# VACUUM TUBE AMPLIFIERS


Literally hundreds of thousands of audio enthusiasts use Dynaco vacuum tube amplifiers in their music systems. Although they have been available for more than a decade, the PAS preamplifier and Stereo 70 power amplifier combination still represent a remarkable combination of flexibility, power, performance and reliability. The SCA-35 stereo control amplifier's long-lasting appeal is based on its outstanding value—it can deliver 50% greater steady-state power at the audio extremes as many other units advertised at twice the wattage. The monophonic Mark III power amplifier has gained strong acceptance for use in guitar amplifiers. An additional 70 volt output is available on the Mark III-70, and the Mark III-500 has only 500 ohm or 125 ohm output for special laboratory applications.

**PRICE:** SCA-35 **$99.95** kit only
PAS-3x **$79.95** kit only
STEREO 70 **$99.95** kit only
MARK III **$99.95** kit, **$129.95** assembled
MARK III-70 Add $10 to above prices
MARK III-500 Add $20 to above prices
West of the Rockies: Add $5.00 to above prices.

**SPECIFICATIONS**

| | PAS-3x | SCA-35 | STEREO 70 | MARK III |
|---|---|---|---|---|
| Rated rms power output | | | | |
| Both channels | | | | |
| @ 1000 Hz | — | 35 | 70 | — |
| @ 20-20,000 Hz | — | 24 | 56 | — |
| One channel | | | | |
| @ 1000 Hz | — | 17.5 | 40 | 60 |
| @ 20-20,000 Hz | — | 14 | 35 | 48 |
| Intermodulation and harmonic distortion at rated output | HD: unmeasurable I.M. under 0.05% @ 2 V out | 1% | 1% | 1% |
| at 1 watt | — | 0.2% | 0.05% | 0.05% |
| Hum and Noise | | | | |
| Phono below 10 mV | 70-74 dB | 70 dB | — | — |
| High level below rated output | 85 dB below 0.5V input | 80 dB | 90 dB | 90 dB |
| Frequency response | | | | |
| Low level | | | | |
| Equalized ± 1 dB | 20 Hz to 20 kHz | 20 Hz to 20 kHz | — | — |
| High level ± ½ dB | 10 Hz to 40 kHz | 20 Hz to 20 kHz | 10 Hz to 40 kHz | 6 Hz to 60 kHz |
| Input sensitivity for rated output | | | | |
| phono | 2 mV | 4 mV | — | — |
| tape head | 2 mV | 2.5 mV | — | — |
| high level | 0.2 mV | 1 V | 1.3 V | 1.5 V |
| Input impedance | | | | |
| phono | 47,000 | 47,000 | — | — |
| high level | 100,000 | 100,000 | 500,000 | 500,000 |
| Damping Factor | — | 10 | 15 | 15 |

| | PAS-3x | SCA-35 | STEREO 70 | MARK III |
|---|---|---|---|---|
| Output impedances: | | | | |
| To power amplifier | 1,000 | — | — | — |
| To tape recorder | | | | |
| from phono | 47,000 | 47,000 | — | |
| from high level | same as source | | | |
| To speakers | — | 8, 16 | 4, 8, 16 | 4, 8, 16 |
| Front panel controls | Input selector; 2 bass; 2 treble; stereo-mono-blend; loudness; tape monitor scratch filter power | Input selector; mono-stereo; treble; bass; loudness; bandpass filter; power | mono/ stereo | |
| Tubes | 12AX7 (4) 12X4 | 12AX7 (2) 7199 (2) 6BQ5 (4) | EL 34 (4) 7199 (2) GZ34 (1) | 6550 (2) 6AN8 (1) GZ-34 (1) |
| Semiconductors | selenium rectifier | 2 silicon diodes | selenium rectifier | selenium rectifier |
| Power consumption | 30 watts | 110 watts | 190 watts | 150 watts |
| Dimensions | 13½"x9"x 4¼" H | 13½"x10½" x 4¼" H | 13x9½" x6½" H | 9"x9"x 7" H |
| Shipping weight | 11 lbs. (5 kg) | 20 lbs. (9.1 kg) | 32 lbs. (14.5 kg) | 28 lbs. (12 kg) |

AC line requirements: 50-60 Hz, 120V
Note: All vacuum tube amplifiers have dual voltage 120/240V power transformers available on special order.

