

IN MAV'S WORKSHOP

FreHD AUTO BOOT EPROM PART 3: HOW TO INSTALL IT ON THE MODEL 4 G-A AND 4D

by

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In previous issues of TRS8Bit I've discussed how to install the FreHD Auto-boot Eeprom into a TRS-80 Model III and Model 4NGA (easy - just remove an old Rom chip and replace it with a newly programmed Eeprom), and a Model I (difficult - requires soldering, and a switch as well as 6 wires). This article explains how to add the FreHD auto boot Eeprom to a Model 4 Gate-Array computer (cat. no. 26-1068A or 26-1069A) or a Tandy Model 4D (cat. no. 26-1070). It's more difficult than adding the Eeprom to the Model III and 4NGA but less difficult than adding one to a Model I. Soldering is required so as I always say, if you are not confident in soldering, get someone else who is skilled to undertake this modification for you. Since no traces need to be cut the modification is easily reversible if things go wrong.

Items required:

Eeprom: 2764

Wires: Black (10cm long), Blue (10cm long), Orange (10cm long), Red (5cm long)

Firstly you need to program the Eeprom with this BIN file from the Downloads page on my web site:

<http://ianmav.customer.netspace.net.au/downloads/model4romgen2-BC.bin>

Once programmed you need to do the following work to prepare the Eeprom for installation in your computer:

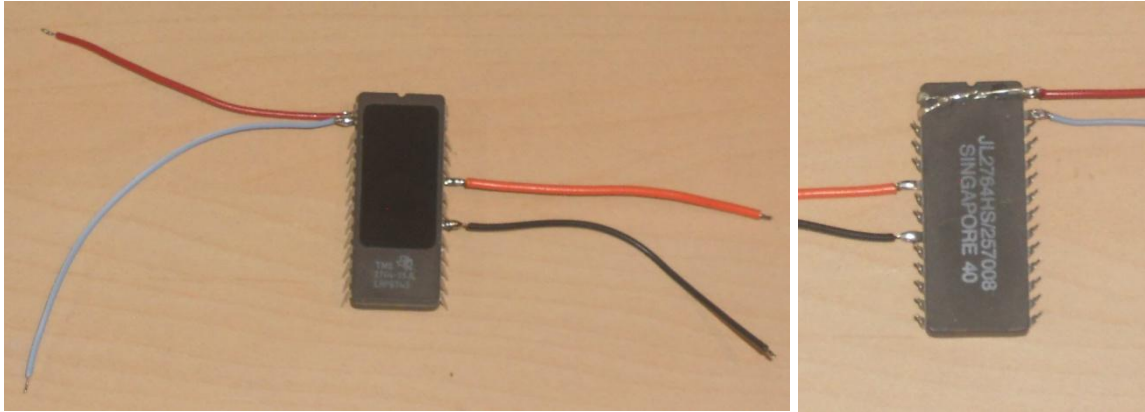
Bend out pin 2 and solder the blue wire to it.

Bend out pin 20 and solder the back wire to it.

Bend out pin 23 and solder the orange wire to it.

Bend pins 1, 27 and 28 under the chip and solder the red wire in a manner which connects all three.

It should look like this:



Pictures: top (L) and under (R) of the 2764 Eprom. Notice pins 1,27 and 28 are joined to the red wire.

If you haven't noticed yet, it will quickly become clear that we are replacing a 24-pin Rom with a 28-pin Eprom. We will be replacing U4, which is up in the top left corner of the motherboard. While it is possible to make this modification with the motherboard left in place, I prefer to remove it, which makes soldering the wires rather easier.



Picture: completed modification and motherboard ready to re-install in the computer.

Once U4 has been removed, the programmed and modified 2764 is inserted into the socket with the 4 pins at the front (pins 1,2,27,28) overhanging at the front. Make the following connections:

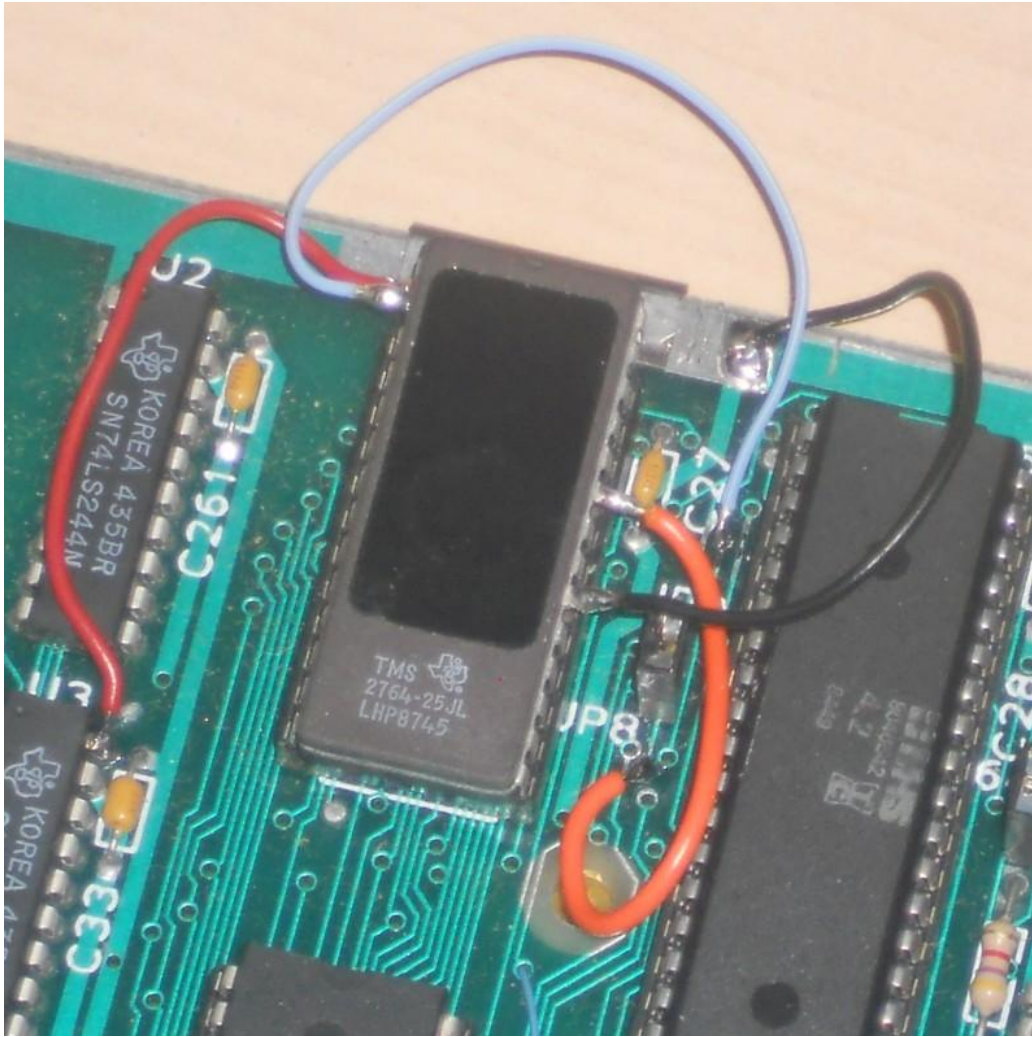
Solder the red wire U3 Pin 20 (this is the 5V source powering the Eprom)

Solder the black wire to the ground rail which runs across the top of the motherboard, near the clip which holds the RFI shield behind the motherboard. Note: the shield does not need to be removed.

Solder the orange wire to the pad directly below (and joined to) JP8*.

Solder the blue wire to the pad nearest the C in C29 silkscreen and directly above the 9 in JP9*.

* You may need to clean away some of the green mask covering the points needed to solder the orange and blue wires to. Also, I find it easier to remove U5 and the JP8 jumper when soldering these two wires. It should look like this:



Picture: shows the completed modification.

Here is a better close-up of the black, blue and orange wires from Dean Bear (thanks Dean) clearly shows where the wires need to go:



Picture: wire-routing close-up. (Photo courtesy of Dean Bear)

Re-assemble the motherboard back into your computer and test the system in the normal manner first to make sure it runs as a floppy-based system and boots properly. If everything seems right, connect your FreHD and download the starter image for the Auto Boot Model III and 4.

Pros / Cons

The main Pro of this modification is that since it doesn't protrude any higher than the Rom chip removed, there is still plenty of room to install a Hi-Res graphics board if needed. Also the aluminium RFI shield can be re-installed without any special sheet-metal acrobatics needed to make it fit.

The main Con of this modification is that you lose the ability to drop to Model III Rom Basic (ie. Cass? and Memory Size?) which may or may not be important depending on how you use your computer. You can still load a DOS, invoke Basic language and CLOAD tapes if needed however most software is available already online transferred from tapes and ready to use.

NF6X little adapter board

For those who wanted the ability to go back and boot Model III Rom Basic, Mark Blair (a.k.a NF6X) designed a neat little PCB which holds both the original ROM and the new Eprom, and allows you to switch between them with a switch accessible through the cooling vent on the top of the computer. You need to get your own PCB made (typically through Osh Park) and solder the sockets, pins and switch as needed. For more information check out Mark's web page on the subject:

<http://www.nf6x.net/2013/11/version-2-of-trs-80-model-4-rom-adapter/>

Please be aware that NF6X doesn't and won't make or sell these, and the project is posted for those who have the ability to assemble and install it themselves. Bugging NF6X about buying one will result in the same reply.

Next time: FreHD Auto Boot on the Model 4P

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