

Western Electric

**SOUND
SYSTEMS**

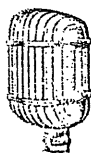
Western Electric

Leadership Through Teamwork

The Sound Systems equipment described in this Catalogue was designed by Bell Telephone Laboratories—world's largest organization devoted exclusively to research and development in all phases of electrical communications. It is made by Western Electric, manufacturing unit of the Bell System and the nation's largest producer of communications equipment. You can depend on this team to give you the best.

QUALITY COUNTS

Sound systems



MICROPHONES

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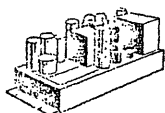
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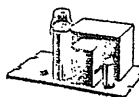
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by _____

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TYPICAL SPECIFICATIONS

The term "Typical Specifications" in the description of the equipment in this Catalogue signifies measurements obtained under controlled conditions including standard measuring equipment and vacuum tubes, and average power supply voltages.

When a single figure is quoted for Source Impedance, this value may vary ± 25 percent with little or no adverse effect on performance.

Limits on Frequency Response apply when the amplifier is operated between nominal values of source and load impedances.

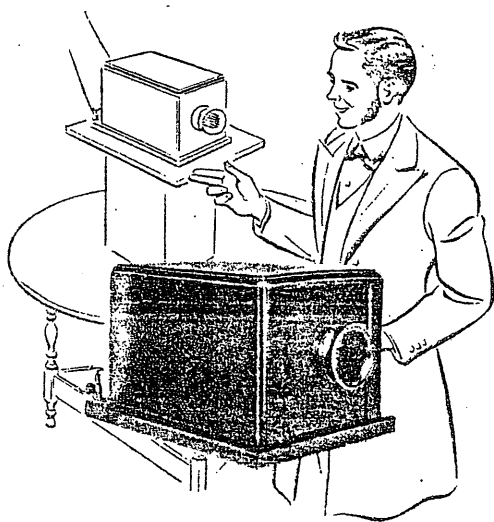
The Gain figures apply between nominal source and load impedances and may vary from quoted figures as much as ± 2 db.

Noise figures are unweighted values, using nominal values of source and load impedances. Noise is given for maximum gain unless otherwise stated.

Figures for Output Power and Harmonic Distortion apply for the nominal load impedance if only one is specified, and for the optimum value if several are specified.

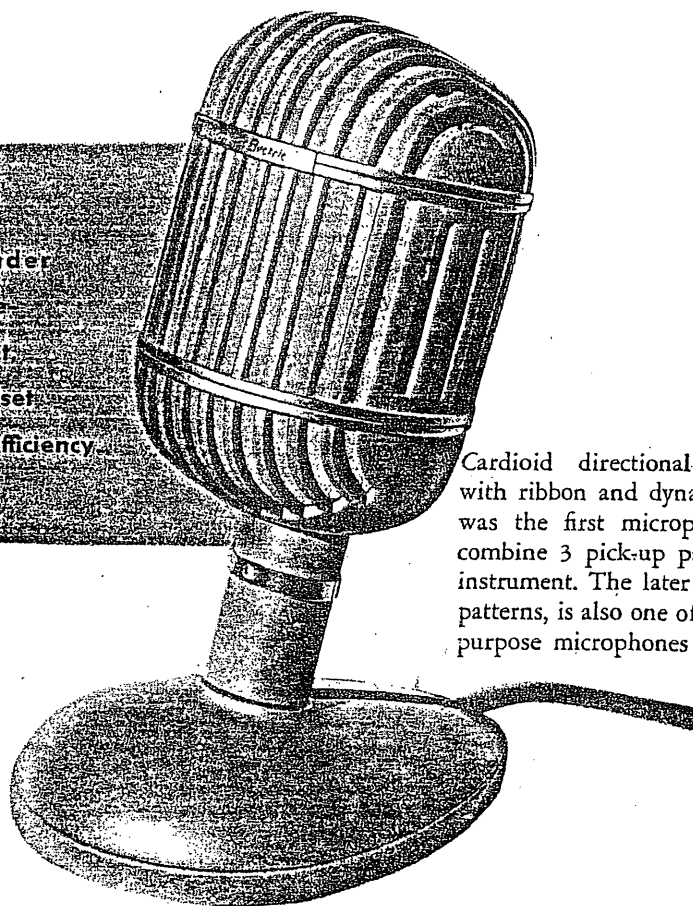
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Microphones



The first microphone was Alexander Graham Bell's box telephone, into which Thomas A. Watson shouted and sang in the first intercity demonstrations of the infant art of telephony.

Since 1877, when the Alexander Graham Bell box telephone, the forerunner of all microphones was built, Western Electric microphones have set the standard in performance and efficiency.



Cardioid directional microphone, with ribbon and dynamic elements, was the first microphone ever to combine 3 pick-up patterns in one instrument. The later 639B, with 6 patterns, is also one of the finest all-purpose microphones ever made.

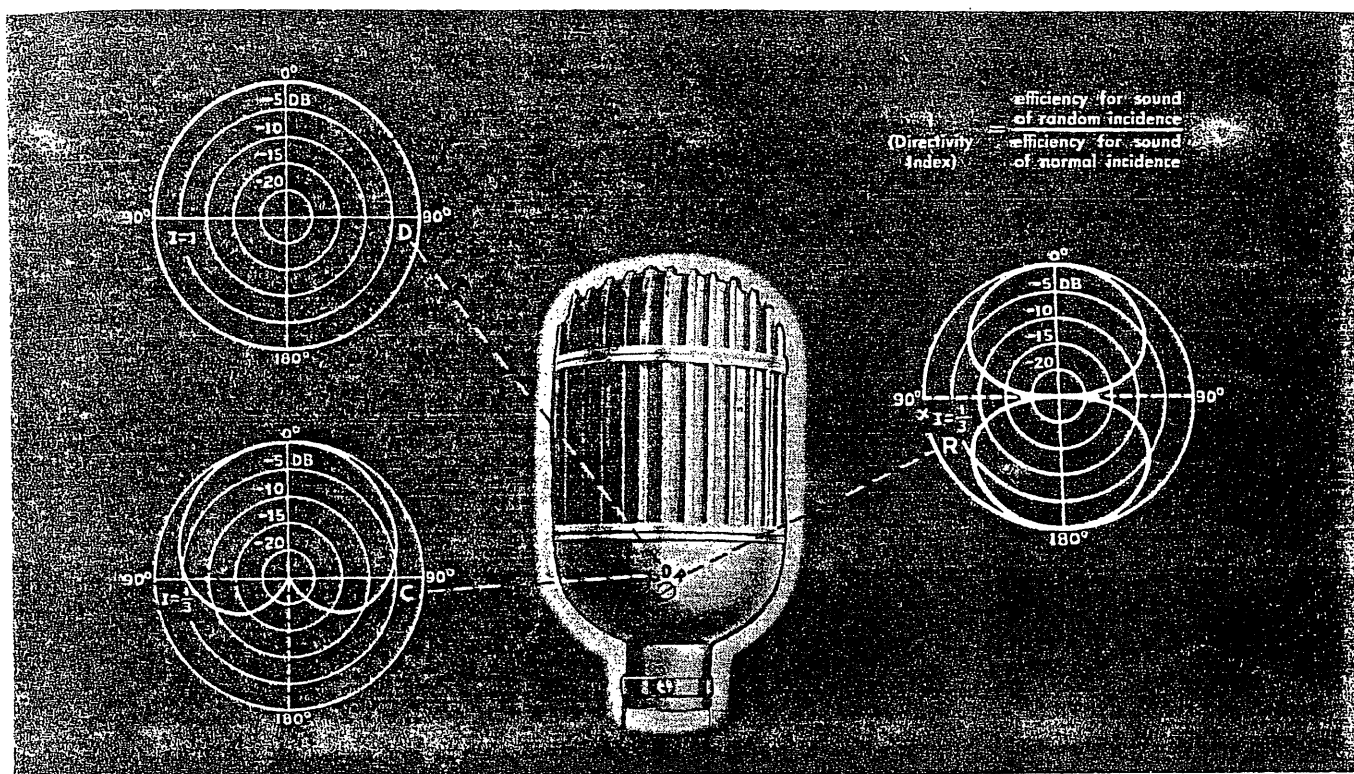


Figure 1 — Cardioid Microphone 639A showing 3 selectivity patterns.

CARDIOID MICROPHONES 639A AND 639B

Use — The 639 type Microphones, because of their high quality and cardioid directivity, are excellent for public address and broadcast use, not only as all-purpose microphones but also as the solution to many difficult pick-up problems.

Description — Each microphone is a combination of a dynamic moving coil type pressure element and an improved ribbon type velocity actuated element enclosed in an attractive housing which serves as a protective guard and as a wind screen. The outputs of these two elements are combined in various proportions to yield the following patterns: When combined equally, the directional characteristic is the heart-shaped cardioid curve "C" shown in figure 1. Each of either element alone presents patterns "D" (dynamic) and "R" (ribbon). These characteristics are available with either the 639A or the 639B Microphone.

The cardioid directional performance of the 639 Microphones over the entire useful frequency range insures a practical, wide pick-up angle of at least 120° at the front of the microphone over which the quality is unchanged and sensitivity remains practically the same.

The 639B Microphone has the above characteristics and in addition, patterns 1, 2, and 3, which combine the outputs of the two elements in three other ratios to produce the patterns shown in figure 2.

Since the problems of pick-up in auditoriums and remote

locations are different for each condition and since they may change from time to time these multi-purpose microphones can be used by the engineer to obtain the best possible pick-up under varying and difficult conditions.

Pick-up problems, such as the following, can either be improved or overcome by the use of the 639B with its directivity patterns, which may be selected by means of a simple screwdriver operated switch:

In Public Address Installations — where acoustical feedback takes place before a satisfactory reinforcement level can be reached.

In the Studio — when sound treatment is not fully effective and control of undesired sound pick-up is necessary.

In the Playhouse or Night Club — where there is an excess of audience noise or where it is desired to give the artist the freedom of working at a greater distance from the microphone.

Features

- High quality.
- Three-way (639A) or six-way (639B) directivity patterns.
- Solves many difficult pick-up problems.
- Dynamic moving coil type pressure element.
- Improved type velocity activated element.
- Multi-purpose microphones.



Typical Specifications

Frequency Response: Essentially uniform from 40 to 10,000 cycles.

Sensitivity: Open circuit terminal voltage 64 db below 1 volt per 10 dynes per square centimeter which is equivalent to 84 db below 1 volt for one dyne per square centimeter.

Signal-to-Noise Ratio: The signal for 10 dynes per square centimeter sound pressure is 78 db above the thermal agitation noise generated within the microphone; 58 db for 1 dyne per square centimeter.

Directivity, 639A: Three patterns C, D, R, Figure 1, selectable through three position screwdriver operated switch. At the angle of minimum response the average discrimination with respect to 0° response is 20 db over the range from 40 to 10,000 cycles.

Directivity, 639B: Six patterns R, D, C, 1, 2 and 3, Figure 2, selectable through six position screwdriver operated switch. At the angle of minimum response the average dis-

crimination with respect to the 0° response is 20 db over the range from 40 to 10,000 cycles.

Impedance: The impedance varies somewhat throughout the frequency range, but has an average value of 40 ohms. The microphone is intended for use with equipment having a rated source impedance from 25 to 50 ohms.

Power Output Level: -56 dbm for a sound pressure of 10 dynes per square centimeter, or -76 dbm for 1 dyne per square centimeter when the microphone is terminated with a resistance equal to its internal impedance of 40 ohms. A pressure level of one dyne per square centimeter is equivalent to a sound level of approximately 74 db.

Mounting: Both floor and desk type stands of attractive design are available. These, together with a number of other accessories, are described under Microphone Accessories.

Dimensions and Weight For 639A and 639B: Height 7½" including the plug terminal, length 4-7/16", width 3-7/16", weight 3¼ lbs.

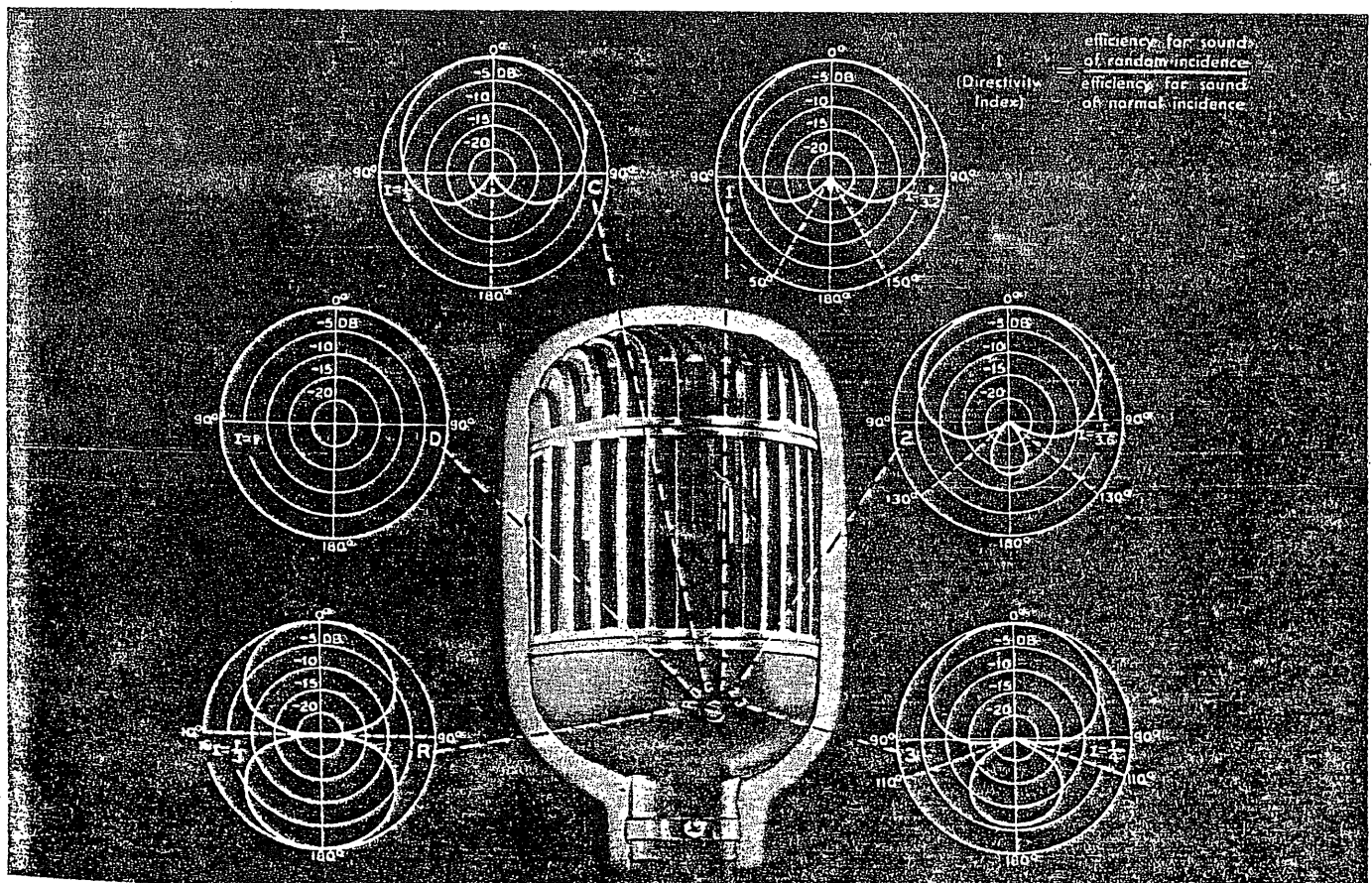


Figure 2 — Cardioid Microphone 639B showing 6 selectivity patterns.

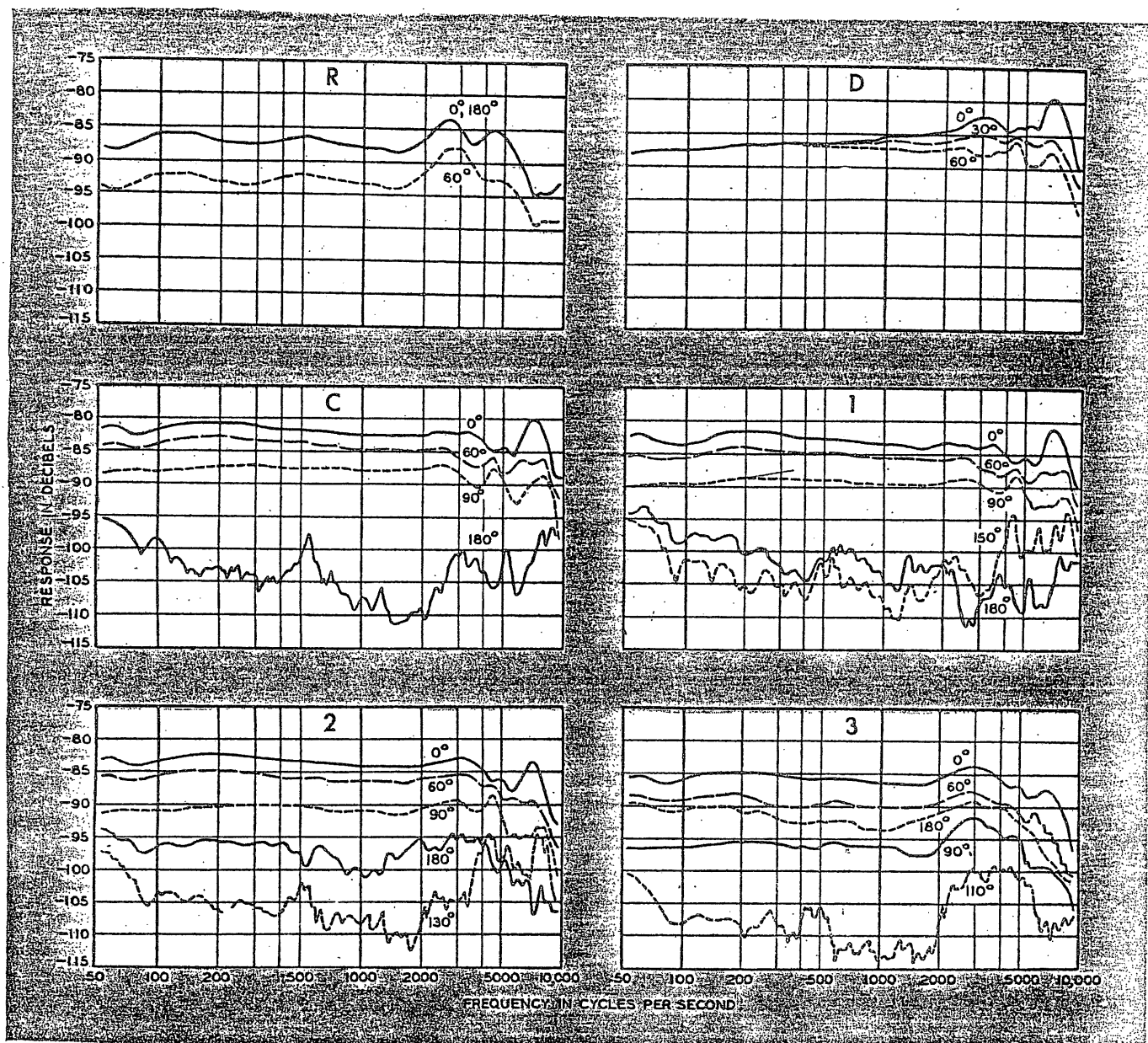


Figure 3 — Field responses of a typical production model 639B Microphone for the six switch positions. Because of the unusually wide discrimination, the lower curves in each group contribute negligible amounts to the total pick-up. Minute variations in the sensitivity of the individual elements prevent absolute cancellation and account for the unevenness of these curves on a decibel scale.

Curve R shows the response of the ribbon element alone, switch on R. The response at 0° and 180° is the same and maximum. The microphone is bi-directional and has a minimum response at 90° .

Curve D shows the response of the dynamic element alone, switch on D. The microphone is now essentially semi-directional. The variations of response with angle of incidence at the higher frequencies are caused by diffraction.

Curve C shows the response of the cardioid microphone, switch on C. The ribbon and dynamic elements are combined to produce maximum response at 0° and minimum response at 180° .

Curve 1 shows the response of the microphone with the switch on 1. Again the ribbon and dynamic elements are combined, this time in such a way that minimum response is obtained at the two 150° points. This directive pattern is slightly better than either R or C for discriminating against general room noise.

Curve 2 shows the response of the microphone with the switch on 2. This combination of ribbon and dynamic elements produces minimum response at the two 130° points.

Curve 3 shows the response of the microphone with the switch on 3. The ribbon and dynamic elements are combined to produce minimum response at the two 110° points.

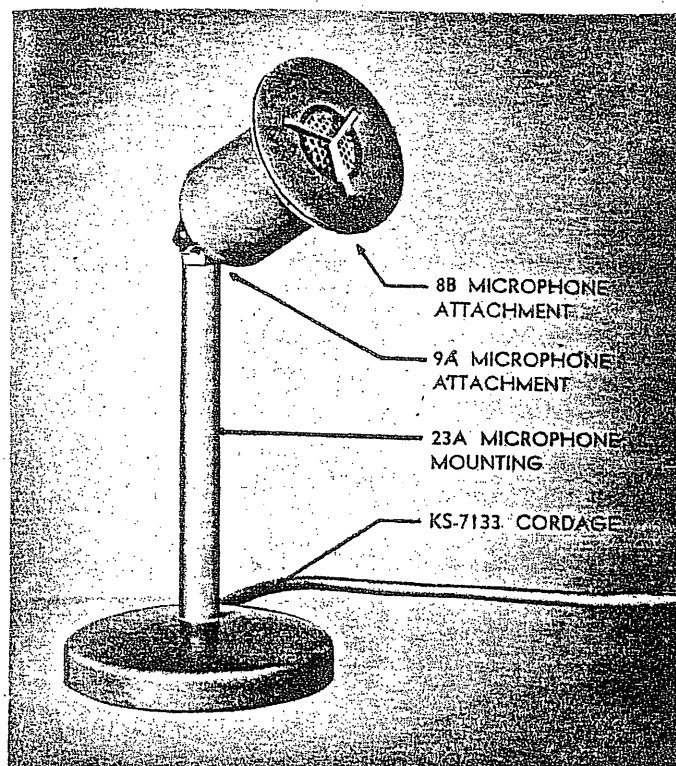


Figure 4 — The 633A Microphone with the 8B Microphone Attachment (Baffle).

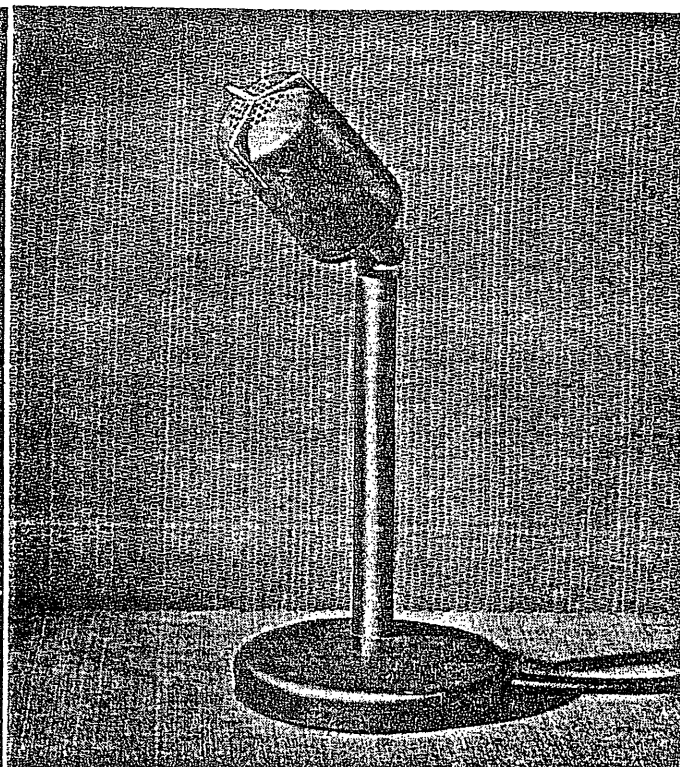


Figure 5 — The 633A "Salt Shaker" Microphone

DYNAMIC MICROPHONE 633A

Use — This microphone Figures 4 and 5 is designed for application in high quality public address, announcing and sound distribution systems and in radio broadcasting. Ruggedness, dependability, high quality and either non-directional or semi-directional performance are features which have contributed to its popularity.

Description — Having an impedance of approximately 20 ohms, the microphone is intended for use with equipment nominally rated at 25 to 50 ohms source impedance. Because of this low impedance the microphone may be used as much as 200 feet to 300 feet (or more) from associated amplifying equipment when connection is made with twisted pair, shielded microphone cordage.

For sound arriving along a line perpendicular to the plane of the diaphragm, the response is, for all practical purposes, uniform over the range of 40 to 15,000 cycles. This, however, includes a peak of up to 10 db in the neighborhood of 6,000 to 8,000 cycles.

For sound arriving along a line parallel to the plane of the diaphragm, the 633A has a uniform response over the frequency range of 50 to 10,000 cycles.

For non-directional use the microphone is mounted vertically on a stand or suspended by its cordage.

Because of the cylindrical symmetry of the microphone the above responses hold for all angles of approach in the horizontal plane (i.e., plane of the diaphragm).

The "in-between" characteristics or directional effects may be utilized by tilting the microphone at the desired angle. The 9A Microphone Attachment (Swivel Joint) is available for this purpose. The directional effect may be further accentuated by the use of the 8B Microphone Attachment (Baffle), a disc $3\frac{1}{4}$ " in diameter which fits snugly over the face of the microphone and increases its sensitivity for sound arriving along a line perpendicular to the diaphragm over the range from 1,000 to 5,000 cycles.

Features

- Non-directional and semi-directional performance.
- Excellent frequency response.
- Rugged construction.
- Low impedance output.
- Stand or suspension mounting.
- Baffle for increased directivity.

Typical Specifications

Frequency Response: 40 to 15,000 cycles, Figure 6.

Operates Into: Circuit for 25 to 50 ohms, source impedance.

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Sensitivity: Open circuit terminal voltage 70 db below 1 volt per 10 dynes per square centimeter which is equivalent to 90 db below 1 volt per 1 dyne per square centimeter.

Power Output Level: —59 dbm for a sound pressure of 10 dynes per square centimeter or —79 dbm for 1 dyne per square centimeter when the microphone is terminated with a resistance equal to its internal impedance. A pressure level of one dyne per square centimeter is equivalent to a sound level of approximately 74 db.

Mounting: Both floor and desk type stands of attractive design are available. These together with a number of other accessories are described under Microphone Accessories.

Dimensions: 2" in diameter and 3½" long.

Weight: 10 ounces.

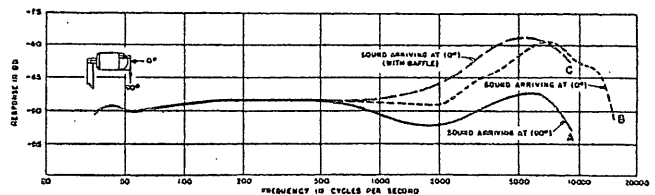


Figure 7 — Typical field response for 633A Microphone. 0 Decibels = 1 volt per dyne per square centimeter (open circuit voltage across output impedance of 20 ohms).

640AA CONDENSER MICROPHONE

Use — The Western Electric 640AA Condenser Microphone, Figures 7 and 8, offers numerous distinctive advantages both to the acoustical technician and to the sound system engineer.

As a laboratory instrument this microphone incorporates the most recent technical advances in the precision measurement of sound intensity over a wide range of temperature and humidity conditions. Accurate, scientific production tests of other sound instruments such as receivers, loudspeakers and microphones may also be obtained through its use.

In sound systems, when associated with its companion RA-1095 Amplifier, the 640AA Microphone provides a means for ultra-faithful program pick-up, especially in auditoriums or in large studios which have proper acoustical characteristics for use of the remote single microphone pick-up technique. This application is particularly effective where orchestras or similar large groups are involved.

Description — The 640AA Condenser Microphone is furnished in a bright metal, cylindrical housing approximately 1" in diameter and 1" long. It is similar to its predecessor,

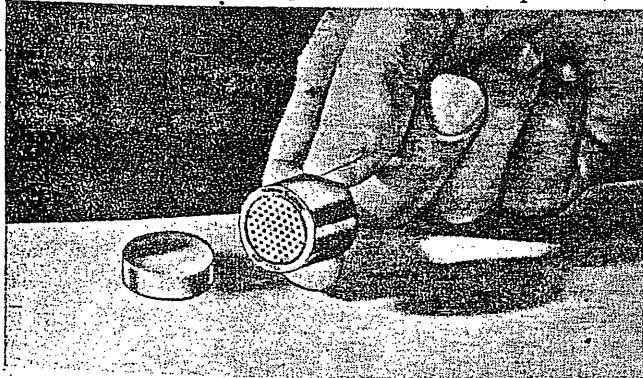


Figure 7 — 640AA Microphone.

the 640A Microphone, except for improved stability with respect to time, temperature and humidity.

For laboratory and test applications, the order should specify that the unit be supplied calibrated. This calibration will be in accordance with procedures established by the U.S. Bureau of Standards, Cruft Laboratories and Bell Tele-

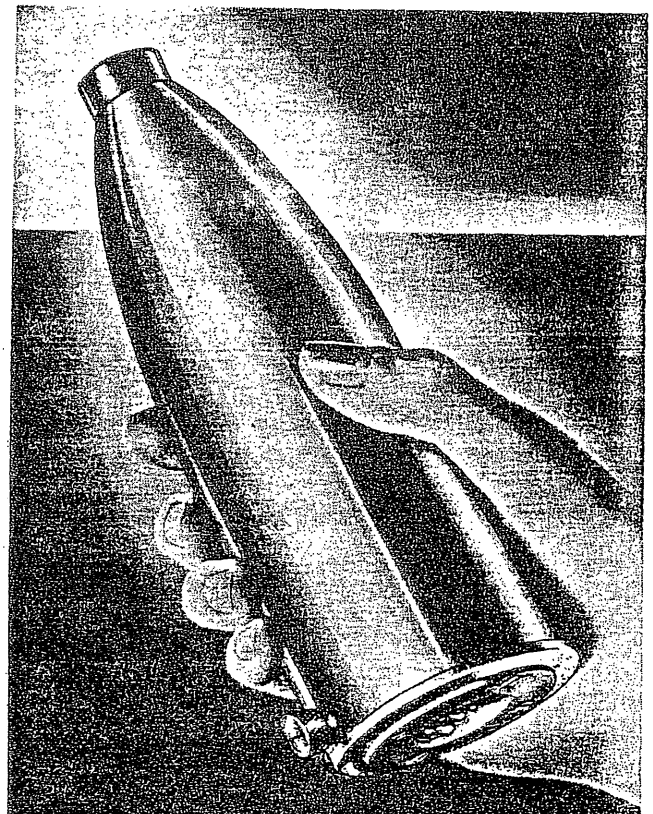


Figure 8 — 640AA Microphone and its associated RA-1095 Amplifier.

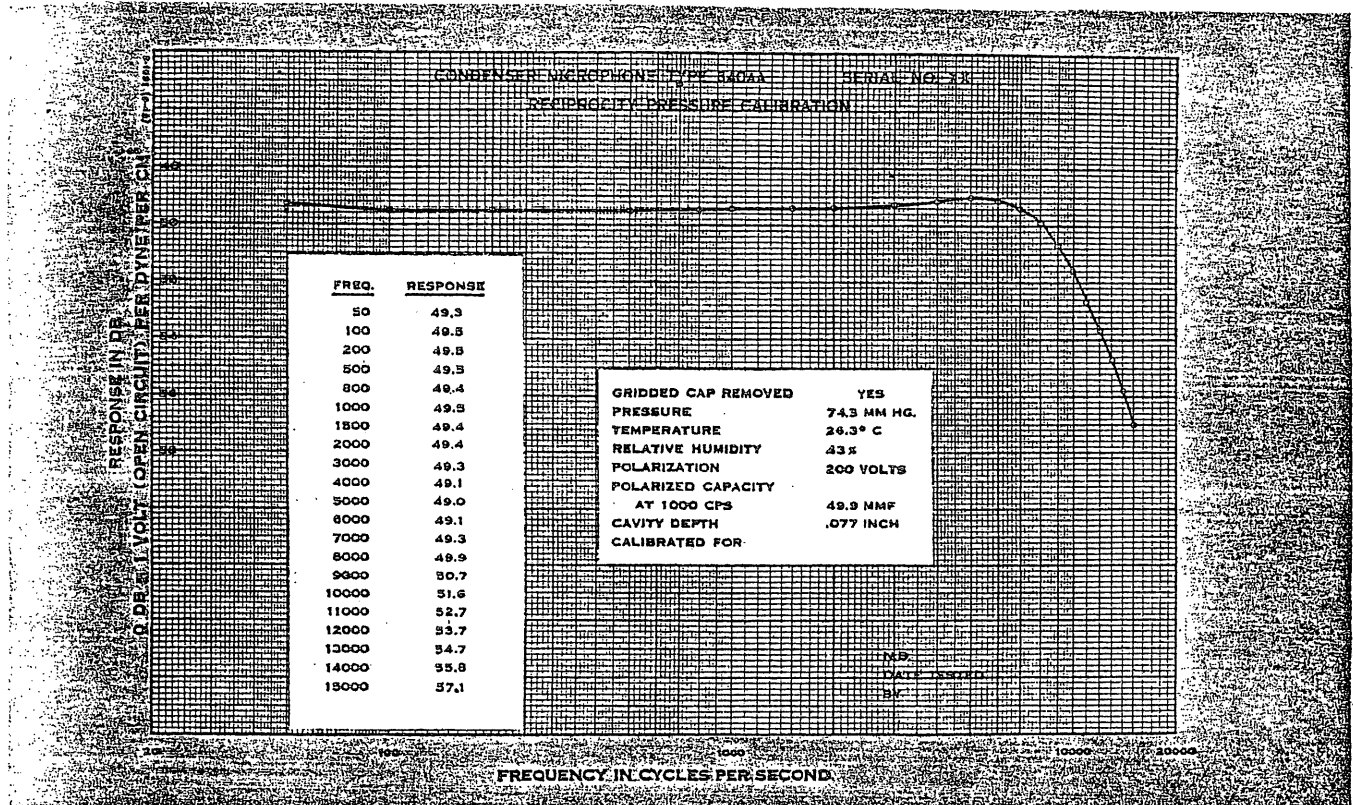


Figure 9 — Typical Pressure Calibration Chart of 640AA Condenser Microphone.

phone Laboratories, Inc. The stability of the 640AA Microphone is such that it will ordinarily hold its calibration within close limits over a long period of time when treated with reasonable care. The 640AA has features which compensate for the variations in viscosity of air with temperature making the instrument response relatively free from variations with temperature.

This microphone is provided with a removable grid over the face of the diaphragm to afford mechanical protection under normal program pick-up conditions.

The pressure response characteristic shown in Figure 9, which is applicable only to measurements in small chambers, is approximately constant to 6,000 cycles per second and then falls off uniformly to the extent of about 8 db at 15,000 cycles per second. Being a condenser microphone it is designed to work into a high impedance grid circuit of a closely associated amplifier stage. The pressure response level of the microphone unit (less amplifier), in the 50 to 6,000 cycle range with 200 volts polarizing potential, is approximately 49.5 db below 1 volt (open circuit) per dyne per square centimeter. Pressure and free-field levels are identical from 50 to 500 cycles per second.

A chart (see Figure 9) is supplied with calibrated microphones which, in addition to the pressure response curve and the points of calibration on which it is based, shows the conditions under which the calibration was obtained and gives the polarized capacity at 1000 cycles.

In order for the calibration to apply exactly, the instru-

ment should be used under conditions identical to those under which it was calibrated. Suitable correction factors can, of course, be determined at the point of use if these conditions must be altered.

Features

Precision measurement of sound intensity.

Ideal for measuring frequency response of sound instruments.

Unvarying excellence under a wide range of temperature and humidity.

Removable cover for mechanical protection.

Small size diaphragm improves fidelity, approaches "Ideal" of "point pick-up."

In combination with the RA-1095 Amplifier, it is especially adaptable for ultra-faithful pick-up in auditoriums, large studios, or cast microphone in small studios.

Especially effective for single microphone pick-up technique for large orchestras and choral or similar groups. Compactness.

Typical Specifications for the 640AA Microphone

Frequency Response: Pressure Response—See Figure 9.

Free-Field Response—See Figure 10.

Sensitivity: Approximately 49.5 db below 1 volt (open circuit) per dyne per square centimeter with 200 volts d-c polarizing potential.

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Operates Into: High impedance grid circuit of closely associated vacuum tube amplifier (such as Western Electric RA-1095 Amplifier).

Output Impedance: Essentially the impedance due to its capacitance which is approximately 50 mmf. to 60 mmf.

Polarizing Voltage: 220 volts d-c maximum from well regulated quiet supply.

Mounting: Mount in structure containing first amplifier stage.

External Connections: The 640AA is especially designed to mount on the RA-1095 Amplifier. A spring mounted plunger contact and male base threads provide for connection to the RA-1095. When the microphone is used with other types of amplifiers it should be connected to the grid of the vacuum tube by means of a short, well-shielded, low capacitance lead to center contact at rear of instrument. The cylindrical shell of the microphone should be connected to the ground of the vacuum tube circuit thereby serving as a shield for the inner components.

Dimensions: Cylindrical shape approximately 1" diameter and 1" long.

Weight: Approximately 1½ ounces.

Protection: Provided with a dust cap for each end of the cylinder when instrument is not in use.

Installation: In mounting the 640AA Microphone, it is important that its associated amplifier be arranged mechanically so as to preserve as nearly as possible the freedom

from distortion of the sound field which is inherent in the small physical proportions of the microphone element.

The free-field response characteristics of the 640AA Microphone mounted on the RA-1095 Amplifier are shown in Figure 10. The difference in shape between the zero degree free-field curve, and the pressure calibration shown in Figure 9, is due almost entirely to diffraction effects which result when the microphone is placed in a free sound field, and not to the amplifier which has practically no effect on the shape of the response characteristic. The range covered, it will be noted, is admirably suited to the highest quality sound system requirements. With the line of sound approach normal, or perpendicular to the plane of the diaphragm, (0 degrees), the response is approximately constant for sounds in the frequency range between 50 and 1,000 cycles per second. Above 1,000 cycles the response rises gradually to a maximum of about 8 db at 8,000 cycles, then drops uniformly to a level which at 15,000 cycles is roughly equal to that at 1,000 cycles per second.

As illustrated in Figure 10, the response of the 640AA Microphone varies somewhat in the higher frequencies, depending on the direction from which the sound wave approaches the diaphragm.

The small, bullet shaped Western Electric RA-1095 Amplifier described on the following pages serves ideally both as a mounting for the 640AA Microphone and as a means of providing the unit with first stage amplification and polarizing voltage. Where a microphone boom or other similar device is used to direct the microphone toward a given sound source, the amplifier should be shock-mounted by means of soft springs or rubber supports to isolate the elements from possible mechanical vibrations which are likely to produce noise. Suitable mounting devices are available through your local dealer.

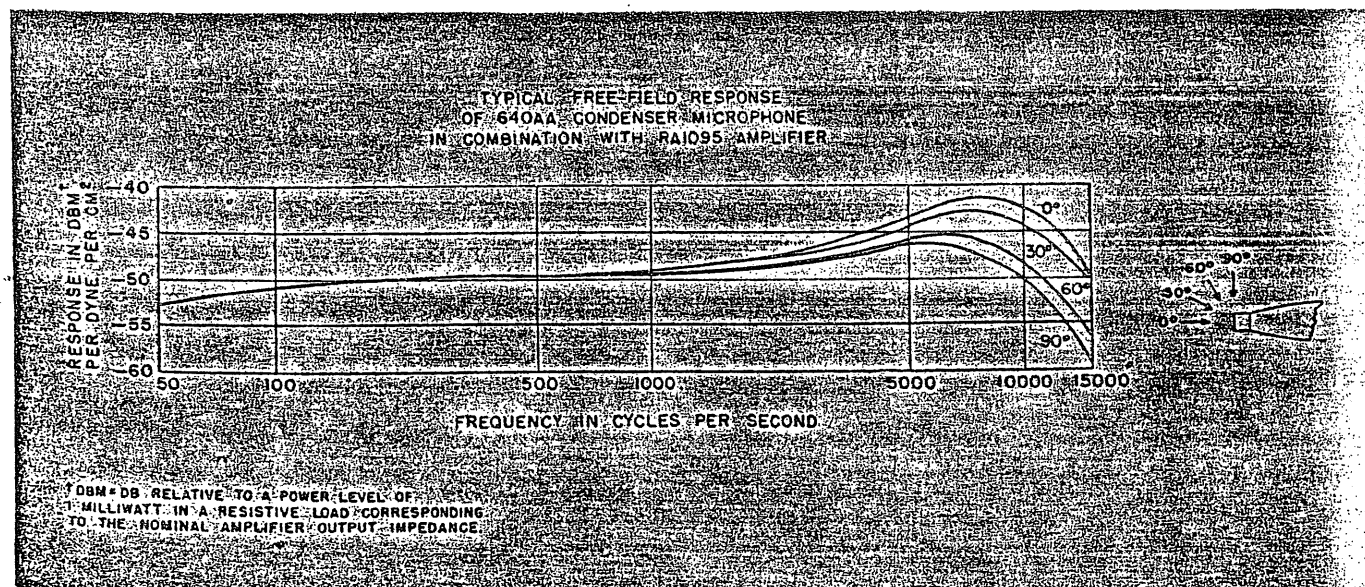


Figure 10 — Typical Free-Field Response Curve of the 640AA Microphone Mounted on the RA-1095 Amplifier.

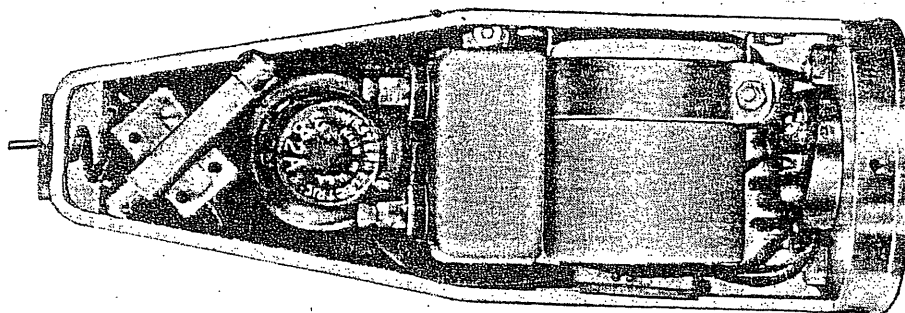


Figure 11 — RA-1095 Amplifier with Cover Removed.

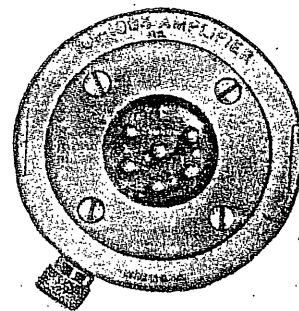


Figure 12 — Base of Amplifier Showing 6 Prong Socket.

AMPLIFIER RA-1095

Use — The RA-1095 Amplifier, Figure 11, is a small, single stage amplifying unit developed especially for use with the 640 type Condenser Microphone.

Description — Streamlined in shape, this amplifier is approximately $7\frac{3}{4}$ " long by $2\frac{1}{2}$ " in diameter and weighs only $1\frac{3}{4}$ lbs. All components are housed in a removable spun metal casing which is normally finished in bright chromium but can be obtained in a non-reflecting dark aluminum, wrinkle gray.

A threaded recess at the pointed end of the housing permits screwing the 640AA Microphone securely in place, so that the two units present a uniform surface offering the least possible disturbance to the surrounding sound field.

The output level of this efficient combination for a given sound field is about 28 db higher than the 639 type high quality studio microphones, and the signal-to-noise ratio compares favorably (see specifications). The frequency response characteristic of the amplifier is such as to assure optimum results from the use of the 640AA Microphone as an ultra-faithful pick-up device. The free-field frequency response characteristics for the combination are shown in Figure 9.

The amplifier is furnished complete with a selected 382A Vacuum Tube of the familiar "door knob" type. A row of terminals arranged alphabetically is provided on the outside of the amplifier base to permit strapping for different impedance conditions (see specifications). The amplifier case is designed to slip easily off the narrow end of the chassis frame to allow ready access to these connections.

Features

- Designed specifically for 640AA Microphone.
- Ease of attachment.
- Ease of access to strapping arrangements.
- Variety of application.

High signal-to-noise ratio.

High output level for low sound field.

Single stage amplifier.

Typical Specifications for the RA-1095 Amplifier

Frequency Response: See Curve Figure 10.

Impedance: Designed to be used with equipment having rated source impedance of 25 to 50 or 150 to 250 ohms.

Operates From: 640A or 640AA Condenser Microphone.

Power Output Level: Approximately —29.5 dbm when used with the 640AA Microphone for a sound pressure of 10 dynes per square centimeter. A pressure level of one dyne per square centimeter is equivalent to a sound level of approximately 74 db.

Signal-to-Noise Ratio: Approximately 60 db at an output level of —29.5 dbm (0-15,000 cycles).

Distortion: One per cent for an output of 0.5 milliwatts with a single fundamental frequency of 400 cycles. The output level with a sound pressure of 10 dynes per square centimeter is —30 dbm.

Power Supply: Quiet sources required for both filament and plate power, (batteries recommended).

Filament: 6.3 volts, 150 milliamperes, d-c.

Plate: 220 volts maximum, 3 milliamperes, d-c.

External Connections: Through 6 prong socket in base of Amplifier, Figure 12. (Use Cannon 6 hole female plug P6-11). Suitable six conductor shielded cordage is available from our nearest distributor.

Dimensions: Approximately $7\frac{3}{4}$ " long, $2\frac{1}{2}$ " diameter.

Weight: Approximately $1\frac{3}{4}$ pounds.

Installation: Because of the variety of applications for which this microphone is suited no mounting is supplied as a part of the amplifier. A shock-type mounting, however, should be used to insulate the microphone from the microphone support. Suitable mounting devices are available through our nearest distributor.

ACCESSORIES FOR 633A AND 639 TYPE MICROPHONES

These photographs show the ease of interchangeability of microphones on the mountings equipped with 442A Jack and 712A Adapter when the 633A is equipped with a 311A Plug.

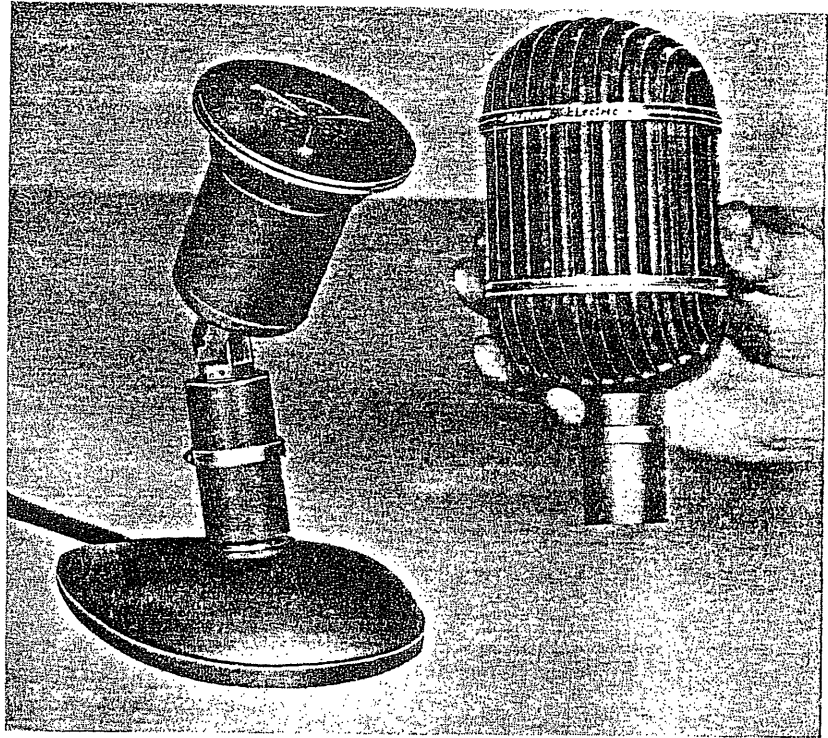
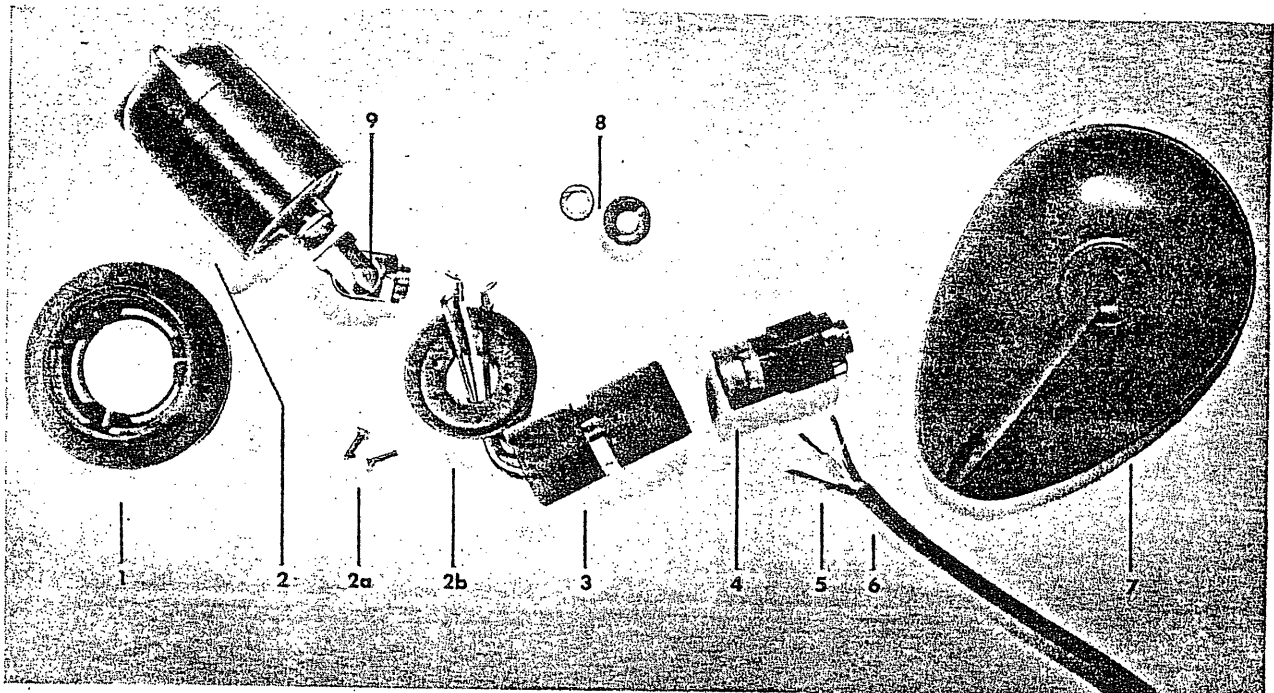


Figure 13 — Left: 633A Microphone with 8B Microphone Attachment (Baffle) mounted on a 24A Microphone Mounting by means of a 9A Microphone Attachment (Swivel Joint) and 311A Plug fitted over a 712A Adapter and 442A Jack (last two items not visible). Right: 639 Type Microphone.



Figure 14 — Left: 639 Microphone mounted on a 22A Microphone Mounting (Floor Stand). Right: 633A Microphone with 8B Baffle, 9A Swivel and 311A Plug.

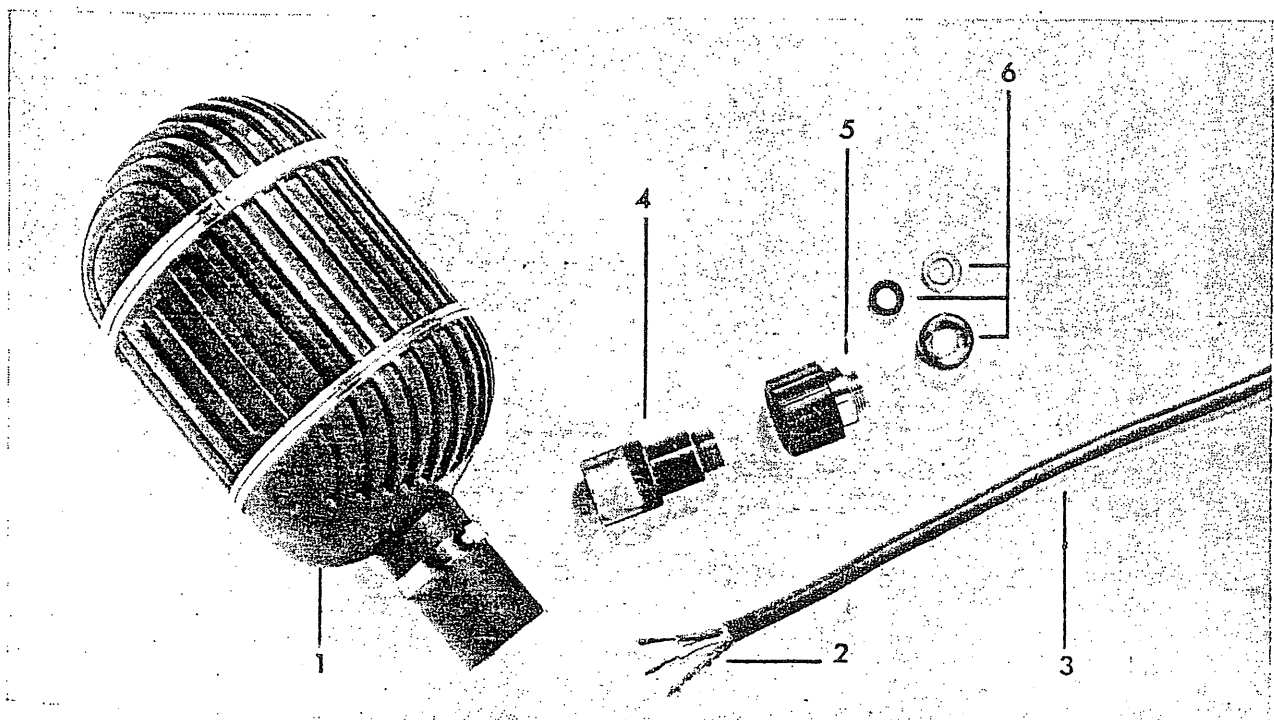


1. 8B Microphone Attachment (Baffle)
2. 633A Microphone
- 2a. Screws from base of 633A Microphone
- 2b. Cover for 633A Microphone

3. 311A Plug
4. 442A Jack and 712A Adapter
5. Shield Braid of Cordage
6. KS-7133 Cordage

7. 24A Microphone Mounting
8. Parts of 442A Jack (unused for this application)
9. 9A Microphone Attachment (Swivel Joint)

Figure 15 — 633A Microphone and Mounting Accessories.



