



مبرمجي الأدرياف

Meet Our Team

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SMART HOME

1- Access Control System

2- Temperature Control System

3- Light Control System

Architecture

1- MCAL:

- ADC - (Asynchronous implementation)
- DIO
- EXIT
- GIE
- PORT

Architecture

2- HAL:

- Keypad (2x2)
- LCD
- LDR
- LM
- Buzzer
- LED
- Stepper Motor

Architecture

3- LIB:

- STD_TYPES.h
- BIT_MATH.h

Access Control System

Hardware:

- Keypad (2x2) (Password Input)
- LCD (Display)
- Red LED (Incorrect Password)
- Green LED (Correct Password)
- Stepper Motor (Door Control)
- Buzzer (Alarm)

Access Control System

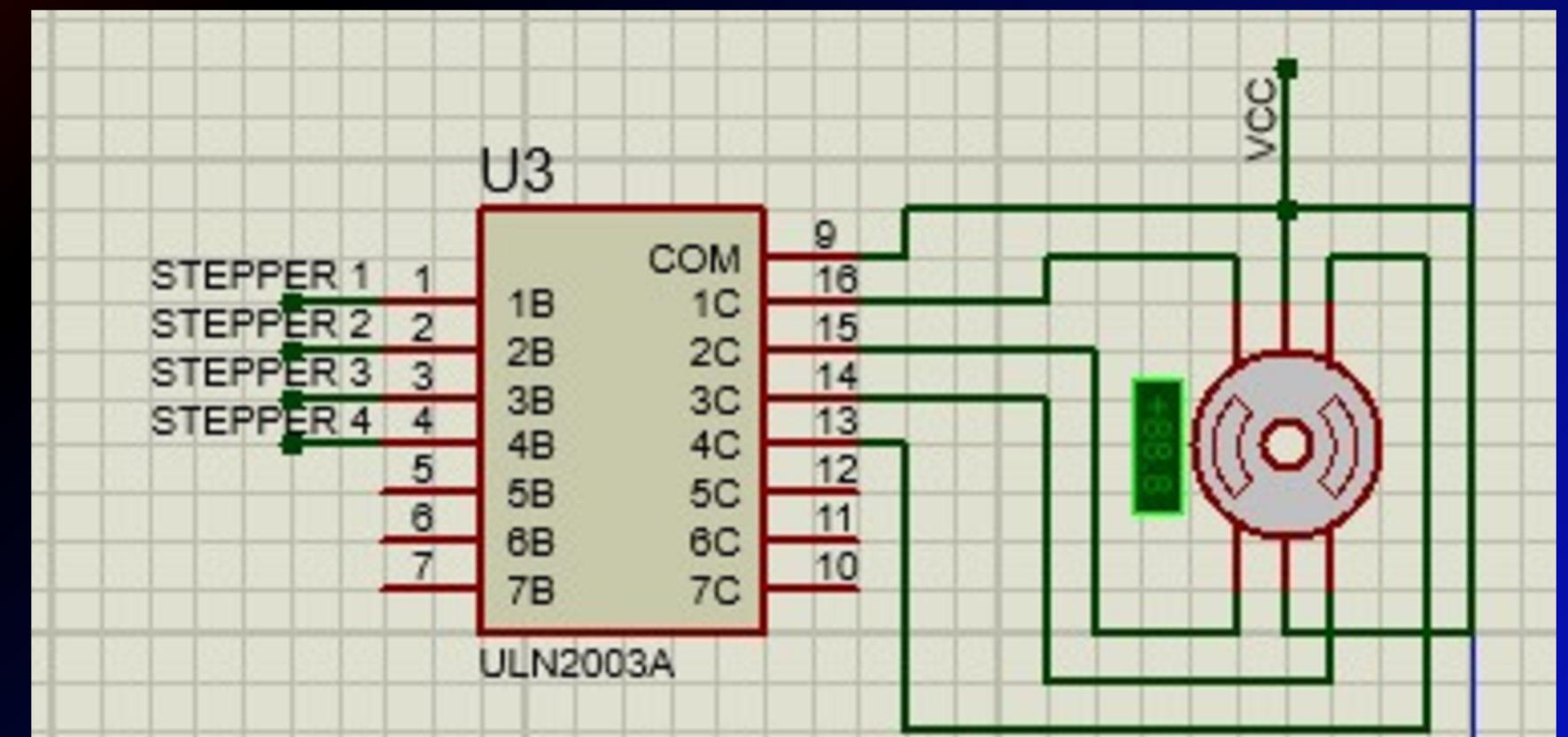
Drivers/Functions Used:

- DIO Driver (Configure and control LEDs, buzzer, and motor)
- Keypad Driver (Read input from keypad)
- LCD Driver (Display messages and status)
- Stepper_Motor Driver (Display messages and status)

Access Control System

Stepper_Motor Driver Functions:

- **STEPPER_voidInit()**
- **STEPPER_voidOff(void)**
- **STEPPER_voidOn(u8 Copy_u8StepType , u8 Copy_u8Direction)**



Temperature Control System

Hardware:

- LM35 (Temperature Sensor)
- Stepper Motor (For Fan)
- Buzzer (For Fire Alarm)
- Push Button (To Turn Off Fire Alarm)

Temperature Control System

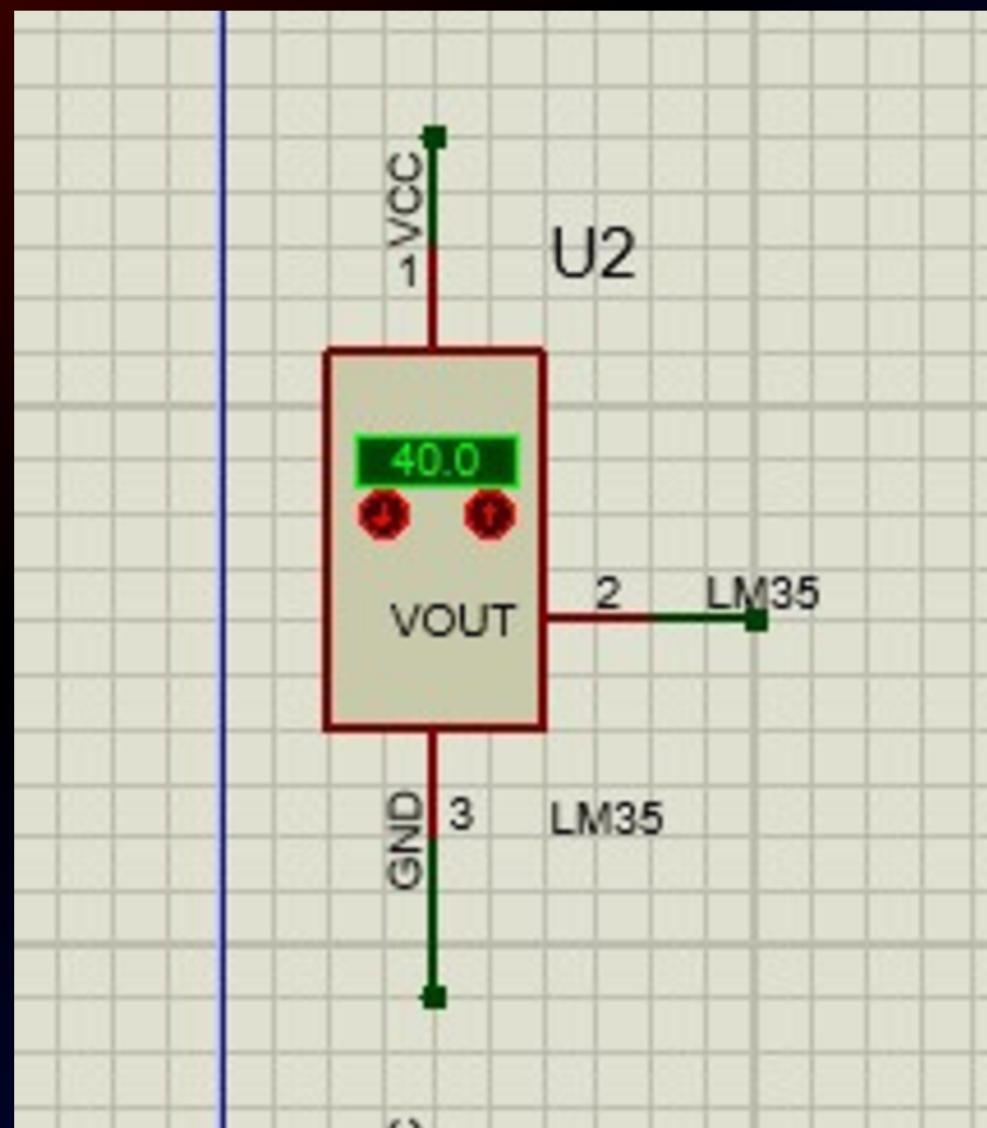
Drivers/Functions Used:

- ADC Driver
(Read temperature sensor value)
- Buzzer Driver
(Control Buzzer)
- LM Driver
(Interface with the temperature sensor)
- EXIT Driver
(Handle interrupts for alarm control)

Temperature Control System

LM Driver Functions:

- u8 LM35_getTemperature(ADC_info* Copy_component , u16 Dig_Temp , u16* Result);



Temperature Control System

EXIT Driver Functions:

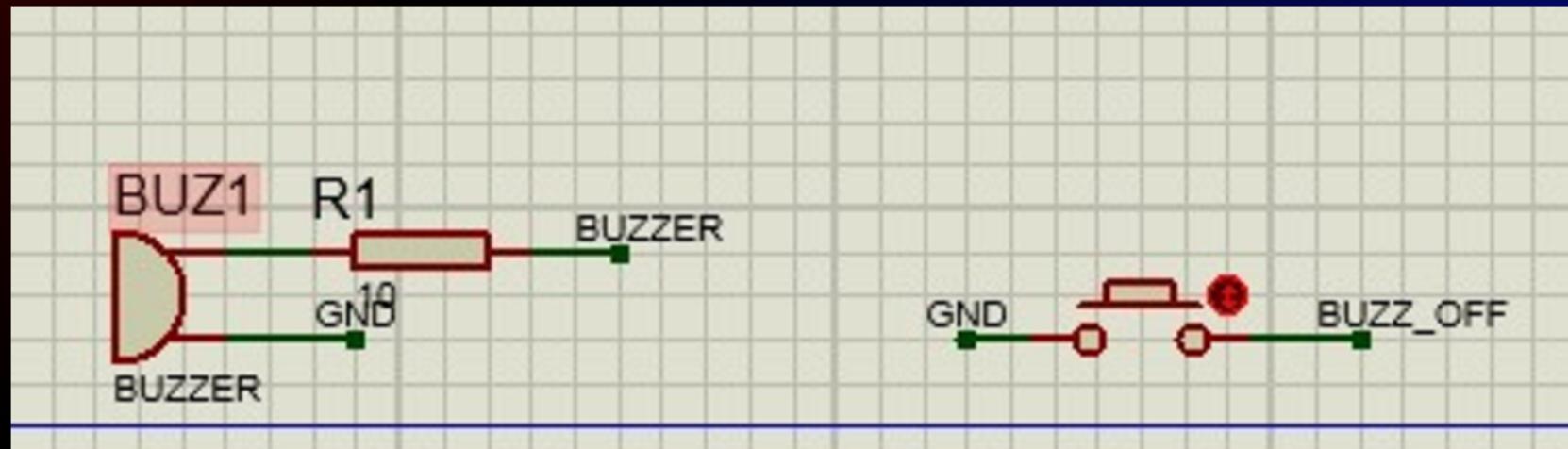
- u8 EXTI_u8SetCallBack(IntChannel_t Copy_IntCh , void(*Copy_pvCallBackFunc)(void));

```
/*  
 * @brief Sets a callback function for a specific interrupt channel.  
 * @param Copy_IntCh: The interrupt channel (INT0, INT1, or INT2).  
 * @param Copy_pvCallBackFunc: Pointer to the callback function.  
 * @return Error status (OK if successful, NULL_PTR_ERR if the callback is NULL).  
 */  
u8 EXTI_u8SetCallBack(IntChannel_t Copy_IntCh, void(*Copy_pvCallBackFunc)(void));
```

Temperature Control System

Buzzer Driver Functions:

- **void BUZZER_voidInit(BUZZER_T buzzer);**
- **void BUZZER_voidOn(BUZZER_T buzzer);**
- **void BUZZER_voidInOff(BUZZER_T buzzer);**



Light Control System

Hardware:

- LDR (Light Dependent Resistor)
 - 5 LEDs (For Brightness Indication)

