



# RF



## ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LX NO. 06

P.O. BOX 3454, TUSTIN, CA 92781

June 2019

### The Prez Sez.....

by Dan KI6X



It is very close to the "big" club event, Field Day. This is an opportunity for the club members, invited guests, and visitors to participate together in preparing and operating in an emergency environment. We have invited a few local groups to come and join us. This is a classic team effort where everyone has a job or is assigned a job to help with the effort. Tim, N6GP, has been working hard overseeing the planning and the band captains have been gathering stations together and operators. There are a lot of behind the scenes things happening and help is always needed. We especially need the assistance on Friday for set-up, then Saturday for final preparations, Saturday to Sunday operating, and then tear-down starting mid-morning Sunday. Please at least stop by and we would love to put you to work. You will find the specific information elsewhere in this newsletter.

Also note in this newsletter the schedule of speakers and activities for the summer general meetings. **The Red Cross building will be going through extensive refurbishment this SUMMER. Areas of the building will be closed at different times. So be prepared that we may meet in a different location somewhere in the Red Cross building.**

News broke at our May meeting that the KH1/KH7Z Baker Island DXpedition was awarded "DXpedition of the Year" at the Dayton Hamvention. OCARC member Arnie, N6HC, was on that team. Congratulations to all. Hope you worked them. Not many are easy in California!

As an officer the past two years, the more I see club workings, the more I see a need for volunteers. For example, we have a couple dedicated members maintaining the website. The website has gotten quite large over the years and some areas become stagnant or outdated (e.g., EmComm, Field Day pictures, etc.). If you care to review a website area and recommend updates or deletions please let us know. If you have webpage knowledge, you could copy that existing page, update it and ready it for upload.

73, Dan, KI6X,

President

### Next General Meeting

The June 2019 OCARC General Meeting presenter will be

**Chip Margelli, K7JA**

His topic will be

**"Good Field Day Preparation"**  
Aka "The Guru's Pep Talk"

The next General Meeting will be on:

**Friday, July 14, 2019**

ENTER from the WEST SIDE entrance of the Red Cross Building, Room 208

Take elevator to the 2nd Floor.

See you there!

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### **Submit articles:**

[editors@w6ze.org](mailto:editors@w6ze.org)

### **Feedback & Corrections**

[rf\\_feedback@w6ze.org](mailto:rf_feedback@w6ze.org)

### **Donations to OCARC:**

Bob Eckweiler, AF6C  
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[af6c@w6ze.org](mailto:af6c@w6ze.org)

## **Monthly Events:**

### **General Meeting time & location:**

**Held third Friday of the month**  
at 7:00 PM held at:  
**American Red Cross**  
600 Parkcenter Drive  
**Santa Ana, CA**  
(Near Tustin Ave. & 4<sup>th</sup> St.)

### **Club Breakfast (Board Mtg):**

**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 - 9:30 PM  
Corey, KE6YHX, Net Control

80M 3.883 MHz LSB  
Wed- 9:00(+/-) PM  
Follows right after end of 2M Net  
Corey, KE6YHX, Net Control

**2019 DUES:**  
**OCARC Membership period is:**  
**1 January to 31 December**

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

**New Member Dues are prorated quarterly and includes a badge:**  
Additional Badges<sup>1</sup> \$3

Use one of our our interactive on-line forms to calculate current prices, join, renew, or order badges:

[Dues and Badges Forms](#)

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



## Technical Committee Chairman

Current Officer: Bob Eckweiler, AF6C,  
[af6c@w6ze.org](mailto:af6c@w6ze.org)

*Note: This will be a monthly Newsletter feature highlighting an officer position, their duties and where you can assist.*

**Duties:** The OCARC By-laws list the following as duties of the Technical Committee Chairman,

It shall be the duty of the technical committee chairman to form a committee of himself and at least 2 other licensed club members to:

- Assist members with technical problems relating to equipment setup and operation.
- Assist members to obtain and/or upgrade their licenses. When sufficient interest exists, hold classes for code practice and theory.
- Assist members with Television Interference (TVI) problems. Each TVI complaint shall be resolved as soon as possible. A log shall be kept for all TVI complaint activities.
- Perform other duties required by the president or the Board.

*Note: OCARC By-laws are being revised and this is a good example of an outdated officer role. The revised by-laws will be presented to the membership this fall.*

Areas that club members may assist the Officer: Volunteers are needed on the committee and to assist in a subject they are knowledgeable when a member asks for assistance. We have had members assist with HT programming and in other areas helping members. Assistance can also be given in the review of members estates when needed. Please contact Bob or volunteer when you hear there is an opportunity to assist in a technical role.

by Dan Violette [ki6x@w6ze.org](mailto:ki6x@w6ze.org),  
2019 President of the OCARC





Field Day falls on the calendar as early as possible this year, so our schedule is compressed. Our Field Day is the largest in the Orange Section, and we need volunteers at every step of the process. Here is a timeline:

**Tuesday, June 11, 7PM** at 18122 Estes Way, North Tustin, 2nd FD planning meeting

**Friday June 14, 6PM** at Red Cross SA - Field Day University class for new ops.

**Friday June 14, 7PM** at Red Cross SA - Chip K7JA FD Program and last minute planning

**Thursday June 20, 4PM** - Meet at Placentia Self Storage, 585 Porter Way, Placentia to move the equipment from the locker to the Gene KJ6OML's trailer.

**Friday June 21, 9AM** - Begin setup of Field Day towers and antennas at the Walter Knott Ed Center. Dinner served by Scouts in the evening

**Saturday June 22, 8AM** - Continue setup of tents, power and radios, and begin operating at 11AM.

**Sunday June 22, 11AM** - Operating stops. Take group photo immediately, and we hopefully done with teardown by 2PM.

### **Band Captains:**

**20m/75m SSB** Tom W6ETC & Bob AF6C

**40m/15m SSB** Tim N6TMT

**20m/80m CW** Dan KI6X

**40m/15m CW** Ron W6WG & Jim AF6N

**10m/440/satellite** Tony N2VAJ

**VHF** Peter NI6E

**Digital** Greg W6ATB

**Any questions? Email or call me.**

**Tim N6GP , FD Captain**

**N6GP@w6ze.org 714-730-0395**



## **OCARC Field Day University**

**Cram Session - 6pm, Friday June 14**

**Classes 1&2 packed into one hour!**

This class is held right before the General Meeting at the Santa Ana Red Cross. This course is targeted at the beginning level operator, who will be using the microphone (phone) on Field Day.

We hope to train some new operators to operate on our Phone stations. This class was a secret weapon that helped propel us high ranking scores in previous years. Topics for this class include:

**Introduction to Field Day – Is it a contest or not?**

**How to call “CQ Field Day”**

**Search and Pounce- Knowing if and when to use it.**

**Use of Phonetics on the air**

**US and Canadian Callsigns – How to enter them correctly**

**Radio Features You Will Need to Use**

**Hands on training with the N3FJP Field Day Software – may be good to bring laptop with software installed from [www.n3fjp.com](http://www.n3fjp.com)**

This class is taught by Tim Goeppinger N6GP, and it is offered free of charge.