1. 639 Type Microphone
2. Shield Braid of Cordage

3. KS-7133 Cordage
4. 442A Jack

5. 712A Adapter
6. Parts of the 442A Jack

Figure 16 — 639 Microphone and Accessories.



Figure 17 — 639 type Microphone mounted on 24A Microphone Mounting (442A Jack and 712A Adapter concealed by plug shell of microphone).

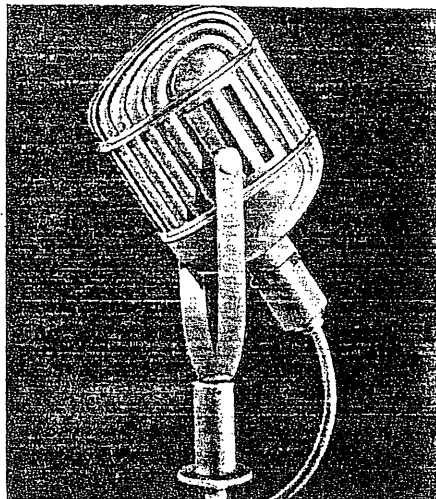


Figure 18 — 639 type Microphone suspended from 11A Microphone Attachment (442A Jack and 712A Adapter concealed by plug shell of microphone).

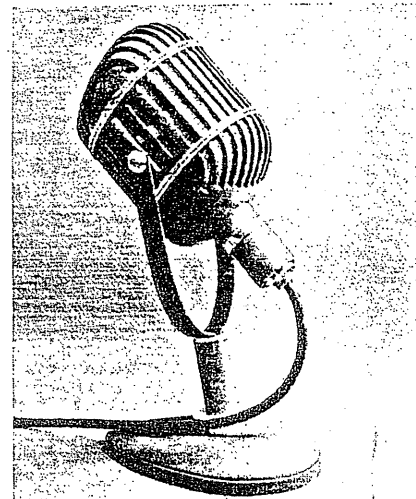


Figure 19 — 639 type Microphone, 11A Microphone Attachment, and 24A Microphone Mounting (442A Jack and 712A Adapter concealed by plug shell of microphone).

KS-7133 CORDAGE (two conductor)

KS-7133 CORDAGE (three conductor)

Two or three conductor, shielded rubber covered cordage, in any length specified. A length of twenty to thirty feet is recommended. Use of the three conductor cordage permits carrying the ground through the cable in addition to the shield ground. Two conductor cable will be supplied unless otherwise specified.

CORD ASSEMBLY

A Cord Assembly consisting of the 442A Jack, 712A Adapter, and KS-7133 Cordage is required for all applications of 639 type Microphones. This Cord Assembly is used when the 639 type Microphone is mounted on the 22A or 24A Microphone Mounting, or is suspended from the 11A Microphone Attachment. The Cord Assembly can also be used for the 633A Microphone (when equipped with a 311A Plug) in connection with the 22A, 23A and 24A Stands.

311A PLUG

633A Microphones equipped with this plug may be used with the Cord Assembly. This makes it possible for customers who use both the 633A and the 639 types of microphones to use them interchangeably, as the particular application may dictate, on the 22A or 24A Stands when equipped with 442A Jacks and 712A Adapters.

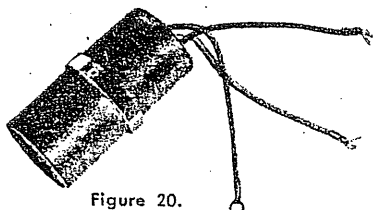


Figure 20.

442A JACK

The 442A Jack terminates the microphone cord at the microphone end. This jack when fitted with the 712A Adapter fits the projecting cylindrical plug which is an integral part of the 639 type Microphone and also the 311A Plug, which may be attached to the 633A Microphone.

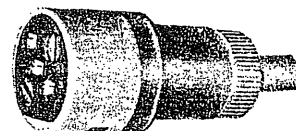


Figure 21.

712A ADAPTER

Used in conjunction with the 442A Jack to give greater mounting security for 633A Microphones equipped with 311A Plugs and 639 type Microphones. New rubber sleeves for replacement may be ordered separately per ES 764300-2.

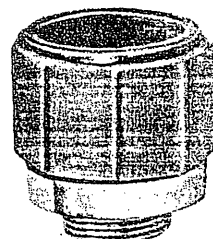


Figure 22.

11A MICROPHONE ATTACHMENT (SUSPENSION MOUNTING)

For suspension mounting of the 639 type Microphones, the 11A Microphone Attachment and the Cord Assembly are required.

The 11A Microphone Attachment and the Cord Assembly are also used with the 639 type Microphones, when mounted on either the 22A or the 24A Stand, if tilting of the microphone is desired.

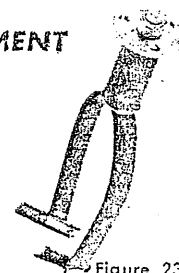


Figure 23.

9A MICROPHONE ATTACHMENT (SWIVEL JOINT)

This swivel joint is for use with the 633A Microphone. It makes possible tilting of the microphone to any desired angle from vertical to horizontal. This attachment may be used with any 633A Microphone whether equipped with the 311A Plug or not. Note: The 9A Attachment should not be used with the 639 type Microphone.

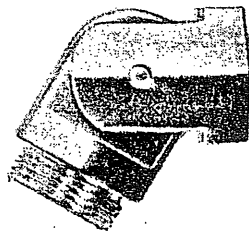


Figure 24.

8B MICROPHONE ATTACHMENT (BAFFLE)

This 3 1/4" baffle mounts on the front of the 633A Microphone and is held in place by a twist locking device. It increases the directional effect of the microphone.



Figure 25.

713A ADAPTER

This is a slotted connector which permits the microphone cord to be run outside the stand when the microphone is mounted on the 22A Floor Stand or 23A Desk Stand. When this adapter is used it is not necessary to disconnect the Cord Assembly from the microphone when the latter is removed from or secured to the stand.

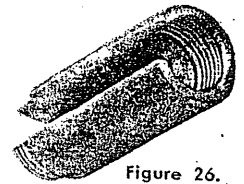


Figure 26.

FLOOR STAND WEIGHTS

For 639 type Microphones it is recommended that the weight of the 22A Floor Stand be increased by use of a 6 lb. pair of iron weights per ES-764305-2. These weights clamp in the base of the stand and give added stability. They are not necessary for the lighter 633A Microphone.

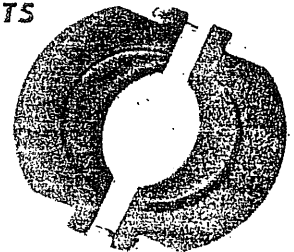


Figure 27.

22A MICROPHONE MOUNTING

⚡ Floor stand, height adjustable from 42 1/2" to 70", requires the use of the Cord Assembly. The 713A Adapter is necessary when the cord is to be run outside the stand. The 11A Microphone Attachment must be used with the 639 type Microphone on this stand when tilting of the microphone is desired. Tilting of the 633A Microphone can be accomplished by means of the 9A Microphone Attachment.

Clockwise rotation of the locking device will lock the microphone at a given height. Counter-clockwise rotation will release the microphone for repositioning purposes. Care should be taken during all height setting operations to hold the microphone with one hand while releasing with the other. The microphone should be held at the required level and then locked.

Section of 22A Microphone Mounting showing 442A Jack, 712A Adapter and 713A Adapter.

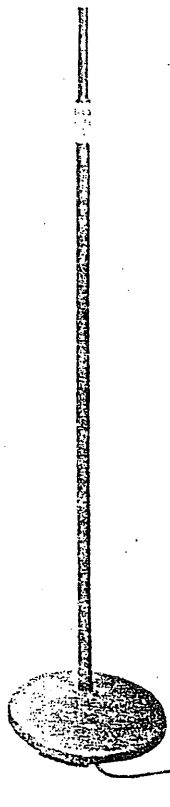


Figure 28.

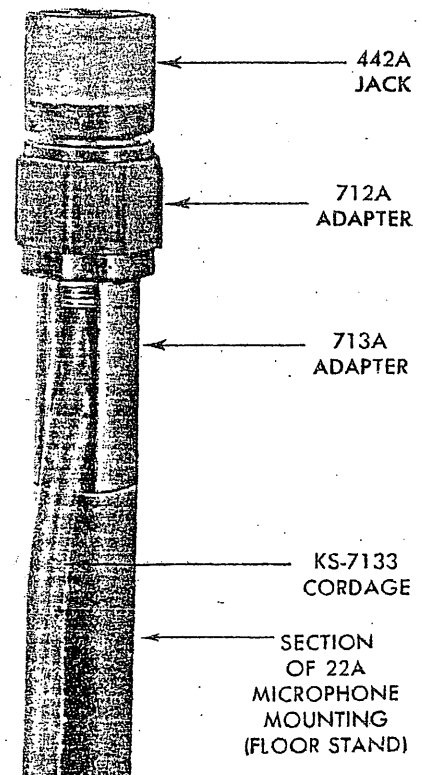


Figure 29.

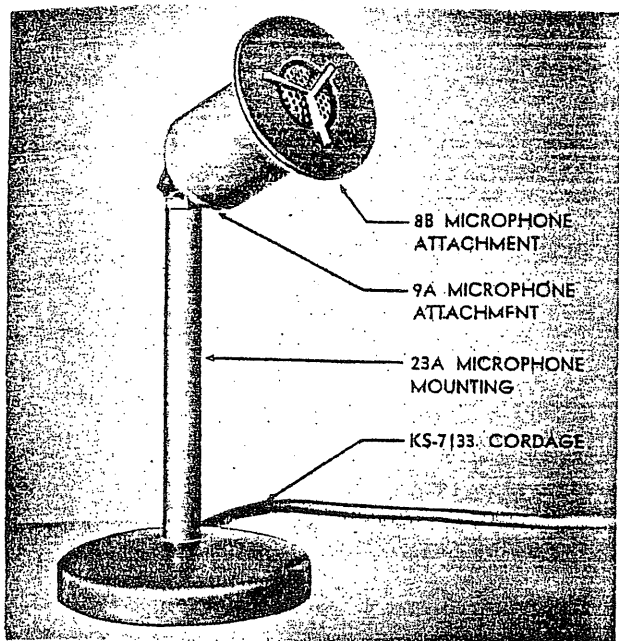


Figure 30 — The 633A Microphone on a 23A Microphone Mounting.

23A MICROPHONE MOUNTING

The 23A Microphone Mounting is for use with the 633A Microphone. The 633A Microphone can be used alone with this mounting, or in the following more common combinations: (1) with the 9A Microphone Attachment, and (2) with the 311A Plug and 9A Microphone Attachment (attached to the microphone), 442A Jack and 712A Adapter (attached to the 23A Microphone Mounting). The base is five inches in diameter and the stand is seven and one-half inches high, exclusive of the microphone and accessories.

24A MICROPHONE MOUNTING

A streamlined desk mounting for the 633A and 639 type Microphones. This mounting requires the use of the Cord Assembly, Page 14. The 24A Desk Stand has a cord slot which makes possible the removal or insertion of the cord assembly intact. When tilting of the microphone is desired, the 11A Microphone Attachment may be used with the 639

type Microphone and the 9A Microphone Attachment may be used with the 633A Microphone, provided, in this latter case, that the 442A Jack, 712A Adapter and 311A Plug units are used in combination with the 9A Microphone Attachment, as in the upper photograph on page 12.

For ordering information, the following combinations of equipment are recommended:

For the 633 Type Microphone

1. a. 22A or 23A Microphone Mounting
b. 9A Microphone Attachment
2. a. 22A, 23A or 24A Microphone Mounting
b. 9A Microphone Attachment
c. 311A Plug
d. 712A Adapter
e. 442A Jack
3. Optional equipment with either (1) or (2) above: The 8B Microphone Attachment.

For the 639 Type Microphone

1. a. 22A or 24A Microphone Mounting
b. 311A Plug
c. 712A Adapter
d. 442A Jack
2. a. 22A or 24A Microphone Mounting
b. 11A Microphone Attachment (for tilting purposes)
c. 442A Jack
d. 712A Adapter

172A REPEATING COIL

The 172A Repeating Coil is an exceptionally high quality impedance matching device for use in low level circuits, particularly between a microphone and an amplifier. It is adaptable for connection in the microphone cordage or it may be mounted on the associated amplifier. A cover protects and relieves the strain on the terminals and terminal plate. See Components and Accessories section page 92.

DYNAMIC MICROPHONE 632A

Use — The 632A Microphone, Figure 31, meets the need for a low price dynamic microphone for close-talking applications such as may be encountered in announcing and public address systems.

Description — The 632A employs a pressure unit similar in principle to that used in the Western Electric 633 and 639 Microphones, but is designed so that its response is more suitable for close-talking purposes. This pressure unit is housed in a black phenol plastic case and is terminated with two flexible cords brought out through holes in the rear of the case.

Features

- Designed for Sound Systems
- Quiet operation
- Absence of overloading
- Ruggedness
- Freedom from temperature and humidity effects

Low impedance permits microphone to be used several hundred feet from its associated amplifier

Means are provided for equalizing the barometric pressure and for draining off the moisture caused by breath condensation

Constructed so that user will not come in contact with the electric circuit when his lips touch the face of the instrument

Parts insulated from one another

Typical Specifications

Frequency Range: Essentially uniform 150 to 5000 cycles.
Sensitivity: —90 db from 1 volt per dyne per square centimeter.

Signal-to-Noise Ratio: 54 db (the signal generated by a sound pressure of 1 dyne per square centimeter is 54 db above the thermal noise generated within the microphone).

Impedance: 25 ± 2 ohms.

Power Output Level: 80 db below 1 milliwatt for a sound pressure of 1 dyne per square centimeter. 60 db below 1 milliwatt for a sound pressure of 10 dynes per square centimeter.

Mounting: The microphone in its case is mounted on Western Electric 20CJ or 20DA Desk Stand, or equivalent, and is equipped with a six foot, three conductor cord, similar to the Western Electric D3N. The 20DA has a press-to-talk lever on the side.

Dimensions and Weight:
 Dimensions: Outside diameter, $2\frac{1}{8}$ " (approx.); depth, $2\frac{5}{8}$ ".

Weight: 8 ounces (approx.).

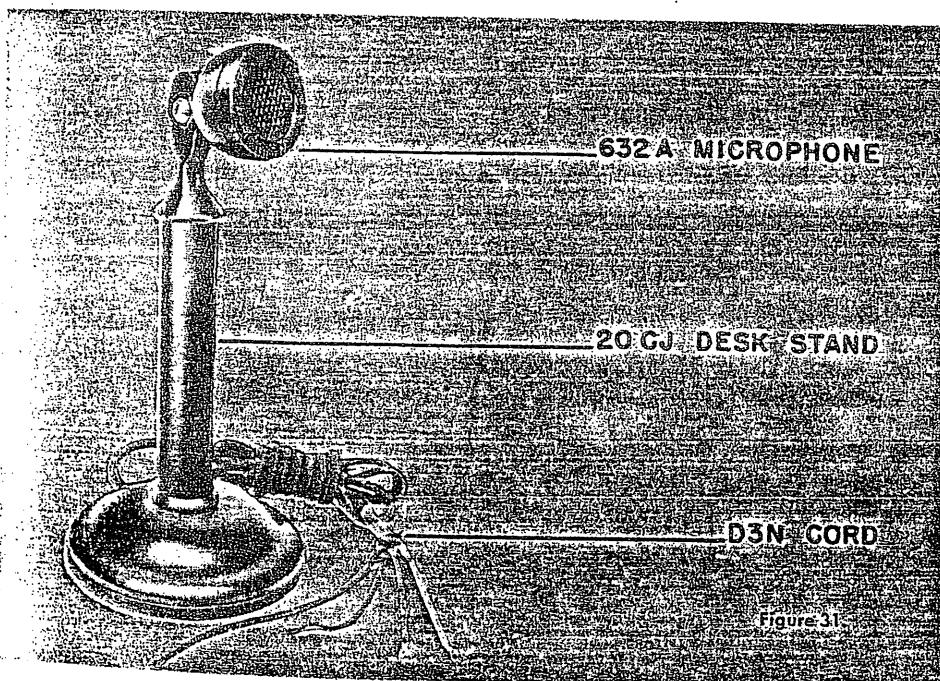


Figure 31

SUMMARIZED MICROPHONE DATA

Use	Frequency Range	Directivity	Power Output Level	Impedance
639A and B Public Address; Broadcast; All-purpose microphone	40 to 10,000 cycles	639A: 3 selectable patterns 639B: 6 selectable patterns	-56 dbm for sound pressure of 10 dynes/ cm ² -76 dbm for sound pressure of 1 dyne/cm ²	Designed to be used with equipment having a rated source imped- ance 25 to 50 ohms
633A Public Address; Sound Distributions; Broadcast microphone	40 to 15,000 cycles	Non-directional and Semi-directional	-59 dbm for sound pressure of 10 dynes/ cm ² -79 dbm for sound pressure of 1 dyne/ cm ²	Designed to be used with equipment having a rated source imped- ance 25 to 50 ohms
640AA with RA-1095 Amplifier For Scientific Produc- tion Tests of other Sound Instruments; Broadcast; Sound Systems microphone	50 to 15,000 cycles See Curves, Figures 9 and 10	Semi-directional	-29.5 dbm from ampli- fier for a sound pressure of 10 dynes/cm ² -49.5 dbm for a sound pressure of 1 dyne/cm ²	Designed to be used with equipment having a rated source imped- ance 25 to 50 or 150 to 250 ohms
632A Announcing; Public Address; Close-Talking microphone	150 to 5000 cycles	Semi-directional	-80 dbm for sound pressure 1 dyne/cm ²	Designed to be used with equipment having a rated source imped- ance 25 to 50 ohms

Western Electric

Reproducers

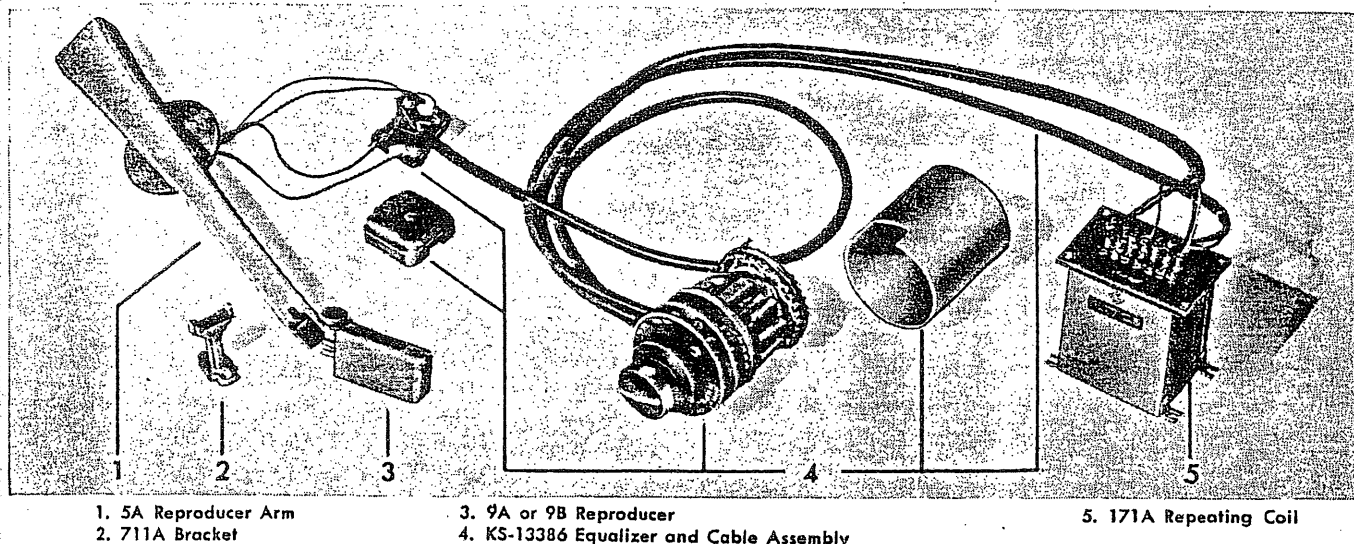


Figure 1 — 109 Type Reproducer Group.

109 TYPE REPRODUCER GROUP

Description — The 109 type Reproducer Group is a professional disc-record reproducing combination, consisting of a versatile single element 9 type Reproducer with its supporting arm and equalizer equipment. It is a practical and efficient reproducer for faithful reproduction of both vertical and lateral-cut disc-type recordings.

Many 109 Reproducer Groups are in daily use in Sound Distribution Systems, Wired Program Services, Broadcasting Stations, and general purpose applications all over the world, wherever high quality reproduction is a requirement.

The 109 type Reproducer Group is available in two combinations.

The 109AA Reproducer Group consists of: 9A Reproducer, 5A Reproducer Arm, KS-13386 Equalizer and Cable Assembly, 171A Repeating Coil, and 711A Bracket.

The 109B Reproducer Group consists of: 9B Reproducer, 5A Reproducer Arm, KS-13386 Equalizer and Cable Assembly, 171A Repeating Coil, and 711A Bracket.

The two reproducers, 9A and 9B, differ only in stylus material and tip radius. They are mechanically and electrically interchangeable on the 5A Reproducer Arm, and they function equally well with the other components of the group.

The 9A Reproducer has a 2 mil radius diamond tip

stylus. It gives good performance and long life on vertical and lateral-cut records. It is ideally suited for vertical and lateral-cut transcription type records.

The 9B Reproducer has a $2\frac{1}{2}$ mil radius sapphire tip stylus. The larger tip radius improves the signal-to-noise ratio of lateral recordings. When used with records containing an abrasive (phonograph records) the sapphire may, in time, wear sufficiently to alter reproduction. However, stylus renewal can readily be obtained by returning the reproducer to our distributor.

Features

- A single unit designed to reproduce both laterally and vertically-cut disc-type recordings interchangeably
- On lateral position, vertical modulation is suppressed
- On vertical position, lateral modulation is suppressed
- Plug-in type reproducer facilitates interchanging the 9A and 9B Reproducer

- Low mechanical impedance assures faithful reproduction
- Natural resonance outside operating range minimizes unwanted vibratory pickup

- Light stylus pressure (35 grams) reduces to minimum wear and tear on record grooves—increases record life

Western Electric

Sturdy construction consistent with above features
Choice of modern equalizer curves
Jewel stylus tip: 9A, 2 mil radius diamond tip; 9B, $2\frac{1}{2}$ mil radius sapphire tip
Attractive finish

9 TYPE REPRODUCER

A dynamic (moving coil) type reproducer with the pick-up stylus arranged to move vertically for reproduction from vertical records and transversely for reproduction from lateral records. This instrument provides excellent discrimination between the two different types of groove modulation.

The vertical noise components always present in lateral record grooves are suppressed when the reproducer is switched for lateral reproduction. Correspondingly, when the reproducer is switched for vertical reproduction, unwanted lateral modulation, inherent in the sides of vertical record grooves, is suppressed.

The 9 type Reproducer and associated 5A Reproducer Arm have been designed so that their natural period of resonance lies below the audio frequencies usually reproduced in any program system. This, together with the low mechanical impedance of the 9 type Reproducer, minimizes unwanted vibratory pick-up and enables the full range of groove modulation to be reproduced faithfully. The jewel stylus tip and the light pressure on the record (only 35 grams) assure long record life.

5A REPRODUCER ARM

Weighing $3\frac{1}{2}$ pounds, the 5A Reproducer Arm has sufficient mass to offer the inertia essential to stable tracking and full low frequency reproduction.

The 5A Reproducer Arm has a four-pin jack into which either of the 9 type Reproducers can be plugged. The reproducer is locked in position by means of a thumb screw. The arm supports and counter-balances the reproducer and contains leads for connection to the KS-13386 Equalizer (and Cable Assembly). The arm is of sturdy construction and is attractively finished in a bright aluminum crackle to match the reproducer. The finish used on the reproducer arm is very durable.

The overall length of the arm and reproducer is $18\frac{1}{2}$

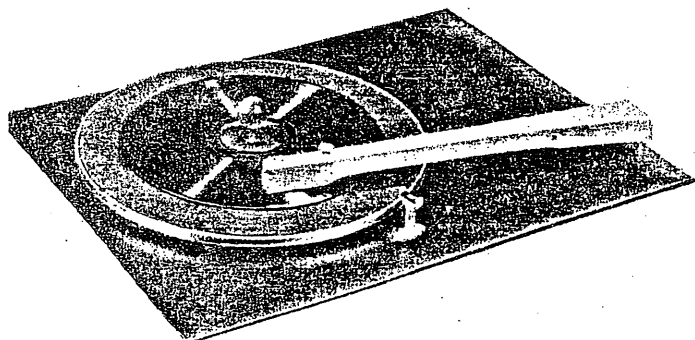


Figure 2 — The Reproducing Group is designed so that it can be accommodated to almost any type of turntable panel.



Figure 3 — 711A Bracket.

inches and the distance between the stylus and pivot is $13\frac{1}{8}$ inches.

Height of the arm is adjustable to accommodate different heights of turntable platters ($\frac{3}{4}$ inch to 2 inches). The

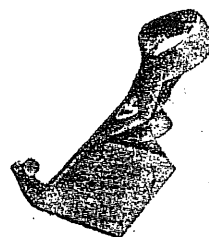


Figure 4 — 712A Bracket.

height is easily adjusted by means of a set screw and should be adjusted for each installation so that the stylus is perpendicular to the record.

The 711A Bracket, Figure 3, is a T shaped arm rest supplied as part of the 109 type Reproducer Group. It is adequate for most turntable installations and is used to support the reproducer end of the arm and reproducer when it is not resting on a record.

KS-13386 EQUALIZER (and CABLE ASSEMBLY) and 171A REPEATING COIL

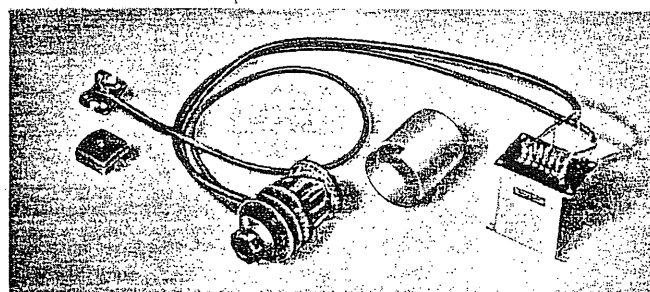


Figure 5 — The KS-13386 Equalizer (and Cable Assembly), and the 171A Repeating Coil form the equalizing, switching, and impedance matching portion of the 109 type Reproducer Groups.

The 712A Bracket, Figure 4, has an arm rest, a support for the arm base, and a guard which protects the rear or weighted end of the arm from accidental contact. This bracket may often be used for cabinet types of transcription turntables which lack sufficient area on the table top to accommodate the base of the arm at the proper distance of $13\frac{3}{4}$ inches from the center of the turntable platter. (712A Bracket not included in the code 109 type, but available as an extra when ordered).

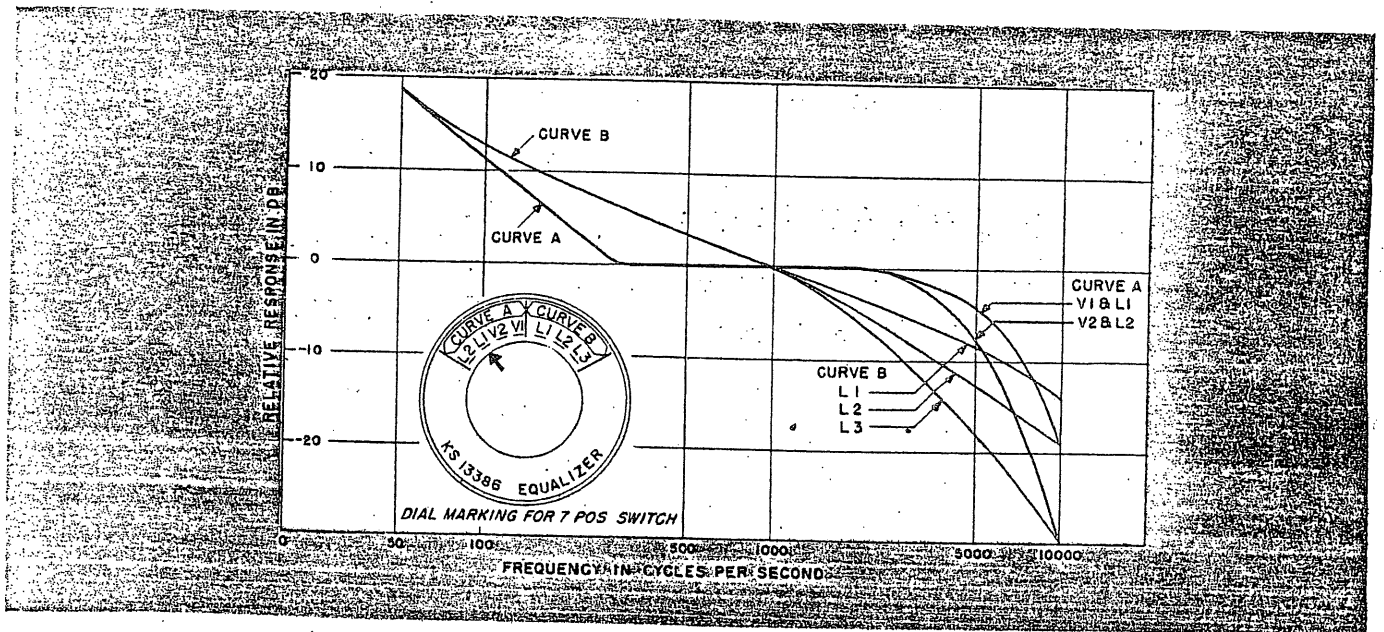


Figure 6 — Frequency Response Curves.

The equalizer switch, Figure 5, has seven reproducing positions, two for vertical and five for lateral. The seven reproducing characteristics are based on two fundamental frequency response characteristics, Curve A and Curve B, Figure 6. These curves are based upon a survey of the recording field and match those which are currently used for record production.

Curve A is the conjugate of the frequency response curve in general use in recording vertical transcriptions, some early lateral transcriptions, and a few "instantaneous type" lateral transcriptions.

Curve B is the conjugate of the frequency response curve in general use in recording lateral transcriptions (NAB Standard and Orthacoustic) and phonograph records.

For information on specific curves used in making recordings, the recording studios should be consulted.

conjugate of Curve B. The overall frequency response will then be as indicated in Table 1 for Curve B.

The 171A Repeating Coil provides taps for feeding circuit impedances of 30 ohms, 250 ohms, or 500/600 ohms. The coil taps must be connected directly into a resistive

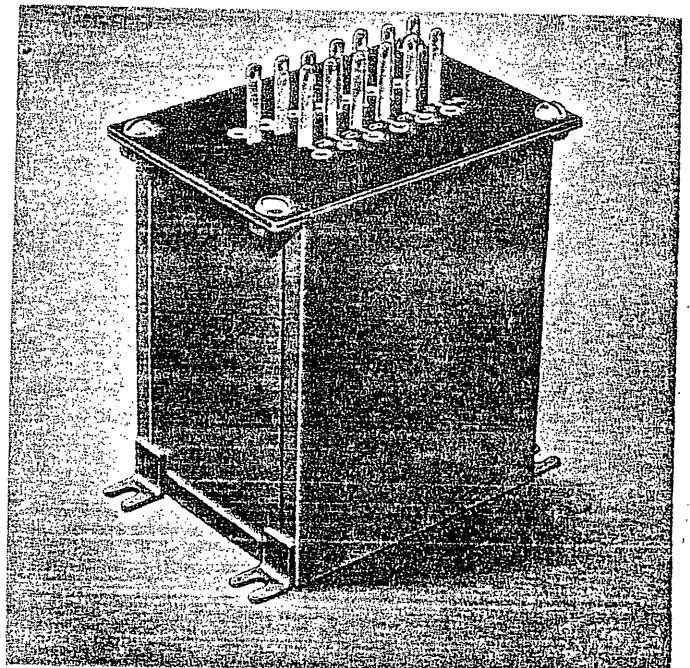


Figure 7 — 171A Repeating Coil.

Table 1

Equalizer Switch Position	Recording Type	Overall System Response
Curve A	V1	Vertical
	V2	Vertical
	L1	Lateral
	L2	Lateral
Curve B	L1	Lateral
	L2	Lateral
	L3	Lateral

Choice of Equalizer Switch Position

The switch positions having the characteristic according to Curve A should be chosen for the reproduction of records made with the characteristic which is the conjugate of this curve. The frequency response will then be as indicated in Table 1 for Curve A.

The switch positions indicated for Curve B should be chosen for the reproduction of records made with the

type circuit such as a constant impedance type mixer. For faithful reproduction when feeding inductive or capacitive circuits such as a pre-amplifier input, a simple "L" pad should be interposed between the repeating coil and the pre-amplifier for purposes of impedance stabilization.

Western Electric

Typical Specifications

Frequency Response: See Table 1. For new transcriptions use Curve A, V1 or L1 positions.

For old or worn transcriptions use Curve A, V2 or L2 positions.

For phonograph records use Curve B, L2 or L3 positions.

For phonograph records having low surface noise use Curve B, L1 or L2 positions.

Output Noise: Dependent on record. Experience indicates that representative signal-to-noise ratios as high as 45 db for transcriptions and 20 db for phonograph records are attainable under operating conditions.

Operates From: Vertical or lateral-cut disc records up to 16 inches in diameter.

Load Impedance: 30, 250, or 500/600 ohms mixer or stabilized pre-amplifier input.

CAUTION: Reproducer Group must be operated into a proper resistive termination.

Output Level: Dependent on record. Representative program level comparable to high quality microphone output level. Experience indicates that a net gain of 60 to 80 db is adequate to raise the level to 0 vu.

Typical Specifications for 9 Type Reproducer Mounted on 5A Arm

Dimensions: Length 18 $\frac{1}{8}$ ", width 2" tapering to $\frac{7}{8}$ ".
Overall height 4".

Base 3" diameter.

Height adjustable for variation of $\frac{3}{4}$ " to 2" of platter top above table.

Weight: Reproducer, $\frac{1}{2}$ pound.

Arm, 3 $\frac{1}{2}$ pounds.

Total, 4 pounds.

Mounting: Flat panel, pivot center 13-9/16" from platter center.

Finish: Light aluminum crackle.

Typical Specifications for KS-13386 Equalizer

Dimensions: Length—body 3 $\frac{3}{4}$ ", shaft 1 $\frac{3}{4}$ ".

Diameter—body 3", shaft $\frac{1}{4}$ ".

Cable Assembly consists of three cables, each approximately 3' long.

Mounting: Mounts on back of panel with shaft and two mounting screws through panel.

Finish: Bright aluminium. Black photo-etched dial plate. Black knob.

Typical Specifications for 171A Repeating Coil

Dimensions: Approximately 2-9/16" by 3 $\frac{5}{8}$ " by 3 $\frac{7}{8}$ ".

Mounting: Base mounted on flat surface. Avoid locating in a-c field such as produced by turntable motor or unshielded a-c supply line.

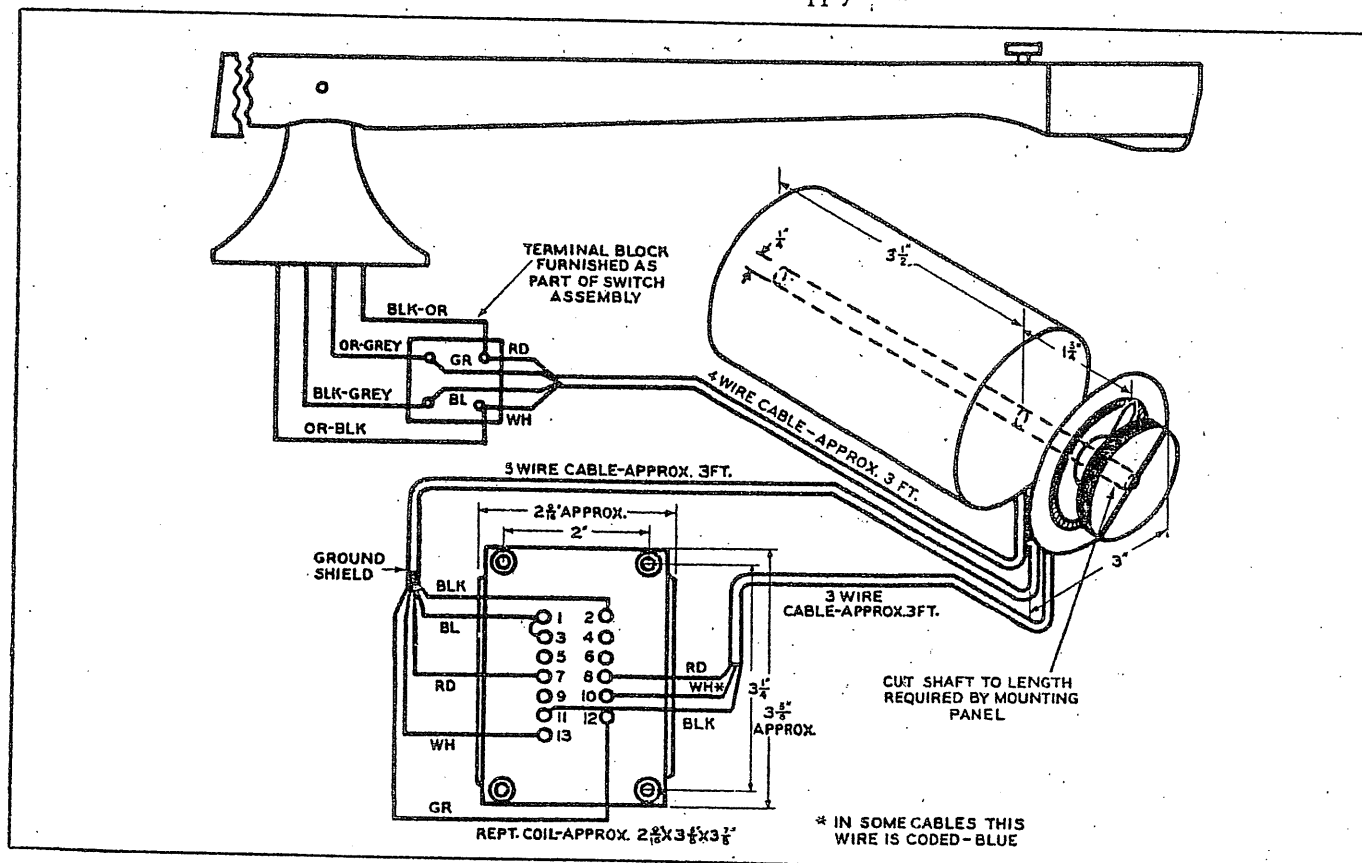
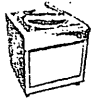


Figure 8 — Wiring Connections of Reproducer Group.



1304A and B REPRODUCER SETS
304A and B REPRODUCER PANELS

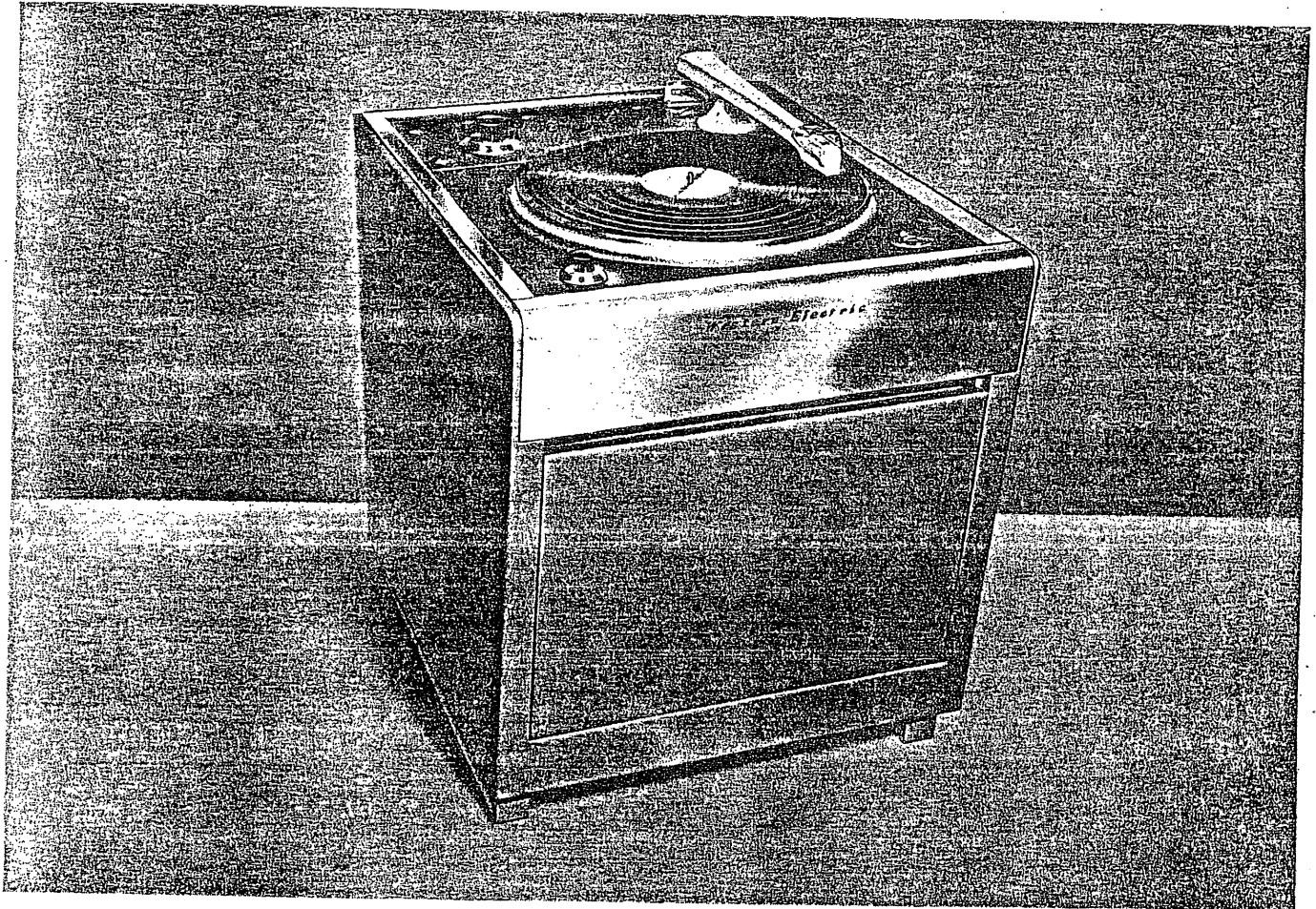


Figure 9 — 1304 Type Reproducer Set.

Features

Modern styling — harmonizes with modern studio units
Compact construction — maximum utilization of space
Powerful, dependable, trouble-free, quiet drive mechanism
High signal-to-noise ratio — rumble, gear and drive noise held well below operating program levels
Total playing time variation over 15 minute program at $33\frac{1}{3}$ or 78 RPM ± 1.8 seconds (platter speed synchronous within $\pm 0.2\%$)
Flutter (including "wow") less than 0.1% at $33\frac{1}{3}$ or 78 RPM
Speed selection of either $33\frac{1}{3}$ or 78 RPM by operating an electrical switch
Standard 16" diameter felt surfaced record platter with durably finished non-marking rim
Interchangeable center pins for "out-size" record center holes
Turntable has built-in isolation to eliminate motor and building vibration as a factor in operation

Arm rest has secure latch for reproducer arm when not in use. Latch easily engaged when record has been played

Placement of speed change switch and on-off switch, both located at front edge of panel, may be interchanged

No rubber-tired or rim-drive wheels to flatten or wear out

Ample proportioning of power transmission mechanism for long trouble-free service

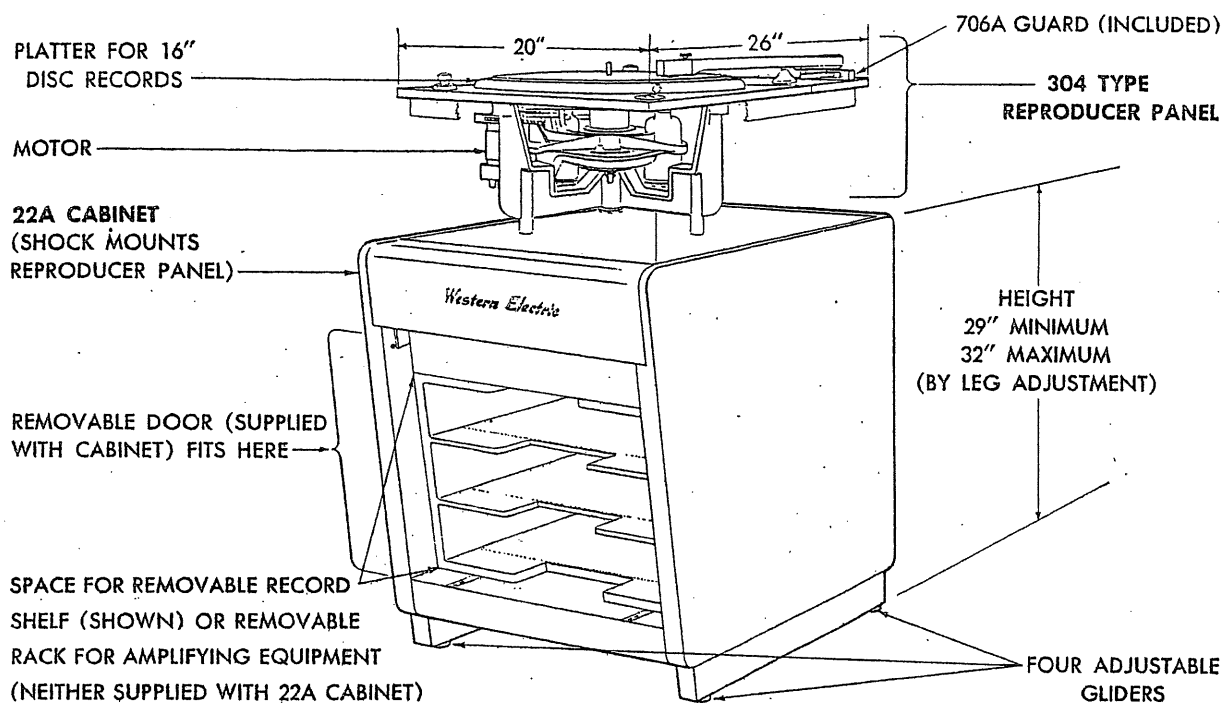
Rapid starting — from standstill to full constant speed in approximately $\frac{1}{2}$ revolution of platter at $33\frac{1}{3}$ RPM and $1\frac{1}{2}$ revolutions at 78 RPM

Operates on 115 volt ($\pm 5\%$), 60 cycle a-c power

Motor and drive pulley replaceable for application with other than 115 volt 60 cycle a-c power

Easy access for maintenance — minimum of maintenance required

Occasional lubrication and inspection readily accomplished by removing the turntable platter to expose entire drive mechanism and lubrication points



1304 TYPE REPRODUCER SET
(consisting of 304A Reproducer Panel and 22A Cabinet)

Figure 10 — 1304 Type Reproducer Set.

These units are designed for electrical transcription and disc record reproduction in sound system installations.

The reproducer is available in floor type cabinets as the 1304 type Reproducer Set, and in panel units without cabinet as the 304 type Reproducer Panel for installation in existing operating tables or special cabinets. Components of these types are indicated in the accompanying table.

The turntable element in these equipments is of a completely new design, precision engineered and manufactured. It performs accurately and dependably under the arduous and exacting conditions of broadcast studio operation over long periods of continuous operation with a minimum of maintenance or variation in performance. The cabinet of an attractive functional design with trimming of stainless steel, and the reproducer panel of a special hard plastic, will give the user long and durable wear under conditions of hard usage. The Western Electric 109 type Reproducer Group, Figure 1, page 19, used with the reproducer set provides excellent, high quality reproduction in the finest professional tradition.

Drive Mechanism — The drive mechanism employed was perfected by Bell Telephone Laboratories, and is a result of years of development in all types of precision drive units — particularly those used with sound recording and reproducing systems. The drive motor and mechanism are amply proportioned to insure turntable rotation under the severe conditions encountered in professional use. The quiet running motor, belt and helical-gear drive, and a system of mechanical filters remove flutter and "wow" as operating problems. Likewise, rumble and vibration are eliminated as an operating problem by isolating the turntable from the cabinet, driving motor, and associated driving mechanism by means of mechanical filters. Large diameter metal

pulleys are used so that the speed of the turntable is not affected by wear over long periods of use.

Speed Change — A unique feature of the drive mechanism is the method of accomplishing a change of speed between 33½ and 78 RPM. This change of speed is made by an electrical switch mounted on the panel. The switch reverses the direction of motor rotation quickly and easily; and the drive mechanism translates this direction change into a speed change at the platter by means of specially designed overriding clutches. Rapid speed change without damage to the mechanism can be made while the turntable is running, as clash-gear or planetary ball devices are not used.

Code Identification

Order Code	Consists of
1304A Reproducer Set	304A Reproducer Panel and 22A Cabinet (floor type)
1304B Reproducer Set	304B Reproducer Panel and 22A Cabinet (floor type)
304A Reproducer Panel	109AA Reproducer Group mounted on a turntable panel which includes a platter and drive mechanism, motor, speed change switch and on-off switch
304B Reproducer Panel	109B Reproducer Group mounted on a turntable panel which includes a platter and drive mechanism, motor, speed change switch and on-off switch
109AA Reproducer Group (less 711A Bracket)	9A Reproducer, 5A Reproducer Arm, KS-13386 Equalizer, 171A Repeating Coil
109B Reproducer Group (less 711A Bracket)	9B Reproducer, 5A Reproducer Arm, KS-13386 Equalizer, 171A Repeating Coil
305A Reproducer Panel	Turntable panel, platter and drive mechanism, motor, speed change switch, on-off switch, and mounting panel for Reproducer Group (Same as 304 type less 109 type Reproducer Group)
305B Reproducer Panel	Same as 305A less rear mounting panel for 109 type Reproducer Group

Western Electric

Wired program distribution equipment

Use — The finest Wired Program Distribution Equipment of its kind is now available as a business tool — that provides a pleasant musical background in plants, factories, offices, to help relieve worker fatigue — or provides soft dinner music, sprightly cocktail music in restaurants, lounges, shopping centers and other locations.

Description — Western Electric Program Distribution Equipment has been designed to operate efficiently with either of the two basic types of telephone line program distribution — *NETWORK* or *DIRECT LINE*.

The *NETWORK TYPE* uses a single telephone loop for each program to connect the program center with the Telephone Company's central office. Distributing amplifiers and associated equipment are provided by the Telephone Company in the central offices as required to raise the program level and send it to other central offices and subscribers. Network operation is not adaptable to the switching of individual subscribers to various program

channels although the entire network may be transferred from one channel to another if desired.

In the *DIRECT LINE* plan, a separate telephone loop is required from the program center through the Telephone Company central office for each subscriber. This method, however, affords flexibility in feeding program material to individual subscribers.

These two methods of program distribution have been designated Type B and Type C systems; Type B covering network operation, Figure 5, and Type C covering private direct line operation, Figure 6. In order to simplify and facilitate the installation of Wire Program Center Equipment, Western Electric has designed the necessary components for each system into flexible units, permitting purchase of the entire program center equipment in a complete package for either type of operation, on a large or small basis.

Schematics of the Western Electric Type B and Type C Program Distribution Systems are shown on pages 27 and 32.

PROGRAM CENTER CONSOLE

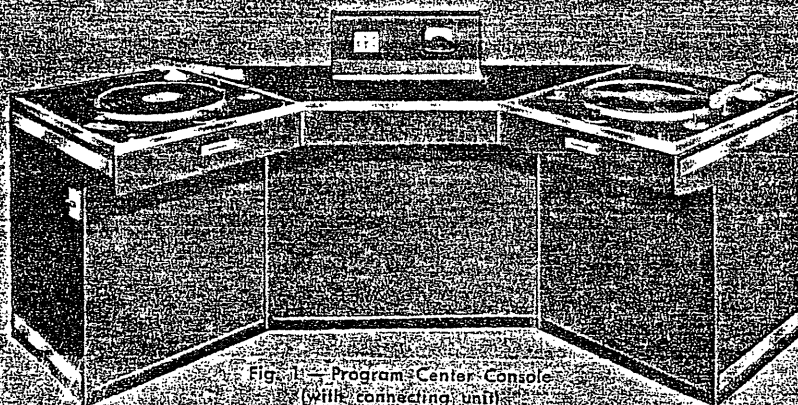


Fig. 11 — Program Center Console
(with connecting unit)

Western Electric

The heart of the program center equipment is the console, which provides a maximum of comfort and operating ease, in a modern styling blending harmoniously in various surroundings.

The console as shown in Figure 1, has two reproducing turntable assemblies, designated the Originating and the Supplementary Units, and a Connecting Unit.

The Originating Unit, when arranged for network operation, becomes part of the Type B System and is equipped with the Western Electric 9 type Reproducer, a two-speed turntable, equalizers, power distribution cabinet, pre-amplifier, cueing amplifier, rectifier, main amplifier, line repeating coils and necessary controls. When arranged for direct line operation the originating unit becomes part of the Type C System and the main amplifier and repeating coils are omitted from the console and mounted instead on enclosed type racks called the amplifier bay and the program distribution bay.

Provision is made for microphone connections for special announcements, and a microphone pre-amplifier may be added to the main amplifier in the originating unit. All amplifiers are easily accessible — and are mounted on rubber shock mounts, as is the turntable panel.

The Supplementary Unit is similar to the Originating Unit, but does not require nor include a main amplifier or line repeating coils for either direct line or network operation. The program circuit of the Supplementary Unit is connected to that of the Originating Unit by tying the inputs of the respective attenuators together thus providing a two-position mixer for smooth program operation.

The Connecting Unit is a specially shaped desk section which may be used if desired to incorporate the turntable sections into one complete assembly.

A turret, containing a volume indicator for monitoring the output level, a clock for program timing, and a cueing speaker, is mounted on the Connecting Unit.

The Originating Unit may be ordered separately, and will be equipped with the turret upon request. When a Connecting Unit is not desired, the Originating and Supplementary Units can be assembled together as shown in Figure 2. Two or more Originating Units can also be assembled in the same manner if so desired. A cabinet containing an amplifier and speaker for aural program monitoring is also available.

