

# The Signal

OFFICIAL MAGAZINE OF THE COLLINS COLLECTORS  
ASSOCIATION \* Q2 2013 Anniversary Issue \*

# WAR

## - 1941 to 1945 -

*Collins Radio  
- And its People -  
Were There*





# Perspective - 1941 -



Scan to see more about the CCA



It is very easy these days to live in the “now”. By that I mean that we naturally tend to view whatever we read or see based upon our experiences in the recent past.

One of the things that this year’s four anniversary issues of the *Signal Magazine* are trying to present here is a picture of what it was like during the featured period in Collins’ history - what happened, and who made it happen.

You have noticed perhaps in the first issue that there were several somewhat unrelated ads for Coke and for Model Airplane News magazine. There were some other touches from the past. This was done intentionally to try and reset your mind to a perspective 60 or 70 years ago. Many of us have memories that go back that far – if we choose to use them.

Before you read this issue in any depth, take a moment and scan the magazine. Try and step back and consider the days that the people of Collins Radio were dealing with. It was a post-depression era of significant recovery. It was a time of industrial progress and of revolutionary changes in the everyday lives of the people as they were coping with the threat, and then reality, of war. But, the new-fangled washing machines – for instance – still had wringers on them.

As you will read, there were not only physical changes going on – new appliances, faster cars, better entertainment – but there were significant social and sociological changes happening. Some of these were hastened by the pressures of the war.

We will read that Collins wound up leasing almost every square foot of available space in Cedar Rapids. This should be taken in the context of that period’s city boundaries and population. As opposed to today where the city covers 70 plus square miles and has a population of about 130,000, the Cedar Rapids of 1940 covered less than 30 square miles and had a population of only 62,000 people.

As you scan and try and reset your perspective, think about the fact that, in 1941, you almost never made a trip of any consequence in your car without having a flat tire. It was very common to have to do valve jobs, or overhauls, on a car engine during the normal period of ownership. Radios quit regularly and needed a call from a “Serviceman”, whatever that is, and when it got hot in the summer, you opened the windows and prayed for a breeze and no mosquitoes.

Now that you have done a memory “reset”, think about the fact that Collins built radios that would fly at 25,000 feet, survive the shock of gunfire (both given and received), and the vibration of really huge radial engines.

Then consider the fact that many of those radios are still working today. Now...read and enjoy.



## Front Cover Artwork Credit “Lightning Encounter” by Nicolas Trudgian

The Limited Edition signed prints of this beautiful authentic painting are now out of print, however Nicolas has many other beautiful aviation prints for sale, often signed by WWII airmen, and these can be seen on his website at

[www.nicolastrudgian.com](http://www.nicolastrudgian.com)

He can also be emailed direct at

[uk@nicolastrudgian.com](mailto:uk@nicolastrudgian.com)

The *Signal Magazine* is privileged to present this striking image from the past and wishes to thank Nicolas for his kind permission.

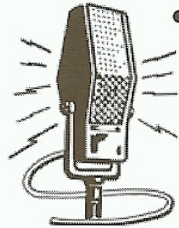


# The Signal Magazine

OFFICIAL JOURNAL OF THE COLLINS COLLECTORS ASSOCIATION

Issue Number Seventy - Second Quarter 2013

## 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
- 1<sup>st</sup> Wednesday AM 3880 kHz at 8pm CST

Sunday for Technical, Buy, Sell & Swap  
Tues., Thurs., Fri., & Sunday for Ragchew

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## - Dedication - to The Collins Radio Co. & The Folks that Served

### 1941 - 1945



This Q2 issue honors all of the men and women of the US Armed Forces that left their normal lives and family behind to fight, and in many cases to die, for their country.

In 1941, our country found itself facing the almost unimaginable challenge of fighting two wars on two separate fronts half a world apart and against two of the most powerful military forces in the world.

The employees of Collins Radio, and indeed the company itself, put normal life on hold for almost four years in order to meet the demands of this battle and defend the freedom of the world.

To all who served, and to the Collins Radio Company, and other companies across the country, who rose to the challenge, we owe our eternal gratitude for the sacrifices given for this valiant effort.

Paraphrasing a letter written by Art Collins to his employees in early December 1941, he summarized the attitude of the entire country: "Knowing that we will prevail, we have a huge challenge ahead of us. Let's get on with it."

And get on with it they did. Four Collins employees lost their lives serving overseas. Hundreds left their jobs and families to serve their country.

Particularly to those at Collins, this issue is dedicated.

As you read on, in the "Pomeroy Legacy" story, you will see the life of one man who could be any man, and we remember that all those lost had families and hobbies and a life to come home to - a life never lived.

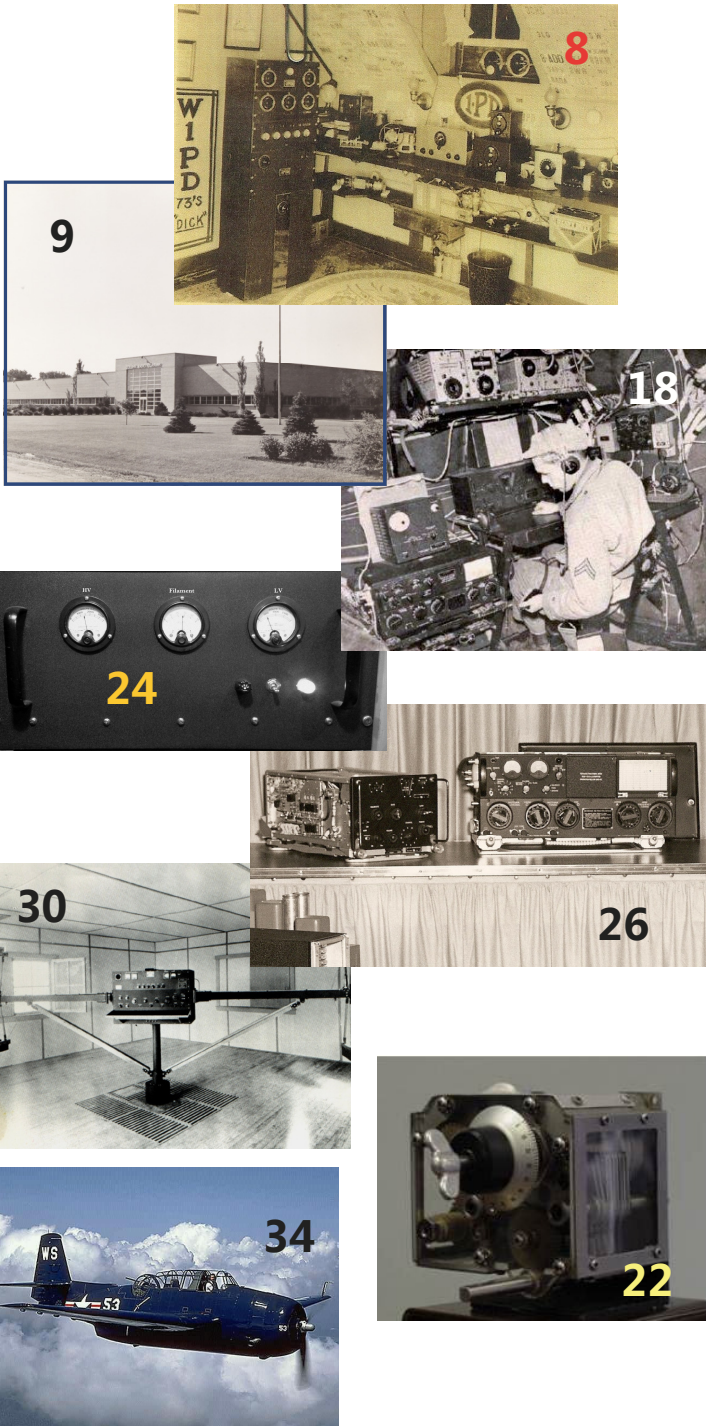
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## A Quick Look in This Issue

- Feature "The War Years - They Made a Difference"
- Featured Products—The Stars Come Out
- Dayton and Dallas Reports
- Special "In the Shack"
- ART-13 **Service Line** Articles



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We relive and Preserve the past with the presentation of this Ad from 1945.



IT'S A WOMAN'S WAR TOO!



JOIN THE  
**WAVES**

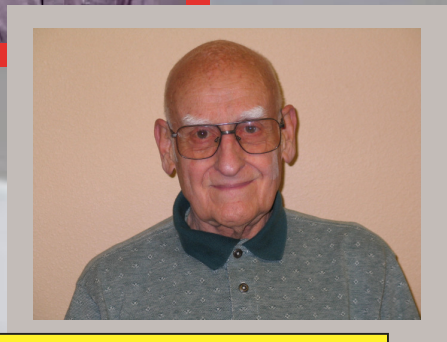
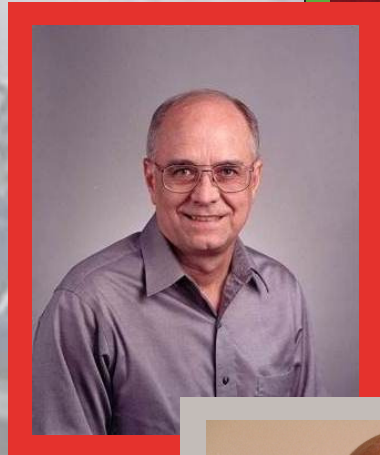
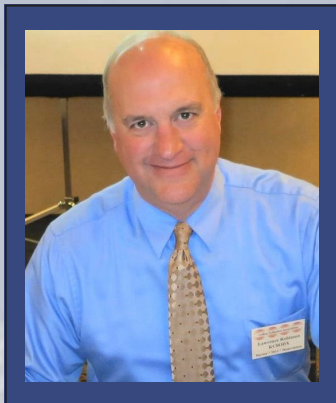
*YOUR COUNTRY NEEDS YOU NOW*

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*Apply to your nearest*  
**NAVY RECRUITING STATION OR OFFICE OF NAVAL OFFICER PROCUREMENT**



# OUR CONTRIBUTORS



## Lawrence Robinson

“The Pomeroy Legacy”, page 8

Lawrence is currently a Engineering Group Head within Rockwell Collins. He is also the curator of the Rockwell Collins Museum and a huge supporter of the CCA and our growing relationship with Rockwell Collins. If it is possible, he is as passionate about the history of Collins Radio as is Rod. Welcome to the **Signal**.

## Bill Carns, N7OTQ/K0CXX

“The War Years - Making the Difference” pg 9

Currently second term President of the CCA, Bill also edits and produces the *Signal Magazine*. He occasionally writes an article and loves to share in the pursuit of historical knowledge about Collins Radio, the people of the Collins Radio Company and Rockwell Collins.

## Rod Blocksome

“B-29 Radio Room Moves South” page 18

Rod is a retired Rockwell Collins engineer and worked as project lead on many of the HF-80 amplifiers that we covet. Rod also is past curator of the Rockwell Collins Museum and a passionate historian regarding all things Collins as well as the search for Amelia Earhart. In this writing he relates some of his experiences during the recent Fifi B-29 Radio Operator’s position restoration.

## Jules Yoder

“ART-13 Autotune System Checkout” page 22

Jules gives us a professional perspective on the maintenance and function of the ART-13 and its autotune mechanism. Jules is a retired Air Force Maintenance Technician who was responsible for keeping the myriad of ART-13s going during the Berlin Airlift just following World War II. Following his retirement from the Air Force, he earned his engineering degree and went to work for Collins Radio. He is now retired from Rockwell Collins and is heavily involved in the B-29 Fifi Radio Room/ART-13 restoration project. We are honored to have him write for the **Signal**.

## Billy Yates, N6YW

“Let’s Build an ART-13 Power Supply”, pg 24

Yates is a long time musician and guitar player from California who also builds serious audio tube amplifiers and associated equipment. He is no stranger to “Home Brewing” and shares his experience and the challenge and thrill of getting a ART-13 back on the air again.

# FROM THE EDITORS' DESKS

by Bill Carns, N7OTQ & Don Jackson, W5QN

## From the Desk of N7OTQ . . . .

This has been a very satisfying quarter for your **Signal Magazine** staff. Last column, I mentioned that the entire scope of the challenge regarding the four 2013 Collins Radio anniversary issues was somewhat daunting, but that we were looking forward to getting the job done adequately. I must say that after seeing the issue in print, even I was pleased at the outcome. I found myself sitting down and rereading the magazine several times. In particular, the fine contribution by Gary Halverson, K6GLH, helped put the entire Prewar phase of Collins Radio, and particularly Art Collins' leadership and performance during that period, in better perspective. One can only hope that, in the coming issues, we can paint such a meaningful picture of the other phases of the history of Collins Radio.

To say that I was happy about the outpouring of compliments for the issue is an understatement. I think all of you know by now that I love my job here, as does the rest of the team. In doing what we do, we not only get exposed to some mighty knowledgeable people, but we also learn a lot as we go, and that is what "fun" is all about here.

I want to particularly thank those of you that took the time to write, or to pick up the phone and call, and give us feedback on the issue and the articles. There are too many to quote here, but they have all been saved and will serve as further motivation to keep raising the bar, and having even more fun.

There were a couple of corrections that came in, and I want to mention those specifically. Several people caught the fact (Tom Rousseau and Brian Harris were the first – Thanks guys!) that we had erred on some receiver identities in the "In the Shack" feature. On page 26, the receiver paired with J. B.s 30J is definitely a National NC-81X very rare receiver, not a RME 9 - as printed. Also at the top of that same page, the receiver with John Firey's 32G was incorrectly labeled a rare S-22R Skyrider Marine. It should read that it is a SX-23 Skyrider.....also equally rare. OK....Can you tell I am not a receiver collector? I will say that I should have known better, having once owned an S-22R. It is easy to forget that one though - It was not a very good receiver.

Changing the subject: We want to continue to encourage contributions to our content. While the 2013 issues do put some additional constraints on the format and the content, we are still looking for material relating to the remaining two 2013 issues that will soon be upon us. And, there is always tomorrow... which will come faster than we think. It is not too soon to be working on articles for the following 2014 year's issues. We do feel a little more "comfortable" when we have a queue working. If you have "In the Shack" contributions (This year or next) or feature or column articles like the Service Line, please get in touch with either me or Don Jackson and we can help you get going.

Thanks for reading and have a great quarter. By the time that you are reading this, Dayton and Dallas will be part of the history of the CCA and we will be looking forward to the AWA and ARRL (and maybe California) events. I hope that we saw you at one, and/or that we will see you at the next couple of meetings. My Best 73s - Bill, K0CXX/N7OTQ  
email: [wcarns@austin.rr.com](mailto:wcarns@austin.rr.com)

## From the Desk of W5QN . . . .

The past couple of weeks have been a lot of fun for me, with Dallas Ham-Com and the CCA dinner as one of the highlights of my year. It was great to meet many new CCA members who I've only previously known by call sign.

Recently I've been fortunate to work with a few folks who are interested in letting their shacks be featured in **The Signal**. These shacks, as well as the stories behind the owners, will be interesting to all readers. That's not to say we don't need more! So, if you are interested in having your shack featured, please contact me via email and I look forward to talking with you. For that matter, if you have any Collins-related story at all, please let me, or Bill, know. The more Collins history we can piece together, the better. Best 73s, Don – W5QN  
email: [w5qn@verizon.net](mailto:w5qn@verizon.net)

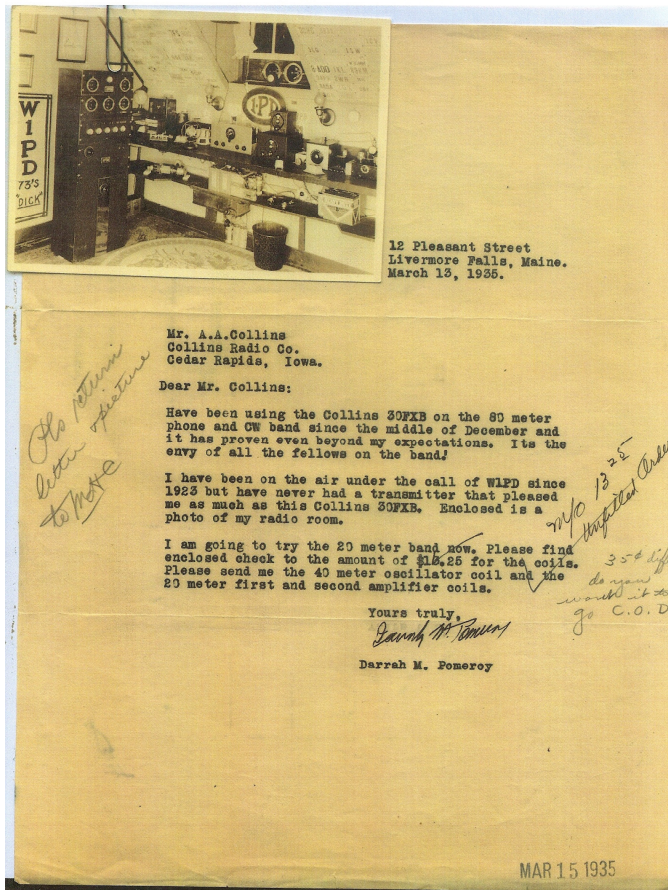




# The Pomeroy Legacy

by Lawrence Robinson, KCOODK

Curator, Rockwell Collins Museum, Cedar Rapids, Iowa



Rarely does a man truly understand his own legacy. In part this fact stems from a lack of historical perspective during his lifetime. I am sure that one Darrah Pomeroy, of Bunkport Maine did not. But, let's go back to how this all started.

As curator of the small museum maintained at Rockwell Collins in Cedar Rapids Iowa, I spend what time I can reviewing various archives pertaining to our company's history.

Of course, anything that pertains to Arthur Collins personally always jumps out as interesting. One day in late winter of 2012 I found a letter written by a customer of Arthur's dated March 13, 1935. That letter, from a Darrah M. Pomeroy, was both a rave review of his new Collins 30FXB transmitter and an order for additional coils for same.

For historical context, the Collins Radio Company was barely a year and a half old in March of 1935 and Arthur was a youthful 26. Additionally, the 30FXB, one of Collins Radio's first "Dressed Up" transmitters, was first introduced in June of 1934. Based on the comments and photo in the letter, Pomeroy's transmitter was purchased in late 1934.

Pomeroy's letter was saved (probably for future promotional use) after office discussions regarding the need to send the parts (that had been paid for with a Money Order) COD because Pomeroy had forgotten to send the \$0.35 postage. The writing in the left margin most likely belongs to MH (Merle H. Collins, Arthur's father) who oversaw business operations.

Upon discovery of the letter, an increasing obsession was calling me to "go further". From the letter, all I could surmise was that Darrah (Dick by nickname) had been a ham for some 12 years, that his call sign was W1PD, and that he was one of Arthur's early customers.

An Internet search soon turned up some interesting facts. Finding his marriage record, I learned that Dick was married in March of 1935. March 16<sup>th</sup> in fact. Hmmm. That was only three days after he took the time to rave about his Collins 30FXB, and to order new coils for it. Dick is a pretty dedicated ham if he is thinking ham radio 3 days before getting married. I like him.

Additional research turned up more information. On November 26, 1936 Dick and his new wife Pauline gave birth to a daughter, Joan. Now I can envision Dick bouncing little Joan on his knee while using that beautiful 30FXB we see in the corner. Other tidbits gleaned include the fact that Dick was 15 when first licensed and worked at a local radio station.