## Buena Park CA BSA Troop 440 Meal Plan:

**Jesse Mendez, KB6MQY, Scoutmaster**

**Cheyenne Lopez, KK6MSK, Assistant Scoutmaster**

**Jack Hernandez, SPL (Senior Patrol Leader)**

**Adrian Mendez, KM6DFL, ASPL (Assistant Senior Patrol Leader)**

**Price of single meal: \$8**

**Price for 4 meals: \$30**

Price for all 5 meals: \$35 (best deal for OCARC members & best for troop fund raiser event)

Approximate number of OCARC members participating in the meal plan this year is 20-25

### **Friday 6/21/19: Dinner**

Foil-wrap dinner:

Cabbage leafs, ground beef, carrots, celery, potatoes, onions, bell peppers, broccoli, + spices.

Cookie

Diet drinks/ Bottle water/ Coffee

### **Saturday 6/22/19: Breakfast**

Scrambled eggs with HAM

Pancakes (2) + butter and syrup

OJ/ Milk / Bottle water/ Coffee

### **Saturday 6/22/19: Lunch**

Chicken Street Tacos (3) (w/ diced onions and cilantro) + lemon wedge

Salad (Asian chop)

Cookie

Diets drinks/ Bottle water/ Coffee

### **Saturday 6/23/19: Dinner**

BBQ chicken (drum sticks) (2 pieces)

Salad (red onion, tomatoes, cucumber, olives, etc) w/ dressings: 1k island, blue cheese, Italian dressing

Corn Bread (Dutch oven)

Diets drinks/ Bottle water/ Coffee

### **Sunday 6/24/18: Breakfast**

Breakfast Burrito (flour tortilla, scrambled eggs, hash browns, 2 bacon slices) + pace picante salsa

OJ/ Milk /Bottle water/ Coffee



## Cash Flow - Year To Date

1/1/2019 through 6/4/2019

Category	1/1/2019- 6/4/2019
<b>INFLOWS</b>	
ARRL FD 2019 T-shirts	79.40
ARRL Membership Dues	49.00
Badge Income	8.00
Dues, Family 2019	120.00
Dues, Membership (PayPal) 2019	1,023.32
Dues, Membership 2019	817.50
Food Snacks Donations	88.00
Raffle Reg Income	69.00
<b>TOTAL INFLOWS</b>	<b>2,254.22</b>
<b>OUTFLOWS</b>	
ARRL FD 2019 T-shirts Expense	79.40
ARRL Membership Expense	34.00
Field Day Equipment	49.79
Field Day Rental - Tent	140.00
New Bank Checks (Refill)	47.16
OCARC Equipment Repairs	270.00
OCARC Historian	48.97
PO Box Rental	80.00
Raffle - Monthly Exp	98.12
Refreshments Expense	76.53
Storage Locker	813.00
Web Site Hosting	101.94
<b>TOTAL OUTFLOWS</b>	<b>1,838.91</b>
<b>OVERALL TOTAL</b>	<b>415.31</b>



## RadioActivity

### June 2019

### Upcoming Activities:

#### June

- **\*ARRL June VHF QSO Party:** 1800 UTC Saturday June 8 through 0259 UTC Monday June 10.
- **Kids Day:** Saturday in June 15, 1800 UTC through 2359 UTC
- **OCARC Field Day:** 1800 UTC Saturday 22 through 1800 UTC Sunday 23.

#### July

- **RAC Canada Day Contest:** 0000 UTC through 2359 UTC Sunday July 1.
- **IARU HF World Championships:** 1200 UTC Saturday July 13 through 1159 UTC Sunday July 14.
- **\*CQ WW VHF:** 1800 UTC Saturday July 21 through 1159 UTC Sunday July 22.
- **\*\*North American QSO Party / RTTY:** 1800 UTC Saturday July 20 through 0559 UTC Sunday July 21

\* 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:

- **West Virginia QSO Party:** 1600 UTC Saturday June 15 to 0400 UTC Sunday June 16

### Repeating Activities:

- **Phone Fry** Every Tuesday night at 0230Z to 0300Z
- **SKCC** Weekend Sprintathon (Straight Key CW) on the first weekend of the month after the 6<sup>TH</sup> of the month. 1200 Sat. to 2359Z Sunday.
- **SKCC** Sprint (Straight Key CW) 0000Z to 0200Z on the 4<sup>th</sup> Tuesday night (USA) of the month.
- **CWops** 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](mailto:w6wg@w6ze.org) to have your favorite activity or your recent RadioActivity listed in next month's column.





## OCARC BOARD MEETING MINUTES 2019-06-01

The OCARC Board meeting was held at the Marie Calendar's Restaurant at 307 E Katella Ave. in Orange on Saturday, June 01. Attendance was 11 members. All directors were present for a Board quorum.

### Director Reports:

- **Treasurer** – Greg W6ATB will send out a financial report to the board as soon as he enters the receipt-book and cash and checks into Quicken.
- **Secretary** – reported that the club PO Box has been paid up until June of 2020.
- **Activities** – OCARC will have a raffle at the June General meeting.

### Old Business:

#### • Newspaper Editors

Jun – Jim AF6N  
Jul – Tom W6ETC  
Aug – Tim N6GP  
Sep – Greg W6ATB  
Oct – Tim N6TMT  
Nov - ??

#### • General Meeting Programs

Jun – “Field Day Prep Talk / Video”  
Jul – “APRS plus Satellites” by Robert KE6BLR  
Aug – Building Tape-Measure antennas  
Sep – “Ducie Island DXpedition” by Arnie N6HC  
Oct – “OCARC Radio Auction”  
Nov - ??

#### • Bylaws Update Committee

Tim N6GP reported that the first draft is being reviewed by the board.

#### • Update EmComm Section on Website

Bob AF6C needs contact information on the ARRL Section appointee

### • FD Tower-plate strengthening

Tim N6GP made a successful motion to for the club to pay \$270 for Atlee's effort for a stronger tower-base

### • Field Day 2019

- The Board passed a motion for a field day budget of \$400 (not including the tower-base expenses).
- Ron W6WG reported that the club is in need of more CW operators to work the bands at Field Day.
- Tim N6GP reported that the next FD planning meeting is scheduled for Tuesday June 11 at his QTH.
- Tim N6GP plans to present another “Field Day University” before the June General Meeting begins.

### • Badges

- The Board authorized Bob AF6C to mail out (without clips) all old member badges he is still holding.
- Tim N6TMT volunteered to become a back-up for the OCARC's “badge maker”.

### New Business:

The Red Cross informed the OCARC that the building for our normal meeting location (600 Parkcenter Drive, In Santa Ana) will be remodeled during **JUNE, JULY, and AUGUST**. During these months, the **OCARC General Meeting may be MOVED** to a different room or even a different Red Cross building. “El Prez” Dan KI6X explained that during construction, the Red Cross staff will most likely relocate our meeting location to the other Red Cross building (across the parking lot from the normal building).

### Good of the Club:

The Tim N6GP reminded members that the VHF/UHF contest (50 MHz and above) will be held Saturday and Sunday on the week-end of June 8 and 9.