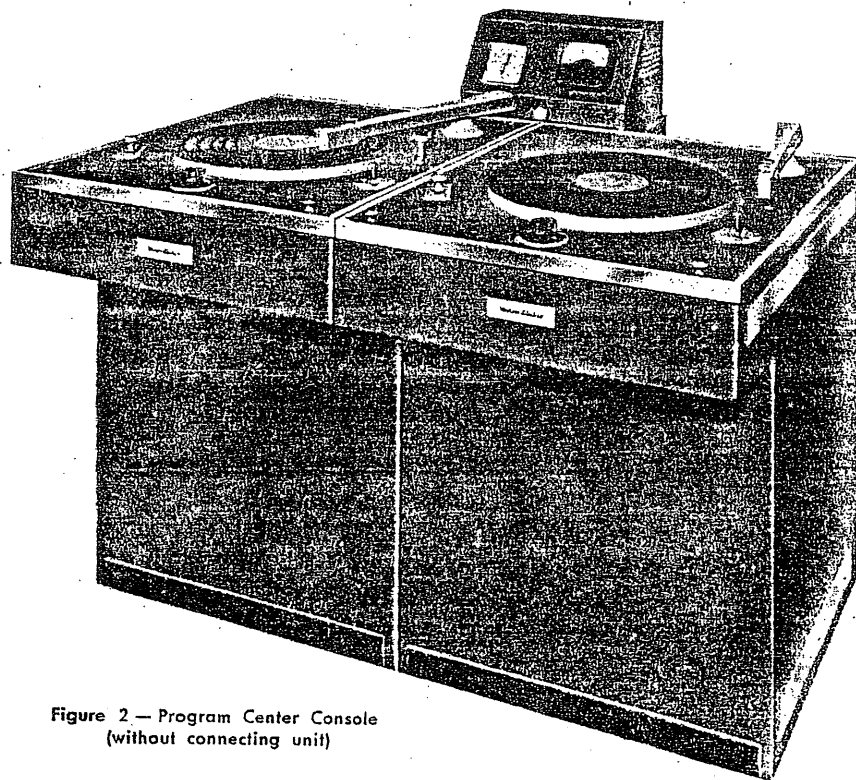


Figure 2 — Program Center Console
(without connecting unit)

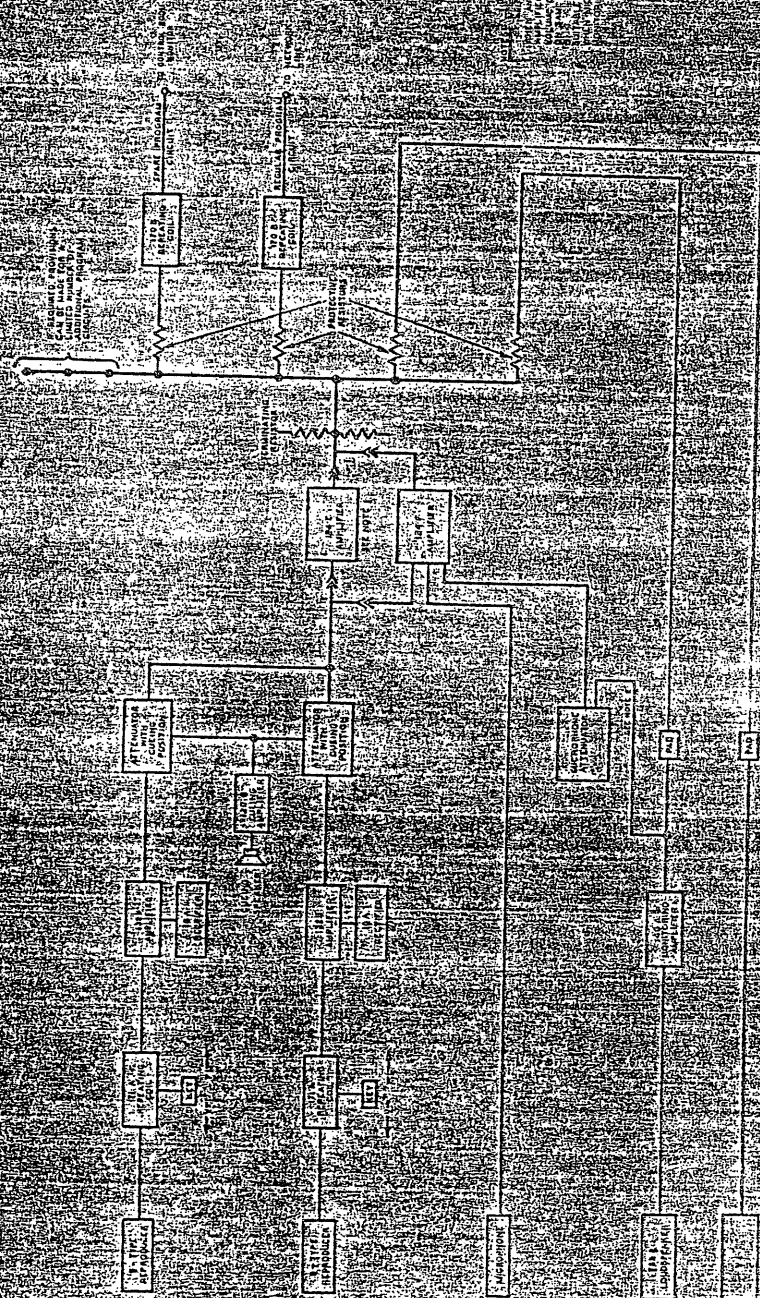


Figure 5 — Schematic of Type B (Network) Wired Program Distribution System.

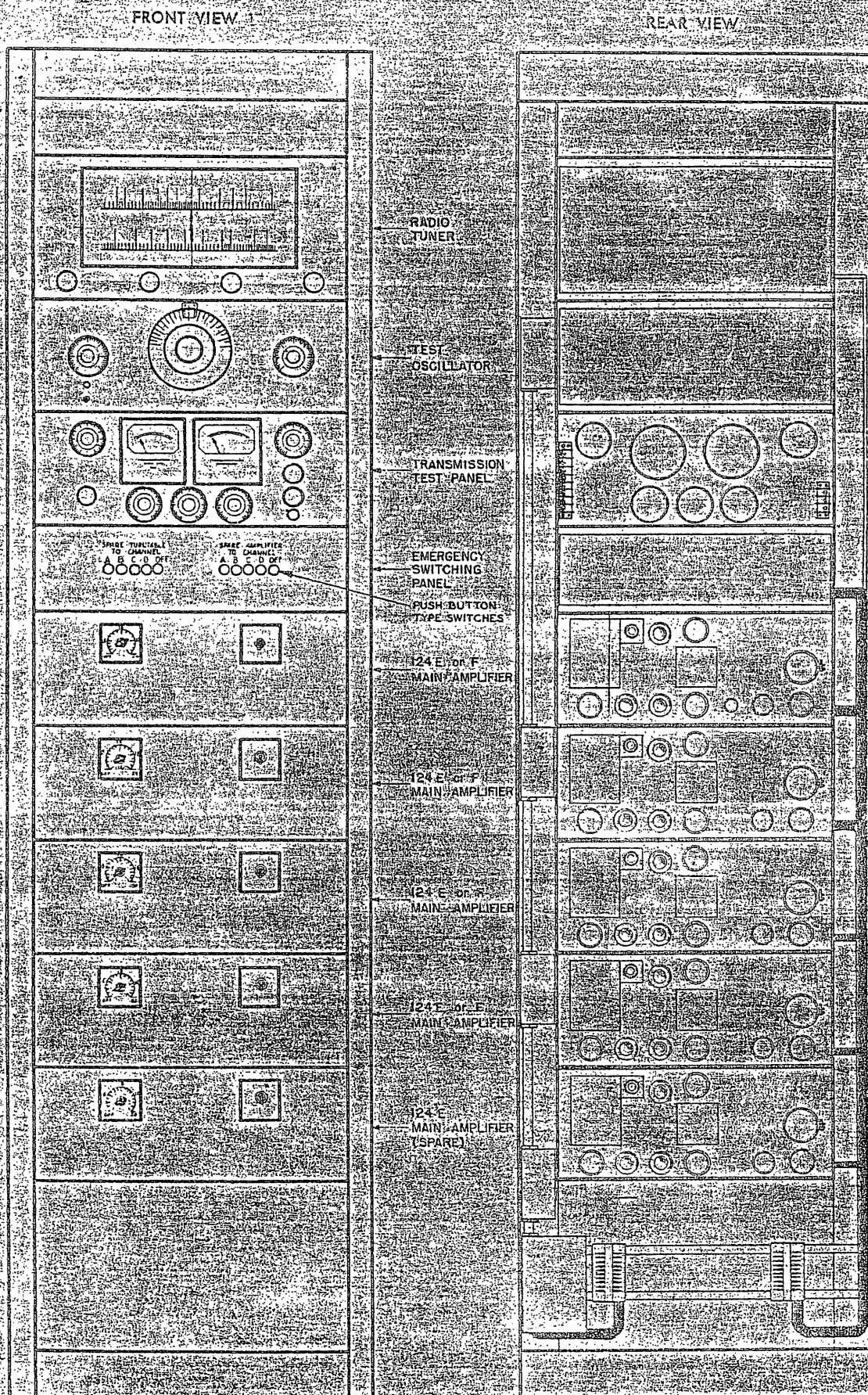
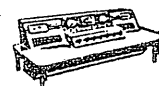
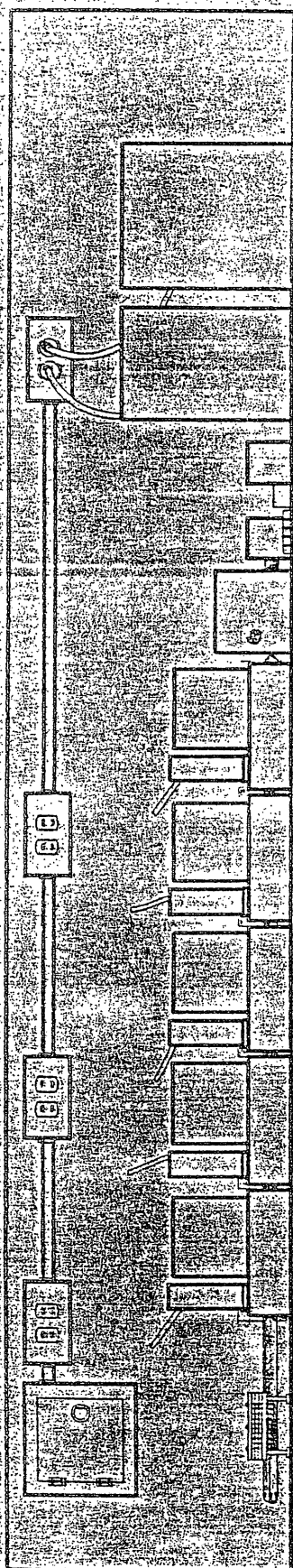


FIGURE 3: AMPLIFIER BAY



SECTIONAL VIEW



AMPLIFIER BAY

The Amplifier Bay, shown here in three views, contains the necessary amplifying and test equipment for direct line operation. Space is also provided for a radio tuner if desired. A typical amplifier bay combination for three operating studios, a spare studio and a radio channel is shown in Figure 3. This bay is equipped with a main amplifier for each channel, a spare amplifier for emergency standby, an emergency switching panel, a radio tuner, a test oscillator and a transmission test panel.

The bay is a fully enclosed, well ventilated steel cabinet measuring $83\frac{1}{8}'' \times 22'' \times 15\frac{1}{4}''$ overall with 77 inches of panel mounting space and a door in the rear to facilitate access to wiring and equipment. The bay is completely wired to accommodate up to five 124E or F main amplifiers, an emergency switching panel, a radio tuner (except antenna connection), test oscillator and a transmission test panel.

Several combinations of this equipment are available. For example, the number of amplifiers obtained initially may be varied to suit individual requirements, and the amplifier switching panel, radio tuner, oscillator and transmission testing panels may be obtained later if desired, when need for them is definitely determined. These features make it possible to set up a program center with a minimum outlay and to provide a means for gradually adding equipment as required.

Radio Tuner

Several tuners of either the continuously variable or fixed-tuned, crystal controlled types are available for use in picking up radio programs for re-transmission over wired program circuits. A space of $8\frac{3}{4}''$ to $12\frac{1}{4}'' \times 19''$ has been provided for mounting such a unit.

Audio Oscillator

A $7'' \times 19''$ space is provided for mounting an audio oscillator.

Transmission Testing Panel

The $7'' \times 19''$ transmission testing panel will facilitate checking the frequency response of program channels from reproducer to line. This may be done either on an individual component or on an overall basis.

The equipment includes input and output power level indicators with associated range switches, three attenuators calibrated in steps of 100 db, 1 db and 0.1 db respectively, plug-in type impedance matching pads and a switch for transferring the output of the panel from the test channel to a test trunk.

Emergency Switching Panel

This $5\frac{1}{4}'' \times 19''$ panel is equipped with two 5 gang push button switches. One of these switches is arranged to connect a spare turntable to anyone of four program channels in place of the turntable or radio normally connected to that channel. The second switch connects a spare main amplifier into anyone of four channels to replace the amplifier normally connected to that channel.

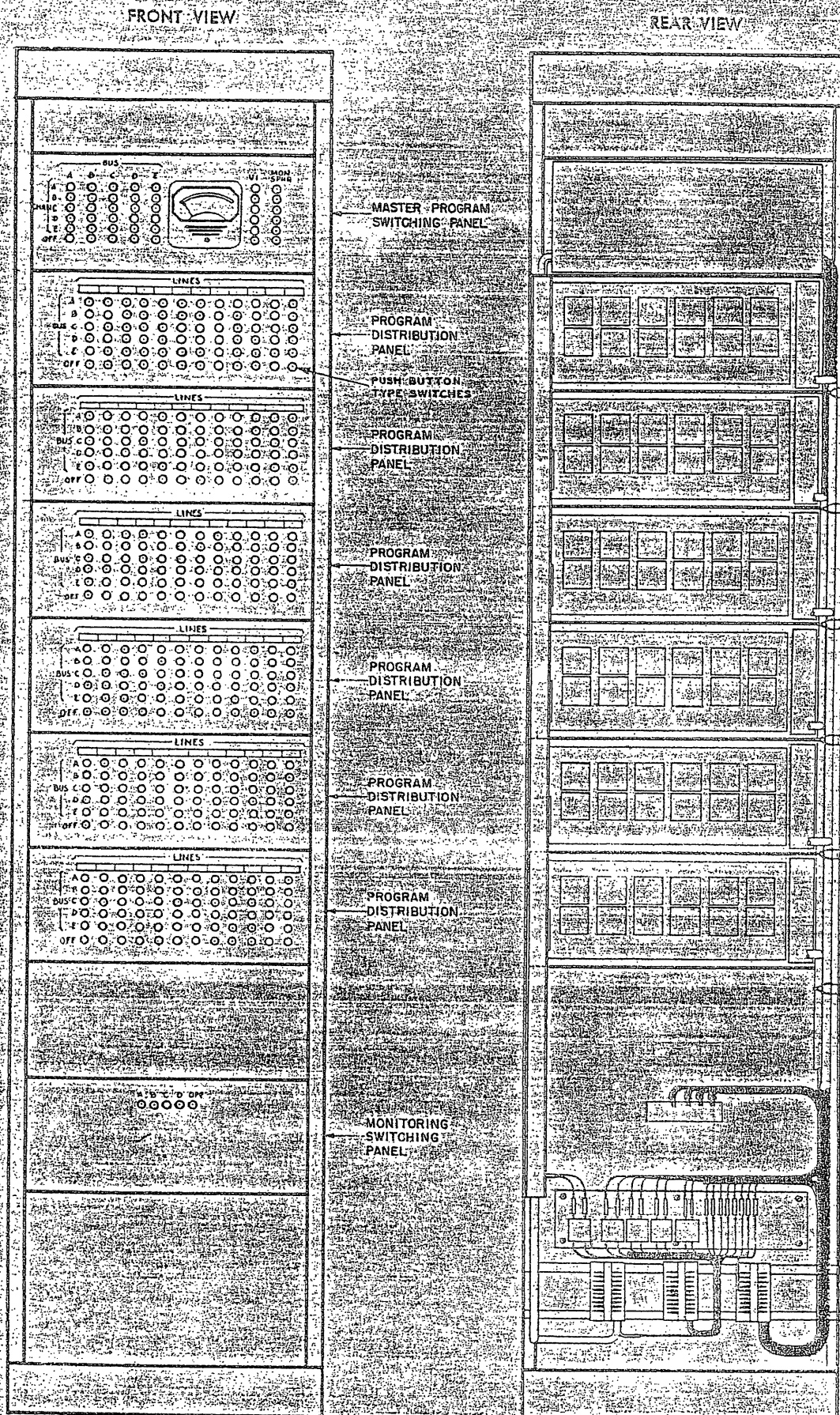
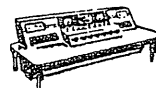
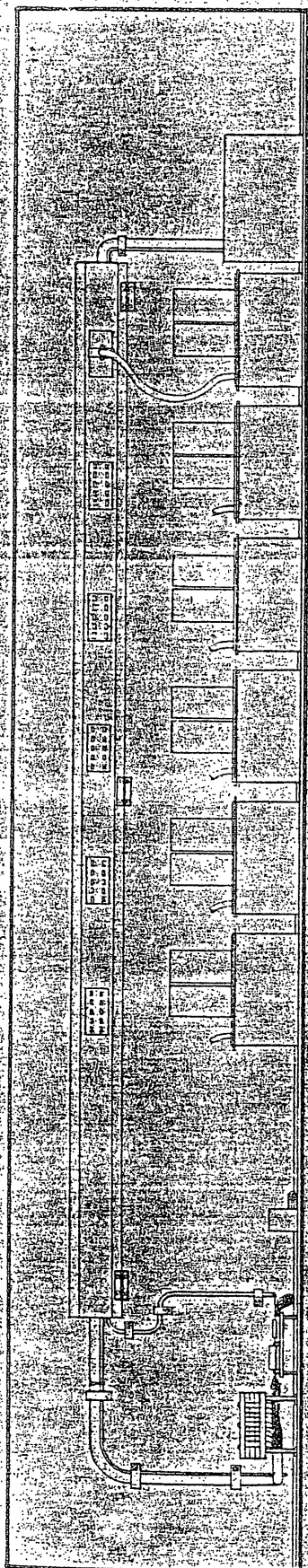


FIGURE 4 PROGRAM DISTRIBUTION BAY



SECTIONAL VIEW



PROGRAM DISTRIBUTION BAY

This bay is a fully enclosed steel cabinet measuring $83\frac{3}{8}'' \times 22'' \times 15\frac{1}{4}''$ overall with 77 inches of panel mounting space on front side and a door in rear to facilitate access to wiring and equipment.

This bay, shown in Figure 4, provides facilities for supplying and switching four programs plus the output of a test oscillator to as many as 72 subscribers on a direct line basis. 72 additional subscribers may be accommodated by means of a supplementary program distribution bay. Included, also, are the necessary circuits for feeding program to four studio monitor amplifiers and volume indicators, and one control room monitor amplifier and volume indicator.

Master Program Switching Panel

This panel is equipped with seven 6-gang push button switches, five of which provide facilities for switching each of the five busses to any of the five channels. The other two gang switches permit the transfer to each of the five channels of the control room monitor amplifier, and the volume indicator which is mounted on the panel. A sixth button provides an OFF position.

Program Distribution Panel

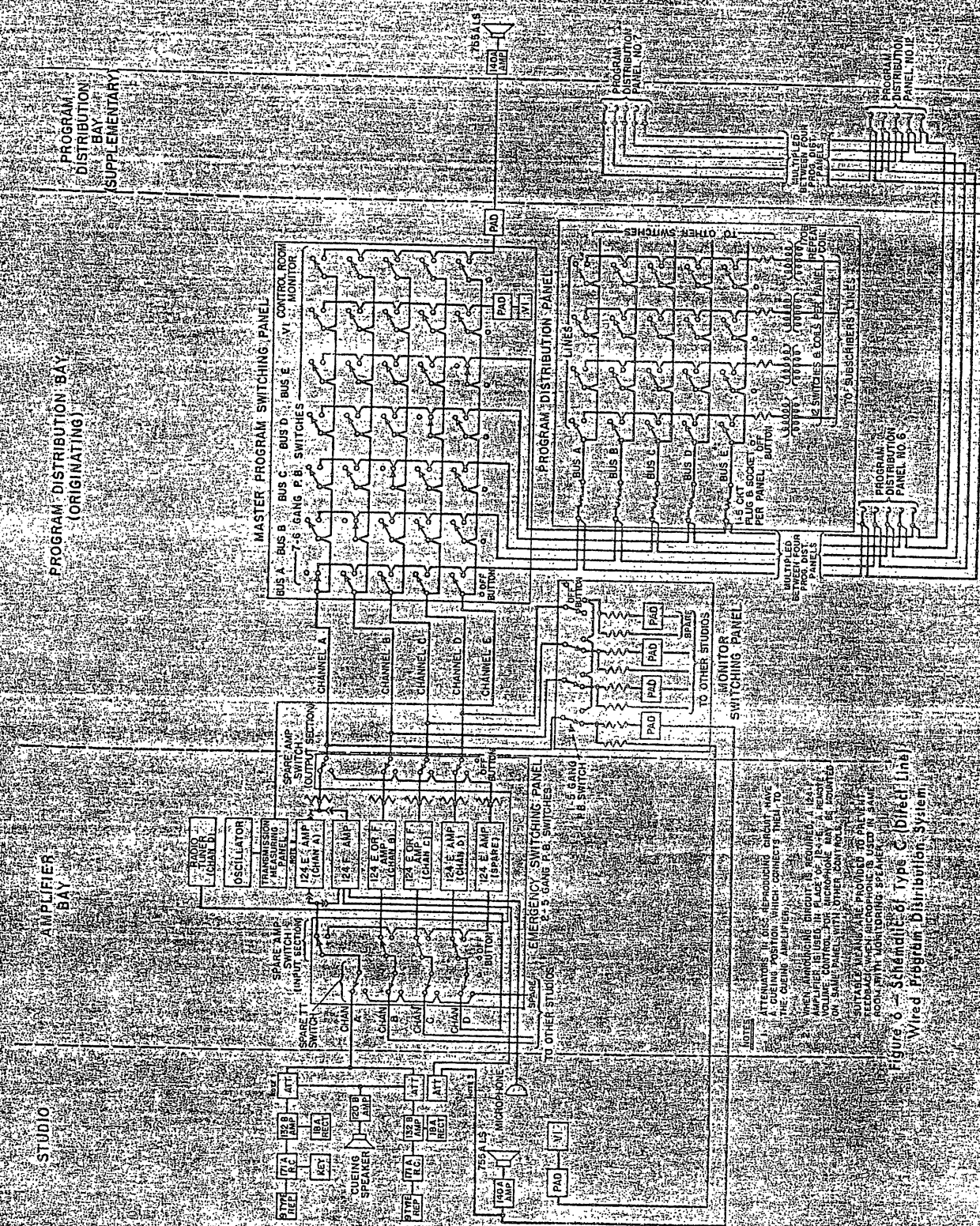
This panel will serve 12 private line subscribers. It is equipped with twelve 6-gang push button switches giving each line access to any one of the five busses.

Necessary line coils and protective resistance are included, and all wiring is made readily accessible by means of a hinged rear cover. The panel is connected to the busses by means of a single ten-conductor plug. Terminals are provided whereby Telephone Company cables may be connected directly to these panels, simplifying the operation of tying into the Telephone Company cross-connection box.

Monitor Switching Panel

This panel includes the necessary protective resistances and pads required in the monitor circuits. It also provides a mean for switching these circuits from one studio to another when an emergency program is originated from the spare turntable.

Equipped panels are wired as individual units and may be obtained as part of the initial installation or added as required. The bay wiring is complete in all cases and the addition of panels is a comparatively simple operation.



NOTES

1. ATTENTION TO REPRODUCING CIRCUIT HAVE A LISTING POINTING TO THE CIRCUIT TO THE CUEING AMPLIFIER.
2. WHEN AMPLIFIER CIRCUIT IS REQUIRED, A PAI AMPLIFIER IS USED IN PLACE OF 124 E, A REMOTE CUEING SPEAKER AND MICROPHONE MAY BE LOCATED ON SAME PANEL.
3. SUITABLE MEANS ARE PROVIDED TO PREVENT FEEDBACK WHEN MICROPHONE IS USED IN SAME ROOM WITH CUEING SPEAKER.

Figure 6 - Schematic of Type C (Direct Line) Wired Program Distribution System



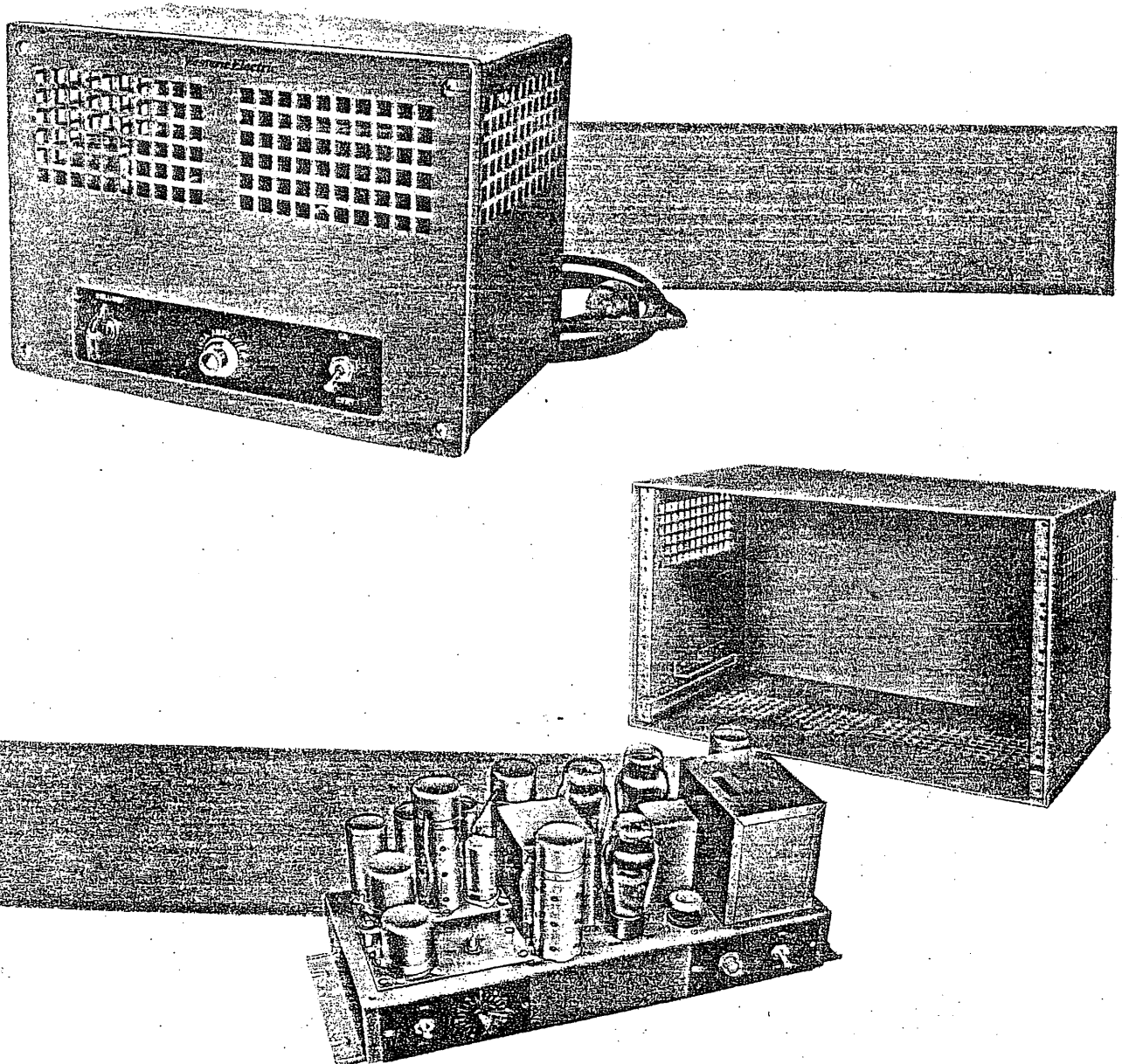
SUBSCRIBERS EQUIPMENT

A complete range of Western Electric equipment for the subscriber's premises is available including amplifiers (6 to 75 watts), loudspeaker systems (8 to 120 watts), microphones and control equipment. The Western Electric 140A Amplifier has a wide frequency range and is an outstanding AC-DC amplifier which will serve the average installation. The Western Electric 124H and 124J amplifiers and the 142 type and 143 type amplifiers having excellent frequency response, higher power output, and self-contained power supplies, are available for larger installations. These amplifiers, designed by Bell Telephone Laboratories for wired program service, are equipped with input transformers which fall well within the requirements of telephone

companies for line repeating coils, thus separate isolating coils can be omitted where local telephone company practices permit.

Matching the fine performance of the other components of the system, the Western Electric twelve inch 728B and eight inch 755A Loudspeakers provide sound reproduction of a quality hitherto unobtainable in single unit loudspeakers.

These speakers, representing the latest development in sound engineering by Bell Telephone Laboratories, satisfy the most critical and hard-to-please listener. They give a sense of naturalness, of realism, of live music coming from a hidden source.



Many types of Western Electric Amplifiers are available for the subscriber.

Western Electric

Other Applications

The advantage of exacting plant manufacture is combined with the flexibility of custom-construction to make this equipment well suited for schools, hospitals, advertising sponsors and agencies, independent recording studios and other applications as well as for wired program distribution.

Typical Specifications of Console

Frequency response of console as measured from input of pre-amplifier to Bus: ± 1 db, 50 to 10,000 cycles.

Noise level: 45 db below normal signal level (+ dbm).

Harmonic distortion: Distortion at an output level (single frequency) of 18 dbm is less than 2% at 400 cycles.

Turnable speeds: 33 1/3 and 78 rpm

Turnable diameter: 15 1/2"

Reproducer: Western Electric 9A—for vertical or lateral recordings.

Output circuit: Output circuit for operation in Type B (Network) System is arranged to feed one telephone line and one demonstration or control room monitor circuit. Space is available for five additional circuits if required.

Output circuit for operation in Type C (Direct Line) System is arranged to feed into a Main Amplifier mounted on Amplifier Bay.

Power requirement: 110-120 volts a-c.

Power consumption: Approximately 375 watts from 115 V 60 cycle source.

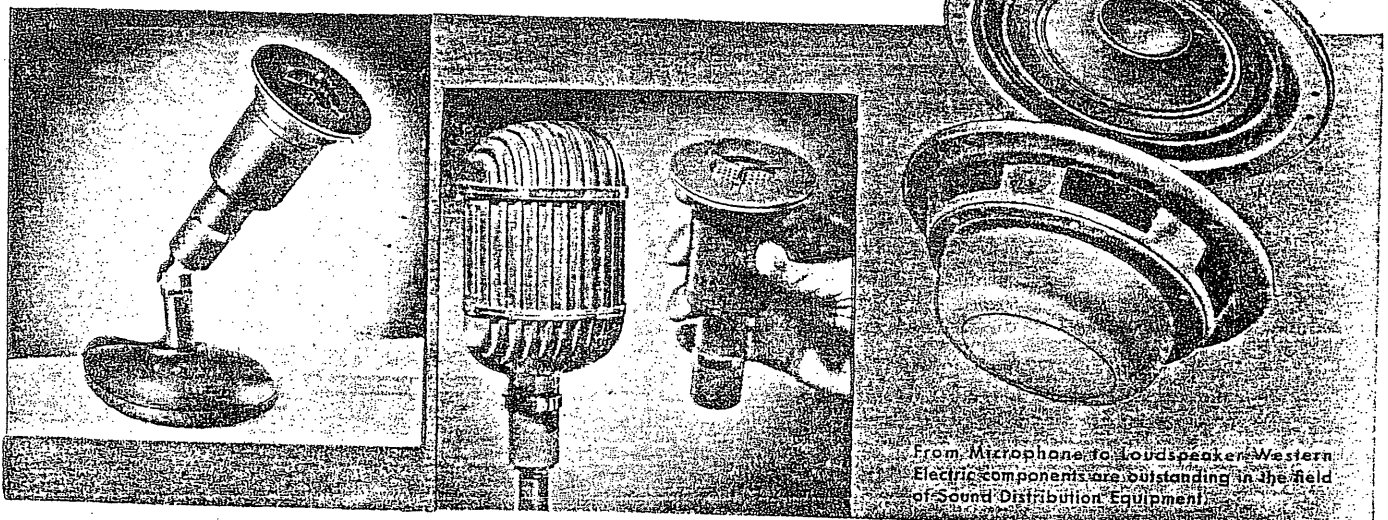
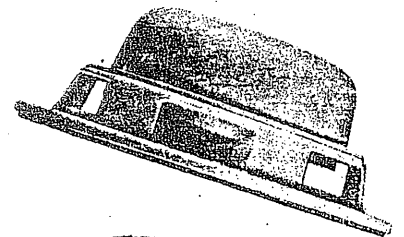
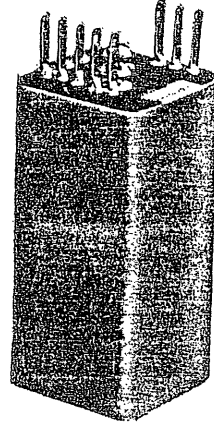
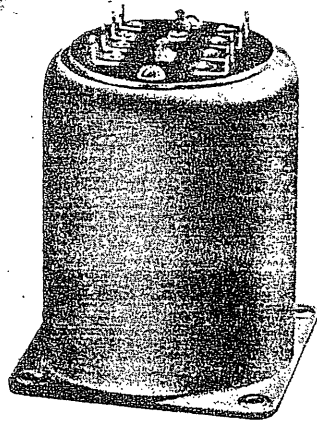
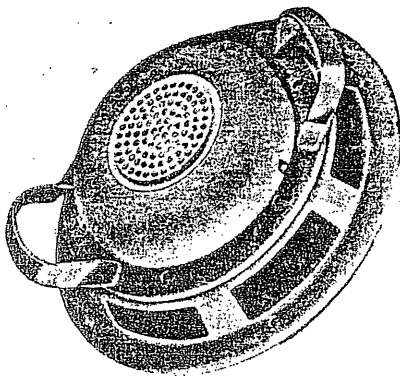
Finish: Aluminum gray.

Dimensions: Originating Unit and Supplementary Units each 24" wide, 30" high, 30" deep.

Installation Wiring: Only necessary to connect a-c, output lines, ground, and monitor amplifier.

Weight: Approximately 600 lbs.

Amplifiers: Pre-amplifier—132B, main amplifier—124E or F, monitor amplifier—140A, cuing amplifier—120A.



From Microphone to Loudspeaker Western Electric components are outstanding in the field of Sound Distribution Equipment.

Western Electric

A Amplifiers

116B PRE-AMPLIFIER

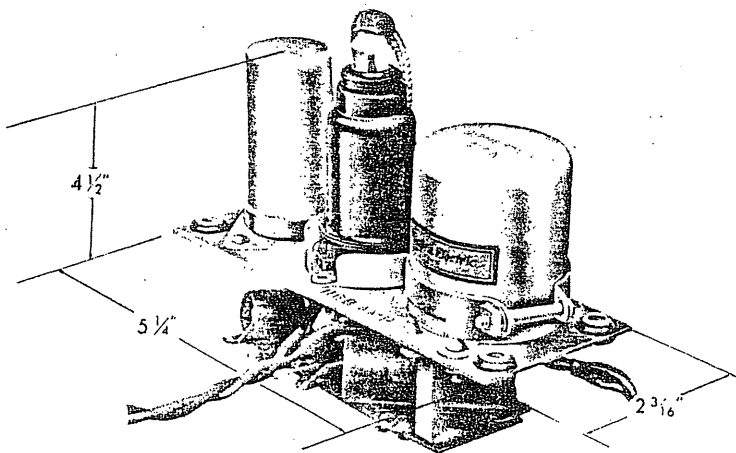


Figure 1 — 116B Amplifier.

Use — The 116B is a pre-amplifier used as an integral part of the 124D, 124F, 124G, 124H, 117A and other Western Electric Amplifiers. It may also be mounted on the 142A and 143A Amplifiers.

Description — This one stage amplifier utilizes a d-c bias gain control, designed to work from low level sources such as microphones and the outputs of phonograph reproducer units into the grid of tube of a following amplifier. When properly connected, it increases the gain of the combination by approximately 40 db over what is obtained with the normal transformer input.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Maximum Gain: see description above.

Source Impedance: Nominal 30 or 120 ohms. Will operate satisfactorily from any impedance between 15 and 250 ohms.

Load Impedance: Arranged for direct connection to the grid input circuit of one tube.

Power Required: 6.3 volts a-c or d-c, 0.3 amperes; 275 volts d-c, 2 milliamperes.

VACUUM TUBES

Quantity Required	Commercial Receiver Type
1	1612

Finish: Light gray.

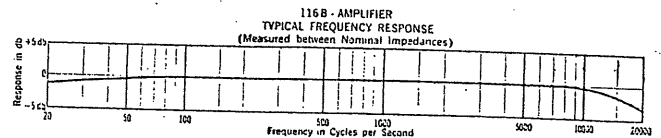


Figure 2 — Frequency Response Curve 116B Amplifier.

117A AMPLIFIER

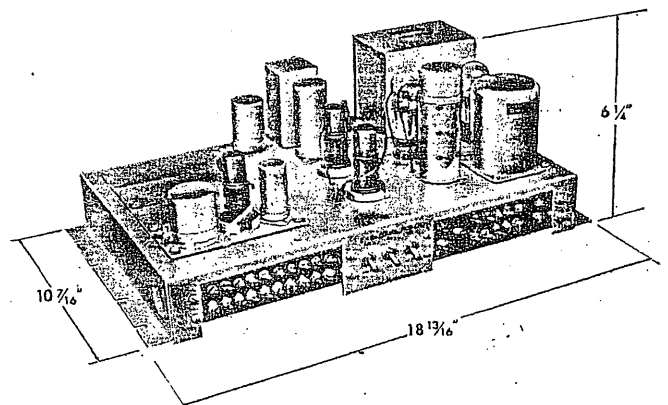


Figure 3 — 117A Amplifier.

Use — The multi-purpose 117A Line Amplifier is primarily designed for use as the input amplifier in sound systems.

Description — Capable of amplifying signals from low-level sources such as microphones or phonograph reproducers to levels suitable for transmission over wire lines or for driving power amplifiers, the 117A includes one mixer stage amplifier known as the 116B. It has sufficient space for accommodating three additional 116B amplifiers to provide a total of four electronic mixing channels. As many as ten channels can be used, in which case the six additional 116B's would be mounted apart from the 117A. The 117A Amplifier can drive as many as 75 power amplifiers such as the Western Electric 118 or 124 type.

Features

Volume limiting, which prevents blasting and overloading of the associated power amplifier.

Volume expansion for more brilliant reproduction of recordings.

Selective speech or scratch equalization.

Provisions for adjacent or remote mixing and volume control, or both simultaneously.

Western Electric

Thermal cutout fuse mounted on chassis.
Magnetic shielding of all audio frequency transformers.
Input transformer can be rotated to position of minimum pickup.

Typical Specifications

Frequency Response: 50-15,000 cycles per second. Gain variation within ± 2 db of the gain at 1000 cycles between 50 and 10,000 cycles.

Output Noise: -32 dbm.

Source Impedance: 15-250 ohms (30 and 120 ohms nominal).

Load Impedance: 300-1200 ohms (600 ohms nominal).

Gain: 77db.

Maximum Output Level: Maximum single frequency output level (without limiting) approximately +25 dbm at which level total r.m.s. harmonic content is less than 5% when operated under recommended conditions.

Output Limiter Characteristic: Single frequency output limited to +20 dbm level for inputs as high as -22 dbm.

Expander Characteristic: Average expansion ratio $1\frac{1}{2}$ to 1.

Power Supply: 105-125 volts a-c, 50-60 cycles, 50 watts. Fused with thermal cutout fuse.

VACUUM TUBES*

Quantity Required	Commercial Receiver Type
2	1612
1	6J7
1	6H6
1	6F8G
1	6X5
6	

One additional 1612 Tube required for each additional 116B Amplifier.

Mounting: Gray finished chassis capable of horizontal mounting in a cabinet or on a shelf, and adaptable to vertical mounting on a relay rack. The 117A Amplifier accommodates four 116B Amplifiers. One 116B is furnished with each 117A Amplifier; the others should be ordered as required. This amplifier is not supplied with a mat, which may be ordered separately.

Weight: 20 pounds.

*Note—Either metal or glass tubes may be used. When glass tubes are selected, tube shields should be used. Grid cap shields should be employed on the metal tubes having the grid connection on the top. Because of the versatility of the 117A Amplifier and the variety of applications, tubes, tube shields, and grid cap shields, together with certain other accessories such as mixer and master control potentiometers with associated mounting plate and bottom cover plate are not furnished with the amplifier. These may be obtained from the distributor.

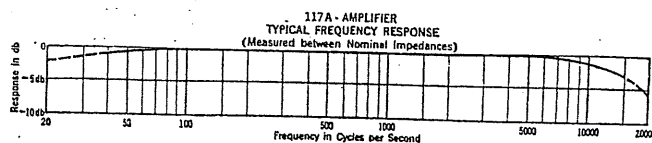


Figure 4 — Frequency Response Curve 117A Amplifier.

118A AMPLIFIER

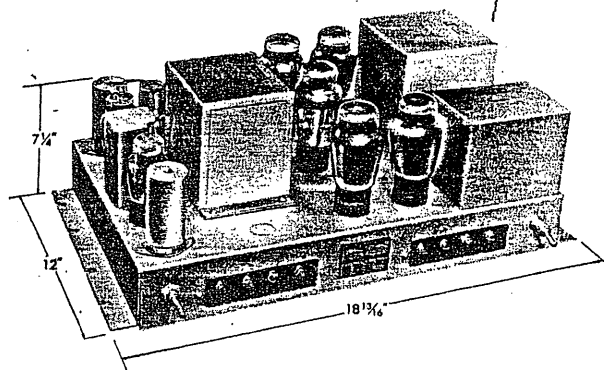


Figure 5 — 118A Amplifier.

The 118A Amplifier is a high power bridging type amplifier of medium gain designed for use with indoor and outdoor sound system installations.

Features:

- Push-pull circuit used throughout
- Self-contained power supply
- Wide range of input and output impedances
- Good frequency response
- Compact construction

Typical Specifications

Frequency Response: 50-15,000 cycles. Between 50 and 1000 cycles the maximum departure from 1000 cycle gain is $2\frac{1}{2}$ db; and between 1000 and 15,000 cycles, ± 2 db with respect to 1000 cycle gain.

Output Noise: -20 dbm.

Source Impedances: Bridging Input 0-25,000 ohms (600 ohms nominal). High Gain Input 0-1000 ohms (600 ohms nominal).

Load Impedance: 1-1000 ohms.

Gain (between nominal impedances): Bridging Input 48 db. High Gain Input 60 db.

Gain Control: Uniform volume control with a 40 db range (used only with bridging connection).



Output Power: 50 watts (+47 dbm) with less than 5% total harmonic distortion 100 to 5,000 cycles.

Power Supply: 110-125 volts a-c, 50-60 cycles, 250 watts. Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2		6J7 or 6J7G
4		6L6 or 6L6G
1	274B	5Z3
7	or	

Mounting: Aluminum finished chassis capable of horizontal or vertical mounting on a standard relay rack or in an adequately ventilated perforated metal cabinet. This amplifier is not supplied with a mat which may be ordered separately.

Weight: Approximately 34 lbs.

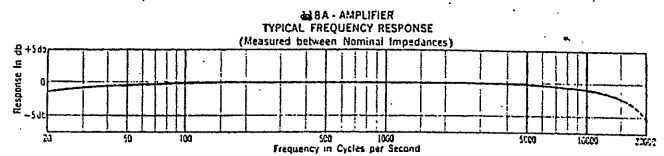


Figure 6 — Frequency Response Curve 118A Amplifier.

120B PRELIMINARY AMPLIFIER

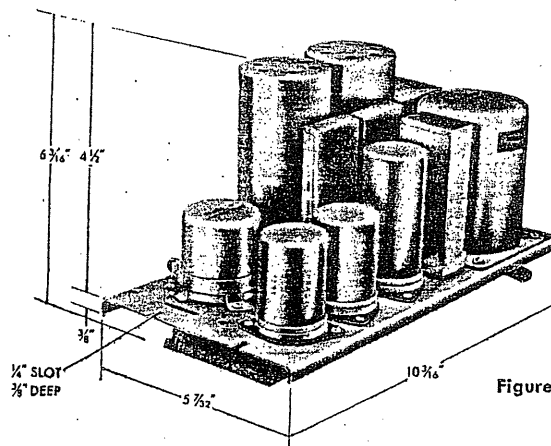


Figure 7 — 120B Preliminary Amplifier.

The 120B Preliminary Amplifier is designed for use in sound distribution systems and speech input equipments. It is a compact, high quality two stage pre-mixing or booster amplifier.

Typical Specifications

Frequency Response: ± 1 db 50 to 15,000 cycles, ± 0.5 db 50 to 10,000 cycles.

Output Noise: -82 dbm.

Source Impedance: 30, 250 or 600 ohms.

Load Impedance: 600 ohms.

Gain: 41 db.

Single Frequency Output Power for less than 1% Total Harmonics: +16 dbm at a fundamental frequency of 400 cycles. +13 dbm at a fundamental frequency of 50 cycles.

Power Required: Filaments, 6.3 volts a-c or d-c, 0.8 ampere; plates, 275 volts d-c, 7 milliamperes.

Power is normally obtained from Western Electric 18 or 20 type Rectifiers which are capable of supplying a number of 120B Amplifiers.

Power for one 120B Amplifier may be obtained from the Western Electric 118A, or 124 type Amplifiers by the use of a simple power supply circuit consisting of two resistances.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
1	348A	6J7 or 1620
1	or	1603 or 6J7
2		or 1620

Mounting: New type of basic amplifier unit designed for mounting in desks or other structures and also adaptable for relay rack or bay cabinet mounting through the use of 190 type or 206A Mounting Plates. For panels, see page 95, Components and Accessories. Isolation both electrically and mechanically from the mounting plate is accomplished by using rubber supports furnished with the amplifier.

Weight: Approximately $6\frac{1}{2}$ pounds.

Finish: Baked aluminum lacquer on zinc plated steel.

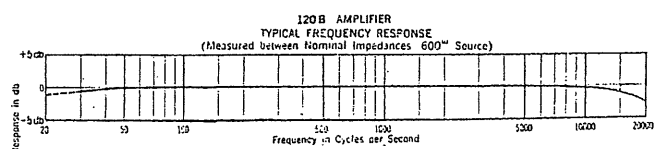


Figure 8 — Frequency Response Curve 120B Amplifier.

120C PRELIMINARY AMPLIFIER

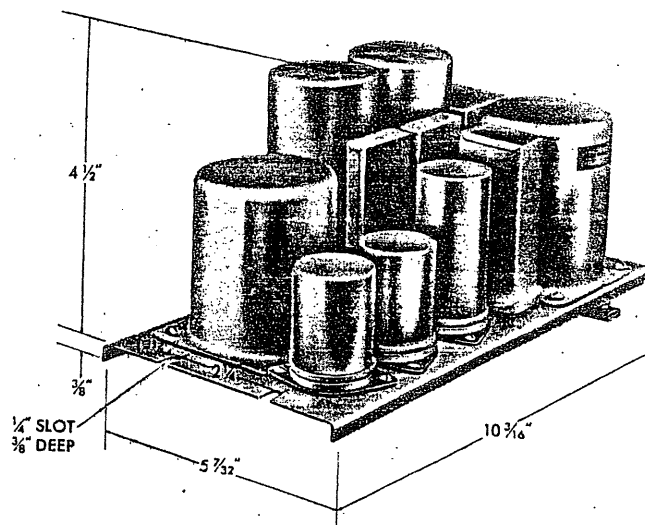


Figure 9 — 120C Preliminary Amplifier.

Use — Designed to fulfill requirements as a pre-mixing or booster amplifier and for use in "no gain" bridging isolation amplifier circuits.

Description — It is a compact two stage 44 db fixed gain amplifier unit having excellent frequency response and low distortion. It has a balanced input transformer with electrostatic and electromagnetic shields. Resistors in cathode circuits are provided to permit checking the tubes through the use of the KS-10003 type Meter or equivalent.

Features

- Compact, two stage fixed gain amplifier.
- Pre-mixing or booster application.
- Ready checking of plate circuits.
- Ease of mounting.
- Electrical and mechanical isolation.
- Isolation amplifier by use of input pad.
- Stabilized feedback.

Typical Specifications

Frequency Response: ± 1 db 50 to 15,000 cycles. Curve same as for 120B, see figure 8.

Output Noise: —79 dbm.

Source Impedance: 30 or 250 ohms matching. For bridging add proper input pad.

Load Impedance: 600 ohms.

Gain: 44 db.

Output Power: Single frequency output power for less than 1 per cent total harmonics: +16 dbm (38 milliwatts) at fundamental frequency of 400 cycles; +13 dbm (20 milliwatts) at fundamental frequency of 50 cycles.

Power Required: Filaments, 6.3 volts, 0.8 ampere a-c or d-c; plates, 275 volts d-c, 7ma. Power is normally obtained from Western Electric 18 or 20 type Rectifiers which are capable of supplying a number of 120C Amplifiers. Power for one 120C Amplifier may be obtained from the Western Electric 124 type Amplifier by the use of a simple supplementary power supply circuit consisting of two resistances.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
1	348A	1620 (or 6J7)
1	—	1603
2	—	—

Mounting: Advanced type of basic amplifier unit designed for mounting in desks or other structures and also adaptable for relay rack or bay cabinet mounting through the use of 190 type or 206A Mounting Plates. For panels, see page 95, Components and Accessories. Isolation both electrically and mechanically from the mounting plate is accomplished by using rubber supports furnished with the amplifier.

Weight: 6½ pounds.

Finish: Light gray.

121A LINE AMPLIFIER

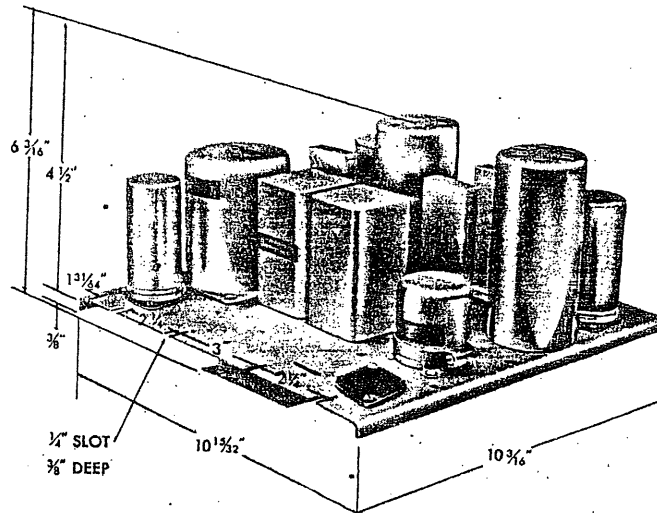


Figure 10 — 121A Line Amplifier.

Use — An adaptable 78 db fixed gain amplifier unit for use as an intermediate or microphone-to-line level main amplifier in sound distribution systems and speech input systems.

Description — It is a three stage 78 db fixed gain amplifier having low distortion and high signal-to-noise ratio. Input impedances of 30, 250, or 600 ohms can be selected by arranging the strapping to the input transformer. The output impedance is 600 ohms. Each cathode circuit is arranged for checking the tubes through the use of the KS-10003 type Meter or equivalent. The total d-c power required is 30 milliamperes at 275 volts. The filaments require 2 amperes at 6.3 volts.

The construction is compact and rugged resulting in a small chassis size for this type of amplifier.

Features

- Three-stage fixed-gain amplifier.
- Intermediate or microphone-to-line amplifier.
- Ready checking of tubes.
- Ease and variety of mounting.
- Electrical and mechanical isolation.
- Stabilized feedback.

Typical Specifications

Frequency Response: ± 1 db 50 to 15,000 cycles.

Output Noise:

Gain	78 db	70 db	45 db
Noise Level:	-42 dbm	-50 dbm	-75 dbm

At + 18 dbm output level signal-to-noise ratio:

60 db	68 db	93 db
-------	-------	-------

Source Impedance: 30, 250 or 600 ohms matching. For bridging add proper input pad.

Load Impedance: 600 ohms.

Maximum Gain: 78 db; 70 db by internal connection change; 45 db by restrapping to eliminate the first stage.

Output Power: Single frequency output power for less than 1 per cent total harmonics: +28 dbm (600 milliwatts) for fundamental frequency of 400 cycles; +25 dbm (300 milliwatts) for fundamental frequency of 50 cycles.

Power Required: Filaments, 6.3 volts, 2 amperes a-c or d-c; plates, 275 volts, d-c, 30 milliamperes.

Power normally obtained from Western Electric 18 or 20 type Rectifiers.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
1	347A	
1	348A	or 6J7 (or 1620)
1	349A	or 6F6 (or 6V6)
3		

Mounting: This basic amplifier unit is designed for mounting in desks or other structures; also adaptable for relay rack or bay cabinet mounting through the use of 190 type or 206A Mounting Plates. For panels, see page 95, Components and Accessories. Isolation, both electrically and mechanically is accomplished by using rubber supports which are furnished with the amplifier.

Weight: 10 pounds.

Finish: Light gray.

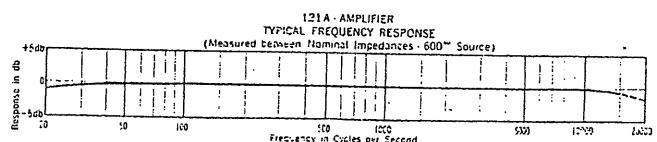


Figure 11 — Frequency Response Curve 121A Amplifier.

124 SERIES LOUDSPEAKER AND GENERAL PURPOSE AMPLIFIERS

OUTPUT TRANSFORMER TERMINATIONS (T-2)

Nominal Load Impedance (ohms)	Working Range of Load Impedance (ohms)	Strap Terminals	Output Connections
600	300 to 1200	7-8, 9-10, 11-12	5 and 14
150	70 to 300	7-8, 9-14, 11-12, 5-10	5 and 14
30	20 to 70	7-8, 9-10, 11-12	6 and 13
16	10 to 20	7-8-10, 9-11-12	6 and 13
7.5	3 to 10	7-9-10-12, 6-8, 11-13	6 and 13
1.75	1 to 3	6-8-10-12, 7-9-11-13	6 and 13

Nominal Load Impedance (ohms)	Working Range of Load Impedance (ohms)	Strap Terminals	Output Connections
600	300 to 1200	4-5, 6-7, 8-9	1 and 2
150	70 to 300	4-5, 6-2, 8-9, 1-7	1 and 2
30	20 to 70	4-5, 6-7, 8-9	3 and 10
16	10 to 20	4-5-7; 6-8-9	3 and 10
7.5	3 to 10	4-6-7-9, 3-5, 8-10	3 and 10
1.75	1 to 3	3-5-7-9, 4-6-8-10	3 and 10

Figure 12 — For 124A, 124D, 124E, 124F, and 124G Amplifiers. (Also for 131A and 133A Amplifiers.)

Figure 13 — For 124H and 124J Amplifiers.

