

AMPEX

4890178-01

Model AM-10 Mixer
Operation and Maintenance Manual

401487A

Model AM-10

1. DESCRIPTION

1.1 GENERAL

The Ampex AM-10 Mixer (see Fig. 1) provides facilities for mixing up to four microphone inputs and two line inputs, and connecting them in any manner desired to a two channel output. If more input facilities are required, any number of mixers can be coupled together--for example, two mixers will provide eight microphone inputs and four line inputs--which will again be connected to provide a two-channel output.

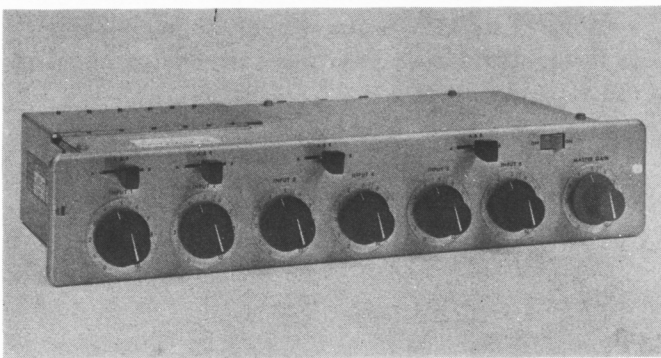


Fig. 1. Ampex Model AM-10 Mixer

Each input incorporates a separate level control, and both output channels are controlled by a master gain control. Inputs 1 and 2, both for microphones, can be switched individually to output A, output B, or both output A and B. Inputs 3 (microphone) and 4 (line), are controlled by one output selector switch for output A, output B, or both. Inputs 5 (microphone) and 6 (line) also are controlled by one selector switch the same as inputs 3 and 4.

Each microphone input is provided with a separate plug-in printed circuit board containing a solid state preamplifier (see Fig. 2). A separate plug-in printed circuit mixer and line amplifier board (see Fig. 3) is supplied for each output. These boards plug into printed circuit connectors from the back panel of the mixer.

Mixers are available in two versions. One, designated as the domestic version, is designed for use with line voltages from 105 to 125 volts, 50 or 60 Hz. The other, designated as the International version, provides a switch which is positioned to select either 115 or 230 volt line voltage, 50 or 60 Hz.

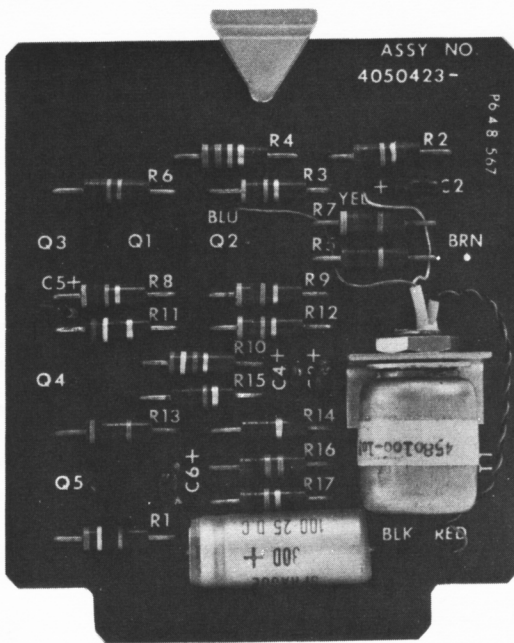


Fig. 2. Plug-in Preamplifier

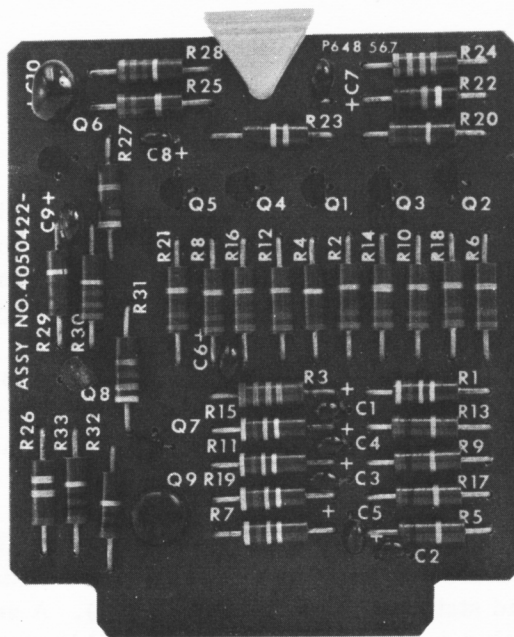


Fig. 3. Plug-in Mixer and Line Amplifier

1.2 ACCESSORY UNITS

1.2.1 Line Inputs

Dummy plugs are provided with each mixer for the line inputs (inputs 4 and 6). This plug, which is inserted in an octal socket on the back panel of the mixer, allows operation from

an unbalanced line. There are four plug-in accessory units available which simply replace the dummy plug in the octal socket.

If it is desired to convert the two line inputs to microphone inputs, microphone preamplifier Catalog No. 4010066 can be used in place of the dummy plug. The mixer can then provide five or six microphone inputs, depending on whether one or two microphone preamplifiers are used.

If operation is to be from a balanced line input, there are two plug-in transformers available. One, Catalog No. 4580200-01, is a balanced bridging transformer with unity gain and an input impedance of 20,000 ohms. The other, Catalog No. 4580200-02, is a balanced matching transformer, which provides 14 db gain and an input impedance of 600 ohms.

