

HP-16C CE — Simple guide (memory, speed, keys, battery, stopwatch)

Firmware file: `Voyager16-ext-path-c-trim4-show-B7B7.bin`

Checksum (g-ENTER-ON → 2 / flasher expected): **B7B7**

MD5: `149576923a2fa992ab4963493c7925fb`

Flash at: `0x4000` · then press **RESET** on the cable

This guide is for the **HP-16C** Collector's Edition with Voyager16 features. The HP-15C Collector's Edition has its own firmware and guide (checksum **C8C8**).

Disclaimer. This is unofficial, experimental firmware and documentation. It is not made, supported or endorsed by HP Inc. or its licensees, and it is provided as is, without any warranty. Installing it is at your own risk and may void the manufacturer's warranty. Flashing can fail, and a failed or interrupted flash, low batteries or an incompatible unit can leave the calculator unusable. Back up your programs and data first, because installing firmware or changing settings can erase memory. Results have not been certified; check important calculations independently. Nobody involved accepts liability for damage, data loss or any consequence of using it. HP and HP-16C are trademarks of HP Inc., used only to identify the compatible hardware.

Features:

- **Extended memory:** a 1,232-byte shared pool (Nut addresses `0x20`–`0xCF` inside the 2 KB Continuous Memory image). **f MEM** shows `r-0616` at word size 16 (registers R0–R615).
- **Store and recall** work correctly at every word size, including 57–64, with or without a program in memory.
- **Indirect RCL/STO (i) in FLOAT mode:** R0–R175; higher registers give **Error 3**.
- **Long programs:** up to **999** lines (attempting line 1000 gives **Error 4**).
- **CLEAR PRGM**, and **SST/BST** wrap around the program.
- **Stopwatch** (menu **9**) and **speed** menu (menu **5**).
- **Key filter** with adjustable settings (menus **6**, **7**, **8**).
- **Battery reading** (menu key **E**).

Flasher and calculator both show **B7B7**.

Open the hidden menu

1. Turn the calculator **off**.
2. Hold **g** and **ENTER**, then press **ON**.
3. Release. You see the usual service menu (`1.L 2.C` ...).

Press **ON** again to leave anytime.

Tip: **f + ENTER + ON** is for USB backup (VoyagerSave). That is not this menu.

What each number does

Press	What it is	What you do
2	Checksum	Should show B7B7 on this build, then date 2026-09-25
5	Speed	Cycle: 4 → 12 → 48 (MHz). Default 4
6	Same-key lockout	How long a repeat of the same key is ignored (ms): 50 → 80 → 100 → 120 . Default 120
7	Key press confirmation	How long a key must stay down before it counts (ms): 10 → 20 → 30 . Default 10
8	Key release confirmation	How long a key must stay up before it counts as released (ms): 10 → 20 → 30 → 50 . Default 30
9	Stopwatch	Opens the stopwatch (see below)
E	Battery reading	Shows the battery voltage once, e.g. bAtt 3.02 (see below)

How to change 5 / 6 / 7 / 8

1. Open the menu.
2. Press the number once to see the current value; press again to change it.
3. Press **ON** to save and exit.
4. To change another setting, open the menu again (one setting per visit is safest).

Speed and key settings are kept while the batteries are in. After a full power cut (batteries out), they return to the defaults above.

How the keyboard is read: the keys are checked every 10 ms. A key counts as pressed only after it has stayed closed for the press confirmation time (menu **7**), and as released only after it has stayed open for the release confirmation time (menu **8**). A short bounce or dropout while a key is held is therefore ignored. In addition, the same key pressed again within the lockout time (menu **6**) is ignored. Longer times reject more bounce, but a key must then be held a little longer, or released a little more clearly, before it is pressed again.

Battery reading (E): in the service menu, press **E**. The calculator takes one reading and shows it, for example **bAtt 3.02** (volts). Press **E** again for a new reading. If a reading fails, the display shows **bAtt - - -**. The value is measured under load and may differ by about 0.1 V from a multimeter. Press **E**

from the menu itself or from the screens of items 6, 7 and 8; on the item 5 (speed) screen, press **ON** or another menu number first. In the stopwatch, **E** does not take a reading. The low-battery ***** uses fixed thresholds: it turns on after five low readings in a row (below 2.5 V, one reading per keypress) and off again after 80 good readings in a row.

Extended memory

This firmware enlarges the shared program / storage pool. The rules in the HP-16C handbook (Section 6) still apply; only the **sizes** change.

After a Continuous Memory reset (as in the handbook), word size **16**, no program:

	Handbook	This calculator
f MEM (hold MEM)	P-0 r-101	P-0 r-0616
Highest register for STO / RCL	R100	R615
Pool size	203 bytes	1,232 bytes

At word size **4**, clear pool, **f MEM** shows **P-0 r-2464** (handbook maximum at that word size is 406); the highest register you can use there is **R2463** (R2464 gives **Error 3**).

f MEM follows the handbook rule: the displayed count is the number of usable registers. **r-0616** means R0-R615, and **r-2464** means R0-R2463.

