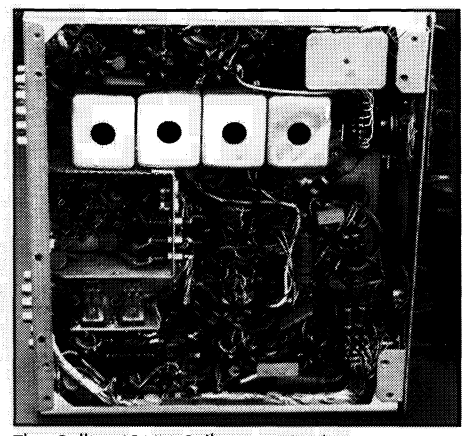
The SIGNAL

Collins Collectors Association

Issue Number Twenty Seven | Official Journal of The Collins Collectors Association | Third Quarter 2002

KWM-2/2A Undocumented ALC Circuit Changes

by John Fuhrman K0LFA - jfuhrman@kc.rr.com



The Collins KWM-2 (bottom view)

Several circuit changes occurred to the ALC circuitry during the production life of the KWM-2/2A. These changes were not documented by the factory in a Collins Service Bulletin or Service Information Letter. These changes were incorporated in production to eliminate hand selection of V4, 6AZ8, reduce ALC meter zero drift and improve ALC meter action. This is a step by step ALC modification procedure prepared in a format similar to Collins Service Bulletins.

Before beginning this modification, check the time constant capacitors in the ALC circuit, C159 and C160. Measure the resistance to ground from pin 6 of V4. It should be 1.5 meg ohm. From turret E50, terminal J to terminal L, you will find C160, .47 uf ceramic, and R119, 1.5 meg ohm resistor. C159, .1 uf disc, is installed from pin 6 of V17 to turret E90 terminal I. I have found that these old circa 1960-1970 high value low voltage ceramic capacitors fail in mysterious ways. Some become leaky while others just decrease in value. I have found it a good practice to automatically replace these capacitors with higher voltage low leakage polyester epoxy dipped type capacitors. I replaced C160 and C159 with new low leakage polyester capacitors with a 250 volt rating. However, a 100 volt rating will work just as well. The circa 1970's circuit diagram has many "arrows" with numbers and explanations or information concerning component values and changes. The reader should exercise good judgement when considering modification of values or circuitry in older models. Trying to make all the various changes in one sweeping effort will likely leave a non-functional unit. Each arrow has to be evaluated individually on its overall impact and necessity of change or installation. It is very easy to fatally impale yourself on an arrow.

NOTE: This is not a simple mod. It requires working in very tight quarters with a very small pencil iron, small wire cutters and long needle nose pliers. It can take several hours to complete depending upon your level of manual dexterity and technical prowess. A headset magnifier can be helpful. For all parts locations please refer to the component location diagram on page 7 of Service Bulletin 7 (reissue) available from the CCA web site. Any references to left or right are as viewed from the front panel. For circuit information please refer to the simplified drawings.

Remove the transceiver from its cabinet by removing the two 6-32 flathead screws in the trim ring under the lid and removing the four feet and the screw that is midway between the rear feet. Carefully slide the transceiver out of the cabinet. Caution: When performing this modification, if the transceiver is wired with polyvinyl chloride insulated wire, exercise extreme care to not damage the insulation with the soldering iron.

1. *Replace R18, 47k-1w resistor, from pin2, V4, to turret E50, terminal G with a 18K-1w resistor.*

2. *Replace R131, 39K-1w resistor, from pin 2, V4, to turret E50, terminal A, with a 39K-2w resistor.*

3. *Remove R38, 220-1/2w resistor, from turret E50, terminal A, to terminal F (grnd).*

4. *Remove VOX time constant assembly from rear of meter and remove the meter for access to the meter switch. Replace R150, 150-1/4w resistor, with a 100-1/2w resistor.*

5. *Move white/blue/black wire from the ALC potentiometer to the meter switch to the opposite end (left side) of the newly installed 100-1/2w resistor. The left side switch contact will have a white/blue/green wire attached. NOTE: There will be two wires with identical color codes on the right side contact. Only one of these wires will go to the ALC control. Be certain you identify the wire from the ALC potentiometer. Re-install the meter and the VOX time constant assembly.*

