

RF



ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. LIII NO. 08

P.O. BOX 3454, TUSTIN, CA 92781-3454

August 2012

The Prez Sez.....

by Paul W6GMU



Entering August and the hazy days of Summer, we have a fine and very pleasant time to enjoy SoCal. We can look back on a fun and successful Field Day experience with a warm and fuzzy feeling. The fun will continue into the rest of the year with our fine Presenters, Auction and Holiday Party. On August 17, 2012, our Monthly presentation will be about "Interference Avoidance", presented by **Fred Daniel, W6FNO**.

He will show us how you could effectively handle interference by virtue of his training in engineering large VHF & UHF radio communications sites and systems.

Also, per NASA, the Curiosity Rover (about the size of a car) has landed safely on the surface of Mars within a couple hundred meters of the target point and is fully operational. NO post-landing problems were reported as of this past Sunday evening (08/05/12). It's a fabulous time to be alive, in my humble opinion!

Please enjoy your Summer!!

73 de Paul W6GMU
The "Prez"



Next Meeting

Our General Meeting
will be held on
Friday August 17th.

"Interference Avoidance"

By Fred Daniel – W6FNO

a presentation to the club on how you can handle interference (the bane of Amateur Radio) at our August general meeting.

The next general meeting will be on:

Friday, August 17th
@ 7:00 PM

As usual, we will be meeting in the east Red Cross Building, Room 208. See you there!

In This Issue: Page

The Prez Sez	1
August Meeting	1
CLUB INFORMATION	2
PACIFICON 2012	3
Heathkit of the Month	4-8
Publicity	9
ARRL Contests	9
Heathkit End	10-11
TechTalk102 Smart Meters	12-13
July Board Meeting Minutes	14
July General Meeting	15
ARRL Technical Award	16
ARRL Letter (1960)	16-17

**ORANGE COUNTY
AMATEUR RADIO CLUB**
www.W6ZE.org



2012 Board of Directors:

President:

Paul Gussow, W6GMU
(714) 624-1717
w6gmu@w6ze.org

Vice President:

Robbie Robinson, KB6CJZ
(714) 978-8049
KB6CJZ@w6ze.org

Secretary:

Ken Konechy, W6HHC
(714) 744-0217
w6hhc@w6ze.org

Treasurer:

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

Membership:

Jeff Hall, W6UX
(949) 697-9279
W6UX@w6ze.org

Activities:

Doug Britton, W6FKX
(714) 742-2459
w6fkx@w6ze.org

Publicity:

Tim Goeppinger, N6GP
(714) 730-0395
k6gep@w6ze.org

Technical:

John Roberts Jr, W6JOR
(714) 540-9148
w6jor@w6ze.org

Directors-At-Large:

Kristin Dankert, K6PEQ
(714) 544-9846
k6peq@w6ze.org

Nicholas Haban, AF6CF
(714) 693-9778
af6cf@w6ze.org

2012 Club Appointments:

W6ZE Club License Trustee:

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

Club Historian:

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

RF Editor (rotating):

Jay Hitchcock, KI6WZU
(714) 244-7171
KI6WZU@w6ze.org

WEB Master:

Ken Konechy, W6HHC
(714) 744-0217
W6HHC@w6ze.org

Assistant WEB Master:

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

ARRL Awards Appointee:

Arnie Shatz, N6HC
(714) 573-2965
N6HC@aol.com

Larry Beilin, K6VDP
(928) 565-4043
K6VDP@aol.com

OCCARO Delegate:

Paul Gussow, W6GMU
(714) 624-1717
W6GMU@W6ZE.org

Monthly Events:

General Meeting:

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

Club Breakfast:

Second Saturday of every
month at 8:00 AM
Jagerhaus Restaurant
2525 E. Ball Road
(Ball exit off 57-Freeway)
Anaheim, CA

Club Nets (Listen for W6ZE):

28.375 ± MHz SSB
Wed- 7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wed- 8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

7.086 ± MHz CW **OCWN**
Sun- 9:00 AM – 10 AM
John WA6RND, Net Control

VISIT OUR WEB SITE

<http://www.w6ze.org>

for up-to-the-minute club
information, the latest
membership rosters, special
activities, back issues of RF,
links to ham-related sites,
vendors and manufacturers,
pictures of club events and much
much more.

Club Dues:

Regular Members	...\$20
Family Members*	...\$10
Teenage Members	..\$10
Club Badge**\$3

Dues run from Jan thru Dec and are
prorated for new members.

*Additional members in the family of
a regular member pay the family rate
up to \$30 per family.

**There is a \$1.50 charge if you'd
like to have your badge mailed to
you.

The ARRL Pacific Division and the Mt. Diablo Amateur Radio Club Present:

PACIFICON 2012 - October 12-14, 2012

- **The Great West Coast Ham Radio Convention!**
- **Proud Host This Year to the ARRL National Convention!**
- **Featuring ARRL EXPO -- ARRL's Big Exhibit Area!**
- **Largest West Coast Vendor Show of Amateur Radio Gear!**
- **More Than 75 Outstanding Technical Forums!**
- **Great Swap Meet!**
- and...much, much more!*

Returning to the Magnificent Santa Clara Venue

Marriott Santa Clara Hotel
2700 Mission College Blvd.
Santa Clara, California

For Events, Latest Updates and Registration go to:

www.PACIFICON.org

If Hotel lodging is needed:

Call the Marriott Hotel Reservations Desk at 1-800-228-9290,
before September 26, 2012, to ask for the special Pacificon rate of \$109/night.

