

New!

11 kW

AM TRANSMITTER

MODEL RA-1000

Raytheon Manufacturing Company

FEATURES

Simplified, More Efficient Circuits

A high level modulation system eliminates the necessity of complicated and critical adjustment of linear amplifiers and reduces harmonic distortion to a minimum. Low tube cost and considerably lower power consumption are added advantages of this system.

Greater Dependability

The use of modern components, operated at well below their maximum ratings, together with simplified circuit design reduce failures to a minimum. Designed to withstand accidental overloads—fully resistant to excessive temperatures and high humidity. Performance is not impaired by ordinary line voltage fluctuation.

High Fidelity Signal

Modern triode type tubes used in all audio stages have an inherently lower distortion level. Specially designed audio transformers reduce the audio distortion still further. The feedback circuit also improves signal quality but is not essential in this simplified circuit design.

Push-Pull Final Amplifier

A Push-Pull R F final amplifier materially decreases harmonic distortion. Parasitic oscillation in this stage is eliminated and suppressors are not needed.

Easy to Operate

Only two stages, the R F Drive Amplifier and Power Amplifier have to be tuned. A Video type amplifier eliminates complicated tuning of the Buffer stage.

Fast, Accurate Tuning

All operational controls are centralized on the front panel; every circuit is completely metered and instantly checked. Low speed motor tuning gives positive micrometer adjustment of the two tuned stages.

Easy to Service

Vertical chassis construction and symmetrical mechanical layout makes necessary servicing easy. Hinged side panels give access to all cabling and meters. Full height double rear doors give maximum accessibility to all wiring and components.

Easily Meets All F.C.C. Requirements

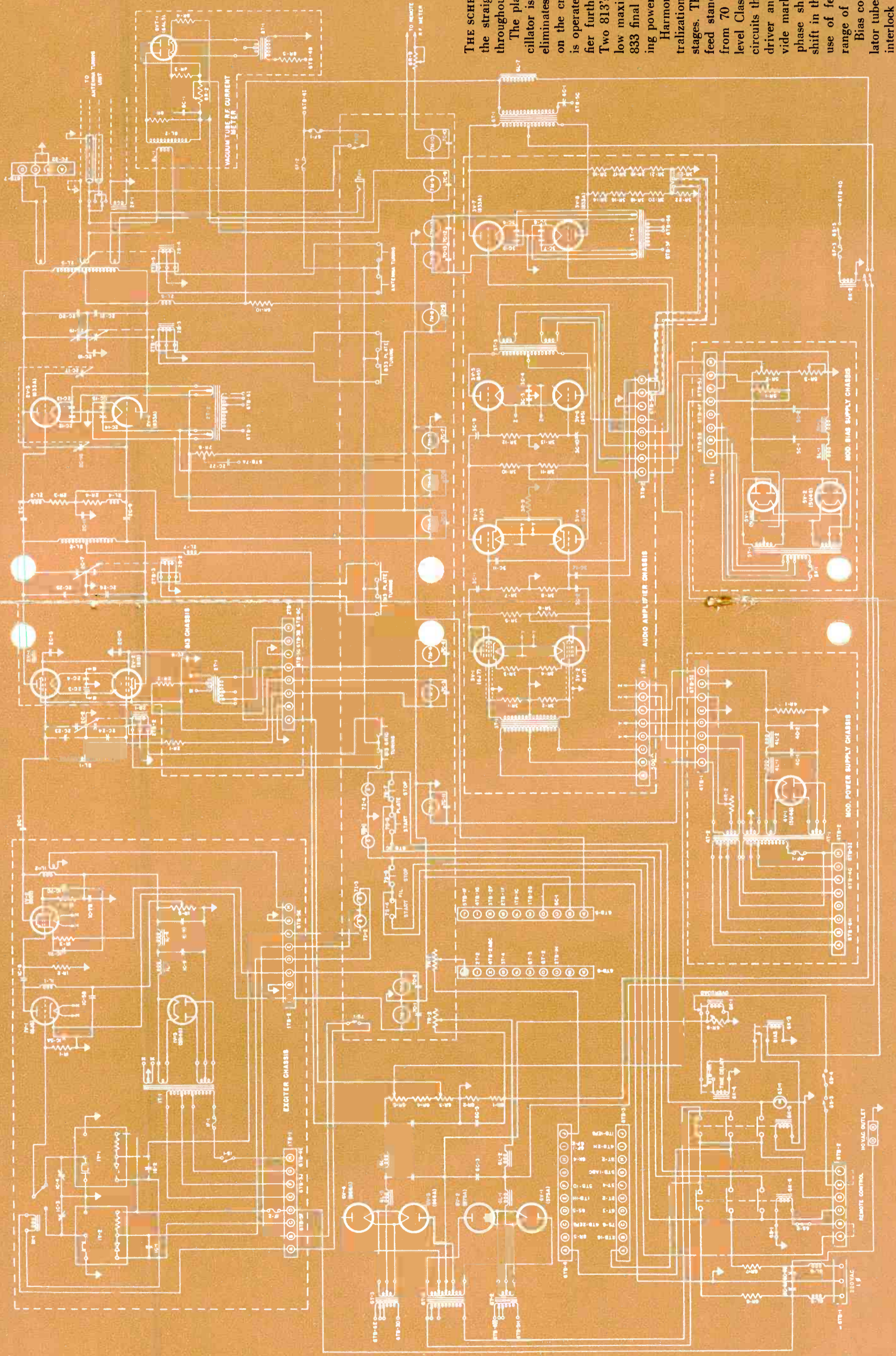
Flat frequency response from 30 to 10,000 cycles per second. Noise level —60 db below 100% modulation. Less than 2½% RMS for 95% modulation.



