



CHEESE BITS

W3CCX
CLUB MEMORIAL CALL

ARRL
Affiliated
Club



Volume XLIX

November 2008

Number 11

PREZ SEZ:

Kudos to all the leadership and participants for the very successful VHF conference and Hamarama. It was truly a relaxing and enjoyable weekend for me, and the results greatly exceeded my expectations, as the attendees at both events were extremely friendly and cooperative, and help materialized from a large contingent of Packrats. Were you there? One of the concerns that the members brought up at the October meeting was that many Packrats did not attend either event. Make sure that you support the club by being involved in our activities. Start thinking now about your contribution to next year's conference and HAMARAMA.

I am happy to announce that Rich Enwright, KB3RNL has accepted the appointment as club recording secretary, now that Bill, K3EGE has completed six years of the duty. With his move further out to the countryside, he relinquished his post. Thanks again for your service and volunteerism. Bill will still be the January Contest Chairperson, and will be soliciting your station needs and gear availability for making sure that all Packrats are well equipped with plenty of working bands for the upcoming January VHF SS.

Speaking about VHF SS—have you assessed your station's capabilities and maintained your feedlines, towers and antennas? Have you checked into the Monday night VHF nets? Our Net Control stations are looking for you starting at 7:30 PM local on 50.150 (or .145) and moving up a band each half hour. We are in the quest for another gavel, and there are other clubs nipping at our heels to grab it from us. Let's keep up the momentum.

At our October meeting, Scotty Moyer, W3URR, formerly the Chief Engineer at WDEL gave a practical talk on all the electronics and mechanics behind taking a throw-away PC power supply and turning it into a beefy switching supply capable of supplying 20 amps to power most common gear. Not only did we learn a little practical information about switching power supplies and component ratings, but several of us were stimulated by Scotty's building and experimentation.

A few of us even paid him small price to take home a converted supply. His presentation is also on YouTube for those who didn't make it to the meeting. It is done in a stepwise and simple fashion, and if the power supply was free to start, less than \$10 of parts is needed to make the conversion.

For power supply theory:
<http://www.youtube.com/watch?v=rkApRg5VWnc>

For Nuts and Bolts:
<http://www.youtube.com/watch?v=S0JDuiTcMxs>

If you need more info contact Scotty at w3urr@arrl.net

Leon, N1XKT, my 3rd Harmonic is tying the knot on November second. This has been a busy wedding year for Jani and I, as our daughter Toby was also wed in May.

We're also planning another trip to Israel for the end of December, but we'll be back in plenty of time for VHF SS roving preparation.

Despite all the events, I managed to clear the weekends of October 17 and November 14 for participating in the group effort for the EME contest at K1JT and K2UYH. For the first weekend I managed the 5AM-10AM shift for both days on MAP65/JT65 at the K1JT station. It was a blast to operate and add several 2m contacts to the log. Packrats WA3QPX and N2UO were also active on EME and K2TXB operated with K2UYH at his station.

Have a safe and happy Thanksgiving holiday, and I look forward to a full house at our next meeting when Chris Patterson, W3CMP will present details from past VHF DXpeditions including his most recent Sable Island 6m DXpedition, CY0X.

73, Rick, K1DS

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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

<u>TIME</u>	<u>FREQUENCY</u>	<u>NET CONTROL</u>
7:30 PM	50.145 MHz	K3EOD FM29II
8:00 PM	144.150 MHz	N3ITT FN20KI
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

Editor's Column

Next Meeting: October 16, 2008 At our usual site:
the Ben Wilson Senior Center, 580 Delmont Av, War-
minster PA. Chris Patterson, W3CMP will present
details from past VHF DXpeditions including his
most recent Sable Island 6m DXpedition, CY0X.
I'm sure we'll all be anxious to learn what it's like
to mount a major DXpedition that includes VHF
operations. Your editor worked CY0X several
times and I'm quite curious to know what sort of
equipment and antennas were used to allow S9 +
10 and up signals in central NJ.

Greetings Packrats!

Little by little the January ARRL VHF Sweepstakes is
sneaking up on us. Bill, K3EGE will be coordinating
the exchange of spare equipment. If you have extra
rigs to lend out or if you'd like to add a band (or more)
to this years effort by borrowing a fellow 'Rat's equip-
ment Bill will be the 'Rat to see about it. Please
keep a sharp eye out for mail from the club reflector
for further details.

This fall seems to have been the time for moving lots
of aluminum and steel around. Several 'Rats have
taken advantage of offers of towers from other hams
in the area. Look for photo essays in future issues of
Cheese Bits on how the towers came down and got
moved. You can be sure there will be calls next
spring for volunteers to put all that steel up at their
new homes.

Some nice pix from the Mid-Atlantic States VHF Con-
ference will also find their way into a future issue

This issue

In this issue of Cheese Bits, we have lots of interest-
ing soapbox commentaries on contest operations in
the September VHF QSO Party. Thanks very much
to associate editor Ed WA3BZT for soliciting and or-
ganizing the comments. Preliminary club scores for
the contest are presented by Bill K3EGE.

We also have the third and final part of Paul W2PED's
article on the design of a subharmonic mixer for the
24 GHz band. Performance results from an actual
prototype are very encouraging. We hope this design
can be reproduced in quantity some time in the fu-
ture. It would make getting onto the 24 GHz band eas-
ier for more members.

Also in this issue, Joe, K1JT presents an update on
his joint operation with Al, K2UYH in the ARRL Inter-
national EME Competition. We hope to present an
update from Joe after the last weekend of the compe-
tition, which happens later this month.

