RF

VOL. LIV NO. 1 P.O. BOX 3454, TUSTIN, CA 92781-3454 JANUARY 2013

THE PREZ SEZ:

Happy New Year! We are starting a new year, and a big one for our Club. I was very happy to see the great turnout we had at the Holiday party. It was a great night of food, prizes and fun! For this year, we have an even bigger agenda with our 80th anniversary celebrations and related activities. Field Day will take center stage, but every single meeting and activity will be marked by an extra effort to remember the Club's birthday. We hope that the Club members will contribute to make this year the one that will be remembered for a long time. There are a lot of things that you can do to help, some with more effort than others, but all of them will be great for the Club. I expect all the membership will join me and participate in this effort; so in closing, let me paraphrase one of my favorite historical speeches: "Ask not what the Club can do for you, but what You can do for the Club".

Thank you very much.

73,
Nicholas, AF6CF

Reminder

It's time for dues! 2012 Members have until the end of March to renew and stay in the good graces of the club Treasurer!

Visit our Webpage:
Scan this QR code with your smartphone or tablet.

http://www.w6ze.org

JANUARY MEETING

At the January meeting a video will be presented on ***Proper Grounding of the Ham Station*** by Tom Lewis - N4TL. This is one of the **HamRadioNow** video series.

FRIDAY, JANUARY 18th @ 7:00 PM

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Click on a page number to go to that page. Works in most versions of Adobe's *Acrobat Reader* and Apple's *Preview*.

The Next OCARC Breakfast & open club Board Meeting is on Sat. February 9th 2013.

THE ORANGE COUNTY AMATEUR RADIO CLUB, INC.
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Monthly Events:

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

Club Breakfast (Board Mtg.):
Second Saturday of the month at 8:00 AM at the Jägerhaus Restaurant
2525 E. Ball Rd.
Anaheim, CA
(Ball exit west off 57-Fwy)

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 OCWN
Sun - 9:00 AM - 10:00 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 January thru December & 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. We prefer you pickup your badge at a meeting.

New members joining after midyear may choose to pay for the remainder of the year and the next year at a savings of $5.

Tech Talk #105:
by Corey Miller - KE6YHX

The Lightning Protection Process: [Part I of IV]

Introduction:
After attending the interesting lecture by Dennis Kidder on grounding and lightning protection at the OCARC, I looked into grounding my rig and installing some lightning protection. The single-point-common-ground recommended by Dennis was easy enough; I already had an aluminum plate screwed to the bottom of my rig table for shelter purposes. I simply crimped tongue-rings onto some ground wires, screwed them to the plate, and ran a cable through to the ground on my new air conditioner; it runs straight back to the house breaker panel. The lightning protection took a while longer...almost two years...at a cost of $764.70 ($706.45 for materials and supplies, and $58.25 for extra tools). The following describes the making of the PolyPhaser panel, the driving of the ground rod, the CadWeld process, and the attachment of PL-259s to shorten the feed lines. Due to its length, I divided it into four sections for the coming months...

Making the PolyPhaser Panel:
It is recommended to place the lightning protectors outdoors. However, for convenience and organization, and to protect it from the elements, I located the PolyPhaser panel indoors, next to the wall pass-through to the outside. In making the PolyPhaser panel, bought first were six IS-50UX-C0 PolyPhasers (Figure I.1), seeing as there are six feed-lines; the aluminum was already on hand. Bought next was 20 feet of No. 4 welding cable from McFadden-Dale, enough to reach the proposed ground rod location. Next, the space on the wall was measured including the stud location, and the distance to the wall pass-through to the outside, where the cables were to come through. There was enough space above the bookcase for eight PolyPhasers. The metal used was .150 aircraft aluminum, and the lines were laid out allowing for a 1-inch border around the outside of the

Figure I.1: IS-50UX-C0 PolyPhasor.
Range: 1.5 – 50 MHz 2000 W
50 – 220 MHz 375 W
220 – 400 MHz 125 W
Insertion Loss: 0.1 dB. SWR 1.2/1.5 : 1
Connectors: SO-239. Typical Price: $62

PolyPhasers including the SO-239 connectors, and a further 1-inch for a tab for the welding cable solder lug. Next, the aluminum was marked and the PolyPhasers were laid out, one below another, orienting them according to the **"ANTENNA"** and **"EQUIPMENT"** markings. In my configuration, the bolt-hole tabs are pointing upwards. Then, the first (top) bolt hole was marked for, and drilled. To keep a practical bolt hole drilling method, each one was marked with the previous PolyPhaser bolted down, and the next one positioned below it. To allow for two future PolyPhasers, I proceeded in this fashion for all eight positions. After the holes were drilled, the PolyPhasers were removed and the aluminum was cut with a jigsaw and a metal-cutting bit. The angles were cut for the solder lug tab with a Dremel and a cutoff wheel. After the piece was cut, four holes for the wall-mounting screws were drilled--three along the left for the stud, a fourth in the upper right corner--and a fifth for the solder lug. Then, to finish-off the piece, the aluminum was scrubbed with a wire brush until the surface had a bright-white sheen, and the sharp edges were sanded down.

After the metal was cut, the welding cable was ready to be attached to the copper solder lug. I made a few inquiries and found that an anvil/

die crimper was needed; this had to be ordered from Orvac because they were out-of-stock at the time. To make the crimp, the crimper anvil was put on another larger anvil, the welding cable was positioned in the solder lug, and the spring loaded die was snapped down. Then the top of the die was given a couple solid blows with a hammer, and the crimp was made. This particular die left a little "+" sign on the crimp.

When all the pieces were ready, the PolyPhasers were bolted down, starting from the top, and a little dab of conductive silver grease was used between the PolyPhasers and the aluminum panel. The bolts were placed in from the back so only the thickness of the head would space the panel from the wall. Lastly, the solder lug was bolted down to the front surface with a dab of conductive grease, and the panel was screwed to the wall. The hex-head sheet metal screws used to attach the panel to the wall provide better torque than phillips.

With the PolyPhaser panel in-place, I then started the process of re-routing the feed lines through the wall pass-through, and connecting them to the PolyPhasers. I bought some custom-length feed lines from CableXperts to keep things neat and organized. (See Figure I.2).

Next month: Driving the Ground Rod...

