KARS KEY KLICKS

JOURNAL OF THE KANKAKEE AREA RADIO SOCIETY

Volume 88 Issue 1/2

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Photos: K9QT, K9NR, N9IO, W9IE
Contributors: N9IO, W9IE

February 2013

Everything you wanted to know about Amplifiers but were afraid to ask - February meeting

The next KARS meeting will be held on Tuesday, February 5th, in the first floor meeting room of St. Mary's Hospital. Following a brief business meeting, Ken W9IE and Don K9NR will present a program on amplifiers—big and small.

Learn the differences between linear and non-linear amplifiers, power and voltage amplifiers, RF and AF amplifiers, solid state and tube amplifiers and classes of operation.

This program is geared to help you understand the proper operation and limitations of RF power amps, receiver pre-amps, etc. Be there!

BOARD MEETING

The next KARS board meeting will be held on Feb. 19th at El Campesino.

All KARS members and spouses are welcome to attend.

Eat at 6:00. Meet at 7:00

HAPPY BIRTHDAY

February 3	K9XI
February 4	K9QT
February 8	KM9Z
February 14	KC9QXV, K9BAC
February 15	NI9H
February 20	N9LYE

Let the newsletter editors know if we miss your birthday or get it wrong

NCS FOR FEBRUARY

February 4	N9LYE
February 11	KC9UNQ
February 18	N9OE
February 25	N9FD

Don't forget the net!
Mondays at 2100 hrs. local time

Don K9NR describing balanced feed-lines at the December meeting program on antennas and transmission lines

KARS KALENDAR

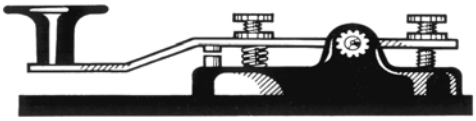
Feb 5	KARS General Meeting
Feb 9-10	CQ World Wide WPX RTTY
Feb 16-17	ARRL International DX CW
Feb 19	KARS Board Meeting
Feb 21	NWS Severe Weather Seminar
Feb 22-24	CQ 160 Meter SSB
Feb 23-24	NAQP RTTY
March 2-3	ARRL International DX SSB
March 3	Sterling Hamfest
March 5	KARS General Meeting
March 10	NA Sprint RTTY
March 16-18	BARTG RTTY
March 19	KARS Board Meeting
March 30-31	CQ World Wide WPX SSB

The Kankakee Area Radio Society operates repeaters on:

146.34/.94	***107.2 PL Access***
449.8/444.8	***114.8 PL Access***
145.130	***107.2 PL Access***

Additionally, KARS sponsors:

144.39 2 Wide Area APRS digi-peaters
145.53 KARS DX Cluster



W9AZ

KARS BANQUET

KARS annual banquet was held at the Homestead Restaurant on January 20th. There were over 40 in attendance, who enjoyed the tasty food and the good company. Pictures will be in next month's newsletter.

MEETING PROGRAMS

If you have an idea for an interesting club meeting program or have a suggestion for one, please let Don K9NR or Harry WD9FYF know.

SEVERE WEATHER SEMINAR

Kankakee County severe weather spotter program, presented by the National Weather Service, will be held on Feb 21st at 6:00PM in the Kankakee Community College auditorium. Be sure to attend if you haven't been there in a couple of years to get your credentials as a weather spotter updated. It doesn't hurt to attend every year, to become reacquainted with pertinent criteria which should be reported, as well as those things which do not need to be reported.

Congratulations to Jerry Whalen, WB9WOC after 48 years of service as a firefighter. A retirement dinner was held by the Limestone FD.

It's time to plan your Dayton agenda!

KARS HOMEPAGE— WWW.W9AZ.COM —KARS HOMEPAGE

W9IE's "radio correct" computer case

A 'view inside" showing the water cooled processor

6 CORE PC WATER COOLER

By Ken W9IE

Who wants a computer in a ham shack to look like a computer ??? I would rather it look like another piece of radio equipment. So I built my 6 Core 2.8 gHz PC in a more proper looking Box.

All went well but COOLING was a problem, or at least the fan noise was a problem… So I removed the fan on the processor and added a Corsair Water Cooling System. You can see in the photos how the pump on the processor moves water to and from the radiator on the side.

