

My Collins KWM-2

by Al Schapira, W2ADS



Collins KWM-2 Transceiver

With thanks to all who provided suggestions and responses to my original request for help, I am providing this account of how I got my newly acquired KWM-2 back on the air. I hope this will be of some interest to other KWM-2 owners.

I bought this rig from its original owner, a retired Collins engineer, who had had it in storage for several decades. It was exactly as delivered by Collins, and according to the seller, had never been out of its case.

With any vintage equipment, there are several things that need to be done before applying power for the first time. After a visual inspection and a little cleaning, a resistance check was in order. Following the chart in the KWM-2 manual, I checked every tube pin resistance to ground. Everything was reasonable except for V11 pin 2. This is the BFO grid. I measured 1.1 Meg (roughly agreeing with the schematic), but the chart in the 1962 KWM-2 manual said 95k. This turned out to be a typo; the 1978 manual specifies 1 Meg.

Satisfied that there were no dead shorts, I powered up the rig for the first time, and the receiver came to life. With a short wire

antenna, I was able to hear WWV on 15 MHz.

The Dummy Load

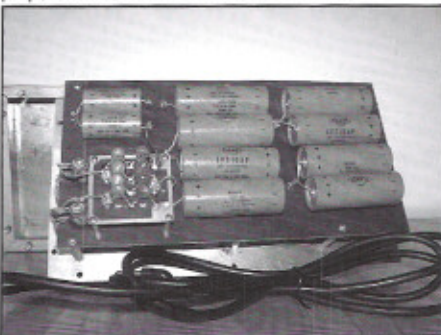
In preparation for transmitter testing, I examined the dummy load that came the KWM-2. It was built by the original KWM-2 owner and consisted of fifty 100 ohm 2 watt resistors in series/parallel to comprise a nominal 50 ohm 100 watt load (five series banks of ten in parallel). Some of the many solder joints had come apart, resulting in an intermittent resistance. I re-flowed the solder joints to solidify the load. It now measures a solid 47 ohms—a little low, but close enough.

The Power Supply

The PS was also built by the seller in 1962, using Collins parts, and is similar in circuitry to a PS-2.



While listening to the rig, after about an hour one of the 40 uF/450V dry electrolytics in the power supply began to snap, crackle, pop, sizzle, and overheat. Uh-Oh.



If you look closely, you can see the full "One Year" guarantee on the capacitors.

I replaced all ten electrolytics with modern equivalents from Mouser. While I was at it, I added a pilot lamp and a jumper to conveniently disable the high voltage. The rectifiers are solid-state diodes, so "removing

the rectifier tube," as the Collins manual suggests, to disable the HV was not an option. I also added a dropping resistor to reduce the B+ slightly, since it was about 50 volts too high. I plan to enclose the PS in a perforated metal cage. Perhaps I'll look for a 516F-2.

The Rig

After repairing the power supply, the receiver seemed to be working properly, but not the transmitter. I originally observed two problems. Although the KWM-2 did appear to tune up properly into the dummy load:

1. There was hardly any audio gain, barely enough to budge the ALC meter even with the mic gain all the way up, and
2. The VOX either pulled in too late or dropped out too early.

I ruled out the microphone by trying four different mics, which exhibited similar behavior. In order to help characterize the transmitter problem, I hooked up an RF ammeter in series with the dummy load, and connected the probe of an HP 410B RF VTVM across the load to monitor the output of the rig. When tuned up in the LOCK position, I measured about 60 volts RMS and 1.3 amps RMS into the load, for a power output of 78 watts (continuous). These measurements are consistent with the 47 ohm dummy load (I^2R and E^2/R). (The load remained cool for the short time I was driving it.) I then knew, much to my relief, that the finals, driver, and most of the preceding stages were okay.

While working into the dummy load, I listened to the signal on another receiver and heard severely distorted and very weak audio. Since the rig tuned up properly, but had very low and distorted audio, I concentrated on the audio chain.

Time to do some homework

I downloaded copies of all of the KWM-2 Service Letters and Service Bulletins from the CCA website. (This alone was reason enough to join the CCA.) I also searched the CCA archives for "audio" and "VOX" and printed the relevant articles. At the suggestion of a reader of my original post, I downloaded the latest KWM-2 manual, even though I had the original 1962 manual. I was pleasantly surprised to find all the modifications from the service bulletins listed in the revised manual

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My Collins KWM-2 (continued from page 1)

by Al Schapira, W2ADS

and indicated on the schematics. (The original service bulletins sometimes provide step-by-step instructions and parts locations for making the modifications; the updated manual only lists the changed components, without instructions or locations. Thus, it is good to have both.)

