ELCOM BAUER TRANSMITTERS

BROADCAST PRODUCTS

TECHNICAL MANUAL

MODEL 701B

AM TRANSMITTER

PROPRIETARY NOTICE

6199 WAREHOUSE WAY, SACRAMENTO, CA 95826, U.S.A. • (916) 381-3750 • TELEX 377-331 • ANS. BK. "ELCOM"

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION

This manual contains information required to install, operate, and maintain the Elcom Bauer Model 701B AM Transmitter. Section I describes the transmitter and lists its specifications, Section II provides installation instructions, Section III contains operating procedures, and Section IV describes the principles of operation. Maintenance procedures and troubles-shooting diagrams are contained in Section V, and replaceable parts are identified and listed in Section VI.

1-2. GENERAL DESCRIPTION

The Model 701B AM Transmitter (Figure 2-1.) is a self contained plate modulated transmitter type accepted by the Federal Communications Commission under Part 73, Broadcast Services. The 701B has a power output capability of 1100 watts and is normally supplied with power cutback circuitry to 250 watts. When specified it can also be supplied as a 1000/500 watt or a 500/250 watt transmitter.

The meters and indicating lamps required for normal daily operation are located across the top of the transmitter. Additional meters and controls are located behind the non-interlocked front door. A full interlocked rear door gives ready access to all components and terminals.

1-2.1 Physical Characteristics

Physical characteristics of the Model 701B are given in Table 1-1.

Table 1-1. Physical Characteristics

Cabinet Dimensions:	75 inches high, 35 inches wide, 29.5 inches deep
Weight:	850 pounds
Cabinet Style:	Enclosed steel cabinet; access provided through hinged front and rear doors.
Input/Output Connections	
a. RF Output:	Feed thru insulator.

Table 1-1. Physical Characteristics (Cont.)

b. Monitor Samples:	Barrier strip.
c. Audio Input	Barrier strip.
Cooling Provision:	Self contained blower provides forced air at 225CFM.
Ambient Temperature:	$0^{o}C$ to $+45^{o}C$ ($+32^{o}F$ to $+113^{o}F$) continuous duty at rated power output.
Altitude:	0 to 7500 feet; continuous duty at rated power output. (Higher available on special order).
Humidity:	0 to 95%.

1-2.2 Functional Characteristics

Functional characteristics of the Model 701B are given in Table 1-2.

Table 1-2. Functional Characteristics

Type of Emission:	A3
Frequency Range:	540 - 1600 KHz
RF Power Output:	250 to 1100 Watts
RF Power Output Capability	1100 Watts
Output Impedance:	50 ohms, unbalanced
Frequency Stability:	$\pm$ 5 Hz
Controls and Indicators:	See table 3-1
Harmonic Attenuation:	75 db minimum below carrier amplitude

Table 1-2. Functional Characteristics (Cont.)

Input Line Voltage:	208 to 240 VAC, single phase, 50 to 60 Hz
Permissable Line Voltage Variation:	± 5% from nominal
Power Factor:	0.9
Power Consumption:	0 Modulation - 3100 Watts Average Modulation- 3500 Watts 100% Modulation - 4150 Watts
Tube Complement:	(4)-4-500B or (4) 4-400C (optional)
Audio Input Level: (for 100% Modulation)	10 db ± 2 db
Frequency Response: (0 - 95% Modulation) (50 - 10,000 Hz)	± 1.5 db
Distortion: (0 - 95% Modulation) (50 - 10,000 Hz)	3.0% maximum
Carrier Shift: (for 100% Modulation)	Less than 3%
Noise Level: (below 100% Modulation)	
1000 and 500 Watts	- 55 db
250 Watts	- 50 db
Remote Control:	Kit is optional accessory
Overload Protection:	

NOTE

The following conditions will cause the Transmitter high voltage to be shut down:

1. Open interlock
2. Loss of final drive

Table 1-2. Functional Characteristics (Cont.)

3. Excessive Modulator current	
4. Excessive final current	
Overload Indicators:	Tally lights on front panel identify the overloaded circuit.

1-3. ACCESSORIES

The Model 701B is normally supplied with the following:

a. 100% set of operating tubes (4-4-500B)or optional 4-400C

b. 2 HC-6/U crystals (1 spare)

c. 1 Instruction manual

1-4. OPTIONAL EQUIPMENT

Available at extra cost for the Model 701B are the following items:

CVS constant voltage transformer to provide ± 1% voltage variation for filament and low voltage supplies. (60 Hz only).

RCK-1 remote control kit including motor driven power trim rheostat and interface relays.

SECTION II
INSTALLATION

2-1. INSTALLATION PLANNING

Dimensions essential to know for proper installation of the Model 701B AM Transmitter are shown in Figure 2-1.

2-1.1 Environmental Requirements

Location of the Model 701B must be within the following environmental requirements:

a. Maximum altitude: 7500 feet (or higher if ordered)

b. Maximum temperature: +45°C (113°F)

c. Minimum temperature: 0°C (32°F)

d. Maximum humidity: 95%

2-1.2 Space Requirements

When installing the Model 701B it is important that sufficient space be left at the front and rear to permit full opening of the doors. At least 29" should be left between the rear of the transmitter and the wall. There should be 30" left between the front of the transmitter and the wall, however, if space is at a premium in this area the front door can be removed and this dimension reduced to only that necessary to permit operation of the front panel controls.

Adequate overhead space must also be provided to permit the RF output connection to be made and to allow for adequate dispersal of cooling air discharged through the cabinet top. A minimum distance of two feet from the cabinet top to the ceiling is recommended. If ducting is used the entire open area of the cabinet top should be reduced to a duct size of no less than 12". Sharp turns or long distances of duct work should be avoided.

2-1.3 Power Requirements

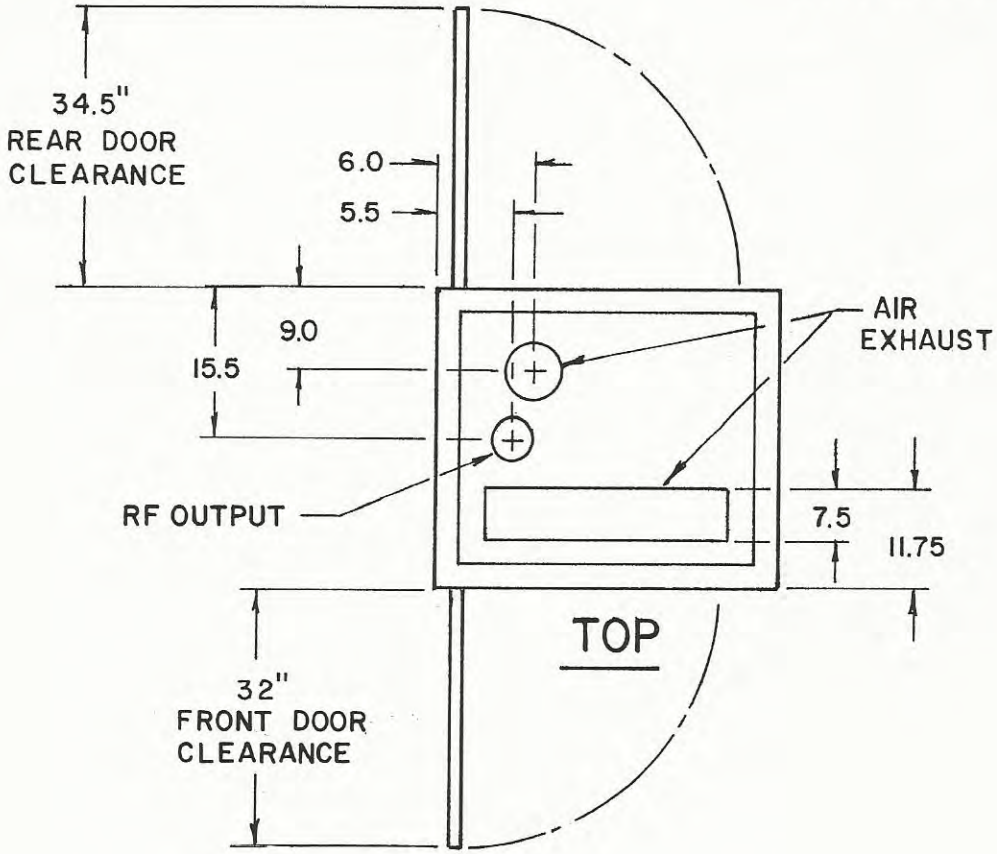
A 30 ampere 230 VAC three wire service should be provided to run this equipment at a frequency of either 50 Hz or 60 Hz. Only the optional Sola regulating transformer is frequency selective - should this unit be supplied with your transmitter make certain that it was designed for the frequency to be used. This is covered under OPTIONAL EQUIPMENT - Section 1.5.

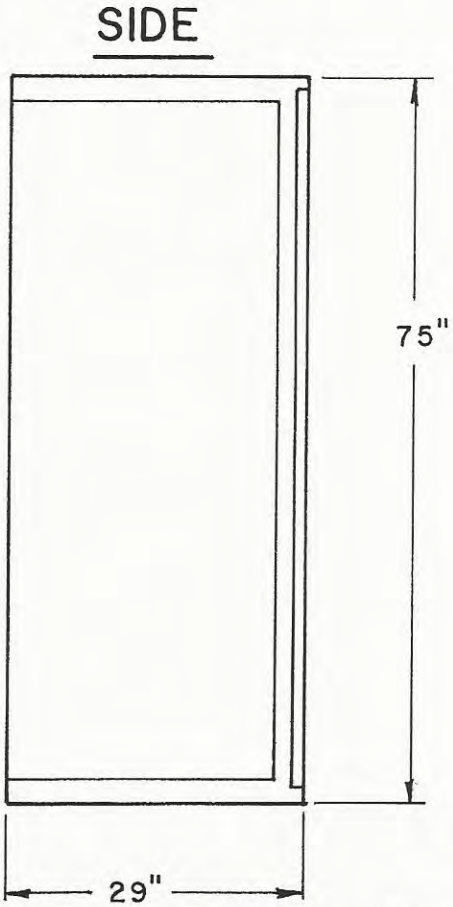
2-1.4 Cooling Requirements

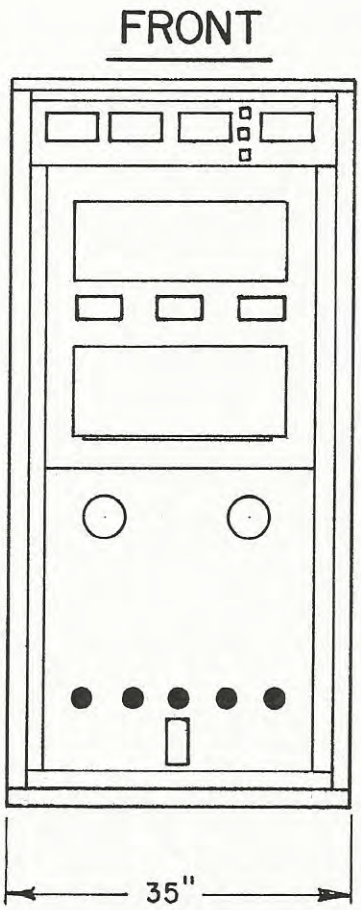
There are no external cooling requirements for the Model 701B. The unit is cooled by a single oversize internal blower which draws filtered air through openings in the rear cabinet door at the rate of 225 cubic feet a minute. If the recommendations given in 2-1.2 Space Requirements, above, are followed there should be no problem in keeping the transmitter cool. Make certain that sufficient filtered air is available within the transmitter room - preferably at floor level - to meet the requirements of the Model 701B and any other equipment that might be in the room.

2-2. UNPACKING AND INSPECTION

Inspect the equipment for shipping damage as soon as it is unpacked. Check for broken knobs, tubes, meter faces, and connectors. Inspect surfaces for dents and scratches. If the equipment is damaged in any way, notify the carrier immediately and report the damage. Items that have been removed for shipment have been properly marked and should be re-installed with the help of the identifying labels provided.







2-3. INPUT AND OUTPUT CONNECTIONS

With the exception of the RF output, all inputs and outputs to the Model 701B are routed into the unit through either of the two holes cut into the bottom of the cabinet. The RF output termination is a feed-thru insulator located on top of the cabinet.

2-3.1 RF Output Connections

The RF output connections are made to the Model 701B as follows:

a. The transmission line recommended for this class of service is RG-218, a 7/8" ohm coaxial cable. It should be connected to the feed-thru terminal at the top of the transmitter using the hardware provided. The cable shield should be grounded at the 1/4 - 20 screw nearby. Make certain that your connections are tight.

b. Frequency and modulation monitor connections are made at TB-1 located on the left panel just inside the rear door. A 50 ohm coaxial cable such as RG-58 is recommended. The frequency monitor connects to terminals 14 and 15. The modulation monitor connects to terminals 12 and 13. The shields of the connecting coax cables should be routed to terminals 13 and 15 respectively.

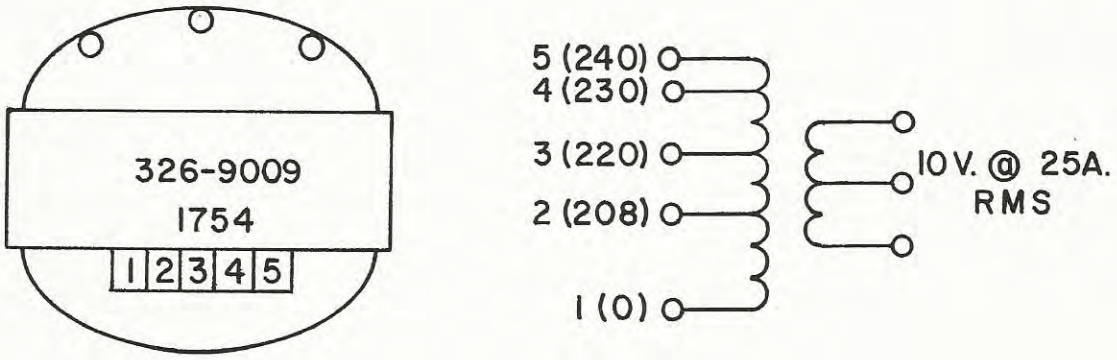
2-3.2 Primary Power and Grounding Connections

Primary mains power connections are made in the Model 701B cabinet at TB-2. Connect the neutral load to TB2-3, which is connected to the main frame grounding lug on the baseplate assembly.

