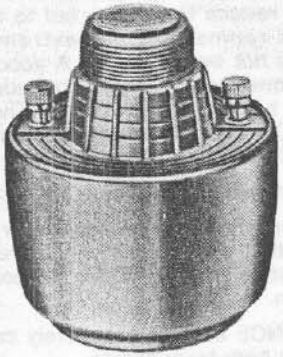
UNIVERSITY® SOUND

Specifications and Instructions

HIGH FIDELITY

T-30 & T-50 Mid-Range & High Frequency Drivers



SPECIFICATIONS—Model T-30 Mid-Range and High Frequency Driver

FREQUENCY RANGE:	Recommended crossover: 350 Hz or higher. High Frequency Range to 15,000 Hz
POWER:	50 watts system power (Integrated Program Material) in multi-speaker systems
IMPEDANCE:	8 ohms
THROAT:	Standard 1⅜" diameter; 18 threads per inch

SPECIFICATIONS—Model T-50 Mid-range and Hypersonic High Frequency Driver

FREQUENCY RANGE:	Recommended crossover: 700 Hz or higher. High Frequency Range to well beyond inaudibility.
POWER:	50 watts system power (Integrated Program Material) in multi-speaker systems
IMPEDANCE:	8 ohms
THROAT:	Standard 1⅜" diameter; 18 threads per inch

DESCRIPTION

The University Sound T-30 and T-50 Mid-range and High Frequency Drivers are true compression units for minimum distortion, using diaphragms of special design that maintain stability under all operating conditions.

Both models may be used to extend the high frequency response of any speaker system, and as the tweeter component of many combinations of University speakers comprising 2- and 3-way systems. The Model T-30 and T-50 also cover the midrange, when used with recommended horns.

POWER RATINGS

The power ratings given for high-frequency drivers are based on "Integrated Program Material" input to the complete speaker system. This refers to the power in speech, music, and other program material averaged over a sufficient length of time to include normal fluctuations. These ratings apply only to a music input to a woofer/driver/network combination, not to the drivers alone.

Bear in mind that the published ratings of 50 watts are not for continuous power. If you want to test your speakers with tones from an oscillator or test record, follow the usual conservative practice of keeping the power level to about 1/10th the rating. This will protect your ears as well as the speaker. Do not use these drivers without a crossover network. Do not exceed 5-6 watts RMS sine wave input at frequencies above the rated low end cut-off of these drivers.

PRECAUTIONS

Clicks, pops, crackles, and other transients of short duration can contain a tremendous amount of momentary power. Such noises should be avoided by turning down the volume when operating switches, and by turning the amplifier off when changing tubes or plugging in and removing connections.

It is also advisable to reduce volume when using the fast re-wind on a tape recorder (unless it has an automatic muting device) because operation at this high speed shifts a large amount of energy into the high-frequency range, and can overload the tweeter.

HORNS

To function properly, a compression type driver unit must be coupled to the surrounding air by means of a suitably designed horn. The size of the horn is determined principally by the lowest frequency for which it is designed.

Horns designed for use with the T-30 and T-50 Driver Units are the Model H-600 Horn and the Cobreflex. The following table shows the recommended low crossover points and frequency ranges for various combinations.

DRIVER UNIT	HORN	CROSSOVER POINTS AND FREQUENCY RANGE
T-50	H-600	700 Hz-Inaudibility
T-30	H-600	700 Hz-15,000 Hz
T-30	Cobreflex	350 Hz-15,000 Hz

IMPEDANCE

The nominal impedance of these drivers is 8 ohms: they should be used with dividing networks designed for this impedance. They can, however, be operated from 4, 8, or 16 ohm amplifier tapes with no loss in performance. Since their efficiencies are higher than any cone speakers for mid-range and bass with which they will be used, the high-frequency output is always capable of adjustment to provide proper tonal balance. See below under BRILLIANCE CONTROL.

