

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA

NEW YORK

DALLAS

BURBANK





COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA, U.S.A.

Reply To
WESTERN DIVISION
2700 West Olive Avenue
Burbank, California
Victoria 9-3361

Mr. Broadcaster:

As you leaf through this catalog, you'll see that Collins provides a complete selection of quality broadcast, speech and communications equipment. But what you can't see is evidence of Collins' complete service to broadcasters and communications men in aviation and other specialized industries. So, we'd like to tell you about it.

In the first place, some of the foremost designers in the field of electronics and communications are on Collins Engineering Staff here in Burbank. And then there's Collins Sales Service Department made up of top field service engineers and technicians. These men are specialists with years of experience in the design and service of all types of radio and communications equipment.

We're equally proud of our development and test laboratories, too. Many years of planning and experience have gone into selecting the equipment that makes these laboratories among the finest in the country.

The Engineering Staff, the Sales Service Staff and the laboratory facilities are here, in Burbank, for one purpose only. That purpose is to serve you—to assist you in replacing obsolete or inadequate equipment—to advise you on expanding or increasing the efficiency of your present operation. Our men are experienced in broadcast and communications systems used in the West. They are, therefore, Western specialists particularly qualified to serve you, with facilities ideally located in the West for prompt and convenient service.

Whether you are in the Broadcasting industry or in Communications for other industries requiring the utmost in electronic precision and dependability, you can be sure Collins is completely staffed and equipped to provide you with the best in service. Collins leadership in AM Broadcast Equipment design has always been recognized. In the past...the present...and in the future...look to Collins for the...
BEST IN BROADCAST!

Please feel free to call on us at any time.

COLLINS OF BURBANK

see you at the **NARTB**

May 23 through 27

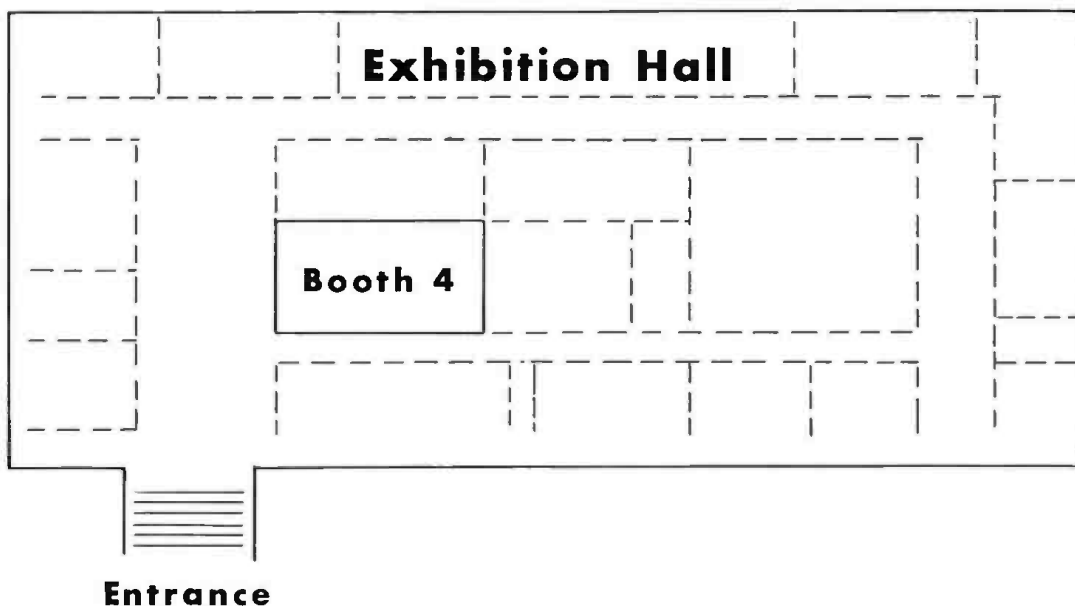
Palmer House, Chicago

See Collins new TV relay equipment simultaneously relaying both video (NTSC standard) and audio information on a common RF channel in the 6,875-7125 megacycle band.

See how provisions can be made for one or two high fidelity audio program channels plus a two-way telephone channel!

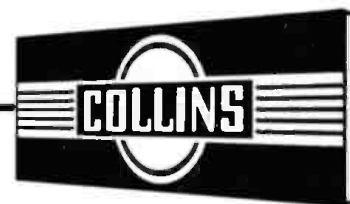
Besides this informative demonstration you'll see Collins' complete broadcast line — transmitters, remote control systems, studio and speech equipment.

Don't miss the Collins booth at the NARTB Convention.



COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

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2700 W. Olive Avenue, BURBANK
COLLINS RADIO COMPANY OF CANADA, LTD.
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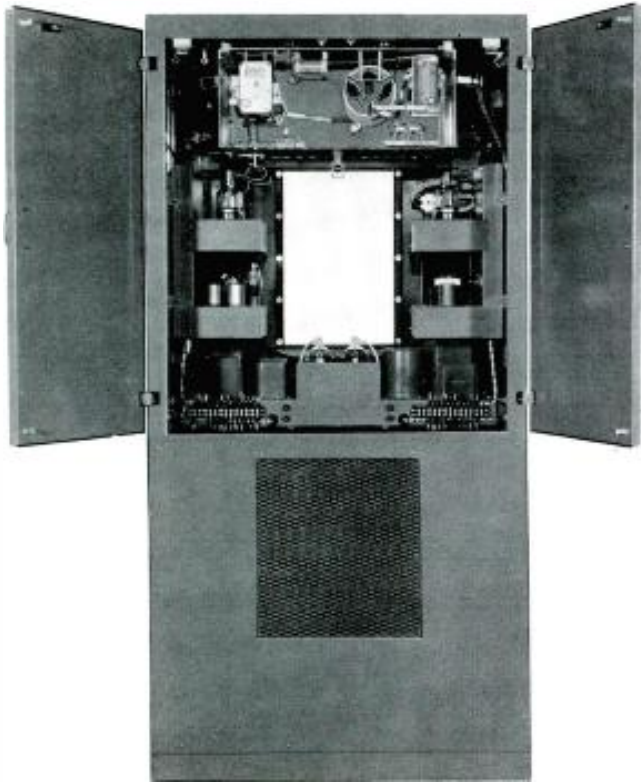
300J



Collins

300J

**250 WATT BROADCAST
TRANSMITTER**



1. 300J REAR VIEW OPEN

250/100 WATT AM BROADCAST TRANSMITTER

The new 300J is designed for continuous high fidelity broadcast operation at any specified frequency in the band from 540 to 1600 kilocycles or any of the high frequency broadcast bands.

Facilities for power reduction from 250 watts to 100 watts are standard equipment in the 300J.

The AC power is obtained from a 208/230 volt single phase 50/60 cps source.

All materials and components used in the 300J are of the highest Collins quality and assure long life with trouble free operation.

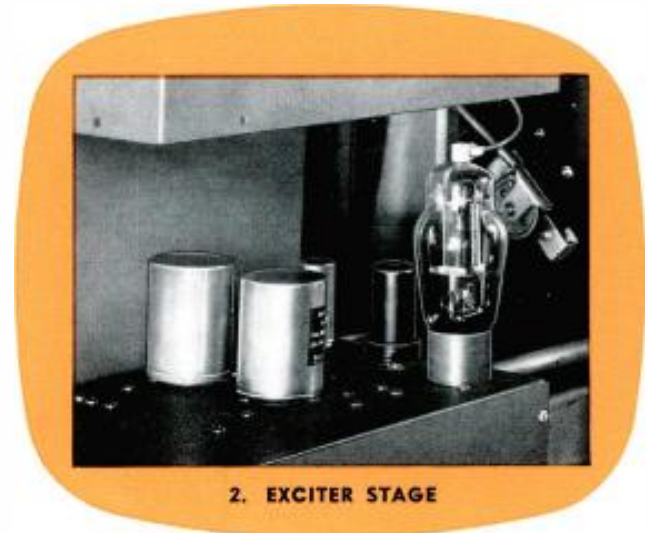
FREQUENCY CONTROL

A very high percentage of transmitter frequency failures and frequency control nuisances have been directly traceable to the crystal oven, thermostat and associated equipment.

As a result of major advances in crystal stability and oscillator design, the Collins 300J *eliminates* the use of crystal ovens and associated thermostats, relays and cir-

cuit complexities (See Picture 2). Extremely stable low temperature coefficient crystals in conjunction with the highly perfected oscillator design produce frequency stability well within the FCC specifications of plus or minus 20 cycles.

Two crystals are employed with one of the two always available in a standby position. A selector switch provides instant choice of either crystal while the transmitter is in operation.



2. EXCITER STAGE

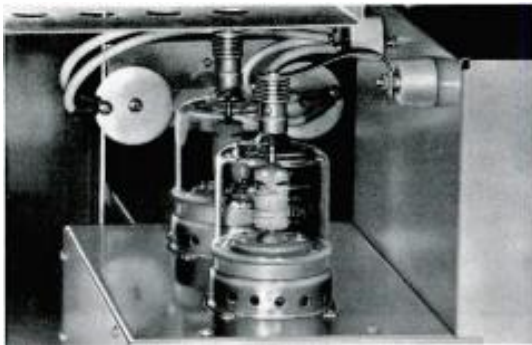
TUBES

High efficiency, high gain type 4-125A tetrode tubes (See Pictures 3 and 4) are used in both the modulator and the power amplifier. Extremely conservative operation is obtained with very low driving power which simplifies the over-all circuitry.

Only 7 different tube types are used. Now you can keep fewer tube replacements to meet FCC requirements.

4	4-125A	2-Final Amplifier 2-Modulator
1	807	Driver Amplifier
3	6SJ7	1-Buffer Amplifier 2-Audio Amplifier
1	6AU6	Crystal Oscillator
2	872A	High Voltage Rectifier
2	866A	Low Voltage Rectifier
1	5U4G	Bias Rectifier

Cabinet ventilation is obtained through a fan on the lower back panel providing quiet, trouble free cooling for all components and tubes.



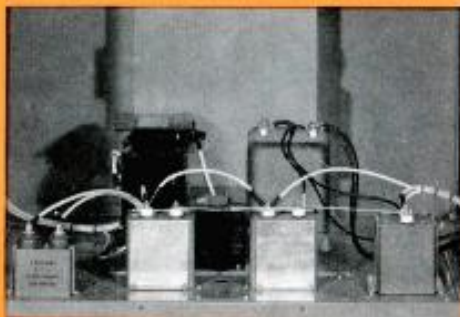
3. MODULATOR STAGE



4. FINAL RF AMPLIFIER

POWER SUPPLIES

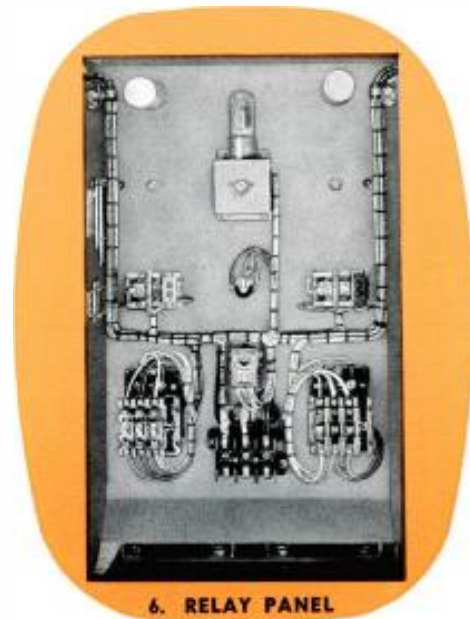
One heavy duty high voltage supply is used for the modulator and final amplifier. A separate low voltage supply feeds the modulator screen grids, as well as the plates and screen grids of the other RF and audio tubes. The bias supply provides approximately 100 volts for the modulator and power amplifier bias and lesser voltages for other biasing throughout the transmitter. (See Picture 5.)



5. HIGH VOLTAGE POWER SUPPLY

THERMAL TIME DELAY RELAY

An instantaneous interruption of line voltage will result in no delay in returning to the air. A thermal time delay circuit automatically selects the proper delay period after short carrier interruptions. This Thermal Time Delay Relay (See Picture 6) allows you to return to the air at the earliest possible moment, cutting the off-the-air time to a minimum number of seconds.



6. RELAY PANEL

CONTROLS

Momentary type filament and plate power start-stop switches are located on the front of the transmitter (See Picture 7).

When the filament ON button is pressed, the filaments, blowers, bias supply and plate time delay circuit are immediately energized. At the end of the filament warm-up cycle the filament pilot light will glow, indicating readiness for application of high and low plate voltages. Manual operation of the plate button on the front of the transmitter will energize these power supplies and the plate pilot light will glow its indication of full operating conditions.

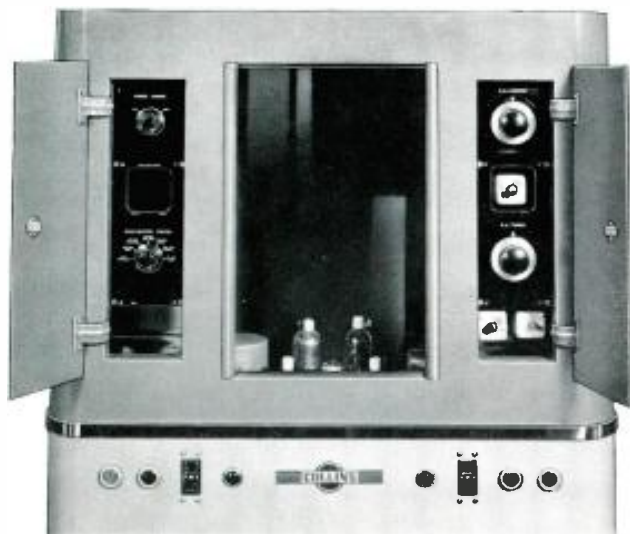
If desired, the transmitter can be started by simply pressing the plate ON button. Filament, bias and plate



power will then be applied in correct sequence and with the proper time delay. Pressing the filament OFF button de-energizes all circuits.

Filament and control circuits, and the high voltage plate supply are protected by toggle type magnetically operated circuit breakers.

Individually adjustable overload relays are provided for the modulator and final amplifier stages. These relays are connected so that an overload removes plate power and the equipment must be re-energized manually.



7. FRONT PANEL CONTROLS

Tuning controls on the left side of the front window:

- High-Low Power Switch
- Multimeter Switch
- Modulator Bias Adjustments
- Audio Balance Control

Tuning controls on the right side of the front window:

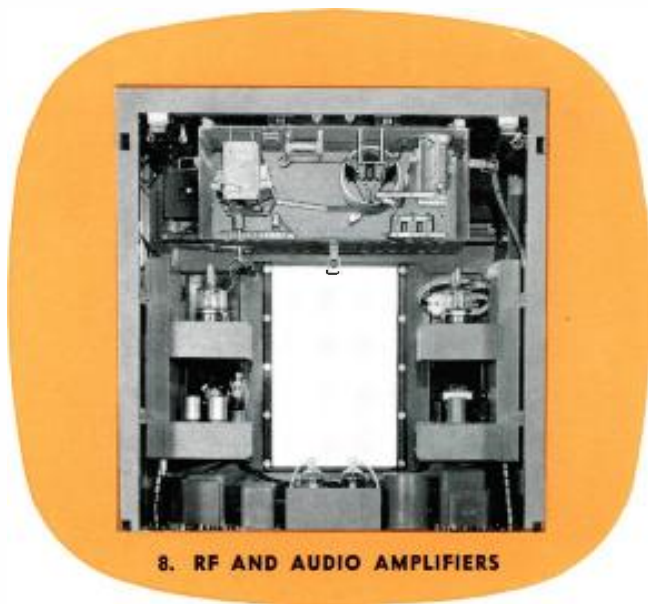
- PA Plate Tuning
- PA Loading
- Crystal Selector Switch
- Crystal Frequency Trimmers
- RF Driver Audio Hum Balance
- RF Final Amplifier Audio Hum Balance

All of the above controls are available for adjustment while the Collins 300J is in operation. AC power

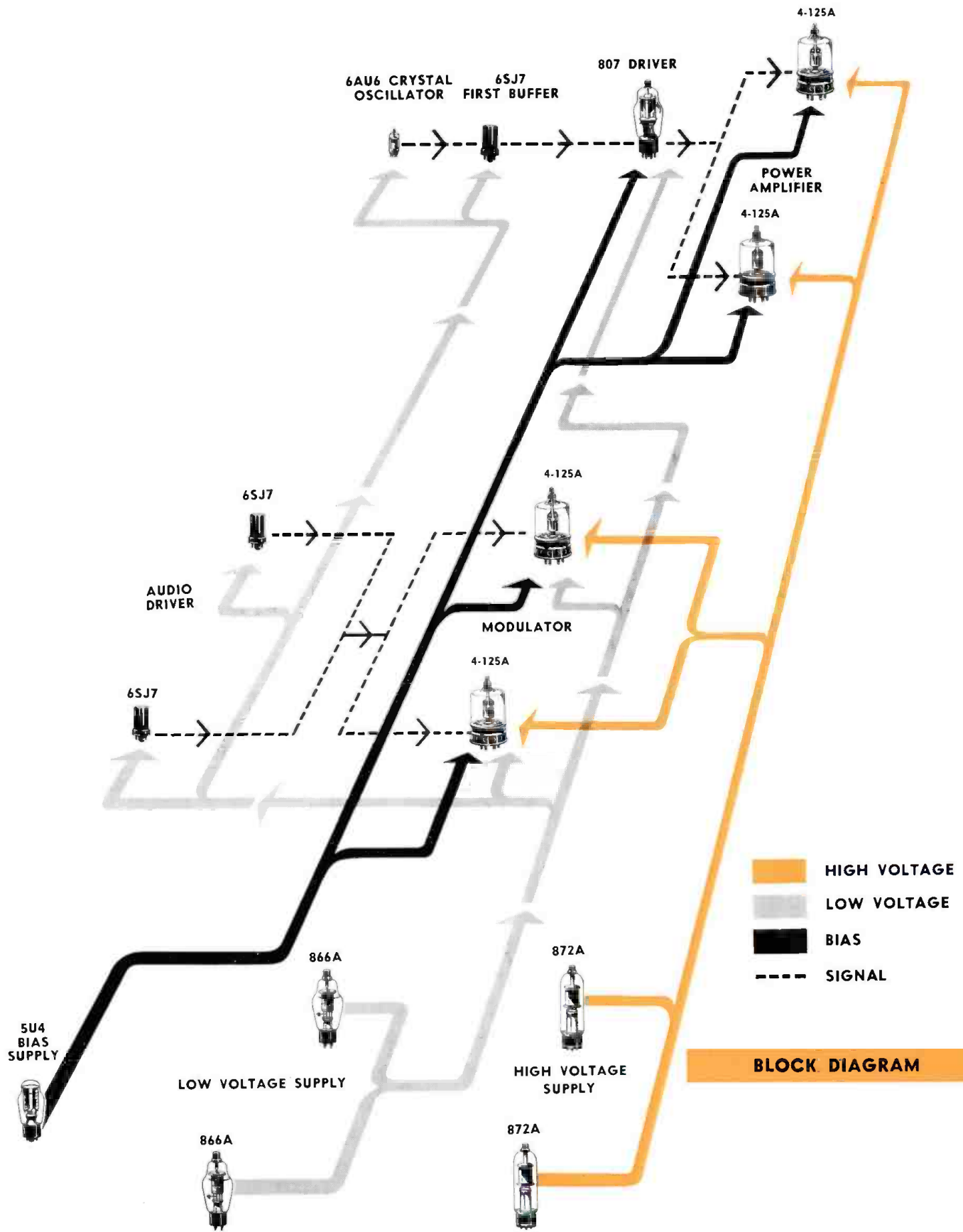
circuit equipment is readily accessible by removing the clip-in flush panel in the lower center of the transmitter front. No neutralization adjustments are necessary for operation at any frequency in the standard broadcast band.

Personnel protection is provided by automatic door interlocks and gravity operated shorting bars. After the interlocks have opened, the gravity bars ground the high voltage and discharge the large filter capacitors.

The lightning and arc-over protective kit, now supplied as standard equipment on the 300J, will safeguard tubes and tank components by interrupting the high voltage and low voltage plate supply primaries in event of a short circuit or flash-over in the transmitter RF output circuit. The protective relay has one set of contacts which are normally closed. The relay coil is connected in series with the monitor coil. The end of the monitor coil that connects to the relay is isolated from ground for DC by removing the ground connection and substituting a bypass capacitor. The transmitter bias supply is used as a convenient voltage source for operation of the relay. When an arc-over occurs in the power amplifier output tuning network, due to lightning or any other cause, the ionized path produced by the RF voltage in the arc-over has a sufficiently low DC resistance to complete the relay coil circuit and energize the relay. As the relay operates, it removes high voltage from the transmitter and stops the arc-over.



8. RF AND AUDIO AMPLIFIERS





When the arc-over no longer exists there is no path to ground for the DC relay coil current, and the relay returns to its normal position. The relay removes arc-over conditions from the output network and returns the transmitter to normal operation so quickly that usually only the click of the transmitter relays will notify the transmitter operator that an arc-over has occurred.

MODULATION

A simplified modulator design plus advanced circuitry has resulted in a more compact, efficient modulator. The Collins 300J can be safely operated at 100% *sine-wave* modulation without fear of breakdown. Conservative ratings, highest quality components and modern design all contribute to the modulation capability of the 300J. Exceptionally low audio distortion is obtained.

METERING

For ease of operation and observation of transmitter performance the following circuits are metered:

- RF Line Current
- Final Amplifier Plate Current
- Final Amplifier Plate Voltage
- Modulator Cathode Current
- Final Amplifier Grid Current
- 807 RF Driver Cathode Current
- 807 Grid Current
- 6SJ7 Buffer Cathode Current
- 6SJ7 Grid Current
- 6SJ7 Audio Cathode Current
- 6AU6 Crystal Oscillator Cathode Current

The meter panel is tilted at an angle for operating convenience.

MONITOR CONNECTIONS

Readily accessible coaxial monitor connections are provided for both modulation and frequency monitors. In addition, a direct monitor speaker connection is provided to allow on-the-air monitoring from the transmitter. A monitor amplifier system also may be fed from this termination.

OUTPUT NETWORK

A high degree of harmonic attenuation has been accomplished.

The entire RF network is double shielded to reduce spurious radiation. All RF circuits are completed independent of the cabinet proper.

CABINET

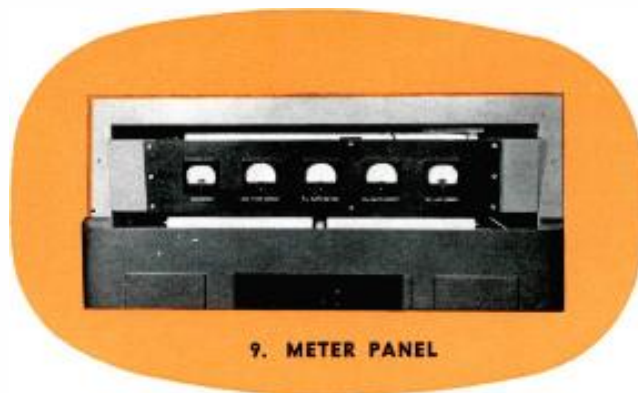
All tubes are visible through the front window and all tuning controls are located on the front of the transmitter.

One vertical door, located on each side of the front window, provides access to the various controls and adjustments. The filament and plate power switches and their associated indication lights are located below these doors on the front of the transmitter.

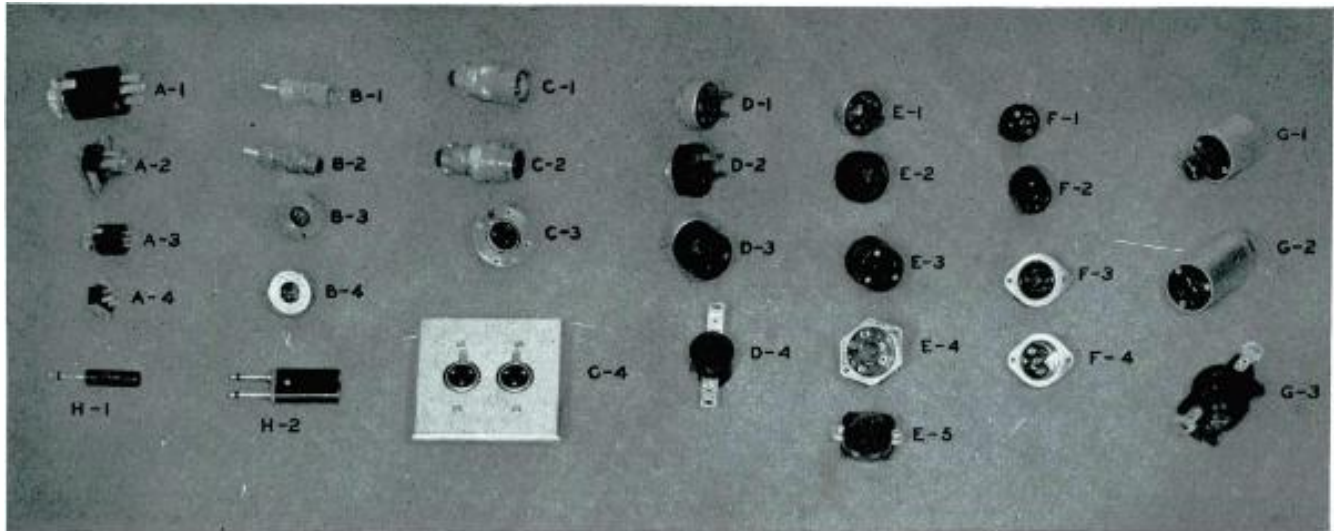
Double doors on the rear of the cabinet provide instant access to the interior of the equipment.

A "clip-in" panel below the window covers the compartment in which the time delay circuits, the plate relay and the primary terminal block are located.

The top panel on the front of the transmitter can be removed (See Picture 9) by releasing two screws. Thus, the meters are readily accessible for any necessary maintenance.



This ruggedly constructed cabinet is finished in an attractive high gloss two-tone grey enamel. Streamlined polished chrome styling adds to the modern appearance and results in a transmitter of striking eye appeal.



(Continued from preceding page)

Cannon Type XL 3 Connectors

B-1	370 2021 00	XL-3-12	Male, cable type
B-2	370 2015 00	XL-3-11	Female, cable type
	370 2028 00	XL-3-12SC	Male, cable type with clamp
	370 2031 00	XL-3-11SC	Female, cable type with clamp
B-3	370 2022 00	XL-3-14	Male, chassis, screw mtg.
	370 2019 00	XL-3-13	Female, chassis, screw mtg.
B-4	370 2014 00	XL-3-14N	Male, chassis, nut mtg.
	370 2018 00	XL-3-13N	Female, chassis, nut mtg.

Cannon Type P-3 Connectors

C-1	370 2030 00	P3-CG-12	Male, cable type
C-2	370 2180 00	P3-CG-11S	Female, cable type
	370 2090 00	P3-14	Male, chassis mtg.
C-3	370 2060 00	P3-13	Female, chassis mtg.
	370 2035 00	P3-36-2G	Male, dual, wall outlet type
C-4	370 2170 00	P3-35-2G	Female, dual, wall outlet type
	370 2027 00	P3-36	Male, single, wall outlet box type
	370 2150 00	P3-35	Female, single, wall outlet box type

Hubbell 3 Prong Polarized 3 Connector

D-1	368 1900 00	7055	Male, cable, heavy duty type
D-2	368 0020 00	9750	Male, cable type
D-3	368 0005 00	7082	Female, cable heavy duty type
D-4	368 0019 00	6051	Female, flush, wall mtg. type

D-4	368 2100 00	7215	Female, flush, with close mtg. strap (Mtg. similar to E-5)
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Hubbell Twist-Lock 3 Connector

E-1	368 1200 00	7311	Male, cable, heavy duty type
	368 4600 00	7313	Female, cable, heavy duty type
E-2	368 1600 00	7567	Male, cable type
E-3	368 1700 00	7555	Female, cable type
E-4	368 2200 00	7556	Male, chassis mtg.
	368 1500 00	7557	Female, chassis mtg.
	368 0017 00	7582	Female, flush wall mtg. type
E-5	368 0018 00	7586	Female, flush with close mtg. strap

Hubbell Midget Twist-Lock 3 Connector

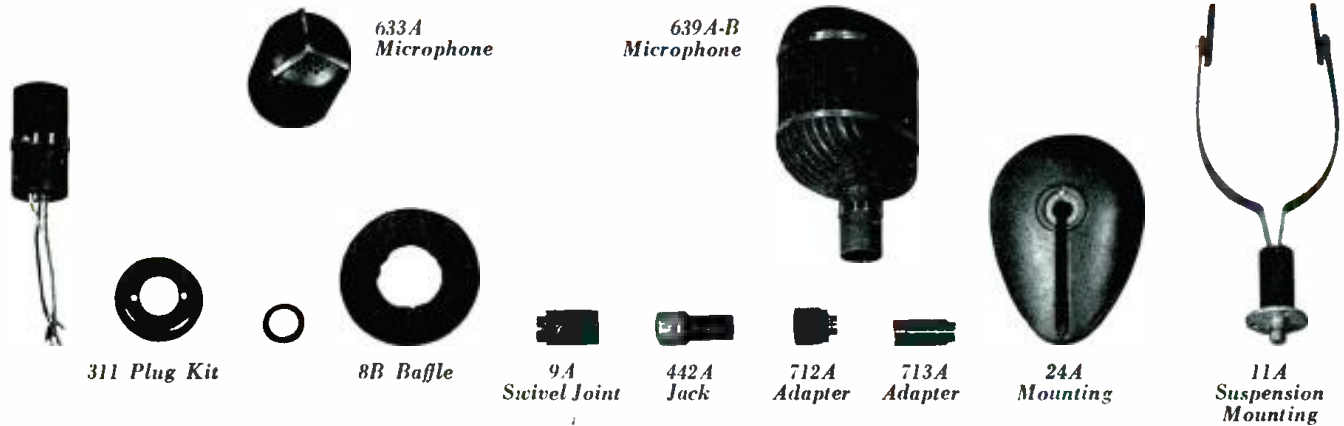
F-1	368 0013 00	7485	Male, cable type
F-2	368 0015 00	7484	Female, cable type
F-3	368 0014 00	7487	Female, chassis mtg.
F-4	368 0016 00	7486	Male, chassis type mtg.

Hubbell Lock Twist-Lock 3 Connector

G-1	368 9000 00	23005	Male, cable type
G-2	368 0021 00	23002	Female, cable type
G-3	368 8000 00	23000	Female, flush wall mtg. type

Patch and Phone Plugs

H-1	361 0018 00		Male, two conductor phone plug
H-2	361 0017 00		Male, three conductor patch plug



ALTEC-WESTERN DYNAMIC MICROPHONE

The 633A is non-directional or may be given directivity by use of the 8B baffle. For non-directional use the microphone is mounted vertically on a stand or suspended by its cordage.

Impedance: Approximately 20 ohms. Works into 25 to 50 ohms.

Frequency response: 40 to 10,000 cps.

Power output level: -59 dbm* for a sound pressure of 10 dynes per square centimeter. Experience indicates that approximately ten dynes per square centimeter sound pressure is produced at conversational level three feet from the microphone.

Mounting: Both floor and desk stands are avail-

able. For stands not listed here see complete listing at end of this section. Baffles, stands, attachments and cordage** are ordered separately.

Collins Part No.:

- 020 6000 00—633A Microphone
- 020 0061 00—311A Plug Kit
- 020 6030 00—8B Baffle
- 020 0016 00—24A Mounting
- 020 0047 00—712A Adapter
- 020 0020 00—442A Jack
- 020 6020 00—9A Swivel Joint
- 020 0048 00—713A Adapter

* Reference level 1 mw 600 ohms.
**See page 33.

ALTEC-WESTERN 639A, 639B CARDIOD MICROPHONES

Each of these microphones is a combination of a dynamic moving coil type pressure element and an improved ribbon type velocity actuated element.

The 639A has 3 patterns selected by a screwdriver operated switch.

C—cardiod D—dynamic R—ribbon

The 639B has 3 additional patterns which are variations of the cardiod.

Impedance: approximately 40 ohms. Works into 25 to 50 ohms.

Frequency response: Essentially uniform 40 to 10,000 cps.

Power output: -56 dbm* for a sound pressure of 10 dynes per sq. centimeter. This level is approximately produced at conversational level three feet from the microphone.

Mounting: Either floor or desk type. Accessories and cordage are ordered separately.

Collins Part No.:

- 020 0021 00—639A Microphone
The above microphone less stand, cord and accessories
- 020 0022 00—639B Microphone
- 020 0046 00—24A Mounting
- 020 0047 00—712A Adapter
- 020 0020 00—442A Jack
- 020 0048 00—713A Adapter
- 020 0045 00—11A Suspension Mounting

* Reference level 1 mw 600 ohms.

Microphones



KB-2C with
KS-5A Stand (extra)



77-D



44-BX



BK-1A with
KS-11A Stand (extra)

RCA KB-2C

A miniature velocity microphone for inside remote applications or studio work.

Output impedance: 30/150/250 ohms.

Effective output level: -56 dbm (referred to one milliwatt and a sound pressure of 10 dynes per cm²).

Response: 50-10,000 cps.

Finish: Satin chrome.

Supplied with 30 ft. of three-conductor cable. Stand shown is accessory equipment. Order separately using type identification KS-5A. Available in either gray metalustre or black.

Collins Part No.: 020 0142 00.

KS-5A Stand

Collins Part No.: 020 0144 00.

RCA 77-D

This microphone has uni-directional, bi-directional, and non-directional characteristics, adjustable by means of a slotted shaft on the rear side of the wind-screen. Supplied with three position "Voice-Music" switch for selection of best operating characteristics for voice or music.

Output impedance (tapped transformer: 50/250/600 ohms. Supplied connected for 250 ohms.

Effective output level: -59 db (referred to 1 milliwatt and a sound pressure of 10 dynes per sq. cm).

Response: 50 to 15,000 cycles. With variations selected by Voice-Music switch.

Supplied with 30 feet, two conductor shielded cable, less plug. 1/2" pipe thread.

Finish: Two-tone umber gray.

Collins Part No.: 020 0035 00.

RCA 44-BX

Output impedance (tapped transformer): 50/250 ohms. Supplied connected for 250 ohms.

Effective output level: -55 db (referred to 1 milliwatt and a sound pressure of 10 dynes per sq. cm).

Response: 30-15,000 cycles "Music" connection. Low frequencies suppressed in "Voice" connection.

Finish: Polished black and chromium.

Supplied with 30 feet, two conductor shielded cable, less plug. 1/2" pipe thread.

Collins Part No.: 020 0036 00.

BK-1A

Pressure-actuated microphone complete with 30 ft. 2 conductor shielded cable.

The high-fidelity BK-1A "Commentator" pressure microphone is designed for broadcast use in AM, FM and TV stations. Its construction makes it particularly well suited for remote pickups where, if used in the open air, the modern design practically eliminates the effect of air currents. The BK-1A features a smooth response and frequency range which make it suitable for reproducing both music and speech.

Non-directional or semi-directional.

Output impedance: 30/250 ohms (tapped transformer).

Effective output level: 52 db (referred to 1 milliwatt and a sound pressure of 10 dynes per sq. cm).

Response: 60-10,000 cycles.

Finish: TV Gray and Chrome.

1/2" pipe thread.

Collins Part No.: 097 1321 00.

KS-11A Stand

Collins Part No.: 097 1322 00.

. . . . Microphone Desk Stands



NO. 1

ALTEC-WESTERN 23A

Base: 5" diameter.
 Height: 7⁷/₁₆".
 Finish: Altec-Western gray crinkle.
⁵/₈ x 24 female thread.
 Collins Part No.: 020 1040 00.

NO. 2

ASTATIC TYPE G

Has press-to-talk lever and amphenol 3 prong female socket in top. Furnished with 8 ft. 3 conductor cord. Base: 5⁹/₁₆" diameter.

Height: 8¹/₄".
 Switch mechanism grounded.
¹³/₁₆-27 thread.
 Collins Part No.: 020 1000 00.

NO. 3

RCA MI-4096

Base: 7¹/₂" diameter.
 Height: 8" to 10¹/₂", adjustable.
 Finish: Chromium and black.
¹/₂" pipe thread.
 Collins Part No.: 020 0040 00.

NO. 4

RCA 91-A FOR 44-BX MICROPHONE

Base: 7" diameter.
 Finish: Dark umber gray.
 Height: 8³/₈" to center swing of 44-BX microphone.
¹/₂" pipe thread.
 Collins Part No.: 020 0038 00.

NO. 5

ALTEC-WESTERN 24A

For use with Altec-Western microphones 633A, 639A, 639B.

Base: 4¹/₂" x 6¹/₂" oval.
 Finish: Aluminum gray lacquer.
⁵/₈-24 thread.
 Collins Part No.: 020 0046 00.

ALTEC-WESTERN 11A YOKE

Yoke attachment with swivel for mounting Altec-Western 639A-B microphones. See listing of 639A-B and 633A microphones for mounting accessories.

Collins Part No.: 020 0045 00.

NO. 6

RCA 91-B

Desk stand with ³/₄" and 1³/₄" fittings for use with RCA type 88A and 77D microphones. Fittings have ¹/₂" pipe thread.

2 supplied, ³/₄" and 1³/₄".
 Finish: Black and chromium.
 Collins Part No.: 020 1130 00.

NO. 7

RCA MI-4095 BANQUET STAND

Base: 10¹/₂" x 3⁵/₈" folded. Base effectively 12" diameter when set up.

Height: 10³/₄" to 24³/₄" adjustable.
 Finish: Black wrinkle and chromium.
¹/₂" pipe thread.
 Base becomes carrying case for the entire stand.
 Collins Part No.: 020 0049 00.

. . . . **Microphone Floor Stands**



NO. 1

RCA 90-A

This stand has a very smooth acting clutch, and does not require adjustment when height is changed.

Base: 12 $\frac{1}{4}$ ".

Height: 3' 8" to 6' 2"

$\frac{1}{2}$ " pipe thread.

Finish: Satin chromium.

Collins Part No.: 020 1140 00.

NO. 2

**MELETRON STARBIRD
MODEL 180 BOOM STAND**

Complete with hooks and adapters for microphones using $\frac{1}{2}$ " thread and $\frac{5}{8}$ -27 thread.

Height: 5' to 9' adjustable.

Boom length: 4' to 8' adjustable.

Finish: Tubing — alumilite, castings—platinum gray.

Collins Part No.: 020 0018 00.

NO. 3

**MELETRON STARBIRD
MODEL 360**

Portable Folding Stand

Height: 19 $\frac{1}{2}$ " to 60" adjustable. Folds to 15 $\frac{1}{2}$ ".

Has single hollow adapter for $\frac{5}{8}$ -24 thread, $\frac{5}{8}$ -27 thread, $\frac{1}{2}$ " pipe tap, and plug-in to fit all standard microphones.

Finish:

Tubing centerless ground and anodized.

Collins Part No.: 020 0010 00.

NO. 4

RCA MI-6208

3 SECTION STAND

Height: 3' 11" to 5' (using 3 sections)

1' 6" to 2' 7" using 2 sections)

Base: 10" diameter.

$\frac{1}{2}$ " pipe thread.

Finish:

Stand—Polished chromium

Base — Gunmetal crackle with satin silver stripes.

Collins Part No.: 020 0041 00.

NO. 5

RCA KS-3A

Boom with $\frac{1}{2}$ " pipe thread. 3 locking casters.

Height: 4' 6" to 8'.

Boom: 4' 11" to 7' 6".

Finish: Satin aluminum and black.

Collins Part No.: 020 0039 00.

JENSEN HIGH FIDELITY COAXIAL LOUDSPEAKER SYSTEMS

Model H-510 (15 inch)

Jensen's finest speaker. Has the new wide range acoustic lens in conjunction with the Hypex formula h-f horn, annular Diaplane low-frequency radiator and Alnico 5 magnet.

Specifications

Input impedance: 16 ohms (See also Type T-102 Transformer Assembly).

Power rating: 30 watts maximum speech and music signal input.

Network: Integral frequency division system. (See Model A-110 Control Network for accessory H-F and Level Control Facilities).

Dimensions: Baffle opening, 13½"; O.D., 15⅞"; depth 9¼".

Model K-310 (15 inch)

This is the lowest cost 15 inch coaxial speaker in the Jensen line. Quality reproduction is evident all over the frequency range, and performance is better than many higher priced speakers.

Specifications

Input impedance: 16 ohms (See also Type T-102 Transformer Assembly).

Power rating: 20 watts maximum speech and music signal input.

Network: Integral frequency division provided. (See Model A-110 Control Network for accessory H-F and level controls).

Dimensions: Baffle opening, 13¼"; O.D., 15"; depth, 8⅛".

A-110 Control Network

Provides adjustable level and high-frequency range controls for Models H-510, K-410 and K-310 coaxial speakers. Mounts directly on speaker housing. Plug-in connections — no wiring changes necessary. Input impedance 16 ohms. May be used in conjunction with Impedance Adjusting Transformers. Chassis complete with network, speaker connection cord and plug, Level Control and H-F Range Control on individual

30" cables for remote mounting on cabinet, satin brass flush-type escutcheons, bar knobs and mounting screws.

T-102 Impedance Adjusting Transformer

This high quality transformer provides alternative input impedances of 500-600 and 250 ohms for Models H-510 and K-310 Coaxial Speakers. Switch on chassis gives choice of two impedance values. No wiring necessary — connecting plug is simply inserted in socket on speaker terminal panel. May be used in conjunction with Model A-110 Control Network.

Model K-210 (12 inch)

Model K-210 combines the advantages of high fidelity reproduction, small size and low cost. It is an excellent speaker to use where these advantages are important.

Specifications

Input impedance: 8 ohms (See Z-3319 Transformer for matching 500-600 ohm lines).

Power rating: 12 watts maximum speech and music signal input.

Network: Built-in frequency dividing system. (See ST836 Control for high-frequency variation facilities).

Dimensions: Baffle opening, 10½"; O.D., 12⅛"; depth, 6⅝".

ST-836 Variable Control

The ST-836 is an "L"-type variable unit used for "shelving" the high-frequency response of the Model K-210 Speaker. Input impedance is 16 ohms. Furnished complete with flush-type satin brass escutcheon and bar knob.

Z-3319 Matching Transformer

The Z-3319 transformer mounts on the frame of the K-210 coaxial speaker and provides matching from a 500-600 ohm line to 8 ohms. Two-hole mounting with 3⅞" centers. Core is ⅞" x ⅞", power handling capability 16 watts.

JENSEN "SPECIAL SERIES" PM SPEAKERS

This series provides excellent high fidelity performance up to 10,000 cps.

8" Model P8-SX with transformer Z-3324 or equivalent.

500 to 600 ohms input impedance.

Collins Part No.: 271 0022 00.

12" Model P12-SX, with input impedance of 600 ohms.

Collins Part No.: 271 0083 00.

JENSEN BASS REFLEX SPEAKER CABINETS
(less loudspeakers)

Jensen B-81 for 8" speaker, floor or wall mtg.,
brown lacquer finish

Collins Part No.: 271 0106 00.

Jensen H-81 corner or flat mounting cabinet for 8" speaker.

Built in bass reflex.

Finish: Brown opaque lacquer.

Dimensions: 22½" h, 17¾" w, 8½" d.

Collins Part No.: 271 0152 00.

Jensen B-121 for 12" speaker, floor or wall mtg.,
brown lacquer finish

Collins Part No.: 271 0109 00.

Jensen D-221 for 12" speaker, floor or wall mtg.,
limed ash blonde finish

Collins Part No.: 097 1373 00.

Jensen B-151 for 15" speaker, floor or wall mtg.,
brown lacquer finish

Collins Part No.: 271 0112 00.

Jensen D-251 for 15" speaker, floor or wall mtg.,
satin finish walnut veneer

Collins Part No.: 097 1167 00.



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SERVICE AT YOUR COMMAND

The Collins Radio Company maintains a Sales Service Department staffed by skilled technicians and engineers who are thoroughly experienced in the use and maintenance of Collins equipment.

The Sales Service Department is prepared at all times to maintain the high standards of quality featured in Collins equipment. In addition to the staff of qualified service engineers, the knowledge and experience of the entire Engineering, Research and Development Divisions are available, to aid in special problems relating to installation and use of Collins equipment.

Because the Collins main plant is centrally located it can serve the entire nation quickly. This is especially helpful when the customer orders replacement components and assemblies from our comprehensive stock.

A Customers' Returned Goods Repair Section facilitates prompt and efficient analysis and repair of units returned to the factory for service. This makes it unnecessary for the customer to attempt major repairs.



SPECIFICATIONS

FREQUENCY RANGE

540-1600 kc standard.
Frequencies to 24mc available.

POWER OUTPUT

250/100 watts.

FREQUENCY STABILITY

± 10 cps.

AUDIO FREQUENCY RESPONSE

Within ± 1.5 db from
50 to 10,000 cps.

AUDIO FREQUENCY DISTORTION

Less than 3% from 50-7500 cps for
95% modulation, including
all harmonics up to 16 kc.

RESIDUAL NOISE LEVEL

60 db below 100% modulation.

CARRIER SHIFT

Less than 5%.

RF OUTPUT IMPEDANCE

75/50 ohms standard. Other
impedances available.

AUDIO INPUT IMPEDANCE

600/150 ohms.

AUDIO INPUT LEVEL

+ 10 dbm ± 2 db., Pad input.

AMBIENT TEMPERATURE RANGE

+ 15° to +45° C.

ALTITUDE RANGE

Sea Level to 6000 feet.

POWER SOURCE

208/230 V single phase 50/60 cps.

POWER DEMAND

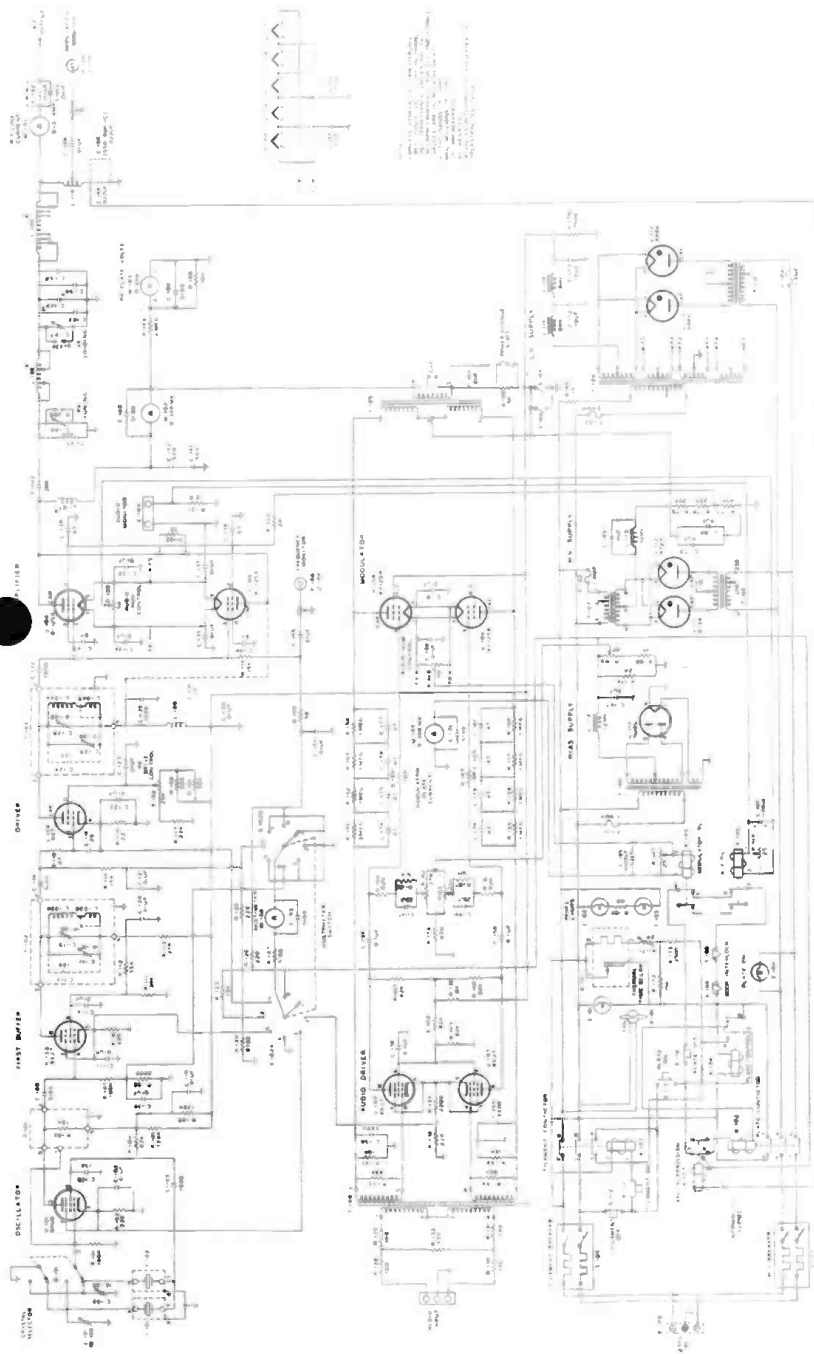
1.6 kw 85% PF at
100% modulation

WEIGHT

Approximately 900 lbs.

