



## INSTRUCTIONS FOR

# Velocity Microphone

## TYPE 44-BX

MI-4027-H, -J, -K

### TECHNICAL DATA

#### Output Impedance

30, 150 or 250 ohms (connected for 250 ohms when shipped)

#### Recommended Load Impedance

Unloaded input transformer

#### Effective Output Level at 1000 Cycles

-55 dbm\*

$G_M = 149$  db (RTMA rating)

#### Directional Characteristics

Bi-directional about horizontal and vertical axes (see figures 2 and 3)

#### Frequency Response

See figure 4.

#### Hum Pickup \*\*

-115 dbm (terminal-board link in M position)

#### Finish

TV gray and satin-chrome

#### Dimensions and Weight

Length - 12 inches (including mounting)

Width - 4-5/8 inches

Depth - 3-1/8 inches

Weight - 8 pound 10 ounces (unpacked)

#### Cable

3-conductor shielded, MI-43B  
30 feet long, no plug

#### Mounting

1/2-inch straight pipe thread

\*Sound Pressure = 10 dynes/cm<sup>2</sup>

\*\*Hum Field =  $1 \times 10^3$  gauss

### DESCRIPTION

#### General

The Type 44-BX Velocity Microphones (MI-4027-H, -J and -K) are high-fidelity microphones of the ribbon type that are specially designed for broadcast studio use. They are constructed to withstand mechanical shocks, and to retain sensitivity and frequency response regardless of changes in temperature, humidity and barometric pressure. Their essentially flat frequency response (50 to



Figure 1 - Type 44-BX Microphone

15,000 cycles) is suitable for reproducing both voice and music.

The moving element of the microphone is a thin corrugated aluminum ribbon suspended between the poles of a strong Alnico magnet. The moving air particles that constitute sound waves vibrate the ribbon in the magnetic field. This motion causes an alternating voltage to be generated in the ribbon, the amplitude of which is proportional to the velocity of the air particles. The output voltage and the electrical impedance of the ribbon are raised to a value suitable for transmission of the signal to an amplifier, by a transformer built into the microphone case. (See *Impedance Changes.*) The transformer is well shielded against stray magnetic fields by multiple shields of mu-metal and copper.

### Directional Pattern

One of the most useful properties of a velocity microphone is its bi-directional or figure-eight directional characteristics. As shown in the directional patterns (figures 2 and 3), the output of the microphone is maximum for sounds originating directly in front of or behind the microphone, and minimum for sounds originating at the sides, top or bottom. This characteristic is valuable for both vocal and musical pickup. For vocal pickup, its chief value lies in the fact that it enables participants in dialogue to face each other across the microphone. For musical pickup, it makes it possible to obtain different effects by arranging orchestral instruments about the microphone so that the sounds of some instruments are attenuated and others are accentuated.

The directional pattern also makes it possible to eliminate acoustic feedback from loudspeakers, which occurs frequently in sound-reinforcement work. In addition, the directional pattern reduces pickup of background noise and reflected sounds. For the same ratio of reverberatory to direct pickup, a sound source can be placed 1.73 times as far from a bi-directional microphone as from a non-directional microphone.