The years pass (with little data) and Joan grows to the age of 7 while W1PD enjoys his family and continues his career. I go further with my internet search and move forward to a more somber record.

On July 8<sup>th</sup> of 1943, young Dick (now 35) evidently feels the tug of patriotism and joins the service. He enlists in the US Army Air Corp as a private and like so many other hams goes to radio operator training school. Following school, he is assigned to active duty flying as a crew member on a B-29.... We know from other B-29 radio men that he most likely trained with BC-375 transmitters in a B-17 aircraft. I imagine how pleased Dick must have been upon seeing his first Collins-designed ART-13 when his crew was first introduced to their new B-29.

Now, I find what I did not want to find.

In the early morning hours of May 19<sup>th</sup>, 1945, Dick, his crew, and their almost new B-29 take off from Tinian Island on a bombing run to Tokyo. It will be a very short mission. On takeoff, the aircraft briefly strays from the runway, loses speed, temporarily recovers only to struggle into the air, and then ditch 4 miles west of the island. Of the 11 souls on board, only 4 survive. Dick is not one of them. Joan and her mother Pauline are waiting at home.

Further research into Dick's family has proved to be a dead end of marriages, name changes and deaths. Joan passed away on December 27, 1999 and her mother was then living in Sun City Center, Florida. I assume she has now passed.

What we have found though is a man dedicated to his country – a man whose face we do not know – and that is somehow appropriate at this point. Similar stories abound about others lost in the war.

Through a long-forgotten time-yellowed letter and slivers of facts, we've met a man who shared our hobby. We have seen a man who left his family, went to serve his country, who was anxious to get the war behind him and return home. We have shared his story and seen the lives important to him that were touched by the war.

Now he has touched our lives. Pomeroy's life entwines with our B-29 ART-13 restoration work and our mutual admiration of early Collins products. His legacy is not lost - nor is it trivial.

Dick, when he wrote that letter and when he went off to serve, spoke to the future. He spoke to all of us. His story speaks to us about all those that we lost—so we could remember. I hope eventually to make contact with his living descendants, to see an image of his face, to share the letter from 1935. Most importantly, I will tell them that we do remember.

That is Dick Pomeroy's Legacy.



# The War Years

## Steel, Hammered True in the 30s, Would Now be Tempered by WAR

by Bill Carns, N7OTQ

*Before we begin, let's go back.....Think almost 100 years ago - 85 to be exact. Envision - cars are just becoming "Streamlined", and washing machines are just now "automatic - but they still have wringers. Some of you may have to look that up. Think - no TV, and radio has this "old" hollow sound due to the microphones in use and the "reproducer" technology.*

*Life Expectancy is just 58 for a male and 61.6 years for a female. Parlor games are prevalent in the home as the main entertainment and families still eat together. Oh, they also eat food that is cooked by the housewife - not heated in a microwave. You can buy a nice new car for \$850 and gas is 11 cents a gallon. Amazingly, there are still about 5 lynchings a year in the south.*

*As an affluent ham, your receiver is probably a hand built RME or maybe a National HRO and your transmitter is probably a Collins 30FXB or C. If you are very lucky, it is a beautiful 30J. You are enjoying the advent of the new glass and metal octal tubes. Home brewing is still rampant, technology is blossoming..... and you are about to be shut down - AGAIN!*

**Impending WAR.....**1941 was a startling year - in many ways. The relatively recent involvement in World War I had left the American public and its leadership leaning towards isolationism and certainly with distaste for another war. More significantly, the US had not found itself in a foreign war which threatened, or was fought on, its soil since the Mexican-American War of the late 1840s. Almost an even 100 years (four generations) had passed since Americans had dealt with the kind of threat that the country would wake up to Sunday morning on the 7<sup>th</sup> of December, 1941.

President Roosevelt, already knowing that reality spoke of the need to support the foundering allies in Europe and now faced with a surprise Japanese attack on American life and soil, led the country to a war that no one had wanted. Life would immediately change for the millions of Americans directly involved and, just as relevant, the history of the United States, and its businesses and culture, would be changed forever.



Two enemies - two powerful enemies - and two fronts; It does not get any worse than that.

### Two Fronts - One Mindset

America, and its industrial might - and its fortitude and internal strength - would prove up to the task. But, it would not be without the payment of a tremendous toll. This toll would be, not only in the terrible cost of human lives - and the subsequent impact on coming generations - but also on the business and economy of the US. All of these impacts would not be bad.

Prior to the declaration of war on two fronts, Collins Radio had been a rather small, but technically successful, communications company out in the central Iowa farm country. Although Collins had certainly made a mark technically and historically with its stout offerings and its fortuitous involvement in several highly visible geographical expeditions,

On December 8, 1941, war was declared on the Empire of Japan, and this was quickly followed in the heat of anger by the declaration of war on Germany 3 days later on the 11<sup>th</sup>. The challenges were huge.



the company was very small when compared to other (then) leaders in communications. Coming into the war, RCA, Westinghouse, GE, even Zenith were much larger electronics manufacturing giants.

If, as we saw in the last issue of the **Signal** with Gary Halverson's wonderful perspective<sup>3</sup>, the 1920s and 30s were the years where the DNA of the success of Arthur Collins was formed and began to percolate in the pot of reality, then the late 1930s and the 40s were the "Cauldron" years where the boy became a man. The 40s were the years where the final expression of this DNA was tempered by the fires of war.

To view these two periods, which we have chosen to call the "Prewar Years" and the "War Years", as distinct periods would be a mistake. They (as we will see) certainly exist as very well defined periods from a business and product offerings standpoint. However, in order to understand the full impact on the transition from peace to war on the history of the Collins Radio Company, one must look back at the country, and the mindset of its occupants, starting a little earlier.

So, let's step back and start about 1938.

**Writing on the Wall** - By late in 1938, it was clearly obvious that Germany and Japan were on an aggressive path of expansionism, and that Germany was clearly in violation of their treaty following the armistice in WW I. Germany had allied with Japan<sup>1</sup> and following this, Japan had attacked China in July of 1937. Germany had annexed Austria in 1938<sup>2</sup> and fears were rising in the United States that the US would be drawn into another war.

As this all too familiar scene played out, Americans watched as Germany invaded Poland in September of 1939 and England and France were forced to declare war on the Germans.

President Roosevelt, responding to calls for help from its historic allies in Europe, was torn between what he knew was coming and needed to be done, and the complete reluctance of the American public to become involved in another costly war.

The recession recovery in the US was well underway and the American public was enjoying some prosperity for the first time in a decade. The Big Band era, a robust business recovery and the *good times* rolled on. No one wanted that interrupted. It would not be until the Japanese forced the hand of Roosevelt and Congress, that America would officially enter the conflagration.

This however does not mean that folks with vision did not see the handwriting on the wall. To the great credit of the government, funding for manufacturing capacity was being made available, equipment was being designed that included aircraft, communications, logistic, and naval capability. In addition, companies involved with the supply of war oriented materials were stepping up and allowing their valid concerns about war to steer their development policies.

**Timely Preparation** - While many view such equipment as the ART-13 as a product of war - and in this case, a response to the needs of the Navy for a robust next generation HF aircraft long distance transmitter - the reality is that the ATC Navy specification (in its initial form) was issued by the Naval Labs prior to 1939. The Bendix ATD was in production by May of 1940 and the ATC prototype (well along in development) was delivered by hand to the Navy in Washington only one week after the attack on Pearl Harbor on December 7<sup>th</sup> 1941. By early 1942, the first production contract deliveries were being made to the Navy.....Why is this relevant?



- THE ATC -  
Contract Date  
1941

It is clear now that the man that was leading Collins Radio was also worried about the involvement in the (what he felt was) upcoming war. Arthur had already shown a propensity for looking ahead and seeing a problem that would become significant, and for then finding a solution in a timely manner that would solve this problem, and serve Collins Radio well in the process. Witness his foresight even as a young boy when he convinced his parents to spend their summer vacation traveling to the east coast and making a contingency 20 meter schedule for contact<sup>3</sup> with John Reinartz, 1QP, and the MacMillen expedition. Witness also his perception, and timely solution (the autotune), for aviation's emerging need for multi-channel transmitter and receiver operation.

We have also already seen, in the Q1 issue article by Gary<sup>4</sup>, how the excitement of the times not only motivated and steered Art Collins, but how those times challenged him to find solutions to what could have been business ending barriers to success. His response to the attack by industry giant RCA and other members of the patent trust is just one example. He was a man that made Lemonade when he was given Lemons. In short, not only did Art see the need for communications solutions that would be required for the US to prevail in the coming war, but he was not ignoring the opportunity to leverage



CARS MORE MODERN

Original 60,000  
Square foot  
- Main Plant -  
Capacity on the  
ground and waiting



this happening to grow the company. Lest there be any doubt, he should not be filed in the "opportunistic" category. Art Collins was a fiercely patriotic man. He was also very motivated by advancing the state of the art in communications and he thrived on providing advancements in technology. These motivations were, in short, "What he lived for". The fact that he saw all of this coming and was ready, both technically, and manufacturing capacity wise, is not lost on us. It speaks highly of Art, and his management team, that he was well positioned when the war did come.

This capacity foresight was dealt with confidently and with commitment. It is well known that during the years preceding the attack on Pearl Harbor, Collins Radio tripled their engineering staffing and more than doubled their total workforce.

**War and Change Come to the USA** – When the war did come, as Art knew it would, he was in many respects ready for the ensuing years. Many of the capabilities and talents that had served him well in the 30s would not change and would take him through the war with honor and a very high level of recognition.

Immediately following the declaration of war, Arthur sat down and wrote a very short (about 2/3rds of a page) letter to all of his employees. While this letter has been seen and read by your author, it is currently "hiding". I do remember it well. It was striking in its clarity and the challenge it laid out.

To paraphrase Art, he said that - with the advent of war - the country, and Collins Radio, would be challenged as they had never been challenged before. He wrote optimistically that, although he knew that the US would "Prevail" in the war, the war would be a difficult time for the company and its employees. He asked all to dig in and contribute to what he knew would be a positive conclusion.

It was a great letter, and it fell on eager ears. Before very long, almost all holidays and time off would be canceled, and the resources of the company stretched to the limit. However, accomplishments and moral remained high at Collins throughout the war.

In other respects, the company was not ready, and changes would abound beneath that first level of preparedness.

In spite of all of his preparation, the Collins Radio facility would be constantly challenged by space limitations during the coming 4 years. In the end, they would occupy almost every square foot of empty space in the Cedar Rapids area and spill out into what was then the countryside.

Collins Radio Buildings Identified as of May, 1945			
Name	Address	Function	Estimated Sq. Ft.
Iowa Theater	108 3rd St. SE	Purchasing, Accounting, Credit Union	28,000
Midland	?	Sheet Metal & Finishing	6,500
Wagner	728 3rd Av. SE	Receiving & Receiving Inspection	6-12,000
Calder	412 A Av. NE	Warehouse	4800
Thorp	?	Carpenter Shop	>3000
McKesson	900 2nd St. SE	Spare Parts Department	>14,000
Store Front-C. R.	unknown	I.B.M Tabulating	>1,500
Mitvalsky	425 2nd St. SE	Warehouse	>2500
Chandler	804 1 st Av. NW		
Main Plant	35th St. NE	Manufacturing – Main	190,000
Miller Annex	111 1st Av. SW	Service Department	
Norva	314/316 1st Av NE	Payroll	
Barry	Unknown	Warehouse	1250
Witwer	318 1st St. SE	Warehouse	
Chandler	?	Warehouse	
"Name Missing"	407 B Av. NE		
Shrine Temple	520/524 A Av NE	Assembly, Chem. Lab and Test Equip	30,000
Smulekoff	107/111 3rd Av SW	Spare Parts Dept.	>5,000
Armstrong	308 3rd St. SE	Literature, Maintenance, Accounting	>10,000
American Transfe	?	Warehouse	

**Collins War Support Facility Location and Use**

In addition, Collins Radio had one of the better document control systems in the industry before the war. The military supply requirements would challenge this paperwork system to the limit and bring about some changes that we take for granted today. CPNs, as we know them today, would be born during WW II.

But, one of the bigger changes could better be called a "Social Revolution". Collins Radio (prior to 1941) had a male dominated work force. There were of course, female secretaries and other office workers on their payroll. But, the factory was completely staffed with not only engineering support male employees, but all of the assembly workers were male.



Outside Row: Paul Hauser, Walker Whitmore, Kenny Vaughn, Harry Rogers, Dick Gintort, Buck Holsinger, Les Bessemer (then foreman), Dale McCoy, next unidentified, and Archie Tarson.  
 Second Row: Bob Davis, Ray Stoner, Milo Soukup and Al Keyes.  
 Third Row: Tom MacGregor, Bill Popek, Bruce Miller, Del Zarub, Chuck Hatfield, Claude Hoppe, Leonard Braun and Elmer Koehn.  
 Fourth Row: Charlie Gould, Henry Dmitruk, Don Tubbesing and Arlo Goodyear.

**All Male Factory Workers at the Old 2920 1st Ave. Building**

When the call went out for the war draft, most of the male assembly workers, immediately went missing for the balance of the war. This was not much different than many of the factory environments in the US prior to the war. We are all familiar with the "Rosie the Riveter" stories and the campaigns during World War II to staff the factory floors of America with women during the war buildup. However, this change came with great difficulty at Collins Radio.

The discussion, and related proposals, started immediately but there was a tremendous amount of pushback from both the upper management structure and also from the factory supervision ranks.

They moved beyond this social conundrum when one of the production floor supervisors, John (Slim) Dayhoff (more on him in this issue) proposed that they start one production line with all women workers and see how it went. Slim was an old and respected friend of Art Collins' from the very early days before the startup of Collins Radio and his voice carried a lot of weight with Art and the higher level managers at Collins. Everyone agreed to try this experiment.



*World War II production lines, staffed by women assembly operators.*

**All Women on the Factory Floor During the War Peak Production Period**





SHRINE TEMPLE—Assembly, Chemistry Lab., and Design and Assembly of Test Equipment



MIDLAND—Sheet Metal and Finishing Departments



WAGNER—Receiving and Receiving Inspection Departments



SMULEKOFF—Spare Parts Department

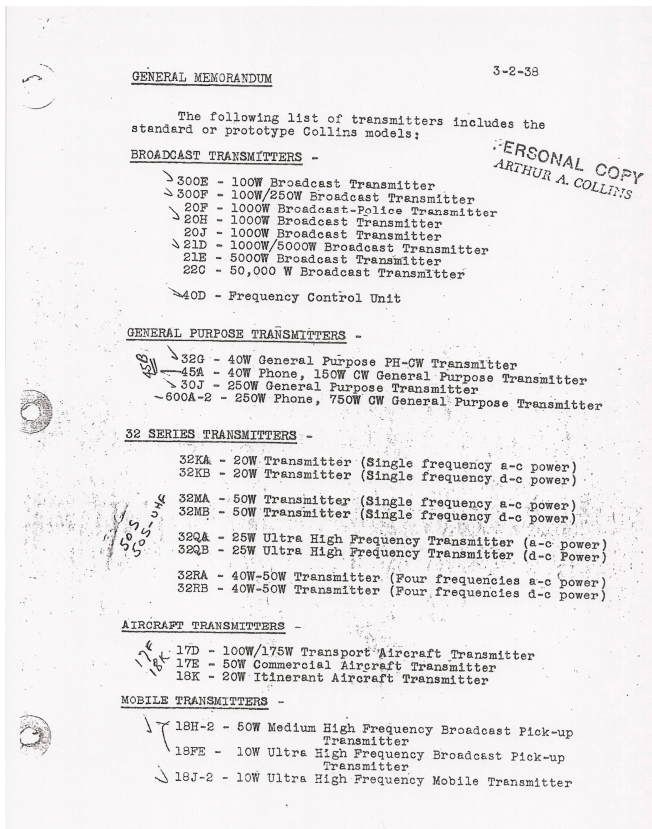
**Almost every square foot** of available space was leased in the Cedar Rapids and surrounding area. Over twenty buildings were pressed into service using multiple floors. At the height of the war expansion, support space totaled more than 100,000 sq. ft. and occupied multiple floors of some of the larger buildings...This while manufacturing space was expanding from 60,000 to almost 200,000 sq. ft.

These photos, combined with the table on page 11, will give you some idea of the environment and also put some good light on the times when the people at Collins were producing radios well ahead of their time.



The results were outstanding. Not only did the women meet all of the quality requirements, but they were faster on the line than the men that they had replaced. This one experiment paved the way for the "Rosie the Riveters" of Collins Radio during the war, and changed forever their mindset regarding the male dominated factory.

**Focus and Readiness** – Going into the war, Collins Radio had pared down their product offering and their models in production to a short list of just 30 models that covered all of the markets from amateur radio, through the commercial and mobile communications, avionics and broadcast. We are very fortunate to have a copy of a memorandum (annotated by Art himself) that was Art's desk copy of the listing of models in production as late as sometime in 1939 (based upon his hand written additions).



**Art's Desk Product Memo dated 1938**

Following the period covered by this modified memo, and between early 1939 and December of 1941, we can track the additions of the following equipment:

**War Models Developed During 1939-1941**

- 18M - Field Set which went on to be the TCH
- 127E - Marine 10 Ch 500 Watt AM Ship Board Transmitter
- 16E/F Series Autotune Transmitters - went on to be the TDO
- 231B/C/D series Autotune Transmitters rated to 3 kW –  
- Became the TCC & TDH
- 17H-2 - ATC & AN/ART-13 - During this same period, behind the scenes, we know Art and Roy Olsen were working on the ATC specification for the Navy using the commercial model number 17H-2

It is clear that, after clearing the decks so to speak in 1938, Art and Collins Radio were focused on introducing models that with very little modification would be acceptable, particularly to the Navy, for military programs during the war.

150-3000 WATTS A<sub>1</sub> A<sub>2</sub> A<sub>3</sub>  
2-20 MC 10 AUTOTUNE FREQUENCIES

Every communication requirement can be met by some member of Collins versatile family of high frequency transmitters. Power output of these transmitters runs from 150 to 3000 watts, frequency extends from 2 to 20 megacycles. A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub> types of emission are all available.

Some important features are common to each of the transmitters. For example, all models have up to 10 Autotune frequencies. Several remote control arrangements can be employed with every model.

Wide acceptance of a standardized versatile design has made possible quantity production and the consequent low prices. Even if there is need for only 2 or 3 frequencies it is still more economical to buy Collins Autotune Transmitters.

16E 16F

231B 231C

231D

16E Rated output 150 watts A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>. 2-20 mc. 10 frequencies with Autotune  
16F Rated output 500 watts A<sub>1</sub>; 300 watts A<sub>2</sub> and A<sub>3</sub>. 2-16 mc. 10 frequencies with Autotune.  
231B Rated output 500 watts A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>. 2-20 mc. 10 frequencies with Autotune.  
231C Rated output 1000 watts A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>. 2-20 mc. 10 frequencies with Autotune.  
231D Rated output 3000 watts A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>. 2.5-15 mc. or 4-20 mc. 10 frequencies with Autotune.

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA - NEW YORK, N. Y.: 11 WEST 42 STREET

**16E/F & 231B-D Series Promoted 1940  
aka TDO/TCC & TDH Navy Transmitters 1942**

Following the declaration of war, the contracts started rolling in. The ATC effort had born fruit just as the war broke out and the resulting contract was established almost immediately. By December of 1941, Roy Olson was in Washington D.C. for the first flight tests of the ATC, where it received glowing reports. Production was started as soon as possible and commenced in March or April of '42. By the end of the year, acceptance testing and installations were progressing and by early 1943, the ATC was being used by Navy pilots in action.