124A AMPLIFIER

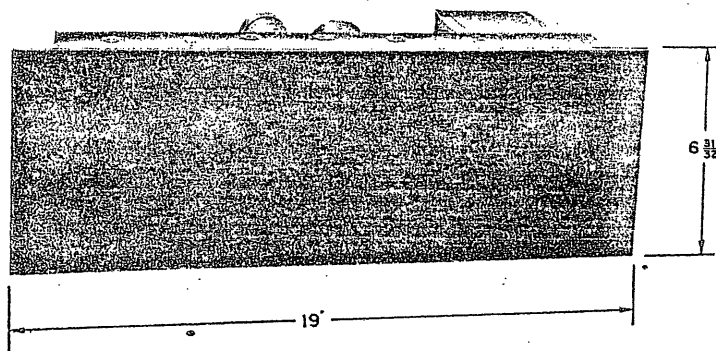


Figure 14 — 124A Amplifier.

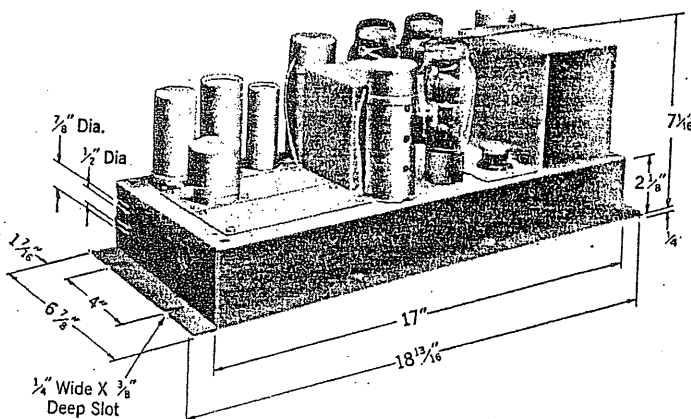


Figure 15 — Dimension photograph for 124A, 124D and 124E Amplifiers.

Use — The 124A Amplifier is intended primarily for use as a high quality monitoring and audition loudspeaker amplifier when a gain control in the amplifier is not required. It also finds very successful application as a high level booster and general purpose amplifier.

Description — This two-stage amplifier provides a frequency characteristic, signal-to-noise ratio and power handling capacity which conform fully to the requirements of sound systems and radio broadcast frequency modulation systems. Designed for specially quiet operation, the 124A may be placed in a loudspeaker cabinet without radiating interfering sounds either from the chassis or from the walls of the cabinet.

Features — Tapped output coil for operating into load impedances from 1 to 1200 ohms. Twenty-watt output available, simply by changing connections and using Western Electric vacuum tubes. No additional apparatus required.

Input coil especially shielded and rotatable to a position of minimum noise pick-up.

Provided with stabilized feedback as a particular aid in reducing hang-over or boominess in loudspeakers.

Wired with glass fibre insulated wire, thus reducing the amount of inflammable material on the customer's premises.

Fused with a thermal cutout fuse to absorb power surges due to momentary flash-over in tubes or condensers under trouble conditions.

Push-pull operation throughout.

Typical Specifications

Frequency Response: ± 1 db 50 to 15,000 cycles.

Output Noise: -37 dbm.

Source Impedance: Bridging Input, 0-25,000 ohms (600 ohms nominal). High Gain Input, 0-1000 ohms (600 ohms nominal).

Load Impedance: 1-1200 ohms. See Figure 12.

Gain: 50 db for Bridging Input, Terminals 1 and 3. 63 db for High Gain Input, Terminals 1 and 2.



Gain Control: None.

Maximum Input Level: —8VU (Bridging Input) —25 VU (High Gain Input), as read on volume indicator calibrated for 600 ohm load, connected across input terminals.

Maximum Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion, 50 to 5000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Connections: All external connections are normally made to terminals under the chassis, and knock-outs are provided in the ends of the chassis to admit the wires. Additional knockouts are provided in the sides of the chassis where sockets may be installed if plug and socket connections are desired.

Power Supply: 105-125 volts a-c, 60 cycles, 125 watts. Fused with 1.6 amp. Thermal cutout fuse on chassis. No power switch furnished.

Heat Dissipation: Approximately 100 watts.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 6J7 (or 6J7G)
2	350B	or 6L6 (or 6L6G)
1	274B	or 5T4 (or 5U4G)
5		

Mounting: Vertical mounting on a standard relay rack, or set flat on mat in bottom of loudspeaker cabinet. Can also be mounted in the 21B Cabinet.

Weight: 20 pounds.

Finish: Chassis, aluminum lacquer. Mat, black japan, specify Code 124A-3. Aluminum gray, specify Code 124A-15.

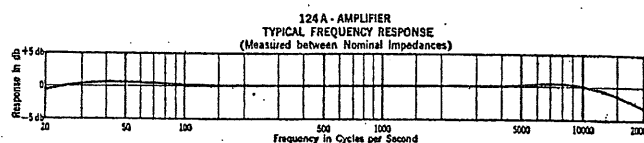


Figure 16 — Frequency Response Curve 124A Amplifier.

124D AMPLIFIER

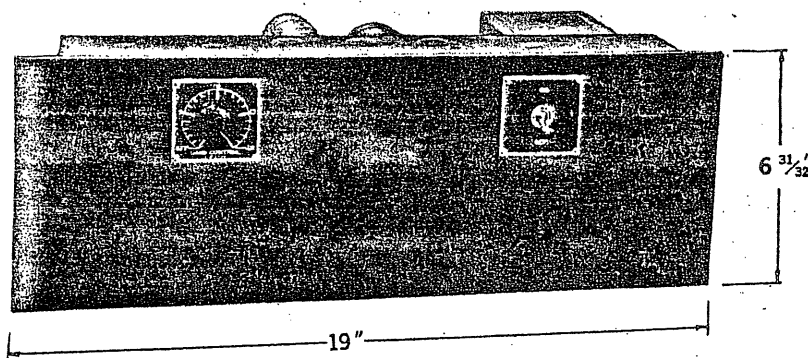


Figure 17 — 124D Amplifier.

Use — The Western Electric 124D is a general purpose, high gain power amplifier for use in high quality sound systems such as are required in churches, schools and similar installations. It is adaptable to portable use.

Description — The 124D includes one 116B Amplifier and has sufficient mounting space for a second 116B, thus providing for two electronic mixing channels. It also has facilities for supplying power to one or two additional 116B's which may be mounted apart from the 124D; a total of four channels in all.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —25 dbm at 90 db gain.

Source Impedance: 15-250 ohms (30 and 120 ohms nominal).

Load Impedance: 1-1200 ohms. See Figure 12.

Gain: 107 db.

Volume Control: 35 db, continuously variable. Paralleled remote control may be added if desired.

Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion, 50 to 5000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Power Supply: 105-125 volts a-c, 60 cycles, 125 watts. Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 6J7 (or 6J7G)
2	350B	or 6L6 (or 6L6G)
1	274B	or 5T4 (or 5U4G)
1		1612
6		

Western Electric

Mounting: Chassis can be mounted vertically on a standard relay rack; or in an adequately ventilated metal cabinet, such as the KS13625, or 21B.

For shelf or fixed installations the 102A cover (Figure 19) is recommended for mechanical protection to the apparatus side of the equipment. The 102A cover may be obtained on separate order.

Dimensions: See Figures 15 and 17.

Weight: 20 pounds.

Finish: Chassis — gray enamel.

Mat — 124D-3 black

— 124D-15 aluminum gray

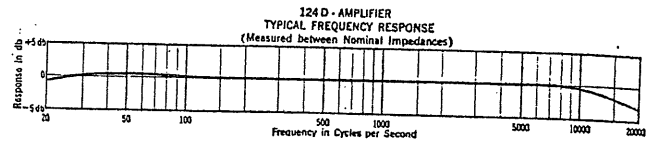


Figure 18 — Frequency Response Curve 124D Amplifier.

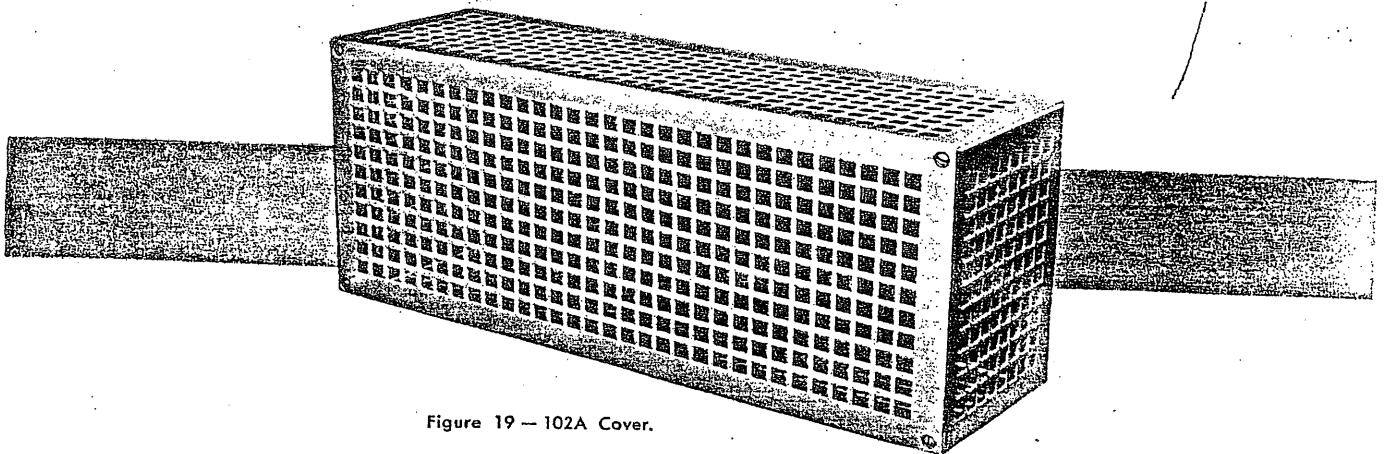


Figure 19 — 102A Cover.

124E MONITOR AND AUDITION AMPLIFIER

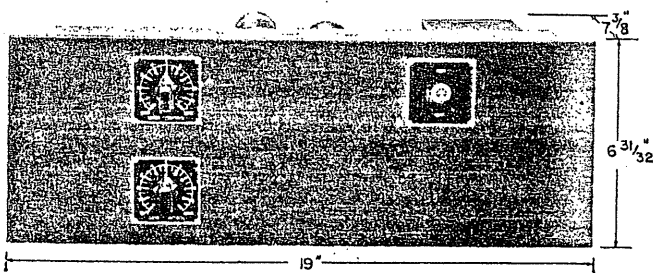


Figure 20 — 124E Monitor Amplifier.

Use — These amplifiers are intended primarily for use as high quality monitoring and audition loudspeaker amplifiers.

Description — The 124E has a gain control and power switch mounted on the face mat and two extra fixed pads in the input circuit for a wider range of input level connection. In addition to its primary use as a loudspeaker amplifier, the 124E is also widely used as a high level booster and general purpose amplifier.

The frequency characteristics of the amplifier, signal-to-noise ratio and power handling capability, conform fully to the requirements of radio broadcast frequency modulation systems. The frequency response is uniform from 50 to 15,000 cycles and at full power output of 20 watts, the

dynamic range between signal and noise is about 80 db. Designed for quiet operation, the 124E may be placed in the loudspeaker cabinet.

Features

Tapped output coil for operating into load impedance from 1 to 1200 ohms.

12 or 20 watt output.

Input coil especially shielded and rotatable to a position of minimum noise pick-up.

Stabilized feedback. Glass fibre insulated wire. Self-contained power supply.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: -37 dbm.

Source Impedance: Line input 600 ohms nominal. See input arrangements, Figure 22.

Load Impedance: 1-1200 ohms. See Figure 12.

Maximum Gain: Depends on the input strapping used. See Figure 22.

Gain Control: 38 db in 2 db steps.

Maximum Input Level: Depends on input strapping used. See Figure 22. Levels given are as read on volume indicator calibrated for 600 ohm load, connected across input terminals.



Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion 50 to 500 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Power Supply: 105-125 volts, 60 cycles. 125 watts maximum. Fused with 1.6 amp. thermal cutout fuse.

VACUUM TUBES

This amplifier should not be operated with a mixed complement of Western Electric and non-Western Electric amplifier tubes. This, however, does not apply to the rectifier tube.

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 6J7 (or 6J7G)
2	350B	or 6L6 (or 6L6G)
1	274B	or 5T4 (or 5U4G)
5		

Mounting: Vertical on standard relay racks or in 21B Cabinet.

Installation: Connections — all external connections are normally made to terminals under the chassis. Knockouts are provided in the ends of the chassis to admit the wires. There are additional knockouts in the sides of the chassis where sockets may be installed if plug and socket connections are desired.

Dimensions: See Figures 15 and 20.

Weight: 20 pounds.

Finish: Chassis — light gray.

Mat—124E-15: dark aluminum gray.

—124E-3: black.

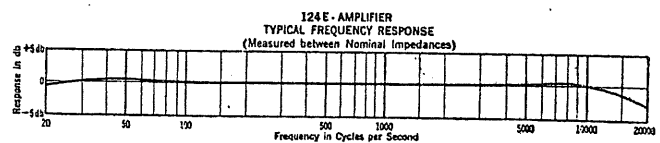


Figure 21 — Frequency Response Curve 124E Amplifier.

Input arrangement number one:

GAIN: 50 db Bridging Input —
Terminals 1 and 3

63 db High Gain Input —
Terminals 1 and 2

Measured between nominal impedances.

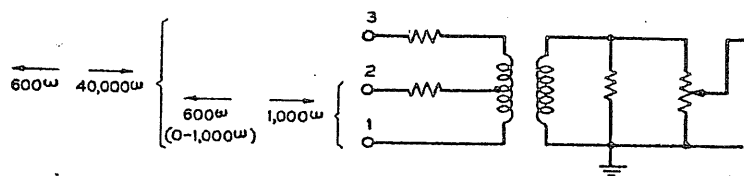
GAIN CONTROL: 38 db in 2 db steps.

MAXIMUM INPUT LEVELS:

+23 VU — Bridging Input

+5 VU — High Gain Input

USE: General purpose where gain control is desired.



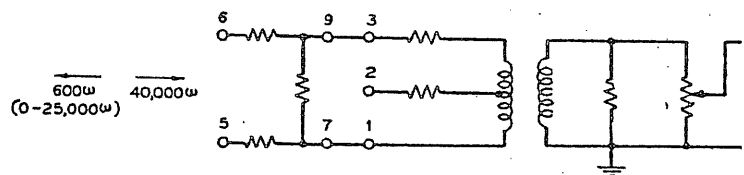
Input arrangement number two:

GAIN: 30 db. Measured between nominal impedances.

GAIN CONTROL: 38 db in 2 db steps.

MAXIMUM INPUT LEVEL: +35 VU

USE: Same as for Input Arrangement No. 1 when higher input levels are available.



Input arrangement number three:

GAIN: 43 db. Measured between nominal impedances.

GAIN CONTROL: 38 db in 2 db steps.

MAXIMUM INPUT LEVEL: +15 VU

USE: Same as for Input Arrangement No. 1 when higher input levels are available and where a 600 ohm internal input impedance is desired.

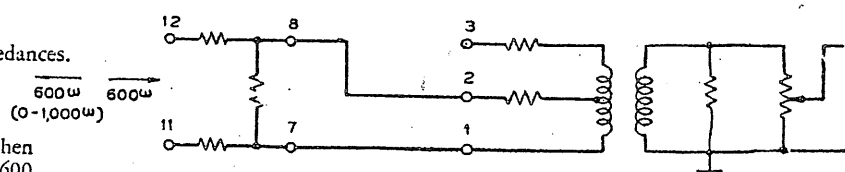


Figure 22 — Input arrangements for 124E Monitor Amplifier.

124F MONITOR AND TALKBACK AMPLIFIER

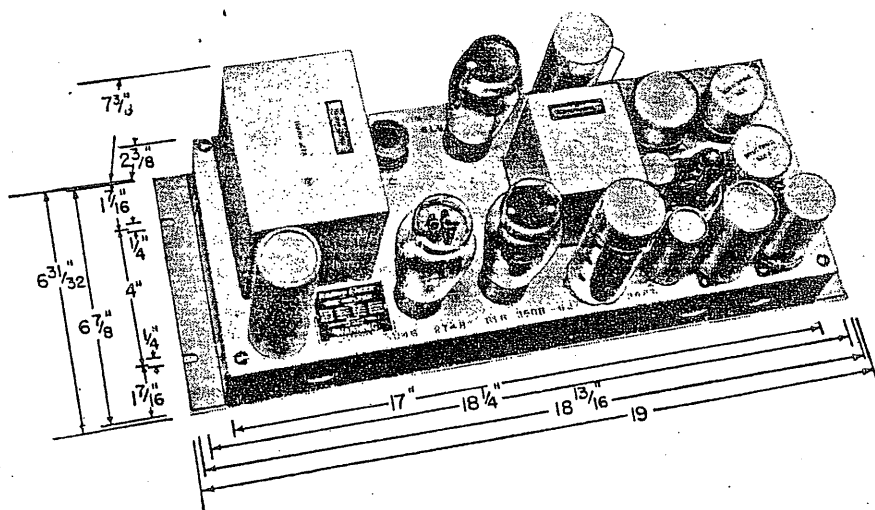


Figure 23 — Interior View, 124F Monitor and Talkback Amplifier.

Use — Ideally suited as a monitor and talkback amplifier, the 124F has separate line level and microphone level input circuits, each with its own gain control.

Description — The microphone input includes one 116B Pre-amplifier. The 124F provides a means of feeding programs to booth and studio loudspeakers, as well as cue-feeding to remote lines, either from low level sources or from line or bus level sources. The low level circuit allows talkback and cueing.

Features

Two inputs—one microphone—one line level.
Separate gain controls.

Quiet operation—The 124F Amplifier may be placed in the loudspeaker cabinet.

Minimum field radiation from power and filter coil, facilitating its use in high gain assemblies.

Shielded input coil—Rotatable to position of minimum noise pickup.

Stabilized feedback.

Glass-fiber insulated wiring.

Push-pull output.

Self-contained power supply.

Typical Specifications

Frequency Response: ± 1 db, 50 to 10,000 cycles, may be down approximately 3 db at 15,000 cycles, on line input. ± 1 db 50 to 15,000 cycles for microphone input.

Output Noise: —25 dbm, at 90 db gain.

Source Impedance: Line input 0-1000 ohms high gain (nominal 600 ohms); 0-25,000 ohms bridging (nominal 600 ohms). Low level input 15 to 250 ohms, (nominal 30 and 120 ohms).

Load Impedance: 1 to 1,200 ohms, see Figure 12.

Maximum Gain: Line level input: 59 db for high gain connection; 46 db for bridging connection. Low level input: 104 db.

Gain Control: Line input 38 db in 2 db steps. Low level input 35 db continuously adjustable.

Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion, 50 to 5,000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Power Supply: 105-125 volts, 60 cycles, 1.25 amperes, 125 watts maximum. Fused with 1.6 ampere thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric		Commercial Receiver Type
2	348A	or	6J7G (or 6J7)
2	350A	or	6L6G (or 6L6)
1	274B	or	5U4G (or 5T4)
1			1612 type (or
6			6L7G or 6L7)

The amplifier should not be operated with a mixed complement of Western Electric and non-Western Electric

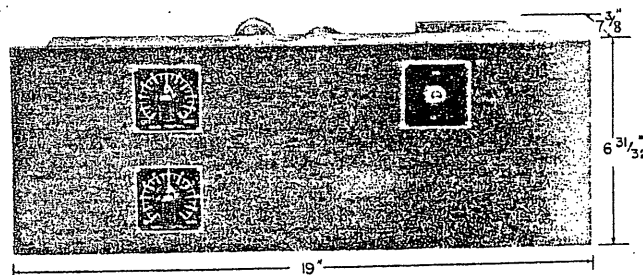


Figure 24 — Front View, 124F Monitor and Talkback Amplifier.

amplifier tubes. This however does not apply to the rectifier tube, nor to the 1612 type Tube.

Mounting: Vertical mounting on standard 19" relay rack occupying 7" of panel space, or in 21B Cabinet.

Weight: 20 pounds.

Finish: Chassis — light gray.

Mat—124F-15: dark aluminum gray.

—124F-3: black.

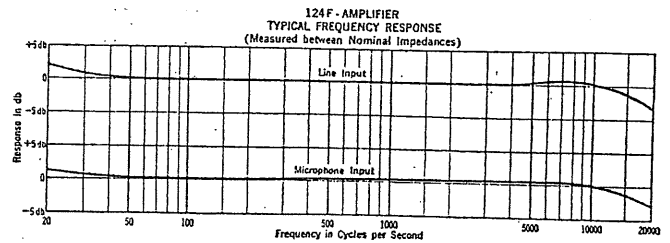


Figure 25 — Frequency Response Curve 124F Amplifier.

124G MONITOR AND AUDITION AMPLIFIER

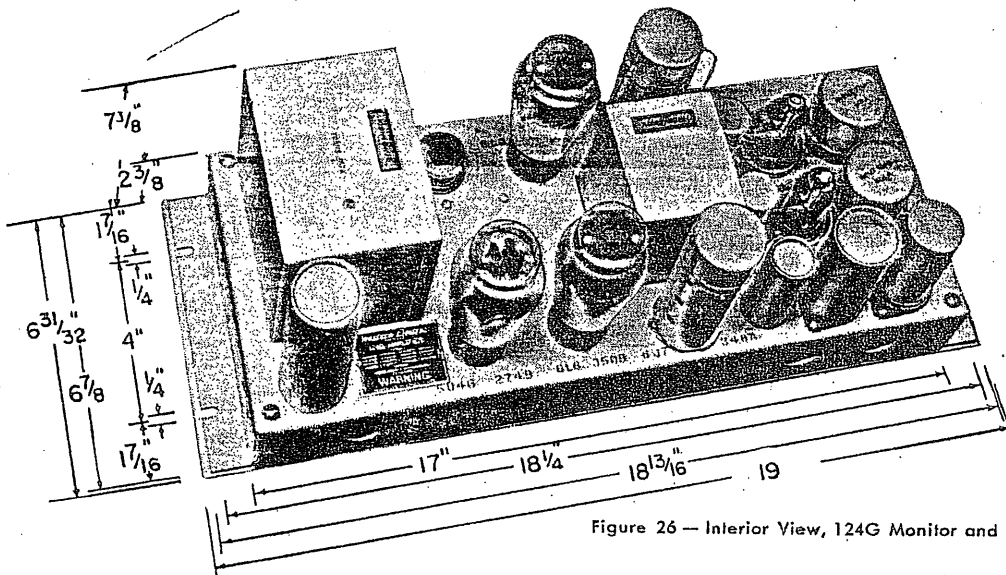


Figure 26 — Interior View, 124G Monitor and Audition Amplifier.

Use — The 124G is a high quality amplifier designed to feed program busses, lines or loudspeakers. It can be adapted as an emergency standby system for larger program production systems because its overall gain and output power are high enough to cover the entire range between input and output network levels.

Description — This unit is completely self-contained, including the power supply. It has two input channels feeding a common output circuit. The input stages are single tube units, each having its own gain control. The output transformer can be connected to work into any impedance from 1 to 1200 ohms.

Features

Two inputs — both microphone level.

Separate gain controls.

Quiet operation — The 124G Amplifier may be placed in the loudspeaker cabinet.

Minimum field radiation from power and retard coil, facilitating its use in high gain assemblies.

Shielded input coils — rotatable to position of minimum noise pick-up.

Stabilized feedback.

Glass-fiber insulated wiring.

Push-pull output.

Self-contained power supply.

Typical Specifications.

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —22 dbm at 90 db gain.

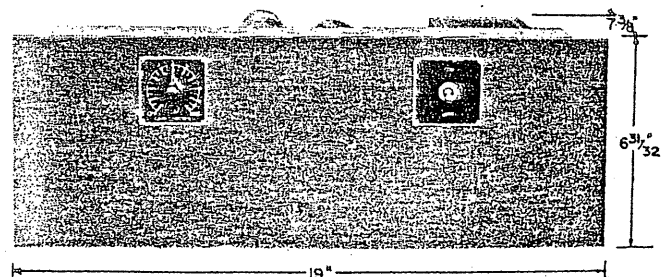


Figure 27 — Front View, 124G Monitor and Audition Amplifier.

Western Electric

Source Impedance: 15 to 250 ohms. Nominal 30 and 120 ohms.

Load Impedance: 1 to 1,200 ohms. See Figure 12.

Maximum Gain: Approximately 104 db.

Gain Control: 35 db continuously adjustable — separate control for each input.

Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion, 50 to 5,000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400-cycles with 600 ohm load.

Power Supply: 105-125 volts, 60 cycles, 1.25 amperes, 125 watts maximum. Fused with 1.6 ampere thermal cutout fuse.

VACUUM TUBES

The amplifier should not be operated with a mixed complement of Western Electric and non-Western Electric amplifier tubes. This however does not apply to the rectifier tube, nor to the 1612 type Tube.

124H AMPLIFIER

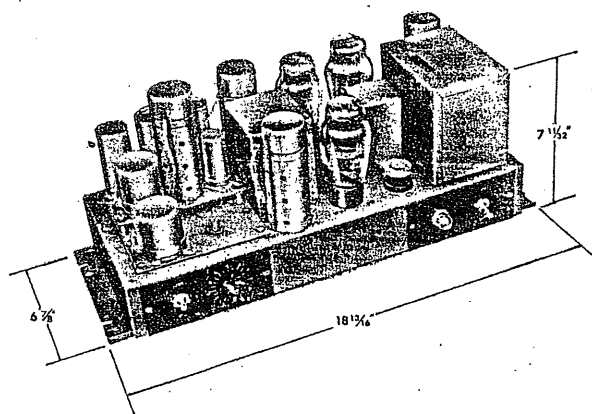


Figure 29 — 124H Amplifier (dimensions also apply to 124J Amplifier).

Use — The 124H Amplifier is particularly suitable for wired program service and as a general purpose monitoring amplifier for speech and music.

Description — The 124H is a two channel amplifier with provisions for selecting either one microphone channel or one line level input. The microphone channel has adequate gain for all low impedance commercial type microphones.

It can be operated directly from telephone lines and meets the requirements imposed by telephone companies for such equipment, hence, separate isolating coils are not

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 6J7G (or 6J7)
2	350A	or 6L6G (or 6L6)
1	274B	or 5U4G (or 5T4)
2		1612 (or 6L7G or 6L7)
7		

Mounting: Vertical mounting on standard 19" relay rack occupying 7" of panel space, or in 21B Cabinet.

Weight: 20 pounds.

Finish: Chassis — light gray.

Mat — 124G-15: dark aluminum gray.

— 124G-3: black.

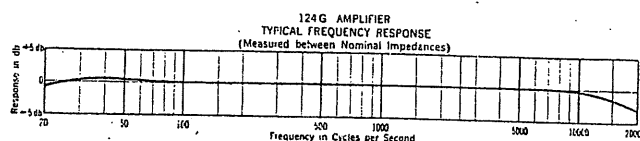


Figure 28 — Frequency Response Curve 124G Amplifier.

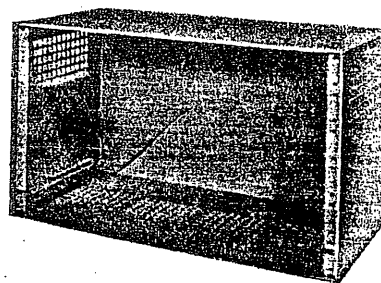
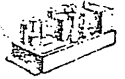


Figure 30 — KS-13625 List 1 Cabinet, used with 124H and 124J and other amplifiers.

required where local telephone company practices permit. The mechanical design affords ease of installation and accessibility in servicing and maintenance. Operation into impedances from 1 to 1200 ohms is provided for by screw terminal strapping. A wide variety of loudspeaker combinations can be matched in impedance without loss of power or introduction of harmonics.

This amplifier is designed for mounting in a KS-13625 List 1 Cabinet, which can be ordered separately. Versatility of design in this amplifier permits it to be used in fixed installations or as portable equipment.



Features

- Designed to be operated directly from telephone lines where local telephone company practices permit.
- Maximum accessibility for servicing and maintenance.
- Output terminal connections permit matching to a wide range of load impedances.
- Self-contained power supply protected by thermal cutout fuse.
- Stabilized feedback gives high quality, reduces distortion and noise.
- Provision made for external volume control for microphone circuit.

Gain Control: 35 db continuously variable.

Output Power: 12 watts (+41 dbm) with less than 5% total harmonic distortion, 50 to 5000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Power Supply: 105-125 volts, 60 cycles, 1.25 amperes, 125 watts maximum. Fused with 1.6 ampere thermal cut-out fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A or	6J7 (or 6J7G)
2	350B or	6L6 (or 6L6G)
1	274B or	5T4 (or 5U4G)
1		1612
6		

Typical Specifications

Frequency Response: Microphone Input: ± 1 db, 50 to 15,000 cycles.

Line Input: ± 1 db, 50 to 10,000 cycles, down approximately 3 db at 15,000 cycles.

Output Noise: —37 dbm on line channel. 25 dbm on microphone channels under average operating condition of 90 db gain. —8 dbm for maximum gain.

Source Impedance: Microphone Channel 15 to 250 ohms (nominal 30 and 120 ohms). Line Channel 20 to 1000 ohms (nominal 37½, 150 and 600 ohms).

Load Impedance: 1 to 1200 ohms. See Figure 13.

Maximum Gain: Microphone Channel 107 db. Line Channel 67 db.

Mounting: KS-13625 List 1 Cabinet is available and can be ordered separately.

Weight: Amplifier—20 pounds. Cabinet—15 pounds.

Finish: Chassis—light gray enamel. Cabinet—light aluminum gray.

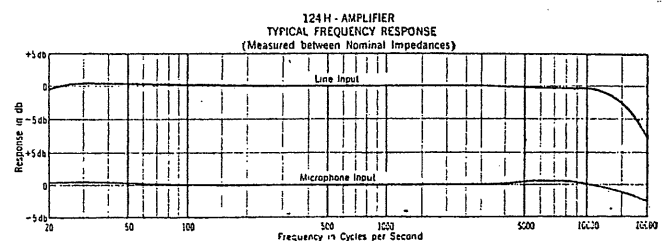


Figure 31 — Frequency Response Curve 124H Amplifier.

124J AMPLIFIER

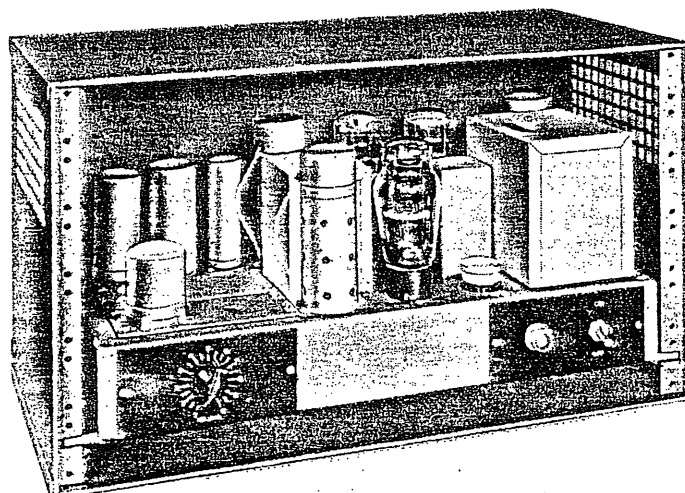


Figure 32 — 124J Amplifier shown mounted in a KS-13625 List 1 Cabinet (face mat not shown).
(For dimensions see Figure 29.)

Western Electric

Use — The 124J Amplifier is particularly suitable for wired program service and as a general purpose monitoring amplifier for speech and music.

Description — The 124J is a single channel line level amplifier. It can be operated directly from telephone lines and meets the requirements imposed by telephone companies for such equipment, hence, separate isolating coils are not required where local telephone company practices permit. The mechanical design affords ease of installation and accessibility in servicing and maintenance. Operation into impedances from 1 to 1200 ohms is provided for by screw terminal strapping. A wide variety of loudspeaker combinations can be matched in impedance without loss of power or introduction of harmonics.

This amplifier is designed for mounting in a KS-13625 List 1 Cabinet, which can be ordered separately. Versatility of design in this amplifier permits it to be used in fixed installations or as portable equipment.

Features

Designed to be operated directly from telephone lines where local telephone company practices permit.

Maximum accessibility for servicing and maintenance.

Output terminal connections permit matching to a wide range of load impedances.

Self-contained power supply protected by thermal cutout fuse.

Stabilized feedback gives high quality, reduces distortion and noise.

Typical Specifications

Frequency Response: ± 1 db, 50 to 10,000 cycles, down approximately 3 db at 15,000 cycles.

Output Noise: —37 dbm.

Source Impedance: 20 to 1,000 ohms (nominal $37\frac{1}{2}$, 150 or 600 ohms).

Load Impedance: 1 to 1,200 ohms. See Figure 13.

Maximum Gain: 67 db.

Gain Control: 35 db continuously variable.

Output Power: 12 watts (41 dbm) with less than 5% total harmonic distortion, 50 to 5000 cycles. 20 watts (+43 dbm) with 5% harmonics at 400 cycles with 600 ohm load.

Power Supply: 105-125 volts, 60 cycles, 1.25 amperes, 125 watts maximum. Fused with 1.6 ampere thermal cut-out fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 6J7 (or 6J7G)
2	350B	or 6L6 (or 6L6G)
1	274B	or 5T4 (or 5U4G)
5		

Mounting: KS-13625 List 1 Cabinet is available and can be ordered separately.

Weight: Amplifier—20 pounds. Cabinet—15 pounds.

Finish: Chassis—light gray enamel. Cabinet—light aluminum gray.

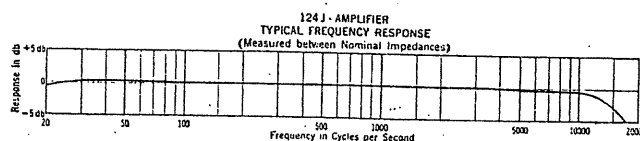


Figure 33 — Frequency Response Curve 124J Amplifier

129A PRE-MIXING AMPLIFIER

Use — The 129A is particularly designed for use as a pre-mixing or booster amplifier in speech input and sound systems; it can also be connected for use as a group of "no-gain" low level bridging isolation amplifiers.

Description — Four identical two-stage amplifiers with fixed gain, mounted on a common chassis, comprise the 129A unit. Four electrically separate audio channels are provided in which the inputs from four low level sources (microphones or reproducers) are simultaneously and individually amplified prior to mixing. Each input transformer is arranged so that it can be rotated to provide a minimum

pick-up from electromagnetic field interference. Cathode resistors are provided to permit tube checks.

Features

High quality pre-mixing and booster amplifier.

Useful with no-gain low level bridging isolation amplifiers.

Four electrically separate channels for simultaneous and individual amplification.

Designed for minimum pick-up from electromagnetic field interference.

Cathode resistors for tube check circuits.

Stabilized feedback.

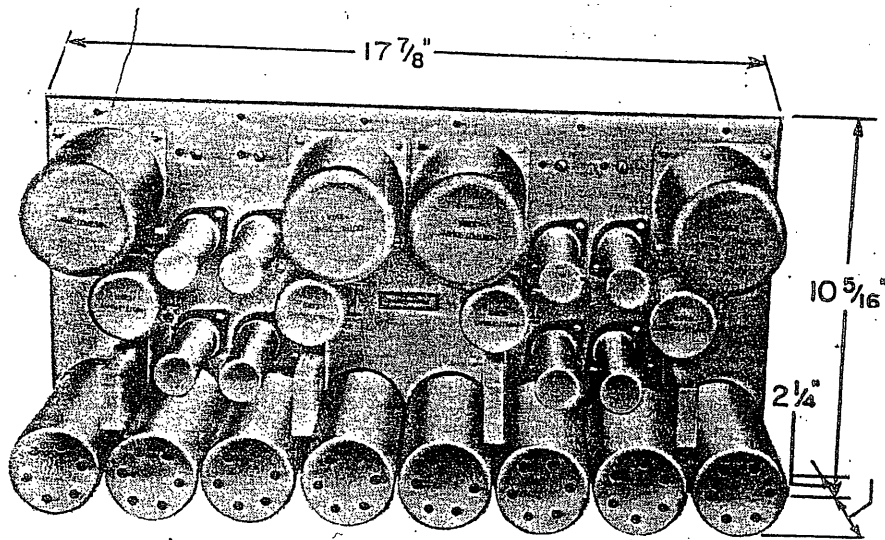


Figure 34 — 129A Pre-Mixing Amplifier.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: -82 dbm.

Source Impedance: 30, 250, or 600 ohms matching. For bridging add proper input pad.

Load Impedance: 600 ohms.

Gain: 41 db (each amplifier).

Output Power: Single frequency output power for less than 1 per cent total harmonics: $+16$ dbm (38 milliwatts) at fundamental frequency of 400 cycles; $+13$ dbm (200 milliwatts) at fundamental frequency of 50 cycles.

Power Supply for Complete Amplifier (4 amplifier units): Filament 6.3 volts, 3.2 amperes a-c or d-c. Plate 275 volts, 30 milliamperes d-c. Two of the pre-amplifiers can be supplied from one source while the other two are supplied from another. 1.6 amperes filament and 15 milliamperes plate required for each half of the amplifier. 20 type Rectifier recommended for power supply. A single 20 type Rectifier will supply power for several 129A Amplifiers.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
4	348A	1620 (or 6J7)
4	or	1603
8		

Mounting: Designed for console mounting; also for rack mounting on 190B Mounting Plate (one per plate). For panels, see page 95, Components and Accessories.

Weight: $20\frac{1}{4}$ pounds.

Finish: Light gray.

Accessories: The following accessory equipment is recommended for use with the 129A Amplifier:

KS-10003 Meter (for measuring plate currents of vacuum tubes).

Western Electric 190B Mounting Plate (one mounts one 129A Amplifier).

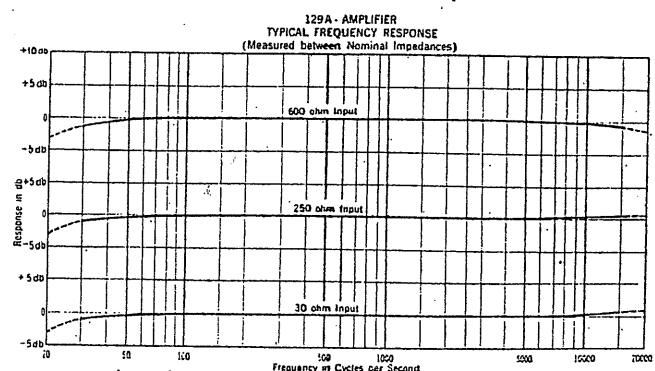


Figure 35 — Frequency Response, 129A Amplifier.

130B TWIN CHANNEL MAIN AMPLIFIER

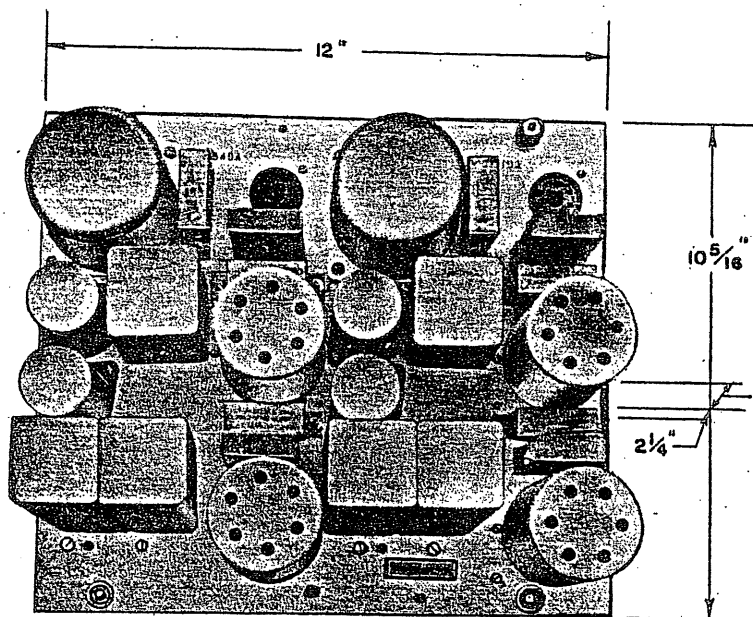


Figure 36 — 130B Twin Channel Main Amplifier.

Use — Recommended where it is desirable to feed two programs through a single program production unit simultaneously. May also be used to provide one regular and one emergency transmission channel. Each amplifier element is arranged for its own interstage gain control, which is intended as the master gain control for that channel.

Description — Two identical, electrically separate, three stage amplifiers are mounted on a common chassis. In operation, cross talk between the two channels is held below audible levels through careful circuit design and expert selection of components.

By the same means a high signal-to-noise ratio and low harmonic distortion characteristic, comparable to that featured in units of the single channel type, have been achieved in this equipment. Resistors in cathode circuits are provided to permit tube checks.

Features

- Handles two programs simultaneously.
- Twin, electrically separate, three stage amplifiers.
- Crosstalk held below audible levels.
- High signal-to-noise ratio.
- Low harmonic distortion.
- Stabilized feedback.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —37 dbm.

Source Impedance: 150 or 600 ohms matching. For bridging add proper input pad.

Load Impedance: Main output 600 ohms. Monitor output 40 ohms (approximately).

Maximum Gain: 81 db.

Gain Control: Requires two (one for each amplifier unit) 100,000 ohm potentiometers mounted externally; low capacity wiring for interconnection must be used as this is a high impedance interstage gain control.

Output Power: +24 dbm (250 milliwatts), for frequencies between 100 and 5,000 cycles less than 1 per cent harmonic distortion; +22 dbm (160 milliwatts) at 50 cycles, 1 per cent harmonic distortion. Monitor output 20 db less than main output. (Isolation between main and monitor output is 20 db).

Power Supply for Complete Amplifier (2 amplifier units): Filament 6.3 volts, 3.6 amperes, a-c or d-c. Plate 275 volts, 65 milliamperes, d-c.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2		1603
2	348A or	1620 (or 6J7)
2	349A or	6F6
6		

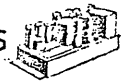
Mounting: This amplifier is designed for mounting in desks or other structures. It is also adaptable for relay rack or bay cabinet mounting thru the use of a 190 type Mounting Plate (one per plate). For panels, see page 95, Components and Accessories.

Weight: 17 1/4 pounds.

Finish: Light gray.

Accessories: The following accessory equipment is recommended for use with this amplifier:

- 2 — 100,000 ohm potentiometers, Western Electric



- BA-73987-3 or BA-73987-4 (for gain controls).
- 1 — KS-10003 Meter (for measuring plate currents of vacuum tubes).
- 1 — Western Electric 18 or 20 type Rectifier.
- 1 — Western Electric 190 type Mounting Plate (one mounts one 130B Amplifier).

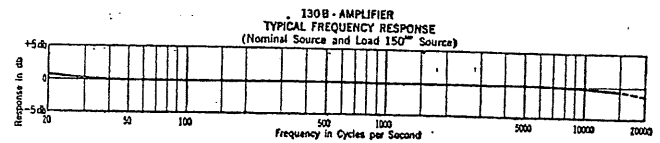


Figure 37 — Frequency Response Curve, 130B Amplifier.

131A MONITOR AMPLIFIER

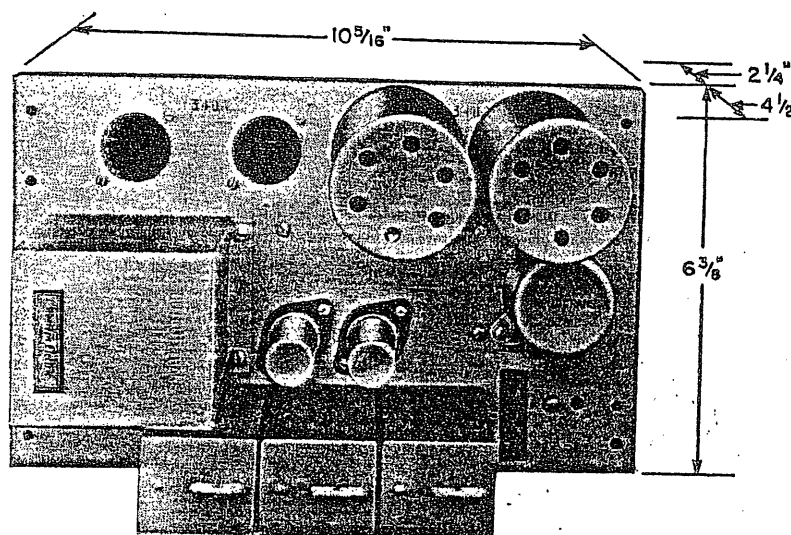


Figure 38 — 131A Monitor Amplifier.

Use — This amplifier is a compact single unit, especially designed for studio-booth monitoring applications where the control booth operator requires a means for program cueing to performers in an associated studio or to remote pick-up lines. A booth and two studio loudspeakers, as well as line cue-feeding circuits, can be served from its output network.

Description — The 131A Amplifier is of the two-stage push-pull type and possesses adequate gain to operate either from the output of a single pre-amplifier or to be bridged across the output of a main amplifier.

Output power is sufficient to satisfy normal booth and studio requirements. Taps are provided on the output transformer which permit adjustment to work into impedances from 1 to 1200 ohms, thus assuring high quality performance over a wide variety of loudspeaker impedance combinations. The unit is constructed for operation from an external power supply source.

Each of the three loudspeaker branch circuits is provided with a cut-off relay which may be connected to operate from microphone or talkback keys so that switching a microphone on, will at the same time, automatically silence

the associated loudspeaker. This feature is desirable where microphone and loudspeakers are located in the same room since it offers a safeguard against acoustic feedback or "singing" which is likely to occur when a microphone is exposed to sound from a loudspeaker connected to the same amplifier channel.

Power for operating the relays is obtained from the power stage cathode circuit of the amplifier so that a separate relay power supply is not required.

Features

- Excellent for studio-booth monitoring.
- Variety of application.
- Cut-off relays — for loudspeakers.
- Tapped output transformer to permit working into impedances from 1 to 1200 ohms.
- Stabilized feedback.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: -55 dbm.

Western Electric

Source Impedance: 600 ohms matching. For bridging add proper input pad.

Load Impedance: 1 to 1200 ohms. See Figure 12.

Maximum Gain: 50 db.

Output Power: 3.2 watts (+35 dbm) with 1 per cent harmonic distortion; 5 watts (+37 dbm) with 5 per cent harmonic distortion.

Power Supply: Filament 6.3 volts, 3 amperes a-c or d-c; plate 275 volts, 75 ma., d-c (18 or 20 type Rectifiers recommended for power supply).

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	or 1620 (or 6J7)
2	349A	or 6F6
4		

Mounting: Designed for console mounting; also for rack mounting on 190 type Mounting Plate (capacity one per plate). For panels, see page 95, Components and Accessories.

Weight: 7¾ pounds.

Finish: Gray.

Accessories: The following accessory equipment is recommended for use with the 131A Amplifier:

- 1 — Western Electric 190 type Mounting Plate.
- 1 — Western Electric 18 or 20 type Rectifier.

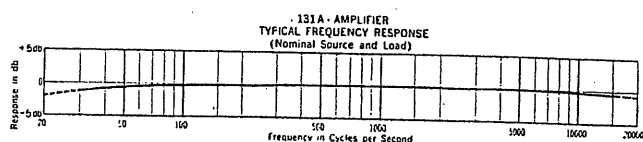


Figure 39 — Frequency Response Curve 131A Amplifier.

132A MAIN AMPLIFIER

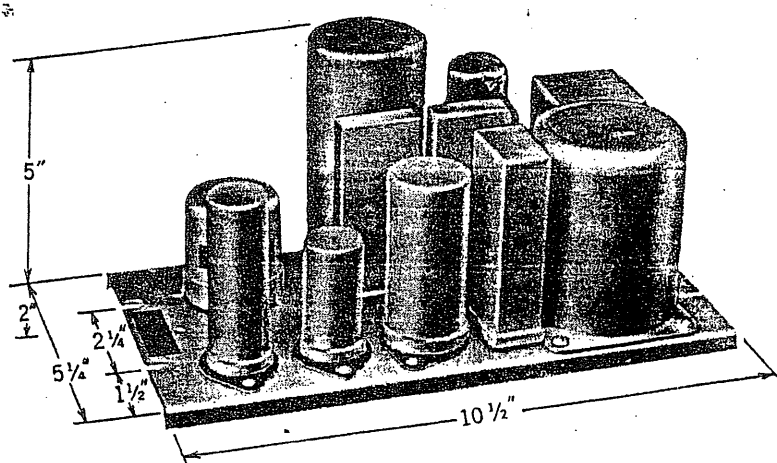


Figure 40 — 132A Main Amplifier.

Use — The 132A is recommended as a main amplifier in modern sound system installations. In addition to feeding normally equalized transmission lines or master switching circuits, adequate power is available to handle program bus systems or studio auditioning facilities.

Description — This two stage amplifier has compact physical dimensions, low signal-to-noise ratio, gain and output capable of providing a suitable margin above line level to allow for losses in coupling and equalizing devices. Fidelity

is maintained over the full 50-15,000 cycle range through use of stabilized feedback, and components are fully shielded to prevent self-generated noise. The 132A operates from an external power supply, and is suited for either desk or rack mounting. Resistors in cathode circuits are provided to permit tube checks.

Features

Latest design.



- Can handle program bus systems and studio auditioning facilities.
- High signal-to-noise ratio.
- Stabilized feedback.
- Desk or rack mounting.
- Easy checking of tubes.
- Compact.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: -65 dbm.

Source Impedance: 30, 250, or 600 ohms matching. For bridging add proper input pad.

Load Impedance: 600 ohms.

Maximum Gain: 48 db.

Output Power: +28 dbm (600 milliwatts) with 1 per cent total harmonic distortion.

Power Supply: Filament 6.3 volts, 1.5 amperes, a-c or d-c; plate 275 volts, 31 ma., d-c.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
1	348A	or 6J7 (6J7G or 1620)
1	349A	or 6F6 (or 6F6G)
2		

Mounting: Designed for console mounting; also for rack mounting on a 190 type or 206A Mounting Plate (capacity three 132A Amplifiers per plate). For panels, see page 95; Components and Accessories.

Weight: 7 pounds.

Finish: Gray.

133A LINE AMPLIFIER

Use — A multi-purpose amplifier providing greater output power than most line amplifiers and less harmonic distortion than many lower-powered units of this type. Its versatility of application is outstanding in the sound system field.

Used as a line amplifier, the unit can either match or bridge 600 ohm impedances, and provides ample power capacity to feed heavily equalized transmission lines, complex switching systems or branching networks, contributing a minimum of harmonic distortion — less than is found in many lower-powered units.

As an isolation amplifier, it can be bridged on main circuits without noticeably affecting the main line transmission. Here again, power and gain are adequate for supplying even the highest level studio bus systems.

Accessories: The following accessory equipment is recommended for use with this amplifier:

- 1 — KS-10003 Meter (for measuring plate currents of vacuum tubes).
- 1 — Western Electric 18 or 20 type Rectifier.
- 1 — Western Electric 190 type or 206 A Mounting Plate.

132B AMPLIFIER

The 132B Amplifier is similar to the 132A Amplifier, but has an input transformer with electrostatic and extra electromagnetic shielding and is arranged for balanced operation. It has 51 db gain, as shipped, with provision for an increase to 60 db gain.

Typical Specifications (same as 132A Amplifier except for the following):

	As Shipped	Modified for Increased Gain
Gain:	51 db	60 db
Output Noise:	-64 dbm	-58 dbm
Output Power:	+27 dbm	+24 dbm

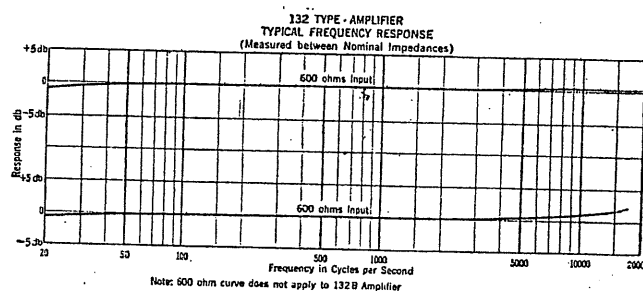


Figure 41 — Frequency Response Curves, 132 type Amplifiers (curve shown for 600 ohm input does not apply to the 132B Amplifier).

For general monitoring purposes, the 133A Amplifier has sufficient power for many studio applications. An output transformer with taps which will satisfactorily feed circuit impedances over a range from 1 to 1200 ohms has been included in its design.

Description — The 133A Amplifier is of the two-stage, push-pull type, incorporating stabilized feedback as a further assurance of high grade transmission. The unit is small in size, light in weight, permitting ready installation in new or existing systems. Resistors in cathode circuits are provided to permit easy tube checks.

Features

Multi-purpose amplifier.

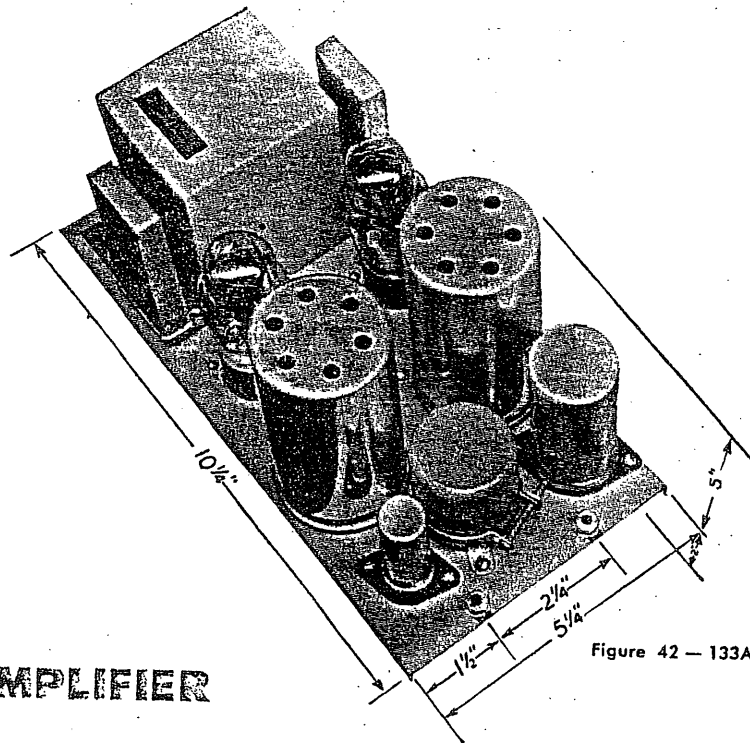


Figure 42 — 133A Line Amplifier.

133A LINE AMPLIFIER

Versatility of application, as line or isolation amplifier or for general monitoring purposes.
Output transformer for feeding circuit impedances from 1 to 1200 ohms.
Stabilized feedback for high grade transmission.
Small size, lightweight.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —65 dbm. —70 dbm with 5.2 db output pad connected.

Source Impedance: 600 ohms nominal matching, or high impedance (20,000 ohms) bridging.

Load Impedance: 1 to 1,200 ohms. See Figure 12.

Maximum Gain: 47 db with 600 ohm matching input; 21.5 db with bridging input.

Output Power: 4 watts (+36 dbm) with 1 per cent harmonics.

