

CHAPTER FOUR
SOFTWARE SIMULATION AND HARDWARE

Chapter Four

Software Simulation and Hardware

This section discusses the achieved outputs from the simulation and hardware circuit when connected each component them at exactly point of connection.

4.1 Simulation:

The following figure shows the simulation circuit of Engine Lock and Control System:

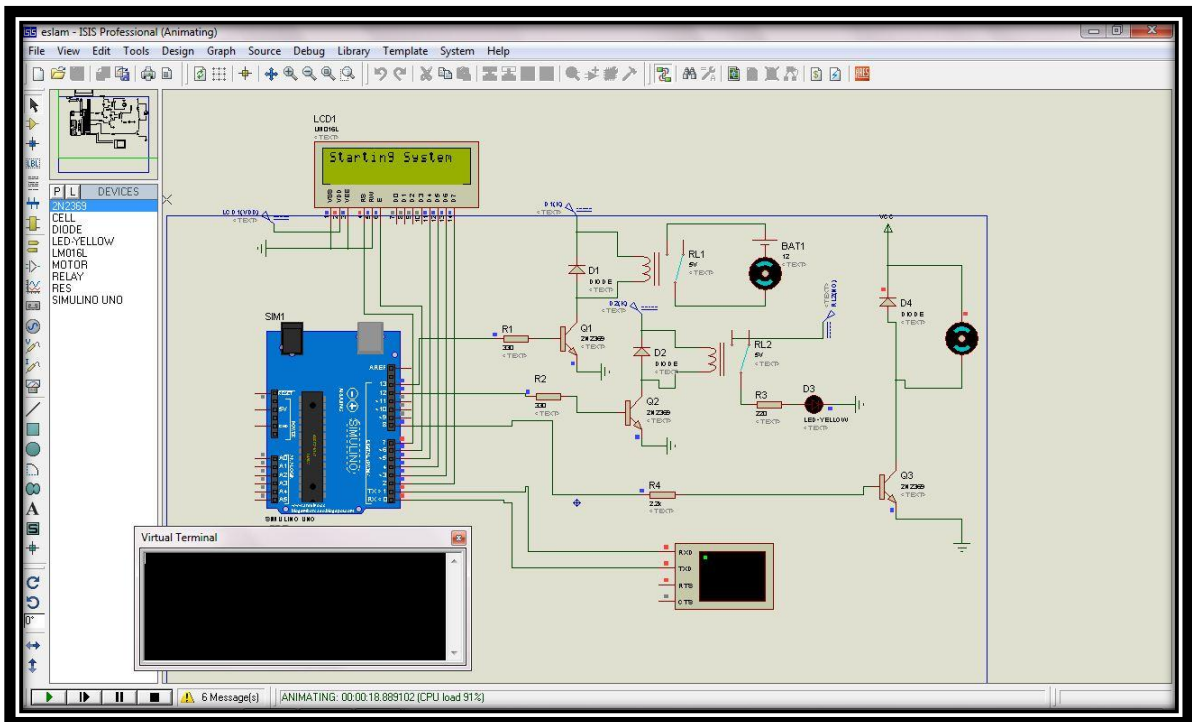


Figure 4.1: Simulation of Engine Lock and Control System.

The Arduino is connected to the virtual terminal through pins 0,1 (RX,TX) to establish the communication instead of the GSM. Relay1 is connected to the Arduino through pin 12 to enable and disable the security system. Relay 2 is connected to Arduino through pin 13 to control over dc motor which represent starter in car ignition system.

When control message is received from virtual terminal and the content of the message was to enable the security system (qw12*e#) relay 1 will be closed and the led will light. And if the message was (qw12*d#) relay 1 will be opened and the led will turn off. If the message was (qw12*s#), firstly relay 1 will be closed then relay 2 will be closed for short time during that the dc motor connected through pin 8 will starting .

All the process will be displayed through LCD, which is connected through pin 7, 6, 5, 4, 3, 2.

The following table summarize the connection between Arduino pins and the components

Table 4.1: Arduino pins connections.

<i>Components</i>	<i>Arduino pins</i>
Virtual terminal	Pin 0 (RX) and pin1 (TX).
LCD	Connected to pins: 2,3,4,5,6,7.
Engine motor	Pin8.
Relay1	Pin12.
Relay2	Pin 13.

4.1.1 Software flowchart:

The following follow chart illustrate the security system flow chart and it show that there are three stages that explain the system main features (disabling the system, enabling the system, starting the engine) :

