

# VTLAB 2.3 User Guide

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## Watch package

The package includes

1. smartwatch
2. band
3. USB cable

Connect the USB cable to a laptop or a 5v charger. Charge it for at least 2 hours.

## Smartwatch

VT watch is a medical smartwatch that monitors several vital signs. The watch automatically measures continuous vital sign monitoring through the wrist. The watch comes with a charger and a cable. Please charge the watch by using these or any other **Qi-certified** charger.

## Smartwatch Screen

After you plug the watch, the screen turns on and shows skin temperature, battery level, time, date and number of steps (as shown in fig.1).

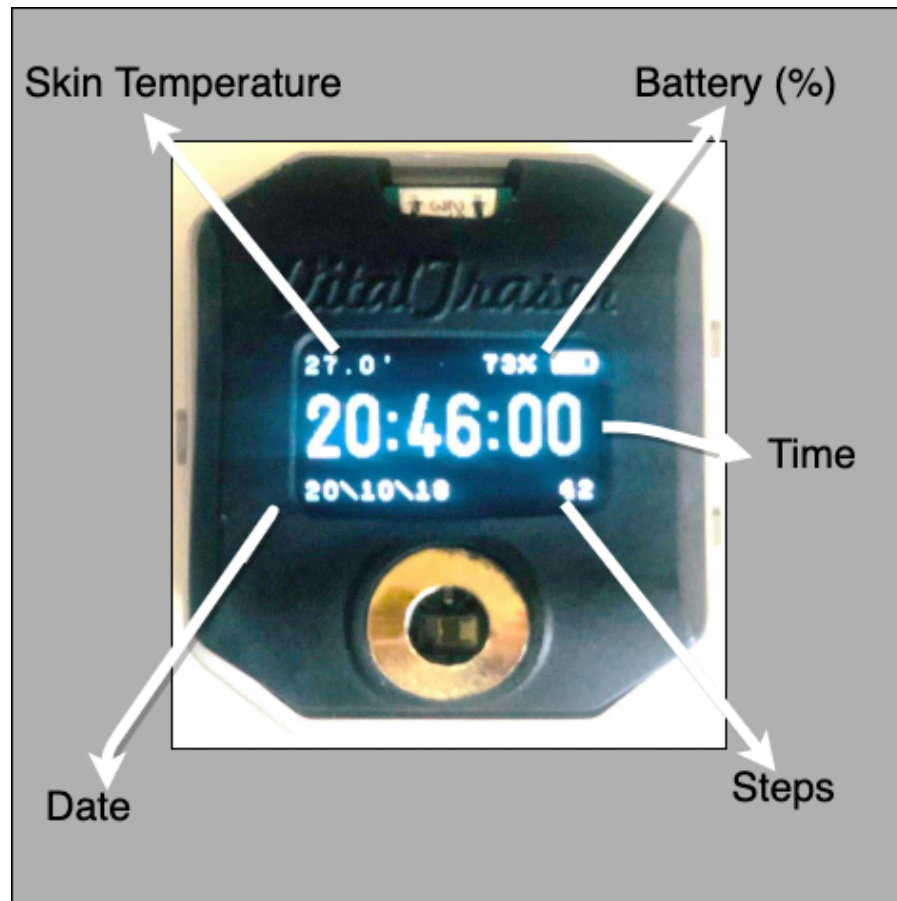


Figure 1: smartwatch main screen including skin temperature, battery level, time, date and number of steps.

## Smartwatch Menu

Press the left button, you see the main menu items including:

- ECG front: Real-time ECG signal recording
- PPG back: Real-time PPG signal
- Steps: counts step
- Alarm: Reminders can be set.
- Temp: shows the skin temperature
- Accel: shows the acceleration in 3 axis
- Settings

Use buttons on the right side of the watch to move between these items. Use the button on

the left to select an item. In the following, we explain more about each item.

## 1. ECG front: Real-time ECG signal

The first item allows you to record your Real-time ECG signal and estimates your heart rate (HR) and the level of SPO2 in your blood. By selecting this item the red light under the screen turns on. Put your index finger on the light as shown in Figure 2.



