

# Nacogdoches Amateur Radio Club

## 2015 CLUB OFFICERS

Pres: John Cechin - W5FWR

Sec/Treas: Army Curtis - AE5P

Visit our web site at

<http://w5nac.com/>

## MISSION STATEMENT

The Mission of the Nacogdoches Amateur Radio Club is to support and promote Amateur Radio by public service, offering training to unlicensed interested parties and licensed Amateurs, mutual support of other Amateurs, engaging events that promote Amateur radio to the general public and other Amateur radio operators, and continuing fellowship by regularly scheduled organized meetings and events.



## JULY MINUTES

The July meeting of the Nacogdoches Amateur Radio Club (NARC) was held as scheduled on July 1st. **Secretary/Treasurer Army AE5P**, opened the meeting at 6:00 p.m. in a meeting room at First Baptist Church. Six members and four guests were present. Each person present introduced themselves. Minutes of the previous meeting were approved as published. The Treasurer's report was read.

### Old Business:

**Field Day:** A few members reported getting on the air

for Field Day from their home stations.

The now annual NARC **Ice Cream Social** was the primary order of business for this meeting, so regular business was cut short so everyone could get to the ice cream. President **John W5FWR** sent his regrets but could not attend the meeting.

### New Business:

Several members reported working several of the K2x stations currently on the air as part of the 13 Colonies Special Event.

Meeting closed at 6:15 p.m. so the ice cream could be served.

## MY 2 CENTS

### FOX WILLY ROGER

#### AUGUST 2015:

August is here, with grass cutting tree trimming and most of all is "HOT WEATHER". Already it is in the high 90s, and our A/C's are working overtime to keep us cooler than outside.

By now, all of you know that I missed the **ICE CREAM SOCIAL**, by the way, who won the prize for the Blue Bell flavor of the month? I want to take this time to thank the ladies for all the work they did at the social, I know the men were just like rocks and sitting there. I will now try and tell you of how I spent my **JULY 4<sup>th</sup>** weekend. Not feeling all that good Wednesday night and had heavy heart pounding Thursday morning. In my weekly visit to the VA I mentioned it to my RN, her reply was let me get an EKG just in case. Before I knew it I had an MD telling me the sky was falling and I had to go to the ER "NOW". The next thing I knew I

was on my way to the ER, it so happened to be in Houston. Test after test EKG after EKG, blood drawn twice a day, vitals taken twice a day and a portable monitor was my companion for my stay. First class getting to Houston, but on your own getting back home. Bottom line is Afib and some more pills to take, it's now up to 10 pills a day and an extra one every month. The medical care I had was nothing less than top shelf, to say first rate would be an understatement, thanks to the VA.

I understand that Army went out and did some roving again, or was it that Pat wanted him out from under foot for a bit? I also understand that he talked Ralph and Bill to join him, and fun was had by all. I think this was just another excuse to find another good eating place, but what do I know. You guys will have to tell all at the next meeting.

Speaking of A/Cs, mine started to collect water in

the pan and drain through the ceiling and down the wall and onto my computer keyboard. This was the only place I know of that you could take a shower and work on the computer at the same time. Well I got the pan to drain to the outside with the help of my buddy. Later that night the A/C unit stopped working, it seems like a fuse is hidden some ware in the unit, just a \$1.00 flat fuse, go figure. Before you guys call the A/C man, check for that little flat fuse hidden about the A/C. The A/C is running an awful long time, perhaps I should close the windows and door?

Army has informed us via hamlist, of the changes taken place with the list, if you are still having problems, send AE5P twenty SASEs and I'm sure he can arrange something.

The hell run seems to be on and requires HAM help. I was told by someone that an ice-cream plant in OK is maybe starting a new product line, called

Backdoor Cream, it seems they have some left over cream, I don't know that's just what I heard.

It has been reported to me once more that the 84 repeater is still sick, but hope is on its way, a quick run up the tower and splice a new end on the coax and we are back in business, I hope.

The latest **QST** page 83 has a picture of a California friend and his crank up trailer rig; this is what you can do if you get out of those rocking chairs.

More spaces make for a longer column, "Jack Taldi". As you can see, as with the last time and the time before that I am using more spaces, this system seems to work well, so why not use it till it drops, and it hasn't dropped yet?

#### **PHASE II.V.V:....**

As I have said before, **CU's** thinking is, why walk when you can stand, why stand when you can sit, why sit when you can lie,

why lay when you can sleep, and why sleep when you can sleep hard? She knows that I will not step on her, so when she picks her middle portion, it's hers until she doesn't require it any longer. That is one thing that **TB** has learned from **CU**.

