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General Electric broadcast amplifiers operate over a frequency range of at least 50 to 15,000 cycles and will deliver their full rated power throughout this range. The distortion and noise are reduced to values suitable for the most exacting service.

Much care has been taken in the design of these amplifiers to assure maximum reliability of operation as well as convenience for servicing.

The ratings given throughout this catalog use the following gain and level ratings:

- db—refers to gain or loss
- dbm—single-frequency, sine wave power referred to 1 milliwatt

\[
\text{dbm} = 10 \log \left( \frac{P}{0.001} \right)
\]

VU—Program level as read on a standard VU meter. Since program material is of a complex and transient nature, the VU meter indicates a level considerably under the instantaneous peak program level. In practical usage the amplifier dbm rating should exceed the VU level to be transmitted by at least 10 db.

The chart showing “Characteristics of G-E Broadcast Audio Amplifiers” lists the General Electric name and uses for each amplifier.

The following uses are defined in EIA Standard TR-105B dated November 1949:

PRELIMINARY AMPLIFIER
A preliminary amplifier operates from a microphone or other low-level source. A preliminary amplifier amplifies the microphone output or other signal to a level that can be fed into a subsequent circuit without the signal-to-noise ratio being degraded.

BOOSTER AMPLIFIER
A booster amplifier is connected in the main-program line between the preliminary amplifier and the program amplifier.

PROGRAM AMPLIFIER
A program amplifier is connected in the main-program channel and is capable of delivering standard output level.*

BRIDGING AMPLIFIER
A bridging amplifier internal input impedance is such that it may be connected across a circuit without appreciably affecting the circuit performance in any respect. The bridging amplifier operates into program circuits or similar loads.

MONITORING AMPLIFIER
A monitoring amplifier is connected to a program circuit to provide a means of checking the program.

The term “Program Amplifier” is now used in place of the nonstandard term “Line Amplifier” or “Main Amplifier.” The term “Bridging Amplifier” is now used in place of “Isolation Amplifier.”

* +18 dbm to lines or +12 dbm to transmitters.

DISCUSSION OF GAIN RATINGS
UNLOADED-INPUT TRANSFORMER (40-db gain)
When the full generated voltage of a microphone, turntable pickup, or similar device is applied to the input terminals of the amplifier which it is feeding, the operating conditions are referred to as those of an unloaded-input transformer since no resistance loading of the transformer, either primary or secondary, is used. Under these conditions the highest signal-to-noise ratio of a microphone-amplifier combination is obtained because the amplifier does not load the microphone.

Operating with an unloaded-input transformer, as explained above, a typical pre-amplifier has a gain of 40 db. This gain is defined as the ratio of “power delivered to the load” to the “power which would be delivered to the load” if the pre-amplifier were replaced by an ideal transformer connected to match the load and source impedance. The gain is determined as follows: (See Fig. 1 for diagram.)

A source resistance (R_s) fed by an oscillator is connected to a load resistance (R_L) of equal value. The oscillator output is adjusted until the power dissipated in R_s is -40 dbm, as indicated by the power measuring instrument P_1. The output voltage of the oscillator, as indicated by voltmeter V is recorded, R_s is then disconnected for R_s and the oscillator, and the pre-amplifier is connected in place of R_s. A tap on the input transformer of the amplifier is used which is equal to the value of R_s (150-ohm tap for 150-ohm R_s). The output of the oscillator, as indicated by voltmeter V, is held constant at the value previously recorded. The resulting output as indicated by P_2 which the amplifier will deliver to its proper load resistor R_L is zero dbm.

Thus the gain of the amplifier is 40 db.

MATCHING INPUT (34-db gain)
When the input circuit of an amplifier constitutes a resistive load equal in value to the impedance of the source feeding it, the amplifier is said to have a matching input. Under these conditions the voltage at the terminals of the input transformer of the amplifier is only one half the voltage generated by the source. This constitutes a 6-db drop in the voltage input to the amplifier which effectively produces a 6-db decrease in amplifier gain as compared with the gain obtained with unloaded-input transformer operation. Thus, the gain of the amplifier with matching input is 34 db.
BRIDGING INPUT (10-db gain)

When an amplifier or similar low-impedance device is connected across a low-impedance line in such a way that only a small fraction of the energy in the line (insufficient to affect the operation of the line) is diverted into the amplifier, the amplifier is said to employ a bridging input. This is accomplished by stepping up the input impedance of the amplifier (to 10,000 or 20,000 ohms, for example) so that in connecting it across the low-impedance line (0–1000 ohms) it has negligible effect.

Figs. 2 and 3 show the circuits of resistive pads either of which, when connected to the 600-ohm input terminals of a typical pre-amplifier, converts the 600-ohm unloaded transformer input to a 10,000-ohm resistive-input impedance. With such a pad the amplifier may be "bridged" directly across a low-impedance line.

Used as a bridging amplifier, the pre-amplifier has a gain of 10 db, where the gain is defined as the ratio of the "power (P₁) in the 600-ohm line terminating resistance (Rₕ) to the output power (P₂) of the amplifier"; that is GAIN (db) = log P₂/P₁. Fig. 4 shows the circuit employed in measuring gain with bridging input.
## CHARACTERISTICS OF G-E BROADCAST AUDIO AMPLIFIERS

<table>
<thead>
<tr>
<th>Type No. and Name</th>
<th>Use</th>
<th>Input (DBM)</th>
<th>Output (DB)</th>
<th>Source Impedance (Ohms)</th>
<th>Load Impedance (Ohms)</th>
<th>Self-Contained</th>
<th>Power Supply</th>
<th>Type of Mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA-20-A Pre-amplifier (Plug-in)</td>
<td>Microphone</td>
<td>-35 max 50 dB gain</td>
<td>-25 max 40 dB gain</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>600 Unbalanced</td>
<td>8 ma-25-v use BP-20-A or 25-v Section of BP-21-A</td>
<td>Plug-in chassis</td>
<td></td>
</tr>
<tr>
<td>BA-21-A</td>
<td>Microphone</td>
<td>-35 max 50 dB gain</td>
<td>-25 max 40 dB gain</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>600 Unbalanced</td>
<td>Gain control and mixer key included</td>
<td>8 ma-25-v use BP-20-A or 25-v Section of BP-21-A</td>
<td>Plug-in front panel module</td>
</tr>
<tr>
<td>BA-22-A Program Amplifier (Plug-in)</td>
<td>PGM Amplifier 8-D Amplifier 1 SO. Amplifier</td>
<td>-22 (matching)</td>
<td>+24 75</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>150/600 Balanced or Unbalanced</td>
<td>Accessory may be added</td>
<td>160 ma-50-v d/c use BP-21-A</td>
<td>Plug-in chassis</td>
</tr>
<tr>
<td>BA-23-A Equalized Stereo/Monaural Transmission Preamplifier</td>
<td>Two channel Pre-amplifier</td>
<td>High impedance Cartridge</td>
<td>-10 40 at 1000 CPS</td>
<td>High impedance</td>
<td>150/600 Balanced or Unbalanced</td>
<td>Self-contained</td>
<td>117 or 230 VAC 50/60 CPS Self-contained</td>
<td>3.5, Motor Board Mounting</td>
</tr>
<tr>
<td>BA-24-A Monitor Amplifier</td>
<td>Monitor or Distribution Amplifier</td>
<td>-25 max (matching)</td>
<td>+33 80</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>8/150/600 Balanced or Unbalanced</td>
<td>Accessory may be added</td>
<td>380 ma max -25-v use BP-20-A</td>
<td>Plug-in chassis</td>
</tr>
<tr>
<td>BA-25-A Pre-amplifier</td>
<td>Microphone</td>
<td>-22 Max Matching</td>
<td>+18 46</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>150/600 Balanced or Unbalanced</td>
<td>Accessory may be added</td>
<td>18 ma-25-v use BP-20-A or 25-v Section of BP-21-A</td>
<td>Plug-in chassis</td>
</tr>
<tr>
<td>BA-26-A Portable Amplifier</td>
<td>Remote pick-ups. Auxiliary studio applications</td>
<td>-25 max 50 below 0 max</td>
<td>+18 after 4 db</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>150/600 Balanced or Unbalanced</td>
<td>Four mic mixers, master, one hi-level set level control</td>
<td>95-135-v 20/60 cycles self-contained plus batteries</td>
<td>Enclosed in portable aluminum case</td>
</tr>
<tr>
<td>BA-28-A Cue/1B Amplifier</td>
<td>For cue, 1B and Lo-level monitor applications</td>
<td>-22 max matching</td>
<td>+27 75</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>150/600 Balanced or Unbalanced</td>
<td>Accessory control may be added</td>
<td>160 ma-50-v d/c use BP-21-A</td>
<td>Plug-in chassis</td>
</tr>
<tr>
<td>BA-30-A Microphone Pre-amplifier</td>
<td>Microphone</td>
<td>-14 max 20 DB Gain</td>
<td>-24 max 30 DB Gain</td>
<td>-34 max 40 DB Gain</td>
<td>-50 max 56 DB Gain</td>
<td>150 or 600 Unbalanced</td>
<td>150 or 600 Unbalanced</td>
<td>None</td>
</tr>
<tr>
<td>BA-34-A 10 Watt Monitor Amplifier</td>
<td>10 Watt Monitor Amplifier</td>
<td>-30 max Matching</td>
<td>+40 100</td>
<td>50/150/250/600 Balanced or Unbalanced</td>
<td>8/150/600 Balanced or Unbalanced</td>
<td>Gain control included</td>
<td>117 or 230 VAC 50/60 CPS Self-contained regulated</td>
<td>Plug-in chassis</td>
</tr>
</tbody>
</table>

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Broadcast Amplifiers
Ratings and Terminology

VOLUME LEVEL TO POWER AND VOLTAGE CONVERSION TABLE
Reference Level
0 dbm = 1 milliwatt, 600 ohms

<table>
<thead>
<tr>
<th>Milliwatts</th>
<th>Volts</th>
<th>DBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.0007746</td>
<td>-60</td>
</tr>
<tr>
<td>.00010</td>
<td>.00649</td>
<td>-50</td>
</tr>
<tr>
<td>.001</td>
<td>.07746</td>
<td>-40</td>
</tr>
<tr>
<td>.01</td>
<td>.2449</td>
<td>-30</td>
</tr>
<tr>
<td>.1</td>
<td>.7746</td>
<td>-20</td>
</tr>
<tr>
<td>1</td>
<td>24.49</td>
<td>-10</td>
</tr>
<tr>
<td>10</td>
<td>77.46</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Watts</th>
<th>Volts</th>
<th>DBM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00100</td>
<td>0.7746</td>
<td>0</td>
</tr>
<tr>
<td>.00212</td>
<td>1.228</td>
<td>+4</td>
</tr>
<tr>
<td>.006310</td>
<td>1.946</td>
<td>+8</td>
</tr>
<tr>
<td>.01000</td>
<td>2.449</td>
<td>+10</td>
</tr>
<tr>
<td>.1000</td>
<td>7.746</td>
<td>+20</td>
</tr>
<tr>
<td>1.00</td>
<td>24.49</td>
<td>+30</td>
</tr>
<tr>
<td>10.00</td>
<td>77.46</td>
<td>+40</td>
</tr>
</tbody>
</table>

RESISTIVE PADS

For impedances other than 600 ohms, multiply all resistors Zx by Factor 600

<table>
<thead>
<tr>
<th>Loss in DB</th>
<th>EIA Resistor Values *</th>
<th>Loss in DB</th>
<th>EIA Resistor Values *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R₁</td>
<td>R₂</td>
<td>R₃</td>
</tr>
<tr>
<td>1/2</td>
<td>36</td>
<td>1000</td>
<td>18</td>
</tr>
<tr>
<td>1</td>
<td>36</td>
<td>5100</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>2700</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>130</td>
<td>1200</td>
<td>82</td>
</tr>
<tr>
<td>4</td>
<td>160</td>
<td>1000</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>200</td>
<td>820</td>
<td>110</td>
</tr>
<tr>
<td>6</td>
<td>220</td>
<td>680</td>
<td>110</td>
</tr>
<tr>
<td>7</td>
<td>270</td>
<td>560</td>
<td>130</td>
</tr>
<tr>
<td>8</td>
<td>300</td>
<td>470</td>
<td>130</td>
</tr>
<tr>
<td>9</td>
<td>300</td>
<td>430</td>
<td>160</td>
</tr>
<tr>
<td>10</td>
<td>330</td>
<td>360</td>
<td>160</td>
</tr>
<tr>
<td>11</td>
<td>360</td>
<td>330</td>
<td>180</td>
</tr>
<tr>
<td>12</td>
<td>390</td>
<td>270</td>
<td>200</td>
</tr>
<tr>
<td>13</td>
<td>390</td>
<td>240</td>
<td>200</td>
</tr>
<tr>
<td>14</td>
<td>430</td>
<td>220</td>
<td>200</td>
</tr>
</tbody>
</table>

* EIA resistor values nearest to the exact values are given.
FEATURES

- Versatile
  Permits unattended remote audio operation
  This amplifier used on an incoming remote line
  automatically controls level variations from an un-
  attended remote amplifier. (See Fig. 3—Typical
  Applications)
  Controls level differences between two or more program
  sources
  Level differences automatically controlled between:
  (a) Turntables and/or projector outputs
  (b) Network incoming signal (when properly
  padded) and projectors, turntables, or an-
  nounce mike pre-amp

May be used as a program line compressor
May be used as an automatic master gain control for
program line
(See Fig. 1—Typical Applications)
May be used as a microwave input audio control
(See Fig. 4—Typical Applications)
May be used as an expander-compressor amplifier
With average program material set for 15 db of gain
reduction, output will be compressed for incoming
signals exceeding 15 db and expanded for signals
below 15 db.
May be used as an automatic fader control
(See Fig. 2—Typical Applications)
May be used as a straight program amplifier with or
without level control

Removal of one tube disables automatic level con-
tral and permits use as a normal program amplifier

- Physically and functionally interchangeable with
  Type BA-12-C plug-in program/monitor amplifier
when used for program purposes
Can be used in Type BC-11-A audio console in place of
the program amplifier to provide automatic master gain
control for the console

- Small, compact, plug-in construction
  (a) Compact design permits four units to be mounted
    in seven inches of rack space
  (b) Plug-in construction speeds maintenance

- Used as a peak level control
  Amplifier will operate over a 30 db range with only a
10 db change in output

- Used as an average level control device
  Amplifier will operate over a 30 db range of input level
  with only a 10 db change in output level

- Variable threshold level
  Amplifier will operate with the threshold level set at
  any output between +19 dbm and +30 dbm.

- Average program/dual recover switch
  This switch permits use of amplifier as an average level
  control or as a peak level control

- Dual time constant eliminates program “pumping”
  Recovery time is an automatic function of program
  material
Plug-in Uni-level Amplifier
Type BA-9-A

WHERE TO USE
The General Electric Type BA-9-A plug-in uni-level amplifier is an automatic level-control unit designed to automatically control variations in audio program level. This compact, plug-in unit replaces or may be used in addition to the Type BA-12-C plug-in program/monitoring amplifier when the latter is used as a program amplifier.

The Type BA-9-A uni-level amplifier may be used as an average level-control device or as a peak level-control amplifier.

Maximums of up to 30 db in program variations may be successfully controlled by this amplifier. Such variations are sometimes encountered when switching between the outputs of turntable pre-amps, projectors, or other sources. This amplifier may be used in any audio system where -34 dbm is available to its input.

DESCRIPTION
The Type BA-9-A plug-in uni-level amplifier is designed to replace the Type BA-12-C plug-in program/monitor amplifier when used as a program amplifier, and when features of automatic level-control are desired.

The Type BA-9-A amplifier, when operated at an output level of +20 dbm, supplies gain-control characteristics over a range of 30 db with a rise in output level of only 10 db. This is a 3:1 compression ratio. At +30 dbm output, the Type BA-9-A has a compression ratio over a 30 db range of 5:1.

The threshold control may be set for a range varying from 0 dbm at a compression ratio of 1.6:1, to +30 dbm at a compression ratio of 5:1. Recommended threshold level is +20 dbm with a resultant compression ratio of 3:1.

A switch is incorporated on the front of the amplifier which permits changes in attack and recovery time.

In the DOWN position of the switch, the amplifier has a dual recovery time—wherein the recovery time is an automatic function of the nature of the program material. For short, single peaks, approximately 0.9 seconds is required for 63 percent recovery of gain after the signal has dropped below the gain-reducing level. For sustained or rapidly recurring peaks, approximately 0.9 seconds is required for 40 percent of gain recovery, increasing automatically up to about 34 seconds for 90 percent of gain recovery. The typical attack time is approximately 11 milliseconds.

In the UP position of the switch, the amplifier is an average level-control device which will work on average levels of program material changes. In essence, single short peaks will not cause gain reduction, but sustained increases in over-all program level or rapidly reoccurring short peaks will cause automatic gain reduction depending upon the over-all amplitude of the incoming signals. The typical attack time is approximately 62 milliseconds. The average recovery time is 13 seconds for 90 percent recovery.

These effects are accomplished by the use of a bias generator which in turn is composed of a full-wave rectifier circuit charging simple RC networks. The output of the bias generator supplies a variable d-c bias to the control grids of a General Electric Type GL-6386 tube (a dual remote cutoff triode).

Gain reduction may be read on any standard VU meter. A third scale, in the form of a decal supplied with the amplifier, may be applied to the VU meter’s face. By the use of a suitable switch connected between the VU meter multiplier and meter movement, gain reduction will be indicated over a 30 db range.

MECHANICAL SPECIFICATIONS

UNITS
One Type BA-9-A plug-in uni-level amplifier

DIMENSIONS
Depth: 10 3/4 inches
Height: 5 3/4 inches
Width: 3 3/8 inches

WEIGHT
6 lbs

MOUNTING
Four amplifiers may be mounted in one Type FA-23-B shelf which in turn mounts flush in the front of a standard EIA cabinet rack. Mounting height of the Type FA-23-B shelf (accessory) is seven inches (four rack units).

OPERATING CONDITIONS
Maximum ambient temperature: 113 F (45 C)
Maximum relative humidity: 95 percent

ELECTRICAL CONNECTIONS
POWER AND SIGNAL
Through Cinch-Jones 2400 series plug, plugging into female mate on Type FA-23-B shelf. Connections on plugs are solder terminal.

THRESHOLD BIAS VOLTAGE
Tip jacks

SAFETY PROVISIONS
No voltage applied to unit until plugged into mating source. No exposed voltages.
Plug-in Uni-level Amplifier
Type BA-9-A

ELECTRICAL SPECIFICATIONS

CIRCUIT OPERATION

Consists of a General Electric Type GL-6386 push-pull triode variable gain input stage supplying signal to a push-pull output stage utilizing two Type 6V6GT power tubes. The signal for the bias generator rectifier is supplied from the plates of the output stage. The bias generator uses a full wave rectifier Type 6AL5 whose output supplies a bias voltage to the control grids of the GL-6386 tube. A switch selects time constants so that either an average control of program material or a peak compression of program material is obtained.

Simplified block diagram, plug-in uni-level amplifier, Type BA-9-A

PERFORMANCE

FREQUENCY RESPONSE
+ or −1 db, 50–15,000 cycles under any condition of gain reduction up to 30 db

GAIN
54 db

HARMONIC DISTORTION
(Threshold control set for +20 dbm output.) At any level up to 30 db of gain reduction, the total harmonic distortion between 100 and 15,000 cycles is 1 ½ percent or less; from 50 to 100 cycles the distortion rating is 2 percent or less.

OUTPUT NOISE
Less than −55 dbm

ATTACK TIME
Dual
11 milliseconds
Average
62 milliseconds

RECOVERY TIME
(Dual)
Single short peaks 0.9 seconds for 63 percent recovery
Sustained peaks 0.9 seconds for 40 percent recovery
34 seconds for 90 percent recovery

(Average)
13 seconds for 90 percent recovery

INPUTS

POWER
Plate—300 volts d-c @ 77 milliamperes
Heater—6.3 volts a-c @ 1.55 amperes

SIGNALS
Threshold control @ 0 dbm output:
−54 dbm to −24 dbm input
Threshold control @ 20 dbm output:
−34 dbm to −4 dbm input
Threshold control @ 30 dbm output:
−24 dbm to +6 dbm input

INPUT IMPEDANCE
Unloaded transformer

SOURCE IMPEDANCE
150,000 ohms, shipped wired for 600 ohms. Balanced input.

OUTPUTS

SIGNAL
150,000 ohms impedance, shipped wired for 600 ohms.
Balanced output:
Threshold control @ 0 dbm:
0 dbm to +18 dbm output
Threshold control @ 20 dbm:
+20 dbm to +30 dbm output
Threshold control @ 30 dbm:
+30 dbm to +36 dbm output
(All signals below and up to threshold level, linearly amplified.)

TEST
Two tip jacks for threshold bias setting.
EXTERNAL VU METER (as Compressor meter)
Pins eight and nine on Cinch-Jones 2400 series plug.

EXTERNAL POWER SUPPLY
Type BP-10-B (Accessory).

CONTROLS
Threshold setting control.
Average program dual recovery switch.

TUBE COMPLEMENT
1—GL-6386
1—6AL5
2—6V6GT

HOW TO ORDER

When ordering please specify:
Type BA-9-A plug-in uni-level amplifier. The type number includes the amplifier, one set of operating tubes, one gain reduction scale (decal) for applying to a standard 4-inch VU meter, and installation and operating instructions.

ACCESSORIES

1—Type FA-23-B shelf—for rack mounting four Type BA-9-A amplifiers
1—Type BP-10-B power supply
1—Type FA-46-A2 shelf for mounting four Type BA-9-A amplifiers in base cabinet
1—7774619P1 VU meter (for steel panels)
1—7774619P2 VU meter (for aluminum or non-magnetic panels)
Amplifiers
Page A10

Plug-in Uni-level Amplifier
Type BA-9-A

TYPICAL APPLICATIONS

![Diagram](image)

**Fig. 1.** The BA-9-A uni-level amplifier as an automatic level control amplifier

The application of automatic level control to a studio system is outlined in Fig. 1. The uni-level amplifier can be used to control level differences between two or more program sources, as a program line compressor, automatic master gain control, expander-compressor operation, or as a straight program amplifier.

![Diagram](image)

**Fig. 2.** Using the BA-9-A uni-level amplifier as an automatic fader control

The use of the "uni-level" amplifier as an automatic fader control is outlined in Fig. 2. In this application, the turntable signal level should be set so that it results in a GR scale reading of about two to three dB of gain reduction. The microphone level at the mixer bus is set about 20 dB higher than the turntable signal at the same point.

The microphone and turntable inputs can now be used together with no manual fading required. Whenever it is desired to use the microphone channel to make an announcement, it is only necessary to talk into the microphone. The turntable will fade into the background and will be separated from the microphone announcement by 20 dB.

The resultant increase in output signal level will be less than seven dB, which can be easily handled by the transmitter limiting amplifier. Depending upon which position the AVER/DUAL switch is in will determine the speed with which the turntable level will return to normal.

![Diagram](image)

**Fig. 3.** Unattended remote operation

When it is desirable to operate the uni-level amplifier on unattended remote operations, either of the above single-line diagrams can be used. A typical setup would be to set levels so that what is considered a normal signal level causes about 15 dB gain reduction. For a signal increase of +15 dB line variations will be only 5 dB.

![Diagram](image)

**Fig. 4.** Microwave relay application of the uni-level

The uni-level amplifier can be used to prevent excessive audio variations in an audio line feeding the audio input of a microwave system. Such an application is shown in Fig. 4.

---

**Plug-pins and control, plug-in uni-level amplifier, Type BA-9-A**
Uni-level Amplifier
Type BA-9-B

FEATURES

- A-c powered
  Requires only 110–125-volt a-c power for operation
- Conserves rack space
  Will mount in any standard rack, utilizing only 3½-inch (2 RU) of vertical height
- Versatile
  Permits unattended remote audio operation
  This amplifier used on an incoming remote line automatically controls level variations from an unattended remote amplifier. (See Fig. 3—Typical Applications).
  Controls level differences between two or more program sources
  Level differences automatically controlled between:
    (a) Turntables and/or projector outputs
    (b) Network incoming signal (when properly padded) and projectors, turntables, or announce mike pre-amps
  May be used as a program line compressor
  May be used as an automatic master gain control for program line
  (See Fig. 1—Typical Applications)
  May be used as a microwave input audio control
  (See Fig. 4—Typical Applications)
  May be used as an expander-compressor amplifier
  With average program material set for 15 db of gain reduction, output will be compressed for incoming signals exceeding 15 db and expanded for signals below 15 db.
  May be used as an automatic fader control
  (See Fig. 2—Typical Applications)
  May be used as a straight program amplifier with or without level control
  Removal of one tube disables automatic level control and permits use as a normal program amplifier.
- Functionally interchangeable with G-E Type BA-12-C plug-in program/monitor amplifier when used for program purposes
- Used as a peak level control
  Amplifier will operate over a 30 db range with only a 10 db change in output
- Used as an average level control device
  Amplifier will operate over a 30 db range of input level with only a 10 db change in output level
- Variable threshold level
  Amplifier will operate with the threshold level set at any output between +10 dbm and +30 dbm
- Average program dual recovery
  Connection permits use of amplifier as an average level control or as a peak level control
- Dual time constant eliminates program "pumping"
  Recovery time is an automatic function of program material
- Easily serviced
  All components exposed for easy service when hinged-front panel is opened

WHERE TO USE

The General Electric Type BA-9-B uni-level amplifier is a rack-mounted, a-c powered version of the familiar and popular Type BA-9-A plug-in uni-level amplifier. It is intended for automatic level control applications in radio and TV stations, sound recording studios, and industrial and public address systems.

