

# Equipment Test Reports

## By Hirsch-Houck Laboratories



### MXR Model 140 System Preamp

**A**LREADY well known as a manufacturer of professional and home signal-processing devices, MXR has now added a novel

preamplifier to its line. The MXR Model 140 "System Preamp" does not include many of the features that one usually finds

in a preamplifier, since it is expected that those functions (filters, equalizers, and the  
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like) will be supplied by the other system components that can be connected to and controlled from it. Instead, the Model 140 offers a most unusual and comprehensive array of switching and control functions.

In effect, the unit consists of two separate stereo preamplifiers on a single compact chassis. Either or both (identified as A and B) can be connected to any of a number of selectable signal sources, or any two of the sources can be mixed in any proportion (or faded from one to the other). The selected program sources can be routed independently to the main outputs; to either or both of two tape-recording outputs; to a separately controllable monitor output for driving a second power amplifier and speakers; to either or both of two external-processor loops that can modify the signals with accessory graphic equalizers, dynamic expanders, or similar accessories; and, finally, to a separate buffered (isolated) headphone output that carries the monitor program. In addition to its stereo inputs (PHONO, TUNER, AUX, TAPE 1, and TAPE 2) there is a separate mono INSTRUMENT input jack on the front panel with its own level control that can be switched to either or both of the stereo inputs. Aside from all its switching functions and an accurately equalized RIAA phono preamplifier, the only response-modification capability of the Model 140 is an infrasonic filter for the phono inputs, cutting off at 18 dB per octave below about 20 Hz.

The flexibility offered by the MXR Model 140 is so great that it cannot be described adequately in a limited space. In fact, we believe that even after careful study of its very comprehensive instruction manual, the only way to appreciate the Model 140 properly is to connect it into a system with a number of accessories for some "hands-on" experience.

The two input-source selectors are labeled A and B, and those letters identify the two preamplifier channels throughout the

unit (each of them also has L and R channels). A small MIX knob passes only the A or B selected signal at its right- and left-limit settings and mixes them at intermediate settings. The main outputs are controlled by a group of three knobs: a large volume control, a smaller balance control, and a small SELECT switch that feeds the main amplifier stages with either A or B alone, the output of the mix circuit, or the playback from either of two tape decks (T1 and T2).

To the right of the main controls is a similar grouping (less the balance control) marked MONITOR. Its SELECT switch duplicates the functions of the MAIN SELECT switch for the monitor and headphone outputs. The front-panel headphone jack carries the monitor signal at the same level, but after it has passed through buffer stages that provide adequate drive levels for either low- or high-impedance phones. At the left of the panel is the mono INSTRUMENT phone jack controlled by its own level knob, which can be selected by the A and B source switches like any of the other inputs.

The other preamplifier controls are a row of pushbuttons along the bottom of the panel. Single buttons control the infrasonic filter and the power; a third button, when depressed, increases the system gain by 20 dB. The remaining buttons are grouped in pairs. The ones marked RECORD ASSIGN (T1 and T2) independently connect the two tape-recording outputs to the MIX circuit output. Regardless of the control settings, it is not possible to create a feedback condition between the recording and playback circuits of a tape deck connected to the Model 140 (a problem not uncommon with some other amplifiers), since assigning either record output to its deck simultaneously disconnects its playback from the program-source switch (it is, however, present at the MAIN and MONITOR SELECT switches). By making appropriate switch settings, it is possible to dub from either tape deck to the other and

to listen to a different program source at the same time.

Two pairs of buttons control the processing accessories through circuits identified as LOOP 1 and LOOP 2. For each loop, engaging one button inserts the processor into a selected portion of the system, and the second button determines what that location is. For LOOP 1, the choice of locations is either the main channel or directly after the A source. For LOOP 2, the processor can be switched in line with the selected B source or just after the MIX circuit. Another pair of buttons can feed either channel in mono to both left and right outputs; when both are pressed in, the stereo channel orientation is reversed. The preamplifier has no built-in mono (summing) facilities.