73, Corey KE6YHX

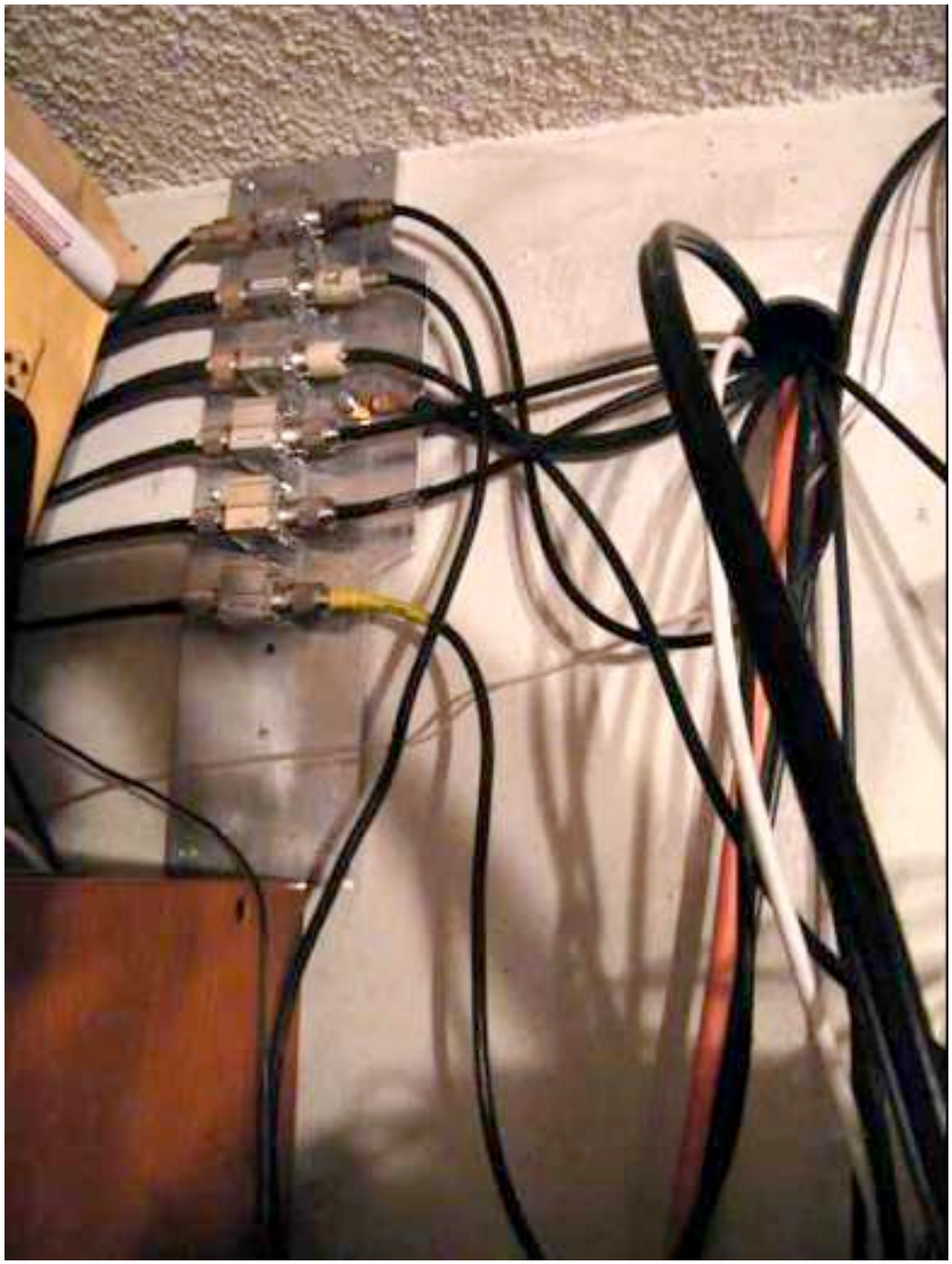


Figure I.2: The PolyPhaser panel and wall pass-through.

Heathkit of the Month #45:
by Bob Eckweiler, AF6C

Heathkit

Heathkit FM-4
FM Hi-Fi Tuner (including FM-1 thru FM-3B)

Fig. 1: Heathkit FM-4 Hi-Fi FM Tuner

Introduction:
Heathkit was not only known for its amateur and test equipment, it also produced a long line of audio Hi-Fi equipment. Their HI-Fi equipment included many monaural, and later stereo, FM tuners. This article looks at Heathkit's early FM tuners from the FM-1 through the FM-4.

A Short History of Broadcast FM:
In an effort to improve the quality of broadcast radio Major Edwin Howard Armstrong developed frequency modulation (FM) in the late 30s. FM offers immunity from interference that affects the amplitude of the received signal; it also provides high-fidelity at the penalty of wide bandwidth. Due to the bandwidth requirements of hi-fi FM, an allocation in the VHF region at 42 to 50 MC (MHz) was initially assigned by the FCC in 1940. Numerous FM broadcast stations started broadcasting in, and many FM radio sets were sold for, the 42 to 50 MC FM broadcast band.

After World War II a broadcast war broke out between Armstrong and RCA chairman David Sarnoff over the FM frequency allocation. RCA was heavily into AM broadcast and pioneering TV, and was pushing to move the FM band to a higher frequency allocation. Part of the reason was to make room for the upcoming growth in TV, but another reason may have been to impede Armstrong's growing FM broadcast business that was in direct competition with RCA's AM broadcasting. The FCC sided with RCA, (a decision that had some merit) and on June 27, 1945 the FM band was moved to 87.8 to 108 MC. The expense of updating a commercial FM station to the new frequency band caused many stations to shut their doors. The result was a blow to FM broadcasting that lasted for many years until home hi-fidelity once again created a demand for high audio-quality broadcasting. The setback to FM broadcast, and the drawn out litigation with RCA, bankrupted Armstrong and, along with domestic problems, drove him to suicide in 1954.

The 88 to 108 MC (actually 87.8 to 108 MC) band allows for 101 FM channels, each 200 KHz wide. The channels center on each odd tenth of a MHz (i.e. 87.9, 88.1, 88.3 MC, etc. up to 107.9 MC). Not all channels are available in all areas. Channels are selected to prevent interference in the nearby aviation and commercial bands. Nearby stations that are 10.6 and 10.8 MC apart are avoided to prevent interference with the 10.7 MHz IF used by most FM receivers.

Stereo FM broadcasting, by transmitting a multiplexed sub-carrier, was initiated on the first of June in 1961.

The Heathkit FM-1:
Heathkit introduced its first FM broadcast tuner, the FM-1 in early 1949 (Fig. 2). It has two tubes, a 14F8 "loctal" dual-triode and a 12A6 octal tetrode that only provides power rectification (more on this later). The circuit design is based on the Hazeltine-Fremodyne super-regenerative detector. This circuit overcomes a serious problem with the typical super-regenerative detector which generates interference on the received frequency that is coupled to and radiated by the antenna unless a stage of isolation is added. The Fremodoyne circuit consists of an oscillator that operates a

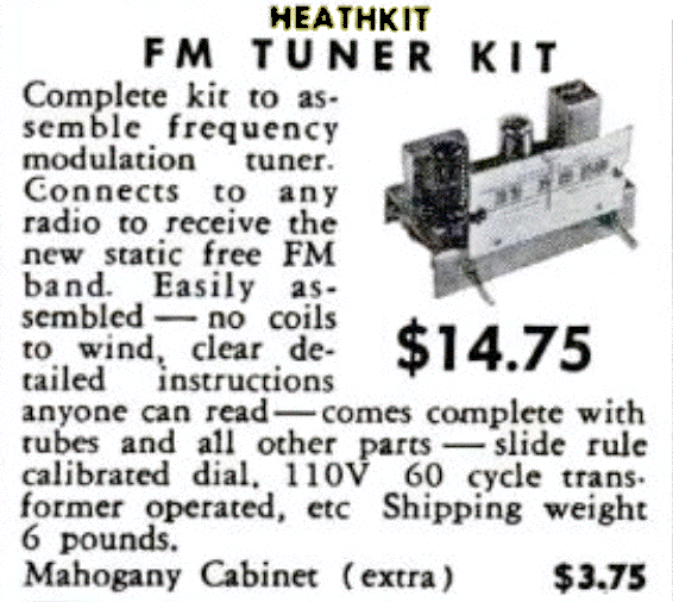


Fig. 2: Heathkit FM-1 Flyer Ad Circa 1949

given frequency above the received signal frequency (about 22 MC is common). The received signal and the oscillator are both fed into a regenerative detector that is tune to this difference IF frequency (22 MC). Thus the Fremodyne oscillation and super-regenerative oscillator signals are not near the receive frequency and don't cause interference on the received frequency.

In the FM-1 each section of a dual-ganged tuning condenser supports a single-turn loop coil. The smaller loop tuned circuit is connected to one-half of the dual-triode 14F8 which operates as an oscillator tracking 21.75 MC above the tuned frequency. The other tuned circuit tunes the incoming signal and feeds it to the second half of the 14F8 dual-triode; the oscillator signal is also coupled to the second triode, a regenerative detector for 21.75 MC that acts like a mixer, FM detector and amplifier all in one. Output from the second triode is the recovered audio. The FM-1 uses a power transformer to isolate the device from the AC line. Heathkit must have acquired a large supply of surplus 12A6 tetrode tubes as they chose to use this tube as the rectifier diode. The grids and plate are connected together and the tube is wired in a half-wave rectifier configuration.

The FM-1 came with the regenerative transformer, the tuning condenser and coil assembly both pre-built and aligned. The kit sold for $14.75 less cabinet. A mahogany cabinet was available for $3.75. The FM-1 has just two controls, a rotary ON-OFF switch and the tuning knob that operates a slide-rule dial. On the back, left to right, are two two-screw terminal strips and a grommet for the exiting line cord. The left-most terminal strip is for the audio output and the other is for the antenna terminals.

The Heathkit FM-2:

In the fall of 1950 Heathkit introduced the more advanced FM-2 superheterodyne FM tuner (Fig. 3). It uses eight tubes, three" loctal" (See Sidebar) and five octal. The tube lineup is shown in Table I.

