RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LIX NO. 07 P.O. BOX 3454, TUSTIN, CA 92781-3454 July 2018

The Prez Sez.....

by Tim N6GP

Field Day is "a wrap", as they say in the movie business, and it sure was a spectacular one. All of our countless hours of planning, logistics and execution came together to make our Field Day a great one as part of our 85th Anniversary celebration. How big of a Field Day was it? Start with Tom W6ETC's well equipped, red EMCOMM trailer complete with A/C. Then add an arsenal of antennas brought in and quickly assembled by Chip K7JA. Then top it off with Dino KX6D's impressive, 100-foot-tall tower and antennas, complete with an American flag on top! Jesse KB6MQY, Cheyenne KK6MSK and Boy Scout Troop 440 served up some delicious, healthy meals. Thank you to everyone who participated – from the band captains, to everyone who set up, tore down, and helped move our equipment. The operators did a great job, including several of whom joined us from the ABCD Group. Many of the very professional photos you see elsewhere in this newsletter were taken by professional photographer Mike Slygh NM6X. Thank you!

On the West Coast, unfortunately we had some strong headwinds of very poor conditions on Field Day. In addition to that, the Sporadic E that added excitement to 6 and 10 meters for most of the month of June, refused to materialize. The East Coast had much better conditions. Our score in the 12,500-point range would have placed us in 28th place last year. Certainly, we will be in the top 1 percentile, and we can be proud of that!

Several of our members made contact with the Baker Island DXpedition, that Arnie N6HC was on. They had to endure 110-degree heat with high humidity in order to make their 68,000 QSOs. As of this writing, they have arrived in Fiji, and are ready to fly home. A fine job by Arnie and the other expeditioners added a "new one" to many of our logs. For me, this was the last U.S. owned DXCC entity to get.

73.

Tim Goeppinger N6GP

President

Next General Meeting

The July 2018 OCARC General Meeting program will be presented on:

"ARES and RACES – A Discussion"

In the planning stage for Carl Gardenias (WU6D – Section Manager, ARES) and Ken Bourne (W6HK – OC RACES Chief) to support a half hour presentation from each on their organizations. Would include purpose, membership, when activated, etc. This will be followed up with a panel of the presenters available for some questions.

The next General Meeting will be on:

Friday, July 20th, 2018
@ 7:00 PM

ENTER from the WEST SIDE entrance of the Red Cross Building, Room 208
Take elevator to the 2nd Floor.
See you there!

In This Issue……Page

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www.W6ZE.org

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Feedback & Corrections:
rf_feedback@w6ze.org

Submit articles:
editors@w6ze.org

Monthly Events:

General Meeting:
Third Friday of the month
at 7:00 PM held at:
American Red Cross
600 Parkcenter Drive
Santa Ana, CA
(Near Tustin Ave. & 4th St.)

Club Breakfast (Board Mtg):
Normally First Saturday of month at 8am
Marie Callender's Restaurant
1821 North Grand Ave
Santa Ana, CA
(Between 17th & Santa Clara)

Club Nets (Listen for W6ZE):
28.375 ± MHz SSB
Wed- 7:30 PM - 8:30 PM
Bob AF6C, Net Control
Alt: Corey, KE6YHX, Net Control

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

7.086 ± MHz CW **OCWN**
Sun- 9:00 AM – 10 AM
Ann K6OIO, Net Control

Club Dues for 2018:
Regular Members renewals*- - - $30
Family renewal/Join**- - - - - - - - $45
New Member Join May-Jun*** **$15.00**
Replacement Badge**** - - - - - - $ 3

* Member renewals Jan-Dec.
** Two members or more, w/badge.
*** New members Jul-Sept, w/badge.
**** There is a $1.50 charge if you'd like to have your badge mailed to you.

W6ZE Field Day!

"RF"

ORANGE COUNTY AMATEUR RADIO CLUB

JULY 2018

FIELD DAY SUMMARY

FOR

THE ORANGE COUNTY AMATEUR RADIO CLUB - W6ZE - - page 1 of 2

by: Ken / W6HHC & Bob / AF6C

NOTE: Adjustments have not been made for duplicate contacts,and bonus points. Final scores appear in QST.

YEAR	160M SSB	80M CW	75M SSB	40M CW	40M SSB	20M CW	20M SSB	15M CW	15M SSB	12M SSB	10M CW	10M SSB	6M CW	6M PHN	2M CW	2M PHN	220 PHN	440 PHN	UHF CW	UHF PHN	ATV	RTTY/PSK Dig	SAT-ELLITE	GOTA	- - - - TOTAL - - - - QSO's	/	(POINTS)
2018	**0**	**97**	**182**	**476**	**923**	**592**	**848**	**138**	**211**	**0**	**38**	**60**	**0**	**67**	**1**	**52**	**0**	**13**	**0**	**0**	**0**	**137**	**4**	**45**	**3,884**	**/**	**10,726**
2017	0	0	12	449	852	262	787	0	0	0	0	0	0	25	0	51	0	0	0	0	0	91	4	50	2,583	/	6,770
2016	0	29	18	163	342	206	760	15	18	0	0	0	1	36	0	44	0	1	0	0	0	188	1	52	1,874	/	4,952
2015	0	53	121	115	507	661	1161	190	324	0	1	71	3	60	0	45	0	6	0	0	0	77	0	1	3,396	/	8,992
2014	0	111	122	756	723	1059	1113	559	382	0	57	134	25	133	0	43	0	11	0	0	0	121	23	47	5,419	/	16,214
2013	0	269	339	655	1052	895	1960	484	614	0	38	67	6	60	0	60	15	11	0	0	0	144	4	186	6,859	/	18,700
2012	0	14	51	125	78	215	735	185	330	0	0	12	1	50	0	37	5	5	0	0	0	13	0	408	2,264	/	5,634
2011	0	58	176	168	217	253	703	32	198	0	16	40	0	57	0	37	0	16	0	0	0	0	0	139	2,110	/	5,278
2010	0	0	0	240	342	223	727	49	0	0	0	0	1	96	0	32	1	7	0	0	0	0	0	160	1,878	/	4,786
2009	0	277	126	838	807	974	970	495	368	0	5	450	11	375	0	125	18	20	1	0	0	0	2	130	5,992	/	17,446
2008	0	179	204	690	405	411	878	141	43	0	22	68	15	135	0	34	2	14	0	3	0	0	5	16	3,265	/	9,468
2007	1	356	310	910	830	988	1285	381	320	0	18	150	9	145	2	175	40	70	2	9	0	2	11	142	6,156	/	17,648
2006	0	28	20	89	512	156	664	16	10	0	0	0	0	38	1	85	0	7	0	0	0	114	0	113	1,853	/	4,514
2005	0	113	6	158	481	337	534	122	17	0	0	0	0	74	0	36	16	20	0	0	0	0	0	31	1,945	/	5,350
2004	0	166	239	37	412	131	477	31	105	0	1	114	0	0	0	46	12	20			0	0	1	0	1,792	/	4,316
2003	0	0	85	52	127	27	295	0	191	0	0	41	0	52	0	64	1	13			0	0	0	0	948	/	2,054
2002	0	26	69	192	279	76	229	0	485	0	0	18	0	62	0	68	6	10			3	2	0	3	1,528	/	3,648
2001	0	0	25	101	251	0	432	0	675	0	0	109	0	48	0	28	1	0			0	0	3	-	1,673	/	3,548
2000	0	19	20	88	91	0	625	0	794	0	0	121	0	36	0	72	7	15			0	0	1	-	1,889	/	3,992
1999	0	13	20	15	237	0	996	0	724	0	0	22		5	0	2	0	0			0	0	0	-	2,034	/	4,124
1998	0	24	75	65	136	100	250	0	624	0	0	82		0	0	46	17	12			0	7	1	-	1,439	/	3,270
1997	5	81	131	83	306	150	853	14	275	0	0	106		32	0	79	4	0			0	32	1	-	2,152	/	5,024
1996	-	146	228	104	125	283	673	40	605	0	0	217		121	0	32	0	40			0	13	1	-	2,628	/	6,428
1995	-	145	272	203	94	443	572	51	451	0	0	131		66	0	93	29	8			0	33	6	-	2,597	/	6,944
1994	-	114	114	208	45	486	748	85	761	0	13	312		58	0	94	33	0			0	31	0	-	3,102	/	8,078
1993	-	150	100	159	81	530	700	131	812	0	0	179		40	0	86	12	16			0	35	0	-	3,061	/	8,132
1992	-	0	294	200	110	541	555	0	840	0	0	232		13	0	74	0	1			2	41	80	-	2,983	/	7,530
1991	-	105	308	182	182	400	623	9	463	0	0	104		4	0	141	23	11			0	48	0	-	2,626	/	6,740
1990	-	0	0	70	144	0	370	0	747	0	0	131		39	0	114	14	26			0	2	-	-	1,657	/	3,454
1989	-	30	0	98	5	0	906	21	172	0	0	238		3	0	121	24	9			1	18	-	-	1,646	/	3,590
1988	-	127	0	93	75	2	359	0	570	0	144	81		0	0	32	0	-			-	14	-	-	1,497	/	3,726
1987	-	22	0	0	39	0	708	0	18	1	117	0		1	0	51	0	-			-	5	-	-	962	/	2,202
1986	-	0	46	219	78	0	488	0	45	10	0	0		0	0	82	0	-			-	0	-	-	968	/	2,374
1985	-	85	0	315	91	35	662	78	0	-	0	0		0	0	22	0	-			-	-	-	-	1,288	/	3,602
1984	-	18	0	313	0	32	196	32	350	-	0	0		0	0	0	0	-			-	-	-	-	941	/	2,672
1983	-	3	93	200	0	0	776	0	995	-	0	43		18	0	16	1	-			-	-	-	-	2,145	/	4,696
1982	-	0	105	59	238	40	352	19	515	-	0	72		0	0	155	27	-			-	-	-	-	1,582	/	3,400
1981	-	0	167	200	265	60	699	77	717	-	0	105		0	0	197	0	-			-	-	-	-	2,487	/	5,648
1980	-	20	149	205	235	471	318	52	1,025	-	0	226		12	0	100	36	-			-	-	-	-	2,849	/	7,194
1979	-	0	195	198	92	42	773	0	737	-	0	95		0	2	124	8	-			-	-	-	-	2,266	/	5,016
1978	-	16	196	246	170	30	981	57	558	-	13	145		0	1	164	23	-			-	-	-	-	2,600	/	5,926
1977	-	25	243	182	199	0	843	81	486	-	4	309		0	4	234	0	-			-	-	-	-	2,610	/	5,812
1976	-	99	254	152	487	21	600	64	210	-	2	54		0	0	2	0	-			-	-	-	-	1,945	/	4,566
1975	-	80	120	154	274	40	863	140	259	-	0	123		0	0	0	0	-			-	-	-	-	2,053	/	4,934
1974	-	6	161	6	333	0	630	12	342	-	0	110		0	0	0	0	-			-	-	-	-	1,600	/	3,248
1973	-	90	226	0	452	0	932	0	273	-	0	0		0	0	46	0	-			-	-	-	-	2,019	/	4,218
1972	-	0	50	0	350	0	521	0	530	-	0	0		0	0	94	0	-			-	-	-	-	1,545	/	3,090
1971	-	0	274	0	106	0	530	0	136	-	0	0		0	0	0	0	-			-	-	-	-	1,046	/	2,092
1970	-	0	272	0	0	0	531	0	426	-	0	0		0	0	0	0	-			-	-	-	-	1,229	/	2,458
1969	-	0	98	0	50	0	375	0	301	-	0	0		0	0	169	0	-			-	-	-	-	993	/	1,986
1968	-	10	224	62	396	93	328	24	430	-	0	68		0	0	145	0	-			-	-	-	-	1,780	/	3,938

