Casio SK-8 & SK-5 Sampler "Sample bank Expansion" modification :: by Plutonig9 2006

Description

Increase SK Sample Banks to 32x without sample memory loss

PART REQUIRED

28-Pin IC Socket (for the SK60 see the bottom note “Extra notes for SK60 expansion”)
Shrinkwrap

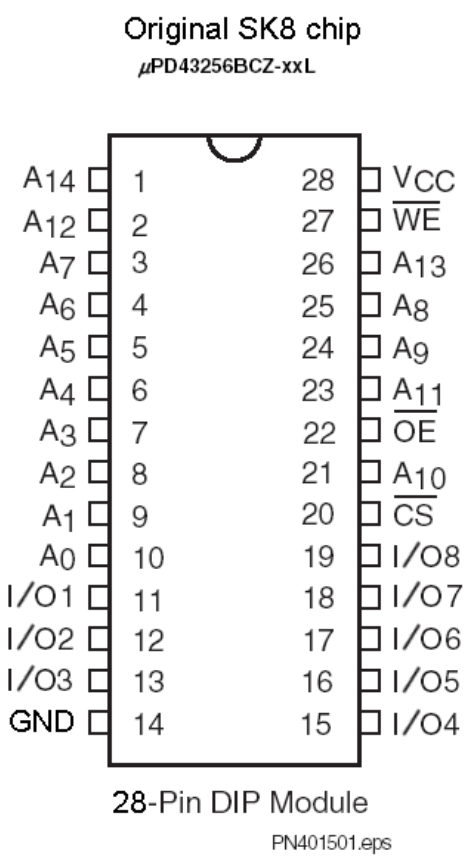
IC NONVOLATILE SRAM 1024k x8 BQ4016YMC-70 36-pin Texas Instruments 8Mbit SRAM (li-ion backed)
http://focus.ti.com/docs/prod/folders/print/bq4016y.html or from here:

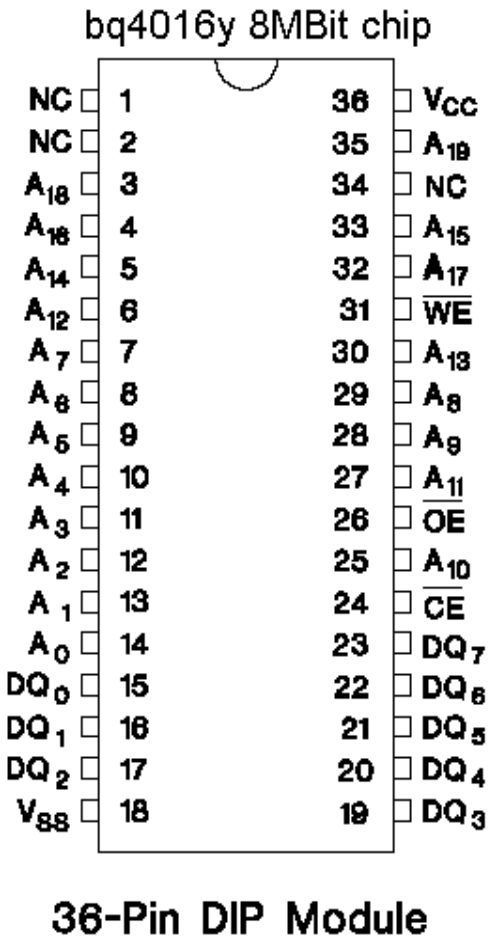
http://www.digikey.com/scripts/US/DKSUS.dll?KeywordSearch?Mpart=BQ4015YMA-70
US$27 from Digikey

ROTARY ENCODER 4 BIT
US$3.50
http://www1.jaycar.com.au/productView.asp?ID=SR1220&CATID=28&keywords=&SPECIAL=&form=CAT&ProdCodeOnly=&Keyword1=&Keyword2=&pageNumber=&priceMin=&priceMax=&SUBCATID=410

If you compare the datasheet with 28-pin 32kx8-bit SRAM, you'll notice the 8Mbit NVRAM has the address & data-lines in the same location as the smaller chip. What is extra is this:

The **8Mbit** chip has 36-pins & (5) of the 9 pins on the top correlate to the 5-highest address-lines.
Pins with “NC” against them, means “Not connected” – they are not used.