The design is straight forward; the signal from the antenna is tuned and fed into a mixer. The local oscillator, tuned to track 10.7 MHz above the received signal, is also coupled to the mixer. The resulting 10.7 MHz output is ampli-

Fig. 3: Heathkit FM-2 Ad Circa Late 1950

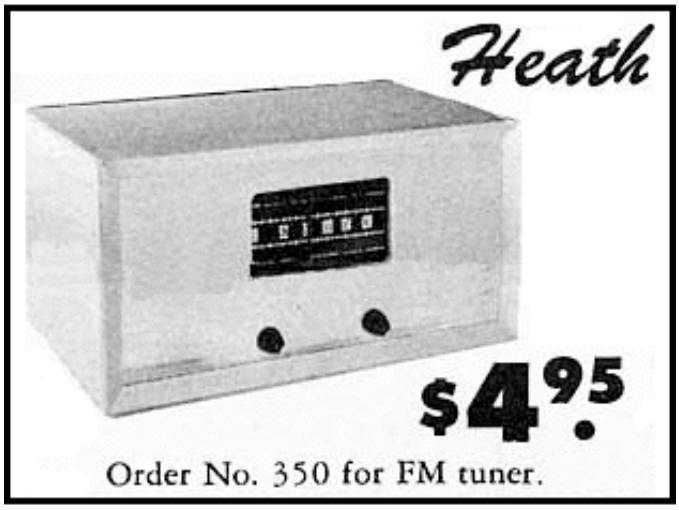


Fig. 4: Heathkit Cabinet for the FM-2

fied in three stages of IF; the last stage, designated the limiter, saturates on moderate signals removing any AM component. The 10.7 MHz signal from the limiter is fed into a Foster-Seeley discriminator, composed of two 7C4 diode tubes. The audio output of the discriminator is de-emphasized and fed through a volume control to the audio output terminals. The FM-2 has neither AGC nor AFC circuitry.

Function:	Tube:	Type:	Base:
Mixer	6SH7	tetrode	octal
Oscillator	7E5	triode	loctal
1st. IF Amp.	6SH7	tetrode	octal
2nd. IF Amp.	6SH7	tetrode	octal
IF Limiter	6SH7	tetrode	octal
Discriminator	7C4	diode	loctal
Discriminator	7C4	diode	loctal
FW [1] Rectifier	6X5	rectifier	octal

[1] FW = full-wave

Table I - FM-2 Vacuum Tube Lineup

The FM-2 sold for $22.50. Also available was a blonde birch veneer cabinet model #350 (Fig. 4) that sold separately for $4.95. The front of the FM-2 has two controls. On the left is the ON-OFF and volume control, and on the right is the tuning control that drives a 6" slide-rule tuning dial. Between them is a pilot lamp that I could not find on the schematic. There are no connectors on the rear of the FM-2 chassis. Instead the connections are on the top of the chassis along the rear edge. From left to right (as viewed from the back) is a two-screw antenna terminal, an AC outlet (switched with the tuner power switch), a grommet where the AC power cord exits, and another grommet that has a shielded pigtail lead, terminating in an RCA plug, that carries the audio output from the tuner.

The Heathkit FM-3:

In the fall of 1955 Heathkit introduced the FM-3 to replace the FM-2. The FM-3 design, again a standard superheterodyne circuit, switched to miniature 7 and 9-pin tubes. While the FM-2 has eight tubes the FM-3 has only seven tubes; however, three of those tubes are dual-section resulting in the equivalent of 10 tubes. The tube lineup is shown in Table II.

Function:	Tube:	Type:
RF Cascode Amp.	6BQ7	dual-triode
Mixer	1/2 6U8	pentode
Oscillator	1/2 6U8	triode
1st. IF Amp.	6CB6	pentode
2nd. IF Amp.	6CB6	pentode
Ratio Detector	6AL5	dual-diode
Audio Amplifier	6C4	triode
FW [1] Rectifier	6X4	rectifier

[1] FW = full-wave

Table II - FM-3/3A Vacuum Tube Lineup

One improvement for the FM-3 is the addition of a cascode RF amplifier before the mixer. The cascode amplifier offers a high gain at a low noise level, important at VHF frequencies. The input to the RF amplifier is broadly tuned in a fixed circuit. It's signal is fed to the mixer along with the oscillator signal, and on to two high-gain stages of IF amplification. Instead of the Foster-Seeley discriminator used in the FM-2, the FM-3 uses a ratio detector which is more immune to amplitude signals. While the high gain of the two IF stages performs some limiting on large signals, limiting is not as critical when using a ratio detector which suppresses amplitude variations. Like its predecessors the tuning condensers and coils come pre-aligned.

Two features not found in the earlier FM-2 are dual audio outputs, one fixed at a low level and one amplified about 22 dB with front panel level adjustment, and the addition of AGC that reduces the gain of the cascode amplifier on strong signals.

The Heathkit FM-3 sold for $24.50 including a metallic gold colored case. Like the FM-2 there are two controls on the front panel of the FM-3, which unlike the FM-2 is in a low-profile cabinet. Left to right are the slide rule tuning dial, the tuning control, and the OFF-ON - volume control. Internally the chassis is shock-mounted vertically with the tubes facing the rear of the cabinet. In the rear, left to right, are two RCA jacks (audio output **LO** and **HI**), the two-screw antenna terminal strip, and the power cord which actually comes out through the cabinet flange.

The Heathkit FM-3A:
After being in production for about a year Heathkit updated the FM-3 to the FM-3A in September of 1956. Most of the circuitry remained unchanged, as did the appearance, except for the B-plus distribution. Additional filtering and isolation resistors were added to better isolate interaction between circuits. Perhaps there were some instability problems in the FM-3 that needed resolution? The FM-3A also added AGC to the first IF amplifier to improve AGC operation. Finally, a second pilot light was added to even-out the lighting of the slide-rule dial. The FM-3A sold for $25.95.

Fig. 5: Heathkit FM-3A Catalog Ad

The Heathkit CFM-3 Modification Kit:
When Heathkit updated the FM-3 to the FM-3A it offered the CFM-3 update kit for $2.95. This kit "converts FM-3 to include major features of FM-3A."

The Heathkit FM-4:
The Heathkit FM-4 came out around 1958, replacing the FM-3A. The FM-4 is a update to the FM-3A adding new features such as a multiplexer output to allow stereo FM that was on the horizon; the FM-4 adds AFC (automatic frequency control) that limits receiver drift. The new FM tuner also features a pre-assembled, pre-aligned FM tuner (part # 110-1). The FM-4 sold for $39.95. The multiplex output connection has no use for a few years until Heathkit released its initial multiplex adapter sometime in 1960 letting FM-4 users get ready for the upcoming Stereo FM broadcasting.

The FM-4 continues the low-profile styling of the FM-3 series, but the color scheme went from gold to black. The cabinet was included in the kit and was metal with vinyl covering. The kit could be mounted into an enclosure, such as the **Heathkit Chairside Enclosure** or a custom-built cabinet, by removing the kit's cabinet and feet; mounting holes are provided. Heathkit recommended keeping the bottom shield in place for proper operation and stability.

The FM-4 Circuitry:
The FM-4 uses five miniature tubes; two are multiple-section. Missing is a rectifier tube which has been replaced by a single silicon diode. The FM-4 tube lineup is shown in Table III. The circuitry is typical of an FM superheterodyne tuner of the day. The tube count of the FM-4 drops to five, due to the pre-assembled tuner

and a silicon rectifier diode. The FM-4 schematic is shown in figures 8a and 8b. Figure 9 shows an FM-4 ad mentioning a multiplexer.

The Tuner Circuit:
As mentioned earlier, the tuner comes pre-built and pre-aligned. The dual-triode tube, either a 6DT8 or 6AQ8, is already installed as it was used for alignment. The tuner is shielded in its own enclosure with five feedthrough terminals carrying the input and output connections. Grounding is through the tuner's case. The five terminals are: Antenna, B+, Filament, AFC and IF output. The pre-built tuner allows for a more exotic design using permeably tuned coupling and oscillator coils utilizing shorted links to improve tuning linearity. This would be hard to align without good test equipment.

Function:	Tube:	Type:
RF Amp. [1]	1/2 6DT8	triode
Mixer / Oscillator [1]	1/2 6DT8	triode
1st. IF Amp.	6AU6	pentode
2nd. IF Amp.	6AU6	pentode
3rd. IF Limiter	6AU6	pentode
Ratio Detector	2/3 6BN8	dual-diode
Audio Follower	1/3 6BN8	triode

[1] Part of pre-assembled tuner.

