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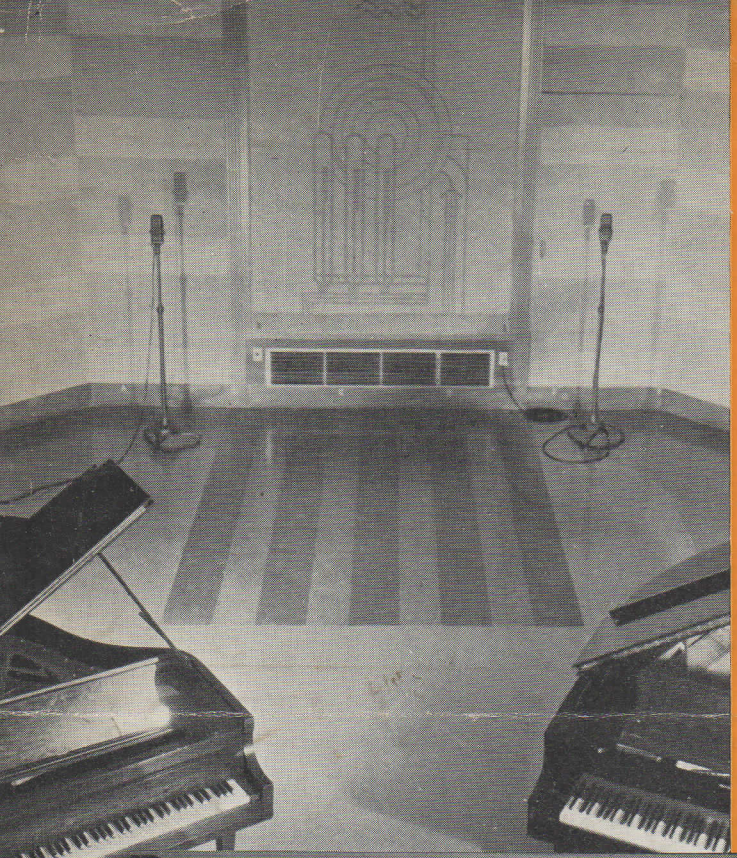
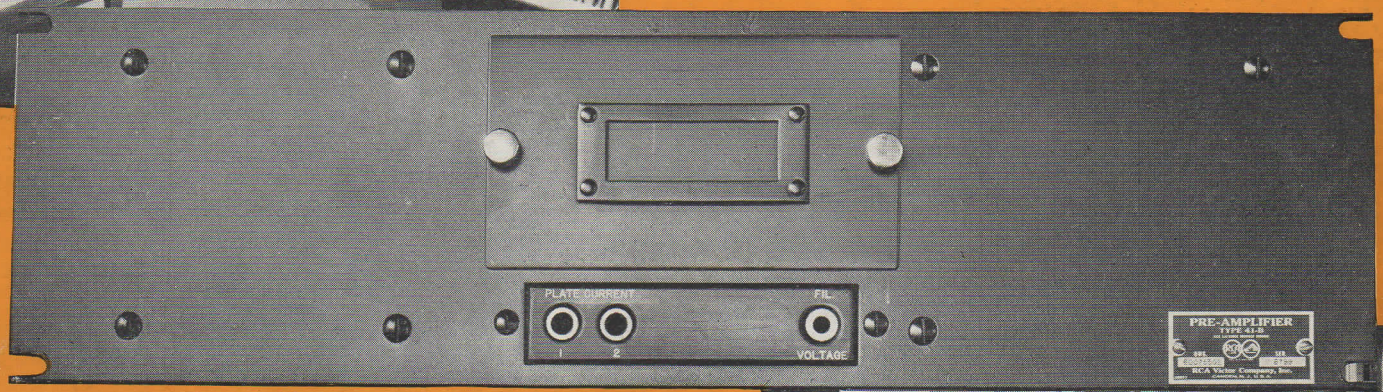
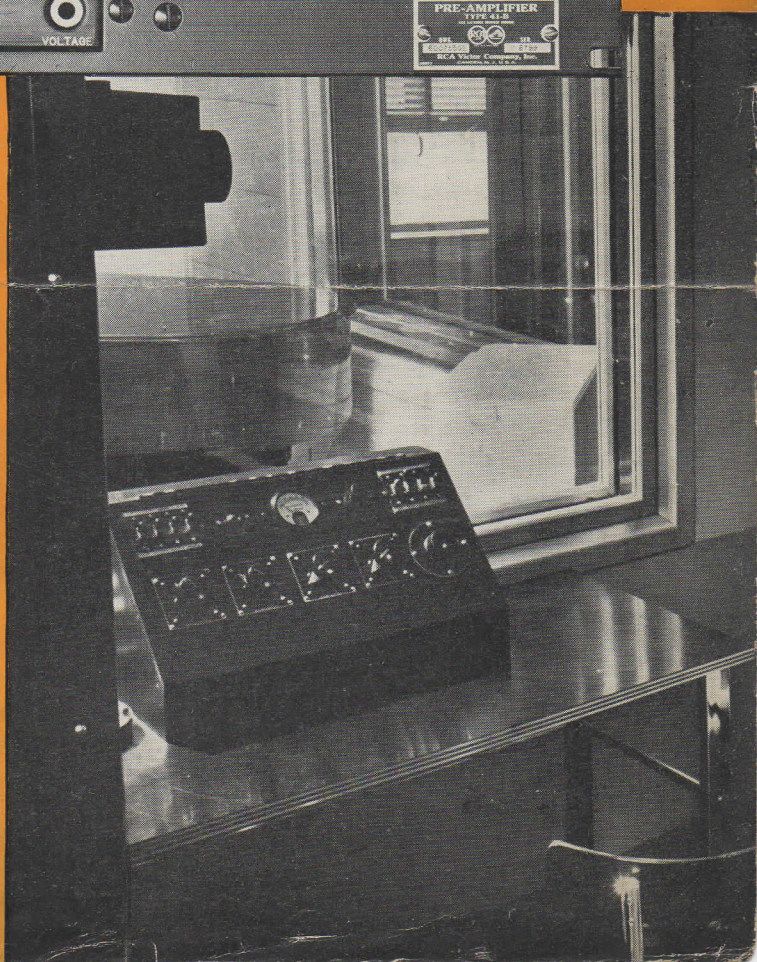
RCA Victor "TYPE 41-B" PRE-AMPLIFIER

