222 Snagging list – #122 – 16/8/2024

This list changes continually without notice.

Currently the 222 S#74005 is in an operational condition but with some anomalies.
All digits 0-9 can be entered at all positions in the display.
Decimal point position switch is working and displays the correct DP position lamps.
All three temporary memories appear to be storing values which can be recalled at will and reset.

Adding two values together works correctly if both of the values are even (2,4,6,8), if any value is odd (1,3,5,7,9) the result is usually 1 less than expected. EG - 2 + 3 = 4, not 5. suspect that there is a problem with bit 1 of the calculation registers (A & E) or the carry circuits have a problem.
Still investigating, problem is the same with large numbers EG – 200 + 300 = 400.

Circuit diagram queries to be resolved.

Note - nets with a backslash (\ ) are inverted signals.

Power supply – None.
Keyboard - None.
Backplane – Circuit and diagnostics confirm the 222 backplane is derived from the 224 backplane, but with a few cut PCB traces and extra wire links.

* Check net [K(\R\ S16)] - PL7.A21, PL8.A22 –
* Net is on board 7 & 8 components only, not on backplane

* Currently PL7.A21, PL8.A22 is [DRV-RB] on backplane as -
  SK7.A21, SK8.A22

* Check all are connected and rename to [K(VERS16UVDBL)]

Board 1 - None.
Board 2 - None.
Board 3 - * D56 where ?, connected to ?

* Pin A1 to where ?

Board 4 - **Redraw =**
W126 used twice.

Board 5 - All conn to GR68
No missing components.

Board 6 - * 6A27 [DRV1] to where on board ?, appears unconnected on this board.

Board 7 - * Check on 224 circuit.
* FF A2, TR11/b through D29 & C35 is [TMP-A33, A3] on circuit, should be [TMP-A8, A30].

* Check on 224 circuit for resets to FF A8 and FF A1.

Board 8 – None.

Board 9 - * On 224 equivalent.
* R89 connects to [WRITE] TR9/c check it should be [\READ\] TR7/c.

Board 10 - * K111 D6 to A2 [\S16\], should it be A12 [\F3\] ?? (D111 on 224 dwg).

* K116 D29 to B22 [\WCNT8], should it be A22 [MUL] ?? (D13 on 224 dwg).

* D94, D128, D159, GR173, GR174, GR175, GR176, GR177, GR178, B21 all missing

D54, D129 used twice on board.
1# D54+ve, D166+, D169+, R48 through D168+, MP13 C5 &R28 to TR10B. Generates [10TR10/C]
D54-ve to 10B7 [V7/14]
#2 D54A+ve, D57+, D58+, R23 (-12V)
D54A-ve, C3 & R22 to TR12B [MDS]

D129+ve, D129A+, D123+, D144+, D125+ R46 (-12V),
D129-ve, MP13, C5 &R28 to TR10B. Generates [10TR10/C]

D129A+ve, D129+, D123+, D144+, D125+ R46 (-12V),
D129A-ve, SK10.B5 [\F2\]

Board 11 – D79 use twice –
#1 D79+ve, R100 (-12V), R97 (through D62 to TR5B).
D79-ve to PL11B1 [\UV\].
#2 D79A+ve, R75, D74+, D77+, through B8, D63+, C36, D23-ve through to TR11B.
D79A-ve to PL11B3 [\R\].

R98 used twice –
#1 R98 1 – C21, D10-ve through to TR2B.
R98 2 – PL11.B8 [VER].
#2 R98A 1 – C38, D20-ve through to TR11B.
R98A 2 to PL11.A20 [KYCLER].

Board 12 - * FFlop F1 (TR1/2) TR1B feed through D35 to R62/C22.
* C22 to 12B2 [K(\Z\S1\R\) check equivalent on 224 as corresponding C went to 12B3 [SELREG1].