Table III - FM-4 Vacuum Tube Lineup

One triode section, coupled to the antenna through a bandpass filter, acts as a grounded-grid RF amplifier; the other triode section is a combination mixer and oscillator driving a 10.7 MC IF transformer. Varying the tuning control tunes the RF amplifier plate circuit as well as oscillator. these tuned circuits are aligned to track 10.7 MC apart. The oscillator circuit also contains a special diode that is reverse biased and acts as a small capacitor changing the oscillator slightly when the bias voltage is varied. This bias is controlled by the external AFC circuit.

The IF and Limiter Circuit:
The three stages of IF amplification using 6AU6 pentodes are coupled with bandpass transformers with a bandwidth of 150 KC and 10.7 MC center frequency. The third IF stage with its high plate resistor is designed as a limiter to help remove any amplitude modulated noise. The second IF also is designed to act as a limiter, but only on strong signals.

The Detector Circuit:
The FM signal at 10.7 MC is coupled to a standard ratio detector composed of the two diode sections of a 6BN8 triple-section tube. The circuit is similar to the FM-3 with the exception of the circuitry for the AGC which is not used in the FM-4. Output from the detector is filtered by a small capacitor to remove any residual IF energy and goes three places: It is directly connected through a 100KΩ isolation resistor to the multiplexer circuit. It is connected to the AFC circuit, and it is connected through a de-emphasis network to the audio output follower stage.

The AFC Circuit:
The output of the ratio detector carries not just the audio signal, but a DC component that varies with the average offset of the signal in the detector. This DC component is isolated and further filtered in an RC circuit. Its level is then set by an internal AFC potentiometer and it is fed to the tuner. If a station drifts off frequency the resulting voltage will correct the oscillator, bringing the signal back into tune. A front panel switch turns off the AFC circuit by shorting the AFC voltage to ground; you may want to disable it when tuning near a very strong signal.

The De-emphasis Circuit:
Audio being transmitted by an FM station has the higher frequency components boosted to help eliminate noise. The de-emphasis network is just a simple RC network with a 3dB point at 2.34 KHz to attenuate the higher frequencies back to their proper levels.

The Audio Follower Circuit:
The triode section of the triple-section 6BN8 tube is wired as a cathode follower. The audio from the de-emphasis circuit is fed through the volume control potentiometer to the grid of the

cathode follower. Negative feedback in the bias circuit helps linearize this stage which lowers the output impedance reducing hum and noise pickup in the cable to the amplifier. The output of the cathode follower is connected to the RCA output jack on the rear of the FM-4.

The Power Supply:

The FM-4 uses a power transformer with two secondary windings and a 120 VAC primary. Silicon diodes were just coming on the market in quantity and at reasonable prices in 1958. The FM-4 uses a single R200 200PRV 200 ma diode in a half wave rectifier circuit. The FM-2 and FM-3 series all used a tube full-wave rectifier circuit. The half-wave circuit requires better filtering, but Heathkit evidently decided the cost of an additional diode was more than the cost of adding higher capacitance and more RC filtering to the B-plus power supply. The FM-3A utilizes three 20µF filter capacitors, while the FM-4 uses one 100µF, two 40µF and one 20µf filter capacitors. The FM4's half-wave rectifier produces about 135 volts DC. A filament winding on the transformer supplies 6.3 VAC to the five tubes. The filament circuit contains choke coils and capacitors to isolate the tube filaments.

The FM-4U FM Tuner:

Heathkit also made the FM-4U FM tuner for the European market. This tuner has a multiply-tapped transformer primary to allow

Fig. 6: Heathkit's European FM-4U

operation on 105, 125, 205, 225 and 245 VAC @50/60 cps. The circuitry is very different than the American FM-4; an EZ80 (6V4) rectifier tube is used instead of the silicon diode. An EM84 (6FG6) tuning indicator tube is included, and no AFC is provided. Physically, the FM-4U (Fig. 6) looks nothing like its American namesake.

The AJ-31 FM Tuner:

In 1961 Heathkit introduced the AJ-31 FM Tuner for $39.95. It replaced the FM-4 and was part of a newly styled series of audio hi-fi equipment which included the AJ-21 AM Tuner, AJ-11 AM/FM Tuner, and a large contingency of other similarly styled tuners and amplifiers of different prices and performance levels. I couldn't find a schematic of the AJ-31 to see how much had changed from the FM-4; however the tube lineup was similar, as was the physical layout except for the tuner which now supports a triple-triode 6GY8 tube and is mounted differently to the chassis. The AJ-31

Fig. 7: Heathkit AC-11A Stereo Multiplexer Converter

front panel controls are the same and located in the same position as the FM-4.

Compatible Multiplexers:

The FM-4 and later monaural FM tuners came with a multiplexer output in preparation for the June 1961 introduction of stereo FM transmitting. Heathkit made two multiplexers that worked with the FM-1, the MX-1 and later the $32.50 AC-11 Multiplexer (Fig. 7). Interestingly, the AC-11 came in two versions, the AC-11A, which was black in color to match the FM-4 and the AC-11B which was tan in color to match the AJ-31, AJ-11 and AJ-32 Deluxe AM/FM Tuner.

Comments:

I have no idea how I acquired my FM-4; I believe it appeared in the mid-to-late sixties. It was used on and off back then and was later modified to allow me to analyze some of the TV scrambling techniques in the days of the infamous scrambled "Channel 52" in the Southern California area! The tuner has sat quietly in a closet for many years since the early 70s until I started this article. My FM-4 needs to be put back into its stock configuration. (No chassis modifications were made so it should be easy to do.) The chassis and tube shields have accumulated that white powder that sometimes accumulates on old chassis parts. (Anyone have a good cleaning technique for that?) Before I modified it I did make sure it was operating properly and it sounded good feeding into one channel of my Heathkit AA-32 stereo amplifier.

A few short years after the AJ-31 replaced the FM-4, Heathkit was moving their popular stereo equipment to all solid-state designs. Many top-of-the line units were complete receivers that contain FM, and often AM, tuners, preamplifiers and a stereo power amplifier in one integrated package. Heathkit stereo products were known for their quality and competitive cost. Many of the audio Heathkits were available factory wired at a moderate cost increase for the audiophile who didn't want to build one from a kit.

SIDEBAR:

What is a "Loctal" Tube?

Most hams are familiar with octal tubes. Their base, usually black bakelite, has eight pins, all of the same thickness and evenly spaced around a keyed non-conductive center post. Occasionally one or more pins are missing for electrical isolation; this is most common on rectifiers, such as the 5U4 which only has five of the eight octal pins.

Loctal tubes have the same pin spacing as octal tubes however the pins are thinner. The base shell is made of metal as is the center post which is not only keyed but has a groove that mates with a locking ring in the tube socket to "lock" the tube in place (hence the name" Loctal", pronounced "Lock-tell"). The center post is also an electrical connection to the tube - most often the base shield.

Loctal tubes were developed by Sylvania for use in high vibration environments, most notably car radios. Philco was a major employer of loctal tubes in its radios.

