



RF



VOL. LVIII NO. 2

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

FEBRUARY 2017

THE PREZ SEZ



January flew by, and now we are in the month of The Super Bowl (what a game!), President's Birthday, and celebration of Valentine's Day. Let's take a different spin on Valentine's Day. What are the things you love in Amateur Radio? Did you have an "old flame" in radio? My "first love" in ham radio was the 10 meter band. I guess it was no coincidence, since I was first licensed in 1976, and got to experience the fantastic solar cycle 21 peak in 1980. I remember finishing my finals at Cal Poly Pomona in the second week of December, and getting on the air for the 10 Meter Contest. Even though band condix are terrible now, I like to re-ignite that relationship every December by participating in that contest.

Wasn't Brenda Emrick an awesome speaker last month? I didn't realize she was a motivational speaker in the area of

Emergency Preparedness! She inspired at least 2 of our members to take her weekend-long CERT training.

This month we will have CQ Hall Of Famer Wayne N6NB and his protégé' Greg W6IT speak on their record setting UHF QSOs between here and Hawaii last summer.

We had fun at the Winter Field Day a couple of weeks ago. The one thing we noticed is that Winter Field Day is now becoming a big event, and the bands were actually getting a bit crowded with WFD stations. Work has already begun to have our Field Day in June at the Walter Knott Center in Buena Park. Keep an eye out for the first planning meeting.

73,

Tim Goeppinger N6GP
President



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Scan this QR code with
your smartphone or tablet.**

<http://www.w6ze.org>



FEB 2017 MEETING

Speakers for the February meeting will be Wayne Overbeck, N6NB and Greg Campbell, W6IT. Wayne and Greg are recognized veterans of VHF thru microwave activities. Both have long and successful histories in VHF DX, contesting, roving, mountain topping, etc.

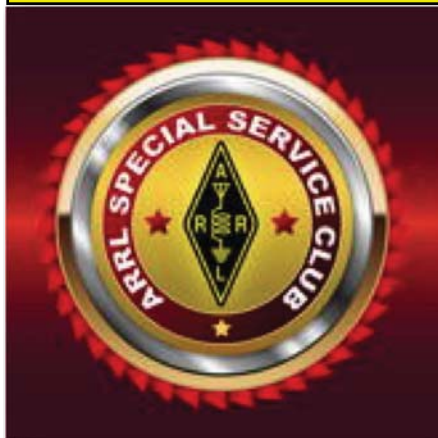
See: Speaker - page 28

**See you FRIDAY,
FEB 17th 2017 @ 7:00 PM
Meeting location on pg. 2**

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**The Next OCARC Breakfast
& open club Board Meeting
is on Sat. MARCH 4th 2017.**

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YEARLY DUES ARE DUE

**The dues deadline is:
March 31st, 2017 to be
included in the April Roster!**

Monthly Events:

General Meeting:

Third Friday of the Month
(except Dec.) at 7:00 PM
The American Red Cross
600 N. Parkcenter Dr.
(east of Tustin Ave. & 4th St)
Santa Ana, CA

Club Breakfast (Board Mtg.):

First Saturday of the
month at 8:00 AM at the
Marie Callender's Restaurant
1821 North Grand Ave
Santa Ana, CA
(Between 17th & Santa Clara)

Club Nets (Listen for W6ZE):

28.375 MHz SSB ± QRM
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 OCNW
Sun - 9:00 AM - 10:00 AM
Listen for Ann K6IOI, Net Cntl

VISIT OUR WEB SITE

<http://www.w6ze.org>

for up-to-the-minute club in-formation, 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 for 2017:

Regular/New Members ¹	\$30
Family renewal/Join ^{1,2}	\$45
Teen member ³	\$15
Replacement Badge ⁴	\$3

¹ Prorated quarterly, w/badge.

² Two or more members in family; includes two badges.. Additional badges extra.

³ Under 20 on 1 Jan of dues year, w/badge

⁴ Additional mailing charges may apply.
Upgrade discount may also apply.



- 25 Years Ago in RF Newsletter - February 1992:

The February 1992 issue of RF announced that our guest speaker at the upcoming meeting would be Bob Berg KB6ZDB talking on the aftermath of the 1989 Loma Prieta Earthquake. Little did we know that in just four more months we would experience the magnitude 7.3 Landers earthquake, which occurred early Sunday morning during Field Day weekend.

The newsletter also announced our new meeting place, the Anaheim EOC on Vermont Street. We had been meeting at Republic Savings on 17th St. east of Tustin Ave. but they were closing their meeting room to the public. Our President, Frank Smith - WA6VKZ commented: "Losing our meeting set at Republic Savings has been a blessing in disguise. The meeting room has become a bit too small and the new meeting room should adequately handle anticipated continued growth."

Frank also reported on the upcoming "Camp In" to be held April 24 - 26 at Indian Cove campground in Joshua Tree National Monument. The

event was being organized by Bob Schnabel - KC6WWP.

Another activity planned for Friday March 27th, believe it or not, was a square dance chaired by Orange police officer Skipper - KC6WJJ. Our square dance caller, who also calls the 2-meter net was Bob - WB6IXN.

The **On the Nets** column by Bob Evans - WB6IXN covered the activity on the club nets for January.

Also covered in this issue was a full page of CW abbreviations, including those used by Bob - WB6IXN in his "Net" column, as well as a list of special "Q" signals used on CW traffic nets. These Q signals all are of the form "QNx".

Meeting minutes for the January General meeting filled most of a page column. The January program was Dale Skinner - W6IWO talking on AMTOR and PACKET as well as a short videotape of "The Last Voice from Kuwait"; remember this was the time of the first Iraq war. Also at the meeting, Dave Hollander announced that he has arranged for the 1992 Christmas dinner to be held at the MCAS(H) Tustin Officer's Club. Discussions about holding a special raffle for a PK-232 packet TNC were held during the business part of the meeting.

Minutes for the February 1, 1992 Board Meeting were also printed, taking up much of the second column. In those days the Breakfast and Board Meeting were held at Denny's Restaurant on 17th just east of Tustin Ave. Topics included more on a raffle, the upcoming "Camp-In", the possibility of moving our meeting site to Chapman College, future meeting programs, and setting up a station at a local high school to contact the Space Shuttle.

The editor for RF at the time was Nancy Bucher - N6QXR, who did a great job of putting together our newsletter. Her's were some of the first RF's to be created by a modern word processor using WYSIWYG technology. In those days RF was typically eight pages; sometimes six-page, ten-page and even twelve-page issues appeared, but the limiting factor was the extra postage needed to mail out the issue via the USPS.

de AF6C



NEW INTERACTIVE MEMBERSHIP FORMS ARE ON OUR WEBSITE

Three new interactive forms are now available on our website replacing the single complex form that was available since 2006. The new forms are simpler and allow the member to pay by PayPal®. A fourth form, for updating your information, is planned for later in the year.

Besides adding PayPal®, the new forms are a lot easier to fill out, with fewer mandatory fields; face it, if you're already a member we have most of your membership information, so there is no need to have you give it to us again, unless it has changed. A brief discussion of the three forms follow:

The Interactive Badge Form:

New members now receive a badge for free as part of their initial membership. However, current members may want to order a replacement or an updated badge. To do this use the Badge Form. The form (Fig. 1a) is simple. All you need to give is your name, call and email. The date is inserted automatically. Now choose how you want your badge delivered. When you make this selection the form expands (see Fig 1b). The form now only shows the options for how you chose to have your badge delivered. Of course you may change

OCARC Interactive Order Form - BADGE
Italicized items are mandatory

BADGE ORDER Part I - Primary Member:
Date: 1/26/2017 to current date.
First Name: Last Name:
Callsign: Email:

BADGE ORDER Part II - Badge Info & Type:
Badge Call: If different from above (10 characters maximum).
Badge Name: as you'd like it to appear on your badge (10 characters maximum).
Delivery: **How do you want to receive your badge?**
☐ Pickup at meeting (**Preferred**). ☐ By mail (postage will be added).

Comments: Please enter any comments or questions you may have:

BADGE ORDER Part III - Payment:
AMOUNT DUE: Method to Pay:
Information: **Choose a Method to Pay:**
• You may pay at a meeting.
• You may mail a check or money order, or
• You may pay with **PayPal**™

Fig. 1a: Interactive Badge Form

☒ Pickup at meeting (**Preferred**). ☐ By mail (postage will be added).

Badge Type: **Choose one:**

☐ New or Replacement Badge w/ clip: \$3.00 pick up at a meeting.

☐ New or Replacement Badge w/out clip: \$2.50 pick up at a meeting.

☐ Upgrade Badge w/out clip: \$1.50 pick up at a meeting.

Comments: Please enter any comments or questions you may have:

Fig. 1b: Badge Form Expansion

this choice just by changing your selection. After you choose your selection, you move on to comments and payment sections. These are common to all the forms and will be discussed separately.

The Interactive Renewal Form:

This form makes it easy to renew. The club has your necessary information, so all we ask for is your name, callsign and email; the email is needed so the form can automatically send you a confirmation. Fig 2 shows the Interactive Renewal Form. If you are renewing a family membership, the form will expand to allow you to enter their information.

If you're renewing, and need to change some data, check "Update Me". Again, the form will expand to allow you to update whatever needs updating.

OCARC Interactive Membership Form - RENEWAL
Italicized items are mandatory

RENEWAL Part I - Primary Member:
Date: 1/26/2017 to current date.
First Name: Last Name:
Callsign: License Class:
Email:
Update Me: ☐ Check to update your data. Additional fields will appear. Fill them as needed.

RENEWAL Part II - Renewal Dues Type:
Dues Year: ☒ for 2017 dues. ☐ 2018 for next year's renewal (accepted after 11/1)
Dues: **Choose one:**
Adult Renewal: ☐ \$30.00 for the full year.
Teen Renewal: ☐ \$15.00 for the full year. < 20 yrs old on Jan 1.
Family Renewal: ☐ \$45.00 for the full year.

