

CS F241: Microprocessor Programming and Interfacing

DOOR SECURITY CONTROL SYSTEM

Section: 1 Group No: 9



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Problem Statement and User Guide

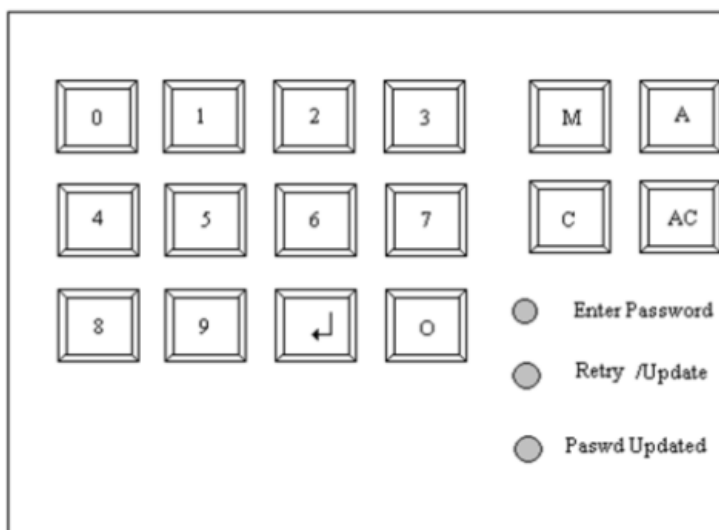
Description

This system controls the opening and closing of a door based on password entry.

If the password is correct the person can enter.

Each person is given two chances to enter the correct password.

On failure, an alarm is sounded. Inside the room a button is available. When the button is pressed the door opens for 1 Min, so that the person can leave the room.



User Interface

There are three set of passwords:

- (1) User
- (2) Master
- (3) Alarm off

- The Master password is used by the security Personnel for updating Password of the day. Pressing the M button activates this mode. The system glows 'Enter Password' LED asking the personnel to enter the password. The master password is a 16-digit value. The master is given only a single chance to enter the password.
- If authenticated, the retry/Update LED glows. If there is a failure in authentication the alarm is sounded.

- When the retry/ Update LED glows the user has to enter password of the day. This is 12-digit value. Once this value has been accepted by the system the 'Passwd Updated' LED glows.
- User has to press the O key when he wants to enter the room. The Enter Password LED prompts the user to enter the password. The user is given C/AC option as well. If the first attempt fails, the RETRY LED glows. The user is allowed to re-enter password, on authentication door opens for a period of 1 Min. On Failure an ALARM is sounded.
- To Turn-off the Alarm the A button has to be pressed. 'Enter Password' LED glows prompting user to enter the 14-digit password for turning of alarm, no retries are allowed. If authentication is successful then the alarm is turned off.
- To leave the room a button is available inside the room, when the button is pressed the door opens for 1 Minute so that the person can leave the room.

Assumptions

- When the system starts for the first time, the Master password and Alarm password are hard-coded as
Master Password: 9999999999999999
Alarm Password: 9999999999999999
- The Master password is valid only for a period of 24 hours. Once this period elapses, the system will only respond to the 'M' key wherein you will have to enter the new password for the day.
- The system runs on a battery backup and in case of power failure, the system will continue functioning.

Memory Interfacing

Size of 2732 (ROM): 2k

Size of 6116 (RAM): 2k

ROM1 (4k, built from 2k chips)

RAM1 (4k, built from 2k chips)

ROM2 (4k, built from 2k chips)

ROM1E: 00000h to 00FFEh

ROM1O: 00001h to 00FFFh

RAM1E: 01000h to 01FFEh

RAM1O: 01001h to 01FFFh

ROM2E: FF000h to FFFFEh

ROM2O: FF001h to FFFFFh

I/O Mapping

Address of 8255-1 port-A: 00h

Address of 8255-1 port-B: 02h

Address of 8255-1 port-C: 04h

Address of 8255-1 control register: 06h

Control word of 8255-1: 89h

Address of 8255-2 port-A: 08h

Address of 8255-2 port-B: 0Ah

Address of 8255-2 port-C: 0Ch

Address of 8255-2 control register: 0Eh

Control word of 8255-2: 88h

Address of 8253A-1 counter 0: 10h

Address of 8253A-1 counter 1: 12h

Address of 8253A-1 counter 2: 14h

Address of 8253A-1 control register: 16h

Control word of 8253A-1 counter 0: 36h

Control word of 8253A-1 counter 1: 56h

Control word of 8253A-1 counter 2: 94h

Address of 8253A-2 counter 0: 18h
Address of 8253A-2 counter 1: 1Ah
Address of 8253A-2 counter 2: 1Ch
Address of 8253A-2 control register: 1Eh
Control word of 8253A-2 counter 0: 14h
Control word of 8253A-2 counter 1: 54h
Control word of 8253A-2 counter 2: 94h

Address of 8253A-3 counter 0: 20h
Address of 8253A-3 counter 1: 22h
Address of 8253A-3 counter 2: 24h
Address of 8253A-3 control register: 26h
Control word of 8253A-3 counter 0: 14h

List Of ICs and Components Used

S. No	Component	Quantity
1	8086 Microprocessor	1
2	8284 (Clock Generator)	1
3	74LS138 (3x8 decoder)	3
4	74LS373 (Octal Latch)	3
5	74LS245 (Octal Transceiver)	2
6	2716 (2K ROM chip)	4
7	6116 (2K RAM chip)	2
8	8255A	2
9	8253A	3
10	74LS241 (Octal Buffer)	1
11	LM016L (16x2 LCD)	1
12	ULN2003A (Darlington Transistor Arrays)	1
13	4x4 Hex Keypad	1
14	Relay (OZ-SH-105D)	1
15	Buzzer	1
16	Stepper Motor	1
17	LED	3
18	Inverter Gate (NOT)	4

Datasheets:

1. 16x2 alphanumeric LCD display (LM016L):

<https://www.google.co.in/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjnzvqCzbraAhWJbVAKHX0-CBwQFgg1MAA&url=http%3A%2F%2Fwww.picaxe.com%2Fdocs%2Fled008.pdf&usg=AOvVaw3UAbaVv0EgfdmNF5 iSD-H>

Flow Chart

