IMPACT: International Journal of Research in Engineering & Technology
ISSN (P): 2347-4599; ISSN (E): 2321-8843
Vol. 6, Issue 12, Dec 2018, 1-10

THE COMPOSITION OF THE ALGORITHM REMOTE CONTROL SYSTEM OF THE SEGMENT SHUTTER OF THE RESERVOIR

Igamberdiev Xusan Zakirovich[1], Zayniddinov Bobirjon Gofirovich[2], & Zayniddinova Zebiniso Akmalovna[3]

[1]Academician Professor, Tashkent State Technical University, Tashkent, Uzbekistan

[2]Assistant Professor, Tashkent State Technical University, Tashkent, Uzbekistan

[3]Mistrant, Tashkent State Technical University, Tashkent, Uzbekistan

Received: 16 Nov 2018 **Accepted:** 30 Nov 2018 **Published:** 05 Dec 2018

ABSTRACT

The article examined the system for automatic control of the reservoir gates using remote control using a mobile phone, which is a promising innovative solution in the field of automatic control of the process, with the goal of optimal use of water resources.

KEYWORDS: *Automatic Control, Reservoir, Segmental Shutter, Algorithm, Program*

INTRODUCTION

Hydro technical valves are part of the pressure head of the hydraulic structure and are designed to block the water throughput and navigation openings and control the flow of water. Shutters are divided into superficial and deep.According to the operational purpose, the valves are divided into main, emergency, repair and construction.

The most common type of shutter is a flat shutter, the main advantage of which compared to others is the simplicity of the design, ease of maintenance and repair. However, they require powerful actuators to overcome their own weight and friction forces in the running gears when raising the bolt.

Less commonly used segment closures due to the complexity of their structural form and increased accuracy of manufacturing and installation. The advantage of segmental closures over flat ones is a lower lifting force, high maneuvering speed and high reliability of operation in winter. The cost of their manufacture is 10-15% higher than the cost of flat locks.

The cross section of the span of the segmented shutter is a segment of a circle, the center of which usually coincides with the axis of rotation of the shutter. The segment rests on the legs, through which pressure is transmitted to the hinges. Support hinges are fixed on the side walls of the culvert. Hydrostatic pressure of water is transferred to the casing, then to stringers, diaphragms and girders.

For remote control of the reservoir segment gate, we propose a new method of control by sending an SMS message from the mobile phone dispatcher. Feedback on the performance of the dispatcher's command, as well as information on the position of the segmental shutter and the water level, also comes in the form of an SMS message.

On the assignment of his assignment and the technology of the valves, they composed the algorithm as follows:Controls should be performed using a telephone (more precisely, an SMS message).

The main part of the algorithm:

a1 is the number of steps (sm);

a2 is the initial position (sm);

Da is the difference from the addition of a1 and a2;

Maximumlift 300 sm;

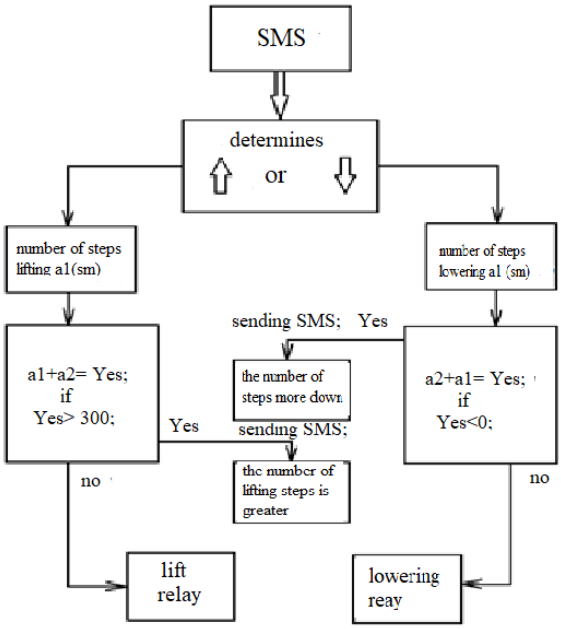

Figure 1: Compiled Control Algorithm

Drawing up the Program. Virtual microcontroller Firmware (Using the "Proteus" Simulator Program)

First you need to write a program using CodeVision (C avr). Our first task is the interconnection of GSM and microcontroller.

At the request of workers, it was decided to continue to transfer data through the UART. The main problem, in my opinion, when communicating two microcontrollers is receiving data.

