

1 MB PC-SIMM in NMS 8250/55

Update your NMS8250/55/80 to 1Mb memory

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Introduction

The modification will not damage in any way the motherboard by cutting print traces etc.

The idea to use a PC-SIMM arose from a bet. A person from Friesland said it would not be possible.

After studying the PC SIMM it became evident that the #OE-signal is tied to ground.

In a Philips MSX-2 computer like the NMS 8245/50/55/80 this is also done this way: #OE connected to ground. In a Sony HB-700 the #OE-sigitaal is not tied to ground and it is therefore not possible to build a PC-SIMM in a simple way into a Sony HB-700.

30 pins PC-SIMMs are easily available at PC consumer shows, for prices around 10 euro per kilo.

The problem is that on offer are both 3 chip as 9 chip SIMMs

The 9 chip version is not advisable, use a 3 chip PC-SIMM

The access time of memory is in a MSX computer not of much concern. Typical is a 120 ns access time, the access time of a PC SIMM is between 60 and 80 ns, which makes it faster than required.

Required parts

| Part | Usage |
|-------------------|---|
| 1 x 74LS670 | mapper use D4 and D5 for MA18 and MA 19 the existing 74LS670 creates the extra MA17 with D3 |
| 1 x 74LS125 | backannotation on D3, D4 and D5 |
| 1 x 74LS08 | cas2/e |
| 1 x 74LS00 | don't write while refresh |
| 1 x 74LS157 | Create L8 and L9 from MA16- MA17 and MA18-MA19 |
| 1 x 30 pin 3 chip | 414400 x 2, 414100 x 1 PC SIMM |

Preparations

Take the motherboard carefully out of the housing

Remove IC 133 - IC 136 (41464) near the VDP. Best is to cut the pins and remove the remains

Remove R 127 and R 128 (both 100 ohm) in the neighbourhood IC 131 (74LS125).

Prepare the following IC's:

74LS670 : cut the pins 1, 2, 3, 6, 7, 9, 10 and 15 half.

74LS125 : cut the pins 2, 3, 5, 6, 8, 9, 11 t/m 13 half

74LS08 : cut the pins 1 t/m 6 and 8 t/m 13 half

74LS00 : cut the pins 1 t/m 6 and 8 t/m 13 half.

74LS157 : cut the pins 2 t/m 7 and 9 t/m 14 half.

Insert IC's

| | | |
|--------------------|----------------------------|----------------------------|
| Insert the 74LS670 | on top of IC 149 (74LS670) | and is now called IC 149B. |
| Insert the 74LS125 | on top of IC 131 (74LS125) | and is now called IC 131B. |
| Insert the 74LS08 | on top of IC 157 (74LS00) | and is now called IC 157B. |
| Insert the 74LS00 | on top of IC 180 (74LS32) | and is now called IC 180B. |
| Insert the 74LS157 | on top of IC 147 (74LS157) | and is now called IC 147B. |

Solder all remaining whole pins to the IC pins underneath.

Attach a wire to IC 131B (74LS125) between pin 13 and pin 1.

Attach a wire to IC 157B (74LS08) between pin 14, pin 13 and pin 12.

Attach a wire to IC 157B (74LS08) between pin 11, pin 10 and pin 9.

Attach a wire to IC 180B (74LS00) between pin 14, pin 13 and pin 12.

Attach a wire to IC 180B (74LS00) between pin 11, pin 10 and pin 9.

Attach a wire to IC 180B (74LS00) between pin 3 and pin 4.

Attach a wire to between pin 12 IC 180 (74LS32) and pin 1 and 2 of IC 180B (74LS00) (RFSH).

Attach a wire to between R 130 (100 ohm) (on teh side of the Video RAM) and pin 5 of IC 180B (74LS00) (WE).

Attach a wire between printspot R 128 (zijthe RAM) and pin 3 of IC 157B (74LS08) (CAS 0).

Attach a wire between printspot R 127 (zijthe RAM) and pin 6 of IC 157B (74LS08) (CAS1).

Attach a wire between pin 1 and 4 of IC 157B (74LS08) to pin 2 IC 111 (74LS32) (CAS2/E).

Attach a wire between pin 2 and 5 of IC 157B (74LS08) to pin 6 IC 180B (74LS00).

Attach a wire between pin 7 IC 149 (74LS670) and pin 2 IC 147B (74LS157) (MA16)

Attach a wire between pin 11 of IC 161 (74LS243) and pin 3 of IC 131B (74LS125) and pin 3 of IC 149 (74LS670) (D3).