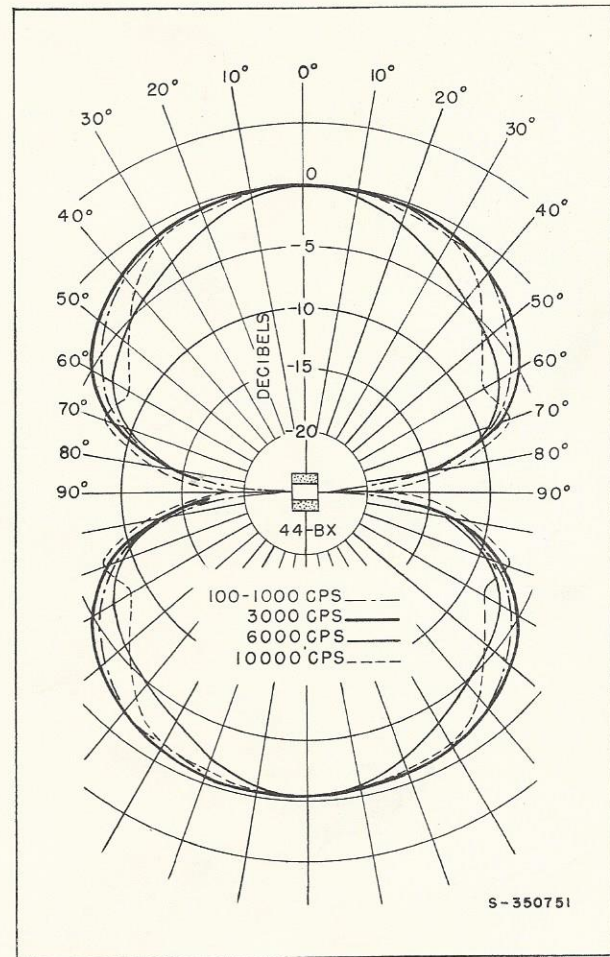


Figure 2 - Directional Pattern  
About Vertical Axis

### Frequency Response

The frequency response of a velocity microphone is essentially uniform when the sound source is at least three feet from the microphone, but the low frequencies are accentuated when the sound source is closer to the microphone. Speakers and singers are often required to stand close to the microphone, and the low-frequency accentuation which occurs is undesirable except when special effects are wanted.

To solve this problem, a jumper connection is provided on the microphone terminal board (see figures 6 and 7) that provide either of two degrees of compensation for close talking. When the jumper is in the M (music) position no compensation is provided, and the response is essentially uniform from 50 to 15,000 cycles per second, provided that the announcer or musical instrument is at least three feet from the microphone. However, the announcer

