



# RF



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

**VOL. LXIV NO. 10**

**PO Box 3454, Tustin, CA 92781**

**October 2023**

### The Prez Sez... By Nicholas AF6CF



Hello and Greetings to all! October is the month when the year starts to feel like the holidays are around the corner, as we will only have one more General Meeting before the Holiday party.

We do have big plans for the rest of the year with the upcoming Club Auction this month. This is your opportunity to convert those items that are eating up space in your garage into money at the auction. Or you could donate them to the Club to help defray its expenses. Or you may want to buy some exotic radio accessory at a bargain price. The possibilities are endless as you can see.

You cannot miss this event, open to everybody, even if you are not a Club member.

At the November meeting, we will have a highly regarded speaker and then 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 Holiday Party date has been set for Friday December 8<sup>th</sup>. 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



Tom W6ETC

### NEXT GENERAL MEETING

IN-PERSON

# OCARC

presents

# October Auction

**October 20th, 2023, at 7PM**  
at the  
**American Red  
Cross**

**Orange County Chapter**  
**600 Parkcenter Drive**  
**Santa Ana, Room 208**

### NEXT BOARD MEETING

**Saturday, November 4th, 2023**

See [www.w6ze.org](http://www.w6ze.org) for Location

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### Monthly Events

#### Membership Meetings\*

Time: 7:00 PM  
When: 3<sup>rd</sup> 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 <sup>1</sup>	\$3
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Use one of our interactive online forms to  
calculate current prices, join, renew, or order  
badges:

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

<sup>1</sup> \$3 or less + mailing. See form.



Location: **American Red Cross Building**  
**600 Parkcenter Drive, Santa Ana, CA 92705**



In memory of Chip Margelli K7JA-SK



# AUCTION RULES

## October 20, 2023 OCARC Radio/Electronics Auction

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 could also indicate a minimum bid or "NO MINIMUM BID (NMB)", and if needed, a **BRIEF ITEM DESCRIPTION**.
4. **Only 3 items from a Sellers 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: 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.  
**SELLER DISBURSEMENTS: 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.

**ITEM &/OR CASH DONATIONS FOR CLUB OPERATIONS ARE WELCOME**

All **proceeds** from the sale of donated items will **go into OCARC operational funds**.



Orange Section  
The Juciest  
Section



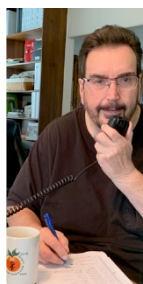
Date: Wednesday, October 11, 2023

From: Bob Turner, W6RHK

ARRL [Orange Section](#) Manger

RE: **Announcement regarding NEW ASEC for Orange County**

Please join me in welcoming **Tom Cowart, W6ETC**, to his new position as **Assistant Section Emergency Coordinator (ASEC) for Orange County**.



Tom W6ETC will oversee the ARES program in Orange County, California and assists where and when needed. He joins the other ASECs for the Orange Section, John Shepherd, AD6NR, Inyo County, and Bob Smith, KO6BOB, San Bernardino County.

Tom's interest in radio began in his teen years with CB radio and he participated with Orange County REACT. Now, many years later, he continues his interest in EmComm (EMERGENCY COMMUNICATIONS) and regularly operates in VHF, UHF, and HF nets. He currently serves on the Board of Directors for the Orange County Amateur Radio Club (OCARC) as its Activities Director.

He is also responsible for the creation of the '**CARA\* Net-at-9 Wellness & Support Net**' which began during the COVID shutdown. Net@9 continues to this day on the CARA repeater. You can join him and other volunteer Amateur Net Control Operators (NCO's) on their CARA 2M and 1.25M repeaters. Information regarding this Net is included below.

If you have any questions for Tom, he can be reached at [tom@W6ETC.com](mailto:tom@W6ETC.com)



Bob Turner, W6RHK

ARRL [Orange Section](#) Manger

w6rhk@arrl.org

The Orange Section is part of the American Radio Relay League (ARRL) Southwestern Division. It is made up of 4 counties: Inyo, Orange, Riverside, and San Bernardino covering over 38,000 square miles with a population over 7 million.

The Orange Section ARES program supports public service events at a cost savings to the public for volunteer communications services. ARES Volunteers also support emergency operations with service hours for additional cost savings to the community. ARES SOP can be found [here](#).

\*[Catalina Amateur Repeater Association](#)

### **Net@9 Wellness & Support Net**

9 AM & 9 PM Monday - Friday

CARA 2M repeater: 147.090 MHz (+0.600 MHz) NO PL

1.25M repeater: 224.420 MHz (-1.600 MHz) PL 110.9

Also available on EchoLink: node \*CATALINA\* and Allstar node: #51597

For Facebook go to '[CARA Net@9](#)'

**SAVE THE DATE**  
**OCARC ANNUAL**  
**HOLIDAY PARTY**  
**DECEMBER 8th 2023**  
 6PM @ Mimi's Cafe Santa Ana

**ORANGE COUNTY AMATEUR RADIO CLUB**  
 CELEBRATING **90** YEARS SERVING THE COMMUNITY  
**W6ZE**

*Mimi's*

**Magnifique Dinner**  
**\$25.00 per person**

*Served with your choice of coffee (0 Cal), tea (0 Cal), lemonade (120 Cal) or soft drinks (0-150 Cal).*

**E N T R É E S**

*Served with House Salad (190 Cal), Caesar Salad (220 Cal) or a Cup of Soup (200-240 Cal).*

**Grilled Strip Steak\***  
 28-day aged 10 oz. USDA Choice New York Strip. House-made herbes de Provence butter (100 Cal) available upon request. Served with mashed potatoes and broccoli. (990 Cal)

**Grilled Atlantic Salmon\***  
 Grilled to perfection. Served with mashed potatoes and broccoli. (560 Cal)

**French Pot Roast**  
 A classique! Slowly braised and simmered with carrots, celery and onions. Served on a bed of mashed potatoes. (510 Cal)

**Tuscan Style Grilled Chicken\***  
 Grilled chicken, mashed potatoes, sautéed vegetables and artichoke hearts served in a savory sauce. (610 Cal)

**Dessert**

**Molten Lava Cake**  
 Hot molten cake served with a scoop of vanilla ice cream and garnished with a drizzle of chocolate and a fresh strawberry. (510 Cal)

**Bread Pudding**  
 Made from scratch bread pudding with raisins topped with whiskey sauce and whipped cream. (1060 Cal)

**MARK OUR CALENDAR FOR DECEMBER 8th @ 6PM**



## OCTOBER 2023

### Upcoming Activities:

#### October

**\*10-10 Int. 10-10 Day Sprint:** 0001 UTC to 2359 UTC Sunday Oct. 10.

- **Oceania DX Contest, CW:** 0600 UTC Saturday Oct. 14 to 0600 UTC Sunday Oct 15.
- **\*CQ World Wide DX SSB Contest:** 0000 UTC Saturday Oct. 28 to 2359 UTC Sunday Oct. 29.

#### November

- **ARRL Sweepstakes Contest, CW:** 2100 UTC Saturday Nov. 4 to 0300 UTC Monday Nov. 6.
- **10-10 Int. Fall Contest, Digital:** 0001 UTC Saturday Nov. 11 to 2359 UTC Sunday Nov. 12.
- **ARRL Sweepstakes Contest, SSB:** 2100 UTC Saturday Nov. 18 to 0300 UTC Monday Nov. 20.

