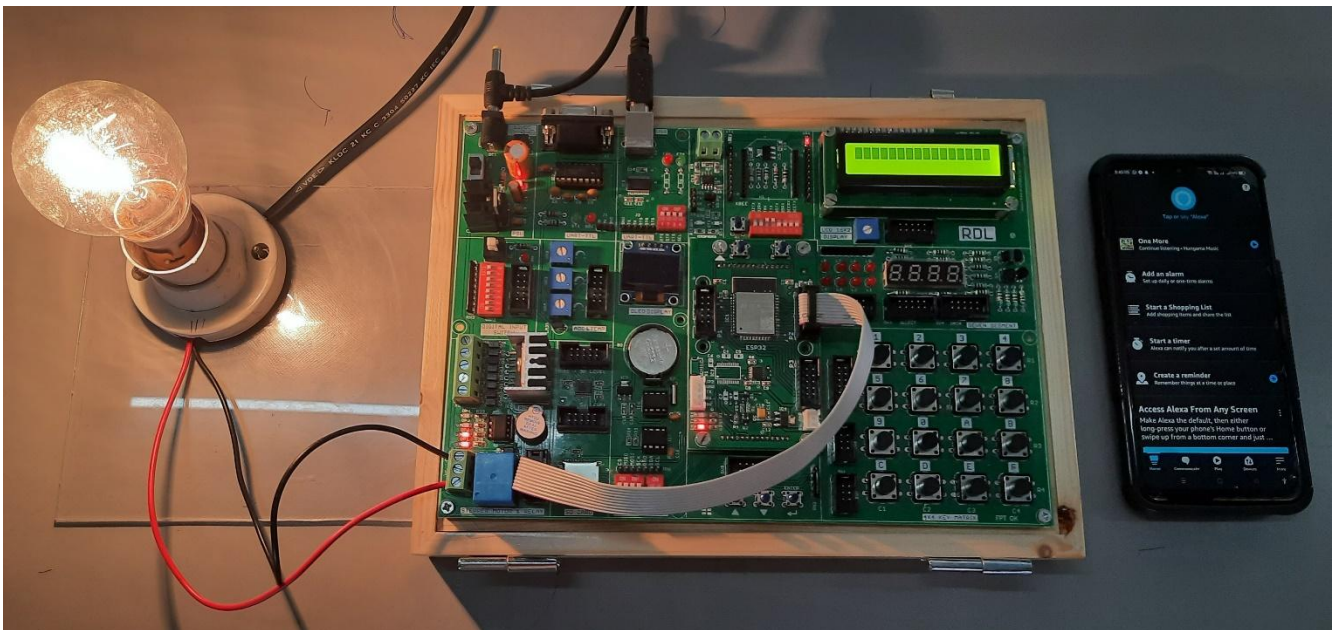


VOICE CONTROLLED APPLIANCES USING ALEXA AND ESP32 CONTROLLER



DOCUMENT VERSION: 1.0

- Switch off the supply voltage of this product as well as of attached devices before connecting or disconnecting them.
- Always use insulated tools while working.
- Do not touch any components of the board in open hand during power ON

Table of Contents

Contents

1.	INTRODUCTION	3
2.	LEARNING OBJECTIVE	3
3.	REQUIRED COMPONENTS	4
4.	REQUIRED CLOUD SERVICES	5
5.	BLOCK DIAGRAM	5
6.	PROCEDURE	6
6.1	: Setting up Adafruit IO:	6
6.2	: Setting up IFTTT:	12
6.3	: Setting up ESP32 Development Kit:	20
6.4	: Code:	20
6.5	: Setting up Amazon Alexa:	22
7.	RESULT	23

1. INTRODUCTION

How to interface Amazon Alexa to control Bulb. By using this OFF).

For more information about available in the link below.



to the ESP32 Development Board power can be controlled (ON /

ESP32 Development Kit is

<https://www.researchdesignlab.com/projects/ESP32%20User%20Manual-V1.0.pdf>

2. LEARNING OBJECTIVE

- How to interface MQTT protocol and how to use it.
- Creating Applets, Trigger and connecting to Amazon Alexa Account in IFTTT.
- How to use Amazon Alexa in Appliances.
- Alexa recognizes the speech and sends command to the Appliances .

3. REQUIRED COMPONENTSs



<p><u>ESP32 Development Board</u></p>	 An ESP32 development board housed in a gold-colored metal case with a green PCB. The board is populated with various components like resistors, capacitors, and integrated circuits.
<p><u>FRC Cable</u></p>	 A flat, grey ribbon cable with a red stripe, used for connecting the ESP32 board to other components.
<p><u>USB Cable</u></p>	 A blue USB-A to USB-B cable, used for programming the ESP32 board.
<p><u>Bulb</u></p>	 A clear glass incandescent light bulb mounted on a white, cylindrical base, which is part of the smart lighting system.
<p><u>Mobile Phone</u></p>	 A white smartphone, likely used for controlling the smart lighting system via an app.

4. REQUIRED CLOUD SERVICES

[Adafruit IO](#) :

To create manual setup to turn on and off the **Bulb**. **And it receives the data from IFTTT and sends the data to** ESP32 Development Kit. Its advantage is that it is an **Open Source**.