Radio and TV Stations

In radio and TV stations the amplifier may be used to control level differences between two or more medium level program sources, as a program-line compressor, as an automatic master gain control for program or remote line, or for expander-compressor...
operation (including automatic fading of music for voice-over-music announcements) or as a straight program amplifier.

**Sound Recording Studios**

In sound recording studios the amplifier may be used to control level differences between various voice or music signals, or as a compressor to be used prior to the recording amplifier.

**Industrial or Public Address Systems**

In industrial or public address systems, the uni-level amplifier may be used to eliminate "blasting" due to varying intensities of sound sources with consequent overloading of line or power amplifiers, as a compressor-expander to control and amplify weak or compress excessively strong input signals, or as a micro-wave audio input control.

Due to the unique design of the Type BA-9-B, this amplifier may be used as either an average level-control device or as a peak level-control amplifier.

Maximums of up to 30 db in program variations may be successfully controlled by this amplifier. It may be used in any audio system where -34 dbm is available to its input.

(See Typical Applications for detailed suggested use.)

**DESCRIPTION**

Essentially, the Type BA-9-B uni-level amplifier is the a-c powered, rack-mounted version of its plug-in counterpart, the Type BA-9-A uni-level amplifier. Other than its mounting and power supply, it is identical in performance and specification with the Type BA-9-A uni-level amplifier.

The Type BA-9-B uni-level amplifier is an automatic level-control device designed to functionally replace or supplement the Type BA-12-C program/monitor amplifier, when used as a program amplifier, or when features of automatic level-control are desired.

The Type BA-9-B amplifier, when operated at an output level of +20 dbm, supplies gain-control characteristics over a range of 30 db with a rise in output level of only 10 db. This is a 3:1 compression ratio. At +30 dbm output, the Type BA-9-B has a compression ratio over a 30 db range of 5:1.

The threshold control may be set for a range varying from 0 dbm at a compression ratio of 1.6:1, to +30 dbm at a compression ratio of 5:1. Recommended threshold level is +20 dbm with a resultant compression ratio of 3:1.

A connection may be made in the amplifier which permits changes in attack and recovery time.

The unit as shipped is connected for dual recovery time—wherein the recovery time is an automatic function of the nature of the program material. For short, single peaks, approximately 0.9 second is required for 63 percent recovery of gain after the signal has dropped below the gain-reducing level. For sustained or rapidly recurring peaks, approximately 0.9 second is required for 40 percent of gain recovery, increasing automatically up to about 34 seconds for 90 percent of gain recovery. The typical attack time is approximately 11 milliseconds.

By strapping an adjacent terminal connection, the amplifier may be changed to an average level-control device which will work on average levels of program material changes. In essence, single short peaks will not cause gain reduction; but sustained increases in over-all program level or rapidly recurring short peaks will cause automatic-gain reduction depending upon the over-all amplitude of the incoming signals. The typical attack time is approximately 62 milliseconds. The average recovery time is 13 seconds for 90 percent recovery.

These effects are accomplished by the use of a bias generator which in turn is composed of a full-wave rectifier circuit charging simple RC networks. The output of the bias generator supplies a variable d-c bias to the control grids of a General Electric Type GL-6386 tube (a dual remote cutoff triode).

Gain reduction may be read on any standard VU meter. A third scale, in the form of a decal supplied with the amplifier, may be applied to the VU meter's face. By the use of a suitable switch connected between the VU meter multiplier and meter movement, gain reduction will be indicated over a 30 db range.

Space is provided behind the hinged-front panel for mounting an input and an output attenuator. These attenuators may be mounted on the hinged panel by the broadcaster to handle input or output levels of higher or lower values than those specified for uni-level operation.

A pilot light and an OFF-ON switch is located on the front panel for convenience. Total dimensions of the chassis (over-all) are height 3½ inches, width 19 inches, and depth 7½ inches. Weight is approximately 12 lbs.
MECHANICAL SPECIFICATIONS

UNITS
One Type BA-9-B uni-level amplifier
One miniature motor base plug for a-c power

DIMENSIONS (Overall)
Depth: 7½ inches
Height: 3½ inches (2 R.U.)
Width: 19 inches
Weight: 12 lbs

MOUNTING

OPERATING CONDITIONS
Maximum ambient temperature 113°F (45°C)
Maximum relative humidity 95 percent

ELECTRICAL CONNECTIONS
A-c power — Recessed miniature motor base receptacle and plug
Signal — Solder lug terminal strips
Gain Reduction — Solder lug terminal strips
Average Program / Dual Recovery — Strap on adjacent terminal

SAFETY PROVISIONS
No exposed voltages when hinged-front panel is closed. A-c switch provided on panel for independent operation of unit. Pilot, light on front panel indicated amplifier operation. A-c power-fused.

ELECTRICAL SPECIFICATIONS

CIRCUIT OPERATION
Consists of a General Electric Type GL-6386 push-pull triode variable gain input stage supplying signal to a push-pull output stage utilizing two Type 6V6GT power tubes. The signal for the bias generator rectifier is supplied from the plates of the output stage. The bias generator uses a full-wave rectifier Type 6AL5 whose output supplies a bias voltage to the control grids of the Type GL-6386 tube. A strap to an adjacent terminal will select the correct time constants to obtain the average control of program material. As shipped, the amplifier is connected for peak compression of program material.

Simplified block diagram, Type BA-9-B uni-level amplifier

PERFORMANCE
FREQUENCY RESPONSE
+ or -1 dB, 50-15,000 cycles under any condition of gain reduction up to 30 db

GAIN
54 db.

HARMONIC DISTORTION
(Threshold control set for +20 dbm output.) At any level up to 30 db of gain reduction, the total harmonic distortion between 100 and 15,000 cycles is 1½ percent or less; from 50 to 100 cycles the distortion rating is 2 percent or less.

OUTPUT NOISE
Less than -50 dbm. (With 6V6GT)
-55 dbm. (With 5881)

ATTACK TIME
Dual
Average
11 milliseconds
62 milliseconds

RECOVERY TIME (Dual)
Single short peaks — 0.9 second for 63 percent of recovery
Sustained peaks — 0.9 second for 40 percent recovery
34 seconds for 90 percent recovery. (Average)
13 seconds for 90 percent recovery

INPUTS
Power — 117-volt a-c 50-60-cycle, 65-watt (Note: B+ voltage is adjustable to 300-volt d-c for a-c inputs varying between 110-125 volts.)

SIGNALS
Threshold control @ 0 dbm output: -54 dbm to -24 dbm input.
Threshold control @ 20 dbm output: -34 dbm to -4 dbm input.
Threshold control @ 30 dbm output: -24 dbm to +6 dbm input.

OUTPUTS
Signal — 150/600 ohms impedance, shipped wired for 600 ohms. Balanced output.

Uni-level amplifier (rear view) Type BA-9-B
Uni-level Amplifier
Type BA-9-B

The use of the "uni-level" amplifier as an automatic fader control is outlined in Fig. 2. In this application, the turntable signal level should be set so that it results in a GR scale reading of about two or three db of gain reduction. The microphone level at the mixer bus is set about 20 db higher than the turntable signal at the same point.

The microphone and turntable inputs can now be used together with no manual fading required. Whenever it is desired to use the microphone channel to make an announcement, it is only necessary to talk into the microphone. The turntable will fade into the background and will be separated from the microphone announcement by 20 db.

The resultant increase in output signal level will be less than seven db, which can be easily handled by the transmitter limiting amplifier. The speed with which the turntable will return to normal is determined by the operation of the uni-level recovery circuits. It may be used either in the dual or average conditions for attack and recovery. The speed with which the turntable level will return to normal is determined by the average or peak condition of attack and recovery of the amplifier.

When it is desirable to operate the uni-level amplifier on unattended remote operations, either of the above single-line diagrams can be used. A typical setup would be to set levels so that what is considered a normal signal level causes about 15 db gain reduction. For a signal increase of ±15 db line variations will be only five db.

The uni-level amplifier can be used to prevent excessive audio variations in an audio line feeding the audio input of a microwave system. Such an application is shown in Fig. 4.

Threshold control: 0 dbm: 0 dbm to +18 dbm output
Threshold control: 20 dbm: +20 dbm to +30 dbm output
Threshold control: 30 dbm: +30 dbm to +36 dbm output

(All signals below and up to threshold level, linearly amplified)

EXTERNAL VU METER
Solder lugs on terminal strip

CONTROLS
Threshold setting

TUBE COMPLEMENT
1—GL-6386
1—6AL5
2—6V6GT
1—5Y3GT

HOW TO ORDER
When ordering, please specify:

General Electric Type BA-9-B uni-level amplifier (for rack mounting). (The Type Number includes the amplifier, one set of operating tubes, one gain reduction scale (decal) for applying to standard 4-inch VU meter, one miniature motor base plug, and installation and operating instructions.)

ACCESSORIES
1—7774619P1 VU meter (for steel panels)
1—7774619P2 VU meter (for aluminum or non-magnetic panels)

TYPICAL APPLICATIONS

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HOW TO ORDER
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FEATURES
- All transistors—no tubes in the circuitry
- Space savings—small, compact, light weight
- Low voltage—low power drain
- Plug-in construction for ease in maintenance
- Fiberglass wire board

WHERE TO USE
The General Electric Type BA-28-A transistor cue/talkback amplifier provides the gain necessary to raise an audio signal from mixer-bus level to a level (+27 dbm) sufficient for cueing and studio talkback service.

This amplifier is designed for use in the Type BC-21-A audio console for any custom console employing transistor amplifiers.

DESCRIPTION
The General Electric Type BA-28-A transistor cue/talkback amplifier is a compact plug-in audio unit constructed on a printed-wire board and mounted on an “L” shaped aluminum frame.

This amplifier contains eight separate transistor stages. The first two stages are coupled directly in a Darlington compound connection. The second stage is capacitively coupled to the third stage which is directly coupled to the fourth stage. The fourth stage is a common emitter directly coupled to an emitter follower which is then directly coupled to another common emitter. The latter stage is directly coupled to a common collector Darlington compound connected output stage. This amplifier differs from the Type BA-22-A transistor program amplifier only in the quality of the output. In this unit, an open core and coil-type output transformer produces a lower quality output.
### MECHANICAL SPECIFICATIONS
Type number includes amplifier assembly, a set of transistors and a set of installation and operating instructions.

**DIMENSIONS**
- Height: 41 1/2 inches
- Width: 4 1/4 inches
- Length: 9 5/8 inches
- Weight: 21 1/2 lbs

### ELECTRICAL SPECIFICATIONS
#### PERFORMANCE
- **Frequency Response:** ± 2 db 100-10,000 cps
- **Gain:** 75 db matching input
- **Distortion:** 3 percent or less at ±24 db (or rated output level)
- **Noise:** S/N ratio of 60 db

#### POWER REQUIREMENTS
- 50 volts d-c at 160 ma

#### SIGNAL INPUT
- Transformer matching—maximum input level—22 dbm

#### SIGNAL OUTPUT
- Balanced or unbalanced—connected for 600 ohms balanced at +27 dbm output level

### TRANSISTOR COMPLEMENT
- 3×2N324 General Electric
- 2N320 General Electric
- 1×2N353 Delco

### COMPLIANCE
Complies with all applicable FCC and EIA specifications.

### HOW TO ORDER
When ordering please specify: Type BA-28-A cue talkback amplifier (requires external power supply).

### ACCESSORIES
- Type FA-48-A equipment shelf.
- Type BP-21 A 50 25 volt transistor power supply (regulated).

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**Cue/talkback amplifier Type BA-28-A installed in equipment shelf Type FA-48-A**
FEATUES

- "Thumping" virtually eliminated
  New design uses a new method for eliminating the "thump" component common to limiter actions

- Greater limiting range
  The new audiomatic limiter incorporates a limiting range of 20 db, an increase of 8 db in limiting range over the popular General Electric Type BA-5-A limiter

- Higher output level
  The new audiomatic limiter has an output level of +27 dbm, an increase of 15 dbm in output level as compared to the General Electric Type BA-5-A limiter

- New program-controlled recovery circuit utilized
  This circuit permits large amounts of gain reduction with a negligible pumping effect

- Two different types of recovery circuits offered
  The conventional dual RC type may be used, or the new program-controlled recovery circuit may be used

- Attack time effectively zero
  Seventy microsecond attack time is obtained by means of a high-speed bias generator

- Extremely low transient waveform distortion

- Very high compression above threshold of gain reduction action

- "Motor-boating" can not occur
  Automatic control voltage is not a function of the output voltage of the controlled amplifier eliminating "motor-boating"

- Very low steady-state distortion and noise level due to inverse feedback circuits

- Instant accessibility
  Vertical rack-mounting chassis utilizes single-hinged front-cover panel

- Compact
  Entire unit measures only 10 1/2 inches high by 9 inches deep by 19 inches wide

- Single unit
  All amplifiers and power supply are mounted on one small chassis

- One VU meter supplies all required readings
  Single VU meter is used to read input level to control amplifiers, gain reduction, output level of limiter, and for balancing of modulator

- No matched tubes required
  The Type BA-7-A audiomatic limiting amplifier uses only 18 tubes—none of which require matching

- Plug-in connections
  All external connections are made on plugs. It is not necessary to solder or unsolder connections when installing or removing amplifier

- Thoroughly shielded
  All transformers, oscillator, and RF power amplifier sections, plus tubes in RF section, are thoroughly shielded to prevent radiation and interaction

- Excellent frequency response with low distortion up to practical limit of gain reduction. (See Electrical Specifications)
WHERE TO USE
The General Electric Type BA-7-A audiomatic limiting amplifier is a peak-limiting device designed to permit a substantial increase in the average program level without danger of any audio peaks exceeding a predetermined level.

The output of the Type BA-7-A audiomatic limiting amplifier is sufficient to drive any EIA, AM, FM, or TV audio transmitter to 100 percent modulation. It is readily adaptable for use in recording systems in the tape, disc, and motion picture sound recording industries. As such, it may be used either before or after pre-emphasis.

DESCRIPTION
The General Electric Type BA-7-A audiomatic limiting amplifier is designed as a fast-acting, thumpless, peak-limiting audio amplifier. It incorporates two new outstanding features, the first being a new and effective method of eliminating the "thump" component common to all limiter actions. The second outstanding feature is the incorporation of the new program-controlled recovery circuit which permits the use of larger amounts of gain reduction with negligible pumping effect. These features are made possible by the use of a new method of limiting, namely the audio modulation of an RF carrier, the imposition of limiting action on this signal, and the demodulation of the RF to render a virtually thumpfree, peak-limited audio signal.

The use of this new design permits an 8 db increase in limiting range, a 15 db increase in output level, and a reduction in physical size as compared to the popular General Electric Type BA-5-A limiting amplifier. Attack time is effectively zero—being limited to approximately 70 microseconds by means of a high-speed generator. A switch is provided which will allow the amplifier to operate either on the new program-controlled recovery circuit where large amounts of gain reduction are expected, or on the conventional dual RC recovery circuit. Should conditions require it, this amplifier may be used in a backward acting mode of operation.

Mechanical Components
Mechanically, the audiomatic limiting amplifier is complete with power supply on one chassis. As such it requires only 10 1/2 inches of vertical rack space, and 9 inches of rack depth. This vertical rack-mounted unit is equipped with a hinged-front panel allowing instant accessibility to the internal controls and components. Only 110 watts of 110-125 volts a-c power are required for its operation. All connections are made by means of a single 10-pin Cinch-Jones plug and a standard a-c plug and receptacles, located on the rear of the amplifier chassis. A VU meter is used to measure signal levels and gain reduction.

Electrical Components
Electrically, the audiomatic limiting amplifier consists of an amplifier and power supply mounted on one chassis. The amplifier incorporates five sections: a preamplifier, an oscillator and RF section, a bias generator, a control section and an output stage.

The operation of the limiting amplifier on the audio signal is as follows: The incoming audio signal is fed into the loaded input of the preamp. From here the signal is split in two paths, the first going to the balanced modulator in the control section, and the second to the bias generator. In addition to the audio signal, the balanced modulator receives a constant amplitude 10-megacycle carrier from the oscillator and RF amplifier section. This carrier is then amplitude-modulated by the audio signal, the main carrier is suppressed, and the resulting output signal, consisting of modulated sidebands only, is fed to the variable gain RF stage in the control section. Simultaneously the audio fed to the bias generator section is first passed through a voltage correction network, through a slope control, then to a voltage amplifier, a phase...
Audiomatic Limiting Amplifier
Type BA-7-A

The carrier and controlled sidebands are recombined in the output section. The carrier present at the output is then passed through the RF circuit and thus is not detected later. The controlled sidebands are then passed to a synchronous detector which also receives a 10-megacycle constant amplitude carrier from the oscillator and RF section. The carrier and controlled sidebands are recombined and the resultant audio is detected. The audio signal is then fed to a voltage amplifier, a phase splitter, and then the push-pull output stage of the limiting amplifier. From a tertiary winding on the output transformer, voltage is fed back around the output unit. The secondary of the output transformer feeds the line through an output attenuator which is bridged by a VU multiplier attenuator. The VU meter is switched to read the output level, the amount of gain reduction, the input level to the balanced modulator, and can be used to check modulator balance.

Recovery of the amplifier is controlled by two different types of circuits, both located in the bias generator section. The first circuit is the conventional dual RC circuit. The second circuit is the new program-controlled recovery circuit. This latter recovery control is obtained by placing a diode in the discharge path of a capacitor in the recovery circuit. The diode is biased to an equivalent voltage of 15 db of gain reduction. The amplitude of the audio trigger voltage from the cathode-follower (bias generator) output is adjusted to produce an artificial verge of 3 db. Thus, below 3 db of gain reduction the diode will not conduct, resulting in a very slow discharge rate and consequent slow recovery time of the amplifier. Between 3 db and 20 db of gain reduction the audio trigger voltage will cause the diode to conduct. This results in a voltage discharge of the capacitor which produces a normal amplifier-recovery rate. However, during the absence of program material the diode will cease to conduct and recovery of the amplifier will be appreciably slowed down. Hence, the audio-gain recovery is controlled by the variances in peak audio amplitudes, with the resulting advantage that large amounts of gain reduction may be used with negligible pumping effect. Where only small amounts of gain reduction from threshold to 6 db are required, the dual RC circuit should be used.

The recommended compression ratio for this amplifier operation is 20:1 when used in either the dual RC or program-controlled recovery operational mode. If used as a backward acting amplifier, the recommended compression ratio is 2:1.

Balanced tubes are not required in this unit. Only a simple adjustment of the modulator balance controls is necessary to balance the modulator. A push-button balance check switch provides an easy, rapid, and convenient means of checking the modulator balance.

Performance, distortion ratings, and other useful information may be found in the ELECTRICAL SPECIFICATIONS section.
Audiomatic Limiting Amplifier
Type BA-7-A

MECHANICAL SPECIFICATIONS

UNITs
1—BA-7-A audiomatic limiting amplifier

DIMENSIONS
- Depth 9 inches
- Width 19 inches
- Height 103\(\frac{1}{2}\) inches

MOUNTING
Standard EIA 19-inch rack-mounting with hinged front panel

OPERATING CONDITIONS
- Maximum ambient temperature: 113 F (45 C)
- Maximum relative humidity: 95 percent

ELECTRICAL CONNECTIONS
- Input and output audio signals made through a 10-pin Cinch-Jones plug and receptacle. A-c power made through standard a-c plug and receptacle

SAFETY PROVISIONS
- Power supply primary fused. All exposed wiring normally covered by hinged front panel

VENTILATION
Normal rack ventilation. No blowers required

ELECTRICAL SPECIFICATIONS

Type of Circuit
(See block diagram of circuitry.) Audio signal is fed into preamplifier through an input transformer with terminated secondary into a 5879 voltage amplifier and 12BH7 cathode-follower output. The preamplifier incorporates inverse voltage feedback. The audio signal is then split into two paths, one into the balanced modulator using a 6AL5, the other into the bias generator circuit. A ten M/C constant amplitude carrier is generated by an oscillator consisting of one-half of a 12AT7 and amplified by a 6AU6 power amplifier. This carrier signal is fed to the balanced modulator and is modulated by the audio signal. The output of the modulator consists of sidebands only with the carrier suppressed. The sidebands are then fed to a variable gain RF stage using a 6BA6. The audio signal which is fed to the bias generator is passed through a voltage correction network: it is then fed into a 12AX7 voltage amplifier and phase splitter, which drives a 12AT7 push-pull cathode-follower. Full-wave rectification is then achieved by using a 6AL5 dual diode. This variable d-c voltage is then applied to the grid of the variable gain RF stage (6BA6) to control the amplitude of the sidebands. The controlled sidebands are passed to a synchronous demodulator using a 6AL5. The demodulator receives a 10 M/C constant amplitude carrier from the same source as the balanced modulator for the detection process. The audio signal is then fed into a 12AX7 voltage amplifier and phase splitter which drives the push-pull 6463 amplifier output stage. Two different types of recovery circuits can be used, the conventional dual RC type or the new program recovery circuit.

Performance

OUTPUT LEVEL
- Variation of ±0.5 db from verge to 17 db of limiting +0.5
- 1.5 db from 18 to 20 db of limiting

FREQUENCY RESPONSE
- ±1 db from 50 to 15,000 cycles (from verge to 20 db of limiting)

DISTORTION
- From verge to 12 db of gain reduction:
  - 1 percent or less, 50 to 15,000 cycles
- From 12 db to 20 db of gain reduction:
  - 1.5 percent or less, 100 to 15,000 cycles
  - 2.5 percent or less, 50 to 100 cycles

ATTACK TIME
- Approximately 70 microseconds

COMPRESSION RATIO
- Forward acting: 20:1
- Backward acting: 2:1

RECOVERY TIME
- Dual RC
- Approximately 0.5 seconds for short peaks for 63 percent gain recovery. For sustained and rapidly recurring peaks, the recovery time is approximately the same for 50 percent recovery and increases to 10 seconds for 90 percent gain recovery

Program-controlled Recovery
- Determined by type of program material

SIGNAL TO
- Noise Ratio 65 dbm below +27 dbm output at threshold or below
- Thump Ratio -45 db or better

TOTAL GAIN
- Amplifier set at verge of limiting 57 dbm, ±2 db
Audiomatic Limiting Amplifier
Type BA-7-A

Inputs

Power
110 watts, 110 117 125 volts a-c, 50/60 cycles, single phase

Audio
600/150 ohms, balanced or unbalanced. Center tap or either side may be grounded as desired

Minimum input level at verge: -30 dbm
Maximum input level at verge: 0 dbm
Input level adjustable by 30 step, 1 db per step control

Outputs
600-ohm unbalanced “T” (can be used to feed a balanced line). One side may be grounded if desired

Output Levels
+27 dbm. Output variable down to 12 dbm by use of “T” attenuator, 30 steps, 0.5 db per step

Controls
Front Panel
Input level control (potentiometer)
VU multiplier (“T”’ attenuator)
VU meter switch (selects pre-amp output, gain reduction or amplifier)
Output level control (“T”’ attenuator, 0.5 db per step, 30 steps)
Power switch

Internal Chassis
Slope control (for adjusting gain reduction characteristics)
Delay bias control (for adjusting gain reduction characteristics)
Zero meter adjust control (zero setting of meter for gain reduction use)
Push-button balance check switch
Recovery selector switch (switches between dual RC and program controlled recovery)

Tube Complement
1 - 5879
1 - 12BH7
4 - 6AL5
1 - 6BA6
2 - 12AT7
2 - 6AU6
2 - 12AX7
1 - 6463
1 - 5U4GA
1 - OB2

How to Order
When Ordering Please Specify:
General Electric Type BA-7-A audiomatic limiting amplifier. (The type number includes the amplifier, one set of operating tubes, one 10-pin Cinch-Jones plug, one a-c plug, and installation and operating instructions.)
Transistor Monitor Amplifier
Type BA-24-A, Plug-in

FEATURES
- All plug-in transistors—no tubes in the circuitry
- Plug-in amplifier construction for ease in maintenance
- Space saving—small, compact, lightweight
- Low voltage—low power drain
- Fiberglas wire board

WHERE TO USE
The General Electric Type BA-24-A transistor monitor amplifier is capable of bridging a number of different circuits and providing the gain necessary to raise an audio signal to loudspeaker level for aural evaluation of the program line, incoming remote lines and other sources.

DESCRIPTION
The Type BA-24-A transistor monitor amplifier is a compact, plug-in audio amplifier constructed on a printed-wire board and mounted on an "L" shaped aluminum frame.

This broadcast amplifier consists of unloaded input transformer which feeds a Darlington compound-connected stage. The third stage is an emitter follower which drives the common emitter fourth stage which in turn drives another common-emitter stage.

MECHANICAL SPECIFICATIONS
DIMENSIONS
- Height 4 1/2 inches
- Width 4 1/8 inches
- Length 9 7/8 inches
- Weight 2 1/2 lbs

MOUNTING
This amplifier plugs into the Type BC-21-A audio console or, by utilizing a Type FA-48-A shelf, up to four of these units may be rack mounted in any standard EIA rack such as the Type PR-1-A equipment rack.

OPERATING CONDITIONS
- Max cabinet ambient temperature, 131°F (55°C)
- Max relative humidity, 95 percent

ELECTRICAL CONNECTIONS
All electrical connections are made by a 9-pin plug which is attached to the amplifier wire board.

ELECTRICAL SPECIFICATIONS
PERFORMANCE
- Frequency Response: ± 2 db, 50-15,000 cps
- Gain: 80 db matching input
- Distortion: 1 1/2 percent or less at +33 dbm
- Noise: S N ratio, 60 db at +33 dbm output
Transistor Monitor Amplifier
Type BA-24-A, Plug-in

POWER REQUIREMENTS
25 volt d-c at up to 400 ma.