\* 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"

#### State QSO Parties:

- **Nevada QSO Party:** 0300 UTC Saturday October 14 through 2100 UTC Sunday Oct. 15.
- **Arizona QSO Party:** 1500 UTC Saturday October 14 to 0500 UTC Sunday Oct. 15.
- **Pennsylvania QSO Party:** 1600 UTC to 0400 Oct. 14 and 1300 UTC to 2200 Sunday Oct. 15.
- **South Dakota QSO Party:** 1800 UTC Saturday Oct. 14 through 1800 UTC Sunday Oct 15.
- **New York QSO Party:** 1400 UTC Saturday Oct. 21 through 0200 UTC Sunday Oct. 22.
- **Illinois QSO Party:** 1700 UTC Sunday Oct. 22 through 0100 UTC Monday Oct. 23.

### Repeating Activities:

- **Phone Fray:** Every Tuesday night at 0230 UTC to 0300 UTC.
- **CWops Mini-CWT:** Every Wednesday at 1300 to 1400 UTC, 1900-2000 UTD and Thursday 0300-0400 UTC . 0700-0800 UTC
- **SKCC:** Weekend Sprintathon (Straight Key CW) on the first weekend of the month after the 6<sup>TH</sup> of the month. 1200 Sat. to 2359Z Sunday.
- **SKCC:** Sprint (Straight Key CW) 0000Z to 0200Z on the 4<sup>th</sup> Tuesday night (USA) of the month.
- **K1USN Slow Speed Test:** (CW, 20WPM Max.) Every Friday 2000 UTC to 2100 UTC Every Sunday night at 0000 UTC to 0100 UTC Monday

### 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:

- **Catalina Amateur Repeater Association (CARA)**
- **Net-AT-9 Wellness & Support Net:** Monday thru Friday 9:00 am and 9:00 pm Local Time 147.090 MHz (+600 MHz) No PL 224.420 MHz (-1.600 MHz) PL 110.9 -EchoLink Conference Server \*CATALINA\* Node #384712 AllStar Node #51597 <http://www.cara.radio/>

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

73, Ron W6WG



**OCARC GENERAL MEMBERSHIP  
MEETING MINUTES  
2023-09-15**



The September General Meeting was set aside as an evening to celebrate 90<sup>th</sup> anniversary of our club's first formation. As such we didn't conduct a formal meeting but spent the evening with various celebratory activities. This included two (2) speaking presentations, one on what WW2 and the years immediately following brought about for the club.



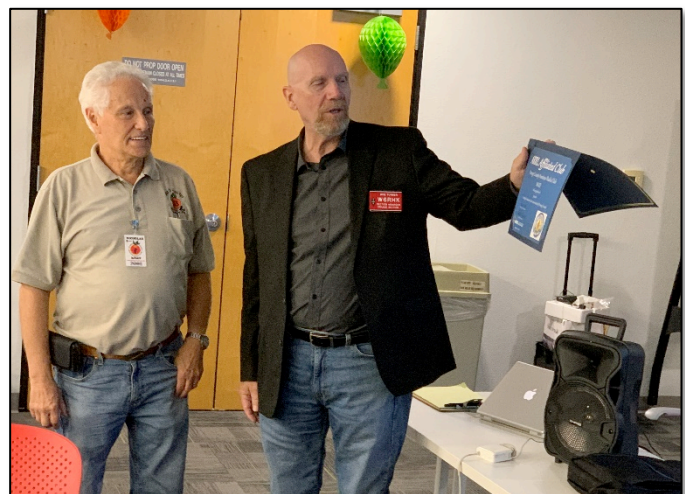
Section Manager – Bob Turner, W6RHK presented a certificate from ARRL acknowledging our 90<sup>th</sup> year.

The second presentation was looking at the early years of OCARC.

Dick Norton, N6AA Southwestern Division also spoke before the club during our celebration.

A short break to enjoy some of the food that was available.

A final round of anniversary cake was enjoyed by all.



Nicholas Haban AF6CF, OCARC President (Left) & Bob Turner, W6RHK (ARRL Orange Section Manager) presented a certificate from ARRL acknowledging our 90<sup>th</sup> year.



Heathkit of the Month #119:  
by Bob Eckweiler, AF6C

# Heathkit

## ELECTRONIC TEST EQUIPMENT

### Heathkit Accessory Probes – Part II: Oscilloscope:

#### Introduction:

In HotM #118 the accessory probes used with Heathkit vacuum-tube-voltmeters (VTVMs), and the later FET analog and digital voltmeters, were discussed. In this article the probes designed to work with Heathkit (and in many cases, scopes manufactured by other companies) will be covered.

Two general types of o'scope probes were offered by Heath. One is the demodulator probe. The second is the low-capacitance probe; Heathkit, over the years offered many different types of low capacitance probes. In the later years, many of these probes were sold fully assembled and were from other manufacturers, but carried the Heathkit brand. **Figure 1** shows the PKW-101 x10 low capacitance probe good for up to 30 MHz.

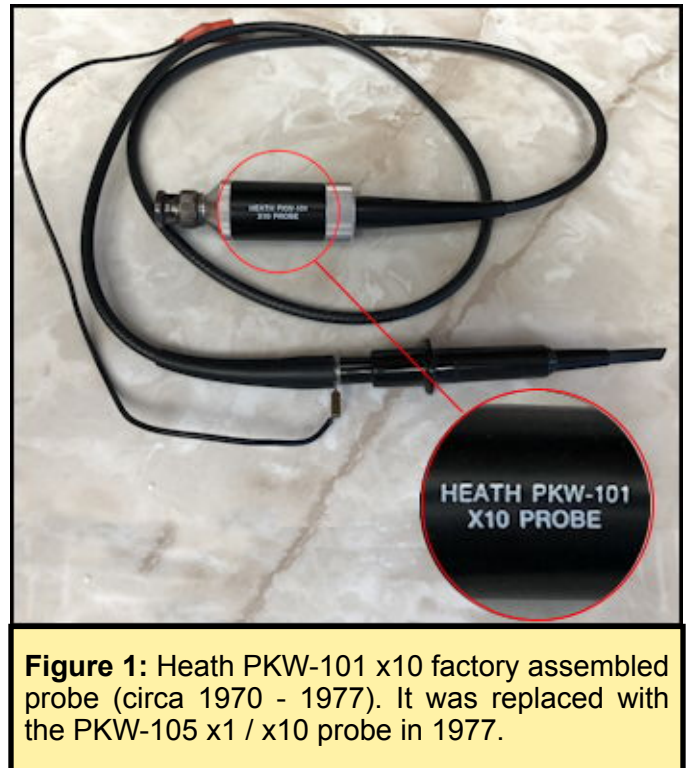
#### Scope Demodulator Probes:

Early Heathkit scopes have a top frequency response from a few hundred kilocycles up to about 5 megacycles, the frequency response that is needed to service analog<sup>1</sup> color TVs. A demodulator probe allows the user to view on

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

[http://www.w6ze.org/Heathkit/Heathkit\\_Index.html](http://www.w6ze.org/Heathkit/Heathkit_Index.html)

1. Notes begin on page 19



**Figure 1:** Heath PKW-101 x10 factory assembled probe (circa 1970 - 1977). It was replaced with the PKW-105 x1 / x10 probe in 1977.

the scope the signals riding on a carrier way beyond the frequency response of the scope. The typical TV IF (intermediate frequency) of the day was between about 20 and 45 mc; way too fast for Heathkit scopes of the time. The demodulator probe allows the TV repairman to look at the demodulated video and audio signals in the TV IF stages.

#### Low Capacity Probes:

Hooking a scope probe to an operating circuit can affect the operation of that circuit due to the added capacitance of the probe, its shielded test lead and the input capacitance of the scope. A low capacitance probe reduces the capacitance by trading off signal level for isolation. A common low-capacitance probe attenuates the signal by a factor of ten to provide the needed isolation. These probes are commonly called 10:1 or x10 probes. Many include a switch that allows the probe to be switched to a regular probe (1:1 or x1) when desired, and when the added probe capacitance is not a problem (usually at lower frequencies).