RAYTHEON

Excellence in Electronics

CIRCUIT DIAGRAM OF RAYTHEON'S 1000 WATT AM TRANSMITTER — RA-1000



THE SCHEMATIC OF THE RA-1000 illustrates the straight-forward simplicity followed throughout the design of this transmitter.

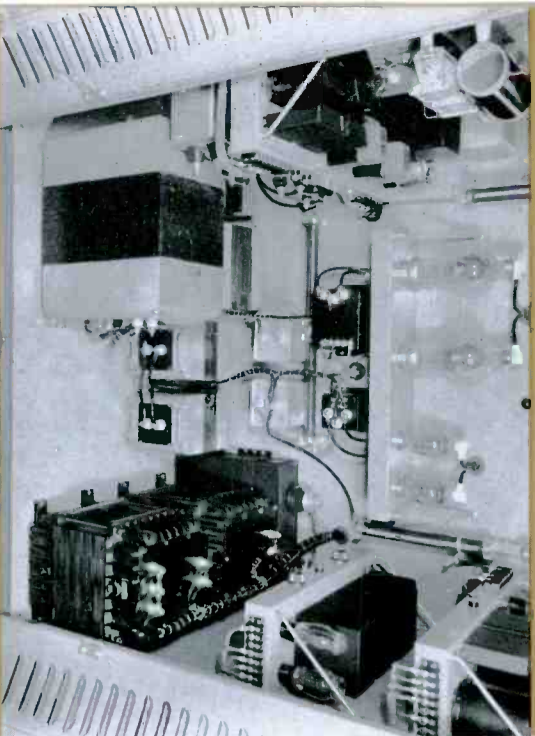
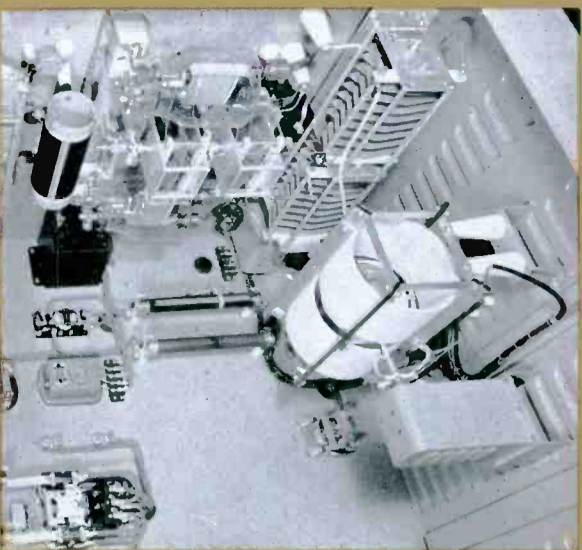
The plate circuit of the 6J5 crystal oscillator is a broad band video type which eliminates tuning and consequent reaction on the crystal frequency. The 807 buffer is operated as an untuned Class A amplifier further isolating the oscillator stage. Two 813's in push-pull operating well below maximum ratings drive the push-pull 833 final amplifier with a reserve of driving power.

Harmonic output and simplified neutralization result from the use of push-pull stages. The output circuit is designed to feed standard type transmission lines of from 70 to 250 ohms impedances. High level Class B modulation using push-pull circuits throughout and specially designed driver and modulation transformers provide marked reduction in distortion and phase shift. The greatly reduced phase shift in these transformers allows effective use of feedback over the entire audio range of the transmitter.

Bias controls permit matching of modulator tubes for best operation. Control and interlock circuits provide protection for the equipment and operating personnel.

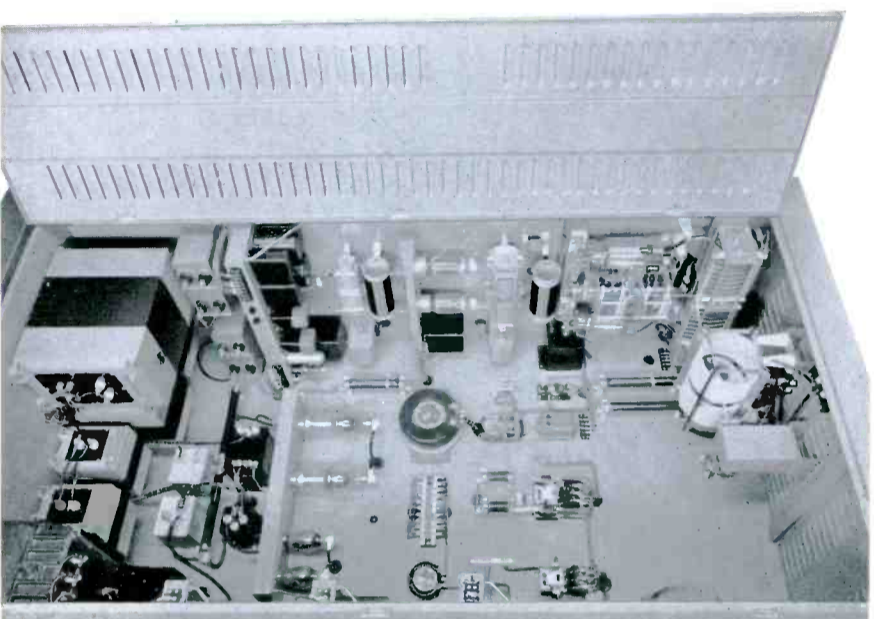
RF Output Stage—The detailed view of the output stage shows the clean symmetrical design and ready accessibility of all component parts.

