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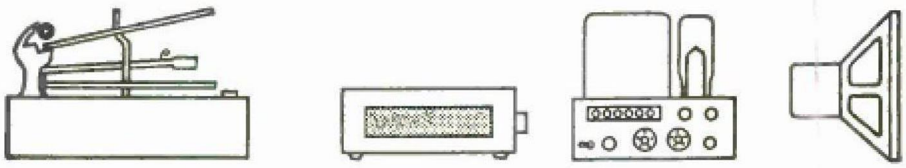

EMPIRE "TROUBADOR" MODEL 398 RECORD-PLAYING SYSTEM

The "Troubador" Model 398 is the latest entry by Empire in the record-playing field. For those who haven't heard, Empire is the short name for Audio Empire. There has been a gradual transition from the latter to the former name over the past year, unattended my fanfare or publicity. In any case, in spite of their apparent modesty, they can't really hide a good reputation under a different name.

The "Troubador" Model 398 consists of the well-known Model 208 turntable and base plus the new Model 980 arm. Although the arm roughly resembles previous models, several significant changes have been made. In addition, the arm now incorporates a device for automatically lifting the stylus off the record—a device which is unusually simple and contains no moving parts.

The appearance of the Model 398 is essentially the same as its predecessor, the Model 298. (*Figure* 1 shows the turntable plus an oversized view of the new arm.) Clearly, the Troubador Model 398 is designed to look like what it is; a massive turntable with precise performance.

The Turntable

The Model 208 turntable consists of a 12-in. diameter platter which is made from an aluminum casting weighing 6 lb. and is individually balanced. The truth of the latter may be observed by lifting the platter up and away from the mounting plate and turning it over. Notice the holes drilled to balance the platter in a procedure similar to the way automobile tires are balanced (small amounts of rubber are removed from locations indicated by a special balancing machine).

The turntable platter rides on a ball bearing at the end of an accurately honed 7/16-in.-diameter shaft. The shaft rides in an equally accurate well while the ball bearing rides on a nylon thrust bearing. A spiral oil groove is cut into the shaft to ensure lubrication of the bearing surfaces.

The platter is driven by means of a ground flat belt which rides on the machined outer rim of the turntable platter and the motor spindle. The spindle is three-stepped to provide three-speed operation: 33⅓, 45, and 78 rpm. Each step contains a convex contour to permit adjustment for a stretched belt. This adjustment is accomplished by rotating the knurled nut of one of the motor-mount screws, which tilts the motor spindle to take up the slack. Speed change is accomplished by manually shifting the belt.

The motor is a dynamically balanced hysteresis-synchronous unit of the inside-out variety. The motor is mounted to the plate by means of three soft rubber shock-mounts which prevent the vibration of the motor from being transmitted to the platter. Thus, because of the compliant drive belt, the motor is completely isolated from the record-bearing elements.

The entire turntable system is acoustically isolated by means of ball-shaped soft rubber feet. We tried to induce acoustic feedback by placing the turntable on top of our large speaker system and turning up the gain; we were unsuccessful.

The Arm

One of the most obvious changes in the new Model 980 arm is in the head. Instead of a removable, plug-in head, the 980 mounts the cartridge on a plate, which is then simply screwed into position—electrical contact being made by means of flat metal gold plated spring-fingers. A special 5-wire cable is provided to mate with the plug beneath the arm, the termination of the cable at the amplifier end being a pair of color-coded phono plugs plus a spade lug on the ground wire.

The change of the head was apparently related with the use of a much thicker-walled tubing in the arm to reduce the fundamental resonant frequency, which is now below 10 cps (the lower limit of our test record) and the manufacturer claims that it is about 8 cps.

The method of pivoting the 980 is the same as in the previous model—both the vertical and lateral pivots utilize ball bearings to suspend the pivot shafts. Stylus force is applied by means of a coil spring which acts directly on the vertical pivot shaft (center of mass) so that dynamic balance is unaffected. A counterweight is provided to balance the arm in the vertical plane.

The method for lifting the arm at the end of the record, called Dyna Lift, is a magnet which attracts a square piece of metal placed on the arm. The magnetic field is effective only after this projection enters a slot in a hollow cylinder which is attached to the arm mount. The cylinder is constructed so as to preclude stray magnetic fields. The lift works with any stylus force from one gram up and folds out of the way if desired.

