



RGB LED Lighting Pattern Workshop User's Guide

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1. Development Board Overview

1.1 HT45F0060 Development Board

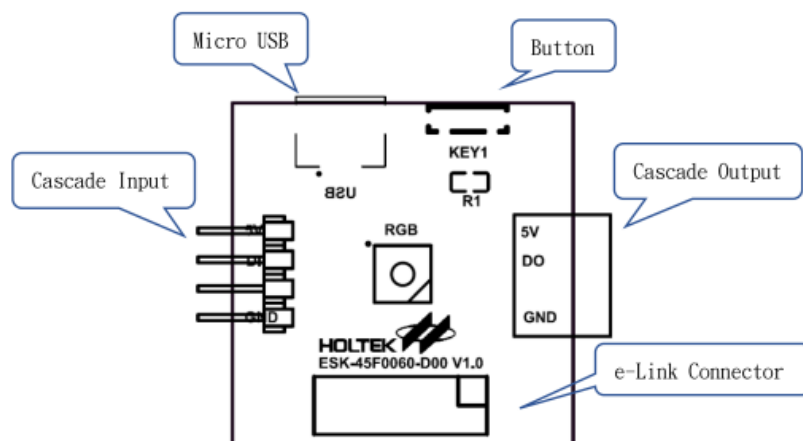
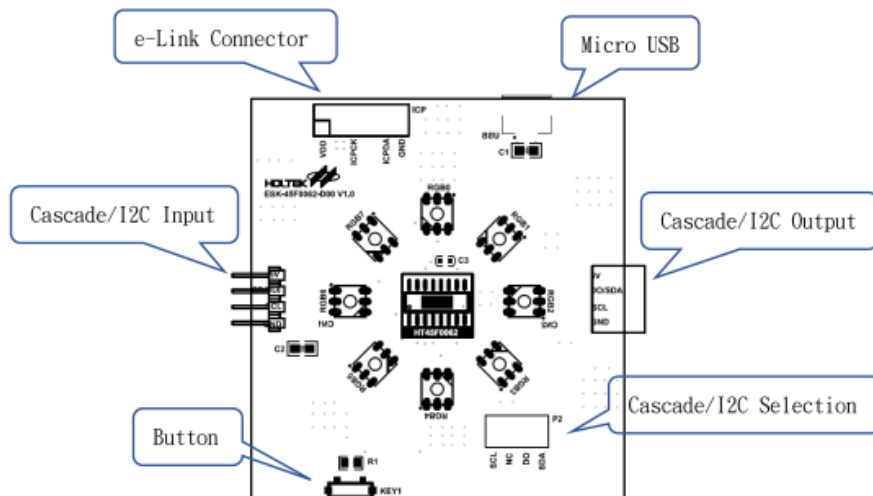


Figure 1.1 ESK-45F0060-D00 Development Board

1.2 HT45F0062 Development Board



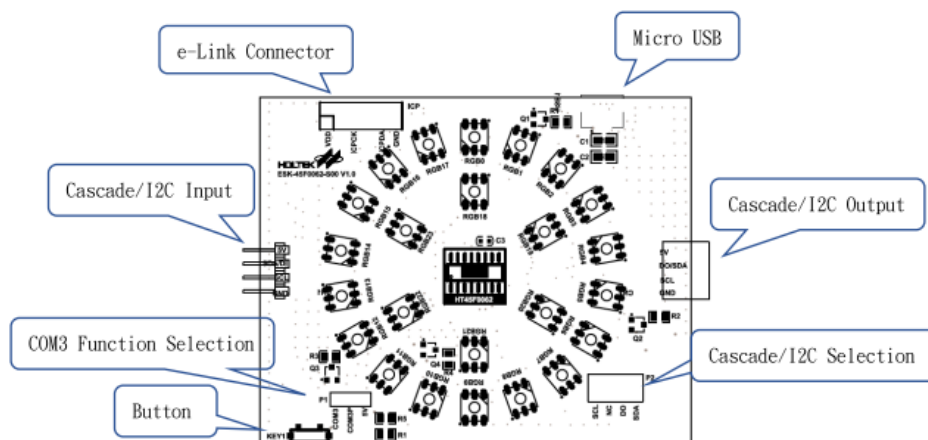


Figure 1.3 ESK-45F0062-S00 Development Board

1.3 HT45F0063 Development Board

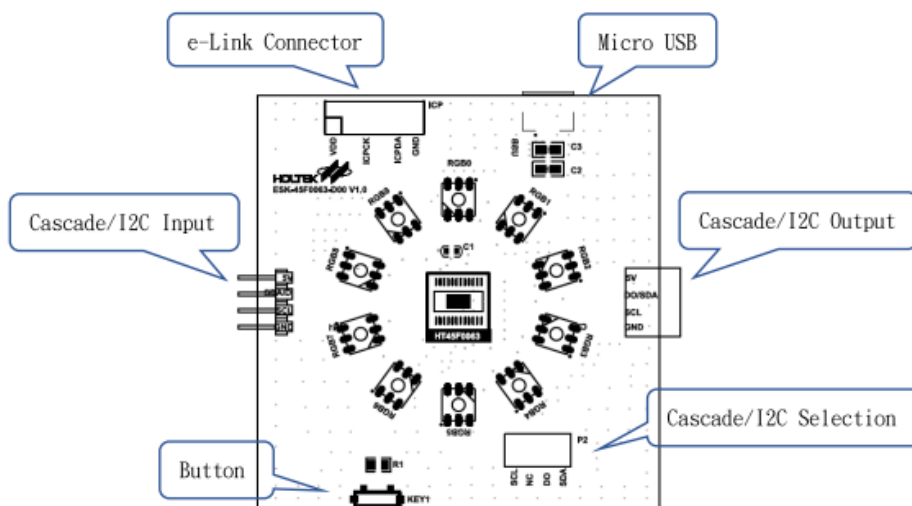


Figure 1.4 ESK-45F0063-D00 Development Board

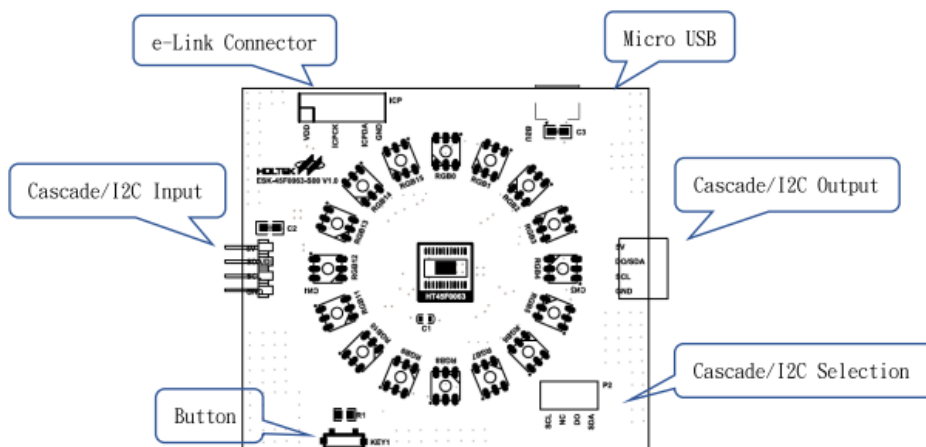


Figure 1.5 ESK-45F0063-S00 Development Board

1.4 HT66F2390 Development Board

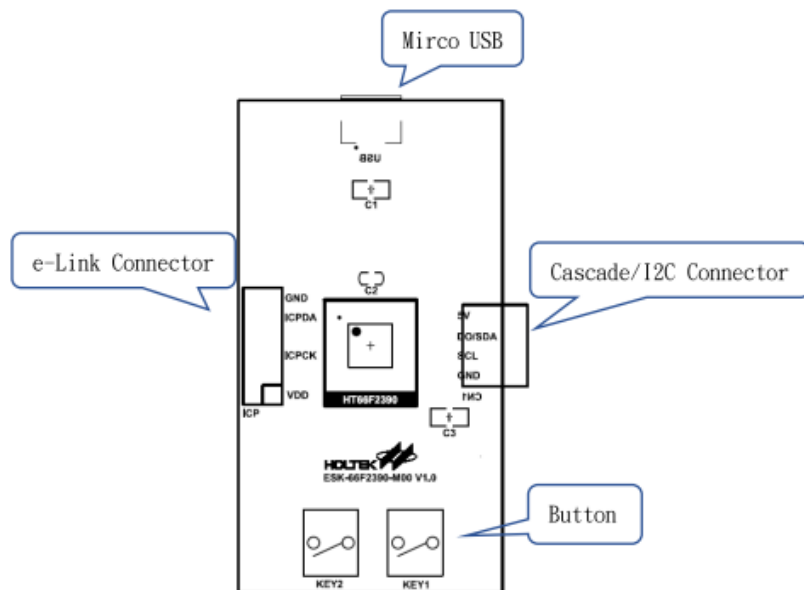


Figure 1.6 ESK-66F2390-M00 Development Board

2. Development Board Introduction

2.1 ESK-45F0060-D00 Development Board

The ESK-45F0060-D00 development board uses HT45F0060 dimming MCU and provides a RGB LED, and flexibly control lighting effects by selecting stand-alone mode or cascade mode in the direct driving mode.

- Stand-alone Mode: Independently operates in stand-alone mode, and switch lighting effects with button.
- Cascade Mode: Multiple development boards are connected as slave (up to 32 cascades), and control and switch lighting effects using master.

Features:

- Operating Voltage: 5V
- Single lighting effect module RGB LEDs are all turned on, the current consumption will be about: 160mA
- Size: 30mm×30mm

2.2 ESK-45F0062-D00 Development Board

The ESK-45F0062-D00 development board uses HT45F0062 dimming MCU and provides 8 RGB LEDs, and flexibly control lighting effects by selecting stand-alone mode, cascade mode or I²C mode in the direct driving mode.

- Stand-alone Mode: Independently operates in stand-alone mode, and switch lighting effects with button.
- Cascade Mode: Multiple development boards are connected as slave (up to 32 cascades), and control and switch lighting effects using master.

- I²C Mode: Multiple development boards are connected as slave, and control and switch lighting effects using master.

Features:

- Operating Voltage: 5V
- Single lighting effect module RGB LEDs are all turned on, the current consumption will be about: 610mA
- Size: 60mm×64mm

2.3 ESK-45F0062-S00 Development Board

The ESK-45F0062-S00 development board uses HT45F0062 dimming MCU and provides 24 RGB LEDs, and flexibly control lighting effects by selecting stand-alone mode, cascade mode or I²C mode in the scanning mode.

- Stand-alone Mode: Independently operates in stand-alone mode, and switch lighting effects with button.
- Cascade Mode: Multiple development boards are connected as slave (up to 32 cascades), and control and switch lighting effects using master.
- I²C Mode: Multiple development boards are connected as slave, and control and switch lighting effects using master.

Features:

- Operating Voltage: 5V
- Single lighting effect module RGB LEDs are all turned on, the current consumption will be about: 300mA
- Size: 80mm×64mm

2.4 ESK-45F0063-D00 Development Board

The ESK-45F0063-D00 development board uses HT45F0063 dimming MCU and provides 10 RGB LEDs, and flexibly control lighting effects by selecting stand-alone mode, cascade mode or I²C mode in the direct driving mode.

- Stand-alone Mode: Independently operates in stand-alone mode, and switch lighting effects with button.
- Cascade Mode: Multiple development boards are connected as slave (up to 32 cascades), and control and switch lighting effects using master.
- I²C Mode: Multiple development boards are connected as slave, and control and switch lighting effects using master.

Features:

- Operating Voltage: 5V
- Single lighting effect module RGB LEDs are all turned on, the current consumption will be about: 730mA
- Size: 62mm×64mm

2.5 ESK-45F0063-S00 Development Board

The ESK-45F0063-S00 development board uses HT45F0063 dimming MCU and provides 16 RGB LEDs, and flexibly control lighting effects by selecting stand-alone mode, cascade mode or I²C mode in the scanning mode.

- Stand-alone Mode: Independently operates in stand-alone mode, and switch lighting effects with button.
- Cascade Mode: Multiple development boards are connected as slave (up to 32 cascades), and control and switch lighting effects using master.
- I²C Mode: Multiple development boards are connected as slave, and control and switch lighting effects using master.

Features:

- Operating Voltage: 5V
- Single lighting effect module RGB LEDs are all turned on, the current consumption will be about: 490mA
- Size: 70mm×64mm

2.6 ESK-66F2390-M00 Development Board

The ESK-66F2390-M00 development board uses HT66F2390 as master MCU to control the RGB lighting effects of HT45F0060, HT45F0062 and HT45F0063 development boards, including changing the lighting effects sequence and the duration period, and then achieve various lighting effects.

- I²C Mode: use master to control the RGB lighting effects of slave.
- Cascade Mode: use master to control the RGB lighting effects of slave.

