A Project Report on

**Microcontroller based Monitoring System**

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**FINOLEX ACADEMY OF MANAGEMENT AND TECHNOLOGY, RATNAGIRI**

**CERTIFICATE**

The Report entitled

**Microcontroller Based Monitoring System**

**Completed by**

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**ABSTRACT**

‘Microcontroller Based Monitoring System’ is a simple and economical system. Intercoms or calling bells proves to be a costlier option for communication between inmates and the assisting staff. Since such a provision can be limited number of points in small hotels, small offices. The system provides an audio-visual identification of call point. This project proposes, monitoring system using Flash based microcontroller IC AT89C51. The system provides feedback to the caller in the form of busy signal. Using minimal hardware and software, it is a clean and easy way to communicate. This system can be also used in hospitals. When switch is pressed then corresponding call-point number is displayed on counter. The system is efficient, flexible and low cost. The system is advantageous in such a way that it saves time and efforts of a person.

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Chapter no.1

**Introduction**

The aim of the proposed system is to develop a cost effective solution that will monitor the system that provides audio visual identification of call point .The system provides availability due to development of a low cost system. The Monitoring system with an affordable cost was thought to be built that should provide service if someone needs help in less time which reduces human efforts to a great extent. In this project we are going to develop Microcontroller based Monitoring system. This system is design for Monitoring rooms, small offices and clinics intercoms. To activate the system the switch is pressed and it is responded at the counter where the Buzzer and 7-segment display are placed. The person at the counter comes to know which switch is pressed. In this project flash based microcontroller IC AT89C51 is used. It is compatible with MCS-51 products.

Chapter no.2

**Working**

In Monitoring System two main circuits are used.

1.Basic circuit using microcontroller

2.Display section using 7-segment display interface

In this Microcontroller only three ports are used.

Port 0 acts as an output port

Port 1 acts as an input port

Port 2 acts as an output port

Here’s simple economical room monitoring system that provides audio-visual identification of R1 to R8 are pull-up resistor, while resistor R10 to R17are current-limiting resistors. Other passive components constitute the reset and clock circuitry for operating the microcontroller.

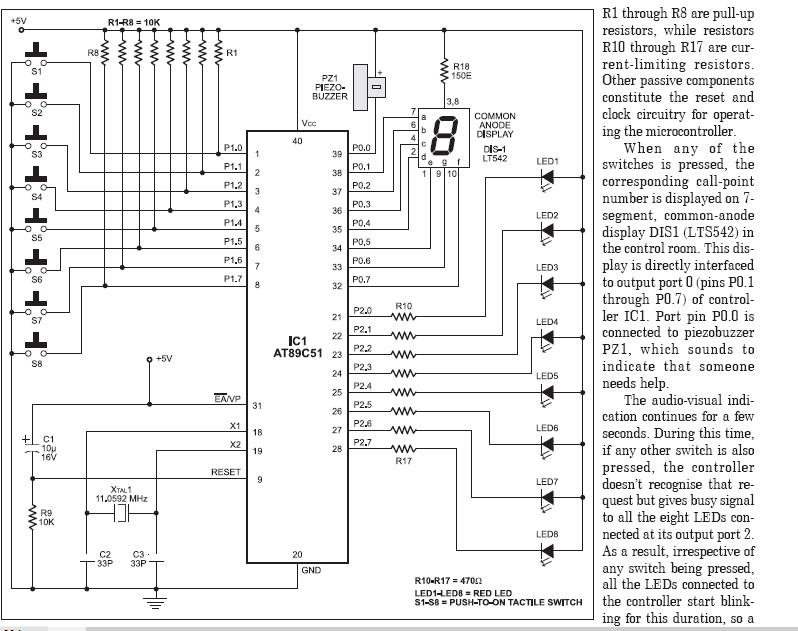
When any of the switches is pressed the corresponding call-point number is displayed on 7-segment,common-anode display DISI(LTS542) in the control room. This display is directly interfaced to output port 0 (pins p0.1 through p0.7) of controller IC1 port pin p0.0 is connected to peizo-buzzer PZ1 which sounds to indicate that someone needs help.

