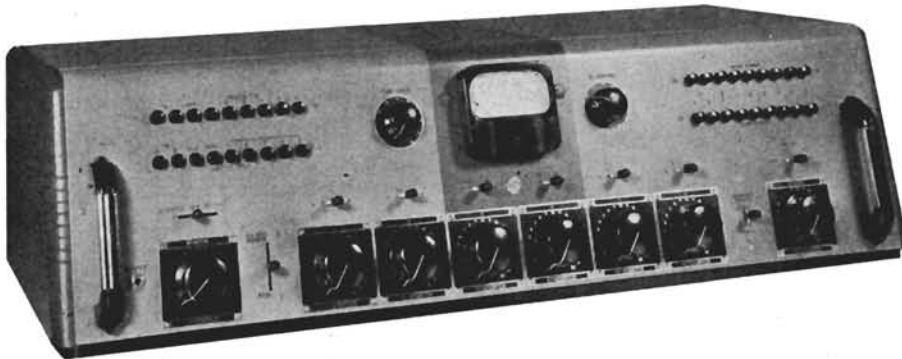


FLEXIBLE AND COMPACT

The 76-B1 Consolette Fills an Important Place in Many Stations

By L. J. FLODMAN



Neat, compact design emphasized in the RCA 76 B1 Consolette.

THE consolette type of speech input equipment has, in the past few years, enjoyed a tremendous growth in popularity. While rack and console equipment is still preferred by many studio engineers as offering the utmost in desirable qualities, the consolette has been gaining favor where space is at a premium or cost is a major factor. In the Type 76-B1 Consolette, RCA is providing the broadcasting industry with complete high fidelity studio audio facilities at a minimum cost.

In order that as many of the advantages of the rack mounted type of speech input assemblies could be incorporated, the design of the 76-B1 required the careful consideration of several factors. First among these is performance. No sacrifice in gain or power could be made since these are primary requirements in any studio installation. Consequently, the 76-B1 uses amplifier circuits that are time proved in their workability. Likewise a conventional parallel mixing circuit is employed for combining the outputs of the various microphone pre-amplifiers, transcription and line inputs.

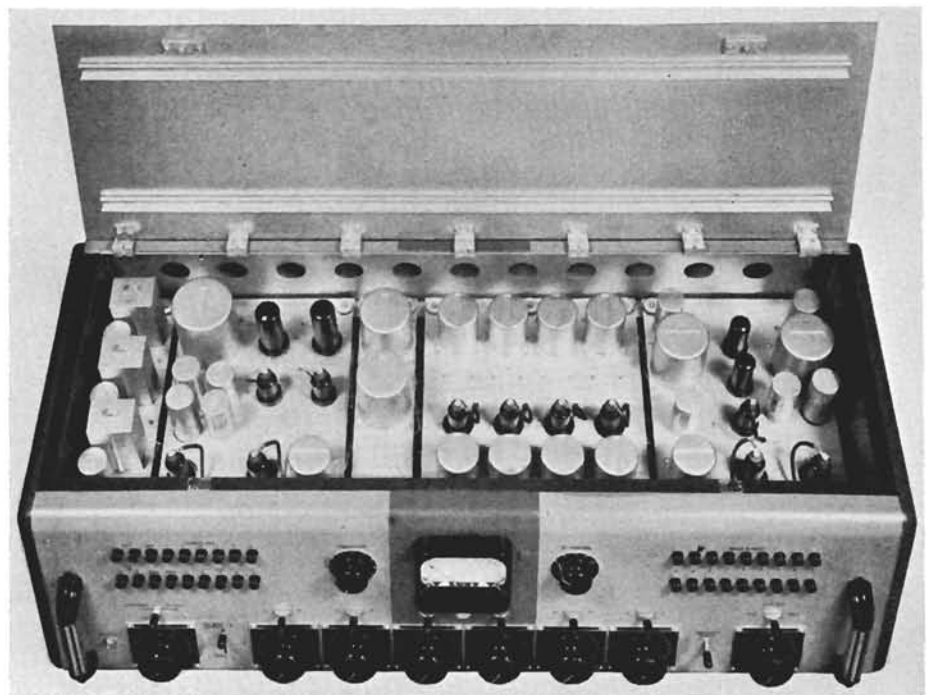
Since the use of jacks and associated plugs and cords, always found with rack mounted equipment, does not lend itself very well for mounting on a console, it becomes an absolute necessity to provide sufficient switches to

