



RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXIV NO. 9

PO Box 3454, Tustin, CA 92781

September 2023

The Prez Sez...

By Nicholas AF6CF



“75th Anniversary Speech”

Greetings to all! September is the Club’s 90th anniversary, and we have a big reunion party to celebrate it. There will be speakers, antique radio exhibits, food, free door prizes and a big opportunity drawing. Even those members that are far away and cannot make it personally will be able to attend remotely by teleconference¹. As mentioned last month, we have big plans for the rest of the year with the upcoming Club Auction in October and excellent speaker for the

November meeting. Speaking of the November meeting, we will have the elections for next year’s Board of Directors. This is your chance to help the Club run its daily business by becoming one of the Directors (or even President). If interested, please contact any Board Member or myself to be in the list. Any current Club member can have any position on the board. The Christmas Party date has been set for Friday December 8th at 6 PM. Mark your calendars early so you don’t miss it. As usual, I look forward to an eyeball contact with you all at the next General Meeting.

73 DE AF6CF



(1) Online visitors can receive Zoom sign-on information on the day of the meeting by an email link that will be provided at <https://www.w6ze.org> at 9:00 a.m. PDT.

NEXT GENERAL MEETING

IN-PERSON (+ Zoom¹)

90th Anniversary Celebration

The following and more:

“State of the Club”

“History of OCARC”

Meet Past Presidents

Pizza, Sandwiches, etc.

September 15th, 2023, at 7PM

at the

American Red Cross

Orange County Chapter
Santa Ana, Room 208

NEXT BOARD MEETING

Saturday, October 7th, 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 Badges¹ \$3

Use one of 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.

OCARC 75th Anniversary Party (a look back)

by AF6CF

The 75th anniversary party was held at the Red Cross building on September 19, 2008. At the time, I was the Club Vice President but President Willy N8WP had moved permanently to the East Coast so I became the “de facto” President and had to organize the event without much help. Some of the program ideas were:

- 1) Some sort of communication with remote members
- 2) Old radio technology devices and exhibits
- 3) A dissertation by the Club Historian
- 4) A time capsule to preserve some mementos
- 5) Some food for members and visitors
- 6) A toast to the health of the Club



For the out of state members we used Skype because at the time the available bandwidth would not allow video streaming (and Zoom was not yet here).

Ken W6HHC (I) was in charge of communications, and he passed a laptop around so everyone in attendance could speak with the other members.

We used email and telephone to advise every one of the schedules.

It was somewhat of a challenge for all to hear, but the system actually worked very well.

The old radio exhibits were an easy one to implement because most of us have lots of vintage equipment that we refuse to dispose of because of sentimental value. Some of the objects displayed were old radios, manuals, vacuum tubes, meters and Morse keys.





More items on display

The Club Historian at the time was Bob Evans, WB6IXN (left, SK). He provided an account of the times from when the Club was organized until the present time, and also provided a few mementos and certificates for all to see.

He was one of the smartest and savvy persons I ever met, and we enjoyed many conversations about quantum mechanics, sub-atomic particles and science in general.

The Time Capsule was an idea to keep some of the Club era mementos in a container to be opened at the 100th anniversary meeting in 2033. Dan N6PEQ was designated the custodian of the capsule, with the idea that it would be transferred to the youngest Club member until the 2033 meeting. Among other things, the capsule contains a movie on a CD that is related to mankind's future. CD players might not be available by the time we open the capsule, so it's uncertain if we will be able to watch it!



A view of the exhibit table. Wayne W6IRD looks exactly today as he did then.



Looking at the certificates and plaques that the Club received during the years



A very young Corey KE6YHX (l) and Paul W6GMU (r) examine the exhibit table.



Our current Treasurer (2023) Tim N6GP had something to say then



Members enjoy talking to each other and to the remote guests



Carl WU6D (right, SK) always had a smile on his face



A young and bearded Chip K7JA (SK) always had a nice comment for everybody, and was quick to tell a faraway tale of operating radios in the strangest places.

Not sure if these folks were crying with laughter or pity?



The activities included food provided in the form of pizza!

I have a few more pictures of that memorable occasion, but it's hard to look at them without becoming emotional because of all those that have left us for greener pastures.

But I'm reminded that we are what we are and have what we have thanks to all those that preceded us and it should be our goal to leave a better world to those who will follow us.

Cheers & 73 DE AF6CF



Come join us as an Officer!

Would you consider volunteering to be of service to the membership and the local Amateur radio community?

Throw your name into the hat for the next **OCARC Board of Directors elections** to be held in **NOVEMBER**.



Heathkit of the Month #118:
by Bob Eckweiler, AF6C

Heathkit

ELECTRONIC TEST EQUIPMENT

Heathkit Accessory Probes – Part I: Voltmeter Probes:

Introduction:

Heathkit's first two kits were the O-1 Oscilloscope and the V-1 Vacuum Tube Voltmeter (VTVM). Over the life of the Heathkit company many different versions of these two products were sold. To make these products more versatile Heath manufactured special purpose probes (or prods)¹ for use with their instruments. A quick count totaled 21 probes for use with their voltmeters (**Table I**) and 17 probes for their oscilloscopes. **Part I** will cover the probes associated with the VTVMs (and the later solid-state and digital meters.) In **Part II** the probes for oscilloscopes will be covered.

Three types of probes were sold in support of Heathkit voltmeters:

RF Probes: for measuring RF voltages at frequencies much higher than the AC section of the instrument will allow (>100 mc vs ~7.2 mc). These probes also provide a higher degree of shielding, eliminating extraneous signal pickup, unlike the provided unshielded AC cables of the early VTVMs. The first

Here is a link to the index of Heathkit of the Month (HotM) articles:

http://www.w6ze.org/Heathkit/Heathkit_Index.html

1. Notes begin on page 18.



Figure 1: Heathkit #309-C RF Probe for all Heath VTVMs. Measures up to 30.V RF on up to 500 VDC (+ VRF).

RF probe offered was the #309 probe, which was produced in three versions. **Figure 1** shows the #309-C that the author has been using for over 50 years now. It still works.

Peak-to-Peak Probes: for measuring the peak-to-peak voltage of an AC signal.

High-voltage (HV) Probes: for measuring voltages up to 30 kV. Different models were manufactured based on the input impedance of the instrument it was to be used with.

Heathkit also sold two stand-alone HV probes with built-in meters that measured up to 40 kV: the IM-5210 (1975 – 1983) and later the IM-5215 (1984 – 1991). Both will be briefly discussed.

The Early Years:

Even before Heathkit began selling specialty probes for their test equipment, they were aware of the need. In an article in an early Heathkit flyer (June 1948) basic plans were given to build a probe that would allow your VTVM to measure to 3 kV² (**Figure 2**). About a half-year later Heathkit began advertising two probes that would work with “any”³ of

**3000 VOLT
TEST PROD
for
HEATHKIT VTVM**

Many and more servicemen are being called upon to service television sets. A simple prod will extend the range of the Heathkit VTVM to handle this. A long (6") high voltage insulated test prod should be obtained together with a length of shielded test lead wire and additional PL55 phone plug.