3. Development Board Application Circuits

3.1 ESK-66F2390-M00 Development Board

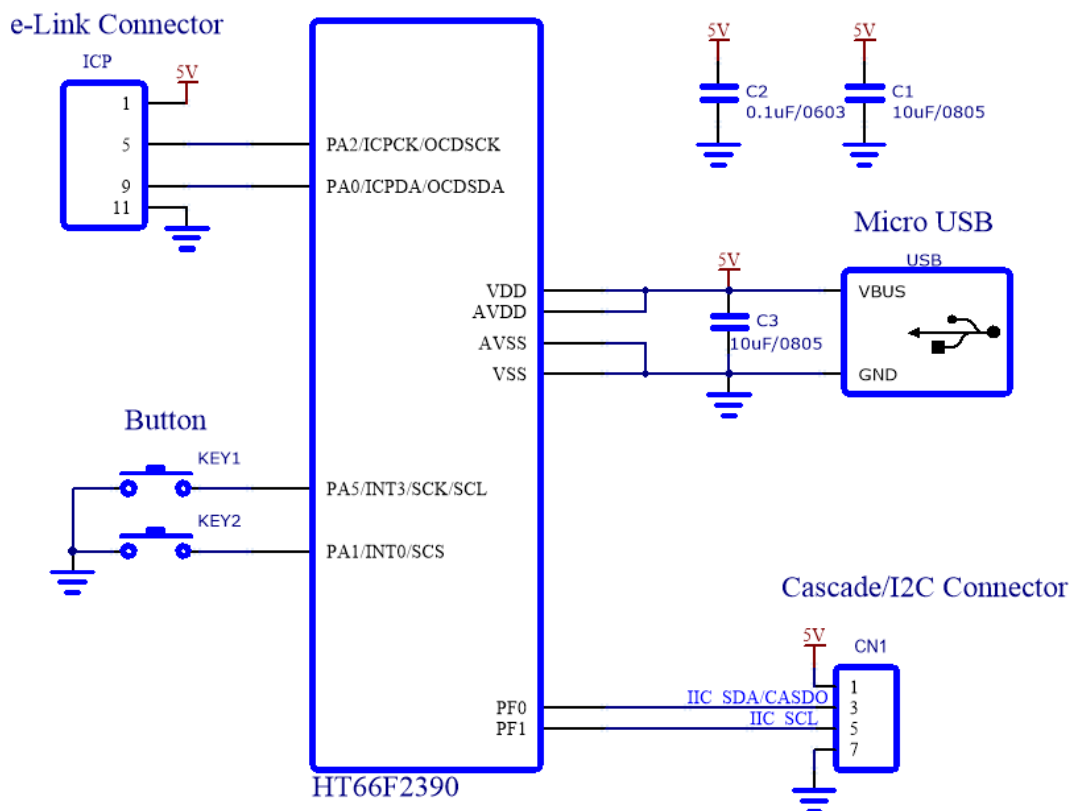


Figure 3.1 ESK-66F2390-M00 Application Circuit

3.2 ESK-45F0060-D00 Development Board

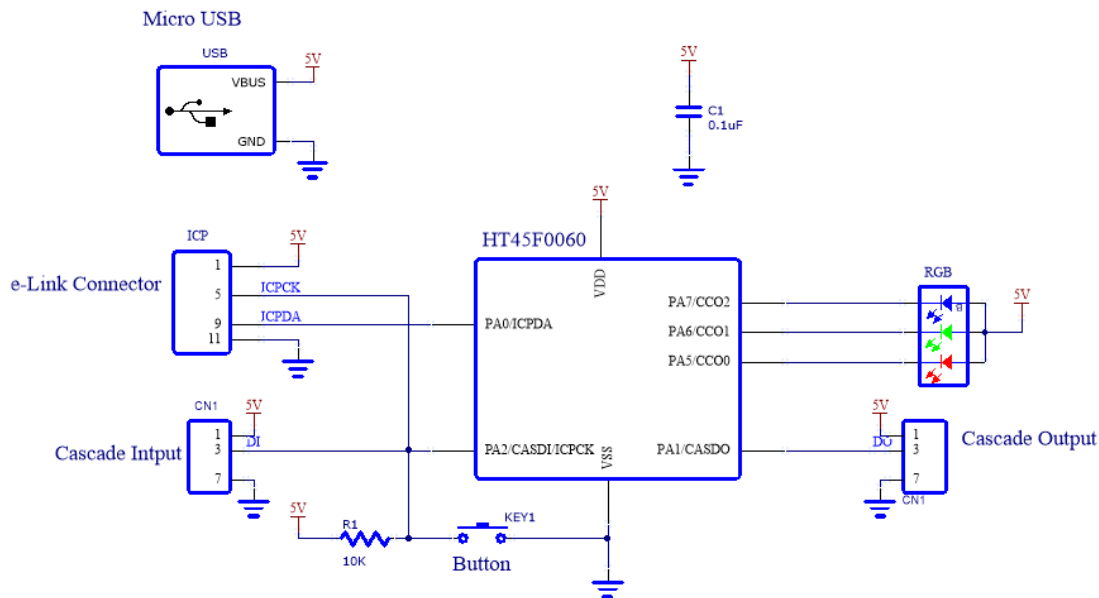


Figure 3.2 ESK-45F0060-D00 Application Circuit

3.3 ESK-45F0062-D00 Development Board

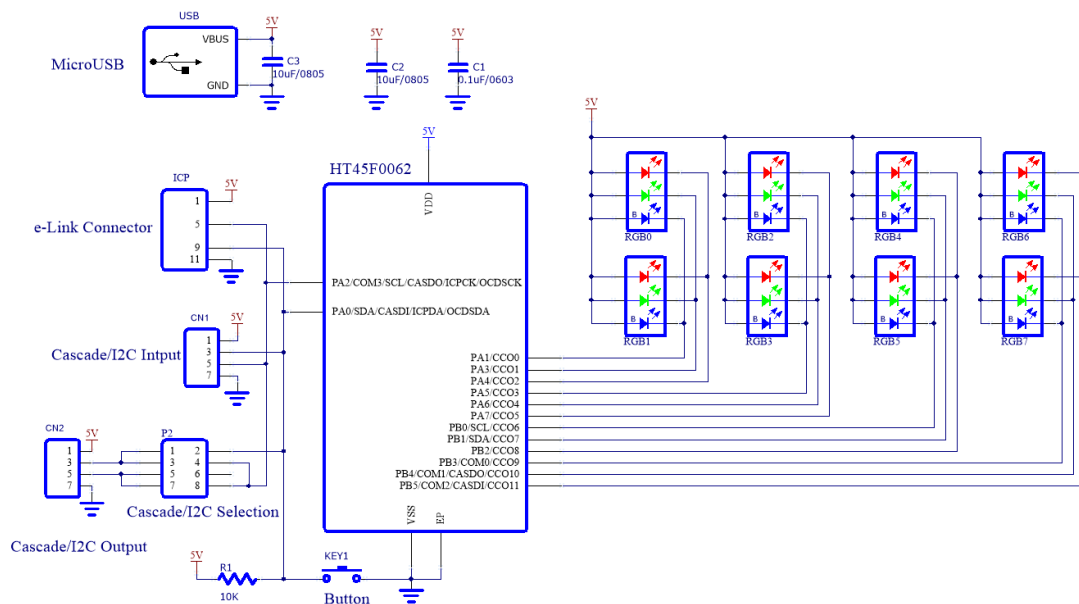


Figure 3.3 ESK-45F0062-D00 Application Circuit

The schematic diagram illustrates the HT45F0063 module and its connections to various components:

- Micro USB:** Connected to the module's VBUS and GND pins. A 10uF/0805 capacitor (C3) is connected between VBUS and GND.
- e-Link Connector:** Connected to the module's ICP pins (1, 5, 9, 11). A 5V supply is connected to pin 1.
- Cascade/I2C Input:** Connected to the module's CN1 pins (1, 2, 3, 4, 5, 6, 7, 8). A 5V supply is connected to pin 1.
- Cascade/I2C Output:** Connected to the module's CN2 pins (1, 2, 3, 4, 5, 6, 7, 8). A 5V supply is connected to pin 1.
- Cascade/I2C Selection:** Connected to the module's P1 pins (1, 2, 3, 4, 5, 6, 7, 8). A 5V supply is connected to pin 1.
- Power and Ground:** The module is powered by a 5V supply (VDD VCC) and grounded (GND). A 10uF/0805 capacitor (C2) is connected between VDD and GND. A 0.1uF/0603 capacitor (C1) is connected between VDD and GND.
- Buttons:** A button (KEY1) is connected to the module's VSS and EP pins. A 10K resistor (R1) is connected between the button and the VSS pin.
- RGB LEDs:** The module has nine RGB LEDs (RGB0 to RGB9) connected to its pins. Each LED is connected to a 5V supply and ground.

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3.6 ESK-45F0063-S00 Development Board

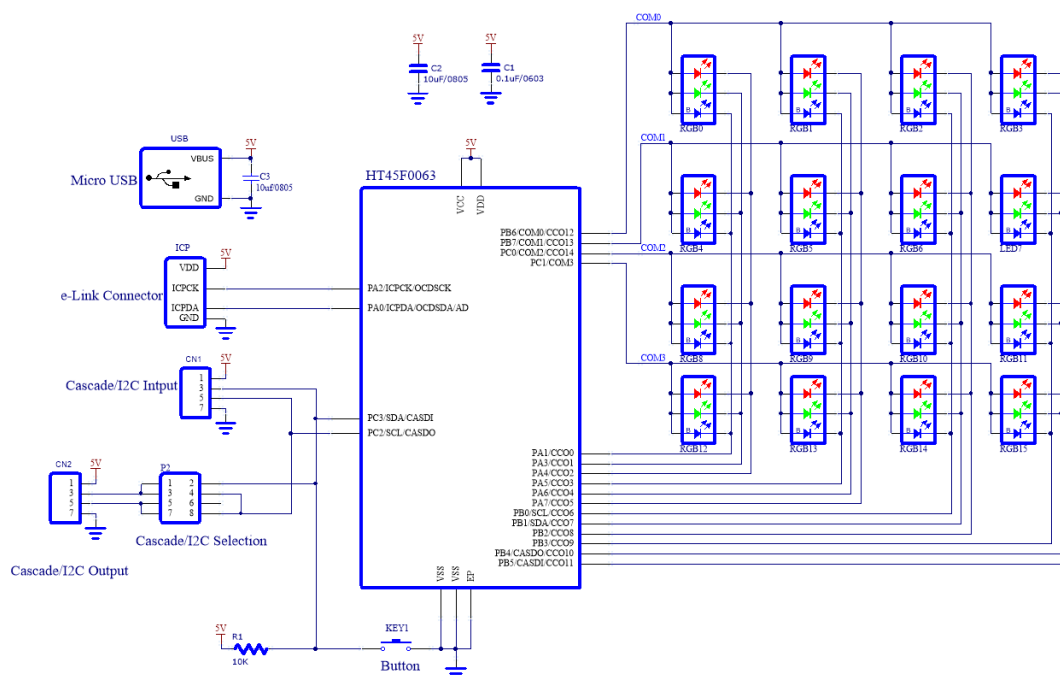


Figure 3.6 ESK-45F0063-S00 Application Circuit

4. Workshop Software Basic Usage

4.1 New project and save project

Open the software operating interface, click the “New” button for a new project, and click the “Save” button to save the project, as shown in Figure 4.1.

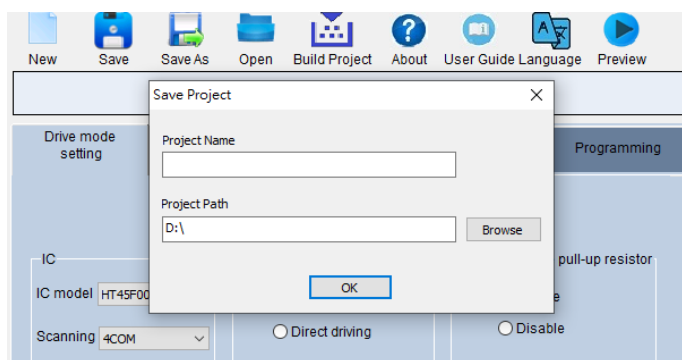


Figure 4.1

4.2 IC basic settings

1. Driving mode setting: Select IC model and set the relevant registers, as shown in Figure 4.2.

- When the HT45F0063 is selected, the scanning mode can be 3COM or 4COM, the drive status can be scanning mode or direct driving mode. The current source pull-up resistor can be enabled and disabled, the COM drive level can be active high or active low. The operating frequency can be derived from f_H , $f_H/2$ or $f_H/4$, and f_{PWM} can be derived from f_{SYS} , $f_{SYS}/2$, $f_{SYS}/3$ or $f_{SYS}/4$.

- When the HT45F0062 is selected, the scanning mode can be 3COM or 4COM, the drive status can be scanning mode or direct driving mode. The current source pull-up resistor can be enabled and disabled, the COM drive level can be active high or active low. The operating frequency can be derived from f_H , $f_H/2$ or $f_H/4$, and f_{PWM} can be derived from f_{SYS} , $f_{SYS}/2$, $f_{SYS}/3$ or $f_{SYS}/4$.
- When the HT45F0060 is selected without scanning mode and pull-up resistor, the operating frequency f_{SYS} can be derived from f_H , $f_H/2$ or $f_H/4$, and f_{PWM} can be derived from $f_{SYS}/4$, f_{SYS} , $f_H/16$ or $f_H/64$.

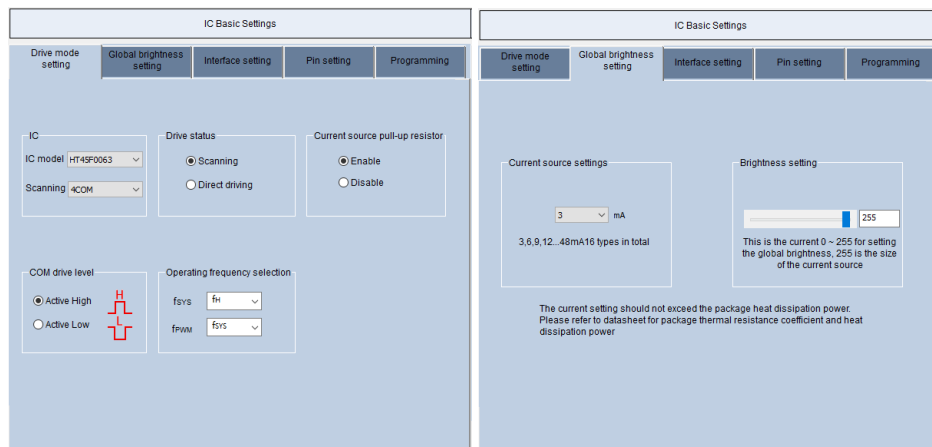


Figure 4.2 Driving Mode Settings and Global Brightness Setting

- Global brightness setting: Current source and brightness settings, as shown in Figure 4.2.
 - When the HT45F0063 is selected, there are 16 stages of current source to be selected. There are 256 stages ranging from 0~255 for global brightness setting.
 - When the HT45F0062 or HT45F0060 is selected, there are 4 stages of current source to be selected.
- Interface type setting: Stand-alone mode, I²C mode or cascade mode, as shown in Figure 4.3.
 - When the HT45F0063 or HT45F0062 is selected, the stand-alone mode, I²C mode or cascade mode can be selected. When the HT45F0060 is selected, the stand-alone mode or cascade mode can be selected.
 - If I²C mode is selected, the slave address can be set from 0x00 to 0x7f; If cascade mode is selected, the cascade frequency f_{CAS} can be derived from f_{SYS} , $f_{SYS}/2$ or $f_{SYS}/4$.



Figure 4.3 Interface Setting and Pin Setting

4. Pin setting: select development board mode or user-defined mode, as shown in the Figure 4.3.

In the development board mode, the pin will be selected as RGB drive pin by default, users can select the user-defined mode, and can click the IC pin to select general I/O function.

5. Programming: download program to the development board, after completing all the settings and building the project, complete the development board download action in this programming interface, including Master/Stand-alone download action and Slave download action.

