

Garrard Model GT55 Automatic Turntable

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MANUFACTURER'S SPECIFICATIONS

Speeds: 33-1/3 & 45 rpm.

Number of Records: 6.

Wow & Flutter: 0.05 percent.

Rumble: -66 dB (DIN B).

Motor: D.C. servo.

Tonearm: Magnesium, low mass.

Dimensions: 15-5/16 in. (38.9 cm) x
14-1/8 in. (35.8 cm).

Price: \$249.95, base & dustcover \$39.95.

The GT55 is now the top-of-the-line Garrard automatic turntable and, at the moment anyway, is the only one using the tangential tracking arm. Unlike other straight-line tracking systems such as the Rabco, Schlumberger and B & O, which use a mechanism to move the pick-up arm across the record on a bar, the GT55 has a twin articulated arm. This kind of arm was first used, if my memory serves me correctly, by Burne-Jones in England in the 1950s but the advantages were more than nullified by the high friction from the various bearings. The Garrard Zero 100, introduced about seven years ago, was the first example of a successful unit using a twin arm in which the angle between the cartridge holder and arm was varied to maintain a true tangential relationship with the record groove. The arm used on the GT55 is a greatly improved version made of magnesium to bring the mass down to the incredibly low figure of 14 grams. It is mounted by a gimbal suspension having jewel bearings in the vertical pivot and double ball bearings in the horizontal mode. The motor is a high speed d.c. servo type coupled to the turntable by a belt. Styling is attractive with a charcoal black and silver finish, making a nice contrast with the well-made walnut base. (Both base and dustcover are optional.)

Quite apart from the tangential arm, the GT55 has a number of rather unusual features. The cueing rate is variable in *both* directions, being controlled by a small knob located just behind the arm rest, and the anti-skating device consists of a magnet which is offset so the force decreases as the stylus moves towards the center of the turntable because skating force decreases towards the center of the record. The adjustment control, which governs the spacing of the magnet relative to the arm, is just behind the arm base, and it is calibrated for both elliptical and conical styli. The arm itself has another interesting design feature which is not apparent at first sight; the rear section with the balance weight is set below the axis of the main portion. This is said to improve trackability with warped records. "Trackability" is not a word I like to use here but, well, there it is!

On the left hand side, at the front, is a small panel on which are mounted the two-position speed change lever and a neat thumb-wheel variable speed control. Over to the right is a group of four controls set in a similar panel. The first one is the cue lift lever, and the second is the auto start control. Number three adjusts the mechanism for record size, 7, 10 or 12 inches, and the last one is the mode switch with positions for *Repeat*, *Auto*, *Manual*, and *Off*. The strobe window is located dead center, right in front of the platter, which incidentally, is dynamically balanced and weighs four pounds. It is driven by a belt from the 1000 rpm

motor mentioned earlier. At the rear, to the left of the arm base, is a small plastic platform on which the records rest in the automatic playing mode. Two center spindles are supplied, a short one for manual play and a longer one for automatic. Accessories supplied include cartridge mounting hardware, alignment gauge, 45-rpm adaptor, and a tiny container of oil for the spindle.

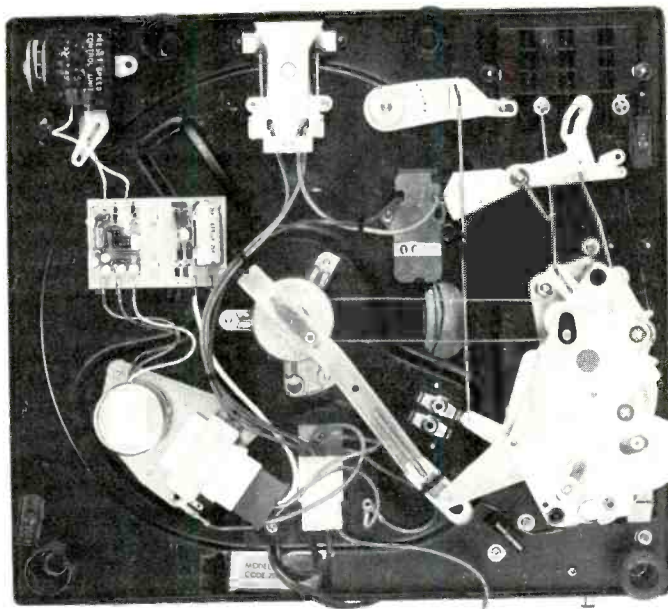
Measurements

The cartridge holder is the flat slide-in type used on other Garrard models, and an Audio-Technica AT-12S was used for most of the tests which included CD-4 records as the connecting cables are special low-capacity types. The anti-skating dial is calibrated for CD-4 styli, and both it and tracking force were set to 1½ grams—the highest recommended figure.

