

# MMT8 DC battery power mod

By Graham Meredith 2007

This modification enables you to run the MMT8 from a **DC 12V power pack**, which is much more common and available than the **AC 9V power pack** that normally powers the MMT8. It also then enables you to run it off **rechargeable AA batteries!**

This particular version of the modification for the **earlier model** grey MMT8's that have the **old style** power jack, which use a **mini phone jack** as shown below:



The later version board has this connector.

**The mod is similar for the later grey models which have this jack**

The mod will work for both variants. **In fact, the MMT8 will actually work of DC voltage already** – if you plug in a DC 12V 500mA plug pack into it, with the centre pin as the + positive and the outer ring as the – negative, it will run happily!

An example of this plug pack type is with Yamaha equipment – they all use outer ring neg, inner pin +. Examples are Yamaha QY series sequencers power supplies, Yamaha guitar pedals/FX power supplies. But any type will do, so long as it's 12V DC, 500mA or more, and the polarity as I have mentioned. If you use a power supply less than 12V, the MMT8 will lock up and crash a lot. So use 12V DC.

This modification enables you to install rechargeable AA NI-MH batteries internally and charge them from an extra socket installed in the casing.

## **Parts needed**

Black insulated wire, ----- 1 metre  
Red insulated wire, ----- 1 metre  
9V DC, 500mA plug pack, with the outer ring on the plug positive