SIGNAL INPUT
Matching input, maximum input level -25 dbm

SIGNAL OUTPUT
8/150 600 ohms at +33 dbm 12 watts

CONTROLS
Not part of amplifier. Terminals provided for mounting a 750K ohm potentiometer inter-stage gain control

TRANSISTOR COMPLEMENT
5—2N324 General Electric
1—2N320 General Electric
2—CTP-1123-Clevite
1—2N169A General Electric

COMPLIANCE
Complies with all applicable FCC and RIA specifications

HOW TO ORDER
When ordering, please specify Type BA-24-A transistor monitor amplifier (requires external power supply). The type number covers the amplifiers, a set of transistors, and a set of installation and operating instructions.

ACCESSORIES
Type FA-48-A equipment shelf
Type BP-20-A 25-volt power supply
2R74P25 750K carbon potentiometer
FEATURES

- Extremely versatile
  May be connected for matching or bridging input
  Both line- and voice-coil outputs have transformer isolation
  Has multi-impedance inputs and outputs
  Power-line voltage variations do not affect operation

- High gain monitor amplifier
  100 db of gain (unloaded input)
  Interstage gain control allows up to -30 dbm input without external attenuation

- Compact
  3½-inch height and 4-inch width permit four amplifiers to be mounted side-by-side on one shelf in 3½ inches of vertical-rack space

- Plug-in construction permits easy removal for maintenance and service
  All external connections are made through one Amphenol blue ribbon connector (audio); and one Amphenol, U L approved 3-wire a-c plug (power)
  A conventional 2-wire a-c extension cord may also be used for a-c power connections. Mating sockets and mounting bracket are included with each amplifier

- Contains built-in, regulated power supply
  The amplifier will operate with full power from 117 ± 15 volts, 50 60 cycles
  The power transformer can be strapped for operation from 230 ± 15 volts, 50 60 cycles

- Rated at ten watt output

- Uses readily available, low cost, low noise transistors
  The amplifier uses four 2N508's, two 2N1925's, one 2N214, two 2N2144's, and one 2N456A
  Wide use of these transistor types in other amplifier designs reduces the necessity of stocking many different spares
  All transistors, including the power transistors, plug into transistor sockets

- Magnetically and electrically shielded transformers
  Hum pickup from this and adjacent equipment is minimized by the use of extra shielding in the transformers, and the use of a steel-amplifier cover

- Stability is improved by the use of negative feedback
  An accidental short circuit of the output will not damage the output transistors, nor even blow the fuse, due to designed-in protection features

- Excellent frequency response with low distortion
  ± 1 db 30 to 15,000 cycles at +40 dbm output
  1 percent or less harmonic distortion 50 to 15,000 cycles
  1½ percent or less harmonic distortion 30 to 15,000 cycles

WHERE TO USE

The General Electric Type BA-34-A monitor amplifier is a versatile audio amplifier designed to serve as a general-purpose monitoring amplifier in radio and television stations, in recording studios, and in motion picture studios. It may be used as a monitor amplifier-bridging program or other lines to furnish power for studio speakers; a control to studio talkback amplifier, where the talkback microphone is fed into the Type BA-34-A without preamplification; a transcription cueing or audition amplifier (again without preampli-
Transistor Monitor Amplifier
Type BA-34-A

Monitor amplifier (inside view)

Amplification; or as a general-purpose amplifier to feed house monitor speakers. The unit contains its own built-in, regulated power supply; and is intended for shelf mounting in an audio rack, or as an attractive desk-top unit.

COMPLIANCE
Complies with all applicable FCC and EIA specifications. The a-c connector is of the grounded type and complies with U/L standards.

DESCRIPTION
The General Electric Type BA-34-A transistorized plug-in monitor amplifier will deliver to the output ten watts of power from a microphone source.

The monitor amplifier consists of an epoxy-fiberglas printed circuit board along with input, output, and power transformers, mounted in a "U" shaped aluminum frame. The front face contains a power switch, pilot light, and volume control, whereas the rear of the unit mounts two fuses and two connectors. All components are located with accessibility in mind, and are protected from dust and stray magnetic fields by means of a steel cover.

Transistors are used throughout for low heat, low power consumption, reliable, maintenance-free operation. Source impedances of 600/150/75 ohms feed an unloaded transformer input for best signal to noise ratio. The first stage is a modified Darlington compound, with interstage gain control, which feeds three more stages of amplification.

PNP-NPN phase reversing predriver stages are Darlington coupled to the output power transistors, which in turn feed a push-pull output to a single ended output transformer. Both 600/150-ohm line and 8-ohm voice-coil outputs are isolated from ground by the output transformer.

Monitor amplifier (inside view)
Transistor Monitor Amplifier
Type BA-34-A

The power supply is a low voltage, well filtered, transistor/zener regulated design. Power line variations will not affect operation; and it may be strapped to operate from 230 volts as well as 117 volts, 50/60 cycles.

MECHANICAL SPECIFICATIONS

UNITS
One Type BA-34-A single plug-in assembly

DIMENSIONS
Height  3\(\frac{1}{4}\) inches  Width  4 inches
Length  13\(\frac{3}{8}\) inches  Weight  9 lb

MOUNTING
Four amplifiers may be mounted in the Type FA-50-A shelf (accessory). Mating sockets and mounting bracket are furnished with each amplifier, so that the amplifier may be mounted in any other shelf of at least 3\(\frac{1}{2}\) -inch vertical space; or the amplifier may be placed in any appropriate location.

OPERATING CONDITIONS
Maximum ambient temperature—130 F (55 C)
Maximum humidity—95 percent

ELECTRICAL CONNECTIONS
Signal—One amphenol 8-pin blue ribbon connector
Power—One ground type a-c connector

SAFETY PROVISIONS
No voltage is applied until the amplifier is plugged into its mating sockets. The amplifier is equipped with an ON-OFF switch, and the power transformer primary is fused.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Frequency response: ±1 db 30 to 15,000 cycles, +40 dbm output
Gain: 100 db
Harmonic distortion: 1 percent or less 50 to 15,000 cycles
1\(\frac{1}{2}\) percent or less 30 to 15,000 cycles

NOISE
-120 dbm relative input

POWER REQUIREMENTS
25 watts (at max output)

SIGNAL INPUTS
Input impedance—Unloaded transformer
Source impedance: 600/250/150/75 ohm connections
(Factory shipped 150 ohms)
Maximum input level: -30 dbm

SIGNAL OUTPUTS
Rated output +40 dbm (10 watts)
Output impedance—600/150/8 ohms
(Factory shipped 600 ohms)

TRANSISTOR COMPLEMENT
4 General Electric 2N508  2 DELCO 2N553
2 General Electric 2N1925  1 DELCO 2N456A
1 Sylvania 2N214

HOW TO ORDER
When ordering, please specify: Type BA-34-A plug-in transistorized monitor amplifier.

ACCESSORIES
Type FA-50-A shelf (can also mount the Type BA-25-A and Type BA-20-A pre-amplifiers).
Type FA-35-G bridging volume control.

www.americanradiohistory.com
A-c Powered Program/Monitor Amplifier
Type BA-14-A

FEATURES

- **Versatile**
  May be connected for matching or bridging input
  Provides both line and voice-coil outputs
  Can be connected for either program or monitor service
  Has multi-impedance inputs and outputs
  Will operate direct from a microphone or a line

- **High gain program or monitor amplifier**
  60 db of program matching gain; 36 db of program bridging gain
  105 db of monitor gain (unloaded input); 75 db of monitor bridging gain

- **Compact**
  6¾-inch height and 7-inch width permit two amplifiers to be mounted side-by-side on one shelf in 7 inches of vertical rack space

- **Plug-in construction and small height permit easy removal for maintenance or service type change**
  All external connections are made on two 10-pin Jones plugs and sockets. Input connections (including fixed bridging pad) are made on one "2400" series plug, while a-c power and output connections are made on second "2400" series Jones plug. Mating sockets are mounted on accessory shelf

- **Contains built-in power supply**
  Only 105 to 125 volts, 60-cycle, a-c needed to power this amplifier

- **Uses readily available low cost, low noise tubes**
  Amplifier uses three 5879's, either two 6V6's or two 5881's, and a 5U4GA. 6V6's are used in program service, 5881's may be used for increased power in monitor service

[Image of the amplifier]
A-c Powered Program/Monitor Amplifier
Type BA-14-A

- Rated at 10-watt output in monitor use; 4-watt output in program use
- Magnetically and electrostatically shielded transformers effectively prevent hum pickup in this and adjacent medium or high level equipment
- Stability improved through use of negative feedback.

Tertiary winding of output transformer supplies negative feedback to cathode of second stage

- Excellent frequency response with low distortion
  Program amplifier: \[ \pm 1 \text{ db } 30-15,000 \text{ cps} \quad +30 \text{ dbm output less than } 0.5 \text{ percent harmonic distortion (50-15,000 cps)} \]
  Monitor amplifier: \[ \pm 1 \text{ db } 30-15,000 \text{ cps} \quad +40 \text{ dbm output } 1/2 \text{ percent harmonic distortion} \]

- Continuous log taper volume control with db markings furnished and mounted on amplifier

Precision step attenuator may be substituted by broadcaster, if desired. (See Electrical Specifications—Gain Control)

- Variable frequency response made by internal adjustment, if desired

APPLICATION
The General Electric Type BA-14-A program/monitoring amplifier is a versatile, dual-purpose audio amplifier designed to serve as a program or line amplifier, or as a general-purpose monitoring amplifier in radio and television stations, in recording studios, and in motion picture studios.

When connected as a program amplifier it may be used as a program or main amplifier, an isolation or bridging amplifier, a line amplifier, for medium power monitoring or as a cueing or audition amplifier.

When connected for monitoring service, it may be used as a monitor amplifier, bridging program or other lines to furnish power for studio speakers; a control-to-studio talkback amplifier, where the talkback microphone is fed into the Type BA-14-A without preamplification, a transcription cueing or audition amplifier (again without preamplification); or an emergency program amplifier in the program channel of speech input systems.

This unit contains its own built-in power supply and is intended for shelf mounting in an audio rack. Simple, easily made internal connections and interchangeable tubes permit this amplifier to be quickly converted from program-to-monitor service, or vice versa.

DESCRIPTION
The General Electric Type BA-14-A program/monitor amplifier is a four-stage, a-c powered unit designed to operate from either microphone or line level signals and to furnish power to drive either program lines or one or more speakers.

Either matching inputs of 600/250/150/30 ohms or a 10,000-ohm bridging input are available for matching or bridging any standard broadcast source impedance.

The output of the amplifier may be used to drive a 600/150 line and/or an 8/2 ohm voice-coil loudspeaker. Separate windings are used for the program and voice-coil sections of the output transformer, thus it is possible to use both speaker and line feed simultaneously (for low or medium level monitoring) if required. Negative feedback is supplied from a tertiary winding of the output transformer back to the cathode of the second stage.

The complete amplifier includes only four stages.*

The first and second stages are conventionally connected 5879 pentode tubes. The third stage, also using a 5879 type tube, serves as a phase-splitter driving the push-pull output stage. When connected for program service, two 6V6 tubes are used in the output stage.

However, when connected for monitoring service, additional power may be gained if 5881 type tubes are substituted for the two 6V6 tubes. A 5U4GA is used as a rectifier.

* In program service, the first stage is by-passed and the tube omitted from the socket.
Changes from program to monitor service or vice-versa are easily made by changing five jumper straps located on easily accessible terminal boards under the chassis. These connections cut in or by-pass the first stage and change the voltages supplied to the tubes.

Impedance changes are made in the customary manner on the transformer terminals. As shipped, the amplifier is connected for program service with a 600-ohm input, an output of 600 ohms and 8 ohms, and minus the first-stage tube which is by-passed. For monitor purposes a tube kit (7145567), consisting of the first-stage 5879 and two 5881 output tubes, is available as an accessory item.

Frequency response and noise and distortion measurements for program and monitor services may be found under ELECTRICAL SPECIFICATIONS.

MECHANICAL SPECIFICATIONS

UNITs

One Type BA-14-A program monitor amplifier, equipped with an Allen-Bradley potentiometer.

DIMENSIONS

Depth 13 inches Weight 20 lbs
Height 6¾ inches Width 7½ inches

MOUNTING

Each amplifier mounts in an Type FA-23-C shelf (accessory). Two amplifiers may be mounted in this shelf which, in turn, may be mounted in a Type PR-1-A or other standard EIA Cabinet Rack. When so mounted, the rear of the amplifier plugs into two Jones "2400" series mating sockets on the Type FA-23-C shelf. These two plugs handle all input, output and power connections to this unit. The Type FA-23-C shelf includes four Jones sockets, spacer bar, and two knobs and shaft extensions.

OPERATING CONDITIONS

Maximum room ambient temperature—continuous operation..................................................113 F (45 C).
Maximum room ambient temperature—5 percent of annual operating hours..........................122 F (50 C).
Maximum cabinet ambient temperature—continuous operation............................................122 F (50 C).
Maximum cabinet ambient temperature—5 percent of annual operating hours.......................140 F (60 C).
Maximum relative humidity.................................................................95 percent.

ELECTRICAL CONNECTIONS

Power and Signal

Two 10-pin, "2400" series Jones plugs (furnished on amplifier) mating to two 10-pin, "2400" series Jones sockets mounted on Type FA-23-C shelf (accessory).

SAFETY PROVISIONS

No voltage applied until amplifier is plugged into mating source. Amplifier is equipped with ON-OFF switch and red jewel indicator light. Power transformer primary is fused. No exposed voltages.

ELECTRICAL SPECIFICATIONS

Type of Circuit

PROGRAM SERVICE

Amplifier consists of a four-stage amplifier with the first stage by-passed. The input transformer is connected to the grid volume control of the second stage; said stage using a Type 5879 tube, pentode connected. The third stage, also a Type 5879, serves as a phase-splitter which, in turn, drives the two 6V6 tubes in the push-pull output stage. 15 db of negative feedback is supplied from the tertiary winding of the output transformer back to the second-stage cathode. A 5U4GA is used as a rectifier.

MONITOR SERVICE

In monitor service, the four stages of the amplifier are used to develop additional gain. Power output is increased by the change in plate voltage and substitution of higher power output tubes. The first two stages are conventionally connected pentode tubes of the 5879 type. The third stage, utilizing a 5879, serves as a phase-splitter which, in turn, drives two Type 5881 tubes in the push-pull output stage. Type 6V6 tubes may be used in place of the Type 5881 tubes with a slight reduction in power output. A Type 5U4GA tube serves as the rectifier. 10 db of negative feedback from the output transformer tertiary winding is supplied to the cathode of the second stage.

Performance

PROGRAM SERVICE

MONITOR SERVICE

FREQUENCY RESPONSE

+30 dbm out, +1 db 30 to 15,000 cycles per second.

+40 dbm out (10 watts), 1 db 30 to 15,000 cycles per second.

Block diagram of program/monitor amplifier Type BA-14-A, shown connected as a program amplifier.
### A-c Powered Program/Monitor Amplifier

**Type BA-14-A**

<table>
<thead>
<tr>
<th>Performance (cont’d)</th>
<th>PROGRAM SERVICE</th>
<th>MONITOR SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GAIN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matching: 60 db</td>
<td></td>
<td>Unloaded transformer input: 105 db.</td>
</tr>
<tr>
<td>Bridging: 36 db</td>
<td></td>
<td>Bridging input: 75 db (supplied with fixed bridging resistor on Jones Plug).</td>
</tr>
<tr>
<td>(for 600-ohm terminated source).</td>
<td></td>
<td>Input stage by-passed: +40 dbm out.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unloaded input: 66 db</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Loaded input: 60 db</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bridging input: 36 db</td>
</tr>
<tr>
<td><strong>OUTPUT</strong></td>
<td>4 watts</td>
<td>10 watts</td>
</tr>
<tr>
<td><strong>HARMONIC DISTORTION</strong></td>
<td>+36 dbm out</td>
<td>+36 dbm out</td>
</tr>
<tr>
<td></td>
<td>50-15,000 cps less than 0.5 percent.</td>
<td>30-15,000 cps—1 percent</td>
</tr>
<tr>
<td></td>
<td>+40 dbm out</td>
<td>+36 dbm out</td>
</tr>
<tr>
<td></td>
<td>30-15,000 cps—1½ percent.</td>
<td>+36 dbm out</td>
</tr>
<tr>
<td><strong>NOISE</strong></td>
<td>+30 dbm out, signal to noise ratio is 83 db.</td>
<td>—18 dbm at maximum gain. Volume control set for 20 db loss.</td>
</tr>
<tr>
<td></td>
<td>—53 dbm or less, unweighted. Noise remains constant regardless of position of gain control.</td>
<td>Noise level will be —30 dbm.</td>
</tr>
<tr>
<td></td>
<td>—35 dbm as high gain monitor. 0 dbm as low gain monitor.</td>
<td>Low gain monitor —30 dbm.</td>
</tr>
<tr>
<td><strong>MAXIMUM INPUT LEVEL</strong></td>
<td>0 dbm.</td>
<td>—5 dbm as high gain monitor.</td>
</tr>
<tr>
<td><strong>MATCHING INPUT</strong></td>
<td></td>
<td>+30 dbm as low gain monitor with fixed resistors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+40 dbm as low gain monitor with FA-35-G bridging volume control.</td>
</tr>
<tr>
<td><strong>BRIDGING INPUT</strong></td>
<td>+24 dbn.</td>
<td></td>
</tr>
<tr>
<td><strong>Input Impedances</strong></td>
<td>SOURCE IMPEDANCES MATCHING</td>
<td>600/250/150/30 ohms, balanced or unbalanced.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Performance (cont’d)</th>
<th>PROGRAM SERVICE</th>
<th>MONITOR SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INPUT IMPEDENCES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MATCHING</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matching</td>
<td>600/250/150/30 ohms, balanced or unbalanced.</td>
<td>600/250/150/30 ohms, balanced or unbalanced.</td>
</tr>
<tr>
<td>Bridging</td>
<td>10,000 ohms, balanced or unbalanced.</td>
<td>10,000 ohms, balanced or unbalanced.</td>
</tr>
</tbody>
</table>

**Output Impedances**
- **LINE**
  - 600/150 ohms.
- **SPEAKER**
  - 8/2 ohms.

**Gain Control**
- Log taper potentiometer continuously variable attenuation from 0 to infinity.

* **The broadcaster may substitute 500,000-ohm Daven attenuator CP-130-Y, 2 db/step -30 step, for the gain control furnished, if desired.**

**Input Power**
- 105/115/125 volts, a-c, 50/60 cycles, single phase, 85 watts

**Tube Complement**
- Amplifier is shipped connected for program service and is equipped with tubes for this type service. For monitor service, see accessory listing for monitor service tube kit.

**Program service**
- 2—5879
- 2—6V6
- 1—5U4GA

**Monitor service**
- 3—5879
- 2—5881
- 1—5U4GA

**HOW TO ORDER**

When ordering please specify:

- General Electric Type BA-14-A program/monitor amplifier. (The type number includes the amplifier connected for program service, a set of operating tubes for program service, and an installation and instruction book.)

**ACCESSORIES**

- 7145567—Monitor tube kit (consisting of 1—5879 tube and 2—5881 tubes).
- FA-23-C—Shelf with four mating Jones sockets, two knobs, and two extension shafts. Shelf will mount two Type BA-14-A amplifiers.
FEATURES
- Small and compact
- Eight units plus eight Type FA-47-A line-to-line coils can be mounted in one 3 1/4-inch high rack-mounted shelf
- 50 or 40 db gain

WHERE TO USE
The General Electric Type BA-20-A pre-amplifier is a high-fidelity, plug-in pre-amplifier assembly designed to raise the level of microphone outputs to mixer level for broadcast applications. The use of printed wiring and complete transistorization makes the unit compact and easy to install and maintain.

The Type BA-20-A pre-amplifier is designed for use in custom console or audio systems, using transistor amplifiers Types BA-22-A, BA-24-A, or BA-28-A.

Power for the operation of these pre-amplifiers may be obtained from the Type BP 20-A transistor power supply or from any other well filtered 25-volt d-c supply.

DESCRIPTION
The General Electric Type BA-20-A pre-amplifier is a complete, plug-in, transistor pre-amplifier assembly. The pre-amplifier is constructed on a fiberglas printed-wire board. The input, output, and power connections are made by means of a 13-pin connector assembly which is staked and soldered to the circuit board.

MECHANICAL SPECIFICATIONS

DIMENSIONS
- Height 2 inches
- Width 2 3/4 inches
- Length 5 1/2 inches
- Weight 6 ounces

MOUNTING
The 13-pin connector of the pre-amplifier is inserted into a receptacle of the Type FA-49-A shelf. The accessory connector, G-E drawing C-777466-P1, is required if the pre-amplifier is to be mounted in any other type of installation.
Pre-amplifier
Type BA-20-A

OPERATING CONDITIONS
Maximum room ambient temperature continuous, 95 F (35 C)
Maximum cabinet ambient temperature continuous 122 F
(50 C)
Maximum room ambient temperature 5 percent of time, 122 F
(45 C)
Maximum cabinet ambient temperature 5 percent of time, 131 F (55 C)
Maximum relative humidity 95 percent

ELECTRICAL CONNECTIONS
All electrical connections are made through a 13-pin mounted
at one end of the printed wire board.

SAFETY PROVISIONS
No power is applied to the unit unless it is plugged into its
mating socket. The maximum voltage applied to the unit is
25 volts d-c.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Frequency Response — 1 db 50-15,000 C.P.S.
Gain — 50 db as shipped. May be set for 40 db gain by modi-
fication.
Distortion — Less than 0.5 percent rated output levels.
Noise — Equivalent to —120 dbm at the input, i.e. a 60 db
S/N ratio with —60 dbm from a microphone. Measures 60
db below a —10 dbm output level.

SIGNAL INPUTS
Source impedance 50 150 250 600 ohms balanced or un-
balanced.
Input impedance — unloaded transformer.

SIGNAL OUTPUT
Between 300 and 1000 ohms unbalanced. A balanced output
may be obtained by use of accessory Type FA-47-A line-to-line coil.

POWER INPUT
25 volts d-c at 8 m.a.

CONTROLS
Accessory — carbon potentiometer.

INTERCHANGEABILITY
This amplifier is not interchangeable with any existing unit.

TRANSISTOR COMPLEMENT
3 General Electric 2N324 transistors
1 General Electric 2N320 transistor

HOW TO ORDER
When ordering please specify: General Electric Type BA-14-A pre-amplifier.

ACCESSORIES
Type FA-49-A shelf
Type FA-47-A line-to-line coil
777746P1 receptacle
2R74P25 potentiometer
Transistor Pre-amplifier Module
Type BA-21-A, Plug-in

FEATURES
- All transistor—no tubes in the circuitry
- Plug-in construction for ease in maintenance
- Space saving—small, compact, light weight
- Low voltage—low power drain
- Modular construction—amplifier, Daven fader, mixer key, and front panel make up complete plug-in unit
- Fiberglas wire board

WHERE TO USE
The General Electric Type BA-21-A transistor pre-amplifier module provides the gain necessary to raise the audio signal from a microphone to a level high enough to feed a mixer bus. This pre-amplifier is designed for use in the Type BC-21-A audio console or other custom-console systems employing transistor amplifiers.

DESCRIPTION
The General Electric Type BA-21-A transistor pre-amplifier consists of a plug-in audio unit of excellent broadcast quality which includes the amplifier chassis, etched-front panel, Daven step attenuator, three-position output-lever switch, and a mounting frame.

This amplifier is composed of four transistor stages. The first and second stages are directly coupled in a configuration known as the Darlington compound connection. The second stage is then capacitively coupled to the third stage which is directly coupled to the emitter-follower output stage. An interstage gain control is located between the second and third stages. The unbalanced 600-ohm output of the amplifier drives a mixer bus.

MECHANICAL SPECIFICATIONS
UNITS
Type number covers the amplifier assembly, a set of transistors, and a set of installation and operating instructions.

DIMENSIONS
<table>
<thead>
<tr>
<th>Height</th>
<th>Length</th>
<th>Width</th>
<th>Weight</th>
<th>Front Panel Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 1/4 inch</td>
<td>9 1/2 inch</td>
<td>3 inch</td>
<td>1 3/4 lbs</td>
<td>45 degrees</td>
</tr>
</tbody>
</table>

MOUNTING
Unit plugs into Type BC-21-A audio console or a similar mounting arrangement using a 13-pin Elco receptacle.

OPERATING CONDITIONS
Max room ambient temperature, cont. 95 F (35 C)
Max cabinet ambient temperature, cont. 122 F (50 C)
Max room ambient temperature, 5 percent of time, 113 F (45 C)
Max cabinet ambient temperature, 5 percent of time, 131 F (55 C)
Max relative humidity, 95 percent

ELECTRICAL CONNECTIONS
All electrical connections are made through a 13-pin plug mounted at one end of the printed wire board.

SAFETY PROVISIONS
No power is applied to the unit unless it is plugged into its mating socket. When the unit is plugged in and console closed there is no exposed voltage. The maximum voltage applied to the unit is 25 volts d-c.
ELECTRICAL SPECIFICATIONS

PERFORMANCE
   Frequency Response: ±1 db 50-15,000 cps.
   Gain: 50 db (may be modified for 40 db if desired).
   Distortion: ½ percent or less at rated output level.
   Noise: -70 dbm

POWER REQUIREMENTS
   25 volts d-c at 8 ma

SIGNAL INPUTS
   Levels (Max):
      -35 db with amplifier connected for 50 db of gain.
      -20 db with amplifier connected for 40 db of gain.
   Impedances:
      Input: Unloaded transformer
      Source: 50/150/250/600 ohms balanced or unbalanced.

SIGNAL OUTPUT
   -10 dbm; impedance between 300 and 1000 ohms (nominally 600 ohms) unbalanced.

CONTROLS
   Daven type, adjustable in 2 db steps, no detents.

TRANSISTOR COMPLEMENT
   3—2N324 General Electric
   1—2N320 General Electric

COMPLIANCE
   Complies with all applicable FCC and EIA specifications.