Figure 2: ECG recording. Select “ECG front” in the watch menu and put your index finger on the sensor. The watch shows the real-time ECG signal, HR and SPO2.

## 2. PPG back: Real-time PPG signal

The second item allows you to record your Real-time PPG signal and estimates your heart rate (HR) and the level of SPO2 in your blood. By selecting this item the lights on the back of the watch turn on as shown in Figure 3.



Figure 3: PPG recording using the back sensors. Select “PPG back” in the watch menu, then, the watch shows the real-time PPG signal, HR and SPO2.

### 3. Steps: counts step

This section shows your walking details. See figure 4.



Figure 4: steps. The step section in the menu shows the number of steps, **max number of steps per hour** and hourly graph.

#### 4. Water

The water section shows the number of glasses you drink per day. You can edit the number by using the right up/down button. See figure 5.



Figure 5. The water menu. This shows how much you drink per day. You can edit the number by using the right up/down button.

#### 5. Alarm:

Use this option to set a reminder. See figure 6.



Figure 6. Alarm. In this menu, you can set a reminder.

## 6. Temp

This section shows the skin temperature in real-time. See figure 7.



Figure 7. Temperature. Measures and shows the skin temperature in real-time.

## 7. Accel

This menu shows the acceleration in 3 axes. As shown in figure 8, this menu shows the position of the watch by a dot and values in the 3D environment.



Figure 8. Acceleration sensor. Shows the position of the watch by a dot and values on the 3D axis.

## 8. Settings

Here you can change some settings of the watch including:

**a. Time**

Time could be changed.

**b. Date**

Data can be changed.

**c. Bluetooth**

Bluetooth could be updated.

**d. SerialNum**

The serial number is shown here in case there are a couple of devices to identify the device.

**e. Format SD**

The SD memory card will be formatted and the watch will be restarted.

**f. Reset**

The smartwatch will be reset, data will be deleted and steps will be zero.

## Update VTLAB firmware

### VTLAB desktop APP

1. Go to the following link in google drive:



<https://drive.google.com/drive/u/0/folders/1dDXBAS6q-lh0JM9v-qz9NtZuQGpp3NFu>  
Download and Run VTLab\_setup.exe as shown below.

2.



Figure 1. Graphical User Interface

1. Shows the collected signals
2. Pauses the collected signals
3. Stops and goes back to the beginning
4. Select the folder that the data are transferred from the watch
5. Data files are shown in this box
6. Signals are shown in this box
7. Signal Cursor: Shows the 100% of the data with respect to time
8. View Width: The width of displayed data could be customized here. Larger width results in more data shown in the display.
9. Speed: Increase or decrease the speed of the displayed signals.
10. Full screen the display
11. Analysis panel which shows vital signs calculations for each pulse

Select ECG front on the watch, place the finger on the top sensor and wait for a couple of seconds. After data collection, connect the USB cable to the computer and the smartwatch, transfer the data to a folder. Select that folder and open the data. It will be shown as below. It is

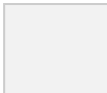
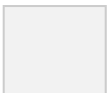

possible to normalize the signals. The analysis panel shows Heart rate from ECG, PPG Red and IR signals, SPo2, RR peak (peak to peak ECG), PTT (Pulse Transit Time) and HRV data for each pulse.



Figure 2. ECG front reading

Select PPG back on the watch and wait for a couple of seconds. After data collection, connect the USB cable to the computer and the smartwatch, transfer the data to a folder. Select that folder and open the data. It is possible to normalize the signals.

