RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LXI NO. 01 P.O. BOX 3454, TUSTIN, CA 92781 January 2020

The Prez Sez.....

By Dan KI6X

Well, it is already a start of a new year! Where did the last year go? Hope 2020 starts and continues well for all of you. Your OCARC 2020 Board has already met and are off to a good start and I want to thank all members of the 2019 Board for all the efforts.

The club auction was delayed until this month so please read all about it in this newsletter. We have an enthusiastic auctioneer lined up and hope every seller gets a brief description of their items ready so that the auction runs even smoother. We are also trying something new this year: Since sellers have to wait to collect until all buyers pay it can take some time after the auction. We will be accepting self-addressed, stamped envelopes from the sellers and we would mail your check home. You can still pick up your funds at the meeting of course.

With the AUCTION and Winter Field Day both in January (both in this "RF" publication) and January being a short OCARC month due to how the calendar falls, we have a lot to do in a short period of time. We have some interesting speakers being scheduled this year and our Field Day effort is going to need to be started. The By-laws are also getting a much-needed update as is our OCARC advertising brochure. Hopefully many good things coming in 2020.

The Board will also need member assistance in various ways. Keep reading the OCARC "RF" and listen carefully at the monthly meetings for opportunities where you can be of help! If you have topics, speakers and contacts for future meetings please let our VP know. Also keep your mind open to running for an Officer position for next year. We have many on the Board that will be termed out this year and we will need some new Officers. Please keep promoting club. Brochures and business cards are available if you need them. Here's an idea? If you see a local ham license plate why not stick a club business card in their door?

I am sure many of you have creative ideas for promoting and/or improving the club and I would like to hear all of them.

Dan, KI6X, President

NEXT MEETING
Friday, January 17, 2020
@ Red Cross, Santa Ana

OCARC Radio Auction
Seller Setup and Viewing - 6PM
Auction - 7:00 PM
(See Page 5 - 7 for details)

In This Issue

2020 Board of Directors:

President:
Dan Violette KI6X
(714) 637- 4632
ki6x@w6ze.org

Vice President:
Tim Millard N6TMT
(714) 744-8909
n6tmt@w6ze.org

Secretary:
Ken Konechy, W6HHC
(714) 348-1636
W6HHC@W6ZE.ORG

Treasurer:
Greg Bohning, W6ATB
(714) 767-7617
w6atb@w6ze.org

Membership:
Corey Miller KE6YHX
(714) 322-0395
ke6yhx@w6ze.org

Activities:
Jim Schultz, AF6N
(714) 544-5435
af6n@w6ze.org

Publicity:
Vijay Anand, KM6IZO
km6izo@w6ze.org

Technical:
Bob Eckweiler, AF6C
(714) 639-5074
af6c@w6ze.org

Directors @ Large
Tim Goeppinger, N6GP
(714) 730-0395
n6gp@w6ze.org

Ron Mudry, W6WG
(714) 840-3613
w6wg@w6ze.org

2020 Club Appointments:

W6ZE Club License Trustee:
Bob Eckweiler, AF6C
(714) 639-5074
af6c@w6ze.org

Club Historian(s)
Corey Miller KE6YHX
(714) 639-5475
ke6yhx@w6ze.org

Bob Evans, WB6IXN
(Emeritus)
(714) 543-9111
wb6ixn@w6ze.org

RF Editor for December:
Tom Cowart, W6ETC
(714) 454-0571
w6atb@w6ze.org

Webmaster:
Ken Konechy W6HHC
(714) 348-1636
W6HHC@W6ZE.org

Assistant Webmaster:
Bob Eckweiler, AF6C
(714) 639-5074
af6c@w6ze.org

Tim Millard, N6TMT
(714) 744-8909
n6tmt@w6ze.org

ARRL Awards Appointees:
Arnie Shatz, N6HC
(714) 573-2965
N6HC@aol.com

John Schroeder, N6QQ
(West Orange Co.)
(562) 404-1112
N6QQ@msn.com

Monthly Events:

General Meeting time & location:
Held third Friday of the month
This month: **AUCTION**
Begins at 7:00 PM held located at:
The **American Red Cross**
600 Parkcenter Drive
Santa Ana, CA
(Near Tustin Ave. & 4th St.)
For more information see below.

Club Breakfast (Board Mtg) info:
Held the First Saturday*
of the month at 8am
Marie Callender's Restaurant
307 E. Katella Ave
Orange, CA 92867
*Unless otherwise advised

Club Nets (Listen for W6ZE):

10M: 28.375 ± MHz SSB
Wed- 7:30 PM - 8:30 PM
Bob AF6C, Net Control
Alt: Corey, KE6YHX, Net Control

2M: 146.55 MHz Simplex FM
Wed- 8:30 PM - 9:00 PM
Corey, KE6YHX, Net Control

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

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


ORANGE COUNTY AMATEUR RADIO CLUB
CONGRATULATIONS TO THE ELECTED
2020 BOARD OF DIRECTORS
ORANGE COUNTY AMATEUR RADIO CLUB
W6 ZE
President
Dan Violette KI6X
Vice President
Tim Millard N6TMT
Secretary
Ken Konechy W6HHC
Treasurer
Greg Bohning W6ATB
Activities
Jim Schultz, AF6N
Membership
Corey Miller KE6YHX
Public Relations
Vijay Anand KM6IZO
Technical
Bob Eckweiler AF6C
Director at Large
Tim Goeppinger, N6GP
Director at Large
Ron Mudry, W6WG
by Tom W6ETC

A HISTORY of OCARC PRESIDENTS

by **Ken Konechy W6HHC**
with great assistance from our
Club Historian Emeritus,
Bob Evans - WB6IXN

2020 KI6X Dan Violette
2019 KI6X Dan Violette
2018 N6GP Tim Goeppinger
2017 N6GP Tim Goeppinger
2016 AF6CF Nicholas Haban
2015 N6TMT Tim Millard
2014 AF6CF Nicholas Haban
2013 AF6CF Nicholas Haban
2012 W6GMU Paul Gussow
2011 W6GMU Paul Gussow
2010 K6PEQ Kristin Dankert
2009 AF6CF Nicholas Haban
2008 N8WP Willie Peloquin
2007 K6PEQ Kristin Dankert
2006 N8WP Willie Peloquin
2005 W6HHC Ken Konechy
2004 N1AB Steve Brody
2003 KQ6JD Lowell Burnett
2002 KE6WIU Cory Terando
(now AE6GW)
2001 KD6BWH Bob Buss
(later KØBWH)
2000 K6LDC Larry Hoffman
1999 WA6VPP Bud Barkhurst
1998 KD6BWH Bob Buss
(later KØBWH)
1997 WA6VKZ Frank Smith
1996 AF6C Bob Eckweiler
1995 N6XTJ Jim Roberts
1994 KJ6ZH Chris Breller
1993 KC6TAM Jane Breller
1992 WA6VKZ Frank Smith
1991 W6HHC Ken Konechy

YEAR	
1990	KJ6ZH Chris Breller
1989	WA6VKZ Frank Smith
1988	W6HHC Ken Konechy
1987	N6JSV Jim Talcott
1986	WA6VKZ Frank Smith
1985	AF6C Bob Eckweiler
1984	KA6IMP Chris Breller (now KJ6ZH)
1983	W6IBR Al Watts
1982	KA6HNY Robin Hoff
1981	WA6VKZ Frank Smith
1980	WA6FOW Ernie Prichard
1979	WB6IHZ Terry Mathers
1978	WA6LFF Jim Kingsbury
1977	WA6WZO Fried Heyn
1976	WB6PEX Martin Raymond
1975	WA6LHB Art Sheldon (now K7ZE)
1974	W6HHC Ken Konechy
1973	WB6QNU Bob Eckweiler (now AF6C)
1972	WA6FIT Ron Cade (now W6ZQ)
1971	WB6CQR Billy Hall (now N6EDY)
1970	WB6UDC Jack Hollander (later N6UC)
1969	WA6ROF Jerry VerDuft (now ADØA)
1968	W6COJ Dave Hollander
1967	WB6GPK Jim Hill
1966	WA6YWN Jack Shaw
1965	K6KTX Rolland Miller
1964	W6WRJ Ralph Alexander (later W6RE)
1963	W6DEY Roy Maxson
1962	K6LJA Ted Glick
1961	K6IQ Roy Morriss