Power Supply: Filament 6.3 volts, 3 amperes, a-c or d-c; plate 275 volts, 66 ma., d-c.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2	348A	1620 (or 6J7)
2	349A	or 6F6
4		

Mounting: Designed for horizontal or vertical desk mounting or for rack mounting on a 190 type or 206A Mounting Plate. For panels, see page 95, Components and Accessories.

Weight: 8 pounds.

Finish: Light gray.

Accessories: The following accessory equipment is recommended for use with the Western Electric 133A Amplifier:

- 1 — KS-10003 Meter (for measuring plate currents of vacuum tubes).
- 1 — Western Electric 18 or 20 type Rectifier.
- 1 — Western Electric 190 type or 206A Mounting Plate.

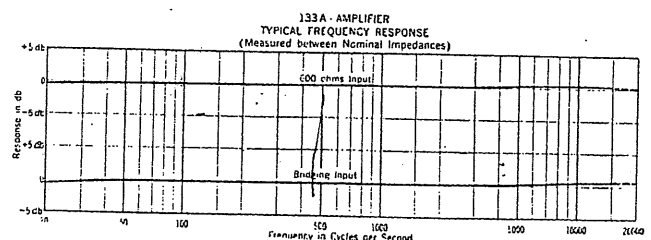


Figure 43 — Frequency Response Curve, 133A Amplifier.



140A AMPLIFIER

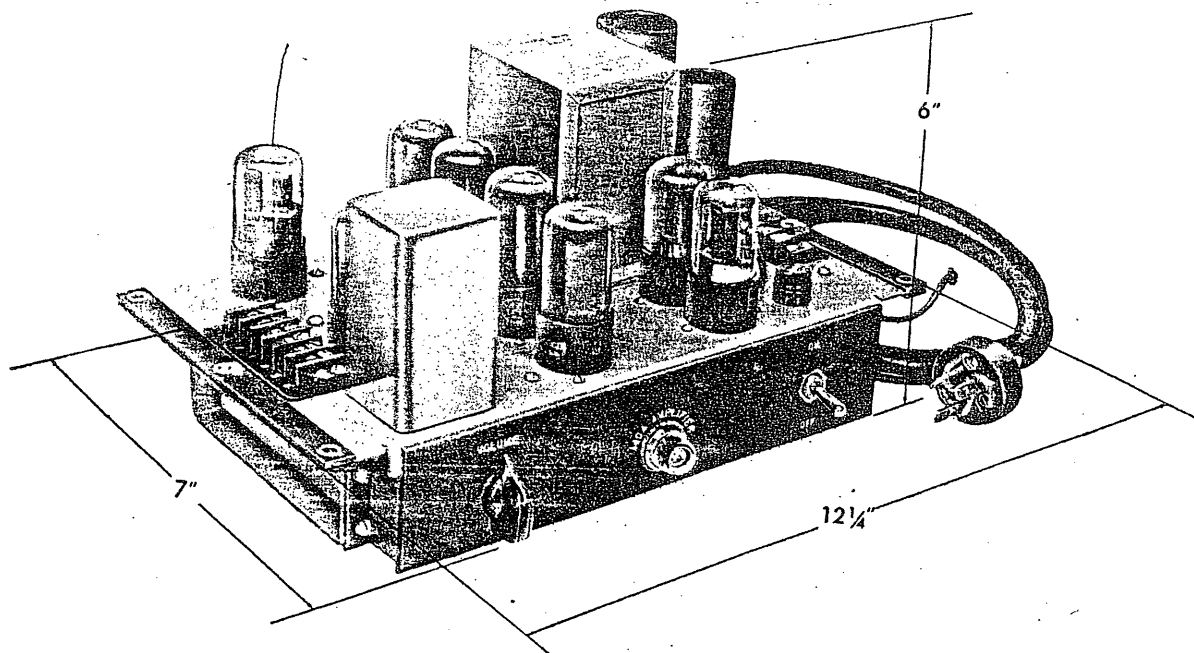


Figure 44 — 140A Amplifier.

Use — The 140A, an amplifier of the AC-DC type of unique design, is used for wired program service and general purpose monitoring. Offering the same stability for d-c operation as it does for a-c operation, it incorporates many features which greatly simplify installation problems for the AC-DC type amplifier.

Description — Basically the 140A is a three stage push-pull AC-DC amplifier using stabilized feedback to obtain high quality performance. Long trouble-free life is assured through the use of high safety factor components.

No special grounding arrangement is required. Usually, considerable trouble is experienced when connecting "ground" to most AC-DC amplifiers and the internal noise is dependent on the grounding connection. However, with the 140A this problem has been completely eliminated. The internal noise of the amplifier is entirely independent of the line or grounding connections.

This amplifier can be operated directly from telephone lines and meets the requirements imposed by telephone companies for such equipment, hence, a separate isolating coil need not be used where local telephone company practices permit. Also, these amplifiers conform to the protection requirements specified by the Underwriters Laboratories for equipment installed on a subscriber's premises, and their stamp of approval will be found on this equipment.

Power output of 10 watts with a-c operation, 6 watts with d-c operation makes these amplifiers applicable for nearly all wired program installations. The 140A Amplifier is designed for mounting in a KS-13678 Cabinet which can be ordered separately. Versatility of design in this amplifier permits it to be used either as fixed or portable equipment. The 1140A, which consists of the 140 Amplifier

in the KS-13678 Cabinet, is recommended for subscriber installations as no additional mounting equipment is required.

Features

- Can be operated directly from telephone lines without the use of additional equipment, where local telephone company practices permit.

- Conforms to protection requirements of the Underwriters Laboratories for equipment installed on subscriber's premises.

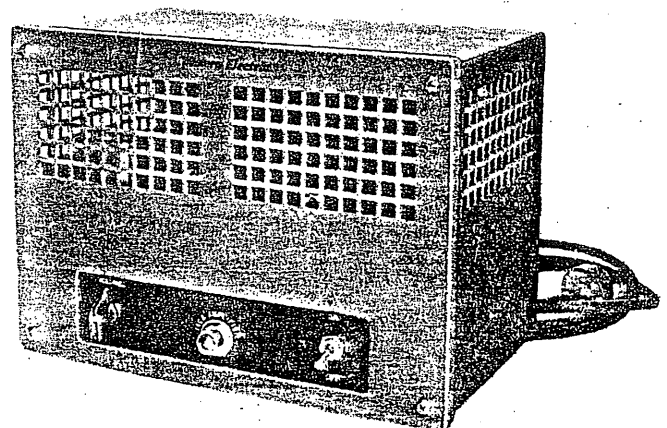


Figure 45 — 1140A Amplifier.
(140A Amplifier in a KS 13678 Cabinet.)

Western Electric

Negligible external field thus permitting its use in close proximity to low level circuits and equipment.

Stabilized feedback gives high quality and reduces noise and distortion.

No special grounding arrangement required.

A-c or d-c operation, protected by thermal cutout fuse.

Maximum accessibility to all components for servicing and maintenance.

Small size — lightweight.

Typical Specifications

Frequency Response: ± 1 db, 50 to 10,000 cycles; ± 2 db, 50 to 15,000 cycles.

Output Noise: —15 dbm.

Source Impedance: See Figure 46.

Load Impedance: See Figure 47.

Gain: 60 db high gain. 40 db bridging.

Gain Control: Continuously variable.

Power Output:

	DC Operation	AC Operation
Less than 1% harmonic distortion	3½ watts	6 watts
Less than 2% harmonic distortion	5 watts	8 watts
Less than 5% harmonic distortion	6 watts	10 watts
(The above distortion percentages are for 400 cycles with 60 cycle power supply on a-c operation.)		

Power Supply: 105 to 125 volts a-c, 25 to 60 cycles or 115 volts d-c, 1.5 amperes, 175 watts. Thermal cutout fuse mounted in chassis.

VACUUM TUBES

Quantity Required	Commercial Receiver Type
2	6SL7
4	25L6
2	25Z6
8	

INPUT CONNECTIONS

Nominal Source (Ohms)	Range (Ohms)	Input Connections
150	75 to 300	2,3
600	300 to 1,200	2,4
600 Bridging	0 to 10,000	1,5

Figure 46 — 140A Amplifier Input Connections.

OUTPUT CONNECTIONS

Nominal Load (Ohms)	Load Range	Strap	Output Terminals
AC SUPPLY			
4	2 to 6		1,2
8	4 to 12		2,3
24	12 to 36		1,3
250	125 to 375	4-6, 5-7	4,7
1000	500 to 1500	5-6	4,7
	70 VOLTS	3-4-6, 5-7	1,7
DC SUPPLY			
1.5	1.0 to 2.5		1,2
3	2.0 to 4.5		2,3
8	6 to 14		1,3
100	60 to 150	4-6, 5-7	4,7
400	250 to 600	5-6	4,7
	70 VOLTS	3-4, 5-6	1,7

Figure 47 — Output Connections for 140A Amplifier

Mounting Arrangement: KS-13678 Cabinet. Ventilated metal box for shelf or wall mounting. It is equipped with a detachable front cover. Input and output terminal terminated at screw type lugs mounted on top of chassis. External terminals also provided to permit changing of output transformer strapping. AC-DC power cord attached with ground connection terminating in a 3 prong plug.

Dimensions: KS-13678 Cabinet overall: 12¾" long, 8⅛" deep, 9" high.

Weight: 1140A Amplifier, 19½ pounds.

140A Amplifier, 9¾ pounds.

Finish: Chassis — light gray enamel. Cabinet — light aluminum gray.

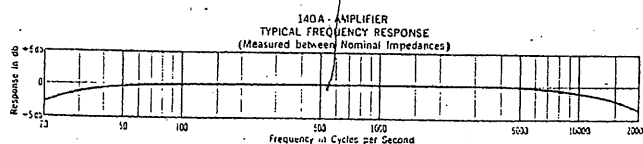


Figure 48 — Frequency Response Curve 140A Amplifier.

141A AMPLIFIER

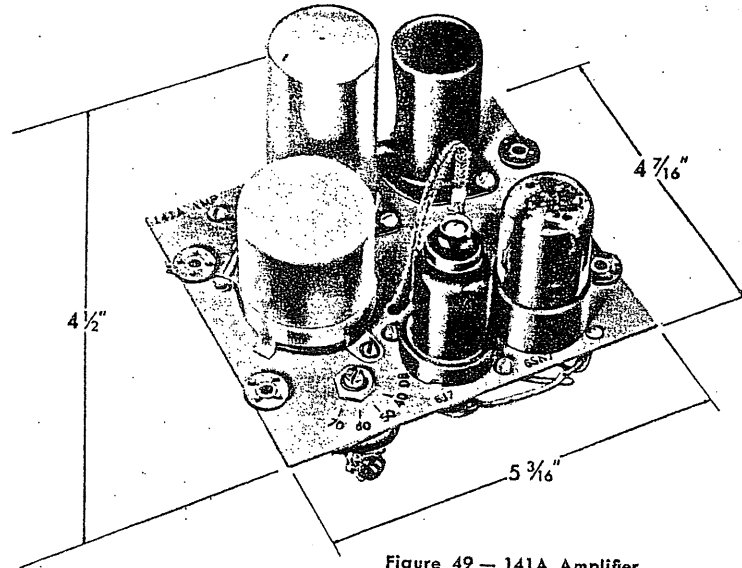


Figure 49 — 141A Amplifier.

Use — The 141A is used as a pre-amplifier for basic amplifier units such as the 142A or 143A Amplifiers.

Description — A three-stage pre-amplifier, the 141A may be connected to a basic amplifier unit without the use of transformers. Provision is made on the 142A and 143A basic amplifier chassis for mounting one 141A unit, or the 141A can be mounted up to 300 feet away from the basic amplifier unit with little effect on the overall performance characteristics, or it can be mounted as far as 1,000 feet away by operating it at a lower output level.

Where a 141A amplifier is to be located close to a basic amplifier unit, the power required can be drawn from the basic amplifier. If the pre-amplifier is to be located remotely from the basic amplifier, the power can be obtained from rectifiers of the 18 or 20 type.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —45 dbm.

Source Impedance: 30, 250, or 600 ohms nominal. Source impedance may be $\pm 40\%$ from these values with little effect upon the response characteristic.

Load Impedance: Any impedance 600 ohms or above.

Gain: 70 db maximum.

Gain Control: Adjustable in three steps of 10 db each.

Output Power: See Figure 50.

Power Required: Filament 0.9 ampere at 6.3 volts, a-c or dc; 15 ma. at 275 volts d-c.

VACUUM TUBES

Quantity Required	Commercial Receiver Type
1	6J7 or (6J7G)
1	6SN7

Mounting: Up to three 141A amplifiers can be mounted on a 203A Mounting Plate.

Output power varies in accordance with gain setting and load impedance. Output levels below are for 50-7500 cycles and 1% total harmonic distortion.

Level	Load	Gain
+ 8 dbm	600 ohms	40 db
+ 18 dbm	6000 ohms	40 db
+ 10 dbm	6000 ohms	70 db

Figure 50 — Output Power 141A Amplifier.

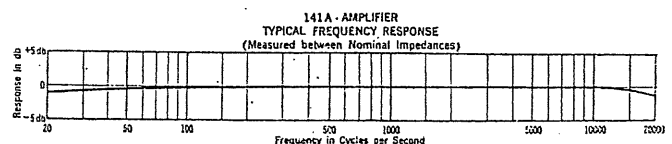


Figure 51 — Frequency Response Curve, 141A Amplifier.

142 AND 143 TYPE AMPLIFIERS

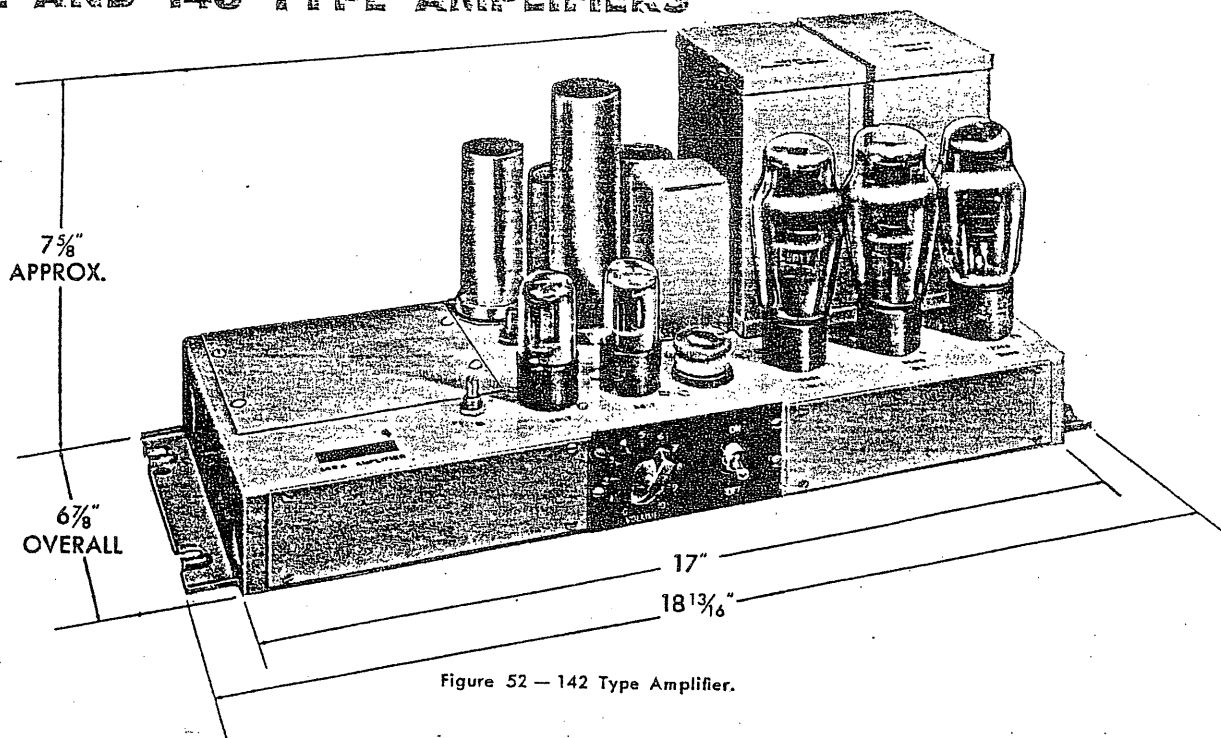


Figure 52 — 142 Type Amplifier.

The 142 and 143 type Amplifiers are an integrated series of amplifiers meeting RMA requirements for public address, wired program, and sound distribution systems. They are designed to fit like building blocks into systems

of any size from the simplest single channel set-up to the most complex multiple system. A single channel system can easily be increased to any size by the economical addition of units.

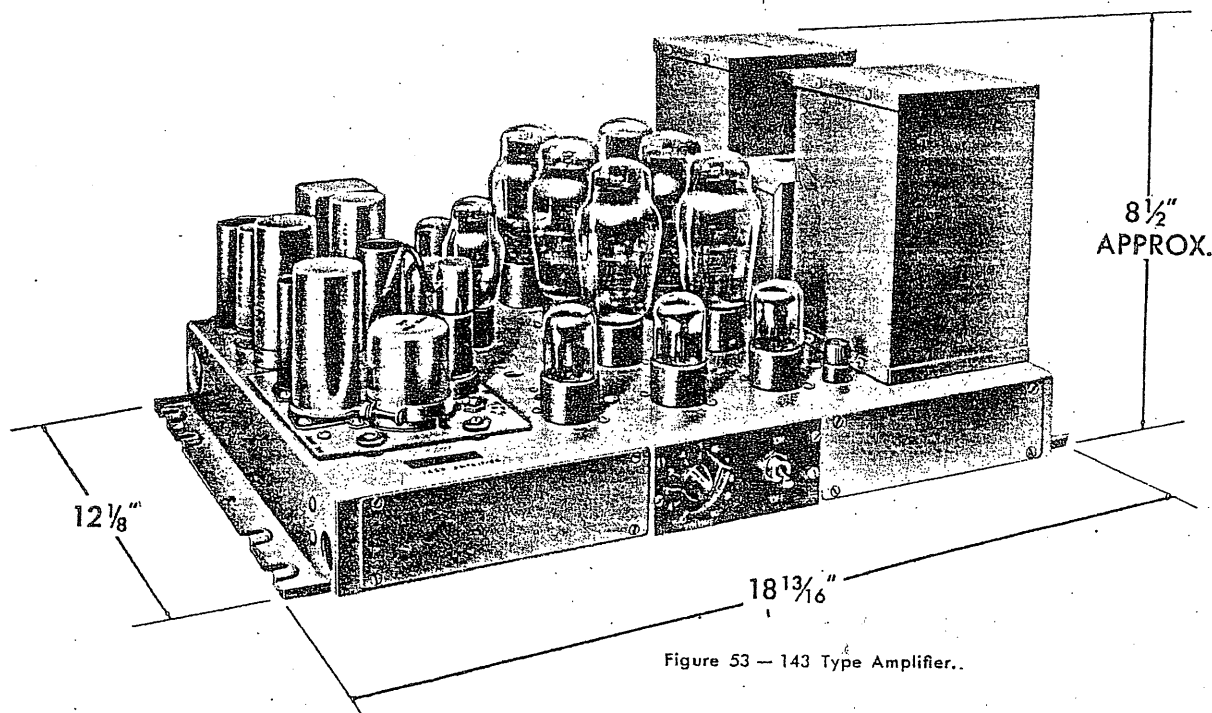
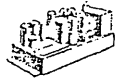


Figure 53 — 143 Type Amplifier.

These amplifiers are all designed around a basic unit, the 142A or 143A. The basic units are modified with different input arrangements to suit the requirements of the customer. A wide variety of amplifier combinations are possible. In addition to the combinations available in the

142A, B, C, D and 143A, B, C, the 142A or 143A may also be equipped with two 116B pre-amplifiers on special order.

The basic difference between the 142A and the 143A is the power output. The 142A has an output power of



25 watts, and the 143, 75 watts.

Features

- Stabilized feedback improves performance — makes load impedance non-critical.
- Completely self contained power supply.
- Excellent frequency response.
- Low distortion over wide frequency range.
- Flexible input arrangements.
- Incorporates new 70 volt speaker distribution line.

Nominal Load Impedance (ohms)	Working Range of Load Impedance (ohms)	Strap Terminals	Output Connections
200	150 to 300		19 and 20
24	18 to 36	14-15, 16-17	13 and 18
12	9 to 18	13-15, 14-16-17	15 and 18
8	6 to 12	14-15	13 and 16
4	3 to 6		17 and 18
2	1.5 to 3	13-15, 14-16	13 and 16

FOR 70 VOLT LOUDSPEAKER DISTRIBUTION LINE CONNECTIONS

Power Output Condition	Strap Terminals	Output Connections
12 watts	14-15, 16-17, 18-19	13 and 20
25 watts		19 and 20

Figure 54 — Output Connections for 142A Amplifier.

Nominal Load Impedance (ohms)	Working Range of Load Impedance (ohms)	Strap Terminals	Output Connections
66.7	50 to 100		19 and 20
24	18 to 36	14-15, 16-17	13 and 18
12	9 to 18	13-15, 14-16-17	15 and 18
8	6 to 12	14-15	13 and 16
4	3 to 6		17 and 18
2	1.5 to 3	13-15, 14-16	13 and 16

Figure 55 — Output Connections for 143A Amplifier.

142A AMPLIFIER

The 142A Amplifier is a basic amplifier unit with a power output of 25 watts. Its construction is such that a large variety of input combinations can be installed directly on the chassis. This permits stocking a number of basic units which can be easily modified to fit individual requirements.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —30 dbm.

Harmonic Distortion: See Output Power.

Source Impedance: 0—250,000 ohms.

Load Impedance: 1.5 to 36 ohms or 70 volt loudspeaker distribution line. See Figure 54.

Gain: 50 db from 600 ohm source.

Gain Control: Continuously variable master control. Chassis drilled for channel controls.

Output Power: As supplied for use with commercial receiver type tubes (6L6), 12 watts (+41 dbm) 50-7500 cycles with 5% total harmonic distortion. May be reconnected to use Western Electric 350B Tubes in the output circuit for 25 watts (+44 dbm) with less than 5% total harmonic distortion over the frequency range of 50-7500 cycles.

Power Supply: 105 - 125 volts, 60 cycles, a-c. 185 watts maximum (1.65 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2		6SN7GT
2	350B or	6L6
1		5U4G
5		

Mounting: Relay rack or in KS-13625 List 3 Cabinet. When amplifier is mounted in the KS-13625 List 3 Cabinet it is coded the 1142A. For relay rack mounting a 405B Panel should be ordered. See page 95, Components and Accessories.

Dimensions: For relay rack mounting 8 $\frac{3}{4}$ " x 19".

Finish: Chassis — light gray.

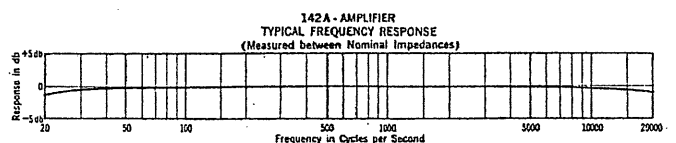


Figure 56 — Frequency Response Curve, 142A Amplifier.

142B AMPLIFIER

The 142B Amplifier is a 142A basic unit plus a high gain pre-amplifier, the 141A. It is especially adaptable for use with microphone and other low output devices. The 141A Amplifier input circuit is described on page 57.

Typical Specifications

Frequency Response: ± 2 db, 50 to 15,000 cycles, ± 1 db, 50 to 10,000 cycles.

Output Noise: —5 dbm at maximum gain; —25 dbm at 90 db gain.

Harmonic Distortion: See Output Power.

Source Impedance: 30, 250, or 600 ohms.

Load Impedance: 1.5 to 36 ohms or 70-volt loudspeaker distribution line. See Figure 54.

Gain: 115 db.

Gain Controls: Continuously variable master and three steps of 10 db each on 141A chassis.

Western Electric

Output Power: As supplied for use with commercial receiver type tubes (6L6), 12 watts (+41 dbm), 50-7500 cycles with 5% total harmonic distortion. May be reconnected to use Western Electric 350B Tubes in the output circuit for 25 watts (+44 dbm), with less than 5% total harmonic distortion over the frequency range 50-7500 cycles.

Power Supply: 105 - 125 volts, 60 cycles, a-c. 185 watts maximum (1.65 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
3		6SN7GT
1		6J7
2	350B or	6L6
1		5U4G
7		

Mounting: Relay rack or in KS-13625 List 3 Cabinet. When the amplifier is mounted in the KS-13625 Cabinet it is coded the 1142B. For relay rack mounting a 405B Panel should be ordered. See page 95, Components and Accessories.

Dimensions: For relay rack mounting, 8 $\frac{3}{4}$ " x 19".

Finish: Chassis — light gray.

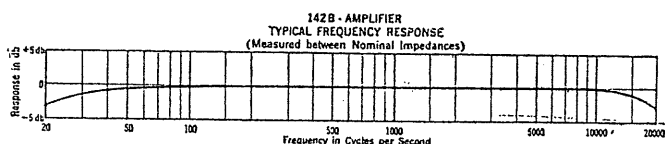


Figure 57 — Frequency Response Curve, 142B Amplifier.

142C AMPLIFIER

The 142C Amplifier is a 142A basic amplifier unit plus a line coil. It is especially suited for applications where high gain amplifiers are not required.

Typical Specifications

Frequency Response: ± 1.5 db, 50-10,000 cycles.

Output Noise: —30 dbm.

Harmonic Distortion: See Output Power.

Source Impedance: 37.5, 150, or 600 ohms.

Load Impedance: 1.5 to 36 ohms, or 70 volt loudspeaker distribution line. See Figure 54.

Gain: 66 db.

Gain Control: Continuously variable.

Output Power: As supplied for use with commercial receiver type tubes (6L6), 12 watts (+41 dbm), 50-7500 cycles with 5% total harmonic distortion. May be reconnected to use Western Electric 350B Tubes in the output circuit for 25 watts (+44 dbm), with less than 5% total

harmonic distortion over the frequency range of 50-7500 cycles.

Power Supply: 105 - 125 volts, 60 cycles, a-c. 185 watts maximum (1.65 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2		6SN7GT
2	350B or	6L6
1		5U4G
5		

Mounting: Relay rack or in KS-13625 List 3 Cabinet. When amplifier is mounted in the KS-13625 List 3 Cabinet it is coded the 1142C. For relay rack mounting a 405B Panel should be ordered. See page 95, Components and Accessories.

Dimensions: For relay rack mounting, 8 $\frac{3}{4}$ " x 19".

Finish: Chassis — light gray.

142D AMPLIFIER

The 142D is a basic 142A Amplifier unit plus a 141A pre-amplifier and a line coil. The two input circuits, one of which may be used with a microphone, provide a flexible combination of mixing and control, for practically all sound systems.

Typical Specifications

Frequency Response: Microphone Input: ± 2 db, 50-15,000 cycles; ± 1 db, 50-10,000 cycles. Line Input: ± 1.5 db, 50-10,000 cycles.

Output Noise: Microphone Input at maximum gain: —5 dbm. Microphone Input at 90 db gain: —25 dbm. Line Input: —30 dbm.

Harmonic Distortion: See Output Power.

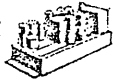
Source Impedance: Microphone Input: 30, 250, 600 ohms. Line Input: 37.5, 150, 600 ohms.

Load Impedance: 1.5 to 36 ohms, or 70 volt loudspeaker distribution line. See Figure 54.

Gain Control: Continuously variable master and an additional three step control, 10 db each step, on 141A Pre-amplifier.

Output Power: As supplied for use with commercial receiver type tubes (6L6), 12 watts (+41 dbm), 50-7500 cycles with 5% total harmonic distortion. May be reconnected to use Western Electric 350B Tubes in the output circuit for 25 watts (+44 dbm), with less than 5% total harmonic distortion over the frequency range of 50-7500 cycles.

Power Supply: 105 - 125 volts, 60 cycles, a-c. 185 watts maximum (1.65 amperes). Fused with thermal cutout fuse.



VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
1		6J7
3		6SN7GT
2	350B or	6L6
1		5U4G
7		

Mounting: KS-13625 List 4 Cabinet. When amplifier is mounted in this cabinet it is coded the 1142D.

Finish: Chassis — light gray.

143A AMPLIFIER

The 143A Amplifier is a basic amplifier unit with a power output of 75 watts. It is especially designed for rack mounting. The chassis of the 143A is so arranged that a large variety of input combinations can be installed. These basic amplifier units can be stocked and can be easily modified to fit individual requirements.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles.

Output Noise: —30 dbm.

Harmonic Distortion: See Output Power.

Source Impedance: 0-250,000 ohms.

Load Impedance: 1.5 to 36 ohms, or 70 volt loudspeaker distribution line. See Figure 55.

Gain: 52 db from 600 ohm source.

Gain Control: Continuously variable master. Chassis drilled for channel controls.

Output Power: As supplied for use with Western Electric 350B Tubes, 75 watts (+49 dbm) with less than 5% total harmonic distortion over the frequency range of 50-7500 cycles. As reconnected for use with commercial receiver type tubes (6L6), 50 watts (+47 dbm), 5% total harmonic distortion 50-7500 cycles.

Power Supply: 105-125 volts 60 cycles, a-c. 335 watts maximum (3 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
4		6SN7GT
4	350B or	6L6
2		5R4GY
1		OC3/VR105
11		

Mounting: Designed for relay rack mounting.

Dimensions: 12¼" x 19" for relay rack.

Finish: Chassis — light gray.

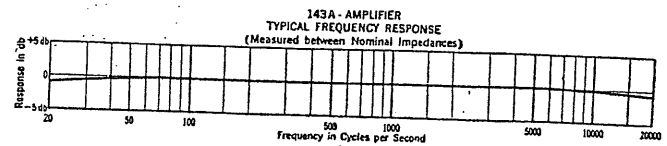


Figure 58 — Frequency Response Curve, 143A Amplifier.

143B AMPLIFIER

The 143B Amplifier is a 143A basic unit plus a high gain pre-amplifier, the 141A. Its high gain makes it especially suitable for use with microphone and other low output devices. The 141A Amplifier, which is used as a pre-amplifier, is described on page 57.

Typical Specifications

Frequency Response: ± 1 db, 50-10,000 cycles. ± 2 db 50-15,000 cycles.

Output Noise: 0 dbm at maximum gain. —25 dbm at 90 db gain.

Harmonic Distortion: See Output Power.

Source Impedance: 30, 250, or 600 ohms.

Load Impedance: 1.5 to 36 ohms, or 70 volt loudspeaker distribution line. See Figure 55.

Gain: 117 db.

Gain Control: Continuously variable master and three steps of 10 db each on the 141A Pre-amplifier.

Output Power: As supplied for use with Western Electric 350B Tubes, 75 watts (+49 dbm) with less than 5% total harmonic distortion over the frequency range of 50-7500 cycles. As reconnected for use with commercial receiver type tubes (6L6), 50 watts (+47 dbm), 5% total harmonic distortion 50-7500 cycles.

Power Supply: 105-125 volts 60 cycles, a-c. 335 watts maximum (3 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
5		6SN7GT
4	350B or	6L6
2		5R4GY
1		OC3/VR105
1		6J7
13		

Mounting: Designed for relay rack mounting.

Dimensions: 12¼" x 19" for relay rack.

Finish: Chassis — light gray.

Western Electric

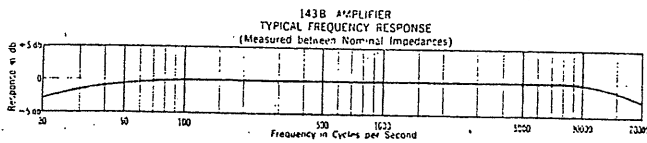


Figure 59 — Frequency Response Curve, 143B Amplifier.

143C AMPLIFIER

The 143C Amplifier is a 143A basic amplifier unit plus a line coil. It is especially suited for applications where high gain amplifiers are not required.

Typical Specifications

Frequency Response: ± 1.5 db, 50-10,000 cycles.

Output Noise: —30 dbm.

Harmonic Distortion: See Output Power.

Source Impedance: 37.5, 150, or 600 ohms.

Load Impedance: 1.5 to 36 ohms, or 70 volt loudspeaker distribution line. See Figure 55.

Gain: 68 db.

Gain Control: Continuously variable.

Output Power: As supplied for use with Western Electric 350B Tubes, 75 watts (+49 dbm) with less than 5% total harmonic distortion over the frequency range of 50-7500 cycles. As reconnected for use with commercial receiver type tubes (6L6), 50 watts (+47 dbm), 5% total harmonic distortion 50-7500 cycles.

Power Supply: 105-125 volts 60 cycles, a-c. 335 watts maximum (3 amperes). Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
4		6SN7GT
4	350B	or 6L6
2		5R4GY
1		OC3/VR105
11		

Mounting: Designed for relay rack mounting.

Dimensions: 12¼" x 19" for relay rack.

Finish: Chassis — light gray.

1126C PROGRAM OPERATED LEVEL GOVERNING AMPLIFIER

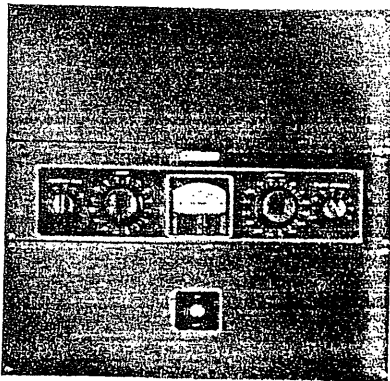


Figure 60 — Front View, 1126C Amplifier.

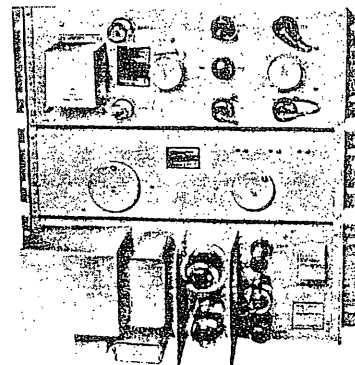


Figure 61 — Rear View, 1126C Amplifier.

Use — The 1126C is designed to reduce excessive program peaks. It has an extremely short attack time. For average program use, peak level reduction will begin within the first half cycle of program frequency. This eliminates results of overloading by peaks and consequent distortion.

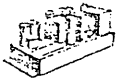
The self-contained automatically regulated power supply stabilizes the operation of the amplifier over a wide range of power supply conditions.

For convenience in installation, the 1126C Amplifier can be separated into three units. The control panel may, for example, be mounted in a control desk and the power supply unit at the base of a rack containing the remainder of the circuit equipment, thus lending itself to flexibility in installation.

Description — The 1126C consists of a 126C three-stage push-pull amplifier, 298A Control Panel, and 20B Rectifier. It is an audio frequency operated level governing amplifier containing automatic means to reduce its gain when the level input reaches a predetermined amount, and to restore the gain as the input level falls below that amount. The 1126C has improved decoupling of the control circuit from the program circuit, and is entirely interchangeable with the 1126B.

Features

Permits higher average program level to be transmitted. No appreciable change in frequency response or increase



in distortion between conditions of no limiting and 5 db limiting.
 Switch to disable limiting action permitting use as a straight amplifier.
 Meter indicating degree of limiting.
 Self-contained attenuators for wide range of input and output levels.
 Plate current checking and improved accessibility.

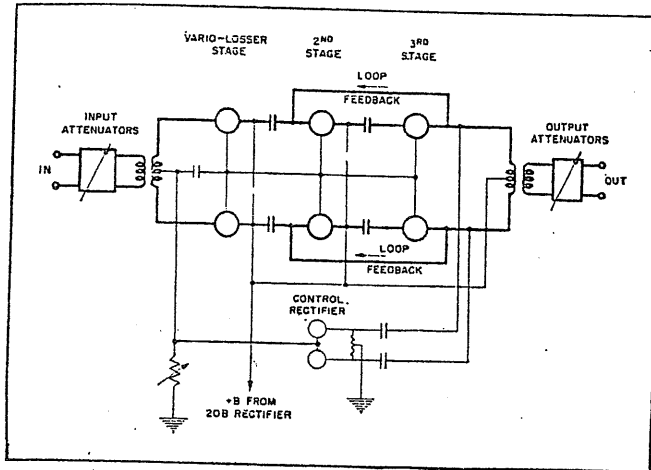


Figure 62 — Functional Schematic of 1126C Amplifier.

Automatic means for controlling gain.
 Short attack time.
 Self-contained power supply.
 Flexibility of installation.

Typical Specifications

Frequency Response: ± 1 db, 50 to 15,000 cycles

Output Noise: -45 dbm.

Harmonic Distortion: For program — less than 1 per cent for all operating conditions up to 5 db compression. For single frequency tone—(a) below compression, less than 1 per cent; (b) for 5 db compression, less than 1 per cent for frequencies above 200 cycles and not more than 1.75 per cent for frequencies as low as 50 cycles.

Compression Ratio: 10:1 (10 db input increase results in 1 db output increase above point at which gain reduction starts).

Recovery Time: Variable in 5 steps of 0.2 second each from 0.2 second to 1 second. Optional adjustment permits variation from 0.1 second to 0.5 second.

Source Impedance: 600 ohms. Operation with one side grounded recommended.

Load Impedance: 600 ohms. Operation with one side grounded recommended.

Maximum Gain: 51 db maximum with all input and output fixed attenuators omitted (34.5 db as shipped with 10 db input and 6.5 db output attenuators connected) when working from 600 ohms and into 600 ohms, both adjustable attenuators at zero.

Input Level Range: -26 dbm to +24 dbm (single frequency tone).

Output Level Range: -4 dbm to +25dbm (single frequency tone).

Program Level Range: Deduct 10 db from single frequency input and output level to allow for peak factor.

Maximum Output Power: +18.5 dbm single frequency (as shipped and with adjustable output attenuator at zero) when gain reduction starts. (+25 dbm, maximum, with all output fixed attenuators omitted).

Power Supply: 105 to 125 volts, 0.7 ampere, 50-60 cycles a-c. Fused with thermal cutout fuse.

VACUUM TUBES

Quantity Required	Western Electric	Commercial Receiver Type
2		1612
3		6J7G
2	348A	or 6SN7
1		6H6G
1	274A	or 5Z3
1	351A	or 6X5G
1	313C	
1	300B	or 2A3
12		

(One No. 44 Mazda Lamp required for meter illumination)

Mounting: Standard relay rack.

Dimensions: 19" wide, 19-7/32" high and 6 3/4" deep.

Weight: 49 pounds.

Finish: Chassis — gray.

Mat — 1126C-15: dark aluminum gray.
 — 1126C-3: black.

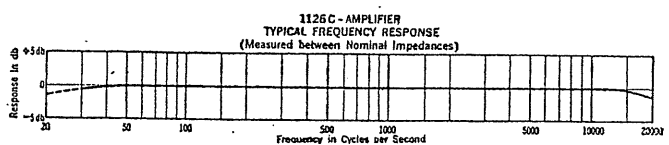


Figure 64 — Typical 1000 Cycle Load and Distortion Characteristics.

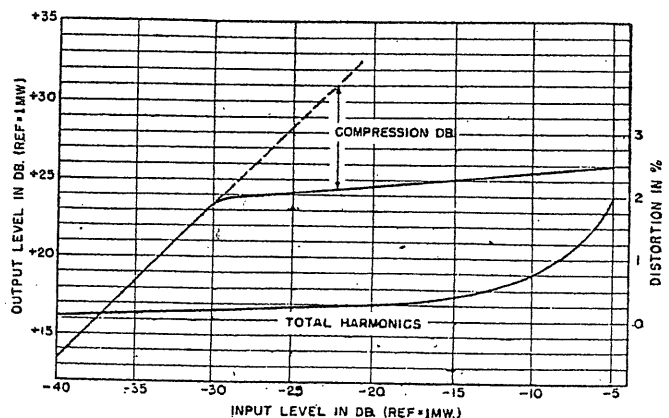
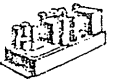


Figure 64 — Typical 1000 Cycle Load and Distortion Characteristics.

SUMMARIZED AMPLIFIERS DATA (cont'd)

Amplifier	Use	Output Noise	Source Impedance	No. Input Circuits	Load Impedance	Gain
116B	Pre-amplifier		15-250 ohms	One	Direct connection to the grid input circuit of one tube	See page 00
117A	Input amplifier	-32 dbm	15-250 ohms	One as supplied —up to ten possible	300-1200 ohms	77 db
118A	Power amplifier for indoor and outdoor installations	-20 dbm	Bridging Input 0-25,000 ohms High Gain Input 0-1000 ohms	One	1-1000 ohms	48 db bridging 60 db high gain
120B	Two-stage Pre-mixing, Booster amplifier	-82 dbm	30, 250 or 600 ohms	One	600 ohms	41 db
120C	Pre-mixing, Booster amplifier	-79 dbm	30 or 250 ohms	One	600 ohms	44 db
121A	Main amplifier, Line amplifier	-42 dbm at 78 db gain	30, 250 or 600 ohms	One	600 ohms	78 db
124A	Monitoring and Audition loudspeaker amplifier, high-level booster, general purpose	-37 dbm	Bridging Input 0-25,000 ohms High Gain Input 0-1000 ohms	One	1-1200 ohms	50 db bridging 63 db high gain
124D	General purpose amplifier, adaptable to portable use	-25 dbm at 90 db gain	15-250 ohms	One as supplied —combinations up to four possible	1-1200 ohms	107 db
124E	Monitoring, Audition amplifier	-37 dbm	600 ohms nominal. See Figure 22	One	1-1200 ohms	See Figure 22
124F	Monitoring, Talkback amplifier	-25 dbm at 90 db gain	Line Input: 0-1000 ohms high gain; 0-25,000 ohms bridging Low-level Input: 15-250 ohms	Two	1-1200 ohms	46 db bridging 59 db high gain
124G	Monitoring, General purpose amplifier	-22 dbm at 90 db gain	15-250 ohms	Two	1-1200 ohms	104 db
124H	Wired program, General purpose, Monitoring amplifier	-37 dbm on line channel -25 dbm on microphone channel at 90 db gain	Microphone channel 15-250 ohms Line Channel 20-1000 ohms	Two	1-1200 ohms	Microphone Channel 107 db Line Channel 67 db
124J	Wired program, General purpose, Monitoring amplifier	-37 dbm	20-1000 ohms	One	1-1200 ohms	67 db



<i>Output Power</i>	<i>Power Required</i>	<i>Dimensions</i>	<i>Mounting</i>
	6.3 volts a-c or d-c 0.3 amperes 275 volts d-c 2 milliamperes	See Figure 1	Can be mounted on amplifier chassis, as required.
+25 dbm, 5% distortion	105-125 volts a-c, 50-60 cycles, 50 watts	See Figure 3	Horizontal mounting in a cabinet or on a shelf, adaptable to vertical mounting on a relay rack.
50 watts (+47 dbm)	110-125 volts a-c, 50-60 cycles, 250 watts	See Figure 5	Horizontal or vertical mounting on standard relay rack or in adequately ventilated metal cabinet.
+16 dbm at fundamental frequency of 400 cycles +13 dbm at fundamental frequency of 50 cycles	Filaments, 6.3 volts a-c or d-c, 0.8 ampere; plates, 275 volts d-c, 7 milliamperes	See Figure 7	Designed for mounting in desks or other structures, adaptable for relay rack mounting through the use of 190 type or 206A Mounting Plates.
+16 dbm at fundamental frequency of 400 cycles +13 dbm at fundamental frequency of 50 cycles	Filaments, 6.3 volts a-c or d-c, 0.8 ampere; plates, 275 volts d-c, 7 milliamperes	See Figure 9	Same as 120B.
+28 dbm for fundamental frequency of 400 cycles +25 dbm for fundamental frequency of 50 cycles	Filaments, 6.3 volts, 2 amperes a-c or d-c; Plates, 275 volts, d-c, 30 milliamperes	See Figure 10	Designed for mounting in desks or other structures, adaptable for relay rack mounting through the use of 190 type or 206A Mounting Plates.
12 watts with less than 5% total harmonic distortion 50-5000 cycles; 20 watts with 5% harmonics at 400 cycles with 600 ohm load	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figures 14 and 15	Vertical mounting on standard relay rack or can also be mounted in the 21B Cabinet.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figures 15 and 17	Vertical mounting on standard relay rack or can also be mounted in the 21B Cabinet or KS-13625 Cabinet. 102A Cover is recommended for rack mounted amplifiers.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figures 15 and 20	Vertical mounting on standard relay rack or can also be mounted in the 21B Cabinet.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figures 23 and 24	Vertical mounting on standard relay rack or can also be mounted in the 21B Cabinet.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figures 26 and 27	Vertical mounting on standard relay rack or can also be mounted in the 21B Cabinet.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figure 29	KS-13625 List 1 Cabinet.
Same as 124A	105-125 volts a-c, 60 cycles 125 watts, fused with thermal cutout fuse	See Figure 29	KS-13625 List 1 Cabinet.

Western Electric

SUMMARIZED AMPLIFIER DATA (cont'd)

Amplifier	Use	Output Noise	Source Impedance	No. Input Circuits	Load Impedance	Gain
129A	Four amplifier channels Pre-mixing, Booster amplifier	-82 dbm	30, 250 or 600 ohms	One for each amplifier	600 ohms	41 db each amplifier
130B	Two amplifier channels. Main amplifiers, general purpose amplifiers	-37 dbm	150 or 250 ohms	One for each amplifier	Main output 600 ohms Monitor output 40 ohms	81 db each amplifier
131A	Monitoring amplifier	-55 dbm	600 ohms	One	1-1200 ohms	50 db
132A	Main amplifier, Line amplifier	-65 dbm	30, 250 or 600 ohms	One	600 ohms	48 db
132B (as shipped)	Main amplifier, Line amplifier	-64 dbm	30 or 250 ohms	One	600 ohms	51 db
133A	Line amplifier, Monitoring amplifier	-65 dbm -70 dbm with 5.2 output pad connected	600 ohms	One	1-1200 ohms	47 db matching 21.5 db bridging
140A	Wired program, General purpose, Monitoring amplifier	-15 dbm	See Figure 46	One	See Figure 47	60 db high gain 40 db bridging
141A	Pre-amplifier, Booster amplifier	-45 dbm	30, 250 or 600 ohms	One	Any impedance 600 ohms or above	70 db
142A	Basic amplifier	-30 dbm	0-250,000 ohms	Two	1.5 to 36 ohms 70 volt loud-speaker distribution line	50 db from 600 ohm source
142B	Public address, Sound distribution amplifiers	-5 dbm max. gain -25 dbm at 90 db gain	30, 250 or 600 ohms	One	Same as 142A	115 db
142C	General purpose, Public address, Sound distribution amplifiers	-30 dbm	37.5, 150 or 600 ohms	One	Same as 142A	66 db
142D	General purpose, Public address, amplifiers Sound distribution for high and low gain applications	Microphone Input at max. gain -5 dbm; at 90 db gain -25 dbm Line Input -30 dbm	Microphone Input 30, 250 or 600 ohms Line Input 37.5, 150 or 600 ohms	Two	Same as 142A	Microphone Input 115 db Line Input 66 db



<i>Output Power</i>	<i>Power Required</i>	<i>Dimensions</i>	<i>Mounting</i>
+ 16 dbm at fundamental frequency of 400 cycles + 13 dbm at fundamental frequency of 50 cycles	For complete amplifier (four amplifier units) filament 6.3 volts a-c or d-c, 3.2 amperes. Plate 275 volts, 30 milliamperes d-c	See Figure 34.	Designed for console mounting. Can be used for rack mounting with a 190B Mounting Plate.
+ 24 dbm for fundamental frequencies between 100 and 5000 cycles + 22 dbm at 50 cycles. Monitor output 20 db less than Main output	For complete amplifier (two amplifier units) filament 6.3 volts a-c or d-c, 3.6 amperes. Plate 275 volts, 65 milliamperes d-c	See Figure 36	Designed for console mounting. Can be used for rack mounting with a 190 type Mounting Plate.
3.2 watts with 1% harmonic distortion 5 watts with 5% harmonic distortion	Filament 6.3 volts a-c or d-c, 3 amperes. Plate 275 volts, 75 milliamperes d-c	See Figure 38	Designed for console mounting. Can be used for rack mounting with a 190 type Mounting Plate.
+ 28 dbm	Filament 6.3 volts a-c or d-c, 1.5 amperes. Plate 275 volts, 31 milliamperes d-c	See Figure 40	Designed for console mounting. For rack mounting a 190 type or 206A Mounting Plate is required (capacity three 132A amplifiers per plate).
+ 27 dbm	Same as 132A	See Figure 40	Same as 132A.
4 watts	Filament 6.3 volts a-c or d-c, 3 amperes. Plate 275 volts, 66 milliamperes d-c	See Figure 42	Designed for console mounting. For rack mounting a 190 type or 206A Mounting Plate is required.
6 watts maximum for d-c operation 10 watts maximum for a-c operation	105-125 volts a-c, 25-60 cycles or 115 volts d-c, 175 watts	See Figure 44	KS-13678 Cabinet, 12 $\frac{3}{4}$ " long, 8 $\frac{1}{8}$ " deep, 9" high.
See Figure 50	Filament 6.3 volts a-c or d-c, 0.9 amperes. Plate 275 volts, 15 milliamperes d-c	See Figure 49	Up to three 141A Amplifiers can be mounted on a 203A Mounting plate.
As supplied with Commercial Receiver type tubes, 12 watts 50-7500 cycles with 5% total harmonic distortion. With W.E. 350B Tubes, 25 watts 50-7500 cycles 5% harmonic distortion	105-125 volts, 60 cycles a-c, 185 watts	See Figure 52	Relay rack or in a KS-13625 List 3 Cabinet.
Same as 124A	105-125 volts, 60 cycles a-c, 185 watts	See Figure 52	Relay rack or in a KS-13625 List 3 Cabinet.
Same as 142A	105-125 volts, 60 cycles a-c, 185 watts	See Figure 52	Relay rack or in a KS-13625 List 3 Cabinet.
Same as 142A	105-125 volts, 60 cycles a-c, 185 watts	See Figure 52	Relay rack or in a KS-13625 List 4 Cabinet.

Western Electric

SUMMARIZED AMPLIFIERS DATA (cont'd)

<i>Amplifier</i>	<i>Use</i>	<i>Output Noise</i>	<i>Source Impedance</i>	<i>No. Input Circuits</i>	<i>Load Impedance</i>	<i>Gain</i>
143A	Basic amplifier	-30 dbm	0-250,000 ohms	Two	1.5 to 36 ohms, 70 volt loud-speaker distribution line	52 db from 600 ohm source
143B	Public address, Sound distribution amplifiers	0 dbm at maximum gain -25 dbm at 90 db gain	30, 250 or 600 ohms	One	Same as 143A	117 db
143C	General purpose, Public address, Sound distribution amplifiers	-30 dbm	37.5, 150 or 600 ohms	One	Same as 143A	68 db
1126C	Program operated level governing amplifier	-45 dbm	600 ohms	One	600 ohms	51 db maximum

<i>Amplifier</i>	<i>Output Power</i>	<i>Power Required</i>	<i>Dimensions</i>			<i>Mounting</i>
143A	With W.E. 350B Tubes, 75 watts 50-7500 cycles with less than 5% total harmonic distortion. With commercial receiver type tubes, 50 watts 50-7500 cycles 5% harmonic distortion	105-125 volts, 60 cycles a-c, 335 watts	See Figure 53.			Relay rack mounting only.
143B	Same as 143A	105-125 volts, 60 cycles a-c, 335 watts	See Figure 53.			Relay rack mounting only.
143C	Same as 143A	105-125 volts, 60 cycles a-c, 335 watts	See Figure 53.			Relay rack mounting only.
1126C	+25 dbm maximum	105-125 volts, 50-60 cycles a-c, 80 watts	19" wide	19 ⁷ / ₃₂ " high	6 ³ / ₄ " deep	Relay rack mounting only.

Western Electric

Loudspeakers

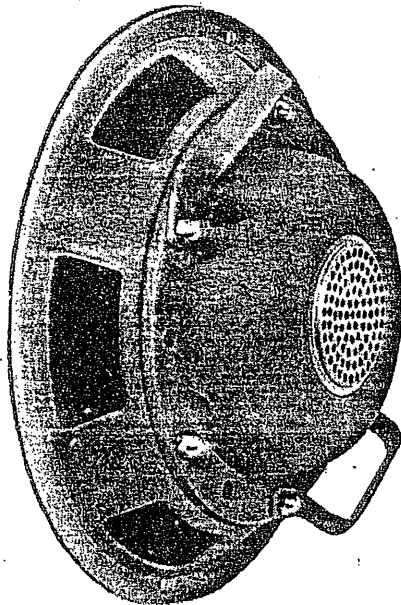


Figure 1 — 728B Loudspeaker.

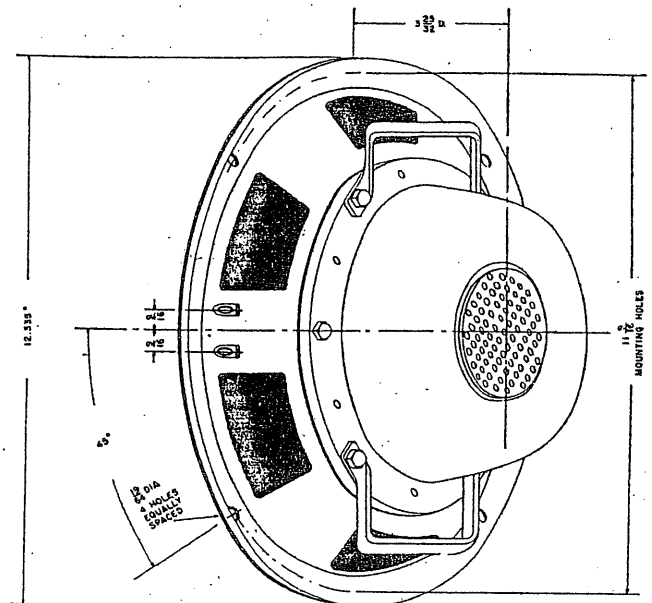


Figure 2 — 728B Loudspeaker, Dimensional Drawing.

728B LOUDSPEAKER

Use — The 728B Loudspeaker is a single unit type speaker intended for high quality reproduction of sound for radio monitoring of speech and music, and for music reproduction and public address systems.

Description — This single direct-radiator type of loudspeaker with its compact construction, high power handling capacity, and low cost is ideally suited for application into new and existing sound systems where a wide frequency range must be reproduced by a single speaker. It is designed to respond to frequencies from 60 to 10,000 cycles when installed in an enclosure as described below. The enclosure is not furnished as a part of the loudspeaker.

This speaker gives firm, well damped low frequency reproduction. It also gives smoothness of reproduction of the higher frequencies as it has a gradual roll-off characteristic at these frequencies.

Features

- High power handling capacity
- Wide frequency range in single unit
- Compact and simple to install
- Relative high efficiency
- No field power supply required

Typical Specifications

Nominal Frequency Response: 60 to 10,000 cycles.

Impedance: 4 ohms.

Coverage Angle: 50°.