The prod is assembled similar to the regular prod except that 7 (seven) 3.5 megohm $\frac{1}{2}$ watt resistors are used in series inside the prod. This allows the 1000 Volt range of the VTVM to read 3000 Volts on the 0-30 Volt scale. Use a rubber grommet over lower end of prod to prevent fingers slipping over the end.

From 1948_06 Flyer

Figure 2: Tech note in the June 1948 Heath flyer discussing how to build a simple probe to extend the V-1 VTVM to measure 3 kV.

their VTVMs; which at the time, were the V-1 and V-2. They are the #309 R.F. Probe and the #310 High Voltage Prod (**Figure 3**).

The #309 RF probe converts RF to a DC voltage to allow measuring RF rms voltage to over 100 mc. Though it was designed for use by the

TV repairman, it turned out to be a necessity to amateurs adjusting their transmitters.

The #310 HV probe provides a 10:1 increase in voltage measurement allowing the 300 V and 1,000 volt ranges to measure 3 kV and 10 kV respectively. Equipment to measure high voltage was becoming a necessity to check the high voltage on the TV picture tube anode.

In mid 1950 the #310 was replaced with the #336, increasing the HV measurement capability to 30 kV as picture tubes got larger and used higher voltages.

Then, in the 1952 main catalog, a third probe, the #338 peak-to-peak probe, was added, though it only showed up on the order blank in my partial catalog. It also showed up in the Oct 1952 flyer at \$6.50. When Heathkit released the V-7 it added a peak-to-peak voltage scale to the meter face and the peak-to-peak probe was discontinued shortly later.

A Polished Aluminum Probe Body:

In September of 1952 Heathkit announced their new kits for 1953. Included in the new kits was Heathkit's third generation signal

VTVM Owners--Don't fail to notice the new accessory test prods for HEATHKIT VTVM's on Page 1. One extends the range to 10,000 Volts and the other an RF prod extends the frequency range to 100 Megacycles. In ordering, please mention whether your kit uses a PL55 or PL68 DC phone plug.

From Tips & Comments 1949-01 Flyer

VTVM ACCESSORIES	
<p style="text-align: center;">10,000 Volt H.V. Test Prod Kit</p> <p>Complete kit to assemble test probe which extends the range of any HEATHKIT VTVM to 3,000 and 10,000 Volts. No. 310. Shipping Wt. 1 lb. \$4.50</p> <p style="text-align: left;">From 1949-01 Flyer</p>	<p style="text-align: center;">R.F. Crystal Test Probe Kit</p> <p>Crystal diode probe kit fits any HEATHKIT VTVM and extends RF range to above 100 Megacycles. Complete with crystal and all other parts. No. 309. Shipping Wt. 1 lb. \$6.50</p>

Figure 3: In January 1949 Heathkit introduced its first two probes, both designed for the V-1 & V-2 VTVMs.

tracer, the T-3. The RF probe that comes with the T-3 is built into a polished aluminum tube 3½" long by ⅞" in diameter with a conical red plastic end cap⁴ threaded to take a probe tip, and a conical black plastic end cap⁵ drilled for shielded cable and braid ground lead exit. An acetate insulator sleeve slides into the aluminum tube to prevent shorts. All the VTVM probes take the same aluminum tube part⁶. Starting in 1953 this probe body began being used on all probe kits except the heavily insulated high-voltage probes. **Figures 1** and **5** show this "red - aluminum - black" style probe body. Probes using this style continued to be manufactured into the 1990's, shortly before Heathkit stopped making electronic kits.

The VTVM RF Probes:

Typical VTVMs can measure AC voltages into the low MHz range. However, many VTVMs have unshielded leads that can add problems during measurements. An RF probe turns the RF signal into a DC voltage that can be read on the DC scale of the VTVM. The voltage read is the RMS value of the RF voltage being measured.

#309:

The early 1949 #309 RF probe uses a 6 inch long phenolic-like tube with a brass probe tip on one end. The other end of the tube has external threads that mate with the ring on an Amphenol 75-MC1F (432-1) microphone connector. Inside the tube sits a 0.02 μF 500 VDC blocking capacitor, a diode (1N34)⁷ and a 4.7 MΩ resistor. A shielded cable leaves the connector along with a length of braided cable. The braided cable terminates in an alligator clip that grounds to the device under test, and the shielded cable ends in a ¼" phone plug that connects to the VTVM. The #309 is rated for 20 volts RF and 500 VDC. **Figure 4** shows the #309 circuit and assembly illustration.

#309-B:

In late 1953 the #309 was repackaged into the #309-B using the "red - aluminum - black" style probe-housing discussed previously. Components mount on a small phenolic board where holes are used as tie points. Leads are passed through a hole, twisted, soldered together and then trimmed to ¼" and bent over to hold the connection in place. Circuit-wise, the only change is the value of the capacitor which decreased to 0.01 μF 500

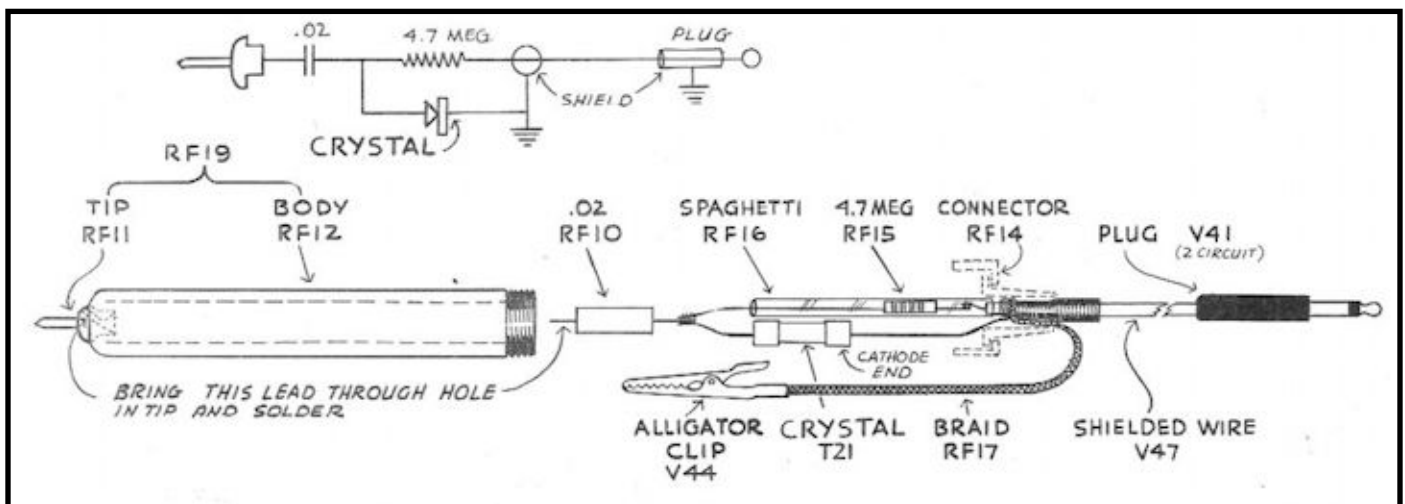


Figure 4: Schematic and assembly drawing of the early #309 probe using the early style probe housing. Part numbers are given in the old Heathkit part # scheme. See HOM #95, page 4 for brief details.

