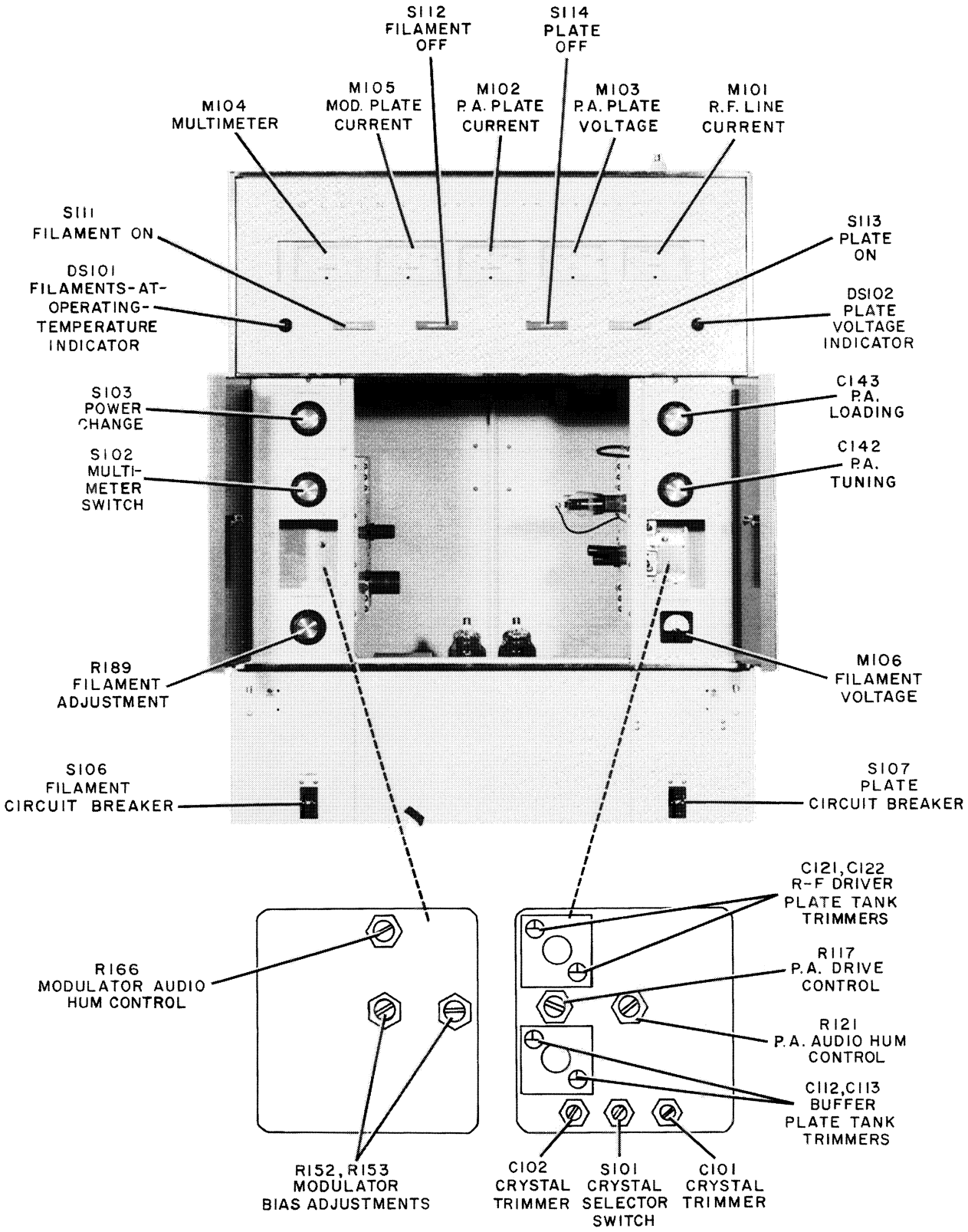

Figure 3-1. Operating Control Locations

SECTION III
OPERATION

3.1 CONTROL FUNCTIONS.

The following paragraphs describe the functions of all adjustable controls in AM Broadcast Transmitter 20V-3. Operating personnel should become thoroughly familiar with the location and function of each control before attempting to operate the transmitter. Refer to figures 3-1 and 3-2 for control location.

The following controls are located directly under the meters on the front panel. The FILAMENT ON switch, S111, energizes all transmitter tube filaments and the bias power supply. The FILAMENT OFF switch, S112, de-energizes all transmitter circuits. The PLATE OFF switch, S114, de-energizes the high- and low-voltage power supplies. The PLATE ON switch, S113, energizes the high- and low-voltage power supplies, supplying plate voltage to all transmitter tubes. The green indicator lamp at the left of the four on-off switches, DS101, lights whenever the tube filaments are at their proper operating temperature. This light also indicates that the plate-voltage interlock has been closed and that plate voltage may be applied to the tubes. The red indicator lamp at the right of the four on-off switches, DS102, lights whenever plate voltages are applied.

