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W4RSC "RADIO SILVER COMET"



SILVERCOMET SKYWAVE

SilverComet ARS, INC NEWS

PO BOX 1873 Hiram Ga. 30141 501 (C) (3) Not for Profit

June 2015 Number 1 Vol 5



Greetings : President SEZ

CQ CQ CQ de K4CGA... Well, it has been a while since I last rambled on about club activities. Spring and Summer have kept a lot of our members including me, pretty busy or unavailable. To pick up where we left off, in March, we had a great Severe Weather presentation by Dave, K4DMF. It was a lot of valuable information and prepared us for the crummy weather that we are now enduring.

Our Dinner and Rag Chew session at Rodney's BBQ in April turned out great. Good food, good company and a lot of rag chewing. We have got to do that more often, so keep your eyes open for new places that can accommodate a bunch of rowdy professional amateurs. In May, the presentation changed directions a bit and got technical. An overview of Echo-link and D-Star was presented. Since the club's D-Star equipment is now on the air thanks to our D-Star experts, Dan, Lee, Ron & Neal, it was an appropriate time to update the membership on its operation. The presentation was extremely interesting and some of us even learned some stuff. Who said you can't teach an old dog (me) a new trick or two. In our June meeting, we will get prepped for Field Day operations. We will discuss locations, setup, tear down, equipment, frequencies, antennas, operation schedules and the purpose of FD. Please plan to attend this meeting and participate in the planning process. Your input is a valued contribution to make our operations successful. Remember to keep the last weekend of June free for participation. Next

month, we hope to review our Field Day operation and discuss antennas. If time permits. Well that is all for now. Hope to see you at the next meeting on June 2nd.

73" Chuck K4CGA



American Radio Relay League
The National Association For Amateur Radio
AFFILIATED CLUB

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ARRL AMATEUR RADIO

www.arrl.org

2015 ARRL FIELD DAY

HAM RADIO



Silver Comet ARS
2015 Calendar



First Tuesday	January	February	March	April	May	June	July	August	September	October	November	December
Meeting Date/Time	01-06-2015 7pm	02-03-2015 7pm	03-03-2015 7pm	04-07-2015 6:30pm	05-05-2015 7pm	06-02-2015 7pm	07-07-2015 7pm	08-04-2015 7pm	09-01-2015 7pm	10-06-2015 7pm	11-03-2015 7pm	12-01-2015 7pm
Meeting Location	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Rodneys BBQ on Dallas/Acworth @ Due West Rd.	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg	Paulding Chamber of Commerce Bldg
Meeting Activity	PC Antenna Analyzer for HF by KOCZR & WD4PAQ	D-Star Radio Primer by WB3ILX/W4DFO	Severe Weather by K4DMF (CURRENT)	Dinner Meeting & Rag Chew Session	DX Hunting & New HF Station by K4ELI See his new Ten-Tec	Field Day Primer & Planning (Planner needed)	Antenna Primer & Discussion (Tentative) FieldDay Review	Antenna Primer & Discussion WB4BQX & ? (Volunteers?)	(new) Silvercometars AM Radio DX Contest	Your Suggestion Here	Holiday Dinner (Location TBD)	2016 Business and New Officers
Additional Activities	WA7BNM Contest 2015 Calendar	Information handed out for WB4QOJ Packet Station BBS/DX/HFGATE	SE USA HAMFEST Calendar arrl.ga.org	GA QSO Party April 11-12, 2015 georgiaqsoparty.org	HF Digital Contests dxzone.com Search Contests	GOTA GET ON THE AIR FIELD DAY			Club Fall Picnic at K4ELI's Time/Date TBD			

(Subject to change. Check club website) ... Don't Forget NETS on 146.955 Rpt. Tuesday 7:30 PM IBM Radio Club Net Thursday 7:30 PM Paulding ARES NET

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FIELD DAY 2015 INFO FROM W4JFL



➤ **W4RSC**
"Radio Silver Comet"



W4IBM  USA
IBM RADIO CLUB ATLANTA

Paulding ARES **WX4PCA**

Please come out and join the **Silver Comet Amateur Radio Society** and the

IBM Radio Club this year as they join up with **Paulding ARES** for
Field Day 2015!

The event will be held at the Paulding ARES headquarters at the old Fire Station #7 in Rockmart the weekend of June 27th - 28th. We will be running Field Day this year as a Class 2F (EOC) station and will be operating SSB, Digital, CW and a GOTA (Get On The Air) station, so no matter your operating preference, we will have something for you.