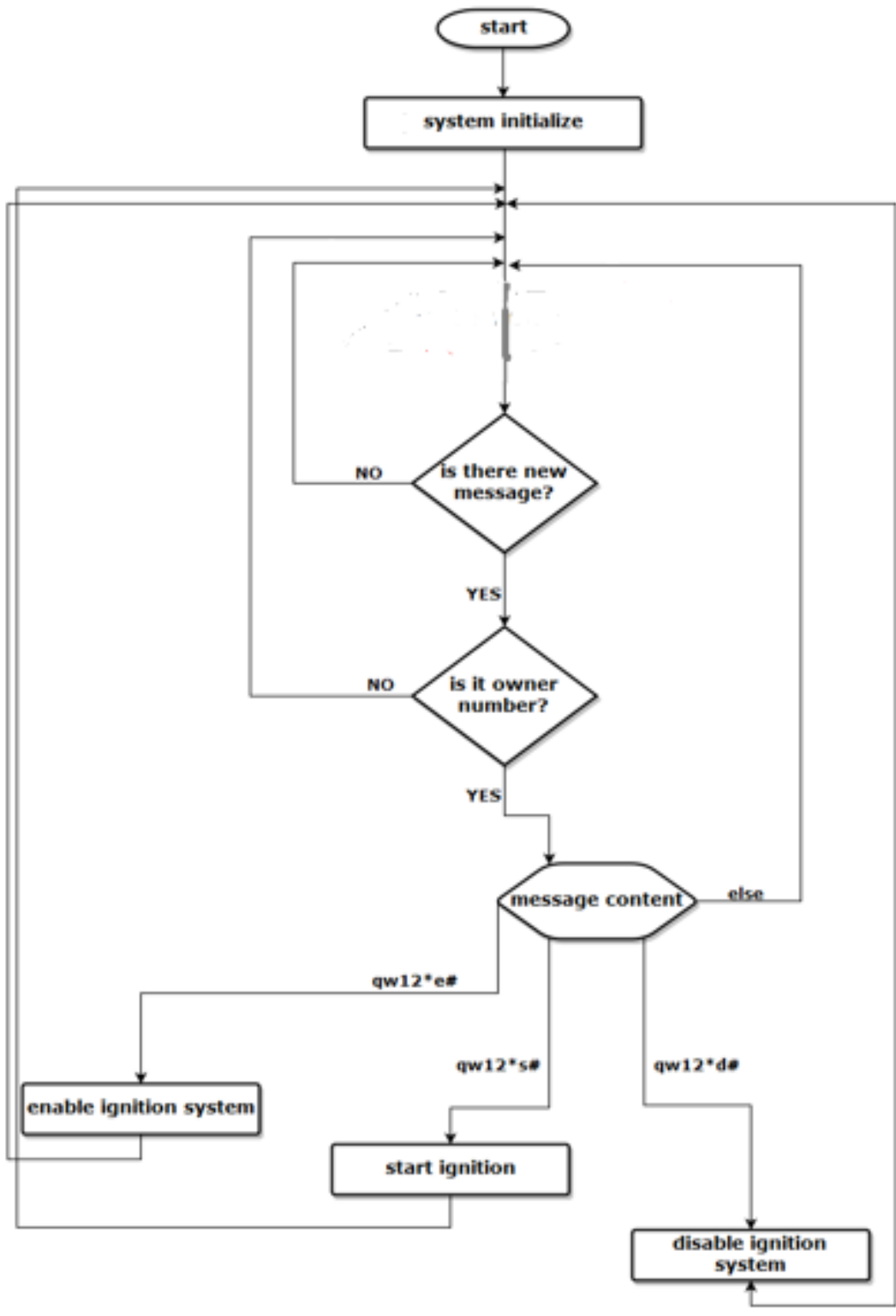


Figure 4.2: Software Flowchart

4.1.2 Simulation results:

Simulation of the system's functions have been done in proteus, the next part shows the response for each SMS frame(source code in appendix A).

- ✚ The below figure displays the response when the received message from virtual terminal is enabling security system (qw12*e#):