Comments: Please enter any comments or questions you may have:

RENEWAL Part III - Payment:
TOTAL DUE: Pay Method:
Information: **Choose a Method to Pay:**
• You may pay at a meeting (cash or check)
• You may mail a check or money order, or
• You may pay with **PayPal**™

Fig. 2: Interactive Renewal Badge Form

The Interactive New Member Form:

New members have a separate form, the Interactive Member Form. This form is a bit longer

since we don't yet know you (See Fig. 3). It requires you to enter the information that the club needs to make your membership viable; things like address, call, email (again, needed to reply to your application) and such. We also ask for your phone number. While not mandatory, we give you a choice to have it included in our offline roster or kept private. Still, we like to have it on file in case we need to get in contact with you. If you are applying for a family membership, additional fields show up for up to three-family members - additional family members can be entered in the comments field.

The Comment Field:

Forms can be too rigid at times, so each form has a comment field where you may enter any questions, add special details or an explanation, report a problem with the form, etc. Feel free to use it for anything you think important, for instance to point out a field that has changed.

The Payment Section:

The amount you owe is shown in the Total Due field. You may pay by mail, at a meeting or via PayPal® (The club will absorb any PayPal® fees). Once you make your selection and click on continue, assuming you have completed the form, you will be presented a summary of your input so you may review it. There are links to go back to the form, to exit without submitting the form or to submit the form. If you chose to pay by PayPal®, you will be taken to the PayPal® button, with your selection already chosen in the pull-down menu. If you've chosen a different way to pay, you will be given the necessary information to complete your transaction.

A Fourth Form:

I have an idea for a fourth form. The club gets a lot of emails where members tell us about member information changes. A new call, new license class, new email or new phone number are common subjects. This form will allow you to update your status and be sure it reaches the correct people in the club. It will also allow us to keep the membership rosters up to date.

Fig. 3: New Member Badge Form

Programmer Comments:

I created the original form, around 2006, as an unsolicited programming exercise. When the club embraced PayPal®, the form was found to be incompatible with needed requirements. While others tried to update the form with little success, I decided to split the old form into three forms, each designed around PayPal®. The effort was not minor, involving a couple of hundred man-hours, four separate programming languages and thousands of lines of code.

I'd like to thank members who helped in testing the new forms on various platforms. Testers included N6GP, W6HHC, and W6ETC. I'd especially like to thank N6TMT who tested it on numerous different devices and operating systems.

de Bob - AF6C



Heathkit of the Month #74:
by Bob Eckweiler, AF6C
STEREO HI-FI EQUIPMENT



Heathkit AA-14
Solid-State Stereo Amplifier

Introduction:

Heathkit of the Month #63 covered the AJ-14 Stereo FM Tuner. For many years I was using this tuner with the AA-32 tube-type stereo amplifier (HOM #52). While the combination worked well, I preferred having the matching AA-14 amplifier. One day I had the opportunity to purchase what appeared to be a modified AA-14 at a good price and grabbed it. Getting it unmodified is a story to be told later.

The AA-14 Solid-State Stereo Amplifier:

In the 1966 Heathkit catalog (810 / 60A) the AJ-14 tuner was introduced; but the matching AA-14 amplifier was still unannounced. By the 1967 catalog (810 / 1967), which carries a 1966 copyright date, the AA-14 was being offered. Also offered then was the AR-14, which is a combination of the AJ-14 and AA-14 in a somewhat larger cabinet. The AA-14 was selling for \$59.95, the AJ-14 for \$49.95 and the AR-14 for \$99.95. By 1969 the prices had increased slightly to \$64.95, \$54.95 and \$114.95 respectively. The AA-14 remained in production into 1975. In its last catalog appearance (in my catalog library), the AA-14 was still shown. However, neither of the other two units were listed. A walnut wooden cabinet - AE-55 (\$9.95) or a metal cabinet - AE-65 (\$3.95) were available for the AA-14. This is the same cabinet that fits the AJ-14.

The AA-14 specifications are shown in Table I. At 15 IHF¹ watts the amplifier can fill a typical living room with loud crisp sound when used with reasonable speakers. Since no expensive

¹ Notes appear on page 12



Figure 1 Heathkit AA-14 Stereo Amplifier (bottom) and AJ-14 FM Stereo Tuner (top)

output transformers are used, and AC coupling is limited with DC coupling in three places per channel, the frequency response is pretty much flat by a large margin over even the widest range of human audio perception.

OPERATION:

The amplifier controls are quite straightforward. Table II lists the front panel controls. The six-position **SOURCE** switch allows the user to select either a turntable, a tuner or an auxiliary device, which might be a tape deck, an additional tuner (AM perhaps) - or in today's world - a CD player, iPod type device or a hookup to your computer audio. This selection may be made as either stereo or monaural. The concentric **VOLUME** controls normally move together, but may be adjusted separately by holding one while moving the other. A **PHONE** jack allows quiet listening with a pair of stereo low-impedance earphones. Plugging in earphones, however, does not automatically disconnect the speakers. The **BASS** control adjusts the low frequency response; -16 dB to +15 dB at 20 cps. The **BASS** control also disconnects the speakers using a switch that is activated by pulling out the knob, allowing quiet listening using earphones. The complementary output stage does not require a load for safe operation, unlike most push-pull transformer output stages. Finally, the **TREBLE** control adjusts the high frequency response from -13 dB to +15 dB at 20 kc. The **TREBLE** control also turns the AC power on and off by a switch activated by pulling out the knob. The **BASS** and

SPECIFICATIONS: AA-14**Power Output:**

Continuous: 10 W per channel

IHF¹ Music: 15 W per channelOutput Impedance: 4 thru 16 Ω

Damping Factor 50 or better

Frequency Response:Normal: 12 cps to 60 kc ± 1 dB6 cps to 100 kc ± 3 dBPower: 15 cps to 50 kc ± 1 dB7 cps to 90 kc ± 3 dB

Channel Separation: 45 dB minimum

Input Impedance:Phono: 47 K Ω Tuner: 180 K Ω Auxiliary: 180 K Ω Phono Equalization: RIAA²**Total Harmonic Distortion at rated output:**

1% or less at 20 cps to 20 kc

0.5% or less at 1 kc

Intermodulation Distortion at rated output:

1% or less using 60 cps an 6 kc mixed 4:1

Power Requirements: 105-125 vac 50/60 cps

20 watts idling, 60 watts full output

Dimensions: 12" W x 3" H x 10-1/4" D

Net Weight: 8-1/2 lbs.

Heathkit AA-14 Solid State Stereo Amplifier
(From Heathkit Manual 595-767)

Table I

TREBLE controls are dual potentiometers that simultaneously adjust each channel equally.

CONNECTION:

The rear panel is shown in Figure 2, and described in Table II. A pair of two-wire AC outlets are mounted on the front panel. The upper outlet is switched with the amplifier power switch and is rated for 150 watts; the lower outlet is not switched and is rated for 350 watts. The Cinch-Jones barrier strips for the speakers allow secure connections using standard

crimp-type wire lugs, even when using heavier gauge speaker wire. A ground screw allows grounding of the amplifier to a nearby ground, if needed for hum reduction. It, more importantly, allows grounding of the turntable and other source devices. The connection is a simple #6 machine bolt, lock washer and nut, with

FRONT PANEL - Left to Right:

Front panel controls are located in a single row below a full-width lit glass panel showing the Heathkit logo, model number and description, and control names.

SOURCE: 6-position rotary switch

PHONO (M), PHONO (S), TUNER (M), (S) TUNER,
 (M) AUX, (S) AUX (M = mono; S = stereo)

VOLUME: dual concentric potentiometer
 (sections are clutched together)

LEFT VOLUME outer lever control

RIGHT VOLUME main knob control

PHONES: 1/4" stereo phone jack

BASS: dual potentiometer

SPKRS OFF - PULL switch on potentiometer

TREBLE dual potentiometer

POWER ON - PULL switch on potentiometer

REAR PANEL Left to Right: (rear view):

FUSE 1 AMP. SLOW BLOW twist fuse holder

LINE CORD entrance (below fuse)

117 V. A. C.:

SWITCHED AC POWER (Top) 2-wire A.C. socket

NORMAL AC POWER (Bottom) 2-wire A.C. socket

SPEAKER:

RIGHT 2-term. Jones strip (vert. mounted)

LEFT 2-term. Jones strip (vert. mounted)

GrouND #6-32 1/2" screw with thumb nut

INPUT RIGHT: triple RCA jack assembly

PHONO, TUNER, AUXiliary (vert. mounted)

INPUT LEFT: triple RCA jack assembly

PHONO, TUNER, AUXiliary (vert. mounted)

Heathkit AA-14 Solid State Stereo Amplifier
Front & Rear Panel Layout
Table II

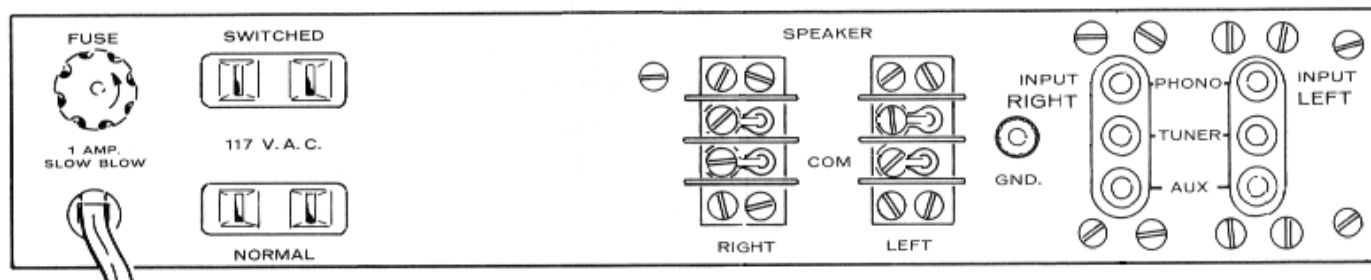


Figure 2 Heathkit AA-14 Stereo Amplifier rear view showing the connections
(Scanned and edited from the Heathkit AA-14 Manual)

washers and a thumb screw added to clamp wire leads or crimp lugs. The input connectors are two assemblies, each having three RCA phono connectors; one is for the RIGHT channel inputs and one is for the LEFT channel inputs. These connectors are made by H.H. Smith.