Procedure:

1) Desolder and remove the old RAM chip

2) Take a 28 pin IC socket. Bend out 90 degrees the socket pins corresponding to the pins Vcc and WE on the old RAM chip horizontally. Solder the socket in place, with pin Vcc and WE **not** soldered in, sitting flat against the board. For the SK60, see the bottom note "Extra notes for SK60 expansion" regarding the socket fitting.

The Vcc pin

3) Drill a small hole somewhere in the circuit board 1cm away from pin Vcc. Drill another, the same way, from pin WE. The holes must miss any tracks on the other side of the board. Pass an insulated wire through each of these holes to the other side of the circuit board (the track side). Solder the Vcc wire to the Vcc terminal track. The other end, which is at the other side of the hole, is now the new +5V supply. Pin 36 is the power supply pin Vcc in the new RAM. Connect this pin to the new +5V Vcc power supply wire that comes out of the hole in the board.

The WE (Write Enable) pin

4) Solder the WE wire to the WE terminal track. The other end, which is at the other side of the hole, is now the new WE (write Enable) terminal for a write enable/disable switch. Solder the end of this wire to the centre terminal of a toggle switch. Solder another short length of insulated wire to one of the outer terminals of the switch (either one). Solder the other end of the wire to the bent out pin WE on the RAM chip.

The Address pins

5) Solder a 10k resistor to each leg of the address pins 3, 4, 32, and 33 of the new chip. Solder the other end of the resistors to GND somewhere on the circuit board.

6) Solder insulated wires, at the place where the 10k resistors connect, to each leg of the address pins 3, 4, 32, and 33 of the chip. Solder the other ends of these wires to the pins labeled 1, 2, 4, and 8 of a 4 bit rotary encoder.

The Rotary Encoder

7) Solder an insulated wire to the centre terminal of the rotary encoder. Solder the other end of the wire to the +5V supply wire to provide +5V to the rotary encoder.

The Bank switch

8) Solder a 10k resistor to the leg of address pin 35. Solder the other end of the resistor to GND somewhere on the circuit board. Solder an insulated wire, at the place where the 10k resistor connects, to address pin 35. Solder the other end of the wire to the middle terminal of a toggle switch. Solder another piece of insulated wire an outer terminal of the switch. Solder the other end of this wire to the +5V supply terminal.

If everything was done right, you should now have 32 banks of memory on your SK-5 or SK-8, the rotary encoder will switch between the 1st 16 banks, with an additional toggle switch to flip on/off the highest address-line bit to access the 2nd 16 banks, again using the rotary encoder.

Ryan (plutoniq9)
Plutonique9@hotmail.com

Rewritten by Graham Meredith

Modification Can’s and Can’ts

Because the SK doesn't store EVERYTHING in its SRAM, certain things about the sampler are actually only stored in the microprocessor, which of course you cannot upgrade.

What is stored in SRAM

-Sample PCM Data (including reversed samples)
-Sequencer Data

What's not stored in SRAM

-Sample tuning
-Envelope assigned to samples
-Whether a sample is LONG or SHORT

The last one above is why you need to also add a "write protect" switch to the SRAM, here’s why:

If you have a mixture of LONG and SHORT samples in different banks, the SK will only remember what the four sample pads are as if there was ONLY ONE bank. That means you have to "tell" the SK what the samples are (long/short) if you’re switching between banks and the sample orientation changes. Also, if you leave the batteries out of the SK....it will actually forget that there are even samples there at all (even though they still are). This is where the write-protect switch comes is. When you write-protect the SRAM, you can then press, for example, SAMPLE 1 -> SAMPLE LONG without the SK overwriting the sample stored in that slot.....and you can restore the settings intended for that sample in the that bank.

It's a bummer, but that’s the way it's designed....it was never designed to have expandable memory nor was it designed so that samples would be retained even without batteries. It's a little annoying re-entering tuning data + envelope data as well, but it's a quick and painless process.....you just have to keep yourself a log of what you assigned to what samples.

Cheers

p9

* Extra notes for SK60 expansion

You can basically follow the assembly instructions word for word to suit the SK60, except for mounting the RAM socket. Here, the SK60 SRAM (the HM62256BLSP-8) is a **narrower** chip than the larger and wider Texas Instruments BQ4016y 8MBit NVRAM chip for the 32x expansion. You'll need to solder wires to the legs of the socket for the new BQ4016y chip, then bend inward and solder the wires into the circuit board holes where the original chip used to be. Now, you can plug the new chip into the socket on the board. From then on, it's straightforward as per the above instructions.

Graham