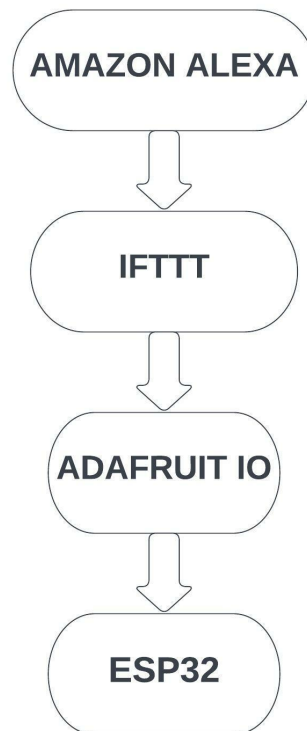
[IFTTT](#) :

To create the phrases and Feed data to Amazon Alexa. (Note: Only **5 Applets** are free to use. If you need more **Applets** you need to **Pay**)

[Amazon Alexa](#) :

To give voice commands to the **ESP32 Kit** to turn ON/OFF the **Bulb**. It is an **Open Source**.

5. BLOCK DIAGRAM

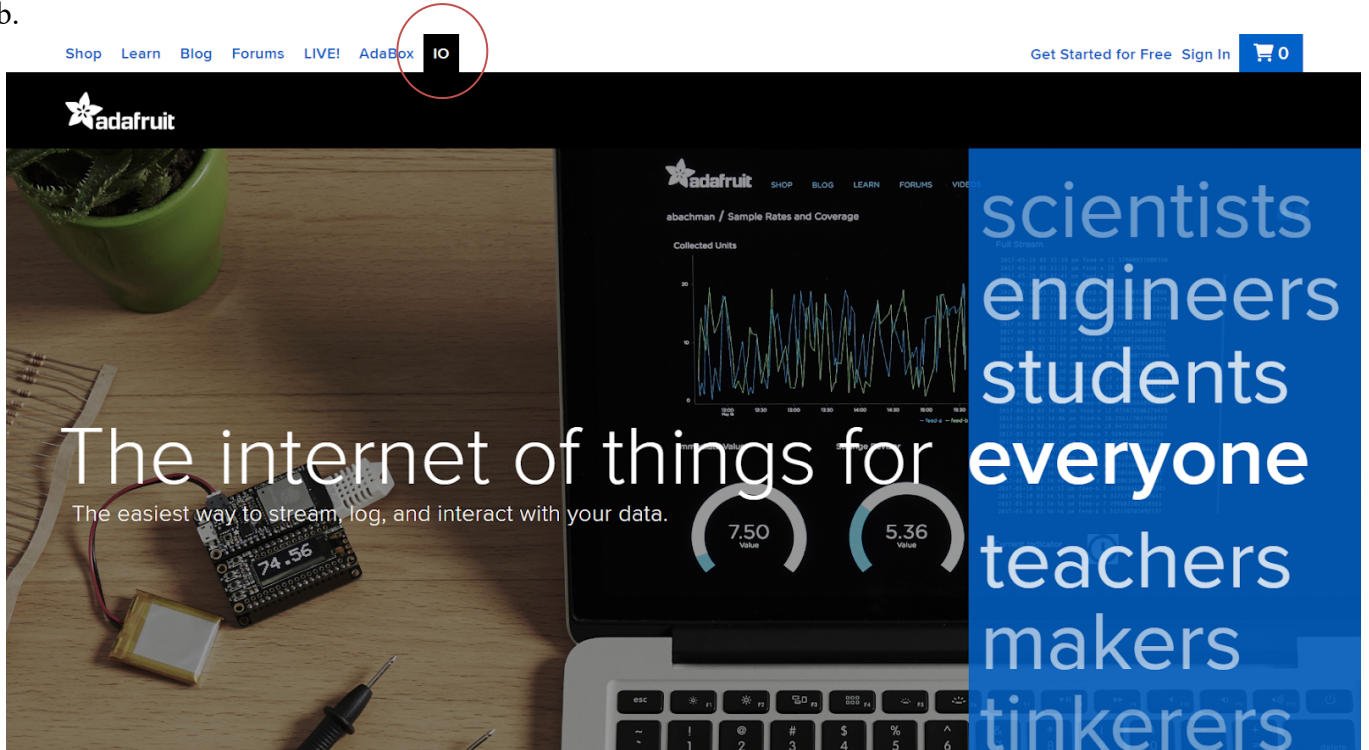


Working Block Diagram

6. PROCEDURE

6.1: Setting up Adafruit IO:

Open **Google Chrome** and Paste the URL ([Welcome to Adafruit IO](#)) given. Then click on **IO** Tab.



Scroll Down to Get Started For Free Account.

Our pricing is as simple as our API.

Try **Adafruit IO** for free. Unlock its full potential for \$10 per month.

Get Started	Power Up
FREE forever	\$10 or \$99 per month or per year
30 data points per minute 30 days of data storage Actions every 15 minutes 5 dashboard limit 2 WipperSnapper device limit 5 group limit 10 feed limit	60 data points per minute 60 days of data storage Actions every 5 seconds Unlimited dashboards Unlimited WipperSnapper devices Unlimited groups Unlimited feeds Learn more about IO+
Sign Up Now	Sign Up Now

Sign Up for creating a New Account .

SIGN UP

The best way to shop with Adafruit is to create an account which allows you to shop faster, track the status of your current orders, review your previous orders and take advantage of our other member benefits.

FIRST NAME

XXXXXXXXXX

LAST NAME

XXXXXXXXXX

EMAIL

XXXXXXXXXXXX@XXXX.COM



USERNAME

XXXXXXXXXX



Username is viewable to the public on the forums, Adafruit IO, and elsewhere.

PASSWORD

.....

