RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXI NO. 09 **P.O. BOX 3454, TUSTIN, CA 92781** **September 2020**

The Prez Sez...

By Dan KI6X

Well, we are still mostly shut down especially in radio activities away from home. Your Board has been continually rearranging things and making contingency plans as the months go by. We moved the OCARC Auction from October to February (hoping?). It is just not going to happen next month and there was no way we wanted to try a "Zoom" auction. We are still working with Mimi's regarding the December Dinner. Best case we will be limited in attendance size in the room.

It is also coming up to Officer elections time in November. Most of your Officers are termed out from their position this year. See the announcement in this ***RF*** and let us know if you might be interested in a position. We as Officers / Nomination Committee are also coming up with names to ask to run for a position. Please consider volunteering your name to run. It will be tougher getting candidates remotely and "self-nominations" are encouraged.

As always, read through each ***RF*** for announcements and other notices that might get slipped in. During Board meetings or at random times something may come up to mention/ask the club members. We try to save the emails for more urgent communications and use the ***RF*** otherwise.

I hope everyone gets a chance to get on some for the California QSO Party. It should be fun like the individual Field Day effort was. Again, more information is included in this ***RF*** issue.

When you get the Zoom meeting notice in your email for the meeting, remember we always welcome visitors. Instead of inviting someone to come along with you to an in-person meeting, forward them the meeting information and invite them to join us. We have had some interesting presentations on-line.

This wraps up the third quarter of the year and it has been quite a year. We look forward to the next 3 months completing the year as we hopefully head towards more normalcy!

Dan, KI6X - President

NEXT MEETING
September 18, 2020
7PM

ONLINE ZOOM

OCARC Virtual Meeting on

"Radiograms, A Fun & Still Useful Ham Tradition?"

(National Traffic System)

By Kate Hutton K6HTN

All current members will receive an email invite

DURING THE CORONAVIRUS (COVID-19) All OCARC Nets Remain Active!

In This Issue

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Monthly Events:

General Meeting time & location:
REGULAR MEETINGS*
***See ZOOM announcement on Page One**
Normally Held third Friday of the month at 7PM, located at:
The American Red Cross
600 Parkcenter Drive
Santa Ana, CA

Club Breakfast (Board Mtg) info:
First Saturday* each month 8 AM
Marie Callender's Restaurant
307 E. Katella Ave
Orange, CA 92867
***Temporarily Cancelled ZOOM only**

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

75M 3.883 MHz LSB
Wed @ 9:15 PM
Follows right after end of 2M Net
Net Control: Corey, KE6YHX

Net-At-9

Outside Nets: ***CARA REPEATER 147.090 MHz (+0.600 MHz) No PL***
(Net-At-9) Monday - Friday
9:00 AM and 9:00 PM
NC & Prg. Director. Tom W6ETC
NC: Jeff: KK6TRC / Don W6ZZW

OCARC 2020 DUES

Membership period is:
1 January to 31 December

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

New Member Dues are *prorated quarterly* and **includes a badge**:
Additional Badges:[1] $ 3.
Use one of our interactive online forms to calculate current prices, join the club and/or order badges:

Online Forms / Dues & Badges

[1] $3. plus mailing costs if applicable
Dues are subject to change without notice

California QSO Party
October 3 & 4, 2020

Orange County Amateur Radio Club

After a successful Winter Field Day and a enjoyable ARRL Field Day it's time to make a concerted effort in one of the most prestigious and anticipated State QSO Parties. The California QSO Party gives you the opportunity to become the station the rest of the country wants to get into their log. There are many clubs that have participated in the CQP year after year so the competition for bragging rights is tough.

If you choose to participate your score will be listed both under your call sign and included with the OCARC club score.

We are planning to enter the "Small Club" category where the 10 highest scores entered by each "small club" will be used to calculate the clubs final score.

Visit the CQP website at www.cqp.org for all the information you will need to help put OCARC on top.

This is intended to be an "At Home" event similar to how Field Day was conducted.

California QSO Party announcement from Ron W6WG

RadioActivity
September 2020

Upcoming Activities:

September

- **North American Sprint, CW:** 0000 UTC to 0400 UTC Sunday September 13.
- **ARRL September VHF Contest:** 1800 UTC Saturday Sept. 12 to 0300 UTC Monday September 14.
- **CQ Worldwide DX Contest, RTTY:** 0000 UTC Saturday 26 to 2400 UTC Sunday September 27.

October

- ***10-10 Int. 10-10 Day Sprint:** 0001 UTC to 2359 UTC Saturday Oct. 10.
- **Oceania DX Contest, Phone:** 0600 UTC Saturday Oct. 3 to 0600 UTC Sunday Oct 4.
- **Oceania DX Contest, CW:** 0600 UTC Oct. 10 to 0600 UTC Sunday Oct 11.
- **Scandinavian Activity Contest, Phone:** 1200 UTC Oct. 10 to 1200 UTC Sunday Oct 11.

***** 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. 12 to 0200 UTC Saturday Sept. 13 and 1400 UTC to 2000 Sunday Sept. 13
- **Iowa QSO Party:** 1400 UTC Saturday Sept. 19 through 0200 UTC Sunday Sept 20.
- **New Hampshire QSO Party:** 1600 UTC Saturday Sept. 19 to 0400 UTC Sunday Sept. 20 and 1600 UTC to 2200 Sunday Sept. 20.
- **New Jersey QSO Party:** 1600 UTC Saturday Sept. 19 to 0359 UTC Sunday Sept. 20.
- **Maine QSO Party:** 1200 UTC Saturday Sept. 26 through 1200 UTC Sunday Sept. 27.

- **California QSO Party**
  1600 UTC Oct. 3 through 2200 UTC Sunday Oct. 4.
  Note: When submitting logs for CQP indicate your club affiliation as "Orange County ARC"

- **Nevada QSO Party:** 0300 UTC Saturday October 10 through 2100 UTC Sunday Oct. 11.
- **Arizona QSO Party:** 1500 UTC Saturday Oct. 10 to 0500 UTC Sunday Oct. 11.
- **Pennsylvania QSO Party:** 1600 UTC Oct. 10 to 0500 UTC Sunday Oct. 11 and 1300 UTC to 2200 Sunday Oct. 11.
- **South Dakota QSO Party:** 1800 UTC Saturday Oct. 10 through 1800 UTC Sunday Oct 11.

Repeating Activities:

- **Phone Fry** Every Tuesday night at 0230Z to 0300Z
- **SKCC** Weekend Sprintathon (Straight Key CW) on the first weekend of the month after the 6TH of the month. 1200 Sat. to 2359Z Sunday.
- **SKCC** Sprint (Straight Key CW) 0000Z to 0200Z on the 4th Tuesday night (USA) of the month.
- **CWops Mini-CWT** Every Wednesday 1300 UTC to 1400 UTC 1900 UTC to 2000 UTC and Thursday 0300 UTC to 0400 UTC

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

73, Ron W6WG

OCARC ANNOUNCEMENTS

ELECTIONS

All positions available and noted whether the incumbent can run again

President – open
Vice-President – open
Secretary – open
Treasurer – open
Activities – Jim AF6N can run again
Membership – open
Public Relations – open
Technical – open
Directors at Large (2) – might be open but President and VP can assume the positions

A description of the duties is in the By-Laws. I also created articles in the ***RF*** in 2019 which were included continuous months regarding each position. I can send my list of articles to you if interested. If you want to self-nominate yourself please send me your interest. If you are interested in a particular position or two also let me know that. We will contact you before you end up on the nomination list. Nominations will still be allowed at the meeting of course.

Dan – KI6X, OCARC President ki6x@w6ze.org

Missing HRO Gift Certificates

We have $200 worth of HRO Gift Certificates on the club books. These were bought as raffle prizes. If you won one, let us know. If it is lost, we may be able to work something out.

$25 raffled in 2014 (maybe at a meeting)
$100 raffled at December Dinner 2017
$50 raffled at a meeting early 2018
$25 still in-hand to be raffled off

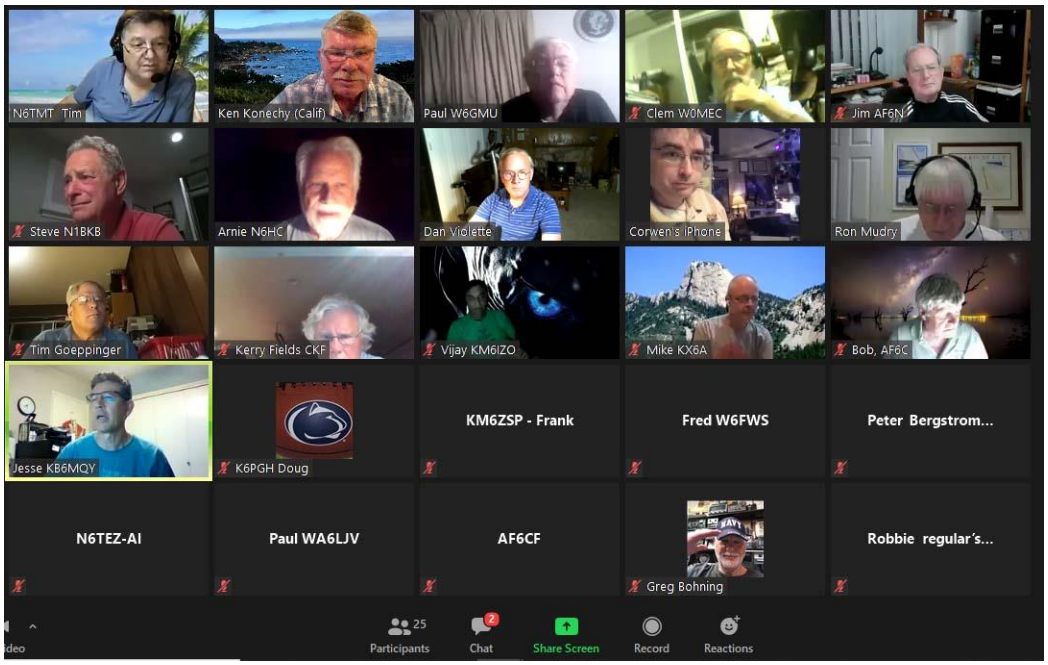
Let Ron know if you think you won any of these. We will research and figure out what to do about it.

