Flying Pigs QRP Club – BBQ

Bacon Bits Quarterly

Flying Pigs QRP Club International, W8PIG
1900 Pittsfield St, Kettering, Ohio 45420
E-mail: w8pig@yahoo.com Web Page: http://www.fpqrp.com

FPQRP membership is open to all licensed QRP operators who reside within 12,007 nautical miles of Cincinnati, Ohio.

Brian Murrey – KB9BVN (FP #-57)
Editor

Happy New Year! Welcome back to the BBQ. This quarter we have a lot of great articles submitted by lots of Flying Pigs. Remember, you don't have to be a Flying Pig to be a BBQ contributor, but being a Flying Pig costs nothing, so why not?

Like last year, we need a few folks that can pledge two or four articles for the 2006 BBQ season. If you are interested in being a contributing writer, please let me know. We're looking for general interest ham radio articles, especially stories about your ham radio adventures, and articles about your homebrewing efforts.. (brian@iquest.net)

Random Thoughts And Rambling – de WB0WAO
Co-Editor FP -347

Happy New Year 2006 to all of my fellow Flying Pigs! I think that 2006 will be an "interesting" year for all of us. For those of you who are prone to make New Year's resolutions, I have listed a few of mine – feel free to take some of these for your own use:

1) Try to get on the air more!
2) Live by the motto "WWBD?" (What Would Brian Do?)
3) Tell the judge I won't do that ever again!
4) Live by the motto "WWDD?" (What Would Dan Do?)
5) Tell the judge I will wear pants from now on!
6) Be kinder to NoGA's!
7) Finally finish the antenna projects I have be swearing to do for 2 years.

Finally, I have outlined some axioms, predictions and speculations for things that will occur or will probably occur in 2006.

The current solar cycle will bottom out this year, so shortly we will be back on the upward slope for HF propagation. Many of us can remember back in 2000 when 20m would be open well past midnight and there was DX to be had by all! It wasn't a matter of finding the DX, but a matter of finding the time to work it! For some of our newer members, just wait a few years; you will have the time of your life working all the DX you can hear with just 5w! A group of researchers will start a project to determine once and for all if Mac exists or not. They will be unable to reach a consensus because during the course of the study, many of the researchers will begin to doubt their own existence!

This year will probably see the FCC issue its R&O dealing with the licensing structure as well as some band "re-alignment" issues. No matter what side of the discussion you were on with regards to the no-code / know-code issue, the matter will be settled by the FCC and will become the "law". Once the FCC has spoken, then it will be time for us to become mentors to the new hams that will be showing up on the air. We will need to reach out to them and show them the true path of enlightenment. Also, the FCC will most likely address the ARRL "band plan proposal" with it being put out for comment sometime this year. This one concerns me more than the "restructuring part deux" did. We need to really study up on this one, think carefully about it and then submit our comments when the time comes.

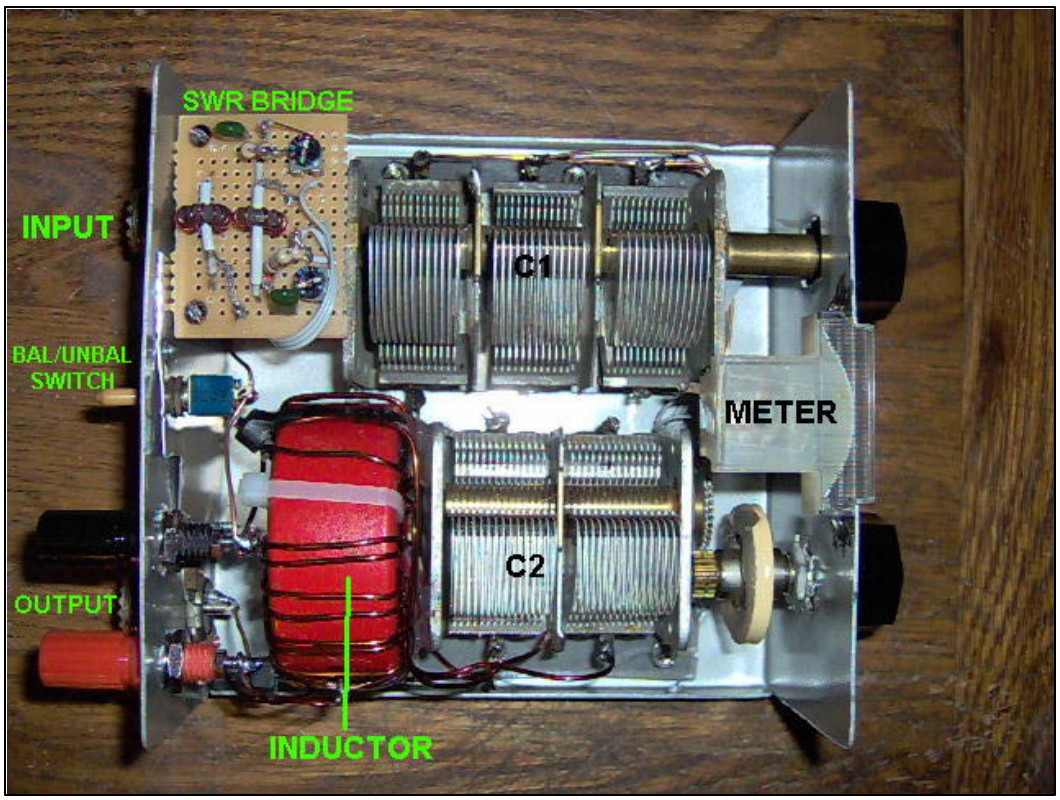
Anyway, here is to the hope that you will all have a great 2006 that is filled with only the good things and good health.

QRP TO 50 WATT Z-MATCH TUNER

By Rick McKee KC8AON

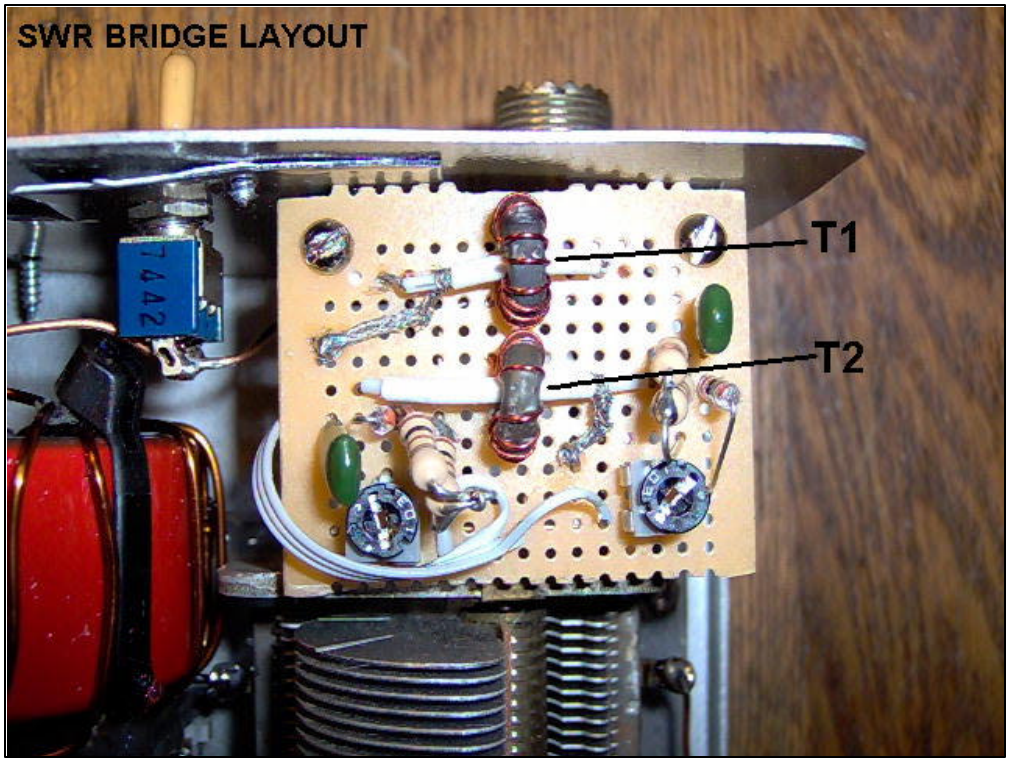
THIS TUNER ONLY HAS 2 CONTROLS AND WILL TUNE ALMOST ANYTHING!

I really didn't need another antenna tuner, but I had the parts in my junkbox and figured I'd build a homebrew Z-match tuner just for something to do. The result was a tuner that will work 10 thru 80 meters and handle up to 100 watts of RF. I originally thought that the variable capacitors that I had would handle 100 watts, but then found out that they will arc over on 80 meters at the 100 watt level. So I backed the power down to 50 watts and it handled it just fine. 50 watts is plenty for my intended purpose though, as the most I plan on putting through it is around 15 watts from my old Yaesu FT-7. The Z-match tuner is designed to handle balanced loads such as a doublet fed with balanced feedline or a loop. Since it is a balanced tuner, it does not need the balun that so many commercial tuners require to feed balanced feedline. I also added a switch to the tuner that shorts one side of the balanced output link to ground, converting it to operate into an unbalanced load such as a coax fed dipole or endfed wire.



Here's the inside layout of the Z-match tuner. As you can see, it is a fairly compact tuner that measures 5" wide, 6" deep, and 3" tall. It's not a backpacker, but it is compact enough to take along on trips without taking up much room. The air variable capacitors I used are nothing more than a 2 gang 400PF

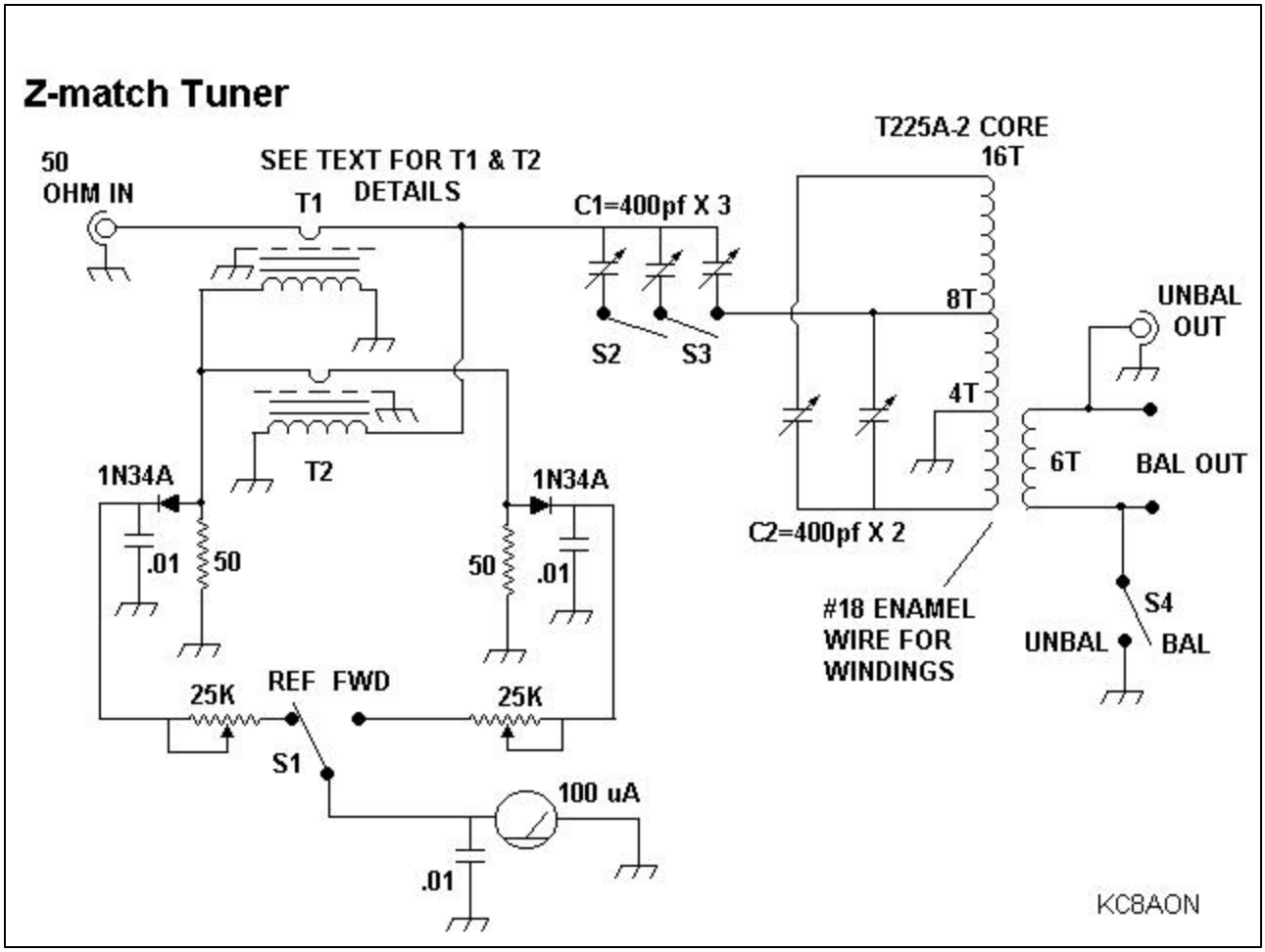
per section, and a 3 gang 400pf per section variables from old receivers. These were acquired over the years from hamfest junkbox diving. In this picture, you can also see the SWR bridge. It is a Stockton type bridge that I built up on a small piece or Radio Shack perf board and I had to compress the circuit to get it to fit the available space. The inductor is wound on a huge T225A-2 core that I had, and the #18 enamel wire was salvaged from an old transformer. The front panel meter for the SWR bridge was salvaged from an old CB, and I made a new relative reading scale of 1 thru 5 on white peel and stick mailing label to make it easier to see. I may even add an LED and small battery for backlighting for the meter later, the meter has a space in the back for a small bulb in case I decide to do so.