The fourth line input accessory is an RIAA phonograph preamplifier, Catalog No. 4010097, which allows the line input signal to be taken directly from a magnetic pick up. Crystal or ceramic pickups may be used if they are loaded with a 1,500 ohm resistor. (Note here that if the phonograph signal has already been amplified, that the dummy plug will be used.)

1.2.2 Meter Panel

A two channel meter panel (see Fig. 4) is available to provide vu meter indications of the two outputs from the mixer. A three position switch calibrates the meters for a +4 db, +8 db, or +12 db output. Monitoring facilities are provided by two phone jacks on both the front and back panel.

The meter panel has a line power input receptacle, and an unswitched power output connector. This allows line power to be connected to the meter panel, then from the meter panel to the mixer.

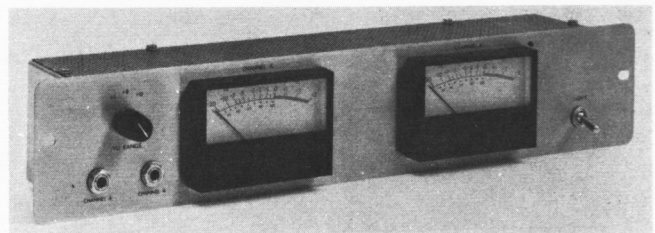


Fig. 4. Accessory Meter Panel

1.3 SPECIFICATIONS

Inputs

Four microphone inputs and two high level line inputs.

Input Impedance

Microphone: 200 ohms, non-terminating.
Line: 100,000 ohms unbalanced. With accessory transformers (refer to paragraph 1.2.1) can be 20,000 ohms balanced bridging or 600 ohms balanced matching.

Outputs

Two, 600 ohm.

Gain

Microphone: At least 75 db.
Line: At least 20 db.

Noise

(Output reference level +4 dbm)

Microphone: Less than -60 dbm.
Line: Less than -70 dbm.
Equivalent input noise level: -122 dbm.

Frequency Response

Microphone: ± 1 db, 30 to 20,000 Hz.
Line: +0, -1 db, 30 to 20,000 Hz.

Distortion

Microphone: With an input level of -30 db (25 millivolts) and the input level control adjusted for a +12 dbm (3 volt) output, the total harmonic distortion is less than 1%.

Line: With an input level of 15 dbm (4.4 volts) and the input level control adjusted for a +12 dbm (3 volt) output, the total harmonic distortion is less than 1%.

Crosstalk Rejection

65 db at 500 Hz. Better than 40 db from 20 to 20,000 Hz.

Power Consumption

Domestic: 105-125 volts, 50 or 60 Hz, 0.1 ampere.

International: 115 volts, 50 or 60 Hz, 0.1 ampere.
230 volts, 50 or 60 Hz, 0.03 ampere

Output Clipping Level

The line amplifier will provide an output of at least 24 dbm, from 50 to 10,000 Hz, before clipping.

2. INSTALLATION

2.1 MOUNTING

The mixer (and the accessory meter panel) will mount in any 19-inch rack, or portable case, each will occupy 3-1/2 inches of vertical space.

Note that these units can therefore be mounted with portable Ampex Models AG-500 single channel and AG-440 recorder/reproducers. They can also be mounted with the electronic assemblies of the console-mounted Model AG-440,

simply by ordering two electronic supports (Catalog No. 4260404) for each unit to be so mounted.

2.2 INSTALLATION OF PLUG-IN ACCESSORIES

Plug-in accessories for the line inputs are described in paragraph 1.2.1. If any of these accessories are employed, simply remove the dummy plug(s) (see Fig. 5) and replace them with the accessory unit.

Either the dummy plugs or an accessory must be plugged into the octal sockets on the rear panel, or the line input will be inoperative.

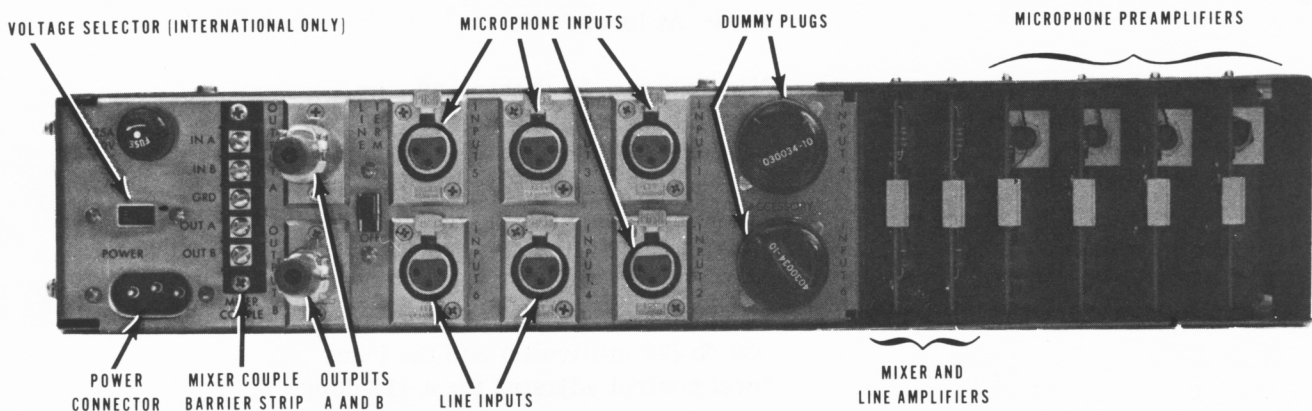


Fig. 5. Back Panel, Mixer

2.3 SELECTING POWER-- INTERNATIONAL VERSION

International equipment has a 115V-230V slider switch (see Fig. 5) on the back panel (this switch is not provided on domestic equipment). The slider must be positioned in accordance with the power line being used.