PACIFICON 2012 Events, Forum Topics, and Exhibits Include:

- Friday All-Day Antenna Seminar • Friday Evening New Media Elmers and Podcasters • Saturday Morning Kickoff with Speaker Gordon West • More Than 75 Outstanding Technical Forums • Largest West Coast Vendor Show of Amateur Radio Gear • Saturday Amateur Radio and the Law Seminar
- Great Saturday Swap Meet • Ham License Exams • Daily Radio Prize Drawings • Direction Finding/Fox-Hunting, Beginner and Advanced • Great QRP Programs • Amateur Television (ATV/DATV) • HFpack Activities • Saturday All-Day Technician License Class • Working Satellites • DXpeditions • Contesting
- A Full Slate of Youth Projects and Activities • Kit Building • Emergency Communications • W1AW/6 Station Operation • Saturday Evening Banquet with Guest Speaker • ARRL EXPO • Annual ARRL Pacific Division Director's Forum • WG0AT "The Goatman" • Understanding the Physics of Radio • FCC Forum • Moon Bounce - EME • Antenna Theory & Construction

**Come and Experience
the Many Facets of Ham Radio!**

Pacificon Committee - pacificoninfo@pacificon.org
www.pacificon.org - (925) 945-8007

Heathkit of the Month #42: by Bob Eckweiler, AF6C



Heathkit HD-1422-A Antenna Noise Bridge

Introduction:

If you work with antennas, an antenna noise bridge can be a very handy tool. Table 1 lists some of the uses of an antenna noise bridge as described in the Heathkit manual:

- Finding Antenna Resonant Frequency.
- Finding Non-resonant Characteristics.
- Making Tuned Circuit Measurements.
- Making Component Measurements.
- Finding Transmission Line Resonant Frequency.
- Tuning Transmission Line Length $1/4\lambda$ or $1/2\lambda$.
- Antenna Tuner Adjustments.

Table 1: Bridge Uses (from Heathkit Manual)

An antenna noise bridge measures an unknown impedance connected to the bridge. Two controls are on the front panel; these controls are adjusted until the noise nulls in an external detector. The front panel resistance control then shows the resistive component of the impedance. The front panel center zero reactance control reads the reactance, usually in \pm pF. To find the true reactance you must convert capacitance into reactance using the well known formula:

$$X = 1/(2\pi fC)$$

where f is the frequency of the detector and C is the capacitor front panel reading. Negative C values represent inductive reactance.

An antenna bridge, sometimes called an **R-X** bridge, is made up of three sections: a wide-band noise generator, sometimes keyed at an audio frequency, a bridge circuit, and a detec-



**Figure 1: Heathkit Antenna Noise Bridge
Model HD-1422-A - Front View**

tor. The best detector (and the one most commonly used) is the station receiver; it is sensitive, selective, stable and accurately reads the frequency.

The Heathkit HD-1422 Noise Bridge:

Heathkit first released the HD-1422 in late 1985. In 1989 it was upgraded to the HD-1422-A, changing the paint scheme to a small degree, as well as making a small improvement to the circuit. The HD-1422-A was priced at \$49.95 in 1989.

The HD-1422 has a range of 0 to 200 ohms resistive component and ± 60 pF of reactance. This 60 pF calculates from 1.5K Ω at 1.8 MHz to 90 Ω at 29.7 MHz.

The front panel of the HD-1422 (Figure 1) contains three controls and an LED pilot light. On the left is the **OFF-ON** slide switch with a red LED above it; the other two controls, left to right, are a potentiometer scaled **0 – 200** that represents the resistive (**R**) component in ohms. A 120 pF variable capacitor that is scaled **60 XL – 0 – 60 XC** that represents the reactive (**X**) component in pF. Negative pF converts to inductive reactance.

On the rear panel of the HD-1422 (Figure 2) are, left to right, **RECEIVER** (SO-239 UHF connector), **UNKNOWN** (SO-239 UHF connector), External **+9VDC** power jack (1/8" mini phone jack) and a #8 **GROUND** stud. The unit

is normally powered by an internal standard NEDA #1604 9-volt battery. The external power jack presents an interesting problem; the external power connector is a male 1/8 plug and is prone to shorting when lying on the table unplugged, or while plugging into the HD-1422 with the power on. This requires a rather high impedance or current-limited external supply to prevent sparks when the plug shorts. The optional PS-2350 wall wart power supply provides a nominal 9V at 100 ma max. that can power the antenna noise bridge. The HD-1422 requires 45 ma at 9 to 11 VDC.

The Heathkit HD-1422-A Noise Bridge:

Externally the “A” model of the HD-1422 appears identical to the original except for the paint scheme. The cabinet color has changed from a two-tone dark brown to a two-tone dark gray. The nomenclature remains in white except for the Heathkit logo in the upper left that is red on the original and is pale yellow on the “A” model.

Circuit-wise the HD-1422-A is very similar to the older model. A bypass capacitor, C108, has been added across the emitter resistor of Q102, the second stage of the noise amplifier. Also, the schematic has been corrected to agree with



Figure 2: Heathkit Antenna Noise Bridge Model HD-1422-A - Rear View

the actual circuit. In the original schematic R107 and R108 are shown connected between the 9-volt line and the base of Q101 and Q102 respectively. However the circuit board x-ray view shows the resistors correctly connected between the base and respective collector. See figure X; this figure also shows the added C108. On the later model R109 is mounted directly to the leads of added C108, and C108 is inserted into the circuit board holes negating the need for an updated circuit board. There is another minor schematic error that was not fixed in the later schematic. The “A” and “B” circuit board connections are mislabeled; “B” should be the ground lead with the BLK wire and “A” should be the connection from R101 with the RED lead.

