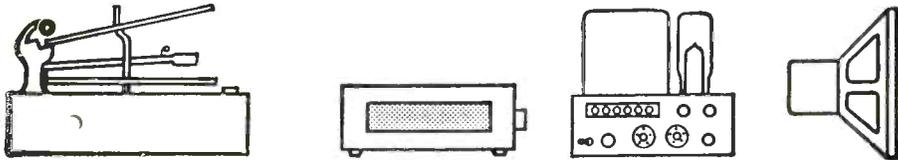


EQUIPMENT



PROFILE

Pilot R1100 Solid-State Stereo Receiver

Pilot Radio represents one of the original group of manufacturers that made equipment available to those of us hungry for better music systems. A perusal of component catalogs of the fifties will reveal considerable representation by Pilot. More recently, however, Pilot seemed to abandon the component market to concentrate on marketing a line of consoles. Now they are back in the fold. And if this new component receiver is typical of their renewed outlook, we can predict that Pilot will again be a name to reckon with.

This is an all-transistor receiver. As such it is quite large—as large, perhaps, as a vacuum-tube unit of similar characteristics might be. Pilot has chosen to follow the path of designing for maximum coolness and spaciousness, rather than compactness. We can find no quarrel with this. Too often, we have seen the institution of miniaturization in a component at the expense of durability and/or serviceability. This Pilot receiver appears to have been built to last.

Then too, a high-power amplifier using transistors has eliminated heavy and bulky output transformers. But if it is after maximum power, it will require light but equally bulky heat sinks on the output transistors. Such is the case here. There are four hefty vertically-finned sinks toward the rear of the chassis. Each contains a pair of power transistors.

The net result of this care in construction is to be seen in the power response graph. These ratings were made with 8-

ohm loads and with both channels being driven simultaneously. 4- or 16-ohm loads will result in a power output derated by a maximum of 2.5 dB.

The front panel layout of the 1100 is forceful. It gives the feeling of machined massiveness (because of solid-metal knobs and a well-finished escutcheon). There are all the controls that any gadget-happy doodler would want. Not that this receiver is over-endowed. Rather, it is a deluxe unit that is making a serious effort to overcome the general feeling that a receiver must leave something out by virtue of its all-in-one design. Every sort of control is there; included beside the usual is a separate three-position contour control and a remote-local-all stereo speaker selector.

A row of rocker switches control power on/off, FM muting, low cut, high cut, and

Fig. 2. Frequency- and power-response curves.

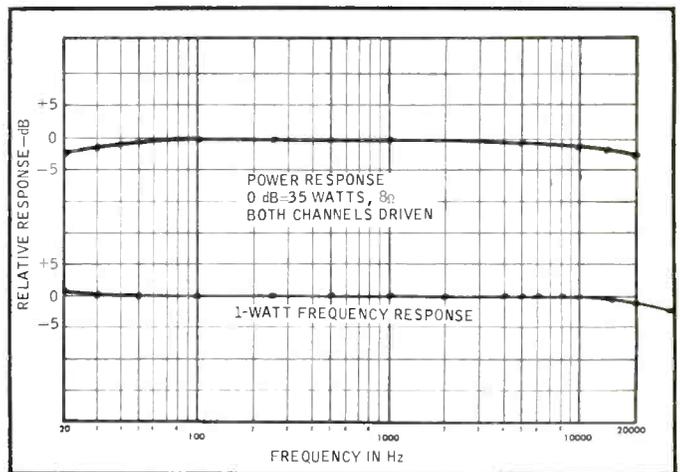


Fig. 3. IM Distortion curves for the R-1100.

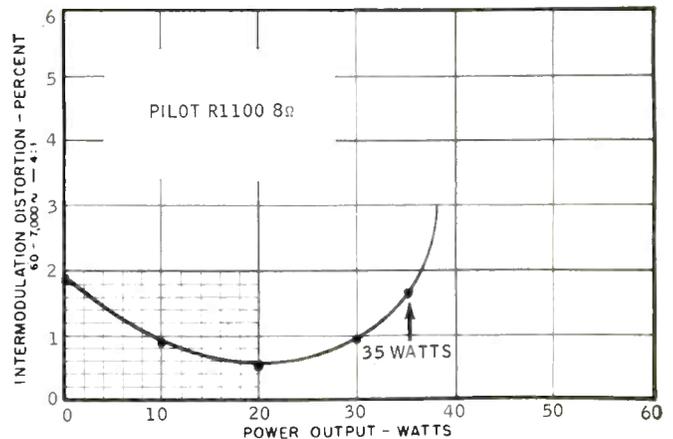


Fig. 1. The Pilot R-1100 Solid-State Stereo Receiver.

tape monitor. In conjunction with that last named switch, there is a front-panel tape-recorder output. This is designed to accept a three-contact stereo plug of the same type usually used for stereo earphones. Yes, there is also a front-panel earphone output. That aforementioned speaker selector switch also has a position that silences all for private listening.

