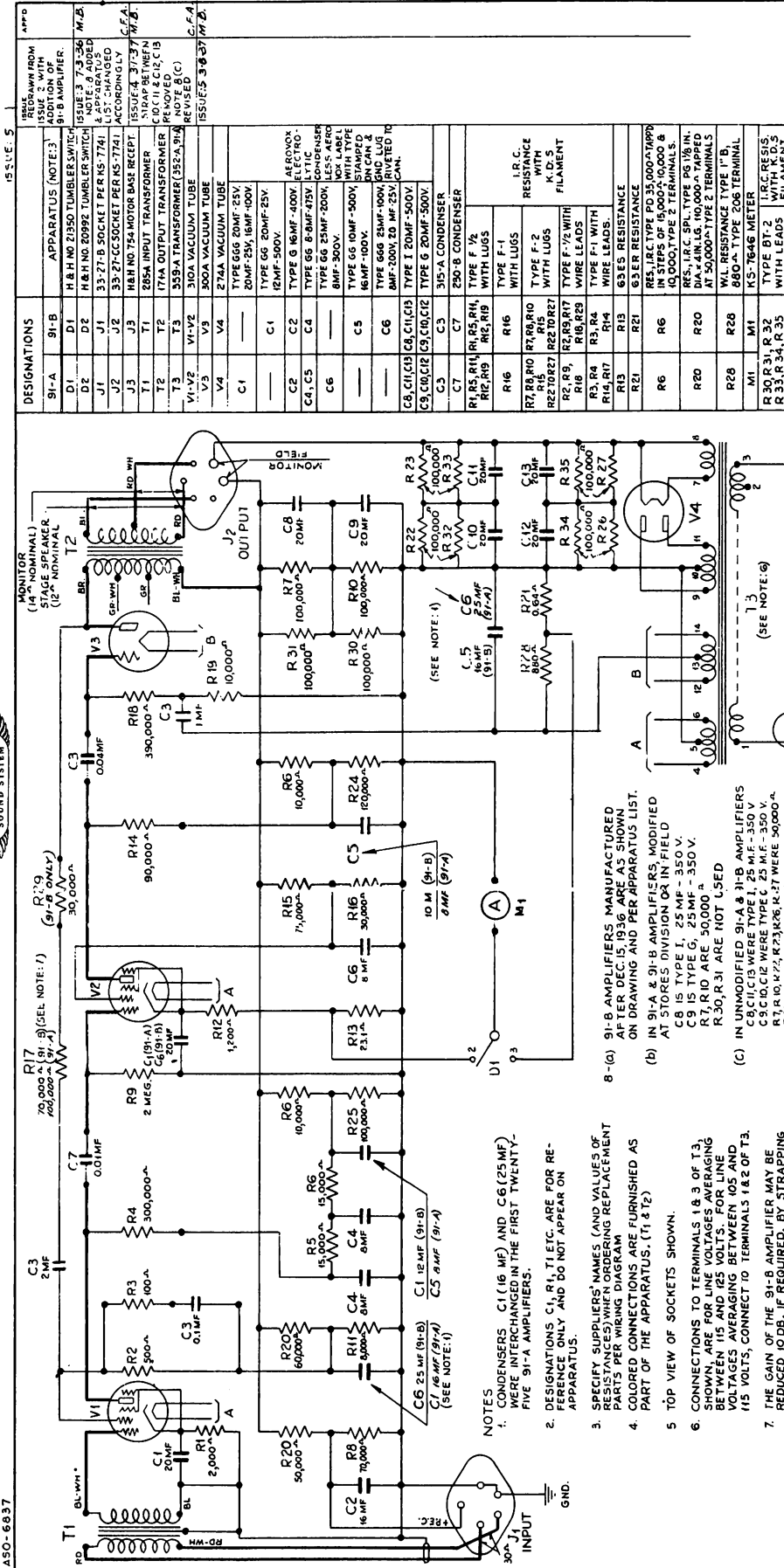


ASO-6837-5 AMPLIFIER, 9I TYPE  
4.03  
ISSUE 5



DESIGNATIONS	APPD
9I-A	RE-APPD FROM
9I-B	ADDITION OF
D1	NOTE: 3
D2	NOTE: 4
J1	NOTE: 5
J2	NOTE: 6
J3	NOTE: 7
T1	NOTE: 8
T2	NOTE: 9
T3	NOTE: 10
V1-V2	NOTE: 11
V3	NOTE: 12
V4	NOTE: 13
C1	NOTE: 14
C2	NOTE: 15
C3	NOTE: 16
C4	NOTE: 17
C5	NOTE: 18
C6	NOTE: 19
C7	NOTE: 20
C8	NOTE: 21
C9	NOTE: 22
C10	NOTE: 23
C11	NOTE: 24
C12	NOTE: 25
R1	NOTE: 26
R2	NOTE: 27
R3	NOTE: 28
R4	NOTE: 29
R5	NOTE: 30
R6	NOTE: 31
R7	NOTE: 32
R8	NOTE: 33
R9	NOTE: 34
R10	NOTE: 35
R11	NOTE: 36
R12	NOTE: 37
R13	NOTE: 38
R14	NOTE: 39
R15	NOTE: 40
R16	NOTE: 41
R17	NOTE: 42
R18	NOTE: 43
R19	NOTE: 44
R20	NOTE: 45
R21	NOTE: 46
R22	NOTE: 47
R23	NOTE: 48
R24	NOTE: 49
R25	NOTE: 50
R26	NOTE: 51
R27	NOTE: 52
R28	NOTE: 53
R29	NOTE: 54
R30	NOTE: 55
R31	NOTE: 56
R32	NOTE: 57
R33	NOTE: 58
R34	NOTE: 59
R35	NOTE: 60
M1	NOTE: 61
T1	NOTE: 62
T2	NOTE: 63
T3	NOTE: 64
V1	NOTE: 65
V2	NOTE: 66
V3	NOTE: 67
V4	NOTE: 68

