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SIGNALS

Rockwell Collins

Monthly Newsletter of the

Amateur Radio Club

Volume 37 Issue 01 **Web Site** http://www.w5rok.us **October 2015**

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RCARC
Membership Meeting

Tuesday 27 October 2015
1700 Social 1730 Meeting
1800 Program

Methodist Richardson Medical Center
At Bush/Renner/Shiloh Intersection
Second Floor Conference Room 200

Subject:
Program TBD

Local Club News

Meeting Notice

The program for this month was not finalized when the newsletter was published; Bob Kirby K3NT was still working on it. But the meetings are always great, so be sure to be there on Tuesday, 27 October!

RCARC Community Service Activities

Siren Testing Dennis Cobb WA8ZBT, Chris Havenridge KF5GUN, John McFadden K5TIP and Jim Skinner WB0UNI participated in the Richardson emergency siren testing on 7 October 2015. All sirens tested operated normally. The siren testing is performed on the first Wednesday of each month. The sirens are monitored by amateur radio operators and reports made using the Richardson Wireless Klub (RWK) repeater at 147.120 MHz.

Crime Watch Patrol Jim Skinner WB0UNI participated in Richardson Duck Creek Crime Watch Patrol (CWP). CWP members, after successful completion of Richardson Police Department Training, patrol their neighborhoods and report all suspicious activities to the Police Department.

New RCARC Officers

RCARC officers for FY2016 were elected at last month's meeting. Let's welcome the following new officers and help them to rejuvenate the club!

President	Chris Havenridge KF5GUN
Vice President	Gene Duprey K1GD
Activities Chair	Bob Kirby K3NT
Secretary	Jim Brown AF5MA
Treasurer	Mike Montgomery WD5TX

The Collins Station is Back on the Air!

W5ROK S-Line is alive and well. Newly returned K1GD (Gene Duprey) is working the station.

Read Gene's VP message on page 2 for more details.

What's Up with Club Members

John K5TIP and friends from RWK (Richardson Wireless Klub) have been meeting nightly on 50.203 MHz starting at 9:15 PM local. Drop in and say hello. *(Continued on page 3)*

RCARC OFFICERS

PRESIDENT
Chris Havenridge KF5GUN
972.509.8580
chris.dfw.tx@gmail.com

VICE-PRESIDENT
Gene Duprey K1GD
319.270.8159
geneduprey2015@gmail.com

SECRETARY
Jim Brown AF5MA
972.495.2209
jhksbrown@verizon.net

TREASURER
Mike Montgomery WD5TX
972.705.1498
dmmontgo@rockwellcollins.com

ACTIVITIES
Bob Kirby K3NT
319.360.0500
rjkirby3nt@yahoo.com

WEBSITE MANAGER
Mike Hollingsworth W5QH
972.571.6060
w5qh@arrl.net

STATION TRUSTEE
Steve Phillips K6JT
972.517.3332
k6jt@arrl.net

NEWSLETTER EDITOR
Jim Skinner WB0UNI
214.535.5264
wb0uni@arrl.net

MEMBERSHIP
Joe Wolf N5UIC
214.202.2757
n5uic@arrl.net

W5ROK CLUB STATION
972.705.1349
461-290

VE SESSIONS

Dallas tests are held on the fourth Saturday of each month at 1000 hrs. 13350 Floyd Rd. (Old Credit Union) Contact Bob West, WA8YCD 972.917.6362

Irving tests are held on the third Saturday of each month at 0900. Fifth and Main St. Contact Bill Revis, KF5BL 252-8015

McKinney VE test sessions are held at the Heard Museum the first Sunday of the month. The address is 1 Nature Place, McKinney TX. The time of the testing is 1430, ending no later than 1645. ***Note: no tests given on holiday weekends.***

Garland testing is held on the fourth Thursday of each month, excluding November, and begins at 1930 sharp. Location is Freeman Heights Baptist. Church, 1120 N Garland Ave, Garland (between W Walnut and Buckingham Rd). Enter via the north driveway. A HUGE parking lot is located behind the church. Both the parking lot and the Fellowship Hall are located on the east side of the church building, with big signs by the entrance door. Contact Janet Crenshaw, WB9ZPH at 972.302.9992.

Plano testing is on the third Saturday of each month, 1300 hrs at Williams High School, 1717 17th St. East Plano. Check Repeater 147.180+ for announcements.

Greenville testing is on the Saturday after the third Thursday, 1000 hrs at site TBA, contact N5KA, 903.364.5306. Sponsor is Sabine Valley ARA. Repeater 146.780(-) with 118.8 tone.

Richardson The Richardson Wireless Klub (RWK) VE team hold license testing on the third Thursday of each month at St. Barnabas Presbyterian Church, 1220 West Beltline Rd. Testing begins at 1900 hrs in room 12. Enter through the Northern most door on the east side of the church building. For further information contact Dave Russell W2DMR, at 972.690.9894 or E-mail warhog4@tx,rr.com.