provide the flexibility desired in speech input equipment. Not only during normal operation of studio equipment are various combinations of circuits necessary, but also, each station has its particular requirement that must be satisfied. Thus any consolette equipment must provide a maximum of switching and circuit combinations. A glance at the block diagram of the 76-B1 (Fig. 1) will show the circuit combinations available. It will be noted that the use of interlocked push but-

ton switches has materially increased the circuit combinations possible, with a given set of amplifier circuits, yet their use has simplified the switching operations.

Simultaneous Auditioning and Broadcasting

Two complete audio channels are provided for in the 76-B1. One channel is used for program while the other is used for auditioning but also performs several other functions. Thus the 76-B1 is primarily designed for two studio operation, that is, while one studio, remote line or transcription is on the air, the other studio (or remote line or transcription) can be auditioned. The transcription equipment and associated announce microphones can very well be located in a separate studio or booth, so that three studios in all can be handled by the 76-B1. The consolette can be readily adapted for single studio operation as well.



Easy accessibility—one of the features of the 76-B1.

Hinged Chassis for Easy Servicing

All controls, switches, amplifiers, etc. of the 76-B1 are contained in a single console cabinet while the power supply required to furnish filament and plate power to the amplifiers, DC current for relays, and field power for speakers, is mounted in a wall box. Both console and power supply are mechanically designed so that access to all wiring and component parts can quickly and easily be made by means of hinged chassis construction.

The controls mounted on the front panel of the 76-B1 console are so located that each control is in its proper place—both from an operational and electrical standpoint. The control panel has a slight slope—15 degrees from the vertical—for ease of control and maximum visibility.

Six Mixer Positions

A total of six mixer controls are used in the 76-B1. These are conveniently grouped together and located along the lower edge and center of the control panel. Four microphone pre-amplifiers are connected to the inputs of the first four mixer controls. The first two being normally connected to

microphones in one studio (Studio A) and the other two to microphones in another studio (Studio B). The input of the fourth pre-amplifier has a three-way lever key which permits the selection of two additional microphones. These can be announce microphones; one located in the control booth (Studio C) and the other at a remote point such as a transcription booth. The announce key is located just to the right of the mixer controls on the 76-B1 control panel.

Push Button Flexibility

The fifth and sixth mixers have at each of their inputs, a set of interlocked push buttons. These push buttons, located in the upper right hand corner of the control panel, each have a total of nine positions, mechanically interlocked so that only one button of a set may be depressed at a time. Two of the nine buttons in each set are for connections to transcription turntables such as the RCA Type 70-C's. Six buttons connect through resistor attenuating networks and line isolating transformers to incoming remote lines. The ninth button is used as an "off" button which places a loading resistor across the input of the corresponding mixer con-

trol. The two sets of push buttons are electrically interlocked so that any one of the remote lines or transcription outputs can not be connected to both mixers. Mixer No. 5 and associated push buttons has priority over No. 6 mixer and push buttons.

