

Why Was Collins Radio The Best?

by Richard L. Webster YS1UL Principal Engineer, (retired) Rockwell Collins



Art Collins

Have you ever wondered why the Collins equipment is so popular and still performs admirably after over forty years of operating? If you haven't been involved directly in the high tech electronic industry, this may be a familiar thought.

The intention of this article is to give you an insider's view as to what made the Collins line of ham equipment such a success. Obviously it started with Art Collins himself. Art was a visionary and an electronic genius. He had a talent that few people possess for knowing "how to design" and "how to build" electronic equipment. Well into the history of Collins Radio, Art took a personal interest and personal involvement into the design, development and manufacture of equipment that bore his name.

Collins, as a company, seemed to also have a talent for hiring great engineers. I believe this was in part due to the fact that most engineering managers within the company had worked their way up through the ranks and they were personally involved in the hiring process. Basically you had experts in their field hiring other engineers. There was

a great deal of engineering expertise and depth inside the Collins doors. Every product, if it's to be worth anything, must start with a good design. Collins did a lot of research and development effort. Engineers within the company published engineering papers that were circulated and taught to other engineers. This was particularly true of SSB circuits, PTO's, etc. The designs were carefully done, state of the art, and continually improved upon.

Good design engineers have to be backed up by good engineering technicians. I am personally convinced Collins had some of the best technicians anywhere. Every design was carefully prototyped, lab built (even though they often looked like they were built in the factory), tested, re-tested and proven before it was ready to consider for production.

No design can become a good product unless you have access to good parts. Here is another area where Collins excelled. There was a group of engineers who dealt strictly with parts and part procurement. Collins did not buy "catalog" parts from anyone. Every part used in a Collins radio had its own, detailed, parts specification. Every parts vendor was "certified" by this group of engineers, their products tested and evaluated for specification compliance. Even periodic audits and visits to vendors by Collins engineers and quality personnel. Not just anybody could sell parts to Collins. They had to be "quality" vendors of "quality" parts.

It was not unusual to see a customer owned radio come through the factory where after ten or more years of service, it still met every performance parameter of its original production tests without any realignment. That isn't by accident!

Even with good designs, good prototyping, and good parts-that is not enough. Collins had teams of engineers-industrial, quality, and electrical who helped transition a design from lab build to production build. Every assembly had build, inspection and test procedures written by these groups of engineers and their support tech writers. Nothing was done without a lot of documentation.

We couldn't begin to understand the integrity of Collins equipment if we didn't understand some of what went into the build, inspection, and test of Collins products. If

Collins had good engineers, good lab technicians, the company had even better assembly, inspection and test persons. Every person who picked up a soldering iron, screwdriver or other tool used to assemble a product went through a school.

If you look at the underside chassis of a piece of Collins equipment, it is a masterpiece of assembly expertise. Every single lead to every termination had to be neatly dressed, mechanically sound, and when soldered-just the exact amount of solder had to be used such that each individual lead could still be easily seen and counted by inspection. The build was "designed" so it could be inspected. Inspected it was! Every single solder connection was inspected for the number of wires, the color code of the wires or connecting part description, quality of the solder joint, and clearance to other parts, chassis, etc. Only after "everything" was in order-a red dot was applied.

During the history of the Collins ham equipment, the company only had one quality standard (except space products). It didn't matter if it was a piece of ham radio equipment, a commercial avionics product, or a military product-it got the same assembly, inspection, and test procedures.

Even the inspections were inspected! There was the "greatly feared" audit department who would take a product from stock, "totally" tear it apart-inspecting everything with a fine tooth comb (boy did they have a tiny comb!). The report from audit would assign "demerits" to those who had earned them. Your job security could well depend upon those audit results. Everyone took the process quite seriously!

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We need your technical articles!

