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SIGNALS

Rockwell Collins

Monthly Newsletter of the

Amateur Radio Club

Volume 36 Issue 6 **Web Site** http://www.w5rok.us **March 2015**

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RCARC
Membership Meeting

Tuesday 24 March 2015
1700 Social 1730 Meeting
1800 Program

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

Subject:
Rockwell and the transition to broadband in the early 90's
By Ron Carlson, WW2CBI

Local Club News

Meeting Notice

At this month's meeting Jonathan Ron Carlson, WW2CBI, will present, " Rockwell and the transition to broadband in the early 90's ". Sounds like a great meeting, so be sure to be there on Tuesday, 24 March!

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 4 March 2015. The testing was cancelled by the City of Richardson due to inclement weather. 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.

Membership Renewals

It is time for membership renewals for 2015. Please get your renewals in to Joe Wolf N5UIC. Joe's email address and telephone number are on page 2 of this newsletter.

WGD Annual Award Nominations

It is time to start working on your submissions for the WG 2015 Divisional Awards which will be presented at the ARRL Regional Centennial Convention at HamCom in June. Nominations for 2015 Award Winners will be accepted until May 1, 2015. Nomination forms for each nominee (by category) must be supported by at least three ARRL members on the award nomination form, a minimum 150-word statement and any available supporting documentation. Other rules do apply and can be found on the nomination forms.

Nomination forms may be downloaded from the West Gulf Division website at http://www.arrlwgd.org . Once on the West Gulf Division website, click on "2015 WGD Annual Awards" in the middle of the page.

The Division Awards judging panel consists of four (4) ARRL members, selected by each of the Section Managers in North Texas, Oklahoma, South Texas and West Texas Sections. The Section Manager may opt to appoint him/herself to the committee. The fifth judge is selected by the Division Director and may reside anywhere within the West Gulf Division. Neither the Division Director nor the Vice Director will participate in the vote.

There is nothing better in life than being recognized by your peers. I know that there is someone in your club who has performed above and beyond the call of duty who deserves recognition. Please take the time to make certain that individual receives the gratitude of the entire West Gulf Division.

Download the nomination forms and submit your entry today!

73, David K5RAV

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VE SESSIONS

Dallas tests are held 4th Sat of each month at 1000 hrs. 13350 Floyd Rd. (Old Credit Union) Contact Bob West, WA8YCD 972.917.6362

Irving tests are held 3rd Sat 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 3rd 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's Message

THIS SPACE RESERVED FOR PRESIDENT'S AND/OR VICE-PRESIDENT'S MESSAGE

Secretary's Report

24 February 2015

The meeting was called to order by Vice President Mike Schmit WA9WCC at 1736.

The following members were present at the meeting:

Jonathan Brandenburg	KF5IDY
Jim Brown	AF5MA
Ron Carlson	WW2CBI
Dennis Cobb	WA8ZBT
Kathy Cobb	
Bob Kirby	K3NT
John McFadden	K5TIP
Bill Reed	NX5R
Mike Schmit	WA9WCC
Jim Skinner	WB0UNI

Officers and Committee Reports:
President's Report: There was no formal President's Report.

Vice-President's Report: There was no formal Vice President's Report.

Secretary's Report: The Secretary's Report is in this newsletter.

Treasurer's Report: There was no formal Treasurer's Report.

Website Manager's Report: There was no Website Manager's Report.

Station Trustee's Report: There was no Station Trustee's Report.

Database Manager's Report: There was no Database Manager's Report.

Old Business:
Mike Schmit WA9WCC reported that he was still exploring approaches to establishing an Internet connection for the club radio site. He is discussing options with RC Cedar Rapids.

Dennis Cobb WA8ZBT indicated that Elecraft has evaluated repairs needed to the club's K3 transceiver and provided an invoice for work needed. Work to be done will include upgrades to bring the equipment up to current product standards, including a new synthesizer with lower close-in phase noise. Funding for the work was approved at a prior meeting.

