

EMS Synthi A / VCS3 MK1 upgrade to work with EMS KS and TKS keyboards and with Portabellabz expansion cards

Disclaimer

*These modifications are **at your own risk** and I assume **no liability** for personal injury or damage to equipment or loss of use caused directly or indirectly by the use of any info shared in these pages. These modifications should only be performed by those experienced in electronics who know what they're doing. Do not attempt otherwise.*

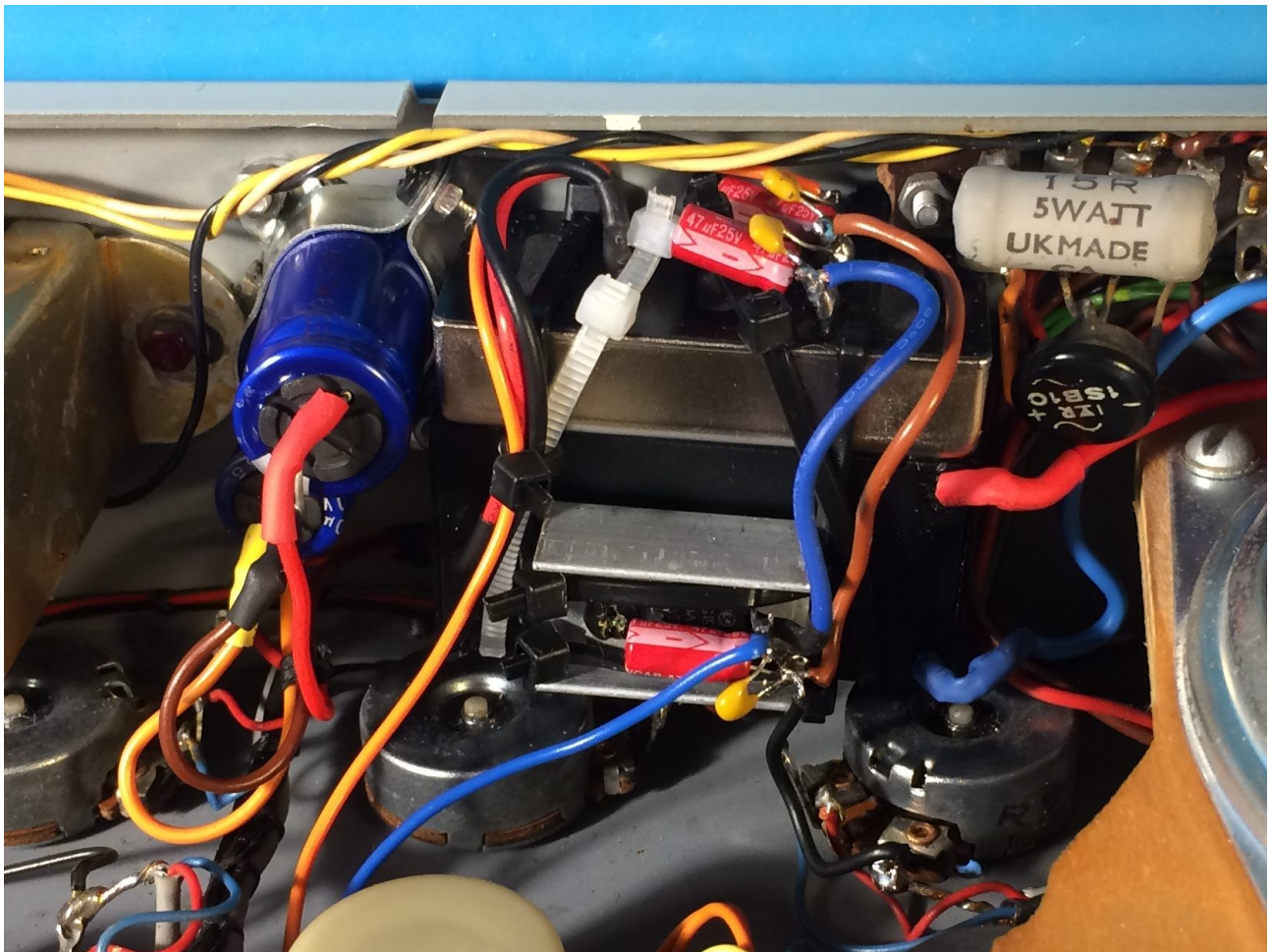
I. Connection of own PSU to Keyboard Jones socket

Only 50mA extra are available from each rail of the MK1 PSU, which is not enough to power a KS / TKS or the Portabellabz SQ-1 and Sister Cards.

