Alesis MMT8 16x Memory Expansion Modification (all grey model MMT8's)

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This modification expands the memory of the Alesis MMT8 to 16x the original memory capacity. It works just as if you had 16 separate MMT8's – each "bank" is an entire MMT8 memory bank.

The total cost of the expansion should be around $US45!!

Each bank is accessed by switching a 16 position rotary switch to choose the current memory. Each memory holds 99 songs, 99 parts, 8 tracks – just like the original MMT8 memory.

The down side of this expansion is that you can't use a part from, say, memory bank 1, and another part from memory bank 2, and put them into the same song. **Each memory is isolated from the other**. However, you can save and load the memory contents from each memory bank as a whole bank, as individual songs, or individual parts, just like doing memory dump on the original memory.

You can also save individual parts or songs to MIDI or tape, change memory position, and load them into the next memory. But you can't directly copy a part or song from one memory to another. You have to save them to tape or disk and then load them into the next memory.

Equipment

Soldering iron, 15W (no greater – can damage the circuit tracks by excess heat), solder
Antistatic wrist band and cable
Wire cutters

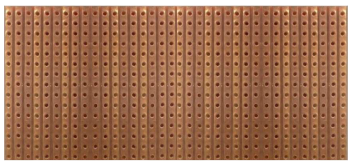
Components required

SRAM chips x 2 needed:

BSI SRAM memory chip BS62LV4006PC-70 SRAM (512k x 8 bit) – About US$19 each – 2 needed

http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=157358&

Other bits:



Veroboard strip board

Heat shrink insulation tubing - small diameter 2-3mm, black and red

Double sided mounting tape

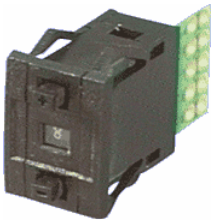
Hookup wires - insulated, of different colours, such as rainbow ribbon cable

Resistors - 10k, ¼ watt – **x 8** needed

Switches: 4-bit Hexadecimal Rotary encoder switch: about US$6.00 --- **x 1** needed

http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=581301&

Or this better, neat pushbutton one instead, with a number display:



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Preparation:

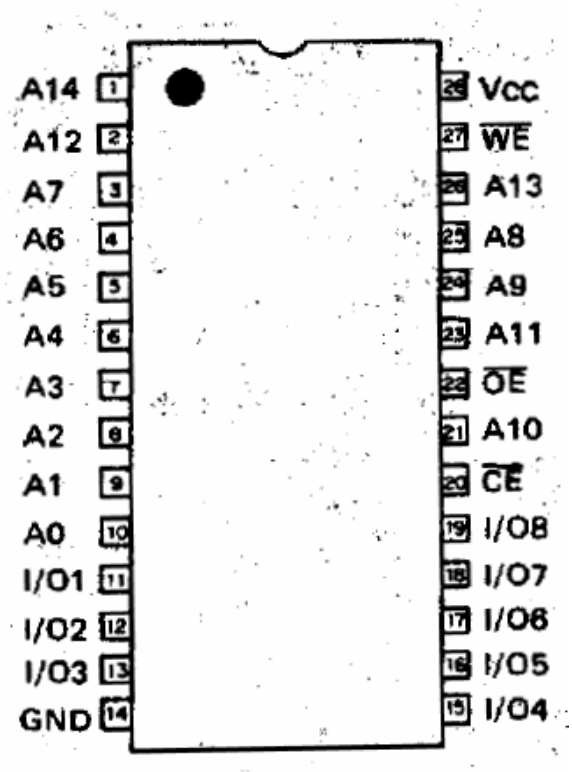
Put on the **antistatic wrist band and cable**; connect the cable somewhere to earth, such as a water tap on the kitchen bench. This will prevent static discharge building up and damaging your chips.

Study the pin out diagrams for each chip below. Also, examine the actual chips when you get them. Make sure you can identify which is **pin 1** on the chip (the top of the chip has a small **notch** in one end of the chip; pin 1 is the first pin on the left of this notch).

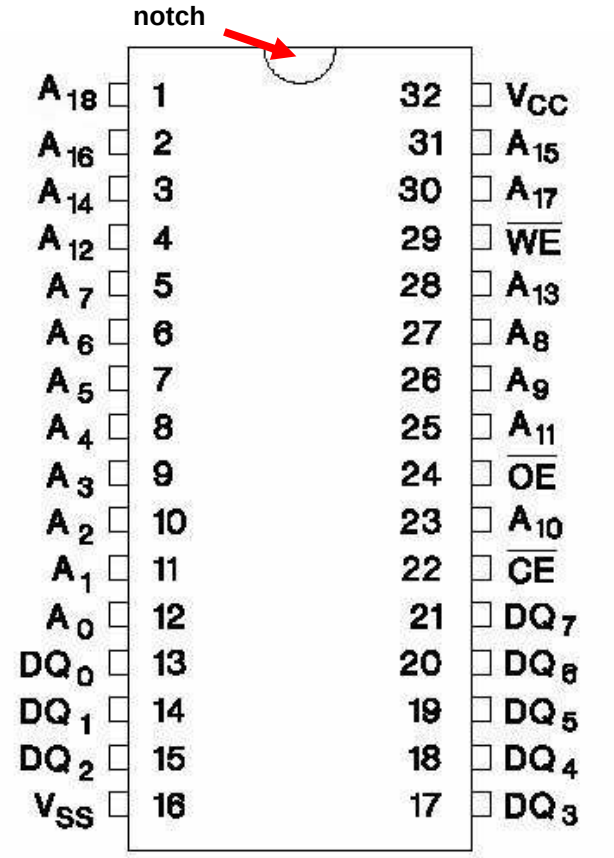
The original 28-pin 32kx8 SRAM and the new 32-pin 512x8k 4Mbit SRAM have the address pins and data pins in the same location. The differences are:

The **4Mbit** chip has **32 pins – it is a larger physical chip**, and pins 1, 2, 30 and 31on the top are the 4 **highest address** lines.