YEAR	
1960	K6TXS Charles(Ed)Edwards
1959	W6BVI Ken Kesel
1958	W6BVI Ken Kesel
1957	- CLUB DISBANDED -
1956	W6HIL Bob Swenson
1955	W6BVI Ken Kesel
1954	W6UPP Marinus Conway
1953	Probably only informal meetings, no officers?
1952	W6QZQ Horace Bates
1951	W6LDJ Sam (Mac) McNeal
1950	Probably only informal meetings, no officers?
1949	W6CGF Chuck Lunder
1948	W6BWO Dale Bose
1947	W6ALO Tommy Gentges
1946	W6DEY Roy Maxson
1945	W6DEY Roy Maxson
1944	- **ALL OFF TO WAR!!**
1943	- **ALL OFF TO WAR!!**
1942	W6IBN Roy Cumpston
1941	W6BAM Shelley Trotter
1940	W6KLU Harold Christensen
1939	Probably only informal meetings, no officers?
1938	W6NSA Les Gates
1938	W6ADT Noral Evans
1937	W6LYN Noral Evans (later reissued as W6ADT)
1936	W6LYN Noral Evans (later reissued as W6ADT)
1935	- CLUB DISBANDED!!
1934	W6IGO Earl Moore
1933	W6IGO Earl Moore

ORANGE COUNTY AMATEUR RADIO CLUB

AUCTION

Buy Used (& New)
RADIO & ELECTRONIC GEAR and ACCESSORIES.
Bring your gear* to sell.

DATE:

January 17th, 2020

7:00PM Auction starts promply
6:00PM Registration and equipment check-in
at the American Red Cross
"George M. Chitty' Bldg."
600 Parkcenter Drive, Santa Ana, CA

**** SPECIAL NOTE: Radio and Electronic Gear ONLY***

The room will *open at 6:00 PM* to allow registration, set-up and viewing.
Buyers and sellers are welcome provided they follow established guidelines:

1. **Only Ham radio or electronic equipment / items will be allowed.**
2. You must register prior to or at the auction site the day of the auction when doors open.
3. Sellers should number each item in their lot. A tag should indicate the minimum bid they expect.
4. Only 3 items from a Sellers lot will be auctioned during each turn and then the auctioneer will move on to the next lot. Once the other lots lot have been offered the auctioneer will start the second round of auctioning with the next 3 items in Lots.
5. Auction bidding will take place as follows:
   (a) $0.00-to-$5.00 bidding will take place in $0.50 increments.
   (b) Over-$5.00-to-$50.00 bidding will take place in $1.00 increments.
   (c) Over-$50.00-to-$100.00 bidding will take place in $5.00 increments.
   (d) Over-$100.00 bidding will be in $10.00 increments.
6. Rules 4 and 5 may be changed at the auctioneer's discretion to expedite the auction.
7. Payments for purchased items are due at the end of the auction and shall be by cash or check with the appropriate ID. No two-party checks or credit cards are allowed. Disbursements to the Sellers will be by OCARC check only.
8. **ALL Sellers will be charged 10% of the selling price for items sold by OCARC.** A special table will be set up for items donated to the OCARC and proceeds from the sale of donated items will go into OCARC operational funds.

by Tom W6ETC

IMPORTANT

NEW AUCTION INFO NEW FOR 2020

SELLERS PLEASE NOTE!

- **IF YOU ARE SELLING ITEMS? >>>** **Before the Auction**: Please prepare in advance on a separate sheet of paper the **DESCRIPTIONS of each item** and the **minimum (opening) bid** $amount if any you are requesting? If no one is willing to bid the minimum amount you will be asked during the auction if you will accept a lower bid. This will be used by the Auctioneer during the AUCTION.
    - Please indicate if the device works or not and any important info regarding its condition?

- **DONATE YOUR EQUIPMENT TO THE CLUB:** Proceeds from club donated equipment will help to offset administrative costs to OCARC throughout the year. A completed transaction is required before the OCARC can accept the donation and gain benefit from your donation. It will be very helpful if you also **include a listing describing the items** you are donating. Thank you for your donation.

- **At the END of the AUCTION**:
    - '**Buyers'** will go **first** in line. After **BUYERS** transactions have been completed then
    - **SELLERS*** can line up for payment following all BUYER transactions. See note below!

- ***SELLERS - save time!** You can request to have the auction proceeds sent to you by check instead of having to wait in line following the AUCTION. Please advise upon check-in with AUCTION administrators and bring an **SASE** (Self-addressed & stamped envelope).

PARTIAL LIST AUCTION ITEMS

- ☐ Ten-Tec "Jupiter" HF rig 100 W
- ☐ Ten-Tec 708 Desktop Microphone
- ☐ Johnson Match-Box antenna tuner
- ☐ SONY FM-AM Stereo Receiver Model STR-DE595 - left speaker channels not working.
- ☐ Pioneer PD-7030 Front-Loading CD Player - malfunctioning.

- ☐ Large Black Plastic Printer Cartridge NEW (laser printer?), unknown make and model.
- ☐ Assorted Electronic Parts and Components including many untested High-Voltage Capacitors.
- ☐ Sprague Mike-O-Meter Model M-2 Dual Motor Capacitor Tester Sprague Products Company North Adams, Mass., U.S.A. -untested.
- ☐ LDG AT-100Proll Auto-Tuner Antenna tuner
- ☐ MFJ 969 Antenna tuner
- ☐ 30M shortened-vertical-dipole (home-designed, 12-ft length designed to radiate Omni)
- ☐ MAHA universal battery charger
- ☐ 144/440 MHz whip antenna for Baofeng and Wouxun handhelds - 15.6 inch model NA-771 with SMA connector
- ☐ ICOM SM20 mic
- ☐ A complete portable analog amateur television station less camera etc. built by WA6PFA Elmer Thomas. This has been used on FD for many years. It's all built into a fancy aluminum box
- ☐ A portable amateur TV transmitter. Built by WA6PFA
- ☐ Power supply 12V & 5 -18 volts adjustable. Built by WA6PFA
- ☐ Magellan GPS 315
- ☐ Magellan GPS Explorist 300
- ☐ Heathkit uMATIC Memory Keyer, model SA-5010
- ☐ J.W. Miller Automatic Antenna Tuner, model AT 2500
- ☐ Robot Specialty Mode RTTY Terminal, model 800
- ☐ LED samples Kit of few hundred LED colors & types, by Stanley
- ☐ Electro-Voice model 619 dynamic microphone
- ☐ Archer Coax Switch
- ☐ Knight microphone audio compressor, model C-577
- ☐ Kenwood UHF commercial transceiver setup on the UHF repeater ham band, model TK-8150. Output power is 45 watts
- ☐ Kenwood UHF commercial transceiver setup on the UHF repeater ham band, model TK-8150. This unit includes the Remote Mount Kit.
- ☐ Heathkit model VL-1180 VHF amplifier
- ☐ Hewlett Packard 204C Oscillator
- ☐ Intronics 'The Pocket Programmer 2
- ☐ Tech-Tools ER3 EPROM Emulator

Mark your calendars for the January 17th, 2020

O.C.A.R.C. AUCTION

COME JOIN US FOR WINTER FIELD DAY 2020

2020 Winter Field Day will begin on

Saturday, January 25th

and ends on

Sunday, January 26th

Ocean View School District site located at
17200 Pinehurst Lane in Huntington Beach

ORANGE COUNTY AMATEUR RADIO CLUB W6ZE

For more information go to www.W6ZE.org

by W6ETC

"2020 Winter Field Day"
January 25th and 26th 2020
Contest period run from…
Saturday 1900 UTC to Sunday 1900 UTC

The event will be held at:
Ocean View School District site located at
17200 Pinehurst Lane in Huntington Beach.

