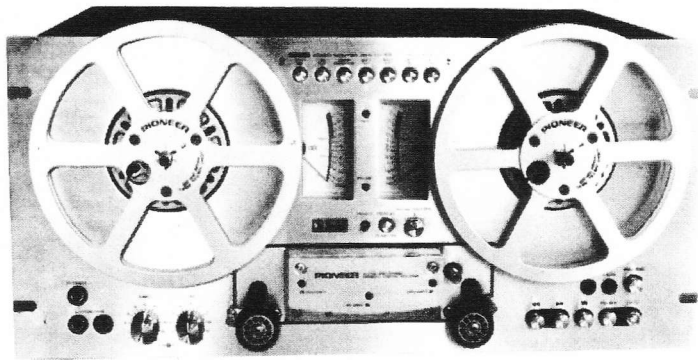


Pioneer RT-707 Open-reel Tape Deck



MOST of today's open-reel tape recorders are as notable for their large size, weight, and price as they are for their generally outstanding performance. This might lead one to conclude that there is little market potential for more modestly endowed open-reel machines costing from \$500 to \$1,000, since that is a price range where the buyer also can choose among a great many de luxe cassette and elcaset decks.

Evidently Pioneer feels otherwise, judging by the appearance of the Model RT-707 recorder in their new product line. The RT-707 is an open-reel, four-track stereo machine operating at $3\frac{3}{4}$ and $7\frac{1}{2}$ ips. It has the usual three-head format, plus a second playback head for use in the reverse direction of tape movement. It is equipped for automatic tape reversal, initiated by a piece of conducting-foil tape attached to the coated side of the magnetic tape, and it also can be reversed at any time by touching a button on the panel. It records only in the normal forward direction.

The Pioneer RT-707 has a three-motor tape transport with six-pole induction motors for each of the tape hubs and a direct-drive a.c. servomotor for the capstan. The use of a direct-drive capstan motor eliminates the belts and pulleys required to couple a high-speed motor to a slowly turning capstan, and with them go the periodic maintenance procedures and potential failures associated with such mechanical systems.

Most of the panel space of the RT-707 is devoted to the two 7-inch tape reels (a metal

take-up reel is supplied with the recorder). Between them are two large illuminated level meters with vertically oriented scales. Between the meters, red and green LED's indicate when the machine is in the RECORD or PAUSE mode.

Above the meters are seven pushbutton switches. Two are REC MODE selectors for the two channels which must be engaged in order to make a recording (they thus serve as a safety device to prevent accidental erasure of a recorded tape). Since it is possible to record on one channel while playing the other, special-effects recordings such as sound-with-sound can be made with external jumper connections between the recorder's input and output jacks.

There are separate recording BIAS and equalization (EQ) buttons. Each has STD (standard) and LH (low-noise/high-output) positions; a table in the instruction manual lists recommended settings for most popular tapes. The MONITOR button channels either the SOURCE signal or the TAPE playback program to the line outputs. The remaining buttons are the SPEED selector and the POWER switch.

Below the meters are the four-digit index counter, its reset button, a REPEAT button, and a PITCH control knob. The REPEAT function allows a tape, or any portion of it, to be repeated indefinitely by switching from forward to reverse playback when the metal foil is contacted and from reverse to forward when the index counter has returned to its

"0000" setting. The PITCH knob is a speed vernier, operating only during playback, with a nominal ± 6 per cent range. It is detented at its center, which establishes the correct playing speeds.

The head assembly is flanked by two rubber rollers and tension arms. When the tension arms are raised to their uppermost (latching) positions, the tape can be loaded in a straight line across the heads. The single capstan is to the right of the heads and nearest the take-up reel in the forward direction of tape motion. Screwdriver access holes in the head cover permit easy azimuth adjustment of the recording and playback heads if required.

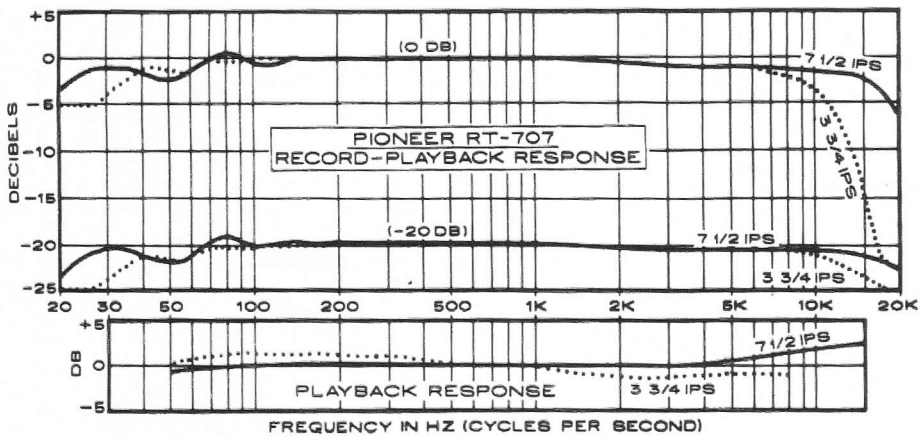
At the lower left corner of the panel are the microphone jacks and the headphone jacks plus separate recording-level controls for the microphone and line sources, which can be mixed. Each control is a concentric pair coupled by a slip clutch for individual adjustment of channel levels.

The tape-transport controls are grouped at the lower right of the panel. They are mechanical pushbuttons that actuate electrical solenoids. Although there is no remote-control facility in the RT-707, the controls can be preset so that unattended recording or playback can be initiated with an external timer switch in the a.c. power circuit. There are fast-speed buttons for both directions, a STOP button, and the PLAY and REC buttons that must be engaged simultaneously to make a recording. (By pressing them both while playing a tape, it is also possible to make a "flying start" recording.) Next to the PAUSE button are small playback-direction selectors on which illuminated arrows show the direction of tape travel.