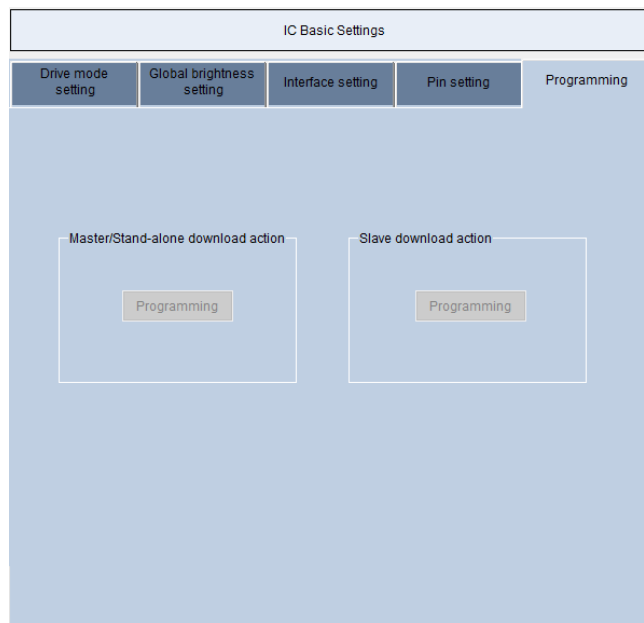
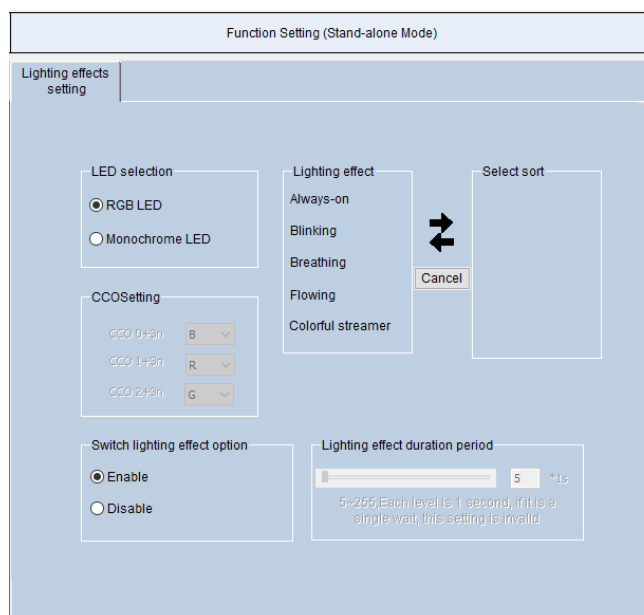


Figure 4.4 Programming

4.3 Function settings

1. Lighting effects setting:

- The LED can be RGB LED or monochrome LED. If the monochrome LED is selected, the color cannot be changed in the lighting effect setting.
- Set CCO for the corresponding color LED on development board by default in the development board mode, and cannot be changed. If the color needs to be changed, user should firstly select user-defined mode in pin setting interface.
- Switch lighting effects function enable/disable is selected by button.
- The HT45F0063 and HT45F0062 lighting effects include always-on, blinking, breathing, flowing and colorful streamer. The HT45F0060 lighting effects include always-on, blinking, breathing and flowing. Double-click the lighting effect name to sort.
- Lighting effect duration period, which is each lighting effect duration time, can be selected from the range of 1~255. If only a lighting effect needs to be set, the lighting effect duration period is invalid.



The screenshot shows the 'Function Setting (Stand-alone Mode)' window. It has a 'Lighting effects setting' tab. Inside, there are several sections:

- LED selection:** Two radio buttons, 'RGB LED' (selected) and 'Monochrome LED'.
- CCOSetting:** Three dropdown menus for 'CCO 0+2n' (set to 'B'), 'CCO 1+2n' (set to 'R'), and 'CCO 2+2n' (set to 'G').
- Switch lighting effect option:** Two radio buttons, 'Enable' (selected) and 'Disable'.
- Lighting effect:** A list of effects: 'Always-on', 'Blinking', 'Breathing', 'Flowing', and 'Colorful streamer'. A double-click icon is next to the list.
- Select sort:** An empty box for selecting a sort order.
- Lighting effect duration period:** A slider bar with a value of '5' and a unit of '*1s'. Below it, a note says '5~255 (Each level is 1 second, if it is a single wait, this setting is invalid)'.

A 'Cancel' button is located between the 'Lighting effect' and 'Select sort' sections.

Figure 4.5 Lighting Effects Setting

2. Always-on setting

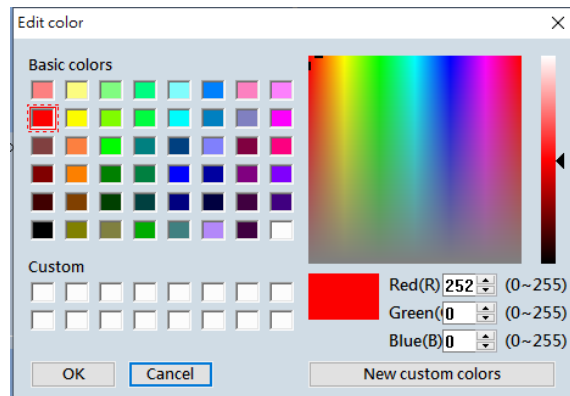


Figure 4.6 Edit Colors on Palette

- Pop up the palette to edit color by double-clicking each LED.
- The HT45F0060, HT45F0063 and HT45F0062 support always-on mode which is up to seven colors, and can switch colors within the specified always-on interval named T. T can be selected from the range of 0~16 units. If T is set to 0, it means no color to be switched.

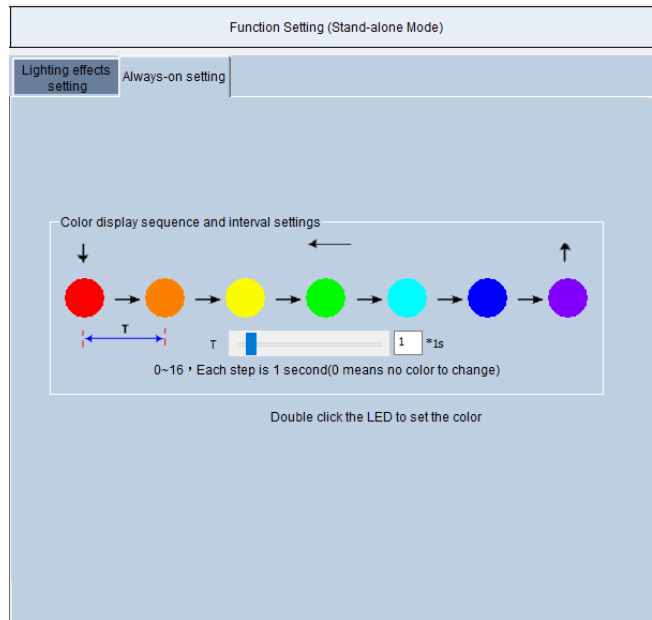


Figure 4.7 Always-on Setting

3. Blinking setting: The blinking lighting effect supports up to seven colors switching by setting the time parameters of T1, T2 and T3.
 - The T1 represents the duration for which each color LED is on each time;
 - The T2 represents the duration for which each color LED goes out each time;
 - The T3 represents the duration for which each color LED is blinking, that is $T3 = \text{multiples of } (T1+T2)$;
 - The T1 and T2 both can be set in the range of 1~255, while the T3 can be set in the range of 0~255. When the T3 is set to 0, it means that blinking lighting effect does not switch color;
 - Pop up the palette to edit color by double-clicking each LED.

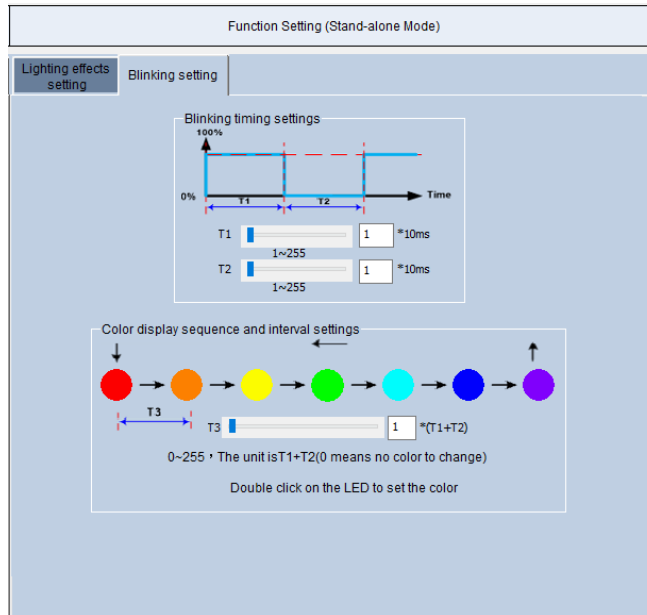


Figure 4.8 Blinking Setting

4. Breathing setting: The breathing lighting effect supports up to seven colors switching by setting the time parameters T1, T2, T3 and T4.

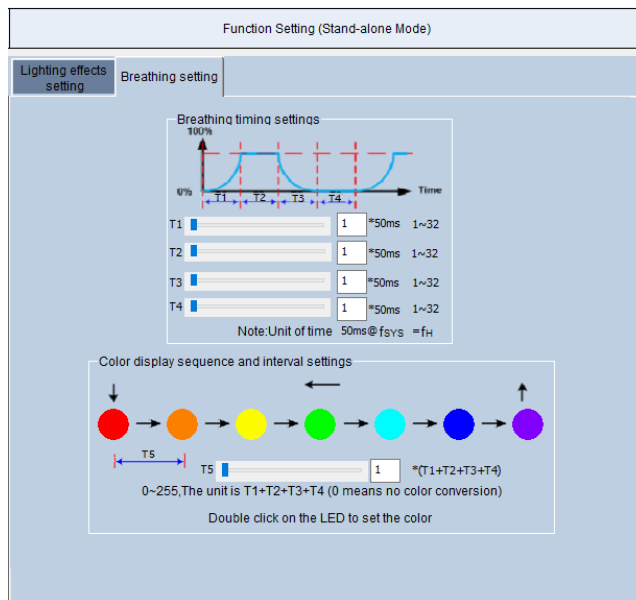


Figure 4.9 Breathing Setting

- The T1 represents the duration for which each color LED with the breathing lighting effect is gradually going on;
- The T2 represents the duration for which each color LED with the breathing lighting effect is keeping on after gradually going on;
- The T3 represents the duration for which each color LED with the breathing lighting effect is fading;
- T4 represents the duration for which each color LED with the breathing lighting effect is keeping off after fading;
- The T5 represents the duration for which each color LED with the breathing lighting effect is on, and $T5 = \text{multiples of } (T1+T2+T3+T4)$;
- The T1, T2, T3 and T4 can be set in the range of 1~32, while the T5 can be set in the range of 0~255. When the T5 is set to 0, it means that breathing lighting effect does not switch color.

5. Flowing setting: The flowing lighting effect is that all RGB LEDs only display one set of RGB color values at a time, and the other RGB color values are displayed sequentially, returning to the first set of RGB color value finally.
- The T and Auto represent pattern sequence, and the T can be set in the range of 1~32 units. Auto means auto increment and decrement.

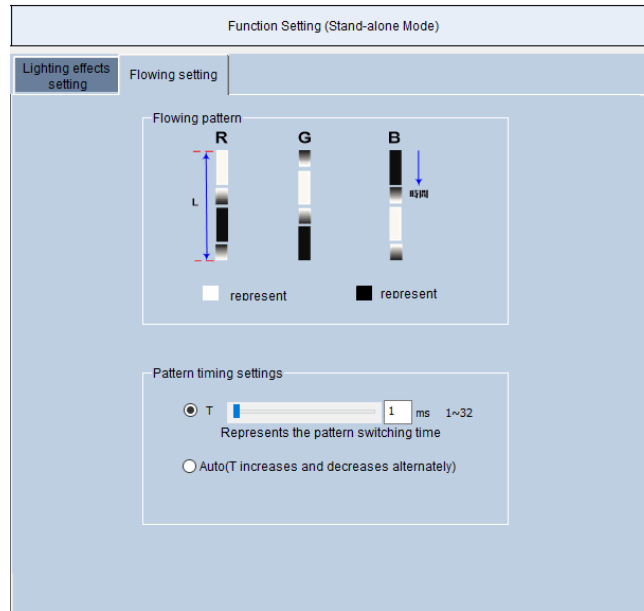


Figure 4.10 Flowing Setting

6. Colorful streamer setting: The colorful streamer lighting effect is that all RGB LEDs display different RGB color values sequentially, and loop back to the first set of RGB color values finally. The HT45F0060 does not support colorful streamer lighting effect.
- The T and Auto represent colorful streamer pattern sequence, and the T can be set in the range of 1~32 units. Auto means auto increment and decrement. The pattern direction can be set to left-rotate, right-rotate or left-rotate + right-rotate.
- If the pattern direction can be set to left-rotate + right-rotate, switching the rotation direction after 1L~20L pattern length.

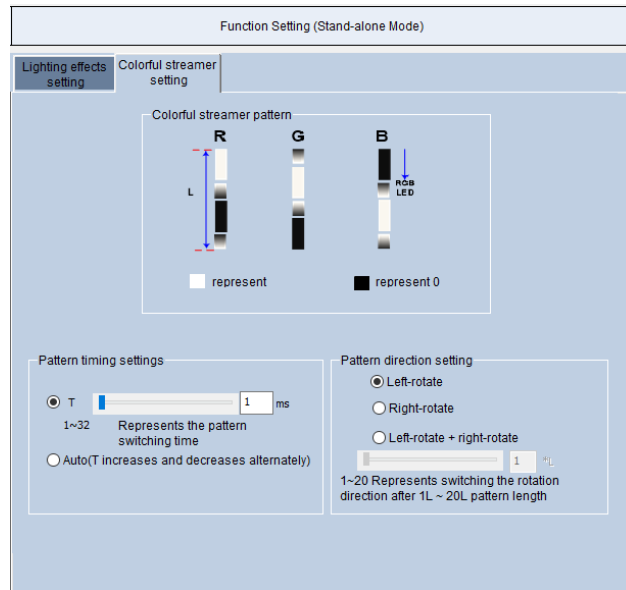


Figure 4.11 Colorful Streamer Setting

4.4 Effect preview

After finishing the lighting effects setting, click the corresponding lighting setting page, and then click the “Preview” button to observe the simulation animation effect of the current lighting effects.

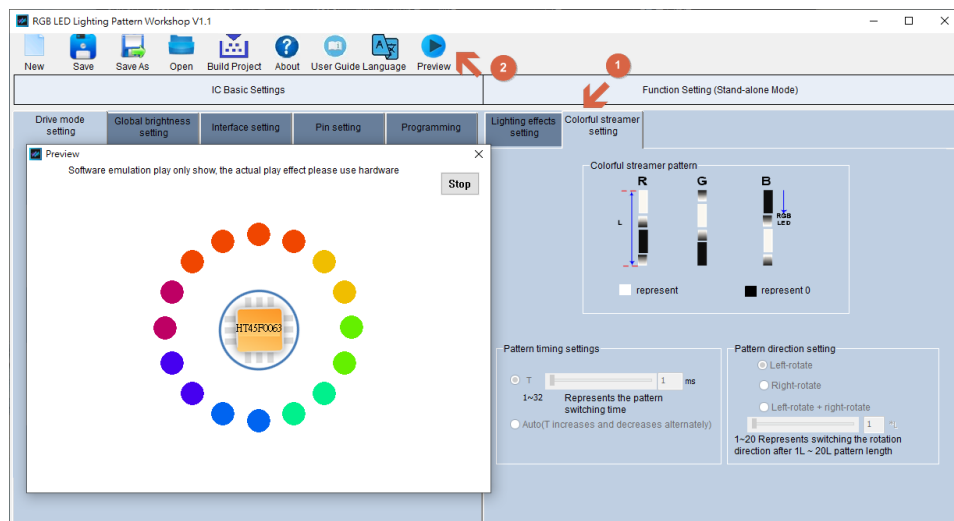


Figure 4.12

4.5 Build project and programming

- After completing all IC basic settings and function settings, click the “Build Project” button to build the entire project file, after which a dialog box of build successful will pop up, as shown in figure 4.13.

