Collins Radio Company History

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Arthur A. Collins
Founder of the Collins Radio Company

Arthur A. Collins (1909-1987) was an American entrepreneur, who founded Collins Radio Co., which is now Rockwell Collins, Inc.

Art Collins' father owned several thousand acres of farmland. After graduating from Washington High School in Cedar Rapids, Iowa, Collins attended several colleges although he never received a degree. Later he started a very successful radio business. Collins began to take his business into more research and development while his father, M. H. Collins, managed the financial end of his son's business until his death.

After his father died, Art Collins began to take the company into less profitable ventures, resulting in near-bankruptcy. Collins looked for buyers, and finally found the Rockwell family, who stepped in to save the company. The Rockwells first purchased stock in the company and then finally pressured the stockholders to exclude Collins out of the management end of the business. While still part of the Rockwell-Collins company, Collins started a new, more experimental, and smaller-scale business in Dallas, Texas.

The Historic Timeline of The Collins Radio Company

1931: Arthur Collins opens Collins Radio Company in the basement of his home with one employee.
1933: Incorporation as Collins Radio Company (September 25) under the laws of Delaware; the Company moves to a sub-floor in the Metropolitan Building at 2920 First Avenue, Cedar Rapids, telephone 2-0016,
(Collins Signal, February 1933)
1934: The Byrd Antarctic Expedition II sails with complete Collins short wave broadcasting station aboard,
(Collins Signal, January 1934)
1935: The factory portion of Collins moves to 7th and First Avenue, Cedar Rapids.
1936: The Radio Corporation of American (RCA) accuses Collins Radio of patent infringement in the use of oscillator tubes in Collins transmitters, (Cedar Rapids Gazette article, 12 December 1965)
1937: The factory moves back to 2920 First Avenue, Cedar Rapids.
1938: Patent licenses were secured from RCA and AT&T on favorable terms,
(Company speech given by Art Collins to the Underwriters' Representatives, 1 November 1944)
1940: The first section of what is now called Main Plant was built at 855 - 35th Street, Cedar Rapids,
(Collins Column, May 1946, Issue XXXVIII)
1942~: Collins Employees Credit Union established
Note: Until 1942, no women had been employed in the factory, (Collins Column, May 1946, Issue XXXVIII)
1943: Factory employees accept the American Federation of Labor as their bargaining unit.
1946: Collins built and began production in a site at Burbank, California,
("The Collins Story" by Arlo C. Goodyear, 14 October 1954)
1950: Collins built a production site in Dallas, Texas, ("The Collins Story" by Arlo C. Goodyear, 14 October 1954
1953: Collins built the C Avenue complex "in the shadow of the WMT-TV tower",
("The Collins Story" by Arlo C. Goodyear, 14 October 1954).
The building cost $2 million on 52 acres of land,
("Collins and the Electronic Beanstalk" article by Nancy Gibbons Zook, 1956)
1955: Acquired Communications Accessories Company in Kansas City, Missouri,
("Collins and the Electronic Beanstalk" article by Nancy Gibbons Zook, 1956)
1961: Collins' Western Division moves from Burbank to Newport Beach, California,
("Collins History is Record of 'Firsts'", Orange County Industrial News, 1961)
1968: Collins Radio had one of the wildest swinging stocks; in 1958 it sold under $11, in 1960 it was $72; in 1964 it was back to $15; and in 1968 it sold over $100, ("Who Needs A Degree" Forbes, January 1968)

1969: Electronic Data System (EDS); at the time a small Texas company headed by Ross Perot, tendered an offer to buy 51% of Collins in an attempt to take over Collins Radio; by May, EDS withdraws its offer; discussions with Honeywell emerged, which later collapsed.
1971: Collins Radio Company merges with Rockwell International Corp.; After the merger, Arthur serves on the Board of Directors.
1972: Robert C. Wilson named President & Chief Executive Officer of Collins Radio Company; Art Collins leaves Collins Radio to form Arthur A. Collins Consulting, Inc.
1982: Art Collins receives the Pioneer Award from the Aerospace & Electronics Systems Society of the IEEE
1996: Consolidation of Collins Commercial Avionics (CCA), Collins Avionics and Communications Division (CACD), and the Dallas, Texas-based Communication Systems Division (CSD) into one organization,
(January 1997 Millennium article)
1997: Collins buys Hughes-Avicom and enters the in-flight entertainment market.
1998: Collins sells Railroad Electronics to WABCO, (August 1998 press release)
1999-2000: Company-wide integration of SAP, (April 1998 Millennium article)
2000: Collins buys Kaiser Aerospace and Electronics, (October 2000 press release)
2001: Rockwell International Corp. spins-off Rockwell Collins, Inc. as independent, public traded, company

Logo History

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COLLINS

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Collins

INTRODUCING COLLINS S/ LINE OF SSB AMATEUR EQUIPMENT

RECEIVERS

Collins 75A-1 Receiver

Introduction Date / Price: 1947 / $375

Tube List: 5Y3GT (1), 6AK5 (2), 6H6 (1), 6L7 (1), 6SA7 (1), 6SG7 (2), 6SJ7 (4), 6SK7 (1), 6V6 (1).

The Collins 75A-1 receiver is first with many new electrical and mechanical performance features covering the 160 thru 10 meter amateur bands. It is a dual conversion design with fixed HFO IF. Selectivity choices include five positions for the crystal filter (approximately 5 kc to 200 cps bandwidth) and that of the 455 kc IF transformers for AM operation. Operating modes for the receiver include AM and CW. Accurate tuning is accomplished through the use of a slide rule dial and a vernier dial calibrated in 1 kc increments (2 kc increments on the 10 and 11 meter bands). Ten turns of the vernier dial cover each of the band ranges. A series noise limiter is used for AM and CW operation. Front panel controls include: Band Switch, Main Tuning, On-Off-Standby Switch, Crystal Selectivity Switch, Crystal Phasing Control, RF Gain Control, Audio Gain Control, CW Switch, CW Pitch Control, AVC Switch, and Noise Limiter Switch. Accessories include an external cabinet mounted speaker (270G-1).

Collins 75A-2 Receiver

<u>Introduction Date / Price: 1950 / $440</u>
<u>Tube List:</u> 0A2 (1), 5Y3GT (1), 6AL5 (3), 6AQ5 (1), 6BA6 (6), 6BA7 (2), 6CB6 (1), 12AT7 (1), 12AX7 (1).

The Collins 75A-2 receiver is dual conversion and covers the 160 thru 10 meter amateur bands. Selectivity choices include five positions for the crystal filter (approximately 5 kc to 200 cps bandwidth) and that of the 455 kc IF transformers for AM operation. The crystal phasing circuit provides a tunable notch rejection for phasing out interference heterodynes. Operating modes for the receiver include AM, CW, MCW. Accurate tuning is accomplished through the use of a slide rule drum dial calibrated in .1 Mc and a vernier dial calibrated in 1 kc increments (2 kc increments on the 10 and 11 meter bands). Separate noise limiters are used for AM and CW operation. Front panel controls include: Band Switch, Main Tuning, Tuning Zero Set, On-Off-Standby Switch, RF Gain, AF Gain, Crystal Selectivity Switch, Crystal Phasing Control, CW-AM-FM Mode Switch, CW Pitch Control, Noise Limiter - Calibrate Switch, CW Limiter Control, and Antenna Trim. An optional 100 kc crystal calibrator (8R-1) is available as a plug-in unit. Other options include a plug-in NBFM adapter (148C-1) and external cabinet mounted

Collins 75A-3 Receiver

<u>Introduction Date / Price: 1952 / $530</u>
<u>Tube List:</u> 0A2 (1), 5Y3GT (1), 6AL5 (3), 6AQ5 (1), 6BA6 (7), 6BA7 (2), 6CB6 (1), 12AT7 (1), 12AX7 (1).

