The SIGNAL
Collins Collectors Association

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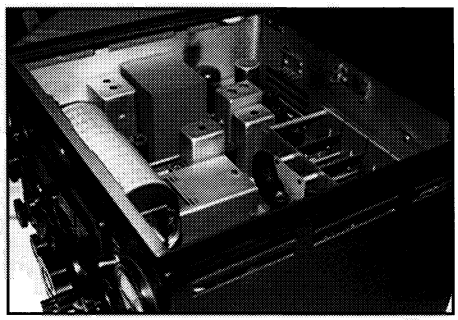
# A Brief History of Collins-Canada - Part 2

by Peter Lower, VE3URO



51J-5...made in Canada

### The 32MS-1

Jim Riach, VE3DSR, who joined Collins in 1959 as an engineering technologist, recalls that his first assignment was the 32MS-1, a four channel, HF SSB transceiver designed for commercial applications. Based on the 32RS-1, a successful, one-piece fixed station design, the MS-1 was a two-piece mobile station with a separate control unit consisting of a telephone-style handset, push-button channel selector and switchable mode selector capable of operating single sideband or "AME" (AM equivalent). If this design concept sounds familiar it is. A number of current generation mobile rigs offer detachable control heads with the bulk of the radio in the trunk or under the seat. The MS-1 offered a choice of four power sources -- 12VDC, 28VDC, 115VAC and 230VA. It also incorporated a crystal oven providing frequency stability and eliminating the need for a user-adjustable "clarifier". Jim recalls Art Collins arriving to tour the plant and look at the MS-1 prototypes.

## In this issue...



"He was a distinguished looking, grey haired man who took a great interest in the work in the plant. He was very hands-on when it came to the products made by his company and not too much got by without his stamp". This was certainly true of the 32MS-1 which was based on a proven design but whose reconfigured look wasn't to Art's taste. Jack MacQuarrie, VE3AWY, commercial product line manager at the time, recalls that the boxy cabinets of the prototypes didn't impress the man whose company had recently dazzled the world with the release of the S-Line. "We argued that orders for the radio had already been received from a number of clients, including the U.S. Navy", says Jack, "but Art was adamant". "Cancel them", he said. "You're not putting my name on this radio." With that he flew back to Cedar Rapids taking a set of drawings with him. A few weeks later the project engineer got a phone call. It was Art. "Pack a few shirts and get down here." He did just that and the two of them went to work until the design met with Art's approval. The 32MS-1 subsequently went into production and did very well over the next few years.

### The 51J-1

The 51J series of general coverage receivers came on line in 1949 sold extremely well in the commercial, military and ham markets. The 51J-4 (1957) with three plug-in mechanical filters was a great radio by anyone's standards. What it didn't have, however, and what it's ham-band cousin the 75A-4 did have, was full SSB capability. It's a little-known piece of Collins history that before the introduction of the 51S-1, there was another radio designed and built by Collins-Canada that was intended to be the general coverage equivalent of the 75A-4.

Walter Bratsberg was a young Norwegian engineer who studied at the University of Illinois and the State University of Iowa in the early 1950's. He got a job at the Turner Microphone company which at the time had a contract from the nearby Collins Radio Company to build their fast-selling 51J-3's. So Walter got to know the J series radios pretty well before family obligations pulled him back to Norway in 1954. About a year later he got a call from "Jock" Giacoletto, the new director of engineering at Collins-Canada. Giacoletto offered him a job in Toronto. Bratsberg arrived at the newly-opened Bermondsey Rd. plant in January of 1956 and set to work on military UHF radios like the ARC-552 and later the 618Y-1 (ARC504). Meanwhile, in another part of the plant the 75A-4 production line was turning out the last of these illustrious radios. There was no design work required on the A-4's of course but one day Giacoletto called the young engineer into his office to say they'd received authorization from Cedar Rapids to design a general coverage version of the 75A-4. The new radio was to be called the 51J-5.

Bratsberg worked hard on creating a design for this "best of both worlds" radio and was gratified when the go-ahead was received to build engineering prototypes. But as the J-5 was poised to make its debut, fate intervened to cut short the life of the new radio. The S-Line had been introduced in 1958 and was a runaway success. Then, in 1959, the 51S-1 appeared incorporating everything slated for the J-5 into a stylish and compact S-Line style cabinet.

