

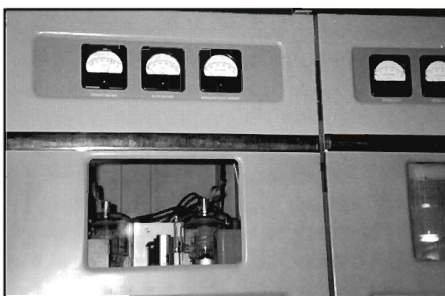
The Collins AN/FRT-24 Transmitter

by Russ Miller, WA3FRP

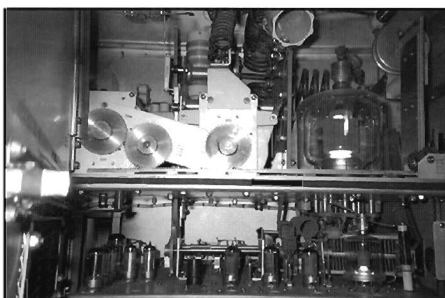


Collins T-440/FRT-24. The modulator, with dual 4-400A's can be seen through the upper left window. The RF Assembly is on the right. You can see the 4-1000A in the upper right window.

This Collins AN/FRT-24 came to me by chance in 1974. A local ham radio operator, with whom I shared an interest in RTTY, was changing his hobby and wanted to dispose of all of his equipment. By the time he called me, all of his equipment was spoken for except his transmitter. He told me that the transmitter was too big for most hams' shacks. He also related that he was turned down by



Window of the Modulator Chassis.



Inside the RF Assembly.

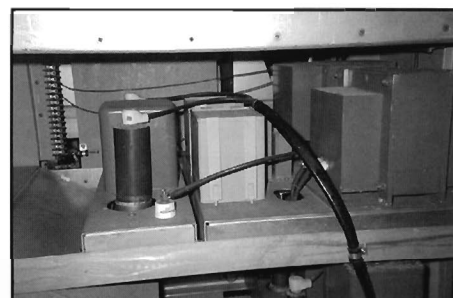
a number of East Coast outfits that specialized in surplus equipment. It was simply a case of size and weight. I assume that this Collins transmitter could have ended its life in a landfill if I didn't express immediate interest.

The Collins Radio Transmitting Set AN/FRT-24 was manufactured by Collins Radio for the Department of Navy under contract N0bsr-57357 starting in the middle 1950s and is composed of eight major units. Three major units—Radio Transmitter T-440/FRT-24, RF Oscillator O-243/FRT-24, and Power Supply PP-454/FRT-5—are contained in two cabinets which you can see in the accompanying photo. Transmission Line Coupler CU-390/FRT-24 and Transmitter Control C-1362/FRT-24 are each housed separately. Telephone Set TA-267/U was the only major unit that I did not purchase in 1974. Fortunately, I was able to locate and purchase this unit in an online auction a few years ago.

This transmitter, also offered by Collins as a commercial product designated 432-D2, is capable of operation across the 2 to 30 MHz frequency range with nine crystal-controlled channels and tuned by Collins 96W series electromechanical positioning systems. A tenth channel is derived from the Collins O-



RF Oscillator O-243/FRT-24.



Rectifier Chassis and Filter Chassis.

243/FRT-24 electromechanically stabilized master frequency oscillator. Power output in excess of one kilowatt is possible for AM and CW. While the transmitter was originally designed for FSK, this feature was not ordered and the 709E-1 Frequency Shift Oscillator accessory was not installed.

The RF assembly portion of the T-440/FRT-24 is divided into a crystal oscillator and buffer, two multiplier stages, a 4-65A RF driver, and a 4-1000A power amplifier, a bias supply, an exciter voltage regulator, a keyer assembly, and an Autotune system. The modulator assembly, consisting of a pair of 4-400 tetrodes biased for Class-AB operation, is enabled for AM operation.

The O-243/FRT-24 is a very stable automatically frequency controlled oscillator that contains a total of 27 tubes and covers a frequency range of 2.0 to 4.2 MHz. It employs a master oscillator and amplifiers in conjunction with automatic frequency control circuits and a servo motor that maintains the frequency output of the master oscillator constant.