Please feel free to drop in and work one, or all, of the stations that will have setup. You do not need to stay for the entire duration of the event, but the longer you can help, the better. We plan to go the distance this year and operate until 2pm on Sunday, so if you are one of those that enjoys working the overnight hours, you are encouraged to attend. As an added benefit, the facility that we will be working out of has A/C, indoor restrooms and a kitchen. There is also room to sit (and sleep) for those wishing to stay overnight. This will be a good chance to come out and brush up on your operating skills and try a mode that you have never (or rarely) worked. It will also be a great chance to come out and enjoy the company of some of the nicest people around.

If you are interested in attending, we will be discussing Field Day this Tuesday, June 2nd, at the Silver Comet ARS meeting being held at 7pm on the lower level of the Paulding Chamber of Commerce.

We look forward to seeing everyone out there!

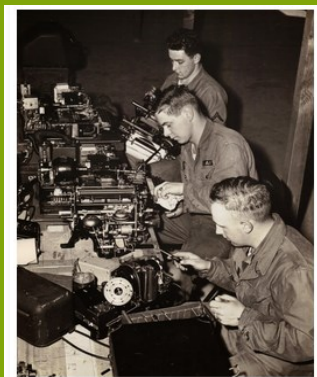
Sean - W4JFL

WB4QOJ Packet

BBS/ DX CLUSTER / HF-
Gateway / WW Chat Server

Some of our group have never had the experience of Packet Radio. Sure you have probably heard of APRS and Paulding ARES runs a Win-Link RMS Packet Gateway for email. A full service packet radio switch like BPQ32 is what conventional Packet Radio is all about. The system is on-line and is working 7x24 on 145.63 mhz and 145.59 mhz. also 14.105 LSB HF. Two other ports are ready to go but have not been placed in service. This system is great for NTS Traffic as well as general bulletins that come in each and everyday. W4DTO and WB3ILX have done a lot of work on getting D-Rats on VHF Packet. All you need is a Soundcard interface and the free software and you are on your way. The VHF side runs 1200 baud and HF is 300 baud. Both are full AX.25 Full error correction (no errors).

DO YOU KNOW WHAT
THIS IS ??????????



ANSWER NEXT MONTH

Breakfast in Dallas on Thursdays 9am

This is a FANTASTIC IDEA. Clubs and organizations that meet to eat have a lot of success with membership and swapping ideas while breaking bread. Thanks to K4ELI and WB4BQX for getting this going.

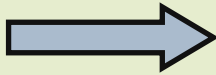
Subject: [Silvercometars] Weekly Breakfast ongoing!!

To all the gang, Chuck and I have been talking about this for a few weeks. Starting this Thursday at 9am, We plan to meet weekly for breakfast.

*Location is the **BUS STOP CAFE** 100 yards west of the OLD Dallas Courthouse downtown. It is the little brick building in the corner of the old Courthouse parking lot.*

Locally owned, good food, Chuck and I know the folks who own it, etc, etc.

We know all cannot attend all the time, Hopefully you can slide in a few minutes late and visit with us occasionally. We look forward to seeing whoever can show up next Thursday, Steve K4ELI



**TYPICAL THURSDAY
MORNING BREAKFAST**

CREW



COFFEE COFFEE MORE !!!



FOOD IS FANTASTIC



**SERVICE IS
GREAT AND
FAST ...SUPER
TASTY . TOO !**

VHF/UHF Quad Antenna

The information in this article has come from many amateur sources, the most notable was from WA6TEY (sk 1985) Ray Frost, who was a pioneer of VHF Quad designs and one of the best Southern California Transmitter Hunters of the 1980's. Ray built hundreds two meter quads in single and paired configurations as well as his famous mobile radio direction finding quad. At Ray's request I have used his information and expanded upon his basic designs.

I've made every design in this paper. I have used 5-Element 2 meter Quad, a pair of 220 Quads, and a pair of 2 meter Quads on my California station for ~10 years. When leaving California I gave all my antennas to WB6ADC (sk 2001) Clark Harris, another great So Calif Transmitter Hunter.

