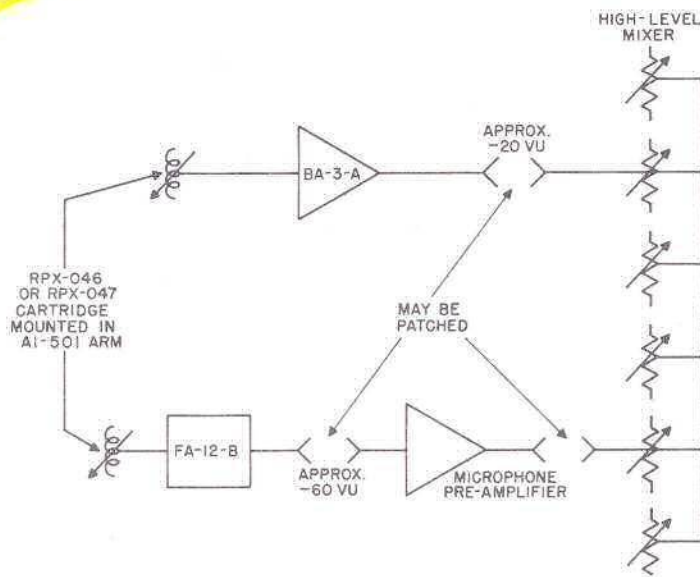




TRANSCRIPTION ACCESSORIES

NEW WAYS TO PUT LIVE QUALITY
INTO TRANSCRIPTIONS...

GENERAL  ELECTRIC



The General Electric Transcription Reproduction System is based on either a single or triple-play low-impedance cartridge, Type RPX-046 or RPX-047, plus a stylus, mounted in a Transcription Arm, Type A1-501.

At this point, it must be decided which of two equalization-amplification systems is to be followed. The first consists of an equalized self-powered pre-amplifier, Type BA-3-A, designed to work directly from the cartridge and to feed typical mixing systems. The second system uses any standard microphone pre-amplifier plus a special low-power equalizer between the pick-up and the amplifier. Using the second method, the output of the cartridge is equalized and stepped down to low impedance for transmission through any length of microphone cable to any microphone pre-amplifier.

The first system is relatively inexpensive as compared with the second system and is ideal where the BA-3-A may be mounted out of the way in a turntable cabinet. The second method, however, is popular because the equalized pick-up may be fed to existing standard mike pre-amps using regular patching facilities.



TRANSCRIPTION ARM TYPE A1-501

GENERAL

The A1-501 General Electric "Baton" Transcription arm, designed for broadcast and professional purposes, is for playback use on lateral type transcriptions and records up to 16" in diameter. The arm, constructed of light weight aluminum alloy, incorporates precision ball-bearing races for minimum lateral and vertical inertia or drag.

FEATURES

- 1) - Precision ball bearing system used in both horizontal and vertical movement planes.
- 2) - Bearings are dustproof and lifetime lubricated.
- 3) - Outstanding tracking ability enables the playing of warped or eccentric transcriptions or records.
- 4) - Low stylus pressures, 6-8 grams when used with G-E cartridges.
- 5) - Cartridge pressure easily and accurately adjusted by means of quickly set sliding weight.
- 6) - Stylus pressure shown directly in grams on sliding weight calibrated scale.
- 7) - No torsional resonances within audio range.
- 8) - Specially designed spherical base mount permits extremely fine mounting adjustment to obtain perfect lateral balance.
- 9) - Mounting height adjustable up to 2" for various turntable heights above motor board.
- 10) - Cartridge head tips up 98° for easy stylus inspection or cartridge change.
- 11) - Two cartridge slides furnished with each arm to facilitate the rapid mounting and changing of G-E cartridges of the single stylus type. The G-E Triple play cartridge is changed by the simple removal of two screws and the change knob. No soldering required.
- 12) - Positioning marker on head facilitates groove location.
- 13) - Adjustable, mating arm rest furnished with arm.
- 14) - Finished in anodized satin silver, with instrument black trim.
- 15) - Correctly designed finger lift on head permits easy and safe lowering and raising of cartridge stylus on disc.

MECHANICAL

Mounting:

- 1 - Base of mounting post is a section of a sphere. By varying the adjustment of three mounting screws, this surface resting against the motor board or special mounting plate (supplied), may be adjusted so that the mounting post can be set in a perfect vertical plane, thus assuring perfect lateral balance of the pickup arm and eliminating lateral balance arm drag.
- 2 - Mount is fastened by use of three mounting screws and special mounting plate.

Construction:

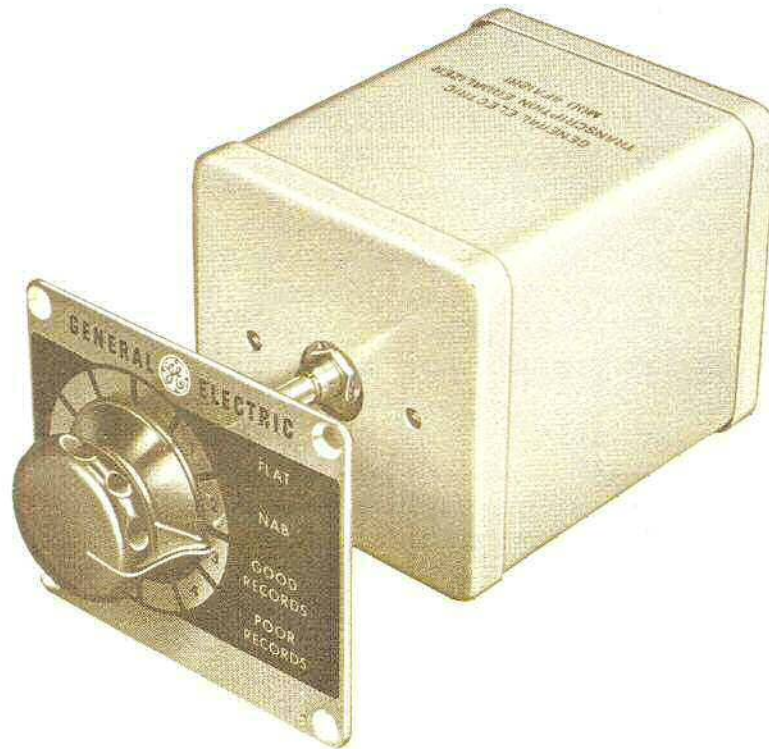
- 1 - Construction is of die cast and machined light weight aluminum alloy.
- 2 - Silver plated beryllium copper spring contacts used for all cartridge contacts.
- 3 - Vertical bearing assembly tension adjustable. One spanner wrench furnished.
- 4 - RPX-046 mounts on slide for instant plug in.

Playback specifications: (ARM-A1-501)

- 1 - Offset head.
- 2 - *Tracking error:* maximum 3° at inside of 4" diameter.
- 3 - *Stylus pressure recommended* (with G-E RPX-046 cartridge): 6 to 8 grams.
- 4 - *Calibrated scale settings:* 4 to 14 grams; 20 grams with counter weight removed (total head weight).
- 5 - *Stylus location:* 23/32" ahead of turntable center.
- 6 - *Bearing post location:* Turntable center to bearing post center 1 1/4".
- 7 - *Minimum mounting distance required:* 12 7/8". (Template furnished)
- 8 - *Fundamental lateral arm resonance:* 16 cps.
- 9 - *Torsional resonance:* None in audible range.
(RPX-046 & RPX-047 Cartridges)
- 1 - *Frequency response:* 30 to 15,000 cps, plus or minus 2 db.
Variable according to equalization used.
- 2 - *Output:* 8 mv. @ 9.6 cen/sec. @ 1,000 cps.
- 3 - *Resistance:* 220 ohms
- 4 - *Inductance:* 250 mh

ACCESSORIES

- | | |
|-------------------------------------|---|
| 1 - Styli, playback (See back page) | 3 - BA-3-A equalizer transcription preamplifier |
| 2 - FA-12-B equalizers | 4 - Additional RKP-012 cartridge slide for spare cartridges |



TRANSCRIPTION EQUALIZER TYPE FA-12-B

The General Electric Transcription Equalizer, Type FA-12-B, is a network for use with professional type cartridges RPX-046 and RPX-047 for playing disk recordings in broadcasting stations. 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. The "NAB" position provides essentially flat high-frequency response from material recorded in accordance with the "NAB" lateral curve. 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" position provides a high-frequency response considerably more attenuated than that given by the "NAB" position.

All switch positions provide low-frequency response essentially the complement of "NAB" curve.

Experience has shown that the "NAB" position is ideal for high-quality transcriptions and both wide-groove and micro-groove 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.

CONSTRUCTION AND MOUNTING

The Type FA-12-B Transcription Equalizer is a single unit housed in a rectangular steel case. Tapped mounting holes are provided at the top (switch end) of the case to enable mounting the Equalizer to the under side of the top panel of a transcription machine 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 thickness of transcription machine top panels. A knob and escutcheon plate are supplied for mounting above the equalizer on the control surface of the transcription machine panel. 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.

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 grounded or balanced.

Convenient to use — connects to any microphone preamplifier.

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.

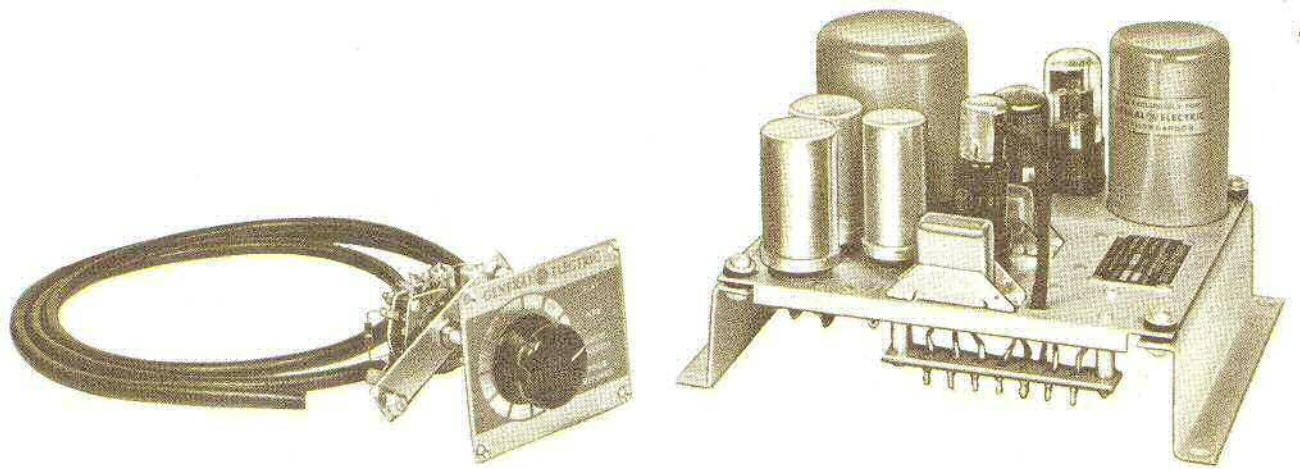
OUTPUT LEVEL:

An output level of approximately -55 VU maximum is obtained when reproducing 78 rpm shellac records; -60 VU maximum from microgroove records.

DIMENSIONS:

Can: 4-1/16" deep by 3 3/8" long by 3 1/4" wide

Dial Plate: 3 5/8" long by 3" wide



EQUALIZED TRANSCRIPTION PRE-AMPLIFIER TYPE BA-3-A

The General Electric Equalized Transcription Pre-Amplifier, Type BA-3-A, is a high quality, a-c operated, equalized audio amplifier. It is designed to enable broadcasters to fully realize the superior play-back performance possible with G-E Variable Reluctance Pickups.

A four-position switch allows control of high-frequency response.

For the convenience of the operator, the Type BA-3-A provides a cueing circuit which will feed headphones.

CONSTRUCTION AND MOUNTING

The amplifier is built on a flat plate chassis which mounts inside the turntable cabinet.

The switch is designed to mount on the turntable either at the top or the side, and includes an escutcheon plate and knob.

Shielded leads are provided for connection to the pickup and to the equalizer switch. Suitable leads can be connected from the amplifier to a headphone cueing jack (to be provided and mounted by the customer). The usual power and audio output leads interconnect with the station facilities. Terminals are provided for metering of tube cathode voltages. Connections may be made to a General Electric Type FA-11-A DC Metering Panel.

FEATURES

Full "NAB" low-frequency response.
Adjustable high-frequency response including "NAB" position.
Sufficient level to feed directly into conventional mixer systems.
Low noise type 1620 input tube.
Tubes and chassis both shock mounted.
Magnetically shielded output and power transformers.
Plug-in electrolytic capacitors.
Provision for tube current checks.
Output circuits are 600/150 ohms and may be run either balanced or unbalanced.
Low distortion.
Cueing circuit for headphones.

SPECIFICATIONS

POWER SUPPLY

105/115/125 volts, 50/60 cycles

OUTPUT CIRCUITS

Load Impedance: 600/150 ohms
Output Connections: 600 or 150 ohms — balanced, or either side may be grounded.

POWER INPUT

20 watts

DISTORTION

0.5% or less, 50 to 15,000 cycles with up to -15 dbm output. 1% or less, 50 to 15,000 cycles with up to -5 dbm output. This includes equalizing circuits.

TUBE COMPLEMENT

1 G-E Type 1620*.
1 G-E Type 6SN7-GT.
1 G-E Type 6X5.

METERING

Cathode resistors tapped at 1 volt for connection to an external 5000 ohms-per-volt 2 volt meter. (Such as G-E Type FA-11-A DC Metering Panel.)

**Type 6J7 may be used where a minimum of microphonics and hum are not required.*

OUTPUT LEVEL

When used with G-E Variable Reluctance Pickups, Types RPX-046 and RPX-047, the output will be approximately -15 VU maximum from 78 rpm records; -20 VU maximum from microgroove records.

DIMENSIONS

7 inches high (over-all) by 8¾ inches square chassis.

NOISE LEVEL

65 db below output level of -5 dbm.

WEIGHT

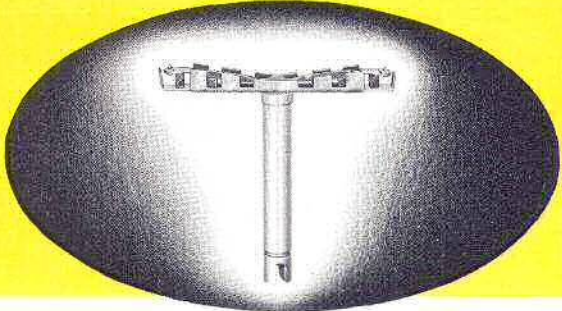
Approximately 6 lbs. 3 oz. (unpacked).

CUEING

Approximately 1½ volts program peak, one side grounded, for use with high impedance headphones. Output isolated from program circuit.

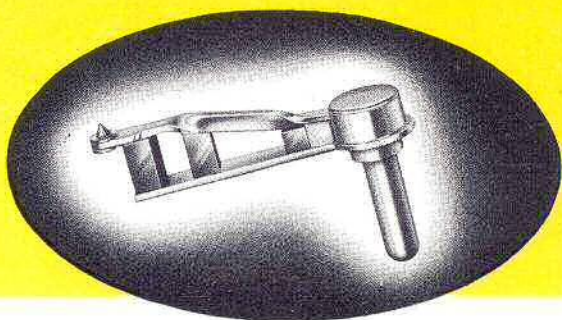
SCOPE OF SPECIFICATIONS

In the construction of the equipment described, the full intent of the specifications will be met. The General Electric Company, however, reserves the right to make any departure from the specification for reasons of improved design.



