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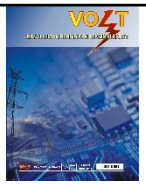

DESIGN OF PARKING SYSTEM MINIATURE BASED PERSONAL COMPUTER USING SOFTWARE BORLAND DELPHI 6.0

Endi Permata[1], Mustofa Abi Hamid[1]✉, Rian Raina Pertiwi[2]

[1]Department of Electrical Engineering Education, Faculty of Teacher Training and Education
Universitas Sultan Ageng Tirtayasa, Serang 42117, Indonesia
✉Corresponding author e-mail: abi.mustofa@untirta.ac.id

[2]Department of Electrical Engineering, Faculty of Engineering
Universitas Sultan Ageng Tirtayasa, Serang 42117, Indonesia

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Abstract

This research aims to create a miniature system for parking using Borland Delphi 6.0 software. The output data in the form of an analog optical sensors, so that the computer can read and manipulate data, then the data is converted to digital data by means of the output from the optical sensors sent to PPI 8255 which served to transform analog signals into a digital signals. The entire system is controlled entirely by computer through the PPI 8255 by Program Borland Delphi 6.0.

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Keywords: Optics Sensor, PPI 8255, Borland Delphi 6.0, Personal Computer

INTRODUCTION

Parking system that exists today only as counting the length of time for parking, the amount of the fees payable and know the number of vehicles that are in the parking area but have not been able to determine parking area position which is still empty. Based on the parking system, a problem that often occurs in the parking system is the problem of irregular parking control.

A problem that often occurs when the driver has entered the parking lot and find an empty parking lot turns out to the parking lot is

full. Because of these problems, then needed a miniature personal computer-based parking system. This parking system parking assist service users to find a parking space on the floor and how many blocks are still empty and not detrimental to the parking service users because if the parking lot is fully charged can be monitored through a personal computer and there is indicators indicate that the parking lot was filled to capacity, so that riders who want to get know if parking area are still empty or already filled.

PC-based parking system is a system that is designed to limit the number of vehicles the car in the parking lot, know the position where there is a parking area which is still empty and can be monitored with Borland Delphi 6.0. This system uses a series of light sensors to detect the car parking and Borland Delphi 6.0 are used as controller overall parking system (Malvino & Leach, 1992).

The sensor is functioning as a moving object detector above the sensor and to detect the state of the environment such as movement, temperature, light, color and metal (Kadir, 2003). Quantity sensor comes out i.e. a quantity of electricity, electric quantities processed part of the control and the results of the process were issued at the output (Monteiro, 2004). So that the sensor can work well and should have the right requirements: Sensitivity, the sensor should be chosen in such a way on the values of the input and output can be obtained that is large enough; Stability in time, i.e. to find a certain input, the sensor should be able to provide a value that remains in quite a long time (Kasmoni, 2004)

The resistance of the LDR changed along with the change of the intensity of the light that hits it, in a State of resistance to dark LDR has a value of ≥ 5 KΩ, and the State in the light of ≤ 2 KΩ. With this energy from light that falls cause more detachable charge or electric current is increased, it means the resistance has decreased. LDR is used to convert light energy into electrical energy. Light sensor serves to detect the light around us, the famous sensors to detect light is LDR. The sensor resistance value will change if there is a rate change the brightness of the light. It is this principle which we will use to activate the transistor to be able to enable the sensor signal parking area and move the motor DC. Change the value of the resistance on the LDR will cause a change in the value of the input transistor's base, so that it will enable and disable the transistor. So his little big value prisoners LDR depending on the intensity of the light hitting the surface of LDR. The reason for using LDR i.e. Sensitivity is good enough against a variety of light source, easy to use due to the nature of the resistance, there are components in the market with relatively cheap prices (Zakaria & Prijono, 2007)

Direct current motor is a machine that serves to convert the direct current electric power into mechanical power or motion power. The motor is a component that can turn electrical energy into mechanical energy. At a time when the motor rotates the rotor coil cutting lines of magnetic force that causes the voltage at the coil induction has occurred contrary to the driving voltage of the motor. DC motor working principle is almost the same with the AC generator, where the difference is in the power conversion. The basic principle in a counter-current wire placed between the poles of the magnet (U-S), then wire it will work on a style that moves the wire

Seven segment decoder is the segment Seven functioning to display output into the form of a decimal. Seven segment decoder is to translate the binary number in order to be

shown on the display of the seven segment, such as 0 (zero) in the seven segment display in binary is 0000. To display the number 0 (zero) on the decoder will provide high signal (active) on all pins (a, b, c, d, e, f) except pin g so it will be formed the number 0 (zero) in the seven segment which has the function of the selection of the output to display seven segment in accordance with the input set. On a seven segment decoder has four binary inputs (A, B, C, D) and outputs as many as 7 in accordance with the seven segment display (McCombie, Software, & 2001, n.d.)

