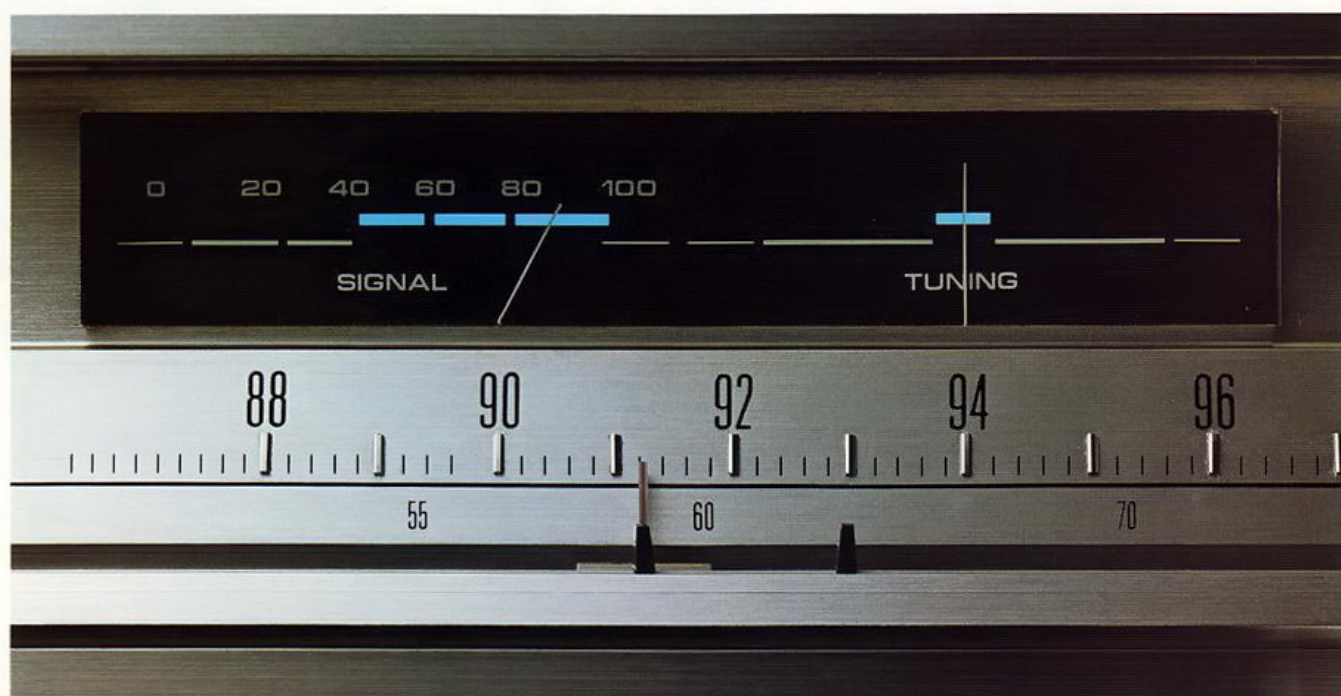


PIONEER TX-7800

STEREO FM/AM TUNER WITH SERVO-LOCK/TOUCH-SENSOR TUNING



 PIONEER®

PIONEER TX-7800

Significant Improvements in Accuracy, Fidelity & Convenience

- **SERVO-LOCK/TOUCH SENSOR TUNING**—Drift-free performance and ease of use with unique FM station selection system.
- **SERVO RE-LOCK INCLUDED**—Selected station is re-locked when you re-power the tuner.
- **PIONEER "CLEAN DESIGN"**—High S/N ratio and low distortion in FM stereo.
- **SELECTABLE AM IF BANDWIDTH**—You choose WIDE or NARROW for better AM sound in any reception situation.
- **HIGH SENSITIVITY/STABILITY**—Enjoy true high fidelity performance every time. Sensitivity is a high 9.3dBf (1.6 μ V).

FINGERTIP TUNING CONTROL

Pioneer's SERVO-LOCK Tuning for FM

Three important criteria were included in the design concept drafted by Pioneer for this attractively-priced stereo FM/AM tuner. First was high tuning accuracy—station-pulling capability in *any* reception circumstances is the least we can offer customers who look to us for state-of-the-art performance. Superior high fidelity *tonal quality* and improved *tuning convenience* were also on the list. Our engineers developed the unique Servo-Lock/Touch Sensor system featured here so that all three demands are fully met. Here's how it works:

Touch to Tune, Let Go to Lock

When you tune an FM station, simply follow these easy steps:



Step #1—Grip the special Touch Sensor tuning knob as you would any other tuning control. The difference here is that the built-in Servo-Lock circuitry in the Pioneer TX-7800 is turned OFF the instant your

fingers make contact. As they do, the LOCKED indicator goes OUT.

