ESD PROJECT

WINTER
2019

RFID BASED ATTENDANCE AND SECURITY SYSTEM

Project Report

Embedded System Design

In

ICT

By

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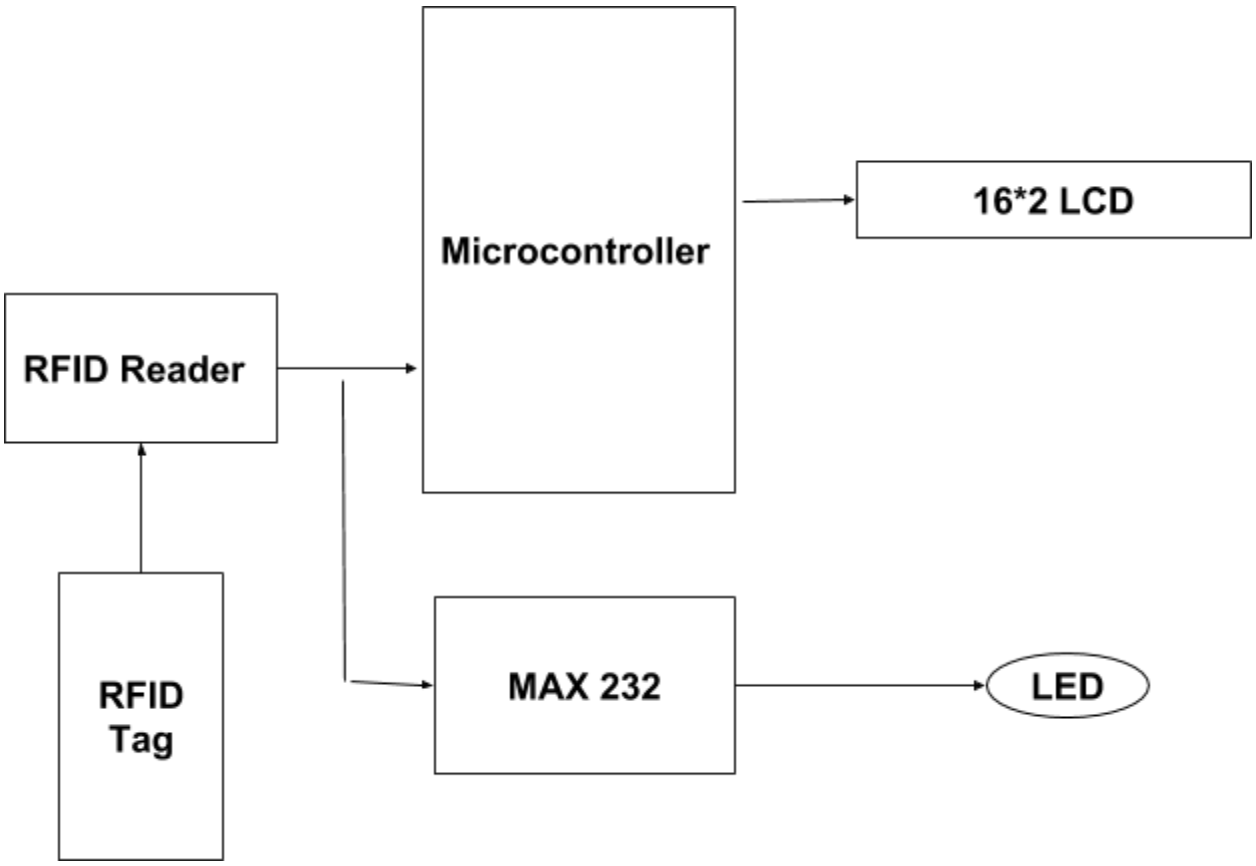
SUMMARY

This report provides a brief introduction to a new way of taking attendance, limiting entries and providing a seamless, time-efficient design for the given purposes. The primitive methods for attendance are the roll call, signature takings or biometric system. As we have found that these methods are either outdated, expensive or time-consuming. We found a comparatively newer and cheaper way to serve the purpose. It is the RFID based attendance system. Each student and lecturer has been issued an RFID tag using which they mark their attendance. This can increase the efficiency of attendance and save lecturers' time.