President and VP Messages

Fellow RCARC members:

Thank you for electing me President; it will be an honor to serve this honorable group of intellectual, fun-loving, civic-minded hobbyists. That's a mouthful, but really, what we do is a lot of fun, but it takes a bit of brain power. As a hobby, we certainly spend more money than we receive, but the rewards are priceless. And Hams love to give back to the community, as evidenced by recent participation in the Richardson Siren tests, the Wild Ride, and the Plano Balloon Festival, for example.

Recently, we've noticed that the club membership and participation is down. But let us not dwell on that! Moving ahead to the future, let's take charge and move out. It's time to define our direction and proceed onward. It is time to set goals based on our values, and get active and visible so that members of the Rockwell Collins facility will know that we are a valuable part of this community, and the RCARC is a place for them as well.

Recently we had a meeting among the club officers, and we discussed topics such as educational projects to present, and enhanced participation in emergency drills and preparations. 'Plug in' and be a part of the new life of this distinguished club. 'Stay tuned!'

73
Chris Havenridge

Hello everyone, This is my first message to the club, and I will first off introduce myself for those who do not know me. My name is Gene Duprey, K1GD, and I have recently moved back to Texas from the Frozen North, otherwise known as Cedar Rapids, Iowa. I retired from Rockwell Collins (Collins Radio to me) in Cedar Rapids in 2008, after 39 years with the company. I am a Life Member of the club, which was given to me after 2 or 3 runs as President,

and also a run as VP, many eons ago. I was the first president of this chapter, back when we split with the commercial division, which became Alcatel. Then in 1999 I transferred to Cedar Rapids. But now I am back.

My first duties for the club, working with Bob Kirby, K3NT, will be to get an accurate listing of the club's assets, to see what we have and what can be used by the club members and what needs to be fixed or liquidated. This last Sunday, Bob and I started this process, and we completed a cataloging of the stations major items. I also went through a set up and checkout of the club's S-Line Station, except for the 30S-1 Amplifier. I am glad to say the S-Line is now fully operational, and we made several contacts on 20 & 40 meters, including checking in on the Collins Collectors Assn. 20 meter net. If anyone would like to use the S-Line, give me a call, so I can get you checked out on the tuning and operation of the station, as it is quite different than operating one of the other solid state stations.

We have many challenges ahead for the club, increasing participation in club activities, such as contests, public service events, new membership, demo operation during lunch hour at the facility, improving the station and especially repair of antennas and the towers. We need to make the club's presence known to the company and its employees, so they know who we are and what we do, both for the company and the community. This will help improve our status with the company and get us more support from the company.

That's about it for this month. I hope to meet everyone at the meeting on Tuesday.

73s
Gene, K1GD

Secretary's Report

22 September 2015

The meeting was called to order by President Mike Schmit WA9WCC at 1737.

The following were present at the meeting:

Jim Brown	AF5MA
Jonathan Brandenburg	KF5IDY
Dennis Cobb	WA8ZBT
Kathy Cobb	Guest
Bob Kirby	K3NT
John McFadden	K5TIP
Liz McFadden	K5LIZ
Mike Schmit	WA9WCC
Jim Skinner	WB0UNI
Joe Wolf	N5UIC

Officers and Committee Reports:
There were no formal reports other than the Secretary's Report, which is contained in this newsletter.

Old Business:
Following discussion at the last meeting it was decided to migrate the club email list to a secure server outside to Rockwell Collins firewall to improve member access. The final selection of a server remains pending.

New Business:
RCARC officers were elected to serve for the following year. After a review of constitutional requirements the following nominations were entered:

Chris Havenridge KF5GUN - President

Gene Duprey K1GD - Vice President

Bob Kirby K3NT - Activities Chairman

Jim Brown AF5MA - Secretary

Mike Montgomery WD5TX - Treasurer

All nominees were elected by unanimous vote of members present at the meeting.

Adjournment:
The meeting was adjourned at 1758 and followed by an interesting program on the design, launch and usage of amateur satellites (AMSAT Fox-1 series) by Jonathan Brandenburg KF5IDY.

What's Up with Club Members

(Continued from page 1) Joe, N5UIC enjoyed a birthday dinner last month with Bob K3NT. Welcome to the Medicare group, Mr. Joe.

Mike, WA9WCC worked with Bob, K3NT to clear tree limbs and change the coax on K3NT's discone antenna and also make space for a new six meter dipole.

Ross, K5SRT is doing a happy dance after scoring a 60's Hammarlund HQ145 receiver with matching speaker at a garage sale. Welcome to the world of vintage radio restoration, Mr. Ross.