Contact Ron, W6WG w6wg@w6ze.org

OCARC
General Meeting Minutes via ZOOM
2020-08-21

The August OCARC General Meeting was ZOOM via the internet on August 21, 2020. The meeting was called to order at 7:00pm by Dan KI6X.

There were a total of 34 members and visitors in attendance. Two more youngsters, Jacob and Mason, were visiting the shack of former-prez Chris KJ6ZH where they like to "play radio". There was a quorum of officers, with all directors present. This was the fifth OCARC General Meeting that was completely conducted using ZOOM (due to meeting restrictions imposed by the Coronavirus).



A typical Screen-Capture of members in attendance during the August meeting.
The majority of attendees could provide video from their home QTH.
But, while some sent no video, everyone could watch video on ZOOM
and could hear the audio during the meeting.

August Program:

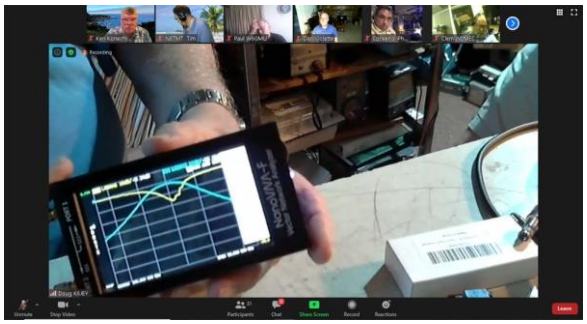
Tim N6TMT introduced OCARC member Doug Millar - K6JEY on ZOOM as the club program speaker for the evening, who talked on:

"Ham Radio Test Equipment…"

Doug K6JEY with part of his test lab in the background.

Doug K6JEY showed and demonstrated a few of his personal pieces of test equipment that he finds useful for hams. Doug mentioned that an excellent book on understanding VNA (Vector Network Analyzer) concepts is by DG8SAQ at SDR-Kits in Germany.

This resistance box can go from 0.1 ohms to 20 Megohms in 0.1-ohm-steps



This low-cost VNA (Vector Network Analyzer) Model NanoVNA-F is showing a 300 MHz filter

Low-cost CLEQEE Model 5012H LCD scope connects to PC by USB

Business –

- **Proposed Bylaw Changes** – “el Presidente” Dan KI6X explained that board members have been working on improvements to the OCARC’s Bylaws (last updated in 2012) for more than 18 months. Dan went on to explain that any proposed changes must be presented at two OCARC general meetings and then voted on at the second presentation. Secretary Ken W6HHC described each of the 18 sets of proposed changes to the ZOOM audience. Ken summarized that the changes typically consisted of updates to current practices (for example: the e-mailing of meeting-notices & club newsletters and removing the required use of the ancient corporate seal) and also clarifications of current procedures (for example: election of directors and post-office-key responsibilities). Ken reminded members that a copy of the OCARC Bylaws with the proposed changes is included inside the August and September RF Newsletters. Any club members who have questions on these proposed changes should contact Ken W6HHC or Dan KI6X by e-mail before the Sept Gen Meeting.
- **Membership** - Chair Corey KE6YHX reported that there were 102 members (including 4 honorary club members). An additional 17 hams, who last paid in 2019, are still receiving courtesy club newsletters and club notices during these Pandemic struggles.

- **Ask Elmer** – Member Ron W6WG wonders why his Microsoft Surface pad computer drifts "off in time", especially notable when using MeinBerg software for his FT-8 digital program. Tim N6TMT suggested that Ron consider connecting an external GPS receiver for exact time. Tim N6GP suggested to adjust the source of time inside the pad settings for Windows10.
- **The Corporate Seal** – During the Bylaws proceedings, there was discussion of the club's corporate seal. We thought you might enjoy seeing what the corporate seal looks like.

Old Corporate Seal
(courtesy of AF6C)

New Corporate Seal
(courtesy of N6GP)

Good of Club –

- **New DXCC (CW) Completion –** Mike KX6A announced that he had just worked 100 countries on CW using an ICOM 7300 and a wire in his back yard. He just started on the DXCC bug in November of 2019.
- **YL DX Records on UHF –** Doug K6JEY told the audience that his wife, Helen Mahoney KI6LQV, holds several DX records for YL's on UHF: including
  - 122GHz at 2.2Km
  - 79GHz at 15miles
  - 47GHz at 15miles
  - 24GHz at 65 miles
  - 10GHz at 100 miles plus

Submitted by: Ken W6HHC, Secretary

PROPOSED UPDATED BY-LAWS
at the end of this ***RF*** (page 27)
Second reading and vote at Sept General Meeting

OCARC BOARD MEETING MINUTES 2020-09-05

Due to the COVID-19 restrictions on physical gatherings, the latest OCARC Board meeting was held ON-LINE via ZOOM on Saturday September 05, 2020 at about 8:40 AM (after we sorted out recent security changes that were made in the ZOOM program). In attendance were eight (8) Board Members and two club members. All board directors (except Greg W6ATB & Vijay KM6IZO) were present for a Board quorum.

Directors Reports:

- **Membership** – Corey KE6YHX reported that the club has a total of 102 members. Includes 74 renewals, 20 new, 4 returning, and 4 honorary (non-voting). Seventeen hams have not renewed from 2019, BUT have been kept on the club e-mail distribution as a courtesy during the COVID struggles.
- **Treasurer** – Greg W6ATB sent a report that the club had a net profit of $ 468 YTD. See this newsletter [page 14] for the complete cash flow report.
- **Secretary** – Ken explained that he will be absent in Florida during the October Board meeting. Dan KI6X will find a volunteer acting-secretary.

Old Business:

- **Newsletter Editors:**
  Sep Dan KI6X, **Oct** Greg W6ATB, **Nov** Tim N6GP, **Dec** Bob AF6C or Corey KE6YHX
- **General Meeting Programs (Zoom meetings until further notice)**
  - Sept – Kate Hutton K6HTN (on National Traffic System)
  - Oct – John Miller K6MM (on 2016 KP5 DXpedition)
    (Radio AUCTION postponed until February 2021)
  - Nov – Dennis Kidder W6DQ, subject: TBD
  - Dinner – [TBD]
    (if cancelled by Mimi's, may be outdoor picnic & raffle on a Saturday afternoon)
- **By-laws Update:** The first presentation of proposed BYLAWS changes to the General Membership was made during the August zoom meeting. There were no objections received after the presentation. The second and final presentation of the BYLAWS changes will be made during the September Zoom Meeting…followed by the membership voting for acceptance of changes.
- **California QSO Party:** Ron W6WG said he will continue to collect interest and encourage operating for the club aggregate score for the CQP.

New Business:

- **Non-renewed hams from 2019.** Originally the board expected the COVID-19 public-meeting issues to be finished by summer Field Day…and decided to allow non-renewed members to stay listed on the club roster. Since the COVID does not seem like it will be going away soon,

the board decided to remove non-renewed hams from 2019. But, the seventeen names will continue to be kept on the club e-mail distribution as a courtesy during the COVID struggles.

Good of the Club:

- Ken W6HHC explained that he had considered both Bioenno Power Model BPP-160 and a Model BPP-H1000 units to solve California's rotating power-black-out threat. Ken was looking for a unit that could serve as a battery-backup DC source for the ham rig and as a UPS (Uninterruptable-Power-Supply) AC source for his internet modem and WiFi router. He chose the larger BPP-H1000 with 1000 Watt-Hours of capacity.

Bioenno Power Model BPP-160
(160 Watt-Hr capacity)

Bioenno Model BPP-H1000

Meeting adjourned 10:24 AM

Submitted by Ken W6HHC, OCARC Secretary

OCARC
MEMBER STATION PROFILE
Ron W6WG – Director at Large

W6WG's Operating Position

After looking at the photos of my "Shacks" operating position your first thought is probably "Where are the radios and where are the knobs we all like to play with". Times are changing and so is the way the radio shacks will be looking in the future. Welcome to SDR radio. Granted there is nothing like the glow of the vacuum tube and warmth that they generated that bring you back to the early days of your radio experience. Whatever ambiance is lost or the ability to tweak the bandspread knob to make that contact it is more than compensated for by the performance of the modern SDR rigs. As Bob Dylan told us "The Times They Are a-Changin".

W6WG Operating Position

Enough nostalgia, let me describe my station, to begin with the radios (without knobs) and antennas are located in Kern County about 100 miles north of my home in Huntington Beach. I think that makes my QTH in the San Joaquin Valley ARRL section. My primary operating position is in my home office which does not contain any ham radio equipment. What I do have is a computer, keyboard and three 28" monitors. My secondary position can be anywhere where I can get internet service for my laptop. Hence my positions can and most likely are already duplicated in your home or

work place. From my operating position, I am able to access the station via the internet and have control of the SDR radio, antenna rotor, band selection switches, etc. With three monitors I can operate the remote radio, view the remote site with 5 security cameras, run logging programs and run DX Summit all at the same time. Nicholas AF6CF, Tom W6ETC and I have put together a remote station where in addition to operating the SDR radio we can monitor temperatures, monitor voltages and turn on air conditioning, if needed, all via the internet. We have antennas for 160 thru 2 meters plus 440 Mhz. The antennas, with the exception of 2 meters & 440, are mounted on a 50-foot tower. Before the remote station, I was among the many hams that didn't have access to a Tribander on top of a 50-foot tower, but once you have, ham radio will never be the same again.

Nicholas AF6CF has, in true ham fashion, designed and constructed antenna switching, networking and battery charging devices that make the station operate. Operations are off grid with power being supplied from solar panels and a wind turbine which in turn charge two banks of batteries. We have commercial power as a backup and for powering the air conditioner.

After starting construction two years ago, it is still a "work in progress". I am really enjoying the station which has exceeded my expectations and I am looking forward to working the next sunspot cycle maximum in style. Putting our station together with Nicholas and Tom has been half the fun. With planned modifications and additions the fun should continue for years to come.

