# Prototype Designing of Coin Based Sensing Water Filling System

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***Abstract*— A prototype is being prepared by using different sensors, relay and motors, which can be electronically connected with a micro controller in order to detect and dispense water when we insert a coin inside the machine. By detecting the shape of the coin by the sensors the known quantity of water will be dispense with the help of relay system and a rectifier.**

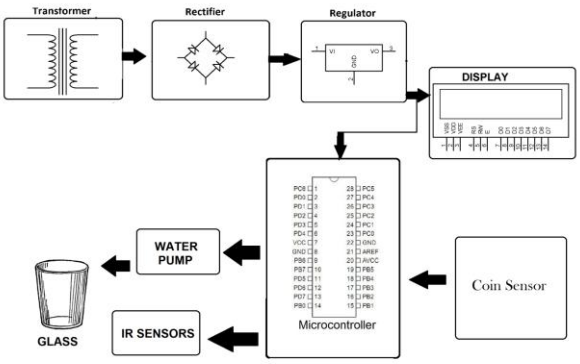
***Keywords—Sensors; Micro Controller ; Relay; Rectifier***

## I. INTRODUCTION

With the improvement in the technology there are many advanced devices and machines that are useful to the mankind. One of them is coin operated telephone. As we know the function of it and how it works. With the same technology used we are going t o design a project which is based on liquid (water, cool drinks). Coin Operated Water Dispensing System as the name indicates it is based on coin operation. It has been specially designed for use on Railway station, Bus deposes, public places etc. This system is based on microcontroller. The inputs to the microcontroller are coin and output in the form of water. Looking at the specifications required for Water Dispensing System and for simplicity of our application, microcontroller was found to be best suited. The use of microcontroller in any electronic equipment makes it compact and user friendly. We equipped our equipment very handy and cheap.

## II. DESIGNING DETAILS

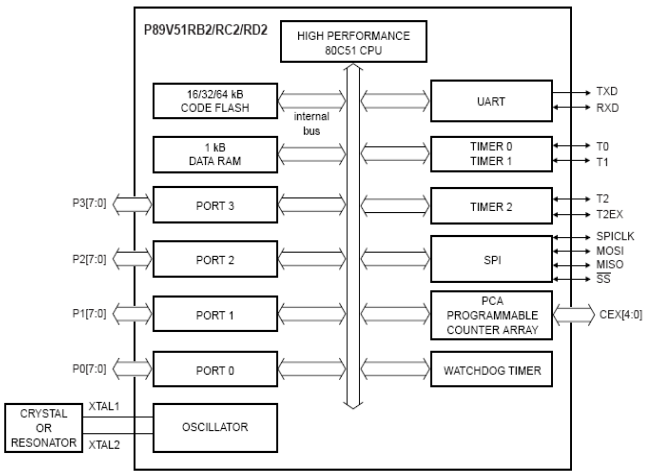
### A. *LIST OF COMPONENTS.*




- Transformer
- Rectifier
- Regulator
- Metal sensor
- 8051 Microcontroller
- IR Sensors
- LCD Display
- Water Pump

The main center part of the project is the microcontroller. Here we are using the 8051 based Philips P89V51RD2 microcontroller.

### B. *Block diagram of 8051 micro controller*




- PORT 0

PORT0 is an 8-bit open drain bi-directional I/O PORT. As output PORT, each pin can sink eight TTL inputs. When are written to PORT0 pins, the pins can be used as high impedance inputs.

PORT0 can also be configured to be the multiplexed low-order address/data bus during accesses to external program and data memory. In this mode, P0 has internal pull-ups. PORT0 also receives the code bytes during Flash programming and outputs the code bytes during program verification. External pull-ups are required during program verification.

- PORT 1

PORT1 is an 8-bit bi-directional I/O port with internal pull-ups. The PORT1 output buffers can sink/source four TTL inputs. When logic 1s are written to PORT1 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, PORT1 pins that are externally being pulled low will source current because of the internal pull-ups.

PORT1 also receives the lower order address bytes during flash programming and verification. In addition, P1.0 and P1.1 can be configured to be the timer/counter 2 external count input (P1.0/T2) and the timer/counter 2 trigger input (P1.1/T2EX).

- PORT 2

PORT2 can also be used as an 8-bit bi-directional I/O PORT with internal pull-ups. The PORT2 output buffers can sink/source four TTL inputs. When ones are written to PORT2 pins, they are pulled high the internal pull-ups and can be used as inputs. As inputs, PORT2 pins that are externally being pulled low will source current because of the internal pull-ups. The alternate use of PORT 2 is to supply a high order address byte in conjunction with the PORT0 low order byte to address external memory. It uses strong internal pull-ups when emitting ones. It also receives the higher order address bytes and some control signals during flash programming and verification.

