pick up replacement wire rope, thimbles, and Nicopress ovals. Bob Fisher W2SJ has volunteered to stop by Thursday afternoon to help me re-cable the tower.

If the weather is not too oppressive next weekend, I'll mount the rotor, thrust bearing, mast, some of the antennas and feedlines.

The plan is to raise the tower for the first time when most of the guests at the picnic are available to witness the event. This project was started two years ago and would still be a dream were it not for the help along the way. It seems only fair to share the moment.

I expect that the tower should be ready for its first raising at the Packrat Picnic on August 7th." --Michael KB1JEY

K3TUF

Phil's nearly complete rotating tower with some antennas already mounted

1296 Electronics and Antenna and 10 GHz dish, just above the top tower ring

And here's Phil's narration of the days events on July 24th: "Not nearly as descriptive and colorful as Mr. Michael's pictures, here are the results of this mornings foray into the heights in Ephrata. Got the all important electronics box and a single 1296 yagi installed along with all control cables. We started at 7 am and were finished at 11 and were blessed with a nice cloud cover and pleasant breeze nearly the whole time.
Also in the picture are the pair of 10g dishes that were installed a few weeks ago for the 10g and up contest in Aug and Sep.
These are installed at the 140 foot level of the rotating tower. "

--K3TUF and trusty assistant KA3TUF

WA3BZT

Ed has the foundation in for his “monster: tower. Here’s what it looks like so far:

Ed writes: “This tower project will be the death of me, so I just had them cover me up. Went in style with my Pack Rat hat and shirt"

This picture shows the next phase of getting the base and tilt over support in place for the tower (2,000 Lbs of steel). Compare size to the current tower next to the house.

CQ WW VHF Operations Report

by Rick K1DS

CQWW-VHF Contest featured some 6m Es on Sunday and made it a bit exciting for those on the air at that time. I managed to operate for an hour Saturday afternoon and then another three hours Sunday morning, using the Moxon and 150w on 6m and the 10 el yagi and 300w on 2m. Found a few of the Packrats active--WA3BZT, WA3QPX, WB2RVX, W3GAD, W2MMD (op KB2AYU) and AA2UK/MM (heard him working K1TEO and then he disappeared).

I was impressed that many of the grids south of us were active on 2m, and I managed to fill in many FM grids that I rarely work in the ARRL events. 6m opened to Florida with all the EL grids represented and nice strong signals, starting about 10AM Sunday. That was followed by several of the EM grids down into the 4 and 5 call area states. The northeast seemed relatively quiet except for the usual suspects in CT. W1XX was doing fine from RI, giving out FN41 on both bands.

I purchased a TE Systems 180W 432 amp from another ham and hope to have it active for the UHF contest, along with one or two of the 9 WL 432 yagis. Still hoping to find more time to get the EME going this summer, just need a rountuit and time.

73, Rick, K1DS

New Dish Installed at N2UO

I finished the 1296 MHz 20' dish. The difference with respect to the old 10’ one is amazing. I can now hear clear SSB echoes 100% of the time, while with the small dish it was only on CW and not always. Not only the gain of the dish increased by approximately 6 dB, but the lower noise figure of the new preamp and, more importantly, the new feedhorn, also contributed to the big difference. 73, Marc

Converting a Commercial TV Transmitter's Driver Amp for Ham Use -- Part 3

By John Sortor, KB3XG

Introduction:
I hope everyone has not been bored by technical details in the past 2 installments. This month we will cut to the chase and discuss how to bring the channel 2 / 6 meter power amplifier to life.

Preliminary Testing
Disconnect the 3 pin bias connectors on all 4 of the ¼ modules. (See photograph of gate bias/alarm connector from part 1) The entire unit can be checked functionally without turning on the bias to the devices. Connect a 50 volt power supply to the terminal block. It is recommended that a low power supply (<3 Amps) be used initially. If there is a problem with the amplifier the power supply will current limit and prevent damage. It is not necessary to terminate the amplifier during this phase of the testing. Reconnect the front panel LED board to the unit.

Over / Under Voltage:
Turn the 48 volt power supply on. Measure the drain voltage on any of the devices. Measure the gain bias voltage on one of the connectors. (Pin 1 of J1, red wire) Both voltages should be zero. Ground the thin purple wire from the rear panel connector. The voltage on the drains should now be +48 volts and the voltage at P1 of J1 should be +15 volts. While monitoring the drain voltage slowly decrease the power supply voltage. At approximately +44 volts the FET switch should shut the unit down and the drain voltage will drop to zero volts. Check the front panel LED board. It should indicate an over/under voltage error (blink code #4). Reset the unit by removing the purple PTT wire from ground and turning the power supply off for several seconds. Adjust the power supply for +48 volts. Turn the supply on, ground the PTT wire, and slowly increase the power supply voltage. At approximately +52 volts the unit will shut down.