The Power Supply PP-454/FRT-5 is used to supply the plate and filament circuits of the O-243/FRT-24 R-F Oscillator.

(continued on page 2)

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AN/FRT-24 (continued from pg. 1)

by Russ Miller, WA3FRP WA3FRP@aol.com

The Transmission Line Coupler CU-390/FRT-24 is used to match unbalanced 52-ohm coaxial cable to a two-wire, 600-ohm balanced transmission line.

The Transmitter Control C-1362/FRT-24 serves a number of functions when the transmitter is operated remotely. The telephone dial allows the operator to set the transmitter to a different channel or type of emission, or to turn on or off its plate or filament circuits. A meter is provided to confirm the channel is properly selected. The Transmitter Control also provides the circuits and metering necessary to remotely operate the transmitter in either AM or CW mode.

The Transmitter Control has not been used for a number of years and will have to be recapped before it is placed back in operation. Everything else in the AN/FRT-24 Radio Transmitting Set is fully operational, including the Autotune system, which is a wonder to see in operation.

Since the FSK function was not originally installed on this transmitter, a homemade 1960s era frequency-shift keyer was installed on the T-440/FRT-24. Care was taken to assure that this modification could easily be removed to restore the transmitter to original as designed condition.

As mentioned before, the transmitter is quite large, standing 83 inches tall and weighing over 1500 pounds. Fortunately, I was having a house built in 1975, and two critical elements of the new house were adequate access and enough ceiling height to get the transmitter into the basement.

Once installed, this transmitter received little use from 1975 until I retired in 2004. The transmitter is now in regular, almost daily use in amateur radio service using RTTY. I've been able to work over 170 DXCC countries on RTTY over the past two years using this transmitter, along with a Collins R-390A/URR and a Teletype Model 28 ASR teleprinter.

I am looking for any information concerning the Collins 709E-1 frequency shift oscillator, an accessory for the Collins 432D-2 Autotune transmitter. If you have any information on this oscillator, please contact me at my e-mail address: WA3FRP@aol.com. Thanks. 73, Russ, WA3FRP



Transmitter Control C-1362/FRT-24.

The W0DAN Mobile Transceiver

by Rod Blocksme, K0DAS

Introduction

Last fall Dennis Day, W0ECK, donated to the Rockwell Collins Museum several artifacts related to Collins Amateur gear history. One item was a small homebrew transistorized receiver-exciter designed and built by Ed Andrade, W0DAN. The unit was well built but suffered some deterioration from many years of garage storage. Accompanying the unit was a mailing tube containing the hand-drawn schematic and chassis layout. The drawings were dated January 2, 1961 and had Ed's initials on them.

This caught my eye, since transistorized ham transceivers did not hit the market until nearly a decade later. I realized I had another example of Collins engineers pushing the state of the art, and I thought perhaps the Collins Collectors community would like a glimpse into the future from the perspective of 1961 Collins ham equipment designers.

Features

The mobile transceiver covers only 100 kHz in the SSB portions of the 20 and 40 meter bands—7.200 to 7.300 MHz and 14.250 to 14.350 MHz. This reduces the complexity considerably over the traditional 5-band design.

Circuit Description

There are two stages of microphone amplification using 2N466 transistors in each. The balanced modulator looks like early S-Line, as it is a diode bridge of 1N34A followed by a standard 2.1 kHz Collins mechanical filter (naturally). The 455 kHz IF signal is amplified by three stages using 2N274 transistors. Another 1N34A diode bridge mixes the 455 kHz signal up to the 2nd variable IF operating from 3.155 to 3.055 MHz. The VFO tunes from 2.700 to 2.600 MHz and uses 2N274's as oscillator and buffer stage.

A second transmit mixer stage (2N274) mixes a local crystal oscillator (10.355 MHz for 40 meters and 8.7025 MHz doubled for 20 meters) with the 3.155–3.055 MHz IF to the final operating frequency. Two tuned RF stages of 2N274's follow and provide 0.4 volts of RF across 50 ohms as drive for the PA stages in a separate chassis.

