Test spec
working copy

346 SAX
(Small Area Scan)

* 120VAC for SAX 120v version, 240VAC for all others.

Low voltage supplies PCB 1

① For these and all subsequent tests, connect the Øv line to the chassis by jumpering R10 (4.7K resistor mounted under the chassis) with a clip lead.

② Install PCB 1 and PCB 6, connect PCB 5. Connect mains input to output of a *variac.

③ Switch on unit and monitor +5V rail (PCB1-15) while turning up variac to full output voltage. Ensure +5V rail is 5V ± Ø.25V. Check that F.P. neon indicator is working. Return variac to Ø.

④ Starting with the variac at Ø, monitor each of the low voltage supplies in turn as follows:

+15V	(PCB1-7)	+15V ± 1V
-15V	(PCB1-6)	-15V ± 1V
	(PCB5-6)	30V ± 2V
	(PCB1-9)	20V ± 2V

⑤ Mains off, subsequent tests performed without variac.

TV Generator PCB 7

① Inspect TV generator PCB 7 and note that correct links are present. For 50Hz (625 lines), link pins C & D. For 60Hz (525 lines), link pins C & E. Install board and temporarily link pins A & B.

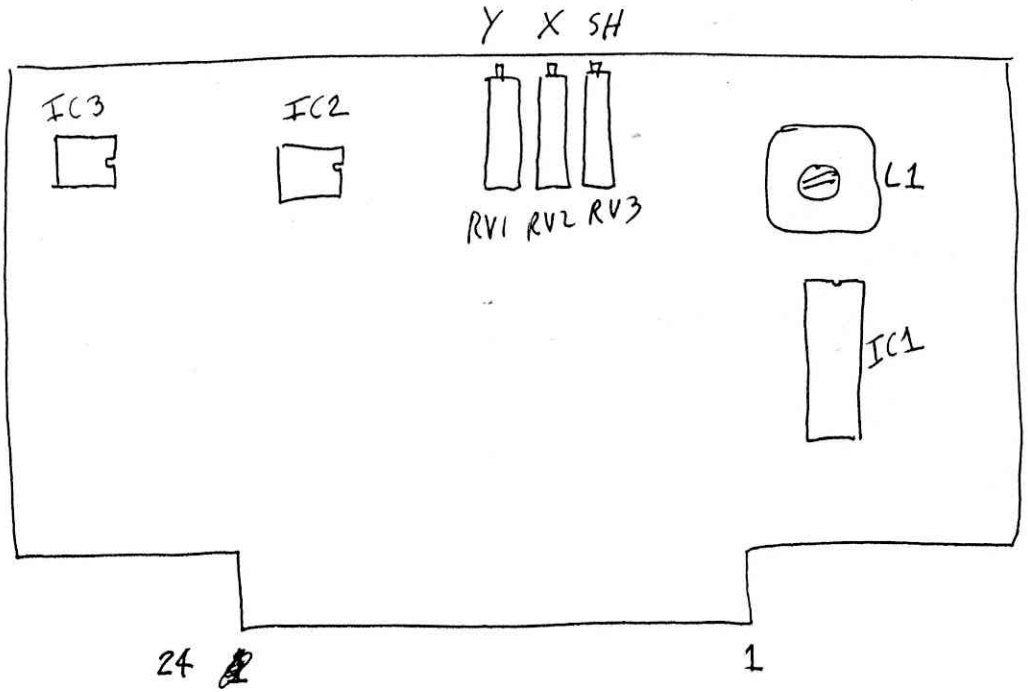
② Switch power on and monitor waveform at PCB 7-16 (IC3-6). Trigger scope on line and observe a ramp waveform. Adjust the core of L1 until the ramp period is 20 msec for 50Hz (625 line) operation or 16.66 msec for 60Hz (525 line) U.S. This waveform should be as stationary as possible. Remove the link between pins A & B. The ramp should lock to the mains frequency.

③ Set RV3 fully CW. Set the amplitude of the ramp to 3.6V P-P using RV1. Set scope to internal trigger and adjust the amplitude of the 64 msec ramp at PCB 7-15 (IC2-6) to 3.6V P-P using RV2.

Video Amplifier PCB 5

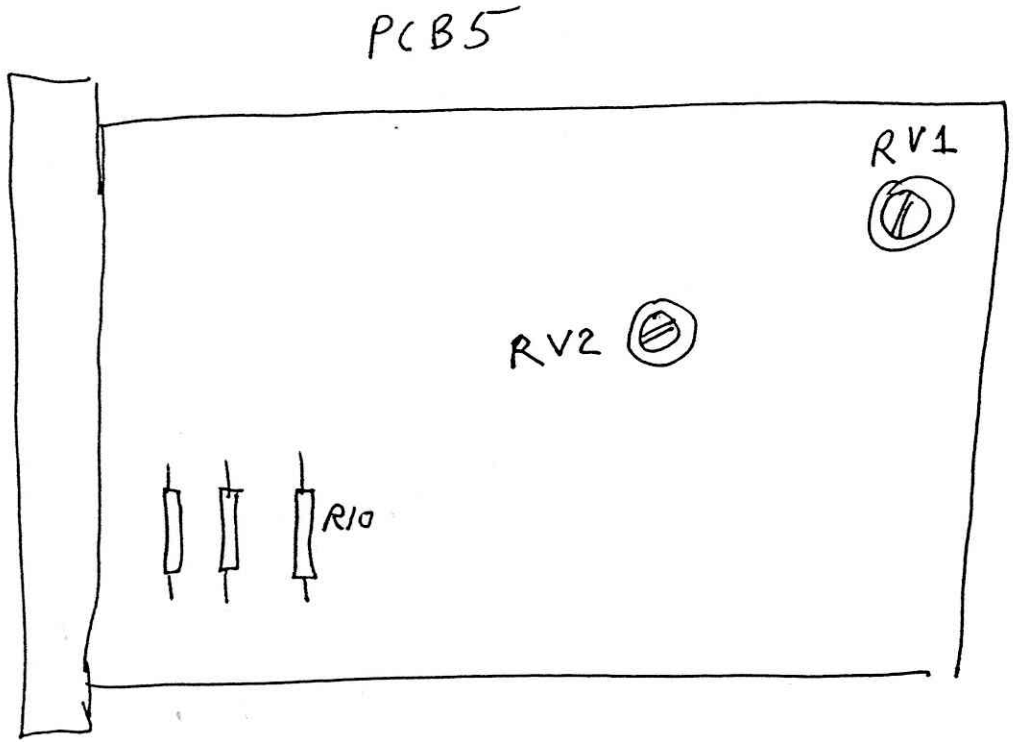
① Turn CONTRAST control fully CCW. Adjust the voltage on PCB 5-8 (R10R) to -0.3V using RV1 on PCB 5. The unit needs to be on for at least 10 minutes to make this adjustment.

PCB 7 TV Generator

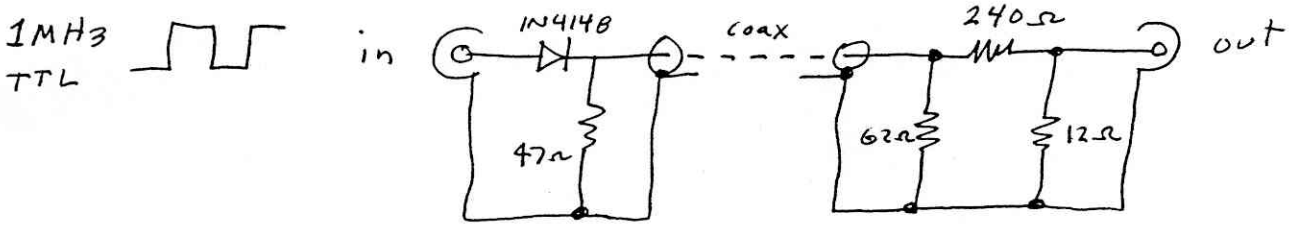


For setup, set SW3 to AUGER and SW4 to INT.

