AUTOMATIC NIGHT LAMP WITH MORNING ALARM USING MICROPROCESSOR

INTRODUCTION

This Project "Automatic Night Lamp with Morning Alarm" was developed using Microprocessor. It is the Heart of the system. The sensors are made with help of LDR which are Light Dependent Resistors, whose Resistance is inversely proportional to the Light falling on it. The LDR converts the light energy into electrical energy and this variable electrical energy was converted into digital signal (0 or 1) by using the timer IC555.

The Timer IC output goes low when light falls on the LDR and the timer IC output goes high when the LDR was placed in dark.

OBJECTIVE

1) To learn and develop knowledge in designing the application by using the microprocessor.
2) To learn how to write an assembly language and combining with the hardware.
3) To learn how make a full report of project Microprocessor

SYSTEM DESCRIPTION

HARDWARE

In this mini project, the components that has been used is 8255, IC 555,resistors, capacitors, LDR, Buzzer, LED and Transistor NPN. Light Dependent Resistors (LDR) is function as a sensor. It will detect when there is light or in we can say in the day. LDR then converts the light energy into

electrical energy and this variable electrical energy was converted into digital signal (0 or 1) bu using timer IC555. The Timer IC output goes low (0) when light falls on the LDR and the timer IC output goes high when the LDR was placed in dark.
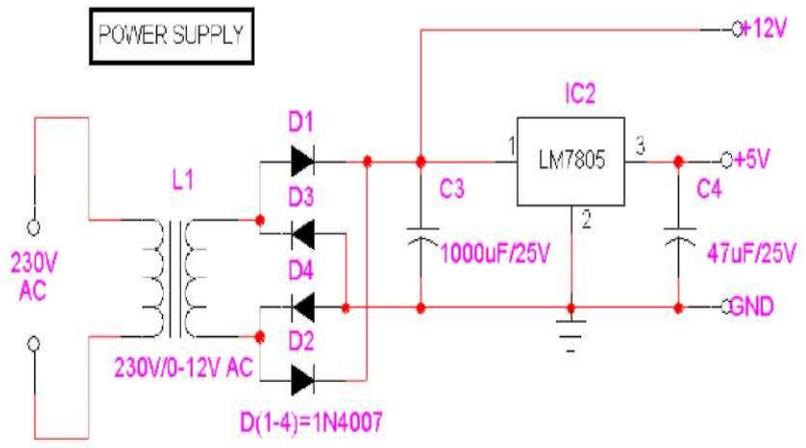
SOFTWARE

SCOPE

The scope of this project is to design an automatic night alarm with morning alarm using microprocessor. The program of this alarm was used the assembly language and implement to the hardware. The alarm is controlled by IC 555. This alarm is available which, due to the output of timer IC 555. It is because LDR will converts the light energy into electrical energy and this variable electrical energy was converted into digital signal (0 or 1) by using timer IC555. The result is the Buzzer will functioning according to the alarm.

