

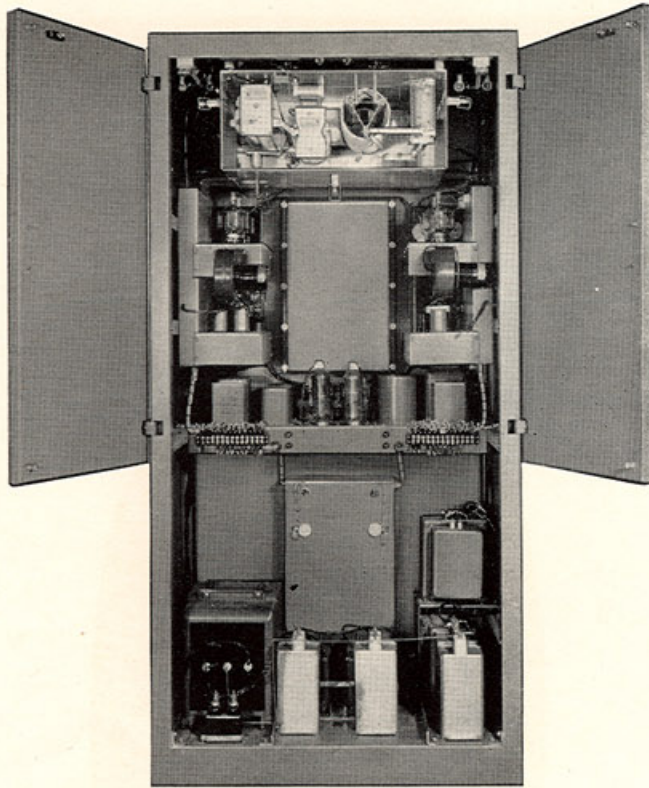
**20V**



*Collins*

**20V**

**1 KW BROADCAST  
TRANSMITTER**



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.

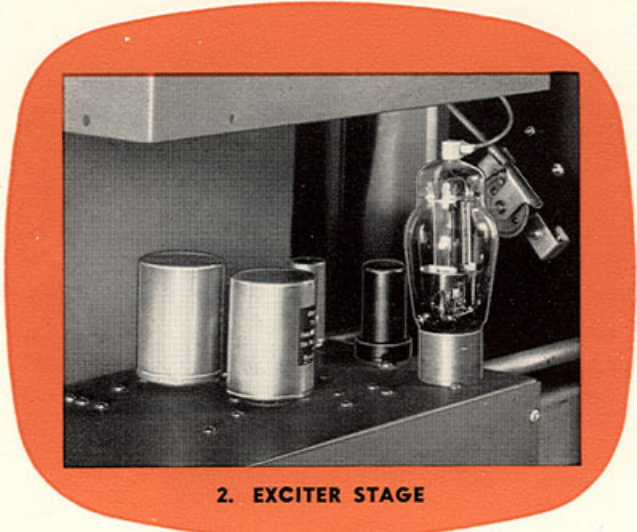
### FREQUENCY CONTROL

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

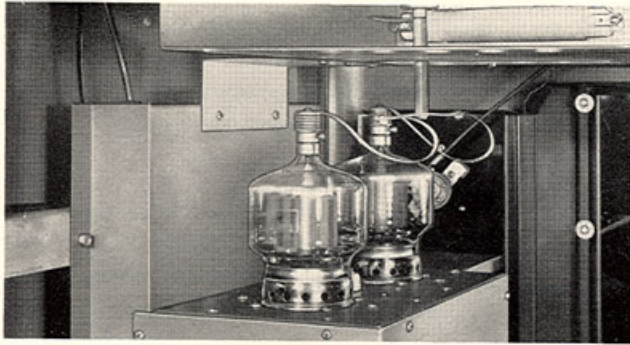
### TUBES

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.

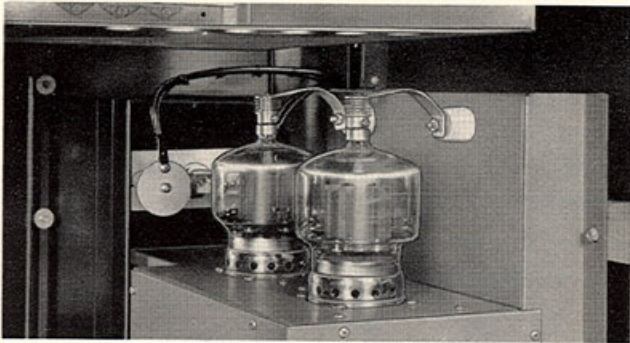
Only 7 different tube types are used. Now you can keep fewer tube replacements to meet FCC requirements.