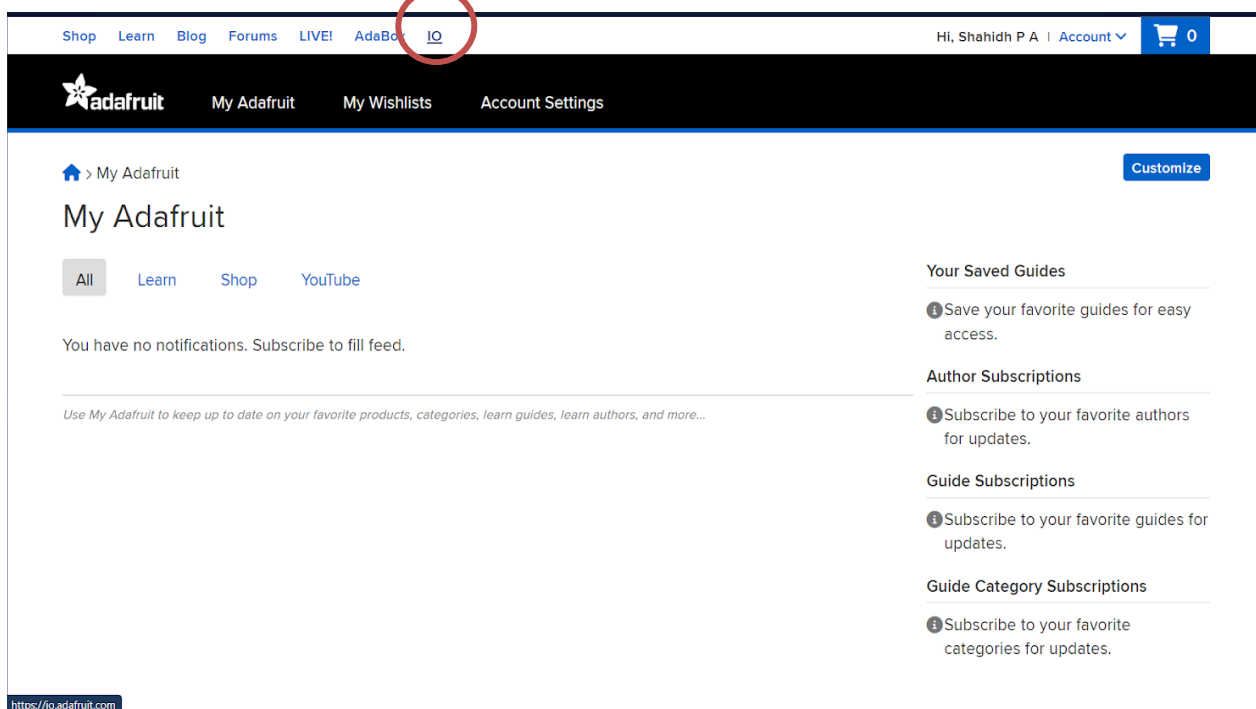


CREATE ACCOUNT

HAVE AN ADAFRUIT ACCOUNT?