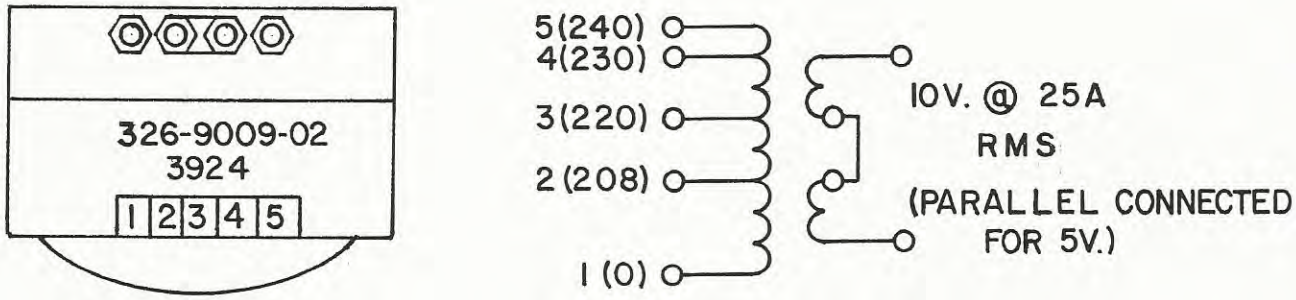
NOTE

It is essential that the exact mains voltage be determined and the primaries of filament transformer T-3 and T-4, low voltage/bias transformer T-5 and high voltage tranformer T-1 be properly connected. Note Figures 2-2. 2-3 & 2-4 and connect to the terminals representing the closest value to the available mains voltage.

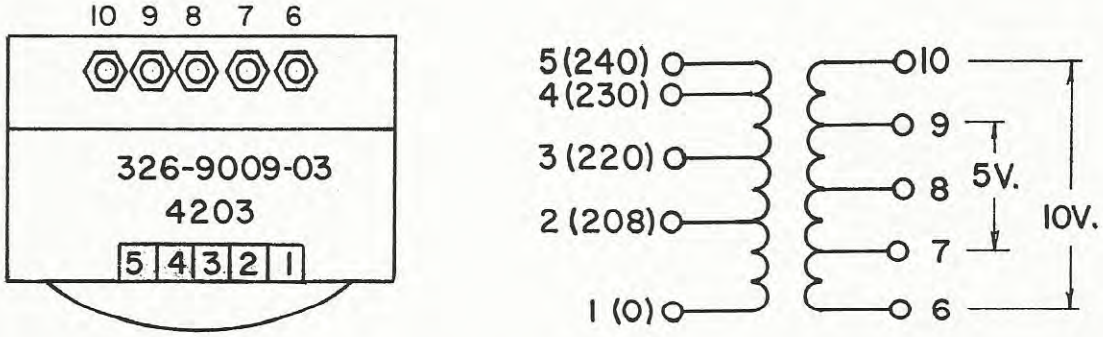
A.



B.



C.



Filament Transformers T3 & T4

FIGURE 2-2

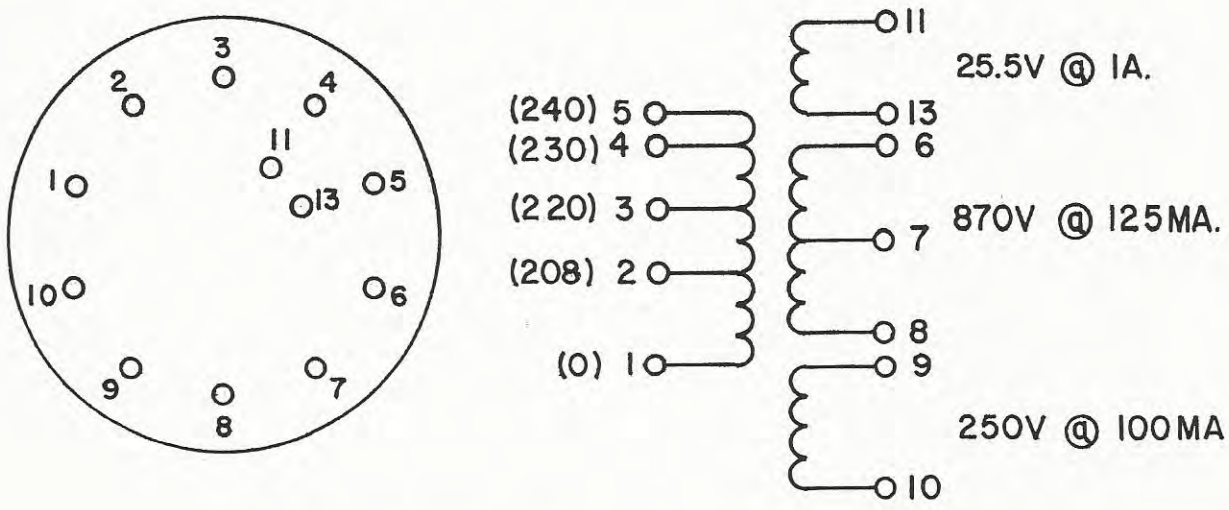


Figure 2-3
Primary Taps - T-5

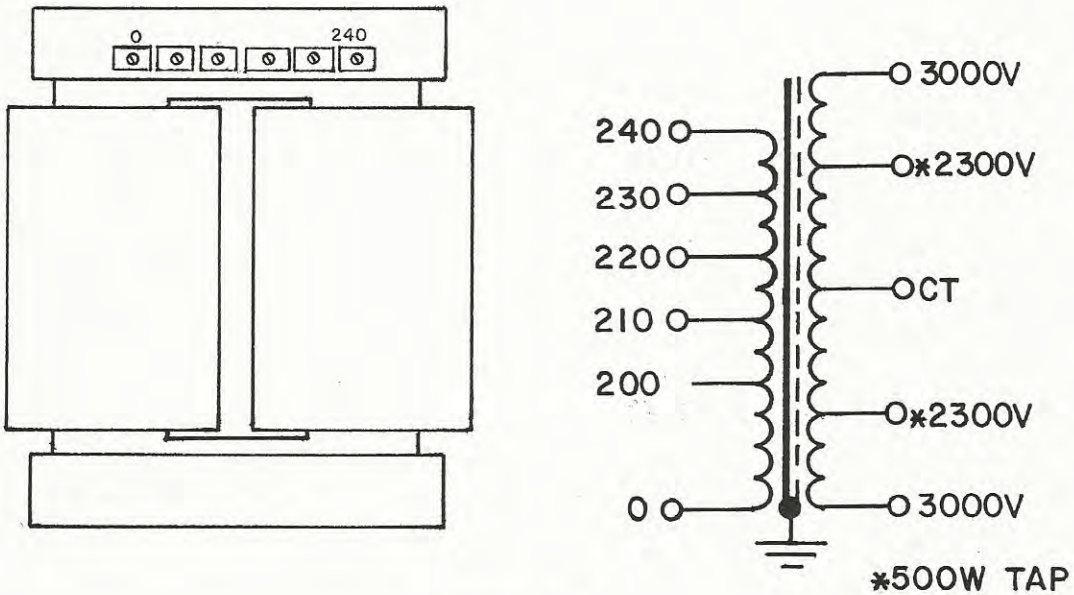


Figure 2-4
Primary Taps - T-1

2-3.3 Audio Connections

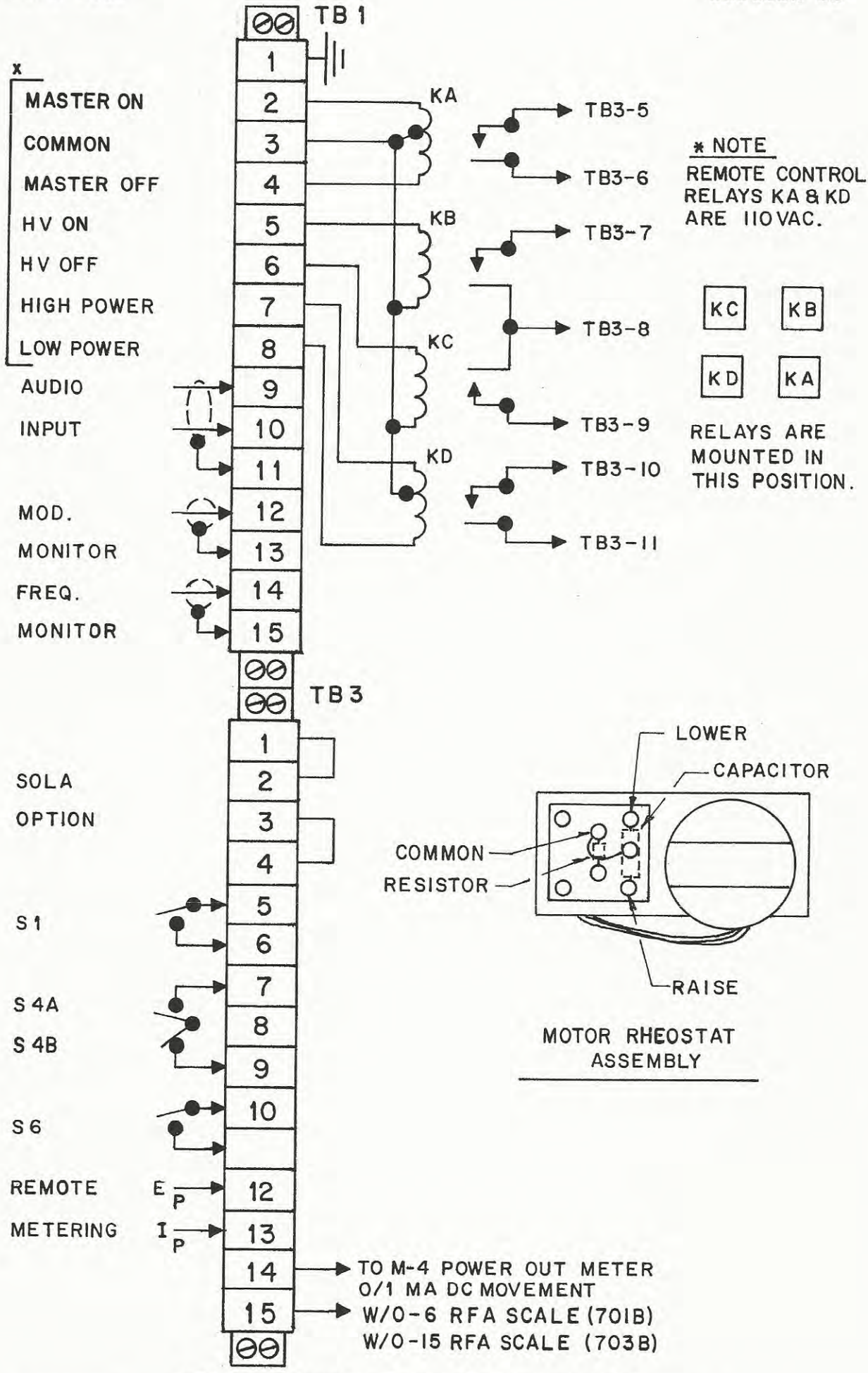
The audio connection to the Model 701B is made at TB-1 located on the left panel just inside the rear door. Shielded audio cable should be used for the audio input. (See Figure 2-5).

2-3.4 RF Output Metering

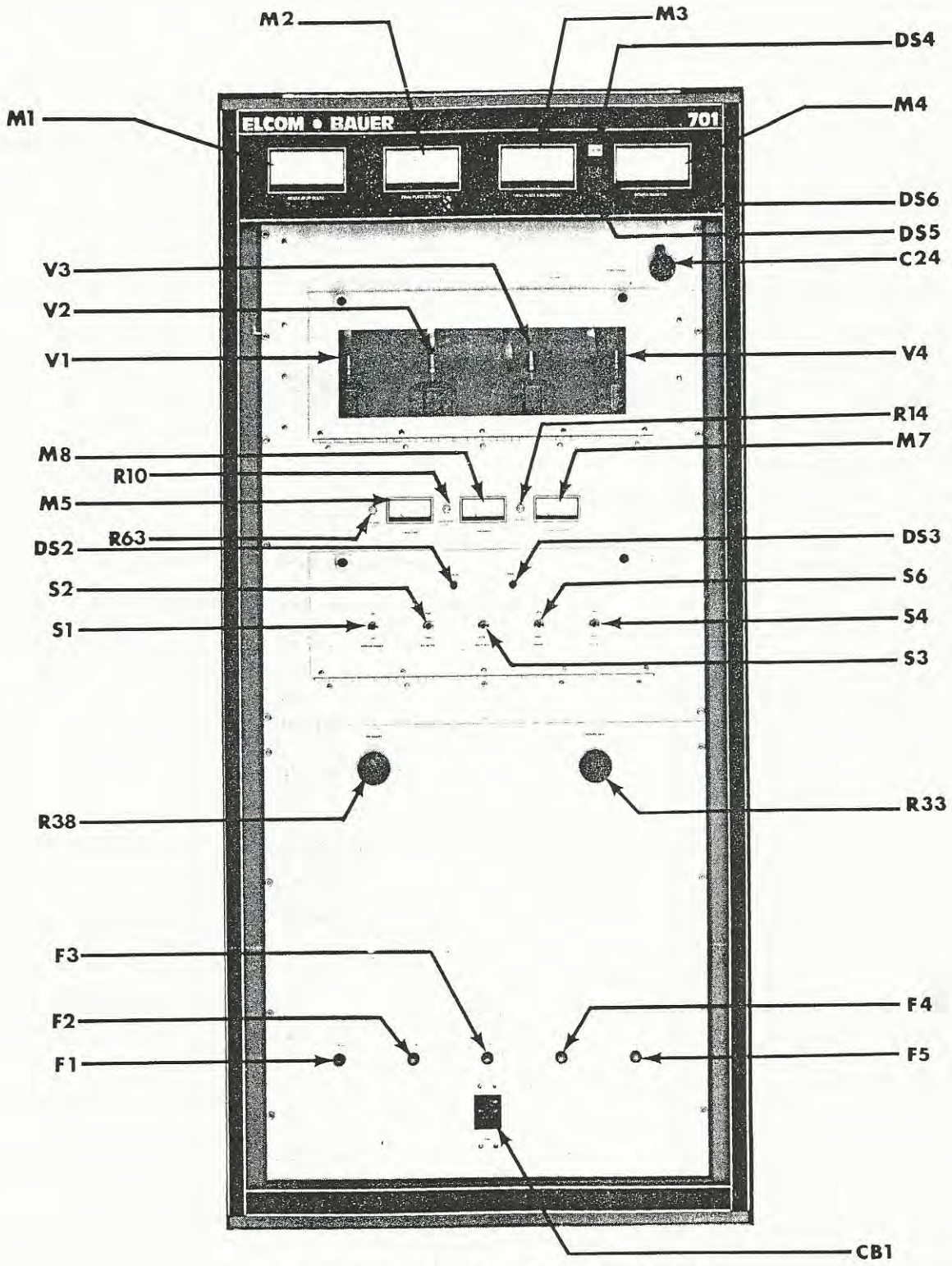
A meter (M-4) with a 0 - 1 MADC movement and a 0 - 6 RFA scale has been installed to provide an indication of RF line current or a remote indication of antenna or common point current. As shipped from the factory, a diode assembly (RMD-1) has been installed to sample line current and its output is connected to terminals 14 and 15 of TB-3. Should a remote antenna current indication be required, the line current metering circuit can be disconnected and the rectified output of the antenna current sampling device connected in its place. A calibration control for M-4 is located on the sub-panel behind the swing out meter assembly.