The Collins 75A-3 is a dual conversion receiver covering the 160 thru 10 meter amateur bands. Selectivity choices include four positions for the crystal filter and a switch for mechanical filter selection in the 455 kc IF stage. This is the first amateur band receiver to incorporate a mechanical filter design. There are provisions for 2 plug-in mechanical filters, the 3 kc factory standard and an optional 800 cycle filter for CW. The new mechanical filter offers a rectangular selectivity curve with steep skirts for rejection of adjacent frequency interference. This provides optimum selectivity for single sideband reception. Modes of operation include AM, CW, and SSB. Accurate tuning is accomplished through the use of a slide rule drum dial calibrated in .1 Mc and a vernier dial calibrated in 1 kc increments (2 kc increments on the 10 and 11 meter bands). Separate noise limiters are used for AM and CW operation. An optional 100 kc crystal calibrator (8R-1) is available as a plug-in unit. Other options include a plug-in NBFM adapter (148C-1) and external cabinet mounted speaker (270G-2).

Collins 75A-4 Receiver

Introduction Date / Price: 1955 / $595; $695 (in 1958)
Tube List: 0A2 (1), 5Y3GT (1), 6AL5 (4), 6AQ5 (1), 6BA6 (8), 6BA7 (2), 6DC6 (1), 12AT7 (3), 12AU7 (1).
*** Note: Tube variations depending on vintage.**

The Collins 75A-4 is a dual conversion amateur band receiver covering the 160, 80, 40, 20, 15, 11, and 10 meter bands. The dual conversion design utilizes a crystal controlled (fixed) high frequency oscillator and a variable first intermediate frequency (IF). The signal from a type 70E-24 VFO is beat against the variable IF to produce a fixed second intermediate frequency of 455 kc. Selectivity choices include AM, CW or RTTY and SSB reception with mechanical filter selection in the 455 kc IF stage for optimum bandwidths. This is one of the first amateur band receivers to incorporate a selection of the SSB mode of operation. There are provisions for 3 plug-in mechanical filters using 9-pin miniature tube sockets, the 3 kc factory standard and optional filters for AM and CW. The new mechanical filter offers a rectangular selectivity curve with steep skirts for rejection of adjacent frequency interference. This provides optimum selectivity for single sideband reception. Accurate tuning is accomplished through the use of a slide rule megacycle drum dial and a vernier kilocycle dial calibrated in 1 kc increments. The passband tuning feature is accomplished by gang tuning the BFO and variable frequency oscillator using a metal belt. A "Q" multiplier stage is used to provide a tunable notch to minimize heterodyne interference. Separate detectors are used for AM and CW-SSB. An adjustable noise limiter is incorporated for AM and CW operation. A built-in 100 kc crystal calibrator is included as standard. Other options include an external cabinet mounted speaker (270G-2).

Collins R-390/390A Receiver

<u>Introduction Date / Price: R-390 -- 1950, R-390A -- 1955 / $1421 (in 1958)</u>
<u>R-390A Tube List:</u> 0A2 (1), 3TF7 (1), 5814 (7), 6AK5 (2), 6AK6 (3), 6BA6 (6), 6C4 (3), 6DC6 (1).

The R-390 receiver was originally designed by Collins Radio Company for military and government applications. The receiver was later re-designed as the R-390A/URR in order to reduce the number of tubes and to improve selectivity through the use of mechanical filters. Although Collins Radio Company developed and manufactured the R-390A/URR under government contract, approximately twelve other companies were also contracted to assemble the receiver and provide components according to contract specifications. Over 55,000 R-390A receivers were manufactured by Collins, Motorola, Imperial, EAC, Teledyne, Stewart-Warner, Capehart, etc. from about 1954 to 1984.

The R-390A is often considered to be one of the best vacuum tube general coverage receivers available for AM, CW and RTTY operation. The receiver is as innovative mechanically as it is electrically and was designed by a mechanical engineering team in addition to the electrical engineering group. The odometer type dial, PTO, and various RF and IF coils are operated through a system of mechanical gears, cams and linkages. Each turn of the frequency tuning knob corresponds to 100 kHz on the linear dial.

The receiver design is a triple conversion superheterodyne with 26 Tubes. It covers from 0.5 MHz through 32 MHz in 32 continuously tunable bands and offers six IF bandwidths designed for CW, AM and RTTY operation. The 455 kHz IF utilizes crystal filters for 0.1 and 1 kHz bandwidths and mechanical filters for 2, 4, 8 and 16 kHz bandwidths. Operational capability of the receiver allows for remote control of the AGC and RF gain adjustments. The receiver also has provisions for diversity operation, external monitoring, and break-in operation with a local transmitter. There are two antenna inputs, one to accommodate balanced antennas and the other for unbalanced or whip type designs. Two audio outputs allow for local and line out. The receiver's modular design utilizes six field replaceable subassemblies or modules for quick diagnostics and repair.

Collins 51J-4 Receiver

<u>Introduction Date / Price:</u>
1955 / $1099; $1464 (in 1962)

<u>Tube List:</u> 0A2 (1) 5V4 (1) 6AK5 (2) 6AQ5 (1) 6BA6 (8) 6BE6 (3) 12AU7 (1) 12AX7 (2)
*** Tube variations depending on vintage.**

51J-4 in Table Mounting Cabinet

FREQUENCY RANGE
.54 to 30.5 megacycles.

TYPE OF RECEPTION
AM, SSB, CW, MCW or FSK with accessory converter for teleprinter operation.

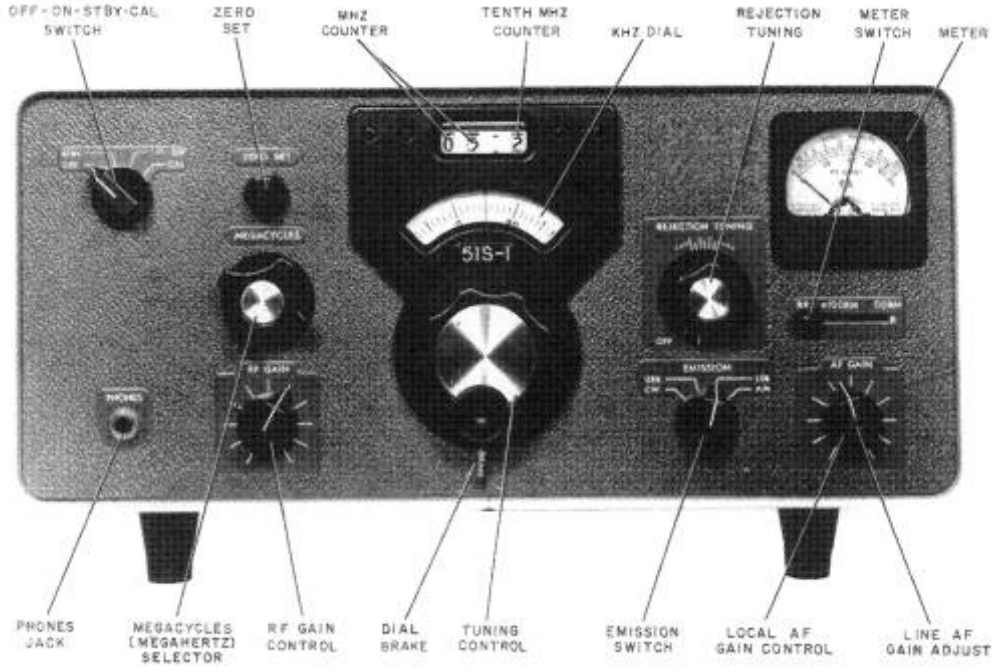
TYPE OF CIRCUIT
Crystal controlled Double Conversion Superheterodyne.

Collins 51S-1 Receiver

Introduction Date / Price: 1959 / $1828
*** Tube List: 5670 (1), 6AK6 (1), 6AU6 / 7543 (2), 6BA6 (4), 6BF5 (1), 6DC6 (1), 6EA8 (5), 12AX7 (2).**
*** Semiconductor List: 1N1492 (3), 2N388 (1), 2N6373 (4), 1N34A (4).**
*** Note: There are some tube/semiconductor variations depending on vintage.**

The Collins 51S-1 receiver is a versatile general coverage receiver with excellent performance in any of its three modes: SSB, CW, and AM. Frequency coverage is continuous from 200 Hz to 30 MHz using thirty selectable 1 MHz bands and a turret tuning arrangement selected by the megahertz control. The design utilizes triple conversion in the frequency ranges up to 7.0 MHz and double conversion on all ranges above 7.0 MHz. Accurate frequency determination is provided by the use of a mechanical counter for megahertz and an analog dial for kilohertz. For AM reception the passband is determined by the use of two coupled IF transformers. Selectivity in the SSB and CW modes is determined through the use of mechanical filters.

