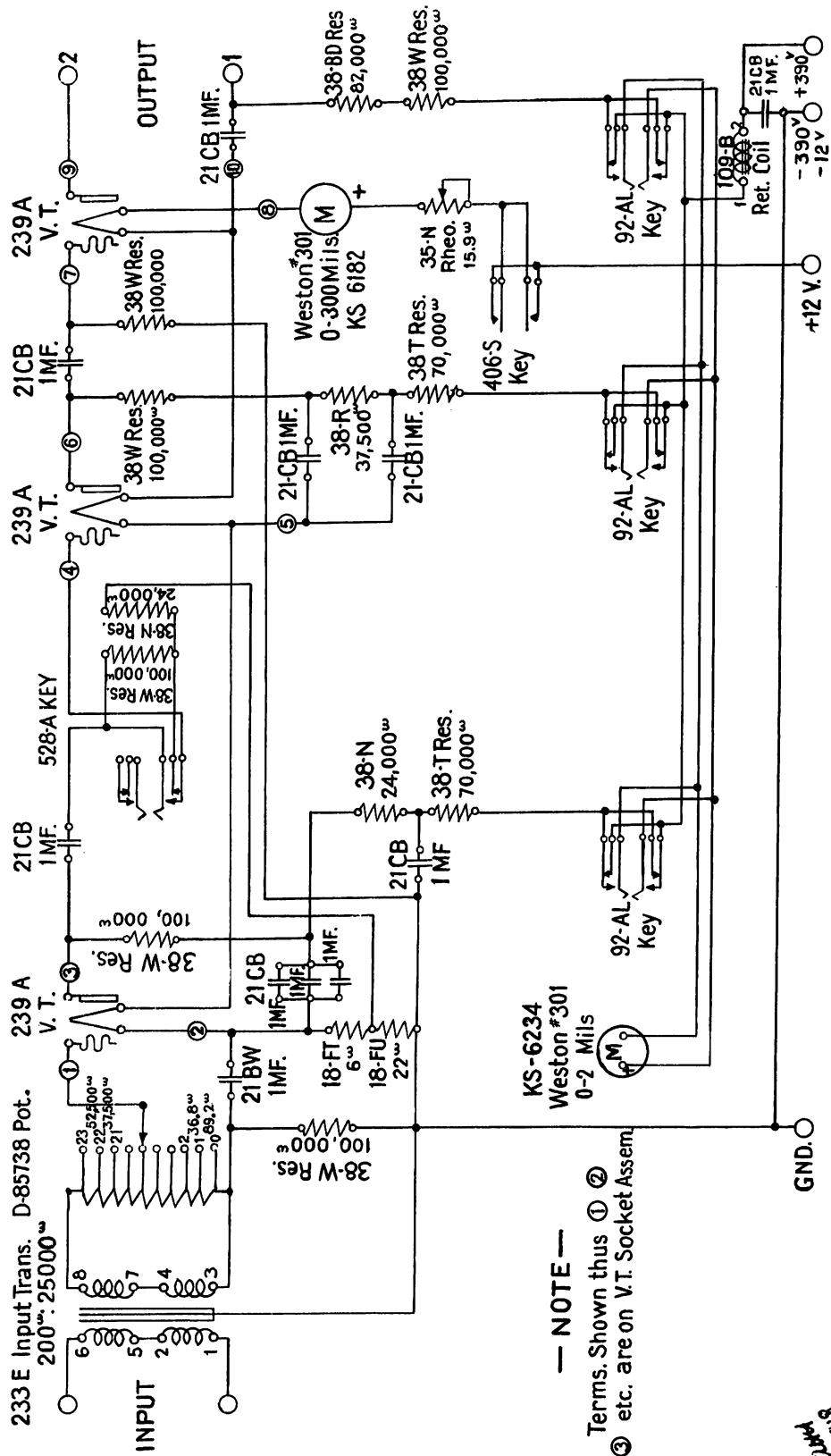


A. T. & I. CO.  
 Dept. of  
 Dev. & Res.



2044  
 2/19/58



# Nos. 41-A and 41-B AMPLIFIERS

## Instructions for Use

In the amplification of voice frequencies at low energy levels, either the Western Electric No. 41-A or No. 41-B Amplifier is especially suitable as a high quality unit for operation between a transmitter, an amplifier, or a phonograph pick-up, and a higher power amplifier. They are particularly designed for operation into a Western Electric No. 42-A Amplifier. The No. 41-A Amplifier operates from a 12-volt DC filament supply while the No. 41-B Amplifier operates from 12 to 18 volts DC.

The schematic arrangement of the No. 41-A Amplifier is shown in Figure 2; that for the No. 41-B Amplifier is shown in Figure 3. In cases where more amplification is required than can be obtained from one No. 41 Type Amplifier, two No. 41-A or two No. 41-B Amplifiers may be operated in cascade ahead of a No. 42-A Amplifier. In such cases, the Western Electric No. 207-A panel is connected between the two No. 41 Type Amplifiers as shown in Figure 6. The method of making connections when using the No. 207-A panel, is given under the heading "External Connections".

The apparatus composing each of these amplifiers is fastened upon panels approximately 19 inches wide and  $12\frac{1}{4}$  inches high and is arranged to mount on a relay rack.