2-4. REMOTE CONTROL

To interface the Model 701B with your remote control system, it will be necessary to add the remote control kit described under Optional Equipment - Section 1.5. If this kit was specified at the time the order was placed, it has been factory installed and wired as shown in Figure 2-5. TB-3 is located on the left wall of the transmitter.



TB1-TB3 Remote Control Connections
FIGURE 2-5



MODEL 701B-FRONT VIEW
FIGURE 3-1

SECTION III
OPERATION

3-1. FRONT PANEL CONTROLS AND INDICATORS

As shown in Figure 3-1., all operational controls and indicators for the Model 701B are located on the front of the unit. Table 3-1 below lists these operating controls and indicators and gives their reference designators and a brief description of each.

Table 3-1. Operating Controls and Indicators

Ref. Des.	Panel Nomenclature	Function
CB-1	CB-1	Switches on main power and provides line overload protection.
C-24	FINAL TUNING	Tunes V-7/V-8 to resonance.
DS-1	NOT USED	
DS-2	MOD OL	Indicates final overload when lit.
DS-3	FINAL OL	Indicates final overload when lit.
DS-4	FIL ON	Indicates master switch is on and power applied to air switch.
DS-5	PLATE	Indicates high voltage is on when lit.
DS-6	INTERLOCKS	Indicates air interlock switch loop closed when lit.
F-1	F-1/2A	Provides protection to 24 volt power supply; illuminates to indicate blown fuse.
F-2	F-2/3A	Provides protection to T-3/T-4; illuminates to indicate blown fuse.
F-3	F-3/2A	Provides protection to T-5; illuminates to indicate blown fuse.

Table 3-1. Operating Controls and Indicators (Cont'd.)

Ref. Des.	Panel Nomenclature	Function
F-4	F-4/5A	Provides protection to K-4 and control circuitry; illuminates to indicate blown fuse.
F-5	F-5/5A	Provides protection to blower and control circuitry; to indicate blown fuse.
M-1	MODULATOR PLATE	Provides readout of modulator plate current.
M-2	FINAL PLATE VOLTAGE	Provides readout of final plate voltage.
M-3	FINAL PLATE AND SCREEN	Provides readout of final plate and screen current.
M-4	POWER MONITOR	Provides readout for externally connected remote metering diode of base or common point current.
M-5	FINAL GRID	Provides readout of final grid current.
M-6	FILAMENT	Provides readout of either modulator or final filament depending on position of S-2.
M-7	FINAL SCREEN	Provides readout of final screen current.
*R-33	POWER TRIM	Adjust power output.
R-10	MOD BIAS - HIGH	Adjust modulator bias for high power.
R-63	MOD BIAS - LOW	Adjust modulator bias for low power.
R-14	AF BAL	Adjust drive to modulators for minimum distortion.
R-38	FILAMENT	Adjust filament voltage to modulator and final.

Table 3-1. Operating Controls and Indicators (Cont'd.)

Ref. Des.	Panel Nomenclature	Function
S-1	MASTER POWER	Switches power to filament; low voltage, control circuit, and blower.
S-2	FIL METER	Switches filament meter to read either modulator or final filament voltage.
S-3	RESET OVERLOAD	Resets tally lamps to off; resets overload recycle unit.
S-4	PLATE	Switches high voltage on and off.
S-6	POWER	Switches high (1000W) to low (500W or 250W) power.

*Set to minimum resistance (maximum clockwise) when operating transmitter by remote control.

3-2. OPERATION

3-2.1 Initial Low Voltage Turn-on

Perform the following preliminary checks before turning on the master circuit breaker (CB1) located on the bottom of the front panel:

a. Make certain all tubes are properly seated in their sockets.

b. Check all front panel fuses and make certain a fuse of the correct value has been installed.

c. Make certain that the primaries of T-1, T-3, T-4, and T-5 have been set properly for the line voltage available.

d. Place the dummy/line switch in the dummy position.

e. Place switch S-6 (high-low power) in the low power position.

f. If you are not operating by remote control, check and make sure a jumper has been installed between terminals 8 and 9

of TB-3. If you are operating by remote control, place the remote/local switch on your remote control system to local.

Once the above checks have been made, place CB-1 in the on (up) position, then:

a. Turn on S-1. The blower should come on and the tube filaments should lite.

b. Note the filament voltage as indicated by meter M-6 (filament voltmeter) and adjust it for 10 volts with R-38 (filament adjust) control on the front panel (5 volts for 4-400C). Operate S-2 (final - mod.) meter switch and make certain both final and modulator filaments read the same.

c. Meter indications will appear on meters M-5 and M-6 (filament and final grid).

d. Check the tuning of L-3 (located inside the final tube compartment to the right of V-4) for maximum indication on M-5 (final grid current).

3-2.2 Initial High Voltage Turn-on

Providing the steps above have been performed satisfactorily, proceed as follows:

a. Check and see if the interlock (DS-6) is lit. If it is not, check all doors for proper interlock closure.

b. Momentarily operate S-4 (H.V. on). All meters should now indicate.

c. Check M-3 (final plate current) and adjust for minimum using C-24 (final plate tune). Resonance should be very close to where the control was left following factory checkout. To reach the optimum, adjust first, final resonance, and then turn the plate tune control toward a minimum capacity direction (clockwise) for a 10 to 15 MA increase in plate current. Compare all other readings with those supplied on the checkout sheet with your transmitter. If in approximate agreement, proceed to step d.

d. Turn the high-low voltage switch (S-6) to high power. The plate voltage should increase to 3000 volts, the plate/screen current to 500 MA. Check these readings for agreement with the checkout sheet. To arrive at an efficiency figure (70 to 75%), you must subtract the screen current

indicated on M-6 (final screen meter) from the plate and screen current indication of M-3. This will give you net plate current.

e. Precise power adjustment can be made by adjusting the front panel power trim control (R-33). When operating by remote control R-33 is left in a maximum clockwise position (minimum resistance) and the motor driven power control rheostat installed as a part of the optional remote kit is used exclusively to control output power. Should you experience any difficulty in obtaining the proper operation at this point, refer to the maintenance portion of this manual, Section V for additional help.

SECTION IV
PRINCIPLES OF OPERATION

4-1. GENERAL

The Model 701B is divided functionally into the following: (1) RF amplifier section, (2) audio section, (3) power supplies, (4) control and interlock circuits, and (5) overload and automatic recycle circuits.

4-2. RF AMPLIFIER CIRCUIT ANALYSIS

Radio frequency energy to drive the final tubes is obtained from a solid-state driver assembly using 2Q-1 thru 2Q-4 as active elements. This assembly is mounted just below the RF final amplifier tubes on a printed-circuit board. Power supply voltage for this driver assembly is obtained from a low-voltage winding of transformer T-5. A conventional bridge-rectifier and filter network (CR-1, C-7, C-19, and R-5) provides a power supply voltage of approximately 25VDC for operation of the driver assembly.

Transistor 2Q-1 operates as a modified "Pierce" Crystal Oscillator at four times the required carrier frequency. Crystals are very stable and easy to produce in the 2-10 MHz frequency range. This oscillator obtains its operating potentials from a zener-diode regulator, 2Z1. This assures that any reasonable power-line variation will not affect operation of the circuit.

The crystal frequency is adjusted by capacitor 2C-2, a small variable unit mounted on the P.C. Board near the crystal. The crystal frequency will not normally require adjustment throughout the life of the equipment since the oscillator is very stable. It is best to leave the frequency 2 or 3 Hz away from the assigned so that the day-to-day operation of the station frequency-monitor can be verified easily.

Transistor 2Q-2 operates as a buffer and supplies a signal to the first divider, 2IC-1. Output of this divider is supplied to 2IC-2. These integrated-circuits serve to divide the crystal frequency down to the operating frequency.

IPA Transistor 2Q-3 amplifies the carrier-frequency output of 2IC-2 to the 1-Watt level. This energy is used to drive RF Output Transistor, 2Q-4.

RF Output Transistor, 2Q-4, feeds a pi-network to match the grid impedance of the final amplifiers. The amount of drive available for the finals is adjustable with a tap on resistor R-62. Low-power drive level is adjusted using resistor R-1. The normal drive levels are as follows:

1 KW (full power)	14 Milliamperes
500 Watts (power cutback)	10 Milliamperes
250 Watts (power cutback)	8 Milliamperes

Operation at higher drive levels (up to 18 MA) is permissible but will increase the AM Noise level somewhat.

The final amplifier consists of a conventional Class "C" Tetrode amplifier using parallel-connected tetrode tubes (4-400C or 4-500B). These tubes are selected for long life and reserve-power capability. The output network consists of a "Pi"/"L" network which is conventional in design.

Feed for the station's modulation monitor is obtained from a tap on L-6. Resistor R-28 is adjusted for equal modulation monitor RF Feed for both high and low power levels. The tap on L-6 should be adjusted on low power and the slide on the resistor adjusted for the high-power level.

An internal dummy-load is provided for ease of service adjustment. It is capable of dissipating the full power of the transmitter when the transmitter is being modulated 100%. Combustible materials must be kept clear of the top of the transmitter when the dummy-load is in operation.

The normal operating levels for the final amplifier are as follows:

	1 KW	500 W	250 W	
Plate Voltage	3,000	2,250	1,500	Volts
Plate & Screen Current	500	375	250	Milliamperes
Screen Current	50	37	24	Milliamperes
Line Current	4.46	3.33	2.23	RF Amperes (50 ohms)

To eliminate the dust and corona problems associated with high voltage metering, the final plate current meter is connected in the cathode circuit where it also measures screen current. A separate screen current meter is provided to permit a determination of net plate current. Since the grid meter is returned directly to the cathode of the final tubes above the plate current meter, its value need not be considered in net plate current calculations. To determine final plate efficiency, therefore, from the figures above, the screen current should be subtracted from the plate and screen current indication. It will average 70%.

To compensate for variations in line voltage, the power output is adjusted by means of a front panel controlled rheostat (R-33) located on the high voltage supply for the final amplifier tubes.

4-3. AUDIO AMPLIFIER CIRCUIT ANALYSIS

The Audio frequency portion of the 701B Transmitter consists of a pair of (4-500B or 4-400C) tetrodes operated push-pull Class AB1. Since this configuration does not require any driving power, a simple voltage amplifier consisting of transistors 1Q-1 and 1Q-2 is utilized to provide approximately 300 Volts peak-to-peak of audio-frequency voltage to the grids. This circuitry is located on the audio-driver printed circuit board directly below the modulator.

A front-panel control is provided to adjust the modulator bias so that about 165 MA of static cathode current is drawn by the modulator tubes. An additional control is provided to balance the modulator feedback. This control, R14 is adjusted at a mid frequency for minimum audio distortion. This control can also be utilized to adjust the transmitter for asymetrical modulation. With a 15% differential between positive and negative peaks, the distortion will be about 6 percent.

From the modulator plates, the high-level audio signal is coupled to the final amplifier via modulation transformer T-7. Inductor L-11 serves to provide a DC path for the final amplifier plate current while keeping this current from flowing in the secondary of the modulation transformer. C-37 (1MFD/4KV) provides an AC ground return for the modulation transformer secondary.

4-4. POWER SUPPLY CIRCUIT ANALYSIS

4-4.1 Low Voltage/Bias Supply

Transformer T-5 provides all low voltages for operation of the Model 701B.

Winding 6/7/8 provides a dual voltage output of 800 and 400 volts. A full wave bridge rectifier (CR-2) converts the output of this winding to DC. The 800 volt supply is filtered by L-10 and C-29. The full 800 volt output of this supply is applied directly to the modulator screens through the high voltage contactor (K-7). The half voltage available from the center tap of this winding is filtered by L-9 and C-31. The full output of this section is applied to the audio driver transistors.

Winding 9/10 provides approximately 250 Volts AC for operation of bridge rectifier CR-3 connected in such a manner so as to provide a negative output for modulator bias. R-8, R-9, and C-11 provide the filtering for this supply.

Winding 11/13 provides 25 volts AC for operation of bridge rectifier CR-1. This supply is filtered by C-7, C-19 and R-4 and provides 25 volts DC for operation of the RF driver section. A portion of the unfiltered output of this supply is used to operate the recycle circuitry.