The receiver front end features a selectable pad feeding a 2N274 RF amplifier stage. Another 2N274 1st receiver mixer with local oscillator from the crystal oscillator produces the 3.155–3.055 first IF. A second 2N274 mixer follows and receives its oscillator injection from the VFO. The mechanical filter provides the IF selectivity at 455 kHz. After IF amplification, the signal is fed to a separate 1N34A diode bridge product detector where it is mixed with the crystal BFO (453.65 kHz for LSB and 356.35 kHz for USB). The AF amplifier is a 2N466 driving a 2N1184

driving a transformer-coupled push-pull pair of 2N1184's in the audio output stage.

The AGC circuit has a 2N466 driving a 2N466 as AGC amplifiers. 1N67A diodes are used for AGC delay and time-constant steering. A 0-to-1 ma meter serves as the S-meter in receive and can be selected to read PA grid current, plate current, or ALC voltage in transmit.

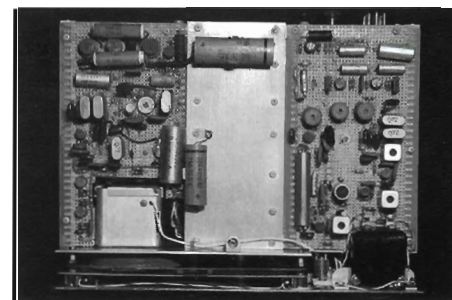
Power Amplifier

The PA unit apparently was in a separate chassis that would clamp together using the latches mounted on the sides of the receiver chassis. A note on the schematic indicates the PA was not transistorized. The note simply states, "Total: 24 transistors & 3 tubes." There must have been a dc-dc converter power supply for grid, screen, and plate voltages either separate or built into the PA chassis.

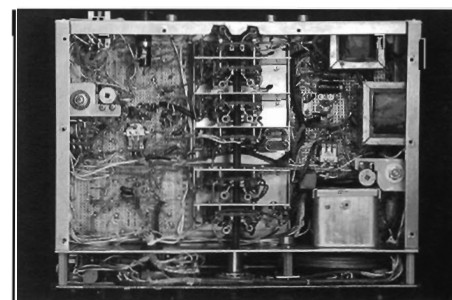
A similar and probably later version of this prototype appeared in an article published in "Electric Radio" by Harry Snyder, W7RN. This prototype covered three bands, 80, 40, and 20 meters, but otherwise carried similar controls and features. Oh, one additional tidbit. Ed always referred to this little radio as his "critter." Are there other prototype versions out there?



Ed Andrade's "critter" rig.



Top chassis view of the prototype mobile rig.



Below chassis view of the prototype mobile rig.


At The Mic

by Mac McCullough W5MC, President CCA

I would like to say thank you to each one of you who is receiving this issue of "The Signal," because it shows your continued support of the CCA and its ongoing viability. I also extend a warm thank you on two levels regarding the recent elections. First, thank you to all of those who chose to seek election to the Board of Directors (BoD) for seeking election to the board. Each person who ran for the board received a good number of votes. Second, thank you to all of the CCA members who cast a ballot in this election. There was a good voter/member turnout, with a total of 443 ballots received. The election resulted in three new CCA BoD members: Mac McCullough, W5MC, Pete Zilliox, K5PZ, and Jim Stitzinger, WA3CEX. The three of us, along with John Bess, WA5VVT, and Jim Green, WB3DJU (existing board members) will be the BoD for the next year. The new board elected me as president. Jim Green, WB3DJU, remains CCA Treasurer, and Jack Mory, KE3WV, stays on as CCA Membership Secretary. I am proud to report that Jim and Jack have served the membership well and have preserved the membership roster and fiscal integrity of the CCA.

The new board has already begun to communicate with CCA members. We started with some soft issues and are gradually moving forward with additional matters to be discussed to better serve us all. By the time you receive this issue of "The Signal," we will have crossed into our long-term goals of addressing issues and concerns related to the CCA.

It has been decided that the BoD will first announce its records of motions and resultant actions via the CCA Sunday 20-meter net, each week giving a recap of the prior week's board actions. At times some of this information may sound dull or mundane, but it is the intention of the board to remain transparent and open to the membership regarding its proposals and actions. Following the Sunday net release of board actions, we will post these actions to the CCA reflector every Wednesday. However, the principal goal is that our primary and initial mode of information dissemination be the Sunday 20-meter net. Therefore, for the latest news first, tune in to the CCA net on Sundays.