Three No. 239-A Vacuum Tubes are required for the operation of either of these amplifiers. Sockets for the vacuum tubes are provided on the front of the panel and are flexibly attached to the panel by an inertia type mounting. A removable metal cover encloses both the tubes and their mountings. This cover serves as a protection against dust and also as a shield against acoustic and electrical interferences. This cover should always be in place when an amplifier is in operation.

The milliammeters are located on the front of the panel, one of which indicates the filament current of the vacuum tubes while the other permits the reading of the plate current of each tube. The plate current reading of any one of the three tubes is obtained by operating its push button key, one key being associated with each tube.

The filament current of the tubes may be controlled by means of a rheostat located in the upper right-hand corner on the front of the panel, and a key marked "FILAMENT" which is located on the lower right-hand corner of the panel. On some panels, this key is designated "STARTING" instead of "FILAMENT".

A twenty-four position potentiometer is provided, there being 22 steps of 3 db each between positions 1 and 23. When the dial is moved from position 1 to position 0, the input is short-circuited. In addition to the variable potentiometer, a single large-step potentiometer is controlled by a key marked "HIGH-LOW" which is located under the tube socket mounting. The gain of the amplifier is 15 db less when this key is in the "LOW" position than when it is in the "HIGH" position.

It is desirable that the amplifier be operated with this key in the "LOW" position if sufficient amplification is obtained under that condition, in order to reduce noises which originate in the first stage.

The amplifier gives an amplification of 42 db and is designed to work from an input circuit having an impedance of 200 ohms. Its output impedance is approximately 16,000 ohms.

### EXTERNAL CONNECTIONS

The terminals for making external connections to the amplifier are mounted on a terminal strip which is located on the back of the panel underneath the cover and arranged as shown on Figure 4.

The No. 41-A Amplifier requires for its operation, a 12-volt DC supply which may be obtained from either a dry or wet battery, and a 390-volt DC supply which is ordinarily obtained from a No. 42-A Amplifier. The No. 41-B Amplifier requires for its operation a 12- to 18-volt DC supply which may be obtained from a dry or wet battery, or from a No. KS-5259 Motor-Generator Set and a No. 702-B Filter, and a 390-volt DC supply which is ordinarily obtained from a No. 42-A Amplifier. The current taken for the filaments of the vacuum tubes is 270 milliamperes and the total plate current taken from the 390-volt supply is approximately 4.5 milliamperes.

The external connections necessary for placing the amplifier in operation are shown in Figure 5. This figure shows the connections for obtaining the plate supply for one No. 41 Type Amplifier from a No. 42-A Amplifier. In this case, the additional "+390V" terminal on the No. 42-A Amplifier should be left unconnected.

If two No. 41-A or two No. 41-B Amplifiers are used together, the two amplifiers may be run from the same supply, i.e. only one filament supply and one 390-volt supply will be necessary. Where a No. 42-A Amplifier is used for the 390-volt supply separate terminals are provided for supplying the two No. 41 Type Amplifiers as illustrated in Figure 6 which shows the connections for this arrangement. The current drains for both the filaments and the plates of the vacuum tubes for the two amplifiers will, of course, be double that for one amplifier.

The No. 207-A Panel is used to connect the output of one No. 41 Type Amplifier to the input of a second No. 41 Type Amplifier when these amplifiers are used in cascade arrangement. The panel is approximately 19 inches long and  $3\frac{1}{2}$  inches wide. All of the apparatus is mounted on the rear of the panel. A mat is provided for the front of the panel. The circuit arrangement is shown on Figure 7.

If two No. 42-A Amplifiers are operated from a No. 41 Type Amplifier, the terminals which are connected in multiple should be similarly placed or bear similar numbers as described in the bulletin on the No. 42-A Amplifier.

If the No. 41 Type Amplifier is used separately or with a power supply which is not arranged to supply plate current to it, the 390-volt supply can be taken from dry batteries. In this case, the minus side of the battery should be connected to the ter-

terminal marked "GND" on the No. 41 Type Amplifier and the battery voltage should be maintained between the limits of 340 and 400 volts. The terminals marked "INPUT" should be connected to the source of voltage that is to be amplified, and the terminals marked "OUTPUT" "1" and "2" to the terminals of the amplifier used.

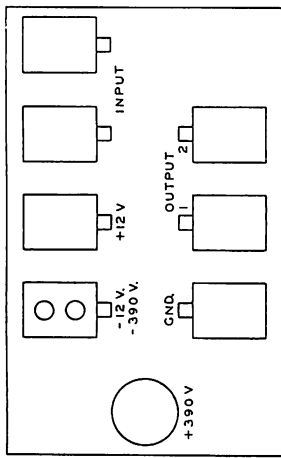


Fig. 4—Terminal Arrangement of No. 41 Type Amplifier

OPERATION

After the above connections have been made, the amplifier may be placed in operation as follows:

Turn the rheostat marked "FIL. CONTROL" to its extreme counter-clockwise position. Remove the cover from the front of the panel and insert three No. 239-A Vacuum Tubes in the socket provided for them and then replace the cover. Operate