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.



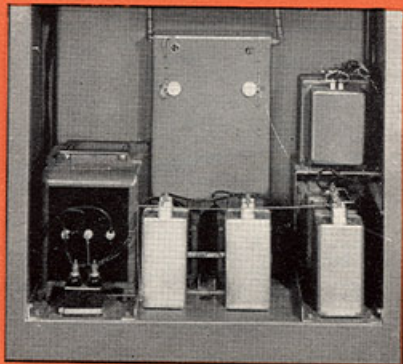
3. FINAL RF AMPLIFIER



4. MODULATOR STAGE

### POWER SUPPLIES

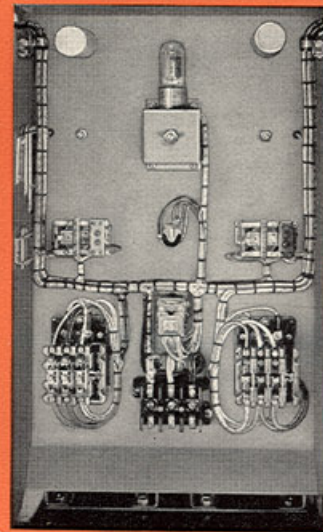
One heavy duty high voltage supply is used for the modulator and final amplifier. A separate low voltage supply feeds the modulator screen grids, as well as the plates and screen grids of the other RF and audio tubes. The bias supply provides approximately 100 volts for the modulator and power amplifier 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.

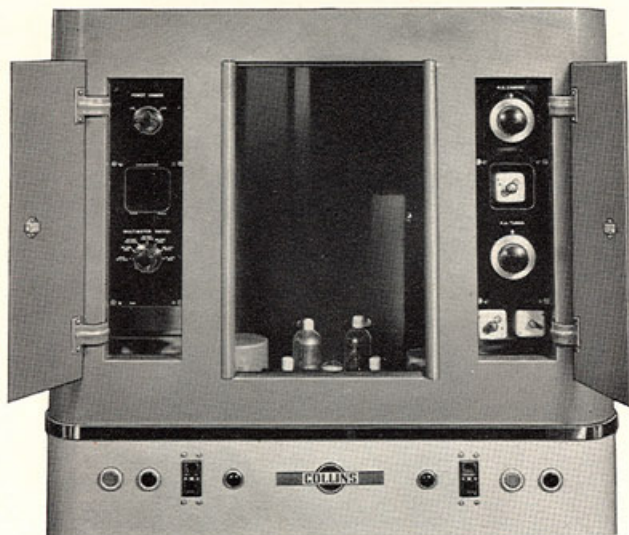
If desired, the transmitter can be started by simply pressing the plate ON button. Filament, bias and plate



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:

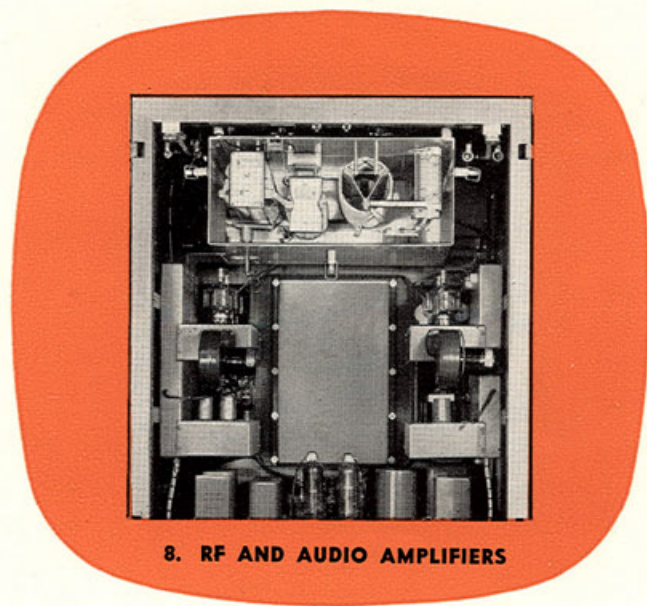
- PA Plate Tuning
- PA Loading
- Crystal Selector Switch
- Crystal Frequency Trimmers
- RF Driver Audio Hum Balance
- RF Final Amplifier Audio Hum Balance