The fan runs at a slow, quiet speed and keeps the processor VERY COOL! In fact, it runs around 15 degrees Centigrade, which is less than room temperature.

Another Fun Project.

73, Ken W9IE pretty "cool" Ken...ed

Good food, good friends, good times at the News Years Eve informal dinner

2013 DUES ARE DUE

If you were unable to pay your dues at the annual Banquet, be sure to get them to Francis KE9MG at the earliest opportunity.

Dues remain unchanged:

Regular:	$30
Family:	$40
Student:	$15
Senior:	$15
Disabled:	$15

Active military dues are waived

The informal New Years Eve dinner included an official "El Guapo" siting!

ORVILLE N9TAJ SK

It is with regret that we report the passing of long time KARSFEST attendee and good friend of many KARS members, N9TAJ.

KARS ELECTION RESULTS

The final KARS 2013 election of officers was held at the December meeting. The results were:

Don K9NR	President
Harry WD9FYF	Vice President
Bob K9SAT	Secretary
Francis KE9MG	Treasurer
Paul W9IEY	Board
Rollie N9RJM	Board
Carl K9CS	Board
John N9LYE	Board
Bill N9OE (retiring president)	Board

Several other members who are key committee chairmen also serve as board members as needed.

Passing the Baton
Retiring President Bill N9OE (r)
New President Don K9NR (l)

More aliens!
Right: Sheri KF9IK/M0SLA— sometimes American/sometimes Brit
Center: Stuart— fulltime Brit and all around nice guy visiting the "colonies"
Left: John N9LYE (temporary Brit) just plain alien and proud of it!
(nice guy too!)

80 & 160m DX - Low Noise RX Antennas Help Make It Possible

(No room for a Beverage or full height Vertical? No problem!)

LOW BAND DXING FROM SUBURBIA

By Clay N9IO

My intent in writing the following pages is not with any specific technical information but to inspire hams on suburban lots *(the majority of us)* to believe low-band DX to be as normal as working the higher HF bands, and to help expand your building skills. Specifics are covered at greater length on the web sites I have linked to throughout by the respective authors.

Inverted - L Ground screen made from 28 inch fencing Layed on ground. **(Fig 1)**

Inverted L Ground Screen, HF2V in background. **(Fig 2)**

Hinge mounted HF2V 40/80m (above ground) Vertical **(Fig 3)**

A few years back I installed an inverted L for 160 meters mainly to hand out a few ARRL 160 points to the locals *(WB9Z, K9NR)* not thinking at all that I could do much more than just that. Many hams think of the antennas required for 160m as being too big for our yards so we usually pass on the idea of 160 altogether. The vertical portion of my inverted L is 50 feet, extends downward to a tree in the front yard 70 feet away then drops down to within 10-12 feet from the ground. Local friends K9CS and N9LYE's Inverted L's are around 30 feet vertical in a tree with the remainder wound to other trees wherever possible, both with great results. I started my L off with a single 75 foot radial and though my lightning ground system is fairly extensive I realize it does not make a good RF ground. Radiation angle and RF in the shack are concerns. I have played in a few of the ARRL 160 meter tests now, coverage is good stateside and I generally pick up 4 to 5 DX countries. This year however I added a couple runs of 28 inch wide galvanized roll fencing 30+ feet long per side onto the ground ***(Figs 1-2)*** then attached it to my ground system with split copper bolts. The results have been better in that I am not experiencing the same RF issues in the shack and this is the first year I have worked Europe on 160 (**F**rance). The main reason I was successful at working Europe I believe is not as much the improved inverted L, but the addition of a couple of excellent performing yet small receive antennas that hear stations the L could never. S/N (noise) being the main issue. Before the ARRL 160 test I had also been working excellent 40 and 80 meter DX with a new Butternut HF2V mounted above ground with radials at 7 feet underneath the eaves of my large shed and on fence with wire stand-offs wherever possible ***(Figs 2-3)***. 80 & 160 DX are now more the norm.

Among the better improvements I have made to my station of nearly 40 years now are those small receive antennas. They include my rendition of a ***Bi-Directional Delta*** ***(Figs 5-9)*** and a ***EWE*** ***(Figs 11-16)***.