DUAL STYLI

General Electric manufactures two dual reversible sapphire styli (RPJ-007, RPJ-010), two dual reversible diamond styli (RPJ-011, RPJ-012), and a combination diamond and sapphire stylus (RPJ-013), combining a .001 diamond and .003 sapphire. All of them incorporate the "double twist" feature of the new Baton Stylus design which reproduces ALL the music as it was recorded. See the table below for complete information on these items.

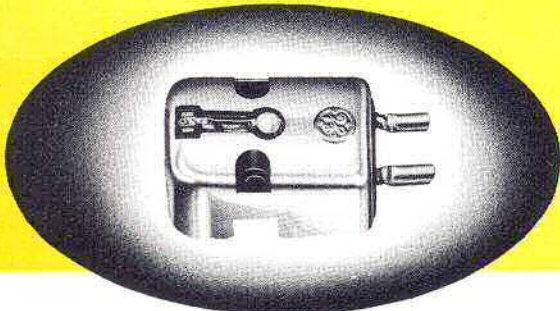
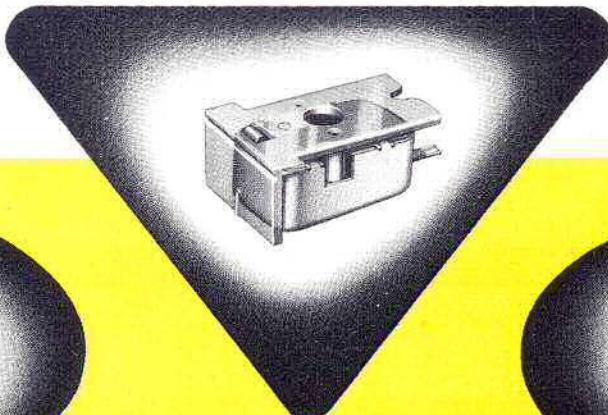


SINGLE STYLI

The General Electric "Baton Stylus" design is also used with all single styli to virtually eliminate buzzing, blasting or fuzziness — three of the greatest foes of listening pleasure. Included in the General Electric line are three single sapphire styli (RPJ-001, RPJ-005, and RPJ-006), and three single diamond styli (RPJ-002, RPJ-003, and RPJ-004). The table below gives complete information on these items.

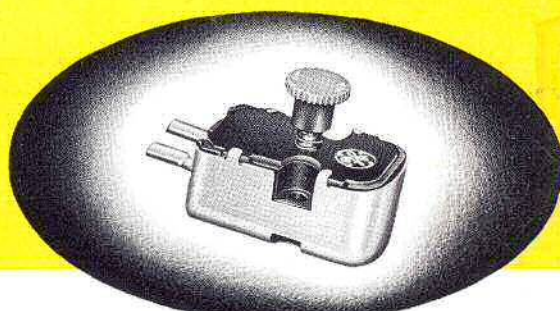
RKP-012

This cartridge slide is used with the A1-501 Transcription Arm to facilitate the rapid mounting and changing of G-E cartridges of the single stylus type.



RPX-046

The G-E Variable Reluctance Cartridge for professional and broadcast use is shipped less stylus but is designed to operate with the following styli: RPJ-001, RPJ-002, RPJ-003, RPJ-004, RPJ-005, RPJ-006. It is a low impedance unit with a smooth, wide-range frequency response designed to match broadcast equalizers. Low mass and the high compliance of any of the suitable styli insure minimum record wear. Every cartridge individually tested with stylus assembly.



RPX-047

This new General Electric Triple Play Cartridge is furnished without a stylus but will accommodate the following G-E Dual Reversible Styli—RPJ-007, RPJ-010, RPJ-011, RPJ-012, and RPJ-013. It is designed for broadcast application requiring a 250mh cartridge. No tone arm adjustment need be made to play all types of recordings. This cartridge has a wide range frequency response and virtually eliminates unwelcome resonance peaks.

REPLACEMENT STYLI FOR G-E VARIABLE RELUCTANCE CARTRIDGES					
Stylus Radius in Inches	Recommended Use	Diamond Stylus	Color Code	Sapphire Stylus	Color Code
SINGLE STYLI FOR RPX-046 CARTRIDGE					
.001	Microgroove (33 & 45 RPM)	RPJ-004	Black	RPJ-005	Red
.0025	NAB Transcriptions	RPJ-002	Yellow	RPJ-006	White
.003	Standard 78 RPM	RPJ-003	Violet	RPJ-001	Natural
DUAL (SAPPHIRE OR DIAMOND) STYLI FOR RPX-047 CARTRIDGE					
.001 & .0025	Triple Play (Microgroove & NAB)	RPJ-011	.001 Black .0025 Yellow	RPJ-007	.001 Red .0025 White
.001 & .003	Triple Play (Microgroove & Standard)	RPJ-012	.001 Black .003 Violet	RPJ-010	.001 Red .003 Natural
DUAL (SAPPHIRE AND DIAMOND) STYLUS FOR RPX-047 CARTRIDGE					
.001 & .003	Triple Play (Microgroove & Standard)	RPJ-013	.001 Diamond .003 Sapphire	Black Tip Natural Tip	

G-E OFFICES EVERYWHERE ARE AT YOUR SERVICE . . .

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Cypress 2581

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963 Commonwealth Avenue
Hubbard 2-1800

CHICAGO 54, ILL.
1122 Merchandise Mart
Whitehall 4-3915

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215 West 3rd Street
Main 5022

CLEVELAND, OHIO
710 Williamson Bldg.
Superior 16822

DALLAS 2, TEXAS
3200 Maple Avenue
Prospect 4296

HOUSTON, TEXAS
1100 E. Holcombe Blvd.
Justin 0657

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Suite 900
777 14th Street, N.W.
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ELECTRONICS DIVISION

GENERAL  ELECTRIC

ELECTRONICS PARK • SYRACUSE 1, N. Y.

(In Canada, Canadian General Electric Company, Ltd., Toronto, Ont. Outside the U.S.A. and Canada, by International General Electric Company, Electronics Sales, 570 Lexington Ave., New York, N. Y., U.S.A.)

Monitoring Speaker, Type FS-1-B
Studio Wall Speaker, Type FS-2-B
Housing for FS-1-B Speaker, Type FS-4-A
Cabinet for FS-2-B Speaker, Type FS-3-A

Section E211 Page 40
Broadcast Equipment Data Book
June 15, 1957
Supersedes E211 40, 8/1/55



FS-1-B Monitoring Speaker (FS-4-A Cabinet)

APPLICATION

The 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 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.

The 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.

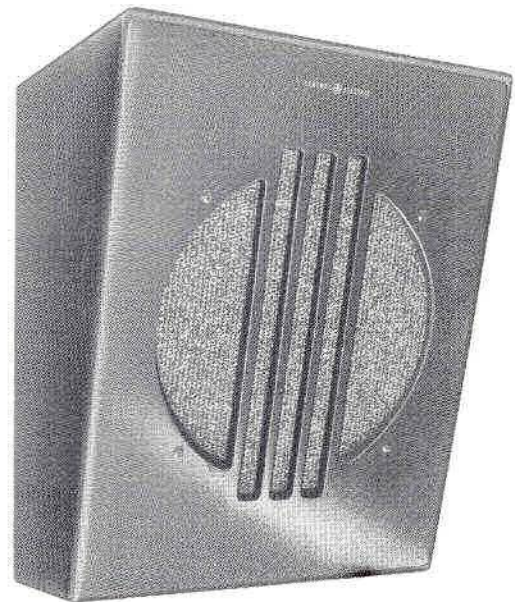
FEATURES

FS-1-B MONITORING SPEAKER

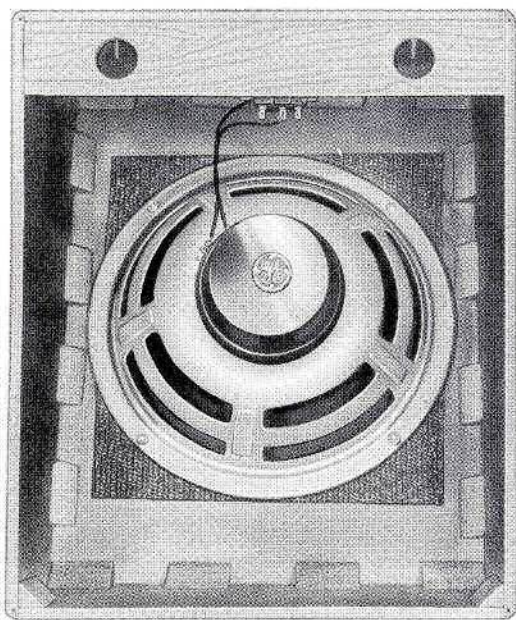
1. **Rich full bass.** Assured by use of ample cabinet volume and bass-reflex design.
2. **Wide range response.** Use of famous G-E speaker Type 1201A provides a uniform response, free from objectionable peaks, over the useful range of 50 to 13,000 cycles per second.
3. **High wattage capacity.** Non-warping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

FS-2-B STUDIO WALL SPEAKER

1. **Good sound distribution.** Cabinet front sloped for best sound distribution.
2. **Good frequency reproduction.** Uses General Electric 1201A speaker.



FS-2-B Studio Wall Speaker (FS-3-A Housing)



FS-2-B Studio Wall Speaker, rear, Showing Voice Coil Transformer

3. Attractively styled cabinet. Attractive walnut-finish wood used in cabinet construction.
4. Line-to-voice-coil transformer included.
5. Economical. Speaker and cabinet combination low in price.

DESCRIPTION

The FS-1-B Monitoring Speaker is composed of the FS-4-A Monitoring Speaker Cabinet, a 1201A Loudspeaker, and an 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.

The FS-2-B Studio Wall Speaker consists of an FS-3-A Wall Speaker Housing, a 1201A Speaker and an 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 at 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: FS-1-B Monitoring Speaker including floor cabinet, speaker, and line-to-voice-coil transformer.

FS-2-B Studio Wall Speaker, including wall mounting cabinet, speaker, and line-to-voice-coil transformer.

FS-3-A Wall Speaker Housing only.

FS-4-A Monitoring Speaker Cabinet only.

Dimensions:	FS-1-B	FS-2-B
Speaker:	12"	12"
Cabinet: Width:	25"	14 $\frac{5}{8}$ "
Depth:	14 $\frac{1}{2}$ "	9 $\frac{3}{4}$ "
Height:	26"	18"

Weight: 70 lbs approx. 10 lbs approx.

Mounting: FS-1-B. Floor mounting.

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

Finish: Walnut.

Connections: FS-1-B and FS-2-B—solder terminals on transformer taps.

ELECTRICAL SPECIFICATIONS

Performance:

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.

ORDERING INFORMATION

When ordering, please specify:

FS-1-B Monitoring Speaker. (The type number includes one FS-4-A Cabinet, one 1201A speaker, one FA-42-A Line-to-Voice-Coil Transformer, and Installation and Operating Instructions.)

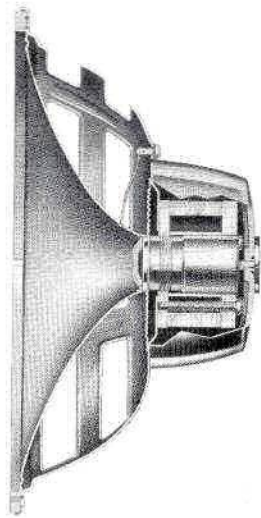
FS-2-B Studio Wall Speaker. (The Type number includes one FS-3-A Wall Housing, one 1201A speaker, one FA-42-A Line-to-Voice-Coil Transformer, and Installation and Operating Instructions.)

FS-3-A Wall Speaker Housing.

FS-4-A Monitoring Speaker Cabinet.

ACCESSORIES

FA-19-J Interconnecting Cable.



Cut-Away View, 1201A Speaker



G-E 1201A Speaker

APPLICATION

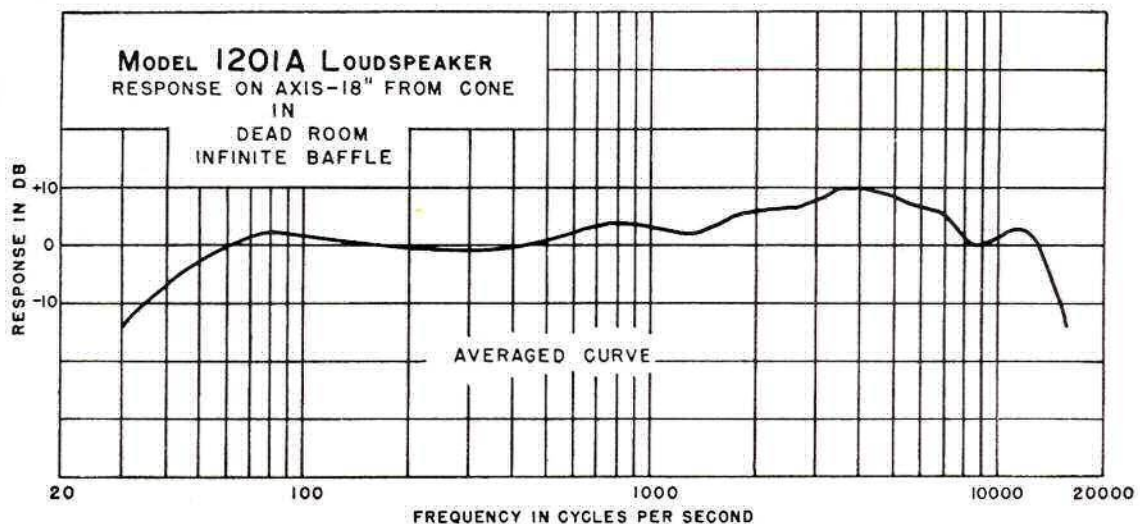
General Electric Loudspeakers are designed for critical high quality monitoring of broadcast program material in AM-FM and TV broadcast studios. They may be depended upon to provide excellent reproduction of music and speech in recording, control, and studio monitoring applications.

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

FEATURES

1. High wattage handling capacity made possible by

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



DESCRIPTION

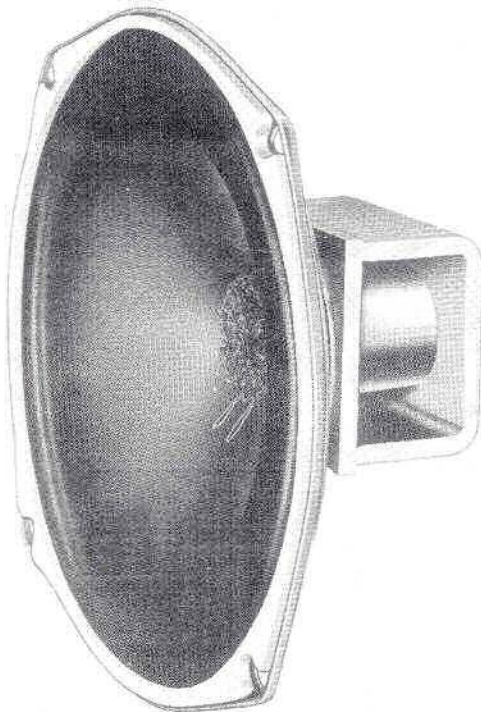
General Electric Loudspeakers are designed by audio engineers and produced under exacting conditions of quality control.

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

The Type 1201A and 1203A Speakers are wide range units, 12" 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. Alnico V magnet material is used for increased efficiency.

