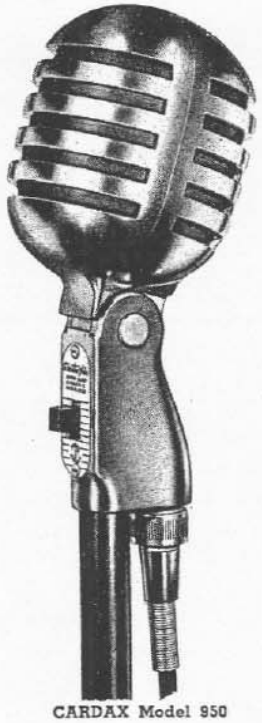
Electro-Voice
MICROPHONES

ELECTRO-VOICE, INC.,
1239 South Bend Ave., South Bend 24, Indiana

TECHNICAL DATA SHEET NO. 50
MODEL—CARDAX 950
TYPE—CRYSTAL

The CARDAX is a cardioid microphone of the crystal type operating on the E-V *Mechanophase principle (Fig. 2). It utilizes a phase shifting diaphragm to produce a high degree of unidirectivity at all frequencies for satisfactory sound pick-up and reproduction, even under adverse acoustic conditions.



CARDAX Model 950

In addition to the advantages of the unidirectional cardioid pick-up pattern, the CARDAX Microphone has a dual frequency response selector. A convenient screw control on the back enables the user to obtain either a flat or a rising frequency response, as desired for any application. The CARDAX is extremely useful for public address work, recording, remote broadcasting, and communications. It is especially valuable in overcoming acoustic feedback, background noise and reverberation — simplifies microphone and speaker placement — permits increased loud-speaker volume levels.

ACOUSTICAL The open housing eliminates internal reflection and diffraction. This assures full utilization of the Mechanophase principle for producing a cardioid of revolution. In no instance should the back of the case be closed as it will reduce the degree of unidirectivity. The air-foil case and dual grille cloths minimize wind noise. Accurate reproduction without imposed peaks and dips are the result of the proper coordination of diaphragm design, reflection-free housing, and crystal mounting. Choice of frequency response curves adapts it to all types of pick-up and acoustic conditions. Cardioid polar pattern is shown in Fig. 3.

PHYSICAL The Electro-Voice CARDAX — Model 950 is constructed on a newly developed principle applied to a crystal type microphone. The frame and internal mounting structure is a single piece high-pressure die casting (Fig. 1). Jars and mechanical shock cannot cause shifting of the parts. The crystal is a Bimorph sealed against moisture to extend the crystal life. The crystal cartridge grille cloths are made from spun glass, selected because of extreme uniformity of thread size and mesh. In addition they are chemically inert and non-hygroscopic.

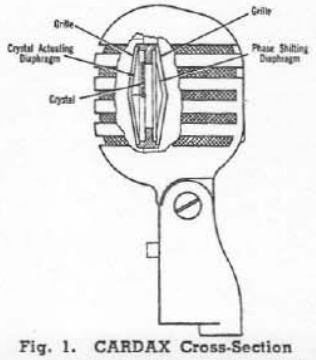


Fig. 1. CARDAX Cross-Section

*Patent Pending

The head is tiltable so that it may be directed toward the sound source for selective pick-up. Large bearing surfaces give smooth adjustment without the use of thumb nuts. Screw at side provides take-up for wear. A single-contact connector is built into the lower mounting stud, relieving the strain on the cable and connector when the microphone is tilted.

HOW E-V "MECHANOPHASE" WORKS

A. Crystal actuating diaphragm
B. Phase shifting diaphragm
C. Crystal element
D. Sound source
E. Sound, transmitted through B, is slowed so that it strikes back side of A at same instant as sound from rear reaches front of A. As these pressures are equal and opposite, there is no movement of the diaphragm or reproduced sound from rear. Sound striking A from front is fully reproduced because of longer path of travel and phase shifting of diaphragm B.

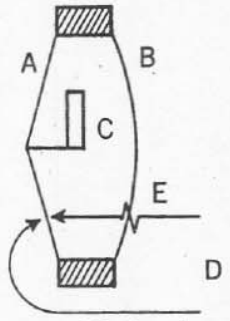
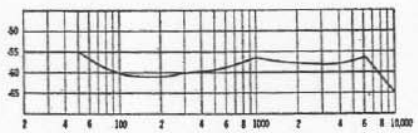


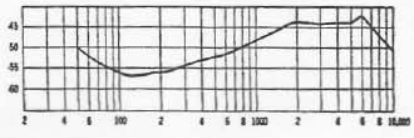
Fig. 2
The Mechanophase principle which produces the cardioid pick-up pattern.

ELECTRICAL Two types of frequency response are provided. These are selected by a screw control on the rear of the microphone. This control is designed for easy adjustment by a small screw driver. Stops are provided for IN or OUT position.



Wide Range, Substantially Flat Curve. Selector Screw OUT.

When the selector screw is in the OUT position the frequency response is wide and flat. Reproduction is full, accurate and completely natural. This response is recommended for music, speech, and for voices that have a full range. When the selector screw is in an IN position, the response is wide and rising. Thus, the higher frequencies are accentuated. Reproduced sound is clean, smooth, and brilliant. This response is recommended for use with speech or music when it is desirable to increase the articulation and sibilance. It it highly useful in the correction of deficiencies in originating sound, room acoustics, and characteristics of the system with which it is used.