The use of motor tuning allows all components in the R F output stage to be properly placed for their electrical needs without, in any way, handicapping the mechanical layout or assembly.



Buffer Chassis—The close-up of the lower portion of the transmitter shows in greater detail the crystal oscillator chassis with its two crystals, each individually adjustable for frequency setting.

Front of panel control permits either of the two crystals to be instantly selected. Changes in ambient temperature are minimized by locating the crystal unit near the bottom of the cabinet.



INSIDE VIEW OF TRANSMITTER

THE CLEAN, MODERN, vertical type of construction used in this transmitter gives complete accessibility to all component parts and simplifies maintenance and servicing. The layout is such that greatest electric circuit symmetry and efficiency have been achieved without sacrifices in mechanical strength and ease of operation.

Modern, motor drive eliminates all older drive mechanism and permits grouping of controls on a single recessed panel located for convenience and operating ease.

Vertical construction with adequate louvers gives excellent natural ventilation which is supplemented with a quiet ventilating fan maintaining low internal heat without objectionable blower noise.

The location of the large power and audio components at the bottom of the cabinet permits easy removal for shipment and simplifies re-installation on the job.

When facing the rear of the cabinet, the right hand wall carries the audio and low voltage power supply chassis. The front wall carries the rectifier tube chassis and control circuit, relays, resistors, etc. The left wall carries the crystal oscillator chassis, power and driver amplifier sections. Control openings in the base and rear are provided for external wiring. Coaxial cable may be brought in either overhead or through the base or, if desired, an over-head connection for open wire line may be provided.



Hinged Side Panel Open



Front Panel Closed

All operational controls are centralized on one panel

New Standards of Beauty, Performance, Dependability

RAYTHEON in the RA-1000 has brought to the higher powered station a completely new 1000 Watt AM transmitter. New simplified circuit design—new specially built components—new striking modern beauty. And the RA-1000 has established a truly new higher standard of performance, dependability and beauty.

Simpler circuits combined with modern components give greater assurance than ever before against program interruption. Designed for maximum dependability; withstands accidental overloads and extreme climatic conditions. Ordinary line voltage fluctuation will not affect performance.

Better program quality, a higher fidelity signal, is achieved through many important improve-

ments. Triode type tubes are used in all audio stages because they have an *inherently* lower distortion. Specially built audio transformers further decrease audio distortion. A push-pull final amplifier circuit lowers harmonic distortion and eliminates parasitic oscillation in this stage.

Operation is simpler too. Only two stages have to be tuned and all controls are conveniently centralized on the front panel. A push button check of all circuits takes only a few seconds because every circuit is completely metered.

Before you select your 1000 Watt AM transmitter, study the many important improvements offered only by Raytheon. *Carefully compare and you will buy RAYTHEON.*