New Business:
There was no new business.

Adjournment:
The meeting was adjourned at 1752, followed by a presentation on the Raspberry Pi processor and its applications by Jonathan Brandenburg KF5IDY.

Using 60 Meters

Amateurs are permitted to operate on five frequency channels, each having an effective bandwidth of 2.8 kHz.

Table 1:
Channel 1: 5330.5 kHz
Channel 2: 5346.5 kHz
Channel 3: 5357.0 kHz
Channel 4: 5371.5 kHz
Channel 5: 5403.5 kHz

These frequencies are available for use by stations having a control operator holding a General, Advanced or Amateur Extra class license. It is important to note that the frequencies shown above are suppressed carrier frequencies — the frequencies that appear in your transceiver's tuning display when your transceiver is in the USB mode.

Amateurs may transmit with an effective radiated power of 100 W or less, relative to a half-wave dipole. If you're using a commercial directional antenna, FCC Rules require you to keep a copy of the manufacturer's gain specifications in your station records. If you built the directional antenna yourself, you must calculate the gain and keep the results in your station records.

When using a directional antenna, you must take your antenna gain into account when setting your RF output power. For example, if your antenna offers 3 dB gain, your maximum legal output power on 60 meters should be no more than 50 W (50 W plus 3 dB gain equals 100 W Effective Radiated Power).

In addition to increasing the power amateurs can use on 60 meters, the Report and Order also expanded the number of legal operating modes:

Upper Sideband (USB)
CW
Digital

Each mode comes with its own requirements for legal operation on 60 meters.

Upper Sideband Operation

Upper Sideband operation on 60 meters is simple. Just tune your transceiver to one of the channel frequencies shown in Table 1 and operate, being careful you do not over-modulate and create “splatter” that would fall outside the 2.8 kHz channel bandwidths. If your transceiver allows you to adjust your maximum SSB transmit bandwidth, setting it to 2.4 kHz should keep you well within the legal limit.

CW Operation

CW operation must take place at the center of your chosen channel. This means that your transmitting frequency must be 1.5 kHz above the suppressed carrier frequency as specified in the Report and Order (see Table 1). Operating at strict channel-center frequencies may come as a disappointment to many, but cooperating with the NTIA is key to expanded privileges in the future.

The channel center frequencies are:

Table 2:
Channel 1: 5332.0 kHz
Channel 2: 5348.0 kHz
Channel 3: 5358.5 kHz
Channel 4: 5373.0 kHz
Channel 5: 5405.0 kHz

Consult your transceiver manual. Some transceivers transmit CW at the exact frequencies shown on their displays, but others offset the actual transmission frequency by a certain amount (for example, 600 Hz). If your manual is not clear on this point, contact the manufacturer. If you have access to a frequency counter, this is an excellent tool for ensuring that your CW signal is on the channel center frequency.

Digital Operation (synopsis added by K6JT - can supply more upon request)

Digital operation, for example PACTOR, used by NTS Digital, requires centering the signal in the channel. This type of operation is essentially the same as SSB using Upper Sideband. It has been specified by the NTIA that only PACTOR III and PSK31 be used on 60 meters, and then only for short periods of time. Most SCS PACTOR III modems use a 1500 Hz center and PSK31 can be set to transmit at 1500 Hz with the transmitter set to a Table 1 frequency. PACTOR III has a bandwidth of about 2.4 KHz and can transfer data at 3200 bps on HF. PSK31 is very slow, suitable only for keyboard to keyboard QSOs.