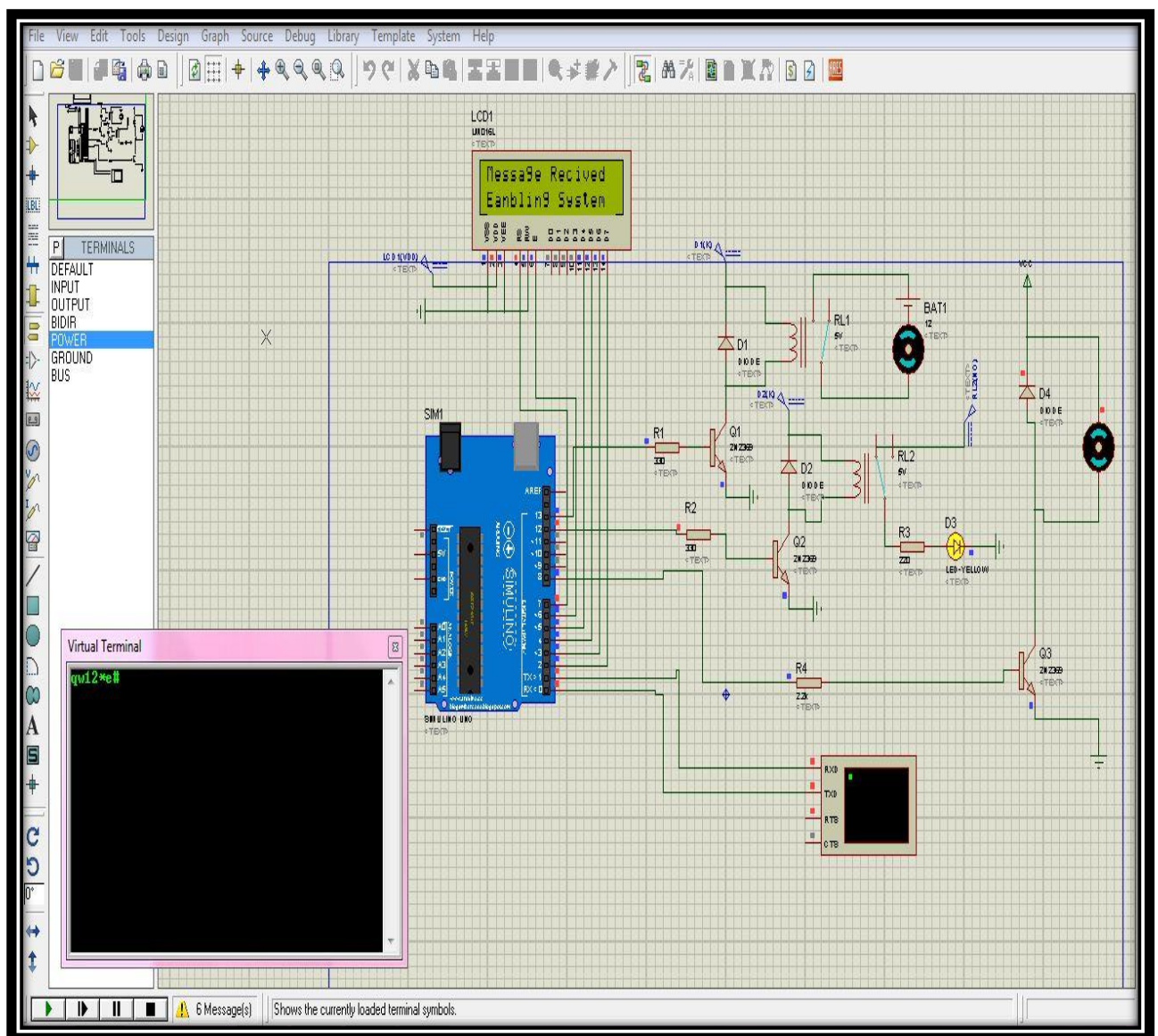


Figure 4.3: Enable Ignition System

✚ The below figure displays the response When the received message is starting ignition system (qw12*s#):

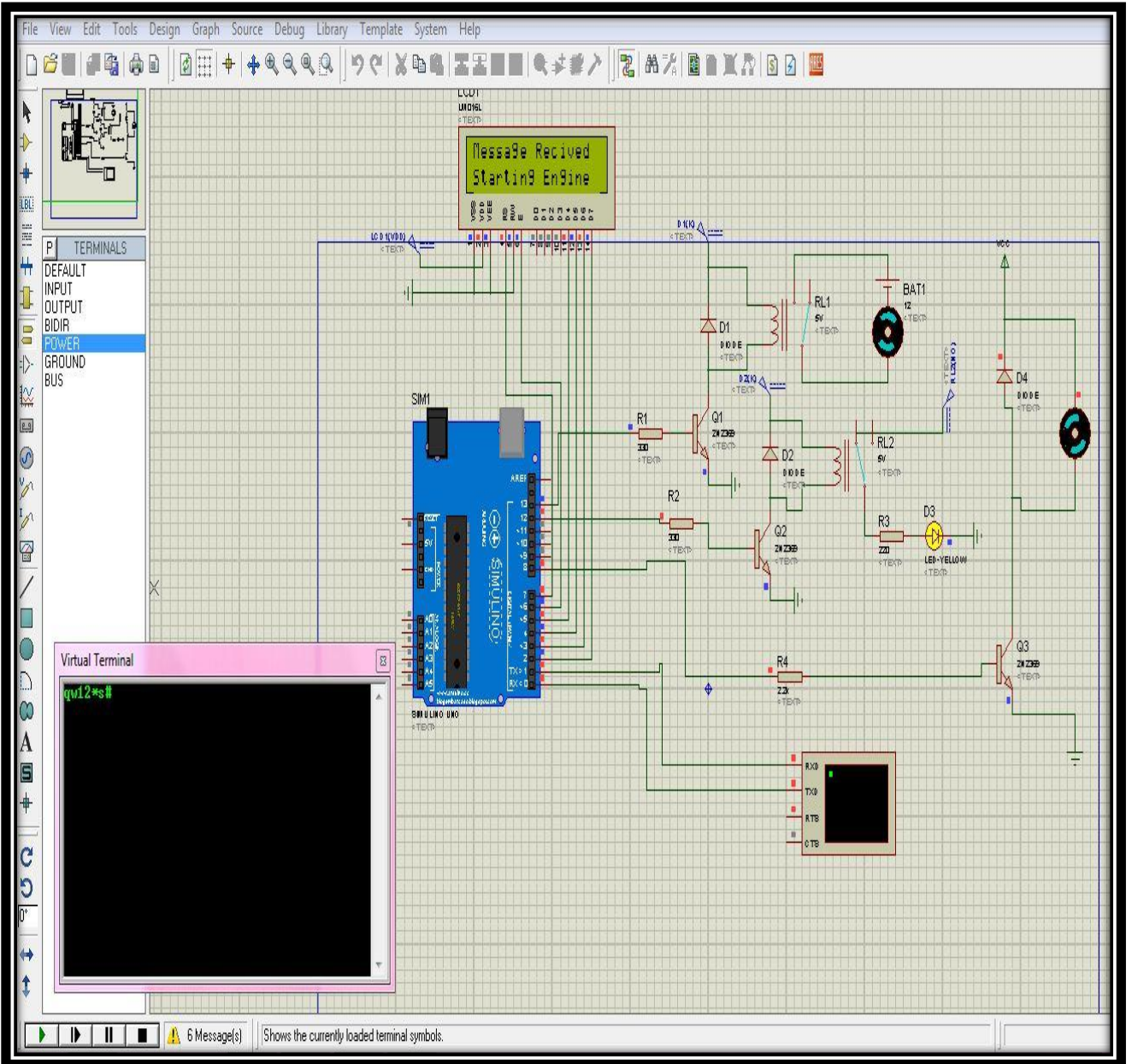


Figure 4.4: Starting Ignition.