Here you can see the layout of the SWR bridge. It looks pretty much like the schematic. and is really a simple circuit that is easy to build and calibrate. Most Stockton bridges use FT50-61 cores for the transformers, but I used FT37-61 cores to save space. Normal size Stockton bridges use RG58 coax through the cores too, but because I used the smaller cores, I had to use RG174 coax. I basically used smaller parts where I could to get them all to fit in the space I had. To calibrate the bridge, connect a 50 ohm dummy load to the output (do this before connecting the bridge to the input of the tuner) of the bridge. Then with the desired amount of RF applied, set the reflected pot on the board to make the meter read zero. Then set the meter switch to forward power, and set the forward pot to make the meter read full scale. I set mine with a maximum input of 15 watts. My meter has a hand written scale of 1 thru 5, but I'm not worried about accuracy, just using it for an indication of forward and reflected power. If you get the antenna to tune to zero or near zero reflected power, the SWR will be low.

And finally, here is the schematic for the Z-match Tuner. For T1 & T2, I used FT37-61 cores and wound them with 12 turns of #24 enamel wire each for the secondary windings. The primary windings simply consist of a short piece of RG174 coax that passes through the center of the core one time, and the shield on them are only grounded at one end to form what is know as a Faraday screen to help eliminate harmonic currents that effect meter accuracy. The two 50 ohm resistors in the circuit are made by using two 100 ohm 1/2 watt resistors in parallel. The main inductor for the Zmatch is wound on a large T225A-2 powdered iron toroid. The main winding consists of 16 turns of #18 enamel wire with a tap at 4 turns and one at 8 turns. The output link consists of 6 turns of #18 enamel wire wound

over the ground end of main windings. Notice that C1 & C2, the variable caps, are floated above ground. I did this by mounting both on a 1/8" piece of plexiglas and made some spacers out of the same plexiglas and glued these to the edges of the sheet that the caps are mounted on. Then I just put the assembly in the enclosure and then drilled through the plexiglas sheet and spacers and bolted it to the enclosure with some 4-40 hardware. I have even used 2 or 3 layers of thick double sided mounting tape to mount variable capacitors with when they need to be ungrounded, but since these were big and heavy, I wanted them to be solid. For the input connector and the unbalanced output jack, I used standard SO-239 connectors. For the balanced output connectors, I used ordinary banana type binding posts.



A Review of the Elecraft KX1 from a construction and field operating standpoint, by: Jim Sheldon, W0EB.

I recently purchased an Elecraft "Ultra Portable Transceiver" kit, the KX1 complete with all accessories. When the kit arrived, I had a bunch of "Honey Do" jobs lined up, and had to get my priorities straight. Needless to say, I opened the package, cleaned the kitchen table off (read this as "kit building workbench") and spread out the tools. Then I went outside and cleaned the rain gutters. So much for "honey do's". With everything, there are 4 kits. The KX1, 30 meter band add-on board, automatic antenna tuner and the case-mountable paddles. I started out with the 30 meter board which took all of 30 minutes to assemble, then did the ATU so these would be ready once the KX1 was finished. These two boards took up that afternoon. After retrieving

my wife from her workplace, we did a bit of shopping and went out for supper. After arriving home, I started the KX1 itself. By 10:00 p.m. I had 2/3 of it constructed and shut down for the night.

The next morning was our ham club weekly breakfast so I took the partially completed kit along to show it off. I got home around 9:00 a.m. and finished the kit by Noon. Everything went together perfectly, there were no missing parts, and it all worked like it was supposed to right off the bat. Once I finished the alignment, I hooked it to my tri-bander and set up on 14.060, using the internal battery pack (9 volts worth of alkalines) for a measured 1.9 watts out. Hitting the "tune" function, the ATU rattled and settled on 1.01 SWR. I tuned around a bit and heard PA600GOES (yeah I know, weird call) calling CQ, so I peaked him with the beam and called him. He came right back and gave me a 549 report. Not too shabby for the first contact with the little black box. I grabbed the KX1, a 3 amp hour 12 volt gel cell, my homebrew version of KA5DVF's PAC-12 vertical and headed for the city park to see how well it worked in the field. Setup took a little over 5 minutes and I fed the PAC-12 through 80 feet of RG-174/U coax which really isn't lossy enough to worry about at these frequencies and it rolls up nicely on an old hookup wire reel.

This whole station, KX1, Battery, PAC-12 (disassembled) 80' of cable and even a spare set of alkaline batteries for the KX1's internal pack all fits in an 11.5 x 7.5 x 5 inch tool case I found at Harbor Freight for under 15 bucks. It's a quarter of the size of the case I use to carry the K2.

Operating from the park was fun and I worked a bunch of stations on 30 and 20 as both bands were wide open. I put over 40 stations in the log (All domestic, no DX from the park), mostly on 30 and 20. I worked a couple of Oklahoma and Texas stations on 40, but during the day, not much activity on that band around here.

After exercising the ATU's 3 bands on the PAC-12 (no problems at all), I flung my weighted line over a couple of trees and jerked my 88' EDZ up to around 60 feet. It's fed with 100' of 300 ohm twin lead and I use a homebrew W1CG 4:1 current balun and a double male BNC connector to attach it to the radio. I checked the tuning on 40 (1.2:1), 30, (1.6:1) and 20 (1.0:1). After insuring the EDZ would load up on all bands, I put the 12 volt gel cell away and ran the KX1 on internal batteries. Power out varied by band with 1.8 on 20 and just over 2.0 on 40. I put another 15 or so QSO's in the log on the various bands with the biggest run being on 30 meters as it was getting close to dark, and 20 was exhibiting some very deep QSB at the time. I packed up around 7:00 p.m. and went home.

I spent the rest of the week optimizing the travelling case and building a modified version of the PAC-2 to fit completely inside the case.

The following Saturday, the Wichita Amateur Radio Club had a tailgate swapfest, so I took the KX1 and K2 along with me and set up a demo table to show the QRO "Life's too short for QRP" bunch that they were all wet. I jammed the PAC-12's base in the ground, set it up on 40 meters and rolled out the RG-174 coax. The "loss mongers" immediately began laughing. I set up the KX1 first and plugged in the amplified speaker rather than headphones. I figured everybody ought to suffer with loud CW. I called CQ on 40 meters, and got a W6 to answer me. We chatted for a few minutes, an when I mentioned I was running a KX1, he dropped his power from 100 Watts to 5 watts, and we continued on, much to the amazement of the QRO bunch who, by this time were congregating around my portable table. Now that I had their attention, they wanted to see what else the little black box could do, so I decided to switch to 20 meters and changed the coil on the PAC-12. A quick tune up, and I started tuning around. Not much activity yet (about 10:00 a.m.) on 20 CW, so I decided to show off another nice feature of the KX1. It has selectable USB/LSB/CW menu items. In CW (normal) the receiver is offset by the sidetone frequency, but in USB/LSB, the transmitter is offset by enough and in the proper direction to give the SSB operator on the other end about a 600 Hz tone. This way, the person with the KX1 can operate cross-mode in an emergency, assuming, of course, that the SSB operator can copy

CW. I tuned across a very loud station that sounded foreign, so I stopped and listened for a bit. It turned out to be Vello, ES1QD in Tallinn, Estonia and he was working a bunch of Stateside SSB ops on 14.246. To make it easier, I quickly grabbed the K2 out of its case and hooked it up to the antenna. Tuned it up on 20, set the rig to 14.246 USB and attached the microphone (I know, it's sacriligious, but there are some SSB ops that can copy CW too) and just for giggles, gave a call - "W0EB QRP".

I know also that one should NOT sign QRP, especially when calling DX on SSB and they usually ignore you from then on. This did not happen with Vello All of a sudden, things got silent around the table when ES1QD said, "All stations stand by. Station EB QRP please go again." I almost fell off the chair, and called him again. He actually gave me a 5 x 7 report and he was S9++ about 20 dB. A new DXCC country for me, and Vello needed KS as well, so it ought to be pretty easy to get a QSL card out of him. After this, everyone quit laughing about how difficult it must be to work anyone with the QRP rigs and wanted to know more about both the KX1, and K2, and were really interested in the PAC-12 as a portable antenna, especially since I only had 5 ten foot radials attached and laid out on the ground. Things started winding down around 12:30, so I packed up and headed for lunch. All-in-all, it was a fun day, and I'm glad I got the KX1. Oh yes, the next day (Sunday) was the FP Run For The Bacon, so I hooked up the KX1 and wonder of wonders, the propagation gods smiled. I made enough contacts on 20 and 40 meters to actually win this one. QRP and Piggies RULE!

73 de W0EB

An 80 Meter Walk in the Park

By W0RW Paul Signorelli

It was a dark and freezing night...+30F in Beak Creek Park...Colorado. This '80 Meter Band' was new to me even though I populated it heavily in 1953 with my old 3739 kHz crystal in a 6L6 rig.

The 80 meter Fox Hunts had just been announced and I was wondering if could participate as a hound using my back pack rig. I wanted to run a few 80 Meter propagation tests operating on 3559.0 kHz.

I was using a 10 foot whip with a top hat and running 50W. A 10 foot whip is about -18 dB down so my ERP was QRP (<1W). The short whip makes my receiver less effective too. I was able to run this test 2 nights (11/17/05 and 11/29/05), just before the fox hunt which was on 11/30/05.

Right after I hit the trail this dog came up from behind me followed by a runner. i almost tripped the runner because he didn't see my counterpoise wire in the dark and I didn't hear him with my earphones on.

I was able to make contacts from Coast to Coast. Slow QSB, but good copy on all. Looks like the 80 meter fox hunts are well with in the capabilities of a Pedestrian Mobile station with a 10 foot whip. I was using my PRC319 at 50W.

(You can see more info on the PRC319 in the PRC319 Yahoogroup.) I was out for about 90 Minutes on 11/17/05 using my camo Whiterook bug without gloves and my fingers froze. Lots of fun, QRT at 0300z.