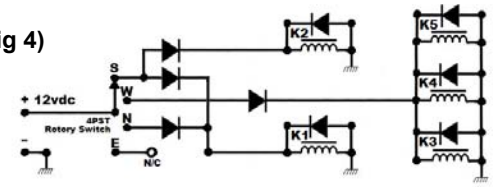
Some years back at HamVention I had purchased from KD9SV himself a pair of KD9SV 75 ohm pennant transformers and his variable gain preamplifier for 80 and 160. I have also spent those last few years trying to figure out where in the world to place a couple of pennants on my lot. Fact is that I cannot without the lower return wire of the pennants becoming a nuisance. In the June 2012 issue of KARS Key Klicks newsletter John, N9LYE wrote an article about his EWE antennas. John's article started me thinking about low noise receive antennas once again so I began an extensive GOOGLE search campaign reading as much as I possibly could on the subject. I also joined the Topband email reflector and studied the archives there. If you're at all interested in working DX on the 160 and 80 meters bands I suggest you join the Topband reflector group as there is a wealth of information to be found there, in fact, the subject of low noise receive antennas comes up more than not. At first I had found bits and pieces on the web but a couple of sites stood out from my GOOGLE searches as veritable clearinghouses of receive antenna information including but not limited to the W8JI.com web site by Tom Rauch W8JI, the July 2000 ARRL QST article "Flags, Pennants and Other Ground-Independent Low-Band Receiving Antennas" by Earl Cunningham, K6SE (pages 34-37) ***(Fig 10)***, and this Feb 95 QST article by Floyd Koontz WA2WVL *(Inventor of the EWE)*. Page 32, Figure 5 of the QST article describes the EWE I installed at my home ***(Figs 11-16)***. If you're interested in good solid information on the subject these sites are must reads!

80 - 160 Meter Bi-Directional Delta at N9IO

(Pennant variant, Mods by N9IO)

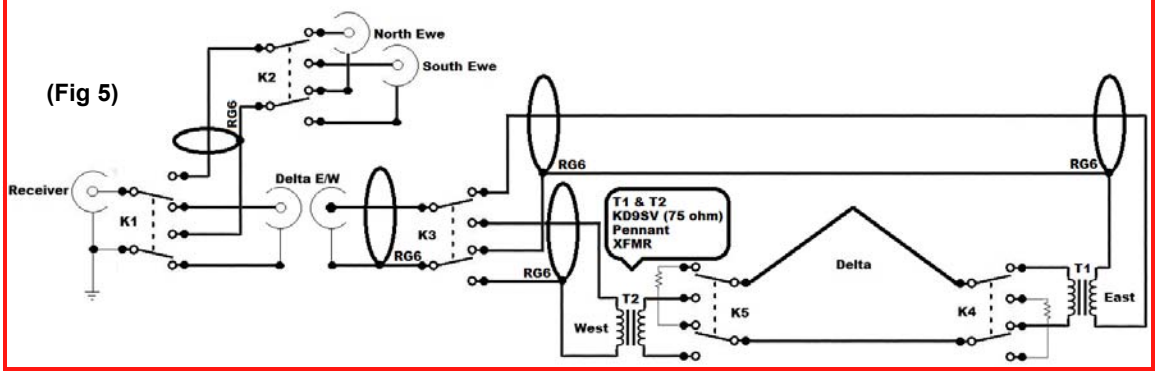
For some time now I have focused on the pennant not realizing that several variants of the pennant had been developed many years back such as the diamond and delta configurations. The next portion of this article will focus on my version of a bi-directional delta. ***(Figs 5-10)*** The delta is basically a pennant that only requires one vertical support as opposed to the standard two. The delta is a triangle with its apex at the top center. Dimensions to cover the 160 and 80 meter bands are 28 feet across at the bottom and 17 feet from the bottom to the center apex. Doing the math about 72 ft of wire is required, I used 14ga thhn wire. RG-6 75 ohm coax is attached to each end of the antenna via impedance matching transformers, I also placed a few two watt carbon composition resistors to each end for a total of 960 ohm which is what I had available in my junk box. Anywhere between 850 and 1K ohms will work just fine resulting in a distinct signal null at the resistor end. The main receive lobe is at the coaxial feed end. I modified my delta to be bi-directional with a DPDT relay at each end that selects either transformer or resistor combination as shown in ***(Figs 5,8)***. A third DPDT relay at the antenna site ***(Figs 5,7)*** is also activated that switches between each of the two box feedlines so I now only have one single RG-6 coax running back to receiver. I can only fit one delta oriented E/W mounted above a three foot fence with a single tree next to the fence toward it's middle. I now cover both East and West through these relay switch boxes with **(one)** antenna. In order to reduce the possibility of common mode coupling from the non selected feedline and possibly skewing of the delta's pattern I opted to place a series of ferrite beads on each feedline as they come out of each relay box, enough to cover 12 to 13 inches of each coax. One other thing is that I did **(not)** commonly connect the grounds on the coaxial relay connections, I left them to **(float)** open.
The French station I mentioned working earlier in this article was heard on the side of the East pointing delta, the noise is