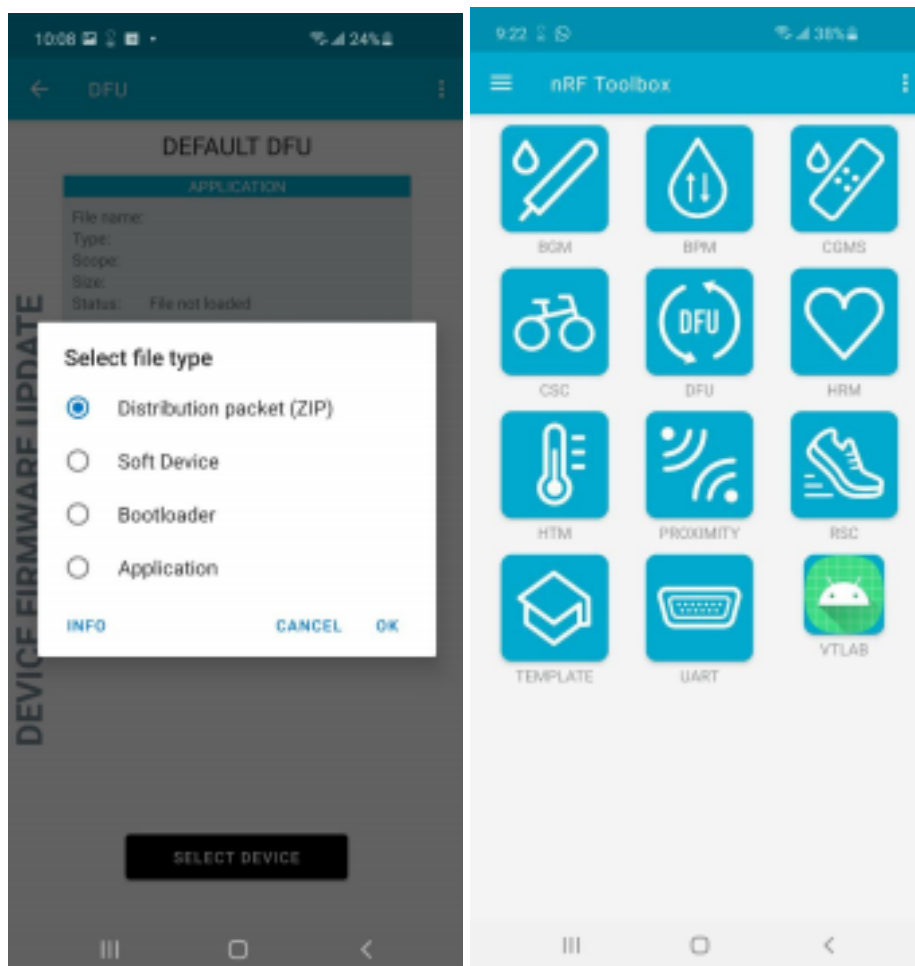
### Keyboard Shortcuts

Pause/play  Move forward  Move backward  Stop 

## FAQ

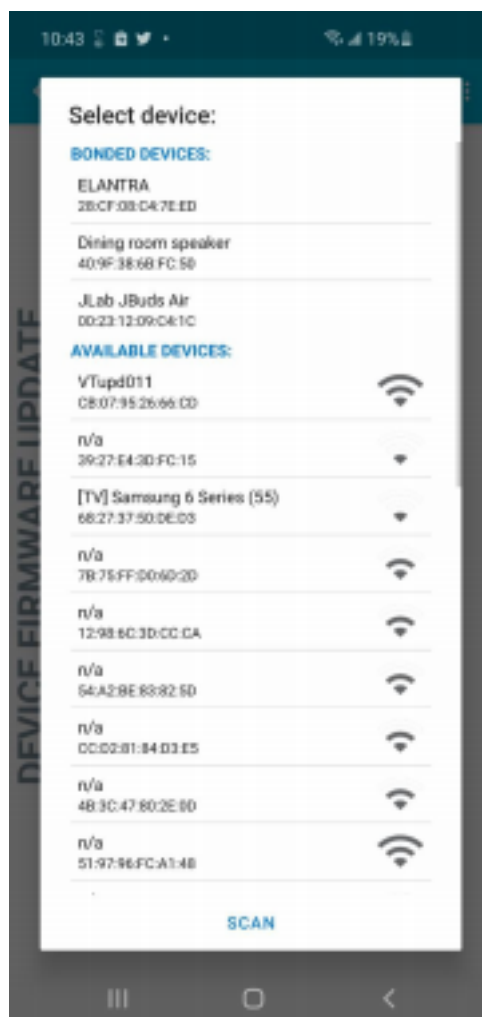
## Update VTLAB Bluetooth firmware

1. Setup NRF toolbox app from google play on your Android phone:  
[https://play.google.com/store/apps/details?id=no.nordicsemi.android.nrftoolbox&hl=en\\_CA&gl=US](https://play.google.com/store/apps/details?id=no.nordicsemi.android.nrftoolbox&hl=en_CA&gl=US)
2. Turn on Bluetooth and Location on your phone
  3. Go to DFU, select ZIP file provided by VitalTracer to you, then select All

