

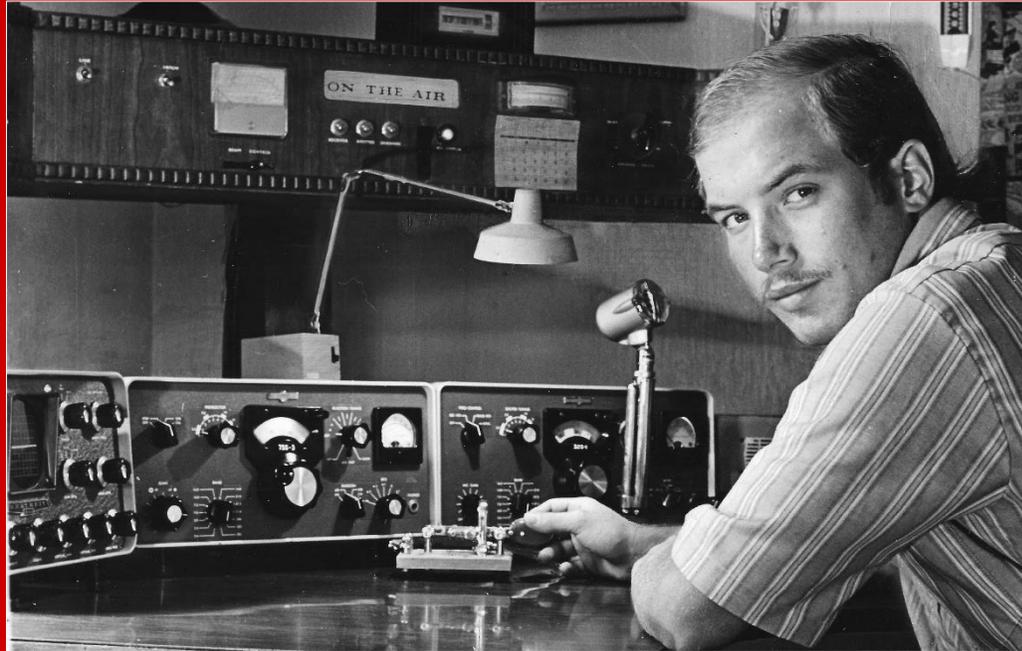
# The History of Collins Radio Co.



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# My Interest in Collins



**THEN**

(in late 60's at my ham family's S-line station)



**NOW**

(recreated Collins S-line in The Villages)



# KWM-2 from my grandfather-in-law



Mom and Dad in  
Halloween Collins S-Line  
Radio Box costumes

# “Collins equipment. You’re ready for it now.”

1960’s ad differentiating Collins from other ham gear by touting their dependable performance and superior engineering.



## Collins equipment. You’re ready for it now.

It was natural to compromise on equipment at first. Gradually your station improved. But, you’re still dissatisfied. You’ve spent frustrating years with a series of rigs. Even if it costs more, you’re thinking about a station that offers truly dependable performance, more enjoyment, fewer headaches. Now is the time to talk it over with your Collins distributor. You’re ready for the S-Line or the KWM-2A. For a distributor list, contact Amateur Radio Marketing, Collins Radio Group, Rockwell International, Cedar Rapids, Iowa 52406. Phone: 319/395-4507.



“It was natural to compromise on equipment at first. Gradually your station improved. But, you’re still dissatisfied. You’ve spent frustrating years with a series of rigs. Even if it costs more, you’re thinking about a station that offers truly dependable performance, more enjoyment, fewer headaches. Now is the time to talk it over with your Collins distributor. You’re ready for the S-Line or the KWM-2A.”



**Similar ad concept was used by the world renowned Hasselblad cameras.**



Ad headline:  
“You don’t just  
buy a Hasselblad,  
you work your  
way up to it.”

# “I Am A Rockwell Collins Engineer”

The Rockwell Collins logo is displayed in a white rectangular frame. The word "Rockwell" is in a bold, italicized sans-serif font, and "Collins" is in a similar font below it. A vertical line with a small orange dot at the top separates the two words.

video

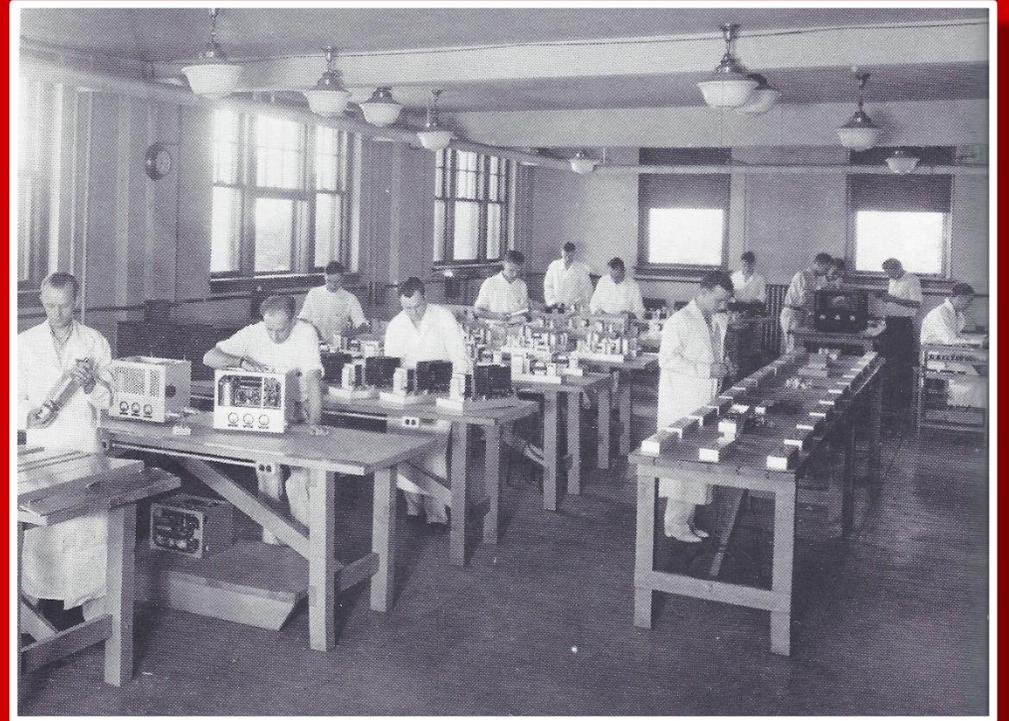
The pioneering spirit of problem-solving and innovation that guides Rockwell-Collins today is the same inspiration that made Collins a leader in radio communication.

Listening to today's RC engineers reveals the vision that Art Collins team **ORIGINALLY** at the founding of the company..



# ENGINEERING - the enduring Hallmark

Important threads that run through Collins' continued success from the start are *nimble breakthroughs to solve problems achieved by Collins selection of the most renowned R and D team* of engineers. It's the same today and a good way to introduce the ingenious and cutting edge company that Arthur Collins created in the 1930's.



“The basement of this home at 1620 6<sup>th</sup> Avenue SE was the first factory in which Arthur Collins produced radio transmitters to order.”

# Big Picture 50 years

Major achievements and technical  
breakthroughs of Collins Radio

- Main concern was technical innovation and achievement which produced necessary, but not high priority profit
- Collins adapted his skills to a wide range of applications in radio communications (military, manned spaced flight, aircraft, amateur radio, etc.)



# Big Picture 50 years

Major achievements and technical breakthroughs of Collins Radio

- Collins equipment was out of the limelight but a part of many historic events like the broadcast of the Japanese surrender on the battleship Missouri by a Collins transmitter, Voice of America, spacecraft radios for the Mercury, Gemini, and Apollo spacecraft, Collins systems transmitted TV of astronauts on the moon.
- “No single person has been more responsible for the ability of air transports to fly and land safely in adverse weather conditions.
- Equipment he developed gave America and its allies a significant edge in WW2, Korea, and Vietnam.



# Big Picture 50 years

Major achievements and technical  
breakthroughs of Collins Radio

- **HF SSB development was a major advance for US commanders for around the world communication prior to satellites.**
- **Made innovations in broadcast transmitters**
- **Dependable data transmission**
- **Computer innovations**
- **“ “Ralph Waldo Emerson wrote than an institution is the lengthened shadow of one man. Arthur Collins left a long and lasting shadow.”**



***Arthur Collins in  
the 1920's***



## ***Arthur Collins' Early Years***

- **“At about the age of nine**, Arthur Collins became deeply interested in the new marvel of radio. The sets used variable condensers inside a tube. From iron plates they fashioned their own transformers, and rigged a 60-foot spark antenna with a lead-in through a basement window of the Lund home.
- Collins: “I used a Quaker Oats box to wind the tuning coil and used a Model T spark coil,” he told a New York Times reporter in 1962. “The main piece of the station’s machinery was the transmitter. Other parts of the station were recruited from a rural telephone service. The way we calibrated was to pick up signals from WWV (the Navy’s station in Arlington, Virginia).”
- The Federal Radio Commission, the predecessor to the Federal Communications Commission, passed a radio act whereby amateurs could get licenses. **Arthur took the test and got his license in 1923 at the age of 14.**



## ***Arthur Collins' Early Years***

- “Gladys Arne, (a reporter) had gone to the Collins home to talk with the 15-year-old boy because he had made a radio contact ***that put him on the front pages of newspapers all over the country.***
- ***The MacMillan expedition set sail from the coast of Maine on the ships Bowdoin and Perry in early 1925.*** One of the explorers was U.S. Navy Lt. Cdr. Richard E. Byrd.
- The plan was for the Bowdoin to make daily radio reports to the U.S. Naval radio station, but because of atmospheric problems, the land station in Washington, D.C., was unable to consistently receive Reinartz’s messages. ***Then word spread that a 15-year-old boy in Cedar Rapid’s had made contact with the expedition.***

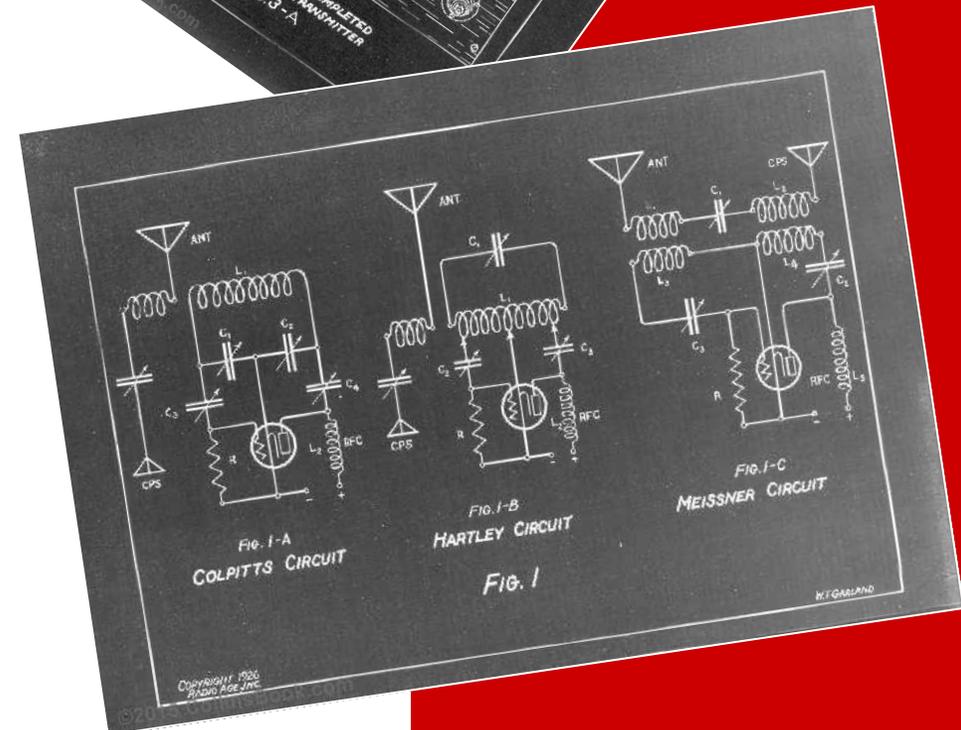
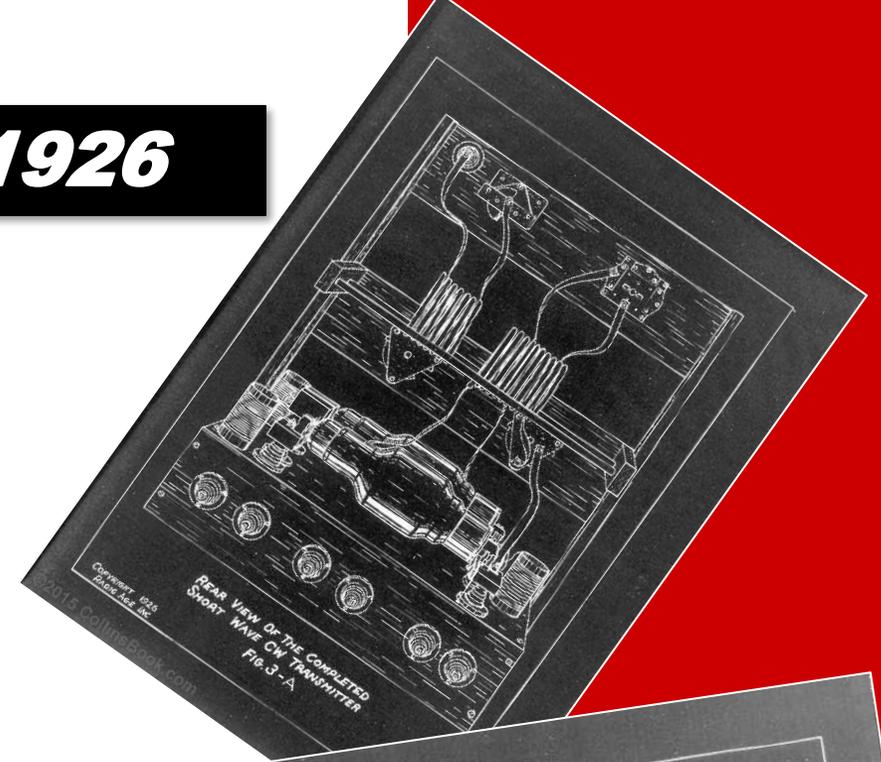
## ***Arthur Collins' Early Years***

- Throughout the summer of 1925, Arthur Collins accomplished a task that even the U.S. Navy found difficult. *Using a ham radio that he himself had built, he talked by code with the MacMillan expedition in Greenland night after night.*
- *Collins' exclusive contact with the expedition soon became a nationwide news story that won him acclaim as a radio wizard.*

## Collins' Radio Age Article – May 1926

At the age of 16, Collins was asked to write a technical article for Radio Age which was published in the May, 1926 issue. One statement in that article foreshadowed the motivational force which was to lead him to “great radio ambitions.”

“The real thrill in amateur work comes not from talking to stations in distant lands ... but from knowing that by careful and painstaking work and by diligent and systematic study you have been able to accomplish some feat, or **establish some fact that is a new step toward more perfect communication.**”



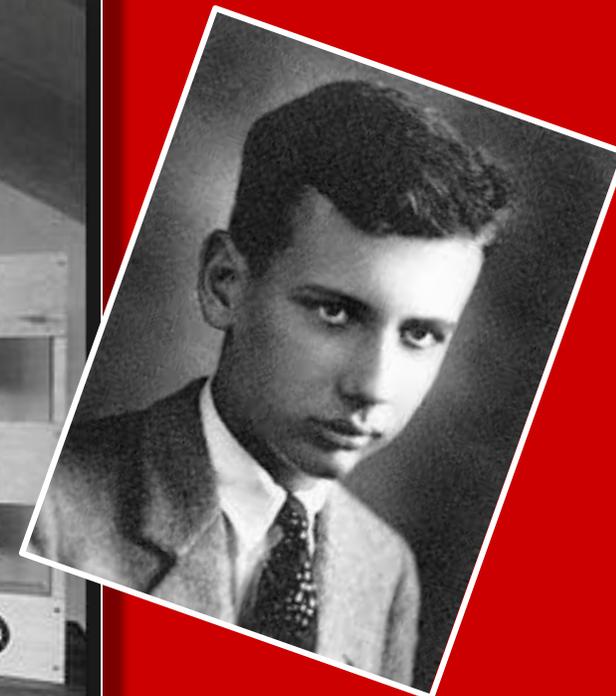
# Arthur Collins Attic Ham Shack – 9CXX – 1920's

Radio \_\_\_\_\_ Ur \_\_\_\_\_ Sigs \_\_\_\_\_ 19 \_\_\_\_\_ abt \_\_\_\_\_ MCST  
Aud \_\_\_\_\_ Qss \_\_\_\_\_ Qrm \_\_\_\_\_ Qrn \_\_\_\_\_ Qsb \_\_\_\_\_ Qrh \_\_\_\_\_ RCR \_\_\_\_\_ HR \_\_\_\_\_  
TR \_\_\_\_\_ HR \_\_\_\_\_ Watts \_\_\_\_\_  
Rad \_\_\_\_\_ T. C. A. \_\_\_\_\_ CKT \_\_\_\_\_  
Aerial \_\_\_\_\_ Q S L or BUST \_\_\_\_\_ RFA \_\_\_\_\_ C209 Det \_\_\_\_\_  
AFA \_\_\_\_\_

Remarks \_\_\_\_\_ I Crave Wall Paper \_\_\_\_\_

ART COLLINS.  
514 Fairview Dr., Cedar Rapids, Iowa.

Cul and best wishes fr better dx.



# ***Arthur Collins Mobile Radio Experiments – 9ZZA - 1927***

In 1927, he and two friends organized an expedition of sorts of their own. Collins, Paul Engle, and Winfield Salisbury outfitted a truck with short wave transmitting and receiving equipment and took a summer trip to the southwest states. *Using power of 10 watts they conducted experiments in connection with the U.S. Naval Observatory in Washington, D.C.* Leo Hruska stayed behind in Cedar Rapids to operate the base station for the study.



*Winfield Salisbury, Paul Engle and Arthur Collins with radio-equipped van used on 1927 trip through Western states.*

***Collins Radio Co.***  
***in the 1930's***



## ***The Start of Collins Radio Co.***

When the depression hit with full force in **1931**, **23-year-old Collins** turned his **hobby into a vocation**. “I picked what I was interested in,” he told Forbes magazine years later, “and looked for a way to make a living.”

**This was the first time radio transmitting apparatus, of any power output, was available for purchase as an assembled and working unit.** In fact, components were hard to come by; they varied widely in characteristics, and there was little, if any, pattern to their construction. Most hams had their radio equipment scattered around a room, usually in a basement or attic where the sight of tubes and wires wouldn't clutter up living areas of a home. Their equipment was strictly functional, almost to the point of inefficiency.

## ***The Start of Collins Radio Co.***

Collins' ham gear was designed to eliminate the clutter by packaging the equipment in neat units. The concept proved that correctly engineered construction not only stabilized the circuitry but also made its behavior predictable. Collins designed circuits, fabricated chassis, mounted and wired in components, tested, packed and shipped each unit. Because the gear was precisely engineered and well-built with the best parts available, it gave years of trouble-free service.

A later article in the New York Times quoted a ham as saying, *“Collins brought us up from the cellar and put us into the living room.”* The industrial philosophy of Collins products “quality” was established at the very start.



## ***First QST Ad – January 1932 - Kit***

# **Crystal Transmitters**

**Radically new design suitable for Class B modulation or high output C.W. on 14, 7 and 3.5 M.C.**

Consists of crystal-oscillator, buffer amplifier, and Class C output amplifier mounted on polished aluminum and hard rubber chassis with plug-in coils and plug-in crystal holder for quick change of frequency. Complete Kits, less tubes, crystal and power supply:

**210 Output . . . . \$37.25      203A Output . . . \$47.50**  
**852 Output . . . . \$47.25**

The smoothest, neatest little rig you ever saw — and what a Kick she has!

**Immediate Delivery**

*Write for data sheets*

**ARTHUR A. COLLINS**

**Cedar Rapids, Iowa**

**Radio Laboratories, Inc., W9CXX**

Noteworthy:

- At this time, Art called his company Radio Laboratories, Inc. W9CCX and added his personal name
- This was a kit.



# ***Collins 30W Transmitter – mid 1932 – First Built Radio***

*The 30W was the very FIRST assembled and tested Collins transmitter* offered to the general amateur community. Each unit had a Bakelite front panel attached to a steel chassis. Although primitive in comparison to later Collins products, the hallmarks of Collins transmitter philosophy were established in its design.

- **10A crystal controlled unit – 247 crystal oscillator, 247 buffer amp, 210 output.**
- **3 plug-in coils wound on Hammarlund coil forms**
- **Basic building block of 40B and the 150A/B transmitters**
- **Optional antenna tuner**

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## The COLLINS 30W



has won enthusiastic users throughout the world. Amateurs everywhere have put the 30W through the gruelling test of popular use—and it has proved itself a winner.

There are good reasons for its success: Correct design—Use of only the very best materials—A DX range equal to that of larger transmitters—And a price so attractive that it is no longer an economy to build your own transmitter from composite parts.