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

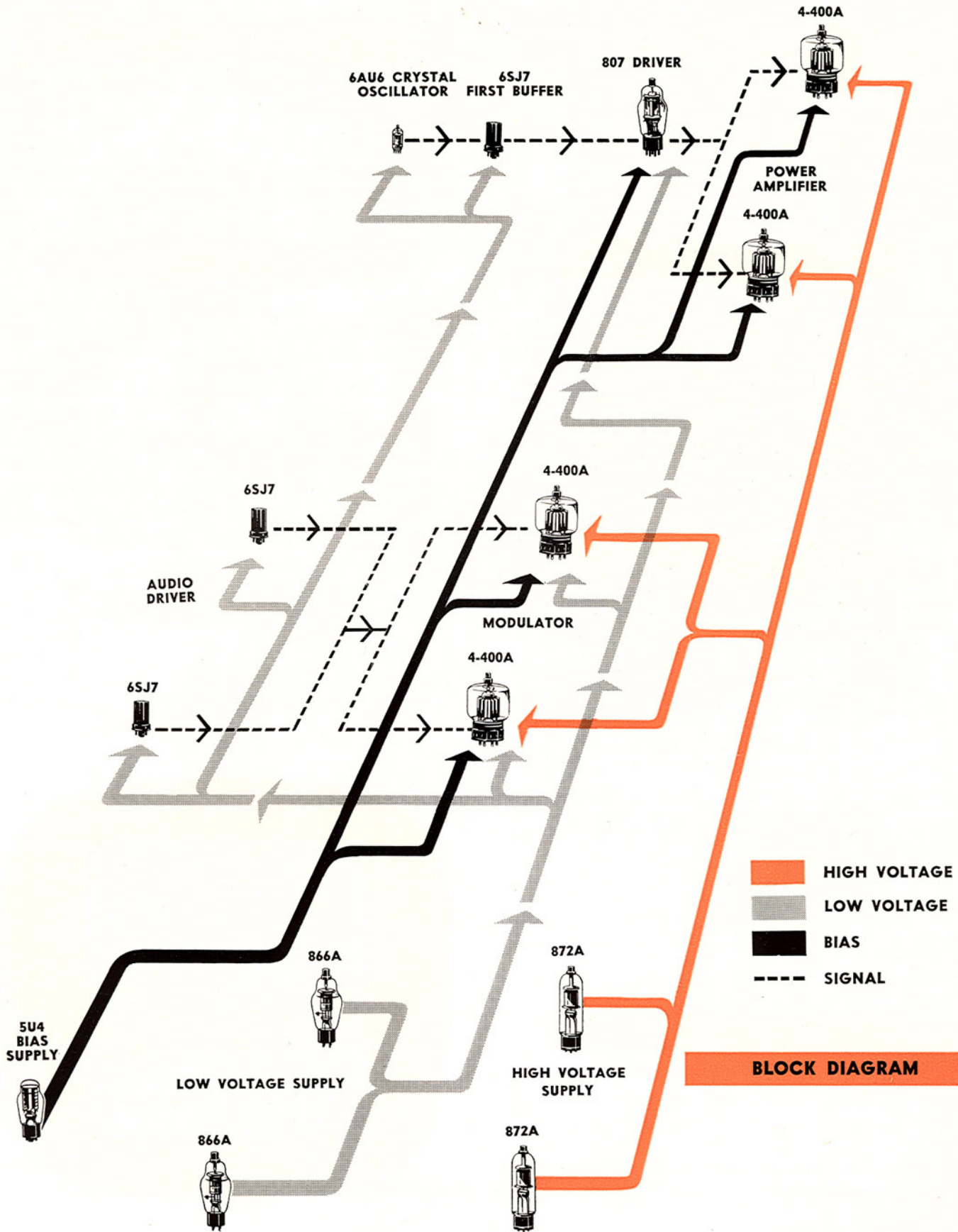
circuit equipment is readily accessible by removing the clip-in flush panel in the lower center of the transmitter front. No neutralization adjustments are necessary for operation at any frequency in the standard broadcast band.

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 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

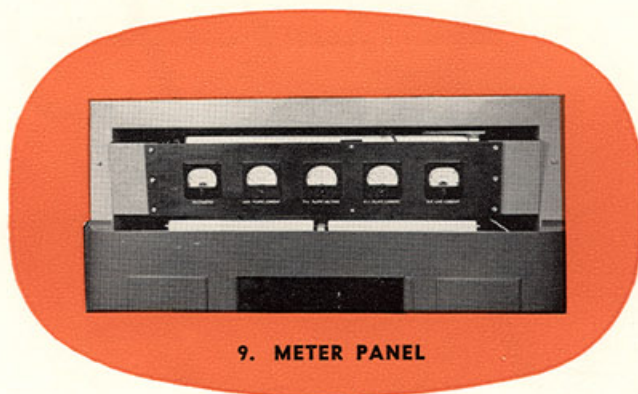
All tubes are visible through the front window and all tuning controls are located on the front of the transmitter.

