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# RKE (Remote Keyless Entry)

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**RKE (Remote Keyless Entry)**

**1. INTRODUCTION**

In our modern society comfort became a standard. This comfort, especially in cars can only be achieved by equipping the car with more electronic devices. Almost all modern cars can be locked or unlocked with a Remote Keyless System. A Remote Keyless System consists communicates wirelessly with the car receiver that is responsible for controlling doors of the car.

### **1.1 Description**

An RKE is some kind of an electronic lock which is alternative to using a traditional mechanical key that controls access to vehicle. A Remote Keyless Entry System consists of a key fob and a car transceiver that locks and unlocks the vehicle. The user presses a button on the key fob to lock or unlock the car instead of locking or unlocking the car with a traditional key.

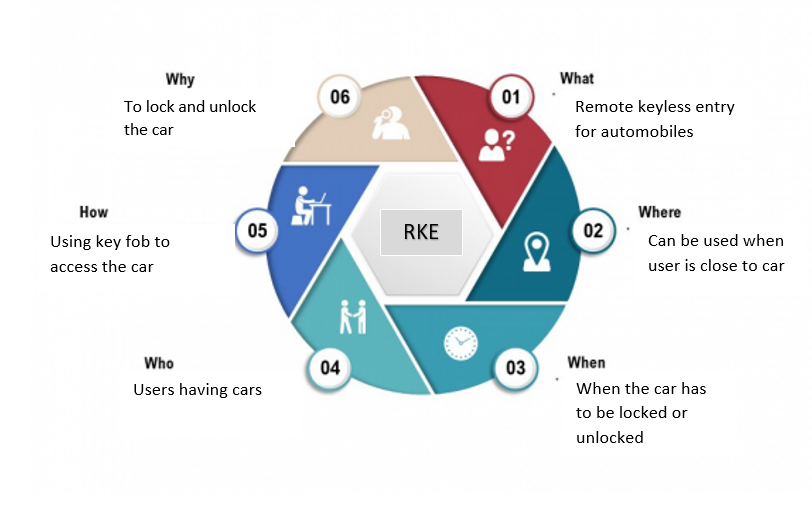
### **1.2 Features**

* Locks the car
* Unlocks the car
* Contains anti-theft system to prevent thieves from intercepting and spoofing the telegrams
* Better Security

### **1.3 SWOT Analysis**



**5W's 1H**



**2. REQUIREMENTS**

* **2.1 High Level Requirements**

|  |  |  |
| --- | --- | --- |
| **S.NO** | **HLR\_ID** | **Description** |
| 1 | HLR-1 | User shall be able to lock the door using key fob |
| 2 | HLR-2 | User shall be able to unlock the door using key fob |
| 3 | HLR-3 | User shall be able to activate or deactivate the alarm |
| 4 | HLR-4 | User shall be able to approach light |

