

# Western Electric



## 106A LINE AMPLIFIER

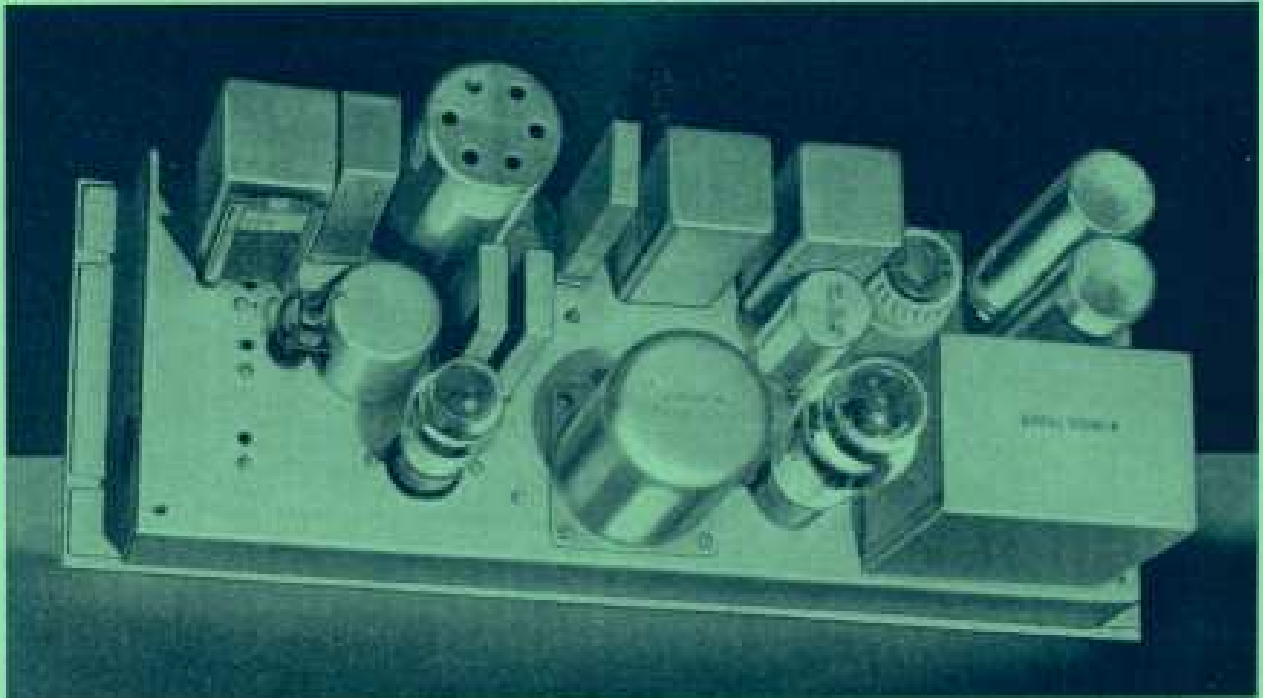
**Its Features are Compactness and Resulting Economy of Space, Highest Overall Quality and Performance, Reliability, Efficient and Economical Operation.**

**W**ITH a full appreciation of the value of space in modern broadcasting stations, Bell Telephone Laboratories' engineers developed Western Electric's recent contribution to radio broadcasting — the 106A Amplifier. The 106A Amplifier is designed for use as a line amplifier in speech input equipment, particularly where compactness and high quality amplification are desired. It is used at studio locations to compensate for output switching circuit losses and to provide isolation between outgoing program lines. It also is used as a general purpose amplifier for applications where moderate gains and power levels are required.

The 106A Amplifier is of the two-stage AC type, having a gain of approximately 45 db.

