

# AquaCalc 5000 Instructions for Removing and Installing Firmware EPROM Updates

6/2/2020

The AquaCalc 5000 Stream Flow Computer's firmware is upgraded by replacing a special Integrated Circuit (IC) chip on the circuit board, called an EPROM (Erasable Programmable Read Only Memory). The latest firmware EPROM can be obtained from the manufacturer.

**Please read the instructions thoroughly before beginning the actual procedure.**

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*Special Note: Micro circuitry components (including EPROM's) can be damaged by any electrical discharge (even from static electricity). Be careful when handling the EPROM during this procedure that you, the EPROM and the AquaCalc circuit board are grounded.*

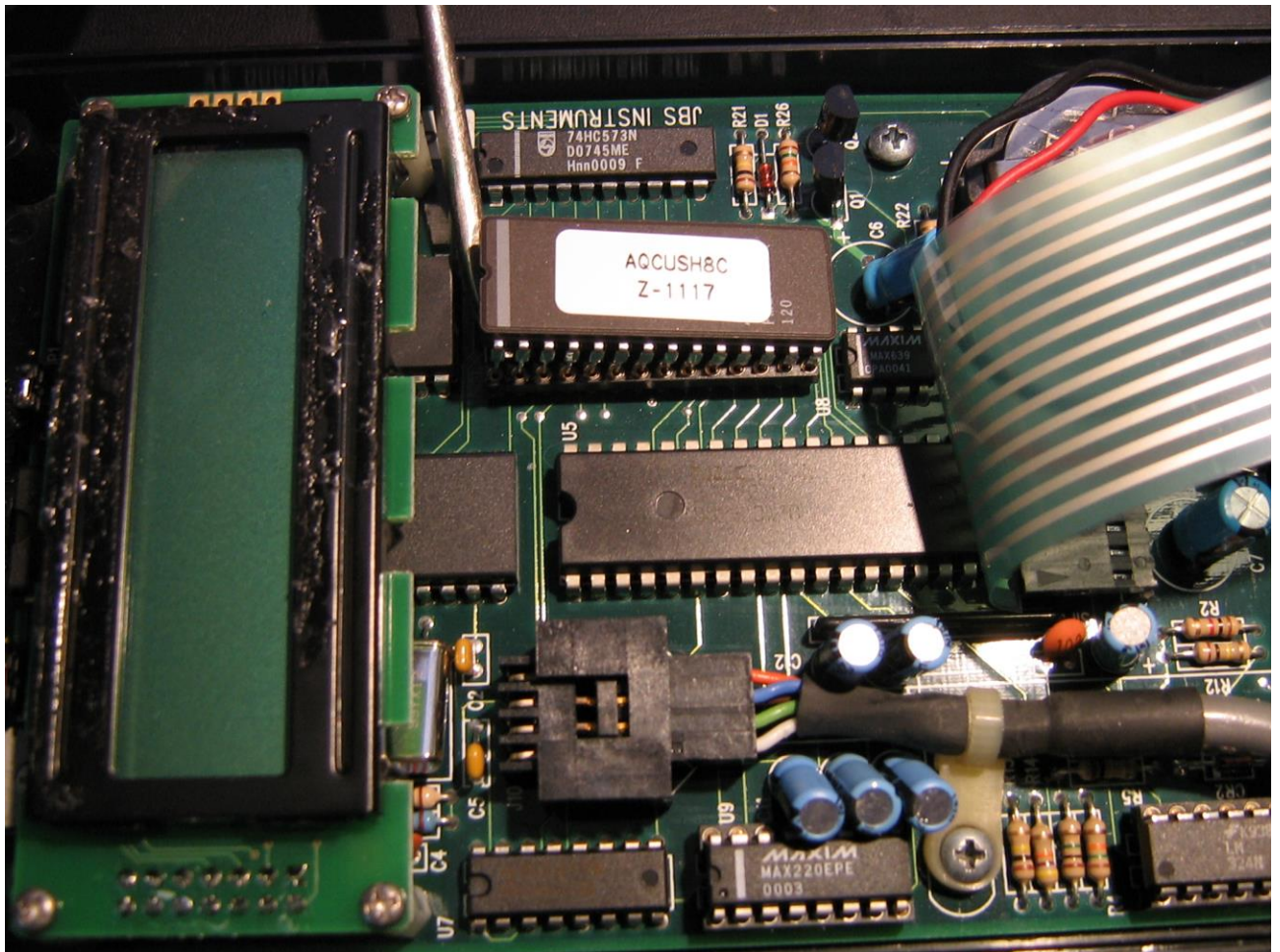
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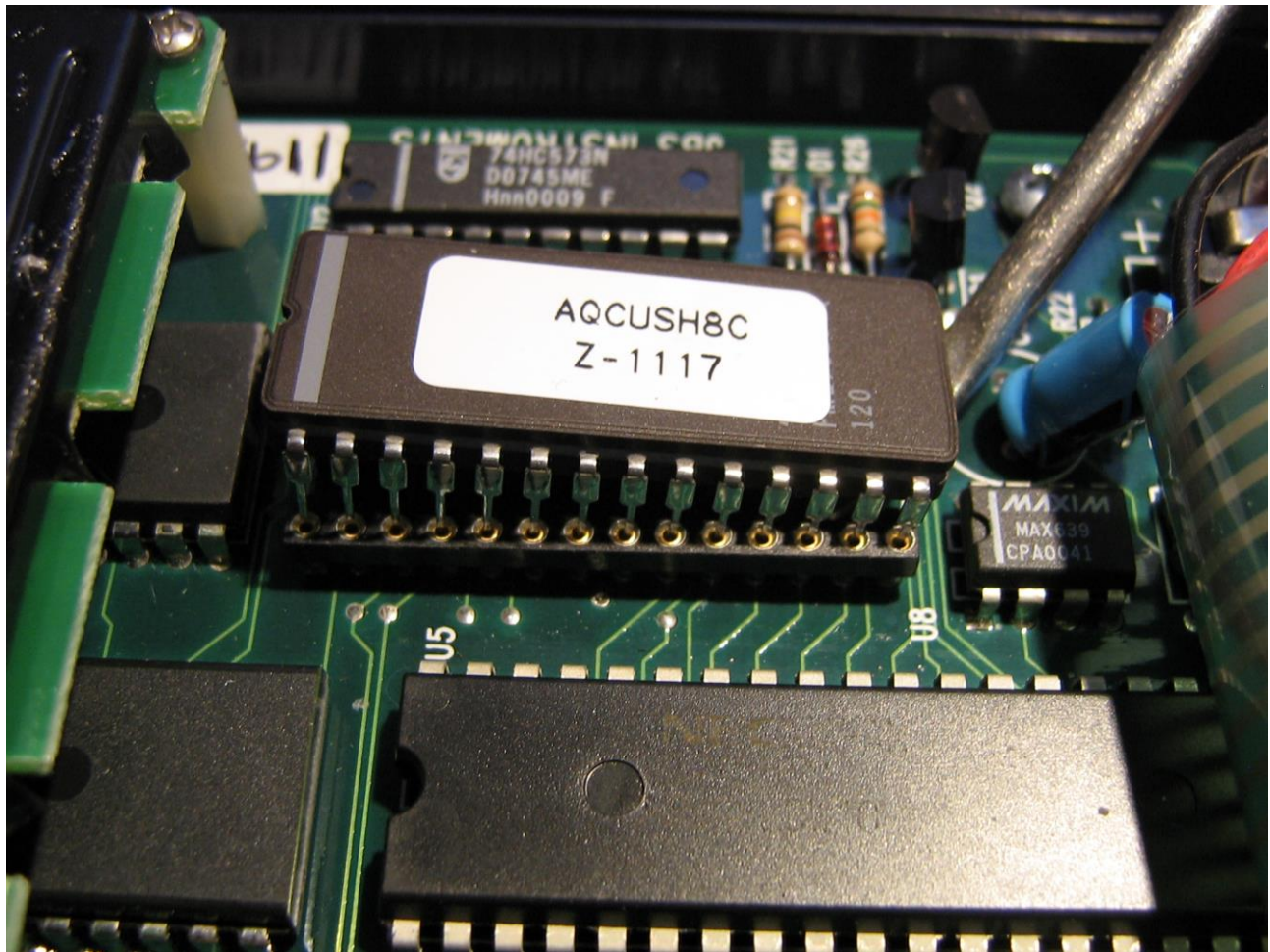
**It is recommended that the EPROM not be removed from its special holder until you are ready to install it.**

Tools required:

- Medium to small size Phillips Head Screw Driver,
  - Integrated Circuit (IC) Remover, or Small Blade-type Screwdriver
1. Place the case face down on a protected surface (so that the face of the case isn't scratched).
  2. Remove the four Phillips head screws connecting the two halves of the instrument case.
  3. Keeping the case halves in alignment turn the case over.
  4. Carefully lift the front half of the case (approximately 4 inches) above the rear half, observing the relationship of the electrical cable with the edge of the case (**note how the grommet bridges the edge of the case**). Also note the umbilical (ribbon cable electrical connection) connecting the case front to the main circuit board. Special notice should be made of the alignment of the silver flat wires with the contacts within the electrical socket on the face of the circuit board (When installed properly each wire must make positive contact with the appropriate socket; otherwise the keypad will not operate properly or there will be a short circuit!).
  5. Optional: Disconnect the keypad ribbon cable from the circuit board by grasping both of its edges and carefully pulling it out (at a right angle) from the circuit board face.

6. Locate the EPROM. This is the Integrated Circuit element with a white typed label, located on the right side of the circuit board just below the LCD display. Note the direction and location of the "Notch" on the end of the EPROM.
  7. Remove the old EPROM
    - a. Using an **IC remover**, carefully pry (gently wiggle the IC with a controlled lifting motion; alternating from one end of the chip to the other) until the IC is free.
- or
- b. Using a **small bladed screwdriver**, carefully pry the EPROM from its socket by an alternating lifting motion at each end of the IC.





**Note how fragile the individual pins of the IC are. It is important to keep this in mind when the new IC is installed.**

8. Install the new EPROM.

- a. Note the EPROM's orientation (Orientation is based on the location of the Number 1 pin, which is indicated by the semicircular notch on the upper surface of the chip). The notched end is installed toward the upper end (toward the LCD display) of the circuit board.



- b. We have found the best way to install large multiple leg chips is to first align one side of pins in their sockets (on the AquaCalc 5000 we have found that it is easiest to install the inner set of pins; those closest to the center of the circuit board; first, then align the other set). First, closely examine the pins of the IC to make certain none are bent and that each set is in rough alignment before you start. Next, setting the pins of one side of the IC (remembering the correct orientation of the chip with the notch towards the top!) into their correct sockets. Using very gentle pressure, press the pins into tops of their socket. (approximately 1/64 to 1/32 inch).

Next, at the same time you apply gently pressure to the face of the EPROM (not pressing the pins of the one side any deeper into their socket holes) wiggle the chip back and forth until all pins on the opposite side are in alignment with their sockets (You should feel a subtle drop in the face of the chip once the pins are all aligned). Make a close visual inspection, before pressing the IC to the bottom of its socket making certain that all pins are **in fact** in their proper hole (if not, they will be bent. It is still possible to correct bent pins by removing the IC and straightening the pins; then repeating the process). Once you are confident the IC is in the proper alignment; is oriented properly; and there are no bent pins, press it home.

9. Re-initialize the EPROM:
  - a. Disconnect the 9V battery.
  - b. Disconnect the 3V lithium battery from circuit by sliding a business card or similar device between the battery hold down clip and battery.
  - c. Wait five (5) minutes and remove the card, and reconnect the 9V battery.
10. If removed, reinstall the keypad ribbon cable into the receptacle on the circuit board face.

Using two hands, first align the ribbon cable's silver stripes with their socket connections, and then press it home.
11. Make preliminary tests. With the instrument's case face held slightly above the rear case, turn on the instrument by pressing the ON button. You may now see one of the following messages in your display: FIRMWARE CHANGE / 1=Reset 0=Cont. or the message: CORRUPTED MEMORY / 1=Reset 0 = Cont. In either case, press 1 to reset or initialize the AquaCalc. The unit should now respond normally. Experiment, using all the keys of the keypad, to verify that they all functioning properly.
12. Once you are satisfied that the unit is operating properly carefully align both case halves, at the same time reorienting the rubber grommet through the case's edge. Once aligned, and the joint closed with gentle hand pressure, install the 4 corner screws. Be sure not to over tighten these screws and strip the socket threads.
13. Recheck the operation of the reassembled unit.

**Should you have any questions or problems don't hesitate to contact or call us at: [support@aquacalc.com](mailto:support@aquacalc.com) / +1 (916) 372-0534**