Submitted by Ken, W6HHC

OCARC Secretary



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

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

**80 Meters Net**  
3.883 MHz LSB SLX  
Wed- 9:00 PM Following 2M Net  
Corey, KE6YHX, Net Control



WWW.W6ZE.ORG



## OCARC CONDOLENCES

### ROGER BERCHTOLD , WB6HMW SK

We are mourning the loss of our treasured friend, OCARC member, and OCRACES member Roger Berchtold, WB6HMW, who died peacefully of natural causes on Saturday, May 11, 2019. Roger was born in 1946. His wife died five years ago. He is survived by two sons and two daughters: Michael Berchtold, K6MKL, Eric Berchtold, KJ6WZK, Sharilyn Castro, and Jodeen Hultquist, KK6OBO. Roger's funeral service was held on Saturday, June 1, 2019, at Our Lady of Guadalupe Church, 900 W. La Habra Blvd., in La Habra.

Roger became a radio amateur in 1964. Amateur TeleVision (ATV) sparked his interest in 1972. He was a member of the Amateur Television Network. Besides his OCRACES service, Roger was a Professional Services Responder (PSR) in the Orange County Sheriff's Department, High-Tech Services Reserve Squad, Investigative Reserve Unit.

(Courtesy of Ken Bourne W6HK and OCRACES)





## OCARC CONDOLENCES

### JACK HOLLANDER, N6UC SK

Sad news. My dad Jack Hollander N6UC, passed away early Sunday morning June 2nd. He had been in failing health for the past few months. He was 95 years old out-living his mother, my grandma by 2 years and his grandfather by 4 years. Jack had one younger brother, Albert Hollander.

Jack was born in Chicago in 1924, served in the army during WWII and graduated from Illinois Institute of Technology around 1948 with a degree in electrical engineering. He married my mom Esther in 1948.

Sick of Chicago's cold weather and shoveling snow, he moved us to California in 1957. First living in Northridge in the San Fernando Valley for 4 years and then moving us all to Orange County to the tiny town of Tustin in 1961 where he resided until his passing last Sunday. I had week long business trip to Chicago in January in the early 80's and it was at that time with the miserable cold weather, I appreciated that he had moved us to California which is where I grew up.

Ham Radio became a big part of his life in his 40's. Prior to becoming a ham, he would always say that ham radio operators were members of the nitwit network. That changed though. First licensed as WB6UDC in 1966 at 42, three years after I got my ham radio license, he immediately became a DXer, was very active and made up for lost time (since not starting out in ham radio in his teens) eventually getting to the top of the DXCC honor roll and being one of the early recipients of the 5BDXCC



Jack N6UC in shack – Sept. 1968

award. He was also a past president of the Southern California DX Club and the president of the Orange County Amateur Radio Club in 1970.

His career was as an electrical engineer working for many of the famous electronic companies no longer with us - Admiral TV, Motorola, Collins Radio, Hallicrafters, Collins Radio again and finally Hughes Aircraft which he retired from.

In addition to ham radio, he was a very avid model railroader starting as a kid in the 1930's building layouts in Lionel O, G, and HO gauges and waiting until his 90's to play with N gauge, the smallest of the model railroad gauges.

My dad was always one to tackle a repair project before calling someone to take care of it. I'm the same way and learned a lot of it from my dad, be it working on cars, home repair and improvement projects, etc.

Rest in peace and enjoy your new noise free QTH

Love and 73 from your son,

David N7RK



David N7RK and Jack N6UC at the OCARC 80th anniversary reunion in 2013

## Heathkit of the Month #92: by Bob Eckweiler, AF6C



### AMATEUR RADIO - SWL

#### Heathkit SW-717 General Coverage Communications Receiver.

##### Introduction:

Over its lifetime Heathkit Company manufactured 17 general coverage (GC) communications receivers. To be considered in this arbitrary category the receiver must cover the AM broadcast (BC) band and a significant portion of the frequencies above it in the HF range that ends at 30 MHz. The coverage should be mostly continuous, though gaps for technical reasons are acceptable<sup>1</sup>. Additional coverage, such as the LW band below the BC band or frequencies above 30 MHz, is allowed. Some of the included Heathkit GC receivers only cover to 10 MHz and others only to 20 MHz. Superheterodyne receivers make up 14 of the 17, the other three being super-regenerative receivers. Ham-band only and even band-oriented SWL receivers are not considered general coverage, so you won't see the SB receivers on the list.

Evidently, general coverage kit receivers were a profitable product; they seemed to be a popular beginner's kit as well as a moderate kit for the more experienced kit builder. Heath focused on having one or two receivers on the market for the beginner, usually at very reasonable prices for modest performance. They also manufactured some higher



**Figure 1:** SW-717 General Coverage Receiver  
Note substitute knob to left.

performance receivers as well as portable receivers that could run off batteries. Features varied with cost; crystal filters, dual conversion, S-meter, an RF amplifier stage and a tracking bandspread control are often missing on the low-end radios.

The first receivers were the super-regenerative K-1 and K-2 (HotM #s 80 & 81). They were followed by the superheterodyne AR-1 through AR-3. In 1960 Heath released their first transistorized GC receiver, the Mohican GC-1, later updated to the GC-1A (HotM #34).

As part of Heathkit's early educational series they produced the EK-2A and EK-2B "Basic Radio Educational Series" in two parts. In part one the student builds various circuits including a crystal receiver and later a regenerative receiver. However, in part two the receiver is modified and expanded into a six-tube general coverage superheterodyne receiver that covers the broadcast band and 3 to 10 MHz; passing the GC requirements.

Around 1961 Heath started the GR receiver line which includes general coverage short-wave radios along with many other general radios including clock radios and AM/FM portables. Qualifying GC receivers from this group are (in chronological order) the GR-81, GR-91, GR-64, GR-54, GR-43[A] and GR-78 (HotM #62). The solid-state GR-43 and its 'A' update are clones of the Zenith Transoceanic

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

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

portable shortwave receiver. **Table I** is a timeline of the 17 Heathkit GC receivers.

By the late sixties the Japanese radio invasion was making competition difficult for Heathkit. After 1969 Heathkit released only two new GC receivers, the SW-717 in 1971 and the SW-7800 in 1984, both solid-state.