HARDWARE DESIGN
  1. Component used IC555
     LDR LED
     RESISTOR CAPACITOR

     BUZZER

2. SCHEMATIC DESIGN

AUTOMATIC NIGHT LAMP WITH MORNING ALARM USING MICROPROCESSOR

+5V

Conn 1

1	14
2	15
3	16
4	17
5	18
6	19
7	20
8	21
9	22
10	23
11	24
12	25
13	26

LDR

R1 120K

IC1 555

4   8

6

7

2

R2 150K

5   1

C2 0.01uF

+12V

MUSICAL BUZZER

BC547

Q1

2.2K R3

+5V

R5 330

D5 WHITE

POWER SUPPLY

+12V

230V AC

L1

D1

D3

D4

D2

230V/0-12V AC

D(1-4)=1N4007

C3 1000uF/25V

IC2 LM7805

1   3

2

C4 47uF/25V

+5V

GND

FLOW CHART

```
                    ┌─────────────────┐
                    │      Start      │
                    └─────────────────┘
                             │
                             ▼
                          ╱─────╲
                        ╱         ╲
                      ╱  Check Day  ╲
                      ╲   or Night   ╱──────────────┐
                        ╲         ╱                  │
                          ╲─────╱                    │
                             │                       │
                             │              ┌─────────────────────┐
                             │              │ Switch off thelight  │