**Heathkit's Scope Probes & Accessories:**

Heathkit sold 16 different probes and one accessory package for their oscilloscopes. The various items are listed in **TABLE I**.

Five probes are in the family of the #337. They are the original #337 followed by -A, -B and -C variations; there was also a factory assembled version of the -C variation given the model #337-WC designation. Some question whether the -A variation ever existed? It did and will be discussed when the #337 is detailed later in this article.

The #342 was the first Low-Capacity probe offered by Heathkit. When used with the current scopes of the time (O-7, O-8) it has an x10 attenuation. The probe came as a kit only.

The PK-1 replaced the #342. It is switchable between x1 and x10, and could be wired for different o'scope impedances. It is the last of the kit scope probes; the remaining only came factory assembled (many from a third-party manufacturer).

The PKW-2 is a switchable x1 - x10 probe designed specifically for the professional Heathkit IO-14 scope<sup>2</sup>.

The PKW-101 is a x10 probe designed for newer scopes with a BNC connector and a one Meg  $\Omega$  input impedance.

The PKW-104 was sold for a time alongside the PKW-101. This probe isn't low-capacity, it is a x1 probe in style to the PKW-101.

Heath also sold an accessory package for the PKW-101 and PKW-104 (PKA-101-1) that included extra probe tips and ground clips.

The PKW-105 is a probe that was sold under numerous brand names. Pomona Electronics (PE), Zenith, Gould, AP, Heath and others.

The probe is manufactured in England as well as possibly the US, and it is believed that it first appeared as the PE 4550. Heath also offered the IOA-3220-1 which is a package of two PKW-105 probes at a discounted price.

For higher frequency scopes Heath offered the PS-250 (250 MHz BW) and the PS-350 (350 MHz BW). These came in sets of two as the faster scopes usually have at least two vertical channels.

Heathkit Probes for Oscilloscopes		
#	Part #	Description
1	#337	Demodulator Probe
2	#337-A	Demodulator Probe
3	#337-B	Demodulator Probe [a]
4	#337-C	Demodulator Probe [a]
5	#337-WC	Demodulator Probe [a]
6	#342	Low Capacity Probe [a]
7	PK-1	1:1 / 10:1 Probe [a]
8	PKW-2	1:1 / 10:1 Probe for IO-14 [b]
9	PKW-101	10:1 Scope Probe [b]
10	PKW-104	1:1 Scope (& Counter) Probe [b]
11	PKA-101-1	Accessory Kit for PKW-101/-104
12	PKW-105	1:1 / 10:1 100 MHz Probe [b]
13	IOA-3220-1	Set of two PKW-105 Probes
14	PS-250-2	Set of two 1:1 / 10:1, 250 MHz Probes [b]
15	PS-350-2	Set of two 10:1, 350 MHz Probes [b]
16	P-150	1:1 / 10:1 150 MHz Probe [b]
17	PS-150	Set of two P-150 Probes [b]
		[a] "red - aluminum - black" probe body style
		[b] Factory or third party assembled probe
<b>TABLE I</b>		

Heath's last scope probe is the P-150 (150 MHz BW). It came out when Heath discontinued the PKW-105. Heath also offered the PS-150 which is a set of two P-150 probes.

**Heath Scope Probe Details:**

Later probes that were assembled from a kit and used the red - aluminum - black body also came with a sheet of decals (Figure 17) to identify the probe type. Here's a closer look at these scope probes:

**#337 Demodulator Probe:**

There are four versions of the #337 probe. Little information is available about the first two; however with some detective work, a good idea of these can be determined. If anyone has any information pro or con to these "best guess" descriptions, please feel free to contact the author and I'll make corrections.

A side article appeared in the December 1949 Heathkit flyer called "Build this Demodulator Probe for your Oscilloscope" (Figure 2). It describes a basic probe using a 1N34 crystal

**Figure 2:** In the December 1949 flyer Heathkit described how to build your own demodulator probe. It didn't become a kit until December 1951.

**Figure 3:** In the December 1951 flyer Heathkit first offered the #337 probe as a kit. Note that they gave a list of parts. Credit: Santos d'Silva

diode and a standard test prod, shielded cable and lugs to connect to the scope vertical input binding posts. It uses the capacitance of the length of shielded cable as well at the input capacitance of the scope to filter the RF and provide the demodulated signal.

The #337 was introduced in the December 1951 flyer (Figure 3). It spells out the parts used in the probe: "Probe kit consists of probe housing, crystal diode detector, shielded cable and two spade lugs." This exactly matches the parts described in the 12/1949 article except for the spade lugs, which are inconse-

**Figure 4:** #337 Probe as it is believed to originally appear, using a circa 1950's standard test probe. It compares closely to Figure 3.



quential. Later flyer ads confirmed the diode used is the 1N34. **Figure 4** is a closer view of what is believed to be the original #337 probe. This photo was used occasionally (and likely incorrectly) in later ads for the #337-A.

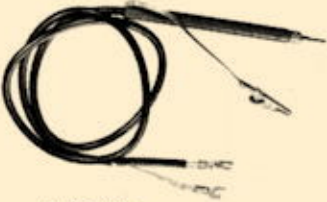
### #337-A Demodulator Probe:

The #337-A is believed to have first appeared in the 1953 main catalog. The catalog entry is shown in **Figure 5**. Note in the text of ad the parts used are now described as a germanium diode, condensers, resistors, probe housing and shielded test lead along with a detailed assembly sheet<sup>3</sup>. Note the plural used for condensers and resistors. At least two of each. The updated circuit is likely for two reasons; to better protect the diode, and to scale the output so it more accurately represents the demodulated signal amplitude. The photo shown in **Figure 5** is identical to that of **Figure 4**, but it would be hard to believe a standard test probe could hold five components<sup>4</sup>. A later photo of the #337-A shows it in what is believed to be the correct probe body, the same one used by the #309 and later the #338, which has more internal room (**Figure 6**). The old part number for this probe body is: RF-19<sup>5</sup> composed of RF-11 tip and RF-12 probe body and the new part numbers are 477-2 tip and 476-3 body. No record of the circuit schematic has been found, but it is assumed to be very close, if not identical, to the #337-B. The #337-A was offered again in the Summer 1953 flyer, this time the photo is believed to be correct. The #337-A was short lived, being replaced that September (1953) by the #337-B.

### #337-B Demodulator Probe:

The #337-B appeared in September of the same year the #337-A was released. It is housed in the new "red - aluminum - black" probe body. The schematic is shown in **Fig-**

*Heathkit*  
SCOPE DEMODULATOR  
PROBE KIT



NO. 337A

**\$450**

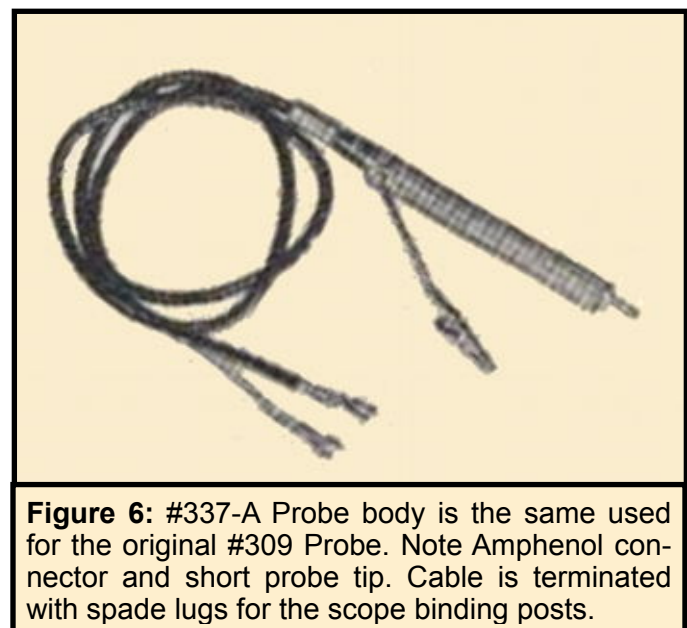
SHIPPING  
WT. 1 LB.

