INSTRUCTIONS

Type BK-11A

Velocity Microphone

MI-11019

RADIO CORPORATION OF AMERICA
INDUSTRIAL ELECTRONIC PRODUCTS, CAMDEN, N. J.

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WA-670

IB-24895

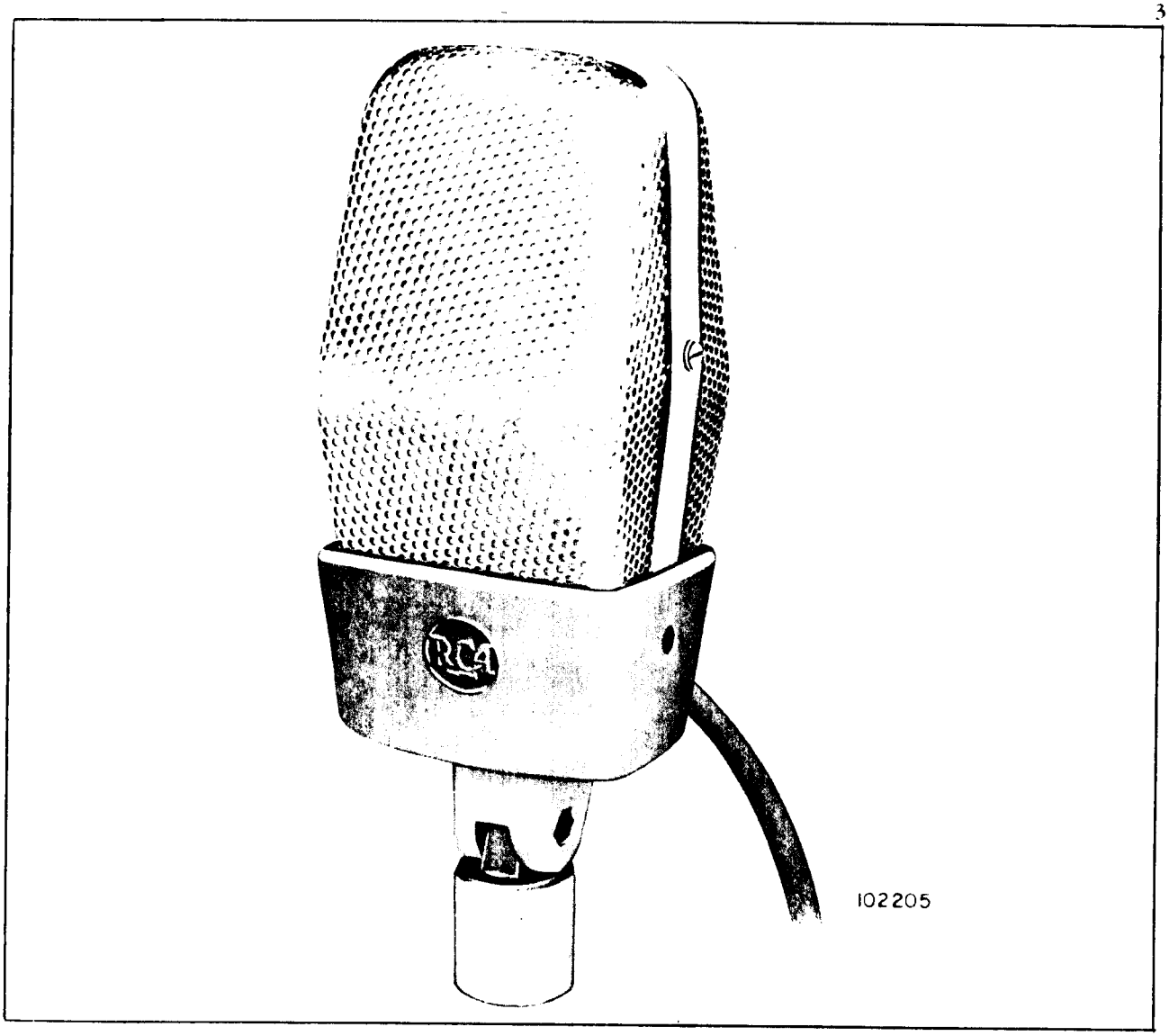


Figure 1—Type BK-11A Velocity Microphone, MI-11019

TECHNICAL DATA

Output Impedance

30, 150, and 250 ohms
(Connected for 250 ohms when shipped)

