



the Climaster Line

Model 62T10

Clegg Laboratories, in 1956, introduced the first complete multi-band, VHF transmitter ever offered to the ham. This unit, the 62T10, has accounted for more outstanding VHF signals – provided more cumulative VHF contest points – worked more VHF states – drawn more praise from other operators – than any other unit commercially produced. There is still no other transmitter available today having either the same frequency coverage or power rating.

The Crystiplexer Model 209

The CRYSTIPLEXER, the most revolutionary development in transmitter design since the MOPA, furnishes all the features of a VFO combined with the desirable characteristics of crystal control. Frequency control is by digital methods; accuracy and resettability of better than .5 KC is readily attainable. Stability is better than most crystal-controlled VHF transmitters. In addition, the CRYSTIPLEXER includes all control circuitry for perfect AM and break-in CW operations, including automatic antenna change-over provisions.

Series 250 and 600 VHF Transmitting Systems

Three independent RF amplifiers, a combined power supply-modulator and the CRYSTIPLEXER comprise a complete 3-band installation in any one of the power classifications. The RF amplifiers are available separately, permitting expansion of the station as operating preference and budget permit.

*Clegg Laboratories
Division of Clegg*

INC.

The Climaster Model 209 Crystiplexer

is a complete frequency and operation control center of unprecedented versatility; designed for use with high quality VHF transmitting installations. Features of the CRYSTIPLEXER include many never before available to the VHF operator:

1. **CRYSTODYNE VFO** – Direct reading to better than 1 KC – Frequency meter accuracy – Negligible drift – Negligible spurious outputs.
2. **PUSH-TO-TALK AM control** – High quality communications speech amplifier with adjustable speech clipping and filtering – Built-in modulation indicator.
3. **BREAK-IN CW control** – complete automatic control of receiver, transmitter and antenna changeover – adjustable audio-tone monitor – Perfect clickless chirpless CW.
4. **METERING** of remote RF amplifier RF OUTPUT and DRIVE.

Model 209

GENERAL DESCRIPTION

VFO The Model 209 employs the exclusive CRYSTODYNE system to provide variable frequency oscillator performance with crystal oscillator precision. The CRYSTODYNE circuit provides the operator with the means of adding a low frequency, high stability, tunable VFO with two high stability crystal oscillators in such a manner that the final output frequency covers the range from 50 MC to 54 MC. Crystal selection by three separate rotary switches provides selectable steps of 1 MC, 100 KC and 10 KC. A calibrated vernier control on the low frequency oscillator provides a continuous 10 KC range adjustment. The end result is best illustrated by the simplicity of reading frequency from the four "OPERATING FREQUENCY" control knobs on the panel of the 209.

AUDIO The 209 includes a carefully engineered audio-preamplifier and a high performance peak-clipper/filter circuit. A cathode follower stage provides low impedance output. Versatile relay control provides push-to-talk operation. Terminals are provided to permit use of the 209 panel meter for monitoring modulation. Clipping levels up to 15 db are provided.

TRANSMITTER CONTROL The 209 furnishes extreme flexibility and versatility of control of associated AM or CW transmitting equipment. On CW, the transmitter is started, the receiver is silenced, the antenna is switched and a keying monitor is activated by the first closing of the key. The process is reversed if the key is held open.

Model 209

SPECIFICATIONS

POWER REQUIREMENTS: 105-125 volts, 60 cycles, 75 watts

FREQUENCY RANGE: 50,000.0 KC to 54,000.0 KC

FREQUENCY STABILITY: Less than 500 cycle drift from cold start.

Less than 150 cycles after 30 minute warm-up

FREQUENCY RESETTABILITY: Approximately 300 cycles

AUDIO RESPONSE: Peaked for maximum articulation with normal communications type crystal microphones (-52 db)

AUDIO OUTPUT LEVEL: Approximately 25 volt peak-to-peak, 500 ohm

METER CIRCUIT: 0-1 Ma., panel selected to 4 external circuits

AUTOMATIC BREAK-IN CW: Recovery time controllable from 1 to 6 seconds

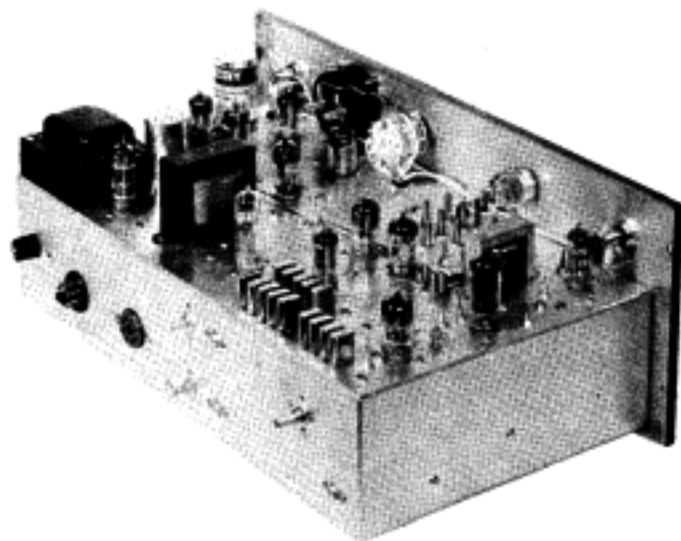
MANUAL CONTROL: Control of up to 3 external 115 volt functions

SIZE: Model 209C in cabinet 21½" wide x 8½" high x 12" deep

Model 209R: 7" x 19" rack panel, 10½" deep.