Black level and contrast signal amplifier

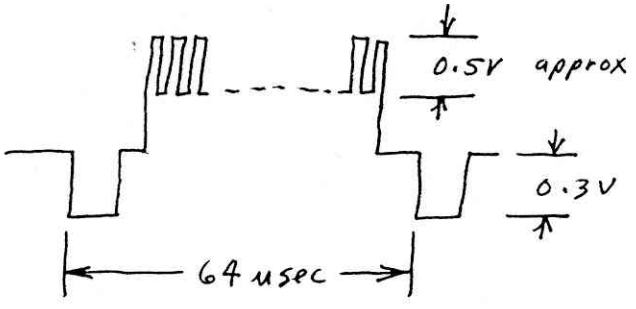


② Connect the signal generator using the network shown to the VIDEO I/P connector.



Set the signal generator to 1 MHz TTL and connect a 75Ω termination to the VIDEO o/p connector. Monitor the VIDEO o/p waveform with scope on internal trigger.

③ Turn CONTRAST fully CW. Observe waveform as shown below.



t_{rise}/t_{fall} < 70 nsec (at 10 - 90%)

Sync pulses should be approx. 0.3V amplitude and 64 usec spacing. 1MHz signal approx. 0.5V.

④ Set scope timebase to 0.2 usec/cm and set trigger to lock in 1MHz signal. On PCB5, adjust RV2 to give a square wave with not more than 5% overshoot.

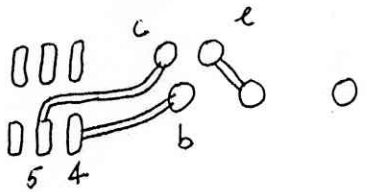
Measure rise ~~time~~ and fall times between the 10 and 90% points. ~~It~~ they should be less than 70 nsec.

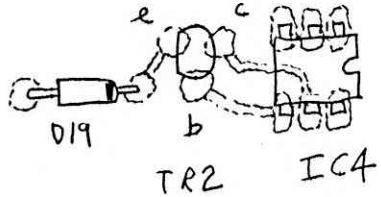
(5) Check that the voltage on SK2-5 varies continuously from +21V ± 1V to zero as the BLACK LEVEL control is turned CW.