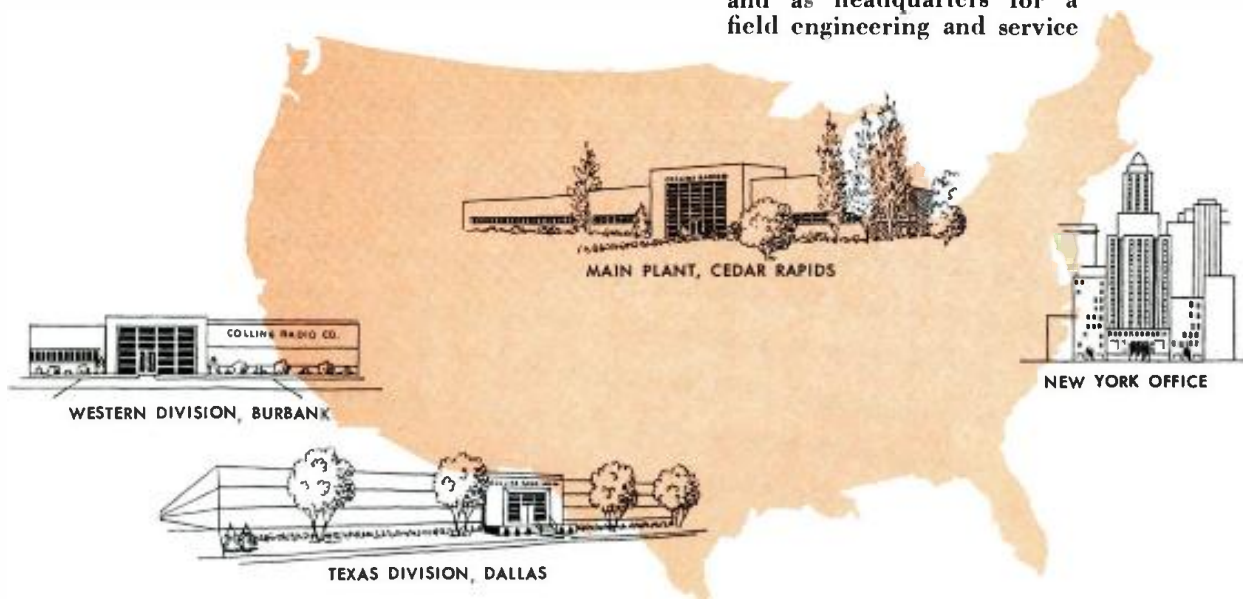
DIMENSIONS

38" wide, 76" high, 27" deep.



SCHEMATIC DIAGRAM

To serve you better, Collins operations are nationwide. Engineering and research laboratories are maintained at Dallas and Burbank. The modern, completely air and light controlled main plant at Cedar Rapids is designed for the most efficient engineering, manufacturing and office use. Collins' expansion program has resulted in an increase in floor space from 410,000 to 735,000 square feet. In addition, the Cedar Rapids Municipal Airport and the Dallas Red Bird Airport are used as experimental stations and as headquarters for a field engineering and service



organization. Sales departments serve the world from the Cedar Rapids, New York, Dallas, Burbank and Knoxville offices. The entire Collins organization, management . . . engineering . . . production . . . personnel, is devoted entirely to the designing and manufacturing of quality radio and electronic equipment.



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd Street
NEW YORK 36

1930 Hi-Line Drive
DALLAS 2

2700 W. Olive Avenue
BURBANK

Dogwood Road, Fountain City
KNOXVILLE



COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA, U.S.A.

11 West 42nd Street
New York 36, N.Y.

2700 W. Olive Avenue
Burbank, California

Dogwood Road
Fountain City (Knoxville), Tenn.

1930 Hi-Line Drive
Dallas, Texas

BROADCAST SPEECH EQUIPMENT

CONSOLES

212A-1 - Studio Console, with wall or rack mounting power supply, relay unit, tubes and instruction book -----	\$2,085.00
Spare Tubes for 212A-1 -----	55.15
212B-1 - Studio Console, with wall or rack mounting power supply, relay unit, tubes and instruction -----	1,450.00
Spare Tubes for 212B-1 -----	34.75
212B-2 - Studio Console, with wall or rack mounting power supply, relay unit, tubes and instruction book -----	1,525.00
Spare Tubes for 212B-2 -----	40.25

REMOTE AMPLIFIERS

212Y-1 - Single Channel Remote Amplifier, with one set of tubes, A.C. power cord, canvas case and instruction book. (Cannon XL-3-13 microphone connector) (See NOTES below) -----	150.00
212Y-2 - Same as 212Y-1 but with Cannon P3-13 microphone connector -----	150.00
Spare tubes for 212Y-1, set -----	6.10
412C-2 - Battery Box, with cable, less batteries -----	26.75
Battery kit for 412C-2 -----	13.50
65S-2 Microphone Adapter Cord (Cannon P3-CG-11) -----	7.50
65S-3 Microphone Adapter Cord (Hubbell 7082) -----	4.75
65S-4 Microphone Adapter Cord (Hubbell 23002) -----	6.00
65S-5 Microphone Adapter Cord (Hubbell 7555) -----	3.80
65S-6 Microphone Adapter Cord (Hubbell 7484) -----	3.80
60H-2 - 30/50 Ohm Two Channel Mixer for use with 212Y Single Channel Remote Amplifier. With carrying case, conversion kit for 212Y Amplifier, and instruction (See NOTES below) -----	125.00

REMOTE AMPLIFIERS (CONT'D)

60H-3 - Same as 60H-2 except 150 ohms -----	\$ 125.00
60H-4 - Same as 60H-2 except 200/250 ohms -----	125.00
212U-1 -Two Channel Remote Amplifier Assembly, 30/50 ohms consisting of 60H-2 Mixer and 212Y basic amplifier, with carrying case, tubes and instruction book (See NOTES below) -----	260.00
212U-2 -Same as 212U-1 except 150 ohms -----	260.00
212U-3 -Same as 212U-1 except 200/250 ohms -----	260.00
12Z-2 - Four Channel Remote Amplifier, 30/50 ohm input impedance, standard Cannon or Hubbell microphone connectors, with one set of tubes, batteries, power cord, canvas case and instruc- tion book (See NOTES below) -----	531.00
12Z-3 - Same as 12Z-2 except 200/250 ohms -----	531.00
Spare Set Batteries for 12Z-2/3 -----	9.80
Spare Tubes for 12Z, set -----	9.40
Spare Power Cord for 12Z -----	1.50
Spare Canvas Case for 12Z -----	6.75

NOTES: Stock 12Z-2 and 12Z-3 Amplifiers have Cannon Type P-3-13 Microphone Receptacles. Units can be supplied with Cannon XL-3-13 or Hubbell 7557 at no increase in price. A \$5.00 service charge per unit applies to installation of any other receptacles.

Stock 212Y-1, 60H, and 212U equipments have Cannon XL-3-13 Microphone receptacles. Microphones not equipped with male plugs to match these receptacles can be modified with the Type 65S Adapter Cords listed above.

If output impedances other than 600 ohms are desired on the 212Y, 212U or 12Z Amplifiers, the units can be modified at our factory providing output impedance is specified on original order. A \$5.00 service charge per unit applies to modification from 600 ohms to 150 ohms output. Impedances other than 150 ohms and 600 ohms can be quoted and/or supplied upon receipt of inquiries or orders.

AMPLIFIERS, RACK MOUNTING, AUDIO

6P-1 - Preamplifier, with one set of tubes and instruction book -----	\$ 100.00
Spare Tubes for 6P-1 set -----	12.50
6R-2 - Isolation Amplifier, with one set of tubes and instruction book -----	93.50
Spare Tubes for 6R-2, set -----	3.50

AMPLIFIERS, RACK MOUNTING, AUDIO (CONT'D)

6T-1 - Monitor Amplifier, 2 watt, with tubes -----	\$ 150.00
Spare Tubes for 6T-1, set -----	9.40
6X-2 - Line Amplifier, with one set of tubes and instruction book -----	185.00
Spare Tubes for 6X-2, set -----	10.65
26W-1 - Limiter Amplifier, with one set of tubes and instruction book --	530.00
Spare Tubes for 26W-1, set -----	14.90

AMPLIFIERS, CONSOLE TYPE

6N-1 - Program Amplifier, with tubes -----	123.00
Spare Tubes for 6N-1, set -----	9.40
6Q-1 - Dual Channel Preamplifier, with tubes -----	148.00
Spare Tubes for 6Q-1, set -----	5.50
6S-2 - Isolation Amplifier, with tubes -----	100.00
Spare Tubes for 6S-2 -----	3.50
6V-2 - Monitor Amplifier, with tubes -----	110.00
Spare Tubes for 6V-2 -----	8.75
6W-2 - Monitor Amplifier, with tubes -----	63.00
Spare Tubes for 6W-2, set -----	5.70

POWER SUPPLIES

409T-1 - Preamplifier Power Supply, with tubes -----	65.00
Spare Tubes for 409T-1 set -----	2.40
409T-2 - Console Mounting Power Supply with tubes -----	40.00
Spare Tubes for 409T-2, set -----	1.20
409T-3 - Rack Mounting Power Supply, with tubes and instructions -----	50.00
Spare Tubes for 409T-3, set -----	1.20
409U-1 - Wall Mounting Power Supply, with tubes -----	250.00
409U-2 - Rack Mounting Power Supply, with tubes -----	235.00
Spare Tubes 409U - 1/2, set -----	5.60
414F-3 - Wall Mounting Relay Power Supply -----	192.00
414F-4 - Rack Mounting Relay Power Supply, with instructions -----	100.00

RELAY UNITS

274D-1 - Wall Mounting Relay Unit for 212A-1 Studio Console -----	142.00
274D-2 - Wall Mounting Relay Unit for 212B-1 and 212B-2 Studio Consoles	106.00
274D-4 - Rack Mounting Relay Unit for 212A-1 Studio Console -----	142.00

RELAY UNITS (CONT'D)

274D-5 - Rack Mounting Relay Unit for 212B-1 and 212B-2 Studio Consoles - \$ 106.00
 274D-21- Relay Panel, less relays (Complete assembly quoted on receipt of
 specific requirements) ----- 30.00

RELAYS FOR USE ON COLLINS 274D-1, 2, 4, and 5 RELAY UNITS

970 1009 00 - Automatic Electric 200 volt D.C. Relay. Contacts right 3C;
 left 2C; 1B (2C contacts for 10 amp. at 6.3 v AC) ----- 6.30
 970 1011 00 - Automatic Electric 12 volt D.C. Relay. Contacts right 1C;
 left 2C ----- 5.25
 970 1012 00 - Automatic Electric 6.3 volt A.C. Relay. Contact 1A ----- 5.00
 970 1013 00 - Automatic Electric 12 volt D.C. Relay. Contact 1A ----- 3.45
 970 1015 00 - Automatic Electric 12 volt D.C. Relay. Contacts right 1A,
 1C; left 1B, 1D ----- 4.80
 970 1017 00 - Automatic Electric 12 volt D.C. Relay, Contacts right 2C;
 left 1D ----- 4.45
 970 1018 00 - Automatic Electric 12 volt D.C. Relay. Contacts right 1C;
 1D; left 1D ----- 4.50
 970 1019 00 - Automatic Electric 12 volt D.C. Relay. Contacts right 2C;
 left 2C ----- 4.50

RELAYS FOR USE ON COLLINS 274D-21 RELAY PANEL

970 1137 00 - Relay, 200-v.d.c. - Coil, - Contacts, Right 1A. ----- 6.15
 970 1138 00 - Relay, 12-v.d.c. Coil, - Contacts, Right - 1A. ----- 4.15
 970 1139 00 - Relay, 12-v.d.c. Coil, - Contacts, Right - 1C; Left - 2C. - 5.85
 970 1140 00 - Relay, 200-v.d.c. Coil, - Contacts, Right - 3C; Left - 2C -
 5 amp, plug 1B ----- 9.25
 970 1157 00 - Relay, 6.3 v.a.e. Coil, Contacts, Right 1A ----- 4.00

STUDIO WARNING LIGHTS

209A-1 - Flush Wall Mounting Studio Warning Lights, Complete with indicating
 plate and lights ----- 20.00
 209A-2 - Wall Mounting Studio Warning Lights, complete with indicating
 plate and lights ----- 20.00

NOTE: Above warning light available with any one of the three following wordings:

- (a) "On the Air"
"Standby"
- (b) "On the Air"
"Audition"
- (c) "On the Air"
"Rehearsal"

RACK CABINETS AND ACCESSORIES

19G-4 - Cabinet Rack 13-1/4" Deep, 31" High, 28" Panel Space -----	\$ 75.00
619B-1- Cabinet Rack 18" Deep, 83" High, 77" Panel Space -----	182.00
619B-2- Cabinet Rack 18" Deep, 76" High, 70" Panel Space -----	177.00
112B-1- Switch and Fuse Panel -----	35.00
151K-1- Terminal Board -----	24.75
151K-3- Terminal Assembly, Rack Mounting -----	95.00
151K-4- Terminal Assembly, Rack Mounting -----	116.00
151K-5- Terminal Board, only -----	12.40
151K-6- Terminal Board -----	27.50
1-3/4" Blank Panel, Gray -----	2.90
3-1/2" Blank Panel, Gray -----	3.75
5-1/4" Blank Panel, Gray -----	4.50
7" Blank Panel, Gray -----	5.00
8-3/4" Blank Panel, Gray -----	5.75
10-1/2" Blank Panel, Gray -----	6.75
12-1/4" Blank Panel, Gray -----	7.40
14" Blank Panel, Gray -----	8.25

RACK MOUNTING ACCESSORIES

265D-1 - 12-pair Jack Panel -----	35.00
265D-2 - 24-pair Jack Panel -----	71.25

RACK MOUNTING ACCESSORIES (CONT'D)

265D-3 - 48-pair Jack Panel -----	\$ 123.75
265D-4 - 72-pair Jack Panel -----	160.00
265D-6 - 120-pair Jack Panel -----	282.00
6" Patch Cord -----	7.85
12" Patch Cord -----	7.95
24" Patch Cord -----	8.25
36" Patch Cord -----	8.50
48" Patch Cord -----	8.75
60" Patch Cord -----	9.00
120" Patch Cord -----	10.25
361 0017 00 Male Three Conductor Patch Plug -----	3.35
360 0009 00 Two Circuit Jack -----	.95
360 1010 00 Two Circuit Jack -----	.70
360 1250 00 Two Circuit Jack -----	1.20
62E-2 - VU Meter Panel -----	131.50
82D-7 - Meter Panel, Less meters (Complete assembly quoted on receipt of specific requirements) -----	17.50
82T-1 - Meter Panel -----	72.25
116E-3 - Single Line High Frequency Equalizer -----	123.50
116E-4 - Dual Line High Frequency Equalizer -----	154.00
116F-1 - Program Equalizer -----	179.00
117N-2 - Repeat Coil Panel, Less coils (Complete assembly quoted on receipt of specific requirements) -----	24.75
117N-4 - Repeat Coil Panel, complete with four coils -----	140.00
117P-1 - Repeat Coil Unit, console mounting -----	40.00

RACK MOUNTING ACCESSORIES (CONT'D)

677 0136 00 - Thordarson line to line repeat coil -----	\$ 30.00
677 0137 00 - Thordarson line to multiple line repeat coil -----	30.00
677 0138 00 - Thordarson line to multiple line repeat coil -----	30.00
677 0139 00 - Thordarson Bridging to line repeat coil -----	30.00
677 0140 00 - Thordarson line to multiple line repeat coil -----	30.00
268A-1-Attenuator Panel, incorporating two balanced "Ladder" attenuators -----	85.00

TEST EQUIPMENT, AUDIO

General Radio: (Panels finished in Collins 4E Gray)

1301-A - Audio Oscillator, Low Distortion -----	495.00
1301-P1- Range Extension Unit for 1301A, 2 to 15 c.p.s. -----	80.00
1932-A - Distortion and Noise Meter -----	595.00
Other General Radio Test Equipment -----	ON REQUEST

TURNTABLES

Presto Type 63A - Transcription Turntable, with 10B Chassis, in 3A Cabinet. No Reproducer -----	292.40
Presto Type 64A - Transcription Turntable, direct gear drive, mounted in cabinet, less reproducer -----	497.25
Presto Type 10B - 3 Speed Transcription Turntable, Chassis only -----	211.65
Rek-O-Kut Type B-16H - 3 Speed Transcriptive Turntable, Chassis only ---	250.00
Rek-O-Kut Type C-7 - Console Cabinet for Type B-16H Chassis -----	129.95

REPRODUCERS AND ACCESSORIES

Altec-Western 109AA Reproducer Group -----	103.00
Altec-Western 9A Reproducer Head -----	56.90
Altec-Western 5A Reproducer Arm -----	9.70
Altec-Western KS-13386 Equalizer -----	19.50

REPRODUCERS AND ACCESSORIES (CONT'D)

Altec-Western 9B Reproducer Head -----	\$ 56.90
Altec-Western 171A Repeat Coil -----	15.80
Altec-Western 711A Arm Rest for WE 109AA Reproducer -----	1.10
Gray 106SP - Playback Arm with Slide-in Cartridge Feature (3 Removable Cartridge Clips included--2 for G.E. Cartridges and 1 for Pickering)	45.15
Gray 108B - Viscous-damped transcription arm with Slide-in Cartridge Feature (4 Removable Cartridge Clips Included--2 for G.E. Cartridges and 2 for Pickering) -----	56.00
Gray 602 - 4-Position Equalizer for G.E. Cartridge (LP, 2.5 or 3.0 mil)-	49.50
Gray 603 - 4-Position Equalizer for both G.E. and Pickering Cartridges -	60.00
RPX-046 - G.E. Cartridge, Replaceable Stylus (Cartridge only-Stylus not included) -----	6.87
RPJ-005 - 1 mil G.E. Sapphire Stylus -----	2.10
RPJ-006 - 2-1/2 mil G.E. Sapphire Stylus -----	2.10
RPJ-002 - 2-1/2 mil G.E. Diamond Stylus -----	16.50
RPJ-004 - 1 mil G.E. Diamond Stylus -----	16.50

DISC RECORDERS

Presto 6-N - Recorder Chassis -----	618.80
Presto 6-N - Recorder in 4B Cabinet -----	730.15
Presto 6-N - Portable Recording Turntable, complete with Type 1B carrying case -----	657.05
Presto 8-N - Recorder Chassis less cabinet -----	1,319.20
Presto 8-N - Recorder Turntable, complete with Type 4A cabinet -----	1,430.55
Presto 85B - Recording Amplifier (Collins 4E Finish) -----	293.25
Presto 87B - Recording Amplifier and Speaker, 50 ohm input -----	320.00
Presto 1-D - Cutting Head -----	159.80

TAPE RECORDERS, MAGNECORD

PT7-P - Portable High Level Mixing Multi-Channel Amplifier in case -----	495.00
PT7-C - Console or Rack Mount Amplifier and Panel -----	365.00

TAPE RECORDERS, MAGNECORD (CONT'D)

PT6-AH - Recorder Mechanism, with portable case, and HI-speed forward ---	\$ 359.00
PT6-AHX- Same as PT6-AH less case -----	339.00
PT6-VAH-Voyager one case portable recorder and amplifier consisting PT6-V amplifier and PT6-AH recorder -----	524.00
PT6-GAHP Portable Magnecordette, complete with 10 watt amplifier and twin 8" speakers in detachable carrying case. Amplifier - speaker combination may be used separately for PA work -----	549.00
PT6-J - Portable Single Channel Amplifier with 10 watts Audio -----	260.00
PT6-M - Long playing auxiliary spooling mechanism, rack mount -----	135.00
PT63-AH-Same as PT6-AH but includes extra head for monitoring from tape -	399.00
PT63-AHX-Same as PT63-AH less case -----	379.00
PT63-J-Portable single channel. Separate amplifiers for record, playback and monitoring from tape -----	349.00
M80AC - Recorder including M80C amplifier, M80A Tape Transport and connecting cables -----	1,265.00
MC80ACX - Same as M80AC but less case -----	1,185.00
M80ACC - Console Recorder including M-80C amplifier, M-80A tape transport and connecting cables -----	1,345.00
Spare equalizer for Magnecord, either 7-1/2" or 15" per second -----	17.60
111A Scotch Brand Recording Tape, 1200' roll, \$3.67 ea., 12 or more \$3.30 ea.	

MICROPHONES AND ACCESSORIES

ALTEC-WESTERN:

633A - Pressure Microphone -----	55.40
639A - 3-Position Cardioid Microphone -----	156.40
639B - 6-Position Cardioid Microphone -----	157.05
GB800A-Program Stand, adjustable 45" to 75" -----	27.50
23A - Desk Stand -----	6.60
24A - Desk Stand -----	5.10
Starbird-Meletron Boom Stand Model 180 -----	130.00
8B - Baffle -----	7.10
9A - Swivel -----	4.65
11A - Yoke Mounting for use with Cardioid Microphone -----	12.10

BROADCAST EQUIPMENT

Collins Broadcast Equipment is engineered to advanced performance standards. Operation is reliable, smooth and straightforward. Thorough consideration has been given to operating detail, in order to incorporate every possible convenience.

The years of successful experience in designing and producing fine audio equipment are reflected in the confidence placed in us by many customers who have asked us to lay out their entire station facilities.

We will be happy to work with you on the overall specifications of your individualized equipment. By obtaining your full requirements in broadcast equipment from us, you get not only the best individual units for your purposes, but also the assurance that you have an integrated system with superior overall performance.

- TRANSMITTERS • ANTENNAS • SPEECH INPUT CONSOLES
- REMOTE EQUIPMENT • RACK MOUNTED EQUIPMENT • TEST AND MONITORING EQUIPMENT • ANTENNA ACCESSORIES
- RACKS AND PANELS • TURNTABLES AND TRANSDUCERS

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA



11 W. 42nd Street,
NEW YORK 36

1930 Hi-Line Drive,
DALLAS 2

2700 W. Olive Avenue,
BURBANK

Dogwood Road, Fountain City,
KNOXVILLE

MICROPHONES AND ACCESSORIES (CONT'D)

311A - Plug Kit -----	\$ 8.35
422A - Jack for use with 639A and 639B -----	5.80
712A - Adapter for use with 639A and 639B -----	2.20
713A - Adapter for use with 22A Program Stand -----	2.10
RCA	
44BX Velocity microphone -----	129.00
77D Polydirectional microphone -----	145.00
BK-1A Pressure microphone -----	79.50
91A Announce Stand, umber gray -----	12.50
90A De Luxe Program Stand -----	40.00
91B Desk Stand -----	12.00
KS-11A Desk Stand for BK-1A -----	7.50
KS-3B Boom Stand -----	138.00
4095-A Banquet Stand -----	25.00
MI-6208 3 section Floor Stand -----	11.25
Turner	
_____ Aristocrat Dynamic microphone -----	90.00
51D Dynamic microphone -----	51.00
87 Velocity microphone -----	29.91
77 Tru-Cardfoid microphone -----	47.70
211 Dynamic microphone -----	22.50
999 Balanced Line Dynamic microphone -----	23.70
U9S Multi-impedance Dynamic microphone -----	25.50

LOUDSPEAKERS

JENSEN:

H-510 - 15" 30 watt coaxial, 16 ohm -----	92.70
K-310 - 15" 16 watt coaxial, 16 ohm -----	39.30
A-110 - Control Network for above speakers -----	18.90
T-102 - Line Matching Transformer, plug-in, for above -----	7.95

LOUDSPEAKERS (CONT'D)

K-210 - 12" 12 watt coaxial, 8 ohm -----	\$ 23.70
ST-836- HF Control for K-210, 16 ohm input -----	3.15
Z-3319- Line Matching Transformer for K-210 and P12-SX -----	2.88
P8-SX - 8" Speaker less transformer -----	9.12
Z-3324- 600 ohms transformer for P8-SX loudspeaker -----	1.98
P12-SX- 12" Speaker less transformer (See transformer Z-3319) -----	12.72
C-81 - 8" Speaker Cabinet (Floor or wall mounting) Specify Blonde or Mahogany -----	25.00
H-81 - 8" Speaker Cabinet (Corner mounting) -----	16.50
B-121 - 12" Speaker Cabinet -----	32.63
C-121 - 12" Speaker Cabinet, Specify Blonde or Mahogany -----	33.16
D-221 - 12" Speaker Cabinet, blonde finish -----	53.00
D-121 - 12" Speaker Cabinet, Walnut veneer -----	51.67
B-151 - 15" Speaker Cabinet -----	38.69
C-151 - 15" Speaker Cabinet, Specify Blonde or Mahogany -----	41.33
D-251 - 15" Speaker Cabinet - Blonde finish -----	53.00
D-151 - 15" Speaker Cabinet, Walnut veneer -----	51.67
U-25 - Ultrasonic High Fidelity Loudspeaker Complete with Cabinet and Speakers (Mahogany finish - Blonde available on special order)	29.75

HEADPHONES

Brush A-1 - Crystal, 80,000 ohms, less plug -----	10.80
Brush A - Crystal, 30,000 ohms, less plug -----	7.20
Trimm Model 156 - Magnetic, 600 ohms, with plug -----	10.56
Trimm Model 157 - Magnetic, 17,000 ohms, with plug -----	10.56
Trimm Model 158 - Magnetic, 600 ohms, less plug -----	9.57
Trimm Model 159 - Magnetic, 17,000 ohms, less plug -----	9.57
361 0018 00 - Phone Plug -----	.50

CONNECTORS

CANNON:

P3-CG-11S	Female, Cable Type -----	\$	3.78
P3-CG-12S	Male, Cable Type -----		3.09
P3-13	Female, Chassis mtg. -----		3.21
P3-14	Male, Chassis mtg. -----		1.68
P3-35	Female, Single, Wall outlet box type -----		5.49
P3-35-2G	Female, dual wall outlet type -----		11.13
P3-36	Male, Single, wall outlet box type -----		4.26
P3-36-2G	Male, dual, wall outlet type -----		8.79
XL-3-11	Female, Cable type -----		.93
XL-3-11SC	Female, Cable type with clamp -----		2.04
XL-3-12	Male, Cable type -----		.90
XL-3-12SC	Male, Cable type with clamp -----		2.01
XL-3-13	Female, Chassis, Screw mtg. -----		.93
XL-3-13N	Female, Chassis, nut mtg. -----		.93
XL-3-14	Male, Chassis, screw mtg. -----		.72
XL-3-14N	Male, Chassis, nut mtg. -----		.87

SHIELDED WIRE & MICROPHONE CABLE

423 0010 00	- Shielded single conductor, #20 AWG, stranded, 5A.-----		.02/ft.
425 0021 00	- Shielded pair, #20 solid, glass insulated, 3A.-----	ON REQUEST	
425 0022 00	- Shielded pair, #20 solid, cotton insulated, 3A.-----		.05/ft.
425 0862 00	- Same as 425 0022 with overall insulation, 3A.-----		.07/ft.
425 0023 00	- Shielded pair, #20 stranded, glass insulated, 3A.-----	ON REQUEST	
425 0024 00	- Shielded pair, #20 stranded, cotton insulated, 3A.-----		.05/ft.
425 0863 00	- Same as 425 0024 00 with overall insulation, 3A.-----		.07/ft.

SHIELDED WIRE & MICROPHONE CABLE (CONT'D)

425 0061 00 - Shielded pair, #16 stranded, cotton insulated, 15A.-----	\$.08/ft.
425 0151 00 - Shielded pair, #12 stranded, cotton insulated, 20A.-----		.10/ft.
097 1142 00 - Microphone Cable, shielded pair, Belden #8422		
In even multiplies of 100 ft. -----		.06/ft.
In fractions of 100 ft. -----		.07/ft.

HIGH VOLTAGE WIRE

423 0219 00 - Insulated for 15,000 volt breakdown -----		.23/ft.
---	--	---------

PRICES OF ALL COLLINS MANUFACTURED EQUIPMENTS ARE F.O.B. CEDAR RAPIDS, IOWA. EQUIPMENT BY OTHER, F.O.B. SOURCE. ALL PRICES ARE EXCLUSIVE OF ANY APPLICABLE FEDERAL, STATE OR LOCAL SALES, USE OR EXCISE TAXES, AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. EQUIPMENT MANUFACTURED BY OTHERS WILL BE BILLED AT PRICE IN EFFECT AT TIME OF SHIPMENT.



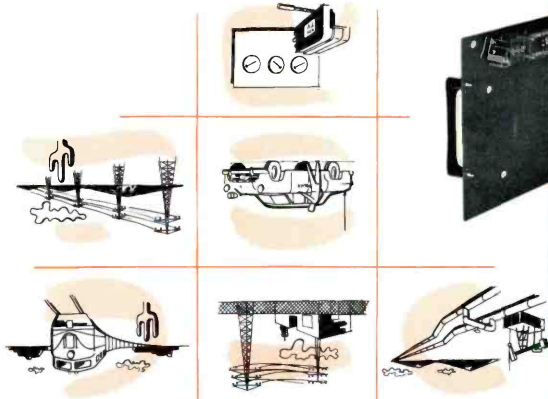
MICROWAVE

MICROWAVE



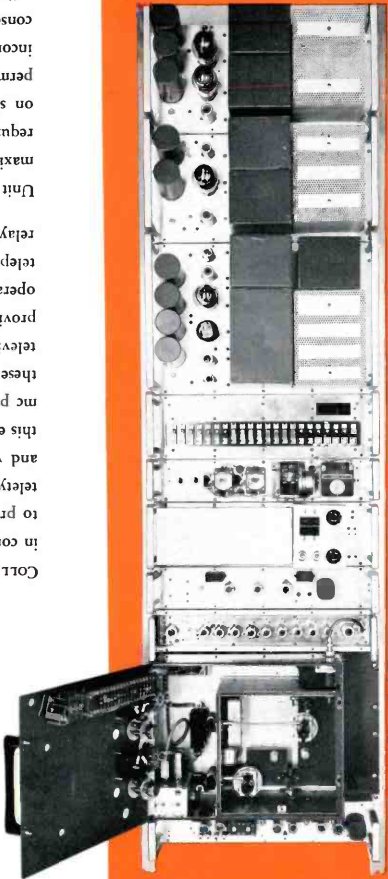
by COLLINS

COMMUNICATION FOR INDUSTRY, PUBLIC AND GOVERNMENT SERVICES



COLLINS MICROWAVE communication equipment can be utilized in conjunction with existing wire lines or other facilities to provide communication circuits suitable for telephone, teletype, telemetering, supervisory control, facsimile and video transmission. The radio frequency section of this equipment can be supplied for operation in the 5925-7500 mc portion of the frequency spectrum. Allocations for these bands include common carrier, operational fixed, television and government services. Thus, microwave provides needed communication for the pipeline operators, public utilities, railroads, public safety services, telephone industry, television, intra-city and studio-transmitter relaying.

Unit type construction has been employed to permit maximum installation flexibility to meet a user's specific requirements. All equipment may be mounted back-to-back on standard relay racks. Articulated swing-out hinges permit access to the rear of the units. Advanced design incorporating modern construction practices, together with conservatively operated components, assures maximum reliability.



235A-1 and B-1 RF UNIT

The RF unit contains a waveguide assembly, automatic frequency control circuit, filament source, metering and control elements.

In the waveguide assembly the transmitter and receiver are combined in a manner that permits simultaneous and continuous transmission and reception through a common antenna. A reflex klystron transmitter supplies energy to a waveguide assembly containing a phasing element and a transmitter frequency reference cavity with its associated crystal detector. The receiver preselector, which is a four cavity filter, branches from the transmitter assembly. This filter provides rejection of the transmitted and other unwanted signals. Output of the preselector is connected to the mixer crystal. A reflex klystron local oscillator is coupled through an attenuator to this mixer crystal. Associated with the local oscillator is a frequency reference cavity and crystal detector. Frequency stability is assured by enclosing the waveguide assembly in a thermostatically controlled oven.

The automatic frequency control circuit uses the long time variation of the discriminator output voltage to control the frequency of the local oscillator klystron. As a result, the intermediate frequency is kept at the discriminator center. A low frequency tone oscillator is supplied on the AFC chassis for fault sensing purposes when automatic switchover is used.

Metering and control elements are used to facilitate routine maintenance. Meter switches are provided to permit inspection of the operating frequency and the performance of the regulated power supplies, IF amplifier, klystrons and crystals.



235B-1 RF UNIT

234A-1, B-1, C-1 MODULATOR

Each modulator amplifies the composite multiplex signal to a level suitable for properly deviating the transmitter klystron. Output voltage of the modulator is controlled by the level of a pilot frequency source. The pilot frequency is originated in the multiplex transmission equipment and is referenced to the standard level of the individual channels.

Modulator 234A is used in the non-switchover and standby equipment.

The 234B is used at a relay station with switchover. It has a voltage sensing circuit in addition to the modulating amplifier. This circuit is used to detect the presence of the low frequency tone applied to the local oscillator klystron or the noise voltage output of the IF amplifier. Absence of this information indicates a failure which will initiate switchover action.

The 234C is used at a terminal station with switchover and is similar to the 234B. In addition, it contains a low frequency tone generator to supply the sensing tone.



234A-1 AGC MODULATOR



234B-1 AGC MODULATOR



234C-1 AGC MODULATOR



220A-1 IF AMPLIFIER

220A-1 INTERMEDIATE FREQUENCY AMPLIFIER

This IF amplifier has a half power bandwidth of 14 mc centered at 60 megacycles. Maximum usable system sensitivity is obtained by providing sufficient amplification to permit limiting from threshold noise.

A cascode input circuit matches the output impedance of the mixer crystal. This circuit is adjusted to provide noise balance at the discriminator.

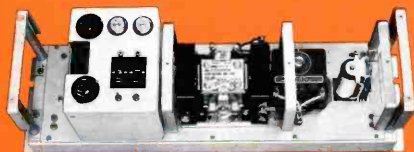
The cascode input is followed by amplifiers and limiters that drive the discriminator. A cathode follower provides a low impedance output for the composite multiplex signals.



221D-1 TERMINAL STATION SENSING UNIT

221D-1 TERMINAL STATION SENSING UNIT

This unit, used only at a terminal station with switchover, is bridged across the output of the IF amplifier. It detects the presence of the low frequency tone applied to the local oscillator or the noise output of the IF amplifier. Switchover action is initiated by the absence of this tone or noise.



221A-1 AC CONTROL UNIT

221A-1 AC CONTROL UNIT

AC power is provided by the 221A for the regulated power supplies, temperature controlled oven in the RF unit and the RF filament transformer. A contactor permits remote control for accomplishing switchover. A time delay, together with a protective relay, prevents damage to the reflex klystrons.



112D-1 FUSE PANEL

112D-1 FUSE PANEL

Standard telephone "grasshopper" alarm indicating fuses protect each independent circuit. Contacts are provided for the remote indication of specific circuit failures.

All power supply voltages and regulated AC are available at the receptacle on the fuse panel. This permits the reserve capacity of the power supply to be used to operate test equipment.



221B-1 SWITCHOVER CONTROL UNIT

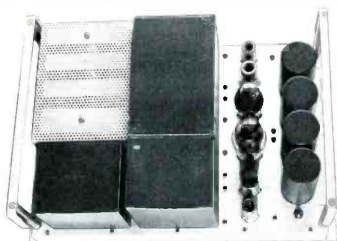
221B-1 and C-1 SWITCHOVER CONTROL UNITS

Switchover action at a terminal station is controlled by the 221B. Failure information from the 234C Modulator, 221D Sensing Unit, the absence of mixer crystal current or the absence of transmitter power monitor crystal current initiates the switchover process. Momentary interruptions due to external conditions will not effect a switchover.

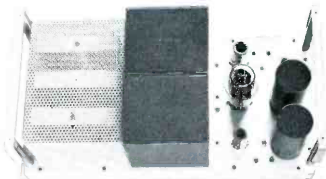
Additional circuitry is provided in the 221C in order to sense failure and control switchover in a relay station.



221C-1 SWITCHOVER CONTROL UNIT



526A-1 POWER SUPPLY



526B-1 POWER SUPPLY



526C-1 POWER SUPPLY

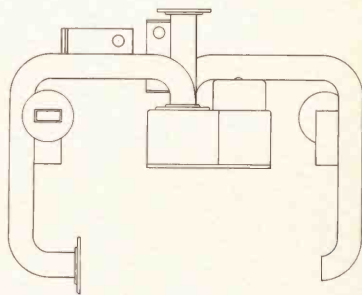
526A-1, B-1, C-1 POWER SUPPLIES

Series regulated, voltage referenced power supplies furnish filtered, stable DC power. The use of conservatively operated transformers and selenium rectifiers provides maximum reliability.

Two voltages are available from the 526A. A negative 300 volt output is used for the klystron anodes. A negative 450 volt output is referenced to the -300 volt source to provide 750 volts to a klystron repeller control network.

The positive 250 volt requirements of the modulator, automatic frequency control, terminal station sensing unit and alarm reporting or indicating unit are provided by the 526B Power Supply.

IF amplifier plate voltage is furnished by the 130 volt output of the 526C.



468A-1 WAVEGUIDE SWITCH AND FEED LINE

The waveguide switch is required when standby equipment is installed. It connects either the main or the standby RF unit to a common parabolic antenna. Dummy antennas within the switch automatically terminate the non-communicating unit so that routine maintenance and inspection can be performed without interfering with system communication. Power monitor crystal detectors and test equipment flanges are provided for each RF unit. A power monitor crystal detector is also installed between the waveguide switch and antenna. This detector in conjunction with sensing elements, provides switchover failure information.

468B-1 WAVEGUIDE FEED LINE

In a non-switchover station the RF unit is connected to the parabolic antenna by the 468B. A power monitor crystal detector, together with a test equipment flange, is provided for maintenance and inspection.

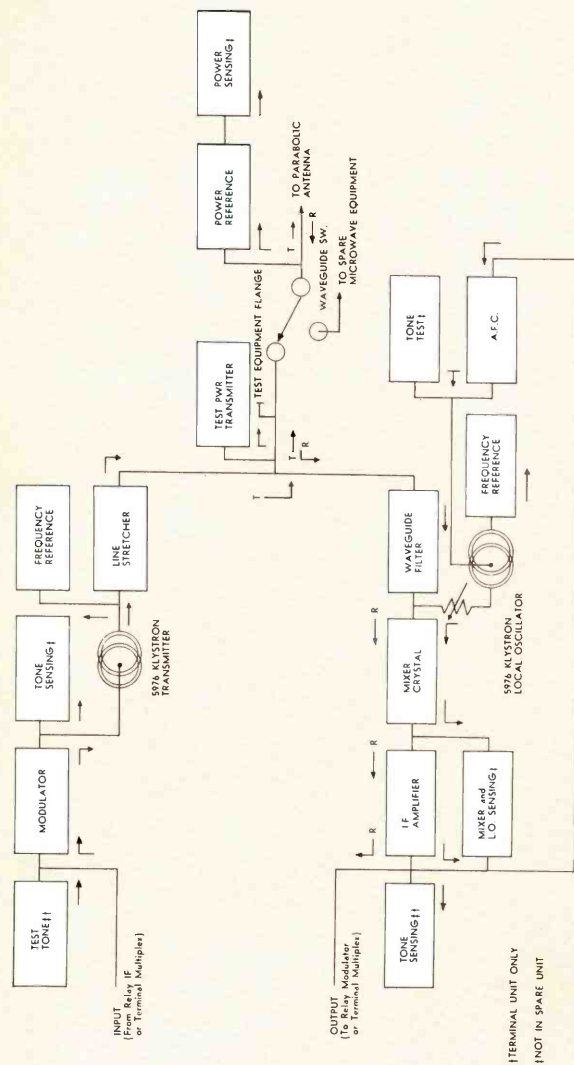
FAULT ALARM SYSTEM

The fault alarm detector and transmitter at any remote microwave station and the fault alarm register and finder at a control station are used to indicate the source and nature of a failure. Microwave switchover, unauthorized entrance, standby generator operation, tower-light failure or other desired information are indicated by visual and aural signals at the control station.

SERVICE CHANNEL UNIT

Voice communications from a microwave relay station without multiplex equipment can be effected by the use of a service channel unit. This portable device, with a self-contained power supply and signalling circuit, provides two-way simplex telephone operation.

MICROWAVE BLOCK DIAGRAM



20V
TRANSMITTER



Collins

20V

**1 KW BROADCAST
TRANSMITTER**

SPECIFICATIONS

RADIO FREQUENCY EQUIPMENT

FREQUENCY RANGE: 5925-7500 mc.

FREQUENCY STABILITY: 0.05%

POWER OUTPUT: 150 mw.

TRANSMITTER: 5976 Reflex Klystron.

LOCAL OSCILLATOR: 5976 Reflex Klystron.

ANTENNA SYSTEM: 6' x 8' or 8' x 12' reflectors on towers with 4' diameter parabolic antennas mounted on equipment building. (6' and 8' diameter parabolic antennas are also available.)

ANTENNA CHARACTERISTICS:	Diameter	Gain
	4'	36.0 db
	6'	39.5 db
	8'	42.1 db

POWER SOURCE: 115 volts, 50/60 cps AC, single phase; or floating battery supply.

TYPE OF SERVICE: Continuous duty, unattended operation.

TYPE OF MODULATION: AM/FM.

INTERMEDIATE FREQUENCY: 60 mc.

IF BANDWIDTH: 14 mc.

MODULATION DEVIATION: ± 3.5 mc.

RF MULTIPLEXING: Continuous and simultaneous transmission and reception over same antenna on main or standby equipment by employing waveguide filters and tuned stubs. Received and transmitted signals are staggered in frequency.

STANDBY PROVISIONS: Provisions are made for the incorporation of complete standby equipment and automatic switchover when desired.

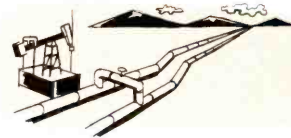
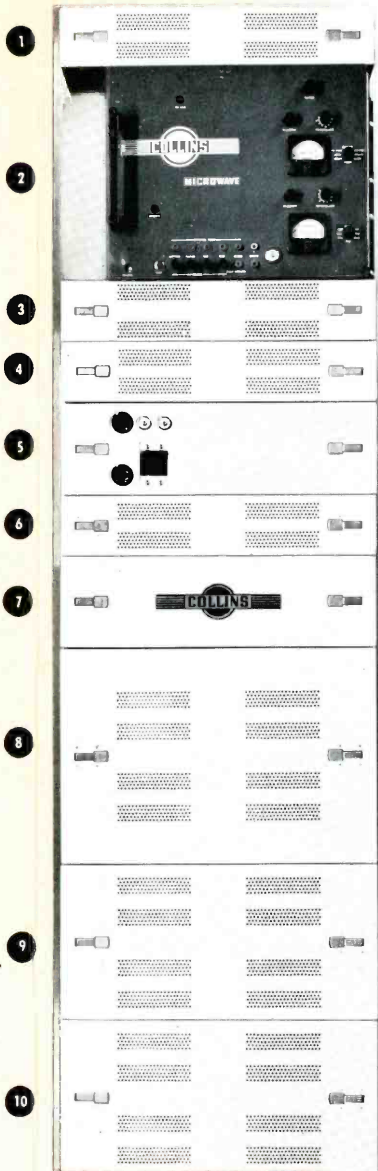
CHANNELING EQUIPMENT

TYPE OF MULTIPLEXING: Frequency Division.

TYPE OF MODULATION: Bilateral single sideband suppressed carrier. In this type of modulation, a carrier is shared between two RF amplifiers that are separately amplitude modulated. The separately modulated outputs of the two amplifiers are each passed through a mechanical filter. One mechanical filter passes only the upper sideband; the other mechanical filter passes only the lower sideband. The final output consists of an upper and a lower sideband, each containing separate intelligence without a carrier.

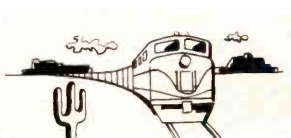
These outputs are then combined in a multiplex line amplifier and used to frequency modulate the microwave transmitter klystron.

TYPICAL MICROWAVE RACK



1 234C-1 MODULATOR

Amplifies the voltage level of the information to be transmitted to an amplitude sufficient to frequency modulate the transmitter klystron.



2 235B-1 RF UNIT

Contains the duplexed transmitter-receiver waveguide components, transmitter and local oscillator klystrons, AFC and tone oscillator and filament source together with metering and controls.



3 220A-1 IF AMPLIFIER

Amplifies a 60 mc heterodyne signal to a level sufficient for full limiting and FM detection.



4 221D-1 TERMINAL STATION SENSING UNIT

This unit, in conjunction with the RF unit tone oscillator, monitors the performance of the local oscillator klystron, mixer crystal and IF amplifier when a remote signal is being received.



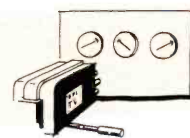
5 221A-1 AC CONTROL

Supplies AC power to all components. Protective circuitry prevents damage to the transmitter and local oscillator klystrons.



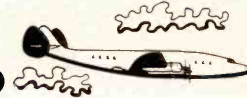
6 221B-1 SWITCHOVER CONTROL

Used when standby equipment is present to correlate all sensing circuit information for the initiation of the standby switchover procedure.



7 112D-1 FUSE PANEL

Contains separate "grasshopper" fuses for each independent circuit. Alarm contacts can be terminated by indicating equipment for relaying specific circuit failures.



8

9

10 526A-1, 526B-1 and 526C-1 POWER SUPPLIES

Provide -450 V DC to the klystron repeller circuits; -300 V DC to the klystron cathodes; +250 V DC to the modulator, AFC, tone oscillator and alarm equipment; +130 V DC to the IF amplifier.

D MULTIPLEX EQUIPMENT



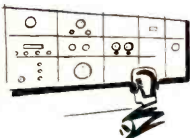
11 393A-1 MULTIPLEX LINE AMPLIFIER

Dual purpose unit used for isolation and level setting of the composite multiplex signal between the multiplex and microwave units.



12 358-1, 358B-1 or 358C-1 4-WIRE TERMINATION PANELS

A hybrid circuit to transform the 4-wire multiplex operation into a 2-wire telephone circuit. Local and common battery as well as magneto circuits can be used.



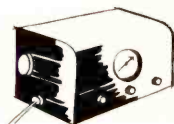
13 365A-1 MODULATOR-DEMODULATOR

Dual purpose unit providing both transmitting and receiving functions for the single sideband sub-carrier channels. Mechanical filters are used for sideband separation.



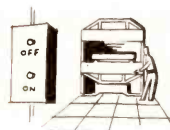
14 221F-1 AC CONTROL

Master AC switch to turn unit off and on. Circuit breaker and fuses used for primary circuits protection.



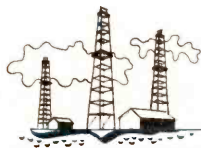
15 112C-1 FUSE PANEL

Uses telephone "grasshopper" fuses to protect all secondary circuits. Unit alarms when fuse is blown.



16 680B-1 CHANNELING FREQUENCY GENERATOR

Used to generate the channeling frequencies. One required for each two channels and four can be mounted in one chassis.



17 680A-1 BASIC FREQUENCY GENERATOR

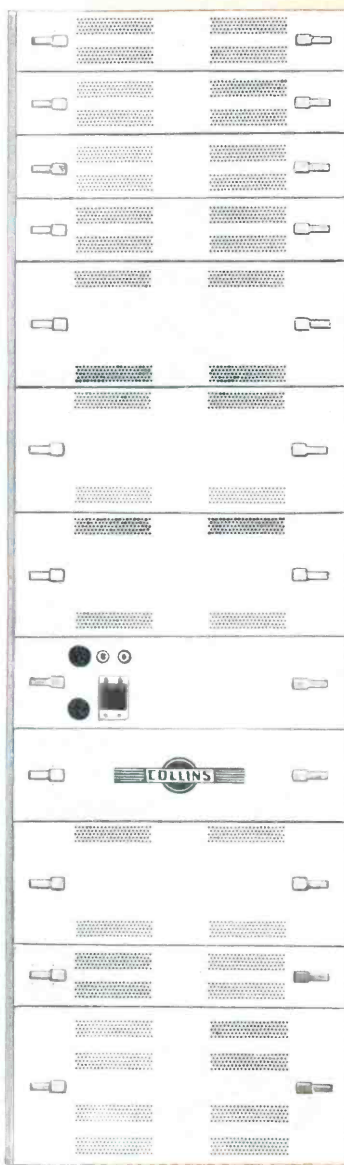
Frequency source for the multiplex equipment. Generates basic 250 kc for carrier modulation and detection and 20.853 kc for generation of channeling frequencies.



18 526C-1 POWER SUPPLY

Provides +130 V to operate all of multiplex equipment. Telephone plant batteries may be used if desired.

TYPICAL MULTIPLEX RACK



SPECIFICATIONS

FREQUENCY RANGE: 310 kc to 530 kc for 24 channels.

NUMBER OF SUB-CARRIER CHANNELS: 1 to 24 full duplex voice channels.

AUDIO FREQUENCY RESPONSE: Within +1 or -3 db of 1000 cps reference from 200-3000 cps.

HARMONIC DISTORTION: Less than 5% without limiting.

CROSS TALK: At least 50 db down from speech level.

SIGNAL TO NOISE RATIO: 45 db.

SUPERVISORY CONTROL OR TELEMETERING: Any or all channels are capable of being multiplexed to carry teletype, supervisory control or telemetering functions.

EQUIPMENT MOUNTING RACKS: The channeling and RF equipment is designed for installation in standard 19" floor to ceiling open or cabinet-type relay racks.

SERVICE CONDITIONS

TEMPERATURE RANGE: -50° F. to +150° F.

MAXIMUM RELATIVE HUMIDITY: 95%.

MAXIMUM ALTITUDE: 20,000 feet.

POWER REQUIREMENTS

RF EQUIPMENT:	Terminal	Relay
Without Standby	270 watts	330 watts
With Standby	290 watts	350 watts

Each RF unit is equipped with a 250 watt heater. The heater will operate approximately 2½ minutes every hour.

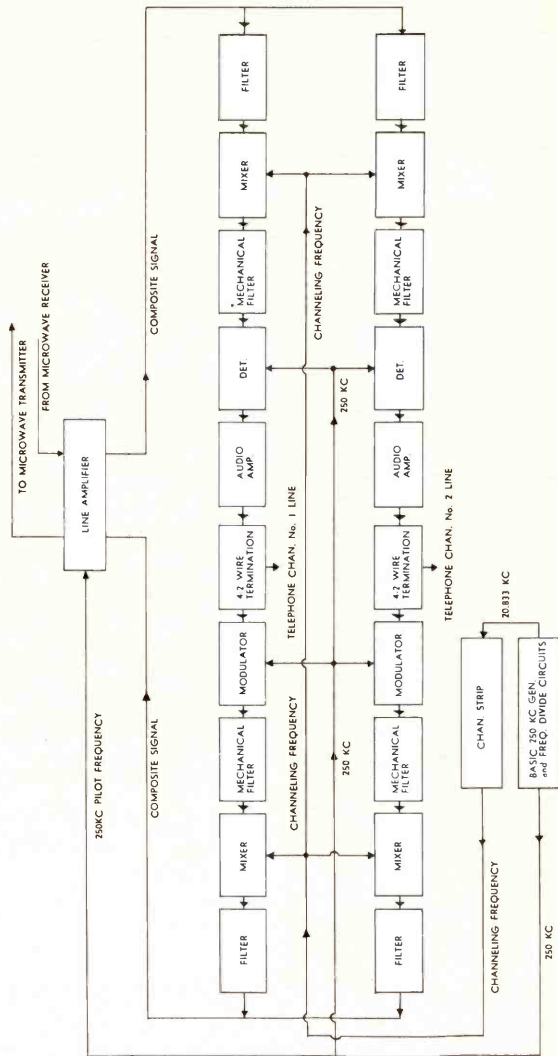
MULTIPLEX EQUIPMENT:

Basic Frequency Generator	25 ma @ 130 V.
Carrier Generator	1.6 amps @ 6.3 V.
Modulator-Demodulator	15 ma @ 130 V. (per carrier).
Multiplex Power Unit	.35 amps @ 6.3 V. (per carrier).
	40 ma @ 130 V.
	1.75 amps @ 6.3 V.
	225 watts maximum AC power input (215 ma @ 130 V regulated output).

