

how a loudspeaker will sound in terms of brightness, smoothness, etc., but to what degree it will satisfy a critical listener when reproducing readily available program material in a normal listening room."

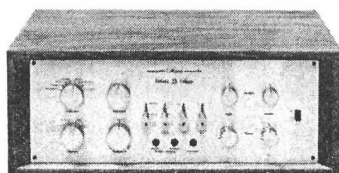
Mr. Augspurger's points are well-taken. I, too, doubt that any measurement (or group of measurements) can fully define or predict a speaker's performance in terms that are meaningful to a listener. Mr. Villchur himself has made extensive use of "live *vs.* recorded" comparisons to prove the fidelity of his loudspeakers, and has devised ingenious variations on this technique using noise and "live" speakers. To me, this is a more convincing demonstration than any amount of purely objective test data.

I would like to add two more coals to the fire. First, it seems to me that reproducing the sound of an instrumental group *in its original environment* with total fidelity is not quite the same as convincing a listener, in his own home, that he is in the original concert hall or studio. Second, even after producing an imposing battery of measurements on, say, a relatively simple, straightforward amplifier, you still have an incomplete definition of its total performance. There are unquestionably some subtle properties of amplifiers that are not clearly understood or measurable but can be distinguished readily by a trained ear. How, then, can we expect to define completely the infinitely more complex loudspeaker by any finite (in human terms) series of measurements?
J. H.

≈ EQUIPMENT TEST REPORTS ≈

By Hirsch-Houck Laboratories

MARANTZ MODEL 7T PREAMPLIFIER



● IN some respects, writing a report on the Marantz Model 7T transistor stereo preamplifier is a difficult task. The fact is, the Model 7T is too good to criticize without resorting to sheer nit-picking. In each of its salient characteristics, we have found other units that are comparable, but we have never encountered one which embodied *all* the performance of the Marantz Model 7T. This sort of near-perfection does, of course, have its price—but as the saying goes, it's only money.

Several hours of laboratory measurements resulted in almost nothing worth presenting in graphical form. Most of the unit's frequency-response curves can be drawn with a straight edge. The only distortions we were able to measure at any reasonable signal level were those inherent in the test equipment. Using the Marantz 7T in a music system for some time did not reveal a single flaw worth criticizing.

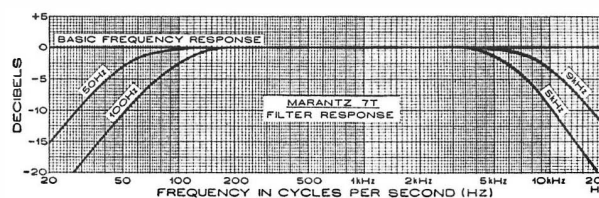
The Marantz Model 7T is a fully transistorized stereo control center that in appearance is very similar to the older vacuum-tube Model 7, which it replaces.

The Marantz Model 7T has eight inputs, selected by a front-panel rotary switch, plus recording and playback connections for a tape recorder controlled by a separate TAPE FUNCTION lever switch. A unique feature is the pair of front-panel jacks for recording and playback connections to a second external tape recorder (in addition to the one built into one's system). These extra jacks make it simple to record a program simultaneously on two recorders, or to copy a tape played on either machine.

The Model 7T has low-level equalized inputs for a

tape head and two magnetic cartridges, plus an unequalized microphone input. There are four high-level inputs, marked TUNER, TV, AUXILIARY 1, and AUXILIARY 2. Input impedance is 47,000 ohms at the phono inputs, and 1 megohm at all the others.

On the rear of the chassis, in addition to the various input jacks, are two pairs of parallel-connected output jacks for driving the power amplifiers, and a pair of parallel-connected center-channel (A + B) output jacks with their own level control. The main outputs will drive loads as low as 600 ohms without distortion. There are five switched a.-c. outlets, and one unswitched outlet, capable of handling a combined load of 1,100 watts. A pair of screwdriver-adjustment controls permits the NAB tape-playback equalization to be trimmed to compensate for head wear in the recorder. As a final touch, there are SCOPE TEST output jacks for checking phase shift or stereo separation with an oscilloscope. If a Marantz Model 10B FM tuner is used in the system, these jacks may be connected directly to the 10B's EXTERNAL SCOPE input jacks



for display of the audio signal on the 10B's cathode-ray tube tuning indicator.

Returning to the front panel of the Model 7T, we find a MODE switch with the conventional settings for playing either right or left channel alone, mixing both for mono reproduction, or for normal or reversed-channel stereo. The tone controls (separate bass and treble controls for each channel) use step switches instead of the usual con-

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tinuously variable potentiometers. The treble controls have five positions of cut and five of boost, while the bass controls have four positions of cut and six of boost.

In the center flat position of each tone control, all tone-control circuitry is by-passed. Each step on the treble controls provides a 2.5-db boost or cut in high-frequency response, and each step of the bass controls corresponds to a 3-db change in low-frequency response. The middle frequencies are unaffected. The bass-boost characteristics are designed to compensate for the ear's apparent loss of lows at reduced volume levels (the so-called Fletcher-Munson effect), and each step of bass boost supplies the compensation for a 5-db reduction in listening levels.