Light Control System

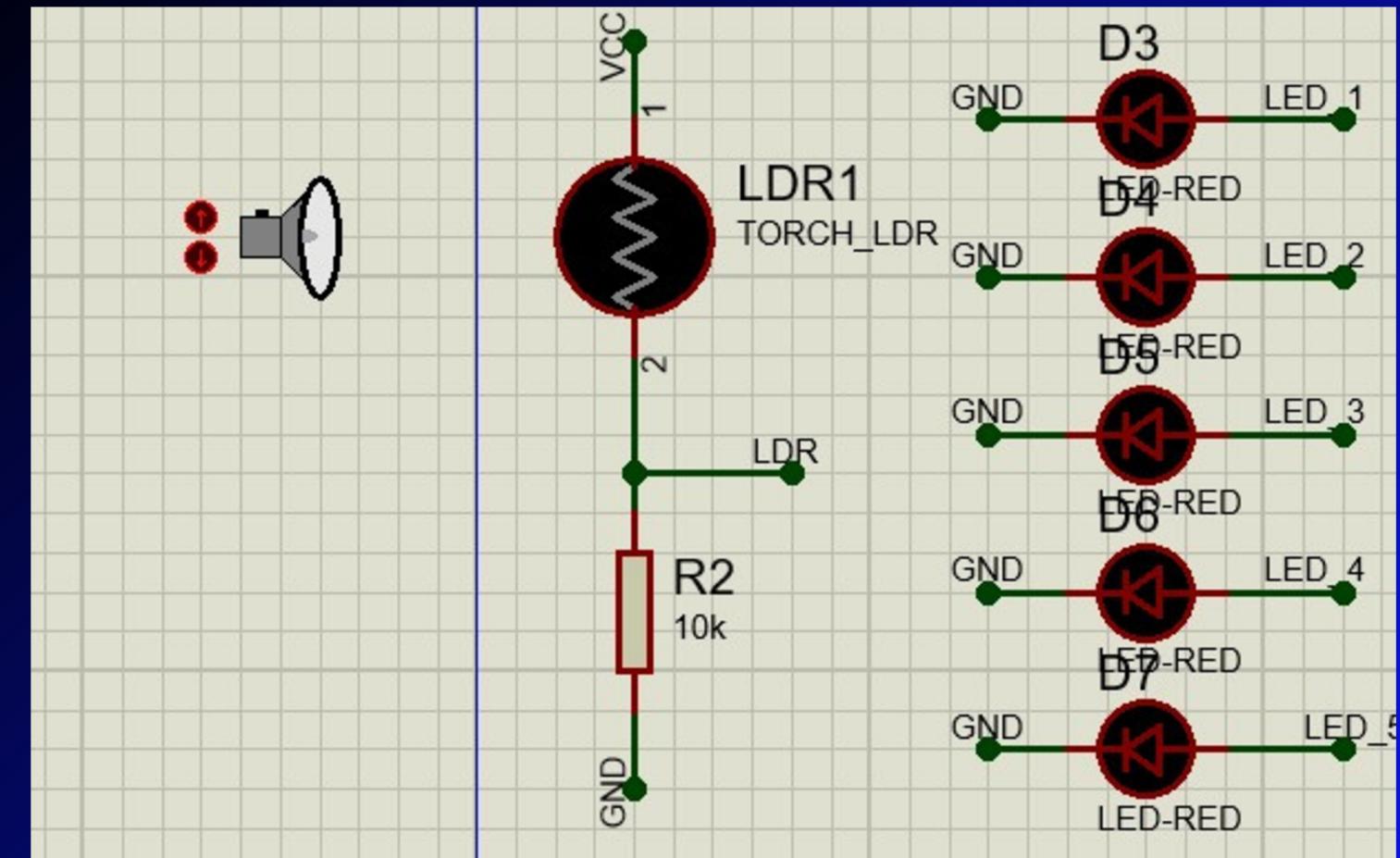
Drivers/Functions Used:

- ADC Driver (Read LDR value)
- DIO Driver (Control LEDs based on light level)
- LDR Driver (Interface with the light sensor)

Light Control System

LDR Driver Functions:

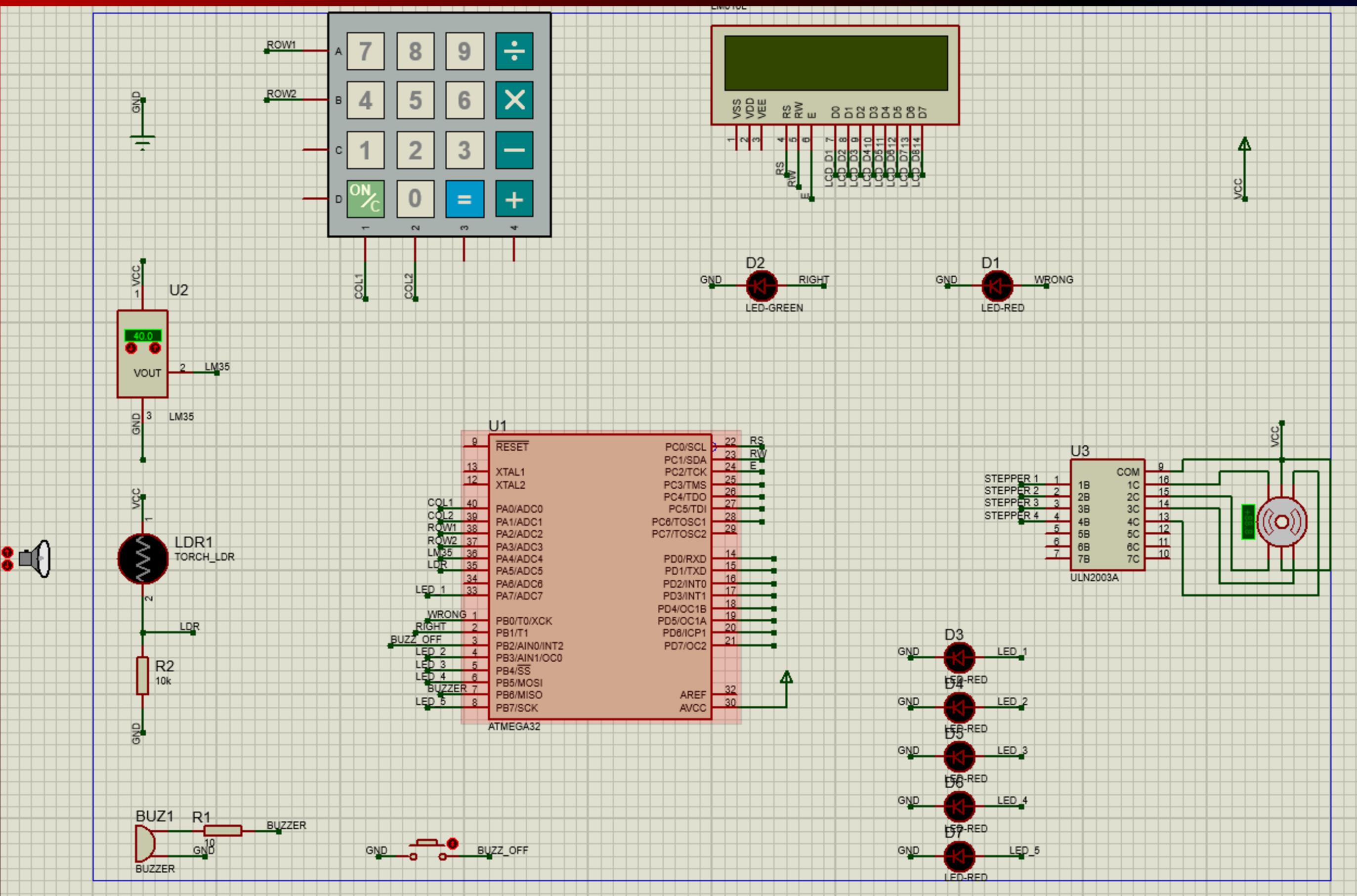
- `u8 LDR_u16GetResistanceFrom8BitADC(u16 Copy_u16Adc_Res);`



Asynchronous ADC

- Implemented asynchronous ADC operations for improved system responsiveness
- ADC Conversion Complete Interrupt Service Routine (ISR) used to handle sensor readings
- Benefits:
 - Non-blocking ADC operations allow for more efficient use of CPU time
 - Improved responsiveness in handling multiple sensors (temperature and light)
 - Demonstrates advanced microcontroller programming skills (جامدين)

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Thank You