One power unit provides power for 4 Modulator-Demodulator units and their associated basic frequency generator and carrier generators.

NOTE: One Basic Frequency Generator handles one to twenty-four channels, and one Carrier Generator is required for every two channels.

MULTIPLEX BLOCK DIAGRAM



TYPICAL MICROWAVE STATION

NO STANDBY

RF EQUIPMENT

1. 538B-1 Reflector & Mount
2. 537A-1 Parabolic Antenna & Mount
3. 259A-1 Terminal Station Relay Rack Asy. Containing:
 - a. 234A-1 Modulator
 - b. 235A-1 RF Unit
 - c. 220A-1 IF Amplifier
 - d. 221E-1 AC Control Unit
 - e. 112C-1 Fuse Panel
 - f. 526A-1 Power Supply
 - g. 526B-1 Power Supply
 - h. 526C-1 Power Supply
 - i. Cable Harness

MULTIPLEX EQUIPMENT

4. 259E-1 Rack Assembly Containing:
 - a. 1 — 151M-1 Terminal Block Panel
 - b. 1 — 393A-1 Multiplex Line Amplifier
 - c. 8 — 358B-1 4-wire — 2-wire Terminating Panels
 - d. 1 — 265G-1 Jack Panel
 - e. 8 — 365A-1 Modulator-Demodulator Multiplexing Units
 - f. 1 — 680A-1 Basic Frequency Generator
 - g. 4 — 680B-1 Channel Frequency Generators
 - h. 2 — 526C-1 Power Supplies
 - i. 1 — Cable Harness
 - j. 1 — 112C-1 Fuse Panel
5. 3.5 Kw Emergency Power Unit
6. Power Transfer Panel
7. Building
8. Tower and Lights

WITH STANDBY

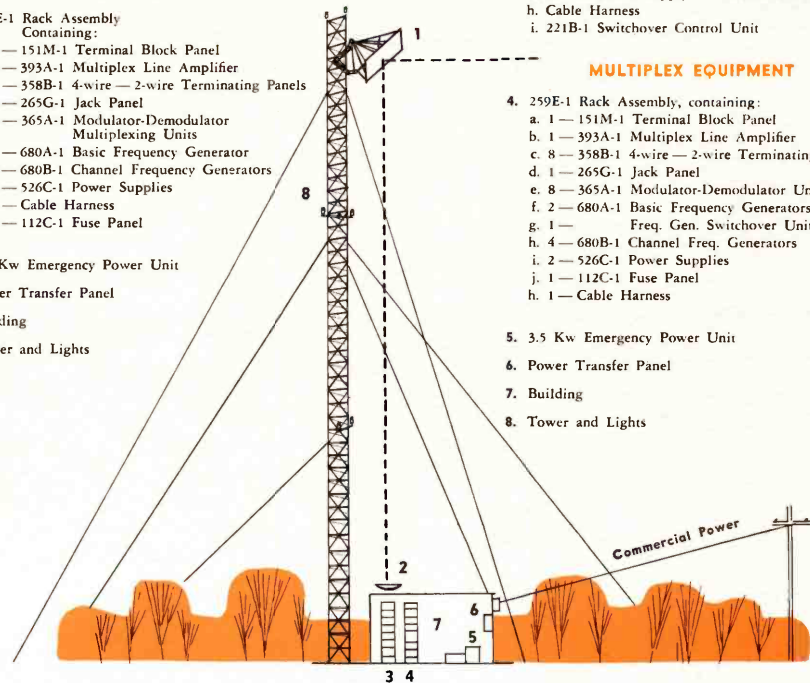
RF EQUIPMENT

1. 538B-1 Reflector & Mount
2. 537A-1 Parabolic Antenna & Mount
3. 259B-1 Terminal Station Relay Rack Assembly, containing:

a. 468A-1 Waveguide Switch & Feed Line Unit	Mounted on Front	Mounted on Back
b. 234C-1 Modulator	i. 234A-1 Modulator	
c. 235B-1 RF Unit	j. 235A-1 RF Unit	
d. 220A-1 IF Amplifier	k. 220A-1 IF Amplifier	
e. 221A-1 AC Control Unit	l. 221A-1 AC Control Unit	
f. 221D-1 Terminal Station Sensing Unit		
g. 112C-1 Fuse Panel		
h. 526A-1 Power Supply	m. 526A-1 Power Supply	
i. 526B-1 Power Supply	n. 526B-1 Power Supply	
j. 526C-1 Power Supply	o. 526C-1 Power Supply	
h. Cable Harness		
i. 221B-1 Switchover Control Unit		

MULTIPLEX EQUIPMENT

4. 259E-1 Rack Assembly, containing:
 - a. 1 — 151M-1 Terminal Block Panel
 - b. 1 — 393A-1 Multiplex Line Amplifier
 - c. 8 — 358B-1 4-wire — 2-wire Terminating Panels
 - d. 1 — 265G-1 Jack Panel
 - e. 8 — 365A-1 Modulator-Demodulator Units
 - f. 2 — 680A-1 Basic Frequency Generators
 - g. 1 — Freq. Gen. Switchover Unit
 - h. 4 — 680B-1 Channel Freq. Generators
 - i. 2 — 526C-1 Power Supplies
 - j. 1 — 112C-1 Fuse Panel
 - h. 1 — Cable Harness
5. 3.5 Kw Emergency Power Unit
6. Power Transfer Panel
7. Building
8. Tower and Lights





THE COLLINS MULTIPLEX SYSTEM



COLLINS MULTIPLEX equipment provides simultaneous transmission and reception for as many as 24 voice circuits. These circuits may contain telephone, teletype, teletyping, supervisory control and facsimile information.

The system employs bi-lateral, single sideband suppressed carrier transmission. This method of multiplexing is made practical by the use of the Collins mechanical filter. The steep skirt attenuation of this filter allows one sideband to be separated from the carrier and opposite sideband.

The sub-carrier frequencies are derived from a master crystal oscillator. A high degree of reliability has been achieved by the use of advanced techniques and conservative operation of all components.



680A-1 BASIC FREQUENCY GENERATOR



680B-1 CHANNELING FREQUENCY GENERATOR

680A-1 BASIC FREQUENCY GENERATOR and 680B-1 CHANNELING FREQUENCY GENERATOR

All sub-carrier frequencies of the Collins Multiplex System are derived from a single, high stability 250 kc crystal oscillator. Channelization is accomplished by division and subsequent multiplication and heterodyning of the crystal frequency.

The 680A Basic Frequency Generator contains the master 250 kc crystal oscillator and the frequency division circuits. This oven controlled crystal, along with its circuit, maintains a long time frequency stability within two cycles. A 250 kc voltage is delivered to all of the modulator and demodulator units to serve as the basic modulated carrier. The 20.833 kc output is supplied to the 680B Channeling Frequency Generator.

Each 680B selects a particular harmonic of the 20.833 kc output, which when heterodyned in the modulator-demodulator units with a sideband of the 250 kc modulated carrier, results in the transmitted sub-carrier frequency. This unit incorporates sufficient selectivity to insure low harmonic content of the output frequency.

**526C-1 POWER SUPPLY**

All of the multiplex equipment operates from +130 volts thus permitting use of either the 526C Power Supply or telephone plant battery. The heater circuits of each multiplex unit can be strapped for 6, 12 or 24 volt AC or DC operation.

393A-1 MULTIPLEX LINE AMPLIFIER**393A-1 MULTIPLEX TRANSMITTING and RECEIVING LINE AMPLIFIER**

The 393A Multiplex Line Amplifier is a dual purpose unit providing isolation and level setting for the transmitted and received composite multiplex signals. Both channels are similar; each consisting of an amplifier having a low impedance output. The composite received multiplex signal from the microwave receiver is fed to the receiving amplifier. The low impedance output of this amplifier supplies the input of all of the demodulators through a resistive network. Outputs of all the demodulators are combined in a resistive network and fed to the transmitting amplifier. From the low impedance output of this amplifier the composite multiplex signal is delivered to the microwave transmitter. The 250 kc pilot frequency for level control of the microwave is combined with the outgoing composite multiplex signal at the input of the transmitting line amplifier.

365A-1 MODULATOR-DEMODULATOR UNIT**365A-1 MODULATOR-DEMODULATOR**

The 365A Modulator-Demodulator is a dual purpose unit which simultaneously performs the functions of a transmitter and receiver for the sub-carrier channeling frequencies. Audio and 250 kc are applied to a balanced modulator whose output consists of two sidebands with the carrier partially suppressed. This signal is then fed to a mechanical filter whose pass band admits only the upper or lower sideband depending upon channel assignment. This sideband, along with the channeling frequency from the 680B Channeling Frequency Generator, is applied to a heterodyne mixer whose difference output is the desired sub-carrier frequency. Sufficient selectivity is provided in the mixer output to eliminate all but the desired signal. Then this output is combined with the outputs of similar units to form the transmitted composite multiplex signal. This sideband, the received composite multiplex signal is applied to a sub-carrier frequency filter in the input of the receiver section. The selected sub-carrier sidebands, along with the same channeling frequency as used in the transmitter section, is applied to a heterodyne mixer to produce upper and lower 250 kc sidebands. These upper and lower sidebands are then fed to a mechanical filter which selects the desired sideband depending upon channel assignment. The 250 kc carrier is reinserted with this sideband for audio detection. An audio amplifier stage brings the signal up to line level. For application not requiring two-way transmission, the 365B-1 Modulator and 365C-1 Demodulator can be used.

TELEPHONE TERMINATING AND SIGNALLING UNITS

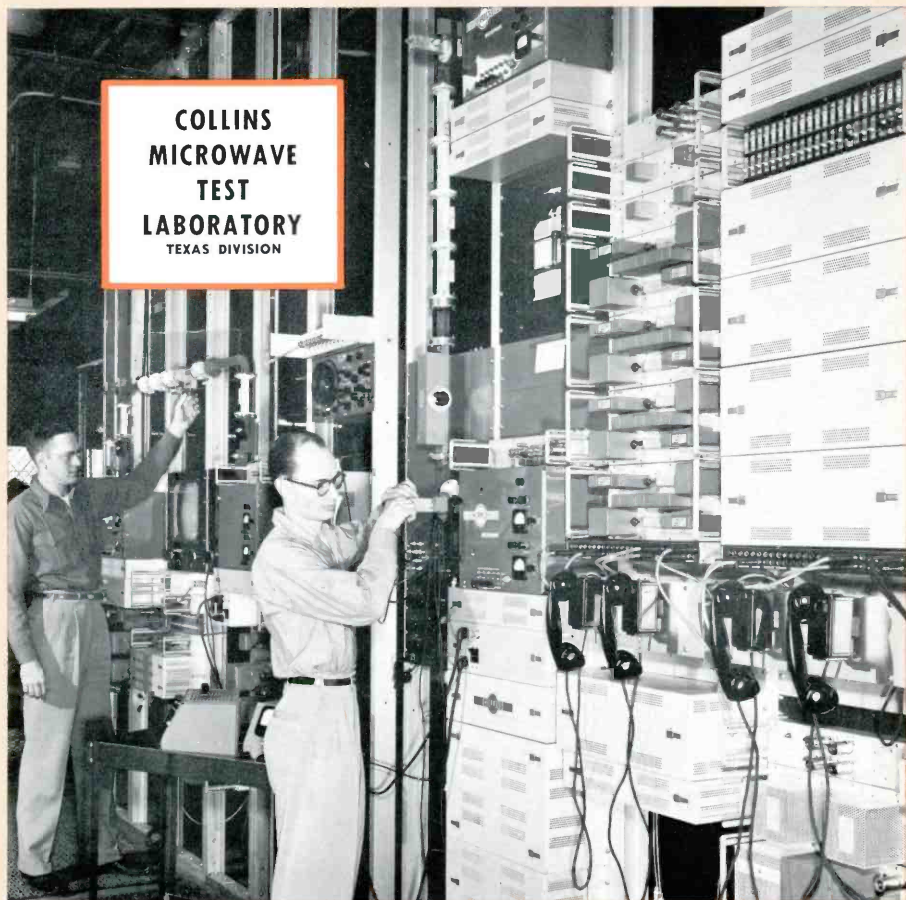
The operation of the modulator-demodulator units is on a four-wire basis. For most telephone applications a two-wire circuit is used. Necessary conversion from four-wire to two-wire operation is achieved in the terminating panels.

Three basic panels can be supplied: 358A-1 4-wire—2-wire Terminating Panel, local battery. 358B-1 4-wire—2-wire Terminating Panel, common battery. 358C-1 4-wire—2-wire Terminating Panel, magneto phone.

In conjunction with the terminating panels the following signalling equipment can be used: 681A-1 3200 cps Signalling Generator, 682A-1 20 cps Ringing Generator, 154A-1 Push-to-Talk Panel.



681A-1 3200 CPS SIGNALLING GENERATOR



COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

11 W. 42nd Street, NEW YORK 36
1930 Hi-Line Drive, DALLAS 2
2700 W. Olive Avenue, BURBANK

COLLINS RADIO COMPANY of CANADA, LTD., 74 Sparks Street, OTTAWA 4, ONTARIO



COLLINS MICROWAVE TV RELAY

Collins Microwave TV Relay equipment is designed to meet the needs for studio-transmitter links, fixed remote relaying, community TV relaying, and interconnection between distribution networks and television transmitters. This equipment will simultaneously relay both video (NTSC standard) and audio information on a common RF channel in the 6,875-7, 125 mc band.

Unit type construction has been employed to permit maximum installation flexibility to meet a users specific requirements. The equipment may be mounted back to back on standard relay racks. Articulated swing-out hinges permit access to the rear of the unit. Advanced design incorporating modern construction practice together with conservatively operated components, assures maximum reliability.

MODULATOR

The modulator amplifies the multiplexed video and audio information to a voltage level of sufficient amplitude to frequency modulate the transmitter klystron. A pilot frequency level control technique is employed to assure the maintenance of a unity gain system. Models incorporating fault sensing elements are available for initiating switchover in a station equipped with stand-by equipment.

RF UNIT

The RF unit contains the duplexed transmitter and receiver, automatic frequency control circuit, filament source, and metering and control elements. A transmitter and receiver waveguide assembly permits simultaneous and continuous transmission and reception through a common antenna. Reflex klystrons are used for the transmitter and local oscillator. Both the transmitter and receiver local oscillator are provided with built-in frequency monitors.

IF AMPLIFIER

The IF Amplifier has a 1/2 power band width of 14 mc centered at 60 megacycles. Maximum useable system sensitivity is obtained by providing sufficient amplification to permit limiting from threshold noise.

A cascade input circuit matches the output impedance of the mixer crystal. This circuit is adjusted to provide noise balance at the discriminator.

The cascade unit is followed by amplifiers and limiters that drive the discriminator. A cathode follower provides a low impedance output for the composite video and multiplexed audio signals.

VIDEO PROGRAM AMPLIFIER

This amplifier receives the information from the cathode follower output of the IF amplifier. It is de-

signed to deliver 1.4 volts peak-to-peak to a 75 ohm line. A filter is incorporated to remove the FM subcarrier intelligence from the video signal.

HIGH FIDELITY SUBCARRIER TRANSMITTER

The carrier frequency of this FM transmission unit is placed above the video spectrum to permit the simultaneous transmission of the audio portion of the television program material together with the video portion. This unit is designed to terminate a standard 600 ohm line.

HIGH FIDELITY FM SUBCARRIER RECEIVER

This receiver is used to recover the program material applied to the input of the high fidelity FM subcarrier transmitter. The output circuit will match a standard 600 ohm line.

TELEPHONE MODULATOR-DEMODULATOR

The telephone modem consists of a FM subcarrier transmitter and receiver, a hybrid and a signalling circuit. This unit can be used as a service or cueing channel. It terminates in a standard 2 wire telephone line.

AUXILIARY EQUIPMENT

Auxiliary equipment available includes regulated power supplies, AC control unit, switchover control unit, fuse panel, terminal station sensing unit, and a transmission measuring set.

Series regulated, voltage referenced power supplies furnish filtered, stable DC power. The use of conservatively operated transformers and selenium rectifier provides maximum reliability.

The AC control unit provides switching functions for all of the AC voltages used in this equipment. A contactor permits remote control for accomplishing switchover.

The switchover unit is used when stand-by equipment is present to correlate all sensing circuit information for the initiation of the stand-by switchover process.

The fuse panel contains separate "grasshopper" fuses for each independent circuit. Contacts are provided for the remote indication of specific circuit failures.

A terminal sensing unit is used at a terminal station with switchover. It monitors the performance of the local oscillator, mixer crystal, and IF amplifier. Switchover action is initiated by the failure of any of these components.

The transmission measuring set includes a 1,000 cycle test oscillator, an indicating db meter and a 20 cycle generator for ringing on the telephone modulator-demodulator.

COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

11 W. 42nd Street, NEW YORK 36
1930 Hi-Line Drive, DALLAS 2
2700 W. Olive Avenue, BURBANK



SPECIFICATIONS

RADIO FREQUENCY EQUIPMENT

FREQUENCY RANGE: 6875-7125 mc.

FREQUENCY STABILITY: 0.05%.

POWER OUTPUT: 150 mw.

TRANSMITTER: 5976 Reflex Klystron.

LOCAL OSCILLATOR: 5976 Reflex Klystron.

ANTENNA SYSTEM: 6' x 8' or 8' x 12' reflectors on towers with 4' diameter parabolic antennas mounted on equipment building. (6' and 8' diameter parabolic antennas are also available.)

ANTENNA CHARACTERISTICS:	Diameter	Gain
	4'	36.3 db
	6'	39.8 db
	8'	42.3 db

POWER SOURCE: 115 volts, 50/60 cps AC, single phase; or floating battery supply.

TYPE OF SERVICE: Continuous duty, unattended operation.

TYPE OF MODULATION: FM.

INTERMEDIATE FREQUENCY: 60 mc.

IF BANDWIDTH: 14 mc.

MODULATION DEVIATION: ± 4.5 mc.

RF MULTIPLEXING: Continuous and simultaneous transmission and reception over same antenna on main or standby equipment by employing waveguide filters and tuned stubs. Received and transmitted signals are staggered in frequency.

STANDBY PROVISIONS: Provisions are made for the incorporation of complete standby equipment and automatic switch-over when desired.

CHANNELING EQUIPMENT

TYPE OF MULTIPLEXING: Frequency Division.

TYPE OF MODULATION: Composite Video and FM Subcarriers.

COLLINS RADIO COMPANY
CEDAR RAPIDS, IOWA

11 W. 42nd Street, NEW YORK 36
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COLLINS RADIO



BROADCASTING • AMATEUR • AVIATION • COMMUNICATIONS

PRECISION RADIO EQUIPMENT FOR EVERY RADIO REQUIREMENT



Collins 300J 250 Watt Broadcast Transmitter

32V-5 Amateur Transmitter



Collins 75A-3 Amateur Receiver



Collins New Mechanical Filter



Collins 618S 144-Channel HF Transceiver



Collins 51V-2 Glide Slope Receiver, Approach Horizon, and Course Indicator



Collins 430 Series Communication Transmitter



Collins 30K-5 2-Channel Communication Transmitter



BROADCAST TRANSMITTERS

- AM
- 300J 250/100 watts
- 20V 1000/500 watts
- 21E 5000/1000 watts
- 21M 10,000/5000 watts

SPEECH EQUIPMENT AND ACCESSORIES

Collins complete line for AM and FM broadcasting is listed in the new *Collins Speech Equipment Catalog*. It pictures and describes a wide variety of high quality speech input consoles, remote equipment, rack mounted audio units, test and control apparatus, transducers, power supplies, meter and jack panels, terminal boards, cabinets — everything needed in building a new station or modernizing an old one. *Collins Speech Equipment Catalog* should be kept in the files of all broadcast engineers as a standard reference work. Your nearest Collins office will be glad to supply a copy to your station upon request.

AMATEUR EQUIPMENT

75A-3 Receiver incorporates the new Collins Mechanical Filter — a new concept in receiver performance. Either 3 kc or 800 cycle bandwidth selected by a front-panel switch. AM signals can be tuned to accept the carrier and either one of the sidebands at will while the other sideband is rejected. Ideal for reception of single sideband signals. It is an extremely stable double conversion superheterodyne receiver, covering the 160, 80, 40, 20, 15, 11 and 10 meter bands. Permeability tuned; crystal controlled h-f oscillator; dial calibrated directly in frequency; extremely sensitive with great tuning accuracy and high signal to noise ratio; 50 db image rejection on all bands; automatic noise limiter; amplified, delayed AVC with quick recovery; miniature tubes.

Price including 3 kc mechanical filter, less speaker. \$530.00
10" speaker in matching cabinet. 20.00

KW-1 Transmitter, one kilowatt input AM phone and CW; covers 160, 80, 40, 20, 15, 11 and 10 meter bands; designed to avoid TVI with additional attenuation in the antenna network and filtered control leads; completely shielded r-f assembly; usual excellent Collins audio with speech clipper and high level low pass filter for bandwidth limitation; single control exciter tuning; single handswitch for entire transmitter; tuning dial similar to 75A-3; output 50 ohms (2.5 to 1 standing wave ratio); PA tubes conservatively operated at one kilowatt. Price \$3,850.00

32V-3 Transmitter, 150 watts input CW, 120 watts phone; Collins 70E-8A VFO controlled, handswitching, gang tuned; designed for maximum reduction of TVI by means of added tuned circuits in the exciter and an added L section in the unbalanced pi output network plus double shielding and filtering of essential leads. Price...\$775.00

35C-2 Low Pass Filter inserted in well shielded transmission line from 32V-1, 2, or 3, provides approximately 75 db attenuation of harmonic emissions at the television frequencies. Price...\$40.00

INDUSTRIAL COMPONENTS

Autotune, a Collins patented automatic rotary positioning device used for accurate remote control of communication receivers and transmitters by means of adjustable positions. It can also be used for the control of many types of industrial equipment.

Autopositioner, a mechanism which will set a shaft accurately to any one of several fixed positions by remote control. It is fast and quiet and is built for long service.

Instrument Type Motors, high efficiency hysteresis type motors are available in both 1" and 2" frame sizes for special applications to airborne and ground communication transmitters and receivers.

Mechanical Filter gives a close approach to the ideal rectangular selectivity curve by using resonant mechanical elements, rather than tuned electrical circuits. Many operating frequencies and band widths are available. When used in a receiver's IF strip, the carrier and one sideband of an AM signal can be accepted while the other sideband is rejected. 3 kc bandwidth filter is ideal for AM or SSB.

AVIATION EQUIPMENT

618S 144-Channel HF Transceiver, 100 watt power output on 144 crystal controlled channels. Automatically tuned elements insure maximum flexibility and high power output.

51R-3 VHF Receiver, for navigational use of the omnidirectional range.

17L-3 180-Channel VHF Airborne Transmitter, frequency range 118.0 to 135.9 megacycles. All 180 channels easily selected on a simple, positive remote control system. Power output conservatively rated at 8 watts.

51V-2 Glide Slope Receiver, designed for reception of 90/150 cps tone modulated glide slope signals on any of the twenty channels in the IFF range.

17M 360-Channel VHF Airborne Transmitter, full 360 channels in the range of 118.0-135.9 mc. 50 watt power output with phone emission. Meets ARINC Spec. #520.

51X 360-Channel VHF Airborne Communications Receiver companion to 17M Transmitter. Complete new design to meet ARINC Spec. #520 for 50 kc bandwidth. Has the sensitivity, selectivity and spurious response rejection characteristics required for flight and airport traffic control.

51Z Marker Beacon Receiver is completely dependable, highly selective and free from spurious response. Operates lights with minimum "twilight" indication.

37J-3 VHF Airborne Navigation Antenna, for use with the 51R-3 navigation receiver. Drag, 2.63 pounds at 250 m.p.h.

37R-1 VHF Airborne Communication Antenna, for use with Collins VHF two-way communications system.

37P Airborne Glide Slope Antenna mounts on nose of aircraft, and provides greatly improved pickup and receiver performance.

Integrated Flight System simplifies ILS approaches by presenting precisely computed steering information in conjunction with simplified pictorial type instruments. Instrumentation also simplifies enroute navigation.

Navigation System, the Collins NC-101, provides the pilot continuous position information by automatically computed triangulation, using two VOR systems.

478C IFS Test Equipment, bench tester for IFS Computer, automatic pilot and other flight director equipments.

479T-2 Signal Generator, a precise ramp-test equipment for airborne VOR localizer and glide slope receivers.

In requesting complete technical information on any Collins product please specify equipment type number.

479S-3 Audio Signal Generator is used in precision bench testing of omni-range, localizer and glide slope receivers. Output signals for VOR, localizer, and glide slope audio circuit investigations are provided.

GROUND STATION EQUIPMENT

231D-2 Autotune Transmitter, frequency range 3-26 mc. 2.5 to 3 kilowatts phone; 5 kilowatts CW.

430 Series Transmitters, 1 or 2 kilowatts, conservatively rated, phone CW or FSK. Simultaneous transmission on two or more frequencies if desired. Transmission on any of ten instantly selectable, pre-set channels over entire range from 2-30 mc. Unitized chassis construction combines production economies with custom requirements.

16F-14 Autotune Transmitter, frequency range 2-20 mc. 300 watts phone. 500 watts CW.

30K-4 Transmitter, 2 channels, pretuned to any frequency between 2 and 30 mc. 300 watts CW. 250 watts phone.

32RA-9 Transmitter, 4 channels, pretuned to any frequency between 1.5 and 15 mc. 75 watts CW. 50 watts phone.

51J-3 Receiver provides continuous coverage from 500 kc to 30 mc, with very high stability and tuning accuracy.

51M-6 VHF Rack Mounting Receiver, single channel, pretuned to any frequency between 118 and 136 mc.

51N-2 Receiver, single channel, for A1, A2, and A3 reception, pretuned to any frequency between 2 and 24 mc. Mechanical filter kits available.

242F VHF Transmitter, rack mounted, providing single frequency operation between 118.0 and 136.0 mcs. 50 watts power into 52 ohms.

For Engineering Excellence in Radio Equipment, it's...



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

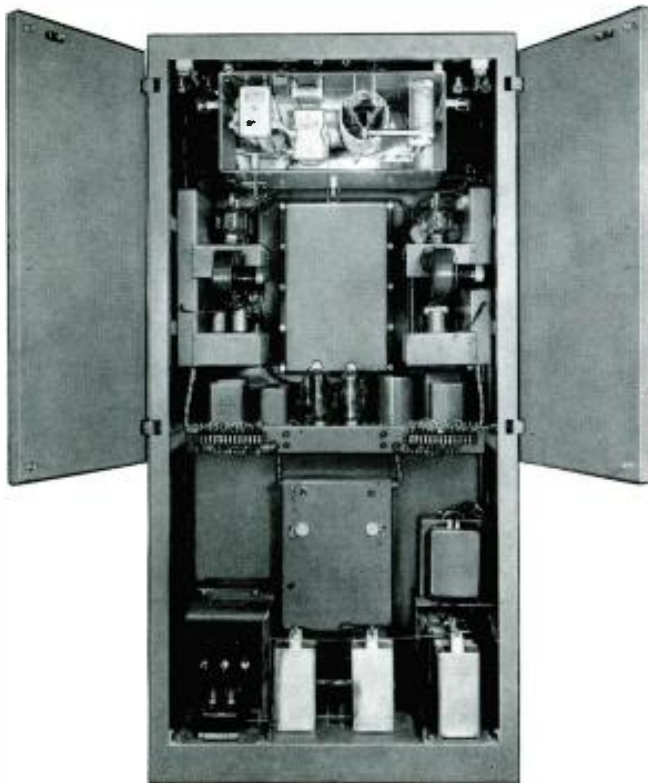
11 W. 42nd St.
NEW YORK 36

2700 W. Olive Ave.
BURBANK

1930 Hi-Line Drive
DALLAS 2

Dogwood Road, Fountain City
KNOXVILLE

www.americanradiohistory.com



1. 20V REAR VIEW OPEN

1000/500 WATT AM BROADCAST TRANSMITTER

The new 20V is designed for continuous high fidelity broadcast operation at any specified frequency in the band from 540 to 1600 kilocycles or any of the high frequency broadcast bands.

Facilities for power reduction from 1000 watts to 500 watts are standard equipment in the 20V.

The AC power is obtained from a 208/230 volt single phase 50/60 cps source.

All materials and components used in the 20V are of the highest Collins quality and assure long life with trouble free operation.

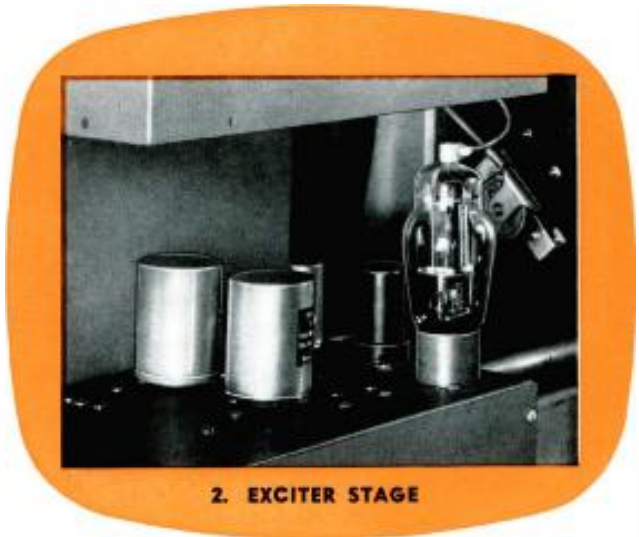
FREQUENCY CONTROL

A very high percentage of transmitter frequency failures and frequency control nuisances have been directly traceable to the crystal oven, thermostat and associated equipment.

As a result of major advances in crystal stability and oscillator design, the Collins 20V eliminates the use of crystal ovens and associated thermostats, relays and cir-

cuit complexities (See Picture 2). Extremely stable low temperature coefficient crystals in conjunction with the highly perfected oscillator design produce frequency stability well within the FCC specifications of plus or minus 20 cycles.

Two crystals are employed with one of the two always available in a standby position. A selector switch provides instant choice of either crystal while the transmitter is in operation.



2. EXCITER STAGE

TUBES

High efficiency, high gain type 4-400A tetrode tubes (See Pictures 3 and 4) are used in both the modulator and the power amplifier. Extremely conservative operation is obtained with very low driving power which simplifies the over-all circuitry.

Only 7 different tube types are used. Now you can keep fewer tube replacements to meet FCC requirements.

4	4-400A	2-Final Amplifier
		2-Modulator
1	807	Driver Amplifier
3	6SJ7	1-Buffer Amplifier
		2-Audio Amplifier
1	6AU6	Crystal Oscillator
2	872A	High Voltage Rectifier
2	866A	Low Voltage Rectifier
1	5U4G	Bias Rectifier

Cabinet ventilation is obtained through a fan on lower back panel. In addition, individual blowers mounted on RF and Modulator chassis provide quiet, trouble free cooling for all components and tubes.

The
COLLINS
75A-3

AMATEUR RECEIVER with MECHANICAL FILTER



ANOTHER
COLLINS
ACHIEVEMENT

NOW

After many years of intensive research, Collins announces development of the mechanical filter, now combined with the unique features of the 75A-2,

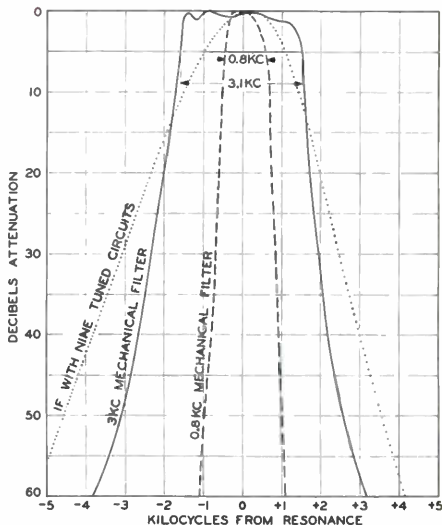
. . . to bring to Amateur Radio

the 75A-3 Receiver

THE selectivity curves shown here tell the story of a new concept in receiver performance. The mechanical filter, recently developed by Collins and incorporated in the 75A-3 receiver, represents an entirely new approach to the attainment of selectivity. Using resonant mechanical elements rather than tuned electrical circuits, the mechanical filter gives a close approach to the ideal rectangular selectivity curve. Each 75A-3 receiver has plug-in provisions for two mechanical filters. A 3 kc. filter is standard factory equipment and when still greater selectivity for c.w. operation is desired, an 800 cycle unit may be plugged in as an optional accessory. With both the 800 cycle and 3 kc. filters in the receiver, a switch on the front panel provides instantaneous choice of selectivity characteristics. When required, the crystal filter may also be switched into the circuit to notch out interfering signals and heterodynes.

The nearly flat top and sharp cutoff at the sides of the selectivity curve of the 3 kc. mechanical filter permit a.m. signals to be tuned so as to accept the carrier and either one of the sidebands at will, while the other sideband, and any signals that are interfering with it, are eliminated. Full advantage may also be taken of the benefits of local b.f.o. carrier reinsertion on a.m. as well as s.s.s.c. signals.

Because of the mechanical filter's straight-sided selectivity curve, the 75A-3 receiver can be tuned near a strong signal without responding to that signal. As the receiver is tuned across the band, signals suddenly appear and disappear. This is because of the absence of broad skirts which "drag out" the tuning of receivers that have conventional i.f. strips.



All of the proven features of the 75A-2 have been retained in the 75A-3. These features, such as crystal controlled front-end, highly stable variable-frequency oscillator, and accurate dial calibration, to name but a few, combine with the new Collins mechanical filter to give unequalled performance.

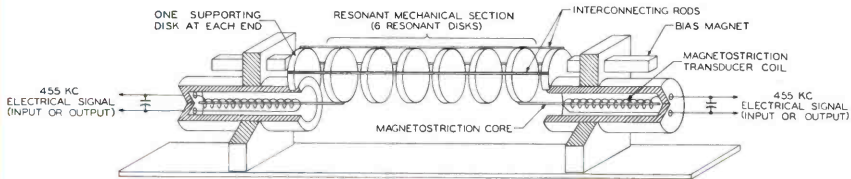
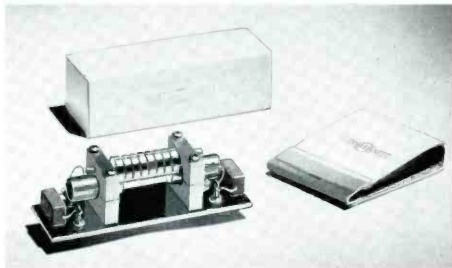
The curves above show a comparison between the selectivity curve of a good i.f. strip using nine tuned circuits, and typical selectivity available in a Collins 75A-3 receiver incorporating an 800 cycle and a 3 kc. mechanical filter. When both mechanical filters are installed in the receiver, either one may be selected by the flip of a switch. These curves show performance without the crystal filter.

The **NEW** Collins
MECHANICAL FILTER
 and
How it works
 in your
75A-3
Amateur Receiver

The mechanical filter is a resonant mechanical device in the 75A-3 receiver's 455 kc. i.f. strip. Unlike the crystal filter, the mechanical filter remains in the circuit at all times. As shown here, it consists of three general sections: an input transducer, a mechanically resonant section consisting of a number of metal disks, and an output transducer. A 455 kc. electrical signal applied to the input terminals is converted into a 455 kc. mechanical vibration at the input transducer by means of magnetostriction. This mechanical vibration travels through the resonant mechanical section to the output transducer, and is converted, by magnetostriction, to a 455 kc. electrical signal which appears at the output terminals. There is no mechanical motion except for the imperceptible vibration of the metal disks. The mechanical filter requires no adjustment.

F455B-31 3 kc.
Mechanical Filter
Characteristics

Operating frequency.....	455 kc.
Nominal band width at 6 db. down.....	3.1 kc.
Shape factor (6 db. to 60 db.).....	less than 2.25/1
Peak-to-valley ratio	less than 3 db.
Insertion loss	less than 26 db.
Overload input voltage.....	15 volts
Operating temperature range.....	-30°C to 80°C
Vibration.....	Complies with Spec AN-E-19
Input and output impedance.....	8000 ohms resistive at resonance
Case size.....	1" x 15/16" x 2-13/16"

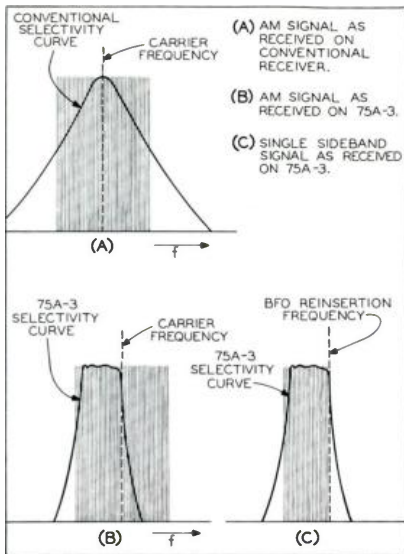


The nearly rectangular
selectivity curve
of the
75A-3
permits tuning procedures
that are ideal for
A.M. or SINGLE SIDEBAND

SELECTIVITY AND TUNING

A receiver with conventional i.f. strip is usually tuned as shown in curve A at right. The carrier is set at the center of the selectivity curve, thereby dividing the receiver's bandwidth between the two sidebands of the received signal. Since all of the transmitted intelligence is included in each sideband, a substantial reduction in heterodynes and other interference can be attained by narrowing the receiver's bandwidth and tuning to only one sideband and the carrier as shown in curve B. However, this cannot be done with the conventional rounded i.f. curve, illustrated at A, because tuning the receiver to a sideband moves the carrier down onto the side of the selectivity curve and reduces the level of the carrier below the level of one of the sidebands. This causes the familiar distortion (overmodulation at the receiver's detector) that always results when a conventional receiver's passband is not centered on the carrier.

Therefore, the bandwidth of the conventional receiver must be split between two sidebands while the 75A-3 receiver, with its nearly rectangular selectivity curve, is designed to be tuned as shown in curve B. Only the carrier and one sideband are included in the receiver's passband. The sideband that is most nearly in the clear is selected, permitting the other sideband, and any signals that are interfering with it, to be eliminated. The 75A-3 is normally tuned to one side of the received signal until the higher audio frequencies are heard, indicating that the receiver is set up as shown in curve B. When tuned in this manner, the 3-kc mechanical filter in the 75A-3 passes the same audio bandwidth as a conventional receiver having a bandwidth of approximately 6 kc.



As shown in C above, the width and shape of the 75A-3 selectivity curve is ideally suited to s.s.s.c. reception. This selectivity curve, combined with the stability made possible by a crystal-controlled high-frequency mixer and very stable low-frequency oscillator, makes the 75A-3 an excellent s.s.s.c. receiver. When tuning s.s.s.c. signals on the 75A-3, turn on the b.f.o., set the audio gain at maximum, and adjust the volume with the r.f. gain control. Where the lower sideband is being transmitted, as is usually the case on 75 meters, set the b.f.o. pitch-control knob about three-sixteenths inch to the right of the +1 position. This sets the b.f.o. carrier at the high edge of the sideband, as shown in C above, and about 1500 cycles above the receiver dial setting. When the high sideband is being transmitted, the b.f.o. knob must be set to a position to the left of the -1 position in order to place the b.f.o. carrier at the low edge of the sideband. Since the b.f.o. carrier is inserted after the signal has passed through the mechanical filter, the carrier frequency does not necessarily have to be included in the i.f. passband. With the receiver set up as outlined above, carefully turn the main tuning knob until the voice being transmitted by the single-sideband station sounds natural.

Collins Professional Gear for the Amateur

COLLINS DEPENDABLE 75A-2 Receiver



The 75A-2 features high sensitivity, exceptional selectivity, stability, and dial accuracy. This popular double conversion superheterodyne receiver is designed for superior performance on the 160, 80, 40, 20, 15, 11 and 10 meter bands.

Net domestic price \$420.00

10" Matching Speaker and Cabinet Assembly
Net domestic price \$ 20.00

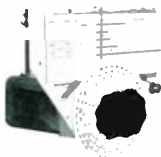


KW-1 Transmitter

The Collins KW-1 Transmitter is engineered to equip the amateur for use of the maximum power permitted. Its input is a full, cool 1000 watts on phone and CW. Frequency range covers the 160, 80, 40, 20, 15, 11 and 10 meter bands. Only four tuning functions are required in operation: bandswitch selection, frequency setting, PA tuning and PA loading.

Spurious radiation is reduced to a very low value, particularly on TV frequencies. Great care has been given to filtering all control and power leads entering the exciter-power amplifier compartment, which is itself a totally enclosed and shielded structure.

Net domestic price .. \$3850.00



70E-8A VFO

Its versatility, ease of operation, accuracy and highly stable output will give your rig or measuring instruments a truly professional performance. This oscillator is permeability tuned, and has a linear range of 1600 kc. - 2000 kc. Sixteen turns of the vernier dial are required to cover the 400 kc. range.

Net domestic price \$97.50



35C-2 Filter

The 35C-2 is a 52 ohm three-section low-pass filter with approximately 0.2 db. insertion loss below 29.7 mc and approximately 75 db. attenuation of harmonic emissions at the television frequencies.

Net domestic price \$40.00

8R-1 and 148C-1

The 8R-1 100 kc. crystal calibrator and the 148C-1 NBFM adapter are available as 75A-2 and 75A-3 accessories, for plugging into completely wired sockets on the top of the chassis. The operation of both units may be controlled by switches located on the front panel.

8R-1 plug-in crystal calibrator
Net domestic price \$25.00

148C-1 plug-in NBFM adapter
Net domestic price \$22.50



32V-3 Transmitter

This is a VFO controlled bandswitching gang-tuned amateur transmitter, conservatively rated at 160 watts input on CW and 140 watts input on phone. It covers the 80, 40, 20, 15, 11 and 10 meter bands, and is specifically engineered for reduction of TVI.

The entire r-f section of the 32V-3 is completely enclosed in an additional shield of perforated metal permitting adequate ventilation while blocking harmonic radiation.

Net domestic price \$775.00

FOR THE BEST IN AMATEUR RADIO, IT'S . . .



COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 36

1930 Hi-Line Drive, DALLAS 2

2700 W. Olive Ave., BURBANK

CONTROLS

The following controls are on the 75A-3

- Front panel:
 - Crystal Selectivity
 - Crystal Set
 - Bandswitch
 - Mechanical Filter
 - RF Gain Selector
 - CW-AM-FM Switch
 - BFO Pitch
 - CW Limiter
 - Antenna Trimmer
 - On-Off-Standby Switch

FREQUENCY COVERAGE

160 meters—1.5 to 2.5 mc.

80 meters—3.2 to 4.2 mc.

40 meters—6.8 to 7.8 mc.

20 meters—14.0 to 15.0 mc.

15 meters—20.8 to 21.8 mc.

11 meters—26.0 to 28.0 mc.

10 meters—28.0 to 30.0 mc.

DIMENSIONS AND WEIGHT

Cabinet size is 21-1/8" wide, 12-1/2" high, 13-1/16" deep. The chassis is mounted on a 19" panel which can be moved from the cabinet and mounted in a standard relay rack. The 75A-3 weighs approximately 50 pounds.

POWER SOURCE

The self-contained power supply requires 115 volts 50/60 cps. a.c.

NET PRICE

75A-3 receiver complete with 3 kc-chemical filter, tubes, and instruction book (exclusive of state tax but including excise tax).

\$530.00 Net domestic price

10" matching speaker and cabinet assembly.

\$20.00 Net domestic price

Type F45B-08 800-cycle mechanical filter

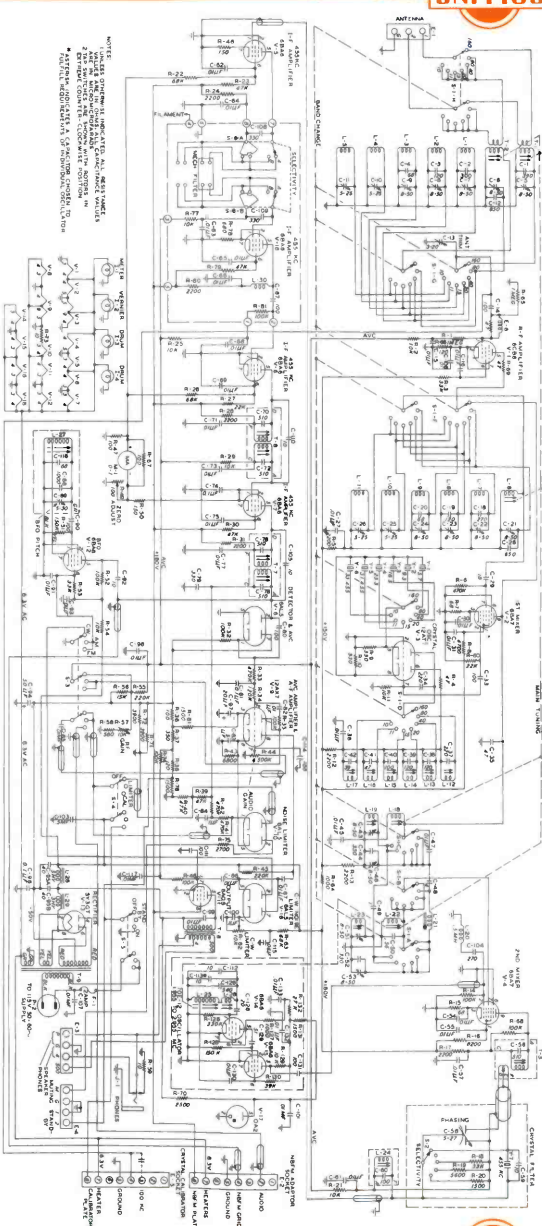
\$55.00 Net domestic price

ATTENTION 75A-2 OWNERS

You can return your receiver through your distributor for factory modification to incorporate the new mechanical filter arrangement. Modification consists of the installation of a mechanical filter conversion kit complete with a 3 kc filter, minor repairs, and complete realignment of the equipment. For full information regarding this service, contact your authorized Collins distributor.

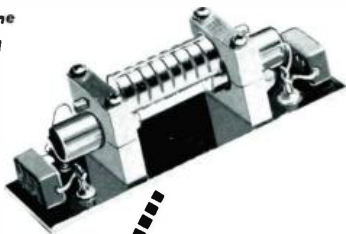
\$105.00 Net domestic price

75A-2 owners who wish to modify their own sets can obtain conversion kits, complete with instructions and a 3 kc mechanical filter, from their Collins distributors. **\$ 80.00** Net domestic price



NOTE: 1. THIS SCHEMATIC DIAGRAM IS FOR THE 75A-3 RECEIVER ONLY. IT IS NOT VALID FOR OTHER MODELS OF THIS RECEIVER. 2. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 3. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 4. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 5. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 6. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 7. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 8. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 9. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 10. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 11. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 12. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 13. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 14. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 15. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 16. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 17. THE 75A-3 RECEIVER IS A 100% SOLID STATE RECEIVER. 18. 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Top view of 75A-3 showing one mechanical filter and socket for another



STABILITY

Three factors contribute to the very high accuracy and stability of the 75A-3:

(1) the use of precision quartz crystals in the first conversion circuit, (2) the inherent accuracy and stability of the v.f.o. in the second conversion circuit, and (3) linearity and absence of backlash in the tuning mechanism. In order to take advantage of this precision, a secondary frequency standard, continually checked against WWV, is utilized in the factory calibration. The 75A-3 calibration is accurate to within 1 kc. except at 10 and 11 meters where it is accurate to within 2 kc.

The stability is such that on c.w. reception extreme variation in the supply voltage causes a change of only a few cycles in the note. Furthermore, the c.w. note is almost independent of all except the tuning controls. Physical shock will not disturb the frequency unless the shock is severe enough to change the dial settings. This outstanding stability, which is available without a long warm-up period, makes the 75A-3 an ideal s.s.s.c. receiver.

IMAGE REJECTION

The circuit design of the 75A-3 receiver has inherently high rejection to spurious frequencies. Image rejection is a minimum of 50 db.

SIGNAL STRENGTH METER

The S-meter is calibrated from 1 to 9 in steps of approximately 6 db. each, and for 20, 40, and 60 db above S9. A reading of S9 corresponds to a signal input of 100 microvolts. Zero adjustment is provided.

AUTOMATIC VOLUME CONTROL

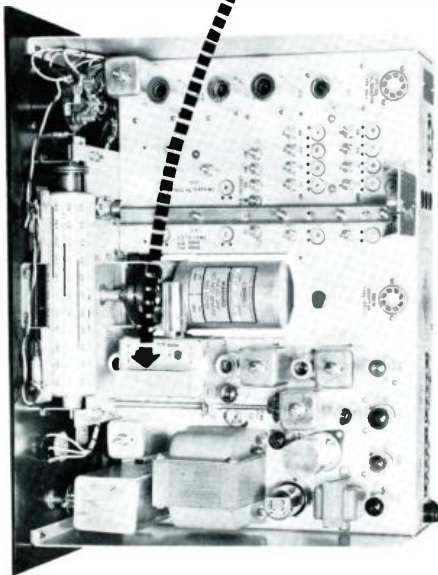
Constant output within 6 db. is obtained for a change in r.f. input from 5 microvolts to 0.2 volts. A.v.c. is applied to the r.f. and i.f. stages. The a.v.c. amplifier tube works into an unusually low value of load impedance which permits quick recovery from strong noise pulses.

ANTENNA COUPLING

The antenna input impedance is in the order of 50 to 150 ohms and will accommodate both balanced and unbalanced lines.

AUDIO OUTPUT

Maximum audio output power is more than 1.5 watts. 500 ohm and 4 ohm output terminals are provided, as well as a phone jack. The speaker is in a matching cabinet.