The first test was for wow and flutter, and the figure came out at 0.04 per cent, slightly better than claimed. Rumble measured -59 dB (ARRL) which is about 2 dB better than the 66 dB DIN B figure quoted as the DIN standard is something like 9 dB higher than the ARRL figure. The stylus force adjustment on the counterweight was found to be 5 per cent low which is well within normal tolerances, and the anti-skating dial was quite accurate. Both lateral and vertical arm friction were too low to measure accurately, but they were certainly less than 30 mg. Tonearm resonance, with the AT-12S cartridge was 8.5 Hz. Speed variation was +4 and -3 per cent and because of the servo control it was not affected by power line variations.

Listening and Use Tests

Tangential tracking is important for the lowest distortion but it is even more important for CD-4 discs, which is why I



selected a CD-4 cartridge for most of the tests. Some of my early RCA releases are a little warped and are difficult to play with many turntable-arm combinations but the GT55 coped with them all, except for the worst specimen, with no trouble. It would seem that the vertical offset arm with accurate tangential tracking really works! In the automatic mode, cycling time is about 10 seconds, and the records are handled very gently. The cue lift is nice and positive with heavy damping in both directions and of course, the adjustment control is a refinement not found on many turntables.

All-in-all, the Garrard GT55 is a worthy successor to this long line of high quality units. It is well-made, very quiet in operation and the carefully engineered mechanism with the minimum of moving parts should give years of trouble-free service. The total design concept is called "Generation Two" and many of the features will be incorporated in future models. We look forward to testing them.

George W. Tillett

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AIWA Model 1800 Cassette Deck

MANUFACTURER'S SPECIFICATIONS

Frequency Response: 30-14,000 Hz LH tape, 30-18,000 Hz FeCr tape, 30-17,000 Hz CrO₂ tape.

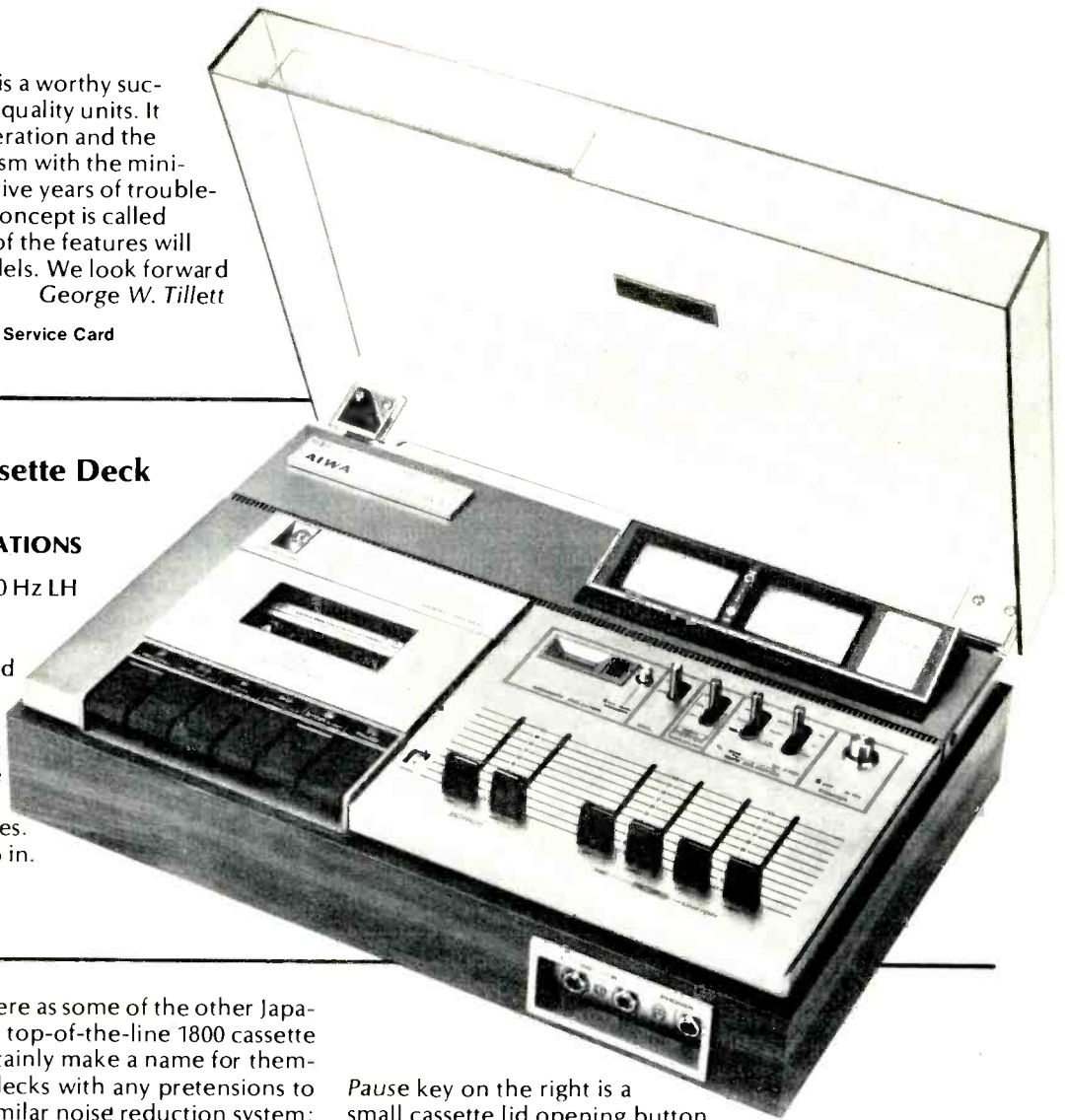
S/N Ratio: 65 dB with Dolby and DNL.