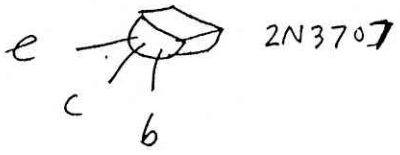
PCB 2 101802

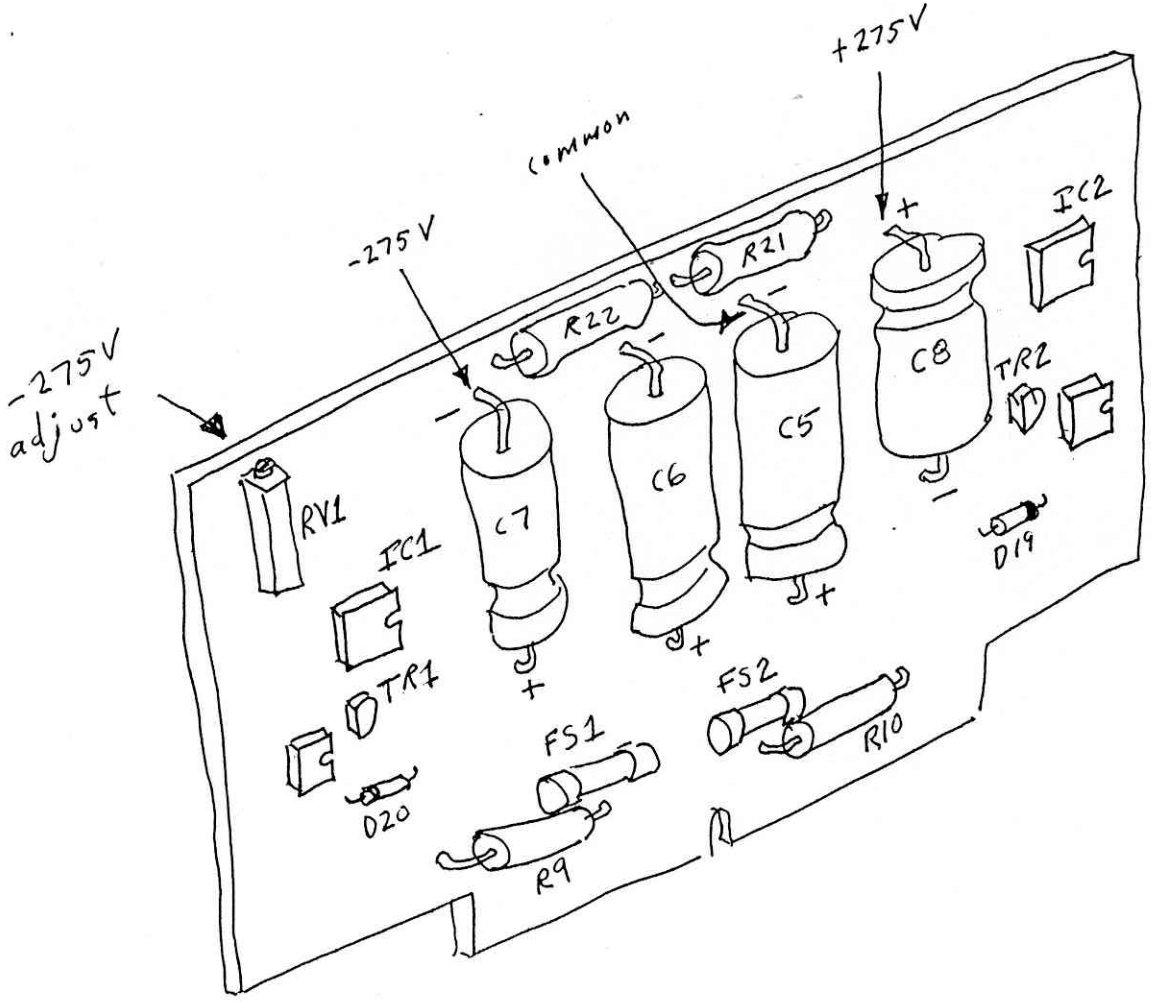
High Voltage Supplies

±275V



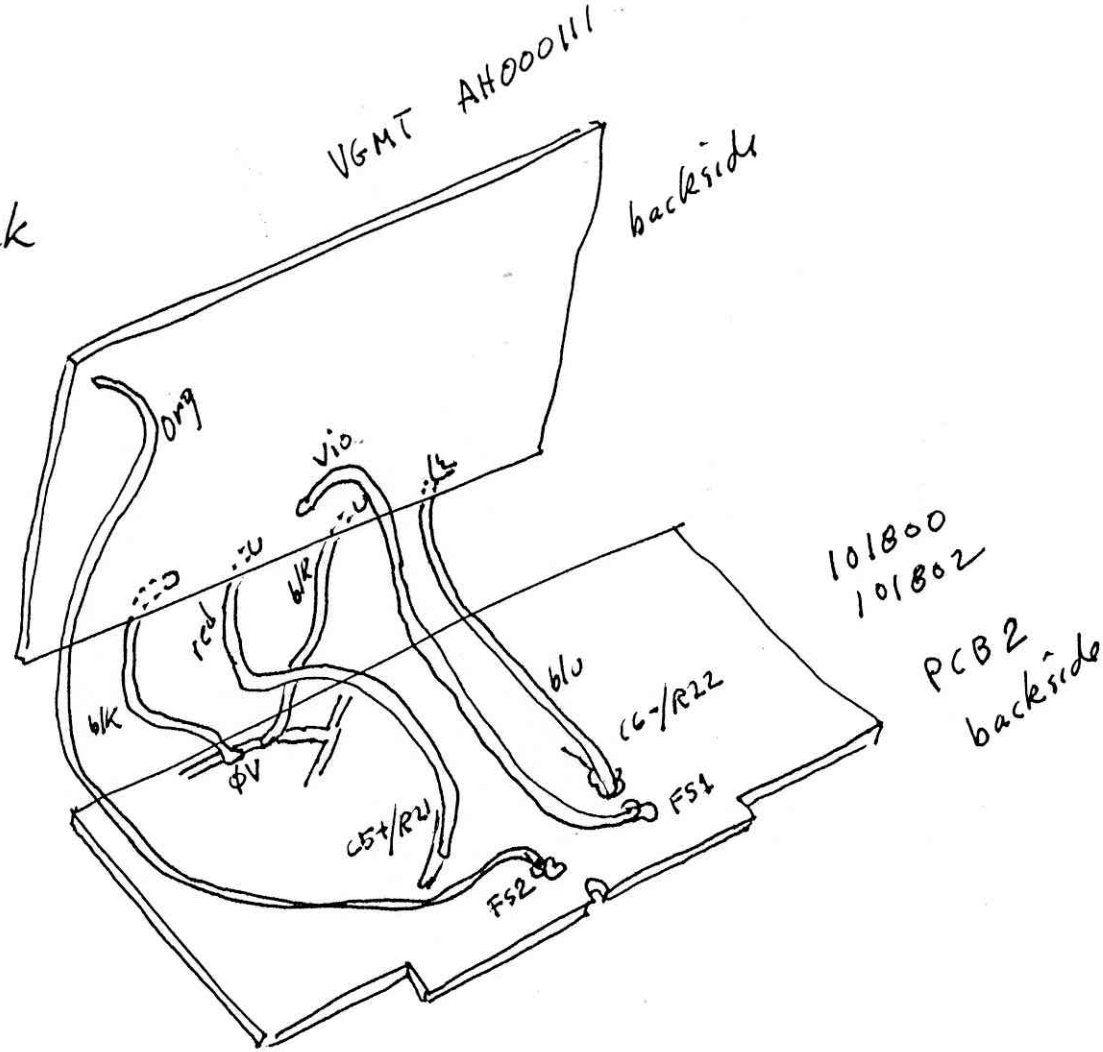






346 SAX 120V

60 Hz piggy-back PCB wiring



346 SAX (120 VAC)

HV Power Supply PCB2

① With mains disconnected, remove pcb 3 & 4. All other boards installed. Connect 3.3k 30w load resistors between ØV common - end of C5 and each HV supply. Connect to +275V supply at + end of C8 and to -275V supply at - end of C7 on pcb 2.

② Reconnect mains via a variac. Monitoring -275V at C7-, turn on unit and set variac to 120VAC. Adjust the -275V with RV1 on pcb 2 and set to -275.0V. Check the +275V at C8+. It should track to +275V ± 3V.

③ Power off. Allow approx 10 sec for capacitors to discharge, then remove load resistors. Subsequent tests may be done without the variac. Install pcb 3 & 4.

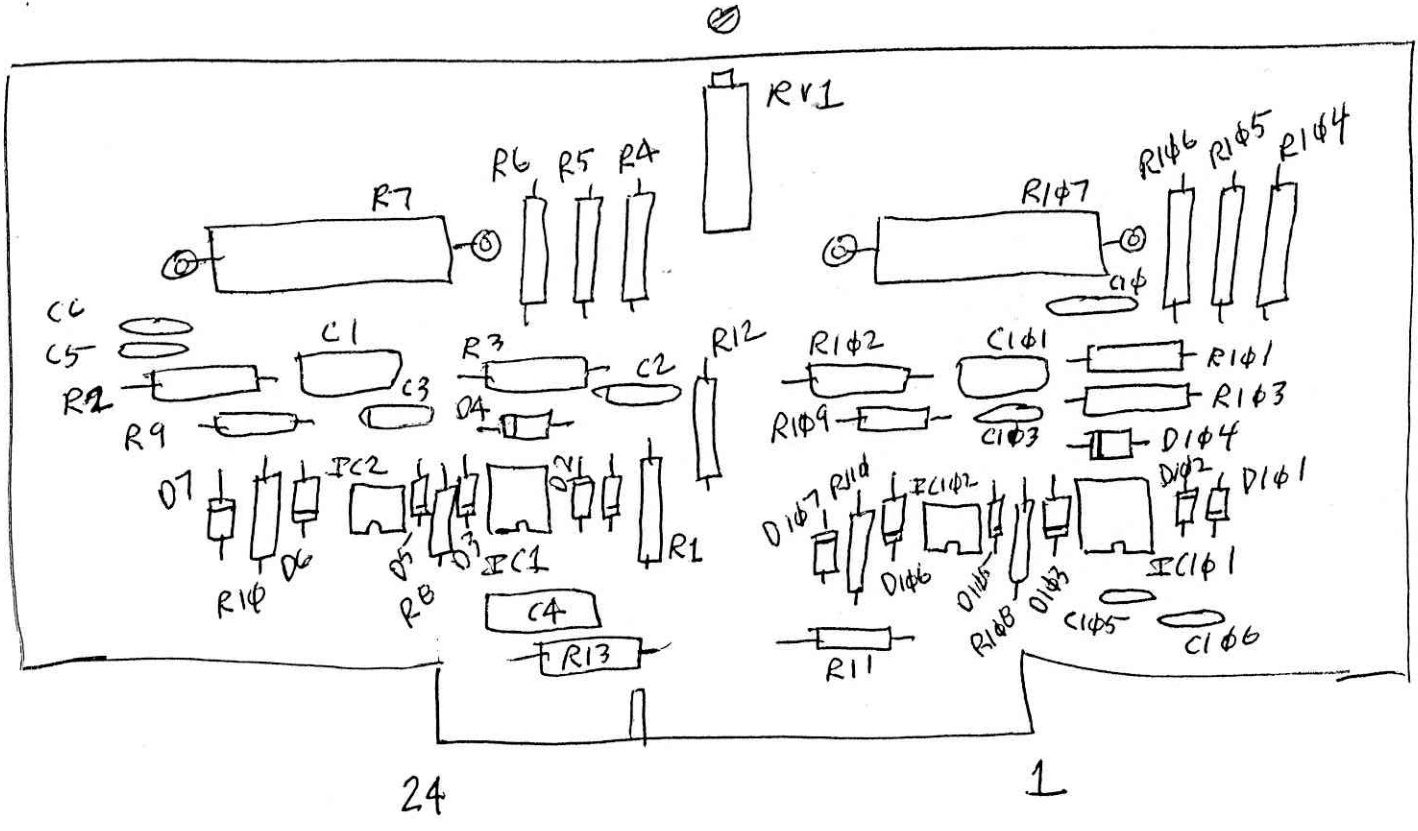
X and Y Deflection outputs (For Auger only)

④ Connect 220pf 3KV ceramic caps to X1, X2, Y1, Y2 connectors using BNC T's for all subsequent tests.

⑤ Power on. Set SWEEP to INT and AUGER, VIDEO GAIN to X1 and MAGNIFICATION to SPOT.