The audio-visual indication continues for a few seconds. During this time if any other switch is also pressed, the controller doesn’t recognize that request but gives busy signal to all the eight LED’s connected at it’s output port 2.As a result irrespective of the call point. The system also provides feedback to the caller(in the form of busy signal) Using minimal hardware and software, it’s clean and easy way to communicate.

Flash-based microcontroller IC AT9C51 is at the heart of the monitoring circuit. Port 0,1, and 2 of IC are used as output ,input and output ports respectively. Switches S1 through S8 are interfaced as inputs to controller IC via port 1(p1.0 through p1.7). These switches along with the respective LED’s are to be installed in eight different rooms, while the remaining circuit is to be place in the control room. Resistors caller gets to know that the he has to wait for some time. When the LED’s stops blinking he can press the switch for help. The LED again blinks to indicate that the request is being processed.

**Chapter no.3**

**HARDWARE DESCRIPTION**

**3.1 Circuit Diagram**

**3.2 COMPONENT LIST:**

1.Display section:

* DIS1 (LTS 542)

2. Basic circuit using microcontroller section:

* IC AT 89C51
* Switch
* R1,R2,R3,R4,R5,R6,R7,R8,R9 : 10k(Brown ,Black ,Orange ,Gold)
* R10,R11,R12,R13,R14,R15,R16,R17 : 470ohm(Yellow, Violet, Red, Gold)
* Capacitor1 : 10uf(electrolytic)
* Capacitor2,capacitor3 : 33pf
* LED’s : Red

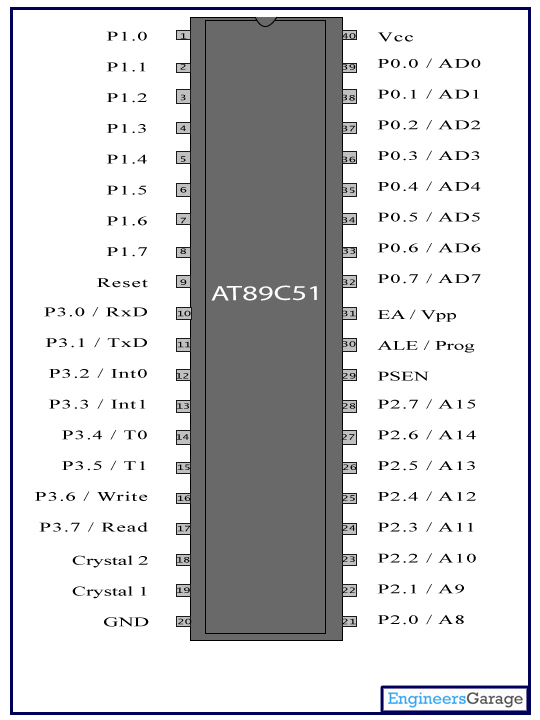
**3.2.1 IC AT89C51:**

AT89C51 is an 8-bit microcontroller that belongs to Atmel’s 8051 family. ATMEL 89C51 has 4KB of Flash programmable and erasable read only memory (PEROM) and 128 bytes of RAM. It can be erased and program to a maximum of 1000 times. In 40 pin AT89C51, there are four ports designated as P0, P1 ,P2,P3.

All these orts are 8-bit bi-directional ports, i.e. they can be used as both input and output ports. Except P0 which needs external pull -ups, rest of the ports have internal pull-ups. When 1s are written to these port pins, they are pulled high by the internal pull-ups and can be used as inputs. These ports are also bit addressable and so their bits can also be accessed individually.

Port P0 and P2 are also to provide low byte and high byte addresses respectively, when connected to an external memory. AT89C51 has an inbuilt UART for serial communication. It can be programmed to operate at different baud rates. Including two timers and hardware interrupts, it has a total of six interrupts.

