

بسم الله الرحمن الرحيم

Al-Najah National University



Faculty of Engineering & Information Technology

Computer Engineering Department

Hardware Graduation Project (The Monitor)

Students:

Haneen Fozan Rizk Banishamsah

Marwan Naser Dawod Soboh

S11715378@stu.najah.edu

S11610758@stu.najah.edu

Under the supervision of

Dr.Sufyan Samara

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Acknowledgment

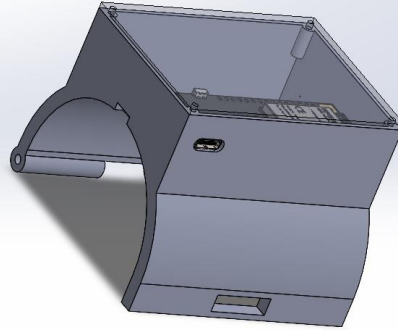
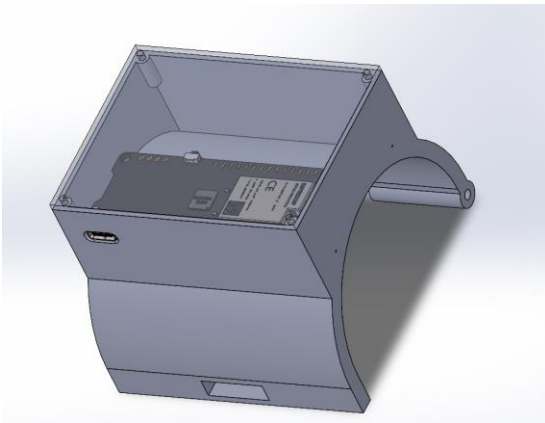
After praising Allah, the Lord of the Worlds, for His generosity and favor upon us and the guidance that accompanied us in this project, each one of us dedicates this project and its success to our beloved mothers, who stayed awake at night out of fear and anxiety, and who never ceased to pray for success and prosperity. We also dedicate it to our fathers, who have always been our primary source of wisdom and experience, to our sisters and brothers who endured our moods and fatigue, and of course, to our esteemed department professors, each by their name and title. Special mention goes to our dear supervisor, Dr. Sufian Samara, for what he endured from us and what he did for us.

We also extend our gratitude to our fellow students in the Computer Engineering department, who never hesitated to share any information we asked for. And, of course, to our beloved university, An-Najah National University.

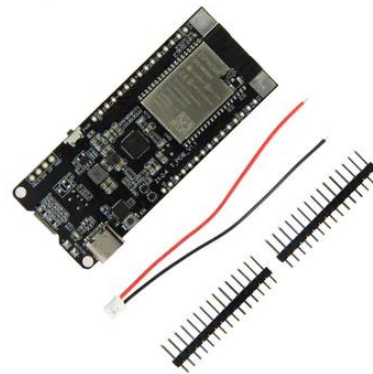
On my behalf, I, Hanin Bani Shamsa, would like to express my special thanks to my husband and my son, who bore my exhaustion, pressure, and my occasional shortcomings throughout the project period. I also extend my gratitude to my second family, who supported me just as my first family did.

- 1. Table of Contents (TOC):** In this table, the report contents with respective page numbers have to be listed. Make sure that each division down to subsections is included with the right page numbers. Also, make sure that the body of your report is organized exactly as it appears in the TOC.

List of Figures (LOF):