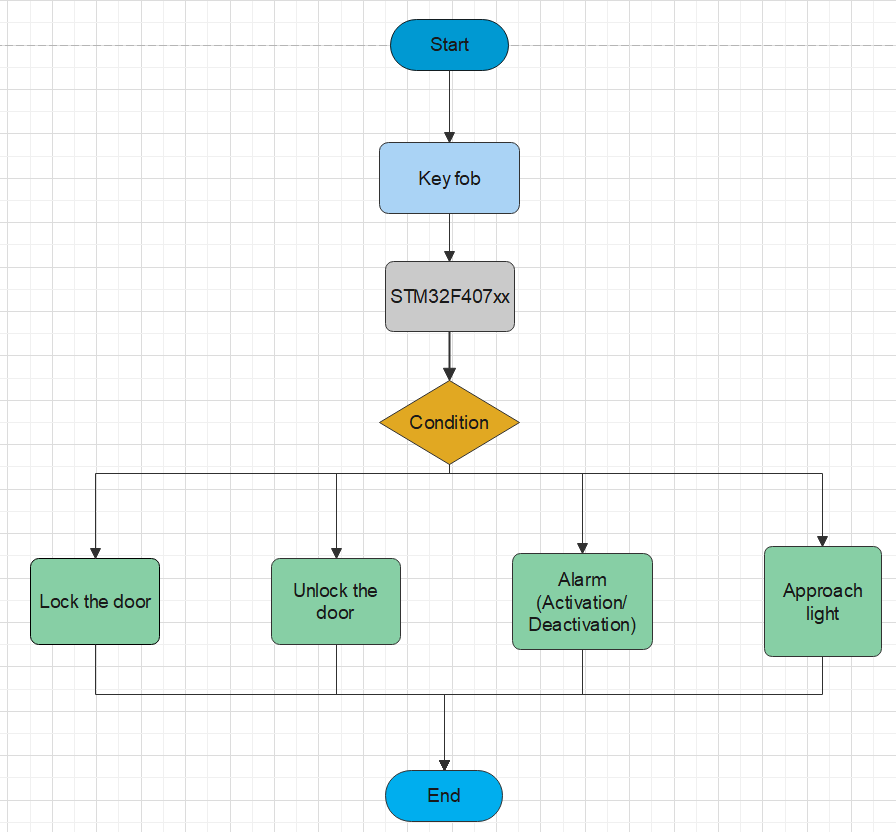
* **2.2 Low Level Requirements**

|  |  |  |
| --- | --- | --- |
| **S.NO** | **LLR\_ID** | **Description** |
| 1 | LLR-1 | When user presses the button, all the LEDs shall glow indicating that door is locked |
| 2 | LLR-2 | When user presses the button twice, all the LEDs shall go off indicating that door is unlocked |
| 3 | LLR-3 | When user presses the button thrice, all the LEDs shall on in clockwise manner |
| 4 | LLR-4 | When user presses the button four times, all the LEDs shall on in anti-clockwise manner |

