Unit Scroll Home Assistant Integration

This tutorial introduces how to use the **Unit Scroll** wheel-style rotary encoder extension unit with a CoreS3 controller and integrate it into Home Assistant to monitor encoder values, switch button states, and control RGB lighting.

Preparation

1. Hardware List

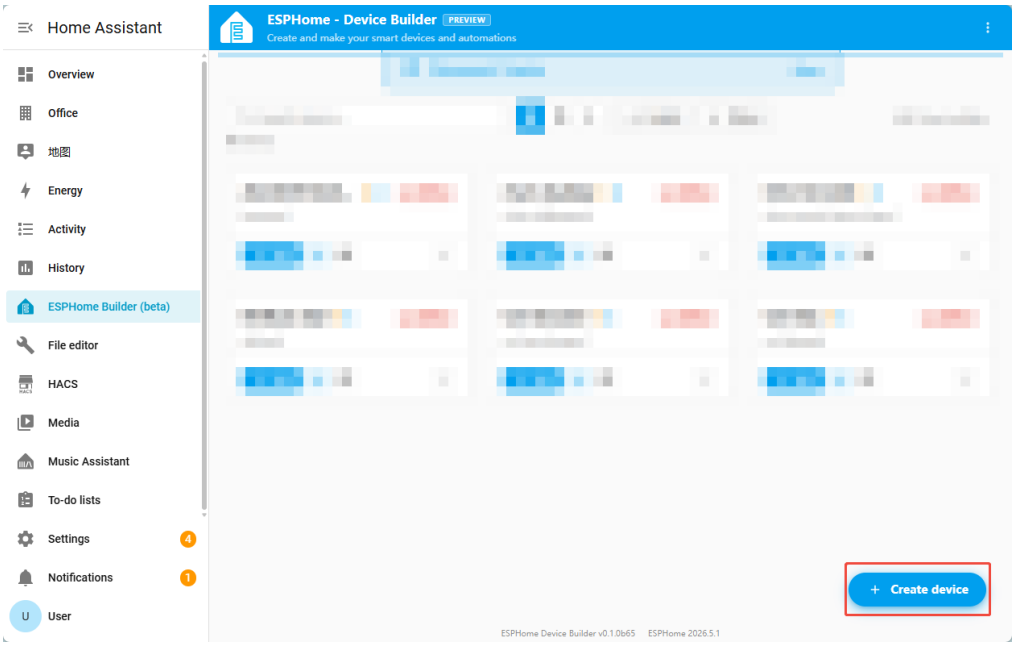
- 1 x Unit Scroll
- 1 x CoreS3
- 1 x HY2.0-4P Grove Cable (20cm)
- 1 x Home Assistant host (server, mini PC, NAS, etc.)

2. Software and Versions

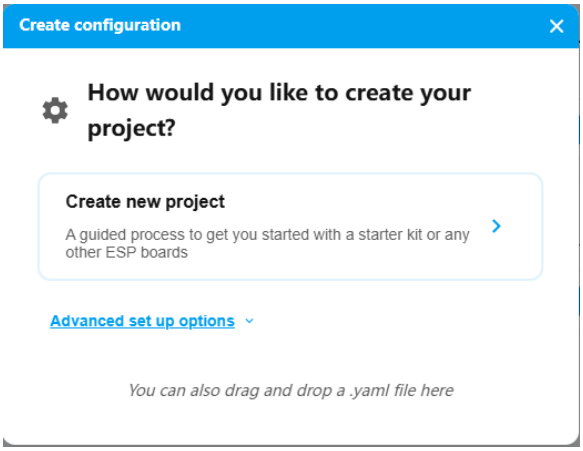
- Home Assistant 2026.2.0 or later
- ESPHome Device Builder 2026.2.2 or later

Create Device

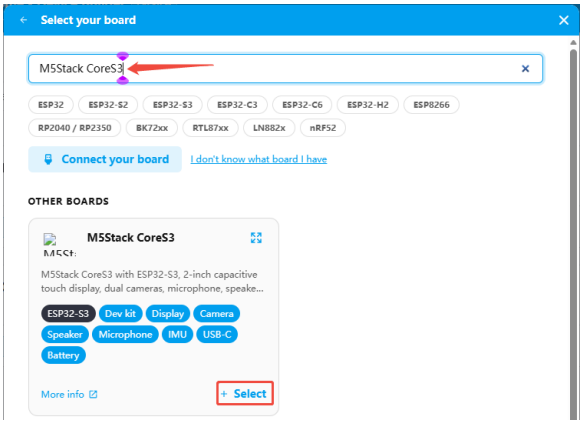
1. Open ESPHome Builder and click the blue **+Create device** button in the lower-right corner to start creating a new device.