The CCA is a non-profit organization and this newsletter is written by non-paid volunteers. **This issue was delayed four weeks because we had nothing to print.** Please contribute Collins-related technical articles, hints n' kinks, & photos! We desperately need your support. Please send your contributions to kw6kw@comcast.net. Thank you to those who have contributed!

Why Was Collins Radio The Best? *(continued from page 1)*

by Richard L. Webster YS1UL Principal Engineer, (retired) Rockwell Collins



The Collins Radio A-Line

Of course after build and inspection comes test! Collins test consisted of the "best of the best". If Collins had a talent for hiring good engineers, good assembly and inspection people—they out did themselves at hiring the best test technicians in the world. I know because I personally worked with them for 30 years!

Collins used the best test equipment available on the market. Every piece of test equipment was constantly calibrated, monitored, re-calibrated and ultimately traceable back to the National Bureau of Standards. When "off the shelf" test equipment could not meet the needs for a specific task, an entire engineering department existed to design and build special test equipment as needed.


Every product consisted of a series of tests—sub assembly tests, top level product tests, then "run-in" or "burn-in" of the equipment for a period of time to catch any "latent defects" that might have gotten by. Before the final "tested ok" tag went on, a "talk out" was executed where the radio was given an "operational test" to exercise it in a similar manner to its end use in the hands of the customer.

We were not perfect! Despite all the efforts described—an occasional radio would leave the factory and exhibit a problem on initial use. It didn't happen very often, and when it did it was evaluated. I mean it was "really" evaluated—down to a dissection of a failed part if necessary. I have looked at many pictures from a scanning electron microscope view of a failed part—clearly showing the mechanism of failure. Then the corrective action started—all the way back to a design change if it was warranted. Design engineering, quality engineering, factory engineering all maintained a very close working relationship. Problems were defined, communicated and fixed!

Quality at Collins Radio was a way of life! Everyone "thought" quality. A single problem, showing up anywhere in the product cycle could shut down the production process until it was fixed. When a substitution of a part or

change of process was necessary (such as a substitute wire color code) it required processing a "waiver" which ultimately recorded the serial number of the unit with the "change" so it could even be tracked into the customers arena. You can believe me, waivers were not easy to get approved. Taking one of those "dreaded" documents to your boss meant you had better "know" what caused the problem, why it happened and most important—why it wasn't going to happen again! It was a mentality that products would be "right" and "processed" according to procedures.

For those Collins enthusiasts who are involved professionally in the electronics industry, little in this article will come as a surprise. Today's technology has changed—drastically! Many of the procedures and processes described are no longer valid in today's factory. However, nearly all the ham gear products were processed as described. Even through the KWM-380 era.

The author hopes this article may have provided some enlightenment to the non-electronic professional ham that marvels at those gray and black boxes and wonders what made them happen. Keep them glowing and enjoy the fruits of the labors described in this article. 

Banquet Prize Donors

by Gene Duprey, K1GD

The CCA would like to thank the following people and organizations for their generous support through donations for door and raffle prizes at this years CCA Dayton Banquet. This years dinner was a tremendous success, a great program and the prizes added to the enjoyment of those in attendance.

Advanced Optic's - Simon Chalmers/Dave Knepper: 312B-3 Reproduction Speaker

WF1U - Frank: \$50

CQ Magazine - Gail SchieberK2RED:
CQ Subscriptions/Calendars

ARRL - Dave Patton NT1N:
ARRL Handbooks, and Antenna Books

Electric Radio - Ray Osterwald N0DMS:
ER Subscriptions

Heil Sound - Bob Heil K9EID:
Vintage Microphone

Peet Brothers - John DeBord: WX Station

K1ROD - Rod Murray:
CP-1 Power Supply Board

W9PJ - Paul Johnston: KW-1 Brochures
(High Quality Reproductions)

KW0L - Frank Baker: 800Hz Filter for S-Line

W8RO - Floyd Soo: Video Tapes and Peak Reading Wattmeter Conversion Kits

The Vibroplex Corp - Betsy Hopson WB4ZYK:
Limited Edition Vibroplex Belt Buckle

K0DAS - Rod Blocksome: Art Collins Radio Wizard Books signed by the author

WA3CEK - Jim Stitzinger: Collins 50 Year Anniversary Paper Weight and Coins

K3ICH - Charlie: 75A-4 Dekaware knobs, Aluminum knob inlays, and 75A series Drum Overlays

If you missed this years banquet, you should make plans to attend next years event.