# WHAT SPECIFICATIONS ARE MEANINGFUL?

Anyone contemplating a component stereo system is faced with a bewildering array of models, specifications and prices. For instance, there is no industry agreement on what loudspeaker specifications are meaningful, much less which ones should be used.

It is Dynaco's belief that specifications are only meaningful if they afford a basis of comparison and if they enable the performance of the equipment to be predicted.

Dynaco engineers have devoted considerable attention to those factors which correlate with listening qualities, and there is no question that one factor basic to the sustained acceptance of all Dynaco products is the singularly appropriate parameters of their designs.

**AMPLIFIERS** The most commonly advertised amplifier specification is power. All Dynaco power ratings are the true sustained power the amplifier will deliver—the steady-state (rms) power. Meaningful comparisons can only be made if all power ratings are on the same basis—the steady-state power output per channel, specified as a function of frequency, distortion, and speaker impedance.

Other pertinent considerations in the design of an amplifier are its noise level (and its frequency distribution), recovery time (dependent on the power supply), transient and frequency response, accuracy of equalization, distortion (through the phono as well as high level inputs), inherent distortion before application of feedback, and the amplifier's stability when driving varying loads such as electrostatic loudspeakers or those using complex crossovers.

**FM TUNERS** While sensitivity is touted to be as important to a tuner as power is to an amplifier, it is really one of the least important considerations to city dwellers who are usually faced with signals being too strong, not too weak. Furthermore, the usable sensitivity figure by itself means little—it is also necessary to know the input signal needed for "full limiting"—the point at which all but 1 dB of audio output is achieved. As Julian Hirsch pointed out in Stereo Review (October, 1969), "the ratio of this full-limiting voltage to usable sensitivity . . . should be numerically as small as possible." The smaller the ratio, the greater the ability of the tuner to give a listenable signal with weak stations.

Far more germane are resistance to overload (so that strong stations do not block out weaker ones at random points along the dial), selectivity (the ability to separate closely-spaced stations), AM (amplitude modulation) rejection, and tuning precision so that the point of lowest distortion can be easily obtained when tuned by the listener.

A test commonly made to determine an FM tuner's sensitivity is to see how many stations can be received without an antenna. If many stations are picked up in this way, the tuner is not necessarily sensitive. It is, however, poorly


shielded and therefore more susceptible to multipath reception.

While present industry standards specify monophonic distortion only, Dynaco also publishes the distortion figure for stereo operation as well since the mono figure alone cannot reveal the stereo distortion, which is invariably higher.

**LOUDSPEAKERS** No industry standards exist for measuring loudspeakers. Qualitative evaluations of loudspeakers require a composite body of tests plus listening comparisons under identical conditions. Dynaco speakers are designed to provide the optimum balance of the various factors affecting natural sound . . . a wide and smooth frequency response, good transient response, wide dispersion, and low Doppler distortion.

All Dynaco equipment is designed for the highest quality with simple, reproducible designs built to meaningful standards. The total appropriateness of Dynaco's philosophy is attested by the longevity of Dynaco equipment—unique in the components industry.

"Over the past decade, Dyna amplifiers have achieved an enviable reputation for uncompromised quality at bargain prices. Either in the form of easy-to-build kits or as factory-wired models, the Dyna units have consistently matched or surpassed the performance of competitive models costing far more.

"As we see it, the 'secret' of Dynaco's success has been in their refusal to incorporate gadgets or passing fads into their products. Sound engineering practice, combined with deceptively simple yet highly effective circuit design, has characterized every Dyna product we have tested over the years."

HIRSCH-HOUCK LABORATORIES IN JUNE, 1967 STEREO REVIEW

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DIVISION TYCO LABORATORIES

Printed in U.S.A.