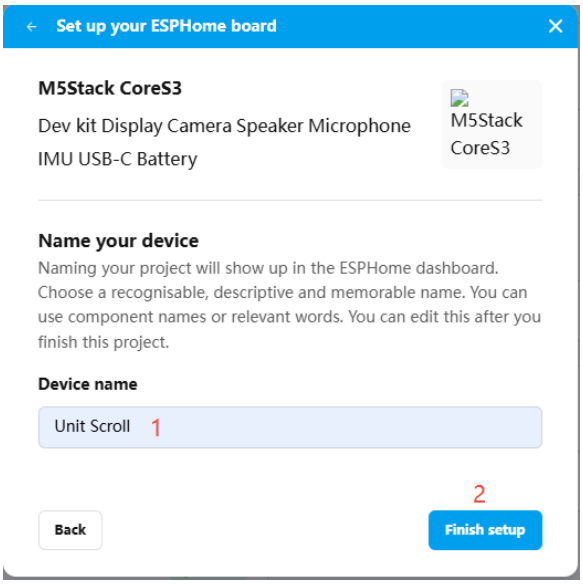
2. Click `Create new project` to enter the device creation wizard.



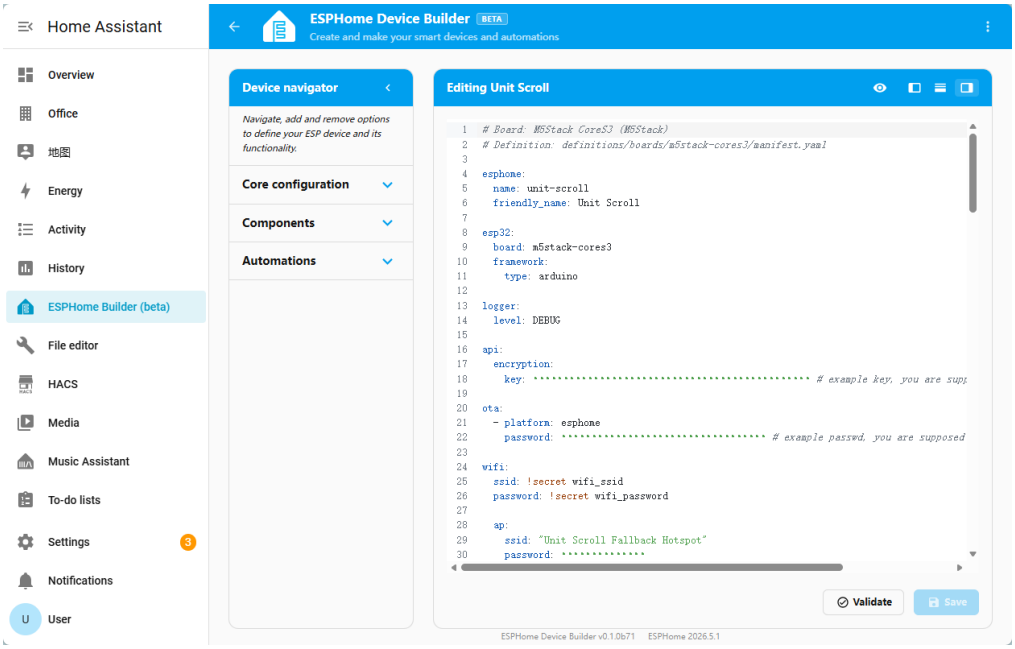
3. Enter a device name in the search bar, such as M5Stack CoreS3, then click `+Select`.