73, Lenny W2BVH

Station Operations in the 2008 ARRL September VHF QSO Party

Presented and organized by Ed, WA3BZT

Rick K1DS

Well we had some good station reports in the September contest and I would like to share some with the rest of the group. Remember the next contest for the club will be the big one.

I had a great rove. Casual and relaxed, and home on Saturday night in my own bed, with a leisurely start Sunday morning. I even managed to give out about 20 QSOs from the home station. Despite other activity conflicts, I was out for 3 hrs Saturday and 12 hrs Sunday covering four local grids, FN20, FN10, FM 19 and FM29. I had the higher power amps of 100+W on 903 and 1296 working. The visit paid by Murphy to my 5 and 10G gear limited those bands to 1 QSO each. Only 1 visit from the local police cruiser while at the bank parking lot in FN20 at the intersection of 309 and Stump road. The pleasant policewoman was glad to hear that I was successfully chatting with my buddies as I explained this was a field test of emergency communications. I headed out to Morgantown to check out my 6m Moxon antenna that seemed to be deaf--or was it the rig? Stopped at N3NGE's to get his assessment and it seemed to be an intermittent coax connector. I still had a limited score on 6m and now I'm thinking that the computer is generating too much noise on that band for me to hear callers, but I have also been told by stations outside of the local area that my signals on 6m are weak, despite having 150W out. The bright spots were 2m and the microwaves as there was plenty of opportunity to make QSOs as 6m wasn't open.

There were several Pack Rats on the air, and those in the southern tier W3OR, WA3BZT and WA3QPX showed up in force on Sunday evening while I was in FM29. There appeared to be some lift at dusk also, as I managed to have QSOs in FM06, EN91, EN92, FN01 and FN03 on 2m and some on 432.

It was hot and steamy all day Sunday, and I

was fortunate to have the air conditioning with the engine running for the entire 12 hours Sunday. I operated from the graveyard in FN10. No problem with floating spirits there. Actually the propagation was decent. Out in that area there is an abundance of horse-drawn carriages on the roads, and a treat for the eyes across the farm fields. It's always great to be able to depend on the big guns and the multi-ops for runs on all the bands from all the grids. Of course, N3NGE and K3TUF had full runs with me in all 4 grids. Claire, KA3TUF was also becoming an expert at contesting at her family station. When we ran 8 bands after she and Phil had dinner, she said, "this is so nice and easy..." to which I respond, "yes, especially when you have a station outfitted like yours, using a point and click SDR radio set-up and a BIG tower and antennas." I found Herb at the WA2FGK rebuilt contest station in FN21 and excellent signals through 3.4GHz from 3 of my 4 grids. Jeff, K1TEO was his usual great communicator, and he and others, besides myself, were disappointed that I couldn't supply the grid multipliers on 5G and 10G.

The rovers were out in force regionally as I logged NN3Q/R, N3IQ/R, N1XKT/R, K4GUN/R and W1RT/R to name a few. Even found 3 LASER QSO's with some fixed and rover stations. As usual, I found it impossible to break into the W2SZ microwave queue, as I was moving when they had an opening in their microwave skeds. I did manage to get the FN32 grid multiplier into the log on the bottom 4. It was also great to have several of the multiop stations to populate the various grids throughout the region--K3YTL, W2EA, N2NK, K8GP and W3SO among them. I was unclear as to why the K3YTL group decided to have their 222 and 432 stations so far away from the calling frequencies at 222.173 and 432.180.

At one point toward the end of the contest, the cursor of my computer started to jump around uncontrollably and wouldn't be captured by any movement of my hand on the finger touch-pad. I was still making a contact a minute, and was able to use key strokes to move

through the W3KM Rover Logger and record them, but I realized that I had better reboot to get this under control. Luckily, K3TUF was able to talk me through the fix.

I tried hard to get more K1WHS contacts in the log, but conditions in that direction were not great. I know that the September QSO Party is the highlight of the operating from up there, and that other Pack Rats have supported the station. I'll be interested to see everyone's scores. Of course, we were rather lucky to have avoided the extremes of weather that were experienced in the Gulf coast, and trust that those affected will get their properties restored and life back to normal quickly. Looking forward to getting my 5G and 10G gear back on the air and the fall sprints. 73, Rick, K1DS

George WB3IGR

I did rather well in the Sept. contest here in FM18xs 11,529 points! I am adding 903 (as soon as DEM gets the transverter to me for January. I also have an RX converter and a loop yagi up for 2304 but I didn't hear anything but the CCX beacon on it (2304.043.5), so I might want to in the future add 2304! Contacts on 1296 were a breeze as I added an SSB RX amp to my 1296 system, 9 contacts and 7 grids all without straining to hear the other stations!!! Grids like WA2FGK (FN-21) and K3YTL (FN11), GOOD SIGNALS here in FM18xs!!!

AI K3EOD

The K3EOD team which consisted of only 3 operators on Saturday did about average (100K), even though we were off the air from around 11:30pm Saturday till around 9:30am on Sunday. We only had 2 operators for all but about 6 hours on Sunday. Which kept us hopping to the 3 operating positions.

Thought conditions were flat with no band openings noted.

What would help is finding one or more aggressive no nonsense operators, especially

someone to work the overnight shift and WSJT.

Equipment wise:

Have to get my 2 meter tower put up and some antenna work done on both this tower and on the main tower. Could also use more power on 432 (only running 100 watts now).

K3TUF Phil & KA3TUF

The contest started as usual with an attempt to get the qso count up to a desirable level by staying on 6 and 2 meters as much as possible. The exception to that is the need to work a Rover in a location that won't be occupied later.

