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Close Circuit Security System Using At89c51

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Abstract—The purpose of this project is to provide a field that's depending on less manual operations because everyone is interested in automated systems. To face new challenges in the present day situation automated systems are more accurate, flexible and reliable. Due to these reasons every field prefers automated control systems. Especially in electronics automated systems are doing better job. The ideal system to protect your property is CCTV (Closed Circuit Television) Not only does it act a visual deterrent but the video or digital recording provides an invaluable method of recording crime, violence or anti-social behaviour. CCTV systems offer such a wide area of applications and benefits 24-hours a day. Systems can aid the monitoring of stock, personnel, visitors, access control and prevent health and safety incidences.

Keywords— *Motor, Microcontroller, Camera, 555 Timer IC, Buzzer.*

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I. INTRODUCTION

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications.

The AT89C51 provides the following standard features: 4Kbytes of Flash, 128 bytes of RAM, 32 I/O lines, two 16-bittimer/counters, five vector two-level interrupt architecture, a full duplex serial port, and on-chip oscillator and clock circuitry. In addition, the AT89C51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The Power-down Mode saves the RAM contents but freezes the oscillator disabling all other chip functions until the next hardware reset. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems. By reducing the size and cost compared to a design that uses a separate microprocessor, memory, and input/output devices, microcontrollers make it economical to digitally control even more devices and processes. Mixed signal microcontrollers are common, integrating analogy components needed to control non-digital electronic systems.

Some microcontrollers may use four-bit *words* and operate at *clock rate* frequencies as low as *4 kHz,* for low power consumption (single-digit mill watts or microwatts)[2]. They will generally have the ability to retain functionality while waiting for an event such as a button press or other interrupt; power consumption while sleeping (CPU clock and most peripherals off) may be just Nano watts, making many of them well suited for long lasting battery applications. Other microcontrollers may serve performance-critical roles, where they may need to act more like a digital signal processor (DSP), with higher clock speeds and power consumption.

In short, the AT89C51 has the following on-chip facilities:

- ROM (EPROM on 8751)
- 128 byte RAM
- UART
- 32 input-output port lines
- Two, 16-bit timer/counters
- Six interrupt sources and
- On-chip clock oscillator and power on reset circuitry.

The 89C51 can be configured to bypass the internal 4 k ROM and run solely with external program memory. For this its external access (EA) pin has to be grounded, which makes it equivalent to 8031. The program store enable (PSEN) signal acts as read pulse for program memory. The data memory is external only and a separate RD* signal is available for reading its contents.

Use of external memory requires that three of its 8-bit ports (out of four) are configured to provide data/address multiplexed bus. Hi address bus and control signals related to external memory use. The RXD and TXD ports of UART also appear on pins 10 and 11 of 8051 and 8031, respectively. One 8-bit port, which is bit addressable and, extremely useful for control applications [2-3].

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The UART utilizes one of the internal timers for generation of baud rate. The crystal used for generation of CPU clock has therefore to be chosen carefully. The 11.0592 MHz crystals; available abundantly, can provide a baud rate of 9600. The internal RAM utilizes the 256-byte address space and special function registers (SFRs) array, which is separate from external data RAM space of 64k. The 00-7F space is occupied by the RAM and the 80 - FF space by the SFRs

II. Our Work

This system demonstrates a circuit named Close Circuit Security System Using At89c51. In this circuit we used Television, motors, Buzzer, MCU: AT89C51, Timer IC, and camera. If anyone one enters through the gate then the Alarm is ON. In gate there is connecting the sensors. Alarm circuit, Television, Stepper motors, motor Driver IC, all these equipment are connected to the microcontroller AT89C51. Motor is connecting with camera for rotating the camera. If someone enters in the room or office by the gate then alarm is ON because sensor sense the person and give signal to the microcontroller. Camera records everything that happens at the gate. Motors rotates according to the microcontrollers instruction when motors are rotate that time camera is also rotate because camera is connect to the motor. With the help of this system we are able to know who enters in room or office. Micro controller operates these all operations through assembly language instruction.

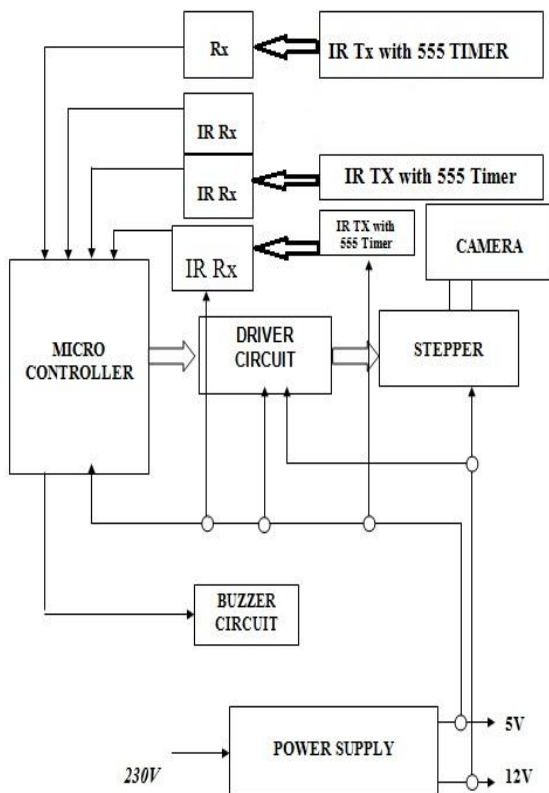## III. Block Diagram And Description

Fig.1 shows the block diagram.