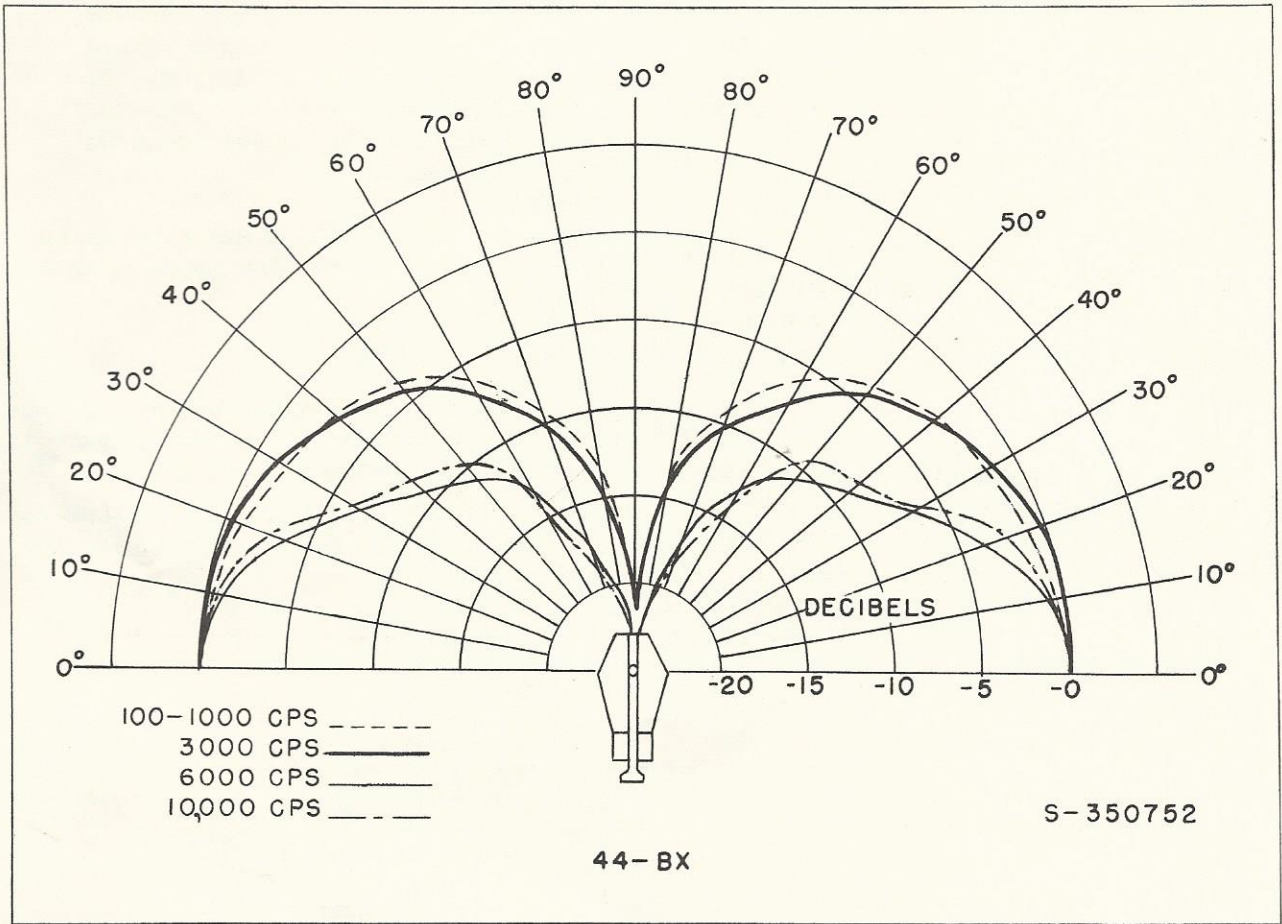


Figure 3 - Directional Pattern About Horizontal Axis

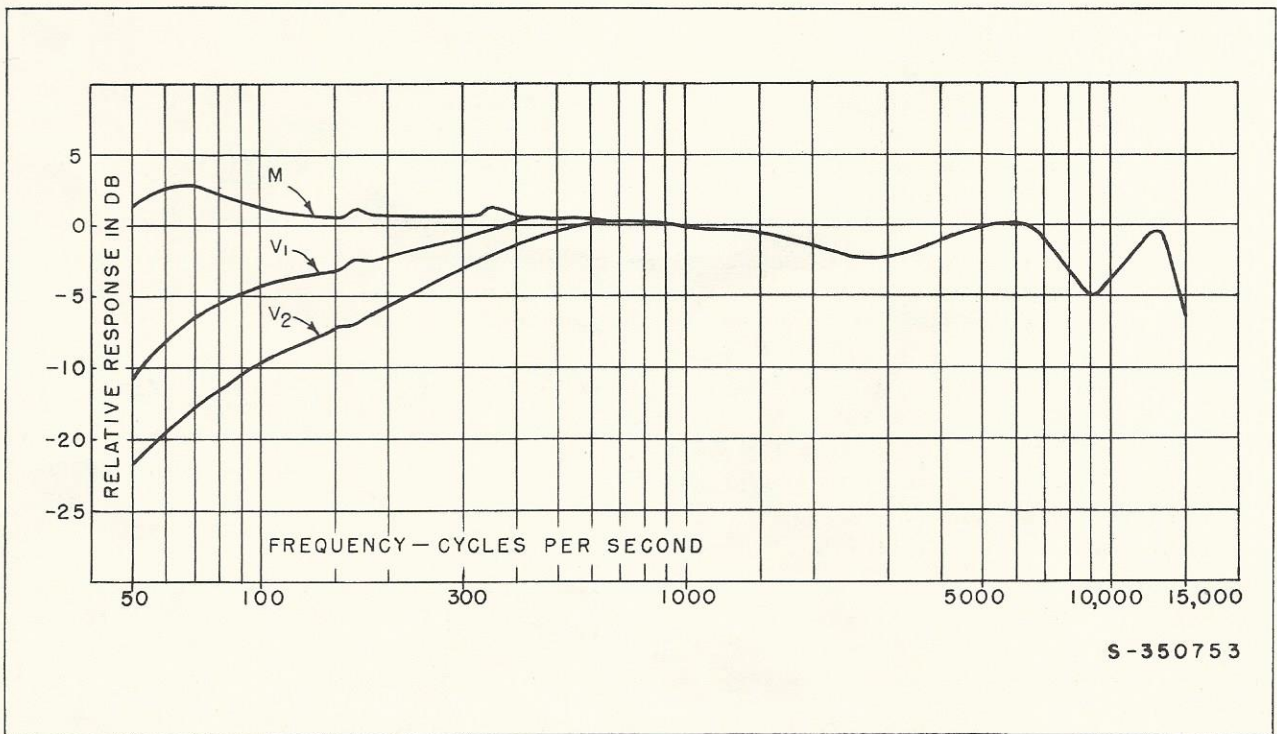


Figure 4 - Frequency Response

may move as close to the microphone as 12 inches when the jumper is in the V1 position, or seven inches when it is in the V2 position, without causing objectionable low-frequency boost.