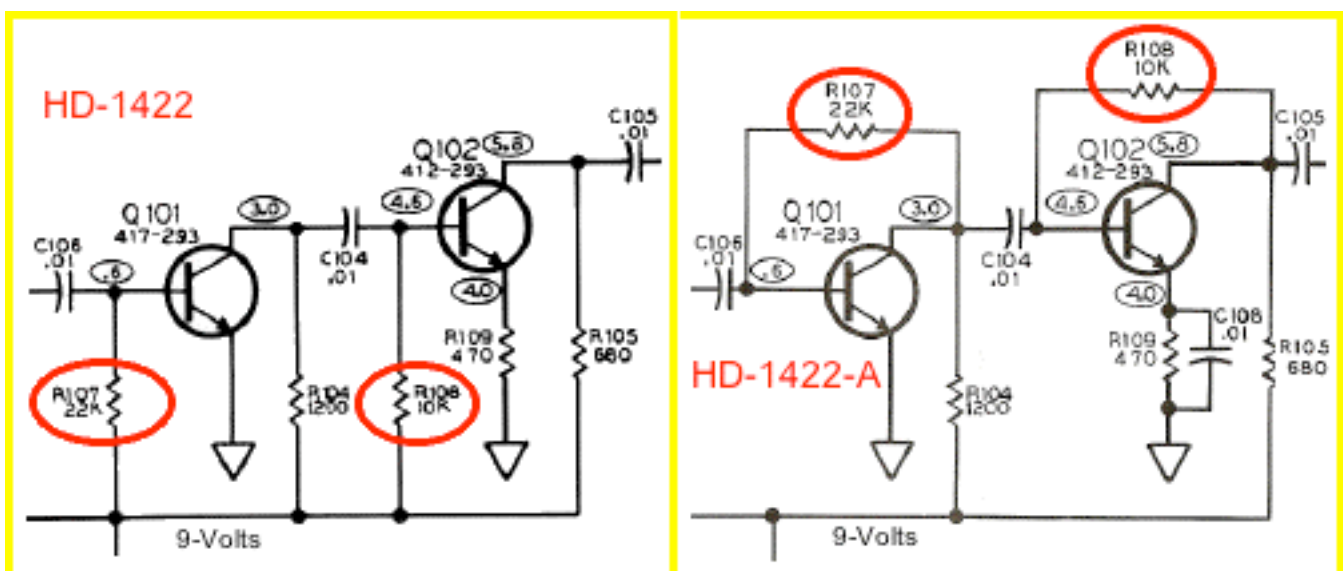


Figure 3: R107 & R108 are misplaced on the HD-1422 schematic (left) but corrected on the HD-1422-A schematic (right). Both units are wired identically except for added C-108.

The Heathkit HD-1422A Circuit Description:

The Heathkit HD-1422A circuit can be broken into 4 parts: A tone oscillator, a noise generator, a noise amplifier and a bridge circuit. The schematic is shown in figure 5.

The tone oscillator uses an NE-555 timer integrated circuit (U101) to produce a nominal 1,000 Hz square wave that drives the noise generator. This effectively puts a 1000 Hz tone on the noise signal making it easy to distinguish. It is a feature not found in many antenna noise bridges.

The square wave output at pin 3 of the U101 passes current through zener diode D103 to ground. Zener diodes are notorious for generating noise. This noise is wide-band and in use where the noise is not desirable is immediately bypassed to ground with a capacitor. Here the noise is wanted and is coupled to a two stage noise amplifier by C106.

The noise amplifier is two stages of simple amplification. The first stage (Q101) is a simple amplifier coupled via C104 to the second stage. The gain of the second stage (Q102) was increased in the later model by bypassing the emitter with C108. The output of the second stage excites the primary lead of T101, the bridge transformer.

T101 is part of the bridge circuit; the heart of the HD- 1422-A Noise Bridge. The circuitry up to this point just produces white noise over the HF frequency at a level of 50 to 100 μ V. Heathkit added U101 to give the noise a nice 1,000Hz tone and make it distinguishable, but the 50 μ V noise should register at least S9 on most receivers. The secondary of the bridge circuit has four legs. Two of the legs are identical windings in a RF toroid transformer. The third leg is coupled through a 68 pF capacitor to the **UNKNOWN** UHF connector on the back. The fourth leg is made up of a 7 - 120 pF variable capacitor in series with a 250 Ω potentiometer. The center tap of the secondary windings is connected to the detector connector on the

back, which is your station receiver. The bridge is pretty simple. When the R of the unknown impedance is identical to the R of the potentiometer AND the reactance of the unknown impedance is also identical to the reactance of the reactance capacitor then the bridge balances and the noise in the receiver nulls. In order to measure inductive reactance as well as capacitive reactance a 68 pF capacitor (C107) is placed in series with the unknown leg of the bridge. This skews the reactance part of the adjustment leg so that zero reactance occurs in the known leg when the variable capacitor is at 68 pF which is about mid-scale.

HD-1422-A Assembly & Test:

Heathkit classed this kit as a "one evening project". Most of the components mount on a small printed circuit board. The internal 9V battery is held to the board by a clip; one lead of the battery connector connects to the board; the other lead is connected to the external power jack so that when external power is plugged in, the battery is disconnected.

Transformer T101 must be wound by the builder. Three 9" color-coded wires are grouped and wound next to each other on the small green color-coded toroid core. A total of seven turns per winding are made. I could not find the core model in an old Amidon catalog.

Only the front and rear panel controls and connectors are not mounted on the circuit board. These are mounted and wired up after the board is completed. Finally the board is installed by #6 hardware to the chassis and leads from the board are attached where necessary.

Checkout is done by first making some simple ohmmeter readings and then installing the battery (or plugging in the external power supply) and making one voltage measurement.