Price effective January 1, 1933  
**\$125.**

Send 25c in coin for the complete Collins manual

### Collins Radio Company

CEDAR RAPIDS, IOWA

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**SPECIFICATIONS:**  
OUTPUT: 30 watts. FREQUENCY RANGE: 20, 40, 80 and 160 meters. Coils for one band standard equipment.  
TUBES: 247 Crystal Oscillator, 247 Buffer, 510 or 530 Output Amp. POWER: Self contained heavy duty dual unit.  
KEYING: Special Clickless Grid-Block. METERS: Weston surface type.  
Additional COLLINS units make the 30W convertible into standard CIF—Radiophone transmitters with power up to 100 watts.



# ***Collins 150 Series Transmitters – May 1932***



The 150B was the *first Collins product to ever appear in a Collins QST ad (May 1932) containing a photograph.*

During this period, home-brew transmitters constructed on breadboards were common in ham shacks. The fully enclosed, rack-mounted, professionally appearing 150 series was a dramatic contrast with the breadboard and had instant appeal to the ham who could afford one.

- **150 watts**
- **150A was the exciter – CW only - \$290 in 1932 during depression**
- **150B add 30B modulator – class B - \$350 in 1932**



# Collins 40A and 40B Transmitters – October 1932



The 40A/B was Collins' first desktop phone transmitter. Based on the 30W, it added a 9C amplifier-modulator and antenna tuner unit. Plug-in coils for 160, 80, 40, and 20 meters were available

- 40A – CW only / 40B ran 30 watts
- External input amp. provided
- necessary gain with a mic.
- Unit price - \$235



# ***Collins series 2A, 2B, 2C Tuners 1933***



Original 2C tuner in Collins 150C transmitter



2C shown rebuilt for 30FXB

# ***Collins 32A and 32B CW and AM transmitters – March 1933***

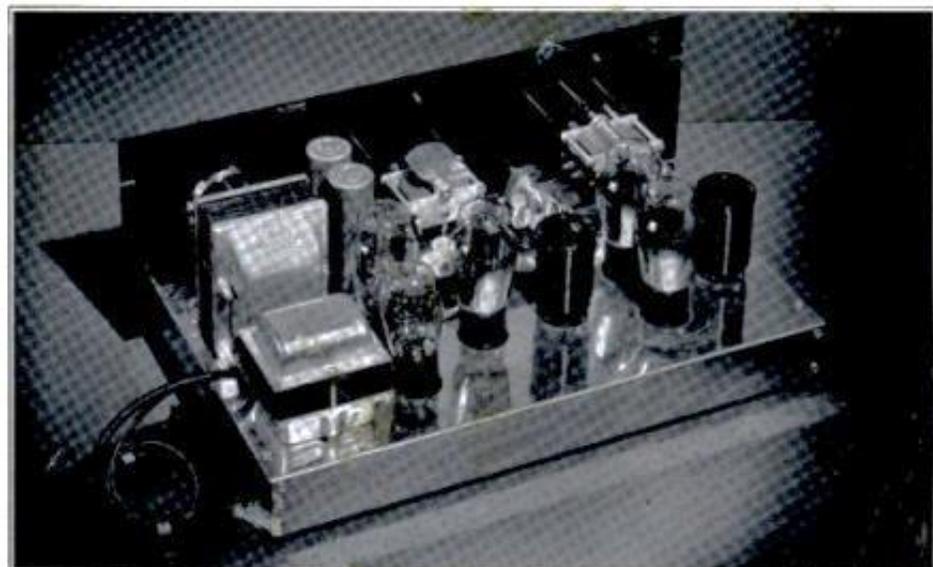
The 32 series was introduced with the 32A 25 watt CW transmitter. It used a 47 as the crystal oscillator, a 46 buffer and a pair of 46's in the final. Phone version already rated at 25 watts.

## **PRICES**

32A CW Transmitter	\$85.00
Kit of Matched Tubes	5.80
Mounted Crystal	7.50
32B CW Phone Transmitter	125.00
Kit of Matched Tubes	9.80
Mounted Crystal	7.50



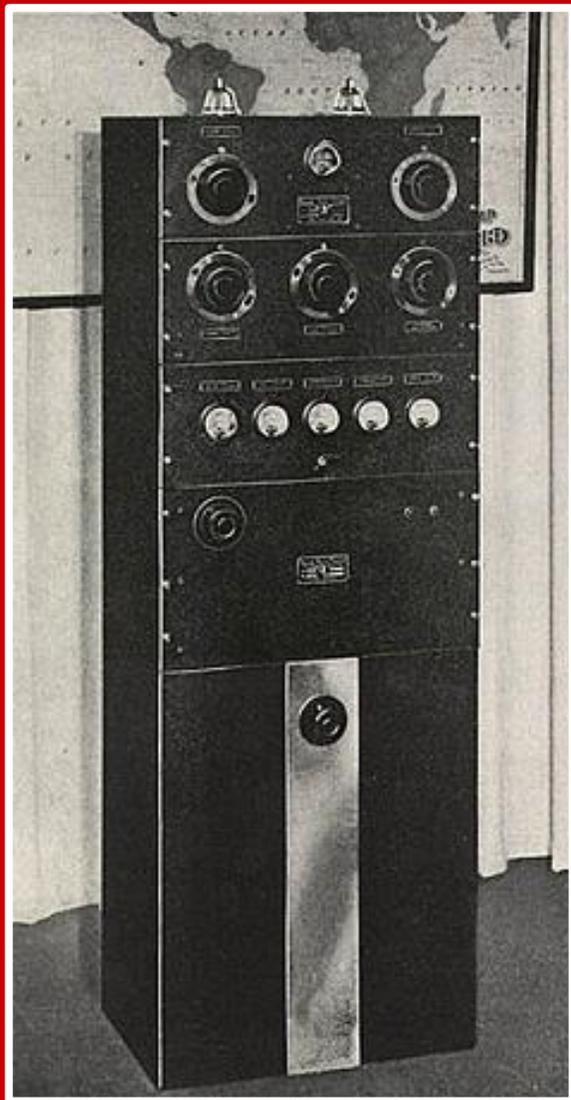
## ***Collins 4A Transmitter – Dec. 1933***



*The 4A was Collins answer to a low-cost basic CW transmitter that the average ham could justify.* This was due to the fact that the combined cost of the parts was greater than the \$58.50 purchase price.

- Built-in power supply
- Used isolantite plug-in coils for each band sold as an option (2 for \$5)
- 25 watts
- 47 oscillator driving parallel 46's.  
(from December 1933 QST)

## ***Collins 30 FXB Transmitter – Nov. 1934***

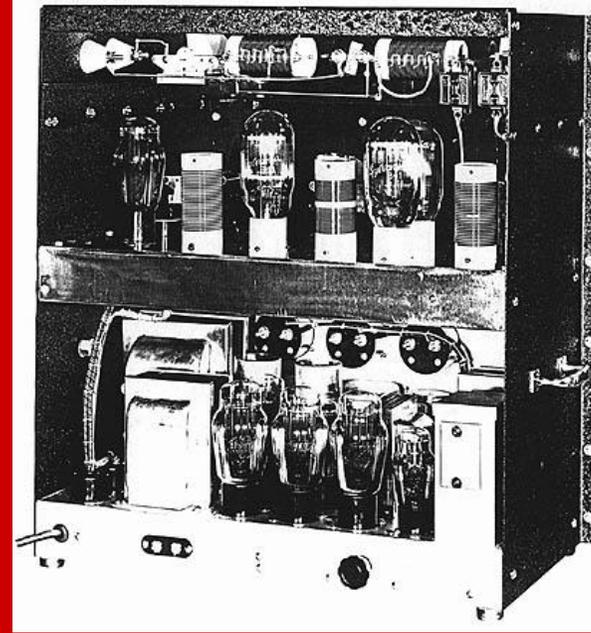


This was a floor-standing 100 watt phone and CW transmitter that was designed to replace the aging 150 series. The November 1934 QST ad stated: *“It’s ultramodern dress will lend an air of distinction to anyone’s library.”*

Introduced in one of the last B/W ads.

- 100 watts from 160 to 20 meters
- Crystal controlled with 10J excited and a 203A in the final modulated by a pair of 830B’s
- Collins targeted the commercial and ham markets with the product

# ***Collins 32F Transmitter – Dec. 1934 / Jan. 1935 – VERY RARE***



**There are only 3 or 4 units known to exist. Never advertised in QST.**

- 47 crystal oscillator into a 841 buffer amp driving a pair of 841's
- 25-30 watts on phone and cw.
- 32F may have been intended as the replacement for the aging 32B

# ***Collins 45A Transmitter – Extremely Popular – Late 1930's***



**Early Production 45A**



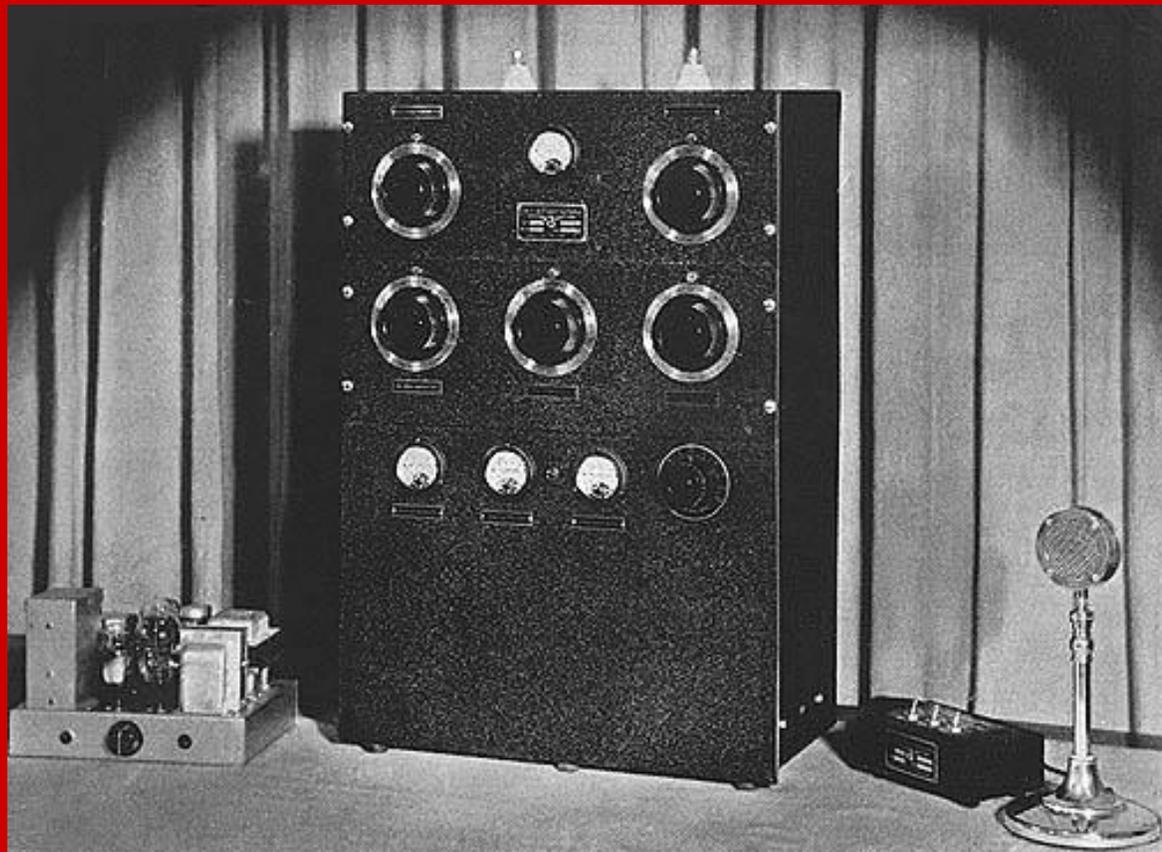
**Mid Production 45A**

VERY POPULAR - While floor standing transmitters were the norm for medium powered CW transmitters, the 45A was a sharp looking self-contained desktop transmitter.

- 120 watts CW, 40 watts phone
- Sold to amateurs, commercial users, and police departments.

## ***Collins 32FX Transmitter –1935***

AD COPY - “The ideal 1935 transmitter – it is simple to adjust – its cost is low and its performance is guaranteed. Here is a transmitter (final 211 triode) capable of putting into your antenna a full 100 watts of CW power, or a phone carrier of 40 watts.”



# ***Collins 32G Transmitter – Sept. 1936***

***Most varied design, more than any other model and first to wear two different logos.***

The 32G was a *celebration of the new 6L6* and was offered as a general purpose HF transmitter in *both the amateur community and to commercial markets.*



Variants

- 40 watts CW and phone, 160 to 10 meters
- Plug-in coils
- Cathode-ray oscilloscope modulation indicator and a universal antenna matching network

## ***Collins 32FXC Transmitter –1936***

The FXC was the successor to the popular 30FXB phone/cw transmitter. It was rated at 175 watts (but proudly boasted over 200 watts) output on AM and CW and covered 160 to 10 meters.



## ***Collins 32FXR Transmitter – July 1936***



*The 30FXR is basically a “reduced” version of the 30FXC.* The FXR can be converted to a standard FXC. The performance of the FXC is identical to the FXC except for reduced output.

# ***Collins 30J Transmitter – Nov. 1937 – Mixed Use***

***Last amateur transmitter before WW2 effort***



Perhaps the Crown Jewel of the prewar Collins transmitters, the elegant 30J was the last amateur transmitter produced before Collins restricted for the war effort. The 30J was a general purpose transmitter “designed for general applications such as police service, aeronautical ground stations, or general purpose point-to-point communications where service is intermittent.” It was advertised in November 1937 QST.

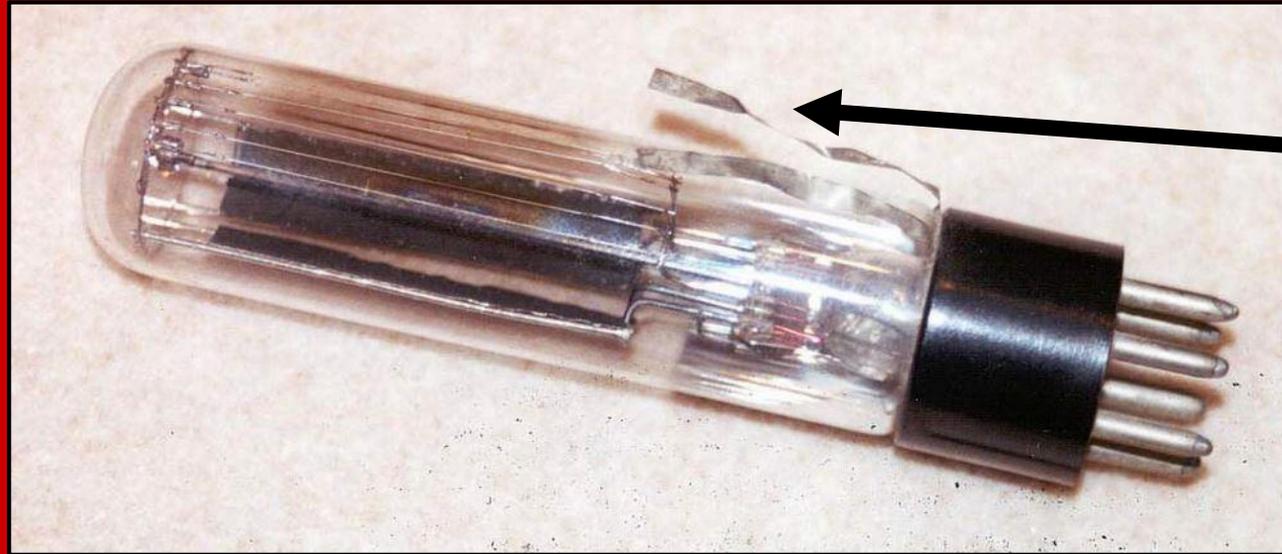
- 40% more powerful than the 30FXC
- RCA suit resolved. Returned to more mainstream tubes



## ***“Radio Trust” vs. Collins Radio Co. (tube suit)***

RCA, AT&T, Westinghouse and others (known as the “Radio Trust”) sued Collins over its use of certain circuits which employed patents owned by this trust.

These patents had been earlier purchased from DeForest. Also at issue was the basic DeForest triode oscillator circuit patent controlled by RCA.



Unusual  
EXTERNAL grid

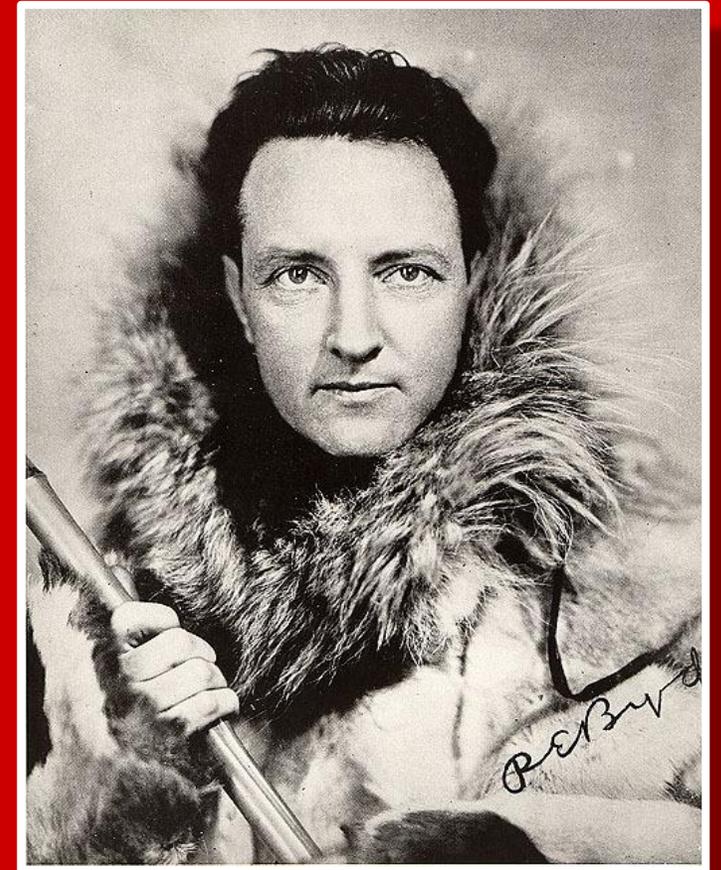
**As a response, Collins partnered with Amperex to produce and brand its own tubes which employed a novel grid structure.** The workaround on the critical oscillator patent was for Art Collins to secure the patent rights from Dr. Robert Goddard (liquid fuel rocket fame) who received a patent for the **unusual grid located outside the vacuum tube.** Branded as the C100A. Fences mended in late 1938 to 1939.



# **2<sup>nd</sup> Byrd Expedition Hurls Collins Into National Spotlight**

**January 1934 - Antarctica - "Little America"**

The company's first major success was not long in coming. In 1933 Admiral Richard Byrd and CBS Radio selected the fledgling Collins Radio Company—by then located in a factory and employing eight people—to produce radio transmitters for Byrd's historic expedition to Antarctica. The successful broadcast of voices from Byrd's flagship thrilled American listeners and catapulted Collins's young company into the national spotlight. Amateur and commercial radio users around the world began buying Collins Radio equipment. Collins was 24 years old.



# 2<sup>nd</sup> Byrd Expedition Hurls Collins Into National Spotlight

January 1934 - Antarctica - "Little America"

**COLLINS SIGNAL**  
*Published by*  
**COLLINS RADIO COMPANY**  
*Designers and Manufacturers of*  
*Transmitters, Transformers and Speech Equipment*  
CEDAR RAPIDS IOWA, U. S. A.

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JANUARY, 1934

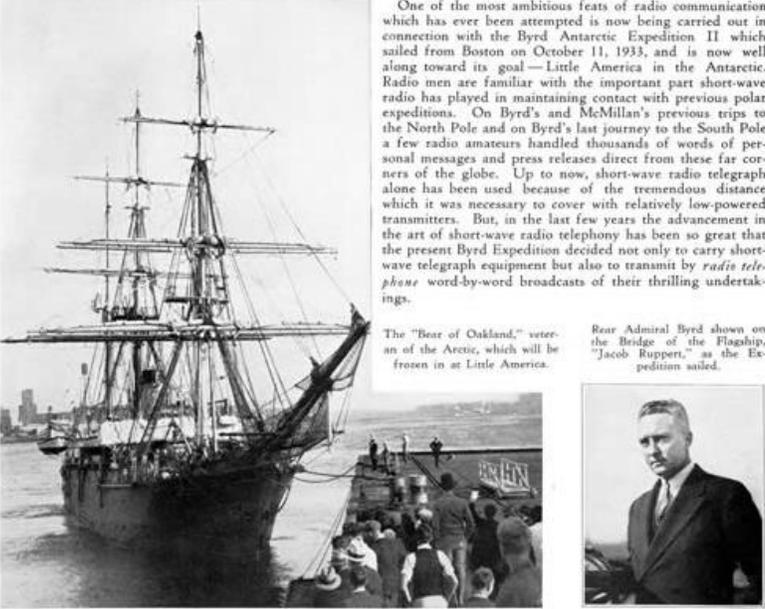
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The Byrd Antarctic Expedition II Sails With A Complete Collins Short Wave Broadcasting Station Aboard!