Original MMT8 RAM chips CXK58257P-12L



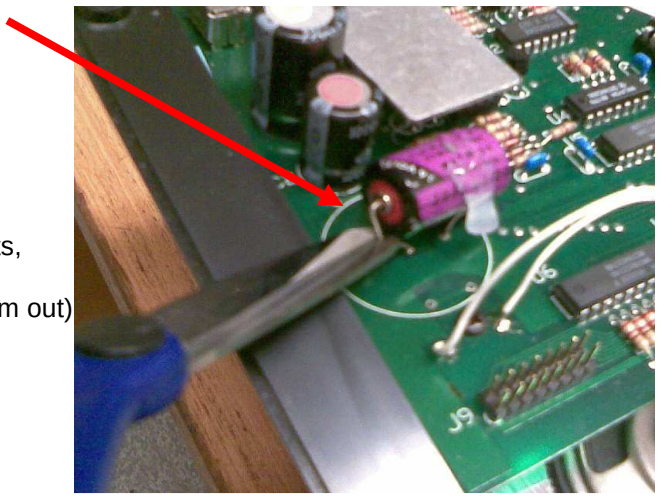
New SRAM chips BS62LV4006PC-70



1) Disconnect the **memory battery** by cutting the **+** wire that is soldered to the board. You can connect it later simply by soldering the cut wire back together. Make sure your valuable sequences are saved to disk or computer as you will lose the memory when this is done.

2) Locate the 2 **RAM chips** on the MMT8 circuit board and put a **mark on the circuit board** with a felt tip pen where the location of **pin 1** is for each chip, so you can remember which way they go in (check the pin diagram of the old chip above).

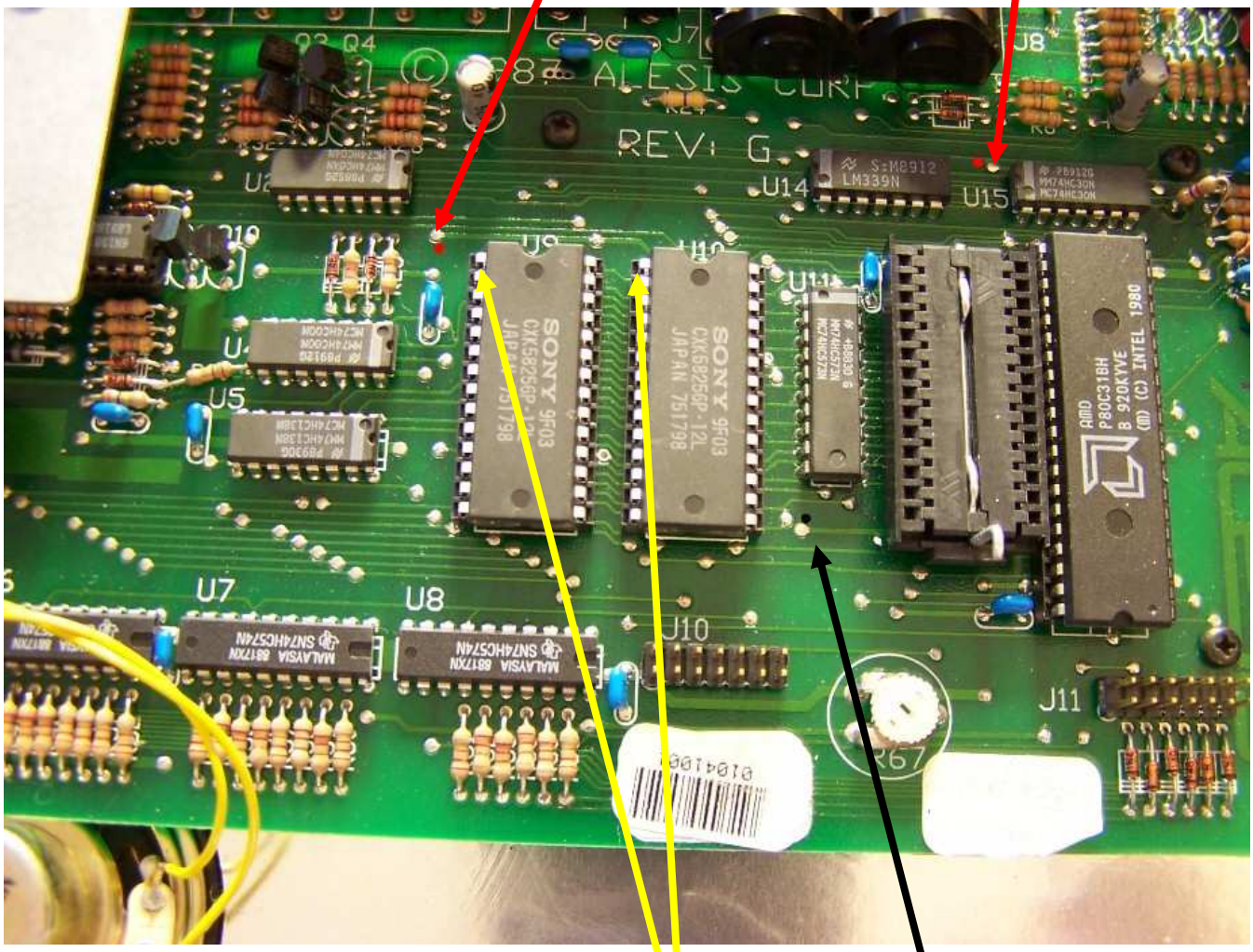
3) **Remove** the old **RAM** chips (they should already in sockets, just carefully pull them out, and leave the sockets in place. You may need a small flat headed screwdriver to prize them out)



The power supply points to the memory chips: Grey MMT8's

+5V Vcc chip Power Supply point

Encoder switch power supply point



Ground point

SRAM memory chips, pin 1 (the top LHS pin)

4) **Study the circuit board photo above**. This is the **grey MMT8 circuit board** (the **black MMT8** is different, so download the specific guide for it if you have a **black MMT8**).

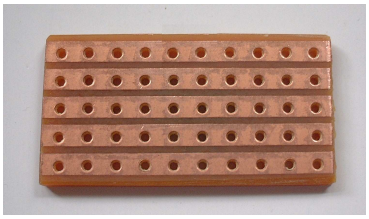
   You will see a red arrow pointing to a **solder blob** on the board next to the memory chips. This is a convenient **+5V power supply point** for the new memory chips. Mark it with a red marker. In the new RAM chips, pin 32 is the **+5V power supply pin (Vcc),** which this point will connect to when we install the chips.