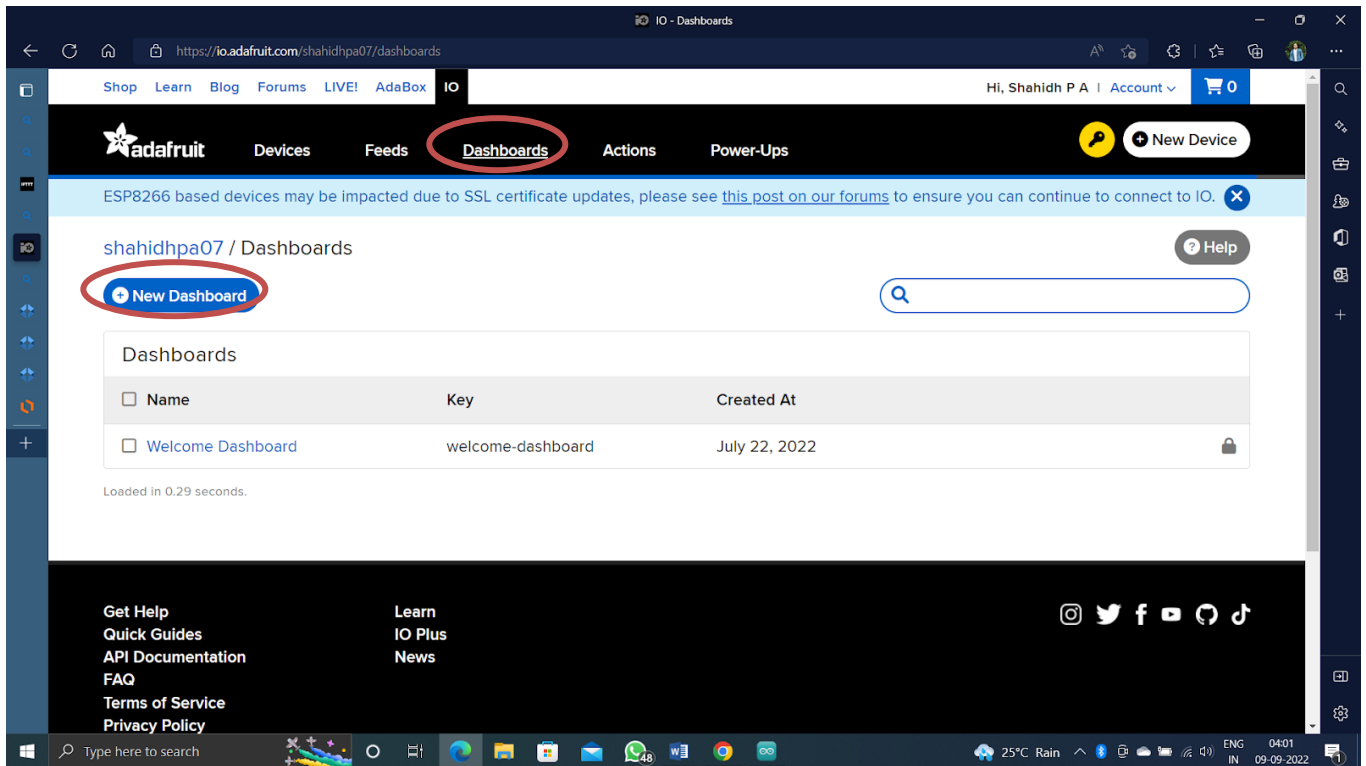
SIGN IN

After signing in this page will be displayed and go to **IO** Tab.



The screenshot shows the user profile page on the Adafruit IO website. At the top, the navigation bar includes links for Shop, Learn, Blog, Forums, LIVE!, AdaBot, and **IO** (which is circled in red). The user's name "Hi, Shahidh P A" and account options are visible. Below the navigation bar, the page title is "My Adafruit" with a "Customize" button. The main content area shows "All", "Learn", "Shop", and "YouTube" tabs. A message states "You have no notifications. Subscribe to fill feed." Below this is a promotional text: "Use My Adafruit to keep up to date on your favorite products, categories, learn guides, learn authors, and more...". On the right side, there are sections for "Your Saved Guides", "Author Subscriptions", "Guide Subscriptions", and "Guide Category Subscriptions", each with a brief description and a plus icon for adding items.

Next click on **Dashboards** and click on **New Dashboards**.



ESP8266 based devices may be impacted due to SSL certificate updates, please see [this post on our forums](#) to ensure you can continue to connect to IO. X

shahidhpa07 / Dashboards Help

New Dashboard

Name	Key	Created At
Welcome Dashboard	welcome-dashboard	July 22, 2022

Loaded in 0.29 seconds.

Get Help
Quick Guides
API Documentation
FAQ
Terms of Service
Privacy Policy

Learn
IO Plus
News

25°C Rain 0401 IN 09-09-2022

Then Name and Describe the **Dashboard** and Create it.

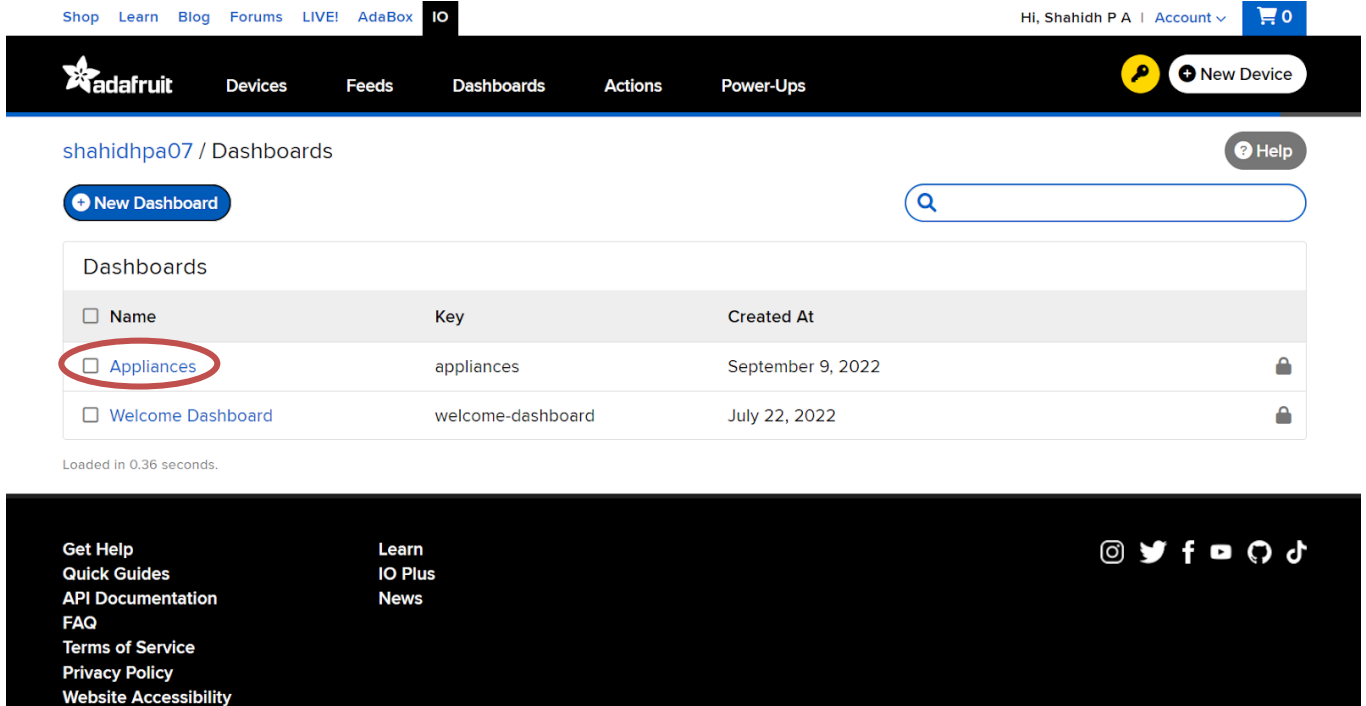
Create a new Dashboard X

Name

Description

Cancel **Create**

Now there is a **Dashboard** named as **Appliances**. Then click on the **Appliances Dashboard**.






