INSTALLATION AND OPERATING INSTRUCTIONS

for the

ALTEC M11 MICROPHONE SYSTEMS

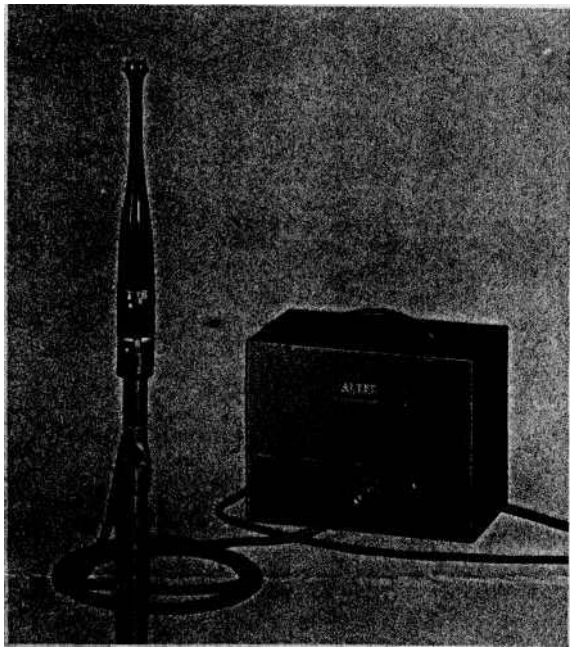
featuring the

ALTEC 21B MINIATURE CONDENSER MICROPHONE

THE M11 MICROPHONE SYSTEMS

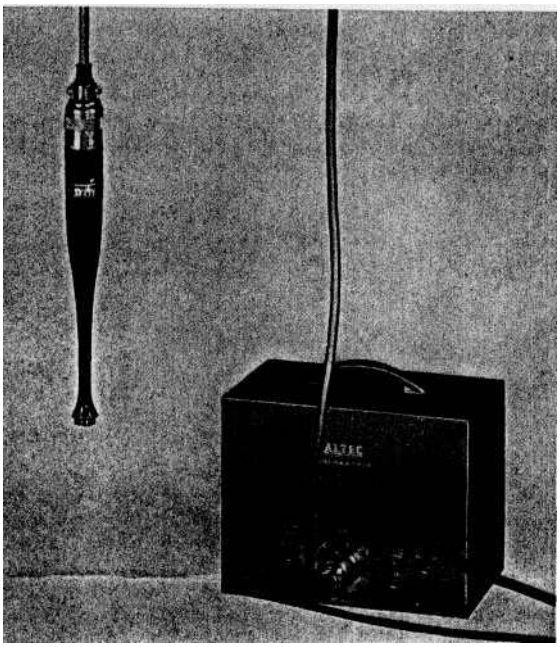
M11A with 152A Cable Set

21B Microphone
150A Base
P518A Power Supply
152A Cable Set



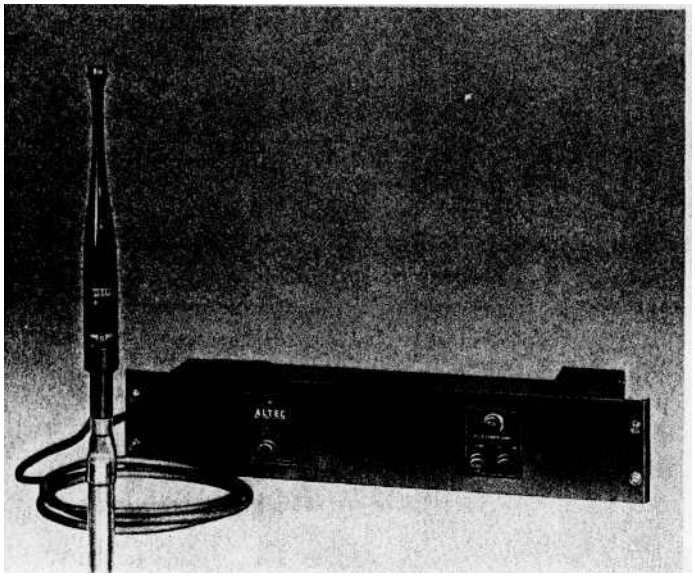
M11A with 153A Cable Set

21B Microphone
150A Base
P518A Power Supply
153A Cable Set



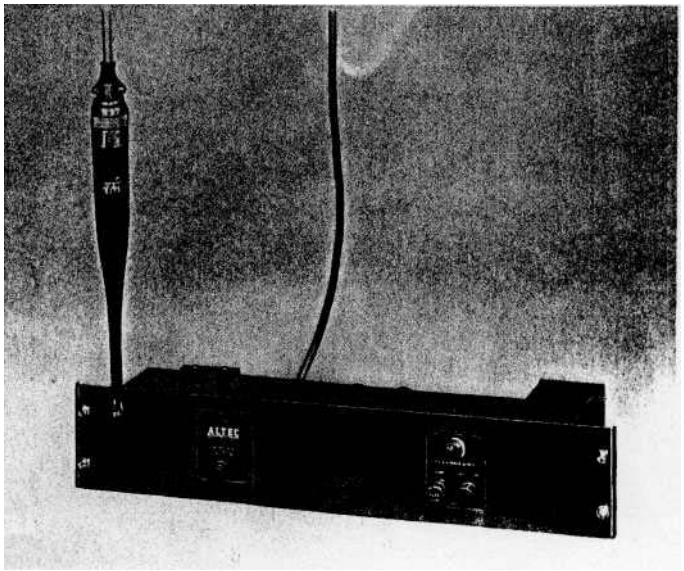
M11B with 152A Cable Set

21B Microphone
150A Base
P519A Power Supply
152A Cable Set



M11B with 153A Cable Set

21B Microphone
150A Base
P519A Power Supply
153A Cable Set



ALTEC M11 MICROPHONE SYSTEMS

S P E C I F I C A T I O N S

FREQUENCY RANGE: 20 cycles through 15,000 cycles.
OUTPUT LEVEL: -48DB. re 1 milliwatt for a sound field of 10 dynes/cm^2.
DIRECTIONAL CHARACTERISTIC: OMNIDIRECTIONAL.
HUM PICKUP: Microphone not susceptible to magnetic fields.
LOW FREQUENCY CUT-OFF POSITIONS: 20 cycles, 40 cycles, 120 cycles.
OUTPUT IMPEDANCES: Nominal, 30 ohms, 250 ohms, 500 ohms.
RMA ratings, 38 ohms, 150 ohms, 600 ohms.
POWER REQUIREMENTS: 117 Volts, 60 cycles A.C
ELECTRICAL CAPACITANCE OF 21B MICROPHONE: Approximately 6 micromicrofarads.
OUTPUT VOLTAGE OF 21B MICROPHONE ALONE (open circuit): Approximately -50 DB. re 1 Volt per dyne/cm^2.
VACUUM TUBES: 1-6AU6.
RECTIFIERS: 1—Fansteel BC-029M (Selenium dry disc type).
1—Fansteel ADL-22 (Selenium dry disc type).