Bob, K3NT thanks Ike, K5IKE for providing precision test equipment to measure RF dBm levels. Kirby notes excellent handy dBm - volts RMS - watts conversion and return loss Vs. VSWR references can be found at http://www.minicircuits.com.

Bob K3NT successfully repaired a vintage 60's SECO transistor tester after finding the RS Micronta 22-024 had a similar circuit. The repaired transistor tester was then used to help repair a small vintage power supply from Don, K5LHO.

Bob K3NT is searching for WWII special government records used to entertain the troops overseas. They are called V-Disks. As there was a musician's strike, special arrangements were made to record the tracks. So they con-

tain unique performances. The records were to be destroyed after the war but some escaped. These are 12" 78 RPM with a distinctive, mostly white label, with war department ID around the edge. The want is for a CAF audio project. The donated records can be returned if desired. Contact Bob, k3nt@arrl.net.

K5MDK - Michael prior W5ROK president meet up with K3NT - Bob and K5SRT - Ross in Ardmore OK and walked away with the grand prize Yaesu FT-857D. Hamarama http://www.texomahamarama.org/ also awarded scholarships to three youth worth $500 each, they do a great job! 73, K5SRT – Ross Terry.

(Contributed by Bob Kirby, K3NT and Ross Terry, K5SRT)

Understanding Antennas For The Non-Technical Ham - Part 14

*Each month, we continue including in **SIGNALS** excerpts of a book by Jim Abercrombie – N4JA (SK) on antenna design. This book is available online for free and can be located at http:// www.hamuniverse.com/basicantennas.pdf.*

XV. DIRECTIONAL BEAM ANTENNAS (Continued)

3. The SteppIR Antenna

The latest developments in yagi designs are found in the ones being sold by SteppIR Antennas. There are two, three, and four element versions. All these versions are frequency agile and cover continuously from 13.5 to 54 MHz. The MonstIR adds three very long elements for 6.9 to 13.5 MHz. The elements are made of fiberglass tubes with beryllium-copper ribbons inside. Each element has stepping motors to wind and unwind the copper ribbons to change their lengths inside the tubes. A multi-wire control cable connecting the control box to the stepping motors accomplishes this. The proper element lengths for all frequencies in its range have been calculated by a computer and stored in the control boxes computer. As you move from frequency to frequency, the control box in the shack readjusts each element length. Thus, the antenna is configured into a properly tuned monobander for any frequency in its range. These antennas are expensive, but the hams who own them say they are worth the money.

4. The Log-Periodic Array

Another beam antenna that looks like a yagi is the log-periodic antenna. It is configured using many elements with each element being shorter than the one behind it. This means the longest element is at the rear of the array and the shortest element is at the front. All elements are divided in the center and insulated from the boom, and all elements are driven. On both sides of the insulator at the center of each element, wires run from the front element of the array to the rear element. Each wire criss-crosses the other ones but they do not touch. That makes a 180-degree phase reversal from one element to the next one behind it. The feed-point is across the insulator at the shortest element. The feed-point impedance is about 200 ohms and a 4:1 balun is used to feed it.

The advantage of the log-periodic antenna is that it is very broad banded and it can cover all frequencies with an SWR below 2:1in its design frequency range. The disadvantage is the gain of a logperiodic antenna is lower than a yagi with an equal boom length. There are designs being sold today that cover continuously from 14 to 30 MHz. In Fort Gordon, Georgia, there used to be a monster log-periodic at the MARS station that covered from 2 to 30 MHz. The boom length was 120 feet and the antenna was rotatable.

5. Directional Cubical Quad and Delta Loop Antennas

We built a number of quads at various times and with them on the test stand and with the bottom wire a foot or so above the ground, worked many DX stations. When we built yagis and they were on the same test stand nine feet above the ground, we could hardly get a signal out of the back yard. Since the vertical beam-width of a quad is narrower than a yagi and the radiation angle is lower, the quad will work better at low heights. Because of its lower angle radiation, many quad users claim a quad "opens and closes" the band.

The two-element cubical quad is a square-or diamond-shaped loop antenna that has a second loop acting as a parasitic element. The quad configuration has all loops in the vertically oriented plane as figure 35 demonstrates. Feeding it in one of the horizontal wires results in horizontal polarization, and feeding it in one of the vertical wires makes it vertically polarized. Every two-element quad being sold today uses a reflector for the parasitic element, although it is possible for it to have a director. The theory of operation is the same as that of a yagi.

Some quad builders believe a diamond-shaped quad has more gain than a square-shaped one. Their logic is that since the maximum current points of both wires are spaced farther apart than with a square quad, the increased spacing of the current points should produce higher gain. To find out if this was true, we built both a diamond-shaped and a square-shaped quad for two meters. Using a commercial field-strength meter connected to a receiving antenna, we fed equal amounts of power to both antennas and measured the radiated field in each ones major lobe. Field strength measurements were made a few wavelengths away and many wavelengths away from the quads. No difference in the radiated field of either could be found.