On the Workbench

by Dutch Maurer, WB7DYW
wb7dyw@mail.ev1.net

Lately you have stopped using your KWM-2 because everyone tells you you're off frequency. Here is one of my favorite fixes, take the rig out of the cabinet and turn it upside down and locate turret E60 (almost in the center of the rig) next locate G-A (about 5 O'clock) you will see a white wire with a RED stripe going to the PTO, put a DC voltmeter from their to ground, turn the microphone gain off and key the transmitter, if you see a shift in voltage (should not be more that 1/2 volt) then this little fix is for you.

Go to your local parts house and get a 150 volt 2 watt Zener diode, a 22000 ohm 1 watt resistor (red red orange) & a 470 Ohm 1 watt resistor (yellow purple brown), disconnect the white with red stripe wire from the turret (G-A) and connect the Zener from the turret (G-A) to ground be careful to get the diode in the correct way (small arrow with the line on top goes to the turret) next solder the 470 ohm resistor to the same spot on the turret and connect the other side of the 470 ohm resistor to the now loose white & red stripe wire going to the PTO cover it with shrink wrap or tape. Next locate the 1500 Ohm resistor (Brown Green Orange) also connected to G-A on the turret and replace it with the 22000 resistor, now check the voltage again for any shift, you should see very little shift of voltage or none in any case put the rig back on the air and start enjoying your KWM-2 again. If you have any questions or need further help please let me know, you can reach me at wb7dyw@ev1.net 

At The Mic

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

Well, Dayton has come and gone again. It was a GREAT get together! The Holiday Inn Fairborn took good care of our group, as they did last year. Plans are already in place for Dayton 2004.

As most of you know, the Hamvention (It hasn't been called the Dayton Hamvention in years!) should be held at Hara Arena for another 5 years. Word came out Sunday morning that a new deal was struck with Hara, so it looks like we'll be going back to Dayton for the next 5 years. I, for one, am glad. It would take too long to get used to "Dayton" not being in Dayton! For details of our Dayton event, please read my "Dayton Report" also in this issue.

I want to acknowledge the CCA Board of Directors. The present Board of Directors consists of Sandy Meltzer, KW6KW; John Bess, WA5VVT; Tony Sokol, W9JXN; Robert Turner, W5APN; and I. Jack Mory, KE3WV is our Membership Secretary and Jim Green, WB3DJU is our Treasurer. I would also like to thank Gayle Lawson, K0FLY; Peter Lower, VE3KWM; Larry Saletski, WA9VRH; and Mac McCullough, W5MC; for serving on the CCA BoD in the recent past. Without dedicated volunteers like these, the CCA would not be able to function.

We held an annual board meeting while we were in Dayton and took care of a great deal of CCA business. A well-deserved pat on the back goes to all involved this year!

It is with great pleasure that I announce the appointment of Gail Scheiber, K2RED, as our new Editor of the Signal. Gail is a CCA member and is the Managing Editor at CQ Magazine. Gail brings a great deal of expertise to the table and will work with Sandy in the production of our quarterly newsletter. She will be looking for interesting Collins Radio related articles for The Signal. If you can help in that regard, please contact her! Gail can be reached at: REDCQ@aol.com.

