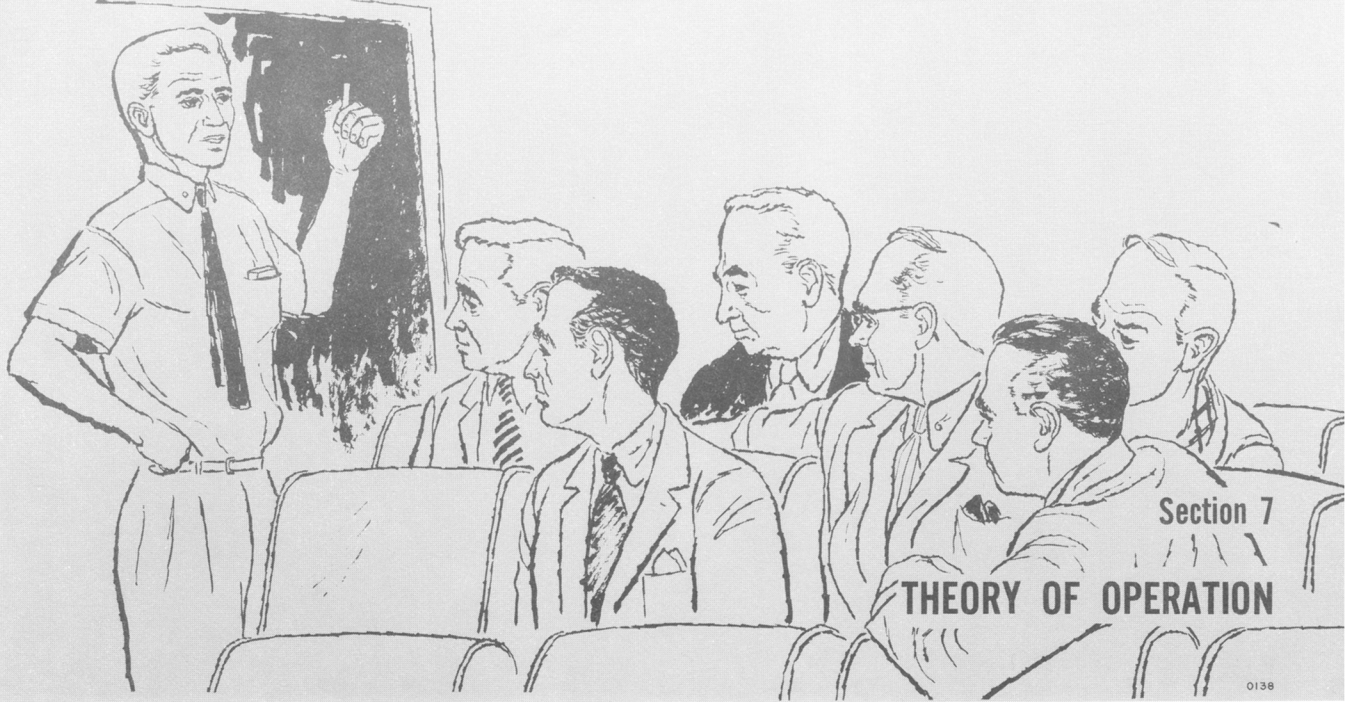


Section 7 THEORY OF OPERATION

Section 7 THEORY OF OPERATION



MICROPHONE PREAMPLIFIERS

Operation of the four microphone preamplifiers is identical. Each preamplifier is a high-gain low-noise, triode-connected pentode. The audio signal from a low impedance microphone is fed to the control grid of the preamplifier by the input transformer. The audio signal is amplified by the preamplifier and coupled to the gain control. In the case of a microphone/line input, switching between the microphone input and the line input takes place immediately prior to the gain control.

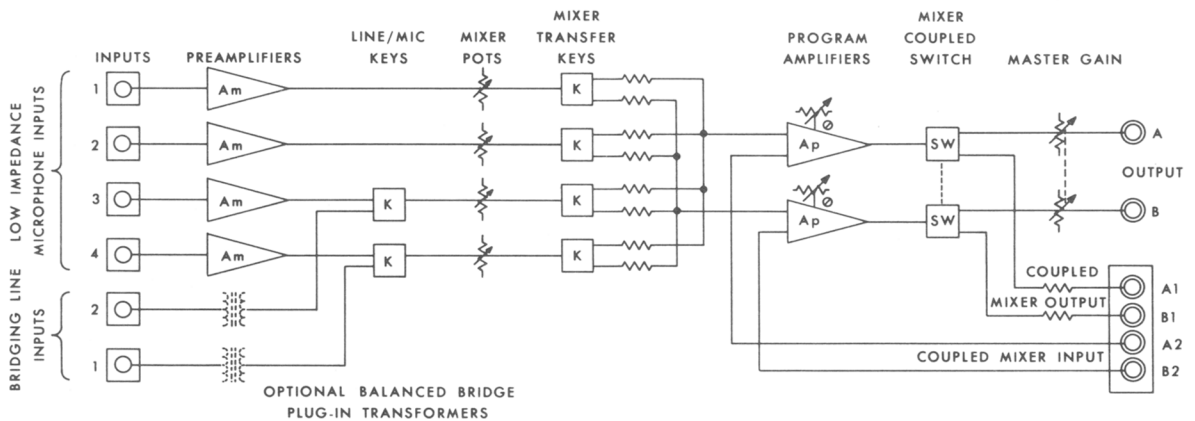
From the gain control, the signal is coupled to the channel selector switch for the station

