ALL-PURPOSE MICROPHONE

TYPE 77-C

MI-4042-A & MI-4042-B

MASTER

NO LONGER STOCKED

DESCRIPTION

The All-Purpose Microphone consists of two ribbon type microphones operating in a common airgap. One of the units is responsive to the pressure gradient of the sound wave and is commonly called a velocity microphone. The other unit responds to the pressure in the sound wave. The outputs of the two microphones are connected in series and the resultant vector addition of the generated voltages produces a directional characteristic as shown in Figure 1 (c). Characteristics of the velocity and pressure sections are shown at "A" and "B" respectively. The velocity section follows the conventional construction for this type of microphone. The pressure operated section is open on one side and terminated on the other in a folded tube packed with sound absorbing meterial. This arrangement produces a pressure operated microphone which is essentially resistance controlled over the response range. This feature is essential since both the phase and magnitude of the output voltages of both sections must maintain a correct relation over the entire operating range.

The ribbon and magnet assembly is enclosed in the perforated housing located at the top of the unit. The screen serves to provide wind screening and protection from dust and mechanical injury. The folded tube associated with the pressure section is contained in the cylindrical body. The impedance matching transformer is located in the hemispherical shell at the bottom of the microphone.

The microphone may also be operated as either a non-directional or a bi-directional microphone by using the elements comprising the uni-directional microphone separately. An externally operated switching means is provided for this purpose.

The cushion mounting is threaded to fit any of the microphone stands having a 1/2-inch pipe thread. Removal of the cushion mounting will allow the microphone to be used with stands having a 1/8-inch pipe thread.

SENSITIVITY - With an input sound pressure of 10 dynes per square centimeter the following output levels will be obtained for uni-directional operation. If the microphone is operated into a matched load these levels should be reduced by 6 db.

Output in volts = 1070×10^{-6}, open circuit, 250-ohm output terminals.

-64 db at 12.5 mw zero level

-61 db at 6 mw zero level

-54 db at 1 mw zero level

MI 4042-A

Non-directional and bi-directional operation will result in a 3 db loss in output.

RESPONSE CHARACTERISTICS - The operating range of the microphone extends from 40 to 10,000 cycles when used as either a uni-directional or bi-directional microphone and from 60 to 10,000 cycles when used as a non-directional microphone.

The output of both the bi-directional and uni-directional microphones will show increased low frequency response when the microphone is located less than two feet from a source of sound. The effect is, however, much less pronounced for uni-directional operation than bi-directional operation. This effect is absent when the non-directional connection is used.

DIRECTIONAL CHARACTERISTICS -

Uni-Directional Operation - On the front, or operating side, of the microphone the response is very uniform, while at the rear of the microphone sounds are attenuated by an average of 14-20 db, thus giving approximately a 10-to-1 ratio of desired to undesired pick-up. Sound waves originating in front and along an axis perpendicular to the plane of the ribbon will, naturally, have the maximum effect.

The actual measured response of the uni-directional microphone, as shown in Figure 2, approaches a cardioid very closely. For all frequencies up to 4000 cycles the cancellation is very good. At higher frequencies a small "tail" occurs because of the slight phase displacement that begins to become noticeable in this range.

Bi-Directional Operation - The directional pattern is shown to approximation in Figure 1 (a). This characteristic remains substantially unchanged with frequency.

Non-Directional Operation - The response is essentially non-directional from 60 to 10,000 cycles over an angle of 180°, and from 60 to 5000 cycles over 360°. For the same allowable reverberation pick-up, the operating distance of the bi-directional and uni-directional microphone is approximately 1.73 times greater than that of a non-directional microphone.

ASSEMBLY

MOUNTING - The microphone may be used with stands having either 1/2-inch or 1/8-inch pipe thread, by first removing the cushion mounting.

CABLE CONNECTIONS - The MI-4042-A Microphone has an output impedance of 250 ohms and MI-4042-B, an impedance of 50 ohms. It is not possible to convert from one impedance to the other except by a complete change of transformer.

OPERATION

The microphone may be used either as:

1. Uni-directional microphone.
2. Bi-directional (velocity) microphone.
3. Non-directional (pressure) microphone.

The change is effected by rotating the ring located at the top of the hemispherical base until the picture of the directional pattern desired lines up with the index mark on the case. These patterns, in color, are placed on both the front and back of the unit and may be identified by referring to Figure 1 (a), (b) and (c).

PHASING - When the outputs of two or more microphones are fed into a common mixing circuit, it is important that their respective output currents be in phase with relation to each other; otherwise, they will cancel each other, resulting in a reduction in output instead of a gain.

To check the phasing of two or more microphones, first turn their respective attenuators to zero. Place two microphones side by side and while speaking into one microphone adjust its respective attenuator to a normal output level as indicated by a volume indicator. If no indicator is available, the volume level from the speakers may be gaged by ear. Turn up the attenuator of the second microphone to approximately the same position as the first and note whether the output level increases or diminishes. If it increases, the two microphones are functioning in phase with respect to each other; if it decreases, the two microphones are out of phase with respect to each other. If the microphones are out of phase, remove the lower cover of one microphone and reverse the cable connections at the terminals.