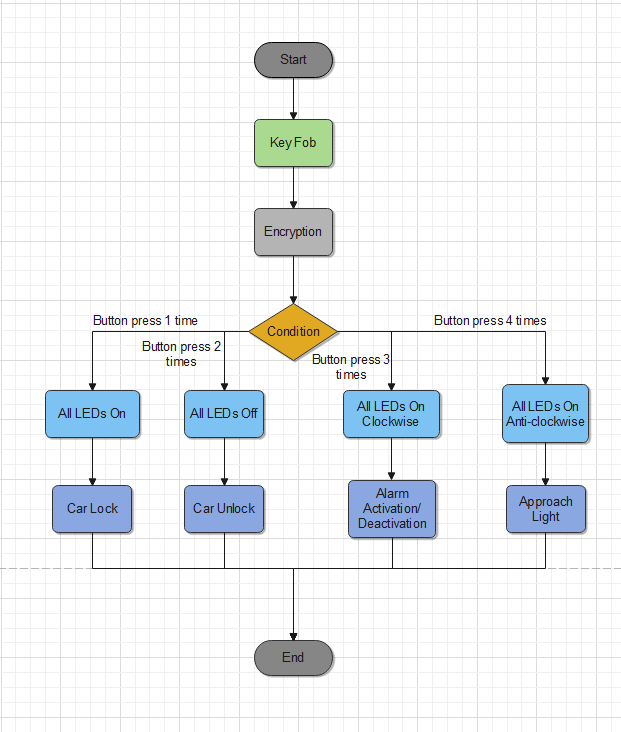
**3. ARCHITECTURE**

**3.1 Behavioural Diagram**

**3.1.1 High Level Flow Chart Behavioural Diagram**

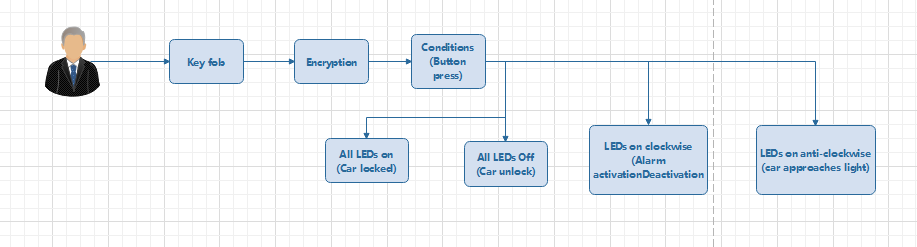


**3.1.2 Low level Flow Chart Behavioural Diagram**

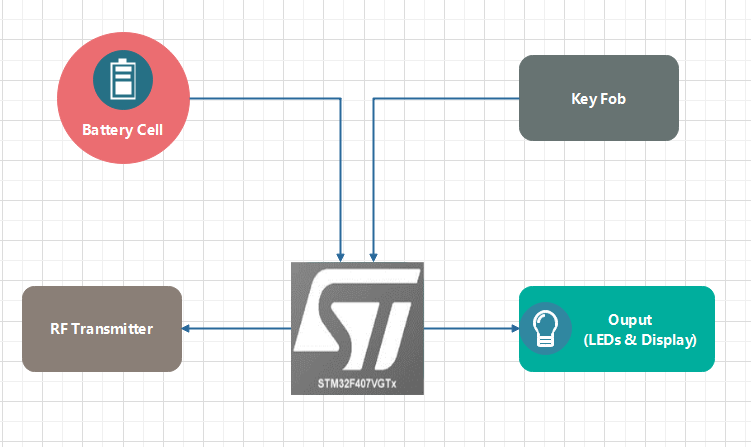


**3.2 Structural Diagram**

**3.2.1 Use Case Structural Diagram**



**3.2.2 Functional Diagram**



**4. SYSTEM TEST PLAN**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test\_ID | Description | Input | Expected O/P | Actual O/P | Status |
| TD\_01 | Car Lock | Button Press "1 Time" | LOCK | LOCK | Pass ✅ |
| TD\_02 | Car Unlock | Button Press "2 Times" | UNLOCK | UNLOCK | Pass ✅ |
| TD\_03 | Alarm Activation/Deactivation | Button Press "3 Times" | ALARM ACTIVATION/DEACTIVATION | ALARM ACTIVATION/DEACTIVATION | Pass ✅ |
| TD\_04 | Approach Light | Button Press "4 Times" | APPROACH LIGHT | APPROACH LIGHT | Pass ✅ |