Variations of the 51S-1 (base model with cabinet) include the 51S-1F (51S-1 rack mount, no cabinet), 51S-1A (has 28 VDC input power supply), 51S-1AF (51S-1A rack mount, no cabinet), 51S-1B (similar to 51S-1 with rear-mounted military connector option).



Collins 75S-3C Receiver

<u>Introduction Date / Price:</u>
75S-3 -- 1961 / $680
75S-3A -- 1963 / $750
75S-3B -- 1964 / $620
75S-3C -- 1964 / $850
(Price $2504.00 in 1977)
<u>Tube List:</u> 6AT6 (1) 6AU6 / 7543 (1) 6BA6 (2) 6BF5 (1) 6DC6 (3) 6EA8 (3) 12AX7 (1)

The Collins 75S-3C is a versatile receiver with exceptionally sharp selectivity and operation in any of its four modes: SSB, CW, AM, and RTTY. For AM reception the passband can be optimized by the installation of an optional 3.1 kHz, 4.0 kHz, or 6.0 kHz Mechanical Filter. Two CW mode switch positions offer up to three degrees of selectivity in the CW/SSB function through use of optional plug-in filters.

The 75S-3C Receiver can be combined with the 32S-3A Transmitter and 312B-4 Station Control to make a completely integrated station. The 75S-3C, when used with the 32S-3A, is capable of transceiver type operation with the receiver PTO controlling the transmitting frequency. The 75S-3C is also compatible with the Collins KWS-1, KWM-1, KWM-2, and KWM-2A Transceivers.

Coverage outside the amateur bands, or additional 10 meter coverage, can be obtained by plugging in the appropriate crystals. Pitch for CW reception can be varied by turning the BFO control on and adjusting it for the most pleasing beat note, while the desired signal is centered in the filter passband. The calibration marks can be used to shift from high mark to low mark when copying RTTY. When the BFO knob pointer is at the 0 reference mark, the BFO frequency is approximately the same as crystal BFO in USB position. With the knob in the off position, the crystal BFO is in operation. RTTY operation requires a conventional converter and printer. Fine tuning in this mode is easy with the variable BFO.

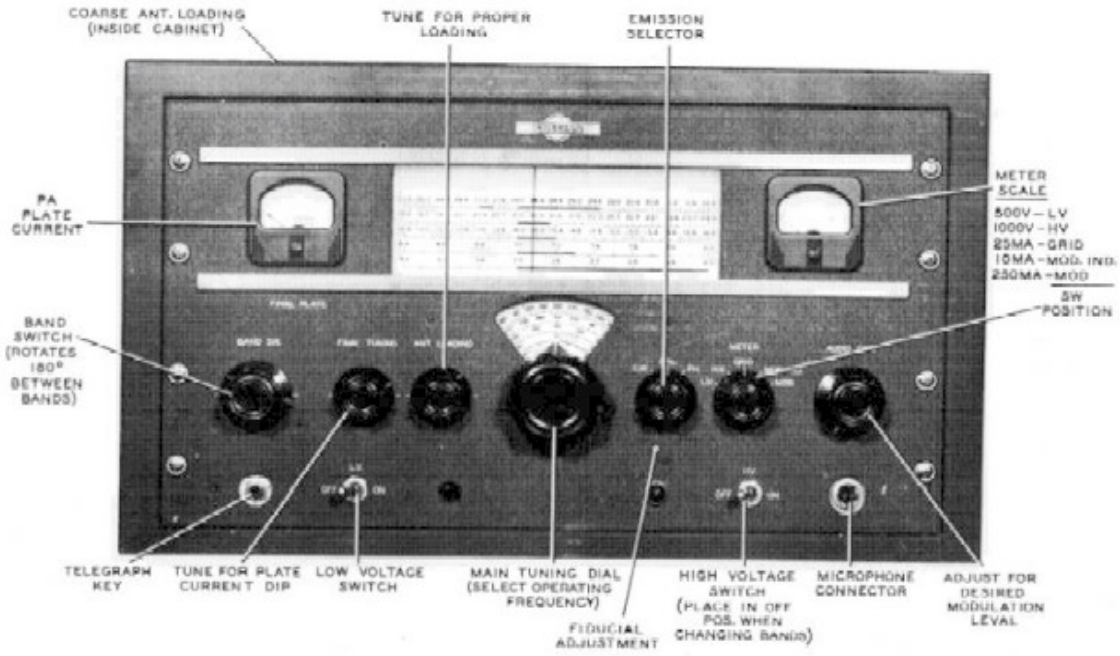
The 75S-3C provides two HF crystal boards. A board for general coverage crystals is located on the top of the chassis, and the standard group of amateur band crystals is mounted in a board on the underside of the chassis. Frequencies near range edges may require trimmer readjustment for proper operation.

TRANSMITTERS

Collins 32V-1 Transmitter

<u>Introduction Date / Price: 1947 / $475</u>
<u>Tube List:</u> 0A2 (2), 0A3/VR75 (1), 5R4GY (2), 5Z4 (1), 6AG7 (1), 6AK6 (1), 6SJ7 (1), 6SL7 (2), 6SN7 (1), 7C5 (2), 807 (2), 4D32 (1).

The 32V-1 transmitter is VFO controlled and features bandswitching on all amateur bands between 3.5 and 29.7 megacycles. The rated plate input power is 120 watts phone and 150 watts CW. The transmitter is a table top unit housed in a single cabinet 12 7/16" high, 21 1/8" wide, and 13 7/8" deep. It weighs approximately 105 lbs. Cabinet openings are provided to assure adequate ventilation for all heat producing elements.



Collins 32V-2 Transmitter

<u>Introduction Date / Price: 1950 / $575</u>
<u>Tube List:</u> 0A2 (2), 0A3/VR75 (1), 5R4GY (2), 5Z4 (1), 6AG7 (1), 6AK6 (1), 6SJ7 (1), 6SL7 (2), 6SN7 (1), 7C5 (2), 807 (2), 4D32 (1).

The 32V-2 transmitter is VFO controlled and features bandswitching on all amateur bands between 3.5 and 29.7 megacycles. The rated plate input power is 120 watts phone and 150 watts CW. The transmitter is a table top unit housed in a single cabinet 12 7/16" high, 21 1/8" wide, and 13 7/8" deep. It weighs approximately 105 Ibs. Cabinet openings are provided to assure adequate ventilation for all heat producing elements.

Collins 32V-3 Transmitter

<u>Introduction Date / Price: 1951 / $775</u>
<u>Tube List:</u> 0A2 (2), 0A3/VR75 (1), 5R4GY (2), 5Z4 (1), 6AG7 (1), 6AK6 (1), 6SJ7 (1), 6SL7 (1), 6SN7 (1), 7C5 (2), 807 (2), 4D32 (1).

The 32V-3 transmitter is VFO controlled and features bandswitching on all amateur bands between 3.5 and 29.7 megacycles. The rated plate input power is 120 watts phone and 150 watts CW. Shielding and filtering are employed to minimize the possibility of television interference.The 32V-3 transmitter is a table top unit housed in a single cabinet 12 1/4" high, 21 1/8" wide and 13 13/16" deep. It weighs approximately 110 lbs. Cabinet openings are provided to assure adequate ventilation for all heat producing elements.

Collins KW-1 Transmitter

<u>Introduction Date / Price: 1950 / $3850 (in 1952)</u>
<u>Tube List:</u> 0C3/VR105 (2), 5R4 (1), 5V4 (3), 6A10 (1), 6AL5 (1), 6AQ5 (4), 6B4 (2), 6BA6 (3), 807 (1), 810 (2), 872A (2), 12AU7 (2), 12AX7 (1), 4-250A (2).