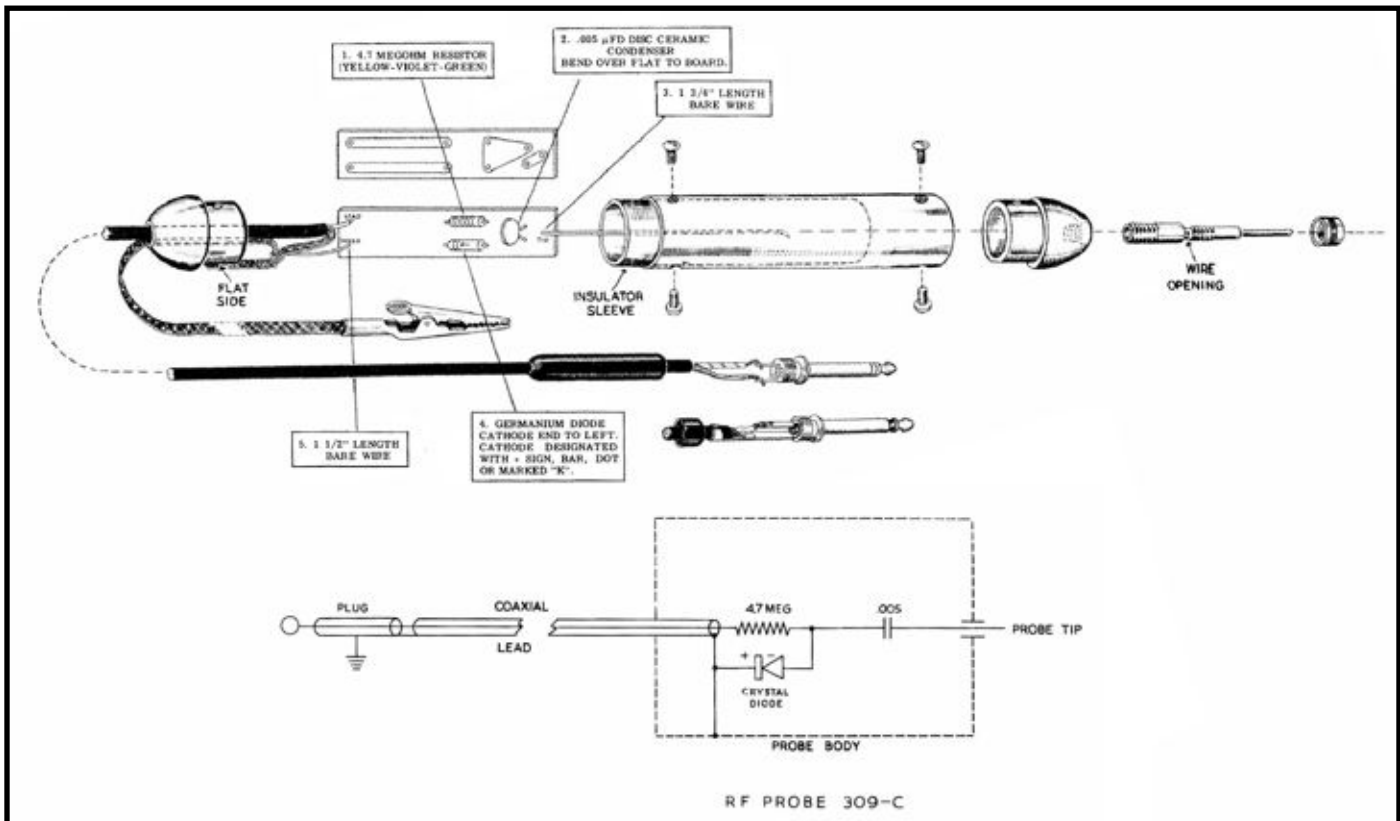


Figure 5: Schematic and assembly drawing of the #309C probe using the later "Red - Aluminum - Black" probe housing & PC board.

VDC. The diode may have changed too (likely to the Hughes HD2257), as the #309-B is rated for 30 volts RF and 500 VDC.

#309-C:

The 309-C is identical to the 309-B with the exception that the small phenolic board was replaced with a printed circuit board that held the components. Also, the blocking capacitor value was decreased further to 0.005 μ F. Comparing a manual dated 9/4/64 and one dated 7/29/66 the diode used in the 309-C changed from a Hughes HD2257 (56-4) to a 1N191 (56-26). The HD2257 is marked with three bands; red - green - violet and the 1N191 is marked with three bands; brown - white - brown. The #309-C is rated for 30V RF and 500V DC. **Figure 5** shows the #309-C circuit and assembly illustration.

A factory assembled #309-C became available late in production as the #309W-C.

Through its existence, the #309 probe series was specified, in available manuals, as "over 100 [MHz]". However, many of the catalog ads state "up to 250 [MHz]" for each of the three models in the series.

The #309 series output is a negative ⁸ DC voltage equal to the RMS voltage of the RF signal being measured. Be sure the FUNCTION switch is in the **DC-** position.

PK-3:

The PK-3 replaced the #309-C RF probe in early 1970. It offers the capability to measure higher RF levels and RF atop higher DC levels. It is spec'd at up to 90 volts of RF and a maximum of 1000 V (DC + RF). This is accomplished by using three 1N191 crystal

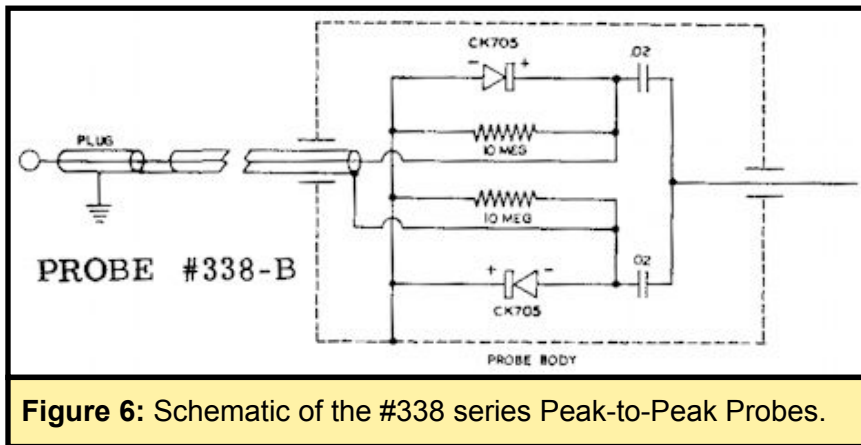


Figure 6: Schematic of the #338 series Peak-to-Peak Probes.

diodes in series. While this allows higher measurement capability, it introduces some errors when measuring low RF voltages. The kit has the option to use a single diode and limit the RF capability to 30 V. Again the blocking capacitor has been further reduced to 1000 pF (0.001 μF).