Outcome:

Through this , any student cannot enter any cabin or any place without ID card or tag . Through this , master can increase his security and no other documents or any paper of them can be missed or replaced or are stolen or leak.
Through attendance system, no other student can be marked absent if student have his or her tag and through this efficiency of attendance and save lecturers' time. So this system is efficient to save attendance and also for security

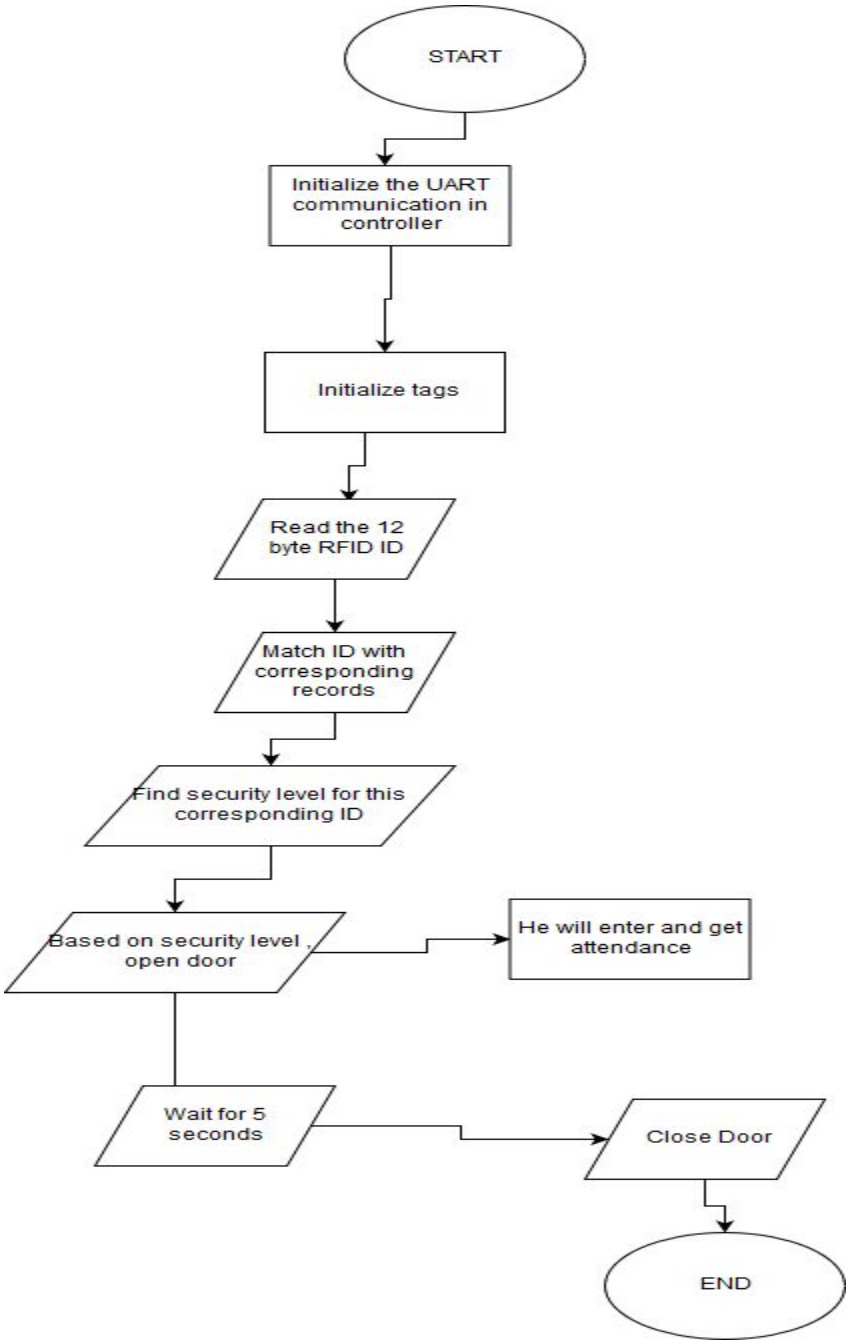
BLOCK DIAGRAM



Components needed:-

Index	Name of component
1	ATMEGA32 Microcontroller
2	Breadboard
3	RFID Reader
4	RFID tags(*3)
5	Jumper wires
6	16*2 LCD Display
7	MAX 232
8	LED