The 20M and 40M SSB stations were having a little competition and cooperation. At the start the 40M SSB station was ahead in QSOs. Then Saturday afternoon hit. Sharon Spring, K6IRD, gave the female voice some punch and kept cranking them out. Chip, K7JA, went over from the 40M and put the rate meter over 200 QSOs/hour. Dan, KI6X, also went over from the 40M and kept the rate meter over 100 QSOs/hour. 20M had passed up 40M during this time at by least 10%. Over the slow periods overnight it was much quieter and things progressed. In the morning, the 40M station with Chip and Dan had a 10M window and took advantage of it to make some 10M QSOs which had been sparse. Then Dan finished the last hour on 40M with good numbers. In the end, 40M SSB QSOs (not counting the 10M) exceeded the 20M SSB (and all other band/modes). It was close with 40M exceeding 20M by 30 QSOs (923 to 893).

--Dan KI6X

The first two days of Field Day, Friday and Saturday, the weather was tepid and overcast. The grass was green and lush with the recent rains. Dino's 100+ foot tower was safe and secure, but a climber was seen working on it; we hope he had a safe climb. Before FD started, Bryan K6AJY tested a G5RV dipole from home by attaching between the two north towers, contacting Pennsylvania! Kenan KR6J, Don K0VNJ and Richard K6RBS manned the VHF Station, and Corey KE6YHX provided a suitcase first aid kit for the site at their tent. Greg W6ATB set up the Digital tent at the far north end of the field on Friday, and was working to set up his rig all morning Saturday. Chip K7JA captained three important stations, 10m CW, 10m SSB, and 40m SSB! Bob, AF6C prepared and tended the generator and gas. Corey brought a jug of gas as well, and helped Bob fill the generator. The Scouts set up Friday afternoon and provided excellent meals all 3 days; they certainly know how to cook, and in the rough to boot!

Saturday night was cool but not too chilly. Some OPs stayed up all night operating their stations, others slept soundly. By morning, the Digital station racked up another 27 QSOs! After dawn broke, propagation opened up on 10m and Chip and Dan took good advantage of it. On Sunday, the sun came out and warmed a little, but the breeze made it comfortable. We had delicious egg and salsa breakfast burritos, prepared by the Scouts. Then 40m cranked-out steady QSOs until the end. Greg caught another two satellite contacts to top it off!

Chip's group started teardown of the GOTA station almost immediately, and after the group photo, started dismantling the other stations. Corey rallied the Scouts and the other OPs for the group photo after David AD7DB offered to take it. Thank you, David. Corey helped Greg take down his tent, and we ended another safe and organized Field Day. Thank you all for offering, providing and participating.

--73, Corey Miller KE6YHX

Left: Dino’s 100+ft tower stands proudly.
Right: Gene KJ6OML, XYL, and Joel

Radio~Activity Opportunities

Dates and Activities well worth considering…

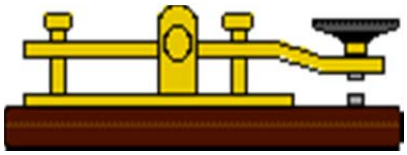
JUNE

- ***ARRL June VHF QSO Party:** 1800 UTC Saturday June 9 through 0259 UTC Monday June 11.
- **Kids Day:** Saturday in June 16, 1800 UTC through 2359 UTC
- **OCARC Field Day:** 1800 UTC Saturday 23 through 1800 UTC Sunday 24.

JULY

- **RAC Canada Day Contest:** 0000 UTC through 1359 UTC Sunday July 1.
- **IARU HF World Championships:** 1200 UTC Saturday July 14 through 1159 UTC Sunday July 15.
- ***CQ WW VHF:** 1800 UTC Saturday July 21 through 1159 UTC Sunday July 22.
- ****North American QSO Party / RTTY:** 1800 UTC Saturday July 21 through 0559 UTC Sunday July 22

* 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:

- **None**

Continuing Activity:

- **ARRL International Grid Chase**
  January 1, 2018 through December 2018

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.

To have your favorite activity included
in next month's *Radio~ Activity column*
send an email to *Ron W6WG, w6wg@w6ze.org*

UPCOMING EVENTS

July 20th, 2018

Panel
"ARES and RACES – A Discussion"

In the planning stage for Carl Gardenias (WU6D – Section Manager, ARES) and Ken Bourne (W6HK – OC RACES Chief) to support a half hour presentation from each on their organizations. Would include purpose, membership, when activated, etc. This will be followed up with a panel of the presenters available for some questions.

August 17th, 2018

"Not Your Grandpa's Ham Radio"

We've all participated in demonstrating ham radio to non-hams in events like Field Day or perhaps emergency communications drills. In every case, demonstration stations feature station equipment and antenna setups and operators in front of the radios. Often, the rigs and operators face away from the passers-by, and all they see are people's backs and wires and the rear panels of radios.

For the most current Upcoming event information go to the OCARC EVENTS website:
http://www.w6ze.org/Events.htm

September – 85th Anniversary and Reunion

Opportunity Drawing Request:
If you have something you would like to part with, donate it before the meeting for the Opportunity Drawing.
See Ron W6WG

OCARC –
An ARRL AFFILIATED CLUB

Save the Date – Sept. 21, 2018

Early in 1933 the Moore brothers, Earl W6IGO and Harry W6FUU, opened a radio store in Santa Ana and supported the formation of a radio club that came to be named the Orange County Amateur Radio Club. Shortly thereafter, on March 15, 1934, that club, OCARC, was granted affiliation with the American Radio Relay League.