Step #2—Tune in the FM station you desire, observing the Twin Tuning Meters and the dial pointer.

Step #3—Now, remove your fingers from the knob. The Servo-Lock is immediately put back in the ON mode and your station is accurately, stably locked in until you intentionally de-tune it for another selection. To confirm this, observe the green LED in the dial panel. When you are on-station, it lights to indicate LOCKED status.

By the way, if the station you have tuned is in stereo, the STEREO indicator lights in red. It, too, is an LED (Light-Emitting Diode) which can never burn out. And on

the rear panel of the TX-7800 is a selector for High or Low sensitivity for the Touch-Sensor itself to accommodate the tuning knob to your particular touch.

How Pioneer's SERVO-LOCK Ends Drift

Absolutely no changes of temperature, humidity or other environmental factors can cause the drift or de-tuning of an FM station once you've locked it in. This "miracle" of technology is not so difficult to understand when our tuning circuitry is examined in depth, as follows:

First, the signal enters the FM antenna and is passed on to the mixer stage where it meets the output of the local oscillator. If the station you have selected is, say, 100MHz, the local oscillation frequency is 110.7MHz to meet the 10.7MHz IF frequency in the next stage. Now let's say the local oscillator frequency drifts +100kHz. The IF frequency will then vary to 10.8MHz and the results will show up in the output of the discriminator transformer in an "S" curve. That difference is rectified into DC voltage, and detected and fed back to the local oscillator through a varicap. Immediately, the local oscillation frequency is shifted down to resume the correct 10.7MHz for accurate reception of the selected station. . . . LOCKED reception.

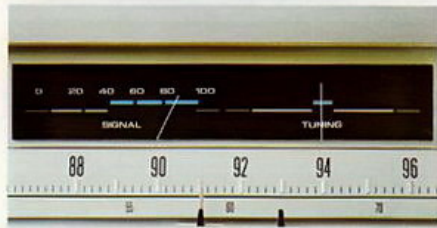
The beauty of the system is that it is foolproof. Like the high-precision servo-systems used in computers, it uses error to correct error—all so fast your ears can detect no error at all.

Automatic RE-LOCK System, Too

The accuracy of the Servo-Lock system in the TX-7800 is unfailing, even when you power-off the tuner. When power is restored, the previously selected station is instantly RE-LOCKED. Tape buffs will note that this is a definite plus when using the tuner with a pre-set timer clock for unassisted off-the-air recording.

Improved Tuning Aids

You'll appreciate the new design of the scales used for the Twin Tuning Meters.



We've used a straight-line format for easier reading, and long-throw needles for more indication margin. The scales are in brilliant blue to match the quick-response fluorescent Peak/Average meters on the latest Pioneer tape decks and SA integrated amps. The meter on the left is for SIGNAL strength for FM and AM broadcasts; on the right is the TUNING meter for center-of-channel tuning for FM.

ADVANCED FM CIRCUITRY

Beautiful Tonal Quality is Assured

Superior high fidelity *tonal quality* was on our list of design criteria along with tuning accuracy and tuning convenience. We've found answers to the challenges of providing a high signal-to-noise ratio, lower distortion and high stereo separation in the TX-7800 in order to deliver that tonal quality without compromise. Along with these hi-fi musts, our advanced circuitry also provides the high sensitivity, high spurious response ratio, high image response ratio and other specifications required for the elimination of all forms of interference. Tonal quality is optimized under *any* reception conditions—from too-weak and too-strong stations alike. Audiophiles will be interested in the details, and here they are:

Sophisticated FM Front End with MOS FET

A low-noise, dual-gate type MOS FET (Metal Oxide Semiconductor Field Effect Transistor) is employed in the FM front end of the TX-7800. It has superior cross modulation characteristics that is responsible for the high sensitivity and high interference rejection capability in FM reception. Proof is in the specs—9.3dBf usable sensitivity, 100dB IF response ratio, 85dB image response ratio and 95dB spurious response ratio.

The MOS FET works with an elaborate frequency-linear 4-gang variable capacitor and the above-mentioned Servo-Lock system to assure stable tuning accuracy at all times.

Three Phase-Linear Ceramic Filters in FM IF

Integrated circuitry employing the latest microelectronic techniques is very popular among Pioneer engineers for a number of very good reasons. They offer, for instance, higher accuracy and higher dependability than discrete parts in most situations. Not incidentally, lower production costs and a much lower incidence of costly repair are also on the list of advantages offered by ICs.

In the FM IF section of the TX-7800, two high-gain ICs are employed as differential type IF amps. They are deployed with no fewer than three phase-linear ceramic filters to further improve interference rejection characteristics. FM alternate channel selectivity, for example, is an excellent 75dB.

