

Luxman LV-105 S.N. 51018675F

From Alan Cashin - status: repaired left channel - in parts - possible issues given last status was blown e-cap.

Power transformer T1001 is 70937F01 indicating SG model, with T 500mA and T 4A fuses.

Main PCB inspection/test

M11 and M12 provide separate AC secondaries from T1001, into separate bridge rectifiers, each with CT to +/- rail cap filters. M11 is the high current supply feeding the largest pair of e-caps and each main amp channel output stage via D5FB20 bridge with integral heatsink. Schematic shows M11/2-yel is CT, but pcb shows M11/3 is CT - need to orient M11 connector for yellow wire to pcb pin 3. (so risk of overvoltage damage if reversed!).

Both main caps measure same C (9.6mF) and R (0.022) at 100Hz, but very difficult/destructive to remove or lift one leg to test leakage. Both minor caps read same C (320uF) and R (0.19) at 100Hz.

Powering M12 energises the pcb signal input differential amp stages, and provides B+ to the next 6CG7 stages (on Tube pcb via M7, M8), and powers V.Stabilizer regulators on Equalizer pcb (via M9), and reforms caps. Circuits to confirm are 'current stabiliser' with red LED for each top Q7317/8 bias, and 6V zener (** replaced by 560R) for Q7303/5 and Q7304/06 bias, and ~113V across Q7317/Q7318 for +/-115V supply. Diff inputs are effectively grounded for no other energised circuitry. Given exactly +/-115V rails, the nominal voltages given in the schematic indicate perhaps 1.5 to 2mA per side.

Powering M11 energises the pcb output stages with ~ +/-62V. Each input bias stage has red LED LD7309/10. L-CH has R7329=390R (not 560) and Q7311/5=2SC1507 (not 2SC3423), and R-CH has R7330=430 (not 560). Schematic shows F1301/2 but no parts fitted or valid. Q7315/6 provide supply to Vbe multiplier Q7313/4 (on H/S). Check M3 regulates to +/-15V zener levels. Check abt 48V across relay coil. Check protection circuit regulates to 12V zener level. Check voltage at TA7317 pin 9 about 3V.

Input signal is nominal +2V bias from 6CG7s to base of Q7311/2, and diode/R was temporarily applied for nominal bias and checking of output stage FETs (idle biased to 45mV/0.44R = 100mA, or 5.3W per FET). Input signal clamped to +/-62V rails, and pulled to output mid-point through Protect pcb if Q7319 source current >3A.

Output stage mid-point output to 2k2 2W to gnd (schematic shows 1k2), and to 56k/56k divider (with 33uF ecap filter) to IC8306 +/-V protection input, and via inductor//10R 1W, to RC zobel, and via protection relay contact to M10 connector to Terminal speaker pcb and linked Speaker/Switch pcb Mid-point through feedback network to diff amp stage. Output stage current protection with voltage across

0.22+0.22=0.44R monitored by Q7323/4 for circa 0.6V (1.4A), and fed to Protection Circuit and IC8306 controlling protection relay. Voltage across 0.22+0.22 also monitored by Protect pcb, and used for idle bias setting.

PCB link wires - blue and white pairs - for A, B, C, D. Blue links +62V main cap star to h/s K405 fet drain and 1uF bypass, and White link is also from +62V star to associated Q7312 and D7306. These 4 pairs of links were disconnected to allow initial testing.

Negative half-wave bias supply off main is divided by 180k and 47k and 12k+15k from +62V rail to give 3.1V at IC8306 pin 9, and 0.75V at pin 1. $50V/27k=2mA$. $2.35V/47k=0.05mA$, $0.05mA \times 180k=9V$, so neg bias supply likely -8V.

Output stage FET's are original 2SK405 and 2SJ115 on right channel, and replaced 2SJ201 and 2SK1530 on left channel. L-Ch Q7311 and Q7315 (2SC3423) replaced with 2SC1507.

R-Ch R7330 (560) replaced with 430R. R7329 (560) now 390. Schematic shows ZD7309-R7311 and ZD7310-R7312 networks with junction connected to 0V, but that network replaced with just 5k6 R7311/12 from 0V to common bases.

