



RF



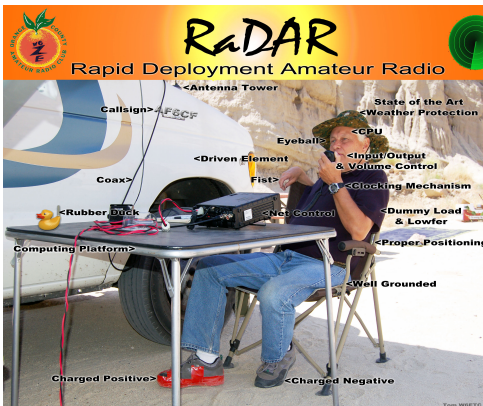
ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXIV NO. 8

PO Box 3454, Tustin, CA 92781

August 2023

The Prez Sez... By Nicholas AF6CF



“Summer Radio Fun”

August is here again, and this means that there is less than a year to the next ARRL Summer Field Day. We know that next year will be as fantastic as this one has been, now that we are “back to normal operations”. In the meantime, we have big plans for the rest of the year with the next meetings, the Club Auction in October and a couple of excellent speakers for this month, September and November meetings. Once more, thanks to the generosity of its members, the Club did not lose too much money on the Field Day activity as expected. And we had a great score, too. The Board of Directors soon will appoint an Elections Nomination Committee to gather candidates for next year’s Board.

Because of the unexpected loss of our leader Chip K7JA, we now have a “transition president” (me) that will try to do his best to finish the year maintaining the high standards that had been the trademark of our Club. Now you all have an opportunity to get a position on the Board. Please consider helping the Club by serving in a position. Just contact any of us if you are interested. The Elections Committee will be contacting members as well to fill the elections slate. The word is that the Directors want “new blood” for next year. Back to this month, we have a highly qualified and talented speaker that will show us how to calibrate and test our test instruments (SIC). Mark your calendars for the Christmas Party on December 8th at 6 PM. Now that we have a place and time, the Board is debating the dinner cost and the opportunity drawing prizes.

As usual, I look forward to an eyeball contact with you all at the next General Meeting.

73 DE AF6CF

NEXT GENERAL MEETING

IN-PERSON

**Doug Millar
K6JEY
presents**

**“Modern Day Test
Instruments”**

August 18th, 2023, at 7PM

at the

**American Red
Cross**

**Orange County Chapter
Santa Ana, Room 208**

NEXT BOARD MEETING

Saturday, September 9th, 2023

See www.w6ze.org for Location

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Monthly Events

Membership Meetings*

Time: 7:00 PM
When: 3rd Friday of each Month
Red Cross Orange County, Room 208
600 N Parkcenter Dr, Santa Ana

Board Meetings

First Saturday of each Month
*Board will handle Club business now
IN-PERSON.*

Club Nets (Listen for W6ZE)

10M ~ 28.375 MHz SSB

Wed- 7:30 PM - 8:30 PM
Net Control: Corey, KE6YHX
Alternate Net Control: AJ, KN6WNO

2M ~ 146.55 MHz Simplex FM

Wed- 8:30 PM - 9:00 PM
Net Control: Corey, KE6YHX

75M ~ 3.883 MHz LSB

Tue @ 8:00 PM
Net Control: Corey, KE6YHX

Other Nets

**Catalina Amateur
Repeater Association (CARA)**
147.090 MHz (+0.600 MHz) No PL
Monday - Friday
9:00AM & 9:00PM
Prg. Director. Tom W6ETC
COME JOIN US

OCARC 2023 DUES:

*Membership period is:
1 January to 31 December*

Individual New or Renewal:	\$30
Family New or Renewal:	\$45
Teen New or Renewal:	\$15

*New Member Dues are prorated
quarterly and includes a badge:*

Additional Badges ¹	\$3
--------------------------------	-----

Use one of our our interactive online
forms to calculate current prices, join,
renew, or order badges:

<https://www.w6ze.org/FormsShortcut.html>

¹ \$3 or less + mailing. See form.

“Modern Day Test Instruments”

Metrology is the science of measurement, a very practical, grounded discipline relying on units, measurements, and comparisons to discover, among other things, accuracy. This includes making use of cutting edge, precision measuring equipment.

Our guest speaker for August is Dr. Doug Millar, K6JEY. A Technical Advisor for ARRL, he was asked to write the 26th Chapter of the ARRL Handbook on test equipment and measurement, and he will share his knowledge of modern day test equipment with us Friday night.