RE-APPD FROM ADDITION OF NOTE: 3 NOTE: 4 NOTE: 5 NOTE: 6 NOTE: 7 NOTE: 8 NOTE: 9 NOTE: 10 NOTE: 11 NOTE: 12 NOTE: 13 NOTE: 14 NOTE: 15 NOTE: 16 NOTE: 17 NOTE: 18 NOTE: 19 NOTE: 20 NOTE: 21 NOTE: 22 NOTE: 23 NOTE: 24 NOTE: 25 NOTE: 26 NOTE: 27 NOTE: 28 NOTE: 29 NOTE: 30 NOTE: 31 NOTE: 32 NOTE: 33 NOTE: 34 NOTE: 35 NOTE: 36 NOTE: 37 NOTE: 38 NOTE: 39 NOTE: 40 NOTE: 41 NOTE: 42 NOTE: 43 NOTE: 44 NOTE: 45 NOTE: 46 NOTE: 47 NOTE: 48 NOTE: 49 NOTE: 50 NOTE: 51 NOTE: 52 NOTE: 53 NOTE: 54 NOTE: 55 NOTE: 56 NOTE: 57 NOTE: 58 NOTE: 59 NOTE: 60 NOTE: 61 NOTE: 62 NOTE: 63 NOTE: 64 NOTE: 65 NOTE: 66 NOTE: 67 NOTE: 68

ASR-4491 WIRING DIAGRAM (9I-A) ASSOCIATED DRAWINGS ASR-4819

9I-A & 9I-B AMPLIFIER AFTER FILTER CIRCUIT MODIFICATION SCHEMATIC & CIRCUIT LABEL WESTERN ELECTRIC SOUND SYSTEMS ELECTRICAL RESEARCH PRODUCTS INC. NEW YORK DRAWN BY Z.S. DATE 8-10-36 APPD BY J.S. DATE 6-28-36 CHECKED BY C.L. DATE 6-28-36

SCALE ASO-6837

105-125V. A.C. POWER SUPPLY. (SEE NOTE 1) 50-60 CYCLE WITH 359-A TRANS. (9I-B) ONLY.

