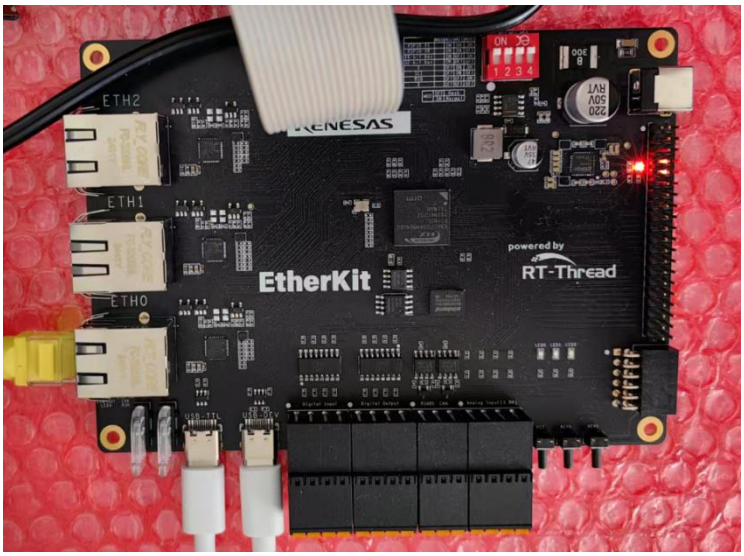
RZN2L key interrupt 例程操作手册-----基于 Etherkit 开发板

简介

本应用笔记介绍了基于 RZ/N2 Etherkit 开发板的 **key interrupt** 例程操作。分别介绍 IDE IAR 和 E2studio 软件下的操作。

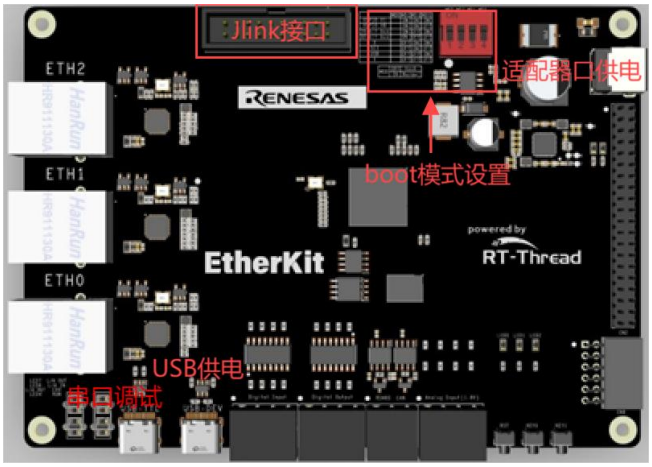
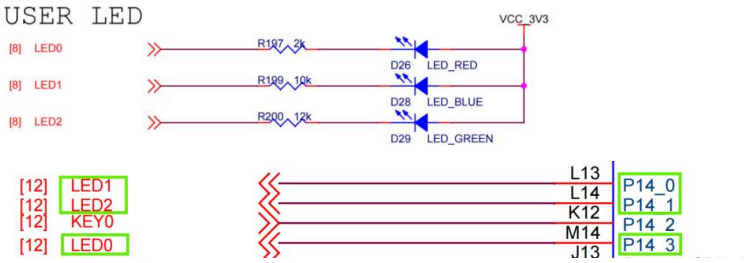
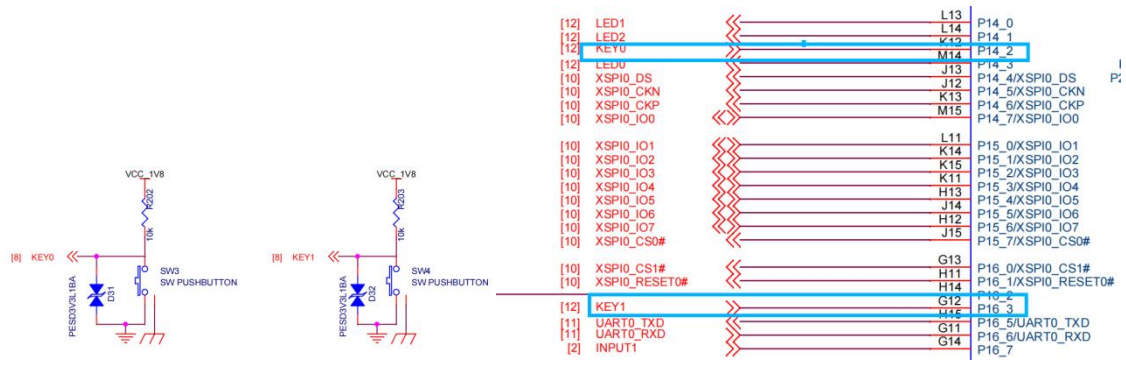