Program memory still grows from the high end of the pool and takes storage away seven bytes at a time. The line-number display tops out at line **999**; attempting line **1000** gives **Error 4**. That is the hard program-length cap.

The extra registers live **inside** the ordinary 2 KB Continuous Memory image, so a VoyagerSave / USB backup includes them.

For the full table of handbook page replacements, see the Voyager16 **Extended Memory** addendum included in this pack.

Stopwatch (menu 9)

Display shows hours · minutes · seconds · hundredths.

Use FLOAT first if you want the time in **Last X** or in a register:

1. Press **f** then **FLOAT**, and choose a display (for example **3**).
2. Open the menu and press **9**.

In integer modes (HEX / DEC / OCT / BIN), the stopwatch still runs, but **STO** shows an error (**KXX**) and **ON** does not write **Last X**.

Key	Action
A	Start / stop. In countdown: stop; press A again to restart the same length
B	Freeze the display (timer keeps running); B again shows live time
C	Countdown: type minutes, then C (example: 5 then C)
D	Clear everything
0-9	Type a number (you see it on screen). 0 works for values like 1000
← (backspace)	Delete the last digit you typed
STO	After a digit 0-9 : store the live time into that register (FLOAT only)
+ / -	Speed trim factor, four decimals (shown briefly, e.g. SCF1.0885). Empty: + / - change it by 0.0001 (0.01%). With digits (hundredths of a percent): + sets 1 + digits/10000, - sets 1 - digits/10000 (example: 885 then + → 1.0885)
ENTER	Show the speed factor for about a second (example: SCF1.0885). Changes nothing; digits you have typed are kept
ON	Exit

Store time into a register (STO) — FLOAT only

From the stopwatch, you can store into **R0-R9** only (same idea as a quick scratch pad):

1. Be in **FLOAT**.
2. Let the stopwatch run (or stop it with **A** — either way, **STO** uses the live time).
3. Type a register **0-9** (example: **5**).
4. Press **STO**. The digit entry clears; the time display stays.
5. Leave with **ON**, then **RCL** that register (example: **RCL 5**).

Same number format as Last X: e.g. **00.00.08.03** → **0.000803**.

- **STO** alone, or **0** then **STO**, stores into **R0**.
- Two or more digits before **STO** (example: **12 STO**) shows an error code and does not store.
- For higher registers (up to **R615** at word size 16), leave the stopwatch and use normal **STO** / **RCL**.

After you leave with ON — FLOAT only

- The time is also stored in **Last X** (format like `0.000803` for 8.03 seconds).
- Your normal stack (X Y Z T) is unchanged.
- To use the time in a calculation: press **g ENTER** (LASTx).

This is **not** a quartz watch. If it runs a bit slow or fast vs a real watch, trim it with the speed factor. The stopwatch multiplies its elapsed time by this factor: at **1.0885**, every 100 s of uncorrected time counts as 108.85 s. To find the factor, time a known interval at **1.0000**, then divide the real time by the time shown.

- To see the factor without changing it, press **ENTER**. The display shows it for about a second, for example `SCF1.0885`, then returns. Digits you have typed are kept. The factor is also shown after each **+** or **-**.
- **+** / **-** with no digits typed change the factor by **0.0001** (0.01%).
- To set a value directly, type the difference from 1 in hundredths of a percent, then **+** (above 1) or **-** (below 1): `885` **+** → 1.0885, `885` **-** → 0.9115, `1000` **+** → 1.1000. Zeros and backspace work while typing.
- Range **0.5000** to **2.0000**; default **1.0000**. The factor is kept while the batteries are in. After changing batteries, check it with **ENTER**.

Short recipes

Stopwatch: **f FLOAT** → menu **9** → **A** start → **A** stop → **ON** → **g ENTER** if you want the time in X.

Save into R5: **f FLOAT** → menu **9** → **A** run → `5` → **STO** → **ON** → **RCL 5**.

5-minute countdown: menu **9** → `5` → **C** → **A** to pause/restart → **ON** when done.

Set factor 1.0885: menu **9** → `885` → **+** (use **←** if you mistype).

Fine trim: menu **9** → **+** or **-** once per 0.0001 (0.01%).

Check the factor: menu **9** → **ENTER**.

Install (short)

1. Flash the `.bin` at **0x4000** with the [Machiilabs flasher](#).
2. Press **RESET** on the cable.
3. After flashing, do a Continuous Memory clear (**ON/-**) if the calculator asks or if registers look wrong.
4. Check: **g-ENTER-ON** → **2** → expect **B7B7**, then date **2026-09-25**.
Optional: **E** → `bAtt x.xx`.
5. Optional test: after a Continuous Memory clear at word size 16, **f MEM** shows `P-0 r-0616`, and **STO 615** works in **DEC**.

BST / SST

SST and BST both wrap through the real program lines (e.g. three lines cycle 000-003 either way).