CIRCUIT DESCRIPTION:

The circuit is made up of three parts: the power supply and identical left and right channels. The left channel's parts carry odd part numbers starting at 1 and the right channel's parts contain even part numbers starting at 2 and typically one higher than the identical left channel part. The Power supply parts have part num-

bers starting at 100, and the few parts common to both channels (such as the SOURCE switch and headphone jack) are not numbered. There are some part number errors in the manual. Semiconductors used in the AA-14 are given in Table III. The schematic, too large to publish, is at: www.w6ze.org/Heathkit/Sch/AA-14-Sch.gif.

POWER SUPPLY:

The AC line is connected directly to the **NORMAL** AC outlet on the rear panel. From there it goes through the power switch on the TREBLE control to the **SWITCHED** AC outlet. Then through a 1 amp fuse to the primary of transformer T1 (T101?). The unfused side of the AC line is connected to the chassis through a 0.01 μ f 1600 V ceramic capacitor (C100). The secondary of T1 has a full-wave bridge rectifier using U-131 diodes (Heathkit part number 57-29). I could find no data sheet on these diodes but assume from the size that they are of the 2-amp variety. The voltage developed when D100 is back biased during half an AC cycle is used to light the two #47 pilot-light bulbs that illuminate the front glass panel; a 75 Ω power resistor limits the current through the lamps. The output of the bridge rectifier is filtered by a computer grade 4,000 μ f capacitor producing 38 volts that is fed to the driver and output amplifier stages. This 38 volt source is additionally filtered by a 270 Ω and 100 μ f capacitor to feed the pre-driver amplifier stages, and an active filter circuit that provides very low ripple voltage to the two noise-critical stages. The filter circuit uses Q100 to effectively boost the capacitance of C103, multiplying it by the beta of Q100 which is typically about

Channel:	LEFT	RIGHT
Preamplifier (2-stage):	Q1	Q2
	Q3	Q4
Tone Filter Amplifier:	Q5	Q6
	Q7	Q8
Pre-driver: (2-stage):	Q9	Q10
	Q11	Q12
Driver:	Q13	Q14
	Q15	Q16
	D1	D2
Complementary Output:	Q101	2N2712
	D100 thru D103	U-131 ³

Heathkit AA-14 Solid State Stereo Amplifier
Solid State Component List
Table III

100 or more. The output of the filter circuit is further filtered by C104, and supplies 28 volt power to the tone filter circuits (Q5 and Q6) and the second stage of the preamplifiers (Q3 and Q4). Even more filtering by R105 and C105 provides 27 volt power to the sensitive first preamplifier stage (Q1 and Q2).

LEFT CHANNEL:

The left channel consists of five sections consisting of eight transistors and one diode.

Source Selection:

Each of the three source inputs are isolated prior to reaching the source switch. The low level PHONO input is isolated by a series 1K Ω resistor. The higher level TUNER and AUX inputs are isolated by a voltage divider that reduces their signal level by 32 dB, bring it inline with the PHONO level signal. The six-position SOURCE switch selects the desired isolated input and routes it to the preamplifier. When the switch is in one of the monaural positions the isolated left and right signals are tied together, resulting in both channels receiving the identical sum signal. To reduce crosstalk the unused isolated inputs are tied to ground by the SOURCE switch.

Preamplifier:

The preamplifier consists of two stages directly coupled with DC feedback. The first stage uses a low-noise 2N3391 transistor (Q1) as a high gain amplifier. The selected signal is coupled to the base through a 10 uF capacitor. R11 sets the proper load impedance for the PHONO input (The other input load impedances are set by their voltage divider). The collector of Q1 is directly coupled to the base of the second stage of pre-amplification transistor Q3, a general purpose 2N2712 running at a gain of about ten. A portion of

the output of Q3 is captured by R23 in the emitter circuit, filtered by C3 and provides DC feedback through R17 to bias Q1.

When the SOURCE switch is in the TUNER or AUX positions AC feedback is provided through the SOURCE switch to the emitter of Q1 via R27. When in the switch is in the PHONO position, however, the AC feedback is through the network comprised of C5, C9 and R25. This network provides RIAA² de-emphasis for vinyl records.

Tone Filter Amplifier:

The signal from the preamplifier is routed through the volume control to the tone circuit. The signal is connected to the high end of both the BASS and TREBLE pots. The low side of the pots are connected, through C17, to the collector of the tone amplifier Q5 (another 2N2712) where the amplified signals are out of phase with the incoming signal. The bass control is isolated by 5.6 K Ω resistors, and the higher frequencies are bypassed by C11. Thus as the pot changes, the amount of the lower frequency signals is either increased or de-

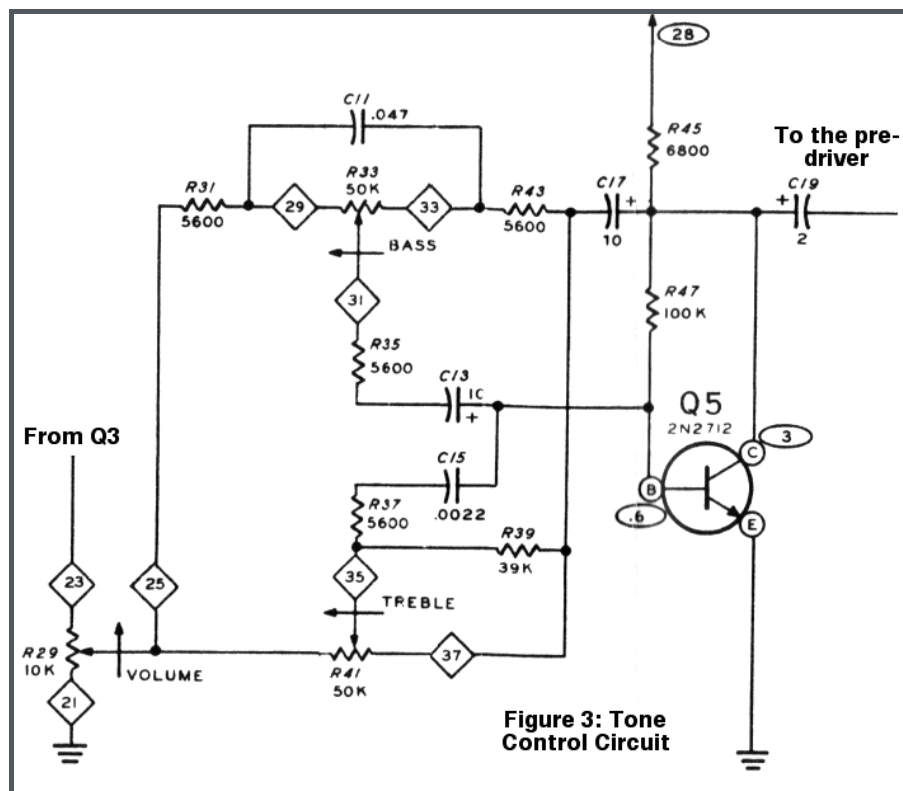


Figure 3: Tone Control Circuit

creased and fed through C13 to the base of Q5. Both bass and treble are either increased or decreased by the treble potentiometer, but only the higher treble signals are coupled to the base of Q5 due to the small size of capacitor C16. The amplified signal at the collector of Q5, besides being fed back to the low end of the tone pots is also coupled to the pre-driver through C19 and R49. See Figure 3.

Pre-Driver:

Q7 and Q9 make up the pre-driver. Like the preamplifier, the two transistors are directly coupled to prevent a loss in frequency response. Q7 is a 2N2712 and Q9 is a 2N3416 which is both low noise and capable of higher collector voltage since it is working into a much lower collector load resistor. Like in the pre-amplifier, a resistor (R55) provides degenerative feedback from the emitter of Q9 to the collector of Q7.

Driver and Output Stage:

The amplified signal from the collector of Q9 is coupled to the base of Q11, a 2N3053 power transistor in a metal TO-5 case. This coupling is via a high electrolytic capacitor (500µf) to keep the low-frequency response while driving the low impedance presented by the base of Q11. Q11 operates as a class A current amplifier.

Q13 and Q15 make up a rather exotic complementary power output stage. See Figure 4. Q13 is a silicon NPN transistor (RCA TA2577A) and Q15 is a germanium PNP transistor 2N2148. Usually complementary transistors are matched closely other than polarity and made of the same material. The collector of the driver transistor is directly connected to the base of Q15 and through diode D1 (1N3754) to the base of Q13. R65 and R67 provide bias to Q13 and Q15, and load to Q11. With no signal both

Q13 and Q15 are lightly conducting and C29 is charged up to about 1/2 of the 38 volt power source. On positive signals Q13 acts as an emitter follower further charging C29 as it drives positive current through the speaker. At the same time Q15 is driven into cutoff. On negative signals Q15 acts as an emitter follower discharging C29 as it drives negative current through the speaker, and driving Q13 into cutoff. Thus, over a full audio cycle these waveforms are combined to faithfully create the complete waveform.