I would like to thank Greg W6ATB, Ken W6HHC, Wayne W6IRD, Vijay KM6IZO, Kevin at Bioenno Power and especially Dino KX6D for their help, contributions and making the remote station possible.

73, Ron W6WG

A Permanent Antenna mounted at new QTH of Ken W6HHC

Comet 144/440 MHz antenna mounted at W6HHC new QTH

Ken W6HHC finally had a Comet GP-3 vertical collinear antenna for 146 MHz and 440 MHz mounted on the eave on the side of his new QTH. After months of having the antenna mounted on the end of a long pole (leaning the pole against the roof), Phil K6PAD offered an old satellite dish-mounting-bracket that provided a perfect mounting solution. The coax comes down the stucco wall and goes nicely through the stucco wall into the "shack" by using an unused satellite coax feedthrough hole. The antenna was installed by Mike AI6WE of Temecula (recommended by Gordo) who did a nice job at a fair price.

Ken – W6HHC

Bioenno Power BPP-H1000 Battery Backup / UPS

by Ken W6HHC

Bioenno Power model BPP-H1000 being tested at QTH of Ken W6HHC

I am aware that California will be suffering from one-hour rotating power blackouts for the next few years….because of the California power generation shortage. I suffered one in August, here in the city of Orange. To solve my problem I needed a Battery Backup / UPS system that would have the capacity to supply at least two hours of DC power for my Kenwood TM-741A rig (about 100 W needed on 144 and 440 MHz while talking) and an AC output to power my internet-modem and WiFi-router (less than 5 watts each) in a UPS mode, I now have a Bioenno Power model BPP-H1000 unit that more than satisfies my requirements. The Lithium battery unit can supply about 1000 W-Hrs of output (a combination of AC output and DC output). It works exactly like I envisioned.

I plan to prepare a technical article for the October RF Newsletter on the Bioenno Power BPP-H1000 unit.

Ken – W6HHC

OCARC Cash Flow - Year To Date

1/1/2020 through 9/1/2020

Category	1/1/2020-9/1/2020
INFLOWS	
Auction In, Jan 2020	1,696.25
Donation - Michael K6GTE	30.00
Donation - N6GP	20.00
Dues, Family (PayPal) 2020	131.78
Dues, Membership (PayPal) 2020	1,292.84
Dues, Membership (PayPal) 2021	101.05
Dues, Membership 2020	568.83
Refunds Received	15.53
TOTAL INFLOWS	**3,856.28**
OUTFLOWS	
Auction Flyer Printing	21.55
Auction Payout, Jan 2020	1,359.23
Donations - Red Cross	250.00
Field Day Winter - Tent Rental	130.00
OCARC Historian	29.29
Opportunity Drwg - Monthly Exp	438.71
PO Box Rental	92.00
Refreshments Expense	32.65
Refund paid	7.50
Storage Locker	475.00
Storage of Equipment - Ann Millard	250.00
Supplies	15.85
Web Site Hosting	101.94
Web Site Hosting - PayPal	183.99
TOTAL OUTFLOWS	**3,387.71**
OVERALL TOTAL	**468.57**

Submitted: Greg Bohning W6ATB, OCARC Treasurer

Heathkit of the Month #102:
by Bob Eckweiler, AF6C

Heathkit

ELECTRONIC TEST EQUIPMENT

Heathkit QM-1
'Q' - Meter.

Introduction:
Home-brewing RF circuits often involves the use of inductors (coils, chokes, toroids, RF transformers and such). In many cases you may be required to "wind your own". There are formulas in the ARRL Handbook that help you figure out the number of turns, the diameter, etc. Usually you still end up with a lot of trial and error iterations before the coil performs as needed. Often you will find an inductor in your junk box but not know its value. Many inductors have no markings or only proprietary markings that tell you little if anything.

The Heathkit QM-1 'Q' - Meter:
The QM-1, shown in **Figure 1,** can measure, within the instrument's range:

- The inductance of an unknown coil.
- The 'Q' of a coil (see sidebar).
- The distributed capacity of a coil.
- The capacitance of an unknown capacitor.

It can make these measurements at the frequency the component will be used at, giving more credence to the results.

The QM-1 was first introduced in an ad in the September 1952 issue of ***Radio News*** for $39.50. That ad ran for eleven pages and the QM-1 was the first kit featured in the ad. The first page listed *"Advantages found only in Heathkits"* and announced *"Nine New Heathkits This Year"*. (In those days Heath

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

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

Figure 1: Front View of the Heathkit QM-1 'Q'-Meter. The unit is shown out of its cabinet.

often announced next year's kits in September.) The second ad page led off with the new QM-1. Overall the ad featured 34 kits for sale (excluding probes and adapters). The nine all-new kits for 1953 were:

1. AG-8 Audio Generator Kit [1]
2. AO-1 Audio Oscillator Kit
3. BT-1 Battery Tester Kit
4. DC-1 Condenser Decade Kit #038
5. GD-1 Grid Dip Meter Kit #007
6. **QM-1** **"Q" Meter Kit #102**
7. RS-1 Resistor Substitution Box Kit #035
8. VC-1 Voltage Calibrator Kit #051
9. VT-1 Vibrator Tester Kit

#nnn signifies the HOtM article that either features or mentions the kit.

SPECIFICATIONS:

Frequency.....150 Kc—18 Mc on 4 bands.
Inductance.....1 microhenry to 10 millihenrys.
Q.....250 Full scale x 1 or x 2.
Capacitance.....Actual 40 mmf—450 mmf
Effective 40 mmf—400 mmf
Vernier ± 3 mmf.
Tubes.....1—12AT7, 1—6AL5, 1—12AU7, 1—6X5, 1—0D3/VR150.
Power.....105-125 Volts AC, 50-60 cps, 30 watts.
Dimensions.....8" high, 17" wide, 6" deep.

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HEATHKIT "Q" meter KIT

features

- *Variable oscillator permits testing at normal frequencies (150 kc–18 mc).*
- *Large 4½" meter mounted in slanted panel for easy reading.*
- *Pre-wound RF coils – all sheet metal formed and punched.*
- *No special equipment required for calibration – test coil furnished.*

The Q Meter is not just a "prestige" instrument to be dusted off each morning when opening the shop or lab. It is fully capable of performing many tasks in a matter of minutes that ordinarily require considerable mechanical and mathematical dexterity. Originally a Q meter was out of the financial reach of the average service shop but now Heathkit ingenuity has brought it into line.

Suspected components and parts being developed or manufactured can be tested at frequencies at which they normally are used (150 kc-18 mc). Wide ranges of inductance, capacitance and Q will cover practically all values encountered. All indications are read directly on a large 4½", 50 microampere, panel mounted meter. Surprisingly easy to use, Model QM-1 will take the guess work out of your electronic efforts.

The Heathkit Q Meter uses a 12AT7 oscillator with pre-wound coils to obtain the full frequency range on 4 bands. Oscillator output is metered to provide constant injection. A complete VTVM circuit is used as a resonance indicator, using a 6AL5 twin diode and a 12AU7 VTVM amplifier. Voltage regulated and transformer operated power supply utilize a 6X5 full wave rectifier and an 0D3 regulator tube. All other components are of the highest quality in keeping with highest Heathkit standards.

Behind the attractive charcoal gray panel with white lettering is a well laid out and factory-formed chassis. No "extras" are required to build or operate this instrument. A special test coil is provided for calibration purposes. Buy it, build it, use it, and if the Q Meter says so, it's so.

$44.50 MODEL QM-1

SHPG. WT. 14 LBS.

APPLICATIONS – Use Model QM-1 in many service, laboratory and development applications. Check peaking coils, chokes, etc., in radio and TV receivers. Determine the values of unknown condensers both variable and fixed. Compile data for coil winding purposes. Measure RF resistance, distributed capacity and Q of coils.

Figure 2: QM-1 ad from the 1956 Heathkit Catalog with schematic and specifications. Note price increase.

The announcement also introduced updated versions of four existing kits:

1. C-3 Condenser Checker Kit
2. O-8 5" Oscilloscope Kit #087
3. T-3 Signal Tracer Kit #009
4. V-6 VTVM Kit #019

The initial delivery of the QM-1 was delayed for a couple of months until Nov. 1952 due apparently to a last-minute design change. **Figure 3** is an image of the QM-1 as shown in the *Radio News* ads of Sept. and Oct. 1952. Note the position of the two large knobs and their associated scales:

Figure 3: Sept. 1952 Image of Early QM-1.

The Nov. 1952 ad shows a redesign of the QM-1 (**Figure 4**). Note that the scales are now below the two large knobs which were moved with their associated variable capacitors upward to just under the binding posts. This was evidently done to shorten critical lead lengths to improve accuracy. While the full reason for the delay was not given, Heath, in their October 1952 flyer commented:

heathkit Q meter kit…
There has been a delay in placing the Q meter in production, but we expect to start deliveries by November 1. It is hard to realize the thousands of hours of engineering time developing a kit of this type consumes.

Figure 4: Nov. 1952 Image of Reworked QM-1.

Hundreds of sets of measurements are made for comparison to correlate with established Q values. Each circuit change necessitated an entire set of measurements. The final version is excellent, however, and well worth waiting for.

In the fall of 1954 the line of Heathkit test equipment underwent a major styling change:

The new instrument panel color combination is high definition white lettering in a soft charcoal panel. Cabinet color is a lighter feather gray.

Chuck Penson WA7ZZE, the author of *Heathkit Test Equipment Products*, calls this style "Classic I". In the introduction to his book[2] he covers the various styling changes of the Heathkit test equipment line over the lifetime of the company, breaking them down into six styles. If you're into Heathkit test equipment, I highly recommend this book.

Other than a change in style, no circuit or model # changes occurred to the QM-1. As part of the styling changes, new style gray knobs were used. These are the same knobs later used on the DX-20, -35, -40 and -100 as well as many early ham accessories. The QM-1 specifications are given in **Table I**.