—designed to insure full realization of the improved fidelity and greater artistry made possible by the use of Velocity Microphones.





"bridges the gap from microphone to mixer"



TRANSMITTER SECTION
BULLETIN No. 30

STUDIOS OF WCAU
Photo by W. M. Rittasse

An Amplifier designed to meet rigid requirements

All the available types of high-quality microphones are characterized by extremely low output. As a result, amplifiers having a total gain of some 100 db. must be placed between these microphones and the transmitter. Usually a pre-amplifier is placed between each microphone and the mixing system. This amplifier must be carefully designed because any noise originating in it will be tremendously amplified by the following amplifier stages. The extent of this amplification is indicated by the fact that in the output of such a system, the noise due to thermal agitation in the microphone leads and shot effect in the first amplifier tubes is easily distinguished. From this it is obvious that ordinary amplifier noises such as microphonics and hum background must be practically non-existent in an amplifier intended for this use.

In the design of the Type 41-B Pre-amplifier, these stringent requirements have been given full consideration. Special provisions to insure low noise-level have been made at a number of points, as for instance in the extremely heavy shielding of the input transformer, and, again, in the use of tubes having the new-type quiet heater. As a result of these precautions, this pre-amplifier is a high-quality equipment entirely up to the standard set by the Type 44-A Velocity Microphone. Together, the two form a coordinated system capable of unmatched quality and fidelity.

