Chattanooga Amateur Radio Club P.O. Box 23121 Chattanooga TN 37422 http://w4am.org

December 2009
Volume 21, Issue 12

Chattanooga Amateur Radio Club
Regular Monthly Meeting November 4, 2009

Meeting was called to order at 7:05 by President Mark Rose.
There were three visitors.

Mark led the Pledge of Allegiance.
Please keep all military personnel in your thoughts and prayers.
Test Report from Swapfest. , 4 people tested, 3 passed.
We need to come up with wood or desks for our new Shack at the Red Cross Building.
If you have a desk or some wood, please donate. Call Mark Rose.

We have a fellow Ham in need of an Antennae Raising Party.
Jeff, KE4OLE, could use a little help. Please get with Mark Rose if you want to volunteer.

We have a new member, Mel Hodges, KO4HWV. Welcome Mel!

The Nominating committee Chairman, Jim Bowman presented the committees report.
Willing to run for:
President- Mark Rose
Vice Pres- Robert Berman
Treasurer- Jim Knight
Board of Directors - Bill Dobbs, Rick Curtis and Tom Morgan
Nominations from the floor were:
Secretary- Susan Miller
Hamfest Chairman- Jim Bowman
Tom Cash moved that nominations cease.
Jim Bowman, Hamfest Chairman Nominee, gave a short report.
The Choo Choo has tentatively marked us in for 2010 at a cost of $1000 for Friday afternoon and Saturday all day.
Jim proposed to have a vehicle competition to show off best "install".
Forums on D-Star and APRS, Areas set up for young hams to practice, uniform police for security, lottery, outdoor flea market and MUCH more to come.

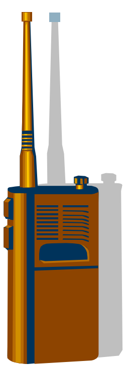
Election Ballots will be in the mail the week of November 9, 2009. Please mark your ballot and return by mail or bring to the December meeting. Instructions are on the bottom of each ballot.

Meeting was adjourned at 8:00.

Respectfully Submitted
V, Susan Miller
KI4RZJ
CARC Recording Secretary

Tuesday Night 8 PM 146.610

Thursday night 8 PM 146.790



CARC Sunday night net 9 PM 146.790

The Doctor Is IN: Antennas for Domestic Contests

By ARRL News Editor S. Khrystyne Keane, K1SFA

Just the other day, the Doctor and I got to talking about ARRL Sweepstakes. I showed him my crystal mug and whisk broom from last year's Sweepstakes running (the W1AW team did quite well), and he showed me what kind of antennas I should look into for domestic contests. Being more of a DX RTTY contester, I really don't know much about the domestic side of things. I dabbled in the February NAQP RTTY Contest last year from K1TTT -- and will do so again in 2010 -- so I made sure to listen attentively. Here is what the good Doctor had to say:

Each contest brings its own special requirements to the antenna designer. While many popular contests focus on communications outside North America and require the ability to send signals to all points of the compass, Sweepstakes is different, with a need to cover just the US and Canada. That means generally shorter range contacts and contacts in a limited range of directions, depending on station location.

In addition, points are gathered based on individual contacts multiplied by ARRL Sections. Thus, it is desirable to have the capability to reach all 80 sections on at least one band that will have propagation available. ARRL Contest Manager Sean Kutzko, KX9X, notes that many a contest superstation's secret weapon for Sweepstakes is a 40 meter dipole up between 25-30 feet. He says 40 meters is the Sweepstakes "money band" -- you can get close-in contacts during daylight and rake in the distant Sections when the band goes long in the evening hours. He said he had never put in a serious effort at Sweepstakes without a low dipole for 40, no matter how much aluminum he had up in the air.