Because amateurs are only secondary users on 60 meters, we are required to yield to other services. In other words, if you suddenly hear a non-amateur transmission on the channel, you must cease operation on that channel immediately. Always listen before transmitting. If you hear another signal on the channel, whether it is a signal from an Amateur Radio or government/private station, don't transmit. As amateurs exercise their new 60 meter privileges, a more detailed and specific channel occupancy plan may become clear. In the meantime, follow these tips to share the channels as efficiently as possible:

- Keep your transmissions as short as possible with frequent breaks to listen for other signals.
- Do not use split-channel operation (transmitting on one channel and listening on another)
- To locate a clear channel, USB operators should begin at Channel 5 and move down (if necessary) to Channels 4, 3, 2 and 1 until a clear channel is found. CW and digital operators should reverse this pattern, beginning at Channel 1 and moving upward.
- If you hear a digital signal and you're not sure if it is an Amateur Radio signal, don't transmit; move to another channel instead.
- Take care when using narrow receive filters, such as when operating CW. To be in compliance you need to be able to hear other stations that may begin operating on the channel.

Over the years, Channel 5 has become a de facto international DX channel. With that in mind, avoid domestic QSOs on this channel when possible.
(Contributed by Steve Phillips K6JT)

Understanding Antennas For The Non-Technical Ham - Part 7

*Each month for the next year or so, we are 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. Now, part 7...*

Understanding Antennas for the Non-Technical Ham

A Book By Jim Abercrombie, N4JA (SK)

Illustrations by Frank Wamsley, K4EFW

Edited by Judy Haynes, KC4NOR

Edited for the web , N4UJW

X. OTHER TYPES OF DIPOLES

1. A Shortened Dipole Using Loading Coils

If you are unable to put up a full-sized dipole on your property, putting loading coils into the dipole could shorten the antenna. See section IX, part 1. A short antenna has capacitive reactance and the capacitive reactance can be tuned out with a coil. The overall length of the shortened antenna will be determined by the amount of inductance in the coil. Pre-tuned antennas of this type are available from at least one manufacturer. The main problem with loaded antennas is they are very narrow banded. If the loading coils are wound with small diameter wire, the coils may introduce unwanted loss into the antenna. Loading coils can also be found in shortened vertical antennas for high frequency (HF) mobile use.

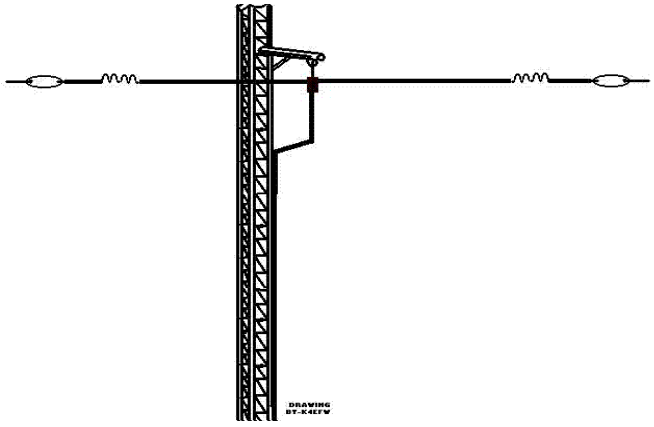

Figure 5. A Shortened Loaded Dipole

2. All Band Dipole

In the figure below, a dipole is cut to a half wave on the lowest band you want to operate. Feeding it with ladder-line and a tuner makes it possible for you to work all the other higher bands. The only losses in this antenna system are the loss in the tuner and the very small loss in the ladder-line. This system is more than 90% efficient. As mentioned above the balun in the tuner will be used, or if your tuner doesnt have a balun, an external balun can be connected between the tuner and ladder-line with a short run of coax. Four-to-one baluns are the most commonly used ones for this arrangement.