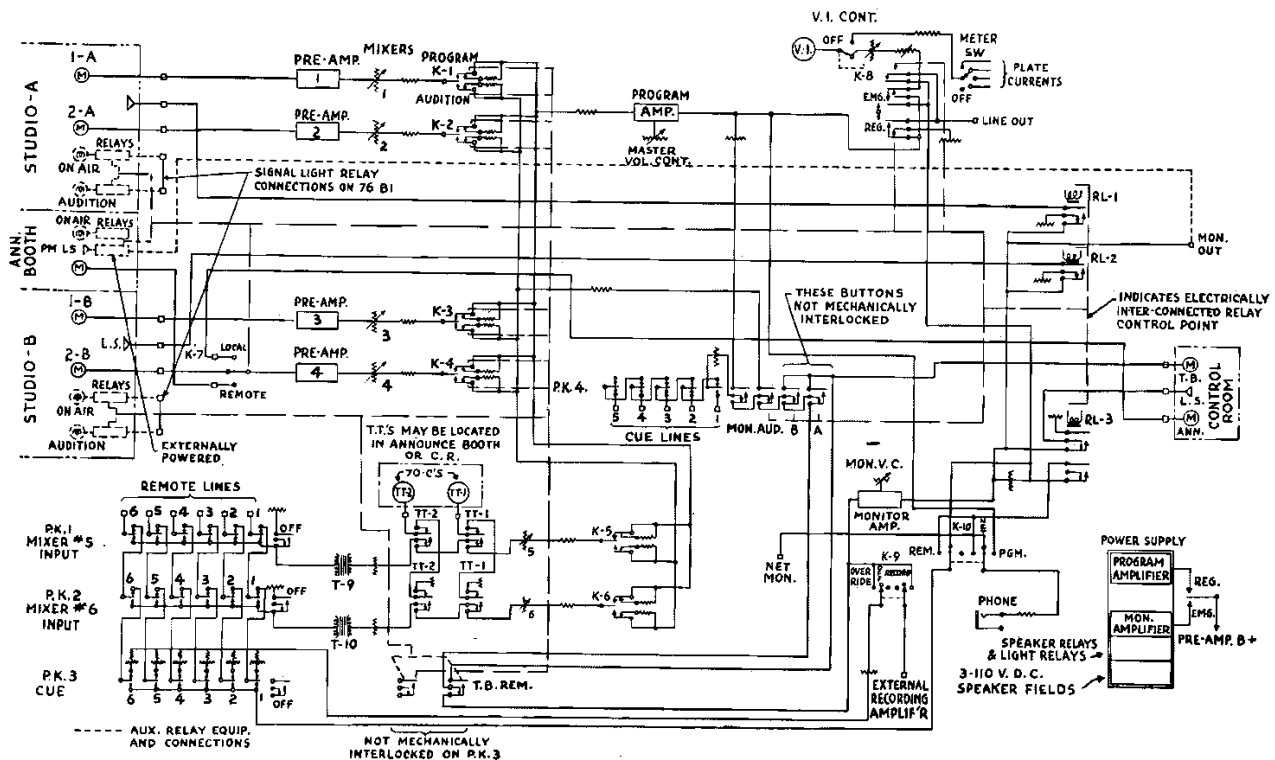
The outputs of the six mixers feed into six three-way locking type lever keys. These switches are located directly above their corresponding mixer on the 76-B1 control panel. When the lever keys are in their center or normal position the output of the corresponding mixer is open while loading resistors are placed across both the program and audition input circuits. Throwing a switch to the right, or "program" position, connects the mixer to the program channel. Throwing switch to the left, or "audition" position, connection is made to the audition channel.

All mixers are high quality step-by-step type which have proved to be the most satisfactory for low level circuits.

High Fidelity Program Channel

When a signal is being fed to the program channel it passes through a four stage program amplifier. This amplifier has first a

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Simplified schematic of the 76-B1.

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"booster" stage, master volume control, and then three additional stages. The output stage is capable of delivering up to +28 vu* of audio power. The output connects to a "line-out" switch. This switch in addition to its normal (or off) position has a Regular and an Emergency position. When in the normal position, a load is placed across the output of the program amplifier. Across this circuit is the volume indicator meter. This meter which is the large, illuminated, VI meter recently developed is calibrated to indicate vu's and is centrally located on the control panel of the 76-B1. A VI control switch which allows adjusting the output to four different output levels is located just to the right of the VI meter.

When the line out switch is thrown to the Regular position, the output of the program is fed into the outgoing line, with load removed and the volume indicator still across the circuit. The function of the line out switch when in the emergency position will be described later.