Calibration requires only your receiver, a short piece of wire and a 51 Ω resistor (supplied with the kit). First the unknown connector is shorted internally with the piece of wire and

the receiver is connected with a short piece of coax to the **RECEIVER** connector. Then the Noise Bridge controls are adjusted for a null. This should happen with the two controls near zero. If necessary the knobs can be loosened and set right on. Then the short is replaced with the 51Ω resistor. Again the Noise Bridge controls are adjusted for a null. This time the pot should indicate 50Ω and the reactance should remain at zero. Again the knobs can be realigned. This should be repeated if necessary until the calibration is as close as possible.

Summary:

The Heathkit HD-1422, while a basic Antenna Noise Bridge, provides numerous features that make antenna measurements easier.

In the late seventies I built a noise bridge from an article in the February 1977 issue of Ham Radio Magazine. The authors W6BXI & W6NKU gave a presentation at our club, providing a lot of additional information. I still have a copy of their presentation if anyone would like to see it. Their bridge is designed to operate over a larger reactance span than the Heathkit bridge - $0-250\Omega$ and ± 180 pF and they designed adapters to further increase coverage on the lower ham bands. A computer program I wrote for the old Apple II and later in "C" for the Apple IIgs made this a versatile piece of test equipment. Unfortunately porting it to a more modern computer is still on my to-do list.

After building the HR featured noise bridge, I picked up a Palomar Engineers "R-X Noise Bridge" which has an R-X range of $0-250\Omega$ and ± 70 pF. And some years back I was given the Heathkit by Elmer - WA6PFA during a shack cleaning he was conducting.

For Next month I hope to present another component of the Heathkit SB Amateur Line.

73, from AF6C



Antenna noise bridge

Reveal the cause of any mismatch between station transmitter and antenna with the Heathkit Antenna Noise Bridge. A tone-modulated broadband noise signal is generated in the bridge and coupled to an impedance bridge. Then, using your station receiver as an indicator, the impedance bridge measures the resistive and reactive components of your antennas. Use the noise bridge also to preset an antenna tuner for faster tune-ups, tune a quarter-wave transmission line and measure the value of unknown capacitors and inductors.

A front panel LED indicates power on, front panel controls give direct readout of resistive and reactive characteristics of the antenna being tested. The rear panel includes external power jack and coaxial connectors for receiver and unknown antenna connections. Requires 9V battery or PS-2350 Battery Eliminator, listed below. Dimensions are $2\frac{1}{4}"$ H x $5\frac{1}{8}"$ H x $5"$ D.

Kit HD-1422-A (2 lbs.) . . Now \$39.95

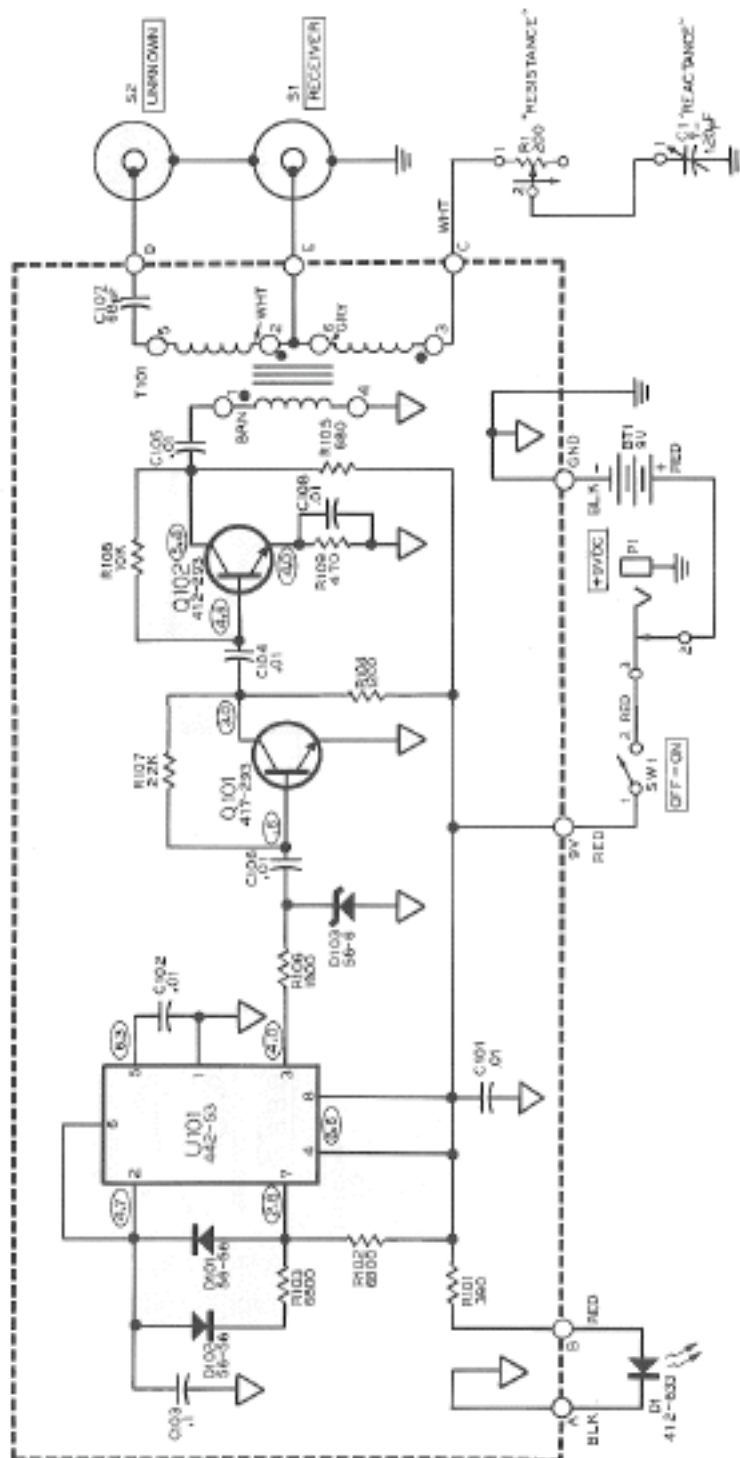
Specifications: Resistance: approx. $0-200\Omega$. Capacitance: ± 60 pF. Operating Range: 1-30 MHz.