**4.1 High Level Test Plan**

## **4.2 Low Level Test Plan**

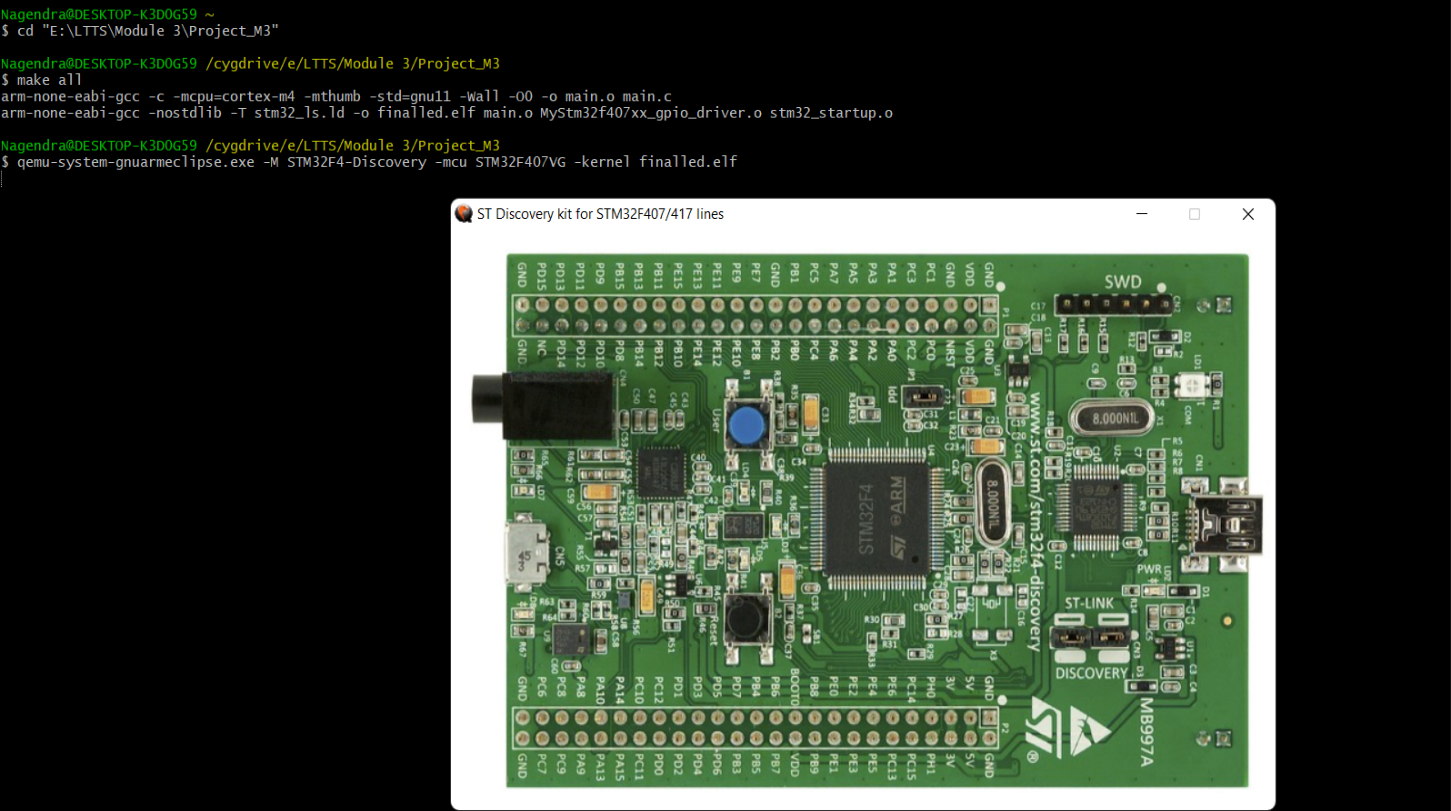
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test\_ID | Description | Input | Expected O/P | Actual O/P | Status |
| TD\_01 | Car Lock | Button Press "1 Time" | All LED's "ON" | All LED's "ON" | Pass ✅ |
| TD\_02 | Car Unlock | Button Press "2 Times" | All LED's "OFF" | All LED's "OFF" | Pass ✅ |
| TD\_03 | Alarm Activation/Deactivation | Button Press "3 Times" | All LED's "ON CLOCKWISE" | All LED's "ON CLOCKWISE" | Pass ✅ |
| TD\_04 | Approach Light | Button Press "4 Times" | All LED's "ON ANTI-CLOCKWISE" | All LED's "ON ANTI-CLOCKWISE" | Pass ✅ |