HOW TO ORDER
   When ordering please specify: Type BA-21-A transistor pre-amplifier (requires external power supply).

ACCESSORIES
   Type FA-47-A line-to-line transformer will provide a balanced 150 or 600 output from Type BA-21-A pre-amplifier module.
   Type BP-20-A 25-volt transistor power supply (regulated).
   7777466P4 ELCO 13-pin receptacle.
FEATURES
- Plug-in construction permits easy removal for servicing.
- Small, compact design. Six of these amplifiers can be mounted in 7-inch of rack space.
- Simple two-stage circuit using printed-wire board makes parts easy to locate for maintenance.
- Excellent plug-in contact efficiency. Unit uses Cinch-Jones "2400" series plugs.
- Tubes are shielded by easily removed tube shields.
- Transformers are of hum-bucking coil construction with magnetically shielded cases.
- Chassis provides mounting hole to accommodate Type FA-35-G bridging volume control.
- Uniformity of performance assured by use of printed-wireboard.

WHERE TO USE
The General Electric Type BA-1-H plug-in pre-amplifier is designed for use as a microphone pre-amplifier or as a booster amplifier between mixer bus and the program amplifier of a studio-audio system. It can also be used as an isolation amplifier when provided with a suitable bridging resistance, such as Type FA-35-G bridging volume control.

This pre-amplifier, when used in conjunction with Type BA-12-C plug-in program monitor amplifier, makes it possible to assemble a complete studio-audio system employing only two basic amplifier types.

DESCRIPTION
The Type BA-1-H plug-in pre-amplifier consists of a single plug-in unit that utilizes a printed-wire board on which are assembled all the amplifier components. This assembly is mounted in a wrap-around frame incorporating a ten-pin Cinch-Jones "2400" series plug.

Electrically, the Type BA-1-H consists of two resistance coupled stages using Type 5879 tubes. A feedback loop is used around the two stages. Specially designed input and output transformers with hum-bucking coil construction and alloy shields are used.

An unloaded transformer input is employed to give maximum gain and optimum signal-to-noise ratio from high-quality broadcast microphones.

A Type FA-35-G bridging volume control is available as an accessory. This control may be mounted in a hole which is available for this purpose on the Type BA-1-H amplifier. When mounted, this control provides a 10,000-ohm input impedance for use as a bridging or continuously variable-input volume control.

MECHANICAL SPECIFICATIONS

UNITS
Type number covers single plug-in assembly.

DIMENSIONS
Height 4 3/8 inches Width 2 3/4 inches
Length 10 3/4 inches Weight 2 1/2 lbs

MOUNTING
Six of these pre-amplifiers or three pre-amplifiers and one Type BP-10-B plug-in power supply can be mounted on a Type FA-23-B shelf (accessory) for rack mounting. Up to seven pre-amplifiers can be mounted in a Type BC-11-A audio console.

OPERATING CONDITIONS
Maximum cabinet ambient temperature: 130 F (55 C)
Maximum relative humidity: 95 percent

ELECTRICAL CONNECTIONS
All connections are made via a 10-pin "2400" series Cinch-Jones plug, which is the standard plug used on all our plug-in units.

SAFETY PROVISIONS
No B+ power is applied to the unit unless it is plugged into its mating connector. The exposed soldered eyelet points on the top side of the board are protected with an insulating coating of resin varnish.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Frequency Response: ±1 db 50-15,000 cps.
Gain: 40 db
Harmonic Distortion: 0.5 percent or less at +18 dbm, 50–15,000 cps.
Noise —80 dbm or less.

POWER REQUIREMENTS
0.3 ma at 6.3 volts a-c (filament power)
Filaments biased at +20 to +50 volts d-c (supplied by BP-10-B power supply).

SIGNAL INPUTS
Input Impedance
Source Impedance: Unloaded transformer.
30/150/250/600 ohms connections
(150 ohms as shipped.)

SIGNAL OUTPUTS
Rated output, +18 dbm; output impedance, 600/150 ohms;
600 ohms as shipped.

TUBE COMPLEMENT
2 Type 5879

INTERCHANGEABILITY
Electrically and mechanically interchangeable with previous Type BA-1-F plug-in pre-amplifier.

COMPLIANCE
Complies with all applicable FCC and RETMA specifications.

HOW TO ORDER
When ordering, please specify: Type BA-1-H plug-in pre-amplifier (requires an external power supply).

ACCESSORIES
Type BP-10-B plug-in power supply, for Types BA-1-H's and/or BA-12-C's. (Type BP-10-B uses 200 watts at 110 volts a-c and will supply power for 25 Type BA-1-H pre-amplifiers or three Type BA-12-C program/monitoring amplifiers.)

Type FA-23-B shelf, for mounting various plug-in amplifiers. The Type FA-23-B shelf requires seven inches of vertical-rack space, and will accommodate six Type BA-1-H pre-amplifiers, or four Type BA-12-C program/monitoring amplifiers, or Type BA-9-A unilevel amplifiers; or two Type BP-10-B power supplies or combinations of these plug-in units.

Type FA-35-G bridging volume control, for use with Type BA-1-H and BA-12-C amplifiers. It is designed to convert a 600-ohm amplifier input to a 10,000-ohm balanced-bridging service and may be used on line levels up to +40 dbm. When used with the Type BA-1-F it is connected ahead of the input transformer.
FEATURES

- Plug-in construction permits easy removal for servicing
- Small, compact design. Ten of these amplifiers can be mounted in 3 1/2 inches of rack space
- Amplifier is assembled on a rugged printed-wire fiberglas board
- Chassis provides mounting hole to accommodate the General Electric Type FA-35-G bridging volume control or an interstage gain control
- Uniformity of performance assured by use of printed wireboard

WHERE TO USE

The General Electric Type BA-25-B plug-in pre-amplifier is designed for use as a microphone pre-amplifier or as a booster amplifier between mixer bus and the program amplifier of a studio-audio system. It can also be used as an isolation amplifier when provided with a suitable bridging resistance, such as Type FA-35-G bridging volume control.

This pre-amplifier, when used in conjunction with the General Electric Type BA-22-A plug-in program amplifier, makes it possible to assemble a complete studio-audio system employing only two basic amplifier types.

DESCRIPTION

The General Electric Type BA-25-B transistorized plug-in pre-amplifier consists of a single plug-in unit. This unit is composed of an aluminum chassis and a fiberglas printed-wire board. All amplifier components, including the plug-in connector, except the input and output transformers are assembled on the fiberglas wire board. The two transformers mount directly to the aluminum chassis.

Electrically, the Type BA-25-B amplifier circuit is composed of two common emitter gain stages followed by a four transistor compound-connected single-ended push-pull output stage. All transistors plug into sockets on the amplifier board.

The input stage is unloaded to provide maximum gain and optimum signal-to-noise ratio from high quality broadcast microphones.

Circuit provisions have been included in the amplifier for the installation of an optional interstage gain control. Either an interstage gain control, or a conventional bridging gain control such as the Type FA-35-G, may be mounted on bracket which is part of the amplifier's basic chassis.

MECHANICAL SPECIFICATIONS

UNIT NUMBER COVERS SINGLE PLUG-IN ASSEMBLY.

DIMENSIONS

<table>
<thead>
<tr>
<th>Height</th>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 3/4 inches</td>
<td>1 5/4 inches</td>
<td>11 1/4 inches</td>
</tr>
</tbody>
</table>

MOUNTING

Plug-in mounting. Ten of these pre-amplifiers can be mounted on a Type FA-50-A shelf (accessory) for rack mounting.

OPERATING CONDITIONS

Maximum cabinet ambient temperature: 130 F (55 C)
Maximum relative humidity: 95 percent

ELECTRICAL CONNECTIONS

All connections are made via a 9-pin Elco plug, which is the standard plug used on all our plug-in units.

SAFETY PROVISIONS

No power is applied to the unit unless it is plugged into its mating connector.

ELECTRICAL SPECIFICATIONS

PERFORMANCE

Frequency Response: ± 1/2 db 50-15,000 cps and ±1 db 30 to 15,000 cps
Gain: -46 db

HARMONIC DISTORTION

0.5 percent or less at +18 dbm, 30 15,000 cps

NOISE

-120 dbm related to input

POWER REQUIREMENTS

18 MA at 25-volt, d-c
Transistor Plug-in Pre-amplifier
Type BA-25-B

SIGNAL INPUTS
Input Impedance: Unloaded transformer.
Source Impedance: 150/250/600 ohms connections (150 ohms as shipped).

SIGNAL OUTPUTS
Rated output, +18 dbm; output impedance, 600/150 ohms; 600 ohms as shipped.

TRANSISTOR COMPLEMENT
2 General Electric 2N508
1 SYL 2N214
3 RCA 2N270

COMPLIANCE
Complies with all applicable FCC and EIA specifications.

HOW TO ORDER
When ordering, please specify: General Electric Type BA-25-B plug-in pre-amplifier (requires an external power supply).

ACCESSORIES
Type BP-20-A power supply, for Type BA-25-B and/or Type BA-24-A.
Type FA-50-A shelf, for mounting various plug-in amplifiers. The Type FA-50-A shelf requires 3 1/2 inches of vertical rack space, and will accommodate 10 Type BA-25-B pre-amplifiers, or Type 4BA-34-A monitor amplifiers.
Type FA-35-G bridging volume control, for use with Type BA-25-A amplifiers. It is designed to convert a 600-ohm amplifier input to a 10,000-ohm balanced-bridging service and may be used on line levels up to +40 dbm. When used with the Type BA-25-B it is connected ahead of the input transformer.
FEATURES
- Small, compact design. Four of these amplifiers can be mounted in seven inches of rack space.
- Plug-in construction with point-to-point wiring makes maintenance extremely easy.
- Only two tube-types used.
- Chassis punched for addition of bridging controls and metering switches.
- No shock hazard. Voltage is applied to the unit only when plugged into a mating source and when so plugged in, no voltage is exposed.
- Fulfills all medium and high-level audio system requirements. Toggle switch allows selection of 56- or 71-db gain.

WHERE TO USE
The General Electric Type BA-12-C, plug-in program/monitoring amplifier is a high fidelity, compact, fixed gain, plug-in audio unit, recommended for use as a program, line, monitoring or isolation amplifier.

DESCRIPTION
The General Electric Type BA-12-C plug-in program/monitor amplifier is a dual-purpose amplifier. By means of a switch, located on the chassis top, this amplifier may be instantly changed from a line amplifier to an 8-watt monitor amplifier.

With the switch set in low position, the amplifier serves as a program or line amplifier. In this position the amplifier has a gain of 56 db. With an output level of +30 dbm, the distortion is less than one-half of one percent with a maximum input of −26 dbm.

When the switch is in the high position, the amplifier may be used as a monitor amplifier with a gain of 71 db. In this application an output level of +39 dbm (6 watts) is possible with a distortion figure of less than 3 percent at maximum input level of −32 dbm.

Electrically the Type BA-12-C amplifier consists of a 5879 pentode input stage plus a triode-connected 5879 used as a split-load phase inverter and two 6V6 tubes in the push-pull output stage. Feedback from a tertiary winding on the output transformer is fed to the cathode of the first stage. For high-gain applications, the "HI" position of the switch decreases the feedback by 15 db.

Holes are provided on the chassis for installation of an accessory Type FA-35-G bridging volume control and two tube metering switches if such are desired.

The Type BA-12-C amplifier is equipped with a male, 10-pin "2400" series Jones plug for mating use in the General Electric Type BC-11-A console. It may also be mounted on an accessory Type FA-22-E tray with mating receptacle for rack use. When so mounted, the tray and amplifier combination is usually mounted on a Type FA-23-A standard cabinet-rack mounting shelf (accessory). Power can then be obtained from a rack-mounted Type BP-10-B power supply.

MECHANICAL SPECIFICATIONS

DIMENSIONS
Depth 10\(\frac{3}{4}\) inches Width 3\(\frac{3}{4}\) inches
Height 5\(\frac{3}{4}\) inches Weight 6 lbs

MOUNTING
Each Type BA-12-C amplifier mounts on a Type FA-22-E tray. Four of these trays mount on one Type FA-23-A shelf, occupying seven inches (four rack units) of cabinet space.
Plug-in Program/Monitoring Amplifier
Type BA-12-C

Operating Conditions
- Maximum ambient temperature: 113 F (45 C)
- Maximum relative humidity: 95 percent

Safety Provisions
Voltage is applied to the unit only when it is plugged into a mating source and when so plugged, no voltage is exposed.

Electrical Specifications
Type of Circuit
Consists of a 5879 pentode input stage plus a triode connected 5879 used as a split-load phase inverter and two Type 6V6 tubes as the push-pull output. Feedback is used from a tertiary winding on the output transformer to the cathode of the input stage. For high gain applications, a switch is provided to decrease the feedback by 15 db.

Performance
Program Amplifier (low gain position)
- Frequency Range: 50–15,000 cps, ±1 db
- Gain: 56 db
- Output Level and Distortion: +30 dbm (1 watt) ±0.5 percent or less distortion (maximum input -26 dbm)
- +39 dbm (8 watts) 1 percent or less distortion (maximum input -17 dbm)
- Output Noise: Less than -60 dbm

Monitoring Amplifier (high gain position)
- Frequency Range: 50–15,000 cps, ±11/2 db
- Gain: 71 db
- Output Level and Distortion: +39 dbm (8 watts) 3 percent or less distortion (maximum input -32 dbm)

For high level loudspeaker applications, the Type BA-12-C can be modified to give 15 watts output by using Type 6L6 or 5881 tubes, and increasing the B+ supply voltage.

Signal Inputs
- Input Impedance: Unloaded transformer
- Source Impedance: 600/150 ohms; 600 ohms as shipped

Power Inputs
- Filaments: 1.2 amps at 6.3 volts a-c
- Bias: Biased at +20 to +50 volts d-c
- B+ Requirement: 88 ma at 300 volts d-c (at 8 watts output)

Outputs
- Output impedance, 600/150 ohms; 600 ohms as shipped.

Tube Complement
- 2 Type 5879 (input and phase inverter)
- 2 Type 6V6 (push-pull output)
  (Type 6L6 or Type 5881 tubes may be used to obtain higher power output when desired)

How to Order
When ordering, please specify:
Type BA-12-C plug-in program/monitoring amplifier (requires an external power supply).

Accessories
- Type FA-22-E tray, for mounting Type BA-12-C.
- Type BP-10-B plug-in power supply, for BA-1-F's and/or BA-12-C's. (Type BP-10-B uses 200 watts at 110 volts a-c and will supply power for 23 Type BA-1-F pre-amplifiers or three Type BA-12-C program/monitoring amplifiers.)
- Type FA-23-A shelf, for mounting plug-in units with trays. (Type FA-23-A occupies seven inches (four units of rack height) in a Type PR-1-A Cabinet Rack and will accommodate six pre-amps, Type BA-1-F, with trays, four Type BA-12-C program/monitoring amplifiers, with trays or two Type BP-10-B power supplies, with trays.)
- Type FA-35-G, bridging volume control. (Bridging volume control for use with Type BA-1-F and Type BA-12-C amplifiers. It is designed to convert a 600-ohms amplifier input to a 10,000-ohm balanced-bridging service and may be used in line levels up to +40 dbm.)
FEATURES
- All plug-in transistors—no tubes in the circuitry
- Low voltage—low power drain
- Plug-in construction for ease in maintenance
- Space saving—small, compact, lightweight
- Fiberglas wire board

WHERE TO USE
The General Electric Type B-22-A transistor program amplifier provides the gain necessary to raise an audio signal from mixer bus level to line output level of +24 dBm (+18 dBm and a 6 db pad).
This amplifier is designed for use in the Type BC-21-A audio console or any custom console employing transistor amplifiers.

DESCRIPTION
The Type BA-22-A transistor program amplifier is a compact plug-in audio unit constructed on a printed fiberglas wire board and mounted on an “L” shaped aluminum frame.
This fine broadcast quality high fidelity amplifier contains eight separate transistor stages. The first two stages are coupled directly in a Darlington compound connection. The second stage is capacitively coupled to the third stage which is directly coupled to the fourth stage. The fourth stage is a common emitter directly coupled to an emitter follower which is then directly coupled to another common emitter. The latter stage is directly coupled to a common collector Darlington compound connected output stage. The master gain control is connected between stages two and three.

MECHANICAL SPECIFICATIONS
Dimensions
- Height 4 1/2 inches
- Length 9 5/8 inches
- Weight 2 3/4 lbs
Transistor Program Amplifier
Type BA-22-A, Plug-in

MOUNTING
This amplifier plugs into the Type BC-21-A audio console or, by utilizing a Type FA-48-A shelf, up to four of these units may be rack mounted in any standard EIA rack such as the Type PR-1-A equipment rack.

OPERATING CONDITIONS
- Max room ambient temperature, Cont. 95 F (35 C)
- Max cabinet ambient temperature, Cont. 122 F (50 C)
- Max room ambient temperature, 5 percent of time, 113 F (45 C)
- Max cabinet ambient temperature, 5 percent of time, 131 F (55 C)
- Max relative humidity, 95 percent

ELECTRICAL CONNECTIONS
All connections are made by a 9-pin plug which is attached to printed wire board.

SAFETY PROVISIONS
No power is applied to the unit unless it is plugged into its mating socket. When the unit is plugged in and console closed there is no exposed voltage. The maximum voltage applied to the unit is 50 volts d-c.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
- Frequency Response: +1 db 50-15,000 cps
- Distortion: 1/2 percent or less at +24 db (or rated output level)
- Noise: S/N ratio of 60 db

POWER REQUIREMENTS
50 volts d-c at 160 ma.

SIGNAL INPUT
Transformer matching — maximum input level — 27 dbm.

SIGNAL OUTPUT
150 600 ohms balanced or unbalanced — connected for 600 ohms at +24 db output level.

CONTROLS
Provisions are made for mounting an interstage control on the amplifier front when required. A 750K carbon potentiometer is recommended. When used in Type BC-21-A audio console, a daven, step-type control is used.

TRANSISTOR COMPLEMENT
3 — 2N324 General Electric
4 — 2N320 General Electric
1 — 2N553 Delco

COMPLIANCE
Complies with all applicable FCC and EIA specifications.

HOW TO ORDER
When ordering please specify: Type BA-22-A transistor program amplifier (requires external power supply).
Type number includes amplifier assembly, a set of transistors and a set of installation and operating instructions.

ACCESSORIES
Type FA-48-A equipment shelf
Type BP-21-A 50/25 volt power supply
2R74P25 750K carbon potentiometer
Plug-in Uni-level Pre-amplifier
Type BA-15-A

FEATURES
- Versatile
  Relieves operators by permitting automatic level control in any microphone channel
  May be used in variety of applications in AM-FM-TV-Recording studios, such as announce booths, boom mikes, and public address systems
  Controls level difference between two or more microphone signals
  Automatic gain control is applied when the microphone signal to the amplifier is \(-70\ \text{dbm}\) or higher. Signals below \(-70\ \text{dbm}\) are linearly amplified
- High gain—60 db vs 40 db gain for standard pre-amplifiers
- Plug-in construction allows easy removal of pre-amplifiers for servicing
- Small compact design. Six of these units can be mounted in seven inches of rack space
- Tubes are shielded by easily removed tube shields
- Transformers are of hum-bucking coil construction with magnetically shielded cases
- Prevents blasting when two or more people are using same microphone
- Automatically adjusts audio level from close-in to six or eight feet from microphone

WHERE TO USE
The General Electric Type BA-15-A plug-in uni-level pre-amplifier is a high-gain microphone pre-amplifier incorporating automatic-level control. This device is designed to automatically control variation in microphone signal levels. This compact plug-in unit may be used in place of the Type BA-1-F or Type BA-1-H pre-amplifiers.
Input level variations of up to 30 db may be successfully controlled by this pre-amplifier with only a 10 db change in the output signal level. Such variations are often encountered in boom microphone operation or in other cases where the relationship between the talent and the microphone is continuously changing. In addition, the uni-level pre-amplifier is a high gain unit having 60 db of gain as compared to a conventional pre-amplifier having 40 db of gain.

DESCRIPTION
The General Electric Type BA-15-A plug-in uni-level pre-amplifier is a single plug-in chassis which consists of a push-pull input stage (12AX7) supplying signal to a variable gain output stage (GL-6386). Signal for the bias generator is supplied from the plates of the output stage (GL6386) to a voltage amplifier stage (GL5670) connected in push-pull. The voltage amplifier supplies a signal to a full wave bias
rectifier stage (6AL5) whose output applies a bias voltage to the control grids of the variable gain stage.

MECHANICAL SPECIFICATIONS

UNITS
The type number covers the amplifier, one set of operating tubes, and installation and operating instructions.

DIMENSIONS
Height 43\(\frac{1}{2}\) inches Width 2\(\frac{1}{2}\) inches
Length 10\(\frac{1}{2}\) inches Weight 11\(\frac{1}{2}\) lbs

MECHANICAL
The size of this unit permits it to be used with our present line of plug-in amplifiers. The chassis size is that of the Type BA-1-H. It may be used to replace a Type BA-1-F or H, or any similar amplifier used as a microphone pre-amplifier of any studio audio system.

MOUNTING
Six uni-level pre-amplifiers can be mounted in seven inches of rack space using a Type FA-23-B shelf. Plug-in construction using a Jones 2400 series plug allows easy removal for servicing.

OPERATING CONDITIONS
Up to an external ambient of 45 C.
Up to 95 percent relative humidity.
Will withstand normal shipping.
Open-type construction allows natural ventilation.

ELECTRICAL CONNECTIONS
All connections are made to one 2400 series Jones connector mounted at end of chassis. The electrical connections to the Type BA-15-A Jones connector except for one connection are the same as our present line of plug-in amplifiers.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Frequency Response: +1 dB 50-12,000 and +1 -1.5 @ 15,000 cycles under any gain condition up to 30 db gain reduction.
Gain: 60 db unloaded transformer input.
Harmonic Distortion: Below and up to threshold of gain reduction 0.5 percent—50 to 15,000 cps. With 30 db gain reduction 50 to 15,000 cps 1 percent.
Output Noise: –60 dbm.
Attack Time: 1 millisecond
Recovery Time: 0.9 seconds for 63 percent recovery.

POWER REQUIREMENTS
300-volt d-c 25 ma approximately.
6.3-volt a-c 6@ 1.30 amps +20 to +50-volt d-c bias on filaments. 15.7 watts. (The Type BA-15-A uses an external power supply—suggested Type BP-10-B power supply.)

SIGNAL INPUTS
Microphone level and up to —40 dbm with 30 db gain reduction.
Source Impedance: 30/150/250/600 ohms.
Impedance: 150 ohms as shipped. Balanced or unbalanced.
Input Impedance: Unloaded transformer.

SIGNAL OUTPUTS
Threshold—10 dbm output 0 dbm at 30 db gain reduction.
150/600 ohms out. 600 ohms as shipped. Balanced or unbalanced.

TUBE COMPLEMENT
1—12AX7
1—6AL5
1—GL6386
1—GL5670

HOW TO ORDER
When ordering specify:
Type BA-15-A plug-in uni-level pre-amplifier to consist of one amplifier; one set of operating tubes and installation and operating instructions.

ACCESSORIES
1—Type FA-23-B shelf (mounts six Type BA-15-A amplifiers)
1—Type BP-10-B power supply will supply five Type BA-15-A amplifiers.
Microphone Pre-amplifier
Type BA-30-A

FEATURES
- Excellent frequency response with very low distortion
- Amplification of line noise is considerably reduced, since the signal is raised to a high level right near microphone
- Small size and little weight permits mounting at the end of a microphone boom
- Operates on 15- to 25-volt, d-c at 10 ma. Use a battery or any well-filtered power supply
- New General Electric PEP (Planar EpitaxialPassivated) silicon transistors used for a high degree of stability and ruggedness

WHERE TO USE
The General Electric Type BA-30-A transistorized microphone pre-amplifier is a boom microphone booster amplifier, a desk or a stand microphone pre-amplifier, or a microphone-to-line amplifier for remote applications. Gain settings of 20, 30, 40, or 56 db are available, with the change of one feedback resistor. With the gain set at 20 or 30 db, the level of a boom microphone is raised to a level which allows better control of the audio at the console. With the gain set at 40 db, a desk or a stand microphone output is raised to a sufficient level to feed directly into the high-level input of an audio-control console. Two microphones using two Type BA-30-A preamps could be used to feed a dual-mixing attenuator; enabling one knob control of a stereo microphone setup. With the gain set at 56 db gain, the Type BA-30-A microphone pre-amplifier may be used to feed a telephone line directly.

DESCRIPTION
Type BA-30-A microphone pre-amplifier consists of a fiberglass printed-circuit board, which mounts a P3 audio connector at each end. The entire assembly is covered by an aluminum sleeve.

The amplifier consists of three common emitter stages, which couple to an emitter-follower output stage. The input impedance is high to bridge the output of a 150- or 600-ohm microphone. The output impedance is low to feed either a 150- or 600-ohm load. The circuit is designed so that the signal does not "clip" nor become distorted at low supply voltages. For example, if the supply voltage decreases to 15-volt, only the gain has decreased by one-half db; but the distortion has not changed from its very low value.

MECHANICAL SPECIFICATIONS

MECHANICAL SPECIFICATIONS

Units
The type number covers the amplifier assembly, two Cannon P3 line connectors, three feedback resistors, a signal-coupling capacitor, a power supply bypass capacitor, a power supply isolating resistor, and an instruction booklet.

DIMENSIONS

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 inches</td>
<td>5 3/4 inches</td>
<td>4 oz</td>
</tr>
</tbody>
</table>

MOUNTING
Any position in the microphone line, between P3 audio connectors furnished with the unit, or any existing P3 connectors.