Today, in 2018, we're celebrating our 85th year of service to the ham community and plan to gather at the September General Meeting for an 85th Anniversary Celebration including all current and former OCARC members.

Please keep the date of Friday, September 21, 2018 open and plan to meet with your old friends at our 85th Anniversary Reunion Meeting.

Meeting time – 7 pm
Meeting location – Santa Ana Red Cross Office Building, Room 208
600 Park Center Drive
Santa Ana, CA 92705
Directions including a map are available at www.w6ze.org/meetings.

Heathkit of the Month #86:
by Bob Eckweiler, AF6C

KIT RESTORATION

Heathkit V-6
VTVM Restoration Part II.

Introduction:

It seems like this project took forever to complete, though actual time working on it was not many hours over a long period. Part I appeared in the April 2018 issue of ***RF*** and covered "siliconizing the selenium rectifier" in the V-6. This amounts to removing the selenium plates and replacing them with a silicon diode (a 1N4004 here) while keeping the outside appearance of the original part. The restored Heathkit V-6 VTVM (circa 1952 to 1954) is shown in **Figures 1** and **2** during burn-in. **Figure 15** shows the V-6 schematic.

If this project were to be done over, there are a few things that should have done that weren't. The first is taking photos of the original V-6. When the cover first was removed a disaster was revealed and the plan changed to recover any parts and take the rest to the electronic scrap yard. Like most all VTVMs the Heathkit V-6 uses a battery for its ohmmeter circuit, a 1.5 volt 'C' battery. The battery was no longer in the unit but the damage it had done from leaking was extensive. Two of the three metal chassis parts were corroded significantly and the third less so, but still damaged. The almost "unobtanium" 7.5 Meg Ω potentiometer in the A.C. balance

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

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

Figure 1: Completed restoration of the Heathkit V-6 VTVM during burn-in. The slight meter offset is intentional and indicates the circuit continues to function.

circuit was badly corroded. So much so that removing it resulted in the threaded bushing disintegrating. Amazingly the pot element appeared okay. After reading a discussion[1] on cleaning and restoring a chassis, the decision was made to try a restore despite the damage.

The second thing that should have been done was to check and clean the **OFF-ON** slide switch. This was an oversight; a fair amount of time was spent cleaning the two rotary switches, actually disassembling one. The OFF-ON switch however, when removed from the chassis, had its terminals cleaned of excess solder and put in the box of parts with-

[1] Notes are on page **.

Figure 2: Another photo of the completed restoration of the Heathkit V-6 VTVM during burn-in. This photo shows the repainted case color.

out further consideration. What's less complicated than an SPST slide switch after all?

Degrees of Restoration:

There are various degrees of restoration when it comes to a Heathkit product. A minimum restoration probably includes a thorough cleaning (some better than others), replacing or repairing any obviously bad parts, and possibly some or all the electrolytic capacitors. A better restoration involves changing all the electrolytic capacitors as well as any tubular paper type capacitors - also replacing any resistors that look overheated or are beyond their marked tolerance. Then there is the "total" restoration. This involves stripping the kit back into a set of parts, checking and cleaning everything, replacing any hardware deemed deteriorated that is still available and replacing the small parts such as resistors, capacitors, terminal strips and anything else

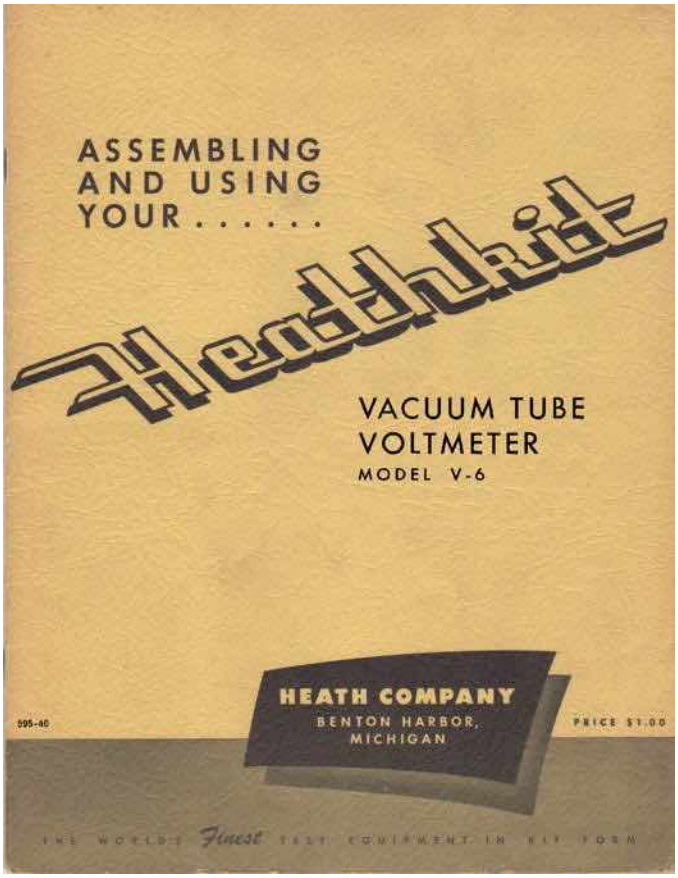


Figure 3: Having a complete manual is important.

that can easily be obtained that could go bad in the future.

Obtain the Manual:

Get a copy of the Heathkit manual for the model you're restoring; it is a wise investment (**Figure 3**). If you are going to do anything but the most primitive restoration the manual is valuable for teardown as well as for rebuild. Sometimes manuals can be found online, however many of those online are missing the step-by-step assembly instruction section. There are many vendors that sell replacement manuals for vintage Heathkits. One source is the new Heathkit Company[2]. Other vendor sources can also be found online. Prices and quality vary so shop around. Often original manuals can be found on eBay. It is wise to know your kit; some kits change over time. For instance there are two versions of the DX-40, each with its own

manual. Also, in larger kits, circuits often change resulting in a new different circuit board. The IO-4550 oscilloscope used at least two different HV power supply boards due to a change made to the chop blanking circuit.

This V-6 Restoration Degree:

This restoration is close to total. The whole kit was stripped down to individual parts except for the RANGE switch (which will be discussed later), and each part was tested, and cleaned if it was to be reused (except, alas, for the power switch). Other than precision resistors, all resistors were replaced; so were two of the three capacitors. A mica-type capacitor (0.003 μf) was kept because it checked good and was of the classic square molded style. It is huge compared to today's dipped mica of the same value, and sits over one of the tube sockets. Later, it kept getting in the way during checkout, so there is some minor regret in not changing it.

Modifications(?):

Another part of restoration may be making modifications to the kit. Generally this is not recommended, especially if it includes modifying or drilling holes in the chassis, or worse the front or back panel. Still, there are safety modifications that can be appropriate, like a three-wire power cord, replacing capacitors used across the A.C. line with safety capacitors and adding a fuse in the primary circuit. Of course, modifications sanctioned by the Heathkit factory are acceptable, and even warranted if they meet the user's needs. The only modification made to this V-6 was the addition of a 3-wire line cord[3].

Disassembly:

Returning the kit to its basic parts requires some thought and skill. The manual will help govern the order of disassembly. For a kit like the V-6, first remove the tubes and place them in tube boxes or wrap them in newspaper. Be sure to mark what's inside. Remove the power cord if there is one; you will likely want to replace it[4]. This kit came with about four inches of power cord sticking out of the back where it had been cut off. For a VTVM you want to get the easily damaged meter removed as soon as possible and stored safely, so remove what's necessary to get there quickly. Heavy items are removed next (if they weren't already). The power transformer is the only heavy item in the V-6. Remove the leads first; unsolder, if you're able, to keep the leads as long as possible for reinstalling. Also note where each lead goes to. This transformer has six leads two black (now gray), two red (now a slightly different shade of gray) and two green, (now yet a third shade of gray) - perhaps a slight exaggeration, but still determining the lead color would not have been a snap, like when the transformer was new.

Finally it is time to remove the wiring and components. Hookup wire generally should be cut off at each end and discarded. Resistors can be measured in situ after you free one end. If they are in tolerance try to save them; you'll probably not use them but they are valuable if you can't easily find a replacement. The same is true of capacitors. The general rule is to save as much as you can, unless you know you have or can obtain a replacement.