Also, on International equipment only, two fuses are supplied. The 0.25 ampere fuse is for use with power line voltage of 115 volts, while the 0.125 ampere fuse is for use with power line voltage of 230 volts. Insert the correct fuse in the fuse extractor post on the rear panel.

2.4 CONNECTING

2.4.1 One Mixer

Connect microphone and line inputs to the

appropriate input receptacles on the rear panel (see Fig. 5). These are XL receptacles which are standard in the audio field. If no accessory microphone preamplifier is used, inputs 1, 2, 3, and 5 are microphone inputs and inputs 4 and 6 are line inputs. (Use of microphone preamplifiers will convert inputs 4 and/or 6 to microphone inputs.)

Connect output A and output B (see Fig. 5) to the equipment with which the mixer is used. Mating plugs are supplied for the output connectors. Pins 2 and 3 are for signal leads, pin 1 is ground. Note that if a meter panel is to be employed, the channel A and B outputs are connected to that unit, and the output of the meter panel then connected to the recording equipment.

Check that the power switch is off. Connect the power cable from the POWER connector on the rear panel (see Fig. 5) to a source of 50-60 Hz, a-c power, of appropriate voltage.

CAUTION

Be sure the slider switch on the rear panel of International equipment is positioned properly for the power line voltage (115 or 230 volts).

If a meter panel is being used, the power source can be connected to the POWER IN receptacle on that panel. The unswitched POWER OUTPUT receptacle on the meter panel can then be connected to the mixer.

2.4.2 More Than One Mixer

When two or more mixers are to be coupled together to provide more input facilities, the INPUT signal and power connections for each mixer are the same as described in paragraph 2.4.1. The output connections are different.

On the rear panel there is a five terminal barrier strip labelled MIXER COUPLE (see Fig. 5). From the top down the terminals are labelled IN A, IN B, GRD, OUT A, and OUT B. To couple the mixers, connect the OUT A and OUT B terminals on the first mixer to the IN A and IN B terminals on the second, the OUT A and OUT B terminals on the second mixer to the IN A and

IN B terminals on the third mixer, etc. The normal OUTPUT A and OUTPUT B connectors (XL type) are employed only on the last mixer in the line, all coupling is accomplished between the barrier strips. When recording stereo (both A and B) use twisted pair shielded cable for the coupling connections, wiring the shield to the GRD terminal on the barrier strips. If only single channel recording is contemplated, one shielded wire is sufficient.

Connect the OUTPUT A and OUTPUT B connectors on the last mixer in the line the same as described in paragraph 2.4.1.

3. OPERATION

3.1 SELECTING OUTPUT CHANNELS

Across the top of the mixer (see Fig. 6) are four 3-position selector switches, with positions marked A, A & B, and B. These positions correspond to the output channel of the mixer. Inputs can thus be connected to output A only, both output A and output B, or output B only.

Note the microphone inputs 1 and 2 are switched individually. Microphone input 3 and line input 4 are switched together, as are microphone input 5 and line input 6.

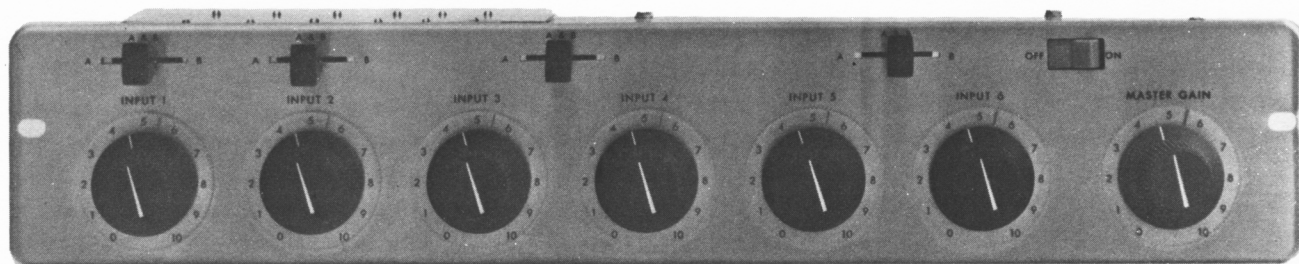


Fig. 6. Operating Controls and Indicators

3.2 APPLYING POWER

An OFF-ON switch is located on the upper right hand corner of the front panel (see Fig. 6). Simply press it ON to apply power. Power application will be indicated either by a pilot light or by back lighting of the OFF-ON switch.

3.3 SETTING LEVEL

Turn the MASTER GAIN control to 6, and position the plastic reset indicator (beneath the knob) to the same number.

Use test tones or program material to

adjust all inputs being used so that proper output levels for the recorder are available. (If a meter panel is employed, it will provide visual indication of output level for each channel.) Set the plastic reset indicators to the same setting.

3.4 DURING THE PROGRAM

While the program is being recorded, or otherwise used, individual inputs can be faded out and in by turning the input level control to 0, then advancing it to the position indicated by the red marker on the reset indicator to return it to proper level.

Similarly, both outputs can be simultaneously faded out or in by using the MASTER GAIN control.

4. MAINTENANCE

The plug-in units and the switching system employed make it very simple to isolate malfunctions to certain circuits.

For example, if a microphone input does not operate through the output which is selected, the selector switch for that input can be placed in

the A & B position. If the input then does not appear on either output channel it is probable that the trouble is in the microphone preamplifier. To check this, the preamplifier for that input can be changed with that of another input. If the trouble clears, the microphone preamplifier is at fault.