6. *Install a 120-1w resistor from pin 3, V4, to the ground terminal between pins 1 & 9 of V4.*

7. *Remove the control shelf by removing the two black 4-40 oval head screws in the dial escutcheon and the #4 type B metal screw at the left end of the shelf. Remove the PTO tube, 6AU6, and swing the control shelf toward the meter. Remove R19, 47-1/2w resistor from the ALC potentiometer mounted on the control shelf and install a 220-1/2w resistor in the same location. Remount the control shelf.*

8. *Near the mechanical filter (chassis top side) locate the 3 place solder terminal strip. Disconnect the lower end of L2, 10 mH, to terminal 3 and disconnect the lower lead of C216, .02 uF disc capacitor to terminal 3, T275 line. Insert a 680-1w resistor in series with L2 to terminal 3, T275 line. Re-attach the free lead from the .02 uF disc cap to the junction of L2 and the new 680 ohm resistor.*

9. *Remove ground on pin2, V17, by cutting wire to center. Any resistors that are using pin2 for ground must be moved to the center.*

10. *Connect a 270K-1w resistor from pin 2, V17, to turret E90, terminal B, TR275 line.*

11. *Connect a 1500-1/2w resistor from pin 2, V17, to ground, socket center. This completes the modification.*

Recheck all wiring and component placement to ensure nothing was shorted or damaged during the installation of the new components. Apply power and adjust the ALC meter position for "zero" on the meter scale. It will have changed considerably and you will have to go through almost the entire rotation of the ALC control. The direction of meter deflection

(continued on page 2)

In this issue...

KWM-2/2A Undocumented ALC Circuit Changes

(continued from page 1)

by John Fuhrman K0LFA - jfuhrman@kc.rr.com

while turning the control will be reversed. IE: CW rotation will cause the meter to go down scale. If you would like to restore original meter deflection of the ALC control, CW rotation moves the meter up scale, then reverse the wires to each end of the ALC potentiometer.

After completion of the ALC modification it is recommended that the ALC threshold be measured and the value of R140 be adjusted, if necessary. Quoting from the manual:

4.7.2 Resistor R140

a.Connect equipment as required to perform ALC zero adjustment, paragraph 4.5.6.

b.Perform ALC zero adjustment.

c.Connect a precision multimeter to the PHONE PATCH terminals and measure the 2-tone generator input.

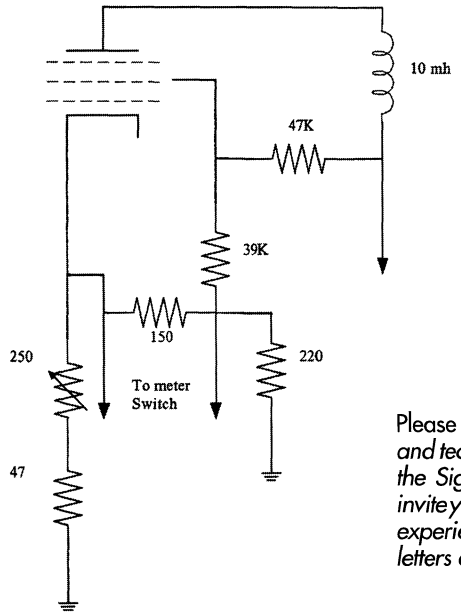
d.Set the MIC GAIN control fully clockwise, and increase the 2-tone .input level until ALC threshold is indicated on the KWM-2/2A meter (set at ALC position).

