

NO	I-15
AMPLIFIER	
80A & B	
12-8-38	

80A AMPLIFIER

ELECTRICAL CHARACTERISTICS

GAIN.....31.4 DB  $\pm$  1 DB  
 OPERATES FROM.....30 OHMS  
 INTERNAL  
 INPUT IMPEDANCE...HIGH (OPEN TRANSFORMER)  
 OPERATES INTO.....200 OR 50 OHMS  
 INTERNAL  
 OUTPUT IMPEDANCE...200 OR 50 OHMS  
 OUTPUT POWER.....APPROX. - 6 DB (0 LEVEL - .003 WATTS)  
 OUTPUT NOISE.....APPROX. - 110 DB ON DC FILA-  
 MENTS (UNWEIGHTED)  
 POWER SUPPLY.....200 V. DC FOR PLATE POWER.  
 10 TO 12 V. AC OR DC FOR  
 FILAMENTS. A COMPLETE POWER  
 SUPPLY MAY BE OBTAINED FROM  
 AN 86 OR 92 TYPE AMPLIFIER.  
 A 716A APPARATUS UNIT IS RE-  
 QUIRED IN SUCH CASE FOR FIL-  
 TERING THE PLATE SUPPLY.  
 GAIN CONTROL.....NONE

VACUUM TUBE

ONE 262A VACUUM TUBE IS REQUIRED.

EQUIPMENT CHARACTERISTICS

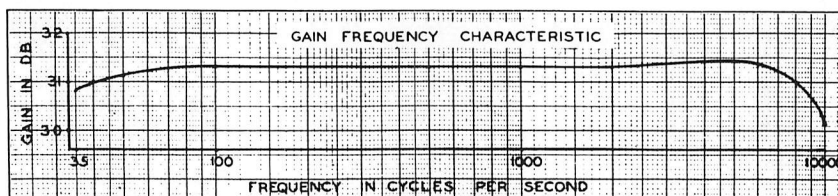
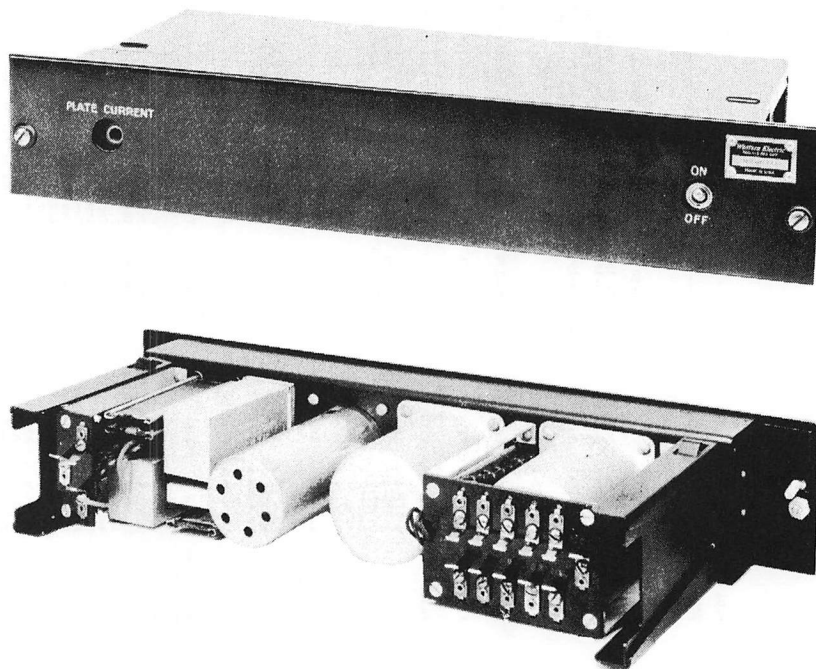
WEIGHT.....APPROX. 16 POUNDS  
 PANEL SIZE.....19-5/32 X 3-15/32  
 DEPTH.....7-5/16  
 MOUNTING.....STD. 19" RELAY RACK  
 FINISH.....BLACK JAPAN