Wow and Flutter: 0.05 per cent W_{rms}.

Features: DNL and Dolby noise reduction systems, FeCr equalization, variable bias for LH tapes.

Dimensions: 17 in. (43.2 cm) x 6 in. (15.2 cm) x 11 1/2 in. (29.5 cm).

Price: \$450.00 with dustcover.



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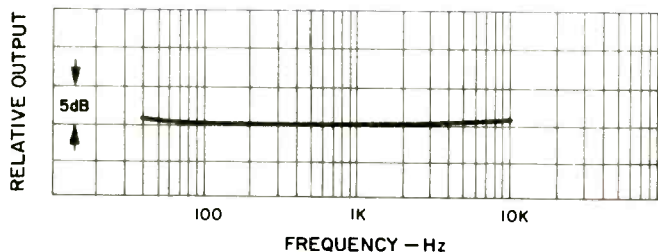
AIWA is not as well-known here as some of the other Japanese concerns, but if their new top-of-the-line 1800 cassette deck is any guide, they will certainly make a name for themselves very soon. All cassette decks with any pretensions to high fidelity have a Dolby or similar noise reduction system; but few can boast of a Dolby system *plus* a DNL circuit. It might be asked, why *two* noise reduction systems? Isn't this rather unnecessary? And isn't the Dolby sufficient on its own? But, of course, the two systems are complimentary as the Dolby is a record-playback expansion compression system while the DNL only works during playback so it can be pressed into service for just about everything. Can both systems be used together—in tandem as it were? The answer is yes, although the improvement in signal to noise is not additive as we shall see later.

Let us have a look at the controls of this unusual machine. On the left hand side in front of the cassette compartment is a row of six tape control keys as follows: *Record*, *Rewind*, *Forward*, *Fast Forward*, *Stop/Eject* and *Pause*. Next to the

Pause key on the right is a small cassette lid opening button and a group of six vertical slider controls. The first two control the output levels and the second and third pair are the microphone and line input controls. Behind the sliders is the digital counter, memory button, and a set of four lever switches for DNL, Dolby, bias, and equalization. The power *On/Off* switch is over to the right, and at the rear are the two VU meters mounted at an angle with illuminated indicators for record, Dolby, DNL and CrO₂. In between the meters are two peak reading LEDs which light up at 3 and 7 dB above 0 VU. At the rear of the cassette compartment, which by the way is illuminated, is a tape run indicator lamp mounted at an angle for good visibility. The headphone and microphone jacks are located in a recessed panel on the front edge, just below the recording controls. The line input and output sockets are at the rear together with a preset control which can vary the bias by about 20 per cent. A DIN socket is also included. Now for a few words about the four lever switches: the DNL switch needs no explanation, but the Dolby switch has three positions: *Off*, *On* with a MPX filter, and *On* without the filter. The bias and equalization switches have positions for CrO₂, FeCr and LH which is called normal.