This year I had the basic system of bands that I had from the previous year so I knew I could count on that working. Having a new 180-foot tower for the microwave bands was the new feature for this contest. The original microwave system on the original tower was untouched and ready to spring into action. I used the original 80-foot tower for close in contacts.

Things were pretty busy for most of Saturday and the day ended with making 100% of the wsjt schedules that were planned before the start, an improvement over last year when 2m wsjt just didn't seem to work as well for anyone. For the first time I was able to find some random contacts in between schedules. This is a great enhancement to the sport.

Getting up for the early morning schedules wasn't as hard as it was last year for some reason, and activity was a little slower generally, it seemed. Perhaps the enhancement last year was a contributor to that condition. At this point in the contest I have no idea how the score is compared to previous years, this is something that needs to be tracked, as it will be a motivator for the long day ahead. Sunday afternoon is the time we set aside for getting both operators in the house to give out points to the Packrats. Not many rats requested schedules so a few were run with other operators. This was fun as I had set up an operating position next to mine where we

could run stations through the bands with both K3TUF and KA3TUF giving out contacts. The evening frenzy wasn't as fast paced as in previous years but still yielded new grids. Some Rovers were talking about the high winds that were ripping through the area, yet not as bad as some had it down in Texas. There were some problems but they had little affect as I have a decent redundancy / backup system in place for most critical equipment. I am sorry to say I had a few glitches in the software department early on, but with the Elecraft K3 fully integrated I was able to move on without skipping a beat. I managed to get the 'software defined' issues handled while still operating the contest at full bore. In the end I had nearly a 50% improvement over last year mostly attributed to the new microwave tower and the added qso and grid count that it brought into the mix.

Bob W2SJ

Everything worked quite well here with the exception of 222. I think I actually have a broken feedline which also stopped the mast mounted preamp from turning on. It's all under control, just have to lower the tower again to troubleshoot. I need to have a 903 preamp hung on my fixed roof tower and change out my 5.7 18" dish with another one I have here. Paul PED may be able to help me with that, I'll check with him. Other than that I did real well and racked up 89K+, so I was real pleased!

Lenny W2BVH

With my modest setup, and only 2 bands I was able to score in the mid 3000's (82 Q's). Many family and some professional obligations ate in to the amount of operating time I could put in. But it was a lot of fun. Best (but not the furthest) QSO was with W1AW on 6M. In 45 years as a ham this was my 1st QSO with the ARRL flagship station.

W3KM Dave

I was on for a few hours. Found the activity low, but lots of easy to work grids as is the usual case in the September QSO Party.

Since I don't have 2m working it was hard to find stations to move around the bands. For January I will fix the 2m transverter and be on the lower 4 plus 1296 I have entered the January contest every year since 1972, so I'm not planning much of an effort.

Ed WA3BZT

Well looking at the rest of the scores and comments I used 6 and 2 meters and did fair for my station. I was going to add more bands for the January contest but as luck has it now I have to dig a big hole and put up a crank up/tilt over tower 72 Feet!. Yes I am still working on getting the antennas up higher in hopes of getting out better. So Looks like January will be just 6 and 2 Meters again. Anybody out there want to stop by and help dig a deep hole?

Preliminary Results from the 2008 ARRL September VHF QSO Party

By Bill K3EGE

20 Packrats submitted scores for the contest resulting in a claimed club score of 1,214,973 points!!!

Scores of note include:

N3NGE - Multi-Op High Power Unlimited - 449,280 points - 3rd place nationally

K3TUF - Single Op High Power - 263,516 points - 2nd place nationally.

WB2RVX - Single Op High Power - 121,832 points - 5th place nationally

K3EOD - Multi-Op High Power Unlimited - 103,024 points - 9th place nationally

K1DS/R - Rover 78+ K points

WAY TO GO PACKRATS!!!! Next contest is the BIG one in January

--- Bill K3EGE

A x4 Subharmonic Mixer for 24 GHz

Part III

Paul Drexler, W2PED

Editors note: This month we present the concluding portion of Paul Drexler's design of a Subharmonic Mixer for the 24 GHz ham band. The relatively narrow bandwidth and low LO harmonic feed through are both advantages when using the mixer to create an amateur service transverter. Hopefully these mixers will be available as production items and that will encourage more 24 GHz operations.

A WAVEGUIDE TO MICROSTRIP TRANSITION

Since the mixer is designed in microstrip, the easiest way to couple RF energy into the mixer would use a high frequency SMA connector. Since most amateur systems however, utilize waveguide, some thought was given to providing a waveguide interface at the mixer RF input. This is normally accomplished using a waveguide to coax transition by soldering a small diameter pin to the microstrip, which in turn acts as a waveguide probe placed into guide with a waveguide backshort roughly 1/4 guide wavelength away from the probe. Paul Wade W1GHz recently presented the design of this type of coax to waveguide transition in a QEX article.

The author has made his own WG to coax transitions and learned quite quickly that the length of the probe can be *very* tricky to get just right! The concern was that if a small wire is used as a probe, the preparation and placement of the wire probe might result in less than optimal performance if building more than one or two mixers. For this reason the author chose a different approach to this aspect of the problem. Instead, a direct microstrip to waveguide transition was designed where the microstrip itself becomes the probe for the transition. The design is illustrated in the figure below. The left side represents the 50ohm microstrip line while the rectangular block to the right represents a WR42 waveguide. The microstrip probe is widened in order to improve the impedance match over a relatively broad frequency range centered around 24 GHz. Note that the board itself is inserted into the guide. What's not shown directly is that the groundplane of the PC board is removed to allow the fields to pass through the board's dielectric.