OPERATING CONDITIONS
Maximum ambient temperature—60 C (140 F)
Maximum relative humidity —95 percent

ELECTRICAL CONNECTIONS
Microphone input, and line output connectors plug directly into each end of the amplifier. Power supply connections can be made at the base of a microphone boom or at the audio console. No extra wires are needed. The d-c and audio share the same wiring. The signal is coupled out through a blocking capacitor.

SAFETY PROVISIONS
Power is removed from the amplifier when the line connector is removed. The line connector and the amplifier are keyed so that only the amplifier can mate with the line connector. A microphone connector is "blocked out" to prevent damage to a microphone by d-c voltage.

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Gain: 20, 30 (factory shipped), 40, or 56 db
For gain settings of 20, 30, and 40 db
Frequency response: =1 db 30-15,000 CPS
Distortion: 1/2 percent or less at rated level
Noise: —70 dbm

POWER REQUIREMENTS
15- to 25-volt d-c at 10 ma
The following 22 1/2-volt batteries will give 150 hours continuous, up to 200 hours intermittent operation:
Neda No. 710
Everaldy No. 763
Burgess No. 4156

SIGNAL INPUTS
Maximum input levels:
- 14 db with amplifier connected for 20 db gain
- 24 db with amplifier connected for 30 db gain
- 34 db with amplifier connected for 40 db gain
- 50 db with amplifier connected for 56 db gain

Impedances:
Input: High impedance
Source: 50 or 150 or 250 or 600 ohms unbalanced

SIGNAL OUTPUT
Level: +6 dbm max for all gain settings
Impedance: Low—to feed 150- or 600-ohm load

TRANSISTOR COMPLEMENT
4 - 2N2195 General Electric

COMPLIANCE
Complies with all applicable FCC and EIA specifications.

HOW TO ORDER
When ordering please specify: Type BA-30-A microphone pre-amplifier. (Requires external power supply.)
FEATURES

- Two complete amplifier channels
- Full RIAA low-frequency response
- Adjustable high-frequency response including RIAA position
- Sufficient level to feed directly into conventional mixer systems
- Completely transistorized
- Shielded output and power transformers
- Output circuits are 600/150 ohms and may be run either balanced or unbalanced
- Low distortion
- Built-in power supply—117/230 volts, 50/60 cycles

WHERE TO USE

The General Electric Type BA-23-A equalized transcription pre-amplifier is a transistorized dual-channel amplifier designed for stereo- or monaural-play-back applications.

It is designed to operate with high impedance stereo or monaural cartridges such as the General Electric Types VR-225, VR-1000, or other similar type cartridges. A four-position equalizer switch plus a monaural stereo output switch provide extreme operating flexibility.

DESCRIPTION

The complete dual amplifier and power supply is assembled into a single-cased unit. All signal input and output connections are made to the unit by means of a Jones 310 series connector. A fixed power-supply cord is provided for power-connection purposes.

Two operating controls are provided in this design. One is four-position switch for selecting response characteristics. The second switch is a MONAURAL/STEREO switch which permits selection of the output modes of this dual-amplifier assembly. Both controls are located inside the basic assembly. Two-inch shafts provide adequate length for bringing the controls through the motor board.

A laminated plastic overlay plate is provided for mounting at the operating position on the motor board top.

The four response positions of the selector switch are:

1. FLAT
2. RIAA
3. RIAA WITH HIGH BOOST
4. RIAA WITH HIGH ATTENUATION

The FLAT position provides essentially unequalized high-frequency response from material recorded at a constant velocity.

The RIAA position provides a flat response characteristic for records recorded in accordance with the RIAA recording curve.

The RIAA HIGH BOOST position provides essentially flat RIAA equalization with a slight boost at the high end to compensate for record wear.

The RIAA HIGH ATTENUATION position produces RIAA equalization with a reduced high end response for use with "noisy" records.

When used as a STEREO transcription amplifier, two separate amplifiers provide stereo outputs. When used as a MONAURAL amplifier, the two channels are connected together at an inter-stage point and two identical monaural outputs are provided. This makes it possible to play monaural recordings, with a stereo cartridge by simply placing the MONAURAL/STEREO switch in the MON position.

Each amplifier channel is equipped with a level-set control for balancing the output level of the two channels. These controls are located on the plug-in side of the pre-amplifier assembly, since they are not normal operating controls.
The self-contained power supply is designed to operate from either a 117-volt or 230-volt 50/60-cycle line. As normally shipped, the power supply is strapped for 117-volt a-c line operation.

**MECHANICAL SPECIFICATIONS**

**DIMENSIONS**
- Depth: 3 5/8 inches
- Width: 3 5/8 inches
- Height: 7 1/2 inches (excluding switch shafts)
- Weight: Approx 3 lb 8 oz (unpacked)

**MOUNTING**
The amplifier mounts below the turntable motor board and the switches are designed to mount on the top of the turntable board.

**ELECTRICAL SPECIFICATIONS**

**POWER INPUT**
- 117/230 volts, 50/60 cycles
- 10 watts

**OUTPUT LEVEL**
When used with the General Electric variable reluctance cartridge, the output will be approximately -20 VU maximum from microgroove records.

**NOISE LEVEL**
- -65 dbm

**OUTPUT CIRCUITS**
Load impedance: 600/150 ohms
Output connections: 600 or 150 ohms—balanced, or either side. May be grounded.

**DISTORTION**
1 1/2 percent or less, 30 to 15,000 cycles with up to -10 dbm output. This includes equalizing circuits.

**HOW TO ORDER**
When ordering, please specify:
Type BA-23-A equalized stereo transcription pre-amplifier.

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**TYPICAL STEREO CHANNEL RESPONSE OF GE VR-1000-5 CARTRIDGE USED WITH LONDON PS-131 STEREO TEST DISC.**

- Flat
- RIAA Hi Boost
- RIAA
- RIAA Hi-Attén

**FREQUENCY C. P. S.**
Transistorized Portable Amplifier
Type BA-26-A

FEATURES
- Completely transistorized—not a tube in the circuitry
- Four microphone inputs, plus a high level input. All five inputs equipped with transformers
- Regulated, self-contained 95-135-volt 50/60-cycle a-c power supply
- Provisions for operating from self-contained batteries
- Built-in tone generator
- Provisions for paralleling portable amplifiers
- Amplified cue
- Small, lightweight design, weighs only 19 1/2 lbs
- All transistors plug-in
- New laminated plastic front panel for ease of write-in and erase
- Built-in studio quality—designed for use on AM-FM-TV broadcast and recording audio applications
- Carrying handle functions as a base to set unit at a convenient operating angle

WHERE TO USE
The General Electric Type BA-26-A transistorized portable amplifier is designed for all remote or auxiliary (emergency) studio audio mixing applications in AM-FM-TV or recording work.
Standard input and output impedances will make it possible to operate this transistorized portable amplifier in conjunction with other makes and models of broadcast audio equipment.

DESCRIPTION
The Type BA-26-A transistorized portable amplifier is suitable for use as a remote audio mixer and amplifier, capable of amplifying and mixing four microphones and one high-level source and feeding the output to a line at a +18 dbm level. The frequency response and distortion characteristics will be such that it will be suitable for use on AM-FM-TV and recording applications.
In addition to providing facilities for mixing five sources, this transistorized portable amplifier has a self-contained power supply and provisions for installing batteries. This will permit the operation of the transistorized portable amplifier from either a power line or its batteries.
A new feature includes a high-level input which may be used for mixing in a music source or as a means of coupling two or more Type BA-26-A transistorized portable amplifiers together to get additional mixing facilities.
Transistorized Portable Amplifier
Type BA-26-A

1. Hinged cover
2. Removable plate for mounting cannon P3 type receptacles
3. XLR type input connectors
4. High level gain control
5. Spring type binding posts for output and public address connections (5)
6. Cue gain control
7. Public address feed control
8. Dual phone jacks
9. Head phone control
10. Eight-foot power cord
Transistorized Portable Amplifier
Type BA-26-A

11. Meter light batteries
12. Output transformer
13. Microphone input transformer
14. Mercury cells for amplifier battery operation (4)
15. Laminated "write on" panel
16. Line ON OFF cue switch
17. Power check +8VU/tone switch
18. Power switch
19. Regulated a-c power supply
20. High level input transformer
Transistorized Portable Amplifier

Type BA-26-A

MECHANICAL SPECIFICATIONS

DIMENSIONS
Depth 12 inches
Height 7 inches
Width 15 inches
Weight 19\frac{1}{2} lb with batteries (18\frac{1}{2} lb less batteries)

MOUNTING
Self-contained portable unit. Sets in position on four rubber feet or may be tilted at an angle by positioning handle under unit. Four rubber feet on the cover allow unit to sit on any surface in the carrying position.

ELECTRICAL CONNECTIONS
All connections are accessible through a spring-loaded hinged rear cover. The connections include:
- 4 Microphone receptacles—Cannon XLR-31 receptacle. (Cannon P3-13 may be substituted by removal of XLR-31 mounting plate.)
- 1 High-level input receptacle—Cannon XLR-31. (Cannon P3-13 may be substituted by removal of XLR-31 mounting plate.)
- 1 Pair of spring-loaded binding posts for output line connections
- 1 Spring-loaded binding post for ground terminal
- 1 Pair of spring-loaded binding posts for public address output
- 2 Monitor phone output jacks
- 1 A-c cord (grounded-safety type)—adapter provided for two-wire plug

SAFETY PROVISIONS
Grounded a-c power plug provided
Completely enclosed
117 a-c max voltage
Binding post for grounding chassis

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Program circuits

Frequency Response +1 db 50 to 15,000 CPS
Over-all Gain 90 db = 2 db
Noise 65 db below +18 dbm output level
Distortion—1 percent or less at a +18 dbm out after a 4 db pad from 50 to 15,000
Battery operation in hours—Approximately 25 hours
Operating Temperature Range—Up to 55 5 percent of the time, 45 continuous

POWER REQUIREMENTS
Power Inputs
A-c Supply—95-135-volt, 50/60-cycle, 225 watts (approx)
Batteries—4 6\frac{1}{2}-volt cells
2 1\frac{1}{2}-volt flashlight cells

Signal Inputs
Impedances
50/150/600 ohms balanced or unbalanced
Levels
MIC level to —25 dbm (maximum)
High Level 0 to —20 dbm

Signal Outputs
Impedance Line
Output—150/600 ohm balanced or unbalanced
Mon. Phone Output—High Impedance output balanced
PA Output—150 ohms, balanced
Levels
Line—+18 dbm (after 4 db pad)
Mon. Phones—0 dbm (maximum adjustable)
PA Feed—50 dbm

TRANSISTOR COMPLEMENT
8—2N527 General Electric
3—2N553 Delco
2—1N537 General Electric silicon diodes
1—1N517 International zener diode
2—1N91 General Electric germanium diodes

HOW TO ORDER
When ordering please specify Type BA-26-A transistorized portable amplifier.

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FEATURES
- Completely transistorized—not a tube in the circuitry
- Use of transistors eliminates need for special cooling provision
- Complete plug-in facilities for all amplifiers, and relay modules—amplifiers may be quickly and easily removed or replaced during service operations
- Buy as you need; console can be operated with less than full complement of preamplifiers; buy the basic package, add more later as you expand operations
- Clean, "crackle-free" switch; springleaf, telephone type lever keys used
- Noiseless fading and mixing—program controls are high quality Daven step-type attenuators
- Improved operational efficiency with color-coded controls; selector switches and associated lever key handles are color coded for instant recognition and prevention of operational error
- Dual channel operation provided in console design; addition of second program amplifier, second master gain module, and VU meter, plus minor terminal board changes, will permit simultaneous two-channel operation. Second VU meter mounting space is included in console for this purpose—no interaction between two program channels when so used
- Built-in cue TB amplifier—console includes complete cue and talkback facilities with push-button selector switch and speaker

WHERE TO USE
The General Electric Type BC-21-A transistorized audio console is designed for studio and or master audio control of radio and television stations. This console provides all the facilities required for switching, mixing, and amplifying the outputs of microphones, turntables, tape mechanisms, projectors, remote and network lines, and other audio sources. It also supplies facilities for auditioning, cueing, monitoring remote lines and cue talkback circuits to studio and remote lines.

Completely transistorized, this all plug-in audio console may be used for single-channel operation or easily, quickly, and inexpensively modified for two-channel operation.

DESCRIPTION
The Type BC-21-A transistorized audio console consists of a desk unit containing four Type BA-21-A preamplifiers, a Type BA-22-A program amplifier, a Type BA-24-A monitor amplifier, and a Type BA-28-A cue/talkback amplifier and associated mixer, gain control and relay equipment. The Type BP-20-A 25-volt power supply and the Type BP-21-A 50 25-volt power supply are included in the basic package; but they are rack mounted outside of the console.

The preamplifiers, high level mixer controls, and master gain control are plug-in modules which make up most of the lower front section of the console. These
units are inserted from the front and become part of the control panel of the console. The cue/talkback and program amplifiers mount in the hinged top section of the console; while the monitor amplifier and plug-in relay modules are located in the console base.

This basic console handles up to eight low-level microphone inputs which are selected by means of microphone keys into the four preamplifiers. Up to ten inputs can be handled by addition of another preamplifier module (accessory).

Eight high level program sources such as turntables, tape and remotes or network are connected by means of three eight-position spring leaf push-button switch assemblies into three high level mixers.

All audio sources feed into mixer bus keys which provide the means of selecting either the program bus or the audition bus. In the case of two-channel operation, the audition bus becomes program bus number two.

This console includes a master gain control module and provisions for mounting the second channel master gain control module. Space and connections are provided for the installation of a second program amplifier for dual channel operation.

By means of a 5-position monitor-selector switch, it is possible to connect the monitoring amplifier input to the program lines, the audition bus, or three external lines.

Two output line keys are incorporated making it possible to switch the program output to either of two lines when the console is used as a single-channel unit. In two channel applications, the line keys will connect either output line to either channel. In single channel operation, the keys control normal program output in one position and in the other position provide emergency program output from the monitoring amplifier.

A single VU meter with associated selector switch and pad is provided. By means of an extra meter hole and dual overlay panel a second VU meter may be mounted if desired.

This design incorporates a cue/talkback amplifier which with a push-button selector switch makes it possible to communicate with either of two studios, an announce booth, or NEMO lines without affecting monitor facilities. A 4-inch speaker is mounted on the console and serves as both TB lines and cue speaker. An eight-position push-button switch assembly provides for selection of six intercommunication positions, a cue position and a LISTEN/TALK operate button. The LISTEN/TALK button is red versus black for other positions.

For cue purposes, the talkback amplifier doubles as the cue amplifier. Cue faders are used in the three high-level mixer positions. The cue output of these faders is connected to a common bus brought up to a position on the cue talkback selector switch.

This console design includes speaker and warning light cut-off relays and associated circuitry. Provisions are made for operation of both audition and on-air warning lights. Relay control circuits provide for operation of two studios, an announce booth, and the control room speaker. Four printed wire board relay assemblies are supplied. These relay modules plug into the console proper.

This console provides a pair of phone jacks for monitoring each channel via a headset.

A spare key is provided (mounted adjacent to the two line keys) which may be wired by the customer for such purposes as feeding recorders, studio amplifiers, etc.
An OVER-RIDE switch is included in the console design. This OFF/ON switch connects the three remote lines to the monitor speaker input. The only exception being that if a remote line is being fed program material for cue purposes that line is automatically disconnected from the over-ride bus.

A four-position switch makes it possible to selectively feed program material for remote cue purposes to any one of three remote lines. When a remote line is being fed cue, it is removed from the over-ride circuit. A single VU meter is mounted in the console together with a four-position meter selector switch which provides the following selections:

(a) OFF
(b) CHAN 1 (Connects meter to Chan 1 output line.)
(c) CHAN 2 (Connects meter to the monitor output. In a two-channel conversion, this position is reconnected to the No. 2 output line.)
(d) EXT (This position connects the meter to a pair of terminals which may be used to meter some external audio circuit.)

Circuits associated with the monitor amplifier include a gain control and an input-selector switch. Both these controls are mounted on the upper right-hand side of the console. The selector switch makes it possible to switch several lines to the monitor input. The positions in detail are:

(a) OFF
(b) CHAN 1 (Bridges monitor input to program channel No. 1 output.)
(c) CHAN 2 (Connects Chan 2 (audition) mixer bus to the monitor input. In a two-channel conversion this position is reconnected so that it bridges Chan 2 program output).
(d) EXT 1 Bridges monitor input to three sets of terminals for connection to three remote audio circuits.
(e) EXT 2
(f) EXT 3

MECHANICAL SPECIFICATIONS

UNITs
Type number covers the console assembly, four Type BA-21-A preamplifier modules, a Type BA-22-A program amplifier, a Type BA-24-A monitor amplifier, a Type BA-28-A cue/talkback amplifier, a Type BP-20-A 25-volt power supply, a Type BP-21-A 50/25-volt power supply, and associated equipment.

DIMENSIONS
(Exterior console dimensions)
Depth Height Length Weight
17 inches 11 inches 38 inches 75 lb

MOUNTING
All amplifier chassis are plug in and mount in console. The console cabinet may be mounted on two Type PR-16-B/C base cabinets or any available desk of sufficient size. The power supplies mount

Monitor, VU meter and line output control panel
Transistorized Audio Console
Type BC-12-A

in one of the base cabinets or any standard EIA cabinet rack, such as the Type PR-1-A cabinet rack (accessory).

CONTROLS AND ADJUSTMENTS
5—Microphone selector keys
4—Mixer and mixer keys (part of preamplifier module)
3—Eight-position push-button selector switches for high level sources
2—Eight-position push-button cue talkback selector switch
1—Master gain control
1—Monitor selector switch
1—Monitor gain control
1—VU meter selector switch
1—Over-ride switch
1—Cue/TB gain control
1—Spare key (utility)
1—Remote PGM cue selector switch
3—Line isolation transformers

ELECTRICAL SPECIFICATIONS

PERFORMANCE
Program Circuits
Frequency Response: ± 2 db, 50 to 15,000 cps
Gain: 105 db ± 2 db
Noise: 65 db below +18 dbm out (with controls set for 68 db of gain)
Crosstalk (Nominal):
At least 50 db down, 50-15,000 cps
At least 80 db down, at 1000 cps
Distortion: 1 percent or less at +18 dbm (after 6 db pad)
Monitor Circuits
Frequency Response: ± 1 db, 50 to 15,000 cycles
Distortion: 1½ percent or less at +33 dbm

POWER REQUIREMENTS
110/117/125 volts, 50/60-cycle, single-phase, a-c, 90 watts (45 watts each power supply)
25 volts, d-c at 1-amp for the monitor amplifier and control relays, from the Type BP-20-A power supply.
50 volts, d-c at 500 ma for program amplifier and cue, talkback

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Transistorized Audio Console
Type BC-12-A

amplifier as well as 25 volts, d-c at 40 ma for the preamplifiers from the Type BP-21-A power supply.

**SIGNAL INPUTS**
- **Microphones:** 10—30/150 250 600 ohms, balanced or unbalanced
- **Turntables:** 3—600 ohms, balanced or unbalanced
- **Network or Remote Lines:** 3—600, 150 ohms, balanced or unbalanced
- **Tape/Projectors:** 2—600 ohms, balanced or unbalanced
- **External Monitors:** 3—20,000 ohms, balanced, bridging

**Levels**
- **Low Level Inputs:** Microphone level to —25 dbm
- **High Level Inputs:** —10 to +18 dbm

**SIGNAL OUTPUTS**
- **Program Lines (Regular):** 2—600 ohms, balanced
- **Monitor Channel:** 1—600 150 8 ohms, balanced
- **Remote Cue (into NEMO line):** 3—Bridging, balanced

**Levels**
- **Program output level:** +18 dbm
- **Monitor output level:** +33 dbm (2 watts)

**TRANSISTOR COMPLEMENT**
1—2N277 Delco
1—2N173 Delco
1—2N169A General Electric
3—2N441 Delco
25—2N324 General Electric
6—1N538 General Electric Silicon Diode
10—2N320 General Electric
2—CTP 1133 Cleveite
2—2N553 Delco

**HOW TO ORDER**
When ordering please specify Type BC-21-A transistorized audio console which includes:
1—Console cabinet
4—Type BA-21-A preamplifier modules
1—Type BA-22-A program amplifier
1—Type BA-24-A monitor amplifier
1—Type BA-28-A cue talkback amplifier
1—Type BP-20-A 25-volt power supply
1—Type BP-21-A 50 25-volt power supply

**ACCESSORIES**
- Type BA-22-A program amplifier for two-channel operations
- Type BA-21-A preamplifier module for fifth position on console
- Type BA-24-A monitor amplifier for auxiliary speaker operation
- Type BP-20-A 25-volt power supply for extra monitor amplifiers (one BP-20-A will provide adequate power for two monitor amplifiers)

or
- Dual channel kit 7168290 consisting of:
  1—Type BA-22-A program amplifier for two-channel operation
  1—7164636 master gain module
  1—7477541-4 meter attenuator
  1—7492839-1 VU meter

Transistorized audio console, Type BC-21-A, for dual channel operation
WHERE TO USE

The General Electric Type FA-35-G bridging volume control is designed to convert a 600-ohm input of an amplifier to 10,000 ohms balanced bridging service. It may be used on line levels up to +40 dbm.

DESCRIPTION

The General Electric Type FA-35-G consists essentially of a continuously variable dual potentiometer, a screwdriver control (a knob may be used), and a dummy switch section tandem-mounted to provide terminals for mounting two resistors and input connections to the control.

MECHANICAL SPECIFICATIONS

DIMENSIONS

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<tbody>
<tr>
<td>Height</td>
<td>21/4 inches</td>
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<tr>
<td>Diameter</td>
<td>1 1/2 inches</td>
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<tr>
<td>Weight</td>
<td>2 ounces</td>
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MOUNTING

The Type FA-35-G is designed to fit holes provided in the ends of the Type BA-1-F pre-amplifier and the Type BA-12-C program/monitor amplifier chassis. It may also be mounted on the Type BA-4-E monitoring amplifier or used in similar applications where a bridging gain control is required. A 5/8-inch hole is required for mounting in applications other than outlined above. (See outline diagram for internal chassis clearance dimensions.)

HOW TO ORDER

When ordering, please specify:
Type FA-35-G bridging volume control.
FEATURES
- Compact, plug-in construction
- Easy to remove, maintain and service
- Conservatively rated components
- Screwdriver control to adjust B+ voltage to current value

WHERE TO USE
The General Electric Type BP-10-B plug-in power supply is specifically designed to power plug-in audio amplifiers Types BA-1-F, BA-9-A and BA-12-C. It will also supply TV or other equipment which will operate from an unregulated supply of Type BP-10-B ratings.

DESCRIPTION
The Type BP-10-B is a plug-in unregulated power supply, constructed on a narrow recessed chassis with all controls and components marked. Fuses and operating controls are accessible from the front. A Jones plug that mates with a corresponding receptacle on the Type FA-22-F tray makes all necessary electrical contacts.

A voltage divider across the d-c output serves as a bleeder and as a source of low voltage d-c for biasing the filament supply 30 volts positive to minimize hum output from amplifiers.

One Type BP-10-B can supply power for up to 25 Type BA-1-F pre-amplifiers, or three Type BA-9-A uni-level amplifiers, or three Type BA-12-C program monitor amplifiers at 300 volts B+.

MECHANICAL SPECIFICATIONS
DIMENSIONS
- Depth: 9 3/4 inches
- Height: 5 7/8 inches
- Weight: 25 lb (approx)

MOUNTING
The BP-10-B plugs into a Type FA-23-B shelf.

OPERATING CONDITIONS
May be operated in an external ambient of up to 113°F (45°C) and a relative humidity up to 95 percent.

SAFETY PROVISIONS
Wiring and terminals are enclosed in a grounded chassis. No exposed voltages because of plug-in construction.

ELECTRICAL SPECIFICATIONS

TYPE OF CIRCUIT
Full-wave, single-phase rectifier using two 5Y3 tubes in parallel. Use of parallel rectifiers increases power supply reliability under average load conditions. The filter is a pi-filter with a rheostat located in the B+ circuit just ahead of the output capacitor. Filament supply is maintained at +30-volt bias.

PERFORMANCE
Potentiometer adjustment to +300-volt for all loads from 40 ma to 230 ma. Maximum ripple, full load: 25 mv (120 cycles).

INPUTS
110/117/125-volt, 50/60-cycle, 200-watt single-phase.

OUTPUTS
40 to 230 ma adjustable to 300-volt d-c at nominal input transformer tap voltages: 4.5-amp at 6.4-volt a-c at 50-cycle, 7.5-amp at 6.4-volt a-c at 60-cycle; at 50 cycles this unit will supply three Type BA-12-C amplifiers or 15 Type BA-1-F amplifiers; at 60 cycles this unit will supply three Type BA-12-C amplifiers or 25 Type BA-1-F amplifiers.
Plug-in Power Supply
Type BP-10-B

INTERNAL POWER SUPPLIES
The Type BP-10-B also derives and establishes the filament winding at a positive bias of 30 volts.

CONTROLS AND ADJUSTMENTS
Voltage output can be adjusted to 300-volt d-c, by a screwdriver adjustment located above the chassis, under all load conditions from 40 to 230 ma. Fuses are removable from the front of the chassis.

TUBE COMPLEMENT
2 Type 5Y3GT/G

HOW TO ORDER
When ordering, please specify:
Type BP-10-B plug-in power supply.

ACCESSORIES
Type FA-23-A shelf, for mounting plug-in units with trays. (Type FA-23-A occupies seven inches—four units of rack height—in a Type PR-1-A cabinet rack and will accommodate six pre-amps, Type BA-1-F, four Type BA-12-C program/monitoring amplifiers, or two Type BP-10-B power supplies.)
FEATURES
- All transistor—no tubes in circuitry
- Maintains constant regulated output voltage
- Full-wave rectification
- Fuses fully protect supply from overload
- Regulation adjustable for various line voltage conditions
- Voltage-adjust control and test jacks on front of panel
- Fuse posts on front of panel

WHERE TO USE
The General Electric Type BP-20-A 25-volt transistor power supply provides the regulated 25-volt d-c required for operation of the Type BA-24-A transistor monitor amplifier and control relays as used in the Type BC-21-A transistor audio console. In alternate applications, it can supply adequate power for two and in some cases three monitor amplifiers.