Multiple operating positions with bands and modes for everyone.*
Bands: 160m, 80m, 40m, 20m, 15m, 10m, 6m, 2m plus UHF and VHF bands
Possible Modes include: SSB, CW, and Digital, Satellite

If you plan on coming please let me know.
If you like more information please contact
Ron W6WG@W6ZE.ORG
WFD Coordinator

****Note: Operating positions and bands of choice are subject to change without notice.***

JANUARY

- **Straight Key Night:** 0000Z – 2359Z January 1
- **ARRL RTTY Roundup:** 1800Z Saturday January 4 to 2400Z Sunday January 5.
- **ARRL Kids Day:** 1800Z – 2359Z Sat. January 4
- ****North American QSO Party / CW:** 1800Z Saturday January 11 to 0600Z Sun. January 12.
- ***ARRL January VHF Contest:** 1900 UTC Saturday Jan 18 to 0359 UTC Mon. January 20.
- ****North American QSO Party / SSB:** 1800Z Saturday January 18 to 0600Z Sun. January 19.
- ***CQ 160 Meter Contest/ CW:** 2200Z Saturday 25 Friday to 2159Z Sunday January 27.
- ***Winter Field Day:** 1700Z Sat. Jan. 26 to 1700Z Sun. January 27.

FEBRUARY

- **10-10 Winter Contest**, SSB: 0001 UTC Feb.1 through 2359 Sunday Feb. 2

- ****North American Sprint / CW**: 0000 UTC through 0400 Sunday Feb. 2

- ***CQ WW WPX / RTTY** 0000 UTC Saturday Feb. 8 through 2359 UTC Sunday Feb. 9

- ***ARRL International DX Contest**: CW: 0000 UTC Sat. Feb. 15 through 2400 UTC Sunday February 16

- ***CQ WW 160 Meter SSB**: 2200 UTC Friday Feb. 21 through 2200 UTC Sunday February 23

- **North American QSO Party / RTTY**: 1800 UTC Feb. 29 through 0559 Sunday March 1

REPEATING ACTIVITIES:

- **Phone Fray:** Every Tuesday night at 0230Z to 0300Z.
- **CWops Mini-CWT:** Every Wednesday at 1300 to1400 UTC, 1900-2000 UTD and Thursday 0300-0400 UTC.
- **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.

* 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”

Do you have a favorite Amateur radio event or activity you’d like added to this list?

Just send an email to *Ron W6WG, w6wg@w6ze.org with your request. Include information and links and/or background information to be considered for inclusion into the next month’s Radio Activities column.*

73, Ron W6WG

Orange Police Dept. ***RACES*** is looking for hams to volunteer during Baker-2-Vegas foot race. Each spring, law enforcement running teams (from around the world) have entered in a competitive foot-relay-race through the desert. This race, known as "Baker-to-Vegas" (and aka B2V), is a 120 mile long race, that starts outside Baker (CA), runs through the desert to Shoshone, then runs through Pahrump, NV and finishes at the Rio Hotel in Las Vegas. The runners of the Orange Police Department have been supported for many years with communications by Hams belonging to COAR (City of Orange Amateur Radio) RACES and OCARC members.

The B2V race this year occurs on Saturday, April 4 & Sunday, April 5, 2020. COAR RACES is looking for a few more hams who are willing to help with communications during the Baker-2-Vegas race.

If interested, please contact Will Stoddard KJ6IA (Orange COAR RACES Radio Officer) at willst64@Gmail.com or Ken W6HHC at W6HHC@W6ZE.org for more information.

Ken
W6HHC

Family Time at Sequoia National Park

by Dan KI6X

Here's a positive example of the camaraderie that Amateur Radio Operators demonstrate when they meet other Amateur Radio Op's.

While my family and I were vacationing in the Sequoia National Park a fellow Amateur Radio Operator Aki (JA5DQH/KH7A) spotted my license plate and just had to come over and say Hello in one of the parking lots!

This resulted in a friendly exchange of information and quick conversation regarding our Amateur Radio adventures and the beauty of the Sequoia National Park. I looked after getting home that I had worked him from Japan in two different CQWW CW contests. The chance meeting and a friendly contact made the trip extra special.

OCARC
BOARD MEETING MINUTES
2020-01-04

The OCARC Board meeting was held at the Marie Calendar's Restaurant at 307 E Katella Ave. in Orange on Saturday Jan 4, 2020 at the 8:07 AM. In attendance were 9 members. All of the directors, except Bob AF6C and Greg W6ATB, were present for a Board quorum.

Director Reports:

• **Membership** – Corey KE6YHX reported the club membership currently has 110 members.

Old Business:

• Newspaper Editors

Jan – Tom W6ETC (this edition)

Feb – Vijay KM6IZO

Mar – Tim N6GP

Apr – Nicholas AF6CF

May – Jim AF6N

General Meeting Programs

Jan – The OCARC Radio Auction

Feb – Pitcairn DXpedition by Arnie N6HC

Mar – To Be Determined

• By-Laws Update Committee

Tim N6GP explained that a clean and updated revised set of by-laws would be sent out to the board for review. There was a discussion of possible changes to the details of the "officer election process". The current plan is to hold a first reading of the updated Bylaws for the club membership at the February 2020 general meeting.

• Financial Audit Committee

The OCARC treasurer, Greg W6ATB, has delayed the audit of 2019 finances until February.

New Business:

• Donation to Red Cross

In recognition of providing the OCARC with a meeting place for the last 25 years, the Board approved a motion to make a donation of $250 to the Red Cross general fund for disaster aid.

• Update to OCARC Trifold Brochure

The urgency is gone now that we discovered about 250 existing brochures. Work will continue to update the existing brochure…especially changes to the club nets.

• Location for next OCARC Christmas Dinner

With the approval of the Board, Jim AF6N is going to make reservations for the next OCARC Christmas Dinner to be held in the "larger room" at Mimi's Café on 17th Street.

Good of the Club:

• WB6IXN

Corey KE6YHX reported that Bob Evans WB6IXN is getting settled in Talent, Oregon. Bob WB6IXN says "hi to all OCARC members".

• Ring Security

Ken W6HHC started a discussion on RING Security Systems.

Submitted by Ken W6HHC, OCARC Secretary

OCARC Cash Flow YTD

1/1/2019 through 12/31/2019

1/10/2020 Page 1

Category	1/1/2019-12/31/2019
INFLOWS	
Antenna Kit INCOME	60.00
ARRL FD 2019 T-shirts	79.40
ARRL Membership Dues	49.00
Badge Income	19.57
Christmas - Opportunity Drawing 2019	288.00
Christmas Dinner 2019	261.00
Christmas Dinner 2019 (PayPal)	635.08
Dues, Family (PayPal) 2020	86.11
Dues, Family 2019	120.00
Dues, Membership (PayPal) 2019	1,023.32
Dues, Membership (PayPal) 2020	353.24
Dues, Membership 2019	892.50
Dues, Membership 2020	150.00
Food Snacks Donations	51.00
Petty Cash Acct Return	300.00
RAFFLE PROCEEDS	118.00
Raffle Reg Income	196.00
Refreshments Income	71.00
Rodrigo's Dinner Meeting	523.00
TOTAL INFLOWS	**5,276.22**
OUTFLOWS	
Antenna Kits	101.14
ARRL FD 2019 T-shirts Expense	79.40
ARRL Membership Expense	34.00
Badges Expense	97.06
Christmas Dinner 2019 Meal Expenses	805.60
Christmas Prizes & Gifts EXP 2019	714.94
Field Day - Flowers	71.00
Field Day - Generator Costs	80.31
Field Day - Generator Rental	85.00
Field Day Equipment	49.79
Field Day Food	17.58
Field Day Rental - Tent	140.00
LIABILITY INSURANCE 2020	300.00
New Bank Checks (Refill)	47.16
OCARC Equipment Repairs	270.00
OCARC Historian	91.51
Petty Cash for Make-Change Rodrigo's	300.00
PO Box Rental	80.00
Raffle - Monthly Exp	275.41
Refreshments Expense	135.08
Rodrigo's Dinner Meeting Exp	580.20
Storage Locker	1,193.00
Web Site Hosting	101.94
Web Site SSL Fee	69.99
TOTAL OUTFLOWS	**5,720.11**
OVERALL TOTAL	**-443.89**

Heathkit of the Month (HotM) #97:
by Bob Eckweiler, AF6C

HEATHKIT

AMATEUR RADIO - SWL
Heathkit SA-2040
Antenna Tuner

Figure 1: Heathkit SA-2040 Full Legal-Limit Antenna Tuner

Introduction:

In the second half of 1979 Heathkit released the SA-2040, a no-frills, full legal-limit, antenna tuner (**Figure 1)**. Heath's previous antenna tuner, the AC-1[1] first appeared in a Heathkit ad in the September 1953 issue of ***Radio News***. The AC-1 continued to be sold until the AT-1 transmitter was replaced by the DX-20 HF CW transmitter in late 1956.