REFERENCES

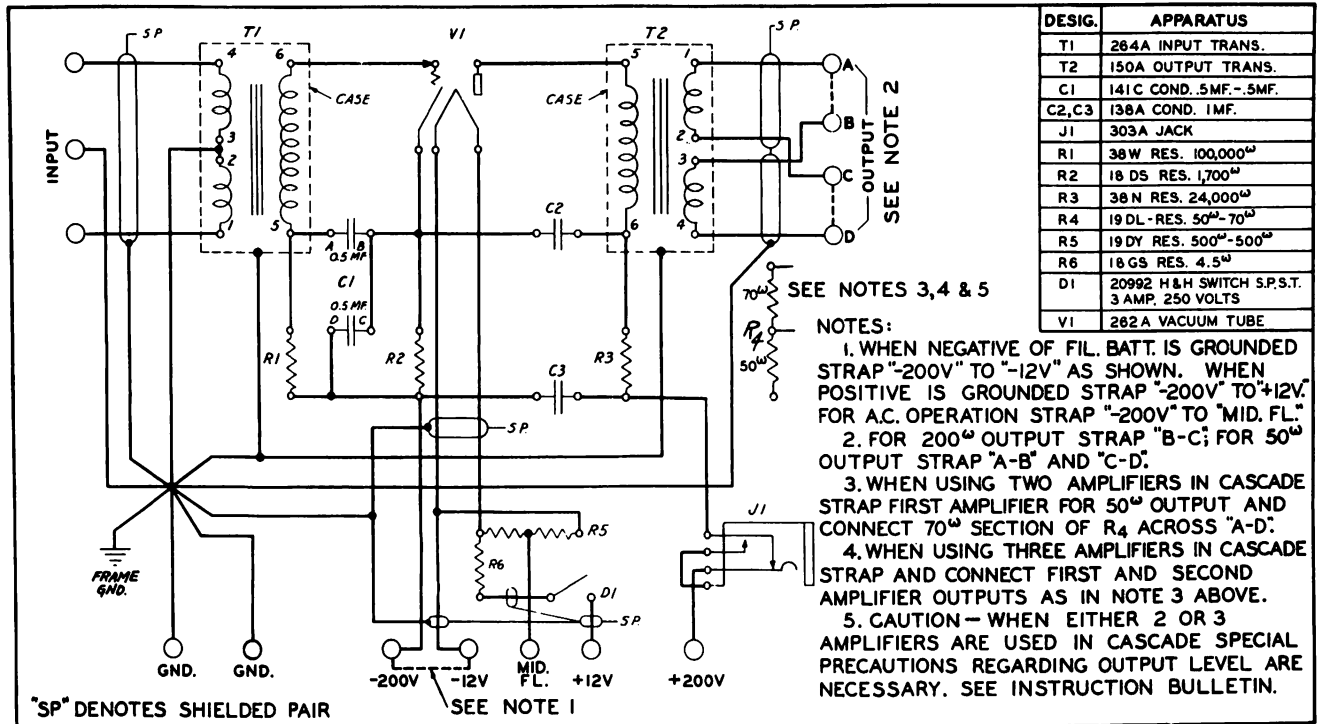
INSTRUCTION BULLETIN NO. 638 ON 80A AMPLIFIER  
 ESO-341102 - ASSEMBLY  
 ESO-341114 - SCHEMATIC (80A)  
 ESO-341115 - WIRING DIAGRAM (80A)  
 ESO-343460 - SCHEMATIC (80B)  
 ESO-343461 - WIRING DIAGRAM (80B)