This modification disconnects the original PSU from the Keyboard Jones socket and connects a second one instead to power external devices only.

The original PSU is left untouched and still powers the Synthi. The modification is 100% reversible.

It looks like this :



BOM

- **1x small sized 2200 μ F 50V min electrolytic capacitor**
- **1x small sized 1000 μ F 50V min electrolytic capacitor**
- **3x 47 μ F 25V min electrolytic capacitor**
- **3x 100nF 25V min ceramic capacitor**
- **1x Artesyn AEE00BB18-LS +/-12V DC-DC converter**
- **1x Meanwell IRM-20-12 +12V AC-DC converter**
- **LM7909 -9V voltage regulator**
- **TO-220 heatsink**
- **200 Ω 5W resistor**
- **cable ties**
- **heatshrink tube**

1. Open the Synthi and remove the 3 boards A, B and C
2. Note or take a pic of the wiring of the reverb tank
3. Desolder and unmount the reverb tank
4. Note or take a pic of the wiring of the 2200 μ F and 1000 μ F large chassis-mounted electrolytic capacitors
5. Remove the 2200 μ F and 1000 μ F large chassis-mounted electrolytic capacitors, the metal clamps and the mounting plate if there's one
6. Install the 2200 μ F and 1000 μ F small sized electrolytic capacitors together in a single metal clamp, fold it if necessary to fit the capacitors
7. Mount the metal clamp with the capacitors as close as possible to the transformer using the existing chassis holes, leave room enough for the Meanwell IRM-20-12 and Artesyn AEE00BB18-LS stacked
8. Solder the cables back to the capacitors, respecting the original wiring
9. Mount the Artesyn AEE00BB18-LS to the flank of the Meanwell IRM-20-12 with 2 cable ties
10. Connect the Meanwell IRM-20-12 +V and -V output terminals to the Artesyn AEE00BB18-LS +V and -V input terminals, insulate with heatshrink
11. Solder 47 μ F and 100nF capacitors across the Artesyn AEE00BB18-LS +Vout and COM terminals respecting polarity
12. Solder 47 μ F and 100nF capacitors across the Artesyn AEE00BB18-LS -Vout and COM terminals respecting polarity
13. Screw the 7909 to its heatsink and mount them between the Meanwell IRM-20-12 terminals with crossed cable ties
14. Solder 47 μ F and 100nF capacitors across the 7909 output and ground leads respecting polarity
15. Connect the 7909 input lead to the Artesyn AEE00BB18-LS -Vout terminal, insulate with heatshrink
16. Connect the 7909 0V lead to the Artesyn AEE00BB18-LS COM terminal and to the Synthi 0V on the CCW end terminal of the reverb level pot, insulate with heatshrink
17. Mount the ensemble to the chassis with cable ties using the existing chassis holes

18. Connect the Meanwell AC/N terminal to the mains N on the Synthi fuse holder terminal located in the corner, insulate with heatshrink
19. Connect the Meanwell AC/L terminal to the mains L on the Synthi contacts rack mounted next to the fuse, it should be the nearest contact to the fuse but it's good to confirm with a continuity test between the contact and AC mains socket, insulate with heatshrink
20. Remove the sleeving from contacts 2 and 4 of the Keyboard Jones socket and unsolder both former cables soldered to them
21. Insulate the former cables' bare end with heatshrink
22. Connect contact 2 of the Keyboard Jones socket to the 7909's output lead for -9V, insulate with heatshrink
23. Connect contact 4 of the Keyboard Jones socket to the Artesyn AEE00BB18-LS +Vout terminal for +12V, insulate with heatshrink
24. Turn on the Synthi and check voltages on the Jones keyboard socket contacts 2 (-9V) and 4 (+12V)
25. Turn off the Synthi
26. Plug in board A only back in place
27. Connect a 200Ω 5W resistor accros the Synthi's -9V (blue cables) and +12V (orange cables) rails temporarily with crocodile clips, this is requested when testing board A by itself, a MK1 unit should NEVER be turned on without this resistor if boards B and C are not in place
28. Turn on the Synthi and check voltages on both -9V (blue cables) and +12V (orange cables) rails
29. If the -9V and +12V rails are ok in both the Synthi and Keyboard Jones socket, remove the 200Ω 5W resistor and board A and proceed with the next modification

II. Connection of matrix row 16 to keyboard Jones socket

This modification is essential to use the sequencer CV output of the EMS controllers such as KS, TKS, Universal Sequencer, Sequencer 256.