21B MICROPHONE: Length, $^3/_8$"; Diameter, $^5/_8$"; Weight, $^1/_4$ ounce.
150A BASE: Length, 8-3/16"; Diameter at base, $1^1/_8$"; Diameter at top, 13/16"; Weight, $5^3/_4$ oz.
COMBINED LENGTH 21B MICROPHONE, 150A BASE AND 152A CABLE SET CONNECTOR: $11^1/_2$".
COMBINED LENGTH 21B MICROPHONE, 150A BASE AND 153A CABLE SET CONNECTOR: $10^5/_8$".
P518A POWER SUPPLY: Height, $7^1/_2$"; Width, $8^1/_4$"; Depth, 6"; Weight, 11 $^1/_2$ pounds.
P519A POWER SUPPLY: Height, $3^1/_2$"; Width, 19"; Depth, 6-9/16"; Weight, 11 $^1/_2$ pounds.
M11A SYSTEM: Weight (unpacked), 13 pounds 9 ounces.
M11B SYSTEM: Weight (unpacked), 13 pounds 9 ounces.
FINISH: 21B Microphone, bright steel; 150A Base, satin black; P518A and P519A, gray.
MOUNTING: $^5/_8$-27 or suspension.
152A CABLE SET: Length with connectors, 25 feet; Weight, 1 pound 11 ounces.
153A CABLE SET: Length with connectors, 25 feet; Weight, 1 pound 11 ounces.
RR6839 MULTI-CONDUCTOR CABLE: Diameter, 9/32"; Weight per hundred feet, 5 pounds.
CABLE CONNECTORS: Cannon P8-CG-11S (female), Cannon P8-CG12S (male).

INTERCONNECTION OF COMPONENTS

The 21B Microphone is shipped in position on the 150A Base. Attachment is by threads on the outside of the shell of the Microphone. Be sure the Microphone is screwed tightly into position. Connection is made to the inner shield and to the center terminal through spring contacts. Connections should not be made by other means. It is recommended that the 2lB Microphone be kept mounted on the Base at all times.