e.If the multimeter indicates more than 5mV input to the PHONE PATCH terminals, recheck the KWM-2/2A alignment. Note: If alignment appears normal and more than 5 mVac is indicated, select and replace R140 with a value to give an .ALC threshold between 2- and 5-mV 2-tone input. f.f. If the multimeter indicates less than 2 mV, select and replace R140 with a value to give an ALC threshold between 2- and .5 mV 2-tone input. Keep in mind that the microphone input is high impedance. The majority of modern test equipment today has 600 ohm balanced low impedance outputs. This 600 ohm output can be used provided a matching transformer is used between the 2-tone generator and the KWM-2/2A. A suitable matching transformer is the CALRAD 45-715. The primary is 500 ohm and the secondary is 50,000 ohms. The nominal frequency response is 200 to 15,000 Hz. This transformer can also be used to provide a good match from popular 600 ohm microphones to the high impedance input of the KWM-2/2A transceivers and S-line transmitters. Reducing the ALC threshold measurement to its' simplest form, tune up the KWM-2/2A normally. In LSB, set the ALC to "zero" on the meter scale. Set the mic gain fully CW (wide open). Close the PTT to put the transceiver into the transmit mode. Gradually increase the 2-tone input to the mic/phone patch input. When movement of the meter is noted, read the audio input from the 2-tone generator to the transceiver. If it is from 2 mV to 5 mV, nothing further is required. If greater than 5 mV, check the alignment. If alignment is OK, then increase the value of R140 which will increase the output of T1. If less than 2 mV, then decrease the value of R140 to reduce the output from T1. Then repeat the ALC threshold measurement to make certain the threshold is between 2 mV and 5 mV. After modification the ALC indication on the meter should be "smoother" with less drift of "zero" and setting of the mic gain control should be less critical.

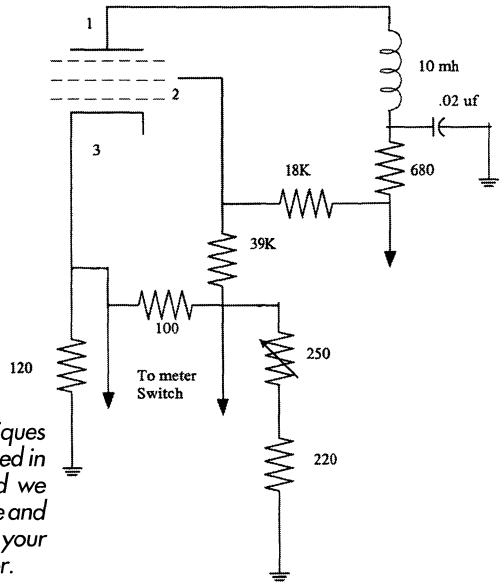
Parts List: For 1 & 2 watt resistors Metal Oxide type are recommended. For ½ watt Metal Film can be used. The smaller size compared to old Carbon Comp types will ease installation of the new parts.

100-1/2w	1.5k-1w
220-1/2w	18k-1w
120-1w	39k-2w
680-1w	270k-2w

Before Modification
V4A, 6AZ8

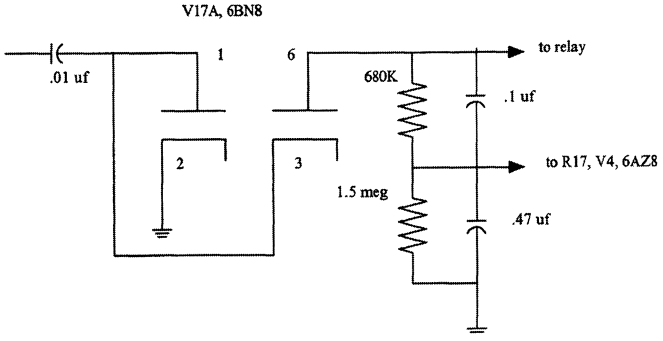


After Modification
V4A, 6AZ8

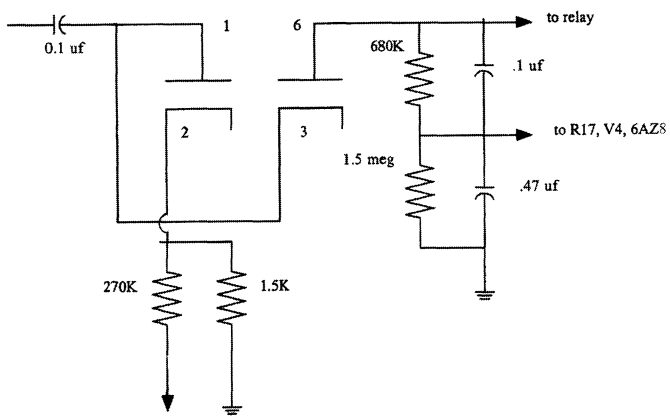


Please Note: *Some of the techniques and technical information discussed in the Signal are controversial and we invite you to share your knowledge and experience with us. Please send your letters and comments to the Editor.*