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.



G-E 850 Speaker

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Units: Wide Range Speakers: 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:

	Diameter Over-all Size	Mtg. Hole Centers	Depth Gasket to Yoke or Cover	Shipping Weight
850	7 $\frac{19}{32}$ "	7 $\frac{5}{8}$ "	3 $\frac{3}{4}$ "	2 lbs 10 oz
1201A	12 $\frac{7}{32}$ "	11 $\frac{9}{16}$ "	5 $\frac{7}{8}$ "	6 lbs 8 oz
1203A	12 $\frac{7}{32}$ "	11 $\frac{9}{16}$ "	5 $\frac{7}{8}$ "	5 lbs 2 oz

Type*	Size*	Alnico V Shape* Cone	Mag. Wt.	Power Rating	V.C.		Baffle Open.
					V.C. Diam.	Imp. Ohms	
** 850	8"	Round	6.8 oz.	15w	1"	8.0	6 $\frac{7}{8}$ "
**1201A	12"	Round	14.5 oz.	25w	1 $\frac{1}{4}$ "	8.0	10 $\frac{3}{4}$ "
**1203A	12"	Round	9.0 oz.	25w	1 $\frac{1}{4}$ "	8.0	10 $\frac{3}{4}$ "

* 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.

**Wide range speakers recommended for broadcast studio and monitoring applications.

Connections: 1201A, 850 and 1203A—Screw terminals.

ORDERING INFORMATION

When ordering, please specify:

Type....., Wide Range Speaker

ACCESSORIES

FS-4-A Monitoring Speaker Cabinet (for 12" speaker).

FS-3-A Wall Speaker Cabinet (for 12" speaker).

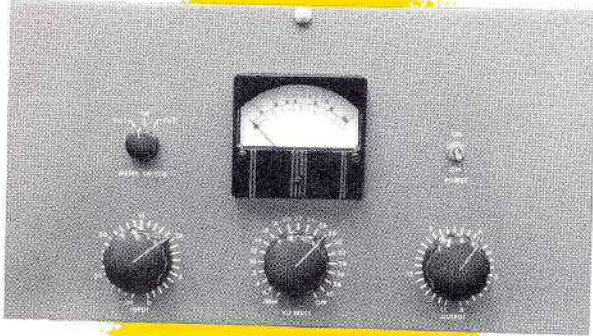
FA-42-A Line-to-Voice-Coil Transformer.

FA-19-J Interconnecting Cable.



AGC AUDIO AMPLIFIERS
Types BA-7-A, BA-9-B, BA-15-A

Three Available Audio AGC Units— **Uni-Level Amplifier** **Uni-Level Pre-Amplifier** **Audiomatic Limiting Amplifier**



Audiomatic Limiting Amplifier



Uni-Level Amplifier



Uni-Level Pre-Amplifier

What's as fast as an electron?

Light is. So is another electron.

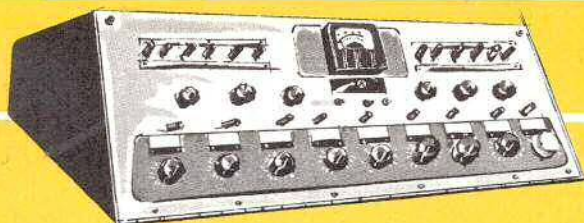
A man riding gain manually on audio can only take corrective action; he compensates to correct highs or lows. It's difficult for him to anticipate these imperfections and then move faster than the speed of light to prevent them.

But G-E audio control units with built-in AGC control preventatively. They send electronic signals to controlling other electronic signals, preventing blasts and peaks and dips.

For quality audio control in your station, investigate the application of these G-E audio units —

- Uni-Level Amplifier
- Uni-Level Pre-Amplifier
- Audiomatic Limiting Amplifier

GENERAL  ELECTRIC



GENERAL ELECTRIC
 ELECTRONICS DIVISION BROADCAST EQUIPMENT

AUDIO SYSTEMS

August 20, 1954

Dear Sir:

What IS a Uni-Level Amplifier? It is a new, scientifically designed device to benefit all broadcasters.

Many types of amplifiers are now in use, but the General Electric BA-9-A Uni-Level Amplifier is different from all others.

Among other things:

1. It relieves your audio control operator of the dull, boring job of keeping his eye glued to a meter.
2. It eliminates the tension of attempting to anticipate blasts of sound and adjust audio gain so listeners will keep listening.
3. It gives your disc jockey one less thing to do during his busy hours.

The Uni-Level Amplifier offers you many other benefits. Complete information is attached, including a re-print of the ad you saw recently in Broadcasting-Telecasting magazine.

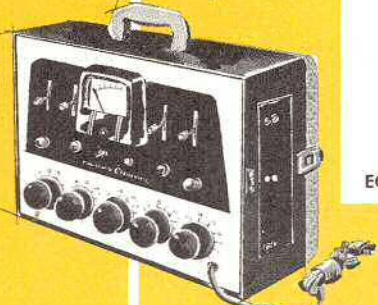
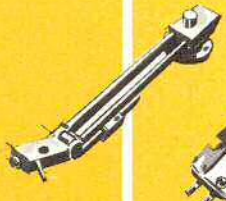
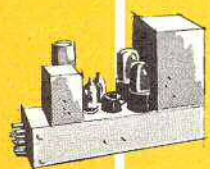
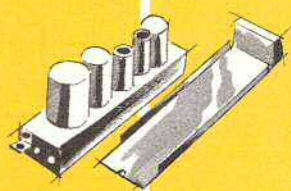
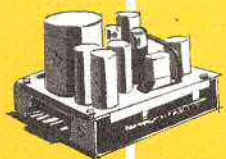
The \$195 you pay for this versatile unit will re-pay handsome dividends to you in a short time. Sign the attached order blank now, and get your Uni-Level Amplifier in September -- the same as many other broadcasters will be doing.

Sincerely,

District Sales Manager
 Broadcast Equipment

ECB-102

Printed in U.S.A.



- Plug-In Units
- Amplifiers
- Transcription Accessories
- Control
- Microphones
- Loudspeakers

**COMPLETE AUDIO EQUIPMENT
 FOR AM, FM, TV, HI-FI**

GENERAL  ELECTRIC
COMPANY

ELECTRONICS DIVISION

ELECTRONICS PARK, SYRACUSE, NEW YORK TELEPHONE 76-4411

December 20, 1957

Manual gain riding is a thing of the past.

Now, General Electric's Uni-Level Amplifiers and Audiomatic Limiting Amplifier electronically control your audio gain from mike to transmitter. Gone are those undesired blasts and fadeouts -- you get constant maximum power output without fear of over-loading your transmitter.

And in addition, with General Electric's Automatic Programmer in control, you can put your programs on the air - on time - everytime, and also switch from tape - to live - to network - to automatic turntable -- without a slip. Punched cards or punched tape give you programming that is on cue -- to the second.

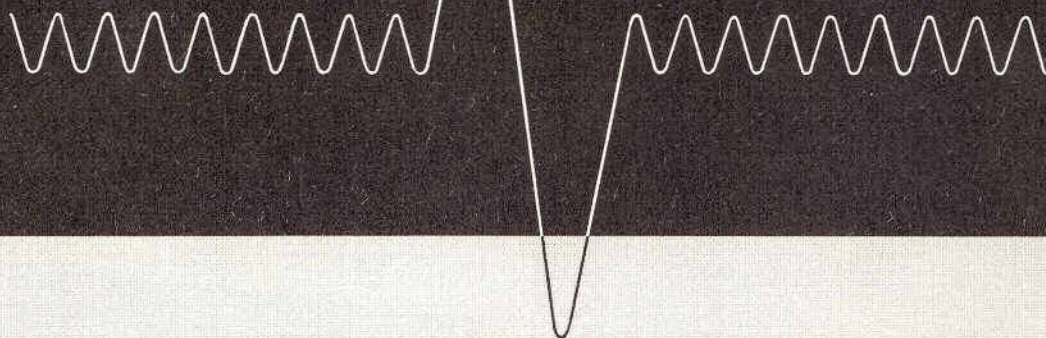
The attached information describes this General Electric Broadcast Equipment which frees your technical personnel from the drudgery and monotony of constant knob twisting and button pushing. Now, they can use their abilities to your greater advantage.

Contact me today for further information on what General Electric's complete AGC package can do for you.

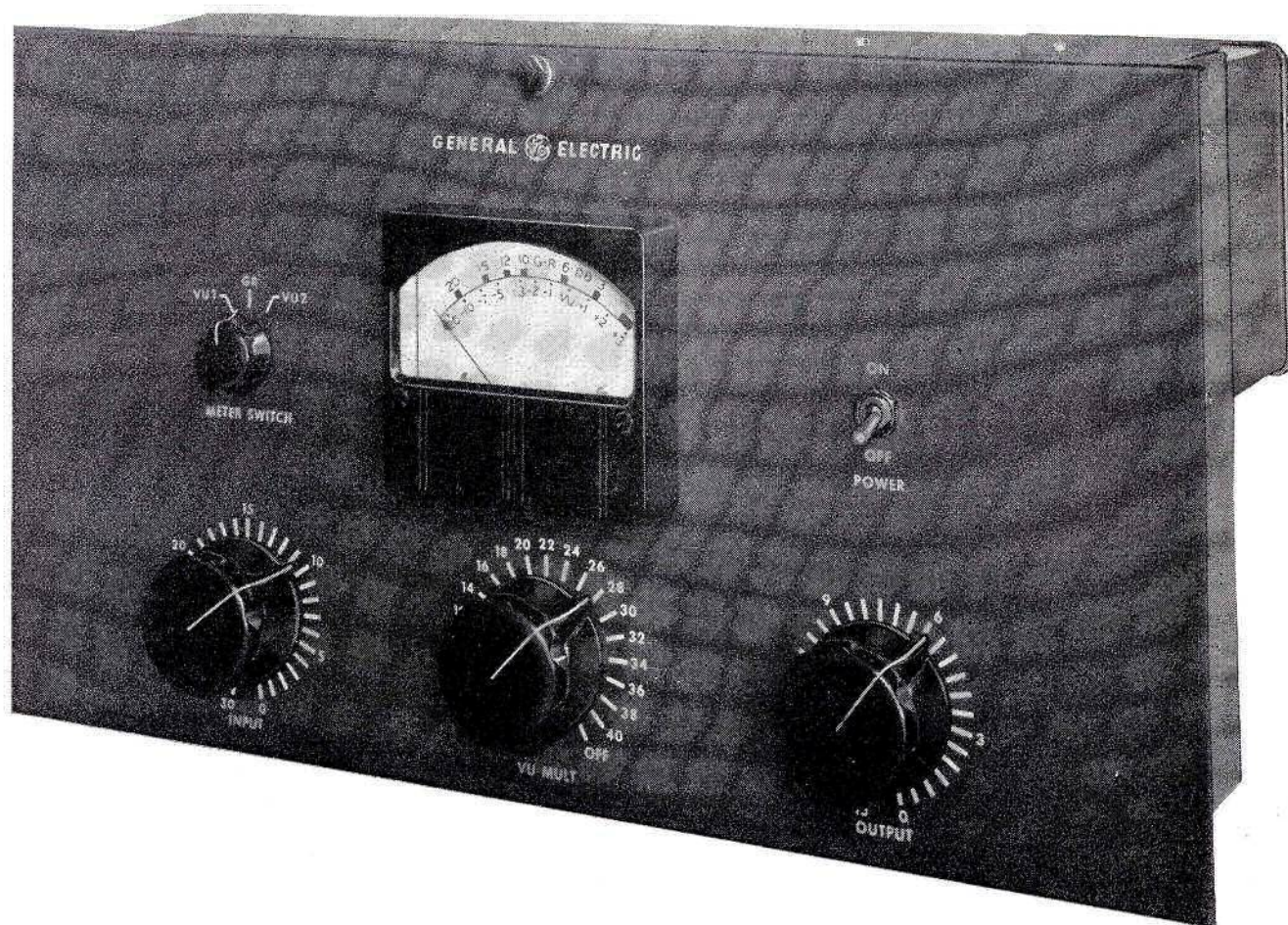
Wm. G. Broughton

GENERAL ELECTRIC's family of automatic gain control (AGC) audio amplifiers cannot — keep up a log — cue up a disc — thread up a tape — open or close a lever key BUT they *can* prevent "gain wandering." These devices refuse to allow your audio to rise above or fall below pre-set limits.

True, AGC does not go to work until the gain is affected. In this respect it is similar to manual gain riding. But AGC goes to work so fast — attack time of all these units is measured in thousandths or millionths of a second — that it is preventive, not corrective.



Get the
GENERAL ELECTRIC **AGC** EQUIPMENT
your
RADIO STATION
needs . . . now!



Type BA-7-A Audiomatic Limiting Amplifier

APPLICATION

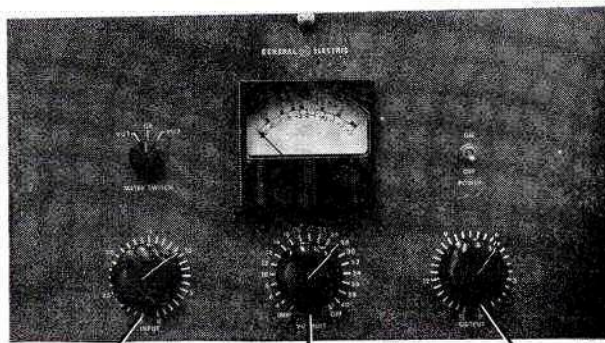
The General Electric BA-7-A Audiomatic Limiting Amplifier is a peak-limiting device designed to permit a substantial increase in the average program level without danger of any audio peaks exceeding a predetermined level.

The output of the BA-7-A Audiomatic Limiting Amplifier is sufficient to drive any RETMA AM, FM, or TV audio transmitter to 100% 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.

FEATURES

1. "Thumping" virtually eliminated. New design uses a new method for eliminating the "thump" component common to limiter actions.
2. 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 G-E BA-5-A Limiter.
3. 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 G-E BA-5-A Limiter.
4. New program controlled recovery circuit utilized. This circuit permits large amounts of gain reduction with a negligible pumping effect.
5. 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.
6. Attack time effectively zero. 70 microsecond attack time is obtained by means of a high speed bias generator.
7. Extremely low transient waveform distortion.
8. Very high compression above threshold of gain reduction action.
9. "Motor-boating" can not occur since automatic control voltage is not a function of the output voltage of the controlled amplifier.
10. Very low steady state distortion and noise level due to inverse feedback circuits.

11. **Instant accessibility.** Vertical rack mounting chassis utilizes single hinged front-cover panel.
12. **Compact.** Entire unit measures only 10½" high by 9" deep, by 19" wide.
13. **Single unit.** All amplifiers and power supply are mounted on the one small chassis.
14. **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.
15. **No matched tubes required.** The BA-7-A Audiomatic Limiting Amplifier uses only 18 tubes—none of which require matching.
16. **Plug-in connections.** All external connections are made on plugs. It is not necessary to solder or unsolder connections when installing or removing amplifier.
17. **Thoroughly shielded.** All transformers, oscillator, and R.F. power amplifier sections, plus tubes in R.F. section, are thoroughly shielded to prevent radiation and interaction.
18. **Excellent frequency response with low distortion up to practical limit of gain reduction.** (See Electrical Specifications.)