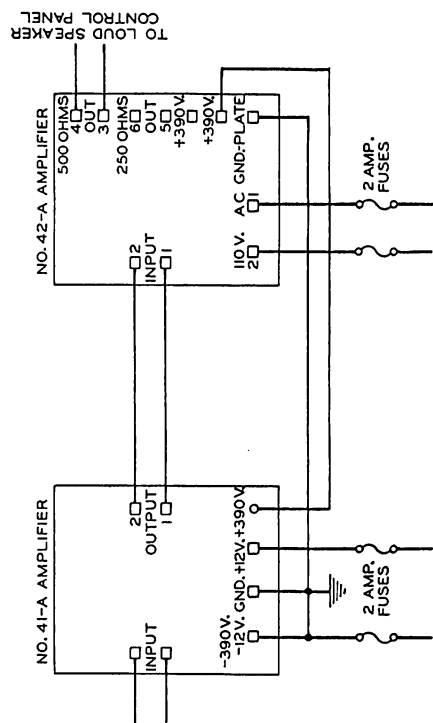


Fig. 5—Connections Necessary for Placing No. 41 Type Amplifier in Operation

the key marked "FILAMENT" to its "ON" position and adjust the "FIL. CONTROL" rheostat so that the "FIL. CURRENT" meter reads  $270 \pm 5$  milliamperes. In case the "FIL. CURRENT" meter has a red sector marked at the 250 milliampere point on the scale, this sector should be disregarded in adjusting the filament current. Turn on

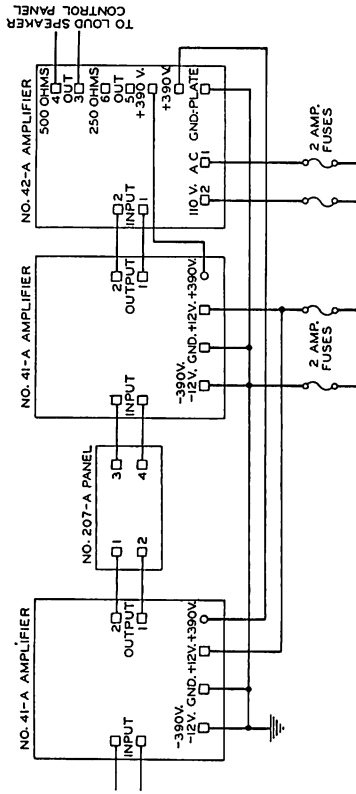


Fig. 6—Connections Necessary for Placing Two No. 41 Type Amplifiers in Operation

the 390-volt filament supply for the plates of the vacuum tubes. If a No. 42-A Amplifier is used for this supply, it should be turned on as described in the Instruction Bulletin for that amplifier. If a separate battery supply is used, a switch should be connected in the battery circuit so as to facilitate turning on and off this supply. Operate in succession the "PLATE CURRENT" keys which are numbered 1, 2, and 3. The "PLATE CURRENT" meter should in each case indicate between 1.30 and 1.70 milliamperes.

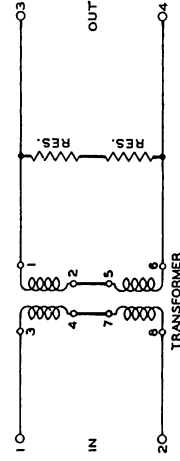


Fig. 7—Circuit Arrangement of No. 207-A Panel

To obtain the proper volume from the output of the amplifier system, the twenty-four position potentiometer should first be set at zero and the setting should then be advanced until suitable volume is obtained.

produce an indication on the milliammeter. If it does, the vacuum tube which has been replaced, has a defective filament and should be discarded. Failure of this procedure to cause the filaments of the tubes to light indicates that the trouble exists in the wiring of the amplifier or is caused by a defective milliammeter.

When the No. 42-A Amplifier is used with the No. 41 Type Amplifier and is supplied from an AC source of 110 volts, the value of the plate current potential applied to the No. 41 Type Amplifier is such that the plate current of each stage of the latter should be minimum 1.30 and maximum 1.70 milliamperes. If the plate current indication for any stage is outside of these limits, replace the vacuum tube in that stage with a new one. If the plate currents of all three stages are outside the limits and if replacing the tubes does not correct this condition, then the trouble may be due to defective wiring in the No. 41 Type Amplifier or to an improper value of plate voltage supply. If the plate supply is obtained from some source other than the No. 42-A Amplifier, the source should be tested to insure that the proper potential is being supplied.

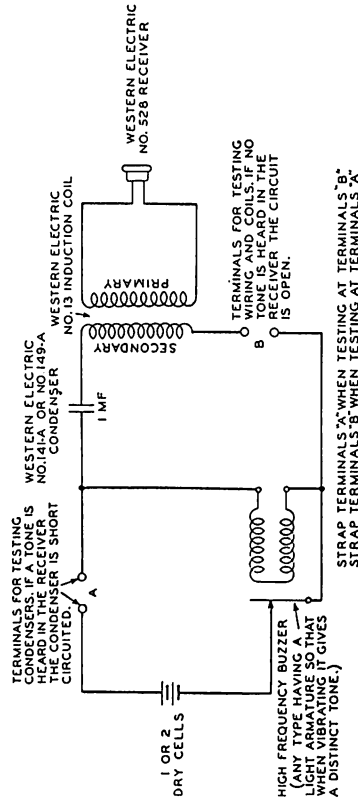


Fig. 8—Continuity and Discontinuity Test Circuit

If an inspection of the wiring does not disclose the trouble, the best policy is to use as a guide, the circuit diagram which will be found pasted inside of the cover of the amplifier and, if possible, trace the trouble to its source by a process of elimination.

