Install a Clock Doubler Board in M100

December 2023

Version 1

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Bitchin100 5MHz Upgrade

Change record

Version	Comment
1	Initial document, based on V4.4 PCB

Note: V4.6 PCB is the latest design. I will post an update.

Overview

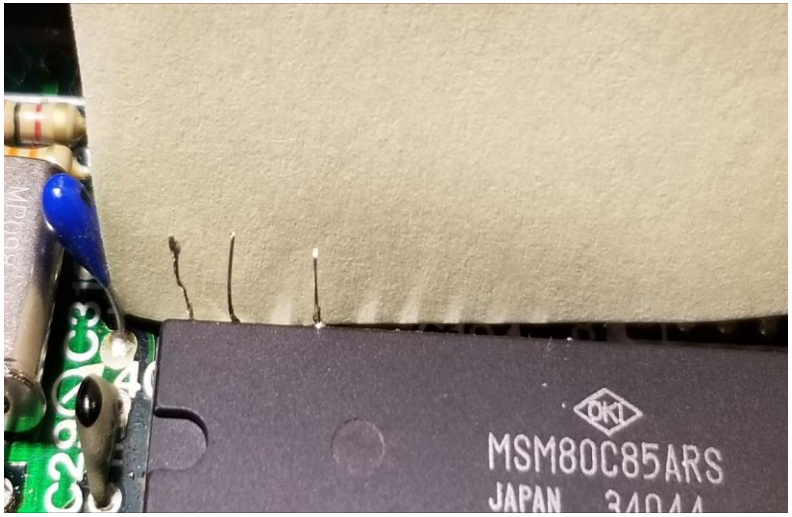
Goal: Installation of the clock doubler board in the M100.

How:

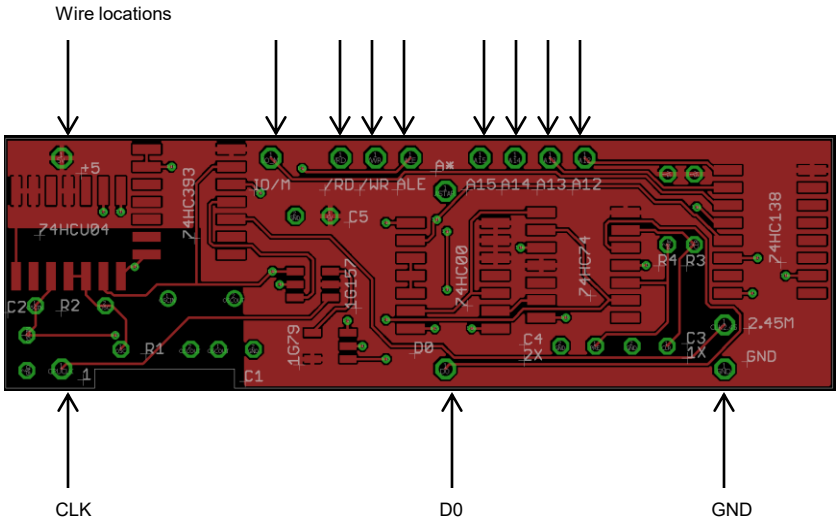
- piggybacking the clock doubler on the CPU
- modifying the PCB slightly to accept the new clock signal
- modifying the PCB slightly to accept the new A* signal
- if necessary, installation of a faster EPROM based Main ROM

Note: The 80C85, 81C55 were not rated for 5MHz. While it appears to tolerate 5MHz operation, this is OVERCLOCKING beyond datasheet support.