C1312 1uF 100V ecap missing on R-CH (it had blown). Replaced with 0.68uF red wima.

H/s fets and bjt's measure ok with diode test.

Four flying leads to Main pcb:

- Grn '1' to AV pcb. GND marked pad on Main pcb (between largest e-caps)
- Grn '2' to AV pcb. Next to Gnd pad marked on Main pcb (between largest e-caps)
- Grn '3' to Vol Control pcb as M-13. M-13 pad marked on Main pcb (near GND pad).
- Blk '4' from H/S to pad next to M-13 pad marked on Main pcb.

Three flying blk leads with ring-lugs - to diff bolts on top of H/S - see photo. One from EQ pcb; one is cable-loom holder; one is Blk '4'.

R8329 shown on schematic going to Heat-up pcb, but that pcb is a later revision, so likely not used now.

Bring up each rail separately. M11 and M12 plugs to main pcb are orientation sensitive (for CT).

Disconnect Blue/White links for +/-62V rails. With Variac and T1001 and 6.3A fuses in, and M11 only, confirmed 15V regs on M3, and confirmed 68-69V on main caps - but at 135Vac input - so !!!

- added 10k bleeds - confirmed self discharge (+62V has 7k bleed), but takes some time.

- used 15V rails to check Tone pcb via M3, but needed to link main pcb 0V to Tone pcb 0V - 0V at opamp outputs ok but Bass pot appears somewhat scratchy.

- M11 orientation was the problem.

Reconnect Blue/Wh links to one channel at a time:

- check at low V, and no tube bias.
- schematic error for red wire to right channel protection - it should go to interconnect #2 (not #3).
- 2SK405 has full supply volts across Vgd, and 2SJ115 has just mV. Vgs ~ -1.7V for both fets, so p-ch 2SJ115 is on.
- + Bias added to Q7312 base using 1k and 2V7 zener from +62V rail to 0V and M8 connector. Both FETs then enhanced as variac increased, and output mid-point about 0V, and current through R7336 rose to confirm bias current of a few mA. Bias current stabilised to abt 61mA with 3.8V gate-to-gate and 6-0-6V rail, and bias adjustable using VR7302. Bias then set to circa 0.031V/0.44R=70mA at 30+30V supply as interim.
- Similar situation for left channel.
- LEDs LD7309/10 not yet confirmed.

With M11 removed and only M12 in, and M9 disconnected, the Diff pair inputs are effectively grounded for no other energised circuitry (0V feedback from main amp output, and 0V from R7303/4).

Circuits to confirm are 'current stabiliser' with red LED (LD7301/2) for each top Q7317/8 bias. Schematic voltage table has Q7317/8 emitter and base voltages reversed. Also shows R7309/10 - which are not used (direct connection of collector to drains).

Top of diff fets at ~-0.3V: minutes to stabilise, coming down from positive voltage.

C7323/4 47uF ecap is reverse biased (by 3-4V) at turn-on with lowish variac. 47uF 25V: C7323 48.2uF 0.041D 100Hz, 1.33R, <6uA 24V. C7324 47.6uF 0.043D 100Hz, 1.45R, <6uA 24V. The original schematic indicates a LED would have restricted reverse bias to say 0.6V. Added 1N4148 in //. At higher variac, ecaps are not reverse biased. Common FET drain voltage slowly subsides to 0V nominal. So stage appears ok, and discharges main caps ok.

and ~113V across Q7317/Q7318 for +/-115V supply. Given exactly +/-115V rails, the nominal voltages given in the schematic indicate perhaps 1.5 to 2mA per side.

If the Diff amps are ok, then M9 can be used to check EQ pcb.

Mains input inspection

no PE. L&N to E1001 header on rear pcb - then connecting to T1001 and T1002 primaries, and to Speaker/Switch pcb E1701 header, where a 0.5A and a 4A fuse protects each primary and is switched by front panel (top left) mains switch. Each PT has two secondaries, which plug into rear pcb and each passes through fuses F1901, F1902, and F1903, F1904, and F1905, and F1906. Large PT secondaries

through connectors to main pcb. Small PT secondaries through two connectors to front panel heat-up/switch pcb E1 & E6. Easier to disable via pcb connectors.