Load Impedance

Unloaded Input Transformer

Effective Output Level

56 dbm*
G_M = 147 db
(G_M = E.I.A. Sensitivity Rating)

Hum Pickup Level**

130 dbm (Music position)

Cable

MI-43-D, 3-conductor shielded, 30 feet, no plug

Mounting

1/2-inch standard pipe thread
Swivel provides ±45° tilt from vertical position

Overall Dimensions and Weight

Length—8 inches
Width—2-7/8 inches
Depth—2-3/8 inches
Weight—2 lbs less cable

Finish

Low gloss deep umber gray and non-reflecting stainless steel.

* Sound pressure = 10 dynes/CM^2.
** Referred to a hum field at 1 x 10^{-3} gauss.

DESCRIPTION

The RCA Type BK-11A Velocity Microphone, as shown in figure 1, is a dependable, bi-directional microphone, specially designed for AM, FM and TV studio use where a microphone of highest quality reproduction is desired. The BK-11A is constructed to withstand mechanical shocks and to retain its sensitivity and frequency response regardless of changes in temperature and humidity. The microphone is exceptionally well shielded and can perform satisfactorily in high hum fields. Acoustically designed, sturdy stainless steel screens protect the microphone from mechanical injury.

The moving element is a thin, corrugated metallic ribbon supported at the ends and placed between the pole pieces of a magnetic circuit. Because of its lightweight, the motion of the ribbon corresponds very closely to the velocity of the air particles and the voltage generated in it is therefore, a reproduction of the sound waves which traverse it. The microphone is free of the effects of cavity resonance, diaphragm resonance and pressure doubling.

The uniform frequency response, 30 to 15,000 cycles, is suitable for high fidelity pickup of voice and music. The three-position (M, V1, V2) screwdriver switch may be easily adjusted to the position suitable for the application depending on the distance between the sound source and the microphone.

Accessories

The BK-11A may be used on any one of the following stands which are designed to secure the microphone properly for a wide range of applications:

Type	*MI-Number*
KS-11A—Desk Stand	MI-11008
91-C Desk Stand	MI-4092-E
KS-2A—Portable Stand	MI-4093-C
KS-3B—Boom Stand	MI-11056

Directional Pattern

The directional patterns are shown in figure 3. The bi-directional pattern of the velocity microphone permits a pickup distance 1.73 times that of a non-directional microphone for an equal signal to random acoustical noise. This is the same increase in distance that is obtainable with a unidirectional microphone having a cardioid pattern. The bi-directional pattern may be used to greater advantage when the unwanted sound or reflections are directed in the null plane. The usual vertical position permits cancellation of floor and ceiling reflections, and by careful orientation, other positions may be used to reduce reverberation and unwanted sound.

The BK-11A response to sounds originating in the null plane is shown by the 90° curves in figure 4. Unlike other types of directional microphones, the null plane provides excellent rejection of sound over the entire audio frequency range. This is particularly valuable for instance, when the microphone is positioned to eliminate feedback from sound-reinforcing loudspeakers.

Frequency Response

The frequency response to a sound source more than three feet from the microphone (plane wave) is shown in figure 4, which includes curves for various angles of pickup. The response to sound sources located over the useful angle of pickup, in the front or rear of the microphone, is more uniform than has been previously obtained in a ribbon velocity microphone; therefore, there is little loss in quality with off-axis pickup.

When the sound source is closer than three feet, this type of microphone has a rising response characteristic at low frequencies. To compensate for this effect, the BK-11A incorporates a shunting reactor and a three-position, screwdriver operated switch. The switch positions and approximate source distance for uniform response are as follows:

Switch Positions	*Distance*
M—Music	3 feet or more
V1—Voice 1	12 inches
V2—Voice 2	7 inches

INSTALLATION

Mounting

The BK-11A may be mounted on any one of the accessories listed in the chart or any stand having the standard 1/2-inch pipe thread. The swivel provides a 90° angle of tilt, forward and backward 45° from a vertical position. The swivel friction may be varied by loosening or tightening the screw.