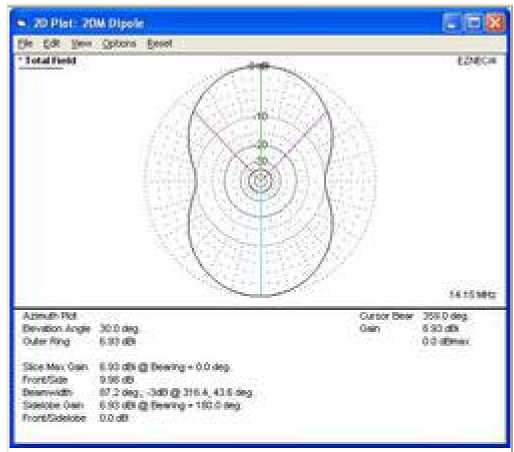


Figure 1: Azimuth pattern of a half-wave dipole at a height of half a wavelength has a -3 dB beamwidth of of 87 degrees on each side -- a close match to the coverage needed by W1ZR to reach US and Canadian stations. Click the picture to enlarge.

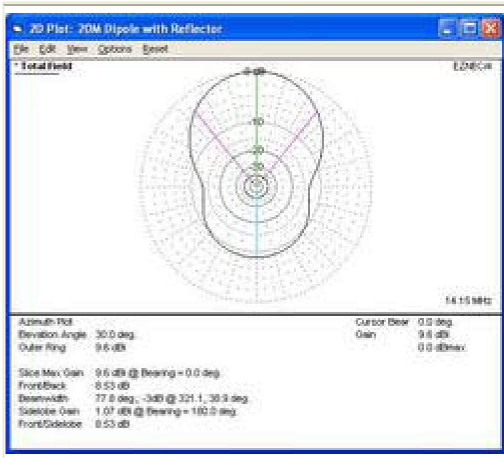


Figure 2: By adding a 5 percent longer than the dipole and 6 feet behind it, I reduce -- but don't eliminate -- rearward radiation and provide some gain to the front where distances are longer. Click the picture to enlarge.

Another great solution is a multiband Yagi that can be pointed towards the areas with the best propagation. If possible, have it relatively low -- perhaps at a half-wave length above ground -- to be able to cover the close-in stations, as well as those at the continent's far edge. Obviously, from the Central US or Canada, distances tend to be shorter than they are from the coasts with stations near the edges better able to make use of higher antennas. If you have the ability to try different heights, by all means try lowering your antenna from the optimum height for transcontinental contacts and see what works best for you.

If you're like me and don't have rotatable HF arrays available, all is not lost. First you need to figure out what azimuths you need to cover and then try to match those to fit your location. From my Connecticut location, I would want to cover from the direction toward old friend Don, WT1I, in Ocala, Florida (bearing 214) up to Mark, KL7TQ, my old Army buddy in Eagle River, Alaska (322).

There are many ways to compute the bearing to a station. The easy way out is to just use **www.qrz.com**. If your listing includes your latitude and longitude, bringing up another station and "looking at the details" will provide you with the bearing to their station. If you don't know anyone at the edges of the desired coverage area, just put a city name in the "Name Search" function and pick one that comes up. It doesn't get much easier -- or, if you must, you can use spherical trigonometry.

Using my station as an example, the range of bearings I want to cover requires a beamwidth of 322 minus 214, or 108. A half-wave dipole at a height of half a wave length has a -3 dB beamwidth of 87 (see Figure 1). At a width of 108 it's only down to -4.6 dB from the peak. That's pretty close, and might be good if I had a lot of distant stations behind me, as in Central US or Canada, but I don't.

If I were to put a wire reflector, 5 percent longer than the original dipole, 6 feet behind it (for 20 meters), I would have an easy to deploy 2-element Yagi with the pattern shown in Figure 2. To make it resonate in mid band, I need to trim about 4 inches from each end of the now driven element and I'm good to go. Note what I have -- a bit more gain in front, a lot less in the back, but still plenty of signal toward northern New England. My signal at the edges of my coverage area is now stronger than the dipole's -3 dB points.