I went out again out walking in the park on 11/29/05, but QRS tonight with my gloves on using a hand key. The 0200z temperatures were colder, below 20F. I had a poor start since there was some RF flash over at my antenna holder. It caused a few bad contacts until the XYL (Sharon) saw the RF arcing. We wedged some cardboard in between the antenna base and the rig and got it going again... I had some adjacent channel strong signal QRM and all signals were fading in and out.

Here is my contact list for both days.

W0AV George, MO, He is usually my first contact.

N9NE Todd WI

NV0P ? WI

KA5S Courtland CA
W5FOA Tony GA
K4BAI John GA
AK5X John TX
K5PSH Jerry TX
K2ZN AL NY
WA8REI Ken MI
WA5ZNU Leigh TX
N0EVH Jim MO
WA5ZNU Leigh TX 5nn
K7TQ Randy ID
K0SU Rick in COS
W0CH Dave MO
WA8ZBT Dennis TX
K5OI TIM NM
AA5CK Ted OK
W6JRY Jerry CA
N3BJ Alan VA

My XYL (Sharon - N0OPM) did the all the logging for me. Would your XYL go for a walk in the 'Bear' park in the dark when it was 16F to do your logging for you? I have a GREAT One! The 0300z temperatures was 16F, no snow and it was clear and cold. Then the night of the first fox hunt finally came around...11/30/05.

Success !, I was able to work both foxes. The Papa Fox (Doc K0EVZ) in NM was strong and easy to work. There was a little SSB QRM on Chris (VA3NR) but i got him after He moved out of the QRM. If you want to work the 80 Meter Fox(s) on Tuesday night there is more info available on the official QRP Fox Hunt Home Page 'QFOX' at http://www.qrpfoxhunt.org. Operating the winter fox hunt outside with a back pack radio walking in the park a FYBO - Freeze Your Boots Off operation.

Calico "Flying Pig" Dip

By Greg Tomerlin – K4KO

1	15 oz can blackeyed peas
1	15 oz can black beans
1	15 oz can whole kernel corn
1	15 oz can diced tomatoes
½	cup diced onion
½	cup diced green pepper
4	diced jalapeno peppers
2	tsp garlic salt
1	8 oz Italian dressing

Drain the canned vegetables then mix all ingredients together in a Tupperware bowl.

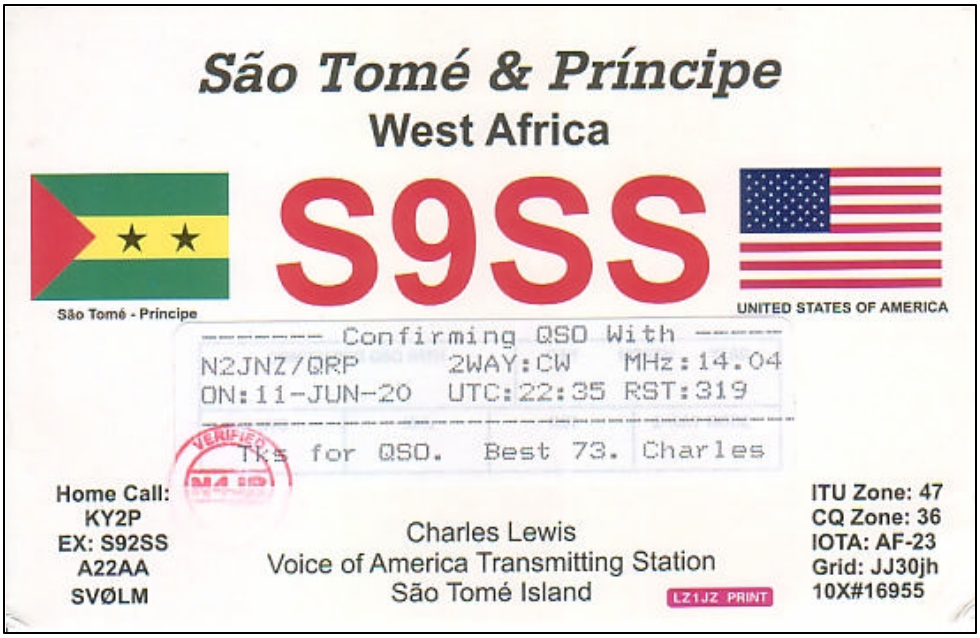
Cover and chill in the refrigerator for at least 6 hours.

Spoon ½ cup or so of the concoction into a bowl or cup and serve with Tostitos tortilla chips (the scoops work great) or Fritos Large Scoops.

This stuff is good and it gets even better after a day or two in the refrigerator. It's one of those things you end up eating more of than you should.

My top 10 QSL List ...
By George Osier N2JNZ

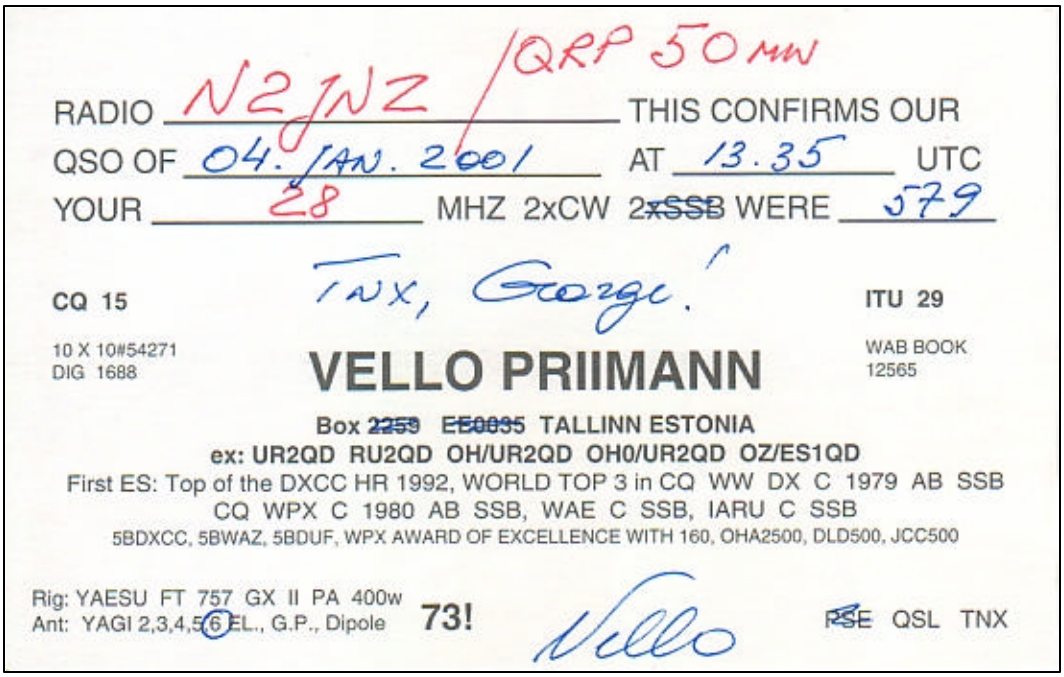
10. S9SS , 700mw , 6/11/02 , 20 meters
Charles had some good ears that day gave me a RST 319 !! Not much of a pileup as I got in before he was posted on the DX sites. 20 meters is TOUGH milliwatt land. Too may linears and huge beams but timing and persistance is handy !



9. TZ6DX , 90mw , 2/20/00 , 10 meters , ARRL DX INT 2000
Did most of the test with 90mw to a Cushcraft AR-10 Ringo up 30ft. Condx were INCREDIBLE ! Took about 15 mins to get him but being agressive was what did it !

8. ES1QD , 50mw , 1/4/01 , 10 meters

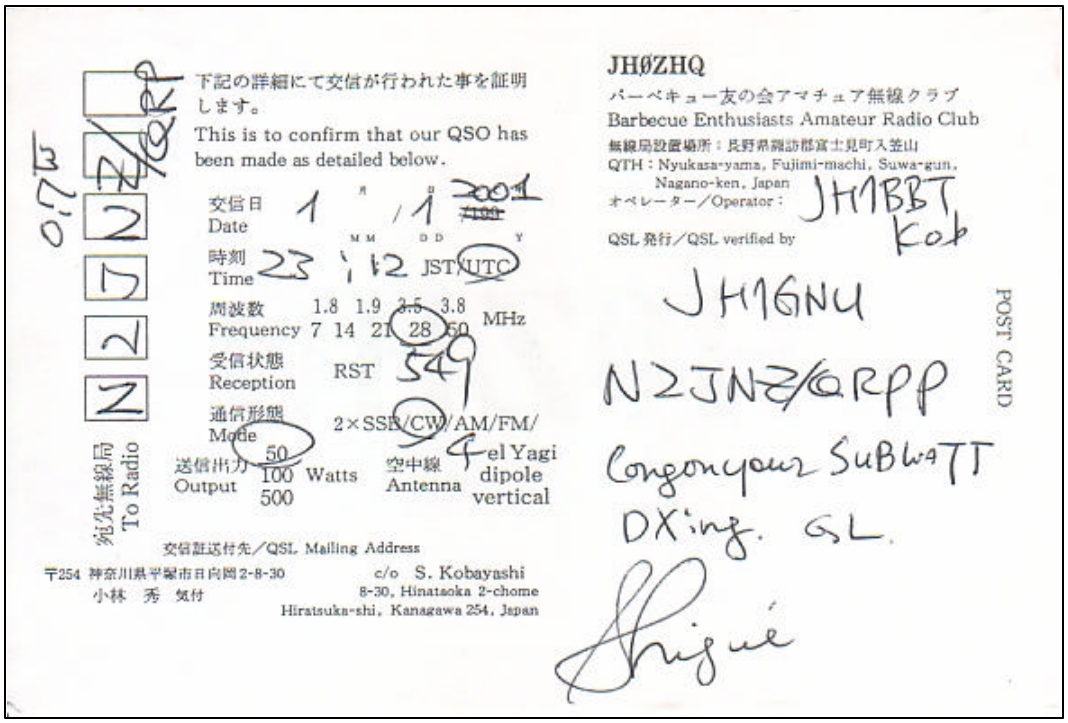
Vello is a dear friend of mine and we have worked many times ! I have worked him from 1 watt down to 50mw and ragchewed during some of the milli QSOs



7. JH0ZHQ , 700mw , 1/1/01 , 10 meters

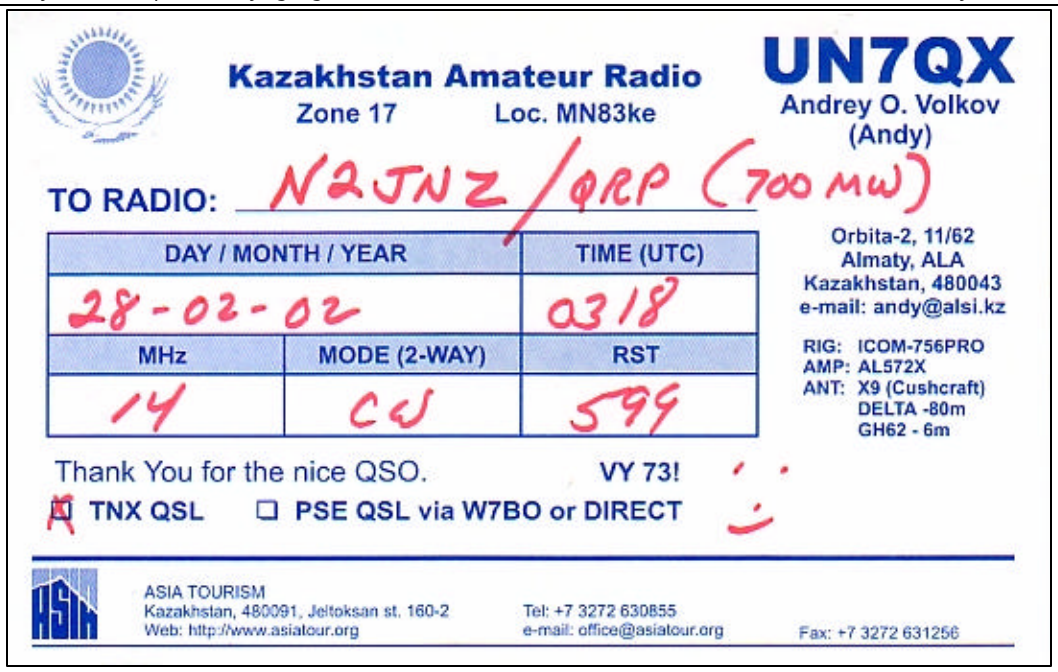
BARBECUE ENTHUSIASTS AMATEUR RADIO CLUB !!