There are two phono inputs and a tape-head input that feed the preamplifier section. The two phono inputs are both designed to accept a magnetic cartridge. A very real problem with solid-state preamps has been (as has been reported in these

pages) the input dynamic swing. What with cartridges having outputs as low as 1 mV or as high as 15 mV *steady-state*, an input designed to accommodate all cartridges would need sufficient sensitivity for the lowest and, at the same time, sufficient dynamic capability to handle musical peaks from a high-output cartridge. These peaks could require an input that will not overload with as much as 80-100 mV peaks.

The two inputs for phono are different. One (phono 2) has maximum sensitivity—3.2 mV for full output. But it will overload with signals that exceed 44 mV. So if you have a high-output cartridge, use phono 1. Now you need 14 mV for full output but you can pump in 178 mV before clipping and breakup. (There is a second benefit. A high-output cartridge in a hot input will be at ear-splitting volume with the gain control just cracked open. A reduced-sensitivity input makes it possible to operate the gain settings at optimum positions both for convenience and to take advantage of loudness compensation circuits.)

The tuner portion of this R1100 is FM—stereo and mono. Tuning is positive through a flywheel-balanced knob. Both signal strength and center-of-station meters are provided. Happily, they did coincide—best reception is at center meter position—this is also the maximum-signal-strength point. Stereo FM switching is automatic in the presence of a 19-kHz signal. This also serves to ignite an indicator light.

Usable information is to be had from low signals without much danger of overload from strong local stations. FM stereo separation measured only fair—16 dB at mid-frequencies, but there was little deterioration at higher (or lower) frequencies. So we suspect that a shift in alignment since the unit left the factory is responsible for the performance measurements. Regrettably, Pilot (like so many other manufacturers) did not supply alignment instructions, nor, for that matter, a schematic.

In other bench measurements the R1100 continued to show us its full-blooded qualities. Total hum and noise are 95 dB down from full output (35 watts). RIAA equalization is accurate ± 2 dB from 50 to 15,000 Hz and is identical for the two different phono inputs. The two-position loudness compensation is at its maximum at 9 o'clock. Position one offers + 8.5 dB at 100 Hz; position 2 at the same frequency is at + 10.5.

IM distortion measurements (Fig. 3) are not quite as low as we would like to see them, particularly at low-listening levels, and they exhibit the usual camel-back hump. Still, they are within acceptable limits.

Listening Tests

High usable bass power is the factor that often distinguishes the exceptional from the ordinary. Extensive listening tests with several different speaker systems, one

a low-efficiency 4-ohm system, revealed that this Pilot is a first class music performer. Sound is rich and full—the natural result of wide-band response, a fast-rise-time square wave, and accurate equalization. It has been demonstrated more than once that there need be no sacrifice of quality inherent in an all-in-one design. Certainly, this set is exemplary in that respect. Indeed, welcome back Pilot!

Circle 200

EMPIRE GRENADE 8000P SPEAKER SYSTEM

Over the past years, many types and designs of loudspeaker systems have appeared on the market, most of them having essentially the same box-like appearance. With the introduction of the Grenadier 8000 a year or so ago, a new shape was offered, one which could conceivably be described as a "natural" for certain decors. In its newest form, the 8000P, the Grenadier is still the same column, but now it

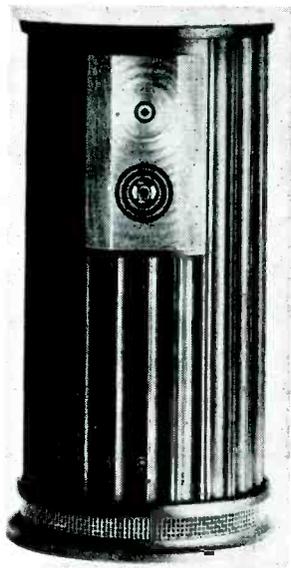


Fig. 4. The new Empire Grenadier 8000P speaker system.

is fluted, and is topped with a marble disc which is retained in place by a short dowel in the enclosure which mates with a shallow hole in the marble.

Measuring 16 inches in diameter and 29 inches high, the 8000P contains a 12-in. mass-loaded woofer weighing 18 lbs., a die-cast acoustic lens for the mid-range unit, and a domed tweeter in a bronze-finished escutcheon which has become the identifying mark of the Empire speaker systems.