In checking circuits, do not use a DC buzzer as there is danger of magnetizing the coils. The best method of testing the continuity of circuits is to use the test circuit shown in Figure 8. Condenser tests should be made by connecting the condenser to be tested across terminals "A" and strapping terminals "B". If a tone is heard in the receiver, the condenser is short-circuited. Continuity tests of coils and wiring should be made by connecting the circuit to be tested across terminals "B" and strapping terminals "A". If no tone is heard in the receiver, the circuit is open. When testing a piece of apparatus, it should be temporarily disconnected. A con-

In using two No. 41 Type Amplifiers in cascade, the following instructions should be followed as regards the settings of the two gain control potentiometers and the two 15 db keys. In the following discussion, the No. 41 Type Amplifier receiving its input from the transmitter or line is considered to be Amplifier No. 1 and the following No. 41 Type Amplifier to be Amplifier No. 2.

Set the 15 db keys on Amplifiers No. 1 and No. 2 in the "Low" position and the gain control potentiometer of Amplifier No. 1 on zero and Amplifier No. 2 on step 17. Bring the input energy in the input circuit of Amplifier No. 1 to the minimum level which the system will be expected to amplify. Increase the gain of the system by turning the potentiometer of Amplifier No. 1 toward maximum until the required amplification is obtained. If the amplification is found to be insufficient with the potentiometer of Amplifier No. 1 on step 23, increase the setting of the potentiometer of Amplifier No. 2. In case the amplification is still insufficient when the potentiometer of Amplifier No. 2 has reached step 23, return the potentiometer of Amplifier No. 1 to step No. 17 and that of Amplifier No. 2 to step No. 17 and turn the 15 db key on Amplifier No. 1 to "HIGH". Increase the potentiometer setting of Amplifier No. 1 and Amplifier No. 2 in the manner previously described until the desired amplification is obtained.

If more amplification is desired than can be obtained under these conditions, return the potentiometer of amplifier No. 1 to zero and that of Amplifier No. 2 to step 12. Turn the 15 db key on Amplifier No. 2 to "HIGH" and increase the gain of the system by turning the potentiometers of Amplifiers No. 1 and No. 2 towards step 23 as previously described. When operating in this manner, the maximum gain of the system is obtained with both potentiometers on step 23.

The 15 db keys are not intended to be operated frequently, but should be set for the conditions of a particular installation and remain in that position. In no case should the potentiometer of Amplifier No. 2 be operated below step 17 if the 15 db key of that amplifier is in the "Low" position.

## MAINTENANCE

If the amplifier fails to function properly when placing it in operation as previously described, the following points should be checked:

In case the potentiometer or rheostat contacts become dirty, they should be cleaned with carbon tetrachloride and lubricated sparingly with vaseline. Dirty contacts and loose "A" battery connections are usually manifested by irregular noises in the output of the amplifier and their presence may be detected in this manner.

If in operating the "FILAMENT" key to "ON" and turning the "FIL. CONTROL" knob in a clockwise direction, the "FIL. CURRENT" milliammeter does not indicate any current, inspect the connections to the filament supply to insure that the proper voltage exists at the terminals of the amplifier. If this supply is found satisfactory, replace each of the vacuum tubes, one at a time with new ones, and see if this will

AMPLIFIERS, 41 TYPE

EQUIPMENT BULLETIN

1. Purpose of this Bulletin

1.1 To present general engineering and installation information on 41 Type Amplifiers.

2. References

- 2.1 Drawings ASL-366, "41-A Amplifier, Schematic" (leaf)
- ASR-389, "41-A Amplifier, Wiring Diagram" (leaf)
- ASL-232, "41-B Amplifier, Schematic" (leaf)
- ASR-491, "41-B Amplifier, Wiring Diagram" (leaf)

3. Description of Equipment

3.1 One of these preliminary amplifiers is used in the former 1S-41, 28X-41, and 2S-41, and the present 1U-41 and 2U-41 Systems to amplify the reproducer and REC Amplifier outputs. They consist of three resistance coupled stages using 2J3-A Vacuum Tubes, on a panel 12 7/8" high and 19" wide. The tube sockets are mounted on a 101 type Rack. A rear cover protects the apparatus on the back of the panel, while the tube suspension on the front of the panel is also protected by a cover. The 41-A Amplifier is shown in Figures 1 and 2. The 41-B and 41-A Amplifiers are practically identical in appearance.

3.2 These amplifiers are designed to give a maximum gain of 41.6 db. They are intended to work from 200 ohms impedance. The output impedance is 15,000 ohms. A potentiometer is which regulates the gain of the amplifier in 22 steps of 3 db each. The potentiometer also has a zero position. There is also a gain control key (not shown in photographs) marked "High" and "Low", and situated near the lower edge of the panel, at the center. This key changes the gain of the amplifier 15 db.

