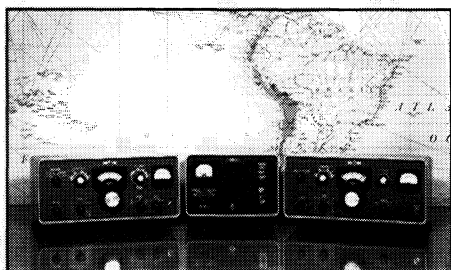


Basic Troubleshooting the Collins 32S-1 Transmitter

by Dennis Stinnett KA9AWF E-mail: KA9AWF@aol.com



The very popular 32S-1 / 75S-1 S/Line

It all started out when I had to begin rocking the band switch back and forth a little to achieve grid drive. As it turned out I was in for some basic troubleshooting experience that I would like to share with you. The symptoms were simple....loss of grid drive until you rocked the switch and then finally, no grid drive at all no matter where you put, or how hard you rocked the switch.

After some thought I decided that cleaning the band switch and an RF alignment was necessary, as the loss of grid drive could be due to the trimmers being bad, or out of adjustment, along with oxidized contacts on the band switch. I proceeded to clean the band switch with some fast evaporating spray cleaner and began the RF alignment. Unfortunately, and unknown to me the band switch had slipped in the front hub, because of two screws coming loose. The switch would turn and indicate but the phenolic shaft that runs through the crystal selector switch and then straight back through the cans was not turning in synchronization with the band switch. Fortunately, all of the cables that drive the switch which is located in the PA cage were

intact, so we can assume that the coils in the tank circuit are being tapped properly.

After sitting back and wondering how this could have happened and what I should do next, I began to reflect on John Bess's (WA5VVT) articles on basic troubleshooting that were printed in the 3rd and 4th quarter of 1999. These articles will prove to be invaluable in the process of bringing the 32S1 back to life. It was also made clear in these articles that one could use a receiver and frequency counter to perform some basic troubleshooting. My shop is small as I only have a HP 410B VTVM, a digital VOM, and a variac. John had mentioned to me about buying a frequency counter at the Radio Shack. I stopped by the store and found that they had a close out special on a little hand held frequency counter for forty- nine dollars. Not much to pay if it works at all and boy did it ever work. Why not jump in with the frequency counter and a Ten Tec Century 21 digital transceiver to listen for signals with.

OK, first of all pull the high voltage rectifier from the 516F2 and unsolder the PA disable wire at the rear of the transmitter. Step two, just as written in John's article: What is the frequency of each of the oscillators? Next I hooked up the frequency counter to the center conductor of the small coaxial cable that is soldered on the back of the on off switch of the 32S1. This is the point to pick up the PTO frequency that is to be in the range of 2.5 to 2.7 mhz. The little frequency counter reads 2.619mhz. Well, that oscillator is working and so is the little frequency counter. Next I went to the BFO, and that signal can be picked up on the bottom of the chassis at the center conductor of the BFO test jack. This time you must enable your PTT with your VOX switch and measure the frequency in the LSB and USB position. This time the counter reads 453.650 on LSB and 456.350 on USB. It should be noted that I used a times ten probe for this measurement and the high impedance mode of the frequency counter to get the correct frequency. Don't be misled by any frequency that does not look right to you. Check and make sure that you understand what you are measuring. How are you attempting to make the measurement? You may be loading the circuit down under test and getting erroneous

readings. As I said earlier, I had to use an old oscilloscope probe and the high impedance mode of the frequency counter in order to get the proper frequency. Also, make sure that you have read the theory of operation in the manual and followed the block diagram through all of the oscillator and mixer stages. OK where was I? This verifies that the BFO is working. Next comes the HFO or high frequency oscillator, sometimes referred to as the crystal deck and can be picked up again on the bottom of the chassis at the center conductor of the crystal oscillator input jack. On this jack the frequency counter will read the fundamental frequency on 80 and 40 meters but will read twice the fundamental frequency on 20, 15, and 10 meters. UNLESS you have the grid drive tuning on a portion of the band that you are not checking. In other words, and as an example, you have the band switch in one of the fifteen- meter positions. The grid drive control in the eighty- meter position as indicated by the grid drive pointer, then, you read the fundamental crystal frequency of the crystal that you have selected with the band switch. If you have the grid drive in the fifteen- meter portion, your frequency counter will read twice the crystal frequency. This allows you to verify that the crystals are working and so is the frequency doubler.