- The following figure displays the response when the received message is disabling security system (qw12*d#):

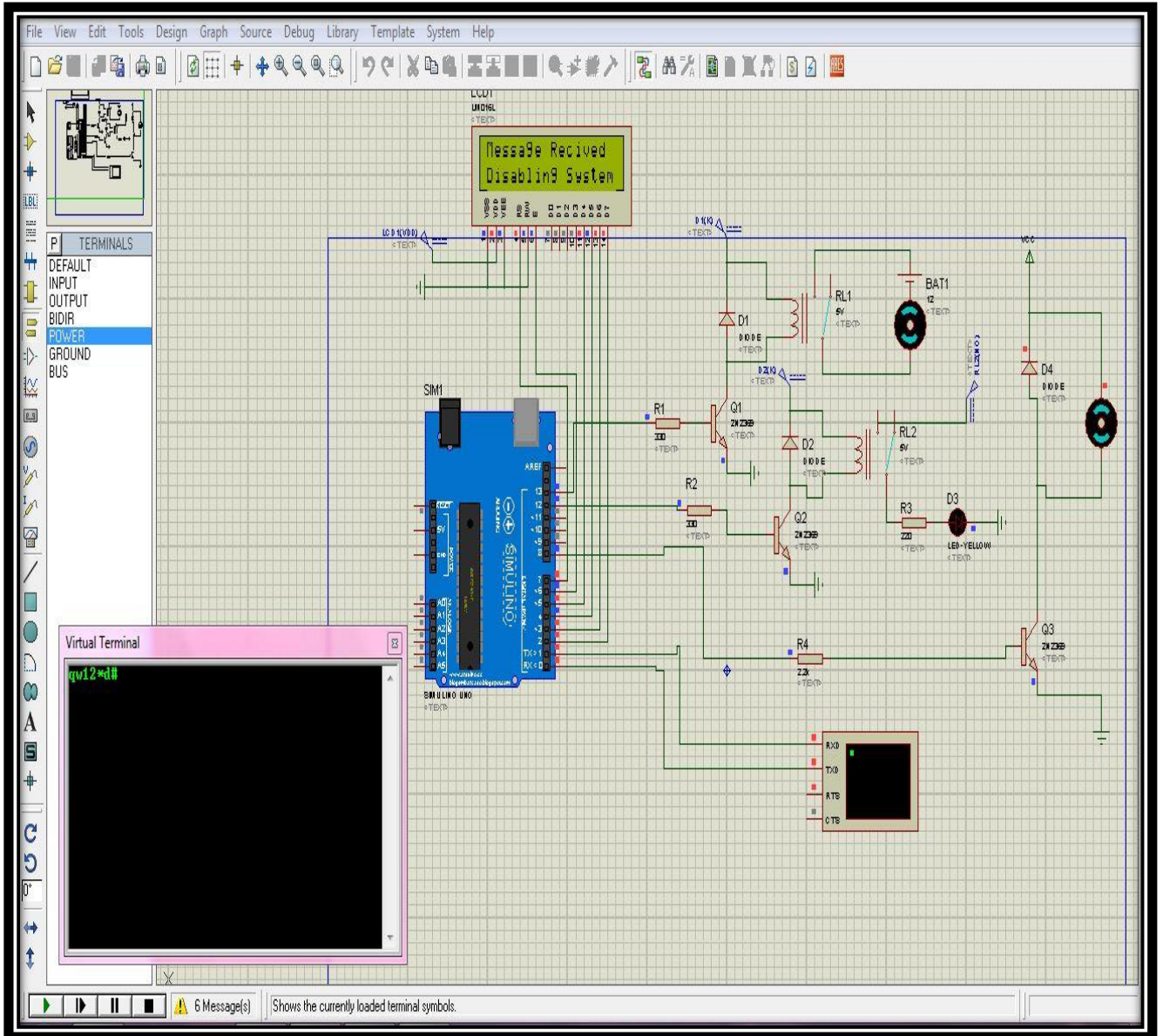


Figure 4.5: Disabling System.

✚ The following figure shows the response of the system when wrong message is received :