The PKW-3, a factory wired model of the PK-3, was also available from Heath.

PK-3A:

The PK-3 was upgraded to the PK-3A around mid-1979 in response to the numerous new FET meters (both digital and analog) that Heathkit was selling. Most of these have a 10 MΩ input impedance. The PK-3A could be built for use with meters having either input impedance. If built for 11 MΩ it is identical to

the PK-3 except for diode polarity. If built for 10 MΩ the internal resistor changes from 4.7 MΩ to 3.9 MΩ; at the same time the phone plug at the end of the cable is replaced with a dual banana plug to mate with the new meters. The PK-3A also has the option to use a single diode for measuring more sensitive RF voltages. While all the other RF probes produce a negative DC output, including the PK-3, the PK-3A produces a positive voltage, so if you are using the 11 MΩ PK-3A with a VTVM be sure the FUNCTION switch is in the **DC+** position.

The PKW-3A, a factory wired model of the PK-3A, was also available from Heathkit. It was sold alongside the PK-3A until mid-1981. The kit version continued to be sold until late in 1987.

The VTVM Peak-to-Peak Probes:

The AC scale on a VTVM usually reads RMS voltage and assumes the AC signal is a sine wave. The #338 series of probes reads the actual peak-to-peak voltage being measured. For a sine wave this would be 2.83 or $(2\sqrt{2})$ times the RMS value.

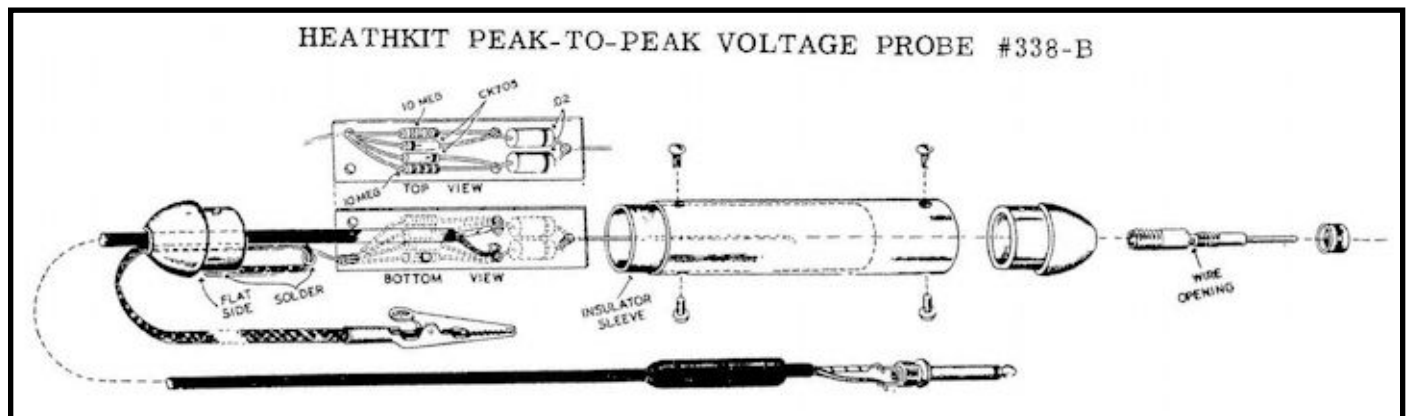


Figure 7: Assembly drawing of the #338-B probe using the later probe housing. Note phenolic board with brass rivets in holes for mounting components.

#338:

The #338 probe was introduced in 1952. It is built into the same phenolic-like tube as the early #309 probe. Little can be found on the original #338, but it appears the circuit stayed the same, or very close, between the three models.

#338-B:

The #338-B was introduced in late 1953. Like the 309-B it appeared in the red - aluminum - black style probe-housing. The components mount to a phenolic board in a similar fashion to the #309 B (See **Figures 6** and **7.**)

#338-C:

The 338-C was introduced with little fanfare along with the #309-C in the fall of 1955. The only change is that the phenolic board that holds the components was replaced with a printed circuit board.

The #338-C was the last of the peak-to-peak probes. Starting with the V-7 VTVM in 1953 Heathkit added a Peak-to-Peak scale on its meter face. The scale corresponding to the 15 V RMS range reads 0 - 42.4 peak-to-peak volts. (Though the actual scale terminates short of full-scale at 40), and the corresponding 50 V RMS scale reads 0 - 141.2 peak-to-peak volts. (Though the actual scale terminates short of full scale at 140). These scales are only accurate when measuring peak-to-peak voltages of sine waves. Heathkit continued selling the #338-C until around 1960, but never advertised a factory assembled unit.


The VTVM High Voltage Probes:

With the possible exception of the early #310 probe, all the high-voltage probes use the same probe body (476-2); a red housing with a



Figure 8: #336 30 kV HV Probe. This probe mounts in a red and black plastic body that Heathkit used for all their HV Probes (Part # 476-2) with the exception of the early #310.

black handle and a brass probe-tip; the end of the handle has male threads to mate with an Amphenol 75-MC1F connector. The significant difference between the models is the value of the high-voltage resistor installed in the probe housing. Also, some of the later probes have different connectors at the far end of their cable to mate with different types of later style meters. The internal resistor value used with each probe is given in the heading; none of the resistors dissipate more than 1 watt.



High voltage probe for IM-102 Multimeter

Ideal for measuring extremely high (up to 30,000 V) DC. Has multiplication factor of 100 on DC ranges of any 10 megohm input meter, provides useful 1000 megohm input for measuring voltages as low as 1 V in high-impedance circuits. Has 1% resistor.

Kit ID-1041, 2 lbs.,
 mailable **6.95**

Figure 9: The ID-1041 HV Probe was designed for the IM-102 DVM with its 10 MΩ impedance.

#310: (R = 100 MΩ)

The #310 10,000 volt HV Probe is for use on 11 MΩ input VTVMs. It uses a probe housing with an old, unknown part #. The probe divides the measured voltage by ten. It uses a 100 MΩ HV resistor. Early VTVMs have a 1,000 volt range that can be used with the probe to measure 0 - 10,000 volts. One can also measure 0 - 3,000 volts on the meter's 300 volt range. Later VTVMs have a 1,500 V range but should only be used up to 1,000 on the scale, to measure 0 - 10,000 V. Use the 500 volt range to measure 0 - to 5,000 V. You should never try to measure more than 10,000 volts. Since it is used with an 11 MΩ meter the total resistance for x10 is 110 MΩ. The probe internal resistor is 100 MΩ, and the internal VTVM resistance is 10 MΩ summing to give the required 110 MΩ.