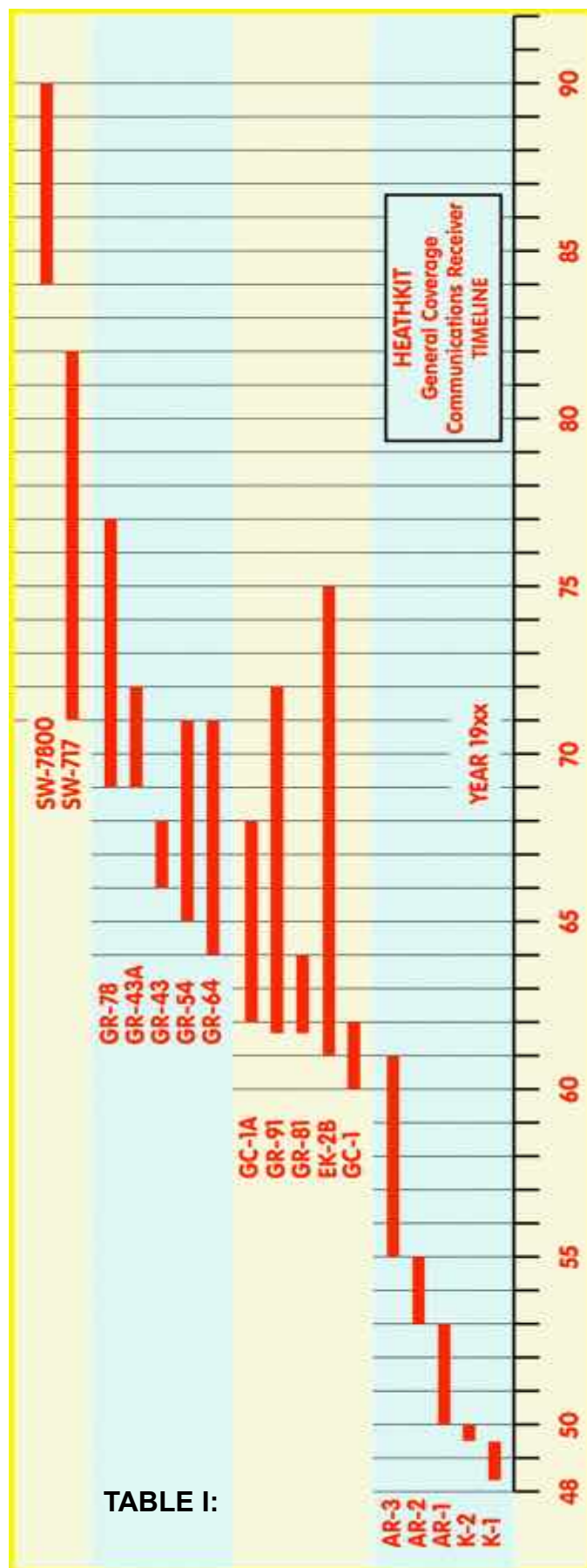
### The Heathkit SW-717 General Coverage Communications Receiver:

**Figure 1** is a photo of the SW-717 receiver. It first appeared in the second half of-1971, too late to make the main 1971 catalog. In the 1972 catalog<sup>2</sup> that came out late in 1971 the SW-717 sold for \$59.95. An accessory long-wire antenna kit (GRA-72)<sup>3</sup> sold for \$2.95. By 1976 the price had started to rise: 1976 - \$69.95, 1977 - \$74.95, 1978 - \$77.95, 1980 - \$99.95. The last price found is \$119.95 in the Christmas 1981 catalog. Meanwhile the accessory long-wire antenna went up to \$4.50, and in 1981 to \$7.95. When the SW-717 stopped production Heathkit would not put out another GC receiver until 1983 when it introduced the multi-hundred dollar synthesized SW-7800 shortwave receiver.

The SW-717 is a tabletop sized radio measuring 14-1/2" W x 5-3/4"H 10" D. It is a basic radio with few frills. It covers the broadcast band and up to 30 MHz in four bands clearly marked on a slide-rule dial. The I-F uses three 455 kHz ceramic filters instead of I-F transformers, which alleviates the need to align the I-F stages. It has an S-meter that gives relative signal strength. The SW-717 specifications are shown in **Table II**.

### The SW-717 Front and Rear Panels:

The front panel has six controls, two slide-rule dials, a 1/4" phone jack for earphones and a small S-meter marked **SIGNAL** with a graduated scale marked 0-5. A large black plastic slide-rule dial plate with green and white markings covers about 70% of the







**Figure 2:** SW-717 General Coverage Receiver Rear view showing ferrite AM band antenna.

front panel starting at the left edge and extending from top to bottom. The dial has five frequency bands, **A** through **D** and a **LOG** scale marked 0 to 100. Band A goes from 550 to 1500 KHz, Band B from 1.5 to 4.0 MHz, Band C from 4.0 to 10 MHz and Band D from 10 to 30 MHz. Below the actual dial marking area four of the controls and the phone jack pass through holes in the plate. They are (left-to-right) **BFO**, **VOLUME**, **BAND**, **MODE** and **PHONES**. To the right of the dial plate and vertically spaced are the larger **MAIN TUNING** (top) and **BANDSPREAD** knobs. To the right and slightly above the MAIN TUNING knob is the small **SIGNAL** meter. and to the right and slightly above the BANDSPREAD knob is the small band spread slide rule dial. marked 5-0-5. The BFO is turned off by turning its control fully counterclockwise.

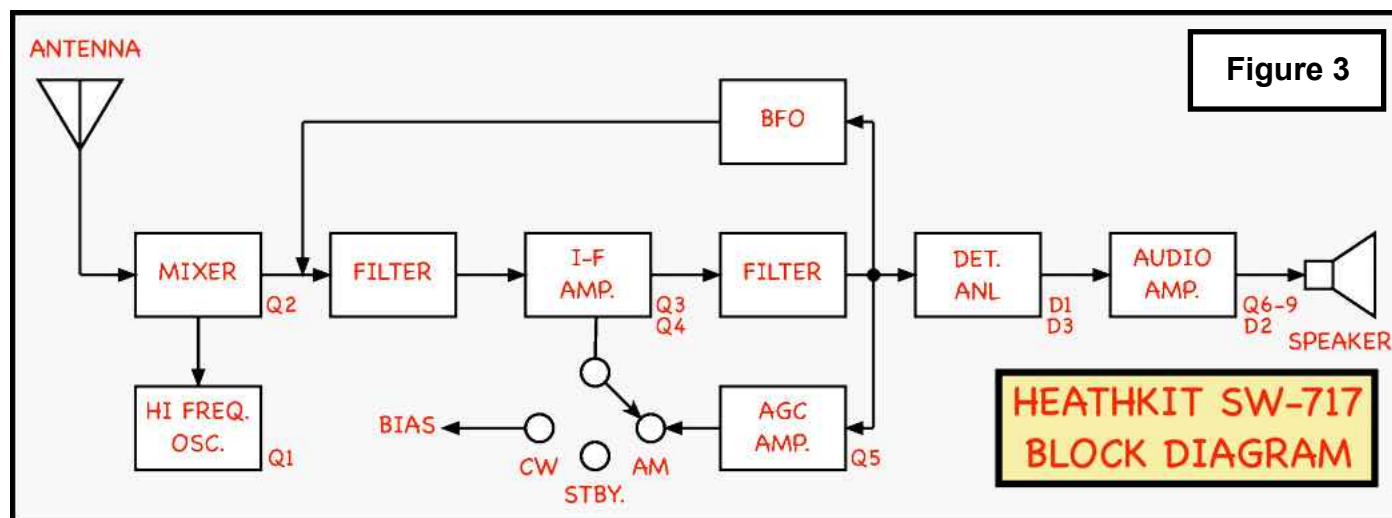
The rear panel (**Figure 2**) is rather barren. Everything is located along the bottom edge. From left to right (as viewed from behind) is the ferrite rod antenna for the broadcast band, the 3-wire AC power cord, a two screw-type terminal strip marked **ANT** and **GND** and a two-position slide switch marked **OFF ANL ON** (automatic noise limiter).

