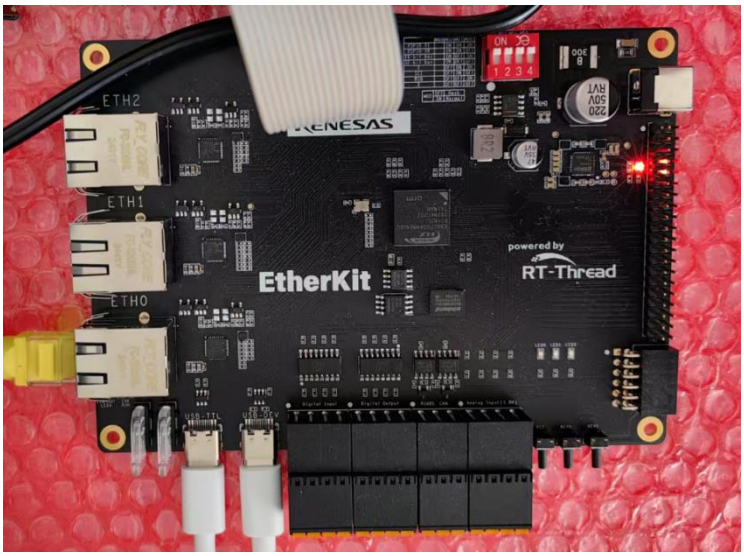
RZN2L IIC 例程操作手册-----基于 Etherkit 开发板

简介

本应用笔记介绍了基于 RZ/N2 Etherkit 开发板的 IIC 操作板载 EEPROM ：AT24C16。分别介绍 IDE IAR 和 E2studio 软件下的操作。

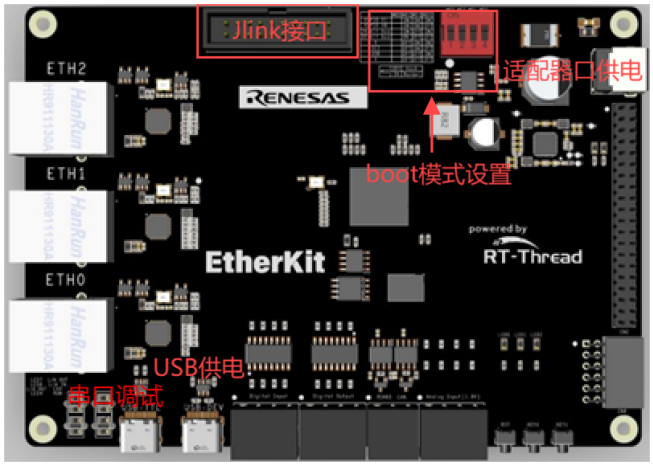
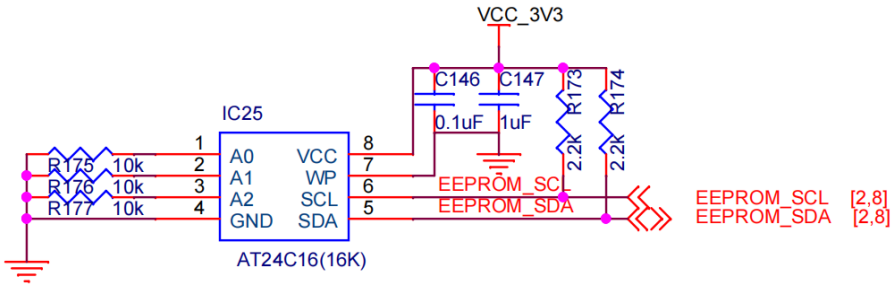


开发工具	实验材料
• IDE: IAR EW for Arm 9.50.2 E2studio 2024-01.1 • FSP：RZ/N2 FSP V2.0 • 仿真器： Jlink V12	• Etherkit 开发板 • Jlink 仿真器，需支持瑞萨 R52 内核

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	硬件原理图：  EtherKit 上的 EEROM 使用为 AT24C16 连接 芯片的 I IC0；