The primary of T-5 is tapped to permit operation over a 200 to 250 VAC range.

4-4.2 Filament Power Supply

Identical transformers T-3 and T-4 provide 10 volts at 20 amperes for operation of the 4-500B modulator and final amplifier tubes. Both of these transformers have primary taps to permit operation over a range of 200 to 250 VAC. By paralleling secondary windings 4-400 tubes can be used (5 volts - 30A).

4-4.3 Plate Supply

High voltage transformer T-1 supplies approximately 3000 volts at 800 MA to bridge rectifier CR-4/CR-5. Choke L-12 and capacitor C-16/C-16A provide the filtering for this supply.

Reduced voltage for 500 or 250 watt operation is provided by series resistance R-24, R-25, and R-26 in the plate-supply circuit. These resistors are located in series with the modulation reactor. This prevents audio power from being dissipated in the resistors. About 375 watts is dissipated by these resistors regardless of whether they are set for 500 or 250 watt operation. During setup, the sliders should all be adjusted to about the same place to equalize power dissipation.

The primary of T-1 is tapped to permit operation over a 200 to 250 VAC range.

4-5. CONTROL AND INTERLOCK CIRCUITS

Once the main front panel circuit breaker (CB-1) is turned on, power is applied to the control circuitry. When the master start switch S-1 is actuated, the blower will start and master relay K-1 will pull in.

Closing of K-1 will apply power to the final and modulator filament through T-4 and T-3 and to the low voltage power supply through T-5. If all four interlock switches are closed (S-9, 10, 11, 12), the interlock lamp (DS-6) will lite. As soon as the tubes heat up (approximately 20 seconds) grid current should appear on M-5 and the final grid underdrive relay (K-2) should close. Final plate voltage can now be applied. As momentary HV switch (S-4) is turned on, K-10 is actuated and the circuit to the HV breaker (K-7)

is completed. If all circuits are in normal operation, the high voltage will come on and stay on (held on by holding contact K-10A) until the plate off switch (S-4) is actuated. The operation of the overload circuitry is discussed in Section 4-6. below.

Relays K-11, K-4, K-5, and switch S-6 are involved in reduced power operation. When S-6 is actuated, the three relays close - K-11 shorts out the adjustable portion of R-28, permitting a greater output from L-6 to become available for modulation monitor operation; K-4 connects the final plate to a reduced source of plate voltage and K-5 places R-13 in the audio input circuit and R-11 in the RF driver circuit - thus reducing audio and RF drive by the required amount.

4-6. OVERLOAD AND AUTOMATIC RECYCLE CIRCUITS

Refer to the overall schematic of the Model 701B to follow this explanation of the overload and recycle circuit.

Two overload relays are used in the Model 701B, in the modulator circuit (K-9) and the final amplifier (K-8). Note contacts K-9A and K-8A located across the HV ON relay K-10. Should either relay operate, these contacts will short out the K-10 coil causing it to drop out. R-39 provides the AC isolation during this sequence of operation this eliminating the possibility of shorting out the 220 volt supply. Note contacts K-8B and K-9B across K-6 and K-8C and K-9C in the indicator lamp circuitry in the right section of the schematic. As K-10 drops out, high voltage is removed as K-10B opens up the AC connection to the high voltage breaker K-7. As either of the overload relays actuate contacts, K8B or K-9B will actuate high voltage breaker K-7. As either of the overload relays actuate contacts, K-8B or K-9B will actuate relay K-6 in the recycle circuit. Contact K-6B (with a full charge on C-14) will drop down to charge C-15.

When C-15 is charged, SCR-3 will fire and energize relay K-3. Since K-3 has contacts in parallel with the HV on switch, it will turn K-10 back on. If the overload still persists, the process will be repeated until C-15 dissipates its charge - four to five times in eight seconds. During the overload either K-8C or K-9C caused either SCR-1 or SCR-2 to fire, lighting DS-2 or DS-3. These tally lites will remain lit until front panel switch S-3 is actuated. Contacts S-3B break the AC connection to the recycle relay K-6 causing it to drop out and be placed once again in a ready position. To accomplish this by remote control, the HV off switch should be actuated prior to turning the HV back on. Only in this way can K-6 return to its recycle function. Tally lites DS-2 or DS-3 will remain on until the front panel switch S-3 is actuated. In this way this circuit maintains an overload memory even though the transmitter has been placed back on the air.

SECTION V
MAINTENANCE

5-1. PERIODIC INSPECTION AND MAINTENANCE

WARNING

Even if the transmitter is completely shut down, be extremely cautious whenever adjustment or maintenance is required to be conducted in the vicinity of components that are normally energized with high potentials. To ensure safety, use an insulated shorting bar and ground all high voltage capacitors and plate caps.

Only the cabinet cooling air filter requires periodic special attention. Otherwise, periodic inspection, cleaning and maintenance requirements for the Model 701B are in accordance with standard practice for maintaining any communications equipment to provide optimum performance with minimum failures.

5-1.1 AIR FILTERS

The cabinet cooling air filter for the Model 701B is located on the rear door of the unit. If permitted to become clogged with dust and dirt particles, the flow of air to the blower may become so restricted that airflow interlock switch S-5 will not close, rendering the unit inoperative. Periodically, as determined by their condition, the filters should be cleaned to ensure a free flow of clean air through the unit. Remove the filters, immerse in hot soapy water and agitate until clean, then rise and allow to dry before replacing in the unit.

5-2. REMOVAL AND REPLACEMENT OF AMPLIFIER TUBES

Certain precautionary steps should be taken to ensure the safety of maintenance personnel when removing and replacing the amplifier tubes as well as to ensure proper handling of the tubes. To remove and replace tubes proceed as follows:

a. Set PLATE switch S-4 momentarily to the OFF position.

b. Set MASTER START switch S-1 to the OFF position.

c. Remove V-1, V-2, V-3 or V-4 as follows:

(1) Remove the plate cap.

(2) Grasping the tube with both hands move gently back and forth while exerting an upward pressure.

To re-install tubes, reverse the above procedures.

5-3. OVERLOAD RELAY ADJUSTMENT

Two overload relays (K-8 and K-9) in the Model 701B are adjustable. Only an audio oscillator is needed when making these adjustments.

5-3.1 Final Plate Overload

To adjust the overload threshold of relay K-8 (see Figure 5-2), proceed as follows:

a. Place transmitter in normal operating condition for 1000 watt output.

b. Detune the final plate control (C-24) in a clockwise direction until the final plate current reads 600 MA. Adjust R-27 for a final plate overload condition - high voltage will go off and final plate OL tally lite will go on. Should the plate overload too soon, turn R-27 clockwise.

c. Check the operation of the overload relay be reducing plate current below the 600 MA set point - then approaching it slowly. When satisfied that the adjustment is correct (within ± 2%) re-dip C-24 - then adjust clockwise to a reading approximately 20 MA above the indicated plate current at resonance.

5-3.2 Modulator Plate Current Overload

To adjust the overload threshold of relay K-9 (see Figure 5-2), proceed as follows:

a. Place transmitter in normal operating condition for 1000 watt output.

b. Feed the output of an audio oscillator into audio input terminals TB-1 - 9 and 10.

c. With the audio oscillator set at 7 KHz, slowly increase the input to the transmitter to a level of 600 MA. Should K-9 trip before this point is reached, turn R-23 clockwise until an overload point of 600 MA is reached. Since this is an overmodulation condition, reduce the

audio input to the transmitter after each test and then increase the level slowly until the proper set point is reached. When operating properly, the high voltage will go off and the modulator OL tally lite will go on.

5-4. NOISE AND DISTORTION MEASUREMENTS

As audio tubes (V-1 or V-2) age or are replaced, it is desirable to make an audio proof on the transmitter to determine if any re-adjustment of either the AF BALANCE control (R-14) is necessary. Using standard equipment and procedures, adjust these controls as follows:

a. With the transmitter operating at normal power output, set MOD. BIAS control (R-10) for at static current of 160 MA.

b. Feed a 5 KHz signal to the transmitter and adjust for a modulation level of 85%.

c. Adjust the AF BALANCE control for minimum distortion and lock the control.

d. Check other frequencies - usually distortion will run higher above and below the 5 KHz setting and a distortion curve when plotted will be crescent shaped. Should distortion be higher at one end of the spectrum than the other, a balance frequency can be lowered or raised depending upon the area you wish to favor. The adjustment of the balance control is compensating for any variations that may occur in the modulator tubes in that it is controlling the drive to these tubes.

e. Modulate the transmitter 100% with a 400 Hz signal and calibrate the noise meter. Remove the audio signal and either short the audio input lead or load it with a 600 ohm resistor. If minimum noise figure is not reached, swap V-3 and V-4.

5-5. POWER CUTBACK ADJUSTMENTS

When changing to a lower level (500 or 250 watts), automatic means are provided within the Model 701 to reduce audio and RF drive as well as the modulation monitor input. Adjustment of these controls is as follows:

a. Assuming that all controls have been set for the higher power operation, actuate the power reduction switch (S-6). Grid drive should be reduced to the correct amount. This was a factory adjustment - if not correct, R-1 on the blower deck should be adjusted.

b. Using the same input signal required for 100% modulation at the higher power, adjust R-13 located on the control relay board (See Figure 5-2) until this same level of input signal produces 100% modulation at the lower power.

c. To maintain the modulation monitor carrier level at 100 when switching power levels R-28 will need to be adjusted. Set the carrier level to 100 at the low power level, then set S-6 (high-low power switch) to the high power position. Without touching the modulation monitor carrier level control, adjust R-28 until the carrier level indicator is again at 100. R-28 is an adjustable tapped resistor and is located to the right of the switching relay (K-11) and below the bank of power change resistors located on the right hand wall (facing from the rear) of the cabinet.

5-6. OUTPUT NETWORK ADJUSTMENT

As supplied, the output network composed on L-7, L-8 and C-26 has been factory adjusted to match a 50 ohm non-reactive load at the frequency specified. Should it be necessary to change frequency in the field - or change the output impedance, the following procedure should be followed by someone familiar with RF measuring equipment and its use.

a. Connect a non-reactive resistor equal to the load impedance expected from the output terminal to ground.

b. Remove the input tap to L-7 where it connects to the plate tank coil (L-5). This now becomes the input for RF bridge measurements.

c. Using standard techniques, adjust L-7 and L-8 until the input to L-7 is 58 to 65 ohms at zero reactance.

d. Reconnect L-7 to L-5 and connect the transmitter to a suitable load. With the transmitter in operation, check the level of the 2nd harmonic using a field intensity meter capable of measuring the frequencies involved.

e. If the 2nd harmonic is not -73 db or better, turn off the transmitter and adjust the L-7 tap in small increments until the desired result is achieved. The portion of L-5 between the C-25 connection (end of L-5) and the L-7 tap provides a series resonant circuit at the second harmonic.

f. Check the 3rd harmonic and repeat the above procedure using the C-26 on tap on L-7. The portion of L-7 between the C-26 tap and the L-8 tap provides sufficient inductance to

to series resonate with C-26 at the third harmonic.

Should the proper test equipment not be available to make these tests, the tuning chart (Figure 5-2) can be used. If maximum harmonic attenuation is required however, the method discussed in steps e and f above should be followed using the proper field intensity meter.

5-7. SCHEMATIC DIAGRAMS

All of the circuitry of the Model 701 is shown on one schematic diagram - 071-0186 in the rear of this manual.

5-8. TROUBLESHOOTING

Table 5-1. lists possible trouble symptoms and their possible cause. References to sections of the instruction book are given that apply to the symptom indicated.

Table 5 - 1 Troubleshooting Guide

Cannot reach normal voltage (10V) with filament adjust control	Check setting of T-3T-4 taps - See Figure 2-3; Page 2-5
Recycle circuit does not operate	Review Section 4-6, Page 4-3. C-14 controls number of recycles. Lowering capacity reduces number of recycles
CBI trips upon application of high voltage	CR-4 or CR-5 shorted. In case of emergency eight IN2071 (600V @ 3/4A) can be substituted for 1/2 of either CR-4, CR-5. Check power mains for proper lightning protector
Unable to make normal output	Increase coupling by decreasing tank inductance - move C-23/C-24 taps to right, one tap at a time
PA overload indicator lights at high power	Relay K-8 may be set too close. See Section 5-3.1; Pages 5-2
Modulator overload relay trips occasionally	Check Relay K-9 setting. See Section 5-3.1; Pages 5-2
Noise level higher than normal	Read Section 5-4e; make certain final grid current is not too high
Modulation level does not reach 100% at lower power level	Check adjustment of R-13. See Section 5-5b; Page 5-3
Modulation monitor carrier level meter changes when shifting power	Check adjustment of R-28. See Section 5-5C; Page 5-3
Center frequency too high	Adjust 2C2 on RF board
High voltage comes on but will not stay on	Make certain jumper is installed from TB3-8 to 9 or - if operating by remote control - a relay has been installed to perform this function
Final tuning almost normal but low output	C-24 adjusted to 2nd harmonic. Turn CCW until cap on vacuum capacitor becomes loose - then turn clockwise to first dip
One modulator tube appears to be taking most of the load	When used in Class AB1 tubes of this type have tendency to "spot" and no two tubes spot in the same place. Chances are offending tube has same spot but out of view

TABLE 5-2

Typical Performance Data

Circuit	Meter Readings		
	250 Watts	500 Watts	1000 Watts
Filament	10 V	10 V	10 V
Final Grid	9 MA	11 MA	15 MA
Final Screen	29 MA	44 MA	60 MA
Modulator Plates	*160/220 MA	*160/330 MA	*160/400 MA
Final Plate Voltage	1500 V	2150 V	*3000/2950 V
Final Plate and Screen	240 MA	320 MA	480 MA
R.F. Output	*2.3/2.6A	*3.2/3.7A	*4.56/5.25
*1st reading at 0% modulation, 2nd at 100% modulation			

Audio Input level, 1000 Hz, 100% modulation +10 DBM
Noise, Below 100% modulation -58 DB (1000 Watts) - 56 DB (500 Watts) -52 DB (250 Watts)
Distortion, measured at 95% modulation