In the 1950s a revolution in ham equipment began. The new rugged 6146 transmitting tube became popular along with the pi-network output circuit designed for 50 - 75Ω coaxial cable. Coax became the feedline of choice due to its ease of use, and 50 and 75Ω resonant antennas became very popular. A well designed pi-network could tune a load with an SWR of up to 3 to 1 allowing reasonable bandwidth around the resonant frequency. The average ham shack no longer needed an antenna tuner. For those still using non-resonant wire antennas the venerable E.F. Johnson *Matchbox* tuner line was widely available. Over this period few antenna tuners were marketed in the ham magazines, though construction articles appeared occasionally, and many users of wire antennas home-brewed their tuners. In the 70's, as newer radios came on the market, many using less rugged TV sweep tubes and others using easily damaged RF power transistors with their broad-band output coupling, antenna tuners quickly entered back into the vogue.

Heathkit reentered the antenna tuner market with the SA-2040 antenna tuner. The SA-2040 originally sold for $149.95, a price it held for about two years during an inflationary period. By the fall of 1981 the price rose to $154.95 and by the winter of 1982/1983 it reached $169.95. It was no longer offered in the fall 1983 catalog.

Heathkit offered two other full legal-limit antenna tuners, the SA-2060 (followed by an 'A' version) and the SA-2500 automatic tuner. The original SA-2060 was offered starting in 1981 and sold alongside the SA-2040 for a couple of years. These tuners may be covered in a future HotM article.

The Heathkit SA-2040:

While the SA-2040 has been referred to as a basic no-frills tuner, this is not in reference to its matching capability. What it lacks are the capabilities that are easily handled externally, such as SWR measurement and antenna switching. The SA-2040 is a clone of Lewis McCoy-W1ICP's *Ultimate Transmatch*[2]. The SA-2040 is capable of tuning into loads with an SWR as high as 10:1[3], though Heath

[1] Notes appear at the end of this article.

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

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

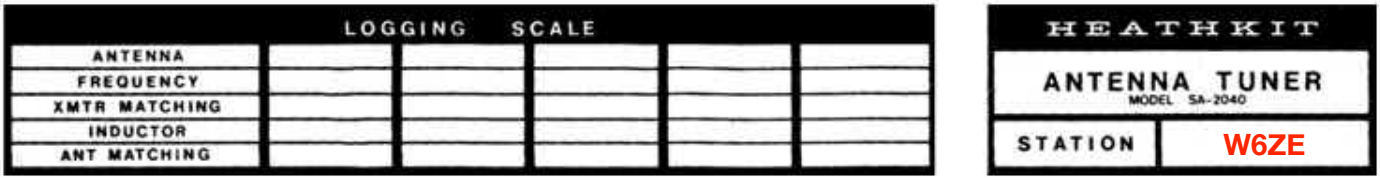


Figure 2: On the front panel is an erasable place to write settings as well as a place to add your station call letters.

specified its matching output impedance only as "wide-range". Specifications are shown in Table I.

The SA-2040 has a 50Ω input and has outputs for a coaxial cable connected antenna, a single wire non-resonance antenna and a balanced-feedline antenna. This last output is coupled via an internal 1:4 toroidal balun transformer. Only one antenna at a time should be connected to the multiple outputs.

The SA-2040 measures approximately 5⅝" H x 14¾ W x 14" D and weighs 10½ lbs. Internally it has only four electronic components: two large high-voltage variable capacitors, a roller inductor and a balun coil. They are liberally spaced apart due to the high RF voltages that can be present in the tuner. Both capacitor rotors are at a high RF potential so the extension shafts are made of insulating material. The input capacitor has two sections, each section is 125 pF. This is not a differential capacitor; the sections track with the same capacitance. The rear stator section on this capacitor is directly grounded by the mounting feet. The rotor section and remaining stator section are isolated from ground by ceramic end-plates. The output capacitor has a single 170 pF section with both the rotor and stator sections isolated from ground by ceramic end-plates. The roller inductor is 12 µH. The hot end is the rear shaft. The front cold end, the roller contact and its shaft and tensioners are grounded.

Heathkit SA-2040 Specifications

Frequency Range	3.5 – 30 MHz (80, 75, 40, 30, 20, 17, 15, 12, 10 meter bands)
Power Capability (input)	SSB: 2 KW PEP CW: 1 KW
Input Impedance:	50 Ω
Impedance Transformation:	4:1 (balance to unbalanced) balun
Output Impedance:	Wide range

Table I

The front panel is bare aluminum covered with a self-adhesive-backed sheet of "vinylite"[4] that contains the panel markings. This panel is medium-dark gray with black trim and black and white lettering. It includes a window to allow viewing the turns-counter. There is also an erasable table area where one may mark down settings for later reference as well as a place to put the station call-letters using supplied vinyl lettering. This area is shown in **figure 2**. The cabinet is painted black, and the rear panel is painted a light gray with black lettering.

The SA-2040 Controls and Connections:

The front panel of the SA-2040 has three large control knobs. On the left, **TRANSMITTER MATCHING** adjusts the dual-section input capacitor. The dial is marked 0 - 100 in 5 unit increments over 180°; every other increment is numbered. In the center, **INDUCTOR** controls the roller inductor. It has no dial markings, but to the left of its knob is the window of a turns-counting dial. Every full turn of the inductor is represented by 10 counts on the dial. The inductor has about 25 turns or 250 counts. On the right, **ANTENNA**

MATCHING adjusts the output capacitor and is marked in a similar manner as the TRANSMITTER MATCHING control.

Figure 3: Heathkit SA-2040 Rear Panel. Outputs are on the left. Input is on the right.

The input and outputs are all located on the rear panel (**Figure 3**). Viewed from the rear, (left to right) are: a ground terminal with a wing nut; two large ceramic feedthrough insulators (J5 and J4) for a parallel feedline; a large ceramic feedthrough insulator (J3) for a single-wire antenna; a UHF coax connector (J2) for a coaxial antenna; and finally another UHF coax connector (J1), for the input from the transmitter. A large space is left between J1 and J2 to help prevent them from being mixed-up. When using a parallel feedline a connecting strap must be connected between the middle and right ceramic feedthrough insulators (J4 and J3). This strap may be stored across J5 and J4 when not using a parallel feedline. Wing nuts are used on these insulators to expedite secure connections.

The SA-2040 Construction:

Heathkit refers to the SA-2040 assembly as a "two evening project". After the parts are checked assembly begins. Here is where you get a surprise. No need to fire up the soldering iron yet, first you have to assemble the two large variable capacitors and the continuously variable inductor. Then the balun toroids must be prepared and wound. Finally you'll be heating the iron to tin the balun leads and solder on a pair of screw lugs.