Rechargeable batteries, AA size, 2000mA, Ni-MH ----- 8x



DC power jack, 2.1mm pin ----- 1x



Battery holders, AA x4 battery ----- 2x



Power diode, IN5404 or similar ----- 1x

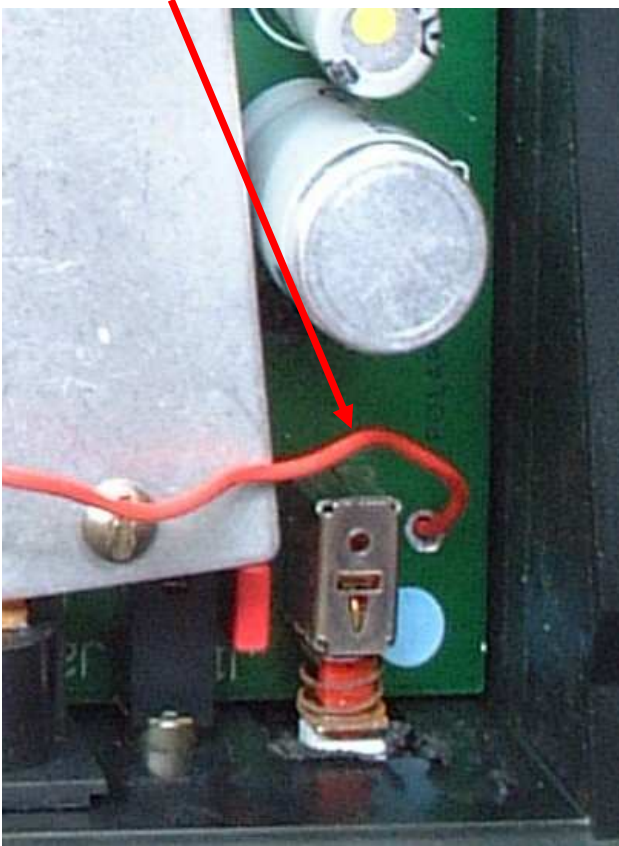


## **Equipment needed**

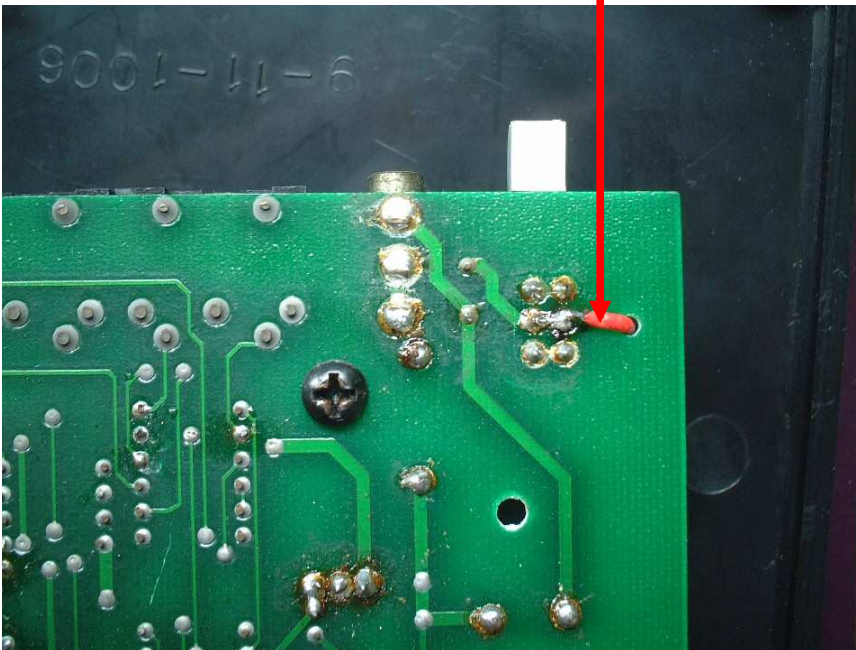
Soldering iron  
Solder  
Drill and drill bits  
Pliers  
Multimeter

## Procedure

1. Open the casing of the **MMT8**. Disconnect the **ribbon connector cables** inside, noting their orientation and place.