本节完

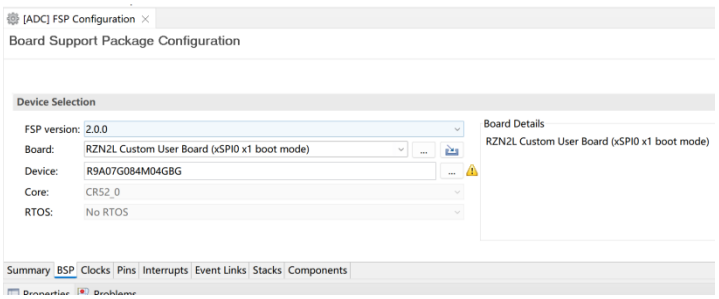
2 .IAR 环境工程介绍

本节介绍 IAR 环境下 IIC 工程。

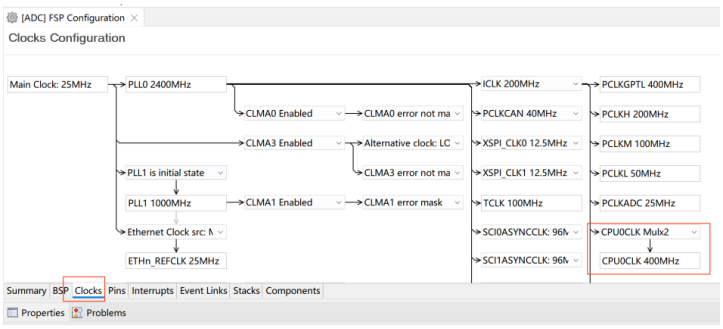
2.1

- 打开 FSP 新建工程：IIC

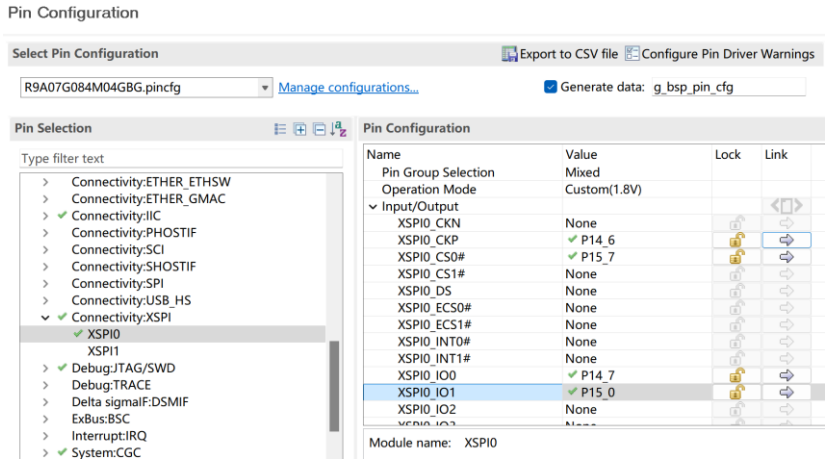
1. 选择 RZN2L Customer User Board（xSPI0 X1 boot mode）