New Quadrature Discriminator

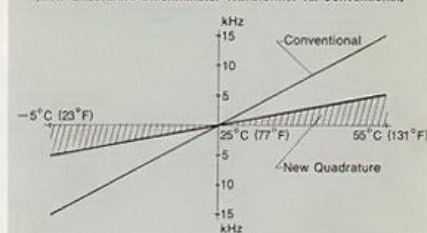
A Pioneer-developed IC, the PA-3001A which is found only in our best tuners and receivers, takes part in FM detection and IF amplification. But the highlight of the circuitry here is the new Quadrature discriminator transformer with which the PA-3001A works. We call it a "one-pack phase shifter" because it packs the conventional micro inductor and the discriminator with new bobbin material in one shielded case. Benefits include the following:

- (1) Positive protection against distortion.
- (2) Improvement of input vs. distortion characteristics.
- (3) Reduction of noise for a better S/N.
- (4) Increased stability against temperature/humidity changes.



Temperature Characteristics

(New Quadrature Discriminator Transformer vs. Conventional)



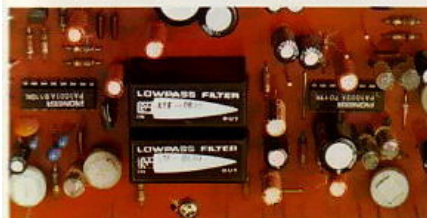
Still Other Pioneer ICs in FM Section

Audiophiles know that Pioneer was among the first to perfect an MPX or stereo FM multiplex demodulator that resists *all* external influences to provide clean, wide stereo separation. This means the stereo images in the reproduced sound field never waver or blur, never leave you in doubt if the station you are hearing is stereo or mono. In specific terms, the stereo

separation in the TX-7800 is a full 50dB at 1kHz. Frequency response is in no way compromised to achieve wide separation, by the way. It remains 20 to 15,000Hz ± 0.2 dB, -0.5 dB at all times.

The Pioneer-exclusive IC No. PA-1001A encapsulates our PLL (Phase-Locked Loop) MPX together with a built-in Automatic Pilot Signal Canceller system to ensure that the stereo FM switching signal does its intended job with no problems. Also included is a new independent left/right-channel MPX Lowpass Filter; since the filter sections are independent for each channel, mutual interference is remarkably reduced.

The Pioneer PA-1002A, still another exclusive IC, is found in the audio amp and FM muting section. Higher accuracy and better musicality are again the benefits.



FM MPX Circuit



IMPROVED AM FIDELITY, TOO

Selectable IF Bandwidth for AM

A new AM broadcasting channel plan has been put into effect worldwide. It reduces the conventional interval between AM stations from 10kHz to 9kHz, a fact we expect to increase AM noise and interference still more. We took this into consideration when we built the TX-7800, and included a *selectable* WIDE/NARROW IF bandwidth for the AM section.



New AM IF Filters

A wide band LC filter is put on line when you switch to WIDE band AM. This reduces distortion to suit the higher sensitivity of the tuner when receiving AM signals of normal strength; this, in turn, means a wider effective frequency range and cleaner reproduction. When the station you want is weak or distant, switch to NARROW. Here, a precision ceramic filter is added to the circuit to cut out all sorts of interference. You can easily hear the differences represented in these specifications: AM selectivity is 15dB in the WIDE mode, a pinpoint 50dB in NARROW.

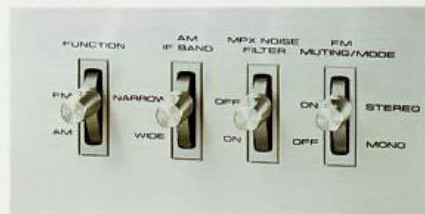
A tip: the movement of the signal meter is related to the characteristics of the WIDE/NARROW selectivity of AM. When you tune in strong-signal stations we recommend that you use the NARROW mode for pinpoint selection, then switch to WIDE to enjoy better sound quality.

AM Circuitry Aims at Hi-Fi Quality

No one can rightly claim that AM is truly hi-fi in the conventional sense of the term. But Pioneer engineers have tackled distortion, noise and frequency response factors to make AM as "hi-fi-like" as possible. An IC with superior characteristics in lowering low-frequency distortion is used in the RF amp and AM detection stage. After detection, the signal is sent to two Pioneer-exclusive ICs (the PA-1001A and PA-1002A as used for the FM section) for amplification. With the WIDE/NARROW facility described above, this elaborate circuitry does make AM listening more enjoyable by eliminating booms, whines and whistles for a cleaner sound.

