

Research for manufacturing braces for heart disease.

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Abstract: Healthcare is a field with outstandingly developed technology and requires constant improvement and quality improvement in all aspects, especially in the field of cardiology. The application of electrical engineering, sensors and microprocessors has long been widely applied and strongly developed in advanced countries. The bracelet model that supports heart patients is also a typical example of applying sensor measurement and data processing techniques to the medical field. Simply put, the medical staff or directly the patients will be measured heart rate and then from the data displayed and the warnings given will have a specific treatment method. With a shortened design and leading equipment, this product promises to be of great help to heart disease patients.

Keywords: Bracelet, Smart bracelet, Aduino.

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I. Pose the problem

Before going to learn about the topic, let's learn about the issues surrounding the topic. Our country is also a country with a developed health care industry, with many advanced advanced infrastructure facilities, a team of good doctors and nurses who love their profession, and above all, have the attention and development of medical professionals. state for this sector. Especially, the cardiology department requires more and more technical expertise in examination and treatment.

However, the nature of heart disease is a long-term insidious disease that is difficult to cure completely, such as: blood pressure, arrhythmia, atherosclerosis, heart valve-related diseases, etc. . . When visiting large hospitals, patients will be able to monitor their heart rate easily. So the question is when at home to support people with heart disease, how can they know their heart rate, while the above devices are expensive.

II. Arduino Nano

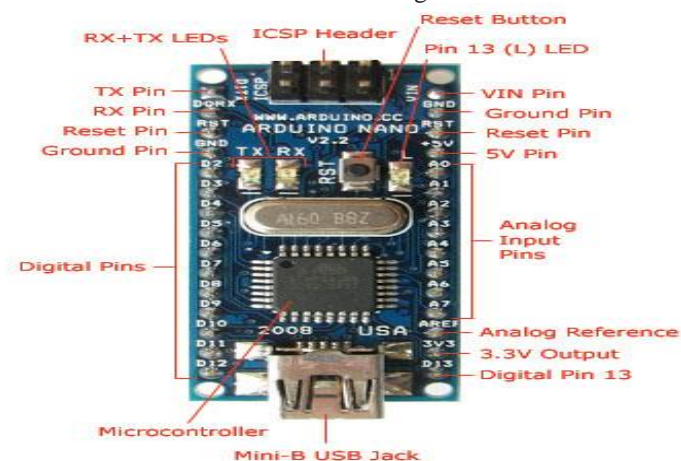
Receive signal from sensor block.

Control signal processing.

Send signal to display block.

Send a signal to the block that executes the alarm.

Connectivity communication is more functional when connecting Bluetooth with another microcontroller block.



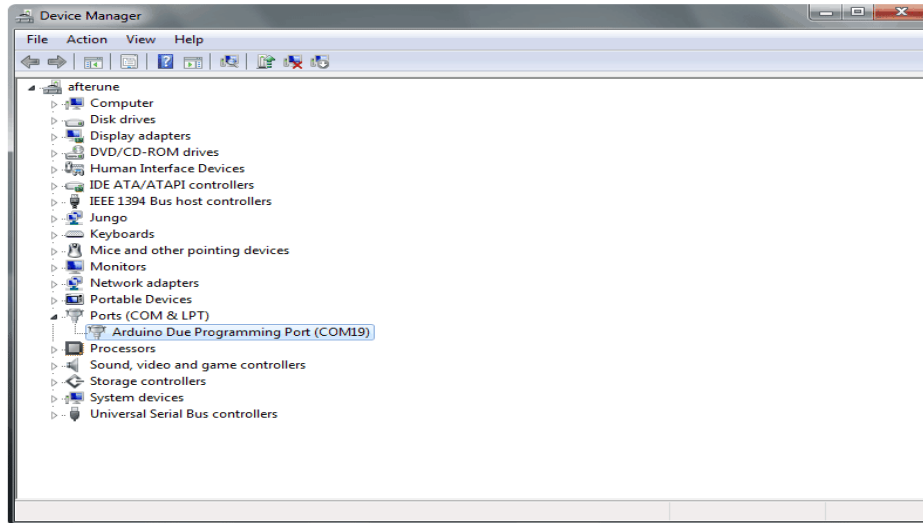
- Clock: 16MHz
- EEPROM: 1KB (ATmega328) and 4KB (ATmega2560)
- SRAM: 2KB (Atmega328) and 8KB (Atmega2560)

- Flash: 32KB (Atmega328) and 256KB (Atmega2560)

Right click on My Computer > Device Manager > Other Devices will see an item appear when plugging in the board is Unknown devices or Arduino.

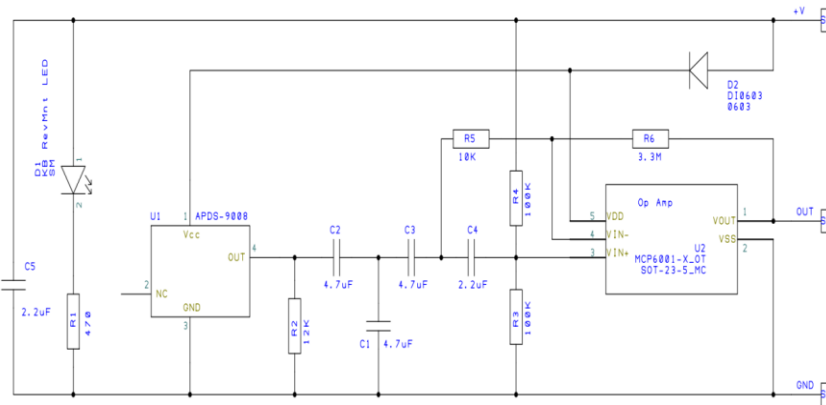
Right-click on the item that just appears in Other Devices > Update Driver Software > Browse my computer for Driver software, then select the path as the folder Arduino has just installed on the computer (usually located in Program Files), then click OK and wait until the installation is successful.

