



# RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXIII NO. 08

TUSTIN, CA 92781

September 2022

## The Prez Sez...

By Nicholas AF6CF



Greetings to all! September is the month when we all come back from vacations, energized and ready to take all the tasks for the rest of the year. However, many of us had no vacations at all, but are glad that we are still here and enjoying our hobby.

This month we have an antenna presentation for our general meeting. If you cannot attend personally, we will have a "hybrid" meeting via Zoom.

There will be coffee and water at the meeting and maybe an opportunity drawing, but you must be at the meeting in person to participate.

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.

Make sure you mark your calendars. The OCARC **Christmas Party** date has been set for **Friday December 9<sup>th</sup>** at Mimi's Café in Tustin. 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

## NEXT GENERAL MEETING IN-PERSON

September 16th, 2022 at 7PM  
at the

**American Red Cross**  
**Orange County Chapter**  
**Santa Ana, Room 208\***

**Speaker:**  
**Dr. Ed Fong - WB6IQN**

**Presents:**  
**Dual band Antenna Talk\*\***  
*\*see page 3*

**NEXT BOARD MEETING**  
**Saturday, October 1, 2022**

**SPECIAL NOTICE:**  
**ALL OCARC Nets Remain Active!**  
**\*\*Presentation also available on**  
**Zoom for those who cannot**  
**attend in person.**

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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

\* **ZOOM** announcements emailed to members

### Board Meetings

First Friday of each Month  
*Board will handle Club business both IN-PERSON and/or ZOOM.*

### OCARC Annual Auction (this October)

See page 5 in Newsletter

### Club 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

### 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 2022 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: \$ 3.  
Use one of our interactive online forms to calculate current prices, join the club and/or order badges:

### **Online Forms / Dues & Badges**

\* \$3. plus mailing costs if applicable  
*Dues are subject to change without notice*





# IN-PERSON GENERAL MEMBERSHIP MEETING

**September 16, 2022 at 7:00pm**

*\*Also available to OCARC members by*



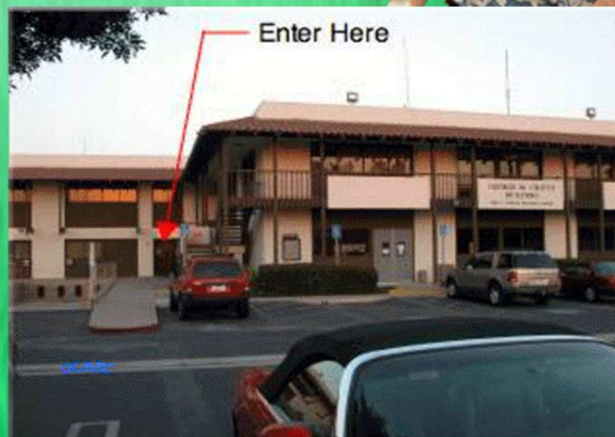
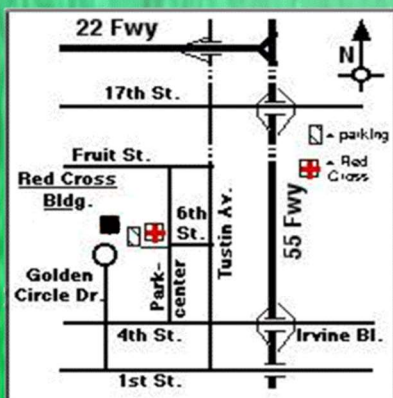
zoom

COME JOIN US

**FACE-TO-FACE QSO**

## American Red Cross

**600 Parkcenter Drive  
Santa Ana, CA 92705  
George M. Chitty Building  
2nd Story, Room 208**



**Masks are required for the unvaccinated.**

*Please come before 7:00 PM, as the door locks automatically to entry at that time.*

*OCARC membership is automatically sent Zoom instructions.*

Graphic by Tom W6ETC



**October Speaker Spotlight**  
**Dual band Antenna Talk**  
**by Ed Fong WB6IQN inventor of the DBJ-1,**  
**DBJ-2 and TBJ-1 antennas.**



Our **guest speaker for the September meeting will be Ed Fong WB6IQN.**

As many of you know, he is the inventor of the DBJ-1 and DBJ-2 antenna that was featured in the February 2003 and March 2007 QST. The DBJ-1 is a highly effective dual band VHF/UHF base station antenna, and the DBJ-2 is the portable roll up version.

The DBJ-2 won the QST Plaque of the Month Award. Both antennas are featured in the ARRL VHF antenna Handbook and in the ARRL Antenna Classic Handbook. His most recent antenna is the TBJ-1 – a triband base antenna that was published in [March 2017 QST](#).

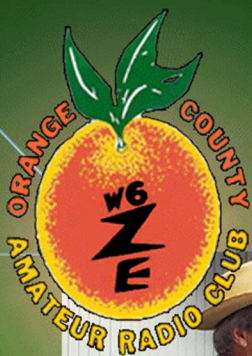
There are **over 40,000 of these antennas in use today.** About half are used by hams and the other half by government and commercial agencies.

Ed will give a history on how these antennas were developed and the theory on how and why they work so well. There is no “black magic” to antennas. He will explain in a non-mathematical manner to convince you for overall performance and simplicity his approach is one of the most practical.

### Biography:

Ed Fong was first licensed in 1968 as WN6IQN. He later upgraded to Extra Class (when 20 WPM was required) with his present call of WB6IQN. He obtained the BSEE and MSEE degrees from the Univ. of California at Berkeley and his Ph.D. from the Univ. of San Francisco. A Life Senior Member of the IEEE, he has 12 patents and over 40 published papers and books in the area of communications and integrated circuit design.

Presently, he is employed by the University of California, Santa Cruz (previously with Berkeley from 1997-2010) as an instructor teaching graduate classes in Antenna Design, RF design and high-speed interface. In his 35-year career, he has done work for Stanford University, National Semiconductor, Advanced Micro Devices, numerous startup companies in the Silicon Valley.



# OCARC 2022

Orange County Amateur Radio Club



Auctioneer:  
Chip Margelli K7JA

## ANNUAL RADIO AUCTION

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

**FRIDAY OCTOBER 21st, 2022**



**7:00 PM**

*Held at the*



**American Red Cross**

**600 Parkcenter Drive**

**Santa Ana, CA**

**Second Floor Rm #208**

**SELLERS & BUYERS REGISTRATION BEGINS AT 6:00pm**

**FOR MORE INFORMATION GO TO [WWW.W6ZE.ORG](http://WWW.W6ZE.ORG)**

Tom W6ETC





## UPCOMING ACTIVITIES

### September

- **ARRL September VHF Contest:** 1800 UTC Saturday Sept. 10 to 0300 UTC Monday September 12.
- **North American Sprint, CW:** 0000 UTC to 0400 UTC Sunday September 11.
- **QRP Afield:** 1500 UTC 2100 UTC Saturday September 17.
- **CQ Worldwide DX Contest, RTTY:** 0000 UTC Saturday 24 to 2359 UTC Sunday September 25.

### October

- **Oceania DX Contest, Phone:** 0600 UTC Saturday Oct. 1 to 0600 UTC Sunday Oct 2.
- **Oceania DX Contest, CW:** 0600 UTC Oct. 8 to 0600 UTC Sunday Oct 9.
- **10-10 International Day Sprint:** 0001 UTC to 2359 UTC Oct 10.

\* 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:

- **Texas QSO Party:** 1400 UTC Saturday Sept. 17 to 0200 UTC Saturday Sept. 18 and 1400 UTC to 2000 Sunday Sept. 18.
- **Iowa QSO Party:** 1400 UTC Saturday Sept. 17 through 0200 UTC Sunday Sept 18.
- **New Hampshire QSO Party:** 1600 UTC Saturday Sept. 17 to 0400 UTC Sunday Sept. 18 and 1600 UTC to 2200 Sunday Sept. 18.
- **New Jersey QSO Party:** 1600 UTC Saturday Sept. 17 to 0359 UTC Sunday Sept. 18.