Equipment needed to build a Quad are:

1. VHF/UHF VSWR Meter & appropriate ≥ 5 watt transceiver(s) or MFJ-269
2. discarded TV antenna to use radials/tubes for spreader supports
3. wooden dowel 5/16" for spreaders
4. AWG 14-18, solid copper wire
5. wood 1 1/2 X 1 1/2 in. boom or re-enforced 1" PVC with "T" and end caps
6. non-metallic or re-enforced PVC for the mast
7. RG-58/8X for the feed line & balun
8. misc. paint, u-clamps, etc.

NOTE: re-enforced PVC is made by inserting a snug fitting wooden dowel the length of the PVC that will greatly add rigidity and strength.

I have a strong view point about Amateur Stations and what makes the station perform the best. The Number one item is the ANTENNA even if you may have the most expensive radio in the world a poor antenna will greatly limit your DX. The more antenna tuners, matching devices, and electronic components in the signal path the more RF energy that is absorbed before getting to the receiver's front end. The uniqueness of the TEY Quad design is in have NO capacitance or inductive matching networks that cut down on the efficiency of the Quad. Direct feed and tuning the antenna to "resonant frequency" gives the most optimal performance. Quads are easy and cheap to build; also a Quad is the foundation for the Quagi antenna. Quagi's, are the brain child of Dr. Wayne Overbeck, N6NB, another GOOD antenna that gives improved gain over a multi-element Quad.

The myth adding elements to a Quad increases gain. I have found that the gain per element drops off significantly after the fifth element (based from real measurements not theoretical modeling). For the cost, size, or material in adding additional elements does not warrant the effort due to the minimal gain increase (of about 0.3 dB per element after the fifth). Also additional elements reduces control of the front lobe directivity, due to lobe to element inter-play. If gain is needed consider making a pair of Quads using a phasing harness (pair of 4 element quads reaches ~14 dB of gain). Or consider making a 10 element wide spaced Quagi that ~13 dB of gain. A four element Quad is best antenna for its size followed closely by my "Extended 3 element" Quad (that has better directivity – covered in another paper).

PLEASE - Read this entire booklet and study the diagrams before building a Quad, it can save you unwarranted frustrations!

Quad Dimension Formulas

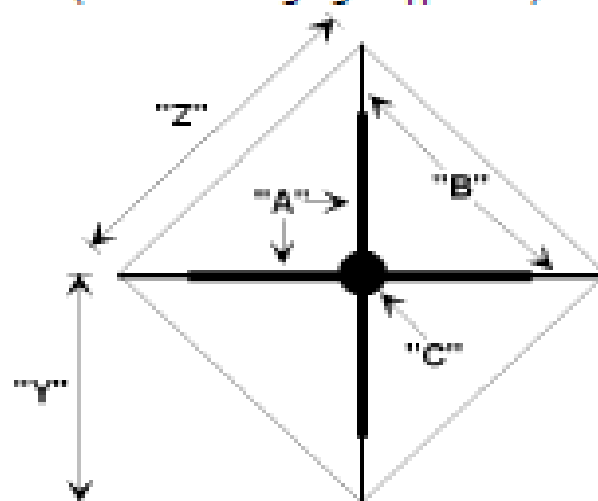
Element	Formula	Data
Reflector	$1030 / F$ (in MHz)	= A'
Driver	$1005 / F$ (in MHz)	= B'
Director 1	$975 / F$ (in MHz)	= C'
Director x	$920 / F$ (in MHz)	= D'

Circumference of Quad wire loop is $((A \text{ or } B \text{ or } C \text{ or } D) * 0.97(VF)) * 12$ (Inches) = Zt

Distance from center of the boom to wire support on spreader is $(1.414213 * (Z/4)) / 2 = Y$

Velocity Factor = 0.97 (for solid 14-20 gauge copper wire).

$$Z = Zt / 4$$



A = metal tubing (TV aerial radials) 3/8" O.D. about 14-20" long)

B = Wood dowelling 5/16" - Insulated spreaders

C = boom

Element wire - #18 solid enameled - strip ends before soldering

Basic Quad Dimensions

Elements	Z	Y	Zt	Spacing	Bazooka
-					
146.000 MHz					
reflector	20.5	14.5	82	12	
driver	20	14	80	10	13.25
director 1	19.4	13.75	77.6	9.0	
director x	18.3	13	73.2	9.0	
224.000 MHz					
reflector	13.4	9.5	53.5	7.7	
driver	13.1	9.23	52.2	6.5	8.7
director 1	12.7	9.0	50.7	6.1	
director x	12.0	8.5	47.8	6.1	
446.000 MHz					
reflector	6.7	4.7	26.9	3.9	
driver	6.6	4.7	26.2	3.3	4.3
director 1	6.4	4.5	25.5	3.1	
director x	6.0	4.2	24.0	3.1	

How to build a QUAD (In brief)

These brief statements are to supplement the illustrations & diagrams.