It is important to organize and store all the parts in one place so they can be found easily for checking and later for reinstallation. A large shoe box was used for this small kit.

The V-6 Range Switch:

The range switch is a two deck, seven position, wafer switch. Each deck not only contains seven switch terminals but also four dummy terminals that are used for tie points for the resistors. The two decks are spaced far

enough apart so large precision resistors can be mounted from one deck to the other. In total, the switch holds fourteen precision resistors. Since they are easy to damage and hard to replace, there was no reason to remove them. The switch itself was cleaned and all resistors checked. One 200 KΩ precision resistor was obviously open as it was bypassed by two tiny 0.1 watt 100K precision resistors in series. These were removed, as was the dead original, and a 200K precision resistor was ordered from a parts warehouse (luckily it was a common value, unlike some of the others). The range switch had suffered some of the corrosion damage caused by the leaking battery. It manifested itself on the nut end of one of the long screws holding the wafers. The nut and and an area of the screw around the nut were rusted. Instead of trying to unscrew it a rust converter[5] was used to neutralize the rust and prevent further damage.

The Function Switch:

The second rotary switch is the function switch. It is a four-position rotary switch with two wafers. The switch was disassembled, the mechanism cleaned and lubricated with white lithium grease. The wafers were carefully cleaned with good a contact cleaner. This is so much easier to do with the switch disassembled, and one is less likely to get cleaner on the phenolic insulation, which can compromise the insulation quality (not good in an ohmmeter that measures up to 1 gigaohm! After cleaning, the switch was wrapped in newspaper and stored, awaiting assembly.

Checking Parts:

Each component that you plan to reinstall should be checked. Resistors may be checked with a good VOM or VTVM. Tubes will require a tube tester; if you don't have one check with your ham friends. Capacitors can be more of a problem. Handheld capacitance meters are okay for determining the capacitance but give no indication of leakage, a problem often encountered in older electronics. A Heathkit IT-11 Capacitor Checker[6] measures leakage up to 600 V as well as capacitance and ESR. Other components should be checked as necessary; check switches for continuity with an ohmmeter, (including the power switch!)

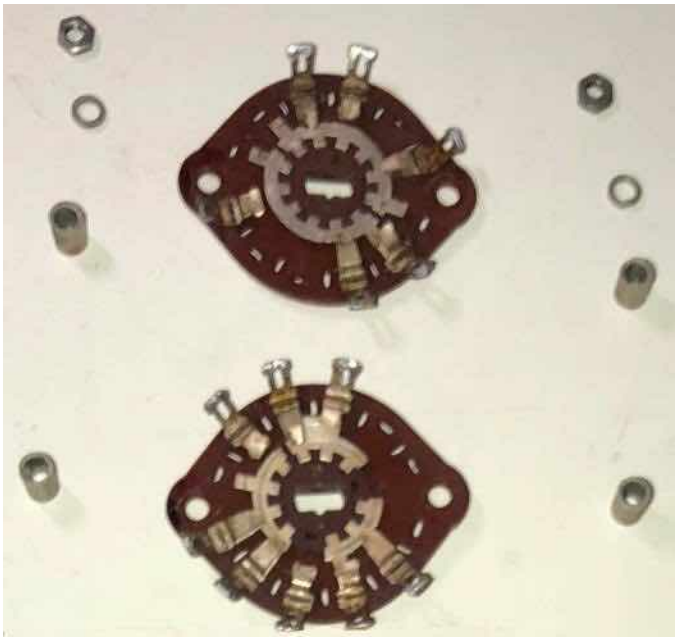


Figure 4: Disassembled function switch wafers awaiting cleaning.

In the case of the V-6, the two tubes tested okay on the Philco 7050 tube tester, another recent restoration product. The V-6 uses only three capacitors the 0.003 µf mica, discussed earlier, a 16 µf electrolytic capacitor used in the power supply and a 0.01 axial tubular capacitor. All three original capacitors were tested; the electrolytic showed an above acceptable leakage rate as did the 0.01 2 KV capacitor (even at a low voltage of 200 volts). This capacitor is common enough except for its voltage rating of 2 KV. Mouser carries them, but was out, as were other sources, so it took awhile until they could be obtained. Several were ordered as there are other Heathkits in house that use this same capacitor.

There are only six non-precision fixed resistors and they all were destined to be replaced; though all but two were within tolerance. Both 10K front panel potentiometers were also replaced. One had been replaced by a ten-turn Bourns pot - a nice touch, but overkill. A three turn pots would be ideal, and make a reasonable modification, but none could be found at a reasonable price. The two 10 KΩ calibration pots were also open for replacement, but tested out okay, so the replacements that had been purchased remained on the shelf. the 7.5 MΩ AC balance pot was still a problem.

Obtaining Replacement Parts:

Each year this becomes more of a problem. Through-hole resistors are still readily available, though newer metal oxide and film resistors are replacing the older carbon composition resistors. While radially-leaded capacitors are still easily obtained, axially-leaded capacitors are growing scarce and getting expensive, as are all types of higher voltage capacitors.

There is a problem today buying replacement potentiometers. Many come from Asia and most are metric. You can buy them with 1/4" shafts so the original knobs will fit, but the bushings are usually not the standard 3/8", (0.375"), but instead 8 mm, which is about 0.315" Thus the pot mounts with a lot of slop in the original mounting hole. A single wrap of #22 solid wire around the base of the bushing can remove a lot of the slack. Otherwise it is hard to get the control centered in the 3/8" mounting hole.

The 7.5 MΩ potentiometer was still the biggest problem. After checking the Heathkit **"boneyard"**[7] without any luck, a member of the Yahoo Heathkit group passed along an eBay link where a Clarostat NOS (new, old stock) 7.5MΩ pot was being sold. The price

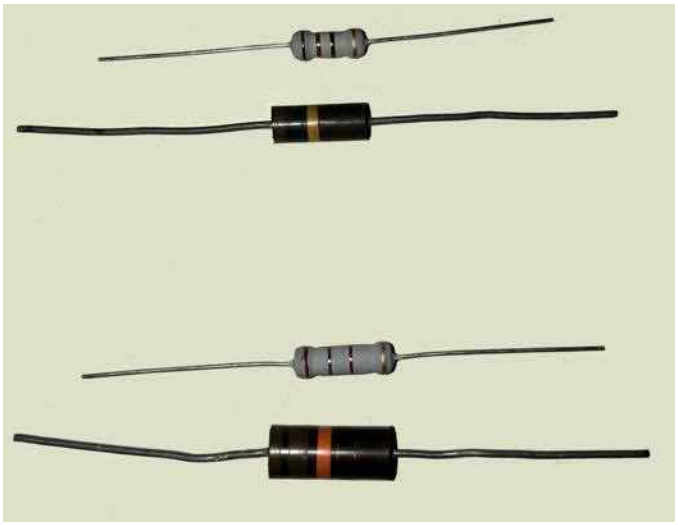


Figure 5: Resistor size comparison (from top to bottom): 1-watt metal oxide, 1-watt carbon composition, 2-watt metal oxide, 2-watt carbon composition.

was high, but not unreasonable, so one was ordered. While the part measured low, slightly out of its 20% tolerance band, it was like new otherwise and worth trying.

Many component parts may be obtained from regular parts houses such as **Allied**, **Digi-Key**, **Mouser**, **Newark** and others. One good source for capacitors and resistors is **Just Radio**[8]. They are in Canada and carry axial 630V capacitors in various capacitances, at good prices, some even in the older capacitances that are hard to find. They also stock a good inventory of axial and radial elec-

Figure 6: The V-6 chassis, cleaned, coated and partially populated with parts.

Figure 7: The front panel cleaned up nicely with just some Dawn detergent and warm water.

trolytic capacitors up to 600V. It was here that I actually found an axial 16µf 160V electrolytic capacitor to replace the original 16µf 150V one. Normally it would have been replaced with a 22µf electrolytic capacitor. Just Radio also has a selection of 1/2, 1 and 2 watt metal oxide and carbon composition resistors at reasonable prices. Be aware that they also sell "audiophile quality" capacitors; these are expensive and not worth the cost for general Heathkit restoration. Also be aware that metal oxide resistors are smaller than their carbon composition resistors of the same wattage (see **Figure 5**). As the prices are reasonable one might be tempted to replace a 1/2-watt carbon composition resistor with 1-watt metal oxide resistor and a 1-watt carbon composition resistor with 2-watt metal oxide resistor. With some exceptions, there is nothing wrong with doing this.