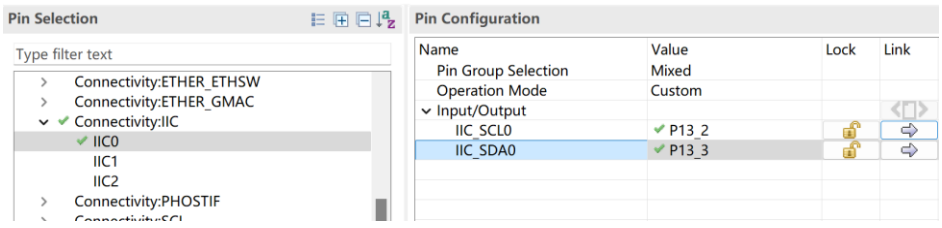
2. 主时钟设置 400MHZ



3. 配置 XSPI0

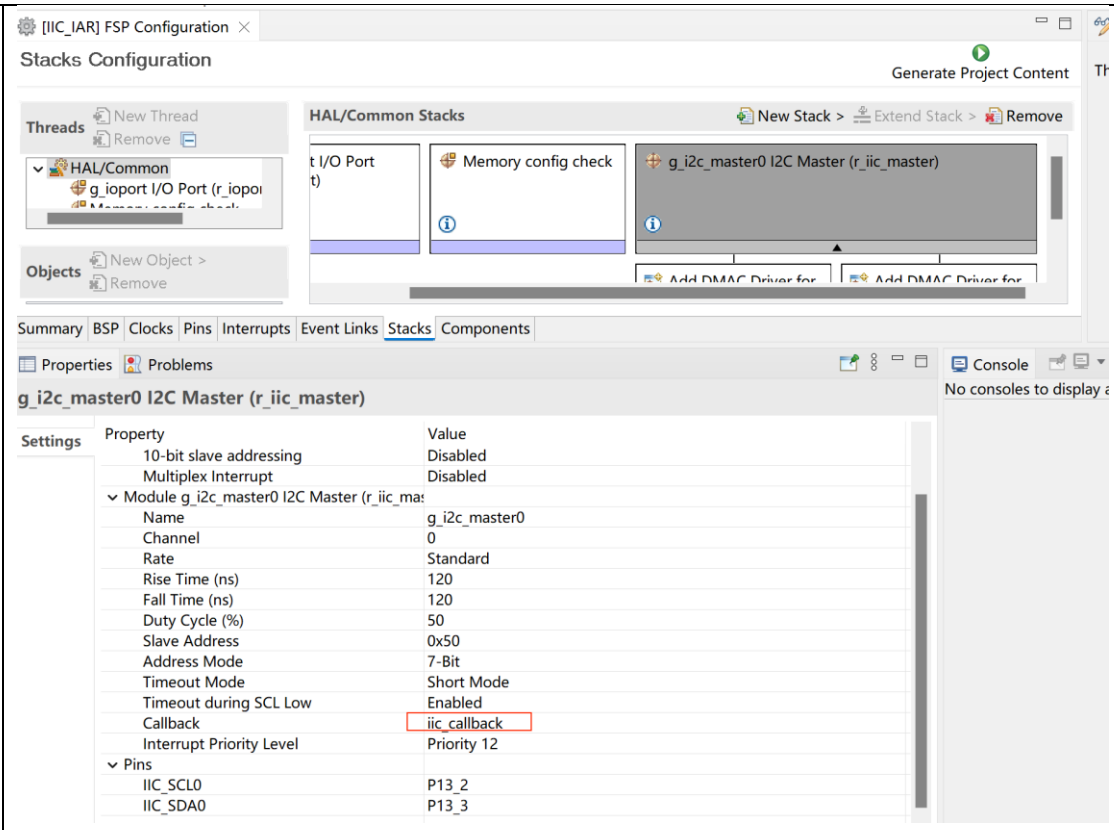


4. IIC 引脚配置

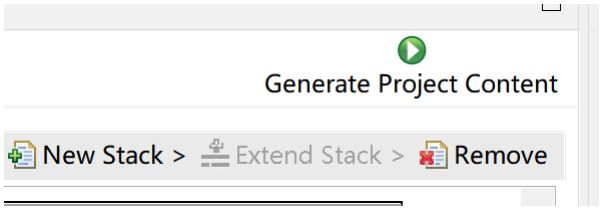


5. 添加 IIC master Stack

添加回调函数 iic_callback, 从机地址 设置 0X50 = EEPROM 7 位地址

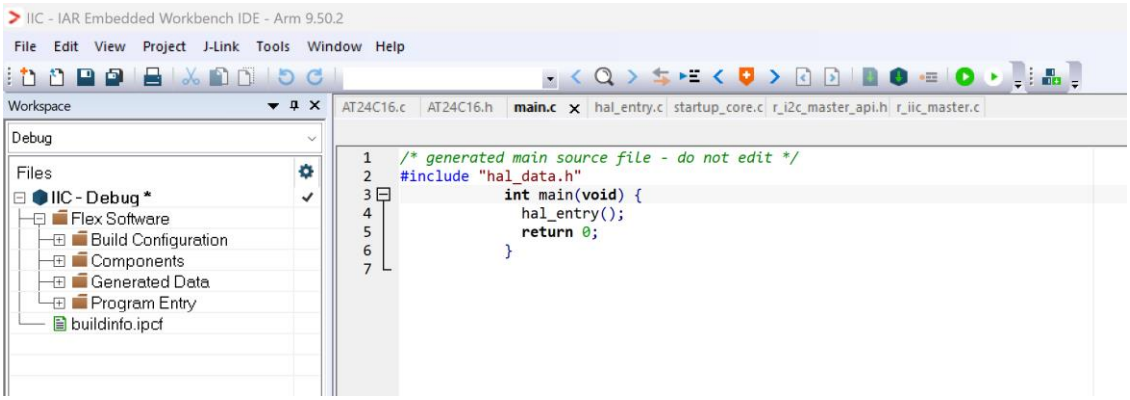


6. 点击：Generate Project Content 生成代码

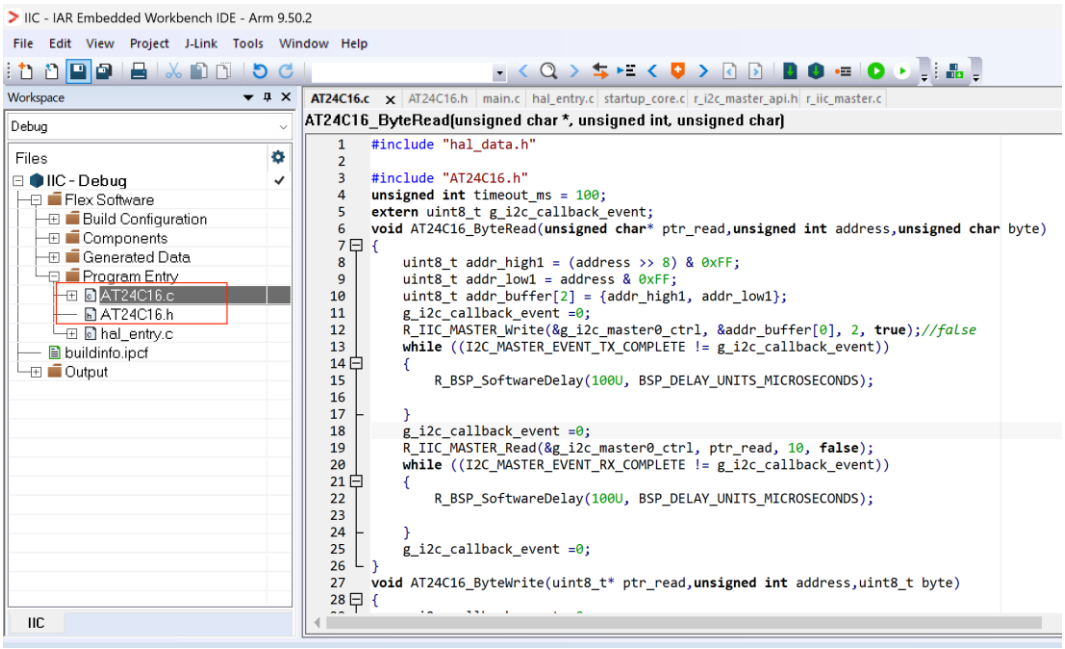


2.2

7. 打开生成的代码



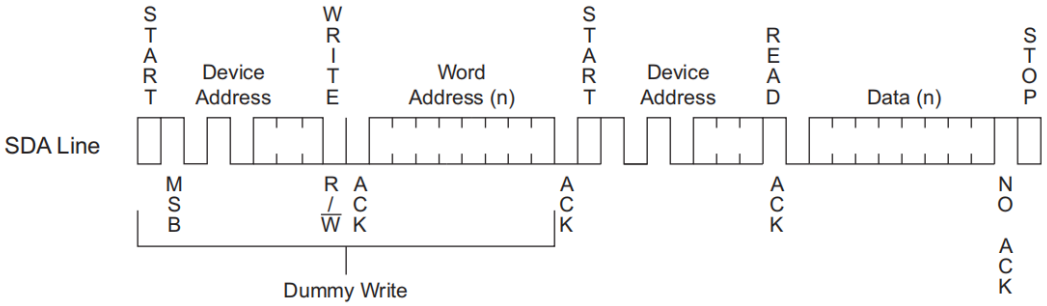
- 仿真器由 Ijet 切换为 Jlink
- 编写用户代码



➢ void AT24C16_ByteRead(unsigned char* ptr_read,unsigned int address,unsigned char byte) ;

实现随机地址读数据，实现 EEPROM 以下读时序：

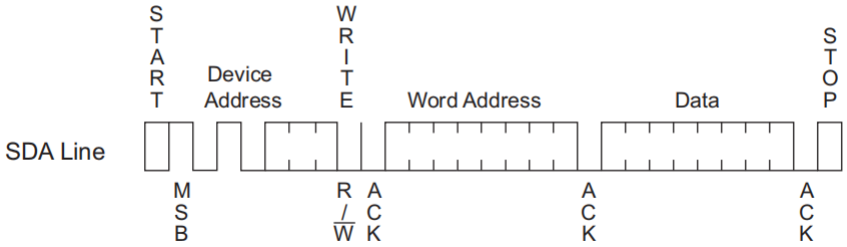
Figure 9-2. Random Read



➢ void AT24C16_ByteWrite(uint8_t* ptr_read,unsigned int address,uint8_t byte)；

实现随机地址写数据，实现 EEPROM 以下写时序：

Figure 8-1. Byte Write



- 回调函数编写，IIC 事件赋值给 g_i2c_callback_event

```
void iic_callback (i2c_master_callback_args_t * p_args)
{
  g_i2c_callback_event = p_args->event;
}
```

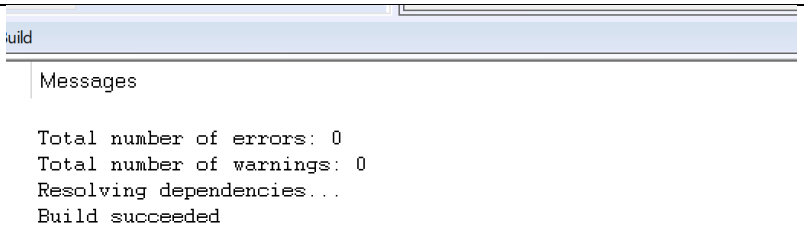