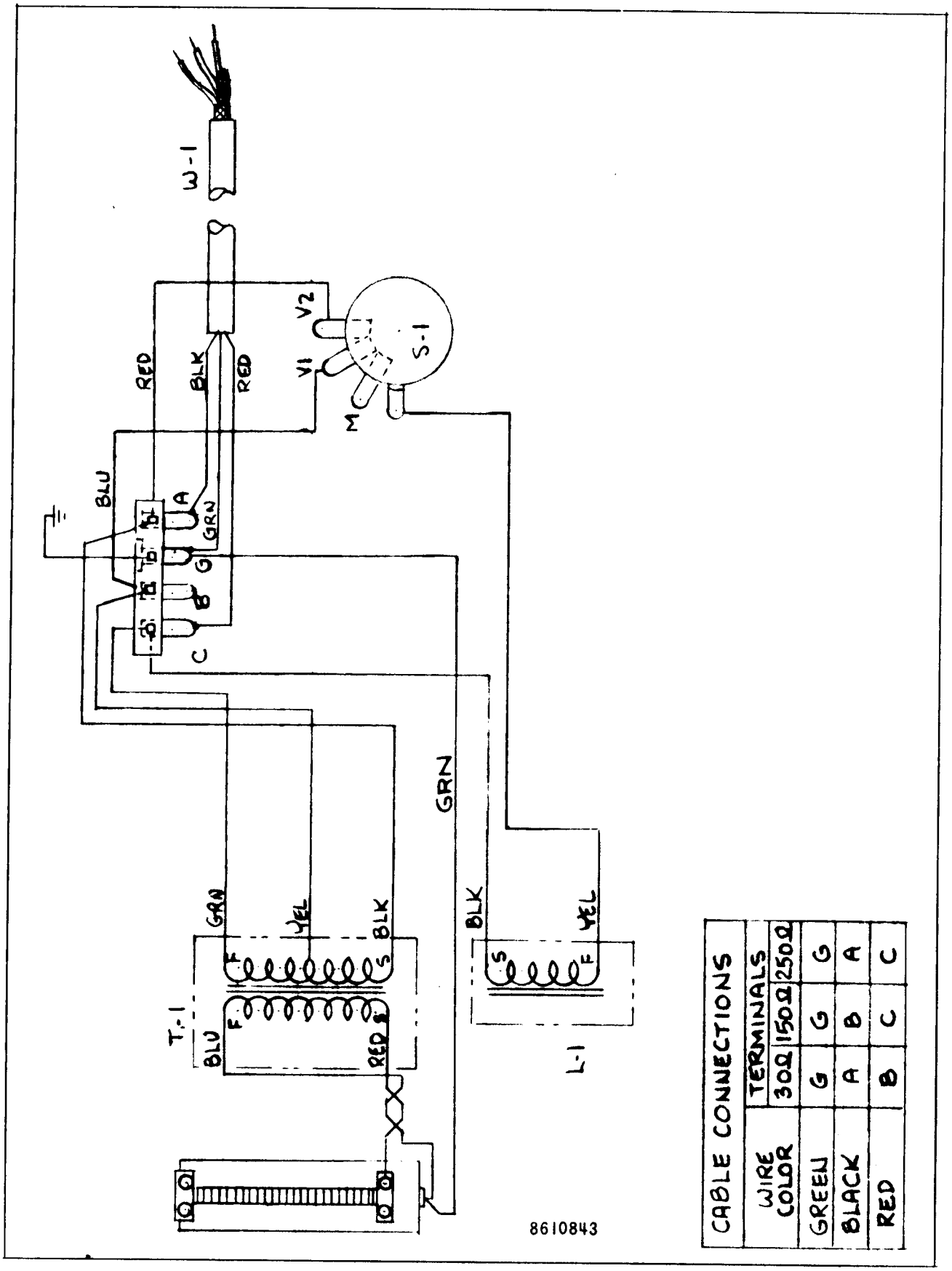


Figure 2—Schematic Diagram