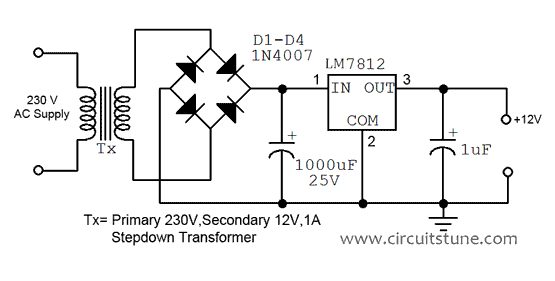
Features of 89c51:

* 4 Kbytes of In- System Reprogrammable Flash Memory.
* Fully Static Operation: 0 Hz to 24 MHz
* 128 \* 8-bit internal RAM
* 32 Programmable I/O Lines
* Two 16-Bit Timer / Counter
*  **Pin Diagram of AT89C51**

**Pin Description of AT89C51:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pin No** | **Function** | | | **Name** |
| 1 | 8 bit input/output port (P1) pins | | | P1.0 |
| 2 | P1.1 |
| 3 | P1.2 |
| 4 | P1.3 |
| 5 | P1.4 |
| 6 | P1.5 |
| 7 | P1.6 |
| 8 | P1.7 |
| 9 | Reset pin; Active high | | | Reset |
| 10 | Input (receiver) for serial communication | RxD | 8 bit input/output port (P3) pins | P3.0 |
| 11 | Output (transmitter) for serial communication | TxD | P3.1 |
| 12 | External interrupt 1 | Int0 | P3.2 |
| 13 | External interrupt 2 | Int1 | P3.3 |
| 14 | Timer1 external input | T0 | P3.4 |
| 15 | Timer2 external input | T1 | P3.5 |
| 16 | Write to external data memory | Write | P3.6 |
| 17 | Read from external data memory | Read | P3.7 |
| 18 | Quartz crystal oscillator (up to 24 MHz) | | | Crystal 2 |
| 19 | Crystal 1 |
| 20 | Ground (0V) | | | Ground |
| 21 | 8 bit input/output port (P2) pins  /  High-order address bits when interfacing with external memory | | | P2.0/ A8 |
| 22 | P2.1/ A9 |
| 23 | P2.2/ A10 |
| 24 | P2.3/ A11 |
| 25 | P2.4/ A12 |
| 26 | P2.5/ A13 |
| 27 | P2.6/ A14 |
| 28 | P2.7/ A15 |
| 29 | Program store enable; Read from external program memory | | | PSEN |
| 30 | Address Latch Enable | | | ALE |
| Program pulse input during Flash programming | | | Prog |
| 31 | External Access Enable;  Vcc for internal program executions | | | EA |
| Programming enable voltage; 12V (during Flash programming) | | | Vpp |
| 32 | 8 bit input/output port (P0) pins    Low-order address bits when interfacing with external memory | | | P0.7/ AD7 |
| 33 | P0.6/ AD6 |
| 34 | P0.5/ AD5 |
| 35 | P0.4/ AD4 |
| 36 | P0.3/ AD3 |
| 37 | P0.2/ AD2 |
| 38 | P0.1/ AD1 |
| 39 | P0.0/ AD0 |
| 40 | Supply voltage; 5V (up to 6.6V) | | | Vcc |

**3.2.2 Power Supply:**

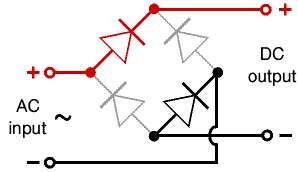
 Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, & rarely to others. Here in our application we need a 5v DC power supply for all electronics involved in the project. This requires step down transformer, rectifier, voltage regulator, & filter circuit for generation of 5v DC power. Here a brief description of all the components is given as follows:

**3.2.3 Transformer:**



A transformer is a device that transfers electrical energy from one circuit to another through inductively coupled conductors — the transformer's coils or "windings". single iron-rich core, or around separate but magnetically-coupled cores. A varying current in the first or "primary" winding creates a varying magnetic field in the core (or cores) of the transformer. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the "secondary" winding. This effect is called mutual induction. If a load is connected to the secondary circuit, electric charge will flow in the secondary winding of the transformer and transfer energy from the primary circuit to the load connected in the secondary circuit. The secondary induced voltage *VS*, of an ideal transformer, is scaled from the primary *VP* by a factor equal to the ratio of the number of turns of wire

**3.2.4 Bridge Retifier :**

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A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with single component bridges where the diode bridge is wired internally.