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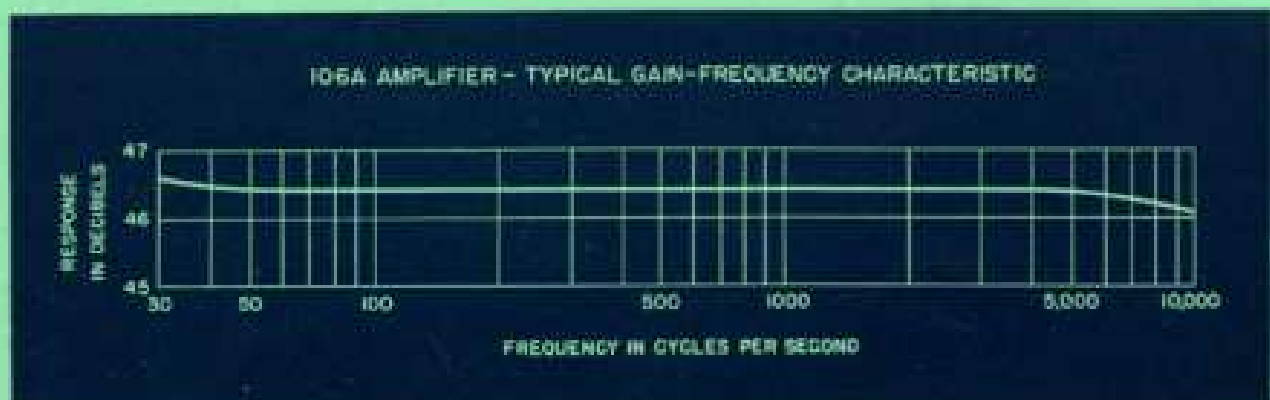
### 106A LINE AMPLIFIER