The screenshot shows the Adafruit website interface. At the top, there is a navigation bar with links for Shop, Learn, Blog, Forums, LIVE!, AdaBox, and IO. The user is logged in as 'Hi, Shahidh P A' with an account dropdown and a shopping cart icon showing 0 items. Below the navigation bar, there is a main menu with 'adafruit' logo and links for Devices, Feeds, Dashboards, Actions, and Power-Ups. A 'New Device' button is also visible. The main content area shows the user's profile 'shahidhpa07 / Dashboards' and a 'New Dashboard' button. A search bar is present. Below this is a table of dashboards:


<input type="checkbox"/> Name	Key	Created At	
<input type="checkbox"/> Appliances	appliances	September 9, 2022	
<input type="checkbox"/> Welcome Dashboard	welcome-dashboard	July 22, 2022	

Below the table, it says 'Loaded in 0.36 seconds.' At the bottom of the page, there is a footer with links for Get Help, Quick Guides, API Documentation, FAQ, Terms of Service, Privacy Policy, Website Accessibility, Learn, IO Plus, and News. Social media icons for Instagram, Twitter, Facebook, YouTube, and TikTok are also present.









Then go to the **Settings** button and create a **Create New Block**.

Shop Learn Blog Forums LIVE! AdaBox IO Account  0

 Devices Feeds Dashboards Actions Power-Ups 


shahidhpa07 / Dashboards / Appliances 

Dashboard Settings

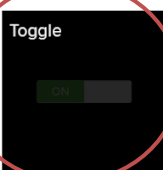
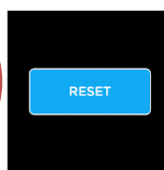



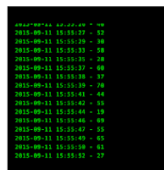


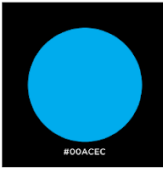

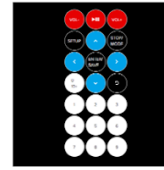

-  Edit Layout
-  **Create New Block**
-  View Fullscreen
- Dark Mode  on
- Block Borders  on
- Dashboard Privacy  
-  Delete Dashboard

Get Help Learn
Quick Guides IO Plus
API Documentation News
FAQ
Terms of Service
Privacy Policy
Website Accessibility

Select any **Block** (For example **Toggle**)

Create a new block 

Click on the block you would like to add to your dashboard. You can always come back and switch the block type later if you change your mind.

Next **Enter New Feed Name**. For Example **Bulb**. Then click on **Enter**. Then click on the Feed named **Bulb** and click on the **Next Step** as shown in the image below.

Connect a Feed ✕

A toggle button is useful if you have an ON or OFF type of state. You can configure what values are sent on press and release.

Choose a single feed you would like to connect to this toggle. You can also create a new feed within a group.

🔍

Default ▼

Feed Name	Last value	Recorded	
<input type="checkbox"/> Welcome Feed		about 2 months	🔒
<input style="border: 1px solid red;" type="text" value="Bulb"/>			

0 of 1 feeds selected

< Previous step
Next step >

Change the **Button On Text** to **1** and **Button of Text** to **0**. Change the **Test Value** as **0**. Then Create Block.

Block Title (optional)

Button On text ON

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button On Value (uses On Text if blank)

Button Off text OFF

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button Off Value (uses Off Text if blank)

Test Value 45

Published Value

0 bytes

< Previous step
Create block

Block Title (optional)

Button On text 1

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button On Value (uses On Text if blank)

Button Off text 0

Limit of 6 characters for the toggle text. Use the block title to be more descriptive.

Button Off Value (uses Off Text if blank)