Figure 4: HD-1422-A From the Winter 1991 Catalog. Note closeout price of \$39.95

This article is Copyright 2012 R. Eckweiler and The OCARC Inc.

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

Thanks - AF6C



SCHEMATIC OF THE HEATHKIT® ANTENNA NOISE BRIDGE MODEL HD-1422-A

SCHEMATIC NOTES:

1. COMPONENT NUMBERS ARE IN THE FOLLOWING GROUPS:
1 - 100 PARTS MOUNTED ON THE CHASSIS.
100 - 199 PARTS MOUNTED ON THE CIRCUIT BOARD.
2. ALL RESISTORS ARE 1/4 WATT, 5%. RESISTOR VALUES ARE IN OHMS (K = 1,000).

3. CAPACITOR VALUES ARE IN μ F UNLESS OTHERWISE SPECIFIED.

4. THIS SYMBOL INDICATES A POSITIVE DC VOLTAGE FROM THE POINT INDICATED TO CHASSIS GROUND, MEASURED WITH A HIGH IMPEDANCE VOLTMETER.

5. THIS SYMBOL INDICATES CIRCUIT BOARD GROUND.

6. THIS SYMBOL INDICATES CHASSIS GROUND.

7. THIS SYMBOL INDICATES A LETTERED OR NUMBERED, SOLDERED CONNECTION TO THE CIRCUIT BOARD.

8. THIS SYMBOL INDICATES THE SAME POLARITY FOR EACH WINDING OF TRANSFORMER T101.

9. VOLTAGES MAY VARY, DEPENDING ON POWER SOURCE.

Figure 5: Heathkit HD-1422-A Schematic

D101-102: 1N4149 Signal Diode

D103: VR6.8 Zener Diode

Q101-102: 2N5770 Si NPN Transistor

T101: 7 turns trifilar wound

U101: 555 Timer IC

Ham radio operators prepared to step up

In the event that Orange County should incur Mother Nature's wrath and she wallops the area with a massive earthquake, tidal wave or other of her destructive forces, the Orange County Amateur Radio Club (OCARC) may be the only communications provider. Cell towers are at risk during such public emergencies, and, if knocked out, cell phone and internet connections would be lost.

OCARC has been in existence since 1933, and last month it joined more than 35,000 amateur (ham) radio operators from the

U.S. and Canada during "Field Day" to practice emergency communications skills.

Ham radio is often a public service and an educational hobby. Whether it's contacting someone across the street or across the globe – even outer space – ham radio operators are ready to supply reliable communications when normal lines fail. There are 700,000 licensed hams in the United States.

For more information, go to American Radio Relay League at aarl.org

Foothills Sentry
July 10, 2012

2012 ARRL CONTEST SCHEDULE

AUGUST

10 GHz & Up Contest - Leg 1:

Third full weekend of August, 6:00AM local time Saturday through 11:59pm local time Sunday.

Rookie Roundup - RTTY:

Third Sunday, 1800 UTC through 2359 UTC.

SEPTEMBER

VHF QSO Party

Second full weekend of September, 800 UTC Saturday through 0259 UTC Monday

10 GHz & Up Contest - Leg 2:

Third full weekend of September, 6:00AM local time Saturday through 11:59pm local time Sunday.

Heathkit Receives Last Coffin Nail

Last month Heath Educational Services closed its doors - probably for good. Earlier, in 1992, with cheap electronics flooding the US market, surface mount technology becoming the electronic manufacturing norm and young Americans growing accustomed to instant gratification, Heathkit abandoned the electronic kit business.

In its heyday Heathkit offered kits that were lower in cost than equivalent store bought units, and were more maintainable - with spare parts easy to order and inexpensive. Heathkit also provided the buyer/builder the fun of assembly, the anticipation of the finished product and a genuine feeling of satisfaction when the kit was completed and working. The kits generally performed quite well; mostly they were on a par, if not superior, to their retail equivalents. The detail that went into the Heathkit manuals to make the assembly directions clear to the builder was legendary.

When Heath Company gave up the manufacture of kits in 1992 they did not die. Prior to 1992 Heath began a series of educational instructional courses with their Heath Educational Systems division. These courses were used by universities and schools; they were also available to private parties. Unfortunately the current long term economic downturn resulted in large reductions in state and federal funding for schools, and school spending dropped significantly - as did Heath's bottom line.

Recently Heath Educational Systems defaulted on its lease and filed for bankruptcy. It is now owned by a bank. A quick check shows that their website is gone and now held by a domain holding company and is for sale.

Early Heath Aviation History:

Edward Bayard Heath, born in 1888, started the E.B. Heath Aerial Vehicle Company around 1913 manufacturing and selling aircraft parts including large quantities of dope used to cover the fabric used in early aircraft construction. Heath bought the Bates Aeroplane Co. and merged the two companies into the Heath Airplane Company. Under the Heath Airplane Company name numerous aircraft were designed, built and sold, including: the "Feather", the "Favorite" in which pilot Heath won 3rd place in the "On to St. Louis" air race, the "Tomboy" in which Heath won 1st place in the National Air Races among a field of eight planes, the "Baby Bullet", the "Cannonball" and his most famous planes, the "Parasol" and the "Super Parasol". The Parasol could be purchased as plans, a kit or full assembled for \$595 in early 1928.

In February of 1931 Edward Heath was killed in the crash of a low-wing prototype of the Parasol. Eighty-one years later, in 2012, his company, which left the aircraft industry soon after World War II, closed up, likely for good.