The SW-717 has a built-in speaker located on its right side-panel; an external speaker may be plugged into the **PHONES** jack since it is low impedance, taken directly off the internal speaker.

The SW-717 operates on 120/240 VAC 60/50 Hz. depending on how the transformer primary is wired. The instruction manual includes the necessary information should it need to be changed. The receiver draws 8-watts.

### The SW-717 Circuit:

Superheterodyne receivers have been discussed in prior reviews so only the highlights will be covered. **Figure 3** is a simple block diagram of the SW-717, showing its simplicity. Only the more unusual aspects of the circuits will be covered in some detail. A schematic of the SW-717 is available online<sup>4</sup> and a smaller copy (**Figure 9**) is reproduced at the end of this article.





**The Front End:**

The front end normally designates everything up to the first IF stage, usually the RF amplifier, oscillator and mixer. The SW-717 has no RF amplifier. The input from the antenna is coupled by separate LC circuits for bands 'B' through 'D' directly to the mixer Q2. Band 'A', the broadcast band, uses the tuned ferrite rod antenna as its coil and is not connected to the external antenna connector. The mixer incorporates an RCA 40673 dual-gate MOSFET.

The HF oscillator Q1 uses a Motorola MPF-105 JFET. Power to the oscillator is regulated by a zener diode for added stability. The IF operates at the standard 455 KHz and the oscillator operates above the received frequency on bands A, B and C and below it on band D. The bandspread only adjusts the oscillator frequency. This is also true on the GR-78 and means as the bandspread is tuned the input coils are not also tuned resulting in some minor loss of sensitivity. The oscillator signal is coupled to the second gate of the mixer MOSFET.

**The I-F:**

The signal from the mixer is fed through two 455 KHz ceramic filters in series before being coupled to a 2N5308 high gain Darlington transistor (Q3). A small un-bypassed emitter resistor provides some degenerative feedback for stability. The output of Q3 is coupled to Q4, a conventional 2N5232A transistor which provides additional I-F gain and impedance matching to a third ceramic filter. Output from the I-F after the filter is fed to the detector stage and also to the AGC amplifier.

**The BFO:**

The SW-717 uses an unconventional BFO circuit. This was probably done as a cost savings measure. Output from the third IF filter is fed back through a potentiometer design-

**Frequency Coverage:**

Band A	550 kHz to 1500 kHz
Band B	1.5 MHz to 4 MHz
Band C	4 MHz to 10 MHz
Band D	10 MHz to 30 MHz

**S-Meter:** Indicates relative signal strength.

**Headphone Jack:** Low impedance headphones or external speaker.

**Loudspeaker:** Built in.

**Controls:**  
**VOLUME** with on-off switch.  
**MODE** AM, Standby and CW.  
**MAIN TUNING**  
**BANDSPREAD TUNING**  
**ANL** ON - OFF (On rear panel)

**Transistor Complement:**  
**40673 (RCA)** Mixer  
**MPF105 (Motorola)** HF Oscillator  
**2N5308** I-F Amplifier  
**2N5232A (Qty: 2)** I-F and AGC Amplifiers  
**2N3393** Audio Preamplicifier  
**X29A829 (GE)** Audio Driver  
**MPSU05 (Motorola)** Audio Output (NPN)  
**MPSU55 (Motorola)** Audio Output (PNP)

**Power Supply:** Transformer operated.  
Full-wave bridge rectifier.

**Power Requirements:** 120 or 240 VAC 50/60 Hz  
8 watts (3/4 amp fused).

**Dimensions:** 14-1/2"W x 5-3/4"H x 10"D

**Net Weight:** 7 lbs.

**TABLE II :SW-717 SPECIFICATIONS**

nated **BFO** to the input of the input of the first ceramic filter. In AM the BFO control is set to zero; in CW the BFO control is advanced and the I-F starts to oscillate at the 455 KHz frequency of the filters. the level of oscillation can be adjusted by the BFO control; however, to change the tone you have to

adjust the main or band spread tuning. This takes some practice to be able to tune in an SSB signal. The BFO control can also be used to increase the sensitivity of the receiver when receiving AM signals by introducing regeneration. When receiving a weak AM signal, the BFO control may be advanced slowly for the best signal reception. Advancing the control too far will result in oscillation.

### **The AGC, S-Meter and Mode Switch:**

The I-F signal is coupled to the automatic gain control (AGC) circuit, through a small capacitance. It is rectified and amplified by Q5, a 2N5232A transistor. Its output is a positive voltage that is dependent on received signal strength. Stronger signals result in a lower positive voltage. This voltage is fed to a milliamp meter that indicates relative signal strength. The other side of the meter is returned to a positive voltage through the meter zero setting potentiometer.

The output of the AGC amplifier is filtered by a pi R-C network composed of C15, C16 and R23 producing a slow decay AGC voltage that is fed back to the bases of the I-F transistors Q3 and Q4, reducing their gain on strong signals.

The MODE switch has three positions. In the AM mode, the AGC is fed back to the I-F as described in the previous paragraph. In STBY the positive bias is removed from both I-F stages causing them to be biased to cut-off. In the CW position a fixed positive bias is applied to the I-F stages instead of the AGC voltage, causing the stages to run at a high gain regardless of signal strength. This bias is set by R24.

### **The Detector and ANL:**

Output from the third I-F ceramic filter is also fed to a simple diode detector circuit that utilizes a 1N191 crystal diode (D1). The

recovered audio is fed to the VOLUME control and to the audio amplifier circuit. In noisy conditions the ANL diode (D3) may be switched in to clip any positive noise peaks.

### **The Audio Amplifier:**

The audio amplifier consists of four transistors, Q6 through Q9. Q6 is a small signal NPN audio amplifier that directly drives Q7. C23 limits high frequency noise. Q7 drives Q8 and Q9, complementary power transistors. Q8 is an NPN MPSU05 and Q9 is a PNP MP-SU55. Diode D2 is a "Stabistor diode, which has a stable forward voltage drop over various currents and temperatures. It helps prevent thermal runaway by the power output transistors. This diode is normally mounted in close proximity to the output transistors so it experiences their temperature environment. The amplifier's low impedance output is coupled through C26 and the headphone jack to drive the internal speaker.

### **The Power Supply:**

Being one of Heathkit's later kits, the power cord is three wire and the transformer can be wired for either 120 or 240 VAC power. A transformer rated about 18 VAC CT provides 22 volts to the audio amplifier and 10 volts at about 30 ma to the rest of the receiver. The low-voltage full-wave power supply, fused at 0.75 amps, is conventional with one exception; there are two transistors that act as zener diodes between the output of the bridge rectifier and ground. These transistors (D9 and D10) each have their collector lead clipped off and the two emitter base junctions of the transistors are connected in series. Normally they are back biased, but when the voltage reaches a point where the junctions go into avalanche conduction they act as zener diodes. This appears to be a protective circuit to limit any power line spikes from reaching the sensitive transistors.