The MI-4027-H and -J microphones have all three jumper positions, M, V1 and V2. The MI-4027-K microphone has only two positions M and V. See figure 7. The response-frequency characteristic for the V position on the MI-4027-K is equivalent to the V1 position on the MI-4027-H and 4027-J.

The frequency response to plane sound waves for the M, V1 and V2 positions is shown in figure 4. Approximately plane sound waves are obtained at the microphone when the source is more than three feet away.

NOTE: It is not intended that the voice-music connections be changed between numbers on a program. The microphone should be connected permanently for either the M, V1 or V2 response.

**Mounting**

Mount the microphone on any stand having a 1/2-inch pipe thread (see Table of Accessories).

**Impedance Changes**

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

- a. Remove the four round-head screws and the plate from the bottom of the microphone case.

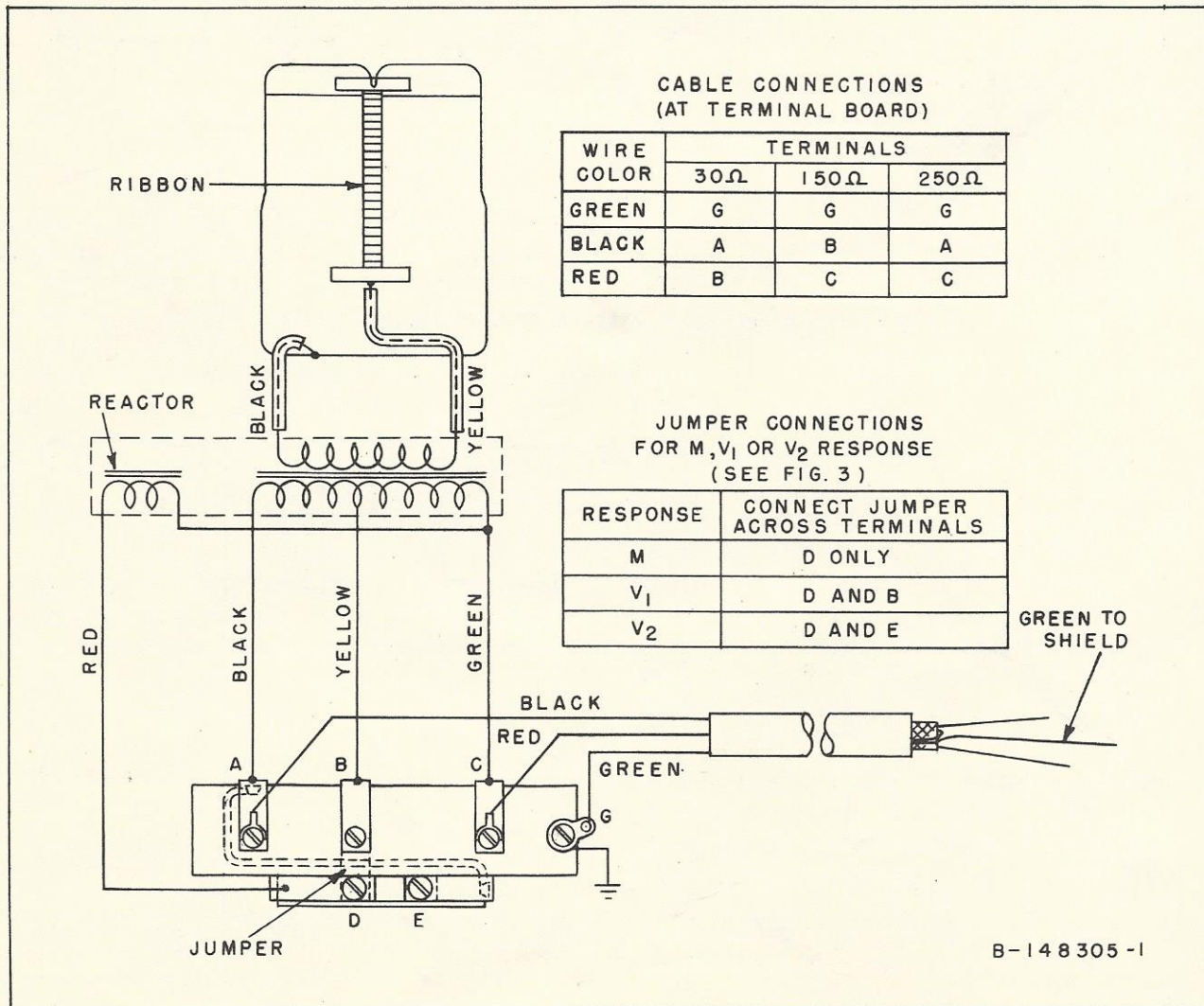


Figure 5 - Schematic Diagram for MI-4027-H Microphone

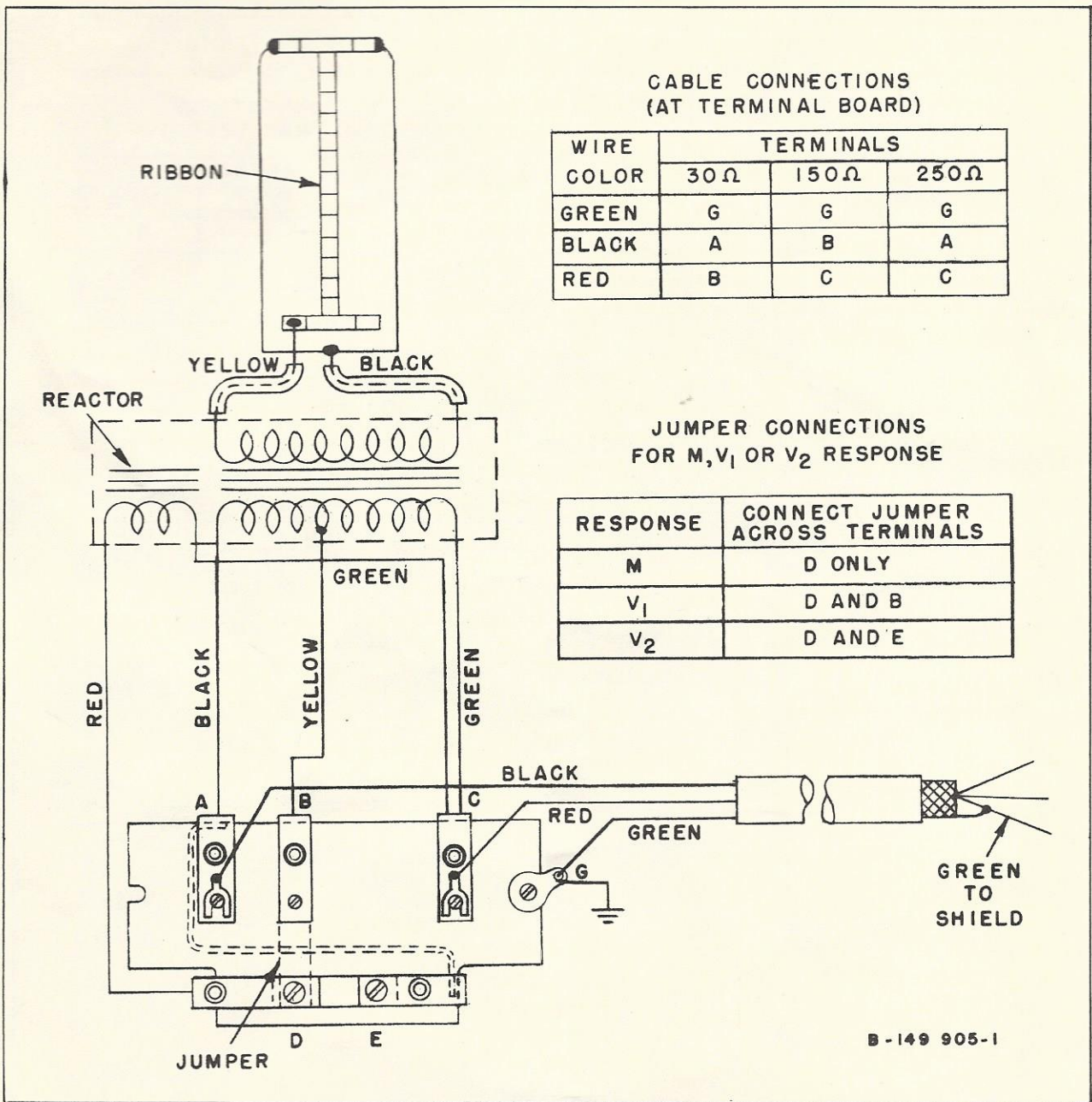


Figure 6 - Schematic Diagram for MI-4027-J Microphone

b. Connect the cable leads to the terminals for the desired impedance as shown in figures 5, 6 and 7, or the diagram attached to the cover of the transformer housing.

#### Voice-Music Connections

The position of the jumper for the M, V<sub>1</sub> or V<sub>2</sub> response can be observed through the hole in the bottom cover of the microphone. To change this connection, remove the bottom cover (as directed under *Impedance Changes*) and connect the jumper for the desired response as shown in figures 5, 6 and 7.

#### Phasing

The Type 44-BX (MI-4027-H, J and K) 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 to 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