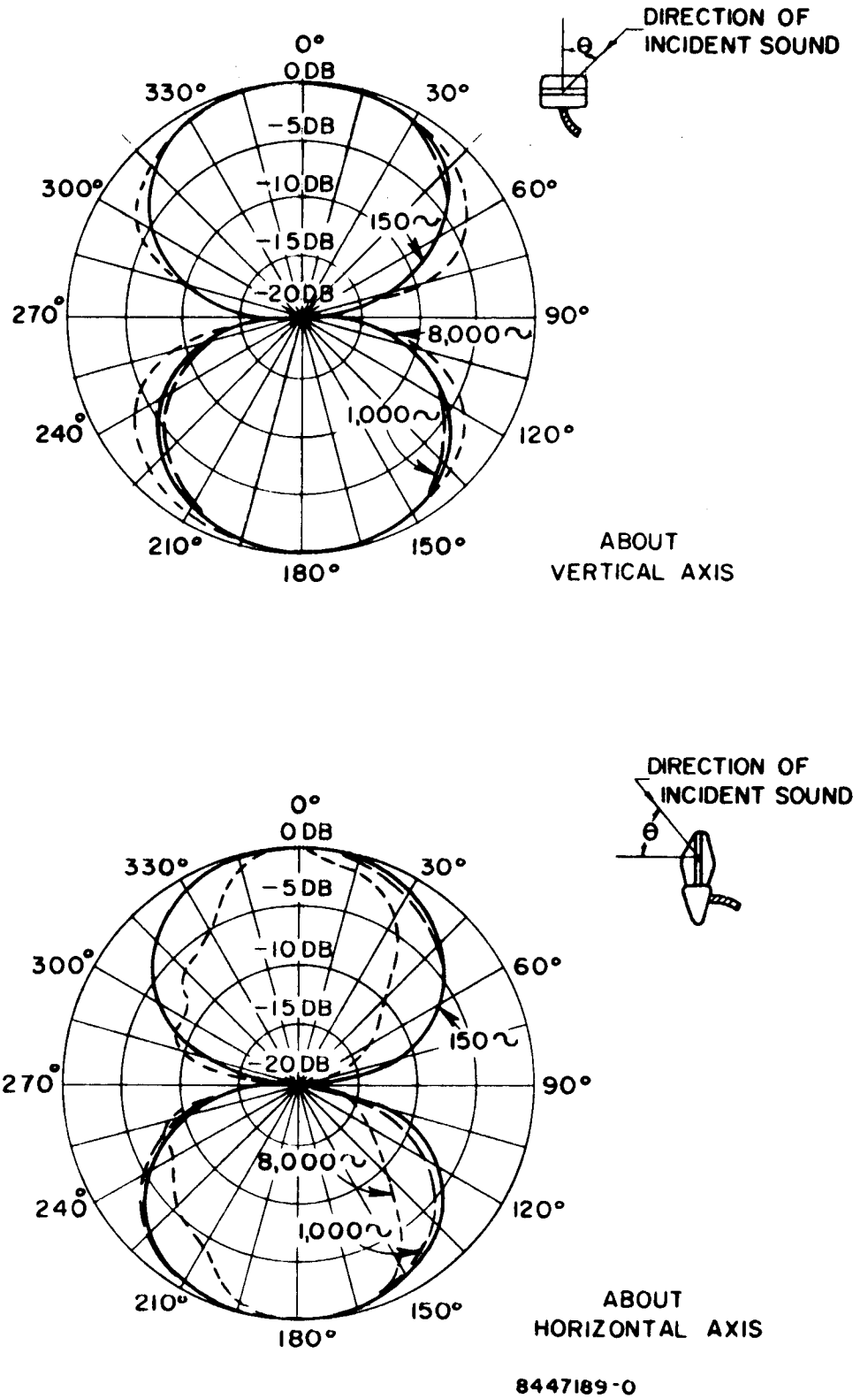