Superseded by time, technology and the marketplace, the 51J-5 project was quietly shelved but happily, not before three complete and fully operational engineering models of the radio had been built. According to Bratsberg one of them went to the Canadian military, another to the U.S. Navy and the third he took with him when he left Collins-Canada in 1973. He has the radio to this day and has refused all offers to buy it.

### The S-Line and KWM-2/2A

When the 75A-4 production line was shut down in the fall of 1959 there was no further production of Amateur gear at Collins-Canada until 1977 when the KWM-2 and 2A and the S-Line went into production. S-Line production in Cedar Rapids had been shut down in early 1976 and arrived in Toronto after a year of production in Dallas.

*(continued on page 4)*

# Basic Trouble Shooting

**by John Bess, WA5VVT**

The first place to start in the process is to make a list of the problems, get out your copy of the manual and read the Theory of Operation. You need to take notes on the following items: 1.What is the frequency of each of the various oscillators? 2.What two frequencies are mixed in each of the mixer stages? 3.What is the resultant output frequency? and, 4. Is any one of the crystal frequencies doubled in the oscillator it self? (Make notes on which bands this occurs).

Next, get out the block diagram and then familiarize yourself with the signal path from each oscillator through the mixer stages. Once you understand what is supposed to happen inside the rig when it is working properly, you can then determine what is not working. (Or we can get closer to the problem.)

Now, what do I need to do this? It would be nice if you had a digital signal generator, frequency counter, digital multi-meter and an oscilloscope. But you don't need all that stuff. You will need a good V.O.M (Volt Ohmmeter, D.V.M (Digital Voltmeter) or a V.T.V.M (Vacuum Tube Voltmeter) and another rig capable of receiving from 455 KHz to 30 MHz. This could be an old boatanchor or one of the newer digital rigs. You also MUST have a new set of spare tubes. Now lets fix that rig.

One at a time change the tubes and see if changing a tube changed the items on your problem list. Remember, do this one at a time NOT all at once. If the problem went away and the rig works, then you are finished and congratulations on fixing the unit.

If problems still are present, you need to get deeper into the block diagram.

Check the oscillators next. Are they working? How do you know? If you have a frequency counter go to the other side of the coupling capacitor and read the frequency. (Oops, you will have to look at the schematic). If you are using a receiving device then hook up a convenient length of RG-58 to the antenna jack of your receiving device. Strip about 1/4 inch of the insulation and shield off leaving an insulated wire extending past the shielded part. This is your frequency sniffer. It is also a good idea to tape or put some heat shrink tubing over the raw end of the "sniffer" and any exposed braid. You do not want to short anything out and make the problems worse and/or mess up your new FT-1000 receiving device.

Tune the receiving device to the oscillator frequency and put the "sniffer down into the oscillator circuit or close to it and see if you can hear the oscillator signal. Remember that every oscillator is a low-level transmitter. Use the S-meter as a field strength meter. If that oscillator is working move on to the next one and do the same thing. If you find that one of them is not working then you have probably found your problem.

Now, you must determine what is wrong with the circuit. Is it a bad crystal, no crystal (should have checked to see if it was there first) a burned component, two wires shorted together, a cold soldered joint or no connection? Is it possible that some "skilled technician" installed the wrong value (A 47K resistor rather than a 47 Ohm)? Don't laugh, I did this myself just a few weeks ago and it took a while to find the "NEW" problem.

In addition to those components and obvious problems you should also check out any RF chokes in the circuit. Use your D.V.M., V.O.M., or V.T V.M. to do this. The choke should show some resistance. If it doesn't, then it is open and needs to be replaced. The question is however, why did it open? The answer is that something went to ground (or close to ground) after the choke. This could have been a shorted tube, capacitor or anything on the circuit that could have gone to ground. Maybe someone prior to you shorted it to ground by accident. Look closely at all leads etc. Check the tube side of the choke for resistance to ground. This should be high. Check the resistance chart in the manual (with the choke open the resistance should be higher than that shown in the manual). If the choke shows resistance, how much should it be? Check the parts list. Sometimes the resistance is given as part of the component description. If not, then Look around there are probably more of the same kind (same value) in the rig. Check them to get an idea of what its resistance should be. If it is considerably lower (10 Ohms rather than 56) then it needs to be replaced. Here again, why did it go low? Use the same procedures as before. After doing all of the above and it is still not working, what to do next? My suggestion is " If confused or in doubt run in circles, scream and shout". Well, you might want to take a break. Go get yourself a cool drink or cup of coffee, read the manual again, look at the schematic and review the block diagram. Darn, I forgot to check to see if there is voltage going to the circuit! That's a good idea. Why didn't I check that first and save all this time? Well, that's a matter that can be discussed by many and there will always be two opinions. I prefer the visual inspection first and I like to get in there and poke around before I get to more serious stuff. I have fixed many problems this way and I am set in my ways. If the voltage is not there then there is an open circuit some where between the circuit and the power supply. Start at the power supply and work toward the non-working circuit. It could be that the relay contacts are not making a good connection or a switch. Spray them with a good cleaner that leaves NO residue. Then check them out with your meter to see if there is continuity (this is a big word that means are they making contact now?). Make sure you don't use something like WD-40 any where in the radio. Oops, I will catch some flak on that one. But I will leave the reasons for another time. Speaking of time, Michael just gave me the sign. We will pick up in the next issue.