One of the most ambitious feats of radio communication which has ever been attempted is now being carried out in connection with the Byrd Antarctic Expedition II which sailed from Boston on October 11, 1933, and is now well along toward its goal — Little America in the Antarctic. Radio men are familiar with the important part short-wave radio has played in maintaining contact with previous polar expeditions. On Byrd's and McMillan's previous trips to the North Pole and on Byrd's last journey to the South Pole a few radio amateurs handled thousands of words of personal messages and press releases direct from these far corners of the globe. Up to now, short-wave radio telegraph alone has been used because of the tremendous distance which it was necessary to cover with relatively low-powered transmitters. But, in the last few years the advancement in the art of short-wave radio telephony has been so great that the present Byrd Expedition decided not only to carry short-wave telegraph equipment but also to transmit by *radio telephone* word-by-word broadcasts of their thrilling undertakings.

The "Best of Oakland," veteran of the Arctic, which will be frozen in at Little America.

Rear Admiral Byrd shown on the Bridge of the Flagship, "Jacob Ruppert," as the Expedition sailed.

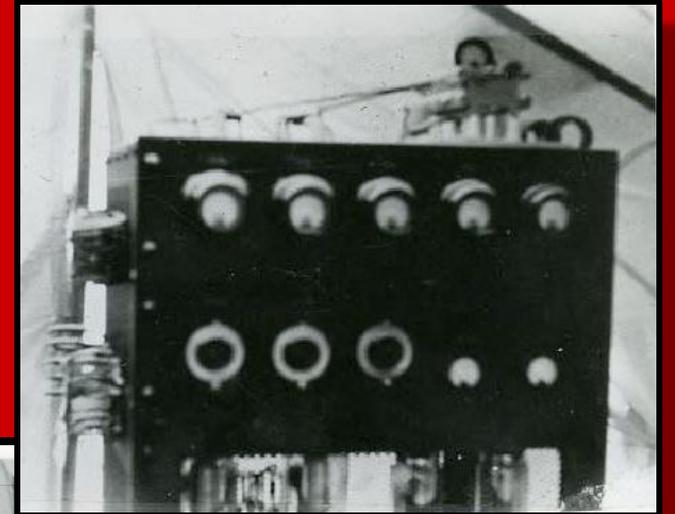
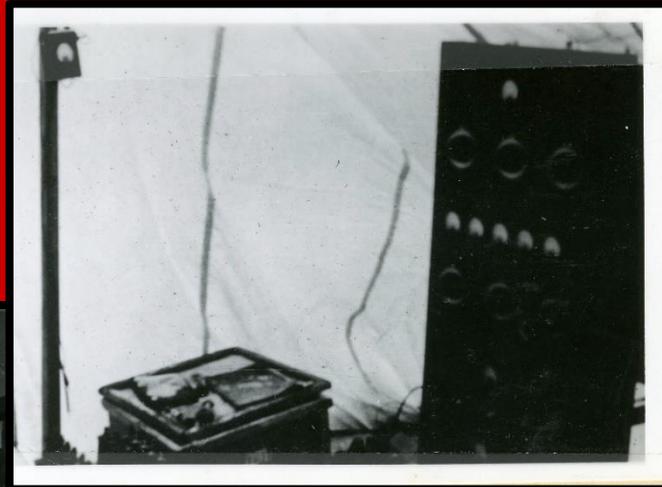
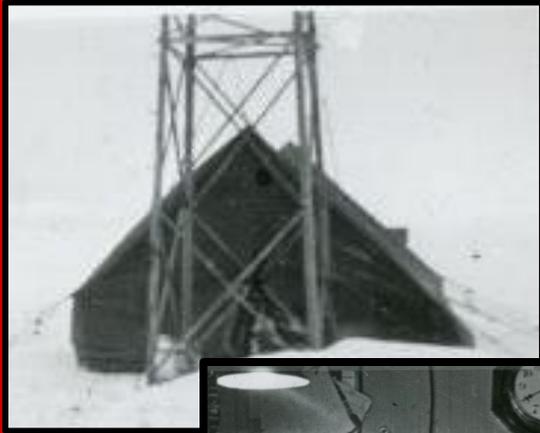


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***January 1934 - Antarctica - "Little America"***



# 2<sup>nd</sup> Byrd Expedition Hurls Collins Into National Spotlight

January 1934 - Antarctica - "Little America"

RECEIVED AT STANDARD TIME INDICATED ON THIS MESSAGE	<b>Postal Telegraph</b> THE INTERNATIONAL SYSTEM Commercial Cables Mackay Radio All America Cables	The cost of rate of Telegrams, Cablegrams or Radiograms unless otherwise indicated by signs on the check or on the address. DL DAY LETTER NL NIGHT LETTER NM NIGHT MESSAGE LCO DEFERRED CABLE NLT NIGHT CABLE LETTER WLT WEEK END CABLE LETTER
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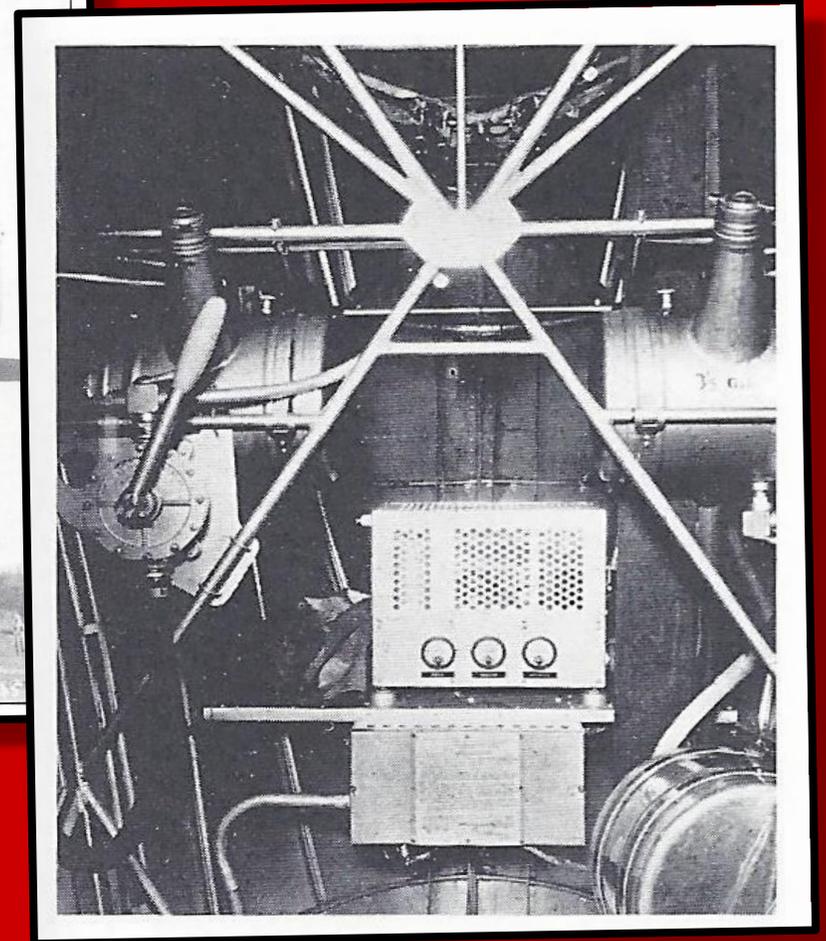
Form 36

C7 51 EXPED RADIO=  
SS JACOB RUPPERT VIA MACKAY RADIO SAYVILLE NY 27 NFT  
MR ARTHUR A COLLINS=  
CEDARRAPIDS IOWA=  
  
YOUR TWENTY B TRANSMITTER HAS BEEN OPERATING EXCELLENTLY FOR OUR BROADCASTS STOP AT OUR PRESENT LOCATION 6000 MILES FROM NEWYORK WITH GOOD ATMOSPHERIC CONDITIONS SIGNALS ARE RECEIVED WELL IN NEWYORK AND SANFRANCISCO STOP THE PERFORMANCE OF THE TRANSMITTER HAS LEFT LITTLE TO BE DESIRED=  
R E BYRD.

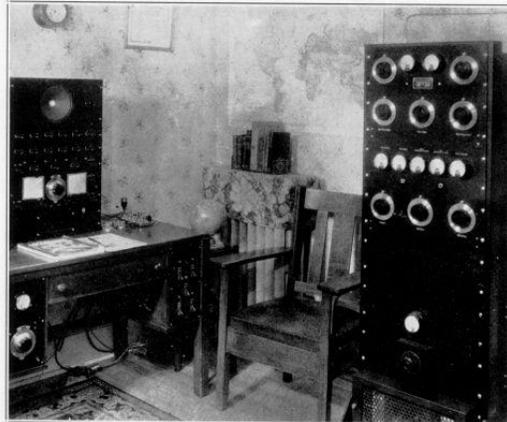


# ***Collins Transmitter Installed in Enterprise – 1934***

- **First known airborne application of a Collins radio.**
- **Pictured is the Goodyear blimp Enterprise in 1935.**



# Early Praise – May 1932



John E. Preston Kearny 2-3063

AMATEUR RADIO STATION  
**W2GOX**  
 105 Prospect Avenue  
 No. Arlington, N. J.

May 10, 1934.

Collins Radio Company,  
 Cedar Rapids, Iowa  
 Attention of Mr. Arthur Collins

Dear Mr. Collins:

I am sending you, under separate cover, a photograph of amateur station W2GOX and a sample of the daily log of the station.

The Collins 300A Transmitter has been giving excellent satisfaction and the results obtained have far surpassed my expectations. The note is always reported T-9 and the signal is frequently reported R-9 in Europe.

The sample log shows the high percentage of DX calls actually worked and gives some idea of the range of the signal, but can give but little idea of the real pleasure and many valued friendships which the transmitter has brought me.

With sincere wishes for your continued success, I am

Very truly yours  
 J. E. Preston

AMATEUR STATION W2GOX, NORTH ARLINGTON, N. J.  
**AMATEUR RADIO STATION LOG**  
 W2GOX

DATE TIME	FREQ	MODE	CALL	STATION HEARD	TIME	REMARKS
5-8-34						
8:55a	14292	400W	ON4BZ	W2 TR	103	T9 QSA-5 R-7
4:15p			HAEZQ	W2 RAC	72	
5:45p			YUTYV	W2 RAC	112	T9 QSA-5 R-7
6:55p			ILKI	W2 TR	41	T9 QSA-5 R-8
7:40p			CQ	W2 JHQ	81	T9 QSA-5 R-8
10:45p			CQ	W2 ANJ	120	T9 QSA-5 R-8
11:15p			ZL2BZ	W2 TR	99	T9 QSA-5 R-8
11:30p			K6JDK	W2 TR	106	
11:35p			VK3MR	W2 TR	97	T9 QSA-5 R-5
5-9-34						
12:25p	14292	400W	W6CKW	W2 TR	105	T9 QSA-5 R-7
3:00a			LA3C	W2 TR	26	T9 QSA-5 R-7
8:30a			G2MA	W2 TR	78	T9 QSA-5 R-8-9
8:55a			G6QP	W2 TR	76	T9 QSA-5 R-8
9:10a			G2PN	W2 TR	56	T9 QSA-5 R-8
4:10p			OK2FF	W2 TR	35	T9 QSA-5 R-8
4:30p			BR0AZ	W2 TR	71	T9 QSA-5 R-7-8
4:55p			G6GX	W2 TR	30	
5:00p			G50J	W2 TR	47	T9 QSA-5 R-8
5:10p			LY1J	W2 TR	79	T9 QSA-5 R-7
6:10p			D4BCK	W2 TR	79	T9 QSA-5 R-7-8
7:00p			G6PY	W2 TR	50	T9 QSA-5 R-8
9:00p			TL2DB	W2 TR	78	
9:05p			CM2JM	W2 TR	82	T9 QSA-5 R-7
9:35p			W6IIA	W2 TR	89	T9 QSA-5 R-7
9:55p			LU1EP	W2 TR	111	
10:25p			ZL440	W2 TR	88	T9 QSA-5 R-8
11:02p			K6COG	W2 TR	90	

Dear Mr. Collins:

I am sending you, under separate cover, a photograph of amateur station W2GOX and a sample of the daily log of the station.

The Collins 300A Transmitter has been giving excellent satisfaction and the results obtained have far surpassed my expectations. The note is always reported T-9 and the signal is frequently reported R-9 in Europe.

The sample log shows the high percentage of DX calls actually worked and gives some idea of the range of the signal, but can give but little idea of the real pleasure and many valued friendships which the transmitter has brought me.

With sincere wishes for your continued success, I am

Very truly yours  
 J. E. Preston

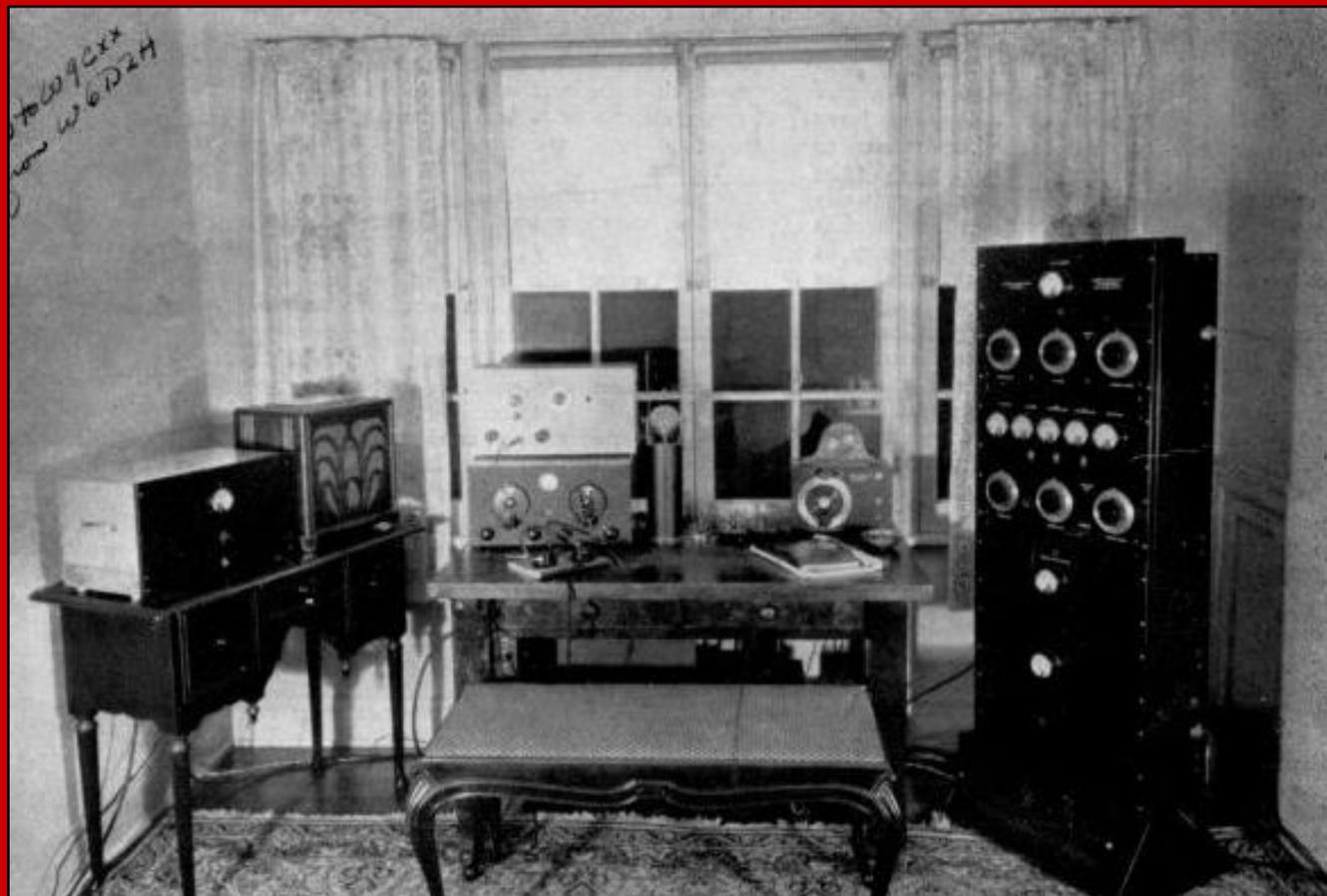


# *Collins Station (W6DZH) in "Collins Signal" March 1933*

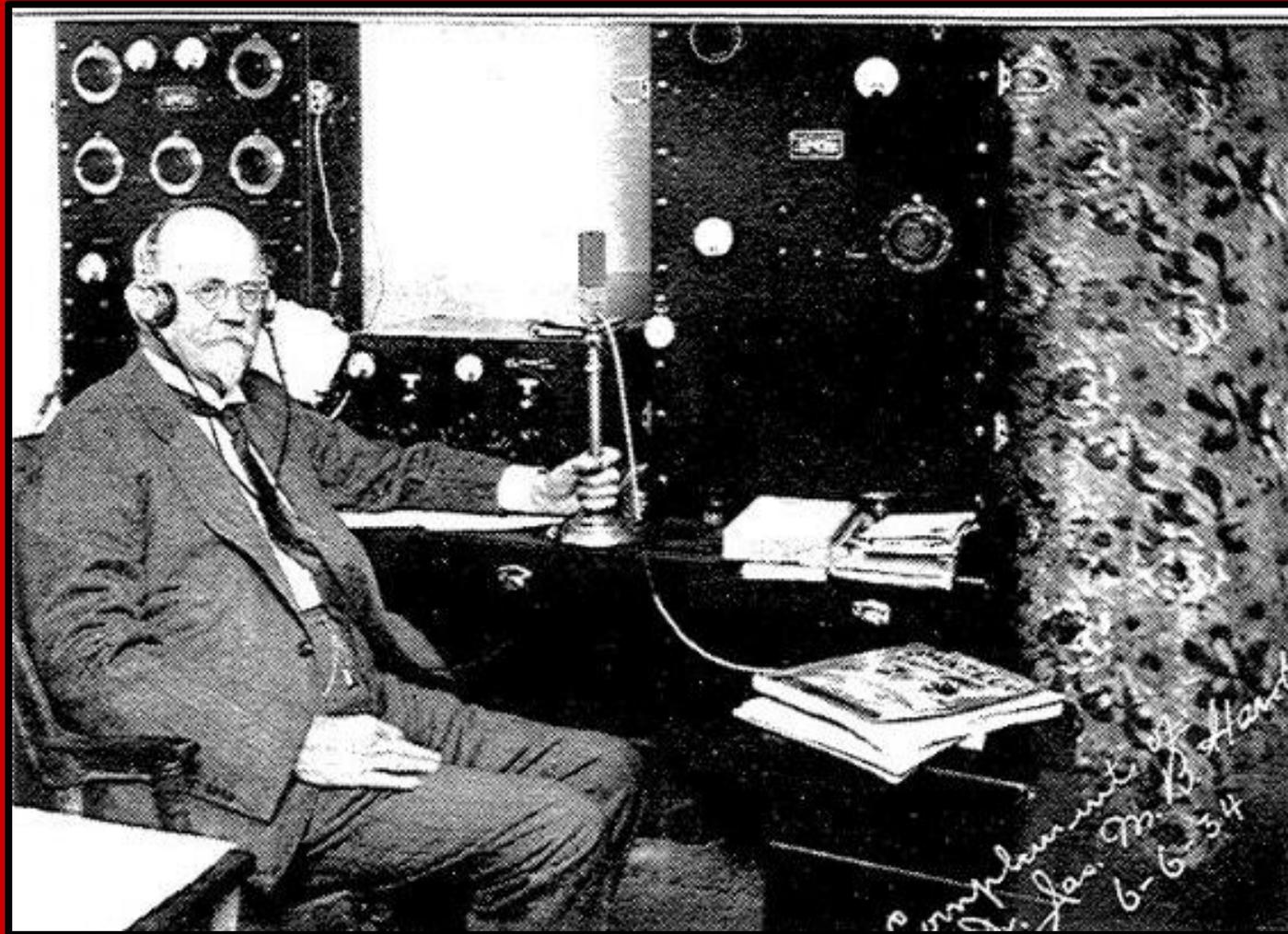
W6DZH Pasadena California -  
Collins 150B with 7D Speech  
Amplifier and 5A Condenser  
Microphone.

Caption:

"The new equipment at W6DZH is  
getting a strenuous workout this  
winter on 20 meter phone and 40  
meter CW."



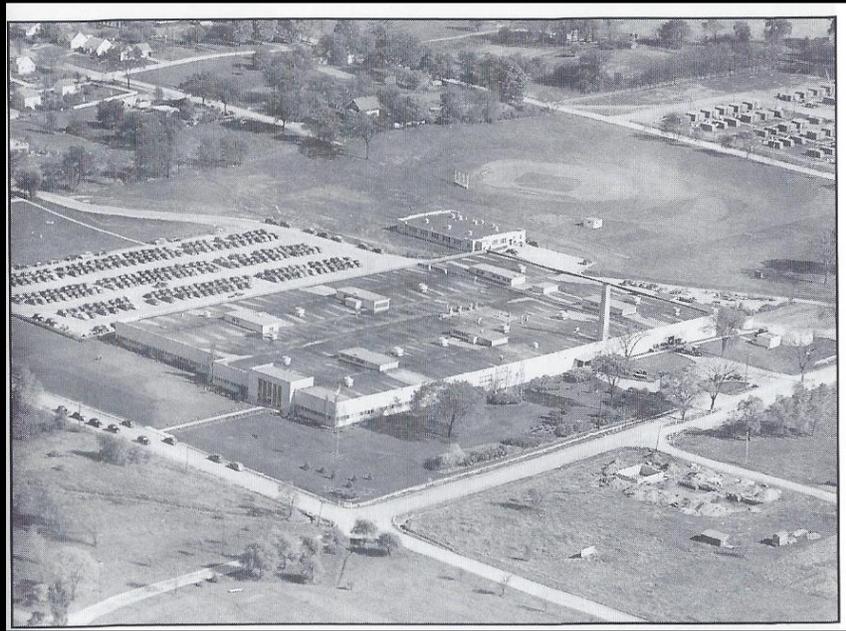
# *Collins Station X1G - Mexico City – 1930's*



***Collins Radio Co.  
in the 1940's***



# *Collins Main Plant in Cedar Rapids, Iowa - 1940*



# *Collins Retools for WW2*

Dec. 7, 1941 “changed the game... *one minute*, literally, Collins was a major commercial and broadcast transmitter manufacturer with 500 employees, 30 or more models, and \$2.1 million in sales. *The next minute all commercial production unrelated to the war effort was shut down by an act of Congress.* But Collins was ready!” They had a large manufacturing facility and many technological innovations such as the Auto-Tune, Pi Network, and reliable/durable construction that made the equipment perfect for the armed services.



