



Hafler DH-110 Preamplifier

- **Hafler DH-110 Preamplifier**
- **Size:** 17 x 8½ x 3 inches
- **Weight:** 10 pounds
- **Price:** \$299.95 in kit form

THE Hafler DH-110 is a high-quality stereo preamplifier embodying many of the basic design and circuit features of the company's highly regarded "no-frills" DH-101 preamplifier, but with an overall level of mechanical and electrical refinement that rivals that of the best of today's stereo components. Like the DH-101, the DH-110 is available either as a kit or factory wired and tested.

The DH-110 is attractively finished in charcoal grey. Adaptors are furnished for rack mounting the DH-110, whose width is increased to 19 inches by their use. The front-panel controls include knob-operated switches for the input selector and tape monitor and smoothly operating potentiometers for volume, balance, bass, and treble controls. The tone and balance controls are center-detented. Depressing a TONE button bypasses the tone-control circuits, and the EPL (external processing loop) button inserts an external signal-processing accessory (connected to jacks in the rear of the DH-110) into the signal path; MONO and POWER are switched by similar buttons.

The switchable program sources include AUX, PHONO, TUNER, TAPE 1, and TAPE 2. There are two separate phono inputs selected by a pushbutton next to the SELECTOR knob. They are essentially identical but can have different input capacitance values to suit specific cartridges. If an optional moving-coil-cartridge head amplifier (DH-112) is installed in the DH-110, it is used with one of the phono inputs.

The MONITOR switch has positions marked OFF (for normal listening), TAPE 1, and TAPE 2. Red LEDs show which control is in use and also serve as power pilot lights. The front-panel phone jack can drive high-impedance phones, and plugging in a head-phone disconnects one of the two parallel sets of preamplifier outputs.

The many phono jacks on the rear of the Hafler DH-110 are mounted on one of its two major circuit boards and are rigidly supported to withstand the insertion of phono plugs without flexing. Separate ground binding posts are located next to the two sets of phono inputs. Three of the four a.c. outlets are switched, with a total rating of 5 amperes continuous and 72 amperes of

surge current, permitting use with the largest Hafler power amplifier (the DH-500) as well as most other high-power amps.

The Hafler DH-110 specifications are exceptionally complete, following the current IHF (now EIA) amplifier-measurement standard and referencing its applicable paragraphs. Some of the key ratings include a maximum output of 14 volts (the rated output is 3 volts), distortion of less than 0.001 per cent, and a phono-overload limit of 300 millivolts at 1,000 Hz. The factory-wired version of the DH-110 is \$399, \$499.95 with the optional DH-112 pre-preamplifier installed. The DH-112 as a separate add-on is \$74.95. (David Hafler Co., Dept. SR, 5910 Crescent Boulevard, Pennsauken, N.J. 08109.)

● **Laboratory Measurements.** We tested a Hafler DH-110 preamplifier that had been assembled from a kit by an experienced kit builder in about 4 hours. Input sensitivity

(for a reference output of 0.5 volt) through a high-level input was 50 millivolts (mV) and 1 mV through a phono input (both exactly as rated). The A-weighted output noise was less than our measurement limit of 100 microvolts through the high-level input, and it was 187 microvolts through the phono input (corresponding to -68 dB referred to 0.5 volt).

The overload limits of the phono preamplifier were exactly as rated: 300 mV at 1,000 Hz and virtually the same at the limits of 20 and 20,000 Hz (295 and 304 mV, respectively, after conversion to equivalent 1,000-Hz values). The phono-input impedance was 47,000 ohms in parallel with 150 picofarads (pF) at input 1 and 260 pF at input 2. The basic input capacitance of the phono preamplifier is rated at 30 pF, the rest coming from the added capacitors, whose values can be changed as desired by the user. RIAA equalization error was less

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● **Comment.** Although one could pay considerably more for a preamplifier than the price of the Hafler DH-110, it would be very difficult to find one that is better in any meaningful way. Certainly no other is likely to have significantly lower distortion or a greater dynamic range, whether based on its noise level, maximum output, or phono-overload point. To a considerable degree, the same could have been (and was) said about the earlier DH-101. However, we (among others) were not so highly impressed with the latter's construction, which conveyed an unavoidable impression of scrimping on mechanical detail. Since we have been using a DH-101 for some years, we know that it is an excellent and reliable product, especially in view of its modest price.

The DH-110, on the other hand, is second to none in its "feel" as well as its performance. Anyone who wonders whether this impression of quality is only skin deep need only remove the preamplifier's cover. Most of its active circuitry is on a single large circuit

board (largely factory assembled and pretested), and high-quality parts are used throughout.

The schematic diagram of the Hafler DH-110 shows that the basic Hafler philosophy has been effectively applied to its design. As we see it, that is to use the simplest circuit that will do the job, since complexity tends to increase cost and reduce reliability faster than it improves performance. Except for the phono preamplifier, the active part of the DH-110 consists of a complementary-symmetry "op-amp" with the tone controls and filter in its feedback loop. This not only supplies the necessary gain and frequency-response control, but delivers a very high output with a low enough impedance to drive most headphones to a very comfortable listening level. The phono-preamplifier configuration is similar, with the RIAA equalization components in its feedback loop.

The Hafler DH-110 ranks with the best preamplifiers on the market today. It is also attractively styled, moderately priced, and (judging from the instruction manual) not very difficult to build. It should hardly be necessary to point out that it sounds as good as it looks and measures!

—Julian D. Hirsch