Performance

The Empire "Troubador" Model 398 is precise in appearance and performance. Total rumble measured better than – 62 db, and wow and flutter were less than 0.1 per cent rms. All three speeds were quite accurate.

As a system, the "Troubador" Model 398 is not inexpensive (about $165 less cartridge), but it just reaffirms something we all know; higher quality means higher costs. The Model 398 is an excellent buy for those who want the quality. L-18

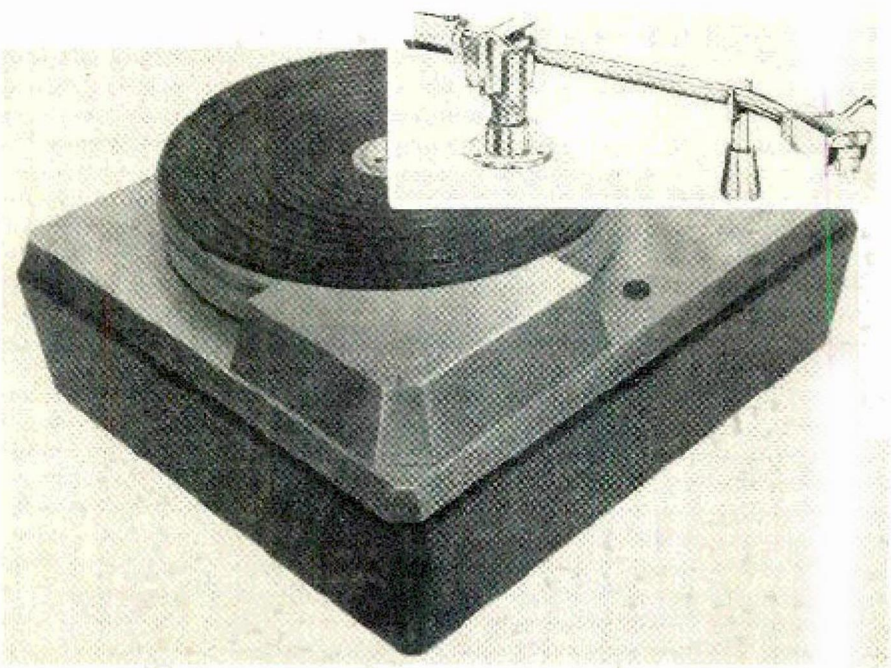

Fig. 1. Empire "Troubador" Model 398 turntable system.

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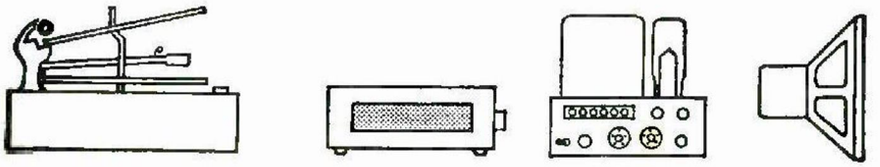

EMPIRE MODEL 498 RECORD PLAYING SYSTEM

Empire certainly has done it this time—they have changed the well-known "Troubador" turntable decidedly for the better. Most of the changes are technical, but the change that struck us first was the new appearance. They have made the 498 lower and more compact than its predecessor, and to our weary eyes, by far the best-looking design they have ever issued. We were immediately aware of, and delighted with, the new look. Of course there are no doubts about its antecedents, but still the visual impression is new.

Before continuing with the changes we had better describe what the Empire 498 system contains. First there is the 408 three-speed turntable. Next there is the well-proved 980 arm. Finally there is the handsome walnut base. (The turntable and arm are available without the base and is then known as the 488 system.)

Aside from appearance, the major change is the acoustic suspension system which makes the 498 almost impervious to acoustic feedback and shocks. We found it to be one of the stablest mounting systems we have encountered to date.

The several other changes we noted in the turntable were all related to the previous major changes. We will discuss them more fully later.

