International Journal of Advanced Information Science and Technology (IJAIST) ISSN: 2319:2682
Vol.1, No.7, November 2012 DOI:10.15693/ijaist/2012.v1i7.22-25

Aqua Script Technology using AVR microcontroller

KaPatel Sagar[1]*, Yadav Nitesh[2], D.H.Shah[3]

*1*Department of Instrumentation Control, Sardar Vallabhbhai Patel Institute of Technology Vasad, Gujarat, INDIA*
2 Department of Instrumentation Control, Sardar Vallabhbhai Patel Institute of Technology Vasad, Gujarat, INDIA
3 Department of Instrumentation Control, Asst.Prof. Sardar Vallabhbhai Patel Institute of Technology Vasad, Gujarat, INDIA

.

Abstract-- In this technology we develop a structure using solenoid valves, and by doing proper programming of valves we creates the alphabets in air by using water. This technology creates the eye-catching experience to see characters being displayed in waterfall. This project's heart is programming and we use AVR controller for programming and the software we used is BASCOM. AVR microcontroller has high performance and it consume low power, it has inbuilt ADC and also provide six sleep modes. Programming is very easy in this controller, so we spend more time in developing different logics instead of use that time in syntax. So it is more efficient. And BASCOM software has also very easy syntaxes, so we learn and do programming in less time. Our project is used at many places like malls, colleges, company to increase the value of infrastructure. We also display numbers and logos and different designs in air by using the water. Another indirectly used of our project is, it is based on proper programming of solenoid valves, so we can used in many chemical industries to mixed the chemicals in proper percentage, in dairy industries also need the proper controlling of valves. So this project has many applications in general as well as in industries. And this all things we applied by easy way using AVR microcontroller.

Key Words--AVR microcontroller, Solenoid valves, Triac-BT136, MOC-3041.

I. INTRODUCTION

THIS project main benefit is , it increases the infrastructure value and separate the institute or mall from others.

Now a day in institutes, companies, malls, party plots everywhere for increase the value of infrastructure different types of fountains are used. But this fountain is very different than others, because by using this technology we can show the company or institute name in air by using water. And we can also display different designs by using water. And all this work has done by proper controlling of solenoid valves.

(1fig600.tef)

By using this technology we can display company or institute logo, name etc. At entrance of malls, hotels and party plots this technology attracts more people so it also increases the value of that mall or hotel.

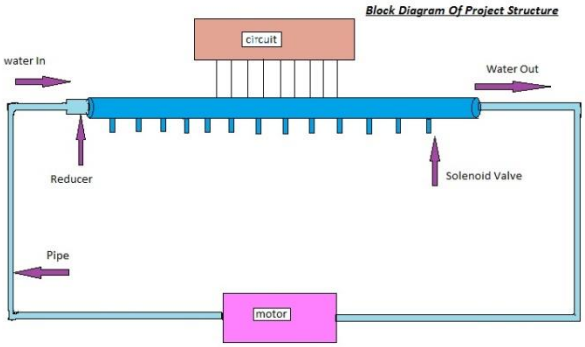
(2fig600.tef)

This project's main part is programming. Solenoid valves switching is done by relay and transistors. And for the programming we used AVR microcontroller and the software BASCOM is used for the programming.

http://www.ieee.org/organizations/pubs/authors.html..

II. WORKING PRINCIPLE

The block diagram of our project is shown in figure. The main water pipe's both ends are cover by reducers and it forms a complete close loop of water circulation.



(3fig600.tef)

The hardware consist a pipe, reducers, motor and solenoid valves. All valves are connected in pipe and one circuit is design to operate that all valves.

switching:

For the switching of valves we use triac and optoisolator circuit.. When we give logic 1 to microcontroller at that time triac circuit come to working state and that time valve coil energized and at output side of valve water comes. The switching is done in milliseconds or microseconds and by creating the proper sequence the alphabet is created.

