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# FX-870P emulator

The program emulates the HD61700 microprocessor and uses the ROM dump from the original calculator, therefore it should function almost exactly like the real one.  
It works on PC-compatible machines with Microsoft Windows operating system.

## Files to download

### Program version 15, updated 2025/08/03

[fx870\\_es.zip](#) - Delphi 5 sources

[fx870\\_em.zip](#) - compiled executable

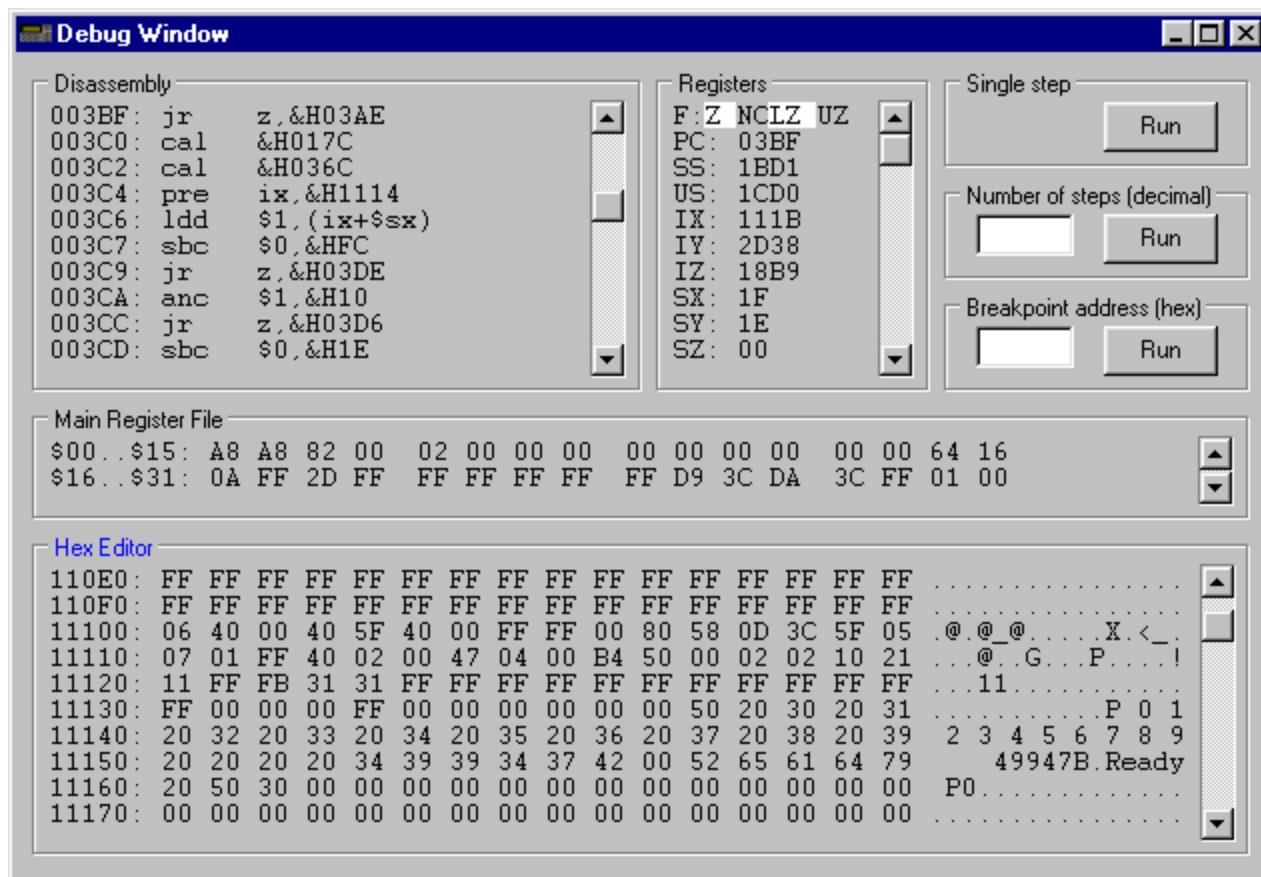
Usage: extract the files into an empty directory, then run the program **fx870.exe**

[fx870\\_fa.zip](#) - alternative face image, contributed by Mahmoud Yassine

Usage: Replace the file face.bmp in the directory where the program was installed.