The motor is an a.c. hysteresis synchronous type, and it is coupled to a heavy flywheel weighing 448 grams (16 ounces). Styling is fairly conventional with a black and gold panel and controls. The base is finished in simulated walnut, and the 1800 comes complete with a transparent plastic dustcover, attached to hinges at the rear.

Fig. 1—Playback response with the standard test tape.



Measurements

The first measurements were made with a standard 40 Hz to 10 kHz test tape as shown in Fig. 1. Then, a record-replay response curve at two levels was made with Maxell high energy UDXL tape (see Fig. 2). The 3 dB point was at 15.8 kHz, and the low end was well-maintained without fringing effects. Next, a C-90 TDK SA tape was tried, using the CrO₂ equalization position as recommended. The results were within 0.5 dB of the Maxell, so the graph is not shown. Then a BASF CrO₂ C-90 tape was checked, and again the response was very similar (see Fig. 3) with the upper 3 dB point extended slightly, to 16.1 kHz. Various other tapes were then tried, and among those giving excellent results (without touching the pre-set bias control) was the Fuji FX-60, Maxell UD, TDK Audua, Nakamichi SX-60, and Scotch Classic. The last tape to be tested was a Ferrichrome, the Meriton FeCr-60, and it will be seen that the frequency response is extended to 20 kHz! The actual 3 dB point was 19.8 kHz but just as significant—note the increased headroom at 0 VU. Next, distortion measurements were made and are shown in Fig. 5. The high-energy tapes (Scotch Classic, TDK SA and Maxell UDXL) were almost identical, so only one curve is shown for this group. Distortion versus frequency is indicated in Fig. 6. Signal-to-noise ratio measurement was more complicated than usual owing to the different efficiencies and the use of the two noise reduction systems. These are shown in Table 1.

Note that all the figures use the "A" weighting and are referenced to 3 per cent distortion. As mentioned earlier, don't expect to just add the Dolby and DNL figures and come up with the right answer! Having checked the Dolby

Table 1
Signal-to-Noise ratio in dB.

	Basic S/N	With DNL	With Dolby	With DNL & Dolby
Maxell UDXL	60.0	65.0	69.0	71.0
TDK SA	60.5	65.5	69.5	71.5
BASF CrO ₂	57.0	62.0	66.0	69.0
Meriton FeCr	58.0	64.0	68.0	71.0

tracking and confirmed that the maximum error was 1 dB, the erase efficiency was measured at better than 70 dB. Wow and flutter was the next test, and the combined figure was 0.04 per cent which is exceptionally good. The Dolby MPX filter was 1 dB down at 16 kHz, with the attenuation increasing to 15 dB at 19 kHz. Input signal for 0 VU was 39 mV, and the output was then between 480 and 690 mV, depending on the tape. Microphone sensitivity was 180 μV, and the signal to noise decreased by 13 dB with the input control at maximum. For most low impedance microphones, the control would be turned down somewhat so the figure in practise would be nearer 6 or 8 dB. Speed was found to be "right on the nose," and rewind time was 140 seconds for a C-90 cassette.

Listening Tests

Before making any tapes, some prerecorded tapes were played, including the new Nakamichi recording of Men-

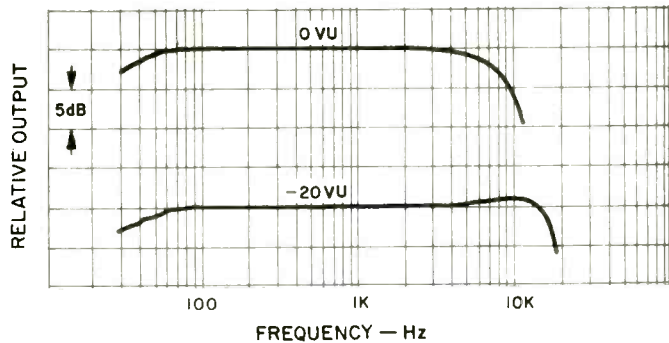


Fig. 2—Record/replay response with Maxell UDXL tape.

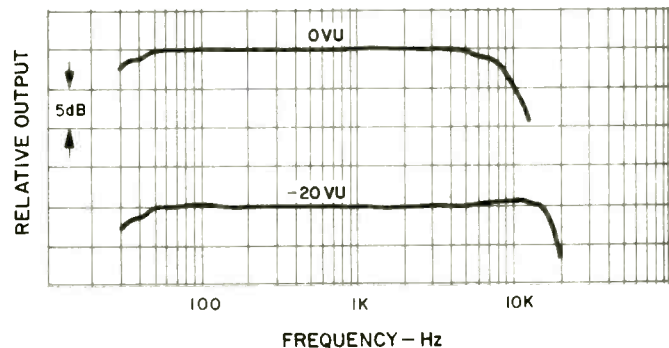


Fig. 3—Record/replay response with BASF CrO₂ tape.