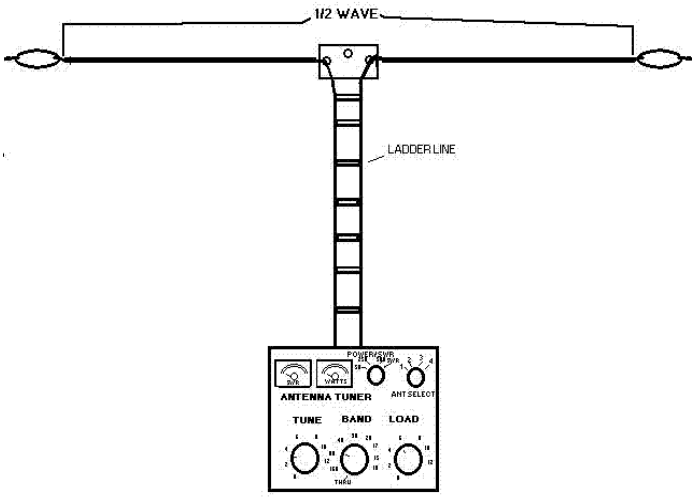

Figure 6. All Band Dipole

3. The Sloping Dipole

A lower angle of radiation can be achieved by tying one end of a half-wave dipole to a high support and the other end near the ground. It is fed with or without a balun with 50-ohm coax.

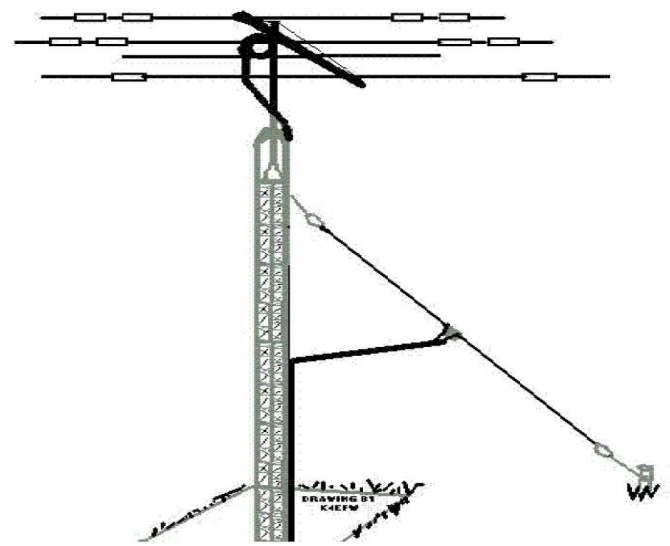

Figure 7. Half-Wave Resonant Sloping Dipole

The sloping dipole will show some directivity and have low angle gain in the direction of the slope. More directivity can be gained if the dipole is strung from a tower, and the tower is acting as a passive reflector. The sloping dipole is mostly a vertically polarized radiator and it works well for DX. Since the sloping dipole is fed in its center, it does not need to be grounded to the earth as a quarter-wave vertical does. Make sure the bottom end of a sloping dipole is at least 10 feet above ground because like all dipoles there is high RF voltage on its ends.

In the picture above, the field of maximum radiation is in the direction of the slope or toward the right side of the picture. The formula for the length of a sloping dipole is the same for any half-wave resonant dipole.

4. The Folded Dipole

The B&W Company makes a folded dipole that claims to have a good match on all bands and it does. However, on the low bands much of the power is burned up in the resistor that connects the two ends together. The power going toward the ends encounter the resistor and is consumed as heat. All that power is lost and does not radiate, and no power is reflected back to the feed point making the antenna have low SWR. On the higher bands, a large part of the power radiates before it reaches the resistor and the antenna is moderately efficient on those bands. On 80 meters the 90 foot-long dipole model will produce a signal at least 10 dB lower than that from a resonant dipole.

If you remember the single channel TV antennas used years ago, the driven element was a folded dipole. Folded dipoles are very broad-banded. That is the reason they were used for TV antennas since a TV channel is 4 MHz wide.

When constructing a folded dipole, the formula for calculating the length of it is the same as for any dipole. The folded dipole consists of two parallel conductors with the ends tied together. The conductors can be spaced from less than an inch to more than two inches apart when made from TV ribbon or ladder-line. At the ends, strip the insulation back several inches, Twist the bare wires together, solder them, and run them through insulators. The feed-point is in the center of only one of the two parallel conductors.