   The other point marked with a red arrow is the **encoder switch power supply point**. We will mention this later.

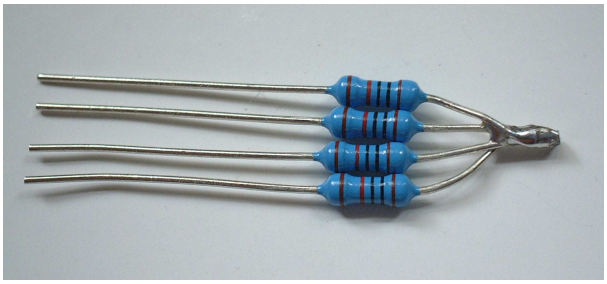
   The **ground point** for the expansion is marked with the **black arrow.**

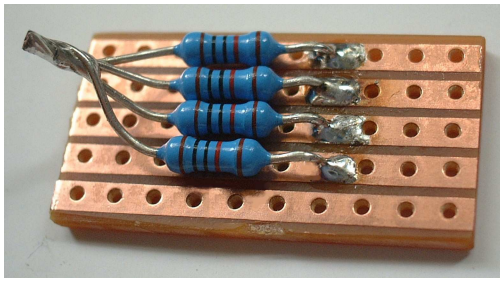
Making the Encoder board

1) Cut a piece of **veroboard strip** to the size shown below:



2) Take 4x **10k resistors** and solder one end of them together. Solder the other loose ends to the veroboard in the position on the board as shown below:



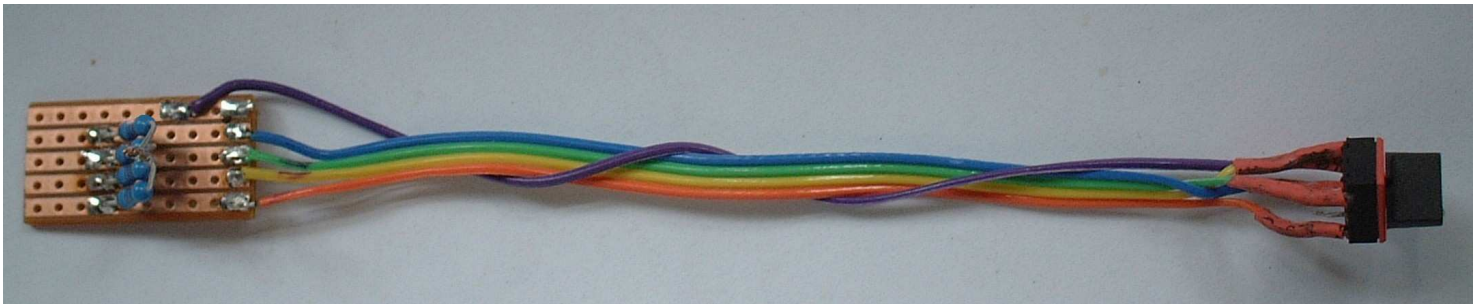


3) Take a 9" length of **rainbow cable** and peel out a section of the colours **blue**-**green**-**yellow**-**orange**. Solder one end of these wires to the veroboard as shown below. Solder the other ends to the rotary encoder terminals. It will have its terminals marked with the numbers **1**, **2**, **4** and **8**, and also 2 middle ones marked "**C**".

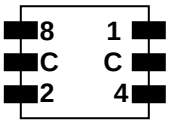
The **blue** wire should go to the terminal marked "**1**".
The **green** wire should go to the terminal marked "**2**".
The **yellow** wire should go to the terminal marked "**4**".
The **orange** wire should go to the terminal marked "**8**".

Solder a **purple** wire to one of the encoder terminals marked "**C**" (it doesn't matter which one).

Use **heat shrink insulation tubing** to cover all the bare soldered terminals of the encoder.



4-bit Rotary Encoder (underside view)