Restoring the Chassis and Front Panel:

Once all components were off, the chassis and the two associated brackets were cleaned with an SOS pad and sanded to remove as much of the pitted corrosion as possible. When it was finally looking reasonably smooth it was coated with Rust-oleum Satin Nickel Metal and allowed to cure. The chassis with one of the brackets attached, along with the major components is shown in **Fig-**

Figure 8: The front panel rear with **ZERO ADJ.** and **OHMS ADJ.** controls, pilot lamp, **D.C.** jack **A.C. - OHMS** jack and **OFF** - **ON** switch installed.

ure 6. Be sure all lock washers are present during reassembly and all hardware is tight to assure good grounding. No problems were encountered in area, though all grounds were checked with an ohmmeter.

The front panel can be difficult to restore if scratched excessively, chipped or stained. Luckily the V-6 front panel cleaned up with just Dawn and warm water. The few minor scratches were allowed to remain "to add character". **Figure 6** shows the front panel drying and **Figure 7** shows the back with some components installed.

Renewing Hardware:

Another consideration of restoration is hardware. the kit may be restored electronically to perfection, but if the screws are rusted, partially stripped or not what they should be, the result will appear shabby. Heathkit used binder head slotted screws in most of their kits. Rarely, if ever, was a Philips-head screw used. Yet if you go to a local hardware store the bulk of the machine screws you will find are Philips. Many of the older kits also used round-head slotted screws, including the V-6. Still the pan head screws were used to replace them as they are the most common screws used by Heathkit. these screws can still be found online and in some of the larger commercial hardware stores. When you find them pick up a box of a hundred of the common sizes Heathkit uses. They are #6-32 x 3/8", #6-32 x 1/4" and 4-40 x 1/4". A source is Jameco Electronics[9].

Often parts are hard to replace. The two 3/8" slide-on speed nuts that hold the A.C. - OHMS and COMMON jacks are an example. These were cleaned up and reused, which required them to be removed carefully during disassembly. Occasionally hard-to-find parts can be located in the little "Hillerman" drawers at local hardware stores. They are often rather expensive for what you get, but if you just need one or two you're set.

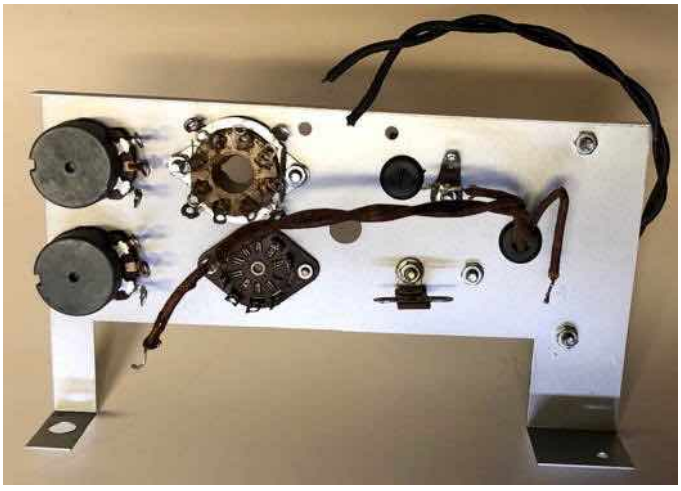


Figure 9: The underside of the chassis prior to wiring. The adjustment pots and tube sockets are original but cleaned and tested. The vacant hole is for the 7.5 MΩ pot.

Figure 10: The underside of the chassis prior to wiring. The adjustment pots and tube sockets are original but cleaned and tested. The vacant hole is for the 7.5 MΩ pot.

Figure 11: Chassis right side, showing range switch. Access to the 7.5 MΩ resistor is through the A.C. balance hole.

Figure 12: Chassis rear, showing 6H6 tube, Ohms battery, AC and DC CAL pots and power transformer.

Assembly:

Finally it's time to reassemble the kit. Again here is where the manual is so helpful. In the case of the V-6, the assembly step-by-step instructions were followed, just as if building a new kit.

If you're restoring an older kit you will immediately be aware of the many improvements Heathkit made in their construction manuals over the decades of their existence. Two areas stood while assembling the V-6, The first is that hookup wire lengths were not generally given unless the far end of the wire was to be connected at a later time. The second is the soldering instruction (S) for solder did not yet include a number for how many leads should be connected to the terminal to be before soldering. For instance this instruction from page 6 of the V-6 manual reads:

"Run a wire from J2 (S) to K2 (S)."

If this were a later manual the instruction might instead read:

"Connect a 2-1/2" wire between J2 (S-2) and K2 (S-1)."

Construction of the V-6 takes place in three parts. First the chassis is wired, then the front panel is wired, and finally the two are wired together. **Figure 9** shows the chassis underside prior to wiring. **Figure 10** shows the wired front panel prior to it being joined to the chassis and **Figures 11, 12** and **13** show the completed V-6 prior to being installed in the cabinet.

Figure 13: Chassis left side, showing "siliconized" selenium rectifier (left), 7.5 M Ω potentiometer (lower center), old style mica capacitor and new 0.01 2,000V capacitor (above octal tube socket), and function switch (in cutout, to right).

The V-6 "Reversed Diode" Situation:

One chronic problem Heathkit VTVMs suffered is poor AC balance. When switching from one of the DC positions to AC the meter zero would change; this is caused by the contact potential generated by each section of the duo-diode tube. The V-1 and V-2 did not have any adjustment to correct this. When the V-4 came out (the V-3 was a different beast) it sported an **A.C. Balance** adjustment pot. This pot used the contact potential in one diode section to cancel out the contact potential in the second section, however this only works if the correct tube section has the higher contact potential. Heath probably preselected the tubes for the V-4, but this meant about half their 6H6 tube inventory could not be used in the V-4. Heath fought the AC balance problem from the V1 up to the V7. Each had a different AC rectification circuit, and at one time Heath even changed the tube to a loctal 7A6. In the V-7 Heath solved the problem by tapping off voltage from the B+ supply using a variable resistor, and coupling it to the duo-diode tube through a string of five 22 MΩ resistors. This circuit worked extremely well and has not been changed in the numerous newer VTVM models sold since.

Starting with the V-4A, and continuing through the V-6 the 6H6 (or 7A6) tube that came with the kit was either unmarked or marked on the box "REVERSED DIODES" and, depending on marking, the VTVM was wired in one of two ways. The wiring changes effectively reversed the two diode sections of the tube. See Figure 14 for Heath's note.

The Moment of Truth:

With the rebuild complete, the wiring carefully checked and resistance measurements taken (there was no resistance table in the manual, but sensible measurements could still be made), it was time to "fire it up". The tubes lit and so did the very bright pilot lamp. As it was warming up it suddenly went dark. Visions of a bad power transformer formed, but at the slightest touch of the power switch the pilot light lit up again. The ON-OFF switch was intermittent. Press a finger on the switch it came on; take the finger off and it might stay on but any slight jarring and it would open. A simple in situ switch cleaning did nothing; the switch

IMPORTANT NOTICE: WHEN A TUBE IS FIRST OPERATED, ITS CHARACTERISTIC ARE NOT AS STABILIZED AS AFTER A PERIOD OF "AGING." THEREFORE EACH 6H6 HAS BEEN "AGED" AND ITS ACTUAL OPERATING CHARACTERISTICS DETERMINED AT THE HEATH COMPANY. THIS AGING AND TESTING PROCESS IS PERFORMED SO THAT THE KIT BUILDER WILL BE ABLE TO MAKE A GOOD INITIAL CALIBRATION AND WILL BE ABLE TO CONNECT THE DUO-DIODE (6H6) IN A MANNER WHICH WILL CAUSE HIS INSTRUMENT TO OPERATE WITH OPTIMUM PERFORMANCE. THUS, IN THE INSTRUCTIONS WHICH FOLLOW, IF THE 6H6 CARTON HAS THE WORDS "REVERSED DIODES" STAMPED ON IT IN LARGE LETTERS, SKIP ALL STARRED STEPS (*), AND PERFORM THOSE STEPS WHICH START OUT "REVERSED DIODES." FOLLOW THOSE PICTORIALS WHICH ARE CLEARLY LABELED "REVERSE DIODES."

IF THE CARTON DOES NOT HAVE THE WORDS "REVERSED DIODES" STAMPED ON IT IN LARGE LETTERS, PERFORM THE STARRED STEPS (*), AND SKIP THE STEPS WHICH START OUT "REVERSED DIODES." FOLLOW THOSE PICTORIALS WHICH ARE NOT LABELED "REVERSE DIODES."