V17A, 6BN8



V17A, 6BN8



Editor's Operating Desk

by H Michael Crestohl, W1RC/VE2XZ
Editor, The CCA Signal

It's been over three years since Sandy Meltzer KW6KW and Floyd Soo W8RO asked me to edit THE CCA SIGNAL. I was greatly honored by this request and I must admit that there were a couple of personal reasons why I agreed to do it. First of all I wanted to give back something to the hobby that has given me so much since 1966. Then there was the DEMIL Project that I wanted to work on and quite frankly I needed the clout that editing THE SIGNAL might give me in dealing with the bureaucrats. For those of you who were not involved with the CCA or Collins radios back then there was an unfortunate situation where the military was destroying perfectly good KWM-2As, 30L-1s, R-390As and other fine older tube-type radio equipment for reasons of "national security". I do not want to dwell on this too much here but suffice it to say that the policy was eventually changed and this wanton destruction was no longer performed on this equipment.

Additionally I felt that the on-line manuals project needed to be encouraged and now many manuals are available on the CCA Website in the Adobe PDF format. Legal permission was obtained for the CCA to distribute electronic versions of the Collins Amateur manuals, service bulletins and other copyrighted documents free of cost to anyone who cared to take the time to download them. Larry Saletzsky WA9VRH and other volunteers put in many long hours scanning these manuals. Now there projects have been completed and you can get the manuals instantly online and as far as the DEMIL project goes, who knows how many radios were saved? September 11th may have put the skids on this but if only one radio was spared the sledge hammer treatment it was well worth then effort.

Since that time there have been several changes in the Board of Directors which is a good thing. No one should stay in the same place forever. We all owe former CCA directors Bill Wheeler, K0DEW, Chuck Rippel WA4HHG, Floyd Soo W8RO, Butch Schartau K0BS Jim Stitzinger, WA3CEX and several others who served in the past a great deal of thanks for their time and efforts. Now I understand that former prez Sandy Meltzer KW6KW is not running for re-election this fall. He served the CCA very well and guided the club through some difficult times. Sandy certainly has earned the title of "President Emeritus" of the CCA. I have enjoyed working with him on THE SIGNAL. If you think the newsletter looks good, please thank him, not me.

Sandy has agreed to continue producing THE SIGNAL for the time being and I have agreed to continue as Editor on the same basis. However the time is coming that there should be a "changing of the guard" with regards to the newsletter and I am hoping that someone will step forward soon and volunteer to perform this important club function. Please feel free to contact me, Sandy or any BoD member if you are interested. I would welcome the additional time to spend with my wife and four year-old daughter and there is a T-368 transmitter sitting in my garage awaiting my attention, so please don't be shy.

It is mid-July as I write this and I hope that we are all looking forward to an active Fall radio season with plenty of Collins activities for newcomers and veterans alike.

At the Mic with K0FLY

Gayle Lawson
President, CCA

I would like to thank all of the members who helped with the hospitality room and banquet registration at Dayton. Tony W9JXN deserves more credit than I can give here for the wonderful array of Banquet door prizes. The program was quite long and with the large number of door prizes we had to cut activities short, Ted Craven has agreed to return and give his full presentation in 2003. The CCA has signed an agreement to return to the Holiday Inn for Dayton 2003 at the same price as last year. The hotel will include a meeting room Friday evening for our social hour to alleviate the congestion in the hall outside the banquet room as well as change the banquet seating arrangements.

Ron Freeman K5MM has completed the IRS 501C-3 forms, by the time you read they will have been submitted to the IRS. Ron spent over 30 hours completing the form. Ron, thanks.