80B AMPLIFIER

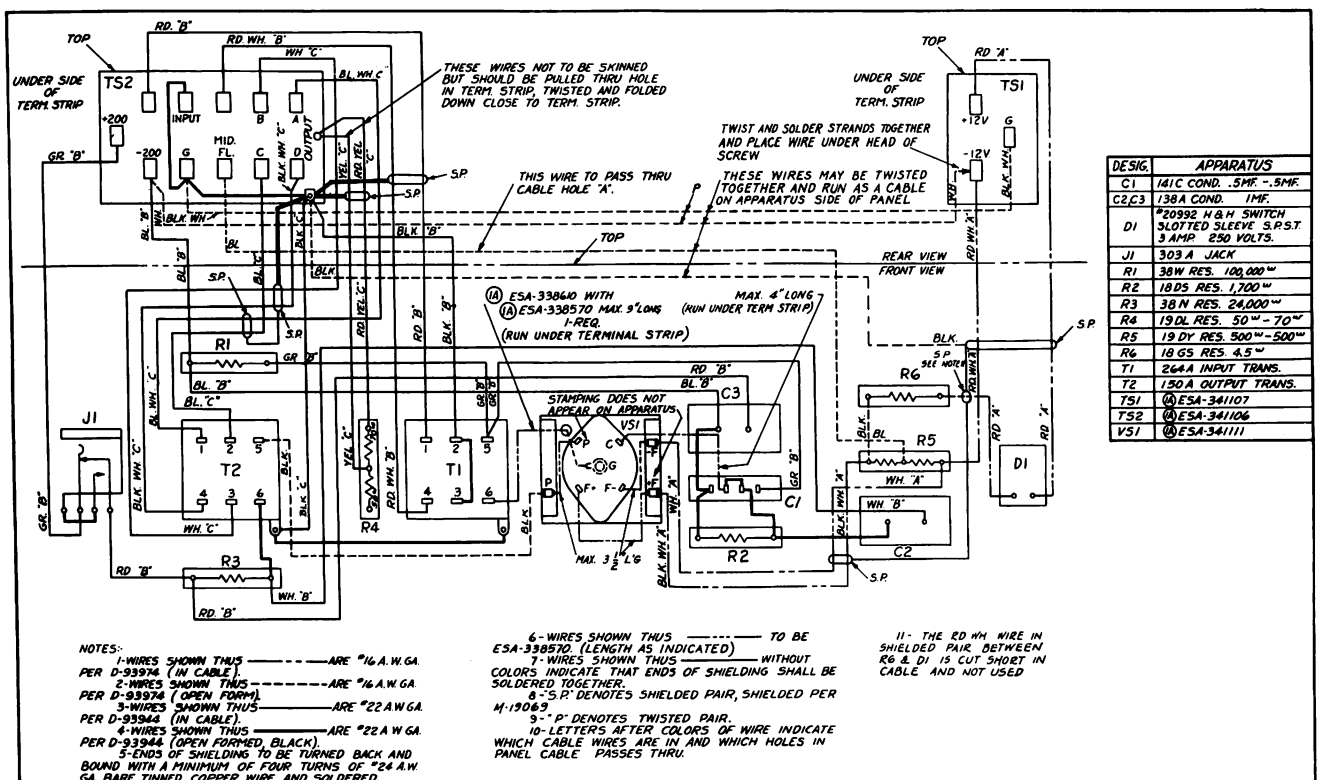
NOTE: THE 80B AMPLIFIER IS THE SAME AS THE 80A AMPLIFIER EXCEPT THAT IT USES THE 264B INSTEAD OF THE 264A INPUT TRANSFORMER AND THEREFORE OPERATES FROM 200 OR 50 OHMS INSTEAD OF FROM 30 OHMS.