# Collins List of WW2 Communications Radios

<u>Model</u>	<u>Description</u>	<u>Years of Mfg.</u>	<u>Quantity (If Known)</u>
TCS 5, 7 & 12	12/25 W (AM/CW) 1.5-12 MC + 4 Xtal Ch. (18Q-3) Xmtrs and Rcvrs f/ PT Boat, LCI & GATO Sub Comm. Based Upon 51Q (Rec) and 50Q (Xmtr)	1941-1944	34,893 All Manuf.
AII/ARD-3	ADF Receiver for Canadian Lancaster Contract		
ATC T-47/ART-13 AII/ART-13A	100 Watt HF 11 Channel Autotune Xmtr (17H-2) - - - Same - - - - - - Same - - - Included Low Frequency Osc. Also Manufactured by Subcontractors	1941-1945	25,896 Total 90,000
AII/ARR-15	HF Receiver Airborne (51H-3 - Matched to ART-13)	1945	
AII/ARC-2	HF Airborn Autotune Transceiver	1944-1945	
TCB	150 W 10 Chan. Xtal Control 1.5-12 mc. AM/MCW/CW		



# Collins List #2 of WW2 Communications Radios

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. Similar to 231C prewar commercial transmitter		
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	Wirklar 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 18 M Transmitter and Receiver



Frequency Coverage: 2 to 16 MHz in three bands  
A- 2 to 4 MHz                      10 watts trans.  
B- 4 to 8 MHz  
C- 8 to 16 MHz  
IF: 455 KHz  
Tubes rx : 2 x 12SK7, 1 x 12SA7,  
1 x 12SQ7, 1 x 6G6G  
Tubes tx : 3 x 6V6G, 1 x 807,  
1 x VR-150-30  
Dimensions: 14 ¼ H x 9 5/8 W x 9 ¾ D  
inc.  
Transmitter Weight: 10 lb.  
Power supply: Dynamotor 415E 12V  
Manual: Collins

South Africa gave Collins its largest contract to that time ... 100 of the 18M transmitter and receiver station at the start of the war in 1939.



# *Collins AN/ART 13 – Popular and Pervasive*

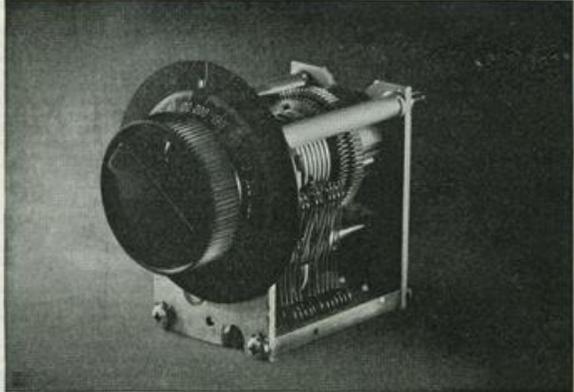
“This is the ubiquitous Collins World War II transmitter. Derived from the original commercial aircraft line of Collins AutoTune transmitters of the 17D prewar family, this ruggedized and beautifully designed 100 watt HF transmitter was, and still is, *the pride of Collins Radio.* It flew in many aircraft ranging from heavy bombers down to multi-seat fighter bombers and eventually into some of the larger single engine/single seat fighters like the P-47 Thunderbolt and the P-38 Lightning.”



# Collins AN/ART 13 Transmitter with AutoTune



video



### COLLINS AUTOTUNE\*

*The Key to Precision Control*

The Autotune was conceived and engineered by Collins many years ago. It was the result of a growing dissatisfaction with slow, haphazard methods of tuning radio equipment and a persistent effort to improve them.

**What is it? How does it work?**

The Collins Autotune head shown above is a mechanical device for turning a control shaft and stopping it precisely at any one of several pre-determined positions.

The Collins Autotune system consists of a number of Autotune heads, all driven by a single electric motor, each quickly and simultaneously repositioning a separate and non-interrelated tuning shaft to new settings chosen in advance by the operator. At the touch of a button or flip of a dial, the Collins transmitter or receiver is thus completely and exactly tuned to the wanted channel in a matter of seconds.

Collins communications equipment, Autotune controlled, was adopted by American Airlines, Braniff Airways, Tropical Radio Telegraph Co. and others long before the war. Reliability has been demonstrated through the years under all service conditions.

The Collins transmitter design and the Autotune have proved so advantageous to the Armed Services that military authorities have requested other large companies, in addition to Collins, to build them. The Collins Radio Company, Cedar Rapids, Iowa.



\*U. S. Patents issued and pending.

QST, October of 1944



# Collins AutoTune

**Collins Autotune\* Sets Records**



Braniff Airways, operating a fleet of Douglas and Lockheed transports throughout the great Southwest, uses the Collins 17D Autotune, 100 watt, 10 frequency Transmitter in all ships. Ten 17D's have been in constant service for two years and ten new 17D's have just been delivered to take care of increased operations.

The 17D is

- the first high powered transport transmitter.
- the first 10 frequency aircraft transmitter.
- the first 100 watt set to receive CAA approval.
- the first modern aircraft transmitter to be proved out during millions of miles of flying.

\*Autotune—The exclusive Collins device used on aircraft and ground transmitters to accomplish quick automatic frequency shift with absolute reliability.

**COLLINS RADIO COMPANY**  
CEDAR RAPIDS, IOWA    NEW YORK, N. Y. 11 WEST 42 ST.



AUTOTUNE – “Proved to be one of the most significant developments in the success of Collins Radio Company.” In the initial stages of equipping aircraft with radios was changing the many channels needed for communication. Each new frequency required retuning. Braniff for instance didn’t want to pay for extra radio ops to tune the radios. Collins responded to this need with the mechanical AutoTune function. It helped bring an Allied victory in WWII.



# *Pilot Experience with Collins ART-13 AutoTune*

Radio operator and historian Jim B. Smith remembers this experience:

I sat down in my swivel seat, and studied the equipment. It was all familiar to me except the new Collins' transmitter. Instead of having to change coils for certain frequencies as we did in radio school (the radio operators had to change frequency coils on B-17's and some early B-29's), these B-29's featured the *new Collins' transmitter which gave the radio operator the capability of presetting 10 frequencies.*



# Collins ART-13 on B-29



The Collins-designed transmitter as the operator sees it from his station in a Superfortress. Boeing-Wichita Photo.

Superfortresses blast and rout the Japs. Official photo U. S. A. A. F.

### In the Boeing B-29 from the first

THE FIRST MESSAGE from the Army's first Boeing Superfortresses over Japan, on the Yawuta mission of June 15, 1944, was transmitted by a Collins radio transmitter of the type shown above. From that time on, this transmitter has been standard equipment for all the Superforts, as it is also for the larger Naval aircraft.

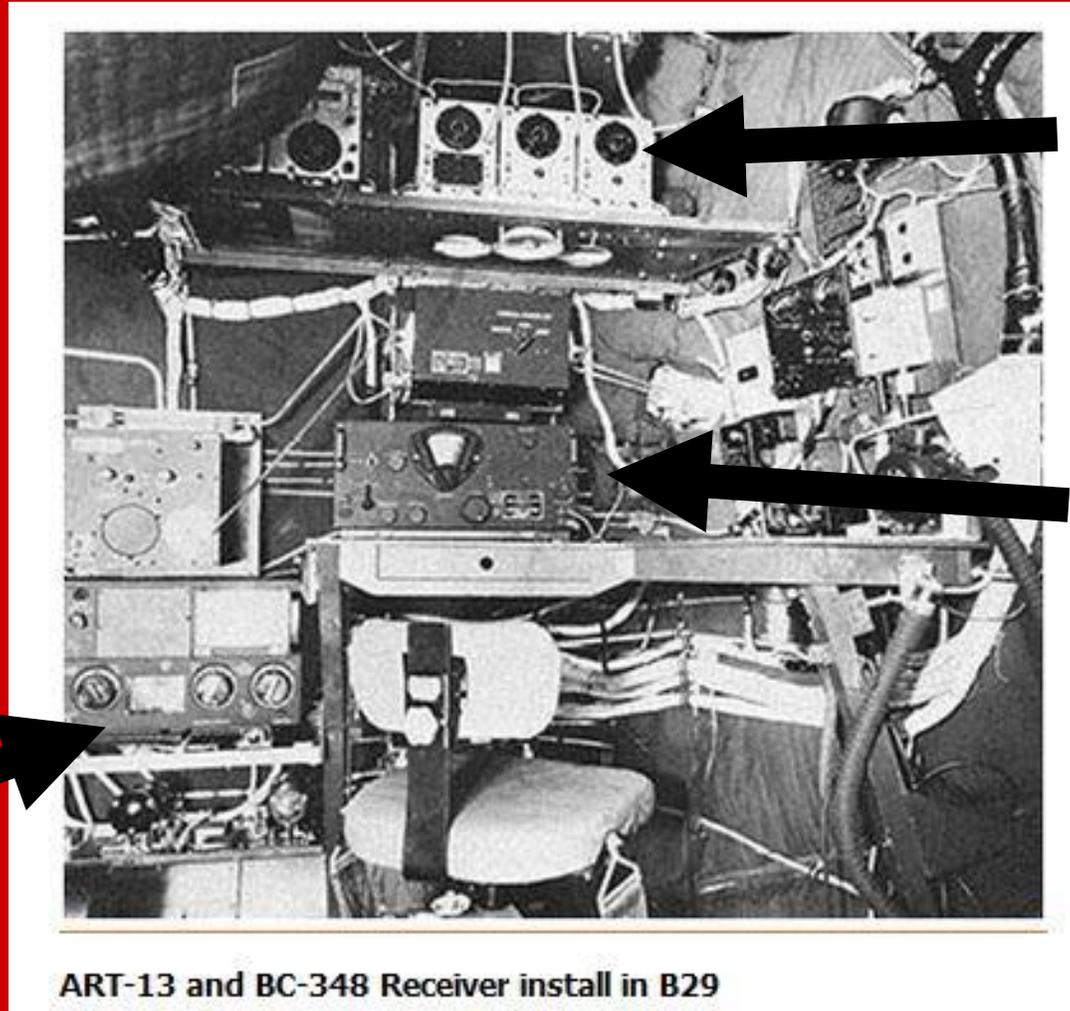
As the Army and Navy demand increased, requirements exceeded the capacity of the extensive Collins facilities, and other manufacturers of radio equipment were drawn into the production program, aided by Collins engineers. Total deliveries have been very large.

Collins engineering and production have gained much valuable experience during the war in providing reliable radio communications under all operating conditions in practically every quarter of the globe. This experience will be available to commercial and personal users as soon as military requirements permit. Collins Radio Company, Cedar Rapids, Iowa; 11 West 42nd Street, New York 18, N. Y.

IN RADIO COMMUNICATIONS, IT'S . . .



ART-13

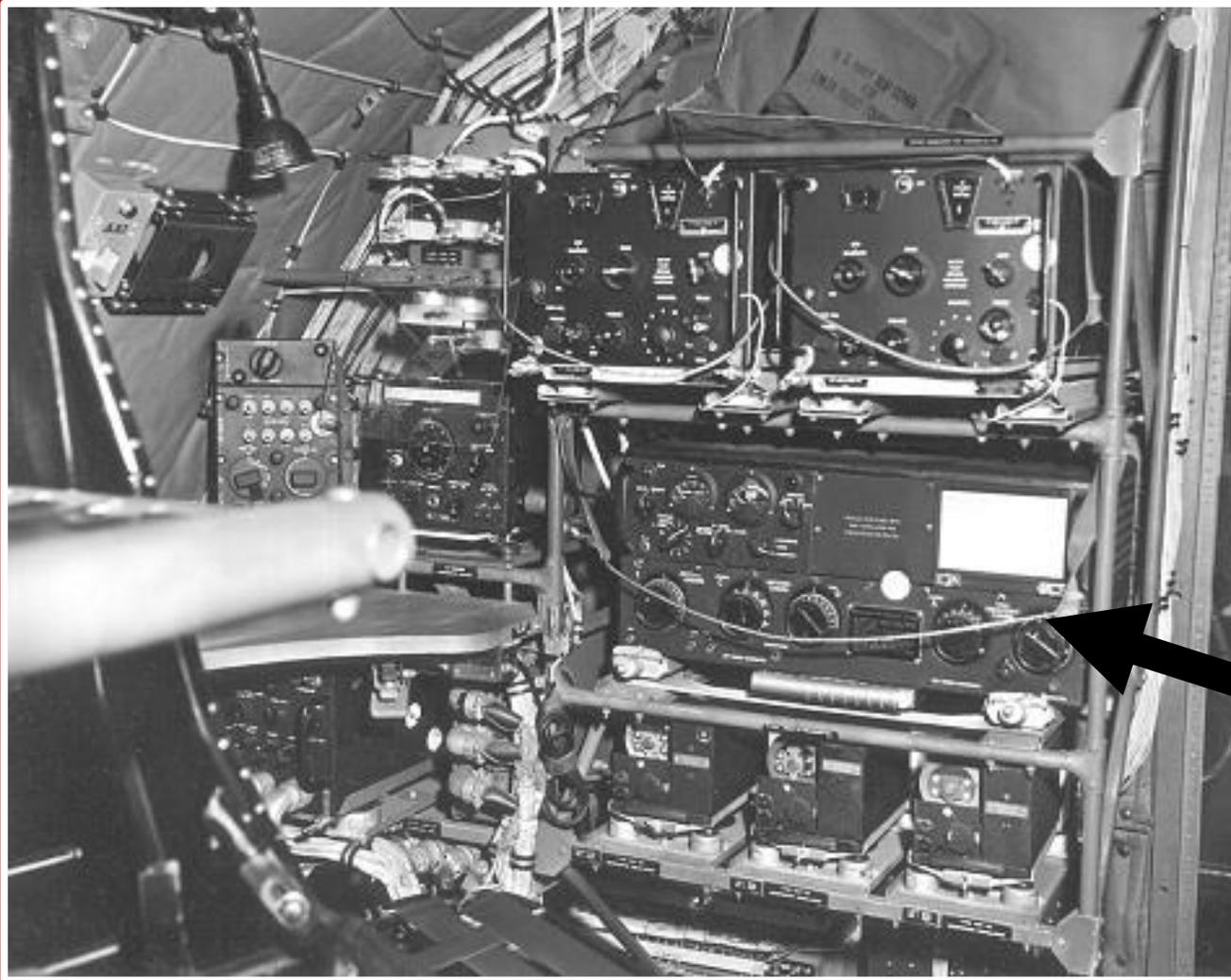


Can you identify these familiar shapes?

BC-348  
The Signal Corps BC-348Q is a WW II vintage U S Army Air Corps receiver.

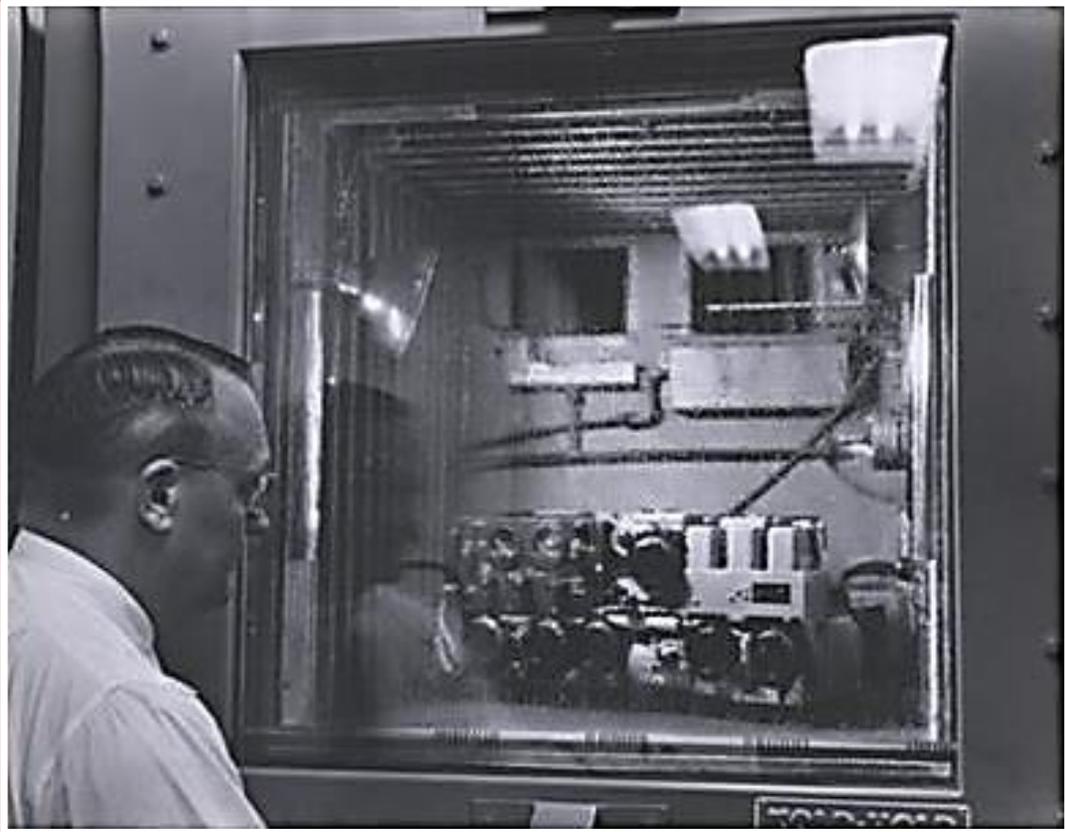


# Collins ART-13 on P2V-5 Neptune Patrol Bomber



“This is a rare photo of a P2V-5 Neptune patrol bomber **RADIO ROOM** with AM/CW ART-13 transmitter with two ARR-15 receivers.”

# *Chief Engineer Humidity Testing ART-13 - 1942*



Ted Hunter watching over the humidity testing of an early version of the ART-13 with AutoTune. He was the “father” of the Permeability Tuned Oscillator (PTO) that made Collins famous. (more to come on the PTO)

# Collins Permeability Tuned Oscillator - 1945

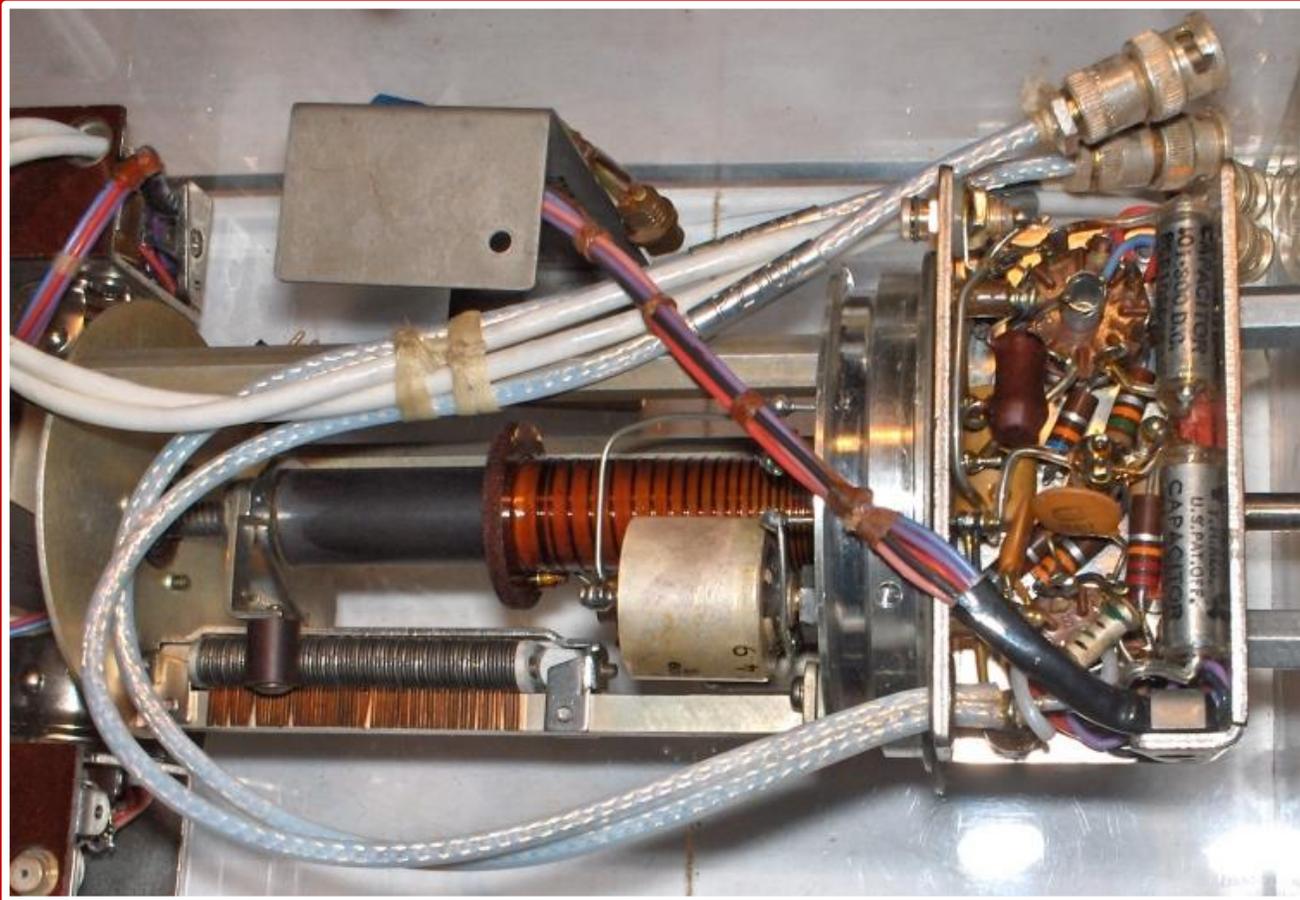


**PROBLEM:** Collins wanted to create a more stable VFO  
**SOLUTION:** Permeability Tuned Oscillator  
**ENGINEER:** Ted Hunter

Collins referred to their VFO as a Permeability Tuned Oscillator or PTO. The PTO circuit uses a *variable inductance for tuning and is essentially a rod of ferrite that can be screwed in and out of a fixed tuning coil.* Some of the early automobile radios used the same tuning which saved space and provided a rugged and reliable tuning circuit in minimum space as well as cheaper components utilized during production.