(Fig 4)



Figures 4 & 5 depict the complete receive antenna control system currently at N9IO

(Fig 5)

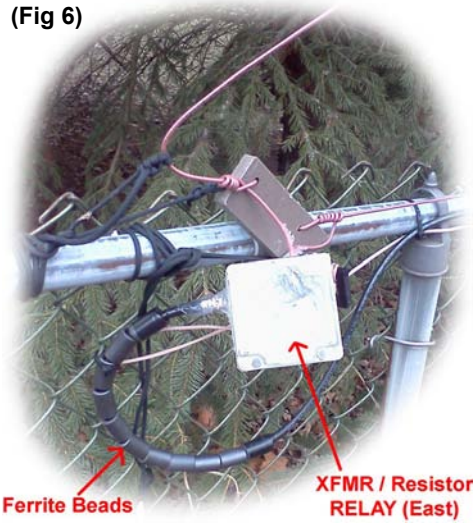


80 - 160 Meter Bi-Directional Delta at N9IO

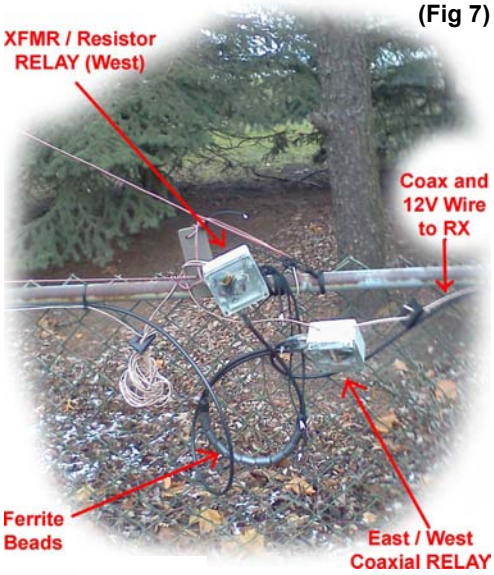
(Continued)

just not there and frankly I think this is one of the few Europeans I had ever heard on 160 let alone to work one practically noise free. I further experimented with this antenna on the AM broadcast bands particularly on 700 khz. With the switch flipped to the east position one evening I was listening to arm chair copy of Cincinnati sports at WLW, switched to the West there was nothing. At 1040 khz WHO in Des Moines was solid copy, switched east WBZ 1030 khz in Boston was nice copy (no AM filter in receiver). The point is that these pennants and variants receive extremely well at their main lobe and decent to good *(technical term)* on the side of the lobes with a nice null at the rear.

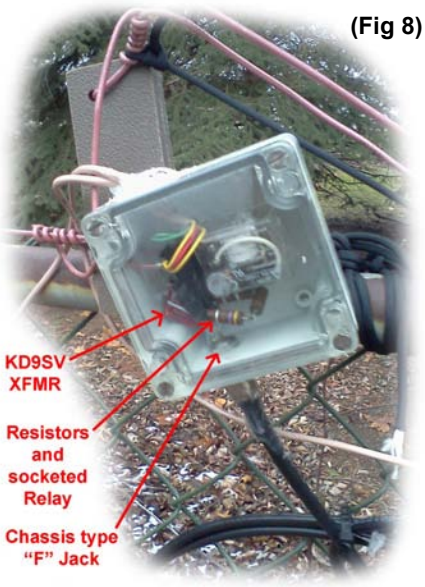
(Fig 6)