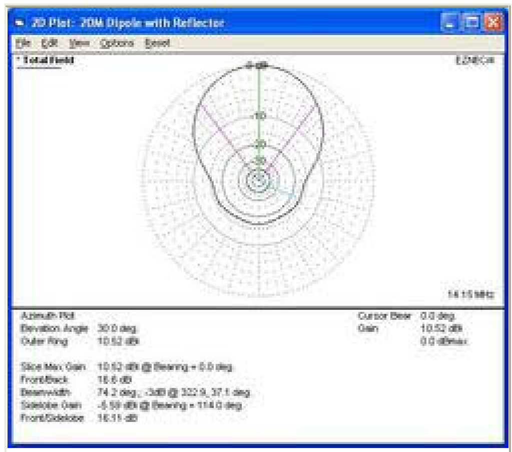


Figure 3: If I have no need for coverage to the rear, I can optimize the reflector length to achieve more gain by focusing almost all of my signal to the front. Click the picture to enlarge.

If I don't have many stations to my rear, an additional 1 dB of forward gain can be achieved at the expense of rearward signals (see Figure 3) and a higher SWR by shortening the reflector a few inches -- about 2.5 percent over the driven element should do the trick. This may be worthwhile if you are right at a corner of the country. For more bands, just use parallel elements and multiple reflectors. See the article by Marcus Hansen, VE7CA, to get the idea. Azimuth plots represented in Figures 1, 2 and 3 represent the output from the EZNEC antenna modeling software by Roy Lewallen, W7EL.

Thanks Doctor! Do you have a question or a problem? Send your questions via e-mail or to "The Doctor," ARRL, 225 Main St, Newington, CT 06111 (no phone calls, please). Look for "The Doctor Is IN" every month in QST, the official journal of the ARRL.

Simple variable frequency oscillator

This is a very simple circuit utilising a 555 timer IC to generate square wave of frequency that can be adjusted by a potentiometer.

With values given the frequency can be adjusted from a few Hz to several Khz.
To get very low frequencies replace the 0.01uF capacitor with a higher value.

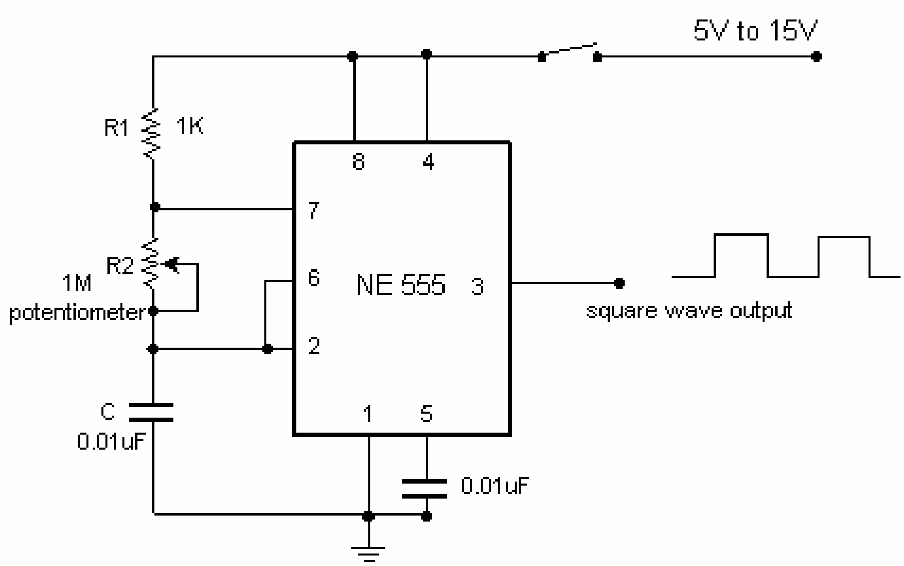
The formula to calculate the frequency is given by:

1/f = 0.69 * C * (R1 + 2*R2)

The duty cycle is given by:

% duty cycle = 100*(R1+R2)/(R1+ 2*R2)

In order to ensure a 50% (approx.) duty ratio, R1 should be very small when compared to R2. But R1 should be no smaller than 1K.
A good choice would be, R1 in kilohms and R2 in megaohms. You can then select C to fix the range of frequencies.



Sawtooth wave generator

Sawtooth wave generators using opamp are very common. But the disadvantage is that it requires a bipolar power supply.

A sawtooth wave generator can be built using a simple 555 timer IC and a transistor as shown in the circuit diagram.

