

Pebble App

Technical Documentation & User Manual

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Technical Documentation

The server has a built in state machine, which determines if it should output messages to the Pebble watch or the Arduino. Depending on requests sent by the Pebble, the server will send information to either the Arduino or Pebble.

User Interface to Middleware

Pebble watch to Server.

The user controls the state machine, and subsequently all of the actions the app can perform from the Pebble watch. For example, if the user decides to enter party mode, the Pebble will send a request to the server to enter party mode- this will be done by sending a state number after a certain character. The server will then parse the state number after the specified character, and update the global variable state. This state variable will then be sent to the Arduino. If the Pebble watch cannot connect to the server, it tries calling the server and if the call fails then it will display that it cannot connect to the server on the watch.

Middleware to User Interface

Server to Pebble watch.

In addition to taking requests from the Pebble, the server is also able to send responses to the Pebble. When updating the temperature on the watch in both regular and polling mode, the server stores the Arduino output in a buffer until the entire temperature is complete, and then updates a variable latestTemp with its value. If the state machine is in either polling or regular temperature update mode, the server will craft a response to the Pebble with the latestTemp value. The Pebble will then check to see if it was able to obtain this successfully and will display it on the watch.

Middleware to Sensor/Display

Server to Arduino.

The Arduino waits for input from the server to determine how it should proceed. Depending on what state the state machine is in, the server will write to the Arduino and communicate the state it should be in. The Arduino will read the input from the server and enter a switch statement that determines its behavior. For example, if the state given by the server is p (for party mode), the Arduino will change the partyMode 3oolean to true and call the partyMode function. If the Arduino is disconnected then the server will continue to try and receive readings from the Arduino. After a given amount of failed readings, the watch will display that the Arduino has been disconnected.

Sensor/Display to Middleware

Arduino to Server.

To get the temperature information, the server needs to communicate with the Arduino. When we plug the Arduino with temperature sensor into the computer, it continually polls current temperature. The server creates a connection to the Arduino (error checking to see if the connection was successful) and configures the connection. It then collects temperature information into a buffer, waiting for the newline character to inform it that one reading of the temperature is finished. It will then store that number into a latest temp variable, which will eventually be sent to the Pebble watch.

Mode and Keys

Pebble sends key to server, which then sends a character to Arduino for it to recognize what it should do. The Pebble sends these values with a \$ sign in front so that the server can parse the number and convert it into a readable character for the Arduino.

State	Pebble	Server	Arduino
Update Temp	0	-	Returns temp
Change to C	1	F	Changes to F
Change to F	1	F	Changes to C
Standby on/off	2	S	Changes on/off standby
Party Mode	3	P	Turns on/off party mode (toggle)
Polling	Just on Pebble	-	-
Comfort Zone	Just on Pebble	-	-
Turn off server	5	-	-

PebbleKit JS Message Keys	Key Name	Key ID	
	setTempDown	7	—
	changeUnit	1	—
	getStats	9	—
	setTempUp	6	—
	stopServer	12	—
	newReading	3	—
	name	0	—
	partyMode	4	—
	pollingOff	11	—
	polling	10	—
	cModeExit	8	—
	standby	2	—
	cMode	5	—
	New Entry	0	—

A mapping from strings to integers used by PebbleKit JS.

Average Temperature Calculation

Temperatures are collected from the Arduino and stored in the server. The server continuously compares each temperature given from the Arduino to the min and max, and stores these values in global variables. Each temperature is also stored in a total temperature count, and a temperature counter is incremented for either Celsius or Fahrenheit. When the user selects Average Temperature Mode, the server will calculate the average temperature (from these totals and counts), and send a reply to the Pebble watch. The Pebble watch will then display min, max and average temperature for the user.

Additional Features

Party Mode

The user will select party mode on the Pebble by holding the top button down, which will send a request to the server to enter party mode. The server will parse the request from the Pebble, to determine which state The server will then send a request to the Arduino Party Mode will turn the LED into alternate flashing colors, from red, to green, to blue.

Comfort Zone Mode

The comfort zone mode is entirely run on the Pebble. The user will select comfort zone mode on the Pebble, by triple clicking the top button. Then they will

be taken to a screen where they can set their ideal upper bound temperature by double clicking up, or double clicking down (this will change the temp up or down respectively by one degree). When the user is done setting the desired upper bound temperature the user will triple click the top button. Then the Pebble watch will update the temperature and compare it to the upper bound the user sent- if the current temperature is above the desired upper bound the user set, the Pebble watch will alert the user that it is too hot. To completely exit this mode the user will triple click down and be brought back to the neutral state in the state machine.

Polling Mode

The user will select polling mode on the Pebble watch by holding the select or center button down. This will then trigger the state machine to switch into polling mode, which will constantly update temperatures on the watch- this will be done by taking the continuous Arduino output and having the server continuously send it to the Pebble watch. The Pebble watch will then continuously display this output instead of waiting for the user to manually update it. To exit polling mode, hold down the select button.

User Documentation

Button Settings

Center Single Click

Clicking the center or select button once will update the temperature on the Pebble watch.

Center Long Click

Holding down the center or select button once will turn on polling mode if polling mode is off, or will turn off polling mode if it is on.

Down Long Click

Holding down the bottom button once will turn on standby mode if standby mode is off, or will turn off standby mode if it is on.

Up Long Click

Holding down the top button once will turn on party mode if party mode is off, or will turn off party mode if it is on.

Up Triple Click

Triple clicking the top button will turn on comfort zone mode. Once you set your temp, you up triple click again to set the threshold.

Double Up/Down Click

When you are in comfort zone, doing this will change your threshold either higher or lower, respectively.

Down Triple Click

Triple clicking the bottom button will deactivate comfort zone mode.

Center Triple Click

Turn off the server.

Up Single Click

To change between units. $C \rightarrow F$, or $F \rightarrow C$.

Down Single Click

Will display temperature statistics- average, high and low temperatures.

Modes and Additional Features

Party Mode

The light on the Arduino sensor will turn different colors- from red to green to blue and back.

Polling Mode

The Pebble watch will continuously update with the most current temperature.

Change Unit Mode

This will change the current temperature unit from Celsius to Fahrenheit and vice versa.

Standby Mode

This will stop the Pebble watch from updating the temperature.

Comfort Zone Mode

This allows the user to specify an upper bound for temperature for their comfort zone. If the temperature goes above their comfort zone the Pebble watch will alert them that it is "too hot."

Average Temperature Mode

The Pebble watch will display the average temperature recorded so far, as well as the min and max temperatures, in either Celsius or Fahrenheit, depending on what unit the Pebble watch is in.