Programmable Peripheral Interface (PPI 8255) is a large-scale integrated circuit (LSI = Large Scale ntergrated) with 40 pins used in microcomputers as an interface (interface) between the data bus microcomputers with external input/output devices. IC type is also used on (i/o) chip such as programmable communications interface (8251) or USART. PPI is different to the USART, where PPI is used to transfer data in parallel, whereas is used for USART serial. The IC is designed to create a parallel input and output ports. This IC has 24-bit I/O are well organized into three 8-bit port with the name port A, port B and port C (Prestiliano, 2005).

PPI 8255 can be operated and functioned on three kinds of modes: 1) Mode 0 (Basic I/O), this configuration provides simple operations for input and output for the third port available. No handshaking signals which can be given or received, but rather the simple data sent and read by port; 2) Mode 1 (*strobe I/O*), This configuration provides the facilities for the transfer of data i/o from a port to a specific port with a complemented by signal handshaking; 3) Mode 2 (*strobe bidirectional I/O*), this configuration provides facilities for 8-bit data communication is two-way with the equipment outside. Available signals for handshaking and interrupt with the enable and disable functions (Cantu, 2006)

DB-25 is the port most used in interfacing with a wide variety of external equipment. Relationships commonly used wiring that is the connector type DB-25 as shown in the picture below. The DB-25 connector is a connector found on most PCs, DB-25 has a 25 pin (Teixeira & Pacheco, 2002)

METHOD

Figure 1 is a diagram of block design of the system as a whole, the main device of the system this is censorship, seven segment, dc motor and PPI 8255. Light sensor will detect a vehicle parking, the output of the sensor the light into the input PPI 8255, which functioned as the interface mode 0, with personal computer as executable software via Borland Delphi 6.0 are used as a parking system interface controller.

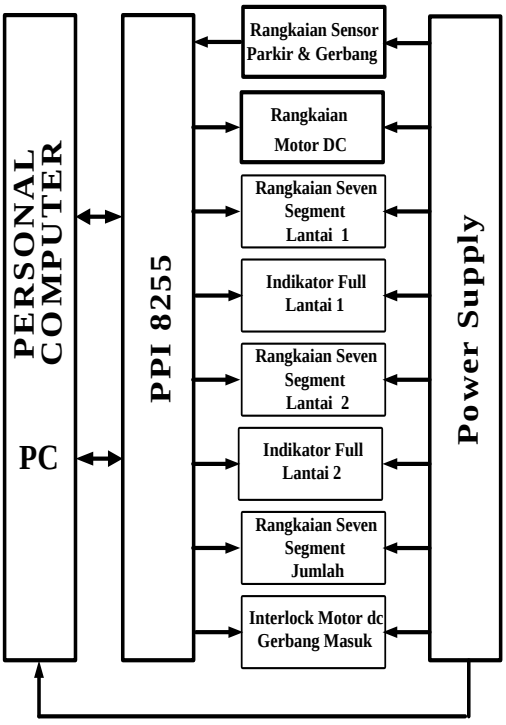

Figure 1. Block Diagram of the system

In Figure 2 shows that the working principle of optical sensor arrangement is when the series was given a source voltage of 12 volts, then the LED will light up. The resulting light is captured by LDR LDR prisoners, so the price becomes smaller and cause base current (I_B) be a big cause of the transistor into saturation, so that the feet of the collector and the emitter leg as if it blends. Thus the relay will work with interesting contact NC (normally close) that originally covered the contacts be open. The relay will continue working until the existence of a vehicle that blocks the light received by the LDR. Tranduser used for this series using NPN transistors, where the type of 2N2222A 2N2222A is one type of transistor switching. LDR is very suitable to be used as the optical sensor for detecting vehicles.