**Building the SW-717:**

Heathkit advertised this radio as being a “Three Evening Kit”, the time in which the average builder could successfully assemble it. Much of the circuitry is located on a single circuit board. As always, prior to assembly the manual recommends you familiarize yourself with the parts. Taking inventory is the easy way to do this. This kit comes with the parts separated into two “packages”. Pack #1, which is the majority of the small components that mount on the circuit board and pack two, which is called the final pack and includes the larger items such as the metal chassis parts as well as the circuit board, hookup wire, nut starter tool, solder and documentation.

Since sometime in very late 1961 Heathkit started including solder with their kits, often in liberal quantities. The reason likely was because they were getting a lot of returned kits that used non-electronic types of solder. Heath supplied solder in 3' rolls, each sealed in a plastic bag (See **Figure 4**) Usually at least one package of solder remained unopened, often several, when the kit was completed. First Alpha and later Kester provided the solder. In larger kits you would find a handful of these bags.

With parts pack #1 and the manual, solder and the circuit board from the final pack, the circuit board is stuffed. Seven pages of the Heathkit manual detail stuffing the board which includes the input and oscillator coils and the oscillator trimmer capacitors.

Once the board is complete, Heathkit suggests you inventory the remaining parts. Again, this is more for your familiarization of parts than that they expect you to find parts missing.

Assembly then begins on the chassis which involves mounting the major parts such as



**Figure 4:** Heathkit supplied packets of solder with their kits. This is manufactured by Alpha. Later Kester was a supplier but used clear bags.

solder terminal strips, the power transformer and power supply components, main and bandspread tuning capacitors, switches and pots, pilot light sockets, etc. At this time the pulleys, shafts and mechanical parts associated with the tuning capacitors are also in-



**Figure 5:** Top interior view of the SW-717. Note the circuit board to the right and the main tuning capacitor and can capacitor along the center. The twisted blk/whi wires go to the speaker attached on the cover partially visible to the left



## Put together an exciting Heathkit short wave-listening hobby




**3 EVENING KIT**

### Heathkit 4-band solid-state "Beginners" SWL Receiver tunes from "Rock" to Russia for only... **59<sup>95</sup>** NO MONEY DOWN

Ideal beginner's kit...most components mount on single circuit board for easy check-by-step assembly in about three evenings. Tunes foreign broadcasts from around the globe — weather reports — ships at sea — amateur and CB bands — plus local AM entertainment. Features slide-rule tuning; log-scale; bandspread tuning for separating adjacent stations; variable BFO for clear code reception; built-in speaker; front panel jack for headphone or external speaker; switched automatic noise limiting; signal strength meter; built-in AM rod antenna plus connection for SWL antenna.

**Kit SW-717, 10 lbs., mailable ..... 59.95**

#### Tune in the world on a budget

Band	Frequency Range	Content
A	550 kHz - 1500 kHz	Local AM entertainment band
B	1.5 - 4 MHz	Marine, weather and local amateur band
C	4 - 10 MHz	Europe, Latin America, Asia & U.S. (amateur)
D	10 - 30 MHz	U.S. & Foreign (amateur), overseas, local (CB)

Most components mount on single circuit board for easy assembly.

**SW-717 SPECIFICATIONS** — Frequency Coverage: Band A — 550 kHz—1500 kHz. Band B — 1.5–4 MHz. Band C — 4–10 MHz. Band D — 10–30 MHz. Meter: Indicates relative signal strength. Headphone Jack: Accepts low impedance headphones or external speaker. Loudspeaker: Built-in. Controls: Volume with on/off switch; Mode (AM, Standby & CW); BFO; Main Tuning; Bandspeed Tuning; ANL on/off. Transistor Complement: 40673, Mixer & RF amplifier; 2N3393, Audio preamplifier; 2N5232A, IF amplifier, AGC amplifier; 2N5308, IF amplifier; MPF105, oscillator; S2090, final audio amplifier; S2091, final audio amplifier; X29A829, Audio driver. Power Supply: Transformer operated; full-wave bridge rectifier. Voltage Requirements: 120/240 VAC, 50-60 Hz, 8 W. Dimensions: 5½" H x 14½" W x 8" D.

**Figure 6:** An ad for the Heathkit SW-717 from the 1972 factory catalog #800/40 (page 30).

stalled. The fiber board rear cover is added along with its ferrite rod antenna, wiring of these devices is begun and the the circuit board is installed and wired to the chassis mounted components. The band switch is added next with lots of connections to the circuit board. Much of the final wiring is then finished including a few shielded cables and the power cord. instructions are given for wiring the power cord for either 120 or 240 volts.

At final assembly the pulleys are added and the main and bandspeed tuning dials are strung with their dial pointers. Each dial cord comes pre-cut to length, a nice touch. The front panel is attached along with the knobs,-pilot lamps and S-meter. The bottom panel is assembled with rubber feet but not yet attached.

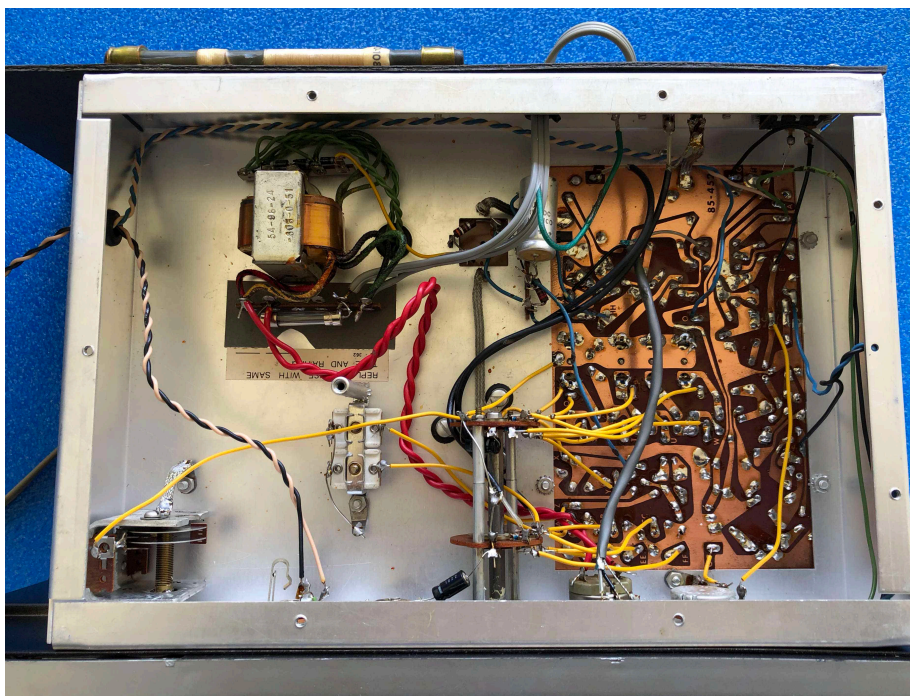
Final testing comes next with resistance and voltage checks. If all checks out the bottom plate is mounted and you may align the receiver with or without test instruments. Of course test instruments (this kit requires a simple signal generator and a VTVM, both available from Heathkit or other places) will give better results, though the non-test equipment will produce good results - a feat Heathkit has been famous for during its reign.