Connection between the 150A Base and the 152A or 153A Cable Set is made through Cannon P8 type locking latch connectors. Normal precautions should be taken in handling the cable so that it is not bent sharply as in knotting, or abraded across sharp corners. Connection of the cable to the P518A or P519A Power Supply is made by inserting the P8 type Cannon connector into the Power Supply receptacle marked "INPUT."

Connect the A.C. line to any supply of 117 Volts 60 cycle alternating current. Fuse protection is provided by a .5 ampere type 3AG Littlefuse.

OUTPUT CONNECTIONS

The output of the M11 System appears at the end 2-conductor shielded cable. As shipped the M11 connected for 250 ohm output (RMA rating 150 ohms) Figure A shows connections for 30 ohms. (RMA 38 ohms), 250 ohms (RMA 150 ohms), or 500 ohms (RMA 600 ohms) output.

TERMINATION

The output of the M11 System is designed to connect directly into either a resistive load equal to the nominal output impedance or an input transformer whose secondary side is terminated in a resistance of proper value. When the microphone system is connected to an input Transformer whose secondary is not terminated in a resistor, it is necessary to either place a resistor of proper value across the input transformer secondary or to terminate the microphone system output as shown in Figure B.

Failure to provide proper termination will usually cause peaks in the frequency response at both high and low frequencies. The degree of this distortion is determined by the characteristics of the input transformer.

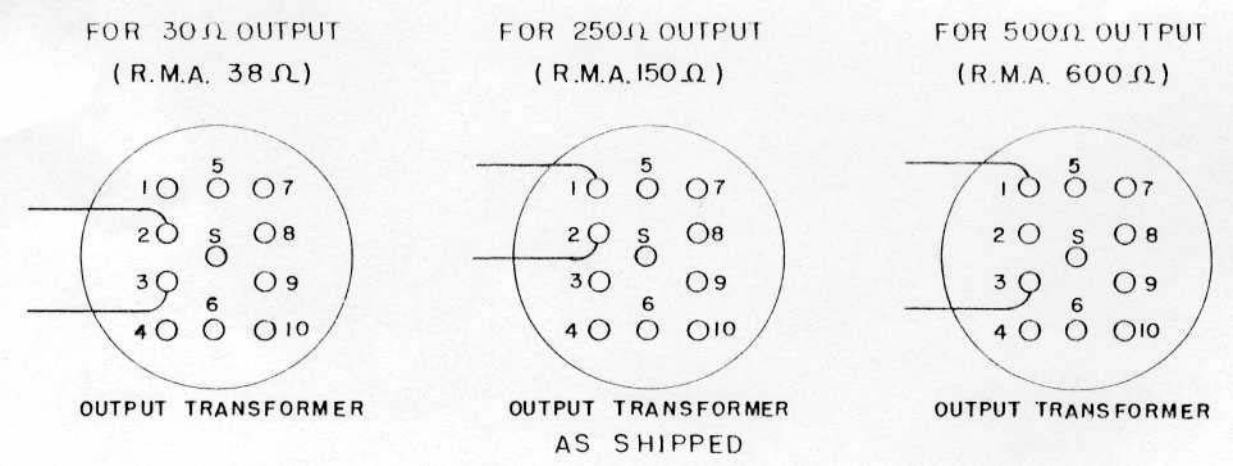


FIGURE A

DISCUSSION OF M11 MICROPHONE SYSTEM COMPONENTS AND THEIR FUNCTIONS

ALTEC 21 B MICROPHONE

A cross-section diagram showing essential electrical and mechanical portions of the 21B Microphone is shown in Figure C. The essential parts, electrically, consist of a diaphragm and an electrode or backplate in close proximity. The backplate and diaphragm being closely spaced constitute an electrical capacitance which varies with microscopic mechanical deflection of the diaphragm caused by pressure variations in the sound wave. The backplate or center terminal is polarized with respect to the diaphragm through a very high resistance so that a fixed charge accumulates on the center terminal. As the sound pressure causes the capacity of the microphone to vary, the voltage between the center terminal and diaphragm also varies, the resulting signal being applied to the grid of a vacuum tube.

The surface of the diaphragm adjacent to the center terminal is formed of insulating material, eliminating the problem of electrical breakdown between these parts. The function of the inner shield which surrounds the center terminal is described in the discussion of the 150A Base.