FLOW CHART


START
Initialize the UART communication in controller
Initialize tags
Read the 12 byte RFID ID
Match ID with corresponding records
Find security level for this corresponding ID
Based on security level , open door
He will enter and get attendance
Wait for 5 seconds
Close Door
END

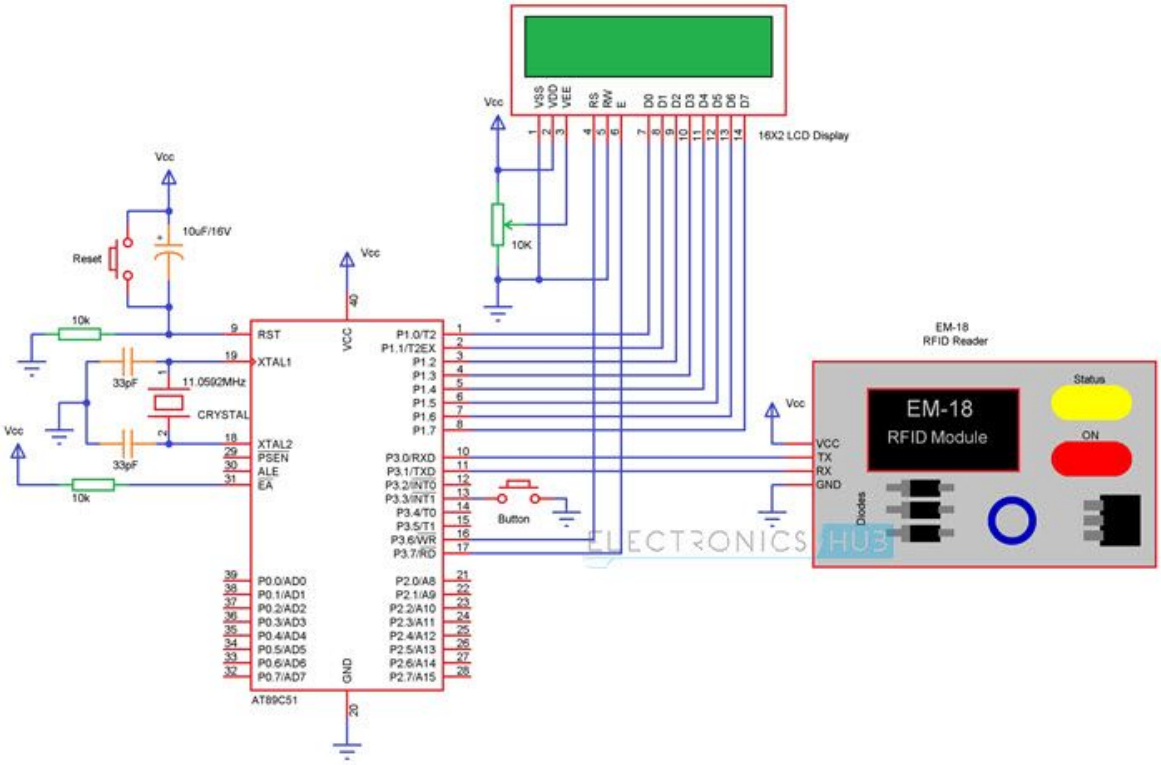
Selection Criteria

- ATmega32 Microcontroller: ATmega32 has USART: Universal Synchronous/Asynchronous Receiver/Transmitter which is a microcontroller peripheral that converts incoming and outgoing bytes of data into a serial bit stream. Attendance system and security system needs almost 32KB of memory. RFID transmits and receives data through USART.