Bias Current:
Use an ammeter to measure the 48 volt supply current. The power supply must have a current rating of >3 Amps. Turn the cooling fans on. Plug the gate bias connector into 1 of the 4 modules. Turn the 48 volt supply on. Ground the purple enable wire (PTT). You should measure 48 volts on the drain at about 1.5 to 2.5 Amps or 0.4 to 0.6 Amps per device. Open the enable (PTT) wire, connect the bias connector to the next module, and repeat the bias current test one module at a time.

One of the 1/4 modules in my plug-in unit had high bias current. (4.9 Amps or 1.2 Amps per device) I pinched 1 device off by connecting a 1 KOhm resistor between the gate and ground and the total current decreased by 1.2 Amps. I repeated this test for the other 4 devices. All 4 devices were drawing equal current. The 4 bias pots showed no sign of tampering and still had the drop of Loctite holding the pot in position. Maybe the factory adjusted this module for high bias current for a gain or phase adjustment. With no RF the flange temperature was more than 30 degrees hotter (+57degC vs +36degC) on the module with the high bias. At full RF power the difference in temperature was only 15 degrees C.

Note: This is another reason to treat your channel 2 amplifier with a little TLC. Some poor Harris technician spent considerable time tuning each 1/4 module for a predetermined gain and phase with an expensive array of calibrated test equipment. If you lose a device or worse yet an entire 1/4 module it will be necessary to measure each 1/4 module individually to make sure they all have the same gain and phase. Otherwise the modules will not combine efficiently.

Low Power Testing:
Configure the test setup with the appropriate attenuators and couplers so it is possible to measure the input and output power. Based on the single 1/4 module test data, the expected gain from the four combined 1/4 modules should be in the 20 dB range. Start by driving the amplifier with 1.0 Watt. You should measure 100 Watts out. If you do not see 20 dB of gain something is wrong. Shut the unit down and consider testing each individual module before proceeding.

High Power Testing:
Slowly increase the power and compare your results to the data in table #1. Periodically release the PTT line and check to make sure everything is running cool. (transistors, ferrite cores, power resistors) I found the efficiency continued to increase as the power was increased beyond 1000 Watts. The amplifier was 3 dB into compression at 1500 Watts out. There are a total of 16 devices rated at 100 Watts each so I did not feel comfortable driving the amplifier above 1500 Watts.

Pin (W)	PRev (W)	Pout (W)	Ids (A)	Vds (V)	Flange1 (deg C)	Rho (RL) dB	Gain dB	Eff %	2nd - dBc	3rd - dBc
2.1	0.047	222	19.0	49.3	36.6	-16.5	20.3	23.7	-31.8	-52.8
3.1	0.072	320	21.3	49.2	38.4	-16.4	20.1	30.5	-30.8	-50.8
5.2	0.122	509	25.8	49.1	41.2	-16.3	19.9	40.2	-30.8	-47.8
7.3	0.172	686	29.7	49.0	44.6	-16.3	19.7	47.1	-29.8	-45.8
10.4	0.238	914	34.2	48.9	45.0	-16.4	19.4	54.7	-29.8	-43.8
13.0	0.354	1091	37.5	48.8	45.2	-15.7	19.2	59.6	-29.8	-41.8
15.6	0.396	1205	39.3	48.7	46.0	-16.0	18.9	63.0	-29.8	-40.8
20.8	0.489	1371	42.4	48.7	46.4	-16.3	18.2	66.4	-28.8	-38.8
26.0	0.635	1496	44.6	48.6	46.6	-16.1	17.6	69.0	-28.8	-37.8