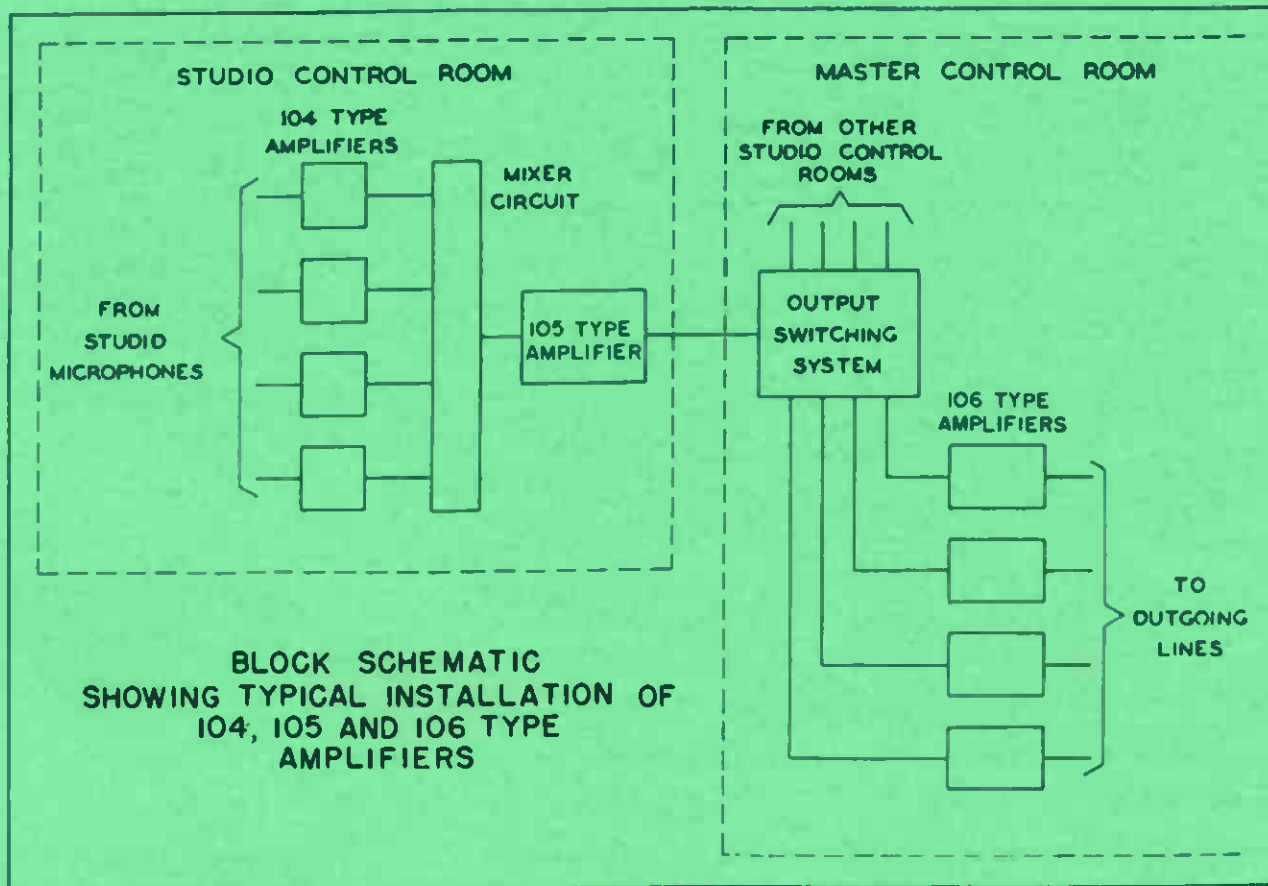
106A Line Amplifier — rear view

While it is designed to operate between impedances of 600 ohms, it will operate equally well between 500 ohm impedances. It also has a high impedance input of 10,000 ohms for bridging across 600 ohm circuits such as may be encountered when additional program lines are desired, thus eliminating the need for special dividing networks; the gain under such a condition is approximately 20 db.

As in the 105 type amplifier, an additional winding on the output transformer will deliver a voltage approximately 20 db below the main output of the amplifier for monitoring with an amplifier of the Western Electric 94 type. The operation of this winding (impedance approximately 40 ohms) has no effect on the main output of the amplifier.



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**Assembly**

The component parts of the 106A Amplifier are assembled on a recessed panel, 19" wide and 7" high, designed for mounting on a standard relay rack or in an equipment cabinet. This panel is equipped with a front mat which is held in place by four screws from the rear and is removable to allow convenient access to the wiring and terminals, otherwise concealed in the recessed portion. The gain control knob, two push type keys and a power switch project through the front mat for convenient operation from the face of the amplifier. The front mat is also equipped with a pilot lamp to indicate when the amplifier is energized.

Two push type keys are used in connection with an external meter for measuring the plate currents of the vacuum tubes in the 106A Amplifier. If the 106A is used in conjunction with the Western Electric 105 type amplifier, the plate current meter in the latter amplifier may be utilized to measure the plate currents. Terminals are provided on the 105 type amplifier for making connections to the 106A. The upper scale (0 to 2 milliamperes) of the meter on the 105 type amplifier indicates the plate current of the first stage vacuum tube, and the lower scale (0 to 40 milliamperes) indicates the plate current of the second stage vacuum tube of the 106A Amplifier. If this meter is not available, a Western Electric KS-10003 Meter or a 200 micro-ampere scale meter with a series multiplier of such

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resistance as to make the total value of multiplier and meter resistance 1,000 ohms, may be used.

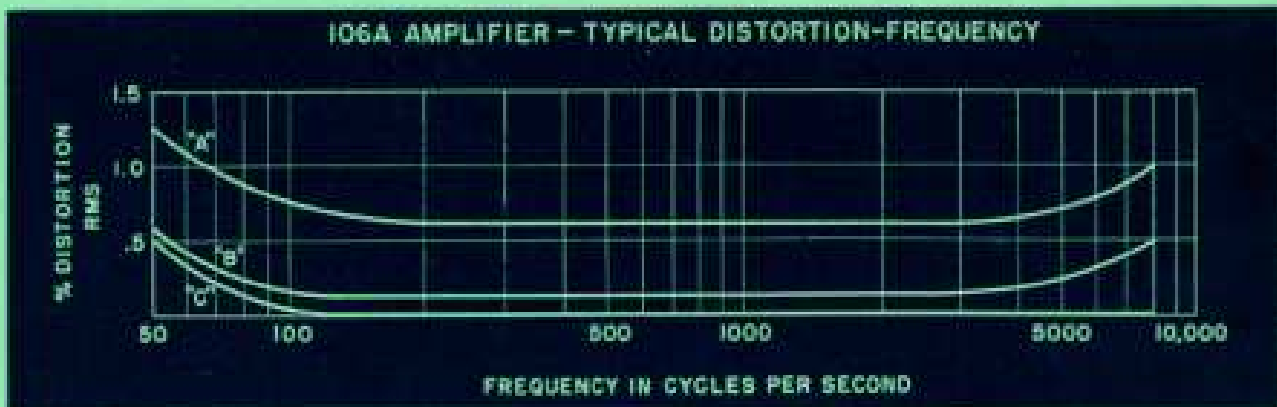
There are two terminal strips on the amplifier, one providing for the audio frequency circuits, plate current meter and plate supplies for external amplifiers and the other providing for the AC circuits.