In our example, if the input operated normally through one output and not the other when the selector switch was placed in the A & B position, it is probable that the fault is in the mixer and line amplifier printed circuit board. Interchange the circuit boards. If the output trouble now is reversed, the printed circuit mixer and line amplifier board is at fault. In this case the trouble can be even further isolated by checking the signal at the five terminal MIXER COUPLE barrier strip on the rear panel. If the signal from the malfunctioning channel is normal at that point, it indicates that the trouble is in line amplifier portion of the mixer and line amplifier; if it is not normal the trouble is probably in the mixer circuit on that card.

Testing of printed circuit cards can be done while they are inserted in their connectors, by removing all cards except those for the circuit being tested. This leaves room for probes from test equipment.

MIXER ASSEMBLY
Catalog No. 4010087

Ref.	-01	-02	DESCRIPTION	LOCATION	Ampex Part No.
	X		Domestic Version		4010087-01
		X	International Version		4010087-02
	2	2	Mixer and Line Amplifier, printed circuit board		4050422-01
C1	6	6	Capacitor, tantalum; 0.68 mfd, ±5%, 25 vdcw		037-495
C2	X	X	Same as C1		
C3	X	X	Same as C1		
C4	X	X	Same as C1		
C5	X	X	Same as C1		
C6	2	2	Capacitor, tantalum; 3.9 mfd, ±20%, 25 vdcw		037-445
C7	X	X	Same as C6		
C8	X	X	Same as C1		
C9	1	1	Capacitor, tantalum; 15 mfd, ±20%, 15 vdcw		037-446
C10	1	1	Capacitor, tantalum; 68 mfd, ±20%, 20 vdcw		037-451
Q1	6	6	Transistor, silicon, npn; low noise		014-698
Q2	X	X	Same as Q1		
Q3	X	X	Same as Q1		
Q4	X	X	Same as Q1		
Q5	X	X	Same as Q1		
Q6	1	1	Transistor, silicon, pnp		014-652
Q7	X	X	Same as Q1		
Q8	1	1	Transistor, silicon, npn; 2N3706		014-585
Q9	1	1	Transistor, silicon, pnp; 300mw		014-611
R1	5	5	Resistor, fixed, comp; 470,000 ohms, ±10%, 1/2w; RC20GF474K		041-080
R2	10	10	Resistor, fixed, comp; 6,800 ohms, ±10%, 1/2w; RC20GF682K		041-058
R3	2	2	Resistor, fixed, comp; 33,000 ohms, ±10%, 1/2w; RC20GF333K		041-066
R4	2	2	Resistor, fixed, comp; 1,500 ohms, ±10%, 1/2w; RC20GF152K		041-050
R5	4	4	Resistor, fixed, comp; 1 meg ohm, ±10%, 1/2w; RC20GF105K		041-031
R6	X	X	Same as R2		
R7	X	X	Same as R1		
R8	X	X	Same as R2		
R9	X	X	Same as R5		
R10	X	X	Same as R2		
R11	X	X	Same as R1		
R12	X	X	Same as R2		
R13	X	X	Same as R5		
R14	X	X	Same as R2		
R15	X	X	Same as R1		
R16	X	X	Same as R2		
R17	X	X	Same as R5		
R18	X	X	Same as R2		
R19	X	X	Same as R1		
R20	X	X	Same as R4		
R21	X	X	Same as R2		
R22	1	1	Resistor, fixed, comp; 56,000 ohms, ±10%, 1/2w; RC20GF563K		041-069
R23	1	1	Resistor, fixed, comp; 220,000 ohms, ±10%, 1/2w; RC20GF224K		041-076
R24	X	X	Same as R3		
R25	X	X	Same as R2		
R26	1	1	Resistor, fixed, comp; 15,000 ohms, ±10%, 1/2w; RC20GF153K		014-062
R27	1	1	Resistor, fixed, comp; 4,700 ohms, ±10%, 1/2w; RC20GF472K		041-056
R28	2	2	Resistor, fixed, comp; 680 ohms, ±10%, 1/2w; RC20GF681K		041-046
R29	1	1	Resistor, fixed, comp; 2,200 ohms, ±10%, 1/2w; RC20GF222K		041-052
R30	X	X	Same as R28		
R31	1	1	Resistor, fixed, comp; 430 ohms, ±5%, 1/2w; RC20GF431J		041-379
R32	2	2	Resistor, fixed, comp; 10 ohms, ±10%, 1/2w; RC20GF100K		041-032
R33	X	X	Same as R32		
	1	1	Handle, snap-on, circuit board		52528-01
	6	6	Mounting Pad, transistor		280-130
	1	1	Mounting Pad, transistor		280-131
	4	4	Microphone Preamplifier, printed circuit board		4050423-01
C1	1	1	Capacitor, electrolytic; 100 mfd, -10+75%, 25 vdcw		031-880
C2	1	1	Capacitor, tantalum; 3.9 mfd, ±20%, 25 vdcw		037-445
C3	4	4	Capacitor, tantalum; 0.68 mfd, ±5%, 25 vdcw		037-495
C4	X	X	Same as C3		
C5	X	X	Same as C3		
C6	X	X	Same as C3		
Q1	3	3	Transistor, silicon, npn; low noise		014-698
Q2	X	X	Same as Q1		