In closing, every board member is committed to you, the CCA members. We want you to receive as much as we can possibly provide for your membership. We also encourage your active interest in our hobby and the Collins equipment we all enjoy. Please, too, if you have the time and inclination to volunteer your services for the CCA, let me or any of the BoD know. We are open to your ideas and suggestions. Please contact me at w5mc@austin.rr.com. 

In the Shack



The radio shack of Jim Smith, VK9NS

The 75S-3 and the 32S-3 were both purchased in a non-working condition (I bought them from the US) but I was able to service both units. The 30L1 is very nice and I had in fact seen the unit whilst I was in CA a couple of years ago, but I was travelling in the wrong direction to purchase it then. In due course I bought it, and on switch on (after the usual checks of course) it promptly blew the line fuse. A disk ceramic was the culprit, pristine condition on top but a jet black largish hollow mark on the chassis side.

I have been on SSB since its early inception in the late 40's (see 1948 QST article) and never really went back to AM. My sideband equipment was all home brew. I did not actually own Collins equipment until three or so years ago (although it often crossed my professional path) when I made a decision to purchase a KWM 2 and power supply.

May I say that CCA has given me a great deal of pleasure and in particular several members have been extremely kind and helpful to me over the 3 years I have been a member. First licensed in 1947 as VS1BQ

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 Meltzer, KW6KW at kw6kw@comcast.net. 

Join Us on the Air!



- Sunday 14.263 mHz at 2000Z
- Tuesday 3805 kHz at 8pm CST
- Thursday 3805 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!

Bill Feldmann, N6PY SK

by Sandy Meltzer, KW6KW

My friends and I here in California were close to Bill N6PY for many years and we are deeply saddened to hear of his passing. We enjoyed Bill's gregarious personality and his great sense of humor. Bill was very knowledgeable about radio and electronics and was always anxious to share information with his fellow hams. When I started the CCA Friday Night West Coast Collins Net (3895) many years ago, Bill volunteered to help me run the net. Bill was there week after week, year after year, always there to check people in and to offer technical advice.

Bill's great signal from Palmdale has gone silent, but we will never forget him. :(

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Collins Radios At Work! Genoa Radio - 20 Years of Collins Receivers

by Lino Esposito, SWL 11-3152/GE <http://www.linoesposito.it/geradio.php>

Aboard a ship in the middle of the ocean, where the only contact with ground stations or home is via radio, radiotelephone or radiotelegraphy is the answer. In the city of Genoa, Italy, is Genoa Radio ICB. Many radio operators aboard ships have heard via SSB, "Here is Genoa Radio, radiotelephonic marine service, transmission for receiver tuning," or on CW, "VVV VVV VVV de ICB ICB ICB k8 12 16 MHz." In this way they have felt in safe hands, swapping messages with family or ship owners, and in cases of emergency, as well.

Genoa Radio is comprised of two stations, a receiver that can be found in the beautiful residential area of Genoa Quarto, and a transmitting station positioned a few miles away on Mount Righi, which overlooks the city of Genoa. The transmitters are in the majestic castle called "Castellaccio." At the receiving station, in addition to the receivers, there are controls for the directive antenna rotors and the CW board. The two stations are connected via cable and radio, and this controls the transmitters at Castellaccio with up to 25 KW. Many radio telegraphers and technicians work at both of the stations. They also have put in their time aboard ships. I, too, have been among them, transmitting and receiving messages.

After my various requests, I was authorized by the Ing. Malatesta of Roma, of Telecom Italia, to have access to the receiver station in Genoa, Quarto. There I met Mr. Mirra,

coordinator of the radio operators. He kindly helped me get in contact with some of the older radiotelegraphers. In this way I met Mr. Bruno Bassi, who said, "You are very lucky. I love photography and I have taken many photographs over the years when we used Collins receivers. I myself have always preferred and used Collins gear." He also added, "Collins . . . the best and the most reliable receivers . . ."