DEVOTED TO RESEARCH AND MANUFACTURE FOR THE BROADCASTING INDUSTRY



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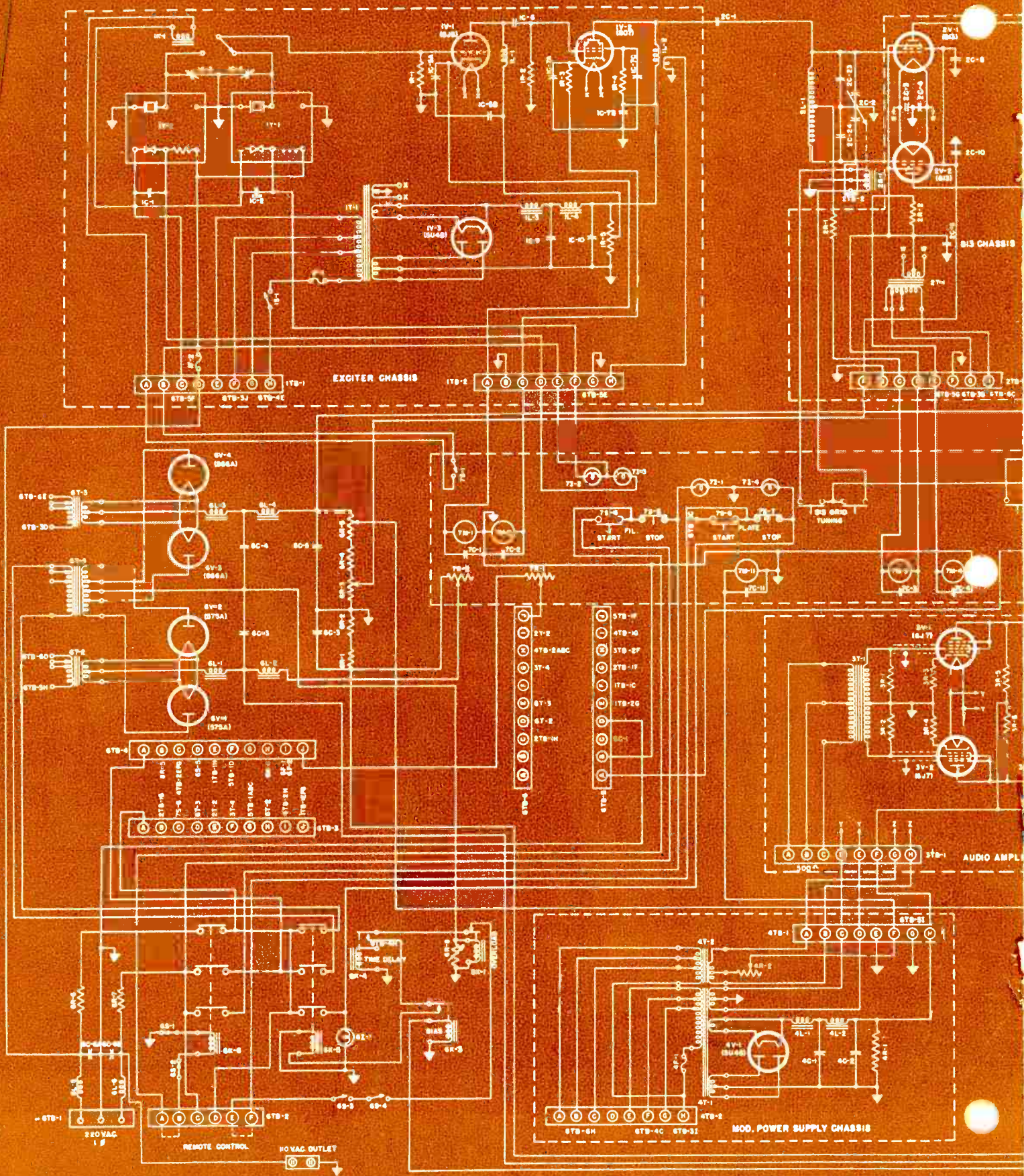
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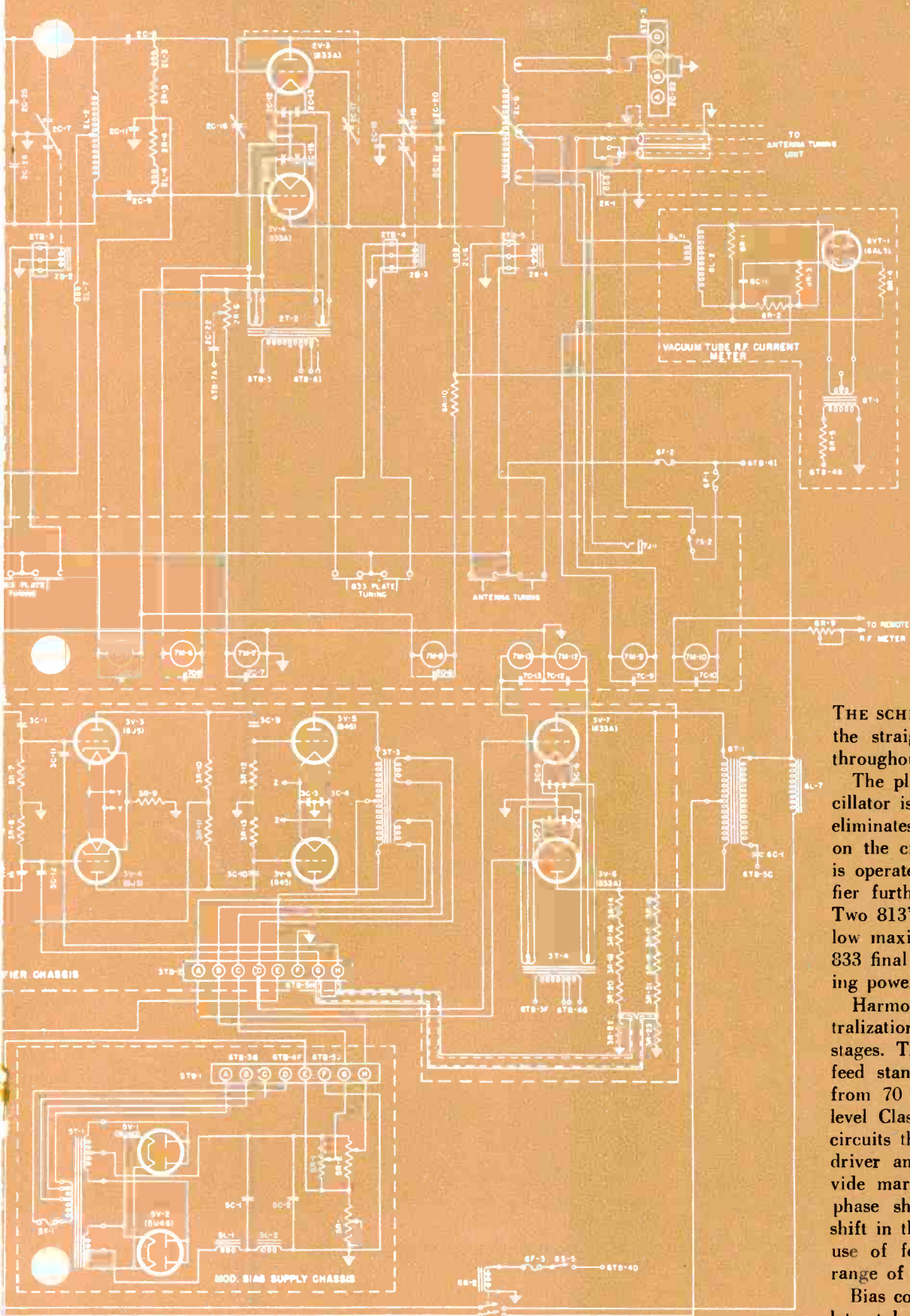
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CIRCUIT DIAGRAM OF RAYTHEON'S 10