A. *Microcontroller Unit (89c51):*

The AT89C51 is a low-power, high-performance CMOS 8-bit microcomputer with 4K bytes of Flash programmable and erasable read only memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the industry-standard MCS-51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89C51 is a powerful microcomputer, which provides a highly flexible and cost-effective solution to many embedded control applications [4].

B. *CCTV:*

The ideal system to protect your property is CCTV (Closed Circuit Television)[1]. Not only does it act a visual deterrent but the video or digital recording provides an invaluable method of recording crime, violence or anti-social behaviour. These days, there is a huge range of CCTV product to choose from, with a wealth of features. Systems range from a simple analogue or digital package to highly advanced digital systems which can be integrated into our other security systems such as intruder alarm or access control. CCTV verification of intruder alarm activation makes for the ultimate security system. CCTV can be used to monitor virtually anything: town centres, public transport, Domestic and commercial premises as well as stock, machinery, personnel, visitors, access control and Health & Safety requirements - the list is endless.

C. *IR Sensor:*

The infrared band can be divided into Near Infrared (NIR) and Far Infrared (IR)[5]. Far infrared is the thermal infrared used to detect hot objects or see heat leaks in buildings, and is way beyond the range of LEDs. NIR can be further divided into two bands, long wave and short-wave NIR, based on how film and CCD cameras react, which I'll get into elsewhere, else when, and else why.

D. *Power Supply:*

Power supply unit provides 5V regulated power supply to the systems. It consists of two parts namely, Rectifier and Monolithic voltage regulator.
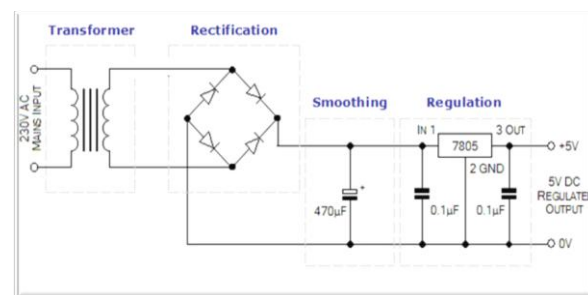

Fig.2 shows the power supply circuit diagram.

- Power supply unit is the basic requirement for electronic devices.

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- We are making use of 5v regulated DC power supply.
- Since the device is a mobile unit the power should be provided using a battery.
- Power supply unit contains
- Battery: Its voltage is up to 9 volts.

The major blocks of power supply are given below

- Transformer
- Rectifier
- Filter
- 7805 voltage regulator

E. Stepper Motor:

A stepper motor is a brushless, synchronous electric motor that converts digital pulses into mechanical shaft rotations. Stepper motors has numerous wires, 4, 5, 6, or 8[6]. When you turn the shaft you will usually feel a "notched" movement. Motors with 4 wires are probably bipolar motors and will not work with a unipolar control circuit.

F. IR Tx and Rx

1. IR TRANSMITTER SECTION

A. 555 TIMERS

The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 timer is one of the most remarkable integrated circuits ever developed. It comes in a single or dual package.

B. Infrared LEDs

An IR LED, also known as IR transmitter, is a special purpose LED that transmits infrared rays in the range of 760 nm wavelength.

2. IR RECEIVER SECTION

a. TSOP1738:

The tsop 1738 is a member of infrared remote operates receiver series. This infrared sensor module consists of a pin diode and a pre amplifier which are embedded into a single package. The o/p of tsop is active low and it gives +5v in off state. When IR waves, from a source, with a centre frequency of 38 khz incident on it, its output goes low.
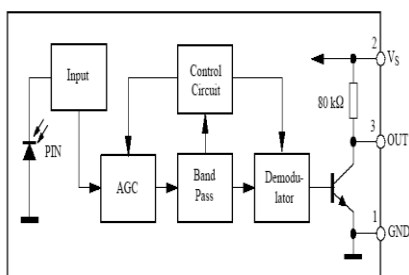

Fig Shows the Block Diagram Of TSOP 1738

G. Camera:

A camera is a device used to take pictures (usually photographs), either singly or in sequence, with or without sound recording, such as with video cameras. A camera that takes pictures singly is sometimes called a photo camera to distinguish it from a video camera. The name is derived from camera obscura, Latin for "dark chamber", an early mechanism for projecting images in which an entire room functioned much as the internal workings of a modern photographic camera, except there was no way at this time to record the image short of manually tracing it. Cameras may work with the visual spectrum or other portions of the electromagnetic spectrum [7-10.]