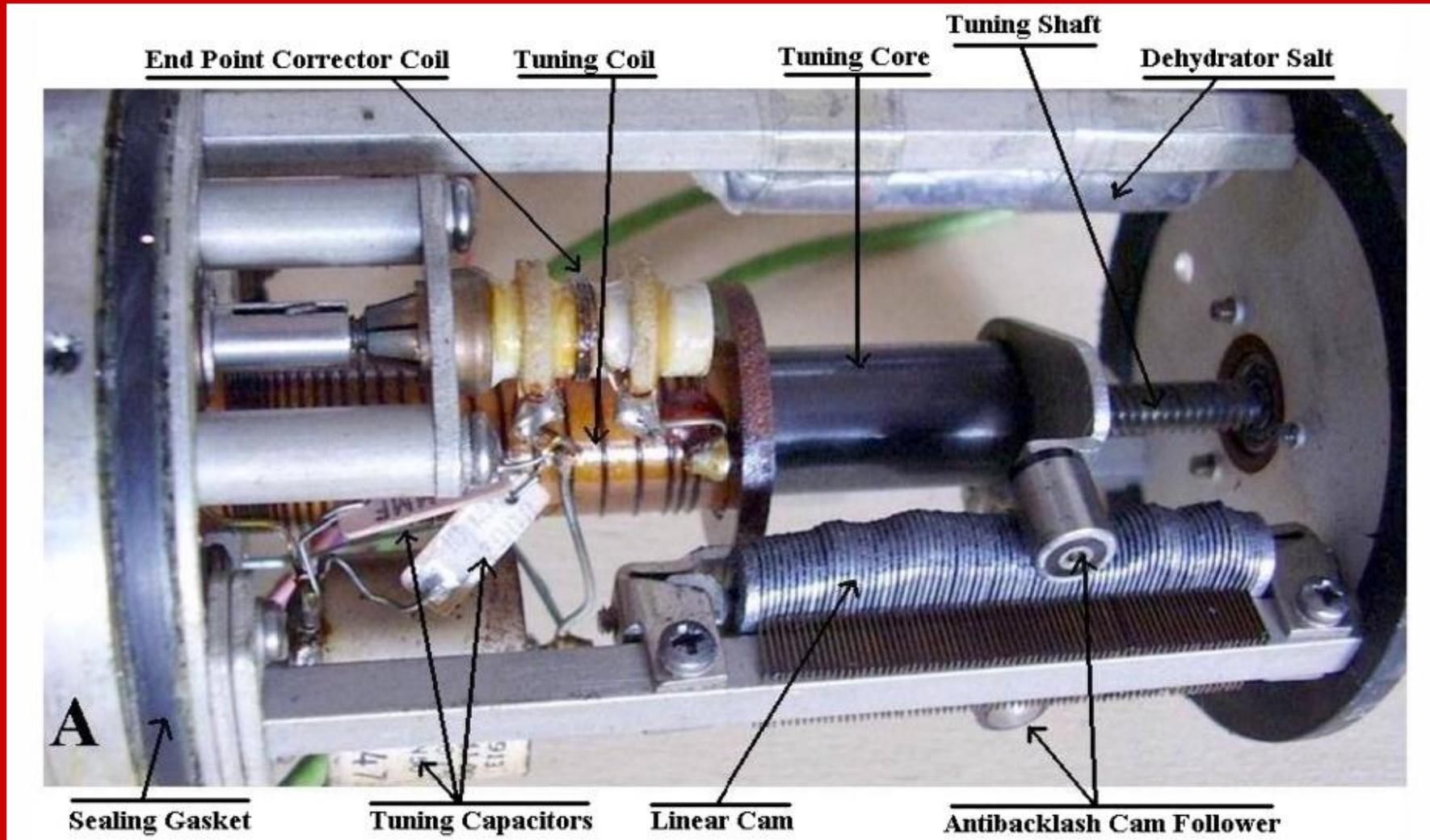
# Collins Permeability Tuned Oscillator - 1945



A PTO Assembly. Note the logarithmic spacing of the coil windings on the red cylinder in the center.

The PTO, invented at Collins under the leadership of Ted Hunter, was first introduced on the ART-13 and quickly became the *standard in linear tuning devices until frequency synthesizing circuits became practical decades later.*

# Collins Permeability Tuned Oscillator - 1945



# Collins TCS System



The TCS was designed by Collins and used, along with its matching transmitter and a power supply, during World War II on LST landing craft, P-T boats, and a variety of other smaller boats as well as on-shore applications.

***Collins Transmitter Broadcast Japanese Surrender  
to the World from Aboard the USS Missouri***



# Collins 30K-1 Transmitter - 1946



30 K-1



310 Exciter accompanied  
the 30K

“High overall operating efficiency is attained by the use of tetrode and beam power tubes throughout the equipment, where applicable, and by the use of Class B, high level, amplitude modulation. A power input of 375 watts phone or 500 watts CW is possible on all bands. A speech clipper is incorporated in the audio section so that sideband power can be greatly increased without over-modulation.”



# ***Collins 310 Exciters - 1947***



***Collins promotional text about the 310's*** - "The Collins PTO (permeability tuned oscillator) exciters give you not only the flexibility and convenience of variable frequency, but also the accurate calibration and high stability inherent in the Collins 70E-8A-PTO.." - Ran 40 watts



## ***Collins RESNATRON – WW2***



Engineers from the Collins vacuum tube lab used Salisbury's 1938 Resnatron principle to develop a high output amplifier tube to work at 350 to 650 MHz. It was used to jam airborne interceptor radar equipment which was carried by German night fighters over the English Channel.

After the war, Collins adapted the Resnatron for TV broadcasting.

# ***Collins – First to Enter Cyclotron Field - Long Island 1947***

“The high energy (particle accelerator) machines were regarded as holding great prospects in the field of medicine for cancer therapy and in the field of energy for development of atomic power sources.” There were many such devices, but all were hand-made without any standards of performance. The job of producing them “had to be done with the skills of a private concern rather than ... the universities. Collins only competitor was GE.



Two 250 ton exciter coils.



Control room



***Collins Radio Co.  
in the 1950's***



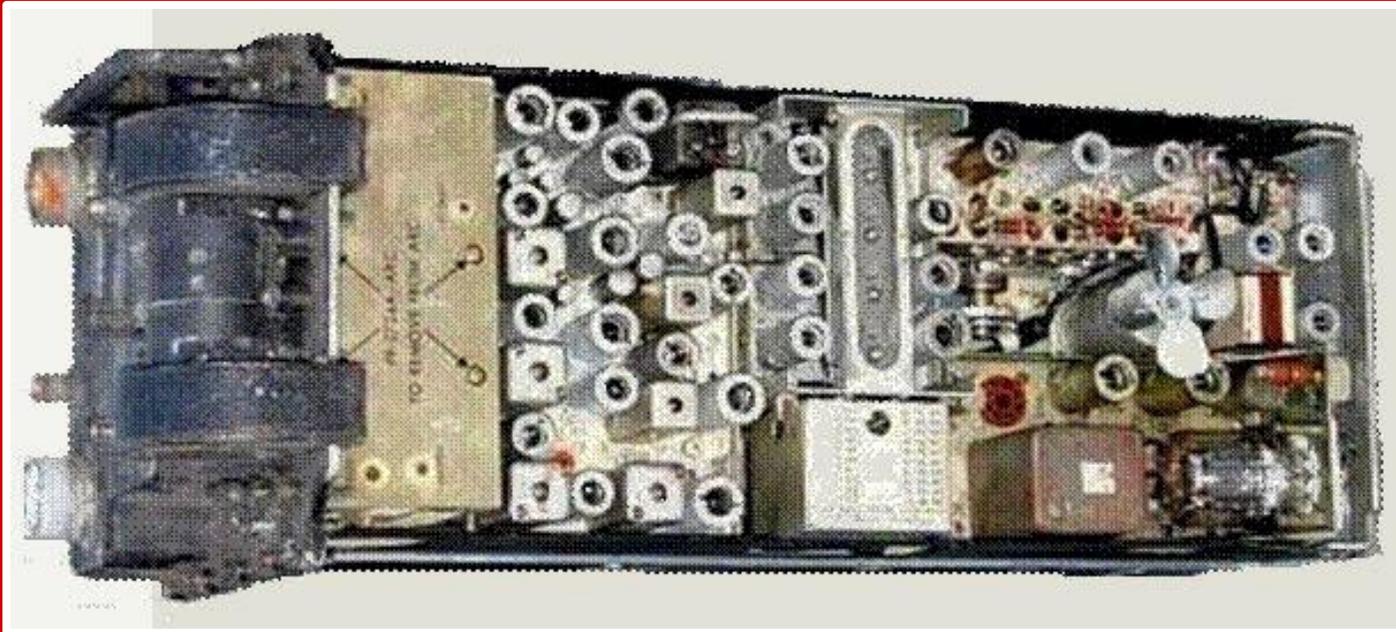
# ***Collins – KW-1 Transmitter – 1950 - (John Ellis – QST)***



COLLINS PROMOTIONAL TEXT - "The KW-1 is a vfo controlled, band-switching, gang tuned, phone and cw transmitter. Its input is a full 1000 watts on the 80, 40, 20, 15, 11, and 10 meter bands and 500 watts on the 160 meter band. The entire transmitter together with its power supply is enclosed in a handsome grey, wrinkle-finish cabinet."

# ***Collins ARC-27 – First UHF Airborne Transceiver - 1950***

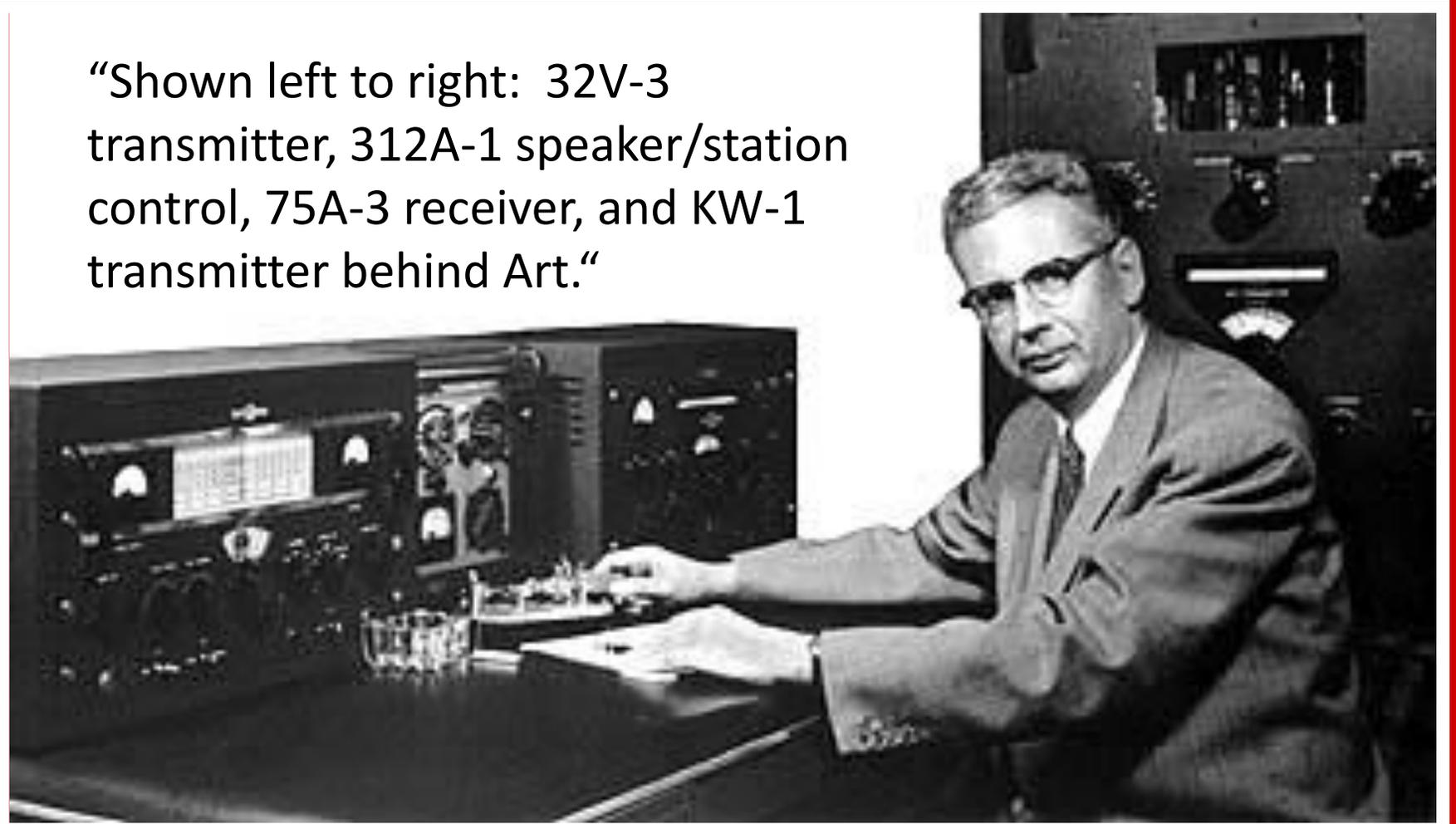
The AN/ARC-27 is capable of transmitting and receiving on any one of 1750 channels, spaced 100 kHz, within the frequency range of 225.0 to 399.9 MHz.



## ***Collins “A” line – First Commercial Gear after WW2***

"Art Collins rather liked this picture and used it to produce a QSL card. *These were the last AM amateur products produced by Collins Radio before entering the single sideband era.*"

"Shown left to right: 32V-3 transmitter, 312A-1 speaker/station control, 75A-3 receiver, and KW-1 transmitter behind Art."



# ***Collins 32V3 Transmitter – 1951***

- VFO gang-tuned band switching
- 150 w input on cw, 120 w input on phone
- 70E-8A PTO in 1600-2000 KHZ
- Covers 80 through 10 meters
- Cabinet identical to the 75A-1 receiver to make a complete desktop station.



# Collins 75A1 Receiver - 1946

**FIRST TIME!  
A COLLINS  
RECEIVER**



***Collins promotional text about the 75A1 - "Collins engineers designed a receiver for the amateur which solves the reception problems of the modern amateur better than any other receiver. In addition to superb selectivity and stability, the 75A receiver has a sensitivity which satisfies the most critical of DX hounds."***



# ***Collins 75A2 Receiver - 1950***

- 1500 KHz to 30 MHz.
- Receives CW, MCW, AM phone
- Provisions for Narrow Band Frequency Modulation Detector and a crystal calibrator
- Double-conversion superheterodyne
- Stability achieved with quartz crystals and sealed PTO



# ***Collins 75A-3 Receiver – 1953 – New Mechanical Filter - SSB***

COLLINS PROMOTIONAL TEXT – “  
The 75A-3 also features excellent stability, sensitivity, and dial accuracy. The *Collins mechanical filter*, a new and radically different of achieving selectivity in communication receivers, use *mechanically resonant elements* to produce a selectivity curve having a flat “nose” for full SIDEBAND response and steep, almost vertical skirts for rejection of adjacent channel interference.”



# ***Collins 75A-4 Receiver – 1955 – New Mechanical Filter - SSB***

FROM COLLINS PROMOTIONAL TEXT - Collins 75A-4 receiver is designed expressly for amateur operation on seven HF bands – 160, 80, 40, 20, 15, 11, and 10 meters. The receiver retains the time-proven features of the earlier 75A series: excellent image rejection, precise and stable PTO, crystal controlled injection oscillator, and the ideal selectivity of the Collins mechanical filters. The new 75A-4 assures best SSB reception in addition to conventional CW and AM.



# ***Collins Was First to Produce Mechanical Filters in Volume***



“The filter is a mechanically resonant device which receives electrical energy, converts it into mechanical vibration, filters out unwanted frequencies, then converts the mechanical vibration back into electrical energy at the output.

By varying the mechanical coupling between the discs, i.e., making the coupling rods larger or smaller, the bandwidth of the filter is varied. “

# ***Rockwell Collins Ends Mechanical Filter Production***

## **Rockwell Collins to End Mechanical Filter Production - ARRL NEWS August 2015**

“As more and more communications equipment designs have adopted digital signal processing techniques, Rockwell Collins has announced that it will stop manufacturing its renowned mechanical filters. It did not provide a specific date.

“Over the past several years, we have seen a dramatic reduction in demand for narrowband analog filters,” the company said on its website. “Due to this and other economic reasons, [Rockwell Collins] Filter Products will be discontinuing its mechanical filter products in the near future.”



# ***Collins KWS-1 Transmitter with SSB Generator – 1955***



COLLINS PROMOTIONAL TEXT –  
“The most advanced design features ever offered in an amateur transmitter ... unprecedented compactness is achieved without crowding, *the exciter and RF power amplifier are housed in a single receiver-size cabinet* which can be placed on the operating desk or mounted on top of the power supply cabinet.