Following the TCS and the ATC contracts, fixed and shipboard contracts began to hit the company, and by the end of 1942, over \$50 million in contracts were on the books. The melee had begun.

Main plant was again expanded and was now triple the original size. A new cafeteria was built at the rear corner of the property and the company, pushed to the limits of its physical space, began exporting support functions out of the manufacturing facilities and into whatever space they could find in Cedar Rapids.

**Management Steps Up** – As much as all of us like to talk about Art Collins and "his company", the reality is that Art was predominantly focused on design and engineering problems. This was his passion, and it showed. It should not be read that Art did not participate in the overall management of the company - he did significantly.... but the fact is that, just as it was before the war, the corporate management team at Collins was a strong and broad one.

M.H. Collins had continued to provide strong and capable Financial and Administrative management while the "Brain Trust", as it was called, was always involved in any key planning or decision process. This "Brain Trust" consisted of Art, M.H., Frank Davis, General Manager of Engineering Design Division, W. J. (Bill) Barkley, Executive V.P. Sales, R.S. (Bob) Gates, V.P. Finance, L. Morgan Craft, General Manager Operations Division, and E.M. Finney, General Manager Industrial Relations. This management council also included S. J. Storm, the Treasurer and Comptroller. He was absent from the photograph on the following page when it was taken. Also notably missing from the photo on the next page is M. H. Collins.





**The "Brain Trust" - These are the folks that led Collins Radio thru the War - Left to Right:**

- F. M. Davis, Gen. Mgr Engineering Design Division**
- W. J. Barkley, Executive V. P. Sales**
- Arthur A. Collins, President**
- R. S. Gates, Vice President**
- L. Morgan Craft, General Manager Operations Division**

Disaster had struck the Collins Radio Company and the Collins family when, in April of 1943, M. H. Collins, seemingly just ill, suddenly died from complications of a two week illness. This sent shockwaves through the company and the Collins family. Described in his obituary as a "Friend of the man in the Factory" and a "Patron of the Arts", M. H. was also part of the heart of the Collins Radio Company. He was loved by the employees and the loss of his experience and leadership was a blow that was hard to take. From a company guidance standpoint, it was as if the Collins ship had lost part of its rudder.



**M. H. Collins Shown at his Desk in the Late 30s**

In spite of this loss, Collins Radio forged on, and to say that the Collins Radio Company "Got the job done" during the war is an understatement. Significant awards followed excellent performance against their war contracts. The little "fledgling company" from Iowa that concerned the Navy during the ATC selection process proved to be one of the more disciplined and quality oriented volume suppliers of communication equipment.

Total unit production just from Collins Radio manufacturing facilities topped 63,000 units and production of Collins designs including contracted assembly of the ART-13 and the TCS was over 125,000. Em-

ployment grew from just less than 500 employees at the beginning of the war to over 3300 by the end. Total square footage of manufacturing and support facilities approached 300,000 square feet of floor space. They started the war running just one shift. By the end they were at a full three shifts.

But, really, the best tribute came from the people/customers in the field. Collins radios did not fail. Collins radios got through and, well, just sounded like Collins radios.

Production contracts included the following models shown below - along with a brief description and what is known about the individual production run data (quantity and period). It should be noted that, with the exception of the ARR-15, the ARC-2 and the MBF, all of the models listed were either fully developed, or well down that path, by the time the war was declared. Art and his team had chosen well, and the equipment went on to distinguish itself where deployed.

Collins Radio had produced at least 20 different models of mainly transmitters during the period December, 1941 through August, 1945.

Model	Description	Years of Mfg.	Quantity (If Known)
TCS 5, 7 & 12	12/25 W (AM/CW) 1.5-12 MC + 4 Xtal Ch. (18Q-3) Xmttrs and Rcvrs f/ PT Boat, LCI & GATO Sub Comm. Based Upon 51Q (Rec) and 50Q (Xmtr)	1941-1944	34,893 All Manuf.
AI/ARD-3	DF Receiver for Canadian Lancaster Contract		
ATC	100 Watt HF 11 Channel Autotune Xmtr (17H-2)	1941-1945	25,896
T-47/ART-13	--- Same ---		Total
AI/ART-13	--- Same --- Included Low Frequency Osc. Also Manufactured by Subcontractors		90,000
AI/ARR-15	HF Receiver Airborne (51H-3 - Matched to ART-13)	1945	
AI/ARC-2	HF Airborne Autotune Transceiver	1944-1945	
TCB	150 W 10 Chan. Xtal Control 1.5-12 mc. AM/MCW/CW		
TCC	1 kW 10 Chnnel + Manual Tune HF 2-18 mc (TCC-1, 3 & 4) Similar to 231C prewar commercial transmitter		(Correqdor Transmitter)
TCH	Special Force Navy version of 18M AM/CW 15 Watt Transportable 2-16 mc. Continuous Tuning or 2 Xtal Channels 1939 to ? XCVR Pwr'd by vibrator, dynamotor or foot generator		
TCZ	Shipboard & Ground 115 Vac version of ART-13	1942-1945	
TDH-1 thru 4	Auto tune - 231D (TDH-1) 3 kW AM 5 kW CW for 2-18 mc.	1941-1946	
TDO	300 AM / 500W CW Autotune (16F-8) 2-18 mc. Signal Corp Contract nomenclature BC-460D	1941-1945	
DAB 1 - 3	Wirkler HF Direction Finding Secret Project Anti-Submarine DF Capability		> 100
MBF	3 watt UHF (60-80 mc) AM Ship to Ship/Shore	1944-45	> 2162
BC-401-A	RA-30-A (Based on 231B Model) 400 W Dual C100D PA	1942	

**Collins Radio War Production by Model**

**More than just transmitters:** Special mention needs to be made about the DAB work (Code named Huff Duff) that was done by Walter Wirkler.

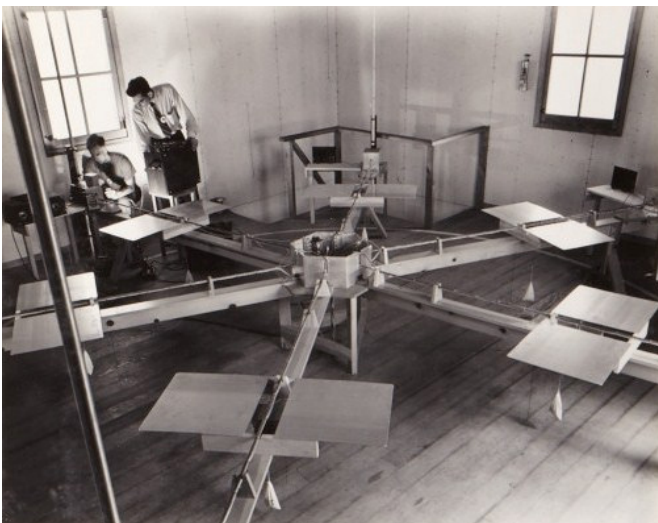
Walter had been hired in 1934 as a young engineer who was spotted by Art Collins. Walter came already holding several patents in SSB applications and theory (Yes - 1934) and also came to Collins with a high level of interest in HF Direction Finding work. Walter continued to work on his DF development well before the war, resulting in several product designs including the AN/ARD-3 which was used on the Canadian Lancaster Bomber.

Wirkler's stunning achievement (assisted by Frank Davis and John Giacoletto) was a Top Secret project started at the beginning of the war and referred to as Huff Duff by the British. Eventually this product was given the military designator DAB. Technically, it was an HF/DF that received from 2-28 mHz and was provided in both a fixed station configuration and could be mounted on a Jeep Transport vehicle that was also its turning platform.



**Wirkler at work on Experiment at "The Tent"**

Quietly, and very shortly after Main Plant was built, there appeared a very strange log cabin looking all wood building out in the pasture alongside Main Plant. Because of its appearance, this building got dubbed Fort Dearborn. While speculation was rampant, and all around knew that something was in the wind, quietly this secret project evolved into a sub finding machine called the DAB. There were only about 100 of these strange looking machines built. They were deployed on both coasts of the US and several foreign countries bordering the Atlantic and Pacific.



**Experimental DF Antenna**

Before the war was officially declared, and early in WW II, allied shipping losses due to the German and Japanese (to a lesser degree) submarines was devastating. The final statistics are telling. During the war, allied losses totaled almost 3000 merchant ships sunk along with 175 warships. 72,000 sailors were lost, most from the merchant fleet. Most of these losses were prior to late 1943.

By mid-1943, with the DAB deployed and other anti-submarine hunt and destroy tactics and equipment improved (including the addition of surface radar), the kill rate had become so high (almost 100 subs sunk between January and May of 1943) that the Germans pulled back almost all of their remaining U-boats<sup>5</sup>. Briefly in September of '43, Germany again tried to attack the allied shipping lanes, only to be soundly defeated again. She then retreated to harbor and began to invest in a new faster submarine that could remain below the surface for a much longer period – thus avoiding detection. Only four of these boats were ever built and they had little impact on the war. By the end of the war, the allies had sunk 783 U-boats and German sailors killed numbered almost 30,000. By comparison, the US lost 52 such boats.

The DAB is credited with a significant contribution to this shutdown of the German U-boat effort. See page 30 for more on the DAB and Walter Wirkler.

**Impact:** Clearly Collins Radio had more than the average impact on the outcome of the war. In addition to the impact of the DAB and the quality of all of the equipment and the volume delivered in all types (how can you assess the value of a radio not failing at a critical moment), Collins is often credited with a major strategic contribution with the invention and production of, particularly the airborne, multi-channel communication capability that came years ahead of this important feature for the Japanese and the Germans. For over a year, and approaching 2 years, the US forces could change frequency at will when they thought a channel had been compromised. The enemy could not.

Financially, the war, and Collins' ability to rapidly expand while maintaining their quality, had an incredible impact on the company. This small company in Iowa (that had sales of less than a million dollars in 1940) took on \$50M in war contracts in 1942 alone. With sales of only \$2.16M in 1942, they grew to ship over \$110M over the course of the 4 year war. We must estimate how this was spit out by year, but by looking at facilities growth and the employment numbers, it is estimated that annual sales peaked around \$45M in 1944, then declined slightly in '45 – to be almost shut down in 1946.....Just as significant as their financial growth was the fact that, by the end of the war, Collins had grown to be one of the Navy's top suppliers and winning the coveted E award. Collins won the E every 6 months for the duration of the war. Their reputation was staged for the future.

Not bad for a little "corn fed" company from Cedar Rapids, Iowa.

To say that Art was proud of his company and its employees, as well he should have been, is an understatement. In his open letter to employees written on August 16, 1945 (Following page), Art compliments his employees, thanks them - and then lays out the challenges - and their position going forward. Reading his two letters (the one from the beginning of the war and this closing challenge) we see the mark of a real leader.

In the next issue, we will see how this plays out.....and there is "Good News" and there is "Bad News".

**Notes:**

1. **1936 November 25** - Nazi Germany and Imperial Japan sign the Anti-Comintern Pact. This was a pact against communism and Russia.
2. **1938 March 12** – In an action later referred to as the Anschluss, Hitler annexes the country of Austria into Germany.
3. **Signal Magazine Q1 2013** – p 12, *In the Beginning*, The Making of the Collins DNA, by Gary Halverson, K6GLH
4. **Signal Magazine Q1 2013** – p 8 article, *In the Beginning*, The Making of the Collins DNA, by Gary Halverson, K6GLH
5. **Radio Wizard** by Ben Stearns, p 68-70



# Art's End of War Letter

## COLLINS RADIO COMPANY

Designers and Manufacturers of  
Transmitters, Transformers and Speech Equipment



CEDAR RAPIDS, IOWA U. S. A.

August 16, 1945

### TO OUR PEOPLE IN UNIFORM:

It's over, thank God. Victory was most directly your task and your accomplishment. A feeling that words are inadequate makes it hard for us to express to you our praise and gratitude. But we are very proud of you and we hope you can sense the thoughts we can't put in words.

We built a lot of equipment here after you left, and we will be glad to know that it was what you needed and that you had plenty of it. We didn't experience the rugged side of the war with you, but we did our appointed job and we hope that you feel we did it well.

After you get back to good old Cedar Rapids and have become used to the feel of that blue serge suit, we want you back at Collins Radio. Here is what the job prospects at Collins look like. Right up until August 14, we were all busy designing new radio sets of the fighting variety and so we are not in a position to simply turn a valve and immediately put 3500 people to work turning out jet propelled convertible roadsters or electronic dishwashers. So, until many of our numerous new product ideas have progressed through engineering, design and tooling, there will be a sharp reduction in all departments related to actual production. As you all know, this preliminary work is a matter of several months and a lot of our folks will have to go back, for a while at least, to farming, housekeeping, their prewar trades and businesses, and maybe get caught up on some trout fishing on the side. It will be a little tough on some, but we hope not too tough and not too long.

Meanwhile, we are continuing a substantial amount of work for the Navy. Although nearly all of our contracts for older types of war equipment have been terminated, several of our most advanced designs, which are now in process of tooling and procurement, will be needed to equip Navy aircraft and vessels on a peacetime basis. We will continue to work under contracts of this character amounting to several million dollars at the present time. In addition, the company has established a fine reputation for engineering development work and, at present, holds several major development contracts which are in accord with the announced national policy of fostering technical and scientific progress as a security measure. We are at present expanding our activities in this direction and will shortly be operating an industrial engineering and research laboratory of considerable size devoted not only to "electronics" (radio, radar, etc.) but also to applied physics, scientific apparatus, special control devices and instruments. We are adding new engineers and physicists to our staff and will require the assistance of all the departments necessary to such a laboratory, such as model shop, drafting, tooling, special production, testing, accounting, purchasing, etc.

One thing in particular we are looking forward to doing when we have more of you fellows who really know what Collins quality means back with us is making a much higher percentage of our parts and components right here in our own plant. During the war we have subcontracted a tremendous amount of this work, sometimes of necessity, to shops not too well qualified. We can increase our own plant volume and improve quality and control by doing this work here.

We are starting production immediately of some of our prewar but still modern designs such as the 300G, 20H, 21A and 12H broadcast station equipments to satisfy old customers and to let the boys in the shop keep their hand in, but our production of radio equipment of the class you were building here before the war will start again in real volume during 1946, after the engineering and development now getting under way has been completed. We have studied this field carefully and we know there is a big job for Collins Radio to do — a job which, together with our new research activities, will mean employment and the satisfaction of creative work for a lot of people in Cedar Rapids — perhaps eventually, with good fortune, as many people as during our war production.

We realize that some of you may not be in the mood just now for so serious a discussion of your company's affairs, but we felt that you in service as well as the people here would want to know that definite work is under way, with the objective of providing employment and opportunity for our people. In any event, you should know we think that offering you your old job again is more than an obligation. You fellows had what it takes to win a mighty big war, and, if you feel like trying your hand at building a bigger peace, we would consider it a privilege rather than an obligation to ask your help.

Sincerely,

A handwritten signature in dark ink, appearing to read "Arthur A. Collins".

Arthur A. Collins, President

# Dayton 2013 Hamvention Report

## What a great time!

As you all know, this year is the **80<sup>th</sup> anniversary of the incorporation of Collins Radio** and the CCA has been in "Celebration" mode all year. Our presence at Dayton was no exception.



The CCA booth was moved to a better traffic location and doubled in size in the East Hall at location 508 & 509. The booth was redesigned with additional hospitality space, carpeting and active displays of Collins related videos as well as rare presentations of Collins equipment from the 30s through the 90s. The booth traffic was tremendous and the displays and special "Eyeball

QSO – aka raffle tickets" well received. It should be noted that Jim Green (WB3DJU), our past Treasurer and mainstay at the Dayton Booth, was sorely missed and promises to be back next year. We are particularly pleased that, as a result of the traffic through the booth and our progress this year, membership sales at the booth, and ensuing sign-ups on the website that weekend, brought in almost 40 new members to the CCA.

There was a great **pre-banquet dinner on Thursday evening** with about 16 notable attendees from the helper and supporter category. Then, of course, we had the **Friday night banquet** where we celebrated the anniversary in wonderful style with a round of speakers talking about the equipment and history of the company over the 80 years - with a focus on "Things you did not know".

There was also a huge round of door prizes again, thanks to our sponsors and supporters, and a great raffle for a Collins 212Z Broadcast Mixer, which strangely enough was won by Rich Sperling, WB3JLK, a Broadcast Engineer and AMer of "Dance Card" fame. Nice going Rich - well deserved and Thank You again for supplying the Dance Card information.



There was a good supply of Collins gear out in the swap area and reports are that a lot of it went out the gates in new hands, so my impression from talking to folks after the fact was that it was a great Dayton in all respects.

-----CCA-----

## Dallas 2013 Ham Com Report

The second CCA Event of 2013 is now behind us and, like the first at Dayton, it was a resounding success. Dallas is always one of our favorite happenings because it is close to the Collins facility in Richardson and we always have a nice turnout of both retired and current Rockwell Collins employees. We should also mention that the swap was full of Collins.

Our booth presence in the Ham Com Main Hall was, again like Dayton, a bigger booth this year and it was in the commercial area. Booth traffic was up and it sure was good to see the number of members that stopped by. Also, like Dayton, we signed up a record number of new members. Between the new folks turning in forms at the booth and the new members that signed up on the website that weekend, we have more than 20 new members. We welcome you all and hope you enjoy your membership.

The booth had active displays of training and historical videos as well as equipment from the 60s. Jim Stitzinger, WA3CEX brought his re-

stored original Collins Radio Company 1964 Ford Econoline S-Line Promotion Van and it was operational right off to the west of the main entrance where all could visit.

In addition to the regular ham visitors, Jim hosted a large group of Boy Scouts who operated the HF gear in pursuit of their Merit Badges.



Jim Stitzinger, WA3CEX & CCA Board Member  
Enjoying the hunt

Thank You Jim for all you do for us, and thanks to all the folks that came by the booth and/or attended our Friday dinner. The presentation this year was on conversion of Collins AM broadcast transmitters and we seem to have some new AM converts.

Our next event is our AWA Partnership Convention in August. Please see our Events Calendar on our website and also the Dallas Ham Com 2013 Website report at [collinsradio.org](http://collinsradio.org). 73s & See you soon!

-----CCA-----

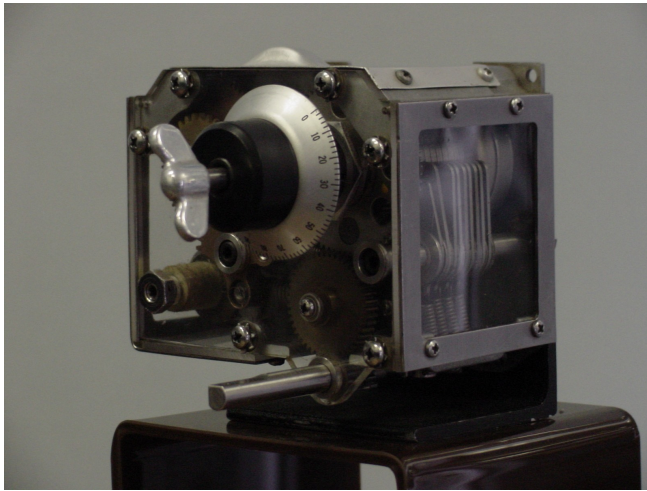


# The ART-13 B-29 Radio Room Moves South & Goes Flying

## A story of Preservation

by Rod Blocksome, KODAS—Retired Rockwell Collins

In 1937, Arthur Collins filed several patent applications describing a device which came to be called a "Collins AutoTune". At the time it was revolutionary – but not without a few bugs. Several years ago, I interviewed John Nyquist, retired executive vice-president of Collins Radio, and he told me one of his first jobs as a newly hired mechanical engineer was to figure out how to make the AutoTune reproducible in the factory. As you can see from the photo, it would easily still be a challenge for today's engineers equipped with modern analytical tools.



