

# TheOldStereoGuy.com Pioneer QX-949 AM/FM Four-Channel Receiver



● PIONEER's finest four-channel receiver, the QX-949, has an impressive combination of performance specifications and operating versatility. The QX-949 has built-in decoding circuits for all the major types of four-channel records—SQ, RM, and CD-4—plus an AM tuner and a high-performance FM tuner. It is a powerful receiver, rated at 40 watts per channel into 8-ohm loads, all channels driven, from 20 to 20,000 Hz, with less than 0.3 per cent harmonic or intermodulation (IM) distortion. For two-channel use, the power output of the front-channel amplifiers can be boosted by inverting a plug in the rear of the receiver. This removes the power-supply voltage from the rear-channel amplifiers and thereby supplies the front amplifiers with a higher d. c. operating voltage. (Note that this is *not* the "strapping" system used in many four-channel amplifiers to obtain higher power in stereo service.)

Pioneer has incorporated an imposing array of control functions on the front panel of the QX-949. The large slide-rule dial has AM and linearly spaced FM calibrations, the latter being at 200-kHz intervals. To the right of the dial is a dual tuning-meter assembly (zero-center and relative-signal-strength indications) and a large tuning knob. Above the dial scales, illuminated words in several colors clearly identify the receiver's operating mode (2 CH, 4 CH, CD-4, RM, SQ, AM, FM, PHONO, AUX, STEREO), and a small red light is activated by the 30-kHz carrier of a CD-4 record.

Along the bottom of the panel are nine control knobs. The VOLUME control is flanked by small left and right CD-4 separation controls (for adjusting the front-rear separation on each side). The CD-4 carrier-level adjustment is located under the receiver. Bass and treble tone controls, which have step detents, are duplicated for the front and rear channels. The MODE switch selects 2 CH, CD-4, RM, and SQ operation. The CD-4 setting also serves two other distinctly different functions. With a four-channel discrete source (such as a tape cartridge player) connected to the AUX inputs, the CD-4 setting provides discrete four-channel amplification within the receiver. Also, when playing stereo records or stereo FM or mono programs, the CD-4 mode drives the front and rear speakers on each side with the same signal. The FUNCTION switch selects the input

source (AM, FM MONO, FM AUTO, PHONO 1, PHONO 2, AUX). There are also front and rear headphone jacks and pushbuttons for low- and high-cut filters.

Just below the dial scale is a row of fourteen pushbutton switches. These include the POWER switch, separate controls for two pairs of front speakers and two pairs of rear speakers, the MPX NOISE FILTER and LOUDNESS circuits, and the FM MUTING switch. The extensive tape-monitoring facilities of the QX-949—for a two-channel tape deck, two four-channel decks, and an external Dolby noise-reduction adapter—are controlled by four pushbuttons. The jacks for the Dolby adapter are in quadruplicate for four-channel Dolby noise reduction; they can also be used for a fourth (four-channel) tape recorder. The output of the two-channel recorder can be dubbed onto any of the others, and dubbing between the four-channel recorders is possible.

To the left of the dial area is Pioneer's unique four-channel level display, which resembles a cathode-ray-tube screen about three inches in diameter. An illuminated X-shaped display occupies the center of the screen, with the length of each arm varying according to the signal level in the corresponding channel. Although this superficially resembles a four-channel "scope" display (such as Pioneer's own SD-1100), it is actually a cleverly designed incandescent filament system. Around the display are four small channel-balance knobs, each located in the appropriate quadrant. Two of the buttons below the dial scale increase the display's sensitivity by 10 and 20 dB (a total of 30 dB when both are pressed).

As may be imagined, the rear apron of the QX-949 is well filled by the many input and output terminals. Insulated spring clips are used for the speaker connections, and there is a pivoted AM ferrite-rod antenna in addition to inputs for both 300-ohm and 75-ohm FM antennas. A 4 CH MPX output is provided for some possible future discrete four-channel FM system demodulator, and a slide switch changes the time constant of the FM de-emphasis network from the 75 microseconds used in this country to the 50-microsecond standard used in Europe. A hinged cover protects the 2 CH/4 CH POWER BOOSTING plug, whose position is visible through a window in the cover. There are two unswitched

a.c. outlets and one that is switched. The Pioneer QX-949 is supplied in a wooden walnut-finish cabinet, and it measures 22 inches wide, 17 $\frac{1}{16}$  inches deep, and 6 $\frac{3}{16}$  inches high. The weight is about 49 pounds. A CD-4 adjustment record is included. Price: \$749.95.

● **Laboratory Measurements.** The audio amplifiers clipped at 49 watts per channel with all four channels driven into 8-ohm loads at 1,000 Hz. Our subsequent tests were made with only the two front channels driven, but with the unit set up in the four-channel mode. This had only a slight effect on the maximum power. With 4-ohm loads, the power at clipping was 72.5 watts per channel, and with 16 ohms it was 33 watts. In 2 CH POWER BOOST mode, the receiver delivered 72 watts per channel to 8-ohm loads.