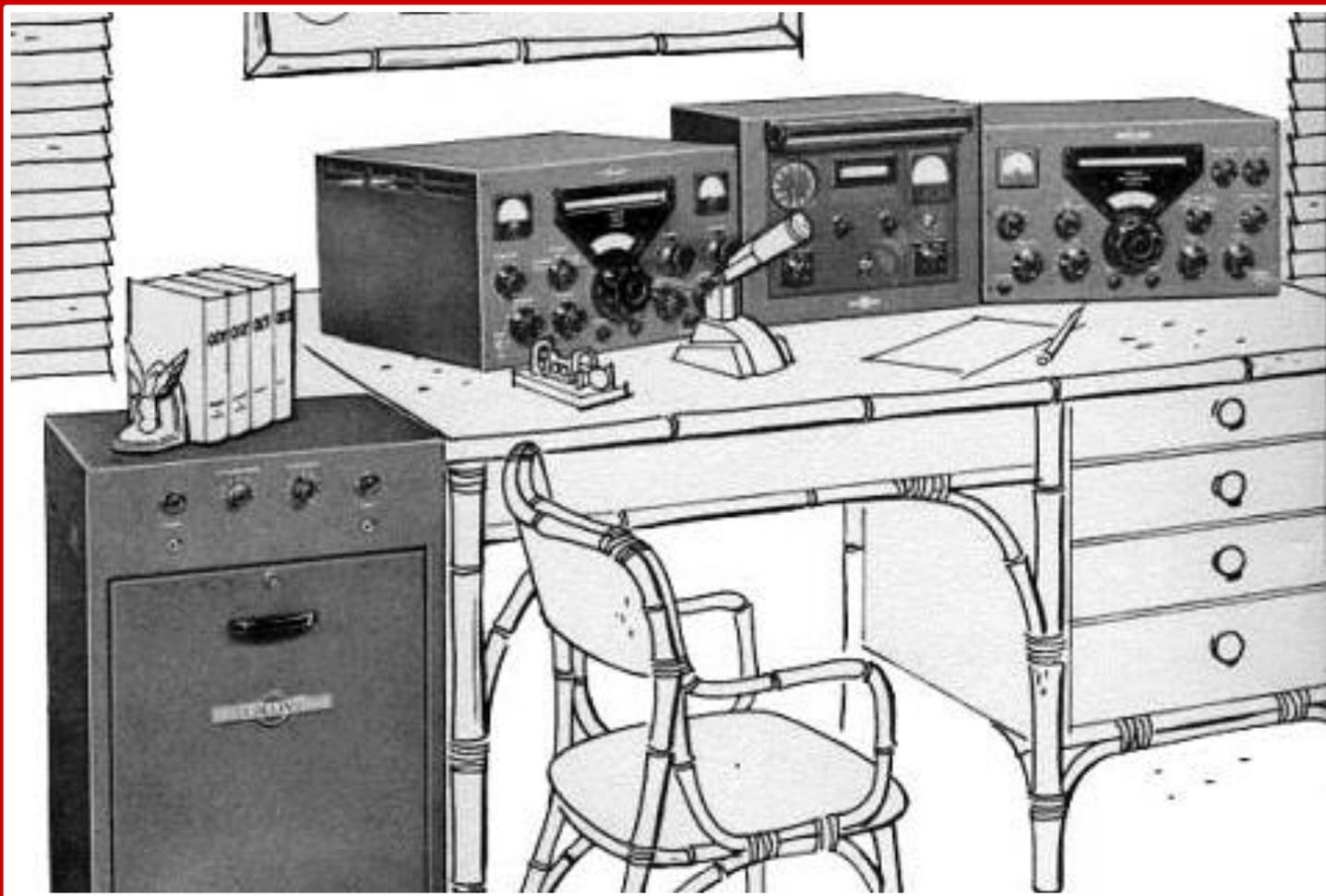
# ***Famous Collins "A Line Gold Dust Twins" – 1955***



Several TVARC members had these and sold them – Don Crosby and John Ellis



## ***Collins “Gold Dust Twins” Accessories***



- Directional wattmeter (302C1 and 2)
- Antenna tuner (180S-1)
- Noise blanker (136C-1)
- Gear reduction tuning knob (307E-1)
- Speaker (312A-1)
- Phone patch (189A-2)
- Low pass filter (35C-2)
- Mechanical filters (F455J series)

# ***Introduction of SSB to Strategic Air Command (SAC)***

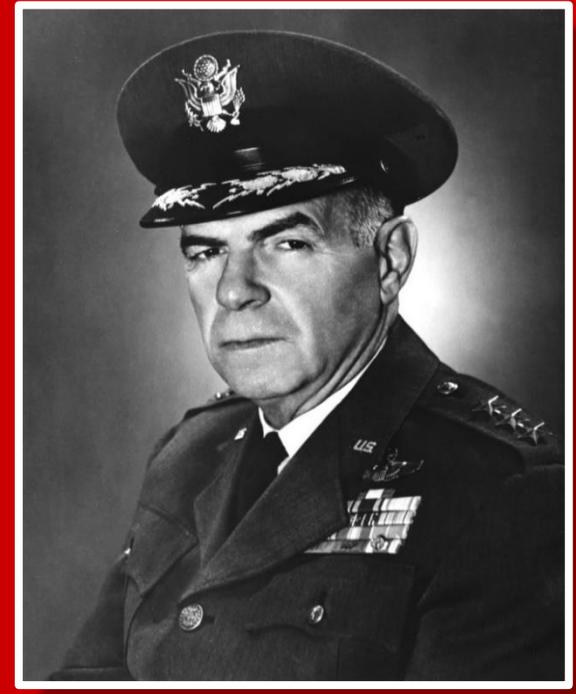
**SAC PROBLEM** - Unable to Seamlessly Connect all SAC Aircraft and Land Bases around the world via HF.

**SAC SOLUTION** - Collins, LeMay, and Griswold worked together to develop airborne SSB system

(Rich referred to this)



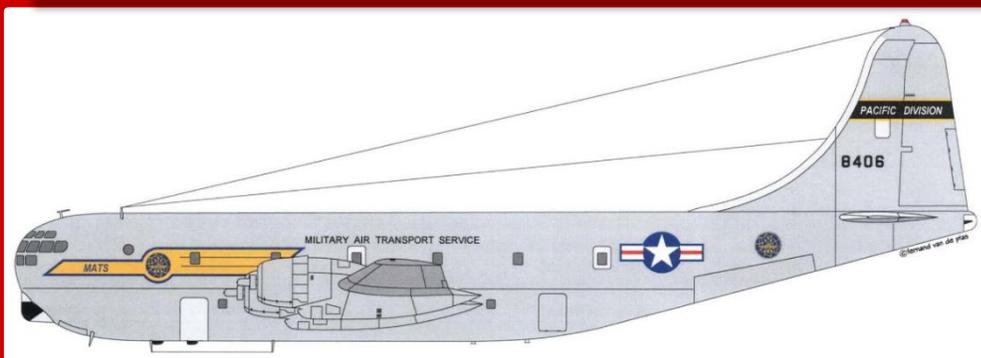
LeMay, Collins



Griswold

# 15,000 Flying SSB Demonstration to SAC

Gold Dust Twins aboard a C-97A StratoCruiser – March 25, 1956



Under Griswold's command, the plane flew from Offutt AFB to Great Falls Montana, to Fairbanks and Anchorage in Alaska, to Adak in the Aleutian Islands chain, to Tokyo, to Okinawa, then back eastward across the Pacific to Guam, Kwajalein, Honolulu, Travis AFB in California and back to Offutt.

“In the biography of Lemay entitled ‘Iron Eagle’, Author Thomas Coffey quoted the general as saying about sideband: “It was so much better than the standard stuff we had, there was no comparison.”



## ***Air Force Refuted First SSB Airborne Test***

“Despite virtually continuous contact with the US from Alaska to Japan and points in between which never had been achieved with conventional HF, the Air Force communication experts still ***would not concede that tests using amateur radio proved conclusive.***”

**A second test was needed and succeeded.**

## ***Collins 30K-5 Commercial Transmitter***



“This 250 watt commercial AM transmitter was a brother of the famous 30K-1 amateur AM transmitter. This rig features beautiful audio, the option of using audio clipping, and dual 75THs modulating a 4-125 driven by an 807. The 30K-5 is a two channel transmitter.”

# ***Collins 51J-4 General Coverage Receiver – 1957***

## **With Mechanical Filter**

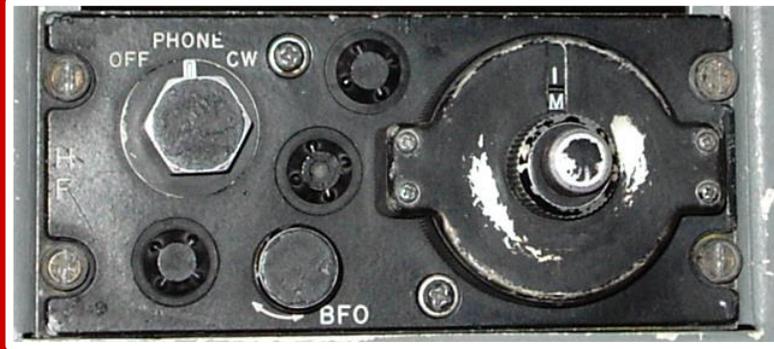


“The Collins 51J-4 Receiver is designed for communication applications where stability and dial accuracy of the highest order are the prime requisites. Under normal operating conditions, the receiver operates in the range of 540 kc to 30.5 mc with a total setting error and ***drift of less than 1 kc at any frequency within its range***. This receiver incorporates the new mechanical filter in the intermediate frequency range to obtain the desirable rectangular- shaped passband.

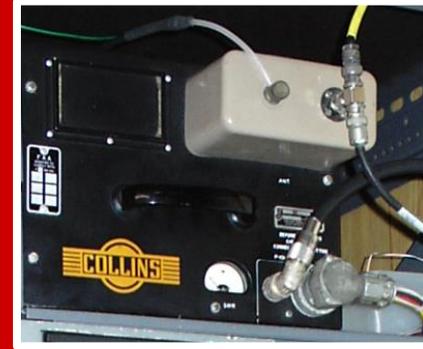
# ***Collins 618S series – HF Airborne Transceiver with AutoTune***



Transceiver



Remote Control Head

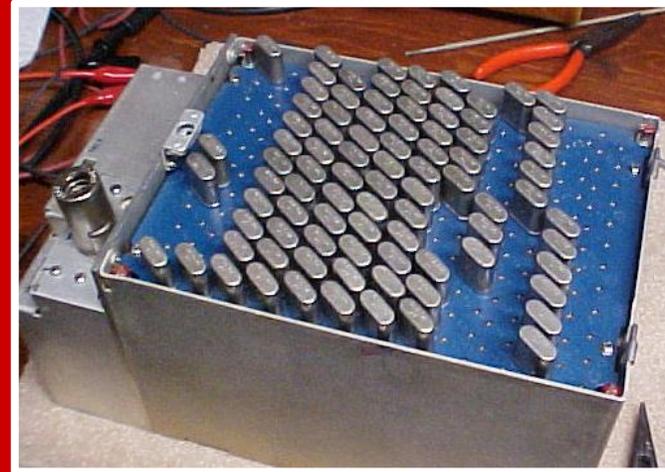


Antenna Tuner

“It featured 144 crystal channels using a signal crystal for both receive and transmit and was AM and CW only.”



Can Slugs and PA Coil AutoTuned for Each Crystal



Bank of Crystal Channels

- Frequency Range: 2-25 MHz in Four Bands – 100 Watts
- On airliners of the day such as the DC-7

# Collins Integrated Flight System



FROM COLLINS SIGNAL MAGAZINE  
– Spring 1953

“This installation of Collins Integrated Flight system (IFS) is on the instrument panel of the personal Super DC-3 airplane of Donald W. Douglas, president of Douglas Aircraft Co., Inc.

Top middle instrument is Approach Horizon; Course Indicator is directly under.

# ***Collins Digital Readout Radios***

Around the end of WWII, in the golden age of analog designs, Collins set new standards for tuning accuracy and stability in communication equipment, culminated since the early '1950s in the introduction of digital mechanic readout sets, as the R-390. ***Specs of these sets were simply exceptional, with overall accuracy and stability figures unsurpassed until the introduction of digital frequency synthesizers.***



# ***Transhorizon Research – 1950+***

“Collins gained attention of the news media in April, 1950, when the *New York Times* reported on the Transhorizon experiments being conducted by Collins. ... The new method appears to make obsolete the generally accepted theory that signals transmitted on very high frequencies, such as those used by video, are limited to line of site.”

## **Collins Radio Company** **Transhorizon Communications**



- 1945 Study for Navy Concluded 1,200 Miles for VHF Ionospheric & 350 Miles for UHF Tropospheric Achievable
- 1951 VHF 770 Mile CRPL & 1952 700 Mile Dallas Tests with 1,000 Ft Rhombic & 20-kw Transmitter at Hangar
- 1951 Tests with 1,100 & 770 VHF Ft Rhombic with Modified AN/FRT-6 40-kw HF Transmitter
- Built Four 500 to 2,000 Ft VHF Rhombics at Konigsmark



*Aug 19, 1952 AF VHF Ionospheric Demo  
with 500 Foot Rhombic & 40-kw Transmitter*

**AF Bought Eight IS-101s DEW Line Long  
Distance Rearward Data Transmissions**

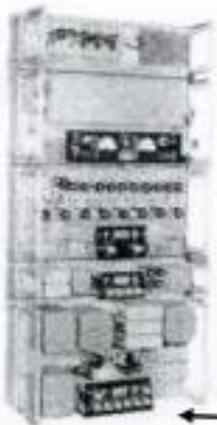
**VHF 51M Receivers, 242F-2 & 242F-3  
Transmitters, & VHF Antennas for  
Aircraft Communications**

# Collins Transhorizon For DEW Line - Early Warning System

## Collins Radio Company



### White Alice – DEW Line



- Authorized in 1954 – UHF Tropospheric for Communication & Data
- 52 Initial Sites – Installed 1955 – 1957 – Expanded to 71 – Updates
- Wideband System – 132 FM Channels – About 900 Mhz
- Various Configurations – Minimum 2 Receive & One Transmit Antennas, 1 Diversity Receiver & 1 Transmitter System Per Site
  - AN/FRC-45 – 1-kw Transmitter
  - AN/FRC-47 – 10-kw Transmitter
  - 60 Foot Billboard Antenna
  - AN/FRA-45 30 Foot Parabolic Antenna
  - 50G-1 Diversity Receiver



Boswell Bay, AK – First Commissioned  
Last Decommissioned



Collins Only Supplier in 1950s  
Complete Military & Commercial  
Transhorizon Systems

Army Mobile Tropospheric

Commercial – Transportation,  
Telephone, & Petroleum  
Communication & Data Terminals

John Designed All DEW Line Communication Antennas



# Collins Moon Bounce Research - 1951

## Collins Radio Company – Moon



- Art Collins – Moon to Reflect Signals from His Amateur Station
- Set Up Team – *Irv Gerks, John Shanklin, Leon Griswold*
- Faced the East Horizon
- Iowa Electric Power Arrangement
- Heated Hanger Sheet Metal
- 2–1/2 Seconds – 500,000 Miles to CRPL
- 800 Ground Miles to Sterling, VA

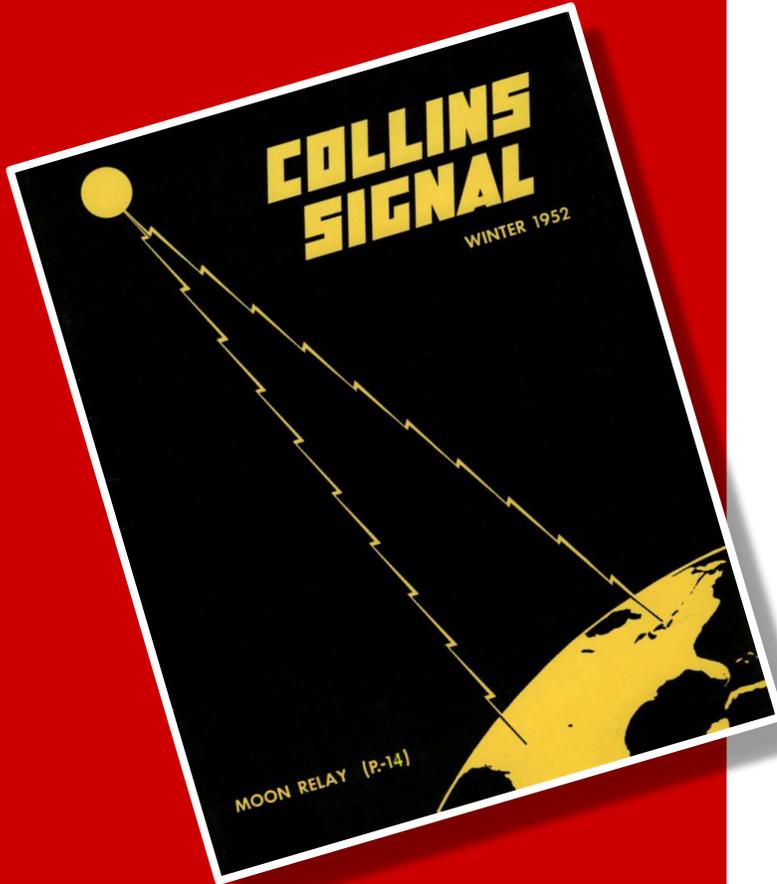
1<sup>st</sup> Successful UHF Long  
Telegraphic Message  
November 8, 1951

*“What Hath God Wrought”*



“Chicken Horn”

- 75 Ft Long Tapered Wave Guide Horn
- 20 X 20 Ft Opening
- Metallic Wire Mesh
- 418 MHz (72-cm) Coded Signal
- 20-kilowatt Transmitter – Collins Liquid Cooled Resnatron Tube
- 26.3 dbi of Gain – 10 Megawatts of EIRP

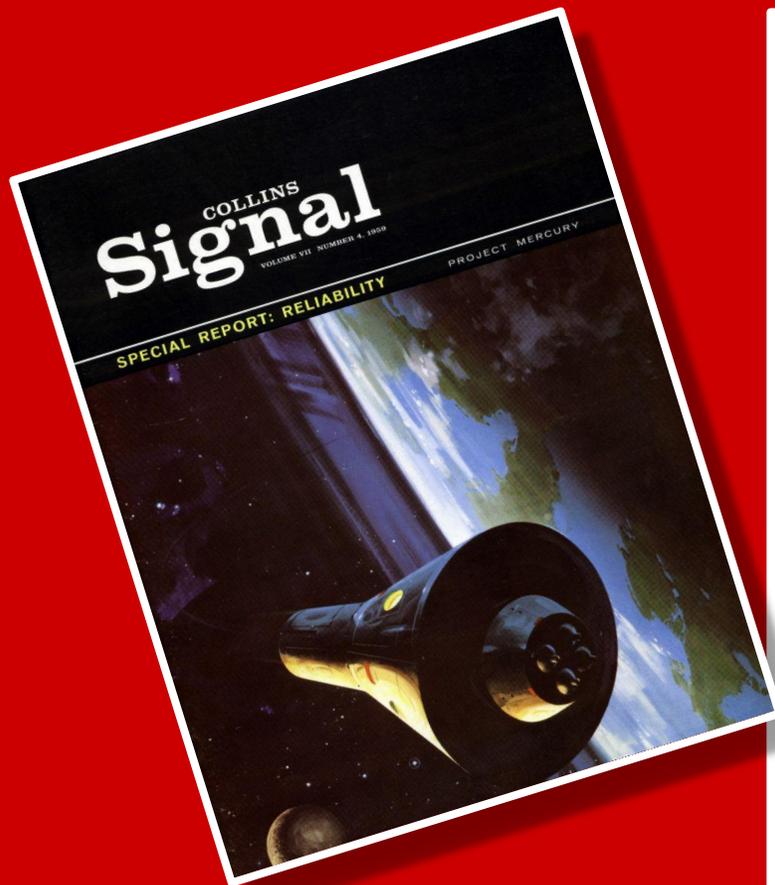


## ***Collins Radio Sextant -1954***

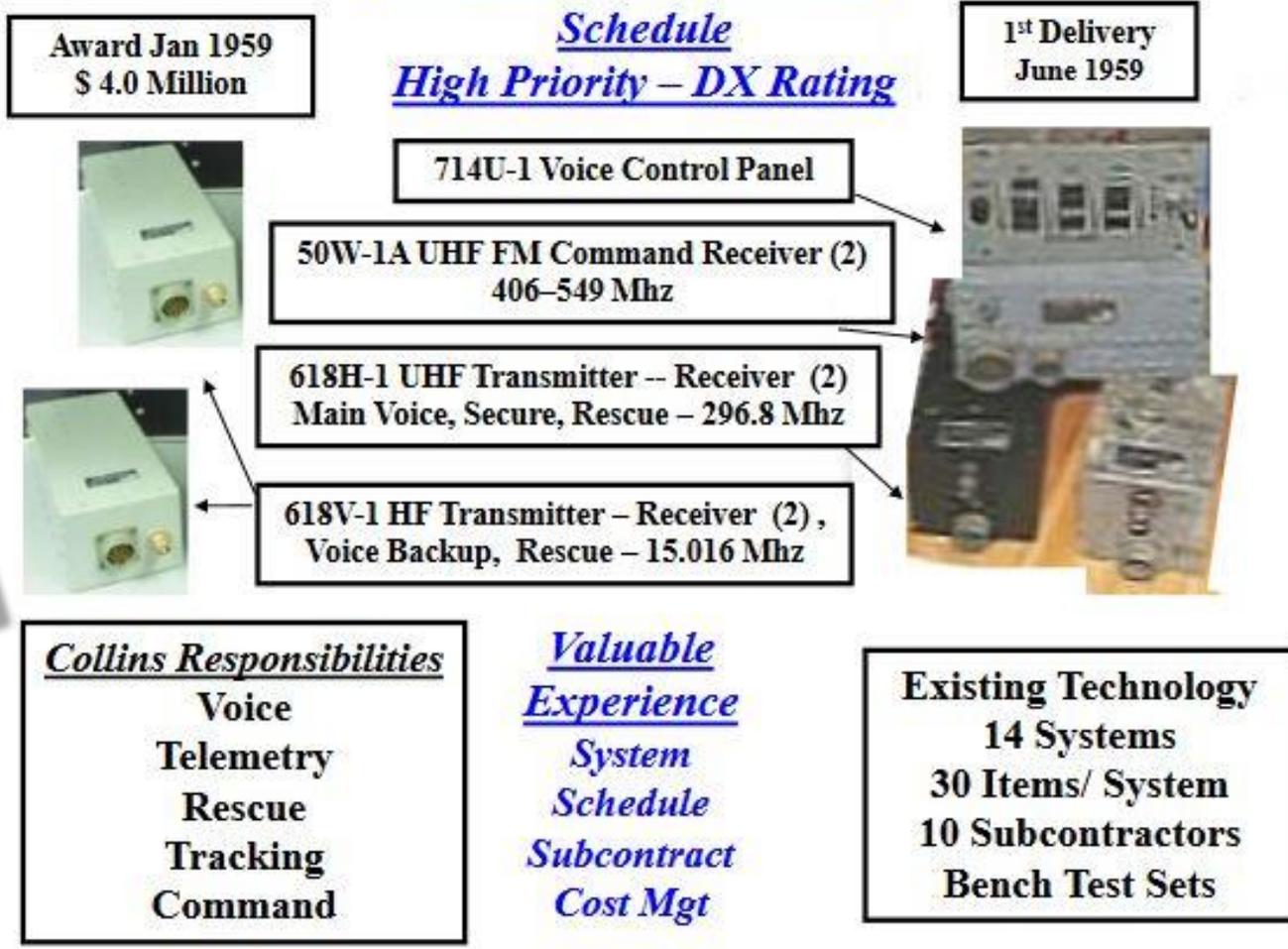


“The ship’s navigator can find his position just as if he had an assistant watching the sun through an ordinary sextant. No cloudy weather gets in the way of the radio sextant, nor can an enemy jam the radio impulses (as is possible with other radio aids to navigation, such as Loran.”