3.3 Plate supply

3.31 The plate circuits of the 41 amplifiers are supplied with DC (rectified and filtered AC) from the rectifier circuit of the 42-A Amplifier, with which they are associated in use. The voltage of this supply as received from the 42-A Amplifier is 390 volts, but it is further filtered and reduced to the proper value for the 2J3-A Vacuum Tubes.

3.32 When used in a Public Address System associated with the 3UX System the 41 Type Amplifier obtains its plate current from the 4E-D Amplifier in a similar manner

denser can be tested for high resistance leakage by disconnecting it and charging it from a DC source of 110 or 220 volts and then after about one minute discharging it by short-circuiting the terminals. If no spark is obtained, the condenser is probably defective. The DC source used for charging a condenser should be protected by suitable fuses.

If it is impossible for the operator to locate the cause of the trouble and the customer desires to avail himself of the engineering service of the Western Electric Company, the matter should be taken up with the nearest distributor.

The vacuum tubes constitute the only element in this amplifier which is likely to require replacement with use. These tubes should be replaced if the plate current, as indicated by the milliammeter, is not within the prescribed limits when the plate voltage is 390.

In case replacement parts are required, they should be ordered as follows from the nearest distributor.

EQUIPMENT LIST

HOW TO ORDER

NAME OF PART

- Vacuum Tube No. 239-A Vacuum Tube (Intended for use in No. 41-A or No. 41-B Amplifier)
- Filament Current Meter No. KS-6182 Meter
- Plate Current Meter No. KS-6234 Meter

NOTE: If a part other than any of the above is required for replacement, it should be ordered by giving a description of the part and its function in the amplifier.

3.4 Filament circuit and supply

3.41 The 41-A and 41-B Amplifiers differ electrically only in their filament circuits, and in the grid bias on the first stage. The 41-A Amplifier is designed for a 12 volt storage battery supply, and has a 15.9 ohm rheostat in its filament circuit. The 41-B Amplifier is suitable for use with a 15 volt battery or the KA-2550 (15V) potentiometer. It has a 30 ohm rheostat in its filament circuit.

3.42 A choke coil is included in the filament circuit of the 41-B Amplifier, to reduce the effect of any inductive interference that may get into the circuit due to improper grounding, etc. To offset the resistance of this coil, it was necessary to reduce the grid biasing resistance R14 from 22 ohms in the 41-A to 17.1 ohms (in the 41-B). The grid bias in the first stage of the 41-B Amplifier is about 44% less than in the 41-A Amplifier.

4. Installation

4.1 Mount the 41-A or 41-B Amplifier on the 101 type Rack, and connect it as specified on the installation drawings.

4.2 In many cases in the past 41 type Amplifiers have been received in the field without the necessary bushings and spacers for mounting the KS-6182 and KS-6234 Meters. In order to avoid the necessity of unpacking and examining the amplifiers for such omission at the Warehouse, an extra set of these parts are now being shipped from the Warehouse with each 41 type Amplifier shipment. They consist of

- 4 Insulating Bushings P-219572
- 2 " Spacers P-219573

and may be found as follows:-

In shipments of Theatre Systems, they are packed in the Tube and Fuse Cabinet.

In shipments on S.D. orders and Branch Office Stock orders, they are inserted in the Amplifier packing case, and the case is stenciled "Complete with Meter Bushings".

In Public Address shipments they are packed with other miscellaneous material.

Return excess bushings and spacers to the Warehouse.

The bushings and spacers are not supplied as part of the meters.

**EQUIPMENT BULLETIN**

**AMPLIFIERS, 41 TYPE**

Therefore, when ordering the meters separately, it is necessary to list the bushings and spacers in the order, if they are required.

**5. Operation**

- 5.1 Follow the procedure outlined in the Operating Instruction Book.
- 5.2 With the filament current (as read on the "FIL CURRENT" meter) adjusted to 270 Mils by means of the "FIL CONTROL" rheostat, the "PLATE CURRENT" meter should read between 1.25 and 1.55 Mils for each tube. Tubes which give readings outside of these limits should be further tested to determine whether they are defective.
- 5.3 The "HIGH-LOW" key is generally set at "HIGH" at the time of installation.

**6. Maintenance**

- 6.1 Replacement orders for 35-N Rheostats for 41-A Amplifiers will be filled with a Patent 90-D or KS-6687 Item 3, 30 ohm Rheostat, and a set of D-90720 Conversion Parts, thus converting the 41-A Amplifier to the equivalent of the 41-B Amplifier. Refer to Bulletin on "Rheostats, General" for additional information.
- 6.2 For replacement of the sponge rubber pads on which the vacuum tube shelf suspension is mounted, order "Two rubber pads P-219564"
- 6.3 Should it become necessary to replace the rubber covered wire connecting to the vacuum tube sockets, make the replacement as follows:  
Use one piece of 10-#35 gauge tinned copper wire to replace each of the present wires, inserting the new wire in the existing rubber tubing. After soldering each wire to the terminals, push the rubber tubing one-half inch toward the shell, leaving one-half inch of slack in each wire.
- 6.31 The replacing wire should be ordered as 6 feet of 10-#35 AWG twisted tinned copper wire per specification 57507, 24 twists per foot.  
Note: 6 feet are required for each amplifier.
- 6.32 The tube socket wiring is to be changed in accordance with the above only if it shows signs of corrosion.