THE 150A MICROPHONE BASE

The 150A Microphone Base encloses a vacuum tube whose function is to translate the voltage generated at extremely high impedances by the microphone to a nearly equal voltage at low impedance so that the signal can be faithfully transmitted over lengths of cable to subsequent apparatus. The circuit of the impedance translating tube in the 150A Base is shown in Figure D. The microphone backplate receives its polarization through the elevation of cathode voltage above ground potential. It is a property of the cathode follower circuit that its input impedance is extremely high whereas its output impedance is low. Also the effect of any capacity connected between cathode and grid is greatly reduced by the cathode follower action. Connection of the inner shield in this manner permits the microphone to be separated by a short distance from the vacuum tube. The extension between tube and microphone is intended to take the fullest advantage of the diminutive size of the microphone by furnishing a minimum visual and acoustical obstacle size.

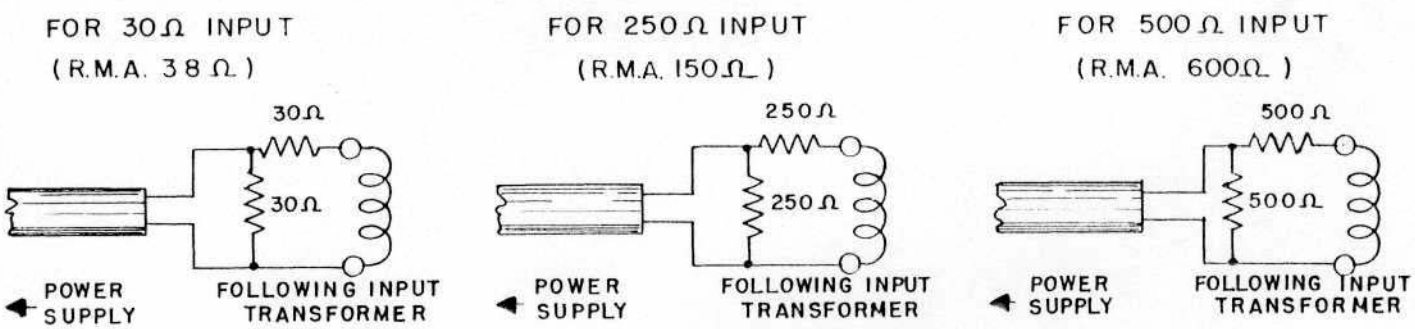


FIGURE B

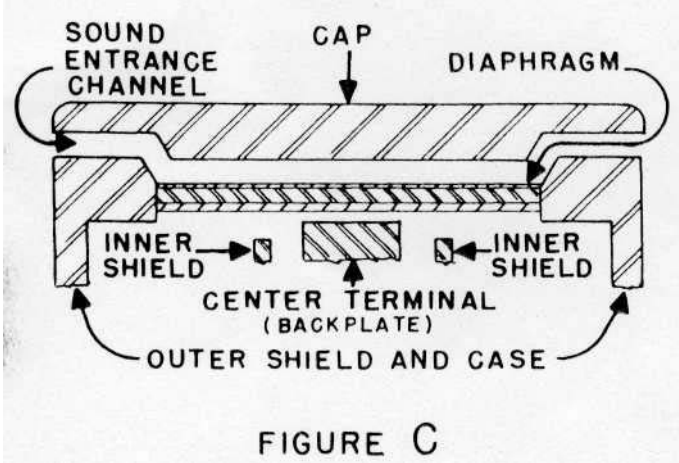


FIGURE C

Since the impedance translating tube furnishes an electrical signal at a low impedance, about 1000 ohms, it is possible to transmit the signal to a considerable distance from the microphone. Furthermore, the resistors and condensers which supply the impedance translator can be located at the far end of the interconnecting cable. Therefore, the bulk at the microphone is reduced to the minimum consistent with reliable tube operation and with esthetic and operational considerations.

The Microphone Base may be separated by as much as 400 feet of cable from the Power Supply without encountering any difficulties. Beyond 400 feet larger conductors should be used for the heater leads to avoid excessive voltage drop.

The above cable sets are normally supplied in 25 foot lengths but may be had in any lengths on special order. The cable (Type RR6839) is also available separately. Cable construction is shown in Figure E and connection of the cable to the Cannon Plugs is shown in Figure F.

Signal transmission through this cable is equivalent to the use of coaxial cable. The three inner conductors which carry the signal have high capacity between them *in* the circuit. The outer conductors carry the other tube functions, all of which are at ground potential for signal. Therefore, the outer conductors serve to shield the inner, signal conductors.