DESCRIPTION
The Type BP-20-A 25-volt transistor power supply employs silicon-rectifier cells in a full-wave center tapped circuit. The regulation is obtained by a transistorized series regulator circuit consisting of three transistors and a zener diode.

MECHANICAL SPECIFICATIONS
DIMENSIONS (Two rack units)
- Depth 6 3/4 inches
- Height 3 3/4 inches
- Width 19 inches
- Weight 5 lb, 11 oz

MOUNTING
Standard rack mounting

OPERATING CONDITIONS
- Maximum room ambient temperature, continuous 113°F (45°C), 5 percent of the time 122°F (50°C).
- Maximum cabinet ambient temperature—continuous 122°F (50°C), 5 percent of time, 113°F (55°C).

ELECTRICAL SPECIFICATIONS
PERFORMANCE
- Output voltage changes less than 1 percent with load changes from no load to one ampere and input voltage changes of ±10 volts. Less than one millivolt ripple with full load.

INPUT POWER REQUIREMENTS
110/117/125 volts a-c, 50–60-cycle, 45 watts

POWER OUTPUT
25 volts regulated d-c, 1 ampere

CONTROLS AND ADJUSTMENTS
ON-OFF switch
Voltage control potentiometer

TRANSISTOR COMPLEMENT
1—2N277 (Delco)
1—2N441 (Delco)
1—2N324 (General Electric)

HOW TO ORDER
When ordering please specify Type BP-20-A 25-volt transistor power supply.

www.americanradiohistory.com
Transistor Power Supply (50/25-volt)
Type BP-21-A (Regulated)

FEATURES
- All transistor—no tubes in the circuitry
- Maintains constant regulated output voltage
- Full-wave rectification
- Fuses fully protect supply from overload
- Regulation adjustable for various line voltage conditions
- Voltage-adjust control and test jacks on front panel

WHERE TO USE
The General Electric Type BP-21-A 50/25-volt transistor power supply provides the regulated 50-volt d-c for operation of up to two Type BA-22-A transistor program amplifiers and a Type BA-28-A transistor cue talkback amplifier. It also furnishes the regulated 25-volt d-c required by up to five Type BA-21-A transistor preamplifiers.

In alternate applications, a single power supply will supply up to four program and/or cue amplifiers.

DESCRIPTION
The Type BP-21-A 50/25-volt transistor power supply employs silicon-rectifier cells in a full-wave bridged circuit. The regulation is obtained by a transistorized series regulator circuit which employs four transistors and a zener diode. An additional circuit using a choke coil, capacitor, and an adjustable resistor supplies the 25-volt d-c required for the preamplifiers.

MECHANICAL SPECIFICATIONS
DIMENSIONS (Two rack units)
Depth 6 3/4 inches
Height 3 1/2 inches
Width 19 inches
Weight 5 lb, 11 oz

OPERATING CONDITIONS
- Maximum room ambient temperature, continuous 113°F (45°C), 5 percent of the time 122°F (50°C)
- Maximum cabinet ambient temperature—continuous 122°F (50°C), 5 percent of time, 131°F (55°C)

ELECTRICAL CONNECTIONS
- A-c input and d-c output connections made on separate terminal boards

SAFETY PROVISIONS
- Primary and secondary circuits are fused. Maximum voltage 117-volt a-c and 50-volt d-c.

ELECTRICAL SPECIFICATIONS
PERFORMANCE
- Output voltage changes less than 1 percent with load changes from no load to 560 ma or with input voltage changes of ±10 volts. Less than 750 microvolts ripple with full load.

INPUT POWER REQUIREMENTS
110/117/125-volt d-c, 50–60-cycle, 45 watts.

POWER OUTPUT
- 50 volts (regulated) d-c, 560 ma
- 25 volts (regulated) d-c, 40 ma

CONTROLS AND ADJUSTMENTS
- ON-OFF switch, voltage adjust

CONTROL POTENTIOMETER
- A slide-wire resistor mounted on the chassis makes it possible to adjust the 25-volt output for 32 to 40 ma loads.

TRANSISTOR COMPLEMENT
1—2N173 (Delco)
2—2N441 (Delco)
4—1N538 (General Electric)

HOW TO ORDER
When ordering please specify Type BP-21-A 50/25-volt transistor power supply.
FEATURES

- **Easy to service and maintain**
  Hinged front panels permit easy, quick replacement of amplifiers, or power supplies.

- **Space saving**
  Construction of shelf, occupying only seven inches of vertical rack space, permits many amplifier combinations to be compactly mounted in a small area.

- **Improved rack appearance**
  Door, when closed, covers all shelf mounting hardware. Shelf panel matches other General Electric rack-mounted audio panels.

- **Easy amplifier replacement**
  Extractor tool, clipped to inside of front panel, permits rapid and easy withdrawal of amplifiers for maintenance or service.

- **Type FA-23-C panel adapted for mounting of controls and indicating light jewels**
  Type FA-23-C shelf is equipped with shaft extensions for Type BA-14-A controls. Front panel is equipped with two control scales and plug buttons for both the controls and indicator light jewels.

- **Mounts many amplifier combinations**
  Spacer bars and mating receptacles may be mounted in any desired manner to permit use of different types of General Electric audio amplifiers. Shelf base is drilled to mount spacer bars and receptacles.

**Type FA-23-B**

The General Electric Type FA-23-B broadcast shelf is designed to mount in a standard EIA 19-inch cabinet or relay rack. This shelf, occupying only seven inches of vertical rack space, provides mounting space for General Electric plug-in audio amplifiers in any of the following combinations:

- Six Type BA-1-F pre-amplifiers, or
- Four Type BA-9-A uni-level amplifiers, or
- Four Type BA-12-C program/monitor amplifiers, or
- Two Type BA-3-A equalized transcription pre-amplifiers, or
- Two Type BP-10-B power supplies.

Combinations of the various units are possible such as mounting three Type BA-1-F pre-amplifiers and two Type BA-12-C program/monitor amplifiers or two Type BA-9-A uni-level amplifiers on a single Type FA-23-B shelf.

The plug-in audio equipment may be easily inserted in or withdrawn from the mating receptacles mounted on the shelf. An extractor tool, clipped to the shelf door, aids in quick removal of amplifiers through the front of the rack.

**Type FA-46-A**

The General Electric Type FA-46-A broadcast shelf is identical to the unit just described less the front panel and hinges.

**Type FA-23-C**

The General Electric Type FA-23-C broadcast shelf is designed to permit rack mounting of the General Electric Type BA-14-A program/monitor amplifiers. This shelf, similar in appearance, size, and function to the Type FA-23-B broadcast shelf, differs in that the front panel of the Type FA-23-C shelf contains four holes with plug buttons, control decals for the operating controls, and the indicating light jewels of the Type
BA-14-A program/monitor amplifier. If a front panel volume control is not required, the Type BA-14-A can be mounted in a Type FA-23-B shelf. Both shelves are furnished with the same number of mating jones receptacles and spacer bars.

DESCRIPTION
The General Electric Type FA-23-B, FA-23-C and FA-46-A broadcast shelves are designed to mount the General Electric line of plug-in audio amplifiers and power supplies in standard 19-inch EIA cabinet or relay racks. Through the use of these shelves, from two to six amplifiers or power supplies (depending upon the type) may be mounted in only seven inches of rack space.

Rear view of Type FA-23-B shelf, showing mounted Type BA-1.1-F and Type BA-12-C amplifiers

These shelves are identical in construction, size, and appearance except for the addition of four holes (with plug buttons furnished) and two scales on the front panel of the Type FA-23-C shelf and the lack of front panel and hinges on the Type FA-46-A.

Front view of Type FA-23-B shelf, with front panel open

All steel parts are given a rust-proof plating of cadmium.

The front panel of the Type FA-23-B shelf is painted a dark metalustre blue and is devoid of holes or control designations.

Front view of Type FA-23-C shelf, showing front panel control of mounted Type BA-14-A amplifiers

The front panel of the Type FA-23-C shelf is painted a dark metalustre blue, and is provided with four holes and two calibrated scales. These holes and scales are used for mounting the two indicator light jewels and for passage of the extension shafts of volume controls in the Type BA-14-A program/monitor amplifiers. The knobs furnished are the push-on type permitting ready insertion or removal of the knobs whenever it becomes necessary to open the front panel.

A shelf utilizes fourteen inches of space between the rear of the front mounting surface and the rear of the shelf. When these shelves are mounted in a General Electric Type PR-1-A cabinet rack, the No. 12-24 mounting screws (furnished) are hidden from sight by the exclusive General Electric rolled front panel and cabinet design, an important contribution to the neat appearance of your control or equipment room.
MECHANICAL SPECIFICATIONS

UNITS

Type FA-23-B
1—FA-23-B shelf
5—Drilled and tapped spacer bars, with screws
6—Cinch-Jones S-2410 10-pin female connectors with special shelf mounting brackets
1—Extractor tool
Mounting screws

Type FA-46-A2
As above less extractor tool, front panel and hinges

Type FA-23-C
1—Shelf with panel plug buttons and two calibrated scales
2—Extension shafts
2—Control knobs and springs
5—Drilled and tapped spacer bars, with screws
6—Cinch-Jones S-2410 10-pin female connectors with special shelf mounting brackets
1—Extractor tool
Mounting screws

DIMENSIONS (Four rack units)

Depth 13^{3/4} inches  Width 19 inches
Height 6^{1/2} inches  Weight 9 lb

MOUNTING

Type FA-23-B, FA-23-C and FA-46-A shelves bolt to the front of the cabinet or relay rack with No. 12-14 round head screws (furnished). They may be mounted in any standard 19-inch width cabinet or relay rack with at least 14-inch clearance between the front panel and the rear door.

FINISH

Front panel—General Electric dark metalustre blue
Shelf base and hardware—cadmium plated for rust prevention

HOW TO ORDER

When ordering please specify:

——General Electric Type FA-23-B broadcast shelf. (Type number includes shelf, panel, spacers, connectors and brackets, extractor tool, mounting screws, and installation instructions.)

or

——General Electric Type FA-23-C broadcast shelf. (Type number includes shelf, panel with scale and plug buttons, spacers, connectors and brackets, extractor tool, extension shafts, push-on knobs, and installation instructions.)

or

——General Electric Type FA-46-A broadcast shelf. (Type number includes shelf, spacers, connectors and brackets, mounting screws, and installation instructions.)
FEATURES
- Fits any standard rack. The Type FA-48-A1 broadcast shelf is designed to fit 19-inch EIA cabinet rack.
- Easy to maintain and service. Hinged front panels permit easy, quick replacement of amplifiers
- Space saving. Shelf occupies only 5¼ inches of rack space

WHERE TO USE
The General Electric Type FA-47-A1 broadcast shelf is designed for mounting the General Electric line of plug-in, transistorized audio amplifiers. This shelf occupies five and one quarter inches of vertical-rack space and is equipped to accommodate four of the following plug-in amplifier types:
- Type BA-22-A program amplifier
- Type BA-24-A monitor amplifier
- Type BA-28-A cue/talkback amplifier

DESCRIPTION
The General Electric Type FA-48-A1 broadcast shelf is designed to mount the General Electric line of plug-in amplifiers. This shelf consists of a horizontal plate equipped with two vertical end-mounting brackets, a hinged-front panel, four plug-in connectors, four fuse-holders with indicator lights, and four adhesive backed write-in strips. The end brackets are provided with mounting slots and screws for fastening the shelf in a standard 19-inch cabinet or rack. The hinged front panel covers the front of the shelf and conceals the mounting screws. The shelf must have at least 13½ inches clear depth between the front mounting surface and the rear door of a rack cabinet.

MECHANICAL SPECIFICATIONS
DIMENSIONS
<table>
<thead>
<tr>
<th>Depth</th>
<th>Width</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>13¼ inches</td>
<td>19 inches</td>
<td>6 lb</td>
</tr>
</tbody>
</table>

MOUNTING
The Type FA-48-A1 shelf bolts to the front of the cabinet or rack with No. 12-24 mounting screws (furnished). They may be mounted in any 19-inch-wide cabinet or rack with at least 13½-inch clearance between the front panel and the rear door.

FINISH
Front panel—General Electric dark metalustre blue outside and inside. Chassis—cadmium plated.

HOW TO ORDER
When ordering please specify: General Electric Type FA-48-A1 broadcast shelf.

ACCESSORIES
- Type BA-22-A1 program amplifier
- Type BA-24-A1 monitor amplifier
- Type BA-28-A1 cue/talkback amplifier
Broadcast Shelf
Type FA-48-A1

Broadcast shelf, Type FA-48-A1 (open panel view)

Broadcast shelf, Type FA-48-A1 (rear view)
FEATURES

- **Versatile**
  Adaptable for mounting either broadcast audio, or television chassis and panels, removable front and rear doors are arranged for left or right opening. Chassis and panels may be mounted in a number of various positions from the front (in which case the front door is not used) to the rear of the cabinet on the movable equipment mounting angles spaced for 19-inch rack-mounted equipment.

- **Ease of wiring**
  Harnesses are eliminated by use of Type PR-5-A wiring ducts which have removable covers providing maximum accessibility to accessory wiring.

- **Accessibility**
  Emphasized by convenient locations for terminal boards and wiring cables and absence of awkward trim strips.

- **Sturdy**
  Welded skin construction with welded stiffeners in the front door.

- **Attractive**
  Panel edges are concealed by recessed front mounting surface.

- **Excellent ventilation**
  Natural draft characteristics in addition to provision for ventilation to a pressurized system.

- **Safe**
  High-voltage door-interlock switch kits (Cat. No. 7460330-G4) are available to attach to the Type PR-1-A cabinet rack so that high voltages are grounded when either the front or rear doors are opened.

WHERE TO USE

The General Electric Type PR-1-A cabinet rack provides space for mounting any broadcast or television audio and video chassis and panels designed for installation in a standard 19-inch rack.

DESCRIPTION

The Type PR-1-A cabinet rack consists of a rigid welded steel cabinet with an open front and a hinged-rear door. Two equipment mounting angles and two short terminal board frame mounting angles, each containing No. 12-24 tapped holes located in accordance with EIA standards, are provided with each rack. The front door is available as an accessory.

The outstanding feature of the Type PR-1-A is its versatility. Any combination of General Electric audio and video chassis plus other manufacturers’ standard rack equipment can all be mounted in the same rack. This is possible because of the three locations for the equipment mounting angles within the rack. Front, intermediate, and rear mounting positions are provided. A neat and uniform appearance can be maintained even when units of different types are installed.

The front position of the mounting angle is for panel-mounted equipment that will be approximately flush with the front edge of the rack, without a front door, as in conventional audio practice. This position is 1 9/16-inch behind the front surface of the cabinet shell so as to recess the audio panels slightly within the front surface of the cabinet and thus conceal the panel edges.

The intermediate position is 4 1/8 inches behind the front surface of the cabinet shell and is intended for any standard panel-mounted units such as jack panels, audio amplifiers, standard test equipment, and some front-mounted television units when a front door is used. With this type of mounting, the front door is used to screen an otherwise heterogeneous appearance and to provide a closed rack so that pressurized ventilation, if used, will be more effective.

The rear position is ideal for mounting television power supplies, video amplifiers, and other chassis-type television units with or without the use of a front door. The mounting surface of the angle in this position is located 11 1/8 inches behind the front surface of the cabinet shell. Combinations of front, intermediate, and rear positions may also be used in the cabinet.

The rear door is hinged on the right-hand side when the rack is shipped. As with the front door, the hinges may be reversed and the door swung from the left-hand side if desired.

Ventilation openings provided in the cabinet rack consist of two perforated grilles in the rear door, a large cut-out in the cabinet top, and cabinet base. A horizontal rectangular dust plate about one inch below the top cut-out protects equipment in the cabinet from dust and other foreign matter. This plate may be removed if an air duct or fan is attached to the cabinet top for forced ventilation.

Three horizontal mounting channels on each side of
the cabinet interior with nine tapped holes in each channel are used for mounting the vertical equipment mounting angles in any of three locations and for mounting such cabinet accessory items as wiring ducts, cabling straps.

**SPECIFICATIONS**

**TYPE PR-1-A CABINET RACK**

Consists of a cabinet shell and ventilated rear door, a pair of equipment mounting angles, a pair of terminal-board frame mounting angles, a set of mounting hardware, and two instruction books.

**DIMENSIONS**

- Total height: 83 1/2 inches
- Vertical mounting space: 77 inches (44 rack units)
- Total width: 22 inches
- Total depth: 23 1/4 inches

**WEIGHT**

130 lbs

**MOUNTING**

The Type PR-1-A cabinet rack is floor mounted. Mounting space 77 inches high (44 rack units), 19 inches wide, and 21 inches deep is available for mounting chassis and panels.

**OPERATING CONDITIONS**

It is considered good practice to limit the cabinet air temperature rise to 10 C or 15 C over the room ambient temperature for most applications. Natural (non-forced) ventilation will dissipate about 350 watts of heat for a 10 C rise in cabinet air temperature and about 525 watts for a 15 C rise.

**ACCESSORIES (Description)**

**Type PR-2-A, Hinged Panel Assembly**

This assembly serves as a front cover and access panel for various television units which mount on equipment mounting angles fastened in the intermediate or rear (center-of-rack) positions of a Type PR-1-A cabinet rack when a front door can not be used with the rack. When a monitor is mounted, with a Type PR-19-C monitor cabinet rack adapter kit, in a cabinet rack, a Type PR-3-A front door can not be used because the front panel of the monitor must be visible. If power supplies, utility video amplifier groups, etc., are “center of rack” mounted in the same cabinet rack, Type PR-2-A hinged panel assembly is available to close up the front of the cabinet rack flush with the front panel of the monitor. This arrangement has the same effect as a front door so that any normal method of air-cooling the equipment in the cabinet rack can be employed. Since the panel is hinged, the units mounted behind it are quite accessible.

**Type PR-3-A, Front Door**

Similar to rear door except for the omission of perforated grilles. Weight is approximately 40 lb. It may be mounted for either right- or left-hand opening.

**Type PR-4-A, Terminal Board Frame**

Weight is 3 lb. The terminal board frame provides mounting holes to accommodate three audio terminal blocks, ML-7118764-G1, and three power terminal boards, ML-7118765-G1. By relocating the two middle straps, the frame will mount six power-terminal boards and one audio-terminal block. It is recommended that one terminal-board frame be installed near the bottom of each cabinet to provide mounting facilities for the required terminal boards.

**Type PR-5-A, Wiring Duct**

Weighing 12 lb, the wiring duct is a metal channel with 42 slots fitted with rubber grommets. It is recommended that two wiring ducts, Type PR-5-A, be mounted in each cabinet rack; one on the right-hand side (facing rear of cabinet) for audio or video inter-unit wiring, and one on the left-hand side for power, metering, and control inter-unit wiring.

**Type PR-7-A, Mounting Angles**

The mounting angles consist of a pair weighing 14 lb and of the following dimensions: 1 1/2 inches by 1 1/2 inches by 80 1/2 inches long. Each is of zinc-plated steel and includes angle mounting hardware. These angles are for use when it is desirable to mount panels or chassis on two mounting locations at the same time, such as mounting “bathtub” chassis with General Electric equipment in the Type PR-1-A rack.

**Type PR-8-A, Cabling Straps**

The cabling straps consist of a pair of steel straps 3 1/2-inch wide by 3/8-inch thick by 73 inches long, in addition to hardware for mounting in the cabinet rack. These straps mount vertically in the rear of the cabinet in place of the wiring duct, and serve as an inexpensive means for supporting cabinet inter-unit wiring.

**Type PR-9-A, Mounting Frame**

Ten inches (six rack units) to mount video and sync amplifier groups.

**Type PR-9-E, Mounting Frame**

Eight and three quarter inches (five rack units) to mount TS-2-A switching components.

**Type PR-9-F, Mounting Frame**

Fifteen and three quarter inches (nine rack units) to mount TS-2-A switching components.

**Type PR-19-D, Adapter Kit**

The adapter kit is 21 inches (twelve rack units) and is used to mount Type TM-21-A monitor.

**Cat. No. 7118764-G1 Audio Terminal Block**

Weighing one lb, this unit is an 80-terminal (four rows of 20 each) solder-lug, telephone-type block. For terminal frame mounting, each block is furnished with mounting hardware.

**Cat. No. 7118765-G1 Power Terminal Board**

This unit consists of an eight-terminal, screw-type terminal board, and marker strip. Mounting hardware is included with each terminal board for mounting on the Type PR-4-A terminal board frame.

**Cat. No. 7460330-G4 Door-interlock Switch Kit**

This kit consists of mounting hardware and an interlock switch which can be attached at either the front or the rear of the Type PR-1-A cabinet rack so that high-voltage circuits will be de-energized when either the front or the rear doors are opened. The stiffening channel on both the front and the rear doors are wide enough to permit the mounting of from one to three General Electric door interlock switch kits for either door.
Cabinet Rack
Type PR-1-A and Accessory Items

Cat. No. 7485321-G2 Blower Kit
This kit consists of aluminum plate baffles, rubber molding, blower, and filter. The blower is mounted on a plate which, in turn, is mounted on top of the Type PR-1-A cabinet rack. The blower is operated by a 1/50-hp, 1550-rpm, 115-volt single-phase 50/60-cycle, 50-watt motor fitted with composition lifetime bearings and delivering 400 CFM of air. The filter is comprised of 9 1/8-inch by 15 3/8-inch by 1-inch replaceable type filter, mounting frame, and hardware for mounting on inside bottom of rear door.

Cat. No. 7140995-G1 Filter
Available for use without blower in negative pressure systems.

Cat. No. 7772418-P1 to P11 “Bath Tub”
Type chassis mounting brackets. These are the brackets which are available where throughout the data book references are made to brackets available to adapt chassis to RCA rack mounting. To adapt a General Electric chassis, the pair of normally included short brackets are removed and two of the following deep brackets are substituted in their place. Mounted in any 19-inch rack with competitive chassis, which have permanently attached deep brackets, the vertical front surfaces of the two makes of chassis will be in the same plane. For information in ordering brackets for chassis of various height, the following table is listed:

<table>
<thead>
<tr>
<th>Height of Chassis Inches</th>
<th>Rack Units</th>
<th>Order Two Brackets Cat. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 1/2</td>
<td>2</td>
<td>7772418-P1</td>
</tr>
<tr>
<td>5 1/4</td>
<td>3</td>
<td>7772418-P2</td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td>7772418-P3</td>
</tr>
<tr>
<td>8 3/4</td>
<td>5</td>
<td>7772418-P4</td>
</tr>
<tr>
<td>10 1/2</td>
<td>6</td>
<td>7772418-P5</td>
</tr>
<tr>
<td>12 1/4</td>
<td>7</td>
<td>7772418-P6</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>7772418-P7</td>
</tr>
<tr>
<td>15 3/4</td>
<td>9</td>
<td>7772418-P8</td>
</tr>
<tr>
<td>17 1/2</td>
<td>10</td>
<td>7772418-P9</td>
</tr>
<tr>
<td>19 1/4</td>
<td>11</td>
<td>7772418-P10</td>
</tr>
<tr>
<td>21</td>
<td>12</td>
<td>7772418-P11</td>
</tr>
</tbody>
</table>

HOW TO ORDER
When ordering, please specify:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR-1-A</td>
<td>Cabinet rack. The Type PR-1-A includes one cabinet shell and rear door; one pair equipment mounting angles, Type PR-7-A; two angles (to mount PR-4-A frame); mounting hardware and two instruction books.</td>
</tr>
</tbody>
</table>

ACCESSORIES

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR-2-A</td>
<td>Hinged panel assembly (seven-inch, four rack units, in height)</td>
</tr>
<tr>
<td>PR-3-A</td>
<td>Front door</td>
</tr>
<tr>
<td>PR-4-A</td>
<td>Terminal board frame</td>
</tr>
<tr>
<td>PR-5-A</td>
<td>Wiring duct</td>
</tr>
<tr>
<td>PR-7-A</td>
<td>Pair of equipment mounting angles. Type PR-7-A includes two angles; and mounting hardware.</td>
</tr>
</tbody>
</table>

Blank panels for filling blanks when front mounting other equipment.
Cabinet Rack
Type PR-1-A and Accessory Items

CUTOUT IN BOTTOM FOR COOLING AND CABLES AND WIRES

FRONT DOOR TYPE PR-3-A MAY BE HINGED ON EITHER SIDE OF CABINET

ANGLES CAN NOT BE MOUNTED IN FRONT POSITION WHEN FRONT DOOR IS USED

EQUIP MTG ANGLES TYPE PR-7-A MAY BE MOUNTED IN 3 POSITIONS

3 SCREWS
#8-32 X 3/4"
3 LOCK WASHERS

4 SCREWS
#8-32 X 3/8"
4 NUTS
4 LOCK WASHERS

3 SCREWS
#8-32 X 5/8"
3 WASHERS
3 LOCK WASHERS

CABLING STRAP TYPE PR-8-A
73" Lg X 1/2" Wd

SECTION A-A

REAR VIEW

These 2 Straps may be moved to alternate positions shown to enable mounting of additional power terminal boards in lieu of 2 audio terminal boards.