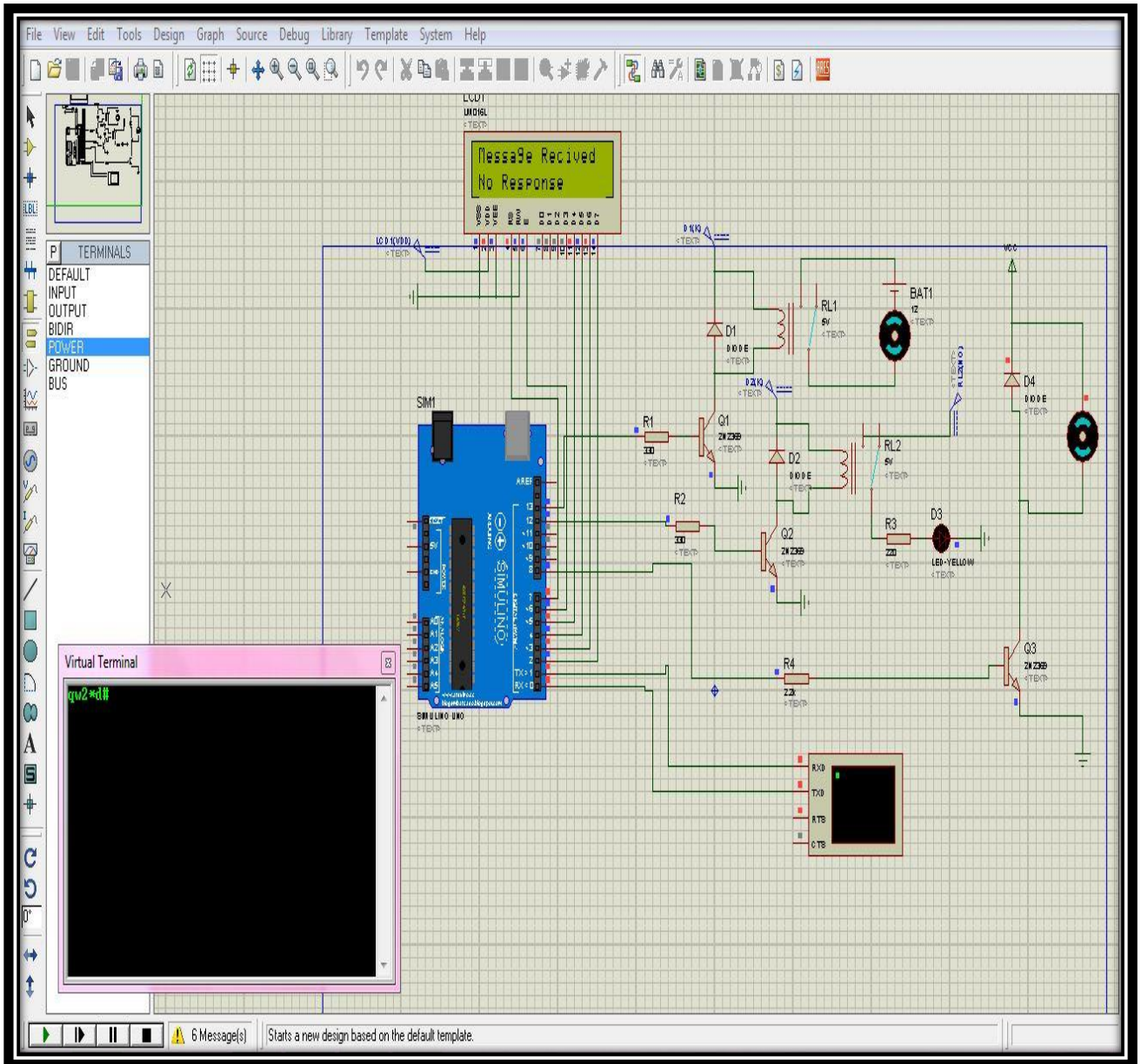


Figure 4.6: Wrong password.

4.2 Hardware System Circuit:

The following figure shows the circuit of Engine Lock and Control System:

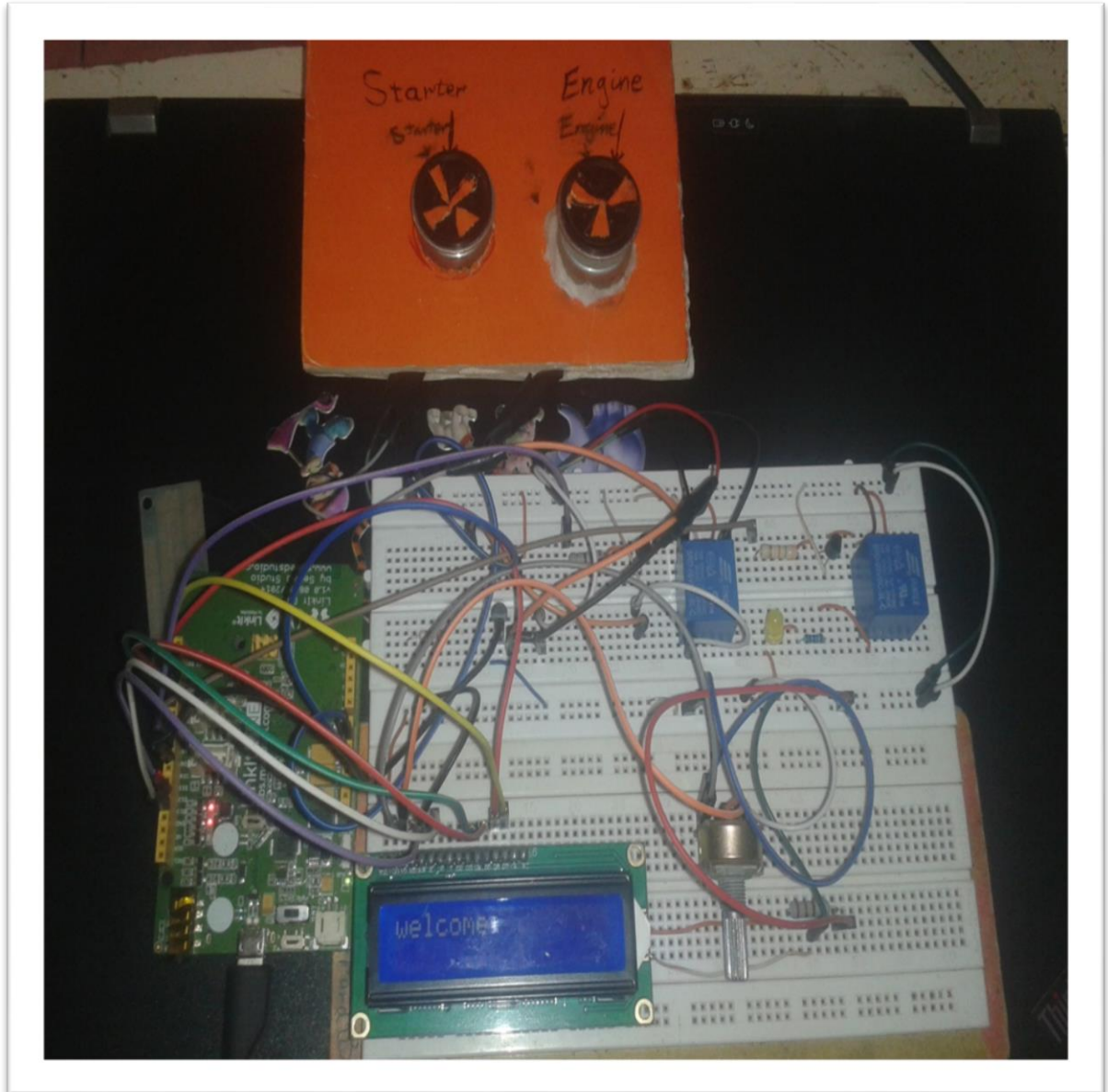


Figure 4.7: system circuit.