TRIMMING LINE

ASO-6837

- CONDENSERS C1 (16 MF) AND C6 (25 MF) WERE INTERCHANGED IN THE FIRST TWENTY-FIVE 9I-A AMPLIFIERS.
- DESIGNATIONS C1, R1, T1, ETC. ARE FOR REFERENCE ONLY AND DO NOT APPEAR ON APPARATUS.
- SPECIFY SUPPLIER'S NAMES (AND VALUES OF RESISTANCES) WHEN ORDERING REPLACEMENT PARTS PER WIRING DIAGRAM.
- COLOR CONNECTIONS ARE FURNISHED AS PART OF THE APPARATUS. (T1 & T2)
- TOP VIEW OF SOCKETS SHOWN.
- CONNECTIONS TO TERMINALS 1 & 3 OF T3 SHOWN ARE FOR LINE VOLTAGES AVERAGING 115 VOLTS. AVERAGING BETWEEN 105 AND 115 VOLTS, CONNECT TO TERMINALS 1 & 2 OF T3.
- THE GAIN OF THE 9I-B AMPLIFIER MAY BE REDUCED 10 DB, IF REQUIRED, BY STRAPPING OUT R17, 70,000-Ω.

- (a) 9I-B AMPLIFIERS MANUFACTURED AFTER DEC 15, 1936 ARE AS SHOWN ON DRAWING AND PER APPARATUS LIST.
- (b) IN 9I-A & 9I-B AMPLIFIERS, MODIFIED AT STORES DIVISION OR IN FIELD C8 IS TYPE 1, 25 MF - 350 V. R7, R10 ARE 50,000 Ω - 350 V. R30, R31 ARE NOT USED.
- (c) IN UNMODIFIED 9I-A & 9I-B AMPLIFIERS C8, C10, C12 WERE TYPE 1, 25 MF - 350 V. R30, R31, R32, R33, R34, R35 WERE NOT USED.





1.1 Use - The 91 type Amplifier is an all "AC" operated, three-stage, combined voltage gain and power, chassis type amplifier unit, with an internal rectifier, used as a main amplifier in the 6F-91 and 6A-91 Systems. It mounts in the KS-7641 Cabinet and is a part of the 500-type Amplifier Set, which is arranged for wall mounting.

1.2 Types, Characteristics, Components, Drawings & Photographs

TYPE (All AC - Reverse feed-back)	91-A	91-B
Gain	92 db (Fixed)	82 or 92 db
Noise Level (below .006 watt-unweighted)	-30 db	5 watts (31.25 db)
Impedance - Input - Nominal	30 ohms	30 ohms
*Vacuum Tubes - Output (9 ohms load)	1.9 ohms	1.9 ohms
1st Stage	(1) 310-A	(1) 310-A
2nd Stage	(1) 310-A	(1) 310-A
3rd Stage	(1) 300-A	(1) 300-A
Rect.	(1) 274-A	(1) 274-A
Input Transf.	285-A	285-A
Power Transf.	171-A	171-A
Power Supply - Volts	359-A	359-A
Cycle	105-125	105-125
Amperes	1.25	1.25 max.
*Fusotron	120	120
Plate Meter (0-150A)	7014 - 1.4 Amp.	702 - 2.0 Amp.
Operates (From	KS-7646	KS-7546
Operates (Into	KS-7658 Pot. in #753	KS-7658 Pot. in #753
Purnishes PEC Supply of	Cont. Cab.	Cont. Cab.
Dimensions	TA-732 App. Unit	TA-732 App. Unit
Schematics	200 V. DC (2 mile)	200 V. DC (2 mile)
Wiring Diagrams	24 H, 18" W, 8" D	24 H, 18" W, 8" D
Photographs	304 db.	304 db.
	ASB-4847	ASB-4847
	ASB-4849	ASB-4849
	9662 & 9683 (500-A)	ASB-4851-3
	9684 & 9685	

\*Ordered and supplied as a separate item.

1.3 Merchandising - The 91-A Amplifier became available, February, 1936; the 91-B Amplifier, June, 1936

The 91-A Amplifier operates on 115 volts, 60 cycle only. The 359-A Power Transformer of the 91-B Amplifier will not fit on the 91-A.