TERMINAL BD FRAME TYPE PR-4-A, SHOWN IN LOWEST POSITION

TO BOTTOM OF TERMINAL BD. FRAME

POWER TERMINAL BOARD MLK 71875501
TO TOP OF SILL
AUDIO TERMINAL BLOCK MLK 71876601
TO BOTTOM OF WIRING DUCT

Installation of accessories in cabinet rack, Type PR-1-A

CABINET RACK TYPE PR-1-A INCLUDES:
1 REAR DOOR
1 PAR-EQUIPMENT MOUNTING ANGLES 77 1/2" LONG
1 PAR-TB FRAME MOUNTING ANGLES 40 3/4" LONG
44 1/2" X 3/8" EQUIPMENT BOX SCREWS
(DUST COVER, WITH MOUNTING HARDWARE

ACCESSORIES AVAILABLE ARE:
FRONT DOOR, TYPE PR-3-A
TERMINAL BOARD FRAME, TYPE PR-4-A
WIRING DUCT TYPE PR-5-A
HINGED PANEL, PR-2-A, 7 1/2" HIGH
EQUIPMENT MOUNTING ANGLES, TYPE PR-7-A
CABLING STRAP, TYPE PR-8-A
BLANK POWER TERMINAL BOARD MLK 71875501
BLANK PANELS PR-6-A HIGHTS 17 1/4"
INCREMENTS FROM 7 1/2" TO 12 7/32

Installation of accessories in cabinet rack, Type PR-1-A

www.americanradiohistory.com
Cabinet Rack
Type PR-1-A and Accessory Items

Outline of cabinet rack, Type PR-1-A
Cabinet Rack
Type PR-1-A and Accessory Items

Inside clearances in cabinet rack, Type PR-1-A, with accessories installed.
FEATURES

- **Pleasing, functional appearance**
  Cabinets and desks mate with other General Electric cabinetry and are designed to match in appearance and operating levels. Ample leg room, correctly designed desk height, and control mounting angle minimize operator fatigue and speed operations.

- **Block built design**
  Cabinets and desk are mated so that they may be bolted together in a line or used as single units. Turret is designed to fit and fasten to base cabinet or desk.

- **Designed for ease of installation and maintenance**
  Ample and convenient ports (in bottom, rear, and both sides) for cable entrances. The Type PR-16-B-C both have two cutouts in the metal part of the desk top; the Type PR-16-C has these openings covered with a removable metal panel and a linoleum top. Removal of linoleum and panel provide opening for flush surface mounting of control equipment. Dividing strip (between the two openings on the desk top) is readily removed for installation of single larger control units. Type PR-16-B-C front and rear panels are removable for equipment installation and service.

- **Turret cabinet mounted control panel may be tilted forward**
  The Type PR-17-A turret cabinet accepts piano hinge or throw-out type mounted panels.

- **REMTA-Standard 19-inch rack mounting facilities in Type PR-16-B-C base cabinet**
  Equipment mounting angles are provided in base cabinet for mounting of chassis and associated equipment. Mounting angles may be moved forward or backward three inches from center position.

- **All cabinets and desks sturdily constructed of steel**
  Easily cleaned desk tops. Smooth matte black linoleum desk tops are easily cleaned.

WHERE TO USE

The General Electric control console cabinets, Types PR-16-B-C, PR-17-A, and desk. Type PR-18-A are matched units designed to support and permit surface, internal or angle mounting of General Electric audio and video control equipment.

The end caps, Types PR-11-A and PR-11-B are designed to dress up the appearance of control console base cabinets and to serve as a support for the ends of the Type PR-18-A desk.

DESCRIPTION

**PR-16-B-C Control Console Base Cabinets**

The Type PR-16-B-C control console base cabinets are designed to mount and house video control panels, relays, and chassis. They also serve as the floor-mounted support of the Type PR-17-A turret cabinet.

These two base cabinets serve as the basic cabinets for most horizontally operated video controls. When used with the Type PR-17-A turret cabinet, audio or video control panels may be flush-mounted at an angle of 60 degrees from the horizontal to improve operational efficiency.

**Type PR-16-B Base Cabinet**

The Type PR-16-B base cabinet consists of a vertical cabinet 19\(1\frac{1}{4}\) inches wide, 28\(\frac{3}{8}\) inches high, and 21\(\frac{3}{8}\) inches deep. The front top of this cabinet protrudes out to form a desk surface 19\(1\frac{1}{4}\) inches wide and 36 inches deep. The desk surface is covered with smooth matte black linoleum except for two panel openings, providing desk mounting space for two 5\(1\frac{3}{4}\)-by 15-inch studio-control panels. If only one control panel is used, a blank panel and dress panel are provided to cover the remaining space.

The center dividing strip between the two openings is held in place by four screws and nuts. This strip may be readily removed to provide space for an 11-by-15-inch control panel.

Both front and rear base cabinet panels are removable for installation and service of equipment. The rear panel contains ventilation grilles at both top and bottom. Internally there are two equipment angle-mounting brackets for mounting standard size rack panels or chassis up to 24 inches in height. These angles, normally located near the center of the cabinet, may be moved forward or backward 3 inches either side of center. They may also be reversed so that equipment may be mounted from the front or the rear of the cabinet. Distance between the inner edges of the mounting brackets is 17\(\frac{3}{4}\) inches.

Cable ports are located on both sides and the rear. The sides ports line up with those of other General Electric cabinets (such as the Type PR-12-A). Buttons are provided to close the unused ports. Holes are provided on either side for attachment of other units or end caps. The bottom is open for passage of interconnecting cables. In the bottom corners are four 1\(\frac{1}{2}\)-inch-diameter mounting holes for rigid floor mounting.

**Type PR-16-C Base Cabinet**

The PR-16-C base cabinet is identical to the Type PR-16-B base cabinet, except for the desk top. The entire surface of the PR-16-C desk top is covered with smooth matte black linoleum. Underneath the linoleum is a blank-metal panel 10\(\frac{3}{8}\) inches by 15 inches, which covers two equipment mounting holes identical in size to those in the Type PR-16-B base cabinet. Each opening is 5 inches by 13\(\frac{3}{8}\) inches in size and, with removal of the linoleum and blank-metal panel, will accept two standard 5\(1\frac{3}{4}\)-inch by 15-inch control panels. As in the Type PR-16-B cabinet, the dividing strip is also readily removed to make way for a single larger 11-inch by 15-inch control panel. This cabinet is primarily intended for use where additional desk space is required, yet it contains the necessary openings for control mounting for future use.

**Type PR-17-A Turret Cabinet**

The Type PR-17-A turret cabinet is a desk-mounted unit with hinged front brackets for mounting audio and master-control panels. The unit mounts on the Type PR-16-B-C base cabinet and is secured to the cabinet through four mounting holes mating those in the base cabinet. The bottom of this cabinet contains a 14-inch by 18\(\frac{3}{8}\)-inch opening for ease in cable installation and maintenance. The cabinet is supplied with throw-out type hinges, with additional provision for mounting panels with a piano hinge. When using the
Control Console Base Cabinets
Types PR-16-B/C, PR-17-A

latter type hinge, the throw-out hinge may be removed if necessary.
This cabinet will accept flush-front mounting audio or video equipment of 14 inch height and 19 inch width, when mounted on throw-out or piano hinge. It may also be mounted on the Type PR-18-A desk.

Type PR-18-A Desk
The Type PR-18-A desk is primarily designed to support the larger General Electric Type BC-11-A audio control console. It will, in addition, accommodate the Type PR-17-A turret cabinet.

The desk top consists of a sturdily constructed wooden top, surfaced with matte black linoleum. It is supported at the ends by the use of Type PR-11-A and Type PR-11-B end caps. It is enclosed by a rear metal panel. The desk top itself is hardwood-edged, 3/4-inch plywood, reinforced with 2-inch angle iron. The unit is 39 inches wide (44 inches with end caps), 28 1/4 inches high and 36 inches deep. This unit may be used as an all-purpose desk to support other video or audio cabinets.

Types PR-11-A and PR-11-B End Caps
The Types PR-11-A and PR-11-B are, respectively, right and left end caps. These end caps are formed steel sections used to dress up the appearance of the Type PR-16-B/C base cabinets as well as other cabinets of this type in the General Electric equipment line. Only two caps are required to finish off the end appearances of a single Type PR-16-B/C base cabinet or a group of them bolted together.

The Type PR-11-A and B end caps are used as end supports for the Type PR-18-A desk.

MECHANICAL SPECIFICATIONS

1—Type PR-16-B base cabinet (includes the cabinet, one subpanel, one dress panel, a removable front and rear panel, two equipment mounting brackets, and cable knock-out buttons).

1—Type PR-16-C base cabinet (includes the cabinet with top completely covered by linoleum, one subpanel, a removable front and rear panel, two equipment mounting brackets, and cable knock-out buttons).

1—Type PR-17-A right-end cap.

1—Type PR-11-B left-end cap.

1—Type PR-17-A turret cabinet (includes cabinet, throw-out hinge, and mounting hardware).

1—Type PR-18-A desk (includes one PR-11-A and one Type PR-11-B end cap and a top and rear panel).

DIMENSIONS
See drawings.

MOUNTING
The PR-16-B/C base cabinets are floor mounting units.
The PR-17-A is desk mounting.
The PR-18-A is floor mounting.
The PR-11-A & B mount on the sides of base cabinets and are not equipped with holes for floor mounting.

CONSTRUCTION
Formed welded-steel construction. Type PR-18-A desk top, 3/4-inch plywood with 2-inch angle iron reinforcement. All operating desk surfaces covered with matte black linoleum.

FINISH
General Electric metallic blue.

VENTILATION
All units are cooled by natural air convection currents. Rear panels of PR-16-B/C contain ventilation grilles at top and bottom.

HOW TO ORDER
When ordering, please specify:

Type PR-16-B control console base cabinet
(The Type number includes one cabinet with two internal equipment mounting brackets, one subpanel, one dress panel, cable knock-out buttons, and installation and operating instructions.)

Type PR-16-C control console base cabinet
(The Type number includes one cabinet with two internal equipment mounting brackets, one subpanel, cable knock-out buttons, and installation and operating instructions.)

Type PR-11-A right-end cap
(The Type number includes the end cap, mounting hardware, and installation instructions.)

Type PR-11-B left-end cap
(The Type number includes the end cap, mounting hardware, and installation instructions.)

Type PR-17-A turret cabinet
(The Type number includes the cabinet, throw-out hinges, mounting hardware, and installation and operating instructions.)

Type PR-18-A desk cabinet
(The Type number includes the top, rear panel, one Type PR-11-A end cap, one Type PR-11-B end cap, and installation and operating instructions.)
Control Console Base Cabinets
Types PR-16-B/C, PR-17-A

COMPONENTS

<table>
<thead>
<tr>
<th>Description</th>
<th>For Use with</th>
<th>Dimensions in Inches</th>
<th>Weight in Lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>36- by 39-inch desk top of hardwood-edged ¾-inch plywood reinforced with 2-inch angle iron and covered with ¼-inch matte black linoleum.</td>
<td></td>
<td>36</td>
<td>28 1/2</td>
</tr>
<tr>
<td>End Caps</td>
<td></td>
<td>29</td>
<td>27 1/2</td>
</tr>
<tr>
<td>Linoleum can be cut and a 10 1/2 by 15-inch metal panel under linoleum can be exposed two 5 by 13 3/8-inch opening. Also, the dividing strip can be removed to make one 10 1/2 by 13 3/8-inch opening (to fit an 11- by 15-inch panel).</td>
<td></td>
<td>Other cabinets where added desk space is required.</td>
<td>36</td>
</tr>
<tr>
<td>14 1/2 by 19 1/4-inch external dimensions of front surface. 13 3/8 by 18-inch opening in front surface.</td>
<td></td>
<td>Types TC-15A, TC-36A and transmitter control panels</td>
<td>24</td>
</tr>
</tbody>
</table>
Control Console Base Cabinets
Types PR-16-B/C, PR-17-A
Microphone Cable, Plugs, and Receptacle

Type FA-15-A • Type FA-16-A, B • Type FA-16-C

FEATURES
- Lies straight in use; but high flexibility permits easy coiling for storage purposes
- Ruggedly constructed for long, efficient service
- Tough outer GRS compound jacket resists abrasion and abuse giving thorough protection to inside shielding and conductors

WHERE TO USE
The General Electric Type FA-15-A microphone cable is a two-conductor, shielded, rubber-covered, flexible, water-proof cable designed primarily for use with low impedance microphones in television and broadcast studios. It may be used also for the make-up of extension cables and as replacement for old cables.

MECHANICAL AND ELECTRICAL SPECIFICATIONS
LOT LENGTH
250 feet per spool
VOLTAGE RATING
600 volts, a-c
OUTSIDE DIAMETER
0.320-inch

This cable consists of two No. 20 AWG (16 strands per conductor), stranded, tinned copper conductors with a cotton wrap over each conductor. Rubber GRS compound insulation is placed over the cotton wrap; insulation colored white on one conductor, black on the other. The two conductors are then twisted with cotton fillers and a cotton wrap is placed over them. A tinned copper braided shield is placed over this assembly. This shield is covered with another cotton wrap. The entire assembly is enclosed within a black rubber GRS compound jacket.

HOW TO ORDER
When ordering, please specify:
___ spools (250 feet each) of Type FA-15-A microphone cable.

FEATURES
- Easily installed
  Large solder pots on pin ends permit easy installation with excellent electrical and mechanical connection of wires.

- Positive locking device
  A push of the male plug into the wall receptacle or mating plug automatically locks the two together.

- Quick, easy disconnect
  Thumb latch allows immediate disconnect of lock and easy withdrawal of plug.

- Rugged construction
  Steel shell with phenolic-mounted contacts assures long, dependable life.

- Rubber bushed cable clamp
  The Clamp takes strain from connections and aids in prolonging cable life. Clamp is integral part of plug shell.

- Large pin-type male contacts
  Assure good connections with mating plug or receptacle.

WHERE TO USE
General Electric microphone plugs and wall receptacle are ruggedly designed units patterned after a trouble-free type of self-locking, quick disconnect plug, and receptacle. They are furnished with three standard contacts and have either a satin chrome or zinc plate finish.
Microphone Cable, Plugs, and Receptacle

Type FA-15-A • Type FA-16-A, B • Type FA-16-C

**MECHANICAL AND ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>LENGTH OF ENGAGEMENT</th>
<th>RUBBER REDUCING BUSHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2&quot; DIA</td>
<td>1/2&quot; DIA</td>
</tr>
</tbody>
</table>

Male microphone plug, Type FA-16-A

The steel shell and zinc cable clamp are finished in satin chrome. Phenolic insulation is used to mount the contact pins. Cable entry is 1/4 inch, through rubber reducing bushing. Shell has circular groove in interior to accept latch of female connector or wall receptacle. The three male contacts are so spaced that they cannot be inserted in a receptacle in the wrong position. The contacts terminate in tinned solder pots for wire connections. Dimensions shown on previous drawing.

The die-cast zinc shell is finished in satin chrome. Insulation is black phenolic compound with contacts anchored within. Cable entry is 9/32 inch, through a rubber reducing bushing. A thumb-operated locking latch locks on inside rim of mating male plug shell when the units are pushed together. Encasements of the three female contacts are so located that the male plug cannot be wrongly positioned on insertion. The contact encasements terminate in solder pots for wire connections. See preceding drawing for dimensions.

**HOW TO ORDER**

When ordering, please specify:
- Microphone plug, male, Type FA-16-A
- Microphone plug, female, Type FA-16-B
- Microphone wall receptacle, female, Type FA-16-C
Monitoring and Wall Speakers
Types FS-1-B and FS-2-B

FEATURES

Monitoring Speaker, Type FS-1-B
- Rich full bass
  Assured by use of ample cabinet volume and bass-reflex design.
- Wide range response
  Use of famous General Electric speaker Type 1201A provides a uniform response, free from objectionable peaks, over the useful range of 50 to 13,000 cycles per second.
- High wattage capacity
  Non-warped aluminum foil base voice coil is unaffected by changes in moisture or temperature.
- Low driving power required
  Speaker is highly efficient.
- Contemporary styling of cabinet
  Carefully selected woods and contemporary cabinet styling complement the appearance of any studio.
- Line-to-voice-coil transformer included

WHERE TO USE

Monitoring Speaker, Type FS-1-B
The Type FS-1-B monitoring speaker is designed for critical high-quality monitoring of broadcast program material in AM-FM and TV broadcast studios. It is ideally suited for every application requiring a pleasing, wide range response coupled with an attractive appearance. The Type FS-1-B monitoring speaker will provide unexcelled reproduction of music and speech in clients' rooms, control rooms, and studios. Its range extends from 50 to 13,000 cps.

Studio Wall Speaker, Type FS-2-A
The Type FS-2-A studio wall speaker is a low-cost speaker and housing combination for general-purpose use in studios, offices, and recording rooms of broadcast studios.

FEATURES

Studio Wall Speaker, Type FS-2-B
- Good sound distribution
  Cabinet front sloped for best sound distribution.
- Good frequency reproduction
  Uses General Electric 1201A speaker.
- Attractively styled cabinet
  Attractive walnut-finish wood used in cabinet construction.
- Line-to-voice-coil transformer included
- Economical
  Speaker and cabinet combination low in price.

WHERE TO USE

Studio Wall Speaker, Type FS-2-B
The Type FS-2-B studio wall speaker is a low-cost speaker and housing combination for general-purpose use in studios, offices, and recording rooms of broadcast studios.
Monitoring and Wall Speakers
Types FS-1-B and FS-2-B

DESCRIPTION

Monitor Speaker, Type FS-1-B
The Type FS-1-B monitoring speaker is composed of the Type FS-4-A monitoring speaker cabinet, a 1201A loudspeaker, and a Type FA-42-A line-to-voice-coil transformer.
The speaker used in the cabinet employs a curvilinear molded cone for efficient dispersion of its wide range reproduction. The heavy Alnico V permanent magnet provides a high sensitivity with reliable, quiet operation.
The interior surfaces of the cabinet are treated with special sound-absorptive material.
While the cabinet is designed for floor mounting, it may be readily wall mounted, if required.

Studio Wall Speaker, Type FS-2-B
The Type FS-2-B studio wall speaker consists of a Type FS-3-A wall speaker housing, a 1201A speaker and a Type FA-42-A line-to-voice-coil transformer.
The cabinet is especially constructed and braced for wall mounting. Its sloping front panel assures good distribution of sound when the speaker is located out of the way or near ceiling level. Its external walnut finish harmonizes pleasingly with other studio fixtures.
A line-to-voice-coil transformer, included with this model, will provide correct matching to several line impedances or parallel speaker operation.

MECHANICAL SPECIFICATIONS

UNITS
Type FS-1-B monitoring speaker including floor cabinet, speaker, and line-to-voice-coil transformer.
Type FS-2-B studio wall speaker, including wall mounting cabinet, speaker, and line-to-voice-coil transformer.
Type FS-3-A wall speaker housing only.
Type FS-4-A monitoring speaker cabinet only.

DIMENSIONS (in inches)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FS-1-B</th>
<th>FS-2-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Cabinet</td>
<td>Depth: 14 1/2</td>
<td>9 3/4</td>
</tr>
<tr>
<td></td>
<td>Height: 26</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Width: 25</td>
<td>14 3/4</td>
</tr>
</tbody>
</table>

WEIGHT
70 lbs approx
10 lbs approx

MOUNTING
Type FS-1-B floor mounting.
Type FS-2-B. Wall mounting with drilled holes to facilitate easy mounting or take-down.

FINISH
Walnut.

CONNECTIONS
Type FS-1-B and Type FS-2-B—solder terminals on transformer taps.

ELECTRICAL SPECIFICATIONS

TYPES FS-1-B AND FS-2-B
Frequency response: 50–13,000 cps.
Power handling capacity: 25 watts, music and speech.
Field: Alnico V permanent magnet, 14.5 ounces.

TRANSFORMER INPUT IMPEDANCE
600/1200/1800/2400 ohms.

HOW TO ORDER
When ordering, please specify:
Type FS-1-B monitoring speaker. (The type number includes one Type FS-4-A cabinet, one 1201A speaker, one Type FA-42-A line-to-voice-coil transformer, and installation and operating instructions.)
Type FS-2-B studio wall speaker. (The type number includes one Type FS-3-A wall housing, one 1201A speaker, one Type FA-42-A line-to-voice-coil transformer, and installation and operating instructions.)
Type FS-3-A wall speaker housing.
Type FS-4-A monitoring speaker cabinet.

ACCESSORIES
Type FA-19-J interconnecting cable.
**Speakers**
Types 850, 1201A, and 1203A

**Cut-away view speaker, Type 1201A**

**FEATURES**
- **High wattage handling capacity**
  Made possible by use of non-warping aluminum foil base voice coils.
- **Faithful reproduction**
  Assured by molded, scientifically designed General Electric cones.
- **High efficiency**
  Due to liberal use of Alnico V magnet material.
- **Rigidly constructed**
  All-welded construction insures rigidity and provides optimum controlled flux density.
- **Attractive appearance**
  Lustrous finish is specially protected to preserve beauty and effectiveness.
- **Wide range**
  The 1201A and 1203A speakers uniformly cover the frequency range from 50 to 13,000 cycles-per-second.

**WHERE TO USE**
General Electric loudspeakers are designed for critical high quality monitoring of broadcast program material in AM-FM and TV broadcast studios. They may be depended upon to provide excellent reproduction of music and speech in recording, control, and studio monitoring applications.

The Types 850, 1201A and 1203A speakers are wide-range speakers for use in broadcast control and studio monitoring.

**DESCRIPTION**
General Electric loudspeakers are designed by audio engineers and produced under exacting conditions of quality control.

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**Model 1201A Loudspeaker**
Response on Axis-18" from cone in dead room infinite baffle.

**Averaged Curve**

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www.americanradiohistory.com
Speakers and Accessories

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Speakers

Types 850, 1201A, and 1203A

Speaker, Type 850

The Type 850 speaker is a wide range unit, 8 inches in diameter with a 15-watt handling capacity.

Speakers, Types 1201A and 1203A

The Type 1201A and 1203A speakers are wide range units, 12 inches in diameter and with 25-watt handling capacities. They differ only in their Alnico V magnet weight; the 1201A having a 14.5-ounce magnet compared to a 9-ounce magnet in the 1203A, with a consequent increase in efficiency in the 1201A.

All speakers employ non-warping aluminum foil base voice coils with molded, scientifically designed circular cones. All-welded frame construction is employed to insure rigidity and controlled flux density.

Due to careful design and quality control in manufacture, these speakers offer a uniform response, with freedom from objectionable peaks over their useful response ranges.

MECHANICAL AND ELECTRICAL SPECIFICATIONS

UNITS

Wide range speakers: Types 850, 1201A, 1203A.

MOUNTING

All speakers are equipped with four mounting holes on the circumference of the frame designed to accept No. 8 machine screws.

DIMENSIONS AND WEIGHTS

<table>
<thead>
<tr>
<th>Type*</th>
<th>Diameter Over-all (In inches)</th>
<th>Mtg. Hole Centers (In inches)</th>
<th>Depth Gasket to Yoke or Cover (In inches)</th>
<th>Shipping Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>850</td>
<td>7 1/2</td>
<td>7 5/8</td>
<td>3 3/8</td>
<td>2 lb 10 oz</td>
</tr>
<tr>
<td>1201A</td>
<td>12 3/8</td>
<td>11 3/8</td>
<td>5 3/8</td>
<td>6 lb 8 oz</td>
</tr>
<tr>
<td>1203A</td>
<td>12 3/4</td>
<td>11 1/4</td>
<td>5 7/8</td>
<td>5 lb 2 oz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type*</th>
<th>Size* (In inches)</th>
<th>Shape*</th>
<th>Alnico V</th>
<th>Mag. Wt.</th>
<th>Power Rating</th>
<th>V.C. Rating</th>
<th>V.C. Imp.</th>
<th>Baffle</th>
</tr>
</thead>
<tbody>
<tr>
<td>850†</td>
<td>8</td>
<td>Round</td>
<td>6.8 oz</td>
<td>15w</td>
<td>1</td>
<td>8.0</td>
<td>6 3/4</td>
<td></td>
</tr>
<tr>
<td>1201A†</td>
<td>12</td>
<td>Round</td>
<td>14.5 oz</td>
<td>25w</td>
<td>1 1/2</td>
<td>8.0</td>
<td>10 3/4</td>
<td></td>
</tr>
<tr>
<td>1203A†</td>
<td>12</td>
<td>Round</td>
<td>9.0 oz</td>
<td>25w</td>
<td>1 1/4</td>
<td>8.0</td>
<td>10 3/4</td>
<td></td>
</tr>
</tbody>
</table>

† The General Electric Company manufactures a complete line of original and replacement speakers in a variety of shapes, sizes, and ratings not shown here. For information concerning these latter speakers, please consult your local General Electric distributor.

HOW TO ORDER

When ordering, please specify:
Type__________, Wide range speaker

ACCESSORIES

Type FS-4-A monitoring speaker cabinet (for 12-inch speaker).
Type FS-3-A wall speaker cabinet (for 12-inch speaker).
Type FA-42-A line-to-voice-coil transformer.
Type FA-19-J interconnecting cable.

CONNECTIONS

Types 1201A, 850 and 1203A Screw terminals.
Transcription Equalizer
Type FA-12-B

FEATURES
- Pleasing record reproduction—full low-frequency response and adjustable high-frequency response
- Easy to install—single unit construction
- Low hum pickup because of adequate magnetic shielding
- Connections simplified—outputs may be run balanced or unbalanced
- Convenient to use—connects to any microphone pre-amplifier

WHERE TO USE
The General Electric Type FA-12-B transcription equalizer is an adjustable network for use with professional-type General Electric cartridges, 4GS-01D, 4GS-02D and 4GD-01D-02D, for broadcast reproduction of lateral transcriptions and records.

DESCRIPTION
The Type FA-12-B transcription equalizer is a single unit housed in a rectangular steel case. It has a low-impedance output which will work into the unloaded input of any microphone pre-amplifier. It includes a four-position switch which provides control of high-frequency response.