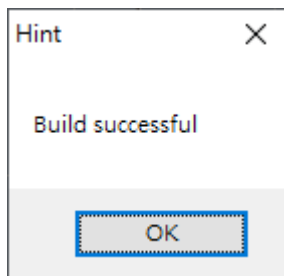


Figure 4.13

- Use e-Link to connect the development board to PC. According to the IC basic settings at the programming interface, click the corresponding “Download” button to program to the development board.

5. Development Board Using Steps

5.1 ESK-45F0060-D00 Development Board

5.1.1 ESK-45F0060-D00 Development Board Using Steps (Stand-alone Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0060 as the IC model, select the operating frequency and set global brightness, select stand-alone mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

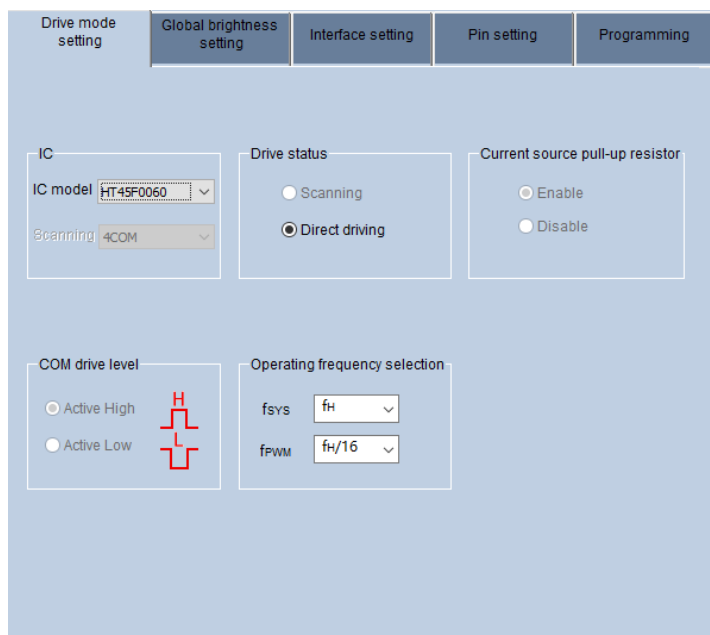


Figure 5.1 ESK-45F0060-D00 IC Basic Settings

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

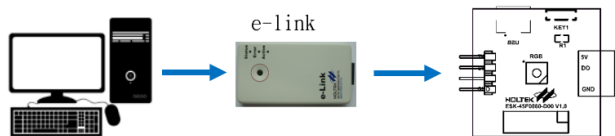


Figure 5.2 ESK-45F0060-D00 Programming Connection

Step4 Power on:

Disconnect the development board from e-Link and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.1.2 ESK-45F0060-D00 Development Board Using Steps (Cascade mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0060 as the IC model, select the operating frequency and set global brightness, select cascade mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

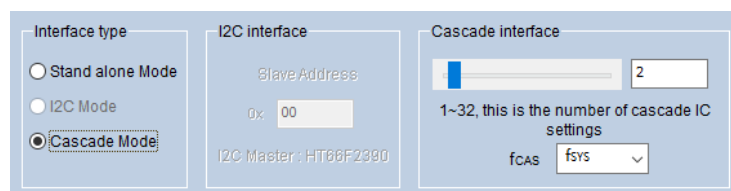


Figure 5.3 Setting Interface

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the ESK-45F0060-D00 development board to PC, click the "Slave download action" button to download on the programming interface. After completing the ESK-45F0060-D00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

Step4 Connect and power on:

Disconnect the development board from e-Link, connect the ESK-66F2390-M00 development board to ESK-45F0060-D00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

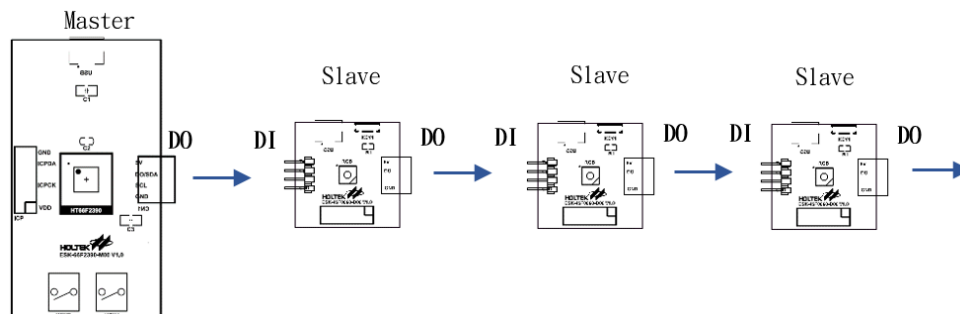


Figure 5.4 ESK-45F0060-D00 Cascade Connection

5.2 ESK-45F0062-D00 Development Board

5.2.1 ESK-45F0062-D00 Development Board Using Steps (Stand-alone Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select direct driving mode as drive status, select Active Low as COM drive level, select the operating frequency and set global brightness according to the user's requirements, select stand-alone mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

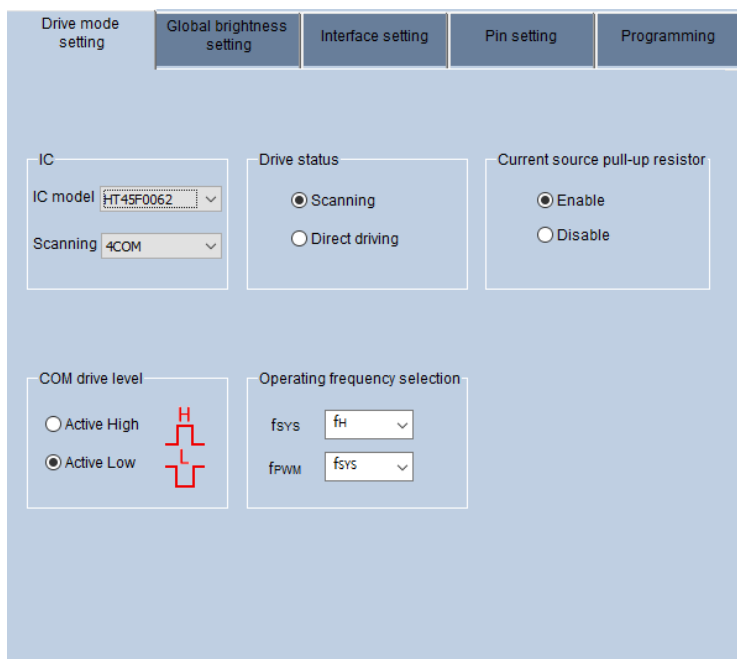


Figure 5.5 ESK-45F0062-D00 IC Basic Settings

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting, flowing setting and colorful streamer setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.



Figure 5.6 ESK-45F0062-D00 Programming Connection

Step4 Power on:

Disconnect the development board from e-Link and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.2.2 ESK-45F0062-D00 Development Board Using Steps (Cascade Mode)

5.2.2.1 HT66F2390 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model and select HT66F2390 as the cascade master according to requirements. Select direct driving mode as drive status, select the operating frequency and set global brightness, select cascade mode and IC number as the interface type by the interface setting, and select development board mode by the pin setting by default.

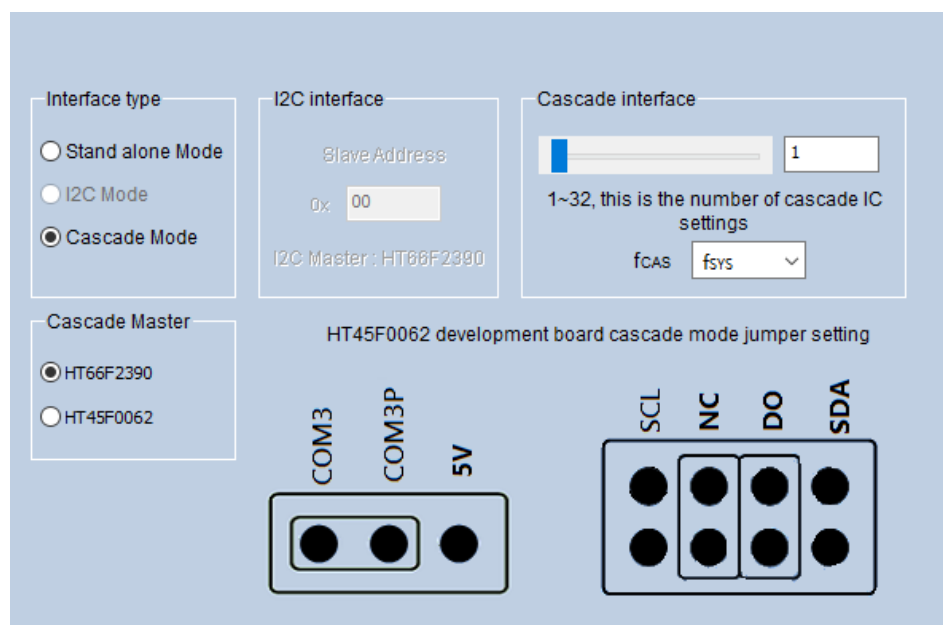


Figure 5.7

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the ESK-45F0062-D00 development board to PC, click the "Slave download action" button to download on the programming interface. After completing the ESK-45F0062-D00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

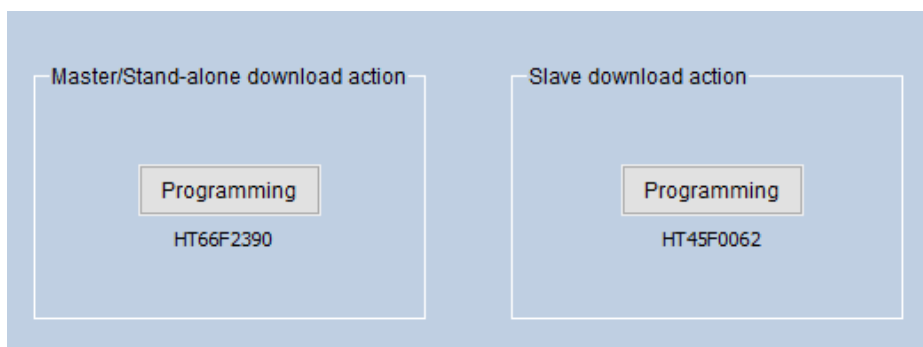


Figure 5.8

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 of ESK-45F0062-D00 development board to connect the DO pin and the NC pin respectively.

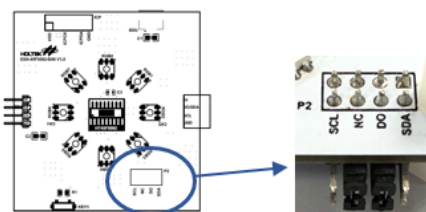


Figure 5.9

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0062-D00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

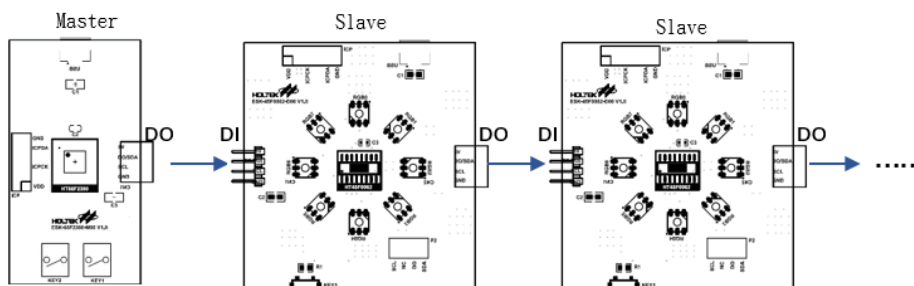


Figure 5.10 ESK-45F0062-D00 Cascade Connection

5.2.2.2 HT45F0062 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode and slave IC number as the interface type by the interface setting, select HT45F0062 as the cascade master and select development board mode by the pin setting by default.

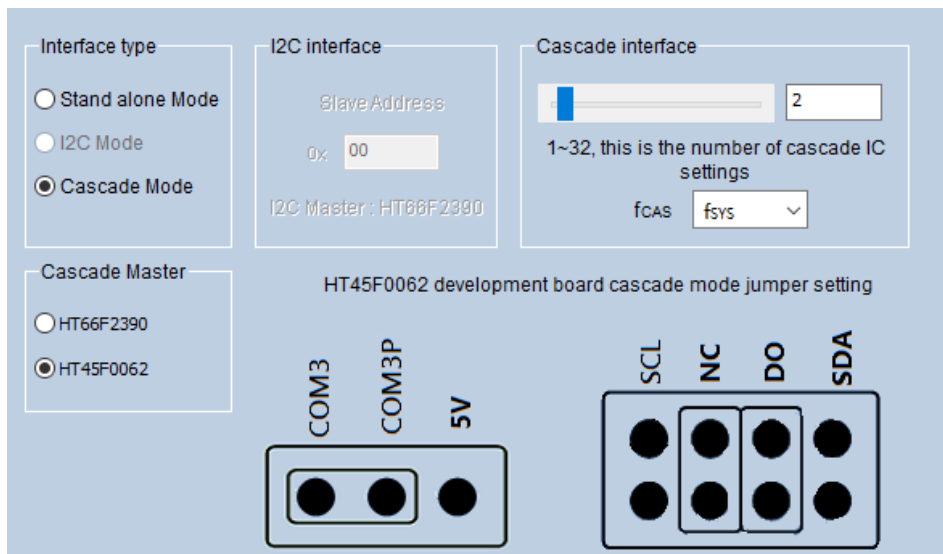


Figure 5.11

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Prepare two or more ESK-45F0062-D00 development boards and connect them to PC. The development board number should increase according to the cascade slave number. Use e-link to connect the ESK-45F0062-D00 development board to PC and click the "HT45F0062-Master programming action" button to download on the software programming interface. After finishing the master programming, replace an ESK-45F0062-D00 development board and use e-link to click the "HT45F0062-Slave programming action" button to download on the software programming interface.