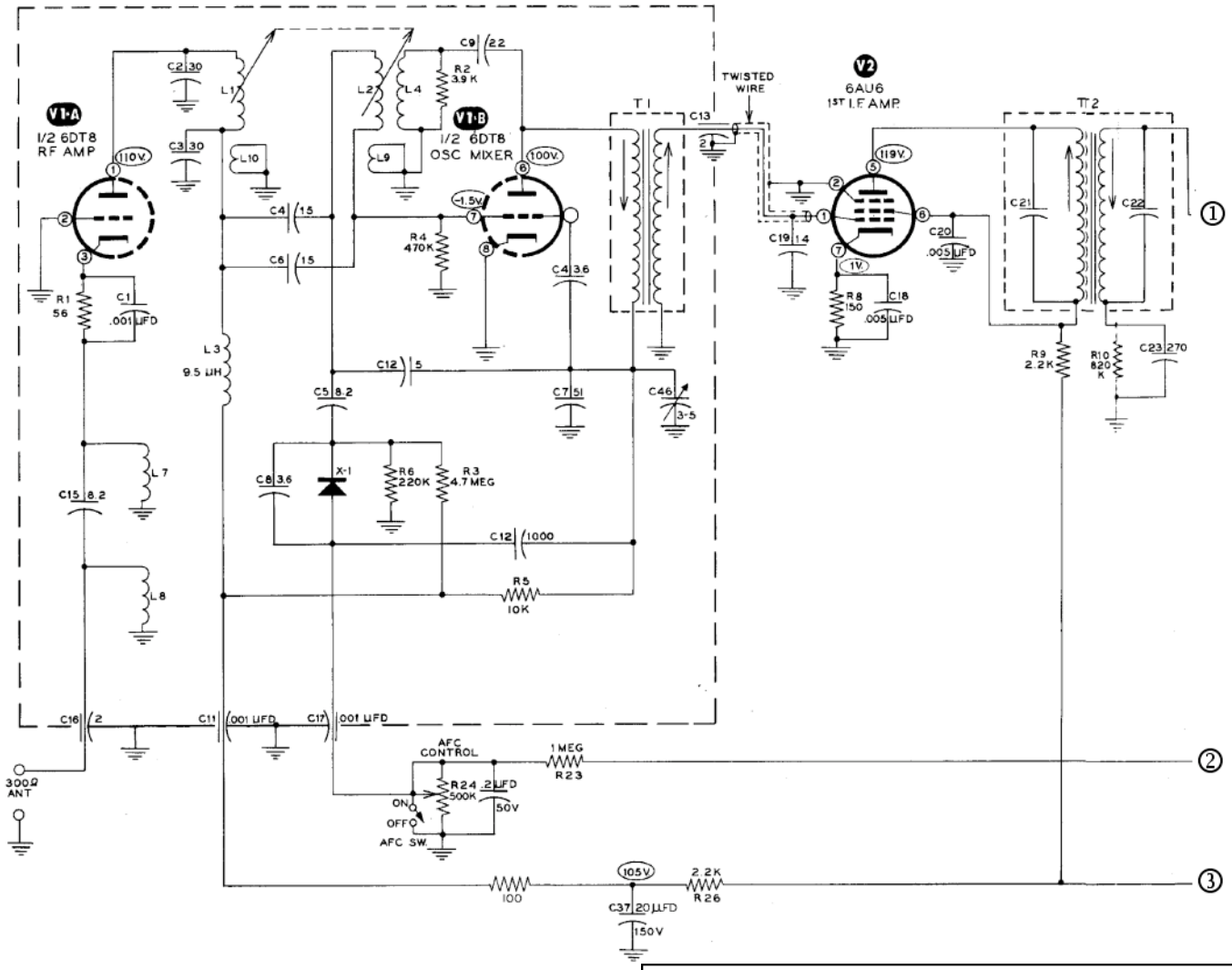
Removing loctal tubes from their sockets can be difficult if the proper technique is not known. On the side of the base of a loctal tube is a mark or dimple. Pushing the tube towards the side that has that mark will cause it to unlock and be easily removed.

Loctal tubes usually have numbers starting with either 7 or 14. While this starting number normally designates filament voltage, these loctal tubes run at 6 and 12 volts; however, as they are designed for automotive use where voltages run closer to 7 and 14 volts when the battery is being charged, they are designed to handle the higher filament voltages as well.

73, from AF6C

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

Thanks - AF6C



HEATHKIT F M TUNER
MODEL FM-4

NOTE: ALL DC VOLTAGES TAKEN TO CHASSIS WITH A HEATHKIT VACUUM TUBE VOLTMETER.

ALL VOLTAGES MAY VARY ±10% FROM INDICATED VOLTAGES.

VOLUME AND TUNING CONTROLS FULL CLOCKWISE.

ANTENNA TERMINALS SHORTED.

AFC SWITCH IN OFF POSITION.

ALL CAPACITORS MARKED IN µµf UNLESS OTHERWISE INDICATED.

ALL RESISTORS ARE 1/2 WATT UNLESS SPECIFIED OTHERWISE.

C10, C11, C13, C16 AND C17 ARE FEED THROUGH CAPACITORS.

ARROWS ↑ AT TRANSFORMERS T1, T2, T3, AND T4 INDICATE TOP SLUGS.