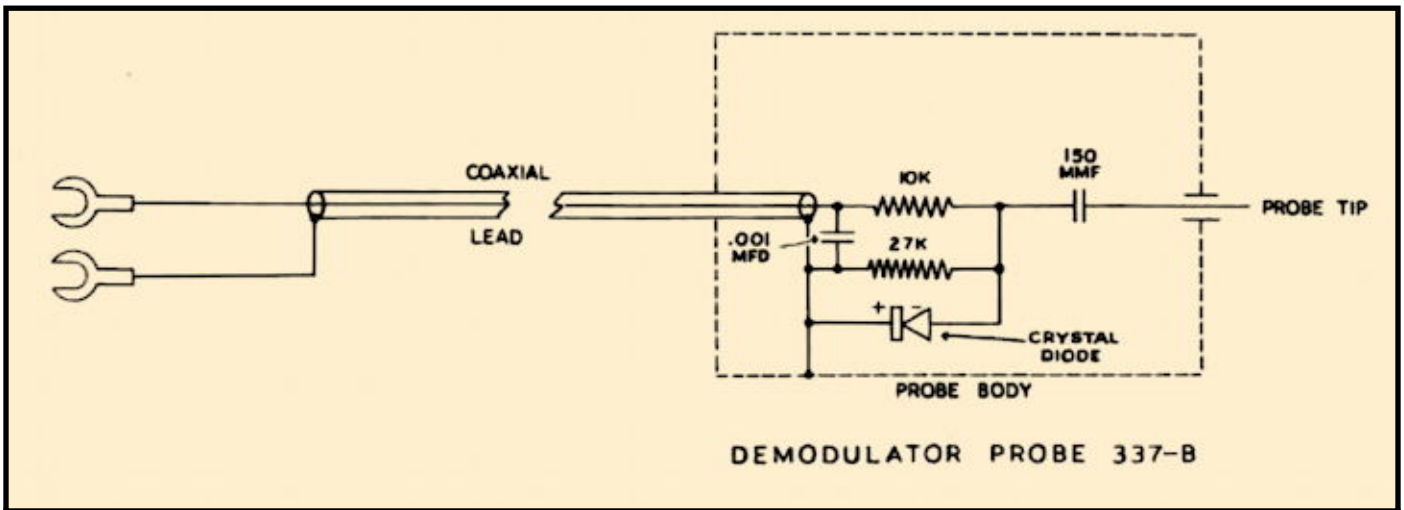
In all types of Radio and TV servicing with an Oscilloscope, a Demodulator Probe is essential. It will prove extremely useful in applications such as trouble shooting or aligning TV, RF, IF and video stages. Work in this frequency range requires demodulation of high frequency signals before Oscilloscope presentation. The Demodulator Probe Kit is supplied complete with the germanium diode, condensers, resistors, probe housing and shielded test lead along with a detailed assembly sheet.

1953 Main Catalog

**Figure 5:** #337-A Probe as shown in the main 1953 catalog. It was also listed in the 1953 summer flyer, and on both their order blanks.

ure 7. This is likely very close to the schematic for the #337-A. The two resistors reduce the peak RF voltage so it reads the RMS voltage correctly on the meter. The #337-B uses a 56-2 crystal diode. Heathkit designated three interchangeable diodes to the 56-2 part number: 1N34, 1N48 and CK-705.





**Figure 7:** A schematic for the #337-B probe; The #337-C is identical except for the diode. The crystal diode is a 1N34, 1N48 or CK-705 (56-2) in the #337-B and an HD-2257A in the #337-C.

Inside the probe body is a small drilled board with holes that are used for tie-points for the five components. Leads are passed through a hole, twisted and soldered together and then trimmed to 1/4" and bent over to hold the connection in place. With its new probe housing the #337-B sold for \$3.50, a dollar less than the previous #337 models.

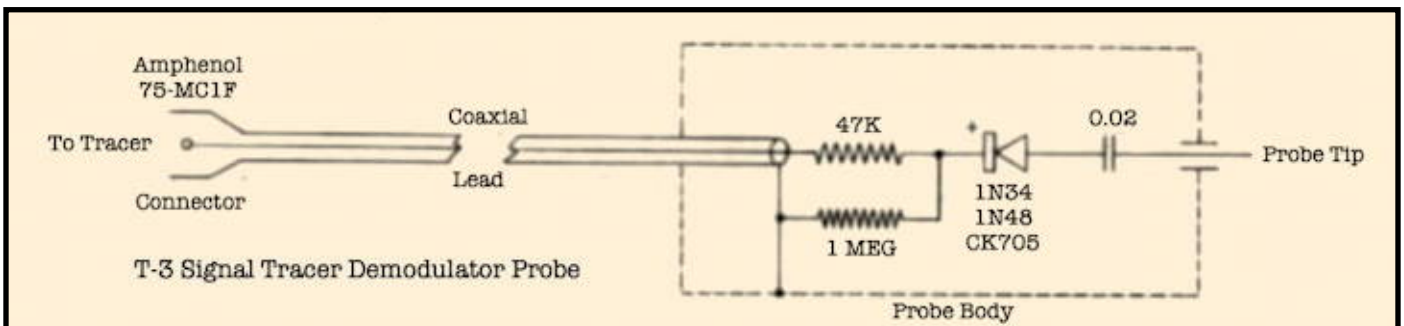
**#337-C Demodulator Probe:**

The #337-C appeared in late 1955. Like the #309-C <sup>6</sup> and 338-C <sup>7</sup>, the major change was the phenolic board was replaced with a true printed circuit board. The only other change was the diode, which changed to an HD-2257 (56-4). The #337-C probe continued to sell for \$3.50 until 1968. It was listed in the Fall 1986

catalog, with a note stating it is "No Longer Available". It's last selling price was \$12.95.

**T-3, T-4 and IT-12 Signal Tracer Probes:**

While not a scope probe, this is a good place to mention the demodulator probes used on Heathkit signal tracers. These probes also demodulate, but, instead of being displayed on a scope, the detected signal is fed to an audio amplifier. The T-3 probe (**Figure 8**) is wired differently than the #337-C probe, as level correction and frequency response is not critical. The T-3 has two probes, one for audio and a demodulator probe for RF. An Amphenol 75-MC1F connector is used to connect to the T-3. The later T-4, and IT-12 (a restyled T-4) have a single probe that can be switched between au-



**Figure 8:** Schematic of the RF Demodulator Probe that came with the T-3 Signal Tracer.

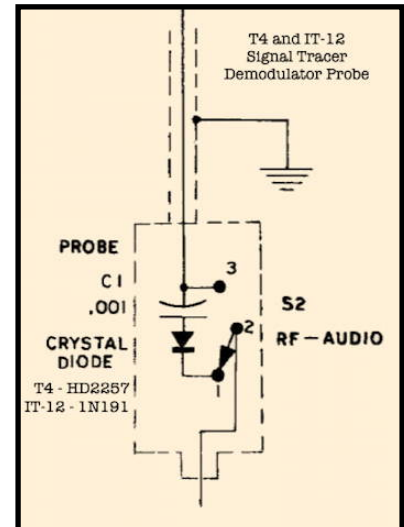
dio and RF (Figure 9), and are hardwired to the chassis. These three probes use the “red - aluminum - black” style probe body.