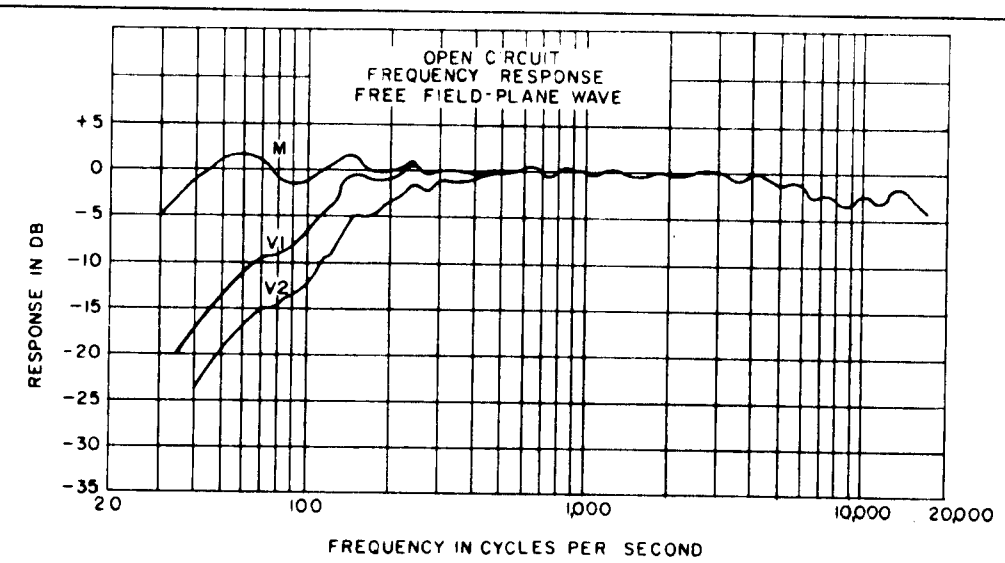
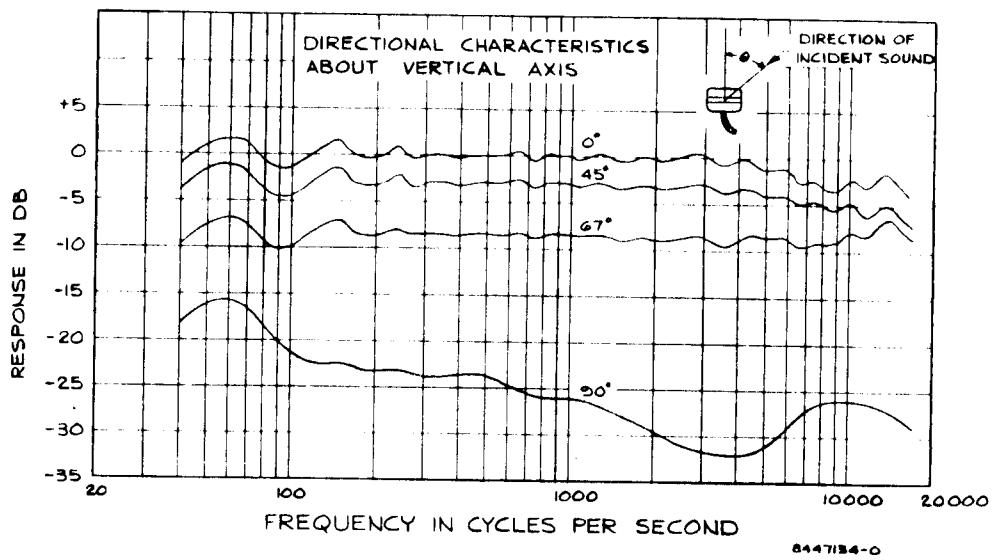