The woofer faces downward, and is loaded with a plug which causes it to radiate over 360 deg. just above the floor level. The cone is freely suspended, and is back loaded centrally through the cabinet to the top, and down along the sides, terminating in a series of small "ports" at the rear. Plugs are provided so that one

or more of the ports may be stopped up at the listener's choice to vary the low-end response over a range of about ± 4 dB at 35 Hz. This is a more intelligent method of balancing the bass response to the room than the simpler mere attenuation of the mid- and high-frequency response, usual in most systems. Varying the response of the upper register does change the over-all balance, and this can be done in the 8000P, varying the response over a range of about 9 dB at 20 kHz. The control is on the bottom of the enclosure, as are the input terminals. This does not, however, change the *low-bass* response, which is particularly desirable when the speaker is to be used in different locations in the room. For instance, if the 8000P is to stand in a corner, it is best to put all the plugs in, which reduces the low-bass response about in proportion to the benefit gained by the corner placement. Conversely, if the speaker is to be used away from the corner or a wall, it is preferable to remove most of the plugs, thus compensating for the less-than-optimum position accorded it. Careful listening and adjustment of the low-end response will permit the 8000P to sound just about the same whatever its location in the room. The low-frequency resonance is at about 35 Hz, but it is not sufficiently pronounced to be recognized as a resonance—in other words, it is not a "one-note-bass" speaker.

Mid- and high-frequency ranges are more than adequately covered by the die-cast assembly, with the result that the over-all performance is crisp and clean, with a well balanced bass that is solid without being at all "juke-boxish." In all, we find the 8000P to be a most listenable speaker system, and one which is uniquely attractive in its appearance. Its shape could fit into the decor in many instances far better than the conventional rectangular enclosures. In other words, if the appearance will fit in with your ideas of room decoration, you may rest assured that the performance of the Grenadier 8000P will be completely adequate—to say the least—in the all-important area of listening quality.

Circle 201

UHER 9000 STEREO TAPE DECK

While ordinary, run-of-the-mill tape recorders continue to be introduced, it is also obvious that the over-all quality is being stepped up, particularly with respect to the features offered in machines intended for the serious recording buff. Just a few short years ago only the professional machines were fitted with three heads. More recently, a few of the better recorders offered the three-head advantage, but within the past months, quite a number of less expensive machines have been so equipped. Not that the Uher 9000 is "less expensive," but it is the first Uher machine we have encountered with full three-head capability. The Royal 8000 had three

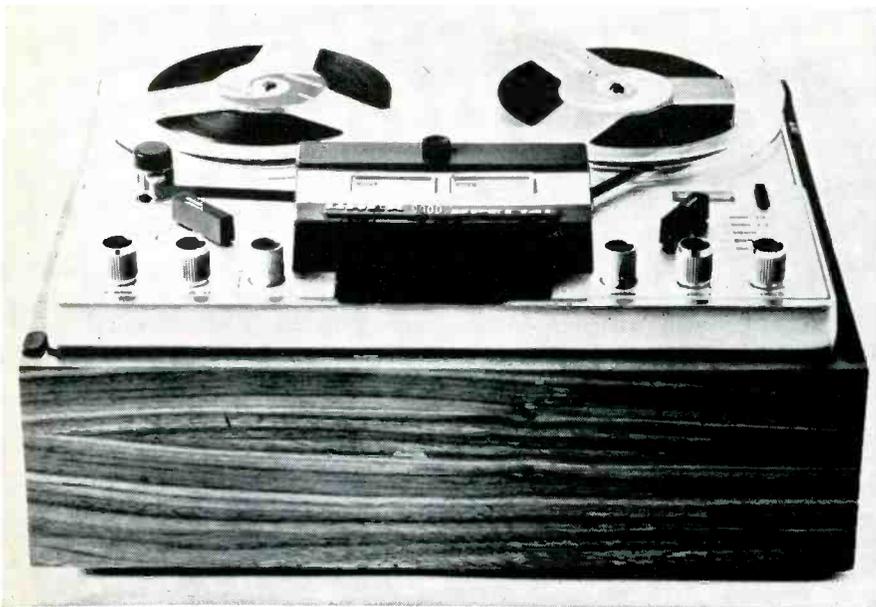


Fig. 5. Uher 9000 two-speed, three-head tape deck.

heads, but did not have enough amplifiers to permit continuous monitoring on stereo. It did on mono, using one of the stereo playback amplifiers for that purpose.

Obviously, it does cost more to provide both record and playback amplifiers for the two channels, as well as separate record and play heads, although it is recognized that the performance of a play-only head is likely to be better than the playback performance of a record-play head, since some compromises have to be made in the design of a multi-purpose head. Be that as it may, Uher has found it worth while, apparently, to employ three heads in this latest—and de luxe—recorder.

