

Design of an Automated Car Parking System by using Microcontroller

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Abstract

Now a days, with the growing number of vehicles and consequent shortage of parking space there is a haphazard and totally unregulated parking of vehicles all over, the station calls out for an automated parking system that not only regulates parking in a given area but also keeps the manual control to a bare minimum. To cater to need here we present a minimum model of an automated car parking system that regulated the number of cars that can be parked in an area at any given time based on the parking space available. The entry and exit of vehicle are vacillated using to using to tally automated gate status signal indicates whether space is currently available in the parking lot and whether a car currently in the process of entering or leaving the parking space. To avoid the manual dependent system a Microcontroller-Based system has been developed. The microcontroller has been interfaced with a simple hardware to a PC so that the program can be easily changed as our needs. So, no special arrangement is required to reprogram the microcontroller. The project is less expensive and works satisfactory.

Index terms— micro-controller, avr, stepper motor etc.

1 Introduction

gate has been provided at the entry of the parking space which opens on the arrival or departure of a car. A display section has been provided which consist of status signal and a display showing the number of the number of the cars space available in the parking space at any point of time .after the maximum number cars have entered the parking space the gate is automatically disabled or closed for vehicles seeking entry into the parking lot. In this project Microcontroller ATtiny26 is used. The software for the microcontroller is written in BASCOM-AVR (a powerful basic complier) which is capable of creating a hex file. The hex file code can be burnt into the microcontroller using any commonly available programmer or kit or burner. The line LCD display, stepper motor, power supply also the key parameters of this project.

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2 Description of a ATtiny26(l) Microcontroller & IRFZ44

The ATtiny26(L) is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATtiny26(L) achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed. The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATtiny26(L) has a high precision ADC with

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42 up to 11 single ended channels and 8 differential channels. Sevendifferential channels have an optional gain
43 of 20x. Four out of the seven differential channels, which have the optional gain, can be used at the same
44 time. The ATtiny26(L)also has a high frequency 8-bit PWM module with two independent outputs. Two of
45 the PWM outputs have inverted nonoverlapping output pins ideal for synchronous rectification.The Universal
46 Serial Interface of the ATtiny26(L) allows efficient softwareimplementation of TWI (Two-wire Serial Interface)
47 or SM-bus interface. XTAL2 Output from the inverting oscillator amplifier.
48 IV.

49 3 Stepper Motor

50 A stepper motor is an electromechanical device which converts electrical pulses into discrete mechanical
51 movements. The shaft or spindle of a stepper motor rotates in discrete step increments when electrical command
52 pulses are applied to it in the proper sequence. The motors rotation has several direct relationships to these
53 applied input pulses. The sequence of the applied pulses is directly related to the direction of motor shafts
54 rotation. The speed of the Design of an Automated Car Parking System by using Microcontroller XIII Issue XVI
55 Version I 2 () Year motor shafts rotation is directly related to the frequency of the input pulses and the length
56 of rotation is directly related to the number of input pulses applied.
57 V.

58 4 ATtiny26(l) Block Diagram

59 5 Reason of using Mosfet

60 Discrete power MOSFETs employ semiconductor processing techniques that are similar to those of today's VLSI
61 circuits, although the device. The metal oxide semiconductor field effect transistor (MOSFET) is based on
62 the original field-effect transistor introduced in the invention of the power MOSFET was partly driven by the
63 limitations of bipolar power junction transistors (BJTs) which, until recently, was the device of choice in power
64 electronics applications. Although it is not possible to define absolutely the operating boundaries of a power
65 device, we will loosely refer to the power device as any device that can switch at least 1A. The bipolar power
66 transistor is a current controlled device. A large base drive current as high as one-fifth of the collector current is
67 required to keep the device in the ON state. Also, higher reverse base drive currents are required to obtain fast
68 turn-off. Despite the very advanced state of manufacturability and lower costs of BJTs, these limitations have
made the base drive circuit design more complicated and hence more expensive than the MOSFET. ^{1 2}



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Figure 1: Figure 1 :