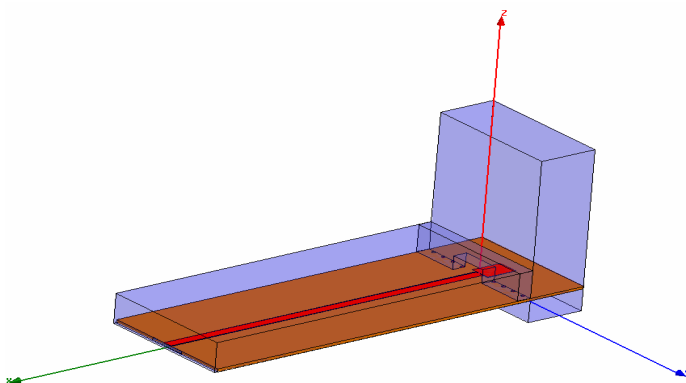


Figure 13 – A Microstrip to Waveguide Transition using Microstrip Probe

The design in Fig. 13, above was modeled using Ansoft HFSS, a full-wave EM simulator useful for analyzing 3D high frequency structures. The model predicts less than a 0.3 dB insertion loss and a very good return loss for this design.

ASSEMBLING THE MIXER

A machined aluminum housing was designed to house the mixer assembly including the waveguide to microstrip transition; a WR-42 waveguide interface for the RF port is built directly into the mixer housing. The diodes are not shown in this conceptual drawing but are placed near the center portion of the microstrip transmission line. The LO input is the SMA connector at the lower edge and the connector at the right side is for the IF. The overall mixer measures approximately 1.5 x 2 inches. The board is attached to the housing using a conductive epoxy.

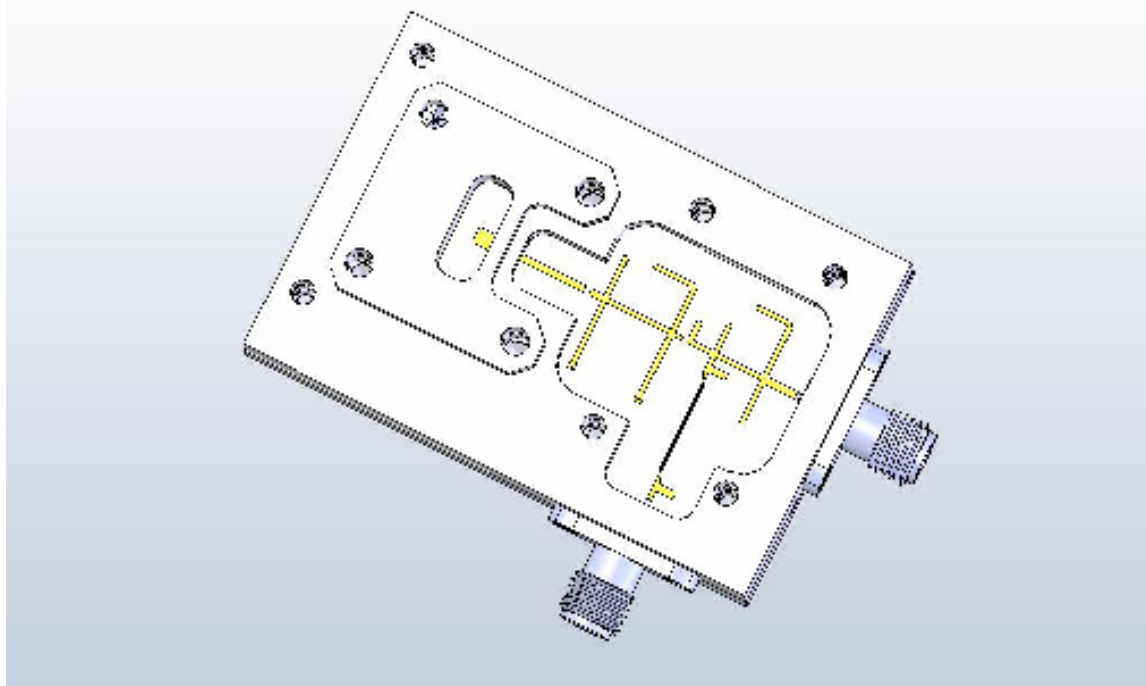


Figure 14 – Mixer Assembly

MEASURED RESULTS of PROTOTYPE SUBHARMONIC MIXER

The mixer was first measured as a downconverter with a 24.192 GHz input of -20 dBm and a $+10$ dBm LO. The resulting 144 MHz IF signal is measured at -29.5 dBm. This translates to a measured conversion loss of 9.5 dB. When varying the RF input signal, the mixer response is essentially flat to within 1 dB over an RF bandwidth of ~ 500 MHz. The design works equally well at the 24.048 GHz amateur band used in Europe and elsewhere. See Fig. 15, next page.