- 测试代码编写：写数据到 EEROM，然后读回来，看是否正确。

AT24C16.c | AT24C16.h | main.c | hal_entry.c | startup_core.c | r_i2c_master_api.h | r_iic_master.c

hal_entry()

```
22      fsp_err_t err;
23      uint8_t i;
24      //uint16_t write_addr;
25      //uint8_t read_data = 0x00;
26      uint8_t read_buffer[20]={};
27
28      err = R_IIC_MASTER_Open(&g_i2c_master0_ctrl, &g_i2c_master0_cfg);
29      if (FSP_SUCCESS != err)
30      {
31        while(1);
32      }
33      R_BSP_SoftwareDelay (10, BSP_DELAY_UNITS_MILLISECONDS);
34      __asm volatile ("cpsie i");
35      __asm volatile ("isb");
36
37
38      for(i=2;i<12;i++)
39      {
40        tx_buffer[i]=i-1;
41      }
42      AT24C16_ByteWrite(&tx_buffer[0],0X0000,12);
43
44      for(i=0;i<10;i++)
45      {
46        read_buffer[i]=0;
47      }
48
49      R_BSP_SoftwareDelay (100, BSP_DELAY_UNITS_MILLISECONDS);
50      AT24C16_ByteRead(&read_buffer[0],0x0000,10);
51
52      while(1)
53      {
54
```