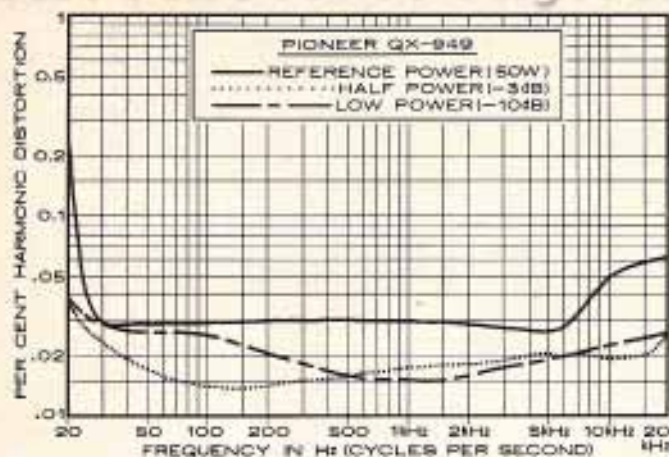
We chose 50 watts per channel as a full-power reference level, although it is higher than Pioneer's own ratings. At 20 Hz, the total harmonic distortion (THD) was 0.3 per cent at full power, and from 30 to 7,000 Hz it was a very low 0.03 per cent, reaching only 0.06 per cent at 20,000 Hz. At lower power levels, the THD was less than 0.04 per cent and typically under 0.02 per cent from 20 to 20,000 Hz. The THD at 1,000 Hz, which was 0.085 per cent at a 0.1-watt output, fell to less than 0.02 per cent between 2 and 40 watts, and rose to 0.1 per cent at 50 watts. The IM distortion was under 0.1 per cent from 50 milliwatts to about 2 watts, and it rose to 0.25 per cent between 15 and 40 watts output.

The input required for a 10-watt output, with the channel-balance controls set to their mid positions (about -7 dB) was 175 millivolts (mV) at the AUX inputs and 0.94 mV at the phono inputs. The respective noise levels were very low: -80.5 dB and -73.5 dB. The phono gain is controlled by the CD-4 separation controls, which also affect the phono overload level. At mid settings the inputs overloaded at a very safe 85 mV, and at maximum (which was not required with either of the CD-4 cartridges we used in our listening tests) at a rather low 22 mV.

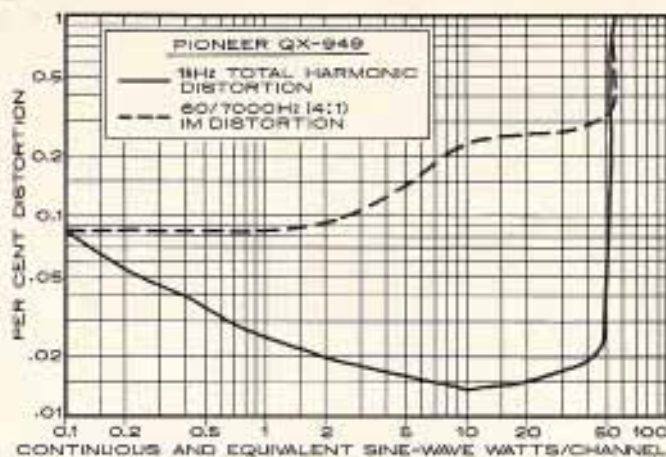
The bass tone-control curves had a sliding characteristic, moving from below 100 Hz to about 500 Hz, and the treble characteristic "hinged" at about 3,000 Hz. The loudness compensation boosted lows moderately and highs very slightly, while the filters had 6-dB-per-octave slopes and -3-dB points of 70 and 4,000 Hz. The RIAA equalization was within  $\pm 1$  dB from 100 to 14,000 Hz, rising slightly to +3.3 dB at 30 Hz. Because the phono signals have to be filtered for CD-4 demodulation, the re-

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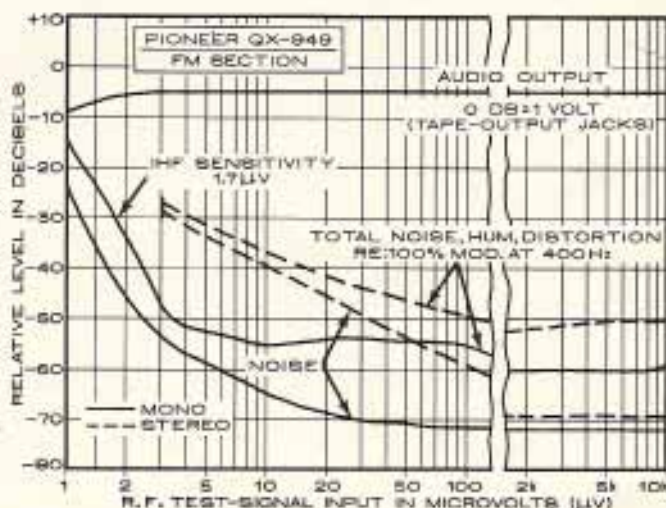


Note: curves were made with the receiver in the four-channel mode, with two channels driven (one measured) to equal power outputs.