For further details – Bulletin 209

Designed as companion units for the CRYSTIPLEXER are two basic series of matching RF and Modulator/Power Supply units. Individual RF units are available in both series for coverage of the 6, 2 and 1¼ meter bands. Both series are basically the same except for power rating and size. A complete transmitting installation thus consists of a CRYSTIPLEXER, a Modulator/Power Supply Unit and one, two or three RF units. Nominal AM power ratings of 250 or 600 watts are provided by the 250 Series and the 600 Series, respectively. Cabinets are available to permit all possible combinations in either series.



Model 209 Crystiplexer
Interior View

The 250 Series

SPECIFICATIONS

POWER RATING:

300 watts CW/NBFM, input

225 watts output

250 watts AM input,

180 watts output

FREQUENCY RANGE:

3 separately available RF

units with band-pass tuning:

Model 250-6 50-54 MC

Model 250-2 144-148 MC

Model 250-1¼ 220-224 MC

Model 250-M Modulator/Power
Supply

For further details - Bulletin 250

The 600 Series

SPECIFICATIONS

POWER RATING:

1000 watts CW, FM input

750 watts output

600 watts AM input

450 watts output

FREQUENCY RANGE:

3 separately available

RF sections:

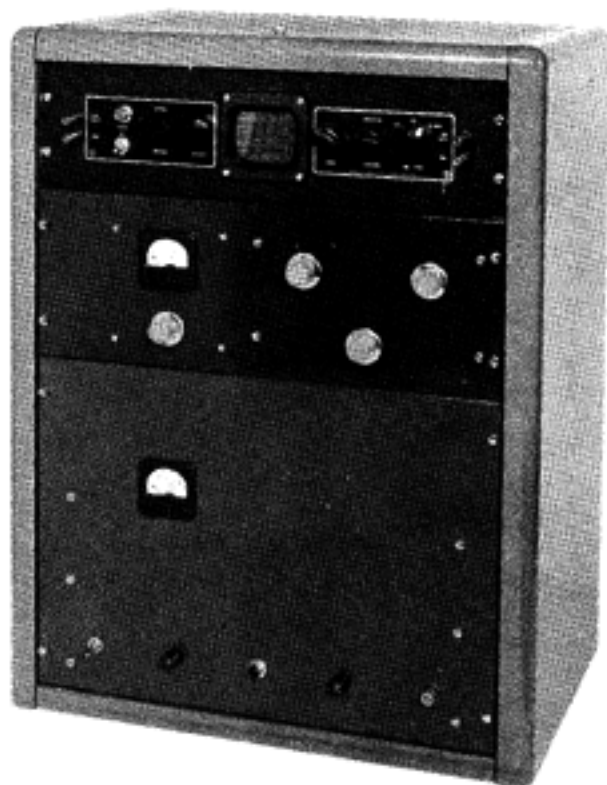
Model 600-6 50-54 MC

Model 600-2 144-148 MC

Model 600-1¼ 220-224 MC

Model 600M Modulator/Power
Supply

For further details - Bulletin 600



A typical combination consisting of a 250M, a 250-6 and a commercial 'scope unit.

CLEGG LABORATORIES VHF CLIMASTER

Serial # 21203

Model 62 T 10

I. GENERAL CHARACTERISTICS

The VHF CLIMASTER Model 62 T 10 is a self contained multistage communications transmitter covering the 11/10, 6 and 2 meter amateur bands. AM phone and CW operation are provided. Frequency control is by means of internal crystals or external VFO. Maximum power input is 160 watts AM Phone and 200 watts on CW.

Power output is in excess of 105 watts AM and 140 watts CW on all bands. Audio clipping and filtering are provided to yield a high quality extremely effective AM signal for communications work.

Band changing is accomplished efficiently and rapidly by means of special multiband tuners and a single band-switch in the final amplifier. Band switching time is normally less than 15 seconds.

The unit is designed to operate into a resistive load of 48 to 75 ohms.

II. PERFORMANCE SPECIFICATIONS

A. FREQUENCY COVERAGE

1. 26.5 to 30.0 Mc.
2. 49.8 to 54.2 Mc.
3. 143.8 to 148.4 Mc.

B. FUNDAMENTAL CONTROL FREQUENCIES (VFO or CRYSTAL)

11/10 Meters	6.74 6.74	to	7.4 7.4	Mc.
6 Meters	8.33	to	9.0	Mc.
2 Meters	12.0 or 12.0	to	12.3 or 12.5	Mc.
	8.0		8.22	

C. TYPICAL MEASURED OUTPUT (Into 52 ohm resistive load)

BAND	AM	CW
10 Meters	130	155 Watts
6	120	145
2	110	140

D. SPURIOUS RADIATION

All spurious radiations are down more than 55db below the intentional output on all three bands. This figure can readily be increased to more than 70db by the use of suitable band pass filters in the antenna feed system.

E. AUDIO RESPONSE

The audio response (without clipping) is essentially flat.

from ⁴⁰⁰~~500~~ cps to 2500 cps. It is down 6 db at ³⁰⁰~~250~~ and 3000 cps; 13 db at 250 and 3700 cps.

F. MODULATION PEAK CLIPPING

Up to 12 db of controllable speech clipping is provided at 95% modulation of a 160 watt input with a -52 db high impedance microphone.