The Collins KW-1 is a complete kilowatt AM and CW amateur transmitter with built-in VFO and bandswitching. The power amplifier is rated at 1000 watts input on the 80, 40, 20, 15, 11 and 10 meter bands, and 500 watts on the 160 meter band. Two 810 modulator tubes operating in push-pull provide 100% modulation to the power amplifier stage. A speech clipper followed by low level and high level low-pass filters provide for increased power in the AM sidebands without over-modulating. The variable frequency oscillator (VFO) is a stable, hermetically sealed unit that is permeability tuned by powdered iron core coils. Additional features include CW muting for a 75A receiver, a CW sidetone oscillator, TVI reduction, a blower, door interlock switches, fuses and an overload relay. The exciter tuning is ganged to one control and the entire rf section is tuned by the frequency selector control. A vacuum variable capacitor provides high reliability for tuning the final amplifier tank circuit. The pi-L output circuit is designed to match an unbalanced resistive load of 52 ohms. The exciter tuning dial shows the frequency in kilocycles for each of seven amateur bands.

Collins KWS-1 Transmitter

<u>Introduction Date / Price: 1955 / $1995; $2095 (in 1958)</u>
<u>Tubes:</u> 0B2 (2), 3TF4A (1), 5749 (1), 6AL5 (1), 6AU6 (1), 6BA6 (4), 6CL6 (2), 6X4 (1), 12AT7 (6), 4X150A or 4x250B (2).
<u>Power Supply Section Tubes:</u> 0B2 (1), 2D21 (1), 3B28 or 866A (2), 5U4 (1), 5Y3GT (1), 6AL5 (1), 6AS7G (1), 12AX7 (1).

The most advanced design features ever offered in an Amateur transmitter are incorporated in the KWS-1. 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.

Collins engineering plus extensive on-the-air tests account for the KWS-1's reliability and optimum performance in CW, AM, and SSB operation. Circuit applications and components which have been proved in preceding Collins equipment are retained in the design of the KWS-1—a 70E VFO, Pi-L output network, extremely accurate VFO dial, and the Collins Mechanical Filter, to mention a few.

Collins 32S-3A Transmitter

<u>Introduction Date / Price:</u> 32S-3 -- 1962 / $750 (32S-3A $2957.00 in 1977)
<u>Tube List:</u> 0A2 (1) 6AH6 (1) 6AL5 (1) 6AU6 / 7543 (1)
6CB6 (2) 6CL6 (1) 6U8A (3) 12AT7 (3) 6146 (2)

Collins 32S-3A is a highly flexible transmitter covering all the amateur bands between 3.4 MHz and 30.0 MHz. The 32S-3A is rated for a nominal output of 100 watts and power input to the final amplifier is rated at 175 watts PEP on single sideband and 160 watts on CW.

Simplified controls on the 32S-3A make tuning quick and precise. Front panel controls are: Power/MIC GAIN, CW CAL, FREQ CONTROL selector, EXCITER TUNING, BAND switching, VFO tuning, P.A. TUNING and LOADING, EMISSION mode selector, and a METER switch which selects between ALC, P.A. Grid and P.A. Plate.

The extra large, finely calibrated VFO dial provides that extra measure of confidence when operating near the edges of the amateur bands while the VFO tuning mechanism itself is shaped to fit the hand and is designed to minimize mechanical backlash.

The 32S-3A can also be adapted for RTTY operation because of the high degree of stability of the unit. For RTTY, the 516F-2 Power Supply and a source of external cooling air should be used.

Grid block keying for CW with adjustable keying characteristic from "soft" to "hard" is provided.

The 32S-3A comes equipped with the crystal sockets, crystals and bandswitch positions for eleven 200 kHz bands. Crystal sockets and bandswitch positions are also provided for two additional 200 kHz bands between 28 MHz and 30 MHz. A fourteenth position, corresponding to the WWV position on the receiver, can be used for an additional 200 kHz band in the 9.5-15.0 MHz range, if desired. Regulation of oscillator voltages insures high frequency stability.

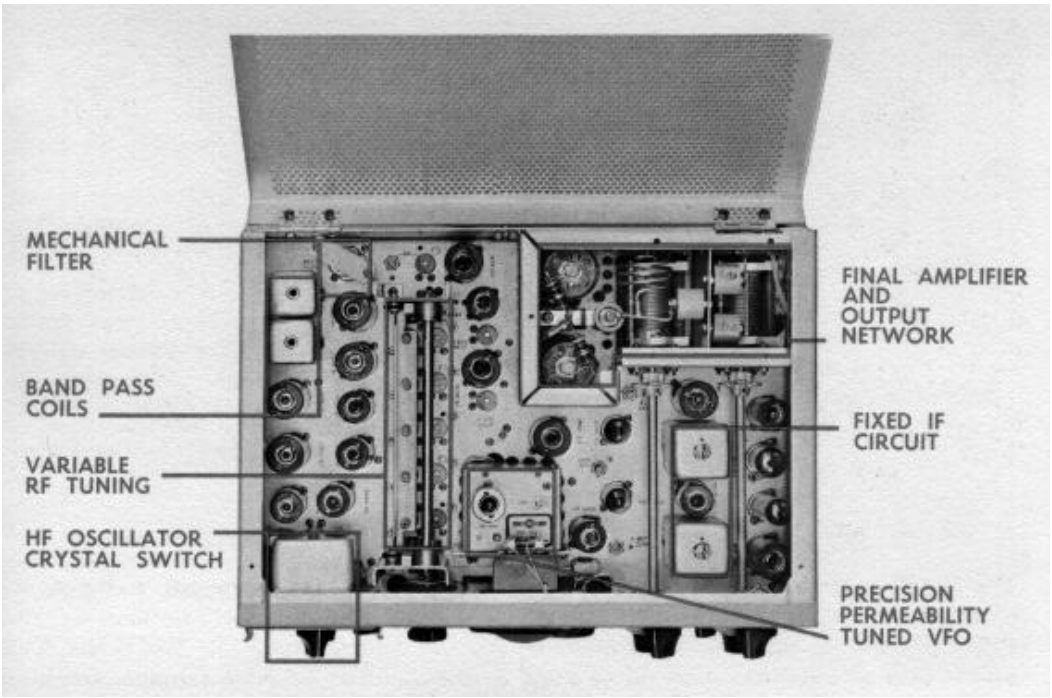
An additional crystal board permits use of up to 14 additional crystals to provide general coverage of non amateur frequencies. Front panel selection of receiver VFO or transmitter VFO provides optional transceiver operation at the flick of a switch when using the Collins 75S-3C receiver. While the 32S-3A provides ample RF power for excellent communication, it can be used without modification to excite the Collins 30L-1 or 30S-1 Linear Amplifier.

TRANSEIVERS

Collins KWM-1 Transceiver

Introduction Date / Price: 1957 / $820
Tube List: 6AH6 (1), 6AL5 (3), 6AQ5 (1), 6AU6 (2), 6BA6 (3), 6BA7 (3), 6CL6 (1), 6DC6 (2), 6U8 (2), 12AT7 (2), 12AU7 (2), 6146 (2).

The Collins KWM-1 is the first amateur band transceiver designed for mobile and fixed station applications. Final amplifier plate input power is 175 watts PEP on SSB or 160 watts on CW. A crystal plug-in unit allows for the selection of ten crystal positions, each covering a 100 kc segment in the frequency range of 14 to 30 Mc. The Pi-L output network with roller-inductor provides for efficient and continuous tuning throughout the entire frequency range of operation. The transceiver utilizes VOX circuits for voice and modified break-in CW operation. Most of the tuned circuits and several tubes function in the dual role of transmitting and receiving. A front panel meter functions as the receiver's S-meter as well as an indicator for transmitter output tuning.