Beginning the Kit Era:

In 1935 Howard Anthony purchased the bankrupt Heath Airplane Company. After WWII, with war surplus flooding the market, Anthony boldly purchased a large quantity of surplus electronic parts including 5BP1 cathode ray tubes. In 1947, using these parts, the first Heathkit was marketed - the O-1 oscilloscope which sold for \$39.95, less than half of what the equivalent manufactured scope was selling for.

In 1954 Howard Anthony, like Edward Heath, was killed in an aircraft accident. The company was sold in 1956 to Daystrom, Inc. ending what was known as the early Heathkit era during which over 200 kit models and kit accessories were manufactured. In 1962 Daystrom was purchased by the French Oilfield company Schlumberger. Schlumberger did little to interfere with the operations at Heathkit which continued to flourish. At its peak the Heathkit catalog offered over 300 models in 11 product lines. Heathkit occupied over 360,000 square feet of floor space in their Benton Harbor, Michigan facility.

In 1979 Heathkit was sold to Zenith, who pushed their line of Heath/Zenith computer products and seemed to care little about the other products or markets. This, atop the aging Heathkit marketing-base led to the decline of Heathkit. The Heath company became three separate entities, Heathkit, Heath/Zenith and Heath Data Systems, the last getting the brunt of the company resources. In 1992, further hurt by problems mentioned in the initial paragraph, the Heathkit division ceased. The Heath/Zenith division focused on the education market. Zenith Data Systems continued until 1996 when it merged with Packard Bell and NEC.

In 2011 Heath announced it was getting back into the kit business and introduced the GPA-100 Garage Parking Assistant. It also announced that the next kit planned was to be a swimming pool monitor. Unfortunately this effort was short lived.

73, from AF6C



Here is a one page excerpt from what could have been the last Heathkit Manual:

Refer to Pictorial 4 (fold out from page 24) for the following steps.

Position the container, completed in the last section, with the wider end to your left.

- () Place the three sections of foam padding into the container. Refer to Detail 4A for their correct orientation. Note that each foam section can be placed with either side down.
- () Carefully unfold the silk lining and lay it inside the container on top of the foam, being sure the wider end is towards your left as shown, and that the pre-sewn flaps are facing down.

Note: In the following steps you will be joining the foam to the pre-sewn folds in the silk using adhesive backed Velcro™ strips.

- () Locate the roll of Velcro™ tape from Package B. Cut 36 1" strips from the roll. Do not remove the protective backing tape at this time.
- () Remove the backing from a Velcro™ strip. At the top right corner of the rightmost foam pad secure the strip to the foam at location A. Refer to Detail 4B for the proper orientation of the strip.
- () Referring to Detail 4C join the nearby Velcro™ pad already attached to the silk flap to the Velcro™ strip, pressing firmly.
- () In a likewise manner install strips and attach the silk flap at locations B through AJ.
- () Carefully examine each attachment and make sure they are all firmly attached.

- () Pick up the previously completed Heath Company assembly and carefully place in the container. It will fit in only one direction.
- () Carefully fold the silk over the assembly and fasten with three 2" Velcro™ strips using the three pairs of Velcro™ pads sewn into the edge of the silk lining. See Detail 4D.

Refer to Pictorial 5 for the following steps.

- () Locate the wooden coffin lid.
- () Place it on top of the container so that the lips on the lid slide into the groove on the container. Be careful not to damage the lead seal located in the groove.
- () Using a #10 x 4" brass wood screw and a #10 decorative brass washer start a screw into the hole at location BA. Tighten the screw until the head is about 1/4" above the lid. See Detail 5A.
- () In a similar manner install a #10 x 4" brass wood screw and a #10 decorative brass washer at each of 23 locations, BB through BX.
- () Carefully tighten the 24 screws in the order shown in the Pictorial. Do not over-tighten.
- () Carefully check that each screw is secure.

This completes assembly of your Heathkit to end all Heathkits. Please continue to the Initial Checkout and Interment section on page 23.

TechTalk102 – Smart Power Meters

Are they a Source of RF Interference?

by Ken W6HHC

Some Background - In 2004, the ARRL provided leadership by informing hams of a new technology threat that could cause RF interference on ham bands and leading the way to fight power companies (and the FCC) that were trying to use Broadband-over-Power-Lines (aka BPL). This BPL technology was designed to carry (radiate?) high-speed data over power lines, but radiation from the power lines could cause RF interference anywhere from 2 MHz to 130 MHz...in very large segments of radio spectrum. The ARRL proved the point about BPL causing unlawful interference and the BPL component manufacturers made improvements. Finally, the poor economics of BPL technology forced power companies to drop the plans to install BPL everywhere.

In 2012, most US hams have heard of "smart power meters" and some seem to express a fear that these meters **WILL** cause interference on the ham bands. I participate in radio nets and ham breakfast conversations ...and it is very typical to hear different hams explain that they have new ham band interference/noise since a smart-power-meter was installed at their home....or they won't allow the power companies to install a smart-power-meter at their QTH.

PLC stands for Power Line Communications. There are several forms of PLC including BPL and carrier-current. Smart-power-meters use PLC to send back small amounts of data back to the power company. One important purpose of this data is to read your monthly power usage without sending a person into your backyard.

Smart-power meters using carrier-current PLC technology instead of RF transmitters operate below 500 KHz. If the smart-power-meter contains an RF transmitter, the Part 15 operation

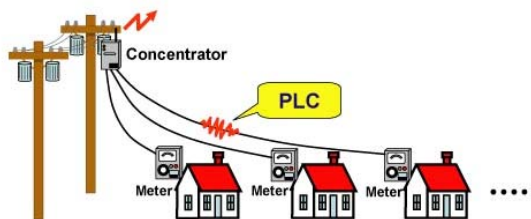


Figure 1 – Automated Power Reading using wire as the physical media (not RF)

can use up to 1W on 902 MHz and much less power less on 2.4 GHz to reach a neighborhood "concentrator". There are some smart-power-meters that operate in the ISM bands (Industrial-Scientific-Medical – "involuntary transmitters") governed by Part 18...but, they still are governed by Part 15.