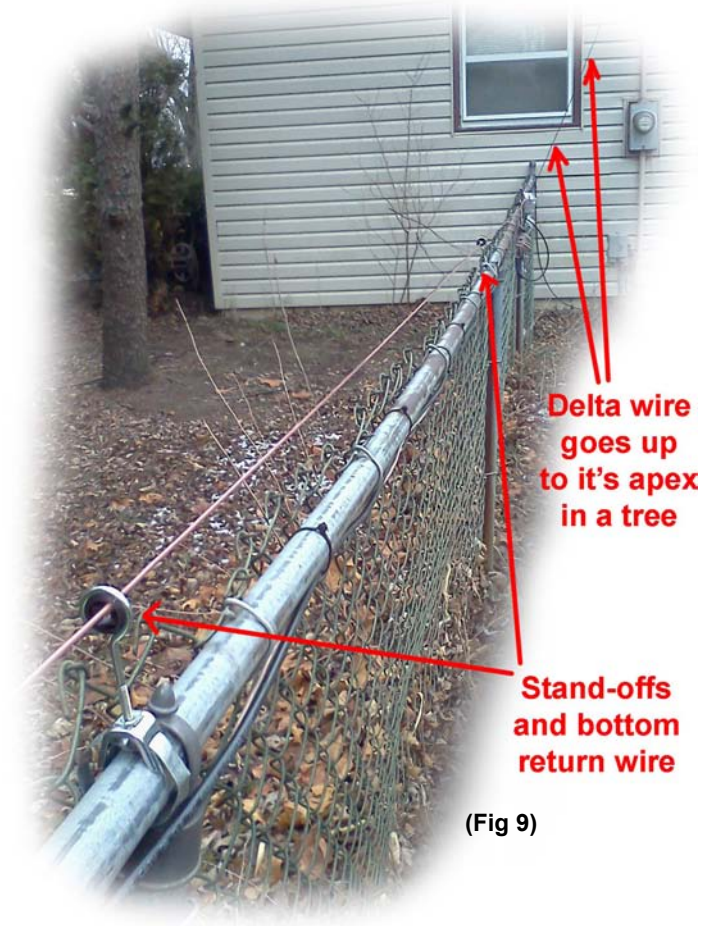


(Fig 7)



(Fig 8)

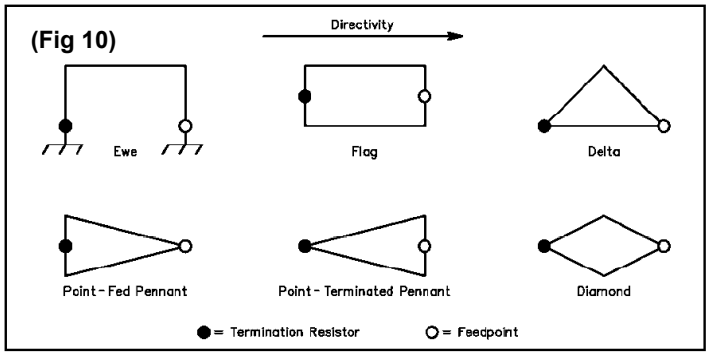




(Fig 9)

Pennant Variants

(Fig 10)



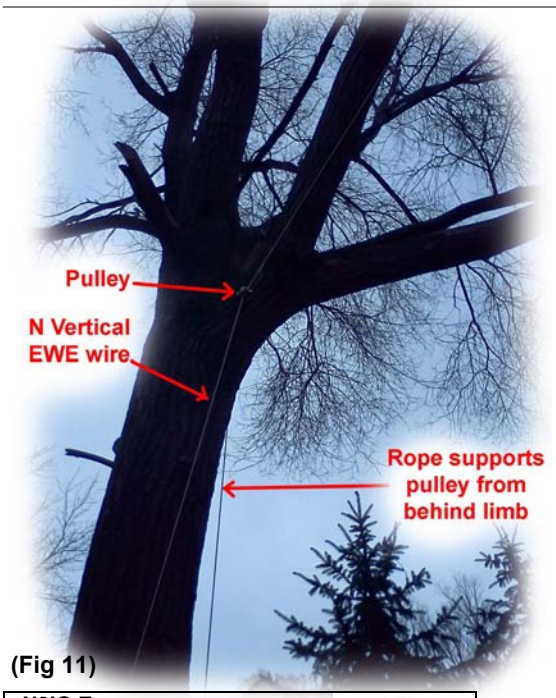
–Configurations of the antennas described in this article. The dimensions of the Flag, both Pennants and the Diamond are 29 feet by 14 feet. The Delta is 17 feet high and 28 feet long. The ground-independent antennas are 6 feet above ground.