Mile Stover W9MWS has stepped down as our Membership Secretary. Mike is self-employed and with a growing business no longer has several hours a week to perform the job. Mike, thanks for three years work. I would like to welcome our new membership secretary Jack Mory KE3WV to the CCA Volunteer team. Jack has been performing the function since Dayton.

The CCA Board of Directors elections are just around the corner and the board has appointed a nominating committee chaired by Dirk W8IQX. Please send nominations to Dirk W8IQX at DoctorDirk@aol.com.

Join Us on the Air!

- Sunday 14.263 mHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3875 kHz at 8pm CST
- Friday (West Coast) 3895 kHz at 10pm CST
- Sunday 10m AM 29.050 mHz at Noon CST
- 1st Wednesday AM 3885 kHz at 8pm CST

Sunday for Technical, Buy, Sell & Swap
Tues., Thurs., Fri., & Sunday for Ragchew

Visit the CCA web site at:
www.collinsradio.org

CCA Collins Technical Hot Line
479-751-6667
Call M-F 4pm-6pm Central
Leave message - will return call

The **Signal** is published quarterly by
The Collins Collectors Association

The Signal
H Michael Crestohl, W1RC/VE2XZ, Editor
tel: 802-658-9554 w1rc@amsat.org
Sandy Meltzer, KW6KW, Production

The Collins Collectors Association
P. O. Box 10459
Phoenix, AZ 85064-0459

www.collinsradio.org

Call for Nominations

Important CCA Board of Directors Election

The Collins Collectors Association will be electing three members to its Board of Directors in October. Board members whose terms expire are Sandy Meltzer KW6KW, Gayle Lawson K0FLY, and Larry Saletzki WA9VRH.

A nominating committee chaired by Dirk Scholten W8IQX will coordinate the nominations and elections.

All members in good standing of the CCA are invited to submit nominations for the above vacancies on the board. All Nominees must be members in good standing of the CCA. All nominations require a nominator and a seconder. All Nominees must be contacted in advance and their willingness to stand for office confirmed before their names are submitted. All Nominees who accept a nomination should prepare a bio (250 words) briefly describing relevant personal history, ham activities, their vision for the future of the CCA and, most importantly, a clear statement of what their presence on the Board of Directors will bring to the CCA.

Membership on the CCA Board of Directors requires a major commitment of both time and energy. The Directors are responsible for the overall operations of the CCA including the planning of all CCA gatherings, the care and feeding of the CCA web site, the publication of the Signal and the recruitment of members to fill key positions such as Treasurer, Membership Secretary, Net Manager, etc. They set the tone of the organization and set its course for the future. Directors must be able to attend key CCA functions including the annual Dayton gathering. Prospective Nominees are urged to give strong consideration to the high level of activity and participation that will be expected of them should they be elected. They are also asked to consider whether or not a conflict of interest might arise between their position on the CCA board and any other undertakings should they be elected.

Election ballots will be mailed to all members with the Fall issue of the Signal, on or about October 16th, 2002. The deadline for receipt of completed ballots is November 30, 2002. The ballots will be received and tabulated by the nominating committee who will convey the results to the CCA President and the CCA Board. Election is by majority vote. The results will be announced on or about December 1, 2002 via the Collins Reflector and the CCA web site : www.collinsradio.org.

Please forward all confirmed nominations directly to Dirk Scholten W8IQX via e-mail at doctordirk@aol.com or mail them to the CCA P.O. Box in Arizona.

The deadline for the receipt of nominations is MONDAY, September 30th, 2002. Let's beat the bushes for our best and brightest!

NET NEWS: Summer 2002

Peter Lower, VE3KWM Net Manager

It's been a great year on the nets with more checkins than ever, a new group of net controllers and the debut of the 10 Meter AM net. As most of you know Pete, K5PZ, in Dallas was the driving force behind the 10 Meter net and it's been extremely popular since its inception. Early logs from February of this year show over 200 checkins with the final count much higher. Russ, WQ3X and Bill, N6PY have been the primary net controllers with Pete plus many others who've pitched in to keep this net going week after week. A '10 over 10' certificate was designed by Sandy KW6KW and issued to those who'd logged 10 checkins. Conditions on 10 have been a little rough recently but the net is hanging in there and should be back in full swing in the fall. Thanks to Pete and his team for making this new addition to CCA net line-up such a great success.