### Collins AutoTune Mechanism on display

Rockwell Collins Museum

The AutoTune is basically mechanical memory. It can "remember" a number of different shaft positions (including multiple revolutions) – ten positions being typical. When installed on the shaft of a transmitter VFO or tuning capacitor, the radio operator can set the desired correct position (after once manually tuning the transmitter). He then locks down the position of the AutoTune for that channel frequency. Then, anytime that desired channel is required, the operator simply positions the channel selector switch and all the AutoTunes slew to the previously set positions and stop – very precisely. In 1940 this was truly revolutionary.

Before the Collins AutoTune, the radio operator had to manually adjust all the tuning controls each and every time he wanted a different frequency (channel). Many transmitters of that period still required removal and insertion of tuning units or plug-in coils, capacitors, and crystals. Changing frequency could easily take 10 to 15 minutes – enough time for the enemy to intercept or jam the new frequency as desired.

Collins designed and produced the Model 17D airborne HF transmitter as the first product to use the newly perfected AutoTune. In 1940 the US Navy announced a requirement for a "modern" airborne HF transmitter. Collins Radio and two other companies entered the competition which included a demonstration of working hardware. The Navy was generally impressed with the Collins entry but was very skeptical about this small Iowa Company's ability to produce the transmitter in the quantities they needed.

The "scales tipped in favor of Collins" when the British representative announced that they would be the first to use the new transmitter (they were already at War with Nazi Germany) and they wanted the Collins transmitter. So Collins got the contract and the Navy assigned it the "ATC" nomenclature. But they hedged their bet on Collins by also awarding a contract to Bendix for their "ATD" transmitter. The

ATD was lower power, with limited frequency range, and used plug-in band modules - but likely lower in price.

As far as we can determine, the ATD was a flop as only a very limited quantity were produced. But the ATC went on to be produced in huge quantities for the Navy. Later the Army Air Corps adopted the transmitter and assigned nomenclature of T-47/ART-13. Some 90,000 of these transmitters were produced by war's end by Collins and two other companies.

In 1942, Boeing started production of the B-29 Superfortress – the nation's first long range high altitude bomber. The AN/ART-13 was selected for the radio operator's position for long range liaison communication. The venerable BC-348 was the receiver.

In 2004 The History Center in Cedar Rapids produced a year-long museum exhibit on the impact of radio on Cedar Rapids. A local group of hams created a mock-up of a section of the B-29 fuselage containing the radio operator's position. Of course all the equipment had to be authentic and operational. It was a year-long effort culminating with a special on-the-air event using the mock-up B-29 station. When the opening day of the exhibition arrived, B-29 veterans and other dignitaries gathered around the exhibit as photos were taken and war stories exchanged. However, the unanticipated high RF noise environment of downtown Cedar Rapids prevented all but only the very strongest signals from having a QSO. After a year the exhibits were dismantled to make room for another exhibit and the B-29 radios were placed in storage while we searched for another "home" or event.

Then in 2007, Rockwell Collins hosted a media event with Boeing to publicize support for the Boeing/Rockwell Collins effort to win a large contract for the next generation of tanker aircraft for the USAF. Since the very first US tanker was a derivative of the Boeing B-29 and it carried the same radio position as the B-29, we were invited to participate with our operational WWII B-29 radios.

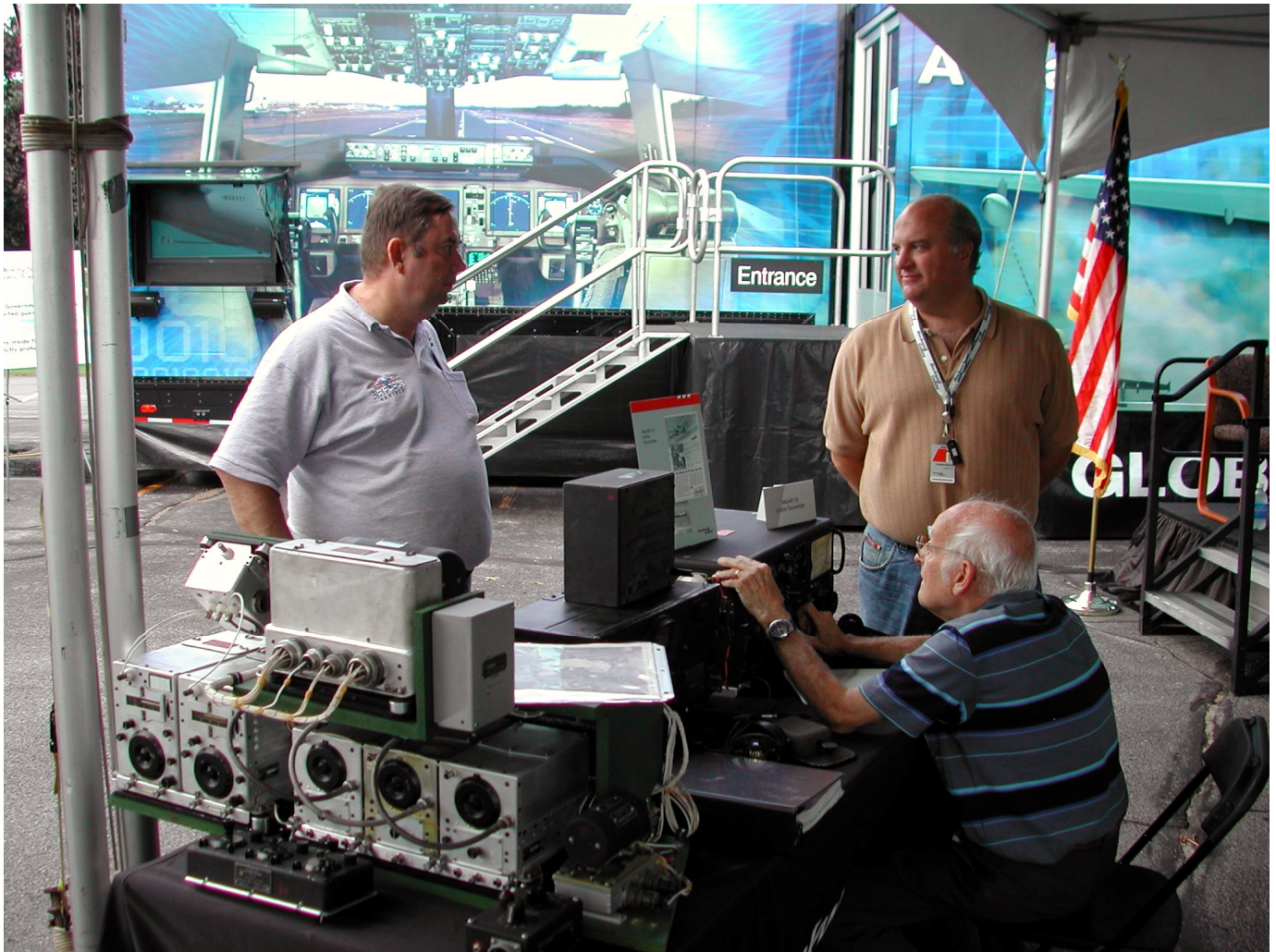
The equipment was assembled on the edge of the Rockwell Collins parking lot under a large tent. A 60-foot sloping wire antenna was installed on the adjacent lawn and this time many AM QSO's were made. There was a large crowd interested in this operational historic radio station but after the event, the equipment was returned to storage for four more years.

In the fall of 2011, we got the idea of offering our equipment to the Commemorative Air Force for installation on FIFI – the only flying B-29. We had tried a similar offer to another group restoring a B-29 at Boeing facilities in Wichita, Kansas but never seemed to gain "traction". So it was great news when the CAF accepted our offer. Over the next few months, additional interested engineers from the Rockwell Collins Richardson plant were added to the team since FIFI was based in hangars at Addison Airport formerly occupied by Collins Radio Company.

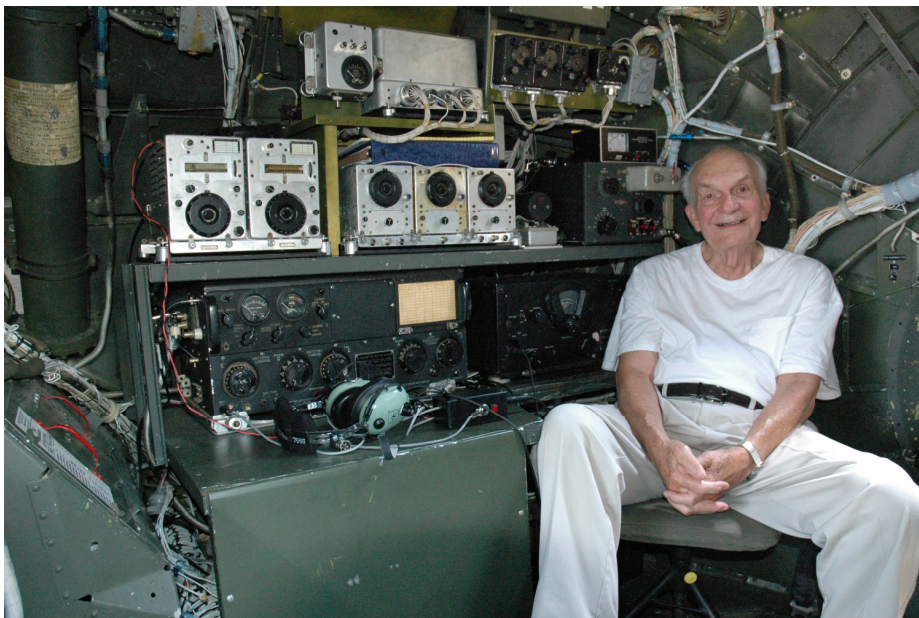
The team in Cedar Rapids went to work refurbishing the on-board equipment in addition to several 'spares' while the Richardson team fabricated and installed the HF wire antenna on FIFI, removed the "mock-up" equipment shells from FIFI and prepared the position for the new working radios. In early 2012, the restored equipment was transported to Addison and over the next few months installed and tested aboard FIFI.

As you can imagine, there were several system level "bugs" to be fixed when working with 70 year old radios in an equally vintage aircraft. But by June 2012, everything was working and a public dedication ceremony was held at Addison. In-flight QSO's were made from FIFI. You can read about the details on [www.b29radio.com](http://www.b29radio.com).





**Jules Yoder, KW0Y operates an AN/ART-13 at the Tanker Rally  
Steve Jones (left), WA6GFZ & Lawrence Robinson, KC0ODK look on.**



**Clyde Hussey, WWII Veteran B-29 Radio  
Operator aboard FIFI in June 2012  
Does he look happy—or WHAT?  
This is why we are doing this!**

**What's next? – you may be thinking.**

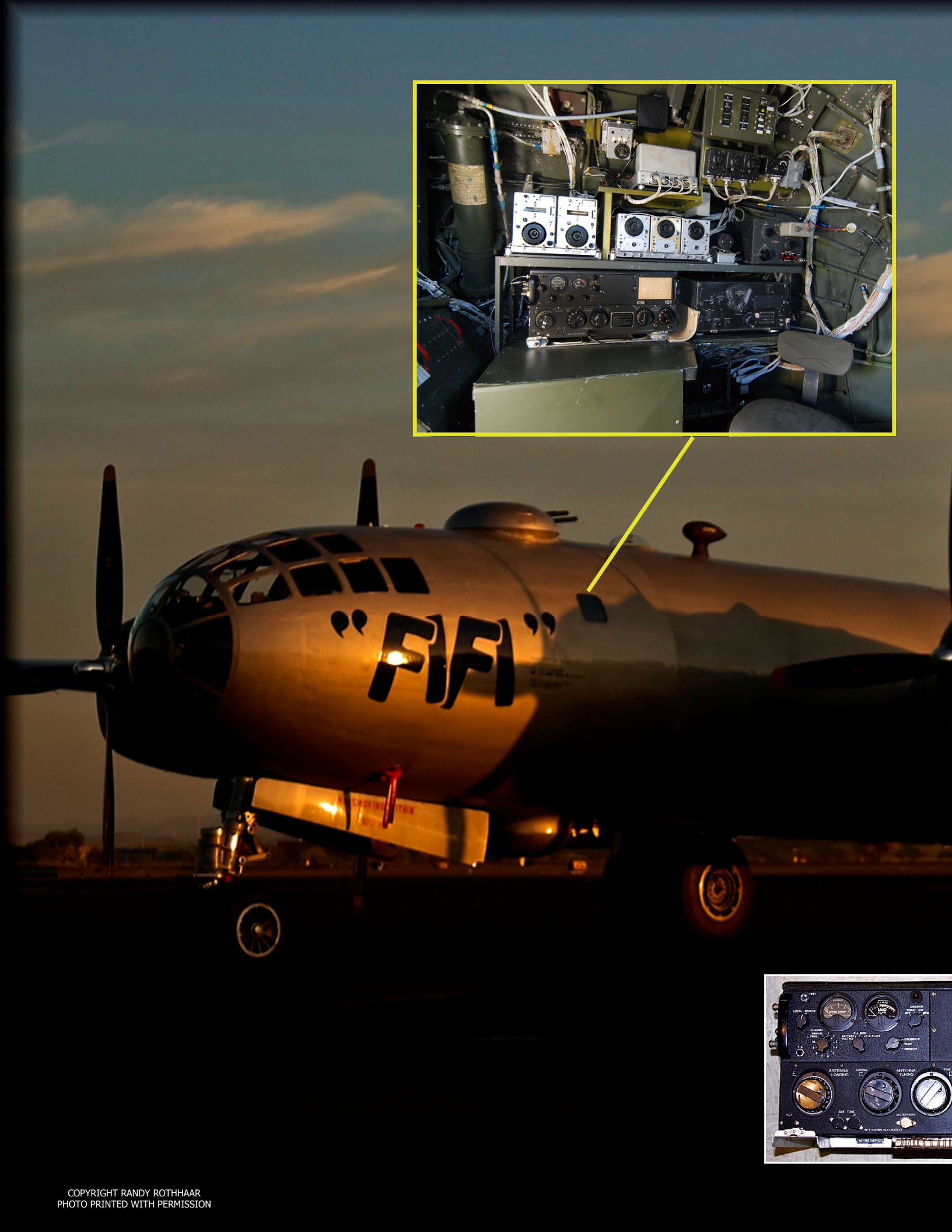
Well FIFI's hangar-mate is "Diamond 'Lil" a restored and flyable B-24. It is a prime candidate for a radio room restoration.

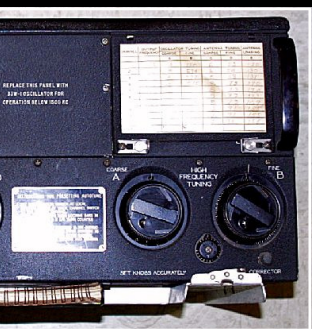
In addition, the Strategic Air and Space Museum near Lincoln, NE has a very clean but non-flying B-29 (Lucky Lady) and they have expressed interest in building an operational radio position and using it for special events. So stay "tuned" as interest in this work continues to spread.

Soon, there may be more than one B-29 on the air and available for special event operation

**Centerfold Credit:** B-29 Centerfold photography by Randy Rothhaar Photography. Website based Aviation Photography, Las Vegas NV - <http://rlrphotography.net/>



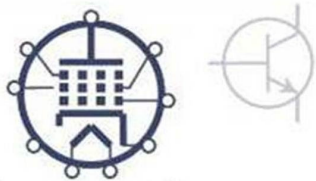




**Still Getting the Job Done  
- 70 Years Later -**



The

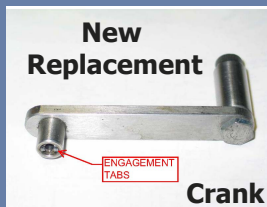


Service Line

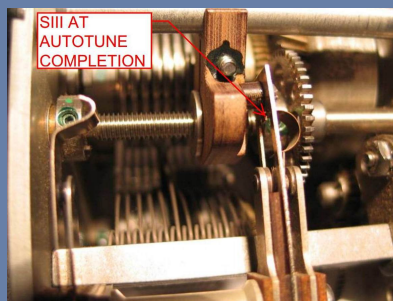
### TIPS ON ART-13 AUTOTUNE SERVICING CHECKING OVERALL SYNCHRONIZATION OF THE AUTOTUNE SYSTEM

Remove the front lower cover from the ART-13 unit. You will first have to remove the bottom cover to free the space needed to remove the front cover. Remove all of the 6/32 machine screws along the top side and the four screws from each cover end on the sides. Remove cover. Now install the hand crank on the right hand side of the ART-13's autotune drive shaft. Note the screw hole in the center of the shaft rod. This accepts a 4/40 machine screw. Attach the tuning crank to the end using the 4/40 screw and lock-washer.

Installing the crank: Occasionally one comes across a situation whereby someone has already tried to attach a hand crank and has botched the job by using an improper screw length or size resulting in leaving a part of the screw broken off into the threaded area. At this point the shaft end will have to be drilled out. It's best to use a small drill that provides clearance with the existing screw threads. Remove as much of the broken screw as possible by drilling it out. In most severe cases one may have to drill further into some of the shaft metal. Use a #43 drill bit size (correct size for a 4/40 screw tap) in order to clear the area and then re-tap the threads using a 4/40 size tap. A slightly longer 4/40 screw length for the handle may have to be used if in the re-tapping process new threads have been cut beyond the original screw depth. In using a longer screw take care not to bottom out due to the screw being too long. This will prevent a firm installation of the hand-crank. In attaching the handle, carefully position it so that the two little tabs of the crank end fit down into the two adjacent slots of the autotune shaft end.



We are now ready to test the autotune system. If the last use of this unit allowed a normal shutdown, the switch S111 on the "B" dial autotune assembly should be engaged as shown below. Note:

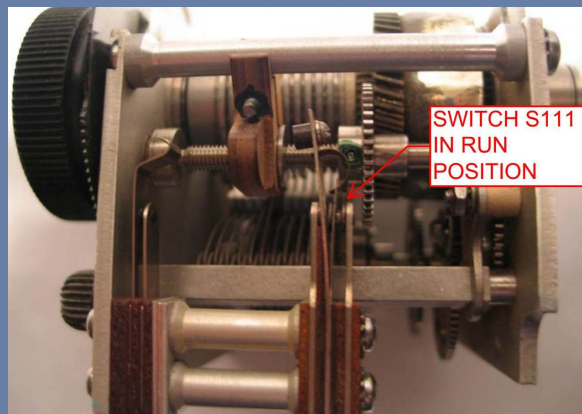


This is the desired place to start the testing sequence as we are now going to manually duplicate a autotune sequence

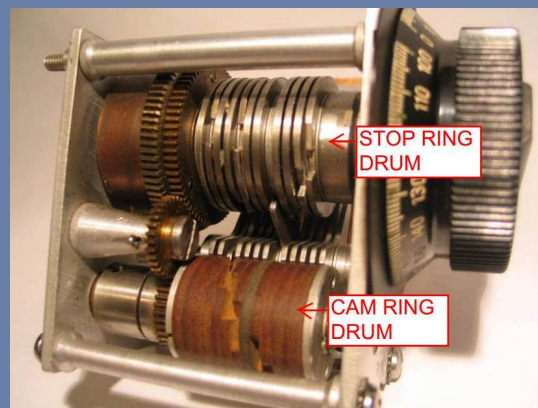
## ART-13 AUTOTUNE SYSTEM Checkout & Adjustment

by Jules Yoder, KW0Y

which always starts from this mechanical position of the autotune system. If one finds that the switch actuator has not engaged S111 but was left somewhat in the middle of the autotune sequence (shown just below), it is best to mechanically rotate the system to a point at or near the normal point of autotune completion.