100 WATT AM TRANSMITTER — RA-1000



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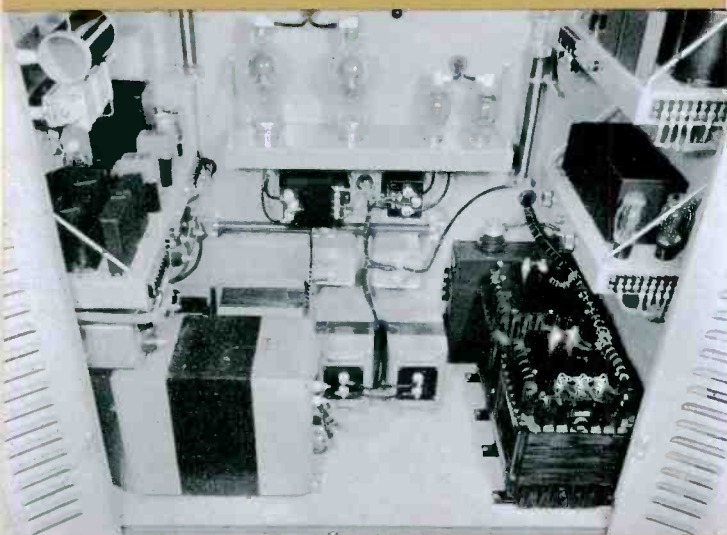
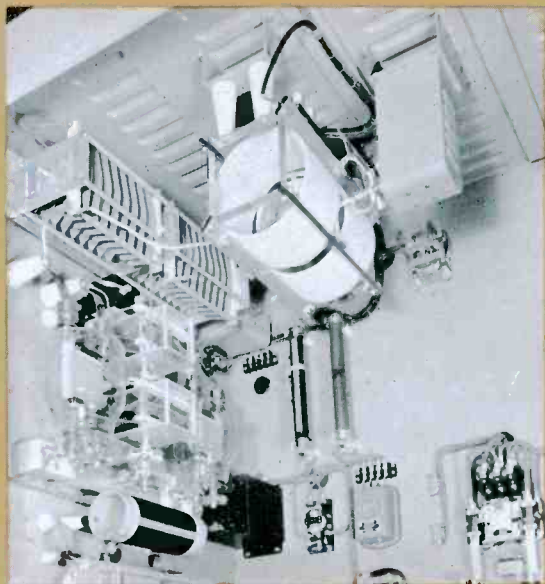
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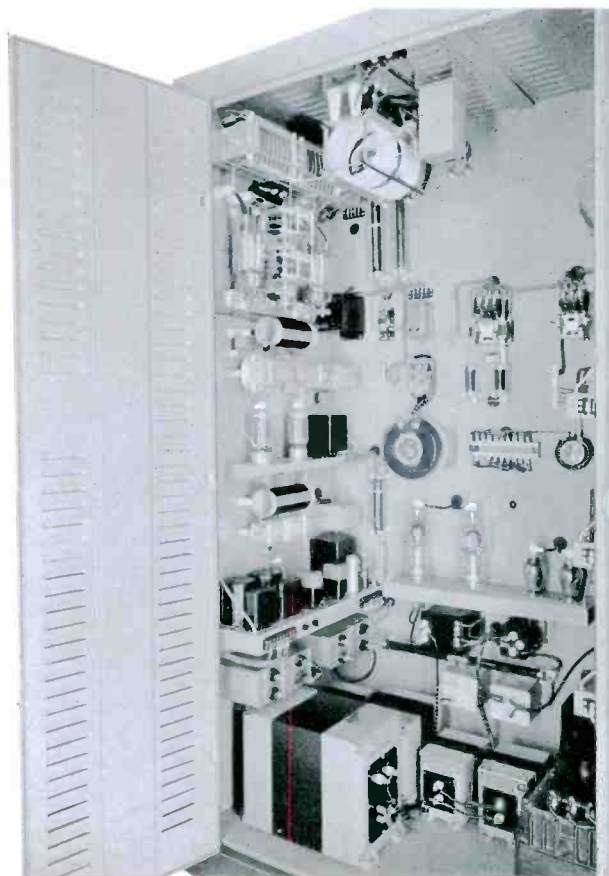
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Specifications