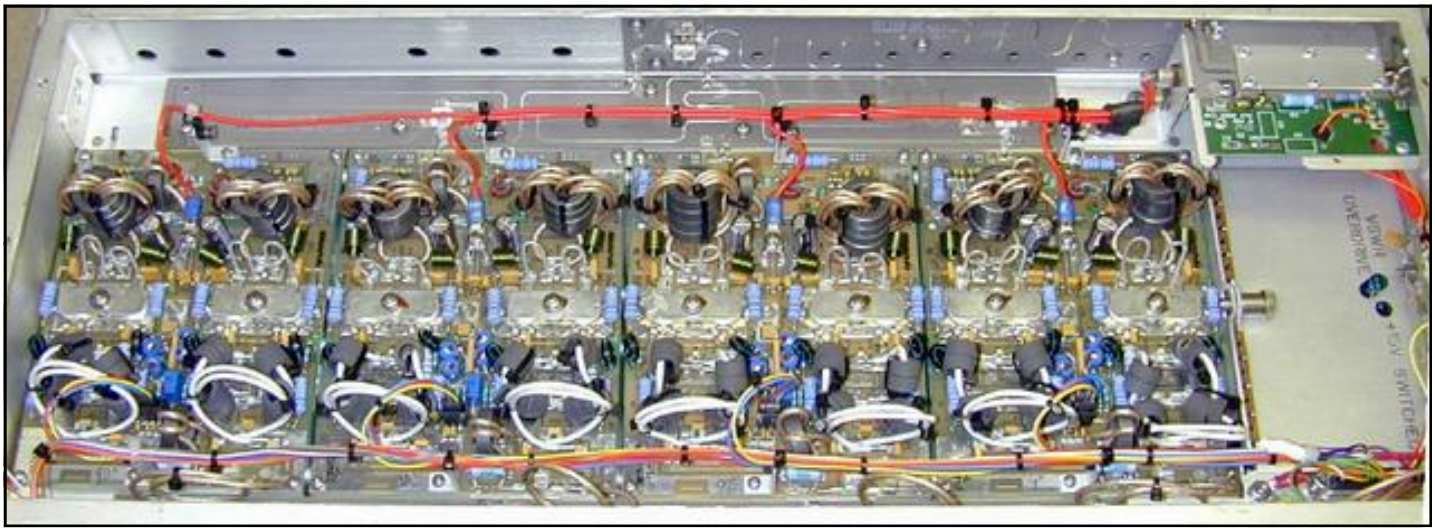
Table 1 Test Conditions

A. CW Data.

B. No low pass filter.

C. Test freq = 50.1 MHz.

D. Idq = 10.5A



Four combined 1/4 modules

Overdrive:
A description of the input overdrive coupler and detector was included in part 2. The amplifier may shut down as the drive is increased for output beyond 1000 Watts. If this occurs refer to the front panel blink codes. Blink code #2 indicates that the input power has been exceeded. Reset the amplifier by releasing the PTT switch and turning the 48 volt power supply off for several seconds. Use a tweak stick to rotate the overdrive pot clockwise. I only had to turn the pot 1/4 turn for 1500 Watts out. Turn the amplifier on and resume the testing to verify that the input overdrive detector is set for 25 to 30 Watts.

Control Board VSWR & Overdrive Adjustment Pots

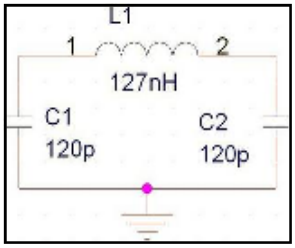
Reflected Power (VSWR):
A description of the output coupler and VSWR detector was included in part 2. This circuit only measures reflected power. As you increase the output power beyond 1000 Watts the amplifier may shut down (blink code #1) even though you have terminated the amplifier with 50 Ohms. My amplifier did not shut down when I had it connected to a 50 Ohm load but it did shut down when I connected it to my antenna. Before proceeding I checked the return loss of my antenna which was <-20 dB. Reset the amplifier and use a tweak stick to rotate the VSWR pot clockwise. I had to turn the pot 1 turn clockwise for 1500 Watts out into my antenna system. Turn the amplifier on and resume the testing to verify that the VSWR detector is set to work with your antenna.

Note: The best way to set the VSWR and Overdrive pots is to make adjustments while the unit is operating. Turn the pots clockwise so the unit does not trip off at full CW power. Slowly turn each pot counter clockwise until the unit trips off then turn the pot an 1/8 turn or so clockwise to give some margin.

The VSWR detector is designed to prevent damage to the amplifier. If your antenna does not have a good match and you rotate the VSWR pot so the amplifier does not trip off, you may cause device failures due to high reflected power. Your antenna may have a good match in the summer but you want the amplifier to trip off in the winter if your antenna is iced up. **Do not re-adjust the pots to operate into the poor antenna match. Reset the amplifier and operate at reduced power**.