- RFID Reader: Radio frequency Identification (RFID) is a wireless identification technology that uses radio waves to identify the presence of RFID tags. This module directly connects to the ATmega32 microcontroller UART or through an RS232 converter to PC. It gives USART output. We use EM18 reader module RFID reader.
  .
- Passive RFID Tags: Passive RFID Tags uses electromagnetic energy transmitted by the RFID reader. It uses frequency of 125kHz
  .
- MAX232: The MAX232 is a dual transmitter / dual receiver that typically is used to convert the RX, TX signals to respective voltage. It is used to convert -3V to -25V and +3V to +25V of RS232 to +5V and 0V.

- LED: It is used to indicate that the door has been opened.

CIRCUIT DIAGRAM



DATASHEET OF VARIOUS COMPONENTS

1) ATmega32

Features

- High-performance, Low-power Atmel®AVR® 8-bit Microcontroller
- Advanced RISC Architecture
  - 131 Powerful Instructions – Most Single-clock Cycle Execution
  - 32 × 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16MHz
  - On-chip 2-cycle Multiplier
- High Endurance Non-volatile Memory segments
  - 32Kbytes of In-System Self-programmable Flash program memory
  - 1024Bytes EEPROM
  - 2Kbytes Internal SRAM
  - Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
  - Data retention: 20 years at 85°C/100 years at 25°C(1)
  - Optional Boot Code Section with Independent Lock Bits
    In-System Programming by On-chip Boot Program
    True Read-While-Write Operation
  - Programming Lock for Software Security
- JTAG (IEEE std. 1149.1 Compliant) Interface
  - Boundary-scan Capabilities According to the JTAG Standard
  - Extensive On-chip Debug Support
  - Programming of Flash, EEPROM, Fuses, and Lock Bits through the JTAG Interface
- Peripheral Features
  - Two 8-bit Timer/Counters with Separate Prescalers and Compare Modes
  - One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
  - Real Time Counter with Separate Oscillator
  - Four PWM Channels
  - 8-channel, 10-bit ADC
    8 Single-ended Channels
    7 Differential Channels in TQFP Package Only
    2 Differential Channels with Programmable Gain at 1x, 10x, or 200x
  - Byte-oriented Two-wire Serial Interface
  - Programmable Serial USART
  - Master/Slave SPI Serial Interface
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated RC Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and Extended Standby
- I/O and Packages
  - 32 Programmable I/O Lines
  - 40-pin PDIP, 44-lead TQFP, and 44-pad QFN/MLF
- Operating Voltages
  - 2.7V - 5.5V for ATmega32L
  - 4.5V - 5.5V for ATmega32
- Speed Grades
  - 0 - 8MHz for ATmega32L
  - 0 - 16MHz for ATmega32
- Power Consumption at 1MHz, 3V, 25°C
  - Active: 1.1mA
  - Idle Mode: 0.35mA
  - Power-down Mode: < 1µA

ATMEL®

8-bit AVR® Microcontroller with 32KBytes In-System Programmable Flash

ATmega32
ATmega32L

2503Q–AVR–02/11

2) RFID Reader(EM18)

EM-18 RFID Reader

The EM-18 RFID Reader module operating at 125kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to recieve pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a weigand output.

Typical Applications

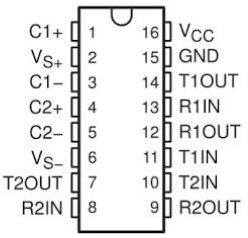
- e-Payment
- e-Toll Road Pricing
- e-Ticketing for Events
- e-Ticketing for Public Transport
- Access Control
- PC Access
- Authentication
- Printer / Production Equipment

3) MAX232

SLLS047L – FEBRUARY 1989 – REVISED MARCH 2004

- Meets or Exceeds TIA/EIA-232-F and ITU Recommendation V.28
- Operates From a Single 5-V Power Supply With 1.0-μF Charge-Pump Capacitors
- Operates Up To 120 kbit/s
- Two Drivers and Two Receivers
- ±30-V Input Levels
- Low Supply Current . . . 8 mA Typical
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
- Upgrade With Improved ESD (15-kV HBM) and 0.1-μF Charge-Pump Capacitors is Available With the MAX202
- Applications
  - TIA/EIA-232-F, Battery-Powered Systems, Terminals, Modems, and Computers