- **Maine QSO Party:** 1200 UTC Saturday Sept. 24 through 1200 UTC Sunday Sept. 25.

## • California QSO Party (CQP)

1600 UTC Oct. 1 through 2200 UTC Sunday Oct. 2.

**Note: When submitting logs for CQP indicate your club affiliation as "Orange County Amateur Radio Club"**

- **Nevada QSO Party:** 0300 UTC Saturday October 8 through 2100 UTC Sunday Oct. 9.
- **Arizona QSO Party:** 1500 UTC Saturday Oct. 8 to 0500 UTC Sunday Oct. 9.
- **Pennsylvania QSO Party:** 1600 UTC Oct. 8 to 0400 UTC Sunday Oct. 9 and 1300 UTC to 2200 Sunday Oct. 9.
- **South Dakota QSO Party:** 1800 UTC Saturday Oct. 8 through 1800 UTC Sunday Oct 9.

### 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 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.
- **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:**

**Other Nets by OCARC members:**

Catalina Amateur Repeater Association  
**CARA Net@9 Wellness & Support Net**

Monday thru Friday

9:00 am and 9:00 pm Local Time

CARA Repeater Frequencies:

147.090 MHz (+600 MHz) No PL

224.420 MHz (-1.600 MHz) PL 110.9

EchoLink Node: \*CATALINA\*

Allstar Node #: 51597

Send an email to *Ron W6WG*, to have your favorite activity included in future RadioActivity listings.

73, Ron W6WG



**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\***



**The California QSO Party (CQP)** is *held the first weekend of October*.

**Modes include CW, Phone. Bands: 160, 80, 40, 20, 15, & 10m.**

Visit the CQP website at <https://www.cqp.org/Rules.html> for additional information on rules, including dates and times, objectives, and scoring. If you're planning to participate in the CQP, would you drop an email to Ron Mudry W6WG the OCARC Activities Director: [w6wg@w6ze.org](mailto:w6wg@w6ze.org)

## CLUB COMPETITION POINTS!!!!!!

10,000 POINTS FOR **EACH** LOG ENTRY

## 50,000 POINTS FOR EVERY COUNTY EXPEDITION

50,000 POINTS FOR EVERY MOBILE (3 COUNTY MIN.)

50,000 POINTS FOR AT LEAST ONE S/O YL  
LOG ENTRY

50,000 POINTS FOR AT LEAST ONE YOUTH S/O  
LOG ENTRY

50,000 POINTS FOR AT LEAST ONE NEW CONTESTER-  
LOG ENTRY



Pacificon | The 2022 ARRL Pacific Division Convention



The ARRL Pacific Division Convention &  
The Mt. Diablo Amateur Radio Club present

**Come and Experience the Many Facets of Ham Radio!**  
**PACIFICON 2022**  
**October 14-16, 2022**

San Ramon Marriott Hotel: 2600 Bishop Drive, San Ramon, California 94583

**General Admission\*\***

\$25 in advance ([online](#) until Oct. 2) - for all 3 days! Youth 17 & under admitted free & college students with valid student ID (25 & under) \$5 Mail-in registrations must be postmarked by Sept. 27.

**\*\*some events have additional cost**

**Hotel Lodging**

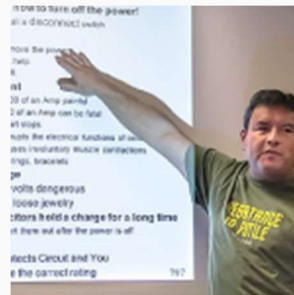
[Reserve your room](#) online, or call Marriott Hotel Reservations at 925-867-9200 and ask if special Pacificon rate (\$152/night) is still available.

**Unique Forums and Programs**

Pacificon 2022 features a long list of great forums and presentations from some of the most well-known and respected names in amateur radio.

For events, schedules, and online registration visit [pacificon.org](http://pacificon.org)

*Events are subject to change*



source: <https://www.pacificon.org/> & <http://www.arrl.org/hamfests/pacificon-arrrl-pacific-division-convention>



# WHAT IS A SET

Image and Report by Tom W6ETC

## **Simulated Emergency Test (SET)**

### **October 1<sup>st</sup> – 2<sup>nd</sup>, 2022**

The **SET** is ARRL's primary national emergency exercise and is designed to assess the skills and preparedness of Amateur Radio Emergency Service (ARES) volunteers, as well as those affiliated with other organizations involved in emergency and disaster response.

The SET encourages maximum participation by all radio amateurs, partner organizations, and national, state, and local officials who typically engage in emergency or disaster response. In addition to ARES volunteers, those active in the National Traffic System (NTSO), Radio Amateur Civil Emergency Service (RACES), SKYWARN, CERT, and a variety of other allied groups and public service-oriented radio amateurs are needed to fulfill important roles in this national exercise.

This is a great time to test your equipment, modes, and skills under simulated emergency conditions and scenarios. Individuals can use the time to update a 'go-kit' for use during deployments, or even if the operator needs to evacuate. Keep your eye out for local organizations who might be participating in the SET.

Source: <http://www.arrl.org/news/the-2021-arrrl-simulated-emergency-test-set-is-just-ahead>







Figure 1: Heathkit IP-5220 Variable Isolated AC Supply

### Heathkit of the Month #113: by Bob Eckweiler, AF6C



## ELECTRONIC TEST EQUIPMENT

### Heathkit IP-5220 Variable Isolated AC Supply.

#### Introduction:

If you work on anything that plugs into an AC outlet and are going to take the covers off, it is a good idea to use an isolation transformer to protect yourself from becoming an accidental conductor to ground. With that in mind Heathkit, back in 1953, introduced the IT-1 Isolation Transformer<sup>1</sup> which can handle 100 volt-amperes (VA)<sup>2</sup> continuously or up to 200 VA intermittently. It also allows adjustment of the output voltage from about 90 to 130 VAC which can be read on an inexpensive voltmeter on the front panel. The IT-1 sold for \$16.50 and weighs 7-½ lbs. Heathkit replaced the IT-1 with the IP-10 (circa 1960 - 1962) and IP-22 (circa 1962 - 1964). They both sold originally for \$54.95 and weighed about 18 lbs. The IP-22 is mostly a styling change from the IP-10 as the two

circuits are close if not identical. They will be briefly discussed later in the article. From 1965 until 1975 Heathkit did not produce an AC isolation transformer kit.

#### The IP-5220 Variable Isolated AC Supply:

Heathkit introduced the IP-5220 (Figure 1), its next (and last) AC isolation supply, in the Christmas 1975 catalog #806<sup>3</sup> with a ⅓ page announcement (See Figure 2). The introductory price was \$109.95, and it weighs 22 lbs. The supply sold for eight years until mid-1983. In the winter 1983 catalog #860 it was selling for \$154.95. Late in 1981 Heathkit introduced a factory-built version designated the SP-5220, priced at \$190.00. At that time the IP-5220 was selling for \$144.95.

