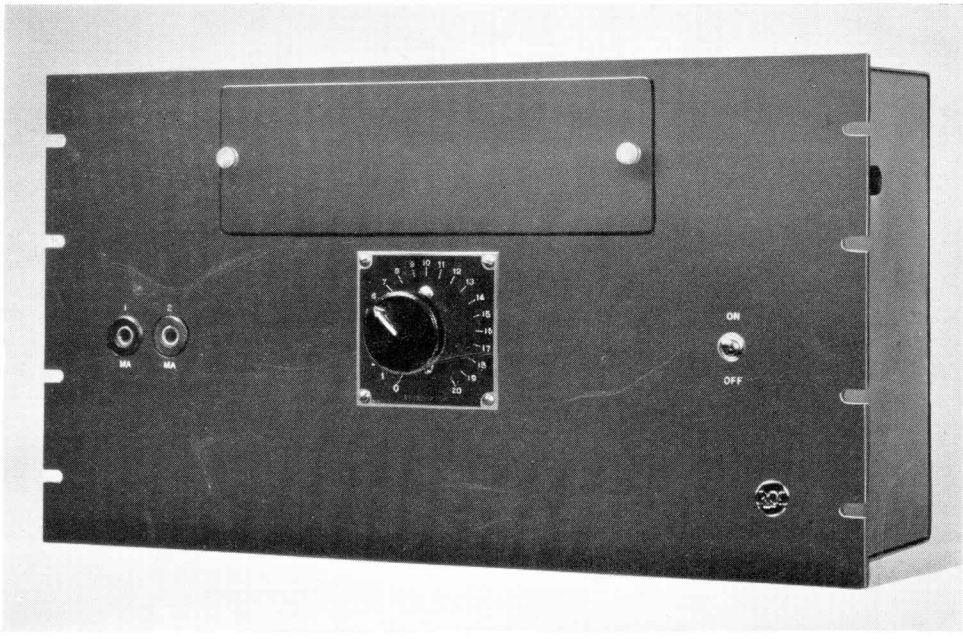
THE NEW

LINE AMPLIFIER

Type 55-A

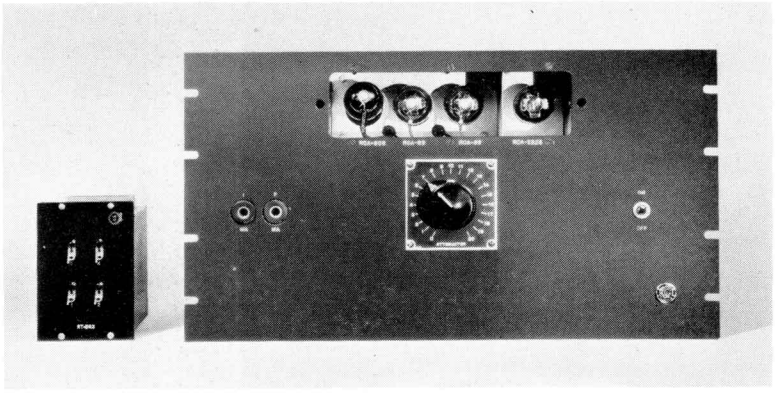


PERFORMANCE • CONVENIENCE

RELIABILITY Unequalled

A Special-Purpose Line Amplifier

The RCA Type 55-A Amplifier is a new medium-gain amplifier designed primarily for use as a line amplifier. It is particularly well adapted for a number of special applications, as for instance in master control rooms to increase the level on outgoing lines. Normally it functions to provide the gain necessary to compensate for losses on incoming lines, losses in switching circuits and the like, and allows the outgoing lines to be fed at the most desirable level. Ordinarily this entails operation at inputs ranging down to —40 db, and outputs around zero level. The Type 55-A Amplifier has been especially designed for these particular conditions. It operates with maximum efficiency at these levels and provides the requisite gain with the minimum number of stages.



Front View with Tube Shield Removed. Transformer at the Left

Alternative Bridging Input Impedance

Despite this special-purpose design, however, the Type 55-A Amplifier is not strictly a single-purpose unit—nor is it limited to use as a line amplifier alone. Such an amplifier, as the name indicates, is connected directly in the line. There are many occasions—particularly in auditioning or monitoring—when a bridging connection would be more desirable. To allow for such use this new amplifier has a high impedance input, in addition to the usual line-matching input. Using this connection one or several of these amplifiers may be connected across a line without noticeably reducing the level on that line. Both the high and low impedance connections may be connected to jacks for interchangeable use.

