

Backing up and restoring the HP15c user memory (with file)

Make sure you have the firmware dated 2024-06-03 and with checksum 0A0Ah. If you have a prior firmware, you need to get the firmware file from this location, and install it following the instructions listed here.

Copy the file VoyagerSave.exe to your computer.

Connect the computer with the programming cable.

Once you have the right firmware, switch the calculator off, press f & ENTER simultaneously, and while keeping them pressed, press "on".

The calculator is now set in USB HID mode. It can be seen in your computer device manager as "Voyager".

(To exit the HID mode you can at any time press "on" to switch the calculator off and come back to standard mode)

Open the command line in your computer (by running cmd in the search line in your windows menu). Linux may need other procedure. For Mac I am using Parallels and a Win11 virtual installation.

Navigate through folders to the folder where VoyagerSave is located.

When executing VoyagerSave without parameters, it gives help on its use:

```
C:\Users\josegonzalezdivasson\Documents>VoyagerSave
VoyagerSave -s file: Save HP15C/HP16C calc structure to file
VoyagerSave -r file: restore calc structure from file
```

To back up your calculator, write **VoyagerSave -s filename** and press enter, where "filename" is the name you want to give to the backup file. The system backs up the user memory area and stores it in the file. You will save the user memory area of the mode you are currently in.

This is interesting to remember when you are moving from HP15c to HP16c and viceversa, to avoid losing your keyed-in programs.

To restore from a previous backup, write **VoyagerSave -r filename**, where "filename" is the name you gave to the back up in point 9.

Press "on" to exit from USB HID mode.

Disconnect the programming cable, pushing gently towards the center on the connecting head side wings. Remember to close and secure the back door!

Of course, you can have as many different backups as needed. A good policy is creating different user profiles, depending on the situation and application. These can be thought as "software pacs", since you can reconfigure your calculator for specific applications, and be able to call them to memory when you need these programs. We plan to create some of these software pacs.

Structure of the back-up file.

The back-up files are just dumps of the user memory area, which is 2048 bytes long, and is organized as shown below. Registers are 8 bytes long, so there are 256 8-byte registers:

- the third is its known use;
 - the 4th and 5th are the two nibbles for the padding byte;
 - and the following are the 14 nibbles of the 7 bytes of the original HP15c registers, starting with the sign, the mantissa, the sign of the exponent and the two exponent numbers.
- For our purposes, it is important to see that the stack is there, and also registers 0 and 1 (and this is the reason that they cannot be allocated to programs, too. It also may imply that operations done to these registers might be slightly faster than with other registers, where we need to have memory map access):

Hex offset	Byte in file		P1	P2	S	1	2	3	4	5	6	7	8	9	0	S
00	70	y														
01	78	z														
02	80	t														
03	88	Pointer														
04	90	Display														
05	98	?														
06	A0	?														
07	A8	Exponent														
08	B0	0														
09	B8	Control L														
0A	C0	Control R														
0B	C8	0														
0C	D0	0														
0D	D8	0														
0E	E0	0														
0F	E8	0														
10	F0	R0														
11	F8	R1														
12	100	I														
13	108	Last X														
14	110	ran			Run	Mantissa Random number										curr.
15	118	map			Data	mA	mB	mC	mD	mE						
16	120	Return1														
17	128	Return2														
18	130	0														
19	138	dimension			matrix A			matrix B			matrix C					

1A	140	flags			matrix D			matrix E				R	F	Flags	
1B	148	0													
1C	150	0													
1D	158	0													
1E	160	0													
1F	168	0													

VoyagerSave