As an example, take 2 pieces Atmega8. The task of the first microcontroller is to send an array of characters, the task of the second MK is to receive them and display them on the LCD screen.

The Scheme Will Look Like this

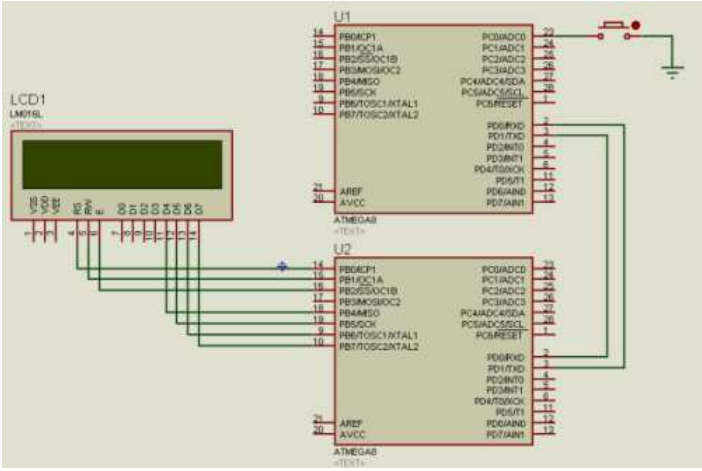

Figure 2: LCD Display Screen

The Code of the Transmitting Microcontroller will Look Like this

```
1  #include <mega8.h>
2  #include <stdio.h>
3
4  void main(void)
5  {
6
7  charmassiv[5]={'С','а','л','о','м'};
8  bit on=0;
9  inti=0;
10
11 PORTC=0x01;
12 DDRC=0x00;
13 UCSRA=0x00;
14 UCSRB=0x08;
15 UCSRC=0x86;
16 UBRRH=0x00;
17 UBRRL=0x33;
```

```
18
19 while(1)
20 {
21 if(PINC.0==0&& on==0)
22 {
23 UDR=massiv[i];
24 i++;
25 if(i>4)
26 {
27 i=0;
28 }
29 on=1;
30 }
31 if(PINC.0!=0)
32 {
33 on=0;
34 }
35
36 };
37 }
```

When a button is pressed, 1 element of the array of characters is transmitted, when pressed again, the next character is transmitted, and so on. As a result, an array of "Salom" should be transmitted. The on variable is needed to prevent the button from chattering (to transmit the next character, release the button and then press).

The second microcontroller accepts data in the interrupt. Code interruption, CodeWizard creates automatically. Processing is big enough, you should not be afraid

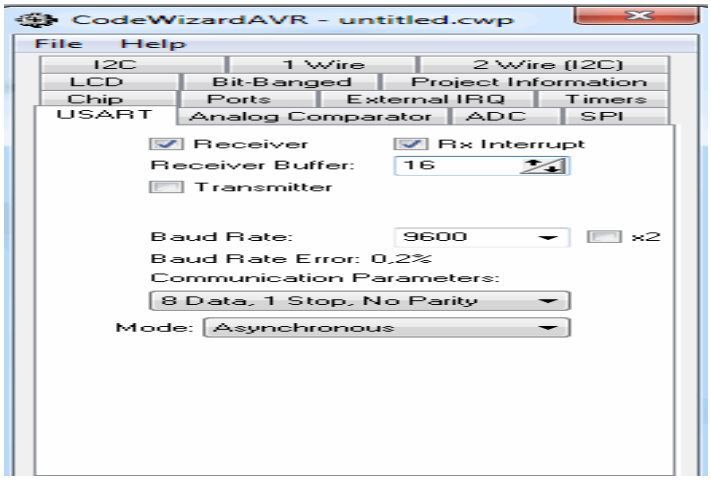

Figure 3: Interrupt Code, CodeWizard

Let us Deal with our Algorithm, For us the Most Important Thing is Self-Interruption

```
1  // USART Receiver interrupt service routine
2  interrupt [USART_RXC]voidusart_rx_isr(void)
3  {
4  charstatus,data;
5  status=UCSRA;
6  data=UDR;
7  if((status &(FRAMING_ERROR | PARITY_ERROR | DATA_OVERRUN))==0)
8  {
9  rx_buffer[rx_wr_index]=data;
10 if(++rx_wr_index== RX_BUFFER_SIZE)rx_wr_index=0;
11 if(++rx_counter== RX_BUFFER_SIZE)
12 {
13 rx_counter=0;
14 rx_buffer_overflow=1;
15 };
16 };
17
18 //here we put the incoming data into the array, the amount is known in advance:
```

```
19 //accepted characters = 5
20 uart_data[i]=data;
21 i++;
22 if(i>4)
23 {
24 i=0;
25 }
26
27 }
```

Reception is done in the interrupt, i.e. as soon as the character arrives, the interrupt is triggered - the character is written to the first element of the array, the counter is incremented. The next character comes to the next interrupt, and so on. Immediately make a reservation that the number of incoming characters is known in advance.