Input Level Control VU Meter Attenuator Output Level Control

Front panel of BA-7-A Amplifier

DESCRIPTION

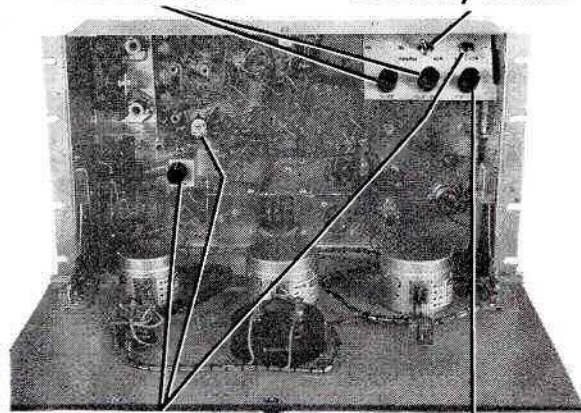
The General Electric Type BA-7-A Audiomatic Limiting Amplifier is designed as a fast-acting, thumpless, peak-limiting audio amplifier. As such it incorporates, among others, two new outstanding features, the first being a new and effective method of eliminating the "thump" component common to all limiter 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 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.

Mechanically, the Audiomatic Limiting Amplifier is complete with power supply on one chassis. As such it requires only 10½" of vertical rack space, and 9" 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 AC power are required for its operation.

Adjustments for Proper Compression Characteristics Selects Dual R.C. or Program Control Recovery Circuit



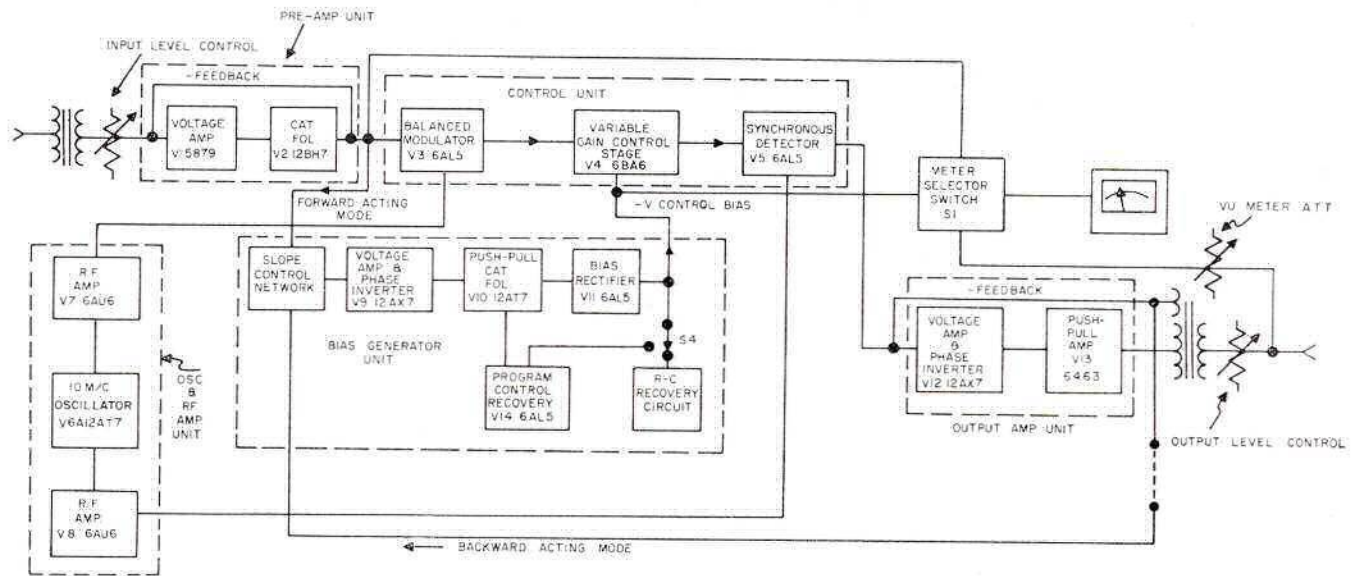
Controls for Adjusting Balance of Modulator Meter Zero Set for Gain Reduction Position

Front view of BA-7-A Amplifier with front panel open to show interior controls

All connections are made by means of a single 10-pin Cinch-Jones plug and a standard AC plug and receptacles, located on the rear of the amplifier chassis. A VU meter is used to measure signal levels and gain reduction.

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 stage. 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. The balanced modulator receives, in addition to the audio signal, 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



Simplified block diagram of BA-7-A Amplifier

voltage amplifier, a phase splitter and then a push-pull cathode follower. The output of the cathode follower is split in two parts, the first being fed to the program control recovery circuit, the second being fed to a full wave rectifier diode. The variable DC voltage resulting from this latter diode's action is then applied to the grid of the variable gain RF stage in the control section. This variable DC voltage has the effect of controlling the amplitude of the audio modulated sidebands. Since there is no carrier present at the grid of this control stage, the low frequency or thump component, created by varying the control voltage, is not passed through the RF circuit and thus is not detected later. These 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.

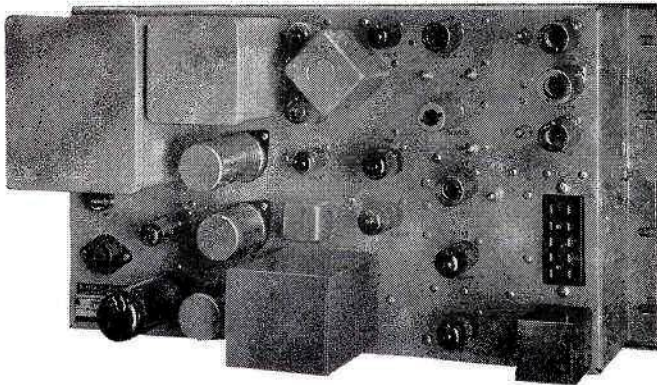
The recommended compression ratio for this amplifier operation is 20:1 when used in either the dual RC or program controlled recovery operational mode. If used as a backward acting amplifier, the recommended compression ratio is 2:1.

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, etc., may be found in the *Electrical Specifications* section.

MECHANICAL SPECIFICATIONS

Units:	1—BA-7-A Audiomatic Limiting Amplifier.
Dimensions:	Height: 10½" (6 Rack Units) Width: 19" Depth: 9" Weight: 42 lbs.
Mounting:	Standard RETMA 19" rack mounting with hinged front panel.
Operating Conditions:	Maximum ambient temperature: 113° F (45 °C). Maximum relative humidity: 95%
Electrical Connections:	Input and output audio signals made through a 10-pin Cinch-Jones plug and receptacle. AC power made through standard AC 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.



Rear view of BA-7-A Amplifier

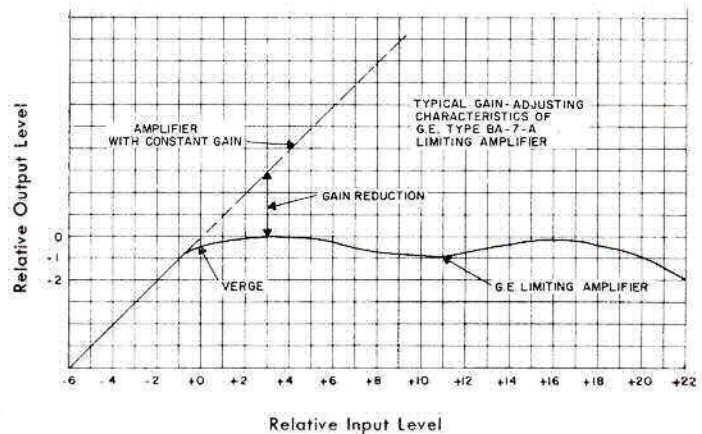
ELECTRICAL SPECIFICATIONS

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 10 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 DC 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 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% or less, 50 to 15,000 cycles From 12 db to 20 db of gain reduction: 1.5% or less, 100 to 15,000 cycles 2.5% or less, 50 to 100 cycles
Attack Time:	Approximately 70 micro-seconds
Compression Ratio:	Forward acting: 20:1 Backward acting: 2:1
Recovery Time:	Dual RC: Approximately 0.5 seconds for short peaks for 63% gain recovery. For sustained or rapidly recurring peaks, the recovery time is approximately the same for 50% recovery and increases to 10 seconds for 90% 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
Signal to Thump Ratio:	-45 db or better
Total Gain (amplifier set at verge of limiting):	57 dbm, ± 2 db.



Inputs:

Power: 110 watts, 110-117-125 volts AC, 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 Level: +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)

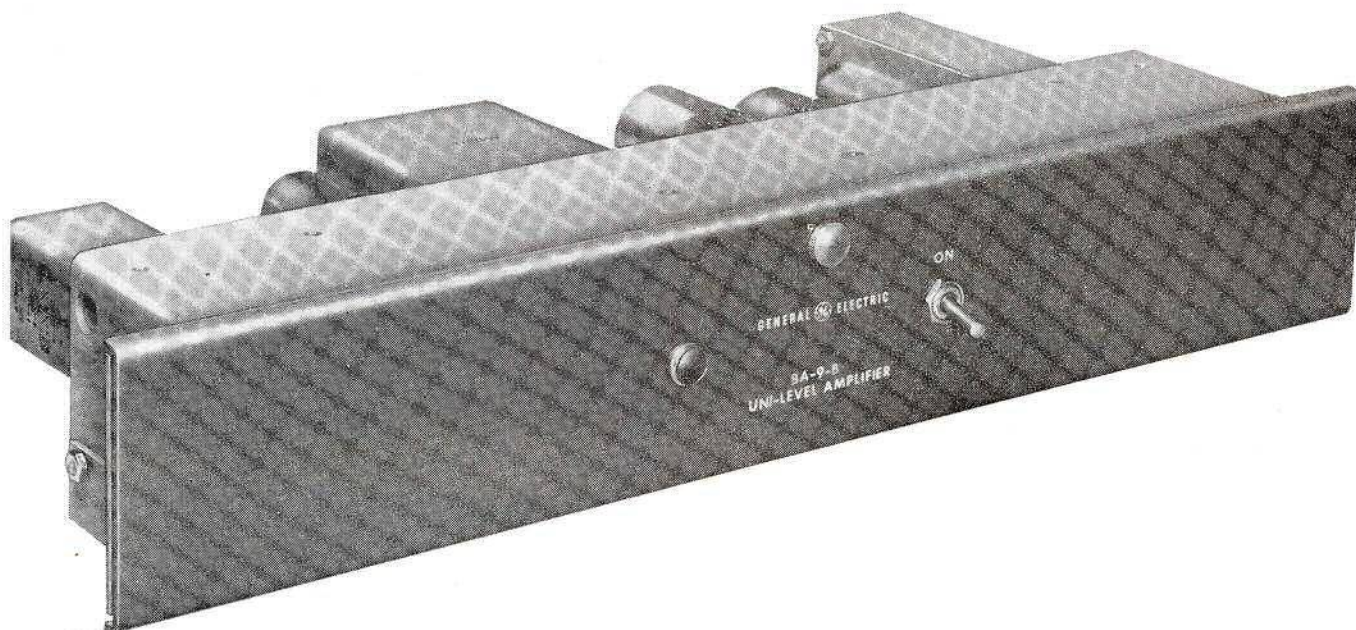
Delay Bias Control (for adjusting gain reduction characteristics)
 Zero Meter Adjust Control (zero setting of meter for gain reduction use)
 Push-Button Balance Check Switch
 Recovery Selector Switch (switches between Dual RC and program controlled recovery)

TUBE COMPLEMENT

1-5879
 1-12BH7
 4-6AL5
 1-6BA6
 2-12AT7
 2-6AU6
 2-12AX7
 1-6463
 1-5U4GA
 1-0B2

ORDERING INFORMATION

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 AC plug, and Installation and Operating Instructions.)



BA-9-B Uni-Level Amplifier

APPLICATION:

The General Electric Type BA-9-B Uni-Level Amplifier is a rack mounted, AC powered version of the familiar and popular 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.

In radio and TV stations it 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, for expander-compressor operation (including automatic fading of music for voice-over-music announcements) or as a straight program amplifier.

In sound recording studios it 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.

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 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 Application section for detailed suggested use.)

FEATURES:

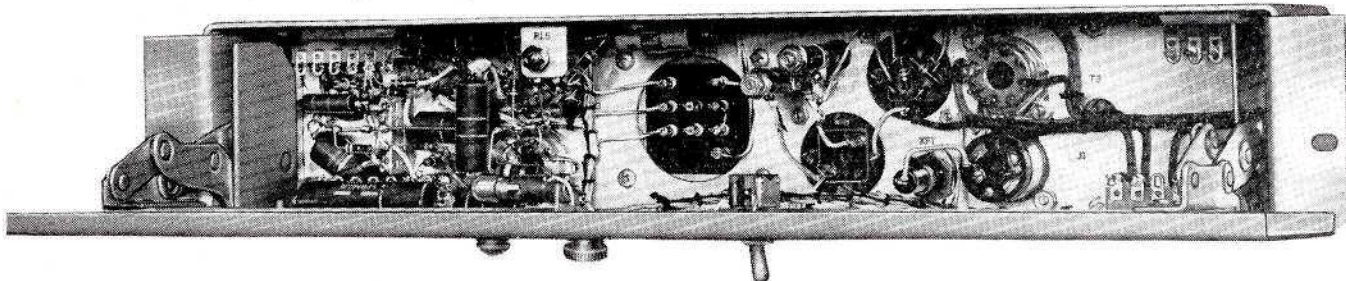
1. **AC Powered.** Requires only 110-125 volt AC power for operation.
2. **Conserves Rack Space.** Will mount in any standard rack, utilizing only 3½ in. (2 RU) of vertical height.
3. **Extremely versatile.**
 - a. **Permits unattended remote audio operation.** This amplifier used on an incoming remote line automatically controls level variations from an unattended remote amplifier. (See Fig. 3—Typical Applications.)
 - b. **Controls level differences between two or more program sources.** Level differences automatically controlled between:
 - Turntables and/or projector outputs.
 - Network incoming signal (when properly padded) and projectors, turntables, or announce mike pre-amps.
 - c. **May be used as a program line compressor.**
 - d. **May be used as an automatic master gain control for program line.** (See Fig. 1—Typical Applications.)
 - e. **May be used as a microwave input audio control.** (See Fig. 4—Typical Applications.)
 - f. **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.
 - g. **May be used as an automatic fader control.** (See Fig. 2—Typical Applications.)
 - h. **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.

4. Functionally interchangeable with G-E BA-12-C Plug-In Program/Monitor Amplifier when used for program purposes.
5. Used as a peak level control, amplifier will operate over a 30 db range with only a 10 db change in output.
6. 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.
7. Variable threshold level. Amplifier will operate with the threshold level set at any output between +10 dbm and +30 dbm.
8. Average Program/Dual Recovery connection permits use of amplifier as an average level control or as a peak level control.
9. Dual time constant eliminates program "pumping." Recovery time is an automatic function of program material.
10. Easily Serviced. All components exposed for easy service when hinged front panel is opened.

recurring peaks, approximately 0.9 second is required for 40 per cent of gain recovery, increasing automatically up to about 34 seconds for 90 per cent 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 per cent 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 DC bias to the control grids of a G-E Type GL-6386 tube (a dual remote cutoff triode).



BA-9-B Uni-Level Amplifier (Front View, Panel Open)

DESCRIPTION:

Essentially, the BA-9-B Uni-Level Amplifier is the AC powered, rack-mounted version of its plug-in counterpart, the BA-9-A Uni-Level Amplifier. Other than its mounting and power supply, it is identical in performance and specification with the BA-9-A Uni-Level Amplifier.

