HP 716B Klystron Power Supply
Ser. 262 6625-01-022-5282 Last Cal: Jan 1993
Assembly No. 9500002-2, Schem 9500003 Ser: 348-00195

Clean and complete condition. Possible repair of Q39, Q35, R32, Q9. Hardwired for 240Vac input. Front panel FAN indicator, and rear panel J5 & J6 connectors, and K4 & K5 relays, and internal relay, and internal fan airflow limit-switch appear to be retrofitted – no circuits. Hardcopy manual is for serial 823 from 1963 onwards, so some discrepancies.

PT1: 9-2=2.5Ω; 8-1=2.5Ω; 10-11=118Ω; 12-14=155+158Ω; 5-7=49+49Ω; 3-4=38Ω;
PT2: 1-2=4Ω; 7-8=4Ω;
K1 time delay relay, Curtiss Wright, type 11 (?), heater 4Ω, noval socket.

A101 Regulated Reference Supply plug-in PCB 00716-66503 Rev B - slight heat-stress under R106/107
V102-V104 85A2/0G3 marked Amperex Holland 604 and 3P3H ^5H
V106-7 12AX7WA GE dot marking
Many 10% resistors at +9%: R109=380k; R112=523k; R113=172k;
R113, R112, R110, R109 replaced.
Extra R121 to pin 12; and R122 to pin1 - so a bleed load on pin 14.
Cleaned valve contacts.

A401 Squarewave Generator plug-in PCB 00716-66501 Rev B
6AW8A GE dot marking
R423=1.11M; R424=372k; R408=1.1M;
Cleaned valve contacts
C411 bad (50u 25V) replaced.

A201 +350V Regulated Supply plug-in PCB 00716-66502 Rev E
bad V204 6CL6 - replaced
6EW6 V203 GE marked with dots
Cleaned valve contacts
R222=25R; R223=522k replaced;

A1 Regulated Filament Supply plug-in PCB 00716-66504 0R
R12=26; R19 350R trimpot bad - replaced with 200R 10T
C3,4,5 100uF 15V; 88u 0.58; 115u .27; 90u 0.42; <5uA - so marginal.

Large chassis e-cap reforming:
C1 8500uF 15V; >10000uF 0.02 50uA;
C101 160uF 450V; 210u 0.22 506k; <100uA
C102 160uF 450V; 190u 0.28 474k; <80uA
C103 160uF 450V; 200u 1.15 481k; < 70uA
C104 160uF 450V; 210u 0.20 481k; <100uA
C201 160uF 450V; 206u 0.26 480k; <100uA
C202 160uF 450V; 190u 0.23 498k; <80uA
C204A-D 20u 450V; 20u 1.46 <80u; 24u 1.12 <90u; 22u 1.33 <100u; 26u 0.87 <100u;
C301A-B 20u 450V; 20.6u 2.4 <70u; 20u 2.8 <70u;
C302 160uF 450V; 190u 0.24 485k; <100uA
C303 160uF 450V; 198u 0.23 474k; <100uA but sporadic peaks
C304 160uF 450V; 185u 0.20 482k; <100uA
C407 160uF 450V; 193u 0.23; <100uA

Large cap
C108 4uF 1kV; 4.0uF 0.30; 55uA at 500V; 70Meg 1kV
C307 4uF 1kV; 4.0uF 0.26; 61uA at 500V; 68Meg 1kV

C308 50nF 1200Vac (0160-0201) Sprague Clorinol had been removed, and leads left hanging. Replaced with 2x 22nF 2kVdc ERO.
R318 470k 2W and R321 39.2k 2W replaced.
R305-R308 all >+10%. Replaced with 1% 0.25W to allow accurate cathode current balance info, and poor mans fuse. Note that V303 cathode connected to heater pin 2, so that V301-304 heater supply sits at cathode level.

6CA7 markings National Electronics, E. Germany, 92B 83781 8734 69 and 114 on base
V201 and 305 terminals sprayed. Need extractor for other 4.

Front panel beam pot wiring had PD to chassis - pot seems ok.
Reflector pots wiper seems ok.
All chassis mount relay contacts cleaned/lubricated and confirmed ok.

Regulated Filament supply testing - done
- Fit A1 Regulated Filament Supply plug-in PCB 00716-66504
- connect 6V3 heater load
- lower limit relay K3 operates at 3.3V
- filament regulation voltage set at 6.77 V - changed to 6.4V (depends on current due to CR6 drop).
- upper limit relay K2 operates at 8.1V (and drops at 2V)

Regulated Beam supply - screen supply testing - done
- Ramp up voltage across C301A and confirm voltage across C301B regulates to 118Vdc, with say 5mA (0.3W), so 2kx5mA = 10V across R301 (ie. 128Vdc input). 114Vdc reg at 5mA.
- Loading circuit path via R314, K301 (poor contact - needed cleaning and scraping), R328 and R327/CR310R322/R321/R320/M301.

Sq Wave Generator testing – somewhat done
- Function switch to EXT
- Plug in A401 pcb (00716-66501 Rev B), and pull V101, V305, V306 and all other plug-ins.
- disconnect pcb pin 9 to disconnect external heater feeds. Connect 6V3dc to pcb pins 9 and 11, with 0.6+0.37=0.97A load, and link to pin 12 (common).
- Energise A401 plug-in with up to 300V from pin 2 to pin 12.
- use scope and 100:1 probe to confirm squarewave, and frequency range from 400Hz to 2.5kHz, with 10 to 150Vpp amplitude (on pin 10).
- 60 to 700hz range and wide amplitude range. Not sure about freq range but didn't check further.