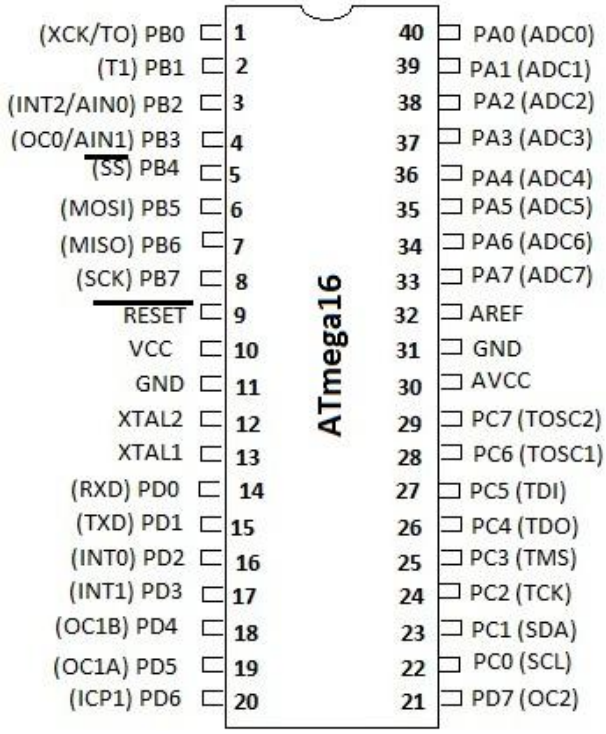
Every alphabet starts from lower side and finishes from its upper side. So in this programming reverse logic is applied to make it correct.

III. AVR MICROCONTROLLER

AVR Atmega16 is an 8-bit high performance microcontroller of Atmel's mega AVR family. It has following features:

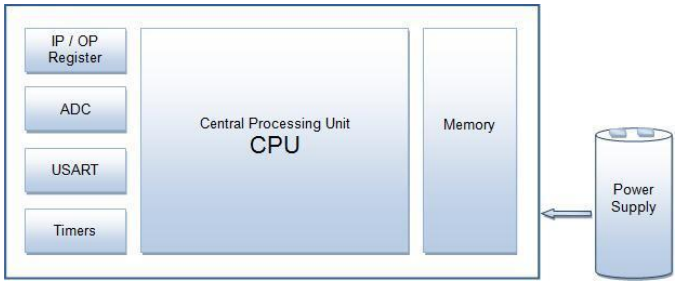
- ➔ High performance and low power consumption
- ➔ 131 Powerful Instructions – Most Single-clock Cycle Execution
- ➔ 16K Bytes of In-System Self-Programmable Flash
- ➔ Endurance: 10,000 Write/Erase Cycles
- ➔ 1K Byte Internal SRAM
- ➔ 32 Programmable I/O Lines
- ➔ Operating Voltages:2.7 - 5.5V for ATmega16
- ➔ Speed Grades:0 - 16 MHz for ATmega16
- ➔ 8-channel, 10-bit ADC
- ➔ Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and Extended Standby
- ➔ On-chip 2-cycle Multiplier
- ➔ Programming Lock for Software Security
- ➔ 512 bytes EEPROM

  Endurance: 100,000 Write/Erase Cycles

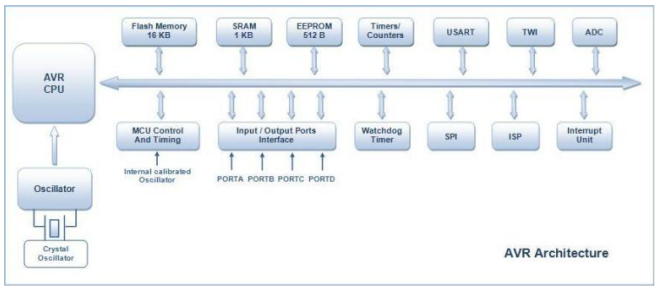


Pin description of ATmega16

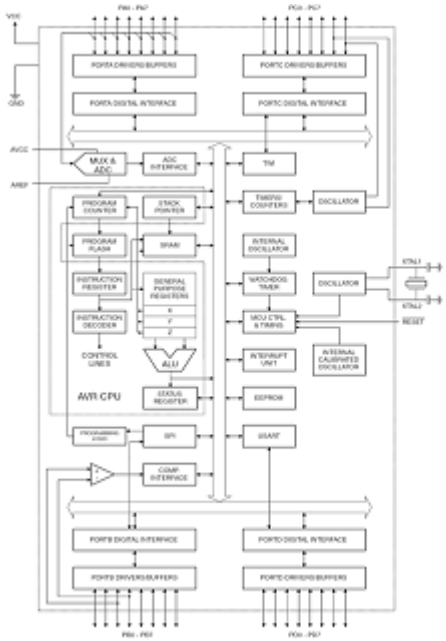
(4fig600.tef)



(5fig600.tef)



(6fig600.tef)



(7fig600.tef)

The main purpose of using AVR in the project is due to its advantages over other microcontrollers like AT89C51. The advantages include maximized power consumption, removal of data transfer bottlenecks, sleepwalking, fast wakeups, advanced arithmetic performance, flash security and peripheral cooperation.