                             │              │ and switch on the    │
                             │              │   morning Alarm      │
                             │              └─────────────────────┘
                             │                       │
                             ▼                       │
                    ┌─────────────────────┐          │
                    │ Switch off the Alarm │          │
                    │ and switch on the    │          │
                    │       lights         │          │
                    └─────────────────────┘          │
                             │                       │
                             ▼                       │
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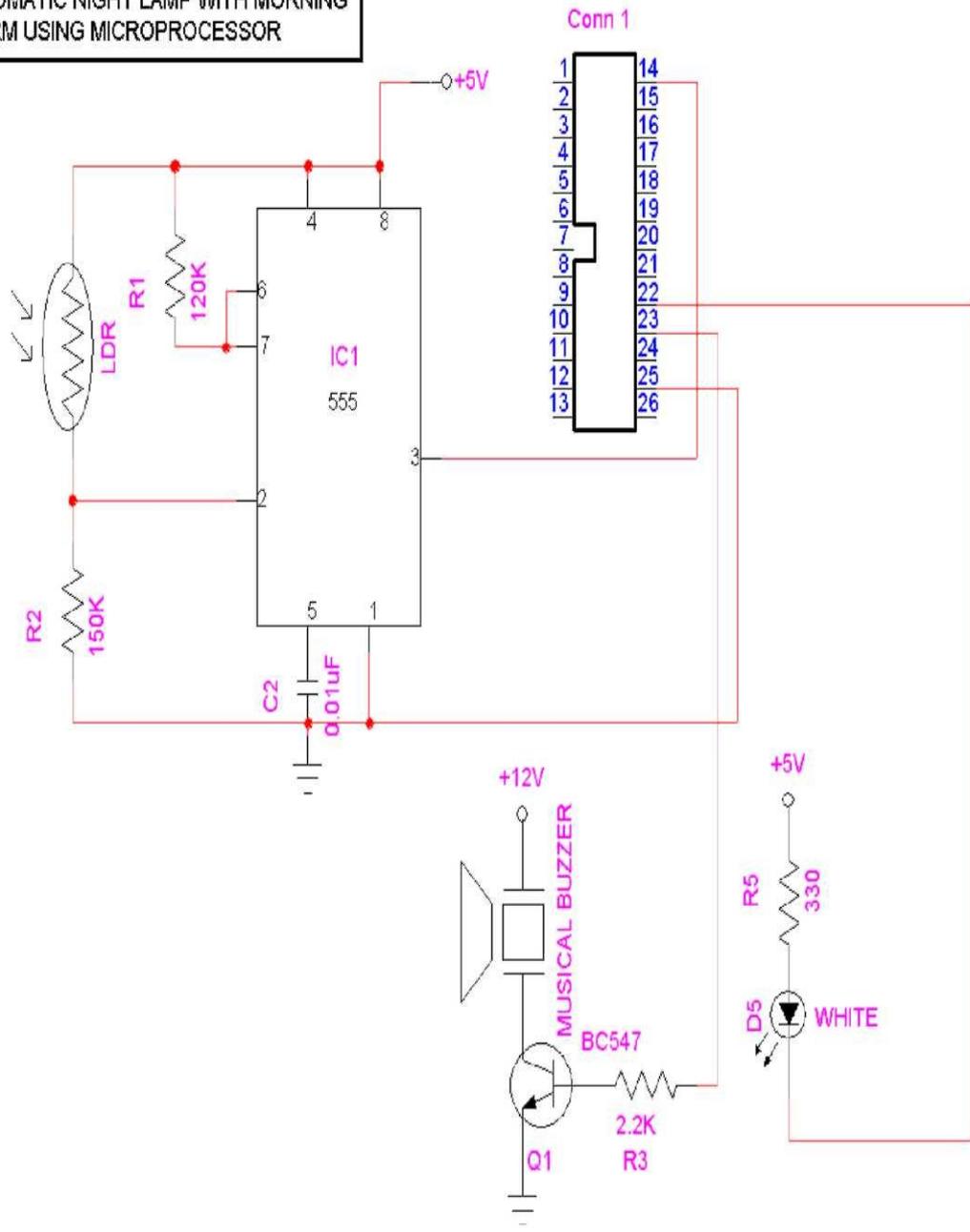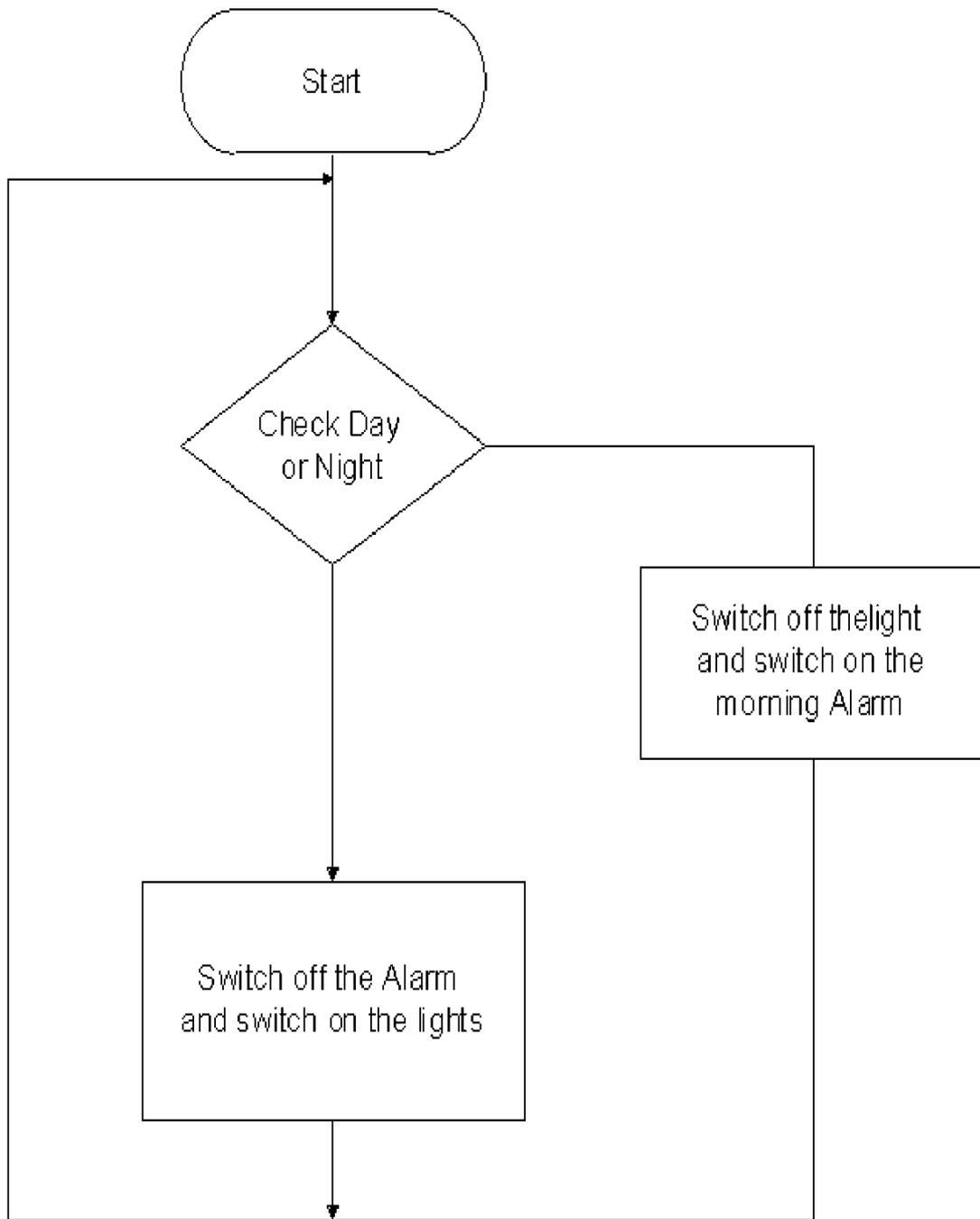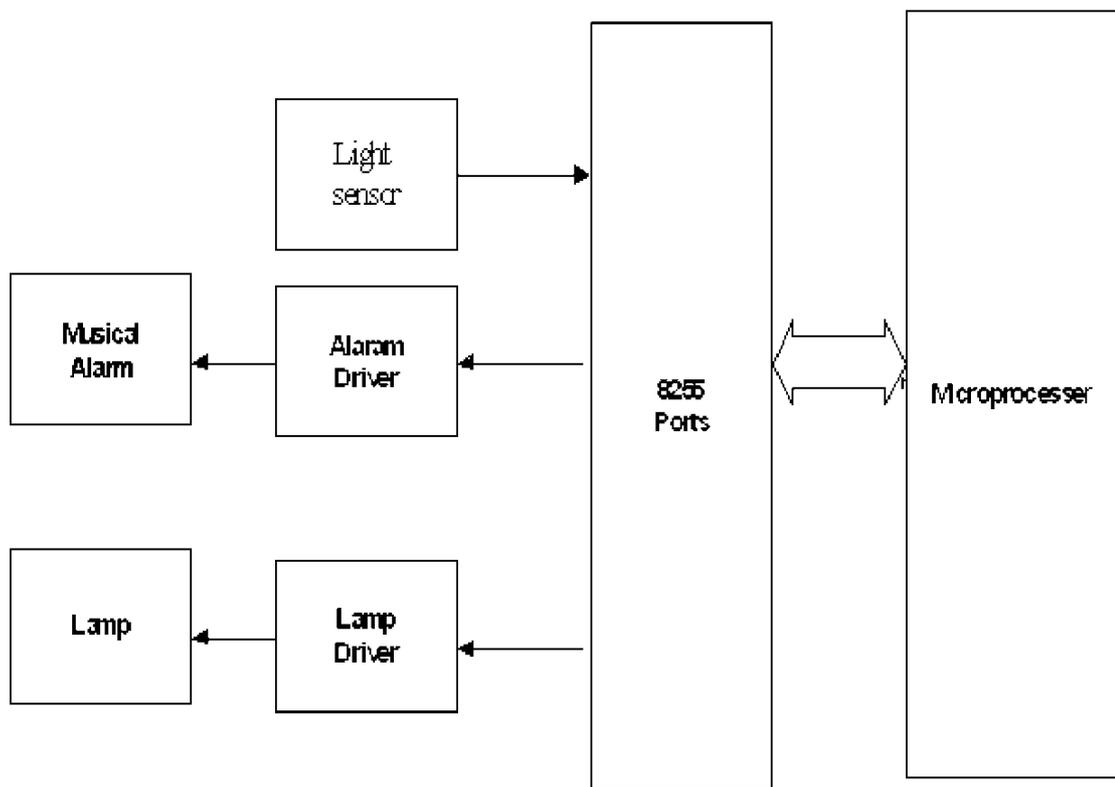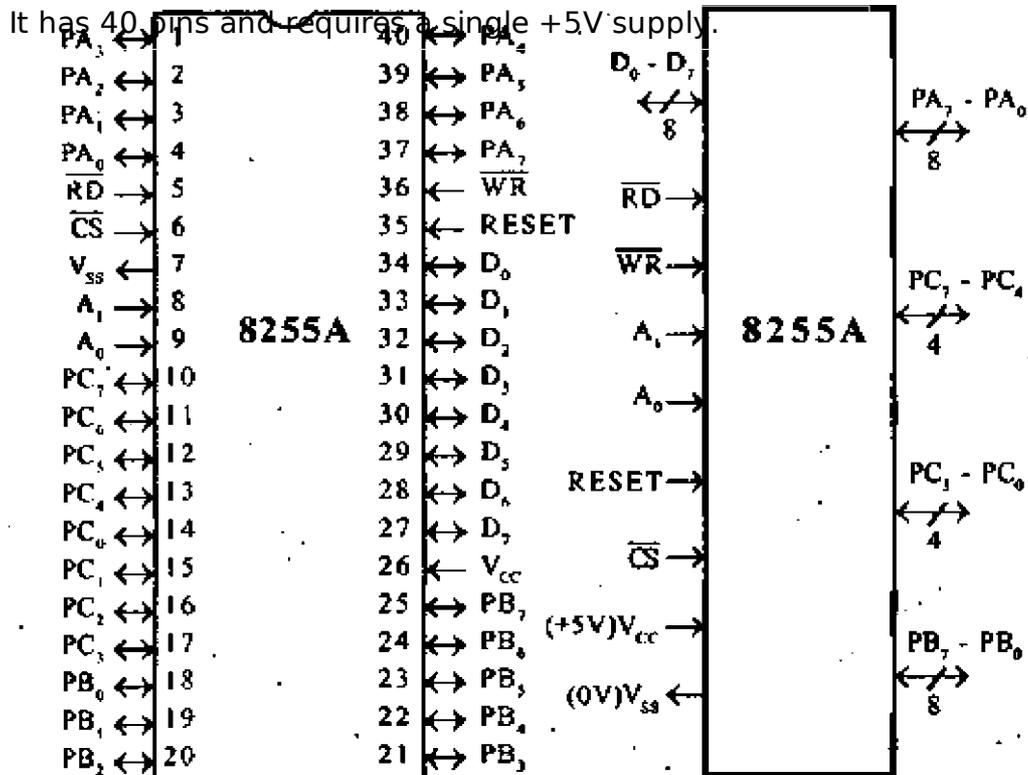
1. 8255

PERIPHERAL INTERFACING - PPI INTERFACING (8255)

Peripheral Interfacing is considered to be a main part of Microprocessor, as it is the only way to interact with the external world. The interfacing happens with the ports of the Microprocessor.

- **The main IC's which are to be interfaced with 8085 are:**