The following controls are located under the left access door on the front panel. The POWER CHANGE switch, S103, switches the transmitter output power from 250 or 500 watts when the switch is set at LOW, to 1000 watts when it is set at HIGH. This switch may be operated while the transmitter is on the air. The MULTIMETER SWITCH, S102, inserts the MULTIMETER, M104, into any one of seven transmitter circuits. Table 5-1 lists the MULTIMETER SWITCH positions and typical indications for each of the seven circuits. The full-scale MULTIMETER indication is given at each switch position.

The following screwdriver adjustments are located behind the panel plate between the MULTIMETER SWITCH and the FILAMENT ADJUSTMENT control. The modulator audio hum control, R166, is a variable resistor used to shift the ground point of the modulator filament circuit to a point that will minimize audio hum caused by the a-c filament voltage. The modulator bias adjustments, R152 and R153, vary the amount of negative bias applied to the grids of the modulator tubes. Another modulator bias adjustment, R182, located on the right top of the power supply chassis as viewed from the rear, performs the same function as the other two bias adjustments, and may be used as a coarse bias adjustment.

The following control is located at the bottom of the front panel. The FILAMENT ADJUSTMENT control, R189, adjusts the current in the primary of filament transformers T106 and T108, and bias transformer T105, thus varying the filament voltage of the transmitter tubes. The FILAMENT VOLTAGE meter under the right front panel indicates the filament voltage of the power amplifier tubes.

The following controls are located under the right access door on the front panel. The P.A. LOADING control varies the transmitter output power by varying capacitor C143 in the r-f output network. The P.A. TUNING control tunes the power amplifier plate circuit by varying capacitor C142 in the r-f output network. Varying the P.A. LOADING control even slightly detunes the output network, causing excessive power amplifier plate current to flow. Therefore, the P.A. TUNING control must be readjusted at the same time the P.A. LOADING control setting is changed. This is done to retune the output network and keep the plate current at an allowable value.

The following screwdriver adjustments are located behind the panel plate between the P.A. TUNING control and the FILAMENT VOLTAGE meter. The r-f driver plate tank trimmers, C121 and C122, tune the plate circuit of the 807 r-f driver stage. These trimmers should be adjusted for maximum power amplifier grid current. The two trimmers are connected in parallel, so one should be adjusted to give a good tuning range for the other. The PA drive control, R117, adjusts the r-f driver screen voltage to vary the power amplifier grid current. The PA audio hum control, R121, performs the same function for the power amplifier that the modulator audio hum control does for the modulator. The buffer plate tank trimmers, C112 and C113, tune the plate circuit of the 6SJ7 buffer amplifier stage. These trimmers should be adjusted for maximum r-f driver grid current. Adjust in same manner as r-f driver plate tank trimmers. The crystal selector switch, S101, selects either of the two crystals that are mounted on the r-f chassis. When the switch is turned counterclockwise, the upper crystal is selected. The crystal trimmers, C101 and C102, are used to vary the crystal oscillator frequency slightly. The left trimmer is for the upper crystal.

The following adjustments are located under the lower front panel. The FILAMENT and PLATE circuit breakers, S106 and S107, are connected directly to the 230-volt a-c power input to limit current in the filament and plate circuits respectively.

Refer to figure 3-2. The operating current values of the modulator and power amplifier overload relays, K105 and K106, may be adjusted by turning the knurled