#### IP-5220 Front Panel Layout:

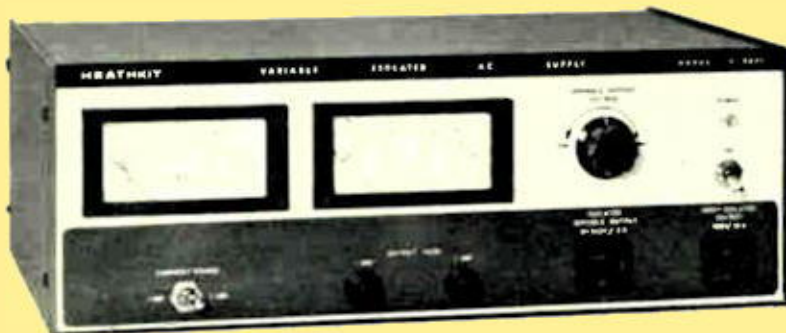
On the front panel there are two AC outlets. The one to the farthest right is wired directly to the AC input line, and is not isolated, nor is it fused or switched by the front panel

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

## The Heath family of high-value supplies -with a new variable AC supply



### New Heathkit IP-5220 Variable Isolated AC Supply

- Safe isolated source of AC power for service work
- Variable 0-140 VAC output
- 1 A & 3 A ammeter ranges for easy low-current readings
- Simultaneous metering of voltage and current output

Every service tech and hobbyist needs a Heathkit IP-5220. With this new variable AC source, you can isolate transformerless equipment for safer operation when servicing. It provides complete isolation between the AC power line and any electrical equipment that is plugged into its front panel variable output socket. The variable 0-140 volt output is useful anywhere a slow run-up of line voltage is needed...like the initial turn-on of that new breadboard you've been building.

A full 360 volt-amperes of AC power — available at the front panel variable output socket. More than enough to operate equipment with large power requirements, such as a color TV. And the IP-5220 is capable of supplying its full rated output continuously.

The IP-5220's ability to start from zero voltage is helpful when trying to locate circuit faults caused by high or low line voltage — or testing equipment with unknown power requirements. You simply monitor the

output on the large voltmeter and ammeter as output voltage is increased. When excessive current is observed, power can be quickly and easily removed before components are damaged.

For easier low current measurements, the ammeter has two switch-selected full scale ranges of 1 A and 3 A. Fuses for both ranges are front panel mounted for easy replacement. The variable output socket is fused to protect the IP-5220 and the circuit under test in case of a short circuit. A socket for direct line connection is front panel mounted for convenience.

Kit IP-5220, 27 lbs., available ..... **109.95**

IP-5220 SPECIFICATIONS — Input Voltage: 120 V @ 60 Hz for specified output. Output Voltage: 0-140 V @ 60 Hz. Voltmeter Range: 0-150 VAC. Ammeter Ranges: 0-1 & 0-3 A. AC Output Current: 3 A max. 10 A (direct line connection). Output Power: 360 Volt-Amperes maximum. Dimensions: 5.5" H x 15" W x 10.5" D.

Figure 2: 1975 Ad introducing the Heathkit IP-5220 Variable Isolated AC Supply

**POWER** switch which sits above the outlet. When the **POWER** switch is in the **ON** position a yellow neon pilot light above it is illuminated. This outlet is rated for 120 VAC 10 amps maximum and is marked: **NON-ISOLATED-OUTPUT 120 VAC / 10A**. To the left of this outlet is a second AC outlet marked: **ISOLATED VARIABLE OUTPUT 0 – 140 VAC / 3A**. Above this outlet is the knob for the **VARIABLE OUTPUT VOLTAGE** transformer (T1). An arrow marked **MIN** at full CCW and **MAX** at full CW shows knob rotation.

To the left of the second outlet are two adjacent **OUTPUT FUSE** holders. The one to the left is marked **1 AMP** and the one to the right is marked **3 AMPS**. Above the fuse holders is a meter that measures the variable output voltage. It has a scale that reads **0 to 150 AC VOLTS** with numbers every 30 volts, major tick marks every 10 volts and minor tick marks every 2 volts. **Figure 3** shows the meter scales.

To the left of the **OUTPUT FUSE** holders is a toggle switch marked **CURRENT RANGE**

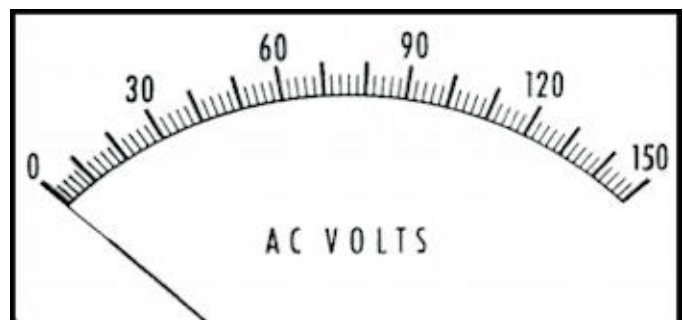
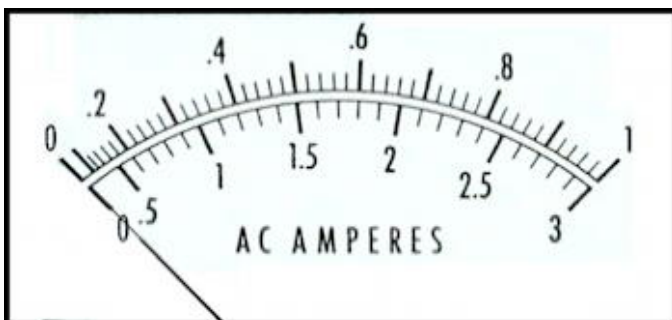


Figure 3: The IP-5220 Ammeter and Voltmeter Scales



with the left position marked **1 AMP** and the right position marked **3 AMPS**. Above the toggle switch is a meter that measure the isolated output current. The meter has two scales: **0-1** and **0-3 AC AMPERES**. The 0-1 ampere scale is numbered every 0.2 amperes with major tic marks every 0.1 amperes and minor tic marks every 0.02 amperes starting after the 0.1 major tic mark. The 0-3 ampere scale is numbered and has a major tic mark every 0.5 ampere with minor tic marks every 0.1 ampere starting after the 0.5 major tic mark. Due to the internal rectifiers the ammeter scales are not linear at their low end.

### IP-5220 Features and Specifications:

One feature of the IP-5220, not available on the earlier units, is a voltage range that extends all the way down to zero and up to 140 VAC; prior Heathkit isolation transformers only output 90 to 130 VAC. Another feature added is the ammeter. Earlier isolation transformers have only one meter that measures voltage only. On the IP-10 and IP-22 it may be switched between reading the input (line) voltage or the output (isolation) voltage. On the IT-1 and IP-5220 only the output voltage is read. The IT-1 meter is non-linear and undamped, and the user has to let the meter come to rest before reading.

The IP-5220 power output is specified for each of its two current ranges. On the 1-amp range the maximum power you can draw is set by the 1-amp fuse. That is 140 VA at 140 VAC. For this range, the allowable VA at other voltages is the same as the voltage setting. On the 3-amp range, up to 120 volts you are limited to 3-amps by the fuse, the allowed VA is equivalent to 3 times the voltage. But above 120 volts the maximum of 360 VA is reached so the current maximum begins to drop. At 140 volts the maximum current is limited to under 2.6 amps<sup>4</sup>. The

published specifications are shown in **Table I**. **Graph I** shows the allowed maximum current for the given voltage for each of the two selectable current ranges.

### IP-5220 Operation:

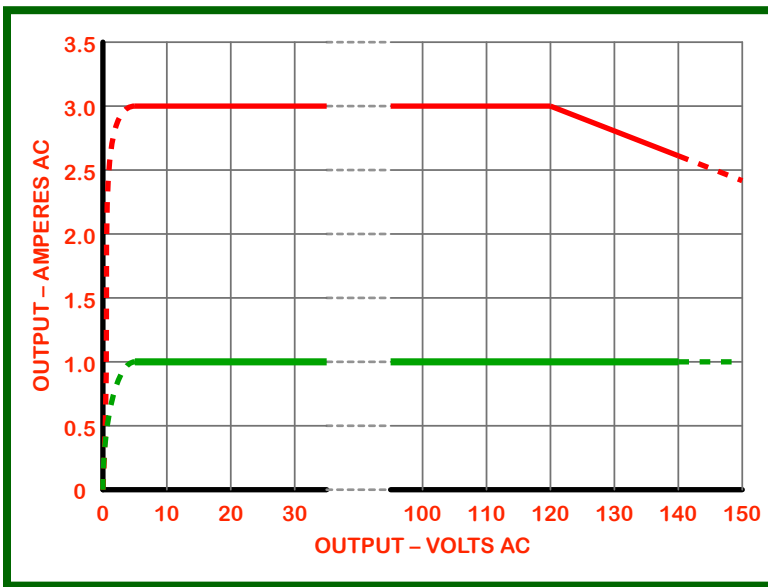
The IP-5220 provides a controllable AC voltage source that the user can control to test equipment under conditions of high and low line voltage. It also provides protection by isolating both sides of the AC line from ground reference.