I have named the kitten that's the offspring of **Visitor** and **Tuff Guy**; **Max** will be its name. So if you venture over to my QTH, say hello to **Max**. I haven't seen **Ghost** for a bit, but know **Ghost** will show up whenever.

I haven't gotten the pictures of my cats for you yet, but I'm working on it, I know all of you want to have a picture of the cats I live with.

**GB** has developed a new trick, she now runs into the house, eats all the inside's cats' food and naps until its cooler in the evening, and runs back outside to spend the night somewhere.

**THOUSANDS OF YEARS AGO CATS WERE WORSHIPED AS GODS, THEY HAVE NEVER FORGOTTEN THIS**

#### **WHY IS IT?**

The old saying, square peg in a round hole, I have found if you use a bigger hammer and take a full swing, you can get a square peg into a round hole, no problem. How about "chili peppers" what are they, chilli or pepper? And how about "café's home cooking"? What do they cook it at home and then bring it to the café? Instant rice, how can it be instant, you still have to cook it, don't you?

I keep asking these questions and don't get any answers, just remember, you might be the next president and you will have to show the way and ask these questions.

**HMMMM**

#### **GREAT INVENTIONS OF ALL TIME:**

Electric lights, now you don't burn yourself lighting it, just when you replace a burnt out bulb. Do you

know how you can turn out the light and get into bed before the light goes out?

The end is here, **TWT** is tired and hot, and I thank you all for tuning in and remember to shop our spongers.

Its Army's turn to fill in all the blank spaces.

Remember: keep your powder dry and your head below the horizon.

Happy Trails

73 Enjoy, what do you think, let me know?

John Cechin W5FWR  
[Carrots4ever2u@suddenlink.net](mailto:Carrots4ever2u@suddenlink.net)

## NOTES FROM OUR EC

FLDigi and AndFLmsg are two new software products developed by the FLDigi team to send and receive digital communications. Lots of hams (many doesn't sound like enough) use FLDigi to work PSK32 and other digital forms on

HF. It can control the radio and send keyboard to keyboard QSOs. It can also send "canned" / prepared messages. It generally works under the Windows environment.

ANDFLMsg is the Android OS equivalent. Again, it was developed by the FLDigi team. Quick note: No, I haven't looked for an IOS (apple) or LINUX variant. ANDFLMsg has templates configured for many of the message forms we could/would be required to use as emergency communicators; ICS213 and ARRL radiogram messages come to mind. You also can send plain text free form messages.

Ralph (WD5RAH) and Robert (KD5FEE) have been exploring FLDigi on Windows; Army (AE5P), a few others and myself have been exploring ANDFLMsg.

Neither software is expensive (freeware). Now that being said if you don't have an Android device you may want to be

induced to get one. I picked one up at Radio Shack for a bit over \$100. The Android software isn't terribly complex; you will have a few setups which you can find mentioned on the web.

I tested my software initially with Army and later with the Voice of America (VOA). The VOA has a radiogram that is produced for Saturday and Sunday (info at the end of the column). I did the Ron Popiel "Set it and forget it" in the Nitro. I was able to get the radio gram with some pictures.

We have run a few tests after the regular nets and it seems to work fairly well.

Pros: Like CW it will get through. Most of the folks running PSK 32 are only running about 25-30 watts. ANDFLmsg has pre-configured standard message forms.

Cons: There is a learning curve but not very steep. If you are used to a different operating

system you may decide to buy some new equipment.

Next Month we'll talk about the Piney Woods Purgatory bicycle race and the plans the City of Lufkin has for it. Why it will be important.

73 de John Chapman  
KC5MIB  
[jlchapman2@juno.com](mailto:jlchapman2@juno.com)

### VOA Radiogram

5745 kHz Saturday 0930-1000 UTC

17870 kHz Saturday 1600-1630 UTC

5745 kHz Sunday 0230-0300 UTC

15670 kHz Sunday 1930-2000 UTC

### VE TESTING

Our next VE testing is scheduled for Wednesday, August 19 at 7:00 p.m. in the Parish Hall of Christ Episcopal Church. Applicants should bring a picture ID, the original and a copy of their current Amateur license, the original of any CSCE's and \$15 to cover the cost of the exam(s). Correct

change is always very much appreciated. 73 de AE5P

email: [ae5p@arrl.net](mailto:ae5p@arrl.net)

### CLUB NETS

Remember to join us each week for the nets sponsored by NARC. Each **MONDAY** is the **NARC ARES/RACES** net, at 8:00 p.m. on the club's 146.84 repeater (PL 141.3). Second, on **THURSDAY** evenings at 8:00 p.m. is the **Deep East Texas Skywarn Emergency Weather Net** on the 147.32 repeater (PL 141.3). Please join us for one or both.