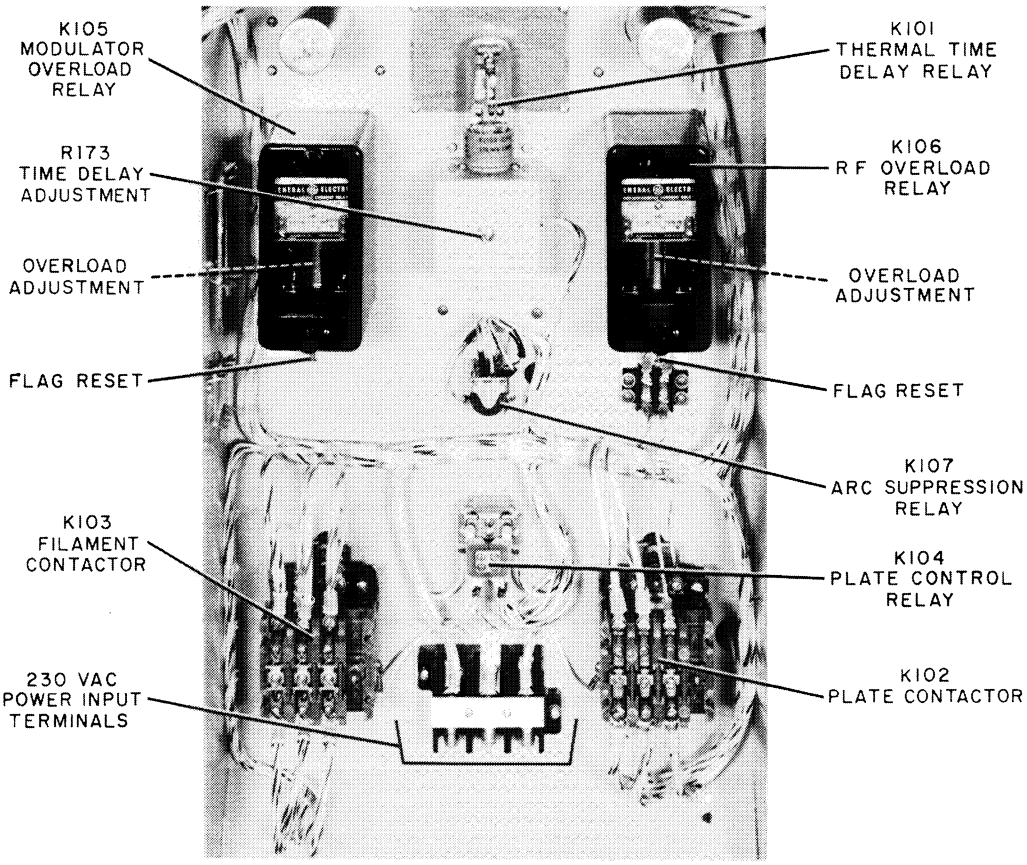

Figure 3-2. Relay Compartment

vertical shafts inside the relay cases. Turning the shafts clockwise increases the value of current needed to operate the relays. Both relays should be set so that they operate when the modulator or power amplifier plate current is 600 milliamperes.

The time delay of time delay relay K101 may be adjusted by varying R173, which is mounted on a small chassis under the relay. Turning this screwdriver adjustment clockwise increases the time delay. The delay should be set to 30 seconds from a cold start.

3.2 STARTING THE TRANSMITTER IN A NEW INSTALLATION.

a. Before starting the transmitter for the first time, inspect it carefully for any mechanical damage.

b. Carefully inspect all door interlocks. Press the contact block until the spring is completely compressed. Release the block. If it does not spring back to its original position, adjust it until it operates properly.

c. Check to be sure that all tubes and crystals are in their proper sockets. Select the proper crystal, using the crystal selector switch, S101.

d. Remove the plate caps from V111, V112, V113, and V114, the high- and low-voltage power supply tubes. Be sure that the caps hang free and are not near any metal parts.

e. Close both rear cabinet doors. Check to see that the FILAMENT and PLATE circuit breakers under the lower front panel are set to ON.

f. Press the FILAMENT ON switch on the front panel. The filaments of all tubes should light and the blowers and ventilating fan should come on.

g. Adjust the FILAMENT ADJUSTMENT control for a 5-volt indication on the FILAMENT VOLTAGE meter.

h. When the green indicator lamp at the top left of the front panel lights, press the PLATE ON switch. The red indicator lamp at the top right of the front panel should light when this switch is pressed.

i. Press the FILAMENT OFF switch. The transmitter should shut down completely.

j. Remove the modulator tubes, V108 and V109, from the transmitter.

k. Replace the plate caps on V113 and V114, the 866A low-voltage rectifiers. Do not replace the caps on V111 and V112, the high-voltage rectifiers, until later.

WARNING

Voltages are present in this transmitter that are dangerous to life. Observe safety precautions when making any transmitter adjustments. Do not reach inside the transmitter cabinet whenever high voltage is applied. Do not depend on door interlocks. Always shut down the transmitter before doing any work inside the transmitter cabinet.

l. Press the FILAMENT ON switch. Allow the transmitter to run for 20 minutes with only the filaments lighted. This operation is necessary to properly age the mercury-vapor rectifier tubes. Aging is required for new tubes and for used tubes that have been inverted or agitated.

m. Press the PLATE ON switch.

n. Set the MULTIMETER SWITCH to its first four positions and check the MULTIMETER indications with those given in table 5-1 in the maintenance section. Slight deviations from the given limits are permissible.

o. Set the MULTIMETER SWITCH to 807 GRID 25MA. Adjust the buffer plate tank trimmers for a maximum indication on the MULTIMETER.

p. Refer to table 5-1, and recheck the MULTIMETER indication with the MULTIMETER SWITCH set to 807 CATH 250MA.

q. Set the MULTIMETER SWITCH to PA GRID 25MA. Adjust the r-f driver plate tank trimmers for a maximum indication on the MULTIMETER. Adjust these trimmers in the same way as those in step o.