2. CHARACTERISTICS - (In addition to those in section 1.2.) The 91 type amplifier is provided with sockets for the cords of the 101-A or 100-B & 101-B Connector Units. The 310-A Tubes in the first two stages are provided with shields or covers P-465451 to insure quiet operation.

3. INSTALLATION - The 91 type Amplifier is connected at the power transformer for the average line voltage during operating hours and is placed on the lower shelf of the KS-7641 Cabinet and the cords of the 100-B and 101-A or 101-B Connector Units are plugged into the three sockets on the right, as follows: CD-1 - Cord of 101-A or 100-B Connector Unit with two-conductor plug body into the "AC" line receptacle in the rear.

CD-2 - Cord of 101-A or CD-1 of 101-B Connector Unit with six prong plug into the CD-2 "Output" receptacle in the center.

CD-3 - Cord of 101-A or CD-2 of 101-B Connector Unit with five prong plug into the "In" receptacle in the front.

\*In 100-A and 101-B Connector Units must be used together, or 100-B and 101-B Connector Units must be used together.

Vacuum tubes, as follows, are inserted in the four sockets in the front (Photo #9684).

100-A Tube in the first socket from the left. - 310-A Tube in the second socket from the left.

300-A Tube in the third socket from the left. - 274-A Tube in the fourth socket from the left.

4. OPERATION - The 91 type amplifier is placed in operation by pressing the power switch to "ON". The filament current is obtained by operating the meter switch up for V2 and down for V1.

\*Percent-of-Normal" are obtained by operating between 85 and 115.

The 91-B Amplifier only, is provided with two resistors (R-17 and R-29) in the reverse feed-back circuit, so that with both resistors (a total of 100,000 ohms) in the circuit, the gain is 92 db. If the R-29 Resistor (30,000 ohms) only is in the circuit and the R-17 Resistor (70,000 ohms) is short-circuited, the gain is 82 db.

5. MAINTENANCE - (a) The three cords and the four vacuum tubes should be checked periodically to see that they are reliably connected and in good condition. (b) The P-465451 Covers should make good contact with the chassis casting. (c) The fuse and tubes should be checked periodically and be replaced as they burn out, or become broken or damaged, or fail to operate properly. (d) Other replacement parts as required. See ASB-6857 and ASB-4491 for the 91-A Amplifier and ASB-5176 and ASB-4851 for the 91-B Amplifier.

1. 91-B AMPLIFIERS manufactured (per CO-120419) after December 15, 1936, will have condensers C-8 to C-13, inclusive, 25 mf, 350 volt type, replaced by 20 mf, 500 volt condensers R-7, R-10, R-22, R-23, R-26 and R-27, 50,000 ohms each, replaced by 100,000 ohm resistors. These resistors will be shunted by additional resistors R-30 to R-35, inclusive, of 100,000 ohms each. The wiring is changed so that each resistor-condenser group is segregated by itself. These changes are to prevent breakdown of the condensers and burn-out of the resistors in the filter circuit.

1.1 91-B Amplifiers, shipped from the Stores Division after March 15, 1937, will have condensers C-10 to C-13, inclusive, 25 mf, 350 volt type, replaced by 20 mf, 500 volt condensers and resistors R-22, R-23, R-26 and R-27, 50,000 ohms each, replaced by 100,000 ohm resistors. These resistors will be shunted by additional resistors R-32, R-33, R-34 and R-35, inclusive, of 100,000 ohms each. The wiring is changed so that each resistor-condenser group is segregated by itself.

1.2 All 91-A and 91-B Amplifiers in the field (at "on" or "off" service installations or in emergency stocks) are to be modified (see "Head and Act" Operating Bulletin of March 2, 1937) by replacing Condensers C-10 to C-13, inclusive, 25 mf, 350 volt type, by 20 mf, 500 volt type. The resistors R-22, R-23, R-26 and R-27, 50,000 ohms each, by 100,000 ohm resistors. These resistors will be shunted by additional resistors R-32, R-33, R-34 and R-35, inclusive, of 100,000 ohms each, so that each condenser is shunted by two resistors in parallel with a resultant value of 50,000 ohms. The wiring is also changed so that each resistor-condenser group is segregated by itself.