T1001 pri DCR 6R, and is switched on from front panel switch. T1002 pri DCR 233R is always on if 0.5A fuse is in.

Could use variac then isolation transformer to feed amp, with 0.5A fuse out, and CB1902 connector removed from rear pcb. Then T1001 is powered through 4A fuse, front panel switch, with secondary through rear pcb fuses to connector M11 to Main pcb. Or alternately, connect secondary through to M12.

Megger AC input to chassis at 250V - ok.

Mains DCR = 240R to T1002 - mains switch off, and 8R with switch on and T1001 energised.

All secs disconnected. Energisation current: 4A fuse in - 0.9A at 240V. 0.5A fuse in - 0.13A at 240V. Both in - 1.03A at 240V.

26+27R 87+87Vac no load. M11 Bl/Rd/Yel 0.7+0.7R 45+45Vac no load.

Heat-up/switch pcb is later version

T1002 E6 winding with 800mA fuse goes via CH1904 to Heat-up pcb via flying connector/E6: E6/3 to gnd; E6/1 to E4/4 (which goes to switch contact on Speaker/Switch pcb) and returns via E4/3 to D1602 diode to then go via E7 to Main pcb to cap input doubler rectifier, and through Voltage stabiliser to M5 to Buffer amp pcb. Also path through Heat-up switch then through D1601 diode to E7

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T1002 E1 winding with 1A fuse goes via CH1903 to Heat-up pcb via E1 connector: switched contact for valve heaters via E5, and another contact to half-wave rectifier to Heat-up indicator via E3.

Leads: E2 to Tone pcb (for ; E4 to Speaker/Switch pcb (for main ON switch); E3 to Tone LED pcb; E5 (pink) to Tube pcb (for heaters).

Tube pcb gets 12Vac heater supply from Heat-up/switch pcb via E5 and series 2R2 5W and also series 10R 5W (for pre-heat which is shorted via switch) from T1002 E1 winding via T1A fuse. Check E1 winding voltage and total heater voltage.

Each channel has 6CG7 with triodes in SRPP config with bottom grid input from Q7307/8 collector of diff amp on Main pcb. Bottom cathode bias from 8k2//47u to -115V rail. Bottom anode load is 3k9 to top cathode, and anode is take-off to input of main amp. Top anode is +115V rail, and top grid is biased from bottom anode load with 47k leak. Heater is elevated to -62V rail, so about +55V above -115V rail.

Assembly removed and inspected, and tube pins and socket contacts sprayed with cleaner/lube. No sign of heat stress. Top foam strip replaced with neoprene adhesive backed strip.

One of the 6CG7 was bad. 8x spare 6CG7 measured in Organ Tone Test Panel jigs #3 and #5. Pairs 4,6 and 5,7 were close matched for Vdc bias and SRPP Vac gain

(5.9x and 6.2x). Pair 4,6 fitted.

Phono and input (EQ-AMP) pcb inspection

+/- raw 45V and 0V rail input from connector M9 on main pcb. Dropper R's to voltage stabiliser using 25V zener for +/-24V regulated rails, and then 20V zener clamping each supply to NJM2043, as max supply spec for IC is +/-22V.

2SK240 matched pairs should have 15V on each drain, and 0.07V on common source. 2.3mV and 0.13mV sensitivity for MM/MC front panel selector switch.

Tone Control pcb assy = separate pcb with metal shield. Front panel - below tubes.

Input D2 from Function pcb Balance pot (which connects via Vol Control pcb back into Function pcb).

L/R separate shielded outputs (yellow and red and marked M1 and M2) to main amp pcb.

Power M3 to main amp pcb for +/- 15Vdc zener reg supply.

Main switch Tone in or out (bypassed).

Needs E2 3-pin lead from Heat-up pcb to switch on the Tone indicator LED on Tone/LED pcb.

Switching ok - not sure if contact cleaner can get into contacts.

EQ pcb

ZD1105/6 HZ24-3 is a 25V nom zener, and reg output as +/-24.5V on schematic.

C1102 is shown as 15V in schematic but 25V in parts list and on pcb; and C1106 polarity on schematic is wrong. Q1101/2 collector at +/-45V on schematic.