ANTENNA MATCHING Capacitor Assembly:

First the ANTENNA MATCHING capacitor **C2** is built. The rotor section, (**Figure 4**) assembles with a hex shaft, two control nuts, nineteen 17/64" spacers and eighteen rotor plates. Next, the front capacitor plate is assembled by adding two ceramic insulators to the metal front plate using four #8 screws and eight fiber washers. Then the stator assembly (**Figure 5**) is built using two 6¾" #10-32 threaded rods, four large fiber washers, eight nuts, four 3/16" spacers, thirty-two 17/64" spacers, seventeen stator plates and the previously assembled front plate. The rotor and stator sections are then mated adding conical and

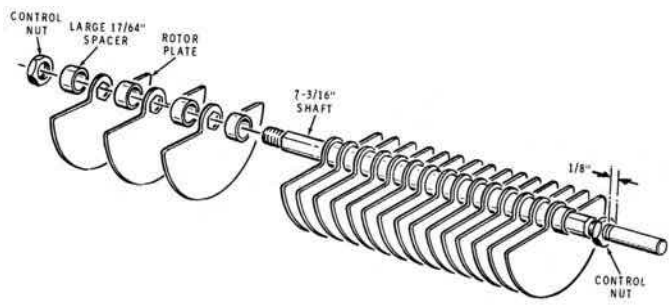


Figure 4: C2 Rotor Assembly; from Heathkit Manual.

forked springs, and lubrication is applied using grease supplied with the kit. Next, the capacitor rear plate is assembled, in a similar fashion to the front plate, and installed. Finally a knob is temporarily installed on the capacitor shaft and nuts are adjusted so the stator plates are centered between the rotor plates (**Figure 6**). Rotational tension is adjusted as necessary, the knob is removed, and C2 is set aside. The assembly of C2 takes up five pages in the manual and a full page in the

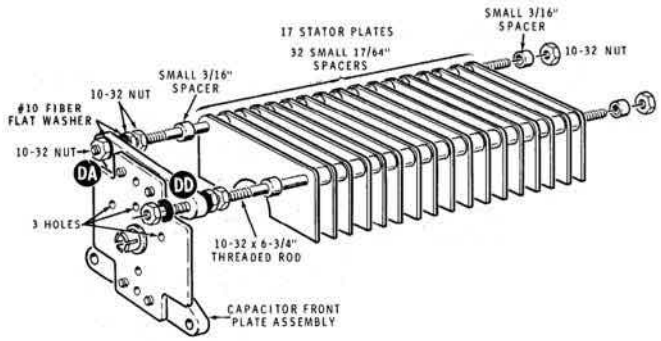


Figure 5: C2 Stator Assembly; from Heathkit Manual.

separate large illustration booklet using four pictorial, four detail and three inset drawings.

TRANSMITTER MATCHING Capacitor Ass'y:

The dual-section TRANSMITTER MATCHING capacitor **C1** (**Figure 7**) is assembled next. Its assembly is a bit more complicated since there are two separate stator sections. The C1 assembly also takes up five manual pages as well as two pages in the illustration booklet.

Roller INDUCTOR Assembly:

The continuously variable rotary inductor **L1** is then assembled. The silver-plated inductor comes mounted on a ceramic drum with shafts attached. End plates and the roller contact mechanism are assembled around the rotor inductor. Assembly of L1 takes four pages in the manual and another page in the illustration book.

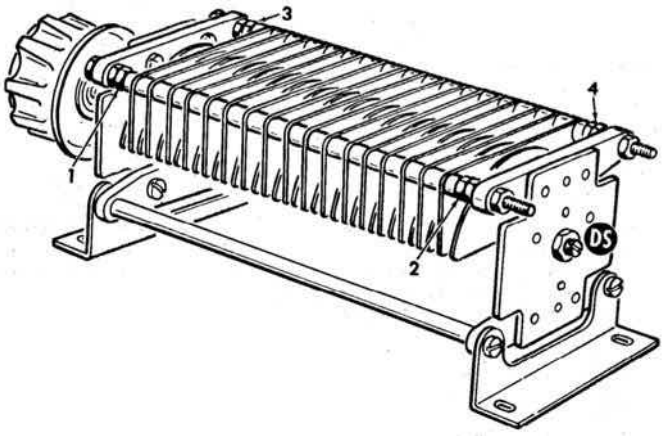


Figure 6: Completed C2 showing plate spacing adjustments; from Heathkit Manual.

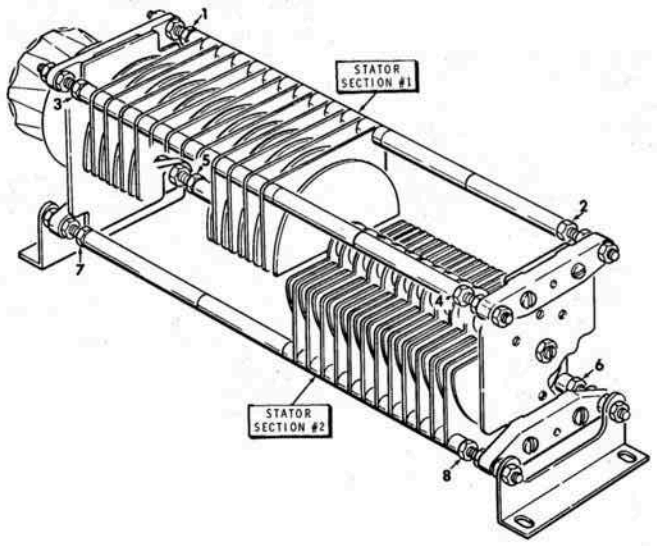


Figure 7: Completed C1; from Heathkit Manual.

Balun Transformer Assembly:

The balun transformer **T1** uses two large toroidal cores. Before winding the coil, each core is separately insulated with supplied glass-cloth tape, and then the two cores are placed atop each other and tape is wound around both cores along the full circumference. An eleven foot length of heavy stranded teflon-insulated wire is doubled over at its center and wound onto the toroid to create fifteen bifilar turns. A two-foot length of glass-cloth tape is then wound around the circumference of the coil to hold the windings in place. The doubled wire is cut apart, and the four wire ends are trimmed to length and tinned. Using an ohmmeter, the winding

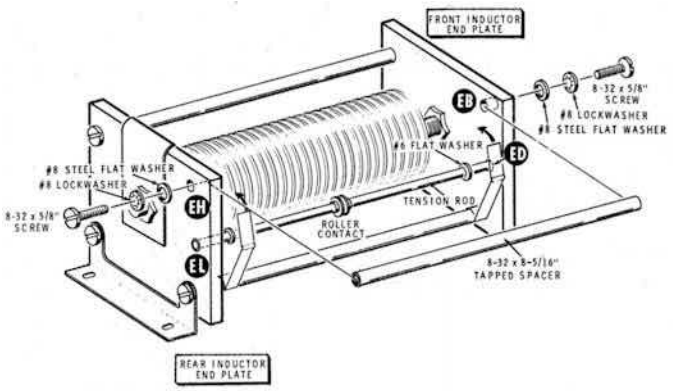


Figure 8: L1 during assembly; from Heathkit Manual.

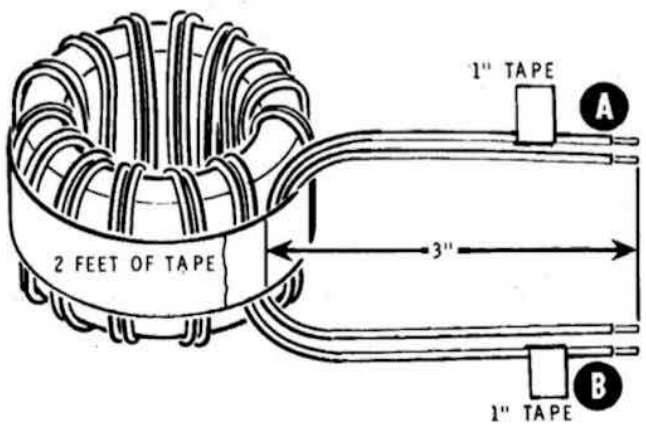


Figure 9: Assembled T1 balun; from Heathkit Manual.

leads are identified and marked with tape (**Figure 9**). The tape is placed on one winding at the starting end and on the other winding at the finished end. #10 lugs are then soldered on the two untaped leads. A ceramic feedthrough is used unconventionally to make a mounting post for the balun (**Figure 10)**. Assembling the balun transformer T1 takes five pages in the manual.