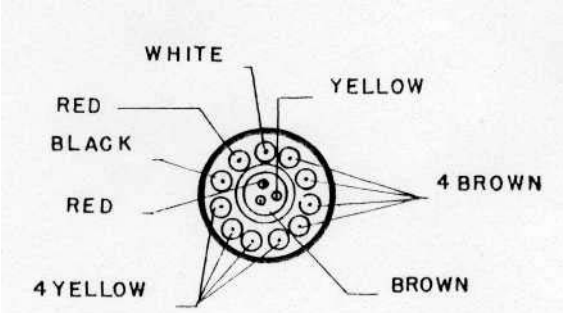


FIGURE E

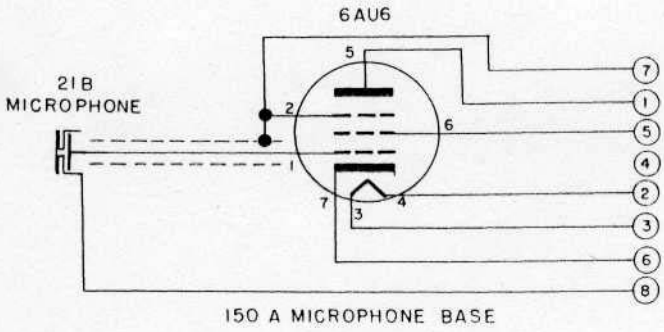


FIGURE D

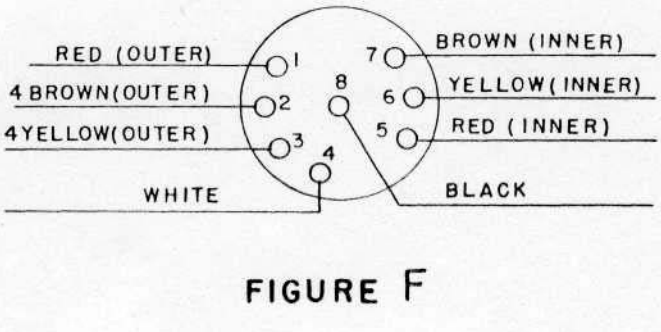


FIGURE F

CABLE SETS TYPES 152A AND 153A

For microphone stand mounting use the 152A Cable Set. This connector, which plugs into the 150A Base, also contains a conventional microphone stand fitting for the RMA standard 5/8"-27 thread. For hanging or suspension purposes use the 153A Cable Set. Either may be used as an extension of the other.

POWER SUPPLIES TYPES P518A AND P519A

These two power supplies are identical electrically, differing only in size and shape. The power supply furnishes the necessary plate and screen voltages and the heater current for the 6AU6 cathode follower impedance translator tube. The circuit of the power supply is shown in Figure G. Vacuum tubes are not used. Rectifiers are the selenium dry disc type which should operate without attention for many years.