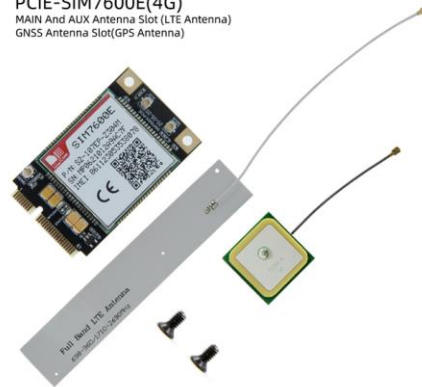


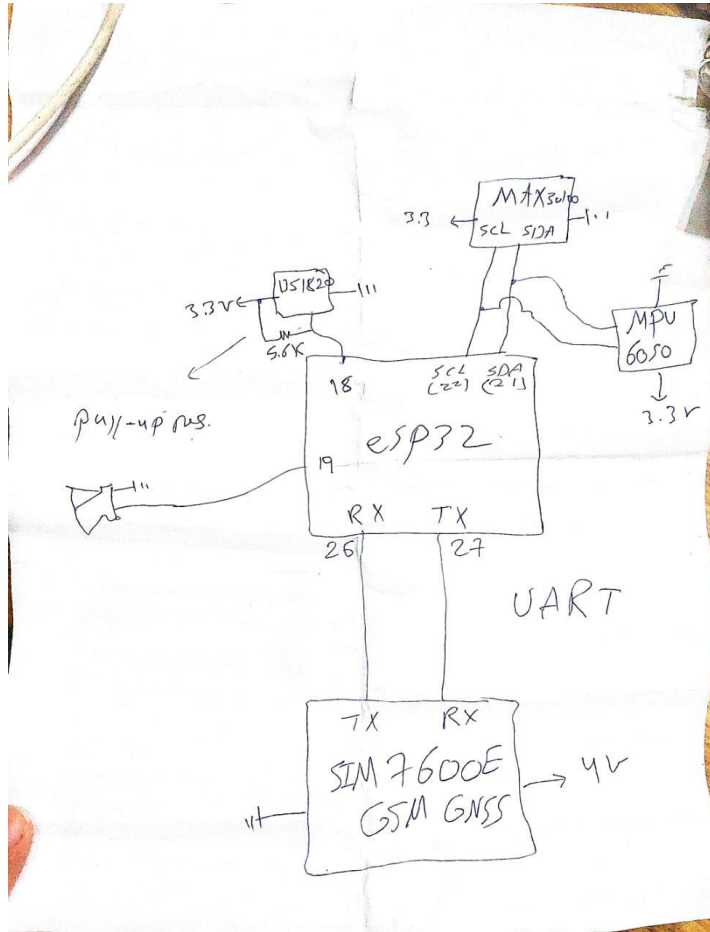
T-PCIE 4MB





PCIE-SIM7600E(4G)
MAIN And AUX Antenna Slot (LTE Antenna)
GNSS Antenna Slot(GPS Antenna)





2. **List of Tables (LOT):** In this section, all tables in the report are to be listed together with respective page numbers. Make sure that the tables appear in the body of the report exactly as they are listed in the LOT.
3. **Nomenclature or list of symbols** (optional): In this section, all symbols used in equations in the text or axis of plots have to be properly defined including the units. The order should be as follows:
 - a. **Roman** letters (a, A, b, B ..., y, Y, z, Z) sorted alphabetically with lower case letters preceding upper case letters.
 - b. **Greek** letters (α , β , ..., ω , Ω) sorted alphabetically with lower case letters preceding upper case letters.
 - c. **Subscripts** used throughout and sorted alphabetically.
 - d. **Superscripts** used throughout and sorted alphabetically.
 - e. **List of abbreviations:** list the abbreviation used in the document with their definition to the right.

Abstract :

In this project, we designed a wearable device consisting of a bracelet that we customized to fit the required functionality. Inside the bracelet, it houses the necessary electronic components and is connected to a sensor that measures heart rate and oxygen levels through the finger. Additionally, when needed, it can also connect to a helmet containing a temperature sensor and a sensor for measuring head tilt angle. This project was modified based on the request of the project committee to make it a more robust hardware project than the one previously proposed, and it was implemented in accordance with the suggestions of the supervising doctor.

This device serves a broad spectrum of society, including children, the elderly, travelers, drivers, and patients in general. It collects the user's vital signs through sensors located in the hand, finger, and head and uploads them to a public server using HTTPS for security purposes.

It also uploads the user's location from anywhere in the world and sends it to an application that displays this information along with detailed location data. The information is continuously updated automatically every ten seconds (with a margin of error in terms of time and server upload time, taking approximately 10-15 seconds).

If these readings fall outside the normal range, for example, if the heart rate is less than 40 or greater than 130, it represents an abnormal reading. The device waits for three consecutive abnormal readings and then sends a text message to the relevant authorities, such as the doctor if the user is a patient, the police if the user is a driver, or emergency services, and in the case of a child user, it notifies the parent, and so on.

The message also includes the user or patient's name and their current location. In case there is an issue with data updates or if the device malfunctions due to an accident, for example, it provides the latest readings and the last location from which the readings were taken.