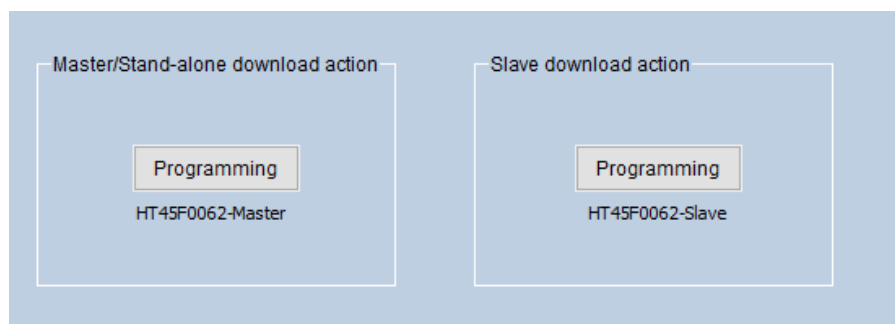


Figure 5.12

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 of ESK-45F0062-D00 development board to connect the DO pin and the NC pin respectively.

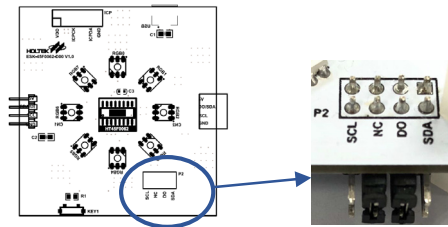


Figure 5.13

- (b) Connect the ESK-45F0062-D00 development board (Master programming) to ESK-45F0062-D00 development board (Slave programming), and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.2.3 ESK-45F0062-D00 Development Board Using Steps (I²C Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select direct driving mode as drive status, select the operating frequency and set global brightness, select I²C mode as the interface type by the interface setting, and select development board mode by the pin setting by default. If the 4COM is selected as the drive mode, the I²C mode option will be unavailable when the pin is configured as development board mode.

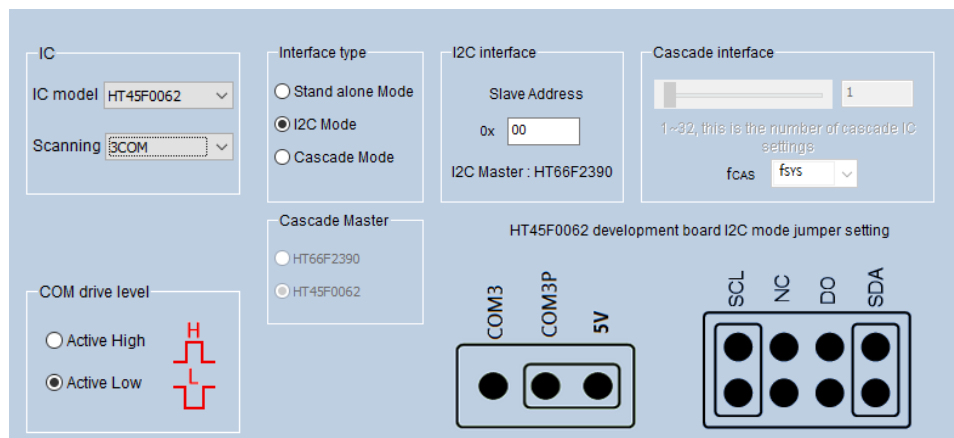


Figure 5.14

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

- (a) Slave programming: Firstly, set the I²C interface slave address, which can be set from 0x00 to 0x7f. For example, select 0x00 as the slave address and click the "Build Project" button. Use e-Link to connect the ESK-45F0062-D00 development board to PC, click the "Slave download action" button to download on the programming interface. After the download is

completed, connect the next development board to e-Link, download it again, and complete the programming of all slaves in turn.

- (b) Master programming: After completing the ESK-45F0062-D00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the “Master/Stand-alone download action” button to download on the programming interface.

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 of ESK-45F0062-D00 development board to connect the SCL pin and the SDA pin respectively.

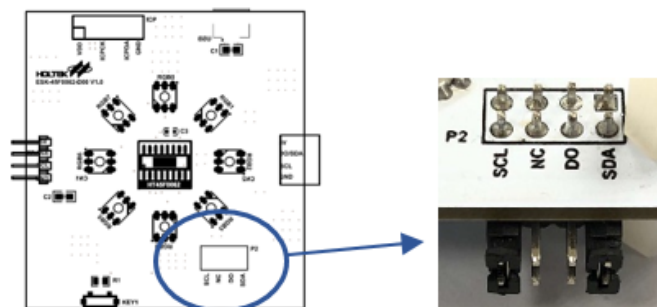


Figure 5.15

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0062-D00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

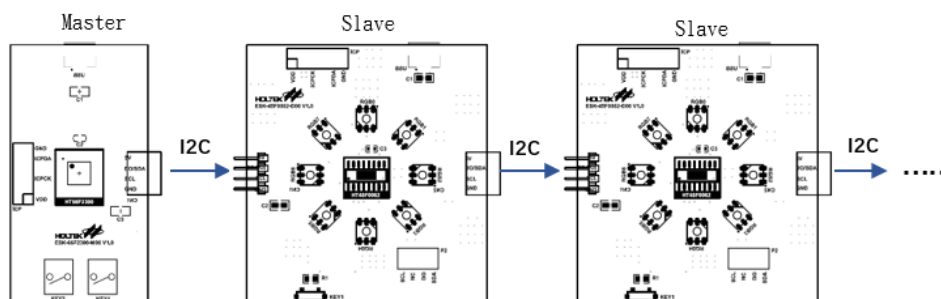


Figure 5.16 ESK-45F0062-D00 I²C Connection

5.3 ESK-45F0062-S00 Development Board

5.3.1 ESK-45F0062-S00 Development Board Using Steps (Stand-alone Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select scanning mode as drive status, select Active Low as COM drive level, select the operating frequency and set global brightness according to the user's requirements, select stand-alone mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

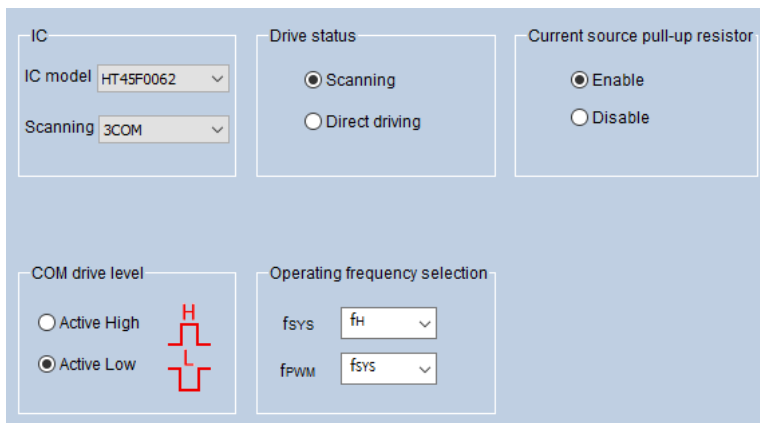


Figure 5.17 ESK-45F0062-S00 IC Basic Settings

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting, flowing setting and colorful streamer setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.



Figure 5.18 ESK-45F0062-S00 Programming Connection

Step4 Connect and power on:

(a) Use the jumper cap at P1 to connect the COM3 pin to the COM3P pin.

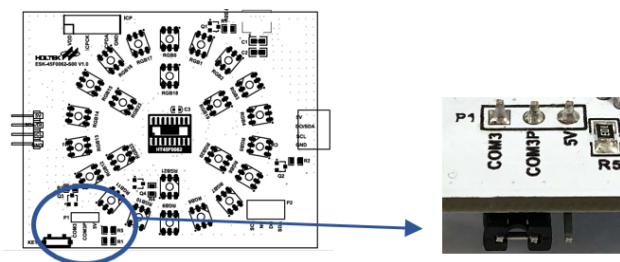


Figure 5.19

(b) Disconnect the development board from e-Link and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.3.2 ESK-45F0062-S00 Development Board Using Steps (Cascade Mode)

5.3.2.1 HT66F2390 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model and select HT66F2390 as the cascade master according to requirements. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode and IC number as the interface type by the interface setting, and select development board mode by the pin setting by default.

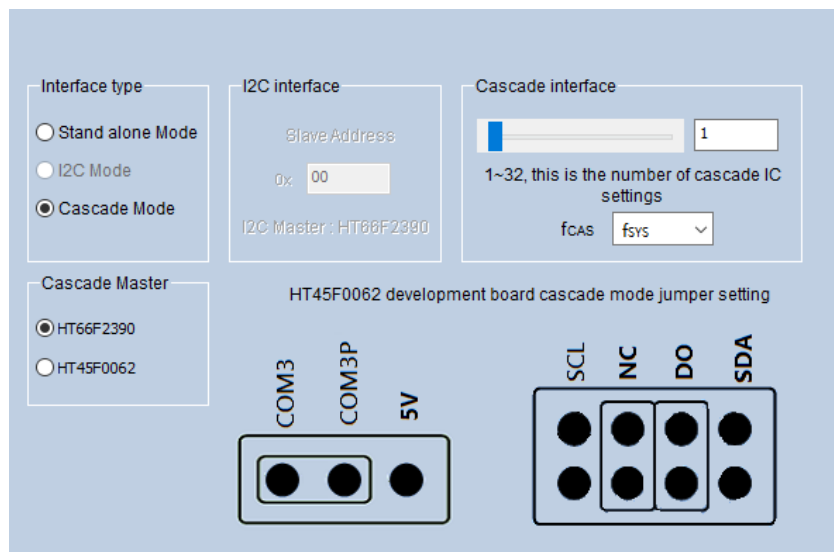


Figure 5.20

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the ESK-45F0062-S00 development board to PC, click the "Slave download action" button to download on the programming interface. After completing the ESK-45F0062-S00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

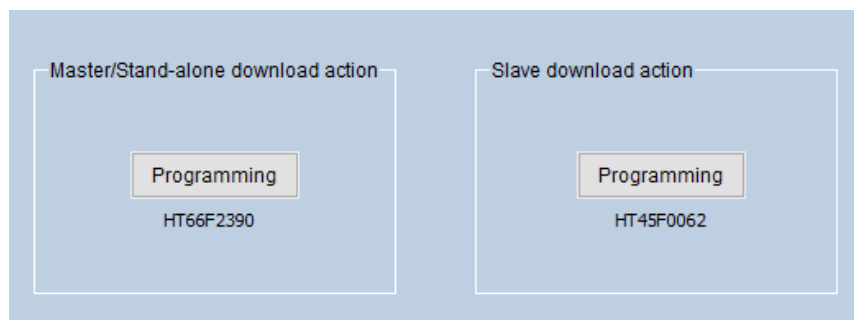


Figure 5.21

Step4 Connect and power on:

(a) Use the jumper cap at P1 to connect the COM3P pin to 5V.

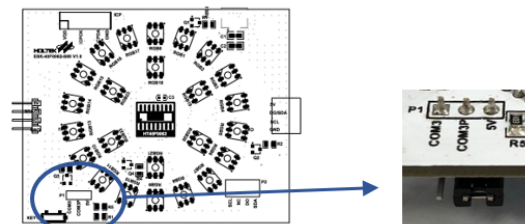


Figure 5.22

(b) Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the DO pin and the NC pin respectively.

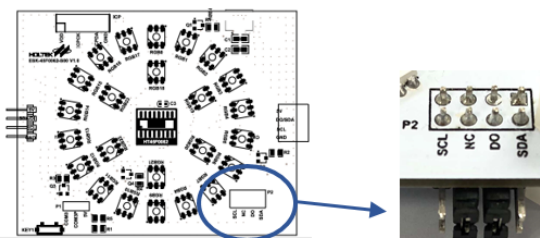


Figure 5.23

(c) Connect the ESK-66F2390-M00 development board to ESK-45F0062-S00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

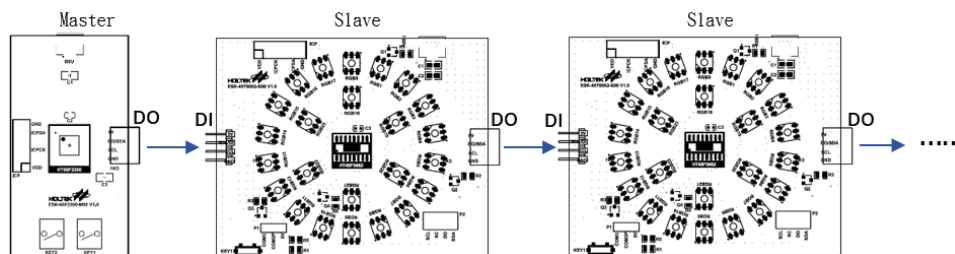


Figure 5.24 ESK-45F0062-S00 Cascade Connection

5.3.2.2 HT45F0062 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode and slave IC number as the interface type by the interface setting, select HT45F0062 as the cascade master and select development board mode by the pin setting by default.

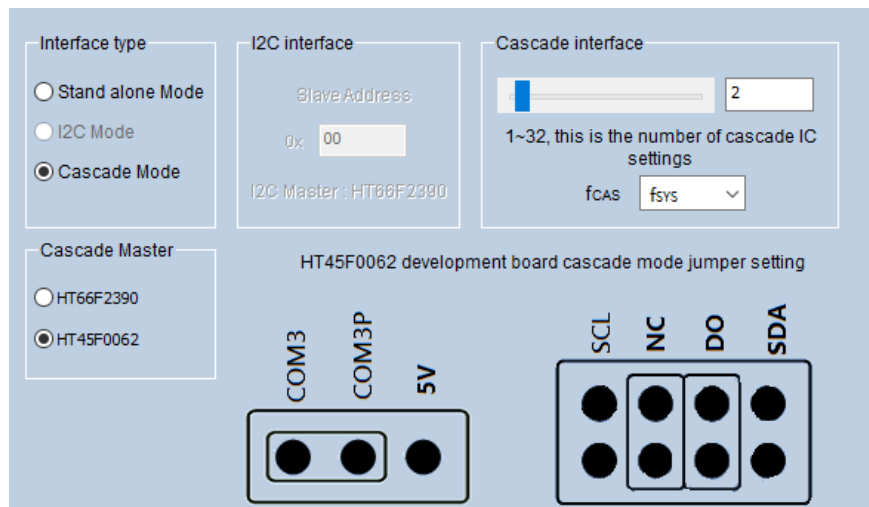


Figure 5.25

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Prepare two or more ESK-45F0062-S00 development boards and connect them to PC. The development board number should increase according to the cascade slave number. Use e-link to connect the ESK-45F0062-S00 development board to PC and click the "HT45F0062-Master programming action" button to download on the software programming interface. After finishing the master programming, replace an ESK-45F0062-S00 development board and use e-link to click the "HT45F0062-Slave programming action" button to download on the software programming interface.



Figure 5.26

Step4 Connect and power on:

(a) Use the jumper cap at P1 to connect the COM3P pin to 5V.