Low Pass Filter:
The need for a low loss, high power, low pass filter was mentioned in part 1 of this article. The data in table #1 shows that the 2nd harmonic is only -29 dBc at 1500 Watts out, which is insufficient. Low loss is the most important factor to consider when working with high power RF. Most hams do not have the capability to measure output power with 0.25 dB accuracy. Consider this example: 1500 Watts – 0.25 dB = 1416 Watts out. i.e.: The filter will dissipate 84 Watts of heat. In general the number of elements you add to a filter is proportional to the loss. I used a linear analysis program to optimize the stop band of a 3 element low pass filter at 150 MHz. This is shown on the next page.

I used UT-141 silver plated semi rigid coax as my series inductor material and ATC “E” size porcelain caps as my shunt C elements. The inductor is suspended in air in a home brew box made of FR-4 material so as not to introduce any unwanted stray shunt capacitance. The low power test results show that the through loss of the filter is -0.05 dB but consider the dissipated power. 1500 Watts – 0.05 dB = 1483 Watts out. I.e.: The filter will dissipate 17 Watts of heat. The dominant loss element in the filter is the inductor. At 1500 Watts the inductor gets hot enough to remove skin from your finger. I had to vent the box and add a small fan to keep the inductor cool. **Cooling high power filters is a common practice in the high power RF business.** A high power amplifier company that I work for uses air conditioning tubing to wind inductors and runs water through the coils using fish tank hose.



High power low pass filter. Inductor is formed by 3 turns of UT141 coax, .72" dia, spaced as shown

Freq	s11	s21	s12	s22
50	-25.0	-0.02	-0.07	-28.0
100	-1.0	-23.0	-23.0	-1.0
150	-1.0	-38.0	-38.0	-1.0

Table 2: Low Pass Filter Data

High Power Testing / Low Pass Filter:
The amplifier was re-tested with the low pass filter inline. The FCC spurious emissions rule for amateur equipment is -40 dBc so the filter provides 8 dB of margin at full power. (1500 Watts – 48 dB = 24 mWatts @ 100 MHz)

Pin (W)	Prev (W)	Pout (W)	Ids (A)	Vds (V)	Flange3 (degC)	Rho (RL) dB	Gain dB	Eff %	2nd - dBc	3rd - dBc
2.1	0.036	218.1	19.0	47.6	55.6	-17.6	20.2	24.1	-52.8	-63.8
5.2	0.104	502.7	25.0	47.5	60.2	-17.0	19.8	42.3	-51.8	-63.8
10.4	0.229	903.6	33.2	47.4	57.8	-16.6	19.4	57.4	-49.8	-64.8
13.0	0.302	1090.6	36.9	47.4	57.8	-16.3	19.2	62.4	-49.8	-64.8
15.6	0.396	1194.4	38.3	47.3	59.4	-16.0	18.8	65.9	-48.8	-63.8
20.8	0.698	1319.1	40.9	47.3	60.1	-14.7	18.0	68.2	-48.8	-62.8
26.0	1.047	1474.9	43.7	47.3	61.2	-14.0	17.5	71.4	-47.8	-59.8

Table 3 Test Conditions: a) CW, b) With Lowpass filter, c) Freq = 50.1 MHz, d) Idq = 10.5A

High Power Testing / Two Tone:
The test equipment was reconfigured to measure 2-tone performance. An output power close to 2KW was measured. In this case I felt comfortable testing the amplifier beyond 1.5 kW since it was only 1.5 dB into compression and as mentioned in part 1, the average power each device must produce is half. At 2 KW out the 3rd order intermod products were only -17 dBc. This will make your SSB signal sound distorted. Operating at 1500 Watts with -22 dBc 3rd orders will give you "studio quality" audio.

Pin W(pk)	Pout W(pk)	Ids A (avg)	Vds volt	Flange3 degC	gain dB	3rd -dBc	5th -dBc
2.5	249.3	15.3	47.7	59.2	20.0	-32	-48
5.2	498.6	18.7	47.6	59.4	19.8	-30	-42
10.6	1038.7	24.4	47.5	60.0	19.9	-29	-40
13.3	1246.4	26.5	47.5	60.2	19.7	-27	-42
18.7	1537.2	29.5	47.4	61.0	19.1	-22	-45
24.2	1786.5	31.8	47.4	60.8	18.7	-19	-45
29.2	1994.2	33.7	47.4	60.8	18.4	-17	-37