# Collins Project Mercury Space Communications



## Project Mercury



# Collins and Atlantic Missile Range Tracking

Signal – Winter 1963



Range tech  
tunes  
Collins  
310F-6  
exciter at  
Malabar, FL

Center - Collins HF log periodic antenna overlooks Malabar transmitter site for all AMR to beam down range for voice communication.



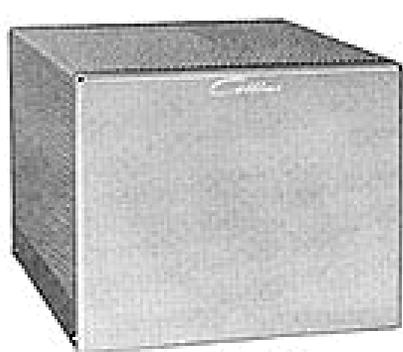
# ***COLLINS KWM-1 TRANSCEIVER - 1957***

**Art Collins took it mobile on his honeymoon! Ask about related articles on transceiver stations in a box radios.**

- Covers 14-30 MHz with an input of 175 watts PEP or SSB.
- Uses VOX for break-in CW
- *Bands covered in 100 KHz increments based on 10 injector crystals*
- *Used in U2 spy planes and many other military uses*



# Collins KWM-1 Transceiver Accessories - 1957



516F-1

A



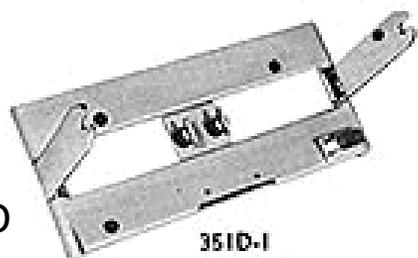
312B-2

B



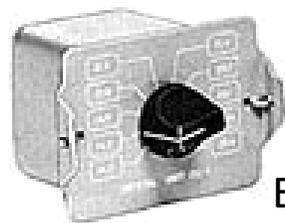
516E-1, -2

C



351D-1

D

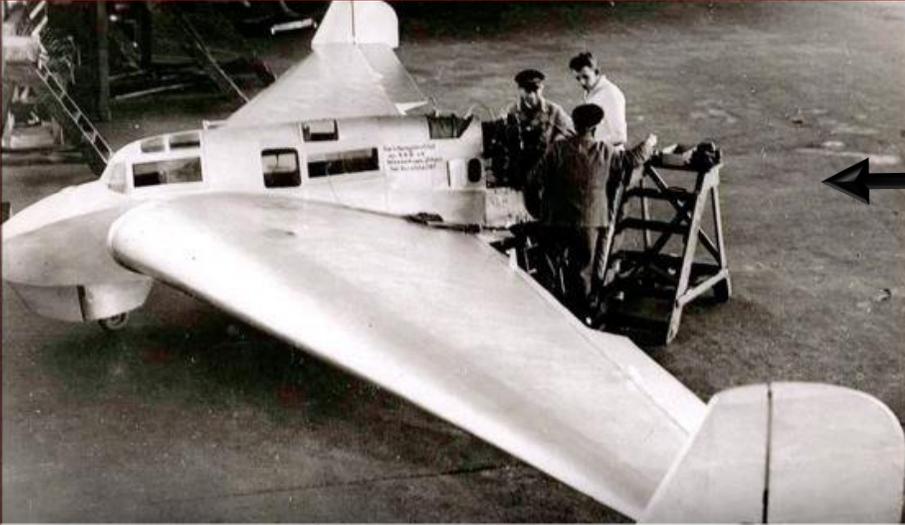


13C-1, 399B-1

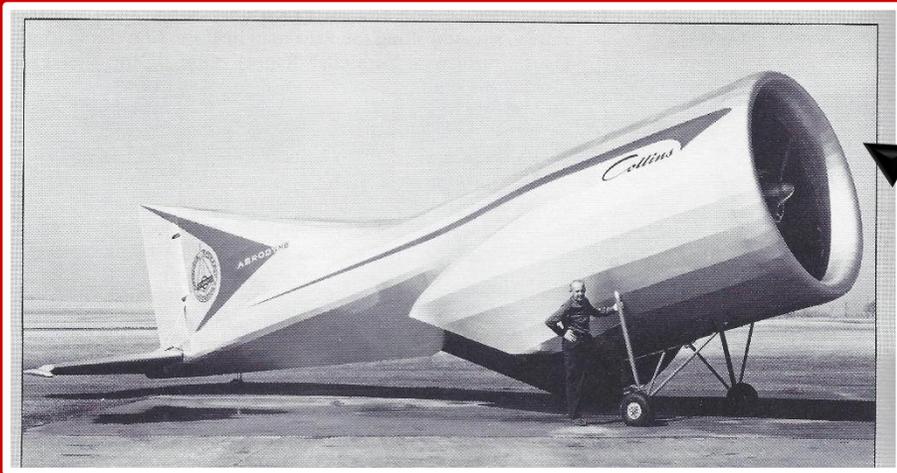
E

- A – Speaker
- B – Speaker console with RF wattmeter
- C - DC power supply
- D - Mobile mount
- E – DX conversion adapter (separate receiver and transmitter functions)

# ***Dr. Lippisch and Operation “Paperclip”***



In 1931 Lippisch developed the Lippisch Delta I ... the - ***world's first delta wing aircraft.***



“After WW2, the US “raced to grab as many of the highly skilled German scientists as possible.” Dr. Lippisch was one of the 50 German scientists brought to the US. ***He joined Collins*** in February 1950, as head of aero dynamical research. It was here that he developed the ‘Aerodyne’, a wingless aircraft.” ***This model never flew except in a wind tunnel.***

***Collins Radio Co.  
in the 1960's***



## ***“007” and Collins Avionics***

Photo of James Bond in the movie Goldfinger about to climb aboard a Lockheed Jet Star L-329 sporting the Collins Radio logo on the blade antenna.



# ***Collins Promotional Van – 1960's***



## ***Collins “S-Line”***



“The Collins S-Line was perhaps the most successful product line in history, spanning over two decades.

The S-Line replaced the A-Line “Golddust Twins” (the 75A-4/KWS-1) in 1958 with the introduction of the 75S-1 and the 32S-1. Inspired by Leica camera, Art Collins wanted the S-Line front panel backgrounds to have a leather-like finish. The visually pleasing aesthetics combined with a simplified control layout and a sloping cabinet design made the S-line very comfortable to use and helped to make it an instant success.”



# Collins 32S-3 Transmitter – 1963

*Improved 32S-1 and S-2 by adding CW calibrate/spotting control and deletion of spurious CW signals*

- Covers 3.4 to 30 MHz with a power input of 175 watts PEP or 160 on watts on CW.
- Dials and controls are “human-engineered for operational efficiency.



## ***Collins 62S-1 Transverter for 6/2 Meters – 1963***



COLLINS TEXT – “The Collins 62S-1 permits you to enjoy operation on either 6 or 2 meters by simply snapping a switch. No cable patching is required. It can be used in any operational mode, as determined by the companion receiver and transmitter. Power input is 160 watts.

Reflecting Collins emphasis on system engineering and flexibility in amateur equipment, the 62S-1 is designed for use with the S-Line, KWM-1 and KWM-2. It converts signals to 14.0 to 14.2 MHz.”



## ***Collins 75S-3 Receiver - 1967***

COLLINS TEXT – “The Collins 75S-3 is a versatile receiver with exceptionally sharp selectivity and operation in any of three modes – SSB, CW, and RTTY. A mechanical filter is optional.

Transceiver operation is achieved when used with the companion 32S-3 transmitter. Receiver PTO then controls the transmitting frequency.



# Collins S-Line 312B-4 Console and 312B-5 VFO



STATION CONSOLE – directional coupler, wattmeter, speaker, phone patch, interconnections.



SEPARATE VFO

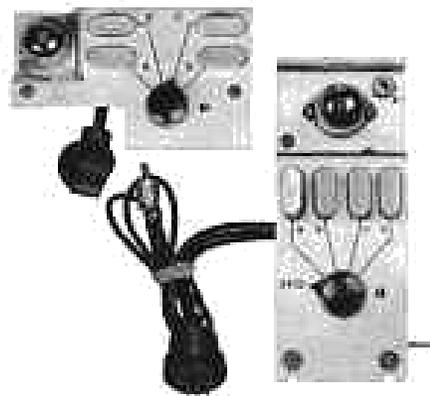
# Collins S-Line Accessories



ANTENNA  
TUNER



SPEAKER



NOVICE CRYSTAL SWITCH



RACK MOUNT



DUMMY LOAD



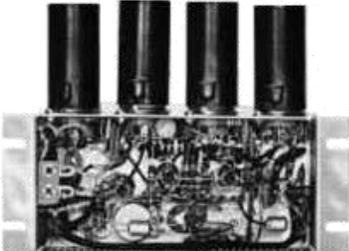
RF WATTMETER / SWR METER

## ***Collins KWM2 Transceiver - 1959***

“The KWM-2/2A was unmatched in performance and dependability for mobile and fixed station applications. The transceiver's power input is 175 watts PEP on SSB or 160 watts on CW. The KWM-2A utilizes an additional crystal board.” Used for military and ham applications. Operates on 80 to 10 meters.



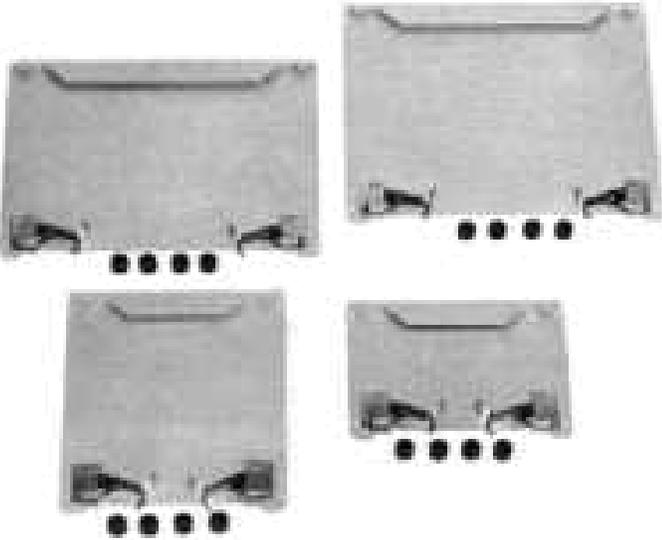
# ***Collins KWM-2 and KWM2-A Accessories***



Noise Blanker



Mobile Power Supply



Mobile Mounts



Carrying Case



Dipole Antenna



## ***Collins 30-S1 Linear Amplifier - 1959***



The Collins 30S-1 is a single final tube (Eimac 4CX1000A), grounded grid linear amplifier with frequency coverage consistent with the 32S-1 and 75S-1. It provides full legal power input for SSB (1kW average) or 1kw input for CW, requiring 70 to 100 watts excitation. By retuning the input coils as necessary other frequencies are available in the range of 3.5-5 and 6.5-30 MHz.

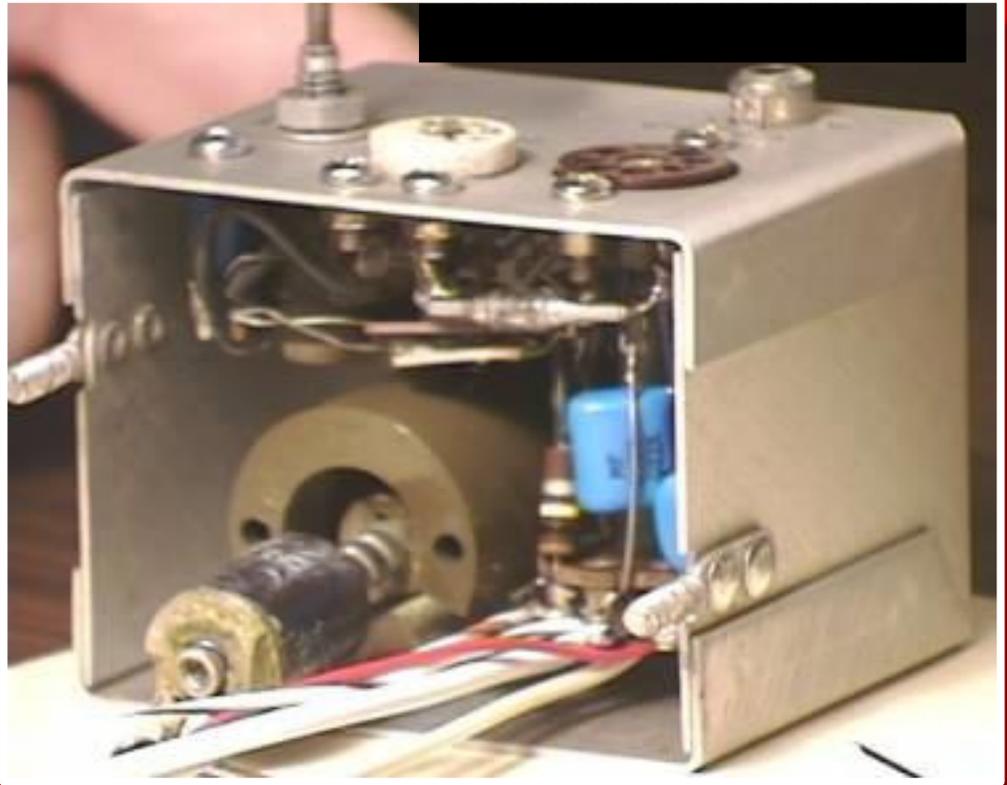
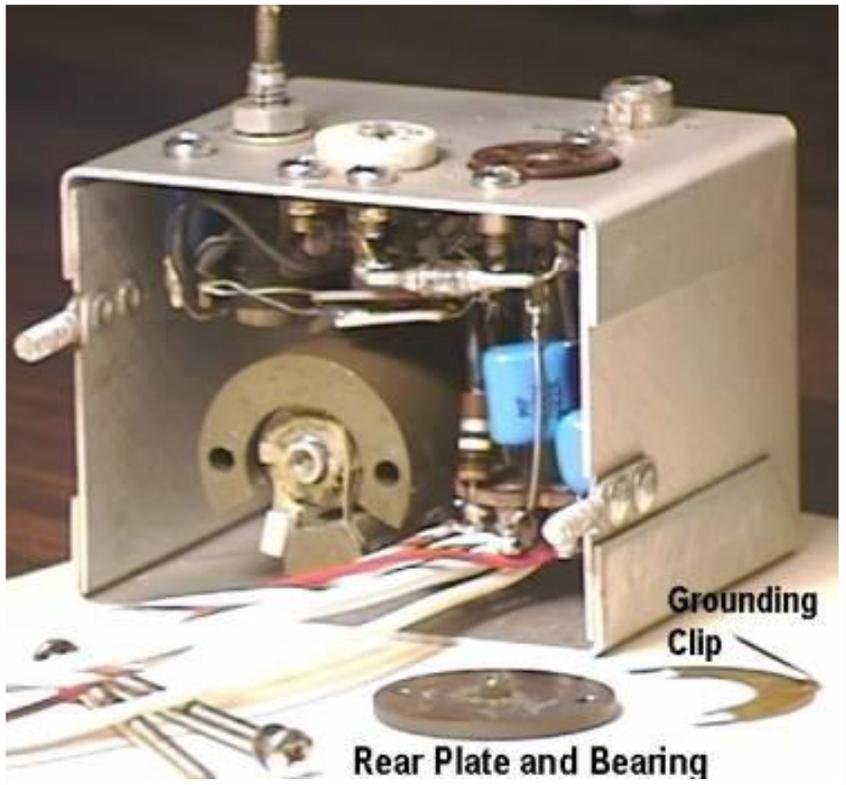
# Collins 30-L1 Linear Amplifier - 1961



COLLINS PROMOTIONAL TEXT - "The Collins 30L-1 has 1000 watts PEP power input on SSB and 1000 watts average on CW on 80, 40, 20, 15 and 10 meters. Uses TWO FINALS (811A) Drive power is 70 to 100 watts for full power output. RF connection is N type."  
(Ask Don Crosby about his)



# ***Collins S-Line Permeability Tuned Oscillator – 70K2***



# ***Collins Former S-Line Engineers/ Techs, and Equipment – 1990's***



Joe Jekerle, W0UEO; Dave Hallock, W0SS; Joe Vanous; Chuck Carney, W0GDJ; Dennis Day, W0ECK; Jerry Vonderheide, W0NGL

# ATRAX – Collins Missile Range Communication System



## ATRAX

MISSILE RANGE COMMUNICATION SYSTEM

by H. C. FELLHAUER, Project Director

Two air transportable communication systems, designed and built on a high priority basis, are currently supporting the nation's space activities along the Atlantic Missile Range. Known as ATRAX, the systems represent the largest transportable complex ever built by Collins Radio Company and one of the largest in the world.

Built under direction of the Rome Air Materiel Area (ROAMA), ATRAX represents a concept prepared by the Eastern Region, Ground Electronics Engineering Installation Agency (EGEIIAR). It is a transportable HF single sideband, VHF, UHF, microwave and wire communication system designed to provide general communication support for the test activities of the Atlantic Missile Range. ATRAX is equally usable either as an independent communication facility of the Range or as an addition to an existing fixed station.

Essential equipment is installed in nine trailer-type vans and two military-type S-141 helicopter-transportable shelters. Two of the trailer-type vans contain receiving equipment, three contain transmitting equipment, two are equipped to operate as maintenance and repair shops, one contains control, tape recording and telephone switchboard facilities, and one, containing teletypewriter and frequency multiplexed tone telegraph equipment, provides a message center. Each of the S-141 shelters contains a one-watt frequency diversity microwave terminal with 24 channels of diversity transistORIZED multiplex equipment. Accessories include diesel generator sets, antennas, inter-unit and inter-equipment cables, test equipment, and spare parts.

### Purposes of ATRAX

The activities of the Atlantic Missile Range include launching and tracking of orbiting vehicles, space probes and ballistic missiles. The importance of reliable communication, particularly radio communication, has been well demonstrated in the recent series of orbiting astronaut flights – Project Mercury. To correlate the work of the entire range – the data gathering points, the tracking stations, the command and control elements, the data reduction and computation centers – reliable communication, both voice and data, must be established from point-to-point, from ship-to-shore, and from ground-to-air. This requires both short- and long-haul radio communication as well as wire circuits.

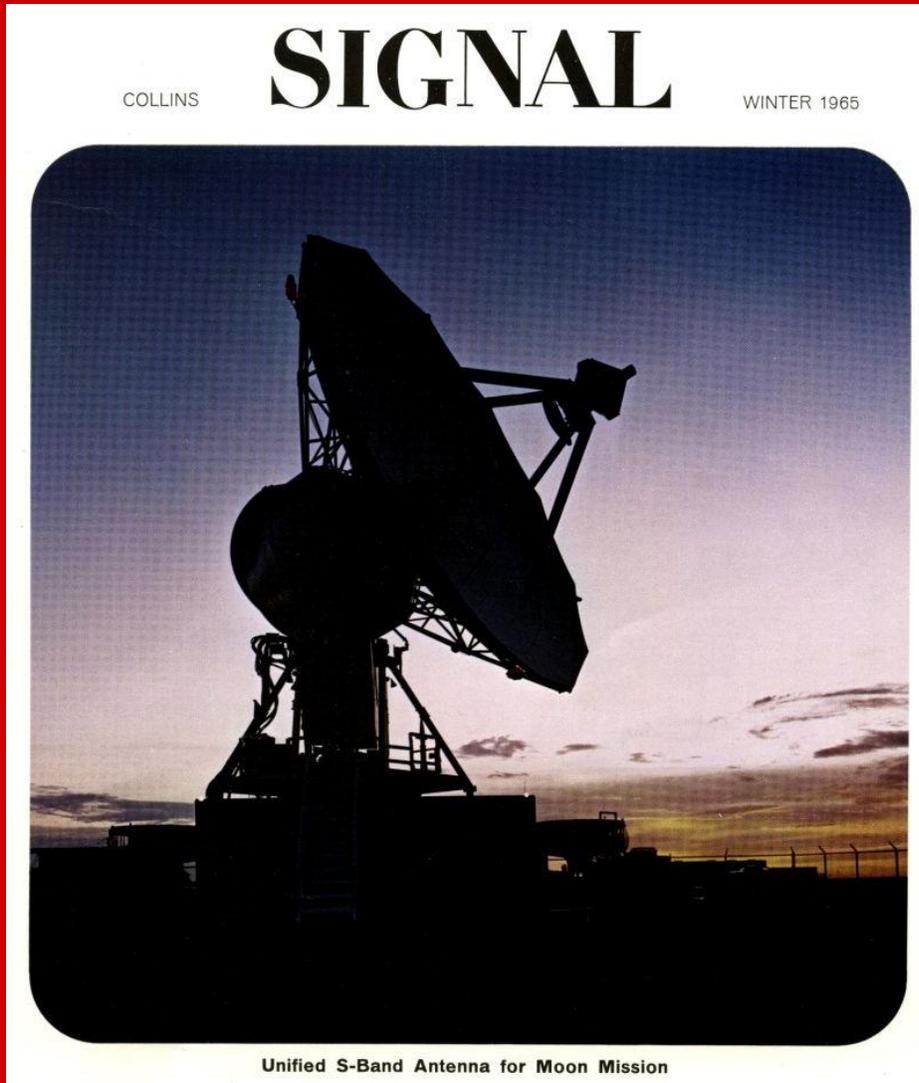
The ATRAX system is designed to supplement the Range capabilities by providing additional communication facilities. ATRAX has VHF, UHF, and microwave capability for radio line-of-sight circuits; it has HF single sideband equipment with both omnidirectional and unidirectional antennas to provide optimum capability for radio circuits up to 3,000 miles by more; and it has telephone circuit capabilities by

FALL, 1963 - Collins built the largest portable complex in the world at that time. It consisted of several trailers that provided communication support for the tracking of the Atlantic Missile Range launches and space tracking programs such as the Mercury astronaut project and military spacecraft operations.