In appearance and in mechanical operation, the Uher 9000 resembles the older Stereo Record III, but is more streamlined and modern in appearance. It operates at two speeds—7½ and 3¾ ips—selected by a switch which also turns power on and off.

A second switch selects the mode of operation—MONO 1, MONO 2, STEREO, MULTIPLAY 1, or MULTIPLAY 2. The first three are reasonably obvious; the two MULTIPLAY positions require some explanation. In the first, the left channel records a mixture of left-channel inputs and right-channel playback, thus allowing sound-on-sound operation so that material previously recorded on the right channel can be rerecorded with new material from microphone, radio, or phono as desired. In the second multiply position, the right channel records the right-channel playback mixed with new material fed to the left channel input, thus making it possible to add echo to the right-channel recording in any desired amount, and adding to it from any of the signal inputs to the left channel. This type of switching provides considerable flexibility without the multiplicity of switch positions required by the circuitry of the Royal 8000.

Recording level control continues to use

the variable feedback circuit which Uher has been employing for recent models. This circuit accepts a wide variety of input levels with a minimum of distortion generation. The controls occupy the two right knobs on the front edge of the unit. The far left knob controls monitor level on both channels simultaneously; the second knob selects inputs from microphone, radio, or phono, and the third selects the monitor signal—either from source or from the tape. Tape transport is controlled by three piano-type keys—the small right one for starting the tape, utilizing a recording button as an interlock; the wide center key is for stopping tape motion, and the small left key is momentary pause. Fast forward and rewind are actuated by another bar in front of the stop key.

Two outstanding new features appear on the 9000—a knob above the head cover permits adjustment of playback-head azimuth without tools so that tapes made on another machine can be played optimally even though their azimuth may not be exactly the same as that of the record head on the 9000 (which should be adjusted to be exactly correct, of course). The playback-head azimuth can be adjusted readily by listening for maximum high-frequency output. The second new feature is the tape tension control, which also serves to remove particles of dust from the tape. This control operates additionally to shut off the unit on tape runout or breakage. Metallic strips on the tape can also be used for stopping the transport, or operation by remote control is possible.

All input and output connections are made on a panel on the back of the case to eliminate unsightly cables from the front of the machine. The panel also accommodates the line voltage selector switch, fuses, and the equalization switch which adjusts playback equalization through three positions—NAB, (50 μ sec), and CCIR for both 70 and 100 μ sec. Recording is in accordance with the NAB curve.

Performance

Record-playback performance is remarkably flat from 20 to about 21,000 Hz at 7½ ips, and from 20 to 15,000 Hz at 3¾ ips. ± 1.5 dB, and each recorder is furnished with a machine-run curve of its frequency response. In/out distortion measured less than 0.5 per cent. Signal-to-noise ratio measured 52 db, and wow and flutter approximately 0.12 per cent at 7½ ips, and 0.16 per cent at the lower speed.

Microphone input impedance is approximately 5000 ohms; radio, 47,000 ohms; and phono 1.0 meg. For full recording level, the input signal required at the three inputs was 0.14, 1.65, and 39 mV respectively.

Two outputs per channel are provided—for an amplifier input, a maximum level of 1.5 volts at an impedance of 7500 ohms, and for headphones, the same voltage at an impedance of 470 ohms, indicating the need for high-impedance (500 ohms) headphones. Twenty-five transistors, one zener diode, and one selenium rectifier make up the semi-conductor complement.

A push-button resettable 4-digit counter, is provided, as well as illuminated level-indicating meters.

Over-all dimensions are 15¼ in. wide, 13 in. deep, and 6¼ in. high, including the plastic dust cover which is readily removable. The unit weighs 24½ lbs.

Anyone familiar with the Uher line will find this an ideal model for including in a home music system. Circle 202

AUDIO MEASUREMENTS COURSE

(from page 35)

ally occurs at specific test frequencies, being particularly dependent on the upper test frequency chosen, variation of which causes more definite distortion at some frequencies than at others. Most often it is accompanied by *some* of the conventional amplitude modulation, that the SMPE test does detect, but the phase effect can be much larger than the amplitude effect at certain frequencies, so that the reading is not a valid representation of the effect.

So testing for amplitude modulation only, as the SMPE test does, will give an unreliable indication of the effect, because phase modulation is just as discernible to the human hearing faculty as is amplitude modulation of the same "depth"—in fact, it is difficult to distinguish between the two forms aurally, just as it is not easy to distinguish musical vibrato from tremolo.