The operation concept will be similar to the concept of the simulation, for pins connection refers to table 4.1 except the virtual terminal is replaced with GSM module.

4.2.2 System circuit results:

System's circuits have been implemented, the next part shows the response for each SMS frame.

- ✚ The below figure displays the response of the system when receiving (qw12*e#) from owner's phone number and the system send feedback via SMS.

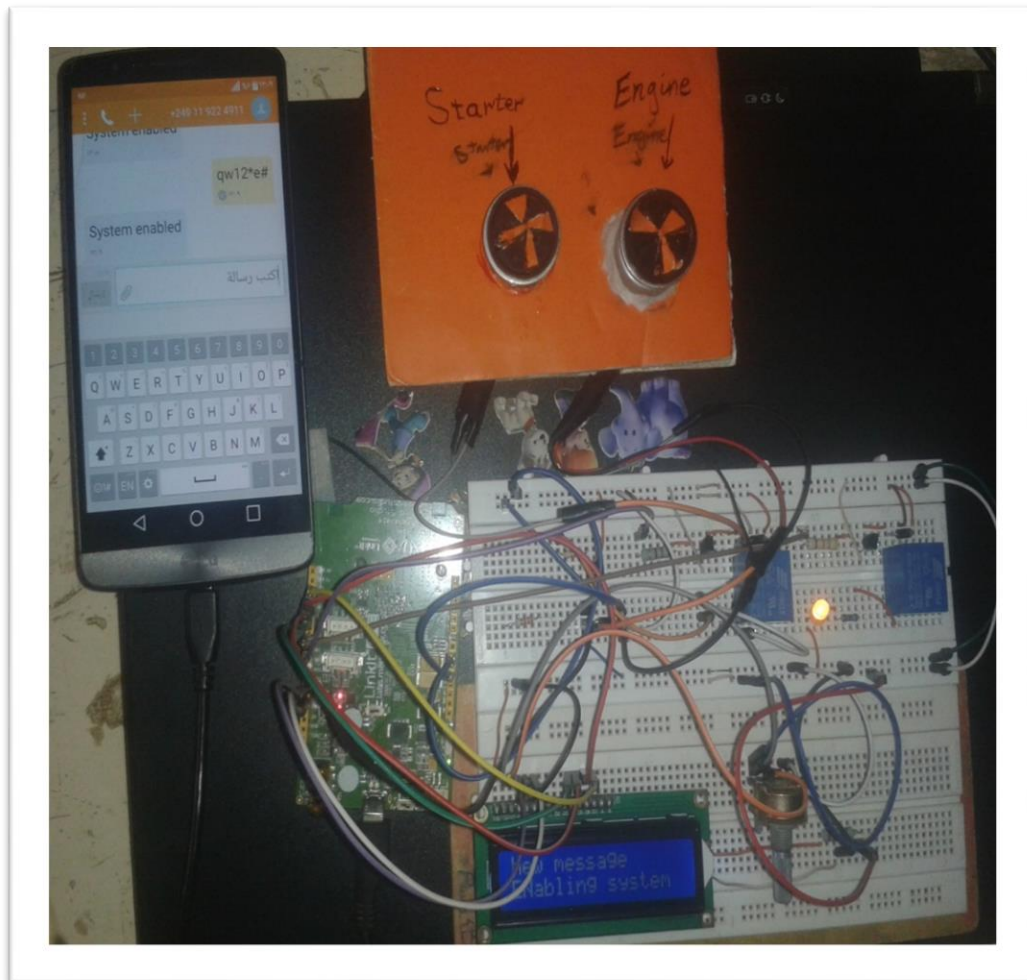


Figure 4.8: system response and feedback for enabling message.

- ✚ The below figure displays the response of system when receiving (qw12*d#) form owner's phone and the system send feedback via SMS.