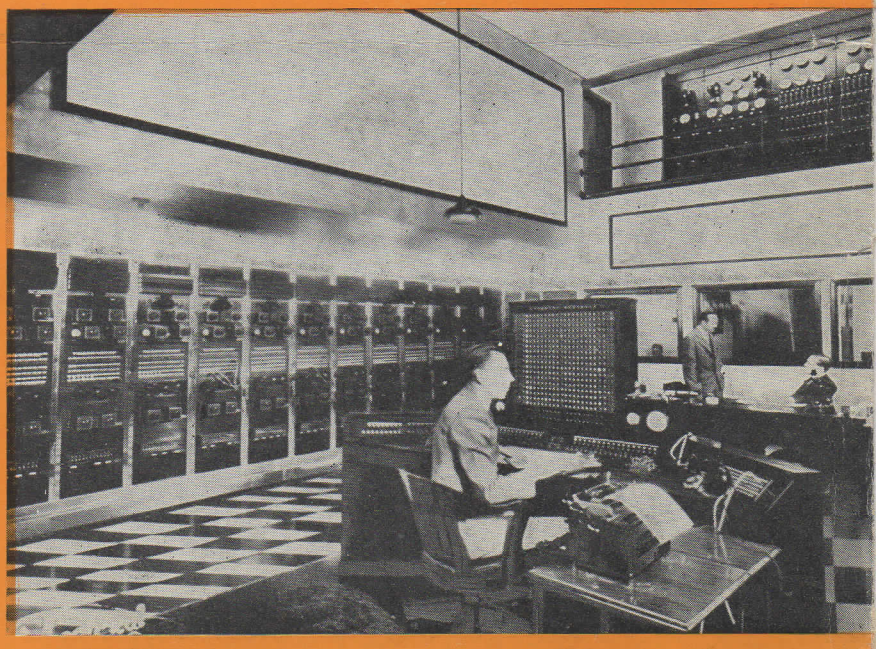
"TYPE 41-B" P

Low Background Noise — Heavy Shielding —

The Type 41-B Pre-amplifier is a two-stage fixed-gain amplifier. Coupling between stages is resistance-capacitance, while transformers provide for input and output coupling. The amplifier has been designed to work from a 250 ohm microphone circuit and into a 250 ohm or 500 ohm line.

An RCA-77 Radiotron is used in each of the two stages of this amplifier. Use of these new six-element tubes as triodes makes possible a relatively high mu with a fairly low plate impedance. The arrangement used provides an overall gain of 40 db. without the necessity of using high plate voltages. In addition these tubes have several new features which are of advantage in obtaining low background noise. Chief of these is the grid lead out the top of the tube—allowing the low-level grid circuit to be kept well away from the AC filament leads. Another is the use of the new-type heater construction which with its spirally-wound filament is an important aid in keeping hum background low.

Filter circuits are provided in each stage to prevent crosstalk and howling when the amplifier is operated from a common plate supply source. Jacks in the plate and filament circuits provide for checking



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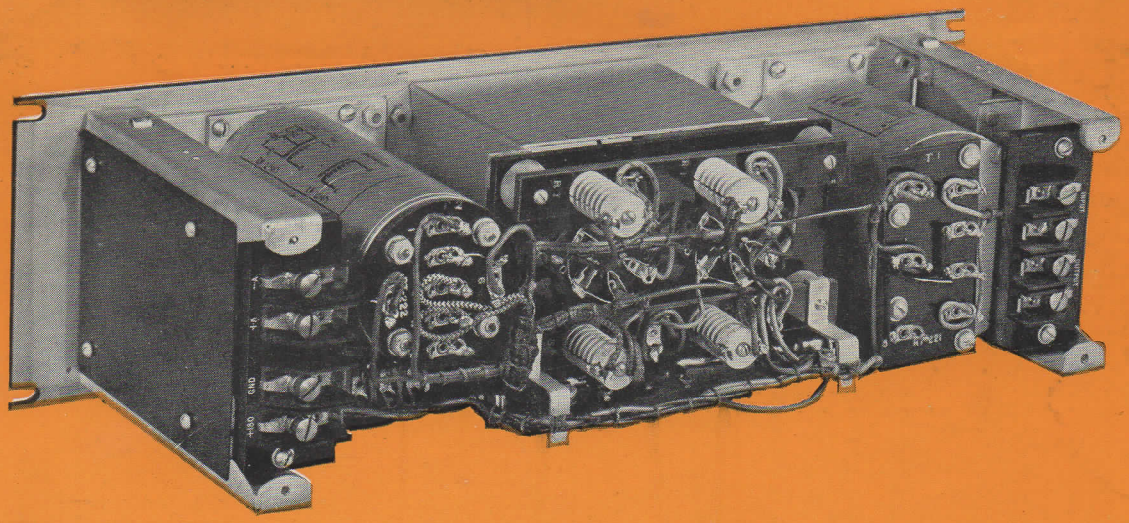