DIVIDING NETWORKS

In 2- and 3-way systems, each speaker reproduces only part of the frequency range. A dividing network electrically allocates to each speaker the frequency range it is to reproduce. It is particularly important to keep frequencies lower than the minimum recommended value from reaching tweeters and horn-type mid-frequency speakers. Aside from the distortion that can result, these units can be damaged by frequencies below their rated minimums. The point of appreciable departure (usually 3 dB) from flat response is called the crossover frequency. The rate at which the unwanted frequency range is reduced as the frequency varies is called the attenuation rate of the network. There are also some advantages to the elimination of the higher frequency range from woofers and mid-range units. The principal ones are: reduced intermodulation distortion, and elimination of interference effect between speakers where their frequency ranges overlap. University Sound Model N-2A and N-2B Dividing Networks can be used to combine the T-50 and T-30 with the other speakers in a multi-speaker system at the appropriate crossover points. See Table 1 for recommended horn/driver combinations and crossover points. The N-2A/N-2B Specification Sheet gives the correct interconnections for the appropriate crossover point.

PHASING

If two identical cone speakers are connected to an amplifier so that when one cone moves outward the other moves inward, their outputs will tend to cancel. Similarly, a tweeter and mid-range unit so connected will cancel in the region where their ranges overlap. Such an operating condition is referred to as being "out of phase," and results in a lack of response over a portion of the sound spectrum. Obviously, speakers should be operated "in phase." This means that the speakers should be in phase acoustically. The relationship between the acoustic phase of a tweeter and a mid-range speaker depends on their physical spacing and on the type of dividing network used, in addition to the "polarity" with which the voice coils are connected. Consequently, phasing is best determined by listening.

A simple method of testing is to listen to wide-range, clean, program material, such as a good, live FM broadcast, or to the continuous white noise obtained between stations on FM when the muting switch is off. A good record or tape can also be used. Reverse the connections to the tweeter. Listening at a distance of 5-10 feet, determine which connection provides more "full", smoother, and louder sound. This is characteristic of correct phasing. If no difference can be heard, either connection will obviously be satisfactory.

BRILLIANCE CONTROL

Horn-loaded tweeters are inherently more efficient than direct-radiator (cone) speakers—even those of high-efficiency design. Consequently, for proper tonal balance, it is usually necessary to reduce the power fed to the high-frequency drivers. (In rooms that are extremely "dead" acoustically, this may not be required.) A good way to accomplish this is by connecting an "L-pad" between the dividing network and the high-frequency driver. The University Model AP-8 Balance Control is recommended. In effect, such a unit becomes a BRILLIANCE control.

To establish optimum system balance:

1. Set amplifier record-equalization control or controls in RIAA or PHONO position, amplifier bass and treble controls in normal or flat position, and loudness or contour control in zero or off position.

2. Turn the BRILLIANCE control completely counterclockwise to attenuate the high frequencies.

3. Select program material of wide frequency range and low distortion, preferably full symphony orchestra. (A clean, live FM broadcast or new classical recording is good for this purpose.)

While listening to sound reproduction from the woofer only, use the amplifier main volume control to establish an average listening level, not too loud, not too soft.

4. Turn the BRILLIANCE control slowly clockwise until you hear the highs just "blossom out". By this expression we mean that you begin to become definitely aware of the range of the speaker referred to and hear it in proper relationship to the rest of the tonal range. This occurs at a fairly well-defined point. Leave the BRILLIANCE control in this position, or retard slightly.

Rotational position of the control means nothing in terms of system balance. The high frequency units are inherently of greater efficiency than the woofer. If operated at too high a level in relation to the woofer, they can sound strident and create an illusion of weak bass. Another effect that results is accentuation of distortion in program material and of recorded noise or tape hiss. If room acoustic conditions are very "live," the BRILLIANCE control will end up in a different position from that which would result in a listening room which is very "dead." System balance achieved by the method outlined, without reference to actual physical positioning of the control, takes into consideration all factors of room acoustics, differing efficiencies of speakers, and listening tastes.

After the system has been properly balanced, any further changes in reproduction characteristics desirable to compensate for differing kinds of program material, program material distortion, worn or noisy records, etc., should be accomplished by means of the amplifier controls. No further adjustment should be required on the speaker system unless the system is moved.

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