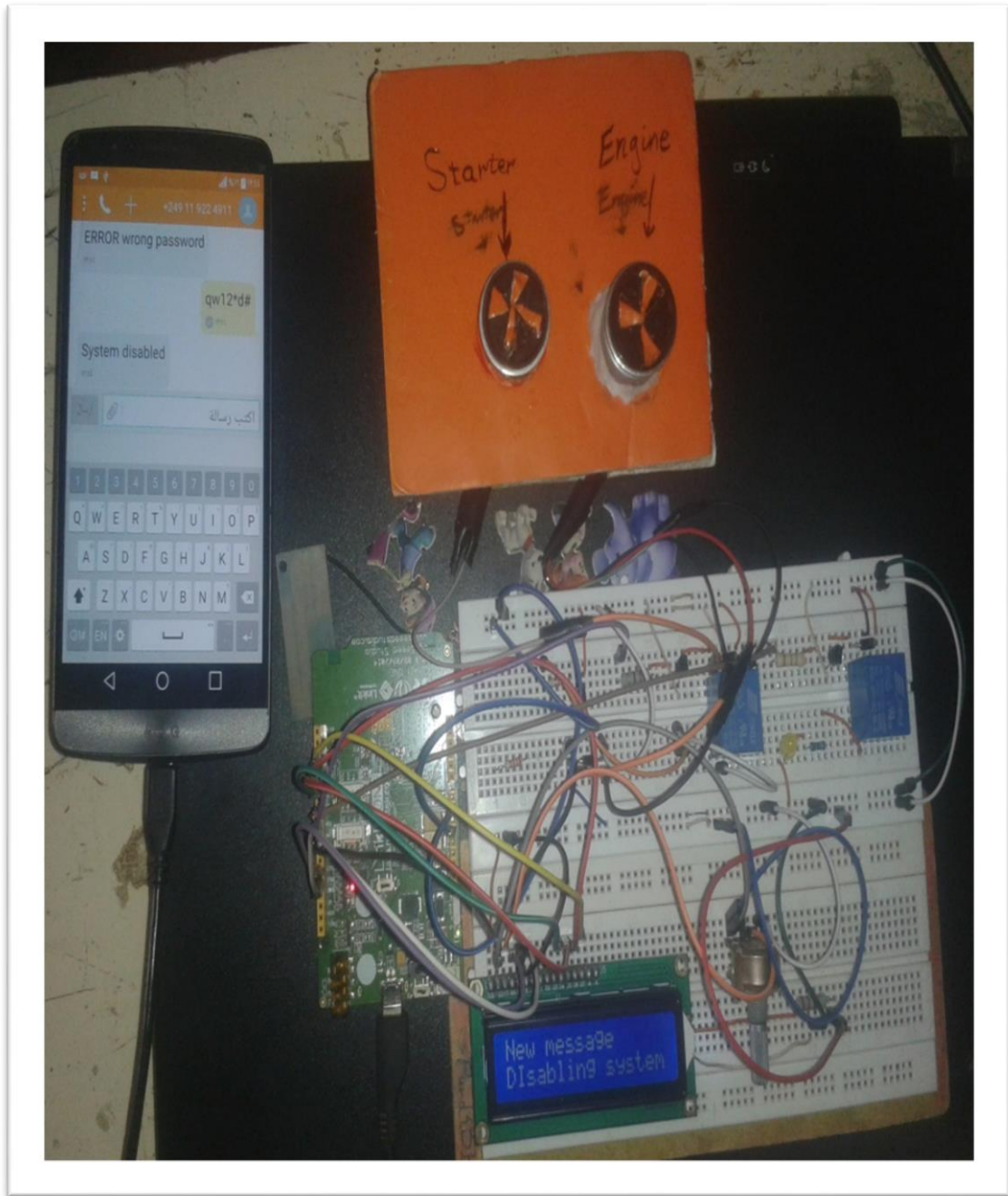


Figure 4.9: system response and feedback for disabling message.

- ✚ The below figure displays the response of system when receiving (qw12*s#) form owner's phone and the system send feedback via SMS.



Figure 4.10: system response and feedback for starting message.

✚ The below figure displays the response of system when receiving wrong password form owner's phone and the system will maintain the pervious status and send feedback via SMS.