开发工具	实验材料
• IDE: IAR EW for Arm 9.50.2 E2studio 2024-01.1 • FSP：RZ/N2 FSP V2.0 • 仿真器： Jlink V12	• Etherkit 开发板 • Jlink 仿真器，需支持瑞萨 R52 内核

实验部分

1 .硬件设置及软件安装

本节 EtherKit 开发板硬件设置。

1.1	开发板设置： ● 供电：可选 USB 供电或适配器供电 ● Boot 模式设置：推荐 xSPI0 x1 boot mode ● Jlink v12 
1.2	LED 电路： 
1.3	Key 电路： 

本节完

2 .IAR 环境工程介绍

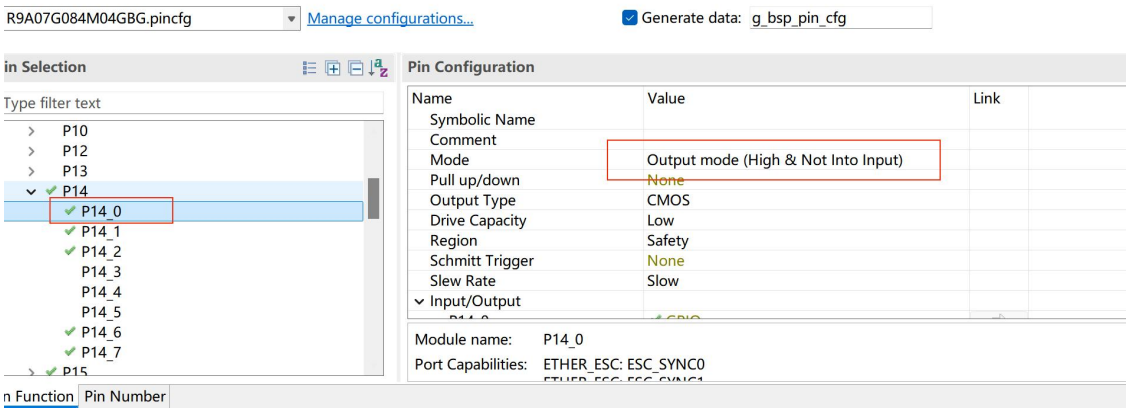
2.1

- 打开工程：key_interrupt

2.2

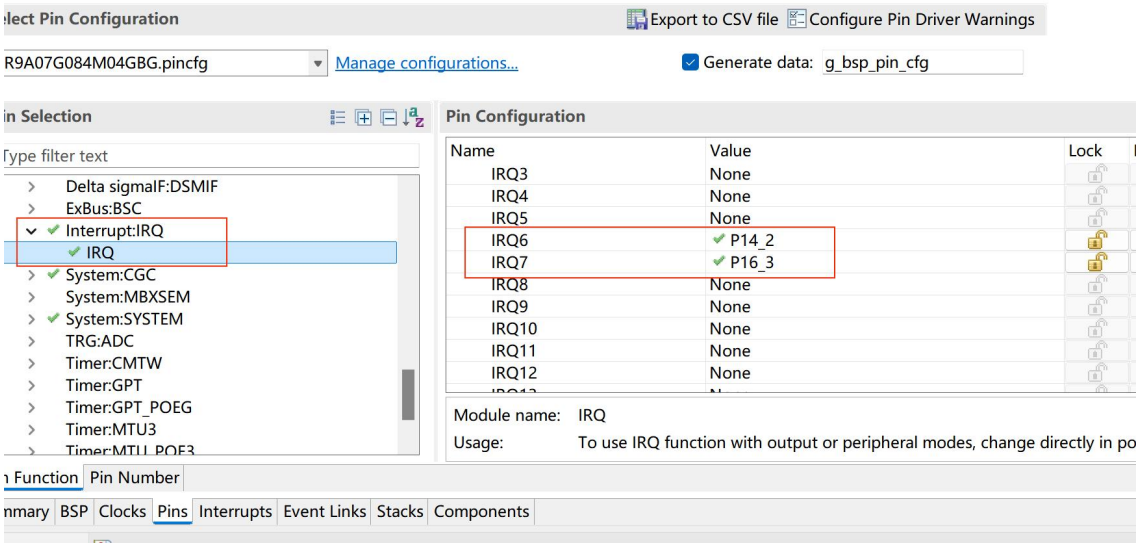
- FSP 配置

1. LED1 引脚配置，初始输出高电平，led 灯灭



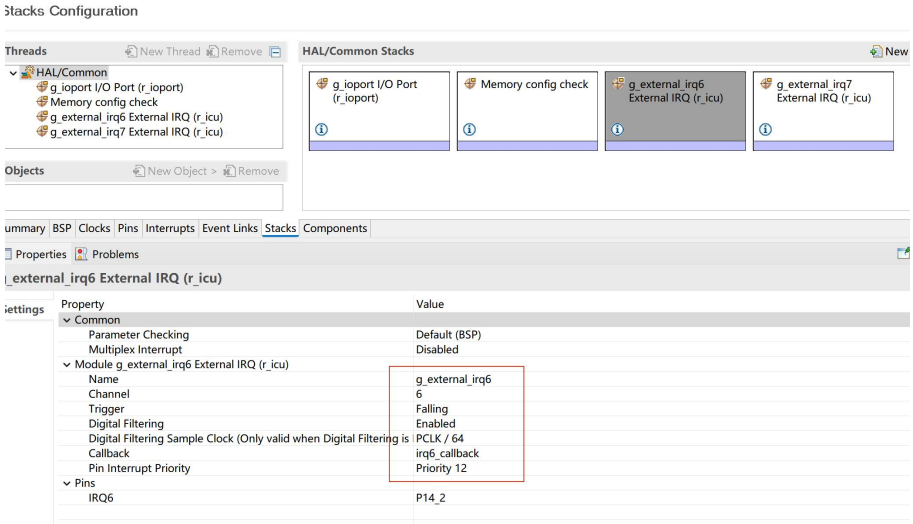
2. Interrupt 引脚配置

中断引脚配置 IRQ6 对应 P14_2，IRQ7 对应 P16_3

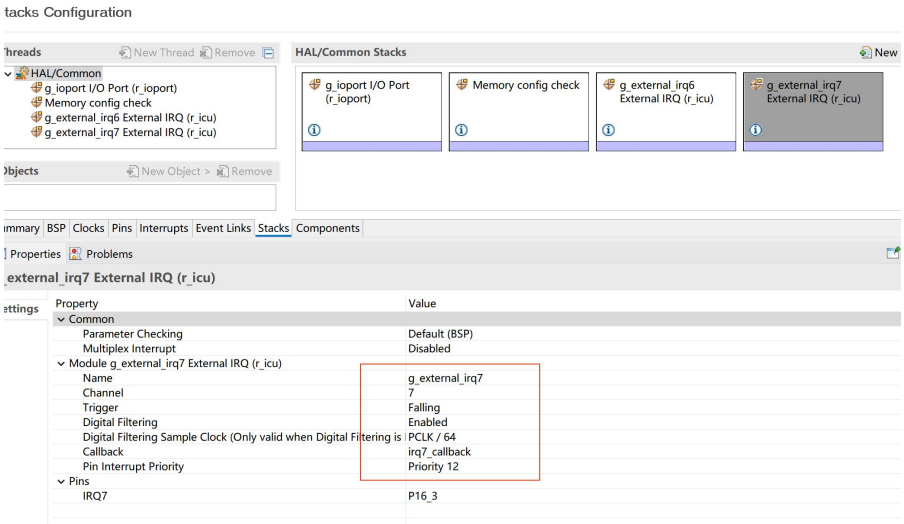


3. 配置中断功能

IRQ6 配置：下降沿中断，设置回调函数 irq6_callback，打开过滤功能



IRQ7 配置：下降沿中断，设置回调函数 irq7_callback，打开过滤功能