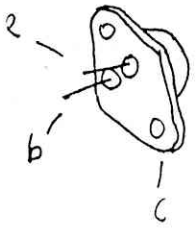
X, Y Deflection PCB 4, 3

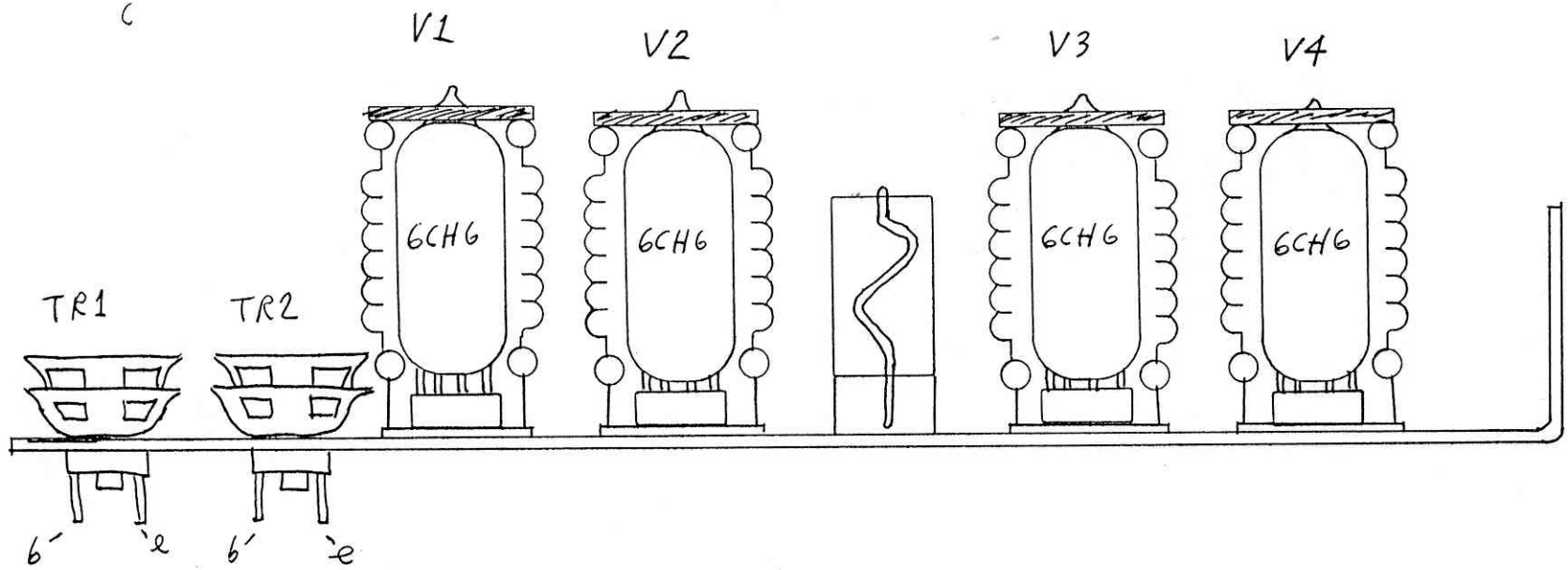
PCB 1Φ2 172
Iss 2

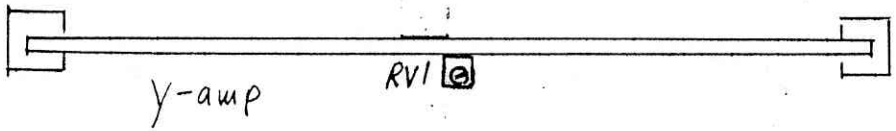


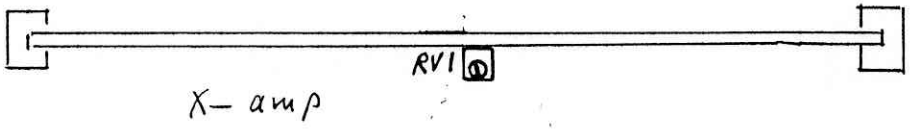
346 SAX

BU208A









(6) Check that tube filaments are lit. Check filament voltage on each tube across pins 4 & 5. Verify 6.3 VAC ± 0.5 V.

(7) Recheck ± 275 rails and adjust if necessary.

(8) Using X10 probes, connect Ch1 of the scope to X1 and ch2 to X2. Check the range of the voltage swing while turning the X SHIFT control. Should see

346SAX → ± 45 V
± 83 to 97 V
± 180 V

(9) Set X SHIFT to 50% (5.0) on dial. Using Ch1 & ch2 volts/div and X SHIFT as required, adjust RV1 on PCB 4 such that when the two scope traces are co-incident, both are at a dc level of ØV ± Ø.ØV. Lock the X SHIFT pot.

(10) Repeat steps (8)-(9) for the y deflection amplifier adjusting RV1 on PCB 3. Lock the Y SHIFT pot.

(11) Connect scope probes back to X1 and X2. Set MAGNIFICATION to each position in turn and observe that the amplitude of the output waveform is within the limits as shown below.

MAGNIFICATION	CH1 & CH2 (180° opposed)
X1	295 to 340V
X2	142 to 175V
X5	57 to 70V
X10	28 to 35V
X20	14 to 18V
X50	5.7 to 7.0V
X100	2.8 to 3.5V
X200	1.4 to 1.8V
X500	0.57 to 0.7V
SPOT	ØV
VAR	ø to ~~340~~ 280V for ccw rotation of x control.

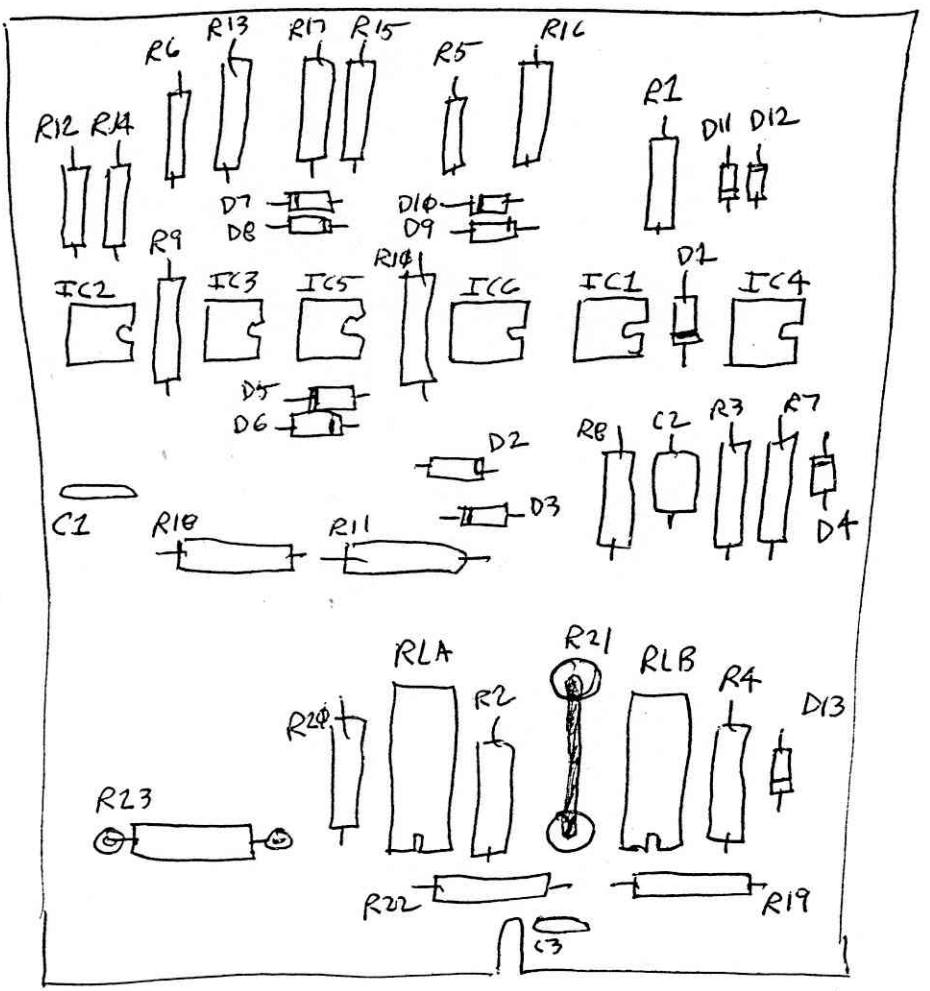
(12) Connect the scope probes to y1 and y2. Set MAGNIFICATION to each position in turn and observe that the amplitude of the output waveform is within the limits as shown below.

X1	243 to 280V
X2	118 to 144V
X5	47 to 59V
X10	23 to 29V
X20	11.5 to 14.5V
X50	4.5 to 5.5V
X100	2.3 to 2.9V
X200	1.1 to 1.5V
X500	0.45 to 0.55V
SPOT	ØV
VAR	ø to 280V for ccw rotation of y control.

(13) Switch to SLAVE. Connect a 1575ΦHz [redacted] 10V p-p triangular signal to X Ext. input and recheck as (11) above.

(14) Connect a 60Hz 10V p-p triangular signal to Y Ext. input and recheck as (12) above.

PCB6 Phase Splitter 10432Φ
Iss 1



(For SAX units only)

SAX PCB 9

① Set SAX/AUGER F.P. switch to SAX, INT/EXT F.P. switch to EXT. Set MAGNIFICATION to 1.

② Feed +1.95 V dc to both Xin and Yin, ⏀V to SAX IN. (Use battery voltage as a source)

③ Connect meter between X1 and X2 and adjust X balance pot (right side of SAX/AUGER switch behind F.P.) for ⏀V on meter.

④ Remove meter lead from X2 and connect to X1 BNC outer shell. Adjust RV1 on X deflection amp PCB 4 for ⏀V reading on meter.