Figure 14: "REVERSED DIODES" explanation from the V-6 manual.

would have to be removed, disassembled and cleaned[10]. Removal was difficult due to all the parts and wires around it. Heathkit's handy red "nut starter" saved the day. after a complete cleaning the switch works well.

Hookup Wire:

Here's something discovered after the fact: Heathkit almost always used #22 AWG solid hookup wire for general wiring in its kits. Special wire was used when necessary, but otherwise PVC coated #22 solid wire was the norm. The wire used to rewire the kit turned out to be rated at 300V. The common value on most current hookup wire. Original Heathkit hookup wire most certainly had either a 600 or 1000 volt rating. This is something to be investigated and will be considered in future restorations. Wire rated at 300 volts would not do well in a DX-40 transmitter!

On the V-6 insulation for the AC and DC jack wires and spaghetti on the 0.01 µf capacitor should be capable of handling at least 1500 VDC. So should the wire from terminal P13 of the function switch to terminal R10 of the range switch.

Cabinet Paint:

The cabinet of the V-6 was generally in good shape. there were a few scratches on one side and the paint was faded and stained, even after a good cleaning. The V-6 is in the "Late Pre-Classic" style[11]. The case is painted a gray wrinkle and seems to have a hint of brown. Finding wrinkled paint, let alone paint to match, is a problem. A base paint of the proper texture has yet to be found. I ended up choosing to leave the original paint, with its wrinkle finish in place as a base coat and cover it with a new coat of satin paint. After much searching I found Rust-oleum 2X London Gray (shouldn't that be London Grey?) paint while perhaps a little on the brown side, once on it looked close to original.

Summary:

Restoring Heathkits can be a fun hobby. It often comes with as much, or more, satisfaction than building a kit originally.

The next project is an IO-4550 scope with serious problems to its HV board. Repair of that board is underway. It's also about time to get the SB-220 back on the air.

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. The Heathkit Yahoo group.
2. https://shop.heathkit.com/page/vintage-replacement-manuals
3. A three-wire cord results in the chassis being directly connected to an earth ground. This should be taken into consideration when making any differential voltage measurements.
4. This is also for safety, so you don't accidentally plug in the unfinished kit by mistake.
5. Rust-oleum® *Rust Reformer*® available at ACE Hdwr.
6. See Heathkit of the Month article #2. Available at: http://www.w6ze.org/Heathkit/Heathkit_Index.html
7. Heathkit Boneyard - (parts kits) http://www.d8apro.com
8. Just Radio: https://www.justradios.com/
9. Jameco Electronics: http://www.jameco.com/
10. See Heathkit of the Month maintenance article #MO2. Available at: http://www.w6ze.org/Heathkit/Heathkit_Index.html.
11. See ***Heathkit Test Equipment Products*** by Chuck Penson WA7ZZE starting on page v for style information.

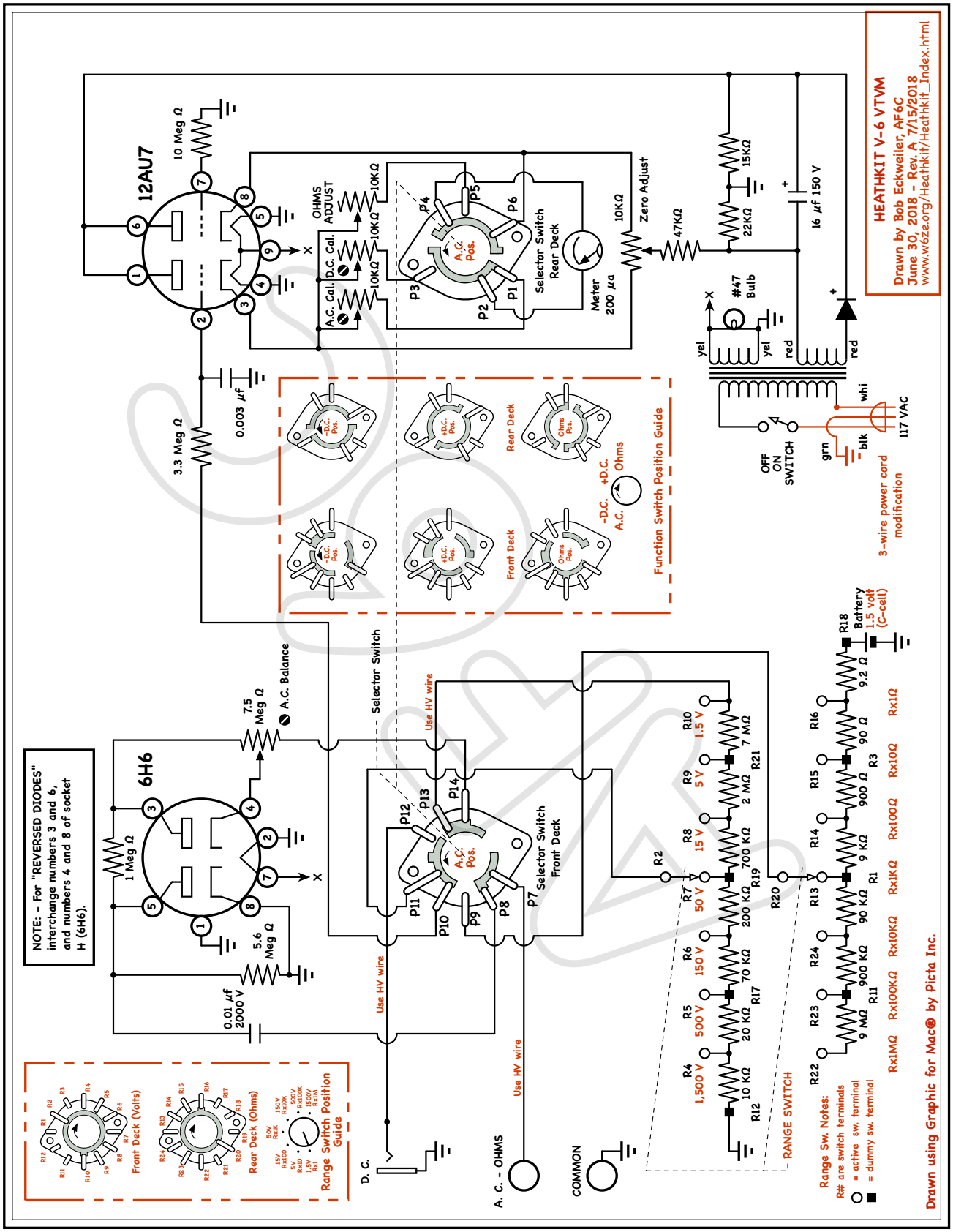


Figure 15: V-6 Schematic. A high resolution copy is at: www.w6ze.org/Heathkit/Sch/V-6-Sch.pdf

OCARC
BOARD MEETING MINUTES
July 7, 2018

The July OCARC Board meeting was held at the Marie Callender's Restaurant at 1821 N. Grand Ave in Santa Ana on July 7, 2018. Meeting called to order at 8:00 am with a quorum.

Roll Call:

President: Tim N6GP, Present
Vice President: Dan KI6X, Absent
Secretary: Jim AF6N, Present
Membership: Bob AF6C, Present
Technical: Kenan KR6J, Absent
Treasurer: Ken W6HHC, Absent
Activities: Ron W6WG, Present
Publicity: Tim, N6TMT, Present

Directors at Large:
Corey KE6YHX, Present
Clem W0MEC, Present

President Tim N6GP congratulated the club members on a safe and successful Field Day. Raw scores were up considerably from 2017 but are incomplete at this time.

DIRECTOR REPORTS:

Vice President No current report.

Tim N6GP reminded that the July General Meeting will feature a combined discussion by ARES and RACES representatives.

Secretary: Jim AF6N reported Anniversary Mug Sales are 13 to date. He suggested that the deadline for accepting member's orders be extended through the September Anniversary meeting and post a deadline reminder by RF or email blast.

A completed Statement of Information was presented for submission and to request a $20 fee payment to the California Secretary of State.

Membership: Bob AF6C reported the current OCARC roster is complete and will be posted on the website. No new members or applications have been received during the past month. Current membership remains at 81.

Technical: No current report.

Treasurer: No current report.

Tim N6GP wrote current reimbursement checks in the Treasurers absence.

Activities: Ron W6WG reported that the last Opportunity Drawing yielded a net increase of $110 to the Drawing account.

Ron will be out of town on the date of the next General Meeting so there will be no drawing that night.

Tim N6GP offered a Snap Circuits kit as a future Opportunity Drawing prize.

Publicity: Tim N6TMT submitted the sign in sheets from the GOTA station. Signatures totaled 77.