r. Press the FILAMENT OFF switch.

s. Replace the modulator tubes, V108 and V109, and the plate caps on V111 and V112, the 575A high-voltage rectifiers.

t. Set the two front panel modulator bias adjustments, R152 and R153, fully counterclockwise. Set the modulator bias adjustment on the power supply chassis, R182, fully clockwise. These settings cause maximum bias and minimum modulator plate current.

u. Place the clip on modulation monitoring coil, L110, located in the r-f output network compartment, at a position near the ground (left) end of the coil.

v. Set the POWER CHANGE switch to LOW.

w. Set the P.A. LOADING control to 100. This setting is for minimum loading.

x. Close the rear cabinet doors. Press the FILAMENT ON switch.

y. When the green indicator lamp lights, press the PLATE ON switch. As soon as this switch is pressed, adjust the P.A. TUNING control for a minimum indication on the P.A. PLATE CURRENT meter.

z. Set the MULTIMETER SWITCH to PA GRID 25MA. Retune the r-f driver plate tank trimmers for a maximum MULTIMETER indication.

aa. Adjust the modulator bias adjustment, R182 on the power supply chassis, until modulator plate current just starts to flow, as indicated by the MOD. PLATE CURRENT meter. Shut down the transmitter to make this adjustment. Recheck meter indication after power is reapplied. Readjust if necessary. Next, adjust one of the front panel modulator bias adjustments, R152 or R153, until the MOD. PLATE CURRENT meter indicates 60 milliamperes. Then adjust the other front panel modulator bias adjustment until the MOD. PLATE CURRENT meter indicates 120 milliamperes.

ab. Set the POWER CHANGE switch to HIGH. Readjust the P.A. TUNING control for a minimum indication on the P.A. PLATE CURRENT meter.

ac. Set the MULTIMETER SWITCH to PA GRID 25MA and readjust the r-f driver plate tank trimmers for a maximum MULTIMETER indication.

ad. Adjust the transmitter for proper output power as follows. Turn the P.A. LOADING control slowly counterclockwise to increase the output power. At the same time, keep readjusting the P.A. TUNING control for a minimum indication on the P.A. PLATE CURRENT meter. Continue this procedure until the R.F. LINE CURRENT meter indication is slightly below the desired value. Then adjust the P.A. TUNING control slightly to the side of resonance that causes an increase in the R.F. LINE CURRENT meter indication. This will also cause an increase in PA plate current, but the power increase in the r-f line will be a large proportion of the power increase in the power amplifier circuit, giving a higher PA plate efficiency. Adjust for maximum efficiency.

ae. Adjust the tap on L110 to obtain the desired output for modulation monitoring equipment.

af. Connect a distortion analyzer and noise meter, such as Hewlett-Packard 330D, to the modulation monitor output (J100).

ag. Apply a 1000-cps audio input to the transmitter. Make the input amplitude sufficient to modulate the r-f carrier 95 percent.

ah. Adjust the two front panel modulator bias adjustments, R152 and R153, for minimum distortion as indicated by the distortion analyzer. The other modulator bias adjustment, R182 on the power supply chassis, may be adjusted, if necessary, to bring the front panel adjustments into the proper adjustment range. The MOD. PLATE CURRENT meter indication should remain at about 120 milliamperes when the transmitter is not modulated.

ai. Increase the level of the 1000-cps modulating signal until the transmitter is modulated 100 percent. Calibrate the noise meter, then remove the modulation. Adjust the PA drive control, R117, and the modulator and power amplifier audio hum controls, R166 and R121, for minimum noise as indicated by the noise meter.

The transmitter is now ready for on-the-air operation.

3.3 STARTING THE TRANSMITTER IN NORMAL OPERATION.

a. Close the rear cabinet doors.

b. Press the FILAMENT ON switch.

c. Set the POWER CHANGE switch to the correct position for desired output power.

d. When the green indicator lamp lights, press the PLATE ON switch.

e. If the output power is to be adjusted, adjust the P.A. LOADING and P.A. TUNING controls as instructed in paragraph 3.2.ad.

f. Check the meter and monitor indications. Typical meter indications are given in table 5-1 in the maintenance section.

g. An alternative method of starting the transmitter is to press only the PLATE ON switch. The plate voltage will be automatically applied when the tube filaments reach proper operating temperature.

SECTION IV
PRINCIPLES OF OPERATION

4.1 GENERAL

Refer to figure 4-1, a block diagram of AM Broadcast Transmitter 20V-3. The r-f carrier frequency is generated by a 6AU6 crystal oscillator, V101. The crystal used in this oscillator circuit is an extremely stable, low-temperature coefficient crystal that does not require a crystal oven. When the transmitter is operating in the AM broadcast band, the oscillator load is resistive. If the operating frequency is in the high-frequency band, the oscillator load resistor is replaced with a tank circuit that doubles the crystal frequency to the operating frequency. Two crystals may be mounted in the transmitter so that one will always be available as a standby. Either crystal may be selected by a switch on the front panel.