73 John, WA5VVT

**CCA Hot Line**

507-282-2141

Sorry, no call-backs available!

The CCA web site can be viewed at:

**www.collinsradio.org**

## 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.


# At the Mike with KW6KW

**Sandy Meltzer - President, Collins Collectors Association**

Space is limited, but I want to take this opportunity to thank our CCA Nominating Committee Peter Lower VE3URO (Chair), Gayle Lawson K0FLY and Dr. Dirk Scholten W8IQX for the fine job they did soliciting for and collating nominees for the two Board of Directors positions now up for election. Great job guys. Please take a few seconds to complete, fold, and mail the CCA election ballot included with this Signal. Election ballots must be returned to the address indicated on the ballot on or before October 20th in order for it to be included in the final count. The winners will be announced on the Tempe/CCA Collins reflector before the end of October and on all of our weekly CCA radio nets.

73 Sandy, KW6KW

# Editor's Operating Desk

**by Michael Crestohl, W1RC**

Hi Everyone. First of all thanks for the kind messages of encouragement - it's nice to know that my efforts are appreciated.

Now on to a more serious subject. Don't read this if you have a weak stomach or get upset easily. Last June 4th and 5th I was at the Rochester (NY) Hamfest which has been an annual haunt of mine for over thirty years. While wandering about in the flea market at 6:00 AM I spotted a pile of RE Collins KWM-2As, 30L-1s, 312B-4s and 516F-2s laying on the ground. They had been unceremoniously and systematically beaten with a small sledge hammer. One of the M-2s had been hit square in the front; another on the top of the slug rack and a third dead on the power amplifier cage. A crowd had gathered and animated negotiations were in progress. Hmmm, yeah, I want one too! In and amidst the confusion one fellow pulled a wad of cash from his pocket and managed to convince the overwhelmed and slightly befuddled seller to give them all to him for the proffered sum which I found out later was $700.00.

As the lucky buyer busied himself carrying away his trophies I took a closer look at these unfortunate radios. Most of the KWM-2As had sustained direct blows to the slug rack, PTO assemblies as well as the power amplifier cage. I figure he'd be able to make a couple of workable units out of the lot - but with a lot of time and effort. Whatever the case they'd be good for parts if nothing else. I offered to buy one of each unit from him but he wasn't interested in selling anything there and then. He beat a hasty retreat and kept a low profile for the rest of the flea market as I suspect he didn't want to discuss anything with anybody.

After the crowd had dispersed, grumbling about the guy who "bought them all", I wandered back to have a chat with the seller. He was unloading more stuff and I spotted a lone 516F-2 supply that had taken a couple of whacks and had its' cords cut. He wanted $20.00 for it. So at least I got something! I asked him where he had come across this pile and he told me he got them from somebody who works at the Tobyhanna Army Depot in PA. Tobyhanna is a storage and repair facility for electronic equipment well known to many hams in this part of the country. Their DRMO sales sheets used to feature lots consisting of nice R-390As, KWM-2As, even cool spy radio sets like the RS-1 and RS-6, M-209 crypto machines and other very neat things. A lot of us got great things from Tobyhanna. However for reasons unknown in the past couple of years the government in its' infinite wisdom has decided it is better to "demilitarize" all radio equipment lest it fall into the hands of enemies and terrorists. I'd heard about this independently from Mike Baranowsky and Jim Williams, both surplus equipment merchants and good guys to deal with. In past years they both had overflowing tables at Dayton but in recent years pickings were slim. This power supply is visual evidence of that policy.