The actual operating frequency for each net is at the discretion of the net control operator. The Monday night nets have been meeting recently on the club 444.050 UHF repeater or the 147.32 VHF repeater. Stay alert to other possibilities such as a simplex frequency or even HF.

### NEXT MEETING

The next meeting will be on **Wednesday August 5th** at **7:00 p.m.** at First Baptist Church in Nacogdoches. The address is 411 North Street (across the street from the old Mize building). You can park in the North parking lot and enter through the Northwest door. The meeting room will be the first door on the left after you enter the building. Note the location change due to continuing construction at our regular meeting spot at Christ Episcopal Church.

### July 2015 CQ

### VHF Contest

### A.K.A. Two Old Salts and the Rookie

The old salts, AE5P (Army) and WK5F (Bill), and the rookie, WD5RAH (me), embarked on a two day ham radio rover

contest on Saturday and Sunday July 18<sup>th</sup> and 19<sup>th</sup>. The old salts have multiple rover trips under their belts, but this was my first rover trip where I operated my own radio from my own vehicle. I had previously driven for W5TV on one previous rover trip two years ago, but this time it would be different. This time I would be on my own.

Each day began with breakfast at IHOP at 8:15 AM where coordination plans were discussed and the day's route confirmed. Each of us had radios in our trucks with antennas mounted or mag mounted on the outside of our vehicles. AE5P had horizontally polarized antennas and WK5F and WD5RAH had vertical polarized antennas. In the future, we all should have horizontally polarized antennas to help with contacts other than the local team members around you. WK5F and WD5RAH struggled to make contacts with other ham's. I appointed myself as the TEC (tail end

Charlie - plus other nameless acronyms) in the convoy as we drove to each of our destinations. We would pretty much stay in visual contact during the journey to each location.

The radio plan called for us to use USB on 6 M (50.125) and USB on 2 M (144.200) for contacts outside of our team and use FM on 6 M and FM on 146.46 for 2 M for our inter-team contacts. This plan worked very well until we got to our first destination point and tried to work each other. Turns out my radio (Icom 706 MKII G) didn't like to transmit FM on 6 M. Every time I pressed the PTT on the mic, the radio would switch intermittently between USB, FM, and CW. Worthless. With AE5P's help we finally determined that we would revert back to USB on 6 M and stay with FM on 2 M for all our local contacts. This we did for the rest of the trip. (Just great, my first time out and my radio acts up!!

All WK5F would say was, "you shoulda got a Yaesu")

Oh, and did I mention the rapid contact speed between our stations at each stop. For a rookie, this took me a little time to get cranked up to speed. (Didn't want to keep the old salts waiting, you know! And, after all, with three vehicles, you will log 16 contacts at a particular location, and the faster you can make the contact, the sooner you can be on the road to the next stop.) A typical exchange between two operators went something like this: AE5P would call - "WD5RAH rover, AE5P rover, Echo Mike 21"; then I would respond, "Roger", to acknowledge his transmission, and then call him - "AE5P rover, WD5RAH rover, Echo Mike 21". He would respond - "Roger, time is 16:32". This would continue on until each operator has called all other operators at all possible grid square locations in an area. You really had to concentrate on the grid square location for your call and

by the end of the day it was easy to overlook. The old salts called it "being braindead". (They might have thought that about me even early in the morning!!)

Then there was the logging part of the contacts: AE5P has written about how he found logging each contact was tedious and confusing even though he used a voice recorder to help him log the contact later. This from an old salt. You can imagine how confusing it was for the rookie. In addition, the contact times had to be UTC time (5 hours ahead of our time) and in 24 hour format. I finally resorted to using the iPhone's recording device to help me keep track of the contact and the time. AE5P is correct; finding the right line to record the contact is one of the main problems. It's going so fast that your eye has trouble picking out the correct line to record the contact, before you are moving on to the next one.