K6SE Article

Figure 10 above is from the July 2000 ARRL QST article "Flags, Pennants and Other Ground-Independent Low-Band Receiving Antennas" by
Earl Cunningham, K6SE (pages 34-37).
ARRL members can search the QST archives here.

Read eHam.net blog comments from K6SE just before the July 2000 QST article went to print.

80 - 160 Meter EWE at N9IO

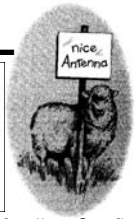


(Fig 11)

(Fig 12)

N9IO Ewe

15 ft H x 36.5 ft L

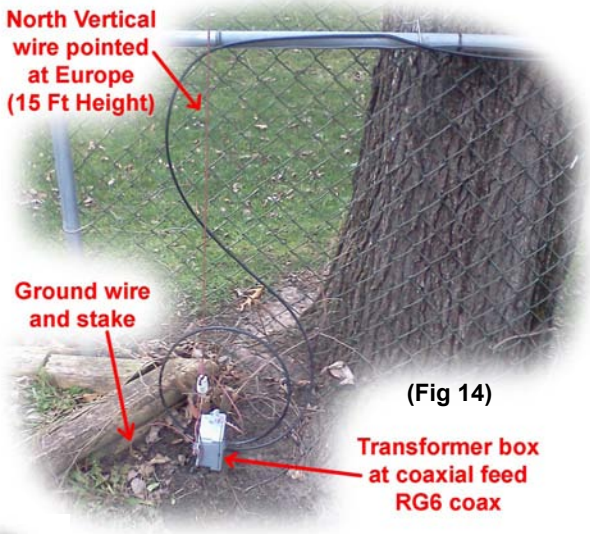


The Floyd Koontz Ewe article p32 fig5 says 15' x 38' great overall dimensions, covers the 40, 80 and 160 meter bands

Avoid getting so caught up in the "perfect" antenna that you never attempt to get on 160. There is always an ant that will work.

Now that I have the East and West covered I began to study the EWE. The EWE does not have a bottom return wire but rather replaces the ground return with a ground rod at each end of the antenna. I installed a EWE pointed North toward Europe over the top of an equipment gate entering my backyard, it does not interfere with my access when I mow. The front and rear ends are 15 feet tall supported by the top 15 feet of a gutted Station Master repeater antenna (non-metallic) U-bolted to a fencepost and painted black ***(Figs 12-13)*** *(the support idea came from WB9Z, thanks Jerry)*, at the signal end a tree supports the north 15 feet of wire at the fence line. ***(Figs 11,14)*** The EWE's resistors are 940 ohms that measured at 1K. It is fed with 75 ohm RG-6 coax ***(Figs 14-16)*** that runs along the fence to an underground PVC pipe where it is grounded before running in the PVC back to the house along side the HF2V coaxial. In use, WCCO 830kHz MN is S8-9, on the Inv-L a **noisy** S4.

(Fig 13)

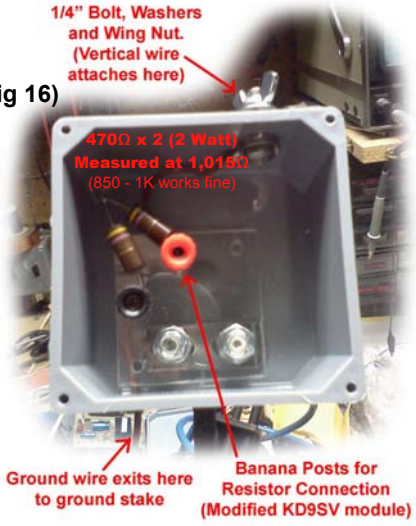


(Fig 14)

(Fig 15)