Figure 8A FM-4 Schematic

Page 1 of 2

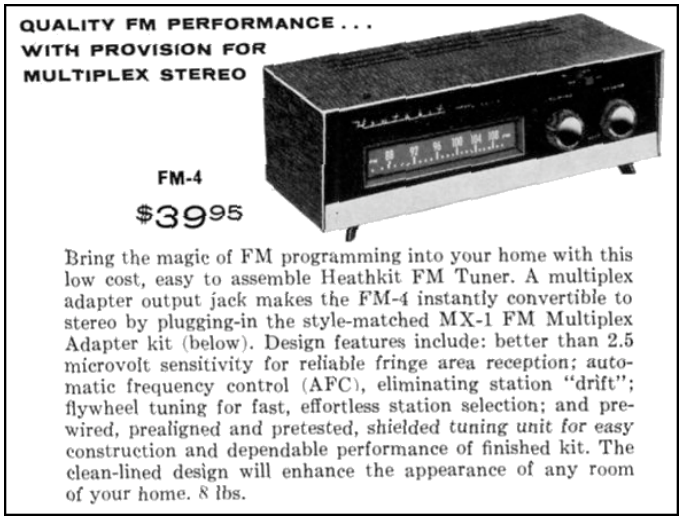


Fig. 9: Heathkit FM-4 Ad from May 1960 Issue of Hi-Fi Stereo Magazine

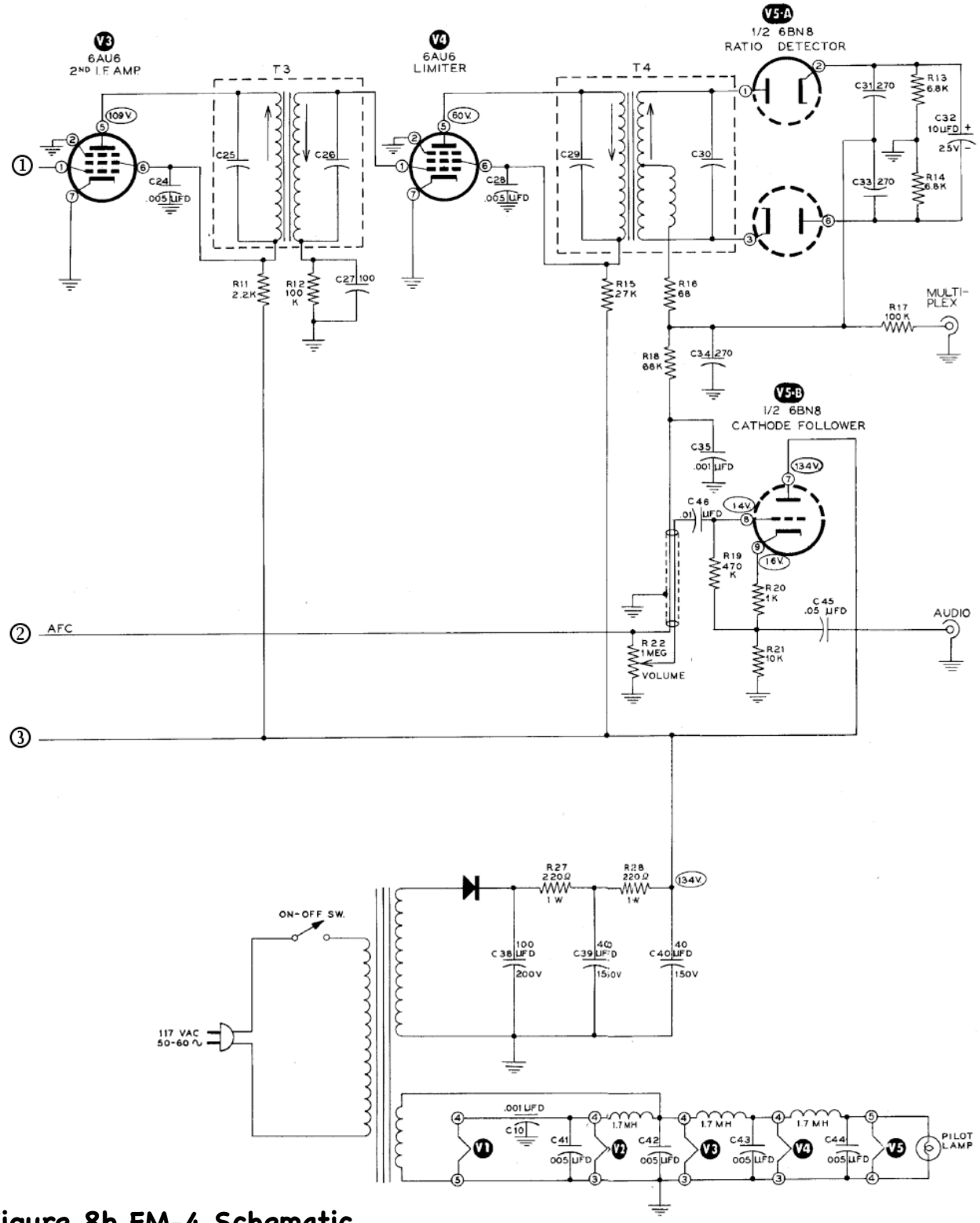


Figure 8b FM-4 Schematic

Page 2 of 2

A HISTORY of OCARC PRESIDENTS

by Ken Konechy W6HHC

with great assistance from our Club Historian, Bob Evans - WB6IXN

YEAR	
2013	AF6CF Nicholas Haban
2012	W6GMU Paul Gussow
2011	W6GMU Paul Gussow
2010	K6PEQ Kristin Dankert
2009	AF6CF Nicholas Haban
2008	N8WP Willie Peloquin
2007	K6PEQ Kristin Dankert
2006	N8WP Willie Peloquin
2005	W6HHC Ken Konechy
2004	N1AB Steve Brody
2003	KQ6JD Lowell Burnett
2002	KE6WIU Cory Terando (now AE6GW)
2001	KD6BWH Bob Buss (later KØBWH)
2000	K6LDC Larry Hoffman
1999	WA6VPP Bud Barkhurst
1998	KD6BWH Bob Buss (later KØBWH)
1997	WA6VKZ Frank Smith
1996	AF6C Bob Eckweiler
1995	N6XTJ Jim Roberts
1994	KJ6ZH Chris Breller
1993	KC6TAM Jane Breller
1992	WA6VKZ Frank Smith
1991	W6HHC Ken Konechy
1990	KJ6ZH Chris Breller
1989	WA6VKZ Frank Smith

YEAR	
1988	W6HHC Ken Konechy
1987	N6JSV Jim Talcott
1986	WA6VKZ Frank Smith
1985	AF6C Bob Eckweiler
1984	KA6IMP Chris Breller (now KJ6ZH)
1983	W6IBR Al Watts
1982	KA6HNY Robin Hoff
1981	WA6VKZ Frank Smith
1980	WA6FOW Ernie Prichard
1979	WB6IHZ Terry Mathers
1978	WA6LFF Jim Kingsbury
1977	WA6WZO Fried Heyn
1976	WB6PEX Martin Raymond
1975	WA6LHB Art Sheldon (later AD6B, now K7ZE)
1974	W6HHC Ken Konechy
1973	WB6QNU Bob Eckweiler (now AF6C)
1972	WA6FIT Ron Cade (now W6ZQ)
1971	WB6CQR Billy Hall (now N6EDY)
1970	WB6UDC Jack Hollander (now N6UC)
1969	WA6ROF Jerry VerDuft (now ADØA)
1968	W6COJ Dave Hollander
1967	WB6GPK Jim Hill
1966	WA6YWN Jack Shaw
1965	K6KTX Rolland Miller
1964	W6WRJ Ralph Alexander (later W6RE)
1963	W6DEY Roy Maxson
1962	K6LJA Ted Glick
1961	K6IQ Roy Morriss

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

Kaiser Permanente Amateur Radio Network is Looking for Volunteers

The Kaiser Permanente Amateur Radio Network (KPARN) is looking to increase amateur radio operators working in hospital to support emergency communications. A brochure is attached with information on KPARN. Would appreciate if your club could mention KPARN in newsletter, or post, pass around, etc the brochure to see if anyone would be interested in assisting KPARN. Our web page has significant information (www.kparn.org)

Thanks in advance for your assistance.

73
Duane
WB9RER

You may view the full-size KPARN brochure here:

http://www.kparn.org/docs/KPARN_Brochure_sept12.pdf

Let the Club Handle Your ARRL Renewal

Over the past few years very few members have taken advantage of joining or renewing their A.R.R.L. membership through the club. The club benefits by receiving a commission when a member joins or renews through the club. If you wish to join the ARRL, see the club Treasurer for a form. You can pay the Treasurer direct and he will submit your form. If it is time to renew, bring your renewal notice to the Treasurer along with your renewal check made out to the OCARC and he will handle the submission. (you can renew early, even before you receive your renewal notice. Just see the Treasurer.)

Greetings Field Day Enthusiasts!

We will have a specific Field Day Meeting Friday January 25th, 7PM; (location to be determined, but will have it out to everyone before the next club meeting). Everyone is encouraged to attend and we will discuss our plans for this year's Mega Field Day Event. In order to be successful we will need everyone's participation! Some of the basics have been nailed down but we still have a lot of work to do and will need your input, expertise, and enthusiasm to make this the best OCARC Field Day ever! We are putting it all on the line this year so prepare for something GREAT!!! Bob and I look forward to seeing you at the next Club meeting and especially the following week for our first Field Day meeting of the year!

Dino Darling - KX6D
Bob Harrington - AA6PW
Your Field Day Chairmen

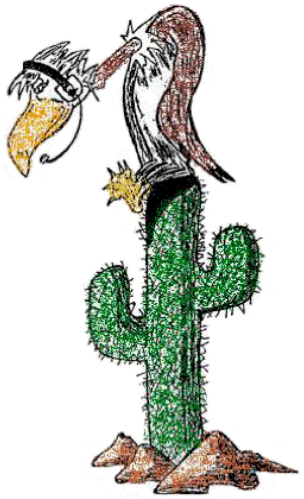
2013 Arizona State Convention

9th Annual

Yuma Hamfest

Yuma, Arizona

Feb. 15 & 16, 2013



Yuma County Fairgrounds
2520 East 32nd Street, Yuma, Arizona

www.yumahamfest.org

Check the Website for Additional Information
and a Current Schedule of Activities and Seminars

Gates Open for Camping Thursday, 2 pm Vendor Setup Friday, 7 am - Noon	Event Hours Friday, Noon - 5 pm Saturday, 8 am - 5 pm	Buzzard BBQ & Grand Prize Drawing Saturday Night 6:00 - 8:00 pm

Vendors & Exhibitors
Consignment Sales
License Testing
Hourly Door Prizes
On-site RV Camping
Famous Buzzard BBQ
ARRL Speaker
$5.00 Admission

Tailgating (Swap Meet)
Full Seminar Schedule
DXCC Card Checking
Incredible Grand Prizes
Emergency Preparedness
Admission Prize
Hospitality Area
Antenna Clinic & T-Hunt

Hamfest Talk-In Frequency: 146.840 (–) PL 88.5 Hz

Email Contact: ***info@yumahamfest.org***

We are proud to have the Amateur Radio Council of Arizona (ARCA) as a sponsor of our event.

The Yuma Hamfest is an American Radio Relay League (ARRL) sanctioned event.

Presented by the Yuma Amateur Radio Hamfest Organization

Jean Shepherd - Radio Personality, Raconteur, and Radio Ham

Jean Shepherd, K2ORS, was a legend in the world of story telling. Shep, as he was known, passed away in 1999 at the age of 78. You may have heard his work if you listened to public radio in the early eighties, lived in metropolitan New York in the mid-fifties to the mid-seventies, or wherever syndication carried his programs. In 2000 he was posthumously inducted into the Cable and Broadcaster's Hall of Fame.

If you are a fan of the classic 1983 Christmas movie, *A Christmas Story*, Jean Shepherd was the off-camera narrator of adult Ralphie Parker with his obsession to get a "Red Ryder carbine-action, two hundred shot Range Model BB rifle" for Christmas. *A Christmas Story* is based on some of the characters and stories Shep talked about during his many years on the air. (Trivia - Shep has a cameo role in the movie - he is the bearded man waiting in the Santa line who points out to Ralphie where the line really starts.)

Jean was a famous American radio raconteur, most notably on the powerful clear channel New York station **WOR** 710 KHz. There he hosted a live 45-minute program five days a week and a two-hour Saturday evening show. His story telling quickly got him a lot of fans, and occasionally into trouble! He also performed live at New York City's famed *Limelight Cafe* in Greenwich Village. These performances were also often broadcast by WOR. Shep's nighttime broadcasts could be heard over much of the northeast. He started his career at WSAI in Cincinnati, Ohio in the early 50s and moved to KYW in Philadelphia, then back to Cincinnati and WLW. Then, after a stint in Television (Jean was selected to host the *Tonight Show* after Steve Allen left, but lost the job due to a contractual obligation NBC had with Jack Paar) he joined WOR in 1956.