It is not needed to use the Portabellabz SQ-1 Card or Sister Card.

If you don't plan to connect an EMS controller to your Synthi, you can omit it and jump directly to step 6.

This modification adds the extra wiring found in MK2 units : when the vertical joystick range pot is switched below 0 with a "click", the KS or TKS sequencer CV output takes precedence over the vertical joystick CV.

If you plan to install a KS into the Spartanite suitcase lid, be careful that the MK1 Synthi A's long joystick lever tends to foul on the KS when the lid is shut. It should be replaced by a short one but these are unobtainium today. A solution is to find a VCS3 whose joystick has a short arm and whose owner would prefer a long one and accept a trade.

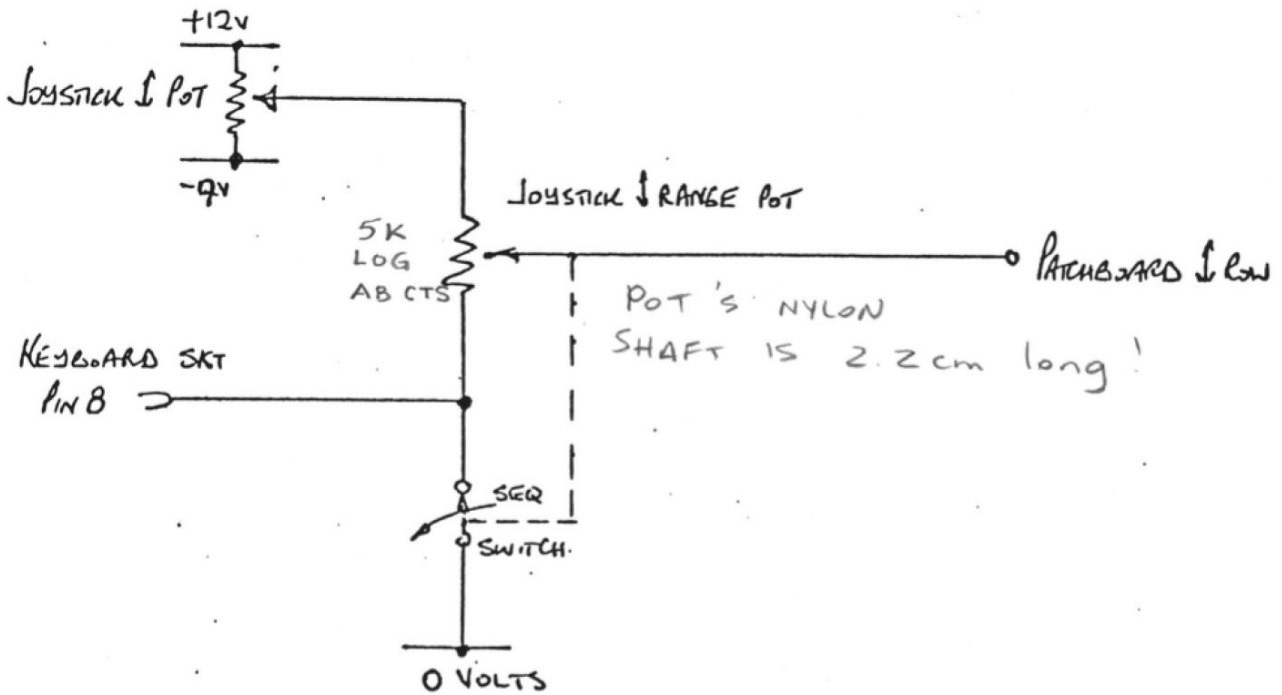
BOM

- **1x CTS (or other) 5k log switched pot - the switch should be off when clicked fully CCW and on in the pot's normal course**
- **1x short joystick lever (if you're lucky enough to find one)**

1. Unmount the transformer
2. Remove the vertical joystick range pot and replace it with the switched pot

3. Connect contact 8 of the Keyboard Jones socket to the CCW end terminal of the switched pot. Take the connection that was already on the CCW end terminal of this that did go directly to 0V (probably black wire) via one of the poles of the switch on the back of the pot to 0V.

The circuit should now look like this :



4. Mount the transformer back in place
5. If you have a short joystick lever, unmount the joystick and take it apart to replace the long lever by the short one, take the opportunity to clean and lubricate it
6. Plug in boards A, B and C back in place
7. Mount the reverb tank back in place and resolder it

Both modifications work with a VCS3 MK1 Putney as well, implementation is even easier thanks to the larger room available. Be creative and adapt the mounting.

Latest update : September 4th 2020