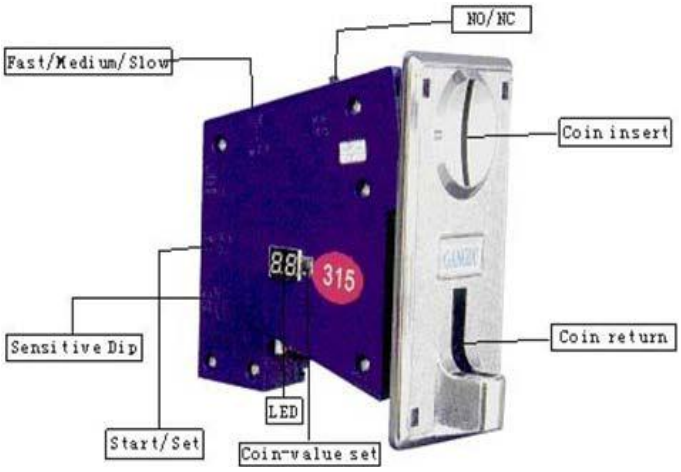
- PORT 3

PORT3 is an 8-bit bi-directional I/O PORT with internal pull-ups The PORT3 output buffers can sink/source four TTL inputs. When ones are written to PORT3 pins, they are pulled high by the internal pull-ups and can be used as inputs. As inputs, PORT3 pins that are externally being pulled low will source current because of the pull-ups.

PORT3 also serves the functions of various special features of the AT89C51, as shown below

| | | |
|---|---|---|
| P3.0 | RXD | (serial input port) |
| P3.1 | TXD | (serial output port) |
| P3.2 | INT0 | (external interrupt 0) |
| P3.3 | INT1 | (external interrupt 1) |
| P3.4 | T0 | (timer 0 external input) |
| P3.5 | T1 | (timer 1 external input) |
| P3.6 | WR | (external data memory writes strobe) |
| P3.7 | RD | (external data memory read strobe) |

*C. Coin Acceptor*




Much obliged gratitude to you purchasing multi-Coin acceptor for installation. Good level of security at a very competitive price. Using the intelligent single chip system, automatically identify coin's material, thickness and diameter Set up five channels of coin-value at the same time, each channels set can memory MAX. 15 types of coins Fine-tuned against better quality slugs and frauds Can connect to the counter supply digital output and make some modification in the output program according to the demand An intelligent multi-coin selector can memorize and recognize 1-5 different type coins with different sig The product include software guard system, and this alarm system can prevent opportunistic behaviors Amusement Machine but also Vending Machines

*D . Specification*

Net weight: 0. 375kgs / each Single chip auto recognize system Signal output in pulse

Apply to coin diameter: 18mm-29mm Apply to coin thickness: 1. 2mm-3mm Work voltage: DC12V ( / -20% ) Current in 50ma

CPU system identify the coin's material, thickness and diameter Include software guard system Can connect the counter

TIME SWITCH can be set to fast-25ms, medium-45ms and slow-65ms.

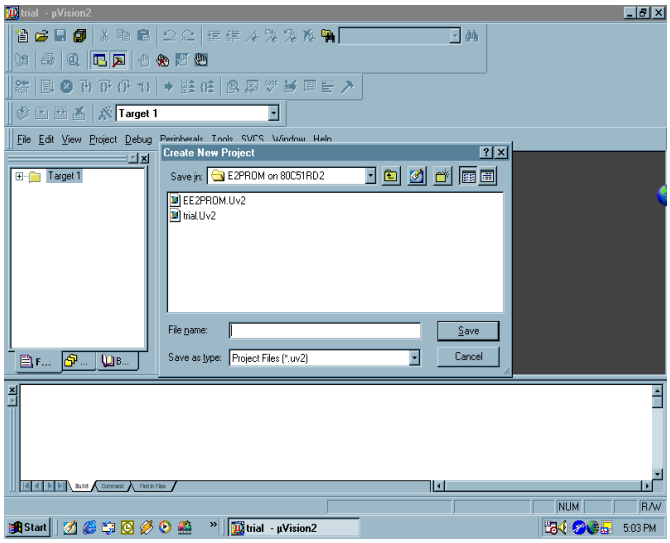
## III. KEIL DEVELOPMENT TOOL

Keil software provides the ease of writing the code in either C or ASSEMBLY. U-VISION 2, the new IDE from Keil Software combines Project management, Source Code Editing and Program Debugging in one powerful environment. It acts as a CROSS-COMPILER.