The BA-9-B Uni-Level Amplifier is an automatic level control device designed to functionally replace or supplement the 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 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 per cent recovery of gain after the signal has dropped below the gain reducing level. For sustained or rapidly

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 in., width 19 in., and depth 7½ in. Weight is approximately 12 lbs.

MECHANICAL SPECIFICATIONS:

Units:

One BA-9-B Uni-Level Amplifier.
One miniature motor base plug for AC power.

Dimensions: (Over-all).

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

Mounting:

Standard RETMA 19 in. Cabinet rack mounting.

Operating Conditions:

Maximum ambient temperature: 113° F (45° C).
Maximum relative humidity: 95 per cent.

Electrical Connections:

AC 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. AC switch provided on panel for independent operation of unit. Pilot, light on front panel indicated amplifier operation. AC power-fused.

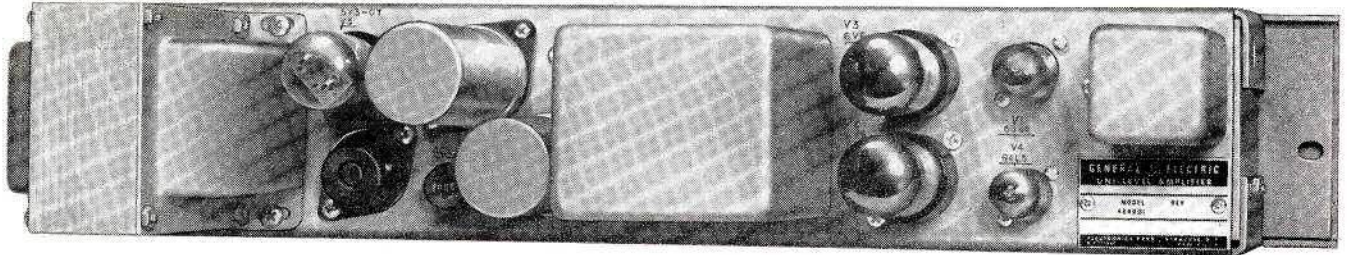
Output noise: Less than -50 dbm. (With 6V6GT)
 -55 dbm. (With 5881)

Attack time:

Dual Average
 11 milliseconds 62 milliseconds

Recovery time: (Dual)

Single short peaks: 0.9 second for 63 per cent of recovery.
 Sustained peaks: 0.9 second for 40 per cent recovery.
 34 seconds for 90 per cent recovery. (Average)
 13 seconds for 90 per cent recovery.

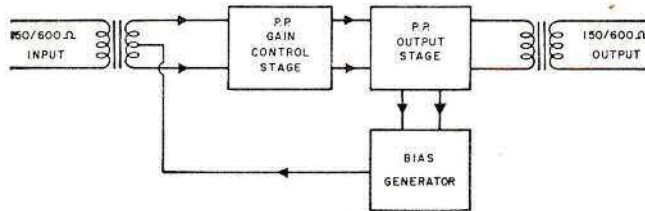


BA-9-B Uni-Level Amplifier (Rear View)

ELECTRICAL SPECIFICATIONS:

Circuit Operation:

Consists of a G-E 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 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, 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 per cent or less; from 50 to 100 cycles the distortion rating is 2 per cent or less.

Inputs:

Power: 117 volts AC 50/60 cycle, 65 watts. (Note: B+ voltage is adjustable to 300 volts DC for AC inputs varying between 110-125 volts.)

Signals:

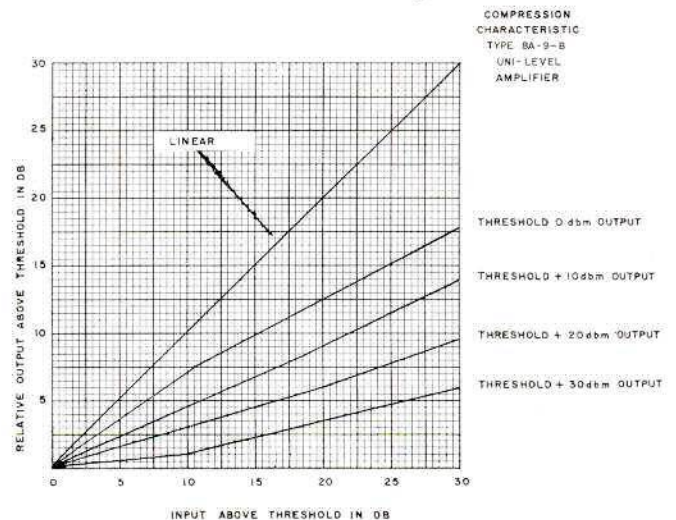
Threshold control @ 0 dbm output: -54 dbm to -24 dbm input.
 Threshold control @ 20 dbm output: -34 dbm to -4 dbm input.
 Threshold control @ 30 dbm output: -24 dbm to +6 dbm input.

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.)

External VU Meter:

Solder lugs on terminal strip.

Controls: Threshold setting.

TUBE COMPLEMENT:

1—GL-6386

1—6AL5

2—6V6GT

1—5Y3GT

ORDERING INFORMATION:

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-in. 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, BA-9-B Uni-Level Amplifier

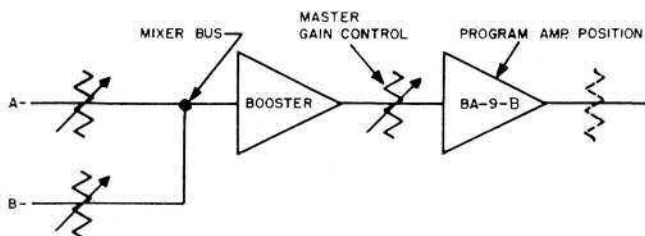


Fig. 1. The BA-9-B Uni-Level Amplifier as an Automatic Level Control Amplifier

The application of automatic level control to a studio system is outlined in Figure 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.

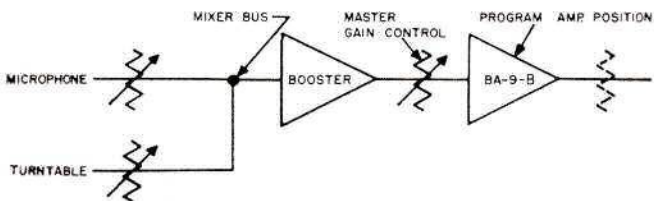


Fig. 2. Using the BA-9-B Uni-Level Amplifier as an Automatic Fader Control

The use of the "Uni-Level" Amplifier as an automatic fader control is outlined in Figure 2. In this application, the turntable signal level should be set so that it results in a GR scale reading of about 2 to 3 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 7 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.

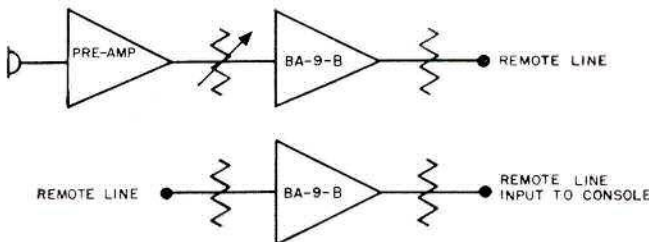


Fig. 3. Unattended Remote Operation

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.

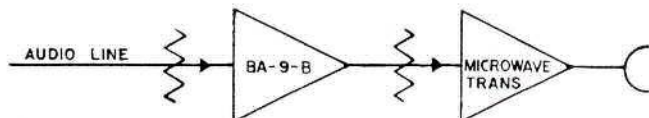
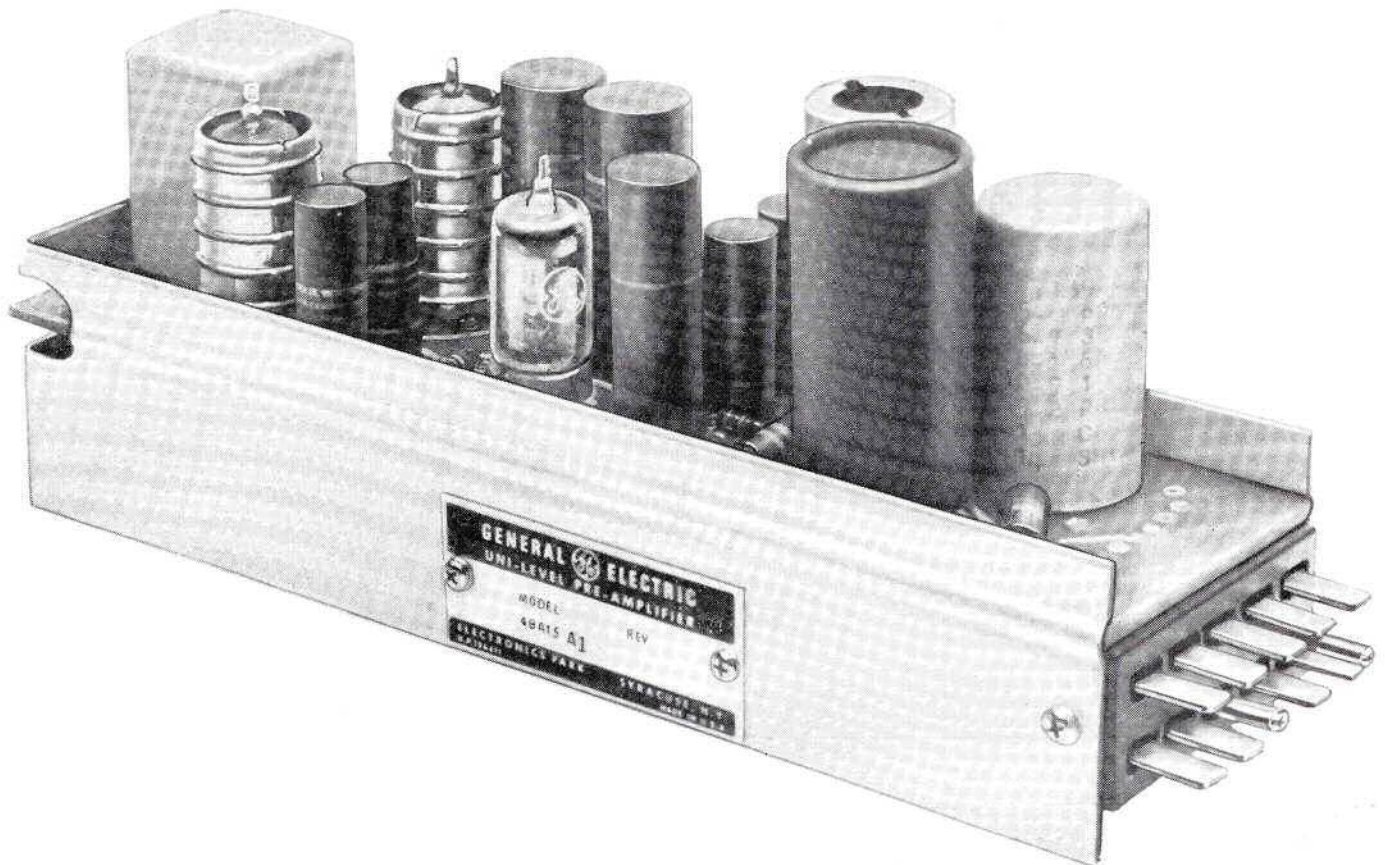


Fig. 4. Microwave Relay Application of the Uni-Level

The Uni-Level Amplifier can be used to prevent excessive audio variations in an audio line feeding the audio input of a mocrwave system. Such an application is shown in Figure 4.



APPLICATION

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 BA-1-F or 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.

FEATURES

1. **Extremely versatile.**
 - a. *Relieves operators* by permitting automatic level control in any microphone channel.
 - b. *May be used in variety of applications* in AM-FM-TV-Recording studios, such as announce booths, boom mikes and public address systems.
 - c. *Controls level difference* between two or more microphone signals.

- d. *Automatic Gain Control is applied* when the microphone signal to the amplifier is -70 dbm or higher. Signals below -70 dbm are linearly amplified.
2. **High gain**—60 db vs. 40 db gain for standard pre-amplifiers.
3. **Plug-in construction** allows easy removal of pre-amplifiers for servicing.
4. **Small compact design.** Six of these units can be mounted in 7" of rack space.
5. **Tubes are shielded** by easily removed tube shields.
6. **Transformers** are of hum-bucking coil construction with magnetically shielded cases.
7. **Prevents blasting** when two or more people are using same microphone.
8. **Automatically adjusts** audio level from close-in to 6 or 8 feet from microphone.

DESCRIPTION

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 (GL6386). 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 $4\frac{3}{4}$ "
Width $2\frac{1}{2}$ "
Length $10\frac{1}{2}$ "
Weight $1\frac{1}{2}$ 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 BA-1-H. It may be used to replace a BA-1-F or H, or any similar amplifier used as a microphone pre-amplifier of any studio audio system.

Mounting: 6 Uni-Level Pre-Amplifiers can be mounted in 7" 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% 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 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 .5%—50 to 15,000 cps. With 30 db gain reduction 50 to 15,000 cps 1%.

Output Noise: -60 dbm.

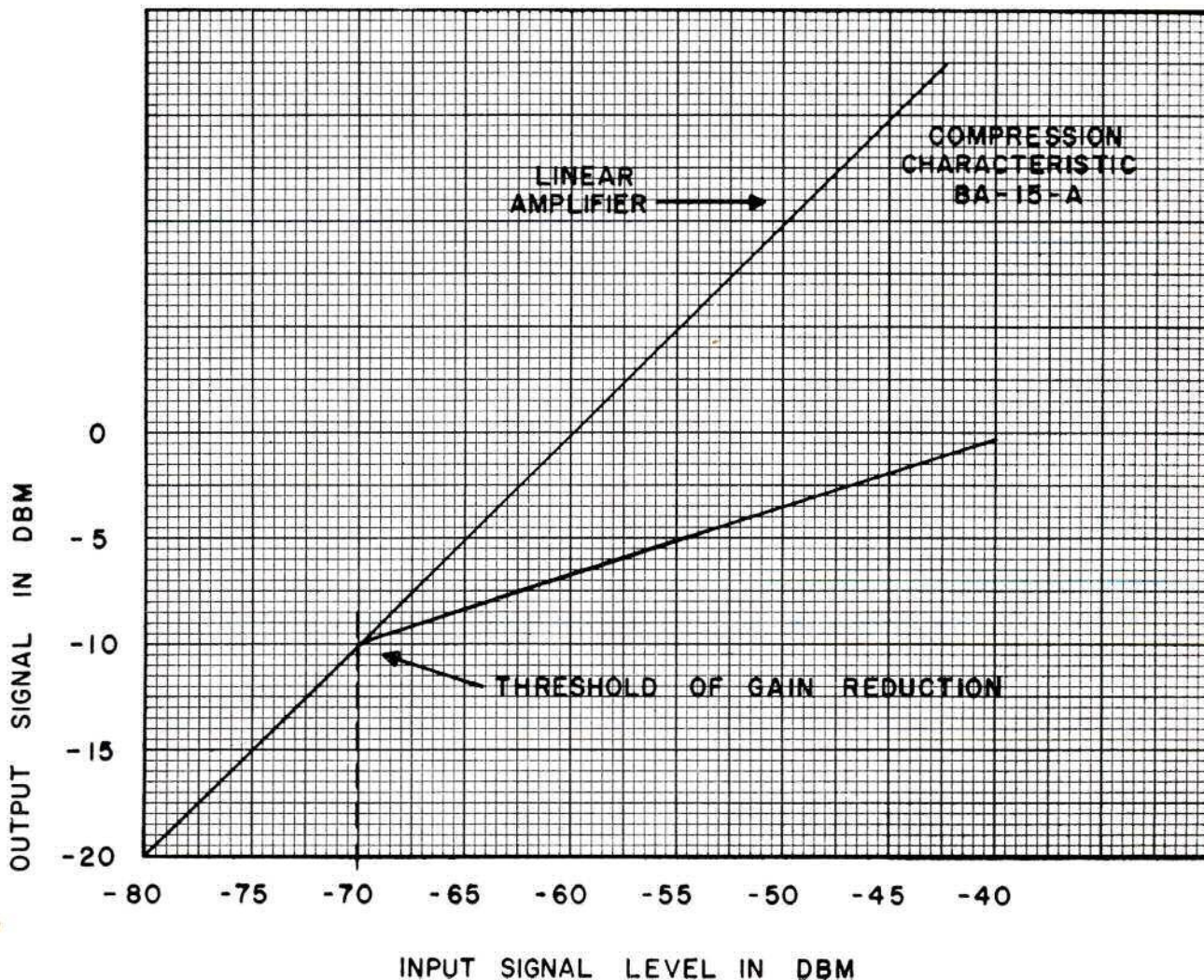
Attack Time: 1 millisecond

Recovery Time: .9 seconds for 63% recovery.

