Despite the complexity of the study and understanding of physical processes of the electrospinning method, it is characterized by instrumental simplicity, high energy efficiency of nanofiber production, versatility of the formable material and flexibility of the control over the process parameters. All this makes the process of electrospinning attractive for industrial production of nanofibers.

Nanofibers and materials obtained by electrospinning are used in a variety of areas. Using different nozzle allows changing the properties in the necessary side and getting different morphology structure. The ability of drug addition to polymeric composition can facilitate rapid healing.

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ULTRASONIC DISTANCE MEASUREMENT

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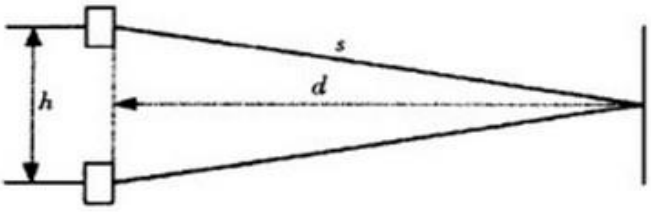
Ultrasonic distance measurement is a very effective non-contact method of measurement. It has been widely applied in navigation, probing, engineering design, construction and other fields due to its precise, fast, stable and easy operating characteristics.

Therefore, in-depth study of the ultrasonic distance measurement method is of practical significance. In order to further improve the precision of the ultrasonic distance measurement, the research focuses on the type of the ultrasonic distance measurement device based on temperature compensation of the microcontroller.

The ultrasound is a sound with the frequency greater than the upper limit of human hearing, this limit being approximately 20.000 Hz. The ultrasound is widely applied to measure distance and ultrasonic cleaning because of the ultrasound characteristics such as short wavelength, high frequency, strong penetrability, cavitation and atomization effect, and so on.

It is obviously efficient in medical, military, industrial industry and agriculture.

The ultrasound can be used for distance measurement. The basic theory is the principle of reflection. When measuring the distance, timing starts when the reflector emits the ultrasonic wave. It is reflected back after it reaches the obstacles, and after the sensor receives the reflected pulse timing is immediately stopped. The distance can be calculated as $D = \frac{1}{2}ct$.



where c is the ultrasonic velocity;

$\frac{1}{2}t$ is the half time period of one-way transmission.

The entire hardware circuit is composed of an ultrasonic transmitter circuit, ultrasonic receiver circuit, power circuit, display circuit and other modules. The temperature compensation adjustment is used in data processing, with four LED nixie tubes displaying distance or temperature by switching.

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Basing on the given explanation, we can get the structure as shown in Fig. 1.

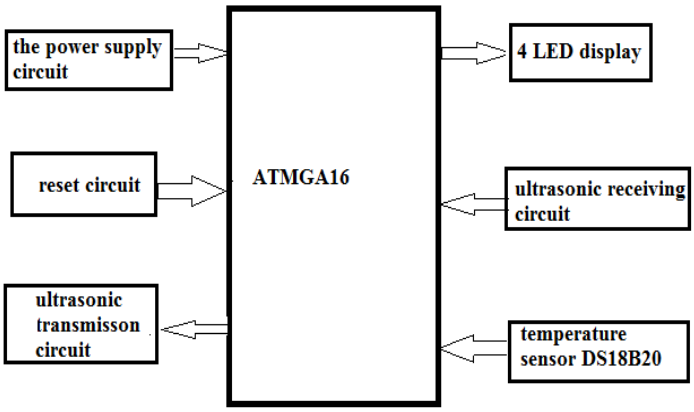

Fig. 1. System structure

The major functions of the system include:

1. Using MCU to control the emission and to receive the ultrasonic wave

2. Calculating the distance according to the measured time.
3. Testing the air temperature to use it for temperature compensation to calculate the distance under measurement;
4. The LED display shows the distance and temperature;
5. When the system is not normal, the circuit reset starts.

Ultrasonic ranging is widely used at present. The ASIC is used to design various distance measuring instruments considering the principle of ultrasonic ranging. However, it is a single function of the application-specific integrated circuit and its cost is high. A single chip processor as the core of the distance measuring instrument can realize the preset, multiple port detection, display, alarm and other functions. It is characterized by simple design, low cost, high control accuracy and reliability.

The design of the block diagram has been developed. It is going to be tested for further analysis and improvement to increase its accuracy and practicability.

AMPLITUDE-FREQUENCY CHARACTERISTICS OF ELECTROMAGNETIC EMISSION DURING UNIAXIAL COMPRESSION

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Introduction

Investigation of the state of the object under load is one of the tasks of non-destructive testing. For this it is developed a variety of methods based on different physical phenomena, such as an acoustic emission [1], which allows to evaluate the concentration of defects on the parameters of acoustic signal, accompanied by their formation and development. Moreover, the character of energy distribution of acoustic emission may serve as a measure of estimate [2].

To study the dynamics of crack it is also used electromagnetic emission (EME), due to the formation of an alternating electromagnetic field in the separation of charges in the mouth developing cracks, at the interfaces of heterogeneous media, the interaction of acoustic waves with inclusions having piezoelectric properties.

For the first time this phenomenon has been used in the Tomsk Polytechnic University in developing methods for forecasting geodynamic phenomena (earthquakes, rock bursts, landslides). In the future, efforts were