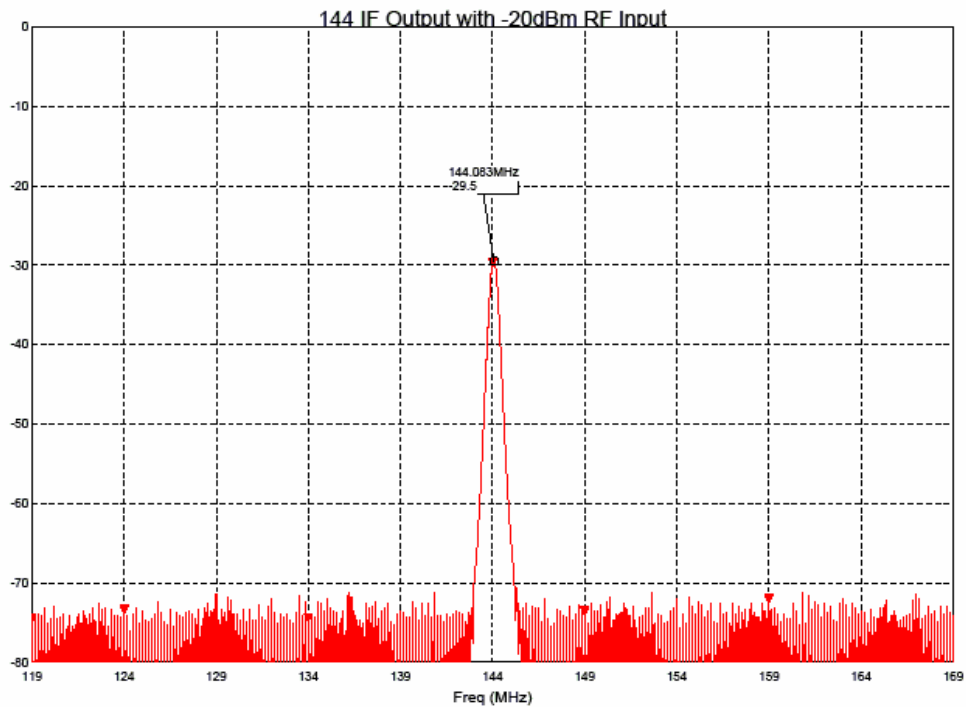


Figure 15 – Prototype Mixer Measured Results as a Receiver Mixer

Next the prototype was measured as a transmit mixer with an output at 24.192 GHz. The LO level is +10 dBm and the IF drive level was set at -10 dBm. While slightly greater output could be attained by driving the mixer harder, an input of -10 dBm represents the highest drive level without driving the mixer into compression. Note that as a transmit mixer, the conversion loss is again 9.5 dB. The measurement was made over a 100 MHz output bandwidth, and no close-in spurious signals were detected.

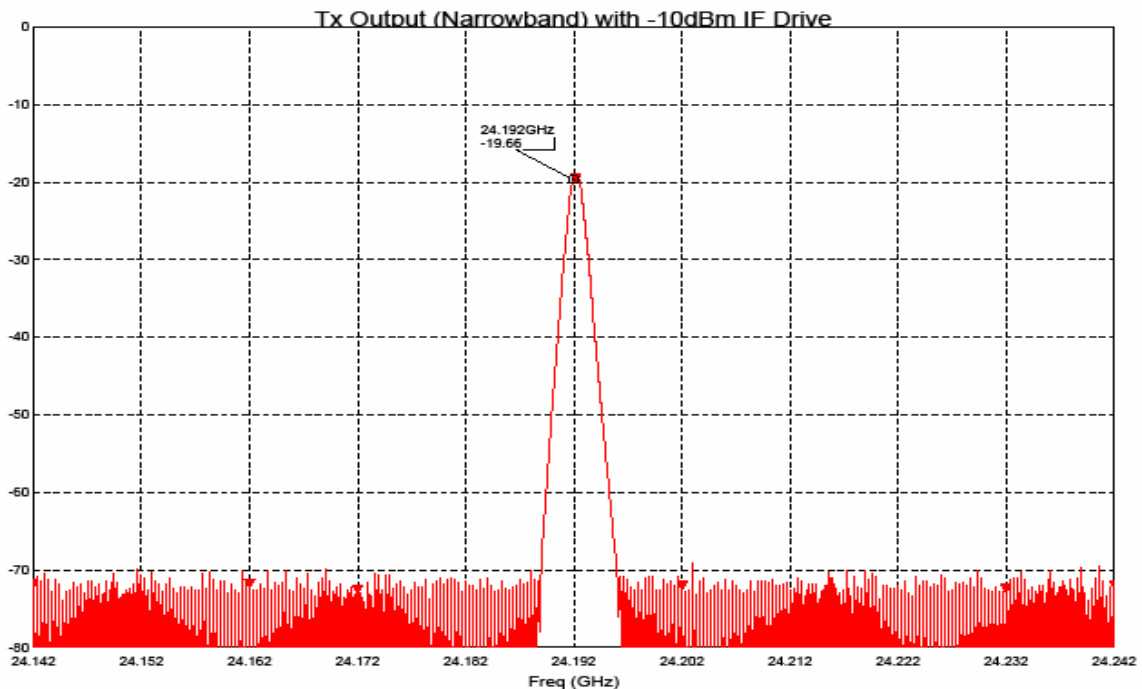


Figure 16 – Transmit Mode Results for Prototype Mixer (narrowband)

Finally, the transmit bandwidth was widened in order to measure the rejection of the close-in 4xLO signal. Results are shown in Figure 17 below.