SENSITIVITY

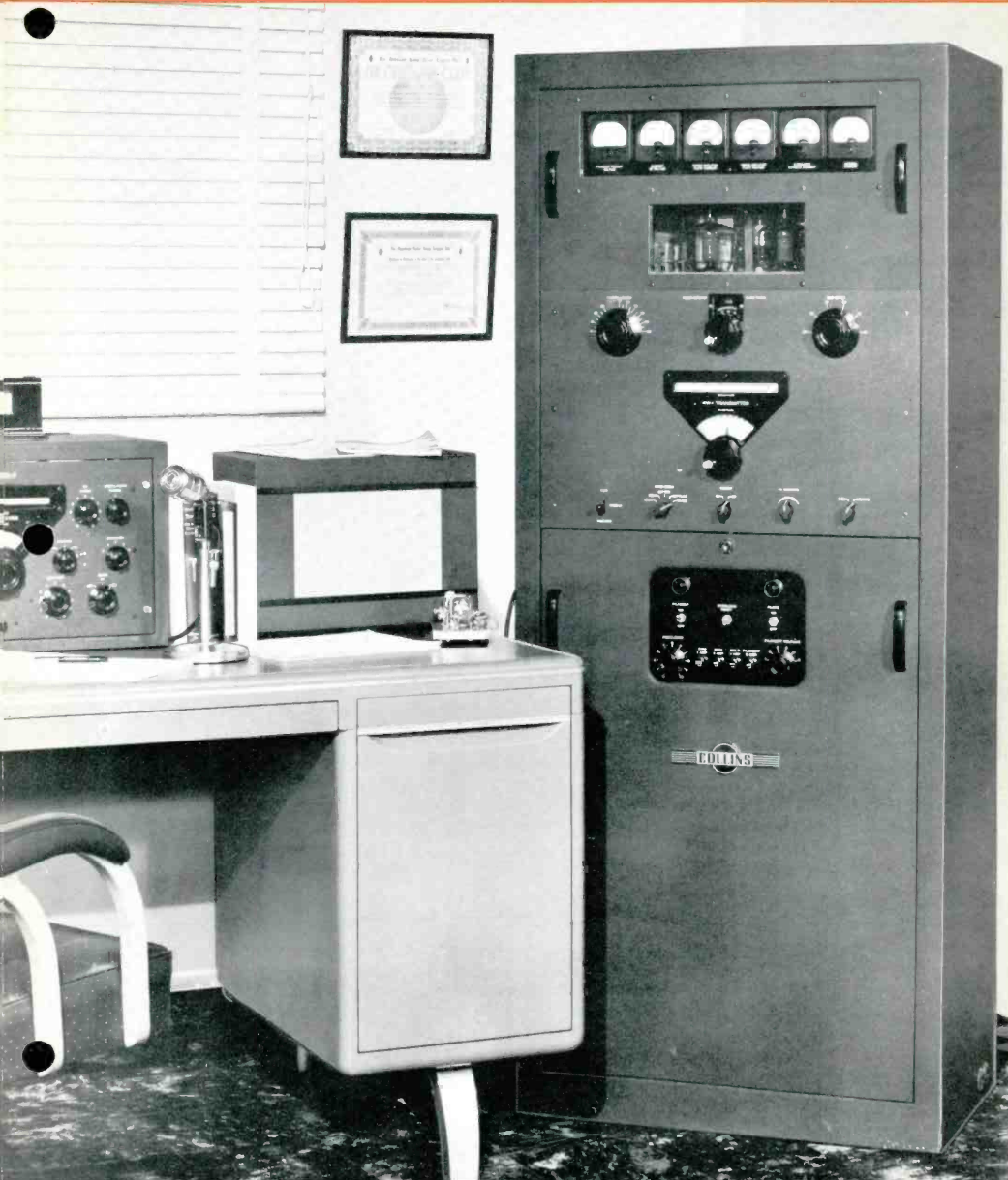
Sensitivity of 2 microvolts or better for a 10 db. signal-to-noise ratio is made possible by the 6CB6 r.f. stage in the 75A-3. A 10 db. signal-to-noise ratio and 1 watt of audio output is obtained on all bands with signal inputs of 2 microvolts or less.

NOISE LIMITERS

The phone noise limiter is a series-type clipper which automatically adjusts to all signal levels. Also, a full wave, shunt-type noise limiter with front panel control of limiting level is provided for c.w. operation.

COLLINS KW-1

AMATEUR
TRANSMITTER





3. FINAL RF AMPLIFIER



4. MODULATOR STAGE

POWER SUPPLIES

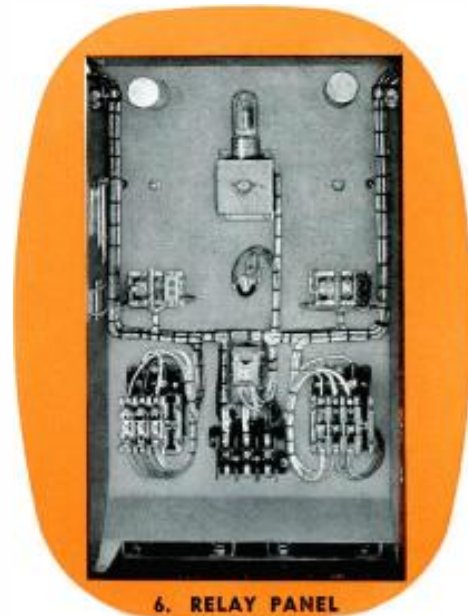
One heavy duty high voltage supply is used for the modulator and final amplifier. A separate low voltage supply feeds the modulator screen grids, as well as the plates and screen grids of the other RF and audio tubes. The bias supply provides approximately 100 volts for the modulator and power amplifier bias and lesser voltages for other biasing throughout the transmitter. (See Picture 5.)



5. POWER SUPPLY

THERMAL TIME DELAY RELAY

An instantaneous interruption of line voltage will result in no delay in returning to the air. A thermal time delay circuit automatically selects the proper delay period after short carrier interruptions. This Thermal Time Delay Relay (See Picture 6) allows you to return to the air at the earliest possible moment, cutting the off-the-air time to a minimum number of seconds.



6. RELAY PANEL

CONTROLS

Momentary type filament and plate power start-stop switches are located on the front of the transmitter (See Picture 7).

When the filament ON button is pressed, the filaments, blowers, bias supply and plate time delay circuit are immediately energized. At the end of the filament warm-up cycle the filament pilot light will glow, indicating readiness for application of high and low plate voltages. Manual operation of the plate button on the front of the transmitter will energize these power supplies and the plate pilot light will glow its indication of full operating conditions.

If desired, the transmitter can be started by simply pressing the plate ON button. Filament, bias and plate

Here is **MAXIMUM POWER**

The Collins KW-1 Transmitter is engineered to equip the amateur for use of the absolute maximum power permitted by his license. This transmitter is the result of years of advanced planning and design — a unit you can be proud to own and operate. With the Collins KW-1 you can work dx you've never reached before. The KW-1 is a vfo controlled, bandswitching, 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.

RANGE

The KW-1's frequency range covers 160, 80, 40, 20, 15, 11, and 10 meter bands. Complete band-switching of the exciter, driver, and power amplifier is accomplished by a single control on the front panel. This reduces to four the number of tuning functions required in operation: bandswitch selection, frequency setting, PA tuning, and PA loading. Over any narrow frequency range, it is only necessary to adjust the frequency control, which is by means of a recently developed, extremely stable, hermetically sealed master oscillator.

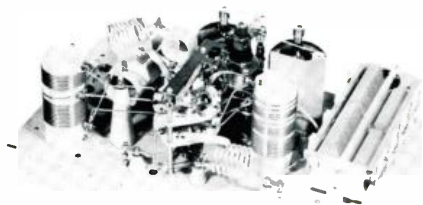
TVI

The design of the KW-1 Transmitter is such that spurious radiation has been reduced to a very low value, particularly on television frequencies. The r-f unit is completely shielded in a metal box inside the main cabinet. All circuits passing through this shield are well filtered for attenuation at television frequencies. These features minimize direct radiation from the cabinet and external leads. In the power amplifier the use of a pi section followed by an L section very effectively reduces harmonics of the carrier frequency. To this is added the attenuation of the 35C-2 Low Pass Filter.



Spurious radiation from the antenna is attenuated by careful design of the r-f circuits. There are always 3 or more tuned circuits at the carrier frequency. The variable vacuum capacitor used for power amplifier plate tuning provides a low impedance circuit to ground at television frequencies.

The speech amplifier has a peak clipper and a low and high level filter, permitting high-percentage modulation without splatter.



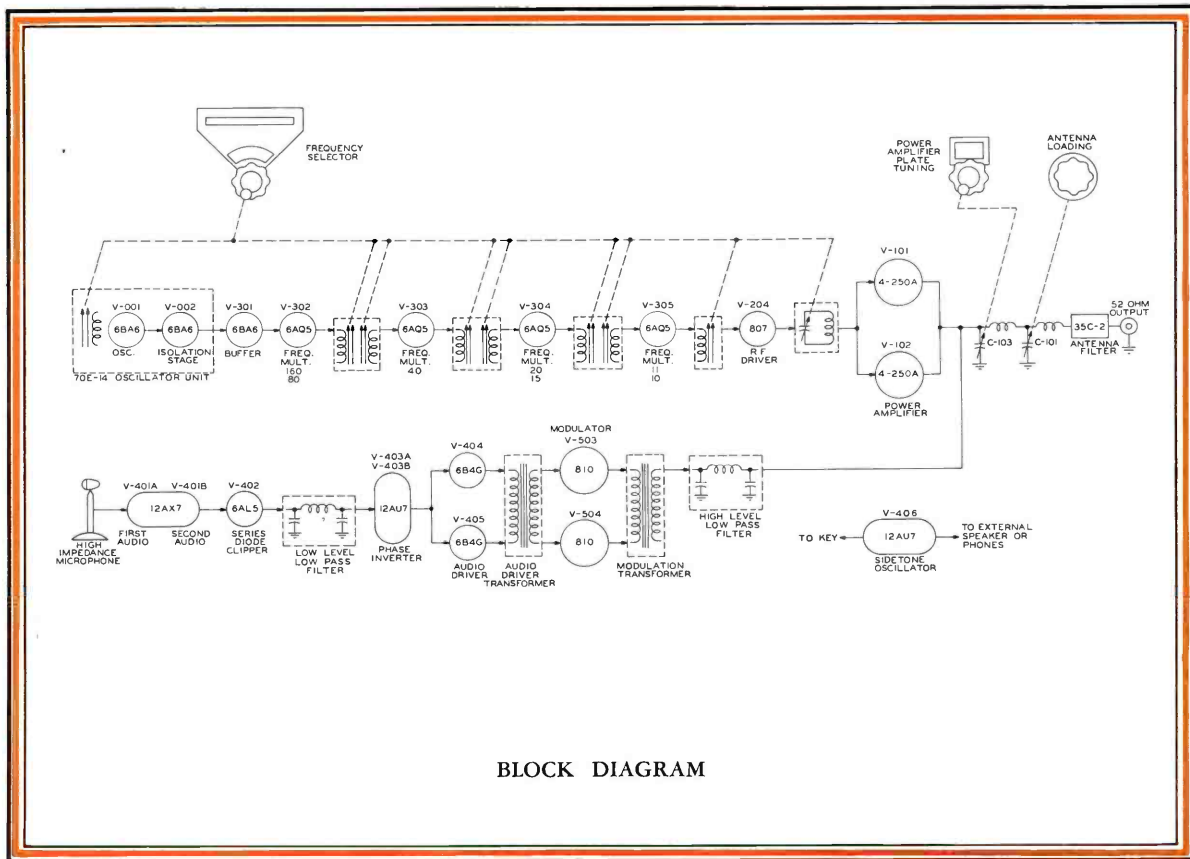
TUBE COMPLEMENT

Oscillator — two 6BA6's.

Exciter — one 6BA6, four 6AQ5's, one 807W, two VR105's, one 6A10 ballast tube. Power amplifier — two 4-250A's. Speech amplifier — one 12AX7, one 6AL5, two 12AU7's, two 6B4G's, two 810's. Rectifiers — two 872A's, one 5R4GY and three 5V4's.

METERS

Modulator current, PA plate current, high voltage, line voltage, multipurpose meter, antenna ammeter. Line fuses, plus overload relay in Class C amplifier current lead, provide circuit protection.



BLOCK DIAGRAM

KW-1 SPECIFICATIONS

- Power Amplifier Input 1000 watts
(500 watts on 160 meters)
- R-F Output Impedance 52 ohms
- Maximum Permissible Standing Wave Ratio 2.5 to 1
- Amateur Bands Covered 160, 80, 40, 20, 15, 11, 10 meters
- Frequency Range 1700-2000 kc
3400-4100 kc
6700-8200 kc
13,400-16,400 kc
20,100-24,600 kc
26,800-32,800 kc
- Emission Voice or cw
- Frequency Control 70E-14 Master Oscillator, 1675 to 2050 kc
- Microphone Input Will match high impedance dynamic or crystal
- Phone Patch Impedance 600 ohms, unbalanced to ground
- Weight 600 pounds
- Dimensions 66½" high, 28" wide, 18" deep
- Circuit Protection Overload relay, fuses, high voltage arc gaps
- Tuning Controls Bandswitching, frequency selector, PA tuning, PA loading
- Other Controls Filament switch, filament voltage adjustment, plate switch, overload reset switch, overload relay adjustment, send-standby-calibrate switch, emission selector switch, tune-operate switch, meter switch, power amplifier excitation control, modulator bias control, audio driver bias control, clipping level, audio gain control, bandsread adjustment.
- Accessories Required High impedance microphone, telegraph key, 52 ohm antenna, wiring to power source.
- Power Source 230 v, 3 wire, 50/60 cycle, single phase, grounded neutral; or 115 v, 2 wire 50/60 cycle, single phase.
- Typical Power Demand, CW

Key closed	2000 w
Key open	800 w
Calibrate, key closed	660 w
Standby	500 w
- Typical Power Demand, Phone

100% sine wave mod.	3100 w
No modulation	2280 w
Calibrate	780 w
Standby	600 w
- Net Domestic Price \$3850.00

For excellence in amateur communications, it's . . .

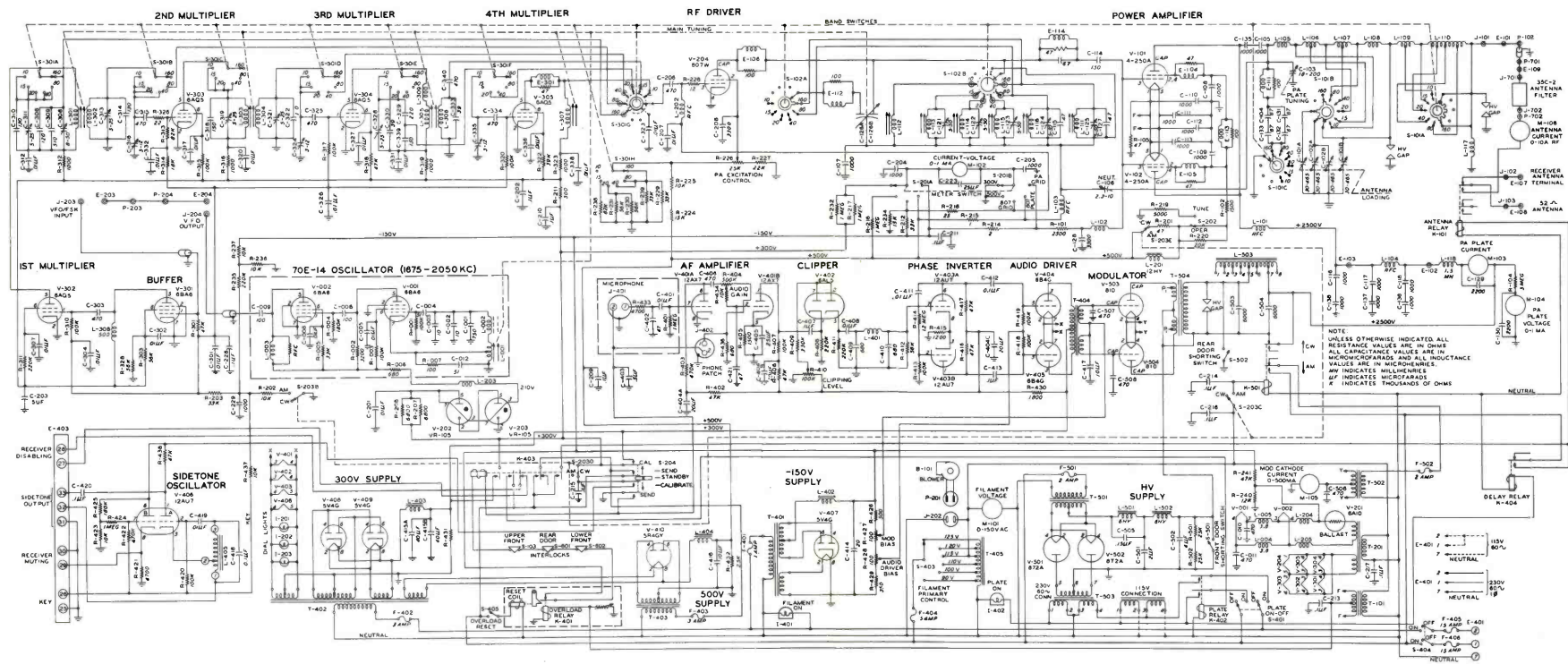


COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 36

1930 Hi-Line Drive, DALLAS 2

2720 W. Olive Ave., BURBANK



Collins KW-1 Amateur Transmitter

Premium Performance

AND DEPENDABILITY

COLLINS 32V-3 TRANSMITTER



The Collins 32V-3—the successor to the 32V-2—has proven itself everywhere to be the most wanted of all medium powered transmitters in the field because of the usual extensive Collins research and design that has been built into it. Collins engineering also offers to the radio amateur in the 32V-3 important added provisions for REDUCTION of TVI, ideal ventilation features and completely adequate power for CW and phone operations on all amateur bands between 3.5 and 29.7 megacycles. Its small, compact chassis is designed also for maximum space-saving in normal table mounting.

Range

The 32V-3 is a VFO controlled, bandswitching, gang-tuned transmitter conservatively rated at 160 watts input on CW and 140 watts input on phone. It covers the 80, 40, 20, 15, 11 and 10 meter ham bands.



Shielding

The entire r-f section of the Collins 32V-3 has been completely enclosed in an outer shield of perforated metal which permits adequate ventilation while blocking radiation of troublesome harmonics. This shielding is in addition to the regular shielding contained in the 32V-3

Speech Line-up

A 6SL7 in cascade to 6SN7 to a pair of 807 modulators, which furnish 60 watts audio power to modulate the final amplifier.

R-7 Tube Line-up A 6SJ7 VFO, 6AK6 buffer, 6AG7, 7C5 and 7C5 frequency multipliers, and 4D32 final amplifier.

Power Supply

The power supply contains a 5Z4 (low voltage) and two 5R4GY (high voltage) rectifiers, a VR75 bias regulator, one OAZ2 and one OBZ oscillator plate voltage regulators, and two OAZ2 screen voltage limiters.

Filters

Low pass filters in the following outgoing leads are visible at the back of the chassis view: both sides of the a-c power line, the antenna relay line (see photo) and both sides of the receiver disabling circuit. Additional low pass filters, not visible, are installed at the microphone connector and the key circuit, and one in each lead to each of the two meters.

Accuracy and Stability

The heart of the 32V-3 is the Permeability Tuned Oscillator, which is used as the VFO. The frequency range is 1600-2000 kc, which is covered in 16 turns of the vernier dial. The dial calibration is very accurate, and frequency stability compares favorably with most crystals used by amateurs.

To assure operation free from humidity effects, this oscillator is baked until thoroughly dry, then completely sealed and moisture proofed. As an added protection against moisture absorption, a silica gel capsule is factory inserted in the oscillator.

The slide rule dial roughly indicates operating frequency, while the vernier dial provides a direct reading in kilocycles. There are no reference charts or curves to interpolate.

Cabinet

The cabinet of the 32V-3 is of solid metal, open only in front to receive the chassis. Even the hand hole at each end is lined. Quarter-inch perforations replace undesirable slots for ventilation. Two types of leakage paths are thus eliminated through these Collins design features: Two pull handles have been added for easy removal of the panel and chassis. When firmly screwed in place, bare panel metal makes proper electrical contact with bare cabinet metal, thus eliminating another leakage path.

Flexibility of Operation

All controls are conveniently located on the front panel. As an additional convenience, both coarse and fine antenna loading controls are actuated by the same dial. The 32V-3 can be operated by a push-to-talk switch on the microphone, a key, or a separate switch. Terminals are provided for supplying the energizing voltage to the coil of an antenna change-over relay. There are also terminals, paralleled with the operate switch, with which to disable the receiver when the transmitter is in the SEND position. Grid-block keying is utilized on three stages following the VFO. Keying is very clean, without chirp or clicks. The bandswitching feature makes it possible to QSY from one band to another in a matter of seconds.

TVI Consideration

The problem of interference with reception of television signals has become more important with the wide-spread installation of television receivers. These receivers are often used in secondary service areas where the television signal is extremely weak and a satisfactory signal is impossible with the presence of a very low-level interfering signal. The difficulty lies in many cases in the design of the receivers. The following methods of avoiding TVI have been provided in the design of the 32V-3 and accessory units:

- (a) Reduction of spurious signals in the transmitter output
 - (b) Filtering of transmitter output at the antenna terminal
 - (c) Shielding of transmitter
- In the 32V-3, series traps were added in the exciter portions and an L section was added to the unbalanced pi output network to reduce unwanted signals to a degree

which will remedy some phases of television interference. This output network is designed primarily to feed into a 52-ohm coaxial transmission line, such as RG-8/U. It will also match unbalanced impedances of approximately 13 to 100 ohms and will tune out normal resonances. A coaxial fitting is provided. This permits the use of a well shielded transmission line in which the Collins 35C-2 Low Pass Filter may be inserted to give more than 75 db additional attenuation to output on TV channels. The unbalanced output permits grounding of the outer conductor of the line and the case of the filter.

For reducing TVI from sources other than the antenna, the 32V-3 is enclosed in a special one-piece cabinet. Adequate ventilation is provided by quarter-inch perforations instead of slots, thus eliminating two types of leakage paths. For additional protection against leakage, the entire r-f section of the 32V-3 has been enclosed in a second shield.

Filtering of essential leads has been accomplished by adding low pass filters in the following leads: both sides of the a-c power line; external antenna change-over relay; two in the receiver disabling circuit; two to each meter; at the microphone connector and at the keying jack.

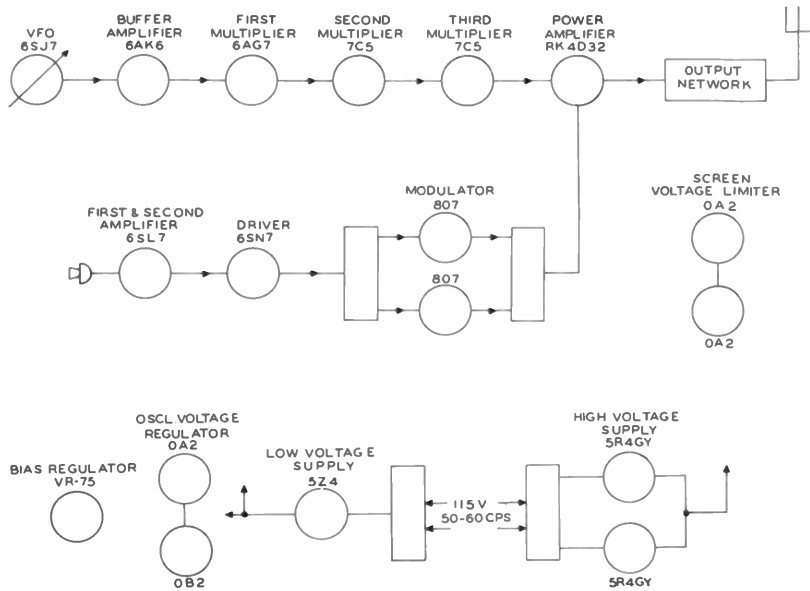


For proper operation, the 35C-2 filter should feed a properly terminated 52-ohm line. Coupling to a balanced antenna may be accomplished by an antenna tuner or by a Balun Transformer which is a wide band, low loss transmission line for coupling from a 52-ohm unbalanced line to a 300-ohm balanced load without tuning controls. It consists of a modified "Bazooka" plus a tapered transmission line. Over the frequency range 7 to 30 mc, a standing wave ratio of less than 2 to 1 is possible. The efficiency of the system is good even beyond the specified limits.

Specifications

- FREQUENCY RANGE: All amateur bands between 3.5 mc and 29.7 mc.
- PA PLATE POWER INPUT: 140 watts on phone, 160 watts on CW.
- AUDIO DISTORTION: Less than 8% at 90% modulation with a 1000 cps input frequency.
- FREQUENCY RESPONSE: Within 2 db from 200-3000 cps.
- POWER SOURCE: 115 volts 50/60 cps, single phase.
- POWER DEMAND: 500 watts at 90% power factor.
- DIMENSIONS: 21 1/2" wide, 12 1/4" high, 13 3/4" deep.
- SHIPING WEIGHT: 133 pounds.
- NET DOMESTIC PRICE:\$735.00

The COLLINS 32V-3 Transmitter



35C-2 LOW PASS FILTER

A coaxial fitting is provided at the rear of the 32V-3 cabinet. This permits the use of a well shielded transmission line in which the Collins 35C-2 Low Pass Filter may be inserted. The 35C-2 is a 52-ohm three-section filter which, with approximately 0.2 db insertion loss below 29.7 mc, provides approximately 75 db attenuation of harmonic emissions at the television frequencies. This high attenuation is added to that provided in the transmitter. The unbalanced output permits grounding of the outer conductor of the line and the case of the filter. Net domestic price-----\$40.00



FOR QUALITY IN RADIO IT'S ...

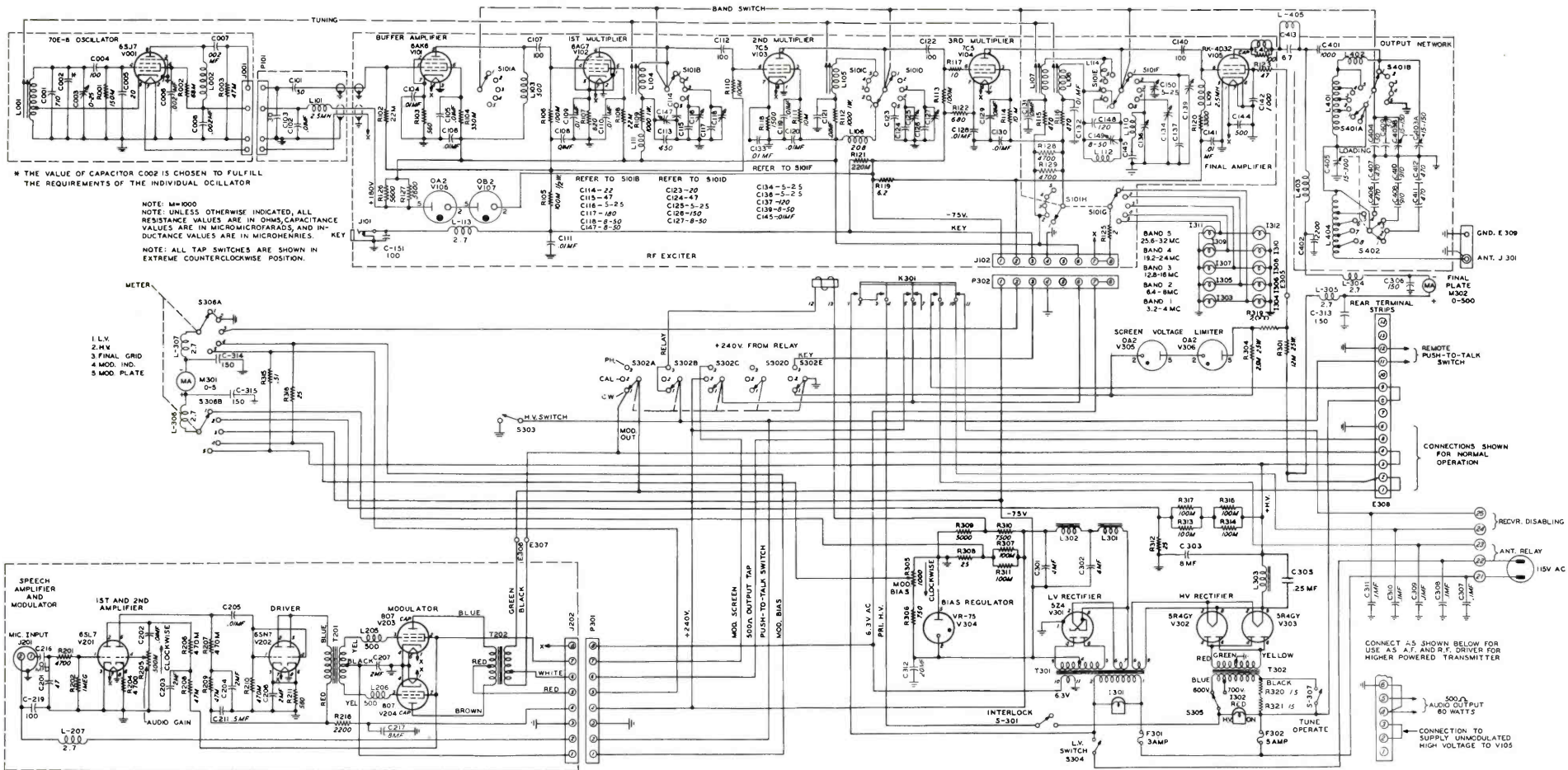


COLLINS RADIO COMPANY, Cedar Rapids, Iowa

11 W. 42nd St., NEW YORK 36

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Collins 32V-3 Amateur Transmitter

All of the above controls are available for adjustment while the Collins 20V is in operation. AC power

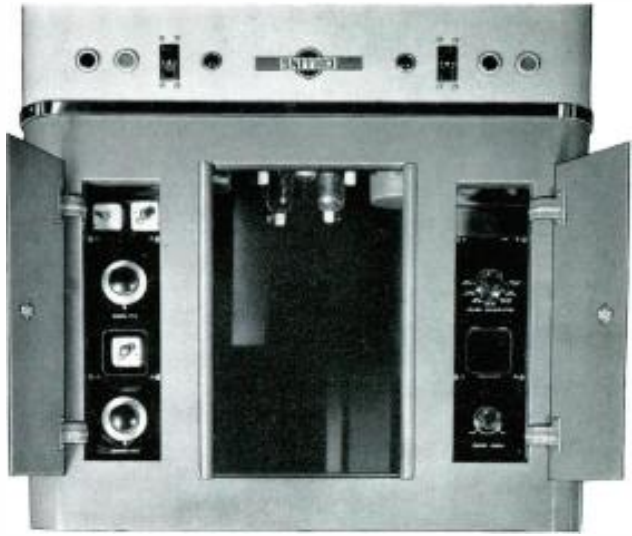
- RF Final Amplifier Audio Hum Balance
- RF Driver Audio Hum Balance
- Crystal Frequency Trimmers
- Crystal Selector Switch
- PA Loading
- PA Plate Tuning

Tuning controls on the right side of the front window:

- High-Low Power Switch
- Multimeter Switch
- Modulator Bias Adjustments
- Audio Balance Control

Tuning controls on the left side of the front window:

7. FRONT PANEL CONTROLS



Individually adjustable overload relays are provided for the modulator and final amplifier stages. These relays are connected so that an overload removes plate power and the equipment must be re-energized manually.

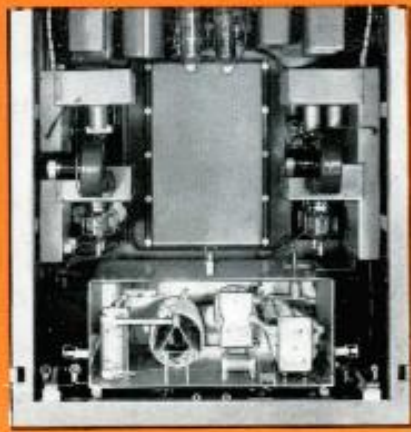
Plate supply are protected by toggle type magnetically operated circuit breakers. Filament and control circuits, and the high voltage OFF button de-energizes all circuits.

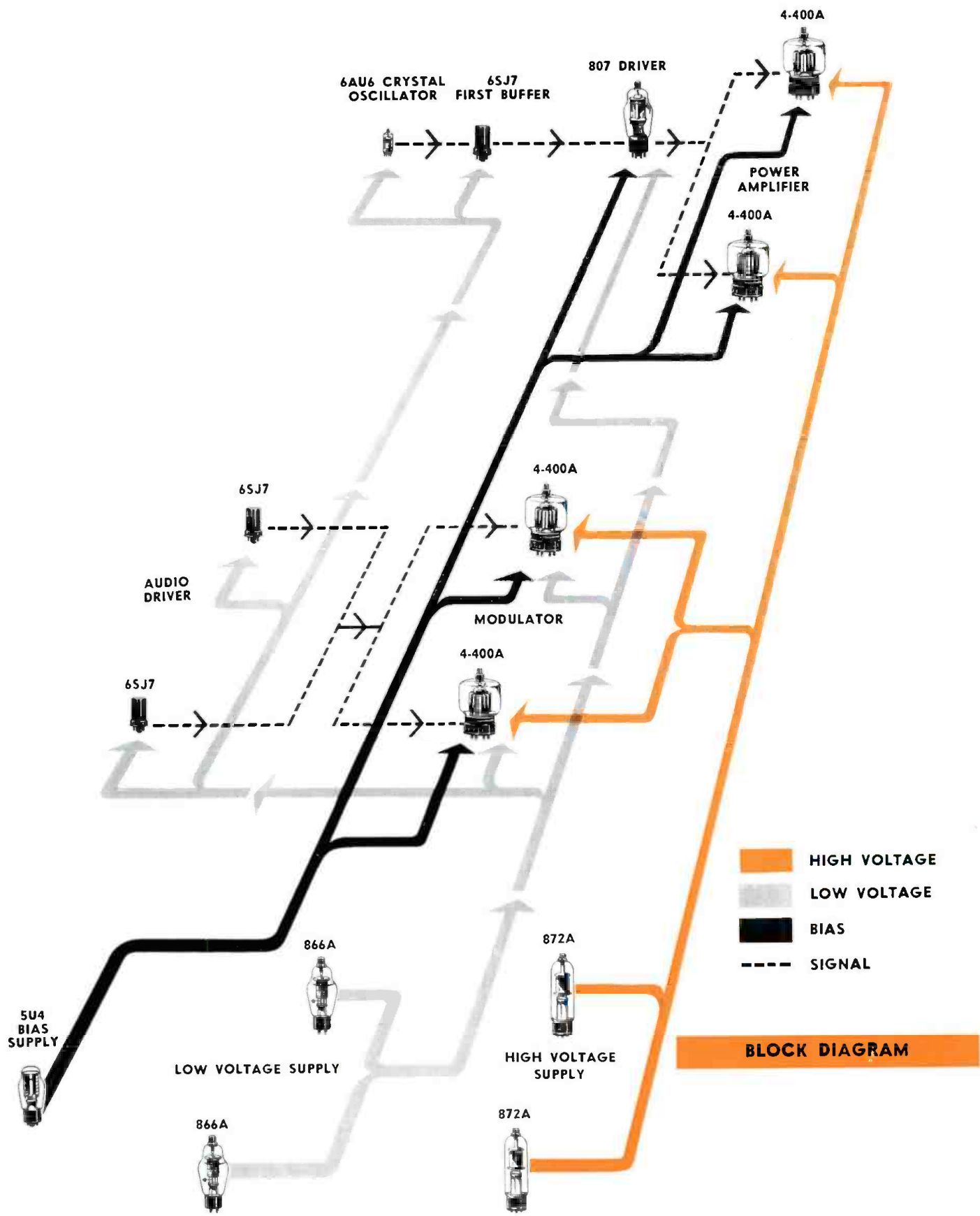
power will then be applied in correct sequence and with the proper time delay. Pressing the filament

circuit equipment is readily accessible by removing the clip-in flush panel in the lower center of the transmitter front. No neutralization adjustments are necessary for operation at any frequency in the standard broadcast band.

Personnel protection is provided by automatic door interlocks and gravity operated shorting bars. After the interlocks have opened, the gravity bars ground the high voltage and discharge the large filter capacitors. The lightning and arc-over protective kit, now supplied as standard equipment on the 20V, will safeguard tubes and tank components by interrupting the high voltage and low voltage plate supply primaries in event of a short circuit or flash-over in the transmitter RF output circuit. The protective relay has one set of contacts which are normally closed. The relay coil is connected in series with the monitor coil. The end of the monitor coil that connects to the relay is isolated from ground for DC by removing the ground connection and substituting a bypass capacitor. The transmitter bias supply is used as a convenient voltage source for operation of the relay. When an arc-over occurs in the power amplifier output tuning network, due to lightning or any other cause, the ionized path produced by the RF voltage in the arc-over has a sufficiently low DC resistance to complete the relay coil circuit and energize the relay. As the relay operates, it removes high voltage from the transmitter and stops the arc-over.

8. RF AND AUDIO AMPLIFIERS







When the arc-over no longer exists there is no path to ground for the DC relay coil current, and the relay returns to its normal position. The relay removes arc-over conditions from the output network and returns the transmitter to normal operation so quickly that usually only the click of the transmitter relays will notify the transmitter operator that an arc-over has occurred.

MODULATION

A simplified modulator design plus advanced circuitry has resulted in a more compact, efficient modulator. The Collins 20V can be safely operated at 100% *sine-wave* modulation without fear of breakdown. Conservative ratings, highest quality components and high efficiency cooling all contribute to the modulation capability of the 20V. Exceptionally low audio distortion is obtained.

METERING

For ease of operation and observation of transmitter performance the following circuits are metered:

- RF Line Current
- Final Amplifier Plate Current
- Final Amplifier Plate Voltage
- Modulator Cathode Current
- Final Amplifier Grid Current
- 807 RF Driver Cathode Current
- 807 Grid Current
- 6SJ7 Buffer Cathode Current
- 6SJ7 Grid Current
- 6SJ7 Audio Driver Cathode Current
- 6AU6 Crystal Oscillator Cathode Current

The meter panel is tilted at an angle for operating convenience.

MONITOR CONNECTIONS

Readily accessible coaxial monitor connections are provided for both modulation and frequency monitors. In addition, a direct monitor speaker connection is provided to allow on-the-air monitoring from the transmitter. A monitor amplifier system also may be fed from this termination.

OUTPUT NETWORK

A high degree of harmonic attenuation has been accomplished.

The entire RF network is double shielded to reduce spurious radiation. All RF circuits are completed independent of the cabinet proper.

CABINET

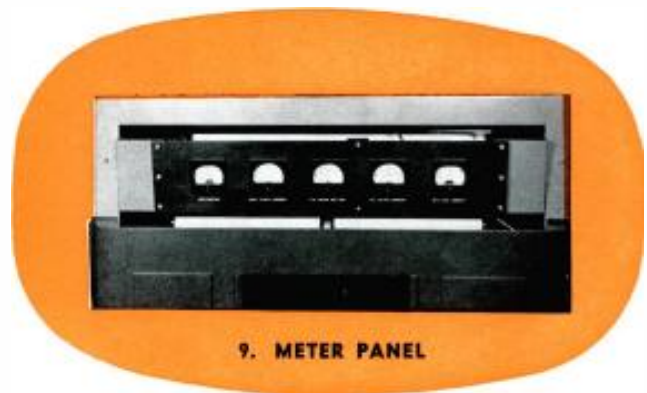
All tubes are visible through the front window and all tuning controls are located on the front of the transmitter.

One vertical door, located on each side of the front window, provides access to the various controls and adjustments. The filament and plate power switches and their associated indication lights are located below these doors on the front of the transmitter.

Double doors on the rear of the cabinet provide instant access to the interior of the equipment.

A "clip-in" panel below the window covers the compartment in which the time delay circuits, the plate relay and the primary terminal block are located.

The top panel on the front of the transmitter can be removed (See Picture 9) by releasing two screws. Thus, the meters are readily accessible for any necessary maintenance.



This ruggedly constructed cabinet is finished in an attractive high gloss two-tone grey enamel. Streamlined polished chrome styling adds to the modern appearance and results in a transmitter of striking eye appeal.



SPECIFICATIONS

FREQUENCY RANGE

540-1600 kc standard.
Frequencies to 18mc available.

POWER OUTPUT

1000/500 watts.

FREQUENCY STABILITY

± 10 cps.

AUDIO FREQUENCY RESPONSE

Within ± 1.5 db from
50 to 10,000 cps.

AUDIO FREQUENCY DISTORTION

Less than 3% from 50-7500 cps for
95% modulation, including
all harmonics up to 16 kc.

RESIDUAL NOISE LEVEL

60 db below 100% modulation.

CARRIER SHIFT

Less than 5%.

RF OUTPUT IMPEDANCE

75/50 ohms standard. Other
impedances available.

AUDIO INPUT IMPEDANCE

600/150 ohms.

AUDIO INPUT LEVEL

+ 10 dbm ± 2 db., Pad input.

AMBIENT TEMPERATURE RANGE

+ 15° to + 45° C.

ALTITUDE RANGE

Sea Level to 6000 feet.

POWER SOURCE

208/230 V single phase 50/60 cps.

POWER DEMAND

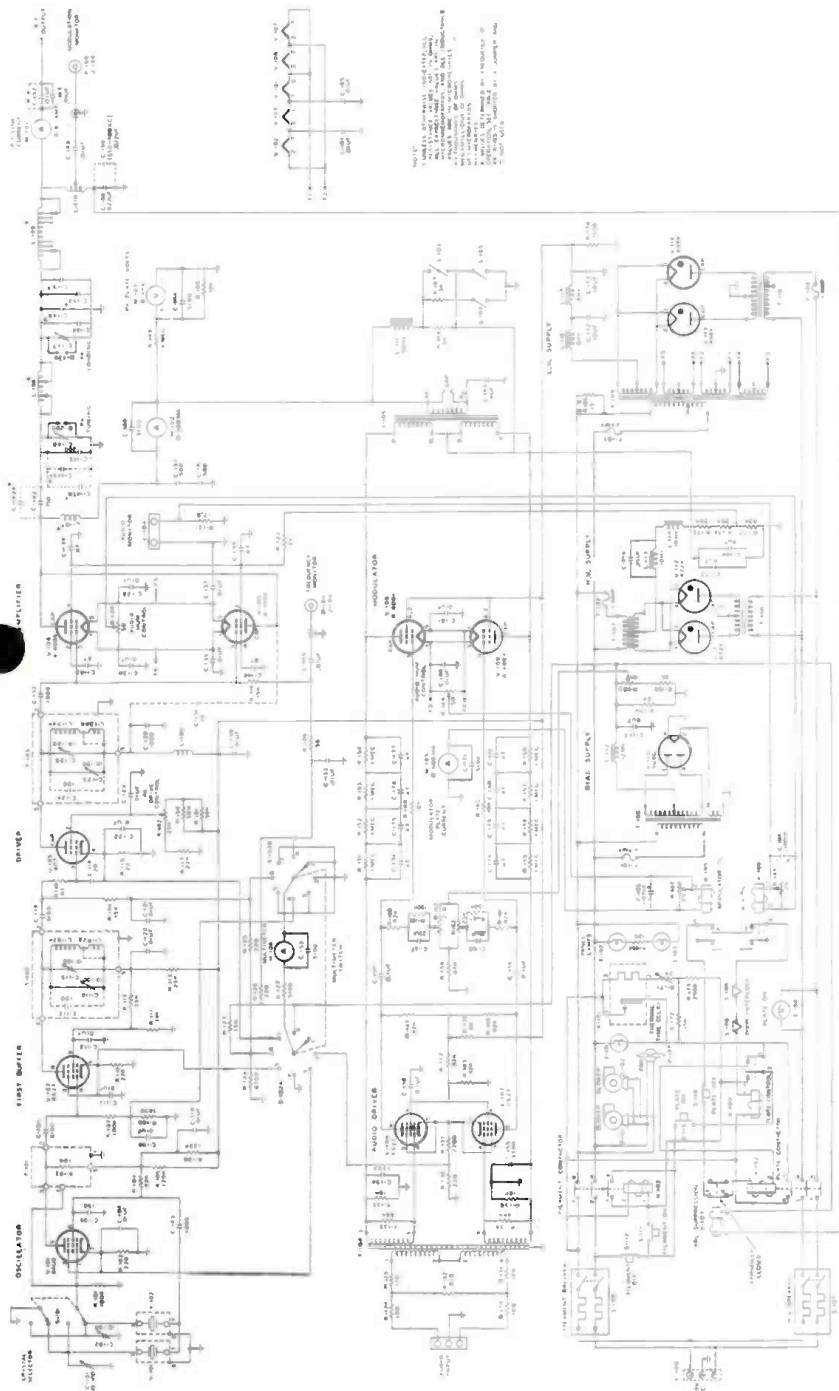
4.25 kw, 90% PF at
100% modulation.

WEIGHT

Approximately 1150 lbs.

DIMENSIONS

38" wide, 76" high, 27" deep.



SCHEMATIC DIAGRAM

BROADCAST EQUIPMENT

Collins Broadcast Equipment is engineered to advanced performance standards. Operation is reliable, smooth and straightforward. Thorough consideration has been given to operating detail, in order to incorporate every possible convenience.

The years of successful experience in designing and producing fine audio equipment are reflected in the confidence placed in us by many customers who have asked us to lay out their entire station facilities.

We will be happy to work with you on the overall specifications of your individualized equipment. By obtaining your full requirements in broadcast equipment from us, you get not only the best individual units for your purposes, but also the assurance that you have an integrated system with superior overall performance.

- TRANSMITTERS • ANTENNAS • SPEECH INPUT CONSOLES
- REMOTE EQUIPMENT • RACK MOUNTED EQUIPMENT • TEST AND MONITORING EQUIPMENT • ANTENNA ACCESSORIES
- RACKS AND PANELS • TURNTABLES AND TRANSDUCERS

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA



11 W. 42nd Street,
NEW YORK 36

1930 Hi-Line Drive,
DALLAS 2

2700 W. Olive Avenue,
BURBANK

Dogwood Road, Fountain City,
KNOXVILLE

COLLINS RADIO COMPANY OF CANADA, LTD., 74 Sparks Street, Ottawa, Ontario

**21E/M
TRANSMITTERS**



Collins

21E/M

**5/10 KW BROADCAST
TRANSMITTER**

THE *Collins* 21E/M TRANSMITTER

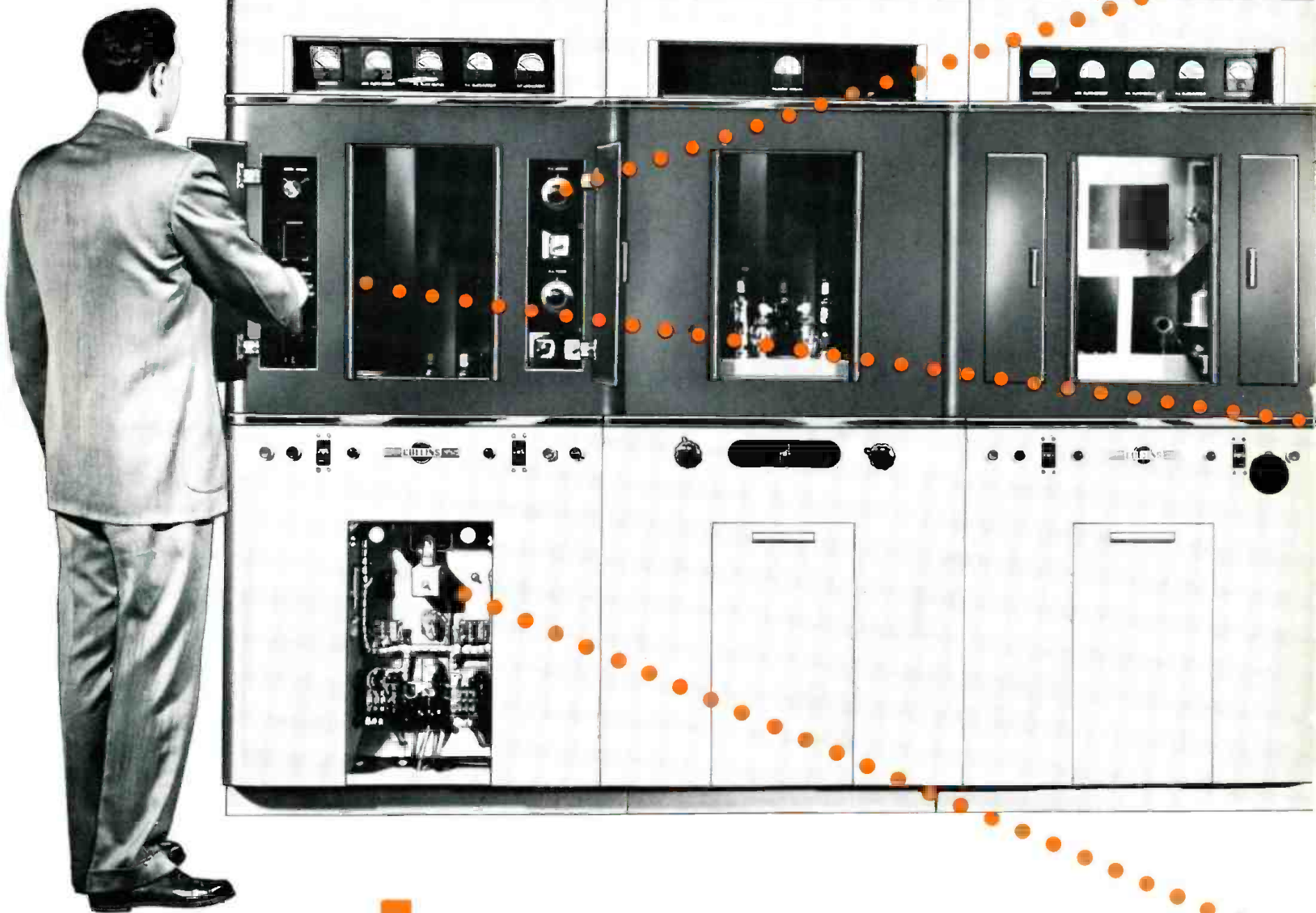


The 5000 watt 21E and 10,000 watt 21M are clean, straight-forward electrically and mechanically designed transmitters that permit operation not only in the standard broadcast band but on short wave as well. They are supplied for any frequency from 540 kilocycles to 18 megacycles.