According to Bill Orr in his book about cubical quads, a two-element cubical quad is equal to a pair of 2 element beams; one is stacked over the other a quarter-wavelength. The ends of the beams bottom driven element are bent up and the top element has its ends bent down where the ends of the top and bottom elements are joined together on the side. When they are joined, this forms the square we call a quad. The bottom element is then feeding the top element from its ends. The parasitic elements have the same configuration except the wire loop has the ends bonded together to form a continuous square.

There are multi-element quad designs that use one or more parasitic directors in addition to the reflector. Adding a director will lower the feed point impedance. The wire of the reflector is about 3% longer than the driven element, and each director has about 3% less wire than the driven element. Adding directors to a two-element quad makes the horizontal beam width narrower, producing more gain.

Another quad design "the delta loop" uses triangular-shaped driven elements. One or more triangularshaped parasitic elements make the antenna complete. Theoretically, the delta loop antenna will have slightly less gain than the cubical quad, because there is less enclosed area in the triangular loop. We believe that there are no instruments available to hams to be able to measure the difference.

Most cubical quad and delta loop antennas that can be rotated are used on 20 meters and higher. A few ambitious hams have built rotatable quads for 40 meters. Others have made 80-meter quads, supported between trees, fixed in one direction.

In order to make the quad smaller, adding loading coils or linear loading sections in its wires has been suggested, but that will defeat the purpose of using a quad. Because the quads gain is produced by the enclosed area inside the loop, reducing the enclosed area will result in less gain.

The wires for quads for 20 through 10 meters are strung around the perimeter of an "X shaped frame made of fiberglass poles or bamboo. Each element has its own X-shaped frame. A smaller X-shaped metal structure, called a "spider," attaches the poles to the boom. The poles are referred to as "spreaders." The four spreaders attached to the spider form the "X." The "X" can be rotated 45 degrees on the boom to form a diamond-shaped quad instead of a square quad. A few have tried with limited success to make the spreaders out of PVC or aluminum.

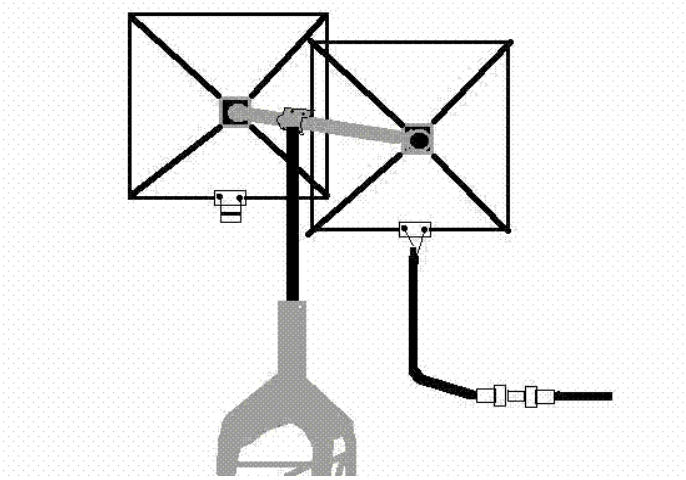

Figure 36A. Single Band Cubical Quad

A wire is attached near the ends of the spreaders to form a loop around them. The two ends of the wire are connected to an insulator to attach the feed-line as is done on a dipole. The quad loop has a theoretical feed-point impedance of 100 ohms. To match it, you can use a quarter-wave matching section of 70-ohm coax, a gamma-match, or a 2:1 balun. More on this is in another paragraph. The delta loop is made much the same way, but it requires only three spreaders to form an equilateral triangular loop. It is matched the same way since the feed-point impedance is about the same.

The reflector and director are formed the same way as the driven element except the two ends are shorted together to form a continuous loop. In order to get maximum performance from a quad you need to tune the reflector for either maximum gain or best front-to-back ratio. For tuning purposes, the wire of the reflector is cut a little shorter than calculated and the ends of the loop are connected to an insulator. A shorted stub, consisting of two parallel wires, is connected to the loop ends and hangs down from the insulator. Another wire is shorted across the two parallel stub wires. The shorting wire is moved up and down the stub to tune the reflector. The stub is a means of adjusting the total length of the reflector. See Figure 36A. A field strength meter is needed to do this and you need a large area and two people. The field strength meter needs to be placed several wavelengths away from the antenna. Low power is fed into the antenna while it is tuned. One person tunes the reflector while the other person reads the field strength meter. Tuning the reflector involves tuning the stub for minimum signal off the back. Once the shorting wire has found its proper position, it is soldered in place. Quads made by the formulas work satisfactorily without tuning. Tuning for

maximum front-to-back ratio instead of maximum gain will do more for the performance of the quad.