	250 Watts	500 Watts	1000 Watts
50 Hz	1.3 %	0.9 %	1.5 %
100 Hz	1.1 %	0.6 %	0.8 %
400 Hz	1.0 %	0.66%	0.95%
1000 Hz	1.1 %	0.95%	1.15%
5000 Hz	1.25%	1.55%	1.5 %
7500 Hz	0.9 %	1.2 %	1.8 %

Response (Variation from 1000 Hz, 95% Modulation)

	250 Watts	500 Watts	1000 Watts
50 Hz	0	0	0
100 Hz	0	0	0
400 Hz	0	0	0
1000 Hz	0	0	0
5000 Hz	+1.0	+0.8	+0.7
7500 Hz	+1.6	+1.6	+1.4

Efficiency - 72%

Dummy Resistance - 48 Ohms

TABLE 5-3
Tuning Chart

	Components Used *						Taps Used *					
Freq. (kHz)	L-3	L-5	C-5	C-24A	C-25	C-26	L-5/C-23 Tap (a)	L-5/C-24 Tap (b)	L-5/L-7 Tap (c)	L-7/C-26 Tap (d)	L-8 Dummy (e)	L-8 Load (f)
540	1	1	1	1	4	4	8	8	3	18	17	19
600	1	1	2	1	4	4	10	10	3	22	21	23
650	1	1	2	1	1	1	10	10	2	8	14	16
700	1	1	3	1	1	1	11	12	2	10	13	15
750	1	1	3	1	1	1	12	13	2	12	13	15
800	1	1	4		1	2	8	9	2	5	11	13
850	1	1	4		1	2	12	13	2	6	10	12
900	2	1	4		1	2	13	14	2	6	10	12
950	2	1	4		1	2	15	16	2	6	10	12
1000	2	1	5		2	2	18	19	2	8	8	11
1050	2	1	5		2	2	20	21	2	7	8	11
1100	2	1	5		2	2	21	22	2	8	8	11
1150	2	1	5		2	2	22	23	2	8	8	11
1200	2	2	5		2	2	2	2	2	9	8	11
1250	2	2	6		2	2	2	3	2	9	8	11
1300	2	2	6		2	2	2	3	2	11	9	12
1350	2	2	6		2	2	3	4	2	15	11	14
1400	2	2	6		2	2	4	5	2	15	11	14
1450	2	2	6		5	3	5	6	2	2	6	9
1500	2	2	6		5	3	6	7	2	2	5	8
1550	2	2	7		5	3	8	9	1	2	5	8
1600	2	2	7		5	3	10	11	1	2	4	7

 * See NOTES on Page 5-9 for number identification

TABLE 5-3 Tuning Chart

Frequency Determining Parts

L-3

(1) P/N 187-1156 Miller 43A104CB1
(2) P/N 187-1148 Miller 43A685CB1

L-5

(1) P/N 186-1409 KTL 120-10 (120 uh)
(2) P/N 186-1410 KTL 50-15 (50 uh)

C-5 (all combinations in parallel)

(1) A+B+C
(2) A+B
(3) A+C
(4) A
(5) B+B
(6) B

A - P/N 110-0389 500PF CRL 8505-500
B - P/N 110-0395 800PF CRL 857-200N
C - P/N 110-0392-09 100PF CRL 8505-100N

C-25/C-26

(1) P/N 101-1206 (.003 uf/6kv)
(2) P/N 101-1204 (.002 uf/6kv)
(3) P/N 101-1207 (.001 uf/6kv)
(4) P/N 101-1214-20 (.0039 uf/6kv)
(5) P/N 101-1203 (.0015 uf/6kv)

C-24A

(1) P/N 115-0107 Jennings JCS 500 (500PF/7.5 kv)

NOTES

a. End turn is counted as No. 1

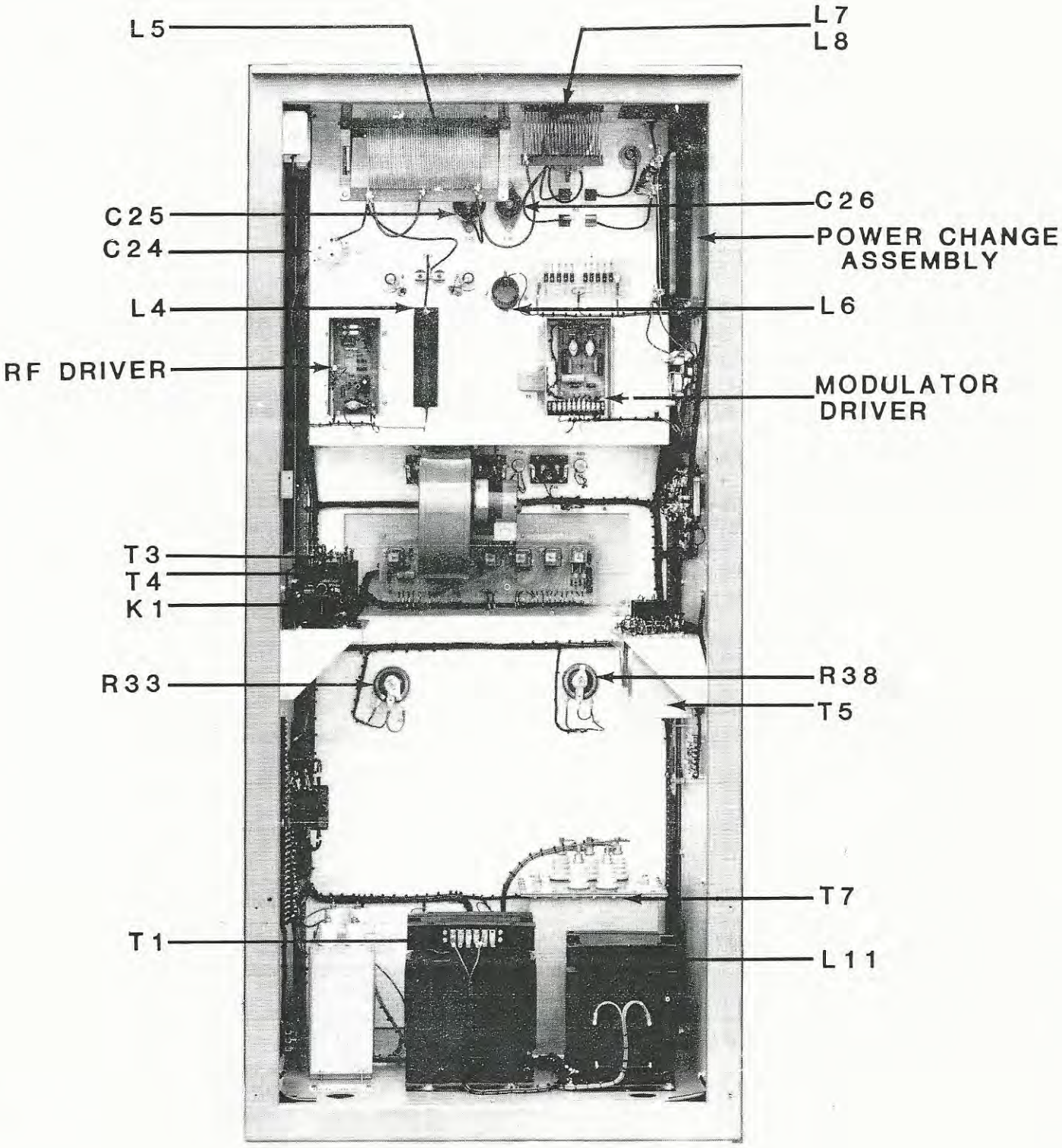
b. Position will depend on loading required - move right (decrease turns) to tighten coupling. Move left (increase turns) to loosen coupling. C-23/C-24 taps usually 1 turn apart - set C-23 tap for best efficiency.

c. End turn on right side of L-5 counted as No. 1.

d. Turn nearest front panel counted as No. 1

e. Top turn counted as No. 1

f. L-7/L-8/C-26 combination selected to give loading of 65-75 ohms Zero reactance measured at input to L-7 with 50 ohm load.