The 21 square feet of floor space occupied by the 21E/M is $\frac{1}{3}$ to $\frac{1}{2}$ less than the space occupied by the average broadcast transmitter of this power output. The weight has been reduced correspondingly. Dependability, long-life, and the savings in size and weight have been achieved by taking advantage of the improved performance offered by modern tubes and components and the use of simplified circuitry design. All transformers and reactors are of the dry type, eliminating the concrete vault required with earlier transmitters using oil-filled components.

The 21E/M is easily serviced and maintained, thus keeping lost air time to a minimum. Full view of all tubes is provided through plate glass windows and all important circuits are metered. Access to relays and contactors for inspection and adjustment may be gained while on the air by the easy removal of access covers on the front of equipment. A removable section at the top front of each cabinet exposes the meter panels for cleaning and maintenance. All other components are accessible through the rear doors, or rear access panels. These doors are equipped with both AC primary interlocks and high voltage shorting switches for protection of operating personnel.





visibility . . . accessibility

TUBES . . . All tubes are visible through the front windows.

CONTROLS . . . Tuning and metering controls are located behind four access doors on the front of the transmitter. Filament and plate power push-buttons are located below these doors on the front panel.

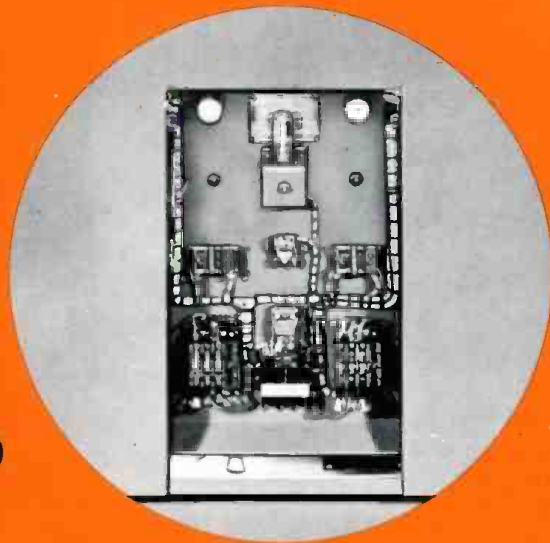
RELAYS . . . Control relays are accessible through identical removable insert panels located on the lower front panel of each of the three cabinets.



DRIVER CABINET OPERATING CONTROLS



DRIVER CABINET AUDIO CHASSIS



DRIVER CABINET RELAY ENCLOSURE

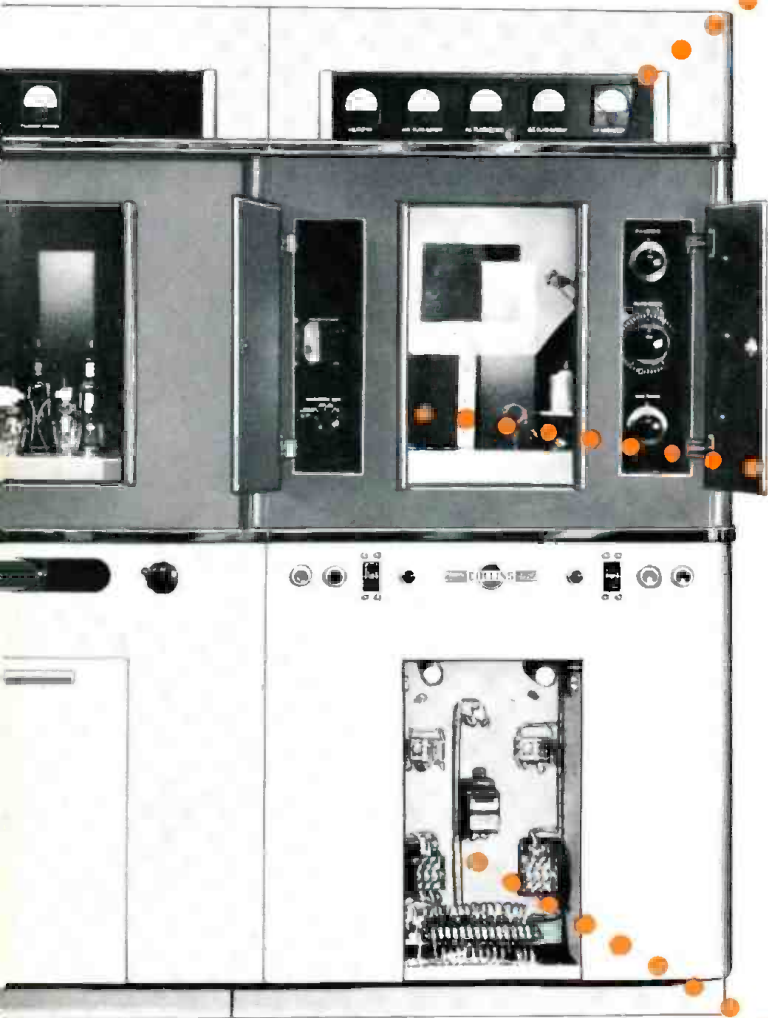
operating controls...

The control circuits have been designed for flexibility, operating convenience and optimum equipment protection. Pushbutton control of filament and plate power is provided. If desired, the pushbutton and indicating light circuits may be extended to a remote position.

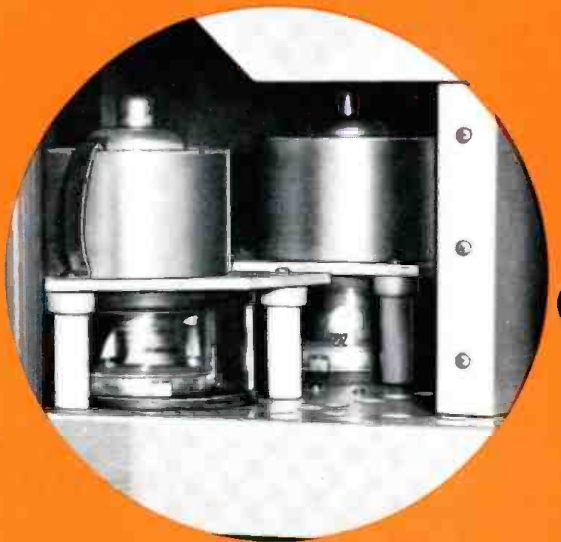
Automatic sequencing is supplied; pressing the final amplifier plate on button causes all filament, bias and plate voltages to be applied in correct sequence and with the proper time delays. Pressing the filament off button instantly removes all power except that applied to the blower motor, which continues to run for a period adjustable up to 5 minutes, and then shuts off.

audio... The input to the audio system consists of a terminating pad that feeds the primary of the audio input transformer. The first audio stage employs pentode-connected 6SJ7 tubes in a push-pull Class A amplifier. Type 4-125A tubes are used in the push-pull Class A audio driver. The 4-125A audio drivers are resistance coupled to the grids of a pair of 3X3000A1, push-pull, Class AB₁ modulator tubes. Approximately 12 db of feedback is provided from plates of the modulator tubes to grids of the first audio stage.

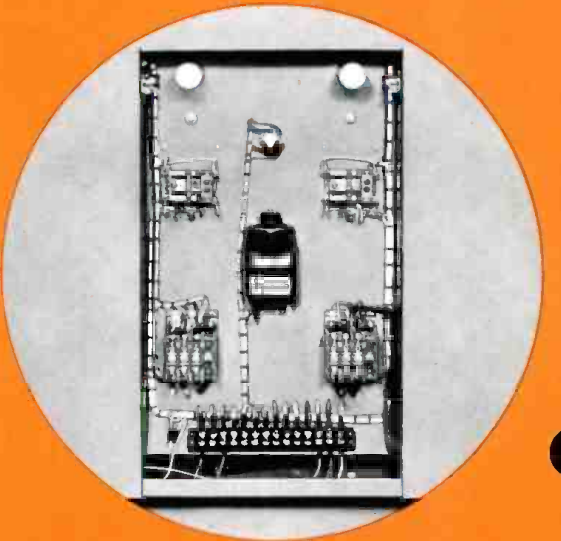
thermal time delay... In keeping with the modern circuitry of these transmitters, a thermal time-delay circuit is employed. The time-versus-temperature cooling curve of this circuit closely approximates the cooling characteristics of the rectifier and amplifier filaments, thereby giving the delay circuit the ability to select the proper time interval after a carrier interruption of any given length. The cold-start delay period can be adjusted for any value between 15 and 45 seconds. However, when a short carrier interruption occurs, the delay circuit allows only enough time for the filaments to reach operating temperature before the transmitter can be returned to the air. After an instantaneous power interruption, the carrier can be returned to the air immediately. This circuit represents a considerable improvement over the oil-filled dash-pots and motor-driven time delay circuits that hold the carrier off the air for a more or less standard delay period regardless of whether the transmitter is being energized from a cold start or whether the power has been off for only a moment.



POWER AMPLIFIER CABINET METERS



POWER AMPLIFIER MODULATORS



POWER AMPLIFIER RELAY ENCLOSURE

metering... Meter panels are tilted at an angle for ease of operation and observation of transmitter performance. The following circuits are metered:

- RF Line Current
- Final Amplifier Plate Voltage
- Final Amplifier Plate Current
- Modulator Plate Current
- Final Amplifier Grid Current
- Back Modulator Cathode Current
- Front Modulator Cathode Current
- Back Final Amplifier Cathode Current
- Front Final Amplifier Cathode Current
- RF Driver Line Current
- RF Driver Plate Voltage
- RF Driver Plate Current
- Audio Driver Cathode Current
- RF Driver Grid Current
- 807 Cathode Current
- 807 Grid Current
- 6SJ7 Cathode Current
- 6SJ7 Grid Current
- Crystal Oscillator Cathode Current
- Audio Amplifier Cathode Current
- AC Filament Primary Voltage

The top panel on the front of each cabinet can be

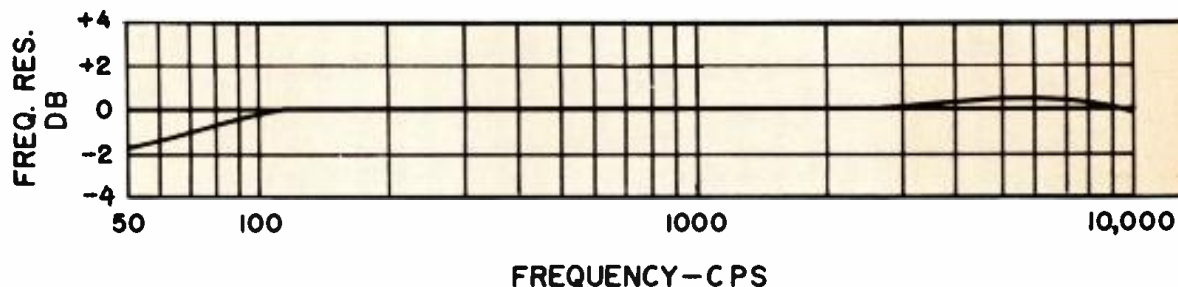
removed by releasing two screws. Thus, the meters are readily accessible for any necessary maintenance.

high level modulation... Class AB₁ high level modulation is used employing Eimac 3X3000A1 tubes. These tubes are physically interchangeable with the 3X2500A3 tubes used in the final amplifier but have performance characteristics ideal for audio use. With Class AB₁ operation, the audio driver transformer and its attendant problems is eliminated.

overload relays... Adjustable overload relays are furnished for the RF driver, audio driver, power amplifier and modulator stages. An overload in the RF driver or audio driver stages removes all plate voltages. An overload in the power amplifier or modulator stages causes plate power to be removed and reapplied. If the overload has cleared, the equipment then remains on the air in normal operation. However, if the overload persists or if a second overload occurs within a 4-second period, the plate voltage is removed and must be reapplied manually.

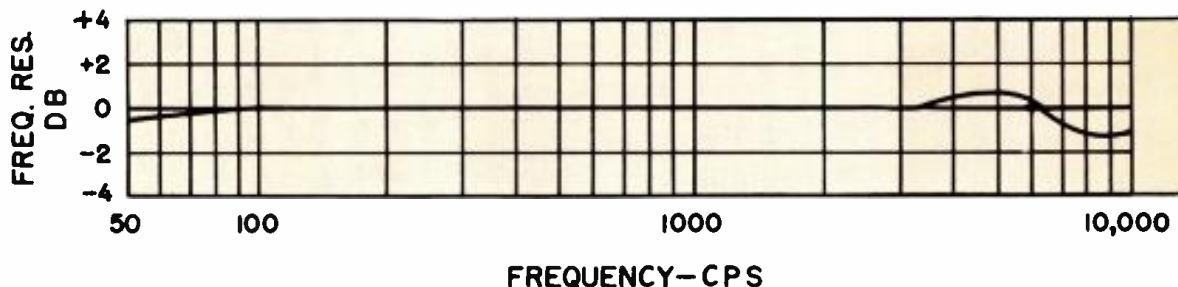
21E AUDIO FREQUENCY RESPONSE

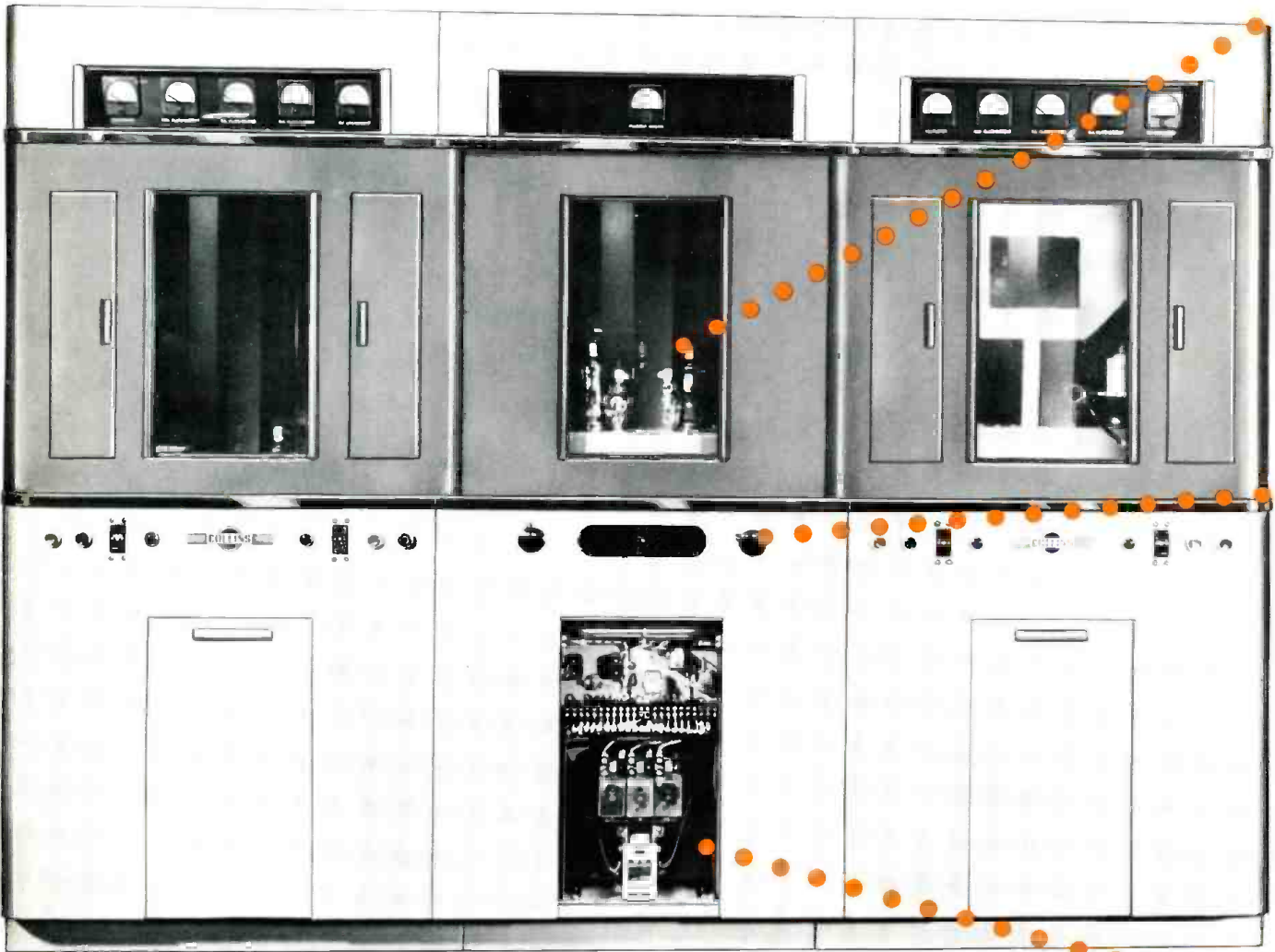
95% MOD

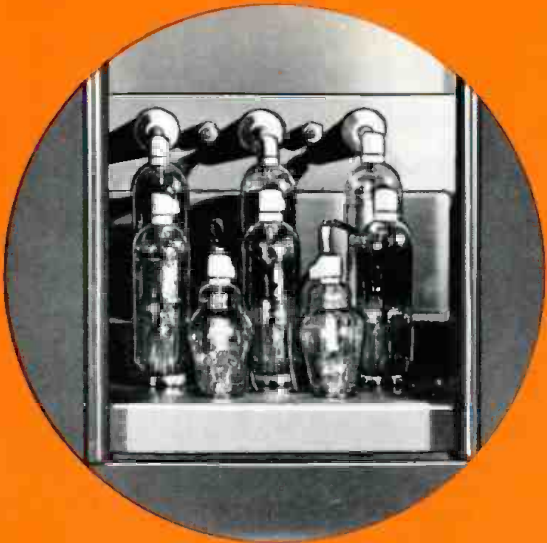


21M AUDIO FREQUENCY RESPONSE

95% MOD



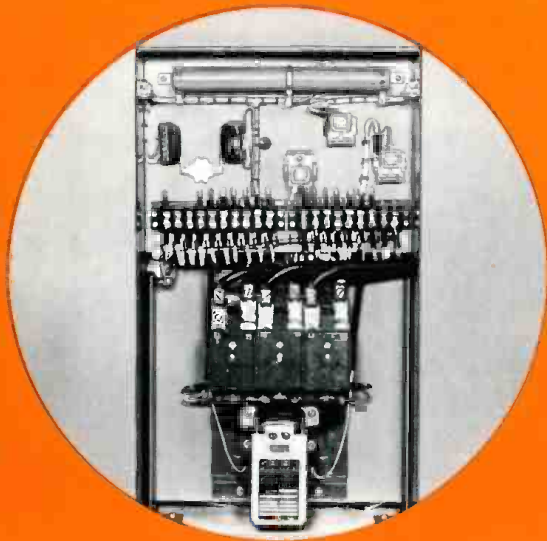




POWER SUPPLY CABINET RECTIFIER TUBES



POWER SUPPLY CABINET OPERATING CONTROLS

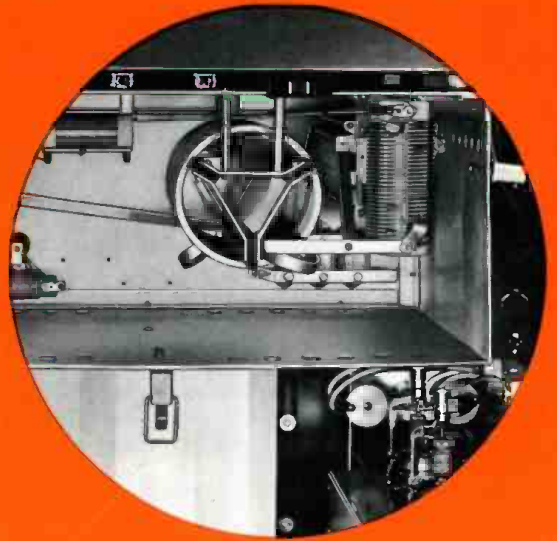
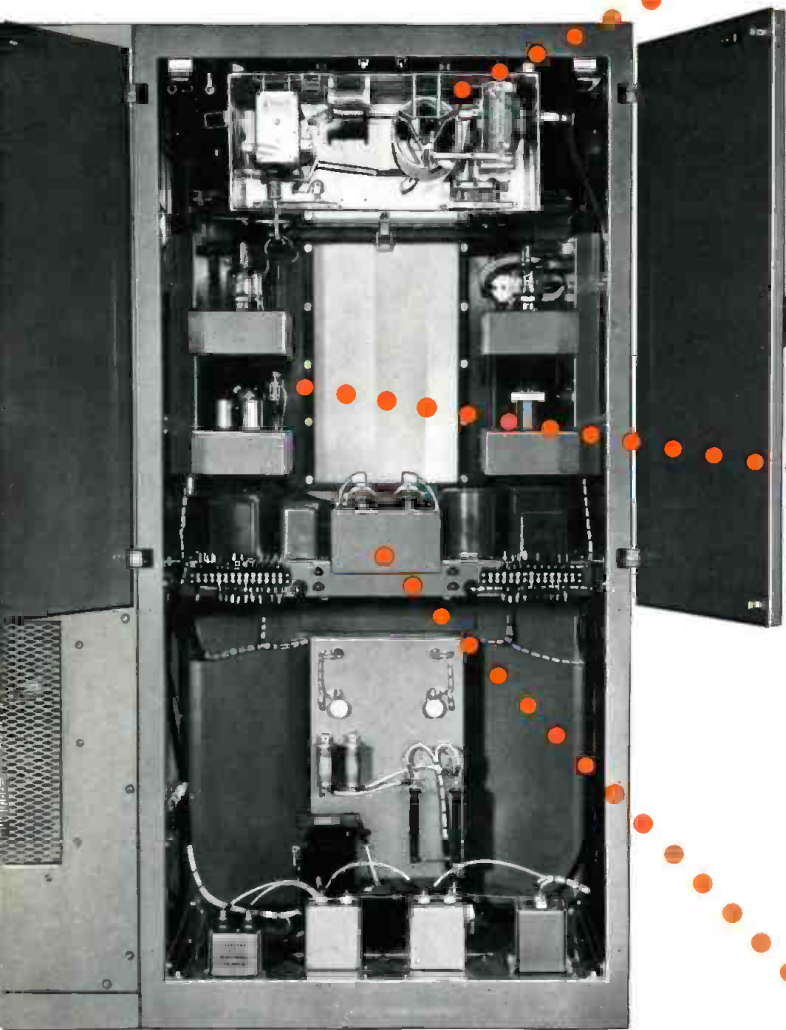


POWER SUPPLY CABINET RELAY ENCLOSURE

power supplies... Plate voltage for the modulator and final amplifier is supplied by a common high voltage supply. Bias for the modulator and final amplifier is provided by a common low voltage supply. Plate voltage for the audio driver and RF driver is supplied by a common power supply. A separate low voltage supply feeds the audio driver screens as well as the plates and screens of the other RF and audio tubes. A second bias supply provides approximately 100 volts for the audio driver and RF driver bias and lesser voltage for other biasing throughout the transmitter.

voltage control... Filament voltage adjustment control, high-low power control, and a high voltage breaker control are located on the front of the center cabinet just below the window. The magnetic high voltage breaker removes the primary voltage automatically upon a heavy overload in the transformer primary circuit and can be reset immediately after the overload is cleared.

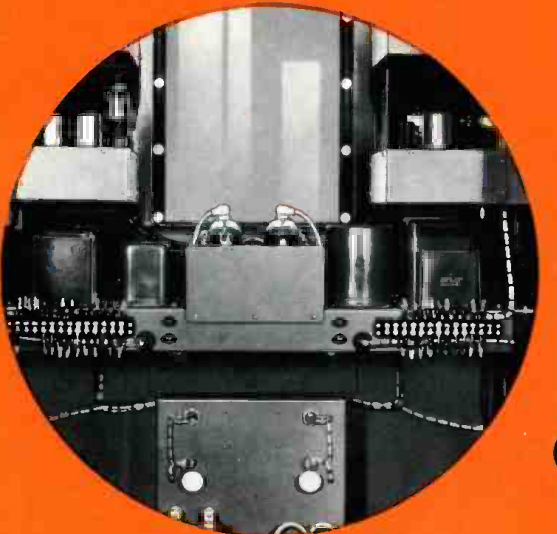
relay accessibility... AC power circuit equipment is readily accessible by removing the clip-in flush panels on the lower front of the transmitter cabinets. All controls are available for adjustment while the transmitter is in operation.



DRIVER CABINET OUTPUT NETWORK



DRIVER CABINET RF CHASSIS



DRIVER CABINET LOW VOLTAGE POWER SUPPLY

shielding . . . The entire RF network is double shielded to reduce spurious radiation. RF circuits are completely independent of the cabinet proper. All materials and components are of the highest Collins quality and assure long life with trouble-free operation.

frequency control . . . As a result of major advances in crystal stability and oscillator design, the 21E/M Transmitter has eliminated the use of a crystal oven and its associated thermostats, relays and other controls. A highly perfected oscillator design in conjunction with extremely stable, low temperature coefficient crystals has resulted in exceptionally good frequency stability. There are provisions for mounting two crystals on the RF chassis, with one of the two always available in a stand-by condition. Crystals are easily selected by means of the crystal selector switch located behind the right-hand control panel.

All RF circuits of the 21E/M Transmitter are extremely straightforward and trouble-free. The oscillator, buffer and RF driver plate circuits are contained within shielded plug-in units located behind the right front access door of the driver cabinet. For frequencies in the AM broadcast band, the oscillator employs a resistive load. As the 21E/M Transmitter is also available for high frequency applications, provisions are included for replacing the resistor with a

tuned tank circuit for frequency doubling. A frequency monitor connection is brought out from the grid circuit of the driver amplifier.

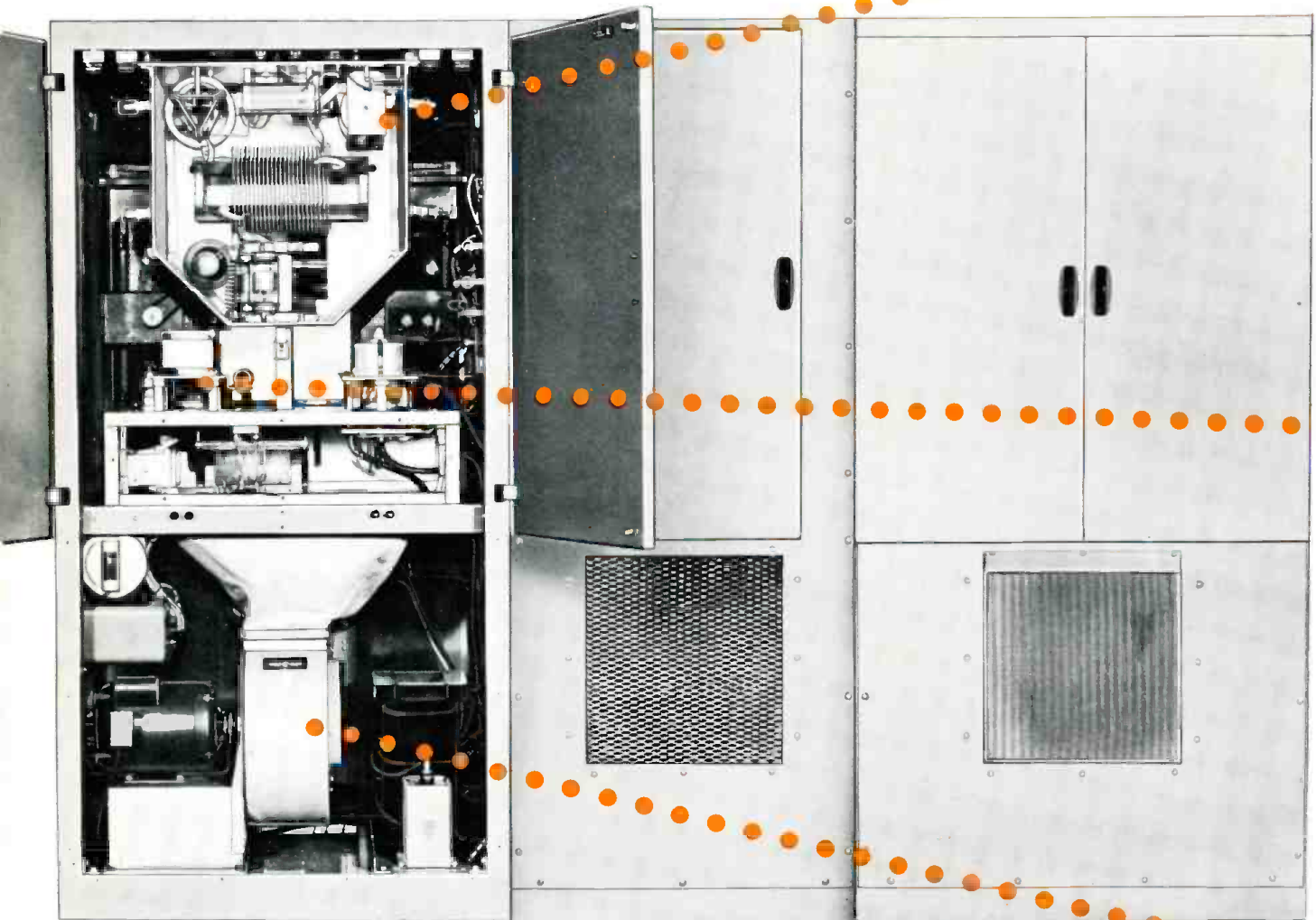
The RF output network consists of a pi section followed by an L section and is designed to feed into impedances between 50 and 72* ohms. Harmonics are greatly attenuated in this network. There is a minimum of fundamental frequency loss between the power amplifier and transmission line.

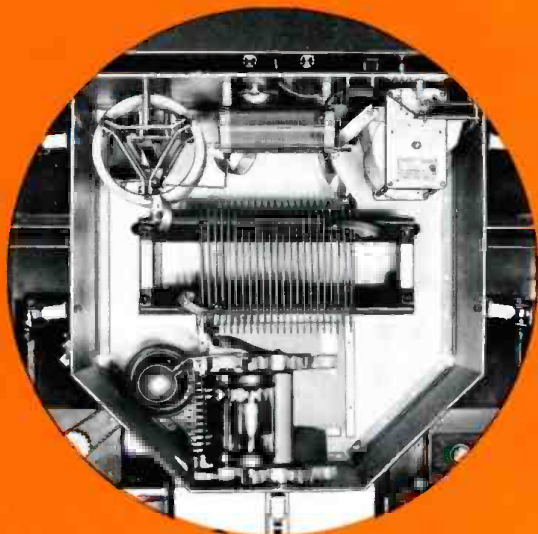
**Other impedances are available on special order.*

driver power supplies . . .

The driver unit has separate power supplies for high voltage, low voltage and bias. The high voltage supply employs two type 872A half-wave mercury vapor rectifiers in a single-phase, full-wave circuit. It supplies dc voltage for the plates of the audio drivers and the plates and screens of the RF driver tubes.

The low voltage supply uses two type 866A half-wave mercury vapor rectifiers in a single-phase full-wave circuit to provide dc voltage for plates and screens of the low power stages and for screens of the audio driver tubes. The bias supply employs a 5U4G high vacuum rectifier in a single-phase, full-wave circuit. It supplies bias to the 807 amplifier, audio driver, and RF driver amplifier tubes, and dc voltage for the arc-suppression circuit.





POWER AMPLIFIER OUTPUT NETWORK



21M POWER AMPLIFIER RF CHASSIS



POWER AMPLIFIER CABINET BLOWER

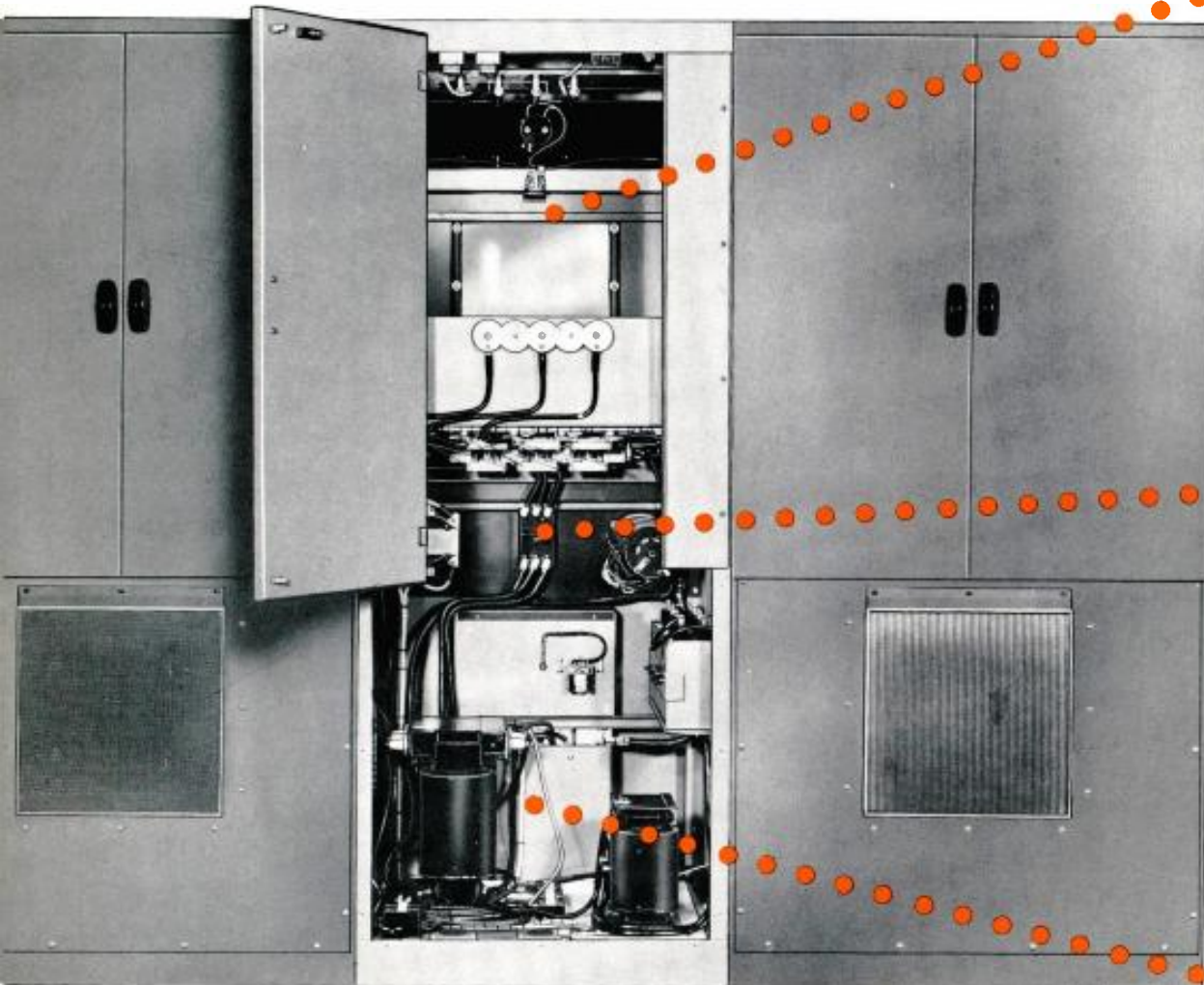
output network . . . Special design attention has been given the RF output network in the 21E/M. A high degree of harmonic attenuation has been accomplished and the network loss between the final stage and the transmission line has been minimized.

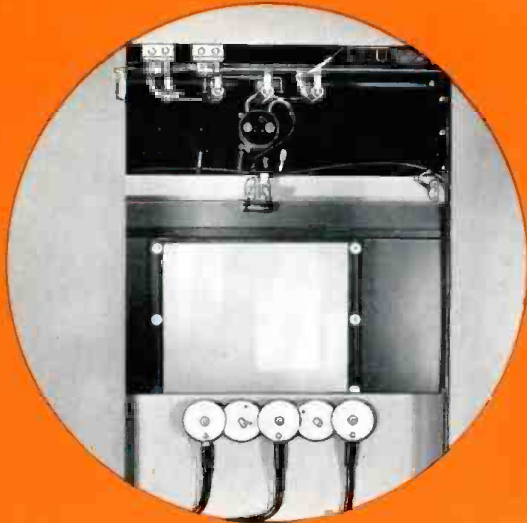
The entire RF network is double shielded to reduce spurious radiation and all RF circuits are completely independent of the cabinet proper.

Another feature of the Collins 21E/M Broadcast Transmitters is the arc-suppression circuit. This circuit protects the final amplifier and RF driver tank circuits against arcs to ground due to lightning or other causes. Should such an arc occur, this circuit removes plate power until the arc is extinguished, then returns the equipment to normal operation.

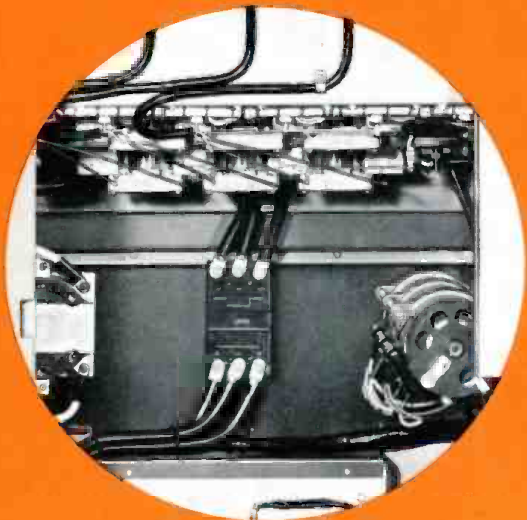
conversion . . . Conversion of the 21E into the Collins 21M 10 kilowatt Transmitter is simple and easy, and may be performed either at the factory or in the field by the customer. The modification consists principally of adding a final amplifier tube and changing certain transformers and reactors. For the customer who initially installs a 21E but desires to increase his power to 10 kilowatts at a later date, the 21M conversion kit can be easily installed between sign-off time in the evening and sign-on time in the morning.

cooling system . . . Cabinet ventilation in the final amplifier is obtained through a blower in the base of the cabinet, providing quiet, trouble-free cooling for all components and tubes. The blower produces a high capacity at a quiet, low speed and continues to run for an adjustable period of up to five minutes after power removal. Ventilation in the other two cabinets is provided by means of circulating fans.





POWER AMPLIFIER CABINET INTERLOCKS



POWER SUPPLY CABINET RECTIFIER CHASSIS



POWER SUPPLY CABINET MODULATION TRANSFORMER

personnel protection...

Dual interlocks, both electrical and mechanical in nature, are incorporated on each of the rear doors to provide double protection to personnel. The electrical interlocks, which are of the split V type, open primary circuits of the high and low voltage transformers whenever the rear doors are opened. The mechanical interlocks close after the electrical interlocks have opened the primary circuits.

circuit protection...

Overload protection is provided by magnetically operated circuit breakers in the filament, blower and plate input lines. In addition, each filament transformer and the bias plate transformer are protected by suitable fuses. The power amplifier and modulator tubes and circuits are also protected by means of individual plate current overload relays.

modulation capabilities...

Simplified modulation transformer design plus advanced circuitry has resulted in a compact and efficient modulator. Conservative ratings and highest quality components contribute to the modulation capability of the 21E/M. Low audio distortion and excellent stability are obtained through the use of ample feedback in the audio system.



SPECIFICATIONS

FREQUENCY RANGE	540 – 1600 kc standard, frequencies to 18 mc available
POWER OUTPUT	21E – 5,500 Watts 21M – 10,600 Watts
FREQUENCY STABILITY	555 kc to 1605 kc ± 10 cps 10°C to 50°C 1600 kc to 18 mc $\pm 0.002\%$ +20°C to +45°C
AUDIO FREQUENCY RESPONSE	Within ± 2 db from 50 to 10,000 cps measured at 95% modulation
DISTORTION	Less than 3% from 50 to 7500 cps at 95% modulation, including all harmonics up to 16 kc
RESIDUAL NOISE LEVEL	55 db below 100% modulation from 0 to 30 kc 60 db below 100% modulation from 150 cycle to 7500 cps
CARRIER SHIFT	Less than 3%
RF OUTPUT IMPEDANCE	75/50 ohms standard. Other impedances available
AUDIO INPUT IMPEDANCE	600/150 ohms
AUDIO INPUT LEVEL	+10 dbm, ± 2 db, 600 ohms input with built-in input pad. With the input pad removed, -5 dbm is sufficient for 100% modulation. 150 ohm connection of input transformer is possible when desired.
TEMPERATURE RANGE	+15° to +45°C ambient
ALTITUDE RANGE	Sea Level to 6000 feet
POWER SOURCE	208/230 V three phase 50/60 cps 50 cps on special order



WEIGHT

Approximately 2700 lbs. for 21E
 Approximately 3000 lbs. for 21M

DIMENSIONS

105 1/4" wide, 76" high, 28" deep
 (Plate transformer extra)

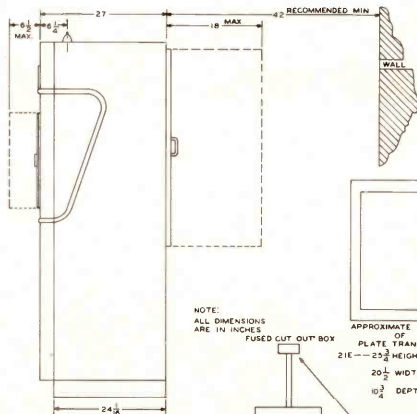
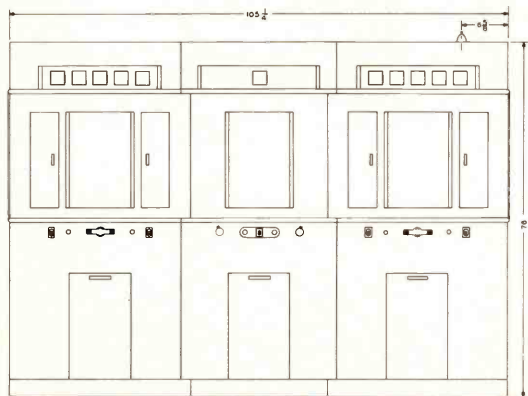
POWER DEMAND APPROXIMATES

		POWER (KW)	POWER FACTOR (%)
*5000 WATTS OUTPUT			
Filaments and Blower Only			
5000 Watts		2.64	75.7
Output —	No Modulation	12.8	90.0
	— 30% Modulation	13.8	90.0
	— 100% Modulation	18.5	90.0
*10,000 WATTS OUTPUT			
Filaments and Blowers Only			
10,000 Watts		3.28	76.5
Output —	No Modulation	21.2	90.5
	— 30% Modulation	23.6	91.0
	— 100% Modulation	32.8	91.5

TUBE COMPLEMENT

21E			21M		
1	6AU6	Crystal Oscillator	1	6AU6	
1	6SJ7	Buffer or Multiplier	1	6SJ7	
1	870	Amplifier	1	807	
2	4-125A	Driver	2	4-125A	
1	3X2500A3	Final Amplifier	2	3X2500A3	
2	6SJ7	Audio Amplifier	2	6SJ7	
2	4-125A	Driver Amplifier	2	4-125A	
2	3X3000A1	Modulator	2	3X3000A1	
1	5U4G	Exciter Bias	1	5U4G	
2	866A	Final Amplifier Bias	2	866A	
2	866A	Low Voltage Plate	2	866A	
2	872A	Intermediate Plate	2	872A	
6	872A	High Voltage Plate	6	575A	

**21E capable of 5,500 Watts Output, 21M capable of 10,600 Watts Output*



NOTE:

ALL DIMENSIONS
ARE IN INCHES

FUSED CUT OUT BOX

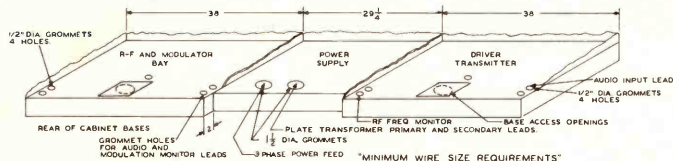
APPROXIMATE DIMENSIONS
OF

PLATE TRANSFORMER

2 1/2" — 2 1/2" HEIGHT 3 1/2" — 2 1/4"

20 1/2" WIDTH 2 1/2"

10 1/2" DEPTH 12 1/2"



"MINIMUM WIRE SIZE REQUIREMENTS"

CONNECTION

POWER LINE FEED FROM FUSED WALL CUTOUT
BOX FOR 200/250 VOLT THREE PHASE 30/80
CPS POWER SOURCE

TRANSFORMER PRIMARY LEADS

TRANSFORMER SECONDARY LEADS

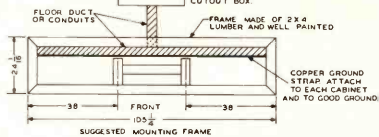
TRANSFORMER FRAME

SIZE OF WIRE

THREE NO 2 RUBBER COVERED BUILDING WIRE FOR THE 2IE.
THREE NO 0 RUBBER COVERED BUILDING WIRE FOR THE 2IM.
ONE GROUND AT LEAST NO 4 WIRE
(FUSE THE 2IM AT 125 AMPERES, THE 2IE AT 100 AMPERES.)SIX NO 6 RUBBER COVERED BUILDING WIRE FOR THE 2IE.
SIX NO 4 RUBBER COVERED BUILDING WIRE FOR THE 2IM.

THREE NO 12 OR 14 10,000 VOLT INSULATION.

ONE NO 4 BARE WIRE TO CABINET GROUND.



SUGGESTED MOUNTING FRAME

CONNECTION

R-F FREQUENCY MONITOR FEED

MODULATION MONITOR FEED

INPUT AUDIO LEAD

AUDIO MONITOR LEAD

R-F TRANSMISSION LINE

SIZE OF WIRE

RG/8U COAXIAL CABLE

RG/8U COAXIAL CABLE

SHIELDED PAIR

SHIELDED PAIR

7/8 OR 1 1/8 50 OR 72 OHM RIGID

COAXIAL CABLE FOR THE 2IE

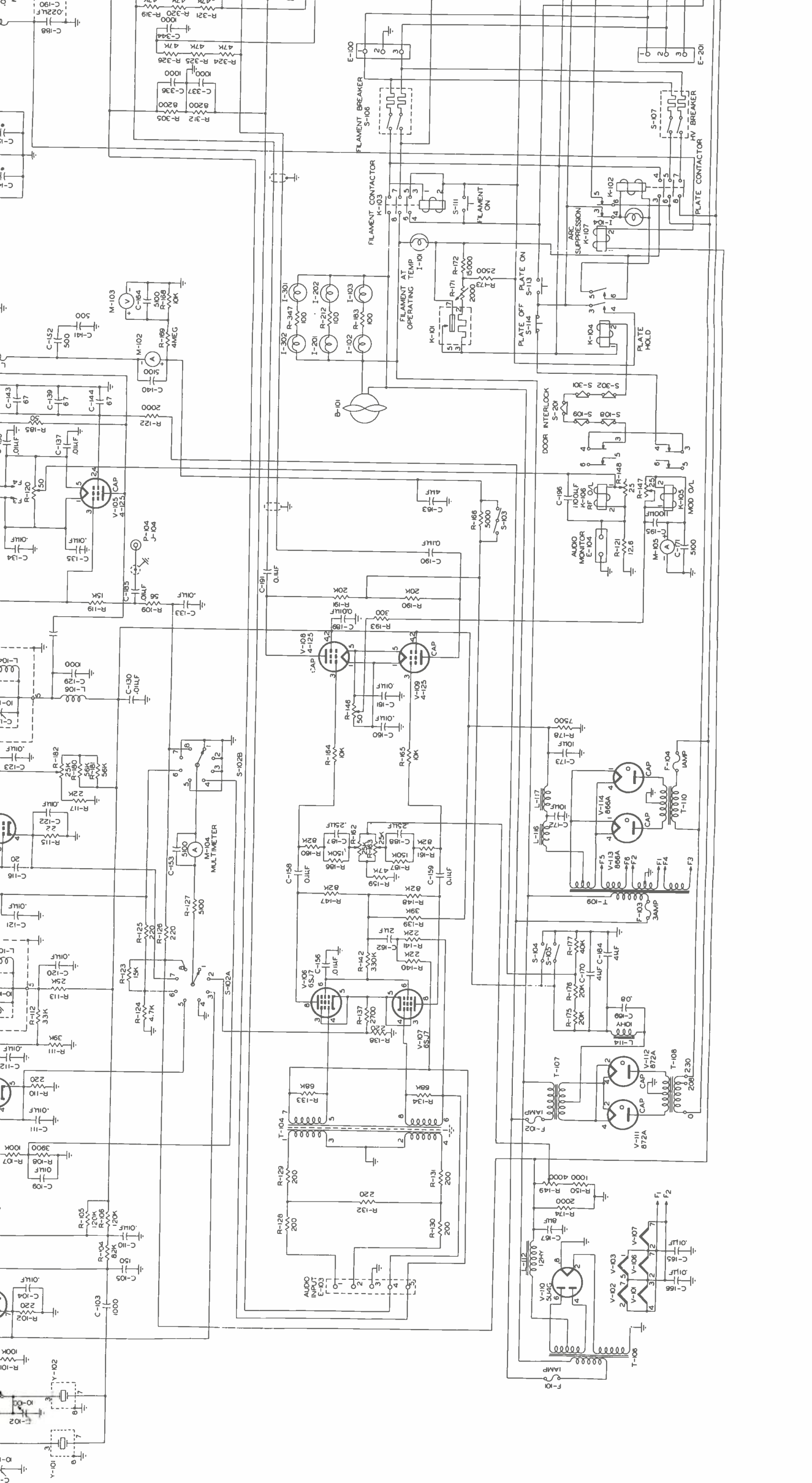
1 1/8 OR 72 OHM RIGID

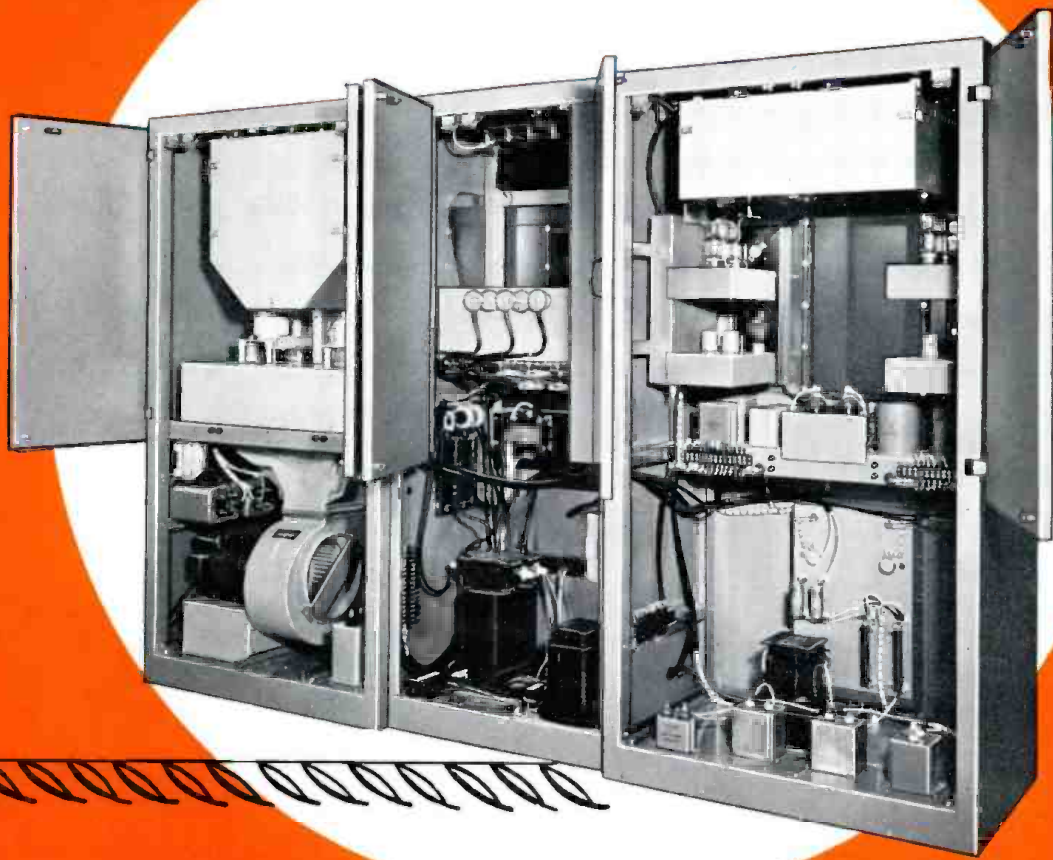
COAXIAL CABLE FOR THE 2IM.