Convenient Adaptability For All Uses

Alternative input impedances are only one of the flexible features of this amplifier. Another is the fact that it is capable of providing an output of +16 db (zero level 12.5 milliwatts). When peak power is not required it may be used to drive a monitoring speaker. Noteworthy also is the fact that it is a self-contained unit complete with its own power supply. This allows it to be quickly inserted in any broadcast layout without need of considering the available power supply. Together, these flexible features make the Type 55-A Amplifier not only ideal as a line amplifier but also as a convenient spare amplifier which, within limits, may double as almost any unit of the circuit.

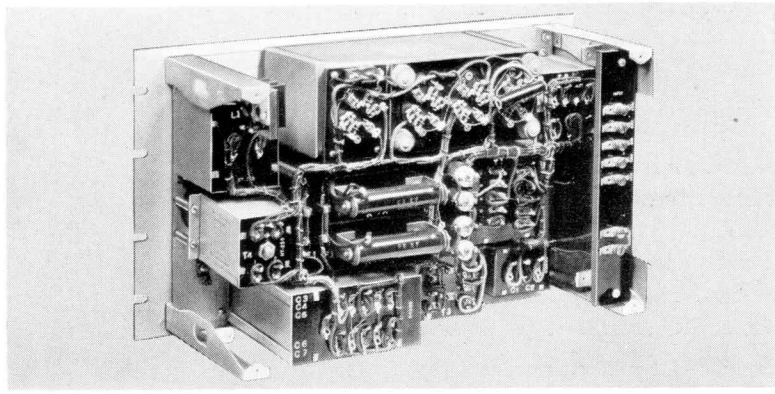
Advanced Electrical Design

In electrical design the Type 55-A is so changed and improved from the older type line amplifiers that, although interchangeable with these, it is actually a new type of amplifier. The input transformer, with its two primary connections (500 and 20,000 ohms), is of special design having a heavy Nicolai case providing a noise attenuation of 70 db. The RCA 6C6 in the first stage improves gain and stability. The volume control, connected interstage, provides an attenuation of 38 db in 2 db steps. An additional fixed reduction of 10 db can be effected by use of an alternative second-stage grid connection. This second, or output, stage utilizes triode-connected RCA 89's in push-pull—thus insuring high output with low distortion. The output transformer is provided with 250 and 500 ohm taps.

Built-in AC Power Supply

The amplifier operates entirely from a 105-to-125-volt, 50-to-60-cycle source. AC is supplied directly to the filament heaters—the first stage filament transformer being provided with a center-tap balancing adjustment. Plate voltages are furnished by a built-

in rectifier. Use of an RCA 25Z5 in a voltage-doubling circuit makes a power transformer unnecessary. This, plus use of an isolation transformer (mounted externally), plus careful filtering and shielding, keeps hum background at an imperceptible level. Protection is provided by a double pole switch and use of fuses in both sides of the power line.



Rear View with Cover Removed

Exacting High-Fidelity Standards

The requirements of high-fidelity are emphasized in the case of line amplifiers, because these amplifiers must be suitable for use in any circuit and must, moreover, be capable of being used at more than one point in the circuit—equivalent to operation in tandem. In the latter case particularly, departures from true fidelity will be additive—and hence any one unit must have characteristics somewhat better than the required overall characteristics. This applies not only to the frequency response characteristic but also to distortion and to background noise level. High-fidelity transmission is possible only when all three have been held to close tolerances.

Wide Frequency Range

In the design of the Type 55-A Amplifier special attention has been given to these high-fidelity requirements. The resulting performance is unmatched in present day amplifiers. The frequency response is such that the overall characteristic is flat within 1 db over the range of 30 to 15,000 cycles. Thus transmission is uniform not only over the presently-used audio frequencies, but over the whole audio band. Moreover, in this unit as in other RCA speech input units, the small departures from absolute linearity which do exist are such that in a normal chain of these units the discrepancies will tend to cancel rather than add.