Collins KWM-2A Transceiver

<u>Introduction Date / Price:</u> KWM-2 -- 1959 / $1150 KWM-2A -- 1961 / $1250; (Price $3533.00 in 1977)
<u>Tube List:</u> 6AU6 / 7543 (1) 6AZ8 (3) 6BN8 (3) 6CL6 (1)
6DC6 (1) 6EB8 (1) 6U8A (4) 12AT7 (2) 6146 (2)

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. It transmits voice or modified break-in CW. The KWM-2A utilizes an additional crystal board allowing the operator to switch-select up to 14 optional crystals which can be outside the amateur bands. Frequencies near range edges may require trimmer adjustment for proper operation. The KWM-2A can be used for RTTY when a 516F- 2 Power Supply and external cooling air are employed.

The transceiver is finished in light gray enamel with a simulated leather front panel to match the S/Line and its accessories. Compactness and efficiency of the KWM-2A are achieved through Collins' advanced design in which all tuned circuits and several tubes function in the dual role of transmitting and receiving. The same oscillators, Mechanical Filter, and RF amplifier serve both the transmitter and receiver. CW break-in and sidetone monitoring circuits are built in.

Collins KWM-380 Transceiver

Introduction Date / Price: 1979 / $6600 (in 1983)

SPECIFICATIONS

FREQUENCY RANGE: Tunable in 10 Hz steps.

RECEIVE MODE: 1.8-30.0 MHz.

TRANSMIT MODE: SSB or CW 160-thru 10 meter amateur bands.
*HF-380 1.6 to 30 MHz.
MODE: SSB(voice and RTTY, either sideband selectable), CW, or AM (receive only).

POWER REQUIREMENTS: 105, 115, 125, 210, 220, 230, 240, 250, ±5% V ac (Internal strapping option) 50-60 Hz 12 V to 15 V dc (Connector strapping). 120 W input in receive max; 600 W input in transmit max.

FREQUENCY ACCURACY: Accurate to within ±5 Hz when the 39.6 MHz oscillator and the 455.0 kHz oscillator are set within ±3 Hz. Warm-up time is 10 min.

FREQUENCY STABILITY: Stability is within ±150 Hz over the temperature range of 0-50°C.
*HF-380 is within ±20 Hz over the temperature range.

TRANSMIT PERFORMANCE:

OUTPUT IMPEDANCE: 50 ohms nominal.

POWER OUTPUT: 100 W PEP nominal from 160 thru 10 meters. In RTTY, there is automatic turndown to 50 W after 30 seconds with continuous key down; 50% duty cycle, key down 15 minutes max.

With the optional blower kit, power is 100 W average, 50% duty cycle, key down 1 hour max at 25°C, ½ hour max. at 50°C for all modes.

UNWANTED SIGNAL SUPPRESSION: (minimum values below PEP output)

Carrier suppression	50 dB
Undesired sideband, 1 kHz ref	55 dB
Harmonics (all)	40 dB
Mixer products	50 dB

THIRD ORDER DISTORTION: 25 dB below each tone of a two tone test.

AUDIO INPUTS: Microphone — low or high impedance type. Line — 600 ohm input unbalanced impedance; level of 40 mV sufficient to produce full output.

AUDIO FREQUENCY RESPONSE: Not more than 5 dB variation from 300 to 2400 Hz.

RECEIVER PERFORMANCE:

ANTENNA IMPEDANCE: 50 ohms.

SENSITIVITY: For 10 dB or better $\frac{S+N}{N}$ at antenna input for SSB and CW:
0.5 uV, 2.0 to 30 MHz
1.0 uV, 1.8 to 2.0 MHz

SELECTIVITY: In operating modes of USB, LSB, CW, and AM.

Filter	BW –3 dB min	BW –60 dB max
Standard SSB	2.1 kHz	4.4 kHz
Standard AM	8.0 kHz	70 kHz
Optional		
AC 3810	360 Hz	1250 Hz
AC 3811	140 Hz	600 Hz
AC 3812	1.7 kHz	3.4 kHz
*AC 3813	6.0 kHz	25 kHz

*optional for 8 kHz position.

IF AND IMAGE REJECTION: Greater than 60 dB.

AUDIO OUTPUT: Not less than 3 W into 4 ohm load at 1 kHz, at not more than 10% total harmonic distortion. Line audio output, −10 dBm nominal into 600 ohms.

AUDIO FREQUENCY RESPONSE: Not more than 5 dB variation from 300 to 2400 Hz.

AGC: Audio output variance not more than 8 dB as the RF input varies from 4.0 uV to 200 mV open circuit.

INTERMODULATION DISTORTION: Two signals spaced 20 kHz at a level of −10 dBm each will produce IMD down 50 dB min. (+15 dBm 3rd Order Intercept).

SIZE: 15.50 (39.4 cm) W, 6.5 (16.5 cm) H (w/o feet), 7.5" (19.1 cm) H (w/feet), 18.00" (45.7 cm) D.

WEIGHT: 50 lbs (22.7 kg).

AMPLIFIERS

Collins 30S-1 Amplifier

Introduction Date / Price: 1958 / $1550; (Price $7049.00 in 1977)
Tube List: 3B28 (2), 12AL5 (1), 4CX1000A (1)

The 3OS-1 is a completely self-contained, single tube, grounded grid linear amplifier. It utilizes the commercially popular Eimac 4CXI000A tube. The 30S-1 Linear Amplifier provides the SSB and CW station with full legal input power for SSB (1 kw average) or 1 kw input for CW transmission. It requires 70-100 watts driving power (supplied by the Collins 32S-3A Transmitter or KWM-2A Transceiver). All the 30S-1 controls are easily accessible on the front panel. This front panel design allows you to tune the 30S-1 swiftly, surely, and easily. With the push of a button you can switch instantly from the 100 watt power level of your transmitter to the full kilowatt output of the 30S-1; yet you retain high linearity and a clean signal. The 30S-1 can also be tuned to frequencies outside of the amateur bands.

Automatic load control voltage from the 30S-1 is fed back to the transmitter, assuring you of maximum talking power without overdriving and distortion. Collins' automatic load control, in combination with inverse feed back, is a major design feature in the 30S-1 which gives more talk power with a cleaner signal than any other linear amplifier in the amateur field. A multimeter on the front panel is switchable to read tuning and loading, bias voltage, filament current, grid current, screen current, and plate voltage. Correct tuning and loading is quick and easy on the 30S-1. With the multimeter selector switch in the Tuning and Loading position, comparator circuitry allows adjustment of the P.A. tuning and loading controls to zero the meter. Conservatively designed around the highest quality components, the 30S-1 is rated for continuous duty on SSB and a 50% duty cycle on RTTY and slow-scan TV.

Collins 30L-1 Amplifier

Introduction Date / Price: 1961 / $520; (Price $1536.00 in 1977)
Tubes: 811A (4)

The Collins 30L-1 is a grounded grid linear amplifier using four 811 A triode tubes. The amplifier delivers 1000 watts PEP power input on SSB and 1000 watts average on CW for all bands. It can be driven by the Collins 32S-3A Transmitter, the Collins KWM-2A Transceiver, or most 70-100 watt exciters. Finished in the same attractive light gray as Collins' classic S/Line equipment and the KWM-2A, the 30L-1 has all the controls conveniently accessible on the front panel.

The 30L-1 provides SSB and CW operation and covers the 80, 40, 20, 15, and 10 meter bands; however, provisions were made for general coverage operation. Automatic load control provides maximum talking power without over-driving and distortion, resulting in a cleaner signal. The 811 A tubes can be replaced without removing the unit from the cabinet. The tubes are instantly heated so that there is no warm up delay. With the meter switch in tune position, the 30L-1 uses an exclusive comparator circuit allowing operation by simply adjusting the loading and tuning controls to zero the meter. The 30L-1's RF and power supply compartment covers operate safety interlock switches. Cover removal during operation closes these switches and shorts the high voltage to ground. The unit is operable outside of the amateur bands; however, retuning of the input circuits may be necessary.

ACCESSORIES

Collins S-Line Accessories

516F-2 AC POWER SUPPLY

The 516F-2 can be used with the 32S-3A and KWM-2A, supplying all voltages for them; 115 v, 50-60 Hz, 400 Hz with minor changes. Size: 10" W, 7¾" H, 12" D (25.4 cm W, 19.69 cm H, 30.48 cm D). Weight: 28 lbs. (12.7 kg).