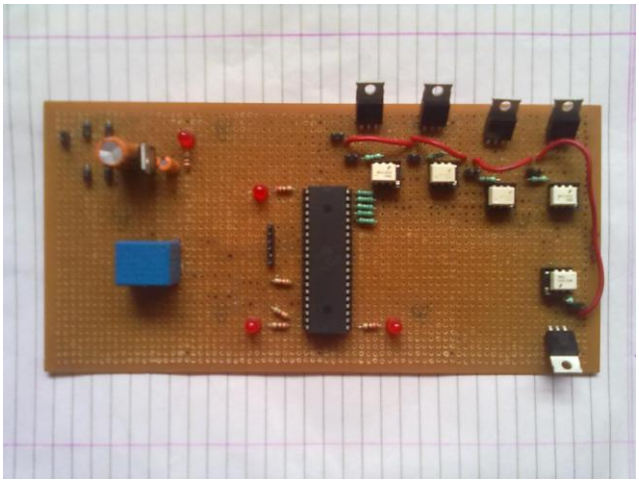
IV. SWITCHING OF SOLENOID VALVES

The main part of the programming is switching.
In BASCOM software we do programming.

(8fig600.tef)

Some header files are necessary to include before we start the programming which are:

- ➔ $regfile = "m16def.dat" -> specify the used microcontroller
- ➔ $crystal = 8000000 -> used crystal frequency
- ➔ $baud = 9600 -> use baud rate
- ➔ $hwstack = 40 ->default use 32 for the hardware stack
- ➔ $swstack = 40 ->default use 10 for the SW stack
- ➔ $framesize = 40 -> default use 40 for the frame space



(9fig600.tef)

In our project for the programming we used following basic syntaxes:

```
Config portB.0 = output      ; Define B.0 as output
Config portB.1 = input       ; Define B.1 as input
Set port B.0                 ; logic 1
Reset port B.0               ; logic 0
Wait 1                       ; delay of 1 second
Waitms 500                   ; delay of 500ms
```

Basic Program:

```
$regfile = "m16def.dat"        ' specify the used
                                 microcontroller
$crystal = 8000000             ' used crystal
frequency
$baud = 9600                   ' use baud rate
$hwstack = 40                  ' default use 32 for
the hardware                   stack
$swstack = 40                  ' default use 10 for
the SW stack
$framesize = 40                ' default use 40 for
the frame                      space
Config portA.0 = output        A.0 as output
```

```
Config portA.1 = output          'A.1 as output
Do
For I=0 to 5 step 1
Set port A.0                      ' logic 1
Wait 1                  ' delay of 1 second
Reset port A.0                    ' logic 0
Set port A.1                      ' logic 1
Wait 1                  ' delay of 1 second
Reset port A.0                    ' logic 0
Next
I=0

For I=0 to 5 step 1
Set port A.0                      ' logic 1
Waitms 500             ' delay of 500 milisecond
Reset port A.0                    ' logic 0
Set port A.1                      ' logic 1
Waitms 500             ' delay of 500 milisecond
Reset port A.0                    ' logic 0
Next
I=0
Loop
End
```

V. CONCLUSION

In this paper, a study of AQUA SCRIPT TECHNOLOGY is done. And this technology is develop by using the solenoid valves, relays, transistors and these all are control and working by the proper programming in the AVR microcontroller. In this technology we store all alphanumeric in controller from beginning or it can added by keyboard interfacing also. So this technology operate by two ways.

VII. ACKNOWLEDGMENT

We express our personal appreciation of the valuable assistance given by the Mr. Dipesh Shah. Without their co-operation, the extensive work involved in compiling background information and preparing the paper for publication would not be possible.

VI .REFERENCES

[1] www.google.com
[2] www.wikipedia.com
[3] www.engineersgarage.com
[4] www.atmel.com
[5] www.futurlec.com
[6] www.nerdkits.com
[7] www.kpsec.freeuk.com
[8] ATEGA16 datasheet
[9] **Atmel AVR Microcontroller Primer** by Steven F. Barrett, Daniel J. Pack (Morgan & Claypool publishers 2012)