- 6.4 Beginning about October 1, 1970, all replacements of 21-OB Condensers with 41 type Amplifiers will be made with D-92583 Condensers. The new condensers are of the same physical dimensions as the 21-OB Condensers but will withstand a higher breakdown voltage. Order them as "One D-92583 Condenser"
- 6.5 The filament rheostat contacts should be cleaned as necessary with carbon tetrachloride and an ink eraser. They should then be given a very light coating of vaseline on the contact surfaces after cleaning.
- 6.6 The potentiometer contacts should be cleaned periodically with a clean cloth and carbon tetrachloride. Place a piece of bond paper between the contacts and springs and rotate the knob to clean the springs. Coat very lightly with vaseline.
- 6.7 The fuse in the filament circuit of this amplifier (Fuse A + in 1-FD Charging Panel) should be three-ampere instead of the one-ampere fuse formerly specified.
- 6.8 It is desirable to select a 239-A tube having low plate-to-filament impedance (high plate current) for the last stage in this amplifier.

**7. Availability**

- 7.1 The 41-A Amplifier became available early in 1926. It is now replaced for new installations, and also for replacement purposes, by the 41-B Amplifier which became available in January, 1930. Order it as "One 41-B Amplifier"

H. B. Santee  
Director of Theatre Engineering

JCC:SO

**EQUIPMENT BULLETIN**

**AMPLIFIERS, 41 TYPE**

**1. Associated Drawings and Photographs**

- ASR-389 A-41-A & E-41-C Amplifiers, Wiring Diagram
- ASL-2424 41-A & E-41-C Amplifiers, Schematic & Circuit Label
- ASL-2322 41-A & 41-B Amplifiers, Schematic
- ASR-4151 41-A & 41-B Amplifiers, Wiring Diagram
- Photo #9200

Replacing Addenda #2 - (3/30/31) and #3 - (8/27/31)

**2. General Information**

- 2.1 For operating data, dimensions and general information, refer to E.B. "Amplifiers, General", F.R. 4.03. For use in systems, see E.B. "Systems, General", F.R. 4.361.
- 3. Modification of 41-A to A-41-A (TA-4107) and 41-B to E-41-C (TA-4108) Amplifiers (FOR USE OF 204-A VACUUM TUBES)

**3.1 Required Material**

- 1 - 18-AL Resistance (4 ohms)
- 1 - 18-R Resistance (10 ohms)
- 1 - Copy Circuit Label ASL-2424.

**3.2 Procedure**

- (a) Replace 18-RT Resistance R13 by the 18-AL Resistance.
- (b) Replace 18-FU (or 18-DY) Resistance R14 by the 18-R Resistance.
- (c) Affix circuit label ASL-2424 over the existing label on the back of the cover.
- (d) Mark with the new code number in accordance with E.B. "Equipment Modifications, General", F.R. 4.01. If the amplifier has a 35-N Rheostat in the filament circuit it should be considered as 41-A type, and the new marking should be A-41-A. If the filament rheostat is KS-6687 or KS-7162, the amplifier should be considered as 41-B type, and recoded E-41-C. In other words, the type of filament rheostat, rather than the original code number, should determine the new coding.

- 3.3 Result: The A-41-A and E-41-C Amplifiers have a filament circuit resistance suitable for the use of 204-A Vacuum Tubes. 239-A Vacuum Tubes may be used in A-41-A or E-41-C Amplifiers, although in some cases it may be necessary to operate at a filament current in excess of the normal for 239-A Vacuum Tubes.

**4. Maintenance**

- 4.1 To replace the rubber covered wire connecting to the vacuum tube sockets, use #10 strand #35 twisted tinned copper wire, leaving 1" slack with sockets in normal position. Enclose each replacing connector in a new piece of rubber tubing cut sufficiently long to cover both the wire and the socket terminals. This material has been supplied to all District Offices. The amount required for one 41 type Amplifier is as follows:-  
6' - 10 strand #35 twisted tinned copper wire  
6' - 1/8" I.D. x 1/32" wall pure gum tubing
- 4.2 For replacement of the sponge rubber pads on which the tube shelf suspension is mounted, order "two P-219564 Cushions".
- 4.3 Clean the potentiometer contacts and springs occasionally using carbon tetrachloride, and lubricate with a very thin coat of vaseline.

**5. Merchandising**

- 5.1 The 41-A and 41-B Amplifiers became available in 1926, and 1930 respectively. Order replacements as: "1 - 41-B Amplifier."
- 5.2 The modification parts listed in Section 3.2 have been supplied to District Offices.

2 Pages - Page 1

Operating Dept. - Equipment Div.

Issue #2  
March 17, 1933





EQUIPMENT BULLETIN

AMPLIFIERS, 41 TYPE  
ADDENDUM #1

4.03

1. ABSTRACT

1.1 This addendum covers instructions for using P-35250 wire for replacing vacuum tube socket connections, instead of 10 strand #35 twisted wire with rubber sleeve, as specified heretofore. It replaces Section 4.1 of the main Equipment Bulletin.