- Rebuild All---编译工程 无报错

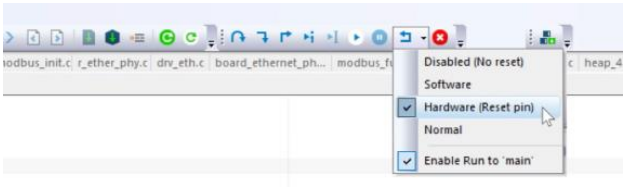


2.3

- Download and Debug ---下载程序

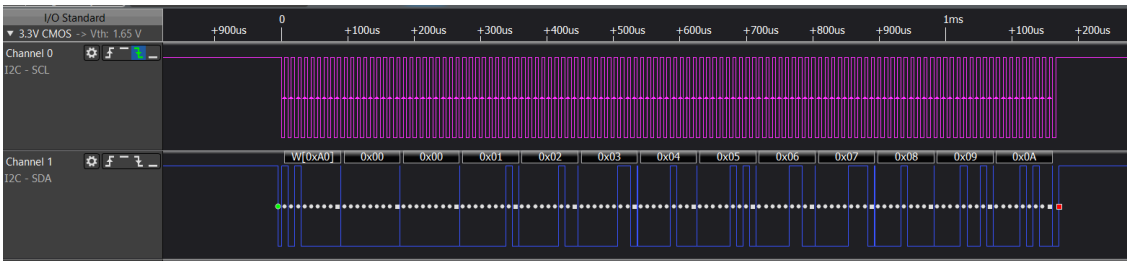
➢ 下载工程到开发板，进入仿真界面

➢ Debug 复位设置为 Hardware



➢ 全速运行代码，以下是逻辑分析仪抓到的写数据和读数据时序。

读到的数据和写入一致。



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3 .E2studio 环境工程介绍