800V regulated reference supply plug-in testing – somewhat done
- Power 66503 PCB
- pin 13 is 150V above pin 14 (due to V105). V106A grid above pin 1 by 255V from V102-4 with (800-255)/90.6k= 6mA.
- Heater powering is difficult. V106 is 12V and V107 is 6V, V106 cathode is abt +260V, and V107 cathode is more.
- just tested regulators only with 500V from pcb pin 14 to pin 1: total of 249.8V at 2mA.

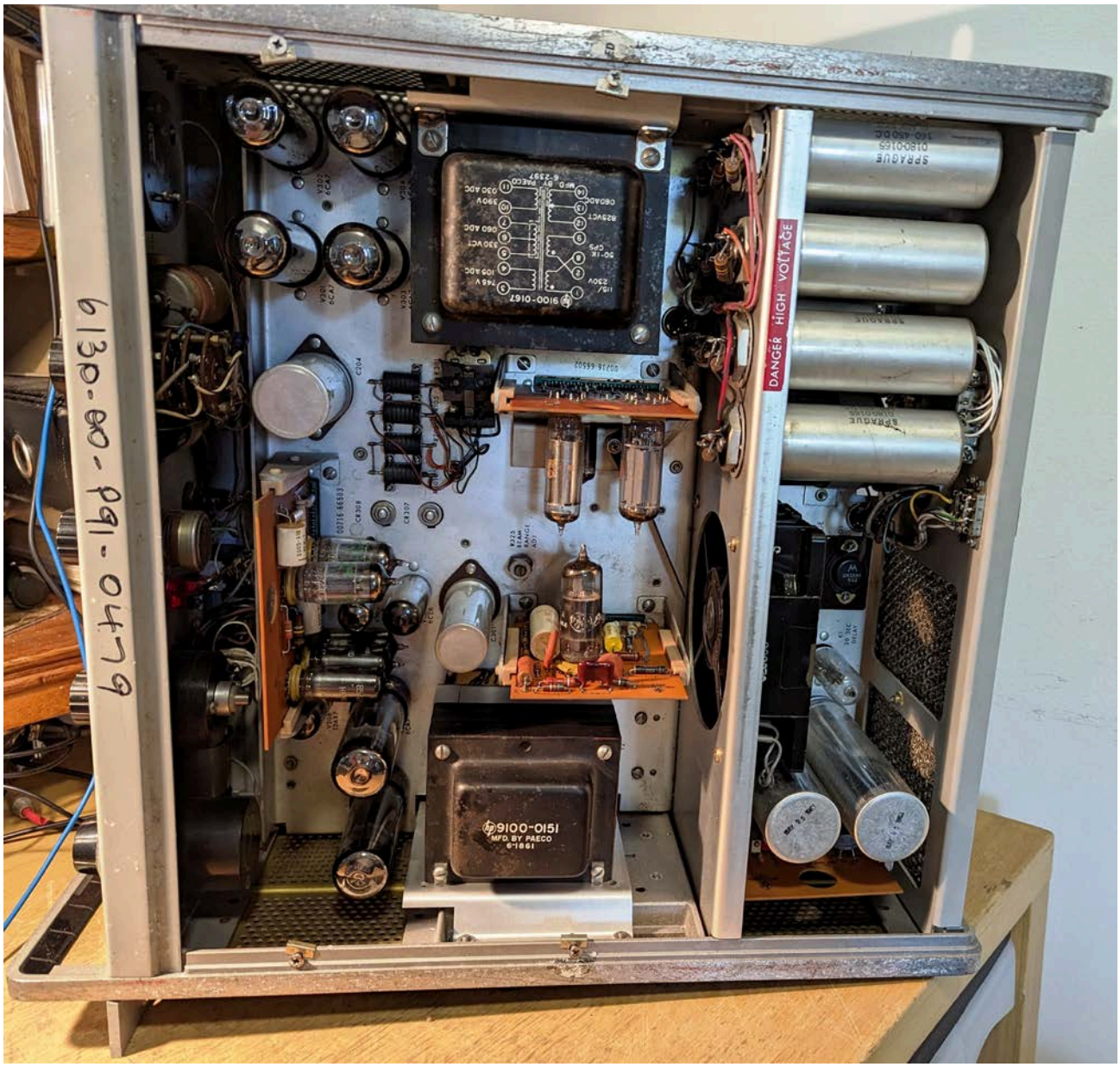
+350V Regulated Supply plug-in testing – somewhat done
- plug-in PCB 00716-66502 Rev E

- B+ supply to pin 3 - up to 500V
- 6EW6 grid needs a negative supply - used a temporary 4M7 grid leak.
- Heater 6.3V pins 10 to 11. Current 0.4+0.65=1.05A. Can't easily test 6CL6 so removed for just 0.4A heater supply.
- OA2 tests at 150V with 370V in.
- tested OA2 in chassis V105 at 148V.

AC mains side testing and heaters -

AC mains side 220MΩ 500Vdc IR; 202MΩ 1kVdc IR. (power switch on)
K1 removed to disable T1. Load connected to 6V3dc regulated heater output. Variac soft start.
Confirmed 0.53A mains input at 240Vac:

- No HV circuits energised; 800Vdc rail (C101 to C104) rose to 4Vdc (from flux leakage ?).
- fan worked;
- front panel FIL indicator worked.
- each heater circuit worked.
- A1 Regulated filament supply regulated to 6.3V with 100Ω load.



To do:

- test 12AX7's and 6DJ8 in test chassis - V306 on chassis, V106 and V107
- V301-304 6CA7 valve extractor tool to clean/lubricate terminals.
- rear panel output plug to connect loads (HP 1251-0183)
- add reverse voltage protection 1N4007 across all series connected e-caps (C201-C202; C101-C104; C302-C304; C407).