The gain of a two-element quad is nearly the same as an average 3-element yagi. The best part of the gain of a quad is the vertical beam width, or H-plane of the major lobe logically should be narrower due to it being equal to two stacked beams. For this reason, the 2-element quad has a lower angle of radiation. A horizontally polarized quad should have a slight advantage over a yagi. A lower angle is better for working DX. While operating using both quads and yagis, we have noticed that the horizontal beam width or E-plane of a quads pattern is wider than a 3-element yagi. We believe the horizontal beam-width of the quad is the same as a two-element yagi. This is why the 2-element quad is not as directional as a 3-element yagi.

Some believe you cannot stack another antenna above a quad. They assume that because the quad has both vertical parts of the loop, a metal vertical mast will couple to the vertical part and detune the quad. We believe a vertical mast will have to be resonant at the operating frequency to detune a quad. Using MMANA, the quad was modeled with a metal vertical mast going through the plane of the quad. The only difference observed was that the resonant frequency was changed by a couple of kHz. The gain and front-to-back remained the same.

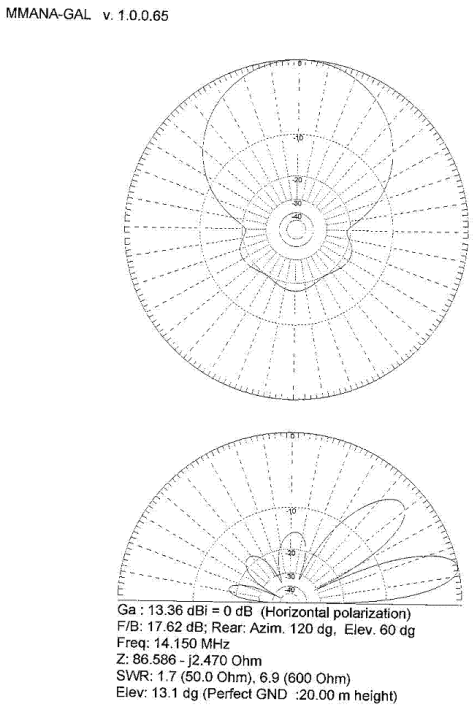

Figure 36. Radiation pattern of a Two Element Cubical Quad at 65 Feet

Modeling our 2-element quad in free space on 20 meters, we found its gain to be 5.49 dBd. The boomlength of the quad is 8 feet. A three-element yagi with a boom-length of 16 feet will have 6.4-dBd freespace gain on 20 meters. The free-space gain of a 20-meter optimum spaced monoband yagi on a 25-foot boom will only have slightly more gain.

The compromise spacing for a 2-element multi-band quad for 20 through 10 meters is 8 feet. This spacing is 0.115 wavelength on 20 meters, 0.175 wavelengths on 15 meters, and 0.23 wavelengths on 10 meters. These spacings are within acceptable limits. For a single-band 20-meter quad, space the elements 12 feet apart. If you want to build a 12 and 17-meter dual band quad, the spacing will be 8 feet, the same as it should be for 15 meters. Eight feet is also a satisfactory spacing for a 10-meter quad, but it can be as close as four feet.

With smaller perimeter requirements, loops for the higher bands can be strung inside and parallel to the lower band loops to make a multi-band quad. It is easier to make a multi-band quad than a multi-band yagi. Quad kits for tri-band and 5-band quads are available. These kits cost less than a multi-band beam.

In the construction of most quads, an insulator is put in the bottom horizontal part of the wire on the driven element so it can be fed like a dipole. A 2-to-1-balun transformer will match the feed-point to 50 ohms, then you can tie all the feed-points of a multi-band quad together. The Lightning Bolt Antennas 32MCQ/WB quad feeds five loops this way and the SWR is 1.4:1 or less on all five bands. The person manufacturing the Lightning Bolt quad went out of business on December 12, 2005.

With other more complicated schemes, each quad loop is fed separately, and each loop uses a 70-ohm odd multiple of a quarter-wave series matching section placed between the 50-ohm coax and the feedpoint. Used this way, the quarter-wave matching section will match 50 ohms to 100 ohms. A remote antenna switch will have to be mounted close to the feed-point to select the desired loop. Other builders use a separate gamma-match on each driven element to get a perfect match to a 50-ohm coax but this method would also require a remote antenna switch. Without the switch, several pieces of coax, one for each band, would have to be run into the shack.

If you are going to build a monoband quad, you need to use the following formulas to cut the wire loops to these approximate lengths:

For the driven element, you divide 1005 by the frequency in MHz.

For the reflector, you divide 1030 by the frequency in MHz.

For the director, you divide 968 by the frequency in MHz.

Make any additional directors the same length as the first one.

These formulas were derived experimentally from tests run here. The exact measurements will be determined by the element spacing, but the lengths cut by these formulas will be very close for any reasonable spacing.