Shep became interested in radio as a young kid. Some of his stories tell about the early family days around the console radio, and of his father who was a DX broadcast listener. Shep grew up in the midwest (Hammond, Indiana) where he got his first amateur radio license - W9QWN. He talks about his early radio projects, crystal sets and even things like Colpitt's oscillators, Heising modulation and other radio topics that were so esoteric to the average listener. Still, Shep could knit these subjects into his story and keep his listeners on the edge of their seats. He also talked occasionally about his ham radio days and getting his license, about CW, radio bootleggers and a lot more. Of course radio was just one of the many topics he based his stories on. Little politics were ever mentioned, but he told a lot of stories interpreting human nature.

Luckily much of Shep's works have been saved and are available on the Internet for downloading or streaming. Unfortunately the links seem to come and go with annoying regularity. Found over a period of time were many of his short public radio's *American Scene* spots, full length WOR shows, commercials (including the **Rheingold Beer** ads), audio from his Dayton **Hamvention** presentations (1980 and 1985), and much more ("over 1,500 programs on line", one website, now vanished, proudly announced). If you search you can also find his readings of many of the Robert Service poems. (*The Shooting of Dan McGrew* and *The Cremation of Sam McGee*, to mention just two).

Shep adopted a theme song for his WOR show; it was *The Bahn Frei Polka* performed by Arthur Fiedler and the Boston Pops in 1958. This moving piece was played at the beginning and end of many of his WOR programs, often with him talking over the music. His skill at timing his story to end with the end of the song is almost uncanny!

One site that currently carries a large selection of Jean Shepherd's audio in MP3 format is:

http://archive.org

You can search for "Jean Shepherd" in their Audio section. To get you started here are a few of his episodes that I enjoyed. (I hope the links stay in place for awhile!) One thing you might want to be aware of is that his shows often start with a bit of silliness and he doesn't get into the title story until about eight, ten or more minutes in. Be patient and enjoy his sometimes bizarre banter, or musical interludes (He played the Nose Flute, the Jew's Harp and the Kazoo.)

Here, from January 29, 1965, is where Shep talks about first getting on AM with Heising modulation much to the annoyance of his date:

http://archive.org/download/JeanShepherd1965Pt1/1965_01_29_Ham_Radio.mp3

Here Shep talks about his young life encounter with lightning while operating his ham station:

http://archive.org/download/JeanShepherd1965Pt1/1965_07_10_Live_Wires_limelight_1.mp3

Here Shep talks of Railroad telegraph operators, CW and his first telegraph key (2 episodes):

http://archive.org/download/JeanShepherd1972/1972_05_23_Railroading.mp3

http://archive.org/download/JeanShepherd1973/1973_06_07_CW_Code.mp3

And here Shep talks about the Allied Radio Catalog:

http://archive.org/download/JeanShepherd1967/1967_11_06_Allied_Catalog.mp3

While Shep mentions his radio hobby in numerous stories, here are a few where he just talks about other adventures. He takes a while getting into these stories, but it's worth the wait:

http://archive.org/download/JeanShepherd1965Pt1/1965_04_12_Tornado_Hits_The_Mill.mp3

http://archive.org/download/JeanShepherd1964LL1/1964_06_27_1_Laying_Wire.mp3

Here are couple of other Jean Shepherd sites that currently offer his material:

http://www.flicklives.com/

http://shepcast.blogspot.com/

Have fun listening to Shep on those nights when the band is dead. Who knows; he might posthumously award you ***The Brass Figalee with Bronze Oak Leaf Palm*** for listening.

An anonymous quote about Jean Shepherd reads: *"He was on the air during the same years as Mr Rogers and undid a lot of the damage."*

And to quote a common expression of Shep: ***"Excelsior!"***

73, from Bob, AF6C

WHOis the OCARC President??

by Ken W6HHC

(This is the first in a series of articles to inform you about the background of the 2013 officers and leaders of the OCARC.)

The 2013 President for the OCARC is Nicholas Haban – AF6CF. While growing up in Argentina, he liked to experiment with electricity before he was a teen. Then he made friends with some local hams and his interest in ham radio was sparked. As an early teen, he built his first transmitter. Now, all he needed was a license. He studied and went down to the government office to take the ham license test. He "aced" the test...but the examiner noticed on the application form that he was not a citizen of Argentina...so **NO license**!! Ham radio was then "put on the shelf" for several more decades!

Finally in 2005, Nicholas felt a need to get involved with ham radio again. He passed his test for Technician as KI6AUL in 2005. He then looked around on the internet and found our club at www.W6ZE.org and quickly joined the OCARC in 2005. He first was elected as a Board member with OCARC in 2007. He has served on the club Board of Directors for six of the last seven years, including as Prez in 2009. Nicholas passed his **EXTRA** license in 2007 and was granted a new call of AF6CF.

Nicholas AF6CF at his "very clean" mobile installation (an ICOM 2720) for 144/440 in this car

The ham radio areas that interest Nicholas are:

- Solar power
- Emergency Communications
- Field Day
- The Baker-2-Vegas communications event
- Designing antennas for portable operations
- Designing solar power for portable op

The mobile radio for Nicholas is a 2M/440 ICOM IC-2720 that was professionally installed in his car by the Solder Joint in Orange (now owned by PCI Race Radios). Very clean...no wires showing! His home station include a Yaesu FT-8800R 144/440 rig with a J-pole. The ham station is being remodeled, but Nicholas has a Yaesu FT-897ND HF rig and a Collins 30L-1 HF RF amplifier ready to set up in the new shack!

Nicholas and his wife, Maria, live in Yorba Linda. They are invaded weekly by five grandchildren!

Outside interests for Nicholas include:

- Vacations in Europe and So America
- Antique radios
- Repairing antique radios
- Astronomy

Ask Nicholas how he installed his new patio?!?

Nicholas AF6CF has been part of the B2V Communications team for the Orange PD Running-team for 5 years

Chip Margelli K7JA
to talk at February Meeting

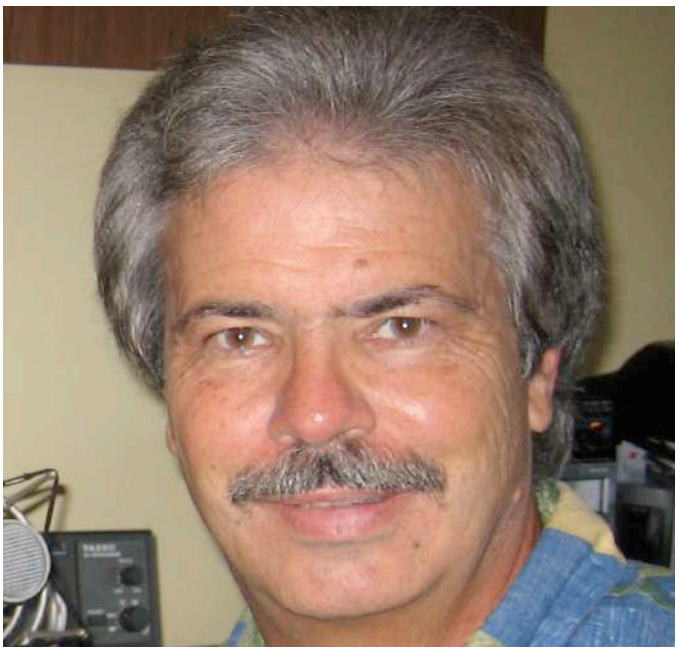
Member, club Auctioneer and well known radio amateur Chip - K7JA has recently joined the ranks of InnovAntennas US Inc. A division of InnovAntennas of Essex UK. Chip will present:

New Geometries for Yagi Beam Antennas
The Story Behind the InnovAntennas' LFA and OP-DES Yagis

There's a lot of talk, on the bands, about a new generation of antennas coming out of England. Some of them are fed with flattened loops, some are fed with bent elements, and some have folded dipole driven elements. But they all are reputed to have significantly improved pattern and listening capability.

New technology or hocus-pocus?

Chip Margelli, K7JA from InnovAntennas U.S. will explain the theory and performance of these new antenna geometries at the OCARC February 15th meeting. Come learn why Chip has been saying, for years, "straight elements don't work right!"