G. INPUT POWER REQUIREMENTS 110 to 120 VAC, 60 cps

Standby - 160 watts Transmit - 520 watts max.

H. COOLING Forced air (Primarily for output and driver stages)

I. NET WEIGHT Approximately 85 pounds

J. OVERALL DIMENSIONS 19 by 10-5/8 by 14-1/4 inches

K. CONTROLS AND CONNECTORS (FRONT PANEL)

1. Generator ^{BUFFER} plate tuning	OSCILLATOR
2. Multiplier " "	MULTIPLIER
3. Driver " "	AMPLIFIER GRID
4. Final Amp. " "	AMPLIFIER PLATE
5. Final Amp. Band Switch	10M - 6M - 2M
6. Final Amp. Loading	LOADING
7. Amplifier Grid Current	DRIVE
8. Filament Power	AC
9. DC Power supplies	OPERATE STANDBY
10. Mode of Operation	OPERATION
a. Set or check frequency	a. FREQ.
b. Operate CW and tune Amplifier	b. CW
c. Tune stages up to Amplifier	c. TUNE
d. Operate conventional AM	d. AM
e. Operate AM with Speech Clipping	e. AM Clipper
11. Audio Preamplifier Gain	AUDIO GAIN
12. Post Clipping Gain	MODULATION
13. 5 position Crystal-VFO Selector	CRYSTAL
14. Microphone input receptacle	MICROPHONE
15. Key receptacle	KEY
16. Metering circuit selector	METER
a. Multiplier Grid Current	1.5763 GRID
b. Driver	2.2E26 GRID
c. Final Amplifier Grid Current	3.4X150 GRID
d. Final Amplifier Plate Current	4.4X150 PLATE
e. Final Amplifier Screen Current	5.4X150 SCREEN

L. CONTROLS AND CONNECTORS (REAR PANEL)

- | | |
|-------------------------------------|--------------------|
| 1. 115 volt input | LINE CORD |
| 2. High Voltage Supply Control | TOGGLE SWITCH |
| a. 800 volts | ↑ a. UP 900v. |
| b. 640 volts | ↓ b. DOWN 640v. |
| 3. Accessory Receptacle | OCTAL SOCKET |
| (Supplies 115 VAC for | → 1. 115 VAC |
| external relay during transmit; | 2. |
| 6.3 VAC at .3A; 300 VDC at | 3. |
| 20 Ma.) | 4. Ground, 6.3 VAC |
| | 5. VFO input |
| | 6. 6.3 VAC |
| | 7. 300 VDA |
| | → 8. 115 VAC |
| 4. Modulated 640/800 Volts for | RED HV CONNECTOR |
| use with external equipment | |
| 5. AC Line Fuse | LITTLEFUSE HOLDER |
| 8 amp., 3-AG Littlefuse | |
| 6. Ground post for permanent safety | GROUND |
| ground of unit | |
| 7. Internal RF Filament (Disables | STRAPPED TERMINALS |
| internal RF) | |

- M. CRYSTAL SOCKETS Internal provisions for up to 5 crystals of the FT-243 type are provided by means of the socket accessible through the hinged top. The rear socket corresponds to position 1 of the CRYSTAL selector switch.

III. CIRCUIT DESCRIPTION

- A. TUBE COMPLEMENT AND FUNCTION
- | | | | |
|--------|-------------|-------------------------------------------------------------|--------|
| 6BH6 | V101 | OSCILLATOR / VHF AMP. | BUFFER |
| 5763 | V102 | CRYSTAL OSCILLATOR or VFO AMPLIFIER / MULTIPLIER | |
| 5763 | V103 | FREQUENCY MULTIPLIER | |
| 2E26 | V104 | DRIVER (Doubles or Triples Frequency) | |
| 4X250A | V201 | FINAL AMPLIFIER | |
| 6Y6-GT | V202 | CLAMP TUBE FOR AMPLIFIER SCREEN | |
| 6AU6 | V301 | FIRST AF AMPLIFIER | |
| 12AU7 | V302 | SECOND AF AMP. & DRIVER | |
| 807S | V501 & V502 | PUSH PULL CLASS AB ₁ MODULATORS | |
| 5R4Gs | V503 & V504 | 800/640 volt-supply rectifiers | |
| 5U4 | V505 | 400 volt supply rectifier | |

B. RF STAGES

RF stages are conventional with the exception of the Multi-Band tuners employed. Study of the schematic diagram will show the technique of employing a combination of a balanced "half wave" circuit for each of the high frequency resonances with a conventional parallel tuned circuit covering a wider and lower frequency range. This technique is employed in each of the tuned circuits up to the Final Amplifier plate. The Final Amplifier plate employs a balanced efficient low-C tank on the 2 Meter Band, and a modified Pi-Network on the 6 and 10 Meter bands.

Variable screen voltage on the second 5763 stage is used to permit adjustment of Final Amplifier grid current to the correct amount for optimum efficiency and linear modulation. This is controlled by the DRIVE control on the front panel.