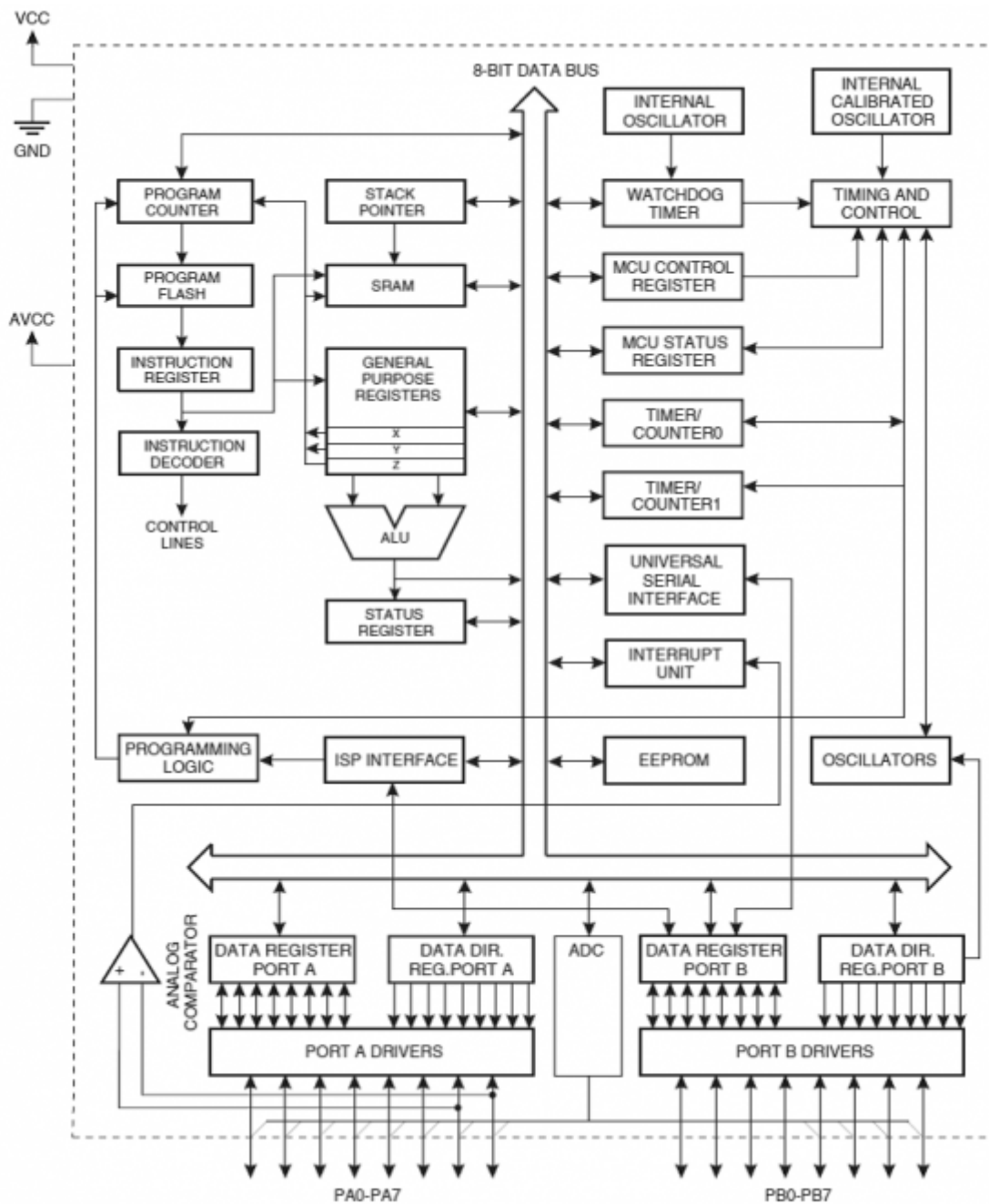
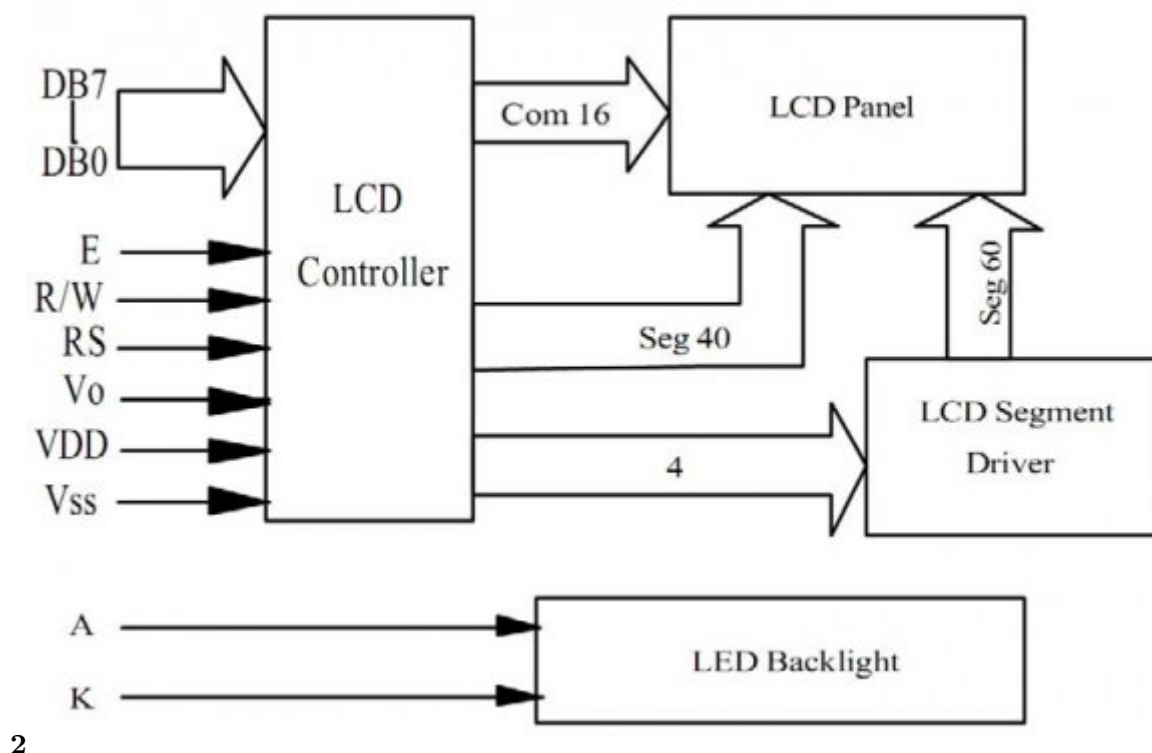
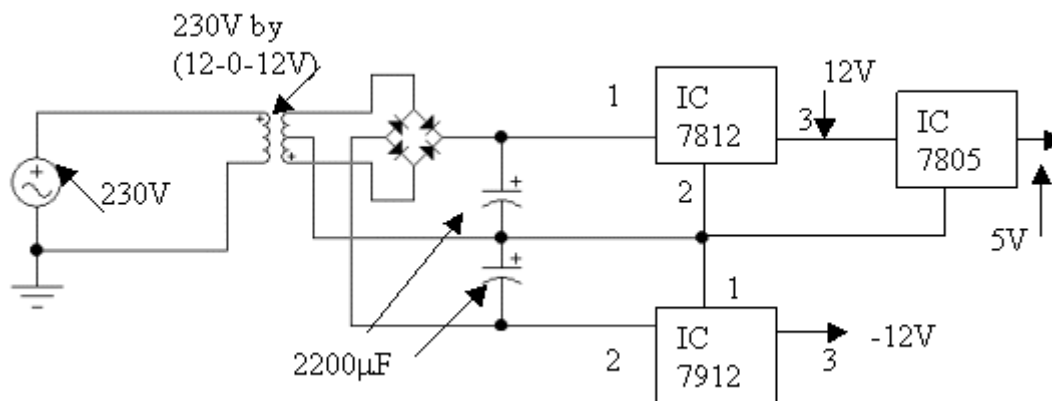