ED W1RFI of ARRL says:

In a recent thread on the BPL e-mail reflector on YAHOO Groups, Ed Hare W1RFI, the interference expert at the ARRL, recently wrote:

In seeing discussion about smart grid deployments:

- Not all smart-grid deployments are using any form of broadband.
- "Broadband" does not necessarily mean broadband over power lines.
- To my knowledge, no current smart-grid system is using BPL. The Xcel Energy Boulder "Smart City" is no longer extant, or a shadow of its former self
- The term "PLC" is usually applied to carrier-current systems operating below 500 kHz. I have tested Maxim chipset BPL modems and found them to be dramatically quiet, even in their occupied band below 500 kHz and quite immune to HF RF transmitters

- It appears that in-premise BPL may play some role in smart-grid development, but the current industry standards, and developing international regulations, do not use the amateur bands. Even HF broadcasting is offered some protection, with adaptive notching, and as a stakeholder, the HF broadcasters have bought in to the concept.
- The smart grid deployments investigated by ARRL did not pose a major interference threat to Amateur Radio. We have one report of harmful interference to 902-MHz Amateur operation, but that is being investigated by a west-coast consultant who does work for us from time to time as you read this. This is near a PG&E area, but other investigations in other parts of the PG&E system didn't show any annoying noise on 902 MHz.
- Many areas of the country now have smart meters that are accessed either by RF, PLC or other means and we don't have widespread interference reports. We have a couple of reports that look to be broadband noise from the meters, but so far, no firm conclusion. Unfortunately, when a smart-grid

system goes in at the same time a regular power-line noise develops, or a new noisy device comes to the neighborhood, cause and effect is such that it must be smart-grid noise.

[At this point] the conclusions are not 100%, but so far, I can't pronounce smart-grid deployments as a major interference threat to Amateur Radio.

73, Ed Hare, W1RFI
ARRL Laboratory Manager

Conclusion

The good news for hams is that Ed W1RFI is reporting that smart-power-meters are not seen as a threat of RF interference to ham radio HF frequencies. There may be problems with some equipment design for the 902 MHz and 2.4 GHz bands...although I have personally written off those two band several years ago as already being hopelessly polluted with interference (before smart-power-meters ever arrived on the scene). I have listed a few useful URLs below that can provide additional information about smart-power-meters and PLC in general.

I sense there are some hams that fear smart-power-meters due to a "fear of the unknown". It is easy to believe every claim heard by a ham over the air! Perhaps this article can help some hams replace fear of unknowns with a better understanding of smart-power-meters?

USEFUL URLs

- ARRL FAQ for Smart-Power-Meters
www.ARRL.org/smart-meters
- Yahoo Group for BPL
<http://groups.yahoo.com/group/BPLandHamRadio/>
- Wikipedia - Power line communication
http://en.wikipedia.org/wiki/Power_line_communication

OCARC BOARD MEETING MINUTES 2012-07-14

The OCARC Board meeting was held at the JägerHaus Restaurant, 2525 East Ball Road, Anaheim, on July 14 and called to order at 8:15 AM. There was a quorum with six Directors attending. Only Robbie KB6CJZ, Doug W6FKX, John W6JOR, and Kristin K6PEQ were absent.

DIRECTOR REPORTS:

- **Treasurer** – Bob AF6C reported that the club had a total of \$5,765 in the bank at the end of June [see July RF for details]. Bob also reported for Field Day, the club spent a total of \$1,320 for food and equipment, received \$570 in donations for FD food...for a net of \$750 in Field Day expenses.

OLD BIZ:

• Newsletter Editors

- Aug – Jay KI6WZU
- Sept – Tim N6GP
- Oct – Ken W6HHC

• Field Day 2012

Dee N8UZE, the FD Chair, reported that we had a great FD. OCARC scored 2,264 QSOs for a total of 7,684 points (including 2,050 bonus points). The OCARC FD scores and logs had been submitted to ARRL. Dee was pleased with the turn out and the amount of help during set-up tear-down.

- A newsletter clipping of OCARC FD publicity was shown to the board.
- There were discussions that several people had difficulty finding the FD entrance on the school grounds property. There was agreement that the club needs to put up signs. There was also discussion that the club could order a banner to be used at FD and hung on the fence to provide direction.

• Field Day 2012 – continued

- There is a need to assign someone to maintain a “talk in frequency” radio during FD.
- The club had an incident where one member brought a dog to FD and the dog performed a “dump” in the middle of the FD site. The member did NOT clean up after the dog. The Board is considering issuing an OCARC FD rule where **“Anyone bringing a dog to FD is responsible for clean-up”**.

• Field Day 2013

2013 will be the 80th Anniversary of the founding of the OCARC....so the Board would like to plan for a “big Field Day” event.

- The current planning is to use the Walter Knott site next year so that we do not lose the use of the terrific school site.
- There has been discussion that Chip K7JA, Bob AA6PW, and Dino KX6D are considering helping OCARC with 2013 FD. The Board agreed to invite Bob AA6PW to be the FD Chair for 2013.

NEW BIZ

• HRO Ham Jam Day

There was discussion that the OCARC should consider setting up a table at the HRO Ham Jam Day on Saturday July 21. The Board decided there was not enough benefit or interest for OCARC to set up and staff a table at HRO.