While we're on the subject of articles, one new column that I will help kick off is one about the personal experiences of CCA members that used Collins Radio gear in the military, commercial, aviation or space service. It will be called "Collins Radios At Work". I have already had a few members send along some of their stories to me. I think these real life stories will be very interesting to other members, so if you have used Collins Radio equipment outside of Amateur Radio, why not jot down your story and share it with the other members of the CCA? For now, send any submissions to this column directly to me at: floyd@hi-rescom.com.

While we're on the subject of submissions for the Signal, if you have a nice picture of yourself sitting in front of your Collins Radios,

send one along to Sandy for inclusion in our newsletter! It's always fun and interesting to see the faces and the shacks of the people I talk to on the air! Sandy's new e-mail address is: kw6kw@comcast.net.


Also in this issue of The Signal, you will see a "Call for Nominations". Of course, this is a very important responsibility for CCA members. This is where YOU get to exercise your rights in the voting process. When you nominate and vote for prospective officers of this great organization, please bear in mind several important factors. First and foremost, nominate and vote for people that are competent and responsible for the position they are vying for.

Second, this is not a popularity contest. Just because someone is heard on the nets a lot (or you see them active on the internet) does not necessarily mean that they are competent to serve as an officer of the CCA. Try to get to know your nominees and subsequent candidates to see if they'll really do the job!

Last, but not least, VOTE! When the ballot arrives, vote for the person(s) that you really believe will do what it takes to keep the CCA moving forward.

Make no mistake, our volunteers WORK! There is plenty to do, and never enough time or manpower to do it with! For all of you potential nominees, please understand that this is a 2 year commitment to the CCA if you are elected! It's hard work, but it is rewarding. I am not trying to discourage anyone from running, on the contrary, I want to ENCOURAGE as many qualified people to run and be elected as possible! The CCA will benefit from it! I just want prospective officers to have a realistic view of what will be expected of them for the duration of their term! If you have the time, qualifications and energy, WE WANT YOU!

We are in the midst of summer now. With all the vacations and other outdoor activities, as well as the days being so long, our net participation is down a bit and that is typical. We've seen this every summer since the Collins User Net began in 1988. If you have a few minutes to spare, please check in and say hello, even if you can't stay for the bulk of the net.

When Fall arrives, kids go back to school, the vacation season ends, the participation will go back up. I mention this because our CCA NCOs try hard to guard our net frequencies at net time. If there are little or no check ins, it makes the NCO's job very difficult. So if you have a few minutes to spare during the vacation season, please check in and say hi! I do whenever I can, whether it is from home, my truck or my boat, I will take the time to check in and say hello to the gang. Hope you will too! Catch you on the air! 73 de W8RO 

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

In the Shack



Floyd Soo W8RO, President of the CCA

Please send us your shack photos for future publication. Send us a high resolution photo ...with you in the photo and a brief description. Email them to kw6kw@comcast.net.

Subscribe to the Collins Reflector...a FREE e-mail mailing list of over 1200 Collins users and collectors! Visit the CCA web site for complete information!

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

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Tony Sokol, W9JXN, Vice-President
Sandy Meltzer, KW6KW, Vice-President
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James Green, WB3DJU, Treasurer

The Signal

Gail Scheiber, K2RED, Editor
Sandy Meltzer, KW6KW, Production

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The Collins Collectors Association
P. O. Box 354
Phoenix, MD 21131

www.collinsradio.org

Call For Nominations!

by Dr. San Hutson, K5YY

The Collins Collectors Association will be electing two members to its Board of Directors during the month of November. Board members whose terms expire are Tony Sokol, W9JXN and John Bess, WA5VVT.


The Nominating Committee will coordinate nominations and elections and is chaired by Dr. San Hutson, K5YY, longtime CCA member and former CCA Board member.

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 K5YY by mail, telephone call or email. 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 the Signal 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 Tuesday, 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, Sunday.

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. All ballots will be submitted to Dr. San Hutson at POB 705, Springdale, AR, 72765. This is the same address for initial nominations and seconds and bio submissions. As mentioned, nominations, seconds and bios may be emailed to k5yy@tcainet.com. Emails are preferred to telephone calls for obvious reasons. 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. 