Throughout the building of the kit are clues that Heathkit was cutting corners to keep the price of the kit down. Most notable is that the S-meter and the speaker are mounted by double back foam tape. For the speaker it does provide acoustic isolation, however the meter is taped to both the front panel and the front sub-panel, making any later



disassembly problematic. Also, the front panel is plastic and the paint is rather thin so that after a little wear light from the two pilot lamps can be seen through any scratch or even the silver paint. Heathkit tried to reduce this by putting some opaque tape between the right hand pilot lamp and the front panel. This pilot light indirectly illuminates the band spread slide rule dial and the S-meter as well as the right side of the main side rule dial. A separate pilot light illuminates the left side of the main side rule dial. Interestingly, Heath uses two different types of pilot bulbs.

The left bulb is a #53 and the right bulb is a #1813. Both are rated at 14.4 volts but they have different light output. The brighter bulb (the #53) is located to the left of the main dial.

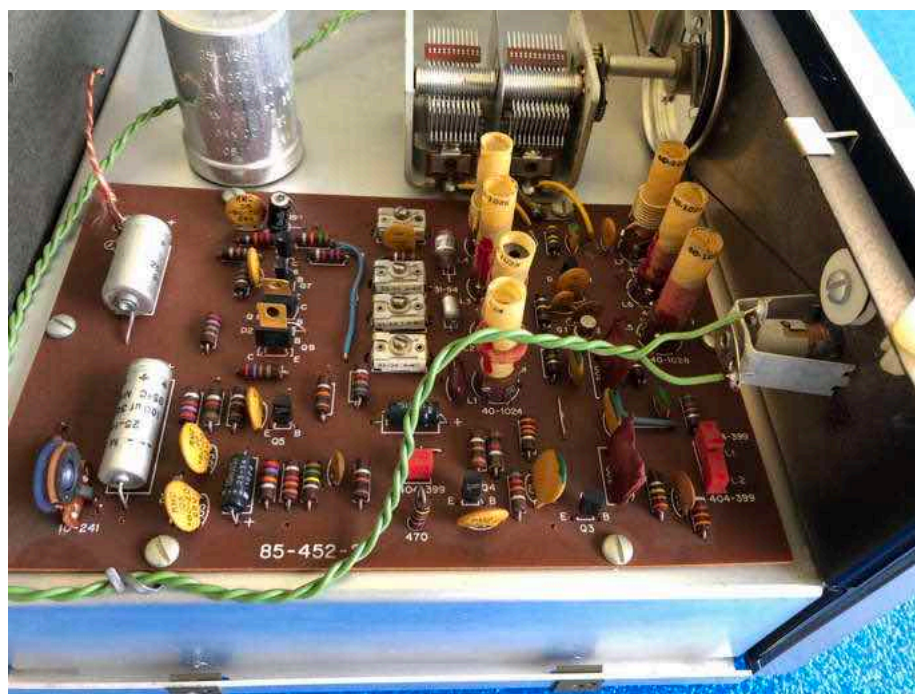


**Figure 7:** SW-717 under-chassis view. Bandspread capacitor is at the lower left.

### Heathkit SW-717 (S/N 133 115120)

Last October at the auction I picked up an SW-717. At first I was a bit hesitant due mainly to the fact the main tuning knob stuck out about 3/8" more than it should, which meant perhaps the kit was modified. Or perhaps the knob was just not on correctly. The latter seemed difficult to believe. I won it in the auction, but really wasn't sure what I had.

On initial inspection the tuning shaft was definitely sticking out too far; something was amiss. there. Also one of the knobs was missing, replaced with a "chicken head" knob. Looking inside, the circuit board seemed intact but some of the tuning coils were leaning, one significantly. Later I noticed one of the ceramic filters was soldered in "catty-



**Figure 8:** SW-717 showing circuit board top.

wampus". Some of the soldering was a bit messy, but no cold solder joints stood out. The radio "let out no smoke" when I first turned it on, and it worked on the AM broadcast band. A quick check with a signal generator showed all the bands were receiving, though an alignment is needed. **Figure 7** and **Figure 8** show internal views of the radio.

The tuning knob physically sticking out farther than it should was caused by the shaft bushing being installed backwards; that I fixed but then the main tuning dial required restringing; that's one of the tasks I really try to avoid.

There are a few common problems with this receiver that users have experienced. Suggested fixes are available on the web<sup>5</sup>. One problem is the tendency for the bandspread tuning to slip when being turned clockwise. This radio experiences that problem and the fix was tried when the front panel was removed to correct the main tuning shaft bushing. It seemed to work for awhile but is slipping again. The whole bandspread dial system is another sign the radio was compromised by cost-cutting. Instead of using pulleys, as the main tuning does, the dial string is strung around three fixed posts, and enough friction is created to cause the vernier drive of the bandspread capacitor to slip. The published solution is to stretch the dial spring slightly to reduce the tension and thus the friction. Obviously it wasn't stretched enough on the first try. Another problem is oscillation on the high end of band D. This radio is not experiencing that problem. A simple capacitor change is supposed to solve it. The third problem is distorted audio. I find the audio a bit muffled so I will try that modification.

Some users have complained of hum from the speaker, even with the volume control at minimum<sup>6</sup>. The fix is to add an additional RC fil-

ter network to the power supply. I have to listen hard to hear any hum and this SW-717 doesn't seem to have a hum problem.

### Summary:

For casual SW listening the SW-717 makes a nice beginner's receiver. Unfortunately, there is less and less English broadcasting to listen to on the shortwave bands.

The SW-717 would not make an acceptable receiver for ham radio; it lacks features that one would need, even if they were operating as a novice back in the sixties. Still it is a kit with which a beginning kit builder could acquire confidence and enjoy playing with. A ham could use it as a simple SWL receiver. Also, a receiver like this is great on the test bench to check that oscillators are working.