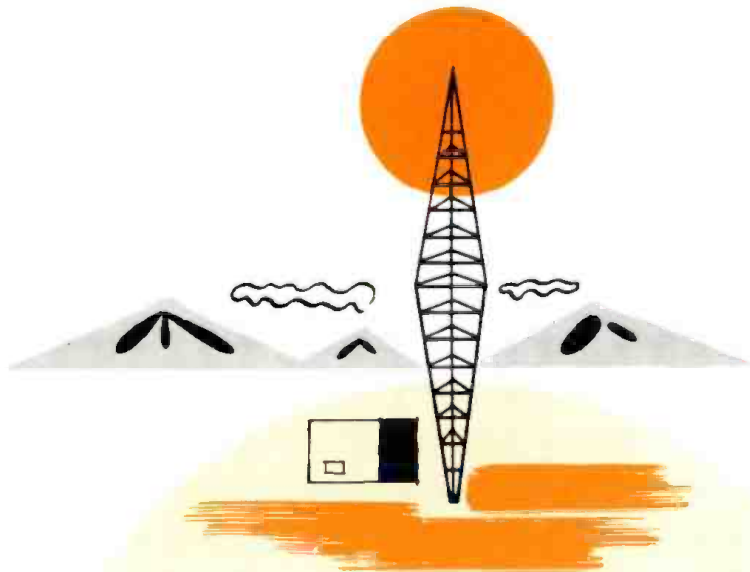
NOTE

IF A DUCT IS USED TO REMOVE THE
WARM AIR, EMPLOY AN EXHAUST
BLOWER OF AT LEAST 1500 CFM
CAPACITY. ALLOW NO BACK
PRESSURE WITHIN ANY CABINET.

INSTALLATION DRAWING







You get the benefits of advanced engineering
in all Collins Broadcasting Equipment —
transmitters, in powers of 250 watts
to 10 kilowatts, speech input consoles, remote
amplifiers, rack mounted speech
equipment, test and control equipment,
custom designed audio equipment,
transducers and accessories
for every need.

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA

11 W. 42nd Street
NEW YORK 36

1930 Hi-Line Drive
DALLAS 2

2700 W. Olive Avenue
BURBANK

Dogwood Road, Fountain City
KNOXVILLE

COLLINS RADIO COMPANY of CANADA, LTD., 74 Sparks Street, OTTAWA 4, ONTARIO





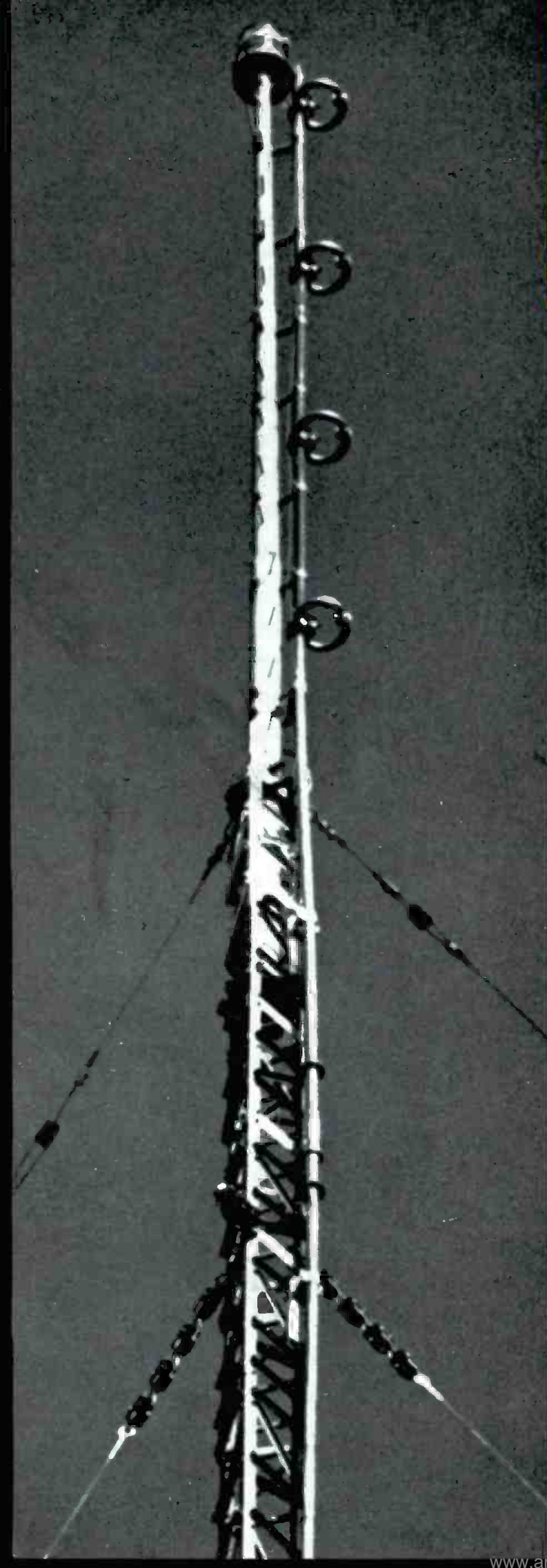
37M

the

COLLINS

37 M

FM Ring Antenna



STREAMLINED SIMPLICITY:

The Collins 37M Series Ring Antennas consist of only two basic parts: (1) radiating rings and (2) connecting inter-ring transmission line. Any number of rings, either odd or even, may be employed, providing maximum flexibility in available power gains for the requirements of the particular installation.

Only one inter-element transmission line is required to feed all rings in a multiple element array. The individual radiating rings are identical mechanically and electrically. They are both shunt fed and mechanically supported by this single interconnecting feed line, which consists of modified lengths of standard RMA specification rigid coaxial transmission line of suitable size for the transmitter power being employed. The 37M terminates in a standard RMA 51.5 ohm flange connection on the bottom element of the array for coupling directly to the transmission line.

LIGHT WEIGHT AND WINDLOADING:

Due to the simplicity of its electrical and mechanical design, the 37M is so light and compact that the resulting dead weight and windloads are reduced to a previously unknown low for FM antennas. The aerodynamic simplicity and low weight of the 37M are achieved through the complete elimination of massive radiating elements, complex external multiple line feed systems, bulky supporting structures, and unwieldy multiple element units in the individual radiating section. Greater efficiencies can be obtained and savings made in new tower costs, erection time and maintenance expense, by installing the 37M. For maximum power gains at low weight and windloads, the 37M is unexcelled.

METHOD OF MOUNTING:

Two advantageous methods of mounting the 37M Antenna are available to the FM broadcaster:

(1) Side mounting of the array on a corner leg of the tower offers definite advantages. Towers, either guyed or self-supporting, which previously have been considered incapable of supporting *any* FM antenna will in nearly all cases handle the Collins side mounting 37M. Towers which support top mounting television antenna arrays increase their usefulness with the addition of a Collins side mounting 37M array. Any number of rings may be side mounted, obviating the necessity of modifying the top of the tower or disturbing in any way the tower lighting equipment, top mounting TV radiator, or the tower proper.

(2) The top or pole mounting design is available on special

COLLINS FM RING ANTENNA outstanding in all features

order for installation on towers where no TV antenna is present or planned. This style of mounting provides the maximum in height and coverage.

The light weight and windloading of the top mounting array allow erection on most guyed and self-supporting towers without extensive tower modification.

INSTALLATION EASE:

The unique characteristics of light weight and electrical-mechanical simplicity make the 37M Antenna easy and quick to erect. There are no extraordinarily heavy hoisting problems, and many hours of erection time may be saved. Support brackets are specially fabricated for each installation to match the tower and mounting arrangement specified by the purchaser, thus minimizing erection problems at the site.

MECHANICAL STABILITY:

Another important advantage of the 37M is the inherent mechanical stability of the tower, transmission line, and antenna assembly. Undue oscillating and weaving of the

tower and antenna are eliminated by the low weight and windload which result in reduced strain on the supporting structure as well as reduction in tower maintenance costs.

CIRCULAR RADIATION PATTERN:

The horizontal radiation pattern of the 37M is essentially circular for both top mounting and side mounting arrays. A maximum deviation of only 1 db is obtained in the top or pole mounted arrangement, while the circular pattern of the side mounted array will generally equal that of the top mounted antenna. The extent of deviation from a circular pattern in the side mounted antenna is normally minor and is dependent on the type and size of tower on which the antenna is mounted. Under the most unfavorable tower conditions the side mounted pattern has proved to be extremely good and entirely acceptable.

HIGH GAIN:

One of the most outstanding features of the new Collins FM Antenna is the availability of high power gains. The flexi-

bility of the number of rings, either odd or even, which may be used, provides a power gain to meet the requirements of each installation.

LOW VSWR:

The voltage standing wave ratio of the 37M can be maintained at better than 1.1 to 1 due to the inherently high stability of the tuning system. Adequate bandwidth virtually eliminates detuning effects caused by changes in atmospheric conditions.

AMPLE POWER CAPACITY:

Antenna arrays mounted on 1 7/8" or 3 1/8" line are available for handling transmitter powers up to 20 kw. There is a 37M to meet your particular power and gain requirements.

DE-ICING PROVISIONS:

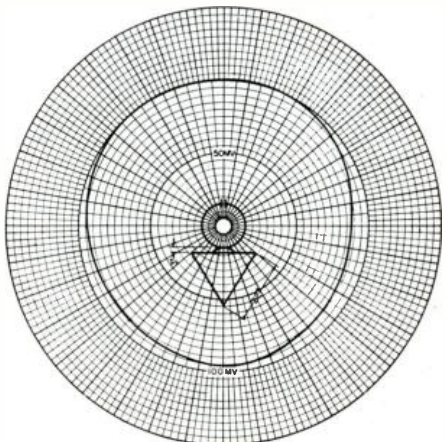
The compactness and simplicity of the 37M Antenna allow the maximum efficiency in ice and sleet removal. Each ring may be equipped with an internally mounted

heating unit which consists of a cartridge type element inside each of the tuning condenser plates and an additional flexible heating element extending the full circumference on the inside of the ring. The absence of large masses of metal makes de-icing of the 37M an efficient and practical operation while the operating costs of de-icers are reduced to an absolute minimum.

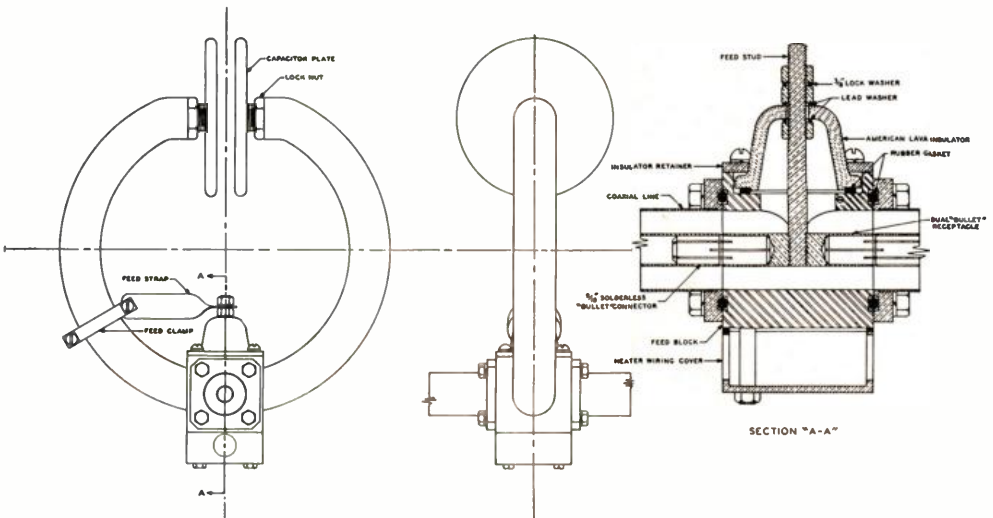
ECONOMY:

From every standpoint, the Collins 37M series FM antennas, whether top or side mounted, offer the FM broadcaster the ultimate in economical operation. Among the economies unique in the 37M are:

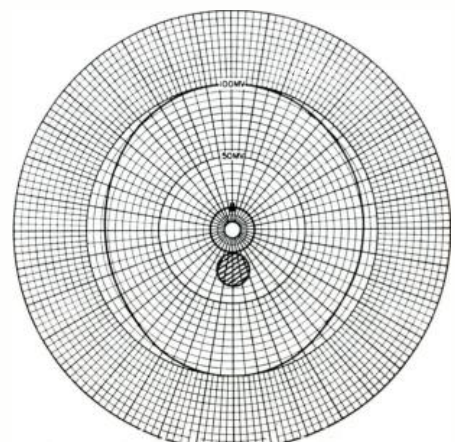
- Low initial cost
- Highest gain at low weight and windloading
- Reduction in new tower costs
- Can be side mounted on light weight existing towers
- Lower erection costs
- Reduced maintenance expense



Typical Side Mounting radiation pattern 100 mc, 12" diameter ring on side of Winchager tower.



FREQUENCY RANGE VERSUS LOOP DIAMETERS
Diameter varies from 11" to 14" depending upon frequency and line size.

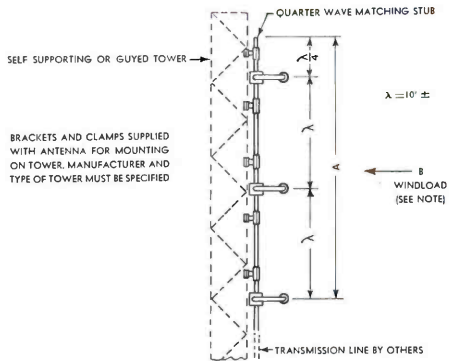


Typical Top Mounting radiation pattern 100 mc, 12" diameter ring on 10" diameter pole.

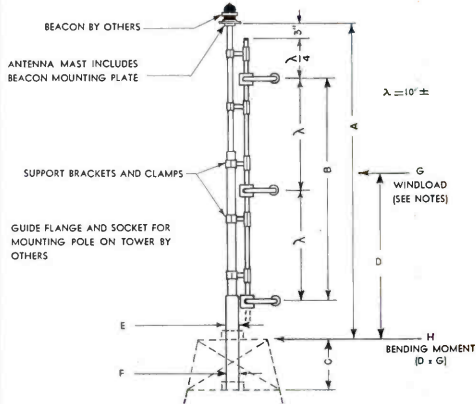
ENGINEERING DATA

COLLINS 37M SERIES FM ANTENNAS

SIDE MOUNTING



TOP MOUNTING



SIDE MOUNTING

Collins Type	No. of Rings	Power Gain	Field Gain	A Feet	On 1 1/8" Line		On 3/8" Line	
					B	Weight	B	Weight
37M-1	1	.9	.95	2-6±	24	23	32	46
37M-2	2	2.0	1.41	12-6±	68	55	100	110
37M-3	3	3.0	1.73	22-6±	114	86	170	175
37M-4	4	4.1	2.02	32-6±	160	119	240	240
37M-5	5	5.2	2.28	42-6±	206	152	310	305
37M-6	6	6.3	2.51	52-6±	252	185	380	370
37M-7	7	7.3	2.70	62-6±	298	218	450	435
37M-8*	8	8.4	2.90	72-6±	344	251	520	500

TOP MOUNTING

Collins Type	No. of Rings	Pwr. Gain	A Ft.	B Ft.	C Ft.	On 1 1/8" Line						On 3/8" Line					
						D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.	D Ft.	E Dia.	F Dia.	G Lbs.	H Ft.-Lbs.	Dead Wt.
37M-1	1	.9	6		3	4-7	3 1/8"	3 1/8"	50	230	223	4-7	3 1/8"	3 1/8"	68	312	250
37M-2	2	2.0	16	10±	4	10	4 1/2"	4 1/2"	239	2,390	305	12-3	4 1/2"	4 1/2"	291	3,565	360
37M-3	3	3.0	26	20±	7	14-5	6 5/8"	6 5/8"	403	5,803	736	14-4	6 5/8"	6 5/8"	486	6,950	825
37M-4	4	4.1	36	30±	10	19	7 7/8"	7 7/8"	564	10,716	1169	18-9	7 7/8"	7 7/8"	678	12,713	1290
37M-5	5	5.2	46	40±	12	23	8 5/8"	7 7/8"	747	17,181	1652	22-8	9 5/8"	9 5/8"	919	20,769	2128
37M-6	6	6.3	56	50±	14	27-2	9 5/8"	8 5/8"	951	25,867	2285	26-7	10 3/4"	9 5/8"	1173	31,260	2770
37M-7	7	7.3	66	60±	15	31	10 3/4"	8 5/8"	1175	36,425	3218	31-3	10 3/4"	8 5/8"	1388	43,375	3485
37M-8*	8	8.4	76	70±	16-6	34-9	11 3/4"	9 5/8"	1417	49,241	4051	34-8	12 3/4"	11 3/4"	1696	58,682	4650

* Antennas with more than 8 rings quoted upon request

- Windloads based on 20 pounds per square foot on projected area of cylindrical surfaces with all sections considered round.
- Power gains compared to half wave dipole.
- Antenna assemblies on 1 1/8 inch line are rated for power inputs at base of antenna up to 3 kilowatts for a single ring array; 6 kilowatts for two or more rings.
- Antenna assemblies on 3/8 inch line are rated for power inputs up to 3 kilowatts per ring at base of antenna; with maximum of 20 kilowatts for seven or more rings.
- Antennas for power inputs in excess of 20 kilowatts incorporate the use of a Tee feed at center of array.

COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA

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NEW YORK 36

2700 W. Olive Avenue
BURBANK

1930 Hi-Line Drive
DALLAS 2

Dogwood Road, Fountain City
KNOXVILLE





COLLINS RADIO COMPANY

CEDAR RAPIDS, IOWA, U.S.A.

11 West 42nd Street
New York 36, N.Y.

2700 W. Olive Avenue
Burbank, California

Dogwood Road
Fountain City (Knoxville), Tenn.

1930 Hi-Line Drive
Dallas, Texas

BROADCAST EQUIPMENT PRICE SCHEDULE

AM TRANSMITTERS

300J-250/100 W. AM complete with one set of tubes, two crystals, and two instruction books - - - - -	\$2,947.80
Spare Tubes for 300J, complete set - - - - -	152.20
Remote Antenna current Metering Kit for 300J Transmitter - - - - -	50.00
20V - 1000/500 W. AM, complete with two crystals, one set of tubes and two instruction books - - - - -	5,475.30
Spare tubes for 20V, complete set - - - - -	274.70
Remote Antenna current Metering Kit for 20V transmitter - - - - -	50.00
21E - 5000/1000 W. AM complete with one set of tubes, two crystals, and two instruction books - - - - -	19,054.00
Spare tubes for 21E, complete set - - - - -	796.00
21M - 10,000/5,000 W. AM, complete with one set of tubes, two crystals and two instruction books - - - - -	22,680.00
Spare tubes for 21M, complete set - - - - -	1,070.00

AM MONITORING EQUIPMENT

GR 1181-A - Frequency Monitor (Collins 4E panel) - - - - -	775.00
GR 1931-A - Modulation Monitor (Collins 4E panel) - - - - -	440.00

AM ANTENNA EQUIPMENT

42E-5 - Tuning Unit, 250 W - - - - -	510.00
42E-5 - Tuning Unit, 1 Kw./500 W - - - - -	560.00

AM ANTENNA EQUIPMENT (CONT'D)

42E-5 - Tuning Unit, 5 Kw. - - - - -	600.00
142A - Shunt Fed Tuning Unit, 250 W- - - - -	460.00
142A - Shunt Fed Tuning Unit, 1 Kw. - - - - -	510.00
142A - Shunt Fed Tuning Unit, 5 Kw. - - - - -	550.00
23C-1 - 500 Watt Lighting Choke - - - - -	24.75
23D-1 - 1500 Watt Lighting Choke - - - - -	90.00
23E-1 - 3000 Watt Lighting Choke - - - - -	140.00
013 0107 00 - Truscon 8' x 24' Expanded Copper Mesh Ground Screen, per sheet	41.00

AM PHASING EQUIPMENT & ACCESSORIES

Complete custom built phasing installations quoted on receipt
engineering data for direction operational - - - - - On Application

Andrew 40C Phase Monitor, less leads - - - - -	575.00
Leads for 40C Phase Monitor, each - - - - -	12.00
Clarke 108C Phase Meter:	
Two element - - - - -	550.00
Three element - - - - -	575.00
Four element - - - - -	600.00
Over Four Element - - - - -	On Request

FM ANTENNA EQUIPMENT

<u>SIDE MOUNTED, LESS MAST</u>		<u>TOP MOUNTED, WITH MAST</u>	
<u>Rings Mounted On</u>		<u>Rings Mounted On</u>	
<u>1-5/8" Line</u>	<u>3-1/8" Line</u>	<u>1-5/8" Line</u>	<u>3-1/8" Line</u>
37M-1 \$ 545.00	\$ 585.00	On Application	
37M-2 1090.00	1170.00	On Application	
37M-3 1635.00	1755.00	On Application	
37M-4 2180.00	2340.00	On Application	
37M-5 2725.00	2925.00	On Application	
37M-6 3270.00	3510.00	On Application	
37M-7 3815.00	4095.00	On Application	
37M-8 4360.00	4680.00	On Application	

DEICERS - Add \$75.00 per bay for deicing elements.

REMOTE CONTROL EQUIPMENT FOR COLLINS TRANSMITTERS

Collins-Rust Remote Control System for Collins Type 300G, #00J, 20K, 20T, and 20V Transmitters, complete with studio and transmitter control units. Control system to remotely read the following transmitter metering readings to the control point; tower lighting current, filament voltage, final plate voltage, final stage plate current, and antenna current. The following functions will be remotely controlled at the transmitter site: tower lights "On-Off", filament power "On-Off", plate power "On-Off", final stage tuning, final stage loading, and reduced power or "Tune-Up". Equipment to include preamplifier to operate the stations frequency and modulation monitors off the air at the control point. Equipment guaranteed to meet all present requirements of the Federal Communications Commission's rules and standards for remote control operation.

Equipment as described above with installation of equipment to be made by Customer (F.O.B. Cedar Rapids, Iowa).

Type 300G Transmitter	\$2,375.00
Type 300J Transmitter	2,620.00
Type 20K Transmitter	2,345.00
Type 20T Transmitter	2,285.00
Type 20V Transmitter	2,620.00

Equipment as described above with actuators to be installed at Factory prior to shipment of transmitter (F.O.B. Cedar Rapids, Iowa).

Type 300J Transmitter	2,920.00
Type 20V Transmitter	2,920.00

TOWERS AND TRANSMISSION LINE

Both self-supporting and guyed towers are available to meet requirements of installation. Tower quotations will be furnished on request.

Andrew Corporation transmission line, fittings and accessories can be supplied in accordance with installation requirements.

Detailed quotations on both towers and transmission line are available from your nearest Collins Representative.

PRICES OF ALL COLLINS MANUFACTURED EQUIPMENTS ARE F.O.B. CEDAR RAPIDS, IOWA EXCEPT FM ANTENNAS WHICH ARE F.O.B. EVANSVILLE, INDIANA; EQUIPMENT BY OTHERS, F.O.B. SOURCE. ALL PRICES ARE EXCLUSIVE OF ANY APPLICABLE FEDERAL, STATE OR LOCAL SALES, USE OR EXCISE TAXES, AND ARE SUBJECT TO CHANGE WITHOUT NOTICE. EQUIPMENT MANUFACTURED BY OTHERS WILL BE BILLED AT PRICE IN EFFECT AT TIME OF SHIPMENT.

ON THE
AIR

with **COLLINS**
Speech Equipment



CATALOG 111

Speech Equipment and Accessories

FOREWORD

This book is prepared for your convenience in selecting equipment that will meet your requirements. The consoles, amplifiers and accessories shown and described are engineered to advanced performance standards. Their operation is reliable, smooth, and straightforward. Thorough consideration has been given to operating detail, in order to incorporate every possible convenience.

The years of successful experience in designing and producing fine audio equipment are reflected in the confidence with which many customers have asked us to lay out their entire station facilities.

We will be happy to work with you on the overall specifications of your individualized equipment. By obtaining your full requirements in audio equipment from us, you get not only the best individual units for your purpose, but also the assurance that you have an integrated system with superior overall performance.

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REMOTE EQUIPMENT	8 - 15
RACK MOUNTED EQUIPMENT.....	16 - 33
TEST AND MONITORING EQUIPMENT.....	34
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212A-1 Speech Input Console



Collins 212A-1; front view

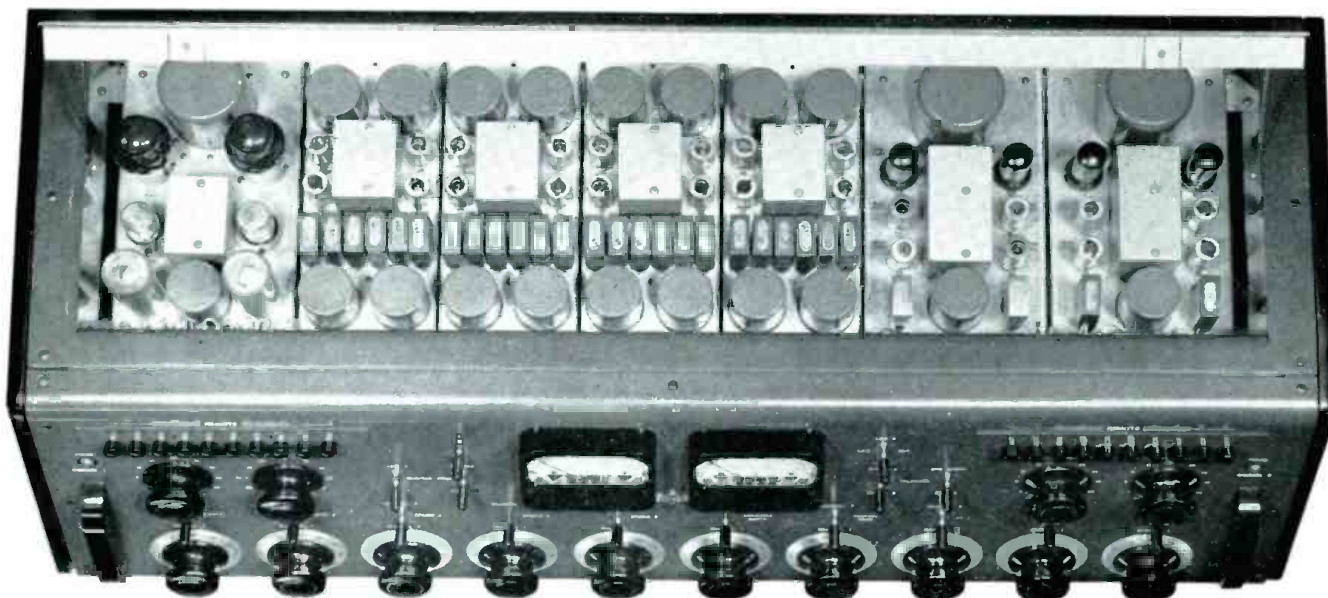
For audio control in AM, FM, and television broadcasting, the Collins 212A-1 speech input console provides simplicity of installation, convenience in operation, and maximum versatility.

A novel rotating arrangement allows the entire unit to be tilted for access to the underside of the chassis without requiring additional space. The 212A can be placed right up against a window, wall, or other obstructing surface without sacrificing accessibility, or requiring external support when the chassis is tilted. Unit amplifiers are individually mounted on airplane type shock mounts.

The sloping front panel provides ease of reading and hand movements. Lever type positive action

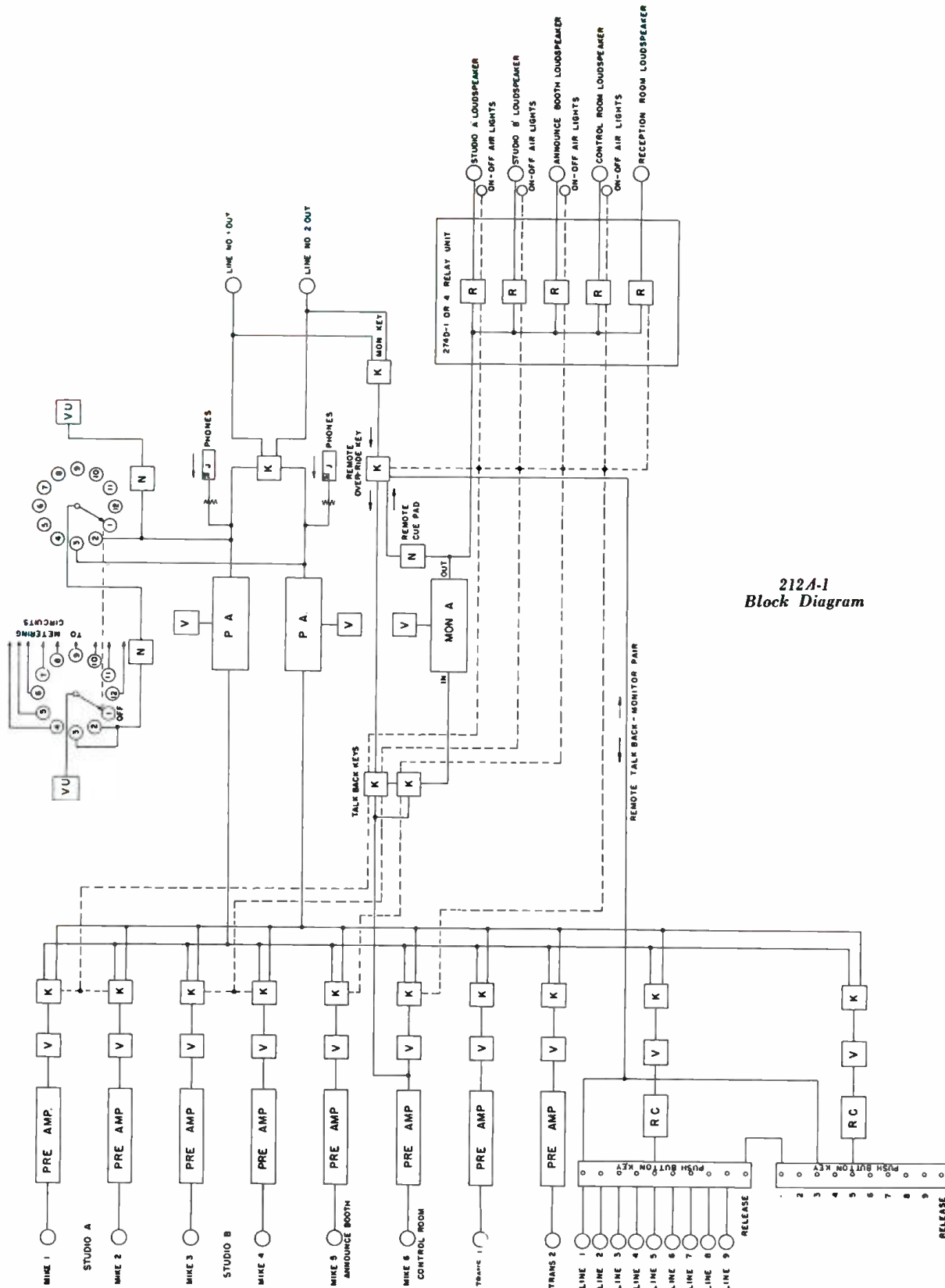
switches are employed in line switching circuits, and reliable telephone type push button controls are used to connect remote lines. The step-by-step attenuators have a smooth, easy action.

Facilities are provided for auditioning or rehearsing, cueing and broadcasting simultaneously from any combination of two studios, an announce booth, a control room microphone, two turntables, and any two of nine remote lines. Two program amplifiers are included in the 212A-1, making possible the feeding of two independent programs at once, or by operating the line reversal switch, providing an emergency amplifier for normal use. A spare key switch is mounted on the panel with leads appearing on the terminal strip.

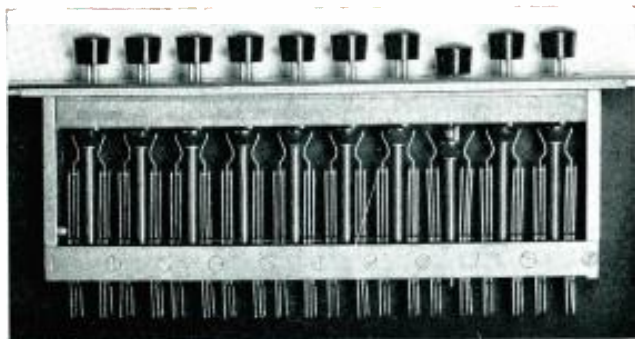


212A-1 Console; top view open

212A-1 Speech Input Console



212A-1
Block Diagram



Telephone type push button switch

FEATURES AND SPECIFICATIONS:

1. Ten independent input channels, including 6 microphone inputs and 2 low level transcription inputs (eight preamplifiers, one for each of the foregoing) and 2 channels for remote pickups.

2. Any two of nine remote lines can be selected at will. Normal connections are supplied through the switches, so that override in the monitor is possible if desired. The remote channel provides for the feedback of cue to the remote lines, as well as for talkback.

3. Loudspeakers in all studios can be fed from the self-contained monitor amplifier, with selective talkback circuits interlocked to prevent program interruption. Talkback from the control room is possible into any one of three studios or into the remote lines by key switch control.

4. Connections are provided for external "on the air" lights, with power furnished by the 212A-1 relay units.

5. Two vu meters are incorporated. One is bridged continuously across the program line 1. The other may be used as a vu meter for the second program amplifier, or to check (by means of a selector switch) individual circuits in the console.

6. Jacks are provided for headphone monitoring of either program amplifier.

7. The construction permits easy access to tubes, components, and wiring, without taking the console out of operation.

8. The power is external, with provision for installation of a duplicate power supply. A single supply is capable of operating the equipment with adequate safety factors for long, trouble-free service. However, if two supplies are installed, a changeover is effected automatically in case of failure of the power supply in use. One power supply and the relay unit are included in the purchase of the 212A-1.

Frequency response: Microphone to line, or microphone to speaker, within 2 db total variation from 30 to 15,000 cps at normal gain control settings. Not more than $\pm 1/2$ db additional variation in frequency response over the above range at any other gain control setting.

Input impedance: Microphones 30/50 or 200/250 ohms. Remote lines 150 or 600 ohms, with repeat coils self-contained. Turntables 30/50 or 200/250 ohms.

Output impedance: Program line 150 or 500/600 ohms balanced. Speakers, maximum of 5, each 600 ohms.

Output level: Program line vu meter adjustable, +4 to +24 dbm* in 1 db steps.

Monitor output: 8 watts.

Distortion: Less than 1.0% rms harmonic distortion at normal output through line amplifier. Less than 2.0% rms harmonic distortion at 8 watts output from monitor amplifier. In addition, combination tone distortion is of the same order at the same levels.

Gain: Maximum, microphone to program line, 100 db; remote line to program line, 50 db.

Noise level: With the gain controls adjusted for normal operation with a low level microphone input and with +16 dbm* output, but with input terminated in an equivalent resistance, the combined hum and noise in the program output is at least 65 db down.

Power input: 115 volts 50/60 cycles a-c.

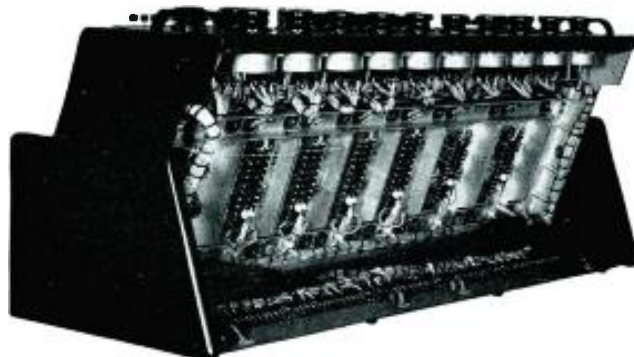
Weight: Approx. 150 pounds.

Dimensions: 42" w, 12" h, 17 1/2" d.

Collins Part Number: 520 2916 00.

See 274D-1 or 274D-4 (pgs. 6-7) for relay unit, and 409U-1 or 409U-2 (pg. 6) for power supply, both of which are furnished as part of this equipment.

*dbm: reference level 1 mw, 600 ohms.



212A-1 Console tilted for servicing

212B Speech Input Console



212B Console; front view

The Collins 212B-1 has the same fine constructional and operational features as the 212A-1 and differs only in that it is smaller, with fewer amplifiers and functional facilities. The 212B-1 fills the needs of the smaller station, in which operating demands are less complex, and is ideal for single studio control in larger stations.

Facilities are provided for one program channel and an audition channel which functions with the self-contained monitor amplifier. The single program channel exactly duplicates one of the two channels in the 212A-1. Headphone jacks are provided across both the program and monitor outputs. Cue to remote and talkback to either of two studios or the remotes is accomplished as with the 212A-1.

A line reversal switch transfers the program output to either of two lines. Four push button positions on the front panel provide utility monitor inputs, in addition to the five circuits already monitored by the push button switch—AUDITION, TURNTABLE 1, TURNTABLE 2, REMOTE and PROGRAM.

FEATURES:

1. Seven independent input channels, including 4 microphone inputs, each with its own preamplifier, 2 high level transcription inputs, and a remote pickup channel. Two models are available: The 212B-1 as described. The 212B-2 includes two additional preamplifiers for low level transcription inputs.

2. Loudspeakers in all studios can be fed from the monitor amplifier, with selective talkback circuits interlocked to prevent program interruption. Talkback from the control room into either one of two studios or into the remote lines is provided by key switch control.

3. Tube check is conveniently provided by a switch in the vu meter circuit.

4. Both the program channel and the audition channel are complete and independent. Audition may be accomplished while a program is on the air.

5. An external power supply is provided, with adequate safety factors for long, trouble-free service. Since the power supply is external, full-size highest quality components are utilized in the speech console, with compact cabinet size and with all components and wiring easily accessible. The power supply used with the 212B-1 and 212B-2 is identical with that used with the 212A-1. See 274D-2 or 274D-5 (pg. 7) for relay unit, and 409U-1 or 409U-2 (pg. 6) for power supply. Both are furnished as part of this equipment.

The specifications of the 212B-1 and 212B-2 are identical with those of the 212A-1 except as follows:

Weight: 107 pounds.

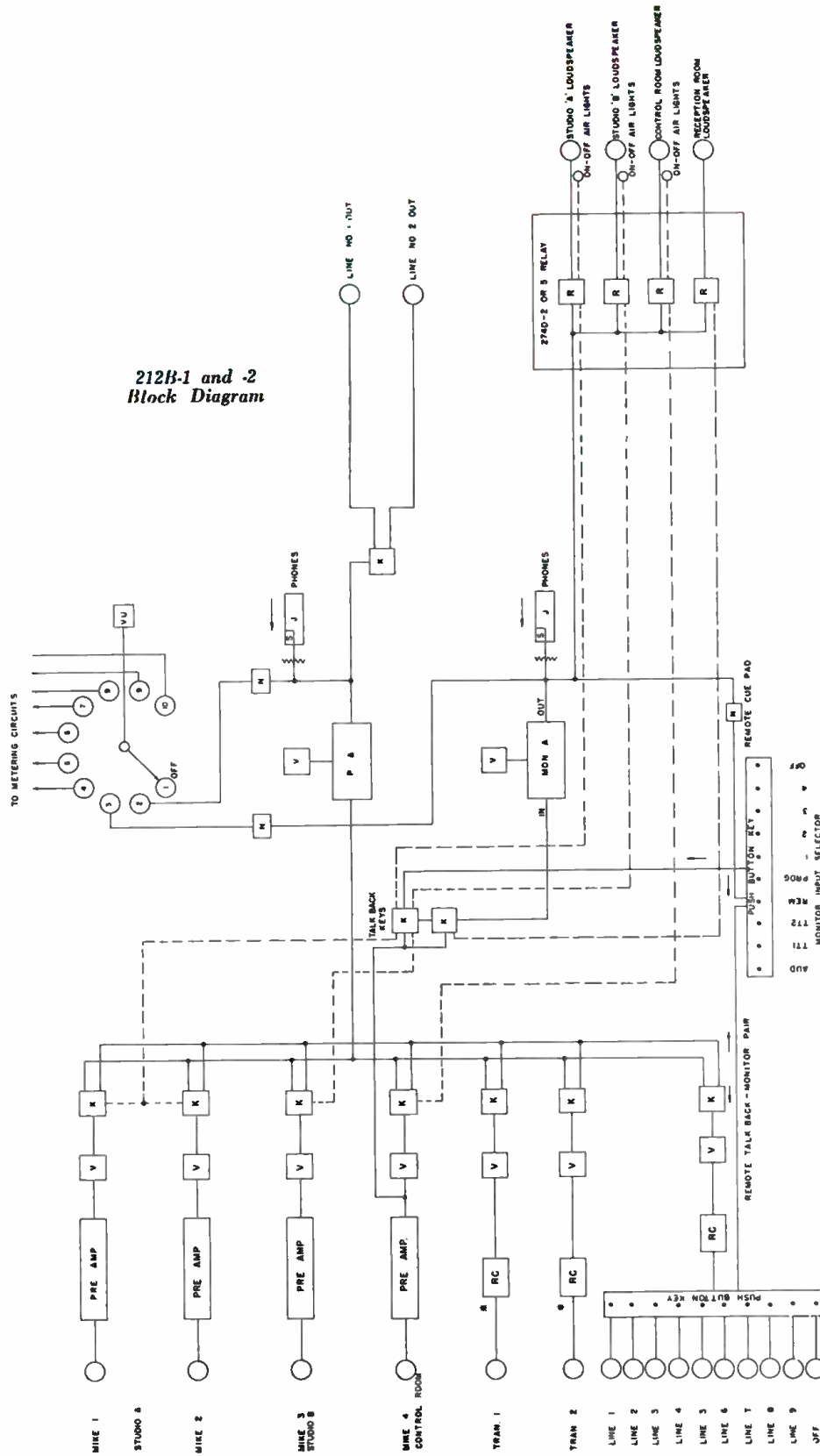
Dimensions: 31½" w, 12" h, 17½" d.

Collins Part No.: 520 2920 00—212B-1

520 3478 00—212B-2

. . . 212B Speech Input Console . . .

**212B-1 and -2
Block Diagram**



* 212B-2 FEATURES TWO ADDITIONAL PREAMPLIFIERS IN PLACE OF REPEAT COILS, FOR LOW LEVEL TRANSCRIPTION INPUT

Studio Console Power Supplies and Relay Units

409U-1 POWER SUPPLY



A wall mounting power supply for the 212A and 212B series consoles. It contains three supplies which furnish d-c power for preamplifiers, monitor and line amplifiers, and 12 volts for relay operation. In addition, it furnishes 6.3 volts a-c to operate all tubes in the console.

The 409U-1 is a stable power supply exceptionally well filtered in high, medium and low voltages. Electrolytic capacitors in the medium voltage circuits are of the plug-in type, while oil filled paper capacitors are used in the high voltage circuits. Tapped primaries on the transformers enable operation over wide voltage ranges. Two separate supplies are included with a single (fullwave) rectifier in the medium voltage supply, and two rectifiers (fullwave) in the higher voltage supply, wired in such a manner that program will not be stopped by a failure of one of the tubes.

Contained in an attractive wall mounting case to harmonize with the 274D-1 or 274D-2 relay units, the 409U-1 can be mounted on the wall, or on the side of the operating desk.

Specifications:

Input: 105-125 volts 50/60 cycles a-c (by varying transformer taps).

Output: 140 volts d-c @ 60 ma max.
325 volts d-c @ 250 ma max.
12 volts d-c @ 1.0 amp.
6.3 volts a-c @ 10 amps.

Tubes: 2—5R4GY, in high voltage supply.
1—6X5GT, in medium voltage supply.
1—Selenium rectifier in 12 volt supply.

Weight: 70 lbs., 3 oz.

Dimensions: 20½" w, 15½" h, 10" d.

Finish: Glossy black cabinet with metallic gray door.

Collins Part No.: 520 2914 00.

409U-2 POWER SUPPLY

A rack mounting power supply electrically the same as the 409U-1.

An easily removable dust cover protects the wiring.

Dimensions: 19" w, 14" h, 9½" d.

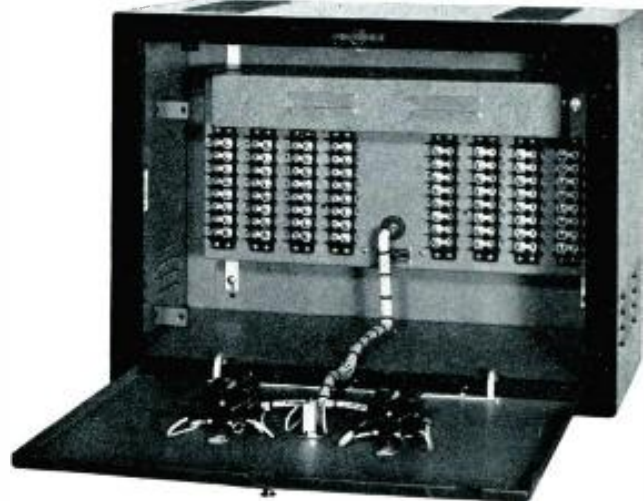
Finish: Metallic gray panel, velvet gray dust cover.

Weight: 61 lbs., 12 oz.

Collins Part No.: 520 3015 00.

For other power supplies see pages 24 and 25.

274D-1 RELAY CONTROL UNIT



A relay control unit for use with the 212A console. It completely controls studio and control room loudspeakers, as well as studio on-off-the-air lights. Two switches on the hinged front panel control 110 volt power to the power supply and 110 volt power to the studio warning lights.

Relays are protected by a dust shield held in place by two easy-to-remove Dzus fasteners. An added feature is a relay switching system with which, by the use of two power supplies, instant uninterrupted service may be effected in case of a failure. Any portion of the operating power supply, including relay and filament power, will operate the changeover. A pilot lamp indicates only when the auxiliary power supply is in use.

Terminals are provided for connection to all studio and control room warning lights. Five loudspeakers are also terminated at this point. The relay unit functions as a terminal point for all power connections between the supply and console. No additional relay circuits are necessary for the warning lights.

Number of Relays: Five—studio loudspeakers and warning light controls.

Four—power changeover relays.

Input Voltage: 115 volts, 50/60 cycles.

Warning Light Power: 115 volts, 50/60 cycles.

Circuit breaker links are supplied for currents up to 9 amperes.

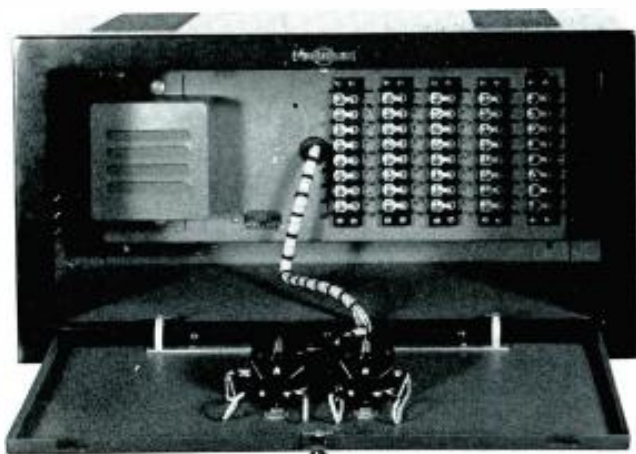
Dimensions: 20½" w, 15½" h, 10" d.

Weight: 17 lbs., 9 oz.

Finish: Glossy black cabinet, metallic gray panel.

Collins Part No.: 520 2918 00.

274D-2 RELAY CONTROL UNIT



The 274D-2 is a wall mounted unit designed for use with the 212B console. It completely controls studio and control room loudspeakers, as well as studio on-off-the-air lights, and line voltage to the power supply and studio warning lights.

Relays are protected by a dust shield held in place by two easily removed Dzus fasteners.

Terminals are provided for connection to all studio and control room warning lights. Four loudspeakers are also terminated at this point. The relay unit functions as a terminal point for all power connections between the supply and console. No additional relay circuits are necessary for the warning lights.