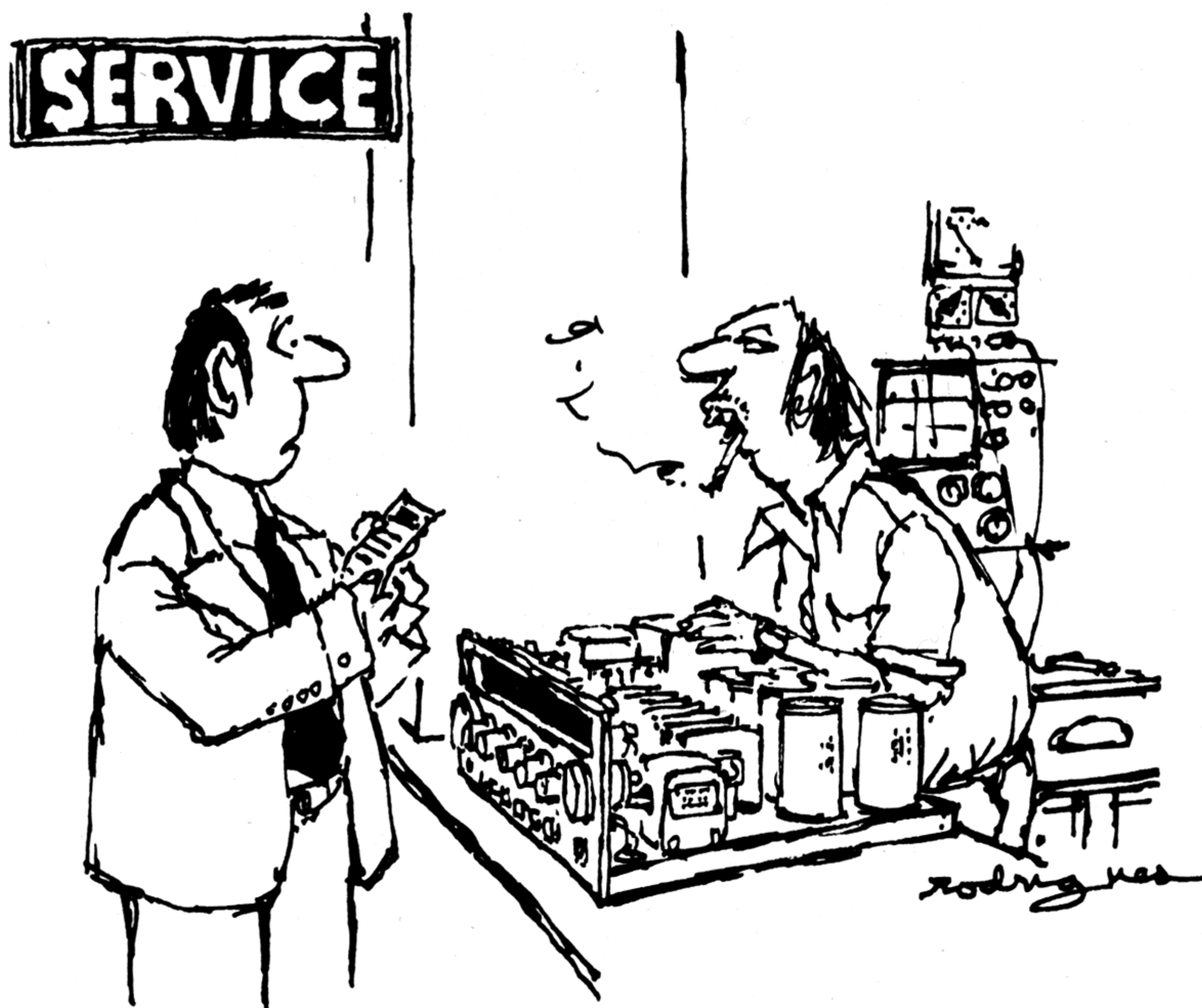
On the rear apron of the MXR Model 140, in addition to the gold-plated magnetic-phono jacks and the various inputs and outputs, there is a single unswitched a.c. outlet. The unit, which is finished in black with white panel markings, is 19 inches wide, 6 inches deep, and 3½ inches high. It weighs 7 pounds. Wooden side panels are furnished, and rack-adaptor "ears" are available for \$18 a set. Price: \$460.

● **Laboratory Measurements.** Our bench measurements on the MXR System Preamp were made in accordance with IHF-A-202 (1978) with respect to impedances, levels, and standard gain settings. The high-level frequency response was almost perfectly flat through the audio range, dropping off to -1 dB at 11 Hz and to -3 dB at 6 Hz. At the high-frequency end, the -3-dB frequency was 170 kHz. The RIAA phono equalization was accurate within ±0.25 dB from 20 to 20,000 Hz and was affected by less than 0.5 dB at any frequency by the inductance of a phono cartridge. The infrasonic filter had no effect above 30 Hz, dropping the response by 1.5 dB at 20 Hz and by 31.5 dB at 5 Hz. The phono preamplifier's input impedance was 46,000 ohms in parallel with 200 picofarads (as rated). MXR will supply information on changing the capacitance to any other value, but the standard 200-pF value should be compatible with most cartridges and record players.