Next to the three-position TAPE FUNCTION lever switch, which has settings for TAPE PLAY/MONITOR and TAPE COPY, there are three more lever switches: the PHONO EQUALIZER, with the old 78-rpm characteristic and the old Columbia LP characteristic in addition to RIAA equalization; a LOW-FREQ FILTER, with cut-off frequencies of 50 and 100 Hz; and a HIGH-FREQ FILTER, with cut-off frequencies of 5 and 9 kHz. The filters all have a 12 db per octave roll-off.

We measured the frequency response of the Marantz Model 7T at ± 0.1 db from 20 to 20,000 Hz. The RIAA phono equalization was within 0.5 db of the ideal characteristic from 30 to 15,000 Hz, and the NAB tape equalization was accurate to within 0.7 db. The filters had near-ideal curves, with no effect on mid-range response and cut-off frequencies were almost exactly as specified.

At 10 volts output (far more than required to drive any power amplifier) the harmonic distortion was under 0.15 per cent between 20 and 20,000 Hz. At lower signal levels, distortion was too low to measure. The IM distortion was less than the residual distortion of our instruments up to 10 volts output.

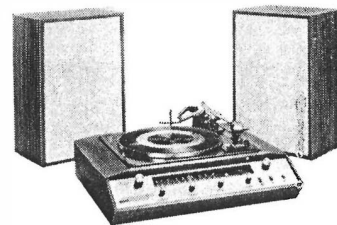
At maximum gain, a signal of 60 millivolts at a high-level input, or 0.6 millivolt at the phono input, was sufficient to drive the Model 7T to a 1-volt output, which is enough to drive almost any power amplifier to full output. There was no measurable (or audible) crosstalk between inputs. The noise level (a smooth hiss audible only at or near maximum gain) was 84 db below 1 volt output on high-level inputs, and 72 db below 1 volt on phono. No hum was detectable.

In use, there were absolutely no clicks or other switching transients when the controls were operated. All controls had a silky smoothness and positive "feel" which must be experienced to be appreciated. The tone-control curves were excellent for loudness compensation, and even at their extremes did not produce any unnatural effects. The filters were highly effective in removing noise with minimum effect on the program.

Used with a good power amplifier, the Marantz Model 7T provides almost limitless flexibility—more than most of us could use—combined with almost ideal frequency response and linearity characteristics. It could well be a lifetime investment, and Marantz offers a three-year warranty. The Marantz Model 7T sells for \$295. An oiled walnut cabinet is available for \$24.

For more information, circle 188 on reader service card

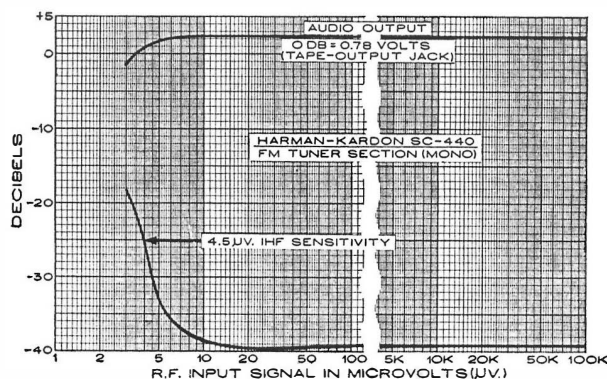
HARMAN-KARDON SC-440 MUSIC SYSTEM



● THE HARMAN-KARDON SC-440 is a complete, integrated music system, including an AM and a stereo FM tuner, a record player, stereo amplifier, and speaker systems. The sloping front panel of the attractive control center contains all the operating controls of what is basically the Harman-Kardon SR-400 receiver. The compact transistor design of this receiver permits it to be packaged in little more space than is required for the four-speed Garrard AT-60 automatic turntable mounted on top of the walnut base.

The receiver-amplifier section of the SC-440 has the usual complement of controls: input selector, volume, balance, and tone controls, as well as slide switches for loudness compensation and speaker muting, plus a headphone jack. The edge-lit slide-rule dial scale has AM, FM, and logging scales and a tuning meter. The stereo FM switching is automatic, with stereo signaled by a pilot light.

At the rear of the unit are inputs for a high-level auxiliary source or tape recorder, and tape-recorder outputs that are unaffected by the tone- and volume-control settings. (There is no provision for monitoring from a three-head recorder.) A ferrite AM antenna is built into the receiver,



and a 48-inch wire is supplied for FM reception. External antennas can be connected for AM and FM reception when necessary.

The receiver section of the Harman-Kardon SC-440 is simple in design, but effective in performance. Portions of the i.-f. amplifier are used by both the FM and AM sections, which have separate front-end and detector circuits. The FM multiplex circuit is unusually simple, using only two transistors and four diodes (plus one transistor to turn on the stereo-signal lamp), but it functions, for all practical purposes, as well as many more complex units. The audio amplifiers are direct-coupled to the speakers, without blocking capacitors.

The speakers of the Harman-Kardon SC-440 differentiate it from most integrated music systems. They are full-sized, oiled walnut "bookshelf" units measuring 23 x
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