Prepare CPU to piggy back the Clock Doubler

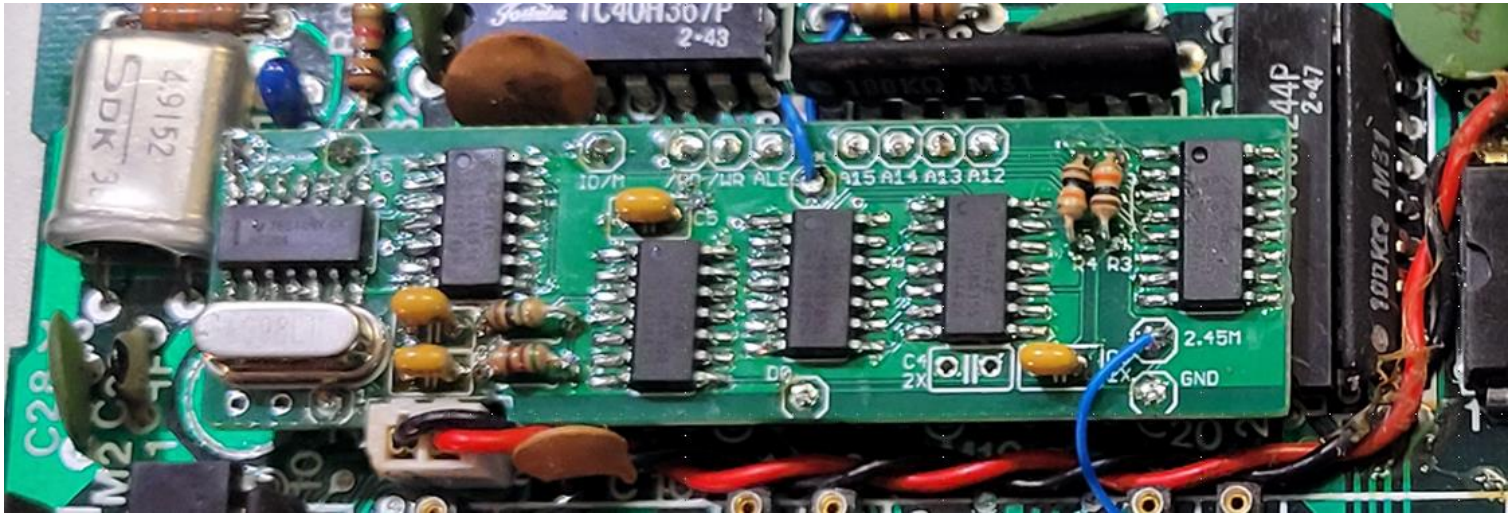


The clock doubler board gets connected on top of the CPU. Solder short wires to the required locations, to provide the needed signals.



12 wires are needed.