He confirmed that the OCARC pamphlets were restocked for the HRO Ham Jam.

Directors at Large: Clem W0MEC reported having a supply of photos from Field Day. He asked and was directed to send the photos to Ken W6HHC.

Clem demonstrated a new pair of reading glasses that included head lights that should be very helpful while soldering today's small components.

Corey KE6YHX reported progress on the Lifetime Achievement presentation and has been entering historical rosters into the Club Rosters web page.

He has completed research on one Lifetime Award candidate and some 330 records remain to review on a second candidate.

OLD BUSINESS:

NEWSLETTER EDITORS: Kristin K6PEQ will edit for July. Tim N6GP volunteered to serve as editor for the September newsletter.

85th ANNIVERSARY MEETING: Tim N6GP asked for refreshment suggestions for the meeting. The board agreed upon a Costco sheet cake and drinks to include coffee, soft drinks, and possibly punch.

Corey KE6YHX submitted a detailed report of supplies and databases used in the Lifetime Achievement research.

All agreed that the Lifetime Award should not be an annually scheduled award but rather a more spontaneous and meaningful award based strictly on merit rather than on schedule. A permanent historical Club Hall of Fame was also suggested and to move forward a committee of the President and two Directors at Large was appointed to determine details of the award and names for inclusion.

Emergency Communications: Bob AF6C reported meeting with Jeff KK6RUP and that Jeff has been working on a draft for an updated EMCOMM page.

NEW BUSINESS:

Field Day Review: All agreed that the 2018 Field Day was a very good one, that participation was excellent and that Chairman Ron W6WG among, others, did an “AWESOME” job. Tim N6GP estimated that our results, as compared to 2017, would place us in the top 1% of entries.
Tim N6GP commented that the network function should have been but was not setup Friday night. Saturday the N3FJP program was found to restrict logging of contacts by stations not on the network. The network was closed and not used for 2018 Field Day.
Tim N6GP and all present agreed that assembly of the Club’s 20m beam is time consuming and some pre-assembly of the elements, a new six color coding of the element parts, and cleaning of the element part joints should be done prior to the 2019 Field Day.
Tim N6TMT expressed that he was pleased to have shared the visitor’s tent with an operating station and enjoyed working with Doug K6JEY and Ron Franks.
Bob AF6N asked that next year the site plan include actual station locations based upon and including power cable lengths and phase identification.
Corey KE6YHX reported that the W1AW message transmission should be changed to a better time for West to East coast propagation.
An extended discussion of preventive measures heading off possible power distribution problems took place. Topics included phase balancing and also line voltage and frequency monitoring. One station power supply failed during the Saturday morning setup and may have been related to problems of site distribution.
A motion was made and passed to reimburse Jim AF6N for $20 in power supply repairs.
Ron W6WG recommended adding an external speaker at each station to allow visitors to actually monitor station activity.
Jim AF6N mentioned that, although having been stationed nearest the club generator twice, generator noise has never been a problem.
Our thanks go out to Chip K7JA and Janet KL7MF, Dino KX6D, Tom W6ETC, Gene KJ6OML and June AG6UG, Wayne W6IRD and Sharon K6IRD, Mike NM6X, Jessie KB6MQY and the Scouts, and a host of other significant contributors to this year’s Field Day effort.

FOR THE GOOD OF THE CLUB:

Tim N6TMT will be reviewing and revising the RF Newsletter Club Info page.

Tim N6TMT reported findings regarding history of the City of Orange antenna height limit. Apparently the planning code describes consideration in 1969 of reducing the 66ft limit. It was, however, left unchanged citing reference to May and June 1969 RF Newsletter articles and a public testimony by OCARC members.

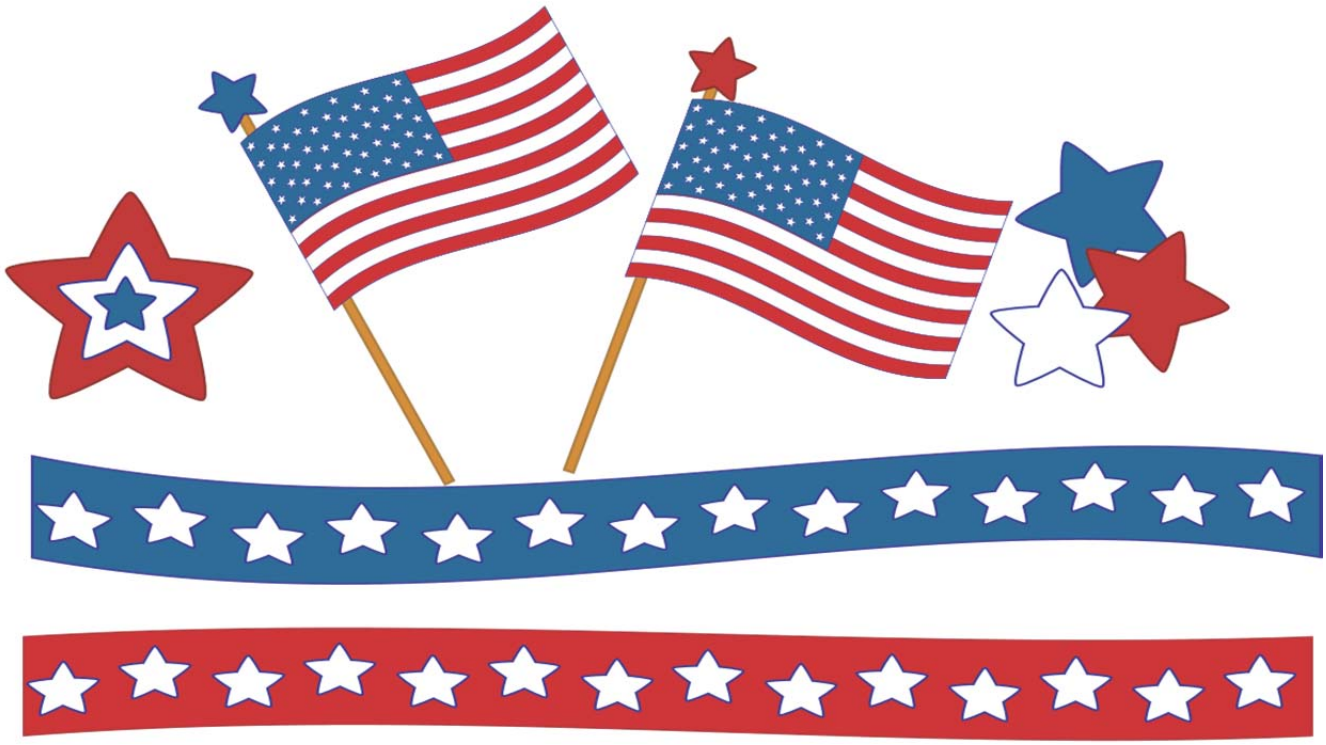
Tim also noted an error in the June RF Newsletter stating that he would contact Mimi's Café regarding our Dec 7 Christmas Dinner. The correct Mimi's contact will be Ron W6WG.

Corey reported that a trial 80m net was held between him and four check ins. The trial was successful and he recommended establishing an ongoing net on 3.883 Mhz beginning 9 pm on Wednesdays and including a listing in the RF Newsletter.

The meeting adjourned at 9:40 am.

Submitted by:

Jim Schultz AF6N
OCARC Secretary



Orange County Amateur Radio Club
85th Anniversary Coffee Mug

Celebrate 85 Years of OCARC with your Morning Cup O' Joe

Order Form

Call Sign _____ Quantity _____

Name Desired _____

Call Sign _____ Quantity _____

Name Desired _____

Price Each $14.00

Please make & mail check to: Total _____

OCARC
PO Box 3454
Tustin, CA 92781
or
Bring check to next meeting

OCARC
GENERAL MEETING MINUTES
June 15, 2018

The OCARC General meeting was held at the Santa Ana Red Cross Complex on June 15, 2018.

Club Officers:
There was a quorum. All officers were present.

Attendance:
Present were 32 members including our evening's speaker, Chip Margelli, K7JA and 4 guests.

The meeting was called to order at 7:02 pm and was followed by the Pledge of Allegiance to the Flag and introductions of the members and guests.

May Program:
Dayton Hamvention:
The meeting began with a Show and Tell by Nicholas, AF6CF who recently returned from the Dayton Hamvention. Nicholas narrated a photographic tour of the event. The Hamvention has moved from Dayton to the nearby site of a county fair. Nicholas reported a massive crowd of about 30,000 visitors and three days of sporadic rain that resulted in a few muddy shoes.