C. AUDIO STAGES

The 6AU6 is a conventional high-grain audio preamplifier stage designed to accommodate a high impedance crystal, dynamic or similar moderate level microphone. The AUDIO GAIN control follows this stage and precedes the balanced 1N34A clipper diodes which are biased to a suitable operating point. The MODULATION control is located electrically between the clipper diodes and the ~~first~~ half of a 12AU7 dual triode. By suitable settings of the combination of the AUDIO GAIN and MODULATION controls it is possible to obtain relatively undistorted 100% modulation with as much as 15 db variation in microphone input level. The end effect of the optimum clipping adjustment will be appreciated fully when the receiving operator is dealing with a signal down near the noise or QRM level. The second half of the 12AU7 is transformer coupled to the push-pull 807s. Regulated bias for the 807s is obtained from a separate selenium rectifier and glow-lamp shunt-regulator. The 807 stage is capable of producing more than 80 watts of clean SINE WAVE AUDIO and therefore permits the full effectiveness of the clipping to be realized.

D. POWER SUPPLIES

The VHF CLIMASTER employs three separate DC power supplies.

1. A 400 volt 200 Ma. supply for all low level RF and AF stages, the modulator screens and the external VFO.
2. An 800 volt, 350 Ma. supply for Final Amplifier plate and screen and Modulator plates. A primary tap on the 800 volt transformer permits reduction to 640 volts.
3. A regulated bias supply for Modulator grids.

E. OPERATION SELECTION (OPERATION SWITCH)

POSITION	V102/103	800 V	807 Scrn	Mod Tx	6Y6
FREQ	OFF	OFF	OFF	SHORTED	ON
CW	ON	ON	OFF	SHORTED	ON
TUNE	ON	OFF	OFF	SHORTED	ON
AM	ON	ON	ON	OPEN	OFF

IV. INSTALLATION AND OPERATION

The VHF CLIMASTER is designed for table top or rack mounting. For standard rack mounting the side panel handles are removed and the panel edge trimming is removed. Adequate air space should be provided at each of the ventilation ports on the sides of the unit. The perforated top area of the unit should be left at least 80% unobstructed during operation.

RF output for all bands is taken from the UHF type coaxial receptacle at the rear of the chassis. Accessory power is taken from the octal socket at the rear of the chassis.

Operating accessories required before the 62 T 10 can be placed in operation are:

1. A suitable power source of 115 volts, 60 cps, 5 amperes.
2. A crystal or other high impedance microphone with shielded plug (Mallory 75A or equal)
3. A telegraph key (for CW only) with standard phone plug (Mallory 75 or equal)
4. Suitable quartz crystals for the desired operating frequencies. (FT-243 or other .486" spacing, .093" pin diameter holders are required to match socket)
5. A suitable load for the frequency band desired. THE VHF CLIMASTER SHOULD NOT BE OPERATED FOR OTHER THAN VERY MOMENTARY PERIODS WITHOUT LOAD.
6. A means of evaluating modulation percentage is a very desirable accessory - both FCC requirements and good operating practice dictate the use of such an instrument.

INITIAL OPERATION

Before applying AC Power after unpacking the perforated top cover of the 62 T 10 should be removed and a general physical examination of tubes and tube connections should be made to assure that no damage has been done to the unit in shipment. The shipping container and all packing material should be retained for any future shipping or transporting of the equipment.

1. Install crystals in 5 position receptacle behind panel lights. (Position #1 of CRYSTAL selector is rear-most socket)
2. SET CONTROLS:

OPERATION selector	to	FREQ
CRYSTAL	to	Desired position
BAND	to	Desired band
METER	to	#1 (5763 GRID)
AF GAIN & MODULATION	to	0

DRIVE	to	5
OPERATE - STANDBY SW	to	STANDBY
AC SWITCH	to	ON
TUNING CONTROLS (4)	to	SETTINGS INDICATED on tuning chart for desired freq.
HI - LO VOLTAGE SWITCH	to	LOW (down position)

3. CONNECT POWER CORD TO AC SUPPLY
4. SWITCH OPERATE - STANDBY to OPERATE
5. ADJUST OSCILLATOR TUNING for MAXIMUM 5763 GRID CURRENT (1)
on 2 Meters only. Set to chart setting on 6 and 10 M.
6. OPERATE-STANDBY SWITCH to STANDBY and METER to 2E26 GRID (2)
7. OPERATION SELECTOR SWITCH to TUNE
8. OPERATE-STANDBY SWITCH to OPERATE
9. ADJUST DRIVER TUNING for MAXIMUM 2E26 GRID CURRENT
10. METER to ~~4X~~ 50 GRID (3) and ADJUST AMPLIFIER GRID TUNING for MAXIMUM GRID CURRENT.
11. ADJUST DRIVE for 10 to 11 MA. GRID CURRENT.
12. OPERATE-STANDBY SWITCH to STANDBY
13. BEFORE PROCEEDING FURTHER IT IS IMPORTANT TO OBSERVE THAT THE SETTINGS OF THE THREE RF TUNING CONTROLS ADJUSTED SO FAR DO NOT DIFFER APPRECIABLY FROM THOSE SETTINGS INDICATED ON THE TUNING CHART FOR THE FREQUENCY BAND IN USE. IN THE EVENT THAT THEY DIFFER BY MORE THAN 1 NUMBER FROM THE CHART THE PRECEEDING STEPS SHOULD BE REPEATED.
14. CONNECT A SUITABLE 50 OHM LOAD (Either an antenna or a dummy antenna.)
15. METER SWITCH TO ~~4X~~ 50 PLATE CURRENT POSITION (4)
16. LOADING CONTROL TO ϕ (MAKE CERTAIN AT THIS POINT THAT BAND SWITCH IS SET FOR PROPER BAND)
17. OPERATE-STANDBY SWITCH to OPERATE and QUICKLY RESONATE AMPLIFIER TUNING CONTROL FOR MINIMUM PLATE CURRENT.
18. ADJUST LOADING CONTROL FOR ABOUT 150 MA. AMPLIFIER PLATE CURRENT (NOVICE OPERATION SHOULD NOT EXCEED 115 MA.) READJUST AMPLIFIER PLATE TUNING FOR MINIMUM CURRENT and again ADJUST LOADING to 150 (or 115) Ma.