Whoever swung the hammer either wasn't very capable or intelligent about doing his dastardly work. The only damage the unit sustained was a crumpled bleeder resistor cage and one of the bells on the small choke that sits behind the two rectifier tubes was dented. The two tube bases were still in their sockets but the tubes were obviously smashed to smithereens in the attack. From looking at this unit I am guessing that it was in very clean condition until the day came for its' execution when it was casually piled up with other unfortunates to be "demilled". It probably spent most of its' working life on some military base or perhaps in an embassy somewhere. Judging from the heat marks above the rectifier tubes it had seen little use. The cabinet had a few scratches but no dents. There was little dust on the chassis. I jury-rigged a power cord and plugged in two new rectifiers and, you guessed it, the supply worked perfectly. When I get time I'll make up a new cable set and I'll have a nice spare 516F-2 supply for $20.00 and a few hours work.

Who can figure the mind of a bureaucrat? What possible justification can there be for this desecration of this fine equipment? It cannot be for security reasons, or can it? This equipment was freely available back in the 1950s and 60s and the stuff never was classified. Today anyone can buy a much more modern compact HF radio set on the open market so keeping it out of evil hands surely cannot have any validity. It just strikes me that the authorities responsible for getting rid of unwanted and unneeded equipment are just too lazy to go through all the steps required by law to sell it. In other words it's just easier to smash the stuff. What an outrage!

I have written to Senator Leahy (D-VT) asking him to look into this. Sen. Leahy is no real friend of radio enthusiasts (remember the ECPA of 1986!) but he was seen publicly after the terrible Ice Storm of 1998 lauding and thanking the radio amateurs here in VT for their fine work providing communications during the long emergency. In addition I have also contacted the Public Affairs Officer at the D.R.M.S. (the government agency responsible for disposing materiel that is no longer needed). We had a long talk (on Uncle Sam's nickel!) and I explained the situation to her and I believe she understood what I was saying. She said she'd look into it and let me know the rational and reason behind this outrageous policy. I told her I see no reason why this equipment cannot be given to us hams so we might have it available for future emergencies. It's much better than the alternative!

If this editorial outrages and angers you too - good! That's what it is intended to do. Write your elected officials (at least the ones that can read) and ask them why this is being done? Demand an answer. Next year is an election year and many of these bozos are now thinking about getting themselves re-elected so some of them may actually be responsive. Emphasize the public service and emergency preparedness aspect of our hobby. I don't hold out much hope, friends, but we can't just sit there and let our beloved radios be violated and desecrated under a moronic government policy that makes absolutely no sense to any thinking person, Collins radio enthusiast or not! As my good friend Tim Smith WA1HLR would say "I'm just so yellified....I just don't know!"

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W1RC/VE2XZ Editor, THE SIGNAL

# W0CXX/MM

W0CXX will take to the high seas on Nov.6th leaving from Ft. Lauderdale aboard the luxury cruise ship CENTURY. Chief Radio Operator Bill, N2YON and other operators will be QRV Sunday, November 7, at 2000Z on 14263 kHz for the Sunday CCA net. Certificates will be issued for all confirmed contacts. Look for W0CXX/MM daily starting at 1500Z between 14260 and 14280 kHz. QSL information will be posted after the cruise.

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# A Brief History of Collins-Canada - Part 2

*(continued from page 1)*

"The new radio was to be called the 51J-5"

Arnold recalls the day when the first KWM-2 came off the line at the Bartley Drive plant in June of 1977. "I went up on the roof and strung a 20 meter dipole while Joyce set up the KWM-2A in the middle of the production floor. We made contact with Dave Jaksa, W0VX, the program manager at Cedar Rapids and had a good QSO." "We were celebrating the first KWM-2 coming off the line in Toronto and I remember the QSO well", recalls Dave, who retired from Rockwell-Collins in 1998 after 30 years with the company. When asked about the number of KWM-2's, 2A's and S-Lines produced at the Collins-Canada facility, Dave re-confirmed what many have discovered while trying to dig up production numbers. "To the best of my knowledge, the company did not release specific numbers of units built nor were amateur product serial numbers consecutively assigned."

In addition to the KWM-2 and 2A's, 312B-5's were also produced along with the complete S-Line including the 75S-3, 32S-3, 312B-4 and B-3. The superb table-top linear, the 30L-1 was built as was the 180S-1 antenna tuner and the 516F-2 power supply. The Canadian-made KWM-2's, S-Lines and accessories were tagged with the Round Emblem. Unlike the 75A-4s, however, these Toronto-made grey boxes were not identified with a "Collins Radio Company of Canada" stencil on the rear of the cabinet. There is some evidence that a letter "T" following the serial number on the silver stick-on tag was an indication that the unit had been built by Collins-Canada.