Prior to plugging in a device under test (DUT) the IP-5220 should be turned on and set to the desired voltage for the test to be performed. Next, the current range should be selected depending on the current draw of the DUT. With the DUT powered off it can

#### Specifications for the Heathkit IP-5220 Variable Isolated AC Supply: From Heath Manual I-595-1773

<b>Input Voltage:</b>	120 VAC 60 Hz for specified output
<b>Output Voltage:</b>	0 – 140 VAC 60 Hz
<b>Voltmeter Range:</b> (Accuracy:	0 – 150 VAC full scale not specified)
<b>Ammeter Ranges:</b>	0 – 1 and 0 – 3 Amperes AC, (accuracy not specified)
<b>Output Current:</b>	3 Amperes maximum 10 Amperes (direct line connector).
<b>Output Power:</b>	360 Volt-amperes maximum in three ampere range 140 Volt-Amperes maximum in 1 ampere range.
<b>Net Weight:</b>	22 lbs.
<b>Overall Dimensions:</b>	15" W x 10½" D x 5½" H (38 cm x 27 cm x 14 cm)

**TABLE I**



**Graph I:** Allowed output current vs. output voltage for the 1-ampere (green) and 3-ampere (red) ranges.

then be plugged into the ISOLATED outlet (be sure to use the correct outlet).

Now the device can be powered on and testing begun. If searching for an intermittent, operation at line voltages above and below nominal can be done by adjusting the voltage control.

If you are going to slowly bring up a DUT that has been sitting idle for a long period, start at a near zero voltage and monitor for excessive current that may indicate a short or badly leaking filter capacitor. One word of caution. Many vacuum tubes that use a filament instead of a heater<sup>5</sup> have a coated filament. Some coated filaments can be easily damaged by running the filament at lower than specified voltage. One tube that is easily damaged in this way is the 1V2 HV rectifier used in many older Heathkit oscilloscopes and the HO-10 and HO-13 monitor scopes. Many rectifiers such as the 5Y3, 5V4, and 5U4 also use coated filaments but are less prone to damage. High Power transmitter tubes such as the 572B and 3-500Z use easily damaged thoriated tungsten filaments

and have tight specs on their filament voltage.

#### IP-5220 Circuit:

The IP-5220 circuit is shown in **Figure 6** on **page 16**. The AC line is directly connected to the 10-amp convenience outlet (S2) and may be used as needed for a soldering iron, piece of test equipment or such. The AC line is also connected to T1, a variable autotransformer<sup>6</sup> (**Figure 4**) through an internal 7-amp slow-blow fuse (F1) and the POWER switch (SW1). The autotransformer has a single tap (terminal 4) about 90.9% of the way from the cold end (terminal 1). A rotary wiper (terminal 3) can tap any winding from the cold end to the winding top (terminal 2).

With 120 input, T1's output can be varied from 0 to 132 VAC. The autotransformer offers no isolation; that is accomplished by T2, a 3-ampere isolation transformer which has a slight voltage step up ratio of 16:15 so 120 volts in yields 128 volts out. Thus, at max voltage the output will be just under 141 VAC.

Output from T2 is fed through ammeter M1 to the CURRENT RANGE switch (SW2) which selects one of two fuses: 1-ampere (F2) or 3-ampere (F3) depending on the range selected. SW2 also switches in a current shunt across M1 when in the 3-ampere range. M1 is a 1-ampere full-scale ammeter with a coil resistance of 0.287Ω. To increase the current capability of the meter to 3-amperes, it needs to be shunted by a resistance of 0.144Ω. This shunt is provided by R1, a coil of resistance wire on a phenolic cylinder (**Figure 5**). The full winding is specified to be 0.2Ω. A tap is connected to the windings to provide the proper shunt resistance during calibration. The output of the two fuses (F2 and F3) are fed to the 150 VAC voltmeter (M1) which is



in parallel with the isolated variable output outlet (S1).

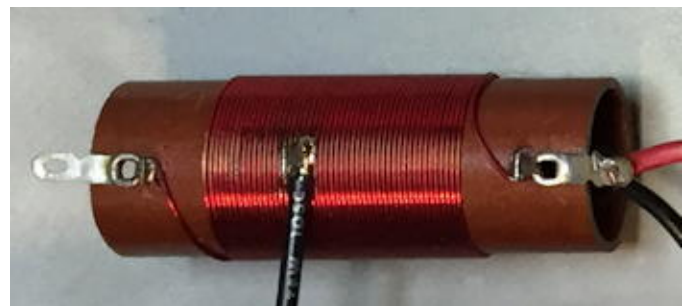
### IP-5220 Calibration:

The only calibration needed for the IP-5220 is making the resistance tap connection on the shunt resistor R1. During construction of the

kit, the wire from switch SW2 (terminal 2) is terminated with a test probe such as one used on a voltmeter. Also, before R1 is mounted, a ¼-inch wide strip of the resistor varnish insulation is sanded off along the coil to allow probing and soldering. After check out is completed a load is applied to the isolated output (S1). The suggested load is an incandescent 150 watt light bulb or parallel bulbs that draw 150 or more watts (Good luck finding one at your local hardware store today!) With the VARIABLE OUTPUT VOLTAGE control fully counterclockwise, and the CURRENT RANGE switch in the 3 AMP position, turn the POWER switch ON. Slowly advance the VARIABLE OUTPUT VOLTAGE control until the ammeter (M1) reads 3A full scale (Without the shunt you are really only measuring 1 ampere.) Now, using the test probe wired to SW2, slowly move it on the bare area along the length of the resistor coil until the ammeter (M1) reads 1-ampere on the 3-ampere scale. While holding the probe at this point unplug the unit and carefully place a piece of tape on the turn just to its right (away from the unconnected end). Remove the probe from the wire end, and without shortening the lead solder it to the exposed turn next to the tape. It's okay if the solder shorts some the turns away from the tape as they are not used. Finally plug the unit back in and check that the meter still reads 1-am-



**Figure 4:** A variable autotransformer similar to T1 that is used in the IP-5220. This is a Powerstat 10B made by the Superior Electric Company.



**Figure 5:** R1 The ammeter shunt resistor. During calibration the tap location on the resistance coil is determined and the wire soldered on.

pere on the 3-ampere scale. That completes calibration.