Install Clock Doubler



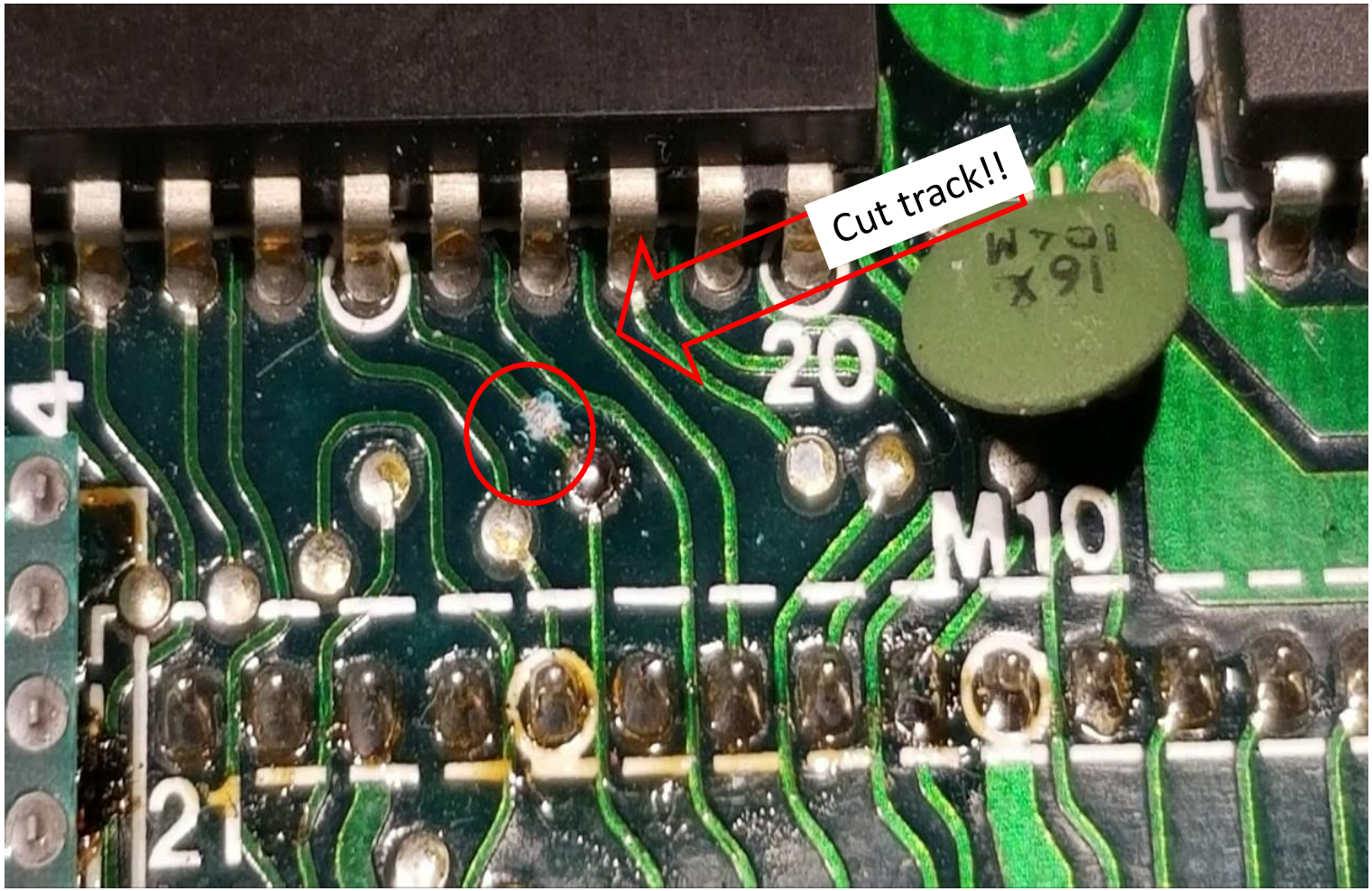
Mount the PCB on the CPU by feeding each wire through the related via.

Once it is well seated, solder each wire and trim.

It should look like this.

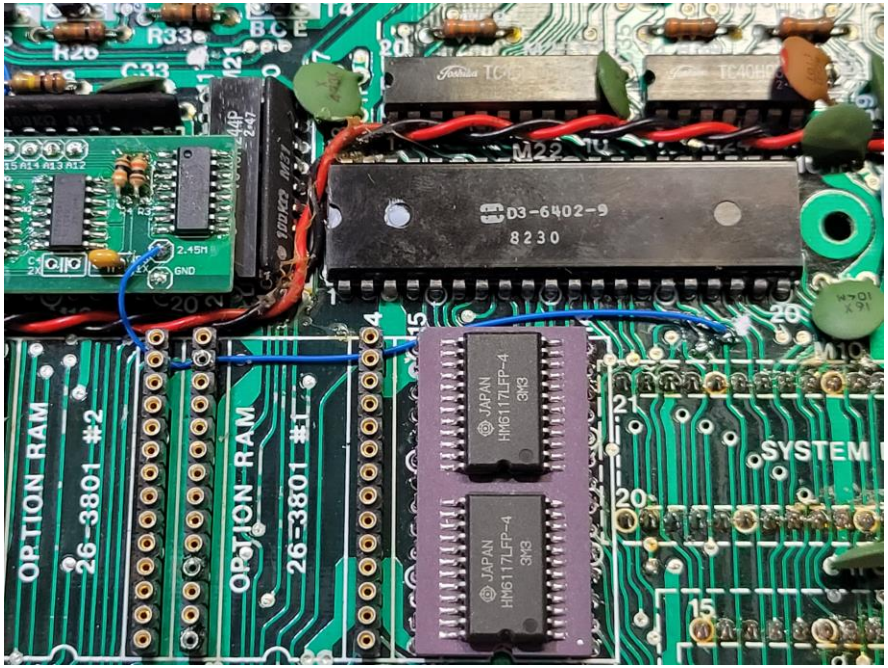
(ignore the blue wires, that’s the next step.