4. Enter the device name `Unit Scroll`, then click `Finish setup`.



5. The YAML configuration page will open automatically, where you can customize the device functions.



Modify Configuration

External Component Configuration

Add the External component to load the Unit Scroll custom component:

```yaml
external_components:
  - source: github://m5stack/esphome-yaml/components
    components: unit_scroll
    refresh: 0s

unit_scroll:
  id: my_scroll
  i2c_id: grove_i2c
  address: 0x40
  direction: true # false = clockwise increases value, true = counterclockwise increases value
  rgb_red: 0
  rgb_green: 255
  rgb_blue: 0
```

Main parameter descriptions:

Parameter	Value	Description
`id`	my_scroll	Unit Scroll component ID, used by subsequent sensors, outputs, and Lambda calls.
`i2c_id`	grove_i2c	Bound I2C bus ID.
`address`	0x40	Default I2C address of Unit Scroll.
`direction`	true	Encoder counting direction, adjustable according to the actual rotation direction.
`rgb_red` / `rgb_green` / `rgb_blue`	0 / 255 / 0	Initial RGB LED color after power-on.

I2C Bus Configuration

Add the I2C component to configure the communication pins between Unit Scroll and CoreS3.

```yaml
i2c:
  - id: grove_i2c
    sda: GPIO2
    scl: GPIO1
    scan: true
```

Note

The PORT.A interface of CoreS3 corresponds to SDA: GPIO2 and SCL: GPIO1. If you use another port, adjust it according to the actual pins.

Global Variable Configuration

Add the Globals component to save the enabled state of the RGB LED:

```
globals:
  - id: scroll_led_enabled
    type: bool
    restore_value: false
    initial_value: 'true'
```

Polling and Lighting Control

Add the Interval component to periodically read the encoder value and button state, and update the RGB color according to the encoder value. Pressing the Unit Scroll button toggles the RGB LED on/off.

```yaml
interval:
  - interval: 100ms
    then:
      - lambda: |-
          static bool last_button = false;
          static uint16_t last_value = 0;
          static bool has_last_value = false;

          bool button = id(my_scroll).get_button_state();
          bool led_toggled = false;
          if (button && !last_button) {
            id(scroll_led_enabled) = !id(scroll_led_enabled);
            led_toggled = true;
            if (!id(scroll_led_enabled)) {
              auto call = id(scroll_rgb_led).turn_off();
              call.perform();
            }
            ESP_LOGI("unit_scroll_demo", "RGB LED is now %s", id(scroll_led_enabled) ? "ON" : "OFF");
          }
          last_button = button;

          uint16_t value = id(my_scroll).get_value();
          id(scroll_encoder_value).publish_state(value);
          bool value_changed = !has_last_value || value != last_value;

          uint8_t position = static_cast<uint8_t>(value & 0xFF);
          uint8_t region = position / 43;
          uint8_t remainder = (position - (region * 43)) * 6;
          uint8_t p = 0;
          uint8_t q = 255 - remainder;
          uint8_t t = remainder;
          uint8_t r = 0;
          uint8_t g = 0;
          uint8_t b = 0;

          switch (region) {
            case 0: r = 255; g = t; b = p; break;
            case 1: r = q; g = 255; b = p; break;
            case 2: r = p; g = 255; b = t; break;
            case 3: r = p; g = q; b = 255; break;
            case 4: r = t; g = p; b = 255; break;
            default: r = 255; g = p; b = q; break;
          }

          if (id(scroll_led_enabled) && (value_changed || led_toggled)) {
            auto call = id(scroll_rgb_led).turn_on();
            call.set_rgb(r / 255.0f, g / 255.0f, b / 255.0f);
            call.perform();
          }

          if (value_changed) {
            ESP_LOGD("unit_scroll_demo", "Encoder %u -> RGB(%u, %u, %u), RGB LED %s", value, r, g, b,
                     id(scroll_led_enabled) ? "on" : "off");
```

```
            last_value = value;
            has_last_value = true;
          }
```

Sensor Configuration

Add the Sensor component to publish the encoder value to Home Assistant.

```yaml
sensor:
  - platform: template
    id: scroll_encoder_value
    name: "Encoder Value"
    icon: mdi:rotate-right
    accuracy_decimals: 0
    update_interval: never
```

Main parameter descriptions:

Parameter	Value	Description
`platform`	template	Uses a template sensor to receive the encoder value published in the Lambda.
`id`	scroll_encoder_value	Used by the Lambda to publish state.
`name`	Encoder Value	Entity name displayed in Home Assistant.
`update_interval`	never	Does not poll automatically; actively updated by the Lambda in `interval`.