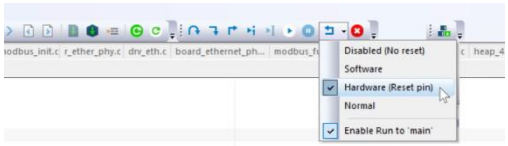


- 代码说明

中断回调函数中 IRQ6 点亮 LED1，IRQ7 中熄灭 LED1。

```
unsigned char g_external_irq_complete6 =0;
unsigned char g_external_irq_complete7 =0;
void irq6_callback (external_irq_callback_args_t * p_args)
{
    (void) p_args;
    g_external_irq_complete6 = 1;
    R_IOPORT_PinWrite(&g_ioport_ctrl, BSP_IO_PORT_14_PIN_0, BSP_IO_LEVEL_LOW);
}
void irq7_callback (external_irq_callback_args_t * p_args)
{
    (void) p_args;
    g_external_irq_complete6 = 1;
    R_IOPORT_PinWrite(&g_ioport_ctrl, BSP_IO_PORT_14_PIN_0, BSP_IO_LEVEL_HIGH);
}
/*****************************************************************************
```

	● 打开 IRQ 功能，使能中断
	`void hal_entry(void)`
	`{`
	`  /* TODO: add your own code here */`
	`  R_ICU_ExternalIrqOpen(&g_external_irq6_ctrl, &g_external_irq6_cfg);`
	`  R_ICU_ExternalIrqOpen(&g_external_irq7_ctrl, &g_external_irq7_cfg);`
	`  __asm volatile ("cpsie i");`
	`  __asm volatile ("isb");`
	`  R_ICU_ExternalIrqEnable(&g_external_irq6_ctrl);`
	`  R_ICU_ExternalIrqEnable(&g_external_irq7_ctrl);`
	`  while(1)`
	`  {`
	`  }`
	`}`
	● Rebuild All---编译工程 无报错
	uild
	Messages
	Total number of errors: 0
	Total number of warnings: 0
	Resolving dependencies...
	Build succeeded

2.3	● Download and Debug ---下载程序 1. Jlink 正确连接，板子上电 2. 下载工程到开发板，进入仿真界面 3. Debug 复位设置为 Hardware  4. 全速运行代码，观察开发板 led 变化 Key0 按下 LED1 亮，key1 按下 LED1 灭