First licensed as KN6JEY in 1957, he has long since become an Extra Class, and became interested in metrology in 1980. His interests are wide ranging, and he has equipment operating not only on HF, but also in the microwave spectrum from 10 to 122GHz. Doug has 302 countries confirmed for DXCC, WAS, and WAZ, plays on HF AM as well, and collects (and uses) vintage “boat anchors”.

At the meeting, members are invited to bring their meters for a calibration check. Voltage, resistance and capacitance standards will be available, so don't miss the chance to learn about today's test equipment and what might be best suited to your needs.

Please join us Friday, August 18, at 7 PM at the American Red Cross, 600 Parkcenter Dr, Room 208, Santa Ana. Bring your meters for a calibration check!

73 de Janet Margelli, KL7MF
Vice-President OCARC



RadioActivity August 2023

Upcoming Activities:

August

- **North American QSO Party, SSB:** 1800 UTC Saturday August 19 through 0559 UTC Sunday August 20.
- **Run for the Bacon QRP Contest:** 2300 UTC Sunday August 20 to 0100 UTC Monday August 21.
- **W/VE Islands QSO Party:** 1200 UTC Saturday August 26 through 0300 UTC Sunday August 27.
- **World Wide Digi DX Contest:** 1200 UTC Saturday August 26 through 1200 UTC Sunday August 27.

September

- **WAE DX Contest, SSB:** 0000 UTC Saturday Sept. 9 through 2359 UTC Monday Sept.10.

- **ARRL September VHF Contest:** 1800 UTC Saturday August 9 through 0300 UTC Monday September 11.
- **North American Sprint, CW:** 0000 UTC to 0400 UTC Sunday September 10.
- **North America Sprint, RTTY:** 0000 UTC through 0400 UTC Sunday Sept. 17.

* Indicates club entries are accepted

** Indicates team entries are accepted

Note: When submitting logs for ARRL Contests indicate your club affiliation as "Orange County ARC CA"

October

• California QSO Party

1600 UTC Oct. 7 through 2200 UTC Sunday Oct. 8.

Note: When submitting logs for CQP indicate your club affiliation as "Orange County ARC"

State QSO Parties:

- **Maryland-DC QSO Party:** 1400 UTC Saturday August 12 through 0400 UTC Sunday August 13.
- **Hawaii QSO Party:** 0400 UTC Saturday August 26 through 0400 UTC Monday August 28.
- **Ohio QSO Party:** 1600 UTC Saturday August 26 through 0400 UTC Sunday August 27.
- **[Kansas QSO Party:](#)** 1400 UTC Saturday August 26 through 0200 UTC Sunday August 27 and 1400 UTC through 2000 UTC August 27.
- **Colorado QSO Party:** 1300 UTC Saturday Sept. 2 through 0400 UTC Sunday Sept. 3.
- **Tennessee QSO Party:** 1800 UTC Sunday Sept. 3 through 0300 UTC Monday Sept. 4.
- **Alabama QSO Party:** 1500 UTC Saturday Sept. 9 through 0300 UTC Sunday Sept. 10.

Repeating Activities:

- **Phone Fray** Every Tuesday night at 0230Z to 0300Z
- **[SKCC](#) Weekend Sprintathon** (Straight Key CW) on the first weekend of the month after the 6TH of the month. 1200 Sat. to 2359Z Sunday.
- **[SKCC](#) Sprint** (Straight Key CW) 0000Z to 0200Z on the 4th Tuesday night (USA) of the month.
- **CWops** Every Wednesday 1300 UTC to 1400 UTC to 0400 UTC UTC 1900 UTC to 2000 UTC and Thursday 0300
- **K1USN Slow Speed Test:** (CW, 20WPM Max.) Every Friday 2000 UTC to 2100 UTC
Every Sunday night at 0000 UTC to 0100 UTC Monday
- **ICWC Medium Speed Test:** (CW, 25WPM Max.) Every Monday 1300 UTC to 1400 UTC 1900 UTC to 2000 UTC and Tuesday 0300 UTC to 0400 UTC

OCARC Club Nets:

- **75 Meter Net:** Every Tuesday night at 8:00 pm to 8:30 pm Local Time. SSB
3.883 MHz
- **10 Meter Net:** Every Wednesday night at 7:30 pm to 8:30 pm Local Time. SSB
28.375 MHz
- **2 Meter Net:** Every Wednesday night at 8:30 pm to 9:30 pm Local Time. FM
Simplex 146.55 MHz

Other Nets:

- **Net-AT-9:** Wellness & Support Monday thru Friday 9:00 am and
9:00 pm Local Time 147.090 MHz (+600 MHz) No PL

Send an email to *Ron W6WG*, w6wg@w6ze.org to have your favorite activity or your recent RadioActivity listed in next month's column.