To do this, rotate the crank in a CW direction and note that the travel of the movable switch activator is moving toward switch S111. Crank until S111 toggles or when it is about to toggle. The reason for starting in this vicinity is to have plenty of mechanical travel for the testing procedure. Now start cranking in a CCW direction and notice that all dials are rotating in a CCW direction. As you crank a series of repetitive click will be heard. The source of this clicking is that of the pawls of each autotune assembly dropping down into their slots of the Cam Ring Drums which arms the pawl for locking the dial rotation when the autotune system rotates in the opposite direction. This drum is located at the lower section of each autotune assembly.



This series of pawl clicks occur each nominal 4 turns of the crank. If the autotune system is synchronized properly, the pawls associated with each of the Cam Ring Drums will be clicking down into their respective positions within 1/2 turn of the crank (1/4 turn before and after the pawl drop of the "B" dial assembly). The "B" dial autotune unit is the reference for the entire system and all synchronization is based on this unit.

We now have to check the synchronization between the "A" and "B" autotune assemblies. The "A" dial autotune determines the exact position that the autotune motor reverses and rotates all dials in a CW rotation which then locks each dial to a fixed position that was set during the tuning process. The "A" dial autotune has an additional switch associated with it which is located to the rear of

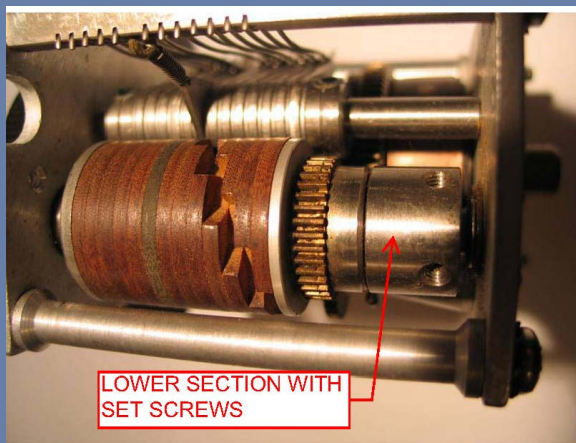
the autotune assembly on the backside of the lower casting of the unit. This is switch S109 and its function is to reverse the autotune motor at the point when the pawl of the "A" dial unit has dropped into the slot of the Cam Ring Drum in order to lock the associated Stop Ring drum into place for the selected channel. To establish if the synchronism is correct between the "A" and "B" autotune units care must be taken in observing the pawls drops between the units. The "B" dial has a multi-turn autotune assembly and is more complex. With this assembly the pawl drops, but not with a snap like the others. On rotation of the system CCW, the pawl of the "B" autotune unit rides down into its designated slot with just a little snap and then rides upwards if you continue to turn the crank. During this dropping sequence you will notice that the adjacent pawl previously dropped will still be lifting out of its slot toward the lifted position. As result it is sometimes hard to establish in viewing this pawl sequence the exact position of the crank that corresponds to the pawl being in the slot. In some cases you will find that the pawls on either side of the pawl you are concerned with will not be completely back to their lifted positions. In these cases, as you approach the drop position of the selected pawl, stop turning when you see this pawl in its' lowest position with respect to the pawls on either side slightly depressed equally. This situation usually comes about as the result of lack of lubrication which causes dragging pawl movements. To perform the synchronization test, rotate the crank slowly CCW with an eye on the dropping of the "A" autotune pawl and when the "B" autotune pawl is at its lowest point the "A" assembly pawl should have already dropped into place within 1/4 turn of the crank before, or if not, 1/4 of a turn after.

To summarize, this whole sequence of approaching the pawl drop-in's of all five Cam Drum Ratchet units must take place within 1/2 turn (1/4 turn before and after the pawl drop of the "B" dial assembly). This completes the overall test for synchronization.

#### SYNCHRONIZATION OF AUTOTUNE ASSEMBLIES

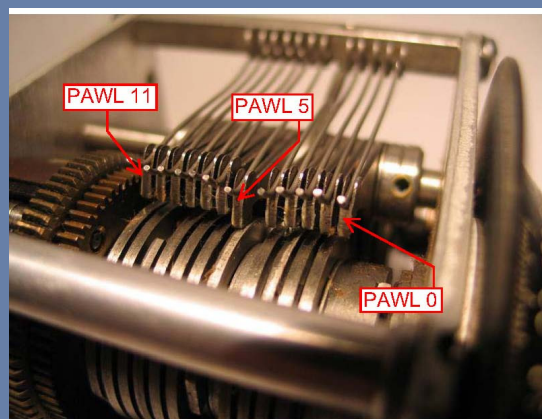
The above section describes a test procedure that can identify an autotune assembly out of synchronization with the others or if it is found that any one of the ART-13 dials does not lock when one or more channels are selected, the following procedure can be used for synchronization.

Install the hand crank per instructions in previous section. Rotate in a CCW direction until the paws drop for channel 5. This is the 6<sup>th</sup> pawl from the front of the autotune assembly front. At least one of the two set screws of the Cam Drum Ratchet lower metal cylinder toward assembly rear should be accessible. There are two set screws involved. When the unit came out of the factory these drum units were assembled in such as way as to have the set screws positioned so that each of the two could be accessed when channel 5 had been selected.

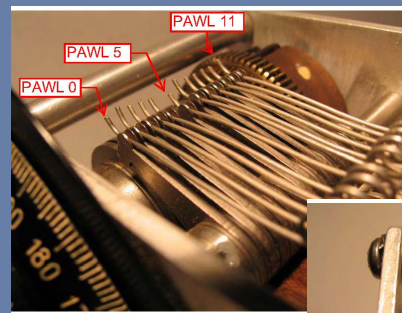


In later years with servicing and even tear down and rebuild of an individual autotune assemble this position setting may have been altered. To do this task one must have just one of the two set screws accessible with the other set screw loose. Channel 5 is a

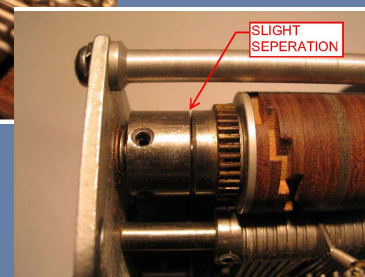
good place to start. Crank in a CCW direction until the pawl for channel 5 just drops into place (6<sup>th</sup> pawl from front). Observe accessibility of the set screws of the unit to be synchronized. Most likely channel 5 will be fine to access the set screws but either adjacent channel can be used. If both set screws are accessible you are in luck. If not, note the position of the other set screw and select a channel so it can be accessed. Using a # 6 Bristol wrench, unloosen the set screw that is not accessible and continue to rotate the crank in a CCW direction until the other set screw can be accessed. These set screws have been treated with Locktite or Glyptol to keep the screw from coming loose. You may find yourself distorting the wrench in order to free the setscrew (depends on hardness of the wrench). Unlock this set screw. At this point the lower cylinder of the Cam Drum Ratchet unit is disengaged from the mechanical driving source and can be turned freely. Rotate this cylinder in a CCW direction being careful not to let it separate from the upper body. As you rotate it goes through the channel selection sequence, each pawl dropping down in sequence starting from the front of the autotune assemble (pawl 0) to the rear (pawl 11). There are 12 pawls on each autotune assembly. The label of each of these pawls in (Ch.



Number) is as follows: Manual (0), 1-10 (R to L) and Low FREQ (11). As indicated earlier, the Cam Drum Ratchet cylinder can be rotated around freely. When rotated, a slight resistance is felt each 360 degrees of rotation due to the ratchet mechanism latch. Rotate CCW until the pawl just drops into the slot of the Cam Drum Ratchet cylinder unit for the number 5 channel, or whatever channel you are using for the synchronism and then put slight pressure in a CW direction against the ratchet latch to avoid any play or backlash.



Also make sure that there is a very slight separation between the lower cylinder and the upper cylinder containing the cam slots.



The manual indicates 0.050 inch separation. At this point tighten the set screw. Now turn the crank in a CCW direction and observe that the Cam Drum Ratchet cylinder starts to turn immediately without any backlash. If any backlash play is observed repeat this entire process. Rotate the crank CCW until the other set screw is accessible and lock down this set screw. Continue to crank and observe that this dial's autotune unit has its' pawl's dropping within the above specified tolerances.

de Jules Yoder, KW0Y



## Let's Build an ART-13 Power Supply Or - How a B-29 named Fifi inspired me to get my ART-13 On-the-Air by Bill Yates, N6YW AC12-12703

On the morning of June 28th 2012, I was reading a post on the CCA reflector that read "Fifi in the air" and, out of curiosity, I dug a little deeper into what this meant. I quickly found out that "Fifi" is the name of a proud and rare bird, a B-29 bomber from WWII that is the pride and joy of, not only the Commemorative Air Force, but also a group of dedicated Collins Radio enthusiasts who painstakingly refurbished and outfitted the original radio operator's position. This included, as its centerpiece, the Collins ART-13 AM/CW auto tune transmitter. The position also features the BC-348-Q (not Collins) receiver and the ancillary equipment associated with the original set-up.

Looking at the posting, I noted the frequency of 7.203 +/- AM and tuned in and listened. After about 5 minutes, I heard two stations conversing - quite weak but copy able. Sure enough it was Fifi - in the air & sparking my interest like a kid with his first crystal radio set... I WAS HOOKED!!! Right then and there is when I decided I was going to find and purchase a Collins ART-13 with the intent of getting it on the air to experience a piece of history and, perhaps, make a little history of my own. I can dream can't I?

While I was familiar with the ART-13, and had briefly owned a non-working example, I at least owned a BC-348-Q that works, so the hard part was to find an ART-13 that met my budget and was in relatively good condition without having been hacked and modified to death. Well, I ended up with two and I'm glad I did because with any radio of this age, you never know what you'll run into and need. These are both T-47 AN/ART-13 as used by the AAC during WWII before the formation of the USAF. Both of them worked mechanically and electrically, but the uglier of the two actually became the unit I focused on for this project and I am happy to report that I didn't have to do a ton of work to get it working either. This attests to the robust and well thought out engineering of this wonderful piece of equipment. However....It's projects like these that require the sage advice from trusted friends and Elmer's, and without them I would have fallen into dire straits because there are certain things about the ART-13 that absolutely must be adhered to in order to enjoy this fine radio. More on that later.

During this time of procurement I realized I needed to study the radio and learn about its details, operation, performance and use for the ham bands because it was not designed for Amateur applications. I also needed to decide on how I was going to power the thing. Here is where this project separates the men from the boys! I immediately ruled out using a Dynamotor. I preferred the idea of "Rolling my own" power supply and control system. My biggest thrill is building equipment from scratch and because I do it for a living, it comes to me naturally. It was time to start digging through my stash piles. My mountain of aluminum paid off!

I had to decide on a power supply to use so I asked my good friend and fellow CCA West Coast 75 meter net NCO Jim Hostetler, K6SXD for some guidance. Boy did he give me plenty! Using his own ART-13 system as a template - plus some engineering ideas of his own - he devised a design that could be considered overkill, but stable and reliable and most importantly, doable. Even better, I already had some of the most important items on hand with which to build it.

Along with Brian Thompson, NI6Q, they encouraged me to take my time and pay attention to the requirements of both the mechanical and electrical properties of the ART-13 to insure success in reaching my goal. Number one on my list was to go with solid state rectification and use of parts readily available. I also opted for a look and feel that captures the look of the period. This led me to a black wrinkle finished rack mounted supply with a full complement of metering and stainless steel hardware to emulate the rugged beauty of Collins equipment made during that period. The Collins Radio history demands this kind of approach.



Within a month I had most everything I needed to put the project into motion including the iron, the chassis parts and many of the electrical components. Making the decision to build my own supply was a trade off because of the weight involved and I must tell you, it's heavy.... around 70 pounds when finished. I also chose to use an inexpensive ready-made 28 Vdc supply - as suggested by Henry Rogers WA7YBS. This shaved numerous hours of fabrication time and weight off of the project and was money well spent. This 28 V supply is a piggyback affair that mounts right onto the top back section of the chassis I built. The generous heat sink is a welcome asset.

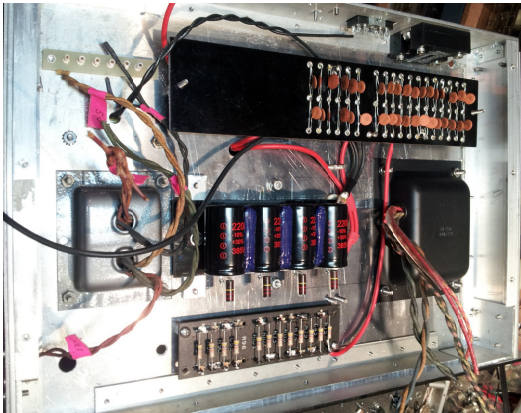
After searching for a good candidate for the chassis, and having no success, I decided to build by own from scratch. I found what I needed in my shop and began the layout and measurement process - - then measured again and again. The idea was to not make a dramatic mistake downstream. The old carpenters rule pays off big time: "Measure twice, Cut once." Then, 1/8" aluminum sheet and 90 degree angle stock was chosen for strength and lightweight. Initially I wanted to have it all Heliarc welded together but settled for tapped screw construction instead. This is less money and more work but looks great. The layout skill is once again needed here because nothing looks worse than sloppy out of line fasteners on a chassis. Because of the weight involved with the iron, spacing of the fasteners is critical. Avoiding sag and top "dishing" is very important when building anything heavy. The style of my chassis is the very common type found in early heavy duty supplies from the 30's and 40's. A nice 19" relay rack panel serves as the front, attached at the bottom directly to the chassis and supported on the sides with vertical aluminum sheet struts on either side. These were cut at a sloping angle to the back of the chassis, much like an R-388. This insures the whole thing stays together in the rack.

The published schematic shows the simplicity of the design, thanks to Jim Hostetler, K6SXD. His idea of using the Crydom 25 amp solid state relay device was brilliant and, for \$18 online, is simply impossible to beat. The photographs also show my method of layout and generous use of 1/8" sheets of Garolite for the tag strips. It's fireproof and the

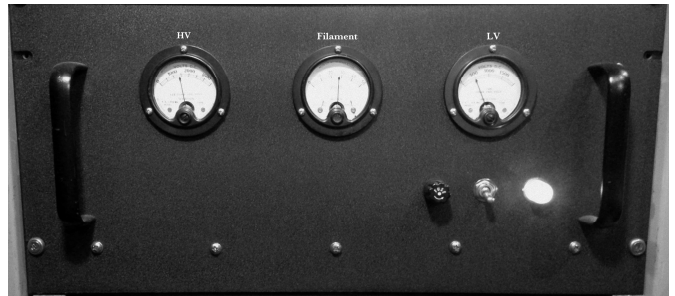
## ART-13 PS (Continued)

insulation properties are excellent. Notice the bleeder resistor string on the top chassis. Does anyone recognize these? They're re-used 30L-1 bleeders from a discarded power supply board. These are wired in series to give me the 100K value I needed and are mounted on Teflon blocks cut from stock. Because of the mounting scheme employed, they are air cooled. I also use Teflon for making the strain relief used on the AC mains cable entrance. Scrap Teflon is plentiful and can be purchased at modest prices. It's easy to machine with common tools and very strong. The insulation properties are excellent too.

The main part of getting the supply right is the choice of iron and because my target plate voltage was 1500 VDC, and I planned on using a full wave bridge, I reasoned that a used plate transformer from an old Heathkit SB-220 linear amplifier would be perfect. Well, it is and it has performed flawlessly and what's really great about this is that I already had it on hand. Thanks to Wayne Spring for the generous gift of the beautiful Thordarson 8hy choke. The rest was procured online. Metering is achieved in the usual manner using multiplier resistors on tag boards and includes adjustment pots for calibration of the meters. I took the extra time to repaint the endbells of the transformers, and the HV capacitor got a dose of Hammerstone. Aside from a painstaking wrinkle finish for the control panel, I purchased some large black handles that nearly match those used on the ART-13.



Layout and lead dress within the supply is critical as you are dealing with very dangerous voltages, so common sense and avoidance of sharp edges is of great importance. All through holes in the chassis were beveled to prevent chaffing of the conductors. The rest of the supply project is pretty straightforward and my best advice is to work slowly and use tried and true construction convention relating to high voltage supplies.



**The finished ART-13 Power Supply in Operation**

So.....How did the rest of the project go?

My ART-13 was in need of some forensics in order to get it operational. Apparently, mine had been a "Depot Reject" as evidenced by some incompetent repair attempts. You really have to get your hands dirty and be willing to go "All In" or else you will never get these beasts working. It is monumentally imperative that one must digest the electrical and mechanical properties of it's design, and the synergy between the two. I alluded to this earlier, that the rules of the ART-13 must be adhered to and for good reason. It can be a nightmare to recalibrate and because of this, a complete understanding of how and why this thing works cannot be stressed enough, but here is the reward...It will all come together in a moment of clarity and right then you will understand why this is one of the most amazing designs of the period and is arguably one of the greatest transmitters ever designed. Once you have figured out how to properly calibrate the mechanisms of the tuning units, and to "program" your frequencies into the channels, operation is predictable and quite accurate.

Like all communication equipment made in that period, it is recommended that certain components be changed out, such as the molded mica capacitors, and the bypass capacitors used in the audio amplifier. While I was at it, some of the coupling capacitors were replaced with different values to open up the audio response in the speech amp. This made a dramatic difference in the audio quality. I'm not suggesting anything radical here, but times have changed and components age. The ART-13 is like any other device and needs to be handled accordingly if you want good results. Other items to look for are signs of deterioration, like wiring insulation and heat related wear and tear. The Cinch Jones connectors also should be carefully inspected and cleaned.

As for tubes, only NOS American made should be considered. The 813 was a very well made and robust tube but unfortunately they're starting to become scarce so buy spares when you can. The same holds true with the 811-A's used for the modulators.

The big payoff is the satisfaction of owning and operating the ART-13. Mine has been in use daily since I brought it back to life in late 2012. I get the sense that when other operators realize I am using the ART-13, that I get instant "street cred" and respect. Rightly so, because those that know understand what is involved with these radios and the amount of work needed to get one on the air. This is a radio that is "earned", not given. Anyone can operate a 32V-3!

So far, my quest isn't over. Fifi has been in the air a few times but my first contact with her has been unsuccessful. However, I will continue to try and, one day, the thrill of meeting this challenge head on will be realized fully when my ART-13 station makes contact with Fifi. Two identical pieces of equipment shaking hands in the skies above our country - the country they were designed to help protect so many years ago. A real testament to the greatness of Collins Radio.