#336: (R = 1090 MΩ Part # 2-47)

The #336 30,000 volt HV Probe replaced the #310 in 1950. It is also for use with 11 MΩ VTVMs. It was the first to use the 476-2 probe housing. It divides the measured voltage by 100. Since it is used with an 11 MΩ meter the total resistance for x100 is 1100 MΩ. The probe internal resistor is 1090 MΩ and the internal VTVM resistance is 10 MΩ summing to give the required 1100 MΩ. The resistor is a BEMAN – MP-6, 1090 MΩ 2%, Ceramic, 6 Watt Resistor⁹.

A factory assembled version, #336-W, was available starting around late 1961.

ID-1041: (R = 990 MΩ 1%, Part # 2-307)

From 1972 to 1975 the ID-1041 30,000 volt HV Probe was built specifically for the IM-102 Digital Multimeter (**Figure 9**). It divides the input voltage by 100

and works with any later FET meter with a 10 MΩ input impedance. Since it is used with the 10 MΩ IM-102, the total resistance for x100 is 1000 MΩ. The probe internal resistor is 990 MΩ, and the internal meter resistance is 10 MΩ, summing to give the required 1000 MΩ. No manual was available but it is believed the output connection is via banana plugs. A factory assembled option was not available.

IMA-100-10: (R = 990 MΩ, Part # 2-307)

In 1975 Heathkit refreshed their complete lineup of HV probes using the model designation IMA. Designed to support 10 MΩ FET meters that Heath was adding to their voltmeter line, the IMA-100-10 replaced the ID-1041. Output is a single heavy red wire with a banana plug for connecting to the FET or digital meter. No ground cable is supplied as the one supplied with the meter is expected to be used.

A factory assembled SMA-100-10 was sold from mid-1983 through 1986.

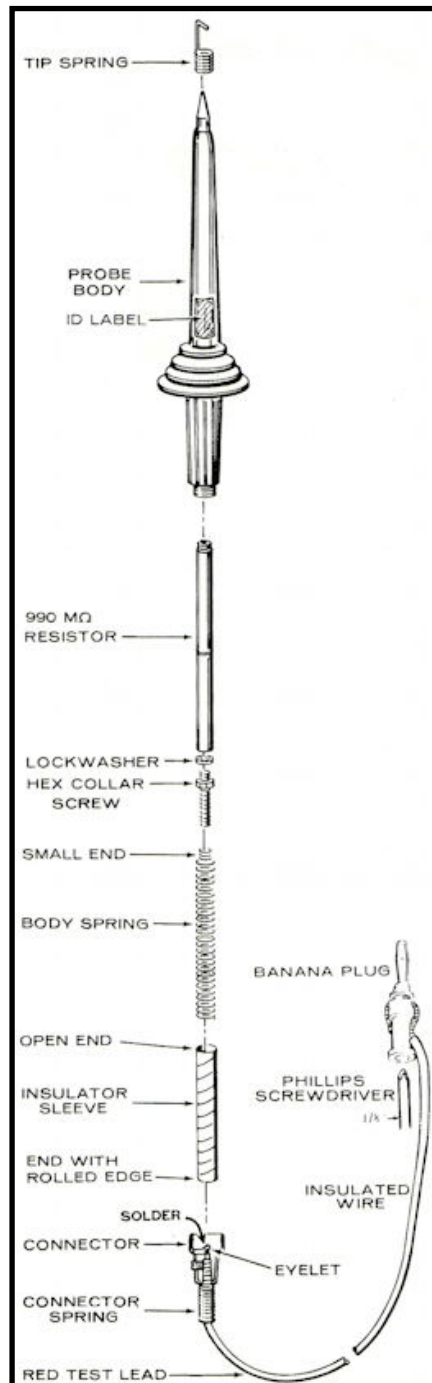


Figure 10: Assembly drawing of the IMA-100-10 and its banana plug output connection.

IMA-100-11: (R = 1090 MΩ Part # 2-47)

This unit replaced the #336 probe. They are virtually identical. The output cable is terminated in a phone plug, a ground lead with attached alligator clip provides the ground path. The SMA-100-11, a factory assembled version, was sold from 1975 through 1980.

IMA-1000-1: (R = 999 MΩ Part # 2-344)

In 1975, along with the two other 30 kV IMA HV probes, Heathkit released the IMA-1000-1 which divides the measured voltage by 1000. It is designed to be used with devices that have an input impedance of 1 MΩ such as the IM-1212 DVM. It can also be used to view high voltages on an oscilloscope, many of which have a 1-MΩ input impedance. Since it is used with a 1 MΩ input device, the total resistance for x1000 is 1000 MΩ. The probe internal resistor is 999 MΩ and the internal resistance of the measuring device is 1 MΩ summing to give the required 1000 MΩ. A factory assembled option was not available.

Stand Alone HV Probes:

This is a good point to mention that Heath also offered two 40 kV HV probes, the IM-5210 (Circa late 1975 – 1983) and the IM-5215 (Circa 1983 – 1986) These probes have a meter built into their handle. The meter is 50 μA and the resistor is 800 MΩ, 2% (2-331).

IM-5210:

The IM-5210 features a switch that shorts out the sensitive meter when not in use. This tends to protect the meter movement from swinging wildly if jarred during transport.

IM-5215:

Little information on the IM-5215 could be found on the web. It appears to be lacking the switch but otherwise is similar in appearance.

A Replacement VTVM Probe – PKW-4:

Many of the early Heathkit VTVMs use three

Heathkit Probes for VTVMs and DVMs		
#	Part #	Description
1	#309	11 MΩ RF
2	#309-B	11 MΩ RF [a]
3	#309-C	11 MΩ RF [a]
4	#309W-C	11 MΩ RF [a] [c]
5	#310	11 MΩ HV 10 kV x10
6	#336	11 MΩ HV 30 kV x100 [b]
7	#336-W	11 MΩ HV 30 kV x100 [b] [c]
8	#338	11 MΩ Peak-to-Peak
9	#338B	11 MΩ Peak-to-Peak [a]
10	#338C	11 MΩ Peak-to-Peak [a]
11	ID-1041	10 MΩ HV 30 kV x100 [b]
12	IMA-100-10	10 MΩ HV 30 kV x100 [b]
13	SMA-100-10	10 MΩ HV 30 kV x100 [b] [c]
14	IMA-100-11	11 MΩ HV 30 kV x100 [b]
15	SMA-100-11	11 MΩ HV 30 kV x100 [b] [c]
16	IMA-1000-1	1 MΩ HV 30 kV x1000 [b]
17	PK-3	11 MΩ RF [a]
18	PKW-3	11 MΩ RF [a] [c]
19	PK-3A	11 MΩ RF [a]
20	PKW-3A	11 MΩ RF [a] [c]
21	PKW-4	11 MΩ Replacement cable [c]
[a] "red - aluminum - black" probe body style		
[b] "Red & Black" HV probe body (476-2)		
[c] Factory assembled probe		
TABLE I		

test leads. A black "common" cable with a black banana plug on one end and an alligator clip on the other; a red "AC-OHMS" cable with a red banana plug on one end and a red test prod on the other; a shielded black cable with a ¼" phone plug on one end and a black test prod, with a series 1 MΩ resistor at its tip, on the other end. Should they be lost or damaged they could readily be fixed by easily

obtainable parts at the time. These VTVMs can be recognized as they have two banana jacks and a phone jack on their front panel.