MODEL 701B REAR VIEW

FIGURE 5-3

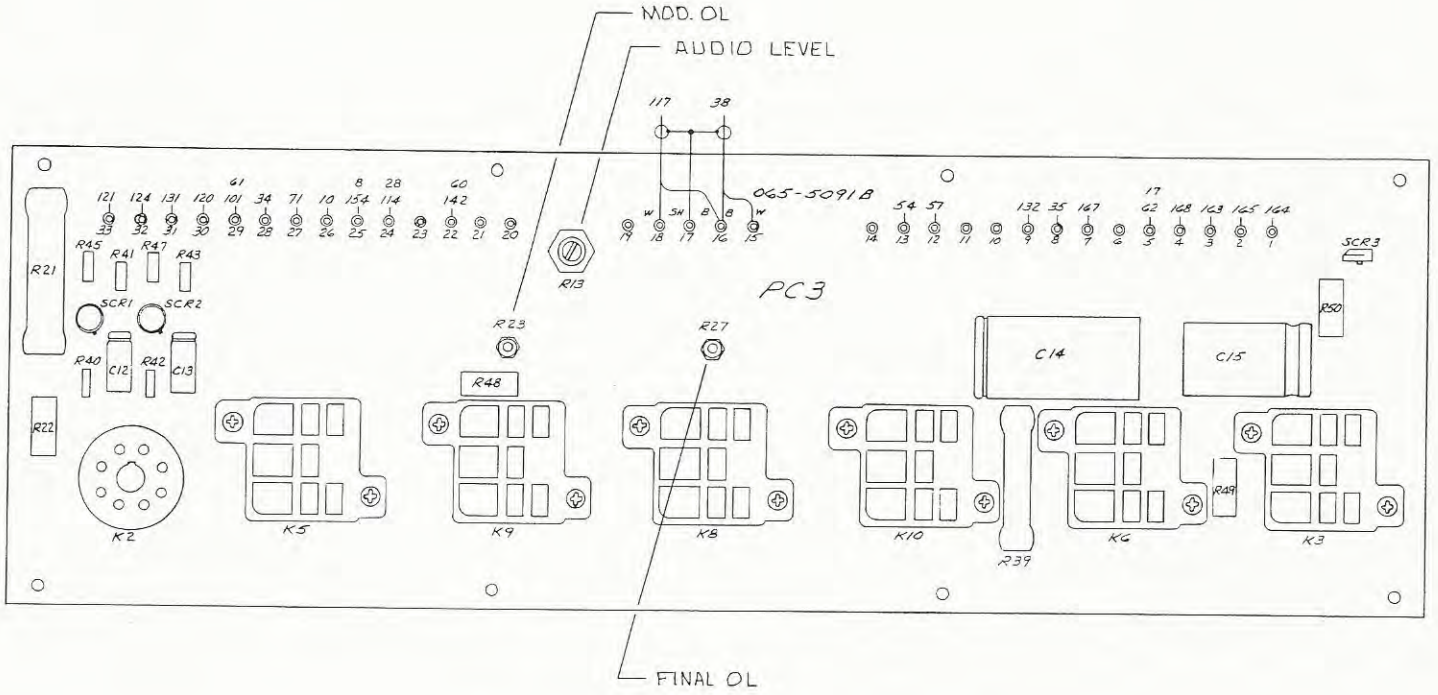


Figure 5-4 -- Control Board

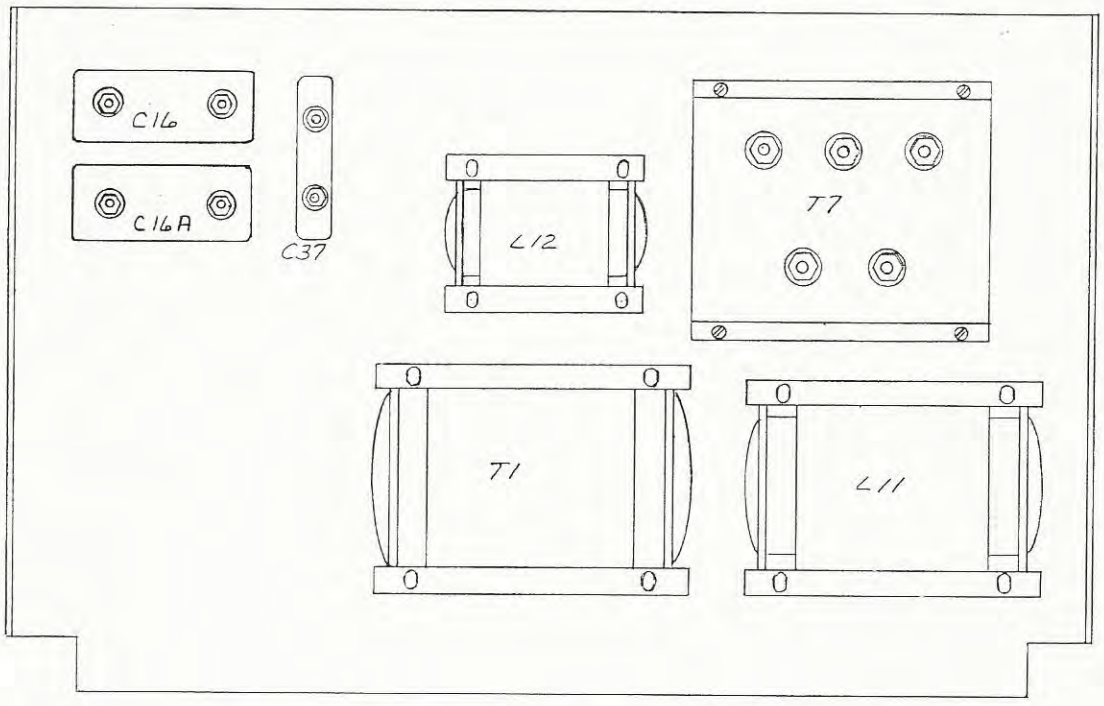


Figure 5-5 -- Baseplate Assembly

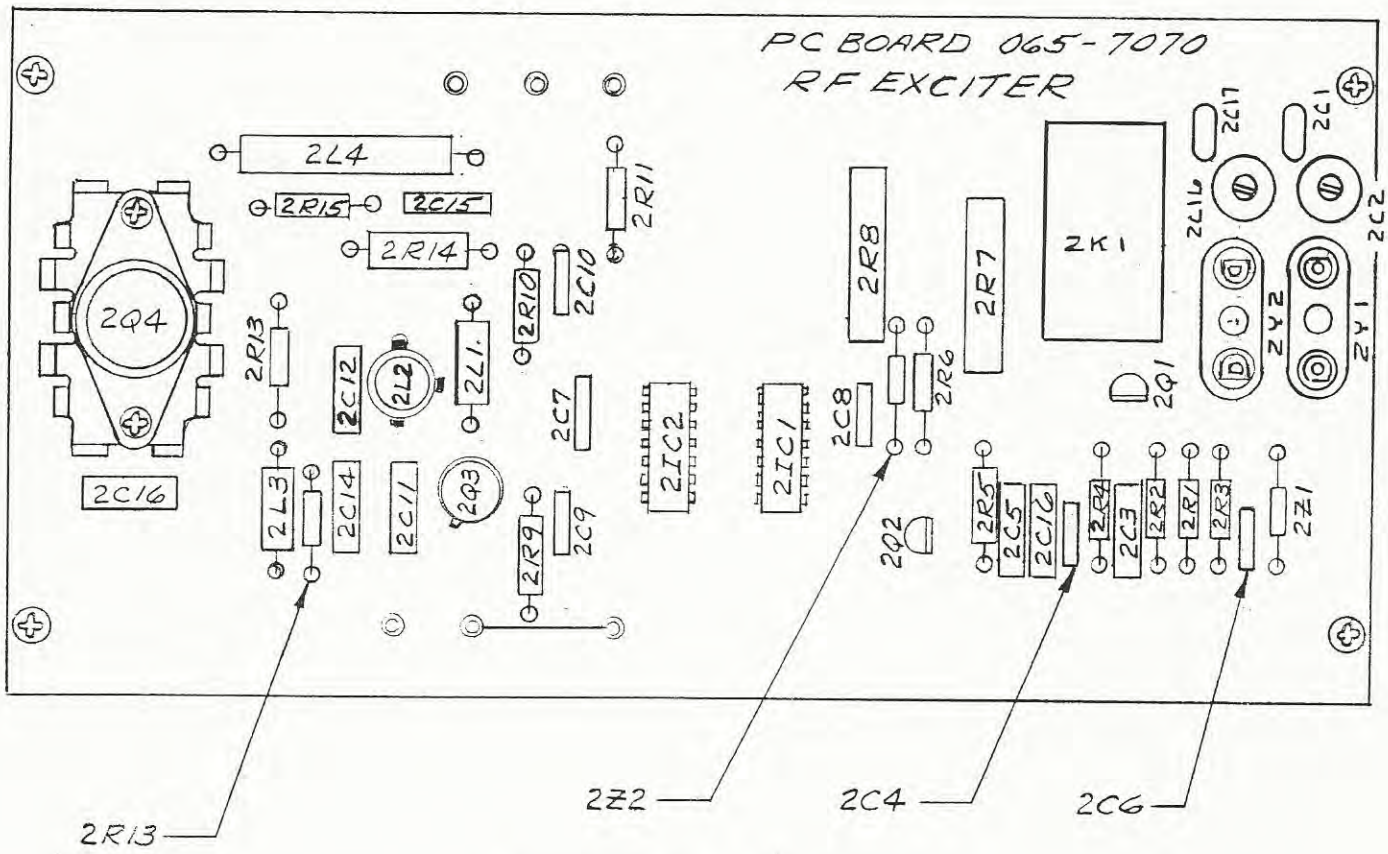


Figure 5-6 -- RF Exciter

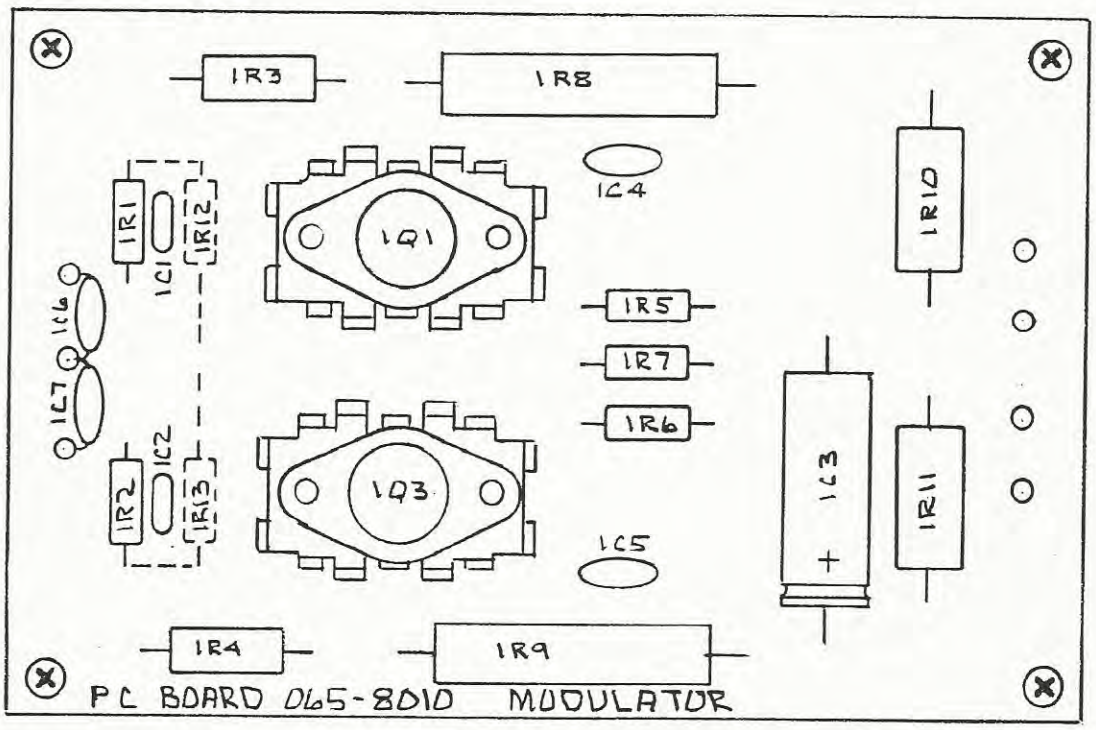


Figure 5-7 -- Audio Driver

SECTION VI
REPLACEMENT PARTS

6-1. ORDERING INFORMATION

When ordering parts for the Model 701B AM Transmitter, give the model number and the serial number of the equipment and the reference designation and Elcom-Bauer part number. To order a part not listed in paragraph 6-3. of this section, give a complete description of the part including function and location.

All parts should be ordered from:

ELCOM-BAUER
6199 Warehouse Way
Sacramento, California 95826
Telephone: (916) 381-3750
Telex: 377-331

6-2. PARTS LOCATION

The location of parts listed in Table 6-2. are shown in Figures 6-1 through 6-11.

6-3. Tables of Replacement Parts

A list of manufacturers of the component parts of the Model 701B AM Transmitter is provided by Table 6-1. Table 6-2 contains a listing of replaceable parts for the Model 701B. The manufacturer of the particular part listed in Table 6-2. is indicated by a code number, which is used to identify the manufacturer as listed in Table 6-1.

Table 6-1. List of Manufacturers (Cont.)

Code No.	Manufacturers	Address
01121	Allen Bradley Company	Milwaukee, WI
02060	Diodes, Inc.	Chatsworth, CA
02111	Spectral Electronic Corp.	City of Industry, CA
02114	Ferroxcube	Saugerties, NY
02295	General Electric Co., General Purpose Control Dept.	Bloomington, IL
02660	Amphenol Corporation	Broadview, IL
03508	General Electric Co., Semi-conductors Dir.	Syracuse, NY
03522	McClean Engineering Labs	Princeton, NY
04713	Motorola Semi-conductors Products, Inc.	Phoenix, AZ
05397	Union Carbide Corp.	Cleveland, OH
05690	Barker & Williamson	Bristol, PA
05820	Wakefield Engineering	Wakefield, MA
06666	General Devices Co.	Indianapolis, IN
06980	Varian Associates, Eimac Division	San Carlos, CA
07263	Fairchild Semiconductor	Mountain View, CA
07793	Cornell Dubilier	Newark, NJ
09353	C & K Components	Watertown, MA
10108	Hurst Manufacturing Corp.	East Princeton, IN
11502	IRC	Boone, NC
12040	National Semiconductor	Plattsburgh, NY
12697	Clarostat Mfg. Co., Inc.	Dover, NH
13327	Solitron Devices	Tappan, NY
14604	Elmwood Sensors, Inc.	Cranston, RI
15249	Multronics, Inc. (CARDWELL)	New York, NY
16327	Dayton Electric Mfg. Co.	Chicago, IL
16727	Condenser Products Corp.	Brookville, FL
18723	Radio Corporation of America	Newark, NJ
19647	Caddock Electronics, Inc.	Riverside, CA
23265	Elcom-Bauer	Sacramento, CA
23880	Stanford Applied Engineering Co.	Santa Clara, CA
24759	Lenox - Fugle Electronics Inc.	South Plainfield, MA
26806	American Zettler, Inc.	Costa Mesa, CA
27264	Moblex Products Co.	Downers Grove, IL
27834	Microwave Filter Co. Inc.	East Syracuse, NY
29505	Temple Industries	Tecate, CA
31433	Union Carbide - Components Dept. (Kemet)	Greenville, SC
32171	Modutec Inc.	Norwalk, CT
32430	Universal Relay Corp.	New York, NY
34333	Silicon General, Inc.	Westminster, CA
34553	Amperex Electronic Components Div.	Hauppauge, NY
44655	Ohmite Manufacturing Company	Skokie, IL
50155	Communications Transistor Corp.	San Carlos, CA
52090	Rowan Controller Company	Westminster, MD
52598	National Radio Co.	Melrose, MA
53021	Sangomo Electric Co.	Pickens, SC
56289	Sprague Electric Co.	N. Adams, MA
58474	Superior Electric Co.	Bristol, CT
71400	Bussman Mfg. Division of McGraw-Edison Co.	St. Louis, MO

Table 6-1. List of Manufacturers (Cont.)

Code No.	Manufacturers	Address
71436	Chicago Condenser Corporation	Chicago, IL
71590	Globe Union Inc. - Centralab Division	Milwaukee, WI
71628	Phelps Dodge Comm. Co.	Marlboro, NJ
71744	Chicago Miniature Lamp Works	Chicago, IL
71785	Cinch Mfg. Co. - Howard B. Jones Division	Chicago, IL
72136	Elmenco	Bronx, NY
72619	Dialight Corporation	Brooklyn, NY
72765	Drake Mfg. Co.	Harwood Heights, IL
72819	Carborundum Co.	Niagara Falls, NY
72982	Eric Technological Products	Erie, PA
73556	Amperex Electronic Corp.	Hicksville, NY
73949	Guardian Electric Co.	Chicago, IL
73950	Great Lakes Pressed Steel Corp.	Buffalo, NY
74193	Heinemann Electric Co.	Trenton, NJ
74970	E. F. Johnson	Waseca, MN
75382	Kulka Electric Corp.	Mt. Vernon, NY
75915	Littlefuse, Inc.	Des Plaines, IL
76487	James Millen Mfg. Co., Inc.	Malden, MA
76493	J. W. Miller	Los Angeles, CA
77342	Potter and Brumfield	Princeton, IN
78971	Underwood Electric Co.	Maywood, IL
80008	Electro Engineering Works	San Leandro, CA
80131	Electronic Industries Associates	Washington, DC
80294	Bourns, Inc.	Riverside, CA
81073	Grayhill, Inc.	La Grange, IL
81095	Triad Transformer Co.	Venice, CA
81483	International Rectifier	El Segundo, CA
82389	Switchcraft, Inc.	Chicago, IL
82768	Hart Advance	Crystal Lake, IL
82877	Rotron Mfg. Corporation	Woodstock, NY
82878	Colman Cable and Wire Co.	Toledo, OH
83003	Varo Inc.	Garland, TX
83330	H. H. Smith, Inc. Inc.	Brooklyn, NY
84171	Arco Electronic Co.	Great Neck L.I., NY
89020	Buchanan Electrical Products Corporation	Union, NJ
90201	Mallory Condenser Corp.	Indianapolis, IN
91506	Augat, Inc.	Attelboro, MA
91637	Dale Electronics, Inc.	Columbus, NB
91929	Honeywell Inc., Micro Switch Division	Freeport, IL
94222	Southco Inc.	Lester, PA
94990	Motorola, Inc.	Scottsdale, AZ
95348	Gordos Corp.	Bloomfield, NJ
95712	Bendix Corp.-Microwave Devices	Franklin, IN
96502	H. G. Dietz, Inc.	Long Island City, NY
96906	Military Standard	Melrose, MA
97965	Essex Wire Corporation	Chicago, IL
99800	Delavan, Inc.	East Aurora, NY

Table 6-2. Replaceable Parts List

Modulator Driver Assembly

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
1C-1	Capacitor, Tant. 2.2 UF/35V	104-0122			2
1C-2	Same as 1C-1				
1C-3	Capacitor, Elect. 30 UF/250V	112-1355-08	56289	TVA 1510	1
1C-4	Capacitor, Mylar 0.1 UF/400V	104-0014	56289	4PS-P10	2
1C-5	Same as 1C-4				
1C-6	Capacitor, .01MF/1KV	110-0230	56289	5GAS10	2
1C-7	Same as 1C-6				
PC-1	PC Board	065-8010	61195	065-8010	1
1Q-1	Transistor NPN Silicon	149-0043	04713	2N3739	2
1Q-2	Same as 1Q-1				
1R-1	Resistor, 620 ohms 1/2W, 5%	136-0031	11502		2
1R-2	Same as 1R-1				
1R-3	Resistor, 500K, 1W, 1%	134-3001	19647	MG-715	2
1R-4	Same as 1R-3				
1R-5	Resistor, 270 ohms, 1/2W, 5%	136-0023	11502		2
1R-6	Same as 1R-5				
1R-7	Resistor, 470 ohms 1/2W, 5%	136-0028	11502		1
1R-8	Resistor, 50K 12W/WW	131-0145	44655	1772	
1R-9	Same as 1R-8				
1R-10	Resistor, 220K, 2W, 5%	136-1604	11502		2
1R-11	Same as 1R-10				
1R-12	Resistor, 22K, 1/2W, 5%	136-0067	11502		2
1R-13	Same as 1R-12				
Mod. Bd.	Modulator Board (Complete - includes all parts above - assembled)	002-7010-13	61995	002-7010-13	1

Table 6-2. Replaceable Parts List (Cont'd.)