Power Requirements:	115 VAC 50/60 cps. 30 watts
Tube complement:	See Table IV
Frequency Range:	150 KC – 18 MC
Inductance Scale Range:	1 µH – 10 mH
Actual Capacity Scale Range:	40 µµf – 450 µµf
Effective Capacity Scale Range:	40 µµf – 400 µµf
Vernier Capacity Scale Range:	–3 µµf – +3µµf
"Q" Scale Range:	250 Full scale x1 or x2
Dimensions:	8" H x 17" W x 6" D
Shipping Weight:	14 LBS.

Table I: QM-1 Specifications

The kit continued to be sold for $44.50 until the mid-1960s when the price increased to $54.95. It's last appearance in a main yearly catalog was in 1966.

The QM-1 Control Layout:

The QM-1 is built using a cabinet similar to the IB-2 Impedance Bridge with a sloping front panel. Controls and connections on the top, sloping and vertical front panels are listed in **Table II**. The cabinet rear hosts only the exit of the AC line-cord.

USE "L" SCALE WITH GENERATOR SET TO				
7.9	MC	FOR	1-10	micro H.
2.5	MC	FOR	10-100	micro H.
790	KC	FOR	100-1000	micro H.
250	KC	FOR	1-10	milli H.

TABLE III: Table atop QM-1 for measuring "L"

Atop the cabinet are two pairs of black binding posts on one-inch centers. One is marked L for inductance and the other C for capacitance; each has a 'hi' and 'lo' binding post. These are for the component(s) to be measured. They should be directly connected with leads as short as possible (especially

QM-1 Panel Controls and Connections:

Front Sloping Panel, Top Row (left-to-right):

FREQUENCY: 450 µµf var. capacitor with vernier dial (6:1) and four frequency scales:
- **A**: **150 – 450 kc**
- **B**: **450 – 1,500 kc**
- **C**: **1.5 – 5 mc**
- **D**: **5.0 – 18 mc**

Meter: 4.5" 50 µA with two scales:
- **Q** **0 – 250** (no units)
- **MULTIPLY Q BY X1, X2**: (These are level set-lines on meter used for calibration [a])

RESONANCE: 450 µµf var. capacitor with vernier dial (6:1) and three scales:
- C_T **450 – 40 µµf**
- C_E **425 – 40 µµf**
- **L** **1 – 10** (X1, X10, X100 µH, X1 mH [b])

Front Sloping Panel, Bottom Row (left-to-right):

RANGE: 2 pole, 4 position Rotary switch: **A, B, C, D**.

SET LEVEL: 3 KΩ pot w/switch at CCW position. **AC OFF** full (CCW). no scale, arrow around control.

SET ZERO: 10 KΩ pot, no markings.

Meter: 2-pole 2-position rotary switch: **CAL, "Q"**

VERNER: 7 µµf variable capacitor. **+ 3 +2 +1 0 -1 -2 -3** with ½ µµf tic marks.

Top Panel: (4 binding posts above RESONANCE knob.)

L (hi) left-front
(lo) left-rear

C (hi) right-front
(lo) right-rear (ground)

Front Vertical Panel, centered

pilot light

Notes:
a. Marked in RED on the meter face
b. Depends on frequency setting. See text).

Table II

with inductors). A table on the left side of the top gives settings for measuring inductance. **Table III** is a reproduction.

QM-1 Construction:

The QM-1 came out early in the long history of the development of the soon to be famous Heathkit manual. In the early QM-1 manual dated 11/5/1952 only one page of the manual (page 3) covers construction of the kit. Construction is supported by three pages of drawings with copious notes in the drawings. These drawings, along with the schematic, also came in a large pictorial size to tape above the work area. There is no step-by-step assembly procedure to guide you. A lot is left to the builder to understand. For instance six sets of #3-48 hardware (screw, lock washer and nut) are provided, but nowhere are you told where to use them. (They mount the three miniature tube sockets, and are probably the only hardware that would fit.) On that single page of construction Heath recommends: *Assemble the generator sub-chassis, the "Q" sub-chassis, the main chassis and the panel separately. Wire the first three parts as far as possible, then mount both sub-chassis on the main chassis and complete the wiring between these parts. Attach the panel to the chassis and complete the wiring.* That is one of the three paragraphs on page 3 covering construction. The page also has two construction notes and a few diagrams, such as one showing the tube socket numbering. A later, 9/18/1964, manual still did not give step-by step instructions, though manuals with that feature were being provided with all the newer kits. It appears there never was a Q-1 manual with step-by-step assembly instructions.

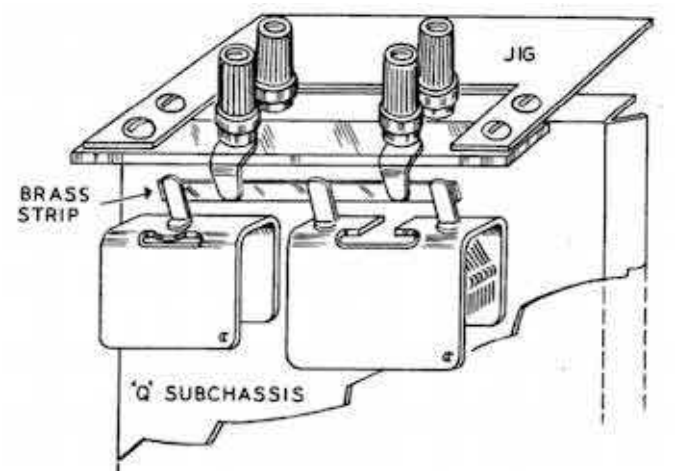

Figure 6: Manual drawing (circa 1960) showing low inductance connection between capacitors and Binding posts. Note use of a jig to align the brass strip.

A critical part of construction is the connections to the **RESONANCE** and **VERNIER** variable capacitors. To keep leads as short as pos-

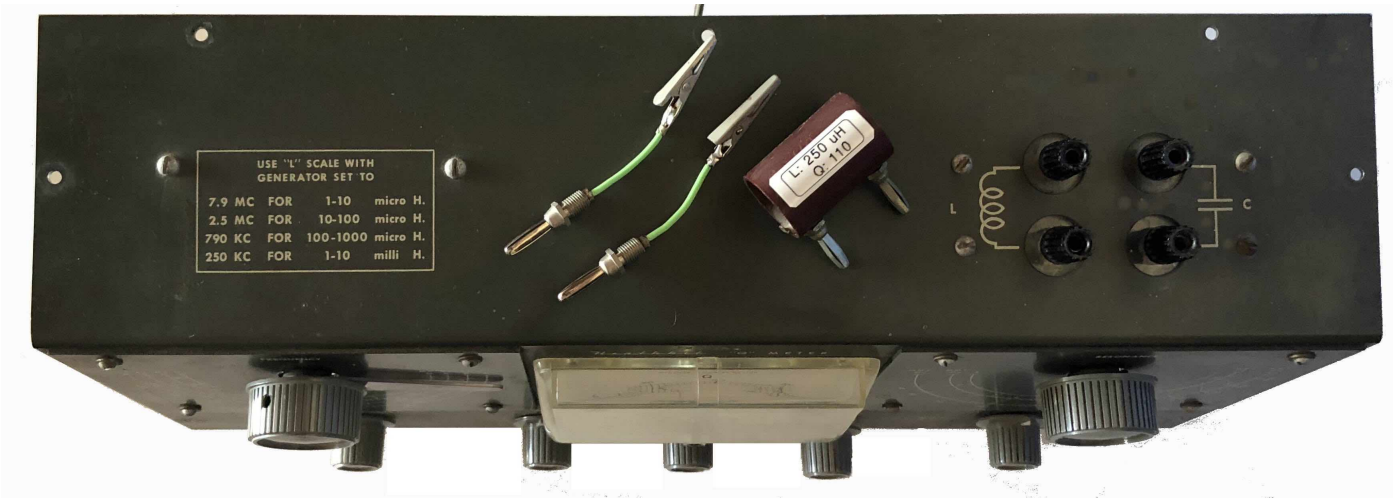

Figure 5: Top View of the Heathkit QM-1 'Q'-Meter. Sitting on top is the Heath supplied test coil used for calibration and a pair of homemade test leads. The unit is shown out of its cabinet.

Figure 7: Rear view of the QM-1 chassis. On the left is the resonance sub-chassis; on the right is the RF generator sub-chassis. the power supply, and meter are located between the sub-chassis.

sible Heath moved these capacitors to a point where they could be connected to the binding posts using a straight low-inductance brass strip. Early on, the physical alignment of these components was done using the panel temporarily fastened inverted to the 'Q' sub-chassis to act as a template. Later on, Heath supplied a metal jig to provide better alignment (see **Figure 6**). Pulleys and dial cord allow the VERNIER capacitor to be placed closely alongside the RESONANCE capacitor and still have its control knob located below.

QM-1 Calibration:

Checkout and calibration of the QM-1 is covered on page 4 of the 16 page manual. The QM-1 comes with a test coil (Heath part #: 40-23). If you decide to purchase a QM-1 be sure this part is included. Store it plugged into the 'L' binding post terminals when not in use so you don't lose it. Marked on the test coil is its inductance, equivalent capacitance and Q. On mine they were scratched into the cover and hard to read after all these years, so a label was added. The test coil provided was marked with an inductance of 250 µH, a 'Q' of 110, and a CE of 96 µµf [3]. This coil is used for calibration. This one measured very close to specification in a qualified cal lab.