**5. IMPLEMENTATION**

A circuit board with many chips

Description automatically generated with low confidence

**Figure 5.1 Simulation Image**



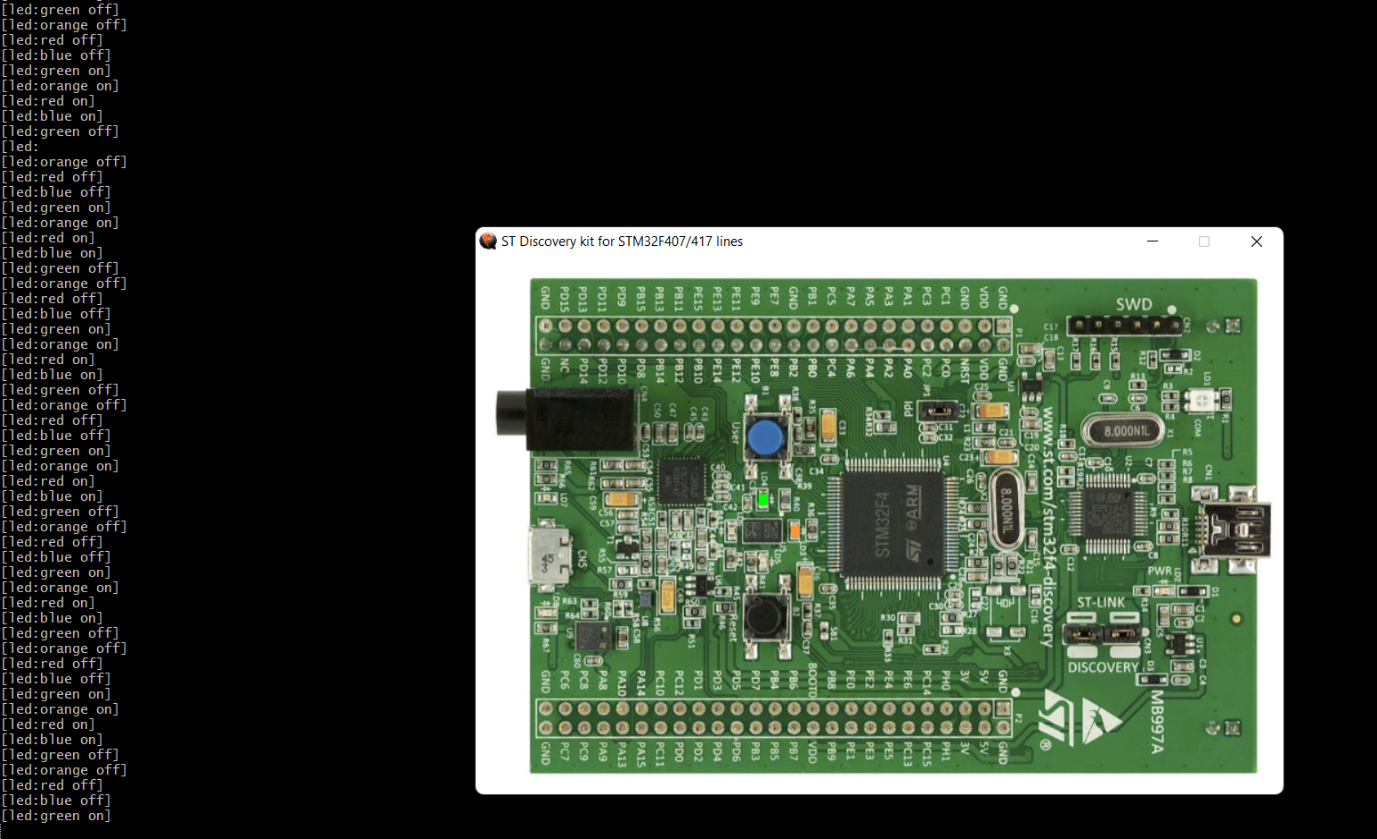
**Figure 5.2 Button pressed once hence all LEDs are on**