The master volume control is located to the right of the six mixer controls while the line out switch is directly above this control.

High Power Audition and Monitor Channel

When a signal is being fed to the audition channel of the 76-B1 it passes first through one of the buttons on another set of nine interlocked push buttons. This set of push buttons is placed at the input of the monitor amplifier. Like the program amplifier the monitor amplifier has four stages of amplification, the first being used as a "booster" amplifier stage, following is the monitor volume control, and then three additional stages. The output stage is capable of delivering up to 8 watts of undistorted (4%) power. The power is fed through three relays, the operation of which will be described later, to three loudspeaker terminals.

* 0 vu = 0.001 watt.

The set of push buttons at the input of the monitoring amplifier allows the following operations to be made:

1. Monitoring—One button connects the input of the monitoring amplifier, through proper bridging resistors, across the output of the program amplifier. A program on the air may thus be monitored by means of the control room loudspeaker.

2. Auditioning—One button as mentioned above feeds the output of the mixer controls (when the corresponding program—audition switch is in audition position) into the input of the monitor amplifier. This allows carrying on of an audition in one studio while the other is on the air.

3. Cueing—Five of the buttons are used for the selection of any one of five monitoring or cue lines. These five buttons and the monitor and audition buttons are mechanically interlocked so that only one is on at a time. Pressing any one button releases the button previously actuated. This circuit may be used to monitor the output of an adjacent transmitter or for cueing from on incoming network.

4. Talk-back—Two buttons, associated with the seven buttons above but not mechanically interlocked with same are used for talk-back, one for talk-back into Studio A and the other for Studio B. Pressing either button connects the talk-back microphone to the input of the monitor amplifier. When button is released, the connection previously made is restored.

This set of push buttons on the input of the monitoring amplifier is located in the upper left hand corner of the 76-B1 Control Panel. The monitor volume control is located just below these buttons to the left and in line with the mixer and master controls.

Unique Remote Line Cueing and Talk-back

A fourth set of push buttons is used in the 76-B1 which provide a function usually not found in console type speech input equipments. These buttons perform the following.

1. Cue—Six buttons of this set

of push buttons connect to the six incoming remote lines. One side of the buttons are normally connected through switch K-10 to the output of the monitoring amplifier. Pressing any one of the six buttons will feed the signal from the output of the monitoring amplifier into the corresponding remote line, provided that the corresponding button of the push buttons on the input of mixers No. 5 and No. 6 is not in use. Another button interlocked with the above six buttons is used as an "off" position.

2. Headphones—A phone jack is connected to switch K-10 which when thrown to the "Remote" position removes the monitor output signal and allows headphone monitoring of any one of the six remote lines.

3. Override—Each of the six line cueing push keys has a bridging pad connected across its normal terminals. The outputs of the six pads are connected in parallel and may be bridged across the input of the monitoring amplifier by throwing switch K-9 to the "Override" position. This arrangement enables the control room operator to listen to all six lines simultaneously on his monitoring loudspeaker. Thus he can immediately hear the remote operator call in from a new setup.

4. Talk-back—Talking to the remote lines can be done by pressing either one of two push buttons associated with the six remote cue buttons but not mechanically interlocked with same. When these two buttons are pressed, the talk-back microphone is connected to the input of the monitoring amplifier and the output of the monitoring amplifier reconnected to the output of the remote cue buttons. Thus, a conversation can be carried on with any of the six remote lines by plugging in phones, and holding down the remote line talk-back buttons.

This fourth set of push buttons is located on the left hand side of the 76-B1 control panel just above the monitoring input selector push buttons. The remote monitor phone jack is situated in the lower left hand corner of the panel.

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Emergency Program Channel

As mentioned above, the line out switch is provided with an emergency position. When thrown to the emergency position, the outgoing line is connected to the output of the monitor amplifier, through a bridging resistor network. At the same time the volume indicator meter is connected to the outgoing line. Thus, in case of failure in the program amplifier, the monitoring amplifier can be used as an emergency program amplifier.