At this time we must find out what band that this transmitter is on and get the band switch back in time. On the bottom of the chassis, underneath the PA tubes you will notice a thin strip of material that ties the grids together of the 6146 PA tubes. In the middle of this strip you will notice a tubular capacitor at a right angle to the strip. Couple the frequency counter to the other side of the tubular capacitor away from the grid strap. The counter will now read your final frequency output. Mine reads 21mhz. And the band switch is in the forty- meter position. Now is the time to loosen the two bristol set screws in the hub of the band switch and turn the band switch to the proper operating position. Tighten the screws.

Two verify the position of the band switch, place the switch in the 21.2 position. Look into the cans from the rear and the dual contactor should be on the set of contacts that are on the

(continued on page 2)

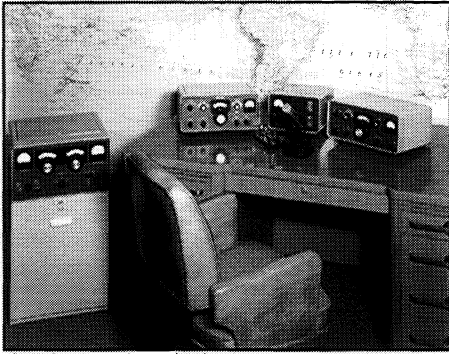
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Basic Troubleshooting the Collins 32S-1 Transmitter

by Dennis Stinnett KA9AWF

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The classic S/Line look...late 1958

left side of the shaft. The crystal selector switch contactor should be on the contact that is at the lower nine o'clock position looking at it from the rear. If you did not pull the phenolic shaft out of the crystal selector switch all of the way, everything should be OK on that switch position anyway. Now we are in time with the band switch. But what about all of those trimmers I adjusted with the band switch out of time?

Back to John's articles.....a signal sniffer.....OK fire up the Century 21 and see if we can place the heat shrink end of the coax near the PA compartment on the bottom side

of the chassis and hear anything. Tune the receiver to the frequency that the 32S1 is tuned to. Make sure that your grid drive is in the proper range of the band that you are on according to the RF alignment procedure in the manual. Get that sniffer probe really close to the grids of the final. In my case, a faint signal was coming through but it was mighty faint. Now is the time to hold that sniffer steady and tweak the trimmer caps on the top of the chassis for maximum signal strength as detected by your ear. These are the crystal oscillator, mixer plate, RF amp plate, and driver plate from the front to the back respectively. Some may have more effect on the strength of the signal than others and uncouple your sniffer as the signal becomes louder so that you will be able to detect slight increases in signal strength. At some point during this procedure you should, and I did acquire grid drive. Obviously your meter switch is in the grid drive position. As soon as you get a grid drive indication on the meter you are no longer dependent on the receiver to tune your trimmers. Keep your grid drive down by lowering the microphone gain as you adjust the trimmers for more and more grid

drive. My final microphone setting came out to around eight o'clock or so. Now you must perform the same procedure on each of the bands as indicated in the RF alignment portion of your manual. Make sure that you have positioned your frequency dial and grid drive knob in the correct positions as indicated in your manual. So, we have now went through each of the band positions, sniffed out the signal and then optimized it by the use of the grid current meter on the transmitter. That's it. Your done. I went ahead and neutralized the finals and driver while I was in there, but articles have already been written on that procedure.