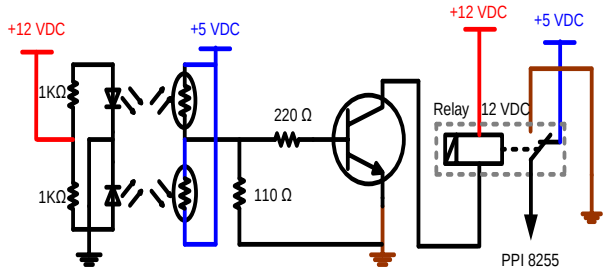

Figure 2. A Circuit of Light Sensors

To simplify the calculation of the number of the parking of the vehicle, then done automatically calculating vehicle that appears in the display on the 7 segment display and the PC. Figure 3 is a 7 segment display design, with the address input from the 8255 PPI (a) namely PB0 to Relay A, PB6 for Relay B and PB7 for Relay C. PPI 8255 Output (a) by 5 V input to the relay circuit make contact NC is open, so IC 74LS47 into input one or high value byte to encode and drive 7 segment so that the output can be in decimal.

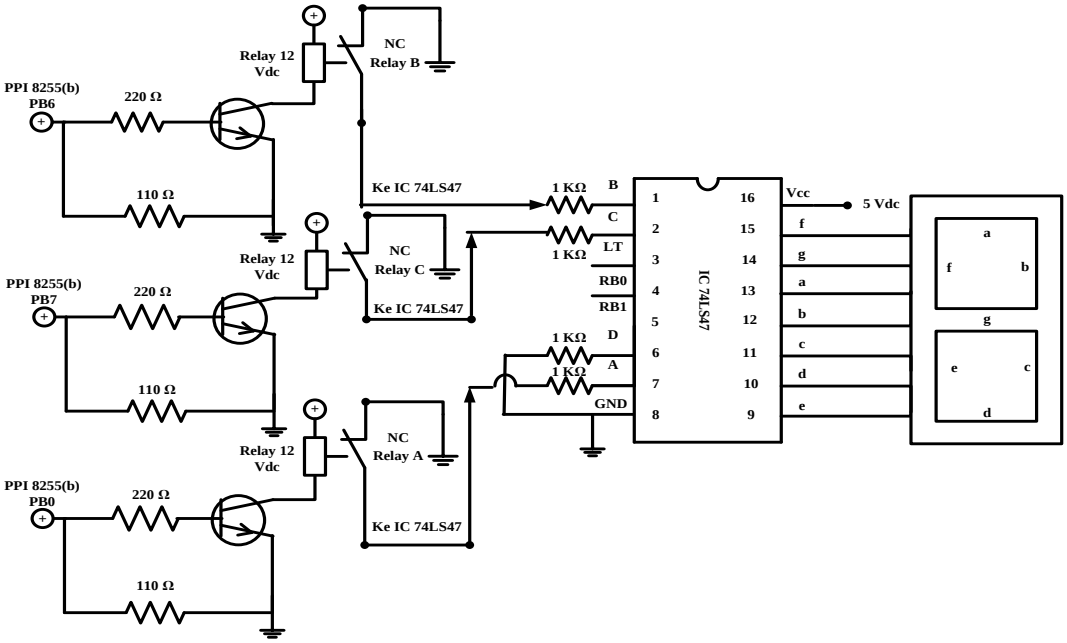

Figure 3. Seven Segmen Display

In the application often a motor used for the direction of the line with the clock or otherwise, to change the rotation of a motor can be done by changing the direction of current flow through the motor. In simple terms as seen in the picture below, this can be done by changing the polarity of the voltage of the motor. So changing the polarity of the voltage of the motor can be done easily, then carried out using two pieces of relay, the relay where the two should operate interchangeably so that the polarity of the voltage that will be supplied to the motor upside down and both Relay not working simultaneously so that both poles (+ 5 volts and 0 Volts) is not connected. Figure 4 shows the settings of the direction of motor rotation and figure 5 shows the controls of the settings of motor rotation.

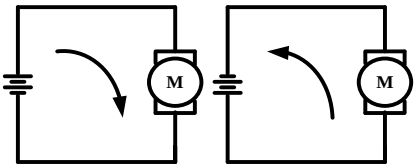

Figure 4. The settings of the direction of motor rotation

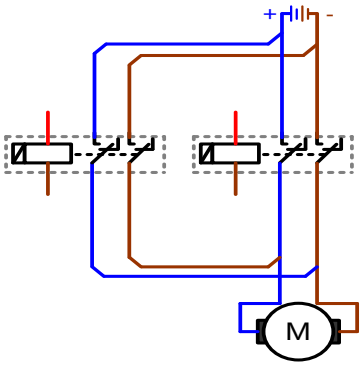

Figure 5. The controls of the settings of motor rotation.