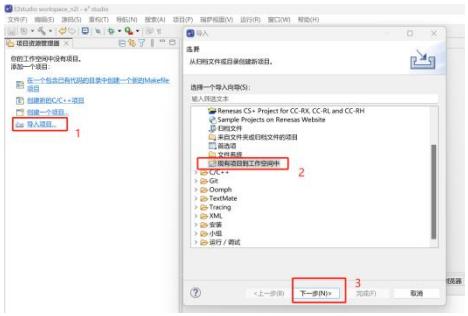
本节完

3 .E2studio 环境工程介绍

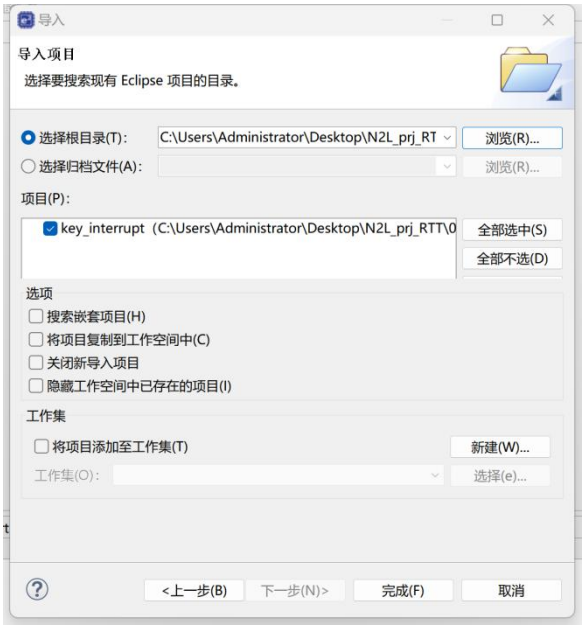
3.1

- 打开 E2studio，导入工程

1. 选择 文件--导入--下一步：



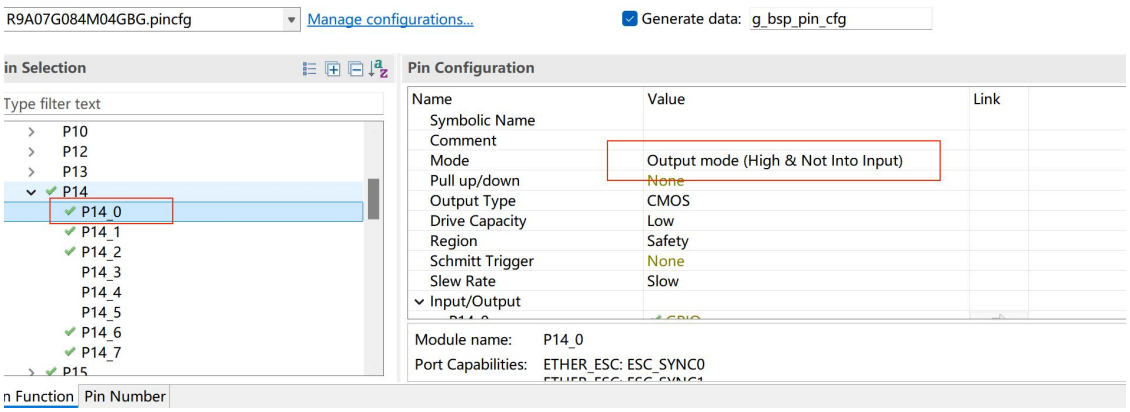
2. 浏览--指定到工程文件夹---完成



3.2

FSP 配置

1. LED1 引脚配置，初始输出高电平，led 灯灭



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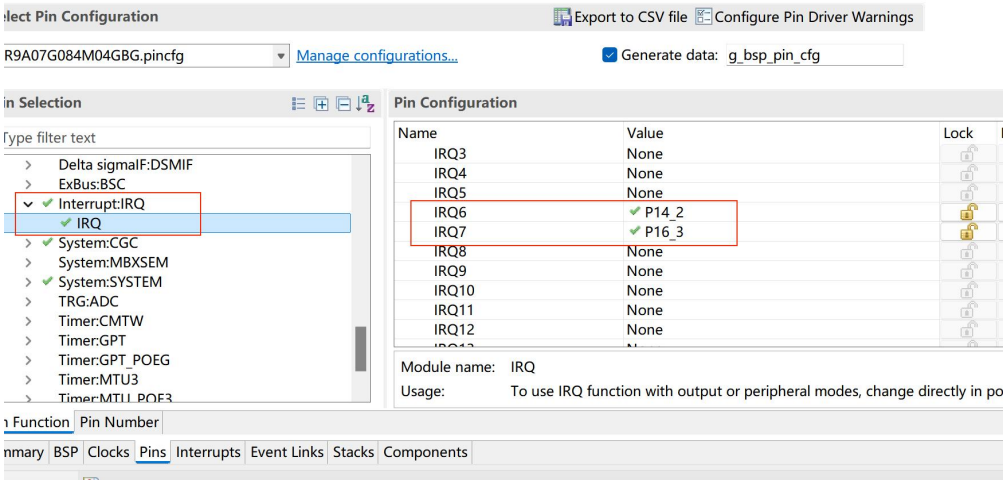
中断引脚配置 IRQ6 对应 P14_2，IRQ7 对应 P16_3



