A MICROPROCESSOR-BASED GATE SECURITY SYSTEM

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Abstract- **A microprocessor-based Security Sestym for gate control in a housing state is describe in this review paper. The system provides efficient gate access and estate control to perform the jobe of the gate security guard. The hardware and software development of this system is presented.**

The system also serves as an automobile parking control unity by periodically checking the number of vehicles that have entered the area and computing the available space limit in the parking area. Once the available space limit is reached, the system triggers an alarm for a specified time and the entrance gate remains inaccessible until another vehicle comes out through the exit gate.

I. INTRODUCTION

The need for automatic gates has been on the increase in recent times. The system described here incorporates the use of a microprocessor as a controller in achieving the aims of this project. It is no exaggeration to say that the microprocessor has revolutionized the electronics industry and has had a remarkable impact on many aspects of our lives (1999).

Almost all areas of technology have started taking advantage of the inexpensive computer control that microprocessors can provide. Some typical applications include: electronic games, CD players, automatic braking systems, industrial process controls, electronic measuring instruments, automobile emission controls, microwave ovens, traffic controllers, and a rapidly growing number of new products.

The automatic gate described here automates the entrances to parking lots of residential homes, organizations, automobile terminus, and public car parks. It uses a remote control convenience to avoid the stress of manually opening and closing the gate. The technology used eliminates gate monitoring and manning by human beings. The gate uses a state-of-the-art entry system. The gates have to perform gyrations – open, auto-reverse, stop, fully close and fully stop.

II. GENERAL OVERVIEW OF THE SYSTEM

The research work presented here is the design and development of a microprocessor based automatic gate. As a monitoring and control system, the microprocessor was used to read in data values from the input device and interact with the outside world.

The system senses, opens and closes the gate, counts, registers, and displays the number of vehicles crossing the gate (both entrance and exit) and triggers an alarm once the space limit is reached. Once triggered, the gate remains inaccessible until another vehicle leaves the park (1983). The automatic gate system comprises a sensor unit, a trigger circuitry, CPU module, memory module, display unit, gate control unit and the power supply unit as shown in the block diagram below.

III. SENSOR UNIT

This module makes use of an optical sensor, specifically a light dependent resistor (photo conductive cell), whose resistance changes with the intensity of light. The type used is ORP12 and it has a dark resistance of 10MΩ. The sensor unit is shown in Figure 2. When light rays are focused on the LDR, the resistance becomes very low (0-500Ω) but when the rays are interrupted, the resistance increases to its dark resistance. The variable resistor is used to vary the sensitivity of the LDR. It is otherwise called Dark Activated Sensor.

Two pairs of sensors (4 total) were used for the entire system; each pair for the entrance and exit gates and the outputs from the sensor units and is part of the trigger circuitry. The sensor unit is arranged in such a way that it consists of two pairs of LDRs to provide signals for the trigger circuitry whenever there is an obstruction through the entrance or exit gate. For the design, two conditions are considered: first, when light rays are focused on the ORP12, and secondly, when the rays are being interrupted.

When light rays of great intensity are focused on the ORP12, the output voltages, V01 and V02 are low (approximately 0V). When the light beams are interrupted, the output voltages increase to 5V approximately.

The circuit has the ability to detect only the passage of an automobile through the entrance and exit gates (1976). Each pair of sensors are separated by a reasonable distance such that the passage of a person or other moving objects cannot obstruct the sensor pair separation. If this happens, only one sensing unit is activated and is processed by the trigger circuitry so that there will be no triggering. Also, the height of the sensors is considered such that only the body of a vehicle can interrupt the light beams of the sensors and not the tires or its windows. To avoid false triggering, the two s

IV. POWER SUPPLY UNIT

A microprocessor based system design has to be activated with a clean power supply of good regulation characteristics. A transient on the power line could send the microprocessor wandering, resulting in system failure. Z80 operates on a voltage VCC = 5V ±10% and as a result of this, the power supply unit designed is 5V DC and is not affected by variation in the AC voltage serving as input to the transformer. The components used in the power supply (Figure 9) include:

TRANSFORMER

A 220/240V transformer is used with output voltage of 12V.

DIODE 1N4007

This converts the AC current to DC and satisfies charging current demands of the filter capacitor. The arrangement of the diodes is called a bridge rectifier. Rectification is done by the PN junction diodes. The DC voltage varies above and below an average value. This variation is called ripple voltage. In order to reduce ripple voltage to a very small value, the DC voltage needs to be filtered.

V. CONCLUSION

The design and implementation of a microcomputer system had been achieved in this project. This design can be easily adapted to any electric gate and any form of control which requires the use of sensors. To effectively design this kind of system, it is necessary to understand the basic sensor characteristics, microprocessor input and output interfacing, and assembly language principles, utilized in the system.

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