I worked Kob , JH1BBT at the club station for my first "JA" under 1 watt !!

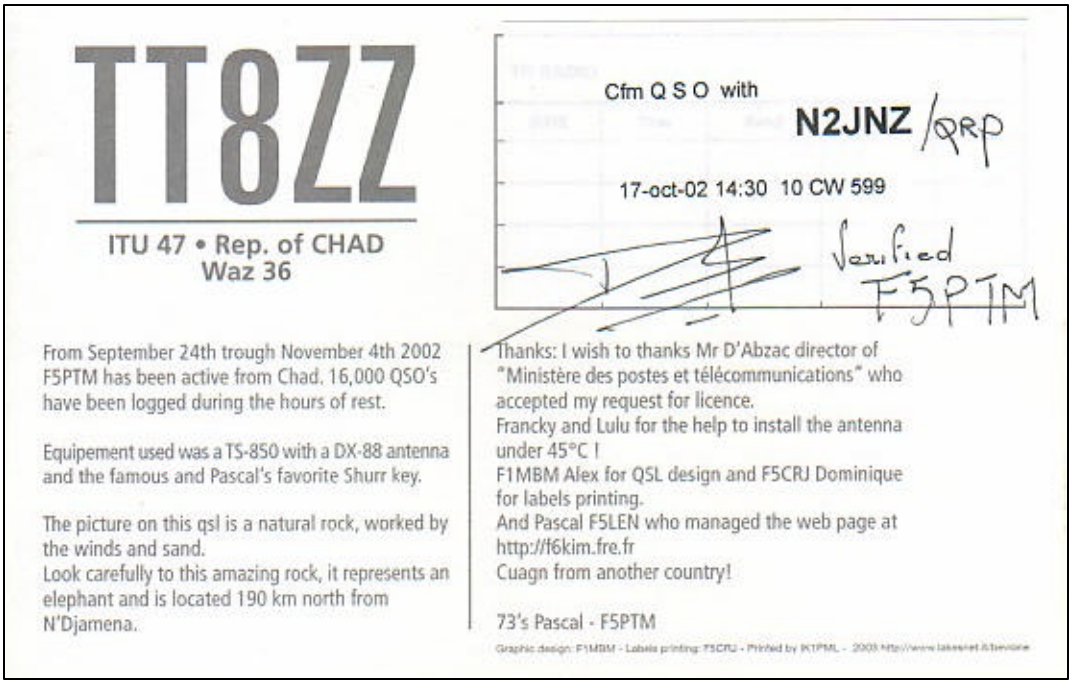


6. UN7QX , 700mw , 2/28/02 , 20 meters (#100 WORKED)

Once again , 20 meters is one H**L of a place to milliwatt ! Got Andy before he was DX-spotted , Some Russian and ex-Russian stations tend to get above 14.025 to escape the crowds and work more people !

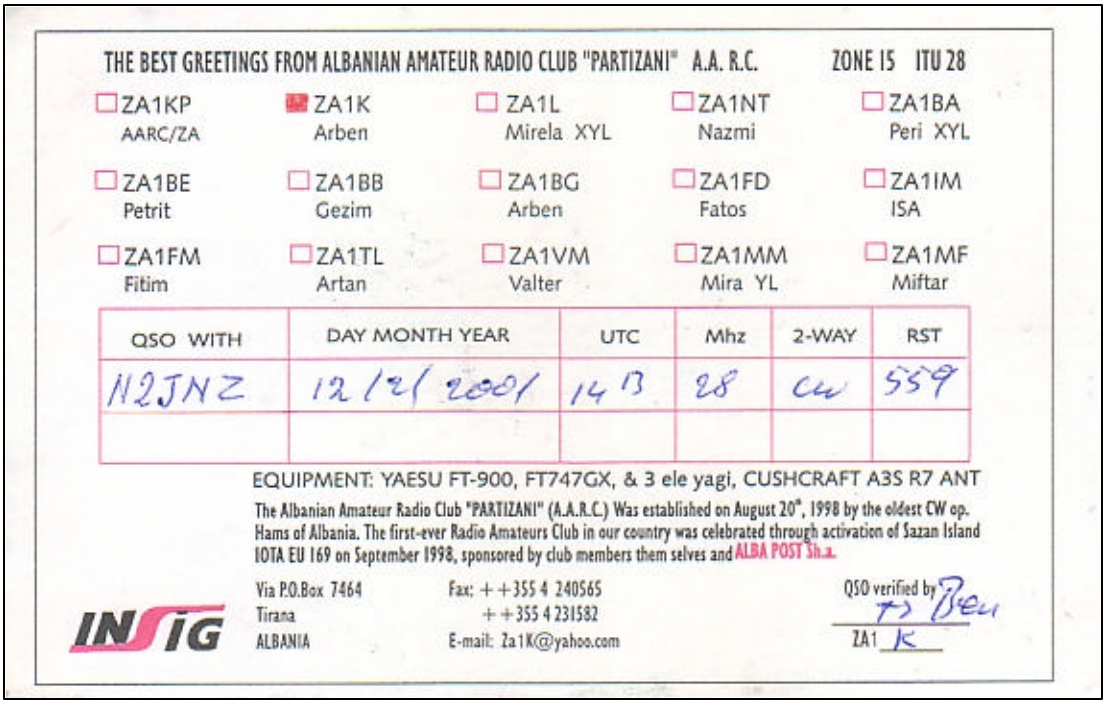


5. TT8ZZ , 700mw , 10/17/02 , 10 meters
Tough to get into Africa at times ! Worked him and also got posted on his website as QRPP !



4. ZA1K , 500mw , 2/12/01 , 10 meters
Always great to work a "ZA" with any power but got Ben when the pileup was small and I could be aggressive (tailending)

3. JY9NX , 700mw , 2/17/01 , 10 meters , ARRL DX INT 2001
I had to fight like H**L for this one !! Tough pileup but set keyer to 35 wpm and let er rip ! Took 20 mins of tight timing but got Koji !!!



THE BEST GREETINGS FROM ALBANIAN AMATEUR RADIO CLUB "PARTIZANI" A.A. R.C. ZONE 15 ITU 28

☐ ZA1KP AARC/ZA	☒ ZA1K Arben	☐ ZA1L Mirela XYL	☐ ZA1NT Nazmi	☐ ZA1BA Peri XYL
☐ ZA1BE Petrit	☐ ZA1BB Gezim	☐ ZA1BG Arben	☐ ZA1FD Fatos	☐ ZA1IM ISA
☐ ZA1FM Fitim	☐ ZA1TL Artan	☐ ZA1VM Valter	☐ ZA1MM Mira YL	☐ ZA1MF Miftar

QSO WITH	DAY MONTH YEAR	UTC	Mhz	2-WAY	RST
112JNZ	12/12/2001	1413	28	cw	559

EQUIPMENT: YAESU FT-900, FT747GX, & 3 ele yagi, CUSHCRAFT A3S R7 ANT

The Albanian Amateur Radio Club "PARTIZANI" (A.A.R.C.) Was established on August 20th, 1998 by the oldest CW op. Hams of Albania. The first-ever Radio Amateurs Club in our country was celebrated through activation of Sazan Island IOTA EU 169 on September 1998, sponsored by club members them selves and ALBA POST Sh.a.

INSIG

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QSO verified by
ZA1 K

THE HASHEMITE KINGDOM OF JORDAN

GRID KM71ww

JY9NX

EX: JM1CAX, JI2UUS, ZS6CAX, 3DAØNX, 3DA5A, VK2FCA, VK9NX, YJØNX, KG7WW, N6RNU, KHØ/N6RNU, F/KG7WW, V5/KG7WW, 7P8/KG7WW, VE7/JM1CAX, S5/JY9NX, S514U

KOJI TAHARA
Embassy of Japan
P.O. Box 2835 Amman 11181

A STAR QSL

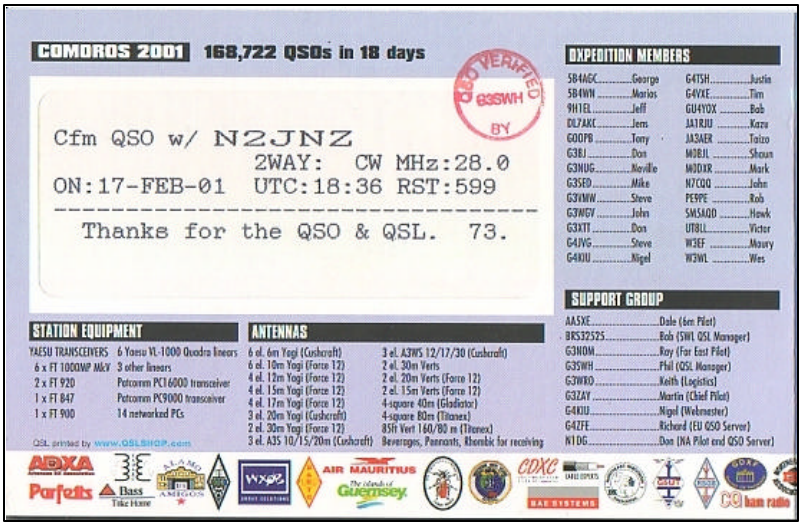
QSL MANAGER:
JH7FQK

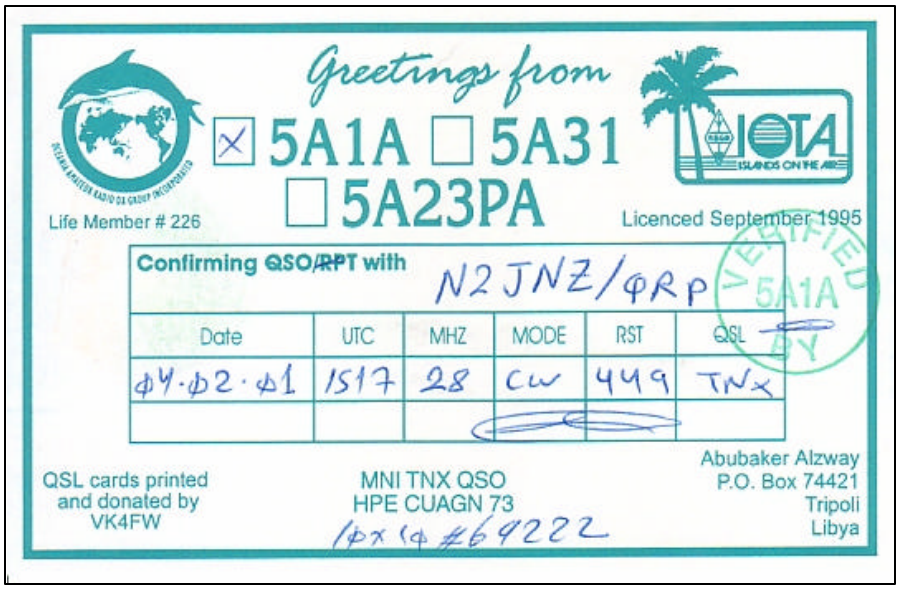
2. D68C , 500mw , 2/17/01 , 10 meters , ARRL DX INT 2001

This was the GREATEST DX-pedition I can recall! When they went to the Comoros they stated that they would work ALL stations with beams or wire antennas! And that they did ! Got him on the FIRST call with NO repeat.