Attach a wire between pin 2 of IC 131B (74LS125) and pin 6 of IC 149 (74LS670) and pin 3 of IC 147B (74LS157) (MA17).

Attach a wire between pin 15 of IC 149B (74LS670) and pin 6 of IC 131B (74LS125) and printspot pin 11 of IC 176 (74LS367) (D4).

Attach a wire between pin 5 of IC 131B (74LS125) and pin 10 of IC 149B (74LS670) and pin 5 of IC 147B (74LS157) (MA18).

Attach a wire between pin 1 of IC 149B (74LS670) and pin 8 of IC 131B (74LS125) and printspot pin 13 of IC 176 (74LS367) (D5).

Attach a wire between pin 9 of IC 131B (74LS125) and pin 9 of IC 149B (74LS670) and pin 6 of IC 147B (74LS157) (MA19).

Placement of the PC SIMM to the bottom of the motherboard

Turn the motherboard to the other side.

Cut all ic pins on the bottom between IC 147 and IC 177 .
Attach double sided sticky paper between the PC-SIMM and the board.

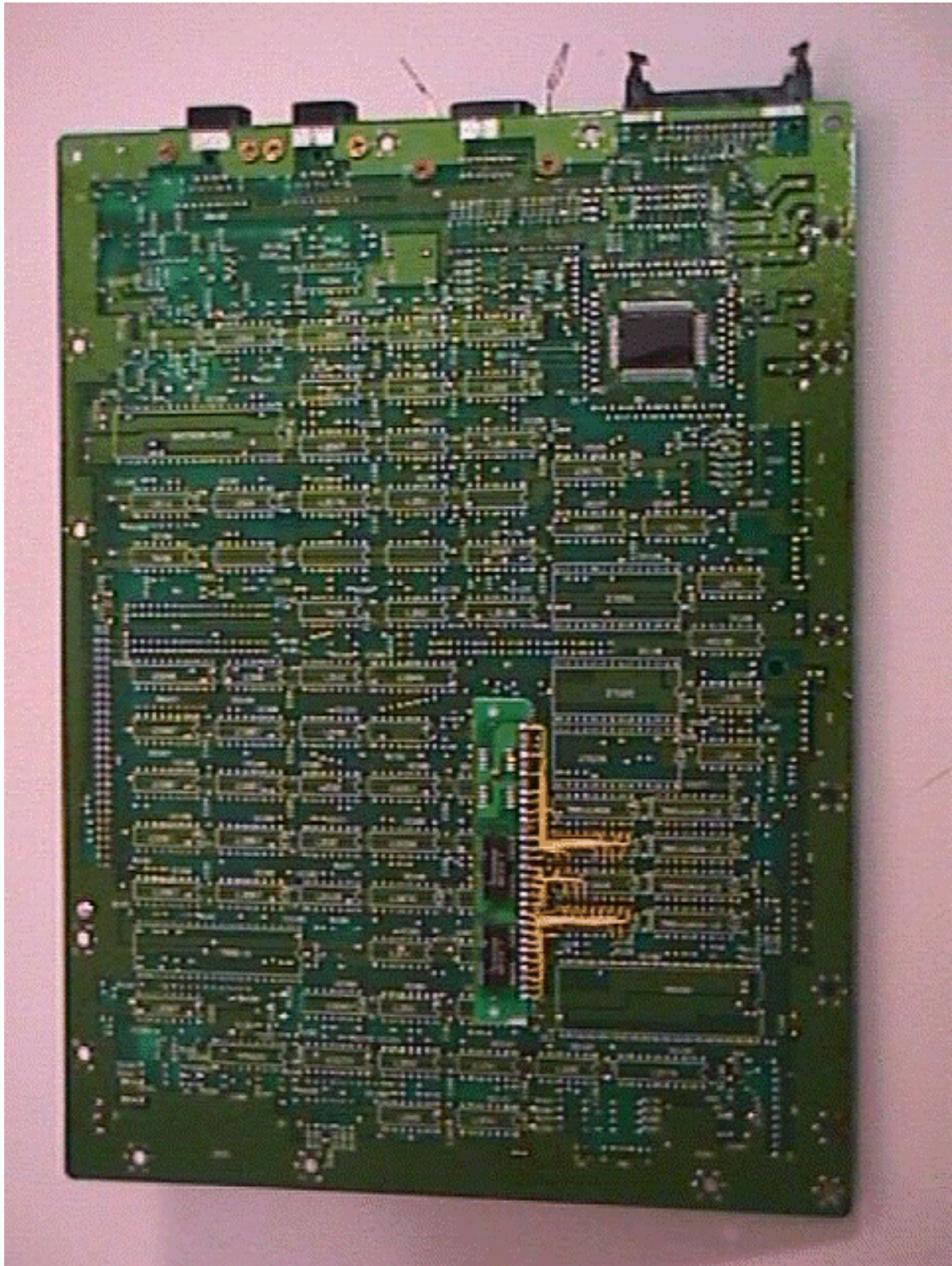
In the next description the wires are soldered directly to the PC SIMM
The 2 wires to IC 147B (74LS157) are lead to a empty IC hole.