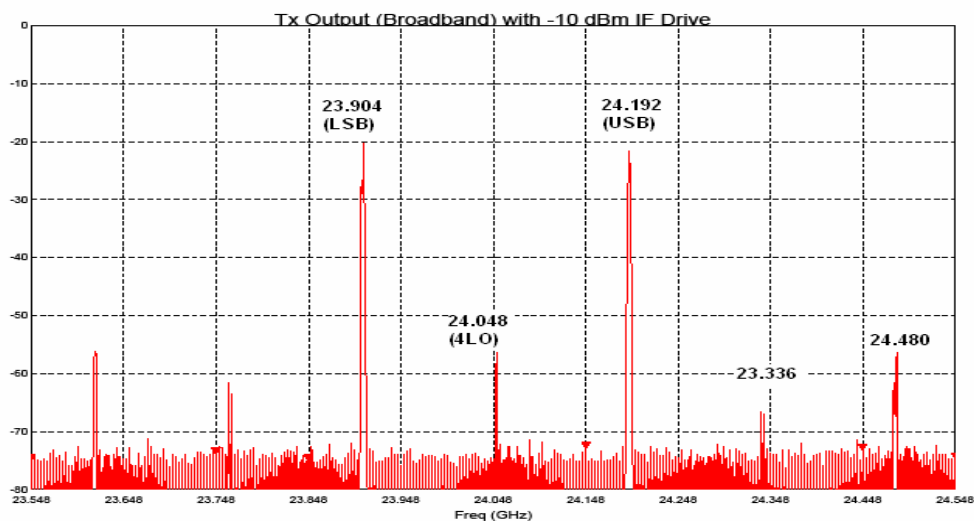


Figure 17 – Transmit Mode Results for Prototype Mixer (broadband)

The above broadband spectrum analyzer measurement was made over a 1 GHz bandwidth, and there are a number of undesired mixer signals, as expected. The desired RF signal at 24192 MHz is the USB mixing product and is seen at one and a half divisions to the right of center. The undesired LSB signal at 23.904 GHz is equal in amplitude to the desired RF signal. There are several additional mixing products every 144 MHz above our desired RF signal; however they are more than 35 dB below the desired. A surprising result can be viewed in this data. **Note that the 4LO signal (at the center) is more than 35 dB below the desired 24.192 GHz signal.** In most fundamental mode mixers that the author has measured, the LO signal is *at the same level* as the desired USB RF signal. While RF filtering is still obviously required, the x4 sub-harmonic mixer appears to require less filtering than a standard type mixer.

Lastly, one comment on the mixer's conversion loss is in order. Recall that the computer simulation of Figure 12 shows a predicted conversion loss of ~8 dB. The conversion loss figures on the prototype measure ~9.5 dB so there is a difference noted. Some of this can be attributed to etching tolerances, etc but there are two factors that were unaccounted for in the model prediction: the loss of the WG transition and the loss of the additional length of input microstrip between the WG transition and the actual mixer input. With these factors in mind, the predicted conversion loss is just shy of 9 dB. A measured conversion loss of 9.5 dB agrees very well with the predicted value.

A photo of the prototype mixer assembly is shown on the next page. The WR42 waveguide RF port can be seen on the left, the IF connector at the right side, and the LO input connector at the lower portion.



Figure 18 – Prototype Mixer

FUTURE EFFORTS

The prototype subharmonic mixer was designed using the 'primo' Teflon-based Rogers 5880 board material. The fabrication costs using this material are somewhat cost prohibitive for amateur radio applications. In an effort to get the costs down to more attractive levels, the author has redesigned the mixer to be fabricated on a lower cost Rogers 4350 type material. While the lower cost 4350 material has a disadvantage of higher dielectric losses, the performance tradeoff is felt to be minimal.

The author is also starting to take a look at this mixer topology for use on 47 GHz.

CONCLUSION

A x4 subharmonic mixer for 24 GHz has been designed and demonstrated with favorable results. It is my hope that this hardware will make it somewhat easier for amateurs to enjoy the 24 GHz band.

The author wishes to thank Al Ward W5LUA, Barry Malowanchuk VE4MA, and Brian Justin WA1ZMS for their thoughtful suggestions and inputs to this paper.

Footnote:

P. Wade W1GHZ, "Rectangular Waveguide to Coax Transition Design," QEX Nov/Dec 2006

The 2008 ARRL EME Contest at K1JT and K2UYH

by Joe Taylor K1JT

Rule 7.1 of the ARRL International EME Competition states:

"A Multi-Operator entry may be made up of neighboring amateurs within one state, province, or non-US/Canadian DXCC entity, but with EME facilities for different bands on different team members' premises, as long as no two are more than 50 km (30 miles) apart."

Under the provisions of this rule, the K1JT and K2UYH stations are once again combining resources to make a multi-op entry using the callsign K1JT. The EME contest runs for three weekends: one in September for the bands 2.3 GHz and up, and one each in October and November for the bands 50–1296 MHz. The September and October weekends are now behind us, so there is one weekend still to go. Ours is a "Mixed Mode" entry, which means that at 1296 MHz and below we can work a station for contest credit once in an analog mode (e.g., CW) and once in a digital mode, per band. For scoring purposes contest multipliers are US states, Canadian Provinces, and DXCC entities, and they count once per band.

The permanent EME setup at K2UYH includes a 28-ft dish with feeds for 432 and 1296 MHz and power amplifiers yielding 1 kW and 500 W, respectively. For the microwave weekend, September 20–21, we temporarily mounted separate packages containing a feed, transverter, and power amplifier for the 2.3 or 10 GHz band. Power output was 80 W from a solid state amplifier on 2.3 GHz and 100 W from a TWT on 10 GHz. The surface of this dish was not designed for 3 cm work, and indeed it is semi-transparent at that wavelength. Nevertheless we found that it works —albeit with undesirably low efficiency and high system noise temperature. The K2UYH station is set up for CW, SSB, and JT65 modes. Most EME activity on 432 and higher bands is CW, but we expected to make some QSOs with JT65 as well.

The K1JT EME station operates on 2 meters only. It has an array of four 35-ft long dual-polarity yagis on a 70-ft tower, and an 8877 amplifier providing 1200 W output in CW and JT65 modes. In general there is plenty of EME activity on 144 MHz in both analog and digital modes; we planned to switch back and forth between CW and JT65 so as to maximize our QSO rate. Over the October 18-19 weekend the majority of stations seemed to be using JT65, so we spent most of our time in that mode.