STILL MORE ADVANTAGES

- **OUTPUT LEVEL CONTROL**—Front-panel control to adjust output level.
- **TWIN OUTPUTS**—Two sets of stereo output terminals are provided. One has a fixed output; use it for connection with your amplifier. The other has variable output (with output control, above); use it for direct connection to tape deck, etc.
- **MPX NOISE FILTER**—Front-panel switch to cancel stray noise from FM carrier when taping.
- **FM MUTING/MODE**—In the OFF position the Servo-Lock FM Tuning system is out of circuit.



- **LED INDICATORS/INDEX MARKERS**—Further aids to fast and accurate tuning. The lights for STEREO and LOCKED (red and green) can never burn out. The index markers slide to your favorite stations for convenient re-tuning.
- **FM DE-EMPHASIS**—Rear-panel switch for selectable de-emphasis.
- **FM MULTIPATH OUTPUTS**—Horizontal and vertical.
- **CLICK-NOISE CANCELLER**—All function switches backed by click-noise canceller circuit for silent operation.
- **VERSATILE STYLING**—Straightforward looks and diamond-cut dial scale finish increase appeal. Styling is coordinated with other new products from PIONEER.

TX-7800 SPECIFICATIONS

FM SECTION

Usable Sensitivity:	Mono: 9.3dBf (1.6 μ V)
50dB Quieting Sensitivity:	Mono: 15.5dBf (3.3 μ V) Stereo: 37.1dBf (39.2 μ V)
Signal-to-Noise Ratio (at 85dBf):	Mono: 83dB, Stereo: 79dB
Distortion (at 85dBf)	
100Hz:	Mono: 0.08%, Stereo: 0.1%
1kHz:	Mono: 0.05%, Stereo: 0.08%
10kHz:	Mono: 0.06%, Stereo: 0.3%
Frequency Response:	20 to 15,000Hz $\pm$ 0.2dB, $-$ 0.5dB
Capture Ratio:	1.0dB
Alternate Channel Selectivity:	75dB
Spurious Response Ratio:	95dB
Image Response Ratio:	85dB
IF Response Ratio:	100dB
AM Suppression Ratio:	65dB
Muting Threshold:	19.2dBf (5.0 μ V)
Stereo Separation:	50dB (1kHz), 35dB (20-10,000Hz)
Subcarrier Product Ratio:	70dB
Multipath Jacks:	Vertical and Horizontal
De-Emphasis Switch (switchable):	25 μ S—75 μ S
Antenna Input:	300 ohms balanced 75 ohms unbalanced

AM SECTION

Sensitivity:	300 μ V/m (IHF, ferrite antenna) 15 μ V (IHF, external antenna)
Selectivity:	15dB (WIDE), 50dB (NARROW)
Signal-to-Noise Ratio:	50dB

Image Response Ratio:

45dB

IF Response Ratio:

50dB

Antenna:

Built-in ferrite loopstick antenna

AUDIO SECTION

Output (Level/Impedance)

FIXED:

650mV (FM), 200mV (AM)/4.2k ohms

VARIABLE:

0mV to 1.3V (FM), 0mV to 400mV

(AM)/3.6k ohms

FM (100% MOD),

AM (30% MOD)

SEMICONDUCTORS

FETs:

2

ICs:

7

Transistors:

11

Diodes:

30

MISCELLANEOUS

Power Requirements:

110/120/220/240V (switchable)

Power Consumption:

50-60Hz

Dimensions:

23 watts

Without package:

16-9/16(W) x 5-7/8(H) x 15-3/8(D)

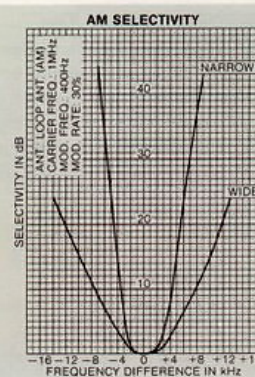
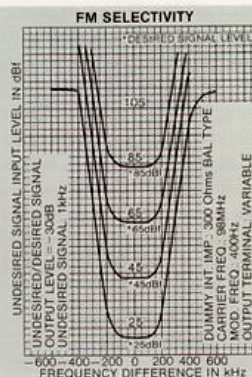
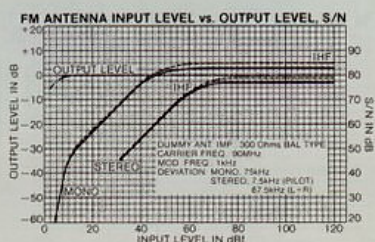
inches

420(W) x 150(H) x 390(D)mm

Without package:

16 lb. 9 oz./7.5 kg

Weight:



NOTE: Specifications and design subject to possible modification without notice.



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