**#342 Low Capacity Probe:**

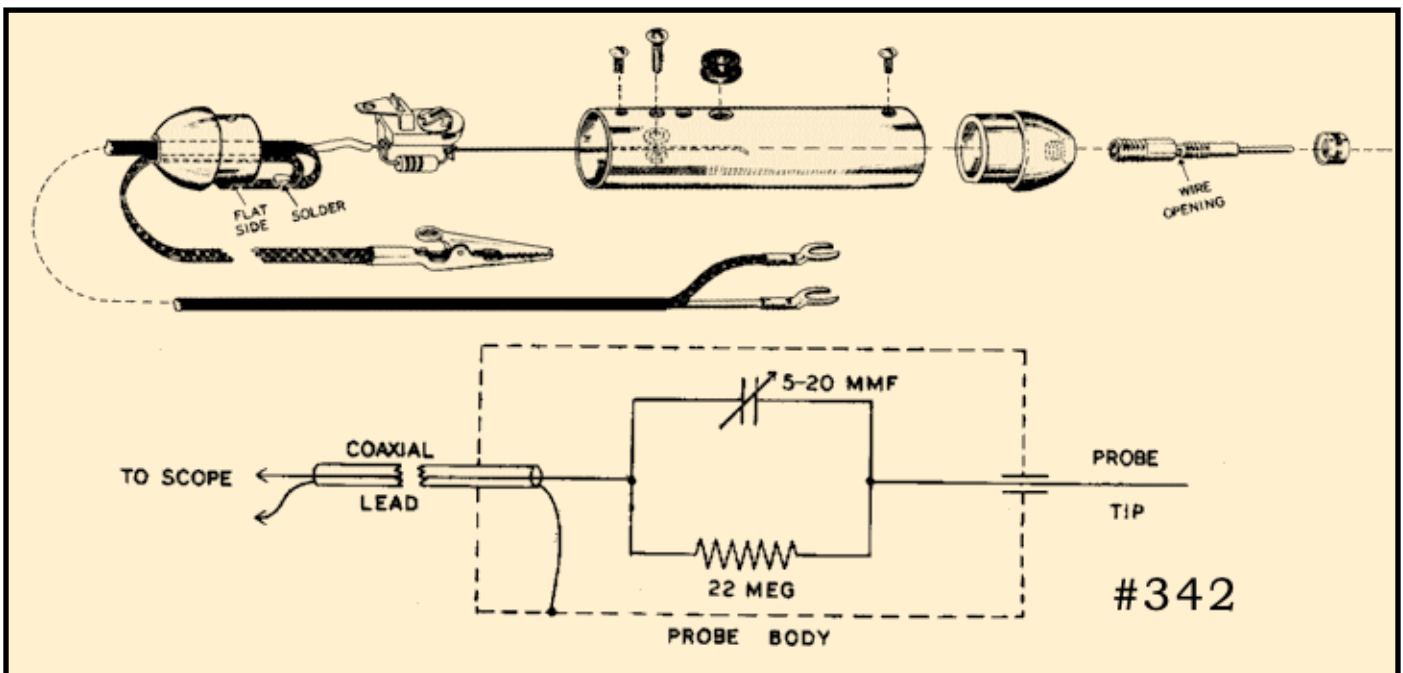
In early 1953 the #342 Low Capacity Probe was introduced in the red - aluminum - black style probe-housing. Due to the need to mount a small trimmer capacitor in the probe housing, the larger diameter aluminum body provides the room and shielding for the simple circuit composed of the trimmer shunted by a resistor in series with the probe tip. Figure 10 shows the schematic and assembly drawing for the #342. Like the #337 it has spade-lug terminals for connection to a scope. This probe is designed to work with the scopes Heath was selling at the time, and provides approximately x10 attenuation with scopes having an input impedance of around 2.4 MΩ. It still works with other scopes providing isolation, though the attenuation will not be accurate. In the assembly sheet that came with the probe, Heath gives instructions on how to de-

termine the attenuation when used with instruments with other input impedances. Also, a note on the parts list states: *NOTE: When the Low Capacity Probe is used with instruments whose input impedance is not compatible with the circuit constants used, there is no objection to altering the resistance value of*

*1-70.* This note refers to the 22 MΩ resistor Heath part # 1-70. The #342 sold for \$3.50 until late 1959 when it was discontinued and replaced by the PK-1 probe. The #342 probe was introduced late enough that the “Red - Aluminum - Black” probe body was already in



**Figure 9:** Schematic of the RF Demodulator Probe that came with the T-4 and IT-12 Signal Tracers.



**Figure 10:** #342 Low Capacity Probe assembly drawing and schematic.



use, nor was a circuit board needed. hence there were no “B” or “C” versions. For a short overview of low capacity probes see the sidebar. “*LOW CAPACITANCE PROBES*”.

**PK-1 Universal Oscilloscope Probe:**

The PK-1 was introduced in late 1959 for \$4.95. It is a probe that is switchable between an x1 regular probe and x10 low capacitance probe. Switching is performed by a slide switch that mounts inside the aluminum probe housing. Also housed inside is the trimmer capacitor and two resistors. The PK-1 schematic is shown in **Figure 11**. Resistors are provided to wire the probe for scopes with 3.6 MΩ and 1 MΩ input impedances. The PK-1 was the last probe scope or VTVM probe to be offered in kit form. The PK-1 sold for over 30 years. In the Winter 1991 catalog the probe was selling for \$17.95.

**PKW-2 Oscilloscope Probe:**

The PKW-2 was released in 1968 specifically for use with the IO-14 “Professional” Scope.

**Low Capacitance Scope Probe . . .**  
**Factory Assembled**

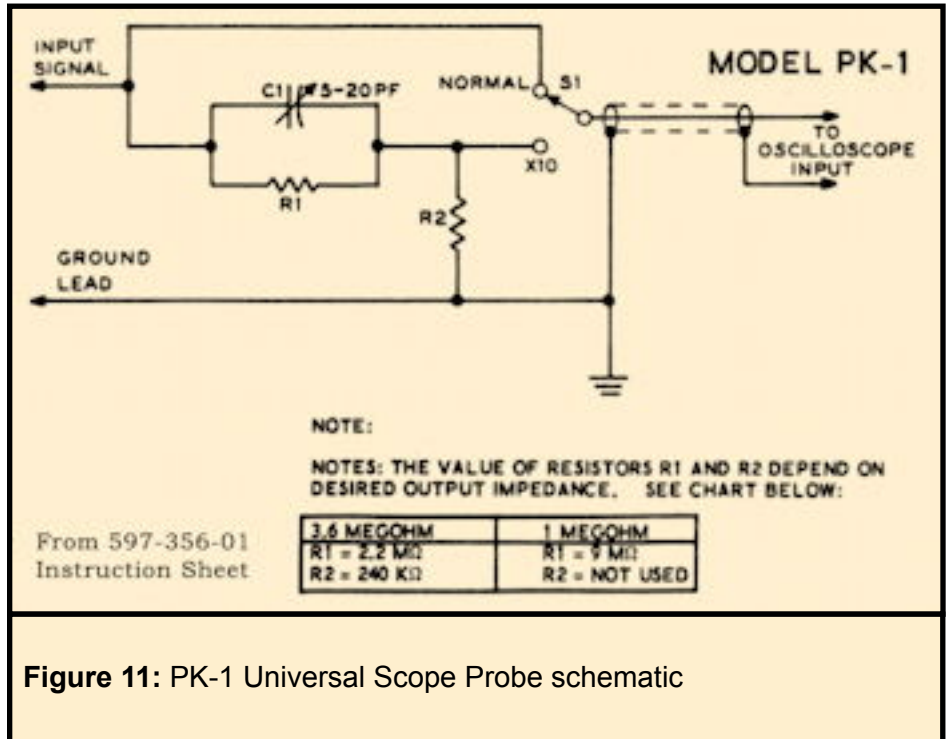
PKW-2 PROBE MINIMIZES CIRCUIT LOADING & SIGNAL DISTORTION . . . designed for scopes with 1 megohm input, such as Heathkit IO-14. Features miniature switch for x1 or x10 attenuation. Impedance in x1 position is 1 meg shunted by 110 pF . . . 10 meg shunted by 20 pF in x10 position. Response is DC to 25 MHz. Max. DC voltage is 600 V. Features spring-loaded clip tip for hands-free operation.  
 Wired PKW-2, 1 lb. . . . . \$12.00

PKW-2  
**\$12<sup>00</sup>**



Catalog 810/69 - 1969

**Figure 12:** PKW-2 x1 / x10 switchable probe with UHF connector was designed to work with the IO-14 “Professional” oscilloscope with an input impedance of 1 MΩ shunted by 15 μf.