Q11 is mounted on a small heatsink and Q13 and Q15 are mounted near each other on a large heatsink along with diode D1. D1 plays an important role in the operation of the complementary output stage. First it provides a nomi-

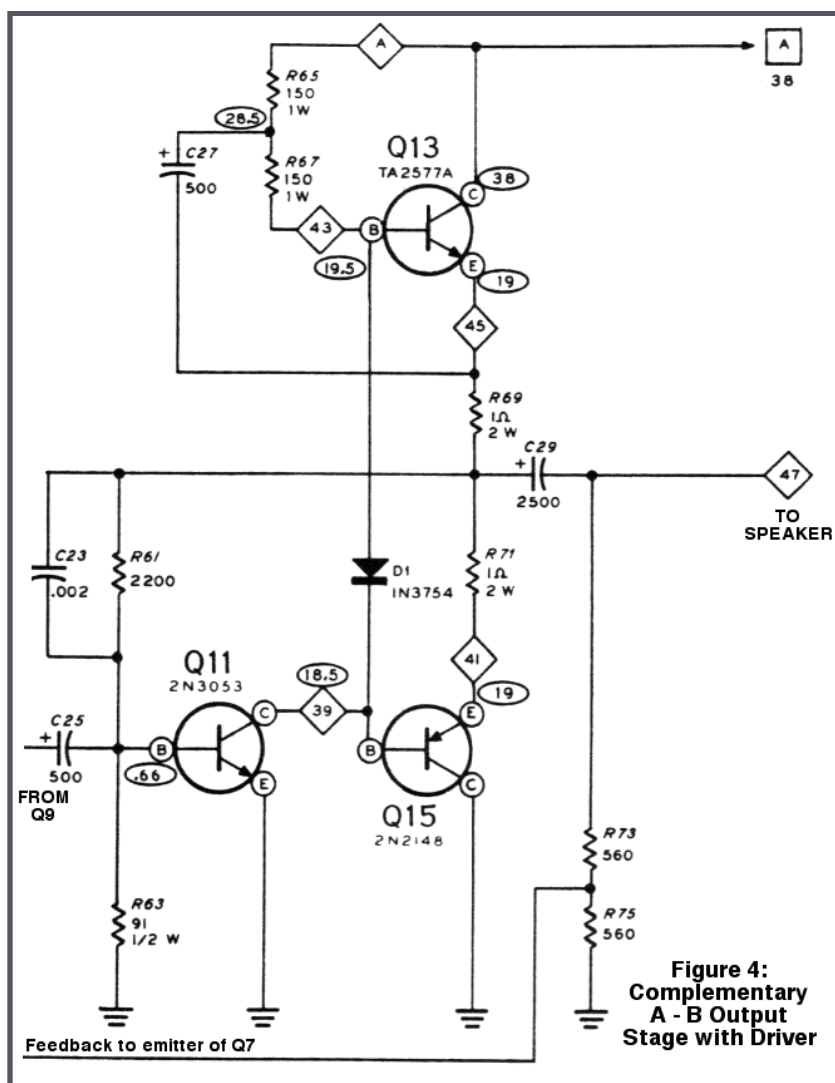


Figure 4:
Complementary
A - B Output
Stage with Driver

nal voltage drop of 1 volt between the base of the complementary pair. This prevents both transistors from being cutoff during the transitions between plus and minus, preventing crossover distortion. Second, it provides temperature stability for the output transistors, especially the germanium Q15. As a germanium transistor, and to a lesser extent a silicon transistor, heat up they tend to draw more current resulting in further heating. This divergent problem is called thermal runaway. D1 is mounted closely between the two complementary transistors. As they heat up and draw more current D1 senses the heat and reduces the bias voltage on the transistors preventing thermal runaway.

RIGHT CHANNEL:

The right channel is identical to the left channel and will not be discussed.

CONSTRUCTION:

The Heathkit AA-14 uses a large circuit board to mount most of the smaller components. Other than the output transistors and their associated reference diode, the power transformer, the large power supply filter capacitor and panel mounted controls and connectors, only a handful of components, mostly associated with the power supply do not reside on the circuit board. Figure 5 is a top view of the AA-14 from the rear with the cover off.

The circuit board mounts inverted near the top of the chassis (foil side up). An easy to remove shield covers the sensitive preamplifier area of the board. This makes troubleshooting easy, especially if you have the foil side X-ray drawing, printed in the manual, handy. Access to the component side of the board is made by taking off the bottom plate. Components near the SOURCE switch may be a bit hard to reach;

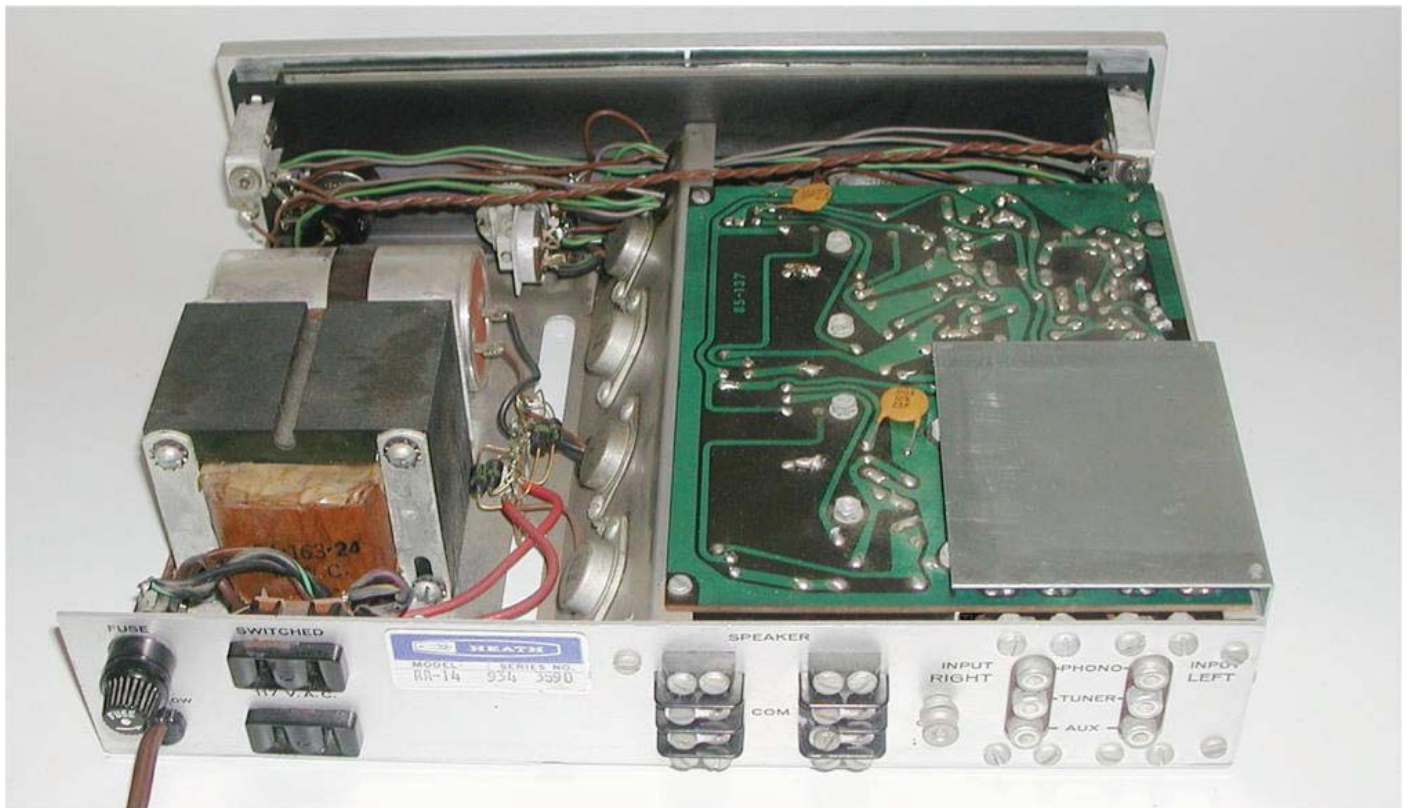


Figure 5: Rear view of the AA-14 Solid-State Stereo Amplifier showing rear connections, and circuit board. Power transformer is to the left and behind it the large 4,000 μf main filter transformer, The four output transistors are on the sloping heat sink. *Photo courtesy of Don Peterson.*

other than that the board's components are readily accessible. A slanting aluminum section of the chassis acts as a heatsink holding the four output transistors. The two reference diodes mount in clips on the back of the heat sink between their associated output transistors so they can sense the output transistor's temperature.

The chassis is modular in construction and is assembled from four sheet metal parts. They are Front Panel, the End Panel (left side), The Rear Panel and the chassis base. See Figure 6. A bottom plate with ventilation slots mounts to cover the left part of the remaining bottom after construction is completed.

RESTORATION:

The AA-14 I bought had been modified and the two triple RCA jack assemblies had been removed and replaced with BNC connectors. Also the Cinch-Jones barrier terminals were replaced with banana jacks. I have to give credit to whoever did the modification as they did it without drilling any additional holes in the rear panel. Instead, they used aluminum plates bolted through the original holes to the back panel and arranged so the new connectors fit through the original holes. The original knobs were missing and the tone control circuitry was wired for a flat response with the tone controls present but unconnected. Evidently this unit was used for some sort of audio measurements.

A bag of parts came with the kit. In it I found the original knobs but not the original barrier strips nor the triple RCA connector assembly, which I found to be the obsolete H.H. Smith part # 1212. I found ONE of these almost immediately. The second took a lot of trips to different electronic stores. The barrier strips were easier as they were still in production. Once the AA-14 was physically restored with new knobs and the original style rear connectors, the circuitry was examined. Once the unit was working, components were examined and replaced

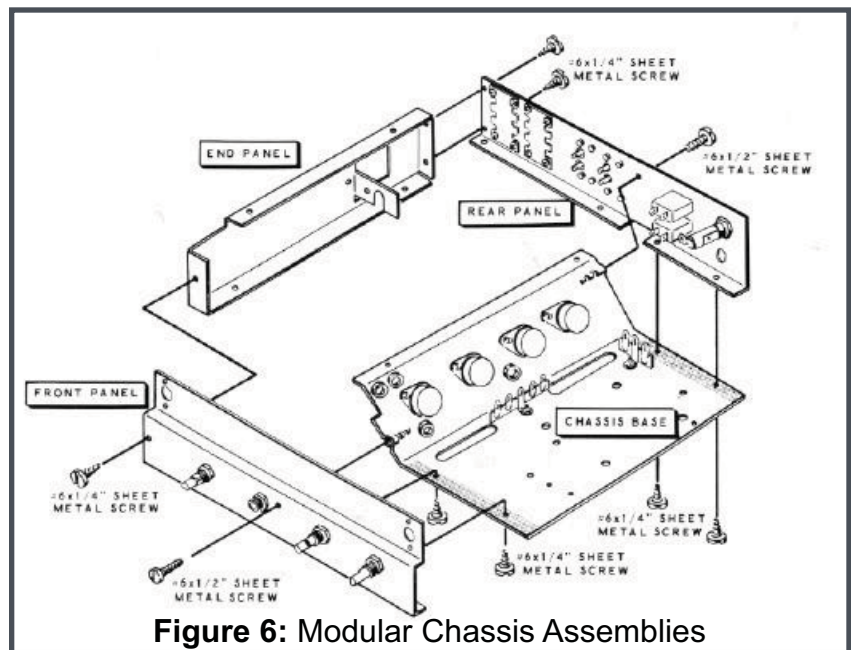


Figure 6: Modular Chassis Assemblies

as needed one stage at-a-time. I generally replace all electrolytic capacitors and just resistors that appear out of tolerance. Restoring one stage at a time, checking operation after each stage, makes finding problems that might arise much easier.