The feed-point impedance of a folded dipole at resonance is close to 300 ohms resistive and can be fed directly with 300-ohm TV twin-lead or a tuner with its balun. This antenna was very popular years ago when coax was expensive and 300-ohm TV twin-lead was relatively cheap. A length of 450-ohm can be substituted for the twin-lead. An alternate feed method is placing a 6:1 balun at the feed-point and then feeding it with 50-ohm coax. The folded dipole will not radiate its second harmonic, so it is not good for a multi-band tuner-fed antenna.

Another folded dipole type is the three wire folded dipole. We have seen this dipole only in books and do not know anyone who uses one. The feed-point impedance is 600

ohms resistive and is fed with homebuilt 600 ohm open wire feeders.

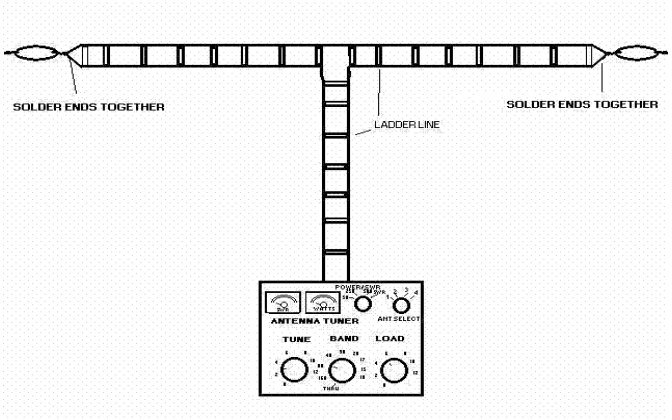

Figure 8. Folded Dipole

5. The Double Bazooka Dipole

The double bazooka is claimed by its users to be broad-banded, a quality especially interesting for those hams operating on 75/80 meters. Tests done at the A.R.R.L. have shown the double bazooka is only slightly more broad-banded than a regular dipole, probably due to the use of a large conductor (coax) for the center part of the antenna. The double bazooka will not transmit its second harmonic, and its users say it does not need a balun. Other users say it is quieter than a regular dipole.

The center of the antenna is made from RG-58 coax. To find the length of coax needed, divide 325 by the frequency in MHz. The coax forms the center part of the double bazooka and a piece of number 12 wire on each end completes the antenna. The length of each of the end wires is found by dividing 67.5 by the frequency in MHz. To increase the bandwidth some builders use shorted ladder-line in place of the number 12 wire, which makes the end pieces to be electrically larger.

The feed-point of the double bazooka is unique. At the center of the coax dipole, remove about 3 inches of the plastic covering, exposing the shield. Cut the shield in the center and separate it into two parts. Do not cut the dielectric or the center conductor. Leave the center conductor with its insulation exposed. On the feed-line strip off about 3 inches of outer insulation, separate the shield from the center conductor, and strip about 1 inches of the insulation from the center conductor. To attach the feed-line, solder the two exposed feed-line conductors to the two pieces of the separated exposed shield of the dipole center. It goes without saying: seal the feed-point to prevent water from getting in. At each of the two ends of the coax forming the center of the antenna, the coax is stripped back and the center conductor and shield are shorted together and soldered. The end wires are soldered to the shorted coax ends, run to insulators at the end of the antenna, and the soldered joints are sealed against the weather.