  1. **8255 PPI**
  2. **8259 PIC**
  3. **8251 USART**
  4. **8279 Key board display controller**

5. **8253 Timer/ Counter**
6. **A/D and D/A converter interfacing.**

It has 40 pins and requires a single +5V supply.

PA$_3$	1	40	PA$_4$
PA$_2$	2	39	PA$_5$
PA$_1$	3	38	PA$_6$
PA$_0$	4	37	PA$_7$
$\overline{RD}$	5	36	$\overline{WR}$
$\overline{CS}$	6	35	RESET
V$_{SS}$	7	34	D$_0$
A$_1$	8	33	D$_1$
A$_0$	9	32	D$_2$
PC$_7$	10	31	D$_3$
PC$_6$	11	30	D$_4$
PC$_5$	12	29	D$_5$
PC$_4$	13	28	D$_6$
PC$_0$	14	27	D$_7$
PC$_1$	15	26	V$_{CC}$
PC$_2$	16	25	PB$_7$
PC$_3$	17	24	PB$_6$
PB$_0$	18	23	PB$_5$
PB$_1$	19	22	PB$_4$
PB$_2$	20	21	PB$_3$

8255A

8255A

D$_0$ - D$_7$ 8

$\overline{RD} \rightarrow$

$\overline{WR} \rightarrow$

A$_1 \rightarrow$

A$_0 \rightarrow$

RESET $\rightarrow$

$\overline{CS} \rightarrow$

(+5V)V$_{CC} \rightarrow$

(0V)V$_{SS} \leftarrow$

PA$_7$ - PA$_0$ 8

PC$_7$ - PC$_4$ 4

PC$_3$ - PC$_0$ 4

PB$_7$ - PB$_0$ 8

PROGRAMMABLE PERIPHERAL INTERFACE - INTEL 8255

Pins, Signals and internal block diagram of 8255:

· **The INTEL 8255 is a device used to parallel data transfer between processor and slow peripheral devices like ADC, DAC, keyboard, 7-segment display, LCD, etc.**