Calibration is done in two stages. First the RF generator section is calibrated by setting it to zero beat with a known broadcast signal

QM -1 Tube / Diode Line-up

No.	Tube	Type	Function
V1A	½-12AT7	Triode	RF Oscillator
V1B	½-12AT7	Triode	Buffer-Follower
V2A	½-6AL5	Diode	'Q' Rectifier
V2B	½-6AL5	Diode	Balance Rectifier
V3A	½-12AU7	Triode	VTVM (Differential
V3B	½-12AU7	Triode	Amplifier)
V4	0D3/VR150	Gas-VR	150 V Regulator
V5	6X5	Dual Diode	Full-wave Rectifier
D1	HD2257	Ge Diode	Crystal Signal Rectifier

Table IV: QM -1 Tube / Diode Line-up

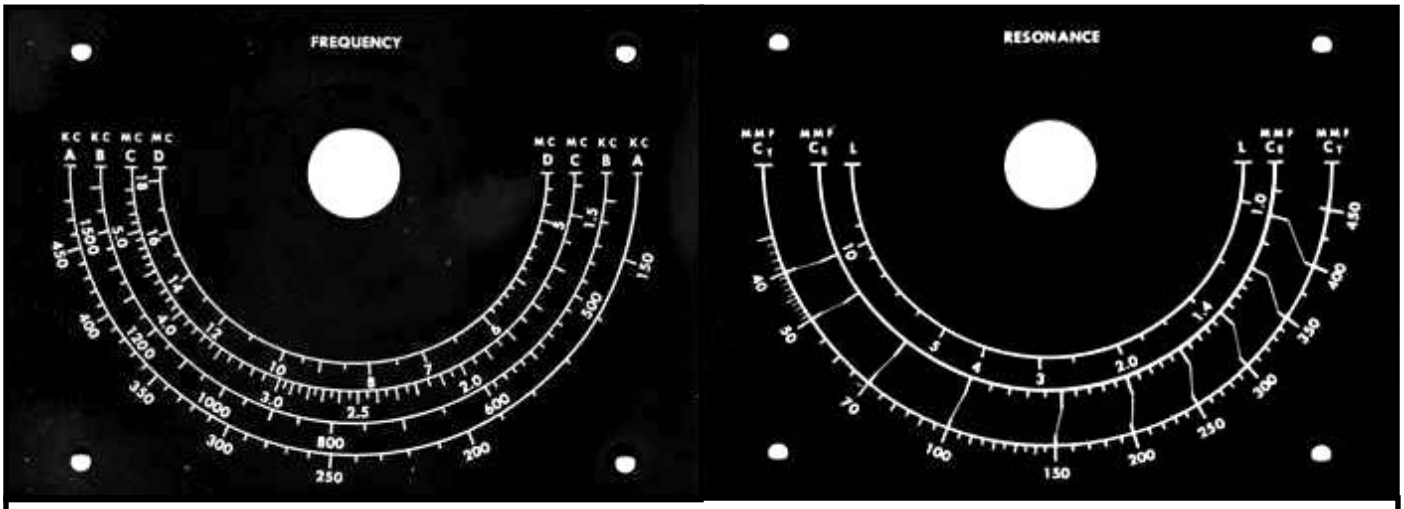

Figure 8: On the left is the FREQUENCY dial showing the four bands. On the right is the RESONANCE dial showing the three scales, Inductance 'L', CE - Capacitance (equivalent) and CT - Capacitance (actual). CE is used to determine the distributed capacitance of an inductor; it is the capacitance of the RESONANCE capacitor in series with the 5000 µµf padder capacitor and corrected for stray capacitance.

in the 1200 through 1500 kc range on band B. This is done using trimmer C2 located on the generator sub-chassis. Heath states that this should result in the calibration being within 3% on all four bands. If you have a general coverage receiver that has a crystal calibrator (or better) you may easily check the accuracy on the other bands.

To calibrate the 'Q' section, first be sure the meter mechanical zero is properly set with the power off. Then set the generator frequency to 1000 kc and, with the test coil plugged into the 'L' terminals, switch the CAL-'Q' meter switch to **CAL** and, with the **SET LEVEL** control at minimum, adjust the **SET ZERO** control until the meter is on zero. Now advance the SET LEVEL control until the meter is over the red **X1** mark. Move the CAL-'Q' meter switch to '**Q'**; adjust the RESONANCE control for maximum meter deflection; then adjust trimmer (C8) till the meter reads the 'Q' indicated on the test coil. Finally, loosen the pointer on the RESONANCE control and move it on its shaft until the pointer is over the CE value given on the test coil. Be sure to use the middle CE scale.

The QM-1 Circuit:

Figure 11 is a schematic of the QM-1, and **Table III** shows the tube line-up. The QM-1 can be broken down into three sections, the power supply, the RF generator sub-assembly and the resonance sub-assembly which includes the VTVM circuit.

The Power Supply:

The power supply is transformer based. The 420 VCT 60 mA HV secondary winding is full-wave rectified by V5 and filtered by C14A, R14 and C14B to produce about 210 volts DC relative to the HV secondary center-tap. The 6.3 Vac., 2.8 A filament secondary winding lights four tube heaters plus the pilot lamp. A 5.6 Ω 1-watt resistor[4] (R16) in series with the 6AL5 rectifier tube drops its filament voltage down to under 5 Vac. Running the 6AL5 at a lower filament voltage lowers the cathode contact potential and improves small signal linearity.

An OD3 (VR150) voltage regulator tube regulates a voltage source to 150 Vdc. Since the HV secondary center tap is connected to ground via R17, which makes up a voltage divider with the overall circuit resistance,

the center tap is at –70 Vdc, and since it is connected to the cathode of the VR tube the anode of the VR tube is at +80 Vdc. This negative voltage is used for the VTVM circuit. Thus the power supply has three outputs, referenced to ground: +140 Vdc, +80 Vdc and -70 Vdc.

The OD3 VR150 tube has a jumper between pins 3 and 7. This jumper is there to disable a circuit should the tube not be in place. This jumper is used by Heathkit likely to prevent meter damage should the VR tube be removed and power applied. Heath actually wired the AC primary to the transformer through the jumper so the power could not be turned on[5] without the tube in place.

The RF Generator:

V1A, ½-12AT7 triode is wired as a Hartley oscillator. The frequency range is determined by one of four coils that is switched into the circuit by the **RANGE** switch. That coil, the 450 μμf vernier-driven **FREQUENCY** control C1, and a parallel calibration trimmer C2, determine the frequency. The SET LEVEL control (R3) adjusts the plate voltage of V1A setting the RF level.

V1B, ½-12AT7 triode is a cathode follower isolating the load from the oscillator section. Low impedance RF voltage appears across R5 and is fed to the resonance section.

A sample of the RF voltage is coupled through C7, rectified by the crystal diode D1, filtered by R6 and C6 and, with the CAL-'Q' meter switch in CAL, the RF voltage is read on the meter.

The Resonance Circuit & VTVM:

To measure 'Q', a coil is resonated with a capacitance at a frequency set on the RF generator. The capacitance is the sum of the RESONANCE capacitor, its VERNIER capacitor and any additional capacitance that may be added across the 'C' terminals (along with any stray capacitance.

The inductor is placed across the 'L' terminals. C9 is a special, very low-inductance injector padder capacitor, that is also in the circuit, effectively in series with the resonance capacitance. Due to its large size (5000 μμf) compared to the resonance capacitance, C9 has little effect on resonance. A small value trimmer capacitor, C8 injects RF into the circuit. Due to its small value, and due to

Figure 9: Side view of Resonance sub-chassis.

the RF voltage being set to a fixed level on the meter, it produces a nearly constant injection current. This trimmer is adjusted to calibrate the 'Q' section of the instrument.

The RF voltage appearing across the coil is practically the same voltage that appears across the capacitor due to the large size of

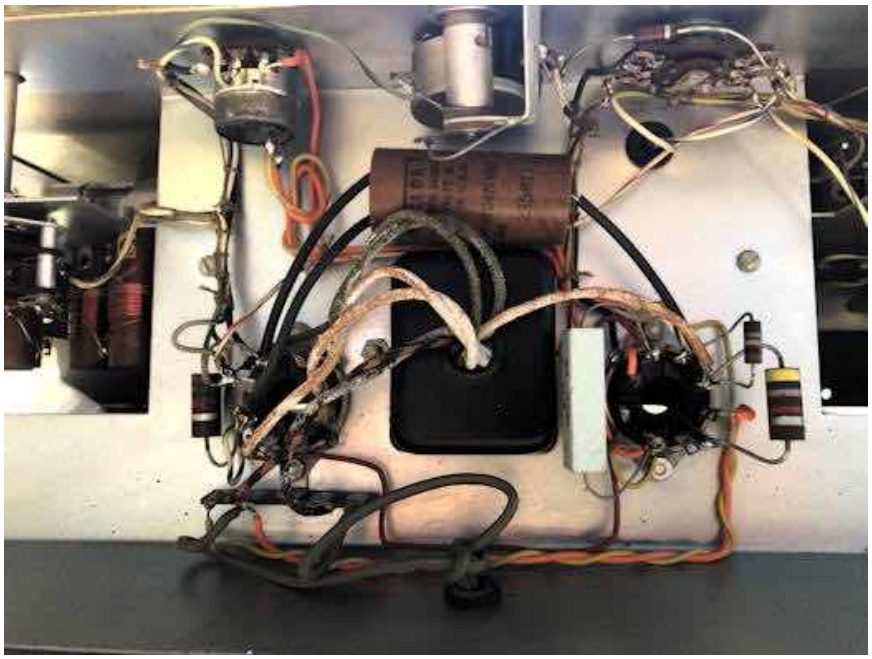

Figure 10: Bottom view of main chassis The 6X5 rectifier is the right octal socket and the VR tube socket is on the right.

C9. This voltage is rectified by V2A and is fed to the the VTVM differential amplifier.

The more efficient the resonant circuit is, the higher the voltage across the coil will be. Losses will result in lower voltage. With the input signal calibrated, the VTVM will record the 'Q' of the circuit. Since the coil usually has the highest losses by a significant amount the circuit Q can be assumed to be the Q of the coil. There are exceptions to this, such as the use of very high Q coils with low capacity settings which are discussed in the manual.

The assumption that the resonance capacitance is small compared to the injector padder, C9, is not true under all situations. Should a large capacitance be used across the C terminals it needs to be taken into account; this also is discussed in the manual.