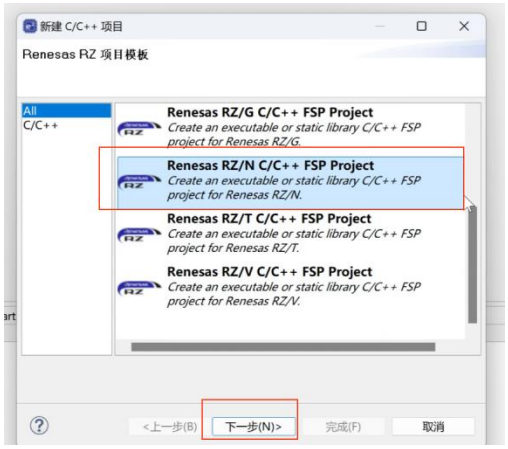
本节介绍使用 E2studio 环境创建 IIC 工程。

3.1

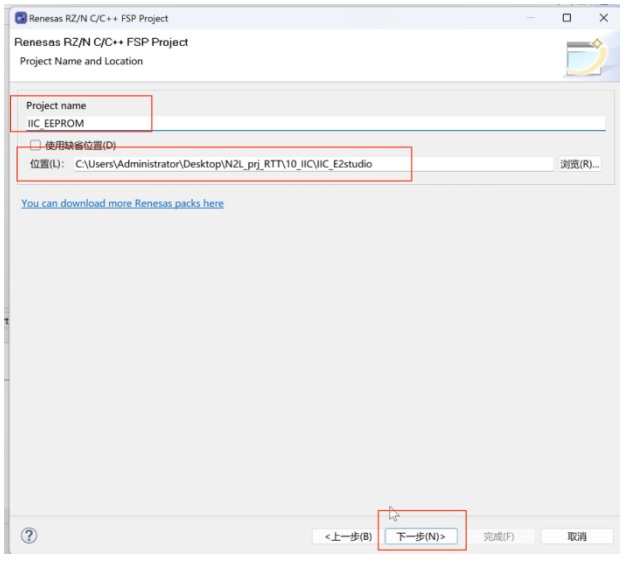
- 打开 E2studio，新建工程

1. 选择　文件--新建--瑞萨 C/C++项目--Renesas RZ：

2. 选择 Renesas RZ/N C/C++ FSP Project

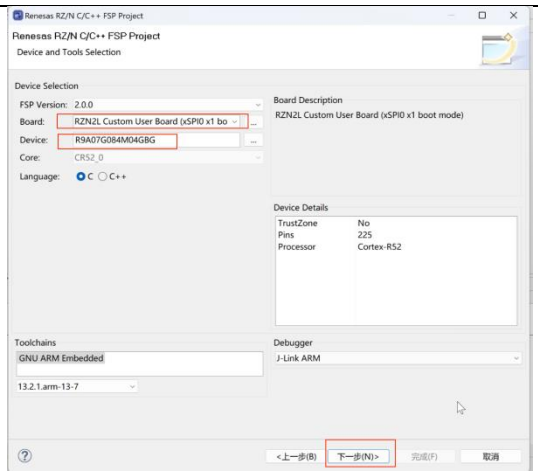


3. 设置项目名称：IIC_EEPROM，选择工程保存路径

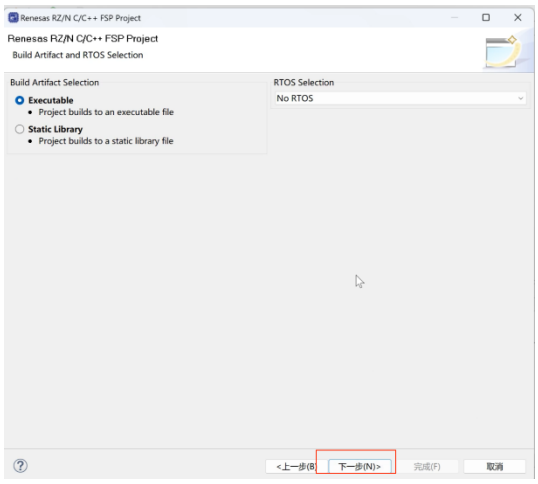