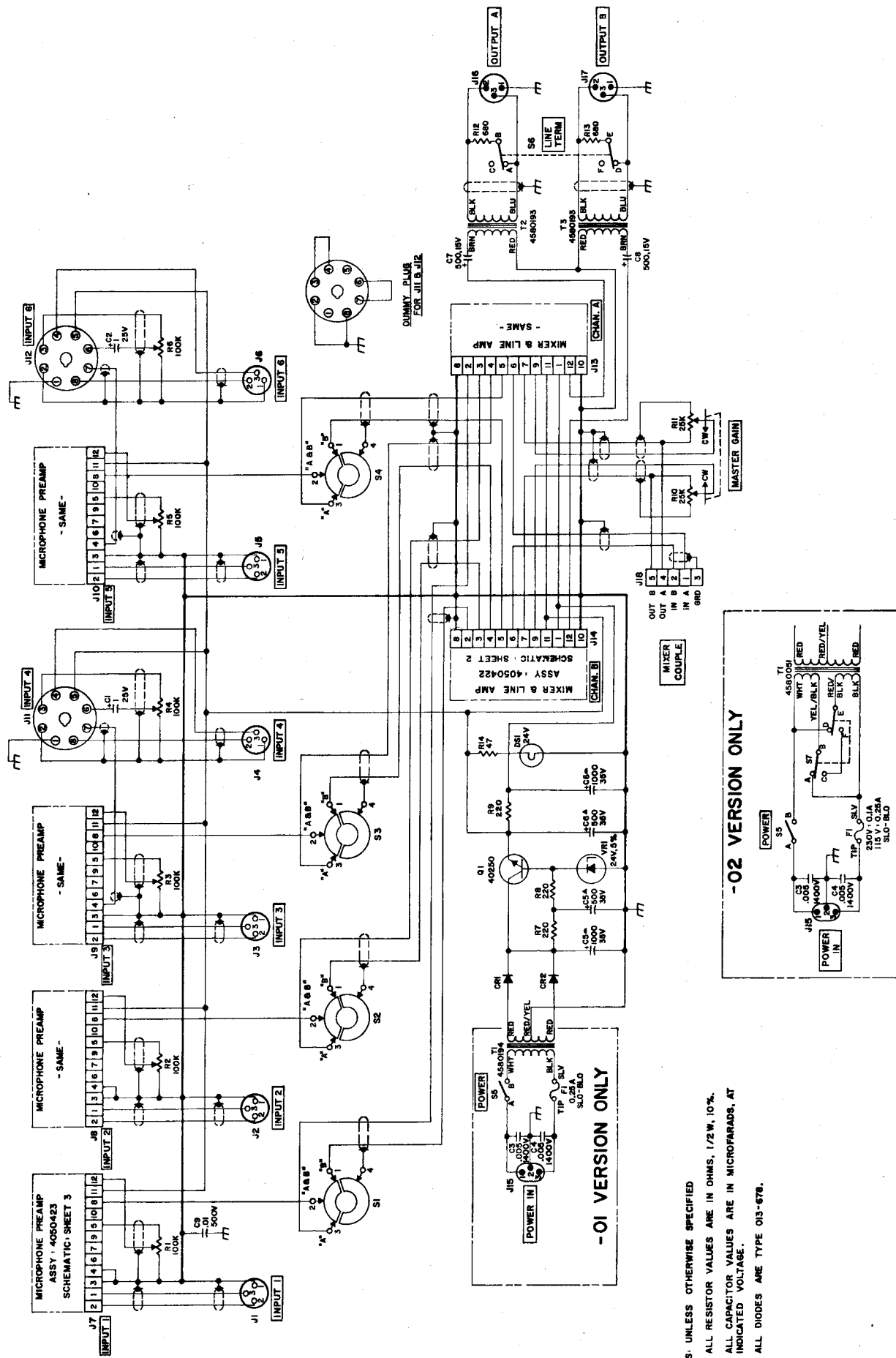
HEP 55
HEP 715
2N3706
HEP 716

MIXER ASSEMBLY (Cont.)
Catalog No. 4010087

Ref.	-01	-02	DESCRIPTION	LOCATION	Ampex Part No.
Q3	X	X	Same as Q1		
Q4	1	1	Transistor, silicon, npn, low noise, low level		014-862
Q5	1	1	Transistor, silicon, pnp		014-652
R1	1	1	Resistor, fixed, comp; 3,900 ohms, ±10%, 1/2w; RC20GF392K		041-055
R2	1	1	Resistor, fixed, comp; 120,000 ohms, ±10%, 1/2w; RC20GF124K		041-073
R3	4	4	Resistor, fixed, comp; 470,000 ohms, ±10%, 1/2w; RC20GF474K		041-080
R4	1	1	Resistor, fixed, comp 330,000 ohms, ±10%, 1/2w; RC20GF334K		041-078
R5	1	1	Resistor, fixed, comp; 1 meg ohm, ±10%, 1/2w; RC20GF105K		041-031
R6	1	1	Resistor, fixed, comp; 22,000 ohms, ±10%, 1/2w; RC20GF223K		041-064
R7	2	2	Resistor, fixed, comp; 4,700 ohms, ±10%, 1/2w		041-056
R8	X	X	Same as R3		
R9	X	X	Same as R3		
R10	1	1	Resistor, fixed, comp; 39,000 ohms, ±10%, 1/2w; RC20GF393K		041-067
R11	1	1	Resistor, fixed, comp; 3.9 meg ohms, ±10%, 1/2w; RC20GF395K		041-285
R12	X	X	Same as R3		
R13	X	X	Same as R7		
R14	1	1	Resistor, fixed, comp; 2,200 ohms, ±10%, 1/2w; RC20GF222K		041-052
R15	1	1	Resistor, fixed, comp; 56,000 ohms, ±10%, 1/2w; RC20GF563K		041-069
R16	1	1	Resistor, fixed, comp; 10,000 ohms, ±10%, 1/2w; RC20GF103K		041-060
R17	1	1	Resistor, fixed, comp; 100,000 ohms, ±10%, 1/2w; RC20GF104K		041-072
T1	1	1	Transformer, microphone		4580100-10
	1	1	Handle, snap-on, circuit board		52528-01
	4	4	Mounting Pad, transistor		280-130
ELECTRONIC COMPONENTS NOT ON BOARDS					
C1	2	2	Capacitor, electrolytic; 1 mfd, -10+75%, 25 vdcw	Octal Socket	031-294
C2	X	X	Same as C1	Octal Socket	
C3	2	2	Capacitor, ceramic; .005 mfd, -20+80%, 1400 vdcw	Rear Panel	030-465
C4	X	X	Same as C3	Rear Panel	
C5	2	2	Capacitor, electrolytic; 1000-500 mfd, 35 vdcw	P. S. Bracket	4550147-02