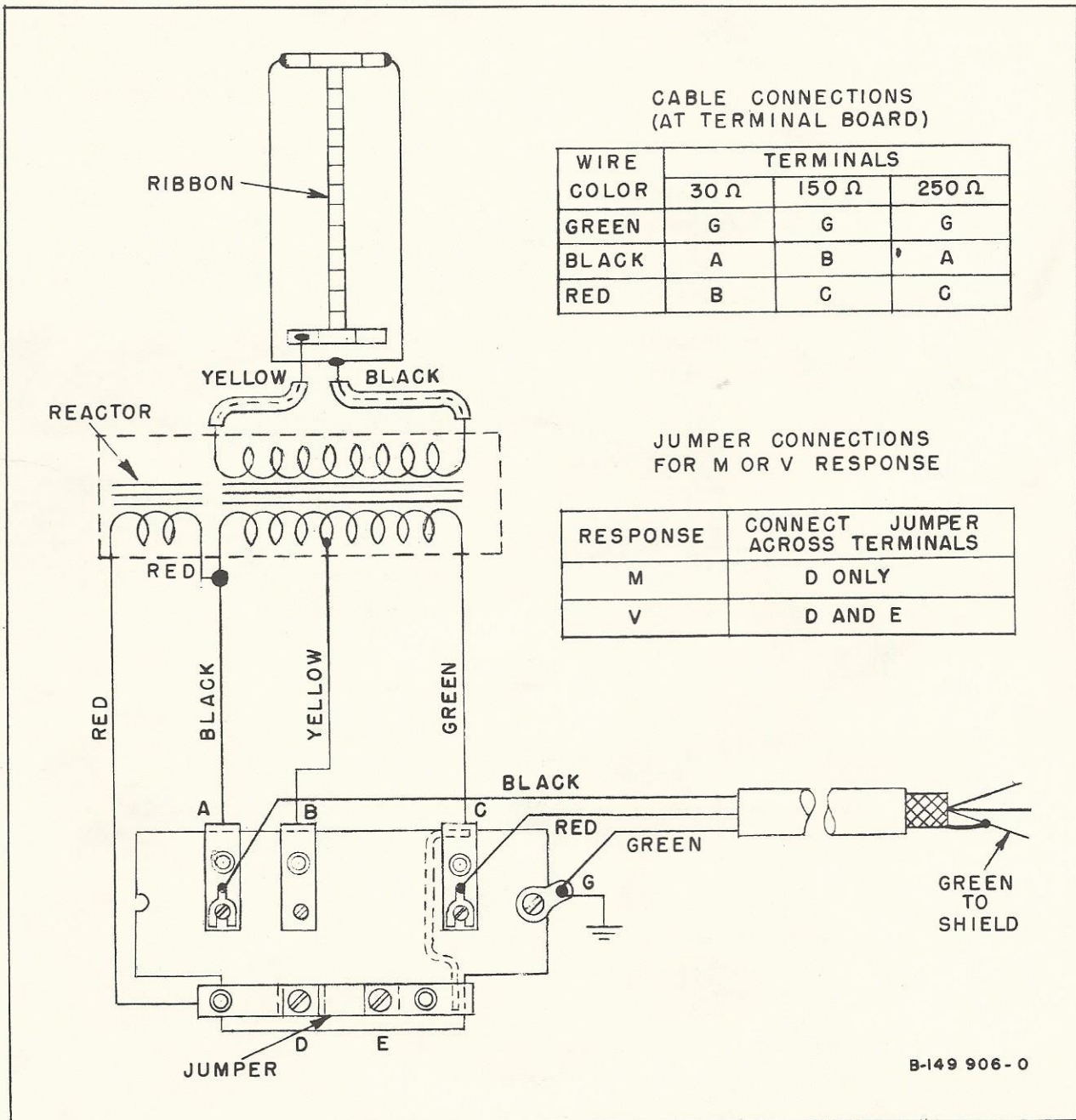


Figure 7 - Schematic Diagram for MI-4027-K Microphone

at the desired level. Then connect the other microphone to the amplifier, hold both microphones together and speak into them. Do not change the volume-control setting. If the volume has decreased, reverse the connections of one of the microphone cables at the amplifier.

*CAUTION: Rotating a velocity microphone 180 degrees reverses the phase.*

### OPERATION

Program quality depends to a great extent on placement of the microphone. Since the microphone position for which the best quality is obtained varies with such factors as the number of performers, types of musical instruments, and construction of the studio, it should be found by experimental placement, and by monitoring the program with a high-fidelity loudspeaker such as the RCA Type LC-1A.

