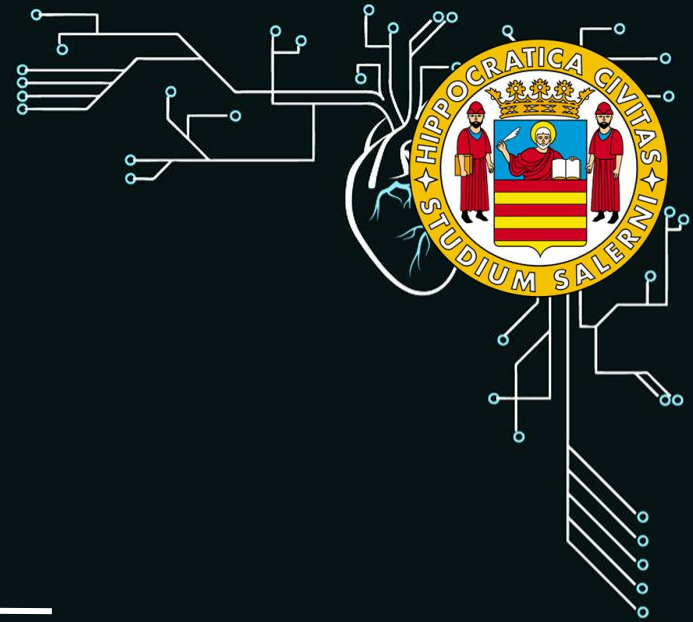


Home Security System

Project Review



TEAM 10: Los Pollos Hermanos

TEAM

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- Valitutto Andrea
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Project



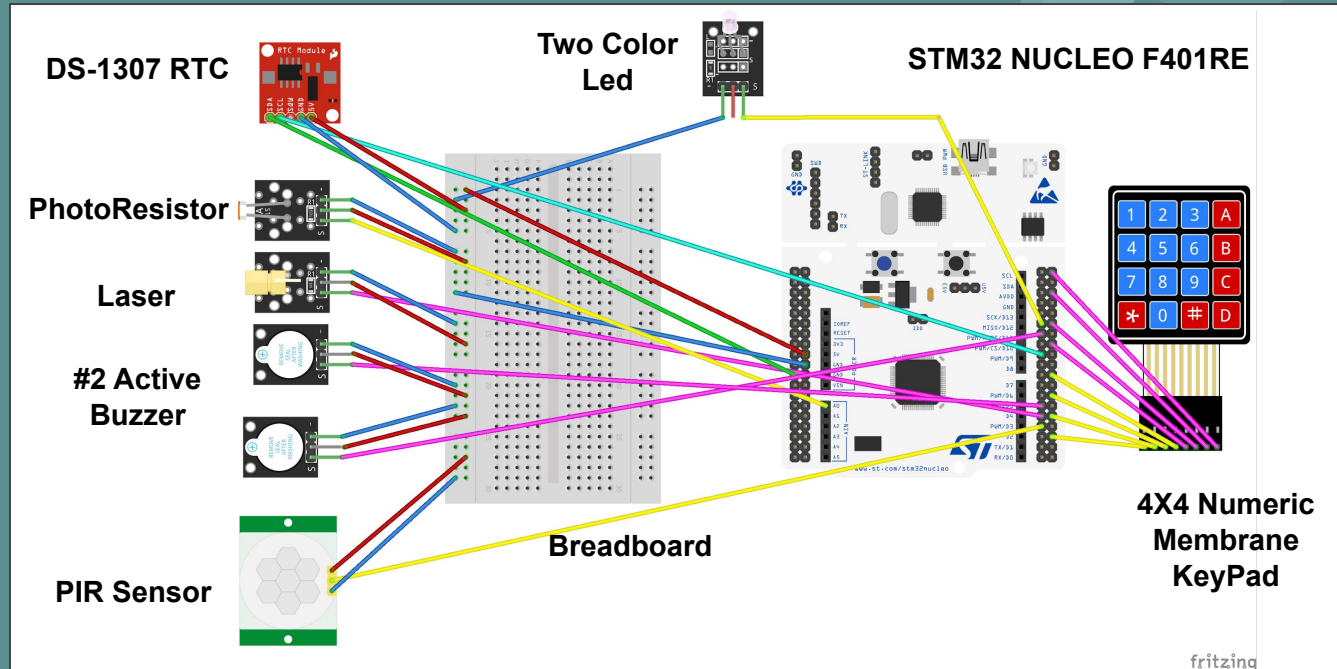
Our Embedded System Project is about an Home Security System that is able to manage two different kind of intrusion detection sensors:

Area and Barrier.

The main features of our system are:

- Activate/Deactivate the system.
- Two different kind of alarms: Area and Barrier.
- Activate/Deactivate both or a single alarm.
- Drive a buzzer for notifications and alarms (different sound for different alarm).
- Active alarm.
- Delayed alarms.
- User pin to activate/deactivate the system and the alarms.
- Log through the UART.