As for the sensor measuring the angle of the head, it is used for the driver. If the driver falls asleep while driving or tilts their head down, for example, to use their mobile phone, the sensor detects this and activates an alarm until the head returns to the appropriate driving position. If the driver does not raise their head within twenty seconds, it sends a text message to the relevant authorities.

MAIN BODY

The front matter is organizational in nature; the actual report begins with the introduction. The body of the report is to be numbered as 1, 2, 3 etc. The following items should be included in the main body of the report:

Chapter 1: Introduction

Due to the risks of driving and the possibility of sudden medical conditions affecting the driver, we have decided to undertake a project aimed at identifying and responding to any potential hazards to the driver as quickly as possible for their rescue.

This project is designed to reduce the number of fatalities among drivers in case of medical emergencies, such as heart attacks, and others, by pinpointing their location and sending an alert message indicating a life-threatening situation. Additionally, the project includes a feature that triggers an alarm inside the car if the driver falls asleep while driving.

In this report, we will discuss the importance of the project in detail, how it operates, the tools we have employed, and the challenges we encountered during the project's design and implementation.

Chapter 2: Theoretical Background and Previous Work

We have reviewed similar previous works to ours and found projects that perform the same functions but operate using 2G technology. We have developed this project to operate using 4G technology, as this feature allows us to use the project on a wider scale.

Chapter 3: Methodology

In research reports, this section can also be called “Experimental Methods”, “Experimental Section”, or “Materials and Methods”. For experimental work, give sufficient detail about your materials and methods so that other experienced workers can repeat your work and obtain comparable results. When using a standard method, cite the appropriate literature and give the details of theories that were applied.

Describe apparatus only if it is not standard or not commercially available. Describe the procedures used, unless they are established and standard. Note and emphasize any hazards, include precautionary handling procedures, and any other safety considerations in adequate detail so that workers repeating the experiments can take appropriate safety measures.

Methodology chapter should include the following subsections:

Standards and Specifications (Codes):

The student should clarify which engineering standards were applied to this design project and how the design project is expected to satisfy these standards. Include the necessary standards and design alternatives and indicate their possible relevance to your project. As an example, if you are using IEEE 802.11 standard in your design you are expected to go through that standard and include in your Interim Report how you will utilize this standard in your design.

Constraints:

The design constraints should be identified and some discussion on their realization are to be included in this chapter. You may refer to the list of some realistic design constraints as in the following lists:

- Economy (such as budget limitations, cost of similar or related products, maintenance cost).
- Environment (such as power consumption, electromagnetic radiation issues, environment friendly power sources, noise pollution).
- Society (such as assisted living for the disabled and elderly, information security, privacy, social networking and communication).
- Politics (such as designs that promote gender and race equality, products that help national security, designs that help solve common international and national problems).
- Ethics (such as designs that do not violate safety and health issues, designs that respect patents and intellectual rights, privacy issues, honesty, truthfulness).
- Health and Safety (such as public safety, safety of the consumers of the product, safety of workers).
- Manufacturability (such as designs that suit to current manufacturing technology and designs that can be physically implemented).
- Sustainability (such as reliability and durability of the design, designs that support future upgrades, designs that are resilient to a range of environmental conditions).

Chapter 4: Results and Analysis

Summarize the data collected and their statistical treatment. Include only relevant data, but give sufficient detail to justify your conclusions.

This section is most effective if written in the past tense. "The data was taken ..."; "the curve was generated..." However, it is appropriate to say such things as 'the data is well represented by a second order polynomial' since this is a fact that extends into present. Additionally, estimate the error in measuring whatever your objective was to measure.

Tables and figures tend to be the most effective ways to present data. It is extremely useful to include figures in the text at the point where they are being discussed. When graphs or tables will

present the ideas clearly, use them, but also include a concise discussion of the graphs and tables focusing the reader's attention on the salient features of data. Do not simply recite numbers or parameters, which should be obvious upon simple inspection of the figures. Moreover, never forget to indicate units.

Chapter 5: Discussion

We encountered an issue in measuring hand temperature, as we were able to measure the external body temperature, and of course, there was a significant impact from the ambient temperature on the results we obtained. We added another sensor to measure temperature on the head to obtain an additional, more accurate result.

As for determining the location on the map, since the GPS antenna doesn't work indoors, we replaced it with another antenna with a long cable that can be mounted on the outside of the car.