RAYTHEON'S 1000 WATT AM TRANSMITTER RA-1000

Electrical Characteristics:

Nominal Carrier Output	1000 Watts
Frequency Range	530-1600 KC
Power Supply	210/230 Volts, 3 Wire, Single Phase 50-60 Cycle AC
Power Consumption (for 100% modulation)	5000 Watts
Radio Frequency Stability	±10 Cycles
Modulation	100% High Level
Audio Input (500-600 ohm source) for 100% modulation.....	Zero Level db for 1 Milliwatt Reference Level
Average Program Level —5 db (1 Milliwatt Reference Level)	
Audio Frequency Response.....	± 2 db from 30-10,000 Cycles
Audio Distortion (50-7500 Cycles).....	Less than 2½% RMS for 95% Modulation
Noise Level.....	More than 60 db below 100% Modulation
Output Circuit	Designed to feed 70-250 ohm transmission lines
Carrier Shift	Less than 3% from 0-100% modulation 50-7500 Cycles

Tube Complement:

Crystal Oscillator	6J5
Buffer	Class "A" 807
R-F Driver	Push-Pull 813's
R-F Power Amplifier	Push-Pull 833A's
First Audio.....	Push-Pull Class "A" 6J7's
Second Audio.....	Push-Pull Class "A" 6J5's
Audio Driver.....	Push-Pull Class "A" 845's
Modulator.....	Push-Pull Class "B" 833A's
R-F Exciter Power Supply.....	350 Volts 200 MA full wave 5U4G
Low Level Audio Power Supply.....	350 Volts 200 MA full wave 5U4G
Modulator Bias Power Supply.....	80 Volts 400 MA full wave 2—5U4G's
R-F and Audio Driver Power Supply.....	2000 Volts 350 MA 2—866A's
High Voltage Power Supply.....	3000 Volts 900 MA 2—575A's

Mechanical Specifications:

Height	84 inches
Width	48½ inches
Depth	34¼ inches
Floor Area.....	11½ sq. ft.
Weight	2450 pounds

FCC

FILING DATA:

APPLICANTS intending to use the Raytheon RA-1000 Transmitter, in applying for a construction permit, are requested to fill in the following technical information on pages 28, 29 and 30 of F.C.C. form No. 301.

Paragraph 18 should be filled in as follows:

- (a) Raytheon Manufacturing Company
Type RA-1000
- (b) On file
- (c) On file
- (d) On file (except for last paragraph where
"not applicable" should be inserted)
- (e) On file
- (f) On file
- (g) On file
- (h) Not applicable
- (i) On file
- (j) Should be filled in by applicant
- (k) Should be filled in by applicant
- (l) Plate voltage meter, on file. Serial number
should be supplied by applicant on in-
stallation of transmitter.
Plate ammeter—same as plate voltage
meter.
Antenna ammeter—same as plate volt-
age meter.
- (m) On file
- (n) 1200 watts
- (o) 1000 watts

Paragraph 19 should be filled in as follows:

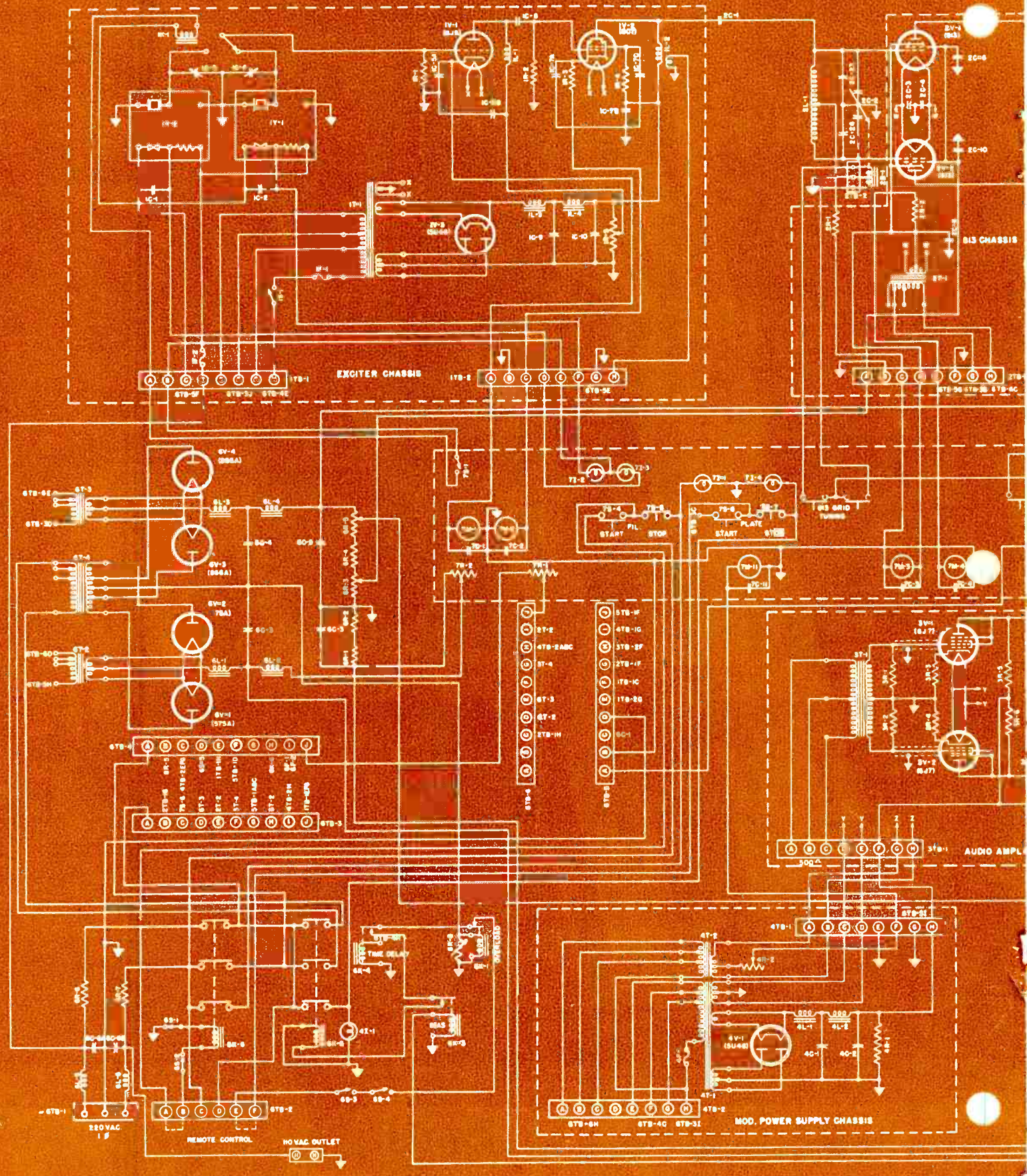
- (a) Raytheon Manufacturing Company part of
Type RA-1000
- (b) On file
- (c) First line insert "Manufacturer" second
and third lines—applicant must insert
frequency in kilocycles at 60° Centi-
grade
- (d), (e), (f), (g), (h), (i), (j), (k), (l),
(m) On file

RAYTHEON MFG. CO.