Power Handling Capacity: 30 watts continuous.

Efficiency: At a distance of 30 feet on axis the 728B will produce a level of 93.5 db above 10^{-16} watt per square centimeter at 30 watts. This level is on a basis of a warble frequency covering a range from 500 to 2,500 cycles per second.

Diameter (overall): 12-11/32".

Depth (overall): 3-25/32".

Weight: 17 pounds.

Baffle Hole Diameter: 10-15/16".

Mounting Holes: Four equally spaced on 11-9/16" diameter.

Western Electric

Speaker Enclosure Recommended: Total enclosure of not less than 3 cubic feet.

The low frequency response can be improved (within limits) by increasing the size of the speaker enclosure.

Speaker Enclosure and Mounting

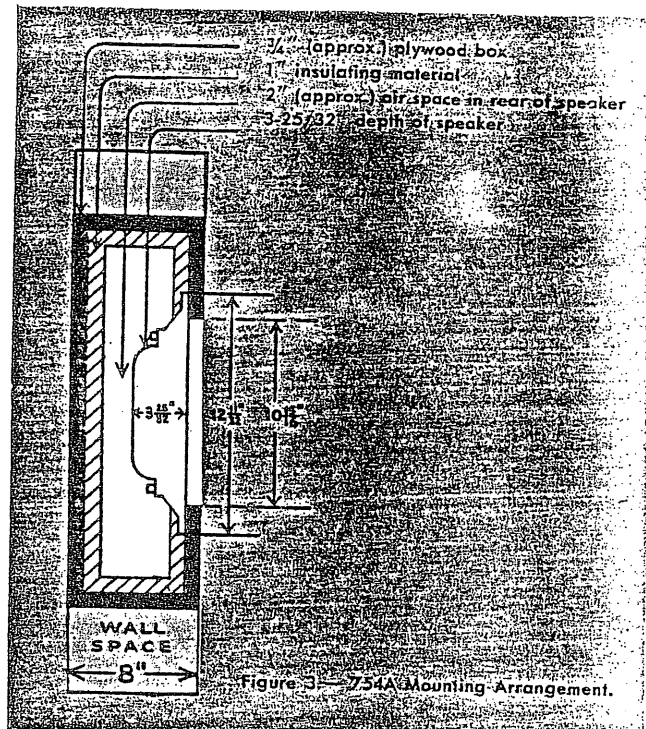
The recommended enclosure is 3 cubic feet and the plywood used for construction should be at least $\frac{3}{4}$ " thick. The only critical dimension is depth and this dimension should be sufficient to provide adequate clearance for the speaker frame.

The following inside dimensions are for a 3 cubic foot sloping front cabinet which has proved to give good performance: 21" wide, $23\frac{3}{4}$ " high, $9\frac{1}{4}$ " top depth, $12\frac{3}{8}$ " bottom depth.

The inside surfaces of the box should be lined with sound absorbing material 1" thick. Hair felt, or absorbent cellulose material is satisfactory. If a grille cloth is used for covering the speaker, it should be open mesh material, to have no audible effect on the high frequency response.

Conveniently placed handles on the speaker frame make it easy to hold the speaker when installing it in a cabinet.

Installation in walls or ceilings can readily be made, as shown in Fig. 3.



754A LOUDSPEAKER

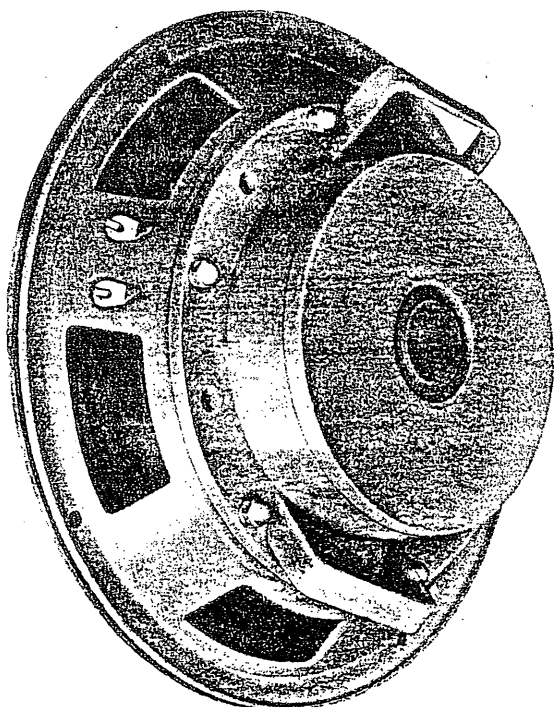


Figure 4 — 754A Type Loudspeaker.

The 754A is a direct-radiator high quality type loudspeaker for public address sound distribution, and wired program services. It is particularly designed for indoor use.

Typical Specifications

Nominal Frequency Response: 60-10,000 cycles.

Voice Coil Impedance: 4 ohms.

Coverage Angle: 50 degrees.

Power Handling Capacity: 15 watts.

Efficiency: At a distance of 30' on the axis, the 754A will produce a level of 94 db above 10^{-16} watt per square centimeter at 15 watts input. This level is on the basis of a warble frequency covering a range from 500 to 2500 cycles per second.

Dimensions: $12-11\frac{3}{32}$ " x $3\frac{3}{4}$ ".

Weight: 17 pounds.

Baffle Hole Diameter: $10-15\frac{1}{16}$ ".

Mounting Holes: 4 equally spaced on $11-9\frac{1}{16}$ " circle.

Speaker Enclosure Recommended: 3 cu. ft.

Speaker Enclosure and Mounting

For optimum performance under average conditions the enclosure should have a volume of three cubic feet with no openings other than the baffle hole. Since its dimensions are not critical, the enclosure can be designed to fit into almost any type of installation — a highly desirable feature.

The following inside dimensions are for a three cubic foot sloping front cabinet, which has proved to give good performance: width 21", height 23¾", top depth 9¼", bottom depth 12¾".

The enclosure should be constructed of wood not less than ¾" thick. Inside surfaces of the box should be lined with sound absorbing material 1" thick. If a grille cloth is used for covering the speaker it should be an open mesh material which has no audible effect on the high frequency response.

754B LOUDSPEAKER

The 754B is a direct radiator type loudspeaker, designed for outdoor public address, program and sound distribution systems. It is equipped with a phenolic diaphragm which makes it impervious to moisture or salt spray. It is ideally suited for baseball parks, football stadiums, and shipboard installations.

Typical Specifications

Nominal Frequency Response: 60-10,000 cycles.

Voice Coil Impedance: 4 ohms.

Coverage Angle: 50 degrees.

Power Handling Capacity: 50 watts.

Efficiency: At a distance of 30 feet on the axis, the 754B will produce a level of 94 db above 10⁻¹⁶ watt per square centimeter at 50 watts input. This level is on the basis of a warble frequency of from 500 to 2500 cycles per second.

Dimensions: 12-11/32" x 3¾".

Weight: 17 pounds.

Baffle Hole Diameter: 10-15/16".

Mounting Holes: 4 equally spaced on 11-9/16" circle.

Speaker Enclosure Recommended: 2.5 cu. ft.

Speaker Enclosure and Mounting

For optimum performance characteristics under average conditions the enclosure should have a volume of two and one-half cubic feet and should be of rigid construction. The dimensions of the enclosure are not critical; and this is a highly desirable feature, since the enclosures can be designed to fit into almost any type of installation.

Sloping-front cabinets are preferred in most installations and the following inside dimensions are for a two and one-half cubic foot enclosure that has been proved to give good

performance: Width 19", Height 22", Top Depth 8⅞", Bottom Depth 11-13/16".

The enclosure should be constructed using wood not less than ¾" thick. Inside surfaces of the box should be lined with sound absorbing material one inch thick. If a grille cloth is used for covering the speaker it should be open mesh material, which has no audible effect on the high frequency response.

755A LOUDSPEAKER

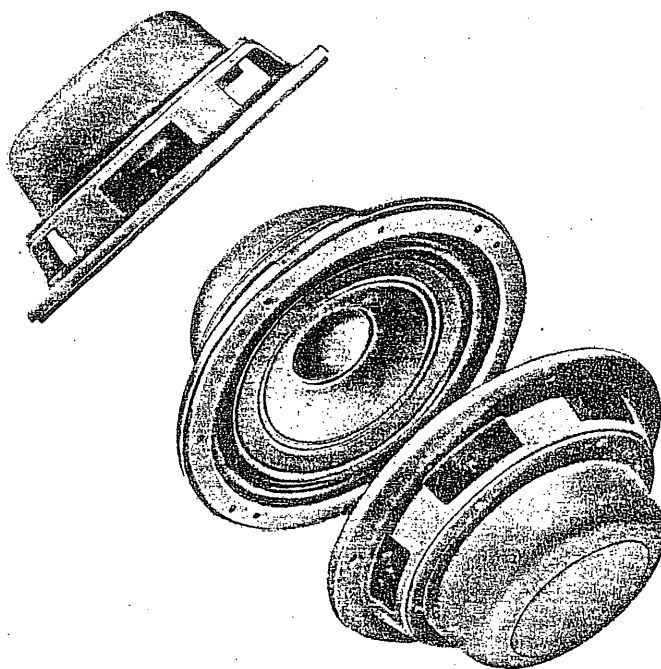


Figure 5 — 755A Loudspeaker.

The high quality loudspeaker in a small package — only eight inches in diameter and three inches deep. Its exceptional frequency response, small size, and moderate power handling capacity make it ideal for low level distribution systems where multiple loudspeakers are used such as Wired Program Services and Program Distribution Systems; it is also highly applicable for Broadcast Station monitoring and general utility use.

The 755A incorporates the design principles of the famous 728B Loudspeaker which give it — *the Emotional characteristic — the Feeling of Presence*. Music and sound reproduced by this loudspeaker will please the most critical listener.

For optimum performance under average conditions a two cubic foot non-critically dimensioned enclosure is required.

Western Electric

Features

- Exceptional Frequency Response.
- Eight Watts Power Handling Capacity.
- Compact Construction.

Typical Specifications

Frequency Response: 70-13,000 cycles.

Voice Coil Impedance: 4 ohms.

Coverage Angle: 70 degrees.

Power Handling Capacity: 8 watts.

Efficiency: At a distance of 30 feet on the axis the 755A will produce a level of 81.5 db above 10^{-10} watt per square centimeter at 8 watts input. This level is on a basis of a warble frequency covering a range from 500 to 2,500 cycles per second.

Diameter Overall: $8\frac{3}{8}$ ".

Depth Overall: $3\frac{1}{8}$ ".

Weight: 4 pounds, 12 ounces.

Baffle Hole Diameter: 7".

Mounting Holes: Four equally spaced on $7\frac{7}{8}$ " circle.

Speaker Enclosure Recommended: 2 cubic feet.

SPEAKER ENCLOSURE AND MOUNTING

For optimum performance characteristics under average conditions the enclosure should have a volume of two cubic feet and should be of rigid construction. The dimensions of the enclosure are not critical. This is a desirable feature since the enclosures can be designed to fit into almost any type of installation.

Installation in walls or ceilings can readily be made as shown in Fig. 6.

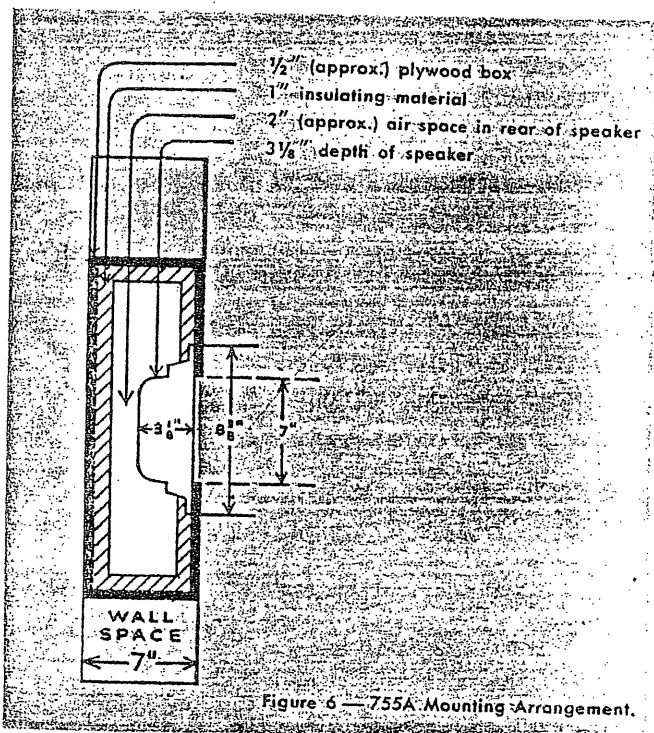


Figure 6 — 755A Mounting Arrangement.

Sloping-front cabinets are preferred in most installations and the following inside dimensions are for a two cubic foot enclosure that has been proved to give good performance. Width 16", Height 21", Top depth $9\frac{1}{4}$ ", Bottom depth 12".

The enclosure should be constructed using wood not less than $\frac{1}{2}$ " thick. Inside surfaces of the box should be lined with sound absorbing material 1" thick. If a grille cloth is used for covering the speaker it should be open mesh material, which has no audible effect on the high frequency response.

Installation in walls or ceilings can readily be made as shown in Fig. 6.

756A LOUDSPEAKER

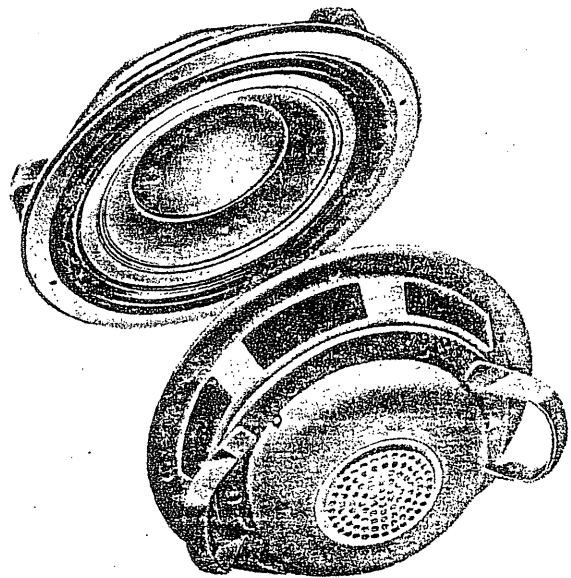


Figure 7 — 756A Loudspeaker.

The 756A Loudspeaker is a medium power unit similar in performance to the famous 728B which has been proved to have exceptional reproduction characteristics. Loudspeakers of this type are unique; they create a *feeling of presence*.

The 756A is available for Wired Program Services, Sound Distribution Systems, Broadcast Station monitoring, and general utility use.

Critically dimensioned cabinets are not required. A two and one-half cubic foot enclosure is recommended for optimum performance under average conditions.

Typical Specifications

Frequency Response: 65-10,000 cycles.

Voice Coil Impedance: 4 ohms.



Power Capacity: 20 watts.

Efficiency: At a distance of 30 feet on the axis, the 756A will produce a level of 89.5 db above 10^{-16} watt per square centimeter at 20 watts. This level is on the basis of a warble frequency covering the range of 500 to 2500 cycles per second.

Dimensions: 10¼" diameter. 3¼" deep.

Baffle Hole Diameter: 8-13/16".

Mounting Holes: 4 on 9⅝" circle.

Weight: 10 pounds.

Speaker Enclosure Recommended: 2½ cubic feet.

SPEAKER ENCLOSURE

For optimum performance characteristics under average conditions the enclosure should have a volume of two and one-half cubic feet and should be of rigid construction. The dimensions of the enclosure are not critical; and this is a highly desirable feature, since the enclosures can be designed to fit into almost any type of installation.

Sloping-front cabinets are preferred in most installations. The following inside dimensions are for a two and one half cubic foot enclosure that has been proved to give good performance: Width 19", Height 22", Top Depth 8⅞", Bottom Depth 11-13/16".

The enclosure should be constructed using wood not less than ¾" thick. Inside surfaces of the box should be lined with sound absorbing material one inch thick. If a grille cloth is used for covering the speaker it should be open mesh material, which has no audible effect on the high frequency response.

757A LOUDSPEAKER

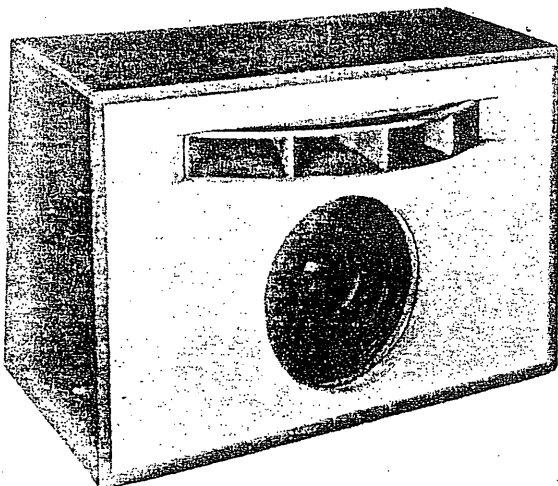


Figure 8 — 757A Loudspeaker.

The 757A Loudspeaker is an outstanding contribution to the sound reproduction field. The extended frequency response — uniform 60 to 15,000 cycles — wide angle of distribution — makes this loudspeaker ideal for Recording Studios, Program Distribution Systems, Wired Program Services, and all other applications where the highest quality in sound reproduction is required.

Description — This unit utilizes two loudspeakers and a frequency dividing network. The low frequency loudspeaker is the Western Electric 728B which has been widely acclaimed for its unusual *presence* of reproduction. The high frequency loudspeaker is a 713 C Receiver used in conjunction with a newly designed sectoral horn (KS-12027) giving a horizontal sound distribution of 90 degrees. A 702A Network is used to divide the audio input to the loudspeakers. A four step high frequency attenuator is incorporated as a part of the 702A Network; it is pre-set at the factory for optimum performance; readjustment by means of a screw driver can be made when necessary to compensate for unusual acoustical conditions. The 757A is furnished in a utility cabinet which can be mounted in the walls of broadcast station control rooms, or it can be readily refinished except for the acoustical material on the front, to blend into the architectural treatment of existing installations. Where the decorative requirements make it desirable, the utility cabinet can be easily mounted within a furniture-piece harmonizing with the other appointments.

Features

- Exceptional frequency response.
- Wide angle of distribution.
- Attractive utility cabinet.

Typical Specifications

Frequency Response: 60-15,000 cycles.

Input Impedance: 4 ohms.

Coverage Angle: 90 degrees.

Power Handling Capacity: 30 watts.

Efficiency: At a distance of 30 feet on axis the 757A will produce a level of 93 db above 10^{-16} watt per square centimeter at 30 watts. This level is on a basis of a warble frequency covering a range from 500 to 2500 cycles per second.

Dimensions: 20" high, 30½" wide, 13¾" deep.

Weight: 82 pounds.

Cabinet: Acoustically treated front. Remainder of cabinet gray finish which can be refinished to blend with individual installations.

31A HORN

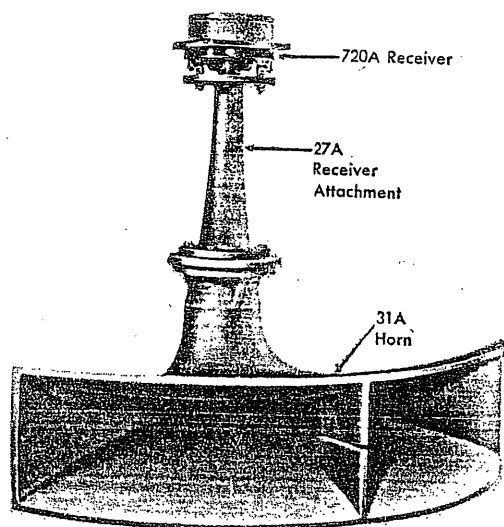


Figure 9

The 31A horn is designed for speech or music reproduction in sound systems where wide angles of horizontal coverage are desired. It is used with the Western Electric 720A Receiver or 713A, B, and C Receivers (when adapted with the 27A Receiver Attachment). This horn is employed as the high frequency component of a high quality loudspeaker system.

Typical Specifications

(See Chart pages 78 and 80 for electrical characteristics.)

Dimensions: 23" wide x 9" high x 15" deep.

Weight: 9½ lbs., approx.

Finish: Gray.

Mounting: A bracket is furnished with the horn for mounting on a ceiling, sidewall, deck or platform and for fixing the inclination at the desired angle.

32A HORN

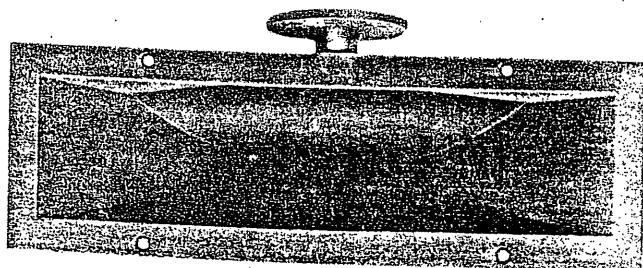


Figure 10 — 32A Horn.

The 32A Horn is an exponential type horn designed for speech and music reproduction in sound systems where wide

angles of horizontal coverage are desired and for use as a high frequency (tweeter) unit in dual loudspeaker systems. It may be equipped with a Western Electric 720A, 722A or 713A, B, and C Receivers.

While intended primarily for use as a part of a high quality speaker system such as the Western Electric 753 type, the 32A Horn may also be used to advantage as an independent speaker — especially for announcing purposes or for use in installations where a high background noise level must be overridden.

Typical Specifications

(See Chart pages 78 and 80 for electrical characteristics.)

Dimensions: 16" wide x 10" deep x 8½" high.

Weight: 5 lbs. approx.

Finish: Gray.

Mounting: It is equipped with a flange to facilitate mounting in a cabinet, baffle or wall surface.

27A RECEIVER ATTACHMENT



Figure 11 — 27A Receiver Attachment.

The 27A Receiver Attachment serves as an adapter for coupling the 713 type or 720A Receivers and the 31A Horn.

Specifications

Dimensions: 8" high, with flanges at both ends which are 4" in diameter.

Weight: 1¾ lbs., approx.

Finish: Gray.

KS-12024 HORN

The KS-12024 Horn is a sectoral horn intended for use with a 713A, 713B, or 713C Receiver. When it is so equipped, a high frequency loudspeaker is formed. This loudspeaker can be used as the high frequency component of a two-channel loudspeaker system or it can be used alone in announcing, paging, and calling systems.

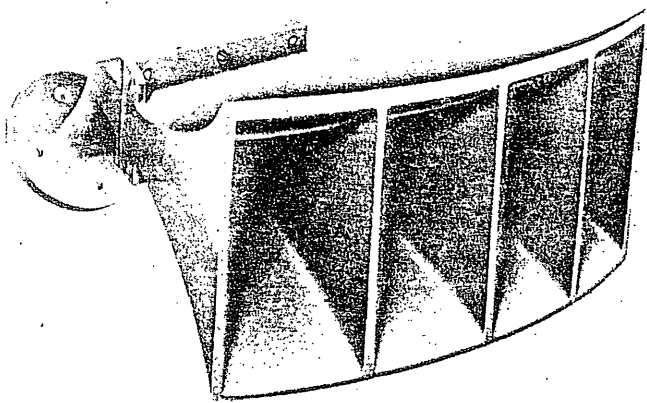


Figure 12 — KS-12024 Horn.

This exponential horn is made of cast aluminum and has a horizontal coverage angle of 50° and a vertical coverage angle of 40°. Two horns may be mounted adjacently and bolted together when 100° coverage is required.

Typical Specifications

(See Chart on page 78-80 for electrical characteristics.)

Dimensions Overall for Clearance: Length 16½", Width 13⅝", Height 6⅜".

Finish: Black.

KS-12025 HORN

The KS-12025 Horn is an exponential horn made of cast aluminum. It is especially designed to be used with a Western Electric 713A, 713B, or 713C Receiver and when it is so equipped a high frequency loudspeaker is formed. This loudspeaker can be used as the high frequency component of a two channel loudspeaker system or it can be used alone in announcing, paging, and calling systems.

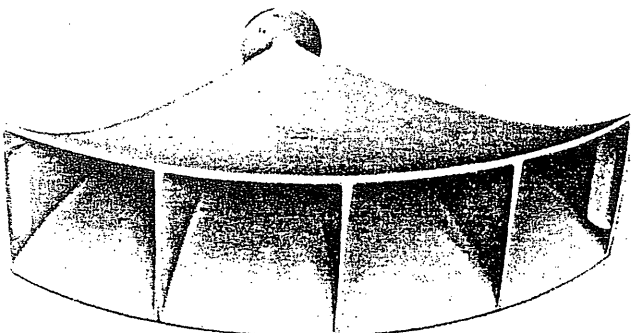


Figure 13 — KS-12025 Horn.

This horn is sectoral in form and integrally cast partitions are provided to reduce reflection effects within the sound passage. It has a horizontal coverage angle of 80 degrees and a vertical coverage angle of 40°.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions Overall to Provide Clearance: Length 19", Width 23⅝", Height 6⅜".

Finish: Black.

KS-12027 HORN

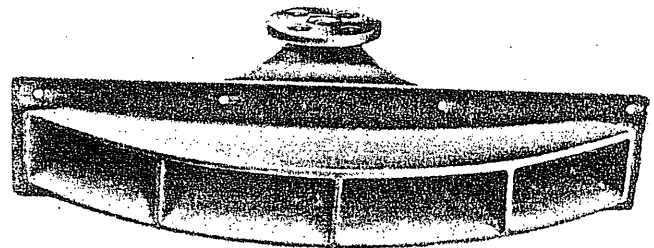


Figure 14 — KS-12027 Horn.

The KS-12027 Horn is an exponential horn made of cast aluminum, specifically designed for use with a Western Electric 713C or 720A Receiver. Its compact design makes it highly applicable for use in two-way loudspeaker systems where space limitations are a factor. It can also be used as a single speaker in announcing, paging, and calling systems.

This horn is sectoral in form and integrally cast partitions are provided to reduce reflection effects within the sound passage. The throat is given a downward bend of 90° in order to reduce the fore and aft space that is required. The horn has a 90° horizontal coverage angle, and a 90° vertical coverage angle.

Typical Specifications

(See Chart on page 78-80 for electrical characteristics.)

Dimensions Overall to Provide Clearance: Length 13½", Width: 19-5/16", Height 2-9/16".

Height: 2-9/16".

Finish: Gray Enamel.

713A RECEIVER

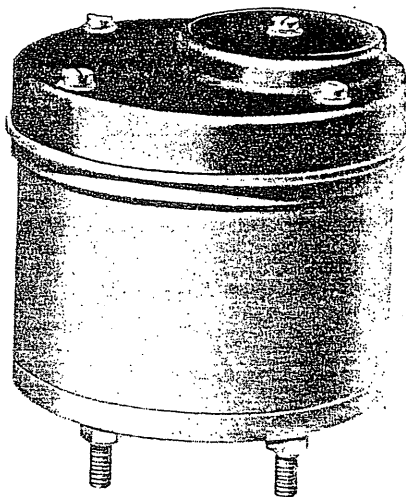


Figure 15 — 713 Type Receiver.

The 713A Receiver is for use as a high frequency loudspeaker in high quality dual loudspeaker systems. It utilizes a small diaphragm in a magnetic structure excited by a permanent magnet. The voice coil which moves in an annular gap between the two field poles is attached to the duralumin diaphragm. When frequencies around and below the low-frequency cut-off of the horn with which it is used, are sufficiently attenuated, the 713A Receiver is capable of handling the full undistorted output of a 25 watt amplifier producing speech or music.

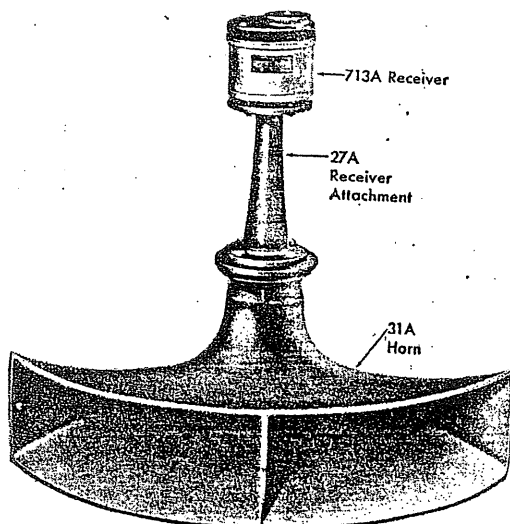


Figure 16 — 713A Receiver attached to 31A Horn by means of 27A Receiver Attachment.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions: 4-5/16" diameter x 4 7/8" deep, approx.

Weight: 8 pounds, approx.

Mounting: It is designed for mounting on a 31A Horn by

means of a 27A Receiver Attachment, or for direct mounting on the 32A Horn as well as on the KS-12024, KS-12025, and KS-12027 Horns.

713B RECEIVER

The 713B Receiver is a permanent magnet, moving coil type receiver, intended for use in high quality public address and monitoring systems where two loudspeakers are used, one a low frequency speaker and the other a high frequency horn (tweeter) driven by a receiver of this type.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions: 4-5/16" diameter x 4 7/8" deep, approx.

Weight: 8 lbs., approx.

Mounting: It is designed for mounting on the 31A Horn by means of the 27A Receiver Attachment, or for direct mounting on the 32A Horn as well as on the KS-12024, KS-12025 and KS-12027 Horns.

713C RECEIVER

The 713C Receiver is of the permanent magnet, moving coil type designed primarily for use as part of the 757A Loudspeaker and similar apparatus in high quality public address and monitoring systems where two loudspeakers are used, one a low frequency speaker and the other a high frequency horn (tweeter) driven by a receiver of this type.

The 27A Receiver Attachment adapts the 713C Receiver for mounting on the 31A Horn; the 713C mounts directly onto either the 32A Horn, or the KS-12027, KS-12025 or KS-12024 Horn.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions: 4-5/16" diameter x 4 7/8" deep, approx.

Weight: 8 lbs., approx.

720A RECEIVER

The 720A Receiver is of the permanent magnet type, especially designed for announcing and public address systems. It is intended for use with the Western Electric 31A and 32A type Horns, or equivalents, or as a replacement for the 707F Receiver when equipped with the D-173471 conversion parts. These parts should be ordered separately if required.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions: 3 1/4" (including studs) x 4-1/16".

Weight: 4 lbs., approx.

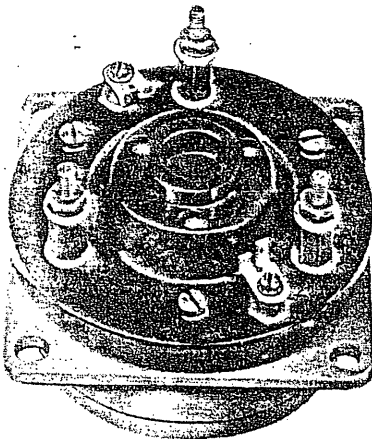


Figure 17 — 720A Receiver

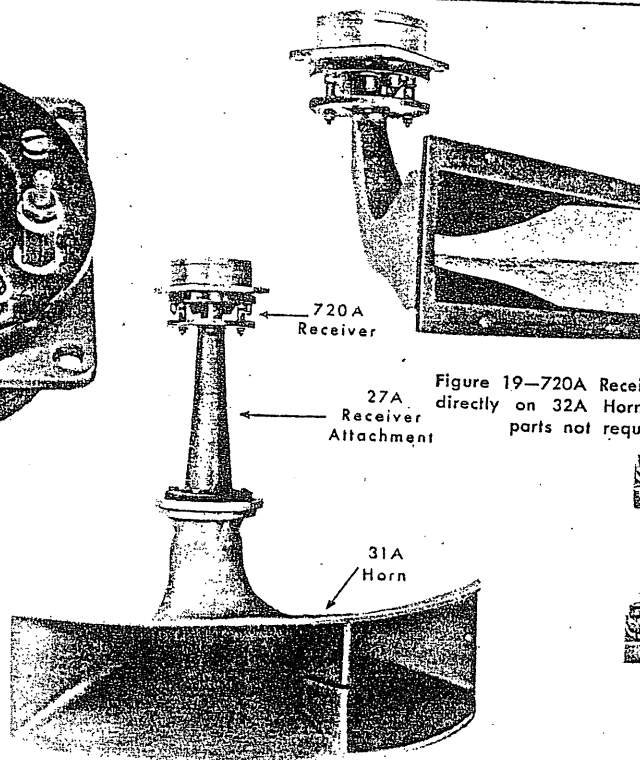


Figure 18.



Figure 21—D-173471 Conversion Parts

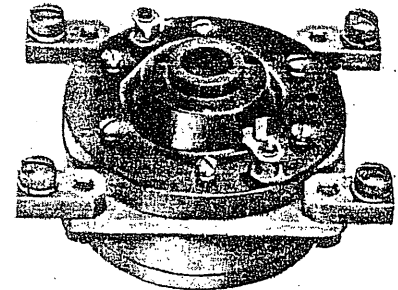


Figure 20—720A Receiver adapted to replace 707F Receiver, using D-173471 Conversion Parts.

722A RECEIVER

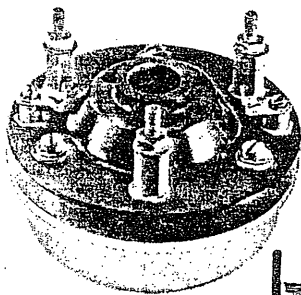
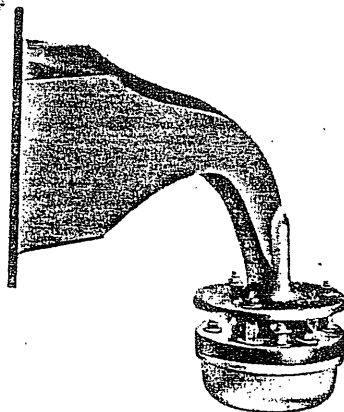


Figure 22 — 722A Receiver

Figure 23 — Profile view of 722A Receiver mounted on 32A Horn



The 722A Receiver of the permanent magnet type is adapted for use as a high frequency loudspeaker in two channel music reproducing systems or for independent use in announcing systems. It may be used with the Western Electric 32A Horn, or with the 31A Horn if provided with a 27A Receiver Attachment.

Typical Specifications

(See Chart on page 78 for electrical characteristics.)

Dimensions: 4-1/16" diameter x 2-3/4" high.

Weight: 3 lbs., approx.

LOUDSPEAKER NETWORKS

D 173048 NETWORK

The D 173048 is a loudspeaker network for use in two channel loudspeaker systems. The crossover frequency is 700 cycles. This network is designed to operate from a 16 ohm source impedance and feed into a high and low frequency loudspeaker each with 16 ohm voice coils.

Dimensions: 10" long x 8" wide x 3/4" high.

702A NETWORK

The 702A Network is designed for use in two channel loudspeakers systems for public address and all types of monitoring systems. The input will work from a 4 ohm source impedance and the two outputs are each designed to feed 4 ohm voice coils. The cross-over frequency is 1000 cycles.

Dimensions: 14" long, 8-1/4" wide, 4-1/4" high.

Western Electric

SUMMARIZED DATA FOR LOUDSPEAKERS

These loudspeakers all have a voice coil impedance of 4 ohms;

Type	Use	Power Handling Capacity	Frequency Response	Sound Level (with warble frequency source 500-2500 cps at level above 10-16 watts per sq. cm. at 30' on axis at power indicated)
728B	Radio sets; sound distribution; Wired program; Public Address; Broadcast Station monitoring	30 watts continuous	60-10,000 cycles	93.5 db
754A	Public Address; sound distribution	15 watts continuous	60-10,000 cycles	94 db
754B (Phenolic Diaphragm)	Program Distribution; Public Address; Ship-board installations; especially designed for outdoor use	50 watts continuous	60-10,000 cycles	94db
755A	Radio Sets; Wired Program; General utility; Program distribution; Broadcast Station monitoring	8 watts continuous	70-13,000 cycles	81.5 db
756A	Radio Sets; Wired Program; Program distribution; General Utility; Broadcast Station monitoring	20 watts continuous	65-10,000 cycles	89.5 db
757A (Consists of 728B Loudspeaker, 713C Receiver, KS-12027 Horn, 702A Network and cabinet)	Wired Program; Recording Studios; Program distribution; Broadcast Station monitoring	30 watts speech and music peaks	60-15,000 cycles	93 db

SUMMARIZED DATA FOR RECEIVERS AND HORNS

Receiver	Frequency Response with 31A, 32A, KS-12024, KS-12025 and KS-12027 Horns	Voice Coil Impedance	Power Handling Capacity	Sound Level at Distance of 30'	
				With 31A Horn	With 32A Horn
713A	800-15,000	16 ohms	25 watts	92 db	94 db
713B	800-10,000	4 ohms	25 watts	95 db	97 db
713C	800-15,000	4 ohms	25 watts	92 db	94 db
720A	500-6500	8 ohms	30 watts*	98 db	100 db
722A	500-6500	16 ohms	25 watts	93 db	95 db

*Rated on continuous power, all others rated on speech and music peaks.

LOUDSPEAKERS



Angle of Coverage	Recommended Speaker Enclosure (Total Enclosure)	Dimensions		Weight	Baffle Hole Diameter	Mounting Holes
		Diameter (overall)	Depth (overall)			
50°	3 cu. ft.	12 $\frac{11}{32}$ "	3 $\frac{25}{32}$ "	17 lbs.	10 $\frac{15}{16}$ "	Four equally spaced on 11 $\frac{9}{16}$ " diameter
50°	3 cu. ft.	12 $\frac{11}{32}$ "	3 $\frac{3}{4}$ "	17 lbs.	10 $\frac{15}{16}$ "	Same as 728B
50°	2.5 cu. ft.	12 $\frac{11}{32}$ "	3 $\frac{3}{4}$ "	17 lbs.	10 $\frac{15}{16}$ "	Same as 728B
70°	2 cu. ft.	8 $\frac{3}{8}$ "	3 $\frac{1}{8}$ "	4 $\frac{3}{4}$ lbs.	7"	Four equally spaced on 7 $\frac{3}{8}$ " diameter
60°	2 $\frac{1}{2}$ cu. ft.	10 $\frac{1}{4}$ "	3 $\frac{1}{4}$ "	10 lbs.	8 $\frac{13}{16}$ "	Four equally spaced on 9 $\frac{3}{8}$ " diameter
90°	3 cu. ft. (enclosure furnished with system)	30 $\frac{1}{2}$ " Width (cabinet) 20" Height (cabinet)	13 $\frac{3}{4}$ " (Cabinet)	82 lbs. (Complete Unit)	—	—

feet on the Axis at Rated Power			Dimensions	Weight
With KS12024 Horn	With KS-12025 Horn	With KS-12027 Horn		
97 db	95 db	94 db	4 $\frac{5}{16}$ " x 4 $\frac{7}{8}$ "	8 lbs.
100 db	98 db	97 db	4 $\frac{5}{16}$ " x 4 $\frac{7}{8}$ "	8 lbs.
97 db	95 db	94 db	4 $\frac{5}{16}$ " x 4 $\frac{7}{8}$ "	8 lbs.
103 db	101 db	100 db	3 $\frac{1}{4}$ " x 4 $\frac{1}{16}$ "	4 lbs.
98 db	96 db	95 db	4 $\frac{1}{16}$ " x 2 $\frac{3}{4}$ "	3 lbs.

COVERAGE ANGLE

<i>Horn</i>	<i>Horizontal</i>	<i>Vertical</i>
31A	120°	40°
32A	90°	60°
KS-12024	50°	40°
KS-12025	80°	40°
KS-12027	90°	90°

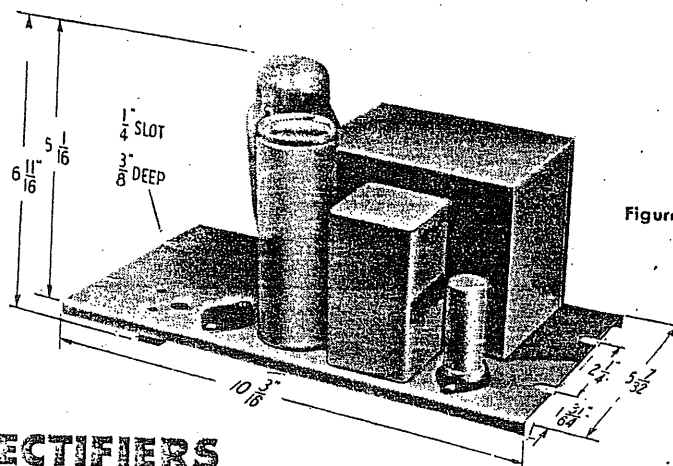


Figure 1 — 18A Rectifier.

18A AND 18B RECTIFIERS

Use — Rectifier type power units for supplying plate and filament power to speech input and sound system amplifiers.

Description — A full wave vacuum tube rectifier for plate supply and a transformer winding to supply filament power. It is normally used to supply power for Western Electric amplifier types 120, 121, 129, 130, 131, 132, 133, and similar equipment. The 18A is designed for mounting on a 177 type Mounting Plate with additional rectifiers or other plate mounted units. The 18B is designed for direct mounting on a relay rack or equipment cabinet, and includes a fuse and a power switch.

Features

- Efficient
- Compact
- Rugged construction
- Tapped transformer permits input and output voltage selection

Typical Specifications

Input: 105-125 volts, 50 or 60 cycles a-c. Approximately 100 watts for full load.

Output: Plate supply maximum 75 ma. at approximately 250 volts d-c, taps on high voltage winding of transformer to maintain voltage between 320 and 250 volts d-c for loads between 7-75 milliamperes. Filament supply maximum 8 amperes at approximately 6.3 volts a-c.

Dimensions: (18A) 10-3/16" wide, 5-7/32" deep and 6-11/16" high.

(18B) 19" (mat) wide, 3-15/32" high, 6-27/32" deep.

Weight: (18A) 9 pounds.

(18B) 12 pounds.

Mounting: (18A) Designed for mounting on 177 or 190 type Mounting Plate with 296 type panel (Capacity 3 rectifiers per plate). See "Components and Accessories" for ordering information.

(18B) Designed for mounting on standard 19" relay rack (includes face mat) or equipment cabinet. Occupies 3 1/2" of rack space.

Finish: (18A) Gray enamel.

18B-15 Dark aluminum gray.

18B-3 Black.

Tubes: One W.E. 274A or one Type 5Z3.

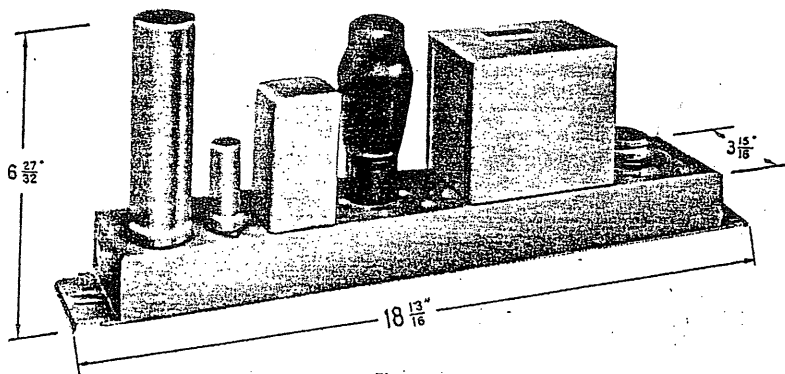


Figure 2 — 18B Rectifier.

20B RECTIFIER

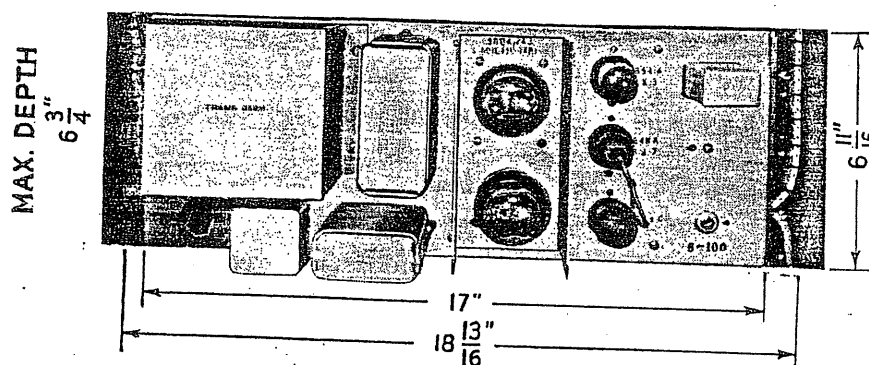


Figure 3 — Rear View, 20B Rectifier.

Use — This rectifier is intended for use with equipment which requires excellent voltage regulation. It is especially useful where several amplifiers are powered from the same source.

Description — A full-wave vacuum-tube rectifier incorporating a vacuum tube voltage regulating circuit which is ultra rapid in operation and which is designed to prevent the plate voltage supply from rising above its final value during the warm-up period of the voltage-regulator tube. Due to its ultra rapid feature it has negligible internal impedance and therefore, practically eliminates coupling between amplifiers which might otherwise be caused by the use of a common plate supply source.

Features

- Efficient
- Rapid automatic voltage regulation
- Low ripple component
- Compact construction

Typical Specifications

Input: 100-130 volts, 50 to 60 cycles. Power consumption approximately 55 watts, 0.7 ampere at 115 volts for no load and 196 watts, 1.7 amperes for rated load.

Output: Rated load — plate supply 110 milliamperes at 275 volts d-c and filament supply 10 amperes at 6.3 volts a-c.

Plate Supply Regulation: 3 volts maximum voltage change from no load and +10 per cent line voltage to rated load and —10 per cent line voltage.

Plate Supply Ripple: Approximately 5 millivolts rms at rated load.

Dimensions: Mat — 19" x 6-31/32". Chassis overall including mounting flanges, 18-13/16" wide, 6-11/16" high and 6 3/4" deep.

Weight: 26 pounds.

Mounting: Designed to mount on standard 19" relay rack or cabinet, where it occupies 7" of panel space.

Finish: Chassis — Light gray.

Mat — 20B-15 Dark aluminum gray.
20B-3 Black.

VACUUM TUBES

Quantity Required	Western Electric		Commercial Receiver Type
1	274A	or	5Z3
1	300B	or	2A3
1	348A	or	6J7
1	313C		
1	351A	or	6X5
5			

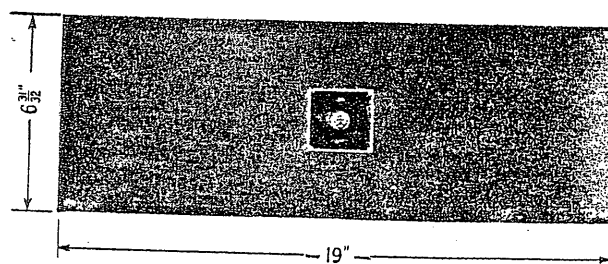


Figure 4 — Front View, 20B Rectifier.



12A POWER UNIT

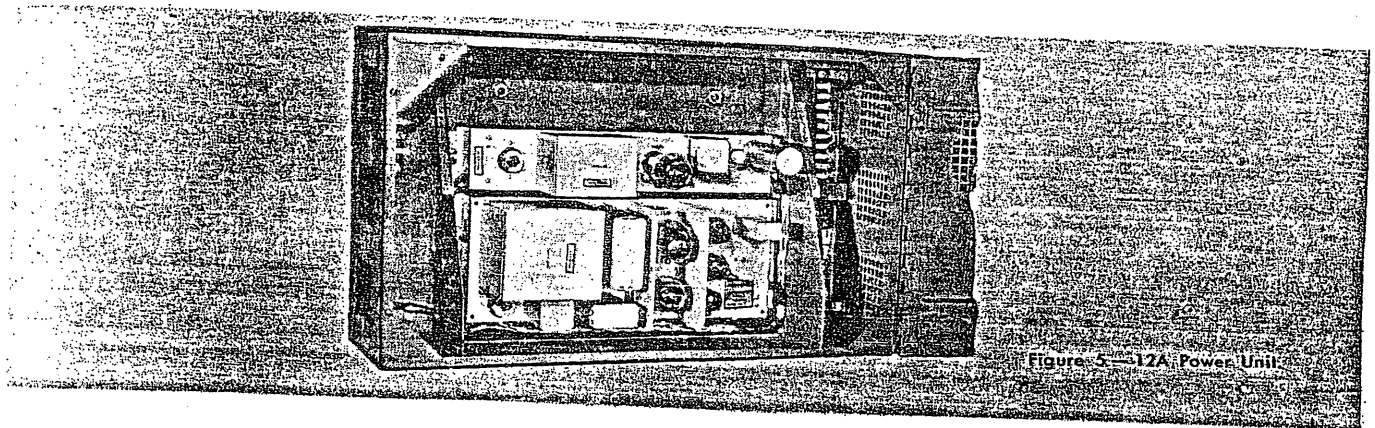


Figure 5 — 12A Power Unit

A complete compact power supply unit consisting essentially of an 18B Rectifier and a 20B Rectifier for mounting in a wall in a 21A Cabinet. The 12A contains power supply units for plate and filament power to vacuum tubes.

The 21A Cabinet, which can be ordered separately, provides 14" of rack space for the mounting of equipment normally mounted on standard 19" racks.

Typical Specifications

Input: 110 to 120 volts, 50 to 60 cycle a-c.

Output: See data on the 18B Rectifier and the 20B Rectifier.

Dimensions: (21A Cabinet) approximately 28" wide, 16½" high and 9½" deep.

Weight: 60 pounds.

Mounting: Designed for wall mounting. Clearance of 28 inches for hinged covers and 10 inches below for swinging down the rack required.

Finish: The 21A Cabinet is finished in gray finished metal.

KS-7593 RECTIFIER

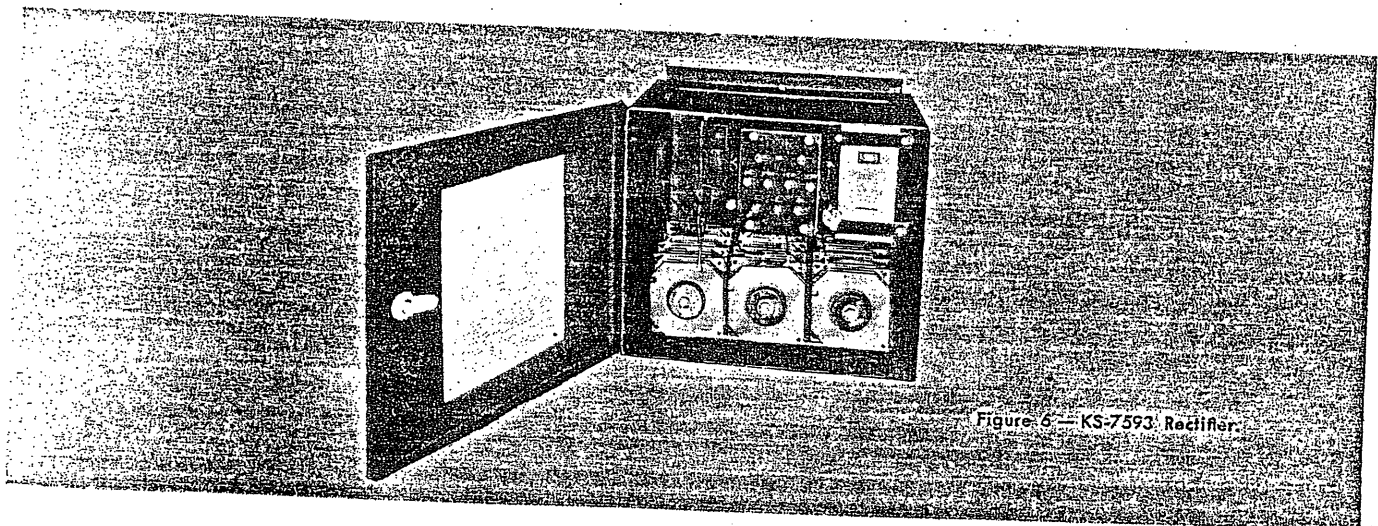


Figure 6 — KS-7593 Rectifier

A copper-oxide rectifier used as a 12-volt d-c power source for operating relays and signal lamps in speech input equipment.

Typical Specifications

Input: 105 to 125 volts, 60 cycle a-c.

Output: 1.2 amperes d-c full load. No load voltage 14 volts. Full load voltage 10 volts.

Dimensions: 14" wide, 13¾" high and 9½" deep.

Weight: 40 pounds.

Mounting: Assembled in a steel cabinet with hinged front cover, arranged for wall mounting.

Finish: Black crinkle lacquer.

Western Electric

KS-5653 LIST 3 RECTIFIER

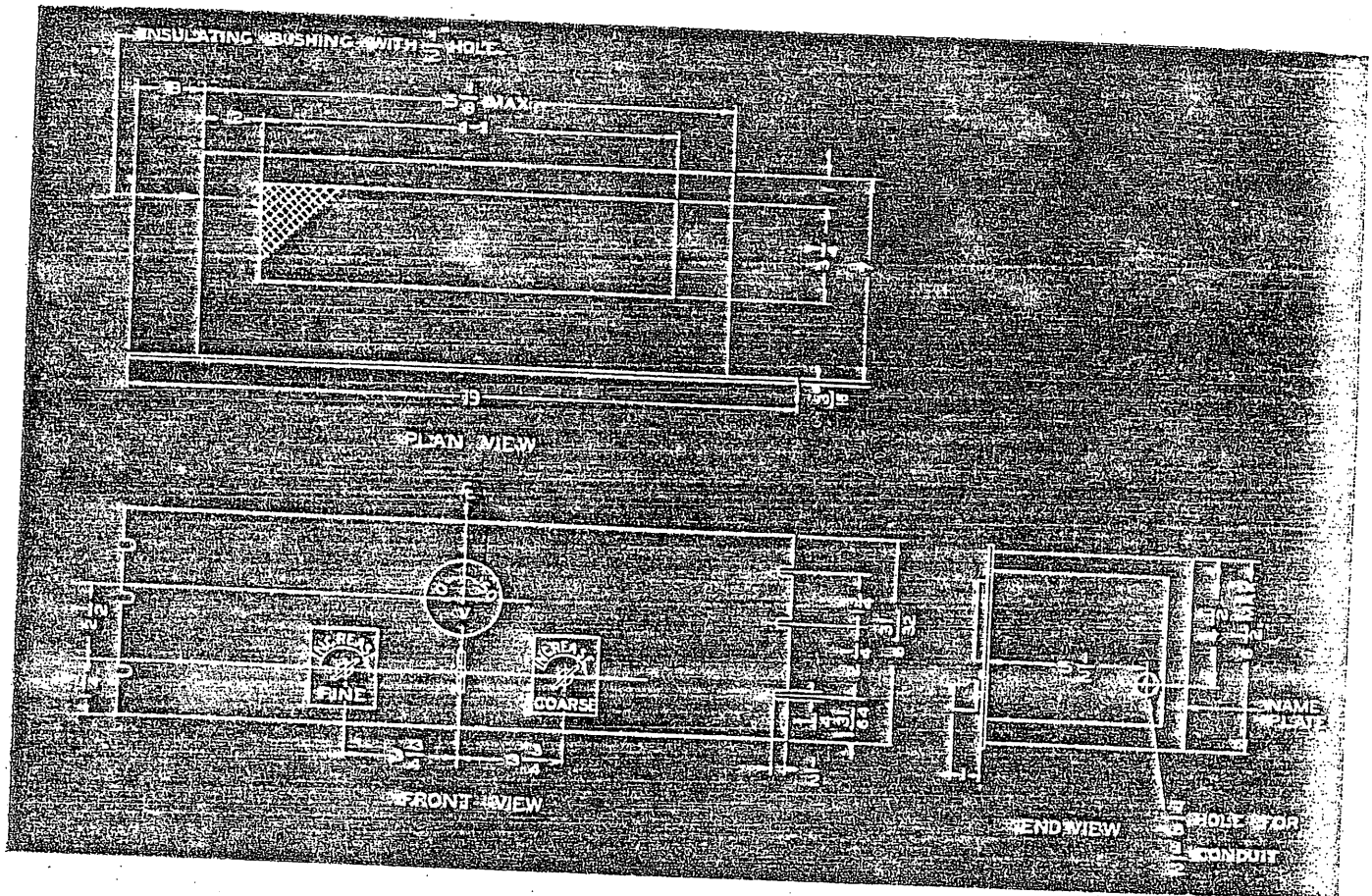


Figure 7 — Dimensional Drawing, KS-5653, List 3 Rectifier.