### IP-5220 Assembly:

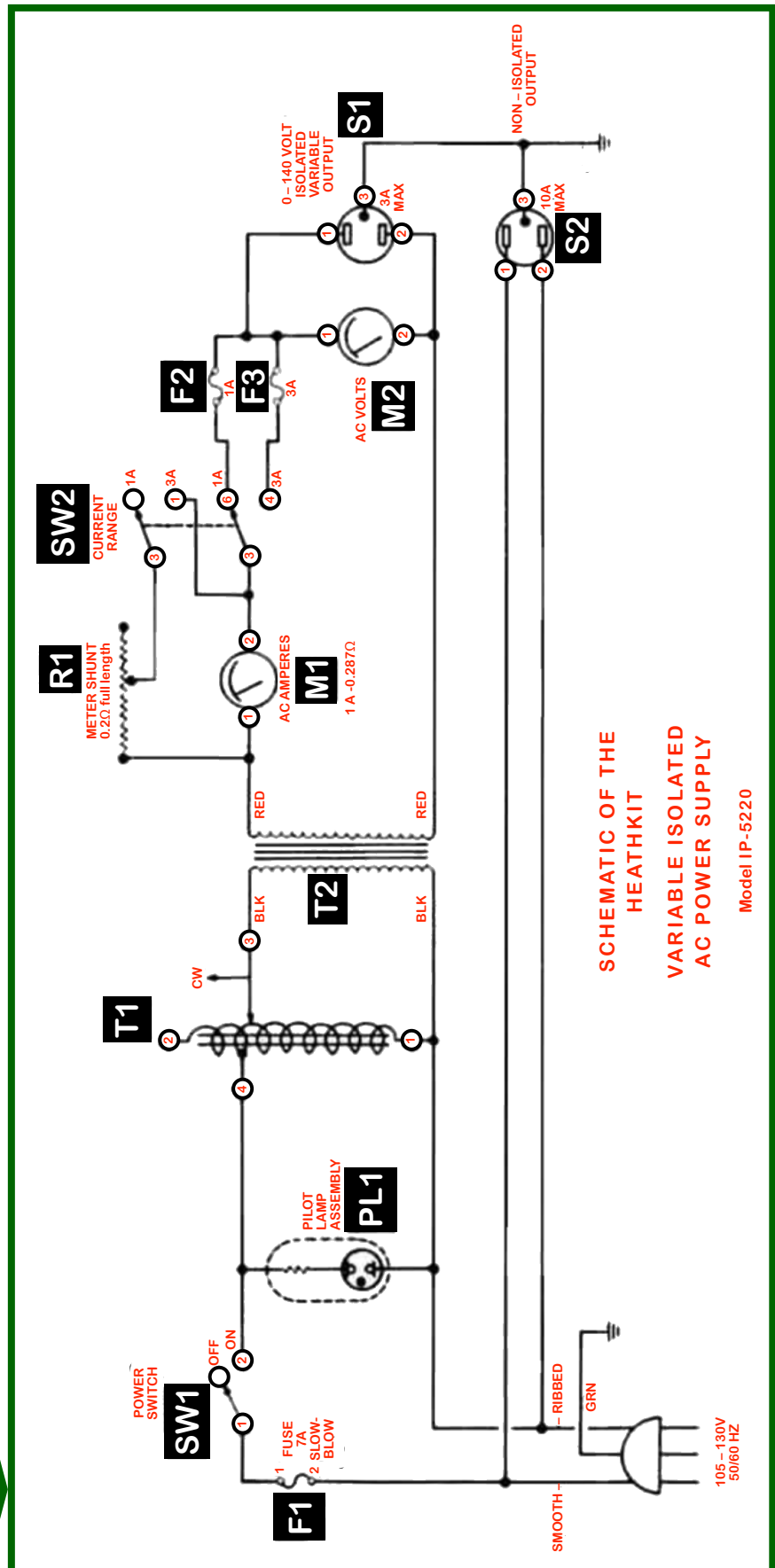
Assembly of the IP-5220 is very straightforward. The Heathkit manual I-595-1773 is only 20 pages excluding covers, replacement parts order form and some blank "note" pages. Actual assembly is covered in about eight pages, including the Final Assembly section done after completing checkout and calibration.

Most of the wiring uses black #18 gauge wire (7½' is provided) so you may want to use a heavier soldering iron than normally used for kit building. Some connections are done with push-on connectors; though the connector still has to be soldered to its wire.

Assembly begins with the installation of the feet on the chassis, then most of the chassis and front panel mounted parts, followed by wiring and the addition of the heavy isolation transformer. The chassis is then put aside and the meters are mounted to the meter bracket.

The variable autotransformer is unpacked next and mounted; its shaft bushing helps hold the meter bracket to the chassis. Then a few final solder connections are made, and lead dress is checked, especial-

**Figure 6:** Schematic of the IP-5220 Variable Isolated AC Supply. T1 is the variable auto transformer and T2 is the isolation transformer.





ly around T1, that can get extremely hot during operation at higher currents.

Final assembly involves adding the side panels, top cover, blue and white label containing the part and series numbers, and the model label that mounts in the trim bar along the top of the front panel.

### Comments on Heat and T1:

To quote the last assembly instruction prior to test and calibration:

- ( ) *Position all wires away from transformer T1, as T1 will get hot during operation and could melt the insulation from nearby wires and possibly cause a short circuit.*

It's interesting to note that the wire supplied with the kit is rated at 105°C. On one website there is a photo of the inside of an IP-5220 that shows where the neighboring voltmeter's plastic case has suffered major heat damage<sup>7</sup>. Evidently the meter still works just fine.



**Figure 7:** T1 is believed to be made by Staco Power Products of Dayton, Ohio. Note when the input terminals 1 & 4 are used, the output is 132 V, not 140 V. Also note that using terminals 1 & 4 the transformer may not be used at 50 Hz.

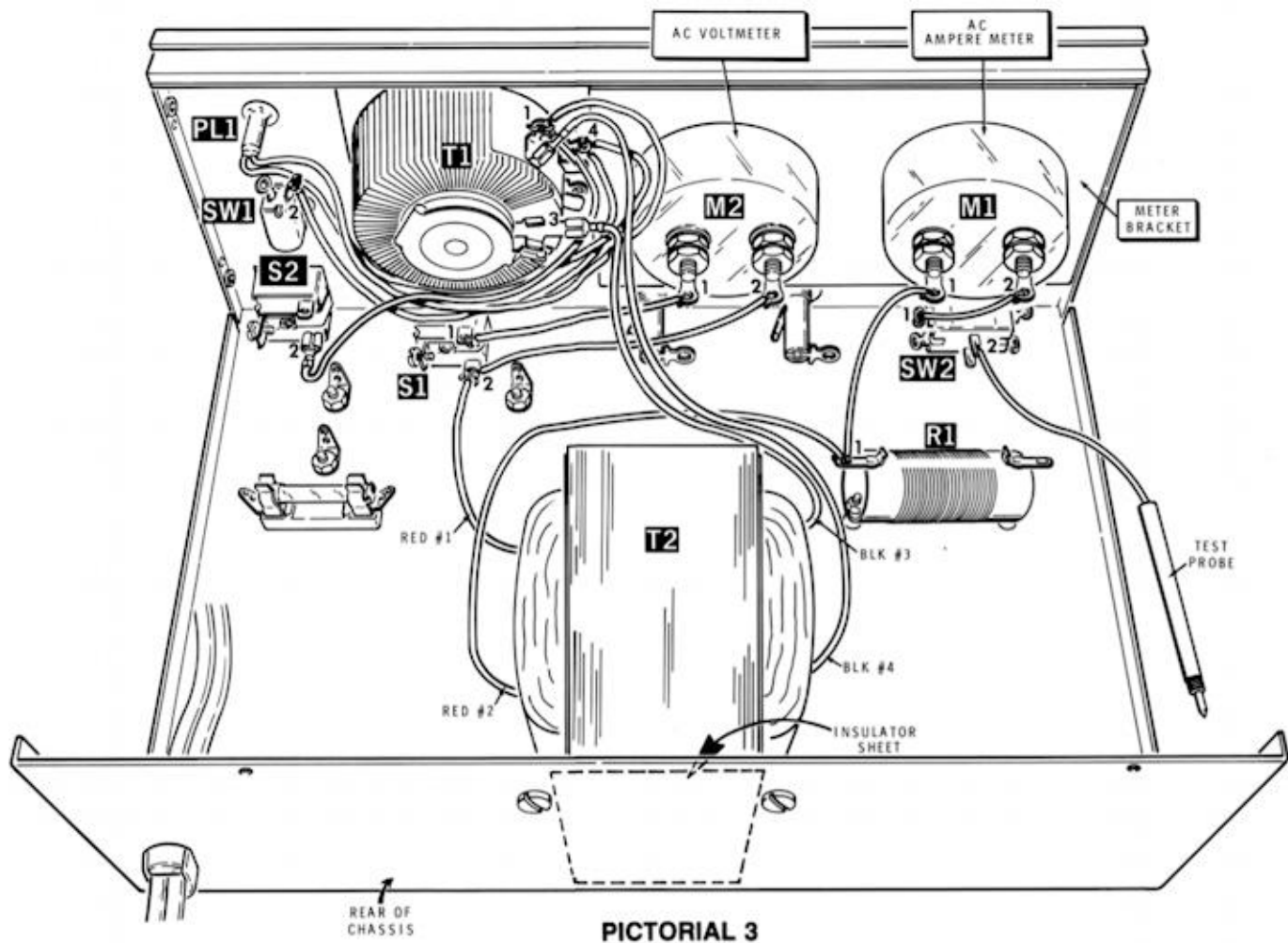
This high heat makes one wonder if T1 is running above the manufacturer's ratings. The Powerstat 10B (**Figure 4**) appears to be close to T1 in size and is rated conservatively at 2.25 amps and 297 VA. **Figure 7** is a partial photo of T1 transformer from the web. Note that though the IP-5220 is rated for 0 to 140 volts, the output of the variable transformer only goes to 132 volts. The additional 8 volts is developed in T2. If anyone has their IP-5200 open and can get the current and VA rating of the T1 transformer I'd be interested in what they find.