The VTVM part of the instrument consists of a differential amplifier made up of triodes V3A and V3B. Their cathodes are tied together after the SET ZERO circuit which in turn is connected to a constant current source of about 700 μA set by R18 and the minus 70 volt source. If no input is present an identical current of about 350 μA flows in each leg of the amplifier Any circuit imbalance due to component tolerances may be corrected by the SET ZERO control. When the CAL-'Q' meter switch is set to 'Q', the 50 μA meter is connected between the cathodes of V3.

When a negative voltage is applied to the grid of V3A its cathode current is reduced forcing V3B current to rise. This causes a difference in cathode voltages causing the meter to move upscale in relation to the voltage applied to the grid. The grid of V3B is connected to a circuit identical to the grid of V3A except for the resonance circuit input. V2B helps balance out any contact potential errors created by V2A.

QM-1 Operation:

It is highly suggested that one purchase or download the manual before attempting to make measurements with the QM-1. There are formulas and calculations that need to be made for some of the measurements; none are really difficult. The manual includes step-by-step instructions for making the measurements noted in the section following the introduction. **The CAL-'Q' meter switch should be placed in the CAL position whenever connecting a coil or capacitor to the binding posts.**

Measuring Inductance:

To measure the inductance of an unknown coil use the table printed atop the QM-1 (reproduced in this article as Table II). Start by

setting the RF generator to one of the four frequencies using an approximation of which of the four decade ranges the coil inductance is in. Connect the coil and adjust the RESONANCE control for the maximum reading. Read the inductance on the L scale using the correct power of ten multiplier given in the table. If no peak is found try a different frequency range.

Measuring the "Q" of a coil:

Connect the coil to be measured between the two L binding posts. In the generator section, set the generator to the desired frequency. Turn the CAL-'Q' meter switch to CAL, and with the SET LEVEL control at minimum, zero the meter with the SET ZERO control. Now, adjust the SET LEVEL control until the meter is over the red X1 mark. Move the CAL-'Q' meter switch to 'Q' and adjust the RESONANCE control for the maximum meter reading. Read 'Q' on the meter. If the meter reads off scale, repeat using the X2 instead of X1 mark, and be sure to multiply the 'Q' meter reading by two.

Measuring Distributed Capacitance of a Coil:

Connect the coil to be measured between the two L binding posts. Set the RESONANCE control to a small convenient value; the manual recommends 100 µµf on the C_E scale. Record this value as C_A. Set the CAL-'Q' meter switch to 'Q' and adjust the generator section for maximum meter reading. Now change the generator to one-half the frequency it was at to achieve the maximum meter reading. Adjust the RESONANCE control to give maximum indication on the meter.. Note the new capacitance on the C_E scale, and record this value as C_B. The distributed capacitance (C_D) may be obtained from the formula:

$$C_D = \frac{C_B - 4C_A}{3}$$

WHAT IS 'Q'?

Certain passive electronic components such as capacitors and inductors store energy. These devices have a 'Q' or quality factor associated with them. 'Q', which has no units (Ω/Ω), measures the efficiency at a given frequency. 'Q' is defined as the reactance X at a given frequency divided by the effective resistance R. Since Xc is negative the absolute value is used.

$$Q = \left| \frac{X}{R} \right|$$

The effective resistance is made up of everything in the component that contributes to energy loss. Capacitors generally have high 'Q' values at frequencies in the HF range and can be ignored. Not so with inductors; while wire resistance plays a major role, so does skin-effect at higher frequencies as well as core losses. Skin effect is the loss of cross-sectional area of the wire due to the tendency of RF to travel closer to the surface of the wire as the frequency increases, raising the RF resistance. Core losses are losses developed in any core material used to increase inductance (ferrite, powdered iron, brass, etc.)

The manual comments: *Note: While this method is not completely accurate, it will suffice in most cases. The accuracy may be increased by repeating the measurement with different values of C_A and averaging the results.*

Measuring Capacitance:

Instructions are also given in the manual for two ways to measure capacitance. One is for capacitors below 425 µµf and down to less than 1 µµf. And the other is a rather complex procedure for capacitors above 425 µµf, up to a few thousand µµf. This second procedure is available in the manual and will not be covered. Suffice it to say it would be a lot easier to measure the capacitance on a capacitor checker such as the Heathkit IT-11 or IT-28.

Capacitances Below 425 µµf:

Connect a test coil between the two L binding posts. Connect the capacitor to be measured between the two C binding posts. Set the RESONANCE control to a small convenient value; the manual recommends 40 µµf on the

CT scale. Record this value as CA. With the meter switch at 'Q', adjust the generator section for maximum reading on the meter. Remove the unknown capacitor and readjust the RESONANCE control for maximum indication on the meter. Record this value as CB. Calculate CX. the unknown capacitor, using the formula:

$$C_X = C_B - C_A$$

For small capacitances, less than 3.5 μμf, use the VERNIER control and read it directly.

Summary:

The QM-1 shown in the photos is currently undergoing restoration. Parts are on order including two 10 μf electrolytic capacitors to replace the dual 8 μf 475 V filter capacitor C14, as well as new resistors to replace R14 through R17 in the power supply section which measured out of tolerance. A few other out of tolerance resistors are also slated for replacement throughout the unit.

The major problem encountered with this QM-1 is the vernier drive on the FREQUENCY and RESONANCE controls. Each variable capacitor has the drive built-in to it. Their lubricant dries out after decades. and the concentric shafts stick together destroying the vernier effect.

When the QM-1 was first obtained both verniers were frozen. With A LOT of work they were freed up, but the fix only lasted a few years. This time they were cleaned up and the old hardened grease was removed and replaced with new white lithium grease. Hopefully they should continue to function for a decade or two. When the QM-1 is restored and functioning, a restoration article will likely be written, and it will include the technique used to free up and re-lubricate the vernier drives.

Notes:

1. The AG-8 was preceded by the AG-7 which was a sine-square wave generator which was a different instrument than the new AG-8. No AG-1 through AG-6 existed. Heath had earlier G-1 to G-5 kits that were generators of various types (RF, audio, sweep) and decided to give them each their own product prefix AG for audio, SG for RF and TS for TV sweep.
2. ***Heathkit Test Equipment Products*** by Chuck Penson - WA7ZZE. ISBN 2014, 978-0-615-99133-7, available from amazon.com.
3. All the Heath test coils (40-23) provided with the QM-1 found so far appear to have these same parameters.
4. R16, a 5.6 Ω 1-watt resistor in series with the 6AL5 heater should be checked and replaced, as it has probably increase significantly in resistance since new.
5. Use caution around the V4 tube socket. When plugged in, even though the power switch is off, there may be AC line voltage present.

Don't Forget to Vote:

Election day is fast approaching. It is amazing that so many people don't exercise their right to vote. In some states, even for a presidential election, the turnout is significantly below 50%. As the saying goes, ***Use it or lose it.*** And folks. we are closer than ever to losing it. Choose your candidate carefully; remember it's your choice alone, and then cast your ballot on or by election day. You must be a US citizen and you must be registered.

73, from AF6C

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

Thanks - AF6C

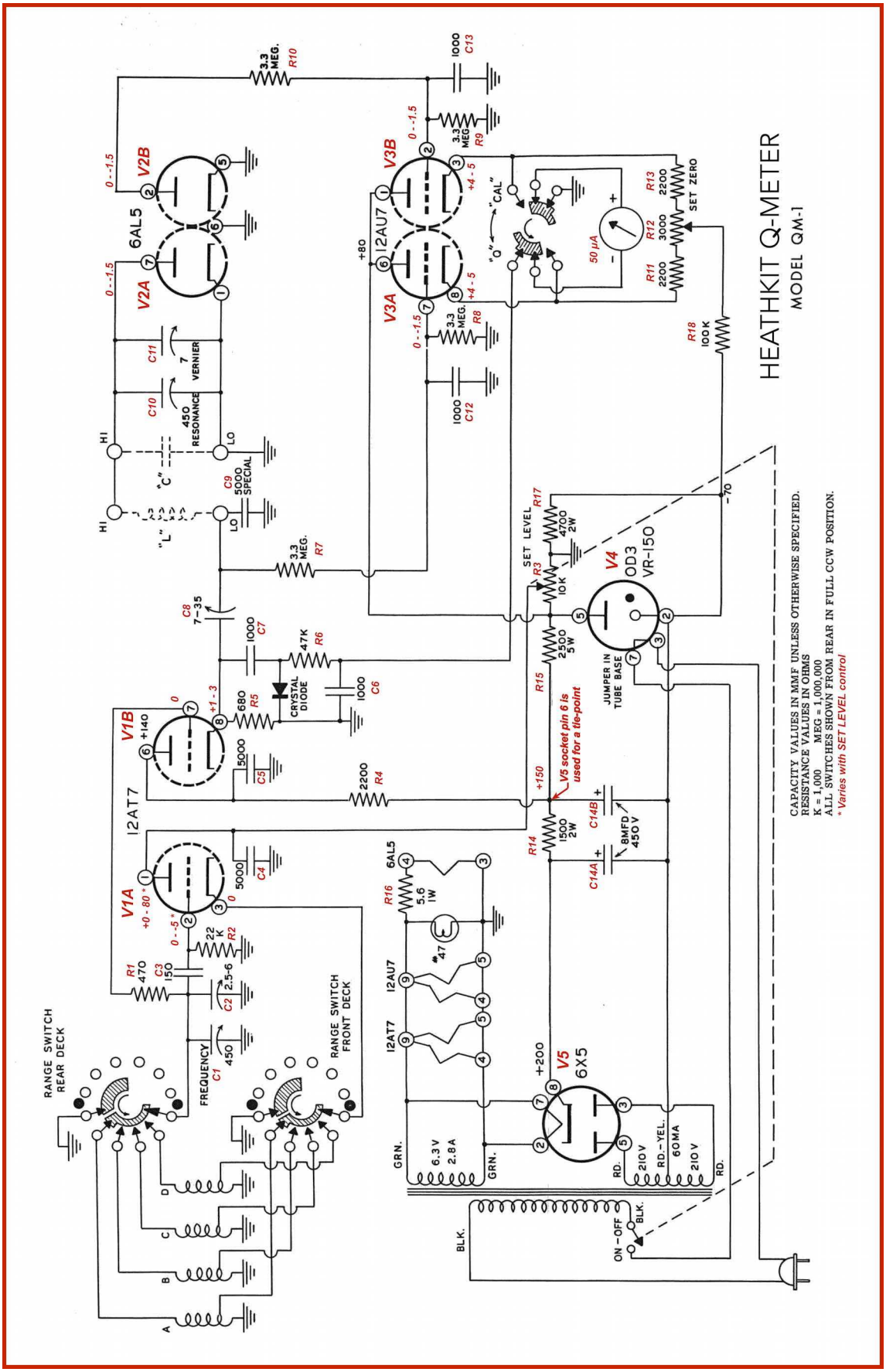

Figure 11: Heathkit QM-1 Schematic

THE
BYLAWS
of the

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

A California Nonprofit Corporation

Incorporated June 4, 1960

Rewritten: October 1993: adopted: April 15, 1994

Draft G: August 5, 2020

Table of Contents

ARTICLE I OBJECTIVES

The objectives of the club, to be known as the Orange County Amateur Radio Club, are:

A. To promote interest in and the advancement of amateur radio, and electronics in general.

B. To promote a good relationship between radio amateurs and the public through public service activities.

C. To help interested persons to obtain a license and new licensees to upgrade.

D. To participate in activities involving or for amateur radio.

ARTICLE II MEMBERSHIP

A. Members shall be of good moral character who have an interest in amateur radio and/or electronics, and have an interest in the aims of the club. Such persons may, upon application and prepayment of dues, become members of the club, provided any other requirements of the Bylaws are met.

B. Yearly dues for members are due and payable on January 1 of each year. Nonpayment of dues by March 31 constitutes forfeiture of club membership. The amount of dues shall be:

The base rate amount of yearly dues shall be determined by the Board of Directors for the coming year, no later than the November Board meeting preceding the beginning of the coming year. If no action is taken by the Board, then the base rate will not change in the coming year.

1. Dues for members 20 years of age or older, are 100% of base rate.

2. Dues for members 19 years or younger, are 50% of base rate.

3. For additional members in the same household as a member who has paid full dues, half of the full dues for his/her age group.

4. For new members joining during the year, dues shall be prorated on a quarterly basis for the remainder of the calendar year.

C. Each member after admission shall receive a dues receipt signed by the treasurer.

D. Each member is responsible for notifying the Membership Chairman of a change of address.

E. The Board of Directors may expel or suspend a member by unanimous vote at a Board meeting under the following conditions:

1. Failure to discharge his debts to the club other than dues.

2. Conduct detrimental to the welfare, interest, character, or order of the club.

3. Conviction of a violation of the FCC rules when such results in the suspension or cancellation of the amateur license.

4. Conviction of a felony under the laws of the State of California or of the United States of America.

F. The Board of Directors may reinstate any expelled or suspended member by a unanimous vote at a Board meeting.

G. Members who have been expelled or suspended or who voluntarily withdraw from the club have no recourse on club assets or property; real or otherwise.

H. Honorary membership may be given to any person under the following conditions. Honorary members shall not be able to vote, or hold office,

1. Nomination for honorary membership may be made by any club member during the good of the club portion of any Board or regular club meeting.

2. Honorary membership shall require a two-thirds affirmative vote of the Board and shall be for a period not to exceed 24 months and shall expire on December 31.

3. Honorary membership may be renewed for an additional period by voting as stated above during the last 3 months of the membership.

4. The Membership Chairman shall maintain a list of all honorary members.

ARTICLE III MEETINGS

A. Regular meetings of the club shall be held monthly at designated times and places. All meetings shall be open to all interested members. Special meetings may be called by the Board when necessary.

Notices of regular and special meetings shall be sent to each member within a

reasonable time prior to each meeting. Notices of special meetings shall contain a list of important items on the agenda. Robert's Rules of Order (revised) shall govern club meetings when it does not conflict with these Bylaws.

The order of business at the regular club meetings shall be as follows unless circumstances dictate otherwise.

1. Call to Order - The president shall call the meeting to order.

2. Lecture or Entertainment - The vice president shall introduce the speaker or entertainment for the meeting.

3. Roll Call of Officers - The secretary shall call roll by title and record the officer attendance in the minutes.

4. Reading of the Minutes - The secretary shall not be required to read the minutes of the previous meeting if they were published in the club bulletin. The president shall ask for a motion and a vote to approve the minutes as published. Any corrections or additions may be made by a member and be approved by the members present.

5. Introduction of Members - The membership chairman shall introduce any new members present.

6. Introduction of Visitors- The president shall introduce any visitors present at the meeting. A visitor log shall be made prominently available for signing by the attendees, at the beginning, and for the duration of the meeting. The visitor log shall be retained in the permanent records of the membership chairman.

7. Board Member Reports - The president shall ask for any Board Member reports.

8. Old Business- The president shall bring up items of old business for further or final action.

9. New Business - The president shall ask for any items of new business for the club.

10. Good of the Club - The president shall ask if there are any items of interest to the club.

ARTICLE IV DIRECTORS

A. Subject to the limitations of the Articles of Incorporation, the Bylaws, and the California General Corporation Laws, all corporate powers shall be exercised by and under the authority of, and the business and affairs of the corporation shall be controlled by a Board of Directors. Without prejudice to said general powers, and subject to the stated limitations, the Directors shall have the following powers:

1. To select or remove all other officers or agents of the corporation. To prescribe the powers and duties for them as are consistent with the corporation and to require from them faithful service.

2. To conduct, manage, and control the affairs of the corporation, and to make rules and regulations as they deem best. To borrow money for the purposes of the corporation.

3. To change the principal office of the corporation, to designate a place for holding meetings.

B. The number of Directors of the Corporation shall be ten (10) or more until changed by an amendment to the Articles of Incorporation and a change to the Bylaws (See Article IX, Section B).

C. It shall be the duty of the Directors to insure that a complete record of all proceedings of all meetings be kept, and to present a full statement at the regular meetings showing the assets and liabilities of the club and the general condition of its affairs.

D. It shall be the duty of each director to receive a copy, read, and understand this document.

ARTICLE V ELECTION OF OFFICERS AND DIRECTORS

A. The officers of the club shall be President, Vice President, Secretary, Treasurer, Activities Chairman, Public Relations Officer, Technical Committee Chairman, and Membership Chairman. The other two board members, designated as Directors at Large, shall be the preceding president and/or the preceding vice president. If either or both are elected to another office or decline the position, nominations are accepted to fill the vacancies. All Directors shall be holders of a current FCC Amateur Radio License, and shall be at least 21 years of age. No officer shall hold the same office for more than two (2) consecutive terms. A term consists of 6 months or more in office.

B. The officers shall be nominated and elected one office at a time from the floor at the regular November meeting. Individual candidates may be nominated to one or two offices. A candidate may be elected to only one office. Election shall be made in order of higher to lower precedence in Article V, section A. Election shall be by secret ballot if there are two or more candidates for any elective office, or by show of hands if there is only one candidate. The new officers shall assume their offices at the first scheduled meeting in January of the next year.

C. Vacancies occurring on the Board during the year shall be filled at the next regular meeting by nomination and election from the floor. The new officer shall immediately assume office for the balance of the term.

ARTICLE VI DUTIES OF OFFICERS

A. PRESIDENT- It shall be the duty of the president to:

1. Preside over all regular, Board, and special meetings of the club.

2. Direct the affairs of the club subject to the advice of the Board and the requirements of the Bylaws.

3. Appoint a Finance Committee of 2 or more members to audit the club account books. Appoint all other committees not provided for herein or elsewhere.

4. Sign as required, all contracts or written instruments on behalf of the club.

5. Represent the club for social or business contacts when required.

6. With approval of the Board, have sent flowers or other appropriate gifts to ill or hospitalized members, or to the family of a deceased member.

7. Perform incidental duties not herein specified.

B. VICE PRESIDENT- It shall be the duty of the vice president to:

1. Act in the absence of the president at all club functions and perform all duties of the president herein described.

2. Arrange for the speaker or entertainment for each of the regular club meetings.

3. Perform other duties required by the president or the Board.

C. SECRETARY- It shall be the duty of the secretary to:

1. Keep a written record of all proceedings of all regular, Board, and special meetings. Provide a copy of each record to the editor of the club bulletin for publication.

2. Receive and send all club correspondence. Read all correspondence of general interest to the members at a regular or Board meeting.

3. The secretary shall be responsible for a PO Box key, verify regular access and collect mail, as required.

4. Perform other duties required by the president or the Board.

D. TREASURER - It shall be the duty of the treasurer to:

1. Keep a written record of all monies received or expended by the club. Initiate checks for normal monthly expenses and have them properly signed. Checks for $250 or less or for normal expenses [Note: "normal expenses" are expenses that tend to recur from year to year] may bear one authorized signature. Checks for expenses over $250, that are not for normal expenses, shall have either the approval of the Board or the approval of the club membership at a general meeting.

2. The treasurer shall report the monthly cash flow of the club in the newsletter.

3. Maintain the club's bank accounts at banks approved by the Board. A signature card shall be kept by the bank showing the signatures of the president, vice president, and treasurer.

4. Issue dues receipts as required.

5. Maintain an accurate list of all physical assets of the club and their present location

6. The IRS requires all 501(c)(7) Non-profit Corporations to file an online FORM 990-N questionnaire yearly; after the close of the fiscal year and before the following May 15. The treasurer shall go to the www.IRS.gov internet site and submit a FORM 990-N (e-Postcard) or later form.

7. The State of California requires small California tax-exempt organizations to file a Form 199 with the Franchise Tax Board by the 15th day of the 5th month after the close of the organization's tax year. The treasurer shall file this Form 199 in a timely manner. If the club normally has annual gross receipts of $50,000 or less, the treasurer may complete this requirement by submitting a Form 199N, commonly referred to as the "e-Postcard," with no cost to file.

8. The State of California requires all 501(c)(7) Non-profit Corporations to file a Statement of Corporation, FORM SI-100 (or later form), every two years (during even years). The treasurer shall file a FORM SI-100, with an appropriate check for the state fee, before August 01 of even-numbered years.