2. USE OF P-35250 WIRE FOR V.T. SOCKET CONNECTIONS

2.1 In the future when the connecting wires to V.T. Socket terminals requires replacement, P-35250 (Engineers Kits) should be used. The existing wiring in rubber tubing should be checked at the next routine call, and frequently thereafter, and replaced when any indication of hardening of the rubber or breaking of the strands appears. The P-35250 wire should be connected with at least 1" slack.

2.2 The above replaces Section 4.1 of the main Equipment Bulletin, and affects all associated wiring drawings, which should be so marked, pending their reissue.

2.3 The above also applies to the sockets of the first two stages of 4G type Amplifiers, if stranded rubber sleeved wire is used therein. The wiring drawings associated with E.B. "Amplifiers, 4G Type", should be marked accordingly.



EQUIPMENT BULLETIN

AMPLIFIERS, 41 TYPE

4.03

Replaces Addendum #1, Issue #1 - 6/19/36

1. THE 41 TYPE AMPLIFIER is a three stage (3 tube) resistance coupled voltage gain amplifier requiring external DC supplies for filament (12V) and plate (300V). It is usually used in systems having a #42 intermediate power amplifier and one or two #43 power amplifiers. It is arranged for rack mounting.

2. TYPES, CHARACTERISTICS, COMPONENTS, DRAWINGS & PHOTOS

TYPE	41-A 41-B	A-41-A E-41-C	A-41-C	B-41-C D-41-A	F-41-C
DATE AVAILABLE	1928(41-A) 1930(41-B)	Fla. Modif. May 1931	Fla. Modif. July 1934	May 1935	Fla. Modif. October 1936
GAIN (DB) MIN.-MAX. (See Notes 1 and 2)	-39 to +42	-35 to +46	-31 to +35	-12 to +54	-32 to +49
GAIN CONTROL - POT.	26-A Pot. See Pot., 26-A, File 4.36	22-3 db steps	26-A Pot. Replaces d.	26-A Pot.	26-A Pot.
H-L SWITCH (See Note 2)	528-A Key (K1) 1-14 db position	Not used	None	528-A Key	528-A Key
RESPONSE CORRECTION AND GAIN RATING CHART	ASO-8337 (E.B. File 4.64)				
OUTPUT (MAX.)	.019W - (5.0 db)				
NOISE LEVEL	See "Amplifier System, Gain, Output Level & Noise Level Chart" File 4.03 (To be issued shortly)				
INPUT TRANSFORMER	233-E 247-A 261-B (Shield per ASA-1349)				
INPUT - WORKS FROM:	200 ohms				
OUTPUT - WORKS INTO:	15,000 to 20,000 ohms (Transf. of succeeding Panel or Ampl.)				
VACUUM TUBES	3 - 239-A 3 - 264 Type				
V.T. SHELF MOUNTING PADS	Replace P-219564 Pads by ASP-6470 Cushions				
FILAMENT-Volts	12V DC				
Current	.27 Amp. .30 Amp.				
Rheostat (R15)	Replace with TA-4167 Rheostat (30 ohms) (35-R (15.9 ohms) - 41-A)(RS-687 - RS-7162 (30 ohms) - 41-B)				
MA Meter	KS-6182 Milliammeter - 0-300 Scale				
PLATE SUPPLY (Note 1)	300V DC (1.35 - 1.55 MA per Tube)				
MA METER	KS-6234 Milliammeter - 0-2 Scale				
DIMENSIONS	12-1/4" x 19" x 8-3/4" D (Panel Type)				
WEIGHT	45-50 Lbs.				
SCHEMATIC	ASL-2322	ASL-2424	ASO-6279	ASL-2845	ASL-6243
CIRCUIT LABEL	-	ASL-2424	ASO-6279	ASL-2845	ASL-6243
WIRING DIAGRAM	ASR-4191	ASR-369	-	-	-
MODIFICATION DRAWINGS	-	-	ASO-6272	-	ASO-8239
PHOTOS	Photos #9260 (41 type Amplifier, 4.03) #9877, 9878 & 9879 (Ampl. Systems, 4.03)				
SYSTEMS SCHEM. & C.L.	-	-	-	-	ASXX-5477

NOTES:

- In certain special applications for Program or P.A. Systems, more than 40 db gain may be required. In these instances, two 41 type Amplifiers may be connected in tandem by means of a 207-A Panel, or equivalent, to give an apparent gain of 80 db. The 207-A Panel consists of a 127-C Output Transformer with a 55 ohm secondary. The 41 type Amplifier usually associated with the 41 type Amplifier has a 300V supply sufficient for two 41 type Amplifiers.)
- The "H-L" key should always be set in the "H" position except in special applications such as referred to under Note 1, when it may be desirable to reduce the gain 14 db by setting the key on "L".



3. INSTALLATION - The 41 type Amplifier is installed on the amplifier rack immediately above its associated 42 type Amplifier and connections made per systems wiring diagrams. Three 264 type Tubes are installed in the sockets.

4. OPERATION - The 41 type Amplifier is placed in operation by turning "ON" the "Starting Switch" and adjusting the filament rheostat so that the correct filament current is indicated on the meter. Check plate currents of each tube by successively depressing keys K3, K4 and K5.