### The Eighties

S-Line production came to an end in Toronto in 1978 and in El Paso a year later as the KWM-380 came on line in Cedar Rapids. The Collins-Canada operation was now a division of "Rockwell International's Collins Defense Communications Electronics Operations" reflecting, of course, the takeover of the Collins Radio Company by Rockwell International in 1971. The focus was now entirely on commercial avionics, air traffic communication control systems and military HF communications systems such as the HF-80. The HF-80 was a flexible, computer controlled HF single sideband communications system featuring remote controlled transmitters with power outputs of one, three and ten kilowatts. They also went mobile/portable via the TCS-4100 communications shelters.

Developed in the mid-70's and first delivered to Supreme Headquarters of the Allied Powers in Europe ("SHAPE"), the HF-80 marked a successful final chapter in the history of Collins-Canada production. These systems were comprised of HF-80 receivers, exciters, controls and pre-selectors; HF 80 power amplifiers and power supplies; HF-80 system racks and assemblies and the HF-8040 antenna coupler. These systems went into production in 1979 and were being produced when the plant closed its doors in 1991.

These sophisticated communications systems sold well both to commercial and military end users with over 100 million dollars in sales recorded during the 1980's. Using rotatable one hundred foot diameter log periodic antennas tied to a ten kilowatt transmitter these systems provided excellent ground to air/air to ground communications from North America to Europe and had no trouble overcoming whatever propagation variables or QRM that might be thrown their way. A number of the three kilowatt versions were sold to Argentina just prior to the Falkland's War to back up an unreliable provincial telephone system.

It was during this period that Collins-Canada produced the highly regarded solid state receiver, the HF-2050 which was build under contract to the Canadian armed forces. It is estimated that 800 to 1000 of these radios were built with many recently finding their way into the hands of hams and SWL's.

The Collins-Canada subsidiary employed some 625 persons during it's peak production years during the 1970's and 80's. Its nearly forty years of operations as a development, engineering and production facility from the early fifties through 1991 provides an interesting and informative sub-plot to the main story of the Collins Radio Company. Its success in producing quality commercial, military and amateur products stands as proof of the remarkable engineering and manufacturing standards developed by Collins which could be transported to and re-created outside of the primary production facility. The fondness with which former Collins-Canada employees speak of the company is testament to the enlightened leadership of its founder, Arthur Collins, who understood that the achievement of his goal of "more perfect communication" required not only the electronic marvels designed and produced by his company, but also the spirited commitment of the individuals who created them.

Special thanks to: Deric Affleck, VY2DA, Walter Bratsberg, Gene Duprey, K1GD, Arnold Ferguson, VE3AZF, Dave Jaksa, W0VX, Doug Joyce, VE3MV, Jack Law, Jack MacQuarrie, VE3AWY, Mike Fothergill, Jim Riach, VE3DSR, Gene Robinson, N5LDX.

# In the Shack

"The Voice of the White Mountains"
Leonard "Joe" Nyberg, W1UN

I have two "shacks". This is my home station from which I operate almost daily during the Winter months. The primary rig on SSB is my "Gold Dust Twins", backed up by the "S" line which I use a little less frequently. For 75 meter AM I use the 32V-3 paired with the 75A-2 and for 160 meter AM I use the Viking Valiant. Note that I use the RCA 77DX Ribbon Microphone fed through a homebrew pre-amplifier for AM work. Both the 32V-3 and the Valiant have been modified slightly to improve the audio.

About mid May we move south to our Summer residence on Newfound Lake. My "Summer rig" is a Collins KWT-6. I can generate about 500 to 600 watts out with that rig, the only drawback being that it sounds kind of like a Hoover when it gets fired-up. One possible advantage is that the noise of the fan frequently covers up band noise; also, it may be possible to connect a hose to the power supply vent fan and vacuum the living room floor. Seriously, its communication quality audio breaks through a lot of pileups on 20 meters. I have been a Collins user since my novice days and enjoy the gear very much.

Thanks for the opportunity to share my equipment with you.

Send us a picture of your shack, along with you callsign, and any shack information and we may use it in a future issue of the *Signal*. Just mail it to the CCA address.