Output Configuration

Add the Output component to expose the three RGB channels of Unit Scroll as outputs.

```yaml
output:
  - platform: unit_scroll
    id: scroll_rgb_red_output
    unit_scroll_id: my_scroll
    channel: rgb_red

  - platform: unit_scroll
    id: scroll_rgb_green_output
    unit_scroll_id: my_scroll
    channel: rgb_green

  - platform: unit_scroll
    id: scroll_rgb_blue_output
    unit_scroll_id: my_scroll
    channel: rgb_blue
```

Light Configuration

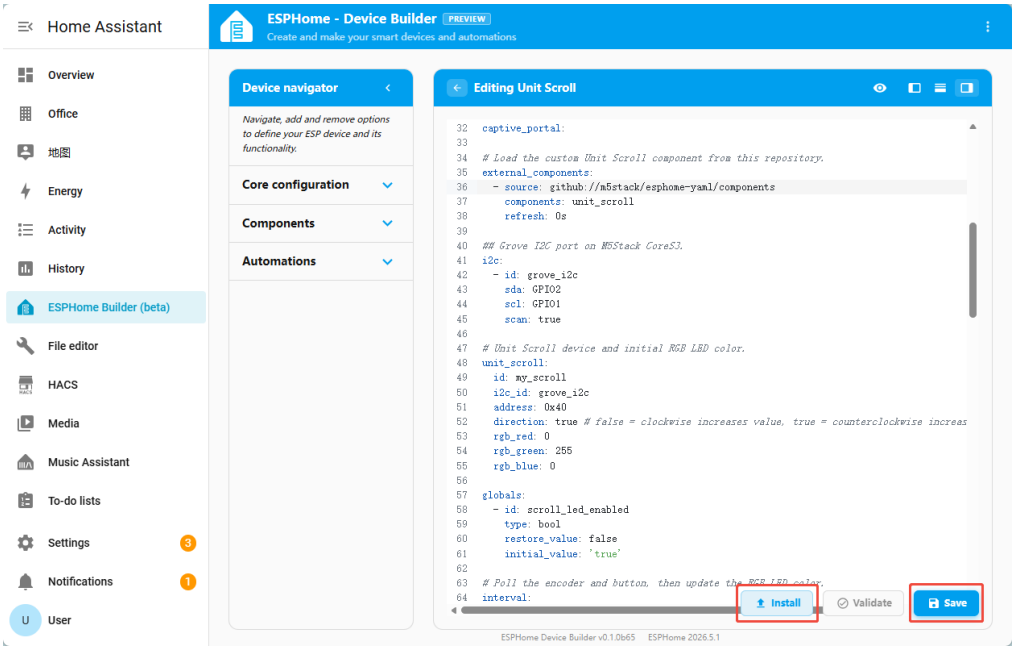
Add the Light component to combine the three RGB outputs into one RGB light entity.

```yaml
light:
  - platform: rgb
    id: scroll_rgb_led
    name: "RGB LED"
    red: scroll_rgb_red_output
    green: scroll_rgb_green_output
    blue: scroll_rgb_blue_output
    restore_mode: ALWAYS_OFF
    default_transition_length: 0s
```