#### Gain

The 106A Amplifier has a maximum gain of approximately 45 db and is equipped with a gain control which has nineteen 2 db steps, providing a total attenuation of 38 db and an "OFF" position.

#### Noise Level

The low distortion, low noise level and flat frequency response characteristics, as in 105 type amplifier, are obtained through the use of the Western Electric circuit principle of stabilized feed-back. With this system, the distortion level is held to less than 1% at 400 cycles at an output level of plus 20 db. At maximum gain the noise level is minus 60 db unweighted, and minus 75 db weighted, as the ear would hear it.

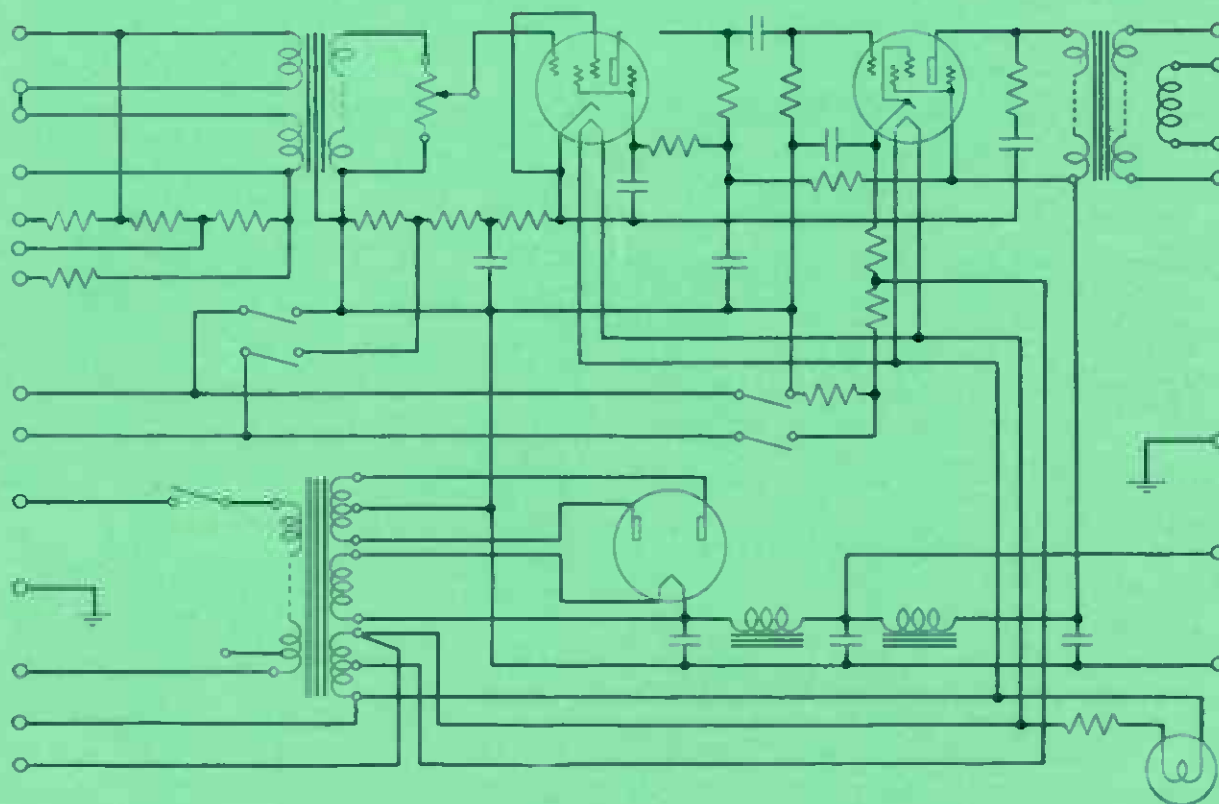


Curve "A"—Output Level + 20 db (.6 Watt)  
Curve "B"—Output Level + 10 db (.06 Watt)  
Curve "C"—Output Level 0 db (.006 Watt)

#### Self-Contained Power Supply

The 106A Amplifier is operated from a 105-125 volt, 50 or 60 cycle power supply. The power consumption is approximately 45 watts at 120 volts. This amplifier, with its self-contained power supply, also has sufficient capacity to supply filament and plate power to as many as six of the 101 type pre-mixing amplifiers. However, if plate supply for 101 type amplifiers is obtained from the 106A Amplifier an additional external filter section, consisting of a Western Electric 221A Retardation Coil or equivalent, and an 8 microfarad condenser is required.