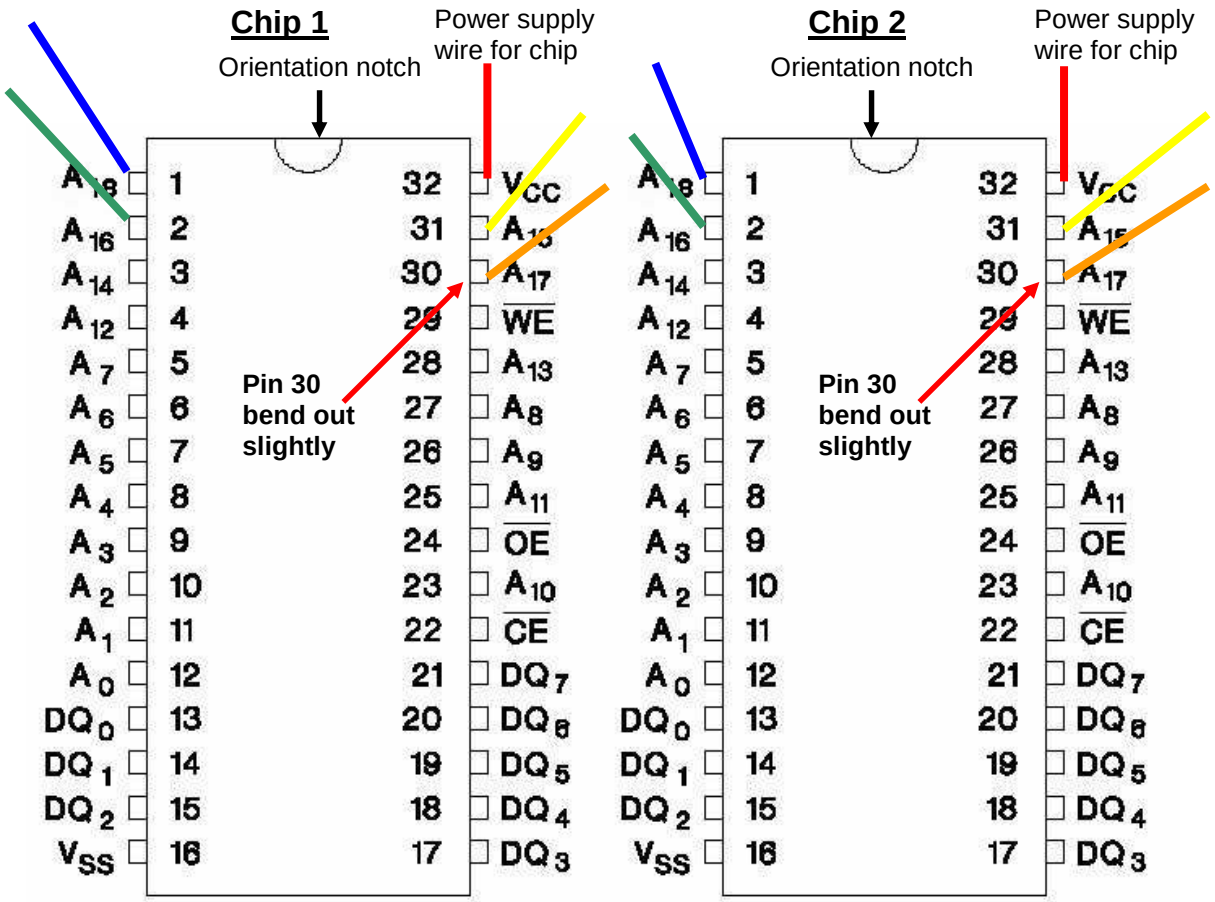


Wiring up the memory chips

The **new memory chips** will most likely be shipped mounted on a piece of **anti-static foam rubber**. Pull each chip out from the foam and put them back in it with the 6 top pins **hanging over one of the edges** of the foam, so they are exposed. The top end of the chip is marked by a **notch** in the end of the chip.

1) Solder 3" lengths of **blue, green, yellow, orange and red** wires to the **top of the shoulders** of each chip as shown below. Both chips should be wired identically. The **red** wires are the **power supply wires** for the chips, and go to **pin 32** of each chip.

2) Bend out **pin 30** slightly at an angle from vertical on each chip. When we insert the chips in the board sockets, we want this pin to **NOT** go into the socket hole, but instead be on the **outside** of the socket.



Installing the chips

Study the photo below to see how the chips should look like when installed. Apply a small strip of insulation tape to the circuit board to insulate the board from the chip pins as shown.

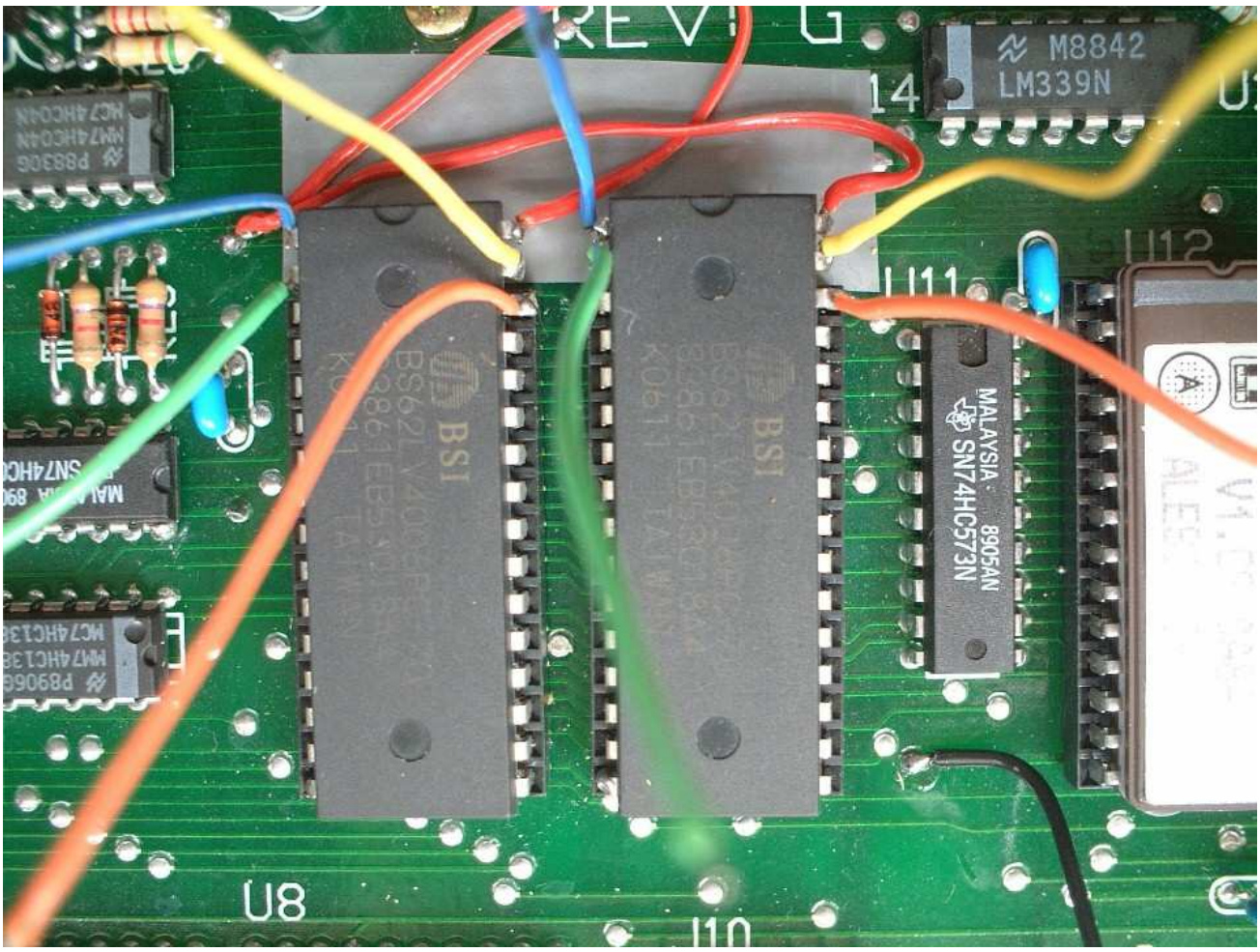
3) Bend the rows of chip pins slightly **inward** to get them to fit in the socket holes. This is best achieved by placing the chip on a table on its side and rolling the chip over slightly while pressing down on it. Do this to both sides of the chip. Make sure **pin 30** of each chip is **bent back out at an angle** compared to the other chips.