H. Buzzer:

We are going to use a buzzer to indicate someone entered through the gate. The Buzzer signal from micro controller is a pulse output of 1sec.
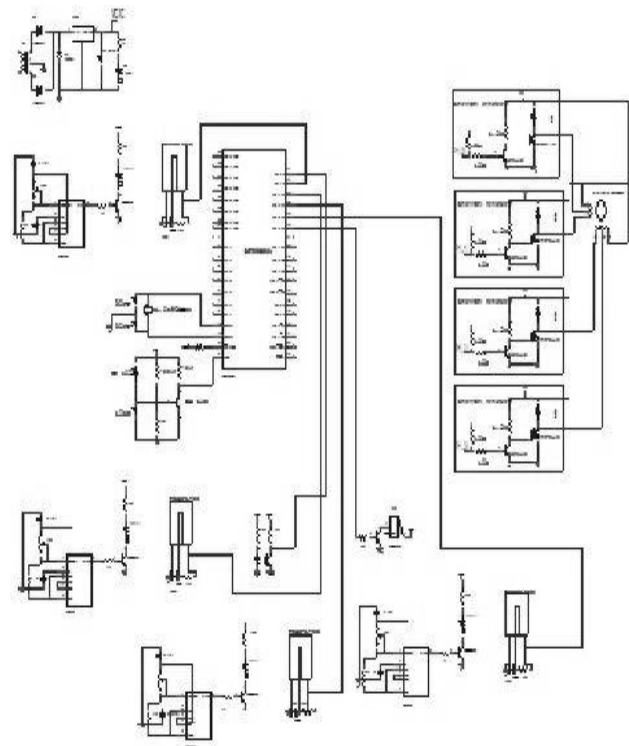
IV. CIRCUIT DIAGRAM AND DESCRIPTION

Fig.2 shows Circuit diagram.

Each IR is connected with an I/O line of the controller. In the initial condition the IR Sensor OUT PUT is in ZERO. I/O line value is compared. When Intruder enters IR receiver gives High value. With this the stepper motor rotates in particular angle. The angle of rotation is given by the shaft angle of stepper motor. The pulses are given from the I/O lines of stepper motor. The pulses are fed to the driver circuit through which MOSFET drives the ground corresponds to the coil connected. This magnetizes the internal coil and shaft is attracted or rippled by the coil, by this it rotates depend on the shaft rotation angle [6].

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The rotation of angle is given by the step sequence. The supply for stepper motor that is 12V DC is taken from the rectifier circuit and 5v for driver circuit and Micro Controller. The alarm is ON if any one enters through the gate. Stepper motor is used for rotate the camera[8-9] If anyone enters through gate the sensors sense the signal then automatically the alarm ON through micro controller operations. Camera observes the everything at the gate. Camera rotates according to the micro controller instructions. With closed circuit TV we know who enters in to the gate. With this system we can provide security. Micro controller controls these all operations through assembly language instructions.

V. COMPONENT DETAILS

Sl/No	Items	Range/specification	Quantity
1	DC Battery	12V	1
2	Crystal oscillator	12MHZ	1
3	Microcontroller	AT89c51	1
4	Regulator IC	7805	1
5	Transformer	12v	1
6	Capacitor	10uF , 0.1Uf , 33uF	5
7	Resistor	1k , 5k , 2k	7
8	Relay	12v DC	1
9	Transistor	BC547	2
10	Preset	10K(1/4 watt)	1
11	Reset switch	-	1
12	LED	-	2
13	Diodes	IN4007	2
14	Camera	-	5
14	Driver IC	-	5
15	Stepper motor	bipolar	5
14	Connecting wires	-	1set

VI. CONCLUSION

This paper discusses the importance of using a Close Circuit Television. In this project the Each IR is connected with an

I/O line of the controller. In the initial condition the IR Sensor OUT PUT is in ZERO. I/O line value is compared. When Intruder enters IR receiver gives High value. With this the stepper motor rotates in particular angle. The angle of rotation is given by the shaft angle of stepper motor. The pulses are given from the I/O lines of stepper motor. The pulses are fed to the driver circuit through which MOSFET drives the ground corresponds to the coil connected. This magnetizes the internal coil and shaft is attracted or rippled by the coil, by this it rotates depend on the shaft rotation angle. The rotation of angle is given by the step sequence . The supply for stepper motor that is 12V DC is taken from the rectifier circuit and 5v for driver circuit and Micro Controller. Camera rotates according to the micro controller instructions.

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