1. 5A1A , 700mw , 2/4/01 , 10 meters

To get Abubaker , 5A1A with 2000 watts would be fine with me but got a RST 449 with 700mw was a thing of beauty. I yelled and scared the wife hihi !





Going through these cards was nice since it's been awhile; it's amazing what you remember about the contact! Each one was a first for me and I will never forget the excitement!

A Junk Box Dipole
Or
Look Ma, No Radials

By Jay Henson AJ4AY

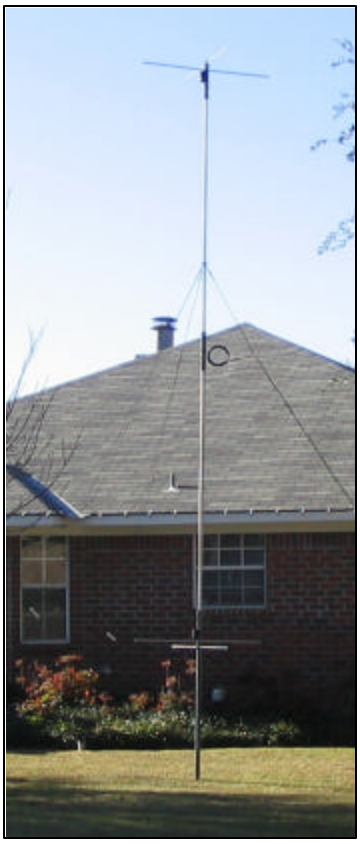
Since I returned to amateur radio in 1989, I have done a lot of experimenting with various types of antennas. There is always a better one to build. I have built dipoles, trap dipoles, end fed wires, horizontal loops, verticals, a sterba curtain, small transmitting loops, and a three-band yagi made of PVC pipe and wire.

Needless to say, my antenna junk box has become well stocked with a lot of excess hardware. After the eastern edge of Katrina came through Mobile this past August, I decided that I needed an antenna

that was a little more substantial than the wires I had been using. Please understand that substantial does not imply hurricane proof. There are several well-engineered antenna towers around Mobile that are lying on their side as a result of the big wind. Substantial means that it is capable of surviving being put up and taken down many, many times.

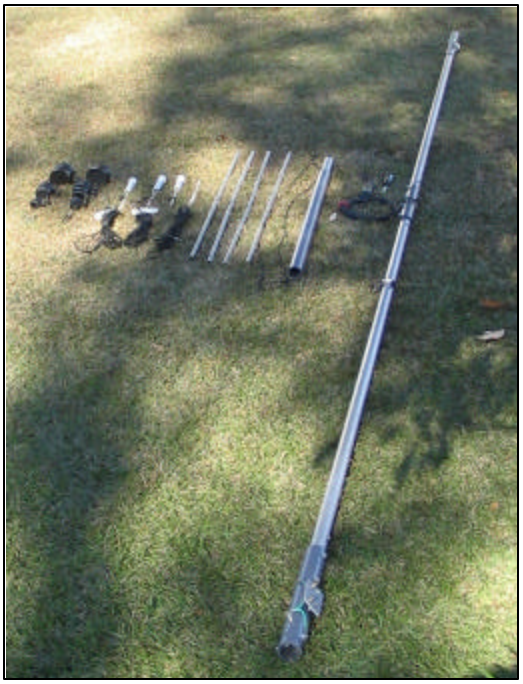
This article is about my latest antenna effort, a vertical dipole made from the various goodies that I had in the junk box. This is not "step by step, how to" article but is more along the lines of a "what I did to make it work" article. If anyone is interested in the numbers and types of nuts, bolts, sizes, etc., I could probably pull all of that together. If I did that though, I think you would probably miss out on all of the fun of investigating and playing with the "why's", the "what's", and the gratification of saying "darn, it works".

Technically, the antenna is a 17-foot tall end loaded vertical dipole that is mounted four feet above the ground. End loading is accomplished by using a two-element capacitance hat at the far ends of the dipole elements. The antenna is made resonant with the addition of loading components connected between the capacity hats and the end of the dipole elements. By changing the loading components, the antenna is able to work 40 through 12 meters with an SWR of 1.5:1 or less. The 1.7 SWR on 10 meters can probably be reduced with a little effort, but 10 is dead right now and I haven't felt an urgent need, yet.



Like all things, the antenna needs a name. Something descriptive. Something that rings. I was thinking of calling it SAM, but I couldn't come up with what that acronym meant. Since this antenna is capable of working 7 bands and has basically been constructed with junk box parts, I'll call it the Junk Box 7, or JB7. Not very original but it is descriptive.

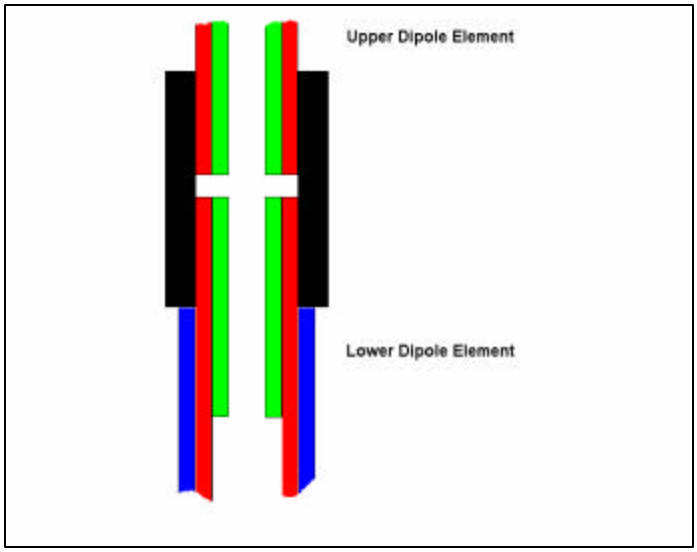
This picture shows the operational JB7 set up in my yard. The antenna has a relatively small footprint but requires a clear opening of approximately 10 feet wide and 25 feet long to construct and raise. This allows enough room for the three guy stakes to be positioned 10 feet from the center and maneuvering room for the 21 feet of vertical section. Visible in the picture are the horizontal elements of the capacity hats at the ends of the dipole elements, the RF choke coil at the feed point, and the three guy ropes.



The next Picture shows the various pieces required to make the antenna operational. Included are (left to right) the loading components, guy stakes and guy ropes, capacity hat elements, the four-foot base section, tools, and the vertical section.

THE VERTICAL SECTION:

Figure 1 on the next page provides a graphical picture of the structure of the vertical section and will make it easier to understand the verbal description.



The vertical section of the dipole is composed of two eight-foot sections of aluminum tubing. The upper dipole element has an outer eight foot length of 1 ¼" aluminum tubing (red) over an inner eight foot length of 1 1/8" aluminum tubing (green). The lower dipole element is composed of an outer seven foot section of 1 3/8" aluminum tubing (blue) over an inner eight foot length of 1 ¼" aluminum tubing (red). There are additional two-foot lengths of 1 1/8" aluminum tubing (green) at both ends of the bottom element. The upper and lower dipole elements are separated by two inches at the feed point and secured by a 14" length of schedule 80 1 ¼" PVC pipe.

From a structural standpoint, the vertical elements are double walled aluminum tubing. Additionally, the lower element is triple walled at its ends. As I said earlier, I wanted this antenna to be strong enough to survive constant raising and lowering.

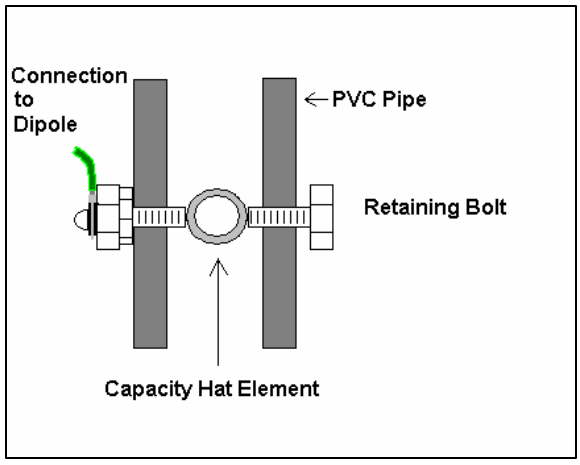
This picture shows the feed point of the antenna where the upper and lower dipole elements are secured and the coax cable attached. There is a two-inch gap between the upper and lower sections of aluminum tubing at the center of the PVC pipe. The coax feed line is connected to each element at this point with the center conductor connecting to the upper element and the coax shield connecting to the lower element. During testing on 40 meters, my MFJ-259 produced some very strange readings as the instrument was held, brought close to metal objects or close to the earth. Coiling the coax into an RF choke at the feed point removed these variations.

THE CAPACITY HATS:

At the far ends of the dipole elements are lengths of schedule 80 1 ¼" PVC pipe. The PVC pipe provides a means of mounting the loading components and attaching the capacity hat elements to the rest of the antenna.

Next picture shows the PVC pipe located at the top of the antenna. Following the green wire from left to right, you will be able to understand how everything is connected. At the physical end of the aluminum tubing, the green wire is attached with a sheet metal screw (far left). The wire travels to the right and connects to a banana plug receptacle (one of two). The loading component is plugged into these receptacles. Coming off the top receptacle, the green wire goes to the lower capacity hat element retaining bolt and travels to the upper capacity hat element retaining bolt. Thus, the RF path is from the vertical dipole element, through the loading component, to the horizontal capacity hat elements.

Figure 2 illustrates how the capacity hat element is retained in the PVC pipe. Connection to the dipole elements and load connectors is made with 14 gauge, stranded wire (green wire). The wire is connected to a 4-40 screw that is screwed into the head of the ¼ X 20 bolt. This bolt is secured in place and does not move. There is just enough clearance between the secured bolt and the capacity hat element to allow the element to be inserted through the PVC pipe. Once the element is in position, the retaining bolt is tightened. There is enough flexure in the capacity hat element to allow it to be pushed against the secured bolt and make connection to the rest of the antenna.



The drilling and tapping of the 4-40 screw hole in the head of the ¼ X 20 bolt was quite a challenge. Luckily, the metal used in the large ¼ X 20 bolt is soft enough that drilling and tapping was not too difficult. I just took my time and tried not to break the tap, which usually happens. This scheme of connecting the capacity hat elements to the rest of the antenna works very well. The main shortcoming (which I have not resolved – yet) is that the retaining bolt is threaded into the PVC pipe. It is just a matter of time before I strip the threads in the plastic so I am keeping my eyes open for a fix. The most obvious solution is to have a blind nut secured on the inside of the PVC pipe. The problem with this is that the holes are several inches inside the pipe and difficult to get at.

This picture shows the top of the vertical dipole with the horizontal capacity hat elements and the 40 meter inductive load plugged its connector. The bottom of the vertical dipole has the same configuration except that the PVC pipe is six inches longer. This is to accommodate the base section that raises the antenna four feet above the ground.