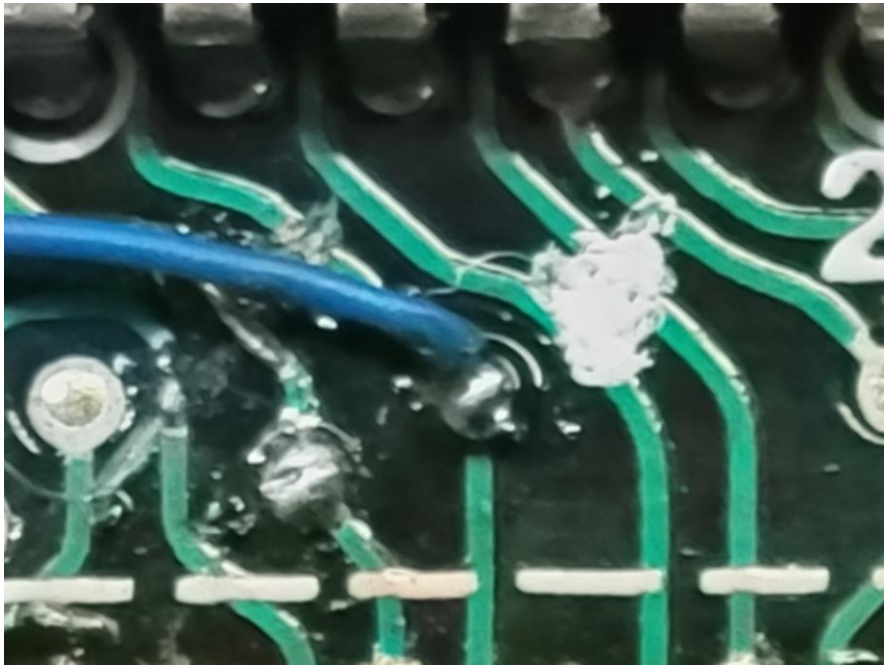
Clock circuit: Cut the clock track at location



Cut track carefully as indicated, to isolate the clock fed from pin 37 of the CPU. This is easily reversed with a single strap wire if needed.

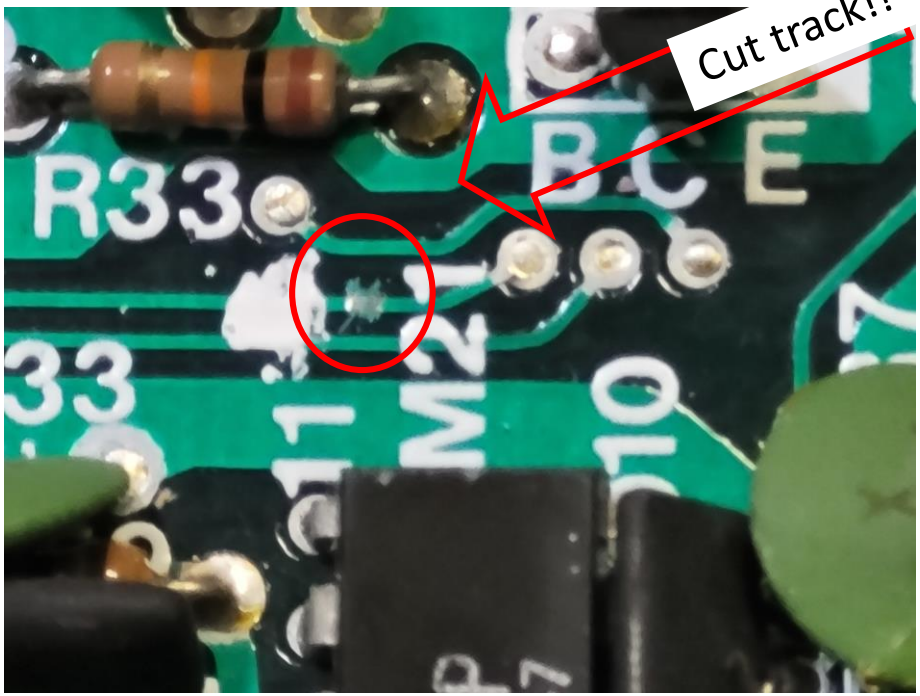
Clock circuit: Connect the new 2.45MHz clock to the PCB