concerned. The channel selector is a three-position switch that connects the signal to either or both output amplifiers while maintaining correct loading and attenuation relationships.

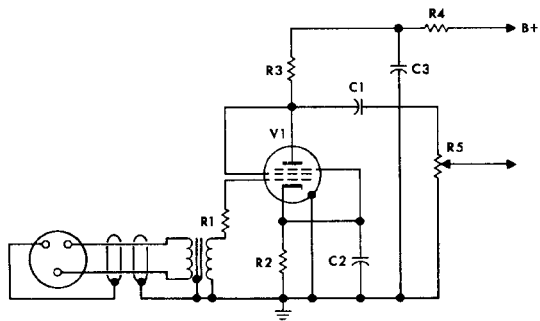
Resistors R1, R6, R11 and R17 are used to isolate the tube input capacitance from the inductance of the secondary winding of the input transformer to yield a flat frequency response.

OUTPUT AMPLIFIERS

The output amplifier consists of a pentode amplifier followed by a cathode follower. One



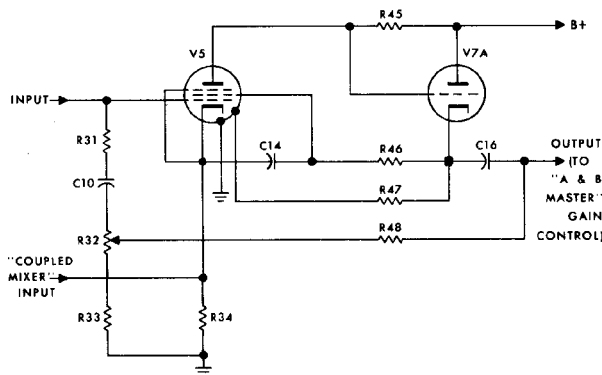
Block diagram, MX-10 mixer



0084

Partial schematic diagram,
microphone preamplifier

of the unusual portions of the circuit is the source of the screen grid voltage for the pentode stage which is derived from the cathode of the follower stage. This provides added reliability to the circuit and helps compensate for tube aging. The plate of the pentode stage is directly coupled to the control grid of the cathode follower.



0085

Partial schematic diagram,
output amplifier

The cathode resistor of the cathode follower is interlocked to ground through the two shield connections of the pentode stage so that excessive current will not be drawn by the cathode follower when the pentode is pulled from the tube socket.

Negative feedback is applied from the cathode of the cathode follower to the control grid of the pentode stage through output capacitor

C16 (C17 for channel "B"), resistor R48 (R52 for channel "B"), LEVEL SET potentiometer R32 (R36 for channel "B"), capacitor C10 (C11 for channel "B"), and resistor R31 (R35 for channel "B"). The negative feedback provides overall gain stability to the circuit and the LEVEL SET potentiometers control the overall gain of each channel of the mixer assembly.

MIXER COUPLING

When switch S7 is in the SINGLE MIXER NORMAL position, the output of the cathode follower is fed to the output connector through the A & B MASTER gain control, R53. When switch S7 is in the MIXER COUPLE position, the output of the cathode follower is connected to terminal strip TS1 through attenuator resistor R54 (R55 for channel "B") and when the terminal strip is connected to terminal strip TS1 of a second mixer assembly, the signal from the first mixer is attenuated and combined with the signal from the second mixer.