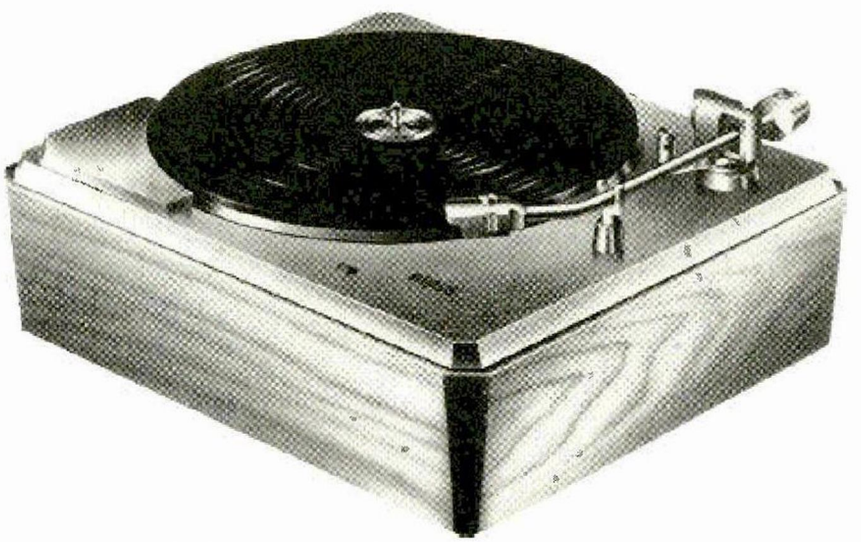

Fig. 5. Empire Model 498 Record Playing System.

outlets are provided, one switched.

Sensitivity on the phono channels is 4 mv for rated output; on the tape head inputs it is 1.4 mv for 3¾ ips and 2.15 mv for 7½-ips; on high levels the sensitivity is 0.48 volts for rated output. Measured frequency response showed equalization to be within ±2 db of the required curves. Provision is made for feeding a tape recorder at an impedance of 400 ohms on the low-level inputs, and at the same impedance as the source on the high-level inputs.

Power output measured 35 watts at 1 per cent harmonic distortion and at 0.75 per cent IM with only one channel in operation. With both channels excited, output at the same distortion points measured 28 watts per channel. Our only question regarding the unit relates to the loudness control. In this circuit, which as usual consits of a resistor and capacitor in series from a tap on the volume control, it is customary to short out the capacitor in the off position of the loudness switch. This does not cause a change in level at 1000 cps, for example, when the loudness compensation is switched on and off. In the ST70 (and also in the earlier HF85 and the current ST84 as well), the series capacitor/resistor combination is simply disconnected from the tap. This causes a jump in volume—about 15 db—when the switch is moved from on to off. This results from a system philosophy which is unique to Eico—it is the only company which uses this arrangement. The individual builder can change this to the conventional arrangement quite simply, however, so that the capacitor is shorted out in the flat position and open in the compensated position. As a matter of fact, it would save a few pennies for Eico to make this change, since a dpdt switch would be required instead of a 4pdt switch. We have discussed this with Eico engineers, but they remain adamant regarding the change. We feel that it should be mentioned, however.

Aside from this one objection, the ST97 is an excellently performing amplifier, and we would not hesitate to recommend it. Over-all construction time on this amplifier is just under 20 hours. The instruction books—in two parts, although bound as one so the construction section can be removed readily—are reasonably clear and lucid, although we feel that one or two of the diagrams could be improved, and we would recommend the mounting of the selector switch onto the front panel before connecting the leads from the input phono jacks if one is to end up with a neat appearance.

The ST84 Stereo Preamp

Similar in appearance to the ST70, the ST84 employs essentially the same circuitry up to the output section. The selector switch provides for three high-level inputs instead of the four in the ST70, with one additional low-level input being provided for microphone input. Other controls are similar, with an output impedance of 8000 ohms and a rated output signal of 2 volts. IM and harmonic distortion measure in the vicinity of .05 per cent at 2 volts. This unit can serve excellently in a system where a high-power output amplifier is required—such as the HF89, which has an output of over 50 watts per channel—or perhaps where the user already has a satisfactory power amplifier but simply wishes to update his equipment to a more modern and flexible preamp. With its construction time of less than 10 hours, the ST84 is an ideal project which is sure to result in a satisfying preamplifier-control unit. **L-22**