SUMMARY:

The AA-14 currently sits on a shelf in my ham shack under a Heathkit AJ-14 FM tuner. It is used on a day-by-day basis and has given good service driving a pair of Ampex bookshelf speakers. Fidelity seems excellent to my ears, at least until I turn the volume up to the point where the windows rattle!



Notes:

- ¹ IHF (Institute of High Fidelity) a standards organization in the 1950 and 60s. IHF power relates to the peak capability of the amplifier during music peaks.
- ² RIAA (Recording Industry Association of America) the organization that set the pre-emphasizing standard for recording most vinyl records. De-emphasis is required in the amplifier to return the music to its original response.
- ³ U131 diode. No info could be found on this part.

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

Thanks - AF6C

OCARC GENERAL MEETING MINUTES JANUARY 20th, 2017

The OCARC General meeting was held at the Red Cross Complex in Santa Ana on January 20th, 2017.

Club Officers: There was a quorum with all officers present with the exception of Dan N6PEQ, Nicholas AF6CF, and Greg, W6ATB.

Attendance: There were a total of thirty club members, three guests, and the guest speaker in attendance.

The meeting started at 7:00 pm.

Program:

“Emergency Preparedness in Your Community”

Jim AF6N introduced Brenda Emrick KI6EXL as the main speaker for the January meeting. Brenda gave a very informative presentation on necessity of community involvement during times of disaster. The presentation covered all aspects of disaster preparedness. It was not limited to only radio related issues, so there was a lot to be learned by all.

Intermission was taken from 8:25 pm to 8:35 pm

From the membership:

- The question was asked “Can you legally operate your mobile rig by holding the mic in your hand?” Arnie N6HC said that an article in the Orange County Register quoting the Commander of the CHP saying that it was legal but subject to the officer’s discussion.
- Doug K6PGH said that he had responded to the newly licensed ham that was having difficulty programming his handheld radio and believes his problems after he sent him the following link:

<http://www.hamuniverse.com/w7dtguv5rprogramming.html>

- A discussion on repeater directories followed with many sources suggested. A search on the internet will provide dozens of helpful websites.



Speaker Brenda - KI6EXL and President Tim - N6GP

- Winter Field Day – Ron W6FPS said he would be at Prado Regional Park, space 29, and would welcome anyone wanting to join him on January 28 & 29. Tim N6GP and Doug K6PGH said they would most likely also be there.
- Lito KI9H said a friend of his, Tim WD6AWP, has a repeater that he could make available for the Wednesday night Nets. This will be brought up as New Business at the next Board Meeting.
- Chip K7JA reminded everyone about the Palm Springs Hamfest which will be held at the Palm Springs Air Museum. Your admission to the Hamfest also includes admission to the museum.

Good of the Club:

- **Corey Miller** KE6YHX was given the 2016 “Good of the Club” Award for his work on digitizing the clubs records for placement on DVDs and work with the Santa Ana Library where memorabilia of the club is housed.
- **Jim** AF6N said Wayne Overbeck N6NB will be the guest speaker for the February General Meeting. Wayne will be speaking about his newest World Record microwave contacts.

The meeting adjourned at 9:15 pm

Submitted by Ron Mudry W6FPS

- OCARC Secretary

OCARC BOARD MEETING MINUTES FEBRUARY 4th, 2017

The OCARC Board meeting was held at the Marie Callender's Restaurant at 1821 N. Grand Ave in Santa Ana on February 4, 2017.

Meeting Called to Order: 8:06 am

Roll Call:

Pres.: Tim N6GP, Present	Vice Pres. Jim AF6N, Present
Sec.: Ron W6FPS, Present	Membership: Bob AF6C, Present
Tech.: Clem W0MEC, Present	Treasurer: Ken W6HHC, Present
Activities: Tim N6TMT, Absent	Publicity, Dan, Absent
DALs: Greg W6ATB, Absent	Nicolas AF6CF, Present

Members Present: Corey KE6YHX, Club Historian

Guests: Rodger Kerr ZL2RR, Kathy (Rodger's XYL), Vijay Anand

DIRECTOR REPORTS:

- **Vice President** – Jim AF6N reviewed the guest speaker line up for February, Wayne Overbeck N6NB and Greg Campbell W6IT will discuss their World Record QSOs between Hawaii and the mainland and March, Art Goddard W6XD speaking on the Croatia DXpedition, and April, Paul Gacek W6PNG speaking on "Summits on the Air".
- **Membership** – Bob AF6C reported 47 2017 members (paid and honorary) and he gave Rodger ZL2RR an application for membership. Membership roster is up to date.
- **Technical** – Clem W0MEC reported on the 2 & 10 meter net activity and will give a General Meeting presentation on his "Slim Jim" antenna.
- **Treasurers Report** – Ken W6HHC provided a "Year-to-Date" Cash Flow report. Membership renewals by Paypal are out pacing payments by cash or check.
- **Activities** – Tim N6GP standing in for Tim N6TMT said the tri-fold brochures have arrived. The Boy Scouts will be selling food at Field Day again.
- **Director at Large** – Nicolas AF6CF reported the Bioenno Battery pack is not taking a charge and will contact Bioenno Power to resolve the problem.

OLD BUSINESS:

- **Newsletter Editors**
Feb- Bob AF6C, Mar- Tim N6TMT, Apr- Tim N6GP, May- Jim AF6N
- **Club Historian Report** – Corey KE6YHX is continuing his work to back-up the W6ZE web site, make PDFs of the three archive databases and making a

self-browsable M-Disc of the OCARC Web Site for the Santa Ana Library

- **June 2017 Field Day** – Tim N6GP contacted Carla Nossett of the Centralia School District and started the process to obtain the Walter Knott Educational Center site for the next Field Day. The club will invite OC RACES and CARA to join us at Field Day. Tim N6GP asked for a volunteer for FD Chairman. Tentatively the "co-chairmen" are Jim AF6N, Ron W6FPS, and Tim N6GP. The first planning meet will be held later in the month or early in March. Ken W6HHC suggested that a priority would be to select band captains early in the planning process.
- **New Assistant WebMaster** – Ken W6HHC is still looking for assistance in the ongoing updating and maintenance of the web site.
- **Radio Donations** – Jim AF6N will provide photos of recently radio equipment to Bob AF6C which he will include in the "For Sale" section of the web site.
- **Winter Field Day** – Ron W6FPS provided a synopsis of the W6ZE Winter Field Day activities. Contacts were made on 2, 15, 20, 40, 80, and 160 meters. Contacts per mode were 75 CW, 48 SSB, and 1 FM. The first 37 contacts were QRP before switching to Low Power < 100W. Ron W6FPS will send the log file to Bob AF6C.

NEW BUSINESS:

- **General Meetings** – The lengths of the General Meetings were discussed and the general consensus was that the guest speaker should be advised to limit his or her talk to between 45 minutes and 1 hour. The break time should last between 15 and 20 minutes. Adjournment of the meeting should be approximately 9:15 pm.
- **Repeater for Net use** – Bob AF6C will contact Tim Sawyer WD6AWP about the use of his repeater for the club 2-meter Wednesday night Net.

GOOD of the CLUB:

- **Honorary Member** – It was proposed and approved that Lee Evans (brother of Bob Evans WB6IXN) would be made an honorary member of OCARC for the year of 2017

Meeting Adjourned 9:52 am

Submitted by Ron Mudry W6FPS

OCARC Secretary



MOBILE AMATEUR RADIO OPERATIONS AND THE LAW

At the January 20th club meeting a question was asked on the legality of operating mobile ham radio with the new laws governing hand-held cellphone devices. A discussion ensued with numerous opinions expressed.

Not many days later Southwestern Division members of the ARRL received a Division **e-Communicator** email on just this subject. That email is reproduced below. (For those who are not yet ARRL members, this is just a tiny example of what you are missing.) I'd like to thank Richard Norton - N6AA for allowing the club to reprint this bulletin:

Amateurs in California and in several Arizona communities are facing recently enacted or impending bans on hand-held electronic devices while driving. Here's what we currently know about these laws.

In California, Assembly Bill 1785 took effect on January 1 of this year. Now included in Section 23123.5 of the Vehicle Code, this law provides that "a person shall not drive a motor vehicle while holding and operating a handheld wireless telephone or an electronic wireless communications device unless the wireless telephone or electronic wireless communications device is specifically designed and configured to allow voice-operated and hands-free operation, and it is used in that manner while driving ... For the purposes of this section, "electronic wireless communications device" includes, but is not limited to, a broadband personal communication device, a specialized mobile radio device, a handheld device or laptop computer with mobile data access, a pager, or a two-way messaging device."

Whether intentionally or unintentionally vague, interpretations of this language have ranged from applying to all mobile communications (a traffic court commissioner speaking to a radio club) to excluding mobile radios (a CHP spokesperson in Orange County). One of our ARRL Volunteer Counsel attorneys spoke with a staff member of the Assembly Transportation Committee, which introduced the bill. The staffer told him that the law was intended to apply to smartphones and similar broadband devices, not to Amateur Radio or other radio communication services. Another Volunteer Counsel attorney is attempting to get a clarifying statement to that effect entered into the official record.

Meanwhile, CHP in Sacramento has provided guidance to the Los Angeles County Sheriff's office that wired microphones permissible but handheld radios are not. Until the law is amended or clarified, it might be prudent for California Hams to avoid wielding a handheld while driving.

In December, the Town of Oro Valley (in Pima County), Arizona adopted a "hands-free" ordinance that states, "No person shall, except as otherwise provided in this ordinance, use a mobile telephone or portable electronic device while operating a motor vehicle upon a street or highway, unless that device is specifically designed or configured to allow hands-free listening and talking and used in that manner while operating a motor vehicle." The ordinance defines "hands free" as the "use of a mobile telephone or portable electronic device without the use of either hand by employing an internal feature of, or an attachment to, the device." Like the new California law, this one was ostensibly targeting smartphones and the like, but

its lack of clear definitions or specific exclusions has Amateurs concerned. The town has provided for a warning-only period of a few months during which mobile radio operators can make their case if stopped. (Source: Oro Valley Web site)

A similar bill was passed earlier in 2016 in the City of San Luis (in Yuma County) but has not led to any enforcement cases to date.