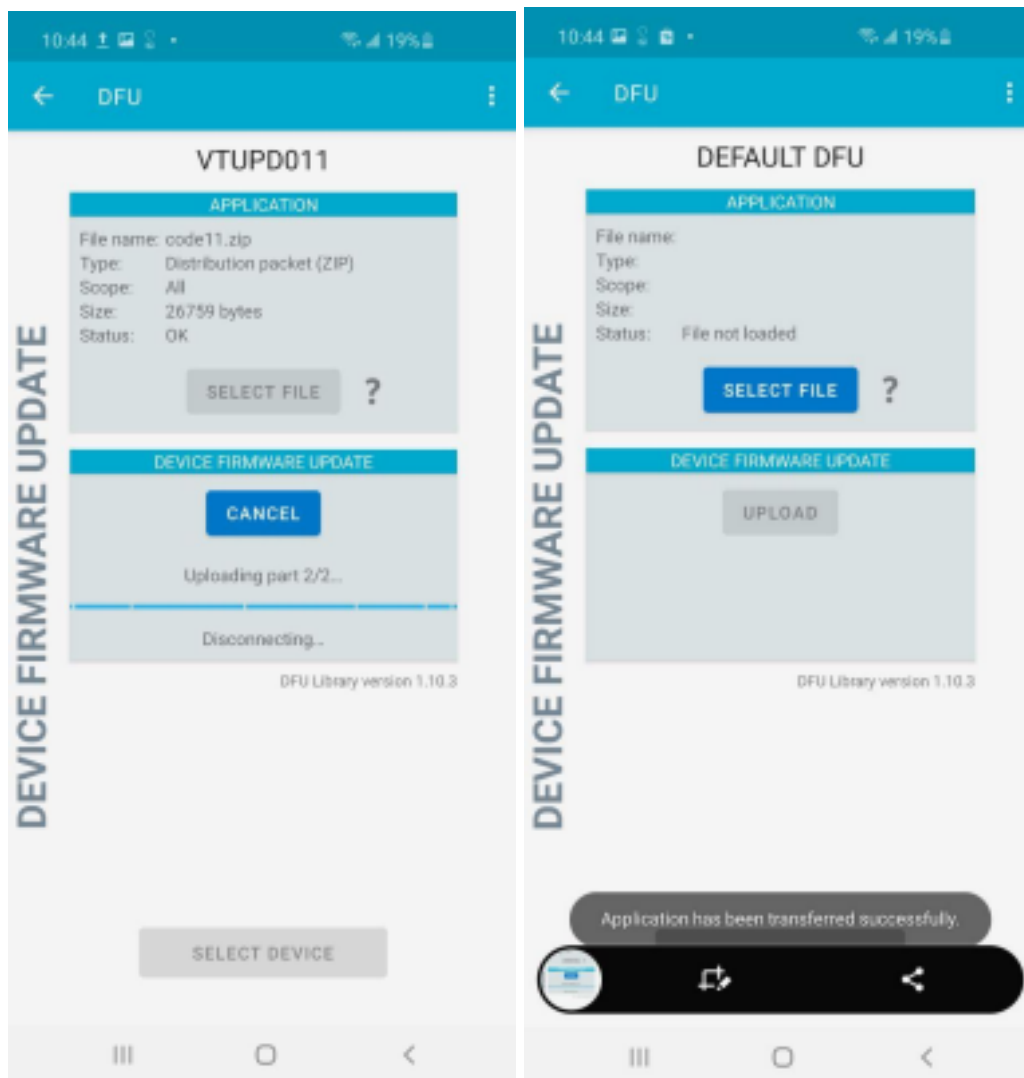


4. Go to watch settings and choose Bluetooth

5. On the app select device and then the "VTupd---" from list



## 6. Update firmware



15. Connect the watch, press and hold left and upright buttons for 5 seconds until you hear a voice of connections.