312B-4 SPEAKER CONSOLE

The 312B-4 integrates the 75S-3C, 32S-3A, 30S-1 and accessories into an operating system. The KWM-2A and 30S-1 can also be combined into an operating system by the 312B-4. A speaker, RF directional wattmeter with 200 and 2000 watt scales, and a phone patch are included in the console. Size: 10" W, 7¾" H, 12¼" D (25.4 cm W, 19.69 cm H, 31.12 cm D). Weight: 8½ lbs. (3.86 kg).

312B-5 VFO CONSOLE

Designed for use with the KWM-2A in fixed station operation, the 312B-5 provides limited separation of receive and transmit frequencies, phone patching facilities and a directional wattmeter. It includes a 5" x 7" permanent magnetic speaker. The PTO control selector can be set as follows: (1) Receive KWM-2A, Transmit 312B-5; (2) Transceive KWM-2A, (3) Transceive 312B-5. Other control functions are Voice Operated, Receive Only, Transmit Only, Phone Patch On-Off, and Station Mute. Cables are furnished for connections to the KWM-2A. Size: 10" W, 7¾" H, 12¼" D (25.4 cm W, 19.69 cm H, 31.12 cm D). Weight: 8½ lbs. (3.86 kg).

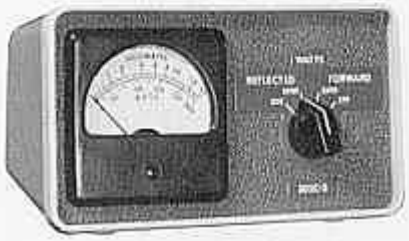
Collins S-Line Accessories

312B-3 SPEAKER

The 312B-3 contains a 5" x 7" (12.7 cm x 17.78 cm) speaker and connecting cable and is styled to match the S/Line and KWM-2A. Size: 10" W, 7¾" H, 8" D (25.4 cm W, 19.69 cm H, 20.32 cm D). Weight: 4 lbs. (1.81 kg).

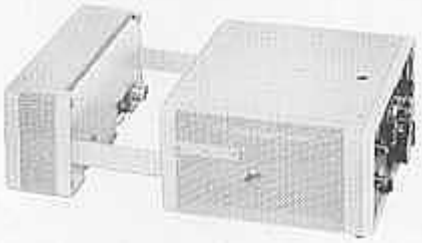
302C-3 DIRECTIONAL WATTMETER

The 302C-3 is valuable for checking the antenna system. It measures forward and reflected RF power. Two scales are provided: 0-200 watts and 0-2000 watts accommodating both high and low power transmitters. The 302C-3 is contained in two units: the remote coupler for connecting into a 50 ohm transmission line and the meter panel.



PM-2 PORTABLE POWER SUPPLY

The PM-2 is a lightweight, limited duty cycle power supply providing voltages needed for the KWM-2A. The PM-2 quickly slides into place and connects to the rear of the KWM-2A, ready to operate in minutes from either 115 v ac or 220 v ac at 50-400 Hz as a complete portable SSB or CW station. Both transceiver and power supply can be packed in the lightweight CC-2 Carrying Case. A small auxiliary speaker is included in the PM-2 for emergency use. Size: 14¾" W, 7¾" H, 4" D (37.47 cm W, 19.69 cm H, 10.16 cm D). Weight: 13.5 lbs. (6.12 kg).



Collins S-Line Accessories

SM-3 DESK TOP MICROPHONE

The Collins SM-3 is a slender gray and brushed chrome desk-top unit that blends with other Collins station equipment. Featuring a push-to-talk switch built into the rubber-isolated base, the SM-3's omnidirectional characteristics provide excellent transmission. Its frequency response—200-3000 Hz—matches that of the S/Line and the KWM-2A. It has an output level of —53 db. It is equipped with a five-foot Koiled Kord; the swivel permits vertical adjustment of 60 degrees.

MM-1 MOBILE MICROPHONE

The Collins MM-1 is a pressure-operated dynamic microphone. This mike is engineered for maximum voice response, and its die-cast case is finished in brushed satin chrome. With its mounting button on the front, the MM-1 slips easily into a dashboard bracket supplied with the mike. When the MM-1 is removed from the dashboard bracket, the microphone is in position for instant transmission. A five-foot length of Koiled Kord with mike plug is supplied with the 22-ounce microphone. The MM-1 has a frequency response from 200-10,000 Hz and has an output level of —48 db.

MM-2 MICROPHONE

The Collins MM-2 includes a high impedance reluctance microphone and single earphone which can be used in either a fixed station installation or with a mobile unit. The MM-2 has a frequency response from 100-7,000 Hz and an output level of —50 db. In mobile use, the earpiece and microphone unit permit the driver to operate his car with both hands while carrying out radio voice communication. Although it weighs only 3½ ounces (0.099 kg), the Collins MM-2 is built to withstand the strenuous demands of daily mobile operation. Its microphone boom has a 360° adjustment making it possible to angle the mike to the best pickup position. The MM-2 Microphone has a magnetic stray field shield to exclude unwanted noises. For optimum reception, an adjustable tone arm in the MM-2 pipes sound directly into the operator's ear, but does not cover the ear as conventional earphones do. The MM-2 is equipped with both mike and phone plugs.

Collins S-Line Accessories

BANDPASS FILTERS

Plug-in filters are available for use in the 75S-3C Receiver to effectively reduce background noise by restricting the 455 kHz IF bandwidth to that necessary for communication. The F455FA series of Mechanical Filters is available in 500 and 800 Hz bandwidths for CW, 1500 Hz bandwidth for teletype, 2.1 kHz for SSB and 3.1, 4.0 or 6.0 kHz for AM applications.

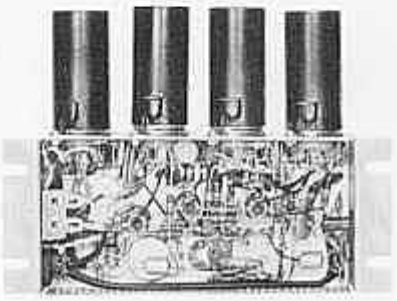
The X455KQ-200 Crystal Filter with a 200 Hz bandwidth can be employed for maximum selectivity in CW.

DL-1 DUMMY LOAD

The DL-1 is a 100 watt resistive load which can be used for various tuning functions without putting the transmitter on the air. The DL-1 can be switched in and out of the circuit by a front panel switch or can be remotely controlled by the addition of another switch in the operating position. This unit reduces tune-up and testing QRM and requires no connecting or disconnecting of wires prior to operation. Weight is 2 lbs. 14 oz. (1.3 kg).

136B-2 NOISE BLANKER

The 136B-2 is designed for use with the KWM-2A under mobile operating conditions. This noise blanker provides effective reduction of impulse-type noise. It differs from simple audio clipping circuits or series-type limiters by silencing ahead of the selective sideband filters. All necessary hardware and instructions are furnished for simple installation into the KWM-2A. The 136B-2 requires a 40 MHz antenna which can be used as a standard whip for the car radio. Weight: 1¼ lbs. (0.567 kg).



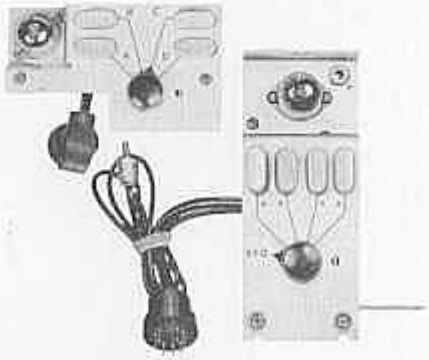
Collins S-Line Accessories

MP-1 MOBILE POWER SUPPLY

The MP-1 converts a 12-volt automobile, aircraft or boat battery to the voltages required for the Collins KWM-1,-2 or KWM-2A. The MP-1 includes a high voltage supply for the transmitter PA, bias and a low voltage supply for the amplifier. Size: 5¾" W, 3¾" H, 11" D (14.61 cm W, 9.53 cm H, 27.94 cm D). Weight: 7½ lbs. (3.4 kg).