The line inputs and outputs are in the rear of the recorder, with separate playback-level controls for each channel. These are detented at their mid-points. There is also a single unswitched a.c. outlet.

The Pioneer RT-707 has a distinctive size and shape, considerably more compact than the typical open-reel recorder. Its satin-finish aluminum panel is 19 by 9 inches and is slotted for mounting in a standard EIA equipment rack. The recorder is 14 inches deep and

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weighs about 43½ pounds. Price: \$575 (the RT-701, identical except that it lacks the reverse-play feature, is \$525).

● **Laboratory Measurements.** Although the instruction manual lists Scotch 206 as the tape used for deriving the recorder's performance specifications, our test sample had been adjusted for TDK Audua tape. Both of these, plus several other comparable tapes, were used in our tests. The differences between them were slight, with Memorex Quantum giving the widest frequency response and Scotch 206 the best signal-to-noise (S/N) measurements. Since the TDK tape fell between these two in all respects and none of the differences were audibly significant, the following test data are based on the use of TDK Audua with LH bias and equalization settings. (Maxell gave essentially the same fine results.)

The playback frequency response, measured with Ampex test tapes, was within ± 1.5 dB from 50 to 7,500 Hz at 3¾ ips (the limits of the tape). At 7½ ips, it was slightly different in the two directions of tape movement. In the forward direction, the response was within ± 0.5 dB from 50 to 5,000 Hz, rising to +2.5 dB at 15,000 Hz. In reverse, the response was ± 0.5 dB from 50 to 15,000 Hz.

A line input of 35 millivolts (mV) or a microphone input of 0.18 mV produced a 0-dB recording level at maximum gain settings. The resulting playback level was 580 mV with the controls centered and 800 mV with the maximum playback level setting.

At 3¾ ips and a -20-dB recording level, the record-playback frequency response was down 4 dB at 30 and 14,000 Hz. At a 0-dB recording level, the high-frequency response was down 4 dB at 10,000 Hz due to tape saturation. At 7½ ips the response was ± 2 dB from 20 to 24,500 Hz at a -20-dB level and from 20 to 18,000 Hz at a 0-dB level.

The playback distortion from a 0-dB recorded signal at 1,000 Hz was 0.23 per cent, and the level had to be increased to +12 dB (far off the meter scales) before the 3 per cent distortion-point reference was reached. The S/N referred to that level at 7½ ips was 63.3 dB in an unweighted rms measurement, 68.5 dB with IEC "A" weighting, and 65 dB with CCIR weighting. The S/N at 3¾ ips was about 3 dB worse, and the noise level increased by 8 dB through the microphone inputs at maximum gain. At more normal gain settings there was little added noise.

The wow was less than 0.01 per cent under all conditions. Unweighted rms flutter was

0.08 per cent at 3¾ ips and 0.065 per cent at 7½ ips in a combined record-playback measurement. With the Ampex flutter test tapes, we measured 0.09 per cent flutter at both speeds in the forward direction. In reverse play, which places the capstan between the supply reel and the heads, the flutter was 0.17 per cent at 3¾ ips and 0.12 per cent at 7½ ips.

The playback speed was exactly the same as the recording speed with the PITCH control set to its detented position. The playback speed could be varied over a +9.2 to -7.6 per cent range. In the fast speeds, 1,800 feet of tape were moved forward in 89 seconds and rewound in 102 seconds. The 0-dB level of the meters corresponded to a 180-nW/m flux level, and the meters responded a little slower than a standard VU meter. Tone bursts of 0.3-second duration indicated about 10 per cent less than their steady-state levels. The headphone level is fixed and is adequate for general listening via 200-ohm phones.

● **Comment.** The Pioneer RT-707 sounded every bit as good as its excellent measurements suggest, and it was also an easy-to-use,

smooth-handling machine. At 7½ ips it appeared to be essentially the equivalent of many other high-quality (and far more expensive) open-reel tape recorders designed for home use. And as with most of them, its performance at 3¾ ips is more comparable to that of a medium-price cassette deck, so that its advantages over a cassette machine at the lower speed are principally those of tape-editing convenience rather than basic recording quality. Nonetheless, it is interesting that this combination of versatility and performance is now available at a price hardly more than that of a good cassette recorder and actually far less than the cost of one of the new top-of-the-line de luxe three-head cassette or elcaset decks.

In using the RT-707 with a number of tape formulations, we discovered that the recommended settings of the BIAS and EQ switches were not always optimum. The Pioneer manual suggests that if one is dissatisfied with the sound, other settings should be tried. We found that recording interstation FM tuner hiss at about a -10-dB level and comparing the incoming and playback signals with the MONITOR switch was the best way to establish the optimum tape bias and equalization. This should be done at 7½ ips, since there will always be a distinct dulling of the highs in such a comparison at 3¾ ips. At 7½ ips, the RT-707 is capable of virtually flawless reproduction of a random-noise signal—which is about as tough a test as can be made.

Since there is little difference in price or size among many good regular cassette decks, the lower-price elcaset decks, and the RT-707, the tape hobbyist is now free to make a choice of format solely on the basis of performance or convenience. Certainly one can no longer generally characterize open-reel recorders as large and expensive and cassette recorders as compact and inexpensive. We suspect that "low-profile" open-reel decks such as this one will become more popular in the future.

Circle 109 on reader service card