Dayton Report 2003

by Floyd Soo, W8RO - President CCA

Well, another Dayton Hamvention has come and gone. It sounds like there will be another Dayton Hamvention next year (and possibly for 4 years following). Rumors abounded before this Hamvention that this year may be the last in Dayton, as the contract to hold the Hamvention at Hara expires with this event. Well, Sunday morning, the word (and new applications for Hamvention 2004) was out that a new 5 year deal was sealed. Let's hope that is the case!

In any event, the CCA gathering at the Holiday Inn in Fairborn was a huge success! Kudos go out to Tony, W9JXN, and his crew of volunteers for a job well done! I have heard comments from CCA members old and new that they had a fantastic time at the hospitality suites, Banquet and general membership meeting. Many members visited the CCA booth in the Hara Arena and then made the rounds to the HI-RES booth the next isle over. As Peter, VE3KWM, would put it, "Great Stuff" happening!

CCA members have also been invited by the QCWA to join them on an Alaskan Cruise in late August, 2005! This is their 2005 Convention and Cruise. This cruise will depart Seward, AK; visit College Fjord, Glacier Bay, Sitka, AK; Juneau, AK; Ketchikan, AK; the Inside Passage and conclude in Vancouver, BC, Canada. For more info on options and pricing, contact Larry McCalvy, WA9JMO at:

wa9jmo@wi.net or (262) 639-7327, and be sure to tell him that you are a present CCA member!

Both the Board Meeting and the General Membership Meeting went just great! Lots of positive vibes, lots of good discussion and lots of business taken care of! The meeting minutes will appear in the next issue of the Signal.

Our Friday night Banquet was the talk of the CCA members that were fortunate enough to attend. The food, libation and service were excellent. After the meal commenced; Gene, K1GD, this year's Prize Chairman (and his volunteers), began drawing tickets to give away the numerous prizes that he had collected. The Prize drawing went smoother than in the past, as Tony, and team came up with a slightly new scheme that made that process several times faster! In addition, there were awards to certain CCA members that stepped up to the plate and donated precious time and energy to make our organization one of THE best in all of ham radio!

To top that off, there were two fantastic presentations put on by Ted Craven, W5USI, and Rod Blocksome, KODAS. Ted had spent part of his career as a Field Service Tech for Collins, covering the entire country! This gave him a tremendous opportunity to get to know Collins Radio Co. and the Collins ham gear! He had some really interesting stories and anecdotes to share with the folks in attendance about his experiences. He also brought along some entertaining correspondence that he

had acquired during his career at Collins. Very enlightening and every entertaining!

Rod has worked for Rockwell/Collins for the past 35 years. He has had his hands into all kinds of things during his career at R/Collins. Some of you may know him as the "curator" of some historical data (serial numbers, production runs, variations, etc.) for certain Collins rigs. Rod has also been the point man at R/Collins when they have hosted CCA gatherings in Cedar Rapids (in conjunction with the C.R. Swap). The CCA has visited R/Collins HQ several times and toured Comm Central, the Antenna Farm, the museum, the two club stations and some production facilities there. He also helped organize the activities at the Longbranch Hotel, our base of operations and where we stayed. Rod's presentation was on his (and Tom Vinson's, NY0V) involvement with the search for Amelia Earhart's plane! What a great story. They didn't find the airplane this time around, but they plan on going out again later this year. Hopefully, at the CCA 2004 Banquet, he'll finish the story and tell us about how they found that airplane 3.5 miles below the surface of the Pacific Ocean near Howland Island! Another GREAT story!

Anyway, we wrapped the banquet up with the handing out of Door and Grand Prizes. The prize donors and Grand Prize winners will be posted in a separate message. Once again, sincere thanks to each and every person that assisted in making the 2003 event, one of the best EVER! 