The Final Cartridge III+ manual by EDK and SAM.
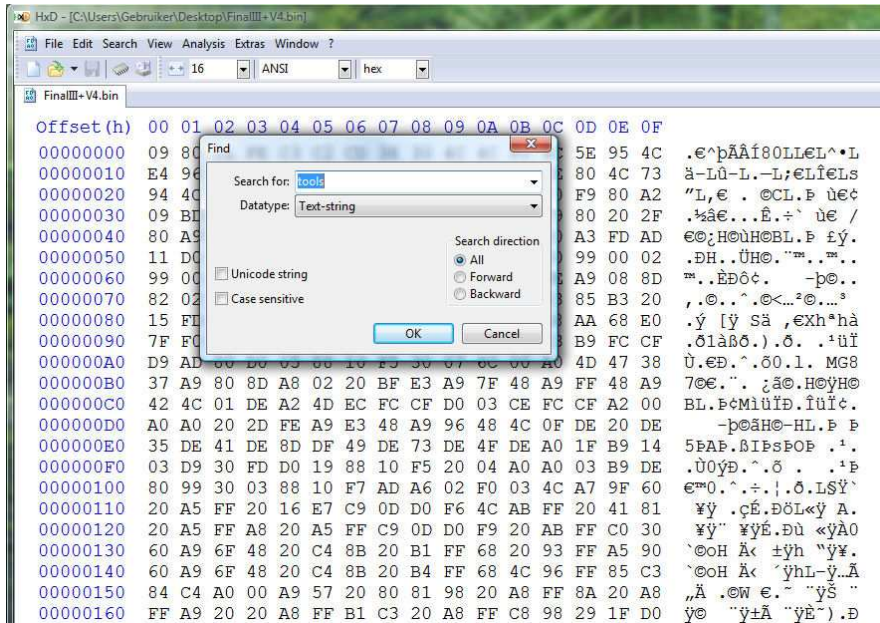
How to change menu text items and tools/programs…

Download the Hex editor HXD in your favorite language here:
http://mh-nexus.de/en/downloads.php?product=HxD
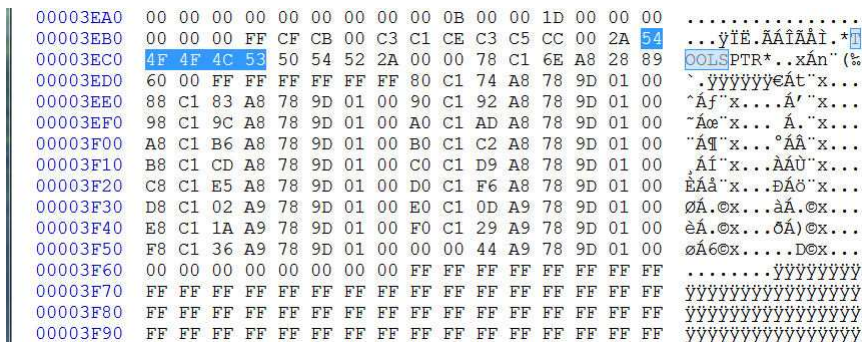
Open the file FinalIII+V4.bin
Do a search for the text-string "tools", choose "All" and press "OK"..

Look what we found here:

This is the table with the pointers to the texts in the "Tools" menu.
We come back to this menu later…
Do a next search by pressing "F3" and you'll see this:
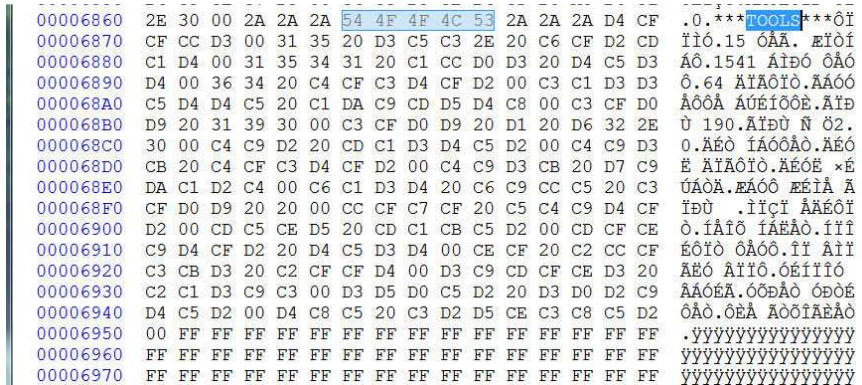
Here you see the text of the menu items in uppercase PETSCII.
So "A"= C1, "B"=C2 and so on..

After ***TOOLS*** you see (left column) D4 CF CF CC D3.
It's the word "TOOLS" as you see in the FCIII+ desktop.
It is followed by a control byte "00" which means the end of that word..
Then you see 31 35 20 D3 C5 C3 2E 20 C6 CF D2 CD C1 D4 and
also followed with "00".. It's "15 SEC. FORMAT"….The first menu item..
(A space is "20" and a point is.. "2E" in Hexadecimal !)

Take a look and you find all the 17 menu items in this list.
It's not possible to add more items because there is no more memory free
for the text pointers (see previous table)…

When you change the text in the menu you must also change the
pointers in the previous menu. This is a way to find the right address:

From offset 6800 do a select to the start of the word "TOOLS" and you see it's "6E".
This is for reference only because this is not needed to be changed and it cannot
be much longer due to available space in the FCIII+ Desktop bar.
Do a select from offset 6800 to the first character of "15 SEC FORMAT". You will see
it's "74". Write it down and do that also for the other 16 items.