2. Drill a hole in the circuit board near the **power switch**, large enough to fit a piece of insulated wire through. Clean up the inside of the hole to remove sharp edges, to prevent it cutting the wire insulation when fitted. Pass a 30cm piece of **red wire** through the hole:

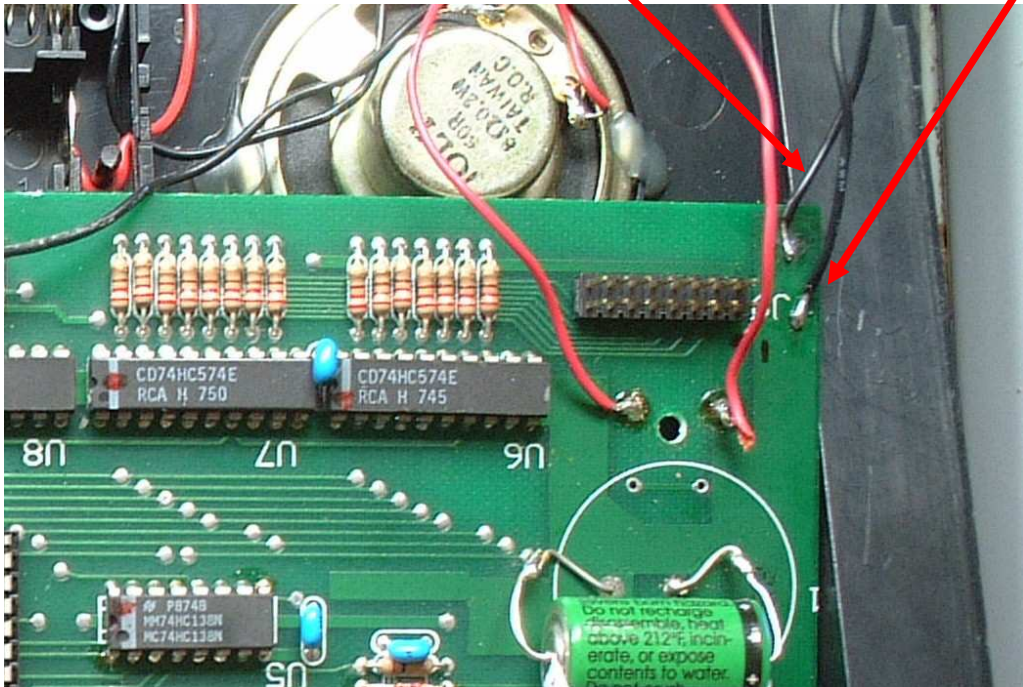


3. Solder one end of the **red wire** to the place on the track side of the circuit board shown, which is to the **power switch**:

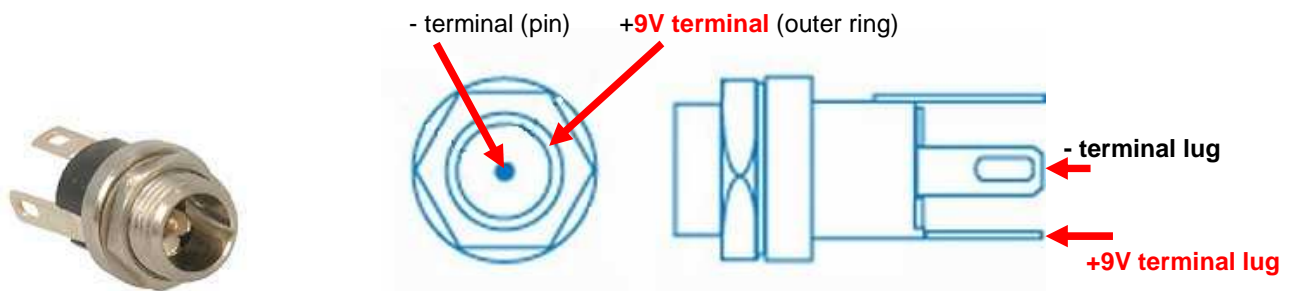


- Take a 30cm piece of **black wire**. Solder one end of the wire to the **MMT8 circuit board** shown below. You will need to scratch away the green insulation coating on the board to expose the copper track first.

Solder one of the **black wires** from one of the battery cases to the same part of the circuit track, in a similar way.

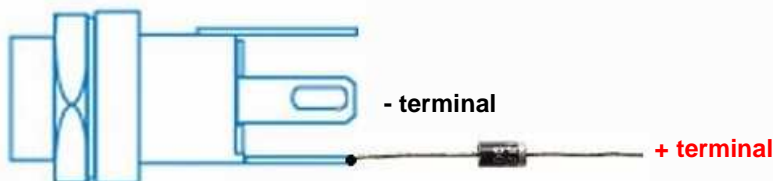


- Check that the new 9V DC plug pack you will be using has its **polarity** correctly set. Using a **multimeter**, connect the **red multimeter probe** to the outer ring terminal of the plug pack's DC output plug. Put the **black probe** inside the negative terminal hole of its plug. Set the multimeter to **DC volts**, and connect the plug pack to the mains power and switch it on. **The meter should read somewhere around +11 to +12 volts DC**, when not powering anything. Make sure that it doesn't read **-11 or -12V**. If it does, change its DC plug position, or cut and reverse the wires in the plug pack cable near the DC output plug. When it is correct, move on to step 6.
- Obtain a **DC power socket**. Connect the **9V DC** plug pack to the socket and switch the plug pack on. With a multimeter, determine which terminal lug is the **+9V terminal**, and also which one is the **negative terminal**. Label them for reference. They will probably be like the diagram below:

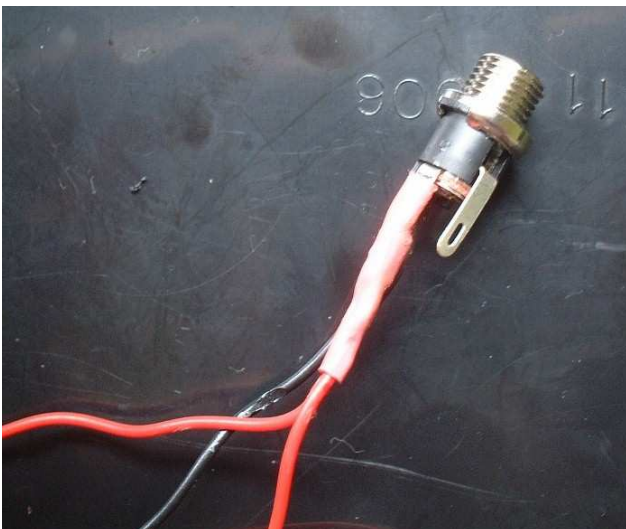
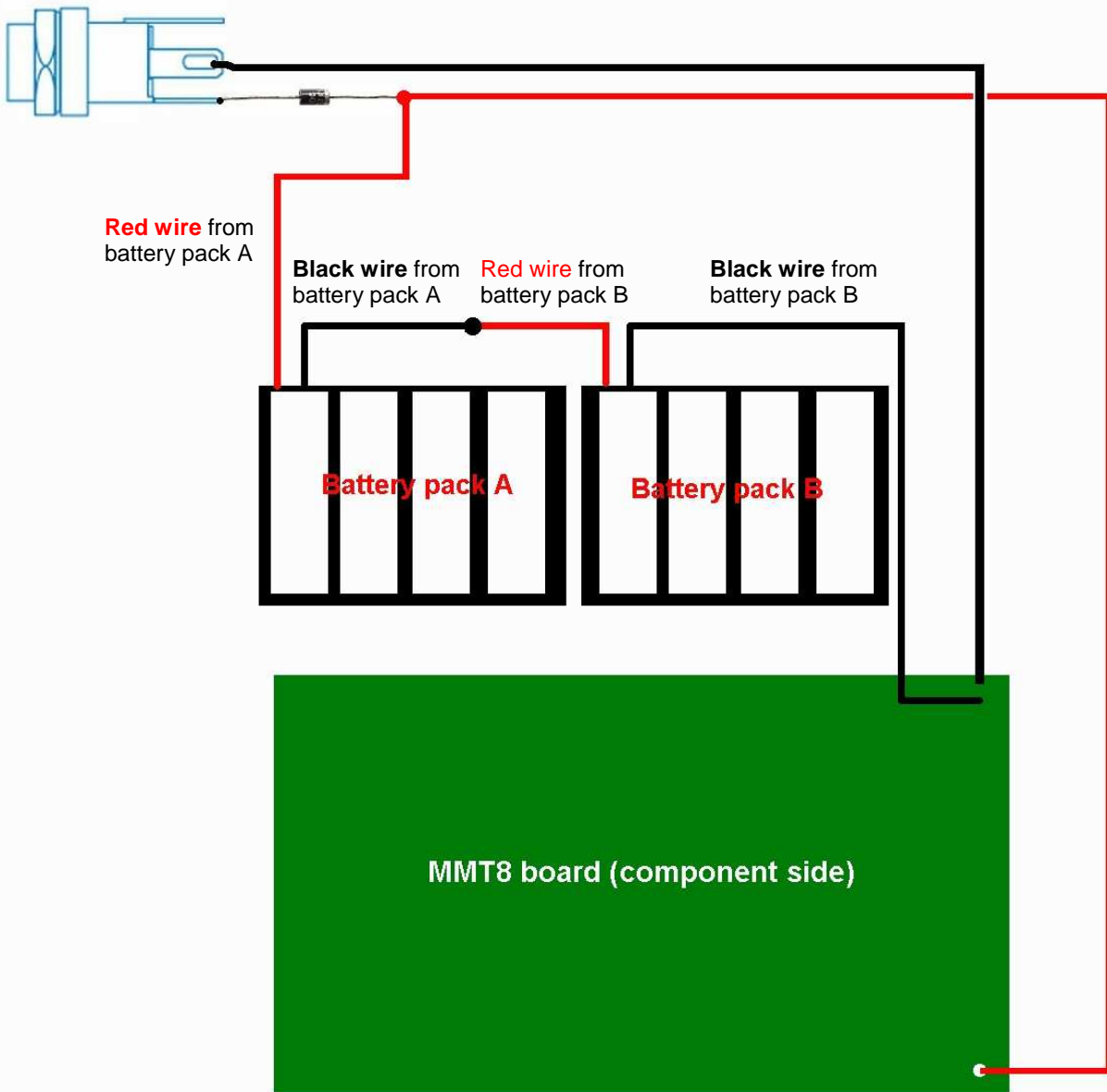