Give me a call for more information and schematics if you are interested in building up your own version of this supply. de Billy, N6YW



# TRANSMITTERS THAT WON THE WAR

## The TCS / 18Q-3

### Specifications:

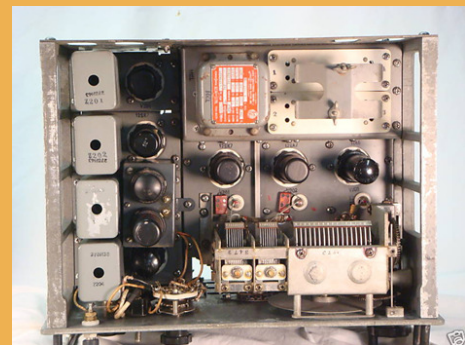
**Transmitter** (COL 52245) – Commercial Model 50Q-1  
 Pout 25 Watts A1  
 15 Watts A3  
 Frequency range 1.5 to 12 MHz (3 Bands, 1.5-3, 3-6, 6-12)  
 Freq. Control MO (VFO) or 4 Xtal Channels (Internal)  
 Pin (DC) 12 V. 9.9 A (400 Vdc Dyn.) and 3.8 A (220 Vdc Dyn + Fil)  
 Mic Input Standard Carbon  
 Antenna Wire or Whip down to 20 feet w/ Loading Unit COL 47205

**Receiver** (COL 46159) – Commercial Model 51Q-1  
 Modes A1, A3  
 Frequency Range 1.5 to 12 MHz (3 Bands, 1.5-3, 3-6, 6-12)  
 Frequency Control Same as transmitter (Channel Matched Xtals Internal)  
 Pin 220 Vdc @ 0.09 A and 12 Vdc @ 1.2 A  
 Spkr or Ph External Spkr – In Control Head COL 23270

Common Access. 12 Vdc Dynamotor Supply and Interconnect COL 21881-A  
 Dual Dynamotor Pac  
 Control (Spkr/Ph & Mic Key Connect) COL 23270  
 AC Supply 115 Vac input COL 20218 (Similar PP-380)  
 Load Coil COL 47205  
 Interphone Amplifier COL 50128



VK2BV.org



The receiver, is a simple single RF stage, dual I.F. Amp lineup and has 7 tubes including a 12SK7 for the RF amp, two 12SK7 for IF amps, 12SA7 for mixer, 12SQ7 for detector and BFO, a 12A6 for master and crystal oscillator. The audio amp is another 12A6.

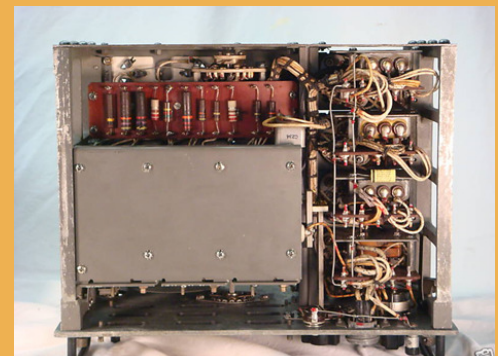
This ubiquitous transmitter receiver pair saw service in both the Navy (predominantly), Marines and the Army. It was originally designed to serve as the main HF comm radio set for the PT Boat (See the back cover of this issue). Due to its simplicity and rugged nature (and reputation) it served well through the 40s and 50s and some were even in service still in the 60s.

TCS Systems were manufactured by at least 5 other companies under sub-contract for Collins Radio. Please see the CCA website for more on the TCS, its components and the companies that made them.

In addition to being sold to the US Forces, these units were also sold to several foreign allies including Britain and Australia. These units often carried commercial name plates showing the 51Q and 51R model numbers.



Mark Tomblason Restoration  
 U. S. Marine MZ Jeep—Photo N6CC



### Collins Radio Equipped

HERE ARE A FEW of many types of the Navy's small craft which maintain communication with this Collins designed TCS radio transmitter and receiver combination. This equipment is so sturdy, handy and reliable, and packs so much power and sensitivity into so little space, that it finds numerous Naval applications ashore as well as afloat. Usually the

first radio installation on the beach-head, it is also standard on fire, rescue and crash trucks, and is often used on jeeps and command cars. The TCS is another example of the variety and quality of radio communication equipment Collins will be able to supply to industry after the war. Collins Radio Company, Cedar Rapids, Iowa; 11 West 42nd Street, New York 18, N. Y.





# Production - 1941 to 1945

## ATC & ART-13/TCZ / 17H-2

### Specifications:

**Transmitter:** Pout >100 Watts <sup>1)</sup>  
**Emission:** A1A, A3, A2A  
**Freq. Range:** 2.0 to 18 MHz HF +  
 Optional 0.2-0.6 or 1.5 MHz  
**Freq. Control:** 10 Ch. Autotune +  
 LF MO or 4 CH Xtal  
**Power Required:** DY11, 12, 17 or 17A  
**Input:** +28 Vdc Dynamotor  
 +28 Vdc @ 10 A Fil.

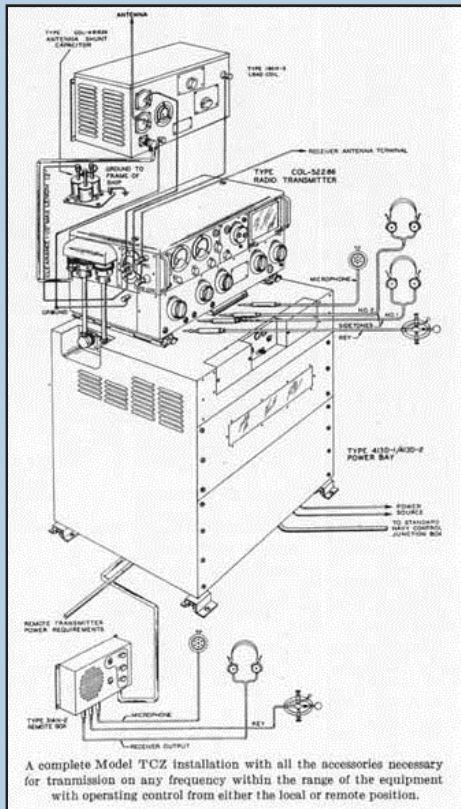
Note 1.) Output Power (and HV) = half  
 Above 25,000 feet to reduce arcing.  
**Mic Input:** St'd Carbon or Hi Z  
**Accessories:** Several Tuners &  
 Control Heads plus Matching (See CCA  
 Website @ collinsradio.org)



**SBD Dauntless Dive Bomber** - Built by Douglas Northrop, this stalwart bomber had one of the best hit records and survival records of the war. It was also the aircraft used for the acceptance flight of the ATC during the trials at the Anacostia Naval Air Station near Washington D.C. in 1942.



**Below: The TCZ 115 Vac Version For Land/Ship Applications**



**TBF/TBM Avenger**



**PB-2Y Coronado**



**PBM-3 Mariner**



**SB2C Helldiver** - Photo (right) Sept. 1945 off coast of China. This aircraft was off the USS Intrepid, CV-11. Lt. Cmdr. W. H. Carns (Bill's Father) was the CIC Commander of the Intrepid at the time the photo was taken.



**Navy PBJ-1 (B-25) Mitchell (Shown Left)**



# TRANSMITTERS THAT WON THE WAR

## The TDO/18F

The TDO family of transmitters was derived from the 1938 through 1940 developments of the 16E/F and 18F series of commercial autotune Collins transmitters that we see starting to appear in the 1940 QST ads prior to the war.

Based upon interviews with Warren Bruene, most of the changes involved in making the change from the 18F to the TDO were in the RF deck. Warren was then a very young engineer at Collins, and he was the project engineer in charge of making the output network changes required to meet the Navy TDO spec.

Following receipt (and the mutual negotiations—we suspect) of the TDO spec from the Navy Department, Collins modified the 18F commercial transmitter to satisfy this Navy specification.

The transmitter used a formidable 26 tubes including the two 813 final PA amplifiers modulated by two 805s.

The transmitter covered 2.0 to 18.1 MHz and produced 400 watts CW and 250 watts phone and was most commonly used in CW applications. It would autotune through 11 pretuned channels and was rated at over 60 wpm keying speed and could work into unbalanced lines from 70 to 600 ohms. Note that the 50 ohm standard had not yet appeared and the concept of coaxial feed lines was just emerging.

The TDO was used extensively by the Navy and also by the Signal Corp. under the nomenclature change to the BC-460. The BC-460 was, however, a TDO by another name.

Due to the weight of the unit, very few of these transmitters survived the end of the war.

We are aware of only a very few in operation and modern pictures are almost as rare as the transmitter itself.



### TDO

The power factor under all the above conditions is approximately 85 percent; operation on 115 volts requires a line current of 20 amperes and operation on 230 volts requires a line current of 10 amperes. Allowable variation in supply line voltage  $\pm 10$  percent.

#### Tube complement

Location and function	Number of tubes	Type
<b>Transmitter:</b>		
R. F. oscillator	1	6A8/6A8GT
R. F. buffer-amplifier	1	6A G7
R. F. multiplier	1	807
Intermediate amplifier	1	807
Power amplifier	2	813
Keyer	1	6S J7
Voltage regulator	1	VR150-30
Converter	1	6A8/6A8GT
Frequency multiplier	1	6S J7
CFI output amplifier	1	6S N7GT
MCW oscillator-amplifier	1	6S L7GT
Audio preamplifier	1	6C8 G
Volume limiter	1	6C8 G
Audio squelch	1	6C8 G
Audio amplifier	1	6S J7
Limiter control	1	6X5 GT
Audio driver	2	2A3
Modulator	2	805
H. V. rectifier	2	249 C
Bias rectifier	1	5U4 G
L. V. rectifier	2	866/866A
<b>Remote control units (2 furnished):</b>		
Audio preamplifier	1	6S J7
Audio preamplifier	1	6S N7GT
Power rectifier	1	6X5 GT

<sup>1</sup> Type 866/866A may be substituted in an emergency.



TDO Transmitter.

### UNCLASSIFIED

**Operating control.**—Front of panel and complete remote control (two identical remote control units furnished).

**Carrier control.**—Press-to-talk switch on microphones.

**Type of Keying.**—Vacuum tube, several hundred words per minute A<sub>1</sub>; 60 words per minute A<sub>2</sub>.

**Antenna.**—The equipment is designed to work into an unbalanced antenna or transmission line having an impedance of from 70–600 ohms with a phase angle of not more than 45°.

#### Weights, dimensions and Navy type numbers of equipment units included in contract

Unit	Navy type No.	Height	Width	Depth	Weight
		Inches	Inches	Inches	
Transmitter	COL-52318	80 $\frac{1}{2}$	28	30 $\frac{1}{4}$	1140
Remote control units (2 furnished)	COL-25377	10 $\frac{1}{2}$	19	11	30
Microphones (2 furnished)	CAU-51057				
Power cord	COL-26019				
Telegraph key					
Metering cord					
Test cables (2)					
Spare parts		12 $\frac{1}{2}$	16	19	100

**Accessories not supplied by contractor.**—Head phones (may be 500 ohm impedance up, including high impedance phones such as the crystal type.)

#### Shipping weights and dimensions

Case	Content	Size	Gross Weight	Cubic feet
		Inches	Pounds	
1	Cabinet	39 x 31 x 84	660	77.5
2	Power unit	24 x 28 x 40	450	15.5
3	Control unit and amplifier unit	20 x 24 x 36	140	10.0
4	Remote control units	20 x 31 x 30	140	10.7
5	Exciter unit	20 x 31 x 35	164	12.6
6	Output network unit	20 x 31 x 35	142	12.6
7	Transformer	13 x 15 x 15	140	1.69
8	Transformer	11 x 12 x 13	76	0.99
9	Transformer	11 x 12 x 13	82	0.99
10	Vacuum tubes (2 sets)	20 x 24 x 30	76	8.3
11	Accessories	20 x 24 x 36	165	10.0
12	Spare parts	15 x 17 x 25	127	2.94



TDO remote control units, microphones, and key.



TDO Remote Control Unit.

CATALOGUE OF NAVAL ELECTRONIC EQUIPMENT—APRIL 1946

T-106

# Production - 1941 to 1945

## MBF

Touted as the Japan Landing Beachhead Transceiver, this little MBF was the result of a late war development program and contract to produce a small transceiver that could be used by the many boats anticipated to be used in landing troops and supplies for the invasion of Japan. . . . An invasion that never happened.

The separate contained transmitter and receiver were crystal controlled and pretuned to a single channel in the frequency range 60 to 80 MHz and produced 3 watts phone using a combined plate and screen modulation technique.

The output network was link coupled and operator adjustable to work into short antennas. A "kit" antenna was provided in the spares case which is shown mounted over the unit. The unit could be fixed mounted on shock mounts or it could be hand carried ashore or to another ship to be used in a more portable mode.

The spares case also included and stored a handset that had a 20 foot cord standard so that the operator could move around on the bridge of the ship involved.

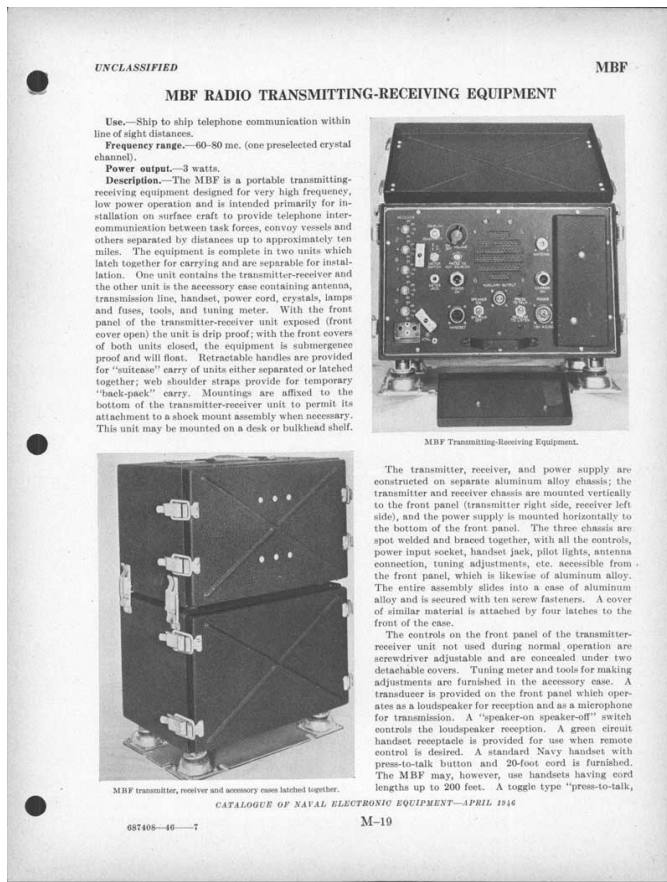
Tuning controls were hidden behind two removable covers on each side of the front panel and, in operation, only the very basic operator controls were visible or usable.



Due to the fact that the war ended before the invasion of Japan was necessary, the first small contract was the last contract and the unit was never used for its intended purpose. It did however go on the serve as a harbor and fleet ship to ship "rather secure" radio due to its low power.

Just a little over 2000 were manufactured between 1944 and 1945 when the contract was canceled along with all the other war contracts.

One of the interesting things about this rig is that it always seems to have had both the Navy MBF name plate as well as the Collins Winged Emblem on the front panel whenever we have observed a surviving MBF. Maybe Art saw peace coming and was not above a little advertising. Today, many MBFs are still serving on 6 meter AM.





# The Top Secret Wirkler/Collins DAB

## Developed from information in the Collins Columns—1946 & Joint Research with the Rockwell Collins Museum

Already introduced to you in the previous story in this issue titled "The War Years", this fascinating machine, and the man behind it, deserves a little more exposure.

Walter H. Wirkler was a farm grown young man from eastern Iowa when he finished High School in the late 20s and went off to Iowa State not knowing for sure what he wanted to do in life. Fortunately for our country, he chose Electrical Engineering as his career. He graduated Iowa State in 1932, and by 1934 had been found by Art Collins and hired as one of the first engineers at Collins Radio. He would have been about the third or fourth engineer hired by Art.

He came to Collins with a strong interest in HF DF work as well as some past experience with Single Sideband. Walter would be the first to acknowledge that he was not a hands-on engineer – much preferring to explore concepts and mathematical solutions that would then lead to real world solutions.

He was also a pilot, as was Art, and they shared this common interest both professionally and for relaxation. Years later in the mid '50s, Wirkler would make a significant contribution to the development of Collins Automatic Flight Control Systems and the development of ILS approaches.

In 1935 we see him co-authoring a paper with Art on Grid Bias Modulation for Power Amplifiers in the 100 Watt class, and in 1937 he is exploring Phasing SSB modulation, although this never matured into a project or product.

By 1939-1940, following the declaration of war on Germany by Britain, and the subsequent start of Germany's sub attacks on US supplied aid to England, it became apparent that there was a need for a solution to the problem of locating German submarines at sea from a long distance based on their radio transmissions.

This need did not escape Art's or Wirkler's attention and by the start of the US involvement officially in the war, strange little wooden houses started to appear outside the rear eastern corner of Main Plant. One of these buildings became known as "Fort Dearborn". The presence of guards and the lack of information clearly indicated a Top



**Walter at Work in the Lab on one of his DABs**

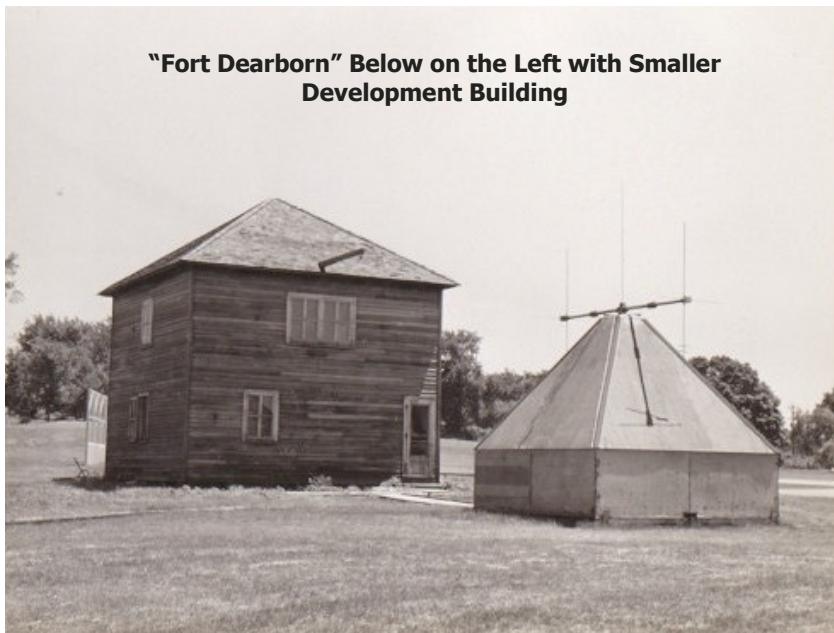
Secret project. The DAB was being born. Throughout late '41 and 1942, strange antennas came and went. New houses appeared.

By mid-1943, rumors of a project called Huff Duff were going around and the Navy was pressing the first version of the DAB into service. Details of this project are still hard to find, but here is what we know.