All the connectors for front-channel sources and speakers are arrayed along the top half of the 949's rear panel, with rear-channel connectors directly below. Two-channel sources plug in at upper left.

In the graph of FM performance, the levels of both random noise and noise plus distortion are compared with the audio-output level as signal strength increases. Both mono and stereo are shown.



sponse drops sharply above 15,000 Hz (at which point it is down only 1.5 dB), to about -20 dB at 20,000 Hz. Phono equalization was influenced only slightly by cartridge inductance (much less than with most receivers we have tested), and

showed a loss of less than 2 dB in the 15,000-Hz level with any of the popular cartridges we use for this test.

The FM tuner surpassed most of its already excellent specifications. The IHF sensitivity was 1.7 microvolts ( $\mu\text{V}$ ) in mono and 4  $\mu\text{V}$  in stereo, and 50 dB of quieting was obtained with 2.4  $\mu\text{V}$  (mono) and 33  $\mu\text{V}$  (stereo). The corresponding distortion levels were 1 and 0.63 per cent. The signal-to-noise ratios at 1,000  $\mu\text{V}$  were 71.5 dB (mono) and 68.5 dB (stereo), and the distortion at that level was 0.09 per cent in mono and 0.21 per cent in stereo—about half the published ratings. The muting and automatic stereo-switching threshold was at 2.8  $\mu\text{V}$ .

The capture ratio of 1.4 dB (at 1,000  $\mu\text{V}$ ) and AM rejection of 50 dB were the only measurements that failed to surpass the published specifications, although no apologies are required for either figure. The selectivity of the QX-949 was very fine—81.5 dB above the signal frequency and 84 below it. The image rejection was 92 dB.

The stereo FM frequency response was  $\pm 0.25$  dB from 30 to 11,000 Hz, down only 1.5 dB at 15,000 Hz. Even with this excellent FM high-frequency

response, the 19-kHz pilot-carrier leakage was a very low -78 dB. Channel separation was unusually uniform, remaining between 32.5 and 35 dB from 30 to 10,000 Hz, and it was still an excellent 30 dB at 15,000 Hz. The AM frequency response was somewhat better than average—flat within  $\pm 2.5$  dB from 25 to 3,700 Hz and down 6 dB at 4,500 Hz. Our test unit's dial pointer was displaced by approximately its width from the correct position, which gave a uniform 200-kHz calibration error across the FM band. A simple readjustment of the pointer would have produced essentially perfect FM calibration; even in the "as received" condition, the calibration was much better than that of most tuners and receivers because of the 200-kHz marking points.

● **Comment.** Despite the almost overwhelming completeness of the Pioneer QX-949's front panel, it is a fairly simple receiver to operate. The CD-4 calibration can be done quickly and easily with the test record supplied, maximizing the right/left, front/rear separation by ear or with the aid of the four-channel display. Although it is convenient to have the  
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CD-4 adjustments on the front panel, it would be better if they were not so close to the volume-control knob, since recalibration is required if their settings are disturbed.

The CD-4 demodulator performed in a most satisfactory manner with the Audio-Technica AT-15S and Grado FTR+1 cartridges. The quality and subjective separation appeared to be limited only by the present state of the CD-4 recording art. Some of the earliest CD-4 recordings were marred by occasional disturbing noises (this happens with any demodulator we have used), but the more recent records produced essentially perfect results. The matrix decoders operated adequately, although they lack logic enhancement.

Perhaps the only instance of ambiguity offered by the well-marked controls has to do with the fact that, although the CD-4 position is also used for other discrete four-channel sources (such as a quadraphonic tape player), there is no indication of this on the panel (it *is* stated in the manual, however). We also noted that there is no provision for playing a single-channel or mono source through more than one channel. For example, if TV sound were to be connected to one of the AUX inputs, it would be heard only through the corresponding speaker unless an external "Y" adapter were used to parallel other channels.

The four-channel display is almost as fascinating to watch as a real "scope" display, and it has the added advantage that its response (unlike a scope's) is approximately logarithmic over a 20-dB display range. This permits simultaneous viewing of high- and low-level signals in different channels; it also gave us a clue as to the actual CD-4 separation, which appeared to be in excess of 20 dB. The variable illuminated quadrants responded rapidly and precisely to program changes.

The figures measured for the tuner section speak for themselves. This is an uncommonly sensitive, selective, and smooth-handling FM tuner. The interstation muting is first-rate, with no noise and only a trace of a muting "thump."

It is difficult to do justice to such a versatile receiver in the limited space available. A study of its schematic diagram leaves us with a sense of amazement that such a complex instrument can be sold for only \$750. It is not only a handsomely styled and highly flexible four-channel control center, but, in respect to the electrical performance of its tuner and amplifier, it rivals some of the finest separate-component systems.

Circle 108 on reader service card