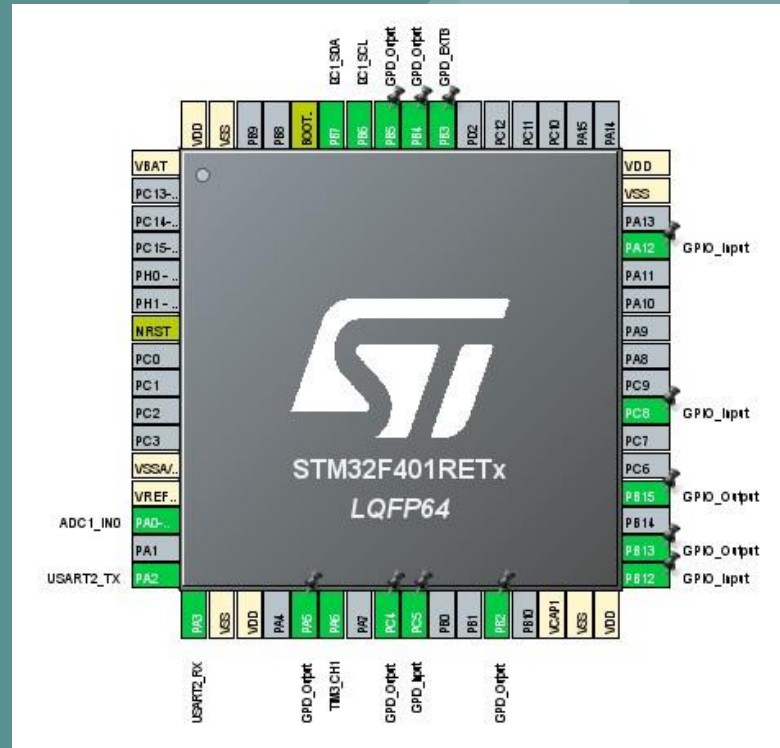
Hardware Scheme



Connections

As the Hardware Scheme shows, there are a lot of connections between the microcontroller and the components of the system.

This picture shows the used Pin in green color and the relative output.



Protocols

UART - Interface for configurations and logging.

I2C - to send and receive data from the RTC.

ADC - to converts an analog signal, in our case the output values of the photoresistor, into a digital signal.

TIMERS - to carry out all the counting operation.

DMA - to exchange data with the outside world or to drive external peripherals.





Interfaces

The systems uses different software interfaces to communicate and interact with the User:

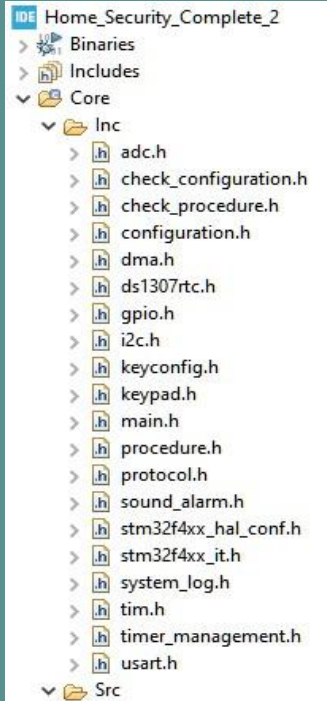
PUTTY - Interaction between user and system during the initial configuration and also to show the log messages periodically.

KEYPAD MODULE - It is required to enter commands, pins and codes that are sent to the system.

USER LED - Indicator of the global state of the system: ON - OFF - BLINK.

BUZZER - Indicator of device confirmed operations, of the keys pressed on KeyPad and obviously for the sound of the alarms.

Software Architecture

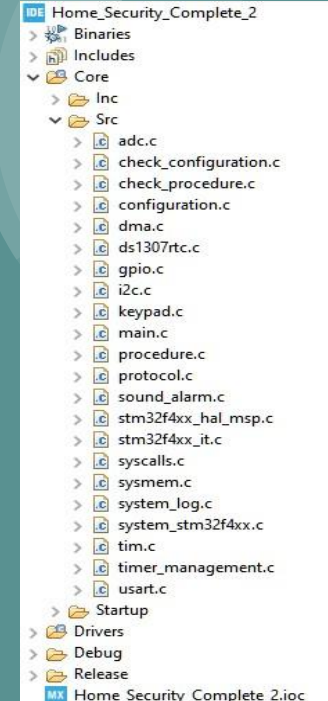


The Software Architecture was organized in:

- default files
- configuration files
- “check” files
- timer management files
- sound management files
- procedure
- protocol

Header Files

Source Files



Software Architecture

INTERRUPTS - most of the events were managed through interruptions, implementing the corresponding callback to describe the code to be executed when a particular situation occurs.



- UART: Transmission (using Dma) and Reception
- I²C: Reception of Date and Time, using DMA (each 10 seconds)
- ADC: Analog-Digital conversion (using DMA) of photo-resistor (every $\frac{1}{4}$ second when sensor is active)
- TIMERS: counting operation in a completely non-blocking mode
- PIR: Sensor managed in RISING_FALLING mode.



Thanks for your Attention



Home Security System

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