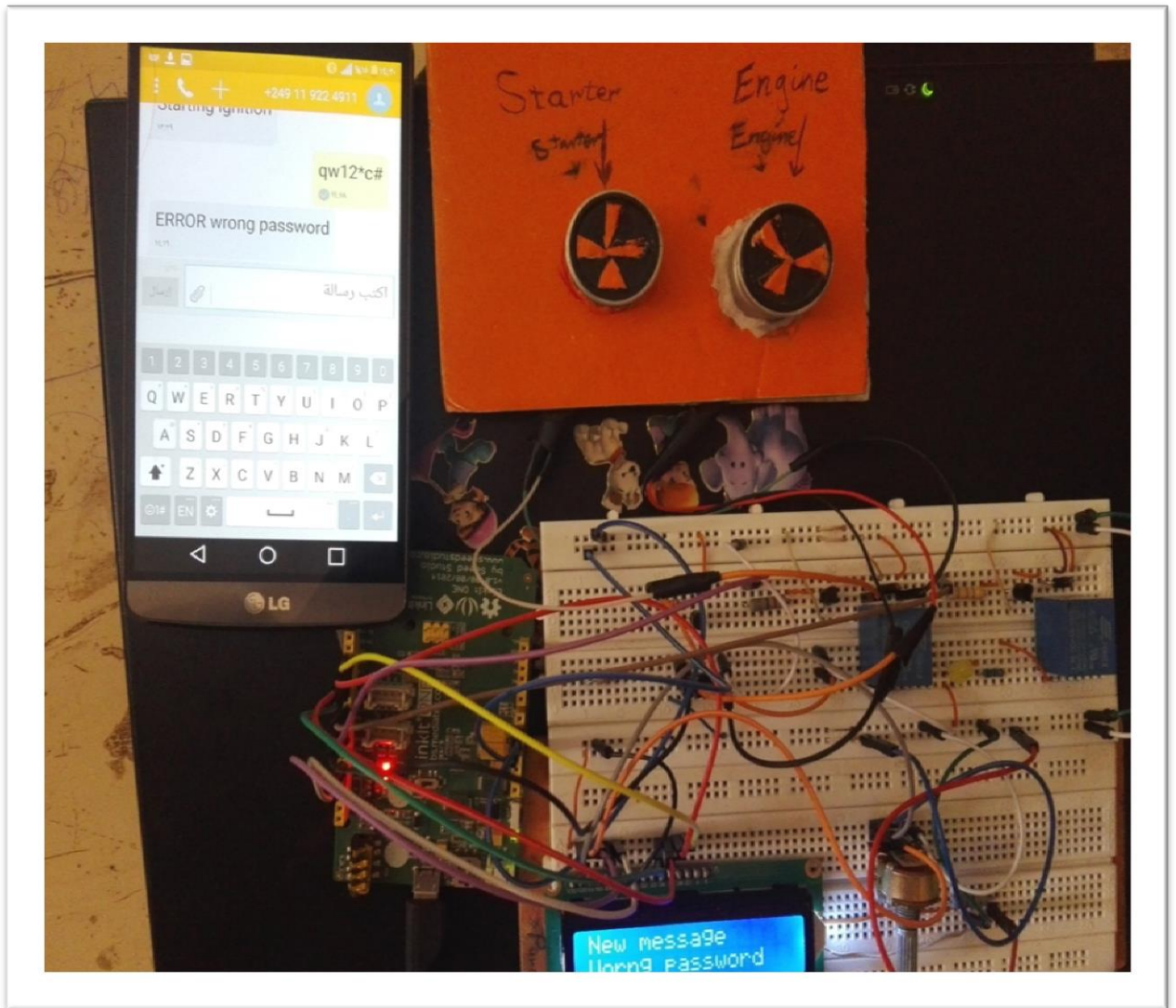


Figure 4.11: system response and feedback for wrong message.

✚ The below figure displays the response of system when receiving message from unknown number and the system will not give any response.

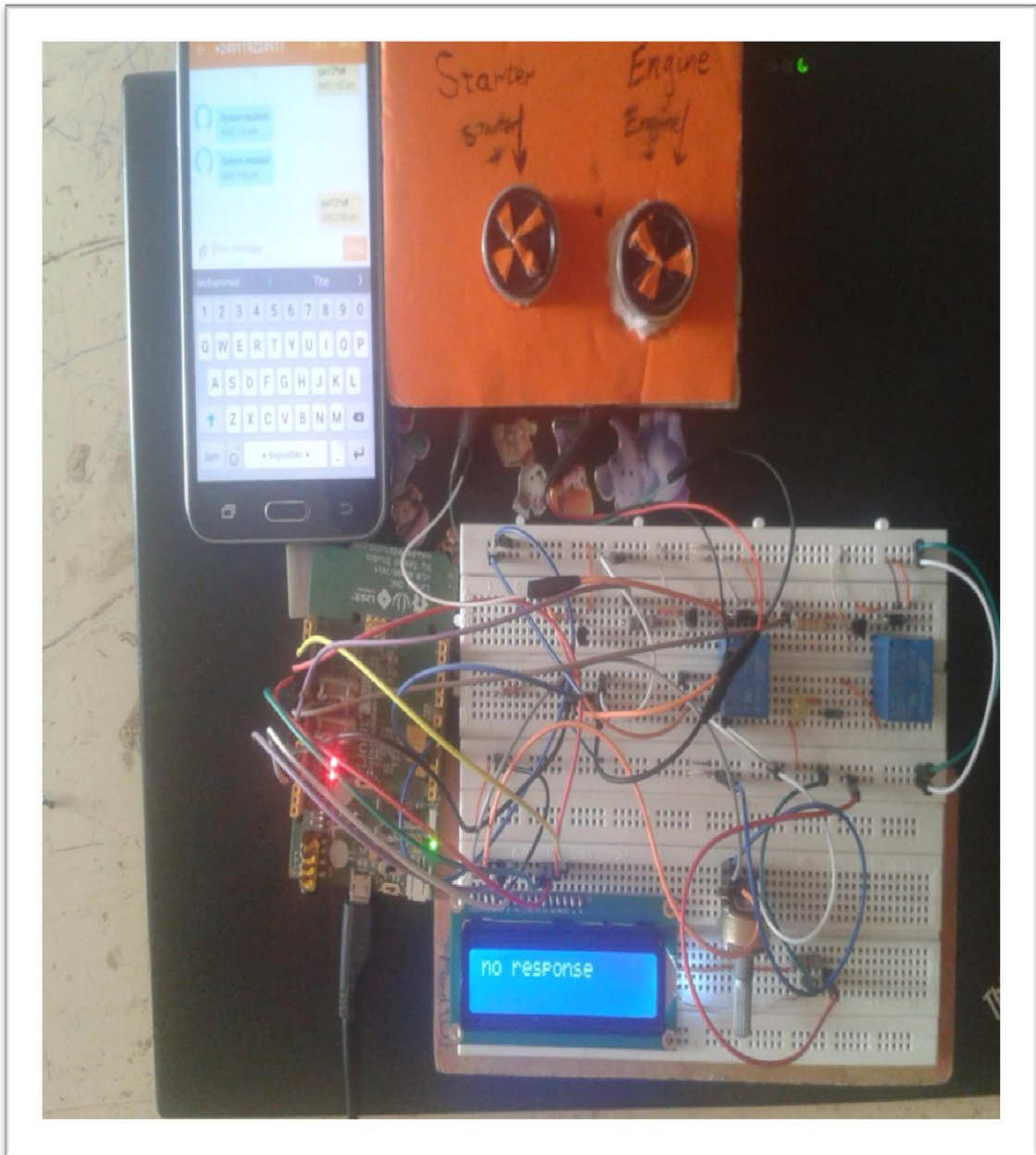


Figure 4.12: system response for unknown number.