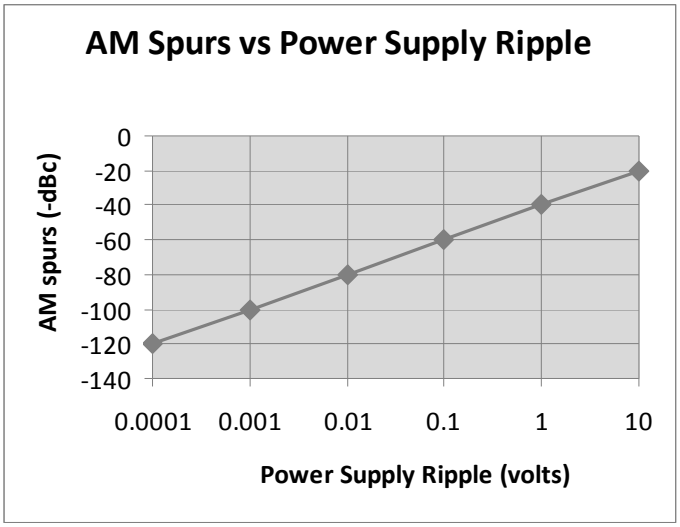
Table 4 (Two Tone) Test Conditions: a) Freq 1 = 50.05 MHz, b) Freq 2 = 50.15 MHz

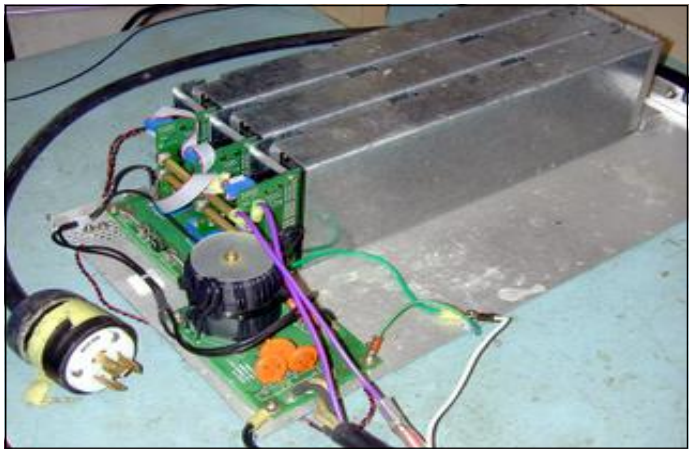
Power Supply:
I originally wanted to use 4 large gel cell batteries in series to provide pure DC to the amplifier. I thought this would be the cheapest way to get 48 volts at >70 Amps. I connected a 48 volt 5 Amp linear power supply to keep the batteries charged during the receive periods. The problem is that 4 batteries in series under a trickle charge have an output voltage of 56 volts and 3 batteries gives 42 volts. The over/under voltage alarm will not allow the amplifier to turn on unless the supply voltage is between 42 and 56 volts. I guess I need to look for a large 6 volt gel cell to fill in the gap.

For the January contest I used three 40 Amp switching power supplies slaved together. I use this +48 volt 120 Amp supply at home to test high power amplifier modules. I looked at the output voltage with an oscilloscope and measured <100 mVolts ripple with the amplifier at full RF power. I also looked for sidebands close to the carrier with a spectrum analyzer and did not see any AM spurs caused by the power supply. I have seen several surplus +48 volt switching power supplies that were originally designed for the telecommunications industry. Take the time to measure the ripple of your supply before you put it on the air. The closer you are to the maximum output of the power supply the higher the ripple. If you measure close to 1 volt of ripple at full RF power out your should consider designing a resonant filter to attenuate the switcher noise. The large switching power supplies operate in the low to mid kHz range so your power supply ripple may cause unwanted interference to other hams on 6 meters.

Use the following equation to calculate the amplitude of the AM spurs that are caused by the power supply ripple voltage.

-dBc spurs = 20 x log (%m /2) where %m (modulation index) = power supply ripple/output voltage.



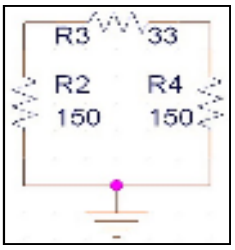


48 Volt 120 Amp Power Supply

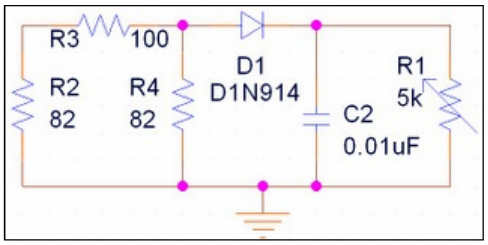
Directional Coupler:
I mentioned in part 2 that there is a dual directional coupler at the back end of the chassis connected directly to the output RF connector. Only the reverse port has been populated with components for the reflected power (VSWR) alarm. The forward port of the coupler is available as a power measurement point. I disconnected the amplifier from the coupler to tabulate the performance. This is an electrically short stripline design which has an increasing coupling factor as frequency increases but offers high power capability and excellent directivity in a small space.