On January 10, the Tucson City Council approved in concept a law similar to Oro Valley's, and the final language is expected any time now. The stated purpose was to enable better enforcement of the city's four-year-old ban on texting while driving, and it appears that the implementation will be as a secondary offense, one for which you can be cited only if you are already being stopped for another offense such as speeding. (Source: Tucson News Now.)

Tucson Amateurs are contacting their council members to request inclusion of appropriate exemption or exclusion language.

It is worth noting that an overly broad mobile-communications ordinance enacted in Coconino County, Arizona in 2014 was amended after pressure from both Amateurs and commercial trucking interests, according to Section Manager Robert Spencer KE8DM.

In Dave Sumner's editorial devoted to this subject in February 2012 QST, he noted that "Safety must be our number one concern. Guiding a motor vehicle is an awesome responsibility. Radio amateurs have been operating mobile for decades without being perceived as a threat to public safety, but if there is ever any doubt in your mind about your ability to discharge that responsibility

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you should either pull off the road (if it is safe to do so) or turn off the radio." I encourage you to read the full editorial.

ARRL Southwestern Division
Director: Richard J Norton, N6AA
n6aa@arrl.org

**GOOD of the CLUB AWARD
PRESENTED TO COREY MILLER
- KE6YHX -**



At the annual holiday dinner then President Nicholas Haban - AF6CF announced to the gathering that the winner of the club's annual Good of the Club award was Corey - KE6YHX.

Unfortunately Corey was not able to attend the dinner, so the presentation was given at the January club meeting by our new President - N6GP.

Congratulations Corey!



MEMBER HAM SHACKS – N1BKB, K7JA:

This month's Member Ham Shack page(s) feature the ham shack of Steve - N1BKB. as well as a couple of the unusual shacks from the man of 1,001 ham shacks: None other than Chip - K7JA.

First, here is Steve - N1BKB's shack with him at the mike. And notice his Vibroplex key on his desk ready for that rare CW DX contact.

Steve reports: *The picture I sent you is the one printed on the back of my QSL card. As for identifying the equipment ... That's easy:*

Top L - R: Yaesu FP-1025A power supply, MFJ-969 antenna tuner, Yaesu FT-847 (primarily used for VHF/UHF and back-up HF xcvr)

Middle L - R: Yaesu SP-5 (with phone patch and audio filter), Yaesu FT-1000 (primary HF radio)

Bottom L - R: Oak Bay Technologies low pass filter, Vibroplex key, clock set to UTC

MEMBER HAM SHACKS



This was the "shack" at my old QTH three years ago. I do not have an updated picture with the current line-up at my "new" QTH which has an MFJ-986 tuner (instead of the 969), Collins 30L-1 amp, and Blue Mountain CLRDsp audio filter.

73, Steve



Steve - N1BKB in his ham shack

And Chip – K7JA/V63RR describes two of his exotic “ham-shack” operating locations:

...here are a couple of photos from me. Shack? Which shack? Here's one of my beach shack at Bolsa Chica State Beach. I was about to work Richard Garriott up on the ISS using my FT-847 and a little 4-element 2-meter Yagi.

And the other is my shack on Pohnpei in 2011 as V63RR, using an FT-857 to a portable 2-element Yagi from Super-Antennas. We actually won the 10-Meter Contest continental award for Oceania, Low Power!

I like HF and six meters, mostly CW, but I keep an eye on the computer screen on JT65 or MSK144

modes if I am busy and can't pay attention to the radio full time. Contests and Field Day are my favorites. . .and not always from home.

73, Chip



TechTalk123

- The MiniTiouner Receiver/Analyzer for Digital-ATV

by Ken W6HHC

Jean-Pierre F6DZP has been modifying Digital-ATV receivers for DVB-S protocol with software for years - in order to allow the tuner to provide information that hams need. The main problems with commercial DVB-S receivers are (a) that if the signal is not good enough - they show only the "blank screen of death" and (b) they do not work with smaller Symbol Rates that some hams want to use. The MiniTiouner receiver/analyzer solves these two problems.

The MiniTiouner unit

The MiniTiouner is a second-generation DATV receiver/analyzer for hams and is USB2based. **Figure 01** shows a block diagram of the MiniTiouner Receiver/Analyzer connected to a PC desktop or portable.

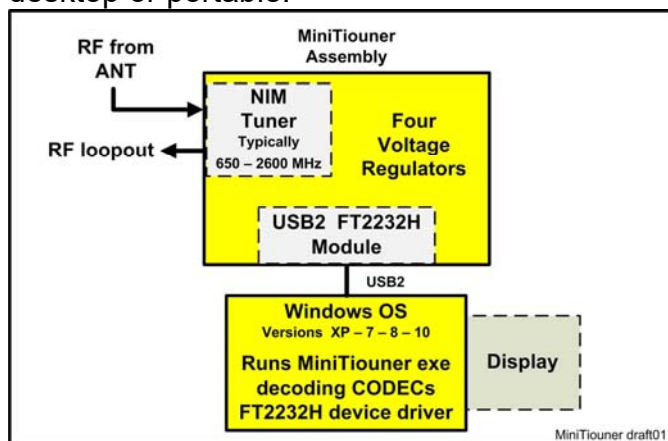


Fig01 – Block Diagram of MiniTiouner set-up for receiving DVB-S and DVB-S2 protocol

The MiniTiouner makes a great receiver for receiving and displaying ham DATV signals, including from the International Space Station (ISS) broadcasts from Ham-TV transmitter.

Figure 02 shows the construction and main components of the MiniTiouner assembly. The NIM-tuner, assembled FT2232H USB module, a hard-to-find 1 V regulator, and blank board can be purchased from the BATC online store. Other components can be ordered individually from an on-line electronic distributor like

Digi-Key (some soldering is necessary).

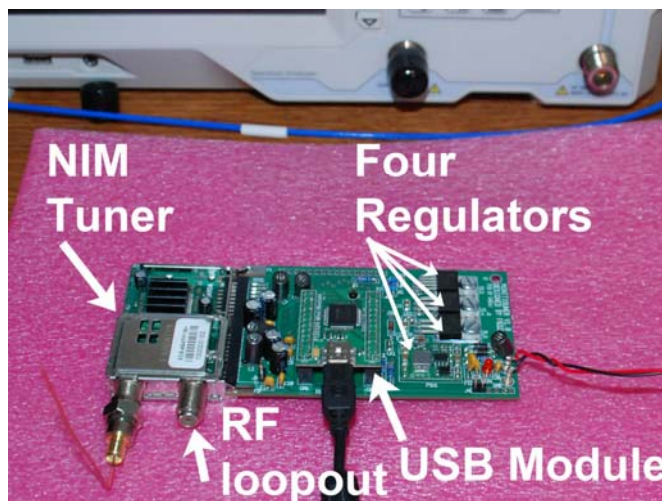


Fig02 – Main Components of the MiniTiouner Analyzer/Receiver

The USB-2 module is a preassembled module and plugs onto the main PCBA by a pair of dual-inline connectors.

The MiniTiouner Receiver

The MiniTiouner makes a great DVB-S and DVB-S2 receiver. **Figure 03** shows the uncluttered video display on your Windows PC.

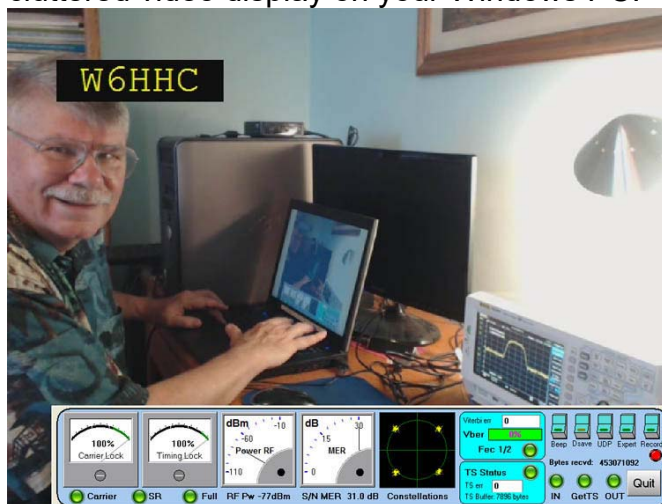


Fig03 - The MiniTiouner shown in receiver-mode for DVB-S. The Measurement-Panel at bottom can also be removed.

The MiniTiouner can accept NIM-tuners manufactured by different companies. Typically the "direct

frequency range” of these TV tuners is from around 650 MHz to 2600 MHz. By adding the appropriate “up-converter” or “down-converter” in front of the receiver’s antenna connector, hams can receive DATV signals from 50 MHz to 10 GHz (and above). Video can be displayed in the video aspect ratio of 4:3 or 16:9 or even square (1:1).

The MiniTiuener Analyzer

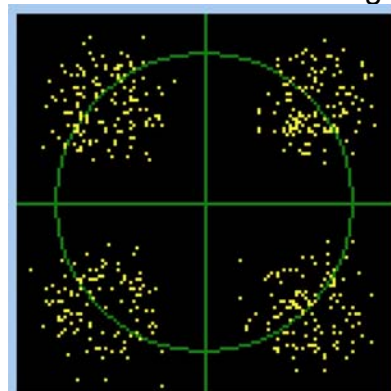
The MiniTiuener is also a ham-radio analyzer tool for DVB-S protocol and DVB-S2 protocol. As Jean-Pierre F6DZP clearly explains: *“On commercial receivers the DATV video is either good or missing...perhaps only with a signal strength reading to guide you. With MiniTiuener, Digital transmissions are not really ‘all or nothing’, in between there are many things that can happen; it's important to be able to observe and define the various stages.”*

The MiniTiuener as an analyzer can be switched into the “expert-mode” to:

- measure signal strength directly in -dBm units
- look at encountered FEC error rates,
- measure MER (Modulation Error Rate)
- visualize noise on modulation “constellation”
- deviation of frequency received
- deviation of Symbol Rate received
- display PIDs for video and audio
- confirm selection of H.262 H.264 or H.265
- enable/disable “anti-rotation”

...and the list goes on.