Sunday began ominously for me. I climbed into

the truck for the trip down to IHOP and discovered that my radio would not pull up memory locations. The old salts at IHOP probably figured typical rookie operator problem. But, as it turned out, sure enough, the radio would not pull up memories. It would, however, let me enter the two frequencies I needed and let me switch back and forth between the two so that we could finish the contest. As AE5P said, "you adapt, you improvise, you overcome." (Seems like I heard that in a movie somewhere, Hmmm. All WK5P would say was.... You guessed it - "you shoulda got a Yaesu")

After Saturday's long trip into Arkansas and back, Sunday's trip to Jasper and back was a piece of cake. In fact, we were back at home by Noonish.

Then, as a last duty, and in order to make your efforts official, you have to submit a log report to the authorities responsible for the contest. I suppose there are several ways this can be accomplished, but

since I had never done one before it was suggested that I simply enter the data using the web site of the organizers. Sounded simple enough. What a nightmare for me. The instructions were not really clear on how they wanted the data to appear, so I had to guess at a few items. Trying to put two and two together was sometimes difficult. In other words, from the rookie, "Not ready for primetime". Gotta be a better way. If I did this on a regular basis, I'd darn sure figure out a better way. The old salts might have struggled with this part also - WK5F reported that the online website robot managed to delete his entries and he had to enter them again. (I'll bet the computer got a talking to when this happened... Bet your ears would have burned if you were in range...)

All in all, I really enjoyed the adventure. I would certainly do it again, and I would encourage each of you to try it. Guaranteed one thing if nothing else -

you will get to know your radio. Speaking of radio: Sunday afternoon after getting home, I initiated a reset on the Icom 706 and it came up working just fine. Lost all the memory locations, but I added them back better organized than before...

Thanks to the old salts for guiding me along. They helped tremendously and were very patient with the rookie. Until next time.....

Ralph WD5RAH

## OLD SALT #1

Who said they would never Rove again? I think it was WK5F. I did, after winning the January 2012 nationwide limited rover award and spending a lot of money to go the whole way to 10 bands. Then everyone quit the UHF bands. I swore to withdraw into the HF bands again. But someone mentioned roving in the CQ vhf contest, only two bands and I was hooked. Army(AE5P) and Ralph (WD5RAH) and I spent

Saturday and Sunday traveling through AR, LA and TX pack roving, eating and looking at the beautiful sights along the highways. Army and Ralph put me in between them to take care of this old man, but I wound up taking care of both of them and kept them out of trouble. Ralph and I had vertical antennas which don't do much for distant stations but we talked to each other a lot. Next time I will dig out my old loops and talk and hear a little further. Another contest coming up in Sept, why don't you join us in the fun and food?

Bill WK5F

## OLD SALT #2

Three of us roved together on this contest.. AE5P/R, WK5F/R, and WD5RAH/R.

We ran a route on Saturday starting in EM24 / EM34 north of Dierks, Arkansas and hitting EM23 / EM33 in Texarkana, EM32 in

Greenwood, and EM21 / EM22 north of Teneha.

We used 146.46 FM as our liaison channel and also as our 2M contact channel. We originally planned to also use FM for our 6M contacts, but radio problems forced us to change that to SSB. This is one of the major strengths of Amateur Radio: If problems develop (as they always seem to do), we can easily change our operations to adapt as needed.

At each grid pair, each rover worked the other rovers using all possible grid combinations. If you do the math, this results in each rover making 16 contacts on the two bands at each grid pair.

Logging was done using the Excel based log sheet developed by Amanda Williams, with the log sheet prefilled except for time. Might have been a good idea, but proved very difficult to use in the field. Hard part was finding the correct line to use and for me, finding

the right column to use. This needs some work.

I used a little voice recorder for logging later in the contest. Some good; some not so good. Wear a shirt with a pocket; turn the voice recorder on and drop it in your shirt pocket. Do not have the stereo on in the vehicle. Only sounds you want are ham radio sounds. I tried using head phones for a while. Helps me hear the weak ones; no radio sounds for the voice recorder; not so good. Using the voice recorder, I found it imperative to announce the callsign of the station just worked; the band I worked him on, and the time of the contact. If the contact was one of the other rovers in the group, then the entire contact is pretty well captured on the VR, so only the time needs to be announced. This can be done on the air for all to capture.

If using the VR, announce where you are when you start a new 'folder' on the VR. Announcements of landmarks etc. can help a lot later when you are

playing back the VR and trying to capture everything to paper. From what I saw this time, it seems to be imperative to go from VR to paper log, and then to computer log.

