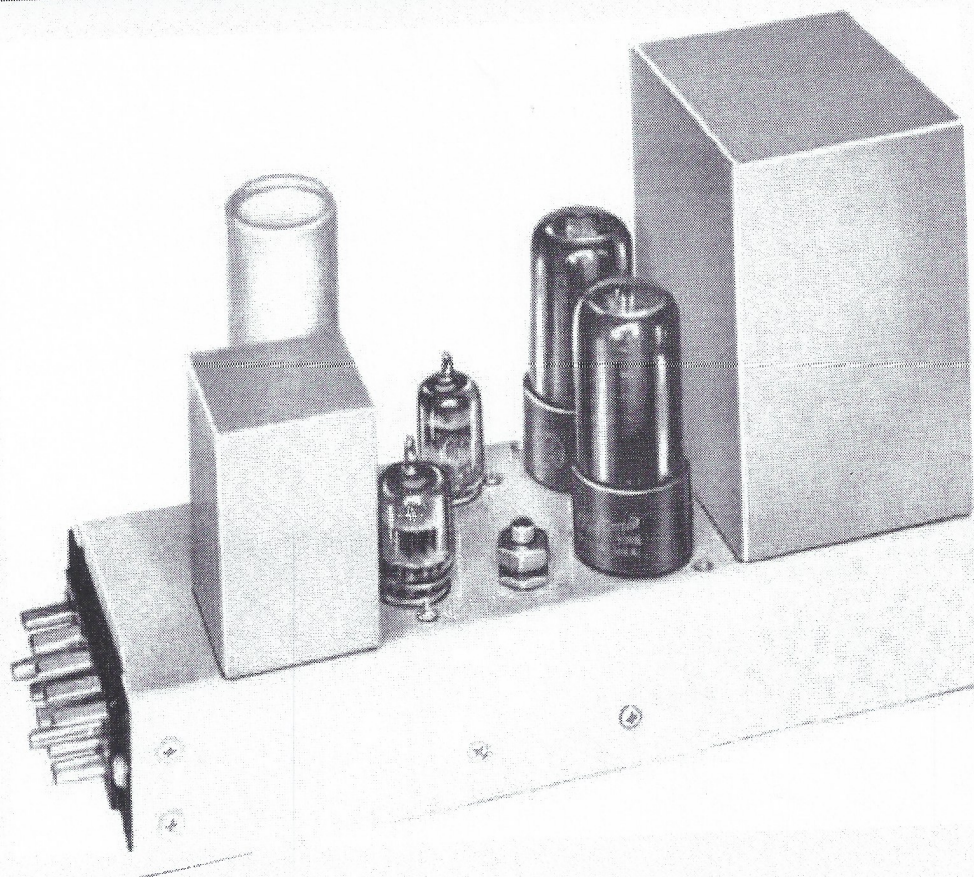


Plug-in Uni-level Amplifier

Type BA-9-A



Plug-in uni-level amplifier, Type BA-9-A

FEATURES

• 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-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 control 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

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 out-

put 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 $\frac{3}{4}$ inches

Height: 5 $\frac{3}{4}$ inches

Width: 3 $\frac{1}{2}$ 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

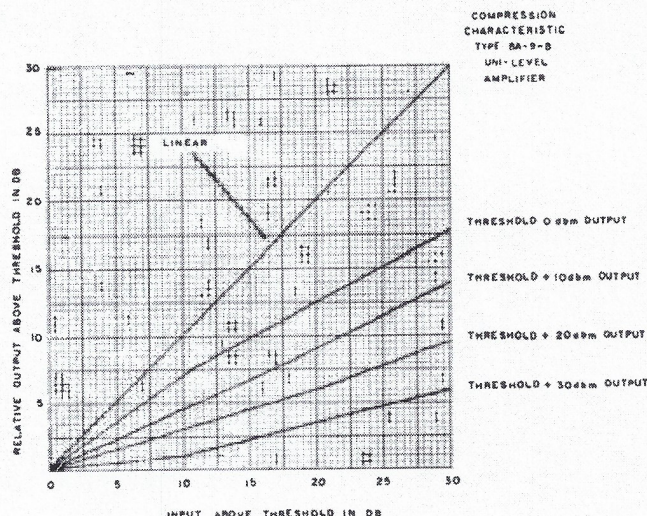
Through Cinch-Jones 2400 series plug, plugging into female mate on Type FA-23-B shelf. Connections on plugs are solder terminal.

THRESHOLD BIAS VOLTAGE

Tip jacks

SAFETY PROVISIONS

No voltage applied to unit until plugged into mating source.
No exposed voltages.



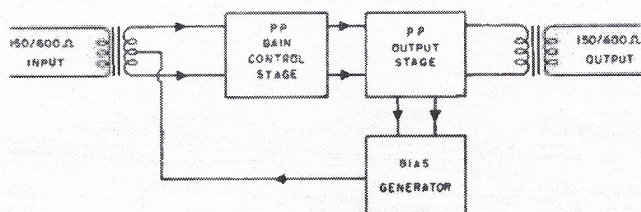
Plug-in Uni-level Amplifier

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 1½ 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	Average
11 milliseconds	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

150/600 ohms, shipped wired for 600 ohms. Balanced input.