The Orange County Amateur Radio Club

Est. 1933



W6ZE.ORG Website Ramblings

Part 8 Dan - KI6X

Serving Orange County in Southern CA

General Information:

- [Club Brochure \(PDF\)](#)
- [About Ham Radio](#)
- [Board of Directors](#)
- [Board Appointments](#)

Club Activities:

- [Meetings](#)
- [Upcoming Events](#)
- [Previous Events](#)
- [Club Nets](#)
- [Emergency Comm.](#)
- [ARRL Field Day](#)
- [Winter Field Day](#)

Membership:

- [New Membership](#)
- [Member Renewal](#)
- [Badge Status](#)
- [Public Roster](#)

Club Library:

- ['RF' Newsletter](#)
- ['Net News'](#)
- [Photo Gallery](#)
- [Club Archives](#)

Links:

- [Ham Related Sites](#)
- [Ham Vendors](#)

Miscellaneous:

- [Healthkit Articles](#)
- [Digital-ATV Library](#)
- [Items of Interest](#)
- [For Sale](#)

Contact Us

This month's article will cover the **Miscellaneous** section of the W6ZE.ORG website. This is the catch-all for sections that do not have another home. Here is a rundown of the items under the **Miscellaneous** section:

“Heathkit Articles”

This is the location where the previous articles that have been in the **RF** over many years by club member, Bob Eckweiler, AF6C, about Heathkit products are stored for reference. Bob has become one of very few Heathkit experts and has been generous in documenting the subject for the ham community.

“Digital-ATV Library”

Another club member, Ken Konechy, W6HHC, has been heavily involved in Digital-ATV and was part of a team that created a product for DATV. He has put his set of references on the website for the community to access.

“Items of Interest”

This is our “catch-all” of the “catch-all” section. In here you will find:

- Technical – Heathkit, TechTalk articles, Calculators, Antenna Modelling, WSJT-X Whitepaper
- OCARC Equipment Inventory
- Equipment Manuals (for some club equipment)
- OCARC History
- MISC – “Ham Cuisine” Recipes, 1940 Sears Ham Catalog, Jay Leno texting vs. CW video
- Info on ordering OCARC shirts
- Net Control Script
- OCARC Bylaws (all historical ones and the current one)



“For Sale”

Items available for sale from club members and historically listed sold items.

That covers the last major heading on our website. This will be the last article regarding the website. Please check out the site. There will be future requests for help authoring some sections that need revisions. No HTML coding needed, just authoring. Examples are “Emergency Comm” and “About Ham Radio” sections. We might create an SK section and each person will need an author... KI6X

ARRL Membership Dues

The ARRL Board of Directors approved increasing the regular membership dues rate to \$59 a year starting January 1, 2024.

The following dues rates and fees are effective January 1, 2024.

Membership Type	Description	1 Year	3 Years
US	All the benefits of ARRL membership plus 4 digital magazines.	\$59	\$174
add print <i>QST</i> magazine	12 issues of <i>QST</i> via standard mail. Membership required.	+ \$25	+ \$75
add print <i>On the Air</i> magazine	6 issues of <i>On the Air</i> magazine via standard mail. Membership required.	+ \$25	+ \$75
US + First-Class Mail® delivery of <i>QST</i>	12 issues of <i>QST</i> via First-Class Mail®.	\$132	N/A
Life Membership First-Class Mail® delivery of <i>QST</i> – paid annually	12 issues of <i>QST</i> via First-Class Mail® for a current Life Member.	\$48	N/A
Family	Must reside with primary member and have corresponding membership dates.	\$12	\$36
Student	Must be under the age of 26.	\$30	N/A
Blind	Requires a one-time signed and dated statement of Legal Blindness.	\$12	\$36



The following article was originally a set of laminated slides that Tony Scalpi, N2VAJ, brought out to the 2023 Summer Field Day and talked to many attendees as an educational presentation. I converted his slides to an article for inclusion in the **RF**. Dan Violette, KI6X

MAGNETIC LOOP ANTENNA

By Tony Scalpi, N2VAJ, email: n2vaj (at) yahoo.com

DESIRED ANTENNA PARAMETERS:

- SMALL SIZE
- HIGH EFFICIENCY
- HIGH BANDWIDTH

MAG LOOP IS A COMPROMISE

- GET SMALL SIZE (VERSUS WAVELENGTH)
- SACRIFICE BANDWIDTH
- SACRIFICE EFFICIENCY

What is a Magnetic Loop Antenna?