Figure 2:



2

Figure 3: Figure 2 :



3

Figure 4: Figure 3 :



Figure 5: Figure 4 :

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Up to 16 MIPS Throughput at 16 MHz Data and Non-volatile Program Memory:	Active 16 MHz, 5V and 25°C: Typ 15 mA Active 1 MHz, 3V and 25°C: 0.70 mA	
2K Bytes of In-System Programmable Program Memory Flash	Idle Mode 1 MHz, 3V and 25°C: 0.18 mA	
Endurance: 10,000 Write/Erase Cycles	Power-down Mode: < 1 ?A	
128 Bytes of In-System Programmable EEPROM	IRFZ44: N channel power MOSFET. Continuous Drain current 36A with V GS =10V	
Endurance: 100,000 Write/Erase Cycles		III. Pin Descriptions
128 Bytes Internal SRAM Programming Lock for Flash Program and EEPROM Data Security	VCC GND AVCC	Digital supply voltage pin
Peripheral Features: 8-bit Timer/Counter with Separate Pre scaler 8-bit High-speed Timer with Separate Pre scaler 2 High Frequency PWM Outputs with Separate Output Compare Registers Non-overlapping Inverted PWM Output Pins Universal Serial Interface with Start Condition Detector 10-bit ADC 11 Single Ended Channels 8 Differential ADC Channels 7 Differential ADC Channel Pairs with Programmable Gain (1x, 20x) On-chip Analog Comparator External Interrupt Pin Change Interrupt on 11 Pins Programmable Watchdog Timer with Separate On-chip Oscillator Special Microcontroller Features: Modes Power-on Reset and Programmable Brown-out Detection External and Internal Interrupt Sources Low Power Idle, Noise Reduction, and Power-down In-System Programmable via SPI Port Internal Calibrated RC Oscillator	These features allow for highly integrated battery charger and light	
I/O and Packages:		
20-lead PDIP/SOIC: 16 Programmable I/O Lines		
32-lead QFN/MLF: 16 programmable I/O Lines		
Operating Voltages:		
2.7V -5.5V for ATtiny26L	High-performance, Low-power AVR® 8-bit Microcontroller	
4.5V -5.5V for ATtiny26	RISC Architecture:	
Speed Grades:	Powerful Instructions -Most Single Clock Cycle Execution	
0 -8 MHz for ATtiny26L	32 x 8 General Purpose Working Registers Fully Static Operation	
0 -16 MHz for ATtiny26		
Power Consumption at 1 MHz, 3V and 25°C for ATtiny26L		

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