1. Tune up should be conducted with as little surrounding metal as possible and with the quad pointing away from any near structures. Study all illustrations before proceeding.
2. Make the Bazooka Balun. Firmly tape the coax to the spreader, boom, and mast. The feed point is on the horizontal spreader for vertical polarization.
3. Before tuning install all metal spreader supports, metal mast, and metal hardware that you are going to use. (This allows you to tune/compensate for any antenna RF pattern anomalies generated by metal in the near field radiation area.)
4. Construct the Reflector and Driver - first - add about 8 inches of wire to the Zt dimensions.
Make the isolation spreader for the Driven element - see [Quad Feed Point](#) diagram.
Place all the spreaders into the Reflector and Driven element holding tubes - measure & place all the spreaders at the proper dimensions.

NOTE: I use electrical tape or lightly crimp the metal tube at the metal tube to wooden dowel intersecting point to hold the dimension.

Adjust the driver feed points by increasing or decreasing the Reflector overall wire length. This allows you to obtain the lowest VSWR reading at the designed frequency.

HINT: Adjust the Driver for the best VSWR and then trim with the Reflector circumference dimension... then back to the Driver and to re-trim...etc.

Expected nominal results: ONLY Reflector & Driver

3 el Quad	3 el VSWR		3 el Quad	3 el VSWR
144.100	1.7:1		221.000	1.7:1
145.000	1.4:1		222.000	1.4:1
145.500	1:1		222.500	1:1
146.000	1:1		223.000	1:1
146.500	1:1		223.500	1:1
147.000	1:1		224.000	1:1
147.995	1:1		224.980	1:1

5. Install and solder the Director(s) to their specified dimensions. Measure and make the Director(s) a perfect diamond.

HINT: Make the wire the Zt dimension and permanently solder the wire - then pull the spreaders out to make a tight diamond with no wire sag! Pin the dowels into the metal tubes will keep the shape for a long time.

Note: VSWR will probably go up; so go back to step 4 and re-tune the Driver and Reflector to obtain the best VSWR.

6. When VSWR is relatively low or as you desire solder and fasten down the Reflector. Recheck the VSWR and trim the Driver as necessary. Then solder and fasten down the Driver.

Nominal results: full Quad all elements

4 el Quad	4 el VSWR		4 el Quad	4 el VSWR
144.100	2.3:1		221.000	2.3:1
145.000	1.4:1		222.000	1.4:1
145.500	1:1		222.500	1:1
146.000	1:1		223.000	1:1
146.500	1:1		223.500	1:1
147.000	1:1		224.000	1:1
147.995	1.2:1		224.980	1:1

7. If you have a field strength meter or BETTER a distant visual repeater, adjust the invisible front main lobe for directivity. This is accomplished by moving the Driven element horizontal spreaders left or right to obtain maximum indication on the field strength or "S" meter while sighting down the vertical spreaders at the repeater antenna.

NOTE: Your body being near the antenna can skew the radiated pattern. So move a few feet away from the antenna when making measurements.