Figure 04 shows a typical the control panel display for the “expert mode analyzer” mode of the MiniTiuener for a DVB-S2 transmission. **Figure 05** displays a typical weak-signal modulation “constellation” for inspection (QPSK modulation in this screen-capture). There is a lot of noise being seen compared with the received DATV signal.



Constellations

Fig05 – The MiniTiuener analyzer permits observing the “constellation” of the received DATV modulation (weak-signal QPSK in this case).

This “constellation” display also allows you to observe the quality of the modulation constellation being transmitted by your station (especially if your I and Q modulator gains have not been balanced).

Reduced-Bandwidth DATV

In 2015, hams in England were provided with a newly opened, but temporary, segment of 2 Meters (from 146.0 through 147.0 MHz. The challenge made to the hams in England was to use

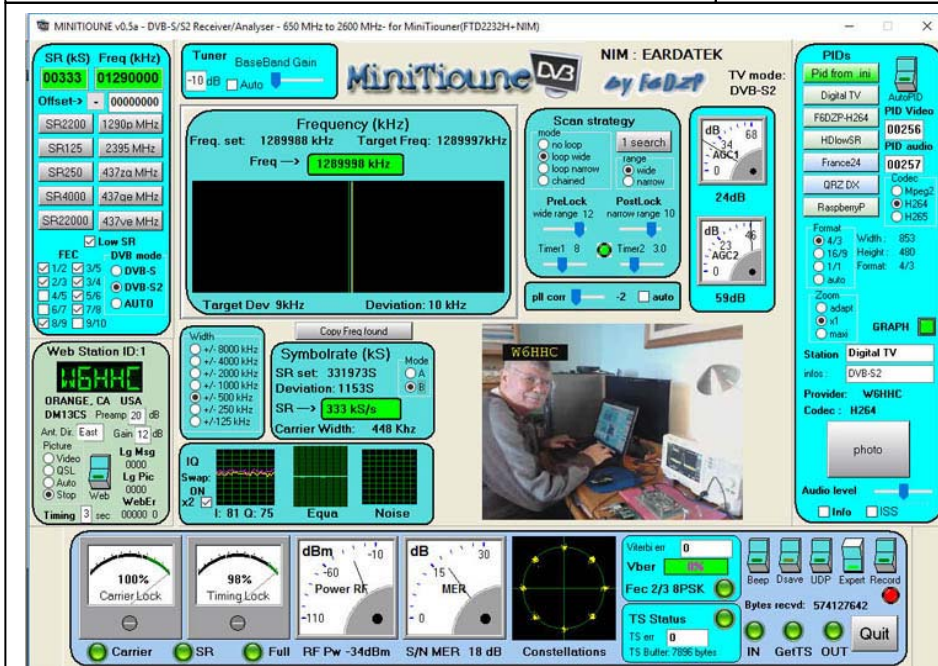


Fig04 - The MiniTiuener design by F6DZP is an excellent analyzer for DVB-S and DVB-S2.

Shown in analyzer-mode (AKA “Expert” mode) looking at 8PSK modulation “constellation”.

this new segment only for digital forms of communications (not just more FM repeaters) and to perhaps also invent a way to produce DATV in 0.5 MHz RF bandwidth...instead of just using the more typical 2 MHz RF bandwidth for DVB-S!! This is called RB-DATV.

Hams in England and France responded with enthusiasm and clever work to make this happen. The DATV-Express software was changed by Charles G4GUO to lower the Symbol Rates to 333 kSymb/sec (and lower) with changes to the anti-alias filters (all in software) to produce low-SR transmissions. Jean-Pierre F6DZP looked at the software of the older TuTioune design and the newer MiniTioune design and with much perseverance was able to allow the MiniTioune RB-DATV reception to work down to less than 125 kSymb/sec (RF bandwidth around 170 KHz). Hams in England started setting distance records on the 2M band with DATV QSO's. These pioneering hams also observed that transmitting H.264 encoding with DVB-S protocol (instead of the normal MPEG2) provided a better (smoother) low SymbolRate video. Noel G8GTZ explained to me that the significantly better low-SR video quality seen on the receiver is due to the H.264 design using a more suitable macro block size.

Then even more benefits were confirmed (or better understood) from using RB-DATV than just reducing RF bandwidth to meet regulations. Reducing that bandwidth of the DATV transmission also increased the signal/noise (aka C/N) performance at the receiver. If you use the same transmitter power...but cut the signal bandwidth by one-half (perhaps going from 2 MHz to 1 MHz) then the receiver is looking at less noise (power) and therefore the signal/noise ratio is doubled (3 dB better)

Power required vs dish size vs bandwidth					
	8MHz	4MHz	2MHz	1MHz	0.5MHz
2.4m	100	50	25	12.5	6.25
1.7m	200	100	50	25	12.5
1.2m	400	200	100	50	25
0.85m	800	400	200	100	50

Fig06 – Comparing power required at transmitter as channel-bandwidth of RX gets smaller.
(courtesy of Rob M0DTS)

Figure 06 shows that the power required at transmitter gets smaller as the channel-bandwidth of receiver is reduced: 25W for 2 MHz BW, 12.5W for 1 MHz BW and 6.25W for 0.5 MHz BW. Conversely, the same transmitter power will go further as the channel-bandwidth of the receiver gets smaller (and the signal S/N at receiver gets improved). [Note - this table was originally created by Rob M0DTS as he planned for groundstations transmitting on 2.4 GHz band to the future DATV satellite.]

Noel G8GTZ also pointed out to me that use of the RB-DATV approach is NOT limited to the 2M band. Creating a more robust signal on 440 MHz, 1.2 GHz and even 10 GHz band by using RB-DATV communications theory also stretches the ability to work DX.

Receive DATV from ISS

Receiving DATV from the HamTV transmitter on the International Space Station (ISS) consists of dealing with three "hurdles" for hams:

- The ISS is a moving target and you need a tracking antenna rotator.
- The ISS moving in orbit creates Doppler shifts in frequency.
- The DATV transmitter on ISS contains issues that prevent the video and audio PIDs from being inserted in the signal normally.

The MiniTioune can overcome the last two ISS challenges in software.

The MiniTioune software package also include a tool called Tioune Data Reader.

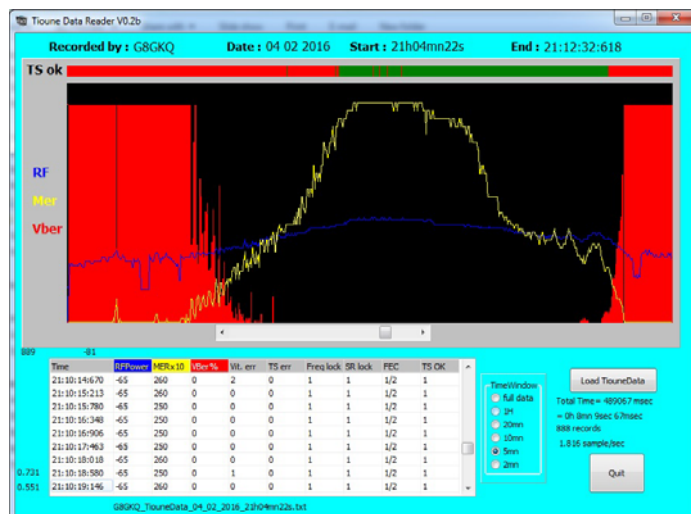


Fig07 – The Tioune Data Reader tool allows plotting the receiver DATV parameters during ISS pass.
(Courtesy of Dave G8GKQ)

In **Figure 07**, the green bar at the top shows where a “solid DATV lock” occurred on this pass of ISS.

Noise Power Measurement Tool

The VivaDATV website for MiniTioune software also contains another software package tool called NPM_USB.zip. The NPM tool can be used for (a) measuring the Sun noise, (b) sweeping their antenna dish around the good value, to be sure their antenna rotator tracking is set correctly (see **Figure 08**) or (c) for observing the noise/interferences.

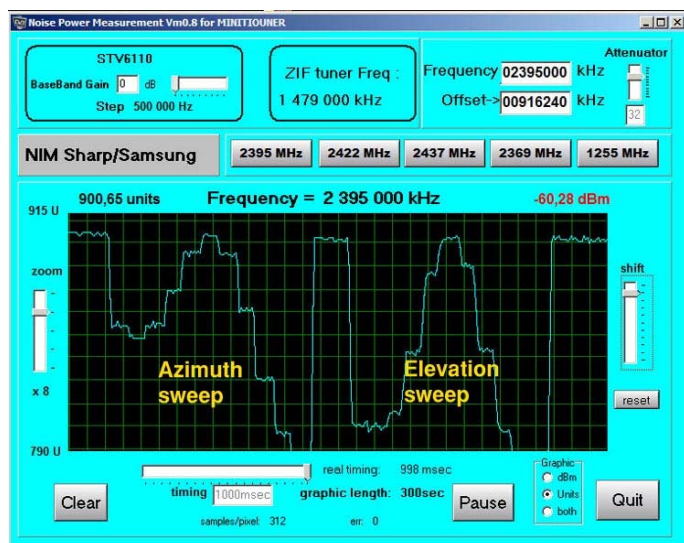


Fig08 - Display of Noise Power Measurement tool sweeping the Sun with antenna rotator
(Courtesy of Jean-Pierre F6DZP)

In the example shown in **Figure 08**, we are tracking the Sun, sweeping the antenna at -10°, -8°, -6°, -4°, -2°, 0°, +2°, +4°, +6°, +8°, +10° in azimuth and in elevation. At 0° we must have the top of the pyramid. If we obtain a symmetric pyramid, then our antenna is set well.