⑤ Repeat steps 3 and 4 for Y. (Y deflection balance pot is on left side of SAX/AUGER switch behind F.P.)

(+1.95V to Xin, Yin)

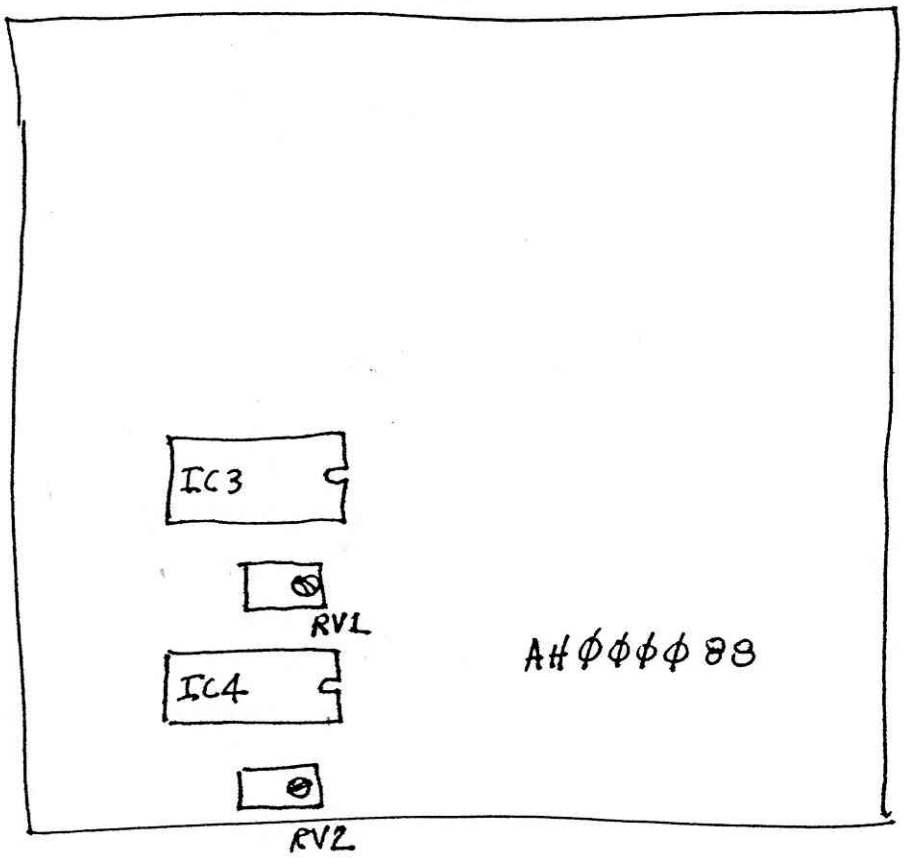
⑥ Feed SAX IN with +5.667 volts dc. Adjust RV1 on PCB 9 to read ⏀V between X1 and X2, [redacted]

[redacted]

Adjust RV2 to read ⏀V between Y1 and Y2. Reduce voltage to SAX IN and observe that meter reading remains at ⏀V between both X1, X2 and Y1, Y2.

346 SAX Amplitude Control Board

PCB 9

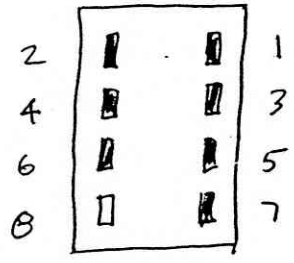


F.P.

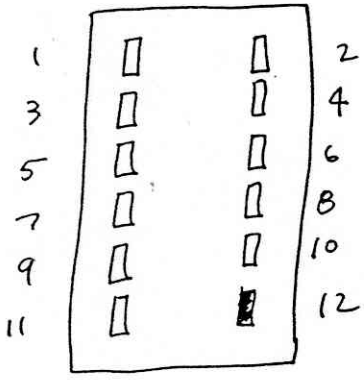
⑦ Reset voltage to SAX IN to +5.667V and feed 3.9V to Xin and Yin. Output voltage should read as follows:

X1	+ 170V	min.	+136V
X2	− 170V	min.	−136V
Y1	+170V	min.	+115V
Y2	− 170V	min.	−115V

346 Rear Panel



PL1
(male)



SK2
(female)