The FLAT position provides essentially flat high-frequency response from material recorded at constant velocity above 700 cps. The NAB position provides an essentially flat reproduction of material recorded in accordance with the NAB lateral curve. This position may also be used for reproduction of 78-rpm vinylite base and "hi-fi" records. The GOOD RECORDS position provides a high-frequency response somewhat more attenuated than that given by the NAB position. The fourth position, marked POOR RECORDS, provides a high-frequency response considerably more attenuated than that given by the NAB position. (See average performance characteristic curves.)

All switch positions provide low-frequency response essentially the complement of the NAB curve.
Experience has shown that the NAB position is ideal for high-quality transcriptions and both wide-groove (0.003-inch) and micro-groove (0.001-inch) types of records. For worn transcriptions and average good records, the GOOD RECORDS position provides the most pleasing response. Noisy and distorted records require the POOR RECORDS position. The FLAT position is useful for the reproduction of instantaneous recordings and other special records cut with a FLAT recording characteristic.

**MECHANICAL SPECIFICATIONS**

**DIMENSIONS**

<table>
<thead>
<tr>
<th></th>
<th>Can (In inches)</th>
<th>Dial Plate (In inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth</td>
<td>4 1/8</td>
<td>...</td>
</tr>
<tr>
<td>Length</td>
<td>3 1/8</td>
<td>3 1/8</td>
</tr>
<tr>
<td>Width</td>
<td>3 1/8</td>
<td>3</td>
</tr>
<tr>
<td>Weight</td>
<td>2 lb</td>
<td>...</td>
</tr>
</tbody>
</table>

**MOUNTING**

Tapped mounting holes are provided at the top (switch end) of the case to enable mounting the Type FA-12-B to the underside of the top panel of a transcription turntable with its switch shaft passing vertically through a clearance hole drilled in the top panel. The switch shaft is made extra long so as to accommodate various thicknesses of transcription turntable top panels. A knob and escutcheon plate are supplied for mounting above the transcription equalizer on the control surface of the transcription turntable. External connections to the pickup and to the amplifier are made on a terminal board located at the bottom of the equalizer case. Although the equalizer components are completely enclosed in a protective metal case containing inner mu-metal shields, the removal of two case screws enables rapid access to the components should servicing be necessary.

**ELECTRICAL SPECIFICATIONS**

**OUTPUT CIRCUITS**

- **Load Impedance**: Designed to work into either a 150/250- or 30/50-ohm unloaded input.
- **Output Connections**: Balanced, or either side may be grounded.
- **Output Level**: An output level of approximately -55 VU maximum is obtained when reproducing 78 rpm shellac records; -60 VU maximum from micro-groove records.

**TYPICAL REPRODUCTION RESPONSE**

See average performance characteristic curve.

**HOW TO ORDER**

When ordering, please specify:

Type FA-12-B transcription equalizer.

![Average performance characteristics of the transcription equalizer with the "new orthophonic" test record and General Electric 405-01D or 4GD-01D-02D cartridge using the 1-mil diamond stylus](www.americanradiohistory.com)
WHERE TO USE

The General Electric Type FA-40-B line-to-line transformer is designed for use as a high quality repeat coil in telephone lines, or for isolation and impedance-matching in output circuits of low- and medium-level amplifiers.

MECHANICAL SPECIFICATIONS

DIMENSIONS (Overall)
- Height: 3 3/4 inches, maximum
- Width: 2 1/8 inches, maximum
- Depth: 2 1/2 inches, maximum
- Weight: Approx 1 3/4 lb

MOUNTING
- No. 6-32-B tapped inserts

HOW TO ORDER

When ordering, please specify:
Type FA-40-B line-to-line transformer.
WHERE TO USE
The General Electric Type FA-41-C bridging-to-line transformer is designed for use in connecting a 600- or 150-ohm device across a low-impedance program circuit without appreciably affecting the performance of that circuit.

MECHANICAL SPECIFICATIONS
DIMENSIONS (Over-all)
- Depth: 2 1/4 inches
- Height: 3 3/4 inches
- Width: 2 1/4 inches
- Weight: Approx. 3 1/4 lb

MOUNTING
- 3/4-inch—No. 6-32 tapped inserts

ELECTRICAL SPECIFICATIONS
FREQUENCY RANGE
- In excess of 50 to 15,000 cycles, ± 1/2 db

IMPEDEANCES
- 20,000 ohms to 600 ohms
- 5,000 ohms to 150 ohms

MAXIMUM OPERATING LEVEL
- +15 dbm at 50 cycles on secondary (corresponds to approx. 38 volts on 20,000-ohm primary)

BRIDGING LOSS
- 19 db (See installation drawing below)

CONNECTIONS
See installation drawing below

HOW TO ORDER
When ordering, please specify:
Type FA-41-C bridging-to-line transformer.

Installation drawing for transformer, Type FA-41-C
 FEATURES

- Multiple primary taps. Permits paralleling of speakers across a single output
- Multiple secondary taps. Permits use of transformer with all common voice coil impedances
- Terminal impedances clearly marked. All terminal impedances are clearly marked on the coil adjacent to the terminal
- Frame bright plated to resist corrosion

 WHERE TO USE

The General Electric Type FA-42-A line-to-voice coil transformer is designed to match a 600-ohm amplifier output to single- or multiple-speaker voice coils. It is provided with multiple primary and secondary taps for this purpose.

 DESCRIPTION

The General Electric Type FA-42-A line-to-voice coil transformer utilizes core and coil construction with solder lug-type terminals.

Multiple primary terminals permit the use of from one to four speakers across the output of any 600-ohm amplifier.

Multiple secondary terminals permit the proper matching of any speaker with a voice coil impedance range of from 3.2 ohms to 16 ohms. Three taps are provided for this purpose.

All terminals are situated on the coils and are clearly marked for ready identification of their impedances.

 MECHANICAL SPECIFICATIONS

 UNITS

1 - Type FA-42-A line-to-voice coil transformer

 DIMENSIONS

Height 2 inches Width 2\(\frac{1}{2}\) inches
Length 3\(\frac{1}{4}\) inches Weight 14 oz

 MOUNTING HOLES

Two—\(\frac{1}{4}\)-inch diameter on 2\(\frac{1}{8}\)-inch centers

 CONNECTIONS

Solder-type terminals, protruding from coil

 MARKINGS

Terminal impedances marked adjacent to them on coil surface

 CONSTRUCTION

Open frame, core and coil construction

 ELECTRICAL SPECIFICATIONS

 PERFORMANCE

Frequency response: ±2 db, 60-8000 cps
Power handling capacity: 5 watts with less than 3 percent distortion

 PRIMARY IMPEDANCES

600/1200/1800/2400 ohms

 SECONDARY IMPEDANCES

3.2/8/16 ohms

 HOW TO ORDER

When ordering, please specify:
Type FA-42-A line-to-voice coil transformer.
FEATURES

- Small outside diameter of Types FA-19-M and FA-19-R enables use of greater number of cables in a small conduit. Outside diameter only 0.152 inches
- Easily stripped and prepared for soldering
- Third bare conductor in full length contact with shield provides excellent grounding in audio cables (Types FA-19-M and FA-19-R). No need to solder ground to shield
- Wrap-around shield in audio cables easily removed during making of connection. No need to fray out shield as with braided type
- Audio cables insulated from each other by over-all polyvinyl jackets on each cable. Permits common grounding at one point
- Sold in 500-foot, nonreturnable spool lots

WHERE TO USE

The General Electric interconnecting cables, Types FA-19-J, FA-19-M, and FA-19-R are used for power, audio, or circuit control connections. Each of the three types has special characteristics and recommended uses. All of the three cables are designed and manufactured to give long, efficient, trouble-free service. Types FA-19-M and FA-19-R cables have been made with very small outside diameters to permit their use in large numbers in small conduits or other small-diameter wiring channels.

DESCRIPTION

The Types FA-19-M and FA-19-R interconnecting cables are small-diameter, two-conductor, shielded cables designed for use in low or intermediate level audio circuits. Both cables are No. 22 AWG two-conductor, shielded with over-all nylon jackets. The Type FA-19-M employs solid conductors, while the Type FA-19-R uses stranded conductors. A unique feature of these two cables is the third, bare ground wire included under the shielding and in contact with it for the entire length of the cable.

The Type FA-19-M is recommended for general-purpose audio wiring within ducts, conduits, and cabinets, where vibration is at a minimum. The Type FA-19-R is recommended for use inside cabinet racks where some vibration or occasional wire movement can be expected. Both cables afford ground control by permitting the shield to be grounded only at those
Interconnecting Cables

SPECIFICATIONS—MECHANICAL AND ELECTRICAL

TYPE FA-19-J
Two No. 16 AWG, stranded, tinned copper conductors with 1/8-inch, black polyvinyl chloride insulation on each conductor. One conductor covered with black lacquered celanese or rayon braid; second conductor covered with red lacquered celanese or rayon braid. The two conductors are twisted and given a pair wrap or paper fold, with a tinned copper, braided overall shield. Length per spool, 500 feet. Rated voltage: 600 volts d-c at 1.8 amperes. Outside diameter: 0.245 inches.

TYPE FA-19-M
Two No. 22 AWG, solid, tinned copper conductor with nylon extruded insulation. One conductor has a black celanese wrap; second conductor has red celanese wrap. A nylon jacket is extruded over the celanese wrap of each conductor. One No. 22 solid, tinned copper ground wire is twisted with the two identified conductors and the whole included in a wrapped, tinned copper shield. A polyvinyl jacket covers over-all. Cable is furnished on 500-foot spools. Rated voltage: 400 volts d-c at 1.8 amperes. Outside diameter: 0.152 inches.

TYPE FA-19-R
Two No. 22 AWG, stranded, tinned copper conductors with nylon extruded insulation. One conductor covered with black celanese wrap; second conductor covered with red celanese wrap. Over the celanese wraps on each conductor is extruded a nylon jacket. One No. 22, stranded, tinned copper ground wire is twisted with the two identified conductors and the whole included in a wrapped, tinned copper shield. A polyvinyl jacket covers over-all. Cable is furnished on 500-foot spools. Rated voltage: 400 volts d-c at 1.8 amperes. Outside diameter: 0.32 inches.

RECOMMENDED NUMBER OF CABLES IN ONE CONDUIT

<table>
<thead>
<tr>
<th>Conduit Size (Nominal)</th>
<th>1/8</th>
<th>3/32</th>
<th>1/16</th>
<th>1/32</th>
<th>1/32</th>
<th>1/8</th>
<th>1/16</th>
<th>1/32</th>
<th>1/8</th>
<th>1/16</th>
<th>1/32</th>
<th>1/8</th>
<th>1/16</th>
<th>1/32</th>
<th>1/8</th>
<th>1/16</th>
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<th>1/8</th>
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<th>1/32</th>
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<tr>
<td>Cable</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Type FA-19-J</td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>13</td>
<td>17</td>
<td>28</td>
<td>40</td>
<td>62</td>
<td>83</td>
<td>107</td>
<td>135</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type FA-19-M</td>
<td>6</td>
<td>10</td>
<td>17</td>
<td>28</td>
<td>38</td>
<td>63</td>
<td>88</td>
<td>138</td>
<td>185</td>
<td>238</td>
<td>300</td>
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<td></td>
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</tr>
<tr>
<td>Type FA-19-R</td>
<td>6</td>
<td>10</td>
<td>17</td>
<td>28</td>
<td>38</td>
<td>63</td>
<td>88</td>
<td>138</td>
<td>185</td>
<td>238</td>
<td>300</td>
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</tbody>
</table>

HOW TO ORDER

When ordering, please specify:
Type No. FA-19___ Interconnecting cable:______feet:______spools.
Equalizer panel, Type FA-14-A

FEATURES
- Provides equalization for two lines
- Front-panel adjustment in steps of 3 db
- Equalizes short lines up to 15,000 cycles—longer lines up to 10,000 cycles
- Simple clamp-type mount permits flexibility of mounting on any standard rack

WHERE TO USE
The General Electric Type FA-14-A equalizer panel is designed to equalize the nonlinear characteristics of one or two nonloaded telephone lines for substantially flat frequency response to 10,000 or 15,000 cycles per second, depending on line characteristics and termination. The Type FA-14-A would normally be used on lines which are not continuously operating and do not require the permanent installation of a fixed equalizer.

MECHANICAL SPECIFICATIONS
DIMENSIONS
Depth 4 1/2 inches  Width 19 inches
Height 3 3/4 inches  Weight 5 lb

MOUNTING
The equalizer panel is designed for vertical mounting on a standard 19-inch EIA relay or cabinet rack. A clamp-type mounting, not visible from the front, is provided to mount the panel in any desired location on a rack.

ELECTRICAL SPECIFICATIONS
TYPE OF CIRCUIT
The Type FA-14-A equalizer consists of two separate and complete Type FA-14-B equalizers mounted on a single panel. Parallel-resonant circuits consisting of a capacitor, a reactor, and logarithmically tapered resistances are used in each equalizer unit. These resistances are selected by a rotary switch located on the front panel. Input and output connections of the Type FA-14-A are available on terminal boards.

The electrical specifications for each of the sections of the equalizer panel are the same as the specifications for the equalizer unit, Type FA-14-B.

HOW TO ORDER
When ordering, please specify:
Type FA-14-A equalizer panel.
FEATURES
- Equalizes up to 10,000 or 15,000 cycles depending on line length and termination
- Easily connected for equalization in steps of 3 db or less
- Small size allows flexibility of mounting

WHERE TO USE
The General Electric Type FA-14-B equalizer unit is a semi-fixed unit recommended for use on lines which are permanently installed and continuously used, such as studio-to-transmitter lines and remote or "nemo" lines. It is designed to equalize nonlinear characteristics of non-loaded telephone lines for substantially flat frequency response up to 10,000 or 15,000 cycles-per-second, depending on line characteristics and terminations.

MECHANICAL SPECIFICATIONS
DIMENSIONS (Two rack units)
- Depth: 3 inches
- Height: 3½ inches
- Width: 3¾ inches (Includes mounting)
- Weight: 1½ lb

MOUNTING
Mounting flanges on the bottom of the case make it adaptable for mounting on any flat surface.

ELECTRICAL SPECIFICATIONS
TYPE OF CIRCUIT
The Type FA-14-B equalizer unit consists of a reactor, a capacitor, and associated resistors mounted in a rectangular metal case. A solder-lug terminal board is provided on one end of this case for adjusting the resistance and for connecting the unit to the line.

LINE IMPEDANCE
- 600 or 150 ohms

EQUALIZATION ABILITY (dependent on line length)
- Line termination 150 ohms: 30 to 15,000 cps
- Line termination 600 ohms: 30 to 10,000 cps

HOW TO ORDER
When ordering, please specify:
Type FA-14-B equalizer unit.
HOW ELECTRICAL the front, cabinet illumination.

MOUNTING MECHANICAL the scale calibrating potentiometer attenuator switch (plus an

DESCRIPTION Program lines.

The General Electric Type FA-1-A program level indicator panel provides a means of measuring accurately the program level of up to ten 600-ohm audio lines. The level of lines having other impedances may be measured by applying suitable correction factors. Program-level readings obtained with this unit are in "volume units" (VU). When used to make steady-state, single-frequency measurements, the readings obtained are in dbm.

MECHANICAL SPECIFICATIONS

DIMENSIONS
Depth 3 3/4 inches
Height 5 1/2 inches (3 RU)
Width 19 inches
Weight 4 1/2 lb

MOUNTING
The unit mounts on a standard 19-inch RETMA relay or cabinet rack. A clamp-type mounting, which is not visible from the front, is provided to mount the panel in any desired location on the rack.

VU SCALE
"B" Scale

ELECTRICAL SPECIFICATIONS

Input impedance 7500 ohms
Measurement range +4 to +42 VU (or dbm) in 2-db steps
Number of lines that may be measured 1 to 10, inclusive

HOW TO ORDER
When ordering, please specify:
Type FA-1-A program level indicator panel.

FEATUES
- Measures levels from +4 to +42 VU
- May be switched to any of ten program lines
- Uses large size, illuminated standard VU meter
- Clamp-type mounting for easy installation

WHERE TO USE
The General Electric Type FA-1-A program level indicator panel fits the standard panel opening of any cabinet for use in audio monitoring and measurement equipment. It has two scales: the upper scale is calibrated in percent, ranging from 0 to 100; the lower scale is calibrated in VU, ranging from -20 to +3. A source of 6.3 volts at 0.3-amp is required for illumination.

FEATURES
- Easy access to fuse block through hinged-front panel
- Unused surface on removable back plate readily fitted with additional equipment
- Attractively styled for any cabinet mounting

WHERE TO USE
The General Electric Type FA-4-A switch and fuse panel provides a master-power switch, indicator lamp, and fuse protection for an entire cabinet or relay rack.

DESCRIPTION
Power circuits running through the Type FA-4-A switch and fuse panel are activated by the switch. Dual fuses protect equipment from surges and shorts in the power line. The panel light indicates that the line is in use, or, with switch on and light out, indicates circuit trouble. The hinged-front panel allows easy access to the fuse block on the inside back plate for inspection or replacement of fuses. Two fuses of the screw-plug type are required, but are not furnished since their rating depends upon the load to be protected. On the removable back plate are approximately 100 square inches of unused surface which may be used to mount additional terminal distribution blocks, filament or line transformers, line pads, equalizers, relays, and other appropriate components. A 7/8-inch diameter hole is provided at each end of the chassis for connecting external wires.

MECHANICAL SPECIFICATIONS

DIMENSIONS
Depth (behind panel) 3 3/4 inches
(over-all) 4 3/8 inches
Height 6 1/2 inches (4 RU)
Width 19 inches
Weight 5 1/2 lb

ELECTRICAL SPECIFICATIONS

Switch DPST, 20-amp, 125-volt
Fuses (not furnished) Plug type; rating dependent on equipment to be protected; 20-amp maximum
Lamp Mazda No. 6S6, 120-volt, at 6 watts

HOW TO ORDER
When ordering, please specify:
Type FA-4-A switch and fuse panel.
FEATURES
- Simple control of desired bandwidth
- Gives variety of "bassy" or "tinny" effects
- Telephone conversation effect may be created
- Helps to eliminate static from overseas or short-wave pickups and rebroadcasts. Clarifies speech intelligence
- Easy installation and operation
- Telephone-type key permits instant switching in or out of audio circuit

WHERE TO USE
The General Electric Type FA-18-A sound effects filter panel provides control of program bandwidth, enabling the user to obtain unusual dramatic sound effects. Speech and music may be made "bassy" or "tinny" and "telephone-quality" effects may be simulated.

DESCRIPTION
The Type FA-18-A sound effects filter panel consists of adjustable high- and low-pass filter sections mounted on a panel. Each of the filters are connected to a variable cutoff frequency-selector switch controlled by a front-panel knob. Each switch has eight cutoff positions (100, 250, 1000, 2000, 3000, 4000, and 5000 cycles) and an OFF position. A key switch is provided to connect or disconnect the filter circuit so that the filter may be preset at any time for desired characteristics and inserted in the circuit when required.

MECHANICAL SPECIFICATIONS
DIMENSIONS
Depth (including front panel control) 8 1/2 inches
Height 5 3/8 inches (three rack units)
Width 19 inches
Weight 9 lb

MOUNTING
The sound effects filter panel is designed for vertical mounting on a standard 19-inch relay or cabinet rack. A clamp-type mounting, not visible from the front, is provided to mount the panel in any desired location on a rack.

ELECTRICAL SPECIFICATIONS
Source Impedance: 600 ohms (unbalanced)
Operating Level: -40 to +20 dbm
Load Impedance: 600 ohms (unbalanced)
Insertion Loss: 1 db or less at passed frequencies

HOW TO ORDER
When ordering, please specify:
Type FA-18-A sound effects filter panel.
FEATURES

- Easily wired ground terminals
  The jacks used on these jack strip assemblies are provided with special off-set sleeve (or grounding) terminals, designed so that the sleeve terminals fall in a line down the center of the assembly when two rows of jacks are mounted on the strip. This makes it possible to ground all sleeves by simply passing a single straight length of bus wire through all sleeve terminals. Results are savings in labor, time, and wiring space.

- Increased strength
  The two-sided construction of this jack adds rigidity, reducing the possibility of wire breakage, and makes a smoother operating jack-strip assembly.

- Easily mounted
  The vertically slotted end-mounting brackets permit some vertical movement of the jack strip. This facilitates the mounting of the strip when used in conjunction with odd sized rack-mounted equipment.

- The Type PV-14-A card holder kit
  The card holder kit is available for labeling of the jack strips where the strips are to be mounted within the rack instead of front flush mount.

WHERE TO USE

The General Electric Type FA-2-A jack strips are used in amplifier racks to permit rapid isolation, selection, and monitoring of individual amplifiers by means of patch cords. They are also used in studio- and master-control room consoles and racks to permit "patching" of the various remote, local, and audition programs into the desired transmitter, remote, and monitoring channels.

DESCRIPTION

The General Electric Type FA-2-A jack strip consists of 48 jacks, mounted in two rows on heavy black

Textolite* board. All jacks are of the tip and sleeve type with an additional normally closed contact making the jack suitable for use on "normalled through" circuits.

Jacks are mounted on 5/8-inch horizontal centers so as to mate properly with General Electric patch cords (Types FA-7-A, B & C) and other manufacturers' standard, double-plug patch cords.

MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>DIMENSIONS</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 1/4 inches</td>
<td>18 1/2 inches</td>
<td>3 1/2 inches approx</td>
<td>51 1/2 lb</td>
</tr>
</tbody>
</table>

MOUNTING

Mounting brackets at the end of the strip are vertically slotted to fit a standard 19-inch EIA cabinet or relay rack. Two No. 12-24 screws are supplied to mount each jack strip. Jack panels, Type FA-3-A, B, and C, may be used with the Type FA-2-A to provide designation cards above and below each jack pair.

ELECTRICAL SPECIFICATIONS

Number of jack pairs 24
Type of jack Tip and sleeve with normalled-through contact

HOW TO ORDER

When ordering, please specify:
Type FA-2-A jack strip.

ACCESSORIES

Type PV-14-A card holder kit
Type FA-7-A B C 2-, 4-, or 6-foot patch cords
Type FA-3-A B C single, double or triple jack panels

* Registered trade-mark of General Electric Company.
Jack Panels • Patch Cords
Types FA-3-A, FA-3-B, and FA-3-C

DESCRIPTION
Jack panels are available for covering one, two or three General Electric Type FA-2-A jack strips.
Designation cards inserted behind clear plastic strips are mounted in card holders on each panel above and below each pair of jack openings.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
<th>Height (in Inches)</th>
<th>Weight (in Lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-3-A</td>
<td>Single jack panel</td>
<td>3½</td>
<td>½</td>
</tr>
<tr>
<td>FA-3-B</td>
<td>Double jack panel</td>
<td>5½</td>
<td>1¼</td>
</tr>
<tr>
<td>FA-3-C</td>
<td>Triple jack panel</td>
<td>6½</td>
<td>2</td>
</tr>
</tbody>
</table>

MOUNTING
A mounting is furnished with each panel to secure it to the jack strip so that no mounting screws will be exposed.

HOW TO ORDER
When ordering, please specify:
Type FA-3-... jack panel.

Patch cords, Types FA-7-A, -B and -C

GENERAL DESCRIPTION
General Electric patch cords consist of two insulated copper conductors shielded with tinned copper braid and covered with heavy black cotton braid. A six-inch length at either end is reinforced so that the two-conductor double plug may be securely mounted. The plug at either end is interchangeable with the W.E. Type 241-A double plug. The shield of the cord is connected to the sleeves of both plugs.

SPECIFICATIONS
General Electric patch cords are available in three sizes:

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Cord Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-7-A</td>
<td>2 feet</td>
</tr>
<tr>
<td>FA-7-B</td>
<td>4 feet</td>
</tr>
<tr>
<td>FA-7-C</td>
<td>6 feet</td>
</tr>
</tbody>
</table>

HOW TO ORDER
When ordering, please specify:
Type FA-7-... patch cord.

Use of jack panel provides a neat flush mounting of jack strips in a rack
DISTRIBUTED OFFICES

WILLIAM G. BROUGHTON  
General Electric Co.  
1 River Road  
Bldg. 33, Room 204  
Schenectady, New York  
Express 3-9110

LEWIS F. PAGE  
General Electric Co.  
20 Lexington Avenue  
Room 2129  
New York, New York  
Plaza 1-1311

EARL H. PLATT  
General Electric Co.  
1013 Williamson Bldg.  
Cleveland, Ohio  
Superior 1-6822

JAMES M. COMER, JR.  
1330 W. Peachtree St., N. W.  
Room 517  
Atlanta, Georgia  
Trinity 5-6691

THOMAS F. BOST, JR.  
1330 W. Peachtree St., N. W.  
Room 517  
Atlanta, Georgia  
Trinity 5-6691

VERNON H. RUSSELL  
General Electric Co.  
478 N. W. Highway  
Des Plaines, Illinois  
Cypress 9-3369

ROBERT E. LAUTERBACH  
General Electric Co.  
Bldg. 27  
3628 W. 95th Street  
Shawnee Mission, Kansas  
Mitchell 9-7131

JAMES M. DOUGLAS  
General Electric Co.  
4447 N. Central Expressway  
Room 400  
Dallas, Texas  
Lakeside 6-0426

HUGH W. GRANBERRY  
General Electric Co.  
565 Broadway  
Redwood City, California  
Emerson 8-4681

ROBERT W. COCHRAN  
General Electric Co.  
Suite 210  
232 North Lake Avenue  
Pasadena, California  
Murray 1-5965

JOHN F. WATTER  
General Electric Co.  
777 14th St., N. W.  
927 Wyatt Bldg.  
Washington, D. C.  
Executive 3-3600

HAROLD H. CONDO  
General Electric Co.  
Division Street Plant  
Room 11—3rd Floor  
Syracuse, New York  
Granite 6-4411—Ext. 6305