Specifications (with MiniTioune v0.5a software)

- NIM-tuner frequency range – typically 650-2600 MHz
- DATV Protocols – DVB-S and DVB-S2
- Modulation constellations – QPSK, 8PSK
- Symbol Rate – 100 k – 22000 kSymb/sec
- Decoder CODECs - H.262 (MPEG2), H.264, H.265
- O/S – Windows XP, 7, 8, 10
- PC interface - USB-2
- Windows device driver – FT232RL from FTDI-chip
- Board power input voltage – 9–16 VDC.
- Assembled board size - approx **5.625 x 2.25** inches

Software and Hardware

The BATC organization for ATV and DATV has created a terrific wiki site to place useful information in one (repository) web location. Included in the BATC wiki is a section devoted to the MiniTiouner details for hardware and software. (See the BATC wiki URL at the end.) The wiki info on MiniTiouner is organized as five areas:

- 1) Hardware overview
- 2) Hardware parts-list and Assembly
- 3) Software Downloads
- 4) Software Installation
- 5) Receive up-converters and RF BP filters

Note that you must be registered on the VivaDATV.org website in order to download the MiniTioune software.

Plans

Jean-Pierre has discussed on DATV forums that he is interested in using a new NIM-tuner manufactured by Serit in Korea. The advantage of this Serit model FTS-4335 NIM-tuner is that the frequency range goes from 144 MHz up to 2450 MHz. That means that the up-convertors would no longer be needed in order to receive on the 2M band and the 70cm band. Note that the pin assignments on the SERIT NIM-tuner are different than the first batch of NIM-tuners by SHARP and EARDATEK. So changes to the current MiniTiouner PCB board or an adapter cable may be necessary to use the SERIT NIM-tuner?

On the current v0.5a software for DVB-S2, only demodulators for QPSK and 8PSK are operational via the current SHARP and EARDATEK NIM-tuners. In the future, the use of SERIT NIM-tuner can provide demodulation implementations for the other DVB-S2 modulation technologies of 16APSK and 32APSK.

Conclusions

Jean-Pierre F6DZP has provided hams with a very useful DATV analyzer. In addition, his design produces a DATV receiver that has capabilities that hams want...but are not provided by commercial DVB receivers. It is my favorite DVB-S/S2 receiver...so easy to use compared to commercial Set-Top-Box receivers!! I also want to give a very large "Thank You" to F6DZP for his help to me whenever I had difficulties or questions with my installing/testing of Mini-Tiouner.

Useful URLs

- British ATV Club - Digital Forum – see www.BATC.org.UK/forum/
- BATC wiki site for ATV information ranging from “getting started” to MiniTiouner installation – see <https://wiki.batc.tv/MiniTioune>
- CQ-DATV online (free monthly) e-magazine – see www.CQ-DATV.mobi
- Orange County ARC entire series of newsletter DATV articles and DATV presentations – see www.W6ZE.org/DATV/
- Yahoo Group Forum for Digital ATV - see <https://groups.yahoo.com/neo/groups/DigitalATV/info>
- VivaDATV forum for many French DATV efforts including TuTioune and MiniTiouner
 - see <http://www.vivadatv.org/viewforum.php?f=80> (English section)
 - see <http://www.vivadatv.org/viewtopic.php?f=60&t=365> for Noise Power Measurement page

**OCARC ENTERS ITS 2nd
WINTER FIELD DAY
by Tim Goeppinger - N6GP**

Winter Field Day (WFD) is no longer the tiny contest that everybody ignored. Now in the able hands of the Winter Field Day Association for 2 years running, this event has come unto its own. There was no comparison between last year's event, where WFD stations were hard to find on the bands, to this year, where there was activity all over the band. There was QRM somewhat like June Field Day!

Like June FD, WFD allows early setup of stations, so Ron W6FP headed out Friday afternoon to camp space #29 to put up his Hex beam, dipoles, and tent. As you might remember, that night had ferocious, cold, 50 MPH winds. Ron said that the tent was flapping all over the place as he tried to sleep. Thankfully, the winds died down at about 4AM.

Tim, N6GP arrived Saturday morning about 9AM, and was impressed to see everything all set up. They put computers, batteries, and Tim's Icom IC-7000 on the table in the tent. For bonus points, the decision was made to operate on battery power only, and to operate QRP 5 watts to get 4 times the points for each QSO.

Ron and Tim were ready to get on the air at the contest's start at 11AM. They found out that operating QRP was quite a limitation, even on CW. They could not call CQ and get a run go-

ing. Search and Pounce was difficult too. Many stations just could not hear us, even when there were no other callers. A lot of stations had pieups going. It was evident to them that there was a whole lot more activity this year, compared to last.

By 3:30 PM they had about 35 QSOs, mainly on 20 meters (both phone and CW). They made 1 QSO on 15 meter CW in order to get a multiplier for that band mode. This contest is interesting in that you get a multiplier for each band-mode that you operate on. At this time, they switched to 40 meters, and found it to be extremely difficult on QRP. They only made 3 QSOs on 40 before having the discussion to increase power to full power (100W or less). In order to save batteries, they chose 50 watts as a compromise. They returned to 20 for a bit, and worked some stations they missed while QRP, and settled in to 40 meters at sunset.

Tim had an idea to operate on 160 meters in the evening during the CQ 160 Meter CW contest, which has tons of activity. He had to return home anyway to attend a family birthday party, so he picked up his 250 foot long 160 meter dipole, along with some support masts. At about 9PM on a night with no moonlight, Ron and Tim unfurled the massive 160 dipole, and hung it as an extremely low inverted vee, up only 30 feet at the apex. The ends were only about 10 feet up. They tested it with an antenna analyzer, and it was very marginal, about 2:1 SWR at 1870 KHz, and only good for about

±10 Khz. Tim's small SST antenna tuner could not tune it.

Tim searched and pounced close to 1870 KHz, and was easily able to work stations in AZ and New Mexico. The WFD exchange confused some of the stations. After about 2 hours, roughly 30 contacts were made on 160, out as far as Minnesota, Florida and Maryland! They were amazed what a low noise location that Prado is for radio, even with high tension lines only about ½ mile away. Ron particularly enjoyed trying 160, since he had never been on that band before.

Another trick they used was to shorten Ron's 80 meter dipole to work on 75 meters by taking 4 feet from each end, and twisting it back onto each dipole leg. The antenna tuner was then able to make the minor adjustments, and 4 QSOs were made on 75 meters for another multiplier. At about midnight, they QRTed for the night.

Tim returned home, but Ron braved the cold weather that night. After 8 AM they were back on the air, working 20 meters, and picking up the multiplier for 15 phone. The thing that surprised them was that unlike June Field Day, WFD finished STRONG, with a good rate up until the last minute. Best DX worked was Cuba, Dominican Republic, Hawaii and Guadeloupe 124 contacts were made on 10 band modes. With 4500 bonus points for outdoor, battery, and away from home, they ended up with a score of

8,480 points. W6ZE was also entered as a Low Power entry in the CQ 160 contest.

The only "Murphy" strike was on Tim and Ron's Winkeyer USBs. They each own one, and the extra RF floating around from the 2:1 SWR condition caused both keyers to temporarily fail. They both came back to life after the batteries were removed and put back in. So, they had to send some CW by hand for a while.

With WFD really on a growth track, Ron and Tim would like to see greater participation by our club next year. Maybe OCARC could change the location to a closer campsite, like Huntington Beach. Next year they are talking about a higher 160 antenna, using a digital interface to enter the BARTG RTTY contest as well that weekend, and having a local ham available for skeds to jump all over the bands to rack up some multipliers. It would be great to see some other local clubs participate as well.



Figure 1: Tim N6GP operating Winter Field Day. Yes, the microwave oven was attached to commercial power.



Figure 2. View of the snow-capped mountains from Prado Regional Park.



Figure 3. Ron - W6FPS's very strong tent that survived the wind.

OCARC Cash Flow - Year To Date

1/1/2017 through 2/4/2017

Category	1/1/2017 - 2/4/2017
INFLOWS:	
Dues, Family	\$ 45.00
Dues, Family (PayPal)	130.17
Dues, Membership	300.00
Dues, Membership (PayPal)	374.79
Sale Of Equipment	150.00
TOTAL INFLOWS:	\$ 999.96
OUTFLOWS:	
Refreshments Expense	\$ 22.98
Supplies	46.62
Trifold Brochure Printing	231.12
Web Site Hosting	44.97
TOTAL OUTFLOWS:	\$ 345.69
NET GAIN (LOSS):	\$ 654.27
CHECKING ACCOUNT BALANCE:	≈ \$ 6,100.⁰⁰

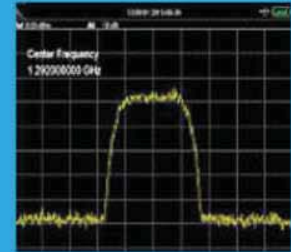
de W6HHC
Treasurer**COAR RACES plans Communication Support for the Orange Police 2017 B2V Running Team**

Many members of COAR RACES and other communications volunteers take a group photo during one of the Orange PD Baker-2-Vegas Communications planning meetings. There are eight OCARC members assisting COAR during B2V this year. - Photo by Ken - W6HHC



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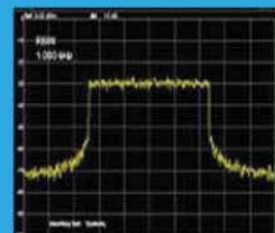


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? ? PUZZLER ? ?

It's been awhile since we had a Puzzler in RF. Here's a simple one everyone should be able to figure out:

If a CW operator and-a-half can make a QSO and-a-half in a-minute-and-a-half, how long would it take two CW operators to make a hundred QSOs?

The answer, along with the first five responders with the correct answer will be published in a future issue of RF. Please submit your answer to:

rf_feedback@w6ze.org

? ? PUZZLER ? ?

Speaker - Continued from page 1:

Wayne has developed equipment such as the Quagi antenna and the "10 band Toolbox Station" for VHF roving operation. Greg, in addition to his ham radio successes, operates an on-line weather station that reports weather parameters and historical graphs around the Upper Newport Bay.

Together, Wayne and Greg teamed up in 2015 and 2016 to set world DX records for two-way microwave QSO's on 902, 2304, and 3456 Mhz propagated via tropospheric ducting. Wayne worked from a mobile station on the Hawaiian Mauna Loa volcano while Greg operated Wayne's Vista Panorama fixed station in Orange County.

Wayne will present a power point report on the planning, logistics and operations of the records. While, Greg will present a power point to show the construction of his multi-band microwave station similar to those used for the record setting operation.



The ORANGE COUNTY AMATEUR RADIO CLUB, INC.

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