**3.2.5 Regulator IC (78XX)**

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It is a three pin IC used as a voltage regulator. It converts unregulated DC current into regulated DC current. Normally we get fixed output by connecting the voltage regulator at the output of the filtered DC (see in above diagram). It can also be used in circuits to get a low DC voltage from a high DC voltage (for example we use 7805 to get 5V from 12V). There are two types of voltage regulators 1. Fixed voltage regulators (78xx, 79xx) 2. Variable voltage regulators (LM317) in fixed voltage regulators there is another classification 1. +ve voltage regulators 2. -ve voltage regulators

**3.2.6 The Capacitor Filter:**

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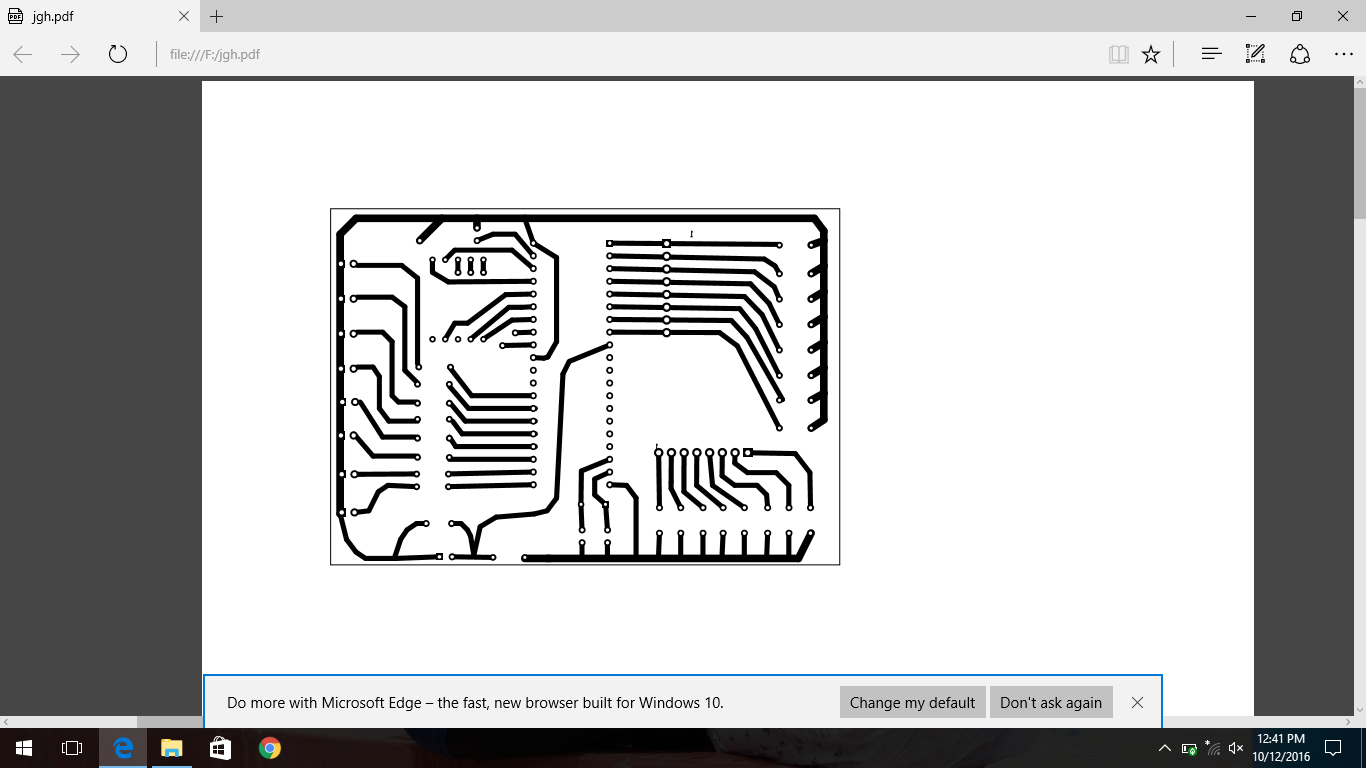
The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode-ray and similar electron tubes, which require very little load current from the supply. The capacitor filter is also used where the power-supply ripple frequency is not critical; this frequency can be relatively high. The capacitor (C1) shown in figure 4-15 is a simple filter connected across the output of the rectifier in parallel with the load.