Test Value 0

Published Value

0 bytes

< Previous step
Create block

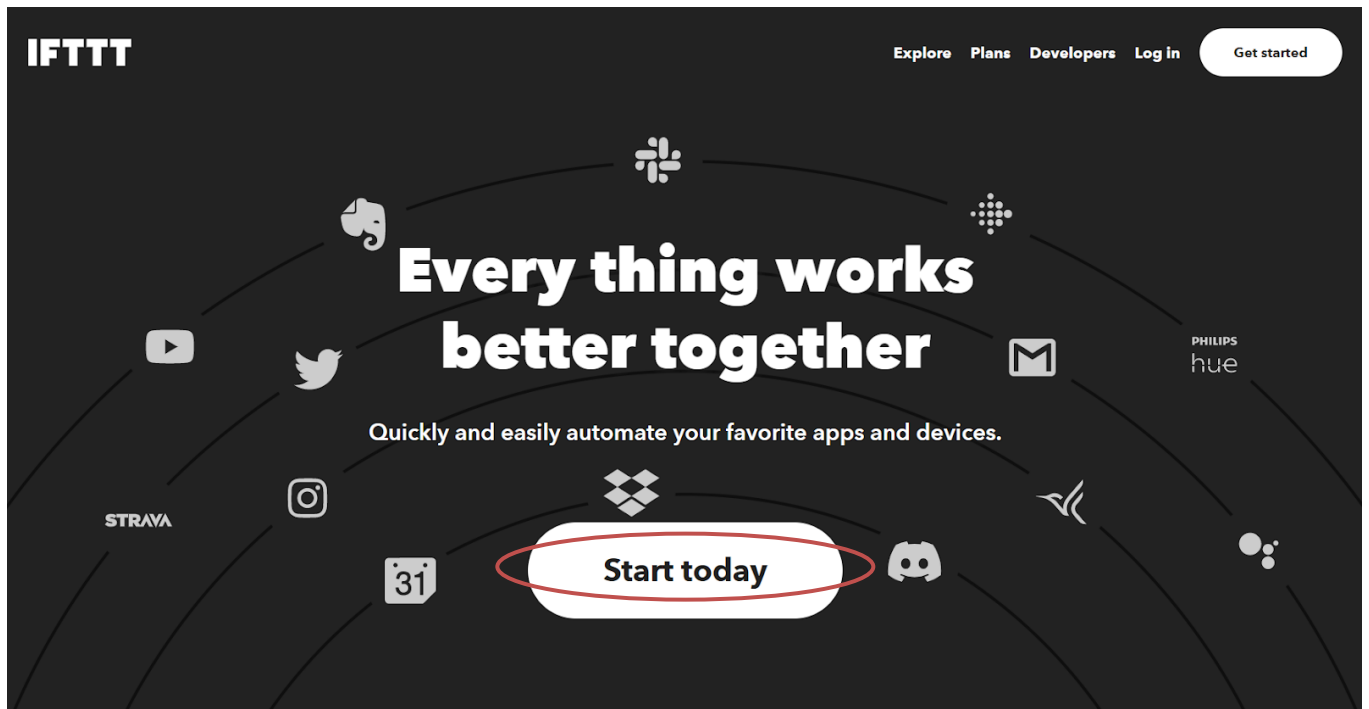
Similarly **Create New Block** for another **Toggle** if you need.



The procedures of **Adafruit IO** is completed.

6.2: Setting up IFTTT:

Open the Google Chrome and paste the URL for IFTTT (<https://ifttt.com/>). Click on **Start today**.



Then **Continue with Google** to create an account. Then sign in with credentials (Create Amazon Account if needed and sign in).

Get started with IFTTT



Continue with Apple



Continue with Google



Continue with Facebook

Or use your email to [sign up](#) or [log in](#)

Then the Home Page will open and then Click on **Create**.

IFTTT

Welcome to IFTTT

My Applets Explore Developers

Upgrade

Create



Explore

All

Applets

Services

Stories

Q Search Applets or services



Get an email if it

Get an email with

Click on **Add**.

Cancel

Create



Have questions? Get support from our friendly team with IFTTT Pro. [Upgrade](#)

You're using 0 of 5 Applets

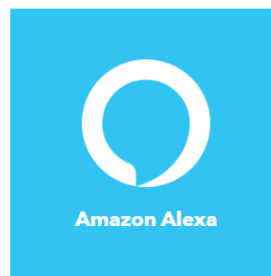
If This

Add

Then That

Then choose a service as **Amazon Alexa**.