I would like to thank those kind folks on the reflector that responded to my original cry for help. Namely, Jim- W0JL, Jerry-W7BUN, Tim-K6TIM, Alan-K6RFK, Tom-WC9M, Ed-N3CMI, Bud-K7RMT, and John WA5VVT. 73, Dennis KA9AWF 

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 .

Call For Nominations: CCA Board Of Directors

The Collins Collectors Association will be electing two members to its Board of Directors in October. Board members whose terms expire are John Bess WA5VVT and Floyd Soo W8RO.

A nominating committee headed by CCA VP Gayle Lawson K0FLY 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, 2001. The deadline for receipt of completed ballots is November 15, 2001. 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 November 15, 2001 via the Collins Reflector and the CCA web site: www.collinsradio.org.

Please forward all confirmed nominations directly to Gayle Lawson K0FLY via e-mail glawson@inav.net or to sandy@sandy.com or mail them to the CCA P.O. Box in Arizona. The deadline for the receipt of nominations is FRIDAY, September 28th, 2001. Let's beat the bushes for our best and brightest!

QCWA and CCA Form Alliance!


The CCA and the QCWA (Quarter Century Wireless Association) Endowment Program {501(c)(3)} tax-exempt organization have entered into an agreement so that you may donate estate or pre-estate gear to the QCWA Endowment Program and receive a receipt and an appropriate letter that may be used as a reference when declaring the gift as a charitable deduction on the donors income tax return.

This benefits not only the donor but also the QCWA and the CCA. The QCWA in conjunction with the CCA will arrange shipment to the proper location and will pay all shipping charges etc. The CCA will then either:

1. Find a proper location (a museum, for example) for any items of historic value or;
 2. Arrange for the sale of any more modern items to the benefit of both organizations.
- You now have a choice and help in your wishes.

Contact Arch Doty W7ACD, QCWA Endowment Program Administrator, Jim Walsh W7LVN, General Manager, QCWA, or Gary Harrison K0BC, President, QCWA for more details about the QCWA Endowment Program and the agreement with the CCA.

This is a new beginning to keep the thieves out of our families lives.

Vy 73 John Bess, VP CCA 

Trouble Shooting Then And Now

by John Bess, WA5VVT

Over 30 years ago I had the pleasure of making friends with Tom Morgavi in Metairie, La. Tom was an old time Collins technician and operated the Collins Service Agency there in Metairie. He and I had many long talks and would compare notes on problems with the rigs and the new problems that were starting to appear that had never shown up before. He is now a Silent Key but I will never forget him, his wisdom, knowledge, experience and friendship. He once told me that he had been to a training course at Cedar Rapids that required him to build a KWM-2 from the bare chassis to the operational rig. I never had reason to doubt him. He was sharp and always on target with his diagnosis.

The reason for these comments is to tell you what Tom told me in the late 1970's and his words of wisdom still ring true today. Actually they are truer now than they were true then.

Tom said that he was ready to stop working on Collins gear because of all of the "dumb people who thought that they knew how to fix problems that did not exist in Collins equipment". They created more problems than the ones that normally occurred in the rigs and he was tired of getting the DOGS from them.

I told him that he was exaggerating the lack of ability and competence of the hams of that time and he was just facing the new problems in the gear that others and I were experiencing due to the age of the equipment. He assured me that his major problem was that the hams of that time were getting the latest manuals and trying to put all of the latest

changes into their radios and were not sticking with the Service Bulletins. He told me that if they would just stay with the Service Bulletins that everyone would be better off. It was when they also "UPDATED" the rig that the fit hit the shan and the time it took to put it right was not worth the effort.

Well, I still thought that he was wrong. Hams had better sense than to go off half cocked and to just make changes in one section of the rig for "better performance" without taking into account the other changes that would also be necessary to accommodate those changes. He also told me of the person who tried to change a 75S-1 into a 75S3-C. Both he and I agreed that would be a VERY big challenge. Well folks, I have that rig here in Springdale and it is a piece of crap. I do not know if I will part it out or restore it to a 75S-1. Those of you who were in Dallas for the International CCA Convention in 1998 saw it and you know what it looked like.