Chapter no. 4

**SOFTWARE DESCRIPTION**

**4.1 PCB layouts:**

Basic circuit using 89c51 microcontroller

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The **Project Windows** area is that part of the screen in which, by default, the Project Window, Functions Window, Books Window, and Registers Window are displayed.

Within the **Editor Windows** area, you are able to change the source code, view performance and analysis information, and check the disassembly code.

The **Output Windows** area provides information related to debugging, memory, symbols, call stack, local variables, commands, browse information, and find in files results.

If, for any reason, you do not see a particular window and have tried displaying/hiding it several times, please invoke the default layout of μVision through the **Window – Reset Current Layout** Menu**.**

**Positioning Windows**

The μ-Vision windows may be placed onto any area of the screen, even outside of the μ-Vision frame, or to another physical screen.

vision displays docking helper controls3, emphasizing the area where the window will be attached. The new docking area is represented by the section highlighted in blue. Snap the window to the Multiple Document Interface (MDI) or to a Windows area by moving the mouse over the preferred control.

:

**Keil µ-VISION**3

The μ Vision IDE is, for most developers, the easiest way to create embedded system programs. This chapter describes commonly used μ Vision features and explains how to use them. A Context Menu, invoked through the right mouse button, is provided for most objects. You can use keyboard shortcuts and define your own shortcuts. You can use the abundant features of a modern editor. Menu items and Toolbar buttons are grayed out when not available in the Current context.

Graphical symbols are used to resemble options, to mark unsaved changes, or reveal objects not included into the project. Status Bars display context-driven information. You can associate μ-Vision to third-party tools.

**4.2 program:**

ORG 00H

AJMP START

ORG 03H

RETI

ORG 0BH

RETI

ORG 13H

RETI

ORG 1BH

RETI

ORG 23H

RETI

ORG 25H

DELAYMS:

MOV R7,#00H

LOOPA:

INC R7

MOV A,R7

CJNE A,#0FFH,LOOPA

RET

DELAYHS:

MOV R6,#00H

MOV R5,#008H

LOOPB:

INC R6

ACALL DELAYMS

MOV A,R6

JNZ LOOPB

MOV A,0A0H

CPL A

MOV 0A0H,A

MOV A,#00H

DEC R5

MOV A,R5

JNZ LOOPB

RET

START:

MOV 61H,#00H

MOV 62H,#0B0H

MOV 63H,#04H

MOV 64H,#24H

MOV 65H,#32H

MOV 66H,#60H

MOV 67H,#48H

MOV 68H,#0F2H

LOOP:

MOV A,90H

CJNE A,#0FFH,L1

AJMP LOOP

L1:

MOV R4,#00H

L2:

SETB C

RLC A

INC R4

JC L2

MOV A,R4

ADD A,#60H

MOV R0,A

MOV A,@R0

MOV 80H,A

MOV 0A0H,#00H

ACALL DELAYHS

MOV 80H,#0FFH

MOV 0A0H,#0FFH

AJMP LOOP

END

Chapter no. 5

**Conclusion**

Integrating features of all the hardware components used have been developed in it presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Using highly advanced ICs with the help of growing technology the project has been successfully implemented. Thus project has been successfully designed and tested.

Chapter no. 6

**Future Scope**

In future this project used in other application by adding some additional component to this project. Hence this project is cost effective it saves time, money and efforts of a person.

Chapter no. 7

**Reference**

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2. [**www.electronicsforu.com**](http://www.electronicsforu.com)
3. [**www.wikipedia.com**](http://www.wikipedia.com)

**Microcontroller Based Monitoring System**

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