General –

Keyboard de-bounce circuit is generally the same as the 220 but with a slight difference –

220-
[NUMKEYS] OR'd with [FNCTKEY] to generate [\KEYPRES\] in Schmitt circuit 9TR4/5.
Routes through 9A13 to V7/30 as [\KEYPRES\]
V7/30 links to V7/29 with test plug net becomes [\KEYPRESS\]
V7/29 goes to 7A10 and 7D7- gated by R105 [\KO\] in N61, 7TR2 for signal [ST+KO]

222-
[NUMKEYS] OR'd with [FNCTKEY] to generate [\KEYPRES\] in Schmitt circuit TS1/2ST on the under keyboard board.
Routes through UK50, 7th4, V7/29 as [\KEYPRES\]
V7/29 links to V7/30 with test plug net becomes [\STF\]
V7/30 goes to 7th5, UK49 to STFL401-ve gated by CDR17 [\KO\] in N416, TS1N416 for signal [N416]

Therefore the 222 pins V7/29 and V7/30 are swapped to the 220. Check to make sure.

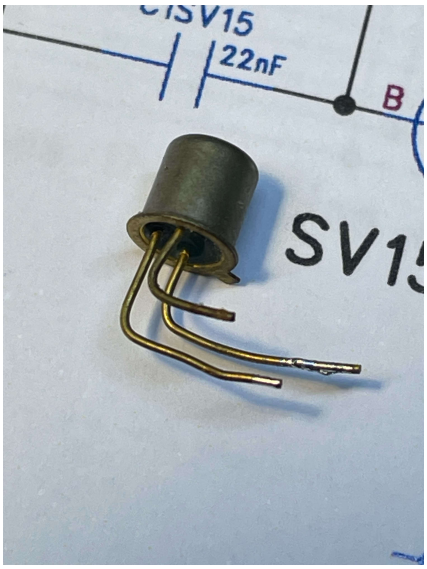
Under Keyboard (Board 13) –

Pin 15 [ZER] feeds ZERK401-ve on K401 from 7th13, is [VER] on backplane from 11TR9/C (N68), rationalise net names.

Hardware faults found with 222 S# 74005

1) Nixie 15 very dim, almost not lit.

   Anode driver SV15, TS2SV15 collector o/c to +180V, not ever soldered. Transistor leads cleaned and resoldered. (Photo right)



2) Power supply C1 5000uF on -12V supply leaking, replaced.

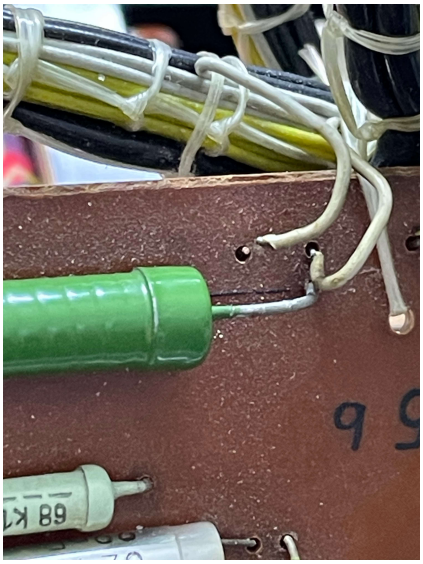
3) Nixie 15, multiple digits showing.

   Board 5, nixie 15 decoder gate, GR106 had high forward voltage, drive had spurious o/p, replaced with new GAZ17.

4) Power ON neon completely silvered so not visible, replaced.

5) Intermittent display on all nixies.

   +180V supply to under keyboard pcb (board 13) broken wire at the pcb edge. (Photo right)



6) Under keyboard PCB (board 13), solder short at W1K416 (resistors common point to 12V?) to board pin 17 (short to supply). TS1SV7 all pins dry joints.

Clock adjusted to 25kHZ, was 26.5kH.

Memory write pulse set to 1.5uS, was 1.8uS.

All boards connector pins cleaned.

Power supply levels adjusted to nominal levels.