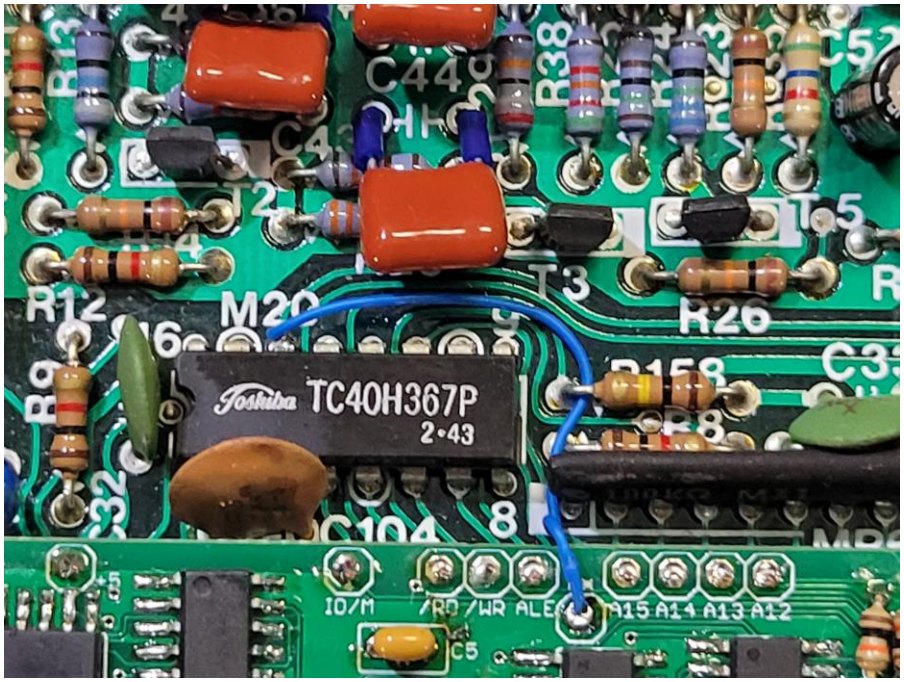




Solder a short wire from the 2.45M via on the Clock Doubler board, to the via on the M100 PCB as shown.