However, later VTVMs use a “*new slim all-purpose probe*” that has a phone plug on one end with two cables leaving the plug. One cable is a black “common” test lead terminating with an alligator clip, and the other is a shielded cable terminating in a special prod that contains a flippable switch that selects either “**AC – OHMS**” or “**DC**”. This switch switches in the 1 MΩ resistor that is located near the tip of the prod when “**DC**” is selected. Should this test probe be lost or broken, a replacement would be hard to find or even make. Realizing this, Heath, between 1978 and 1986, offered a fully assembled replacement probe assembly. When introduced, the PKW-4 sold for \$8.95; later, before it was discontinued in late 1986 the price had risen to \$19.95.

Safety First:

When measuring High Voltage be sure to:

- Never measure voltages higher than the rating of the probe.
- Be sure the proper ground lead is connected.
- Be sure the probe is connected to the meter.
- When possible, make the connection using the probe spring clip with the voltage off. Then turn the power on to measure. After measuring, turn the power off. Discharge any HV capacitors prior to removing the probe.

Conclusion:

The VTVM probes give users extra versatility making measurements. A Heathkit VTVM is still a useful instrument to have on your bench. It is rugged and the only two parts you’re ever likely to destroy by misuse are the 6AL5 rectifier tube and the 9.1 ohm resistor¹⁰ in the ohms divider chain. The 6AL5 can be damaged by measuring a high AC voltage with the range switch in one of the

low voltage settings, and the resistor can be damaged trying to measure voltage with the FUNCTION switch in OHMS position. Both components are readily available and easy to replace. Probably the most common damage to these meters is caused by not checking the battery often. I remove the batteries when I’m not expecting to use the meter within a month. The meters also are marked with a label with Battery Installation Date, battery manufacturer, and a box to check noting “batteries removed.”

In a future article the probes Heathkit sold for their oscilloscopes will be covered. **Table II** shows the basic model numbers for the various Heathkit probes that are being covered.

Ramblings:

I was looking for something short to write on as my external workload has gotten hectic. I recently picked up a box of electronic “junk”. In it were a couple of Heathkit probes, along with an old Hammarlund FS-135-C 100 kc frequency standard (circa 1948 - 1955). The two Heathkit probes are model PK-1. On one the tip is broken off, but I should be able to find a replacement. They are in the “red - aluminum - black” style. These work with some of the older vacuum tube oscilloscopes.

The article took a lot longer to finish than I had thought, so with that and our editor rushing due to an impending trip, I missed last month’s RF deadline. Thus you are reading this a month late. However, I have extra time to start on the next article.

Speaking of publishing this article in “RF”, Let me comment that “RF” is the newsletter of the Orange County Amateur Radio Club, that is celebrating its 90th anniversary this September. They are allowing me to post my articles on the website after they appear in

the newsletter. So let me give recognition to our current club members who have also supported these articles by acting as rotating editors for the newsletter and/or passing along Heathkit paraphernalia.

Ron Mudry - W6WG
 Tony Scalpi - N2VAJ
 Jim Schultz - AF6N
 Dan Violette - KI6X (New Club Webmaster)

73, from AF6C



In alphabetical order:

Steve Belasco - N1BKB
 Tom Cowart - W6ETC
 Frank Doting - W6NKU
 Tim Goeppinger- N6GP
 Nicholas Haban - AF6CF (darn near stole my call!)
 Ken Konechy - W6HHC (Club webmaster emeritus)
 Tim Millard - N6TMT
 Corey Miller - KE6YHX (Current Editing Manager)

BASIC TEST PROBE MODELS	
PROBES FOR OSCILLOSCOPES	PROBES FOR VOLTMETERS
Model #	Model #
337	309, -B, -C
342	310
P-150	336
P-250-2	338, -B, -C
P-350-2	ID-1040
PK-1	IM-5210 All-in-one
PKW-104	IM-5215 All-in-one
PKW-105	IMA-100-10
PKW-2	IMA-100-11
PS-150	IMA1000-1
	PK-3, -3A
	PKW-4
MISCELLANEOUS PROBES	
Model #	
PKW-200	
TABLE II	

Notes:

1. In the early years Heathkit used the word "prod" instead of "probe" Both are correct, and both are still used today.
2. The V-1 has 5 voltage ranges: 3V, 30V, 100V, 300V, 1000V
 The V-2 through the V-5A have 6 voltage ranges: 3V, 10V, 30V, 100V, 300V, 1000V
 The V-6 and above have 7 voltage ranges: 1.5V, 5V, 15V, 50V, 150V, 500V, 1500V
3. While the Heath VTVM ranges sometimes changed with a new model, the voltage range divider resistors always added up to 10 Meg Ω internally with an additional 1 Meg Ω resistor in the probe tip when measuring DC. The resulting 11 Meg Ω means the probs will work with all the meters.
4. Part # 459-M2 (459-2) red probe tip end (tapped).
5. Part # 459-M3 (459-3) black probe tip end (not tapped)
6. Part # 476-8 (0.035 wall thickness), drilled 4 places. Other aluminum tubes, with different part numbers, machined for a slide switch, adjustable capacitor access etc. are used with the various scope and other probes.
7. The use of the 1N34 crystal diode (56-1) was stated in many of the ads at the time. The 1N48 and CK705 are also listed under (56-1). Other diodes were used throughout the life of the #309 series, including the Hughes HD2257 (56-4) and the 1N191 (56-26)
8. Negative output was selected because the diode presented less capacitance with the cathode to ground.
9. This resistor is still available at:
<https://www.electronicsurplus.com/beman-mp-6-1090meg-2-resistor-ceramic-1090meg-ohm>
10. The value of this resistor varied in different VTVMs. However it was in the range of 8 – 10 Ω .

Notes for HotM #118 (VTVM Probes) 9/2023

Remember, if you are getting rid of any old Heathkit Manuals or Catalogs, please pass them along to me for my research.

This article is Copyright 2023 R. Eckweiler, AF6C and The OCARC Inc.