Freq MHz	S11 dB	thru dB	coup dB	rev dB	iso dB
40.0	-38.0	-0.050	-36.20	-57.20	21.00
50.0	-39.0	-0.050	-34.30	-55.20	20.90
60.0	-38.0	-0.038	-32.75	-53.20	20.45

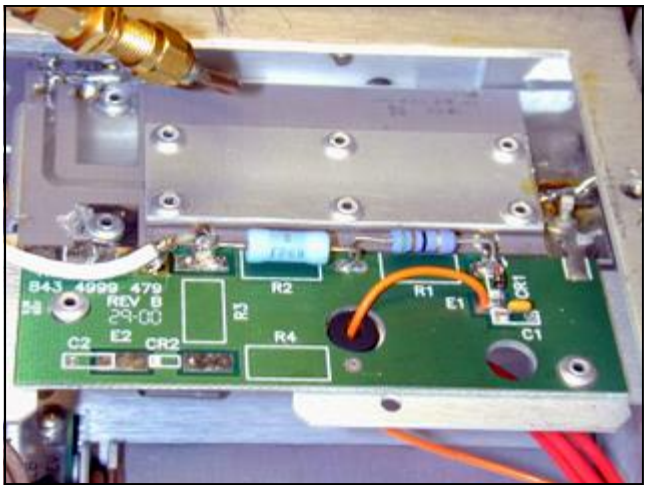
Table 5: Directional Coupler Data



-5.7 dB Pad



-13 dB Pad / Detector



Dual directional coupler

There are three approaches you can take to utilize the forward port of the coupler. 1) Remove the termination resistor (R2) from the coupler board, solder a coax cable directly to the coupler, and install a 2nd BNC connector to the rear panel. It will be difficult to gauge how much power you are putting out since the coupled value at 6 meters is an oddball number. (1500 Watts – 34.3 dB = 0.56 Watts) 2) Install a 5.7 dB pad using the existing connections on the PC board. (1500 Watts – 34.3 dB -5.7 dB = 150 mWatts). (Use 0.5 Watt resistors) 3) Populate the coupler board with a -13 dB pad and detector diode. Use the detected output signal to drive a meter movement. Install a pot to either the coupler board or the meter to calibrate the meter for 1500 Watts. I have future plans to add a font panel and a rail to the bottom plate so the amplifier can be installed in a standard 19” relay rack. The front panel will include a power meter and the LED board.

Conclusion:

I used this amplifier in my 6 meter system for the 2010 January contest and received many good comments about the quality of the signal. The broadcast industry adheres to high linearity specifications to meet the FCC rules on spectral purity. The broadcast customers demand conservative designs for a long trouble free service life. I don’t have any of the price breakdowns but based on the cost of (16) 100 Watt power transistors I would guess that the cost of each of these 1 KW plug-in modules is >$8,000. We are very fortunate to be able to integrate this type of commercial quality equipment in our home ham stations. 73xg

NOTES:

1.Equipment used to measure the amplifier: HP8765A 3-1300 MHz network analyzer, HP141T spectrum analyzer with 8555A plug in, HP435 power meters with 8481A power heads, HP8640B 0.5-500 MHz signal generator, HP608 10-480 MHz signal generator for 2-tone tests, Mini Circuits ZFSC-2-1 power splitter for 2-tone tests, Textronix TDS220 oscilloscope, Narda 3020A 50-1000 MHz high power coupler, Bird 8895-300 2500 Watt 50 Ohm load, homebrew 1-150 MHz 25 Watt driver amplifier, homebrew 100 Amp current shunt, homebrew 10-500 MHz dual directional coupler.