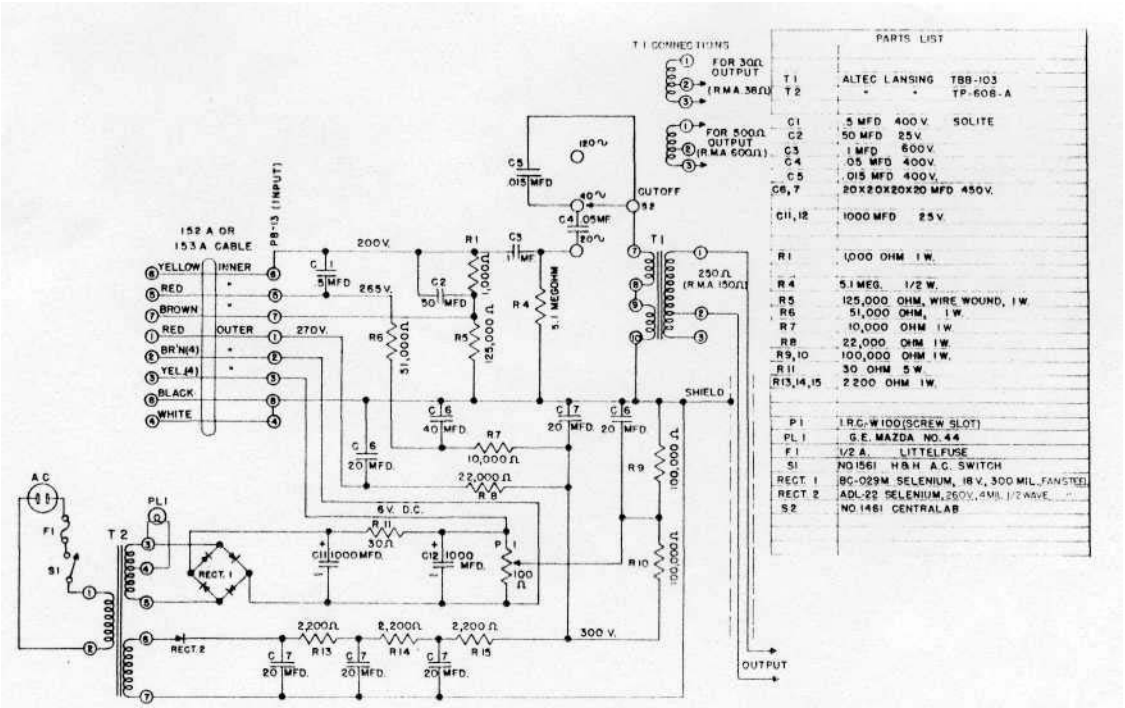


FIGURE G

The power supply also houses the components associated with the vacuum tube in the 150A Base together with the transformer through which the signal passes for transmission to following amplifiers or controls. While a cathode follower has a low output impedance it cannot be loaded with low values of resistance or impedance. Therefore, if the M11 Microphone System is to be operated into a mixer or into a preamplifier having an input transformer, the output transformer in the power supply is necessary.

If the M11 Microphone System is to be followed by a pre-amplifier in a permanent installation intervening transformers can be eliminated. In this case transmission should be directly from the cathode of the cathode follower through coaxial cable, then through a blocking condenser to the grid of the following amplifier.

HUM BALANCE

A screw driver adjustment for hum balance is accessible through a small hole in the front panel of the power supply. Experience to date indicates that this control is not necessary but it is provided as an added precaution in the event that it is needed under some unusual circumstances.

LOW FREQUENCY CUT-OFF SWITCH

The response of the condenser microphone inherently extends to very low frequencies. In some cases this is a disadvantage where rumblings at low frequencies are caused by ventilating systems or traffic. The low frequency cut-off switch located on the power supply reduces low frequency response at a rate of 6 DB per octave, being down approximately 6 DB at the frequencies indicated—20 cycles, 40 cycles, or 120 cycles. The 40-cycle position gives low frequency response at least equivalent to the best commercial microphones.

SERVICE INSTRUCTIONS

Difficulties with the M11 Microphone System are most readily diagnosed by means of voltage measurements using a high resistance voltmeter, (at least 10,000 ohms per volt).

P518A Power Supply. Remove the chassis of the power supply from its case. The chassis is attached to the front panel by four oval head screws and slides out when they are removed. This is most readily accomplished by laying the case on its back.

P519A Power Supply. Remove the front panel exposing the resistor board and components.

The power supplies will appear as shown in Figure H which shows the position of parts on the chassis with component values labeled. Typical operating voltages are shown.

With the Microphone System in operating condition, check voltages in the power supplies as shown. If voltages are abnormal, remove the microphone from the base. Unless the microphone needs repair all voltages should remain unchanged except for momentary surges. The input cable can be removed to check the power supply alone.

With the base and cable detached the heater supply voltage will rise to about 13 or 14 volts and the plate and screen voltages will rise to about 310 to 325 volts. No voltage will appear at the cathode since the 6AU6 Vacuum Tube is not connected and no current is flowing through its load resistor.

Assuming that the power supply alone is operating properly, add first the cable, then the base, then the microphone. Thus the component which is responsible

for difficulty can be isolated. Since voltage appears at the cathode only when the 6AU6 Tube is operating, a shorted blocking condenser connecting the cathode to the transformer will not be detected except under operating conditions.

If the 150A Microphone Base is suspected after these tests, (failure of cathode voltage to appear or failure of the heater to draw current) the 6AU6 Vacuum Tube in the 150A Base can be changed as follows:

Remove the 21B Microphone. Place the 150A Base on its cable connector which makes a convenient withdrawal tool. Remove the two oval head screws near the nameplate. Grasp the cable connector firmly and gently slide the exterior shell of the Base off of its interior parts. The 6AU6 Vacuum Tube is now accessible for replacement. Normally this tube should have a life expectancy of two years or more operation. When replacing the outer shell note that the nameplate should be opposite the latch on the Cannon connecter.

Do not attempt to make any adjustments or repairs to the 21B Microphone. If the rear insulated portion has accumulated dirt, it may be removed with a cotton swab dampened, but not wet, with alcohol.