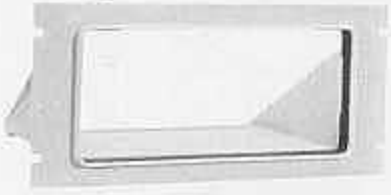
399B NOVICE ADAPTERS

The 399B-4 is a crystal-controlled oscillator which is used for frequency control in place of the VFO in the 32S-3A Transmitter. Sockets are provided for four crystals which are selectable by switch. The 399B-5 is used in place of the VFO to control the transmit frequency in the KWM-2A Transceiver. The receiver remains PTO tuned. Crystals are not provided.



351R RACK MOUNTING ADAPTERS

The 351R-1 is a matching gray rack panel for mounting the 75S-3B,-3C, 32S-3,-3A, KWM-2, -2A, 30L-1, or 51S-1. The 351R-2 Rack Adapter is a panel for mounting the S/Line and KWM-2A accessories. The 516F-2, 312B-4 and 312B-5 can be mounted in the 351R-2. Both adapters are 8¾" H and 13-3/16" D (22.23 cm H and 33.5 cm D) behind the front panel. A supporting shelf holds the unit securely. Mounting hardware is finished.



Collins S-Line Accessories

CC-2 CARRYING CASE

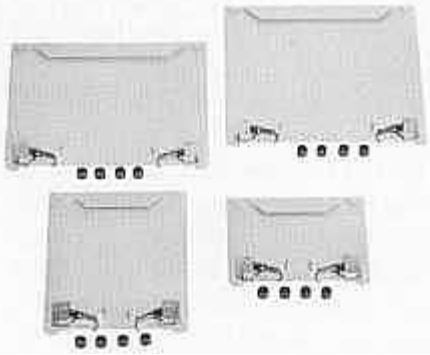
The CC-2 is designed to hold the components of a portable Collins SSB or CW station. The KWM-2A plus the PM-2 Power Supply, the KWM-2A alone, the 30L-1, or the 51S-1 can be transported in the case. The CC-2 is adapted from the Samsonite Silhouette and includes a shock-resistant interior. Weight: 9.5 lbs. (4.31 kg) empty.

CC-3 CARRYING CASE

The CC-3 is a specially built case for accessory components of a portable Collins SSB or CW station. The CC-3 has the same styling features as the CC-2. A molded interior allows the CC-3 to accommodate a 312B-5 (or 312B-4) Station Control Console, a 516E-2 (28 v dc) or MP-1 (12 v dc) Power Supply, a 637T-2 Dipole Antenna, as well as a supply of spare tubes and fuses. Weight: 10 lbs. (4.54 kg) empty.

351E MOUNTING PLATES

The 351E can be used to secure the S/Line or KWM-2A equipments to bench or table in shipboard, airborne or vehicular installations. The 351E-1 will accommodate either the 75S-3C Receiver or the 32S-3A Transmitter; the 351E-2 will mount either the 516F-2 Power Supply or the 312B-5 Station Controls; the 351E-3 will mount the 312B-3 Speaker. The 351E-4 has two snap-in clamps for secure installation of the KWM-2A. The equipment can be easily unclamped for removal without the use of tools. The unit is removed by pulling forward and lifting from the mounting plate.



Collins S-Line Accessories

637T-2 ADJUSTABLE DIPOLE ANTENNA

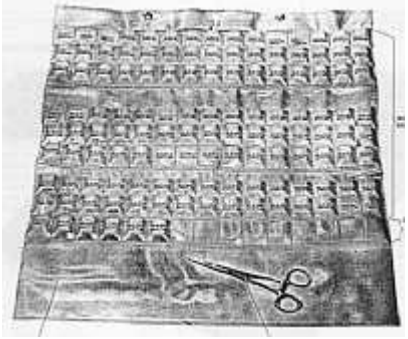
The Collins 637T-2 antenna is an adjustable wire unit developed for portable HF installations. Weighing less than five pounds, the antenna can be erected by one man. The 637T-2 operates in the 3.4- to 30-MHz range. The antenna consists of two reels of phosphor-bronze wire rope stored in a cylindrical housing. For operation at a particular frequency, the ropes are pulled out to the correct length as indicated by a frequency-calibrated dial. A built-in ferrite balun transforms the balanced dipole circuit to 50 ohms unbalanced.

180S-1 ANTENNA TUNER

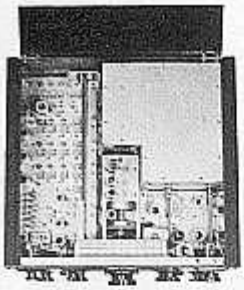
The 180S-1 is basically a 1 kw pi network for matching various antenna impedances to a 50 ohm coaxial transmission line in the range of 3-30 MHz. In most cases it is used as an L network, but when the L network cannot match the desired antenna, the complete pi circuit is used. The variable vacuum capacitor in the output circuit can be connected either in series or shunt with the antenna. The 180S-1 is useful for tuning trailing wires on large aircraft.

CP-1 CRYSTAL PACKET

The CP-1 contains a set of crystal grippers and all the crystals for operation of the S/Line receiver, the S/Line transmitter or the KWM-2A, throughout the complete operating range. Crystals not supplied for the range of 5.0 to 6.6 MHz and those already provided with the equipment. The packet is of a waterproof plastic containing a pouch for each crystal and one for the grippers. The complete packet can be fastened into the CC-2 Carrying Case.



KWS-1 / 75A-4 Accessories

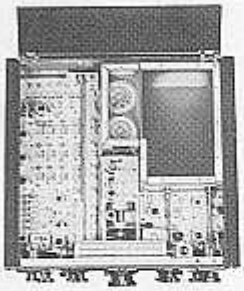


In addition to the complete KWS-1 Transmitter certain building-block combinations of the major transmitter units as well as construction kits are available as follows:

KWS-1K

The KWS-1K consists of the KWS-1 Exciter and PA assembly in the RF cabinet, plus an external type 429A-1 low voltage power supply, interconnecting cable, PA blower and air hose. The 428A-1 H.V. power supply and the pair of 4X150A PA tubes are not supplied.

To provide the H.V., bias and screen supplies for the KWS-1K, a type 428A-2 power supply kit is available. This kit contains all necessary parts and instructions required to build a complete type 428A-1 power supply. As an alternate, the amateur may elect to provide his own power supply in accordance with Collins' recommendations.



32W-1

The 32W-1 consists of the KWS-1 exciter, PA shield box and two sockets for 4X150A tubes, an external type 429A-1 low voltage power supply and interconnecting cable. Power amplifier components and the 428A-1 high voltage power supply are not included.

A power amplifier kit contains the necessary parts and instructions to complete the linear amplifier.

As in the KWS-1K, a type 428A-2 power supply kit is available.

367A-2 RF POWER AMPLIFIER KIT

All necessary components are included to complete the power amplifier section of the 32W-1. The blower and air hose for cooling the power amplifier tubes are included. The 4X150A tubes are not supplied. The type 428A-1 high voltage supply is not included.

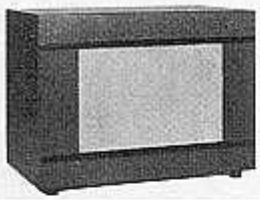
428A-2 H.V. POWER SUPPLY KIT

All components to construct the 428A-1 high voltage power supply are supplied. Includes the cabinet, internal wiring cable and interconnecting cable. Kit does not include the 429A low voltage power supply, which is furnished, as a part of the KWS-1K or 32W-1.

428A-1

High voltage power supply completely assembled and wired. The blower, air hose and 429A low voltage supply furnished with the KWS-1K or 32W-1 is not included.

KWS-1 / 75A-4 Accessories

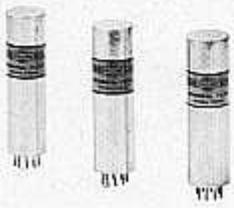


270G SPEAKER

The 270G-2 cabinet and 10" PM speaker assembly is attractively finished to match the 75A-4 Receiver.