Ours is a very much a team effort. For the September weekend K2UYH, K2TXB, and K1JT were available to man the K2UYH station. We used two receivers; when on 2.3 GHz one was usually tuned around 2304.100 and the other around 2320.100, to accommodate different band allocations in different parts of the world. (EME operators have learned to do such split-frequency QSOs with little fuss; if we hear G3LTF calling CQ on 2320.110, we answer on 2304.110.) On 10 GHz we simply had two operators using independent receivers, both covering the region around 10368.100. We all took our turns with the headphones on, and operating the CW keyboard. Russ is especially good at digging calls out of the noise, and Al always kept an eye on the antenna's tracking of the moon, tweaking the pointing as necessary.

For the October weekend Rick, K1DS joined me at K1JT. K2TXB was also available for the first two hours on Friday evening, while the moon was still in the trees at K2UYH. We used the combination of Linrad and MAP65 software — a very powerful duo for 144 MHz EME. We operated mostly in JT65B, but whenever it seemed that we had worked everyone we could hear, we switched to CW for an hour or so. Meanwhile, operations at K2UYH were handled by K2UYH, K2TXB and W2KV. EME activity on 432

and above is mostly CW, so we followed suit — switching over to JT65 from time to time, to pick up additional QSOs.

With the third and final weekend still to go, our interim summary sheet looks like this:

<u>Band</u>	<u>CW</u>	<u>JT65</u>	<u>Total</u>	<u>Mults</u>
144	9	108	117	49
432	20	1	21	15
1296	54	7	61	30
2.3G	24	0	24	20
<u>10G</u>	<u>8</u>	<u>0</u>	<u>8</u>	<u>7-</u>
Total	115	116	231	121

We look forward eagerly to the contest's final weekend, November 15–16 — when we hope to have additional operator reinforcements from team members K2LNS, N4HY, KC2TA, and K2BMI.

For email recipients of Cheese Bits, please check the following page for some antenna shots. -Ed.

Joe, K1JT

HAM RADIO URL OF THE MONTH

As a tease for the presentation at the November Packrats meeting, check out www.cy0x.com/. And if you happened to work CY0X, you can check out the online log for your QSO(s).

Joel Knoblock W3RFC

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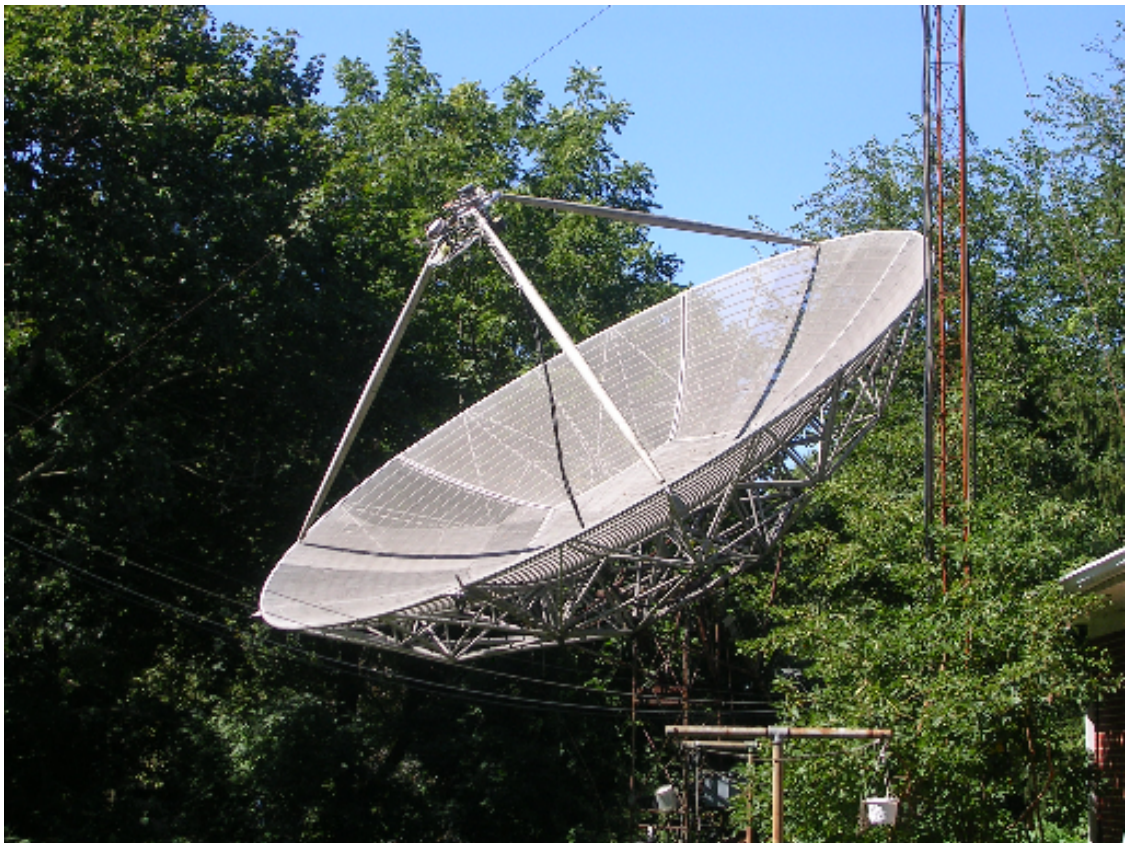
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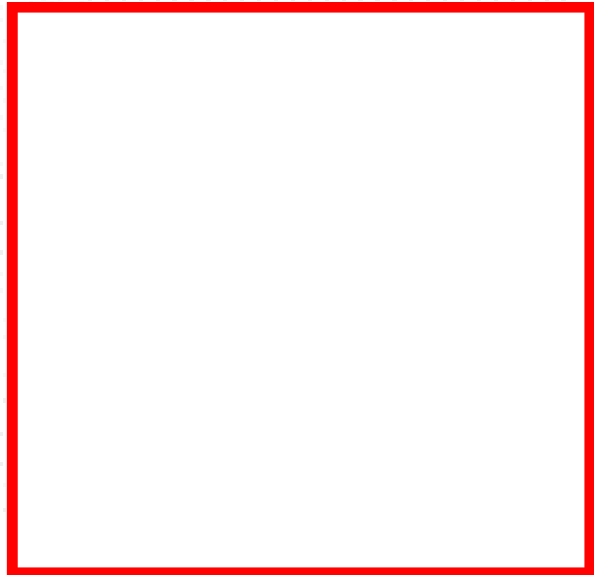
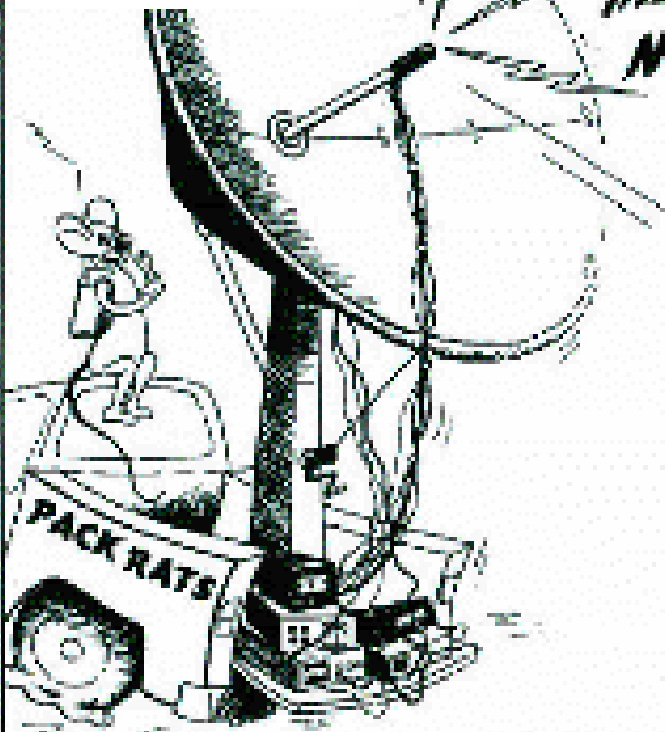
Dual-polarization 4-yagi array at K1JT, with beautiful fall colors in the background. Single yagis for 50, 222, and 432 MHz are atop the EME