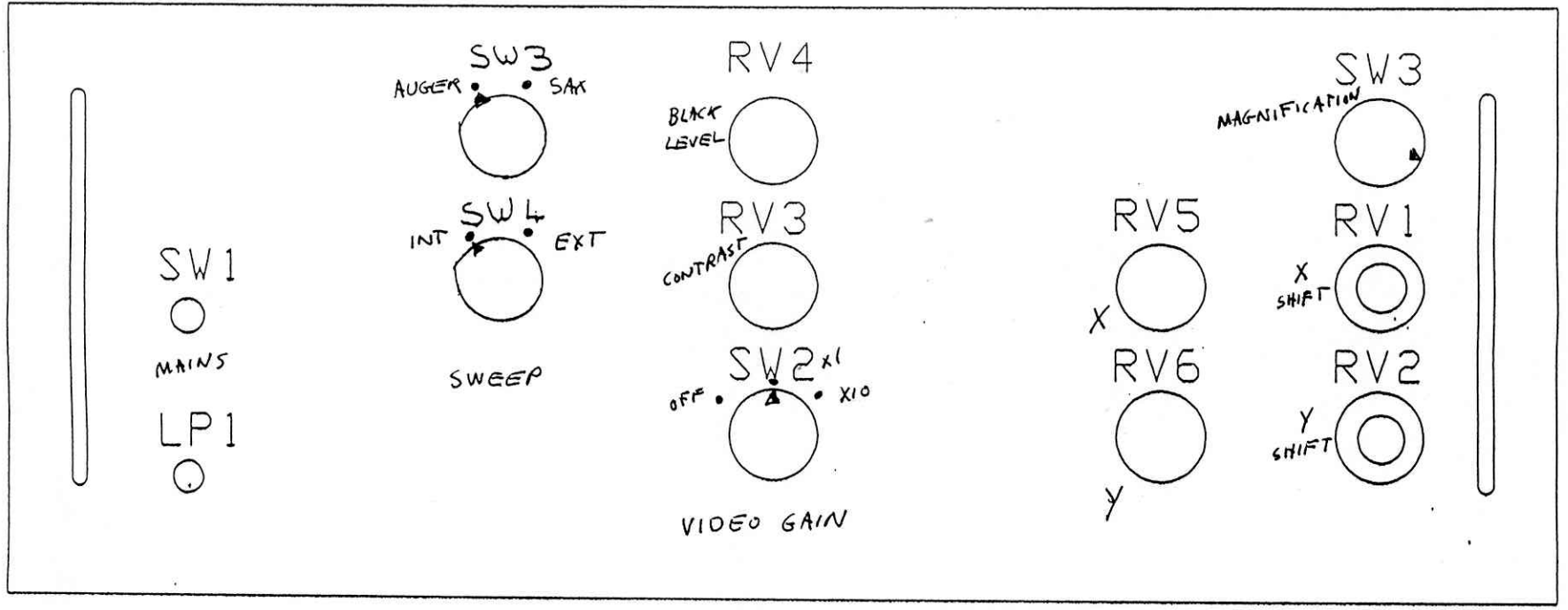
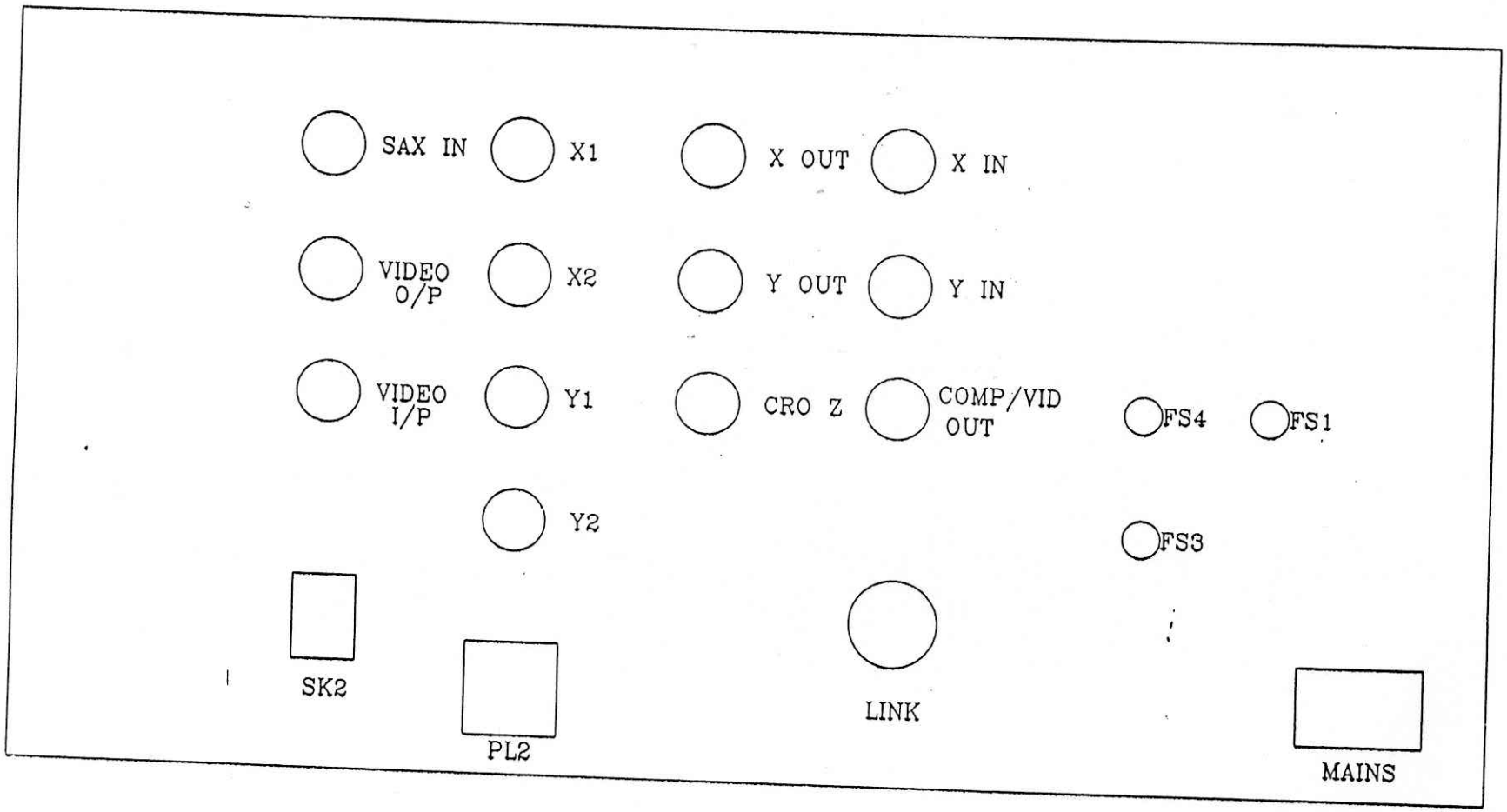
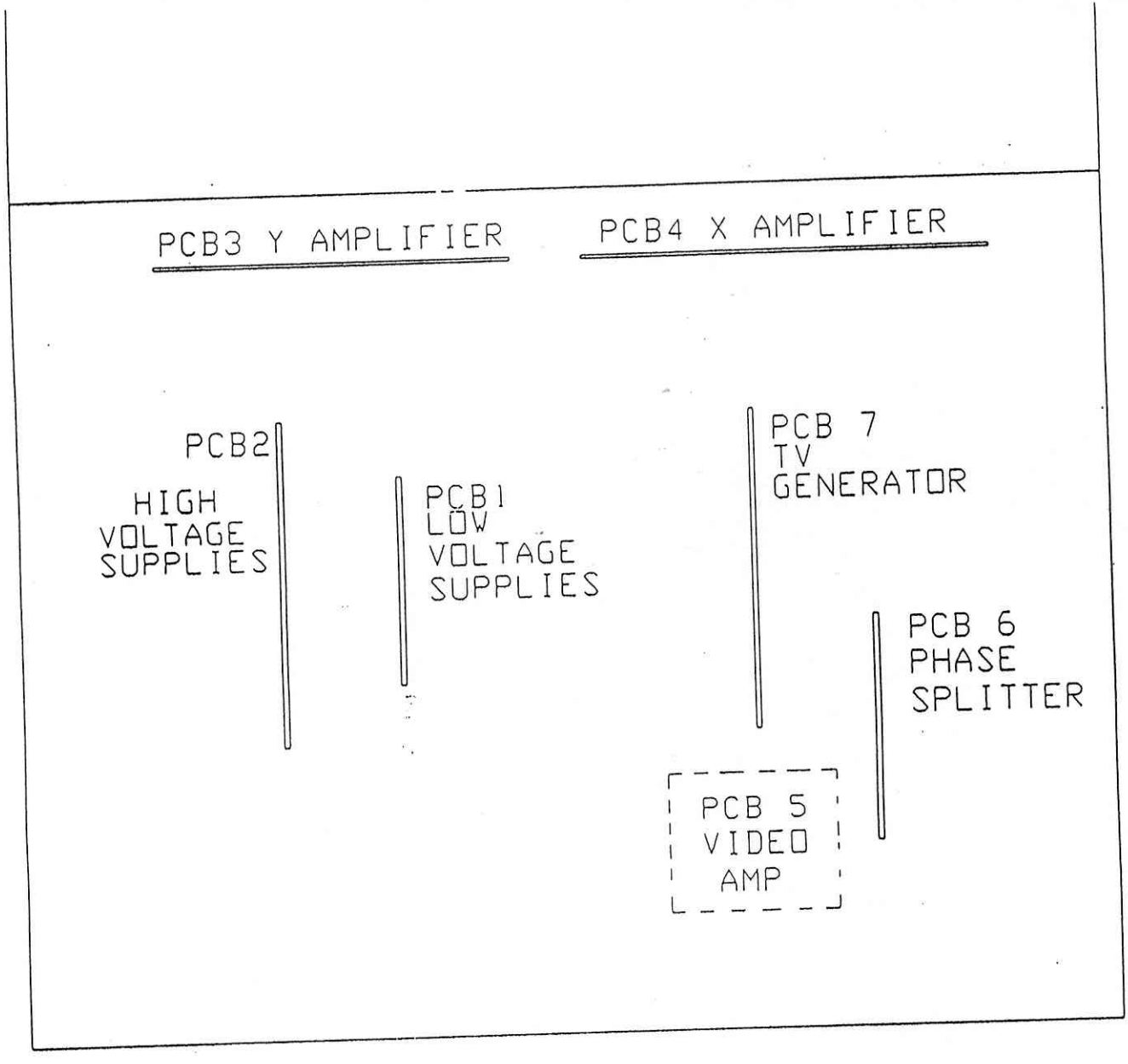