The oscillator output drives a 6SJ7 buffer amplifier, V102, which is coupled to an 807 r-f driver, V103. The buffer and driverplate circuits are contained in shielded, plug-in units located behind the right front access door. The driver output is coupled to the control grids of power amplifier tubes V104 and V105, two 4-400A tetrodes in parallel. An audio monitoring signal is fed from a resistor in the power amplifier cathode circuit. A frequency monitor connection is brought out from the power amplifier grid circuit.

The power amplifiers are plate modulated by two 4-400A tetrodes, V108 and V109, that are connected in a push-pull, class AB_1 modulator circuit. The modulator is driven by a 6SJ7 push-pull audio amplifier, V106 and V107. The transmitter audio input is fed through a terminating pad and audio input transformer, T103, to this amplifier. About 12 db of feedback is provided from the modulator plates to the audio amplifier input.

The r-f output network consists of a pi-section followed by an L-section. It is designed to feed into an unbalanced output with a resistive output impedance of from 50 to 72 ohms. This network greatly attenuates harmonics while passing the fundamental frequency with minimum loss. Coil L110, connected from the output end of the L-section to ground, acts as a static drain and is a voltage source that feeds the modulation monitor.

Output power change is accomplished as follows: Power-change switch S103 shunts resistors R167 through R171 in the power amplifier plate circuit during high-power (1000-watt) operation. During 500-watt operation, resistors R168 and R169 are shunted by a jumper strap. For 250-watt operation, this jumper is removed. Resistor R167 is tapped to allow coarse output-power adjustment around 500 or 250 watts. Fine power adjustments are made with the P.A. LOADING and P.A. TUNING controls.

There are three separate power supplies in the 20V-3 for high voltage, low voltage, and bias. The high-voltage supply uses two 575A half-wave, mercury-vapor rectifiers in a full-wave circuit. It supplies d-c voltage to the modulator and power amplifier plates and the power amplifier screens. The low-voltage supply uses two 866A half-wave, mercury-vapor rectifiers in a full-wave circuit. This supply furnishes d-c voltage for plates and screens of the low-power stages and screens of the modulator tubes. The bias supply uses a 5U4G high-vacuum rectifier in a full-wave circuit. It supplies bias voltage to the r-f driver, modulator, and power amplifier.

Overload protection is provided by magnetically operated circuit breakers in the filament and plate circuits, fuses in the primaries of the filament, low-voltage, and bias transformers, and by individual overload relays in the power amplifier and modulator cathode circuits.

4.2 CONTROL CIRCUITS.

Refer to figure 4-2. When the FILAMENT circuit breaker, S106, is closed, pressing the FILAMENT ON switch, S111, will energize the filament contactor, K103. Contacts 3 and 4 of K103 shunt S111 to keep K103 energized after S111 is released.

The filament contactor, K103, connects the 230-volt a-c input to the three ventilating blowers, B101 through B103, the bias power supply, and filament transformers T106 and T108. K103 also connects the a-c input to the filament of time delay relay K101 through the normally-closed FILAMENT OFF switch, S112, contacts 4 and 3 of K103 and resistors R174 and R173. After about 30 seconds from a cold start, the filament in K101 has heated a bimetal strip in the relay sufficiently to close a pair of contacts which light the green lamp, DS101, on the front panel and close a plate-voltage interlock circuit. The green lamp indicates that the tube filaments have reached their proper operating temperature. The time delay is adjustable by varying R173, which is in series with the time delay relay filament.

This time delay relay filament cools at approximately the same rate as the tube filaments. Therefore, it will automatically select the minimum time delay needed to return the filaments to their proper operating temperature after a short power interruption. The transmitter will return to the air immediately after instantaneous interruptions.