Number of Relays: Four. Studio loudspeaker and warning light controls.

Input Voltage: 115 volts 50/60 cycles.

Warning Light Power: 115 volts, 50/60 cycles.

Circuit breaker links are supplied for currents up to 9 amperes.

Dimensions: 20½" w, 11" h, 10" d.

Finish: Glossy black cabinet, metallic gray door.

Weight: 13 lbs.

Collins Part No.: 520 2919 00.

274D-4 RELAY CONTROL UNIT



Identical with 274D-1 with the exception that it is constructed for rack mounting. An easily removable dust cover protects the wiring.

Dimensions: 19" w, 8-¾" h, 5½" d (with dust cover).

Weight: 10 lbs.

Finish: Metallic gray panels, velvet gray cover.

Collins Part No.: 520 2013 00.

274D-5 RELAY CONTROL UNIT



Identical with 274D-2, with the exception that it is constructed for rack mounting. An easily removable dust cover protects the wiring.

Dimensions: 19" w, 7" h, 5½" d (with dust cover).

Finish: Metallic gray panel, velvet gray cover.

Weight: 7 lbs., 3 oz.

Collins Part No.: 520 3014 00.

12Z Remote Amplifier



12Z-2 AND 12Z-3 REMOTE AMPLIFIERS

The 12Z is a prime example of Collins design ingenuity, quality and efficiency. This light-weight, small-size a-c or battery operated remote amplifier is ready to go anywhere, any time, and features double program protection, convenience and excellent performance.

The input impedance of the 12Z-2 is 30/50 ohms. That of the 12Z-3 is 200/250 ohms. Otherwise the two are identical.

Advanced engineering has combined four input channels with individual controls, a master control, an a-c power supply, and a self-contained battery power supply in one easily carried unit. The mixing controls are low impedance T type to give low insertion loss. The master gain control is a high im-

pedance potentiometer. All controls have an attenuation of 2 db per step. A range switch and a meter switch connect a 4 inch illuminated vu meter to the proper circuit for measuring the output level in volume units, or operating voltages.

A 3 db pad between the output of the amplifier and the line provides line isolation. The vu readings are taken at the front of this pad, so that when the vu meter is reading +4, the line level is +1 vu.

The output switch, in 0 position, connects the output of the amplifier into a 600 ohm resistor, and the Tel terminals are across line 2 terminals. In LINE 1 position, the output of the amplifier is across line 1 terminals, and the Tel terminals are across line 2. In LINE 2 position the amplifier is across line 2, and the Tel terminals are across line 1.

. . . . 12Z Remote Amplifier

Jacks are provided for monitor headphones. The program monitor jack is across the output of the amplifier. The line monitor jack is across line 1, or across the Tel terminals when the output switch is in LINE 2 position.

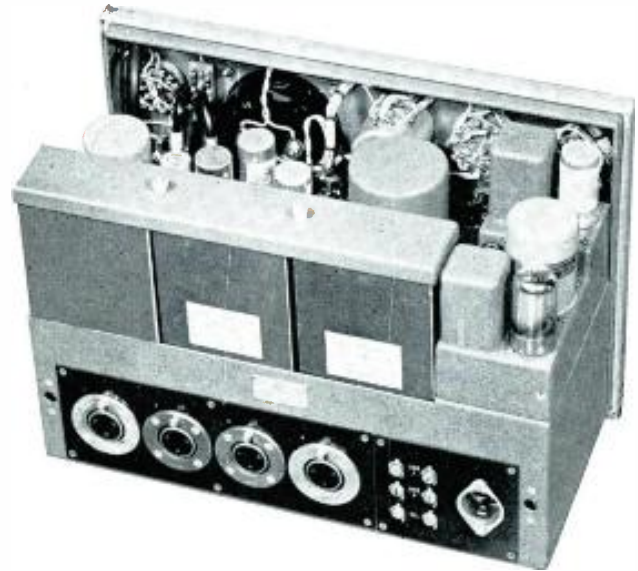
The program is protected against a-c failure by automatic, instantaneous change-over to battery operation. When a-c power is restored, the amplifier may be put back on a-c operation by turning the power switch to "a-c reset," then back to "on." The change back to a-c operation is also instantaneous, and the program is not interrupted.

Unit type construction provides easy maintenance. The batteries are held in place with thumb screws. The a-c power supply is removed by taking out three bolts and unplugging the unit. The amplifier is shock mounted and is also easily removable.

The 12Z is supplied with a canvas carrying case which, on arrival at the location of a pick-up may be taken off entirely or opened at the front by means of a slide fastener. The front dust cover is removed by means of two ring type Dzus fasteners. An interlock switch, operated by this cover, disconnects the batteries when the equipment is not in use. A snap buttoned flap in the canvas carrying case provides access to the four microphone receptacles, power receptacle, and line connections.

SPECIFICATIONS

Input: Four channels, with individual controls and a master control.



Construction is neat, clean and compact. The dust cover slips off easily after loosening only two fasteners. The audio amplifier is shockmounted

Gain: Approximately 90 db.

Noise level: 60 db below program level or better.

Power output: 50 milliwatts (+17 dbm*)

Distortion: Less than 1% at typical operating levels.

Frequency response: ± 1 db 50 to 15,000 cps.

Input impedance: 30/50 ohms for 12Z-2;
200/250 ohms for 12Z-3.

(Continued next page)

*dbm, 1 mw into 600 ohms.



The 12Z can be disassembled easily and completely, requiring only small hand tools. Unit construction has been used advantageously for simplicity of maintenance.

. . . . 12Z Remote Amplifier



Microphones, connecting wire, and small tools can be carried conveniently in a small brief case or grip.

Output impedance: 600 ohms (150 ohms available on special order).

Case: Welded aluminum alloy, finished in black wrinkle.

Carrying case: Leather reinforced canvas.

Microphone connections: Cannon type P-3-13 supplied. Hubbell and other types available.**

Power source: 110 volts a-c or self-contained batteries. Batteries are low cost standard types, 3 Burgess M30 or Eveready 482, and 5 Burgess 4F or Eveready 742. Filament life is 50 hours. B Battery life is over 100 hours.

Weight: With 3 45V B batteries and 5 A batteries approximately 40 lbs. 28 lbs without batteries.

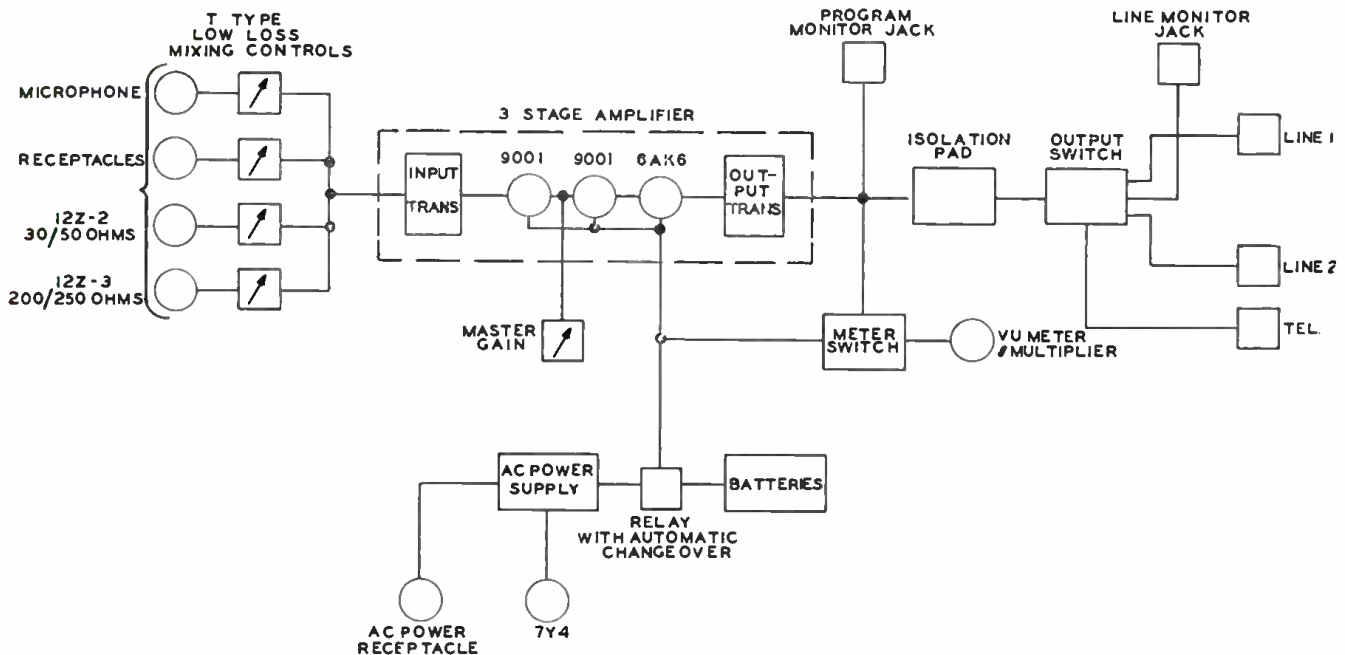
Size: 14½" w, 11½" h, 8¼" d.

Collins Part No.: 522 0002 002—12Z-2

522 0003 002—12Z-3

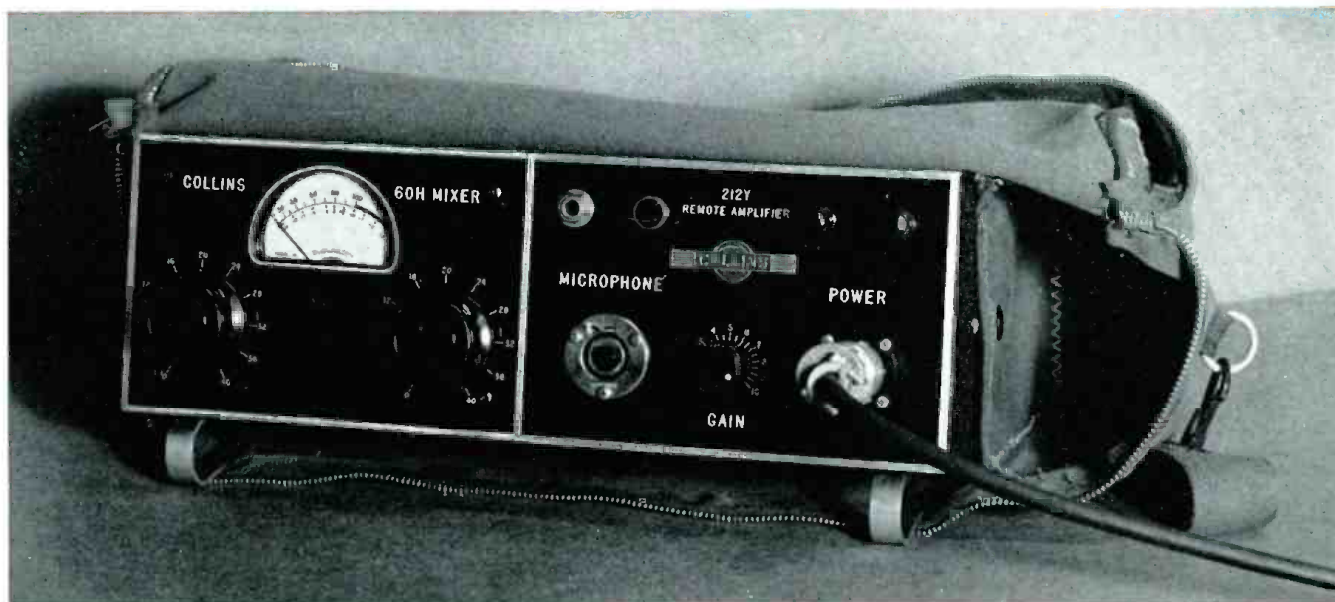
Tubes: 520 2714 00

***Refer to connectors, pages 39 and 40.*



Block diagram of Collins 12Z remote amplifier

. . . . 212U Remote Amplifier. . . .



212U TWO-CHANNEL REMOTE AMPLIFIER

The 212U consists of a type 60H mixer and a type 212Y amplifier. Both units are mounted in a single aluminum cabinet. A convenient carrying case is provided having a carrying handle and a shoulder strap.

To set up this equipment the canvas carrying case may be removed, or, in bad weather, the front of the case may be opened by slide fastener for access to the controls. A snap fastened flap at the rear of the case allows connection of the microphones. The a-c cord provided is connected to the 212Y unit. If battery operation is required, a Collins type 412C-2 battery box and interconnecting cable must be used. The battery box is not included in the 212U equipment*. Line connections are made through binding posts on the 212Y unit.

The mixing controls are ladder type attenuators, having db calibrations on the front panel. The master gain is the volume control on the 212Y. Legs

raise the front of the unit to a convenient height for knob twisting and meter reading. The meter is a standard 3 inch vu meter with an adjustable range extension network. A phone jack on the 212Y panel allows headphone monitoring.

The ease of operation and the very high fidelity and reliability of the 212U assure positive pick up of remote programs.

SPECIFICATIONS

Input impedance: 212U-1, 30/50 ohms.
212U-2, 150 ohms.
212U-3, 200/250 ohms.

Output impedance: 600 ohms.

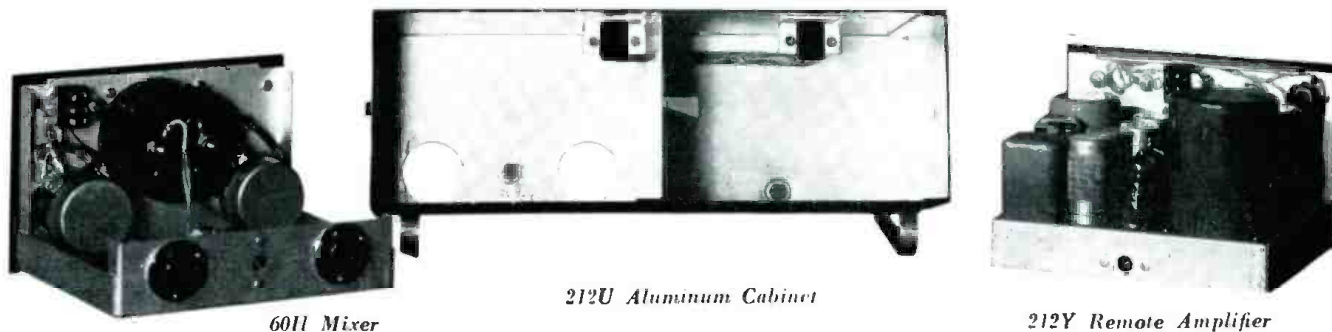
Power output: +17 dbm (1 milliwatt 600 ohms reference level).

Distortion: Less than 1½% between 50 and 15,000 cps.

Noise level: Better than 65 db below program level.

(Continued next page)

*Refer to page 15 (battery box).



60H Mixer

212U Aluminum Cabinet

212Y Remote Amplifier

212U-212Y Remote Amplifiers

(212U continued from preceding page)

Frequency response: ± 2 db between 30 and 15,000 cps.

Gain: 85 db less mixer insertion loss.

Mixer insertion loss: Approximately:

212U-1, 6 db.

212U-2, 10 db

212U-3, 4.5 db.

Tubes: 2-6AQ6, 1-6AK6, 1-7Y4

Gain controls: Master gain, high resistance potentiometer.

Mixers: Ladder type attenuators.

Number of input channels: Two.

Microphone receptacles: Cannon type XL-3-13; adapters available for other standard types.**

Finish: Black anodic aluminum panel, black wrinkle cover.

Carrying case: Leather reinforced canvas with

slide fastener and pouch for power and microphone cables, canvas carrying handle and shoulder strap.

Size: 14" w, 6" h with legs ($4\frac{3}{4}$ " less legs), $7\frac{1}{2}$ " d.
Weight: 13 lbs.

Power source: 115 volts a-c 60 cps. Power supply is self-contained.

Battery operation: Requires 412C-2 battery box* and interconnecting cable. Filament battery life approximately 50 hours. B battery life approximately 100 hours.

Weight of battery box: Approximately 16 lbs., including batteries.

Collins Part No.: 212U-1—520 3738 00

212U-2—520 3739 00

212U-3—520 3740 00

*Refer to page 15 (battery box).

**Refer to page 15 (adapters).



212Y SINGLE CHANNEL REMOTE AMPLIFIER

The Collins 212Y Remote Amplifier combines small size and light weight with high fidelity. Careful engineering design has produced an extremely compact, completely accessible unit suitable for dance orchestra and newsroom pickups, sports broadcasts,

and any other applications where fast "set up" is important or necessary. The low cost of the 212Y further suggests its permanent installation at points where pickups are made regularly.

The design of the 212Y includes all features necessary to provide dependable remote operation.

. . . . 212Y Remote Amplifier

One high fidelity channel is incorporated, which operates from a low level velocity, dynamic or other self-generating microphone. A universal input transformer matches all low impedance commercial type microphones.

The 212Y Remote Amplifier is available in two models; the 212Y-1 which has a Cannon XL-3-13 microphone connector, and the 212Y-2 which has a Cannon P3-13 microphone connector.

Three stages of amplification provide an overall gain of 85 db, with an output of +17 dbm*. A headphone jack connected across the output terminals permits program monitoring as well as talk-back from the studio.

Because of its simple construction, installation, and operation, the Collins 212Y can be handled by non-technical personnel without fear of program failure.

The front of the leather reinforced carrying case, which has a pouch for power cord and microphone cable, opens by slide fastener to allow full access to all controls and connections. If desirable, the case may be removed completely. Line connections are made to binding posts, and the supplied a-c power cord is plugged into the front panel. If battery operation is required, the interconnecting cable from a 412C-2** battery box is connected. Merely exchanging plugs in the power input receptacle permits quick change from a-c to d-c operation. The battery box is not supplied with the 212Y.

The amplifier slides into its case and is fastened by one Dzuz fastener.



212Y in Canvas Carrying Case



The cover can be removed by loosening a single fastener.

212Y SPECIFICATIONS

Size: 7" w, 4 $\frac{3}{4}$ " h, 6 $\frac{1}{4}$ " d.

Weight: 10 lbs.

Number of channels: One.

Gain: 85 db max.

Input impedance: 30/50 ohms or 200/250 ohms.

Output impedance: 600 ohms.

Power output: +17 dbm*.

Distortion: Less than 1.0% between 30-15,000 cps.

Noise level: 65 db below normal program level.

Tubes: 2 6AQ6, 1 6AK6, 1 7Y4.

Frequency response: Within 1.0 db; 30-15,000 cps.

Gain control: High resistance potentiometer.

Microphone receptacle:

212Y-1—Cannon type XL-3-13 (Adapters available for other standard types.)**

212Y-2—Cannon type P3-13.

Finish: Black anodic aluminum panel, black wrinkle cover.

Carrying case: Leather reinforced canvas with pouch for power and microphone cables.

Power source: 115 volts a-c, 50/60 cps. Power supply is self-contained.

Battery operation: Requires 412C-2 battery box and interconnecting cable.**

Weight of battery box: Approx. 16 pounds including batteries.

Collins Part No.: 212Y-1—520 3095 00.

212Y-2—506 0775 002.

*1 milliwatt, 600 ohm base.

**See Page 15.



60H TWO-CHANNEL REMOTE MIXER

The Collins 60H Mixer is a two-position, low-level mixer to be used in conjunction with the Collins 212Y Remote Amplifier. It consists of a mixer chassis in a cabinet which has an opening for the insertion of the 212Y Amplifier, and a convenient canvas carrying case with both a carrying handle and a shoulder strap.

The 212Y slides into the 60H mixer case exactly as it does into its own case. A built-in plug and socket arrangement handles the interconnection problem at the same time the amplifier is installed in the mixer case.

A standard 3-inch vu meter with adjustable range extension attenuator is provided for visual monitoring of the program material, while headphone monitoring is accomplished as before in the 212Y amplifier. The two ladder type attenuators are furnished with convenient control knobs having decibels calibration on the front panel. The volume control on the 212Y will then serve as a master volume control.

The mixer rests upon two removable legs which raise the knobs to a convenient height and tilt the panel at an angle to afford sight of the dial calibrations and meter scale. The microphone connections are at the rear of the cabinet. The canvas carrying case is equipped with two snap fasteners to hold the case on the mixer when operating in inclement weather. A flap on the rear of the case opens to allow insertion of the microphone connectors and at the same time protects them from the weather.

60H SPECIFICATIONS

- Input impedance: 60H-2, 30/50 ohms.
60H-3, 150 ohms.
60H-4, 200/250 ohms.
- Output impedance: 60H-2, 50 ohms.
60H-3, 250 ohms.
60H-4, 250 ohms.
- Insertion loss: 60H-2, 6 db.
60H-3, 10 db.
60H-4, 4.5 db.
- Gain controls: Ladder type attenuators, step by step.
- Number of input channels: Two.
- Microphone receptacle: Cannon type XL-3-13. Adapters are available for other standard types.*
- Finish: Black anodic aluminum panel, black wrinkle cover to match 212Y.
- Dimensions: 14" w, 6" h with legs (4³/₄" h less legs), 7¹/₂" d.
- Carrying case: Leather reinforced canvas with slide fastener and pouch for power and microphone cables; canvas carrying handle and shoulder strap.
- Weight: Mixer and carrying case only, 6 pounds.
- Collins Part No.: 60H-2—520 3758 00
60H-3—520 3759 00
60H-4—520 3760 00

*See Page 15.



412C BATTERY BOX

The 412C-2 battery box is sturdily constructed, and holds the batteries securely. There is room in the top of the case for storing the 6 ft. rubber jacketed cable for transportation. Three thumb screws hold the clamp which secures all of the batteries in place. A convenient carrying handle is provided.

Finish: Black wrinkle.

Dimensions: 10³/₄" w, 6¹/₂" d, 9³/₄" h.

Weight: With batteries approximately 22 lbs.

Collins Part No.: 520 3096 00 (less batteries).

Collins Part No. of Battery Kit: 520 3097 00.

Requires standard low cost type batteries:

4—Burgess M30 or Eveready 482 or equivalent. Collins Part No. 015 0021 00.

5—Burgess 4F or Eveready 742 batteries, or equivalent. Collins Part No. 015 0020 00.

MICROPHONE ADAPTERS



655-5
WITH HUBBELL
7555



655-6
WITH HUBBELL
7484



655-4
WITH HUBBELL
23002



655-3
WITH HUBBELL
7082



655-2
WITH CANNON
P3-CG-115

Adapters using other type connectors available on special order.



Introduction

On the following pages the complete line of Collins standard rack mounted speech equipment is shown and described, including:

- Amplifiers
- Power Supplies
- Metering Panels
- Jack Panels and Accessories
- Equalizers
- Repeat Coils and Panels
- Mixer and Attenuator Panels
- Racks and Accessories

These units are designed for mounting in standard 19 inch racks, and every effort has been made to provide ready accessibility for adjustments and maintenance without removal from cabinets.

6P-1 Preamplifier



6P-1 PREAMPLIFIER

The Collins 6P is a high fidelity preamplifier designed for service in AM, FM and TV applications. It operates from a low-level microphone or similar source and has sufficient output to drive a program amplifier, or audition facilities. As many as five of these preamplifiers, which require an external power supply, can be powered from the Collins 409T-3 power supply.

The 6P uses standard tubes and has two stages of amplification. It is carefully engineered for high performance through the use of the latest circuit refinements and improved components. Generous safety factors throughout insure operating reliability. The hum and noise levels are low, and the output is clean and brilliant. The frequency response is flat from 30-15,000 cps, with a variation of only ± 1.0 db. Distortion at normal program level is less than 1.0%. Adequate shielding and careful circuit arrangement prevent cross-modulation between preamplifiers when more than one are used, even when they are placed side by side. Two gain positions are provided, giving approximately 45 db or 35 db amplification respectively. Gain is constant for a given setting.

The advanced design of the 6P provides easy accessibility to all parts. An access door in the panel permits tube changing from the front. Removal of the slip-on dust cover gives immediate access to all circuit components.

Input impedance: 30/50, 200/250, or 500/600 ohms.

Output impedance: 600 ohms (150 ohms available).

Input level: Commercial microphone level.

Output level: -35 to -15 dbm*.

Overall gain: 45 db in high position, 35 db in low position.

Frequency response: 30-15,000 cps ± 1.0 db.

Noise level: -65 db from program level.

Distortion: Less than 1.0% at program level.

Tube complement: 2-1620 or 2-6J7.

Power requirements: 6.3 volts a-c @ 0.6 amperes, 180 volts d-c @ 6 ma. Use Collins 409T-1 or 409T-3 power supplies.

Mounting: Standard 19" rack.

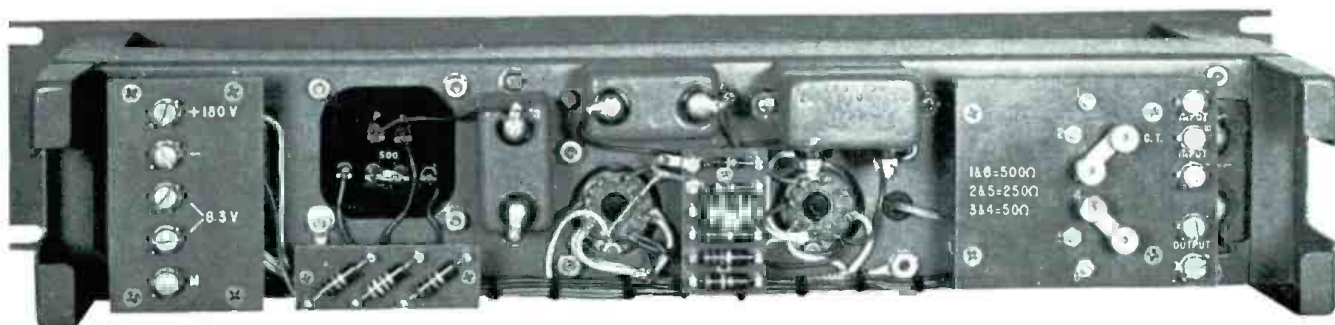
Mounting dimensions: 19" w, 3 1/2" h, 7 1/2" d.

Finish: Metallic gray.

Weight: 11 pounds.

Collins Part No.: 502 8377 004.

*1 millivolt, 600 ohm base.



Rear view with dust cover removed.



6R-2 ISOLATION AMPLIFIER

The 6R-2 is a two stage push-pull amplifier. The gain control has twenty steps of 2 db each, and is located immediately behind the access door. Tubes are easily accessible through a door in the front panel. Other components are easily reached by removing the dust cover, held in place by spring fasteners. Provisions have been made for external metering of the tube currents.

Frequency response: 30-15,000 cps ± 1.0 db.
 Distortion: 1% max. at any level up to +20 dbm*.
 Noise: -65 db.

Overall gain: +45 db as line amplifier, +35 db as bridging amplifier.

Gain control: step by step with detent, 2 db per step.

Output level: -20 to +20 dbm*.

Maximum input level: -10 dbm*.

Input impedance: 600 ohms, or bridge with 20,000 ohms. 150 ohms available.

Output impedance: 600 ohms, 150 ohms available.

Tube complement: 2-6SN7.

Power requirements: 6.3 volts @ 0.6 amp. a-c or d-c. 100 to 250 volts d-c at 20 ma. Power may be obtained from the Collins 409T-1 or 409T-3 power supplies.

Dimensions: 19" w, 3½" h, 8¼" d.

Finish: Metallic gray.

Weight: 10½ pounds.

Collins Part No.: 520 3434 00.

*dbm, 1 mw into 600 ohms.



6T MONITOR AMPLIFIER

The 6T is a 2 watt monitor amplifier having a self-contained power supply. The power switch, pilot light, and volume control are mounted on the front panel, tubes are accessible from the rear.

Input impedance: 600 ohms matching, or 20,000 bridging.

Output impedance: 600, 150, 16, 8, and 4 ohms.

Frequency response: 30-15,000 cps ± 2 db.

Gain: 55 db. Matching 600 ohms.

45 db. Bridging with 20,000 ohms.

Distortion: Less than 3%.

Noise: -65 db.

Output level: +33 dbm*.

Maximum input level: +10 dbm*.

Tubes: 2-12AU7, 2-6AQ5, 2-6X4.

Finish: Metallic gray.

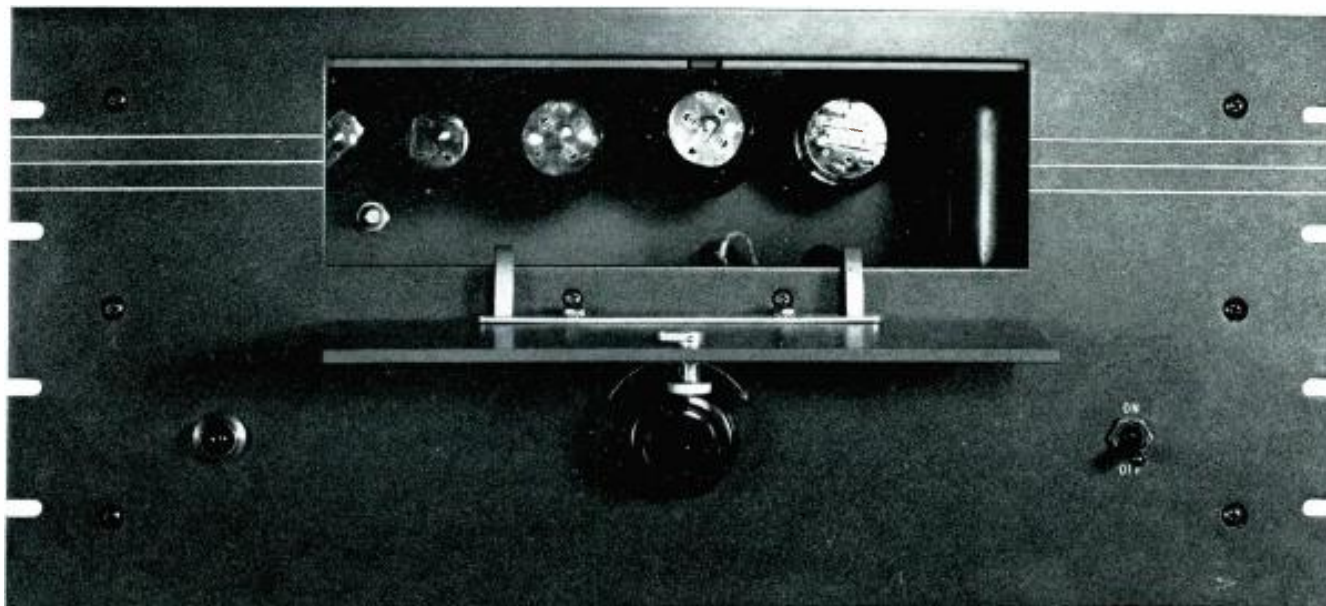
Mounting dimensions: 5¼" h, 19" w, 6½" d.

Power requirements: 115 volts a-c, 50/60 cps.

Weight: Approx. 15 pounds.

Collins Part No.: 520 3744 00.

*dbm, 1 mw into 600 ohms.



6X-2 MONITOR AMPLIFIER

The Collins 6X-2 is a reliable 10 watt monitor amplifier complete with self-contained power supply. Its high fidelity, typical of all Collins speech equipment, commends its use for AM, FM and TV broadcasting and in the most exacting professional recording work.

All tubes are easily reached through the door in the front of the unit. Other components are made

readily available by removal of the slip-on dust cover.

Because of its excellent electrical characteristics, its 10 watts of audio power, and its inbuilt power supply, the 6X-2 is also an unsurpassed amplifier to follow a good AM-FM tuner and to be followed by a high fidelity speaker, for custom installation in schools, clubs, homes, and other applications calling for the finest radio reception.

SPECIFICATIONS

Number of channels: One.

Input impedance: 600 ohms matching, 20,000 ohms bridging (150 ohms available).

Output impedance: 600 ohms, balanced.

Output level: +40 dbm (10 watts, 12 watts max.).

Overall gain: 55 db maximum.

Frequency response: 30 to 15,000 cps ± 1.5 db.

Noise level: Better than 70 db below output level.

Distortion: Less than 2% from 50 to 15,000 cps, 10 watts output.

Tubes: 1-6SN7, 1-6SL7, 2-6L6G's, 1-5V4G.

Power source: 115 volts a-c, 50/60 cps.

Mounting dimensions: 8 $\frac{3}{4}$ " h, 19" w, 10 $\frac{1}{4}$ " d.

Weight: 34 pounds, 10 ounces.

Finish: Metallic gray.

Collins Part No.: 520 3364 00.

Tubes: 520 3365 00.



26W-1 LIMITING AMPLIFIER

The 26W-1 limiting amplifier is recommended for use in any AM or FM installation where it is desired to control the amplitude of audio frequency peaks. In AM transmitter applications it limits loud audio passages, thus preventing overmodulation and the accompanying distortion and adjacent channel interference. This limiting action permits a higher average modulation level, and, consequently, a stronger transmitted signal.

In FM applications the 26W-1 limiter is necessary to prevent excessive transmitter swing which, in general produces distortion at the receiver due to the inability of the average discriminator to handle frequency swings greater than 150 kc. In FM systems the use of wide range reproducer systems makes such distortion extremely noticeable.

The 26W-1 performs with equal satisfaction in recording equipment and high quality P.A. systems. It regulates the audio level and prevents overloading

the cutting head or speaker, and by raising the average audio level it improves signal to noise ratio.

The 26W-1 amply meets the three most important requirements of a superior product—(1) performance to comply with the specifications prescribed by the application, (2) reliability of operation, and (3) accessibility for maintenance. Thorough consideration was given the resistance-capacitance circuits and transformers to produce a true high fidelity frequency response. Distortion and noise are extremely low. Input and output levels are adjustable.

Two high quality meters provide a continuous visual indication of operating conditions. Individual tube operation, supply voltage, the amount of compression in db, and the output in vu are metered. The limiter stage can be adjusted easily from the front to precise balance, which makes it a simple job to hold the distortion to a very low level.

A door in the front panel provides access to all

26W-1 Limiting Amplifier

tubes. The dust cover is fastened by snap fasteners, and requires no tools for removal. The inside-out chassis construction reaches a new standard for accessibility of components; all resistors and circuit capacitors are on the rear of the chassis and are outermost upon removal of the dust cover.

The very best components, conservatively operated, are employed in the 26W-1. Electrolytic capacitors appear only where specified performance cannot be obtained with paper capacitors, and are limited to cathode circuits with less than 50 volts potential. Transformers are sealed, and all insulating materials are the best available.

Frequency range: 50-15,000 cps \pm 1.0 db.

Input impedance: 200, 600 ohms, or bridging.

Input level: -25 to +25 dbm*.

Output impedance: 600 ohms.

Output level: -12 to +18 dbm*.

Gain controls: Input and output levels adjustable in 30 steps of 1 db.

Overall gain: 47 db max.

Compression ratio: 18/1 in db above verge of compression.

Operate time: Adjustable 1.0, 3.0, or 10.0 milliseconds.

Release time: 1.0, 2.5, or 5.0 seconds.

Distortion: Harmonic distortion below 1% rms at any frequency from 100 to 15,000 cycles with no compression. 50 cycle distortion below 1.5% under same conditions. Harmonic distortion below 2% from 100 to 15,000 cycles at any value of compression up to 10 db.

Hum and noise: -65 db below output level.

Controls: Input and output attenuators, vu range switch, and meter selector switch.

Metering circuits: Individual tube currents, plate voltage, compression level, and output level.

Tube complement: 3-6N7, 1-6H6, 2-1621 (2-6F6 may be used), 1-5V4G.

Power source: 115 volts a-c, 50/60 cps.

Dimensions: 14" h, 19" w, 9" d, for rack mounting.

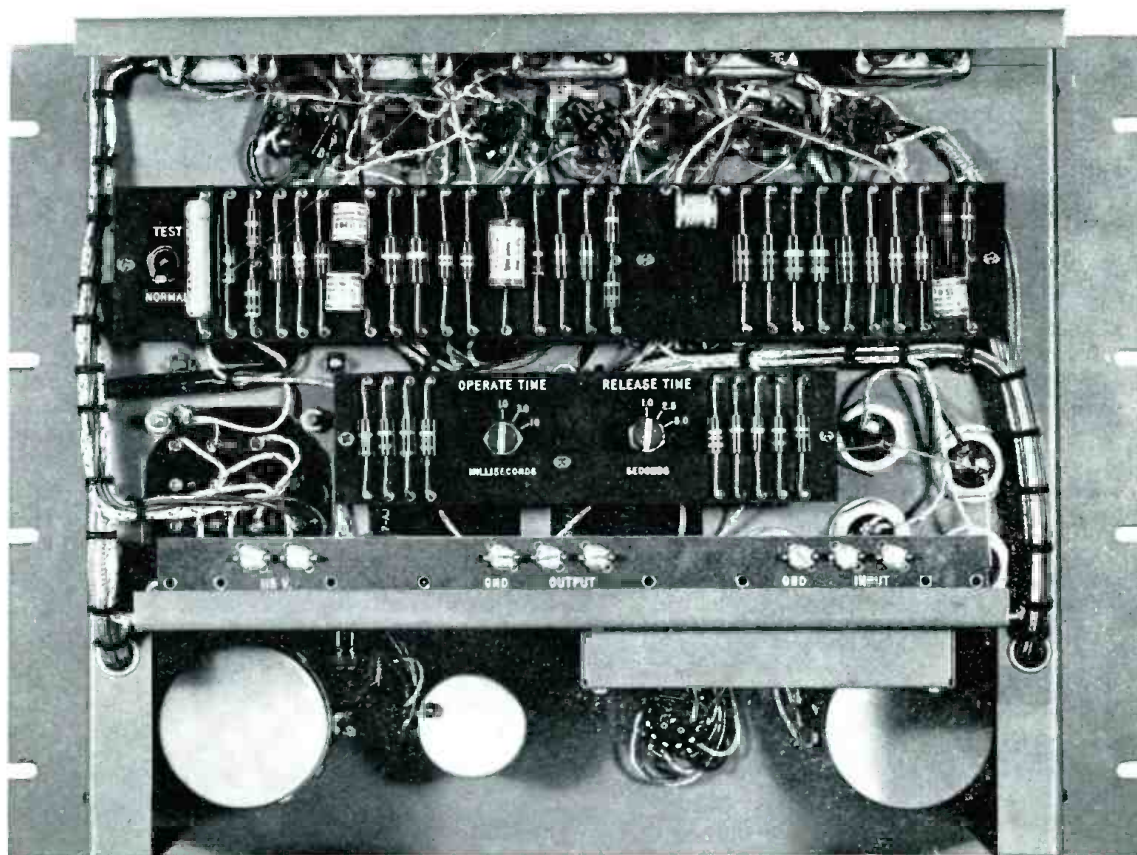
Weight: 45 lbs. (55 lbs. shipping weight).

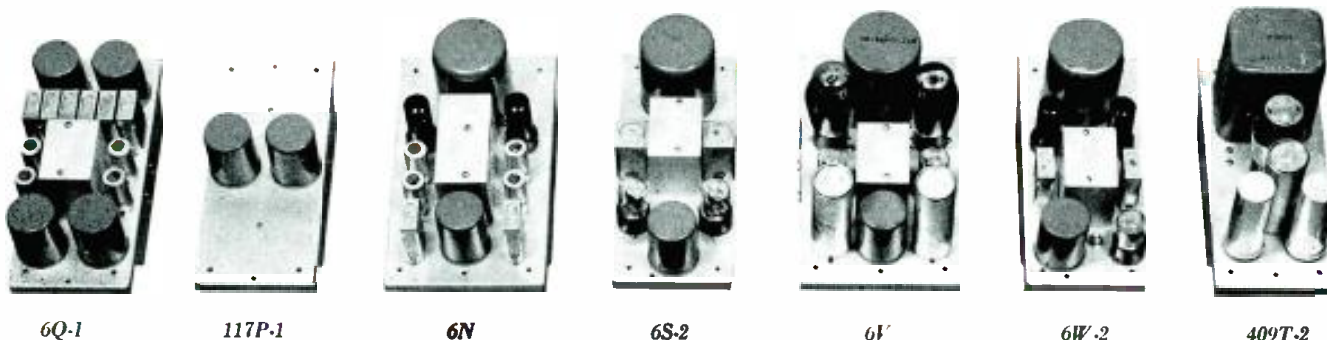
Finish: Metallic gray panel.

Collins Part No.: 520 2722 00.

Tubes: 520 2723 00.

*dbm, 1 mw into 600 ohms.





CONSOLE TYPE AMPLIFIERS

Heretofore employed primarily in custom installations, the fine amplifiers used in the Collins 212 series consoles are now available for mounting in other equipment. Shown above and described on this and the following pages are:

- 6Q Dual Preamplifier
- 6N Program Amplifier
- 6S-2 Two-stage Isolation Amplifier
- 6V 10-Watt Monitor Amplifier
- 6W-2 2-Watt Monitor Amplifier
- 117P-1 Repeat Coil Unit
- 409T-2 Power Supply for 6N, 6S or 6W-2

The 409T-2 power supply is capable of operating two 6N program amplifiers, five 6S-2 isolation amplifiers, or two 6W-2 2-watt monitor amplifiers. Power for the 6Q dual preamplifiers may be obtained from a 409T-3 power supply, a standard rack mounting unit listed elsewhere in this section. The 409U-1 or -2 power supply, as supplied with the 212 series consoles, is recommended for use with these amplifiers if a complete system is contemplated. See listing of 409U-1 or -2 on page 6 of CONSOLES section.

6Q-1 DUAL PREAMPLIFIER

The 6Q contains two preamplifiers on one chassis. These amplifiers usually work into a program amplifier, such as Collins 6N or 6R. An external power supply is needed.

- Input impedance: 50 or 250 ohms.
- Input level: Commercial microphone level.
- Output impedance: 600 ohms.
- Gain: 47 db.
- Frequency response: ± 1 db 30-15,000 cps.

- Distortion: Less than 1%.
- Noise: Better than -65 db.
- Tubes: 2-6AQ6, 2-6C4.
- Power requirements: 140 volts d-c @ 8 ma.
6.3 volts a-c or d-c @ 0.6 amp.
- Dimensions: 4 $\frac{3}{4}$ " h, 4 $\frac{1}{2}$ " w, 10 $\frac{1}{2}$ " d.
- Weight: 5 pounds 2 ounces.
- Collins Part No.: 520 2999 00.
- Tubes: 520 3000 00.

6N-1 PROGRAM AMPLIFIER

The 6N is a program amplifier meeting the strictest requirements of present day broadcasting—AM, FM, or Television. Mounted on a console type chassis, it requires an external power supply. A dual section, 100,000 ohm-per-section potentiometer is also required, such as the Collins No. 378 0014 00.

- Input impedance: 600 ohms matching or 20,000 ohms bridging. 150 ohms available.
- Input level: Not exceeding -10 dbm*.
- Output level: +30 dbm*.
- Output impedance: 600 ohms. 150 ohms available.
- Gain: 68 db matching. 58 db bridging.
- Frequency response: ± 1 db 30-15,000 cps.
- Distortion: Less than 1% at +30 dbm*.
- Noise: Better than -65 db.
- Tubes: 2-6AQ6, 2-6C4, 2-6F6.
- Power requirements: 325 volts d-c @ 50 ma.
6.3 volts a-c or d-c @ 2 amp.
- Dimensions: 5 $\frac{3}{4}$ " h, 6" w, 10 $\frac{1}{2}$ " d.
- Weight: 4 pounds, 12 ounces.
- Collins Part No.: 520 2996 00.
- Tubes: 520 2998 00.

*dbm: reference level 1 mw, 600 ohms.

6S-2 ISOLATION AMPLIFIER

The 6S-2 is a two stage push-pull isolation amplifier. It may be used as a bridging amplifier for monitoring, as a distribution and isolation amplifier, as a program booster at studio or transmitter, or as a program amplifier. An external power supply is required. The components are mounted on a console type chassis, and are all easily accessible. A screwdriver operated switch will vary the gain in four steps of 3 db per step.

Frequency response: 30-15,000 cps ± 1.0 db.

Distortion: Less than 1% at any level up to +20 dbm* output.

Noise: -65 db.

Overall gain: +45 db line matching, +35 db bridging.

Input level: -10 dbm* max.

Output level: -20 to +20 dbm*.

Input impedance: 600 ohms, or bridge with 20,000 ohms, 150 ohms available.

Output impedance: 600 ohms, 150 ohms available.

Tube complement: 2-6SN7.

Power requirements: 6.3 volts @ 0.6 amp a-c or d-c. 100 to 250 volts d-c at 20 ma.

Dimensions: 5½" h, 4½" w, 10½" d.

Weight: 5 lbs., 4 oz.

Collins Part No.: 520 3491 00.

*dbm: reference level 1 mw, 600 ohms.

6V-2 MONITOR AMPLIFIER

The 6V-2 is a 10 watt monitor amplifier mounted on a console type chassis. A dual section (25,000 ohm per-section) potentiometer is needed, such as Collins No. 378 0022 00 no detent; or Collins No. 378 0021 00 with detents. This amplifier may be used on a 600 ohm circuit, matching, with 62 db gain, or as a bridging amplifier with approximately 52 db gain. An external power supply is needed.

Input impedance: 600 ohms matching, or 20,000 ohms bridging.

Input level: Not more than -10 dbm*.

Output impedance: 600 ohms balanced.

Gain: 62 db matching 600 ohms.
52 db bridging with 20,000 ohms.

Frequency response: ± 1 db 30-15,000 cps.

Distortion: Less than 1% at +40 dbm (vu).

Noise: Better than -75 db.

Power requirements: 325 volts d-c @ 150 ma.
6.3 volts a-c or d-c @ 2.7 amp.

Dimensions: 6½" h, 6" w, 10½" d.

Tube complement: 6SN7, 6SL7, 2-6L6.

Weight: 7 pounds.

Collins Part No.: 505 3965 003.

Tubes: 520 3004 00.

*dbm: reference level 1 mw, 600 ohms.

6W-2 MONITOR AMPLIFIER

The 6W is a 2 watt amplifier mounted on a console type chassis. It may be used to drive monitor speakers, or for any other applications requiring up to 2 watts. An external power supply is needed. A screwdriver operated switch will vary the output level in 4 steps of approximately 3 db each.

Input impedance: 600 ohms. 150 ohms available.

Input level: Not over -10 dbm*.

Output impedance: 600 ohms. 150 ohms available.

Gain: 45 db, 600 ohms matching, 33 db at 20,000 ohm bridging.

Frequency response: 30 to 15,000 cps ± 1.5 db.

Distortion: At +30 dbm, less than 1%.

Noise: Better than -70 db from +30 dbm* output.

Power requirements: 325 volts d-c @ 50 ma.
6.3 volts a-c or d-c @ 1.7 amp.

Dimensions: 5½" h, 4½" w, 10½" d.

Tube complement: 6SL7, 2-6F6 or 2-1621.

Weight: 4 pounds, 12 ounces.

Collins Part No.: 520 3223 00.

Tubes: 520 3224 00.

*dbm: reference level 1 mw, 600 ohms.

117P-1 REPEAT COIL UNIT

The 117P-1 consists of two coils mounted on a console type chassis. The characteristics of the repeat coils are as follows:

- Input impedance: 600, 250 or 50 ohms balanced. 150 ohms available.
- Input level: +25 dbm* max.
- Output impedance: 600 ohms. 150 ohms available.
- Distortion: Less than 0.2% at +25 dbm*.
- Frequency response: ± 0.4 db 30-15,000 cps.
- Dimensions: 4½" h, 4½" w, 10½" d.
- Weight: 1 pound, 14 ounces.
- Collins Part No.: 520 3012 00.

*dbm: reference level 1 mw, 600 ohms.

409T-2 POWER SUPPLY

A power supply mounted on a console type chassis, 4½" wide. Mounting holes are standard for mounting in Collins consoles. By changing 2 resistors supplied in a kit, any one of the voltages and currents listed below may be obtained.

- 325 volts d-c @ 50 ma.
- 300 volts d-c @ 100 ma.
- 250 volts d-c @ 50 ma.
- 250 volts d-c @ 75 ma.
- 250 volts d-c @ 100 ma.

Also 6.3 volts a-c @ 5 amp, CT

- Tube: 5R4GY.
- Output connections: Solder type terminals.
- Input: 115 volts a-c 50/60 cps.
- Dimensions: 8½" h, 4½" w, 10½" d.
- Weight: 8 pounds, 4 ounces.
- Collins Part No.: 520 3219 00.

409T-1 POWER SUPPLY



409T-1 Power Supply

A rugged, reliable power supply is a necessity for innumerable applications. The 409T-1 is a well engineered unit, with sturdy components and a very

low hum level. Both plate supply and filament power are available, with a tapped primary for voltage adjustment. Collins 6P preamplifiers and 6R isolation amplifiers may be mounted in the same rack with the 409T-1 power supply, and fed directly from it.

- Tubes: 2-6X5.
- Plate supply voltage: 250 volts d-c @ 100 ma.
- Filament supply voltage: 6.3 volts a-c @ 5.0 a.
- Dimensions: 19" w, 5¼" h, 7½" d.
- Weight: 24½ pounds.
- Finish: Metallic gray panel, velvet gray dust cover.
- Collins Part No.: 520 2883 00.

409T-3 POWER SUPPLY



409T-3 Power Supply

The 409T-3 is a rack mounting power supply on a 3½" panel. The power switch and pilot light are on the front panel. Connections to the unit are made to a covered terminal board at the rear. Any one of the output voltages and currents listed below is made available by changing two resistors supplied in a kit. Two plug-in high capacity electrolytic condensers of ample safety margin contribute to an extremely well filtered output. The filter input capacitor is an oil-filled paper unit.

- Ripple voltage: .005 volts at 250 volts d-c, 50 ma.
- Output: 325 volts d-c @ 50 ma.
- 250 volts d-c @ 50 ma.
- 180 volts d-c @ 50 ma.
- 140 volts d-c @ 50 ma.
- 250 volts d-c @ 25 ma.
- 140 volts d-c @ 20 ma.
- 6.3 volts a-c @ 3 amp.

- Tubes: 1-6X5.
- Finish: Metallic gray.
- Weight: 11 pounds.
- Input: 115 volts a-c 50/60 cps.
- Collins Part No.: 520 3576 00.