The site featured antennas and towers scattered throughout. It included a huge and tempting swap meet, vendors' booths from such as MFJ, Icom, Flex, Yaesu, and Kenwood, tech talks and, of course, many friendly hams to meet and greet.

Nicholas reported that the event, in spite of the rain, was a great experience and one that he hopes to repeat.

Field Day Prep and Pep talk:
Chip, K7JA presented his annual Field Day pep talk. Chip began with a slide show of a 1973 beachside Field Day in which he and Janet, KL7MF participated. The event was very ambitious, successful and, at times humorous. Important to the theme of Chips talk, the slides showed the value of planning, and pre-testing in preparation for Field Day success.

Following his slide show, Chip offered many tips for Field Day. Among them were antenna and equipment outdoor testing, use of wing nuts and color coding, and fiberglass fishing poles for antenna elements. He recommended tuning Yagis with the antenna pointing toward the sky. Other valuable tips included proper coax coiling and push up (**not tilt up**) for mast raising.

The Club's thanks to Chip for another informative and for another entertaining presentation.

Business Meeting:

Field Day Reports:
Ron, W6WG presented a Field Day Budget of $530.00. The budget was approved unanimously by members.
Several announcements followed:

- The Field Day logging program will be N3FJP version 5.8.
- Members help is needed for equipment handling.
- Thursday the 21st at 4:30 pm we will meet to load equipment at Placentia Storage
- Friday the 22nd at 9:00 am we will begin setting up the site at Buena Park.
- Sunday the 24th tear down of the site will begin at 11:00 am at Field Day operation's end.
- An email blast was requested to explain the need for member's help in preparation and tear down.
- Band captains were asked to bring laptops Friday for logger testing and file loading.

Good of the Club:

HRO HAM JAM: Janet, KL7MF reminded of the upcoming HRO HAM JAM on Saturday, July 7. She listed several contributors to be on site including Bill, W1HIJ. Welcome to all. A fun Saturday is planned.
Janet noted that most of the available booth locations are claimed but she will check for one available to OCARC.

Closing:
Ron, W6WG conducted the Opportunity Drawing. Congrats to Bioenno battery winner, Nicholas AF6CF.
The meeting adjourned at 9:00 pm.

Submitted by:
Jim Schultz, AF6N OCARC Secretary

WORD SEARCH

Field	Contacts	Club	Radio
Love	Friend	Scouts	July
Board	Contest	World	Day

L	B	V	W	C	W	U	C	W	A	C	W	D	A	B
J	O	O	F	I	E	L	J	O	W	O	R	L	D	L
S	A	V	I	L	W	Y	C	R	E	N	I	C	V	U
C	R	A	E	A	O	R	L	J	I	T	T	A	O	R
O	W	T	L	N	R	N	O	B	O	C	T	J	E	A
W	X	A	D	B	K	E	B	C	C	L	U	D	X	D
T	S	C	O	U	T	S	J	L	O	U	B	A	z	I
B	C	T	D	Y	S	C	U	O	N	B	O	Y	Y	O
A	O	S	A	J	D	O	L	B	T	S	A	G	A	B
D	N	C	P	U	E	N	Y	R	A	D	I	A	O	A
I	T	L	Y	W	Y	T	L	T	C	F	R	V	N	O
O	E	B	C	O	N	T	E	S	T	R	D	L	C	R
C	S	B	J	R	T	E	O	J	S	I	S	A	O	D
U	R	D	U	D	U	S	V	U	Z	E	T	V	N	E
B	O	A	R	D	O	T	E	L	F	R	I	E	N	D
L	B	I	Y	S	C	O	N	T	E	S	S	O	T	S

2018 is OCARC's 85th Anniversary

Customized Embroidering of the OCARC Logo,

Your Name and Callsign can placed on shirts, jackets, hats, bags, and just about anything you want.

You can either purchase the item from I.Initial or bring in whatever you have and have it embroidered for $10.00.

They have the OCARC logo artwork on file. Delivery takes one to two weeks.

Location: 399 El Camino Real, Tustin, CA 92780

Phone # (714) 573-2552 Online at "iinitial.com"

OCARC Cash Flow

1/1/2018 through 7/1/2018

Category	1/1/2018-7/1/2018
INFLOWS	
Badge Income	2.00
Coffee Mug Sales	70.00
Donation	10.00
Dues, Family (PayPal)	172.89
Dues, Membership	787.50
Dues, Membership (PayPal)	663.09
Field Day Food Income	406.00
Opportunity Drawing -Monthly	303.00
Opportunity Drawing IN - Christmas	100.00
Refreshments Income	59.83
Troop 440 donation from KM6EMP	65.00
TOTAL INFLOWS	**2,639.31**
OUTFLOWS	
CA Statement Of Info filing	20.00
CU service Fee	20.00
Donation to Troop 440 - from Joel KM6EMP	65.00
Field Day Food Reinbursement	576.00
Opportunity Drawing - Monthly	137.57
PO Box Rental	70.00
Postage	11.00
Publicity - OCARC Biz Cards	18.29
Refreshments Expense	54.25
Storage Locker	492.00
Supplies	24.33
Web Site Hosting	101.94
TOTAL OUTFLOWS	**1,590.38**
OVERALL TOTAL	**1,048.93**

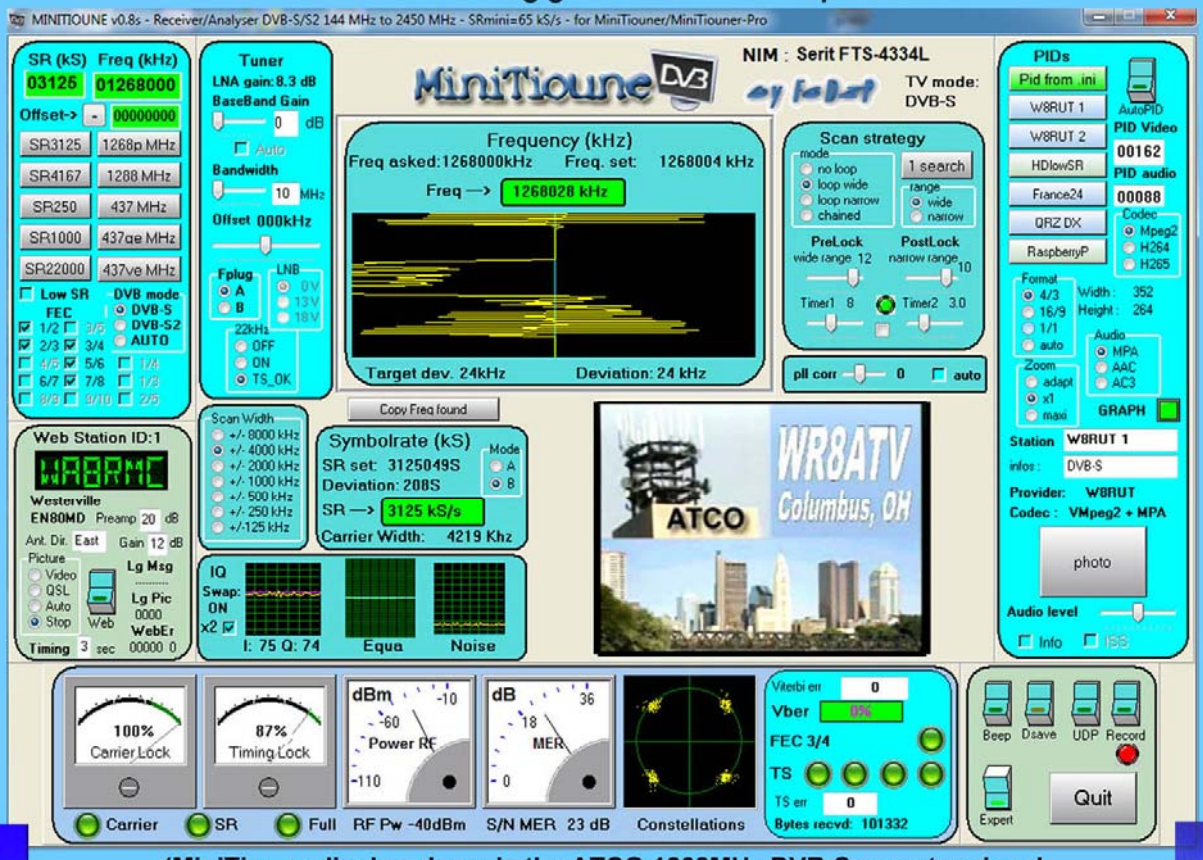
MiniTiouner-Express

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).