On SSB HF, there are ten 51S-1's and four 651S-1's. The radio operator and technician, Mr. Sergio Musante (I1SRG, ex-radio op on petrol stations of Texaco and collector of Collins R-390A's), told me, "Collins equipment never broke down . . . we never had to re-align when we had to change tubes or when we cleaned the golden contacts of the wafers. Only once in 1982 during a heavy thunderstorm right on top of the receiving station, the over-voltage of the power supply of the 220 VAC burned the condenser in the power supply." I1SRG went on to say, "I was lucky to unpack two 51S-1's with the Collins-Rockwell emblem. They were wonderful, so new and shiny. I will remember them forever"

The radio station was built in 1952, and the first receivers were BC-312's and BC-314's, which later were substituted by the Italian Allocchio-Bacchini OC-11's. However, the stability and selectivity did not compare with that of the 51S-1, and the operators appreciated working with the exceptional characteristics of that Collins rig. The

equipment was connected to vertical antennas supported by two giant support structures 60 meters high. The antennas exist today, in addition to Hy-Gain log-periodics.

For the emergency and international calling frequency of 500 kHz, the 51S-1's were connected to the 55G-1 preselector and were switched on 24 hours a day. The antenna was 600 meters long and 60 meters up in the air. They were the only receive antennas that could stand up to the interference caused by nearby broadcasting stations. The 51S's and 651S-1's were also used on 500 kHz, as well as for other Italian radio stations.

Recently, Genoa Radio transferred from the P.T. Ministry to Telecom Italia. The SSB and CW HF portions of the bands are now centered on Roma Radio. Genoa Radio is on CW 500 kHz, SSB 2182 kHz, and VHF FM on some repeaters. The station has also been refurbished and is beautiful. It is now almost completely automatic and computerized.

Toward the end of 1992, the last of the 51S-1's and 651S-1's were removed from service and replaced with Rhode-Schwarz receivers. The fascination I have had for Collins equipment led me to write this piece. I am grateful for having had the opportunity to contribute to the testimonials giving credit to the leadership and technology that gave rise to the legend of Collins Radio, which still exists in the world today. 

Dayton 2007

by Rich Sperling, WB3JLK
2007 Dayton Chairman


I'm happy to announce the time to make your Dayton plans has arrived. This is a pleasant thought especially if you're trudging through the winter as a lot of us are.

We will be headquartered at Holiday Inn North again this year. For those of you who attended in 2006 and filled out the reservation form for 2007, you are all set. For those of you planning to stay at the hotel for the first time this year, you should make your reservation as soon as possible by calling the Holiday Inn Dayton North: **937-278-4871**.

The room rate is \$125/night based on a three day stay with arrival on Thursday 5/17 and departure on Sunday 5/20.

Be sure to mention you are a CCA member to receive this rate.

**Holiday Inn Dayton North
2301 Wagner Ford Road
Dayton, Ohio 45414**

I'm looking forward to seeing everyone there. More Dayton information to come. 



With the wintertime band conditions, we are having many check-ins on the 75-meter Tuesday night net. The Thursday night net has been struggling since we moved to 3872 kHz, but I am pleased to announce that we are changing the frequency to 3805 kHz.

With the FCC revising the 75-meter band privileges in mid-December 2006, the General Class operators can now operate on 3805 kHz. We now have one 75-meter frequency on which to conduct our SSB nets. Mark your calendars and try to meet us on Thursdays.

The first Wednesday AM net continues to have a good turnout. It is amazing what these old rigs can still do - the audio quality is great! Please remember to check-in when the Net Control is calling for your time zone. With the unexpected and unfortunate passing of Bill, N6PY, we need an NCO for the West Coast, as well. A volunteer? Please contact

me, e-mail rafalla@charter.net

The 20-meter net is by far the most popular net, but band conditions can change quickly, so if Net Control isn't hearing someone, please relay in him or her. The first hour is for Buy-Sell-Swap and is a good place to find or sell Collins-related gear.

Band conditions for 10 meters should be improving as we get further into the next sunspot cycle. The band does come alive from time to time, so keep listening. We will return to a regular schedule as soon as band conditions permit.

Technical discussions have been doing well. We have a lot of technical experience available on the nets, so please come prepared with your questions or problems. As always, we are looking for additional NCO's for all the nets. It really is a lot of fun. If you are interested, please let me know. I am looking forward to a good 2007. 