

# Web User Interface Based Automator

Pratik Bhagwat

Department of Electronics And Telecommunication  
Atharva College Of Engineering  
Mumbai,India

Ganesh Chavhan

Department of Electronics And Telecommunication  
Atharva College Of Engineering  
Mumbai,India

Dipesh Galande

Department of Electronics And Telecommunication  
Atharva College Of Engineering  
Mumbai,India

Sushant Chougule

Department of Electronics And Telecommunication  
Atharva College Of Engineering  
Mumbai,India

Manoj Mishra

Department of Electronics And Telecommunication  
Atharva College Of Engineering  
Mumbai,India

**Abstract**— In today's competitive world it is very difficult to look over the menial day to day work by taking time from our busy schedules. We can use technology in resolving such problems. In this world of internet it has become very easy to shop several things sitting at home itself. With the concept of IOT(internet of things) we can take internet shopping to whole new level. Our circuit will sense the required material and automatically shop it from the predefined url by emulating the human actions on a particular device connected to the internet.

**Keywords:**- ARM mbed, nrf24l01, HX711 WEIGHING SENSOR.

## I. INTRODUCTION

The WEB USER INTERFACED AUTOMATOR is mainly a system that makes use of the data from the sensors to control a particular device that is connected to internet. This is done using a transmitter circuit and a receiver circuit. The transmitter and the receiver is implemented using two microcontroller boards and some peripherals interfaced to them. The controllers are based on ARM\_cortex-M architecture. The peripherals interfaced to the controllers are:

1. RADIO FREQUENCY MODULE
2. WEIGHING SENSOR(LOAD CELL)
3. ANALOG TO DIGITAL CONVERTER.

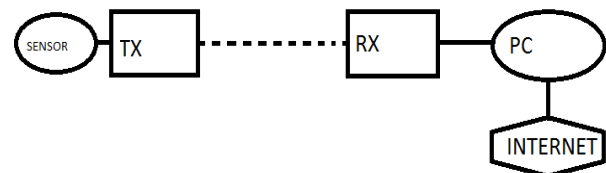
For ease of programming, the controllers are compatible with the MBED platform. MBED is a platform which is mainly developed for ARM microcontrollers . The platform provides various services such as operating system, cloud services, tools and developer ecosystem for better programming.

## II. WORKING

There are two units in this project. One is the transmitter circuit and other is the receiver circuit. The transmitter circuit will sense the weight of a material and will keep monitoring it. As soon as the material will reach its threshold value the transmitter circuit will send a message to

the receiver circuit. The receiver circuit will read the message and emulate the human actions on the device connected to the internet and will end up shopping the specified material from the specified URL by the user.

This entire mechanism can be illustrated using a simple block diagram shown below.



Block Diagram

## III. COMPONENTS

The system comprises of the following components.

1. MBED frdm kl25z
2. HX711 as an Analog to digital converter.
3. NRF24L01 as a Radio Frequency module.:

### A. Mbed frdm kl25z

It is based on Avia Semiconductors patented technology. HX711 is a precision 24-bit analog to-digital converter (ADC) designed for measures weigh scales and many industrial control applications to interfacing directly with a bridge sensor. The input multiplexer select either Channel A or B this is differential type of input to the low-noise Programmable Gain Amplifier (PGA). Channel A can be possible to programmed with a gain of 64 or 128, with corresponding to a full-scale differential input voltage of  $\pm 20\text{mV}$  or  $\pm 40\text{mV}$  respectively, whenever a 5V voltage supply is connected to AVDD analog power supply pin. And second Channel B has a fixed gain of 32. It consist of On-chip power supply regulator which eliminates the need for an external supply regulator to providing analog power for the ADC and the sensor. HX711 has clock input which is flexible. It can be from an external

clock source, a crystal, or the on-chip oscillator that does not require any external component. There On-chip power on-reset circuitry simplifies digital interface initialization.

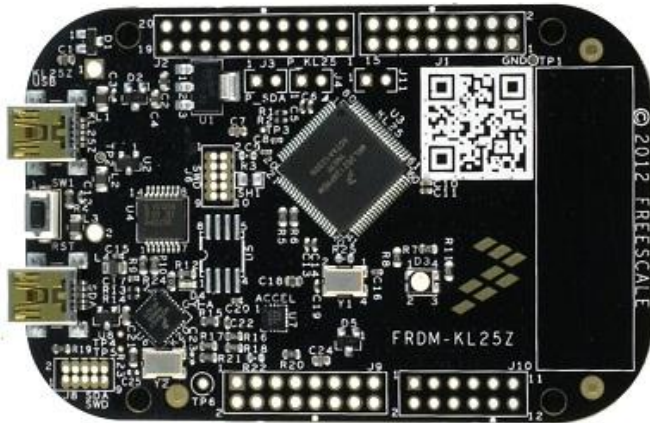


Figure 1: MBED KL25Z

#### FEATURES

- NXP KL25Z Kinetis KL2x MCU (MKL25Z128VLK4)
  - High performance ARM® Cortex™-M0+ Core
  - 48MHz, 16KB RAM, 128KB FLASH
  - USB (Host/Device)
  - SPI (2)
  - I2C (2)
  - UART (3)
  - PWM (TPM)
  - ADC (16 bit)
  - DAC (1x 12bit)
  - Touch Sensor
  - GPIO (66)
- FRDM-KL25Z Onboard Sensors
  - MMA8451Q - 3-axis accelerometer
  - Capacitive touch sensor
- Evaluation Form factor
  - 81mm x 53mm
  - 5V USB or 4.5-9V supply
  - Built-in USB drag 'n' drop FLASH programmer
- mbed HDK & SDK enabled
  - Drag-n-drop programming
  - USB Serial Port
  - CMSIS-DAP
  - Online development tools
  - Easy to use C/C++ SDK
  - Lots of published libraries and projects