1.3 Merchandising - The following parts for each 91-A or 91-B Amplifier to be modified should be obtained per the "Head and Act" Operating Bulletin of March 2, 1937.

Quantity	Item
2	Aerovox Electrolytic Condensers, Type G, 20 mf, 500 volt, 4-3/4" high, 1-3/8" diam. can, with ground lug riveted to can; less Aerovox label and with the type identification stamped on the can.
2	Aerovox Electrolytic Condensers, Type I, 20 mf, 500 volt, 4-3/4" high, 1-3/8" diam. can, with ground lug riveted to can; less Aerovox label and with the type identification stamped on the can.
4	IRC type BR-2, 100,000 ohm, 2 watt resistors with KDS filaments and with wire leads.
4	IRC type F-5, 100,000 ohm, 2 watt resistors with KDS filaments and with wire leads.
1	Copy of Circuit Label and Schematic of 91-A and 91-B Amplifiers (after modification) ASB-4491-2, reduced to 7" high (paste on outside of cover plate of 91-A Amplifier only).
1	Copy of Circuit Label and Wiring Diagram of 91-A Amplifier (after Filter Circuit Modification), ASB-4491-3, reduced to 7" high (paste on inside of cover plate of 91-A Amplifier only).
1	Copy of Circuit Label and Wiring Diagram of 91-B Amplifier (after Filter Circuit Modification) ASB-4491-2, reduced to 7" high (paste on inside of cover plate of 91-B Amplifier only).

2. FILTER CIRCUIT MODIFICATION PROCEDURE

(a) Remove cover plate and loosen the bakelite resistor mounting strip from the chassis by taking out the 3 bolts and bushings on which it mounts, and remove the metal box, on the top of the chassis, which covers C-8, C-11 and C-13.

(b) Disconnect all wiring to C-10, C-11, C-12 and C-13 and to R-22, R-23, R-26 and R-27.

(c) Remove the black insulating washer (where supplied) from the necks of the 25 mf, 350 volt type G Condensers and place them on the 20 mf, 500 volt condensers; also remove the varnished tubing from the ground lugs of both the type G and I, 25 mf, 350 volt condensers and install them on the 20 mf, 500 volt condensers.

(d) Mount the 20 mf, 500 volt type G Condensers in positions C-10 and C-12 and the 20 mf, 500 volt type I Condensers in positions C-11 and C-13. Reinstall on the top of the chassis the metal box which covers C-8, C-11 and C-13.

(e) Install the type F-2, 100,000 ohm resistors in the same positions and remove the bakelite resistor strip in place of the 50,000 ohm resistors and then shunt each F-2, 100,000 ohm resistor by a type BR-2, 100,000 ohm resistor, mounting and connecting the BR-2 resistor, with wire leads, as shown in the figure of No. 9, ASB-4491-3, for the 91-A Amplifier and Note 5, ASB-4491-2 for the 91-B Amplifier. Then replace the resistor mounting strip.

(f) Remove the resistors and condensers in accordance with Wiring Diagram ASB-4491-1 for the 91-A Amplifier and ASB-4491-2 for the 91-B Amplifier.

(g) Paste a 7" high copy of ASB-4491-3 for 91-A Amplifier, of ASB-4491-2 for 91-B Amplifier, on the inside of the cover plate of each modified amplifier and a 7" high copy of ASB-4491-3 for 91-A Amplifier, of ASB-4491-2 for 91-B Amplifier, on the inside of the cover plate of each modified amplifier and cover both circuit labels with a coat of clear shellac. Then replace cover plate.

3. REPLACEMENT - Always be ordered in accordance with the apparatus lists on the back of the wiring diagrams ASB-4491-1 and ASB-4491-2 for the 91-A and 91-B Amplifiers. It should be noted that the Aerovox Condensers for the 91 type Amplifiers are a special type. Order replacements per Section 1.3.