

Department of Electronics and Telecommunication Engineering University of Moratuwa



BM2210 - Biomedical Device Design Modularity of Design Task Assignment Submission

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1 Introduction

In this modular design, an ECG signal is simulated to monitor heart rate, with the WiFi module on the ESP32 enabling remote alerts. Threshold values are set at below 60 BPM and above 100 BPM. If the heart rate goes outside this range, a warning message is triggered. This message is displayed on the serial monitor and sent via the MQTT protocol to HiveMQ, using the WiFi module on the ESP32 to establish the connection and transmit alerts in real time.

2 Pinouts of ESP32

This section provides detailed information about the pin configuration for the ESP32 microcontroller, as shown below:

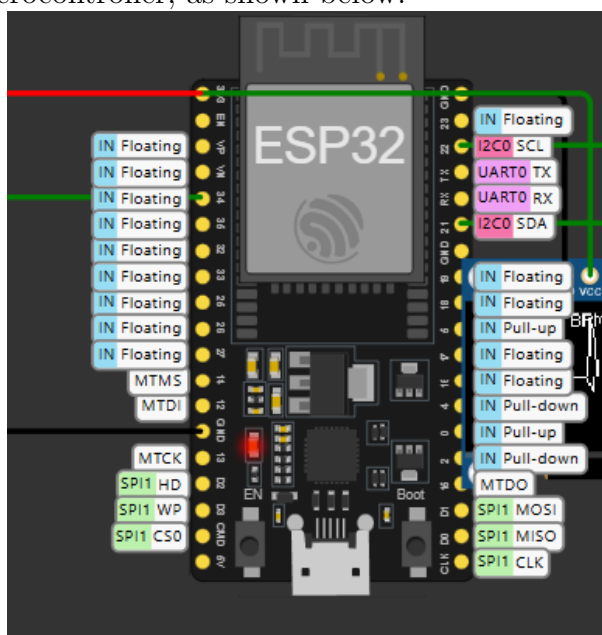


Fig 1: ESP32 Pinout Configuration.

3 Simulation Setup

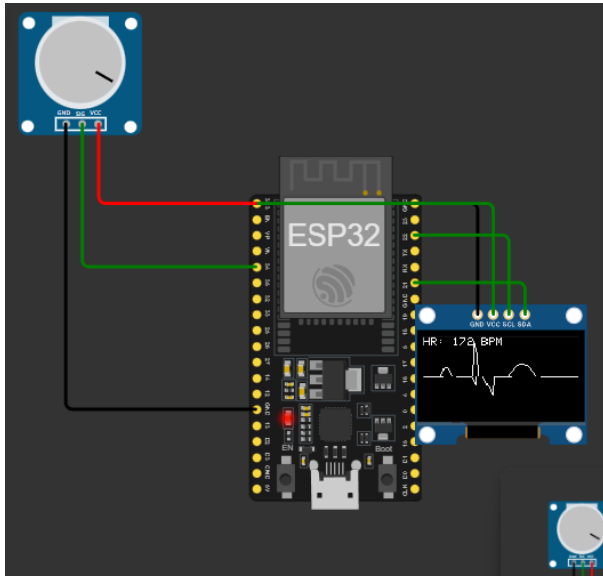



Fig 2: Simulation Setup Picture.

4 Warning Messages Received from HiveMQ

Messages received from HiveMQ are shown below when a warning condition is triggered (heart rate goes out of the safe range).



Need a fully managed MQTT broker?
Get your own Cloud broker and connect up to 100 devices for free.

Get your free account

Connection

Host

mqtt-dashboards.com

Port

8884

ClientID

clientid-ICJUM8KMjr

Connect

Username

Password

Keep Alive

60

SSL

Clean Session

Last-Will Topic

Last-Will QoS

0

Last-Will Retain

Last-Will Message

Publish

Subscriptions

Messages

Fig 3: server details.

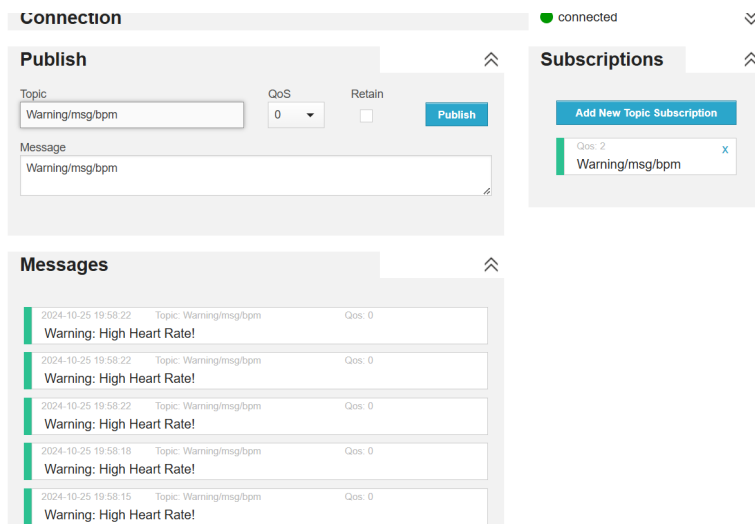


Fig 4: Warning Message from HiveMQ.

5 Block Diagram

This section includes a block diagram illustrating the overall system architecture.

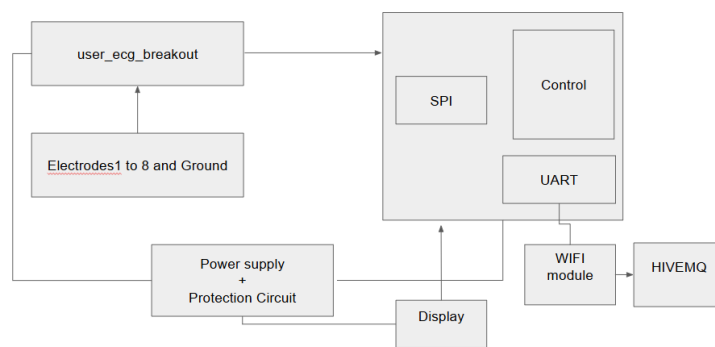


Fig 5: System Block Diagram.