2. The American Technical Ceramics (ATC) size “E” chip caps for the low pass filter can be obtained from Amplitude Technical Sales, 279 S. Main St., Suite 2A, Doylestown, PA 18901

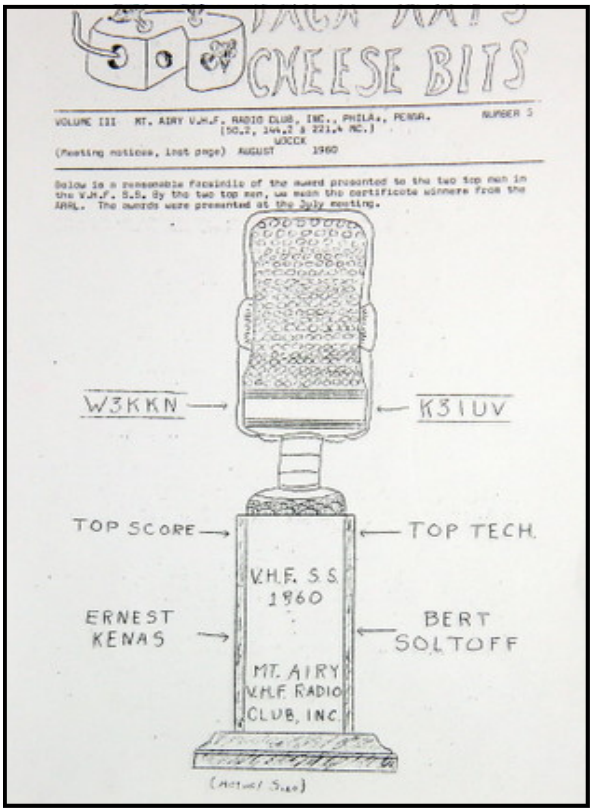
The Wayback Machine

Gleaned from the pages of Cheese Bits, August, 1960 (Vol. III Nr. 5)

de K3IUV

(*author's comments in italics*)

1. The cover page featured a full page picture of trophies presented to W3KKN (Top VHF SS score in the country), and K3IUV (Top score for a tech *[at that time]* in the Jan SS. (*Still have that trophy in the shack!)*
2. The club Field Day report (230 contacts, 6 multipliers), for operation on 6, 2, and 220. 15 members participated. (*Those still here are W3GXB Bob, K3IUV Bert, and K3BPP Walt.)* Operation used generator power, supplied by W3IHT. Sadly, the rest are now SK. *(This was before we switched to operating the June SS).*
3. Technical report by Ed, W3HKZ *(now SK)* on a detailed analysis of corner reflector antennas, performed by the National Bureau of Standards. The results provide detailed info on design and performance.
4. A list of "daffynitions" generated by Raytheon Engineers was reprinted. Some of the funny examples included: Toroidal Coil – a tropical snake; Semiconductor – a railway conductor under 5' 2"; Grid Bias – college football game reported by an old grad. (*For more, go read the original article.)*
5. Next hidden transmitter hunt on 50.7 announced for September. Cash Prizes! $10 to first finder *(if any).*
6. Packrat picnic announced for 8/14, Ft Washington State Park. As usual, peanuts will be donated by W3KKN, and door prizes came from Gimbels, PSFS, Ham Buerger, Radio Electric Supply (RESCO) and others. *(all now SK!!). (this well attended annual event included an auction, and games for the kids).*
7. Official ARRL Bulletin announces five new countries for DXCC credit, including Mauritania and Somalia Republic.
8. Detailed report on the July 20 meeting, which was held at WCAU studios, arranged by Ed, W3HKZ (SK). Highlights included a "behind-the-scenes" tour showing the ticker tape and Teletype news machines, and a meeting with news anchor John Facenda.
9. August meeting to be held at QTH of W3KKN *(one of many, many).*



Cover of Cheese Bits Vol III Nr 8

Ham Radio URL of the Month

Think online security became a major issue only in the 21st century? Think again! Go to http://www.ieee.org/documents/IEEE%20History%20Center%20newsletter%2083-3.pdf and scroll to page 6.

There you'll find a fascinating article on how "information security" was breached on telegraph lines by both sides in the Civil War! Lines were tapped, cryptography had to be instituted (and carefully controlled) and spoofed messages took and saved lives.

Thanks go to Bert K3IUV for suggesting this URL.

ENJOY! — Lenny W2BVH

Events

For inclusion, please direct event notices to the editor.

