



KENYATTA UNIVERSITY

DESIGN AND FABRICATION OF A MICROPROCESSOR –BASED CAR LENGTH MONITORING SYSTEM

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In our local car storage facilities in some of our major towns, the drivers spend a lot of time looking out for an appropriate space for their cars. In a simple system where cars are categorized on the dimension basis, sensitive sensors may be utilized to configure the exact size with a higher degree of accuracy. This ensures maximum utilization of the storage facility simply by storing the car whose dimensions match to those of the facility. This technology is available in robotic parking. The usage of this robotic technology in our Kenyan situation is however expensive and unreliable and is thus vital to develop cheaper and cost effective means. One advantage in this cheaper technology is the standard width of modern cars and can therefore use length criteria to categorize the cars. It is possible to design a system that would continually and automatically monitor the cars length, display the length to the client (driver) and the facility currently available and suitable for such car size.

To solve this problem, this research project focused on designing and fabricating a microprocessor-based car length monitoring system. The system reads the bit pattern from the length monitoring sensor stem, interprets the information and displays the length configured and later display the facility suitable for the car length. The system is implemented by constructing a microelectronic system based on Z80 processor interfaced to 2716 EPROM, 6116 RAM, two 8255 PIAs ,a seven-segment display, two Light Emitting Diode Displays and a photo resistor sensor circuit. The photo resistor sensor circuit consists of eight photo resistors separated at a distance of 10cm from each other. The seven segment displays and Light Emitting Diodes are both driven by 74LS48 Integrated Circuits (ICs) and are connected to port B (8255 PIA 2) and port B (8255 PIA 1) respectively. The program for driving the system is developed and coded using Z80 assembly assembler. The components used are chosen based on their cheap cost, low current and voltage ratings (5V), high performance, better frequency response and easier logic family compatibility. The Z80 assembly language is preferred due to its powerful but extremely flexible instruction set (150 in number) and its ability of supporting 64K RAM memory. A car model is passed over the photo resistor sensors. As it fully by-passes the first sensor, it is stopped momentarily for 20 seconds. The length monitoring system configures the resulting binary combination due to mechanical optical beam interruption. The information is fed into port A (8255 PIA 1). The car length size and facility are displayed in port B (8255 PIA 2) and port B (8255 PIA 1) respectively.

The system displays the car length size and facility in order of 1, 2, 3, 4, 5, and 6.

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