It combined UHF, VHF, and HF radio communications.



# Collins Apollo Mission Communication/Data Systems - 1965



“Communication and data equipment on the spacecraft will also be provided by Collins. Among this equipment will be S-band transceivers, VHF transceivers, intercommunication and associated equipment. The CM and LEM can communicate with each other via the low power VHF radios.

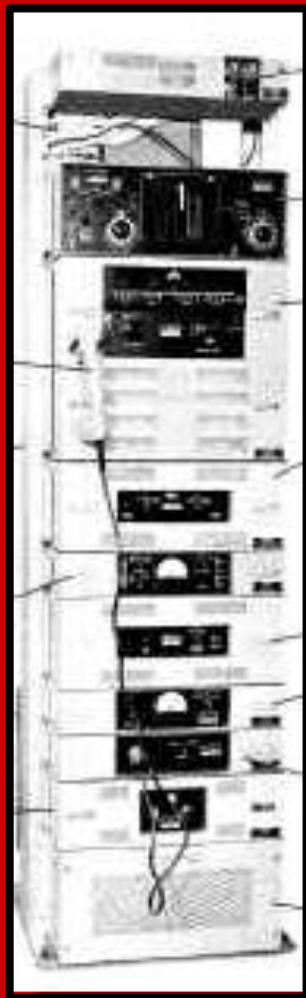
Frequencies:

- Uplink – earth to CM (2100 MHz)
- Downlink – CM to earth (2300 MHz)

Phase modulation and frequency modulation will be employed.”



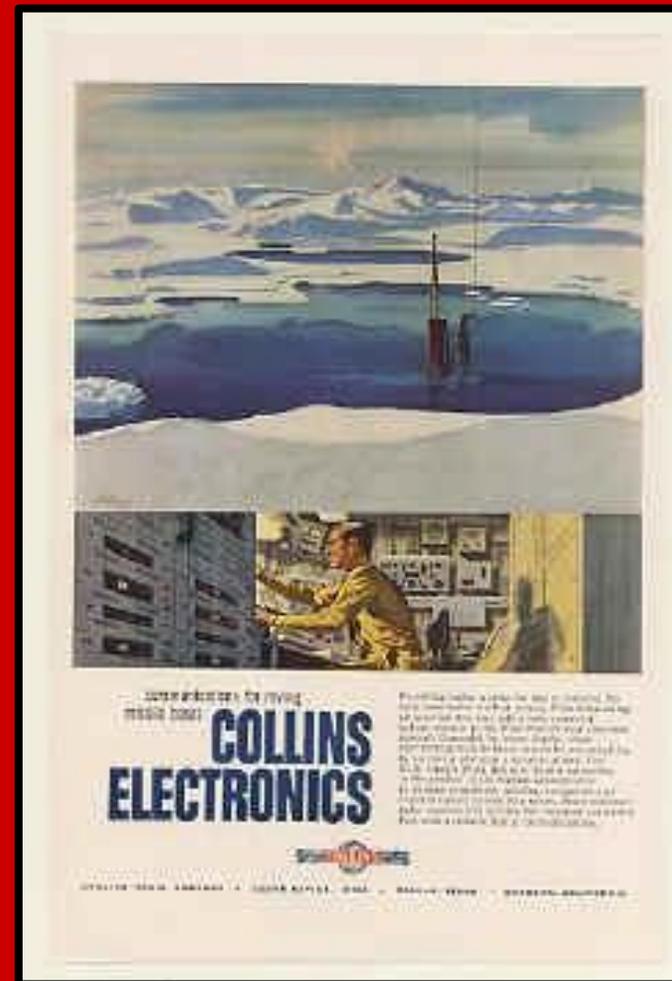
# ***New navy fleet strategy – Use Collins SSB - URC 32***



FORMER SUBMARINER - “The URC-32 was the fleet’s mainstay comm rig once SSB replaced AM and all the older boat anchor receivers and huge transmitters.

The ATU was usually mounted at the base of the supplied 35' whip antenna and controlled from the main rack. It ran 500W PEP output on SSB to a pair of 4CX250R/7580's in the 2- 30 MHz range.

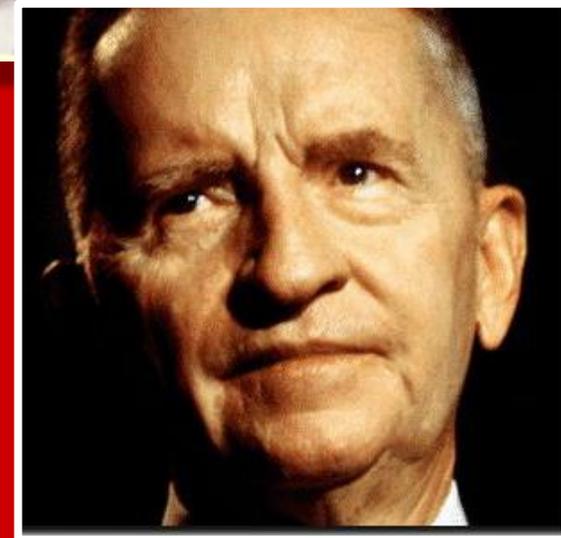
Once hams got permission to operate aboard ship I ran hundreds of phone patches but since it was the ships primary rig there was no general hamming. I had to use the old CW/AM gear in Radio 2 for that.”



# ***The Perot Saga – 1960'S***

## ENCOUNTER 1 – 1963

- “Collins needed larger scale computers for its manufacturing, engineering, marketing, finance, personnel, and other functions.” Collins sought capacity with other companies who had time to sell on their computers. Collins got that he needed by hiring Ross Perot’s Electronic Data Systems in Dallas ... and Ross himself was the sales person
- Perot said in 1992 when he was a presidential candidate, “It took me 78 sales calls to make my first sale ... though in, all of places, Cedar Rapids Iowa. I used that \$100,000 to hire more systems engineers.”



## ***The Perot Saga (2) – 1960'S***

### **ENCOUNTER 2 - 1969**

- Art Collins wanted his company to pursue the development of computer systems (“C-System”)
- Collins announced in 1968 that it would enter the computer field with its C-8500. His goal was not to compete with IBM, but to “combine processing functions with high speed, high volume data communications.”



## ***The Perot Saga (3) – 1960'S***

- 1968 was a record sales year (\$447 million). Arthur thought these high sales justified the course he was taking with the highly costly development of the C-System of computers.
- In 1969 a torrent of troubles settles on Collins Radio. Sales dropped to \$440 million and the price of Collins stock began to fall. Superficial and explicable reasons for the fall:
  - 1) Military spending was down for R and D, avionics and communication equipment. Pentagon priority was on guns and bombs for the Vietnam war.
  - 2) Downturn in US economy
  - 3) Reduction in new business for the aviation industry. This hit Collins hard as airlines cut orders for new planes.
  - 4) Apollo space program reached its goal of putting men on the moon.



## ***The Perot Saga (4) – 1960'S***

- Collins was accustomed to fluctuating business cycles with its two main sources of sales: military and aviation ... ***“but never before in the company’s history had Collins Radio been burdened with the level of bank loans it held in 1969: over \$100 million” with Collins pressing forward on the expensive C-system with a “damn the torpedoes, full speed ahead attitude regarding costs.”***
- Then in early 1969, Ross Perot attempted a takeover of Collins to merge it with his fledgling Electronic Data Systems.
- ***“The Perot attempt failed, for a variety of reasons.*** The bankers looked upon EDS as a much smaller firm with inflated stock values, in no way qualified for what Perot wanted to do, and saw no advantages for Collins in his proposal. Also, there were bank loans, which Perot would have to payoff or negotiate.”



***Collins Radio Co.  
in the 1970's***



## ***Rockwell-Collins Dismissal of Arthur Collins – 1970's***

- When the bankers helped prevent Perot's takeover of Collins, they delved deeper into the company's books and what was happening inside the firm. ***Bankers and analysts thought that "Collins Radio was not a healthy organization from a financial viewpoint. They felt he spent too large a portion of the company's funds on R&D to ever show consistent profits and dividends.*** They were concerned about the volatile earnings record and one-man control, which as one put it, *is not a lasting base on which to build an organization.*"
- Once Arthur Collins accepted that he needed outside help, a search began for a financial partner or a relationship. They started with Honeywell and Schlumberger. ***His goal "was to find a suitor who would provide financing to allow him to complete the C-system of computer, data, and communication connections ... and still leave him in charge.***



## ***Rockwell-Collins Dismissal of Arthur Collins (2) – 1970's***

- By late 1970, informal talks began with North American Rockwell (1967 merge of North American Aviation of top military aircraft fame and Rockwell Standard Corporation.)
- Sales declined further in 1970 to \$349 million with a drop in stock of 80% in two years. Over this two year period from 1969 to 1971, Collins employment dropped 40%. *The C-system was primarily at fault for this decline.*
- TRW began negotiations with Collins Radio in March 1971, but nothing solid developed.
- In May 1971, a final agreement was made with North American Rockwell: \$35 million investment, NR had right to elect majority of Collins Radio's board members.

(NOTE! Chuck Kilgore, N2GXX, commends Rockwell-Collins for the excellent research they completed from him while working for the FAA. Ask him about it.)



## ***Rockwell-Collins KWM-380 (Fall 1979)***

“The transceiver basically covers the 1.8 to 30 MHz range in 10 KHz steps with a four-speed tuning capability on receiver and nominally only the 160-10 meter amateur bands on transmit. WARC bands are provided for by a simple modification. For its power class as a nominal 100 watt output transceiver, it is several times large and heavier than other transceivers. It contains a speaker, power supply, second VFO, and space for a host of accessory items such a unique type of new speech processor.”



# Rockwell-Collins 451-S Receiver



“The 451-S is a professional single sideband (SSB) communications receiver that offers reception of upper and lower sideband, CW, AM, or FSK signals over the frequency range of 0.2 to 30 MHz. The unit is of *solid-state design* ... and uses single knob tuning to cover the entire frequency range without band switching. A high resolution *synthesizer with microprocessor* controls four tuning rates down to 10 Hz increments.”



# Collins HF-2050 Receiver



**“Introducing Digital Signal Processing** techniques to the HF communications market. The extensive use of digital circuitry for signal processing and control affords the operator convenient command of the **LF, MF, and HF** spectrum. **Tuning is accomplished by any of four methods**: (1) The numeric keypad may be used for selecting frequency; (2) User preset channels may be recalled; (3) The rate selectable tuning knob may be used; or (4) Tuning may be via the digital remote control interface. A simple user code allows multiple receivers to be controlled from a standard video display unit.”



## ***Rockwell-Collins 651-S Receiver – late 1970's***

“The 651S-1 receiver series was developed and produced by Collins in late 1970 to meet the need for a remotely or locally controlled state-of-the art, general purpose HF receiver capable of reproducibility in high volume and at an economical cost. It was design using modular, solid-state construction.”



Note that ONLY the Collins “meatball” logo is displayed.

# ***Rockwell-Collins 851-S Receiver***

PROMOTIONAL TEXT - “Like the HF-8050 it is triple conversion and 5 additional mechanical filters can be installed in the sister board attached to the Channel A-IF board. The 815S-1 features “continuous” rate sensitive tuning and phase-locked digital variable bfo. Slide-out chassis and plug-in circuit cards provided easy access to maintenance.”



# ***Collins Logos from CCA***



# *Rockwell-Collins* *Today*



# ***United Technologies Takeover of Rockwell-Collins***

***September 4, 2017***

## United Technologies To Acquire Rockwell Collins For \$30 Billion

### *Combination Creates Premier Aerospace Systems Supplier*

- Combined business will be well-positioned to meet rapidly evolving global customer demands
- Highly complementary to existing capabilities
- Enhances innovative systems capabilities and integrated digital product offerings, including avionics, flight controls and data services
- Expected to generate cost synergies in excess of \$500 million
- Anticipate acquisition to be accretive to UTC adjusted earnings per share after first full year following closing



*Click to enlarge*

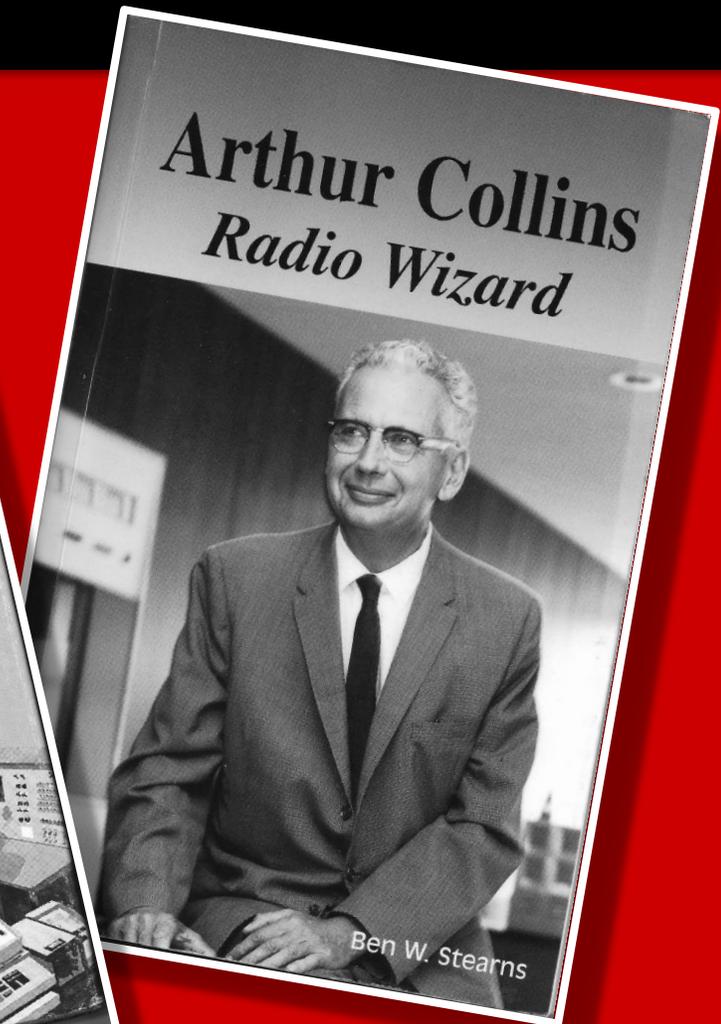
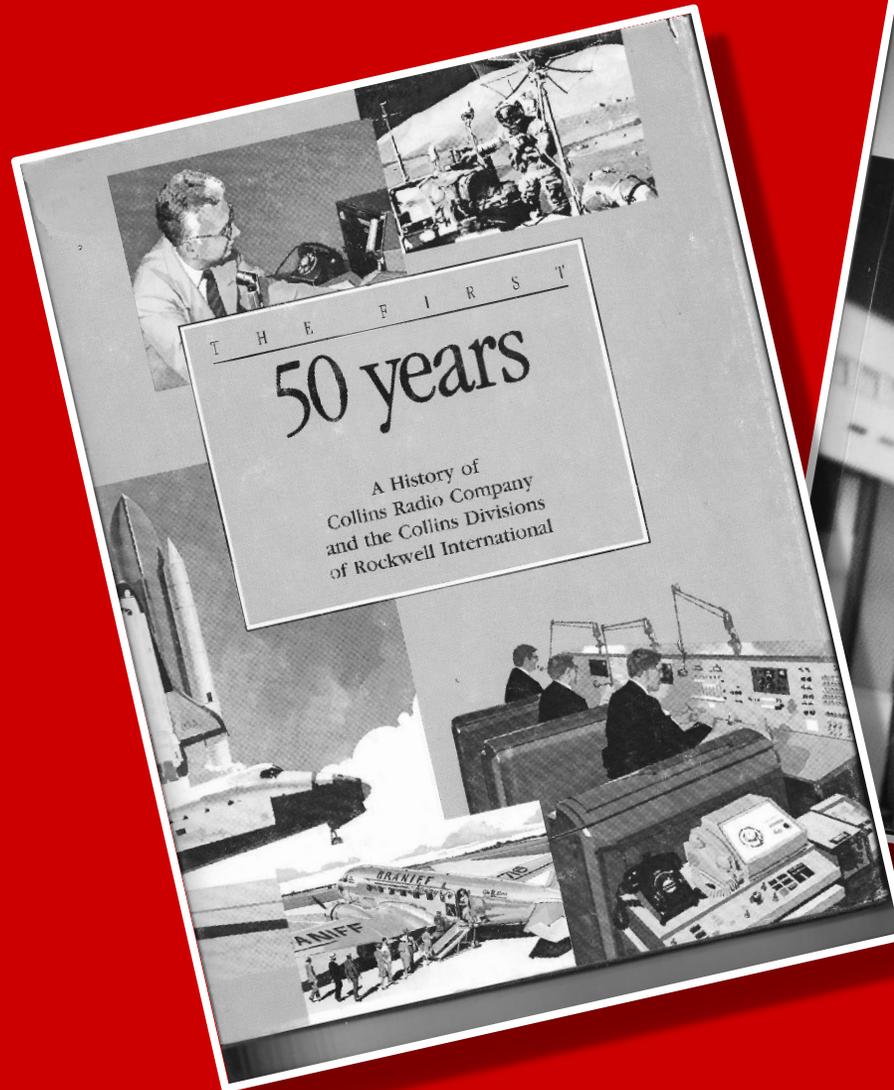
FARMINGTON, Conn., and CEDAR RAPIDS, Iowa – September 4, 2017 – United Technologies Corp. (NYSE: UTX) (“UTC”) and Rockwell Collins, Inc. (NYSE: COL) (“Rockwell Collins”) today announced that they have reached a definitive agreement under which United Technologies will acquire Rockwell Collins for \$140.00 per share, in cash and UTC stock.

Rockwell Collins is a leader in aviation and high-integrity solutions for commercial and military customers and is globally recognized for its leading-edge avionics, flight controls, aircraft interior and data connectivity solutions. On a 2017 pro forma basis, its estimated sales are greater than \$8 billion.



# Sources

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- The First 50 Years
- Ohio State Climate Center (Byrd photos)
- TVARC club members who owned Collins equipment
- Websites listed at end
- Collins Collectors Association archives and mail serve traffic



# Complete Way to Review All Collins Radios and History



## Rockwell Collins Museum

[HOME](#)

Publications:

Collins Column

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- [Issues](#)
- [Index A-Z](#)

Collins Signal

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Collins Pulse

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Rockwell Pride

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- [Issues](#)

Rockwell Vision

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- [Issues](#)

Rockwell Millennium

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- [Issues](#)

Bulletins

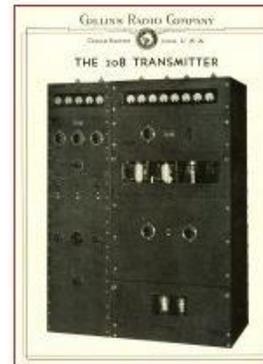
### Early Collins Radio Co. Product Brochures

#### ★ Transmitters ★

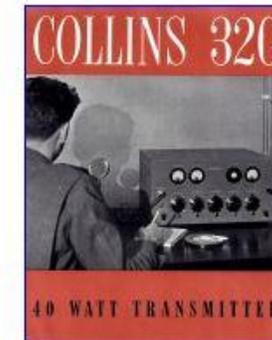
- [http://rockwellcollinsmuseum.org/collins\\_brochures/index.php](http://rockwellcollinsmuseum.org/collins_brochures/index.php)



**4A**  
Transmitter  
1/1935



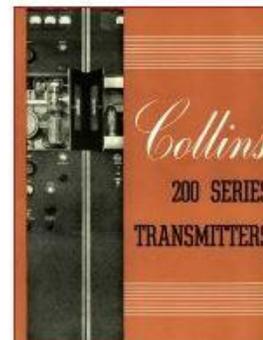
**20B**  
Transmitter  
11/1934



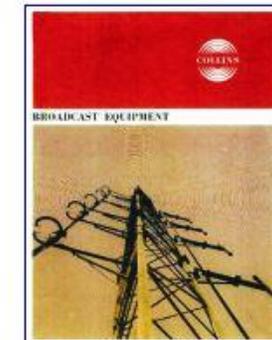
**32G**  
Transmitter  
1937



**202A**  
Transmitter  
1/1936



**200**  
Series  
Transmitters



**Broadcast**  
Catalog  
1964



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