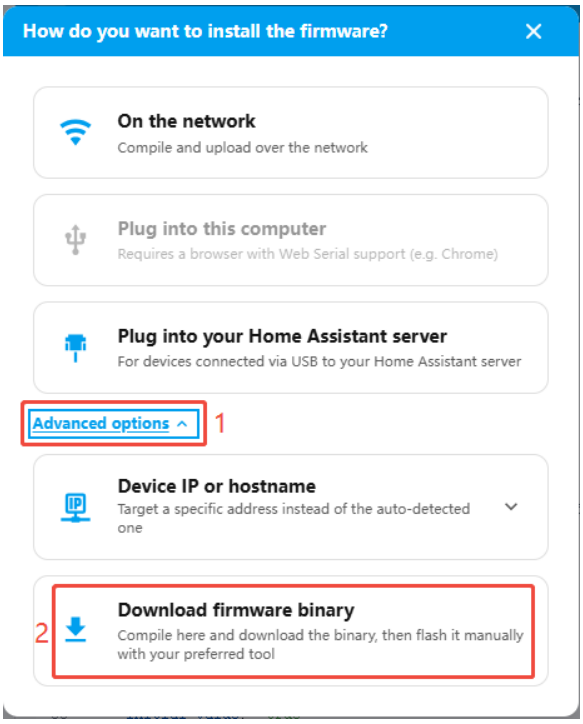
Download and Flash Firmware

Compile Firmware

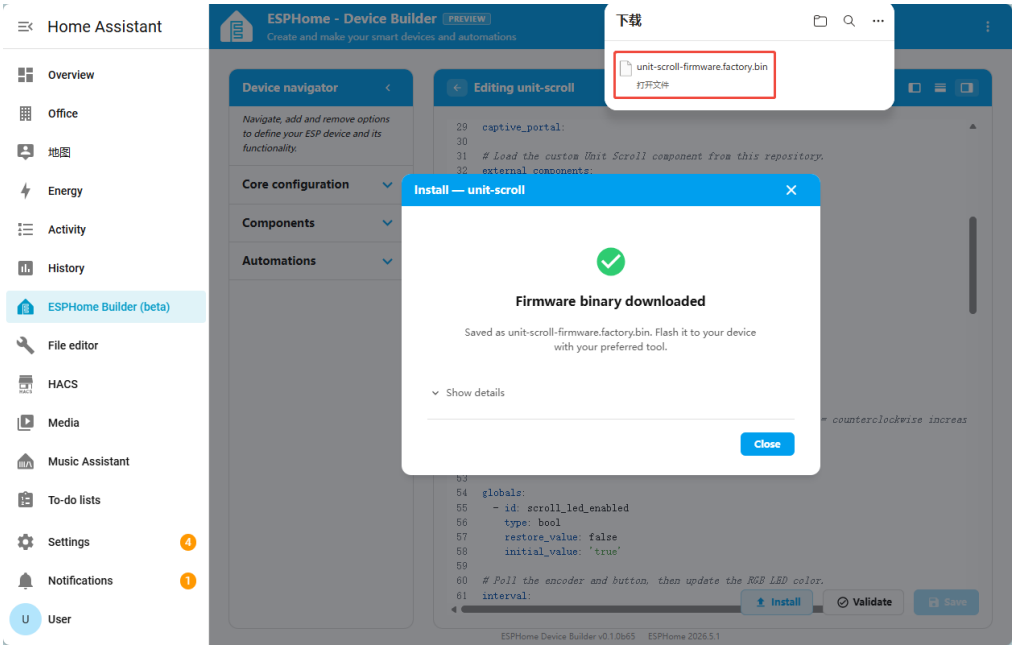
1. After completing the YAML modifications, click `Save` in the lower-right corner to save the configuration, then click `Install`.



