Scintilla Session 8
Elacsta Home

31-03-2020

Abstract

Session 8 of scintilla was planned for March 2020, but due to spread of COVID19 it was postponed. The session aimed in creating mobile controlled switch, using IoT. Also integrated with Google assistant to switch using voice comands.

1 Objectives of the Session

The session was planned with objective to introduce the idea of IoT and also to design & build a complete product. Starting from creating PCB and to implement it in their own home. This session was to give an practical approach to what they learned in their previous sessions. The schematics and layout was designed in EasyEDA, printed and etched the copper plate to fabricate the PCB. Separate power supply unit was used. The product was made such that it can be integrated to many application.

2 Technical Details

The elacsta home was made with the objective of controlling a switch from a remote location. It had two relay channels to control two switch. The esp12e served as Elacsta Home had main three units:

- esp12e unit
- relay unit
- code

2.1 ESP12e unit

It features ability to embed Wi-Fi capabilities to systems or to function as a standalone application. It is a low cost solution for developing IoT applications.

- Frequency Range: 2.412 - 2.484 GHz
- Programmable GPIO available
- Wireless Network Type: STA / AP / STA + AP
- Security Type: WEP / WPA-PSK / WPA2-PSK
- Network Protocol: IPv4, TCP / UDP / FTP / HTTP

- Operating Voltage: 3.3V
- Maximum current allowed to draw per pin: 15mA
- Integrated low power 32-bit MCU
- Onboard PCB Antenna
- Standby power consumption of < 1.0mW
- Operating Temperature: -40ºC to +125 ºC

The esp12e unit connected to the web server and accepted the commands to switch. It passed a digital high for switch on and digital low for switch off. These signals where sent to the relay units. The unit also accepted interrupts from manual switch to switch on/off. The esp12e schematic was done on open source cloud platform easyEDA. PCB file was created. PCB was printed and etched on copper. The PCB file was created and available at :
https://easyeda.com/SCINTILLA01/Elacsta-Home

2.2 Relay unit

Relay units consisted of relay and relay driver circuit. It accepted signals from esp12e unit to switch the relay. Schematic was done on open source cloud platform easyEDA. PCB file was created. PCB was printed and etched on copper . The files are readily available at:
https://easyeda.com/SCINTILLA01/Elacsta-Home

2.3 Code

The esp12e was programmed using tasmota firm ware. Tasmota is an alternative firmware for ESP12e based devices like iTead Sonoff, offering web and OTA (Over The Air) firmware updates and sensors support, which can be controlled under Http, Serial, MQTT and KNX, allowing for an easy integration with Smart Home Systems. It is written for Arduino IDE and PlatformIO
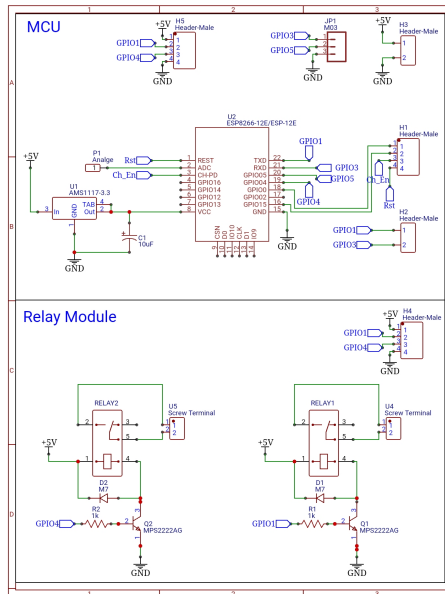
3 Images

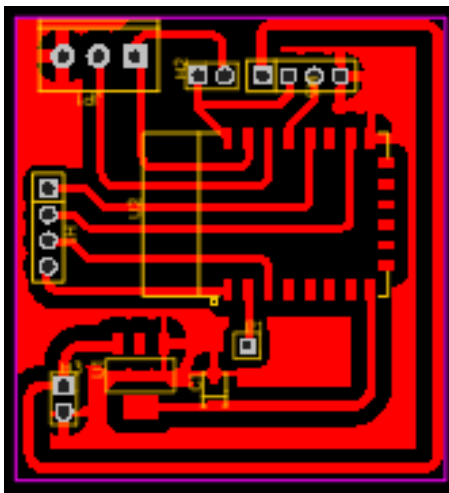Figure 1: schematics: esp12e unit and relay unit
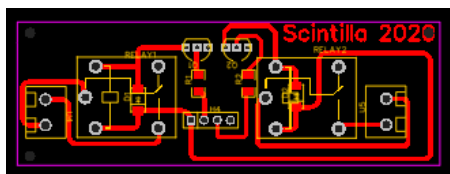

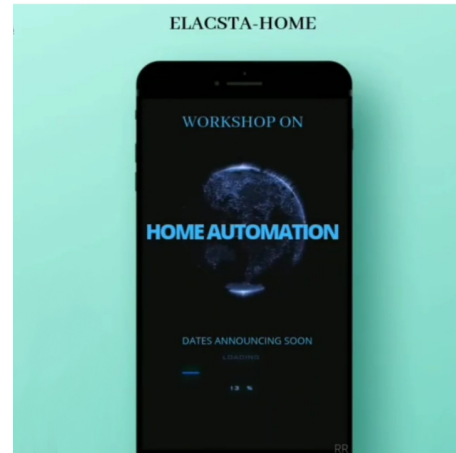Figure 2: Layout: esp12e unit

Figure 3: Layout: relay unit

Figure 4: Poster

4 Conclusions and Suggestions

The session was planned to give the idea about one of the leading trends in electronics i.e IoT. Using simple chip like esp12e low cost low power system can be designed.