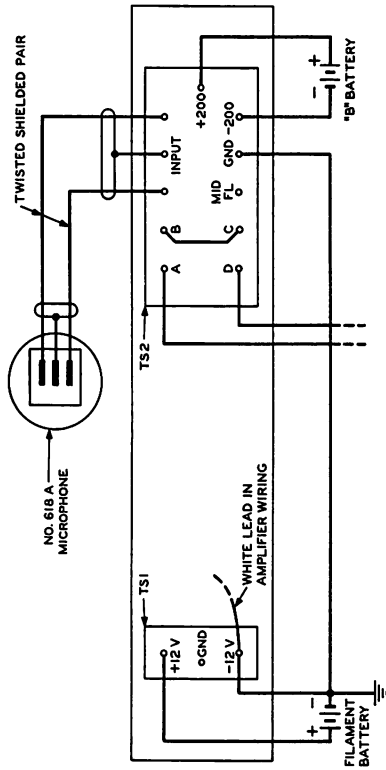


SCHEMATIC

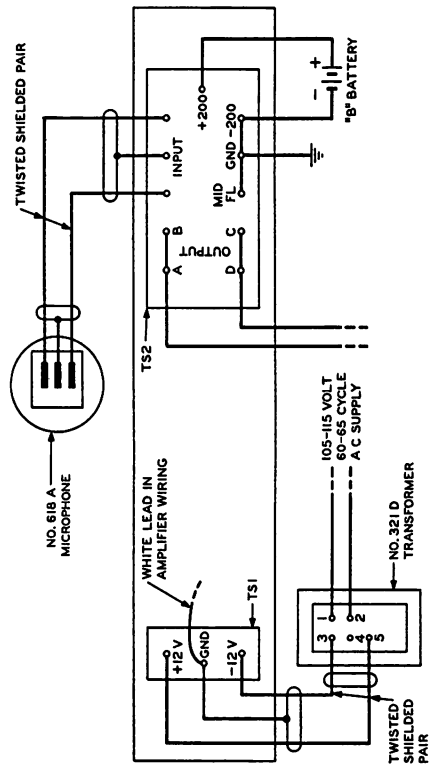


WIRING DIAGRAM

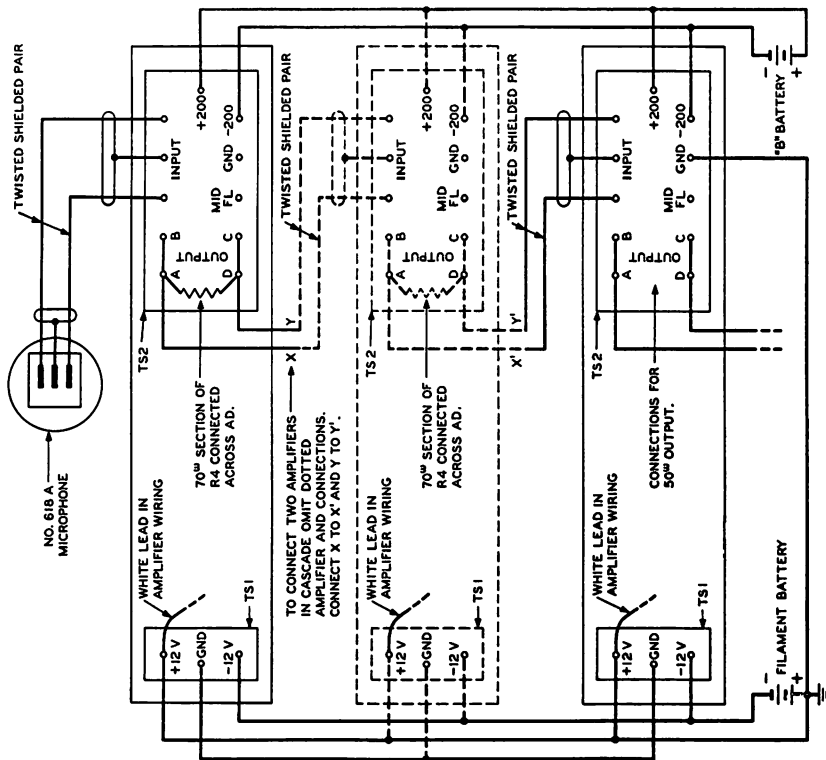




External connections for complete battery operation



External connections when heater voltage is obtained from an alternating current source



External connections for complete battery operation of 2 or 3 No. 80A Amplifiers in cascade

Western Electric

# AMPLIFIER No. 81A

## Instructions for Use

The Western Electric No. 81A Amplifier is a two-stage, adjustable gain, resistance coupled amplifier, intended for use as a low-level line amplifier in alternating current operated speech input equipments for radio broadcasting.

The No. 81A Amplifier is designed to operate between impedances of 200 ohms and 500 ohms with a gain of 30 db, 40 db, or 50 db, as determined by the position of the flexible connector which is soldered to one of three taps on the resistance in the grid circuit of the second vacuum tube. The frequency response characteristic is uniform within approximately 1 db from 30 cycles to 10,000 cycles per second. This amplifier will deliver a zero energy level (0.006 watt) with less than 1 percent total harmonics introduced by the amplifier. Two Western Electric No. 262A Vacuum Tubes are used; these tubes have a low noise level when the filaments are operated from alternating current. The vacuum tubes are not supplied with the No. 81A Amplifier and must be ordered separately.

The schematic circuit diagram is shown on Figure 1 and the wiring diagram on Figure 2.