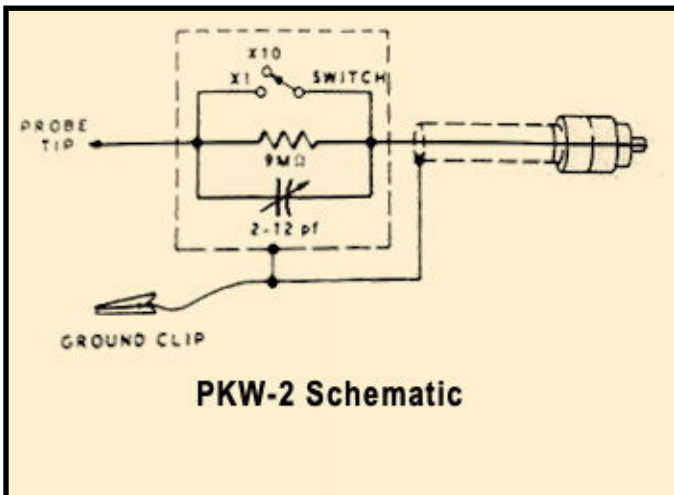


**Figure 11:** PK-1 Universal Scope Probe schematic

It is factory assembled, switchable between x1 and x10 and terminates in a UHF PL-259 connector. The IO-14 is the only scope the author is aware of made by Heath that uses that connector. The catalog ad gives the specifications for the PKW-2 (**Figure 12**). The probe was last offered in 1971, and remained selling for \$12.00. **Figure 13** shows the schematic for the PKW-2.

**PKW-101 Oscilloscope Probe:**

The PKW-101 factory assembled scope probe, shown in **Figure 1**, was introduced in the 1971 catalog (810/71) alongside the new EU-70A Solid State oscilloscope <sup>8</sup>. It is a 10x only probe. The new probe matches the 1 MΩ input resistance of the EU-70A. One megohm was quickly becoming a standard scope input impedance in the mid-seventies. Up to then the older Heathkit scopes had a typical input resistance in a range between about 2 and 4 megohms.



**PKW-2 Schematic**

**Figure 13:** PKW-2 factory wired probe schematic. The resistor is 9 MΩ the capacitor is 2–12 pf.

Many varied with the setting of the input attenuator. Most, if not all, of the oscilloscopes Heathkit developed after 1971 standardized on an input impedance of 1 MΩ<sup>9</sup> shunted by a capacitance around 35 - 45 μf<sup>10</sup>. The PK-101 looks very similar to scope probes of the seventies. It is likely that Heath used a commercially manufactured probe or assembled the probes from parts procured through another probe manufacturer? The PK-101 sold for \$19.95 when it was introduced, and it was selling for \$27.95 in late 1976 when it was discontinued.

**The PKW-101-1 Probe Accessory Pack...**

*“...consists of the most commonly lost or damaged parts of the PK-101. Includes three assembled tips, two 6-inch ground leads and one 12-inch ground lead. PK-101-1 mailable*

*..... 9.95”*  
 is how the accessory pack was described in the 1975 Christmas catalog. The pack also supports the PKW-104 introduced in 1975. the PKW-101-1 continued to be sold until 1979, more than two years after the PKW-101 and PKW-104 it supported were replaced by the PKW-105. In the Christmas 1978 catalog the price was dropped to \$5.95, evidently a close-out price.

**LOW CAPACITANCE PROBES**

In order to inflict minimum disruption on a circuit under measurement, the test probe should present high resistance and low capacitance. For a DC circuit added resistance is adequate. This resistance attenuates the voltage being measured. Typically an attenuation of x10 provides good isolation. To get x10 the resistance in the probe should be nine times the input resistance of the scope. This works well at DC, but as soon as the frequency being measured is about a few hundred Hertz the AC attenuation is no longer x10. To correct this a capacitive voltage divider needs to be added to the probe. For this to be realized the capacitance across the probe resistor must be one-ninth the capacitance of the scope input, including the capacitance of the probe test lead. Low capacitance shielded wire is used with the probe to keep the capacitance across the probe resistor as small as possible. The capacitor across the probe resistor is made variable by using a trimmer capacitor. There are various ways to adjust the capacitor, one being looking at a square wave and adjusting the trace for the best square wave.

The schematic shows a typical low capacitance probe. The two equations show the required probe component values to work correctly where:

*R<sub>p</sub>* is the probe resistor;

*R<sub>in</sub>* is the scope input resistance;

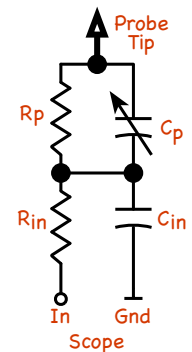
*C<sub>p</sub>* is the probe capacitor;

*C<sub>in</sub>* is the scope input capacitance, including the test lead capacitance;

*n* is the desired attenuation.

$$R_p = (n - 1)R_{in}$$

$$C_p = \frac{C_{in}}{n - 1}$$



**PKW-104 Oscilloscope & Counter Probe**

“The PKW-104 is a derivative of the PKW-101. It is a direct 1:1 probe and is designed to be used with counters as well as oscilloscopes when measuring low-impedance

sources. Like the PKW-101 it comes factory assembled. The frequency response in a low impedance circuit is above 17 MHz. The PKW-104 is also supported by the PKW-101-1 Accessory Pack. The PKW-104 was introduced around 1975. It remained for sale until the PKW-105 replaced it and the PKW-101 in the fall of 1977.

**PKW-105 Oscilloscope Probe:**

The PKW-105 dual purpose (x1 / x10 switchable), factory assembled, probe is listed as new in the Fall 1977 catalog (#817) for \$24.95. This same probe was also sold by Gould, Pomona, Zenith, AP and other companies under their own brand name. It was a very popular probe at the time. The actual manufacturer is unknown. The Heathkit probe instructions are marked "Made in England". None of the other brands I've seen give



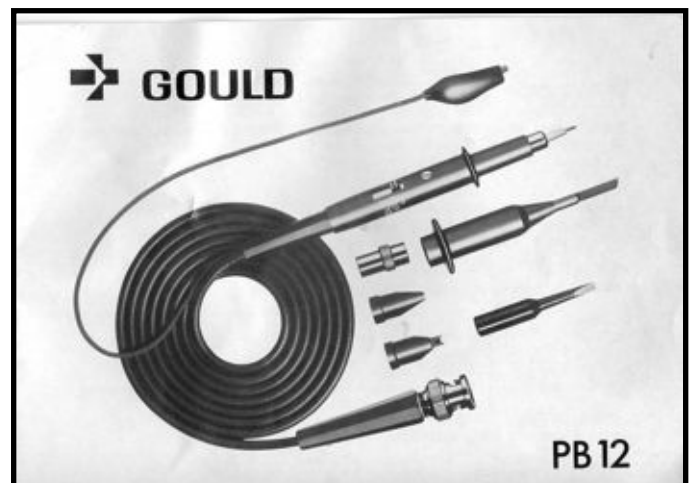
**Figure 14:** Heath PKW-105 factory wired probe instruction book and accessories.

a country. They all come with the identical instruction sheets, except for the branding. However, in the specifications "meters" is spelled in the British fashion as "metres" on all the spec sheets seen.