I cross-checked the relevant modifications listed in the 1978 manual against the service bulletins, looking for changes that might affect either the audio or the VOX. Several numbered service bulletins were relevant, so I made the indicated changes:

#3 - C6 - changed from 0.47 μ F to 1 μ F, replaced with 600V Orange Drop.

#11 - C47 - changed from 0.047 μ F to 0.068 μ F, replaced with 600V Orange Drop.

#7 - R201 - 220k, added.

#8 - R199 - 2.2M, added.

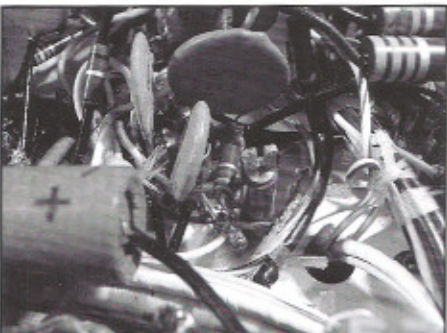
#36B - C227 - 0.01 μ F, added.

C160 - replaced with 0.47/100V Orange Drop.

Changes #7 and #8 require the addition of a terminal post to allow for the insertion of a series resistor. I tried to be as faithful to the quality of the original Collins work as possible.



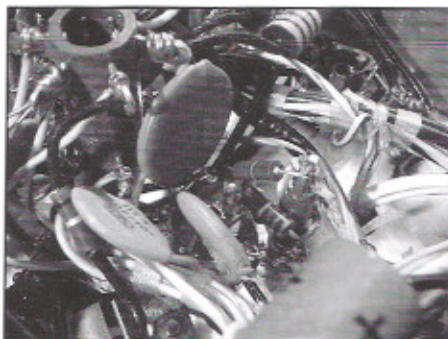
R201 Before



R201 During

These changes did not cure the audio problem, but did solve the VOX problem, so audio was getting through to the VOX circuits but not to the modulator. (I later removed change #8, R199, since it made the minimum VOX time constant much too long.)

In the course of a very thorough visual inspection, I spotted a cracked resistor, R169, 1k! (No, it wasn't in an area I had worked on.)



R201 After



R169

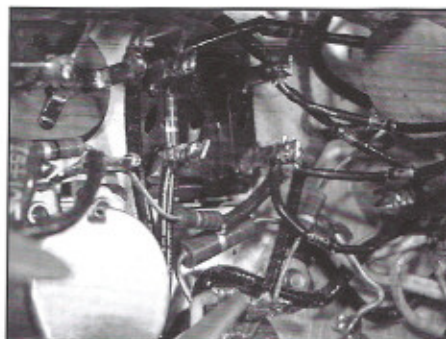
I replaced it, but that was not relevant to the audio problem.

To troubleshoot the audio problem, I wanted to hook up an audio source to the mic (or phone patch) input, but what audio level to use? I measured the audio output from each microphone (while whistling at a constant amplitude!) and obtained results as follows (the first two mics came with the KWM-2):

#	Microphone	Milli-Volts (P-P)
1	Euphonic C-47 Hand Mic	40-50
2	Stromberg-Carlson #10	40-45
3	GE/Shure 97U29	120-140
4	Astatic D-104	120-140

I set my audio source for 1200 Hz, 80 millivolts peak-to-peak (an intermediate value) and connected it to the phone patch (mic) input. I then began to carefully scope out the audio chain starting from the microphone input and working inward. Just to make things interesting, the audio chain is fully energized only when in TX mode, so I disabled the PA screen and HV, and keyed the PTT line.

I found the audio signals to be normal until I got to the "input" to the balanced mixer, where the audio signal was severely clipped and distorted. Ah-Ha! Using a DMM with a diode test range, it looked like two of the four 1N34A diodes in the balanced mixer ring were bad (one open, one shorted). I unsoldered one end of each diode to confirm this. Yes! I replaced all four diodes CR1,2,3,4 with the modern 1N4454 equivalent.



CR1, 2, 3, 4

Voila! Plenty of clean audio right through. **This was the main problem all along!**

I quickly readjusted the carrier balance, reset the ALC zero, ran coax from my workbench up the basement stairs, and connected my antenna, a trap dipole for 80/40/20. I heard W8ERN in Michigan on 7.184 MHz, called him, and he came back with a 5x5 report. The band was extremely noisy, but I was ecstatic! I asked W8ERN to indulge me while I switched from the hand microphone to the D-104. The report was "very, very good audio." K3MRG on frequency also heard me and said I was 30 over S-9, with great audio (using the D-104). Having seen the failure of the 50-year-old dry paper electrolytics in the power supply, I decided to replace the paper electrolytics in the KWM-2. (continues next issue)

Silent Key, W6OAU!

by Bill N6PY

I have some very sad news to report. We all lost our friend Scotty, W6OAU, on June 28th. Scotty's big KW1 signal disappeared from the AM windows about a month ago. A week before his death, some of us found out he was in the VA hospital suffering from kidney failure and many other ailments.