Now it remains only to display the result on the screen; for this, all the characters on the screen are displayed in a cycle.

```
1 while(j<5)// cycle until all 5 characters are displayed
2 {
3 lcd_gotoxy(j,0);//choose a place where the character will be displayed
4 sprintf(lcd_buffer,"%c",uart_data[j]);//we transform a character to a look, clear for the display
5 lcd_puts(lcd_buffer); //output on display
6 j++; //increase counter
7 }
8 j=0;// reset counter
```

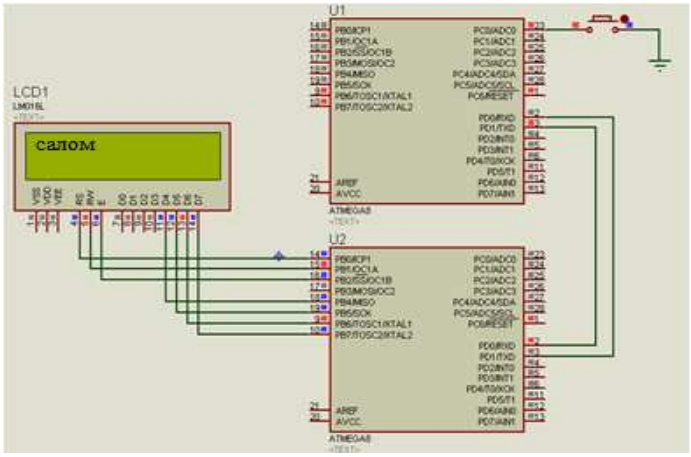

Figure 4: Result on the LCD Screen

Installation of the Program for the System of Remote Control of the Segment Shutter

The circuit is assembled in the computer simulator Proteus. This program will help to solve the experimental part of the work. With its help, I collected almost the complete scheme of the process control system at levels 2 and 3. As well as provided access to a relay unit to control the shutter.

To Flash a Virtual Microcontroller, you Need to Specify where the Firmware File is Stored on the Hard Disk.