- CLASSIFIED AS A "**SMALL LOOP**"
 - GENERALLY, LESS THAN 1/10 OPERATIONAL WAVELENGTH
 - LARGER THE LOOP - HIGHER THE EFFICIENCY (see ONLINE CALCULATORS)
 - LARGELY MAGNETIC IN NEAR-FIELD (FAR-FIELD SAME EM WAVE)
 - HIGH Q TUNED CIRCUIT
- HIGH CURRENT (CAN BE MANY AMPS)
 - With only few watts input - large loop currents
- HIGH VOLTAGE (Kilovolts) ACROSS CAPACITOR
 - Special capacitors needed
- REQUIRES EXTREMELY LOW LOSS CONNECTIONS
 - $P = I^2R$ power loss can be very high

As an example of a large loop: (not mag loop)

- M2 2-meter HO loop
- 11.25" square loop

- 2 meters $\approx 78''$ full wavelength, Behaves as a folded $\frac{1}{2}$ wave dipole
- Standard size versus the frequency of use

MFJ-936C *Deluxe High-Efficiency Magnetic Loop Tuner* Instruction & Technical Manual

Table 3: Efficient Loop Length Estimates

(a) Single Band

Band (m)	Length (ft)
80	63.0
40	28.0
30	20.0
20	13.0
17	9.0
15	7.0
12	5.5
10	4.0

(b) Multi Band

Bands (m)	Length (ft)
40 – 30	20.0
30 – 20	13.0
30 – 17	9.0
20 – 15	7.0
17 – 10	4.0

ONLINE CALCULATORS FOR CONSTRUCTING NON MFJ LOOPS. CALCULATES LOOP DIAMETERS AND CAPACITOR VALUES and INDUCTIVE LOOP COUPLING

on-air experimentation. Designing an outdoor loop for a band such as 7 MHz could be a challenge yet result in a very good radiator and especially good receiving antenna for DX-ing and rag-chewing. We at MFJ think the experimental aspects of the MFJ-936C are exciting, and can provide hours of quality operating, even at QRP levels.

Figure 1. From MFJ-936C Deluxe High-Efficiency Magnetic Loop Tuner manual

SIZES FOR COMPARISON:

- 20 METER MAGNETIC LOOP
 - CIRCUMFERANCE IS 13 FEET \approx 4.1 FOOT DIAMETER LOOP
- 20 METER HALF WAVE DIPOLE
 - 10 METERS \approx 32.5 FEET IN LENGTH