I'm still a big believer in using Tom Mayu's RoverLog to log VHF contests. The paper log needs to be designed to facilitate easy data entry into RoverLog.

Trying to work other frequencies while in motion is tough (at least for me) as it requires tuning the main dial on the radio while trying to keep the vehicle between the lines. Much easier to use preset memory frequencies as I can change them using the channel switch on the radio or the buttons on the mike. This almost certainly will be different for different radios. I was using a Yaesu FT-857.

All operators need to be pretty well familiar with their radios BEFORE the contest. At minimum they should know how to program a frequency into

memory, how to change the frequency in memory, how to change TX power level; and how to change modes.

For working other stations outside the rover group, there is a definite advantage to using horizontally polarized antennas. For inside the rover group, vertical polarization works just fine. Stations need to check ahead of time to see if RX overload is going to be a problem for them. Very dependent on the radio used.

To determine exact position and grid square, I used to use a Garmin Etrex handheld GPS. With the advent of SmartPhones and apps, now I use the HamSquare app from KramStuff which gives the grid square to 6 digits, and the lat/lon to 6 decimal places. Best part is it's free!! Many thanks to WK5F for reminding me I had this app on my phone. Prior to the contest, disable any passcode you might have on your phone to make it easier to

access the HamSquare app while in motion.

Just for the record, we left Nacogdoches Saturday morning at 9:00 (1400Z) and arrived at EM24 at 1745Z for a start at 1800Z. I got back home at 7:15 p.m. (0015Z), which was actually a few minutes earlier than I had originally estimated. The new I-49 with its 75MPH speed limit really saved us a bunch of time.

On Sunday, we left Nac again at 9:00 (1400Z), arrived at EM20 / EM30 in Jasper at 1530Z, and at Bronson EM21 / EM31 at 1630Z. I got back home at 1:00 (1800Z). Not too bad at all. Still had time for my nap.

Some notes on the equipment I used. Rig was my FT-857. I built a small table to bolt the radio to. The table sat on the front passenger side floor, and was sandwiched between the dash and the front seat. The radio was mounted to a separate piece of plywood that could swivel on the table top. Worked great! I sat

a 25AH battery (fully charged) on the floor under the table and wired the 12V from the power point on the dash to the battery and then to the radio. Greatly reduces the current draw from the truck's power point this way. Antennas were the KB6KQ loops on the trailer hitch mount with LMR-400 coax run through the sliding rear window. Used pipe insulation around the window and coax so everything could pretty well close. Had to use LMR-400 extension cables to reach the radio (cut the &\*%\$# cables twice and they were still too short!!). Had my miniature CW paddles along for CW. Used them once from EM34. Brought along an external speaker for the 857. Was more trouble than it was worth. Brought along a couple pairs of headphones for the 857. The noise cancelling set worked well, but then you did not get any radio audio into the voice recorder. Wound up just using the speaker in the 857.

Definitely need a clip board to hold the log sheets. I wound up using a red pen to record contact times. Although a gel pen, it dries almost instantly so it doesn't make a mess. The red makes it very easy to see.

It really was a fun weekend. As Bill noted, come join us for the next one.

Army AE5P

## UPCOMING EVENTS OF NOTE

Mark your calendars for the following events coming up in the next few months:

### North American QSO Party, CW

1800Z, Aug 1 to 0600Z, Aug 2

<http://www.ncjweb.com/N AQP-Rules.pdf>

### North American QSO Party, SSB

1800Z, Aug 15 to 0600Z, Aug 16

<http://www.ncjweb.com/N AQP-Rules.pdf>

### ARRL Rookie Roundup, RTTY

1800Z-2359Z, Aug 16

<http://www.arrl.org/rookie-roundup>

### ARRL September VHF Contest

1800Z, Sep 12 to 0300Z, Sep 14

<http://www.arrl.org/september-vhf>

### Texas QSO Party

1400Z, Sep 26 to 0200Z, Sep 27 and

1400Z-2000Z, Sep 27

<http://www.txqp.net/>

### CQ WW DX SSB

0000Z, Oct 24 to 2400Z, Oct 25

<http://www.cqww.com/rules.htm>

### ARRL Sweepstakes Contest, CW

2100Z, Nov 7 to 0300Z, Nov 9

<http://www.arrl.org/sweepstakes>

### ARRL Sweepstakes Contest, SSB

2100Z, Nov 21 to 0300Z, Nov 23

<http://www.arrl.org/sweepstakes>

### [pstakes](#)

### CQ Worldwide DX Contest, CW

0000Z, Nov 28 to 2400Z, Nov 29

<http://www.cqww.com/rules.htm>

### ARRL 160M Contest, CW

2200Z, Dec 4 to 1600Z, Dec 6, 2015

<http://www.arrl.org/160-meter>

### ARRL 10M Contest, CW/SSB

0000Z, Dec 12 to 2400Z, Dec 13

<http://www.arrl.org/10-meter>

### ARRL Rookie Roundup CW

1800Z-2359Z, Dec 20, 2015

<http://www.arrl.org/rookie-roundup>

## VOLTAGE AND CURRENT BALUNS

By

Thomas Atchison, W5TV

In Fig. 1 we have a **voltage transformer type balun**.

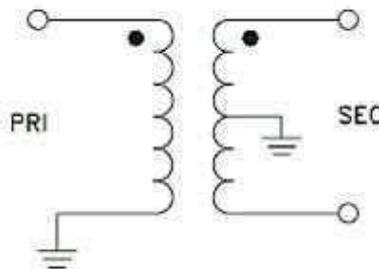


Fig. 1

This balun uses transformer action or magnetic transfer to produce a balanced signal (SEC) from an unbalanced input (PRI). The impedance of the match can be varied by changing the number of turns on the windings of one or both sides of the transformer. In general, if changing the number of turns on windings changes the voltage, then we have a voltage balun.

In Fig. 2 we have a typical current type balun.

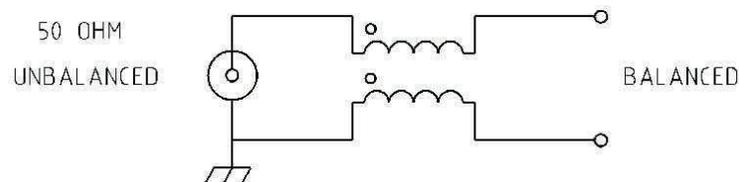


Fig. 2

This type of balun controls currents. There is no transformer action in this type of balun. We have equal and opposite current in this balun that cancel one another. Common mode currents produce a mutually inductive magnetic field that presents a high impedance to these unwanted signals. The result is a current choke balun. In general, if changing the number of turns on the windings changes the current, then we have a current balun.

Voltage baluns provide equalization of voltage in each leg of an antenna. Current baluns equalize the current flow. If you get on the Web and read about baluns you will find many differing opinions about whether to use a current balun, a voltage balun, or no balun at all. I don't have any magic solution; however, some people suggest the following simple rules:

- a) For a 4:1 match use a current balun for high power (1000W+) or a voltage balun for low power.
- b) For a 1:1 match use a current balun for either low or high power with low SWR.

Generally, a current balun is the best choice because it provides a wider bandwidth and higher efficiency. If you read the advertisements from various places who sell baluns, you will find that current baluns are highly recommended.

I have used a 20 meter dipole that is cut for the center of the 20 meter band and has an SWR that is less than 2 to 1 over the entire band. I feed it directly with RG-58 coax (no balun) and I find that it works very well. The fact that this antenna is a resonant antenna allows it to work well without a balun.

On the other hand, I have a center-fed half-square antenna that is 250 feet long and fed with 450 ohm ladder line. This antenna works very well on 160 meters; however, I want to use it as a multiband antenna also. This means that, in general, this antenna will be nonresonant on the other bands. There will be a variation of impedance as I move from band to band. Often a 4:1 balun is suggested for such an antenna so, initially, I used a 4:1 LDG voltage balun (RBA-4:1). From what I have read, antenna tuners have more difficulty tuning low impedances than high impedances, therefore, a 4:1 balun will present too low an impedance to the tuner in some cases. To avoid this problem I selected a 1:1 current balun made by DX Engineering. I feed the 450 ohm ladder line to the 1:1 balun, and then I have 10 feet of 50 ohm coax that comes in to the shack and connects directly to the transceiver. This antenna works very well on all bands from 160 through 10 meters (See Fig. 3).



Fig. 3

Finally, I have an 80 meter inverted vee antenna that is cut for 3.750 MHz. I use a 1:1 current balun at the center and feed it with 52 ohm coax that comes directly into the shack and connects to the transceiver. This is a resonant antenna on 80 meters, however, 80 is a broad band so I felt that I needed to use the balun to avoid common mode current on the transmission line. Besides, the balun gave me a good way to hang the inverted vee and connect the coax. The antenna works extremely well over the entire 80 meter band (see Fig. 4).



Fig. 4