Power Requirements:

300 V DC 25 ma approximately.

6.3 V AC@1.30 amps +20 to +50 V DC bias on filaments. 15.7 watts. (The 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—GL6386

1—6AL5

1—GL5670

ORDERING INFORMATION

When ordering specify:

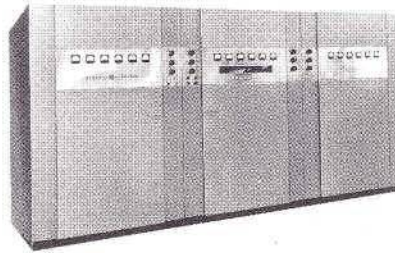
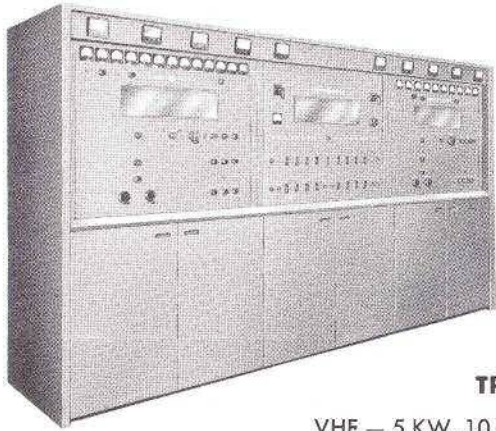
Type BA-15-A Plug-In Uni-Level Pre-Amplifier to consist of one amplifier; one set of operating tubes and installation and operating instructions.

ACCESSORIES

1—FA-23-B Shelf (Mounts 6 BA-15-A Amplifiers)

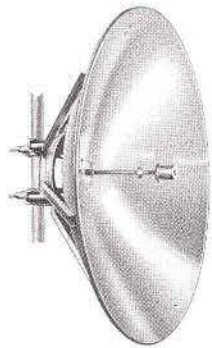
1—BP-10-B Power Supply will supply 5 BA-15-A amplifiers.

**Complete Broadcast Equipment
for the Complete Broadcast Station**



TRANSMITTERS

VHF — 5 KW, 10 KW, 35 KW, 50 KW, 100 KW
UHF — 100 W, 1 KW, 12 KW, 23 KW, 45 KW



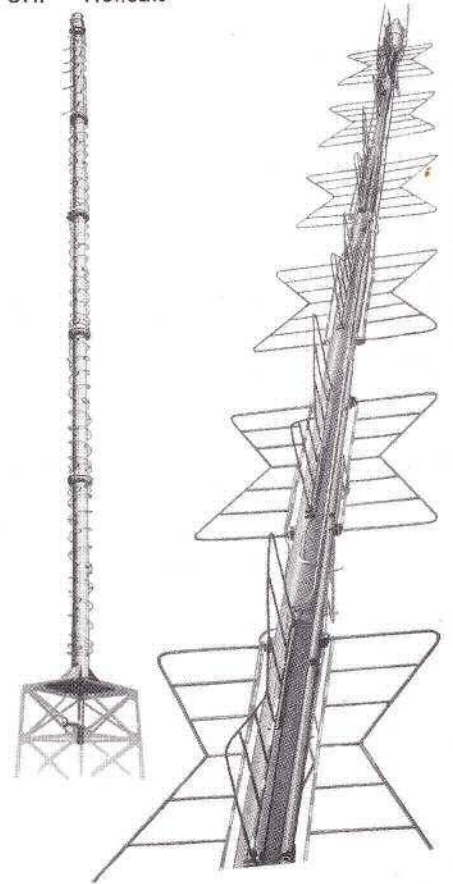
MICROWAVE Links

2000 mc. Diplexed Signal



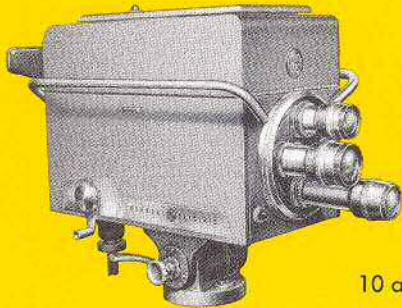
ANTENNAS

UHF — Helicals

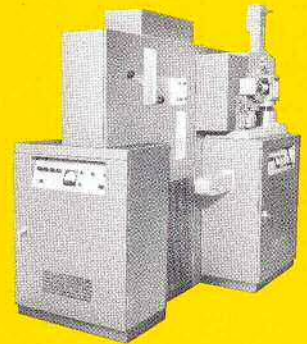


VHF — Batwings and Helicals

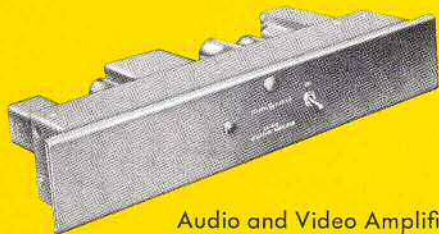
STUDIO



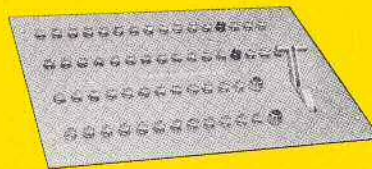
10 and Vidicon Cameras



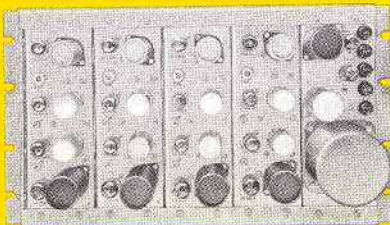
Film Scanners for Monochrome and Color

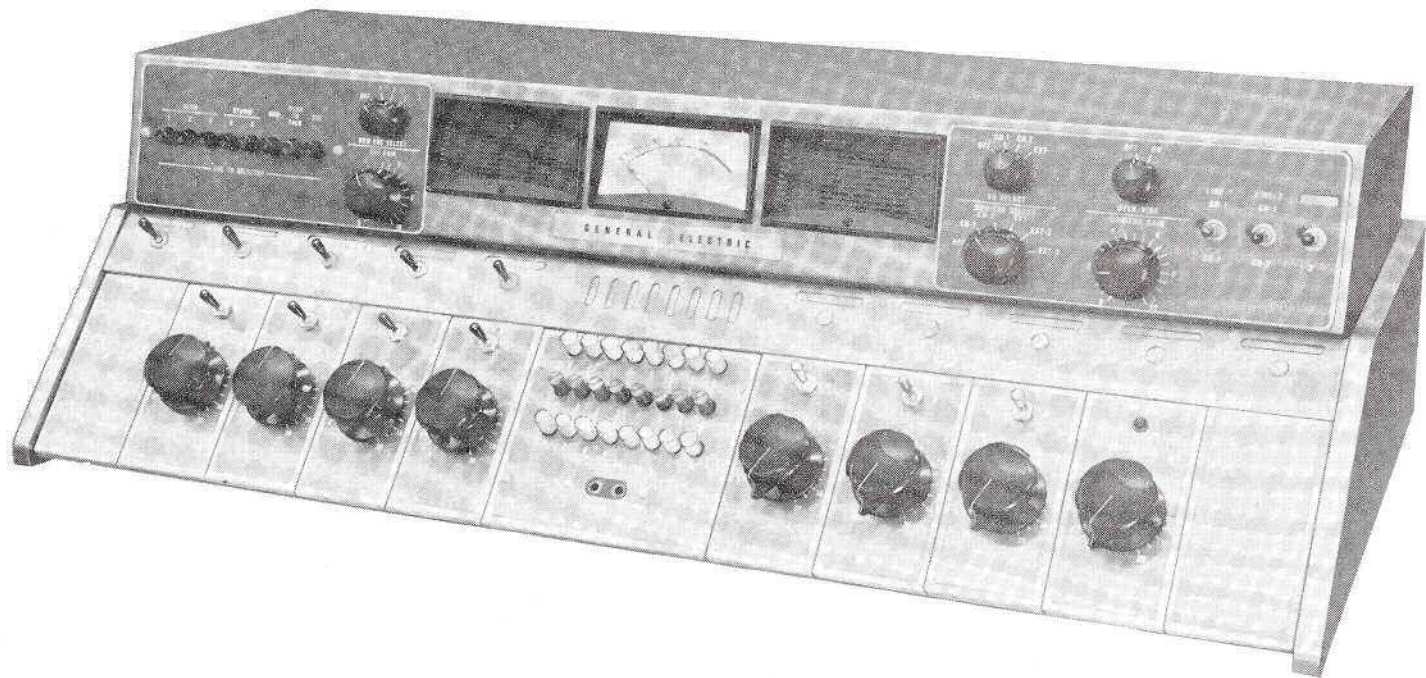


Audio and Video Amplifiers



Complete Audio and Video Control Systems
and All Accessories





Type BC-21-A Transistorized Audio Console

APPLICATION

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.

FEATURES

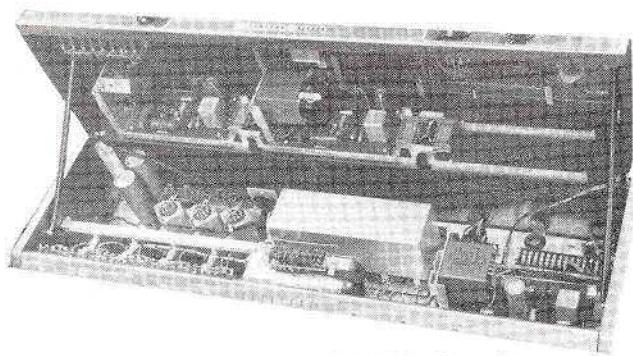
- Completely transistorized—not a tube in the circuitry.
- Use of transistors eliminates need for special cooling provision.
- Complete plug-in facilities for all amplifiers, and relay modules. Amplifiers may be quickly and easily removed or replaced during service operations.
- Buy as you need. Console can be operated with less than full complement of preamplifiers. Buy the basic package, add more later as you expand operations.
- Clean, “crackle-free” switching. 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.
- Records, tapes and transcriptions easily cued. The OFF position of hi-level attenuators equipped with cue switch to feed input to cue amplifier.

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 25v Power Supply and the Type BP-21-A 50/25v 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

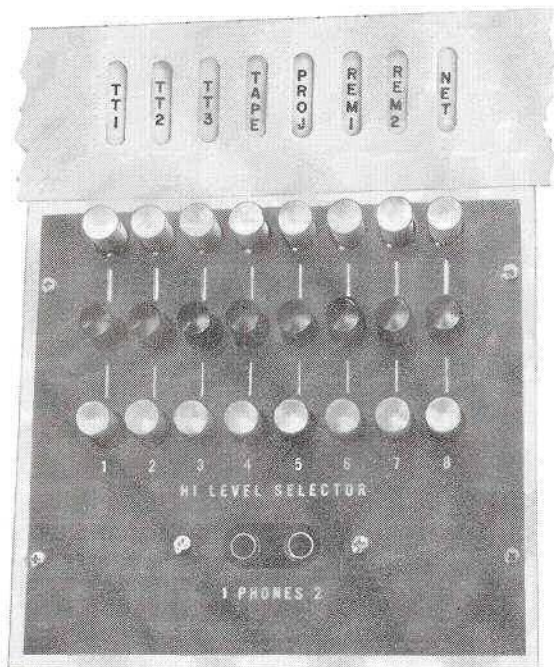


Console open showing Cue/Talkback and Program Amplifiers mounted in swing-up top and Monitor Amplifier in bottom of console at right. (Note: Mounting space for additional Program Amplifier in top at right.)

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 8 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.



High Level Input Selector Panel

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

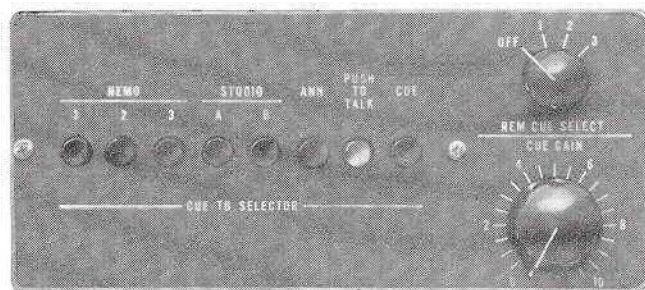
for the installation of a second program amplifier for dual channel operation.

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 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 mike 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.



Cue/Talkback Selector and Gain Control Panel

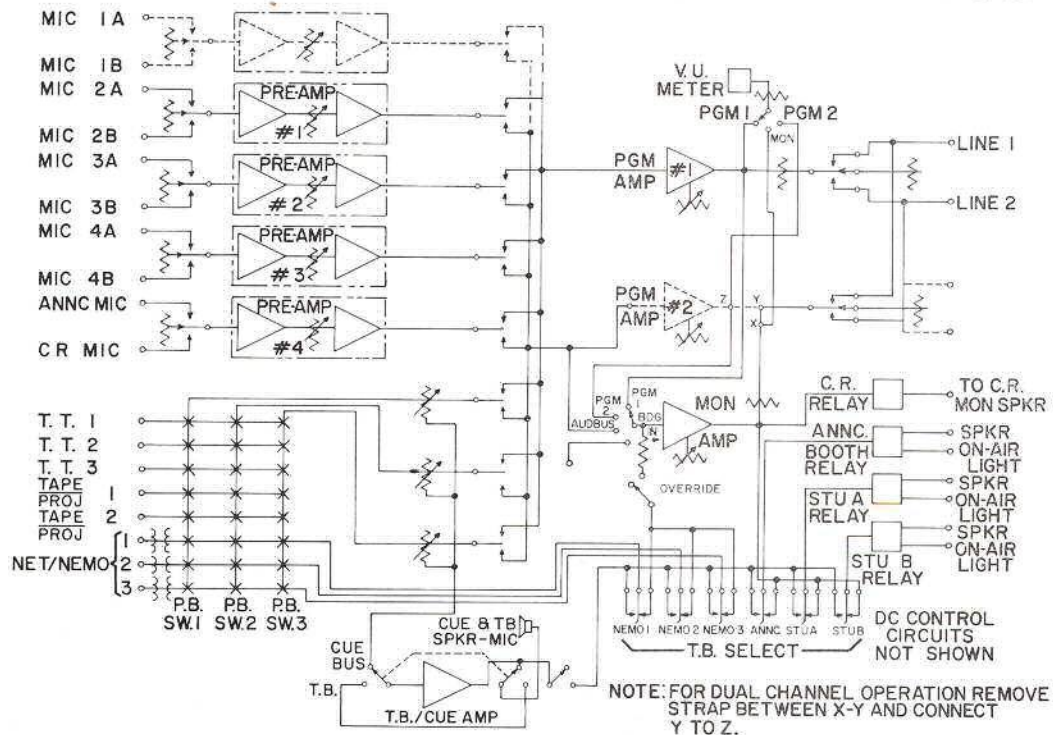
For cue purposes, the talkback amplifier doubles as the cue amplifier. Cue faders are used in the three high level mixer positions. The cue output of these faders is connected to a common bus brought up to a position on the cue/talkback selector switch.