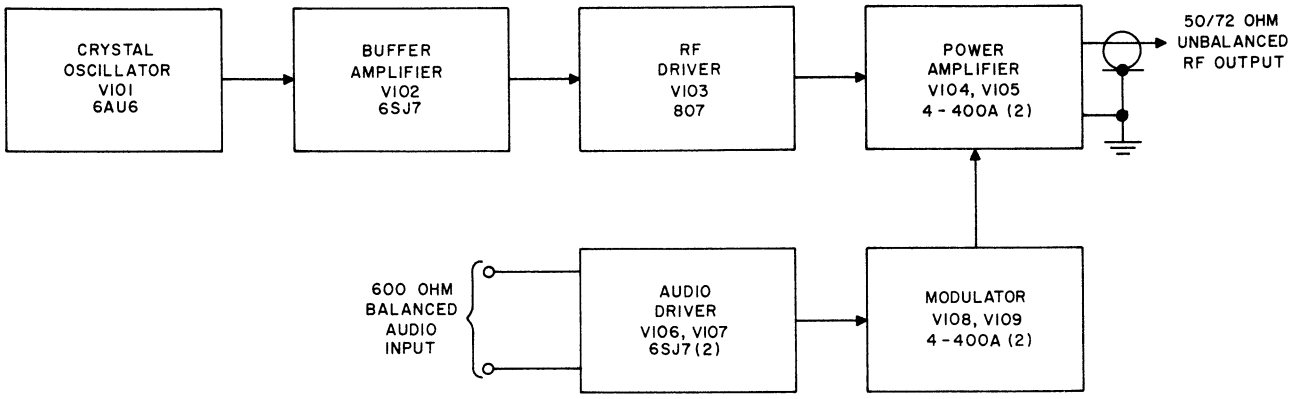

Figure 4-1. AM Broadcast Transmitter 20V-3, Block Diagram

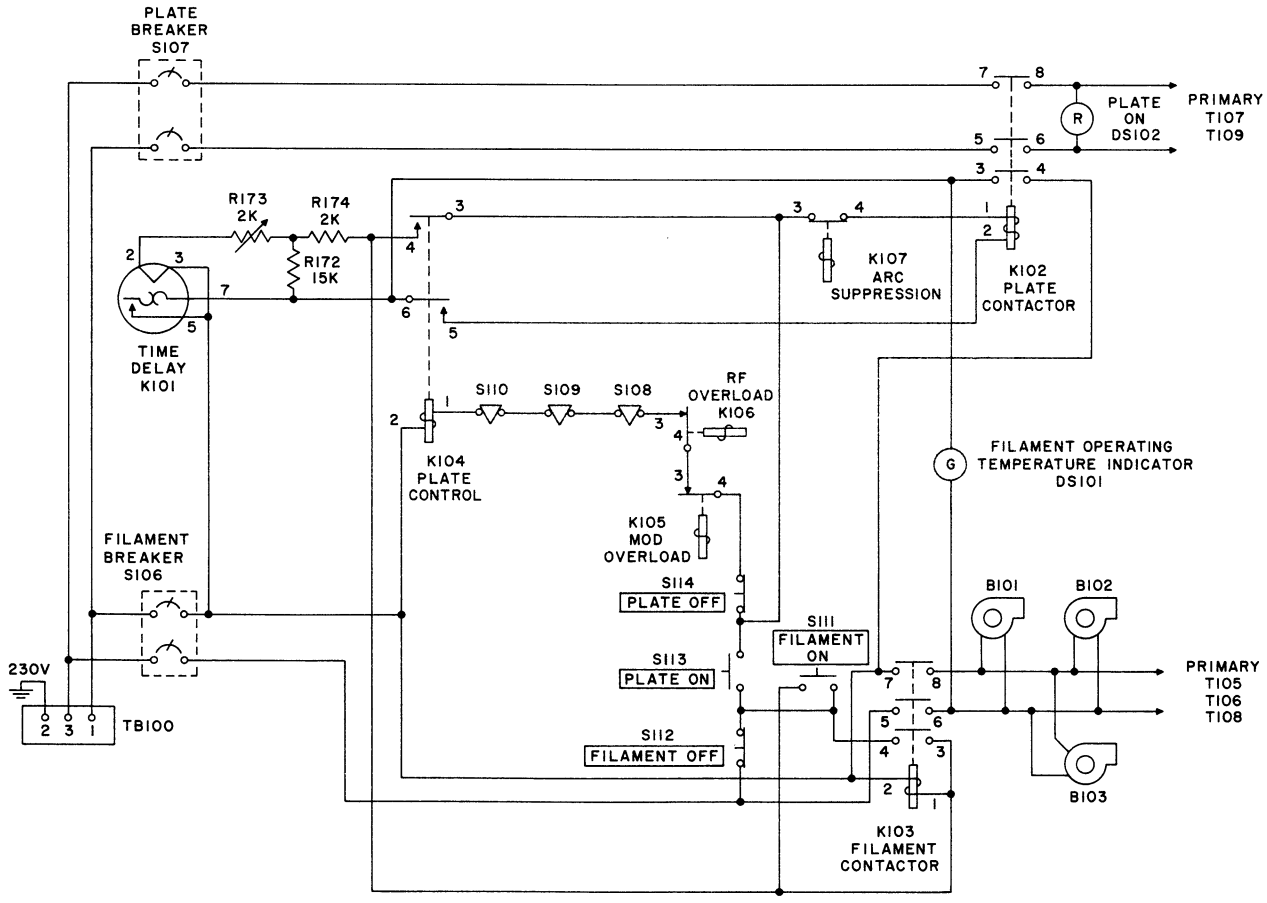

Figure 4-2. Control Circuits, Simplified Schematic Diagram

When the filaments have been energized and the time delay cycle has been completed, pressing the PLATE ON switch, S113, will energize the plate control relay, K104, through switches S112, S113, and S114; the modulator and r-f overload relays, K105 and K106; the three door interlocks, S108, S109, and S110; and the coil of K104. K104 remains energized after S113 is released by a circuit that shunts S113 through contacts 4 and 3 of K103, and contacts 4 and 3 of K104.

