SR-Σ / System
Sigma

panoramic imaging electrostatic earspeaker

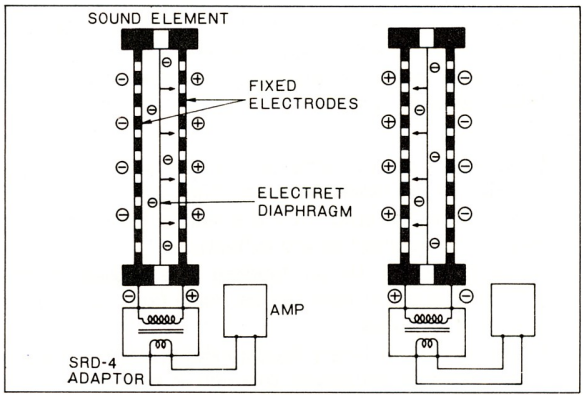
The STAX SR-Sigma panoramic imaging electrostatic earspeaker design is a successful attempt to recreate a natural, realistic sound field from a headphone format. Headphones were originally designed for picking up Morse Code in communications, not recreating a musical sound stage. Until the introduction of the STAX SR-Sigma, no headphone manufacturer paid much attention to ambience and its effect on musical imaging.

The SR-Sigma earspeaker design locates an oval shaped electrostatic transducer in front of the ear at a 90° angle to the ear. This does two things to improve the image perspective to the listener. First, by using an oval shaped transducer that is larger than the outer ear itself, the SR-Sigma allows the outer ear to naturally channel the waveform into the inner ear. This allows the sound to reach the eardrum in the most conventional way. Second, the transducer is located in front of the ear, not over the ear. This removes the image perspective from within the listener's head and places the image in front of the listener. The SR-Sigma transducing elements are positioned ideally in terms of the natural perimeters and auditory path of the ear. The result is optimum spacing for music in relation to the ear. The SR-Sigma gives natural sound with none of the tight, sealed-in feeling, or the diminished scale sensations conveyed by ordinary headphones.

Specifications

Type	Electrostatic
Frequency Response	20—35 KHz
Sensitivity	94dB/100v rms
Maximum Output	103dB

HOW ELECTROSTATIC EARSPEAKER WORKS



If we speak of a headphone, it usually means a dynamic one employing a dynamic transducer. In the dynamic transducer the driving force is applied only to the one part of the diaphragm which, therefore, must be stiff enough not to be deformed by air load. However, stiff materials considerably increase the diaphragm mass resulting in significant deterioration of transient response. In addition, the ununiform force applied over the diaphragm area leads to what is called "cone break-up". Hysteresis distortion caused through the magnet inevitable in the dynamic transducer cannot be ignored, either.

The electrostatic transducer adopted in the STAX earspeakers consists of two parallel-arranged fixed electrodes and several microns thick (2 microns in the SR-Sigma, the SR-Lambda, the SR-X/Mk3 and the SR-5N. 6 microns in the SR-84 and the SR-34) high-polymer film diaphragm suspended in the middle of the electrodes. The low-mass film diaphragm is supplied with the biasing voltage from the energizing adaptors or from the SRM-1/Mk2. In the electret type earspeakers like the SR-84 and the SR-34 the diaphragm is permanently charged minus. When the fluctuating voltage of the audio signal is applied to the electrodes, the diaphragm is pulled by the electrode which has the opposite charge of the diaphragm's and simultaneously pushed by the other electrode which then has the like charge of the diaphragm's. The continuous flow of alternating voltage in interpretation of audio signals causes the diaphragm to vibrate in faithful compliance with the amplifier output without time lag, assuring undistorted sound waves. This is why the STAX electrostatic earspeakers sound so good. The figure above shows the driving mechanism of the SR-84 and the SR-34.