Choose a service

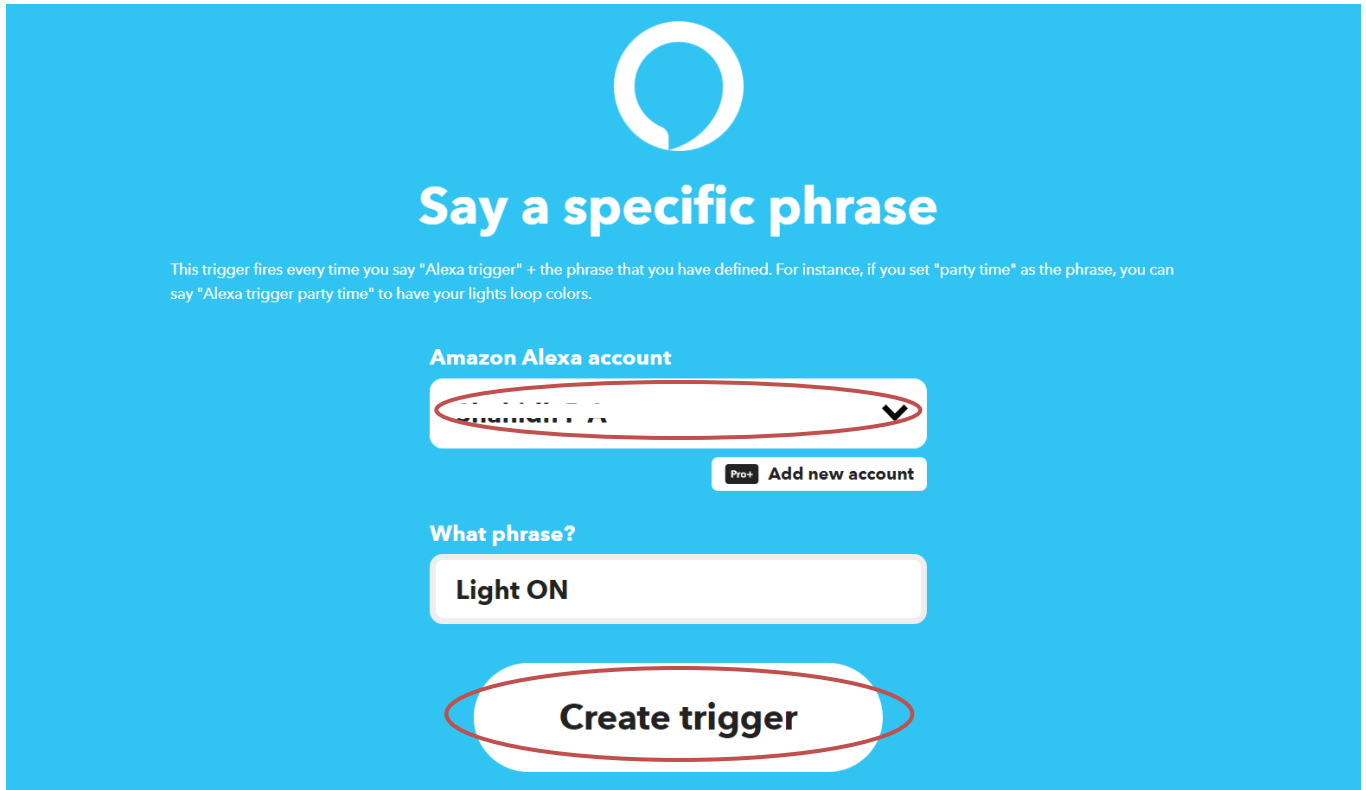


Choose a Trigger “Say a Specific Phrase”



- Say a specific phrase**
This trigger fires every time you say "Alexa trigger" + the phrase that you have defined. For instance, if you set "party time" as the phrase, you can say "Alexa trigger party time" to have your lights loop colors.
- Ask what's on your To Do List**
This Trigger fires every time the you ask Alexa what's on your To Do List.
- Item added to your To Do List**
This Trigger fires every time you add an item to your To Do List.
- Item completed on your To Do List**
This Trigger fires every time you complete an item on your To Do List.

Select the **Amazon Alexa Account** and name a phrase for the trigger and **Create Trigger**.



Say a specific phrase

This trigger fires every time you say "Alexa trigger" + the phrase that you have defined. For instance, if you set "party time" as the phrase, you can say "Alexa trigger party time" to have your lights loop colors.

Amazon Alexa account

Account A ✓

Pro+ Add new account

What phrase?

Light ON

Create trigger

Click on **Add**

You're using 0 of 5 Applets



The screenshot shows a visual programming interface for an Alexa skill. At the top, a blue bar contains an 'If' condition with a microphone icon and the text 'Say a specific phrase'. To the right of this bar are 'Edit' and 'Delete' options. Below the blue bar is a plus sign in a circle. Underneath that is a black bar with the text 'Then That' in large white letters. To the right of 'Then That' is a white button with the text 'Add'. A red oval highlights the 'Then That' bar.

Choose a service as Adafruit.

Choose a service



Select "Send data to Adafruit IO"

Choose an action



Adafruit

Send data to Adafruit IO

This Action will send data
to a feed in your Adafruit
IO account.



**Suggest a new
action**

Select the **Adafruit Account**, then Select the **Feed Name** and **Data to save as 1**.

Send data to Adafruit IO

This Action will send data to a feed in your Adafruit IO account.

Adafruit account

Pro+ Add new account

Feed name

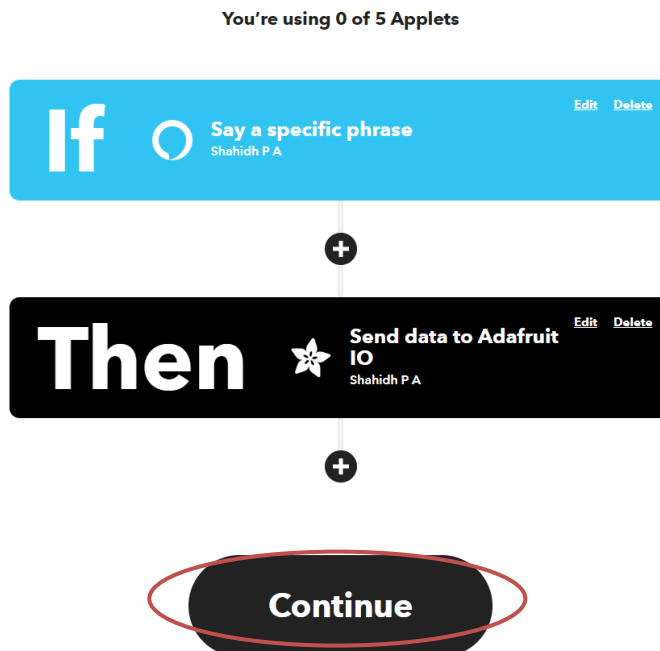
The name of the feed to save data to.

Data to save

The data to be saved to your feed. Add ingredient

Create action

Then Click **Continue** button.



Turn on **Receive notification when this Applets runs**. Then click on **Finish** button.

Review and finish



Applet Title

If You say "Alexa trigger Light ON", then Send data to Appliance feed

by shahidhpa07 69/140

Receive notifications when this Applet runs

Finish

Then Light ON will be connected.



If You say "Alexa trigger Light ON", then Send data to Appliance feed

[Edit title](#)

by shahidhpa07

Connected

Similarly create another trigger for **Light OFF** (Put **0** instead of **1** in **Data to save**). And see the results in **My Applets**.