The 28 ft dish at K2UYH. Dense foliage limits system efficiency at moon elevations less than about 25 degrees.

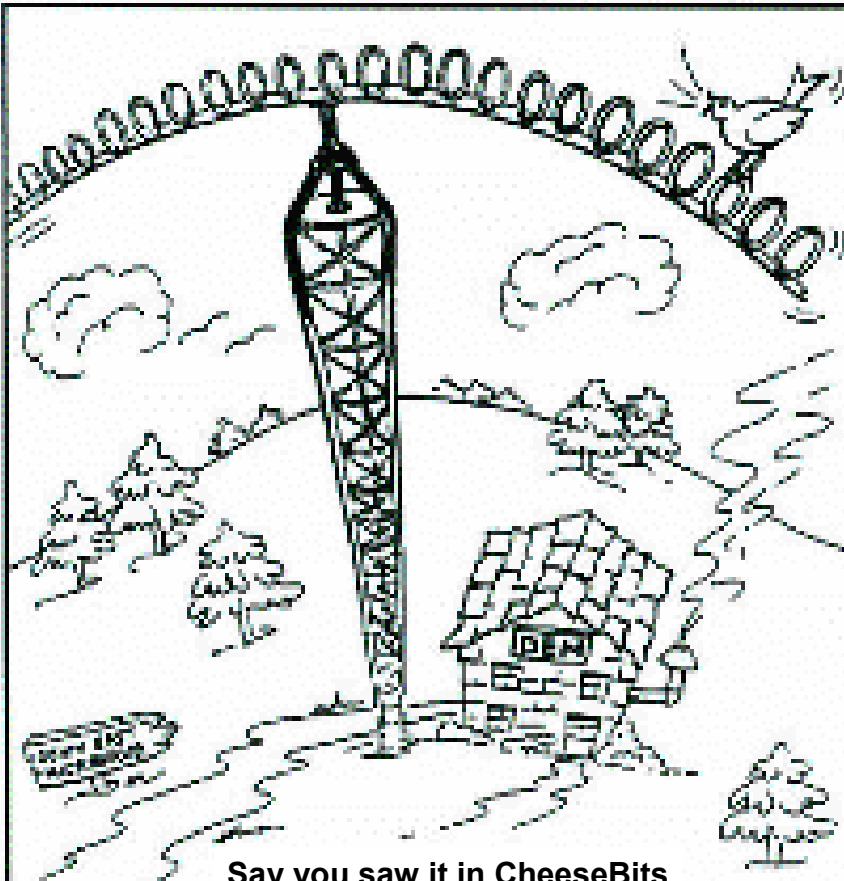
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