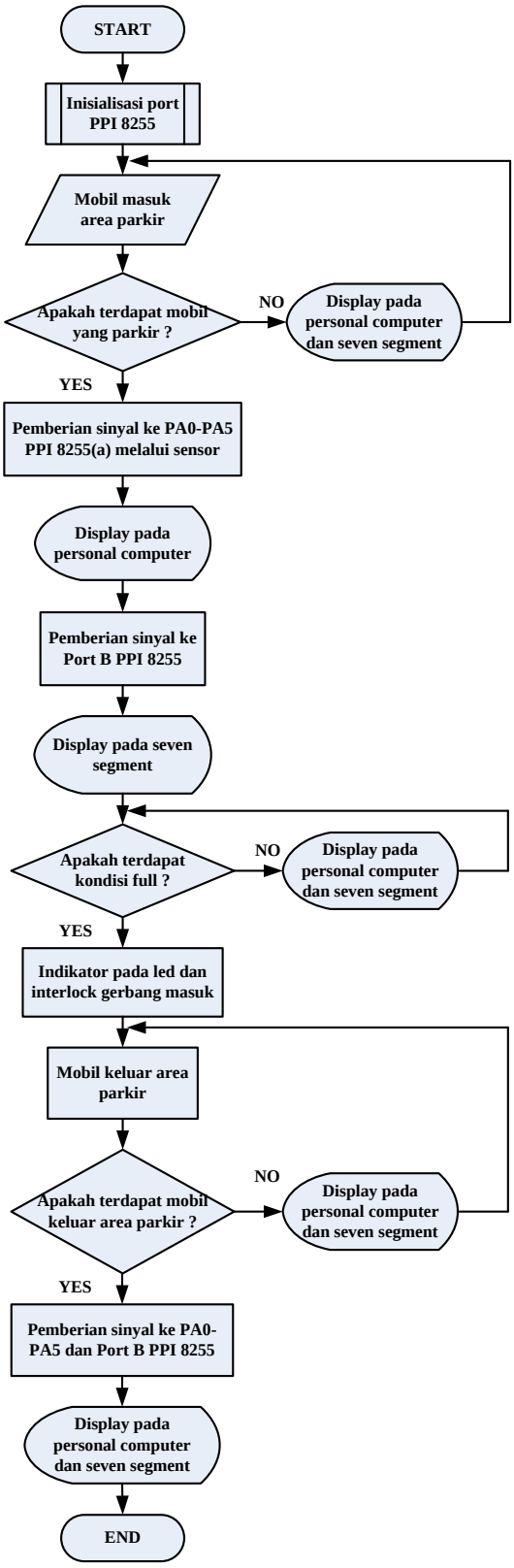

Figure 6. Flowchart of Parking Area Monitoring

For communication of the tool through controlled computer needs software that is useful to control the controller hardware via a computer. We can make a software controller with borland delphi 6.0. Making software aims to control parking system, such as monitoring the parking area, the data input of vehicle parking area entrance and exit make an attractive display with a goal can monitor overall. In the manufacture of miniature parking system used borland delphi 6.0, to display program design that are divided into some form that is: Menu, transactions, Monitoring, reports and parking tickets. Flowchart of monitoring Parking Area can be seen in figure 6.

RESULTS AND DISCUSSION

A series of light sensors can detect the led light as well. 1 KΩ resistors arranged in series with the led aiming to limit the current through the led so that the led is not quickly broken. Maximum current through the LEDs according to the datasheet is 10mA.

$$R_{(LED)} = \frac{V}{I} = \frac{12}{10mA} = 1.2\ k\Omega \quad (1)$$

then the resistor used for led is the resistor has a value of 1 KΩ. The requirement to create transistors on IC < IB, so we choose the IB on the datasheet PN2222A i.e. of 0.015 A. The transistor will be turned on by using the voltage of 5 volts. For silicon transistor VBE ranging between 0.6 – 0.7 volts. The calculation would be:

$$V_{in} = V_{BE} + I_B.R_B$$

$$R_B = \frac{V_{in} - V_{BE}}{I_B} \rightarrow R_B = \frac{5 - 0.7}{0.015}$$

$$R_B = 286.66\ \Omega \quad (2)$$

from the calculation (2), and then selected a smaller resistor because to qualify $V_{in} > V_{BE} + I_B \times R_B$, so in order to make transistors really work in the mode of saturation, then the resistor that is used for the value of the resistor is RB has a value of 220 Ω.

