Yankee Amateur Radio Newsletter

August 2007

Yankee Club Meeting

FOR MEETINGS AND LOCATIONS, PLEASE ASK ON ANY NET DURING THE WEEKS PRIOR TO ANY HAMFEST IN MAINE FOR THE YANKEE CLUB MEETING AND UP TO DATE INFORMATION.

NEW starting this month, EDITOR'S PICK of WEB SITES that is HAM RELATED and for this MONTH'S CHOICE IS:
http://www.ks1r.net

The Man that keeps the great Link Repeater System running. KQ1L – Dave Hawke

The July newsletter was not printed because Lee, W1LWT was on vacation for most all of July.

The Secretary's Report wasn't available for this issue of the newsletter.

Six Meter Wavelength Band Antennas or, What's Hot and What's Not

The advent of new, affordable MF/HF/VHF radios in the last few months from virtually all the major manufacturers, has spurred a migration by more and more Hams to the Six Meter band. I'm often asked, "What antennas are best for Six Meters?". Before answering a question like this, I must first ask the Ham what he or she knows about the band, and in what sort of activity they want to engage. Often times I'll get a response such as, "Well, I just want to get on six!".
Next I'll want to find out what sort of a Six Meter station the person might already have. As often as not, my preconceived notion of the Ham owning an MF/HF/VHF transceiver is dispelled. They may tell me that they have a 50 Watt FM transceiver, or maybe a Six Meter hand-held radio. They usually follow this response by indicating that they are really anxious to work some of that Six Meter DX they have been hearing about! My task has at this point fallen to explain the entirety of activity on the band, and what is needed for each of the various modes of communication available on the band.

You see, the Six Meter band works almost as if it were two distinctly different bands rolled into one. Down at the low end of the band most operators are interested in working distant DX states and countries on Single Sideband (SSB) or Morse code iCW. At the upper end of the band the predominant mode is Frequency Modulation (FM).

Most of the people that you'll find at the top of this band have used it for years and years as a sort of quiet intercom channel to talk with college buddies or other friends. In this upper portion of the band the activity is

similar to the two meter band, with perhaps a better sense of manners and operating skill. The lower end of the band is where the "Big Fun" is! In this lower spectrum, distant (DX) signals are often found, resulting from a myriad of propagation sources. This is why Six Meters is known as the "Magic Band"!

Why 6 Meter Hams Design The Best Antennas

At this particular juncture in time we are quickly approaching what seasoned Six Meter Hams call "F season". This is because in the next several months we will see a transition from relatively low "Solar Indices" numbers hovering at about 100, to an increase that we all hope will exceed the 168 solar indices peak of 1958. During this 1958 peak, many Hams worked all states within our country, and several zealous individuals worked all continents.

Other signal propagation modes are also common on this band. Even at times when signal propagation is "shut down" on the HF bands due to solar storms called "proton events", Six Meters will often yield Auroral skip. This can be really fun to operate, and is distinguished by the eerie and gravelly sounding phase distortion that occurs.

Another mode of propagation I have enjoyed over the years is "Meteor Scatter". The best meteor skip I have successfully worked is during the Geminids and Ursids showers in December. I have also though had good luck on occasion with the many showers that occur in June and July. Here is a listing of these, and the approximate dates of their peak:

Scorpids June 2 through 17	Perseids June 4 through 6	Arietids June 8
Pons Winnecke June 27 though 30	Taurids June 30 through July 2	Cygnids July 14
Capricornids July 18 through 30	Perseids July 25 through August 4	

Meteor skip allows about ten to twenty minute conversations or QSOs as the earth rotates below the ionized meteor trail. You might think of this sort of propagation as the "billiards of Ham Radio". The way this works is that signals from my station in Anaheim go up and bounce off the meteor trail and come down in Texas. As the earth rotates, twenty minutes later I can talk to a station or stations in New Mexico. The arc of this propagation will ultimately yield contacts for me in Utah, Idaho, Washington and Canada before the signal starts coming down in the Bering Sea. I have seldom worked Alaskan stations via this mode of propagation but, I hope to as more Hams acquire Six Meter equipment! It would be nice to follow this propagation all the way to Russia. I have never worked any Russian stations however, probably due to the economic and political situation of the then Soviet Union.