The working of the circuit can be explained as follows:
The part of the circuit consisting of the capacitor C, transistor,zener diode and the resistors form a constant current source to charge the capacitor. Initially assume the capacitor is fully discharged. The voltage across it is zero and hence the internal comparators inside the 555 connected to pin 2 causes the 555's output to go high and the internal transistor of 555 shorting the capacitor C to ground opens and the capacitor starts charging to the supply voltage. As it charges, when its voltage increases above 2/3rd the supply voltage, the 555's output goes low, and shorts the C to ground, thus discharging it. Again the 555's output goes high when the voltage across C decreases below 1/3rd supply. Hence the capacitor charges and discharges between 2/3rd and 1/3rd supply.

Note that the output is taken across the capacitor. The 1N4001 diode makes the voltage across the capacitor go to ground level (almost).

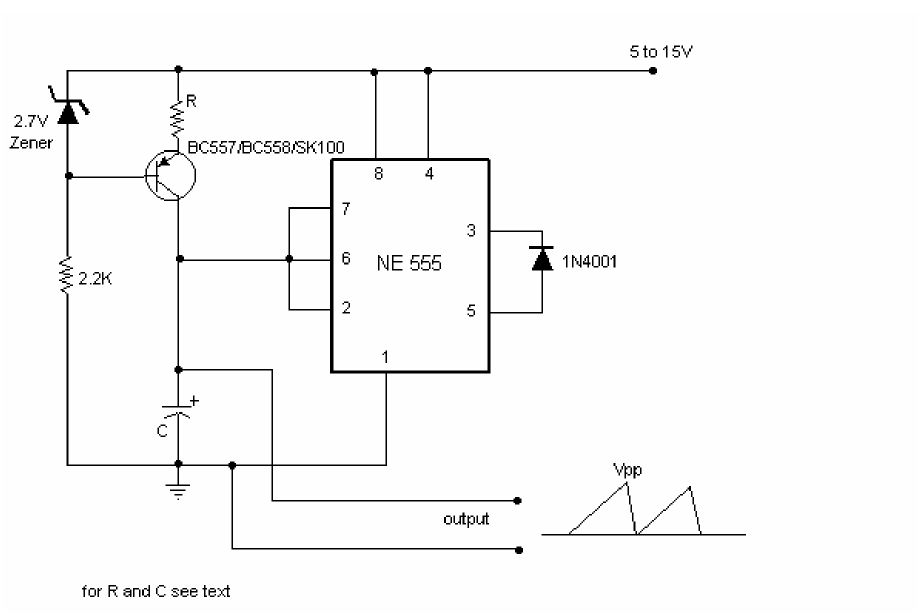
The frequency of the circuit is given by:

f = (Vcc-2.7)/(R*C*Vpp)

where:

Vcc= Supply voltage.
Vpp= Peak to peak voltage of the output required.

Choose proper R,C,Vpp and Vcc values to get the required 'f' value.



40 meter Direct Conversion Receiver

Using the circuit of 40-meter band direct-conversion receiver described here, one can listen to amateur radio QSO signals in CW as well as in SSB mode in the 40-metre band. The circuit makes use of three n-channel FETs (BFW10). The first FET (T1) performs the function of ant./RF amplifier-cum-product detector, while the second and third FETs (T2 and T3) together form a VFO (variable frequency oscillator) whose output is injected into the gate of first FET (T1) through 10pF capacitor C16. The VFO is tuned to a frequency which differs from the incoming CW signal frequency by about 1 kHz to produce a beat frequency in the audio range at the output of transformer X1, which is an audio driver transformer of the type used in transistor radios. The audio output from transformer X1 is connected to the input of audio amplifier built around IC1 (TBA820M) via volume control VR1. An audio output from the AF amplifier is connected to an 8-ohm, 1-watt speaker. The receiver can be powered by a 12-volt power-supply, capable of sourcing around 250mA current. Audio-output stage can be substituted with a readymade L-plate audio output circuit used in transistor amplifiers, if desired. The necessary data regarding the coils used in the circuit is given in the circuit diagram itself.