Chassis Assembly:

Once the two capacitors, roller inductor and balun are assembled, chassis assembly is started. The turns counter is assembled and mounted, the front panel "vinylite" face is mounted to the front panel, shaft bushings are installed for the three front panel controls, and the shaft with nylon gear is installed on the turns-counter shaft. On the rear panel the two UHF connectors, three large feedthrough insulators and grounding bolt with wing nut are mounted. The balun T1 is mounted next. The two taped leads are soldered to a ground lug on the inside of the chassis at the grounding bolt, and the two remaining leads are attached to feedthroughs. The roller inductor, and two variable capacitors are aligned with and mounted to the chassis and attached to insulated shafts that fit through the bushings on the front panel. A beveled nylon gear is first mounted on the inductor shaft that meshes with the gear on the turns-counter shaft. The turns-counter is calibrated and the gears are tightened.

Chassis Wiring:

Wiring the components together is done by straps and short lengths of #10 bare wire. Two silver-plated straps are used. One connects L1 to C1 and C2; the second connects C2 to the J3 feedthrough. A short piece of #10 wire connects J1 to a lug that bolts to

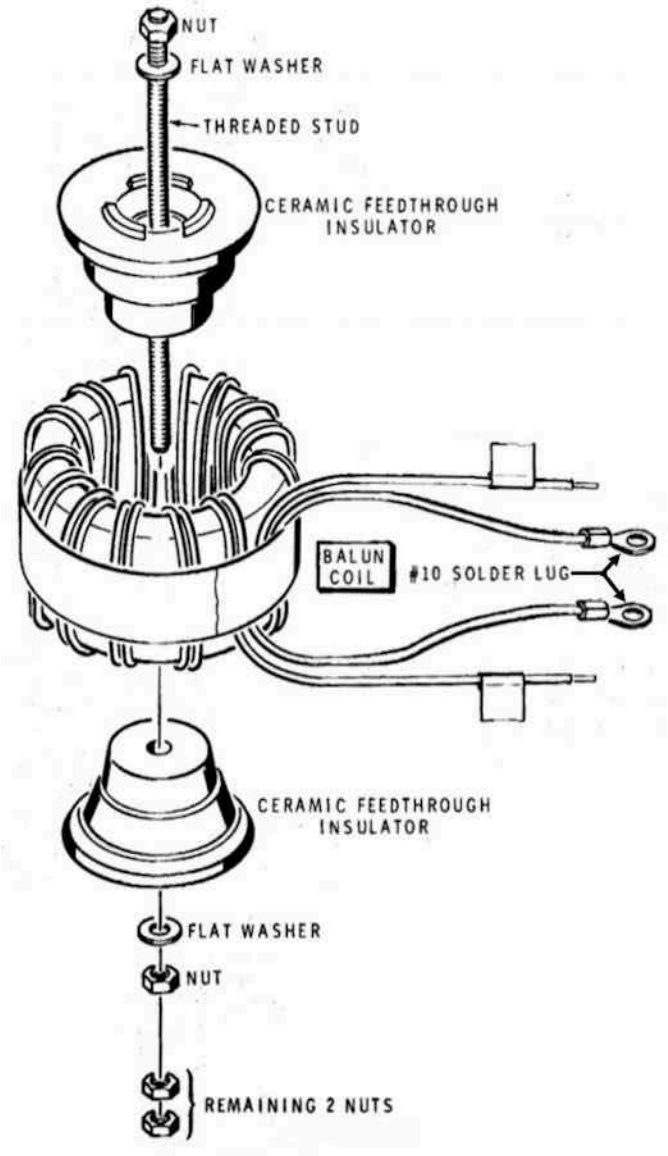


Figure 10: T1 balun mounting, see text; from Heathkit Manual.

C1; another short piece of #10 wire connects J2 to a lug that bolts to J3.

This completes the soldering. In all four leads were tinned, four solder lugs were soldered to the ends of those wires and three other soldering connections were made.

Final Assembly:

After the "Blue Label" that contains the kit's model and series numbers is attached to the inside rear of the chassis, the feet are installed. Heathkit offers a choice of the kit sitting flat or tilted at an angle by adding extensions to the two front feet. Knobs are attached, and after a thorough inspection the cabinet is attached using eight black machine screws.

SA-2040 Circuit:

The SA-2040 circuit diagram is shown in **Figure 14** at the end of the article. It is one of two popular design derivatives of the Tee-matching network (Tee-Transmatch[5]). The basic Tee-Transmatch network is shown in **Figure 10A**. It does a good job of matching even very high SWR loads (The W8ZR antenna tuner[6] can match up to an SWR of 16:1). What it lacks is good harmonic attenuation, especially if improperly tuned. **Figure 10B** is a modification of the Tee-Transmatch called the *Ultimate* Transmatch previously mentioned. It adds another section to the input variable capacitor to ground and was said to have better harmonic suppression. Later it was found that the extra capacitor added little if any performance advantage. An "improved circuit", called the SPC network, "*because the word 'ultimate' had already been used*", is shown in **Figure 10C**. SPC stands for "series, parallel capacitance". The SPC did do a better job of harmonic suppression and was described in the ARRL Handbook for many years. It did have two drawbacks, the first being the tuning was

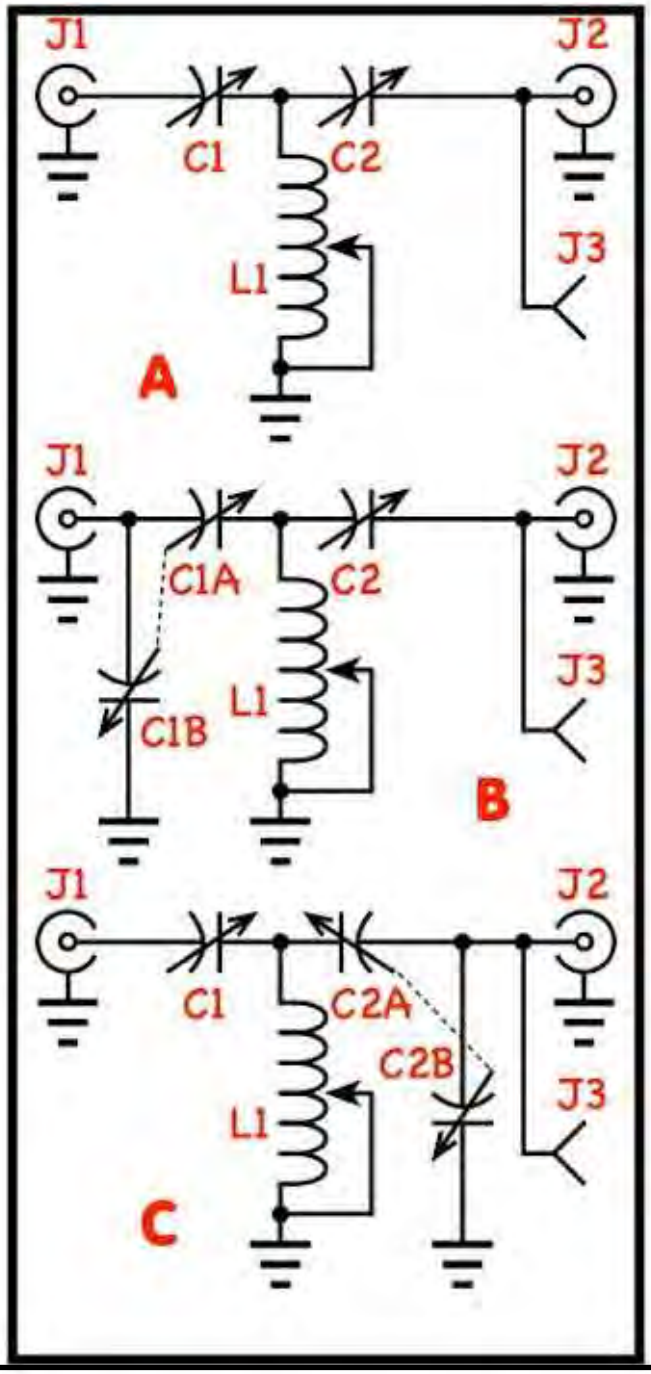


Figure 10: Three Popular Transmatch Schematics:

A: Tee Matching Network (Tee-Transmatch Network)
B: Ultimate Transmatch Network
C: Series Parallel Capacitance (SPC) Transmatch Network

In each schematic:

C1 (C1A/B)	Transmitter Matching Capacitor(s)
C2 (C2A/B)	Antenna Matching Capacitor(s)
L1	Inductor (Rotary or Multi-Tapped)
J1	Coax Input from Transmitter
J2	Coax Output to Low Impedance Antenna
J3	Feedthrough to Single Wire Antenna

very sharp, especially on the lower bands, and a vernier knob on the capacitors was needed to ease tuning. The second drawback turned out to be the one that killed the SPC design. It was found to be significantly more lossy than the other two. Heathkit never used the SPC circuit; the SA-2040 uses the *Ultimate* Transmatch circuit and the later SA-2060(A) and SA-2500 both use the Tee-Transmatch circuit. Not shown in the **Figures 10** is the balun often found in these tuners. It is shown in **Figure 11**.