Figure 3—Directional Characteristics





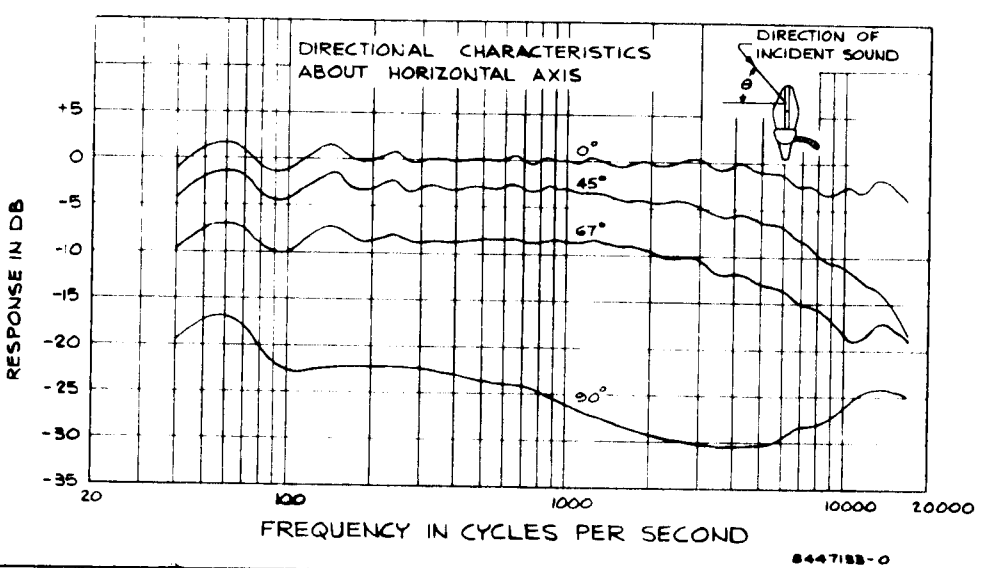


Figure 4—Frequency Response of Type BK-11A

Impedance Changes

The microphone is shipped connected for a 250-ohm output impedance. To change the impedance to 30 or 150 ohms, proceed as follows:

1. Remove the two screws which secure the screens and remove the screens.

2. Connect the cable leads to the terminals for the desired impedance as shown in the schematic diagram, figure 2.

3. Replace the screens, adjusting their position so that no gap exists for dirt to enter.

CAUTION: The screens should be removed only in an area free of magnetic particles and other dirt.

Phasing

The Type BK-11A microphone is phased so that when the sound pressure on the front of the microphone is in the positive half of the cycle, the red cable lead is electrically positive.

When several microphones are to feed the same system, connect them so that their outputs are in phase. To check the phasing of two microphones connect one microphone to the amplifier, speak into the microphone and adjust the volume control until the output is at the desired level. Then connect the other microphone to the amplifier; position both microphones close together and speak into them. If the level has decreased, reverse the connections of one of the microphone cables at the amplifier.

NOTE: Rotating a velocity microphone 180 degrees reverses the phase.

Hum

Hum may originate in any part of the audio system. In the microphone circuit, it may result from ground loops or un-balance caused by improper cable connections to the preamplifier board or microphone plug. Hum also may be induced in the microphone transformer or ribbon by magnetic fields emanating from power transformers or electrical machinery. In the Type BK-11A, shielding and careful design have reduced hum pickup to a minimum. In the event that exceptionally strong fields are encountered, the induced hum may be minimized by turning or tilting the microphone or changing its location.