There were three different versions of the DAB specification eventually developed: DAB-1 through 3. These were, for the most part, serious sized antenna, fixed position, moving antenna direction finders always installed in mostly wood building along the coast lines. They were used for both German and Japanese submarine location. They were an important part of a large successful joint project between Britain and the US to improve our ability to locate and sink enemy

**Lab. Ass't Dale McCoy working in the Small Building**

**"Fort Dearborn" Below on the Left with Smaller Development Building**





UNCLASSIFIED

DAB TO DAB-3

DAB, DAB-1, DAB-2, AND DAB-3 RADIO DIRECTION-FINDING EQUIPMENTS

Use.—Permanent land stations.  
 Frequency range.—2000-18100 kc. nominal in four bands.

Bearing indications.—Visual, phase comparison.  
 Signal reception.—CW, MCW.  
 Antenna collector system.—Rotatable, spaced vertical loops for vertical wave detection.

Power.—Supply required—105/110/1/60; allowable variation in line power, ± 10 percent.  
 Consumption—270 watts.

Description.—The Models DAB, DAB-1, DAB-2, and DAB-3 are identical and incorporate spaced vertical tuned loops with identical "switch" receivers and cathode ray indicator. Tuning of the loops has resulted in an increase in the sensitivity of the loop type of antenna, facilitating the detection of weak signals. Precision in bearings is increased by the method of continued connection and cross connection of the two main loops to the receiver channels, thus minimizing the effects due to possible phase shift in the receivers. The rate of change of the two loops from one

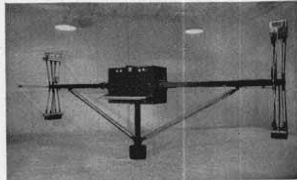
radius from trees and metallic obstructions. The diameter of the circle formed by the swing of the equipment is approximately 17 feet 2 inches.

TECHNICAL FEATURES

Design.—Navy.

Tube complement

Location (unit)	Circuit function	Number of tubes	Type
RF tuner unit A.	First r-f amplifier	1	68K7
	Second r-f amplifier	1	68K7
RF tuner unit B.	First detector	1	68J7
	Second r-f amplifier	1	68K7
Oscillator unit C.	First detector	1	68J7
	H. F. oscillator	1	6J5
Mixer unit D.	First buffer amplifier	1	68K7
	Second buffer amplifier	1	68K7
	Third buffer amplifier	1	68K7
IF amplifier unit E.	Output amplifier	1	68K7
	Mixer	1	68A7
Power supply unit F.	Input buffer amplifier	1	68K7
	First detector	2	68K7
	Second detector	2	68K7
	AVC amplifier	2	6J5
Audio amplifier unit H.	Plate supply power rectifier	2	5U4G
	Plate voltage regulator	2	VR-100-30
	Second audio amplifier	2	68J7
	Audio output amplifier	2	6J5
Monitor unit J.	Differential rectifier	2	6J5
	Keyer amplifier	1	6J5
	Bias supply power rectifier	1	5U4G
	1. F. oscillator	1	VR-100-30
Oscilloscope amplifier N.	Carrier strength meter amplifier	1	6J5
	Carrier strength meter limiter	1	6H6
	Carrier strength meter amplifier	1	6J5
	Monitoring amplifier	1	6J5
Total	Oscilloscope amplifier	1	68J7
	Oscilloscope	1	902
Total		48	



Model DAB-3 direction-finding equipment installation.

receiver to the other is approximately ten cycles per second with provision for a small degree of overlap so that the antenna circuits of the two receivers are never open. This equipment is considered one of the more accurate type in direction finding indication.

The equipment consists of a main cabinet structure housing the indicator, electrical circuits and controls, and a collector system mounted on the main cabinet. The entire assembly is elevated on a vertical spindle, permitting complete manual rotation. The cabinet frame is constructed of spot-welded stainless steel, the collector loops and supporting structure of wood and aluminum alloy.

Dimensions and weight of equipment assembled

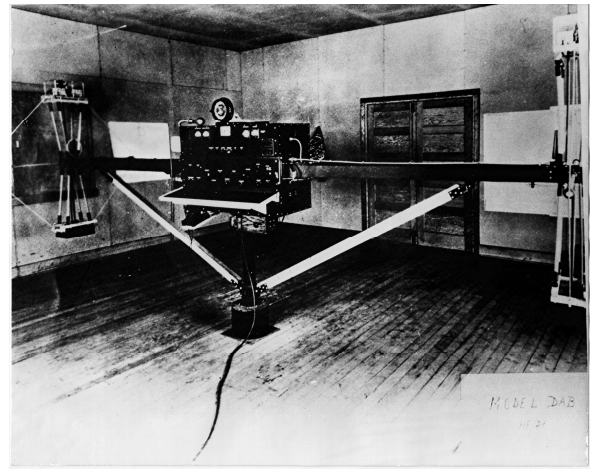
Length	Height	Depth	Weight
16 feet 7 inches...	7 feet 2 3/4 inches...	5 feet 10 3/4 inches...	832 pounds.

Space required for installation.—Recommended minimum: 24 x 24 feet, with a clearance of 200 yards

CATALOGUE OF NAVAL ELECTRONIC EQUIPMENT—APRIL 1946

D-5

687408-46-3



of South America. These Networks comprised a number of DABs tied together with phone lines to a central command center where multiple bearing were crossed and coordinated. Bearing accuracy was touted as better than 1 degree (Which was still a 50 to 100 mile search area at 1000 miles range). Accuracy varied with propagation and particularly the time of the year.

There were 17 DABs in the US network, 20 in the British employment and 11 operated by the Canadians.

In addition to fixed location DABs, this important DF was employed in a Jeep mounted configuration where a 24 x 18 x 18 inch deep dual receiver/display was mounted on the Jeep along with a 20 foot span antenna pair. The entire Jeep was then driven in an arc until a phase lock was achieved and then the bearing of the Jeep taken and transmitted. There are no known photos of this configuration.

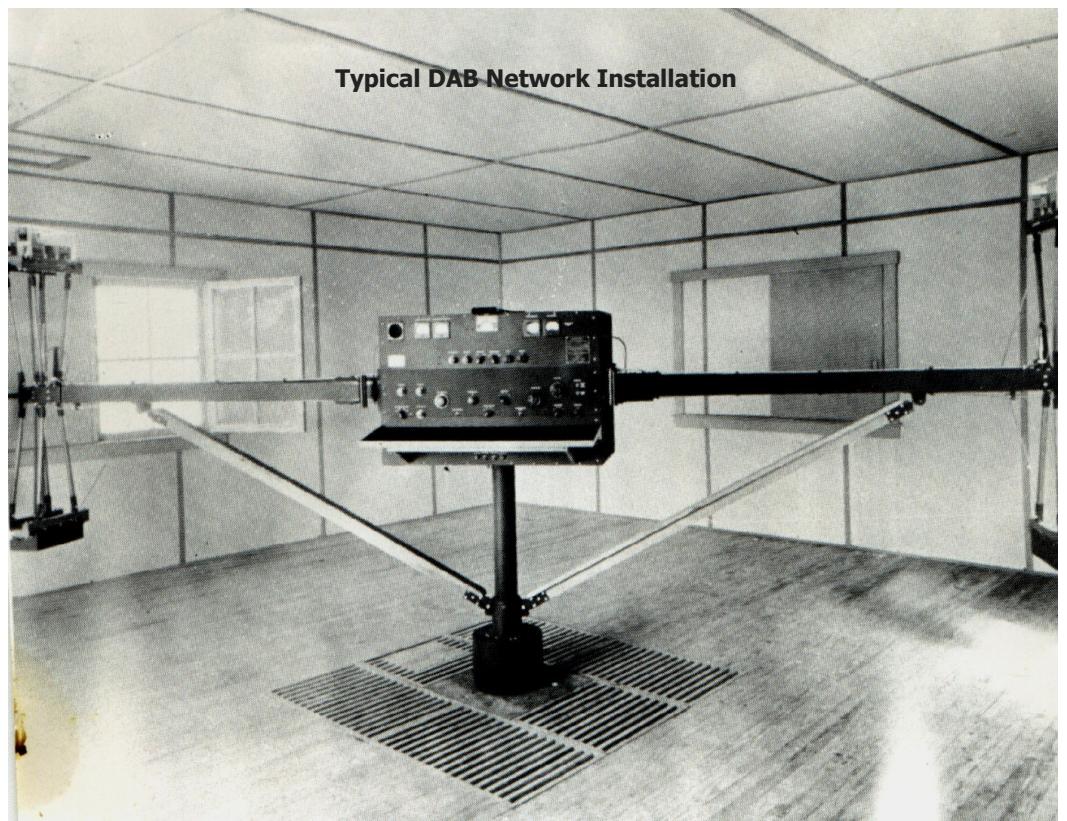
In total it is believed that only about 100 total DABs of all configurations were built and very few, if any, survive.

submarines. This program was seriously successful as outlined in the previous article in this issue.

The DAB consisted of two 2-28 MHz receivers (including dual IF) and then a phase comparison was done at the IF level and displayed on a contained oscilloscope. Somewhere in the history of the project, we know that they started using a low pass discriminating filter (the DAB used a Collins Type 115K-3) which significantly improved the IF performance and accuracy of the system.

Frank Davis was the assigned Electrical Engineer on the project and John Giacometto was the Mechanical Engineer. Bob Cox also was later assigned to this project during its development. The lab assistants were Dale McCoy and Francis Malone.

There were several "Networks" of DABs both in the US and Britain, as well as on the coast



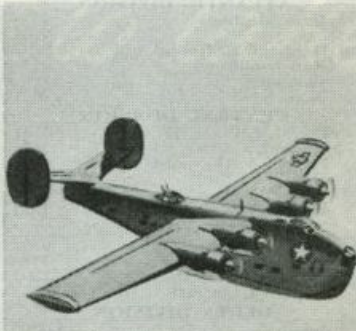


**MAKING THE DIFFERENCE EVERY DAY**  
**-- Just Ask the Man Who Bet His Life On It --**

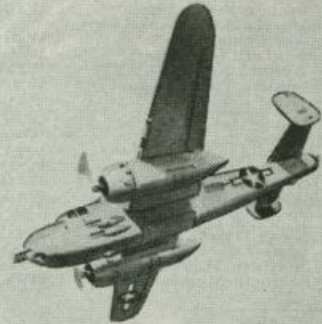
## **These U.S. Navy Planes Carry Collins Autotune Transmitters**



GRUMMAN TBF AVENGER



PB2Y-3 CORONADO

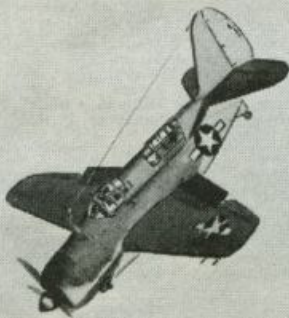


MARINE CORPS PBJ MITCHELL

### **The voice of thousands of Navy fliers**



THE COLLINS ATC Autotune transmitter is regulation equipment for most two-place-and-larger types of Navy aircraft. It is the military successor of Collins airborne Autotune transmitters which were adopted by several of the great commercial airlines years before the war. Since Japan struck, the Navy has ordered many thousands. In advanced design and rugged construction, today's ATC reflects the lessons of war learned in every quarter of the world. It is a foretaste of the reliability and efficiency to be expected of Collins by commercial and private users after victory. Collins Radio Company, Cedar Rapids, Iowa; 11 West 42nd Street, New York 18, N. Y.



CURTISS SB2C-1 HELLDIVER



PB4Y-2 PRIVATEER



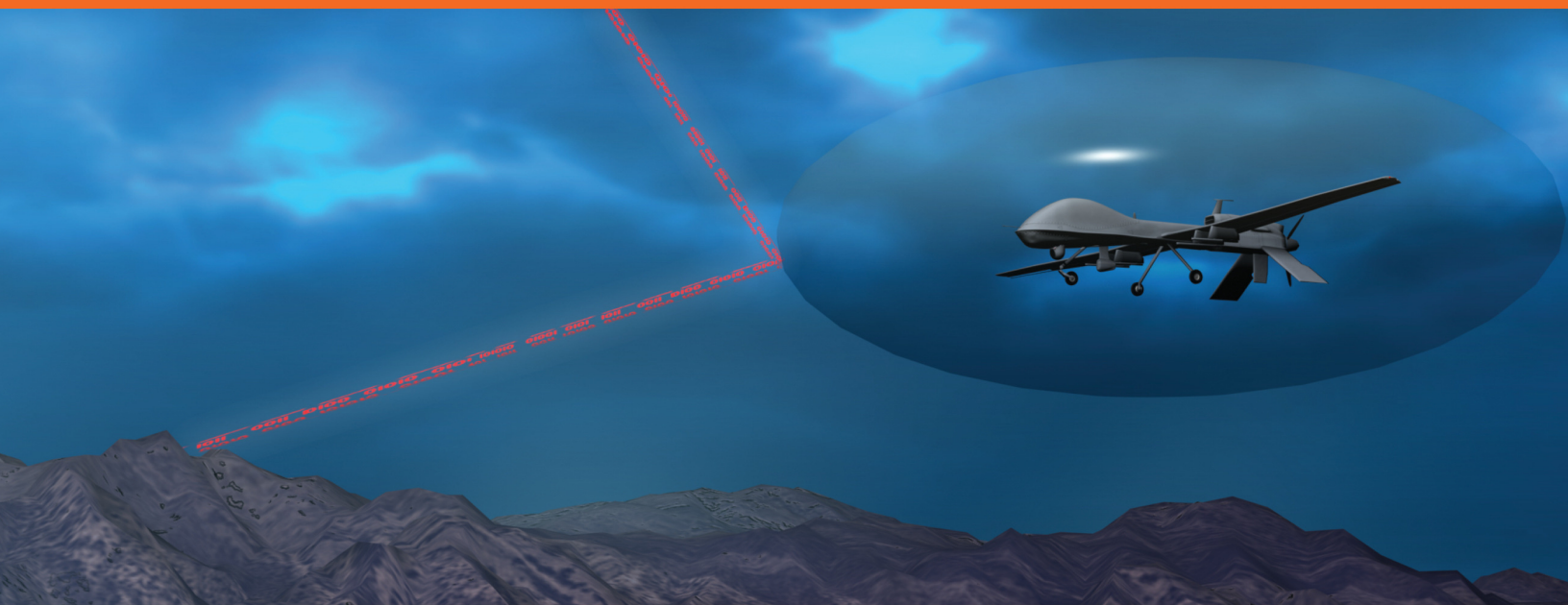
MARTIN PBM-3D MARINER



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With the convergence of manned and unmanned operations in future airspace, reliable GPS information is beyond critical. Rockwell Collins combines high-accuracy GPS with proven security and anti-jamming technology to allow manned and unmanned aircraft to safely navigate through the world's most challenging environments. See how we continue to lead the industry in GPS innovation.

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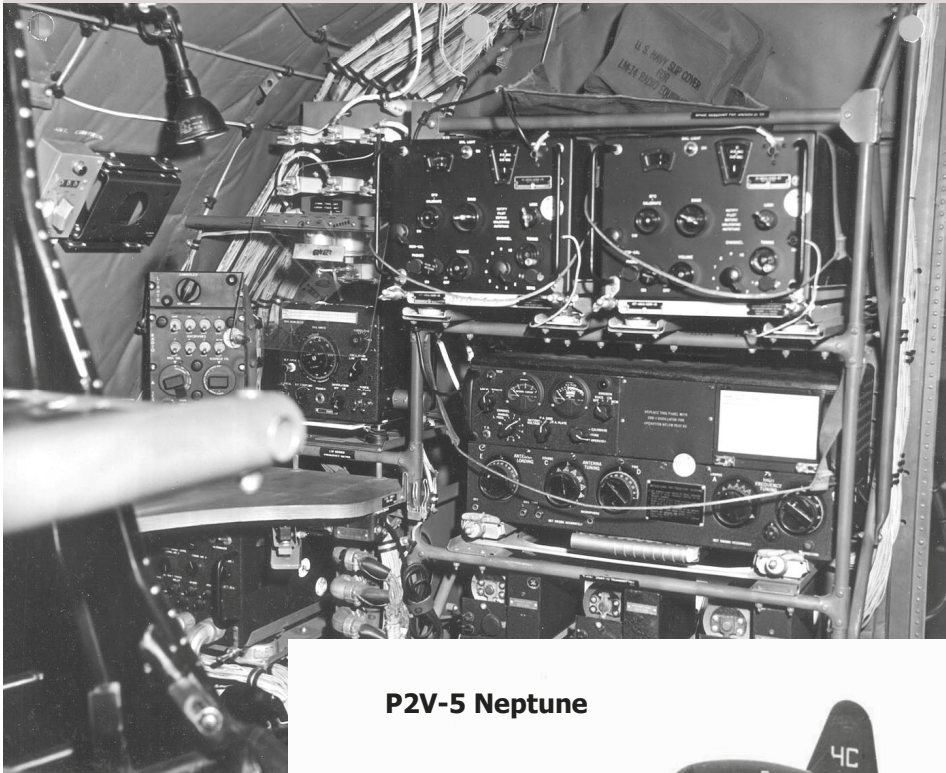
**Rockwell  
Collins**

Building trust every day



# IN COLLINS WAR "SHACKS" OF THE FOURTIES

## Then



**P2V-5 Radio Operators "Shack"** - A full suite of Collins equipment supports the radioman in the P2V-5. The ATC or JAN ART-13 transmitter is complemented by dual Collins Autotune ARR-15 receivers.

The ART-13 and one ARR-15s could also be remotely controlled by the pilot. One of the ARR-15s was operated by the radio op and was usually monitoring the base HF frequency or, after the war, WWV.

The installation also included the LM-10 frequency meter (just to the left of the ART-13), the trailing wire and fuselage antenna tuner (Located to the rear over the wing through-spar, the crypto and PA equipment and the three carbon pile regulators for the engine starter/generator sets.

Below the desk you can see the knee operated keying switch and to the left of the LM-10 is the control panel for the intercom and the panel lights.

This operating position faces to the rear and backs up to the through-spar which the crew had to crawl over to get forward to the flight deck. Notice that there is a safety cable strapped around each piece of heavy equipment like the ART-13 and the ARR-15s in case of an abrupt stop which could rupture the rubber shock mounts and careen the rigs into the operators position.

Also mounted over the spar was the command set complement of ARC-5 equipment.

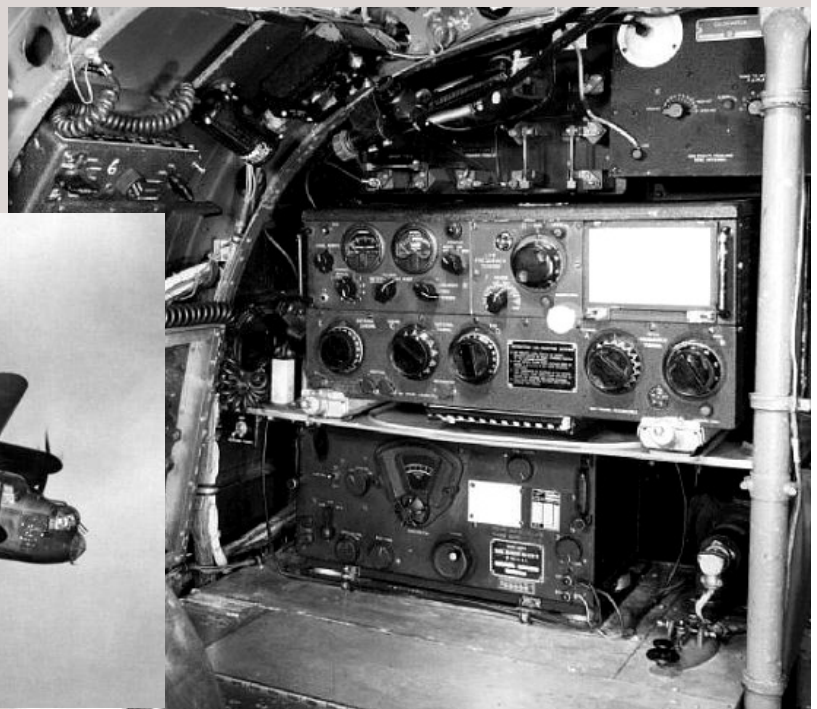


**P2V-5 Neptune**

**British Lancaster Bomber (below)** and its Collins equipped radio position.

As you have probably read, the British and the Canadians were one of the first customers to adopt the new autotune 10 channel transmitter from Collins Radio—that upstart small production company from Iowa farm country.