4. Boot 模式选择 RZN2L Custom User Board（ XSPI0 x1 boot mode）

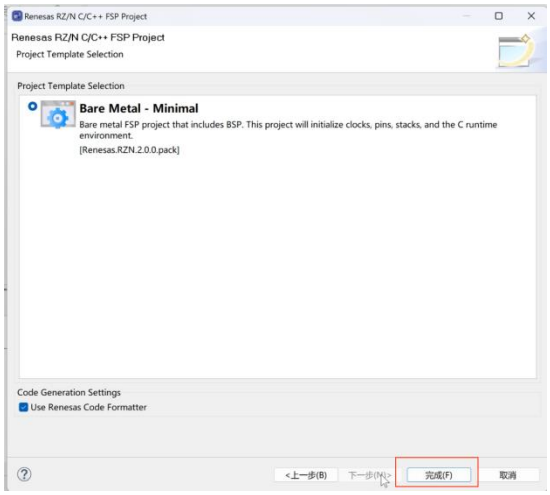
芯片型号：R9A07G084M04GBG



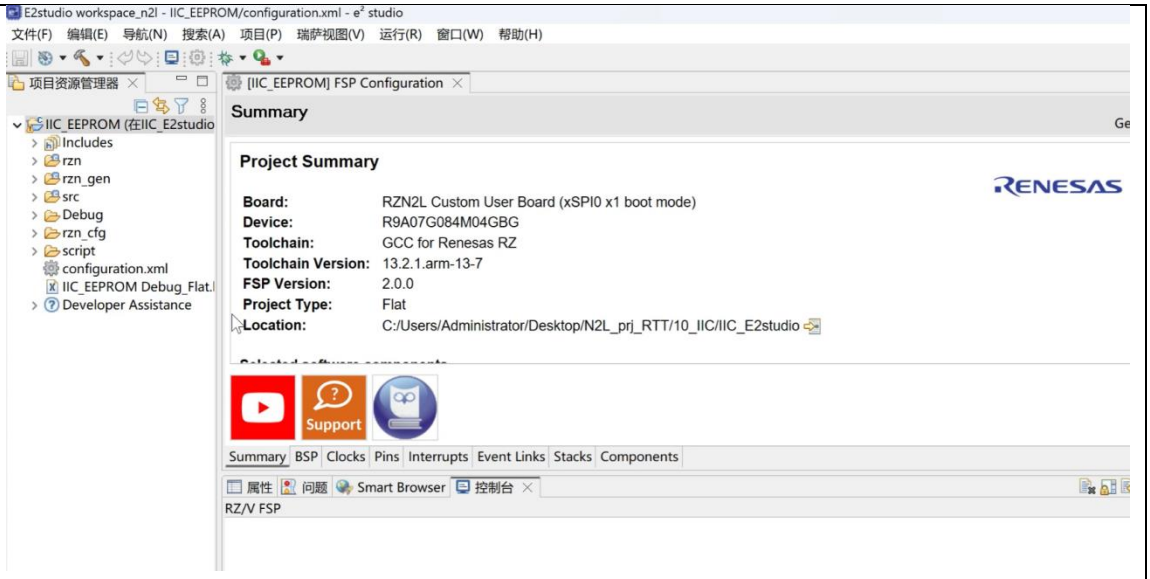
5. 直接下一步



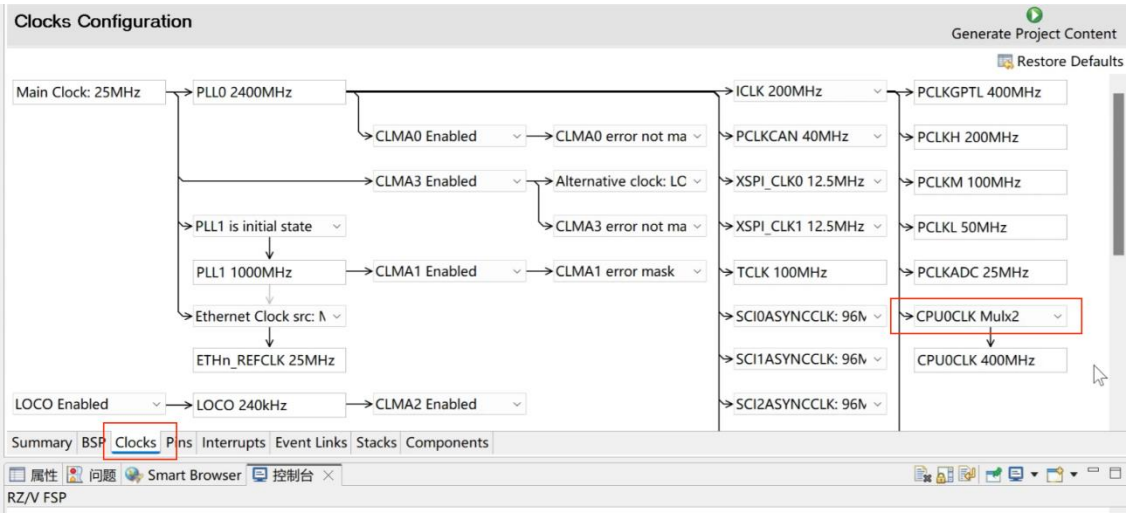
6. 点击 完成



7. 进入到工程界面

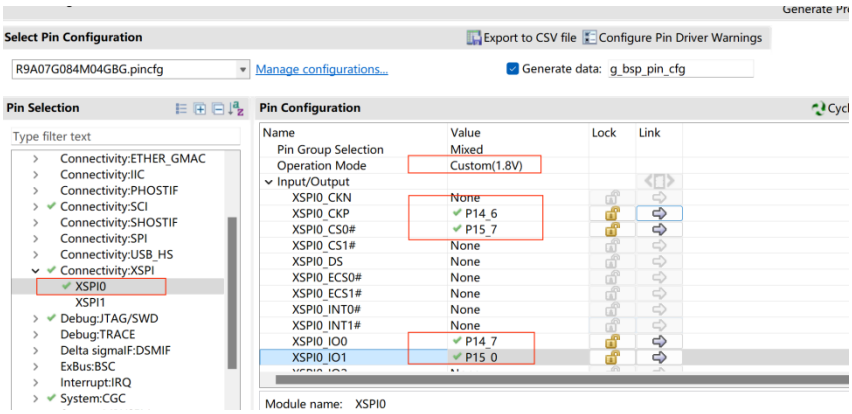


8. 设置时钟 CPU0CLK 400MHZ



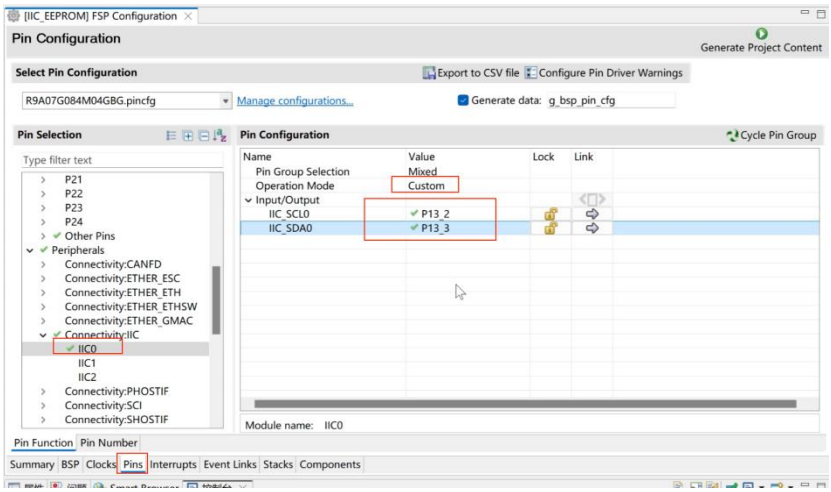