5. MAINTENANCE - Connections to the amplifier and tube sockets and the condition of the potentiometer contacts and springs, and of the filament rheostat should be checked regularly.

Replacement of tube socket connecting wires is made with P-359250 Wires (Inspector's Kit.)

Objectionable clicks resulting from operation of plate meter keys are eliminated by connecting a short strap between first and third spring terminals of K5 (viewed from rear - left to right). Mark circuit label accordingly.

AC hum pick-up by the retardation coil of the TA-7300 Apparatus Unit (A-41-C Amplifier), has been reduced in several instances by relocation of the retardation coil to a position back of the original mounting plate above K3 in a plane 900 from its original position. Mount coil with a brass screw to a brass strap fastened to the original mounting plate and twist leads to coil.

Objectionable noise during operation of filament rheostat is eliminated by either replacement with TA-4167 Rheostat or by connecting a TA-4115 Condenser between Gnd. and terminal of R45 connected to M1. The required condenser may be removed from corresponding circuit of power unit and mounted in suitable metal box.

6. MODIFICATIONS

MODIFICATION	MODIF. SPEC. #	CONVERSION PARTS Includes Cct. and Equipment Labels	PURPOSE
41-A to A-41-A 41-B to E-41-C	TA-4107 TA-4108	1-16AL and 16R Resistances	Permits operation with #264 Tubes by reduction of filament circuit resistances to suitable value.
A-41-A or E-41-C	TA-222	ASF-6282 - 1-TA-7300 Apparatus Unit	Provides Wide Range Horn and Film equalization when used with B-62-A Amplifier.
A-41-C to B-41-C E-41-C to D-41-A	TA-245	247-A Input Transformer	Increases gain for operation in Public Address Sys., in conjunction with 80 type Amplifiers.
E-41-C to F-41-C	TA-278	ASO-8239 - 261-B Imp. Transf., ASO-8239 Det. 1, Mtg. Plate and ASK-1349 Shield	Reduces noise level caused by pick-up at input transformer approximately 12 db, and increases gain approximately 3 db.

7. UNDERWRITERS' APPROVAL - The 41-A and 41-B type Amplifiers are listed as approved under Underwriters' Laboratories File E-5432-A (see reprint of card, E.B. File 7.6) and also in the Underwriters' Laboratories' List of Inspected Electrical Appliances, under "Sound Recording and Reproducing Equipment" of the Western Electric Company.

Amplifier Type	Gain (1000) dB	Gain Control	Source Imped. (ohms)	Input		Section Load Imped. (ohms)	Output	Trans.	Socum. Test Load (ohms)	VT Corr. #	Att'n 1000 cps	Power Output		Unweighted Noise Level		Type	Vacuum Tubes		Power Required	Power Supplied			
				Term. Imped. (1000) (ohms)	Trans. Imped. (ohms)							dB	dB	dB	dB		Stages	Ip (mA) each tube			Vg (volts)		
A-41	43	22	3	200	1220	247-A	-	-	-	-	.019	5	12.8	-	-	264	1	0.3	1.35-1.55	4.2	12V DC	390V DC	
F-41	46	1	15	200	1220	233-E	15,000	-	-	-	-	-	-	-	-	264	2	0.3	1.35-1.55	7.2	12V DC	390V DC	
D-41	49.3					D-88822	20,000	-	-	-	-	-	-	-	-	264	3	0.3	1.35-1.55				
A-41-F	54	22	3	200	1220	247-A	15,000	-	-	-	.019	5	12.8	-	-	264	1	0.3	1.35-1.55	4.2	12V DC	390V DC	
E-41-F	57	22	3	200	1220	233-E	20,000	-	-	-	-	-	-	-	-	264	2	0.3	1.35-1.55	2.7	12V DC	390V DC	
F-41	49	22	3	200	1220	261-B	15,000	-	-	-	.019	5	12.8	-	-	264	1	0.3	1.35-1.55	4.2	12V DC	390V DC	
		1	15				20,000	-	-	-	-	-	-	-	-	264	2	0.3	1.35-1.55	7.2	12V DC	390V DC	
A-41-G	61	22	3	200	1220	247-A	15,000	-	-	-	.009	2	9.8	-	-	262-B	1	0.32	0.85(1.7)	5	12V DC	390V DC	
S-41-G	64	1	15	200	1220	233-E	20,000	-	-	-	-	-	-	-	-	262-B	2	0.32	0.80(1.6)	5	12V DC	390V DC	
D-41-G	67.3					D-88822	20,000	-	-	-	-	-	-	-	-	262-B	3	0.32	1.6(3.2)				
A-41-GAF	61	22	3	200	1220	247-A	15,000	-	-	-	.009	2	9.8	-	-	262-B	1	0.32	0.85(1.7)	5	10V AC	390V DC	
E-41-GAF	64	22	3	200	1220	233-E	20,000	-	-	-	-	-	-	-	-	262-B	2	0.32	0.80(1.6)	5	10V AC	390V DC	
F-41-GAF	67.3	1	15	200	1220	D-88822	20,000	-	-	-	-	-	-	-	-	262-B	3	0.32	1.6(3.2)				