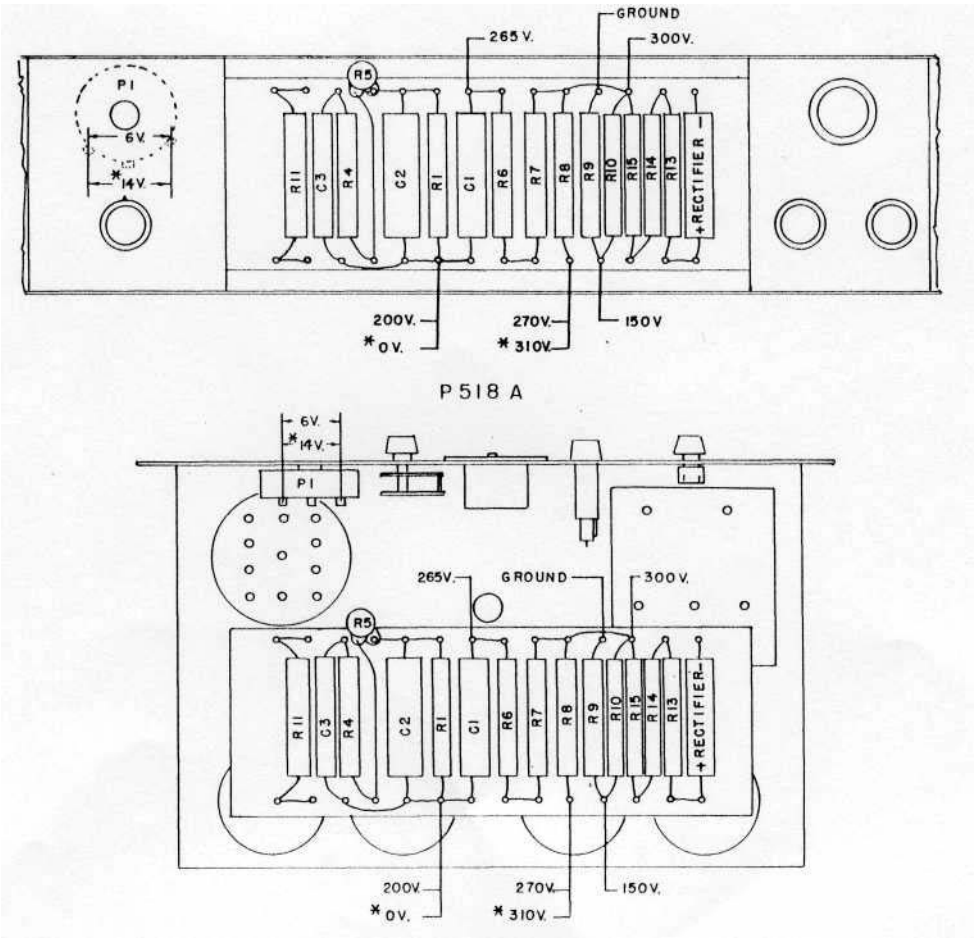
Complete repair facilities are available in either New York or Hollywood.

GENERAL

We believe every facility has been provided to permit you to obtain dependable, trouble-free operation while enjoying the high quality performance possibilities of your Altec 21B Microphone. Enclosed with these Instructions are some suggestions for use of the microphone. We will appreciate hearing from users with further suggestions for best results in order that your experiences may be included in future issues of our suggestions for use of these systems.

ALTEC LANSING CORPORATION
161 Sixth Ave., New York 13, N.Y. 1161
North Vine St., Hollywood 38, Calif.

P 519 A



* VOLTAGES MEASURED WITH 150A MICROPHONE BASE DETACHED. ALL VOLTAGES TO GROUND EXCEPT AS SHOWN.