Note: On the 2 meter band, in the event that insufficient loading as indicated by inability to reach the desired Amplifier Plate Current (at minimum current adjustment of AMPLIFIER PLATE tuning) it may be necessary to increase

the internal coupling. This is accomplished by means of opening the hinged section of the top cover and increasing the coupling between the 2 Meter tank coil and the 1 turn insulated loop at its center. TURN OFF HIGH VOLTAGE SUPPLY by means of the OPERATE-STANDBY SWITCH BEFORE OPENING COVER.

- CARE must be taken that no physical contact exists between link # coil*
19. OBSERVE THAT THE SETTING OF THE AMPLIFIER PLATE TUNING CONTROL IS SIMILAR TO THAT ON THE TUNING CHART.
 20. THE 62 T 10 is now ready for CW operation at reduced power. At this point, for other than NOVICE operation, the HI-LO SWITCH may be placed in the HIGH (800 Volt Position). The LOADING may be increased to 250 Ma. for CW operation or 200 Ma. for AM operation. Screen Current (Position 5) should be between ~~20~~ and ~~27~~ Ma.
 21. AM. OPERATION ²⁵ ³⁷

The modes of AM operation are possible with the VHF CLIMASTER. The first of these is conventional unclipped linear modulation and can be used where it is desirable to attain the highest quality voice communication in strong signal areas. The second mode, employing adjustable speech clipping is usable under all conditions, and when properly adjusted, is most desirable for all-around usage. (UNDER EITHER MODE OF OPERATION both good operating practice as well as existing FCC regulations dictate the use of a suitable modulation indicator as a permanent part of the station equipment.)

A. CONVENTIONAL AM OPERATION

Conventional AM requires only the insertion of a suitable microphone and connector, switching the OPERATION selector to AM and finding an adjustment of the AUDIO GAIN and MODULATION controls that gives 100% peak modulation. It is relatively unimportant in this mode of operation as to which of the two controls is used as the modulation level adjustment. A suitable arrangement is to operate with the MODULATION control at or near maximum and the gain adjustments all made with the AUDIO GAIN control.

AM clipper operation should be adjusted in the following manner:

- 1) Advance AUDIO GAIN to ~~full clockwise~~ position ⁵.
- 2) While speaking in a relatively low level into the microphone advance the MODULATION control in a clockwise direction until 100% peak modulation is indicated.
- 3) Reduce the AUDIO GAIN control until the desired amount of clipping is not exceeded.
- 4) Once established for a given power input the MODULATION control should not require resetting over long periods of time, When working DX stations or combating heavy QRM it is desirable to advance the AUDIO GAIN control towards maximum; at other times it can normally be operated considerable below the maximum point.

22. ACCESSORY OPERATION

Study of the schematic diagram will show the flexibility and versatility of the 62 T 10 as a power supply and modulator for external equipment. The MODULATED 800/640 volts may be used with any Low Frequency or VHF transmitter. The internal RF of the CLIMASTER is disabled by means of the strap across the terminal strip at the rear of the unit.

V. MAINTENANCE AND SERVICING

The conservative design and rating of components in the 62 T 10 should assure an absolute minimum of maintenance. All components, when operated within ratings, should give at least 1000 hours of usage. As in all electronic equipment, replacement of components may be required, and for this reason very few special components have been employed in the unit. Where failure occurs, and a qualified service man is not available, the unit should be returned to the factory. Shipping instructions should be requested from Clegg Laboratories before returning any material.