ARRL UHF Contest - Aug 7-8, 2010. See http://www.arrl.org/august-uhf for details

JSARS Hamfest - Aug 8, 2010. See http://www.jsars.org/?q=node/50 for details

Reading Radio Club Hamfest - Aug 14, 2010. See http://readingradioclub.org for details

International EME Conference - Aug 11-14, 2010 Dallas TX. See http://www.ntms.org/eme/ for details

ARRL 10 GHz and Up Contest—Aug 21-22, 2010. Rules at http://www.arrl.org/10-ghz-up

Pocono Area Hamfest - Sept 11, 2010. See http://www.qsl.net/n3is/hamfest/index.html for details

ARRL September VHF QSO Party Contest - Sept 12-13, 2010. 1800Z Saturday - 0300Z Monday. See http://www.arrl.org/september-vhf-qso-party for rules

Gloucester County ARC 32nd Annual Hamfest - Mullica Hill NJ. See http://www.w2mmd.org for details

Mid-Atlantic States VHF Conference - Sept 25, 2010. See add, this page. Additional details to follow.

Antique Radio Show - Sept 17-18, 2010, at Renningers Antique & Farmers Market, Kutztown PA. See http://www.renningers.com/kutzradio.htm for details

ARRL 10 GHz and Up Contest— Sept 19-20, 2010. See http://www.arrl.org/10-ghz-up for details

Mt Airy VHF Radio Club "Hamarama" Hamfest - Oct 3, 2010. Newtown PA. See http://www.packratvhf.com/Hamarama/hamarama.html for details

Mid-Atlantic States VHF Conference

CALL FOR SPEAKERS, PAPERS, ABSTRACTS
send to: pdrexler<at>hotmail.com

NEW LOCATION: Quality Inn Conference Center--969 Bethlehem Pike--Montgomeryville, PA

One Day Conference for experts and beginners alike. Full info at: packratvhf.com

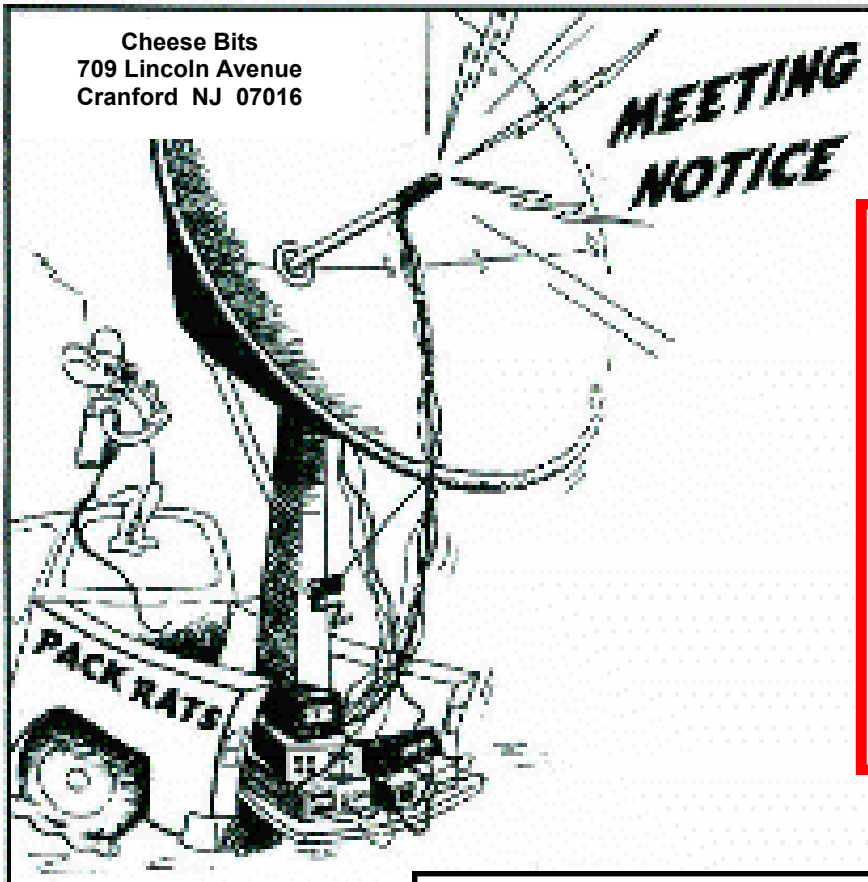
One price **$70 early-bird** includes CD, light breakfast, lunch, snack & buffet dinner

Raffles and Door Prizes--Indoor Selling , Outdoor Tailgating, VHF gear testing

--Friday Night Hospitality Room-- **FREE BEGINNERS SESSION** (must register)

Special room rate if you want to stay overnight $79+tax (mention Mt Airy VHF) On-line Registration now open http://dataandwireless.com/packrat/vhf_registration.php

Cheese Bits
709 Lincoln Avenue
Cranford NJ 07016



FIRST CLASS

MT. AIRY VHF RADIO CLUB, INC.