I want to take this opportunity to thank those who've been net controllers over the last few years and to welcome the new guys including Fred, W1SKU, in Michigan who has a big signal, a fine station (Check out his QRZ entry) and who's doing a great job for us on the 3rd Tuesday; Mac, W5MC who holds down the third Sunday slot with me and makes the trip with a big signal from the Dallas area; Bob, W0YVA, in Great Falls, Virginia who takes the second Sunday with Jim, W0LSB and who has also pinch hit on numerous occasions. Our newest net controller is Dave, WA5IMF, from Baton Rouge who's jumped into the fire on the second Thursday and did a tremendous job last week despite a very high noise level. Welcome, Dave. We've also got a great group on the West Coast for the Friday night net including the veteran Bill, N6PY, Chuck, KC6ARU, Sandy, KW6KW, Mickey, WA6FIZ and Joe, WB6ACU.

Special thanks to Dutch, WB7DYW, who helps take the "earlies" on Sundays and keep 14.263 warmed up for the net. Dutch also takes a regular shift on the fourth Sunday with Tim, K6TIM, who's returned to active duty after a few months away. Welcome back, Tim.

A few long time controllers have taken a well earned break and hopefully we'll hear them again in the fall. Thanks for service above and beyond the call to Sandy, KW6KW, Larry, WA9VRH, and John, WA5VVT.

Speaking of Larry, we all owe him a giant thank you not only for his huge contribution to the CCA archives but also for being the AM Coordinator and putting together the "1st Wednesday" AM net on 3.880. Larry also has a lot of help from coast to coast including Bill, K2LNU, Jim, W0NKL and Bill, N6PY plus others. Thanks to all of you for making the first Wednesday of every month a night to look forward to for those who love AM.

Another big tip of the hat is due Dean, KA6BGW, our Asst. Net Manager who has done so much over the last year to make the nets run smoothly. Thanks, Dean!

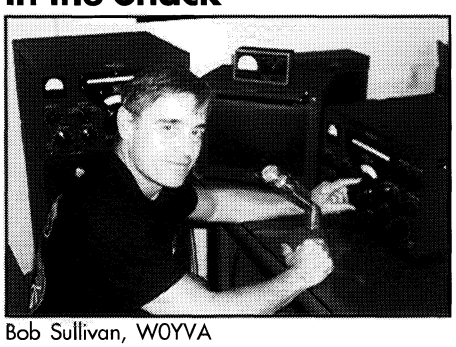
Our "Theme Weeks" went well this year with lots of checkins and some interesting info and serial numbers collected on hundreds of radios. Looks like the KWM-1 was the sentimental favourite this year with the KWM-2s taking the prize for sheer numbers. I'd vote the owners and operators of the KWS-1 as the most dedicated group requiring the most patience and a fair degree of technical prowess to get these classics up and running -- and keep them running!

The nets are really the heart and soul of the CCA because that's where we get to put the pedal to metal and put these great radios that we've worked so hard to restore to the test. It's also the place where we get to exchange ideas, opinions and even the weather as we sit back in good company and operate, test and tweak the best amateur radios ever built. We can rest assured that these radios that we all love to collect, restore and play with will never be duplicated and never matched in terms of quality engineering and production. So if you haven't made checking in to one of our nets a regular habit, you should. Get on the air and say hello. Our dedicated crew of net controllers are standing by to take your call!

And of course we're always looking for new blood in the net controller ranks so if you'd like to give it a try -- it's fun and painless -- let Dean or Larry or myself know.

Special Note: As many of you know Warren Hall, K0ZQD, who has generously shared his impressive technical knowledge of Collins radios on the Sunday net for more than a decade is resting at home following a brief stay in the hospital. Our thoughts are with you Warren and we're counting the days until you're back on the air!

In the Shack



Bob Sullivan, W0YVA

Bob is one of our CCA net control stations. A wonderful station and a big signal on the air.