OUTPUTS

SIGNAL

150/600 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

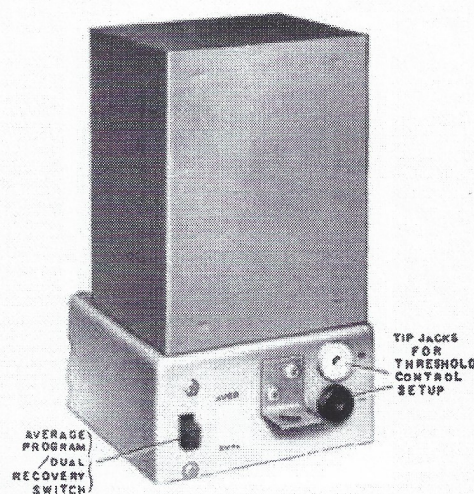
Type BP-10-B (Accessory).

CONTROLS

Threshold setting control.
Average program dual recovery switch.

TUBE COMPLEMENT

- 1—GL-6386
- 1—6AL5
- 2—6V6GT



Tip jacks and switch, plug-in uni-level amplifier, Type BA-9-A

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)

Plug-in Uni-level Amplifier

Type BA-9-A

TYPICAL APPLICATIONS

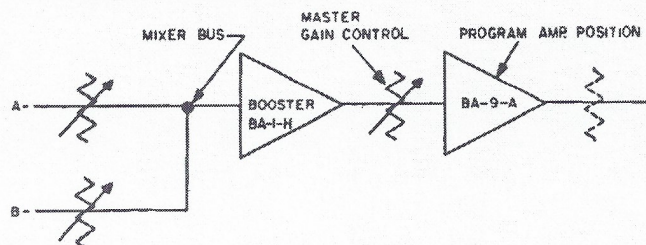


Fig. 1. The BA-9-A uni-level amplifier as an automatic level-control amplifier

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.

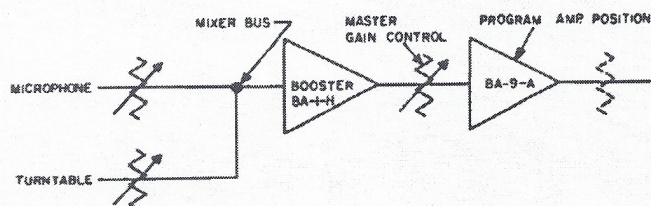


Fig. 2. Using the BA-9-A uni-level amplifier as an automatic fader control

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.

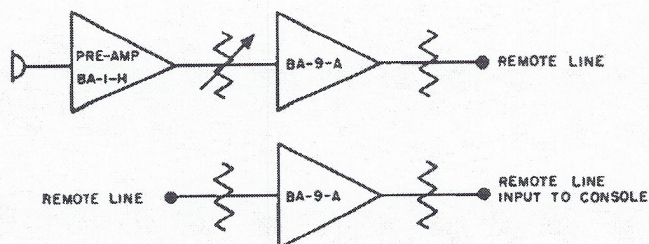


Fig. 3. Unattended remote operation

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.

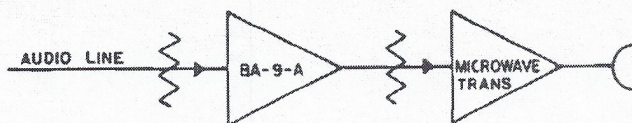
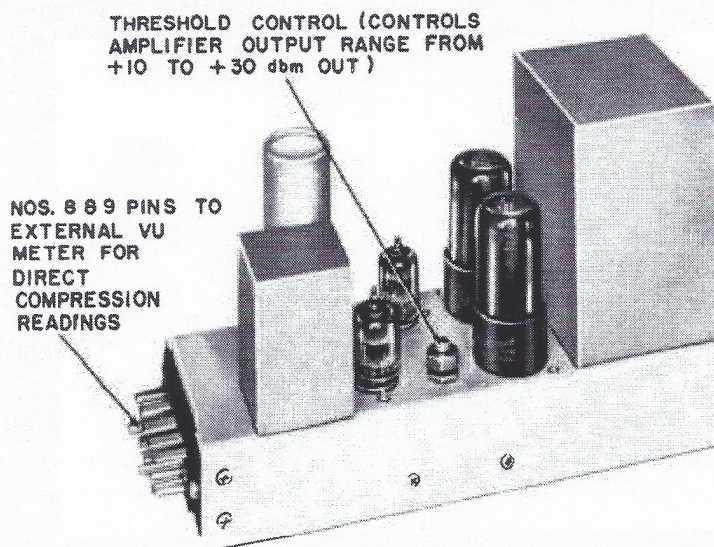


Fig. 4. Microwave relay application of the uni-level

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