Chapter 6: Conclusions and Recommendation

In this chapter, we will summarize the main results and key findings obtained from the "Smart Doctor" project, which aims to enhance the safety system for car drivers through the integration of a smart bracelet and cap.

6.1 Summary of Results

- We have successfully developed a model for the smart bracelet and cap that effectively enhances the driver's safety during driving.
- The bracelet is equipped with advanced sensors to monitor the driver's condition and level of concentration.
- The cap is equipped with wireless communication technology to receive and analyze data from the bracelet.

6.2 Recommendations

- It is recommended to expand the application of this model to more drivers and vehicles, where it can have a positive impact on road safety and accidents prevention.
- Further research is suggested to improve the accuracy of the bracelet's measurements and to develop additional useful functions for the cap.

6.3 Key Conclusions

- The "The Monitor" project has proven that modern technology can significantly enhance the safety system for car drivers.
- Notable progress has been achieved in the ability of the bracelet and cap to effectively analyze and monitor the driver's condition.

6.4 Future Directions and Open Issues

- In the future, we aim to enhance the accuracy of the bracelet and increase its interaction with the cap to provide a better safety experience for drivers.

With this conclusion, we emphasize the importance of developing safety systems in the field of driving and highlight potential future efforts to improve this model and expand its application. In the project, we collected data related to the driver's heart rate, hand temperature, head temperature, blood oxygen level, and the car's coordinates on the map. After gathering this data, we linked it to a database and displayed it in real-time on a mobile application. We found that the normal blood oxygen level should not be less than 94%. As for the heart rate, the device is designed to send an alert if it falls below 40 or exceeds 120 beats per minute.

References (Refer to Appendix B: guideline)

- **The list of references** should be alphabetized by authors' last names without any numbering. This is very helpful when additional references are added at any stage of the work. if you have more than one work by the same author, order them by publication date, oldest to newest. if no author is given for a particular source, alphabetize using the title of the work; numeric style (Vancouver) can be used as well. The references should be written according to the **American Psychological Association (APA)** format.
- **Citing References:** Tools such Microsoft Word Endnote and Mendeley can be helpful for generating the list of references and citations within your document.

Appendices

A report should be a complete, concise, self-contained document without appendices. These sections contain information not appropriate to any other section. For example, raw data, Analysis of Data, detailed derivations, rest of the calculations etc. may be included in the appendices. For example, you might include a sketch of an improved way to complete the experiment, or to present the data. All appendices and graphs should be attached at the end of the report.

Attachment A:

Proposed Disclaimer Statement Format

The report is a document written by the student(s) and should reflect expertise in different aspects of research methodology and technical writing skills. The supervisor's job is to guide the student so that she/he can achieve the objectives in an efficient way while gaining the skills sought. While maintaining credit the ***disclaimer statement*** is simply a statement protecting the Department and the University from any legal liability claims associated with the use of the results and the methods presented. Its format is as follows:

DISCLAIMER

This report was written by student(s) at the () Engineering Department, Faculty of Engineering, An-Najah National University. It has not been altered or corrected, other than editorial corrections, as a result of assessment and it may contain language as well as content errors. The views expressed in it together with any outcomes and recommendations are solely those of the student(s). An-Najah National University accepts no responsibility or liability for the consequences of this report being used for a purpose other than the purpose for which it was commissioned.

Appendix B

Cite Resources: American Psychological Association (APA)

Basic Rules

- **Author's** names are inverted. Begin with last name, followed by a comma, then by middle and first initials. **Example:** Smith, M. F. Use "&" instead of "and" when listing multiple authors. **Example:** Calfee, R. C., & Valencia, R. R.
- **Date:** The publication date should be enclosed in parentheses. **Example:** (1998)
- **Title:** Italicize titles of books and periodicals. Capitalize only the first word of a title and subtitle of a work. **Example:** *Curing the crisis: Options for America's health care.*
- **Location:** You should always list the city, but you should also include the state abbreviation if the city is not well known for publishing. You can omit state for the following cities: Baltimore, Boston, Chicago, Los Angeles, New York, Philadelphia, and San Francisco. Place a colon (:) after location. **Example:** Springfield, MA:
- **Publisher (for books):** Use the full name of the publisher, but drop *Co.*, *Inc.*, *Publishers*, etc. Retain *Books* or *Press*. **Example:** Merriam-Webster.