As far as I know Scotty didn't have much of a family so I don't know what arrangements are being made for him. I think all of us in the AM and Collins Collecting community were really his family.

Scotty has been a great supporter and help to those of us the enjoy restoring and operating older radios. He has been a great source of parts and encouragement to me. I met Scotty in 1970 when he practically gave me a 32V2 to use with my restored 75A3 on CW.

I drifted away from ham radio until 1997 when I obtained a Collins S line station and one of the first people welcome me to the CCA West Coast Net was Scotty. He was also one of the people that really encouraged me to get back on AM and collect military gear.

He will be greatly missed by all of us in the AM community.

At The Mic

by Floyd Soo, W8RO - President CCA
floyd@hi-rescom.com

The 2006 Dayton Hamvention® was fun and exciting and plans are already in progress for Dayton 2007 as I type this. We will be staying at the Holiday Inn Dayton North at Wagoner Ford Rd. and I-75 again next year. It proved to be closer and more convenient to Hara Arena than the Fairborn location and the free shuttles were a big plus. We'd like to hear from those of you who attended Dayton this year and get your comments and suggestions on how to make the upcoming CCA gatherings there even better. Thanks again to Rich Sperling, WB3JLK, and the gang for their hard work in making this year's banquet, hospitality suites, and booth such a success.

The CCA still needs a Net Manager! All this position entails is the organization of the NCOs for the HF nets. If we can get several volunteers to step up, we would like to have a Net Manager for each of the HF nets: one for the Tuesday 75-meter net, one for the Thursday 75-meter net, one for the Friday West Coast 75-meter net, and one for the Sunday 20-meter net. This way the managers all can "specialize" in their favorite net and maybe help out the others during busy or vacation times. Once the NCO sked is established (as it has been for years), there really isn't much to do, just organize the occasional substitute for someone who may be on vacation or away from the shack for work. One thing is for sure, this position does NOT mean that you have to be there for all the nets! The responsibility of the Net Manager is just to make sure that all the NCOs are communicating with one another and filling in for each other when necessary. If you need more information about this position, please contact me (or any other BoD member).

Last, but not least, CCA elections are coming up soon. If you have anyone who you would like to nominate for one of the Board of Directors slots, please contact Robert Turner, W5APN at rwturner@jonesday.com. Three board positions are up for re-election (Sandy Meltzer, KW6KW; Robert Turner; and me, W8RO). However, Sandy and I have reached our term limits and we must allow our positions to be filled by new members. This makes the upcoming elections even more important than usual, so please take part in the decision-making process.

Last year we had an excellent turnout for the voting, and we hope to see that level of participation again this year. Please nominate someone whom you think can do the job of running this great organization!

Well, that's about it from here. Hope to catch you on the air! Have a great rest of the summer and early fall season...

73 from Floyd, W8RO

In the Shack



The radio shack of Ron Holtzman, WD2AJC

Bottom: Collins KWM-2A, 32S-1, and 75S-1. 2nd level: 51S-1, 312B-5, 51S-1, 75S-3, 75S-3B. 3rd Level: 75S-1, 312B-4, Rockwell KWM-2A, Rockwell 32S-3A, 75S-3B. 4th level: Hallicrafters R-46B speaker, Collins 55G-1. Behind Ron: Two KWM-2A's, 312B-5, KWM-2 w/516F-2, 310B-1, 30L-1, & SM-1 mic.

Call For Articles!

by Gail Schieber, K2RED

We need material to publish in the Signal newsletter! Technical articles, "hints 'n kinks," on-the-air experiences with Collins equipment, articles of historical nature, and items for the new column, "Collins Radios at Work"...which includes experiences of CCA members who used Collins gear in the military, commercial, aviation, and space services.

We don't necessarily need full-length articles. A few paragraphs or even just a photo with an explanatory caption are welcome. You do not have to be an experienced writer either. We are willing to help you. In exchange for any full-length articles accepted for future publication, the CCA will provide you with a FREE 1-year CCA membership!

You can contact me via e-mail at K2REDCCA@aol.com.

We are also looking for shack photos for "In The Shack." Please send us a photo of yourself sitting at your Collins station and include a brief description of your equipment. Email them to Sandy KW6KW at kw6kw@comcast.net.

Technical Disclaimer

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Join Us on the Air!