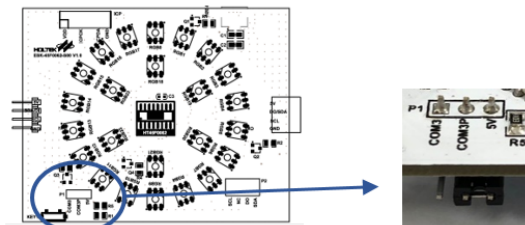


Figure 5.27

(b) Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the DO pin and the NC pin respectively.

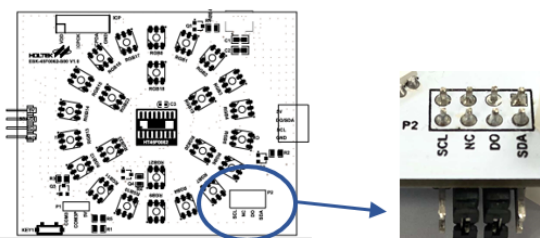


Figure 5.28

(c) Connect the ESK-45F0062-S00 development board (Master programming) to ESK-45F0062-S00 development board (Slave programming), and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.3.3 ESK-45F0062-S00 Development Board Using Steps (I²C Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0062 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select I²C mode as the interface type by the interface setting, and select development board mode by the pin setting by default. If the 4COM is selected as the drive mode, the I²C mode option will be unavailable when the pin is configured as development board mode.

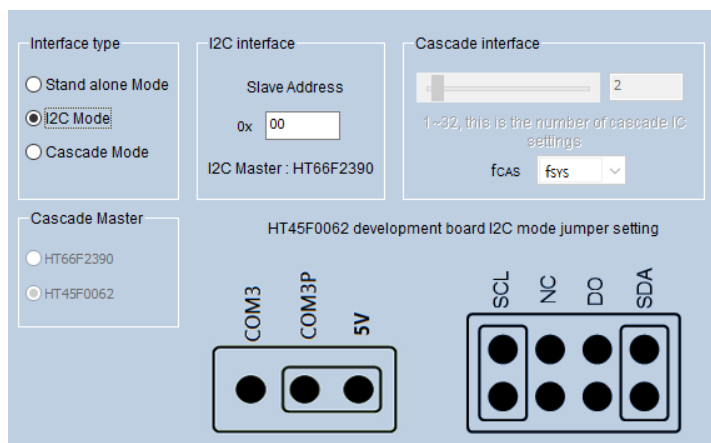


Figure 5.29

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

- (a) Slave programming: Firstly, set the I²C interface slave address, which can be set from 0x00 to 0x7f. For example, select 0x00 as the slave address and click the "Build Project" button. Use e-Link to connect the ESK-45F0062-S00 development board to PC, click the "Slave download action" button to download on the programming interface. After the download is completed, connect the next development board to e-Link, download it again, and complete the programming of all slaves in turn.
- (b) Master programming: After completing the ESK-45F0062-S00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

Step4 Connect and power on:

- (a) Use the jumper cap at P1 to connect the COM3P pin to 5V.

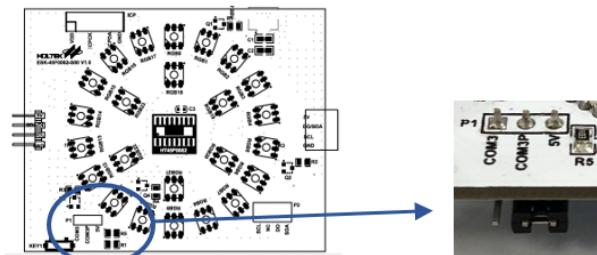


Figure 5.30

- (b) Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the SCL pin and the SDA pin respectively.

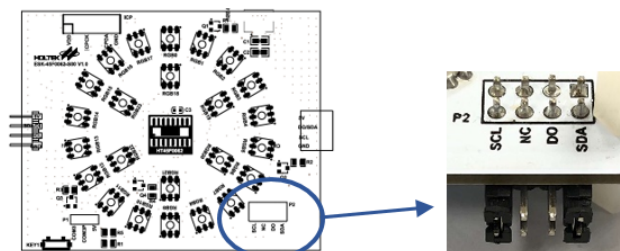


Figure 5.31

- (c) Connect the ESK-66F2390-M00 development board to ESK-45F0062-S00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

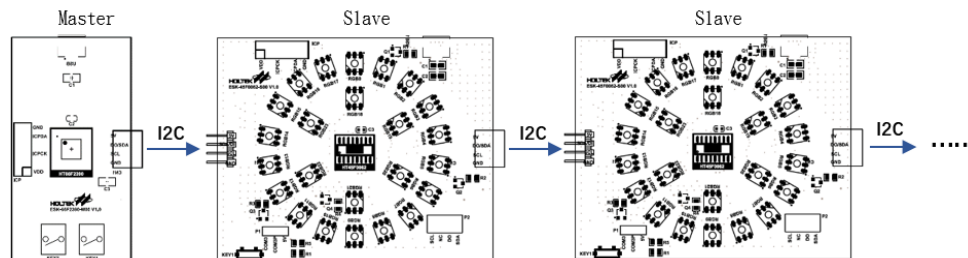


Figure 5.32 ESK-45F0062-S00 I²C Connection

5.4 ESK-45F0063-D00 Development Board

5.4.1 ESK-45F0063-D00 Development Board Using Steps (Stand-alone Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select direct driving mode as drive status, select Active High as COM drive level, select the operating frequency and set global brightness according to the user's requirements, select stand-alone mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

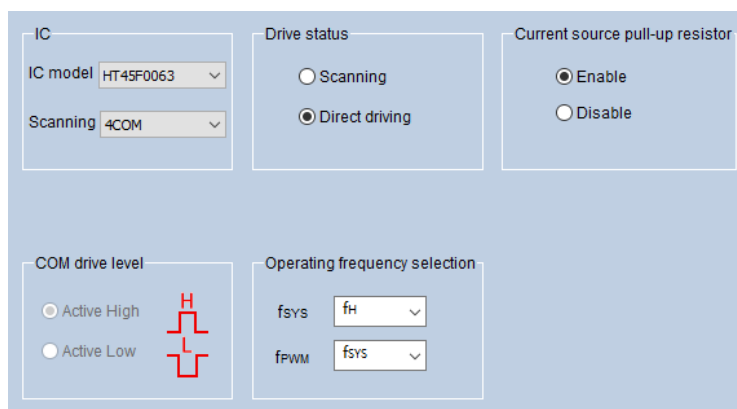


Figure 5.33

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting, flowing setting and colorful streamer setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.



Figure 5.34 ESK-45F0062-S00 Programming Connection

Step4 Power on:

Disconnect the development board from e-Link and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.4.2 ESK-45F0063-D00 Development Board Using Steps (Cascade Mode)

5.4.2.1 HT66F2390 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model and select HT66F2390 as the cascade master according to requirements. Select direct driving mode as drive status, select the operating frequency and set global brightness, select cascade mode and IC number as the interface type by the interface setting, and select development board mode by the pin setting by default.

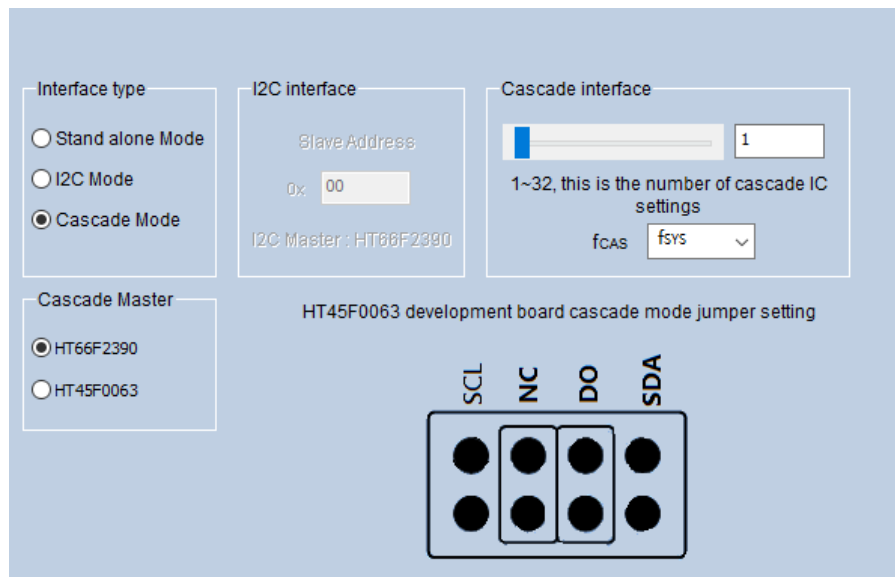


Figure 5.35

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the ESK-45F0063-D00 development board to PC, click the "Slave download action" button to download on the programming interface. After completing the ESK-45F0063-D00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

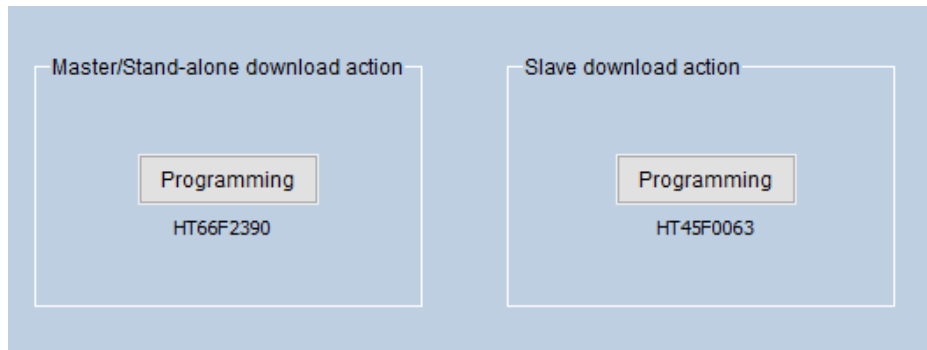


Figure 5.36

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 to connect the DO pin and the NC pin respectively.

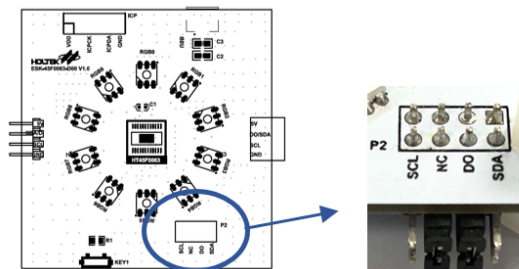


Figure 5.37

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0063-D00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

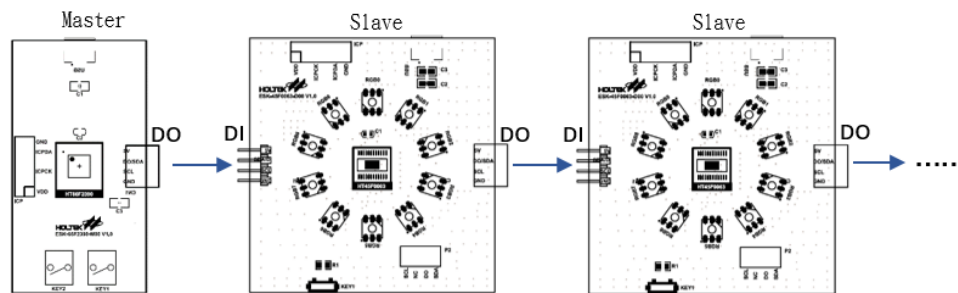


Figure 5.38 ESK-45F0063-D00 Cascade Connection

5.4.2.2 HT45F0063 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode and slave IC number as the interface type by the interface setting, select HT45F0063 as the cascade master and select development board mode by the pin setting by default.

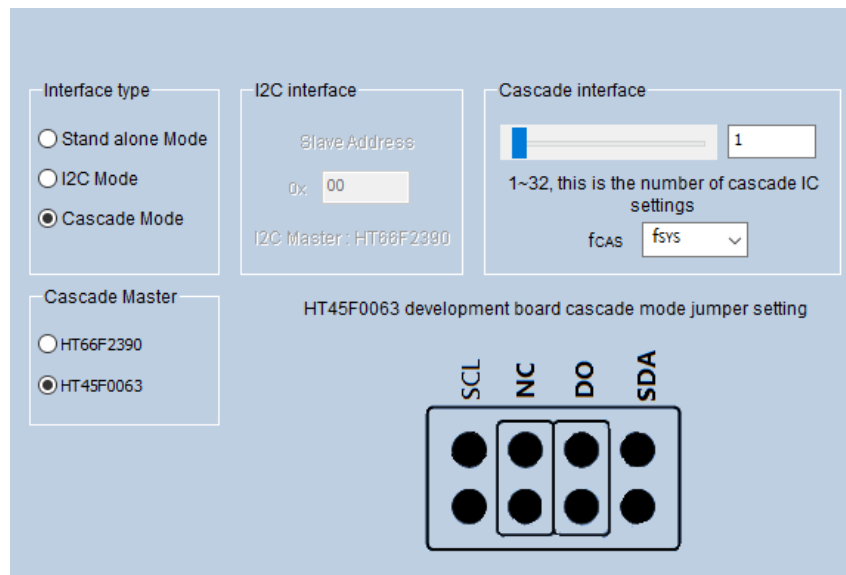


Figure 5.39

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Prepare two or more ESK-45F0063-D00 development boards and connect them to PC. The development board number should increase according to the cascade slave number. Use e-link to connect the ESK-45F0063-D00 development board to PC and click the "HT45F0063-Master programming action" button to download on the software programming interface. After finishing the master programming, replace an ESK-45F0063-D00 development board and use e-link to click the "HT45F0063-Slave programming action" button to download on the software programming interface.

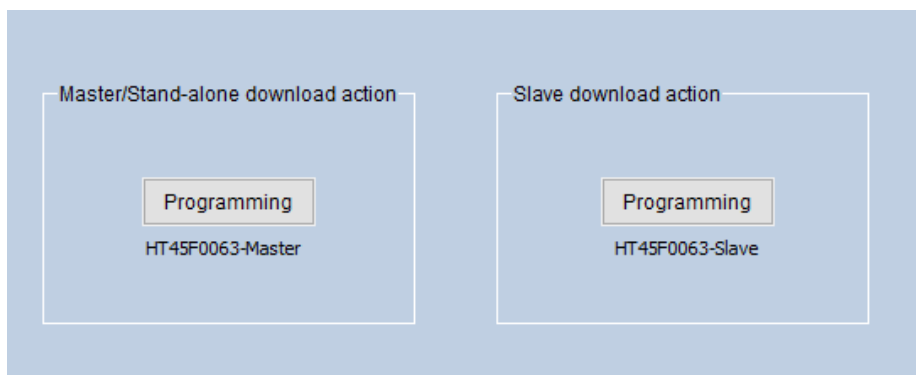


Figure 5.40

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the SCL pin and the SDA pin respectively.

