Assembly Notes

NOTE: Please read errata before assembly!

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

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

In this larger configuration, 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 selectedp memory region.

When using an AT28C64 EEPROM:
- Populate EEPROM, RN1, RN2
- Omit R1, R2, R3, R4, J1, C1
- Leave JP1 uncut.

When using an AT28C256 EEPROM:
- Populate EEPROM, RN1, RN2, R3, R4
- Omit R1, R2, C1
- Leave JP1 uncut.
- Connect 2x toggle switches to J1 (see "Expanded Configuration Notes")
- Do NOT short J1 pin 2 to VCC at any time!

IMPORTANT:
The assembled cartridge must be initialized before use!

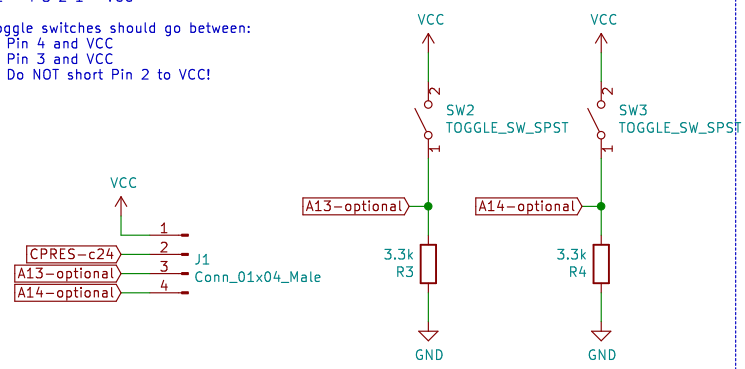
Power up the synth
Plug in the cartridge
Press "STORAGE"
Press the button under "CARTRIDGE"
Press the button for "INT TO CART A"
Press the button for "YES"
Repeat for "INT TO CART B"

Expanded Configuration Notes

Wiring the togggle switches when using large EEPROMs can be a bit confusing.

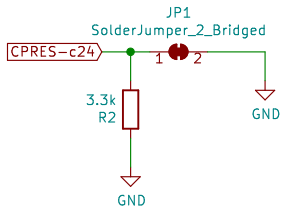
Pins numbers on J1 are not labeled well. The "VCC" label is closest to pin 1, i.e.:
J1  4 3 2 1  VCC

Toggle switches should go between:
- Pin 4 and VCC
- Pin 3 and VCC
- Do NOT short Pin 2 to VCC!

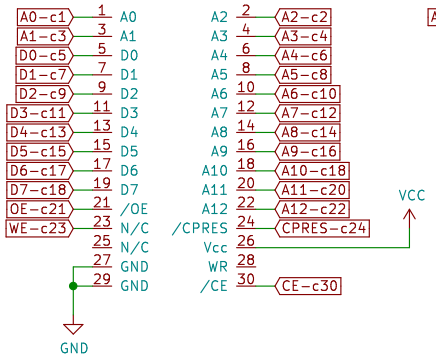



Errata: Cartridge presence circuit (/CPRES) is incorrect!

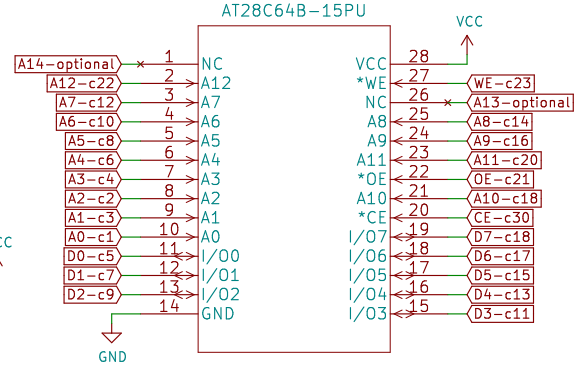
1. Do not cut JP1
2. Do not populate R2
3. Do NOT short J1 pin 2 (/CPRES) to VCC at ANY time

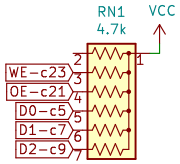


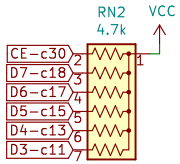

U2
ensoniq-cartridge-edge-connector
Pin 1 on back side of PCB, towards back of esq-1




U1
AT28C64B-15PU

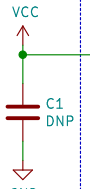


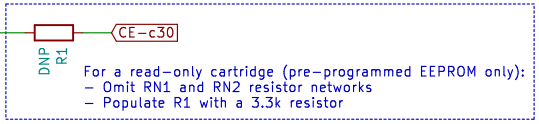




Errata: C1 appears to cause stability issues on some synths!

It was present on the OEM cartridges so it was kept.
If you notice stability issues without C1, please consider populating it. Values between 0.01uF and 20uF may work. Your millage may vary.




For a read-only cartridge (pre-programmed EEPROM only):
- Omit RN1 and RN2 resistor networks
- Populate R1 with a 3.3k resistor

Behind the scenes tech info: AT28C64 and similar use the undocumented /WE pin (23 on the edge connector) instead of /WR. The /WR pin (28 on the edge connector) is for older EEPROMs.


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 legandary 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 | **Rev:** 3.1.0 |
|---|---|---|
| KiCad E.D.A. kicad (5.1.8)-1 | | Id: 1/1 |