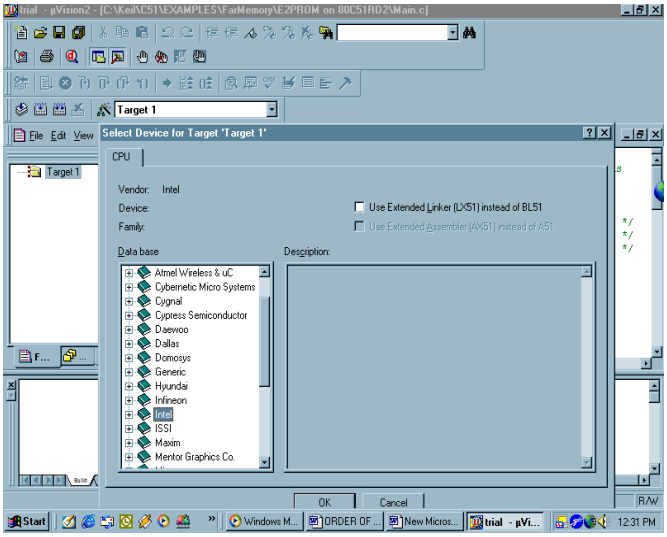
*How to Create a New Project*

Step1

- Select the Project from the menu bar.
- Select New Project.
- Give the File Name. A project with extension of .uv2 will be created



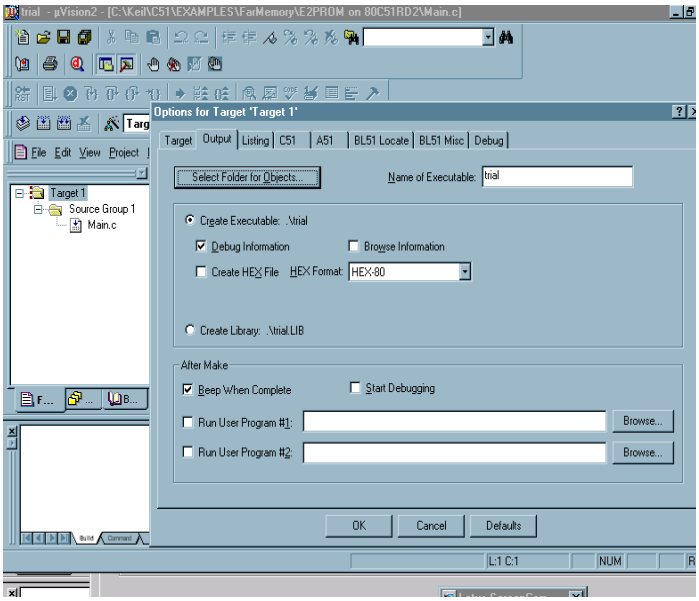

Step2.Selecting the device




- After giving the file name the device list windows opens.
- Select the respective company's microcontroller IC that is going to be implemented in hardware.
- From the drop down arrow, we get a list of all the chips from that particular manufacturer. Choose the appropriate one
- .Now the target is ready.
- The data sheets and user manuals are automatically added.

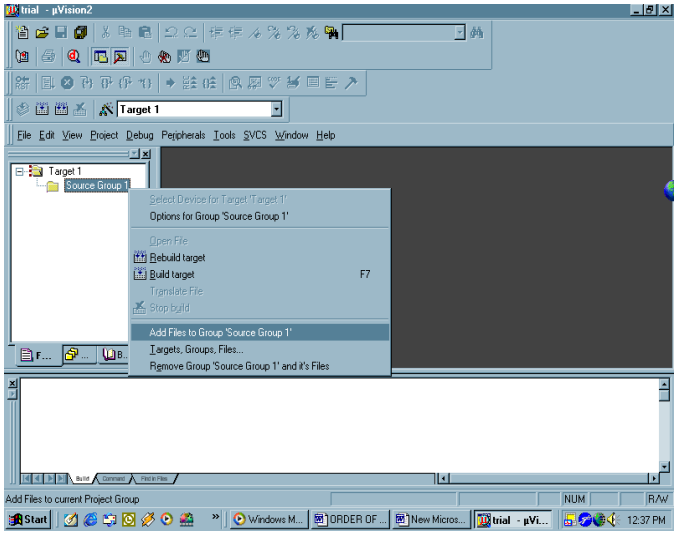
Step3. Configuring the essentials

- Right Click on Target to view the options for Target 1.
- The Target tab enables to give the Starting address and size of RAM and ROM. We also have to specify the frequency of the crystal used which in our case is 11.0592Hz.