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



Line Diagram of Type BC-21-A Transistorized Audio Console. Note how easily it can be modified for Dual Channel operation

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
- (e) EXT 2 terminals for connection to 3 remote
- (f) EXT 3 audio circuits.

MECHANICAL SPECIFICATIONS

Units: Type number covers the console assembly, 4 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.

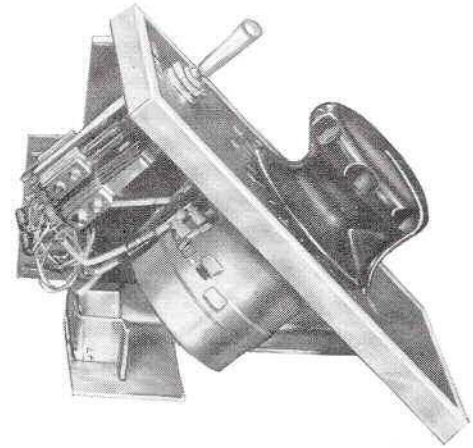
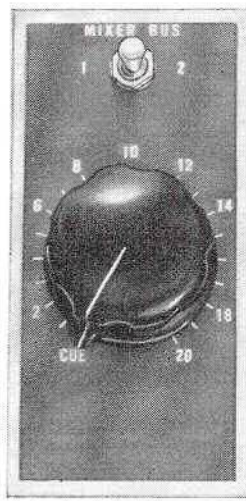
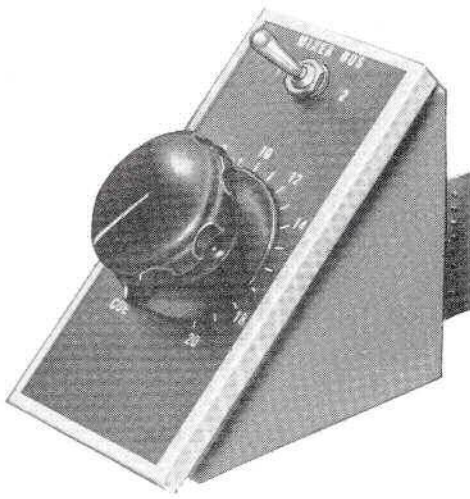
Dimensions: (Exterior console dimensions)

Height	Length	Depth	Weight
11 in.	38 in.	17 in.	75 lbs.

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 in one of the



Monitor, VU Meter and Line Output Control Panel



High Level Plug-in Module

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—8-Position Push-button Selector Switches for high level sources
- 3—High Level Mixers and Mixer Keys
- 1—Master Gain Control
- 1—Monitor Selector Switch
- 1—Monitor Gain Control
- 1—V.U. Meter Selector Switch
- 2—Output Keys
- 1—8-Position Push-button Cue/Talkback 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 at "2 o'clock").

Crosstalk (Nominal):

- At least 50 db down, 50-15,000 cps.
- At least 80 db down, at 1000 cps.

Distortion: 1% or less at +18 dbm (after 6 db pad).

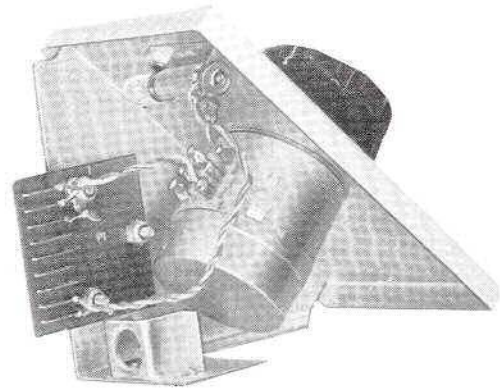
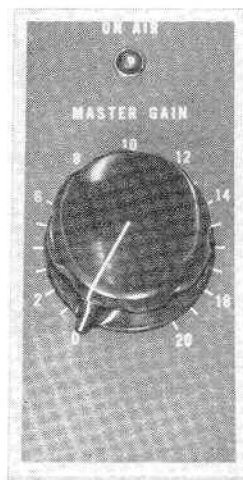
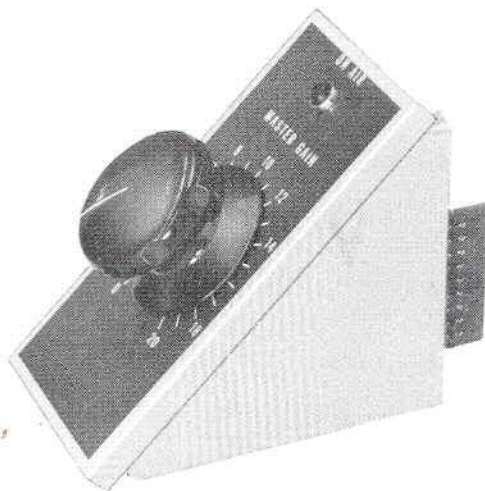
Monitor Circuits

- Frequency Response: ± 1 db, 50 to 15,000 cycles.
- Distortion: 1½% at +33 dbm.

Power Requirements: 110/117/125 volts, 50/60 cycle, single phase, AC, 90 watts (45 watts each power supply).

25 volts, DC at 1 amp for the monitor amplifier and control relays, from the Type BP-20-A Power Supply.

50 volts, DC at 500 ma for program amplifier and cue/talkback amplifier as well as 25 volts, DC at 40



Master Gain Control Module

ma for the preamplifiers from the Type BP-21-A Power Supply.

Signal Inputs:

Impedances

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 Monitor: 3—20,000 ohms, balanced, bridging.

External VU: 1—7500 ohms, balanced, bridging.

Levels

Low Level Inputs—Microphone level to -25 dbm.

High Level Inputs— -10 to +18 dbm

Signal Outputs:

Impedances

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 G.E.

3—2N441 Delco

25—2N324 G.E.

6—1N538 G-E Silicon Diode

10—2N320 G.E.

2—CTP 1133 Clevite

2—2N553 Delco

ORDERING INFORMATION

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

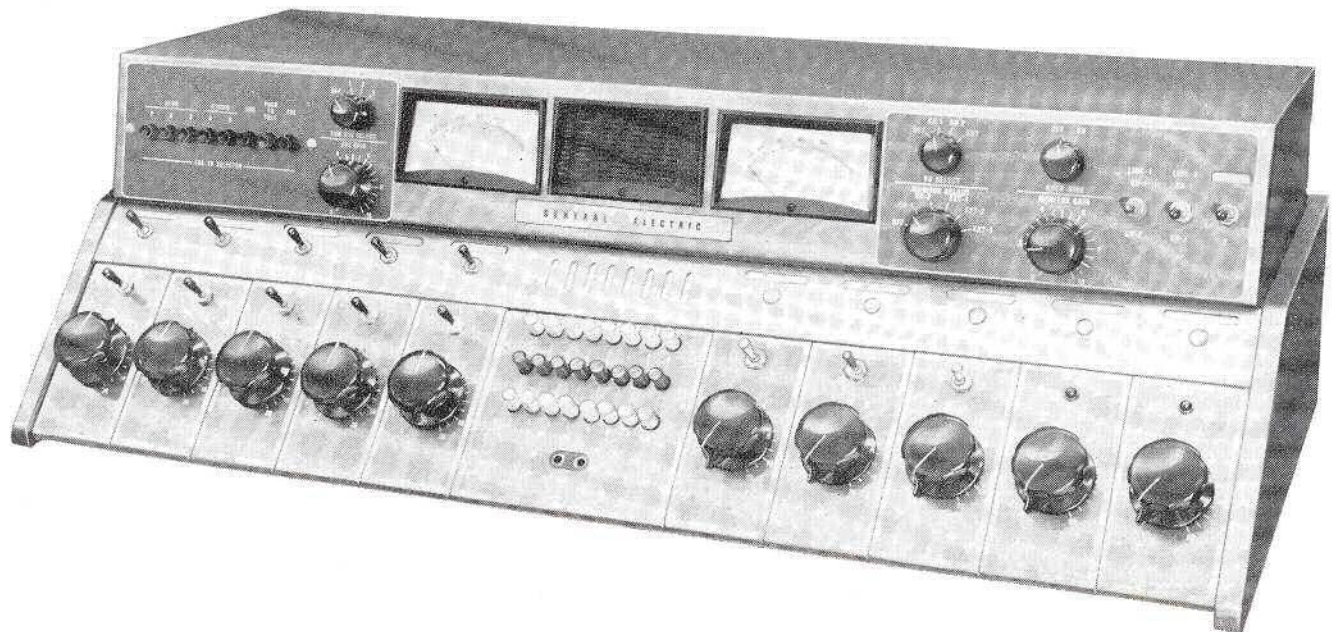
ACCESSORIES

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)



Type BC-21-A Transistorized Audio Console for Dual Channel Operation

BROADCAST AND TV STUDIO EQUIPMENT PRICE LIST
 BROADCAST EQUIPMENT DATA BOOK

FEBRUARY 15, 1959

Section E 211

PAGE	TYPE NUMBER	EQUIPMENT	PRICE
35	BC-21-A	AUDIO CONTROL FACILITIES, SINGLE CHANNEL Includes	2,500.00
	BA-21-A	(4) Preamplifier @ \$140.00 each	560.00
	BA-22-A	Program Amplifier	175.00
	BA-24-A	Monitor Amplifier	240.00
	BA-28-A	Coe/Talkback Amplifier	160.00
50	BP-20-A	25V Power Supply	190.00
51	BP-21-A	50V Power Supply	190.00
	FA-47-A1	Line to Line Transformer for use with BC-21-A	28.50
	7164636-1	Master Gain Control Module	75.00
113-1	BA-1-H	Pre-amplifier	97.50
13	BA-12-C	Program Amplifier	125.00
13	BA-12-C	Monitoring Amplifier	125.00
54	BP-10-B	Power Supply	105.00
54	FA-22-F	Tray	9.75
75	FA-23-B	Shelf for BP-10-B	45.00
32	FA-45-A	Relay Assembly, plug-in	69.00
14	BA-9-A	Unilevel amplifier, plug-in	140.00
114	BA-15-A	Unilevel preamplifier plug-in	175.00
	PR-18-A	Desk	350.00
76	FA-19-J	Audio Cable 2#16 stranded 500 ft. roll	64.00
76	FA-19-M	Audio Cable 2#22 solid 500 ft. roll	30.00/
76	FA-19-R	Audio Cable 2#22 stranded 500 ft. roll	30.00/
	7477541-1	Daven Zero Set Pad	12.85
	7477541-4	Daven Meter Pad	14.00
	7774619-1	Weston VU Meter for Magnetic panel	61.00
	7774619-2	Weston VU Meter for non-magnetic panel	61.00
	BA-206	Double Headset (Brush)	19.80
	7145256	Console Control Relay Kit	135.00

Prices are net f.o.b. point of shipment and do not include sales, use, excise or similar taxes.

Prices are subject to change without notice.

Where tubes are required, price includes one set.

/Indicates correction or addition to former price list.

Section E 211

PAGE	TYPE NUMBER	EQUIPMENT	PRICE
AUDIO CONTROL CONSOLE ACCESSORIES			
14	BA-9-A	Unilevel Amplifier	\$ 140.00
114	BA-15-A	Unilevel Preamplifier	175.00
54	BP-10-B	Power Supply	105.00
54	FA-22-F	Tray	9.75
75	FA-23-B	Shelf	45.00
32	FA-45-A	Relay Assembly Plug in	69.00
75	FA-46-A2	Shelf (FA-23-B less front panel and hinges)	30.00
	PR-16-B	Base Cabinet	230.00
	7477541-1	Daven Zero Set Pad	12.85
	7477541-4	Daven Meter Pad	14.00
	7774619-1	Weston VU Meter for Magnetic Panel	61.00
	7774619-2	Weston VU Meter for non-magnetic panel	61.00
	BA-201	Single Headset, Brush	7.65
	BA-206	Double Headset, Brush	19.80
	714526	Console Control Relay Kit	135.00

AUDIO AMPLIFIERS, POWER SUPPLIES
 AND ACCESSORIES

113-1	BA-1-H	Preamplifier Plug-in	97.50
75	FA-23-B	Shelf for BA-1-H	45.00
11	BA-3-A	Equalized Transcription Preamplifier	150.00
	BA-6-B	Portable Amplifier	765.00
112	BA-7-A3	Audiomatic Limiting Amplifier	1,000.00
14	BA-9-A	Unilevel Amplifier, Plug-in	140.00
75	FA-23-B	Shelf for BA-9-A	45.00
19	BA-9-B	Uni-level Amplifier, Rack Mounted	200.00
13	BA-12-C	Program/Monitor Amplifier Plug-in	125.00
75	FA-23-B	Shelf for BA-12-C	45.00
110	BA-14-A	Program/Monitor Amplifier Plug-in	250.00
75	FA-23-C	Shelf for BA-14-A	55.00
114	BA-15-A	Unilevel Preamplifier	175.00
75	FA-23-B	Shelf for BA-15-A	45.00
54	BP-10-B	Power Supply, Plug-in	105.00
75	FA-23-B	Shelf for BP-10-B	45.00

Prices are net f.o.b. point of shipment and do not include sales, use, excise or similar taxes.

Prices are subject to change without notice.

Where tubes are required, price includes one set.