EWE wire is 15 feet above the equipment gate. Look closely, it's hard to see

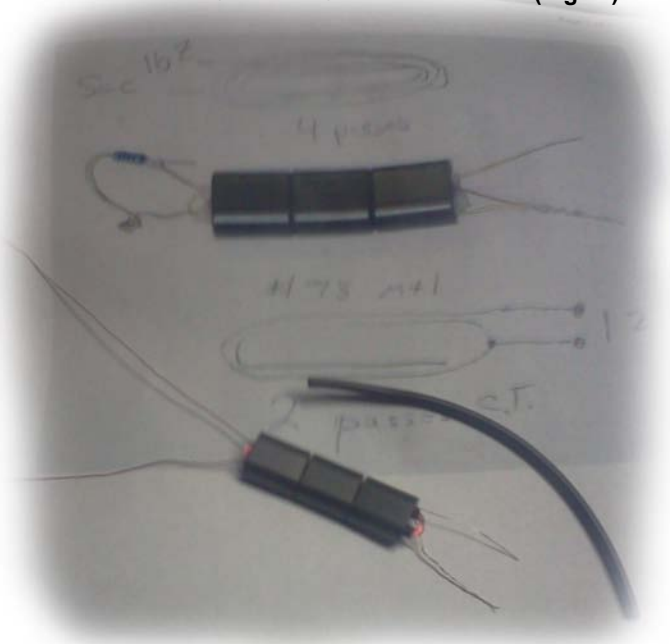
(Fig 16)



W8JI EWE Transformer

My choice for the EWE's transformer is that of Tom Rauch W8JI built to W8JI's specification from this page of his website ***(Fig 17)*** made with three stacked type 73 binocular ferrite cores ***(part number BN-73-202).*** I found a bag of 10 cores for just under $10 shipped from W8DIZ at www.kitsandparts.com ***(Fig 18)***. ***(Click "SHOPPING" then select #48)***. The non-conducting tubes I inserted in the binocular core holes are 3/16 inch heat shrink tubing that worked out perfectly. The two turn center-taped **primary** is Teflon coated ultra thin wirewrap wire ***(Figs 19,21,22)***. Wirewrap wire is mainly used on the primary instead of enamel coated magnet wire to avoid being scuffed and shorting to the ferrite wall when it is wound between the ferrite wall and outer wall of the heat shrink tubing. The four turn #26 enamel coated magnet wire **secondary** is wound in the center of the two tubes ***(Figs 20,23)***. Be sure to read the specifics of the primary, ½ of the first turn terminates (open) at the beginning of the tube opening. (again, study this page link at w8ji.com under ***Feedpoint Matching***). The center tap then attaches to the center solder connection of the F chassis jack ***(Fig 25)*** and the end of the second turn connects to the shield side of the F chassis jack (not grounded). The **secondary** winding is straightforward with four turns, one end is connected to the antenna wire the other is connected to the ground rod connection. ***(Fig 24)***

Click photo for original drawing at W8JI.com [LINK] **(Fig 17)**



Even looks like the original W8JI drawing

[LINK]

(Fig 18)

Pack of 10 each BN-73-202 Binocular Ferrite Cores (Pack of 10) Ordered from KitsAndParts.Com

Teflon coated Wirewrap wire (For Primary)

(Fig 19)

(Fig 20)

#26 Enamaled Magnet Wire for Secondary Winding

This page is a must read by W8JI entitled,
"How Low-noise Receiving Antennas really work"
****
Greater detail of W8JI's transformer design is at the bottom of this page link at W8JI.com

(Fig 21)

Primary winding between 3/16" shrink tube and ferrite wall

(Fig 22)

Back side of Primary winding

(Fig 23)

Transformer (pri / sec) winding completed

Transformer mounting

Both transformer and resistor assemblies are housed in weatherproof (NON METALIC) electrical boxes that were purchased at Lowe's. The boxes are U-bolted to a 18 inch steel rebar to be driven into the ground as shown in ***(Figs 27-28)***. After installing boxes in ground, weather seal wingnut, rear U-bolt and front coaxial holes with silicone RTV. The bottom ground hole can serve as a condensate weep hole. The feed and resistor boxes can alternatively be mounted to the ground rods, I opted to keep them separate for more simple maintenance to the boxes.