RF Generator Parts List

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
2C-1	Capacitor, Dipped Mica, 15PF/500V	101-0152	72136	DM15-150	2
2C-2	Capacitor, Variable 9-35 PF	114-0006	18796	538-0110	1
2C-3	Capacitor, Dipped Mica 220PF/500V	101-0086	72136	DM15-221	1
2C-4	Capacitor, Ceramic .01UF/100V	110-0015	56289	TG-S10	4
2C-5	Capacitor, Dipped Mica 330PF/500V	101-0185	72136	DM15-331	1
2C-6	Same as 2C-4				
2C-7	Same as 2C-4				
2C-8	Capacitor, ceramic 0.47UF, 50V	110-0040	56289	56023474X025-0B3	1
2C-9	Same as 2C-4				
2C-10	Capacitor, 0.33UF 100V	110-1120	18796	8131-100-651-334M	2
2C-11	Capacitor, Dipped Mica 1500PF/500V	101-0202	72136	DM19-152	2
2C-12	Capacitor, Dipped Mica freq. determining part		72136	DM15 series	1
2C-13	Capacitor, 1000 PF 500V	101-0198	72136	DM15-102	2
2C-14	Same as 2C-11				
2C-15	Same as 2C-10				
2C-16	Same as 2C-2				
2C-17	Same as 2C-1				
2C-18	Same as 2C-13				
2D-1	Diode	161-0096	03508	IN4148	1
2IC-1	Integrated Circuit	425-0029	07263	950PC	2
2IC-2	Same as 2IC-1				
2K-1	Relay, DPDT, 24VDC	180-0013	77342	R50-E2-Y1-24V	1

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
2L-1	Inductor, 33 UH	186-0027	76493	9250-333	2
2L-2	Inductor, Adj. 105-187 UH	187-0004	76493	23A154RPC	1
2L-3	Same as 2L-1				
2L-4	Inductor, 24 UH/750 MA	186-0010	76493	4626	1
2PCB	Printed Circuit Board	065-7070	61195	065-7070	1
2Q-1	Transistor NPN Silicon	149-0032	04713	2N4124	2
2Q-2	Same as 2Q-1				
2Q-3	Transistor NPN Silicon	149-0169	18723	2N3053	1
2Q-4	Transistor NPN Silicon	149-0190	18723	2N3878	1
2R-1	Resistor, 10K, 1/2W, 5%	136-0057	11502		1
2R-2	Resistor, 3.9K, 1/2W, 5%	136-0045	11502		1
2R-3	Resistor, 620 ohms, 1/2W, 5%	136-0031	11502		2
2R-4	Same as 2R-3				
2R-5	Resistor, 1K, 1/2W, 5%	136-0034	11502		2
2R-6	Resistor, 270 ohms 1/2W, 5%	136-0023	11502		1
2R-7	Resistor, 1K 5W-WW	131-0748	44655	4623	1
2R-8	Resistor, 600 ohms 5W-WW	131-0640	44655	4414	1
2R-9	Resistor, 4.7K, 1/2W, 5%	136-0047	11502		2
2R-10	Resistor, 10 ohms, 1/2W, 5%	136-0005	11502		1
2R-11	Resistor, 3.3K 1/2W, 5%	136-0043	11502		1
2R-12	Resistor, 22 ohms, 1/2W, 5%	136-0006	11502		1
2R-13	Resistor, 4.7 ohms, 1/2W, 5%	136-0003	11502		

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
2R-14	Resistor, 330 ohms 1W, 5%	136-0210	11502		1
2R-15	Same as 2R-9				1
Y-1	Crystal - 4X op. freq.	165-0005	01766	HC6/U	2
Y-1X	Crystal Socket	396-0200	71785	TS0205C01	2
2Z-1	Zener diode, 12V/1W	161-0012	04713	IN4742A	1
2Z-2	Zener diode, 1V/1W	161-0022	04713	IN4733	1
RFGEN	RF Generator (complete - includes all parts listed above - assembled)	002-7010-12	61195	002-7010-12	1
B-1	Blower, 230 VAC, 1 Ø	231-0086	16327	2C917	1
B-2	Fan	231-1000	23936	4600XP	1
C-1	Capacitor, 10PF/1KV	110-0002	56289	5GAQ10	1
C-2	Capacitor, .01MF/1KV	110-0230	56289	5GAS10	17
C-3	Capacitor, 0.1MF/600V	110-0038-02	56289	6PS-P10	4
C-4	Same as C-3				
C-5	Capacitor, Freq. Deter. Part				
C-6	Same as C-2				
C-7	Capacitor, 2600MF/50V	112-1430	56289	36D262G050 AB2A	2
C-8	Same as C-3				
C-9	Same as C-3				
C-10	Capacitor, 1000PF/5KV	110-0390	56289	858S-1000	1
C-11	Capacitor, 2MF/500V	112-0495	56289	TVA-1930	1
C-12	Capacitor, 47MF/25V	112-1388	56289	KE14725	2
C-13	Same as C-12				
C-14	Capacitor, 3300/50V	112-0018	29505	301	1
C-15	Capacitor, 50MF/250V	112-0462	56289	TVA-1512	1
C-16	Capacitor, 4MF/4KV	103-2004	16727	AOC4M4	2
C-16A	Same as C-16				

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
C-17	Capacitor, .05MF/3KV	105-0401	71436	PAS-503-3M	1
C-18	Not Used				
C-19	Same as C-7				
C-20	Same as C-2				
C-21	Same as C-2				
C-22	Same as C-2				
C-23A	Capacitor, 500PF/30KV	110-0397	56289	30DK-T5	3
C-23B	Same as C-23A				
C-24	Capacitor, Vac. 25-500PF/7.5KV	115-0424	73905	UCS-500	1
C-24A	Capacitor, Freq. Deter. Part				
C-25	Capacitor, Freq. Deter. Part				
C-26	Capacitor, Freq. Deter. Part				
C-27	Same as C-23A				
C-28	Same as C-2				
C-29	Capacitor, 12MF/1KV	103-1986	16727	AOC1M12	1
C-30	Same as C-2				
C-31	Capacitor, 10MF/600V	103-1987	06001	GE23F	1
C-32 - C-36	Same as C-2				
C-37	Capacitor, 1mfd/4KV	103-1992	16727	AOC1M4	1
C-38-44	Same as C-2				
C-45	Capacitor, 39PF/6KV	110-0305	71590	DD60390	1
CB-1	Circuit Breaker, 30A	280-0071-02	02295	TQC 2130	1
CR-1	Bridge Rectifier	161-0332	94990	MDA-802	2
CR-2	Bridge Rectifier	161-0348-10	61195	161-0348-10	1
CR-3	Bridge Rectifier	161-0010	83003	VS448	1
CR-4/ CR-4A	HV Rectifier 1.5A/10KV	161-0450	83701	KH010	4

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
CR-5/CR-5A	Same as CR-4				
DS-1	Not used				
DS-2	Lamp 24V	244-0014	72619	11-604	2
DS-3	Same as DS-2				
DS-4	Lamp, Neon	244-0034-02	71744	387	3
DS-5	Same as DS-4				
DS-6	Same as DS-4				
F-1	Fuse, 2.0A, Slo-Blo	261-0080	71400	MDA-2	2
F-2	Fuse, 3.0A, Slo-Blo	261-0083	71400	MDX-6	1
F-3	Same as F-1				
F-4	Fuse, 5.0A, Slo-Blo	261-0092	71400	MDL-5	2
F-5	Same as F-4				
K-1	Contactor, 3PST, 230-VAC/50A	180-0412-02	52090	EBC-430BA	2
K-2	Relay, SPDT, 5K	180-0215-06	77342	KCP5/5K	1
K-3	Relay, SPDT, 12 VDC	180-0391-08	77342	KUP-5D15	1
K-4	Relay, DPDT, 230 VAC	180-0407-03	96261	RO-7 SPST	1
K-5	Relay, 3PDT, 240 VAC	180-0391-10	77342	KUP14D15-24	1
K-6	Relay, 3 PDT, 240 VAC	180-0391-02	77342	KUP14A15-240	2
K-7	Same as K-1				
K-8	Relay, 3 PDT, 12 VDC	180-0391-05	77342	KUP14D15-12	2
K-9	Same as K-8				
K-10	Same as K-6				
K-11	Relay, SPDT, 24 VDC	180-9507	77342	KA11DG24VDC	1
K-12	Relay, SPDT, 24 VDC	180-9506	77342	KA5DY-24VDC	1
L-1	RFC, 2.5 MH, 160 MA	186-0348-02	76493	6302	2
L-2	Not used				
L-3	See freq. deter. components				
L-4	RFC, 1.5MH, 700 MA	021-0042	61195	021-0042	1

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
L-5	See freq. deter. components				
L-6	Monitor Pickup Coil	022-4158	61195	022-4158	1
L-7	Inductor, 22uh, 10A	186-1407	88356	MJ20-7	2
L-8	Same as L-7				
L-9	Reactor, 15 H/85 MA	317-0040		2426	2
L-10	Same as L-9				
L-11	Reactor, 65 H/500 MA	317-0006		1218	
L-12	Reactor, 10H/800 MA	317-0023		1712	1
M-1	Meter, 0-1 ADC	368-9168	32171	4SDAA-001	2
M-2	Meter, 0-1 MADC/5KV Scale	368-9106-02	32171	840-680	1
M-3	Same as M-1				
M-4	Meter, 0-1 MADC/0-6RFA Scale	368-9111-02	32171	840-681	1
M-5	Meter, 0-25 MADC	368-9161	32171	2S-DMA-050	1
M-6	Meter, 0-15 VAC	368-9143-02	32171	2S-AVV-015	1
M-7	Meter, 0-100 MADC	368-9113-02	321717	2S-DMA-100	1
R-1	Resistor, adjustable, 25 ohms, 25W	137-0736	44655	0365	1
R-2	Resistor, 10 ohms, 2W	136-1500	11502		3
R-3	Same as R-2				
R-4	Resistor, 3 ohms, 10W	131-0847	44655	4742	1
R-5	Resistor, 150 ohms, 20W	131-0157	44655	1809	1
R-6	Resistor, 50K, 10W	131-0839	44655	4873	1
R-7	Resistor, 60K, 25W	131-0243	44655	0225	2
R-8	Resistor, 1K, 5W	131-0748	44655	4623	1
R-9	Resistor, 5K, 5W	131-0751	44655	4642	1
R-10	Potentiometer, 10K	131-0058	44655	CLU21031	2
R-11	Resistor, 6K, 5W	131-0752	44655	4645	1
R-12	Same as R-2				

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
R-13	Potentiometer, 500 ohms, 2W	130-0050	44655	CLU-5011	1
R-14	Potentiometer, 100K, 2W	130-0099	44655	CLU-1041	1
R-15	Resistor, 5 MEG, 5W, 1%	136-1616	91637	(5) 1 MEG/2W	10
R-16	Resistor, 3.3K, 1/2W	136-0043	11502		2
R-17	Same as R-16				
R-18	Same as R-15				
R-19	Resistor, 100 ohms, 2W	136-1524	11502		2
R-20	Same as R-19				
R-21	Resistor, 20K, 20W	131-0191	44655	1844	1
R-22	Resistor, 15K, 2W	136-1576	11502		1
R-23	Potentiometer, 15 ohms, 12.5W	137-0895-09	44655	0107	2
R-24	Resistor, adjustable 2500 ohms, 225W	137-0791-05	44655	1363	3
R-25	Same as R-24				
R-26	Same as R-24				
R-27	Same as R-23				
R-28	Resistor, adjustable 300 ohms, 25W	137-0750	44655	0371B	1
R-29	Resistor, 50 ohms, 300W	131-1371	02822	ASC-6-1225	4
R-30	Same as R-29				
R-31	Same as R-29				
R-32	Same as R-29				
R-33	Rheostat, 300 ohms, 100W	137-0244	44655	0453	1
R-34	Resistor, 40K, 225W	131-0396	44655	0921	1
R-35	Resistor, 8K, 10W	131-0126	44655	1753	1
R-36	Resistor, 4 MEG, 5W, 1%	134-2901	19647	MG-750	1

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
R-37	Resistor, 5.1K, 2W	136-1566	11502		1
R-38	Rheostat, 5 ohms, 100W	137-0248	44655	0444	1
R-39	Resistor, 1K, 12W	131-0109	44655	1736	1
R-40	Resistor, 560 ohms, 1/2W	136-0030	11502		3
R-41	Resistor, 100 ohms, 1/2W	136-0016	11502		4
R-42	Same as R-40				
R-43	Same as R-41				
R-44	Resistor, selected at checkout		11502		
R-45	Same as R-41				
R-46	Resistor, 470K, 2W	136-1612	11502		
R-47	Same as R-41				
R-48	Resistor, 1.5K, 2W	136-1552	11502		1
R-49	Resistor, 100 ohms, 2W	136-1524	11502		1
R-50	Resistor, 56K, 2W	136-1589	11502		1
R-51	Resistor, 6K ohms, 5W	131-0752	44655		3
R-52	Same as R-51				
R-53	Same as R-51				
R-54	Resistor, 100 ohms, 5W	131-0714	44655		1
R-55	Resistor, 5 MEG, 5W, 1%	134-2900	19647	MG-750	1
R-56	Resistor, 25 ohms, 25W	131-0215	44655	0200C	1
R-57	Resistor, 10 ohms, 25W	131-0213	44655	0200	1
R-58	Same as R-7				
R-59	Resistor, 5 ohms, 12W	131-0081	44655	1708	1
R-60	Not used				
R-61	Not used				
R-62	Resistor, 50 ohms, 50W	137-0725-14	44655	0563	1
R-63	Same as R-10				