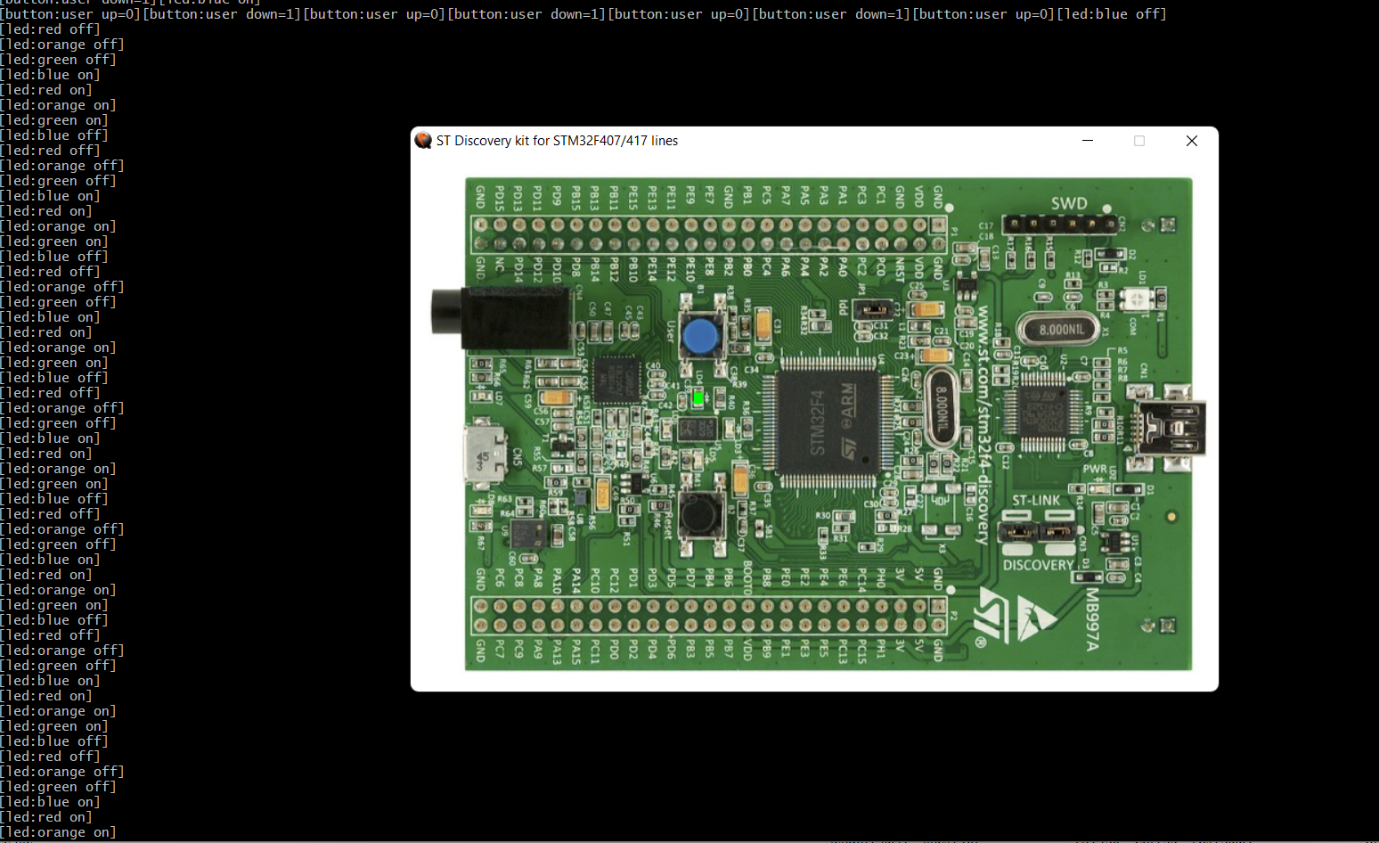
**Figure 5.3 Button pressed twice hence all LEDs are off**



**Figure 5.4 Button is pressed thrice hence LEDs on in clockwise direction**



**Figure 5.5 Button is pressed four times hence LEDs on in anti-clockwise direction**



**6.APPLICATION**

# Automotive Application

* Flight System.
* Train System.
* Home Automation System.
* Industrial Application.

**7. REFERENCES**

* https://www.sciencedirect.com/topics/engineering/keyless-entry-system