### Heathkit IP-10 and IP-22:

Between the 1953 IT-1 and the 1975 IP-5220 Heathkit sold the IP-10 and IP-22 isolation transformers. Unfortunately the IP-10 manual is not available to the author at this time. There is a schematic available on the web titled: "Schematic of the Heathkit Isolation Transformer Model IP-10/IP-22". So for now the assumption is the schematics are identical.

Unlike the IT-1 and IP-5220, these isolation transformers don't use a variable transformer. Instead they use a transformer with a multi-tap secondary. One end of the transformer has a 5.25 volt winding that is tapped every 0.75 volts. The central winding is 90 volts with no taps, and the top winding is 36.75 volts with taps every 5.25 volts. The total secondary is 132 volts. There are two eight-position rotary switches; one (S1) OUTPUT VOLTAGE COARSE selects one of the eight taps on the 36.75 volt winding, and the other (S2) OUTPUT VOLTAGE FINE selects one of the eight taps on the 5.25 volt winding. Thus the user may select any voltage from 90 to 132 VAC in 56 steps of 0.75 volts each.

A second feature of the IP-10 / IP-22 is the expanded voltmeter that has a scale that reads from 90 to 140 VAC. The meter may be



**Figure 8:** (Pictorial 3 from the manual) shows the inside layout of the IP-5220 during assembly. Note on the right the test probe on the end of the wire from SW2. This probe is used to find the “sweet spot” on R1 during calibration and is then removed and relegated to one’s junk box.

switched to measure either the input line voltage or the isolated output voltage. The expanded scale capability is achieved by a bridge circuit and a 0C3 voltage regulator vacuum tube that sets the offset voltage. The meter accuracy is specified as  $\pm 1$  V.

The IP-10 / IP-22 has two parallel isolated outlets. The third (ground) terminal of the two outlets connects to a front panel binding post. It is next to a ground binding post. Thus the user can isolate or ground the third contact on the isolated outlets or connect it to some other point or potential.

### Final Comments:

I started to write this article on the IP-2715 Battery Eliminator which shares a lot of components with the HP-1144(A) power supplies for the SB-104(A) transceivers. I had obtained the IP-2715 late last year, and a brief checkout showed it was in working order and worth an article.

However, I couldn’t find a manual online and bought one through Don Peterson of the new Heathkit; they sell vintage manuals – Excellent service and reasonable prices. There is a glitch on their website that sometimes caus-



es the international shipping price to appear when you put in a US location. It happened to me and to others. Changing browsers sometimes cures the problem. I do have to say that I once placed an order with the wrong postage showing, and noticed the price was corrected when I finished the order. Since Don is in California, the Governor takes his cut in sales taxes. These manuals are usually clean spiral bound copies with a "Heathkit" cover on them. I believe in owning a "paper" manual for any Heathkit I own.

The manual came in just a couple of days but I was already making good progress on the IP-5220 article since that manual was on-hand. Look for the IP-2715 article soon. The manual I received is a late one, (595-1845-06) and has changes not found in earlier units.

73, from AF6C



### Notes:

1. See HotM #18: Heathkit IT-1 Isolation Transformer. [https://www.w6ze.org/Heathkit/Heathkit\\_018\\_IT1.pdf](https://www.w6ze.org/Heathkit/Heathkit_018_IT1.pdf)
2. In AC theory Volt-amperes (VA) differs from Watts. VA is the RMS voltage times the RMS current. Watts is the VA times the cosine of the phase difference between V and A.
3. The IP-5220 may have also appeared in an earlier catalog, unavailable to the author.
4. Actually 2.57143 for the person who wrote and complained that I round off my calculations too severely.
5. The term filament is used when the heating element is also the cathode. Heater is used when the heating element and cathode are separate. The 6X4 has a heater, the 5Y3 has a filament.
6. These autotransformers are often referred to by their brand names Variac® or Powerstat®.
7. [https://www.byan-roper.org/steve/Media/img\\_0520.jpeg](https://www.byan-roper.org/steve/Media/img_0520.jpeg).

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

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*Thanks - AF6C*

HEATHKIT ISOLATION TRANSFORMER COMPARISON CHART

FEATURE	IT-1	IP-10 / IP-22	IP-5220
INPUT VOLTAGE	117 VAC 50/60 cycles	105-125 VAC 50/60 cycles	120 VAC 60 Hz
ISOLATED OUTPUT VOLTAGE	90 - 130 VAC (continuous)	90 - 130 VAC (0.75 V Steps)	0 - 140 VAC (continuous)
POWER RATING - Continuous	100 VA	300 VA	140 VA (in 1-amp range) 360 VA (in 3-amp range)
POWER RATING - Intermittent	200 VA	500 VA	(same as continuous)
VOLTMETER	50 - 150 VAC (undamped) Output Voltage Only	90 - 140 VAC (Expanded scale) Input or Output Voltage (switched)	0 - 150 VAC Output Voltage Only
AMMETER	(none)	(none)	DUAL: 0 - 1 AMP / 0 - 3 AMP
ISOLATED OUTLET(S)	1 ea. 2-wire (Non Polarized)	2 ea. 3-wire (Polarized)	1 ea. 3-wire (Polarized)
UNISOLATED (CONVENIENCE) OUTLET	(none)	(none)	1 ea. 3-wire
NET WEIGHT	7 Lbs 8 oz (measured)	18 Lbs (manual)	22 Lbs (manual)

## OCARC BOARD MEETING MINUTES 2022-09-03

The 9<sup>th</sup> Board Meeting of the year was both in-person, on Saturday, September 3<sup>rd</sup>, 2022, at Tom W6ETC's QTH in Tustin, and on Zoom for those who where unable to attend in-person. The meeting was called to order by club president, Nicholas Haban AF6CF at 8:18 AM PDT. All ten (10) directors were present for a quorum, including two (2) who attended by Zoom. We had one visitor in-person, Jim KB6TKA. There were sixteen (16) topics brought to the board this morning, including three (3) Director Reports and thirteen (13) agenda items. Two (2) motions were carried, including adjournment.



Fig 1 – All Ten (10) Board Directors were present in person and via Zoom.

### Director Reports

Nicholas AF6CF calls for director reports.

