

Certificate of Restoration

Component: Pioneer SX-828 Serial Number: SL1602382

Manufactured: December 1972, Production line 16

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 3.3 uF or less, WIMA film capacitors were used. Voltage ratings were increased where appropriate, providing improved long-term reliability. A couple, small tone board caps were dead. A total of 69 capacitors were replaced.
- **Power Supply Capacitors:** Both main filter capacitors were replaced with high-quality, modern Cornell Dubilier USA 12,000 uF capacitors, upgraded from 8,000 uF. Voltage ratings were increased to improve reliability and operating headroom. A total of 2 main filter capacitors were replaced.
- **Output Transistors:** New gain matched OnSemi MJ21195G and MJ21196G output transistors were installed. The receiver was received with a failed right-channel output transistor. New mica pads and thermal compound applied. 4 output transistors and 4 mica pads replaced.
- **Emitter Resistors:** All 4 0.5 Ohm 5-watt emitter resistors replaced due to age and coloration.
- **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 34 transistors were replaced.
- **Safety Upgrades:** All failure-prone factory safety and signal diodes were replaced with modern equivalents. A total of 9 diodes were replaced.
- **Relay:** The original relay was replaced with a modern equivalent. The old plastic housing was utilized to allow for proper fit.
- **Safety Resistor Upgrades:** To improve long-term stability, all flameproof resistors were replaced with flameproof, metal film resistors. Many of these were pushed to their wattage limits, particularly R12 on the Power Supply board. A total of 4 resistors were increased in wattage and 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.
- **Trim potentiometers:** New Bourns trim pots installed for better precision and reliability. A total of 4 were replaced.

II. CALIBRATION & BENCH TESTING

- **DC Offset:** DC offset was adjusted to +/- 1 mV DC.
- **Bias:** Bias current was adjusted and verified to 20 mV DC across both sets of emitter resistors.
- **Laboratory Verification:** Performance confirmed via oscilloscope analysis, including 1kHz and 10kHz sinewave 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 new output transistors.

- **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 8-hour thermal stress test completed under an 8-Ohm dummy load at 50% rated power.
- **Factory Specifications:** Both channels produced 57 watts into 8 Ohm at 1 kHz sinewave before visible waveform clipping. Factor rating is 54 watts/channel.

TESTING DATA

DC Offset (mV DC) – L: 1 R: 1 (0-100 mV)

Bias (mV DC) – L: 20.2 R: 20.3 (measured across both 0.5 Ohm emitter resistors – 20 mV)

Power (watts) – L: 57 R: 57 (service manual minimum 54 watts)

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:** Dial and meter lamp conversion to warm-white LED illumination. The dial pointer was brighter with the original incandescent lamp, so a replacement LED was not used. A total of 7 LED fuse lamps and 10 LED indicator bulbs were installed.
- **Line Voltage Selector:** The receiver was set to 110V. Selector was reset to 120V for present-day U.S. operation.
- **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 a real walnut veneer. The cabinet was repaired, sanded, stained, and refinished.
- **Tuner Dial:** The tuner cord pulleys were all lubricated for smooth tuning. FM stations verified.
- **Chassis:** The lower chassis was cleaned and touched up where needed.
- **Tamper-Evident:** Key adjustment and inspection points are marked with tamper-evident lacquer seals.

WARRANTY & PROVENANCE

This restoration includes the "Bag of Bones" and this certificate of restoration as proof of service. This unit carries a 90-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.

Original Pioneer carton and factory packing survive with the receiver, including foam inserts, internal cardboard packaging and cloth shroud. The carton bears period markings for Major Dennis H. Holden, HQ USAF AFCENT, APO New York 09011, together with European shipping/routing markings. The receiver also retains a period Condes Stereo Service label from 407 Poyntz, Manhattan, Kansas. Receiver acquired by ECB Audio Labs from The Audio Exchange, Richmond, Virginia, in June 2026.

Restoration documentation retained by restorer.

Restorer: Jamie Johnson

Date of Service: _____

Signature: _____