Now, what does this have to do with trouble shooting problems in your rig? Well, if you make the same mistakes that Tom talked about then you had better back up and go back to ground zero. If you are unfortunate enough to have gotten one of those "I'M GONNA MAKE IT BETTER" rigs, then I feel your pain. Just do yourself, your friends and me a big favor. Do not sell it to anyone you know or send it to anyone to repair.

Put it on the shelf and admire the one of a kind Collins Experimental Prototype that you are fortunate to have.

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 for Technical, Buy, Sell and Swap.
Tuesday, Thursday and Friday for Ragchew.

THE COLLINS VIDEO LIBRARY!

- The R-390A Addendum Video
 - The R-390A Video
 - The Collins Amateur Radio Equipment Video Spotter's Guide
 - The Collins 75A-4 Video
 - The Collins KWS-1 Video
 - The Collins KWM-2 Video
 - The Collins 75S-3 / 32S-3 Video
 - The Collins 30S-1 Video
 - The Collins 30L-1 Video
 - '91, '92 & '97 Dayton Videos
- also the PDC-1 kit that converts ANY average reading wattmeter to true PEAK READING even the Bird 43!

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Visit the CCA web site at:
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The Signal

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The Annual CCA Awards Banquet at Dayton Hamvention 2001...another great get together!

Rockwell Collins License Agreement Updated

Many of our members have asked the CCA Board of Directors if Collins Military and Commercial Broadcast equipment documents would eventually be made available via the CCA Collins archives.

When we asked Rockwell Collins to amend our present licensing agreement they agreed that the license grant contained within our License Agreement includes Collins Copyrighted documents related to obsolete surplus military or commercial radio equipment

that is normally and customarily utilized by amateur radio operators.

This means the CCA has permission to include technical, historical, and operational data in our CCA Collins Radio archives if it relates to any Collins Military or Broadcast equipment that is normally adopted for use on amateur frequencies. This is great news for the CCA and everyone in the Collins community. Keep an eye on the CCA Collins Archives on the CCA web site for more information.

Editor's Operating Desk

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

Summer is hot here in the Northeast and we're enjoying some very fine weather. I hear that some parts of the country are baking under the heat but fortunately Vermont is a very pleasant place right about now.

But with the nice weather my thoughts are of what's ahead, namely the fall and winter months which are more conducive to amateur radio activities which take place inside. It also reminds me that I am running a bit low on material for THE SIGNAL. With this in mind I'd like to throw the ball out into the membership and actively request material. Last year at Dayton one of the members commented that "it must be hard to find new stuff to write about a bunch of forty year-old radios!" Well, he's right - it is, but the technical knowledge and expertise is out there within our group so now is the time to dig into those memory cells and come up with something to share with your fellow CCA members. I am particularly interested in seeing more troubleshooting, repair and restoration pieces as well as anecdotes and tales of the Collins Radio Company. If you have something to offer please think about doing it NOW as you might not get the chance later on. Please e-mail me or phone if you have something you'd like to see in THE SIGNAL.

While on this topic it seems timely to mention something that most of us don't want to think about and that is "what will happen to the stuff when I'm gone?" I was recently informed that an agreement was reached with the QCWA that may address this issue in part but my main concern is the "vulturism" that often takes place when a ham passes away. I have an arrangement with a friend who does not collect tube-type radio equipment (as do I not collect his special items) to help keep these creatures away from our families at a very stressful and trying time. It may behoove you all to consider such an arrangement with a friend who does not share your collecting interest.

Also the CCA Board of Director elections are coming up soon and it may be a good idea to give this some advance thought as to who you may wish to nominate and/or vote for to help guide the CCA into the future.