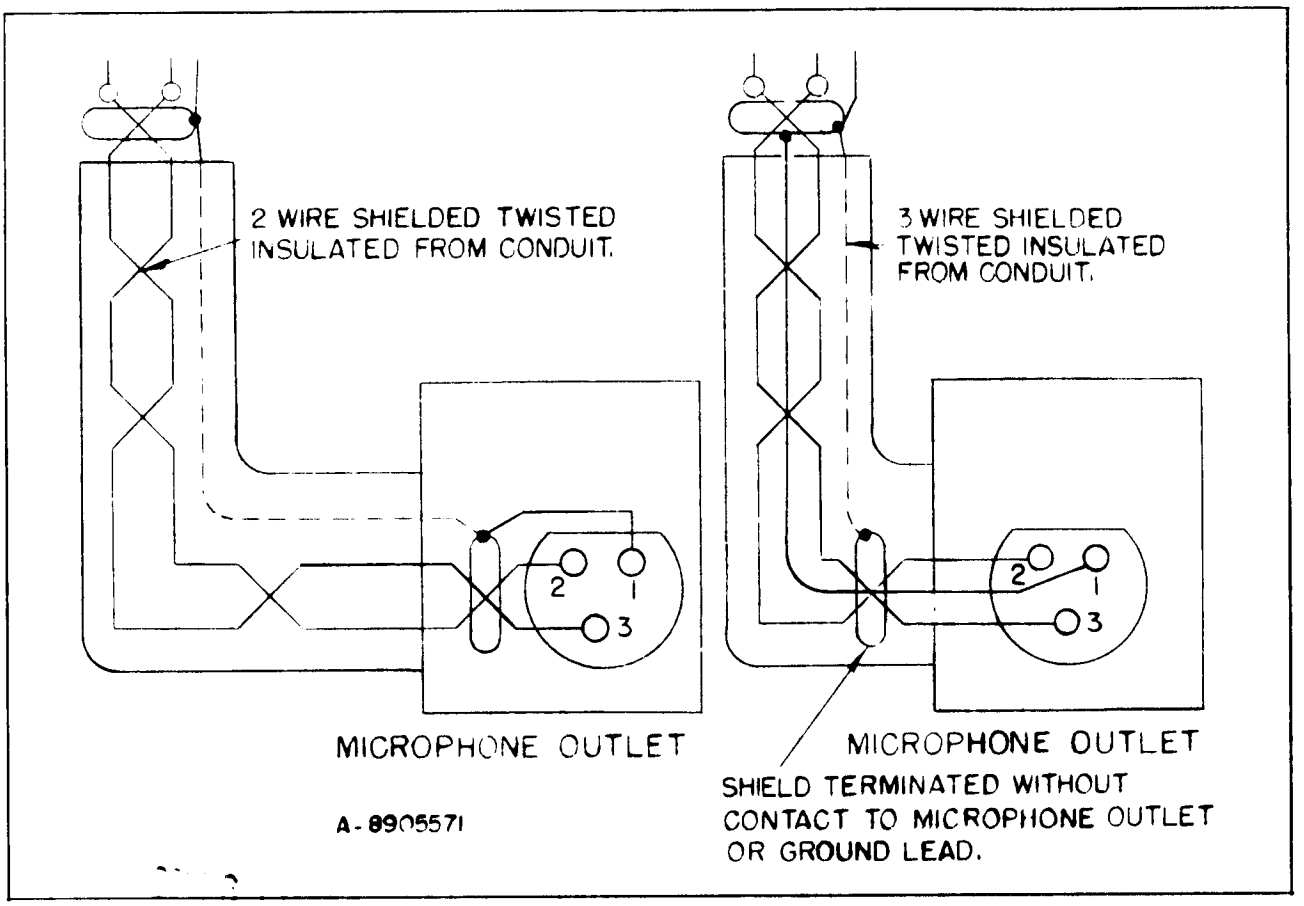


Figure 5—Ground and Shield Connections

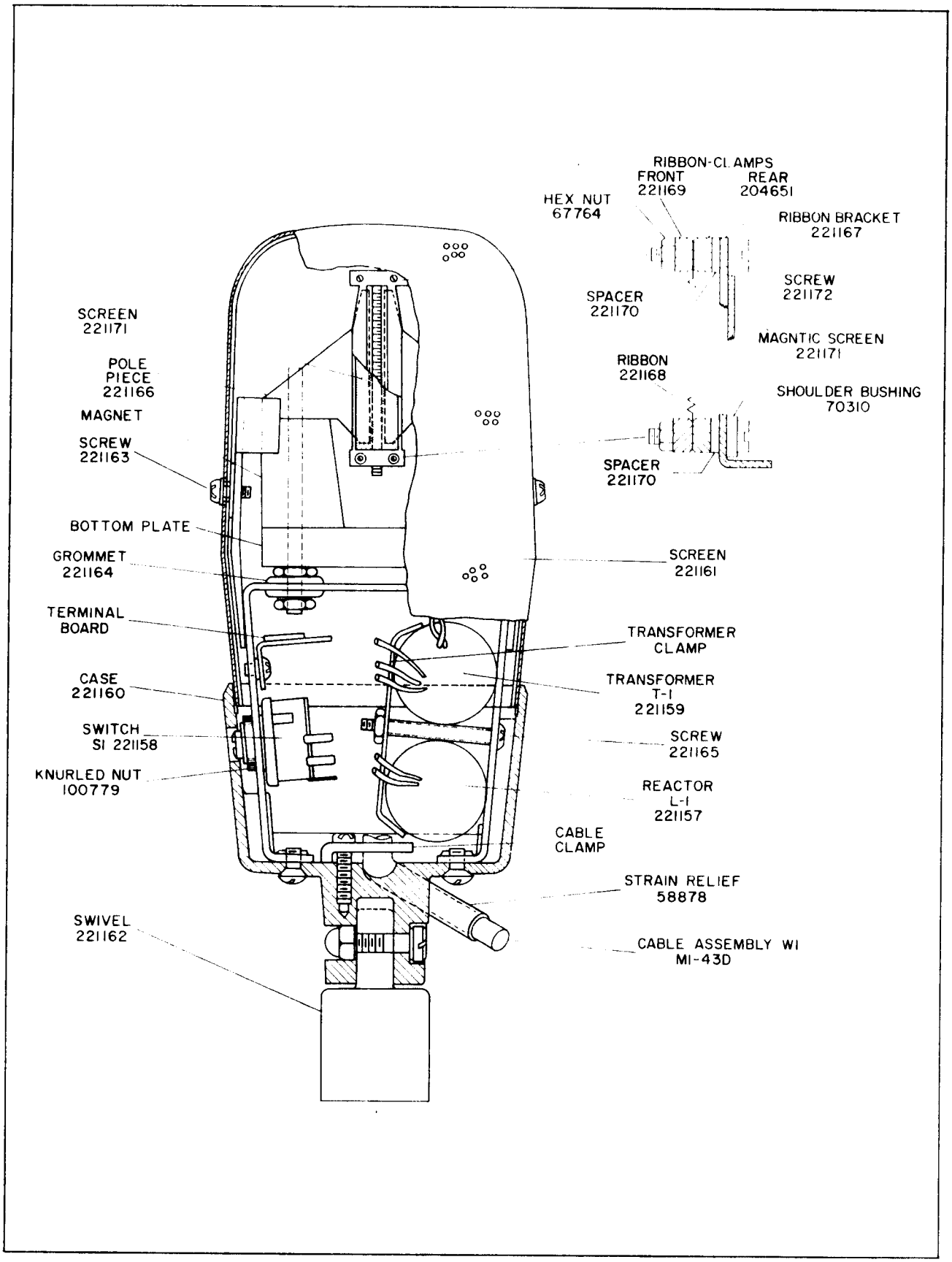


Figure 6—Location of Parts in Microphone BK-11A

MAINTENANCE

It is recommended that no attempt be made to make repairs other than replacement of screens, mounting parts and cables.

For microphone mechanism repairs, return the unit to the factory. Secure a Repair Order and a Returned Apparatus Tag from the RCA Field Office or write to RCA Service Company, Returned Apparatus Control, Camden, New Jersey. Attach the tag properly filled out, to the damaged microphone and send it and the repair order to the manufacturer.

CAUTION: To prevent permanent damage to the ribbon do not test continuity of the microphone with a circuit checker without connecting a resistor of at least 50,000 ohms in series with the checker. When testing the microphone lines, observe the same precautions or make certain that the microphones are disconnected.

LIST OF PARTS

Symbol No.	*Stock No.*	*Drawing No.*	*Description*
L1	221157	8443388-1	Reactor: microphone
S1	221158	149974-2	Switch: 1 circuit, 3 position