This rectifier is a selenium disc type designed to furnish power for relay and signaling circuits in connection with speech input equipment.

Typical Specifications

Input: 105 to 125 volts, 50 to 60 cycles a-c.

Output: 1 ampere d-c full load at 24 volts.

Dimensions: 19" wide, 6-31/32" high and 7" deep.

Weight: 42 pounds.

Mounting: Arranged to mount on a standard 19" relay rack.

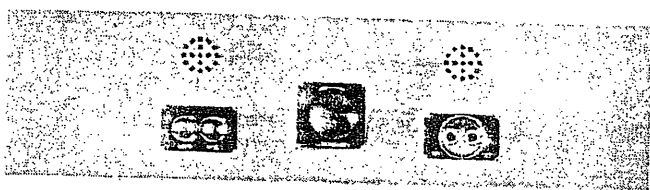
Finish: Gray enamel.

Western Electric

C Components and accessories

SPECIAL FACILITY PANELS

TELEPHONE PANEL 260A



Use — The Western Electric 260A Telephone Panel provides magneto type subset facilities for order wire telephone communication between the operating points in a sound system installation or wired program service over a pair of wires. (Check suitability for use with owner of wire circuits.)

Description — This panel permits the use of standard type telephone instruments such as the Western Electric F2BW-3 Handset, or an operator's telephone set with breast type transmitter and headset or both if desired. (Instruments not included with panel.)

The component parts are assembled on a recessed metal panel. It is designed to mount in a standard relay rack or equipment cabinet. A mat finished in dark aluminum gray is provided for the face of the panel where the various keys and jacks, as well as the control for the hand operated generator are assembled for convenient operation. The rear side of the equipment mounting is covered with an aluminum-finished dust cover which is removable to provide access to the apparatus. The mat and back cover may be obtained with a black finish if desired.

The circuit of the 260A Telephone Panel is designed to operate from an external quiet 12 or 24 volt d-c source or (as an alternative where 12 volts is not available) from a 4.5 volt dry battery, space for which is provided in the panel.

Typical Specifications

General: Intended for furnishing telephone subset facilities for order wires at the operating points in sound system installation or wired program service.

Accessory Equipment: An F2BW-3 Handset or an operator's telephone set, or both simultaneously, may be used but must be ordered separately.

Current Supply: 12 or 24 volt d-c source or local 4.5 volt dry battery. (Dry battery is not furnished and must be ordered separately.)

Weight: 25 pounds.

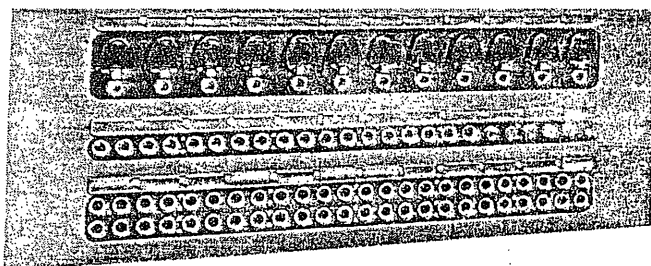
Dimensions: 19" wide by 5-7/32" high.

Finish: Chassis — Light gray.

Mat — 260A-15 — Dark aluminum gray.

260A-3 — Black.

268A ORDER WIRE PANEL



Use — This order wire panel is a ring down drop and patching panel for terminating magneto type order wire lines. Especially useful when radio broadcast or sound system or wired music programs originate at points remote from the main location and where communication is important between the operator at the remote pickup point and the operator in the main control room. This panel is ideally suited for use in main control rooms where a large number of lines are to be terminated. (Check suitability for use with owner of wire line facilities.) The use of this panel expedites handling calls and promotes efficient program dispatching. Requires separate subset facilities such as 260A telephone panel.

Description — Terminating facilities are provided for twelve incoming order wire lines.

The 268A Order Wire Panel furnishes terminating facilities for twelve income order wire lines including:

1. Twelve plug in restoring combined jack and signal units, one for each order wire line.
2. Jacks for testing and for interchange of order wire lines and program lines in emergencies.
3. Night alarm type call indicator lamp and key-controlled

Western Electric

buzzer which announces incoming signals simultaneously with respective line signals.

4. Calling and answering cord.
5. Key for ringing from external 20 cycle ringing voltage supply.
6. Spare jacks for three additional lines.
7. Jacks for talking and ringing circuit of associated telephone panel.

The components are assembled on a recessed panel approximately 19" wide and 7" high that is designed for mounting on standard relay rack or in an equipment cabinet. The face of the panel is covered with a mat which conceals the panel mounting screws. This mat provides a mounting for the designation stripes which identify the telephone line signals or drops as well as the three rows of jacks.

Incoming calls are registered by the drops, the signal lamps, and the buzzer simultaneously. A key is provided for disconnecting the buzzer.

Typical Specifications

General: Provides terminating and signalling facilities for twelve telephone order wire circuits between the operating points in sound systems installations. Spare jacks and mounting positions for terminating three additional lines if required.

Power Supply: 12 volts grounded d-c supply for the signal lamps and the buzzer and 20 cycle ringing voltage are required. 24 volt d-c may be used instead of 12 volts if lamps suitable for this voltage are employed.

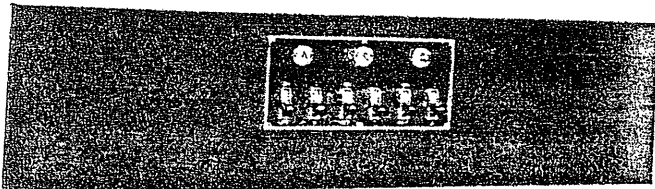
Dimensions: 19" wide by 6-31/32" high.

Weight: 25 lbs.

Finish: Chassis — Light gray.

Mat — 268A-15 — Dark Aluminum Gray.
268A-3 — Black.

OUTPUT SWITCHING PANEL 270B 3 STUDIO-3 LINE CAPACITY



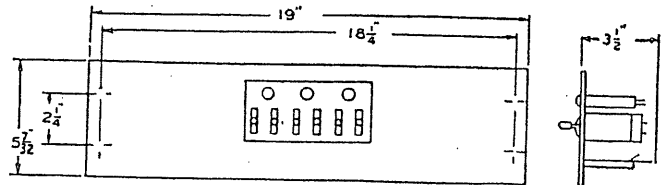
Use — The 270B Output Switching Panel provides lever key switching facilities for interconnecting three amplifier channels to three outgoing line circuits in any combination except that the outgoing lines cannot be connected to more than one amplifier at a time. The outgoing line circuits may be used for local audition purposes, or for direct connection to an adjacent radio transmitter. They may also be used in conjunction with repeating coils and telephone lines to furnish programs to networks or to subscribers situated remotely from the control point.

Description — The 270B panel is designed to operate between 600 ohm impedances and will accommodate input power levels as high as 240 milliwatts (+24 dbm). Resistance networks maintain constant impedance relations in the connecting circuits irrespective of the switching combinations employed. The insertion loss introduced by these coupling networks is 10 db.

The components are assembled on a metal panel, equipped with a face mat, which serves as a mounting for the designation plate associated with the control keys and indicating lamps.

There are six lever type keys and three signal lamps. Three keys are employed to assign the outgoing circuits to the various studio channels. Each key is connected to a particular outgoing channel and is locking in both up and down positions. The other three keys and the three signal lamps are for control of the signals to the studio booth operator. These keys are locking in both "On" and "Off" positions.

Four terminal strips are provided for external connections.



Typical Specifications

Input: Input impedance is 600 ohms for each of three available circuits. Will accommodate input levels up to +24 dbm.

Output: Three output circuits of 600 ohms each.

Power Supply: 12 volts battery supply is required for the operation of the signal lamp system; 24 volts d-c supply may be used if lamps suitable for this voltage are employed.

Dimensions: 19" wide by 5-7/32" high.

Mounting: Standard relay rack or equipment cabinet.

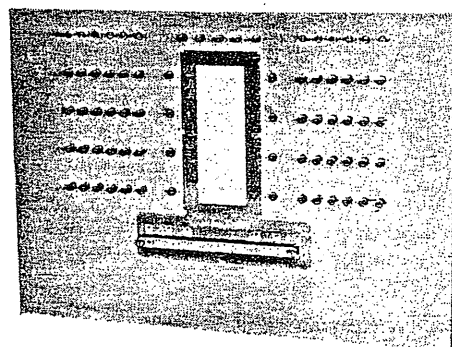
Weight: 7 1/2 pounds.

Finish: Chassis — Light gray.

Mat — 270B-15 — Dark aluminum gray.

270B-3 — Black.

271B OUTPUT SWITCHING PANEL 6 STUDIO-4 LINE OR 4 STUDIO-6 LINE CAPACITY





The 271B output switching panel provides high grade mechanically interlocked selector key switching facilities for inter-connecting six amplifier channels to four outgoing line circuits in any combination except that the outgoing lines cannot be connected to more than one amplifier at a time. Duplicate banks of selector keys allow pre-setting of amplifier channels for the next scheduled program. A master key switches between the banks of selector keys, and a monitor switch transfers a monitoring amplifier or a volume indicator to any one of the outgoing circuits. The 271B is designed to operate between input and output circuits of 600 ohms impedance.

Typical Specifications

Source Impedance: 600 ohms.

Load Impedance: 600 ohms.

Insertion Loss: (Studio to Line) 23 db from input to output.

Power Supply: 12 volts d-c required for the amplifier channel designation lamps; 24 volts d-c may be used if suitable lamps are employed.

Dimensions: 19" wide, 13-31/32" high and 3 3/8" deep.

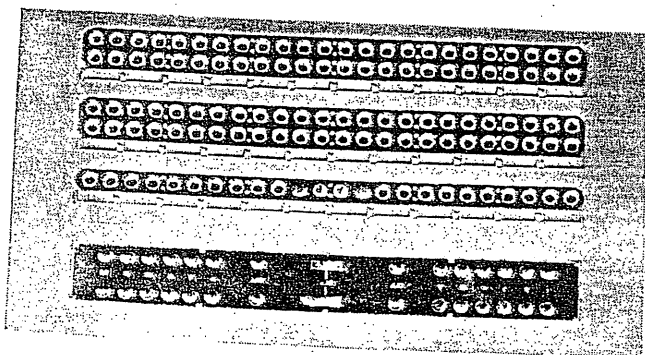
Weight: 18 pounds.

Mounting: Designed to mount in a standard relay track or equipment cabinet.

Finish: Chassis — Light gray.

Mat — 271B-15 — Dark aluminum gray.
271B-3 — Black.

272A PROGRAM LINE PANEL



Use — The 272A Program Line Panel provides facilities for terminating and switching incoming programs from outside sources. It may be used at the main location or other suitably equipped switching points of sound systems installations.

It is intended for operation from incoming program circuits of 150 or 600 ohms nominal impedance. The two outgoing circuits contain transducer networks which effect for each circuit an output impedance of 600 ohms to the studio equipment. The transmission loss from any selected incoming

program circuit to either of the two available output circuits is approximately 11 db exclusive of the loss introduced by the associated program circuit equalizer if one is employed. A 600 ohm artificial line with an attenuation or loss of 10 db is provided in the panel for further attenuating the program energy of either output circuit, should this be required. The terminals of this pad are connected to jacks which appear at the front of the panel.

Description — This panel accommodates twelve incoming program circuits which are connected to jacks for testing, cross connections or interchange of program circuits and order wire lines in emergencies. High impedance monitoring (bridging) connections are provided for each program circuit for headset monitoring, testing, or other purposes as may be required.

Any one or two of the twelve incoming program circuits may be selected and assigned to either of two output key circuits.

The program circuit selector keys are mechanically interlocked which ordinarily prevents the assignment of more than one incoming program circuit to a single output key circuit.

The selector keys in duplicate also make possible pre-setting for one outside program while another is in progress.

Indicating lamps associated with each local circuit inform the operator when selected program circuits are in service through the local amplifier channels.

Circuit jacks at the necessary points in the electrical paths throughout the panel provide access to any part of the circuit for testing purposes. However, normal operation is accomplished without the use of patching cords and plugs, the circuits being continuous through the jacks.

The component parts of this unit are assembled on a mat covered metal panel which occupies a space approximately 19 1/4" wide and 10 1/2" high in a standard relay rack or an equipment cabinet.

Typical Specifications

General: Provides facilities for terminating and switching twelve incoming program lines.

Input: Operates from 150 or 600 ohms nominal impedance.

Output: 600 ohms for each of two output circuits.

Weight: 25 lbs.

Dimensions: 19" long by 10-15/32" high.

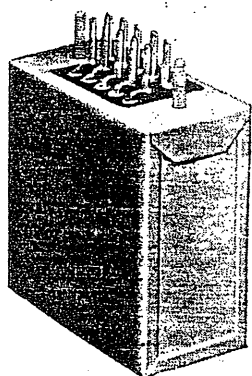
Finish: Chassis — Light gray.

Mat — 272A-15 — Dark aluminum gray.
272A-3 — Black.

23A EQUALIZER

Use — Used to correct the non-uniformity of transmission in the range from 25 to 8,000 cycles of non-loaded telephone cable employed for the transmission of program material. It is intended for use on program lines which are employed frequently enough to justify the permanent association of an equalizer.

Western Electric



Description — The 23A is of the shunt type consisting of an inductance and a capacity in parallel and a tapped series resistance the value of which is determined at the time of installation from the transmission characteristic of the circuit. Seven resistance units provide a total of 322.5 ohms.

By use of the 23A Equalizer, non-loaded cable circuits consisting entirely of one gauge can be equalized up to the following approximate lengths with a maximum deviation of 1 db: 16 gauge — 21.5 miles; 19 gauge — 10 miles; 22 gauge — 6.5 miles. The following lengths can be equalized with a maximum deviation of 2 db: 16 gauge — 25 miles; 19 gauge — 11.5 miles; 22 gauge — 7 miles.

Typical Specifications

Frequency Range: 25 to 8000 cycles.

Range of adjustment see "Description."

Dimensions: 1-11/16" wide, 3-9/32" high and 4-3/16" deep.

Weight: 3 pounds.

Mounting: Mounts on equipment panel such as Western Electric 993B or 993 C Mounting Plate.

Finish: Gray enamel.

303 EQUALIZER PANEL

This equalizer panel is a mat type panel drilled to mount five 55A Equalizers. It is normally supplied with the center position equipped with a 55A Equalizer. The drilled holes for the other four positions are covered with apparatus blanks which may be removed when additional apparatus is to be mounted.

The equalizer mounting holes correspond to a standard step-type volume control mounting so that the panel may be equipped with a variety of combinations of equalizers and volume controls.

Typical Specifications

Length: 19 inches.

Width: 3 15/32 inches.

Finish: 303A-3 black. 303A-15 dark aluminum gray.

55A EQUALIZER

This equalizer consists of a 23 type Equalizer shown on this page and a step type variable resistance. It is intended for connection across non-loaded telephone cable pairs which are normally used for transmitting high quality program material. It is used to correct the differences in attenuation at different frequencies. The range of adjustment is such that lines having a difference in attenuation from 1000 cycles to 8000 cycles of 0 to 14 db may be equalized. The variable resistance is step controlled so that 0.5 db steps of equalization may be chosen.

Typical Specifications

Frequency Range: 50 to 8000 cycles.

Range of Adjustment: See text above.

Mounting: Mounted on a bracket which is arranged for panel mounting. Equipped with a graduated dial and knob.

Dimensions: Occupies a space 3" x 3 1/4" and 8 1/4" overall including knob.

HEADSETS AND HAND TELEPHONE SETS

D-97690 HEADSET



This ruggedly built dynamic type headset consists of two 711A Receivers and a D-90957 Head Band. A D-90944 cord 6 feet long equipped with a 47 type Plug is required for use with this headset and must be ordered separately.

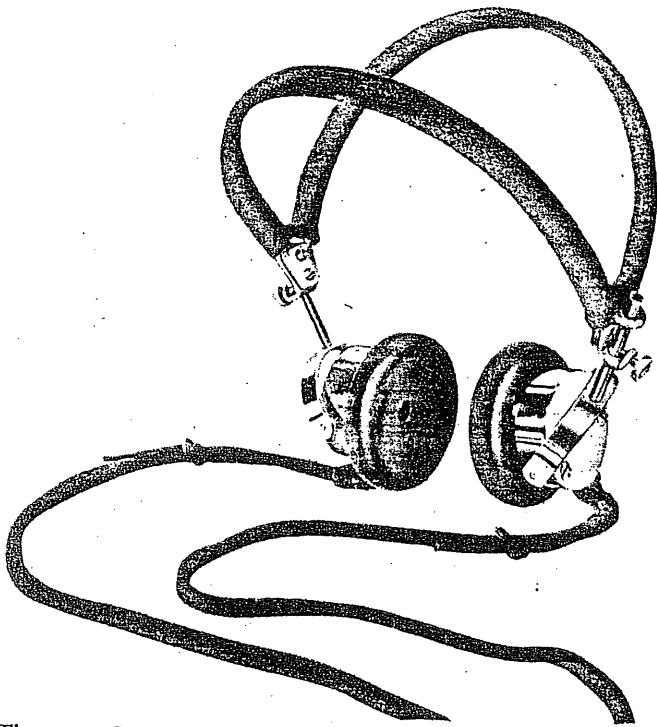
Typical Specifications

Impedance: 50 ohms.

Frequency Response: Uniform to 7500 cycles.

Power Handling Capacity: Maximum 0.5 watts.

1002C HEADSET



The 1002C Headset has been proved by many years of service; it uses resonant type receivers and resonates at about 1100 cycles. Equipped with head band and pin-tipped cord, it is light in weight and comfortable, rugged in construction and constant in efficiency.

Typical Specifications

Impedance: Approximately 20,000 ohms a-c impedance at voice frequencies.

Spare Parts and Accessories:

Complete Receiver Unit: 509.

Ear Cap: P-99768.

Diaphragm: P-98387.

Head Band: 1-B.

Cord: R2CY.

1002F AND 1002H HEADSETS

Useful and durable monitoring headsets familiar to most sound engineers. They are recommended for use with portable speech input equipment and in control room monitoring. Consist of a cloth-covered wire headband carrying two non-adjustable receivers (509) connected in series by means of a Y cord. The 1002F has a two-conductor (47B) plug at the opposite end of the cord (R2DA) which is built up and tipped to accommodate a 47B Plug while the 1002H terminates in spade terminals.

When either of these headsets is required fully equipped with the 241 type Twin Plug, order the R2ET Cord and either the 241A (black shell) or 241B (red shell) Plug and replace the corresponding items.

Typical Specifications

DC Resistance: Receivers connected in series, 2,200 ohms.

AC Impedance: Nominal, 11,000 ohms each 509 Receiver.

F2BW-3 TYPE HAND SET

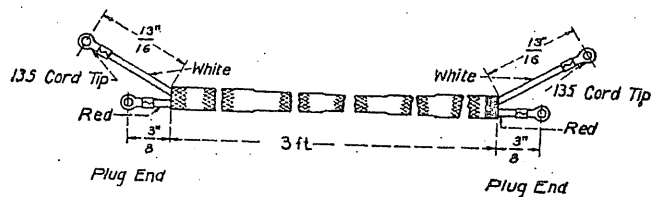
The F2BW-3 type Handset is designed for use with the 260A Telephone Panel and other installations using local battery talking (magneto) systems. It is made of the same durable material so widely used in your telephone. Normally supplied in black, it can be obtained in other colors on special order.

PATCHING CORDS

Western Electric Patching Cords have been proved through many years service to give long, trouble free life. They are designed to resist moisture in the humid climates, and dampness from the operator's hands.

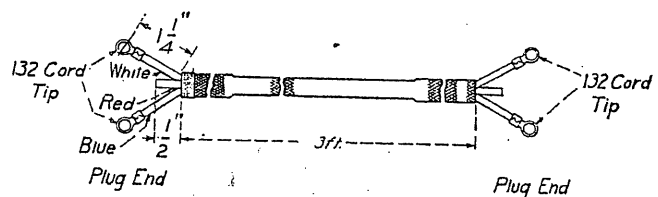
The resistance of each cord is approximately one ohm per six foot length. The current carrying capacity is 3 amperes which is much greater than normally experienced in actual service.

P2A AND P2AA CORDS



Moisture proof, long life, two-conductor patching cords, with rubber insulated tinsel conductors. While the stock length is 3 feet these cords are also available in 1, 2, 4 or 6 foot lengths. The P2A is equipped at each end with cord tips for 47 type Plugs and the P2AA for 241 type Plugs. Color: Slate gray. Can be obtained in red, green or black if specified on order.

P3J CORD

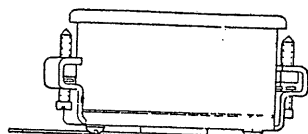
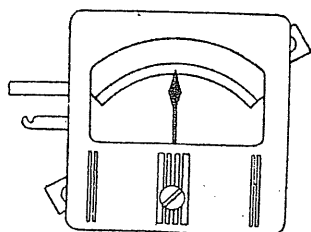


A three-conductor moisture proof patching cord with rubber insulated tinsel conductors. The third conductor is tied to the sleeves to carry through the grounding connection. While the stock length is 3 feet these cords are also available in 1, 2, 4 or 6 foot lengths. Arranged at each end for 241 type Plugs. Color: Slate gray. Can be obtained in red, green or black if specified on order.

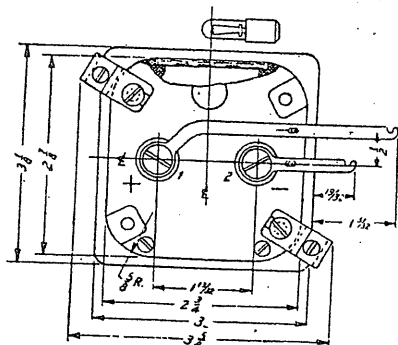
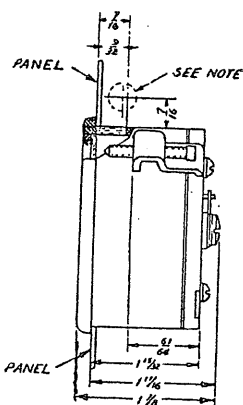
METERS

KS-10003 METER

This sensitive meter is designed for use as a plate current checking meter for Western Electric amplifiers. It is housed in a black bakelite case with a ground glass window above which a lamp may be mounted for scale illumination. Full scale sensitivity is 200 microamperes and the scale is calibrated 0 to 2 milliamperes, and 0 to 40 milliamperes. This meter is designed for tube checking using the cathode metering shunts which are provided in many of the standard Western Electric amplifiers.



TWO MOUNTING BRACKETS ARE FURNISHED WITH EACH INSTRUMENT



NOTE THIS ILLUSTRATES POSITION OF EXTERNAL LAMP FOR PROPER SCALE ILLUMINATION. LAMP NOT FURNISHED WITH METER. WINDOW FOR SCALE ILLUMINATION NOT PROVIDED UNLESS SPECIFIED.

REPEATING COILS

Outstanding features of Western Electric Repeating Coils are:

- (1) Designed by communication experts especially for indicated use.
- (2) Excellent frequency response.
- (3) Rugged construction.
- (4) Dependable performance.

111C AND 119C REPEATING COILS

Toroidal type line repeating coils designed to provide dependable impedance matching and line isolation at line circuit transfer points. They are intended for use with amplifiers for program transmission over long or short cable or open wire circuits equipped with proper loading.

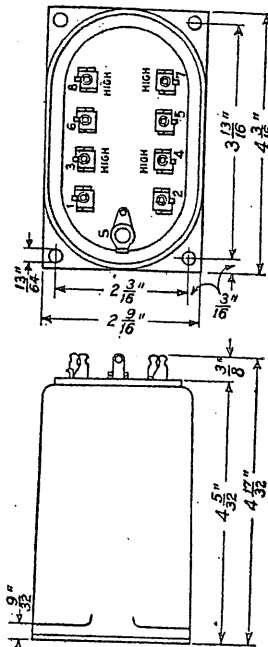
Typical Specifications

Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 30 cycles, 1.1 watts (+30 dbm).

Insertion Loss: Less than 1 db.

111C REPEATING COIL



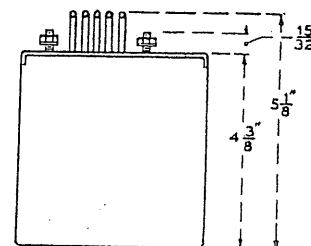
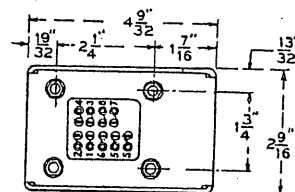
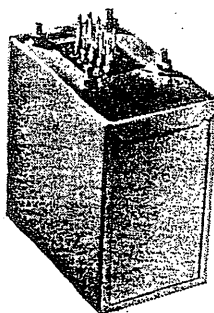
Dimensions: 2-9/16" x 4-3/16" x 4-17/32".

Weight: 4 1/2 pounds.

Mounting: Flat base for board or panel mounting. Mounting holes to clear #8 machine screws.

Finish: Gray enamel.

119C REPEATING COIL



Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 30 cycles 1.1 watts (+30 dbm) Insertion Loss, less than 1 db.

Dimensions: 2-9/16" x 4-9/32" x 5 1/8".

Weight: 4 pounds.

Mounting: Single side stud mounting using 993A or 993C Mounting Plate.

Finish: Gray enamel.

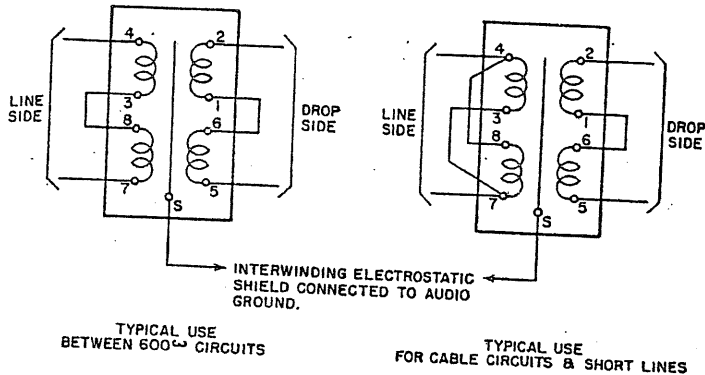
COMPONENTS AND ACCESSORIES



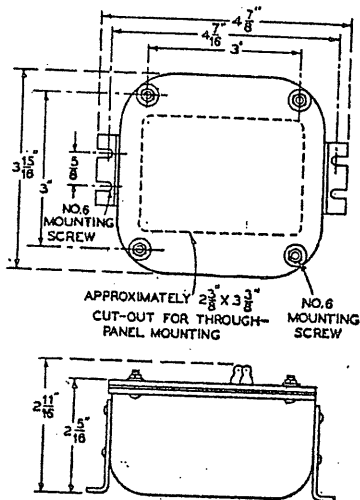
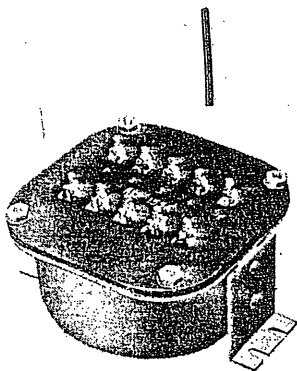
111C AND 119C REPEATING COILS

IMPEDANCE RATIO
111C 600Ω:600Ω
119C 520Ω:600Ω

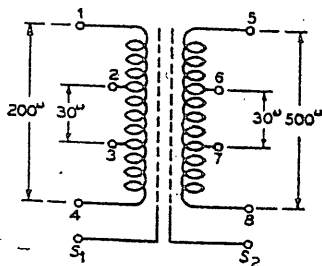
IMPEDANCE RATIO
111C 150Ω:600Ω
119C 130Ω:600Ω



153A REPEATING COIL



A toroidal coil with permalloy core in a flat type mounting, potted in a heavy iron case. Designed for general use in microphone or line level circuits to match impedances. A high degree of shielding against unwanted longitudinal transmission is provided by two electrostatic shields between windings — use separately to segregate grounds or strap to form a single shield.



Typical Specifications

Frequency Range: 40-15,000 cycles.

Maximum Power Capacity: At 30 cycles, 0.226 watts (+24 dbm).

Insertion Loss: Less than 0.5 db.

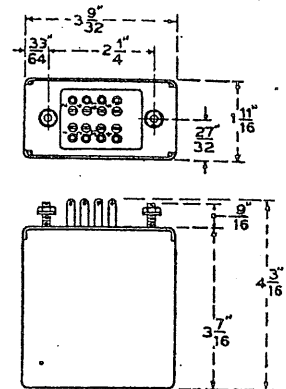
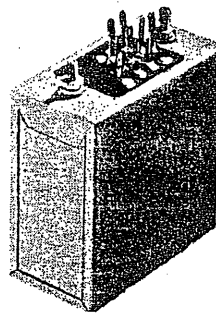
Dimensions: 4 7/8" x 3-15/16" x 2-11/16" including terminals.

Weight: 2 pounds, 10 ounces.

Mounting: Flat base for board or panel.

Finish: Gray enamel.

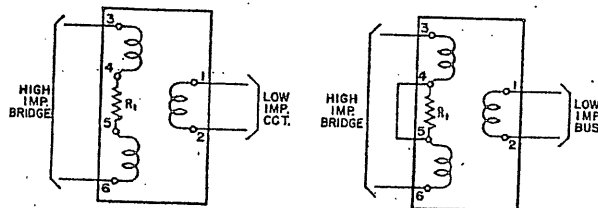
154C REPEATING COIL



A high quality repeating coil for bridging service. It has a shell type chrome permalloy core and is potted in a rectangular metal case arranged for single side stud mounting.

IMPEDANCE RATIO
55400:600
LOSS THROUGH COIL 24db

IMPEDANCE RATIO
30400:600
LOSS THROUGH COIL 18db



LOSS IN CIRCUIT BRIDGED NEGLECTIBLE IF COIL IMPEDANCE IS AT LEAST 5 TIMES THAT OF CIRCUIT BRIDGED.

$R_1 = 25,000$ ohm resistor.

Typical Specifications

Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 30 cycles 0.782 watt (+29 dbm).

Insertion Loss: See sketch above.

Dimensions: 3-9/32" x 1-11/16" x 3-7/16" (4-3/16" overall).

Weight: 2 1/4 lbs.

Mounting: Single side stud mounting using 993B or 993C Mounting Plate.

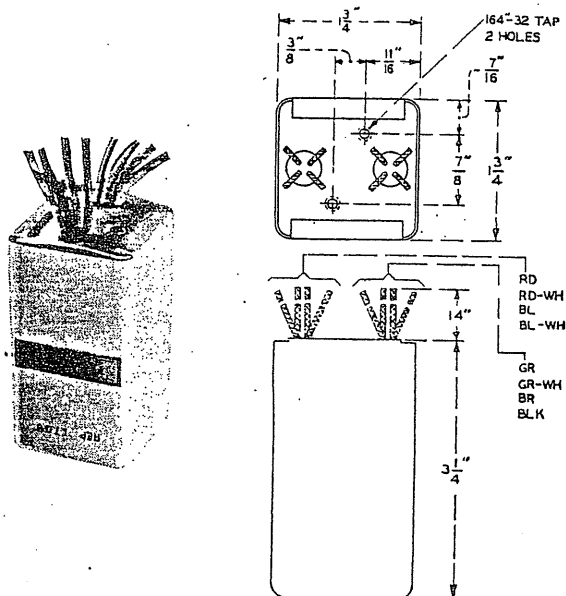
Finish: Gray enamel.

170B REPEATING COIL

A shell type line repeating coil with a permalloy core enclosed in a metal case of unusually small size. Designed to provide dependable impedance matching and line isolation

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at line circuit transfer points with complete assurance that the highest program quality is being maintained. It has all impedance ratio of 600:600 ohms.



Typical Specifications

Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 30 cycles. 0.247 watts (+24 dbm).

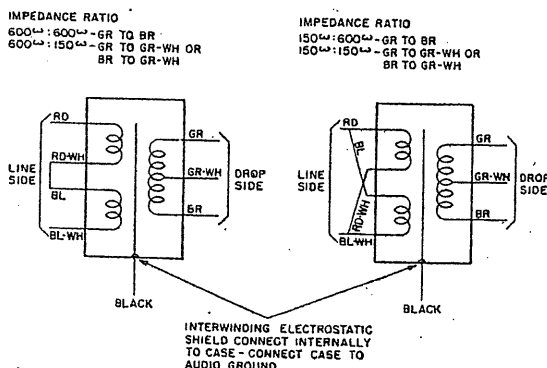
Insertion Loss: Approximately 1 db.

Dimensions: 1 3/4" x 1 3/4" x 3 1/4".

Weight: 1 1/4 pounds.

Mounting: Flat base for flat plate or chassis mounting. Two threaded mounting holes take 8-32 screws.

Finish: Gray enamel.



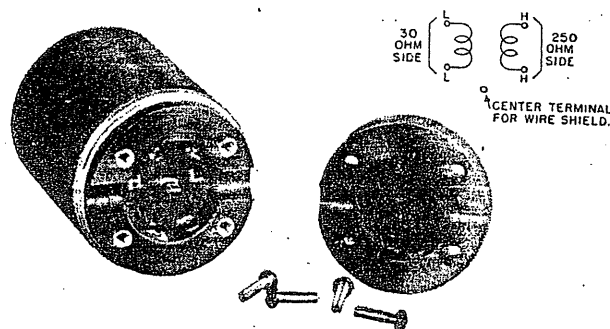
171A REPEATING COIL

Used with 9 type Reproducer see page 22 for detailed information.

172A REPEATING COIL

An exceptionally high quality impedance matching device for use in low level circuits particularly between a microphone and amplifier. It employs screw type terminals and is adaptable for connection in the microphone cordage or it

may be mounted on the associated amplifier. A plastic cover, illustrated below, protects and insulates the coil. The cord slots grip the cord and relieve the strain on the terminals and terminal plate. The 172A will transmit equally well in either direction.



Typical Specifications

Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 30 cycles 0.045 watts (+16 dbm).

Insertion Loss: Approximately 1 db.

Dimensions: 1 3/4" diameter x 2-25/32" long.

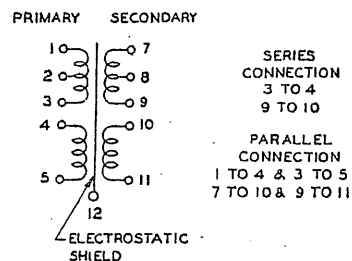
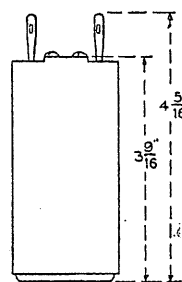
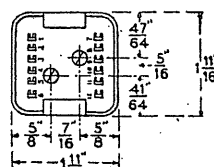
Weight: 12 ounces.

Mounting: Use connected in microphone cord or mount on flat surface by means of loop bracket.

Case: Magnetic shielding permalloy metal.

Finish: Black.

177C REPEATING COIL



SCHEMATIC 177C REPEATING COIL

	Series Connection	Input	Output	Center Tap
Primary	3 to 4	1-5		3 (or 4)
Secondary	9 to 10		7-11	9 (or 10)
	Parallel Connection			
Primary	1 to 4, 3 to 5	1-3		8
Secondary	7 to 10, 9 to 11		7-9	2



A shell type line repeating coil with a permalloy core enclosed in a metal case of small size. Designed to provide dependable impedance matching and line isolation at line circuit transfer points, and for changing from balanced to unbalanced circuits. The coil has a one-to-one ratio. It has an electrostatic shield between windings and an electromagnetic shield inside the case. Additional electromagnetic shielding, if required in instances of severe exposure, may be obtained by adding a 42A Shield externally. Winding data on the 177C Repeating Coil is shown above. All windings are identical except that windings 1—3 and 7—8 have a mid-tap (terminals 2 and 8, respectively). These may be used to provide a mid-ground point for the parallel connection; for the series connection terminals 3 and 9 may, of course, be used. The following connections should be used for impedances between 25 ohms and 600 ohms:

WINDINGS		OPERATING
Primary	Secondary	Impedance Ratios
Series	Series	600 ohms to 600 ohms or 150 ohms to 150 ohms
Parallel	Parallel	25 ohms to 25 ohms
Series	Parallel	150 ohms to 25 ohms

Typical Specifications

Frequency Range: 30-15,000 cycles.

Maximum Power Capacity: At 50 cycles 0.34 watts (+25 dbm)

Insertion Loss: Less than 1 db when connected between two like impedances. Slightly more when operating from a low impedance into an open circuit.

Dimensions: 1-11/16" x 1-11/16" x 3-9/16".

Mounting: Flat base for flat plate or chassis mounting. Two threaded mounting holes take 8-32 screws.

Finish: Gray enamel.

AUTOTRANSFORMERS

18A AND 19A AUTOTRANSFORMERS

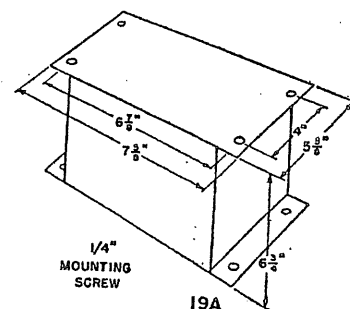
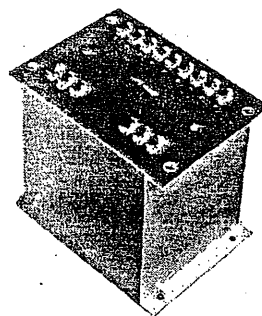
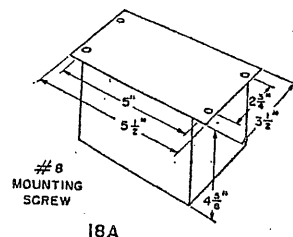
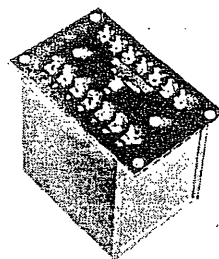
Designed to provide impedance matching between amplifiers and loudspeakers over a wide range of applications. These two transformers have the same impedance ratios and cover the same frequency range, but differ in size and power handling capacity.

Typical Specifications

Frequency Range: 50 to 15,000 cycles.

Average Loss: 0.35 db for the 18A; 0.1 db for the 19A.

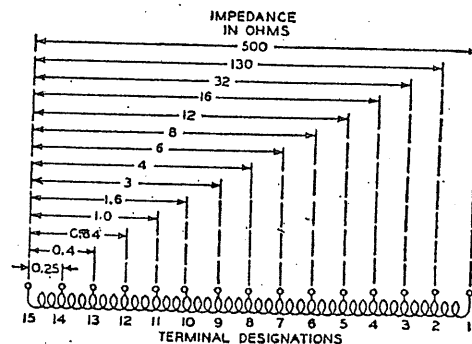
Power Capacity: 18A is 50 watts continuous; 19A is 200 watts continuous, 500 watts on speech or music from 100 to



15,000 cycles. (These power ratings hold only to tap 10. For lower impedance taps reduce ratings 2 db.)

Insulation: 18A—2,000 volts a-c; 19A—3,000 volts a-c.

Impedance Ratio: See diagram.



Dimensions: 18A — 5 1/2" long, 3 1/2" deep and 4 3/8" high (not including terminals); 19A — 7 3/8" long, 5 3/8" deep and 6 3/4" high (not including terminals).

Weight: 18A — 9 pounds 3 ounces; 19A — 27 pounds.

25A, 26A AND 27A AUTOTRANSFORMERS

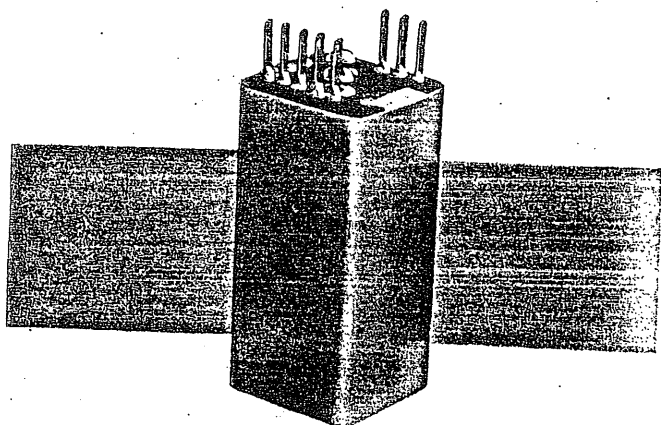
These autotransformers were especially designed for loudspeaker matching purposes. The 25A will handle four watts of audio power, the 26A sixteen watts and the 27A sixty-four watts. They were designed to work from a standard 70 volt distribution circuit, or other circuits as required. By using a transformer for each loudspeaker, in multiple systems, the volume for each speaker can be individually adjusted by selecting taps on the transformer.

A high degree of flexibility is possible since all the loudspeakers in a system using these transformers may be connected in parallel across the distribution circuit. No complicated connecting circuits are required.

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The frequency range of 50 to 15,000 cycles permits exceptional quality. When the transformers are connected between proper impedances the transmission loss is less than 0.6 db.

25A AUTOTRANSFORMER 4 WATTS



Typical Specifications

Maximum Power: 4 watts. Transformer is tapped for lower power outputs, reducing 3 db per step to 0.25 watts.

Source: Standard 70-volt amplifier output or distribution circuit.

Load: 4 or 8-ohm loudspeaker.

Dimensions: Approximately 1-11/16" wide, 1-11/16" long, 3-9/16" high. Including terminals, 4-5/16" high.

Weight: Approximately 12 ounces.

Mounting: Can be mounted on loudspeaker (728B) frame through the use of the 713A Bracket.

If loudspeaker voice coil is 4 ohms, connect it to terminals 1-2. If loudspeaker voice coil is 8 ohms, connect it to terminals 1-3.

Power from 70-volt Line	Line Terminals	Input Impedance
4 watts	1-8	1,250 ohms
2 watts	1-9	2,500 ohms
1 watt	1-10	5,000 ohms
.5 watt	1-11	10,000 ohms
.25 watt	1-12	20,000 ohms

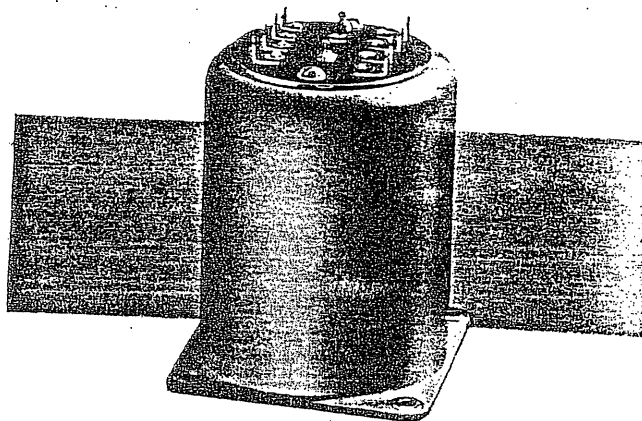
26A AUTOTRANSFORMER 16 WATTS

Typical Specifications

Maximum Power: 16 Watts. Transformer is tapped for lower power outputs, reducing 3 db per step to 0.25 watts.

Source: Standard 70-volt amplifier output or distribution circuit.

Load: 4 or 8-ohm loudspeaker.

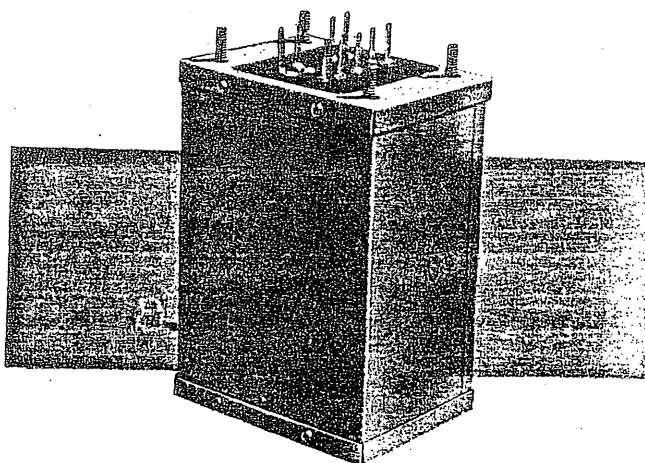


Dimensions: Approximately 2 7/8" wide, 2 7/8" long, 4" high, including terminals.

Weight: Approximately 2.5 pounds.

Power from 70-volt Line	Line Terminals	Voice Coil Terminals 4-ohm 8-ohm	Input Impedance
16 watts	1-8	1-4 1-5	312 ohms
8 watts	1-9	1-4 1-5	625 ohms
4 watts	1-10	1-4 1-5	1,250 ohms
2 watts	1-11	1-4 1-5	2,500 ohms
1 watt	1-12	1-4 1-5	5,000 ohms
.5 watt	1-12	1-3 1-4	10,000 ohms
.25 watt	1-12	1-2 1-3	20,000 ohms

27A AUTOTRANSFORMER 64 WATTS



Maximum Power: 64 watts. Transformer is tapped for lower power outputs, reducing 3 db per step to 1 watt.

Source: Standard 70-volt amplifier output or distribution circuit.

Load: 4-ohm loudspeaker.

Dimensions: Approximately 4" wide, 3" long, 6" high, including terminals.

Weight: Approximately 8 pounds.

COMPONENTS AND ACCESSORIES

Power from 70-volt Line	Line Terminals	4-ohm Voice Coil Terminals	Input Impedance
64 watts	1-8	1-4	78 ohms
32 watts	1-9	1-4	156 ohms
16 watts	1-10	1-4	312 ohms
8 watts	1-11	1-4	625 ohms
4 watts	1-12	1-4	1,250 ohms
2 watts	1-12	1-3	2,500 ohms
1 watt	1-12	1-2	5,000 ohms

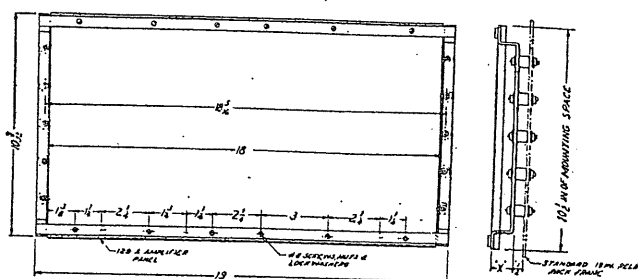
This transformer can be used in place of the 18A Autotransformer to match a 500-ohm amplifier output to lower impedance loads as follows:

Primary or Line Impedance	Secondary or Load Impedance	Connect Line to Terminals	Connect Load to Terminals
	Nominal		
	Range		
500	250 ohms	180 to 400 ohms	1-9
500	125 ohms	90 to 180 ohms	1-10
500	62 ohms	45 to 90 ohms	1-11
500	31 ohms	20 to 45 ohms	1-12
500	12 ohms	8 to 20 ohms	1-9
500	6 ohms	5 to 8 ohms	1-10
500	3 ohms	2 to 5 ohms	1-10
500	1.6 ohms	1 to 2 ohms	1-10
500	.8 ohm	.6 to 1 ohm	1-11
500	.4 ohm	.25 to .6 ohm	1-12

405B PANEL

The 405B Panel is intended for use with the 142 type Amplifiers, which are arranged for rack mounting. It is the same as the 405-A Panel except that it has an opening for the controls of these 142 type amplifiers. It includes the following accessories: screws for mounting the amplifier and panels on the rack and for mounting the control plate of the amplifier in a suitable position; plug buttons for closing the unused holes.

190A & B MOUNTING PLATES



Possible Mounting Combinations Using One 190A or 190B Mounting Plate.

Combina- tion	TYPE OF AMPLIFIER OR RECTIFIER							
	120B	121A	129A	130B	131A	132A	133A	18A
1	3	—	—	—	—	—	—	—
2	—	—	—	—	—	3	—	—
3	—	—	—	—	—	—	3	—
4	2	—	—	—	—	1	—	—
5	1	—	—	—	—	1	1	—
6	1	—	—	—	—	2	—	—
7	—	—	—	—	—	2	1	—
8	2	—	—	—	—	—	1	—
9	—	—	—	—	—	1	2	—
10	1	—	—	—	—	—	2	—
11	1	1	—	—	—	—	—	—
12	—	1	—	—	—	1	—	—
13	—	1	—	—	—	—	1	—
14	—	—	1	—	—	—	—	—
15	1	—	—	1	—	—	—	—
16	—	—	—	1	—	1	—	—
17	—	—	—	1	—	—	1	—
18	—	—	—	—	1	—	1	—
19	—	—	—	—	2	—	—	—
20	1	—	—	—	1	—	—	—
21	—	—	—	—	1	1	—	—
22	1	—	—	—	—	—	—	1
23	—	—	—	—	—	1	—	1
24	—	—	—	—	—	—	1	1

These mounting plates are designed primarily for mounting 129, 130, 131 type Amplifiers (will also mount 120, 121, 132, and 133 type Amplifiers and 18A Rectifiers) in equipment cabinets or on standard 19" relay rack frames. These mountings are identical except for dimension "X" which is 1 inch and 2 1/4 inches for the 190A and 190B Mounting

BLANK PANELS AND MOUNTING PLATES

400 SERIES BLANK PANELS

For use on standard 19" equipment racks or bay cabinets. Panels are steel finished in either dark aluminum gray or black japan. Length is the standard 19" and nominal heights are multiples of 1 1/4". These panels fasten with screws through them into the rack or bay cabinet.

Nominal Height*	Dark Aluminum Gray	Black
3 1/2"	402A-15	402A-3
5 1/4"	403A-15	403A-3
7"	404A-15	404A-3
8 3/4"	405A-15	405A-3
10 1/2"	406A-15	406A-3
12 1/4"	407A-15	407A-3
14"	408A-15	408A-3
15 3/4"	409A-15	409A-3
17 1/2"	410A-15	410A-3

*Actual height of panels is 1/32" less than height indicated in table.

Panels are furnished with the necessary Phillips recessed button head screws and spacers. The screws are satin chromium finish.

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Plates respectively. The 190A Mounting Plate is intended primarily for use in the 21A or 21B Cabinet or other cabinets where no front panel is required. The 190B Mounting Plate is intended for use in cabinets where the mounting frame is at the front. A 406A Panel (ordered separately) may be used to close the front of the cabinet.

200 SERIES MOUNTING PLATES

These mounting plates consist of open frame chassis type structures designed primarily to mount on relay rack type cabinets and intended to mount flat plate type apparatus such as 141, 120, 132 and 133 type Amplifiers, etc. All mounting plates in the 200 type series are similar in design except for height as indicated in the following table. The plates are 18-13/16" long and are intended for mounting on 19" racks.

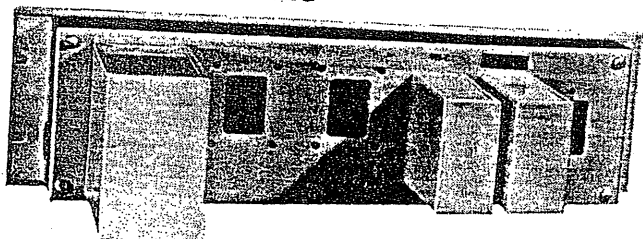
	Nominal Height*
202A Mounting Plate	3 1/2"
203A Mounting Plate	5 1/4"
204A Mounting Plate	7"
205A Mounting Plate	8 3/4"
206A Mounting Plate	10 1/2"

*Actual height 1/4" less than shown.

The plates are 2 3/8" deep over-all (2 3/8" from rack mounting surface), including 1/4" deep mounting flange. Tapped mounting strips are provided on both front and back of the strips. Mounting hole spacing is standard relay rack spacing (1 1/4" - 1/2" - 1 1/4" - 1/2", etc.). The plates are steel, zinc plated with outside surfaces finished in gray enamel. Knock-outs are furnished on each side, and cable entrance holes at ends are equipped with plug buttons.

When used on relay rack type cabinets, the 400 series Panels may be used to cover the front of the cabinet. No. 12 - 24 x 1/2" long mounting screws are furnished.

993A, 993B AND 993C MOUNTING PLATES



993C Mounting Plate with 23A Equalizer, 154C and 119C Repeating Coils.

Recessed type relay rack mounting plates equipped with face mats. The 993A has a mounting capacity of six 119 type Repeating Coils. The 993B has a mounting capacity of eight 23A Equalizers or 154C Repeating Coils. The 993C has a mounting capacity of three 119 type Repeating Coils and either three 23A Equalizers or three 154 type Repeating Coils.

Typical Specifications

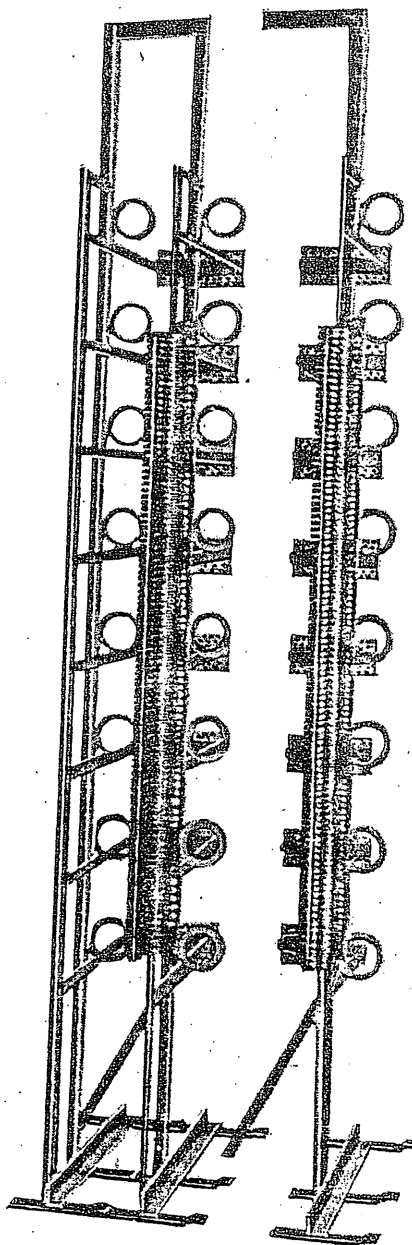
Dimensions: 19" wide, 5-7/32" high.