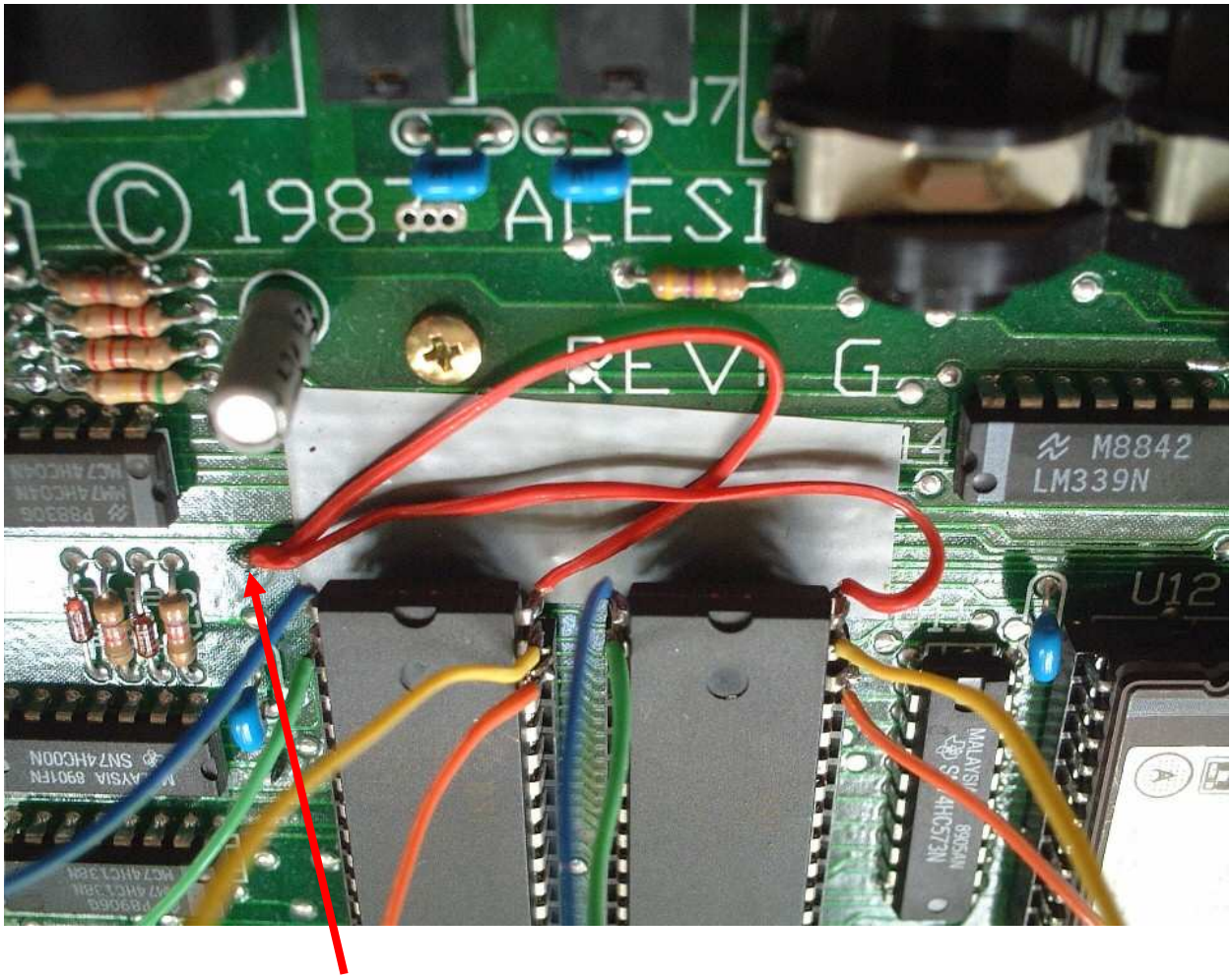
4) Now **rest the chips on the sockets**, taking care to insert them the **right way around -** look at the new chip diagram above to locate **pin 1** - if the chip is sitting correctly, this should then be near the mark you put on the board where **pin 1** was on the old chips, but slightly higher. Also, the **orientation notch** at the top of the chip should be facing upward. The chips should have the **4 top pins** on each chip **overhanging** the socket.

   Once aligned, **press down firmly** on each chip. You should feel the chips move down in the socket. Check that each has properly contacted the socket top and that there are no significant gaps.

   When inserted in the sockets, the 2 chips should have the pins 1, 2, 31 and 32 **overhanging the socket**, with nothing underneath. **Pin 30 (A17) should be on the outside of the socket, not going into the socket hole**.

   The photo below shows how the chips should look when they are in their sockets correctly:

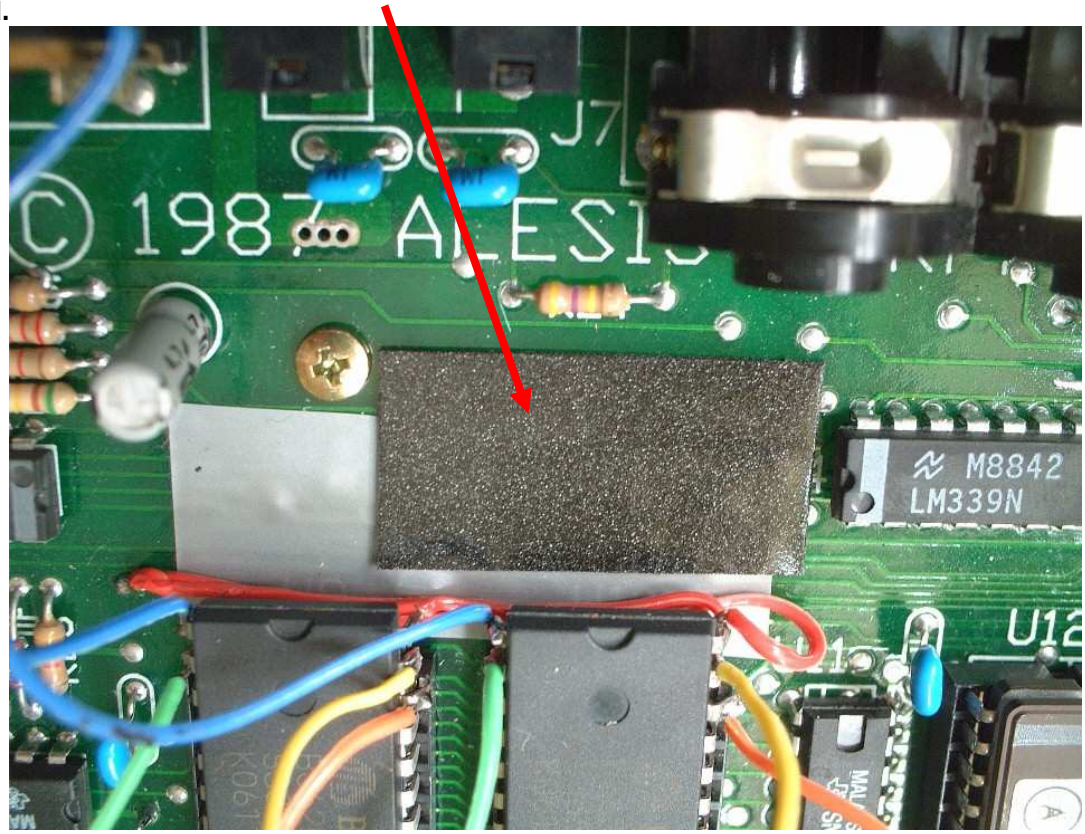




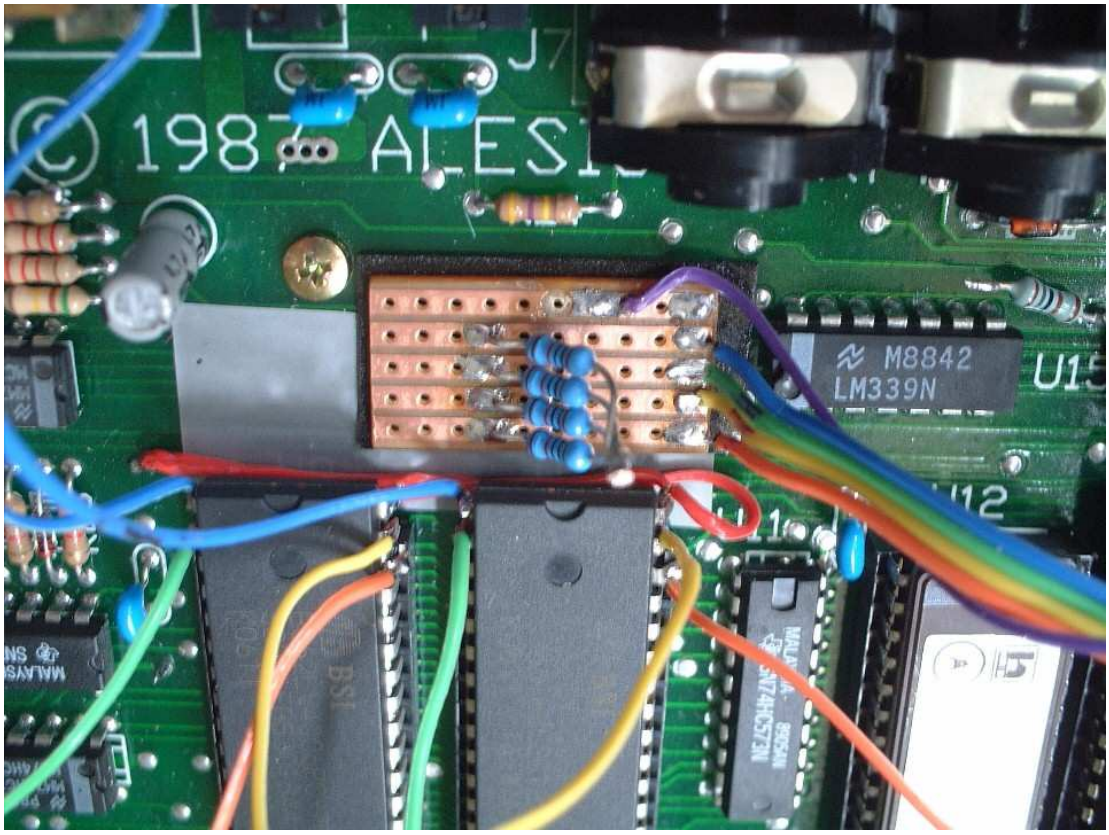
5) Solder the **2 red wires** attached to each chip's **pin 32** to the **solder blob** on the **circuit board** shown above. Look at the photo of the board near the beginning of this guide for its general location. This point provides **power to the chips** and also the **battery backup power** to them when the machine is switched off. This is essential otherwise the machine will lose its memory each time you switch it off. After soldering, tuck these wires under the chips to keep them out of the way.

Mounting the encoder board

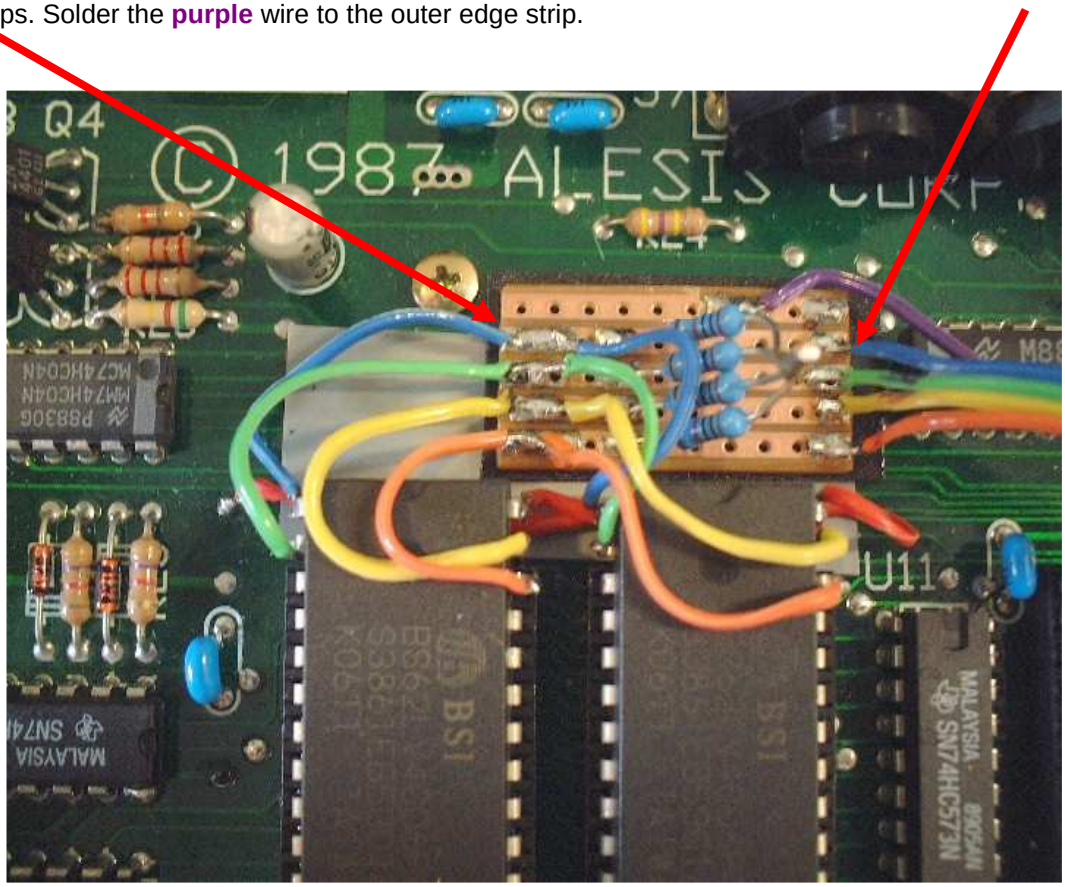
1) Place a small strip of **double sided sticky tape** on the circuit board just above the chips to mount the **encoder board.**