A final form of skip that is often mis-judged by Hams who exploit it even on 10 or 12 Meters is Sporadic E-Layer skip. The ionospheric E layer resides above the earth at approximately 80 miles up. The F1 and F2 Layers by contrast are about 60 to 200 and some miles higher. This is why F layer skip typically yields further contacts because of the consequential lower angle of propagation. E skip on Six Meters is a very common occurrence during the months of April through July. It is believed that stimulation of the E layer occurs at this time because of high thunder head conditions during spring storms. I have tracked and confirmed this sort of activity in the past by correlating it to weather warnings given to airline pilots. Generally speaking, the Six Meter activity will come about a day or two after the highest thunder storm activity. This sort of skip yields single, double and even triple hop skip. During one E season when two "E-clouds" were simultaneously over the midwest and southwest on the weekend of the June VHF contest, stations all over the country were talking to one another on Six Meters. It was an unusual sort of gentlemanly bedlam that covered better than 300 KHz. at the lower end of the band!

Back to Antennas

If you're interested in Upper Sideband (USB) you will run into folks who will tell you that you should use a horizontally polarized antenna, probably a Yagi Uda beam. If you want to work FM, everyone will tell you to use a vertically polarized antenna such as a Ground Plane or a "J", since that's what the mobile stations and everyone else is running. Well, here's the low down scoop so you can have your cake and eat it too!

Use a vertical omni-directional antenna for both modes, actually all modes, and you will have the best of all possible worlds! I say this based on my own experience, as well as others who have worked a great deal of DX

with vertically polarized antennas. For about 31 years now I have used vertical omnis on this band to very good success. I've worked all 50 states, and four countries, most times running not more than about 100 watts of power.

I'm not knocking beam antennas such as Yagis or Cubical Quads, I have used them too! What I'm really saying though is that I have learned to put them up vertically polarized as opposed to using them in horizontal polarization. One station I can think of has worked all states more than twice over, as well as working all continents using a pair of *vertical* five element Yagi beams.

The reasoning behind this becomes more clear if you consider that propagation on this band is more often similar to that of an High Frequency (HF) band, rather than a VHF band. On bands like 2 Meters or 222 MHz., when you operate Single Sideband (SSB) you would probably be foolish not to use a horizontal antenna. In my experience on the Six Meter band, signal propagation comes in most times at an angle that is closer to the vertical plane, than it is to horizontal.

About the only time using a vertical antenna would be a disadvantage would be trying to talk to a horizontally polarized station within your "direct wave" range. This would be a station within about 50 miles of you. In this circumstance about an additional 20 Decibels of attenuation would be imposed between the cross polarized stations. In reality though all Six Meter stations should have an omni-directional vertical antenna. With such an antenna you will be aware of the prevailing activity on the band, even if you then switch to some other antenna to optimize that activity.

So what sort of vertical omnis are desirable? Ground Planes work well, either the 5/8 wavelength variety or even simple 1/4 wavelength versions. These can often be fabricated from easily modified Citizens Band antennas. The venerable "J" antenna is though, probably both the simplest to build, and the best overall performer. One major reason the *voltage fed* "J" is nice is that it can be constructed to provide enough bandwidth to utilize almost all of the band. This allows you to have one antenna that can be used for FM, AM, SSB, or CW. So, what must be done to provide this wide bandwidth J antenna?

Bandwidth in an antenna is a function of the antenna's circuit "Q", or circuit "quality factor". If the antenna provides the lowest possible reactance, the Q will be improved, and consequently so will bandwidth. To provide the lowest possible reactance, or Alternating Current (AC) resistance, we could either use large diameter conductors, or maybe plate the antenna with some nice low resistance conductive material like Silver. I think using fat large diameter tubing is probably the better and more economical approach!

Usually 3/4 inch diameter tubing is used for Six Meter "J" antennas. If this seems like a desirable mechanical configuration to you, here are the dimensions for such an antenna fabricated from copper tubing. Actually it uses 1/2 diameter tubing also but, hang in here with me, we'll make use of this smaller diameter tubing in a later modification for higher frequency bands!

First, let me explain how we do these measurements! Start all your measurements from the top edge of the bottom of the antenna. This means the top edge at the bottom of the "Q-Line" or Linear Impedance matching transformer that is formed by the two parallel quarter wavelength tubes. So let's get started by listing the parts you will need.