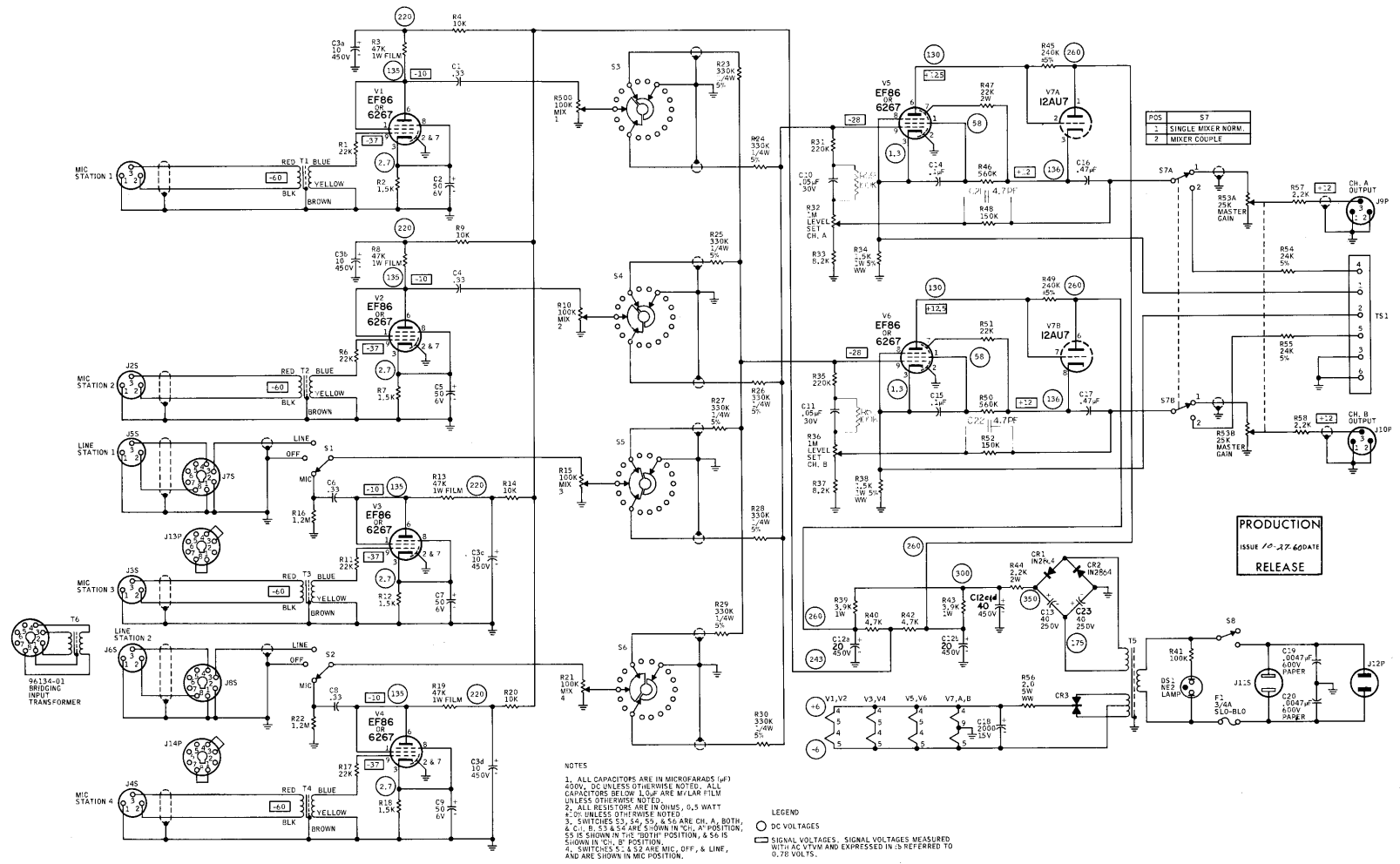
POWER SUPPLY

Silicon rectifiers CR1 and CR2 are used in a conventional full-wave voltage doubler rectifier circuit to supply plate power for all tubes in the mixer assembly. Selenium rectifier CR3 is connected as a conventional full-wave center tap rectifier to provide dc filament voltage to all tubes.

The center tap of the V7 tube filament provides a ground for the dc filaments. AC power input is connected at the power receptacle, J12P, and is controlled by POWER switch S8. The power is fed through fuse F1 to the primary of power transformer T5.

There are two secondary windings on the power transformer—one for the filament supply and one for the high voltage supply. The filament winding supplies 12.6 volts dc (after rectification), to the filaments of all tubes. The high voltage supply ripple is filtered by a capacitance-input r-c filter formed by resistors R39, R40, R42, R43, and R44 and capacitors C13, C12d, C12c, C12b, and C12a; additional filtering is supplied by the decoupling networks.

SCHEMATIC DIAGRAM



NOTES

1. ALL CAPACITORS ARE IN MICROFARADS (μF) 250V, DC UNLESS OTHERWISE NOTED. ALL CAPACITORS BELOW 1.0μF ARE M/LAR FILM UNLESS OTHERWISE NOTED.
2. ALL RESISTORS ARE IN OHMS, 0.5 WATT
3. SWITCHES S1, S4, S5, & S6 ARE CH. A, BOTH 2, C, & S2 ARE S-DOWN IN "1", "A" POSITION, S5 IS SHOWN IN "1" POSITION, & S6 IS SHOWN IN "1", "B" POSITION
4. SWITCHES S1 & S2 ARE MIC, OFF, & LINE, AND ARE SHOWN IN MIC POSITION.

LEGEND

○ DC VOLTAGES

□ SIGNAL VOLTAGES. SIGNAL VOLTAGES MEASURED WITH AC VTVM AND EXPRESSED IN -dB REFERRED TO 0.70 VOLTS.