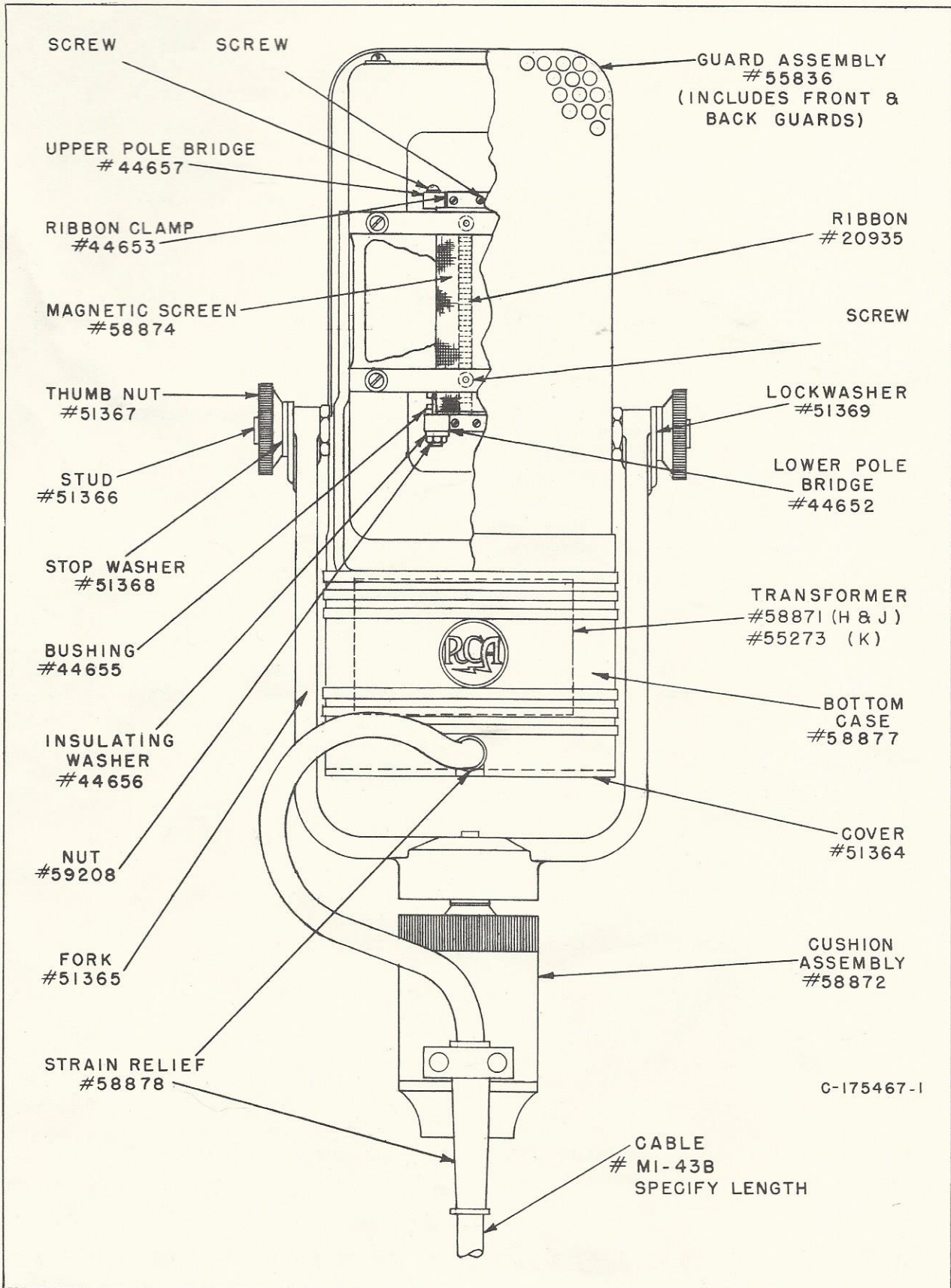


Figure 8 - Parts Location Diagram

When placing the microphone, observe the following general rules:

a. Place the microphone so that its front or rear surface faces the sources of desired sounds, and its sides face the sources of reflections or other undesired sounds.

b. Place high-frequency musical instruments, such as violins and saxophones at small angles with the axis perpendicular to the front or rear surface of the microphone, and low-frequency instruments at greater angles. Refer to figures 2 and 3 for curves showing the directional response to tones of various frequencies.

c. Do not place the microphone nearer to speakers or singers than 12 inches when the V1 connection is used, 7 inches when the V2 connection is used or three feet when the M connection is used, or voices will sound unnaturally deep. When only one voice position V is available as in MI-4027-K, place the microphone 12 inches from speakers or singers.

#### MAINTENANCE

*CAUTION: Keep the microphone away from iron filings or magnetic dust. Although the screen provides excellent protection, minute iron particles commonly found on work benches and in maintenance shops may be drawn through the screen by the powerful magnet. If allowed to accumulate, the particles may mar the quality of reproduction.*

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

#### ACCESSORIES

The following accessories are recommended for use with the Type 44-BX Microphone.

Description	MI Number
Boom Stand, Type KS-3B, Satin-chrome and umber-gray finish	11056
Desk Stand, Type 91-A; Dark umber-gray finish	4058-C
Program Stand, Satin-chrome finish	4090-A
Type 90-A	
Type 90-AS	4098
Cable, extnesion; three-conductor shielded (specify length in feet)	43-B

For replacement of the ribbon or magnet assembly, it is recommended that the microphone be returned to the manufacturer. Before returning a unit, make sure the trouble is in the microphone and not elsewhere in the circuit. Obtain a Returned Apparatus Tag and Repair Order from your RCA Field Office or write to RCA Service Company, Returned Apparatus Control, Camden, N.J. Attach the tag, properly filled out, to the damaged equipment and send the equipment and the repair order to the manufacturer.

#### LIST OF PARTS

Description	Stock No.
Bridge, pole (upper)	44657
Bridge, pole (lower)	44652
Bushing, ribbon clamp	44655
Cable (specify length)	MI-43B
Case, bottom	58877
Clamp, ribbon	44653
Cover, bottom-case	51364
Cushion Assembly (includes cable clamp and two hex nuts and lockwashers for mounting)	58872
Fork, supporting	51365
Guard Assembly, front and back	55836
Nut, thumb; for swivel	51367
Nut, 2-56, for lower pole bridge	59208
Ribbon	20935
Screen, magnetic	58874
Strain relief, for cable (quantity one)	58878
Stud, swivel	51366
Transformer, for MI-4027-H and -J	58871
Transformer, for MI-4027-K	55273
Washer, lock; for thumb nut	51369
Washer, pole-bridge insulating	44656
Washer, stop; for thumb nut	51368

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