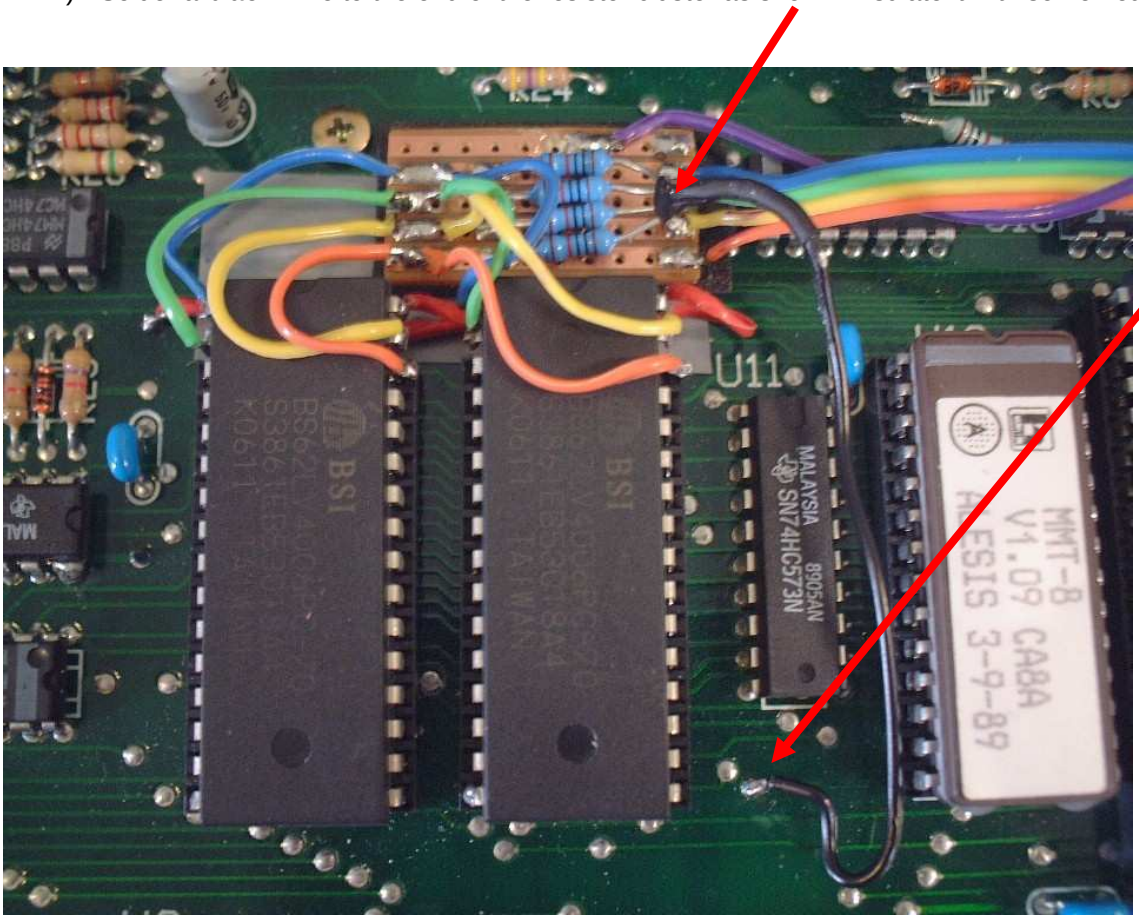
2) Place the **encoder board** on the sticky mounting tape and press it down to fasten it:



3) Now solder each pair of **coloured wires** from the chip pins to the **encoder board**. Solder them in the coloured order as shown. The same coloured wire from the encoder should be in line with the same coloured wires from the chips. Solder the **purple** wire to the outer edge strip.



4) Solder a **black wire** to the end of the resistor cluster as shown. Insulate it with some heat shrink tubing.