K104, in turn, energizes the plate contactor, K102, through contacts 3 and 4 of arc-suppression relay K107, the coil of K102, contacts 5 and 6 of K104, and contacts 7 and 5 of K101. When K102 is energized, contacts 3 and 4 of K102 connect R172 across the filament of K101 and R173 to decrease the current in the filament to a value that is just enough to keep contacts 5 and 7 of K101 closed.

When the plate contactor, K102, is energized, the 230-volt a-c input is connected through the closed PLATE circuit breaker, S107, to the plates of rectifier tubes in the high- and low-voltage power supplies. The red lamp, DS102, on the front panel lights whenever K102 is energized.

Pressing the FILAMENT OFF switch, S112, interrupts the coil circuits of K103 and K104, shutting the transmitter down completely. Pressing the PLATE OFF switch, S114, shuts down only the plate circuits, leaving the filament circuits energized.

Note that if the arc-suppression relay, K107, is energized by a fault in the r-f output network, only K102 will be de-energized. Since K104 remains closed, K102 will be re-energized immediately after K107 is de-energized. If one of the rear cabinet doors is opened while plate voltage is applied or if an overload occurs in the modulator or power amplifier, K104 is de-energized, and the PLATE ON switch must be pressed to restart the transmitter.

If desired, the transmitter may be started from a cold start by pressing only the PLATE ON switch. Pressing this switch energizes K104, which, in turn, energizes the filament contactor and the time delay relay. At the end of the time delay interval, the closing of K101 will automatically energize K102, applying plate power to the transmitter. Pressing the FILAMENT OFF switch will again shunt down the entire transmitter.

4.3 ARC-SUPPRESSION CIRCUIT.

The arc-suppression circuit in AM Broadcast Transmitter 20V-3 will safeguard tubes and r-f output network components by interrupting the plate voltages in the event of a short circuit or flashover in the r-f output network. Refer to figure 7-1. The arc-suppression relay, K107, has normally-closed contacts in series with the plate contactor coil. The coil of K107 is connected in series with monitor coil L110. The end of the monitor coil that connects to the relay is bypassed to ground for r-f by capacitor C151. The bias power supply supplies current for the operation of K107. When an arc-over occurs in the r-f output network due to lightning or any other cause, the ionized path produced by the r-f voltage in the arc has a sufficiently low d-c resistance to complete the relay coil circuit and energize the relay. When the relay operates, its contacts open, disabling the high- and low-voltage plate supplies, removing the transmitter carrier from the air, and stopping the arc-over. When the arc is extinguished, there is no path to ground for the d-c relay-coil current, and the relay contacts close, returning the carrier to the air. Ordinarily, the program interruption will hardly be noticeable.

SECTION V
MAINTENANCE

5.1 GENERAL.

The following paragraphs contain information concerning the maintenance of AM Broadcast Transmitter 20V-3.

WARNING

Voltages are present in this transmitter that are dangerous to life. Observe safety precautions when performing any maintenance. Do not reach inside the transmitter cabinet whenever high voltage is applied. Do not depend on door interlocks. Always shut down the transmitter before doing any work inside the transmitter cabinet.

5.2 PREVENTIVE MAINTENANCE.

5.2.1 CLEANING.

Most service interruptions in equipment of this type are caused by dirt and corrosion. Corrosion is accelerated by the presence of moisture and dust. In some localities it is impossible to keep moisture out of the transmitter, but dust should be removed periodically with a soft brush or a dry, oil-free air jet.

There is always a slight accumulation of dust in the vicinity of high-voltage circuits. Remove dust as often as a perceptible quantity accumulates at any point in the transmitter. It is very important to keep moving parts such as tap switches dust-free to prevent undue wear.

When the transmitter is operated near salt water or in other corrosive atmospheres, inspect and clean tap switch contacts, tube prongs, cable connectors, and other metal parts more frequently to keep the equipment in operating condition.

Once each month clean the air filter at the rear of the transmitter cabinet. Wash the filter in luke-warm water to which a detergent has been added. Before replacing the filter in the transmitter, dip it in SAE 30 oil and allow excess oil to drain off. Replacement filters are Collins part number 009-1069-00.

5.2.2 INSPECTION.

Once each week check and clean the three interlock switches at the rear of the transmitter cabinet to be sure that they are in good working order.