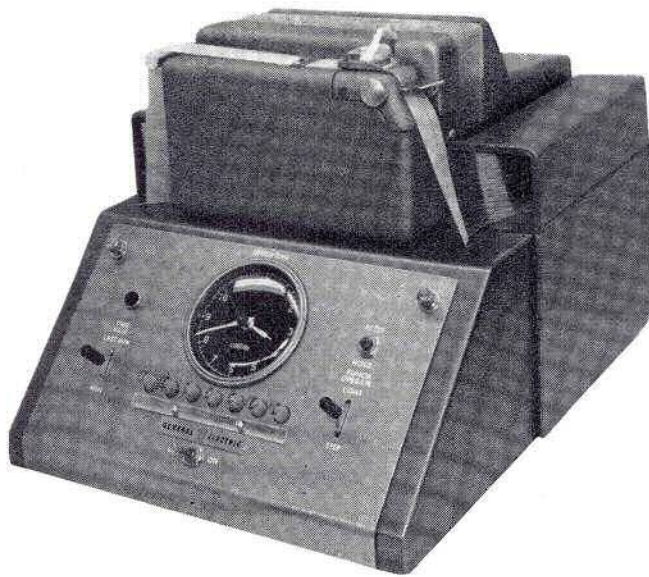
Section E 211

PAGE	TYPE NUMBER	EQUIPMENT	PRICE
LOUDSPEAKERS, TAPE RECORDERS AND TRANSCRIPTION EQUIPMENT			
40	FS-1-B	MONITOR SPEAKER Includes	\$ 165.00
40	FS-4-A	Cabinet	135.00
41	1201-A	Speaker	23.75
74	FA-42-A	Line to voice Coil Transformer	7.00
40	FS-2-B	WALL SPEAKER Includes	48.00
40	FS-3-A	Wall Housing	17.50
41	1201-A	Speaker	23.75
74	FA-42-A	Line to Voice Coil Transformer	7.00
41	850	8" Loudspeaker	10.95
41	1201-A	12" Loudspeaker	23.75
41	1203-A	12" Loudspeaker	17.75
11	BA-3-A	Equalized Transcription Preamplifier	150.00
11	FA-26-A	Plug in Adaptor for BA-3-A	6.00
63	FA-12-B	Transcription Equalizer	57.50
61	4GS-01D	Single Stylus Cartridge (1 Mil. Diamond)	20.50
61	4GS-02D	Single Stylus Cartridge (2.5 Mil. Diamond)	20.50
61	4GD-01D-02D	Dual Stylus Cartridge (1 Mil. 2.5 Mil Diamond)	33.50
	530	16" Turntable, 3 speed, less arm and pickup Direct Drive, Fairchild	629.50
	T-18-H	12" Turntable, 3 speed, less arm and pickup Rim Drive, Presto	131.00
	T-68-H	16" Turntable, 3 speed, less arm and pickup Rim Drive, Presto	170.00
	TC-200	Console Cabinet for Presto Turntables	150.00
	MB-201	Mounting Board for Presto T-18-H	27.00
	MB-202	Mounting Board for Presto T-68-H	27.00
	B-12-H	12" Turntable, 3 speed, less arm and pickup Rim Drive, Rek-o-Kut	129.95
	C-7BT	Console Cabinet for Rek-o-Kut B-12-H	124.95

Prices are net f.o.b. point of shipment and do not include sales, use, excise or similar taxes.

Prices are subject to change without notice.

Where tubes are required, price includes one set.



APPLICATION

The Type BC-16-A Automatic Program Control System provides television stations with a means to automatically time and control the switching of film, slide, audio tape and network sources.

In the AM or FM radio station application, it may be used to automatically control the playback of audio tape, operate automatic turntables, and switch to either network or local programs.

FEATURES

1—Operating costs reduced by:

- a. Preventing human errors in switching during station breaks.
- b. Preparation of programs in advance, by stenographic personnel and using low cost paper tape. (About 6" of tape per hour continuous programming.)
- c. Relieving technicians of manual switching, so they can devote full time to checking quality of output signals.

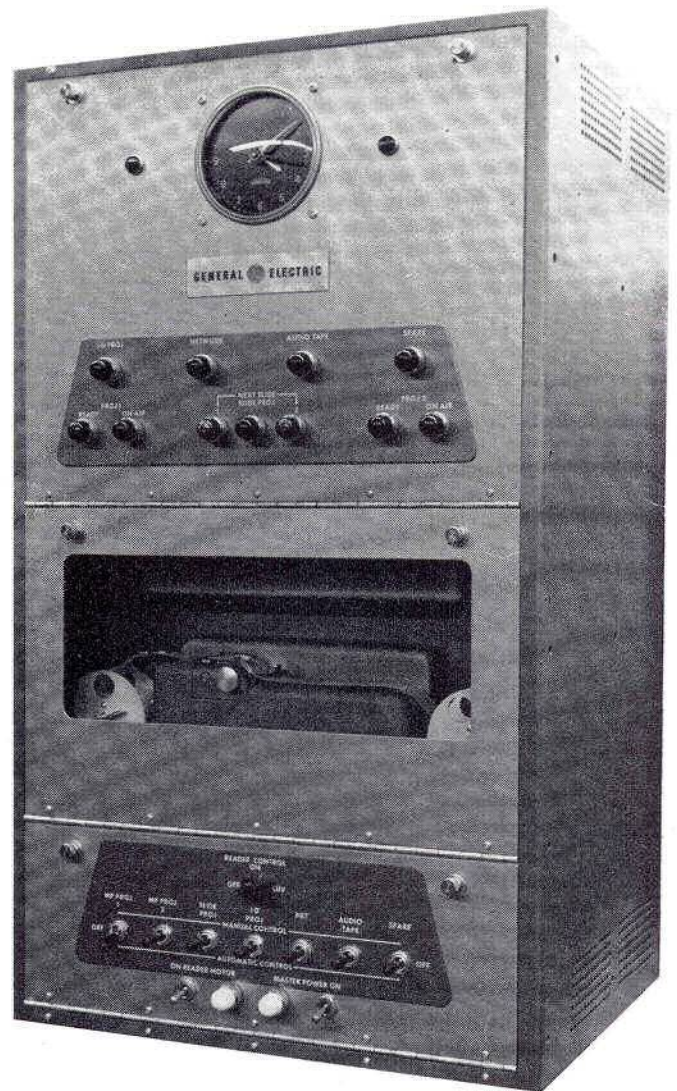
2—Operation—Simple, flexible, reliable.

- a. Controls up to seven different operations.
- b. Designed for continuous or intermittent program operation.
- c. Provides manual over-ride controls and adjustable time delay projection control circuits.
- d. Visual indicators of program source and timing.
- e. Built-in power supply in control unit.

DESCRIPTION

Type BC-16-A Automatic Program Control System consists of a Type BC-17-A Tape Editor and a Type BC-18-A Reader-Control Unit.

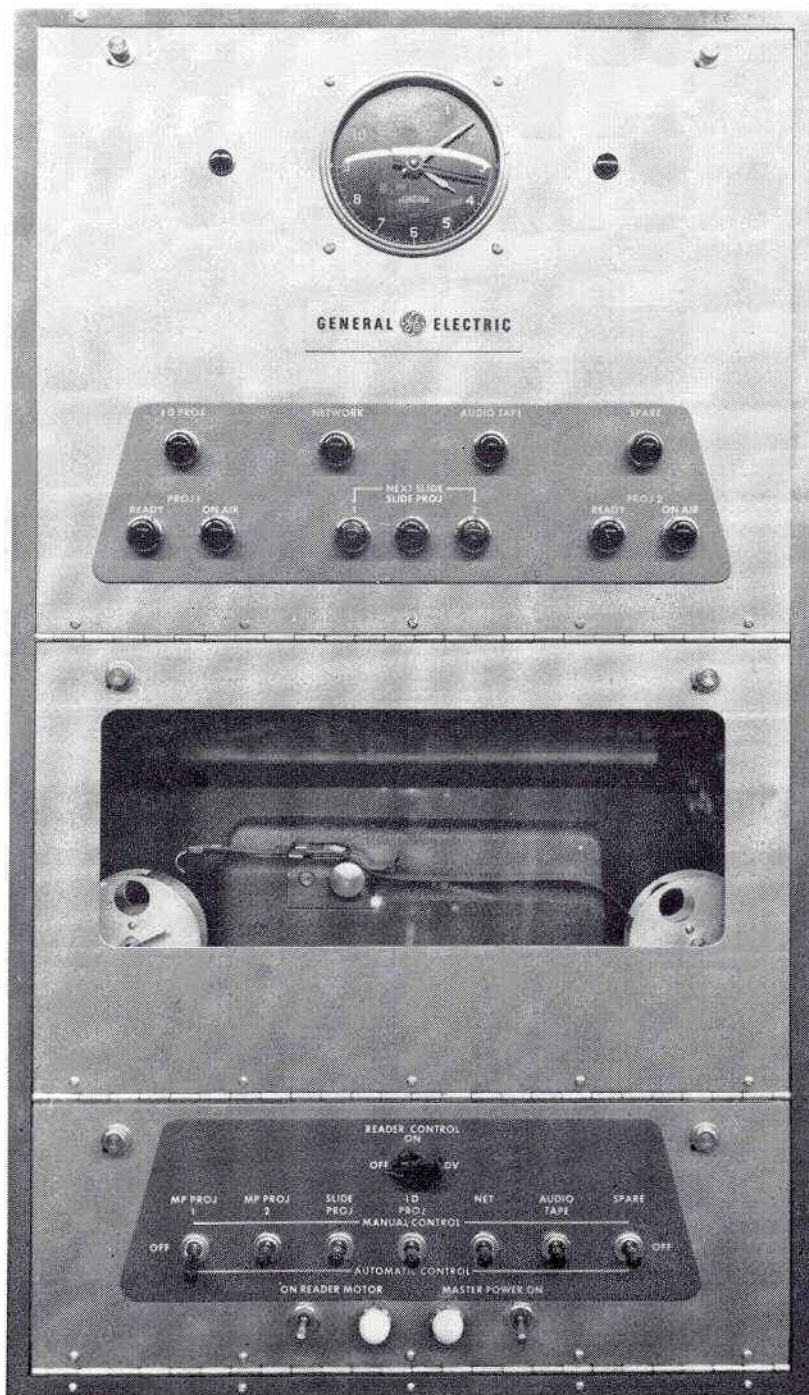
Basically the circuit is composed of an eight channel



paper tape controlled relay switching system. The paper tape reader stepping rate is controlled by either one second or one minute pulses which are supplied by a synchronous timer unit. The one minute or one second rate is determined by the eight channel of the control tape.

The use of a dual time base reading system, either one second per step or one minute per step, makes it possible to control a half hour of continuous program material with only 3" of tape (18 hours of material with approximately 60' of tape). It should be understood that complexity of programming can effect this over-all length of control tape.

Type BC-17-A Tape Editor is composed of a motor-driven eight channel punch mechanism, tape feed spool and take up assembly, two lever keys and one seven-position push-button switch for the control of the editing unit and an impulse-type clock unit which will provide a tabulation of time as it is edited into the tape. This unit also contains a power supply for the operation of the punch mechanism and indicator light.



Type BC-18-A Reader-Control Unit

Type BC-18-A Reader-Control Unit is composed of a punched paper tape reader and the associated relays required for the operation of projectors, slide mechanisms, tape recorders, turntables, network circuits, etc. in TV, AM and FM operations.

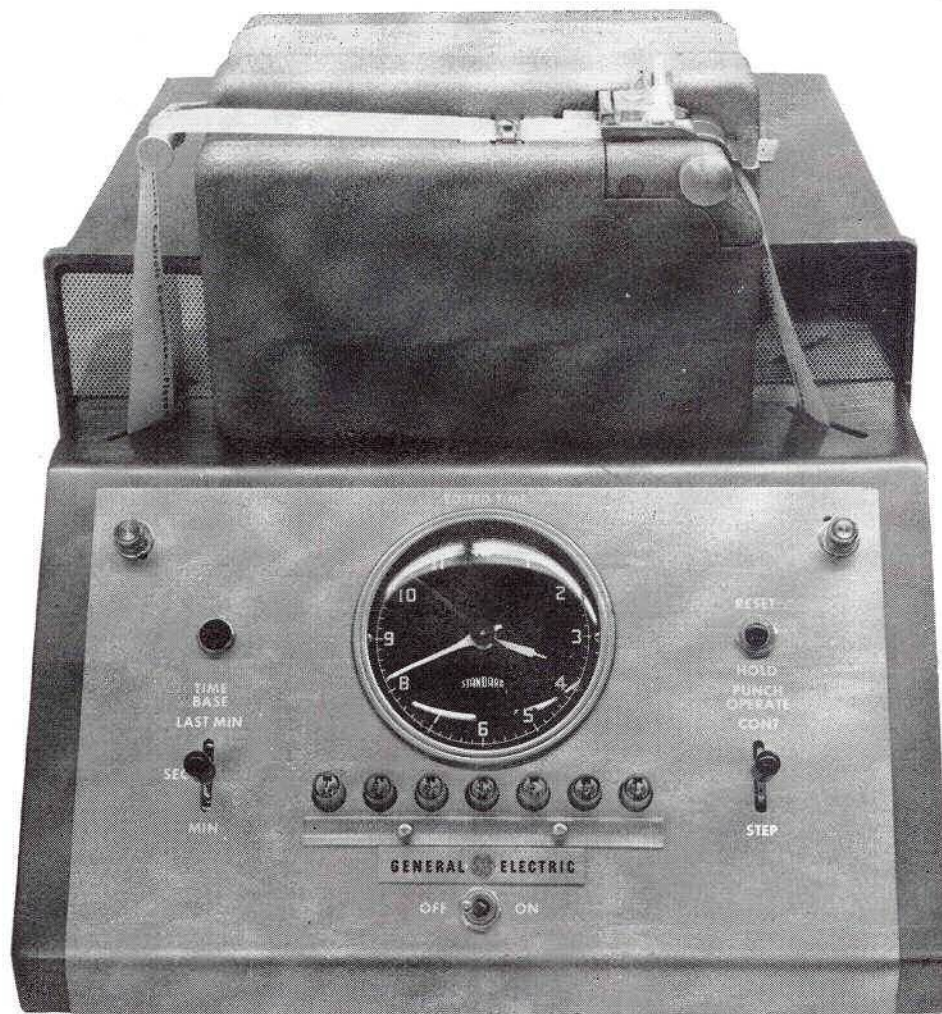
The operation of this control unit is governed by an eight channel punched paper tape. The spacing and location of the punched holes in this paper tape controls the time and sequence of operations to be performed.

The relays provide start and stop switching for seven separate functions. Two of these functions include time delay relays for use with motion picture projectors. These delay relays are variable so that the unit can be adjusted to operate with any type or combination of

projectors. In addition, the projection control channels provide either operating pulses or holding voltages for the operation of all types of projection equipments.

Lever keys are provided for manual over-ride. Tally lights are provided to indicate the status of the control circuits.

A small chassis containing relays required for the flip-flop operation of dual slide projectors and a third projector for I.D. or emergency slide use is also provided. This unit will be located in the vicinity of the slide projection equipment, remote from the reader-control unit. This reduces the installation wiring required between the control unit and the projection equipment.

*Type BC-17-A Tape Editor***MECHANICAL SPECIFICATIONS**

Units: Type number covers editor unit and reader-control unit.

Dimensions:

Reader and Relay Assembly: 29½" high x 17" wide x 14" deep. Cabinet for rack or wall mounting.

Editing Unit: Portable, may be set on any desk or table, 14" high x 18" deep x 12½" wide.

Slide-Relay Sub-Assembly: 12" long x 6" wide x 3" high.

Operating Conditions: External ambient temperature of 35° C, and a relative humidity of 95%.

Electrical Connections: Inter-connections between units and control connections from relay assembly are made via use of terminal boards. Editing unit provided with a cord and connector for use on any standard 117 V AC outlet.

Reader head assembly plugs into main assembly of the reader-control unit for ease of maintenance.

Safety Provisions: All voltage points are contained within unit case.

ELECTRICAL SPECIFICATIONS**Power Requirements:**

110/117/125 volts AC 60 cycle single phase, 140 watts.

Inputs:

Control Voltages: 117 V AC and 24 V DC

Signal: Audio

Outputs:

Control Voltages: 24 V DC and 117 V AC

Signal: Audio

Controls and Adjustments: Manual over-ride control switches. Adjustable time delay relays on projector positions to cover starting speeds of various types of projectors. Stop, operate and rapid advance control of the reader unit.

Indicators: Status light on relay switching assembly to give indication of operation, accumulated time counter. Tally light and counter tape clock to show edited time in the editor unit.

ORDERING INFORMATION

When ordering specify: Type BC-16-A Automatic Program Control System to consist of:

1—Type BC-17-A Tape Editor

1—Type BC-18-A Reader-Control Unit.