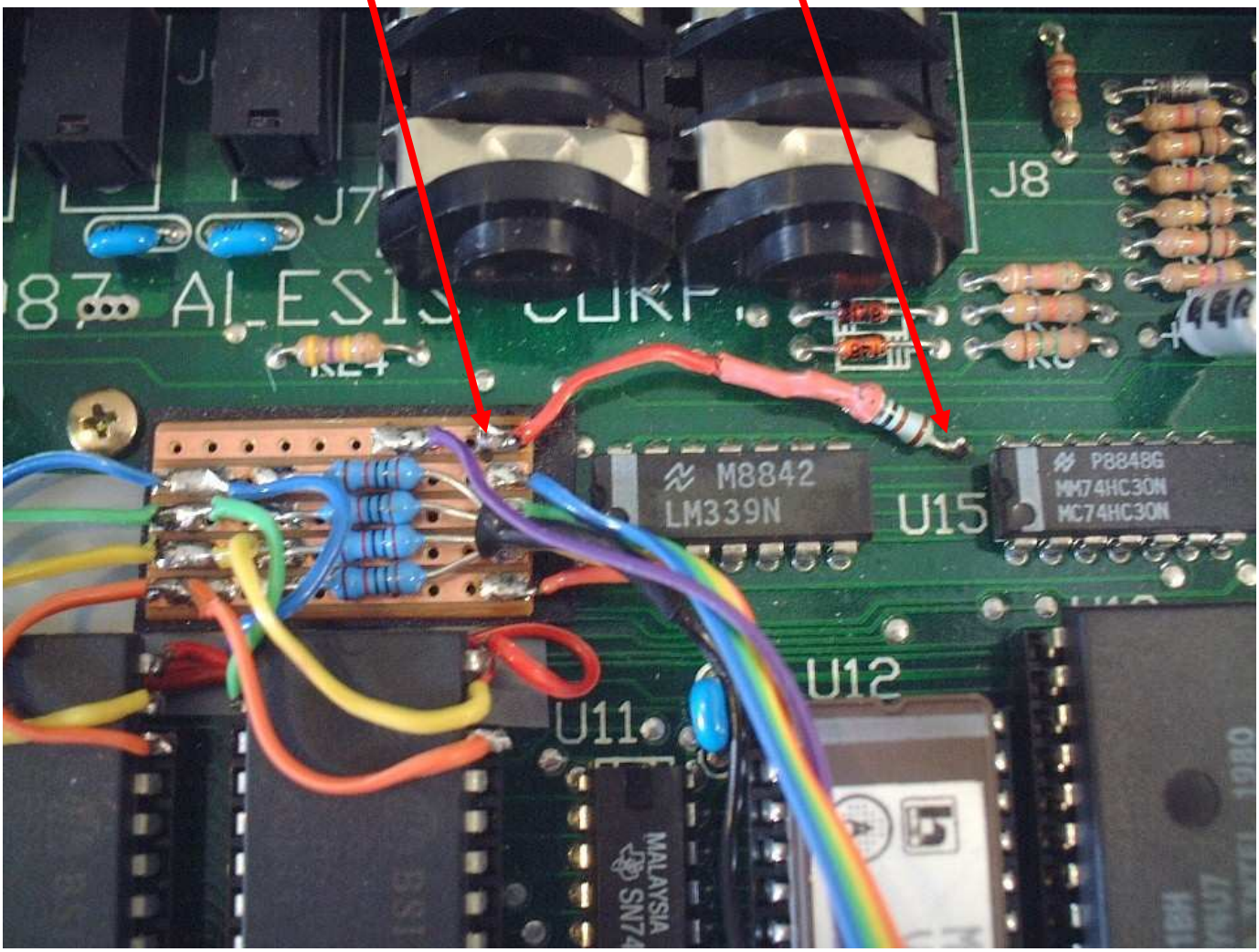


Solder the other end of this wire to the **ground point** on the board here:

The Encoder power supply

1) Solder a **1k resistor** to the solder point on the board below.
   Solder a **red wire** to the other end of it. Insulate the resistor as much as possible with heat shrink tubing.

   Solder the **red wire** to the **copper track** on the **encoder board** as shown. It solders to the same track as the **purple** wire.



Congratulations! You've finished it!!

Testing the memory expansion and formatting (initializing) the memory

1) **Reconnect your memory battery**. Solder the cut leg back together.

2) Loosely put the casing back on after **reconnecting** the top casing **ribbon connector cables and plugs** to the connectors on the circuit board. **Dangle** the rotary encoder out of the casing for testing. When you are sure everything is working, you can tidy it up by mounting the encoder somewhere convenient on the front panel, with the wires going through a small hole in the casing somewhere.
Alternatively, you can swap it later for the neat **pushbutton wheel type** encoder mentioned in the parts list. If you use that one, you just cut a small rectangle hole in the casing and it pushes through from the front and mounts neatly and flush with the surface.

3) **Turn the rotary encoder to position "0".** This is the **first** memory position.

   Connect the power supply to the MMT8 and do an **initialization** (formatting) of the machine to clear the memory – press and hold the **ERASE, PAGE UP, and PAGE DOWN** buttons when turning on the **power** while **holding** these buttons down for 3 seconds. This will initialize and erase the memory and ensure there is no random data in it.

   Plug the MMT8 into a MIDI synth, and try recording a **part**. Record a few parts make a few simple, quick songs.

4) **Switch the machine off, and then back on again**.
It should still have remembered your test recordings. If not, check that you have reconnected your memory battery properly, and that the solder connection is good. Also, check that you have connected the red power wire on the circuit board to **both chip's pin 32.**

5) Switch the machine off, and turn the encoder to **position "1",** which is the **2nd** memory position. Initialize the memory, repeat the procedure, record some tracks. Switch it off. Repeat for the other memory positions.

   When you get to encoder position **"15"**, this is the final **16th** memory. If you now keep turning the encoder (it can turn continuously around and around) to position "0", it starts it from scratch again at memory 1, then 2, 3, 4 etc.

   Once your machine is working well, you can record away. Mount the encoder somewhere on the casing and put the machine back together. As mentioned, If you get the better **pushbutton encoder** mentioned in the parts list, all you have to do is cut a small rectangle hole in the casing and it fits in it neatly and securely.

The memories in use

The general best practice is to switch the machine off before changing the memory position.

If you **change the memory position** and then hit play **without powering down**, the machine will freak out and crash.

However, I have found that you **CAN** change memory positions without powering down **IF** you don't hit play, but instead, scroll up to the next part which has something in it, and then scroll back to the original one it was on. Now if you hit play, it will play ok.

If you change the memory position and there is **absolutely nothing** in the memory bank you change to and you **haven't initialized** that memory, it will freeze. But if each empty memory **has been initialized** first, as in the testing procedure, then this won't happen at all, and you'll be ok.

So, in summary, if you want to **change memory positions without powering down**, do the **initialize** steps for each memory position **once** to ensure each memory has been formatted, and it will be ok.

Disclaimer

No responsibility will be taken by me for any damage done as direct or indirect result of this modification. Do it at your own risk. Protect your equipment from static by wearing an earthed antistatic wrist band when handling the chips or circuit board.

Graham Meredith 2006 Revised 13th January 2009