

Rectilinear® X1a

A LOW-COST BOOKSHELF SPEAKER SYSTEM FOR CRITICAL LISTENING

Design Goals

The Rectilinear X1a was designed to make available to critical listeners a budget-priced bookshelf speaker of genuinely accurate response and very low distortion, including low *time delay distortion*. The utmost simplicity of design was sought in order to eliminate unessential parts and keep labor costs down, as long as no compromise in performance would result. Particular emphasis was placed on high efficiency without loss of bass response, as well as on relatively constant impedance across the frequency spectrum. These characteristics were considered necessary to make the speaker compatible with receivers and amplifiers of moderate price and therefore of modest power output. The subjective listening quality of the Rectilinear X1a was to be judged by the same standards as that of higher-priced speakers in the Rectilinear line.

Basic Configuration

The Rectilinear X1a is a two-way speaker system utilizing an extended-range woofer and an extended-range tweeter, both of the moving-coil principle. The cabinet is of normal bookshelf size but somewhat unconventional in that it is a tube-vented bass reflex enclosure instead of being completely enclosed.

Woofer

The most sophisticated woofer ever used in a low-priced speaker system is the heart of the Rectilinear X1a. Its diameter is 10 inches, which is optimum size for a two-way bookshelf speaker. The butylized cloth surround, in combination with the spider and voice coil construction used, permits unusually large cone excursions without distortion.

Since the operating range of the woofer is from 45 to 1000 Hz, provision must be made for unimpaired response far up into the midrange. This cannot be accomplished with a small-diameter voice coil driving a large diaphragm; therefore a large voice coil of 1½-inch diameter is used. It is re-

markable that this massive bass driver approaches the lighter and more specialized midrange speakers used in three-way systems as far as lack of coloration and low time delay are concerned.

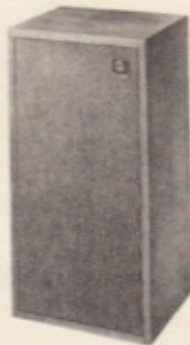
Since high efficiency is essential to the design concept of the Rectilinear X1a, the woofer requires less power to drive than most competitive models. An extra-long magnetic path is provided so that maximum electrical damping is applied to the moving mechanism. This results in unusually low distortion at high output levels, which is not an easy feat in a bass reflex design.

The response of the woofer begins to roll off naturally (i.e. mechanically) at 1000 Hz. This facilitates steep attenuation by means of an extremely simple crossover network.

Tweeter

This is a 3½-inch unit that covers the range from 1000 to 20,000 Hz, a span of more than four octaves. To avoid breakup at the bottom of this range requires a relatively large voice coil with a 9/16-inch diameter. Low moving mass is assured, however, by the special paper used in fabricating the cone and by the characteristics of the surround material. The resulting response is exceptionally flat, smooth and free from distortion. Total flux density of better than 11,000 gauss assures an extremely efficient, low distortion and linear response curve.

FIGURE 1:
Rectilinear X1a in oiled walnut.



Rectilinear® X1a bookshelf speaker