To turn on a transistor using transistors to switch off while the IB to use IE, where the value of voltage passing through RE will control the transistor on the initial state. The resistor is used for the value of RE is a resistor having a value of 110 Ω with the following calculation

$$V_{BB} = I_B \cdot R_B = 0.015A \cdot 220\ \Omega$$

$$V_{ref} = \frac{R_1}{R_1 + R_2} \cdot V_{CC}$$

because V_{ref} passing R_{ref} i.e. R_1 where R_1 and R_2 resistance connected in parallel then the value of $V_{ref} = V_{BB.}$

$$V_{ref} = \frac{R_1}{R_1 + R_2} \cdot V_{CC} \rightarrow \frac{V_{ref}}{V_{CC}} = \frac{R_1}{R_1 + R_2}$$

$$V_{ref}(R_1 + R_2) = V_{CC}(R_1)$$

$$(3.3 \cdot 220) + (3.3 \cdot R_2) = 5 \cdot 220$$

$$(726) + (3.3 \cdot R_2) = 1100$$

$$R_2 = \frac{1100 - 726}{3.3} = 113.33\ \Omega \quad (3)$$

The results of the measurement of the light sensor can be seen in table 1.

Table 1. The Results Of Measurements Of Light Sensor

LDR sensors given 5 VDC input	Measurement results	
	Not Exposed to Light	Exposed to Light
Voltage (V_{out})	0 Volt	1,6 Volt
Resistor	≥ 5 kΩ	≤ 2 kΩ

After the PPI 8255 (a) reading the State of the parking sensors, then the PPI 8255 writes the results of sensor to seven segment through port B (PPI 8255-a), port A (PPI 8255-b) and port B (PPI 8255-b) by writing the following port address:

```
Procedure Re_Set;
Begin
asm
    mov dx,$303;
    mov al,$91;
    out dx,al;
end;            end;
if A1_0 and B1_0 and C1_0 then
// lantai 1 = 0
begin re_set;
tulisport($381, $00);   end ;
if (A1_1 or B1_1 or C1_1) then // LAN-
TAI 1 = 1
begin re_set;
tulisport($381,$01);    end;
if (A1_1 and B1_1)or(A1_1 and C1_1)
or(B1_1 and C1_1) then
// LANTAI 1 = 2
begin re_set;
tulisport($381,$02);    end;
if (A1_1 and B1_1 and C1_1) then
// LANTAI 1 = 3
begin re_set;
tulisport($381,$03);    end;
```

Listing re_set program to restore the settings to their original state 8255 PPI, all ports on the condition of low or 0 zero. by giving port control settings on the initial conditions of the control word. Write port ($381, $3), where $381 is the address of the port B for PPI 8255-b, while $3 is the address data for hexa binery coded decimal.

$03 → 0 0 0 0 1 1

PA7……..PA1 PA0

from the description above can we know that PPI 8255 or (b) provide high signal on the PA0 PA1 and where PA0 get conditions high then continues toward a series of relay, relay circuits provide high signal to IC 7447 on pin 7, while PA1 get conditions high then continues towards the circuit relay, relay circuits provide high signal to IC 7447 on pin 2. So it appears the number 3 (three) in the seven segment display and PC. Write port ($381, $2), where $381 is the address of the port B for PPI 8255-b, while $2 is the address data for hexa binery coded decimal.

$02 → 0 0 0 0 1 0

PA7… ……..PA1 PA0

from the description above can we know that PPI 8255 or (b) provide high signal on PA1, PA0 get conditions where low then continues toward a series of relay, the relay of the circuit signal low to IC 7447 on pin 7, while PA1 get the condition is high then continues toward a series of relay, relay circuits provide high signal to IC 7447 on pin 2. So it appears the number 2 (two) in the seven segment display and PC.