· **The 8255 has three ports: Port-A, Port-B and Port-C.**

· **Port-A can be programmed to work in any one of the three operating modes mode-0,**

mode-1 and mode-2 as input or output port.

- **Port-B can be programmed to work either in mode-0 or mode-1 as input or output port.**
- **Port-C (8-pins) has different assignments depending on the mode of port-A and port-B.**

- **If port-A and B are programmed in mode-0, then the port-C can perform any one of the following functions.**

  - **As 8-bit parallel port in mode-0 for input or output.**

- **As two numbers of 4-bit parallel ports in mode-0 for input or output.**

- **The individual pins of port-C can be set or reset for various control applications.**

- **If port-A is programmed in mode- 1/mode-2 and port-B is programmed in mode-1 then some of the pins of port-C are used for handshake signals and the remaining pins can be used as input/ output lines or individually set/reset for control applications.**
  - **The read/write control logic requires six control signals. These signals are given below.**

1.RD (low): This control signal enables the read operation. When

this signal is low, the microprocessor reads data from a selected

I/O port of the 8255A.

2.   **WR (low): This control signal enables the write operation. When this signal goes low, the microprocessor writes into a selected I/O port or the control register.**

3.   **RESET: This is an active high signal. It clears the control register and set all ports in the input mode.**

4.   **CS (low), A0 and A1: These are device select signals. They are,**

Interfacing of 8255 with 8085 processor:

  • **A simple schematic for interfacing the 8255 with 8085 processor is shown in fig.**
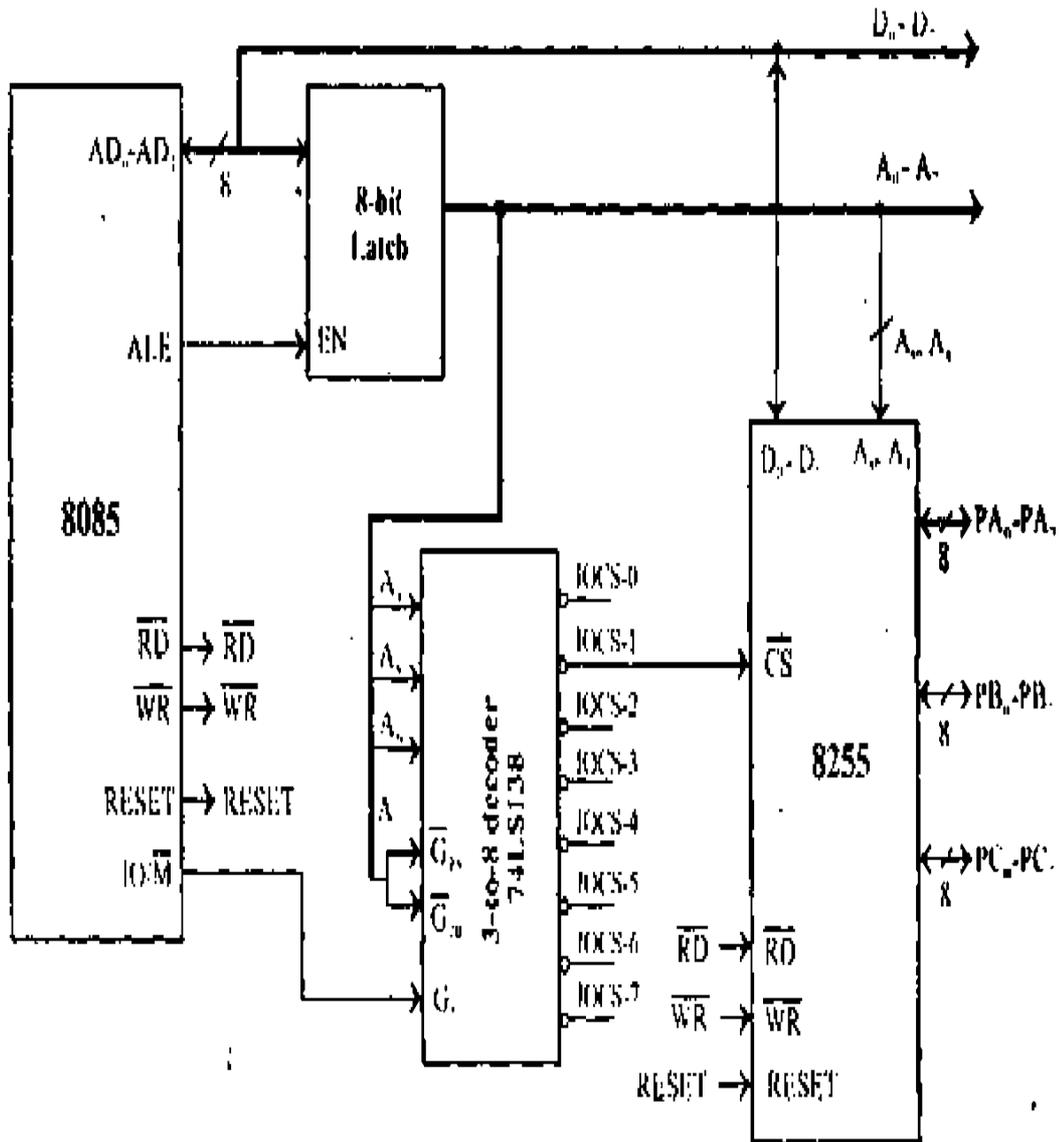
PIN DESCRIPTION - INTEL 8255

Pin	Description
	Data lines
RESET	. Reset input
CS	Chip select
RD	Read control
WR	Write control

A$_n$, A$_i$	Internal address
PA, - PA$_0$	Port-A pins
PB$_7$ - PB$_0$	Port-B pins
PC, - PC$_0$	Port-C pins
V$_C$c	+5V
	OV (GND)

- **The internal block diagram of 8255 is shown in fig:**

Internal Devices	Ai	
Port A	0	0
PoitB	0	1
Port C	1	0
Control Register	1	1

Block diagram of 8255:

The 8255 can be either memory mapped or I/O mapped in the system. In the schematic shown in above is I/O mapped in the system.

- Using a 3-to-8 decoder generates the chip select signals for I/O mapped devices.