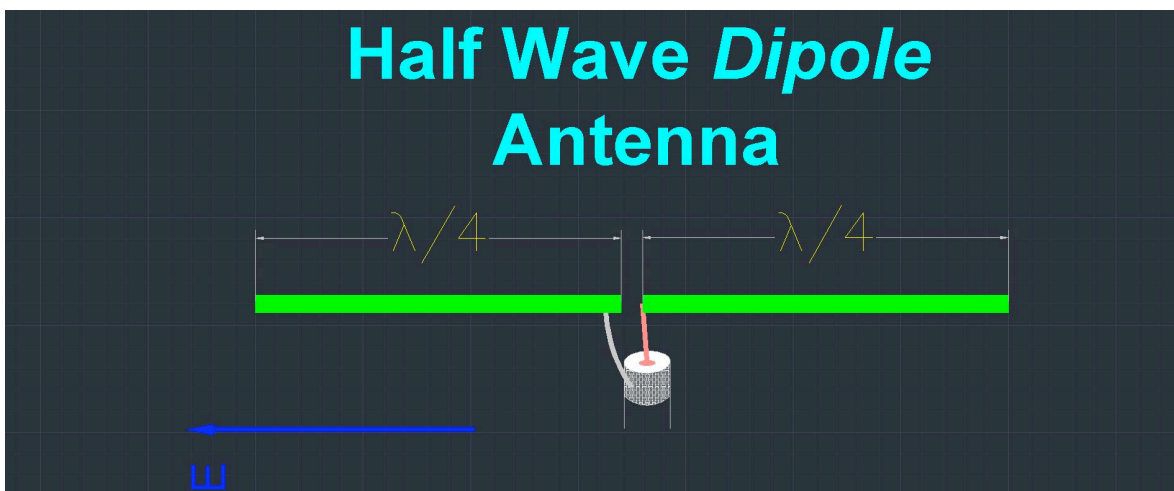


Figure 2. Half Wave Dipole

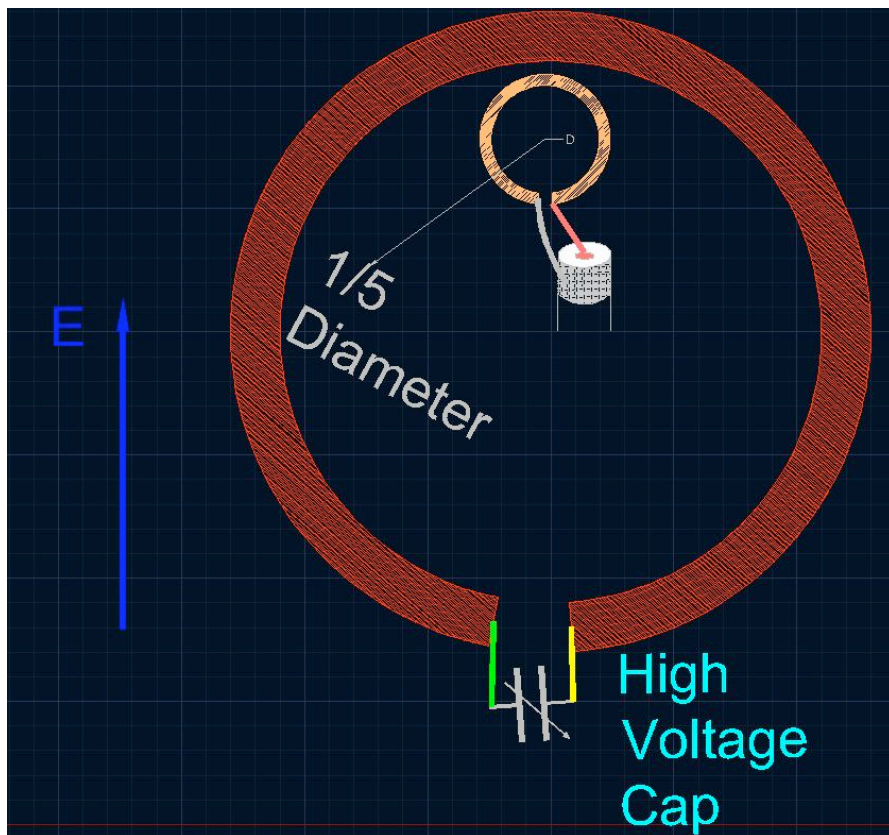


Figure 3. Magnetic Loop Schematic
(Coupling Loop, Capacitor)

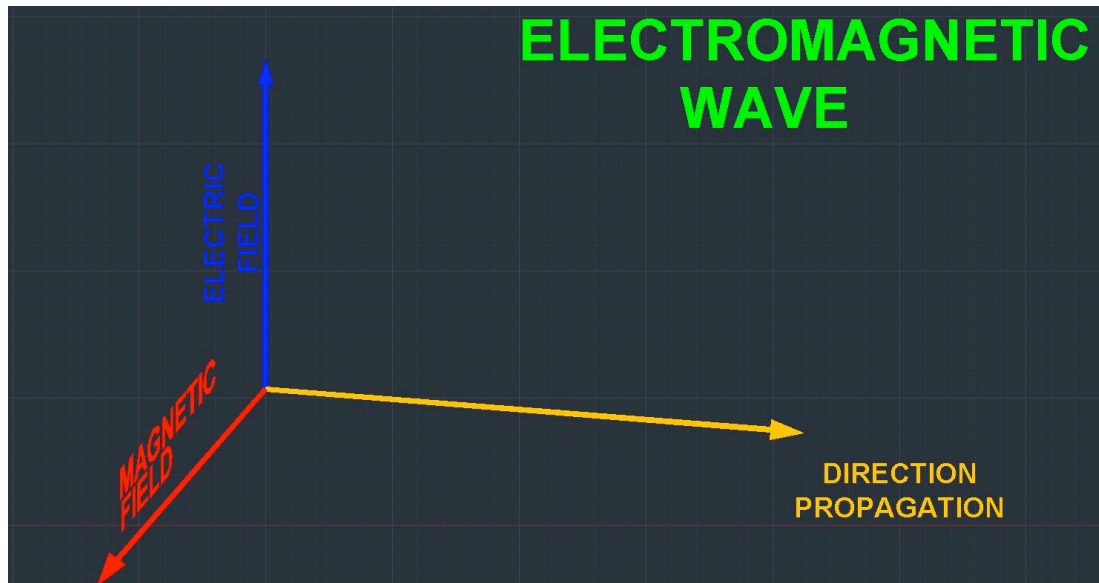


Figure 4. Electric and Magnetic Fields

Electric & Magnetic fields are at right angles to direction of propagation
 RF Radiation in-plane (off ends) of mag loop; Null out front center face (90 deg to plane) of loop.
 Pattern is bidirectional.