T1	221159	8443387-1	Transformer: output
W1	MI-43D	149110-506	Cable: microphone, 360 inches long
			Miscellaneous:
	221167	8986915-1	Bracket: ribbon
	70310	180731-19	Bushing: fiber, shoulder
	221160	8313228-1	Case: bottom
	221169	8851550-6	Clamp: ribbon, front, brass 0.050 thick
	204651	8851550-3	Clamp: ribbon, rear, brass 0.063 thick
	221164	921109-34	Grommet: motor assembly shock mounting
	100779	60514-103	Nut: knurled, 3/8-32, for S1 switch
	67764	183730-1	Nut: ribbon, mounting, 0-80
	221166		Pole Piece: right and left hand
		8443351-1	Pole Piece - right hand
		8443351-2	Pole Piece - left hand
	221168	810811-4	Ribbon
	221161		Screen Assembly: front and rear
		8443350-501	Screen - front
		8443350-502	Screen - rear
	221171	8875243-10	Screen: magnetic, for ribbon
	221165	990154-125	Screw: 4-40 x 1-1/4" lg. for transformer clamp
	221172	8835320-459	Screw: ribbon mounting, 0-80 x 0.281" lg.
	221163	990104-105	Screw: screen mounting, 4-40 x 1/4" lg.
	221170	8851565-1	Spacer: insulating, for ribbon clamps
	58878	8842615-1	Strain Relief: rubber, for microphone cable
	221162	8986924-1	Swivel: microphone mounting, 1/2-14 NPSM thread