Wide Range, Rising Curve. Selector Screw IN.

Electro-Voice TECHNICAL DATA SHEET No. 50, MODEL CARDAX 950 TYPE CRYSTAL

The cardioid characteristic of the CARDAX gives a wide angle front pick-up and is virtually dead from the rear, as indicated by Fig. 3. In addition the CARDAX gives the following advantages:

1. True cardioid characteristic gives wide angle front pick-up. Dead at rear.
2. The pick-up range is nearly doubled over that of a conventional pressure microphone for average conditions of reverberation, acoustic feed-back, and room noise. For public address applications, this pick-up range may be increased

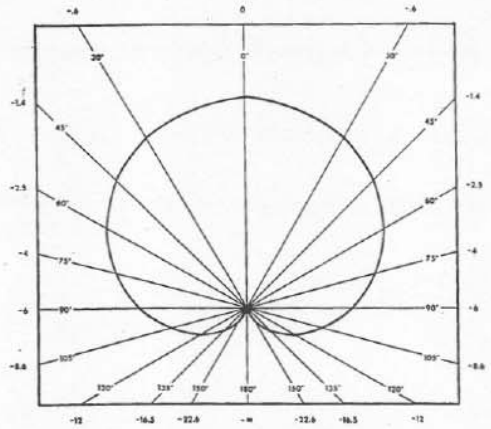


Fig. 3. Angle of Pick-up vs. Output in db.

considerably by proper placement of speakers so that direct and reflected sound strikes the microphone at the back (dead zone).

3. Random room noise and reverberation are substantially reduced.
4. The microphone may be placed so as to almost completely eliminate unwanted sounds.
5. The Mechanophase principle provides true cardioid pick-up *with* high output level.
6. Relatively high crystal capacitance makes possible the use of moderately long microphone cables. (See Table 1).
7. High output level of the CARDAX enables it to be used with any standard amplifier employing high impedance input.

INPUT CIRCUIT. Recommended input grid resistor .5 to 2 megohms for normal frequency response.

APPLICATIONS. The CARDAX is designed for all types of voice and music reproduction, indoors and outdoors. It performs faithfully under adverse acoustical conditions because of its directivity and dual response. The wide angle front response and increased pick-up range are ideal for group work. The cardioid pattern gives the user more freedom of movement. Recommended for all types of better quality public address, recording, paging systems, remote broadcast, dispatching, and radio communication.

MECHANICAL ON-OFF SWITCH. Sliding contact type switch is an integral part of the CARDAX. Short-circuits microphone output in "Off" position.

STAND MOUNTING STUD. On-Off switch is built in as an integral part, is easily accessible for reconnecting as a relay control. Large bearing surfaces give smooth tilt adjustment . . . Wear take-up provided by screw on the side.

CABLE. Supplied with 20 feet of well-shielded, low-loss synthetic rubber jacketed cable. Additional cable reduces the output level (See Table 1) but does not distort the frequency curve.

TABLE 1. CABLE LOSS

Cable Length in Feet	DB Loss in Level
20	.8
40	1.4
60	2.0
100	3.2
150	4.4
200	5.6

CASE. The microphone case is fabricated from the highest purity (99.99%) pressure cast metal.

FINISH. The CARDAX is finished in durable satin chromium. Wiping with a soft cloth is all that is necessary to maintain its rich lustre.

NET WEIGHT: 1¾ pounds.

SHIPPING WT: 2¼ pounds.

DIMENSIONS: See Fig. 4.

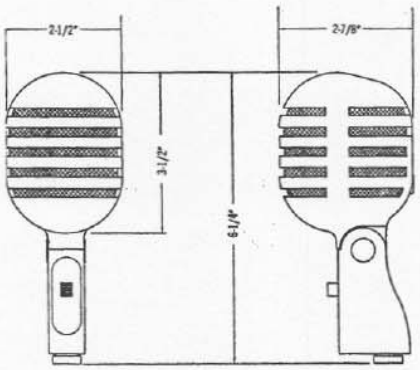


Fig. 4. Mechanical Dimensions

SPECIFICATIONS. *Output Level Rating.* Wide range, high fidelity (selector screw OUT): 57 db below 1 volt/dyne/cm² (open circuit). Voltage developed by normal speech at one foot (10 dynes/cm²): .014. Wide range, rising characteristic (selector screw IN): 48 db below 1 volt/dyne/cm² (open circuit). Voltage developed by normal speech at one foot (10 dynes/cm²): .033.

FREQUENCY RESPONSE. Selector screw located in rear of case selects either of the response curves listed.

POLAR PATTERN. (See Figure 3.) Wide angle front pick-up with high forward gain. Highly attenuated back pick-up.

TEMPERATURE. Crystal microphones should not be exposed to an ambient temperature of more than 125° F. or in direct sunlight, closed automobiles, or show windows in hot weather.

WARRANTY: The CARDAX is guaranteed against defects in workmanship or material for a period of one year. Damage to the crystal element through exposure to temperatures exceeding 112° F. is expressly not covered by this guarantee.

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