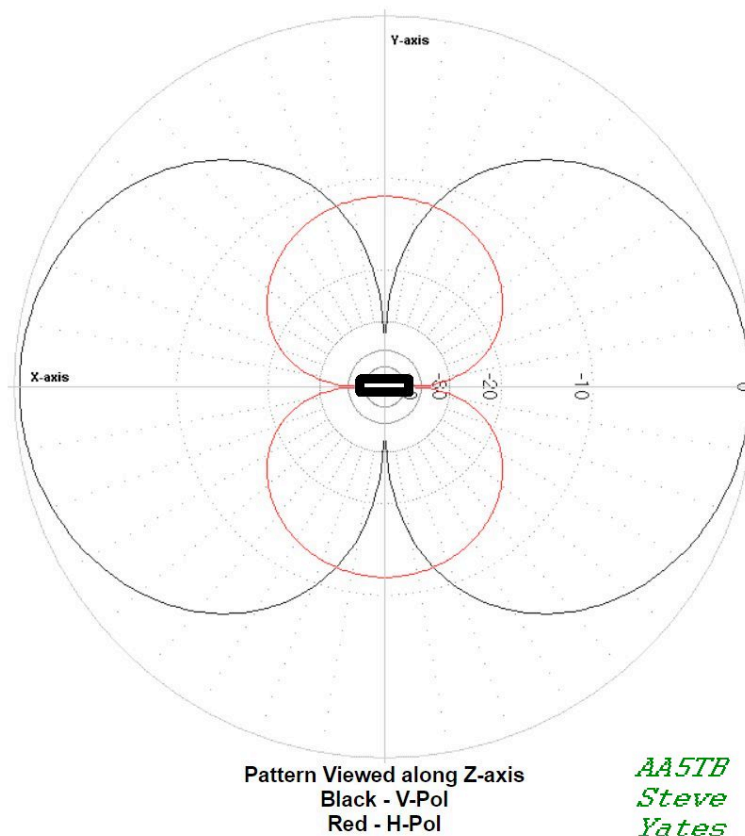


Figure 5. Radiation pattern of small loop (loop drawn in center).

ANTENNA RESISTANCES

- RADIATION RESISTANCE - effective resistance that represents the radiated rf power out from the antenna
- DC OR OHMIC (LOSS) RESISTANCE – occurs in a real conductor and in physical connections
- HIGHER EFFICIENCY DESIRED
 - High radiation resistance (radiated energy) vs. lower structural resistance (loss)
 - Loss resistance will “eat up” input rf power in the form of heat
 - Must keep DC resistance very low for higher efficiency & more radiated power!

MAGNETIC LOOP ADVANTAGES

- Loop can be operated close to ground
- No ground radials or counterpoise needed
- Portable quick setup
- Construction & operation
 - Coupling loop is opposite tuning cap
 - Rotate coupling loop about vertical axis to adjust coupling

- Can use adjustable vacuum capacitor to tune remotely
- There are other coupling methods available (e.g., MFJ tapped capacitor matching input)

SUMMARY-CONCLUSION

A Mag-loop gives you a small size & decent efficiency (when built properly for low DC resistance) at the cost of a narrow frequency bandwidth

- Narrow bandwidth then requires constant retuning over the operating band as you change frequency

Can be ideal for digital low power operation



Figure 6. OCARC FIELD DAY EDUCATIONAL SETUP

REFERENCES:

1. M2 Antenna Systems, Inc., 4402 N. Selland Ave., Fresno (USA), CA 93722, Tel: (559) 432-8873
2. MFJ / Vecronics / Mirage, Phone#: 1-662-323-5869, Mailing: 300 Industrial Park Rd, Starkville, MS 39759 Customer Support Email: mfjcustserv@mfjenterprises.com
3. Small Transmitting Loop Antennas (Magnetic Loop Antennas) Steve Yates - AA5TB

'Ameri-Ham' Ingenuity on Display at OCARC Field Day

By Tim Goepfing, N6GP

Necessity is the mother of all invention, and at Field Day this is certainly true. Tim N6GP was having troubles getting his computer mouse for his laptop to move his cursor. The shiny surface of the white rented table just wouldn't work. Tim had forgotten to bring a mousepad. Dan, KI6X suggested "Why don't you make a mousepad out of blue painters tape?" I put a couple strips of tape down on the table to test it out, and "voila!" the cursor moved. Tim then laid a few more rows of tape to complete the temporary mousepad. It worked well all 24 hours, with maybe a little curling up of the edges by the end of FD. It was ripped off the table at the end of the event with no residue left behind.