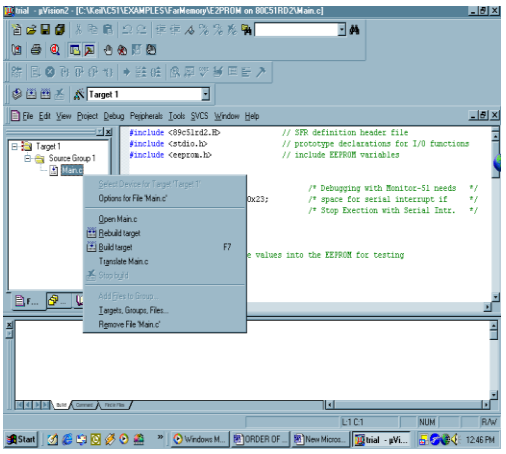

- The Output tab has the option to create the HEX file. Confirm the check box given beside it.
- The A166 and C51 tabs shows the compiler options.

Step4. Addition of files in Source group




- After the Target is created the source group is added to it.
- Select the file menu and choose the 'New' option in it to get a page. Save the same with a .a51 or .asm extension. These assembler files are the ones recognized by the compiler.
- Right click on source group and select add files to include the program. Select the assembler files created earlier and confirm the action. The selected files appear in the left-hand side project window
- . These files will contain your actual program in assembly or in embedded C language
- Options for source group includes the compilers C51 and A51 paths.

Step5.Running the program



- Any number of sub programs can be added to source group.
- To run the program right click on it and select Build Target. When you build an application with syntax errors, µVision2 will display errors and warning messages in the Output Window – Build page. A double click on a message line opens the source file on the correct location in a µVision2 editor window.
- Then select rebuild all the target files too. With the Rebuild Target command, all source files are translated, regardless of modifications.

- After the target is built, debugging is done.
- After all the debugging the file is built again which creates a hex files. This hex file is then used to download to the microcontroller using a programmer kit.

Step6.Target Program Execution & Debugging

µVision2 lets execute your application program in several different ways:

- With the Debug Toolbar buttons and the "Debug Menu and Debug Commands".
- With the Run till Cursor line command in the local menu. The local menu opens with a right mouse click on the code line in the Editor or Disassembly window.
- In the Output Window – Command page you can use the Go, Ostep, Pstep, and Tstep commands.

*Watch Window*

The Watch window lets you to view and modify program variables and lists the current function call nesting. The contents of the Watch Window are automatically updated whenever program execution stops. You can enable View Periodic Window Update to update variable values while a target program is running.

The Locals page shows all local function variables of the current function. The Watch pages display user-specify program variables. You add variables in three different ways:

- Select the text <enter here> with a mouse click and wait a second. Another mouse click enters edit mode that allows you to add variables. In the same way you can modify variable values.
- In an editor window open the context menu with a right mouse click and use Add to Watch Window. µVision2 automatically selects the variable name under the cursor position; alternatively you may mark an expression before using that command.
- In the Output Window – Command page you can use the Watch Set command to enter variable names.
- To remove a variable, click on the line and press the Delete key. The current function call nesting is shown in the Call Stack page. Double clicking on a line shows the invocation an editor window.

## IV. RESULTS

Our system works on the principle of coin detection. When we insert the coin in the slot, it will detect by the sensor we used. Here we used IR based optocoupler for the coin sensor. With an optocoupler, the only contact between the input and output is a beam light. When coin is passed through the slot Infrared light beam is interrupted, pulses are generated at the output of coupler. It will pass output signal to the microcontroller and according to the output signal microcontroller start for working. First it will check interrupt, if there are interrupt on signal it means coin is inserted. Microcontroller display" PLACE THE GLASS "message on lcd. Then it will switched on water pump. And water will fall in glass. Time is set for water pump. When set time is over pump is switched off automatically. After that it will display "Save Water Thank you" message on lcd. Then counter will increment for another coin. When counter is overflow it will show coin box is full, this is the working operation of coin operated water dispensing system.

## V. CONCLUSION

This Paper is to develop basic skills regarding programming of microcontrollers, basic electronics that will help us in future programming of system.

## REFERENCE

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