

Certificate of Restoration

Component: PIONEER SX-680 Serial Number: ZA3638527Y

Manufactured January 1979

RESTORATION SCOPE

This vintage, high-fidelity receiver has undergone a comprehensive electrical and mechanical overhaul, meticulously restored to provide decades of reliable service. All life-limited components have been replaced with modern, high-tolerance equivalents to ensure long-term stability. Beyond a simple recap, the circuit has been stabilized with precision-matched transistors and flameproof safety resistors, ensuring excellent sonic performance, thermal stability, and long-term reliability beyond original 1970s component tolerances.

I. ELECTRICAL OVERHAUL

- **Capacitor Replacement:** Full electrolytic recap using high quality, modern Nichicon/Panasonic/WIMA capacitors. For values of 1 uF or less, WIMA film capacitors were used. Voltage ratings were increased where appropriate, providing improved long-term reliability. A total of 60 capacitors were replaced.
- **Power Supply Capacitors:** Both main filter capacitors were replaced with high quality, modern Nichicon capacitors. Voltage ratings were increased to improve reliability and operating headroom.
- **Semiconductors:** All known "noisy" or "failure-prone" small signal and driver transistors were replaced with modern low-noise equivalents. Front-end differential pairs were hand-matched for gain (hFE) to ensure the lowest possible DC offset and maximum thermal stability. A total of 18 transistors were replaced.
- **Safety Upgrades:** All failure-prone regulator/varistor diodes were replaced with modern equivalents. A total of 6 diodes were replaced.
- **Safety Resistor Upgrades:** To improve long-term power supply stability, resistors R401, R402, R408, R409, and R410 were replaced with larger wattage Vishay flameproof, fusible resistors. The known problematic R401 33-ohm resistor is a current-limiting feed resistor for the 45V circuit. Glue covered resistors were also replaced. A total of 6 resistors were replaced.
- **Circuit Integrity:** Corrosive factory adhesives physically and chemically removed. Select high-stress PCB traces reflowed with 63/37 tin/lead solder. Any damaged traces were professionally repaired.
- **STK0039 Power Packs:** New thermal compound applied for superior heat transfer. The power packs tested within specification, producing clean sine and square-wave response at 400Hz, 1kHz, and 10kHz.
- **Grounding Points:** All chassis and board grounding points re-soldered.
- **Meter tracking:** VU meter tracking and channel balance verified under thermal load.
- **Tuner:** Tuner tracking adjusted to provide accurate positioning.

II. CALIBRATION & BENCH TESTING

- **DC Offset:** DC offset is almost perfect thanks to new matched differential pairs.
- **Laboratory Verification:** Performance confirmed via oscilloscope analysis, including 1kHz and 10kHz sine wave and square wave stability and full-power clipping symmetry.
- **Stress Test:** Under heavy equalization and high-volume stress, the receiver remains stable without breaking into parasitic oscillation, proving the robustness of the power supply and the health of the STK output modules.
- **Linearity:** The receiver was tested with the EQ flat to ensure the power stage provides transparent, uncolored amplification across the audible spectrum.
- **Burn-In:** Minimum 4-hour thermal stress test completed under an 8-Ohm dummy load at 50% rated power.
- **Factory Specifications:** The receiver was tested to meet or exceed published factory power specifications. While rated at 30 w/channel at 8 ohms, this unit was driven to rated output and beyond under controlled load conditions to verify protection circuit behavior and power supply stability.

TESTING DATA

DC Offset – L: 1 R: 2 (0-100 mV)

Bias (Idle current) – Factory-fixed via STK 0039 modules; verified stable

Power – L: 32 R: 32 (Service manual minimum 30 watts)

Technical Note: Offset values are consistent with the non-adjustable STK-based amplifier topology used in the SX-680. There are no adjustment trim potentiometers for DC Offset and Bias on the Pioneer SX-680. The STK-0039 power packs and supporting components essentially fixes the bias. The DC offset is primarily controlled by the input updated differential pair transistors and feedback loop.

III. MECHANICAL & COSMETIC RESTORATION

- **Signal Path:** All switches and potentiometers deep cleaned and lubricated with DeoxIT D5/F5 and Fader Lube F100L to restore proper contact conductivity and reduce background noise to an exceptionally low noise floor.
- **Lighting:** Full dial and meter lamp conversion to warm-white LED illumination (3 bulbs) to preserve the original aesthetic while reducing thermal load and extending service life.
- **Aesthetics:** Professional chassis detailing performed. The faceplate was removed and meticulously cleaned with metal polish. All knobs were cleaned and polished to their original luster.
- **Case:** Factory units came with vinyl veneer. Cabinet refinished and fitted with new period-correct walnut vinyl veneer consistent with the original 1970s appearance.
- **Tuner Dial:** The tuner cord pulleys were all lubricated for smooth tuning.
- **Chassis:** The lower chassis was cleaned and finished in a protective black coating, providing a clean, professional appearance.
- **Tamper Evident:** Key adjustment and inspection points are marked with tamper-evident lacquer seals.

WARRANTY & PROVENANCE

This restoration includes the "Bag of Bones" (the original-replaced components) and this certificate of restoration as proof of service. This unit carries a 30-Day Limited Warranty covering the restoration work. Warranty coverage is void if tamper-evident seals are disturbed or if evidence of unauthorized internal service is present.

Restoration documentation retained by restorer.

Restorer: Jamie Johnson

Date of Service: _____

Signature: _____

