

The most basic cartridge uses an AT28C64 EEPROM which allows for two banks of 40 patches each, Cart A and Cart B.

When using an AT28C64 EEPROM:

- Populate EEPROM, RN1, RN2, C1
- Omit R1, R2, R3, R4, J1
- Leave JP1 uncut.

With extra circuitry, a larger AT28C256 EEPROM can be used to allow for 8 banks of 40 patches each.

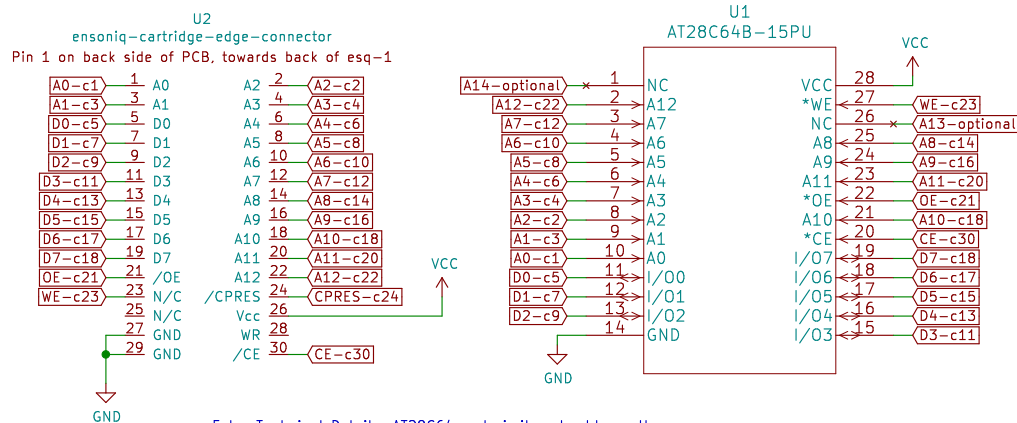
When using an AT28C256 EEPROM:

NOTE: Please read errata section before using AT28C256 EEPROM's!

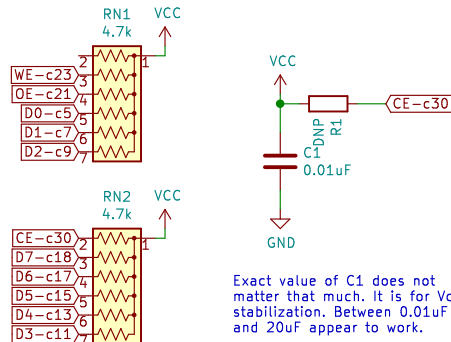
- Populate EEPROM, RN1, RN2, R3, R4, C1
- Omit R1, R2,
- Leave JP1 uncut.
- Connect 2x toggle switches to J1 (see comments and Errata in "Expanded configuration" box)
- Do NOT short J1 pin 2 to VCC at any time!

In this configuration, the toggle switches select which set of 2 banks to expose to the synth. (i.e. 00, 01, 10, 11 to select 1 of 4 sets of 2 banks)

After toggling either bank select toggle switch, select "Internal", then "Cart A" or "Cart B" on the synth to re-load patches from the selected memory region.



Extra Technical Details: AT28C64 and similar should use the not-so-wonderfully-documented /WE pin (23 on the edge connector) instead of /WR. The /WR pin (28 on the edge connector) is for older EEPROMs.



Building a Read-only cartridge:  
- Omit RN1 and RN2 resistor networks  
- Populate R1 with a 3.3k resistor

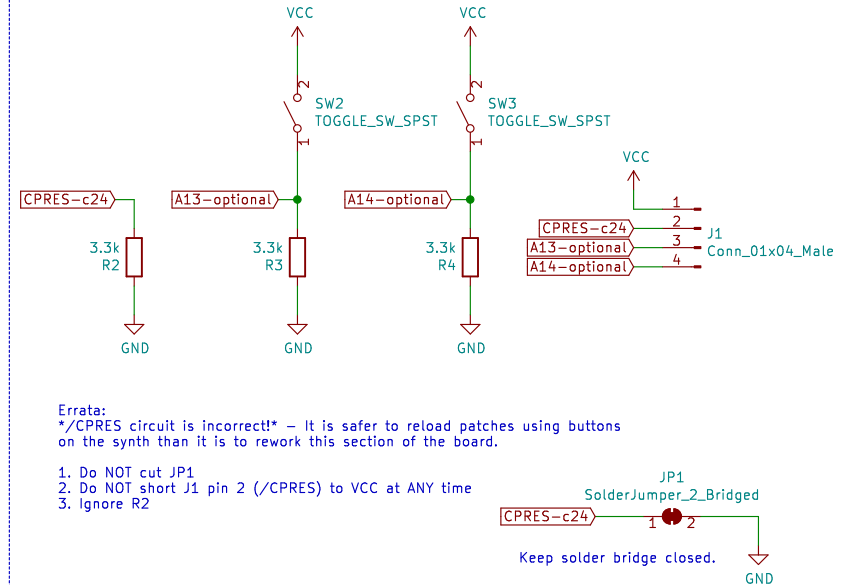
Exact value of C1 does not matter that much. It is for Vcc stabilization. Between 0.01uF and 20uF appear to work.

Expanded configuration (optional, requires AT28C256 EEPROM)

Pins on J1 are not labeled well. The "VCC" label is closest to pin 1:  
J1 4 3 2 1 VCC

Toggle switches should go between:

- Pin 4 and VCC
- Pin 3 and VCC
- Do NOT short Pin 2 to VCC!



Designed and tested by James.Hagerman@gmail.com (@jamisnemo) <https://zenpirate.com>  
Project Files: <https://github.com/JamesHagerman/Ensoniq-ESQ-1-EEPROM-Cartridge>  
Details sourced from inspecting an intact, original EPROM cartridge and the following references.  
CRITICALLY important information provided by the legendary Rainer Buchty himself!  
<http://www.buchty.net/ensoniq/cartridge.html>  
<http://buchty.net/ensoniq/files/schematics/sq80-digital.jpg>  
<https://neatcircuits.com/ensoniq/stkcart.htm>

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**Title:** Ensoniq EEPROM Memory Cartridge (ESQ-1/SQ-80)

Size: A4 Date: 2022-05-18

KiCad E.D.A. kicad (5.1.8)-1

**Rev:** 3.0.1

Id: 1/1