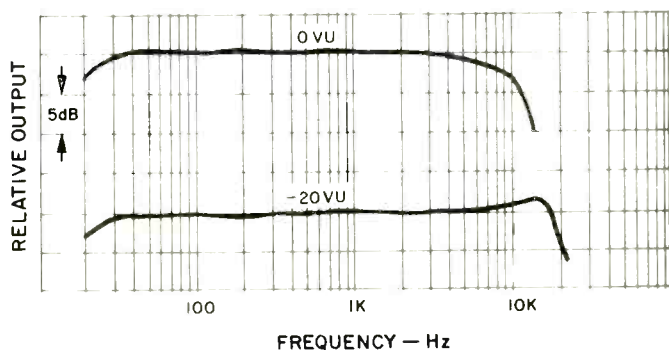


Fig. 4—Record/replay response with Meriton FeCr tape.

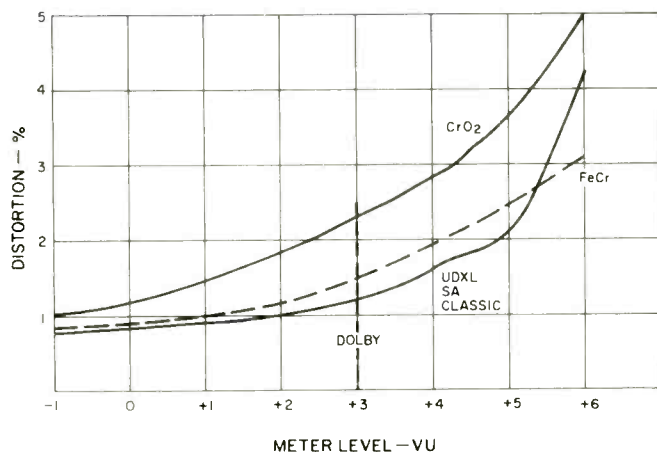


Fig. 5—THD at 1 kHz.

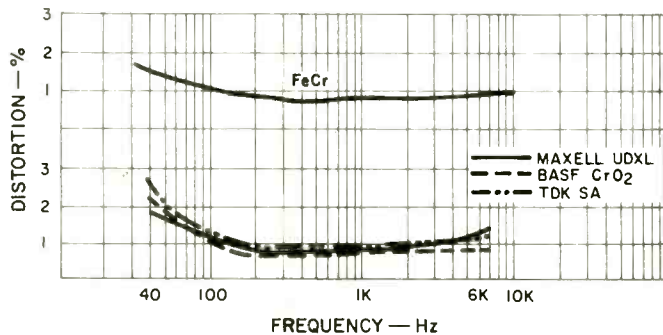


Fig. 6—Distortion vs. frequency at 0 VU.

delsohn's **Trio in D Minor** which is notable for its overall sound quality and low background noise. Next a tape was made using a spoken commentary, and here I found the twin peak indicators most useful. I would have liked some provision for a center microphone, but other than that, I have no criticisms to make. The controls all handled well, and the eject mechanism treated the cassette very, very gently, as it merely opened the compartment lid where-

upon the cassette moved slowly upwards. Aiwa calls this idea "oil damped elevation," and I have noticed something of the sort on one or two other decks. Much better than the devices which toss the cassette right out of the deck! As far as the electronics is concerned, in terms of frequency response, signal-to-noise ratio and distortion, the Aiwa 1800 is in the highest class, irrespective of price. Not only is the high-frequency response excellent, but the low end is better than average too—a tribute to good head design. The variable bias control is a refinement that will certainly appeal to the enthusiast who wants optimum results from any tape—although I must confess I only had to change the setting for one—the Scotch Master 90. However, a list of many other tapes with recommended bias settings is given in the instruction manual.

How about the DNL system? Well, it does help in reducing background noise, although the effects are not as dramatic as with the Dolby. The losses are not significant, and I imagine many people will leave the DNL switch on more or less permanently.

Summing up: the Aiwa 1800 is not particularly cheap, at about \$450, but it does offer excellent performance and a lot of extras for the money.

George W. Tillett

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