If more than two microphones are to be used in the same mixing circuit, the phasing test should be repeated with each microphone, using the first microphone as a reference for each of the others. After each microphone is phased, its attenuator should be returned to zero so that it will not affect the testing of the next microphone. When more than two microphones are being phased, it is a pretty good idea to check the phasing of all of the microphones before changing the connections of any, then reverse the connections of the minority group to save unnecessary labor.

REPLACING RIBBONS - It is not recommended that the customer attempt repairs other than the replacement of screens, transformers and mounting parts. For new ribbons, etc., it is recommended that the unit be returned to the manufacturer for repair.

This may be done by writing to the RCA Manufacturing Company, Inc., for a "Returned Apparatus" tag and "Report Blank". Before doing this, however, make absolutely certain that the trouble is in the microphone and not elsewhere in the circuit.

PARTS LIST

Description	Type	Stock No.	Description	Type	Stock No.
All-Purpose Microphone (250-ohm)	77-C	MI-4042-A	Light Program Stand (Chrome and Black)		MI-4068-A
All-Purpose Microphone (50-ohm)	77-C	MI-4042-B	Boom Stand	90-B	MI-4091
Program Stand	AZ-4090	MI-4056	Portable Microphone Stand	59-A	MI-4059
Program Stand (Chrome and Black)	90-A	MI-4090	Microphone Screens		18225
			Output Transformer (250-ohm)		18391
			Output Transformer (50-ohm)		18392
			Cushion Assembly		18227

Description	Type	Stock No.
Fork		18393
Clamp Nut Cushion Washer Cushion Washer Clamping Washer		18229
Microphone Cable (Specify Length)		MI-55

Description	Type	Stock No.
Microphone Plug	P3-CG-125	MI-4630
Female Cord Connector	P3-CG-115	MI-4620
Flush Type Wall Receptacle	P3-13	MI-4622-A
Surface Wall Receptacle	P3-17	MI-4621
Flush Wall Receptacle (In Switch Plate)	P3-35	MI-4625
Microphone Cable (30 ft.)		32583

Ribbon 27973
Contact Spring (for ribbon) 19895

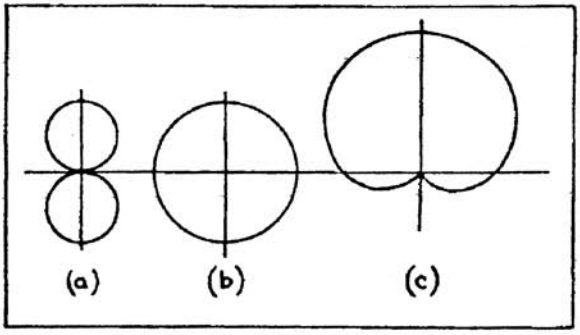

FIGURE 1 - DIRECTIONAL PATTERNS

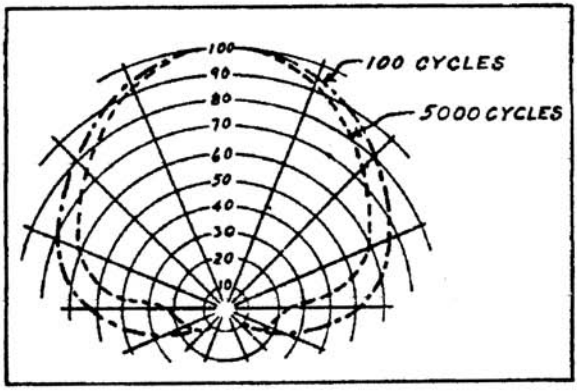

FIGURE 2 - RESPONSE PATTERN

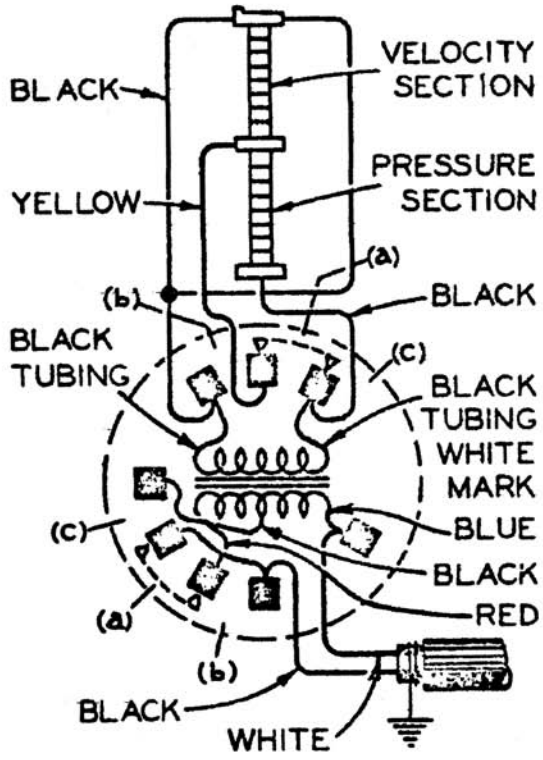

FIGURE 3 - MICROPHONE CIRCUIT (Schematic K-845900)

Manufactured by
RCA MANUFACTURING COMPANY, INC.
Camden, N.J., U.S.A.