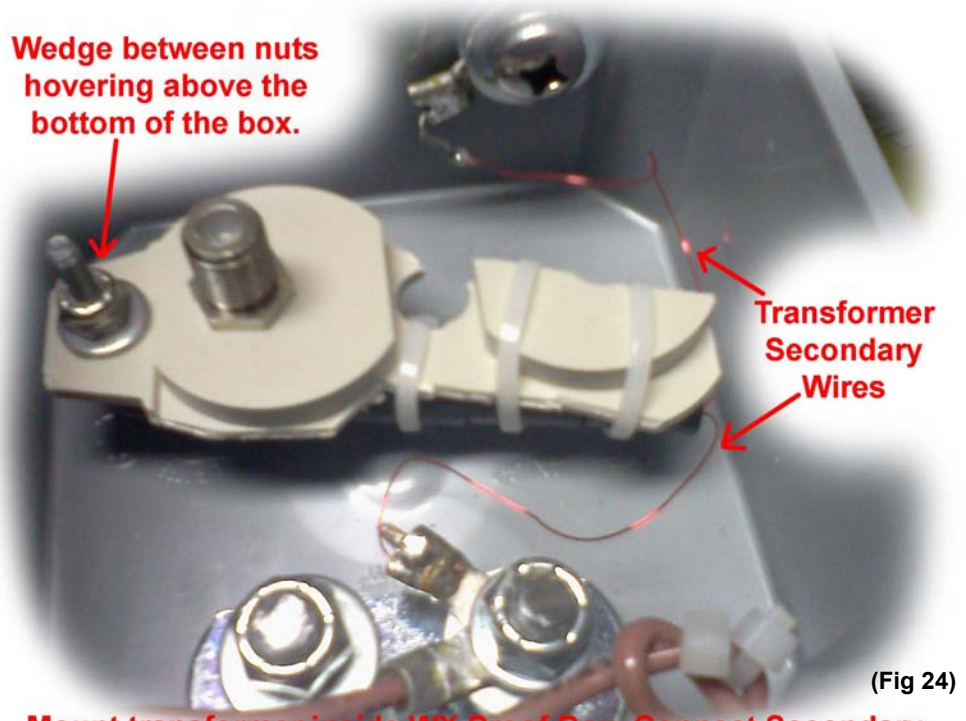
In closing, it is **very important** to install a rig saver at your radio's RX ANT port to protect the receiver front end particularly when receive and transmit antennas are close together.

It is my hope that you may be inspired to try similar projects. Start hearing Low Band DX without all the noise. Improving your signal to noise (S/N) ratio is the goal (Less noise than signal).

Try to avoid getting so caught up in the "perfect" antenna that you never attempt Top-Band, make your yard's dimensions work for you, compromise antennas "do" work just fine.

My results here have been so positive that I look forward to installing a final EWE to the South this spring. Good luck, and keep experimenting…

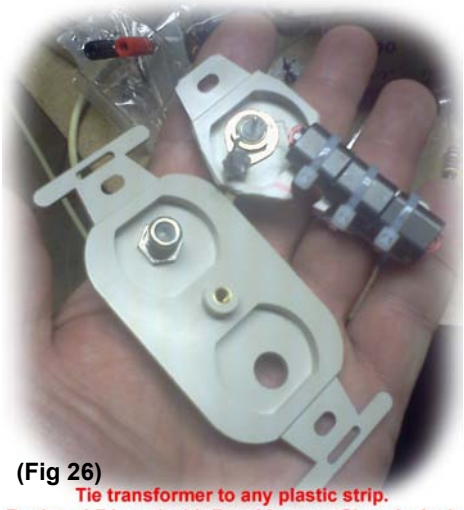
Best 73' and DX,
Clay N9IO,
KARS Webmaster
Bonfield, Illinois
www.w9az.com



(Fig 24)

Mount transformer inside WX Proof Box. Connect Secondary to antenna wire bolt above and ground lug below.

(Fig 25)



(Fig 26)

Tie transformer to any plastic strip.
Replaced F barrel with F- solder type Chassis Jack

(Fig 27)

[LINK]

(Fig 28)

Rebar stake U-Bolted to back of both boxes

[LINK]

(Fig 29)

Drill hole in cover large enough to pass an F-Connector and RG6 cable through.