| pin | Omschrijving | To |
|-----|--------------|--------------------------|
| 30 | Vcc + 5 Volt | IC 133 pin 9 |
| 29 | Din(9) | |
| 28 | CAS(9) | |
| 27 | RAS | IC 133 pin 5 |
| 26 | Dout(9) | |
| 25 | D7 | IC 133 pin 17 |
| 24 | NC | |
| 23 | D6 | IC 133 pin 15 |
| 22 | Gnd | IC 133 pin 18 |
| 21 | WE | IC 133 pin 4 |
| 20 | D5 | IC 133 pin 3 |
| 19 | NC | |
| 18 | L9 | IC 147B pin 7 (74LS157) |
| 17 | L8 | IC 147B pin 4 (74LS157) |
| 16 | D4 | IC 133 pin 2 |
| 15 | L7 | IC 136 pin 10 |
| 14 | L6 | IC 136 pin 6 |
| 13 | D3 | IC 134 pin 17 |
| 12 | L5 | IC 136 pin 7 |
| 11 | L4 | IC 136 pin 8 |
| 10 | D2 | IC 134 pin 15 |
| 09 | Gnd | IC 134 pin 18 |
| 08 | L3 | IC 134 pin 11 |
| 07 | L2 | IC 134 pin 12 |
| 06 | D1 | IC 134 pin 3 |
| 05 | L1 | IC 134 pin 13 |
| 04 | L0 | IC 134 pin 14 |
| 03 | D0 | IC 134 pin 2 |
| 02 | CAS | IC 134 pin 16 |
| 01 | Vcc + 5 Volt | IC 134 pin 9 |

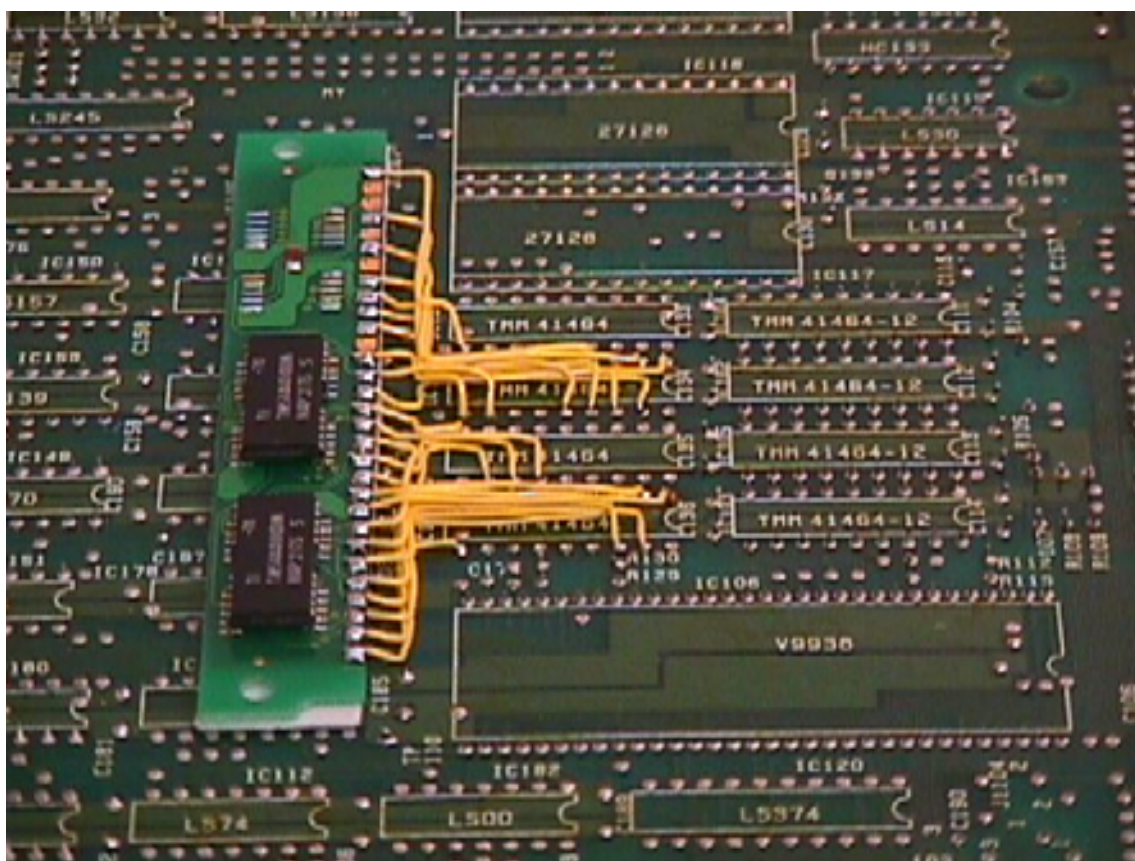
Control all wires and soldering points!