FIGURE 2

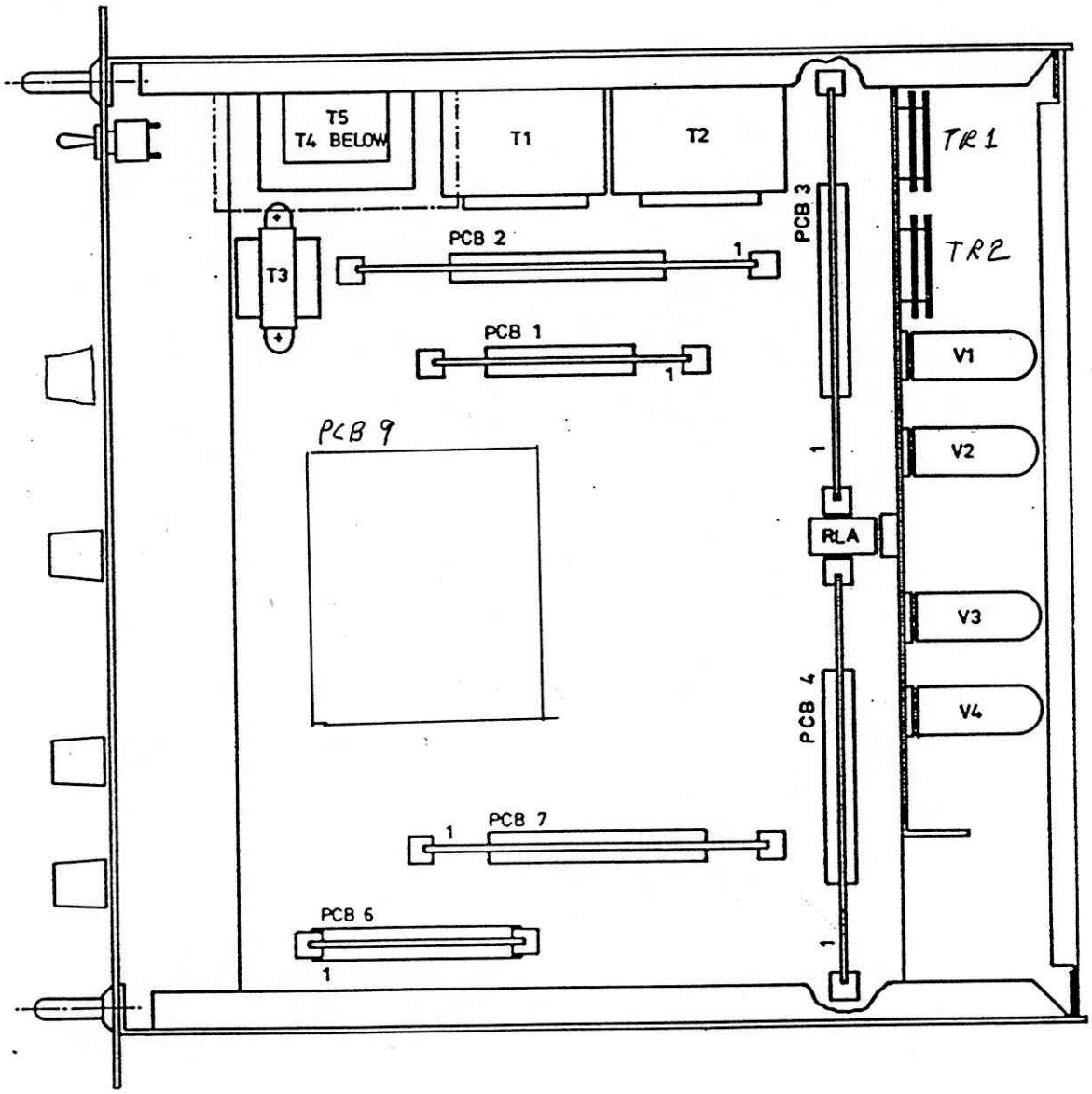
346 SAX Front Panel



346 SAX REAR PANEL CONNECTIONS

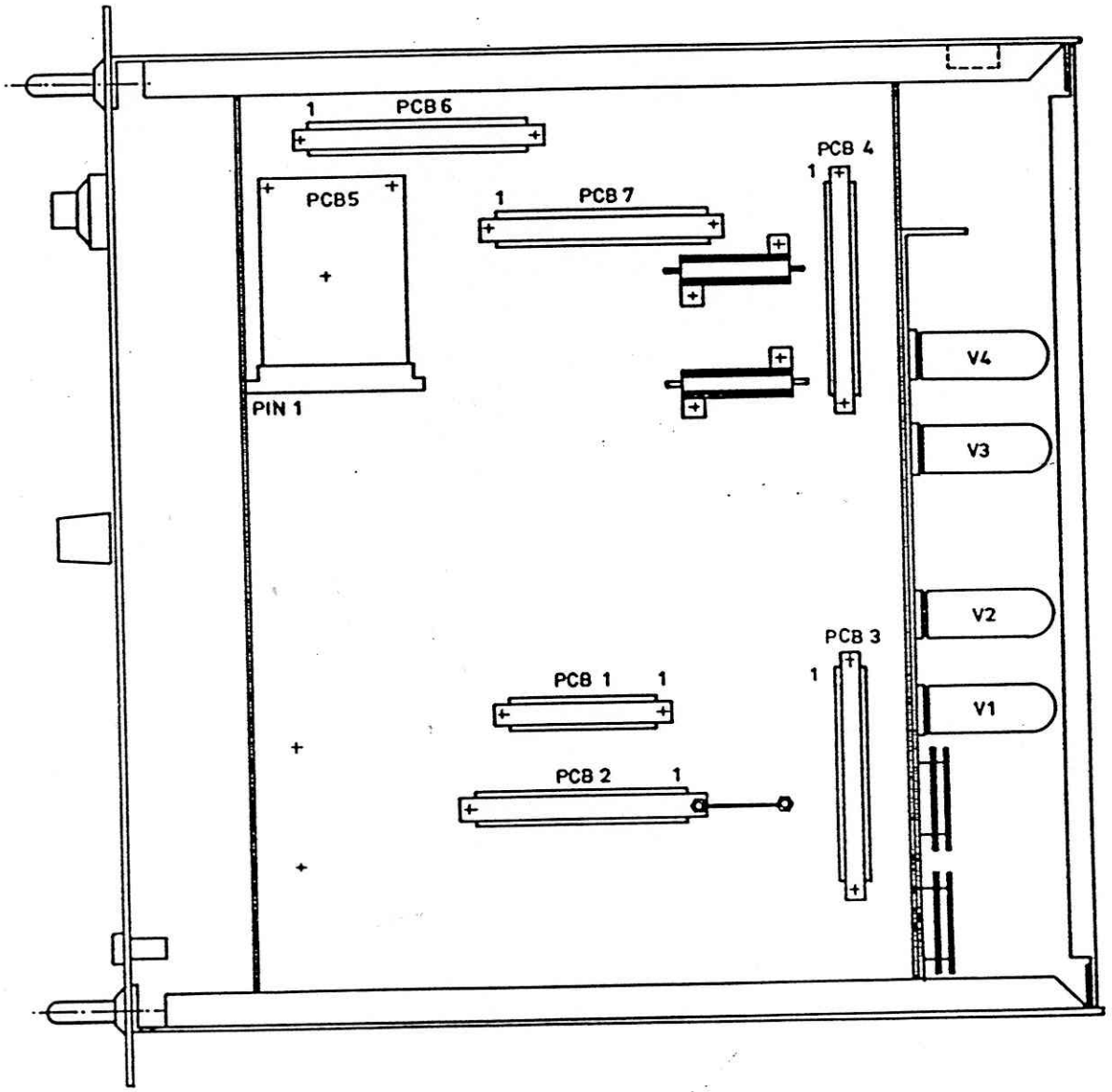


PCB LAYOUT 346



346SAX PHYSICAL IMAGING UNIT

Top View



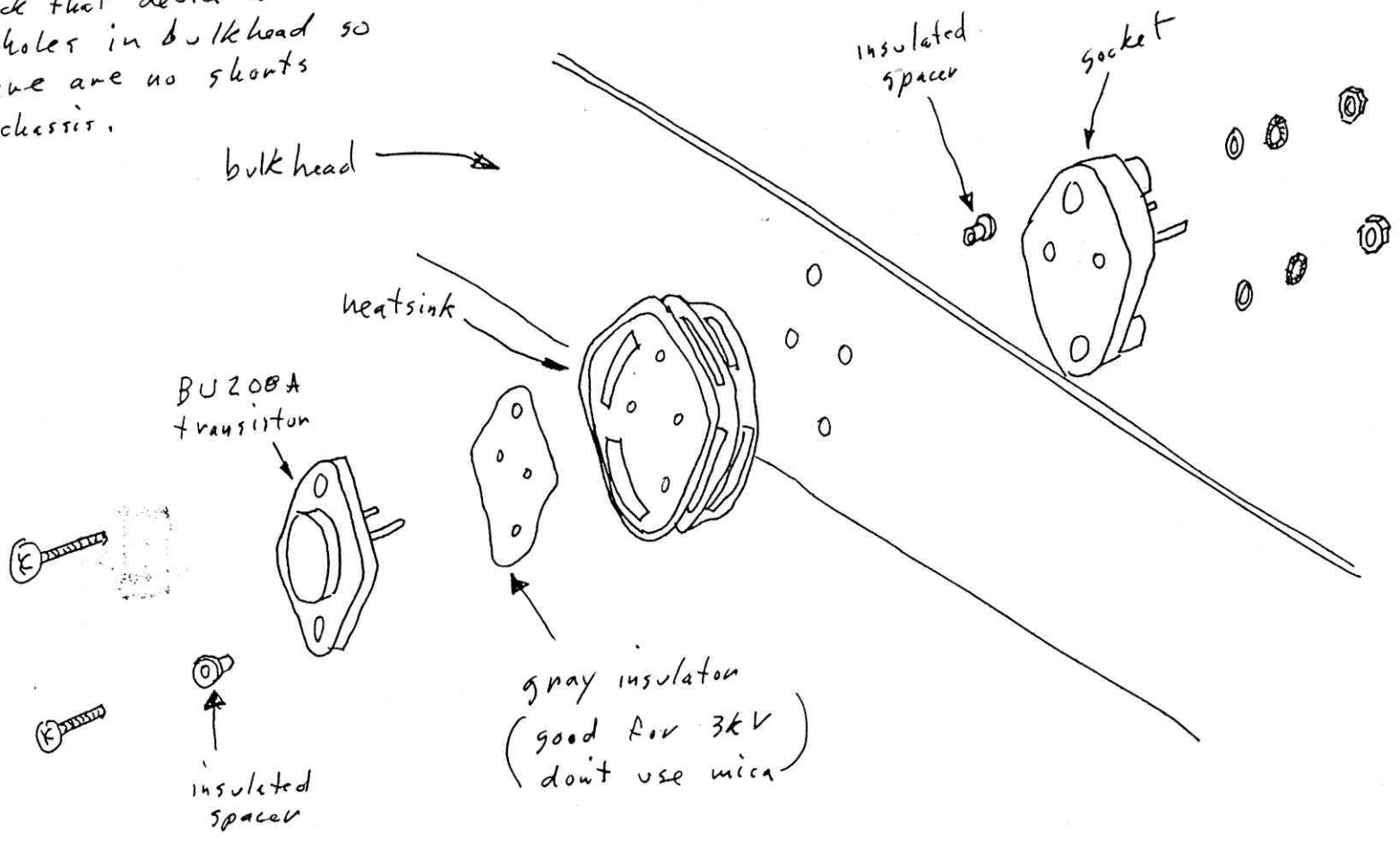
PHYSICAL IMAGING UNIT

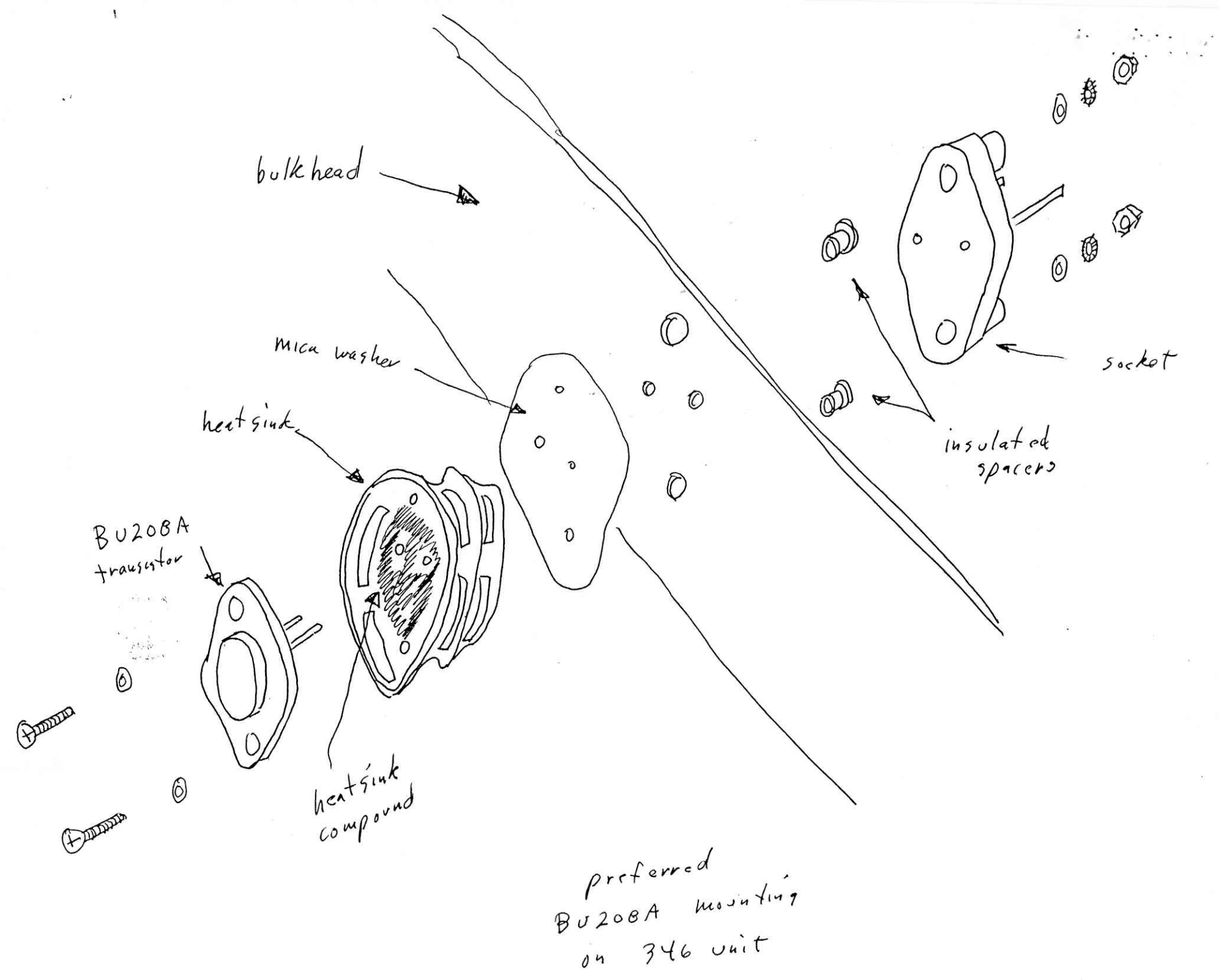
Bottom View

Microtech 346SAX (120VAC) TR1 & 2

mounting detail

1. Make sure collector makes good contact through to socket,
2. Check that device is centered in holes in bulkhead so there are no shorts to chassis.





preferred
BU208A mounting
on 346 unit

346 SAX

346I — Has to and fro board instead of TV board. (Ionex)

3465 — Has tv board (Scientific)

3465AX — Has amplitude control board and TV board. (Microtech)

Align the 3465AX in AUGER mode when ignoring the offsets. Check that Transistors on near are BU208A, use silicone grey impregnated insulators, not mica with heat sink compound.

Set the deflection amp offsets on the 3465AX unit per the SAX test spec only.

Check the video polarity on computer, check wiring input/output as there is an error in schematic # SAX-20-1 (120V) 20/7/94. R32 at computer video output needs to be removed with coax to PCB 5 101890 pin 8. R33 75Ω resistor is retained with wire connected from ~~video~~ computer video output connector directly to video in connector.

3465AX

Make sure values of resistors R20 & R21 on PCB 6 104324 are 2.21K and 215.0K respectively. These values are for the 3465AX units only and should remain the original values of 1.78K and 147.0K on all other 346 units.

To convert 120V unit to 240V, transformers T1-5 must have primary taps rewired. Replace F.P. power switch to 1A unit, F.P. neon lamp must be changed to 240 unit and R.P. fuses FS2-4 must be changed to 315 ma types.

EX05 flashover through the deflection plates can damage the 3465AX circuitry particularly HV PCB 2 components. Severe flashover can punch through coax to tube grid resistors leaving a carbon track shorting out the coax to gnd. this will severely load -275V damaging the board. To check for this, turn off power and remove PCB 2. with DVM, measure resistance between chassis and cases of TR1, TR2. They should measure an open but if 100k is indicated, the coax is shorting to gnd and the meter will be reading R9 or R109 on PCB 3 or 4.