The probe has a three position switch that selects **x1**, **Ref**, **x10**. The Ref position connects the probe tip to ground through a 9 MΩ resistor and connects the output to the scope directly to ground. This allows the user to see the trace location at zero input. **TABLE I** gives the specifications for the PKW-105.

<b>Heath Zenith PKW-105 Scope Probe Specs:</b>	
<b>Position x1</b>	
Bandwidth:	D.C. to 10 MHz
Input Resistance:	1 M Ω*
Input Capacity:	40 pF + Plus o'scope capacity
Working Voltage:	600 Volts D.C. (Including peak A.C.)
<b>Position Ref.</b>	
Probe tip grounded via 9 MΩ resistor, o'scope input grounded.	
<b>Position x10</b>	
Bandwidth:	D.C to 100 MHz
Risetime:	3.5 nanoseconds
Input Resistance:	10 MΩ ± 1%*
Input Capacity:	11.5 pF*
Compensation Range:	10 – pF
Working Voltage:	600 Volts D.C. (Including peak A.C.)
<b>Supplied Accessories:</b>	
Insulating Tip	I.C. Adapter
Sprung Hook	BNC Adapter
Trimmer Tool	
* Value for an o'scope with 1 MΩ 30 pF input.	

**TABLE I**



**Figure 15:** Gould PB12. similar to the Heathkit PKW-105 probe.



**IOA-3220 Oscilloscope Probes:**

In the fall of 1985 the price of a single PKW-105 had risen to \$32.95. In that catalog Heath first offered two PKW-105 Probes with a pouch for \$59.95 under the part # IOA-3220. When the Christmas catalog came out the prices had increased to \$34.95 and \$64.95. And when they were discontinued in the summer of 1990, the prices had reached \$37.95 and \$69.95.

**P-250-2 Oscilloscope Probe Set:**

The P-250-2, a two probe set, was introduced in the Spring 1988 catalog at a price of \$99.95. It is switchable x1 or x10 with a bandwidth of 250 MHz at x10. The P-250-2 continued to sell at the same price at least through the Winter 1991 catalog was not offered in the March 1992 catalog.

**P-350-2 Oscilloscope Probe Set:**

The P-350-2, a two probe set, was introduced along side the P-250-2 probe set in the Spring 1988 catalog. The X10 only probe has a bandwidth of 350 MHz. It initially sold for \$139.95. By the fall of 1989 the price dropped

to \$99.95, and in the Christmas catalog it dropped another \$20 to \$79.95. It remained at that price in the Winter 1991 catalog but was not offered in the March 1992 catalog.

One may wonder why the 350 MHz probes were eventually selling for less than the 250 MHz probes? The 350 MHz probe has only the x10 function so a switching mechanism isn't needed. An additional possible reason was the sales volume for the 350 MHz probes was higher.

**P-150 (PS-150) Oscilloscope Probes:**

In The Summer 1990 catalog (Volume #221) the PKW-105 and IOA-3220 were replaced with the new P-150 (\$37.95) and PS-150 two probe set (\$69.95). Like their predecessors, they are switchable between x1 and x10. The bandwidth of these new probes is 150 MHz when used in x10. These probes continued to be sold by Heath Educational Systems and appear in their 1993 catalog #270.

**PKW-200 Test Leads (Miscellaneous):**

Little can be found on the PKW-200 other

CAT. 211 Spring 1988

**250 MHz scope probes**

A set of two modular X10 probes, switchable X1/X10, with a bandwidth of 250 MHz. Packaged with accessory tips.

**Assembled P-250-2**  
Ship wt. 1 lb. .... \$99.95

**350 MHz scope probes**

A set of two modular X10 probes with a bandwidth of 350 MHz. Packaged with a full complement of accessory tips.

**Assembled P-350-2**  
Ship wt. 1 lb. .... \$139.95

**Figure 16:** In the Spring 1988 Catalog #211 Heathkit introduced two high bandwidth probe sets to complement the PKW-105 / IOA-3220-1 probe(s) that have a 100 MHz bandwidth.

than a short description in a few catalogs. It is basically two unshielded 2000V 20 amp, 1.5 meter (about 5 feet) test leads, one red and one black, with a “4mm shielded plug”<sup>11</sup> on each end. Included are a red prod, a red sprung hook<sup>12</sup> and a black shrouded crocodile clip. Each appear to be designed to mate with the 4mm plug so you can have different ends on the test leads. Obviously, this should have been included in **Part I** last month, as it is probably best used by a newer style voltmeter; the 20 amp capability means it can also be used with an appropriate multimeter to measure high current. The PKW-200 was first listed in the Fall 1980 #850 catalog at \$14.95. In 1981 the price was increased by a dollar. It remained at \$15.95 until the 1983-84 winter catalog where it was shown, but instead of a price “no longer available” was printed.

### Ramblings:

Over the years I've owned numerous scope probes, none of them Heathkit. In 1980 when I bought a Heathkit IO-4235, then Heath's top of the line 35 MHz scope, I knew I'd need a pair of good scope probes. A friend sold me a pair of Gould PB-12 probes that worked well, so I didn't order the then recommended PKW-105 probes. Little did I know they were the same probe, and they worked fine with the scope.

Over the past half-decade I picked up a Heathkit PKW-101 and two PK-1 probes. The PKW-101 is currently with my Sony

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

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

*Thanks - AF6C*

Tektronix 323 portable scope. The two PK-1 probes are awaiting an IO-18 to be restored.

Until next time, keep well my friends.

73, from AF6C



*Heathkit* R. F.  
P R O B E

**Figure 17:** With some kits Heath supplied a sheet of 4 decals (390-13) to place on the aluminum probe body. The decal for the 309-C and PK-3(A) is shown above. Decals for the Low-Capacity probe, Scope Demodulator probe and Peak - to - Peak probe are also included on the sheet.

### Notes:

1. CRT TVs before today's LCD flat screen digital TVs.
2. The IO-14 (IOW-14 factory wired) was one of the first Heath scopes to adopt the trending standard of a 1 MΩ input resistance.
3. No copy of this sheet has been found yet.
4. This, and the fact that none of the other probes of the time had an 'A' revision (they all went directly to a 'B' revision), let people to believe the 'A' was just a typo. Not so!
5. See last month's HotM (#118) Figure 4.
6. Ibid. Page 3 (page 11 in RF)
7. Ibid. Page 6 (page 14 in RF)
8. In the 1972 catalog 800-28 Heathkit announced a kit version of the factory wired EU-70A (\$565.00), the kit was given the model number IO-105 (\$399.95).
9. The 1 MΩ input resistance refers to the Vertical Input. The Horizontal input may be different.
10. the input capacitance varied between scopes due to lead length and dressing. The capacitance was in a range that could be compensated for by the probe adjustment capacitor.
11. A “4mm shielded plug” is evidently a banana plug, though I wonder if they meant insulated instead of shielded. This test lead set may have come from Europe.
12. A “sprung hook” is a spring loaded hook on the probe tip that may be clipped onto a terminal. wire or other point in a circuit, usually before applying power so the measurement may be made hands-free and eliminate the damaged should a hand-held test probe slip and short something out.

Notes for HotM #119 (VTVM Probes) 10/2023



OCARC Board Meeting Minutes for: September 9, 2023, The OCARC Board meeting was held at The Streamliner Lounge, 186 N. Atchison St., Orange, and called to order to order by President Nicholas Haban AF6CF at 8:20 am. Board Members were in attendance. Member Arnie Shatz N6HC and Dave N3BKV were also in attendance.

Treasurer report –presented a current Cash Flow report with a positive cash flow but also somewhat tight.  
Technical – club donations are picked up and after testing it will be determined whether to sell or make the items a prize at Xmas party.