- The address lines A4, A5 and A6 are decoded to generate eight chip select signals (IOCS-0 to IOCS-7) and in this, the chip select IOCS- 1 is used to select 8255.

- **The address line A7 and the control signal IO/M (low) are used as enable for the decoder.**

  - **The address line A0 of 8085 is connected to A0 of 8255 and A1 of 8085 is connected to A1 of 8255 to provide the internal addresses.**

    The data lines D0-D7 are connected to D0-D7 of the processor to achieve parallel data transfer.

The I/O addresses allotted to the internal devices of 8255 are listed in table.

Internal Device	Binary Address		Address
	Decoder input and enable	Input to address pins of 8255	
	A_7 \ A_5 A_4	A_i A_2 A_0 A_1	
PoivA	0 0 0 1	x x 0 0	10
Port-B	0 0 0 t	x x 0 1	11
Port-C	0 0 0 1	x x 1 0	12
Control Register	0 0 0 1	X x 1 I	t3

Note : *Don't care "x" is considered as zero.*

2. Resistor

A resistor is a two-terminal electrical or electronic component that resists an electric current by

producing a voltage drop between its terminals in accordance with Ohm's law

R = V/I

The electrical resistance is equal to the voltage drop across the resistor divided by the current through the resistor. Resistors are used as part of electrical networks and electronic circuits