Sensor Watch Quick Start Guide

For general guidance, check out www.sensorwatch.net, where there are links to videos of the watch setup and documentation for the watch library.

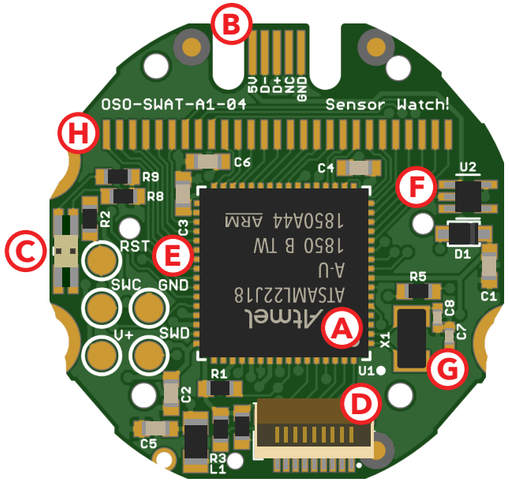
Replacing your F-91W's stock board with a Sensor Watch board

1. Remove the four screws from the back of the watch.
2. Remove the back plate and rubber gasket, then remove the watch movement from the case.
3. Unclip the metal retainer from the white plastic enclosure.
4. Remove the battery and battery clip, then remove the green F-91W circuit board.
5. Clip the battery clip into the battery clip area on the back of the Sensor Watch board.
6. Install the Sensor Watch board and battery in the white plastic enclosure.
7. Clip the board and battery into the white plastic enclosure using the metal retainer.
8. Reinstall the watch movement in the watch case, along with the rubber gasket.
9. Screw the back plate back onto the watch.

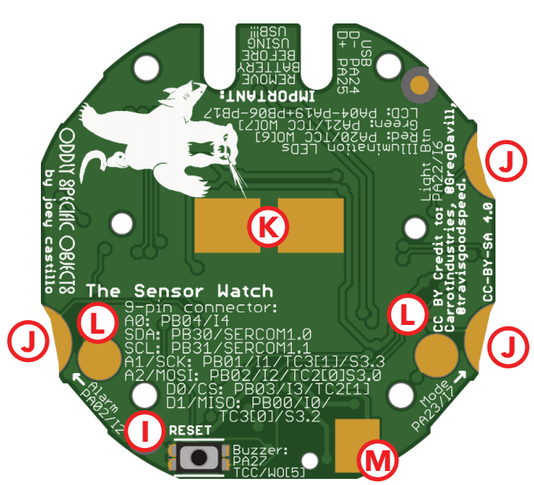
Scan to see a video of this procedure.

Board Tour

Top of Board

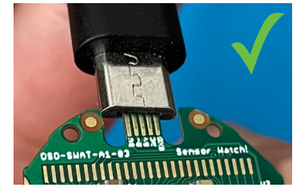


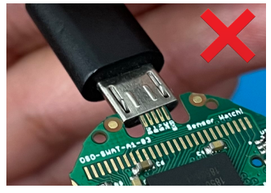
Bottom of Board



A. SAM L22 microcontroller
B. On-board USB Port
C. Dual-color LED
D. Nine-pin flex connector
E. Debug test points (covered in tape)
F. 3.3V low dropout regulator
G. 32.768 KHz crystal oscillator
H. LCD screen connection Pads
I. Reset button
J. Pads for external buttons (Light/Mode/Alarm)
K. Battery clip connector (Battery –)
L. Metal retainer connections (Battery +)
M. Buzzer connection pad

Getting Code onto the Watch





To get code onto your watch, you should first disassemble the watch and remove the board from its white plastic enclosure. Remove the battery from the watch until all you are holding is the green Sensor Watch board itself. Plug the watch in to a USB Micro-B cable as shown, with the pads facing the bottom of the cable. **The connector is delicate; do not bend it!**

Double tap the reset button to enter UF2 bootloader mode. It is a tiny button, and you may need to use a fingernail to press it. You will know you are in UF2 bootloader when the LED begins to pulse, and a disk drive called WATCHBOOT mounts on your computer.

You can drag a UF2 file with watch code directly to the WATCHBOOT drive, or if you are writing an application with the watch library framework, run `make && make install` from the terminal. This will compile your code and copy it to the watch.

IMPORTANT NOTE: ***Ensure that there is no battery attached to the watch before plugging in to USB.*** Generally this should not be an issue, as the USB port is mechanically inaccessible when clipped to a battery in the plastic enclosure. Still, it's worth pointing out that if you did figure out a way to do this, it could cause a dangerous condition where the 3.3V regulator backpowers the coin cell.

Component Notes

The **dual-color LED** may be red/green or blue/red. In both cases, red is the less power-efficient color to use; for general illumination, you can extend your battery life by using either the blue or the green LED.

The **nine-pin flex connector** is designed to connect to small flexy sensor boards that you design. The area available for your electronics is quite small, about 6.5×6.5 mm, with no parts over ~1mm tall. Consult the Sensor Watch repository for several examples of sensor boards. You can get these boards fabricated quite inexpensively using OSH Park's 2-layer flex PCB service: www.oshpark.com

The **debug test points** include, from top left: reset, SWCLK, ground, power, and SWDIO. They are covered with orange Kapton tape to insulate them electrically from any sensor boards you may plug in.

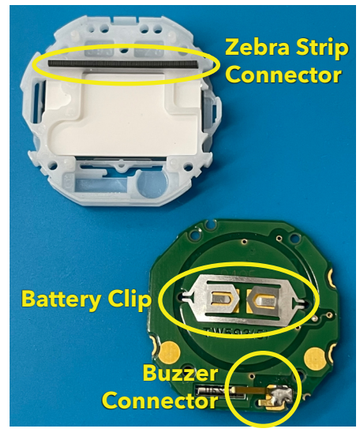
The **3.3V regulator** is only used when plugged in to USB power. It powers the board in the absence of a coin cell, so that you can drag your code onto the microcontroller.

The **LCD screen connection pads** connect to the F-91W's LCD via the gray elastomer "zebra" strip that comes inside your F-91W. It tends to stay put, but take care not to let it fall out whenever disassembling or reassembling the watch.

The **reset button** is connected to the reset pin on the SAM L22. You can tap it once it to reset the application you are running, or double-tap to enter UF2 bootloader mode.

The **battery clip connector** matches the shape of the battery clip that comes with the F-91W. For the watch to function, you must remove the battery clip from the F-91W's circuit board and place it on this spot; it will clip into the two holes on either side.

The **buzzer connection pad** is the only part that requires any soldering. On the F-91W's circuit board, there is a piece of metal in this spot that reaches upward to make contact with the piezo buzzer. To make use of the buzzer, you will need tweezers and a soldering iron. You will need to de-solder the metal piece from the F-91W's circuit board while holding it with tweezers — it will get very hot! — and solder it into place on the Sensor Watch circuit board.



Parts Reused from the Stock F-91W Watch Assembly:

The Zebra Strip remains in its place. Remove the Battery Clip and place it on the Sensor Watch board. Optionally, desolder the Buzzer Connector and solder it to the Sensor Watch board in the same spot.