When the computer starts normally the modification is very likely successful!

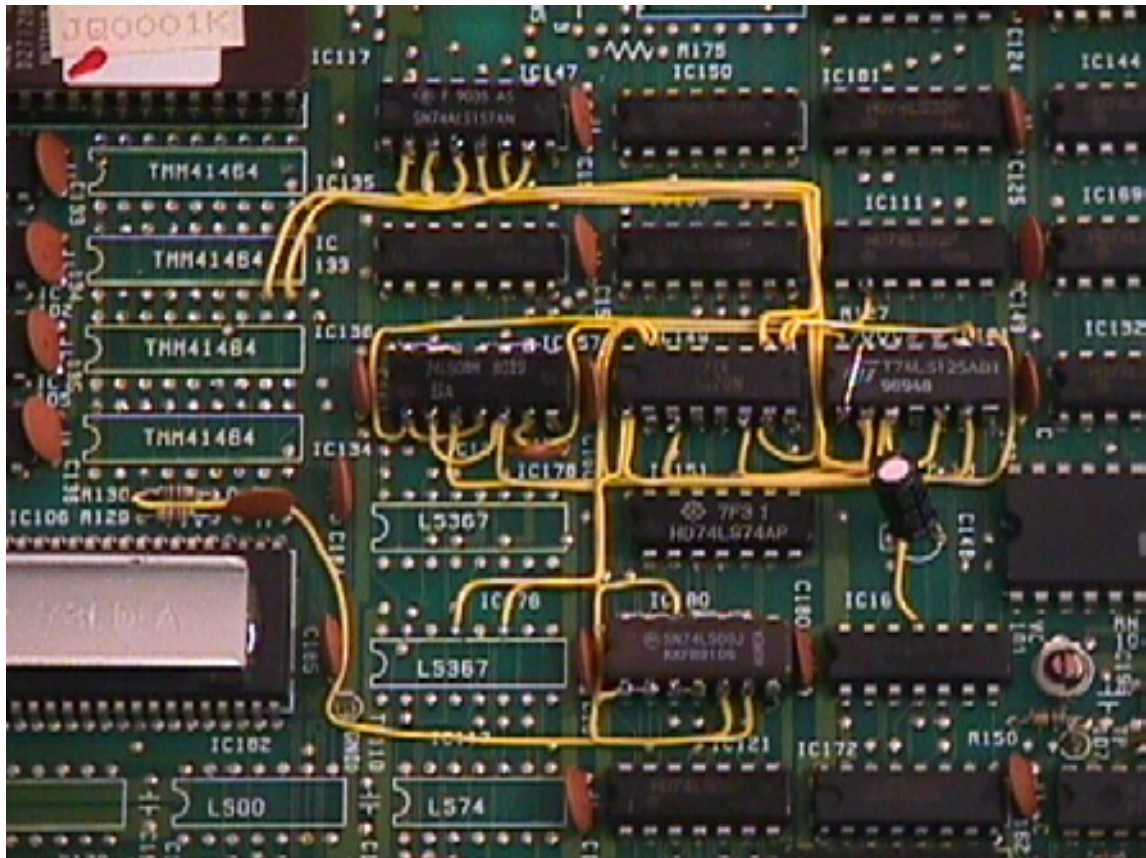
When the computer starts it will still tell you that 128K RAM is present, that is the normal behaviour of the ROM and does not tell the modification failed.