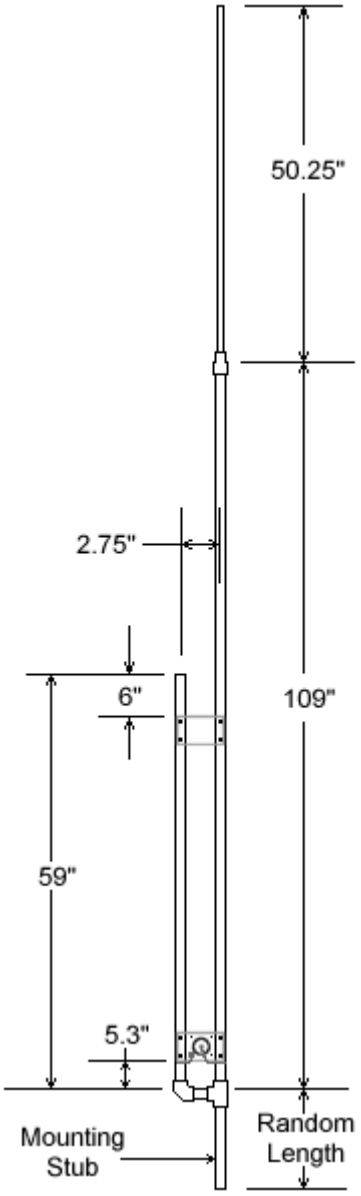
The "J" Shopping List

- One 10 foot length of 1/2 inch copper tubing
- Two 10 foot lengths of 3/4 inch copper tubing
- One 3/4 inch "T" fitting
- One 3/4 inch to 1/2 inch reducer
- One 3/4 inch elbow fitting
- Two 3 inch by 2 inch by 1/2 inch thick pieces of Plexiglas flat stock
- One coaxial SO-239 chassis mount connector, or maybe a chassis mount "N" connector
- 6 inches of #12 American Wire Gauge (AWG) THHN solid copper wire
- One ring type crimp-on terminal to attach to the connector's flange

You will also need 4 appropriately sized screws, nuts and lockwashers for the connector and, also eight (8) 3/16 inch machine screws and lock nuts for mounting the Plexiglas plates.

Putting This Puppy Together

Remember to clean and polish all these copper pieces, as well as the tip ends of the tubing that will fit onto them before soldering! Use non-acid solder!



Use a tubing cutter so as to make nice smooth even cuts. Cut one length of 3/4 inch tubing such that it is 59 inches long when seated with the elbow fitting and mated to the shorter leg of the "T" fitting. You will need a short piece of tubing to accomplish this so that proper spacing can later be accomplished. Next cut the second piece of 3/4 inch diameter tubing such that when it is fitted within the top port of the "T" fitting, it is parallel to the 59 inch piece, and its total length is 109 inches. When this has been done, adjust the center to center spacing between the two parallel tubes to 2.750 inches. Make sure they are still exactly parallel, and solder these pieces together.

Place the reducer on top of the longer piece, and cut a 1/2 inch diameter piece to exactly 50.25 inches. Clean up this last piece and solder it in place. Let the antenna cool off while you fabricate the Plexiglas bracing plate, and "feed-point" connector assembly.

Drill a 5/8 inch hole in the exact center of one of the Plexiglas plates. Place the coaxial connector you are using in this hole, and mark the plate for each of the small mounting screws. Drill these four holes, and also four holes near the corners of the plate where it will be mounted to the Q-line.

Snip the 6 inch wire in half. From one end of each wire, strip about a 1/2 inch of insulation. Strip about 3 inches from each of the other two ends. One piece of wire will be soldered to the center pin of the connector at the 1/2 inch stripped portion. The other piece of wire will have a ring connector installed at this point. The ring connector will later attach to one of the flange screws for the connector.

Place this finished Plexiglas connector assembly such that it is straddling the two parallel tubing pieces. Using a pencil, mark positions beneath this plate to drill holes for soldering the 3 inch stripped portions of wire. The center pin wire will connect to the longest piece of tubing, and the shank side of the connector will be soldered to the 59 inch Q-line. These connections will be made exactly 5.300 inches above the top edge of the lower end of the Q-line. This is a very critical dimension! It affects the feed point impedance, and the resulting antenna Standing Wave Ratio (SWR). Bolt this plate assembly in place with four 3/16 screws and lock nuts. Place the second similar plate on the Q-line about six inches below the top end of the Q-line, and bolt it in place.