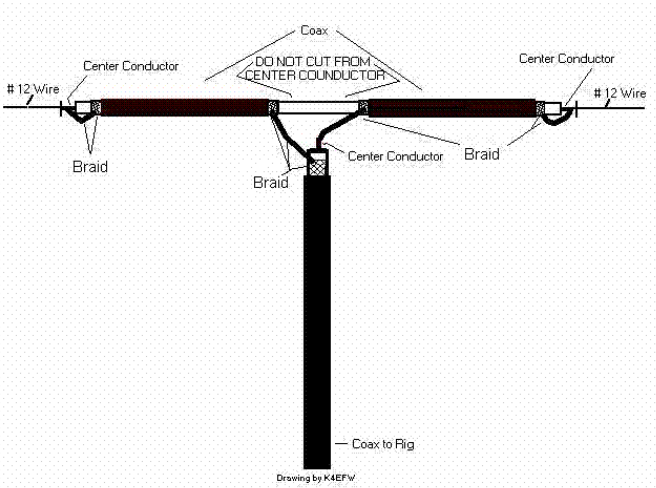

Figure 9. Double Bazooka Dipole

6. Broad-Banded Coax-Fed Fan Dipole

A broad-banded dipole for 75/80 meters can be constructed by attaching two equal length dipoles to the center feed-point and spreading the ends about 3 feet apart using PVC water pipe to separate them. The completed dipole looks like a bow tie. This makes the antenna to appear electrically to have that of a large diameter conductor. Because of this, the overall length will need to be shorter than a single wire alone. When we used the antenna, we found a length of 110 feet would cover most of the 75/80-meter band without a tuner. It is fed with 50-ohm coax. The use of a balun is optional. The antennas for most of the higher bands have enough bandwidth so they do not need broad banding.

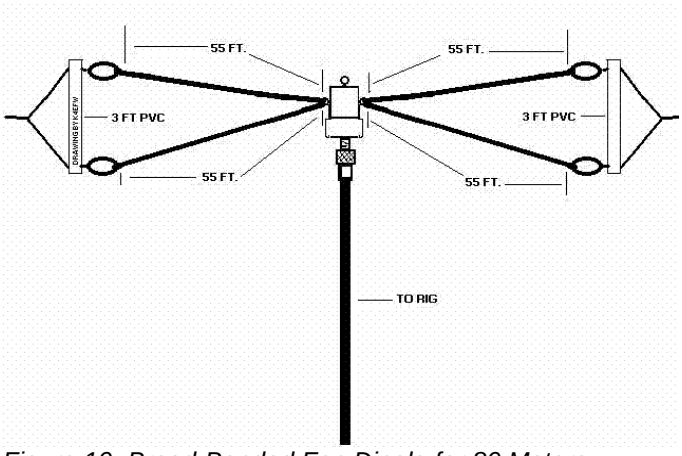

Figure 10. Broad-Banded Fan Dipole for 80 Meters

7. Two-Element Collinear Dipole

The two-element collinear dipole is an antenna that is a full-wavelength antenna having a two-dBd gain. It can be fed with ladder-line and a tuner and used as a multiband antenna, or it can be fed with a quarter-wave-matching stub with 50-ohm coax cable to make it a single band array. In the stub matching system, a quarter wavelength of

ladder-line is connected across the center insulator, and the opposite end of the ladder-line is shorted. A shorted quarter-wave piece of feed-line acts like an open circuit. Going from the shorted end of the ladder-line toward the dipole, there will be a point where a piece of 50-ohm cable will find a perfect match. The 50-ohm feed-point will have to be found empirically (trial and error).