BAND LOADING COMPONENTS:

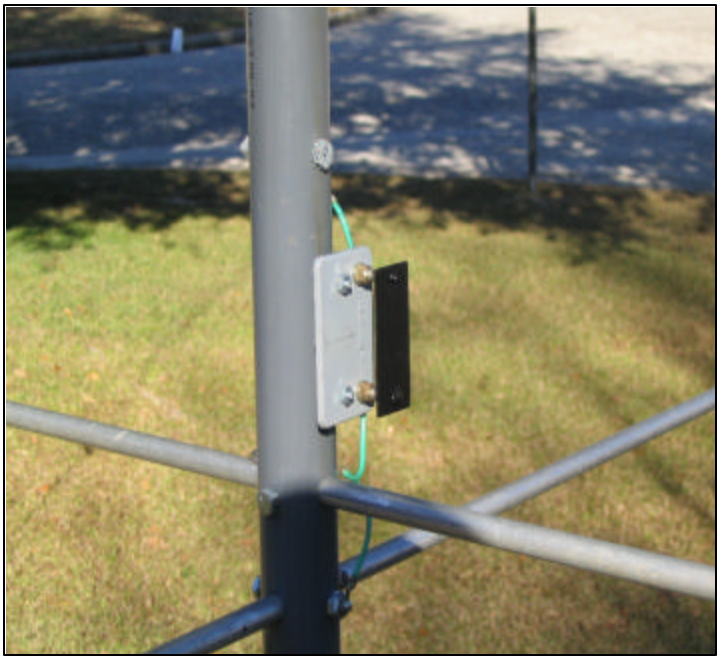
With a shorting jumper across both the upper and lower loading connectors, the JB7 is naturally resonant at 18.28 mHz.

This means that the antenna is electrically short on 40 through 17 meters and requires inductive loading for resonance in the desired band. For 15 through 10 meters, the JB7 is electrically long and requires capacitive loading for resonance in the desired band.

A 1" X 2" piece of PC board is used as a template and starting point for all of the loads. Banana plugs are soldered to the PC board and provide the connection to the antenna.

This picture shows one (of two) of the 40 meter loading coils. An Autek VA1 analyzer measured the coil inductance at 15.9 uH. The coil form is a plastic jar that I had accumulated (for some reason). The wire is 14 gauge solid copper house wire with the plastic insulation left on. The loading inductor has been sprayed with an insulating material to act as a moisture sealant.

The loading inductors for 30 and 20 meters are constructed in a similar manner using different coil forms (PVC pipe and prescription jars). I am not an active user of the 17 meter band so I have not constructed the loading coil for it as yet. Being very close to the antenna natural resonance point, I would expect the inductive load to be very small.



This picture shows the lower capacity hat elements with the 15 meter load in place. Remember, the antenna is long on 15 meters and acts as an inductor. To counter that inductance, the 15 meter loads are 32 picofarad capacitors. In this case, the capacitor is fabricated by using the double-sided PC board template. The copper layers on each side of the board act as the capacitor plates. Banana plugs are soldered to the copper layer on one side of the board and isolated from the opposite copper side. Using a Dremel tool with a sanding drum attachment, copper is carefully removed from one side of the PC board. Resonance is checked after each grinding session. As crude as it sounds, 15 meter resonance was adjusted to 21.1 mHz very easily.

10 meter resonance occurs with no loads installed. The SWR is 1.7 at 28.1 mHz. This is a little high for normal operations, IMHO, but is completely satisfactory. I suspect that the required capacitance value to achieve a lower SWR would be extremely small and, possibly, not attainable using PC board. I just have not felt the need to pursue this any further than I have.

ANTENNA ASSEMBLY:

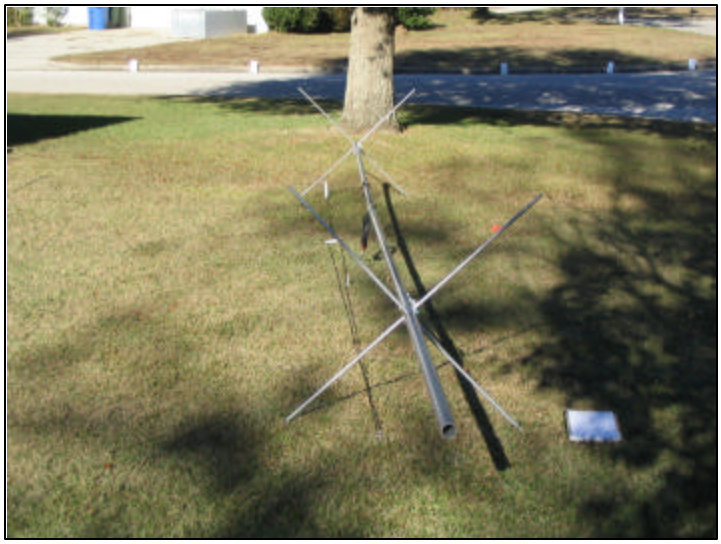
Starting from scratch, it takes about 10 to 15 minutes to assemble and raise the antenna. The tools required are a hammer and a 9/16" nut driver.

The first task is to lay out the guying system. A 12" stake is driven vertically into the ground leaving 4" above ground. This is the center point of the antenna. The three guying stakes are located 10 feet from the center stake and 120 degrees apart. A simple template and 10 foot length of rope makes this task very easy. The three guy ropes are attached to the guy stakes and laid out on the ground parallel to each other. The guy stakes are also 12" lengths of 3/8" rebar.

This is a guy rope clip on connection to a guy stake. The rebar stake is hidden by the short piece of PVC pipe. Take it from me. It is not pleasant to be cut by a sharp edge on bare rebar. Been there and done that. WORSE - It would not be a good thing to trip and fall onto one of the stakes. The PVC covers provide protection from the sharp edges that could cut or puncture.

The vertical dipole section is now positioned on the ground with the feed point at the center stake and laid parallel to the guy ropes. The four capacity hat elements are inserted into the PVC pipe and secured with the nut driver.

This shows the vertical section with the capacity hat elements attached and secured. The four foot base section has also been installed.



The free ends of the guy ropes are secured to the guy rings attached to the upper dipole section. The feed line coax is attached to the RF choke coil and is secured to one of the guy ropes with a piece of Velcro. The desired band loading components (if needed) are plugged into their respective positions.

The next picture shows the guy rope and feed line attachment to the antenna. By keeping the guy ropes and vertical section parallel to each other on the ground, it becomes easy to determine which guy ring goes with each guy rope. Notice the orange Velcro strap in the bottom center of the picture. This Velcro strap secures the feed line to one guy rope. I have set aside one guy rope for this function and have marked the attachment point with a cable tie.

Because my guy ropes are preset, it is now possible for me to walk the antenna to the vertical position, release it, walk away, and the antenna stay, more or less, in that position. This allows me to go to each

guy rope and take up the small amount of slack that exists. It is not possible to hold the vertical section AND adjust the guy ropes at the same time. The very first time I raised the antenna, my wife held the antenna vertically while I adjusted my guy ropes.

This next picture shows the method that I use for adjusting my guy ropes. The piece of ½" PVC pipe acts as an adjustable slide and provides a quick and easy method of securing the antenna.

Once the antenna is raised to a vertical position, the base is placed over the center stake and the guy ropes are adjusted so that the antenna is vertical. The feed line coax is wrapped around its supporting guy rope to the ground level. It is very IMPORTANT that the coax not be allowed to hang close to the elements of the lower capacity hat.

At this point, the antenna is operational. All that is needed is the radio equipment.

HOW DOES IT WORK?

Although the JB7 is still being continuously developed, I have used it to work several foxii during the 40 meter fox hunts and a lot of piggies during the November RFTB. I have worked stations from WA to ME to FL. It has worked Dominica on 20 meters. My ONLY voice contact in many years was a 20 meter QRO contact to WA state last month using the JB7.

Is it as good as a two element quad at 40 feet or a three element yagi at 70 feet? Heck no. Having worked with and used the JB7 over the last few months, I have come to believe that if I can hear a station using it, I can work them.

THE GOOD AND THE BAD:

GOOD

- Relatively easy to put up and take down.
- Requires no fixed or natural supports. Can be raised in an open field.
- No ground radials.
- Stores on the floor in the garage with a car parked over it.
- Is resonant on the band of choice.

BAD

- Must be lowered to change bands and then raised. This takes about a minute.
- Not easily transportable unless you have a pick up truck.
- Until the guy ropes are adjusted and preset, the JB7 requires at least two people to raise.
- If you don't have a well stocked antenna junk box, the aluminum tubing would have to be purchased. This is the most expensive part of the antenna.

Why did we build this thing??
By Bob Cerreto WA1FXT

We have learned this from our woodworking hobby:

If you want to build a high quality project, you must have high quality tools. Tools do not make a craftsman. But, good tools sure make the construction easier, precise and add more quality to the project. There is nothing more frustrating than not having the right tools for the job. Because we are not independantly wealthy, we often build our own tools

Here at the WA1FXT QTH we enjoy building and designing from magazine articles, handbooks, and our own ideas. We find that using the high quality test equipment makes the learning easier and the building much more enjoyable. The N2PK Vector Network Analyzer (VNA) is one of our high quality tools.

You can build the N2PK VNA for about $200. Upon completion of your build, you will have a first class piece of test gear. You can trust this VNA to give you reliable and accuate data that will rival results from expensive commercial VNA's. With patience and perserverance, you will learn that, you can build high quality test equipment. And, a whole lot less expensive!!! Also, these tools will reinforce the electrical theory you learn from the books and will enable you to build/design high quality radio gear.

What is a VNA?

A Vector Network Analyzer (VNA) will measure and analyze the magnitude and phase of an AC voltage as it is applied to a network containing inductance, capacitance and resistance. An antenna analyzer is a form of a VNA. The antenna analyzer will measure the magnitude and phase of the voltage sent to the antenna and the magnitude and phase of the voltage reflected back from the antenna. Something called the "Reflection "Coefficient is derived from these measurements and SWR is calculated. Many other parameters can be calculated from the reflection coefficient as well; Such as, Reactance (X), Resistance (R) Impedance (Z) Return Loss (RL) etc.

What Can The VNA Be Used For?

If you wanna measure the magnitude of resistance, voltage and current, in a DC circuit use a volt/ohmmeter!

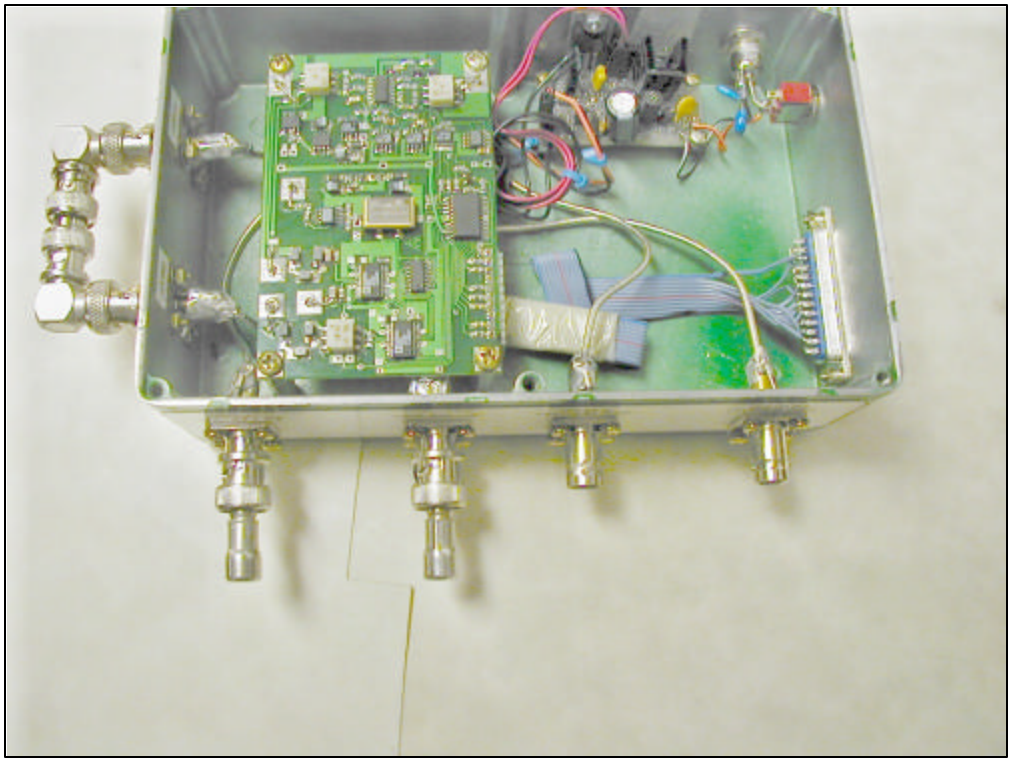
If you wanna to see the magnitude and shape of an electrical signal with respect to time, use an oscilloscope!