**-Secretary:** Corey KE6YHX explains the process he went through including the support of Bob AF6C, to resolve the problem with our lapsed Post Office Box. The club has the same Post Office Box 3454 at the Tustin Post Office, starting Monday, August 22, 2022. The new renewal date is September 30<sup>th</sup>.

**-Treasurer:** Ken W6HHC reports our income since the beginning of the year totals \$3,682. We have outflows totaling \$2,681, for a net increase of about \$1,000 [See page 26].

**-Membership:** Bob AF6C reports the membership is at 102 plus one person who is trying to pay by mail.

### Old Business

#### •Newsletter Editors

October: Corey KE6YHX

November: —open to volunteers—

December: —open to volunteers—



### •General Meeting Programs

September: Speaker: Edison Fong WB6IQN presents: "Dual Band Antenna Talk"

### October: OCARC Auction

November: Speaker: Kevin Zanjani presenting "Ham Radio Operations Using LiFePO<sub>4</sub> Batteries"

### •PayPal Account Ownership

This item is tabled indefinitely.

### •In-Person Board Meetings at a Restaurant

Morning restaurant locations are considered, and we have an option in Orange. Polly's Pies Restaurant on Tustin St. is considered for next year's Board Meetings. A call-in advance would be needed and the cutoff time is 9:00 AM. Polly's Pies in Santa Ana and Mimi's Cafe in Tustin are considered as alternatives. A meeting room not at a restaurant and an evening meeting are discussed. More research is needed.



### •Christmas Party Plans

Ron W6WG reports on the **Christmas Party reserved for Friday, December 9<sup>th</sup>**, at Mimi's Cafe in Tustin. Food, the meeting program, and the raffle are the topics for this item. There is some confusion with identical menus at different prices, and this needs to be clarified.

Speaker/Presentation if any or options for the party's presentation were discussed.

Corey KE6YHX reports the Christmas Party budget for last year was \$500. Ron W6WG moves to set a budget of \$750, Tim G. N6GP seconds, and the motion is carried unanimously for the nine (9) Board members present at 9:11 AM PDT.

### •October Annual Auction

The Club Auction is planned for the October General Meeting date, at the American Red Cross in Santa Ana. Chip K7JA accepted the auctioneer position, Nicholas AF6CF, Ron W6WG, and Bob AF6C will be his helpers.

Ken W6HHC will be managing the finances, and Corey KE6YHX and Greg W6ATB are considered as a treasurer helper. We need some more publicity for the auction. Flyers at the TRW Swap Meet are to be distributed.

### •Election Nominations Committee

Chairmen:

- Nicholas AF6CF
- Tim M. N6TMT
- Bob AF6C

-Current Board Nominations:

- President: --open to nominations--
- Vice President: --open to nominations--
- Secretary: Tim M. N6TMT



Quest: Jim KB6TKA

Treasurer: --open to nominations—  
Activities Chairman: --open to nominations--  
Publicity Chairman: Ron W6WG  
Technical Chairman: Bob AF6C  
Membership Chairman: Corey KE6YHX  
Director-at-Large 1: Nicholas AF6CF  
Director-at-Large 2: Tim G. N6GP

Various proposed nominations are to be contacted by select Board members.

### •Tower and Other Donations

-We still have the donated tower being held on one of Gene KJ6OML's trailers. We have not found a buyer and it needs to be disposed of. It is a Tristao CZ-454-FS and the middle section has been shortened. There have been some difficulties with the prospective page for our web site. Advertisement and disposal options are discussed.



### New Business

#### •TRW Swap Meet Plans

Plans to sell at the TRW Swap Meet after the Club Auction are discussed. This is not considered a viable option. Ron W6WG volunteers to distribute flyers for the Club Auction at the TRW Swap Meet.

### Good of the Club

#### •Articles for RF

Tom W6ETC calls attention to the need for articles in the RF Newsletter. Some sources are considered for RF Newsletters following September.

### •Visitors from Australia

Bob AF6C received an email to the club from a Ham Radio couple who are coming from Australia on vacation here for a few days and need a place to stay. Some possibilities are discussed.

### •ARRL September VHF Contest

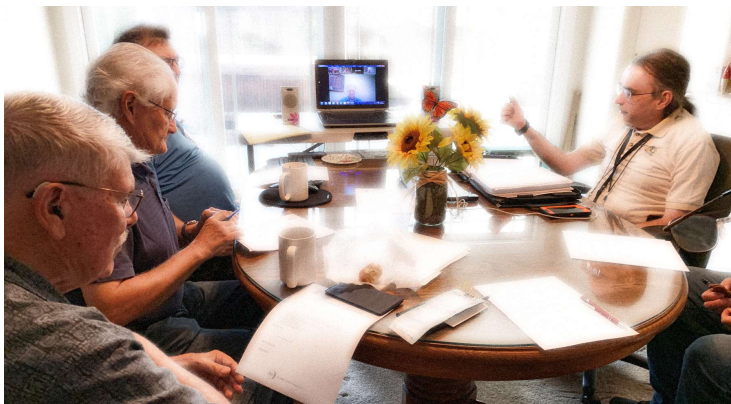
Tim G. N6GP announces the ARRL VHF Contest is the weekend of September 10-11<sup>th</sup>.

### Ask The Elmer

Ron W6WG has a problem with his remote desktop, and the Board knows of two other software options.

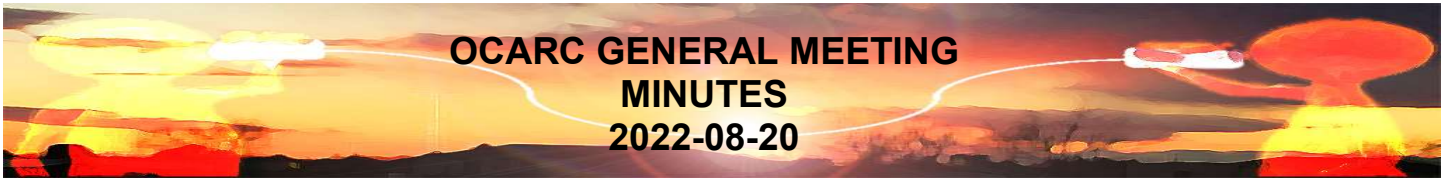
### Adjournment

A motion to adjourn is made, seconded, and carried at 9:49 AM PDT.



--Respectfully submitted by  
Corey KE6YHX, OCARC Secretary





The 8<sup>th</sup> General Meeting of the year, and the third in-person General Meeting since the pandemic, was successfully executed on Friday, August 19, 2022, and offered members the opportunity to engage with fellow hams at the American Red Cross in Santa Ana, or via Zoom for those who could not attend in-person.

The meeting was called to order by club president, Nicholas Haban AF6CF at 7:04 PM PDT. There were twenty-three (23) members, guests and visitors present, with ten (10) in-person, and thirteen (13) by Zoom including our speaker.

### **Beginning of Meeting with Pledge of Allegiance**

Nicholas AF6CF leads the pledge of allegiance at 7:04 PM PDT.

### **Introductions**

Nicholas AF6CF starts the attendee introductions. All twenty-three members and visitors are acknowledged and introductions made.

### **Scheduled Meeting Presentation**

Nicholas AF6CF introduced our guest speaker who was connected via Zoom and personally located within San Diego: The presenter is Chris Claborne N1CLC, and the title of his presentation was: SOTA - Summits On The Air.



**Chris Claborne N1CLC offered an Engaging Presentation on...  
"SOTA – Summits On The Air"**

### **Questions and Answers**

Chris N1CLC called for questions from the audience following his SOTA presentation.