#### B. HX711

**DESCRIPTION :** It is based on Avia Semiconductors patented technology. HX711 is a precision 24-bit analog to-digital converter (ADC) designed for measures weigh scales and many industrial control applications to interfacing directly with a bridge sensor. The input multiplexer select either Channel A or B this is differential type of input to the low-noise Programmable Gain Amplifier (PGA). Channel A can be possible to programmed with a gain of 64 or 128, with corresponding to a full-scale differential input voltage of  $\pm 20\text{mV}$  or  $\pm 40\text{mV}$  respectively, whenever a 5V voltage supply is connected to AVDD analog power supply pin. And second Channel B has a fixed gain of 32. It consist of On-chip

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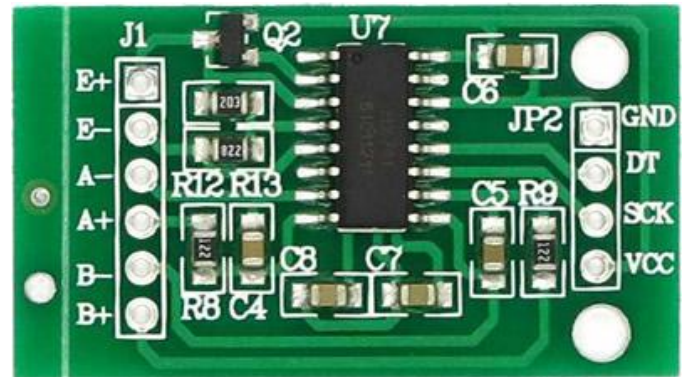


Figure 2: HX711

#### FEATURES

- It has two selectable differential input channels.
- On-chip active low noise PGA with selectable gain of 32, 64 and 128.
- On-chip power supply regulator for load-cell and ADC analog power supply.
- On-chip oscillator requiring no external component with optional external crystal.
- On-chip power-on-reset
- Simple digital control and serial interface: pin-driven controls, no programming needed
- Selectable 10SPS or 80SPS output data rate
- Simultaneous 50 and 60Hz supply rejection
- Current consumption including on-chip analog power supply regulator: normal operation  $< 1.5\text{mA}$ , power down  $< 1\mu\text{A}$
- Operation supply voltage range : 2.6 ~ 5.5V
- Operation temperature range :  $-40 \sim +85^\circ\text{C}$
- It is 16 pin SOP-16 package

#### C. NRF24L01

The nRF24L01 module is used to implement wireless sensor network. This module is highly integrated therefore it is small in size..It can transmit as well as receive and behave as a transceiver and perform ultra low power 2Mbps RF transceiver IC for the 2.4GHz ISM band.(Industrial, Scientific and Medical).It includes specifications like peak TX/RX currents is lower than 14mA, a sub  $\mu\text{A}$  power down mode, advanced and featured power management, and a 1.9V to 3.6V power supply range. This nRF24L01+ provides a Ultra Low Power(UTP) feature for enabling months to years of battery life from coin cell and AA/AAA batteries. This Transceiver consist of a power amplifier, a crystal oscillator, modulator/demodulator, integrated frequency synthesizer and Enhanced Shock-Burst protocol engine.



Figure 3: NRF24L01

Whenever we want to perform the wireless operation and requires to generate wireless network that time this nRF24L01 module is best option to perform operation. To perform operation it does not require external loop filter, resonators, or VCO varactor diodes. It requires only a low cost  $\pm 60$ ppm crystal, matching circuitry/impedance and TX/RX antenna.

#### FEATURES

- True single chip GFSK transceiver
- Complete OSI Link Layer in hardware
- Enhanced ShockBurst
- Address and CRC computation
- Auto ACK & retransmit
- On the air data rate 1 or 2Mbps
- Digital interface (SPI) speed 0-8 Mbps
- 125 RF channel operation
- Short switching time enable frequency hopping
- Fully RF compatible with nRF24XX
- 5V tolerant signal input pads

- 20-pin package (QFN20 4x4mm)
- Uses ultra low cost +/- 60 ppm crystal
- Uses low cost chip inductors and 2-layer PCB
- Power supply range: 1.9 to 3.6 V

#### IV. FUTURE SCOPE

These devices have a great future scope. These can be used in making high end smart devices. It can also be used in industrial maintenance. For example: smart fridge, washing machines etc which will automatically sense their requirements and get it done via online shopping.

#### V. CONCLUSION

It can be concluded that the WEB UI BASED AUTOMATOR can simply take the online shopping to a whole new level by reducing the efforts of humans to shop their required material as the system automatically senses the necessary material by weighing it and shops it from a pre defines url.

#### ACKNOWLEDGMENT

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