Minimum Harmonic Distortion

Equally important, and even more noteworthy in the extent of improvement over previous designs, is the extremely low distortion in this amplifier. At normal output of zero db (12.5 milliwatts) the measured distortion is only .15% with all harmonics arithmetically added (this arithmetic sum is larger than the r.m.s. sum). That this is an astonishingly low figure need hardly be pointed out. At higher outputs—as, for instance, when used as a monitoring amplifier—the distortion factor increases somewhat, reaching a maximum of 1.0% total at +16 db output. However, the requirements for this type of use are less critical and hence the relative performance is equally good.

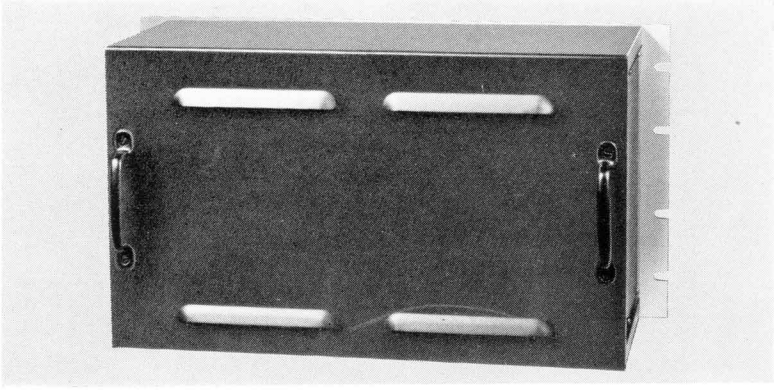
Unusually Low Background Noise Level

A low background noise level is the third important characteristic necessary for high-fidelity transmission. It is important because it determines directly the lower limit of the usable volume range. As a result of precautions taken to overcome hum and prevent noise pickup in the input circuit, the noise-background level in the output of the Type 55-A Amplifier has been reduced to —60 db. This is the over-all level of all the noise and hum components (measurements through a weighted filter give lower levels). It is practical assurance that noise in the output circuit will be at least 60 db below normal program level—thus amply providing for a volume range of 50 to 55 db, ordinarily considered the maximum usable range.

Improved Mechanical Construction

Mechanically the Type 55-A Amplifier features an improved panel-type construction. On the standard 10 15/32" panel are located the tube door, the vol-

ume control, the plate current jacks and the power switch. All other components, except the tube sockets, are mounted on a back panel. This new method of mounting facilitates removal of parts and, by eliminating screw heads from the front panel greatly improves the appearance of the unit. The rubber-floated tube sockets are mounted on the back of the tube compartment. Terminals and cover supports are mounted as usual. Handles to facilitate removal and ventilators for cooling are new features of the dust cover.



Rear View of the 55-A Line Amplifier

Utmost Ease in Servicing

In case of servicing the Type 55-A Amplifier is unique. The tubes and volume control are removable from the front of the panel. All other components are mounted so that their terminals are at the extreme rear, thus making every connection easily accessible without the necessity of removing any part. Moreover, the terminals of every component, and the components themselves, are marked with designations corresponding to those on the schematic diagram—a copy of which is secured in the back of the dust cover. Transformers and capacitor packs have schematics stamped on the side. Finally, any component may, if necessary, be easily removed—loops of wire having been left at each terminal in order to facilitate this.

Complete Reliability

The final criterion of any broadcast unit is dependability. In this most important quality the Type 55-A Amplifier, and other RCA speech input units, are in a class by themselves. All components are separately tested to meet rigid specifications and are operated well below their normal ratings. Wirewound resistors are used throughout and every other practical precaution is taken to reduce the possibility of failure in operation to an absolute minimum. Protection against replacement costs is provided by the standard RCA guarantee against defective materials and workmanship.

Maximum Gain	46 db
Normal Output Level	0 db
Usable Output Level	+16 db
Distortion at 0 db Output (Arith. Sum)	.15%
Distortion at 16 db Output (Arith. Sum)	1.0%
Background Noise Level (Unweighted)	−60 db
Frequency Response (Within 1 db)	30 to 15,000 cycles
Input Impedances	500 and 20,000 ohms
Output Impedances	250 and 500 ohms

TRANSMITTER SECTION

RCA MANUFACTURING COMPANY, INC.

Camden, New Jersey