After giving you the advantages of a quad, here are the disadvantages: The two-element quad for 20 meters is large vertically and horizontally. When the 20-meter quad is on the ground, the boom is 8 feet high and most people arent tall enough to maneuver it by holding the boom. Some quads, which are made from lightweight materials, are flimsy, and they will suffer during wind and ice storms. The bestconstructed quads have their spreaders made of heavy fiberglass. Those quads, although they are heavier, stand up well under adverse weather conditions. The Lightning Bolt quad used here has stood up very well during three ice storms in the past two winters.

Here is some information we discovered after originally writing this book. The MMANA antennamodeling program does not perform very well when modeling a quad. On 20 meters, the modeling program says the front-to-back ratio of our quad is at a maximum at 14525 kHz, but actually, it occurs at 14050 kHz. The measurements of actual front-to-back were made using a field strength meter. We reduced the power levels off the front to give the same field strength reading we got off the back. The front-to-back ratio in dB was calculated from the two power levels. What was interesting was the maximum front-to-back ratio occurs at a single discrete frequency and the front-to back deteriorates somewhat on either side of that frequency. While looking at the radiated field off the front, the field strength does not vary one dB across the whole band. Maximum gain and maximum front-to-back was very close to the same frequency. Not having tested them in this way, we believe yagi beams perform the same way regarding front-to-back ratio and gain. In working stations, the gain is the important parameter. Front to-back ratio is important in reducing interfering signals from behind the antenna. We decided to tune our quad for maximum front-to-back rather than for maximum gain. The next step is to lower the quad and carefully tune the reflector for each band. After running tests to determine the frequency where maximum front-to-back occurs, we found the maximum measured front-to-back ratio was 22 to 23 dB.

Good news! After writing the above paragraph, we lowered the multi-band quad and reduced the reflector element lengths on the two-element Lightning-Bolt Quad. The original reflector lengths were too long according to the field strength readings we made. The formulas that were originally used to cut the reflector lengths were anywhere from 1029 to 1036 divided by the frequency in MHz. We derived from field-strength measurements that the maximum front-to-back ratio occurred when the reflector length was cut by dividing 1022 by the frequency in MHz. While searching the Internet, we discovered EI7BA in Ireland used 1019 divided by the frequency on his multi-band quad. We decided to use his formula and we could lengthen the reflector by adjusting the stubs if necessary. After cutting the reflectors to the new dimensions, we made new field strength readings. The front-to-back ratio occurred near the frequency of our calculations. In addition, the frequency of maximum field strength from the front also occurred inside each band. As an example, today we were listening to GD4PTV on the Isle of Man on 17 meters. On the front of the quad, he was S7. With the quad 180 degrees from him, he was inaudible. We also found that other stations were down by at least six S-units off the back. Originally, stations off the back of the quad were down only two S-units.

Several months later it was discovered that a multi-band quad tunes differently from a single-band quad because the interlaced elements react to detune each other. That may be the reason we found the reflectors of a multi-band quad needed to be different lengths than the 1030/frequency formula.

Here are some words of wisdom about using a field-strength meter in trying to tune a quad:

Tuning the quad reflector stubs can give you misleading data. If you look only for the minimum signal from the back of the quad, that may not be the point of best front-to-back because you may have detuned the quad so that the signal from the front may have also deteriorated.

Using a field strength meter, keep the receiving antenna as short as possible to prevent the receiving antenna from being nearly resonant. Certain receiving antenna lengths seem to be frequency sensitive, that is, as you change frequency toward the receiving antennas resonant point, the field strength meter will give a false higher reading. The only problem with using a very short receiving antenna is the meter may not have enough sensitivity to make measurements from the back of the antenna.

It will be impossible to achieve a high front-to-back ratio on certain bands on a multiband-quad because the reflector wires for adjacent bands affect the tuning by interacting with each other. When the Lightning Bolt Quad was designed, we are not certain which parameter was used in its design (gain, SWR, or front-to-back). From the field strength readings made with that design, it was impossible to draw any conclusions. If you are going to build a quad, what we said about designing a yagi is also is true for the quad: you can tune for best gain, best front-to-back, or best impedance match. You cannot tune for more than one of these parameters at a time. To tune a quad for maximum gain is relatively easy using a short antenna on the field-strength meter.

While we were trying to measure the frequency of the highest forward gain on 17 meters, we found the maximum field strength occurred at the high end of the band on one receiving antenna. Subsequently, it was strongest on the low end of the band on another receiving antenna having a different length. No changes had been made to the dimensions of the quad in either case. Trying to move the frequency of the maximum field to the middle of the band, we adjusted the length of the reflector stubs and it made no difference to the frequency where the maximum field occurred. What caused the error was we were trying to measure the field strength 100 feet in front of the quad. The long receiving antenna connected to the field strength

meter was acting like a parasitic element and was not accurately measuring the signal being radiated from the quad.