### DESCRIPTION

The component parts of the No. 81A Amplifier are assembled on a depressed metal panel 19 inches wide and 5¼ inches high designed for mounting in a standard relay rack or equipment cabinet. The panel is equipped with a dark gray mat on the front. The mat is removable to allow access to the panel wiring and the terminal blocks which, with the smaller pieces of apparatus, are located in the depressed section of the panel behind the mat. The larger pieces of apparatus such as the vacuum tubes, coils, and condensers, are mounted on the back of the panel and are protected from dust and mechanical injury by an aluminum finished back cover. The mat and the back cover may be obtained with a black finish if this is specified in the order.

An alternating current supply of approximately 0.64 ampere at  $10 \pm 0.3$  volts is required for the filaments of the No. 262A Vacuum Tubes which are

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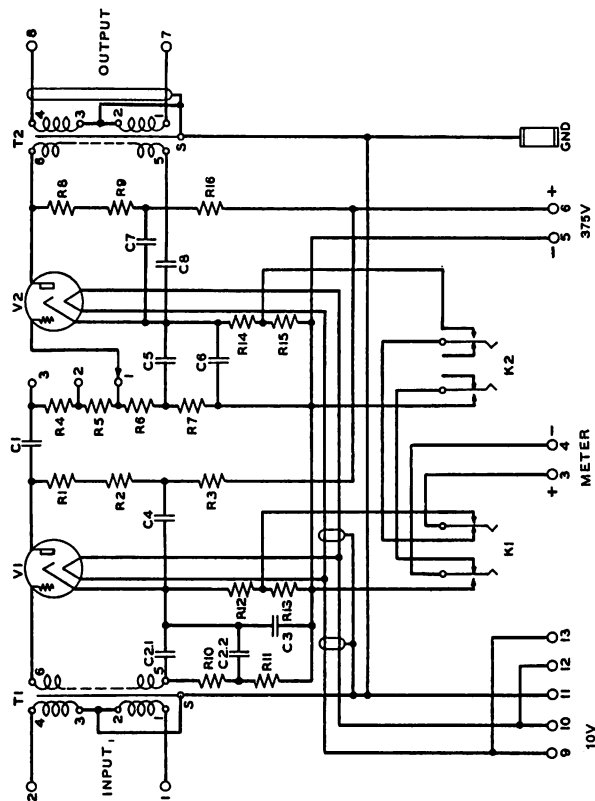


Fig. 1—Schematic Circuit

connected in parallel. The Western Electric No. 263A Voltage Regulator Panel, which supplies a constant 10-volt potential from 100-125-volt, 60-cycle power mains, is recommended for this purpose. (If the frequency of the power supply is 50 cycles, Western Electric No. 263B Voltage Regulator Panel should be used).

A plate power supply of approximately 0.005 ampere (5 milliamperes) at  $375 \pm 25$  volts DC is required for the plate circuits of the vacuum tubes. The Western Electric No. 8A Rectifier and No. 716A Filter are recommended for this purpose.

The grid bias potentials for the vacuum tubes are obtained from voltage drops across resistances R12 and R13, and R14 and R15, located in the cathode circuits of the first and second tubes, respectively.

Keys K1 and K2 are provided at the front of the panel for measuring indirectly the plate currents of the vacuum tubes through an external meter which should be connected to terminals 3(+) and 4(-) of the amplifier. For these measurements the voltage across a part of the bias resistances in each vacuum tube circuit is measured on the external meter by depressing the proper key. An interlock circuit is provided so that the space current in only one tube can be measured at any one time even though the keys may be operated

simultaneously. The circuit is designed for use with a Western Electric No. 262A Meter Panel, which is furnished as an integral part of the speech input equipments of which this amplifier forms a part. If the No. 81A Amplifier is used in assemblies other than those for which it is designed, it is recommended that a No. 262A Meter Panel be obtained for measuring the space currents. It will likewise be necessary to provide, externally, power control switches for the filament and the plate circuit power supply voltages since these controls are not included in the No. 81A Amplifier. The No. 8A Rectifier contains a power control switch with a time delay feature which permits the cathodes of the vacuum tubes in the amplifiers to reach their normal operating temperatures before the high voltage plate power is applied. This is a necessary precaution to insure long life for the vacuum tubes. The No. 8A Rectifier also contains terminals for connecting to a No. 716A Filter which is designed for the plate supply circuit of the No. 81A Amplifier.