MAX232 . . . D, DW, N, OR NS PACKAGE
MAX232I . . . D, DW, OR N PACKAGE
(TOP VIEW)



description/ordering information

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply. Each receiver converts TIA/EIA-232-F inputs to 5-V TTL/CMOS levels. These receivers have a typical threshold of 1.3 V, a typical hysteresis of 0.5 V, and can accept ±30-V inputs. Each driver converts TTL/CMOS input levels into TIA/EIA-232-F levels. The driver, receiver, and voltage-generator functions are available as cells in the Texas Instruments LinASIC™ library.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP (N)	Tube of 25	MAX232N	MAX232N
	SOIC (D)	Tube of 40	MAX232D	MAX232
		Reel of 2500	MAX232DR	
	SOIC (DW)	Tube of 40	MAX232DW	MAX232
		Reel of 2000	MAX232DWR	
	SOP (NS)	Reel of 2000	MAX232NSR	MAX232
–40°C to 85°C	PDIP (N)	Tube of 25	MAX232IN	MAX232IN
	SOIC (D)	Tube of 40	MAX232ID	MAX232I
		Reel of 2500	MAX232IDR	
	SOIC (DW)	Tube of 40	MAX232IDW	MAX232I
		Reel of 2000	MAX232IDWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

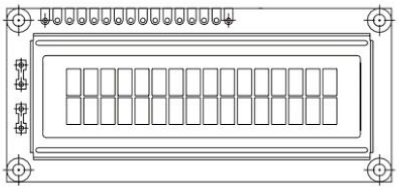
4) LCD(16*2)

VISHAY

LCD-016M002B

Vishay

16 x 2 Character LCD



FEATURES

- 5 x 8 dots with cursor
- Built-in controller (KS 0066 or Equivalent)
- + 5V power supply (Also available for + 3V)
- 1/16 duty cycle
- B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED)
- N.V. optional for + 3V power supply

MECHANICAL DATA

ITEM	STANDARD VALUE	UNIT
Module Dimension	80.0 x 36.0	mm
Viewing Area	66.0 x 16.0	mm
Dot Size	0.56 x 0.66	mm
Character Size	2.96 x 5.56	mm

ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	STANDARD VALUE			UNIT
		MIN.	TYP.	MAX.	
Power Supply	VDD-VSS	- 0.3	–	7.0	V
Input Voltage	VI	- 0.3	–	VDD	V

NOTE: VSS = 0 Volt, VDD = 5.0 Volt

ELECTRICAL SPECIFICATIONS

ITEM	SYMBOL	CONDITION		STANDARD VALUE			UNIT
				MIN.	TYP.	MAX.	
Input Voltage	VDD	VDD = + 5V		4.7	5.0	5.3	V
		VDD = + 3V		2.7	3.0	5.3	V
Supply Current	IDD	VDD = 5V		–	1.2	3.0	mA
Recommended LC Driving Voltage for Normal Temp. Version Module	VDD - V0	- 20 °C		–	–	–	V
		0°C		4.2	4.8	5.1	
		25°C		3.8	4.2	4.6	
		50°C		3.6	4.0	4.4	
		70°C		–	–	–	
LED Forward Voltage	VF	25°C		–	4.2	4.6	V
LED Forward Current	IF	25°C	Array	–	130	260	mA
			Edge	–	20	40	
EL Power Supply Current	IEL	Vel = 110VAC:400Hz		–	–	5.0	mA

DISPLAY CHARACTER ADDRESS CODE:

Display Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DD RAM Address	00	01														0F
DD RAM Address	40	41														4F

TIMELINE

Date	Basic Design of our Circuit and second report	Coding part of our Circuit and third report	Entire Project and Final Report	Project demo and viva
05/03/2019	✔			
19/03/2019		✔		
02/4/2019			✔	
17/04/2019				✔