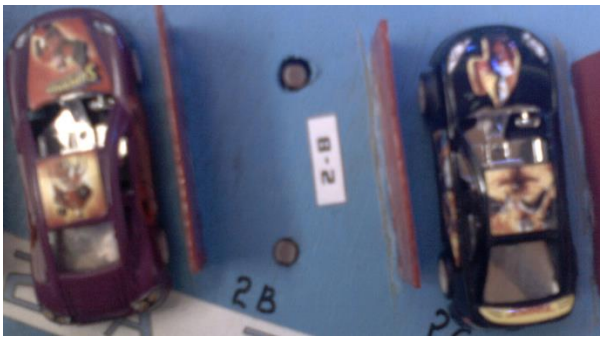

Figure 7. Vehicles Parking on the 2nd floor

According figure 7 on the 2nd floor there are 2 (two) cars parked, so directly the number of the cars that appear in the display in the seven segment display and PC, it can be seen that the number of vehicles parking on miniature parking system in accordance with the number of contained on a computer display. When there are conditions of full on the 1st floor or 2nd floor, then automatically the form of indicator LEDs on each floor will be lit (ON) that indicates that the floor has been filled, as the picture below can be seen full conditions It is on the 1st floor, so that gives the indicators is LED on the 1st floor which corresponds to the segment seven.

Series DC motor relay harness for changing the polarity of the supply to the motor is DC so that the direction of rotation of the motor can be changed. Series DC motor voltage 5 volts is triggered from the 8255 PPI. The voltage moves the transistor used as switching. Control signals derived from PPI 8255 customize transistor on the conditions of saturation or cutoff. When the control signal value is high (5 volts) then the value of the VEB 0.7 volts. Thus the two built-in relays will work and change the polarity of the motor. 220 Ω resistor serves to limit the current flow at the base of the transistor.

This test aims to find out the motorcycle can function as both a mover and reflexive direction round doorstop. PPI 8255 receives input from a series of light sensors (PC2, PC3) mounted on the entrance and the exit, then the data is processed with the delphi program to enable bit port C (PC6 PC7,) on a PPI 8255-a and PPI 8255 -b for driving the motor. After a bit of 6 and 7 active bits, then the gate will open and close automatically or manually.

A series of light sensors (PC2, PC3) on a PPI 8255-a and PPI 8255 -b utilizes the LDR for detecting light emitted from LEDS, so that the value will shrink when the LDR inmates exposed to light that causes base current (Ib) flows large enough to bias so the transistor saturation. To the contrary, the condition value of custody standard will be worth LDR causes base current is not enough to membias so that the transistor transistor cut off.

Write port is intended to make the PPI 8255 ports of low condition become high, or the opposite of the condition of high into low. Suppose a write port address: ($302, $0) to PPI 8255-a where $302: address: $0 C port and address to turn off the motor and DC relay does not work. While the write address port: ($302, $40) to PPI 8255-a where $40: address to enable PC6 on PPI 8255-a binary with 01000000 and write port ($302, $80) to PPI 8255-a: where $80: address to activate the 8255 PPI at PC7-a binary with 10 million, PC6 enable gateway in and gateway out to open the door of the parking lot, while the PC7 enable gateway in and gateway out to close the door. Write port ($382, $0), ($382, $40) and ($382, $80) is for PPI 8255-b.

$40 → 0 1 0 0 0 0 0 0

PC7 PC6……..PC1 PC0

$80 → 1 0 0 0 0 0 0 0

PC7……..PC1 PC0

When the program is run the motor can move as expected, despite the difference in speed. The difference in speed due to the motor is the motor of the former and unknown specification of the motor correctly. The reliability of this system in the parking capacity has been fully charged, then the entrance to the parking area automatically interlock, meaning the entrance gate cannot open although there are vehicles that pass through the sensor enters the parking area, the operator can control gate parking area manually on the monitoring form below.

CONCLUSION

The system can know the parking area on the floor and how the block still empty, can find out the number of vehicles that are located on the 1st floor and 2nd floor 7 segment display and via the PC. Being able to limit the number of cars in accordance with the parking capacity is equipped with an indicator in the form of led to the 1st floor and 2nd floor when in a state of full. Data on the number of vehicles with parking fees can be stored in the database is available, so as to minimize the existence of rigged data can be

done by the operator. There is a interlock; do in capacity is full, i.e., the motor will not operate even though the sensors detect vehicles that will enter the parking area. Motor at the entry and exit gate can be operated in automatic mode and manual, works automatically when there is a vehicle that passes the sensor first and working manually with controlling the gate through a personal computer.

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