Members Honored at Dayton Banquet

Many CCA members were recognized at the CCA Banquet in Dayton for their contributions to the CCA. Special thanks was also given to everyone who donated door and raffle prizes. Please see the CCA web site for a complete list of the awards presented this year and the people and companies who supported us by donating prizes for this annual event.

Membership News!

by Mike Stover W9MWS mikestover@aol.com
CCA Membership Secretary

It's the third quarter and time to think about renewals again. As a reminder, CCA full year membership includes 4 issues of the Signal each year. In 1998, the CCA adopted a common renewal period for all members. This coincides with January 1 of each year. Dues are \$20.00 US per year (\$25.00 US per year outside USA and Canada). Prorated dues are accepted for new members if you join during the year and do not desire back issues of the current year Signal. Prorated amounts are: \$15 (\$18.75 outside USA and Canada) for members joining during the second quarter, \$10 (\$12.50 outside USA and Canada) for members joining during the third quarter and \$5 (\$6.25 outside USA and Canada) for members joining during the fourth quarter. New members that opt for the prorated dues schedule will only receive the Signal for the prorated period. Membership renewals can be for a single year or multiple full years. Membership renewals are due by January 15 of each year to ensure membership continuity and that you will retain your current membership number. No prorated renewal schedule is available. Reminders will be sent to all active members during the fourth calendar quarter (October, November, December) of each year with the Signal. Renewals will be acknowledged by sending the next year's renewal sticker for you to affix to your membership certificate. This is the only acknowledgement you will receive when you renew your membership.

Back issues of the Signal are available to members at a cost of \$5.50 US per issue. Availability of back issues is very limited. Please check with Sandy or me before you send a request to be sure your desired issue is available.

Replacement membership certificates are available to current members at a cost of \$5.00 US. Requests should be sent to the CCA P.O. box. Please include legible information regarding information changes being requested on the new certificate.

Please remember to notify us of any changes in your mailing address, call sign, license grade, e-mail address, phone number or Name. You should allow 8 to 10 weeks for implementation of an address change.

Please note the address label on the Signal envelope you receive. The first line contains your CCA member number, your call sign (if you provided one) and your membership expiration date (e.g.: 2001, Dec 31). PLEASE, verify the accuracy.

CCA Technical Hot Line

501-751-6667

Sorry, no call-backs available!



At the Mic with KW6KW

Sandy Meltzer
President, CCA

I'm pleased to announce that after careful consideration and discussion, the CCA Board of Directors has unanimously decided to move all CCA activities for Dayton Hamvention 2002 to the Holiday Inn Fairborn located at 2800 Presidential Drive in Fairborn, Ohio. Our Annual CCA Award Banquet, hospitalities, and CCA meeting have been very successful at the Downtown Dayton Marriott, but the Marriott has continued to increase their prices to the point where most of our members are staying elsewhere. The Holiday Inn Fairborn facilities (meeting and banquet rooms) are on par with the Marriott, but guest rooms will only be \$99 double occupancy. They have set aside 75+ rooms for the CCA for next year. Easy to find, the hotel is located just off of I-675 at exit #17, with convenient access to I-70, I-75 and US 35. No more fighting that downtown traffic.

Our thanks to Art Lewis WA8VSJ for handling the site inspection and to John WA5VVT for handling the contract negotiations. We will make the room reservation information for Hamvention 2002 available on the CCA web site in the very near future. Please register early.

Special thanks to everyone who helped us with another very successful Hamvention 2001. Our CCA Awards Banquet was filled beyond capacity (just under 200) and everyone enjoyed the food and talks by CCA members Bob Heil K9EID, Riley Hollingsworth K4ZDH, Bill Carns N7OTQ, and Floyd Soo W8RO. The friendship and information shared at these get togethers are a perfect example of what our hobby is really all about. Special thanks to John WA5VVT for acting as our CCA Dayton Hamvention 2001 Chairman.

In the Shack



Bob Struk, KX6K

Bob enjoys collecting, operating, and repairing Collins gear especially the HF/KWM-380.