C6	X	X	Same as C5	P. S. Bracket	
C7	2	2	Capacitor, electrolytic; 500 mfd, -10+100%, 15 vdcw	Chassis	031-297
C8	X	X	Same as C7	Chassis	
C9	1	1	Capacitor, ceramic disk; .01 mfd, 500 vdcw	Back of J7	030-002
CR1	2	2	Diode, silicon, rectifier	P. S. Bracket	013-678
CR2	X	X	Same as CR1	P. S. Bracket	
F1	1	1	Fuse, sio-blo; 0.25 ampere (105-125 volt a-c power)	Rear Panel	070-005
F1	1	1	Fuse; 0.125 ampere (230 volt a-c power)	Rear Panel	070-028
J1	6	6	Connector, audio, 3 sockets, female; XL type	Rear Panel	146-998
J2	X	X	Same as J1	Rear Panel	
J3	X	X	Same as J1	Rear Panel	
J4	X	X	Same as J1	Rear Panel	
J5	X	X	Same as J1	Rear Panel	
J6	X	X	Same as J1	Rear Panel	
J7	6	6	Connector, printed wiring board; 12 double contacts	Rear Panel	143-308
J8	X	X	Same as J7	Rear Panel	
J9	X	X	Same as J7	Rear Panel	
J10	X	X	Same as J7	Rear Panel	
J11	2	2	Socket, octal	Rear Panel	150-023
J12	X	X	Same as J11	Rear Panel	
J13	X	X	Same as J7	Rear Panel	
J14	X	X	Same as J7	Rear Panel	
J15	1	1	Connector, ac, 3 pin, male	Rear Panel	147-396
J16	2	2	Connector, audio, 3 pins, male; XL type	Rear Panel	147-999
J17	X	X	Same as J16	Rear Panel	
J18	1	1	Barrier Strip, 5 terminals	Rear Panel	180-627
Q1	1	1	Transistor, silicon, npn; 40250	P. S. Bracket	014-587
R1	6	6	Potentiometer, carbon; 100,000 ohms, ±10%, 2w; audio taper (Input Levels)	Front Panel	044-015
R2	X	X	Same as R1	Front Panel	
R3	X	X	Same as R1	Front Panel	
R4	X	X	Same as R1	Front Panel	
R5	X	X	Same as R1	Front Panel	
R6	X	X	Same as R1	Front Panel	
R7	3	3	Resistor, fixed, comp; 220 ohms, ±10%, 1/2w; RC20GF221K	P. S. Bracket	041-040
R8	X	X	Same as R7	P. S. Bracket	
R9	X	X	Same as R7	P. S. Bracket	

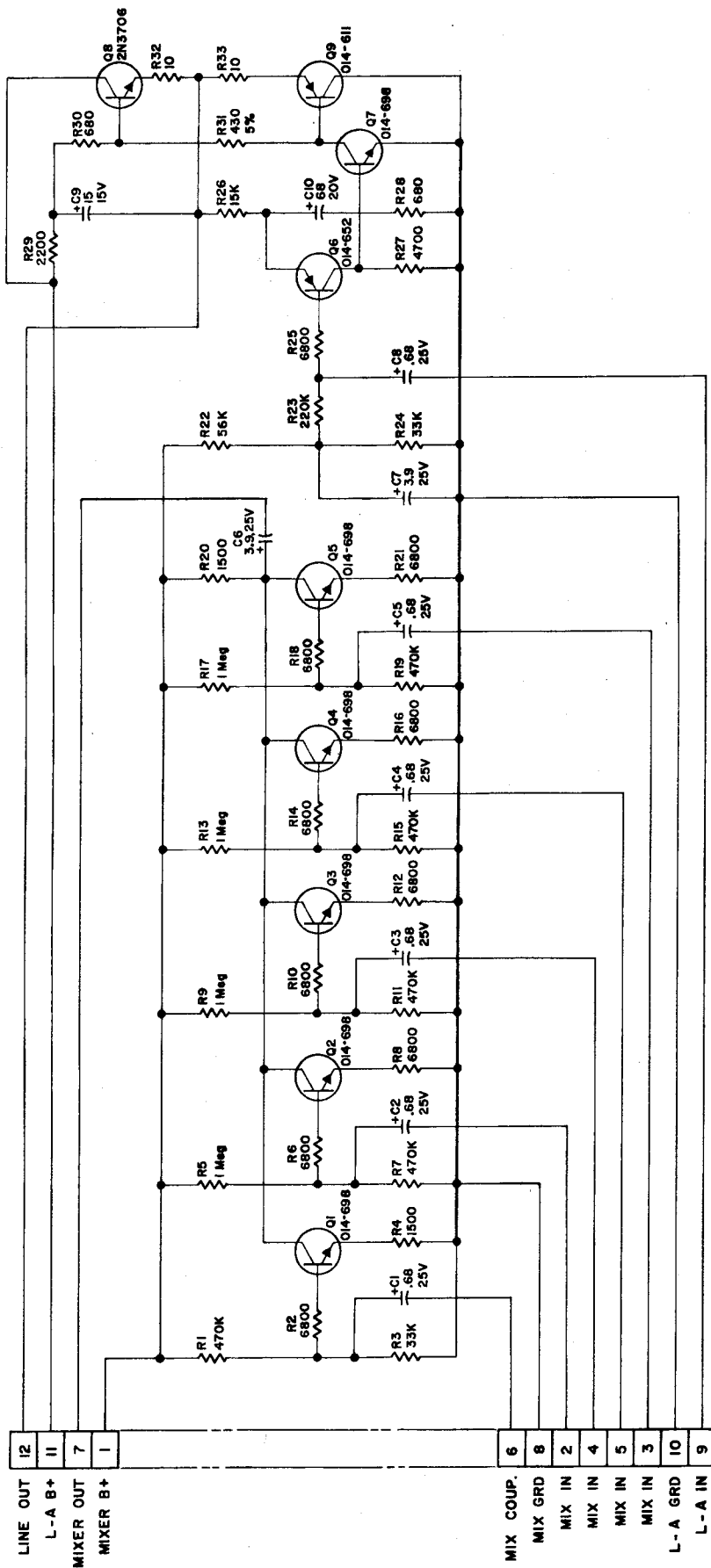
MIXER ASSEMBLY (Cont.)
 Catalog No. 4010087