TUNING CHART VHF CLIMASTER

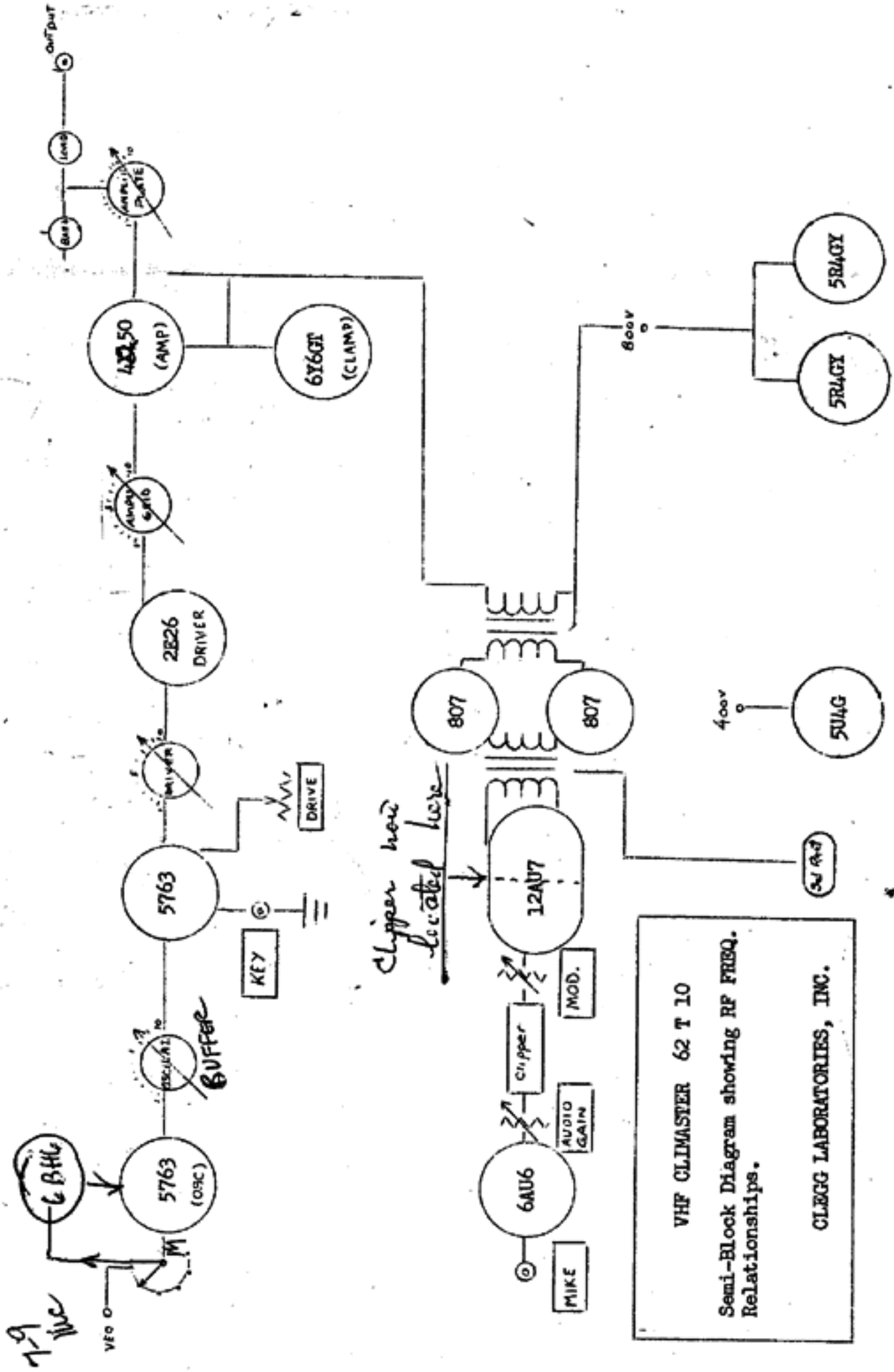
Serial # 21703

CONTROLS	2 M	6 M	10 M	11 M
Xtal or VFO	8050	8340	7150	148 AC
OSCILLATOR	2 m	6 m	10 m	VFO Ground 4 HOT 5
DRIVER	2 m	6 m	10 m	
AMPLIFIER GRID	2 m	6 m	10 m	
AMPLIFIER PLATE	2	6 1/2	7 1/2	(Right meter) left P-T
LOADING (52 ohm)	8	4	2	#2 mikes #1 P-T