BOOKS - General Format

Author, A. A. (Year of publication). *Book title*. Edition. Location: Publisher. Page number (s) if appropriate.

One Author

Reference: Kmoisar, L. (1991). *The new feminism*. New York: Franklin Watts.

In-text: (Komisar, 1991, p. 201)

Two Authors

Reference: Strunk, W., Jr., & White, E.B. (1979). *The elements of style* (3rd ed.). New York: Macmillan.

In-text: (Strunk & White, 1979, p.43)

Three to Six Authors

Reference: Pratkanis, A. R., Brecker, S. J., & Greenwald, A. G. (1989). *Attitude structure and function*. Hillsdale, NJ: Erlbaum.

In-text: (Pratkanis et al., 1989, p.50)

PERIODICALS - General Format

Author, A. A. (Date of publication). Title of article. *Title of periodical*, volume number, pages.

- **Date of publication:** Include year of publication, add month and day of publication for daily, weekly, or monthly publications. Enclose in parentheses.
- **Title of article:** Do not italicize the title of article or place quotation marks around it.
- **Title of periodical:** Include the full periodical title, using upper and lowercase letters. Italicize the name of the periodical and the volume number, if any.
- **Volume number:** Give the volume number of journals, magazines, and newsletters. Do not use "Vol." before the number.
- **Pages:**
 1. Give the page numbers for the whole article rather than the first page. **Example:** 204-232.
 2. For journal and magazine articles, just include the page numbers with no abbreviation or label. **Example:** 28-31.
 3. Only use the abbreviations before page numbers from newspapers. Use "p." for one page (**Example:** p. A1) and "pp." for more than one page (**Example:** pp. A1, A6).

ARTICLES

Journal Article - General Format

Author, date of publication, article title, journal title, volume and issue numbers, page number(s);

Reference: Atkinson, R.C., & Shiffrin, R.M. (1971). The control of short-term memory. *Scientific American*, 225, 82-90.

In-text: (Atkinson & Shiffrin, 1971, p.87)

Magazine Article

Reference: Kandel, E.R. (2000, November 10). Neuroscience: Breaking down scientific barriers to the study of brain and mind. *Science*, 290, 1113-1120.

In-text: (Kandel, 2000, p. 1119)

Encyclopedia Article

Reference: Warren, S.A. (1977). Mental retardation and environment. In *International encyclopedia of psychiatry, psychology, psychoanalysis, and neurology* (Vol. 7, pp. 202-207). New York: Aesculapius Publishers.

In-text: (Warren, 1977, p. 204)

Newspaper Article - General Format

Author (s), date of publication; article title, name of newspaper, section title and page number(s).

Reference: Amazing Amazon region. (1989, January 12). *New York Times*, pp. D11, D14.

In-text: ("Amazing Amazon Region," 1989, p. D11)

ELECTRONIC RESOURCES

Electronic Article (From Database)

Reference: Jacobson, J.W., Mulick, J.A., & Schwartz, A.A. (1995). A history of facilitated communication: Science, pseudoscience, and antiscience. *American Psychologist*, 50, 750-765. Retrieved from PsychINFO database.

In-text: (Jacobson et al., 1995, p. 755)

Web Site- General Format

Author (s), date when the site was accessed, article and publication title as well as a [URL](#)

Reference: Thaller, M. (2007). *Cool cosmos*. Retrieved August 27, 2007 from <http://coolcosmos.ipac.caltech.edu/>.

In-text: (Thaller, 2007)

Document with Author

Murray, J. P. *Children and television violence*. (1995). Retrieved July 19, 2001, from <http://www.ksu.edu/humec/kulaw.htm>

Document with No Author, No Date

GVU's 8th WWW user survey. (n.d.). Retrieved August 8, 2000, from

http://www.cc.gatech.edu/gvu/user_surveys/survey-1997-10/

- Begin with the title of the document if there is no author
- n.d. = no date

Personal communications (e-mail, personal interviews, and telephone conversations, etc.)

Source: email message from John Smith

Citation: (J. Smith, personal communication, May 16, 1998)

- Personal communication is not available to your readers. Cite it in text only. Do not include it in the reference list. Give the initials as well as the surname of the communicator, and provide as exact date as possible.