A* circuit: cut A* signal on M100 PCB



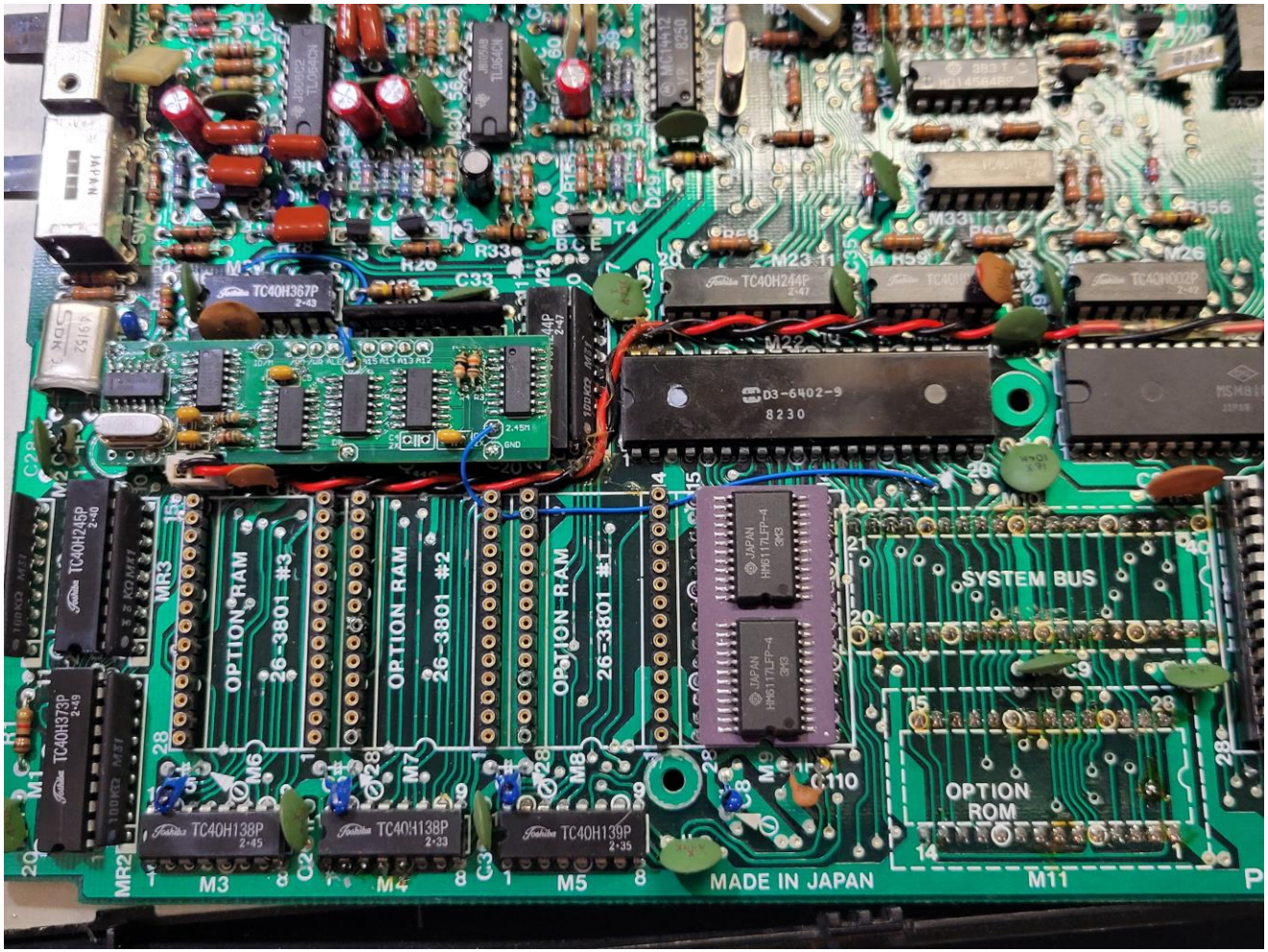


Cut track as indicated to disconnect the A* signal from the SRAM subsystem.

Connect a wire from the A* via on the Clock Doubler board, to pin 14 of M20 on the M100 PCB.