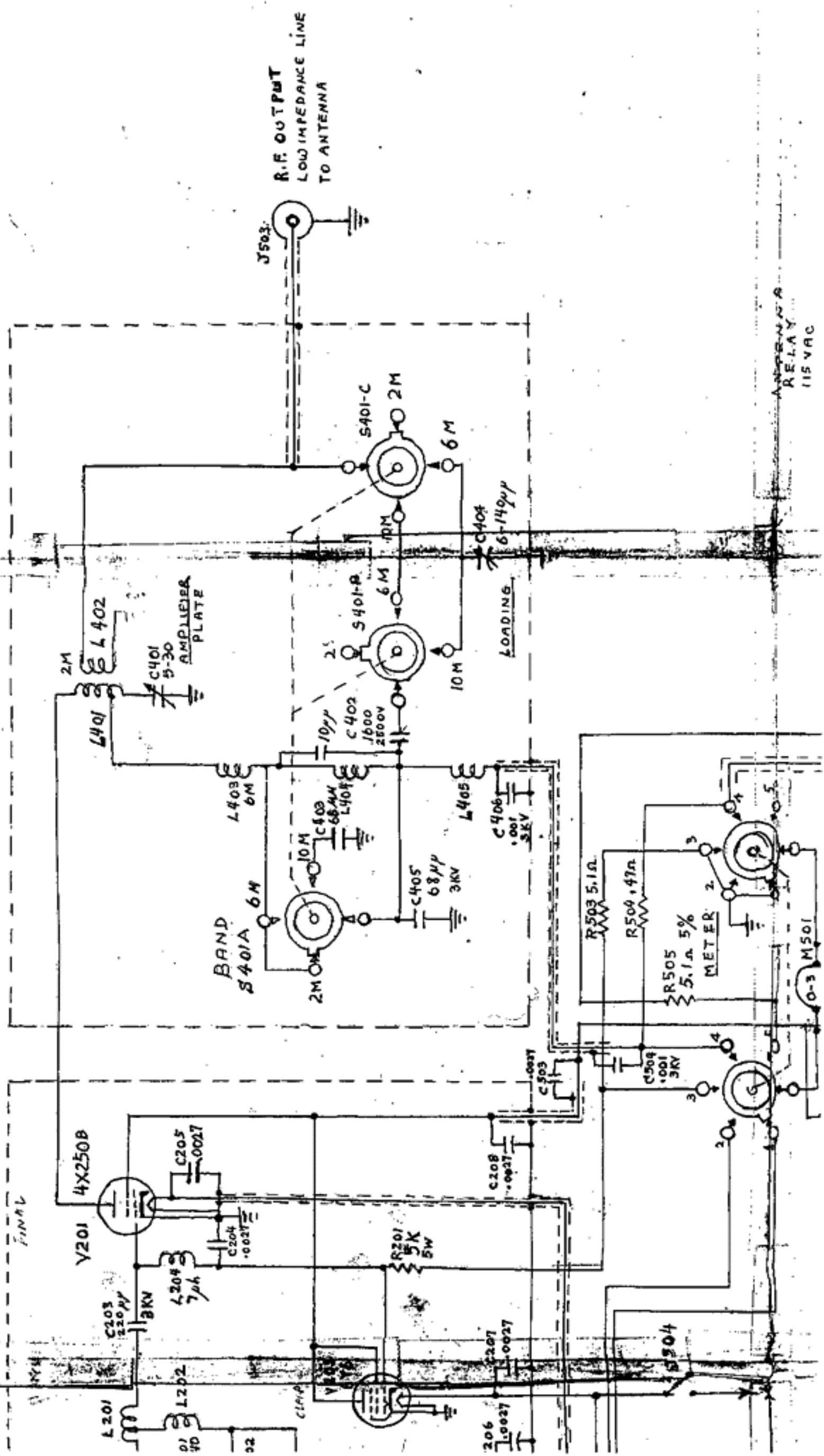
METER CHART

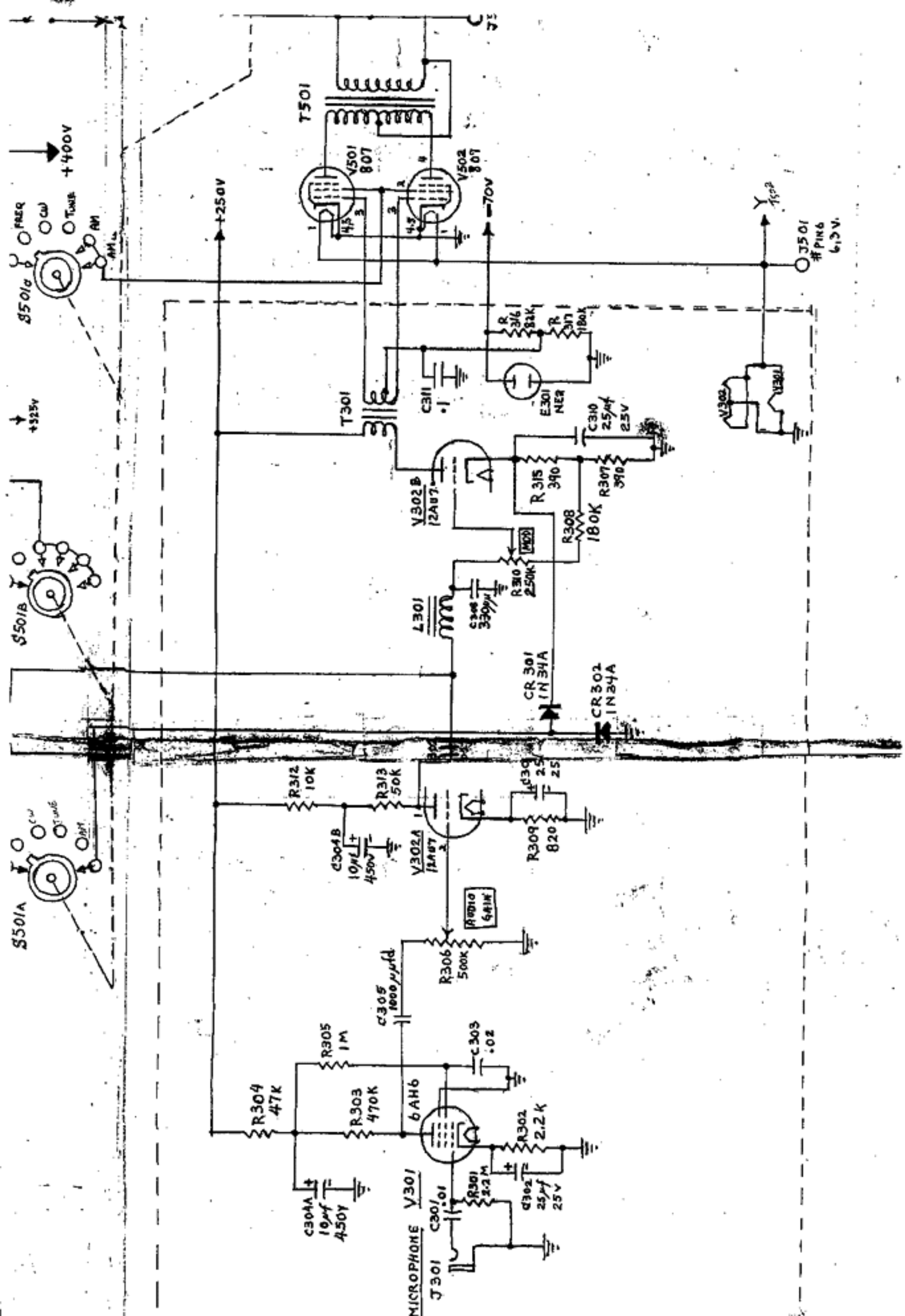
FUNCTION	SCALE	NORMAL	REMARKS
1) V102 Grid	0-3 Ma.	0 5 - 3.	Adjust OSCILLATOR for MAX. on 2 meters only
2) V103 Grid	0-3 Ma.	0 2 - 2.	Adjust DRIVER for MAX.
3) 4X 50 Grid	0-30 Ma.	9 - 11.	Adjust AMPLIFIER GRID for MAX and DRIVER for 20
4) 4X 50 Plate	0-300 Ma.	AM 200 max CW 250 max	Resonate AMPLIFIER PLATE for MIN and adjust LOADING for correct current.
5) 4X 50 Screen	0- ⁶⁰ 20 Ma.	20	Do not exceed 37 Ma.