BROADCAST EQUIPMENT DIVISION

**7517 NORTH CLARK STREET
CHICAGO 26, ILLINOIS**

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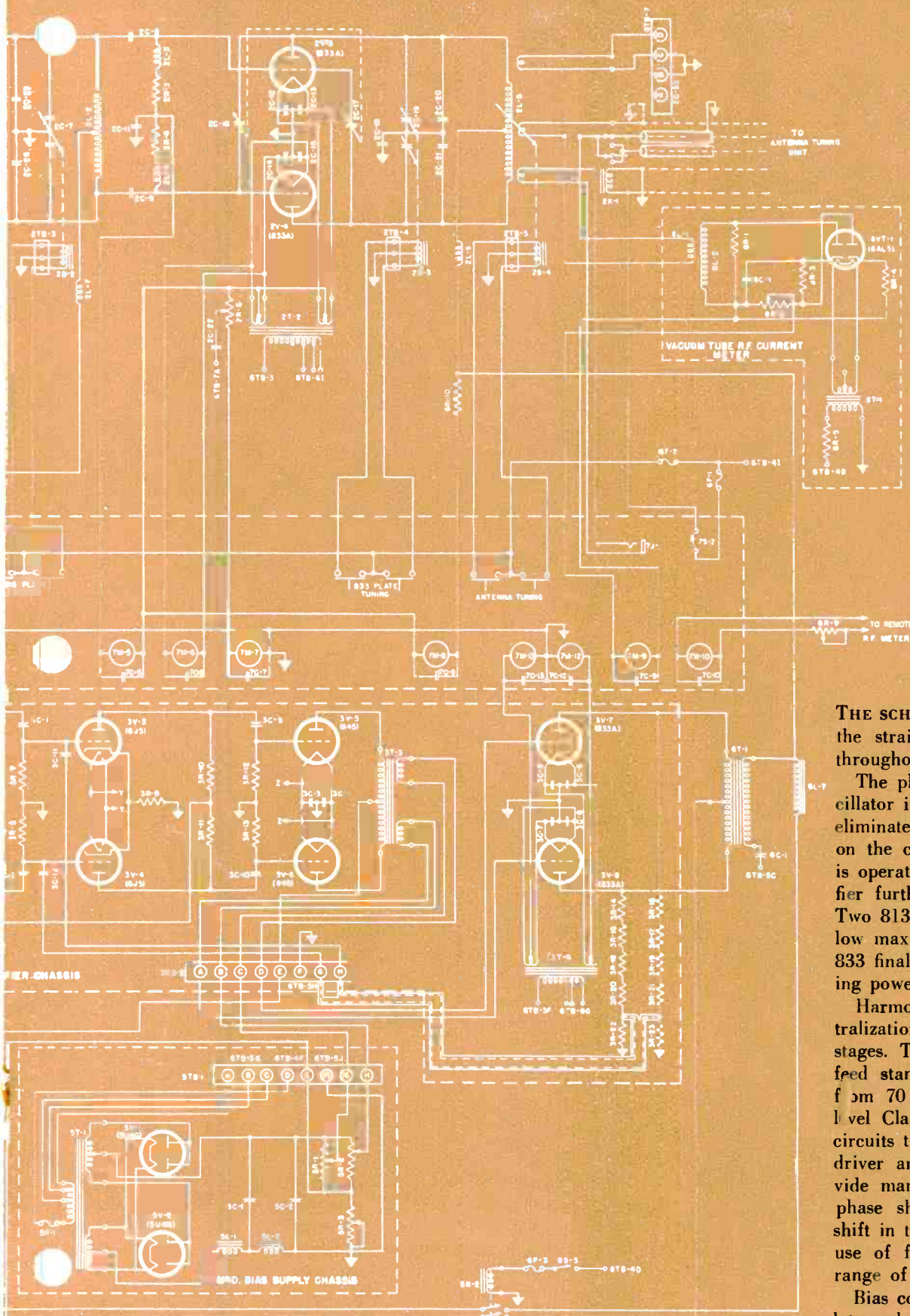
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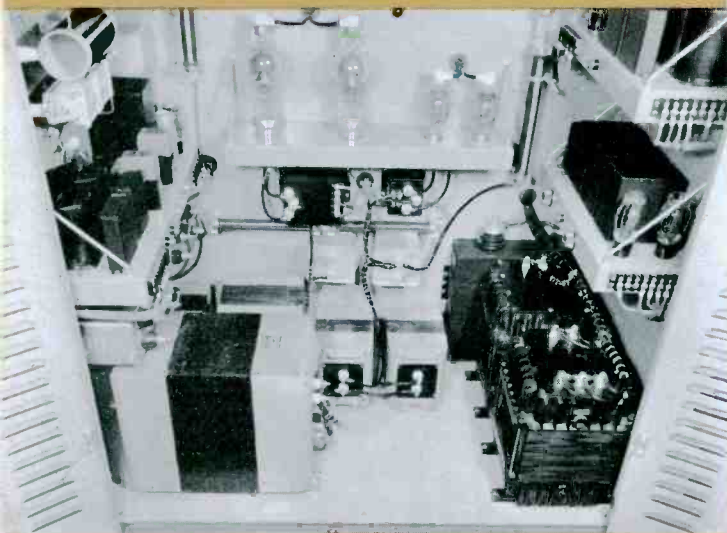
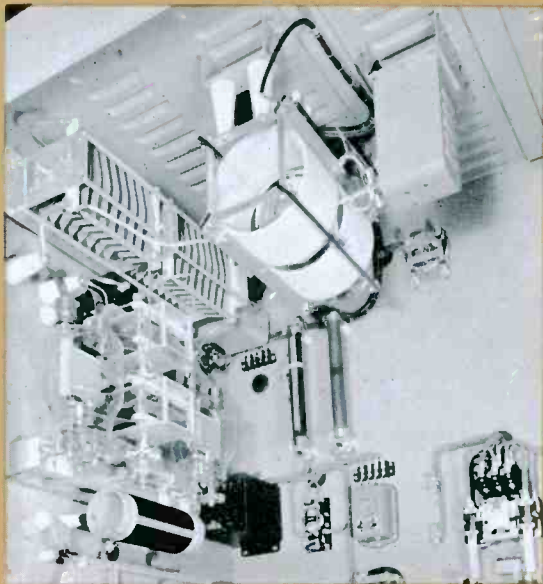
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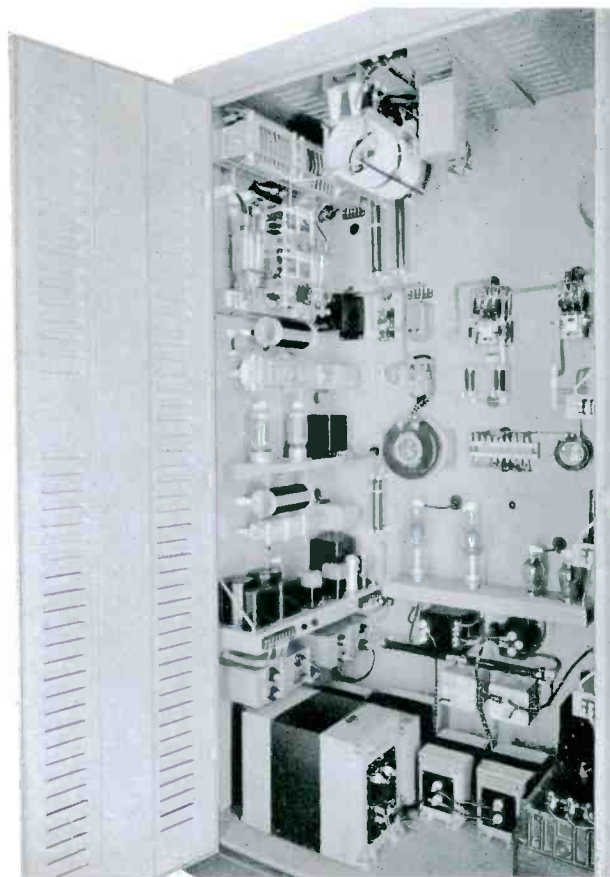
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