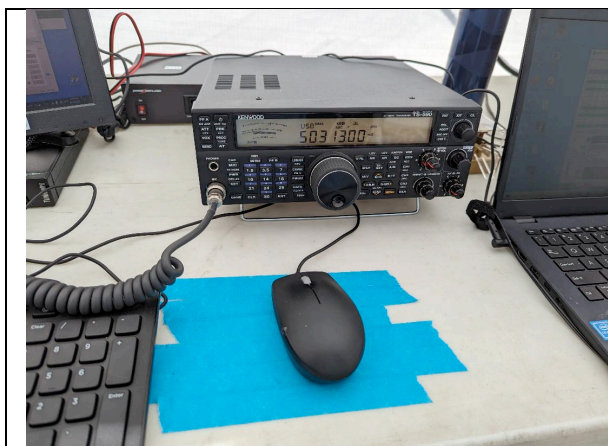


Figure 1 The Temporary Mousepad



Figure 2 Ron and his Ingenious Guy Rope Template

A common problem at FD is trying to evenly space out the 120 degree angles around a tower for 3 guy ropes. No matter how hard you try, you always get the spacing wrong. Ron, W6WG has the answer. He made a template-like device that you lay flat on the ground next to the tower. His ingenious pattern allows you to perfectly lay out the guy ropes to be staked at 120 degree intervals. His template also does 90 degrees if 4 guy ropes are being deployed.



**OCARC GENERAL MEETING MINUTES
2023-07-21**

President Nicholas opened the July 21st, 2023 General Membership meeting with the Pledge of Allegiance to the Flag at 7PM and proceeded with introductions for those in attendance. Nicholas presented WB6NOA and wife with honorary member's badges and certificate.

Then **VP Janet KL7MF** introduced this month's speaker **Gordon West, WB6NOA** with his presentation called "**Tropospheric Ducting**". Gordon (aka Gordo) is a well-known speaker, writer, and active amateur radio operator. Along with fellow authors, Ken Neubeck, WB2AMU and Chip Margelli, K7JA, Gordo has written a book about VHF Propagation. CQ Publications recently released the *2nd Edition* of this book "**VHF Propagation, A Practical Guide for Radio Amateurs**."



After a short break we had a business meeting. Plans are underway for Winter Field Day 2024.

Vice President Janet KL7MF reported on upcoming speakers such Doug Millar for August. Janet also reported on a donation of 4 copies of the VHF Propagation book by Gordo. These will be included in a near future opportunity drawing.

Treasurer Tim N6GP - Club finances are in good shape. He is still in need of a few bills left from Summer Field Day and reminded those who need to turn them in to do so soon.

Technical Director Bob AF6C is attempting to answer a question where a ham is having interference issues on 17m day and night. Waiting to hear back if any suggestions have worked.

Activity Director Tom W6ETC offers refreshments in the back of the room for those in attendance.

Membership Corey KE6YHX reports that we have a total of 101 current members.

Good of the Club: Tony N2VAJ presented a simple DIY reflector that can be added to a 2m satellite antenna. An example was made using a solid piece of sheet metal, but it could be a screen material, or another antenna. The purpose of using a reflector is to improve gain about 2dB(+/-) in signal strength, including enhancing reception when the satellite passes locally high overhead. Tony referenced an article from the August 2001 QST by L.B. Cebik, W4RNL.

September meeting is the 90th Anniversary of the club's founding in 1933.

The club was recognized as an ARRL affiliated club in 1934. A limited number of 90th anniversary license plate frames may be available at the time of printing (first come-first served). N6GP will give a short history presentation for the club at that meeting.

December year end celebration on Dec. 8th. This is the OCARC Annual Christmas party and Arnie Shatz N6HC will have a presentation of interest to all at that time.

Next meeting is Aug 18th with Doug Millar, K6JEY, Modern Day Test Instruments.
Meeting adjourned at 8:55 PM

Highlights of Gordon West WB6NOA presentation on...