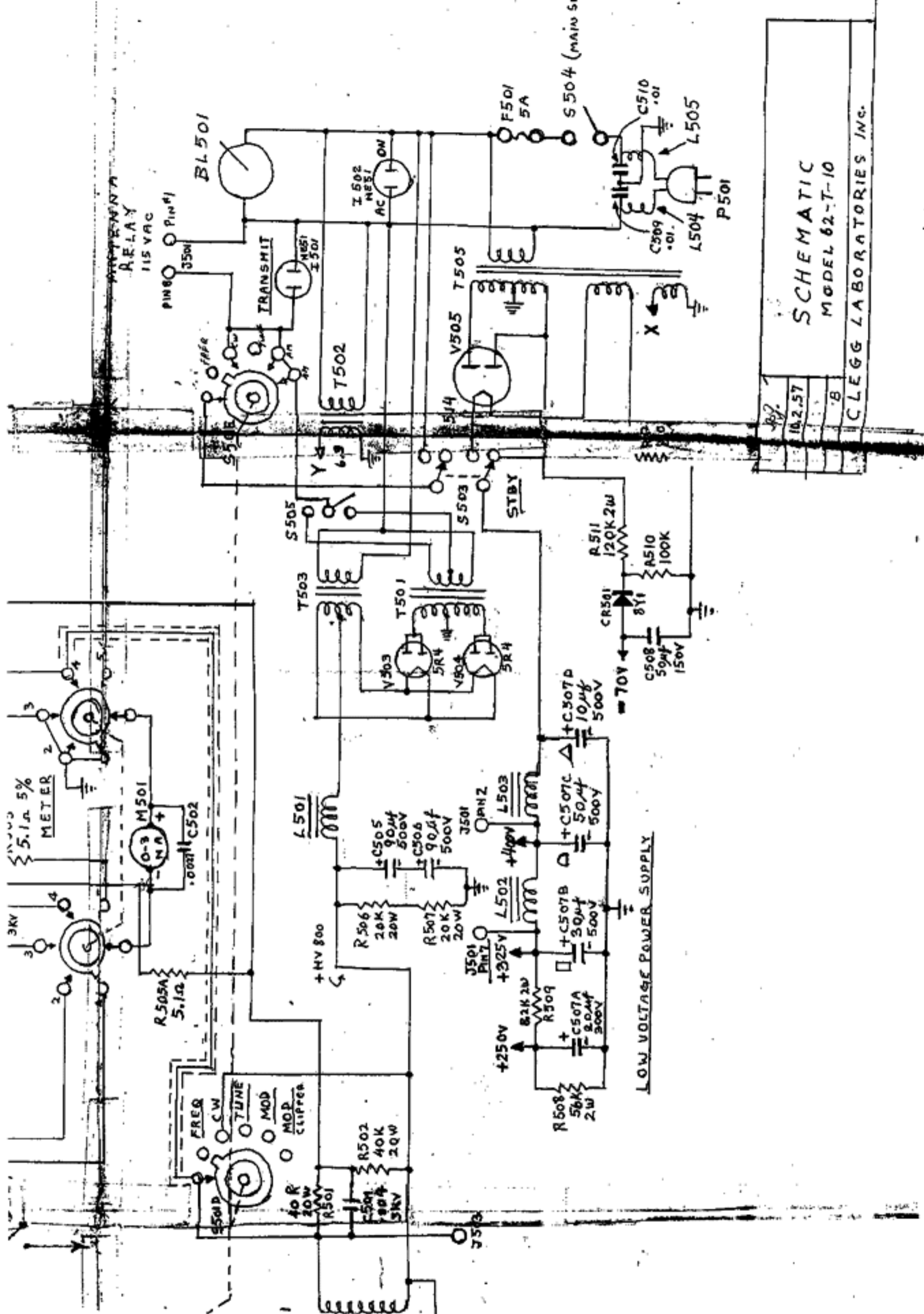
- Modulation: Set at 3-4 1/2 for 100% modulation at 200 Ma.
 AUDIO GAIN: No clipping -
 6 db " -
 12 db " -



VHF CLIMASTER 62 T 10
 Semi-Block Diagram showing RF FREQ.
 Relationships.
 CLEGG LABORATORIES, INC.







SCHEMATIC
 MODEL 62-T-10
 CLEGG LABORATORIES INC.