Thanks - AF6C

New Member Q&A with Albert N6ACG

by KN6SMP

This month in a “New Member Q&A” feature, we meet Albert, N6ACG.

Can you tell us something about yourself?

I grew up in Anaheim, California. I work in IT and have 40 years of experience working for large and medium size companies. I have lived with my wife in Corona del Mar for the last 27 years. I have one son who lives in Colorado. I have 2 huskies that like long walks, belly rubs and as many snacks as I will give them (no limits). I like outdoor activities, hiking, camping, and backpacking. I am running again, building up my distance slowly to reduce the chance of injuries. I would like to run a Disney half-marathon but they are sold out so I may do a Catalina half-marathon carrying my HT and have hiked the Trans Catalina Trail with my son. On a bigger scale, I have hiked Mt. Whitney and went on 2 different trips, one over-night and one on a day hike. I just recently started Brazilian Jiu Jitsu and I find that very challenging, so I consider myself a nerd that likes to be physically active

How did you become interested in amateur radio?

I started my ham radio journey to fulfill a need in my Community Emergency Response Team (CERT) program. My neighborhood did not have any active hams in CERT, so I trained with Gordo and received my Tech License. After my own training, I helped train and coordinate our City CERT Communicators for a few years. Now, I help my HOA maintain our storage container, Land Mobile repeater and backup radios. I later upgraded my license to General.

What has been your amateur radio involvement so far?

I have been active with the Catalina Amateur Repeater Association (CARA) my entire ham radio years. I found the group to be friendly and welcoming when I started, so I got involved helping with events and nets. Also, I ran the “Swap Net” on CARA for several years until traffic dwindled down.

On what equipment and antennas are you presently operating?

I still have my first radio which is a Yaesu VX-6R. I also operate TYT Mono bands 2m, 220, 440 on a CX333, Yaesu FTM-400 in my vehicle, Yaesu 817 and 7250 in garage for nets, Kenwood TMV-71A, ICOM 7300, Yaesu FT-5DR & FT-70, Baofeng UV-5R & UV-5X3, and TYT HT's.

Describe your current and future interests in amateur radio.

I would like to focus on growing our 440 community in C4FM and developing some skills in SOTA on QRP when I retire.

de Bill KN6SMP

RadioActivity

September 2023

Upcoming Activities:

September

- **ARRL September VHF Contest:** 1800 UTC Saturday Sept. 9 to 0300 UTC Monday September 11.
- **North American Sprint, CW:** 0000 UTC to 0400 UTC Sunday September 10.
- **QRP Afield:** 1500 UTC 2100 UTC Saturday September 16.
- **CQ Worldwide DX Contest, RTTY:** 0000 UTC Saturday 23 to 2359 UTC Sunday September 24.

October

- **Oceania DX Contest, Phone:** 0600 UTC Saturday Oct. 7 to 0600 UTC Sunday Oct 8.
- **Oceania DX Contest, CW:** 0600 UTC Oct. 14 to 0600 UTC Sunday Oct 15.
- **10-10 International Day Sprint:** 0001 UTC to 2359 UTC Oct 10.

State QSO Parties:

- **Texas QSO Party:** 1400 UTC Saturday Sept. 16 to 0200 UTC Saturday Sept. 18 and 1400 UTC to 2000 Sunday Sept. 17.
- **Iowa QSO Party:** 1400 UTC Saturday Sept. 16 through 0200 UTC Sunday Sept 17.
- **New Hampshire QSO Party:** 1600 UTC to 2200 UTC Saturday Sept. 16 and 1600 UTC to 2200 UTC Sunday Sept. 17.
- **New Jersey QSO Party:** 1600 UTC Saturday Sept. 16 to 0359 UTC Sunday Sept. 17.
- **Maine QSO Party:** 1200 UTC Saturday Sept. 23 through 1200 UTC Sunday Sept. 24.

• 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 Amateur Radio Club"

- **Nevada QSO Party:** 0300 UTC Saturday October 14 through 2100 UTC Sunday Oct. 15.
- **Arizona QSO Party:** 1500 UTC Saturday Oct. 14 to 0500 UTC Sunday Oct. 15.
- **Pennsylvania QSO Party:** 1600 UTC Oct. 14 to 0400 UTC Sunday Oct. 15 and 1300 UTC to 2200 Sunday Oct. 15.

- **South Dakota QSO Party:** 1800 UTC Saturday Oct. 14 through 1800 UTC Sunday Oct 15.

Repeating Activities:

- **Phone Fry** 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 Mini-CWT** Every Wednesday 1300 UTC to 1400 UTC 1900 UTC to 2000 UTC and Thursday 0300 UTC to 0400 UTC
- **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 & 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.

73, Ron W6WG

OCARC General Meeting Minutes – 2023-08-18 by N6TMT, Secretary



President Nicholas started the August 18th, 2023, general meeting a little past the hour since we were having issues with the screen projector.

After the Pledge of Allegiance, Nicholas proceeded with introductions for those members and guests in attendance.

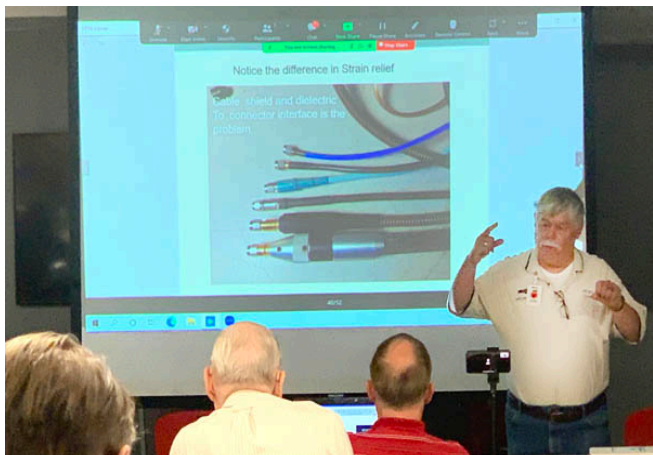


Janet KL7MF introduced this month's speaker **Doug Millar, K6JEY** with his presentation called **"Test Gear for Hams"**.

Doug spoke on modern test equipment and what you may want to have in your shack.

Doug brought samples of the various test devices he uses.

Additionally, Doug's presentation included even more equipment that would round-out the lab for anyone wanting to fix or fine tune their radio equipment.



After a short break we had a business meeting with a quorum of the officers in attendance.





OCARC President Nicholas reported that we have reserved **December 8th at 6 pm for a holiday celebration at Mimis in Tustin**. Make sure you mark your calendars. There will be a prize drawing with each attendee receiving one free ticket and additional tickets will be available to purchase. Cost and menu will be forthcoming.

Also, we have OCARC **Officer Elections during our November General Meeting**. A nomination committee will come up with a slate of candidates with additional nominees also accepted from the floor on the meeting night.