FIGURE H

Talent deserves

to be seen

as well as heard

ALL SOUND BY ALTEC

Microphones

Loudspeakers

Amplifiers

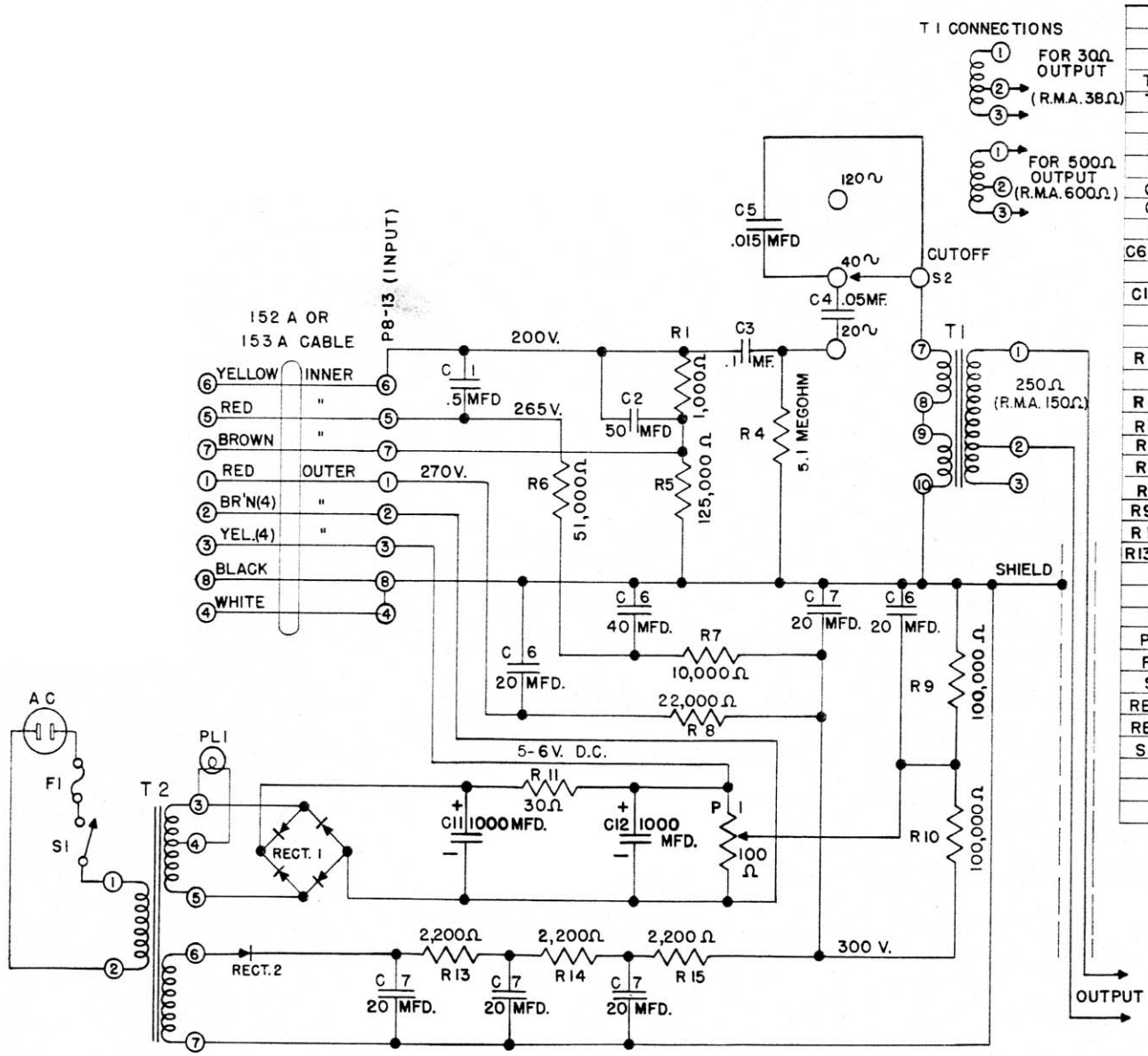
ALTEC

LANSING CORPORATION

161 SIXTH AVENUE, NEW YORK 13

1161 NORTH VINE STREET, HOLLYWOOD 38

Printed in U.S.A.



ALTEC LANSING
P 518 A POWER SUPPLY

PARTS LIST	
T1	ALTEC LANSING TBB-103
T2	" " TP-608-A
C1	.5 MFD 400 V. SOLITE
C2	50 MFD 25 V.
C3	.1 MFD 600 V.
C4	.05 MFD 400 V.
C5	.015 MFD 400 V.
C6, 7	20X20X20X20 MFD 450 V.
C11, 12	1000 MFD 25 V.
R1	1,000 OHM 1 W.
R4	5.1 MEG. 1/2 W.
R5	125,000 OHM, WIRE WOUND, 1 W.
R6	51,000 OHM, 1 W.
R7	10,000 OHM 1 W.
R8	22,000 OHM 1 W.
R9, 10	100,000 OHM 1 W.
R11	30 OHM 5 W.
R13, 14, 15	2200 OHM 1 W.
P1	I.R.C.-W100 (SCREW SLOT)
PL1	G.E. MAZDA NO. 44
F1	1/2 A. LITTELFUSE
S1	NO. 1561 H & H A.C. SWITCH
RECT. 1	BC-029M SELENIUM, 18 V., 300 MIL., FANSTEEL
RECT. 2	AD-1009 SELENIUM, 260 V., 4 MIL. 1/2 WAVE, "
S2	NO. 1461 CENTRALAB

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