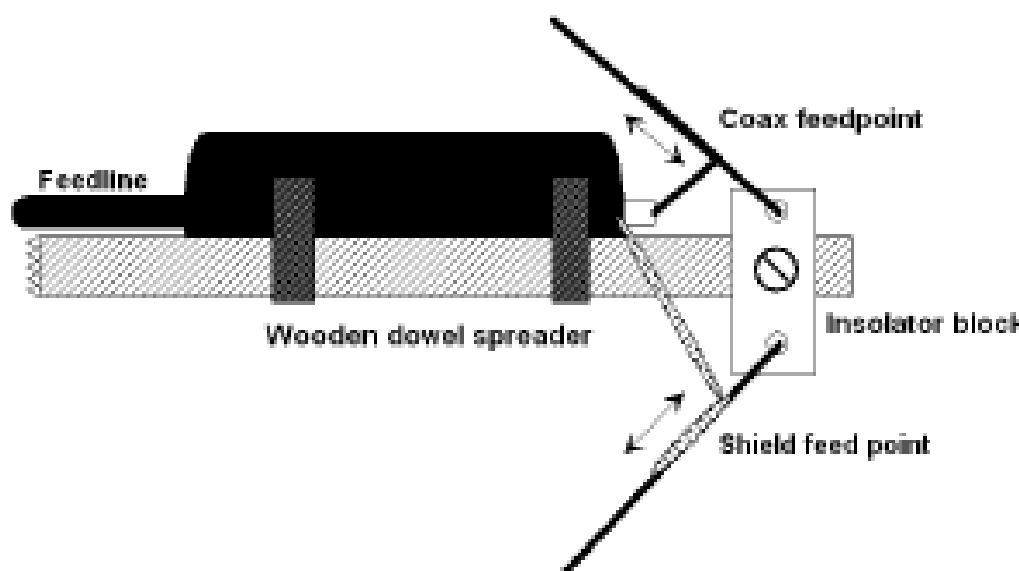
8. Measure, align, and set all spreader elements for a good diamond shape.

9. The antenna is built; now preserve the antenna in any fashion you deem necessary for your weather environment.

Recommendations: silicon caulk the coax on the driver feed connections, marine spar varnish over a coat of paint, peg the spreader wooden dowels if desired to increase stability.

NOTE: the more metal on the spreaders the less dowel to treat. In Southern California the heat/wind/rain/smog weather antennas quickly.

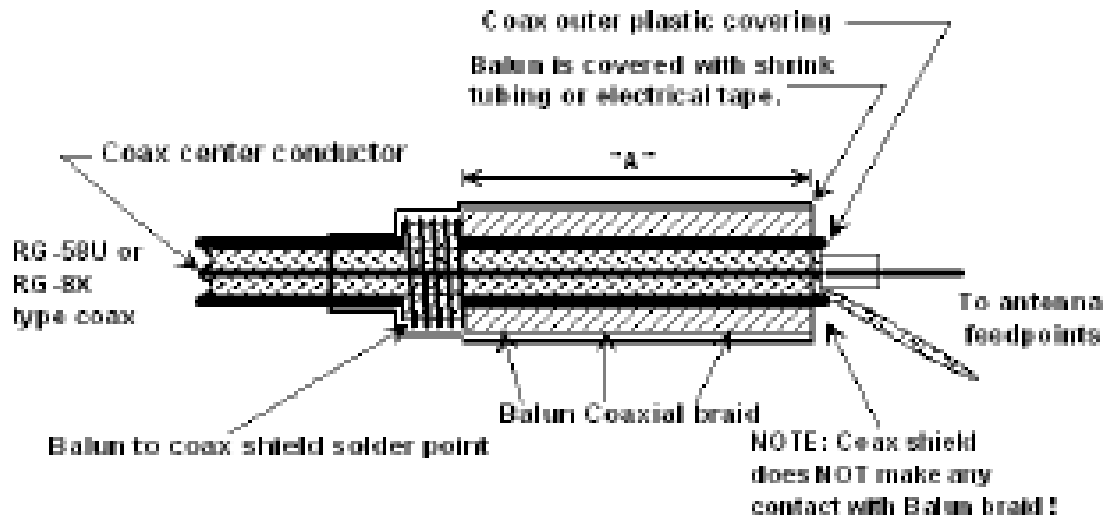
Quad Feed Point



NOTE: Moving the feed point attachment up and down the Quad wires will vary the VSWR. When the construction is completed solder the coax/balun - Quad wire attachment points.

Bazooka Balun

also called a Coaxial Sleeve Balun



Dimension "A"

2m = 13.25"

220 = 8.7"

440 = 4.4"

or

$245.F \text{ (in MHz)} \times 12" \times 0.66$

(coax velocity factor) =

Balun dimension

NOTE: Wrap 20 gauge solid wire around the balun shield solder point.

Use flux to coat the solder point.

Using minimal heat quickly solder

the balun shield area, ensuring that

the coax center conductor does not melt causing a short to the coax shield.

Use about 1.5 times the "A" dimension of the same coax for the balun shield.