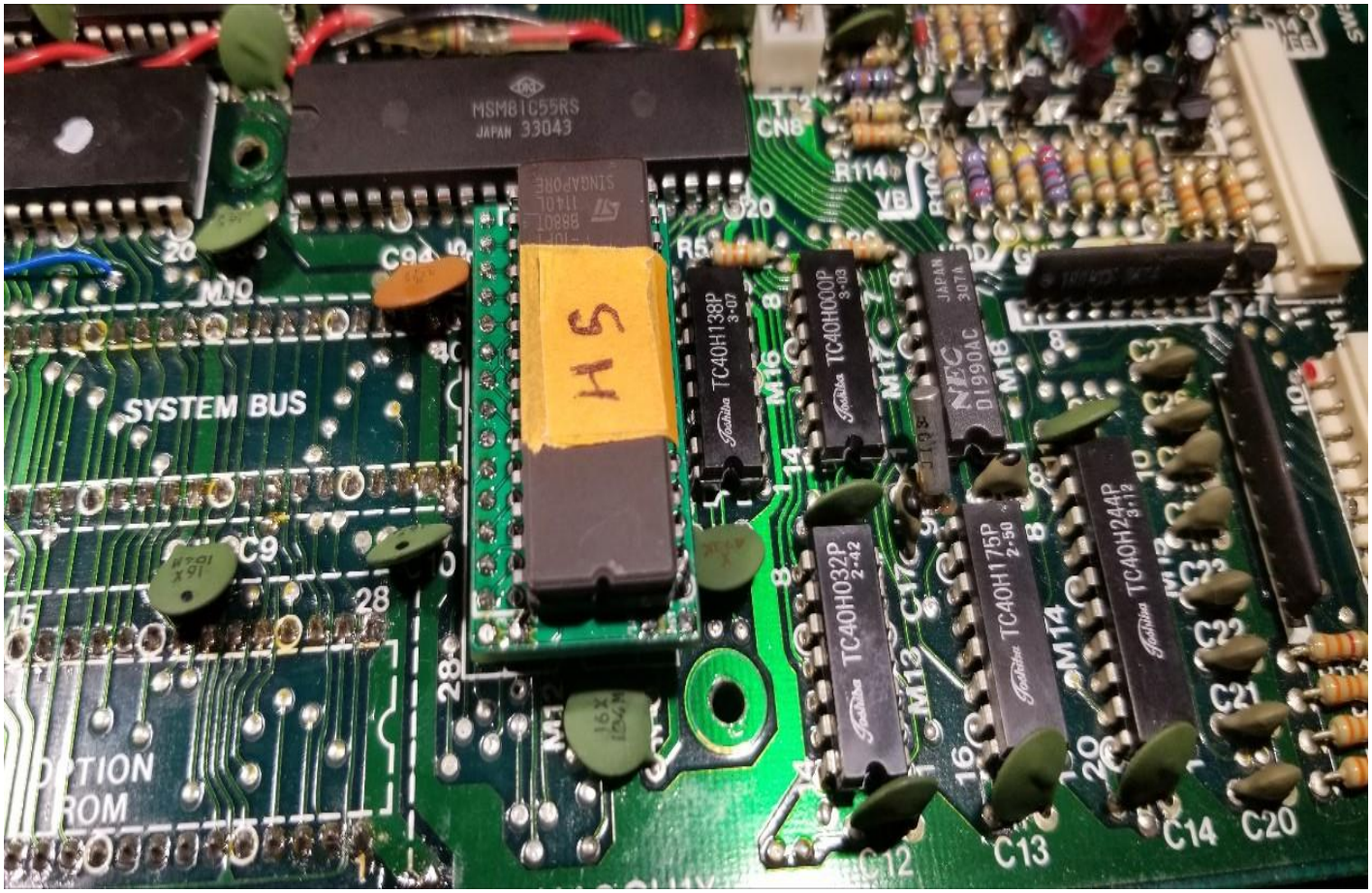
This provides the advanced RAM timing needed for 5MHz mode.

All done!



This is what it should look like (V4.4 board). Note the SRAM here is -4 meaning 200nsec, which needed the new A*

But wait! Maybe you need a faster Main ROM?



The stock M100 Main ROM may be too slow to run 5MHz. If so, you need to install an EPROM or other faster ROM solution. What's shown here is an adapter board and a standard 27C256 EPROM. Use 150 nsec or faster!

Finishing comments

- OUT85,1 for 5MHz, OUT85,0 for 2.5MHz
- this modification is easily reversed if needed.
- If you have any questions, don’t hesitate to ask!

Steve Adolph

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