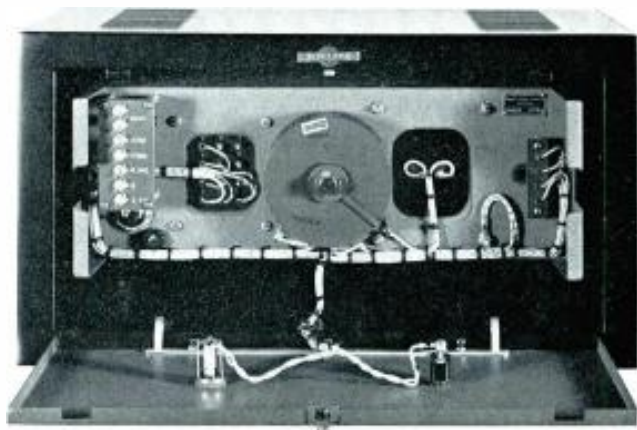


409T-3 Power Supply (rear view)

409U-1 & 2 POWER SUPPLY (see page 6)

414F-3 RELAY POWER SUPPLY

A well filtered, well regulated, dependable d-c power source for operating relays and pilot lights. The power transformer has a tapped input permitting operation on line voltages from 105 to 125 volts. A rugged selenium rectifier followed by a filter network furnishes the d-c power suitable for use in control circuits running near the lower level audio circuits.



Open view of 414F-3

The 414F-3 is placed in a wall mounting cabinet and is accessible through a hinged access door on the front. An on-off switch and a pilot light are mounted on the front of the cabinet. A fuse receptacle is available through the access door.

Dimensions: 20½" w, 11" h, 10" d.

Weight: 35 pounds.

Finish: Metallic gray door, glossy black cabinet.

Input: 105-125 volts a-c. 50/60 cps.

Output: 12 volts d-c at 5 amperes.

12.6 volts a-c center tapped at 5 amperes.

Collins Part No.: 520 3016 00.

414F-4 RELAY POWER SUPPLY



The 414F-4 Relay Power Supply is designed for use where a small number of relays are to be operated. This unit provides a source of 12 volts d-c at 1 ampere, and 12.6 volts a-c center tapped, at 3.5 amperes. Where low current drain is feasible for operating relays, the small size of the 414F-4 makes it especially desirable. The 12.6 volt a-c center tapped voltage is also useful for a filament supply or for operating pilot lamps.

Power source: 115 volts a-c, 50/60 cps.

Output voltage: 12 volts d-c @ 1 amp.

12.6 volts a-c CT @ 3.5 amps.

Dimensions: 19" w, 3½" h, 7" d.

Weight: 8¾ pounds.

Finish: Metallic gray.

Collins Part No.: 520 3221 00.

62E vu PANEL



The 62E is designed for accurate monitoring of audio levels in broadcasting, recording studios, and sound systems. A Weston type 30 meter is provided, with illuminated face and easily read figures. Over-swing is small, and pointer action is deliberate and positive. The 62E-1 meter has a type A scale, with -20 to +3 vu on the upper side and zero to 100% on the lower side. The 62E-2 meter has a type B scale, with per cent calibrations on the upper side.

(Continued next page)

Three controls are provided. Any of four circuits can be monitored by means of the circuit selector switch. The attenuator control is calibrated at 1 milliwatt (zero level) and in steps of 2 db up to a total of 40 db. In addition, a vernier screw adjustment allows ± 0.5 db variation for coordinating various meters.

The 62E vu panels are designed to operate from a 600 ohm line. However, other impedances may be used in conjunction with a calibration chart.

Input impedance: 7500 ohms constant except on the 1 mw calibration position.

Attenuator range: +4 db to +40 db in 2 db steps. T-type construction.

Number of input circuits: Four.

Meter scale: Standard vu.

62E-1: Type A Scale.

62E-2: Type B Scale.

Frequency range: Constant response within 0.2 db up to 10,000 cps.

Power requirement for meter illumination: 6.3 volts a-c or d-c @ 0.3 amp.

Dimensions: 19" wide for standard rack mounting, 5 $\frac{1}{4}$ " high.

Finish: Metallic gray.

Weight: 9 pounds.

Collins Part No.: 62E-1—520 2910 00.

62E-2—520 2911 00.

METER PANEL TYPE 82D-7



Meter panels have many applications in monitoring and measuring equipment. D-c and a-c voltages and currents can be continually metered by using this convenient rack mounting panel. The unit accommodates four meters of the Weston type 301 size (not supplied), and is equipped with a dust cover 7 $\frac{1}{2}$ " deep. Dzus fasteners are employed to hold the cover in place. The panel is made of aluminum, $\frac{3}{16}$ " thick. Meters are available to suit any requirements.

Dimensions: 19" w, 5 $\frac{1}{4}$ " h, 5" d.

Finish: Metallic gray.

Weight: 6 pounds.

Collins Part No.: 520 2922 00 (less meters).

82T-1 METERING UNIT



The 82T-1 is a versatile unit for measuring currents of various rack mounting type amplifiers, such as the Collins 6X, 6P, and 6R and the console mounting type amplifiers, such as 6Q, 6N, 6V, 6S, and 6W. It is also adaptable for use with any circuit employing tapped cathode resistors of the proper multiplier values, or in circuits where the multiplier is in the plate circuit. The unit is wired to accommodate 10 plate metering circuits, and 10 cathode metering circuits. By adding jumpers on the terminal strip, the unit will operate for 20 cathode circuit measurements.

The basic meter movement is 1 ma full scale, and is calibrated 0 to 5. It will indicate currents of 0-5, 0-50, and 0-500 ma with a 25 ohm, 2.04 ohm or 0.22 ohm multiplier resistor.

In addition to the direct current measurements, a twenty-first position allows a check of the a-c voltage in the rack.

The dust cover protects switches and is held on by means of two snap fasteners.

Dimensions: 12" w, 5 $\frac{1}{4}$ " h, 7 $\frac{1}{2}$ " d.

Weight: 10 lbs.

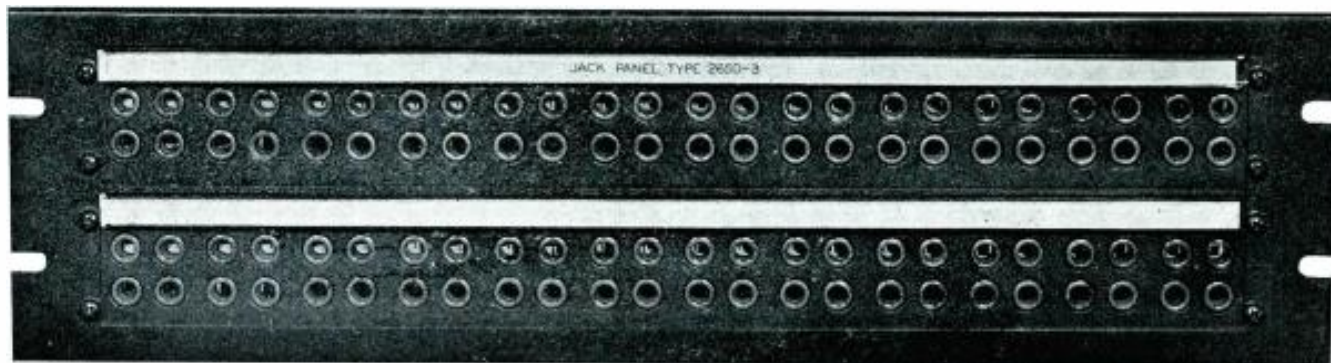
Finish: Metallic gray.

Current range: 0-5, 50, 500 ma (with appropriate circuit).

a-c Metering: Indicates 120 volts center scale, and shows variations of 5 volts per 1 scale division from 80 to 130 volts. (Scale not calibrated for a-c volts).

Collins Part No.: 520 3580 00.

. Jack Panel



TYPE 265D JACK PANELS

Utmost flexibility is afforded a control room through the use of jack strips and associated patch cords. Connections can be made for test purposes or for terminating program lines and order wires. Lines, amplifiers, microphones, equalizers, and other audio equipment can be speedily interchanged for maintenance or emergency operation. These jack panels mount in standard 19 inch racks. Regularly supplied with Collins 360 1010 00 jack.

PATCH CORDS

Patch cords for use with jack strips are available in lengths from 6 inches to 10 ft. The plugs are of the shielded type, with the sleeves tied together and grounded. The circuit is maintained through connections to the plug tips.



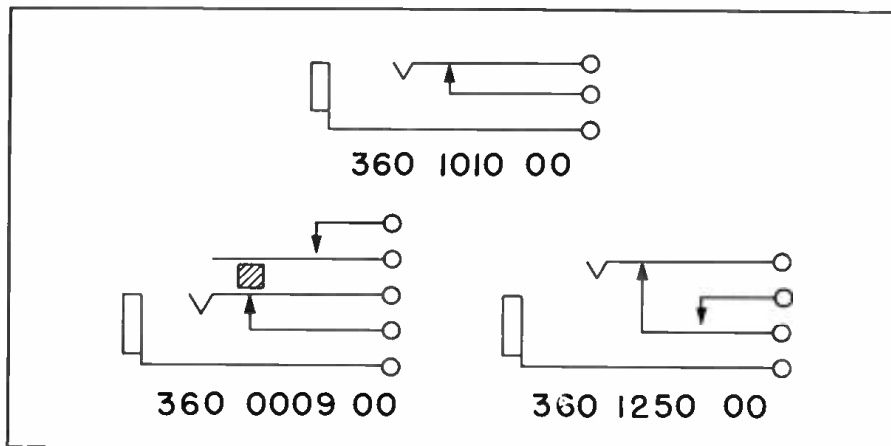
Type No.	Description	Height	Weight	Part No.
265D-1	12 pr. jacks	1 3/4"	3 3/4 lbs.	520 2878 00
265D-2	24 pr. jacks	3 1/2"	6 1/2 lbs.	520 2879 00
265D-3	48 pr. jacks	5 1/4"	11 1/2 lbs.	520 2880 00
265D-4	72 pr. jacks	7 "	17 lbs.	520 2881 00
265D-5	96 pr. jacks	10 1/2"	22 1/2 lbs.	520 2882 00
265D-6	120 pr. jacks	12 1/4"	28 lbs.	520 3406 00

Length	Part No.
1/2 ft.	361 0010 00
1 ft.	361 0011 00
2 ft.	361 0012 00
3 ft.	361 0013 00
4 ft.	361 0014 00
5 ft.	361 0015 00
10 ft.	361 0016 00

LONG FRAME TWO CIRCUIT JACKS

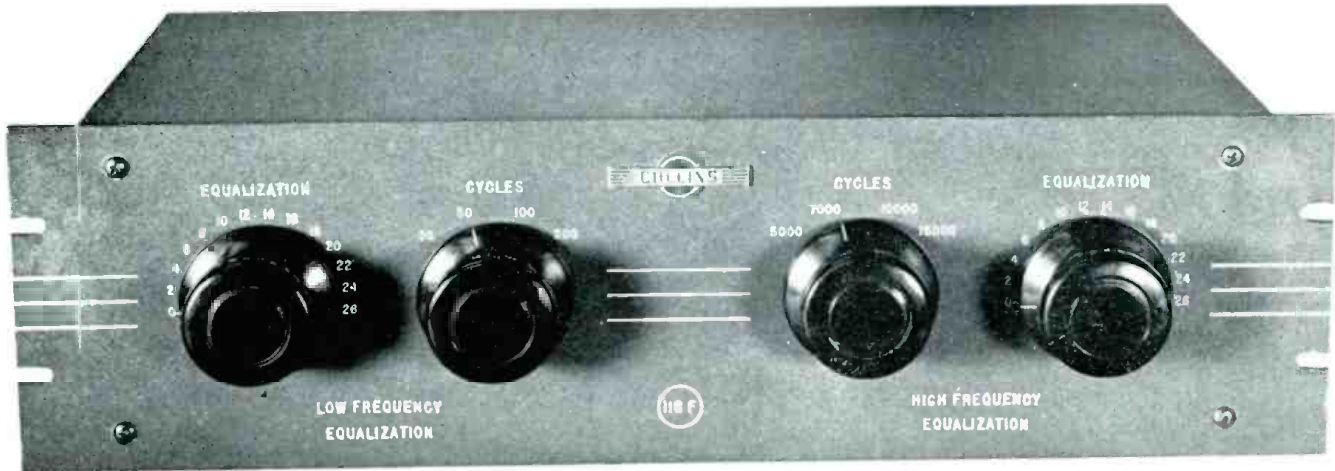
Circuit	Part Number
Break one, make one	360 0009 00
Break one	360 1010 00
Make before break	360 1250 00

Male, three conductor patch plug 361 0017 00



Jack circuit schematic

Program Equalizers



PROGRAM EQUALIZERS

Collins Equalizers provide complete facilities for controlling the frequency response of program and communication circuits. The circuit is new and ingenious, giving simple, smooth control of equalization. As these units have an insertion loss of approximately 30 db, the Collins 6R Isolation Amplifier used in conjunction with the equalizers will provide a means of bringing the level back to normal, plus a little gain if desired.

116F-1 EQUALIZER

Input and output impedance: 600 ohms, unbalanced.

Equalization frequencies: 30, 50, 100, or 200 cps at low frequency. 5, 7, 10, or 15 ke at high frequency.

Maximum boost: 26 db, in steps of 2 db each. High and low frequency equalization independently adjustable.

Insertion loss: 30 db at unequalized frequency.

Frequency range: 30-15,000 cps.

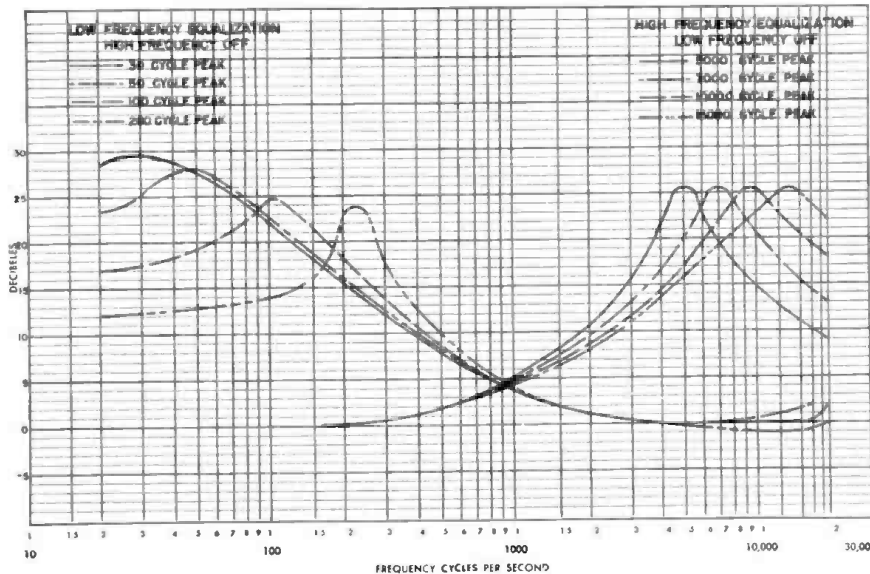
Dimensions: 19" w, 5 1/4" h, 7 1/2" d.

Weight: 15 pounds.

Finish: Metallic gray.

Collins Part No.: 520 2893 00.

116F-1 performance curves



116E-3 AND 116E-4 EQUALIZERS

The 116E-3 and -4 equalizers are another application of the 116F-1 circuit with a variable insertion loss dependent upon the amount of equalization used. Especially suited for stations having a variety of remote programs coming from different lines, the 116E-3 and -4 offer equalization in the high frequency ranges only. A calibrated attenuator selects the amount of equalization at the required frequency which is selected by a panel switch. Such calibration reduces line equalization time to a single run to find the line characteristics, and adjustment of the equalizer to the conjugate frequency characteristic.

The 116E-3 is a single high frequency equalizer while the 116E-4 has two identical high frequency equalizers mounted on the same panel with separate input and output terminals. Both are supplied with a flat gray finished dust cover.

116E-3 EQUALIZER



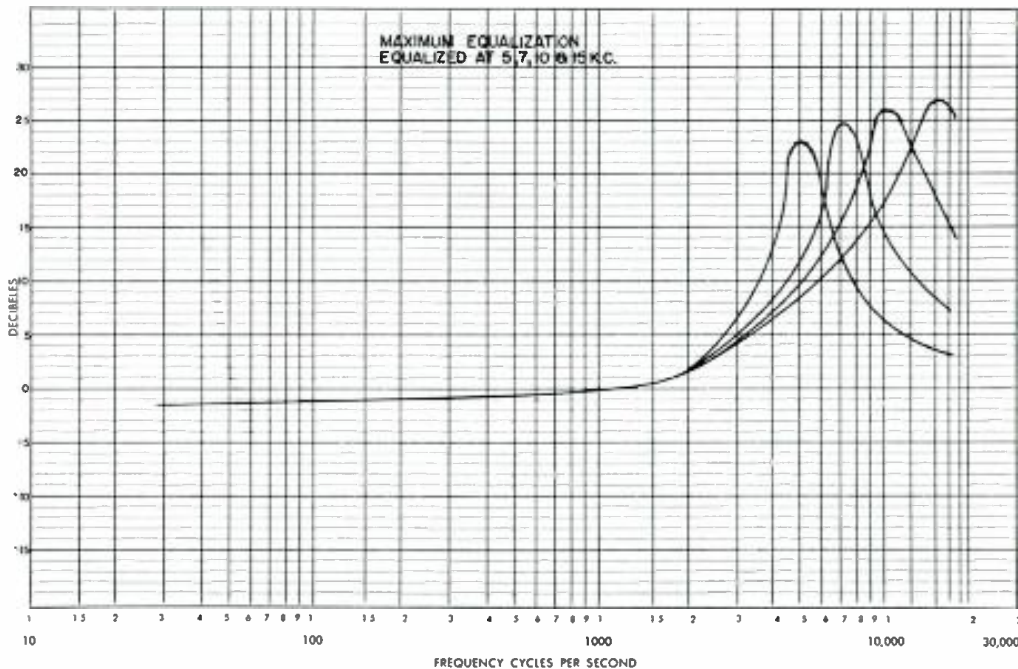
Input and output impedance: 600 ohms unbalanced.
Equalization frequencies: 5, 7, 10, and 15 kc.

Maximum boost: Approx. 30 db.
Insertion loss: Approx. equal to amount of equalization used.
Frequency range: 30 to 15,000 cps.
Dimensions: 19" w, 3½" h, 7¼" d.
Weight: 6 pounds, 7 ounces.
Finish: Metallic gray panel; flat gray back.
Collins Part No.: 520 3577 00.

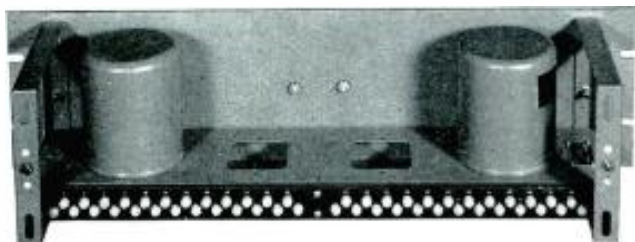
116E-4 EQUALIZER



Input and output impedance: 600 ohms unbalanced.
Equalization frequencies: 5, 7, 10, and 15 kc.
Maximum boost: Approx. 30 db each channel.
Insertion loss: Approx. equal to amount of equalization used.
Frequency range: 30 to 15,000 cps.
Dimensions: 19" w, 3½" h, 8¼" d.
Weight: 9 pounds, 7 ounces.
Finish: Metallic gray.
Collins Part No.: 520 3578 00.



117N-2 REPEAT COIL PANEL



The 117N-2 Repeat Coil Panel is a complete assembly including chassis, terminal board, and dust cover, but less repeat coils. This unit will accommodate four Thordarson type repeat coils with an R-4 case. There are 50 terminals on the board for making connections to external equipment. The dust cover is held on by two convenient Dzus fasteners.

Dimensions: 5¼" h, 19" w, 5" d.

Weight: 7½ pounds (less coils).

Finish: Metallic gray panel, velvet gray dust cover.

Collins Part No.: 520 2923 00 (less coils).

REPEAT COILS—THORDARSON R-4 CASE

1. Line to Line No. 677 0136 00	Primary	600 ohms 250 ohms 50 ohms, split
	Secondary	600 ohms, split
2. Line to Mult. Line No. 677 0138 00	Primary	600 ohms, split
	Secondary 1	600 ohms
	Secondary 2	600 ohms
	Secondary 3	600 ohms
3. Line to Mult. Line No. 677 0137 00	Primary	600 ohms, split
	Secondary 1	600 ohms, split
	Secondary 2	600 ohms, split
4. Bridging No. 677 0139 00	Primary	20,000 ohms, split
	Secondary	600 ohms 250 ohms 50 ohms, split
	Secondary 2	600 ohms, split
5. Line to Mult. Line No. 677 0140 00	Primary	600 ohms, split
	Secondary 1	250 ohms, split
	Secondary 2	50 ohms, split



268A-1/268B-1 ATTENUATOR PANELS

Separate gain control may be maintained over incoming and outgoing lines, auxiliary amplifiers, and speakers, by the use of the Collins 268A-1 and 268B-1 attenuator panels. The 268A-1 consists of two balanced ladder attenuators while the 268B-1 features two bridged-tee type attenuators. Both attenuator types have 20 steps, 2 db attenuation per step, with infinite attenuation in the last step. Connections are conveniently brought out to a terminal strip on

the rear. The front panel is attractively engraved to indicate decibels of attenuation.

Dimensions: 3½" h, 19" w, 4" d.

Input or output impedance: 600 ohms. Other impedances available.

Finish: Metallic gray.

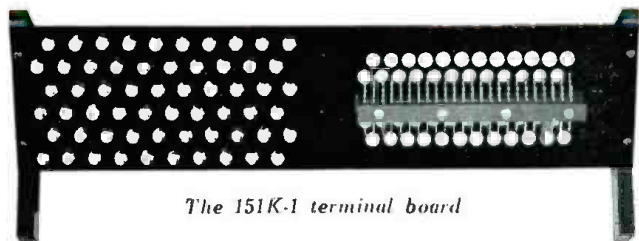
Weight: 268A-1, 8 pounds, 14 ounces.

268B-1, 8 pounds, 14 ounces.

Collins Part No.: 268A-1—520 3571 00

268B-1—520 3572 00

151K Terminal Boards



The 151K-1 terminal board

The 151K-6 is similar to the 151K-1 except that 144 telephone type terminals are provided as well as the 60 heavy duty terminals. Part No. 520 3761 00. Wt. 3 lbs.

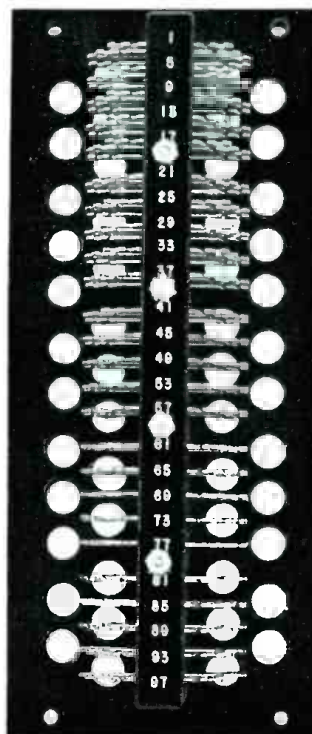
151K TERMINAL BOARDS

151K-1 (above) is used in the base of rack mounting cabinets. It contains 96 telephone type solder terminals for audio connections, and 60 heavy duty threaded stud type terminals for power connections. Part No. 520 2926 00. Wt. 2 lb., 14 oz.

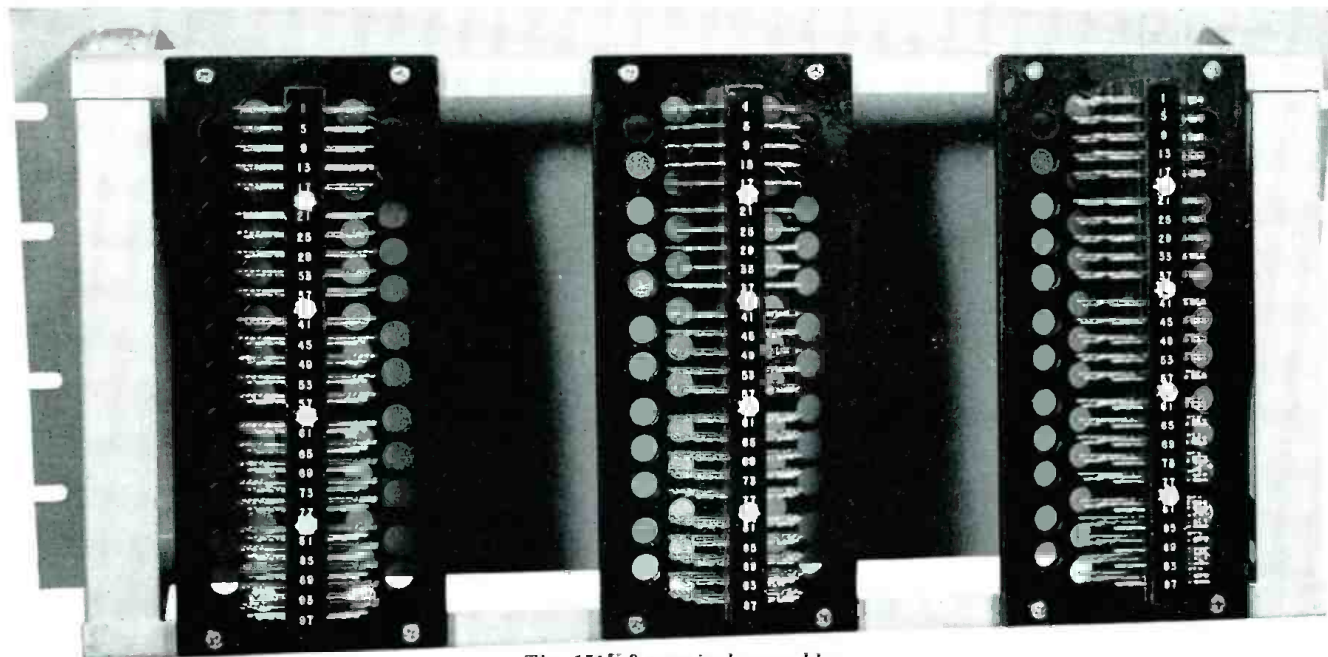
The 151K-5 is a terminal board consisting of 100 telephone type terminals, 25 in a row, 4 rows deep, on a 3½" x 8" bakelite board which has 7½" x 2½" mounting centers. Part No. 520 3449 00. Wt. 1 lb.

The 151K-4 has 4—151K-5's assembled on an inclined plane on an 8¾" x 19" panel, for standard rack mounting. The assembly is 7½" deep. Part No. 520-3448 00. Wt. 7 lbs.

The 151K-3 is identical to the 151K-4 except it has only 3—151K-5's assembled on a panel. Part No. 520 3352 00. Wt. 8 lbs.



151K-5 terminal assembly



The 151K-3 terminal assembly



209A-1



209A-2

209A WARNING LIGHT ASSEMBLIES

The type 209A Studio Warning Lights are constructed of aluminum sheet metal with a divided light compartment. Each of the two light compartments contains two 7½ watt 110 volt a-c bulbs and sockets to provide illumination of the lettering.

The 209A-1 flush type is mounted with the light box recessed in the wall, using the light box as the junction box, or mounting it to a standard junction box recessed deeper into the wall. The cover plate mounts directly to the wall with four screws.

The 209A-2 external type is mounted with the light box directly over a standard junction box which is recessed in the wall the usual depth. The cover plate mounts directly to the light box with two screws.

SPECIFICATIONS:

209A-1—For mounting flush with the wall. Sign must be ordered separately.

Dimensions: 4⁵/₈" h, 7³/₈" w, 2" d.

Weight: 11 oz.

Collins Part No.: 520 3659 00.

209A-2—For wall mounting. Sign must be ordered separately.

Dimensions: 4⁵/₁₆" h, 9¹/₂" w, 2" d.

Weight: 15 oz.

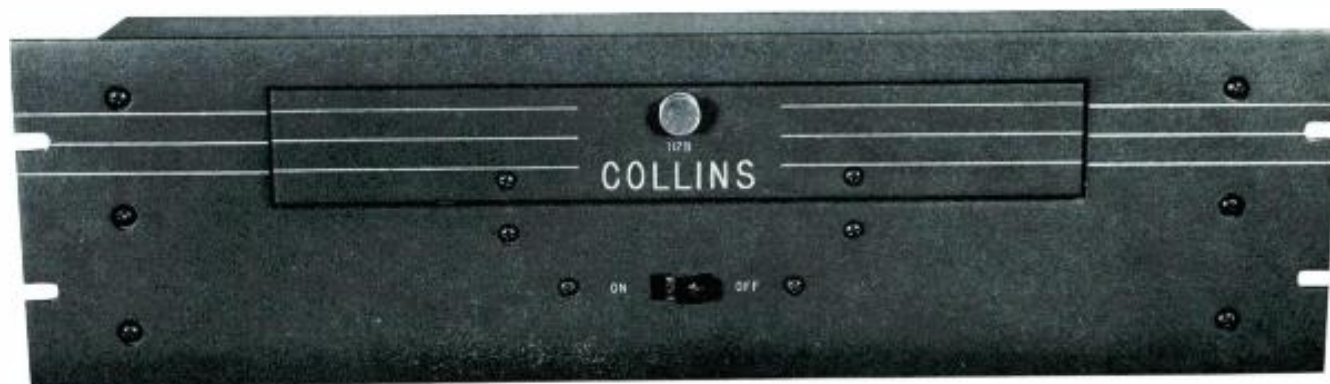
Collins Part No.: 520 3660 00.

SIGNS

The signs are made of boilable lucite with a black surface except for colored lettering.* The weight of each sign is 2 oz. The four available signs are:

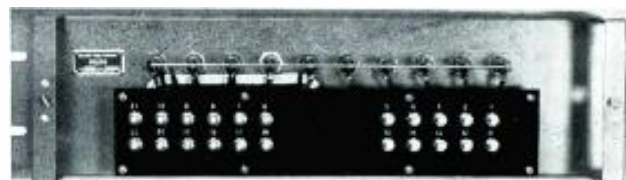
ON THE AIR	Red letters	STAND BY	Green letters	Part No. 503 4499 002
ON THE AIR	Red letters	AUDITION	Green letters	Part No. 503 4497 002
ON THE AIR	Red letters	REHEARSAL	Green letters	Part No. 503 4498 002
AM	Red letters	FM	Green letters	Part No. 503 4854 002

*Special wording available at additional cost.



112B-1 SWITCH AND FUSE PANEL

The 112B-1 provides primary a-c control over ten different circuits. A heavy-duty circuit breaker, operated by a snap action switch, carries the total a-c load, and each of the ten circuits is individually fused. A terminal board and dust cover complete the unit. A door in the front panel furnishes convenient access to the fuses. The panel is 5 1/4" high, and mounts in a standard 19" rack. Metallic gray finish. Weight, 6 1/2 pounds. Complete with set of extra circuit breaker heaters for operation at 3, 5 or 7 amperes. Furnished with 9 ampere link installed.



Rear view, dust cover removed

Collins Part No.: 520 2925 00.

3 amp replacement link	260 4544 81
5 amp replacement link	260 4544 85
7 amp replacement link	260 4544 87
9 amp replacement link	260 4544 89

SHIELDED RADIO HOOKUP WIRE

Two Conductor: Two insulated conductors, twisted and covered by tinned copper braid.

Each conductor: No. 20AWG gauge, 3 amp capacity. Two solid colors, or solid color with tracers to distinguish one conductor from another.

Shielding: 96 strands No. 34AWG tinned copper wire braided in groups of 4 strands side by side.

Collins Part No.:

- 425 0021 00 Solid conductor Fiber glass braid insulation.
- 425 0022 00 Solid conductor Lacquered cotton braid insulation.
- 425 0862 00 Same as 425 0022 00 except cotton braid overall.
- 425 0023 00 7 strands min. Fiber glass braid insulation.
- 425 0024 00 7 strands min. Lacquered cotton braid insulation.
- 425 0863 00 Same as 425 0024 00 except cotton braid overall.

Two Conductor: Each conductor color coded, No. 16AWG (19 strands min.) 15 amp a-c, 1000 volts rms. Lacquered cotton braid insulation.

Shield: 90 (min.) strands of No. 32 to No. 38AWG tinned copper wire with 5 (min.) strands running side by side.

Overall diam.: 0.32" max.

Collins Part No.: 425 0061 00.

Two Conductor: Each conductor No. 12AWG (19 strands min.) 20 amp a-c, 1000 volts rms.

Lacquered cotton braid insulation color coded.

Shield: 92 strands of No. 34AWG tinned copper wire with 4 strands side by side.

Overall diameter: 0.420" max.

Collins Part No.: 425 0151 00.

Microphone Cable (Rubber): Two insulated conductors, twisted, covered by tinned copper shielding and encased in rubber. Diam. approx 0.285".

Each conductor: 26 strands No. 34AWG tinned soft annealed wire twisted for flexibility. Equivalent to No. 20AWG gauge 3 amp 300 volts. Rubber covering 1/64", one white, one black.

Shield: 96 strands of No. 34AWG tinned copper wire, braided with 4 strands running side by side.

Jacket: 3/64" black rubber.

Collins Part No.: 425 0250 00.



General Radio Type 1931-A AM Modulation Monitor



General Radio Type 1301-A Audio Oscillator

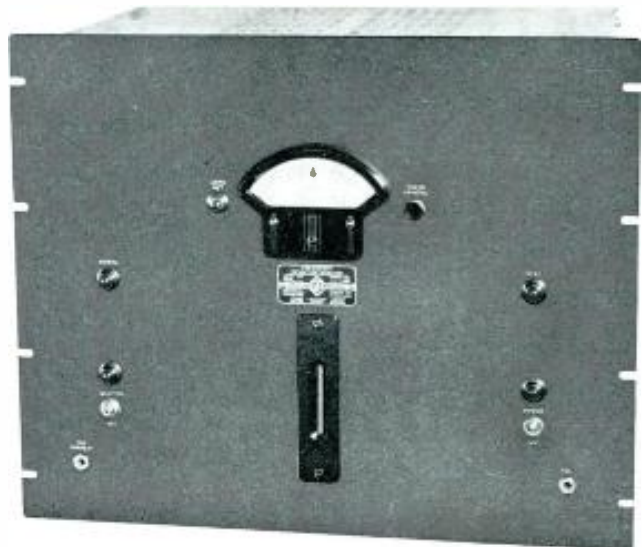
The importance of test equipment in the maintenance of your station cannot be overstressed. Test equipment, properly used, tells your engineer what operating conditions exist in the apparatus under test and enables the location of existing or imminent difficulties. Moreover, government regulations require that minimum operating characteristics be maintained. Constant check, for example, requires the use of monitors to indicate deviation of the carrier frequency from its assignment and modulation percentage. Characteristics of the equipment may thereby be kept at a satisfactory maximum with consequent savings in components that could become damaged through prolonged harmful operation, and direct economics can be realized by the elimination of considerable lost air time.

To enable your engineer to obtain reliable indications, test equipment must be of high quality and contain far better characteristics than the apparatus on which tests and measurements are to be made. The test equipment listed below fills these requirements. They are all manufactured by concerns known for quality and reliability.

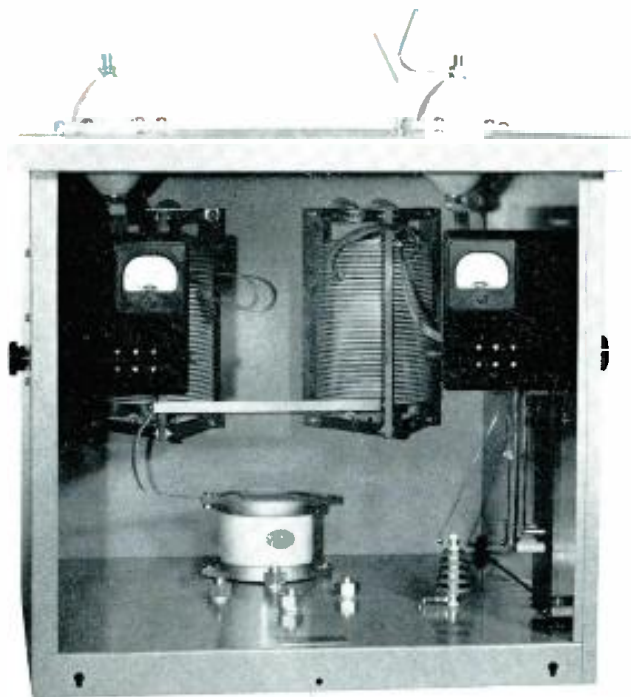
- Audio Oscillator, General Radio Type 1301-A
- Range Extension Filter for 1301-A, General Radio Type 1301-P1
- Audio Oscillator, Hewlett-Packard Type 201-B
- Audio Oscillator, Hewlett-Packard Type 206-A
- AM Modulation Monitor, General Radio Type 1931-A
- AM Frequency Deviation Monitor, General Radio Type 1181-A
- FM Monitor, General Radio Type 1170-A

- FM Monitor, Hewlett-Packard Type 335B
- Noise and Distortion Meter, Hewlett-Packard 330 Series
- Distortion and Noise Meter, General Radio Type 1932-A
- Attenuator Network, Daven Type 740

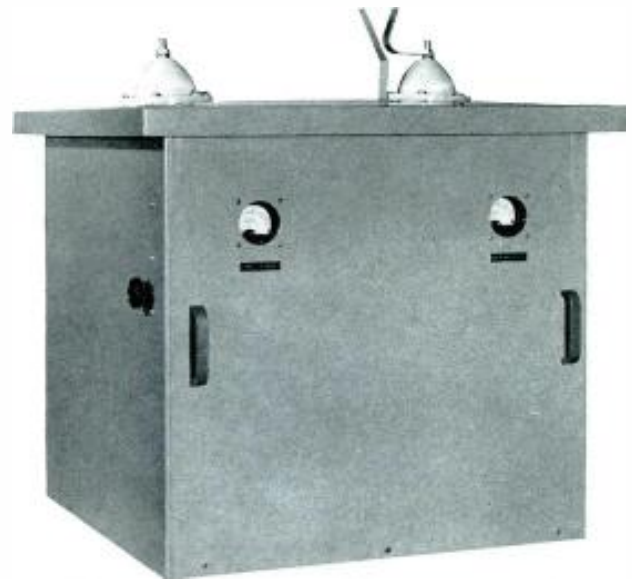
You can get every test and monitoring equipment you need from Collins. Save yourself time, and place all equipment responsibility on one reliable company — Collins. Connections are constantly maintained with all the approved suppliers of test and monitoring equipment. Ask for quotations on the models you want.



General Radio Type 1181-A AM Frequency Monitor



Open front view of a 42E-5 antenna tuning unit showing substantial mounting and wiring of all components.



42E-5 Antenna tuning unit with front cover in place

Overall dimensions: 27" w, 27 $\frac{3}{4}$ " h, 27" d.

Weight: 117 lbs.

Finish: Gray.

Collins Part No.: 505 5373 005.

The Collins 42E series comprises a group of specially constructed units to match a vertical radiator to an unbalanced transmission line. The electrical circuit is arranged in the form of either a T section low pass filter or other configuration depending upon the particular application. The use of a T section allows operation over a wide range of antenna impedances without changing the circuit configuration. Line current and antenna current meters are provided as well as a current transformer for a remote meter. A horn gap is provided for lightning protection.

The 42E unit is housed in a sturdy weatherproof cabinet constructed of heavy gauge welded steel. It is arranged to mount by means of a 3" pipe support. All components are easily accessible upon removal of the front cover, which is simply lifted upward and outward. Meters are read through two windows in the housing. The meter shorting switches can be operated from the outside. The transmission line and antenna connections are made by means of insulated feed-through bushings on the roof of the cabinet. The unit comes complete with an 8 ft. length of 3" diameter pipe for mounting on a concrete base.

142A SHUNT MATCHING NETWORK

A reactance cancelling network for matching shunt fed antennas to a transmission line. Because of the varying requirements of each customer, these units are designed for each specific application.

Supply the Collins Radio Company with the following information:

- Transmitting frequency
- Impedance of transmission line
- Tower height
- Transmitting power

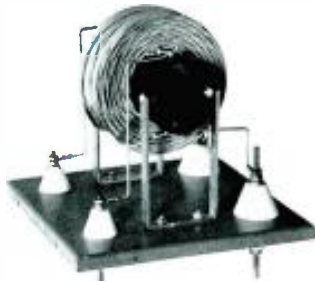
Distance to tap from ground

Distance from tower to matching unit

In general the 142A Shunt Matching Network is housed the same as the 42E Series Antenna Tuning Units with the exception that one antenna current meter only is supplied. The unit includes static drain choke and transformer for remote antenna current meter. See 42E-5 above for dimensions and approximate weight.

TOWER LIGHTING CHOKES

In accordance with government specifications, all towers must be lighted. Collins chokes provide thorough isolation of power lines from the r-f field. They are in all-weather housings complete with mounting brackets. Conduit terminations are provided.



Open view of 23C-1

Type	Part No.	Weight
23C-1— 500 watt single phase	520 2933 00	20 lbs.
23D-1—1500 watt single phase	520 2934 00	20 lbs.
23E-1—3000 watt three phase	520 2935 00	20 lbs.



Enclosed view of 23C-1

BLANK PANELS

Useful for filling up unused space in racks and for making special equipment, blank panels have many applications. These panels are drilled to mount in standard 19 inch racks. The thickness is $\frac{3}{16}$ " inch. Standard panels are aluminum, with metallic gray finish. Other metals and colors are available on special order.

Height	Weight	Part Number
1 $\frac{3}{4}$ "	10 oz.	502 8389 003
3 $\frac{1}{2}$ "	1 lb. 4 oz.	502 8393 003
5 $\frac{1}{4}$ "	1 lb. 14 oz.	502 8397 003
7"	2 lbs. 8 oz.	502 8401 003
8 $\frac{3}{4}$ "	3 lbs. 2 oz.	502 8405 003
10 $\frac{1}{2}$ "	3 lbs. 12 oz.	502 8409 003
12 $\frac{1}{4}$ "	4 lbs. 6 oz.	502 8413 003
14"	5 lbs.	502 8417 003

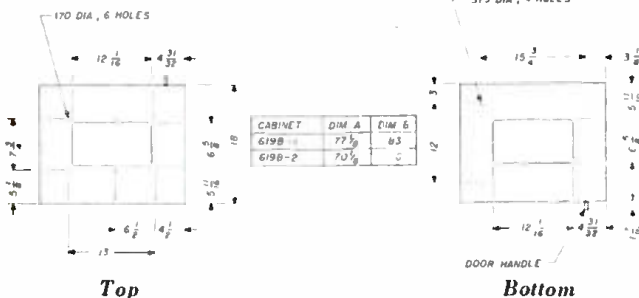
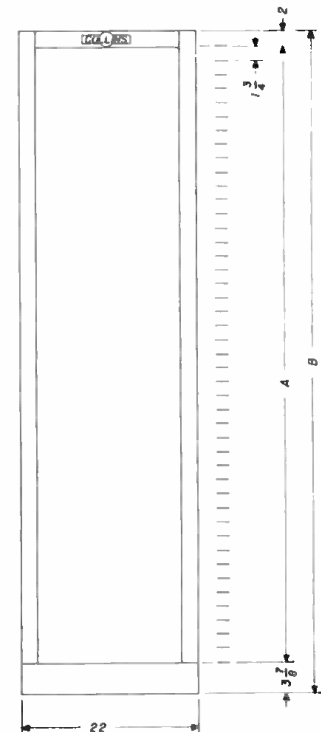
RACK CABINETS

Type 619B Cabinets are sturdily constructed of sheet metal, conveniently drilled to accommodate standard 19" panels of any height. A hinged full-length rear door provides immediate access to all units mounted in the cabinet. Adequate ventilation is obtained through properly distributed louvers in the door and through an opening in the top that is protected from dust by a baffle plate. The outside depth of the cabinet is 18 inches.

These cabinets are available in metallic gray finish. Black lacquered style strips are furnished with each cabinet.

619B cabinets are furnished in two sizes, the 619B-1 having 77" panel mounting space, and the 619B-2

which has 70" panel mounting space. Overall heights are 83" and 76" respectively.





Designing custom audio equipment

While the regular Collins line of audio equipment is very comprehensive, operating methods in individual stations sometimes demand a special combination of functions in a given piece of equipment, calling for custom building. Recognizing that fact, Collins engineers have designed our standard audio line in such a way that the standard sub-assemblies can be adapted in any wanted variety to provide custom equipment for special individual requirements, at a surprisingly low increase in cost.

The highly skilled engineering group responsible for Collins custom work has had years of experience

in broadcasting, and is capable of building anything which may be required by the broadcaster. We also have all facilities for factory wiring and testing and, if desired, will be glad to cooperate with your Chief Engineer in supervising installation.

A functional block diagram of the equipment facilities required and a rough physical layout, together with information regarding any special circuit or construction features desired, should accompany your inquiry.

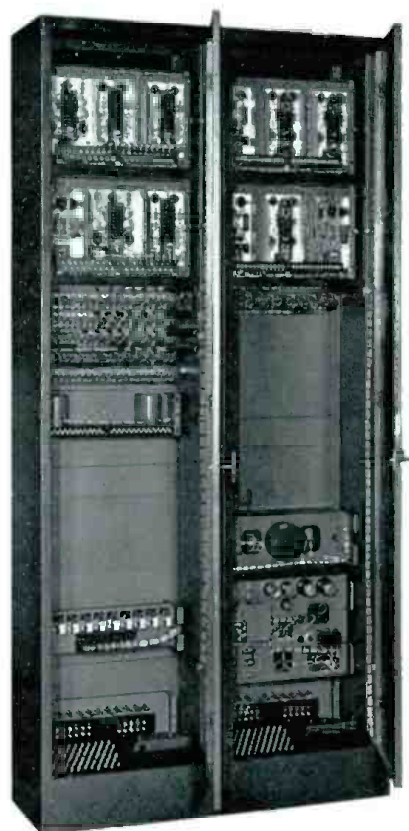
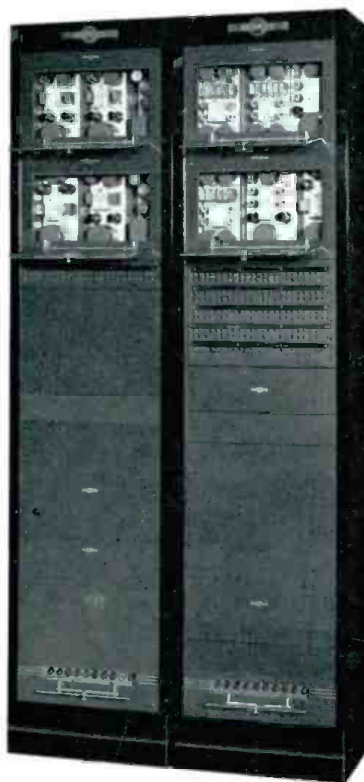
A few examples of Collins custom audio equipment are shown on the following page.



Special music library console



Special control console



Typical control room rack mounted equipment



Rear view master control rack equipment — custom built for AM-FM operation

PRESTO TYPE 62-A TRANSCRIPTION TURNTABLE

The 62-A consists of a 16" dual speed turntable, Audak lateral magnetic reproducer, compensating network and scratch filter mounted in a wood cabinet.

Standard equipment includes the following parts and accessories: Type 10-A turntable chassis mounted in a 3-A cabinet, equipped with a 151-A lateral magnetic reproducer and compensating network, a 501-A cutoff filter, a 601-A sapphire reproducing needle, and a 502-A screwdriver.

Frequency response is uniform from 500 to 9000 cycles. Noise level: 45 db below useful sound level. Sapphire reproducing needle pressure: 1 $\frac{3}{4}$ oz. Output level approximately -55 dbm. Output impedance: 200 or 250 ohms. Type 505-A matching transformer is required for 50 or 500 ohms output. The synchronous motor draws 50 watts from a 115 volt, 60 cycle line. The cabinet mounts the table 33" above floor level. Finish: two-tone gray with silver trim.

Shipping weight: 1 case 95 lbs., 1 carton 10 lbs.

Collins Part No.:

- 272 1176 00—62-A turntable
- 272 1182 00—505-A matching transformer

PRESTO TYPE 63-A TRANSCRIPTION TURNTABLE

The 63-A is a 16" dual speed turntable mounted in a wood cabinet with chrome trim. The cabinet mounts the table 33" above floor level.

Standard equipment: 10-A turntable chassis mounted in 3-B cabinet.

Shipping weight: 180 lbs.

Collins Part No.: 272 1601 00 turntable and cabinet only, no reproducer.

Presto 506-A arm rest for mounting W. E. 109AA reproducer to 3-B cabinet

Collins Part No.: 272 1604 00.

PRESTO TYPE 64-A TRANSCRIPTION TURNTABLE

The Presto 64-A transcription turntable is an electro-mechanical gear driven turntable suitable for the most discriminating users. The simplicity of operation permits its use by unskilled persons.

Turntable operation and speed change are accomplished by operating a single switch. Two motors are used, one for 78 rpm and the other for 33 $\frac{1}{3}$ rpm. An overrunning clutch disengages the motor which is not energized. The simplicity of the transmission eliminates much noise so that the total program disturbance will be reduced to 50 db below maximum program level. The cabinet mounts the table 33" above floor level.

Supplied without reproducers.

Power requirements: 75 watts 115 v 60 cps.

Dimensions: 24" w, 33" h, 24" d (turntable and cabinet only).

Weight: 266 lbs. (less reproducer).

Collins Part No.: 272 1186 00 turntable and cabinet only, no reproducer.

CONNECTORS

(See next page for illustration)

Large Howard Jones 4 Connectors

Illus. No.	Collins Number	Manufacturers Number	Description
A-1	363 8042 00	P404 CCT	Male, cable type
	364 8042 00	S404 CCT	Female, cable type
A-2	363 2040 00	P404 AB $\frac{1}{16}$	Male, chassis mtg.
	364 2040 00	S404 AB	Female, chassis mtg.

Small Howard Jones 4 Connectors

A-3	365 8040 00	P304 CCT	Male, cable type
	366 8040 00	S304 CCT	Female, cable type
	365 8042 00	P304 CCT-K	Male, cable type w/lock
A-4	366 8042 00	S304 CCT-K	Female, cable type w/lock
	365 2040 00	P304 AB	Male, chassis mtg.
	366 2040 00	S304 AB	Female, chassis mtg.

(Continued next page)