3. 配置中断功能

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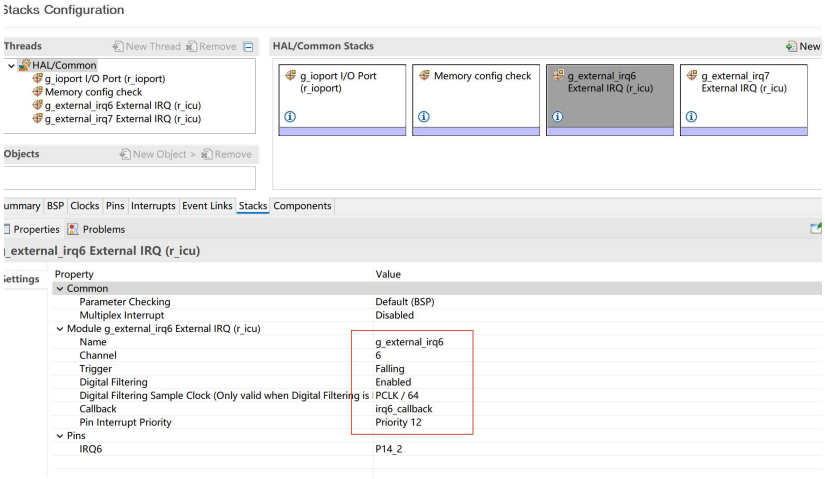
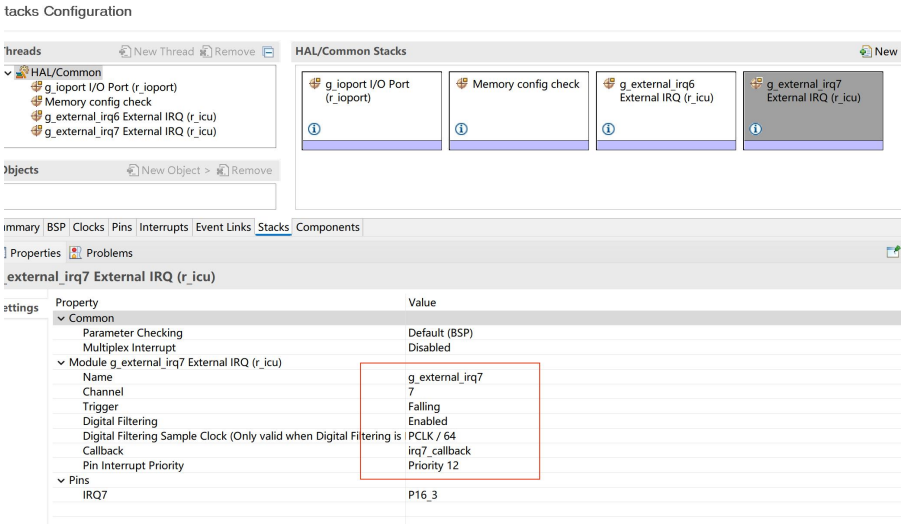


IRQ7 配置：下降沿中断，设置回调函数 irq7_callback，打开过滤功能



- 代码说明

中断回调函数中 IRQ6 点亮 LED1，IRQ7 中熄灭 LED1。

```
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unsigned char g_external_irq_complete7 =0;
void irq6_callback (external_irq_callback_args_t * p_args)
{
    (void) p_args;
    g_external_irq_complete6 = 1;
    R_IOPORT_PinWrite(&g_ioport_ctrl, BSP_IO_PORT_14_PIN_0, BSP_IO_LEVEL_LOW);
}
void irq7_callback (external_irq_callback_args_t * p_args)
{
    (void) p_args;
    g_external_irq_complete6 = 1;
    R_IOPORT_PinWrite(&g_ioport_ctrl, BSP_IO_PORT_14_PIN_0, BSP_IO_LEVEL_HIGH);
}
/*****************************************************************************************
```

- 打开 IRQ 功能，使能中断

```
 ******************************************************************************
void hal_entry(void)
{
    /* TODO: add your own code here */
    R_ICU_ExternalIrqOpen(&g_external_irq6_ctrl, &g_external_irq6_cfg);
    R_ICU_ExternalIrqOpen(&g_external_irq7_ctrl, &g_external_irq7_cfg);

    __asm volatile ("cpsie i");
    __asm volatile ("isb");

    R_ICU_ExternalIrqEnable(&g_external_irq6_ctrl);
    R_ICU_ExternalIrqEnable(&g_external_irq7_ctrl);
    while(1)
    {

    }
}
```

- 编译工程，无报错

问题 | 控制台 | 属性 | Smart Browser | Smart Manual | 内存 | 包含浏览器 | 搜索

CDT Build Console [key_interrupt]

```
10:35:43 **** 项目key_interrupt配置Debug的构建 ****
make -r --output-sync -j22 all
arm-none-eabi-size --format=berkeley "key_interrupt.elf"
   text    data     bss     dec     hex filename
   7820    2324   24464   34608    8730 key_interrupt.elf

10:35:44 Build Finished. 0 errors, 0 warnings. (took 186ms)
```

3.3

- 下载代码到开发板

E2studio 在线仿真下载，全速运行

3.4

- 观察开发板 led 变化

Key0 按下 LED1 亮，key1 按下 LED1 灭

本节完