9. The treasurer shall be responsible for a PO Box key, verify regular access and collect mail, as required.

10. Perform other duties required by the president or the Board.

E. ACTIVITIES CHAIRMAN - It shall be the duty of the activities chairman to:

1. Organize club activities with assistants of his choice for the enjoyment of the members.

2. Obtain prizes for and run the raffle at each of the regular club meetings. Select prizes of general value to radio amateurs and when possible solicit prize donations from retailers or manufacturers. Strive to maintain a net positive cash flow from the raffle activities.

3. Provide refreshments, with assistants of his choice, at each of the regular club meetings.

4. Help with the organization of the annual Field Day.

5. Perform other duties required by the president or the Board.

F. PUBLIC RELATIONS OFFICER - It shall be the duty of the public relations officer to:

1. Prior to each regular club meeting, provide~~,~~ with the assistants of his choice~~,~~ adequate seating for the members.

2. Welcome members and visitors to the meeting and answer any questions they may have about the club.

3. Contact and get published in local newspapers, as needed, announcements of club activities such as Field Day.

4. Perform other duties required by the president or the Board.

G. TECHNICAL CHAIRMAN - It shall be the duty of the technical committee chairman to form a committee, if needed, to:

1. Assist members with technical problems relating to equipment setup, operation, and interference.

2. Assist members to obtain and/or upgrade their licenses. When sufficient interest exists, hold classes for code practice and theory.

3. Perform other duties required by the president or the Board.

H. MEMBERSHIP CHAIRMAN - It shall be the duty of the membership chairman to:

1. Maintain to date, an accurate roll of all honorary, paid-up and other members.

2. After the March regular meeting, prepare a list of honorary, paid-up and other members including name, call, address, telephone number, and electronic mailing address, with member password-protection, and submit this list to the webmaster for posting on the club web site in April and to the club historian.

3. In the month before the end of his term, prepare a list of honorary, paid-up and other members including name, address, telephone number, and electronic mailing address, and submit the list to the appointed webmaster for posting on the club web site with member password-protection, to the club historian, and to the membership chairman elected for the following term.

4. Bring at least one copy of the most recent club bulletin to the regular club meetings for attendee perusal.

5. Perform other duties required by the president or the Board.

I. DIRECTORS AT LARGE - It shall be the duty of the Directors at Large to:

1. Be available to head up special committees or accomplish tasks at the discretion of the Board.

2. If a Director at Large was the preceding president or the preceding vice president, provide sage advice from their leadership experience, therefore promoting the continuity of the Club.

3. This position can be also used as an entry level position on the Board, as the workload of it is generally less than some of the others.

ARTICLE VII COMMITTEES

A. FINANCE COMMITTEE - The president shall appoint a finance committee consisting of two or more members at the December Board meeting whose duty shall be to audit the club account books and report their findings to the club at the January meeting.

B. FIELD DAY COMMITTEE - The president may appoint a field day committee to organize and run the annual field day.

C. NOMINATION COMMITTEE - The president may appoint a nomination committee to propose a slate of candidates for club offices for the next year.

D. SPECIAL COMMITTEES - The president may appoint special committees for a specific purpose or for the good of the club.

ARTICLE VIII LONG TERM APPOINTMENTS

Long term appointments shall be made by the president when necessary. These appointments shall be for an indefinite period preferably for several years, and should only be given to members who are able to perform the specific requirements of the job.

A. CLUB HISTORIAN - The club historian shall maintain records and all other items of historical value to the club. He shall be responsible for recording changes to the Bylaws as they are approved.

B. LICENSE TRUSTEES - The club license trustees shall each hold a General or higher amateur license. ~~He~~ They shall be responsible for the club calls, W6ZE, in memory of Earl Griffin, a long time club member who died in 1956; and W6NGO, in memory of Kei Yamachika, a long time club member who died in 1997. The license trustees shall file renewal forms with the FCC when required.

C. WEBMASTER - The Board shall appoint a club webmaster to oversee the administration and upkeep of a club website while the OCARC operates a website. The webmaster may appoint other club members to assist in the maintenance and programming for the site. The webmaster shall assure that the website content remains up-to-date and focused on club interests. The webmaster shall also coordinate issuance of club email addresses (using the w6ze.org domain) for club members, as needed.

D. OTHER - Other appointments may be made as necessary, such as club net control operators.

ARTICLE IX AMENDMENTS

A. These bylaws may be amended by motion at a regular club meeting by a two-thirds affirmative vote of the members present provided that the proposed amendment has been presented to the membership at two consecutive general club meetings.

B. To reduce the number of Directors to less than ten shall require an amendment obtaining a written consent or affirmative vote of at least 80% of the members.

AMENDMENTS

AMENDMENT A
Rewritten 10/1993; adopted 4/15/1994

AMENDMENT B
Adopted 1/15/1999 and 2/19/1999

AMENDMENT C
Adopted 11/2000

AMENDMENT D
Adopted 11/2003

AMENDMENT E
Adopted 11/2008

AMENDMENT F
Adopted 01/2012

AMENDMENT G
Adopted --/----

1. Article III, Section A, shall update mailing of notices of meetings to sending of notices.

2. Article III, Section A, Treasurer's Report, shall move the financial report from presenting at the meetings, to Article VI, Section D, Treasurer.

3. Article III, Section A, shall change the attendance sheet procedure, change Committee Reports to "Board Member Reports," and remove Communications.

4. Article IV, Section A, remove outdated director corporate seal powers, remove the 5-year license requirement for Board members, and clarify term limit to two (2) terms.

5. Article V, Section B, elections shall provide for same nominee to two offices, and remove old Section C,

6. Article VI, Section C, Secretary, add PO Box key responsibilities.

7. Article VI, Section D, Treasurer, add duties for IRS Form 199, remove corporate seal duty, and add PO Box key.

8. Article VI, Section E, Activities Chairman, shall remove suggested activities.

9. Article VI, Section G, change “Technical Committee Chairman” to “Technical Chairman,” remove TVI duties, and add interference assistance.

10. Article VI, Section H, Membership Chairman, clarify duties to include honorary members, electronic mailing addresses, password-protection of membership list, and change the newsletter mailing to the web site.

11. Article VI, Section H, Membership Chairman, add duty to prepare a list of members before the end of his term, and send it to the webmaster, club historian, and the membership chairman elected for the following term; and change from handing out extra bulletin copies to visitors, to providing one or more for attendee perusal.

12. Article VI, Section I, shall add “Directors at Large” to Duties of Officers.

13, Article VIII, Section A, Club Historian, add bylaw recording duty.

14. Article VIII, Section B, add license trustee for the W6NGO call sign.

15. Article VIII, new Section C, add “Webmaster” in Long Term Appointments.

16. Article IX Amendments, Section A, change “reading of an amendment” to “presenting of the amendment.”

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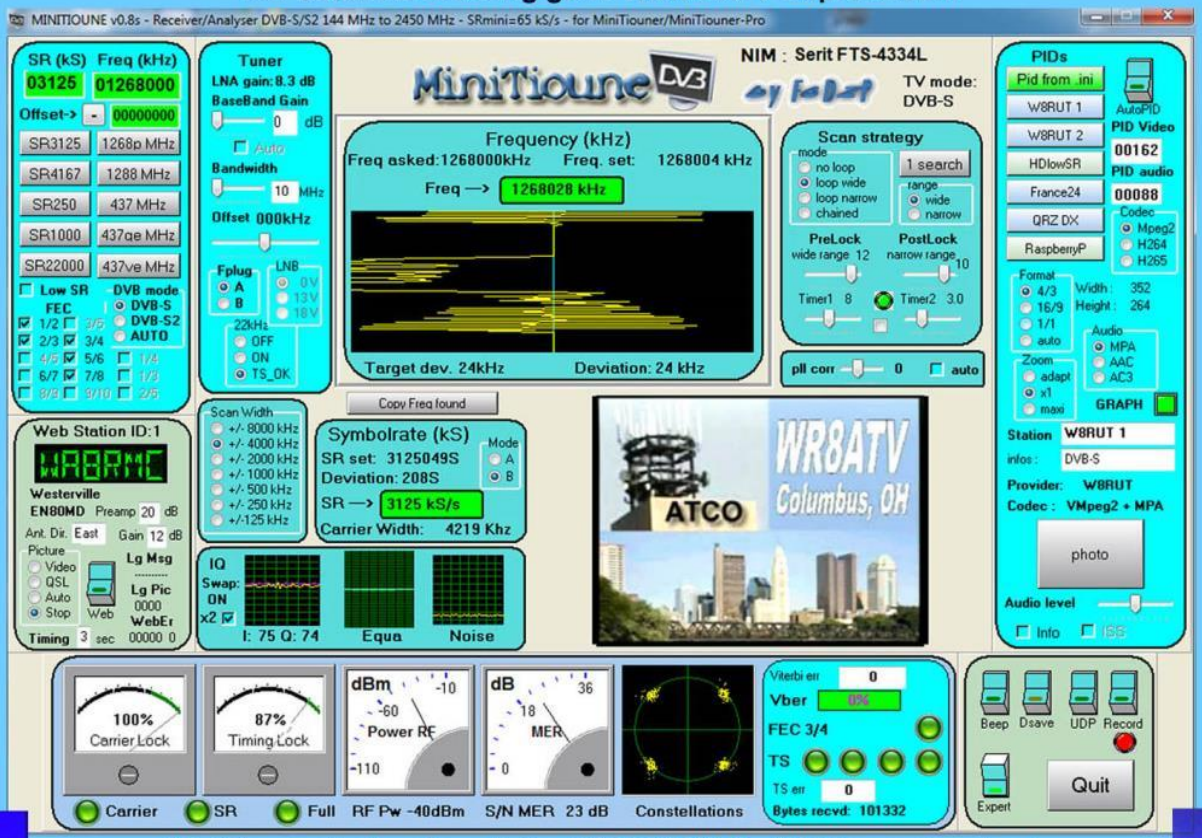

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