Here the ATC is shown paired with the BC-348. The tuner is mounted above the ART-13 along with the switching.



**Canadian Lancaster**





**B-29 Radio "Shack"** - The radio operators position in the spacious and pressurized B-29 was luxurious compared to the previous installations of the ART-13. Here in the early installations, the AN/ART-13 is paired with the BC-348-R receiver and its tuner which drives the fuselage to tail mounted wire antenna. Also shown on the upper level is the ubiquitous SCR-274N Command Set suite which provided the airborne short range formation communication as well as the local flight control.

The AN/ART-13 was normally used only in CW (MCW usually) mode to communicate with the base and airborne long range pathfinder aircraft. Only in emergencies requiring immediate open communication with rescue or base ops, did the operator use the voice AM mode.

The 10 autotune channels could also be selected by the pilot with a remote control box

Proud USAAF Aircraft  
 Dedicated Support  
 (& below right)  
 Proud Airmen of the  
 330th Bomb Group



*B-29 Superfortress*





# IN COLLINS WAR "SHACKS" OF THE FOURTIES Now



**W4CT, Ben Booth of Mentone, Alabama Shows off his working ART-13**



**Above - WA7YBS, Henry Rogers upstairs at the Western Historic Radio Museum Showing his ART-13 w/ the BC-348-R And his rare RCA CGR-32-1**



**WD2XFJ, Dave Curry Operates his ART-13B from his home in Burbank, CA**



**R-105/ARR-15**



**COL TCS-12 WA7YBF H. Rogers**



**N6YW, Billy Yates & his ART-13/BC-348 Position**

# A Glimpse of the Movers and Shakers from the War

## John Dayhoff - Director of Fabrication



John (Slim) Dayhoff was a man that played an important role in the formative years of Collins Radio. He was also a man that I think you would have liked. You certainly would have respected him.

Slim's story is one of growth and overcoming obstacles. It begins in 1903 in a small town, Fairmont Nebr., which lies right along the railroad line east of Grand Island. John Dayhoff was born October 14, 1903 to John Arthur and Mollie Lauretta (Cook) Dayhoff.

His Father John, having moved from Baltimore to Nebraska, was then working for the railroad.

Slim left home at an early age – after leaving High School – in order to find work. By the depression, Slim had found his way East into Iowa and was working for M. H. Collins on his farm. He had risen to be the chief mechanic responsible for all of the farm equipment on M. H.'s many farms spread across the state of Iowa and M. H. thought very highly of him.

Prior to the collapse of the M. H. Collins Farms business in 1932, young Arthur Collins had often played on the farm and was friends with Slim who was just 8 years older than he was.

When Art married and started building his first transmitters in the basement of his 6th Avenue home, Slim often helped him with the construction, and Art wanted him to come to work for Collins Radio as soon as the company was incorporated. M. H. resisted this – valuing Slim highly and needing him to help shut down and sell off his bankrupt farm business.

It was not until 1934 when Art was hiring several other engineers that Slim finally officially came to work for Collins Radio. Slim's clock number was #3. He would prove to be a valuable contributor and a man that kept things running on course.

Between 1934 and 1940, Slim did a range of jobs with increasing responsibility mostly related to fabrication. By 1940, with the war looming, the Navy gave Collins Radio its first war development contract for the TCS family of transmitter, receiver and accessories. This proved to be a very successful program for the company and Slim was right in the middle of it all.

When the war broke out, and the all-male workforce policy of Collins was tested by the draft and the loss of most of its key assemblers, Slim was assigned the job of Production Supervisor for the new TCS line. He was also right in the middle of the hiring of female assemblers. This amounted to a huge social change. With all of the management staff resisting going to female assemblers, it was Slim that proposed letting him start one female assembly line (the TCS) in one building, and seeing how they did.

The rest is history. Slim had hired well qualified female "foremen" to run the line and the women beat their goals - both in terms of output and quality.

It was not long before Slim was in charge of all production at Collins Radio during the war, and Collins was on its way to the Iowa version of Rosie the Riveter. He had developed a reputation as a no-nonsense manager with a firm but fair hand....but there was another side to Slim also.

While working at the Farms, Slim had developed a problem with alcohol. He could knock down a few....or more. Sometimes it got him in trouble. The good news imbedded in that bad news is that he was known as a "friendly drinker" and rarely got into serious trouble...but there was the occasion or two.

He did not mind talking about it because fate, and Arthur, handled him firmly, and after one particularly rough experience, Art strongly persuaded him to join AA (a group of only 5 folks at the time in Cedar Rapids). The result was a changed man.

Slim was as proud of his handling of this problem as he was of his work at Collins. But he was very silent about both – other than when he stepped out and helped others. Bottom line, with all that strength, he was a very quiet and humble man.

On June 30, 1962, Slim married Arlene, a young nurse, who also worked for Collins Radio. His first wife Alene has passed away after a long illness in 1961. There were no children from either marriage. Arlene still lives in Cedar Rapids.

Slim had a reputation that really only fully came to light after he had passed. He had helped many people quietly in their fight with alcoholism and even more generally, he had quietly helped line workers with personal problems, paid for children's tuition and just generally been there when his employees needed him. Just as M. H. had a reputation for knowing and caring about his employees, Slim also walked the line each shift getting to know people ...and when necessary, helping them in their outside lives. Like I said, you would have liked him.

Slim and Art remained very close friends. That friendship had started on the farm years before, and it would endure until they died. The friendship never interfered with their business dealings though.

In 1965 Slim was diagnosed with cancer following an attack mimicking a cardiac problem. Lung cancer had taken its toll on one of his lungs, but aggressive treatment at the University of Iowa (removal of one lung and surrounding area) pushed the cancer into remission.

In 1972, while working as Director of Fabrication, Slim decided it was time to retire. The Rockwell Collins people thought so much of him (and his continuously profitable cost center) that they begged him to stay on in an advisory role. They even offered him his old office.

This pleased Slim greatly and he accepted their request to stay on, however he would not accept keeping his old office. He said it would not be fair to the man who replaced him. His wife Arlene related that Slim stayed on because of his loyalty to the company and his close relationship with the Collins family. So, in March of 1972, he moved into a new office - and assumed his advisory role. In 1976 Slim took retirement and left Collins after more than 42 years of service to the company. The 42 years did not include his employment at Collins Farms.

He passed away in Cedar Rapids on March 25th, 1981 at the age of 77. He had been straight and sober for over 30 years. Those that knew him well, knew that the world had lost a strong, humble, and compassionate man. Collins Radio had lost one of its biggest contributors.

### Editor's Note:

The **Signal Magazine** wishes to thank Arlene Dayhoff of Cedar Rapids Iowa for her time, and for our many discussions about her husband, Slim.

Sometimes, doing this magazine has unexpected side benefits, and meeting and working with her is certainly one of them.

Her pride and love for Slim was obvious, and it helped me get to know more about her husband, what he meant to his friends, family and to Collins Radio.



## Glimpses (Cont'd)

### Roy Olson - Engineering Project Lead



**Very Rare Photo of Roy Olson  
Engineering Lab -late 30s**

Roy Olson was the consummate Engineer and apparently a bit of an enigma. With all that we know about his contributions to the company, there are only a few photos of Roy. He is a bit of a mystery. The story told here will be in short form due to space limitations but the longer form is yours to read at the link below.

Roy grew up on a farm in Eastern Iowa near the town of Osage. His older brother had survived World War I where he had been exposed to radio communication. When he returned from the war he became a ham and at the same time had gotten his brother Roy interested in radio. Roy obtained his amateur license and became involved with Art Collins on the air. He had "listened along" as Art started his company. When Roy graduated from Iowa State, Art was just hiring his first engineers and Roy was the second engineer hired by Collins Radio. Bob Samuelson was the first.

Besides ham radio and engineering, Roy and Art shared a common interest in flying. It was

not long before they both had their pilot's licenses and Art was buying his Red Rearwin Monoplane. Roy and Art picked up the new little plane with some home brew ferry radios installed (see full story of this adventure on page 33 of B. Stearns' book Arthur Collins— Radio Wizard).

At the same time Collins had obtained its first order for aircraft radios – the Colombian Air Force order for 50 sets. Roy Olson, Bob Samuelson and Walter Wirkler were assigned by Art as the design team for these radios.

The adventure with the Rearwin and Roy, combined with their Colombian Air Force contract, led Art to conclude that there was a huge opportunity for high margin business from the avionics market. Their first actual product was a four channel ground transmitter about which little is known. At the same time, Art was making important contacts with Braniff Airways and with its owner, Tom Braniff. Out of discussions with Tom (Scratched out on their lunch table cloth), came the first design concept for a autotune 10 ch transmitter that would suit Braniff's needs. Designing this autotune transmitter fell squarely on the shoulder of Roy Olson – at least the autotune part of it. The task was arduous and results only came after significant effort and the modernization of the Collins Radio machine shop capability.

A 10 channel 100 watt autotune transmitter similar to the 17D emerged after a great deal of work from 1935 to 1937. The first ground version was installed at a Central American Tropical Airways Telegraph facility. Art was pleased with the business result but the two motor autotune was difficult to build. He challenged Roy to develop a single motor autotune that would be more cost effective. The 17D was the result and Braniff immediately bought 10 to be installed in their DC-3s. By 1939 a satisfied Braniff had ordered 10 more 17D systems.

In 1939, war was looming and this fact was not lost on Art. Using their capability and experience with the 17D, Collins went to the Navy and began working on the new ATC specification for a long range autotune 100 watt transmitter. Art put Roy Olson and Frank Davis on this important project, but Art was heavily involved. We know the result. By the time war was declared, Collins was ready to deliver the trial transmitter to the Navy. After acceptance of the Collins offering (See story on page 9 this issue), Roy Olsen and Kenny Vaughn took the first deliverable ATC to be installed in the acceptance aircraft, a SBD dive bomber, at Anacostia.

Following a successful test flight, they returned to Cedar Rapids and immediately received a large contract to deliver ATCs to the Navy. Roy stayed on the ATC project until it was in production and then moved on to other research projects during the war. There is little information on what he worked on – apparently due to its secrecy at the time.

Roy again "appears" in January of 1944 when he is elected President of a Research Engineer's "Collins Technology Forum", a group of engineers formed to share technology within the company (See Collins Columns issue XI, Feb., 1944). And, then Roy becomes highly visible in late 1945 when Art Collins comes to him and says: "Roy, I want you to build the best amateur receiver that exists. I don't care what the price of it is, or about the time it takes – just do it!". Roy (with almost no budget) then developed the 75A receiver. This receiver, started from a prototype 51H-1 general coverage receiver (which never resulted in a product), took about 6 months to get to the field trial stage.

Suddenly, in late 1946 and more cutbacks imminent, Roy Olson left the company. Bob Samuelson, his peer since 1934, had just left Collins to join the Motorola Government Group in Scottsdale, Arizona. We do not know for sure, but it seems like Roy may have also gone to Motorola following Bob. Regardless, Roy Olson had left his mark on Collins Radio. He was instrumental in getting Collins into the Avionics business (a business they would dominate), he was the man behind the success for the early autotune, and he was the man who executed the design of the ATC.

For more on Roy, go to the CCA website at: <http://www.collinsradio.org/cqa-collins-historical-archives/the-people-of-collins-radio/Roy-Olson>



### Did You Know?

While most connoisseurs of Collins history know about the impact that transmitters like the TCS and the ATC or ART-13 had on the outcome of World War II, many know little about the other 17 or so models manufactured by Collins during the war.

Hardly a single Navy ship or shore station did not have at least one, and often many, Collins Radio Transmitters on board.

Before the war in the Pacific began on December 7th, 1941, a Collins TCC 1 kW transmitter was installed in a concrete tunnel on the island of Corregidor. This station, installed as a contingency backup should the island be overrun, took over all of the communications from that region of the Pacific and played a strategic role in maintaining the link with Hawaii and the US Mainland.

The autotune capability, and the robust nature of the transmitter, allowed the station to tune even the 100 foot feed line inside the tunnel when the antenna was often damaged by attacks. Q5 copy was maintained under such conditions using the TCC. More powerful equipment available was less successful.

This transmitter is often credited with saving many lives and allowing the successful withdrawal of General MacArthur and his family in those desperate hours.

At the end of the war, and following Japan's surrender to the US Forces, the surrender signing ceremony August 14, 1945 aboard the battleship USS Missouri anchored in Tokyo Bay was beamed to the world over a Collins transmitter in the radio room.

It is fitting that one of the strategically significant Collins transmitters (the ATC) was on its way to trials when the war broke out, and when the war was over almost 4 years later, the surrender was transmitted to the states over another Collins transmitter.

----- CCA -----

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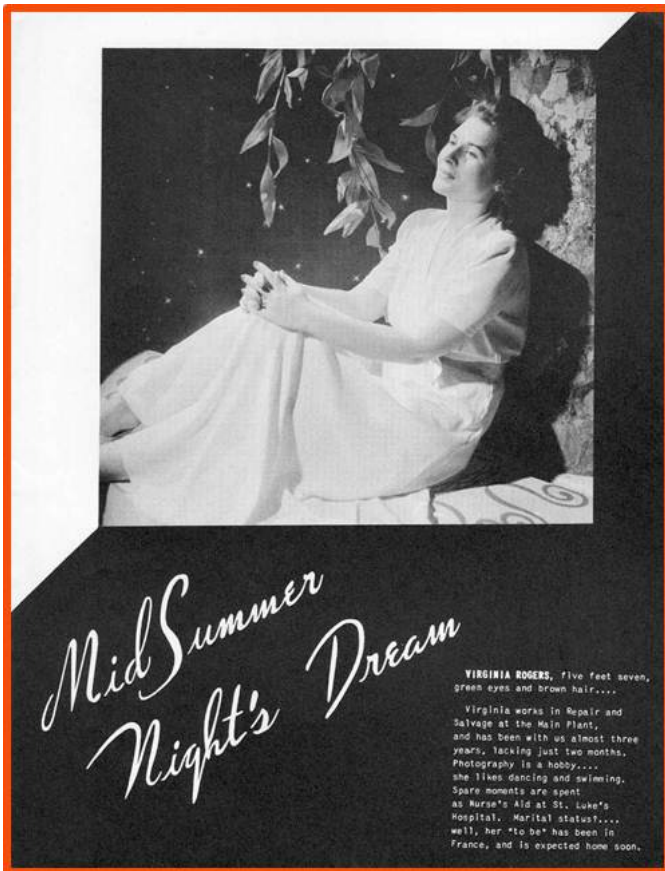


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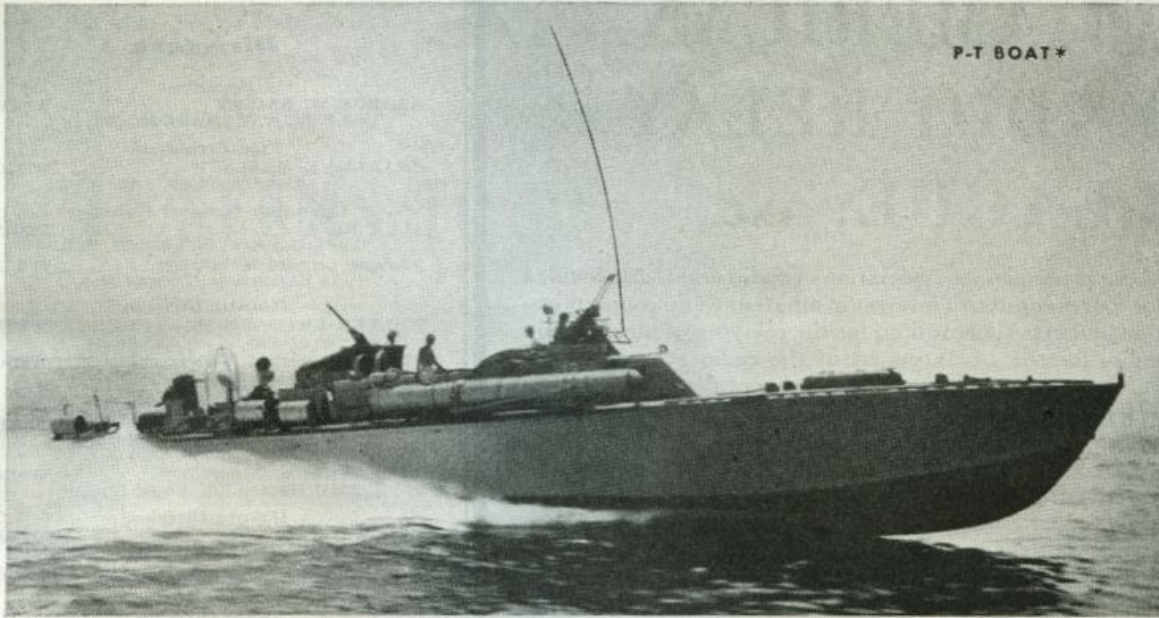
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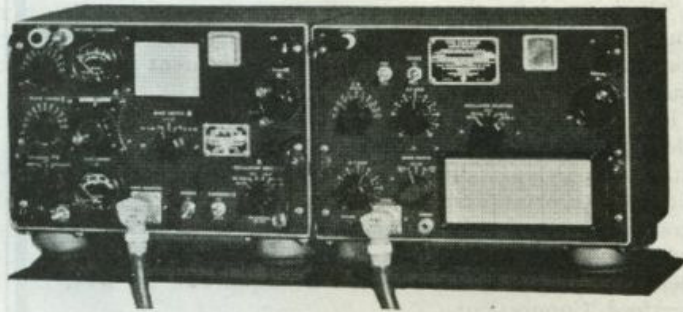
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## Collins Radio Equipped



HERE ARE A FEW of many types of the Navy's small craft which maintain communication with this Collins designed TCS radio transmitter and receiver combination. This equipment is so sturdy, handy and reliable, and packs so much power and sensitivity into so little space, that it finds numerous Naval applications ashore as well as afloat. Usually the

first radio installation on the beach-head, it is also standard on fire, rescue and crash trucks, and is often used on jeeps and command cars. The TCS is another example of the variety and quality of radio communication equipment Collins will be able to supply to industry after the war. Collins Radio Company, Cedar Rapids, Iowa; 11 West 42nd Street, New York 18, N. Y.

*\*Official U. S. Navy Photo*



BOMB TARGET BOAT\*



LVT-4 LANDING VEHICLE TRACK\*



AIRCRAFT RESCUE BOAT\*



IN RADIO COMMUNICATIONS, IT'S . . .