Finish: 993A-15; 993B-15; 993C-15 — Dark aluminum gray.

993A-3; 993B-3, 993C-3. — Black.

DISTRIBUTING FRAMES

1425 TYPE DISTRIBUTING FRAMES



(Left) This shows two units of No. 1425C Distributing Frame lined up and bolted together. As many 100 line units as desired may be installed. Two units are necessary at the beginning of the frame; one unit for each additional 100 lines.

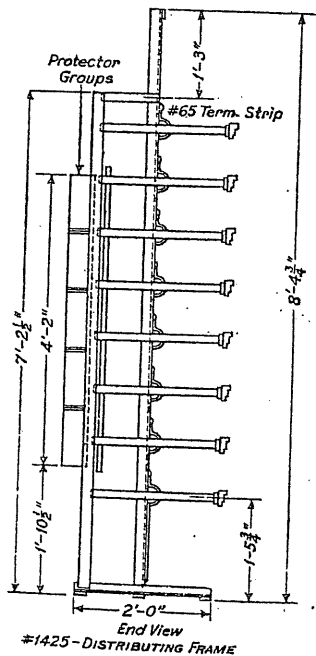
(Right) This is one 100 line unit of No. 1425C Distributing Frame. The Code No. 1425C covers the steel framework, distributing rings and fanning strips.



This is a unit type frame suitable for main frame and distribution points. In multiple installations considerable convenience can be gained by terminating all wiring on a central structure either in or closely associated with the main equipment room. These frames permit permanent cabling of established circuits and jumper wire connection for emergency or temporary circuits.

They are rigidly constructed of steel angles and bar iron, and are made up in units of one vertical member each. Each frame has a capacity of 100 lines. Several frames can be bolted together to increase the number of circuits that can be handled. By lining up a number of these frames any number of lines can be terminated. All frames are equipped with rubber covered distributing rings which are placed conveniently to facilitate the running of jumper wires.

An assembly of these frames should begin with at least two units. When ordering, specify the number of units required. Further information on the application of the frames into a specific installation may be obtained from our distributors.

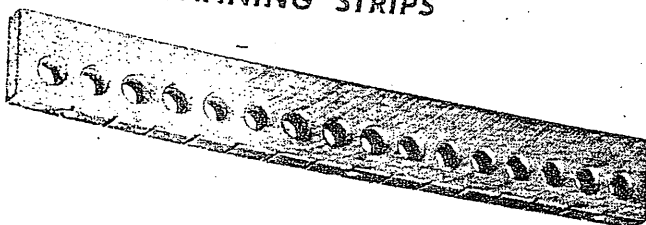


#1425-DISTRIBUTING FRAME

The Terminal strips shown on this page may be ordered separately for use with this frame; No. 65 Terminal strip is recommended.

FANNING STRIPS AND TERMINAL STRIPS

15 TYPE FANNING STRIPS

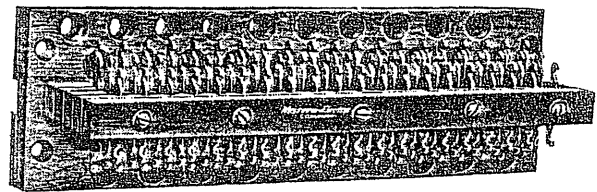


Made of well seasoned maple, the dimensions are 1-5/16" x 1/2" in either 16 pair capacity with a length of 10-7/16" (15A) or 26 pair capacity with a length of 16-11/16" (15B). They are designed to mount on edge and fasten in place by means of flat head screws. The outside edge is finished in black, so that white characters may be painted upon the surface for identification of the various wires. The holes through which the wires are to pass have their edges carefully chamfered to prevent injury to the insulation.

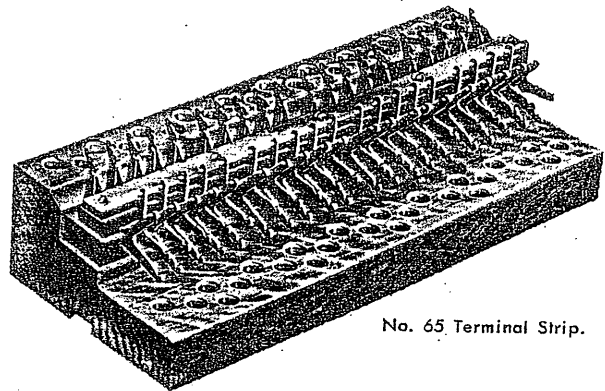
Ideally suited for use with the 31 type Connecting Blocks, where both are mounted on a suitable base or in a wall box, for studio or interstudio wiring arrangements; keeps wiring neat and orderly and permits designation for ready identification.

TERMINAL STRIPS

These terminal strips are ideal for mounting on the 1425 Distributing Frame, at the base of racks and inside equipment cabinets. They provide convenient terminations for many circuits. They are made of a solid maple base upon which are assembled hard rubber insulating strips which



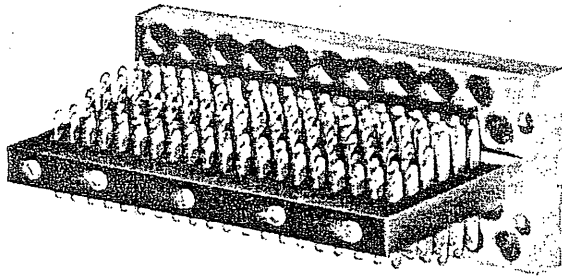
No. 35 Terminal Strip.



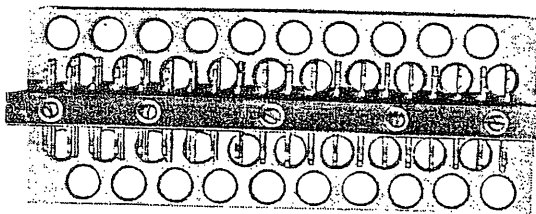
No. 65 Terminal Strip.

hold the terminal punchings in place. The base is drilled to act as a fanning strip for wires and the holes are chamfered to prevent injury to the insulation. The type 65 is a three way terminal which makes it suitable for junction points in multiple studio wiring.

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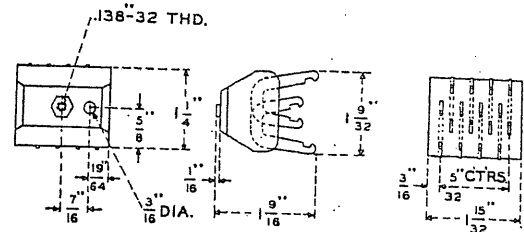


No. 85 Terminal Strip.



No. 100A Terminal Strip.

700A TERMINAL STRIP



A rugged, moulded, eight terminal strip for many applications in audio systems. U-shaped punchings are arranged so that terminals are in two rows of 4 each.

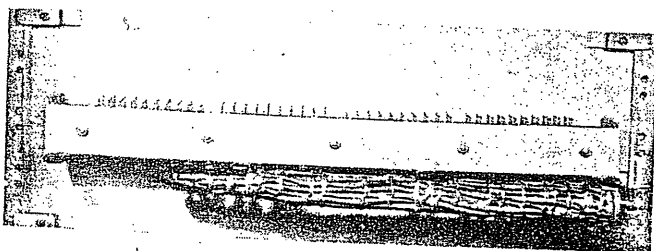
TERMINAL STRIP MOUNTING INFORMATION

Code No.	Number of Terminals per Row	Number of Rows of Terminals	Length of Strips in (Inches)	Width (Inches)	Height Overall (Inches)
35	20	3	7-31/32	2-17/32	2-31/64
36	20	4	7-31/32	2-17/32	2-55/64
*65	40	1	7-31/32	3-3/8	2-3/32
85	20	6	6-15/32	2-19/32	4-1/64
99	50	6	14-7/16	2-19/32	3-7/16
100A	20	3	6-1/16	2-15/16	2-11/16
100B	20	4	6-1/16	2-15/16	3-1/32
100C	20	5	6-1/16	2-15/16	3-13/32
100D	20	6	6-1/16	2-15/16	3-3/4
185A	30	6	11	2-15/16	4

* Three way.

TERMINAL PANEL AND CONNECTING BLOCKS

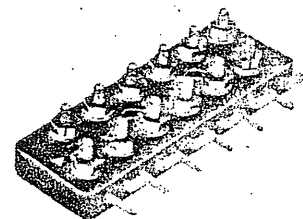
288A TERMINAL PANEL



Consists of a mounting plate equipped with 16 P-250833 Terminal Units, of 10 terminals each, a total of 160 terminals. Tie bars are provided for external cables. Approximate overall dimensions are 19" long, 1 3/4" high and

4 1/8" deep. The terminal panel, however, will require a minimum mounting space of 5-7/32" for one and 8-23/32" for two in standard racks or cabinets in order to provide space for cable forms and for making connections to the terminal units. The code 288A Terminal Panel does not include the necessary blank face panel which must be specified as a separate item on the order.

11 TYPE AND 31 TYPE CONNECTING BLOCKS



CONNECTING BLOCK MOUNTING INFORMATION

Code No.	No. of Connectors	Descriptions	Size of Base (Inches)			Material Base
			Length	Width	Thickness	
11A	2	{ Two screw terminals on each connector. Opposite terminals are electrically connected.	1-5/32	1-5/32	9/16	Composition
(a) 11B	2					
(b) 11C	2					
31A	12	{ Each connector has one lock nut binding post and one soldering terminal, brought out on the side. Intended for use with 15 type Fanning Strips.	4-3/16	1-1/2	1/2	Composition
31B	22		7-5/16	1-1/2	1/2	Composition
31C	32		10-7/16	1-1/2	1/2	Composition
31D	52		16-11/16	1-1/2	1/2	Composition

(a) The No. 11B consists of a No. 11A equipped with a black finished metal cover.
 (b) The No. 11C is the same as No. 11B except that the under-surface of the top of the cover is provided with an insulating strip to protect the terminals from short circuits.

These connecting blocks provide suitable terminals for equipment wiring. They are available in a number of sizes and arrangements and can be mounted on 102D Adapters in GA26 Cable Terminals.

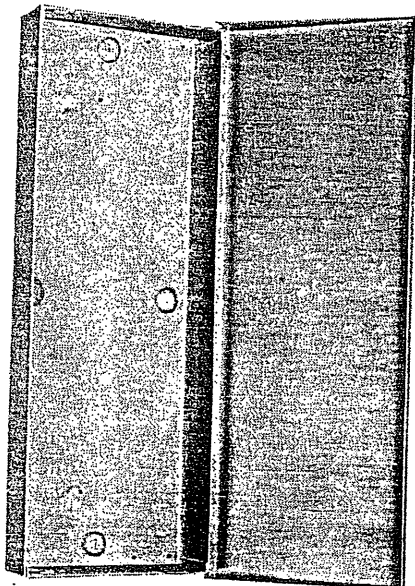
Width: 4 1/8 inches.

Depth: 2 1/2 inches.

Can be used with all types of terminal strips. When used with 11 type and 31 type Connecting Blocks a 102D Adapter is required.

CABLE TERMINAL BOX

TYPE GA26 — CABLE TERMINAL BOX

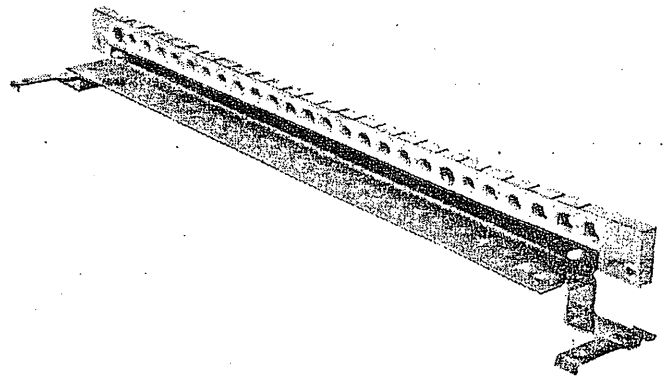


Intended for use in housing terminal strips or adapters for connecting blocks. They provide a flexible wiring arrangement by use of fanning strips and 8A Distributing Rings.

Overall Dimensions

Height: 19-9/16 inches.

102D ADAPTER



The 102D Adapter is intended for mounting No. 31 type Connecting Blocks in the GA26 type Cable Terminal.

Code No.	Mounts in Cable Terminal Box	Overall Dimensions (Inches)		
		Length	Width	Depth
102D	GA26	19-1/16	2-23/32	1-7/8

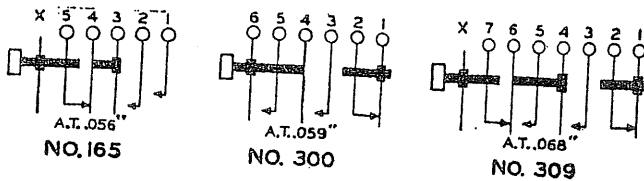
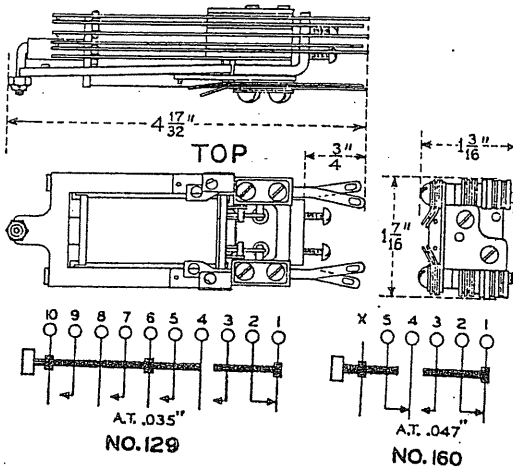
RELAYS AND MOUNTING PLATES

The "U" and "Y" type Relays are flat type, round core, general purpose twin contact relays capable of operating large spring combinations with low current consumption.

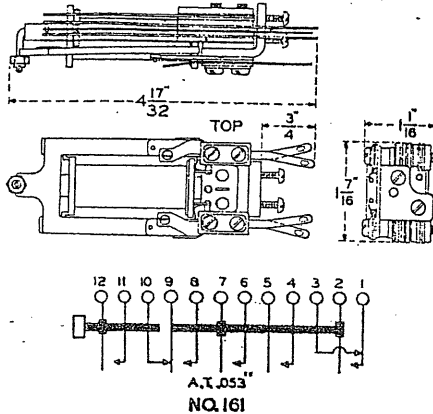
The use of the rare-metal alloy twin contact arrangement on each contact spring provides paralleled paths for current. This coupled with a slight wiping action assures positive connection on every operation.

Western Electric

U TYPE



Y TYPE



These relays can be used for program bus switching, loud-speaker cut-off, microphone switching, and for many other purposes where an efficient dependable relay is required. The "Y" type is essentially the same as the "U" type but is designed to have a slightly slower release time.

They will mount on 1 3/4" vertical centers; horizontal centers are shown in the accompanying table. They can be equipped with either individual or common dust covers. A variety of spring and contact combinations are available. Representative types only are listed below.

Code No.*	Winding	Rated Resistance (Ohms)	Operate Ampere	Horizontal Mounting Centers	Relay Cover	Spring Combinations Top	Spring Combinations Bottom
U 430	Single	700	.028	1-1/2"	U4	309	300
U 590	Single	700	.0245	1-1/2"	U4	165	160
U1183	Pri.	500	.026	1-3/4"	U5	129	129
	Sec.	500	.026				
Y 130	Pri.	165	.0645	1-7/8"	U5	161	161
	Sec.	225	.080				

*Note: Maximum safe coil dissipation for each type is 4 watts.

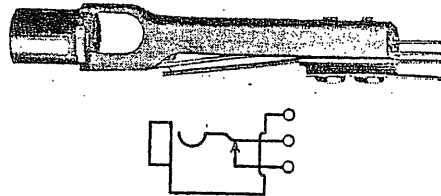
RELAY MOUNTING PLATES

These plates are of steel, arranged for mounting relays on relay racks. Dust covers are available to protect the relays from dirt and damage. The 737 type comes equipped with a common cover for all the relays on one plate. The 600A is designed to use either no cover or an individual cover for each relay. The proper cover must be ordered to fit each relay.

Code No.	Relays per Plate	Mounting Centers	Length
737J	20	3/4"	19"
737N	10	1-1/2"	19"
600A	10	1-3/4"	19"

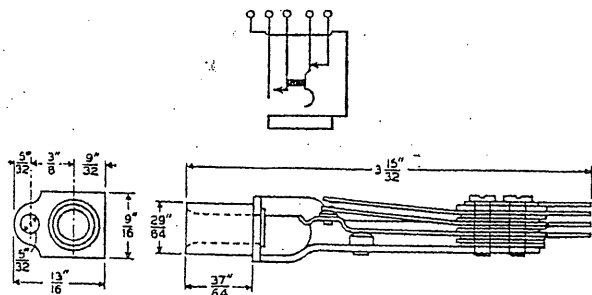
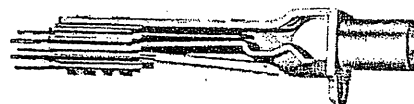
JACKS AND MOUNTINGS

JACKS — 218A AND 218J



Singly mounted, electrically welded frame type jacks with contacts of rare metal alloy. Terminals are arranged to accommodate two No. 19 or smaller B and S gauge wires. The 218J has a nickel silver sleeve while the 218A has a plain brass sleeve. They are used with 47 and 241 type Plugs, and mount in 221 and 222 type Jack Mountings. With this type of mounting the springs are in the vertical plane. These jacks can be mounted on 3/8" horizontal centers and 7/8" vertical centers.

225CE JACK

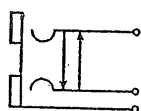
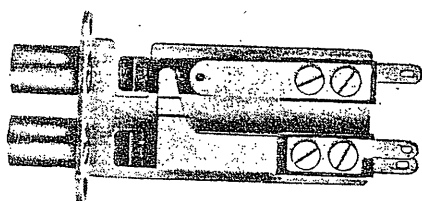




A singly mounted, electrically welded frame type jack equipped with platinum contacts and a nickel silver sleeve. Terminals of all springs are arranged to accommodate two No. 16 or smaller B & S gauge wires. It is used with 47 and 241 type Plugs and mounts in the 221 and 222 type Jack Mountings. With this type of mounting the springs are in the horizontal plane. This jack can be mounted on $\frac{7}{8}$ " horizontal centers and $\frac{3}{8}$ " vertical centers.

410D JACK

A twin jack consisting of a single frame equipped with two plain brass sleeves and two sets of springs. The tip springs are gold plated at the tip end. The 410D is used with the 241 type Plug and mounts in 221 and 222 type Jack Mountings. When so used, plugging into one jack of a pair will disconnect both normal-through connections, removing the equipment from the line, to permit testing, either toward the line or toward the equipment as desired.



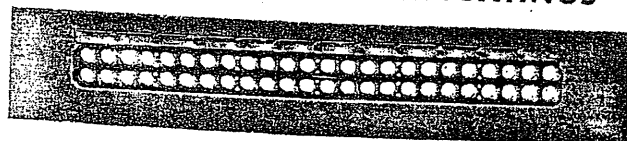
184 AND 185 JACK MOUNTINGS

Consist of a strip of black insulating material reinforced by metal strips at the sides, and equipped with metal mounting lugs at the ends.

For mounting on standard relay racks, Number 25 Jack Fasteners are required, the 184 ($1\frac{1}{4}$ " wide) has mountings for 24 jacks and the 185 ($2\frac{1}{8}$ " wide) has mountings for 48 jacks (218 or similar type). These jack mountings are supplied unnumbered. The mountings will be numbered in accordance with the order when so designated.

The 184 and 185 are arranged for, but not equipped with (unless specified on order) one No. 90A Designation Strip. 62 and 63 type Jack Spacers may be used to obtain multiples of $1\frac{1}{4}$ " for rack mounting.

221A AND 222A JACK MOUNTINGS

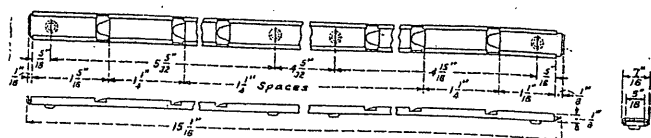


Consist of one or two jack mounting strips and a metal face mat equipped with a designation strip. The mounting strips are made of hard rubber reinforced with metal strips on top and bottom. The 221A uses one mounting strip with

a capacity of 48 jacks (218 or similar type) and occupies $3\frac{1}{2}$ " of mounting space on a standard 19" rack or cabinet. The 222A employs two mounting strips with a capacity of 96 jacks and occupies $5\frac{1}{4}$ " of 19" rack mounting space.

DESIGNATION STRIPS

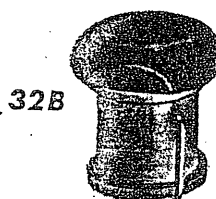
90A TYPE DESIGNATION STRIPS



These strips consist of a black finish metal retaining strip. Each designation card holder is arranged to accommodate a card for each pair of jacks or lamps. Use as an additional designation strip with 221A, 222A Jack Mountings or for other like applications requiring designation.

APPARATUS BLANKS

These blanks are designed to fulfill the need for neat appearing covers for blank jack and lamp holes. When inserted in unused apparatus holes they provide finished appearance to the equipment.



32B



39B

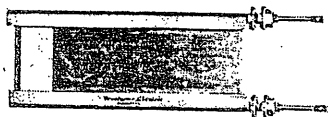
Code No.	Material	Finish	Use
32B	Metal	Black	In unequipped positions of No. 30 Lamp Sockets.
39B	Metal	Black	In unequipped positions of 218 type and similar jacks and 49 type Lamp Sockets.

RESISTANCES

To meet a wide range of circuit requirements and equipment conditions many types of dependable Western Electric resistances have been developed. Information on all specific types may be had upon request but shown below are the 18 and 19 type Resistances which are unique non-inductive precision resistances of high wattage rating for size. They will dissipate six watts continuously without injury from overheating and are ideal for making up fixed attenuator pads.

NO. 18 TYPE RESISTANCES

Resistances of the No. 18 type have a micanite core upon which a single winding is placed. The winding is protected by a covering of sheet mica. The ends of the winding are soldered to tinned terminal posts which are also used for mounting the unit. Each terminal post is provided with two fibre washers and a hexagonal nut. Will mount on 7/16 inch horizontal centers and 1 3/4 inch vertical.



The over-all dimensions are: length, 4-21/32 inches, width, 1-31/64 inches, thickness, 3/8 inch.

The resistance values do not vary more than plus or minus 5 percent from those rated in the table below. In some cases as noted, the resistance is held to even closer limits. Each resistance will dissipate six watts continuously without injury from heating.

NO. 18 TYPE RESISTANCE VALUES

Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)
18A	37	18T	50	(b) 18AP	500	18CJ	5	18EM	8600
18B	40	18U	100	18AR	380	18CN	800	18ES	4800
18C	83	18Y	90	18AT	1600	(b) 18CR	2000	(a) 18EU	500
18D	120	18Z	67	(d) 18AY	2.4	(d) 18CU	0.8	18EW	5000
18E	140	18AA	95	18BA	2000	(d) 18CW	1.6	18FB	900
18F	150	18AB	45	(b) 18BE	20	(b) 18DA	1510	18FC	4000
18G	200	18AC	500	18BF	284	(b) 18DB	3000	18FG	8080
18H	210	18AD	240	(b) 18BG	400	(b) 18DG	426	18EP	6350
18J	30	18AE	600	18BH	1000	(b) 18DH	700	(b) 18FR	3200
18K	80	18AF	300	18BJ	1200	(b) 18DJ	15	(b) 18FS	4250
18L	170	18AG	226	(b) 18BK	1300	(a) 18DP	18.75	(c) 18GL	5545
18N	180	18AJ	400	18BL	750	(b) 18DS	1700	(b) 18GU	8
18P	130	18AK	60	(b) 18BM	1000	18EA	9000	(b) 18GW	5.4
18Q	110	18AL	4	(b) 18BT	200	18EC	6000	(c) 18HH	0.3
18R	10	18AM	250	(b) 18BU	300	(b) 18EE	128	(c) 18HJ	0.5
18S	20	18AN	350	(b) 18BW	100	18EF	2500	(g) 18JC	600
								18JG	220.4

(a) Resistance value does not vary more than plus or minus 1/2 %.

(b) Resistance value does not vary more than plus or minus 1 %.

(c) Resistance value does not vary more than plus or minus 2 %.

(d) Resistance value does not vary more than plus or minus 3 %.

(g) Resistance value does not vary more than plus or minus 0.1 of 1 %.

NO. 19 TYPE RESISTANCE VALUES

Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)	Code No.	Resistance (Ohms)
19A	37 and 37	19AN	260 and 260	(f) 19DN	100 and 100	19GJ	300 and 500
19B	40 and 40	19AP	180 and 180	19DP	0.25 and 0.5	19GL	300 and 300
19C	40 and 83	19AW	2.5 and 2.5	19DR	1 and 2	19GM	400 and 1000
19D	83 and 83	19BA	900 and 900	19DT	150 and 300	(c) 19KG	160 and 2990
19H	40 and 120	19BB	300 and 2300	19DY	500 and 500	(c) 19KH	286 and 1325
19K	100 and 100	19BC	50 and 300	(b) 19EA	115 and 115	(c) 19KJ	467 and 512
19S	60 and 90	19BE	30 and 90	19EB	20 and 330	(c) 19KL	269 and 1490
19T	25 and 25	19BG	200 and 400	19EC	650 and 1600	19KM	84 and 6350
19Z	120 and 120	19BJ	350 and 350	19EW	800 and 800	(c) 19KN	146 and 651
19AD	150 and 150	19BL	1 and 1	(b) 19GA	400 and 600	(a) 19PC	102.6 and 3509
19AH	240 and 240	(b) 19CA	185 and 770	(b) 19GB	80 and 85	(b) 19SR	600 and 800
19AJ	200 and 200	19CN	100 and 200	(b) 19GC	75 and 110	19SS	2500 and 2500
19AM	50 and 50	(b) 19DG	133 and 770	(b) 19GH	425 and 425		

(a) Resistance value does not vary more than plus or minus 1/2 %.

(b) Resistance value does not vary more than plus or minus 1 %.

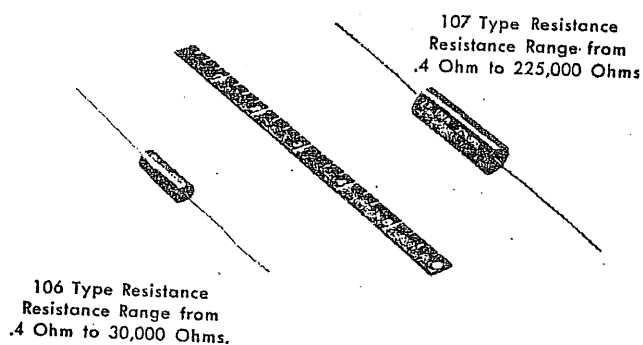
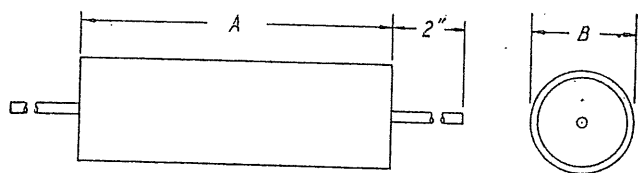
(c) Resistance value does not vary more than plus or minus 2 %.

(f) The two parts are balanced for resistance within 1 % of each other.

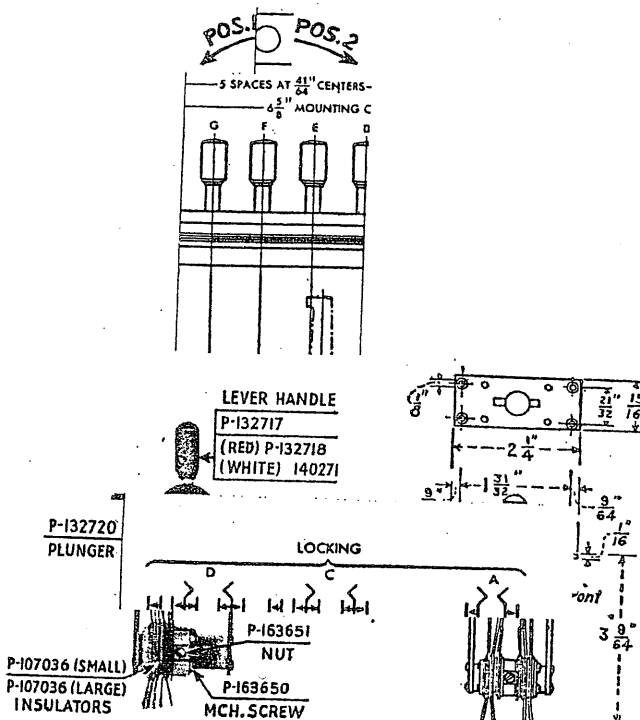
NOS. 106 AND 107 TYPE RESISTANCES

These resistances are low wattage, tubular type, precision wire wound units having a low reactance; suitable for use at high frequencies. They are equipped with tinned axial terminals by which they can be supported.

Code No.	Resistance Values Held Within	Allowable Range of Resistance (Ohms)	Dimensions A (inches) B	
106A	± 1%	0.4 to 30,000	1	5/16
106B	± .25%	7.0 to 12,000	1	5/16
106C	± .10%	10.0 to 12,000	1	5/16
107A	± 1%	0.4 to 250,000	1-1/2	1/2
107B	± .25%	7.0 to 90,000	1-1/2	1/2



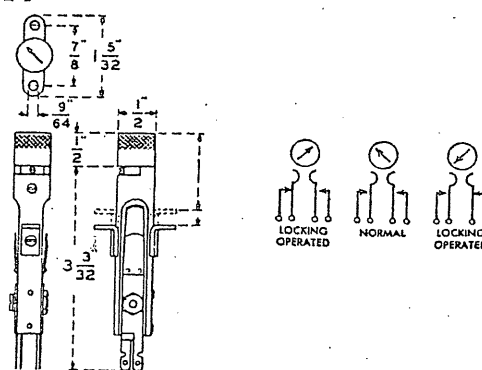
KEYS AND KEY UNITS 479 KEY



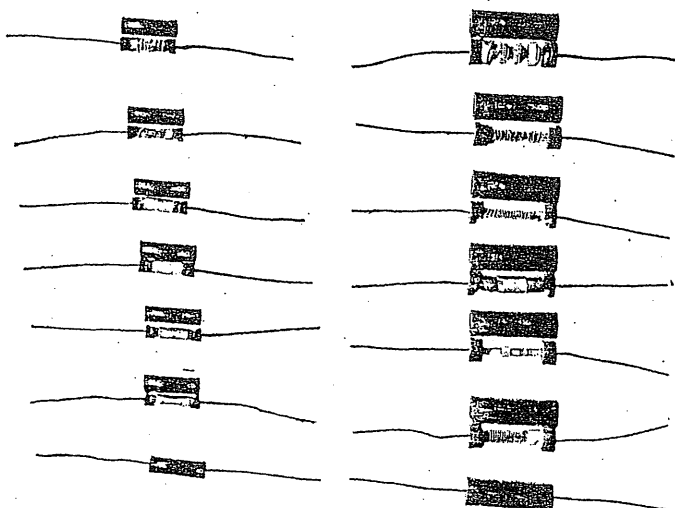
The No. 479 two or three position, lever operated type keys have spring combinations mounted in a metal frame. A black finish metal top or face plate 2 1/4" long x 15/16" wide supports the 479 type Key for mounting through a large rectangular hole in the front of a wood or metal panel. The face plate covers the mounting hole and is an integral non-removable part of the key frame. Four No. 4 oval head wood screws are furnished with each key for mounting. Key handle not included; order as required.

A wide variety of spring combinations are available in this type of key; some of the more popular combinations are shown below. For spring combinations other than those shown, consult our nearest distributor. (See also No. 2 type Key Units, page 105.)

498A KEY



Singly mounted rotating type key intended for switching. Arranged to rotate 90 degrees clockwise and 90 degrees counterclockwise from normal; closes a "make" contact in each position except normal; designed to mount on a 3/8"

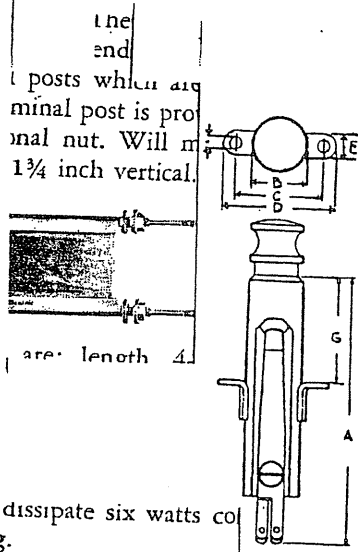
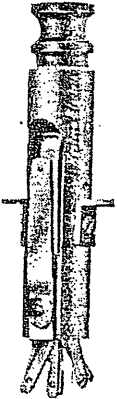


106 and 107 type Resistances with cases removed to show type of construction.

Western Electric

thick panel. Other 498 type Keys have a single 90 degree rotation and have various contact arrangements up to six springs.

92 TYPE KEY

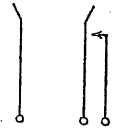
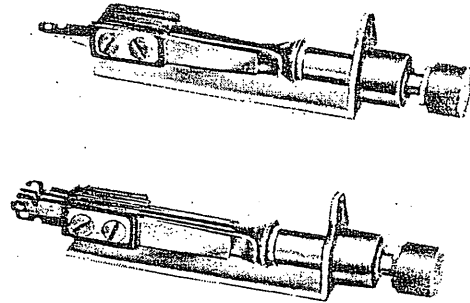


each resistance will dissipate six watts coil injury from heating.

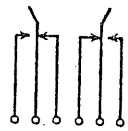
NO. 18 TYPE

A singly mounted, mechanically locking type key equipped with a variety of "make" and "break" contacts, up to a capacity of four transfers (twelve springs).

547A AND 547B KEYS



547 A



547 B

Non-locking push button type keys interchangeable with and mounting like the 218 type Jack. The 547A closes one "make" contact while the button is pressed and 547B operates two sets of "break before make" contacts when the button is pressed.

92 TYPE SINGLE MOUNTED KEYS (Representative List Only)

Singly Mounted Type Keys

LOCKING TYPE (Button remains at rest in either operated or unoperated position)

Code No.	No. of Springs	Spring Arrangements	Dimensions (Inches) (See Dimension Cut)								
			A	B	C	D	E	F	*G		
92B (1)	6	2 Sets Fig. C	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92D	9	3 Sets Fig. C	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92H (2)	8	{1 Set Fig. A}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
		{2 Sets Fig. C}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92N (3 & 4)	3	1 Set Fig. C	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92P (3 & 5)	2	1 Set Fig. A	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92AA	6	2 Sets Fig. D	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8

NON-LOCKING TYPE (Button at rest only in unoperated position, spring restoring)

Code No.	No. of Springs	Spring Arrangements	Dimensions (Inches) (See Dimension Cut)								
			A	B	C	D	E	F	*G		
92A (1)	6	2 Sets Fig. C	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92J	6	{1 Set Fig. A}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
		{2 Sets Fig. B}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92W	6	2 Sets Fig. D	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92Y (6)	4	2 Sets Fig. A	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	5/8	11/16	7/8
92AN	8	{1 Set Fig. A}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	1/2	11/16	7/8
		{2 Sets Fig. C}	3-5/32	21/32	1-1/32	1-5/16	9/32	5/32	1/2	11/16	7/8

(*) Arranged for thickness of shelf as indicated.

(1) Keys arranged for 7/8" shelf will be furnished unless otherwise specified.

(2) Top of button engraved "MON".

(3) Keys arranged for 1 1/16" shelf will be furnished unless otherwise specified.

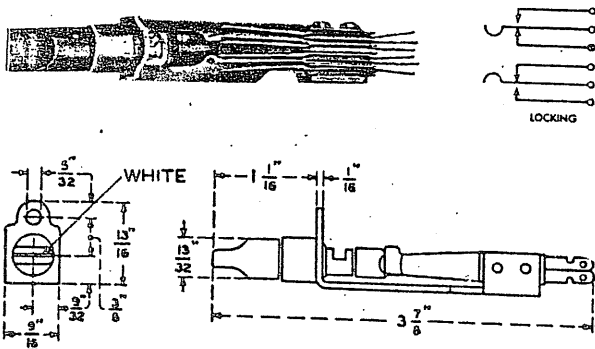
(4) Top of button engraved "E".

(5) Top of button engraved "C".

(6) Keys arranged for 1/2" shelf will be furnished unless otherwise specified.

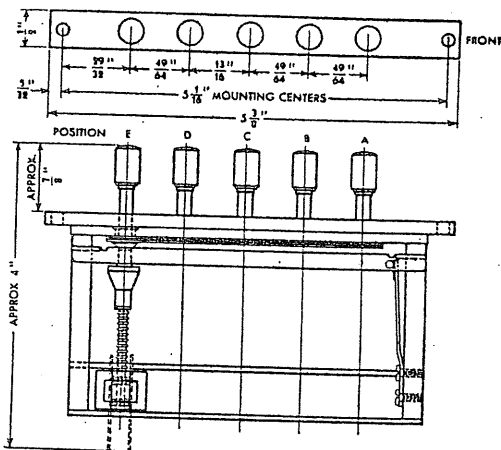


552A KEY



A turn button locking type key arranged to rotate 90 degrees clockwise from normal. The 552A closes two "break before make" contacts upon rotation of the button. It is interchangeable with and mounts like the 218 type Jack.

553A KEY

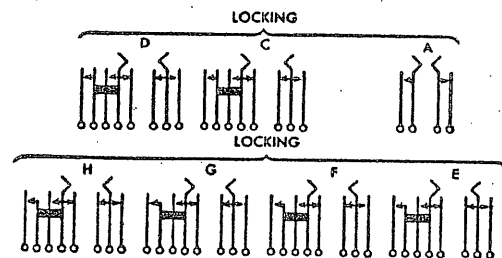
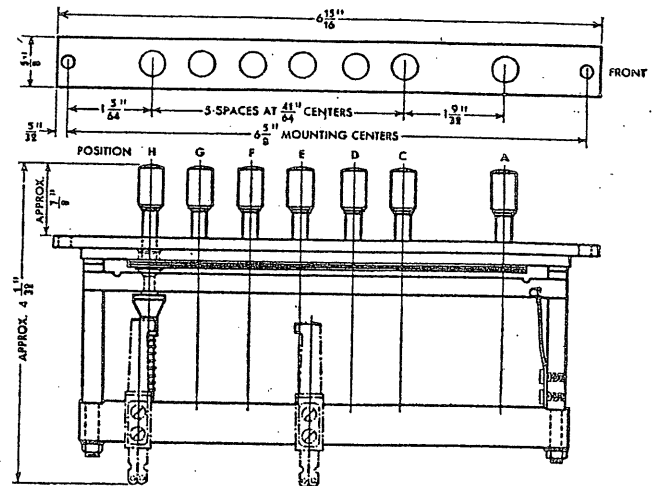


A reliable five button, mechanically interlocking key used for program switching. All plungers lock in the operated position, but operation of any one plunger releases any other operated plunger. This key is used in the 271 type Output Switching Panel. Four active positions; fifth position is "Off."

Width: 25/64". Buttons project approximately 7/8" to the front.

Length: 5 3/8". Key projects 3 1/8" to the back.

554A KEY



A reliable seven button, mechanically interlocking key used for program switching. All plungers lock in the operated position, but operation of any one plunger releases any other operated plunger. This key is used in the 271 type Output Switching Panel. Six active positions; seventh position is "Off."

Width: 7/8". Buttons project approximately 7/8" to the front.

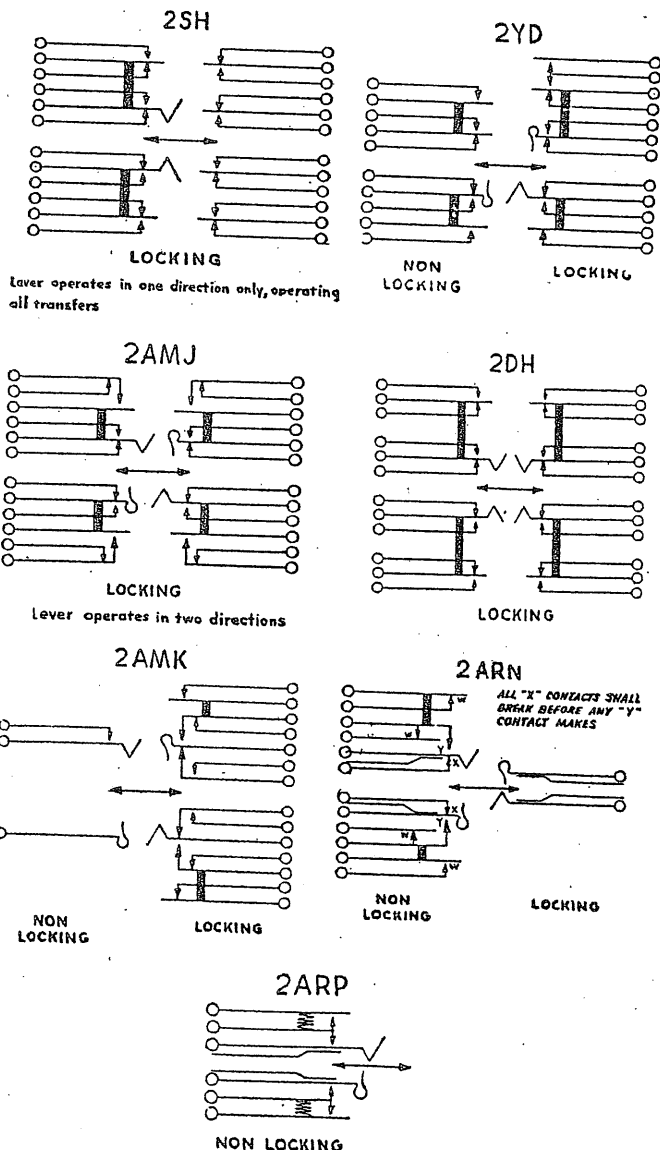
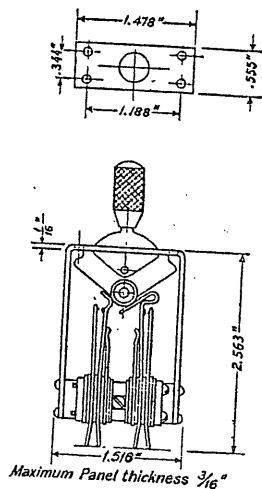
Length: 6-15/16". Key projects approximately 3 1/8".

NO. 2 TYPE KEY UNITS

Two and three position lever operated type keys having spring combinations mounted in a metal frame. The operation of these key units is the same as for the 479 Key described on page 103; the keys are also similar in mechanical arrangement. However, they are arranged for mounting on a metal panel only with a small rectangular slot for the key lever. The metal mounting serves instead of the key top (face plate), the face plates shown on the 479 Key being omitted. Usually these switches are mounted on photo etched panels or other types of panels where face plates are unnecessary. Key handle not included; order as required.

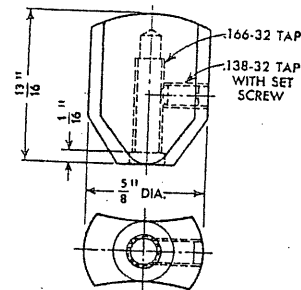
A variety of spring combinations are available, some of the more popular of which are shown below.

NO. 2 TYPE KEY UNITS (Cont'd)



KEY HANDLE AND KNOBS

KS-10011 KEY HANDLE



A decorative flat type key handle with convex finger surfaces for fingertip control of lever type keys such as 479 type Keys or 2 type Key Units. Available in black, red, white, blue or green. Colors must be specified on order.

KS-10088 KNOB

A black phenol plastic mushroom type knob with skirts and raised pointers to facilitate fingertip control and eliminate cramped hands. It has a chromium bar on the pointer and a chromium indicator line inset in the top of the knob to show the knob setting at a glance. The depth of the knob is 1-5/16" and the skirt diameter for List 1 is 2-7/16" and for List 2 is 2 1/8". Two set screws are provided 90 degrees apart to insure positive positioning.

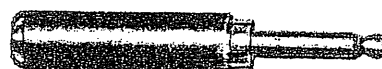
KS-10283 KNOB

Primarily intended for use in Sound System Equipment and similar applications.

Consists essentially of a black moulded knob having a chromium bar type pointer and equipped with a bushing for use on a 1/4" diameter shaft, primarily for such applications are meter switching where frequent operation is not required. Approximate overall dimensions of this knob are 1 3/4" in diameter by 1 1/8" high. Similar to the KS-10088 knob except that it is smaller in size.

PLUGS

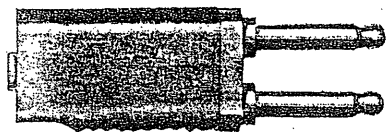
47A, 47B PLUGS



For use with a two conductor cord (P2A) and 218 and 225 type Jacks. The 47A has a red shell and the 47B has a black shell.



241A, 241B PLUGS



Double circuit plugs with the brass frames of the two plugs electrically connected to the two plug sleeves. Used with the P2AA and P3J Cords and 218, 225 and 410 type Jacks when these jacks are mounted in jack mountings such as 221A and 222A. The 241A has a black shell and the 241B has a red shell.

LAMP SOCKETS

47B AND 49B SOCKETS

Double ...
each pair distinguish...
...nated.

Singly mounted sockets arranged to take the 2 type Lamp and the 2 or 72 type Lamp Cap. The 47B mounts interchangeably with the 218 type Jack. The 49B mounts on a key shelf or panel $\frac{7}{8}$ " thick. These sockets are made of brass with nickel silver springs and are insulated with hard rubber. The shell has a nickel plate finish. Brass finish can be had by specifying 47A or 49A type Sockets.

LAMPS

2 TYPE LAMPS



High quality carbon or tungsten filament lamps with a long life and high illuminating power. They have a tipless, clear glass bulb, length $1\frac{3}{4}$ " and diameter $\frac{5}{16}$ " and mount in 47 and 49 Lamp Sockets. The special filament and rugged construction provide the user with a lamp that will give long and dependable service.

A 116 Lamp Tool is required to facilitate insertion and removal of the lamp from its socket.

Code No.	Operating Voltage	Current Consumption	
		Min. Amps.	Max. Amps.
2F	12	0.105	0.120
2G*	24	.075	.115
2U	24	.035	.0475
2Y	48	.025**	.035**
A1***	24	.033	.045
E1***	6	.033	.045

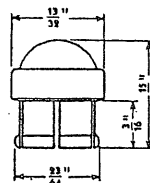
* The 2G is inherently more rugged than the 2U and provides nearly 3 times as much light.

** Currents at 40 volts.

*** These lamps are Tungsten filament lamps; the others are carbon filament lamps.

LAMP CAPS

2 TYPE LAMP CAPS

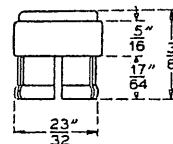
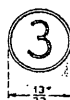


Made from specially selected and treated glass, the lens of this cap is thick and substantial. The cap is slotted to give a spring fit in the socket. It is available in a variety of surface treatments and colors including red, white, blue, green, and amber opalescent; jeweled red, blue, and green; and clear amber. The 2 type Lamp Cap mounts in the 47 and 49 type Lamp Sockets. In order to facilitate removal of the lamp caps for maintenance purposes a 319B Lamp Cap Tool is required.

No. 2 Type Lamp Caps

Symbol	Code No.	Color
○	2H	Red opalescent
○	2L	Green opalescent
⊗	2P	Jeweled red
⊗	2S	Jeweled green
○	2U	Amber opalescent
○	2W	Blue opalescent
○	2AY	White opalescent
⊗	2BP	Clear Amber

72 TYPE LAMP CAPS



Similar to the 2 type Lamp Cap except that the lens has a flat top with translucent numbers engraved on a black background (single characters), or black characters on white, red or green backgrounds (up to four characters). Mounts in the 47 and 49 type Lamp Sockets.

Western Electric

No. 72 Type Lamp Caps

Code No.	Symbol	Color
72A	①	Translucent on black
72B	①	Translucent on black
72C	②	Translucent on black
72D	③	Translucent on black
72E	④	Translucent on black
72F	⑤	Translucent on black
72G	⑥	Translucent on black
72H	⑦	Translucent on black
72J	⑧	Translucent on black
72K	⑨	Translucent on black
*72L	⑩	Black on white
*72M		Black on red
*72N		Black on green

* Characters as specified in order. One, two, or three characters will be arranged on one line, four characters on two lines.

WIRE

J1 WIRE

Solid, tinned conductors, two cotton braids, asphaltic impregnation. Obtainable in 18, 20, 22, and 24 gauges; singles only; black only.

KS-13385 WIRE

This hookup wire is designed for use at operating voltages of 600 volts rms or less and temperatures not exceeding 185°F. This wire consists of solid or stranded tinned copper conductor insulated with a polyvinyl chloride covered with a cotton braid and a coat of lacquer.

It can be obtained in AWG conductor sizes 22, 20, 18, 16, 14, 12, 10 and 8 stranded and numbers 22, 20, 18, 16 and 14 solid in singles, pairs, triples, quads or other combinations. It is furnished in various colors designated by colored thread in the outer part. The order should include reference to KS-13385 and specify the quantity, feet, gauge and numbering, conductors, color and whether solid or stranded. For color combinations consult our nearest distributor.

P2 WIRE

Designed primarily for high grade transmission circuits and for general use where a shielded wire is required. Tinned enameled conductors, double cellulose acetate yarn, single cotton and lacquer coated. The wires are covered with a braided shield of tinned copper wires with a 22 gauge tinned copper wire running longitudinally under the shield

for grounding purposes. The braided shield is covered with a paper tape and a gray cotton braid. Both the cotton braid and the braided shield may be readily pushed back in terminating the wires. Obtainable in 22 gauge; single, pair, and triple, and in a variety of colors. For color combinations please consult our nearest distributor.

KS-7133 CABLE CORDAGE

(See page 14 in microphone accessories section.)

CABLE

LEAD COVERED

CONSTR. KNOB

Western Electric lead covered cable possesses several advantages of material benefit to users. It makes use of the most suitable designs and materials to secure and maintain high quality cable construction. The design is such as to insure ease of handling without tendency to buckle. Manufacture is controlled to keep moisture content to a minimum. Sheathing and insulation are of uniform thickness and have a maximum of mechanical ruggedness as a protection against damage.

These cables are ideally suited for inter-studio relay circuit and speech input equipment wiring.

TYPE "OUA" LEAD COVERED CABLES

Conductors: No. 22 A. W. gauge — tinned.

Insulation: Enamel, double cotton, lacquered, each pair distinguishable from every other pair.

Core: Not impregnated.

Sheath: Pure lead.

Conductor Resistance: Not greater than 96 ohms per mile of cable at 68 degrees Fahrenheit.

Insulation Resistance: Not less than 20 megohm miles at 60 degrees Fahrenheit.

Dielectric Strength: Insulation between conductors and between conductors and sheath capable of withstanding a-c potentials having maximum instantaneous values of 700 and 1415 volts, respectively.

Intended for interior construction.

COMPONENTS AND ACCESSORIES



Code	Actual Number of Pairs	Number of Good Pairs	Mean Outside Diameter (Inch)	Thickness of Sheath (Inch)	Approx. Lbs. per Foot
OUA6	6	6	0.33	0.040	0.21
OUA11	11	11	.41	.043	.30
OUA16	16	16	.47	.045	.38
OUA20	21	21	.51	.047	.46
OUA26	26	26	.57	.049	.53
OUA31	31	31	.60	.050	.58
OUA41	41	41	.69	.053	.71
OUA51	51	51	.75	.056	.86
OUA76	76	76	.89	.061	1.1
OUA101	101	101	1.01	.065	1.4

Conductor Resistance: Not greater than 96 ohms per mile of cable at 68 degrees Fahrenheit.

Insulation Resistance: Not less than 10 megohm miles at 60 degrees Fahrenheit.

Dielectric Strength: Insulation between conductors and between conductors and sheath capable of withstanding a-c potentials having maximum instantaneous values of 700 and 1415 volts, respectively.

Intended for interior construction.

TYPE "BUA" LEAD COVERED CABLES

Conductors: No. 22 A. W. gauge — tinned.

Insulation: Double cellulose acetate yarn, single cotton, lacquered, each pair distinguishable from every other pair.

Core: Not impregnated.

Sheath: Pure lead.

Code	Actual Number of Pairs	Number of Good Pairs	Mean Outside Diameter (Inch)	Thickness of Sheath (Inch)	Approx. Lbs. per Foot
BUA6	6	6	0.32	0.040	0.20
BUA11	11	11	.41	.043	.28
BUA16	16	16	.45	.045	.36
BUA21	21	21	.50	.047	.44
BUA26	26	26	.55	.048	.49
BUA31	31	31	.58	.049	.56
BUA41	41	41	.67	.053	.69
BUA51	51	51	.74	.055	.82
BUA76	76	76	.87	.060	1.1
BUA101	101	101	.99	.065	1.4

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Western Electric

GENERAL INFORMATION

History

The Western Electric Company was organized in 1881 as the successor to the Western Electric Manufacturing Company of Chicago, manufacturers of telephone apparatus. This was just five years after Alexander Graham Bell invented the telephone. The Western Electric Company is, therefore, the oldest electrical manufacturer in the United States continuously engaged in the production of electrical apparatus.

Factory, Products, Distribution

Our new radio shops, established in Burlington and Winston Salem, N. C., to augment our production facilities, combined with a centralized system of purchasing and established inspection procedures, enable the Western Electric Company to produce at all times, electronic equipment which sets the standard in the fields of communication, sound reproduction and amplification.

Western Electric electronic products are given world wide distribution through selling organizations maintaining branches in the principal business centers. This means that products of this company are readily available everywhere. Also available are the services of specialists who understand the use and application of these products and can supply definite and comprehensive information and assistance to prospective customers and purchasers.

Accessibility of a Permanent Source of Supply

An important factor to be considered initially, in the purchase of sound system equipment is the certainty of a

permanent source of supply, as well as for repair and additional parts. Purchasers of Western Electric Sound equipment are assured of this advantage. As advances in the art of sound system communication make it necessary to develop new types of apparatus, the improved or newly developed equipment, when ready for the market, is made ready and immediately available through the Western Electric Company's domestic and foreign distributors and dealers. Names of these concerns in the United States can readily be found in the local telephone classified directories under "Public Address Systems".

Prices

Prices are always as low as possible consistent with the high grade of material, expert workmanship and excellent performance which form the basis of the Western Electric Company's manufacturing policy. Quotations will be furnished upon application to the nearest authorized Western Electric Sound Systems dealer.

Additional Descriptive Literature

Additional descriptive literature is available from the offices listed on the opposite page, covering not only every phase of sound distribution, but broadcasting, police, marine, aviation and emergency communications as well. You are invited to communicate with your local Western Electric Sound Systems dealer for further information. His address will be found under the "Public Address System" listing in your Classified Telephone Directory.