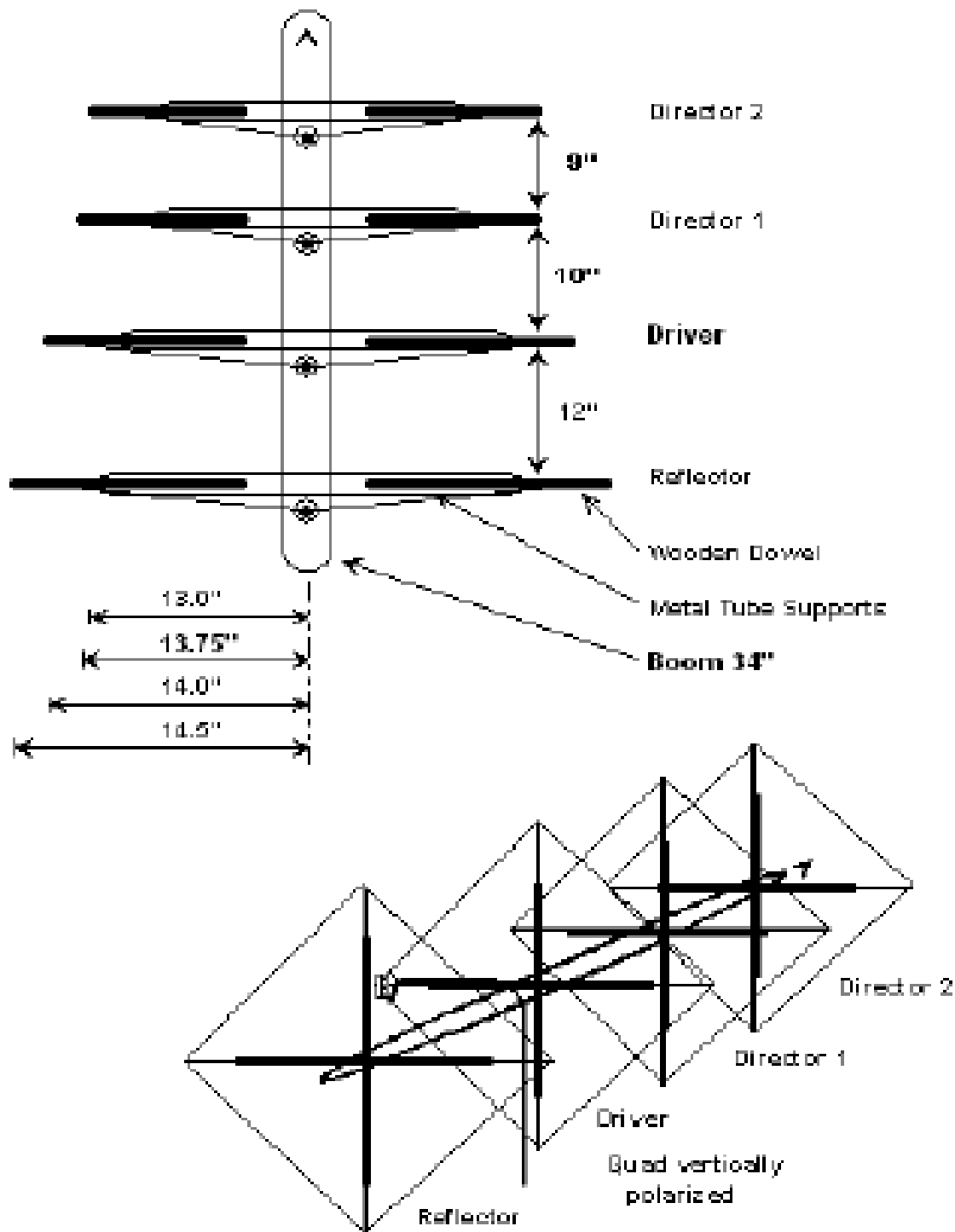
ENSURE the balun shield does NOT make contact with the coax shield at the feedpoint end of the coax!

The BAZOOKA BALUN is the Secret for maximum efficiency of these Quads! The bazooka balun is the only "Matching" device used. The bazooka balun is effectively an RF choke used to kill all/any returning RF energy from being conducted on the coax shield. The bazooka is the means of connecting an unbalanced (coax) line to a balanced antenna.

The Bazooka Balun eliminates extraneous capacitive or inductive matching networks. This allows the Quad to be tuned to resonant frequency for maximum signal reception. As shown in the Quad Feed Point Illustration the coax is soldered directly to the antenna driven element. This highly efficient coupling method conducts the most received RF signal into the receiver. Many of today's antennas use the easy to make/tune lossy/capacitive/inductive gamma type matches which consume some amount of antenna RF energy, thus, taking received signal from the radio RF amp/1st mixer!