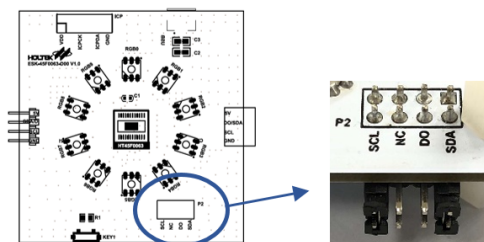


Figure 5.41

- (b) Connect the ESK-45F0063-D00 development board (Master programming) to ESK-45F0063-D00 development board (Slave programming), and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

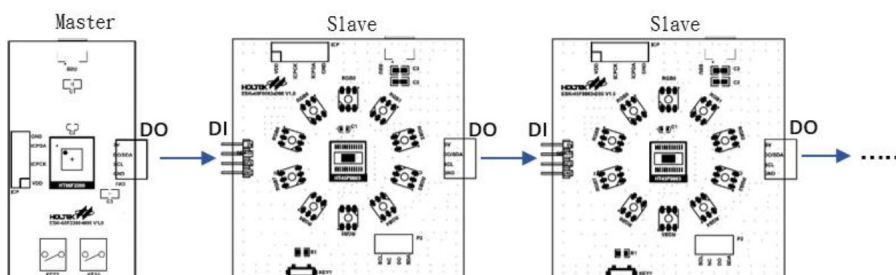


Figure 5.42 ESK-0063-D00 Cascade Connection

5.4.3 ESK-45F0063-D00 Development Board Using Steps (I²C Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select direct driving mode as drive status, select the operating frequency and set global brightness, select I²C mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

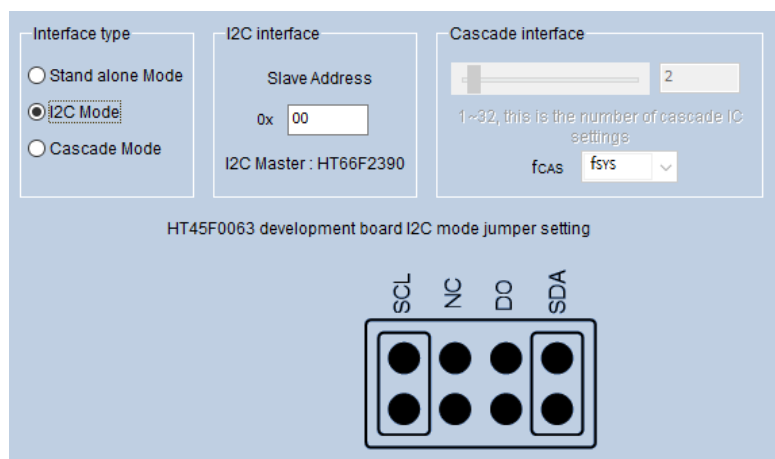


Figure 5.43

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

- (a) Slave programming: Firstly, set the I²C interface slave address, which can be set from 0x00 to 0x7f. For example, select 0x00 as the slave address and click the "Build Project" button. Use e-Link to connect the ESK-45F0063-D00 development board to PC, click the "Slave download action" button to download on the programming interface. After the download is completed, connect the next development board to e-Link, download it again, and complete the programming of all slaves in turn.
- (b) Master programming: After completing the ESK-45F0063-D00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 to connect the SCL pin and the SDA pin respectively.

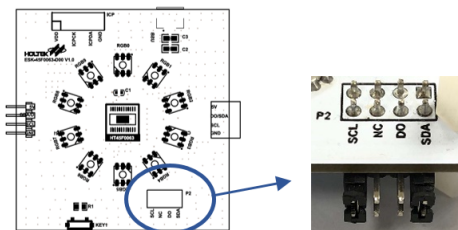


Figure 5.44

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0063-D00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

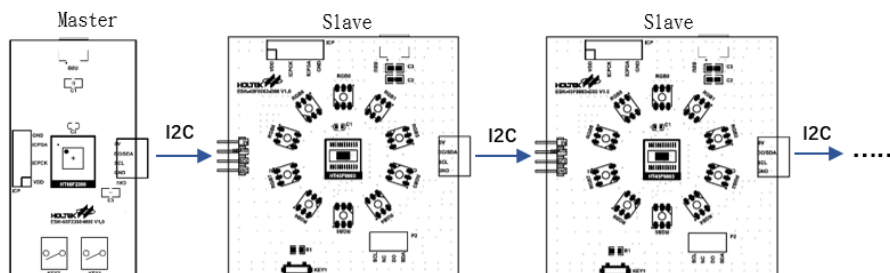


Figure 5.45 ESK-0063-D00 I²C Connection

5.5 ESK-45F0063-S00 Development Board

5.5.1 ESK-45F0063-S00 Development Board Using Steps (Stand-alone Mode)

Step1 IC basic settings:

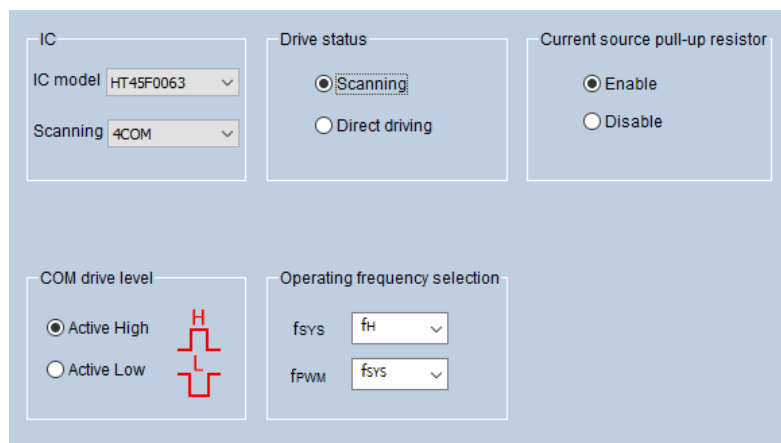


Figure 5.46 ESK-45F0063-S00 IC Basic Settings

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select scanning mode as drive status, select Active High as COM drive level, select the operating frequency and set global brightness according to the user's requirements, select stand-alone mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting, flowing setting and colorful streamer setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.



Figure 5.47 ESK-45F0063-S00 Programming Connection

Step4 Power on:

Disconnect the development board from e-Link and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

5.5.2 ESK-45F0063-S00 Development Board Using Steps (Cascade Mode)

5.5.2.1 HT66F2390 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model and select HT66F2390 as the cascade master according to requirements. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

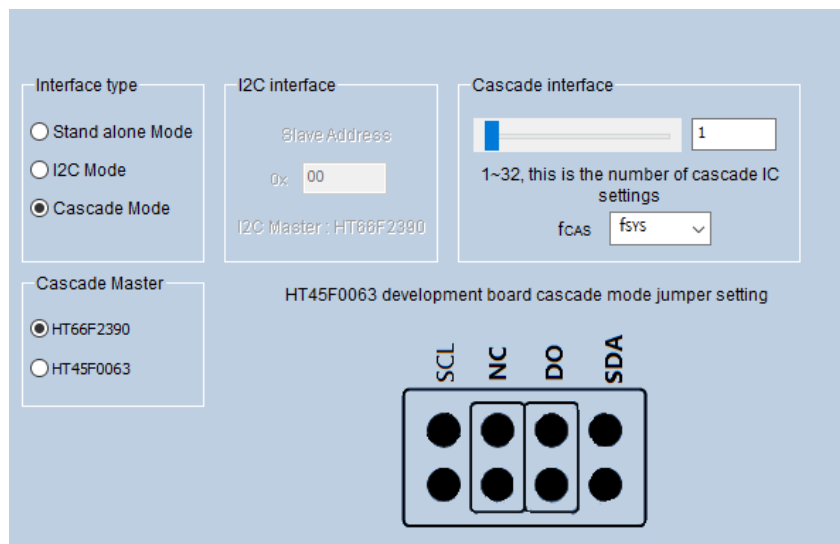


Figure 5.48

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Use e-Link to connect the ESK-45F0063-S00 development board to PC, click the "Slave download action" button to download on the programming interface. After completing the ESK-45F0063-S00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

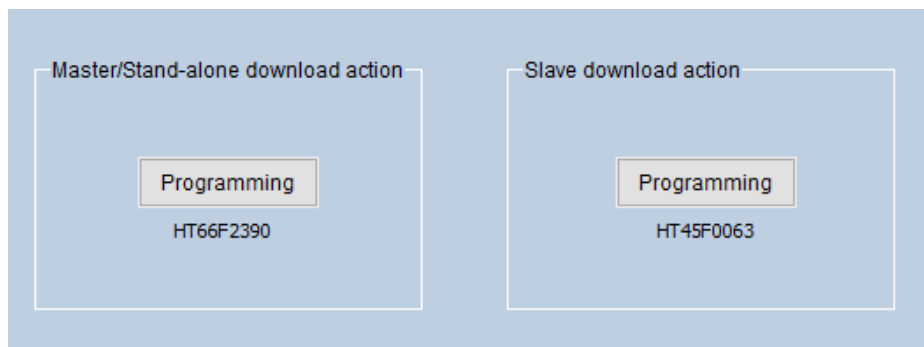


Figure 5.49

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link. Use the jumper cap at P2 to connect the DO pin and the NC pin respectively.

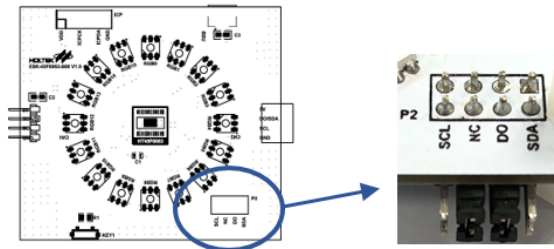


Figure 5.50

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0063-S00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

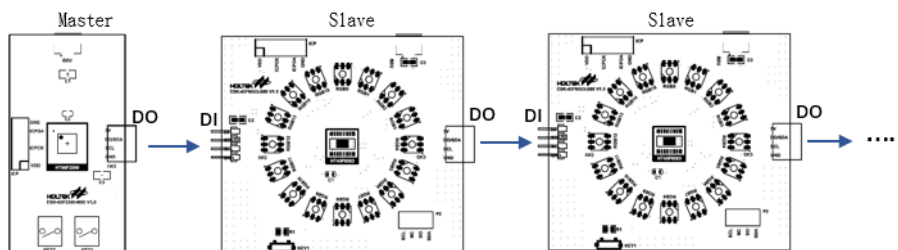


Figure 5.51 ESK-45F0063-S00 Cascade Connection

5.5.2.2 HT45F0063 is selected as a cascade master

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select cascade mode and slave IC number as the interface type by the interface setting, select HT45F0063 as the cascade master and select development board mode by the pin setting by default.

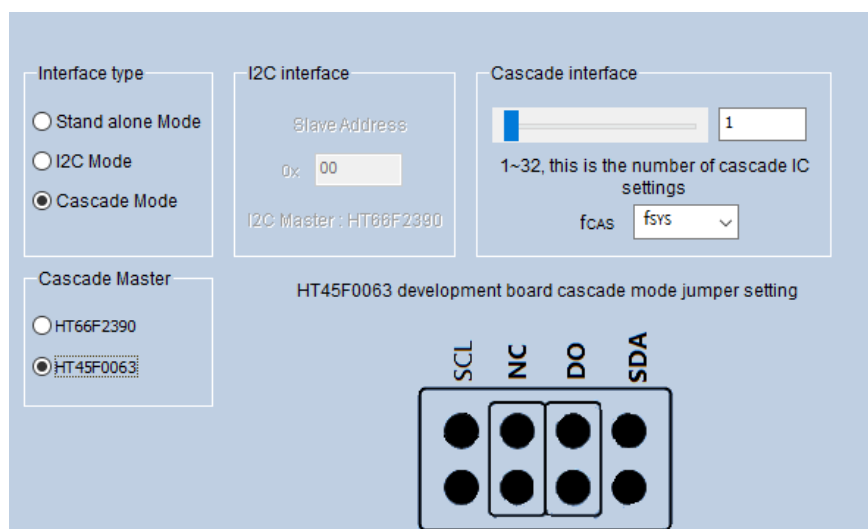


Figure 5.52

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

Prepare two or more ESK-45F0063-S00 development boards and connect them to PC. The development board number should increase according to the cascade slave number. Use e-link to connect the ESK-45F0063-S00 development board to PC and click the "HT45F0063-Master programming action" button to download on the software programming interface. After finishing the master programming, replace an ESK-45F0063-S00 development board and use e-link to click the "HT45F0063-Slave programming action" button to download on the software programming interface.

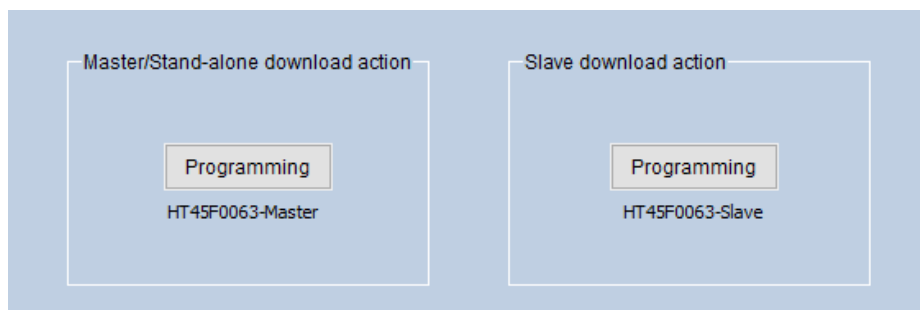


Figure 5.53

Step4 Connect and power on:

- (a) Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the DO pin and the NC pin respectively.

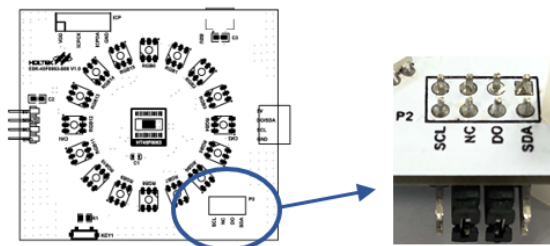


Figure 5.54

- (b) Connect the ESK-45F0063-S00 development board (Master programming) to ESK-45F0063-S00 development board (Slave programming), and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

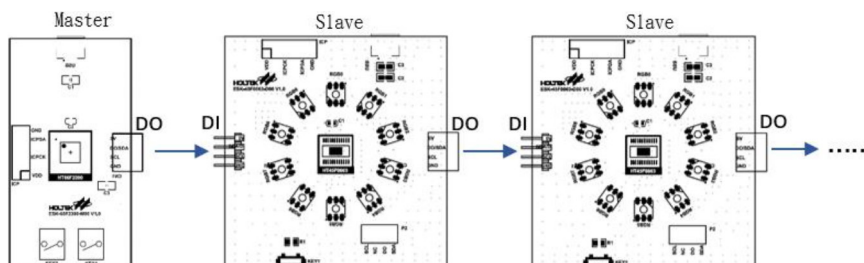


Figure 5.55 ESK-45F0063-S00 Cascade Connection

5.5.3 ESK-45F0063-S00 Development Board Using Steps (I²C Mode)

Step1 IC basic settings:

Open PC software interface for IC basic settings, select HT45F0063 as the IC model. Select scanning mode as drive status, select the operating frequency and set global brightness, select I²C mode as the interface type by the interface setting, and select development board mode by the pin setting by default.