## The screenshots





## Usage hints

- Following files contain the memory images, and are loaded when the program is started:

rom0.bin – processor's internal 6kB ROM

rom1.bin – external 128kB ROM  
charset.bin – LCD controller's internal character ROM of size 1.5kB  
ram0.bin – 64kB RAM  
register.bin – processor's internal register file

- The updated files ram0.bin and register.bin are saved when the program is terminated. If they weren't found, they will be created. In such case the memory has to be initialised with the **ALL RESET** button.
- The emulator can be operated with the mouse or the keyboard. Special function keys:

Cursor keys: corresponding arrow keys  
Page Up: red S  
Page Down: CAPS  
Esc: BRK  
Insert: INS  
Delete: DEL  
Backspace: BS  
Enter: EXE  
F3: suspends the code execution and opens the debugger window  
F4: invokes the communication utility  
F9: Reset

## Peripheral devices

### Serial port

The communication utility invoked with the F4 key is equivalent to a terminal program used with a real calculator. Button functions:

[Send]

selects the file to be sent to the calculator

[Receive]

selects the file to which the data received from the calculator is saved

[Stop]

closes the file

### Cassette tape recorder

Files are transferred in the same way as over the serial port, except that the data format specified in the [mass storage and printer interface for the FX-700P calculator](#) project is used. It is supported by Marcus' von Cube [Casio utilities](#) as Piotr's or *ASCII encoded raw data* format.

### Printer

The printed text is saved to the file selected with the [Receive] button of the communication utility.

### Floppy disk drive

Emulated is the [MD-120](#) device. Files are stored in the path specified in the [INI file](#). Error messages may be inaccurate because Delphi's file management routines do not provide a detailed cause of failure. The following disk commands are excluded: DSKF, FORMAT, MODE 200, MODE 201.

# Integrated debugger

## Disassembly box

- On entry, the starting address matches the Program Counter, but it can be modified by clicking on the address in the first line. New value must be confirmed with Enter.
- After clicking on a disassembled instruction, a new instruction can be typed. As with the starting address, pressing Enter accepts the changes. Only changes in the RAM area will be saved upon program termination, all ROM modifications will be lost. Characteristics:
  - labels and expressions aren't supported
  - accepted are hexadecimal (with the prefix &H) and decimal numbers
  - destination of relative jumps can be only specified as absolute address, not as displacement

## Hex Editor box

- The HEX box allows viewing/changing the RAM contents only.
- It is possible to modify the starting address and the RAM contents by clicking on them. Enter accepts the changes.

## Registers box

- The contents of the registers can be modified by clicking on them. Enter accepts the changes.
- The top line in the register box shows the state of the upper four bits of the Flag register. They can be modified as well.

## Main register file box

- The contents of the registers can be modified by clicking on them. Enter accepts the changes.

## Program execution control

- Closing the debugger windows resumes the program execution without tracing.
- Pressing the button [Run] in the **Single step** group box executes a single machine code instruction without servicing of the interrupts.
- To execute a specified number of machine code instructions type the required value to the field in the **Number of steps** group box, then press the associated [Run] button.
- The **Breakpoint** group box allows to specify condition that determine when the program execution should be interrupted. Currently it only compares the Breakpoint Address typed in the field with the Program Counter. When they match, the program execution is stopped and the debugger window reappears.

## The fx870.ini file

Some parameters of the emulator can be customised by editing the **fx870.ini** file with any text editor.  
Description of the contents of this file:

0scFreq = 921

This setting specifies the emulated CPU clock frequency in kHz.

Option2 = 0

This setting specifies the state of the port P4: 1 for the Japanese version, 0 for some unreleased export version (in fact both the FX-870P and VX-4 have Japanese setting).

Path = disk0

This setting specifies the path to the disk folder that stores the contents of the floppy disk. It can be relative or absolute. It can also be the name of the real floppy disk drive which allows to exchange files with a real [MD-120](#) device (the PC and MD-120 have the same disk format if the MD-120 dip-switches are set to 2DD 720K).

## Uninstalling

To uninstall the emulator, simply delete the directory where it was installed. The program doesn't modify anything outside its installation directory.

## Acknowledgments

- The program includes a freeware component **ThreadedTimer** developed by [Carlos Barbosa](#).

## Known limitations and issues of the current version

- The sound isn't supported.
- The scrolling function of the LCD controller command \$8 isn't supported.
- Bugs may still lurk in the `rom0.bin` memory image.

## Utilities

[FMEM](#) is a RAM image editing tool. It can display the usage status of `ram0.bin` and write/delete text files in the F0-F9 areas. It is also possible to load machine language files into FBF/VX-MENU with the included `Pbf2FM.b` tool.

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