Emergency "B" Supply

A switch in the power supply unit permits obtaining "B" supply voltage from the monitoring amplifier power supply circuit instead of the program amplifier power supply circuit. It should be noted that the 76-B1 power supply unit has in reality two separate and complete power supply circuits—one for the program amplifiers (and pre-amplifiers) and one for the monitoring amplifier.

Relay Operation

A system of relay interlocking is used in the 76-B1 which provides the necessary function of controlling the output of the monitoring amplifier into the two studio speakers, and the control booth speaker. Provision has been made for adding an interlocked relay for a speaker in a third studio. Provision has also been made for easily connecting signal light relays which can control signal lights in the studios.

The interlocking is such that at no time is a speaker on in a studio whenever that studio is on the air. Likewise the booth speaker is disconnected whenever the talk-back microphone or an announce microphone in the control booth is connected to the 76-B1.

When signal light relays are used, the interlocking is such that an "on-air" light will be turned on in the studio which has a microphone connected through to the outgoing line. Also an audition light in a studio can be turned on whenever an audition is being carried on with the studio.

All relay power is obtained from the 76-B1 power supply so that no external relay rectifier is required. Extreme care has been taken in the design and production of the relay switching circuits so that the "clicks" resulting from breaking the DC relay current have been reduced to an absolute minimum.

Cutouts have been provided in the 76-B1 for mounting two signal lamps on the control panel which may be used for various purposes. One of these may be to obtain "preset" and "on air" signals from master control room in large studio installations.

An additional control on the 76-B1 control panel is a plate current switch for checking tubes in the 76-B1. This switch, located just to the left of the VI meter, is used in conjunction with the VI meter for measuring the bias voltages of the tubes in the program channel of the 76-B1. While the scale of the meter is not calibrated to give exact voltage measurements an indication of the tube condition or tube voltages can be obtained.

Conclusion

While the 76-B1 provides switching, amplifiers, and control circuits comparable to those found in large rack and console speech input assemblies, the overall size and weight of the consolette is quite small. Small enough that broadcasting stations should have very little difficulty in fitting this unit into their speech input requirements—both in present studios or in contemplated new studio installations.

312-A NOISE METER

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provided which connects a conventional detector, average type indicator, and audio amplifier with an output jack for the connection of headphones in place of the quasi-peak indicator. So operated, the instrument is the practical equivalent of the standard field intensity meter, except that great accuracy is not to be expected, since the effective height of the rod antenna provided will vary appreciably depending upon the location of the instrument

with respect to ground and other conductors.

The demands for light weight and long battery life are directly opposed. The Type 312 Radio Noise Meter has been designed to give the longest battery life obtainable with a reasonable weight for a portable instrument. By clever design the sensitivity of the instrument has been made relatively independent of the battery voltage, so that during an average battery life of 50 hours intermittent service four hours per day, the sensitivity changes only about 10%. This change is, of course, taken care of by the convenient calibration check provided. Standard readily procurable batteries are used, yet the weight of the complete instrument, including these batteries contained within the case, is only 32 lbs. The condition of the filament and plate batteries may be checked at any time by means of a switching arrangement which permits the use of the D. C. indicating instrument as a battery voltmeter.

This single D. C. indicating instrument performs so many functions that it may be of interest to enumerate them.

- (1) Filament Voltage
- (2) Plate Voltage
- (3) Plate current or diode used as a standard noise source for calibration.
- (4) Output indicator of the average-reading type, for field intensity measurements.
- (5) Output indicator of the quasi-peak type, for radio noise measurements.

The different functions are selected by a multi-position rotary switch. In this way the accuracy and reliability of the readings of the Type 312 Radio Noise Meter are insured without the necessity for the weight and cost of additional meters.

Great care has been taken to prevent overloading and cross-modulation in the Type 312 Radio Noise Meter. For this reason a radio frequency amplifier stage has been used, and the range change attenuator has been introduced ahead of the tube in this stage. Thus inputs up to 0.1 volt or 0.1 volt per meter may be measured and inputs 100 times

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