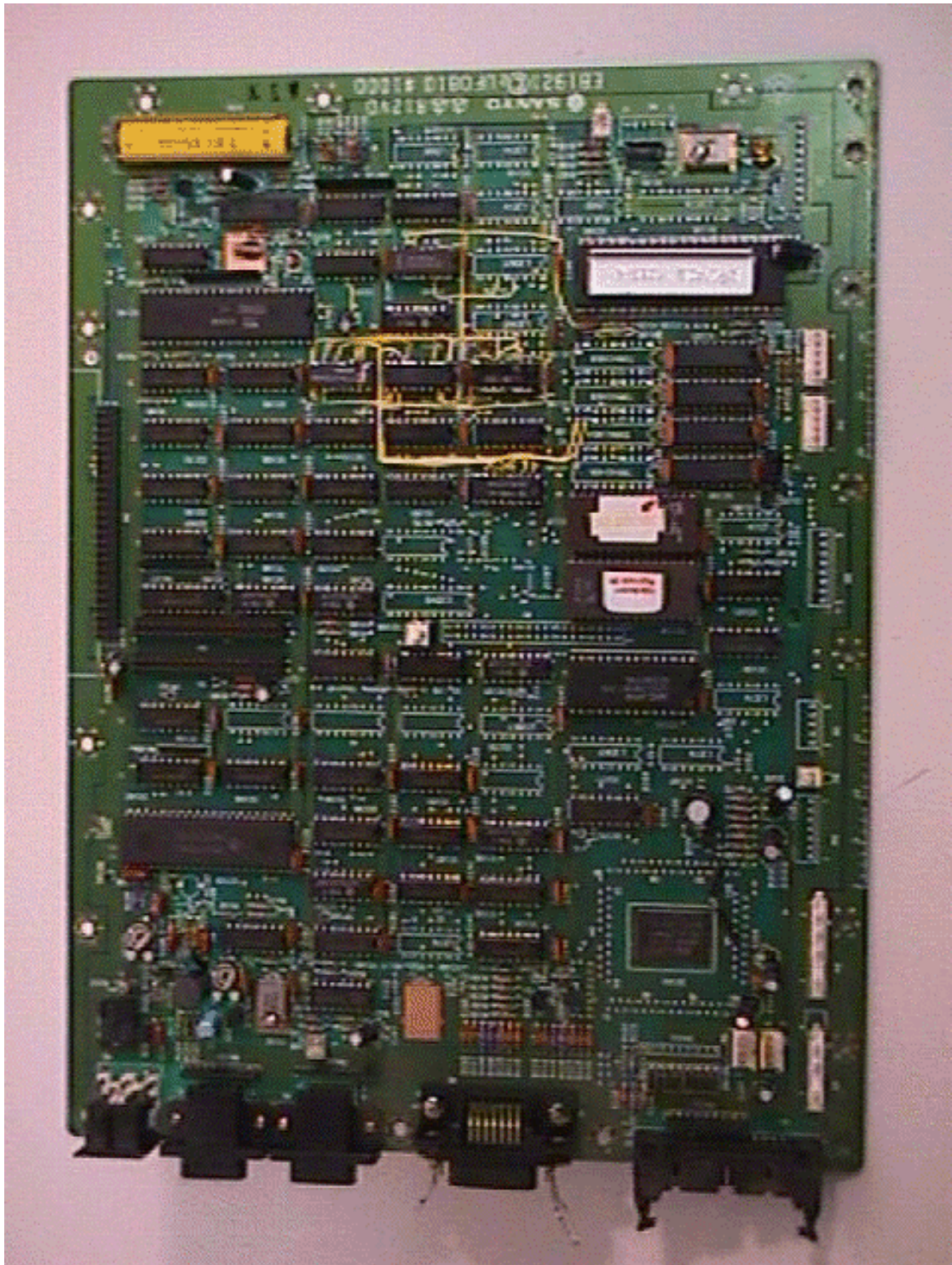
Bottom view of motherboard



Detail view of bottom of motherboard



Detail view of topside of motherboard



Top view of motherboard