NJM2043 rails are zener regulated to +/-20V nom. Opamp outputs should be nominal 0Vdc. 210Vac mains: 98Vdc, -24.6V, 24.8V 1k2 drop=34V (28mA), 1k5 drop=27V (18mA); 20.4V, 20.1V. Opamp o/p stabilise at about -7mV and +15mV - with initial few seconds at rail. LED's on. So stage appears ok, but checked C1105/6 and C2105/6.

C1105/6 47uF 100V.

48.5uF, 0.055D, 1.81. bad 30uA replaced with 100uF 100V 12uA.

50.7uF, 0.037D, 1.16. <8uA 60V

C2105/6 47uF 16V cerafine BP

47uF, 0.047D, 1.62, <6uA +15V, <6uA -15V

47uF, 0.04D, 1.36, <10uA +15V, <10uA -15V

General condition of Main pcb is good. Some visible darkening of glue used on e-caps.

Total testing:

Variac needed to be limited to 130Vac to restrict 62V rail to circa 62V (ie. below 71V e-cap rating) - no obvious AC ripple voltage. This was due to M11 connector being reversed.

Left-channel (new FETs) mid-point railed at -19V. R-ch initially shows a few volts then sort of subsides towards 0V - typically this would be related to valves reaching stable operation.

Swapping valves caused a 'swap' in behaviour, with L-ch changing over seconds, but R-ch pinned to -60V. So need another 6CG7.

Pre-heat indicator on when mains connected but power switch off.

Removing top front facia can be difficult due to the three slide-in sections - can carefully lever inside surface of facia through two metal chassis cut-outs. Removing 6CG7 valves requires pcb to be slid out - so need to take top panel off, and remove pink E5 connector from pcb - no need to remove M7 and M8 connectors from main pcb - then carefully unlatch black plastic tabs inside to allow pcb to slide forward.

Variac up to 140Vac gives Vo about +1.4Vdc with +63Vdc rail. Vo is quite jumpy and swings while warming up, and prone to change if valves nudged. Valve socket pcb terminals resoldered. Valve pcb connectors sprayed for 3x leads at their connectors.

Tone in/out switch causes significant output jumps (likely due to Vol pot issue).

M1 and M2 connectors removed from main pcb. Output mid-point much more stable.

Bias measured across resistor outer leads - increased to abt 50mV, and variac raised to about 150-160Vac with rails reaching 70-71Vdc, and protection relay starting to turn on and off. Fixed 62V rail connector issue. Idle set to 51-52mV at 220Vacmains, and +/-54Vdc rails, and output offset +3.4mV and -1.0mV.

Function/LED - no indicators working - Q1301 2SD1266 bad - zener ok. Pcb pads to npn had cracked - repaired tracks and now ok with 13.5V regulated with 35V input from doubler. All indicators display when switched.

CD R input via A3/1 to REC/Selector pcb and Sw S8403 to A5/7 back to Tape 1 and Tape 2 REC out, and to A4/1 to Function pcb through switch S8413 to D1/5 to Vol Control pcb and back and then out via D2/3 to Tone pcb and either switch via opamp, or direct out to M2 (yellow - R-ch) to main pcb.

M1 (red) is L-ch. Rear RCA's may not make contact sometimes.

Tone treble pot is faulty/issue for both channels, but bass pot seems fine.

Speaker posts need fork spade lugs (ie. no 4mm style connection). Speaker to main pcb connector M10 gnd pin is a bit suss - maintenance check load 0V to 0V resistance at loads.

Final setting of idle bias of Fets to 55mV. From cold, bias was 62 and 70mV,

subsiding over 10 mins to nominal.

Mains AC current 0.33A at 240Vac at idle and warmed up. Protection relay operates after a few seconds once output dc reaches 0Vdc.
CD and phono testing with speakers - MM phono seems fine.

To fix (March 2026):

Treble pot fault.

Volume pot was sometimes noisy at low levels for right channel.

<https://www.youtube.com/watch?v=MIVIdkfVniM>

<https://www.audiovintage.fr/leforum/viewtopic.php?f=74&t=428>