Activities report – 90<sup>th</sup> Anniversary coming in September.

Membership – Roster online, currently 105 members.

Newsletter Sep- Dan, Oct– Ron, Nov- Corey, Dec- Ken, Jan– Tim N6TMT

Speakers - September 90<sup>th</sup> Anniversary celebration, October Auction, Nov - KD6NOT – Radio to Rockets followed by elections. Dec – Xmas Party 12/8 Mimi’s 6 pm.

September Party – various prizes, books, license plate frames, donate radio, mugs. A full program is planned. Several ARRL officials are invite and we are expecting various former members as well.

December Party – Arnie N6HC speaker and need to further discuss possible prizes.

Monthly Planner – no progress

“In Remembrance of” web page – Dan and Bob are working on it and are trying to determine a good font to use.

### **New business**

Election Committee – Tim GP, Nicholas, and Tim N6TMT

December Party cost to members – It was presented that the price from the restaurant is \$36 per dinner, it had not been determined if that includes tax and tip. A motion was made and seconded to price the dinner at the \$36 price. After discussion the motion was defeated. Motion was made and seconded to price at \$25 per dinner. After discussion the motion was passed.

Corey has received 2,400 historical QSL cards from the family of the one of the early club presidents -Norol Evans. Corey bought material to display 1,200 cards at a cost of \$194.

The Board was presented with an anonymous donation to the club in the amount of \$2,000.

### **Good of the Club**

Adjournment occurred around 9:58 am.





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 8:17 am. A quorum of Board Members was in attendance as well as Member Arnie Shatz N6HC.

**Treasurer report** –presented a current Cash Flow report with a positive cash flow by about \$1,500 because of last month’s large donation. The annual PO Box fee has been paid.

**Publicity report** – flyers for the auction were distributed at last month’s TRW swap meet.

**Activities report** – Auction and Xmas party plans in full swing.

**Membership** – 106 current members. The QSL cards are returned to, and a \$200 donation was received from Marilyn Best to cover the binders purchase to display QSL cards. A thank you email has been sent to Marilyn on behalf of the club for her donation.

**Newsletter** Oct– Ron W6WG, Nov- Corey KE6YHK, Dec- Ken W6HHC, Jan– Tim N6TMT

**Speakers** - October Auction, Nov - KD6NOT – Radio to Rockets followed by elections. Dec – **Xmas Party** 12/8 Mimi’s 6 pm. Jan – Charles Spetnagel, W6KK – presentation on the NH8S Swains Island DXpedition.

**December Party** – Arnie N6HC speaker and need to further discuss possible prizes. One current prize is a TYT 9800 radio.

**Monthly Planner** – tabled unto Jan. 2024

**Election Committee** – Tim GP, Nicholas, and Tim N6TMT. AJ is open to most positions. Hoping that most officers will stay in their current position for next year but there are always some openings.

“In Remembrance of” web page – Dan and Bob are working on it and trying to determine a good font to use.

### New business

Featuring a PayPal donation button on the W6ZE.org website is being considered.

Auction plans and helpers are being organized. Several radios up for auction include a Kenwood TS2000, TS 540S, Henry Amp.

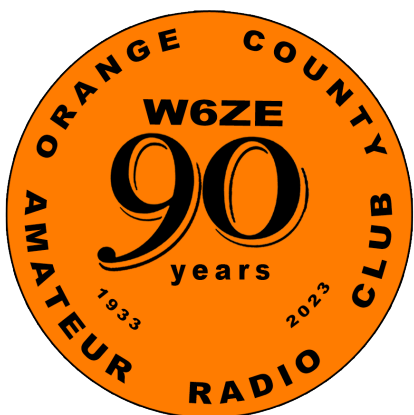
Plans were discussed to distribute excess Coffee mugs to the membership and magnets for visitors.

## **GOOD OF THE CLUB**

Corey is working with Bob to add a link on W6ZE.org to his historical presentation.

Adjournment occurred around 9:35 am.

# OCARC 90<sup>TH</sup> Anniversary Party



Corey KE6YHX presentation on OCARC History







**Passing of the OCARC  
100 YEAR TIME CAPSULE  
from Nicholas AF6CF  
to AJ KN6WNO**



AJ KN6WNO  
OCARC  
DIRECTOR AT LARGE

NICHOLAS AF6CF  
OCARC  
PRESIDENT



Nicholas AF6CF  
President  
OCARC

Bob W6RHK  
Orange Section Mgr.  
ARRL

**OCARC  
WHEN IT FIRST  
BEGAN**

Report by Tom W6ETC



**RADIO AMATEURS  
FORM CLUB HERE**

Plans for future meetings were being made today following the first meeting of radio amateurs of Orange county here Thursday night. Named the Orange County Amateur Radio club, members of the new organization elected Earl Moore, W6IGO, president, and Tom Jentges, W6BXI, secretary.

Twenty charter members were enrolled at the organization meeting. It was decided to hold future meetings in the Santa Ana Y.M.C.A. building. Other radio operators and amateurs in the county will be invited to join the new group, as well as anyone interested in radio work.

Members of the club voted to join the A.A.R.L. and the Federation of Radio Clubs of Southern California, becoming a part of the two organizations.

The following article provided by  
Corey Miller KE6YHX  
Orange County Amateur Radio Club  
(OCARC) Historian.

Image Courtesy of the  
SANTA ANA HISTORY ROOM,  
SANTA ANA PUBLIC LIBRARY

*The Article reads as follows...*

Plans for future meetings were being made today following the first meeting of radio amateurs of Orange county here Thursday night. Named the Orange County Amateur Radio club, members of the new organization elected Earl Moore W6IGO president and Tom Jentges, W6BXI secretary.

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Members of the club voted to join the A.A.R.L. (ARRL) and the Federation of Radio Clubs of Southern California, becoming a part of the two organizations.





**COME JOIN US**

9 AM & 9 PM Monday – Friday on CARA Repeaters:  
2M: 147.090 MHz (+0.600 MHz) No PL and  
1.25M: 224.420 MHz (-1.600 MHz) PL 110.9 repeaters.  
Also available on EchoLink node \*CATALINA\*

**OCARC Nets**  
(Listen for W6ZE)

**10M ~ 28.375 MHz SSB**  
**Wed- 7:30 PM - 8:30 PM**  
**Net Control: Corey, KE6YHX**

**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**

Tom W6ZTC

## Cash Flow - Year to Date

1/1/2023 through 10/1/2023

10/1/2023

Page 1

Category	1/1/2023- 10/1/2023
<b>INFLOWS</b>	
Badge Income	3.00
Badge Income (PayPal)	3.00
Donation	2,000.00
Donations - FD	30.00
Donations - FD Food	590.00
Dues, Membership (PayPal) 2023	1,410.00
Dues, Membership (Paypal) 2024	120.00
Dues, Membership 2023	697.50
Dues, Membership 2024	30.00
Opportunity Drawing -Monthly	352.00
<b>TOTAL INFLOWS</b>	<b>5,235.50</b>
<b>OUTFLOWS</b>	
Anniversary Party Food	207.80
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	196.52
Historian Expenses	289.33
Opportunity Drwg - Monthly Exp	293.37
PayPal Fee	82.16
PO Box Rental	166.00
Propane Tank	61.30
Refreshments Expense	60.66
Secretary of State	5.00
Storage of Equipment - Ann Millard	250.00
Web Site Hosting	240.99
WFD - Propane	47.39
WFD Flowers	30.00
WFD Rental - Tent	150.00
Xmas Party Expense	300.00
ZOOM subscription	-44.97
<b>TOTAL OUTFLOWS</b>	<b>3,694.02</b>
<b>OVERALL TOTAL</b>	<b>1,541.48</b>