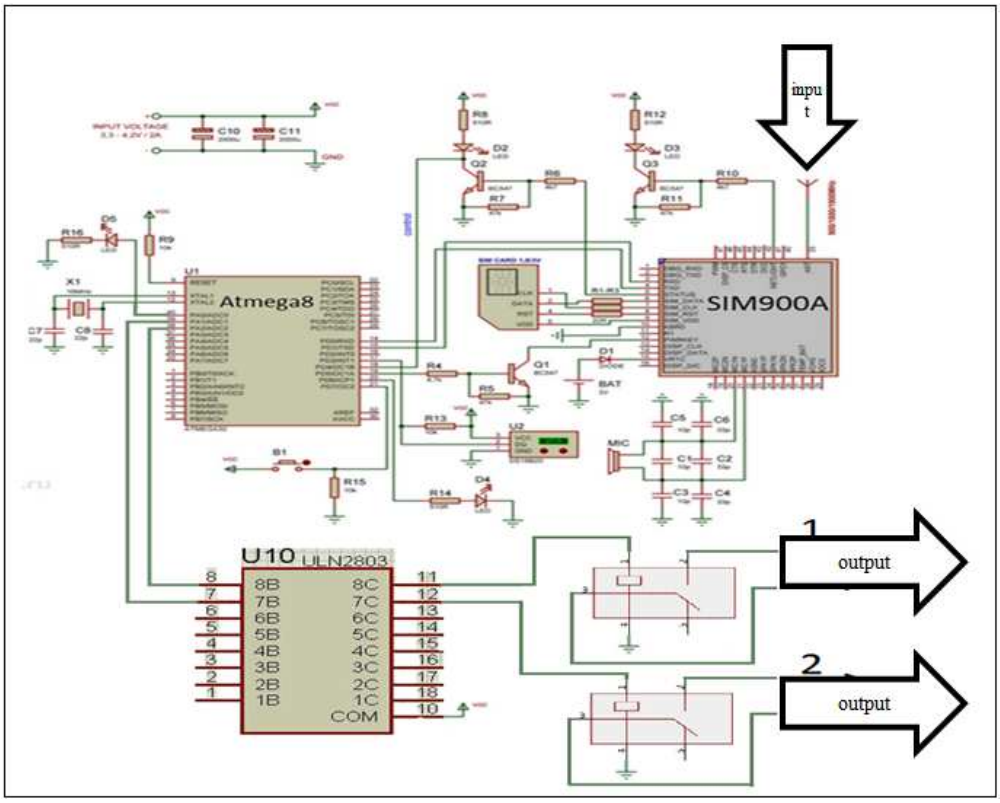

Figure 5: The Scheme Collected on the Program Proteus. 8.1

After Checking on the Proteus Simulator. I Compile and Flash

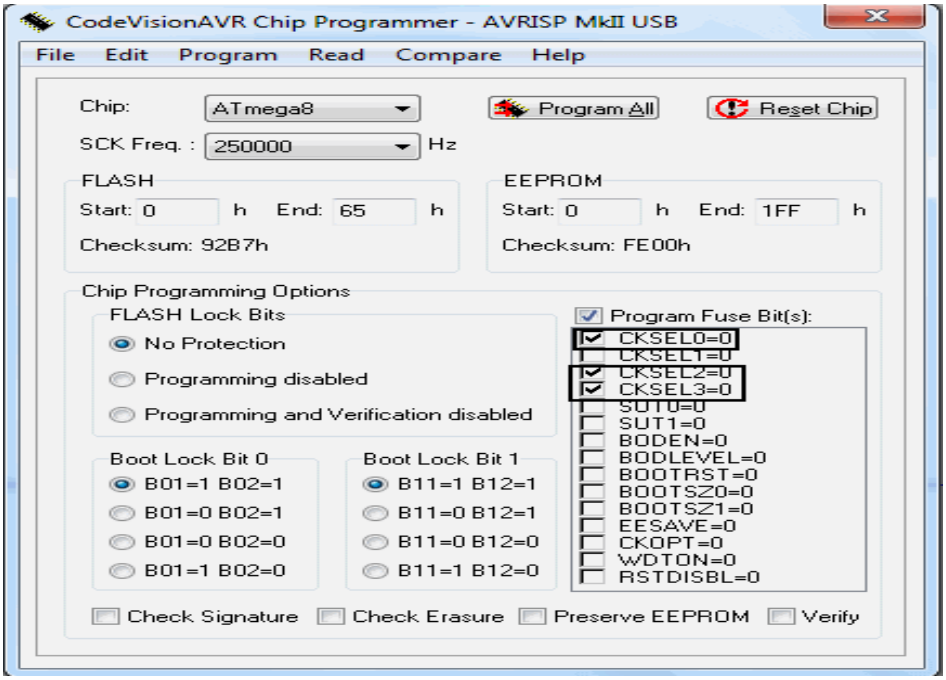

Figure 6: Firmware Microcontroller

This configuration of fyuzov allows you to run the microcontroller from the internal generator at 2 MHz.

Next task: Flash the real microcontroller. For this, I need the programmer shown in Figure 7.

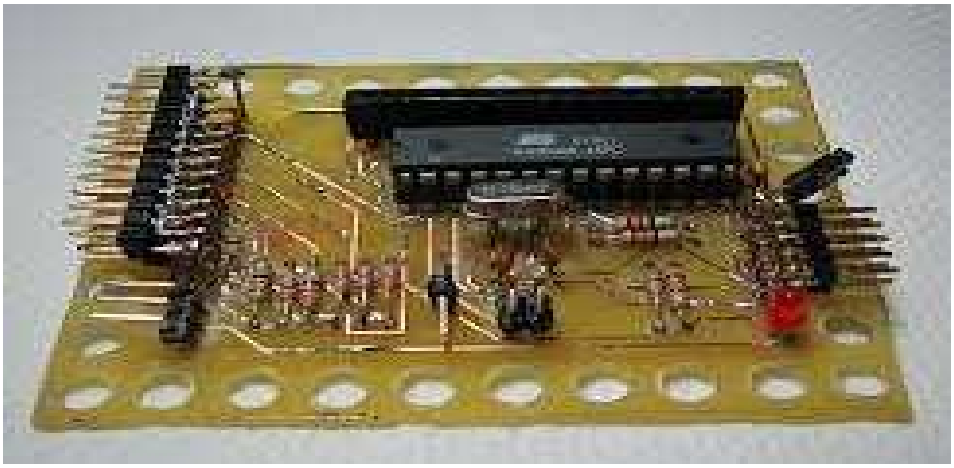

Figure 7: Programmer for Firmware on the MK

For installation of the controller and the amplifier the special payment was made:

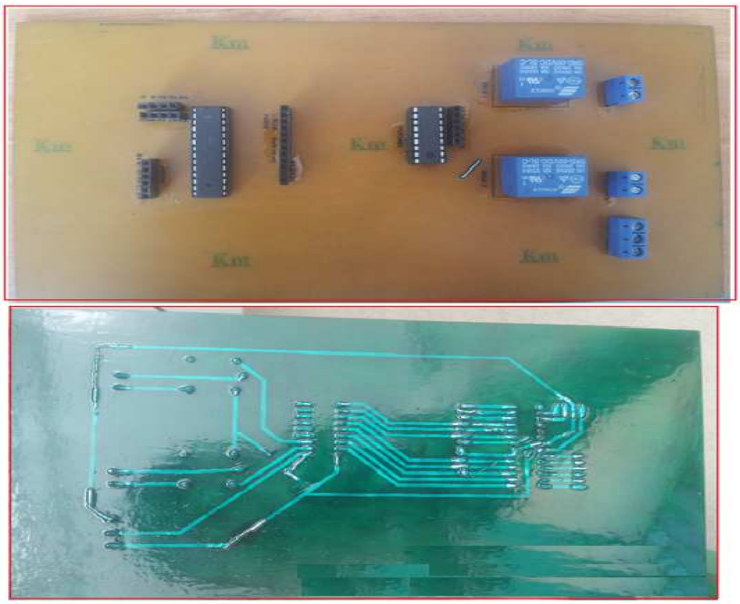

Figure 8: Board Ready

RESULTS

Figure 9 shows a generalized block diagram of control and transmission of control commands.

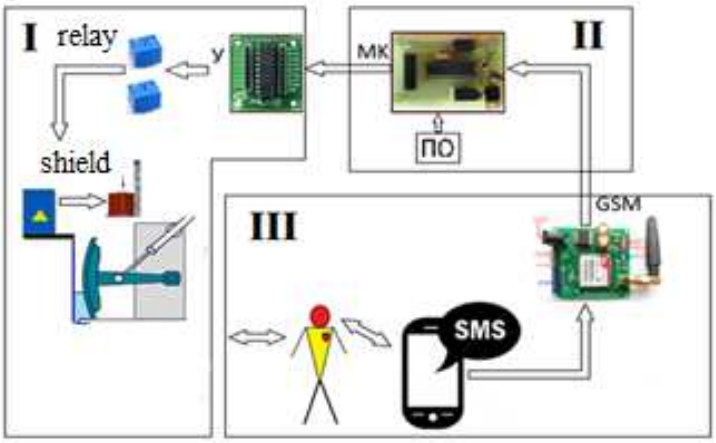

Figure 9: The Block Diagram of the Technical Means of the APCS-Mini

This scheme reflects the hierarchical levels of the process control system as applied to our object. On site III, the upper carrier level with means of IC (GSM) and personnel represented by the owner of the phone, II medium level control with an Atmega8 PLC and I lower field level with controls and THEM. Actuator - shutter is presented to clarify the purpose of this figure. The distance S shown on the figure S closes in time due to its speed. And this time is used by me in the installed program and the operator's actions when sending an SMS, when he types specific see to move.

CONCLUSIONS

In summary, in remote automated hydroelectric engineering, one of the most important things to do is to create an algorithm and software first. With the help of the method we offer, remote control of mobile phones is easy and convenient.

REFERENCES

1. *Goloskokov DP Equations of mathematical physics. Solving problems in the Maple system: textbook for higher education.-St. Petersburg: Peter, 2014.*
2. *SWALHA, SALLAMEH A., JAWDAT A. AL-JARRAH, and ALI DBEAN AL-RASHIDY. "SYSTEM TO REMOTE CONTROL THE VEHICLES DURING THE CHASING."*
3. *Matrosov AV Maple 6. Solving problems of higher mathematics and mechanics. - St. Petersburg: BHV Petersburg, 2015.*