When the antenna is mounted high and in the clear of all nearby objects, it should provide a good low VSWR over most of the lower two and one half to three megacycles of the band. It is desirable to mount this antenna at least 30 feet in the air, and higher if possible. I would also recommend the use of high quality 50 Ohm coaxial cable such as Belden RG- 213/U. To mount the antenna, you can use a threaded plumbing fitting, or make a mounting bracket fabricated from 1/4 inch thick aluminum plate stock and TV antenna type "U-bolts".

Later modifications to this antenna could also allow it to be used on the 2 Meter band, as well as the 135, and 70 Centimeter bands. This can be done by exploiting the "odd order" harmonics of the Six Meter band, or better, by adding Q-lines for these other bands.

To be Continued in next issue

On The Air Nets (Updated Aug 16th)

Sunday – 12 County Net.
(starts between 9:30 – 9:45 am.)
Central Maine Swap Net. 7:00 pm.
TRI-County ARES VHF traffic Net. 8:00 pm.

Monday – Oxford County Ares Net. 7:00 pm
(except on the first Monday.)

Tuesday – ELMER Net. 7:00 pm.

Wednesday – WAWA Net. 7:30 pm.
SKYWARN Net. 8:30 pm.

Thursday – SOUTHERN AROOSTOOK NET 7:00pm.
YL & OM Net 8:00 pm.

Friday – Slow Scan Net 7:30 pm.

Saturday – SKYWARN Net 7:30 pm.

Sunday – YOUTH NET 6:00 pm.

Repeater List

146.880 Streaked PL 100.0
146.850 Dixmont PL 100.0
146.820 Camden PL 100.0
146.670 Augusta PL 100.0
147.000 Lincoln PL 100.0
145.350 New Sharon PL 100.0
146.670 Topsfield PL 100.0
146.970 Sugarloaf PL 100.0
145.170 Island Falls PL 123.0
147.180 Sanford PL 100.0

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SSTV Frequencies

2meters – 145.500 FM
6meters – 50.680 USB

PSK31 Frequencies

2meters – 145.550 FM
2meters – 144.144 USB
6meters – 51.120 FM
6meters – 50.290 USB

Common Packet Frequencies:

145.01, .03, .05, .07, .09

Other Frequencies for Packet:

144.91, .93, .95, .97, .99
145.51, .53, .55, .57, .59
145.61, .63, .65, .67, .69
145.71, .73, .75, .77, .79

This Months 6 Local Repeater's

Bar Harbor - 145.290
York – 147.180 PL 100
Wiscasset – 146.985 PL
Hiram – 147.015 PL
Farmington – 147.180
Hulls Cove – 147.030 PL

Hamfest for 2007

Windsor, Me Sept 8
Alexander, Me Sept 15
Deerfield, NH Oct 12 - 13

Packet Frequencies

Packet can be used for keyboard to keyboard communications as well as other uses too.

Two Meter Simplex Frequencies.

146.400***, 146.415, 146.43, 146.445, 146.46, 146.475, 146.49, 146.505, 146.52 National Simplex Calling Frequency, 146.535, 146.55, 146.565, 146.58, 147.42, 147.435, 147.45, 147.465, 147.48, 147.495, 147.51, .147.54, 147.555, 147.57

*** The Frequency 146.400 Mhz is used in some areas as a repeater input.
Http://www.bloomington.in.us/~wh2t/

Any articles and entries, please send to Yarn Editor by the 15th of each month to W1LWT@ARRL.NET or to address on the back of the Yarn. Anyone that wants a e-mail version of the Yarn, please e-mail W1LWT to address above.

N1ARY
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stamp

Yankee Amateur Radio Club, Inc.
Membership Application

Date_____
Renewal___New Member___
Full($20)___Family($30)___Associate(non-voting)($15)___
Last Name_____
First Name_____ Call Sign_____
First Name_____ Call Sign_____
First Name_____ Call Sign_____
Address_____
City_____ State_____ Zip_____
Telephone_____
Email Address(es)_____
Are you an ARRL Member? (The Yankee Club is an Affiliate Club)_____

Please make your check payable to:
Yankee ARC, Inc.
Then mail the completed form with your enclosed check to:

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Fryeburg Me 04037-9603