After successful installation, in Device Manager, the corresponding board name and Comport port order will be displayed as follows:

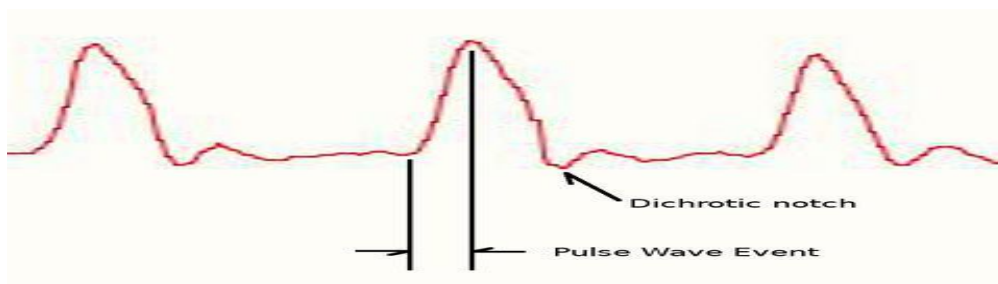


III. Experimental model design

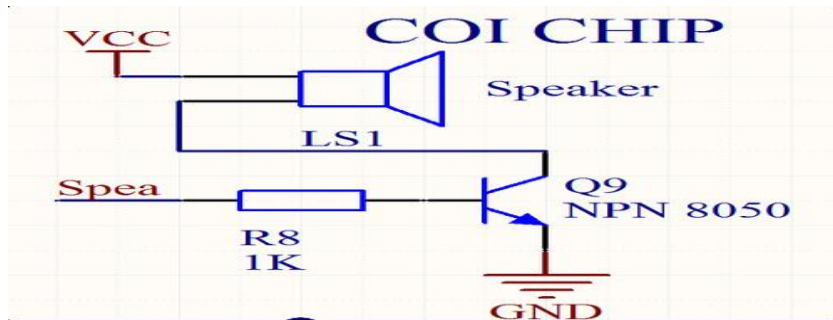
The schematic diagram of the heart rate sensor



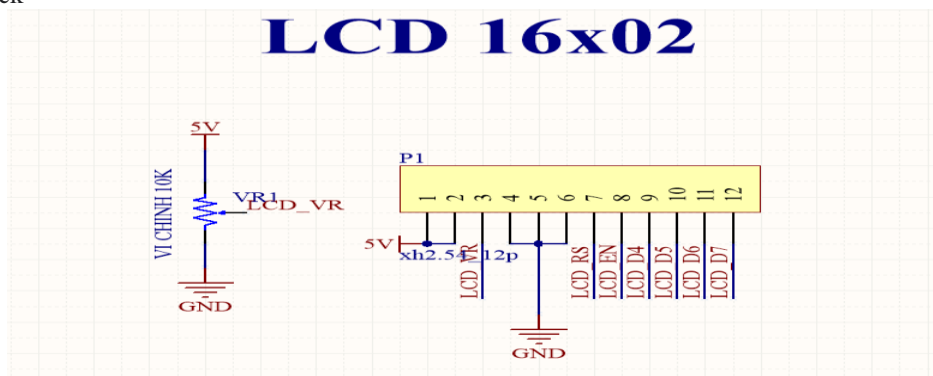
The pulse signal emitted by the radiograph is a voltage analogous oscillation and it has a predictable wave shape as shown in Figure 1. The description of the pulse wave is called a spectrometer or PPG.



Control block



Display block



AT+ROLE=0 ----Set the SLAVE role for the module.

Default is SLAVE. AT+ROLE=1 ----Set the MASTER role for the module. - Set connection mode:

AT+CMODE=0 ----The bluetooth module can only link to the familiar SLAVE module.

AT+CMODE=1 ----The bluetooth module can connect to any SLAVE module (no fixed address).

The common way to connect to any SLAVE module is to start the HC-05 in CMODE 1 → connect to the SLAVE module → change the HC-05 to CMODE 0 → the module will automatically connect to the SLAVE module.

- Set up PIN code:

AT+PSWD=XXXX ---- set pin code to pair. Password includes 4 digits

- UART setting:

AT+UART=< Param1>, < Param2>, < Param3> Example: AT+UART=9600,0,0 ---- set the UART to operate at 9600N81

- Set device name:

AT+NAME=XXXXX

- List SLAVE devices around: AT+INQ ---- Returns a list of SLAVE devices around the module

IV. Conclude

To develop from a measuring model into a measuring device requires a lot of effort, testing, upgrading, and replacement. For this measurement model we can design further optimized filters to recover almost completely the signal form. The future software has a diagnostic function based on measured parameters to assist the physician in making the final decision.

Although this is not a new topic, in fact it has been an extremely advanced topic in the world. But being able to implement the model and apply it in practice from the theoretical basis.

Combined with the oxygen temperature sensor system for the patient.

Replace data transmission with RF waves, Wifi waves for higher transmission capacity.

Improve product stability, while reducing product cost and size - The model can be designed to be more compact thanks to the use of smaller microcontrollers but still ensure standards such as low power consumption, integrated ADC, DAC. When combined with good anti

Interference and layout techniques, the model can be made much more compact than it is today.

References

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