2. In the pop-up window, expand `Advanced options`, then click `Download firmware binary`.

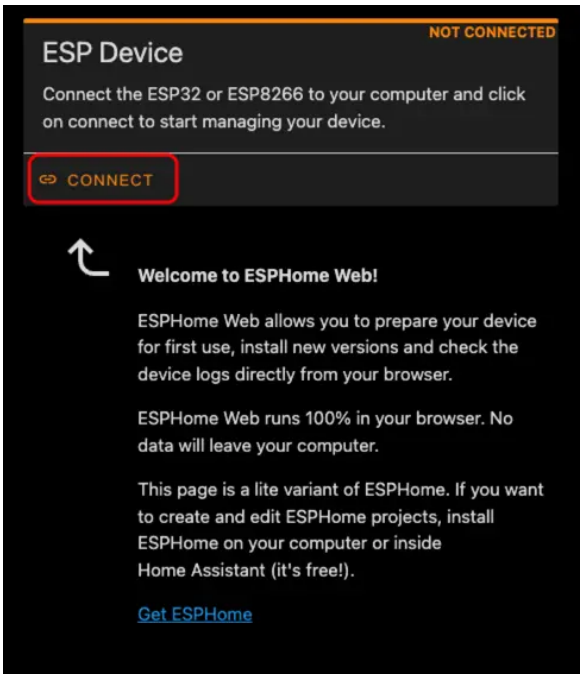


3. Wait for the firmware compilation to complete. The firmware will be automatically saved locally.

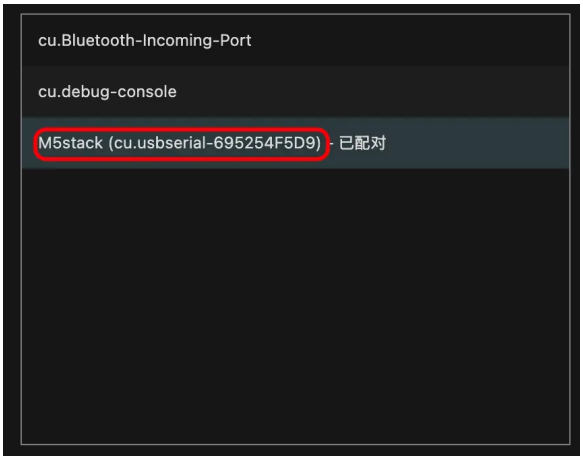


Flash Firmware

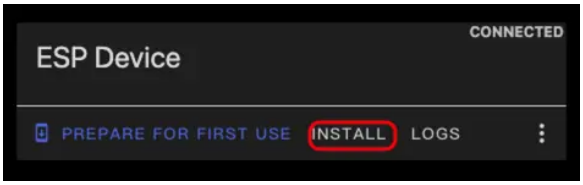
1. Connect CoreS3 to the computer using a USB Type-C cable. Open ESPHome Web and click `CONNECT`.



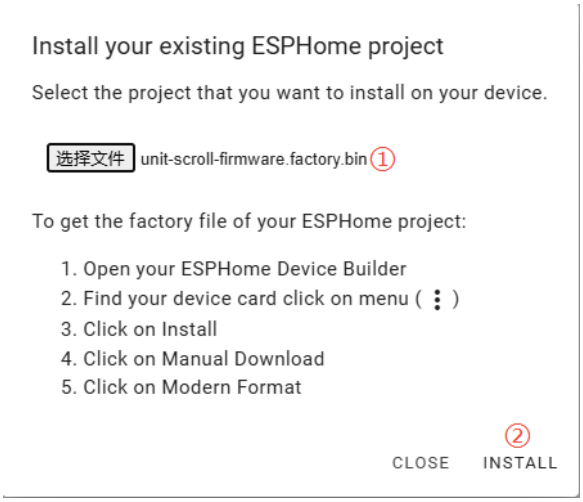
2. In the pop-up serial port selection window, select the correct serial port.