312A-1 SPEAKER/CONTROL

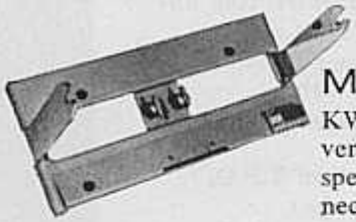
The 312A-1 Speaker/Control Unit provides space to mount the loudspeaker and the extra control functions necessary in a complete installation. This unit is furnished with a removable perforated steel front panel insert with no cut-outs; the operator can remove the panel and install any control functions such as beam direction indicators, clocks, switches, etc. A 10" speaker is submounted behind the front panel. The rear of the unit is open and across the bottom is a terminal strip.



MECHANICAL FILTERS ADDED

Collins new type F455J-Series Mechanical Filters are available as accessories for the 75A-4 Receiver. The F455J-08 Filter, providing a bandwidth of 800 cycles, is recommended for CW reception. The F455J-31, 3.1 kc is supplied with the receiver for AM and SSB, and the F455J-60, providing a 6.0 kc bandwidth is recommended for AM reception where interference is not a problem.

KWM-1 Accessories



Mobile Mount

KWM-1 slides in and out very easily with power, speaker and antenna connecting automatically.

DX Conversion Adapter

This box replaces the normal crystal box in the front panel. Provides up to 7 transmitting frequencies within the band and allows reception over a 100 kc band in or out of the band. An export model available with transmitting frequencies outside band. This box and normal crystal box easily interchange for switching back and forth.

DC Power Supply

Completely transistorized. Minimum maintenance. Provides all voltages from 12 volt system. 85% over-all efficiency.

Extra Crystal Boxes

These can be obtained with crystals for operation anywhere in the 14 to 30 mc band. Also available for crystal-controlled transmitter for Novice operation. Power is easily reduced to conform with Novice power regulation.

AC Power Supply

Very compact unit supplies all voltages for KWM-1.

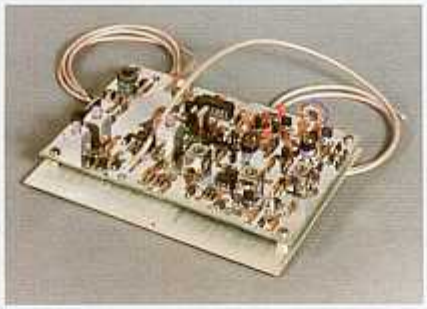
Speaker Console

Contains a 5x7 inch speaker and directional wattmeter to give the fixed station that finished touch.

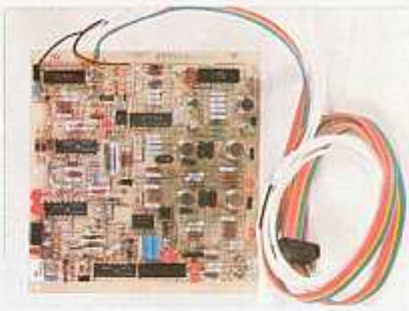
Collins CREATIVE LEADER IN COMMUNICATION COLLINS

KWM-380 Accessories

OPTIONS



Noise Blanker
The noise blanker option is designed for use in transceivers located in high impulse RF noise environments.



Speech Processor
The speech processor is a new circuit (patent applied for) that increases the effective "talk power" in SSB transmissions without using limiting or clipping.

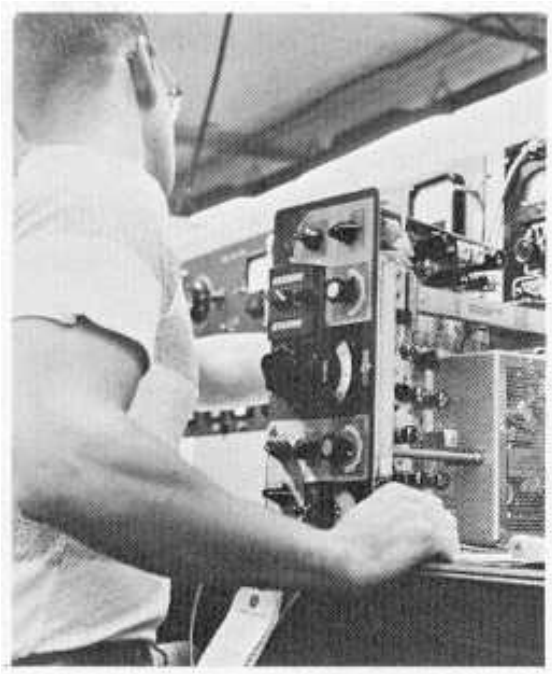
IF filters
A choice of IF filters are available including: a 360 Hz CW filter, a 140 Hz CW filter, a 1.7 kHz RTTY/SSB filter, and a 6.0 kHz AM filter.

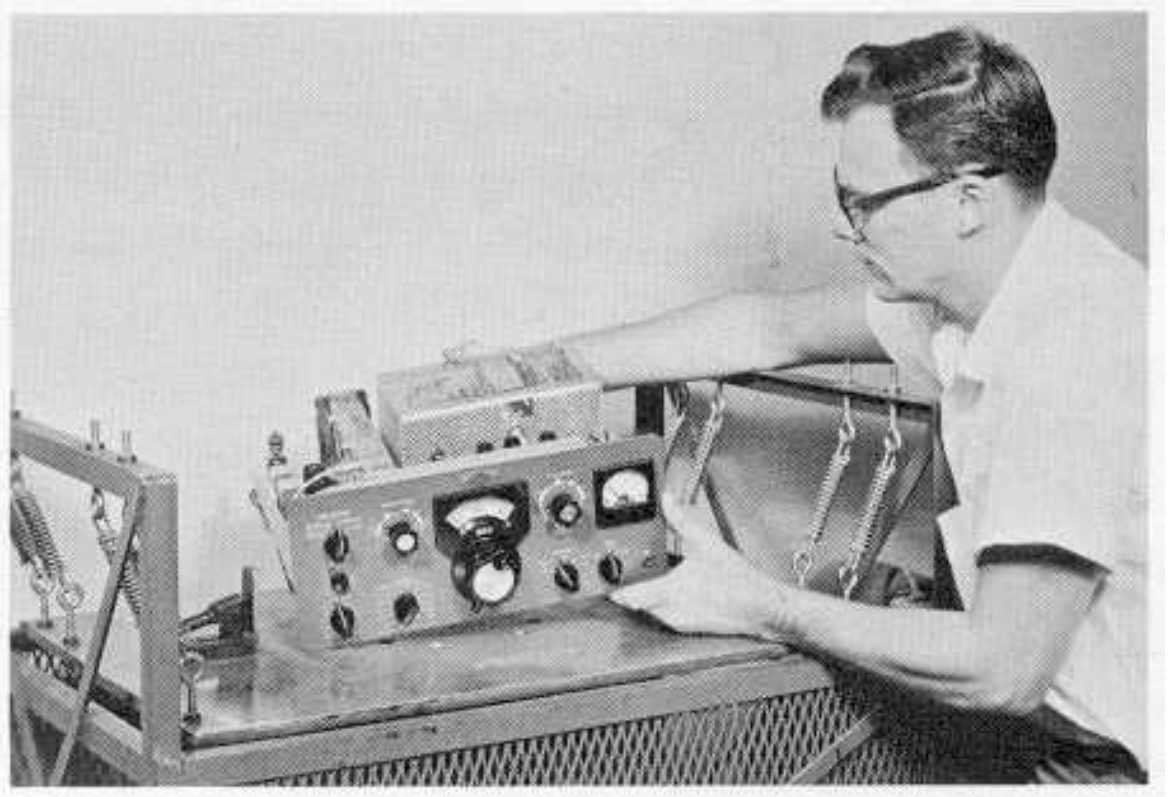
ACCESSORIES

Three Generations of Transceivers

Models: KWM-1, KWM-2A w/312B-5 (bottom), KWM-380 (Top-right)

Collins Radio Company: S-Line / KWM-2 Production / Test Facilities
(circa 1966/67)





Collins S-Line Photo