Using the SA-2040:

Setting the three controls on the tuner properly is important. It is possible to get a low SWR at more than one setting, but the wrong setting will reduce harmonic suppression, be less efficient and can cause arcing across the tuning capacitors due to excessively high voltage. To properly tune-up using the SA-2040, and most other antenna tuners, an SWR bridge, placed between the transmitter and antenna tuner is needed. Fancier tuners, such as the SA-2060(A), have this capability built in. When using an external SWR bridge it should be dedicated to the tuner if the setup will be used on a day to day basis. Short lengths of 50Ω coax should be used to connect between the transmitter, SWR bridge and SA-2040.

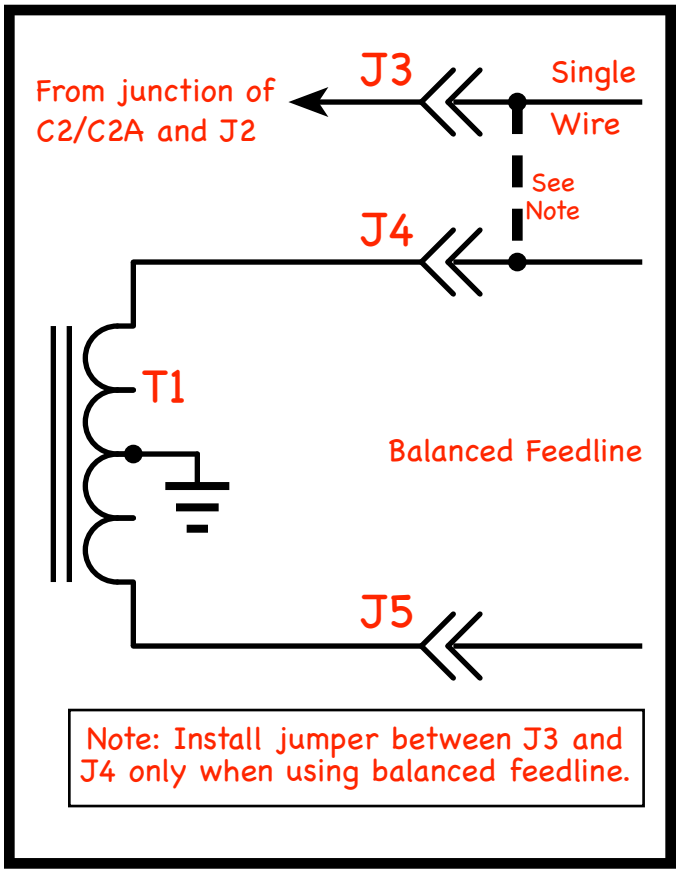


Figure 11: A toroidal balun (T1) may be added to any of the Transmatch networks discussed for a balanced feedline.

In Lew McCoy's article[7], that introduced the circuit used in the SA-2040(A), he gave basic adjustment instructions, here is the author's interpretation:

1. Start with C1 and C2 at maximum capacitance (fully CCW), and L1 at maximum inductance for 80/75 meters, about half inductance for 40/30 meters, about quarter inductance for 20/17 and about eighth inductance for 15/12/10 meters.
2. Apply just enough power to get a full-scale reading in the forward direction on the SWR bridge.
3. Set the bridge to read reflective power, and slowly adjust L1. At some point the reflected power will dip sharply; adjust for a minimum.
4. Now adjust C1 and C2, and touch-up L1 for a perfect match.
5. Now you may increase power to the level desired. You may want to touch-up the settings at the higher power.
6. If you change frequency check the match, and touch-up C1, C2 and L1 to correct the match if needed.
7. More than one match often is encountered. Always select the match that uses the highest capacitance settings.

To aid initial operation, Heathkit provided a table of starting points for the initial settings for 80 through 10 meters (non-WARC bands only). For each band, settings are given for the low and high end of the band and a third around mid-band. This table may be found in the manual.

Figure 12: Interior view of the SA-2040. C1 is on the left, and C2 is on the right. Behind C2 is the balun T1. The Inductor L1 is in the center. Photo by Bob Koller - KG7EMO; used with permission.

Make note of your settings for each antenna you use so you can make adjustments quickly when making large frequency excursions or changing bands. Note that things like moisture and obstacles can cause you to have to adjust your settings somewhat. Sudden major changes warrant a physical check of the antenna before transmitting at high power.

Comments:

Today many solid-state radios come with some sort of antenna tuner built-in or available as an accessory that mounts internally. These tuners generally provide only a coaxial output. They help match the transmitter to an antenna that is resonant at one frequency in the band by making the antenna capable of being resonant across the whole band, or in the case of 80/75 meters across a larger part of the band.

If you are using a non-resonant antenna such as a long-wire or end fed antenna, or an antenna fed by parallel feed (such as twin-lead) then a full-fledged antenna tuner such as the SA-2040 is recommended.

From the Author:

Suggestions are always appreciated for kits of interest to research and write about. April will soon be upon us and, as some know, I often try to pick an unusual kit to write about in celebration of April Fool's Day. Suggestions for April are also welcome, though I believe I have found an unusual one for 2020. Due to the holidays I probably won't have an article for January, which could make the April article #100.

In HotM #95 I wrote about the A-1 Audio Amplifier, the first hi-fi kit offered by Heathkit. I'm still looking for any documentation

anyone has on that kit. I have not found the original schematic, though one dated August 18, 1948 is on the web. Unfortunately this turns out to be a schematic later released by Heathkit so users could upgrade their A-1 to the A-2. That schematic uses a 6SL7 preamplifier tube while the original uses a 6SN7. If you have an A-1 or the documentation, please contact me. You may email me by clicking on the link at the bottom of the copyright box.

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.