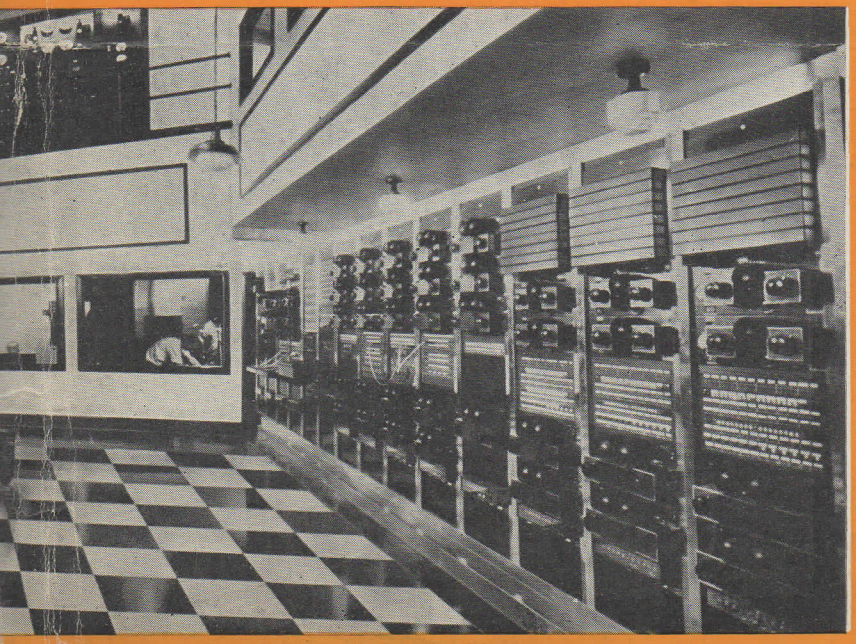
RE-AMPLIFIER

lat Frequency Response — Latest Type Tubes

plate currents and filament voltage. The arrangements for DC or AC operation are described elsewhere.

The construction of the amplifier is indicated in the two views above. The panel is 5¼" high and is designed to mount on a standard rack and match in appearance other standard units. The front of the panel is blank except for the jacks and tube access door.

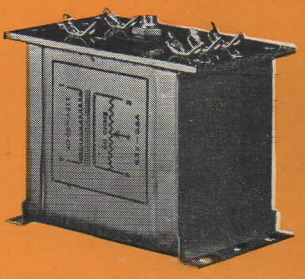
All parts in the rear of the panel, as well as the panel and cover supports, are finished in an opalescent gray lacquer which gives a finish of very nice appearance and extreme durability. The input transformer is mounted in a heavily shielded can. The output transformer and filter reactor are mounted in a second can and the filter condensers in a third. The tube sockets are mounted on a vibration-proof bakelite base board. Arranagement of terminals and other small parts can be seen in the illustration above. Particularly noteworthy is the fact that every component part is mounted so that its terminals are very easily accessible. Moreover, each part is marked systematically. Servicing, therefore, is a very simple matter.