For a reference output of 0.5 volt at 1,000 Hz, the required input was 0.5 volt (AUX) or 0.67 millivolt (mV) at the phono inputs using the LO setting of the gain switch. Changing the switch to HI gave a sensitivity of 50 mV (AUX) or 0.05 mV (PHONO). With either CCIR/ARM or A-weighting, the output noise was below our measurement floor of 100 microvolts (-74 dB referred to a 0.5-volt output). The high-level unweighted noise was also too low to measure, but the unweighted phono-noise output was 107 and 220 microvolts, respectively, for LO and HI gains. The INSTRUMENT jack input sensitivity was 1.6 mV (HI) or 16 mV (LO) for a 0.5-volt output. Its unweighted noise was 180 microvolts and its overload limit was 8.6 volts.

The phono-overload capacity of the MXR Model 140 was 97 mV at 1,000 Hz, and at 20,000 Hz (adjusting for the different gain) the corresponding 20-Hz limit was 91 mV. In most amplifiers levels are

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"... Sure, I know \$229.50 is a lot of dough, but I had to replace the whole chassis."



adjusted by potentiometer voltage dividers, but in the Model 140 the actual gain of an operational amplifier is varied by a resistance in the feedback loop (all the active elements in the Model 140 are integrated-circuit "op amps").

The preamplifier distortion is specified as less than 0.005 per cent at a 1-volt output through any combination of inputs and outputs. We measured the distortion at 1,000 Hz as less than 0.001 per cent up to a 1-volt output, and it reached 0.005 per cent at about 4 volts. Just below clipping, at an 8-volt output, the distortion was still only 0.05 per cent. The output impedance, which is rated at 600 ohms, was measured as 590 ohms.

In addition to being protected against inadvertent feedback loops when used with tape decks, the MXR Model 140 is designed to be free of transient noises during switching and turn-on or turn-off. Instead of using relays to mute the outputs until power-supply voltages have stabilized, MXR uses an all-electronic system with FETs shunting the signal to ground at key points within the circuit. There is a turn-on time constant of several seconds before the FET switches open up completely and allow the unattenuated signals to pass. In use, the muting system worked perfectly.

● **Comment.** The electrical and mechanical performance of the MXR Model 140

was excellent and in most respects surpassed the manufacturer's ratings (as well as in some cases our measurement capabilities). Nevertheless, it seems to us that a novel product such as this can be judged only in terms of one's own system requirements. If considered only as a "preamp," it appears to be a very good (but rather expensive) device lacking many of the signal-modification functions one would expect to find in a conventional preamplifier. The main reason to have a preamp like the MXR in your system is for its wonderful flexibility, for its ability to control an assortment of inputs and a variety of accessory signal processors and tape decks.

We connected the unit up with a tuner, two cassette decks, and an octave-band graphic equalizer, and even this array of components left quite a few of the MXR's functions idle. It did everything it was supposed to do, and it never gave us any unpleasant surprises. It was obvious that the circuits and switching layout of the MXR Model 140 have been carefully engineered (not thrown together haphazardly) so as to forestall the problems that could easily occur with such complex interconnecting capability. Of course, as with any complex instrument, it was necessary to practice with the controls a bit in order to discover how to use them effectively.

One consequence of the light weight of the Model 140 was that it tended to slide

backward when any of its buttons was pushed. The cure, other than rack mounting, is to rest the hand atop the cabinet while pressing the button with the thumb. We also noted that the MXR's single unswitched a.c. outlet is hardly adequate for a control center that may interconnect with as many as eight to ten powered components. Obviously MXR decided that a full a.c.-power switching capability would be prohibitively bulky and expensive, and the user would be better advised to employ some form of external power switching. For those who would like two phono inputs and the ability to crossfade between them, MXR has the Model 150 in the works; it will include such a function for about \$40 more than the Model 140 and will be available early this spring.

Our tests of the MXR Model 140 can do little more than confirm that it is a very conservatively rated, well built, and uniquely versatile system-control center. We cannot begin to guess all the uses to which it might be put, although its flexibility is certainly beyond the needs of the average component hi-fi system user. But anyone with special system-switching requirements who is not satisfied with the facilities of conventional preamplifiers would be well advised to investigate the special features of the MXR Model 140.

**Circle 140 on reader service card**