When they are marked, switch off the plug pack and disconnect it from the socket.

- Solder the power diode to the **+9V terminal lug** of the power jack. Make sure that the diode is connected the right way: the **silver stripe** at one end of the diode should face **AWAY** from the power jack **+ lug**.



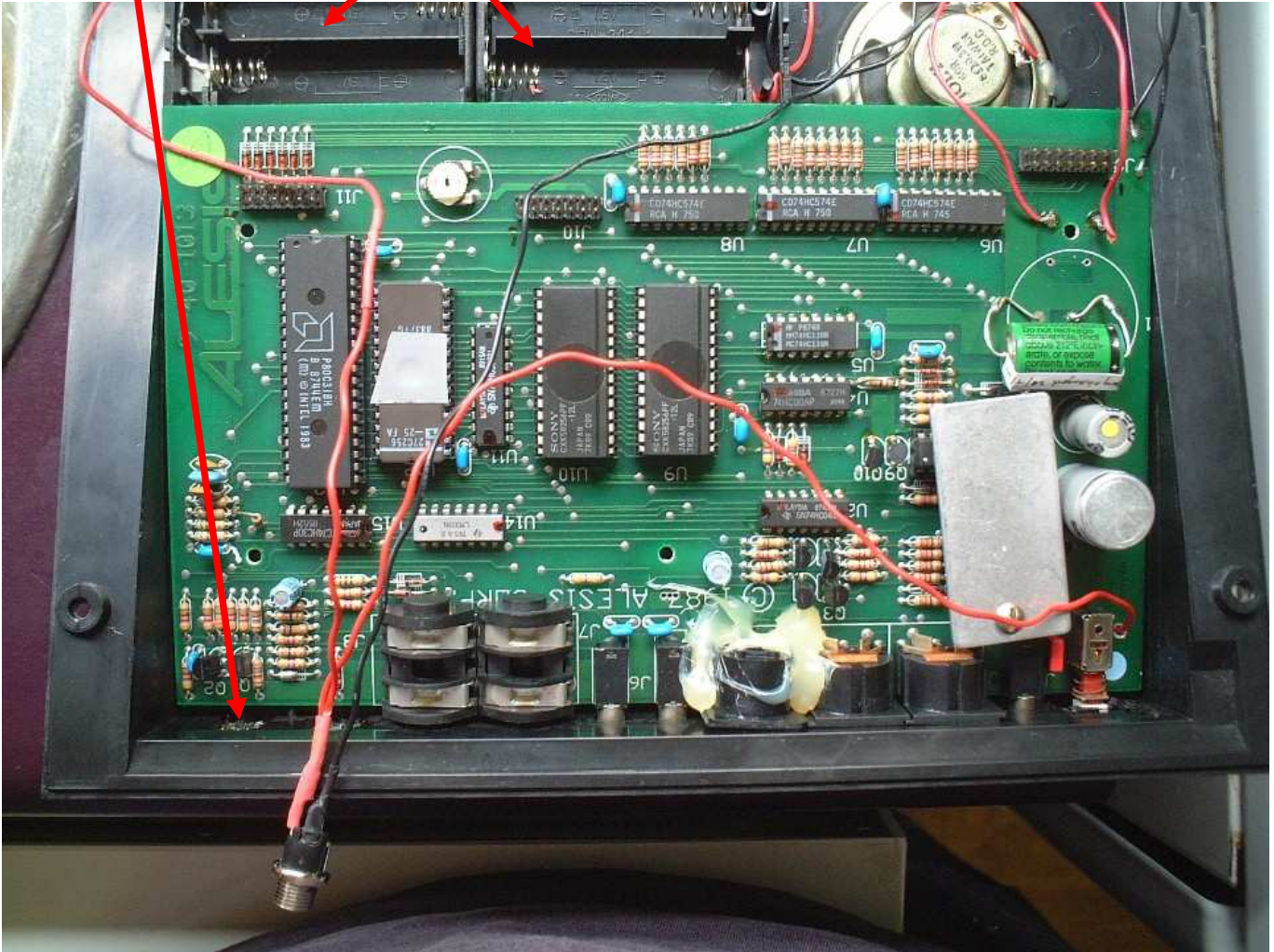
8. Wire up the connector and battery packs as shown below:



Cover the terminal lugs of the power jack with insulation tape to prevent them from shorting out

9. Drill a hole in the back panel of the MMT8 to fit the power socket. Mount it in the hole.

Mount the **battery cases** with double sided sticky tape as shown here, as close to the board as possible, otherwise the MMT8 casing won't close properly.



10. Reassemble the MMT8, connect the **ribbon cables and connectors**, but leave the casing apart for testing.

**Don't put any batteries in it yet.**

## Testing the setup

\*\*\*\* Do not install batteries at this stage, first test the MMT8 on a DC power pack to ensure the wiring \*\*\*\* is correct. If you have the wiring the wrong way around and have the batteries installed the batteries may explode or leak when the plug pack is connected!!

1. Make sure the **MMT8 power switch** is in the **OFF** position. Plug the **new 9V DC plug pack** into the MMT8's **new power socket**. Switch the plug pack on, but don't switch the MMT8 on just yet.

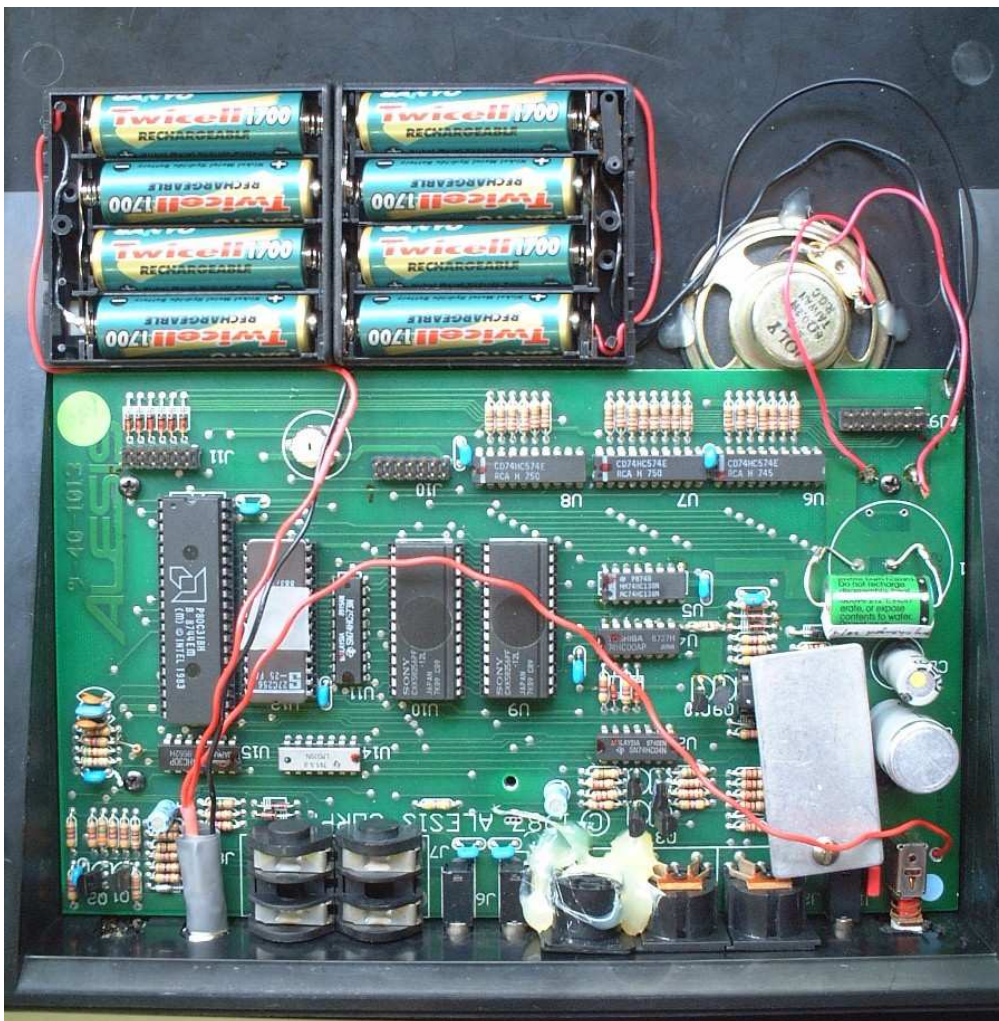
Put the **red multimeter probe** on the first battery case's **+ terminal**, the one that the battery case **red wire** goes directly to, where the first battery makes contact in the case. Put the **black probe** on the solder joint connecting the **black wire** to the MMT8 board. The multimeter should read about **+11 to 12V DC**. If it reads **-11 to -12V**, recheck the socket wiring.

2. If the voltage polarity is ok, switch the MMT8 on. It should power up as normal. Congratulations!

If it doesn't, disconnect the new plug pack from the MMT8. Plug in the **old plug pack** in to the **old power socket** (the mini jack socket) and switch it on. It should power up. If not, check that **the ribbon cables** connecting the display are plugged in to their correct connectors on the circuit board, and that they are around the right way.

Once you have confirmed that the MMT8 is running properly on the new DC plug pack, switch everything off, and **install the rechargeable batteries** as shown. Switch the DC plug pack on, and charge the batteries. It may take a good 24 hours to charge new batteries, depending on their size. After a reasonable amount of charging time, disconnect the plug pack from the MMT8. Switch the MMT8 on, and enjoy battery power!!

You can also **use the MMT8** from the plug pack **while the batteries are charging**.



After testing everything, Put the MMT8 back together. Enjoy!

**Note – Although you can still operate the MMT8 with its old AC 9V plug pack, it is not advised while there are batteries in the MMT8. The AC voltage may have undesirable effects on the life of the rechargeable batteries, and may cause them to leak or rupture, or cause inadequate charging.**

**My advice is to completely seal up the old AC 9V socket on the MMT8 with a cover, so you never make a mistake accidentally, and then toss the old AC plug pack away. You won't want to use it after using DC and battery power anyway!**

**WARNING – do not use normal, NON-RECHARGEABLE alkaline batteries in the MMT8. The plug pack will try to recharge them, and they will rupture or even explode!!!**

**Only use rechargeable Ni-Cd or Ni-MH rechargeable batteries.**

Cheers, Graham

#### **OPTIONAL EXTRA**

You can install a **switch** disconnecting the battery pack if you so wish. You may find it useful for various reasons – such as being able to use the MMT8 from the plug pack, but not overcharge the batteries, if they are fully charged, or if you **MUST** use non-rechargeable alkaline batteries in an emergency. Just put a SPST toggle switch where the 2 battery packs connect – at the red/black wire join.