BIOGRAPHICAL INFORMATION
Charles H. "Chip" Margelli, K7JA
Garden Grove, CA

Chip Margelli, K7JA, has been licensed since 1963, and an Extra Class licensee since 1968. Chip and his wife Janet, KL7MF live in Garden Grove, California. Chip is a Life Member of ARRL, AMSAT, and Quarter Century Wireless Association, and works with InnovAntennas U.S., Inc., based in Glade Park, CO.

For almost fifty years, Chip has been active in DXing and, especially, international radiosport competition. Among his accomplishments are twelve First-Place finishes nationally in the ARRL November Sweepstakes, and a number of world-high or national wins in the CQ World-Wide DX Contest, ARRL DX Contest, and CQ WPX Contest.

Chip's DXpedition activities include operations from St. Lucia, Dominica, Antigua, the U.S. Virgin Islands, Puerto Rico, Saipan, Micronesia, Aruba, Bonaire, Curaçao, Martinique, and Barbados. In 1984, Chip and Janet were invited by the Chinese Radio Sport Association to travel to Beijing for operation from BY1PK and help train the new Chinese operators during the early phases of the rebirth of Amateur Radio in China.

In 1989, Chip was honored by being selected to be the American representative in the first-ever Finnish-Soviet-American DXpedition to Malyj-Vysotskij Island as 4J1FS. The following year, Chip and his teammate Mike Wetzel, W9RE, won a Silver Medal at the World Radiosport Team Championship held in conjunction with the Goodwill Games in Seattle, an elite competition featuring twenty-three teams from fifteen countries around the world.

And in the Fall of 1991, Chip was a member of the Instructor/Operator team in the IARU Albania Project, led by Martti Laine, OH2BH, which brought about the rebirth of Amateur Radio in Albania after many decades of radio silence.

In 1994, Chip and Janet accepted commissions by two magazines to visit the Havana area to document the participation by members of the *Federación de Radioaficionados de Cuba* in the ARRL June VHF QSO Party, which included operation as COØFRC, CO2/K7JA, and CO2/WA7WMB. Theirs was the first group of American radio amateurs to be so honored. Feature articles by Chip and Janet appeared in *The QCWA Journal* and *QST* in late 1994. In 2003, Chip and Janet and four other members of the Piña Colada Contest Club (KP2AA) joined forces with the FRC in the first-ever joint Cuba-U.S. Field Day operation as COØUS. This operation marks the first occasion where a Treasury Department Specific License was granted for a public Amateur Radio demonstration involving U.S. Amateurs.

In May of 2005, Chip and partner Ken Miller, K6CTW, made an appearance on *The Tonight Show with Jay Leno* on NBC, competing with (and defeating) the U.S. champion cell-phone text messenger in a message-completion speed contest.

Articles by Chip have been published in *CQ*, *CQ VHF, Popular Communications*, and *CQ* magazines, and in several books. Outside of Amateur Radio, Chip enjoys photography, astronomy, and is a marathon runner.

In May of 2008, Chip was inducted into CQ Magazine's **Amateur Radio Hall of Fame**.

OCARC's YEARLY FINANCIAL REPORT
Jan 1, 2012 Through Dec 31, 2012

OPERATING EXPENSES

Operations and Supplies (Total: $787.07):
- Calif. Corp. Fee: $20.00
- Insurance 2012: $300.00
- **Insurance 2013: $300.00**
- PO Box 3454 (1 Yr. Renewal): $52.00
- Postage: $17.60
- Stationary Supplies: $17.76
- Raffle Tickets Rolls: $20.45
- President's Plaque: $59.26

Club Badges:
- Materials: $0.00

ARRL Membership thru Club (Total: $24.00):
- New: $24.00
- Renewal: $0.00

Monthly Opportunity Drawing:
- Purchases: $1,507.78

Soldering Class (Total: $70.78):
- Class Kits [2]: $63.05
- Supplies: $7.73

Field Day (Total $1,386.95):
- Food: $1,014.94
- Generator (Gas, Oil, Parts): $50.93
- New Power Cable: $124.42
- Tent Rental (1 each): $25.86
- Hardware, Misc.: $103.99
- Flowers (Field Day site): $66.81

W6ZE Web Page:
- Hosting: $143.88

Auction:
- Seller Consignment Payout: $407.25

Christmas Dinner (Total $2,318.71):
- Dinners [4] (50 @ $29.73): $1,486.50
- Prizes: $732.21
- Women's Baskets: $100.00

TOTAL: $6,646.42

CHECKING ACCOUNT BALANCE

Jan 1 Statement Balance:	$4,165.36
Checks outstanding prior to Jan 1 [3]:	($298.30)
Jan 1 Checking Balance:	**$3,867.06**
2012 Income:	$6,339.45
2012 Expenses:	($6,646.42)
Dec 31 Checking Balance:	$3,560.09
Checks outstanding as of Dec 31:	$0.00
Dec 31 Statement Balance:	$3,560.09

Notes:

[1] $420.00 of 2012 dues collected in 2011 **are not included** in the 2012 accounting.
[2] One kit transferred to monthly drawing.
[3] All 2011 outstanding checks have cleared.
[4] The club has **on deposit $200 with Jägerhaus** for reservation with next year's holiday party.

OPERATING INCOME

Dues 2012 (Total: $1,405.00):
- Regular Membership [1]: $1,095.00
- Family Membership [1]: $70.00
- **2013 Regular Membership: $200.00**
- **2013 Family Membership: $40.00**

Club Badges (Total: $34.00):
- New Badge: $32.00
- Mailing: $2.00

ARRL Membership thru Club:
- New: $39.00
- Renewals: $0.00

Monthly Opportunity Drawing:
- Ticket Sales: $905.00

Soldering Class:
- Class Kits: $63.25

Field Day:
- Food Donations: $570.60

Auction (Total: $1,076.10):
- From Consignment Items Sold: $452.50
- From Donations Sold: $623.60

Holiday Dinner (Total: $2,246.50):
- Dinner Income: $1,274.00
- Drawing Donations: $240.00
- Drawing Income: $546.00
- W6NGO Trust Fund Dinner Donation: $186.50

TOTAL: $6,339.45

SAVINGS ACCOUNT BALANCE

Jan 1 Statement Balance:	$2,300.04
Moved from Checking:	$0.00
Moved to Checking:	$0.00
Interest YTD:	$2.31
Dec 31 Statement Balance:	$2,302.35

SUMMARY

January 1, 2012

Savings Account:	$2,300.04
Checking Account:	$3,867.06
Total:	**$6,167.10**

December 31, 2012

Savings Account:	$2,302.35
Checking Account:	$3,560.09
Total:	**$5,862.44**
Net Gain (Loss):	**($304.66)**

Audit Committee: *5 January 2012* ***Date***

AF6CF *Nicholas Haban* ***Club Auditor***

N6GP *Tim Goeppinger* ***Club Auditor***

W6HHC *Ken Konechy* ***2013 Treasurer***

AF6C *Bob Eckweiler* ***2012 Treasurer***

How Did the Club Do in 2012?

As the club Treasurer for 2012, I'd like to take a look back at the year and see how we really did. The audited club financial report for the year is shown on page 21. However this covers the time period from Jan 1 to Dec 31. Let's redo the figures and add the monies received in 2011 for the 2012 membership as well as expenses taken in 2012 for 2013 (namely the club liability insurance). Of course we must also subtract the dues received in 2012 for 2013 as well as any expenses paid in 2011 for 2012.

Income (from audit):	$6,339.45
Dues rcvd. in 2011 for 2012:	$420.00
Dues rcvd. in 2012 for 2013:	($240.00)
Adjusted Income:	**6,519.45**
Expenses (from audit):	$6,646.42
2013 insurance pd. in 2012:	($300.00)
Adjusted Expenses:	**$6,346.42**
Net Checking Gain (Loss):	**$173.03**
Savings Account Interest:	**$2.31**
Net Total Gain (Loss) for 2012:	**$175.34**

de AF6C 2012 Treasurer

Contribute to *'RF'*

Are you doing something in ham radio or electronics that might be of interest to other members or hams in general. Why not write an article for inclusion in 'RF'? It is easy and you can find a lot of help from any of our rotation editors!

No December Minutes:

There was no December Board Meeting nor General Meeting; so there are no minutes.

The **ORANGE COUNTY AMATEUR RADIO CLUB, INC.**
P.O. BOX 3454
TUSTIN, CA 92781-3454

First Class Mail
Time Dated Material.
Please Expedite!
http://www.w6ze.org