## INSTALLATION

Care should be exercised in the installation of the No. 81A Amplifier to guard against unnecessary exposure to strong magnetic fields from rectifiers or other alternating current operated equipment. Since the amplifier as ordinarily employed forms a part of a larger system the gain of which may be as high as 110 db, it is obvious that any noise which is induced in the input circuit may become objectionable in the ultimate output of the system. Although special shielding precautions have been taken in the design of the amplifier, if this precaution is not observed an abnormal amount of hum due to magnetic coupling may be experienced. Two terminal strips are provided to isolate the alternating current filament leads from the input, output and plate supply wires. The terminal strip at the left side of the amplifier (viewed from the front) contains eight terminals, numbered from 1 to 8. The right side terminal strip contains five terminals, numbered from 9 to 13. The following table gives the terminal numbers and the connections to be made to each terminal.

### TERMINAL NUMBERS AND CONNECTIONS FOR NO. 81A AMPLIFIER

Terminal Numbers	External Connections
1 and 2	Input
3 and 4	Meter Terminals; 3 is positive
5	-375 Volts DC
6	+375 Volts DC
7 and 8	Output
9 and 10	10 Volts AC
12 and 13	10 Volts AC (multiple)
11	Ground

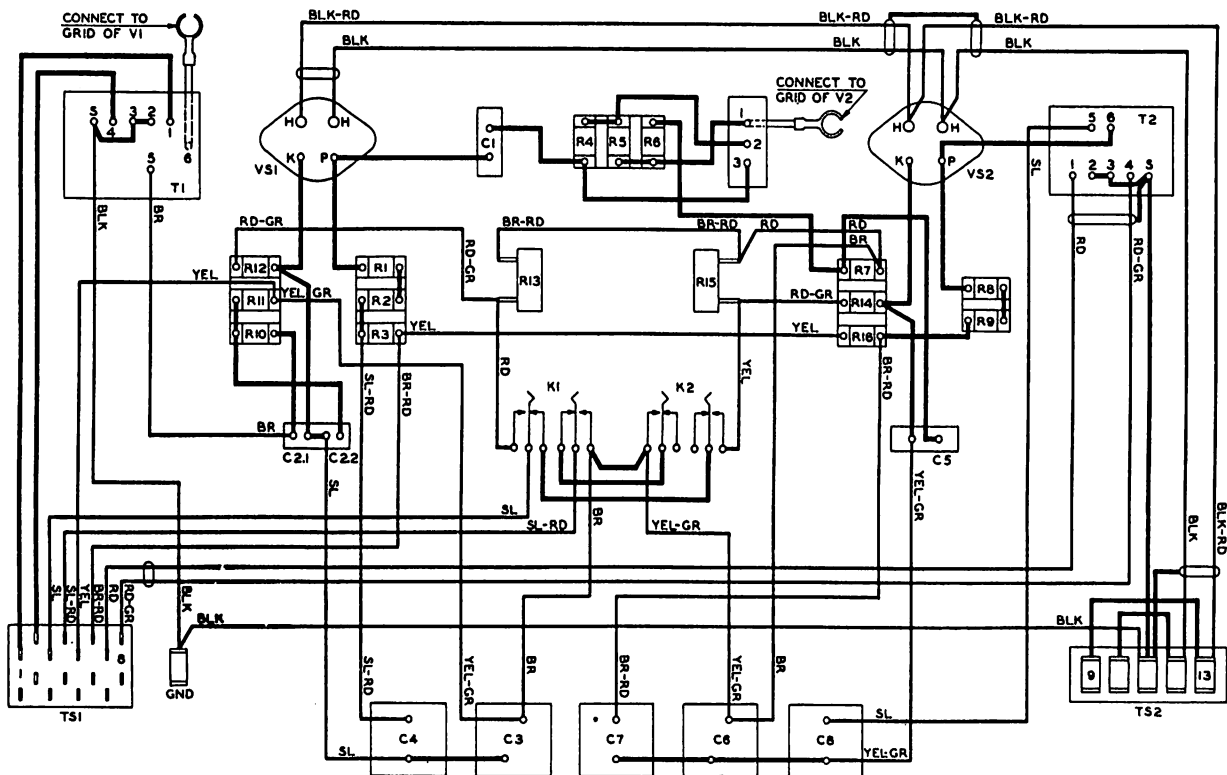


Fig. 2—Wiring Diagram