6. The Quagi
A variation of the quad and the yagi is a marriage of the quad and the yagi called the quagi. The quagi has a quad driven element, quad reflector, and yagi directors. Hams who have built the quagi report the yagi directors work better than quad directors, but we have never compared the two types of directors.

At one time we converted a two-meter yagi to a quagi and compared the field strength readings from both configurations. By changing the driven element and reflector to quad loops, we measured a signal increase of 1.8 dB. We also experimented to see what effect the quad reflector had on the signal. While using the quad driven element we changed the reflector back to a yagi reflector. What was surprising to us was the configuration of the reflector had no affect on the radiated signal. Only by changing the driven element from a yagi element to a quad element made any change in the field strength. All these field strength readings were made using a commercially manufactured field strength meter. To insure our readings were valid, the power being fed to the antenna was measured and kept constant.

Ham Lunch and Ham Home for Sale

The following was received by email from fellow amateur Larry Essary, K5XG

Ham Lunch
We are meeting for lunch each Monday at Red Hot & Blue located at 5017 W. Plano Parkway in Plano. It is located about 500 feet west of the intersection of Preston and Plano Parkway. It's on the north side. They have BBQ and great Southern dishes. I really like their chicken fried steak.

For Sale in Lucas, Texas - A home for hams
Also, we are downsizing, and our home at 21 Pecan Grove Circle, Lucas TX 75002 is for sale with all the towers and antennas in place. All are permitted and city approved.

At some point there will be a garage sale to find homes for 45 years of ham radio items.

Below is some basic information about the house. If you are interested, or know someone who would be, please contact me at 972 742-2053.

- About 3700 sq ft 2 story Tim Jackson Custom home
- 4 bedrooms (3 up / master suite down),
- 3 1/2 baths, study, 2 family areas, living room, dining room, large kitchen with large island and breakfast area, utility room,
- 3 car attached garage. Top end appliances. Granite counter tops, extensive crown moldings, 20 foot tall main family room.
- Central battery back up system with outlets available in several rooms, lawn irrigation system. Fire Pit and bench seating.
- House built in 1999 on 2 acres. See more details below

Antenna systems
- 70 foot motorized Tri-Ex LM470 crank up tower with 2 el 40 meter, 5 el 20, 6 meter vertical dipole, 80 meter inverted "V". Tail Twister rotator
- 50 foot Tri-Ex W-51 manual crank tower up with 6 el 6 meter and pair of 10 element M2 2 meter beams. Ham IV rotator.
- 50 foot Rohn 25 (with Phillystran) and KLM KT34 (antenna currently on ground), Ham IV rotator.
- 80 meter inverted "V"
- 160 meter inverted "L" 1/4 wave About 35 feet vertical, balance horizontal.
- 2 full size (34 ft) 1/4 wave 40 meter verticals
- 2 44 foot 80 meter verticals with large top hats
- 2 Butternut multi-band verticals.
- All fed with buried 1 1/4", 7/8 " or 1/2" Heliax.
- #6 solid copper ground from each tower to house service entrance.
- All installed and approved/permitted by city of Lucas

(Contributed by Steve Phillips K6JT)

ARRL Asks FCC to Clarify that Hams May Modify Non-Amateur Gear for Amateur Use

From ARRL Headquarters

Newington CT October 14, 2015

The ARRL has asked the FCC to make clear that Amateur Radio licensees may modify non-amateur equipment for use on Amateur Radio frequencies. Some hams have expressed concerns that recently proposed rules would inhibit post-sale modification of Wi-Fi equipment, now sometimes altered for use on Amateur Radio frequencies. The ARRL made its point in comments filed on October 8 on a Notice of Proposed Rule Making (NPRM) in ET Docket 15-170 and RM-11673. The proceeding mostly addresses proposed amendments to FCC rules regarding authorization of RF equipment. The NPRM can be found on the web in PDF format at, https://apps.fcc.gov/edocs_public/attachmatch/FCC-15-92A1.pdf.

"The Commission should clarify...that the ability of licensed radio amateurs to modify and adapt non-amateur equipment for use in the Amateur Service is beneficial, is permitted, and is not restricted by any rule of general applicability adopted in this proceeding," the League said in its comments. The ARRL said proposed rules requiring manufac-

turers to include security features to prevent network devices from being modified were "problematic," to the extent that they would preclude hams from adapting network equipment for ham radio applications.

"The Amateur Radio Service has a very long tradition of modification and adaptation of commercial communications equipment," the ARRL's comments pointed out. Amateur licensees should be permitted to modify any previously authorized equipment for use under Amateur Service rules, the League asserted. The proceeding attracted many comments regarding this aspect of the proceeding, although the proposed rules differ only slightly from the current rules.