Once each month check all connections in the transmitter. Tighten any nuts, bolts, or screws that may be loose. Check cable connections to see that they are clean and mechanically secure. Check moving parts such as tuning controls for excessive wear.

5.2.3 LUBRICATION.

No lubrication is required in AM Broadcast Transmitter 20V-3. The fan and blower motors have sealed bearings that are lubricated for the life of the equipment.

5.3 TUBE MAINTENANCE.

Do not operate tubes above their rated capacity. Keep a record of how long each tube is in use. Check emission of all tubes, at least every 1000 hours of service. (Check 4-400A's by comparing with new tubes of known quality.) Refer to the tube manufacturer specifications for the rated filament life of each of the tubes. Replace tubes after they have been in service for about 75 percent of the rated filament life.

Spare, preaged mercury-vapor rectifier tubes should be available for immediate replacement. To ready these tubes for emergency use, place them in the transmitter during off-the-air hours and run them for twenty minutes with only the filaments lighted. This will remove the mercury coating from the tube elements. Then carefully remove the tubes from the transmitter and store them in an upright position where they will not be inverted or agitated. When these preaged tubes are placed in the transmitter, handle them carefully to avoid the twenty-minute warmup period that will be required if mercury comes in contact with the tube elements. Never apply plate voltage to mercury-vapor rectifier tubes that have not been aged long enough to remove all mercury from the tube elements.

5.4 TROUBLE SHOOTING.

The most frequent cause of trouble will probably be tube failure. If there is ever any doubt concerning the performance of a tube, check it in a tube checker or by replacing it with a tube that is known to be in good condition and noting any change in performance. Low-emission tubes may cause erratic or poor transmitter performance. Tube emission may be checked with a tube checker. Tube failure may also cause distortion or hum. If such difficulty occurs, replace the defective tube with one known to be in good operating condition.

The five front panel meters on the transmitter will be helpful in locating any trouble. Table 5-1 contains

typical meter indications. The indications given in this table are averages obtained from several production transmitters operated in the frequency range from 550 to 1600 kilocycles. The indications on some operating units may vary slightly outside the given limits without affecting transmitter performance. Values for transmitters operating from 1.6 to 12 megacycles may vary appreciably from the given values. It is a good idea to prepare a list of panel meter indications for each individual transmitter when it is operating properly in its particular installation. Any abnormal deviation from these values will then be apparent during a check of meter indications.

5.5 ORDERING REPLACEMENT PARTS.

Refer to the guarantee inside the front cover for information about ordering replacement parts. Collins part numbers for transmitter components may be found in the parts list, section VI.

TABLE 5-1. TYPICAL METER INDICATIONS

SWITCH	SWITCH POSITION	METER	METER INDICATION
MULTIMETER SWITCH	AUDIO CATH 25MA	MULTIMETER	7 to 11 milliamperes
MULTIMETER SWITCH	OSC CATH 25 MA	MULTIMETER	4.8 to 5.8 milliamperes
MULTIMETER SWITCH	1ST BUFF GRID 25 MA	MULTIMETER	0.2 to 0.5 milliamperes
MULTIMETER SWITCH	1ST BUFF CATH 25MA	MULTIMETER	6.7 to 8.3 milliamperes
MULTIMETER SWITCH	807 GRID 25MA	MULTIMETER	1.5 to 2.3 milliamperes
MULTIMETER SWITCH	807 CATH 250MA	MULTIMETER	36 to 54 milliamperes
MULTIMETER SWITCH	PA GRID 25MA	MULTIMETER	15 to 24 milliamperes
POWER CHANGE	LOW	P.A. PLATE CURRENT	245 milliamperes
POWER CHANGE	LOW (250 watts)	P.A. PLATE VOLTAGE	1560 volts d-c
POWER CHANGE	LOW	R.F. LINE CURRENT	
		70-ohm load	1.9 amperes
		50-ohm load	2.2 amperes
POWER CHANGE	LOW	P.A. PLATE CURRENT	300 milliamperes
POWER CHANGE	LOW (550 watts)	P.A. PLATE VOLTAGE	250 volts d-c
POWER CHANGE	LOW	R.F. LINE CURRENT	
		70-ohm load	2.8 amperes
		50-ohm load	3.3 amperes
POWER CHANGE	HIGH	P.A. PLATE CURRENT	500 milliamperes
POWER CHANGE	HIGH (1100 watts)	P.A. PLATE VOLTAGE	3150 volts d-c
POWER CHANGE	HIGH	R.F. LINE CURRENT	
		70-ohm load	4.0 amperes
		50-ohm load	4.7 amperes
POWER CHANGE	LOW and HIGH	MOD. PLATE CURRENT	
		No modulation	120 milliamperes
		100-percent modulation, 1000 cps	Not more than 450 milliamperes.