Take a look at the pointers table at offset 3EC0. There are 8 bytes for every menu item.
You see 78 C1 6E A8 28 89 60. This is for the text "TOOLS". 78 C1 is the address on the
screen in lowbyte highbyte order. 6E (remember ?) A8 is the address of the text in memory.
28 is the width of the lit area when you select the TOOLS menu. Do not change this..
89 is the length of the menu and 60 the width of the menu.
From offset 3ED8 you see 80 C1 74 (remember ?) A8 78 9D 01 00.
There is a 8 byte string for every menu item. The first two bytes 80 C1 are the screen
address and the second two bytes 74 A8 the pointer to the text in memory.
78 9D is the address where it jumps to when you select a item. This is the same for
every item. How is that possible ? From $9D78 the screen position is read out and the
right pointer in another table (will follow later) is choosen. Then you see the byte "01".
That will mean "normal text". When you change that in "00" the text will be in "ghost"
mode and is not selectable then. In the last item the screen address is not set and must
be filled with "00 00" and also locked with a couple of "00" to let the program know it's
the last item in the menu. There is no more space in memory for more menu items
but I think 17 pieces is a respectable number.. ☺

Do a next search for "tools" and you will see this, the tools handler !

```
00009F40  2A 2A 54 4F 4F 4C 53 48 41 4E 44 4C 45 52 2A 2A  **TOOLSHANDLER**
00009F50  A2 00 BD 60 9F 9D 00 01 E8 E0 64 D0 F5 4C 00 01  ¢.½`Ÿ...èàdÐõL..
00009F60  78 A5 9B 38 E9 78 4A 29 7F AA BD 20 01 8D FF DF  x¥>8éxJ).ª½ ..ÿß
00009F70  BD 21 01 8D 1D 01 BD 22 01 8D 1E 01 4C 1C 01 EA  ½!....½"....L..ê
00009F80  44 10 80 FF 44 60 84 FF 45 10 80 FF 44 00 9A FF  D.€ÿD`„ÿE.€ÿD.šÿ
00009F90  44 00 A2 FF 46 10 80 FF 47 10 80 FF 48 10 80 FF  D.¢ÿF.€ÿG.€ÿH.€ÿ
00009FA0  49 10 80 FF 4A 10 80 FF 4B 10 80 FF 45 00 AE FF  I.€ÿJ.€ÿK.€ÿE.®ÿ
00009FB0  46 00 A6 FF 4C 10 80 FF 4F 00 80 FF 4D 10 80 FF  F.¦ÿL.€ÿO.€ÿM.€ÿ
00009FC0  4E 10 80 FF 00 00 00 00 00 00 00 00 00 00 00 00  N.€ÿ............
00009FD0  00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  ................
```

From offset 9F80 you see four bytes 44 10 80 and FF is a separation byte for the first menu item. 44 is the banknumber and 10 80 the startadress in lowbyte highbyte order. The next four bytes are for the next item in the tools menu. So program 1541 ALPS TEST is also in bank 44 but starts from address $8460.. And what about 64 DOCTOR ?? You see it ? Bank 45 and start at $8010 ☺

You can find the startadress of every item in the file with a search of the program name in HXD. For example SIMONS BASIC:

```
0003BFC0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ
0003BFD0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ
0003BFE0  FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  ÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿÿ
0003BFF0  53 49 4D 4F 4E 53 20 42 41 53 49 43 2E 2E 2E 2E  SIMONS BASIC....
0003C000  A2 FF 78 9A D8 20 A3 FD 20 50 FD 20 15 FD 20 89  ¢ÿxšØ £ý Pý .ý ‰
0003C010  80 58 20 53 E4 20 BF E3 78 A9 00 8D 20 D0 8D 21  €X Sä ¿ãx©.. Ð.!
0003C020  D0 4C D0 80 EA EA EA EA EA EA EA EA EA EA EA EA  ÐLÐ€êêêêêêêêêêêê
0003C030  A9 F0 85 FC A9 80 85 FD A9 00 85 FE A9 80 85 FF  ©ð…ü©€…ý©....þ©€…ÿ
0003C040  A2 3F A0 00 B1 FC 91 FE C8 D0 F9 E6 FD E6 FF CA  ¢? .±ü'þÈÐùæýæÿÊ
0003C050  D0 F0 EA EA EA EA EA EA EA EA EA A9 FF 85 AE 85  Ððêêêêêêêêê©ÿ…®…
0003C060  2D A9 0D 85 AF 85 2E A9 A0 85 38 A9 EA 8D 28 03  -©.…¯…..©  …8©ê.(.
0003C070  A9 1B 8D 11 D0 A9 30 8D FF DF 4C 52 81 EA EA EA  ©...Ð©0.ÿßLR.êêê
0003C080  EA EA EA EA EA EA EA EA EA A9 03 85 9A A9 00 85  êêêêêêêêê©.…š©.…
0003C090  99 A2 2F BD A0 80 9D FF CF EA D0 F7 20 1B E5 60  ™¢/½  .ÿÏêÐ÷ .å`
```

SIMONS BASIC is in Bank 4F and starts at $8000..
You see a copy routine. The program is copied from ROM to RAM, after that the cartridge is disabled (by writing #$30 to $DFFF) to let the area from $8000 - $BFFF be available as RAM and the program is started. The copy routine is treated in the next chapter..

NOTE: Maybe it's a good idea to edit the .CRT version first.. You can simple find the right bank number by the CHIP headers and test the menu in VICE to see if it's all right.

Making a .BIN file from the . CRT is very easy. Remove the first 50 bytes, do a search for CHIP and remove every 10 bytes CHIP header and you are ready. After that the .BIN file must be 40000 bytes.