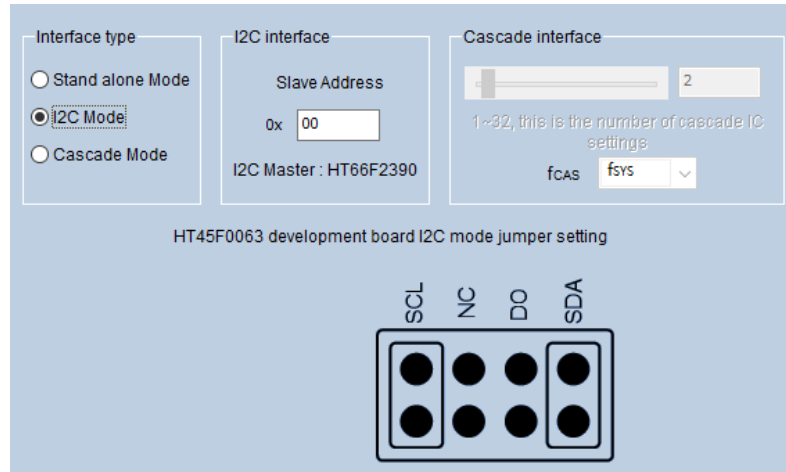


Figure 5.56

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out always-on setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

- Slave programming: Firstly, set the I²C interface slave address, which can be set from 0x00 to 0x7f. For example, select 0x00 as the slave address and click the "Build Project" button. Use e-Link to connect the ESK-45F0063-S00 development board to PC, click the "Slave download action" button to download on the programming interface. After the download is completed, connect the next development board to e-Link, download it again, and complete the programming of all slaves in turn.
- Master programming: After completing the ESK-45F0063-S00 development board programming, use e-Link to connect the ESK-66F2390-M00 development board to PC, click the "Master/Stand-alone download action" button to download on the programming interface.

Step4 Connect and power on:

- Disconnect the development board from e-Link, and use the jumper cap at P2 to connect the SCL pin and the SDA pin respectively.

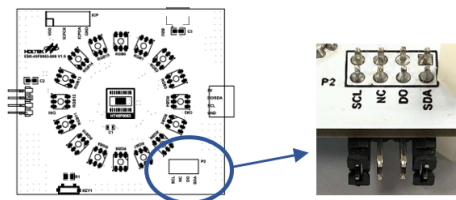


Figure 5.57

- (b) Connect the ESK-66F2390-M00 development board to ESK-45F0063-S00 development board, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

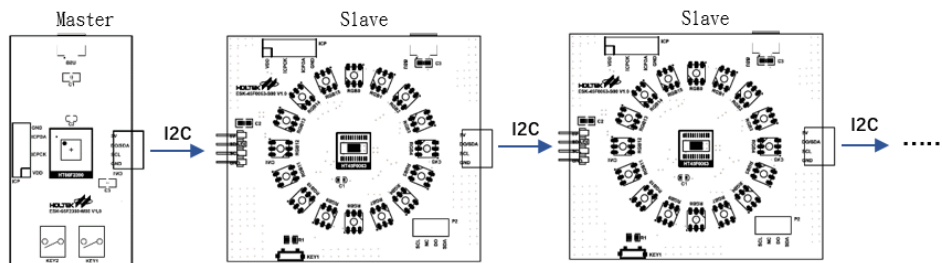


Figure 5.58 ESK-45F0063-S00 I²C Connection

5.6 ESK-66F2390-M00 Development Board

Step1 IC Basic Settings:

Open PC software interface for IC basic settings, and select the IC model and other basic settings required by user. Select I²C mode or cascade mode by the interface setting, and select the IC number according to the user's requirement.

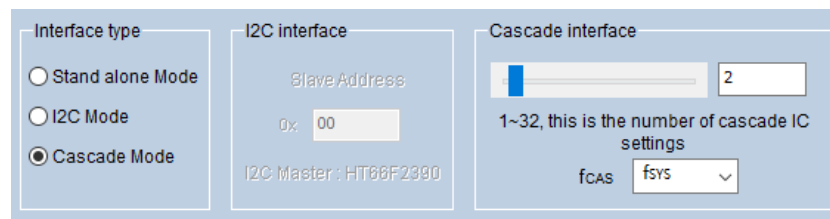


Figure 5.59

Step2 Function settings:

According to the user's requirements, select the lighting effect sequence and duration period, and carry out brightness setting, blinking setting, breathing setting and flowing setting respectively. If it needs to switch the lighting effect, click the "switch lighting effect option" button to enable this function.

Step3 Programming:

After the programming of the slave development board is completed, use e-Link to connect the ESK-66F2390-M00 development board to PC, and click the "Master/Stand-alone download action" button to download on the programming interface.

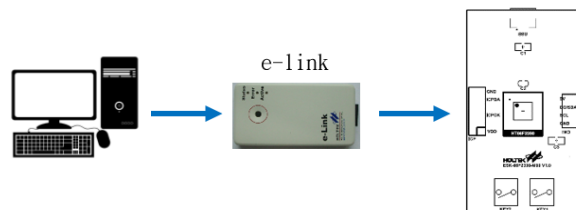


Figure 5.60 ESK-66F2390-M00 Programming Connection

Step4 Connect and power on:

With the different slave development boards, connect the ESK-66F2390-M00 development board with slaves in turn, and use the Micro USB power supply wire to supply power for the development board to achieve various lighting effects.

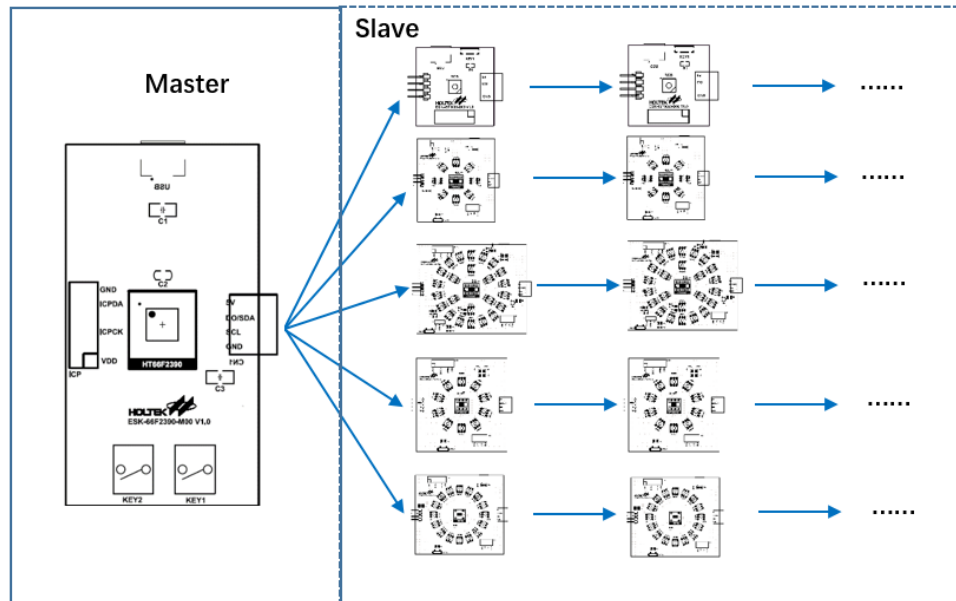


Figure 5.61 ESK-66F2390-M00 Master Slave Connection

6. Development Board Kits

6.1 ESK-66F2390-M00 Development Board Kits



Figure 6.1 ESK-66F2390-M00 Kits

6.2 ESK-45F0060-D00 Development Board Kits

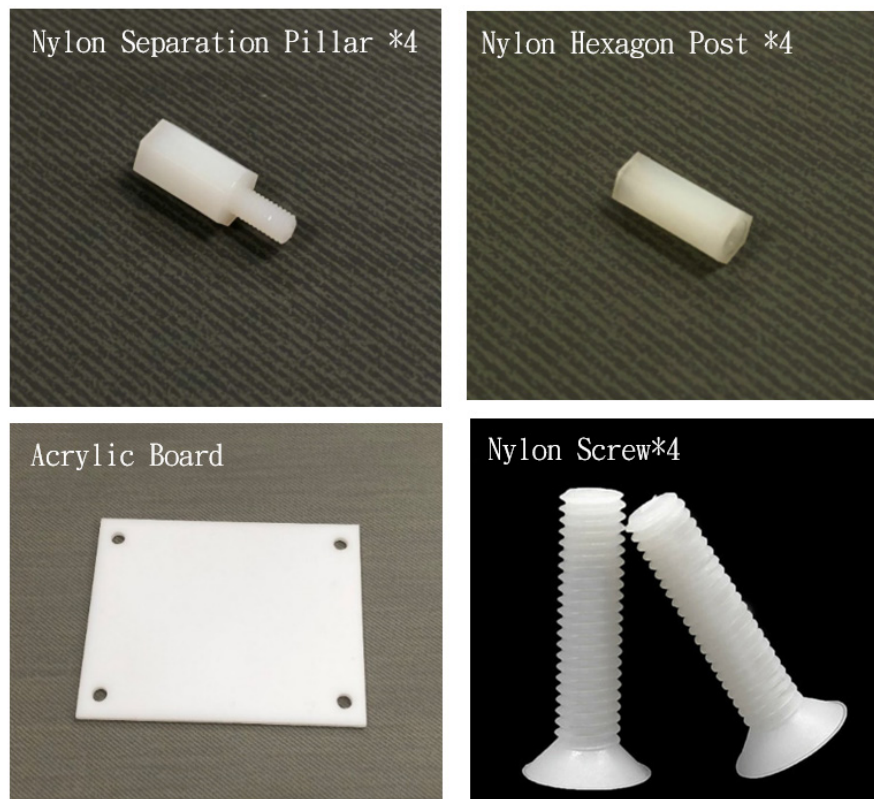


Figure 6.2 ESK-45F0060-D00 Kits

6.3 ESK-45F0062-D00 Development Board Kits

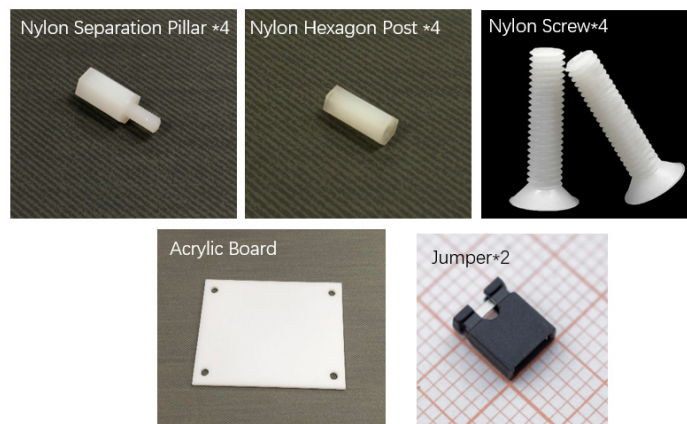


Figure 6.3 ESK-45F0062-D00 Kits

6.4 ESK-45F0062-S00 Development Board Kits

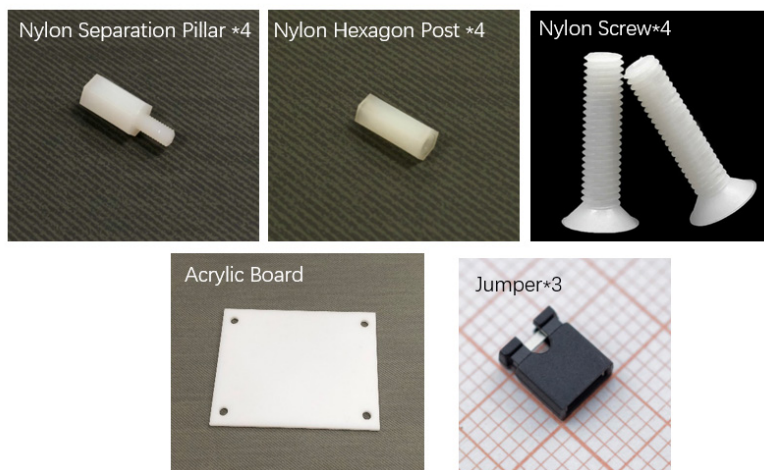


Figure 6.4 ESK-45F0062-S00 Kits

6.5 ESK-45F0063-D00 Development Board Kits

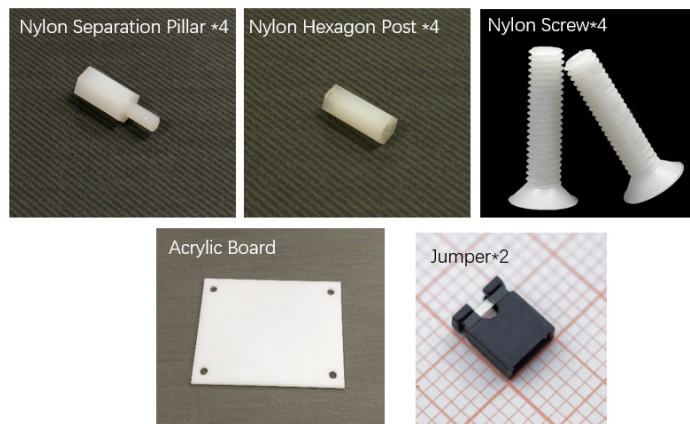


Figure 6.5 ESK-45F0063-D00 Kits

6.6 ESK-45F0063-S00 Development Board Kits

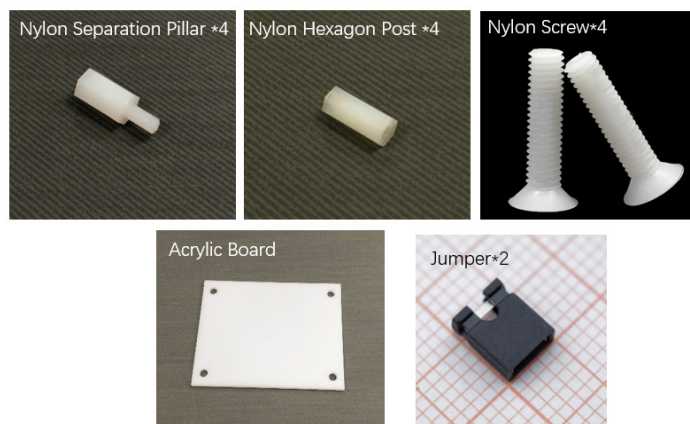


Figure 6.6 ESK-45F0063-S00 Kits

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