*Continued on next page...*

-Ron W6WG asks what percentage of Chris' contacts are CW compared to SSB, and what the speed is of his CW. Chris says it is about 90% CW at 22 WPM, also accommodating for slower operators. Ron also asks how short the exchange is. *(Continued on next page)*



Chris says it is normally:

W6WG DE N1CLC

N1CLC UR 599 BK or TU CHRIS, UR 599 BK

TU UR 599 BK

A summit-to-summit contact includes "S2S" and the summit-code.

-Bill via Zoom asks for a quick explanation of the best way for a new Amateur to learn CW. Chris tells us he went online to CW Academy, which is a twice-a-week course. Practicing every day but not for too long is best. Finding how you learn and what keeps you going, finding the happy medium is important. Chris used a spreadsheet of call signs to make the breakthrough in his learning.

-Tom KA9FRH asks how Chris logs his contacts. Chris uses a very useful app on his cellphone to log.

Chris says in closing, to have fun and contact him on the air or by email. Chris thanks us for having him present, and the audience gives him a much appreciative round of applause. Thank you from all of us at the OCARC, Chris!

### **Recess**

Nicholas AF6CF calls for a recess at 8:08 PM PDT.

### **Business Meeting**

Club president, Nicholas AF6CF starts the business meeting at 8:18 PM PDT. Seven (7) board members were present for a quorum. Four (4) topics were brought to the board, tonight, including two (2) Director Reports and two (2) discussions. Two (2) motions were carried, including adjournment.

#### **•Director Reports**

Nicholas AF6CF calls for Director Reports.

**-Secretary:** Corey KE6YHX reports the prospective Club Breakfast and Board Meeting location, Polly's Pies on Tustin Street in Orange has an electrical outlet for our electronics in the breakfast room.

**-Membership:** Bob AF6C reports our membership count is now at 103.

### **September Board Meeting**

Tim M. N6TMT makes a motion to rescind the adopted motion to move the September Board Meeting to the 10<sup>th</sup>, made on Saturday, January 8, 2022, at 9:24 AM PST. The motion is seconded by Bob AF6C, and is carried unanimously for the board members present at 8:23 PM PDT. The September Board Meeting is now planned for Saturday, September 3<sup>rd</sup>, at Tom W6ETC's QTH.

### **Good of the Club**

Bob AF6C reports Apple urges its computing device users to upgrade to the most current operating system due to security vulnerabilities.

### **Ask the Elmer**

There are no items for Ask the Elmer.

### **Adjournment**

A motion to adjourn was made, seconded and carried at 8:30 PM PDT.

--Respectfully submitted by Corey KE6YHX OCARC Secretary

**OCARC Member  
Carol Bourne N6YL – SK  
by Ken W6HHC**

The OCARC Board of Directors and its Members is sad to report the passing of OCARC member Carol Bourne N6YL on September 05. Carol (ex-WA9NEJ), the wife (XYL) of member Ken Bourne W6HK. They were married Ken in 1963, and it seems that the love for Amateur radio help kindle the love they had for each other.

In the 2012-October issue of the OCARC RF Newsletter, Ken W6HK told the story that before they were married, his future wife Carol “bought an RME-45 receiver to listen to Ken (then K9GHR) on 10 and 15 meters AM, back in Illinois (I believe the Wheaton Radio Club?).” She got her first license (WA9NEJ) in 1964 - soon after they married.

Both Ken W6HK and Carol N6YL have been very active in OC RACES through the OC Sheriff's Department and also have been longtime members of OCARC. In 2014, the Orange County Sheriff Department awarded Ken Bourne W6HK the Gold Star Award.

In the photo below, OC Sheriff Sandra Hutchens poised with Ken W6HK, Carol N6YT, and their family in the award ceremony given to individuals who exemplify the mission of the Department and go above and beyond the line of duty.



This photo of the Gold Star Award ceremony is a great shot of Carol N6YL, Ken W6HK and their family in 2014.  
From L to R - OC Sheriff Sandra Hutchens, Don Bourne KB6TVK, Sarah Bourne, Ken Bourne W6HK, Carol Bourne N6YL, Bob Bourne K6RBI and Ken's 3 grandchildren.  
(Photo above is from OCARC RF Newsletter of 2014-Sept)

The funeral ceremony is planned for Thursday, Sept 22<sup>nd</sup> (10 AM) at St. John's Lutheran Church in Orange.  
<https://www.legacy.com/us/obituaries/name/carol-bourne-obituary?id=36427148>

I will miss Carol N6YL who always seemed to be at the side of Ken W6HK ... de Ken W6HHC

**OCARC Member  
Bruce Creager KC6DLA – SK  
by Ken W6HHC**

Former OCARC member Bruce Creager – KC6DLA passed away on Sept 08. I remember how much I was impressed by the energy and professionalism that Bruce contributed to the COAR OPD Baker-2-Vegas events over many years.

1) For a span of over 15 years, Bruce provided detailed plans for communications and detailed logistics for each person who was involved with COAR helping the OPD running team. His planning details (detailed diagrams and written instructions) were second to none.

2) In addition to B2V-planning, Bruce played a very active role in the operations-phase of Baker-2-Vegas events. For many years while Bruce owned a motorhome, Bruce would use his motor home as the OPD runners staging “room” located near the intersection of Sandy Valley Road (which in those days was located between Stage 15 and Stage 16). The photo below was taken during B2V-2002 in Bruce’s motorhome which acted as a communications center located near Mountain Pass (above Las Vegas).

In 2002 I was assigned to spend a few hours at the OPD runners staging “room”, before trading places with another COAR radio operator finishing his assignment in the race. I remember the difficulty of locating the entrance to Sandy Valley Road at night along a very dark road (the main running course).

Seeing the lights to the entrance was almost impossible because the other motorhomes were set back from its entrance. Each time I missed the road...I had to drive another 5 miles before I could find a turnaround spot on the racecourse....and back I go looking for the entrance once again. I think it was the third or fourth attempt that Bruce brought a flashing light...and talked me in using his HT.

3) The photos on 2002-B2V on the OCARC website also explains that **“.... In his spare time, Bruce - KC6DLA even managed to provide communications for a "shuttle vehicle" taking a new runner into position near Sandy Valley”**. He put all his energy helping B2V COAR members to remain safe.

His energy and friendship will be greatly missed.....de Ken W6HHC



**Bruce Creager, KC6DLA,  
shown operating from his  
OPD Comm Center during the  
B2V (Baker To Vegas) event  
held April of 2002**



**Shown above equipment-test workshop and  
preparations for the 2018 B2V  
being held at the QTH of W6HHC.  
Although Bruce KC6DLA wasn't active in the  
B2V at the time, he did enjoy the process of  
preparation and the camaraderie of fellow  
hams. Bruce is second from left.  
His wife Ann is far left.**



## OCARC Cash Flow - Year to Date

1/1/2022 through 9/1/2022

Category	1/1/2022- 9/1/2022
<b>INFLOWS</b>	
Donations - FD Food	724.00
Dues, Family (PayPal)	128.82
Dues, Membership	360.00
Dues, Membership (PayPal)	2,311.50
Dues, Membership (PayPal) 2023	71.40
Opportunity Drawing -Monthly	87.00
<b>TOTAL INFLOWS</b>	<b>3,682.72</b>
<b>OUTFLOWS</b>	
Christmas Party- Deposit	300.00
Field Day - Propane	73.22
Field Day Equipment	20.00
Field Day Food	758.05
Field Day Rental - Tent	500.00
Opportunity Drwng Expenses	117.46
PO Box Rental	156.00
Publicity	37.64
Storage of Equipment - Ann Millard	250.00
Web Site Hosting	161.95
Web Site SSL Fee	69.99
WFD	26.68
WFD - Food	17.90
WFD - Propane	43.06
WFD Rental - Tent	150.00
<b>TOTAL OUTFLOWS</b>	<b>2,681.95</b>
<b>OVERALL TOTAL</b>	<b>1,000.77</b>