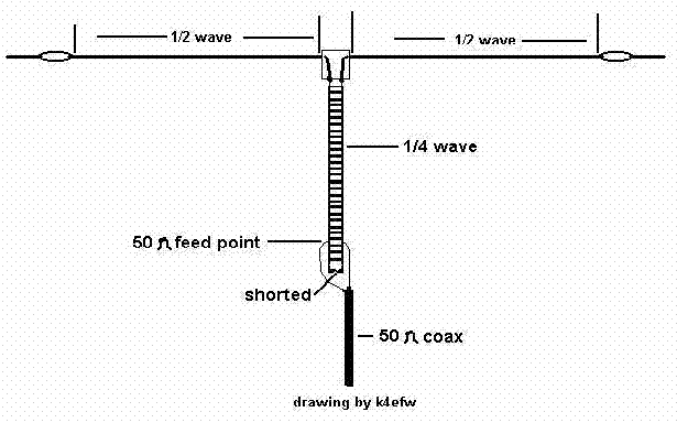

Figure 11. Two Element Collinear Dipole

8. Four-Element Collinear Dipole

The four-element collinear dipole array consists of four half-wave segments connected end-to-end with an insulator between each two adjoining segments. The feed-point is at the center of the array. The antenna is fed with ladder-line through a tuner. A quarter wave shorted ladder-line stub hangs down vertically from the insulators between the inside and the outside half-wave segments. This stub provides a 180-degree phase shift so that all half-wave segments are fed in phase. This antenna has a 6-dBd gain and it radiates bi-directionally at an angle perpendicular or broadside to the plane of the wires.

This antenna is too long for most hams to use on 80 and 40 meters, and the stubs hanging vertically will be too close to the ground. For 20 meters, the four-element collinear array will be 97 feet long and the stubs will be 18 feet. To find the length of each half-wave segment, divide 468 by the frequency in MHz, and for the quarter-wave stubs, divide 246 by the frequency in MHz.

MFJ has begun marketing the four-element collinear monoband array. They have them for 20, 17, and 15 meters. This antenna is so easy to build that you can do it yourself. All you need is 5 insulators, antenna wire, and some ladder-line.

It will have no gain if you use it on bands for which it is not designed because the stubs are used as phasing lines. It is definitely not a multiband antenna.

It is possible to add more half-wave segments to the ends of this array to make it have 6, 8, 10, etc half wave segments. Adding more segments will add more gain and make the lobes narrower.

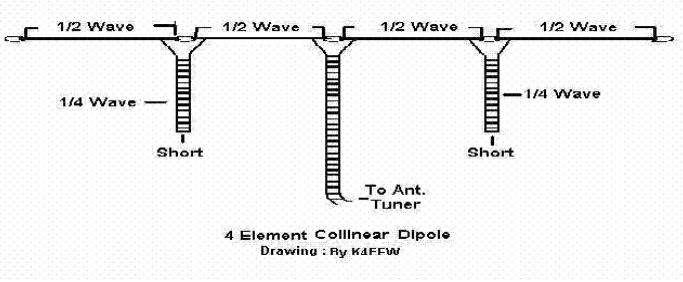

Figure 12. Four-Element Collinear Dipole

Upcoming Events

APRIL

19 **Rookie Roundup—Phone** The Rookie Roundup returns to SSB on Sunday, April 19, 1800 UTC through 2359 UTC. This is a great opportunity for new operators to get on the air and learn the skills of contesting. "Old Timers" should also take note of this event. Consider opening your station up to a rookie (or two) and become an elmer. Remember, the more operators are on the air, the more fun the Roundup will be for everyone. Be sure to read the rules before the event. It is also helpful to be familiar with the logging and submission processes ahead of time. You're in the right place; browse this page for information and tips on operating the Rookie Roundup. We hope to hear you on the air! More info at http://www.arrl.org/rookie-roundup.

JUNE

13-15 **June VHF** For amateurs in the US and Canada (and their possessions) to work as many amateur stations in as many different 2 degrees x 1 degree Maidenhead grid squares as possible using authorized frequencies above 50 MHz. Stations outside the US & Canada (and their possessions) may only work stations in the US (and its posessions) and Canada. Stations in KH0-9, KL7 & KP1-KP5, CY9 and CY0 count as W/VE stations and can be worked by DX stations for contest credit. Begins 1800 UTC Saturday, runs through 0259 UTC Monday. More info at http://www.arrl.org/june-vhf.

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 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 830 pm—930pm

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 24 March 2015

1700 Social 1730 Meeting

Methodist Richardson Medical Ctr
At Bush/Renner/Shiloh Intersection

Second Floor Conference Room 200

NEXT SIGNALS INPUTS DEADLINE:
➔➔➔ 17 April 2015 ➔➔➔