TROPOSPHERIC DUCTING



Tropospheric ducting is a type of radio propagation which allows transmission of VHF frequencies and above beyond the traditional line of sight range. Even though tropospheric ducting has been occasionally observed down to 40 MHz, the signal levels are usually very weak at HF frequencies...

Gordo explained the reasons for the phenomenon and gave hints on when and how to take advantage of the “ducting” from the West Coast to the islands of Hawaii and other parts of the continental US.



August Board Meeting

OCARC Board Meeting Minutes for: August 5, 2023,

The OCARC Board meeting was held at The Streamliner Lounge, 186 N. Atchison St., Orange, and called to order by President Nicholas Haban AF6CF at 8:19 am. 8 Board Members were in attendance. Member Arnie Shatz N6HC was also in attendance.

Secretary question regarding Street Fair conjunct with scheduled Board Meeting in September, Board members agreed to move the meeting till Saturday September 9th because of Street Fair conflict and several members will be out of town the holiday weekend.

Treasurer report –presented a current Cash Flow report with a positive cash flow. Waiting on receipts from Field Day expenses such as tents, still will be positive even with all expenses paid out.

Activities – September drawing and food. Already have \$250 towards food. One free drawing ticket for each attendee with the opportunity to purchase additional ones. Purchase of about \$130 in prizes when factoring in \$120 Gordo Propagation books already held by club to distribute through drawing.

Newsletter Editors: Aug Nicholas AF6CF Sep Dan KI6X Oct ?

Entertainment for Next Meetings:

August: Doug Millar K6JEY - Modern Day Test Instruments

September: 90th Anniversary celebration. Tim N6GP will present Orange County Ham history at celebration. Corey is asking for 30 minutes to speak on club history. Some board members suggested that that would be much too long, and that the audience would lose interest and that 15 minutes would be a better length to keep everyone's attention and keep with the general celebratory mood for the evening. Corey did say that he could move a portion of the presentation to November when he asked for the approval to move some of the results of his findings into the historical record. Tom has a 90th anniversary logo design. Looking at producing about 20 mugs. N6GP will personally provide about 100 magnetic bumper sticker items for the party.

October: Club Auction

November: KD6NOT Radios to Rockets and Elections

December: Xmas Party, Arnie presenter. Proposal to have a big prize, possibly Bioenno battery, prepper meal kit from Costco, TYT TH-9800, \$100 HRO gift card, etc. Tom will check with Mimi's for a reservation after today's meeting. Arnie suggested Rodrigos in Tustin as a backup location.

OCARC Monthly Planner

Proposal to implement a board reminder planner within Google Calendar which would send reminders emails to those members of the board that have various annual and/or monthly functions that need to be done at certain points during the year. Examples of this would be renewing PO Box, filing certain tax forms, etc. A new unique club email would be established and used to request a Gmail account. Then the planner reminders would be entered into Google calendar which would be set for each type of event to the appropriate parties on the board to act.

New Business

Club Logo update – no changes currently.

Webpage “In Remembrance of”- Board members agree that it would be a good idea to have a webpage for former members who are now SK.

Good of the Club

Bob AF6C – mentioned that a Canadian Amateur Radio club is interested in publishing some of his Heathkit articles. They put out a 120-page newsletter every other month.

Adjournment occurred at 10:00 am.

Submitted by Tim N6TMT, OCARC Secretary.

Cash Flow - Year to Date

1/1/2023 through 8/1/2023

	<u>8/1/2023</u>	<u>1/1/2023</u> <u>Category</u>
INFLOWS		
Badge Income (PayPal)		3.00
Donations – FD		30.00
Donations - FD Food	590.00	
Dues, Membership (PayPal) 2023	1,440.00	
Dues, Membership (Paypal) 2024		60.00
Dues, Membership 2023	675.00	
Opportunity Drawing -Monthly	352.00	
TOTAL INFLOWS		\$3,150.00
OUTFLOWS		
Field Day – Propane		38.66
Field Day Food	875.31	
Guest Speaker Meal – Exp	160.02	
Opportunity Drwg - Monthly Exp	293.37	
PayPal Fee		80.62
Propane Tank		61.30
Refreshments Expense		40.59
Secretary of State		5.00
Storage of Equipment - Ann Millard	250.00	
Web Site Hosting	133.00	
WFD – Propane		47.39
WFD Flowers		30.00
WFD Rental – Tent	150.00	
ZOOM subscription		-44.97
TOTAL OUTFLOWS		\$2,120.29
OVERALL TOTAL		\$1,029.71

Submitted by Treasurer Tim N6GP