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
S-1	Switch, SPST	296-0421-02	82389	13001L	2
S-2	Switch, DPDT	296-0421-09	82389	13006L	1
S-3	Switch, DPST MOM	296-0421-07	82389	13006	1
S-4	Switch, DPDT MOM	296-0421-04	82389	13036	1
S-5	Air Switch	305-0001	03522	S1278	1
S-6	Same as S-1				
S-7	Not Used				
S-8	Switch, Dummy Load	021-0189	61195	021-0189	1
S-9	Switch, Inter Lock	302-0020	91929	V3L2103D8	1
S-10	Switch, Inter Lock	296-0311	91929	2AC6	2
S-11	Same as S-10				
S-12	Switch, H.V. Inter Lock	014-7052-16	61195	014-7052-16	1
S-13	Switch	296-0015	15608	7101	1
SCR-1	Silicon Controlled Rect.	149-0025	18723	40529	2
SCR-2	Same as SCR-1				
SCR-3	Silicon Controlled Rect.	161-0009	03508	C106F2	1
T-1	Plate Transformer	326-9012-03		1283B	1
T-2	CV Transformer (60 Hz only)	326-9014-02	58474	23-26-150	Opt.
T-3	Filament Transformer 3 Secondary Taps Used W/4-500 Tubes Only	326-9009		1754	2
	Filament Transformer 4 Secondary Taps Used W/4-500 or 4-400 Tubes	326-9009-02		3924	
	* Filament Transformer 5 Secondary Taps Used W/4-500 or 4-400 Tubes (*Standard - Others Optional)	326-9009-03		4203	

Table 6-2. Replaceable Parts List (Cont'd.)

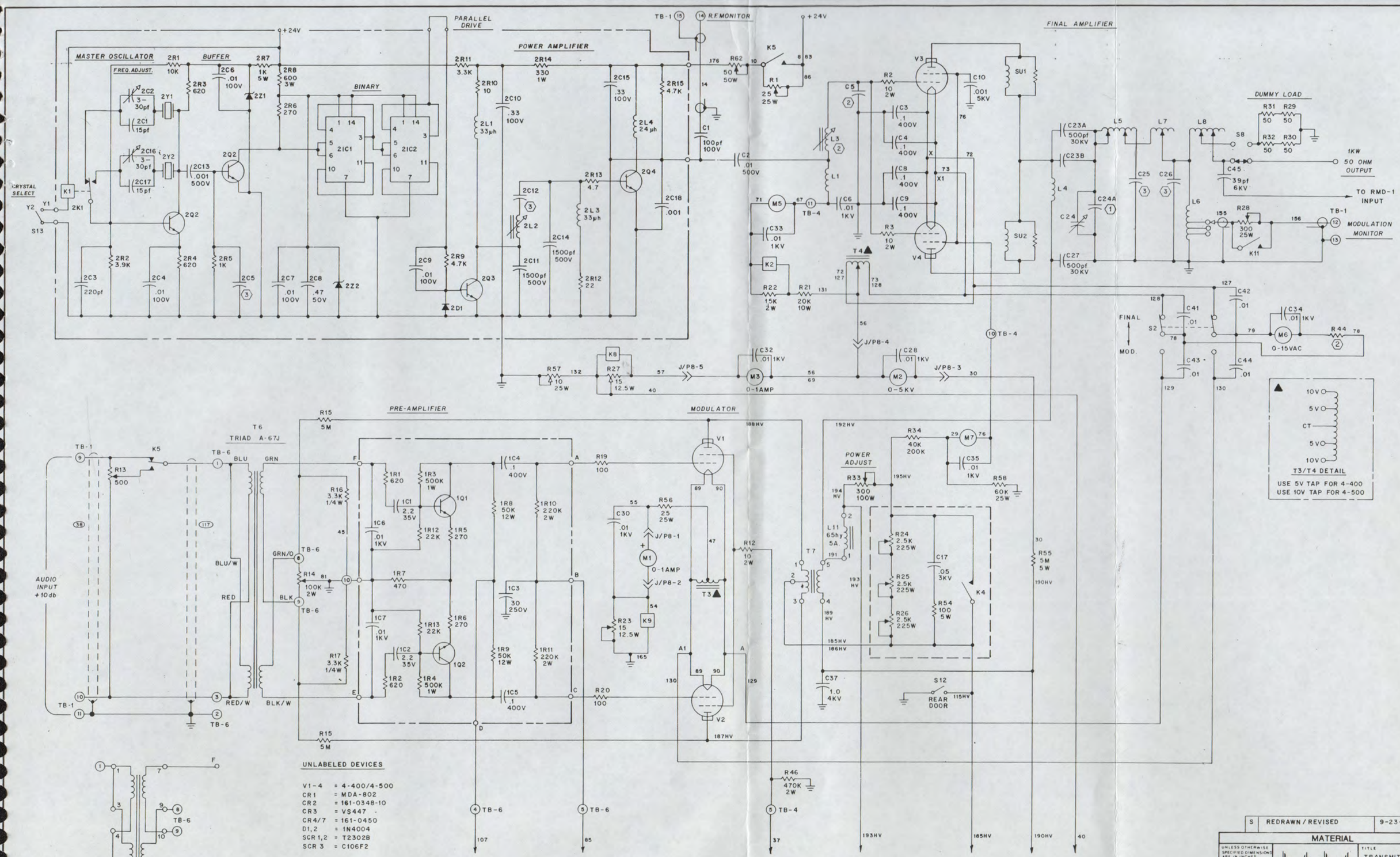
Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
T-4	Same as T-3				
T-5	LV/BIAS Transformer	326-9027		1652	1
T-6	Audio Input Transformer	318-0116	80223	A-20	1
T-7	Modulation Transformer	326-9050		1325	1
TB-1	Terminal Board, 15 pos.	477-0900	81349	38TB15	3
TB-2	Terminal Board, 3 pos.	477-0178	89020	222	1
TB-3	Same as TB-1				
TB-4	Same as TB-1				
TB-5	Terminal Board, 10 pos.	477-0759-02	71785	10-140	2
TB-6	Same as TB-5				
V-1	Tube, 4-500A	353-0115	06980	4-500A	4
V-2	Same as V-1				
V-3	Same as V-1				
XC-24	Flange, VAC CAP	115-0225	73905	FM2	1
XDS-1	Not Used				
XDS-2	Lamp Holder	244-0003	72619	4428	2
XDS-3	Same as XDS-2				
LDS-4	Lens, White w/"Filament"	247-1416-02	72619	303-6375	1
LDS-5	Lens, Green w/"Interlock"	247-1416-03	72619	303-6372	1
LDS-6	Lens, Red W/"Plate"	247-1416-04	72619	303-6371	1
XK-2	Socket, 8 Pin	396-0064-02	02660	78S8W-0125	1
XK-3	Socket, 11 Pin	396-0057-02	77342	9KU2	6
XK-5	Same as XK-3				
XK-6	Same as XK-3				
XK-8	Same as XK-3				
XK-9	Same as XK-3				
XK-10	Same as XK-3				

Table 6-2. Replaceable Parts List (Cont'd.)

Desig.	Description	P/N	Mfg.	Mfg. P/N	Total
XF-1	Fuse Holder, Indicator Type	261-0039	71400	HKL-X	4
XF-2	Fuse Holder, Indicator Type	261-0040	71400	HKX	1
XF-3	Same as XF-1				
XF-4	Same as XF-2				
XV-1	Socket, 4-500A	396-0209	74970	122-275-100	4
XV-2	Same as XV-1				
XV-3	Same as XV-1				
XV-4	Same as XV-1				

MISCELLANEOUS

PCB-1	Printed Circuit Board - Relay Control Panel	065-5091	61195	065-5091	1
PCB-2	Printed Circuit Board - Low Voltage Supply	065-1110	61195	065-1110	1
PCB-3	Printed Circuit Board - Metering Board	065-4030	61195	065-4030	1



S	REDRAWN / REVISED	9-23-86	JC Z.

MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES: DECIMALS ANGULAR .XX ±.030, .XXX ±.010. DO NOT SCALE DRAWING. FINISH

ELCOM • BAUER
BROADCAST PRODUCTS
6190 WAREHOUSE WAY
SACRAMENTO CA. 95826 U.S.A.

DRAWN JC Z. DATE 4-15-86 SCALE

CHK'D DATE

APP'D DATE

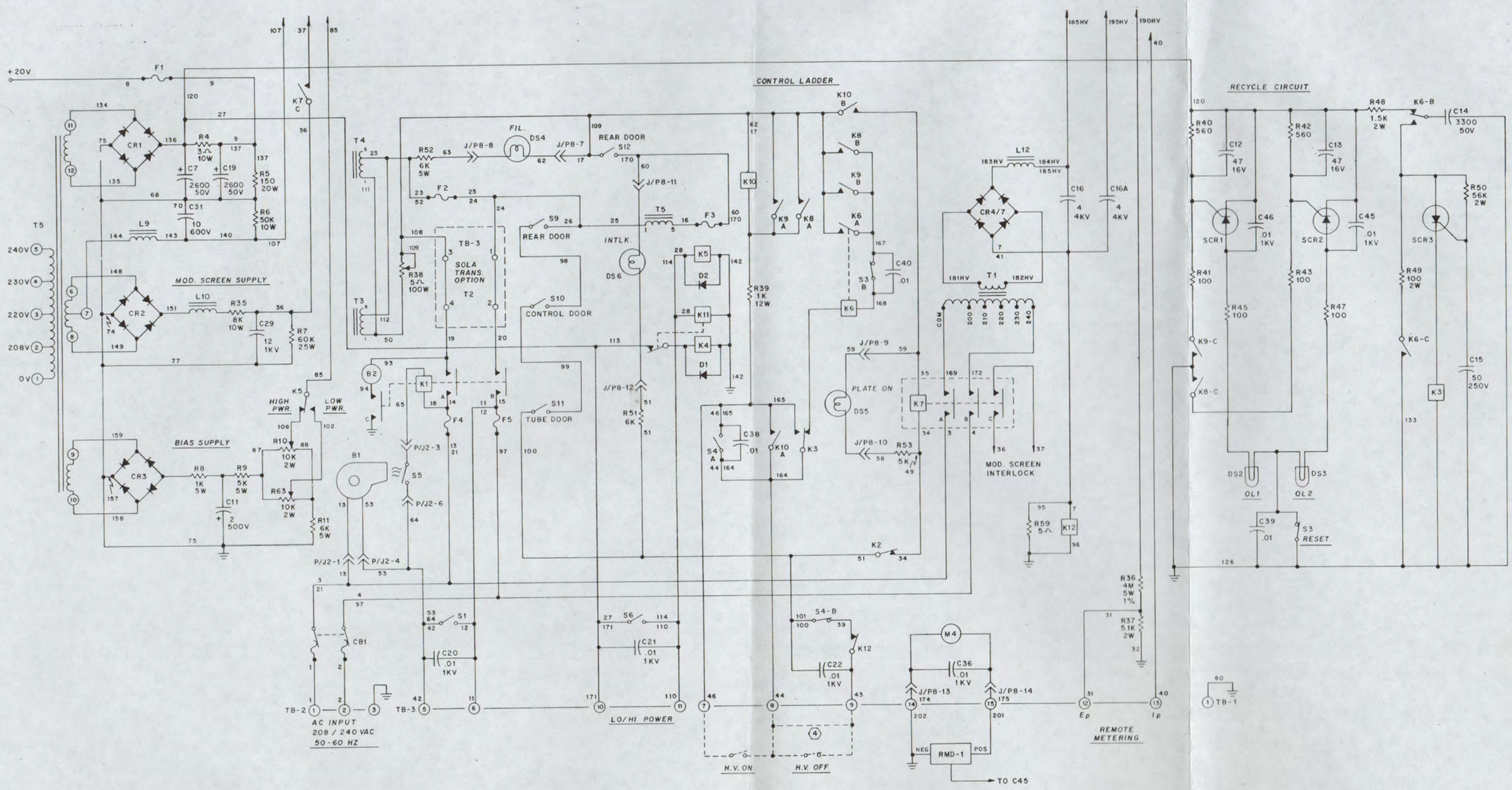
QTY REQ. SUB ASSY

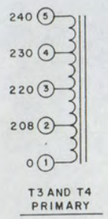
QTY REQ. FINAL ASSY

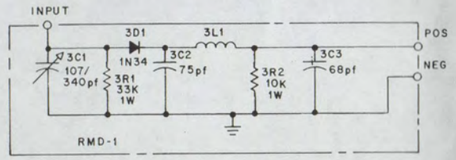
TITLE
TRANSMITTER
SCHEMATIC
701B
FIGURE 6-1
PAGE 6-17

SHT 1 OF 2 SHTS

DWG NO. 071-0186 S







UNLESS OTHERWISE SPECIFIED –
ALL RESISTORS ARE 1/2 WATT.
ALL CAPACITORS ARE IN μfd.

MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS ANGULAR
.XX ± .030
.XXX ± .010
DO NOT SCALE DRAWING

FINISH ~

ELCOM • BAUER
BROADCAST PRODUCTS
6198 WAREHOUSE WAY
SACRAMENTO, CA. 95826 U.S.A.

DWN FC3 DATE 8-13-84
CHK'D DATE
APP'D DATE
SCALE ~

QTY REQ | SUB ASSY | QTY REQ | FINAL ASSY

TITLE
TRANSMITTER SCHEMATIC
701B
FIGURE 6-2
PAGE 6-18

SHT 2 OF 2 SHTS
DWG NO. 071-0186 S