73, from AF6C



### NOTES:

1. For instance the GR-54 has a 1682 kHz I-F so it is designed NOT to receive frequencies between 1550 and 2000 kHz
2. It may have been introduced in a later 1971 catalog that is not in my catalog collection.
3. The GRA-72 came with 75' of antenna wire, 30' of lead-in and all insulators and hardware.
4. A copy of the SW-717 schematic is available on the W6ZE website at:  
<http://www.w6ze.org/Heathkit/Sch/SW717Sch.jpg>
5. For modification info see Bill Wilkinson's webpage at:  
[http://www.heco.home.mindspring.com/heco\\_fix.html](http://www.heco.home.mindspring.com/heco_fix.html)  
and scroll down to SW-717 near bottom.
6. For hum solution see:  
<https://people.ohio.edu/poslr/bapix/SW-717.htm>

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

*Thanks - AF6C*



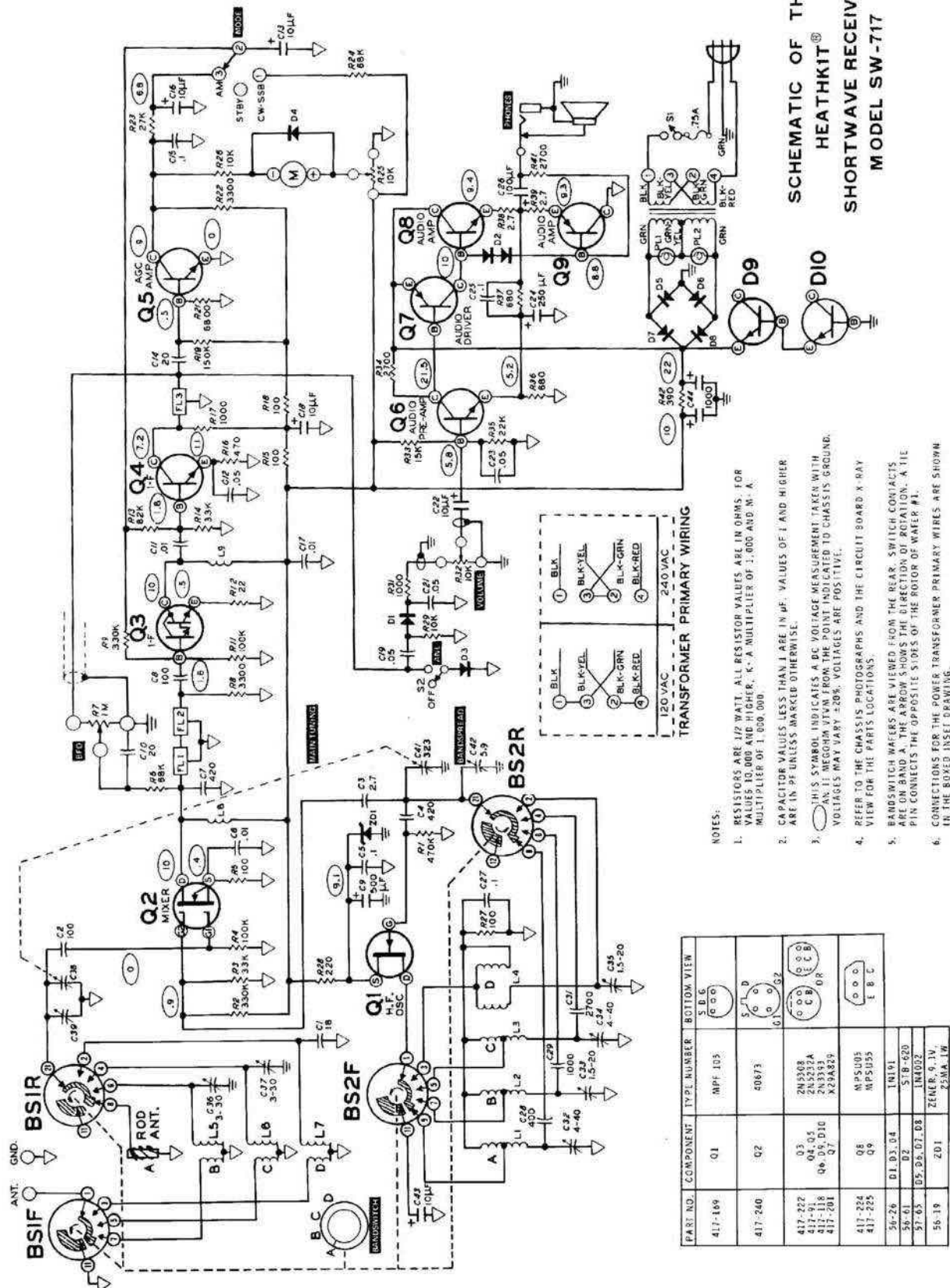


Figure 9

# MiniTiouner-Express

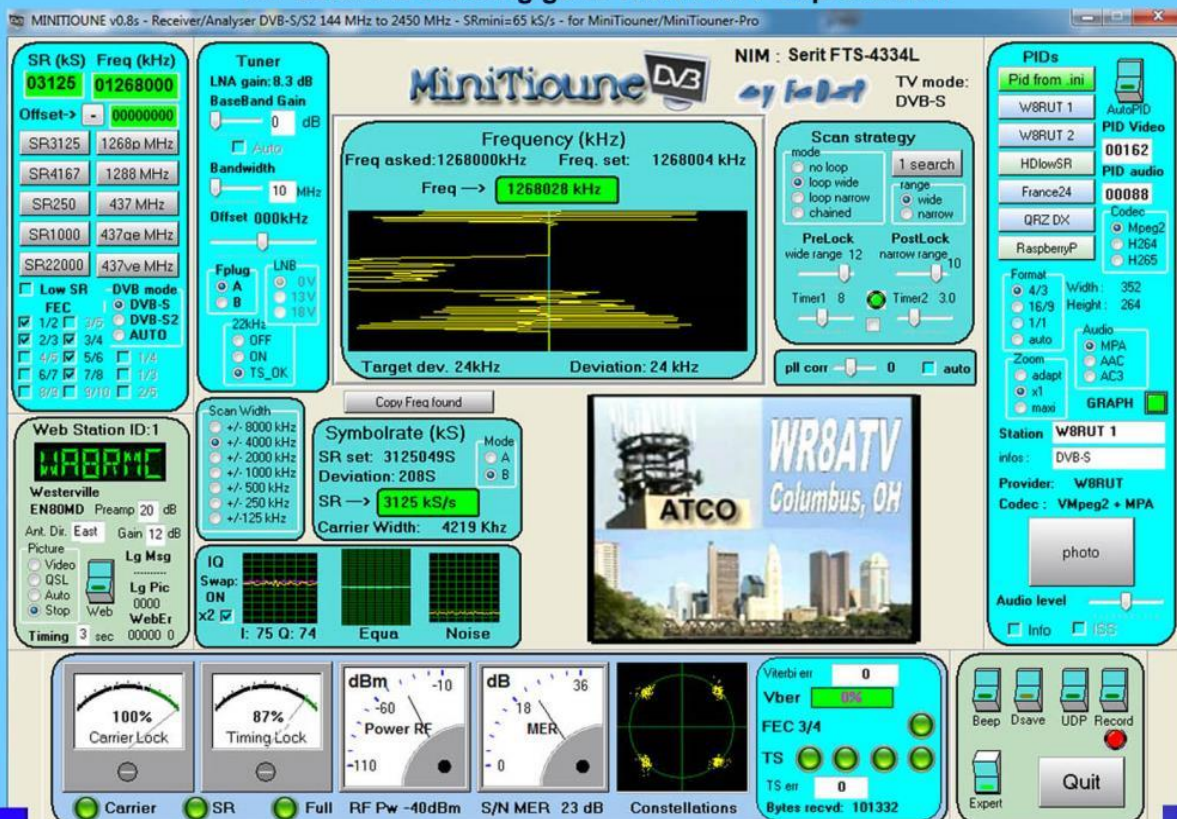
## Digital Amateur Television DVB-S/S2 Receiver / Analyzer



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