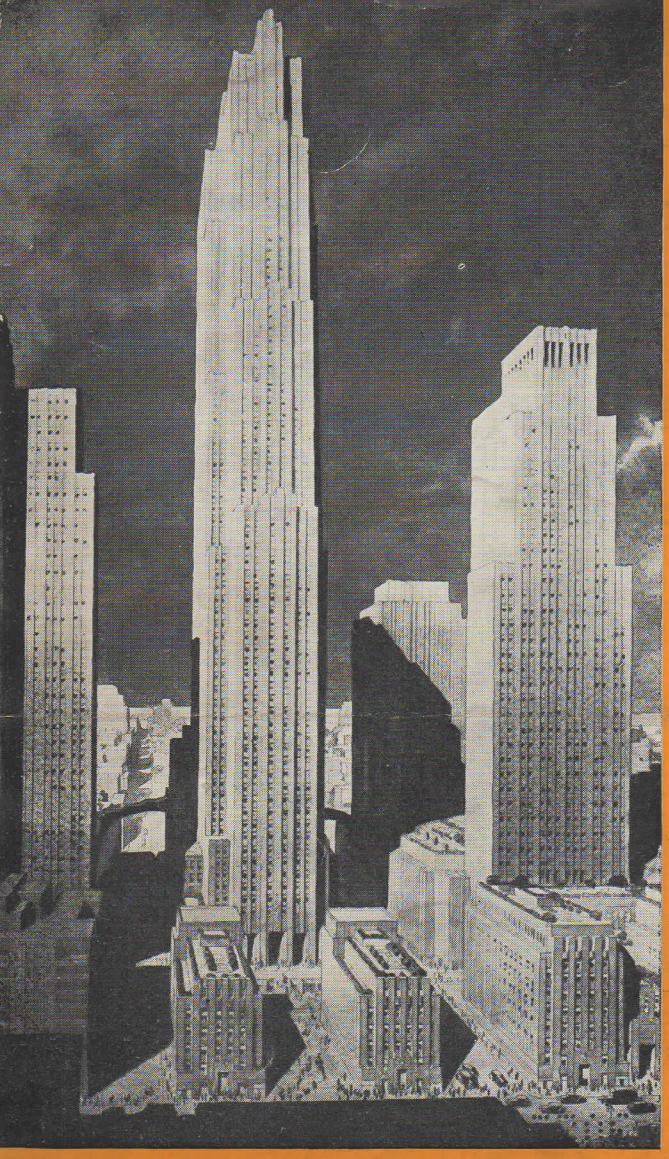
PLETELY RCA VICTOR EQUIPPED

Operates from either AC or DC Filament Supply

The filaments of the RCA-77 Radiotrons employed in the Type 41-B Pre-amplifier require 0.6 amperes from a 6.3 volt source. The filament supply may be either AC or DC. Where DC is used the voltage supplied to the amplifier filaments may be from 6.3 volts to 15 volts—a tapped resistor being incorporated in the amplifier to provide the required voltage drop. For operation from AC the XT-1298 transformer is used. One of these transformers—which steps down 115 volts to 6.3 volts—is supplied with each amplifier. Mounting of this transformer external to the amplifier eliminates the necessity of bringing 115 volts AC close to the low level audio circuits, thus reducing the possibility of AC pickup. This, plus adjustment of the hum potentiometer built into the transformer case, allows reduction of hum in the output to below ordinary background noise.



The plates of the Radiotrons require approximately 4.4 milliamperes from a 180 volt AC supply. The supply source may be batteries or a properly filtered rectifier. When Type 41-B Pre-amplifiers are used in conjunction with a Type 40-C Studio Amplifier the latter supplies plate current for one to three of these pre-amplifiers.

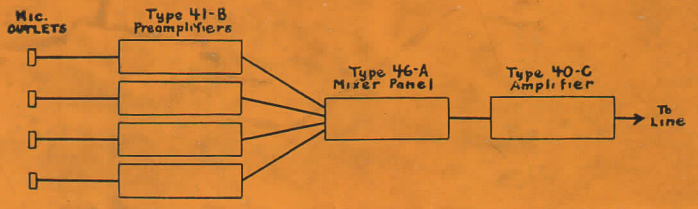


The Microphones and Amplifiers of Radio City

Into the studios of the most elaborate radio and entertainment development ever built go some hundred and fifty Type 44-A Velocity Microphones—and with them an equal number of Type 41-B Pre-amplifiers. This choice is no hit or miss judgment, but the result of considered planning on the part of the foremost group of broadcast engineers in the country.

Suggested speech input layouts utilizing "Type 41-B" Pre-amplifiers

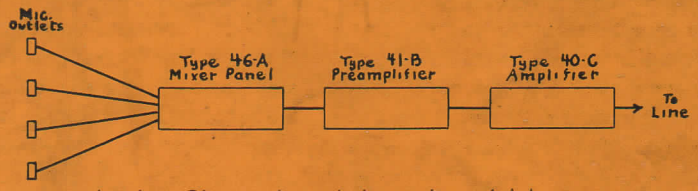
It is recommended that a Type 41-B Pre-amplifier be supplied for each microphone position. The number of pre-amplifiers per complete channel need, of course, not exceed the maximum number of microphone outputs which are to be mixed at one time. A suggested arrangement is shown below. The Type 46-A Mixer contains four constant-impedance attenuators whose outputs are paralleled and fed to the output line through a transformer. The Type 40-C Amplifier has a gain of 65 db.—more than sufficient to bring the programs up to



Audio Channel with High-Level Mixing

correct line level. In addition, it has built into it a volume indicator to read line level and a plate power supply unit which has been designed to furnish plate voltage for three Type 41-B Pre-amplifiers as well. Thus these three units when assembled comprise a complete audio channel, which while simplified and inexpensive to install is capable of the very highest-quality performance.

An audio channel utilizing a low-level mixing system is shown in the second diagram. Such a system is slightly less expensive to



Audio Channel with Low-Level Mixing

install, but has the disadvantage of considerably higher background noise. Experience indicates that, even when all extraneous noise pickup can be eliminated, the background noise due to thermal agitation in the microphone leads and that effect in the first amplifier tube will be roughly 10 db. higher in a low-level mixing system than in a corresponding high-level mixing system. For this reason, it is recommended that this first arrangement be used when to do so entails sacrifice at other points.

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Engineering Products Division

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