The ARRL also urged the FCC not to apply any limitations proposed for Software Defined Radios to SDRs intended for use exclusively in the Amateur Radio Service, "as has been the policy for the past 10 years."

(Excerpted from Arrl.net website)

New K5RWK Repeater Operational on 441.3375 MHz

It's operational!! The Richardson Wireless Klub has the new Yaesu System Fusion DR-1X repeater operational on 441.3375 Mhz with a 5 Mhz positive offset. The repeater is set for Automatic Mode Selection (AMS) which will pass legacy analog FM modulated signals as well as the new C4FM modulated digital voice signals. The newer Yaesu System Fusion digital radios can use either method.

No PL tones are currently required on the input frequency but a PL tone of 110.9 Hz is transmitted on the FM modulated output. This allows users of FM-only radios to set their radio for Tone Squelch (CTCSS) of 110.9 Hz on the 441.3375 MHz receive frequency to block the noise of a digital transmission.

It's possible for an FM user to inadvertently interrupt an ongoing digital QSO when the Tone Squelch is active. The FM user should check to see if the channel is busy before transmitting. This can be done by looking at the Channel Busy LED or the Signal Strength bar graph on the display. Another way is to program two adjacent channels with the same frequency but one with Tone Squelch active and one without. Monitor on the channel with Tone Squelch active but switch to other channel when operating.

There is no "411" voice recorder and there is no courtesy tone on the repeater. Only the hiss of a short squelch tail will be heard. The repeater ID's with CW only.

(Contributed by Douglas Kilgore KD5OUG by email)

Upcoming Events

NOVEMBER

31-Nov 1	**EME 50-1296 MHz** The objective is to work as many amateur stations as possible via the earth-moon-earth path on any authorized amateur frequency above 50 MHz. 48-hour periods (0000 UTC on Saturday through 2359 UTC Sunday). More info at http://www.arrl.org/eme-contest.
7-9	**NOVEMBER SWEEPSTAKES—CW** The objective is for stations in the United States and Canada (including territories and possessions) to exchange QSO information with as many other US and Canadian stations as possible on 160, 80, 40, 20, 15 and 10 meter bands. Begins 2100 UTC Saturday and runs through 0259 UTC Monday. More info at http://www.arrl.org/ sweepstakes.
21-23	**NOVEMBER SWEEPSTAKES—PHONE** The objective is for stations in the United States and Canada (including territories and possessions) to exchange QSO information with as many other US and Canadian stations as possible on 160, 80, 40, 20, 15 and 10 meter bands. Begins 2100 UTC Saturday and runs through 0259 UTC Monday. More info at http://www.arrl.org/ sweepstakes.
28-29	**EME 50-1296 MHz** The objective is to work as many amateur stations as possible via the earth-moon-earth path on any authorized amateur frequency above 50 MHz. 48-hour periods (0000 UTC on Saturday through 2359 UTC Sunday). More info at http://www.arrl.org/eme-contest.

DECEMBER

4-6	**160 Meter** The objective is for Amateurs worldwide to exchange information with W/VE amateurs on 160-meter CW. Starts 2200 UTC Friday, ends 1600 UTC Sunday. More info at http://www.arrl.org/160-meter.
12-13	**10 Meter** The objective is for Amateurs worldwide to exchange QSO information with as many stations as possible on the 10 meter band. Starts 0000 UTC Saturday; runs through 2359 UTC Sunday. More info at http://www.arrl.org/10-meter.

REGULAR ACTIVITIES

Daily	DFW Early Traffic Net (NTS) at 6:30pm 146.88 – PL 110.9Hz
Daily	DFW Late Traffic Net (NTS) at 10:30pm 146.72 – PL 110.9Hz
Daily	Texas CW Traffic Net (NTS) at 7:00pm on 3541 KHz and at 10pm on 3541 KHz www.k6jt.com
1st Wednesday	Richardson Emergency Siren Test. At noon using the Richardson Wireless Klub (RWK) repeater at 147.120 MHz.
2nd Wednesday	ARES North Texas HF Net Every month—3860 KHz at 8:30 pm—9:30pm

Rockwell-Collins

Amateur Radio Club

Mail Station 461-290

P.O. Box 833807

Richardson, TX 75083-3807

TO:

CLUB STATIONS
(972) 705-1349
W5ROK REPEATER
441.875 MHz +5 MHz Input
131.8 Hz PL - RX and TX
W5ROK-1 PACKET BBS ROK Node
145.05 MHz
W5ROK-N1, W5ROK-N2 & W5ROK-N3 HSMM-MESHNET Nodes 2.4 GHz

Tuesday 27 October 2015
1700 Social 1730 Meeting
Methodist Richardson Medical Ctr
At Bush/Renner/Shiloh Intersection
Second Floor Conference Room 200

NEXT SIGNALS INPUTS DEADLINE:

➔➔➔ 13 November 2015 ➔➔➔