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Schematic—106A Amplifier

SPECIFICATIONS

Electrical Characteristics

Gain

45 db when operated as a line amplifier between 600 ohm circuits, and a gain of 20 db when operated as a high impedance (10,000 ohms) bridging amplifier across program lines of 600 ohms impedance.

Output Power

0.6 watt (+ 20 db)

Output Noise Level

- 60 db unweighted
- 75 db weighted, as the ear would hear it at maximum gain

Input Impedances

600 ohms or 10,000 ohms

Output Impedance

600 ohms

Frequency Response

Variation with  $\pm 1$  db from 30 to 10,000 cycles

Distortion

At + 16 db output, distortion less than 1.0% at any frequency from 50 to 8,000 cycles

Power Supply

105/125 volts, 50 or 60 cycles, AC

Power Consumption

Approximately 45 watts at 120 volts

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#### **Vacuum Tubes**

The following Western Electric vacuum tubes are required and should be ordered separately:

1 — 310B Vacuum Tube (1st stage)      1 — 274A Vacuum Tube (rectifier)  
1 — 336A Vacuum Tube (2nd stage)

#### **Mechanical Characteristics**

##### **Dimensions**

Height 7"  
Length 19"  
Depth 7¼"

##### **Weight**

Approximately 22 lbs.

##### **Construction**

Recessed panel construction. Panel has removable front mat to allow access to wiring and terminals in recessed portion of panel.

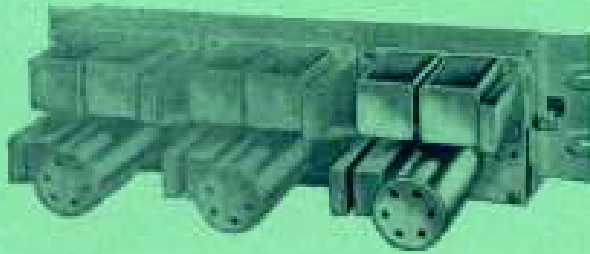
##### **Finish**

The front mats are finished as listed below. The code number suffix indicates the color. The complete number, including the suffix, should be specified in the order.

<b>Code No.</b>	<b>Finish</b>
106A-3	Rubber Finish, Black, Japan
106A-15	Dark Aluminum Gray

# Other Western Electric Speech Input Amplifiers

## 104B SINGLE STAGE PRE-AMPLIFIER



A high quality, low cost, fixed gain unit — extremely compact and economical to operate. Gain: approximately 28 db. Frequency response: flat within 1 db from 30 to 10,000 cycles. Impedances: 30 or 250 ohms input, 30 or 500 ohms output. Dimensions: 5¼" x 4⅞" x 6¾".

Three 104B's on 998 type mounting plate (as shown) occupy only 5¼" space on standard relay rack.

## 105A THREE STAGE, HIGH GAIN UNIT

Stabilized Feedback. Impedances: 30 and 600 ohms input, 600 ohms output. Frequency response: flat within  $\pm 1$  db from 30 to 10,000 cycles. Gain: approximately 70 db. Gain Control: range 38 db. Power supply: completely self-contained, operating from 105-125 volt, 50-60 cycle, AC. Distortion level: less than 1% at 400 cycles for 20 db output. Noise level: -55 db unweighted, -65 db weighted (as the ear would hear it) at maximum gain. Includes v. i. and plate meters. Occupies only 10½" of standard rack space.



## 110A VOLUME LIMITING AMPLIFIER



Efficient utilization of channel capacity by non-distorting compression of excessive levels allowing higher average of transmission and modulation. Impedances 600 in and out. Input levels down to -35 db. Output levels up to +20 db. Maximum overall gain 55 db. Frequency response within 1 db from 30 to 10,000 cycles. Distortion less than 1%. Power supply self-contained operating from 105-125 volt, 50-60 cycle AC. Either metal or glass tubes. Occupies 19¼" panel space on 19" rack.



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