For the September General membership meeting, we plan to celebrate together the **90th Anniversary** of this club which first met in 1933. We know of several previous members who currently live outside of the area that are planning on being in attendance. Also, there will be new OCARC 90th Anniversary cups available for purchase with a special 90th year celebration logo.



Finally, club members are beginning to get excited about the upcoming **Winter Field Day** activation scheduled for January 27th & 28th, 2024. Our club has done very well over the last few years by establishing a record number of contacts during the event and we look forward to having OCARC members and the local Amateur radio community come out and support this event once again. Make sure you mark your calendars and come out and join us for this fun and exciting event.

VP Janet KL7MF outlined our speakers and events at the General Meetings for the remainder of this year.

With Tropical Storm Hilary coming the first weekend of September, it was asked if there was going to be any planned radio net activation by club members when it hits. There is no planned activation, but one member stated that he always keeps a radio receiving on the 2-meter calling frequency. No specific activation was agreed upon.

Membership Corey KE6YHX reports that as of August 2024, OCARC has a total of 104 members.

Next General meeting will be September 15th, 2023, whose theme is the 90th Anniversary of the Orange County Amateur Radio Club. Interesting to note that the first meetings occurred in 1933 and by 1934 our club became recognized by the ARRL as an Affiliated Club.

There was a question regarding activity on the 23-centimeter band. A member wants to test an antenna but hasn't been able to hear anything and therefore is not sure the antenna works. It was mentioned that there is a beacon out of San Diego area however the beacon frequency wasn't readily recalled. An online search shows that beacon traffic should be between 1,296.070-1,296.990. [A 1296 MHz beacon is operating on 1296.300 MHz with 16 watts to a horizontal yagi antenna aimed northwest - K6QPV/B - ed.]

Good luck and 73. Meeting adjourned at 9:00 PM

Submitted by Tim N6TMT, OCARC Secretary

**COAR Ham Operators
Support City of Orange
International Street Fair
- - by Ken W6HHC - -**

Labor Day weekend is the time for the International Street Fair, a three-day event in the City of Orange. Held on Friday, Saturday, and Sunday. The event completely disappears by the end of Labor Day (Monday night).

The Orange Police Department has the largest visible presence for keeping order during the huge event. But OPD is just one of many government agencies helping to make the event run safely. Other agencies include the Orange Fire Department, the city Emergency Management department, and even the FBI. COAR, is a group of volunteer hams for OPD and provides the OPD with extra “eyes and ears” during the event (using 2M simplex 146.535 MHz).



Four members of COAR (fore ground) gather for their shift in front of OPD Mobile Command Post. (L-R) Bryan K6BRY, Scott KM6RTE, Toni KN6CHX, and Mike KF6WRM
- Photo by Quent W6RI -



The COAR Chief Radio Officer, Scott KM6RTE, is taking a shift as Net Control for the COAR “Fair patrols” inside the OPD Mobile Command Post.
- Photo by Ken W6HHC -



The streets of the City of Orange International Street Fair are lined with booths offering food or drinks. Here, many types of sausage are offered on the “Swiss Street”.
- Photo by Quent W6RI -



Each COAR “Fair Patrol” usually consisted of two hams and became extra “eyes and ears” to help the OPD and the volunteers running the Street Fair. (L-R) Ken W6HHC and Jeff KK6YUP chose a spot to watch the crowd walking by.
- Photo by Dan KI6X -



OCARC 2023

Orange County Amateur Radio Club



Nicholas AF6CF will be auctioneer (center)
In memory of Chip Margelli K7JA (SK on left)

ANNUAL RADIO AUCTION

**LIVE AUCTION TO BUY & SELL NEW/USED
HAM RADIO EQUIPMENT**

FRIDAY OCTOBER 20th, 2023



7:00 PM

Doors Open for Registration at 6:00PM



Held at the

American Red Cross

600 Parkcenter Drive

Santa Ana, CA

Second Floor Rm #208

→ SELLERS/BUYERS CAN REGISTER AT 6:00PM

FOR RULES & INSTRUCTIONS GO TO WWW.W6ZE.ORG

AUCTION RULES

October 20, 2023 OCARC Radio/Electronics

The room will open at 6:00 PM to allow registration, set-up, and viewing. All buyers and sellers are welcome.

The following rules for the 2023 OCARC auction will be in effect:

1. Only Ham radio or electronic equipment / items will be allowed.
2. Sellers and Buyers should register to receive a bid number. The bid number is also the Seller's number. **Registration is Free***.
3. Sellers should tag each item in their lot. The tag should be identified with the Seller's number, a dash and a sequential number starting at 1 for each item to be auctioned. The tag should also indicate a minimum bid or "No Minimum Bid", and if needed, a short item description.
4. Only 3 items from a Seller's lot will be auctioned during each turn and then the auctioneer will move on to the next lot. Once all lots have been offered the auctioneer will start the second round of auctioning with the next 3 items starting with Lot #1.
5. Auction bidding will take place as follows:
 - (a) \$0.00-to-\$5.00 bidding will take place in \$0.50 increments.
 - (b) Over-\$5.00-to-\$50.00 bidding will take place in \$1.00 increments.
 - (c) Over-\$50.00-to-\$100.00 bidding will take place in \$5.00 increments.
 - (d) Over-\$100.00 bidding will take place in \$10.00 increments.
6. Rules 4 and 5 may be changed at the auctioneer's discretion to expedite the auction.
7. Payments for purchased items are due at the end of the auction and shall be by cash or check with the appropriate ID. No two-party checks or credit cards are allowed. Disbursements to the Sellers will be by OCARC check, only.
8. *Sellers will be charged 10% of the selling price for items sold by OCARC. A special table will be set up for items donated to the OCARC. Proceeds from the sale of donated items will go into OCARC operational funds.

Cash Flow

1/1/2023 through 9/1/2023

Category	1/1/2023- 9/1/2023
INFLOWS	
Badge Income	3.00
Badge Income (PayPal)	3.00
Donations - FD	30.00
Donations - FD Food	590.00
Dues, Membership (PayPal) 2023	1,410.00
Dues, Membership (Paypal) 2024	90.00
Dues, Membership 2023	697.50
Dues, Membership 2024	30.00
Opportunity Drawing -Monthly	352.00
TOTAL INFLOWS	3,205.50
OUTFLOWS	
Christmas Drawing Prizes	229.50
Field Day - Propane	38.66
Field Day Food	875.31
Field Day Rental - Tent	215.00
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	221.99
WFD - Propane	47.39
WFD Flowers	30.00
WFD Rental - Tent	150.00
ZOOM subscription	-44.97
TOTAL OUTFLOWS	2,653.78
OVERALL TOTAL	551.72

The **ORANGE COUNTY AMATEUR RADIO CLUB, INC.**

RF - VOLUME 64 ISSUE 9 - September 2023

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