• Sponsoring a “Tent” at WRTC

The World Radiosport Team Championship is scheduled to be held in New England (CT.) in 2014. The contest organizers are looking for donations (\$1,000 per tent) from clubs and individuals to help defray the costs of putting on the event. Rather than having \$1000 coming directly from OCARC, Paul W6GMU will ask if OCCARO can combine donations from several clubs to make one \$1000 donation under the banner of OCCARO. See **WRTC.org** for more details.

Respectfully submitted by:
Ken Konechy W6HHC, Secretary

OCARC GENERAL MEETING MINUTES 2012-07-20

The OCARC General Meeting was held at the Red Cross complex in Santa Ana on Friday evening, July 20th at 7 PM. There were 37 members and visitors at the meeting. There was a quorum of directors present; with only Jeff W6UX, John W6JOR, and Kristin K6PEQ absent.

The club Vice President Robbie KB6CJZ introduced our speaker, club member Peter NI6E, who presented on:

“Solar Panels & Ham Radio...”

Peter NI8E explained the basic technology used in solar cells and reported the theoretical amount of power that can be generated by the sun is about 1,300 watts per square-meter.



Fig 1 - Peter NI6E talks on Solar Power

Peter NI6E also explained there are two basic approaches to solar power: (1) selling power back to the utility company and (2) storing power in batteries for off-grid usage (portable operations and for home emergency usage when grid power is lost).

OLD BUSINESS

• Field Day

Dee N8UZE reported that OCARC Field Day was a success. She was very pleased as FD Chair at the number of members that helped with set-up, operating, and tear-down. The scores (2,264 QSOs plus bonus points) had already been sent into the ARRL.



Fig 2 – Dee N8UZE (standing) reports on Field Day

“El Presidente” Paul W6GMU reported that the club is actively planning to have a bigger Field Day in 2013...since the OCARC will be celebrating its 80th founding anniversary in 2013.

GOOD OF CLUB

• IOTA Anacapa Isle

Tim N6GP reminded club members to look for W6UX/P operating next week-end from Anacapa Island during the RSGB IOTA Contest. Three club OCARC members will be part of the IOTA team.....including Jeff W6UX, Tim N6GP, and Kenan KR6J.

• Show-and-Tell

Nicholas AF6CF introduced an ARRL membership letter that had been sent to Bob Evans WB6IXN (then K3JFG) in 1960. Paul W6GMU read some details from the old letter that reminded members of when the cost of ARRL membership back then was \$7/year. The cost of QST magazine then was \$0.50. A copy of the ARRL letter follows on the next page.

Respectfully submitted by:
Ken Konechy W6HHC, Secretary

**ARRL Board of Directors
awards 2012 ARRL Technical Innovation Award
to David Rowe - VK5DGR
for developing open-source CODEC2 digital audio algorithms**

In the minutes of the recent ARRL Board meeting is the following minute:

"32. On motion of Mr. Norris, seconded by Dr. Weaver, the following was ADOPTED with applause:

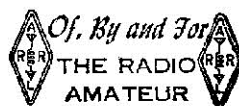
Whereas David Rowe, VK5DGR, has been a major leader and the primary technical author of an open-source CODEC2 protocol, designed to address the impediment to the development of amateur digital-voice posed by closed sources protocols; and Whereas the open-source nature of this work is a major step forward in the development of digital voice communications; ARRL Board of Directors

Therefore, the ARRL Board of Directors awards the 2012 ARRL Technical Innovation Award to David Rowe, VK5DGR"

CODEC2 is a project to develop digital voice **C**oding/**D**ECoding (aka Codec) algorithms that are open source (meaning no cost and any ham can work with and use them). A Codec normally compresses the bandwidth of digital voice for a transmitter and de-compresses it for the receiver. Details on CODEC2 technology and project can be found at www.CODEC2.org. The purpose of the CODEC2 project is to replace the proprietary (that is: expensive license needed) Codec used by the ICOM D-STAR technology. The D-STAR digital voice Codec is called AMBE+ and is normally sold inside of hardware chips.

**An Old ARRL Letter from 1960
directed to
Bob Evans WB6IXN (then K3JFG)**

AMERICAN RADIO RELAY LEAGUE, INC.
QST
WEST HARTFORD 7 CONNECTICUT, U.S.A.



ROBERT J EVANS K3JFG
15 EAST BISSELL AVENUE
OIL CITY PA

THE AMERICAN RADIO RELAY LEAGUE

INCORPORATED

ADMINISTRATIVE HEADQUARTERS

WEST HARTFORD, CONNECTICUT, U.S.A.



Fellow Amateur and League Member:

Welcome back for another year! I am sure you will find QST continuing to be interesting and informative and helpful in your amateur activities.

Your ARRL membership assures you of representation in international as well as domestic fields, essential to the maintenance of broad operating privileges for the Amateur Service. As a Full Member you are eligible for any organization appointment in line with your qualifications and special interests, and with the required continuity of membership you are eligible for nomination for division director or SCM. As a member of the largest and strongest amateur organization in the world, the choice by yourself and fellow members of the director representing you on the Board of Directors in guiding League policy is of great importance to you and the future of amateur radio.

We at the headquarters office are here to serve you in any way we possibly can. I hope you will feel free to write us for advice on any questions you might have, be they technical, operating, legal, public relations, or regulatory -- or on TVI! Then, too, we have a great many items available which may be of direct help to you in your amateur activities; for examples: dope on how to organize a club, pamphlets to educate the public on amateur radio, operating desk aids, sample broadcast scripts on amateur radio, suggestions for hamfest and convention organization, training aids films for affiliated clubs. Contact us for information and help on any phase of amateur affairs.

What we want to do is to convince you your membership is so valuable that not only will you keep renewing year after year, but you will also tell amateurs who are non-members about some of the things they are missing!