Ref.	-01	-02	DESCRIPTION	LOCATION	Ampex Part No.
R10	1	1	Potentiometer, dual ganged; 25,000 ohms/section, audio taper (Master Gain)	Front Panel	4520100-10
R11	1	1			
R12	2	2	Resistor, fixed, comp; 680 ohms, ±10%, 1/2w; RC20GF681K	Rear Panel	041-046
R13	X	X	Same as R12	Rear Panel	
R14	1	1	Resistor, fixed, comp; 47 ohms, ±10%, 1/2w; RC20GF470K	On Light	041-034
S1	4	4	Switch, lever (Input Switching)	Front Panel	4620070-01
S2	X	X	Same as S1	Front Panel	
S3	X	X	Same as S1	Front Panel	
S4	X	X	Same as S1	Front Panel	
S5	1	1	Switch, rocker (power off-On)	Front Panel	4620071-01
S6	1	1	Switch, slide, dpdt (line termination)	Rear Panel	120-139
S7	1	1	Switch, slide, dpdt (115-230 volts)	Rear Panel	120-510
T1	1	1	Transformer, power	P. S. Bracket	4580194-01
T2	1	1	Transformer, power	P. S. Bracket	4580051-01
T2	2	2	Transformer, output	Chassis	4580193-01
T3	X	X	Same as T2	Chassis	
VR1	1	1	Diode, Zener, 24v, ±5%	P. S. Bracket	013-712
MISCELLANEOUS COMPONENTS					
	2	2	Dummy Plug Assembly		4030034-30
	7	7	Reset Indicators (beneath level knobs)		4040350-02
	4	4	Knob, Key Tab (for S1 through S4)		4100102-02
	1	1	Knob, grey, skirted (for R10/R11)		6000009-10
	6	6	Knob, black, skirted (for R1 through R6)		6000009-20
	1	1	Top Cover		4290665-01
	1	1	Cover, printed wiring boards		4290198-01
	1	1	Instruction Manual		4890178
	1	1	Cord Set, power, 8 feet		084-027
	1	1	Fuse Extractor Post		085-001
	2	2	Connector, plug, audio; 3 sockets, male (mate with J16, J17)		144-003
	12	12	Guide, printed wiring board		530-111
	1	1	Socket, light		132-098
	1	1	Light, indicator, clear		132-099
	1	1	Clip, light		435-069