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.



9. METER PANEL

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**  
 $\pm 10$  cps.

**AUDIO FREQUENCY RESPONSE**  
 Within  $\pm 1.5$  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  $\pm 2$  db., Pad input.

**AMBIENT TEMPERATURE RANGE**  
 + 15° to +45° C.

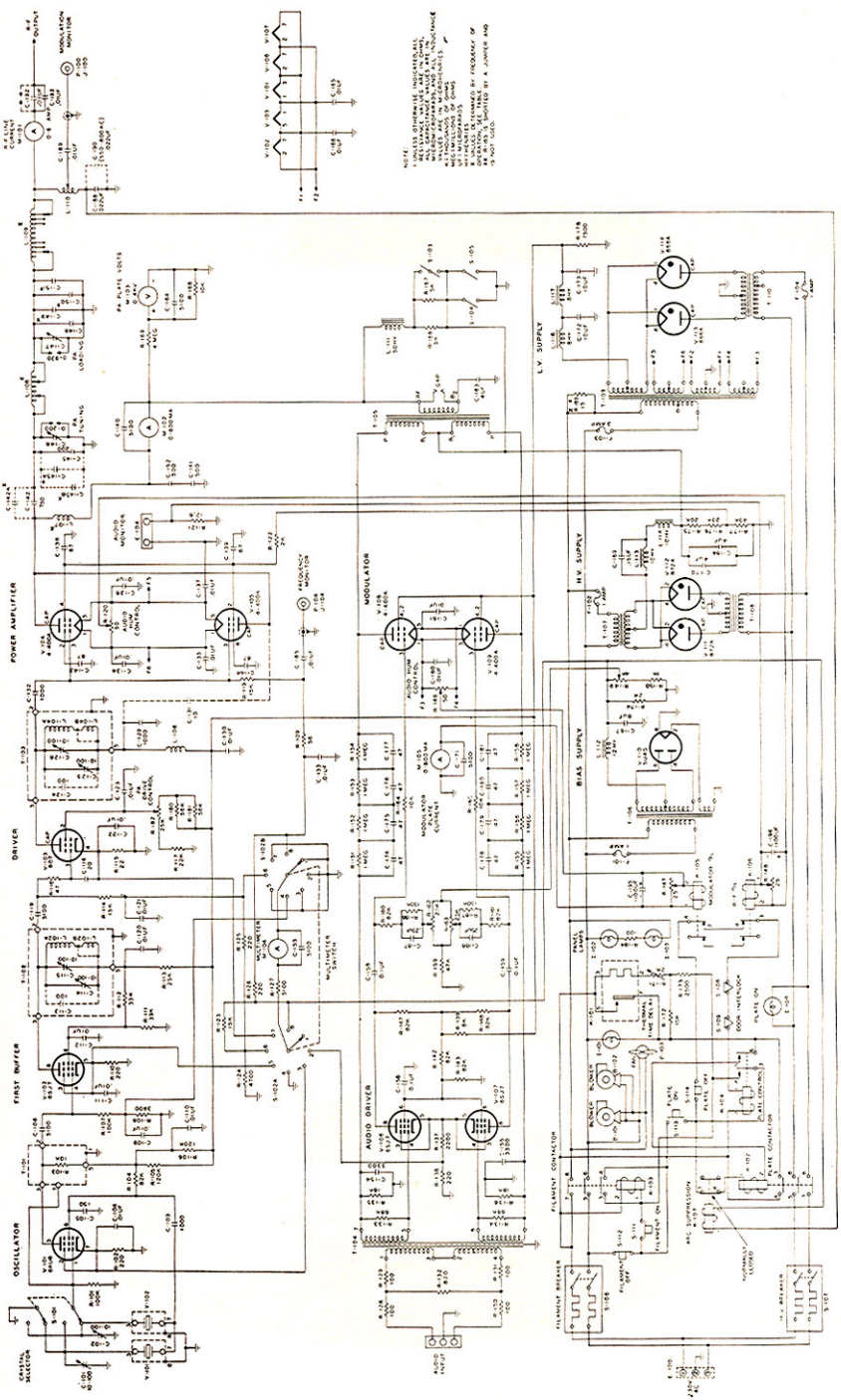
**ALTITUDE RANGE**  
 Sea Level to 6000 feet.

**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**



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