My Applets

All (2 of 5) Published Archive

[Get Pro to get 20 Applets](#)

If You say "Alexa trigger Light OFF", then Send data to Appliance feed

by shahidhpa07

Connected

1

If You say "Alexa trigger Light ON", then Send data to Appliance feed

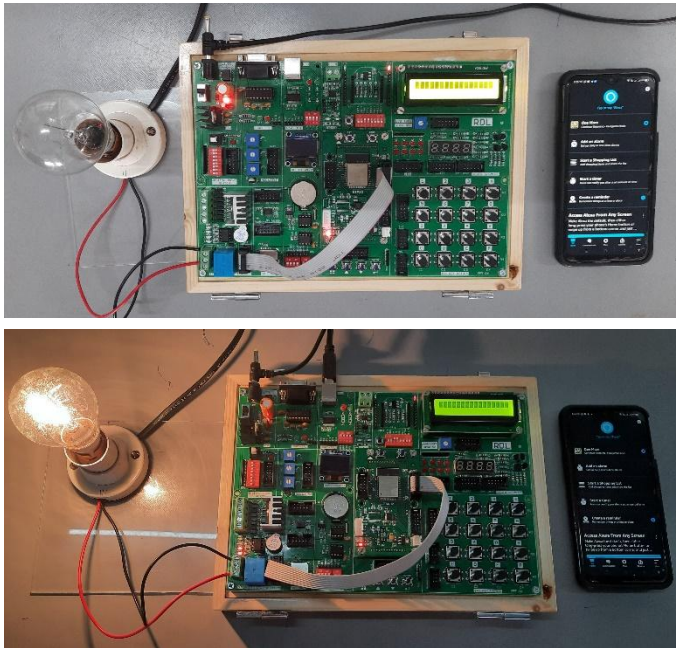
by shahidhpa07

Connected

1

The procedure for IFTTT is completed. And then take the ESP32 Development board and connect Light to that board.

6.3: Setting up ESP32 Development Kit:



1. Connect Bulb for the Setup as shown above.
2. Connect the USB cable to the board.
3. Open Arduino IDE. Select DOIT ESP32 DEVKIT V1 in boards and select COM port.
4. Now write the program, verify and Upload it.
5. Now you can see the Bulb blink on and off the ESP32 development board.

6.4: CODE

```
#include <WiFi.h>
#include <Adafruit_MQTT.h>
#include <Adafruit_MQTT_Client.h>

#define light          5

#define WLAN_SSID      "xxxxxxxxxx"           // Your SSID
#define WLAN_PASS      "xxxxxxxxxx"         // Your password

/***** Adafruit.io Setup *****/

#define AIO_SERVER      "io.adafruit.com" //Adafruit Server
#define AIO_SERVERPORT 1883
#define AIO_USERNAME    "xxxxxxxxxx"        // Username
```

```
#define AIO_KEY "aio_XXXXXXXXXXXXXXXXXXXXXXXXXXXX" // Auth Key
/*AIO_USERNAME AND AIO_KEY will be getting from Adafruit IO by clicking on Key
Symbol.*/
//WIFI CLIENT
WiFiClient client;

Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME,
AIO_KEY);

Adafruit_MQTT_Subscribe Light1 = Adafruit_MQTT_Subscribe(&mqtt,
AIO_USERNAME"/feeds/Appliance"); // Feeds name should be same everywhere

void MQTT_connect();

void setup() {
  Serial.begin(115200);

  pinMode(light, OUTPUT);

  // Connect to WiFi access point.
  Serial.println(); Serial.println();
  Serial.print("Connecting to ");
  Serial.println(WLAN_SSID);

  WiFi.begin(WLAN_SSID, WLAN_PASS);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println();

  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());

  mqtt.subscribe(&Light1);
  mqtt.subscribe(&Light2);
}

void loop() {

  MQTT_connect();

  Adafruit_MQTT_Subscribe *subscription;
  while ((subscription = mqtt.readSubscription(20000)) {
    if (subscription == &Light1) {
      Serial.print(F("Got: "));
      Serial.println((char *)Light1.lastread);
      int Light1_State = atoi((char *)Light1.lastread);
      digitalWrite(light, Light1_State);
    }
  }
```



```

}

}

void MQTT_connect() {
  int8_t ret;

  if (mqtt.connected()) {
    return;
  }

  Serial.print("Connecting to MQTT... ");

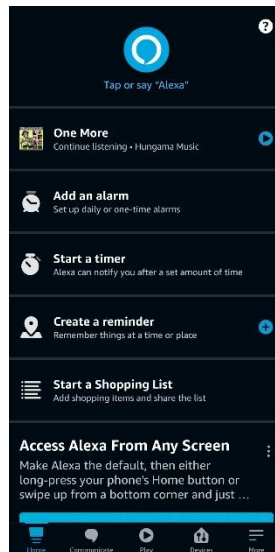
  uint8_t retries = 3;

  while ((ret = mqtt.connect()) != 0) {
    Serial.println(mqtt.connectErrorString(ret));
    Serial.println("Retrying MQTT connection in 5 seconds...");
    mqtt.disconnect();
    delay(5000);
    retries--;
    if (retries == 0) {
      while (1);
    }
  }
  Serial.println("MQTT Connected!");
}

```

6.5: Setting up Amazon Alexa:

Install Amazon Alexa Application on your mobile phone using the same credentials you are given previous. Tap or say “Alexa” for example “Alexa, Trigger Light ON”. One of the Bulb will turn on and repeat the same for the other Bulb as well.



7. RESULT

Click on Serial Monitor on Arduino IDE and set the Baud Rate to 115200.

Output Serial Monitor ×

Message (Ctrl + Enter to send message to 'DOIT ESP32 DEVKIT V1' on 'COM4')

```
Connecting to realme5pro
.....
WiFi connected
IP address:
192.168.239.132
Connecting to MQTT... MQTT Connected!
Got: 1
Got: 0
```