If you wanna measure RF power, use a DB/Wattmeter!

If you wanna see fundamental frequencies, harmonics and their magnitudes over a range of frequencies, use a Spectrum Analyzer!

If you wanna to measure Magnitudes, SWR/Return Loss, complex impedances, Phase Angles, Phase Delays, Frequency Response, use the VNA !!!

This VNA and its companion software provide you with a number of tools. The tools you'll have are: a reflection tool, a transmission tool, and a precise signal source.

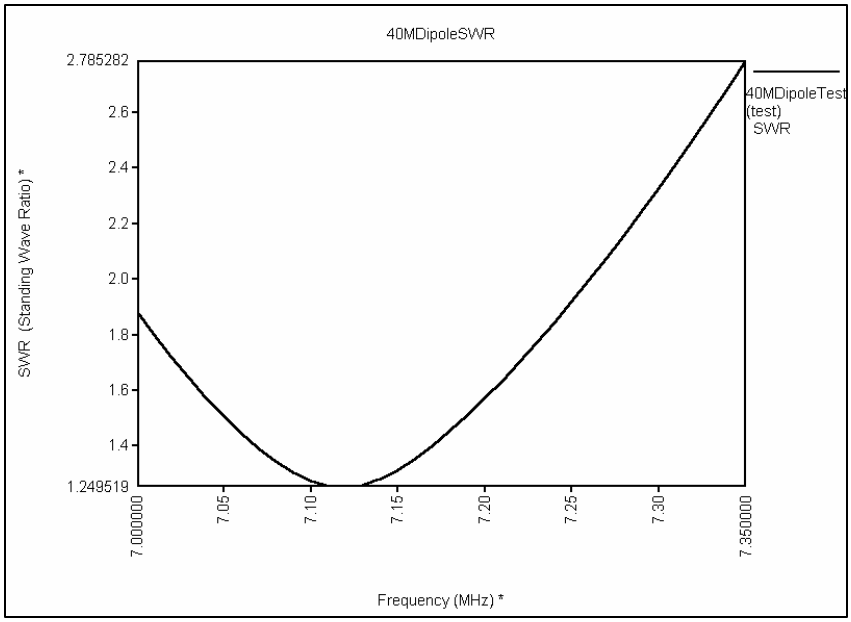


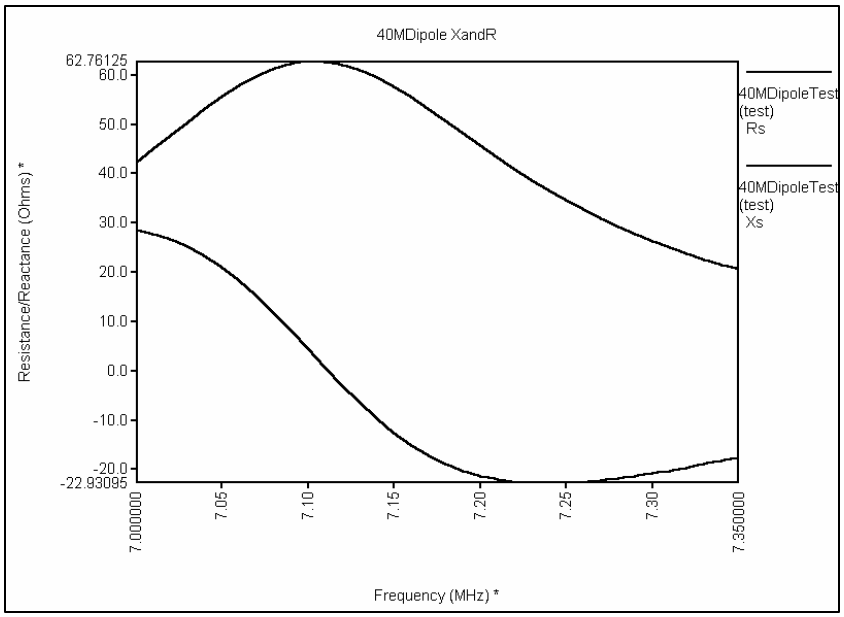
The reflection tool is used with a standard precision Directional coupler (or reflection bridge) that you build yourself. This tool enables you to look at antennas, filters and other networks to determine such things as reactance, resistance, impedance, SWR/Return Loss, Inductance, capacitance, phase angles and a bunch of other stuff. The VNA does this by sending a known signal at a known phase angle to the Device Under Test (DUT) through the Reflection Bridge. The VNA will simultaneously measure the magnitude and phase of the signal reflected back from the DUT through the Reflection Bridge. This will be done over the range of freqeucies that you set up in the control program. The PC gathers all this data. And computes all the different parameters and puts them in a graph for you to see. Cool beans man !!!!

Oh yeah, I forgot to mention that this tool has a calibration mode. What the calibration mode lets you do is compensate for losses and impedance transformations in the connecting cables between the VNA and the DUT. Yeah, so what?!!! Well man, this means you can set the PC and VNA up in the shack near the snacks and where it is warm in the winter and cool in the summer. You then can test your antennas and see it's characteristics AT THE ANTENNA eliminating of any influence the feedline has on the data. More better cool beans eh?!!! The control program will graph this data for the shack end and the antenna end. This way you can see how the feedline affects your antenna parameters.

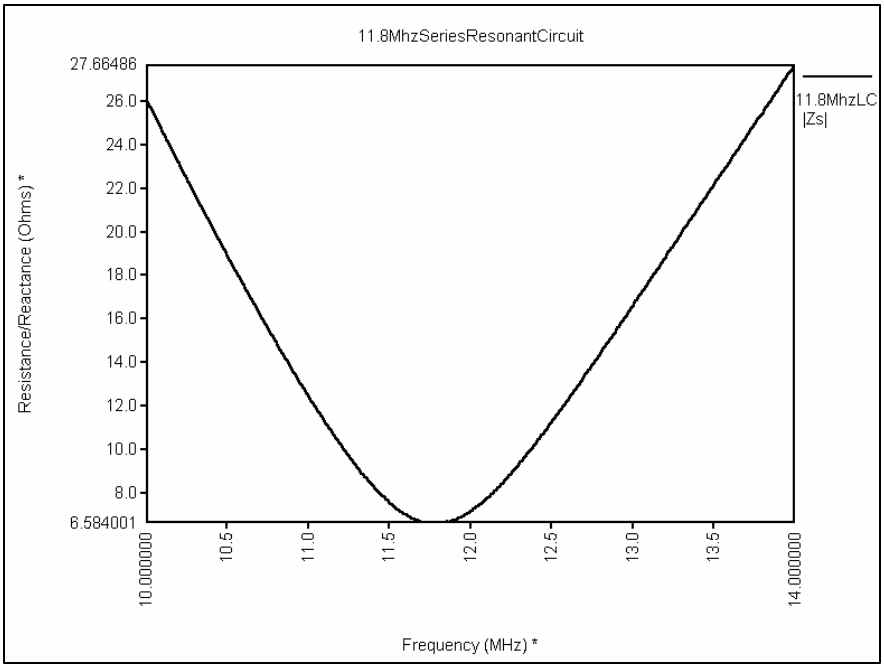
Here are a few example plots of what you can do with this tool:

40M Dipole Stuff

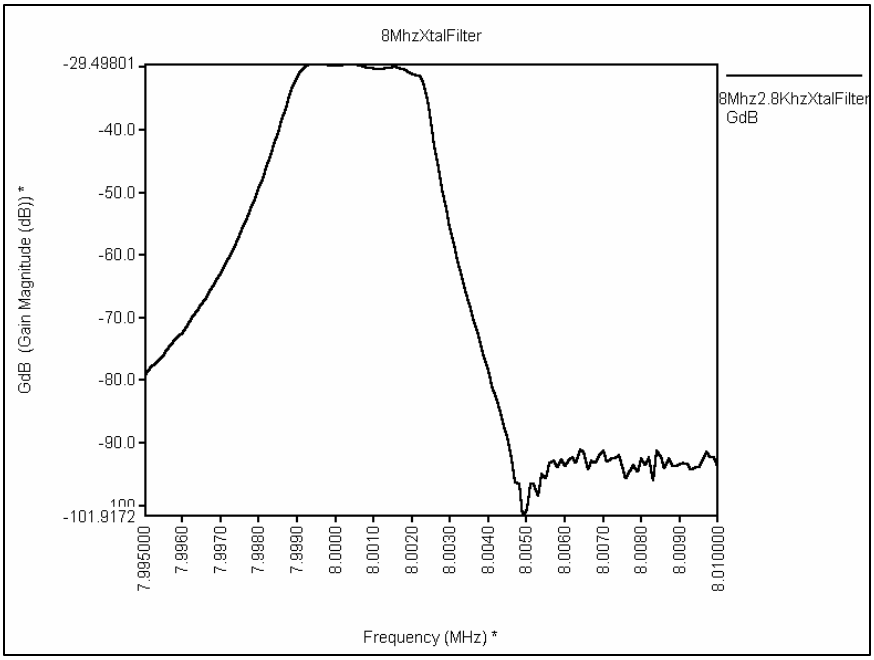




11.8Mhz Parallel Resonant Circuit (Like An Antenna Trap)



The Transmission tool is pretty neat too. This tool does not require the use of the reflection bridge. Just a couple of coax jumpers from the VNA to the DUT are required. The Transmission tool is also calibrated from the control program. This calibration removes any influence and errors caused by the interconnecting cables and the tool itself.



Then, you connect the cables from the VNA to the DUT. The VNA will inject a known signal into the DUT and will measure the output amplitude and phase angle coming out of the DUT. This will be done over a range of frequencies that you set up in the control program. The results of this data gathering mission is then plotted for you to see. So, who cares? Anyone who has ever built or analyzed

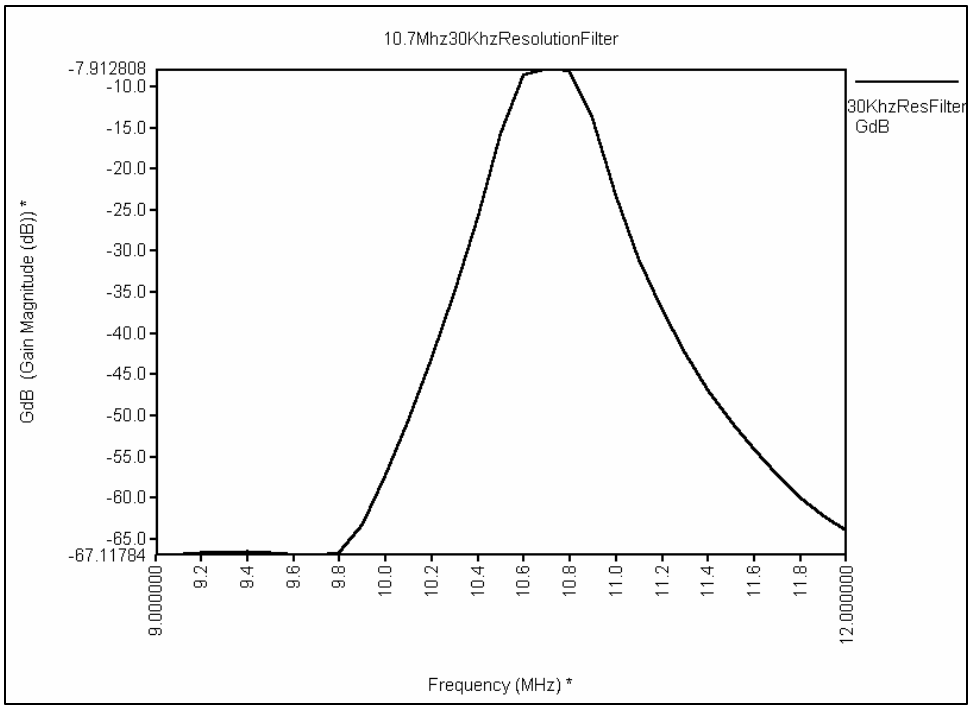
a filter cares. This little Doo Dah will plot a filter's frequency response, Gain Delay, and Phase parameters. Here is some of the stuff I tried. BTW, I had to build the 8Mhz Filter from Wes Hayward's tools before I could test it. Fun, Fun, Fun!!!!!!!!!! The astute reader will notice the Gain Magnitude is pretty low.