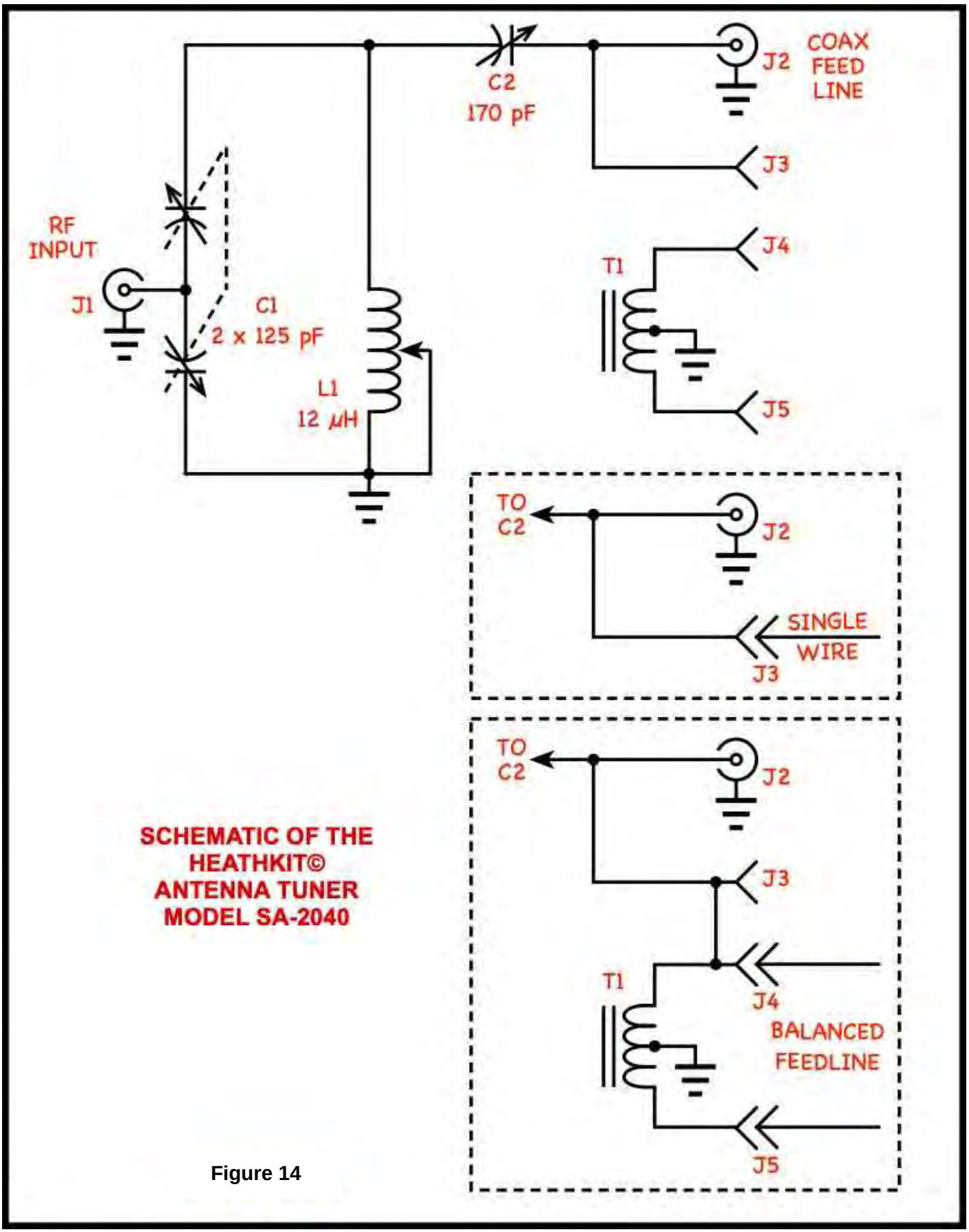
Thanks - AF6C

Notes:

1. Discussed in Heathkit of the Month #13.
2. Lewis McCoy W1ICP, *The Ultimate Transmatch*, QST July 1970, p. 24.
3. Paul Pagel, N1FB, *Heath SA-2040 Antenna Tuner* Product Review, QST November 1980 pp. 49, 50.
4. ibid.
5. Lewis McCoy W1ICP, *The 50-Ohmer Transmatch*, QST July 1961 p. 30. '[Transmatch is a] *generic name coined by the editors* [of QST] *to apply to any type of matching network inserted between a transmitter and a transmission line. There has been an obvious need for such a term, since "antenna coupler" is inadequate both technically and psychologically.'*
6. James Garland, W8ZR, *The EZ-Tuner* [Part 1], QST April 2002, pp 40 - 43.
7. McCoy W1ICP 1970.

NOTE: This article was originally written to appear in the December 2019 issue of ***RF*** but was held until January of 2020 due to circumstances beyond the control of the author.

Figure 13: Ad for the SA-2040 Antenna Tuner from the Fall 1980 Heathkit Catalog (#850)



SCHEMATIC OF THE HEATHKIT© ANTENNA TUNER MODEL SA-2040

Figure 14


2020 OCARC DUES
ARE NOW DUE
PAY DUES ONLINE
OR IN PERSON
by W6ETC

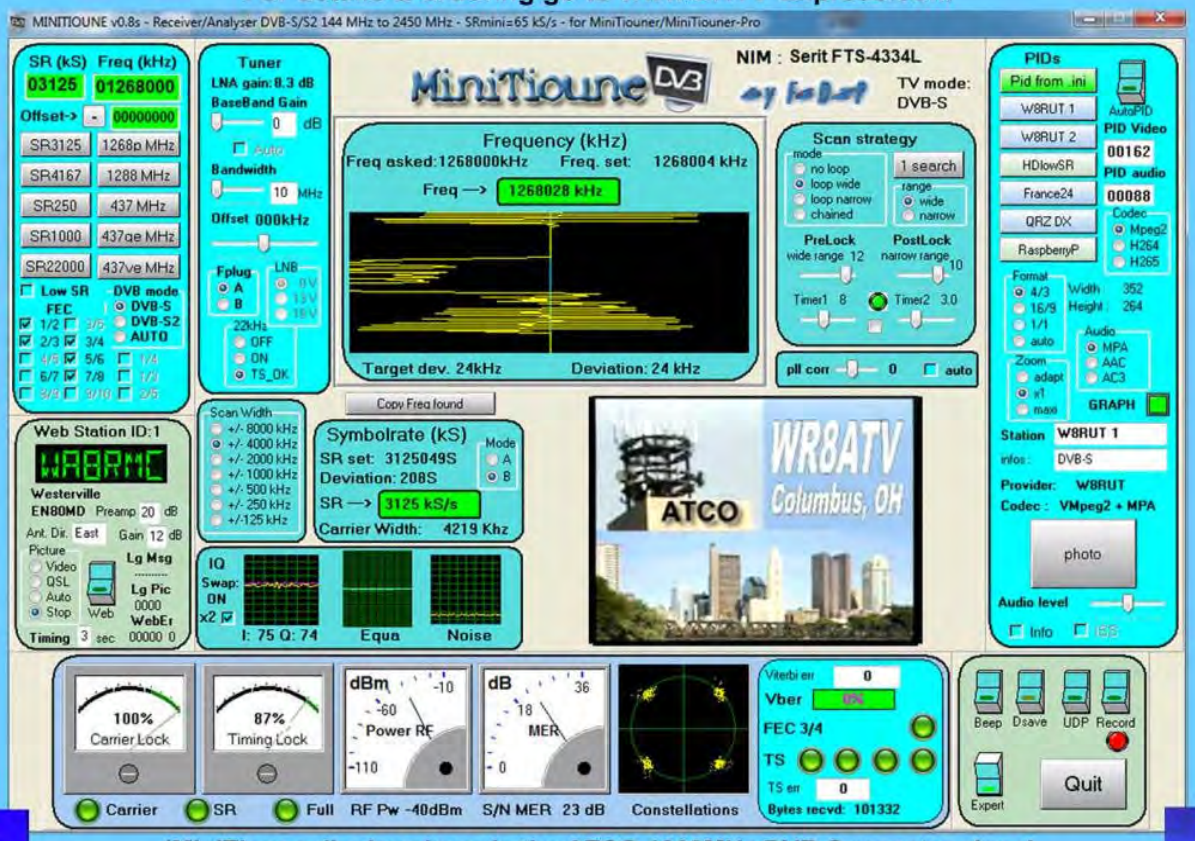
MiniTiouner-Express

Digital Amateur Television DVB-S/S2 Receiver / Analyzer

Available at DATV-Express.com

- Operates with Windows PC using free MiniTioune software from Jean-Pierre F6DZP
- Smaller than a stack of 2 decks of cards (picture above is full size)
- Two independent simultaneous RF inputs with internal preamps
- High sensitivity -100dBm @1288MHz – at 1/2 FEC
- Fully assembled/tested in aluminum enclosure
- Covers 144-2420MHz (ideal for Space Station DATV reception)
- Symbol rates from 75 KSymb/s to >20 MSymbols/sec
- Uses external 8-24VDC supply or +5V from USB-3 port (with small modification)
- Real time signal modulation constellation & dBm signal strength display
- Price: US $75 + shipping – order with PayPal

For details & ordering go to www.DATV-Express.com



(MiniTioune display above is the ATCO 1268MHz DVB-S repeater signal at WA8RMC QTH 15 miles away).