WA6TEY Two Meter 4 Element Base Quad Design

146.000 MHz. center frequency

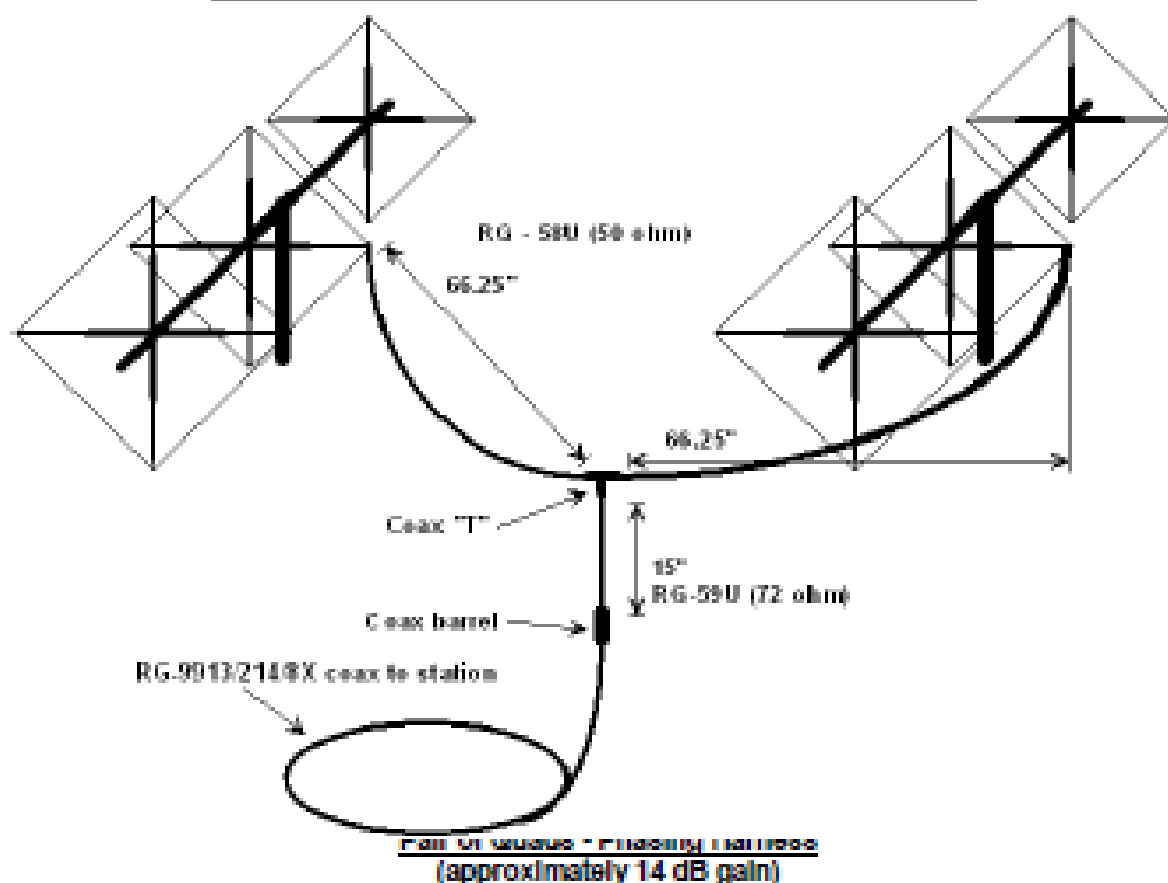


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Two Meter Phasing Harness



Each leg of coax from the antenna to the first barrel connector is of RG-58 coax with bazooka balun at a length of 66.25 inches each (each leg must be identical) and attached as shown for both antennas to be "IN" phase complementing one another.

The phasing harness is of RG-59 coax (72 ohm) at 15 inches long.

A minimum of 72" of horizontal spacing should be placed between two vertically polarized Quads

References:

WA6TEY VHF Quad design
73 VHF Antenna Handbook
RSGB VHF-UHF Manual

COMING THIS MONTH

ARRL Field Day is June 27-28, 2015

Firestation 7 Rockmart, Georgia Talk-in 146.955 (-) 77 hz tone



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