That is because I made no effort to impedance match the filter to 50 ohms. But, wow! Look at that passband!!!!!! If you tried to plot this with a RF Generator and wattmeter, you will find the VNA results extremely accuate…..takes the VNA about 5 seconds to do this. It would take you about 15 Minutes !!!!

Technical Details

I left the technical details out of this paper. The Designer John, N2PK maintains a site at www.N2pk.com that explains it all. I can't improve on that. Another guy who organizes group builds and has written some great software for the VNA is Greg Ordy W8WWV. Greg is at: www.seed-solutions.com/gregordy. Both of these guys will help you get through the build as well as all the guys at the N2PK-VNA Yahoo User Group.

Where Can I Buy the N2PK VNA Kit???



This is a "scratch" build guys. The N2PK VNA is not sold as a kit. You can buy various "bags of parts" from guys who have done group builds. If you want to do your own shopping, all the parts with the exception of the circuit boards and the Master Oscillator are available from Digi-Key or Mouser. There are guys on the Yahoo User group that offer the printed circuit boards and group buys for the Master Oscillator.

So, How Difficult is the Build?

You might say this is not a "Beginner's" project. I won't say that because my philosophy is you are only a "Beginner" at the moment of birth. From that time on you become an experienced person.

Elmers help but, it is mostly up to you. Nothing is impossible if you have patience, perseverance, the willingness to learn, and the desire/need for an excellent piece of test equipment.

This is an SMD project. Now before you all run away and make excuses why you can't do SMD (don't be a bunch of grouchy old men please!!). Consider my case:

1. This was my first SMD build.
2. I wear Tri-Focals and have terrible vision.
3. I have an average soldering station at an average workbench.
4. My hands shake from drinking ten cups of coffee a day…minimum
5. And two or three 807's at night.
6. I am a severe arthritic with most of the problem in my hands
7. My XYL needs lots of attention
8. My pets need lots of attention
9. My house needs lots of attention
10. I have a day job and do travel for it…I am not retired
11. I sleep at night
12. I am 57 years young this year
13. I am not money rich…but, I do have many wonderful Pig friends

Have I come up with enough reasons why not to build this VNA? You GOTTA WANNA you know.

What's Next?

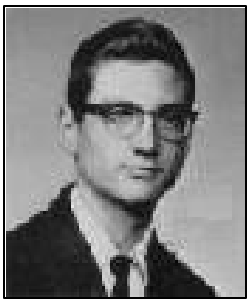
The WA1FXT Lab is always open for your questions. If I don't have the answers I can probably tell you where to find them. I can also tell you what not to do based on my mistakes.

This note is pretty general. I am currently writing a more detailed "Build" paper for QQ (and anyone else who wants it). I couldn't get the paper done in time for this issue of the BB. I am hoping to incorporate plenty of practical "hands on" application notes as I learn more on how to use the VNA.

The Yahoo user's group is one of the best I have joined. The Designer, Paul N2PK is always there to answer your questions. You'll learn a lot from his patient and understanding answers. Members range from super engineers to newbies. All the members have either built or are in the process of building Paul's VNA. I have yet see anyone have any negative comments about the group and any of its members. They are a great bunch.

This little booger reminds me of a Swiss army knife……lotsa good stuff in a small box.

WA1FXT



A Tribute to Michael Hopkins FP #820 AB5L SK
By David White WN5Y

Michael Hopkins, Piggie # 820, was one of QRPs most colorful characters. Unfortunately, we lost AB5L in June 2005 to a heart attack at his home in Dallas. Michael was an extremely close friend. He edited all my articles and provided most of the introductions for no compensation other than "Thank you till you are better paid."

He had a way with words no one else could touch. His posts on QRP-L were always unique and reflected studies of history, poetry, classic Roman literature and Eastern philosophy, which were always interwoven in his writings.

Six meters was his preference and his personality defined the word "experimenter." Most of his purchases at hamfests were for rebuilding, parts, or curiosity. Visitors to his home were always offered an old rig for something that was precious inside of the box, not for what it was supposed to do.

Michael's workbench was in the attic with an old soldering iron (corroded tip that barely held solder), a '60s TTL frequency counter, a high impedance "tube type" VOM, and a 5 MHz scope. His understanding of circuitry and his love of "figuring out puzzles" was what really got equipment working. I have to say though, that I was witness to fixing an SX-111 with all the above equipment in his attic.

He loved Frank Jones, of the early 20s & 30s, who put 5 meters on the map. Frank "took the hobby from the rich to the masses," said Michael. Michael attributed Frank with bringing tons of new homebrewers into ham radio with his easy-to-build 5 meter rigs. Michael always handed out copies of "5 Meter Radiotelephony" by Frank Jones, circa December 1934, to his experimenter friends. The publication is considered a classic and was republished by RJ Press. "RJ," editor of RJ Press, stated "…meet Mr. Frank C. Jones, one of the best technical writers ever to grace our hobby."

In the late '90s Michael sent emails to ham friends about the "Tales of Frank and the 5 Meter Liberation Army." He immortalized Frank with these emails. Frank returned in the old style in which he lived and found residence in Michael's basement. Most of the writings barely touched on QRP, but Frank was a died-in-the-wool homebrewer, which is a big, big part of QRP.

I would like to share one story when Michael took Frank to a QRP hamfest, which brought Frank to a new form of homebrewed rigs. There were approximately 55 stories; the following one is number 42, "Talking Trash."

———

Date: Sat, 26 Jun 1999

All the QRPers don't drive SUVs and go backpacking on weekends. I learned that when I went down to Austin to a dinner for QRP Guru George Dobbs, G3RJV, and sat across from an OT.

Frank, my pal who wants to take back 56-60mc with a Five Meter Liberation Army refused to go, saying QRPers were "transferring the receiving problem to the other guy." But I wanted to get him a memento and the OT needed part of a Command Set TX for something. I had one in the car and traded it for a little solid state TX.

"Is that a snuff can?" Frank asked as he examined the offhanded style of the builder.

I explained it was a cat food tin standing in as the chassis for a "Tuna Tin Two." An entire series of Doug DeMaw revivals from the '70s is underway, I told him, and mentioned the Herring Aid Five RX and the CB (chipped beef can) Slider VFO.

I was able to trade for this piece only because the builder succumbed to the widespread QRP obsession for circuit board clone projects – the fellow tossed his homebrew for a ".38 ACP," or some such will-of-the-whisp West Coast board kit.

Frank sneered at that, but he was engaged by the "ugly" style of building evidenced on the Tuna Tin TX. I soon forgot about the trinket, but not Frank.

Three days later I happened down to the basement to find Frank resplendent in rubbish. He explained his new VFO would never settle down on a solid tin base so he ended up putting a 12A6 Tri-Tet on the metal end of a paper Magnesium Citrate carton he termed his "Epson Salts ECO."

Then he saluted Native Americans with the visage of a warrior on the base of his interstage "Calumet Coupler" which used a baking powder can to hold a 6AQ5 set up as a buffer.

Next came a mildly pear shaped platform with tapped coils and a dual variable. He called it a "Deviled Ham Doubler," and he must have rushed it into service as Charlie, the demonic white ferret, was clawing at its lower edge despite the considerable potential danger from the microwave oven chassis Frank was using to power all this stuff.

The output was single ended, which is strange for Frank, but he said he was working out the kinks on 10M before he took it up to 5.

His receiver, termed a String Bean Super-Gainer, used 303 cans for shields over the coils he wound on paper product tubes and someone's old cabinet door supplied the base. Frank always prefers to build on wood, and it is a good thing since he won't use a transformer unless he needs big voltage.

He rigged two mayonnaise jar tops on threaded shafts for a neutralizing cap. He had a Hellmann's and a Kraft and said he was careful to put the Kraft on the low side because, he felt, Hellmann's caps took HV better. I just ignored that. These old-timers have all kinds of superstitions.

He fires up the rig and dipped the 813, which he mounted on a big can that once contained "Polish" sausage, although that is not what it said. Frank won't say "German." It is something left over from the war, I guess, but when he sees a Rin-Tin-Tin looking dog he calls it an "Alsatian."

In short order he was working some of his pals at a CW clip I cannot follow, but on tune up the final plate cap, cut from tuna cans, arched over. The ferret took off and Frank said, "must have been some dolphin in that one." I could not see if he was joking and was afraid to ask.

The whole set up was impressive, like some adult's electric train, and it took up about as much space, but Frank is not into miniaturization. It covered our 6-foot bench and at the end he stacked up some milk cartons to hold the final, which was partially obscured by a grocery sack to keep the ferret out of the high tension leads.

"What kind of output are you using on your Polish Sausage PA?" I asked. (I decided to go along with the WWII convention.)

"Link, of course," he said.

I still could not see his face.

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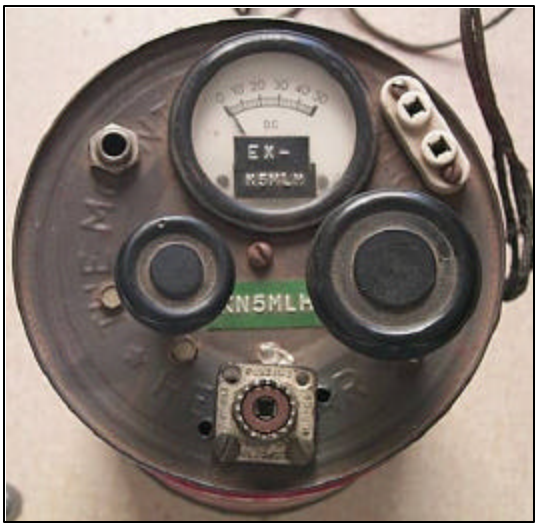
P.S. Until reading this story, I had no idea how far advanced I was with the first rig I built as a Novice in 1961.

I even entered my 40 meter CW coffee can rig in the homebrew building contest at the Midland Amateur Radio Club hamfest in 1962. I didn't even win "honorable mention" for what I thought was the most creative project in the contest.

I made hundreds of contacts with the rig, a 6V6 oscillator with about 12 watts input built into a two pound (transmitter) and one pound (power supply) Folger's coffee can. Little did I know how far advanced I was in homebrewing QRP rigs. I guess I was way behind my time (Frank's)……but also way before my time (QRP's). I somehow missed the middle. Pictures below:

David White, WN5Y



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OUR MISSION:
1: Have Fun.
2: No rules.
3: Have a group of Friendly Hams who enjoy Amateur Radio, and sharing their skills with their fellow Hams.

CLUB EMAIL POLICY:
These are not rules, just common sense.
Club email is not moderated, as we are not a stuffy group. You can send off topic messages about most subjects, but please keep it clean and in good taste. We do like good-natured ribbing and joking with each other, but we will not tolerate flaming other members or spamming the group.
We will remove offenders who abuse our open policy. The word eBay is allowed.

CLUB WEB PAGE:
The club web page is our forum for sharing projects, and information about us. You are encouraged to submit your ideas and projects to be added to the web page.

http://www.fpqrp.com

OUR MONTHLY CONTEST – RUN FOR THE BACON SPRINT:
This event is held on the 3rd Sunday Night (EST) of the month. For full details on how to participate, see the website address of: http://www.fpqrp.com/fpqrprun.html

PROBLEM REPORTING:
If you are having problems with email, the web pages, or a fellow club member, please report this to either:

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