3. Click `INSTALL`.



4. Select the firmware file downloaded in step 3 of the firmware compilation process and start flashing.

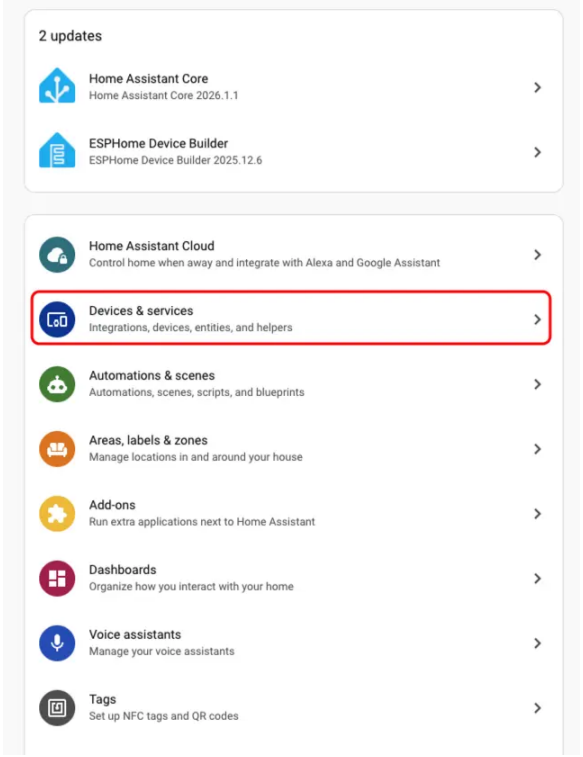


Note

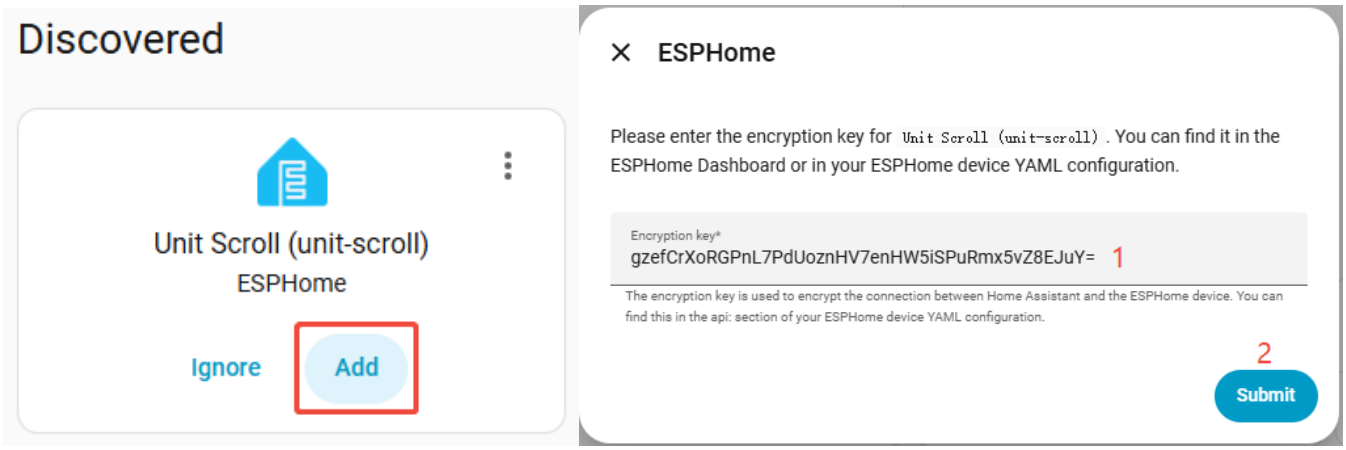
After flashing is complete, you must reset the device; otherwise, the firmware may not start properly.

Start Using

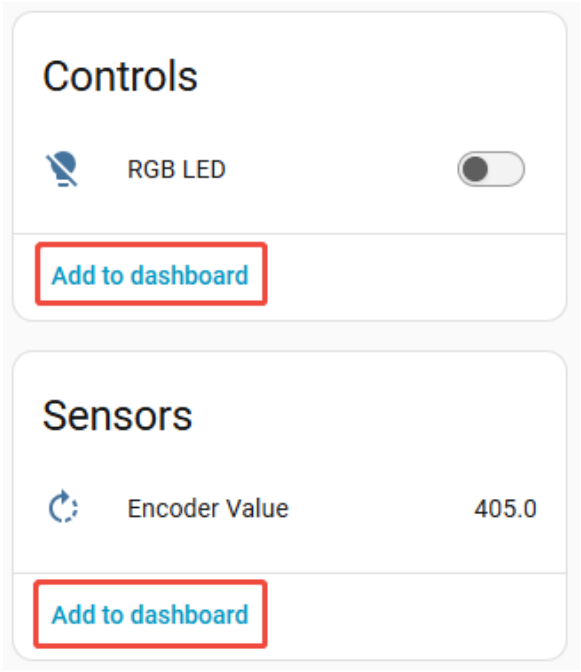
1. In Home Assistant, click `Settings` > `Devices & Services` in order to enter the integration management page.



2. Find the **Unit Scroll** device in the `Discovered` area, click `Add`, then enter the Encryption Key from the YAML configuration and click `Submit`.



3. After the device is added, you can see entities such as the encoder value and RGB LED on the device details page, along with their real-time states.



4. Finally, add these entities to the dashboard to view the encoder value in real time and control the RGB LED of Unit Scroll.