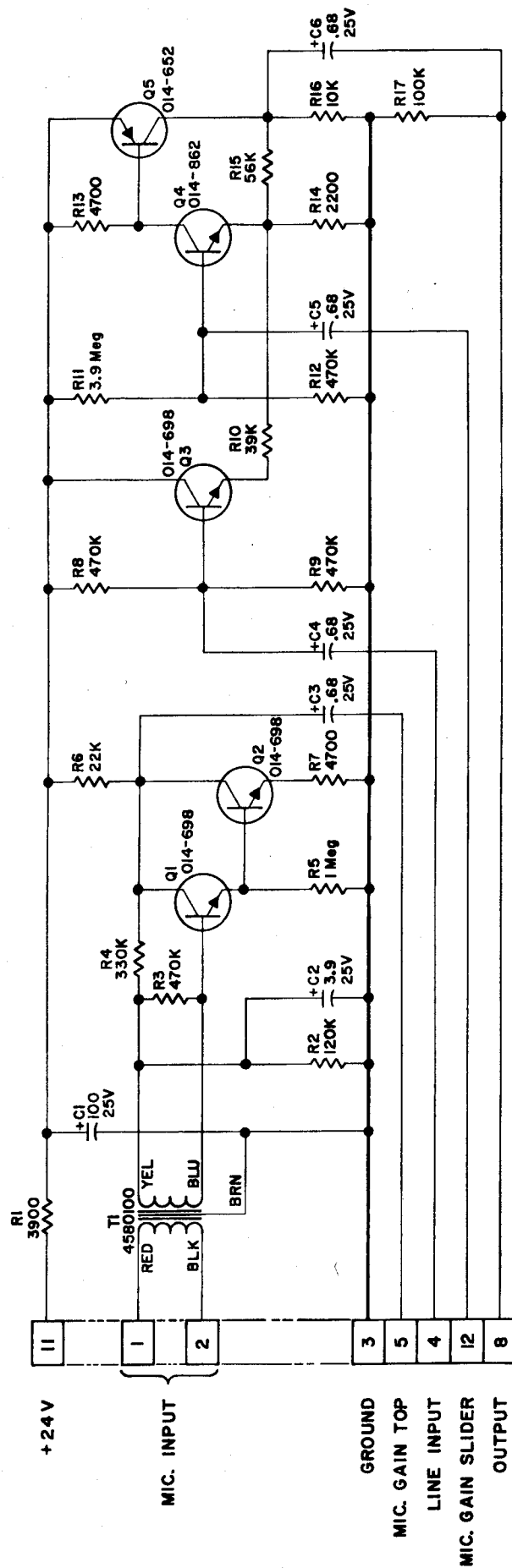
- NOTES: UNLESS OTHERWISE SPECIFIED
1. ALL RESISTOR VALUES ARE IN OHMS, 1/2 W, 10%.
 2. ALL CAPACITOR VALUES ARE IN MICROFARADS, AT INDICATED VOLTAGE.
 3. ALL DIODES ARE TYPE 013-678.

Fig. 7. Schematic Diagram, Mixer, Sheet 1



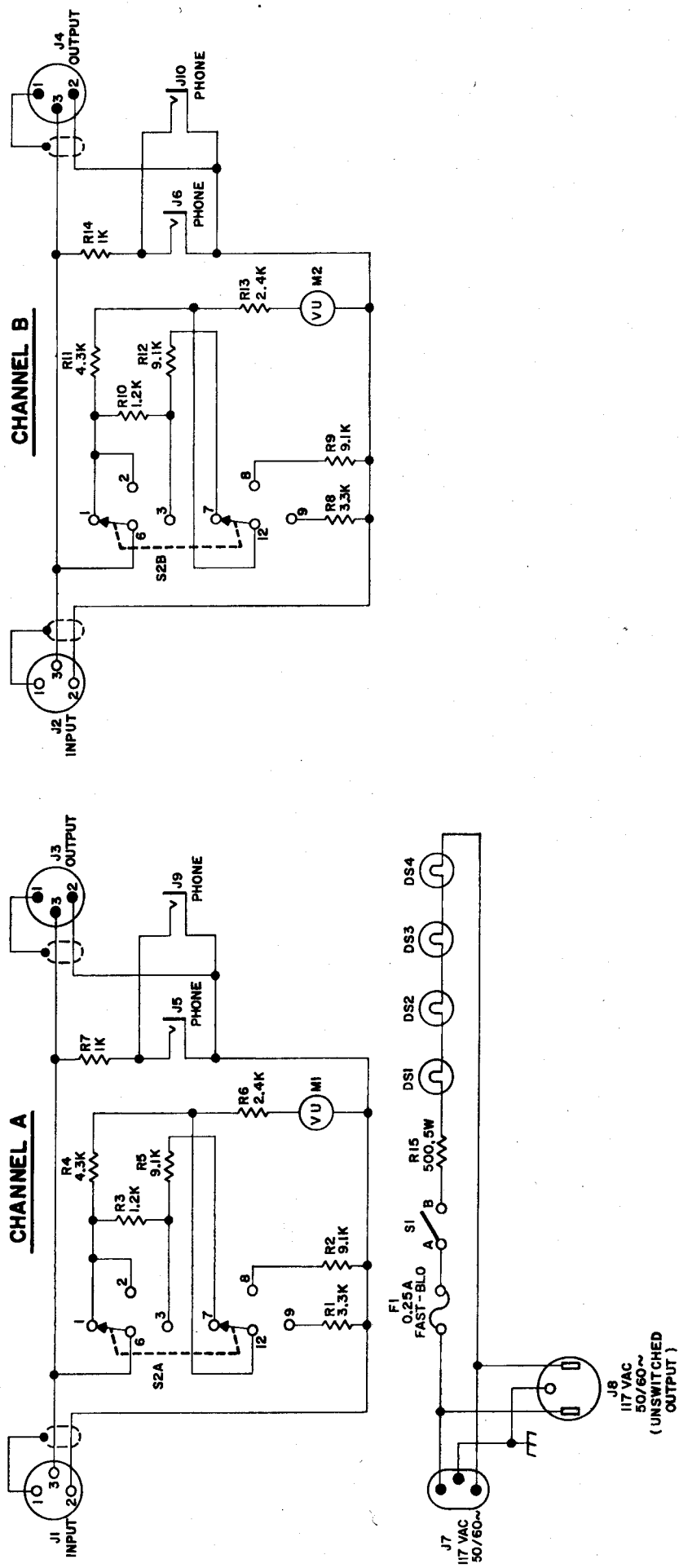
**MIXER & LINE AMP
PRINTED WIRING BOARD**

Fig. 8. Schematic Diagram, Mixer, Sheet 2



MICROPHONE PREAMP PRINTED WIRING BOARD

Fig. 9. Schematic Diagram, Mixer, Sheet 3



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTOR VALUES ARE IN OHMS, 1/2W, 5%.

Fig. 10. Schematic Diagram, Meter Panel