- Sunday 14.263 MHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3872 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

Subscribe to the Collins Reflector...a FREE e-mail mailing list of over 1300 Collins users and collectors! Visit the CCA web site for complete information!

Letter to the Editor

My dad became a Silent Key in June 1992. He had been a ham since 1956. His call was K5TJG and later W5OAK, the latter callsign while he was in Mobile, Alabama. Sometime in the mid to late sixties, he purchased a Collins S-line. When he passed away, I inherited his ham equipment, minus the transmitter. I have the matching Collins receiver, the 75S-3B. He last had the Collins equipment in the Mobile area. If anyone could help me locate his transmitter, it would be great. My dad was special to me, and getting back his transmitter would be a long-time ambition fulfilled. If anyone can help me, please contact me, Boz, WB5HUF, at: wb5huf@juno.com.

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Another Great Year at Dayton!

by Rich Sperling, WB3JLK 2006 CCA Dayton Chairman

CCA members enjoyed another great year at the Dayton Hamvention. After the traditional Thursday rain and a hailstorm, the bad weather moved out by early that afternoon. We all waited to see what Friday would bring, and happily, we enjoyed pleasant weather the next two days with moderate temperatures and plenty of sun. We had a brief shower late Sunday morning, but it passed through very quickly.

Our new location at the Holiday Inn North worked out well, and we have decided to return there next year.

We had a nice turnout for Thursday night's Hospitality Suite. There was plenty of food and drink, and all of us enjoyed renewing old friendships and starting new ones. There was plenty of great conversation, and a few of us gave up some of our sleeping time to enjoy the camaraderie late into the night.


Inside Hara Arena, the CCA booth was very busy, and I'm sure we will be adding new members. Thanks to everyone who manned the booth!

Friday night's CCA Banquet was enjoyed by all. We had an excellent meal and enjoyed an interesting presentation by Rich Davis, K8PJQ, on his experiences serving aboard the USS Skate, a submarine during the Cold War era.

I'd like to thank Floyd Soo, W8RO, for his service as Master of Ceremonies. I'd also like to thank Tony Sokol, W9JXN, for the excellent

job he did handling the door prize giveaways, and this year we had lots of them!

Our raffle for a Peet Bros. weather station and Heil microphone netted a nice amount of cash for the CCA general fund, as well. A big "thank you" to all of the prize donors!

I appreciate all the help from everyone who volunteered to make 2006 another great year at the Hamvention. We are already planning our 2007 event. Hope to see you next year! 



Call for Nominations

The Collins Collectors Association will be electing two members to its Board of Directors during the month of November. A nominating committee temporarily chaired by CCA Board member Robert Turner W5APN will coordinate the nominations and elections. If you would like to volunteer to help with the elections, please contact Robert Turner W5APN at rwturner@JonesDay.com.

Members in good standing of the CCA are invited to submit nominations for the board vacancies, and those nominated must be current CCA members. All nominees must have a second by another CCA member in good standing. All nominees should be contacted in advance to confirm their willingness to stand for the board position, and this should be done before submitting a name to the Chair of the Nominating Committee. Nominations and seconds may be made to Robert Turner W5APN at rwturner@JonesDay.com.

All nominees in accepting a nomination shall prepare a brief bio of approximately 250 words describing relevant personal history, ham activities, their vision for CCA's


future and, most importantly, a clear statement of what their presence on the Board of Directors will do to enhance the CCA as an organization.

The CCA Board of Directors membership requires a commitment of time and energy, and nominees should consider the high level of activity and participation that will be required of them as a board member. There should be no conflict of interest between their board position and other undertakings. The CCA Board of Directors is responsible for overall operations of the CCA including planning of CCA events, the care and feeding of the CCA web site, publication of "TheSignal" and recruitment of members to fill other key positions such as Treasurer, Membership Secretary and Net Manager. The Board sets the tone of the organization and plots the course for the future.

All nominations with appropriate seconds should be made in a timely fashion so that the completed bio of the nominee can be received by the Nominating Committee Chairperson no later than Saturday, September 30th. No nominee will be considered if a bio is not

submitted to the Nomination Committee Chair by the deadline. This requirement confirms that the nominee is willing to serve if elected. Election ballots and nominees' bios will be included in the Signal's Fall issue mailed between October 15th and November 1st, and the deadline for ballot receipts is November 30th.

Following tabulation of results the Nomination Committee Chair shall convey results to the CCA President and Board, and shortly thereafter results will be announced via the Collins Reflector and on the CCA web site. Nominations, seconds and bios should be emailed to Robert Turner W5APN at rwturner@JonesDay.com.

Put your thinking caps on and contact your potential nominee for his willingness to serve, get a second to the nomination and encourage immediate bio formulation and submission prior to the September 30th deadline. 

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