3.2

9. 配置 XSPI0

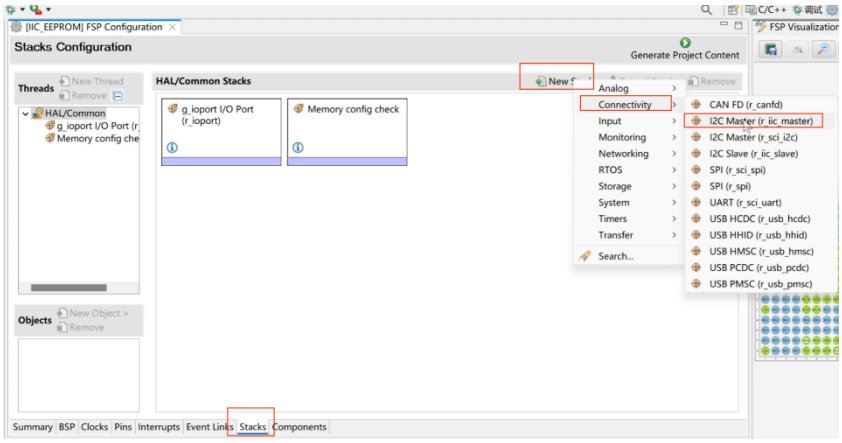


10. IIC 引脚配置

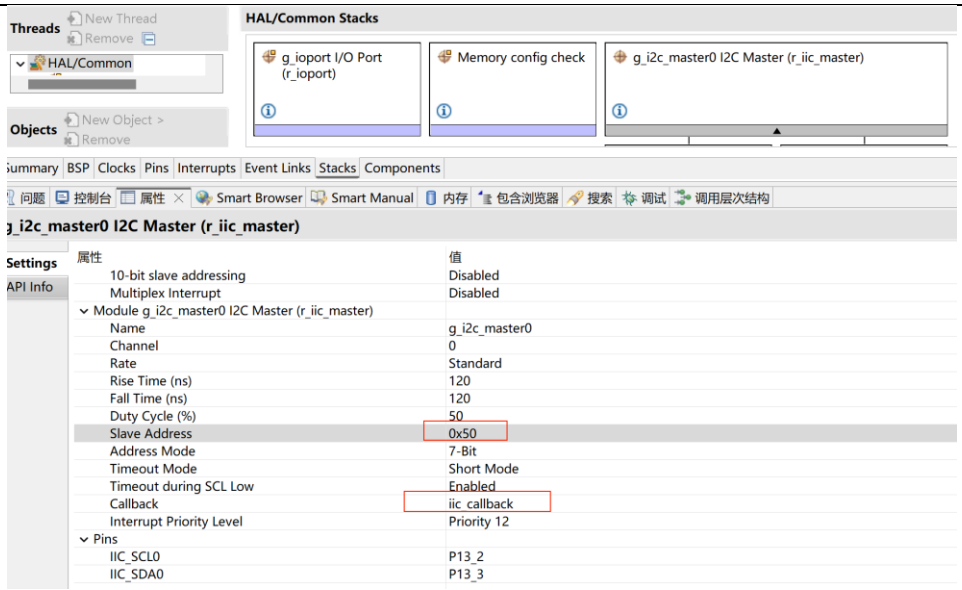
由原理图可知 EEPROM 接到 IIC0，打开 IIC0 外设，配置引脚。



8. 添加 NEW Stack： IIC master Stack



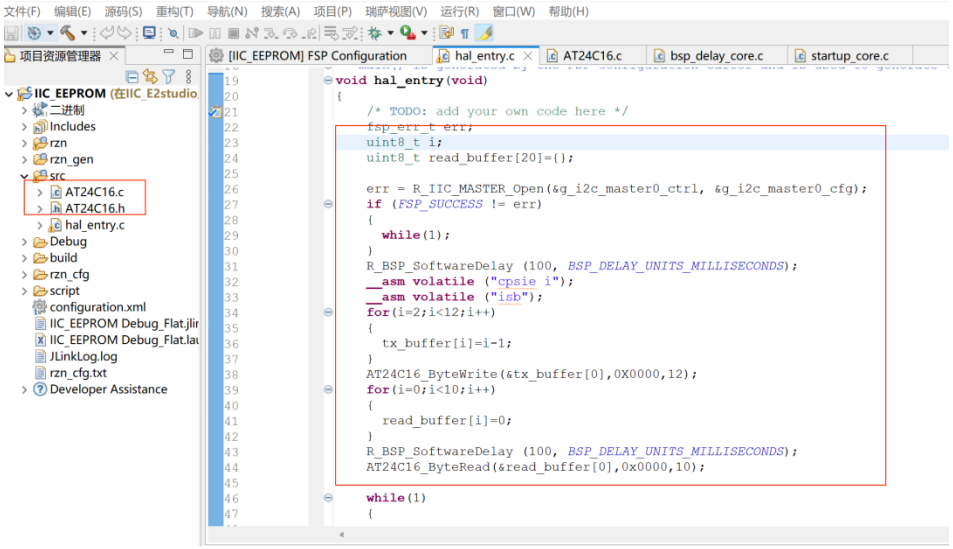
9. 设置回调函数 iic_callback， 从机地址 0X50



10. 设置完毕，点击 Generate Project Content 生成代码

11. 用户代码编写

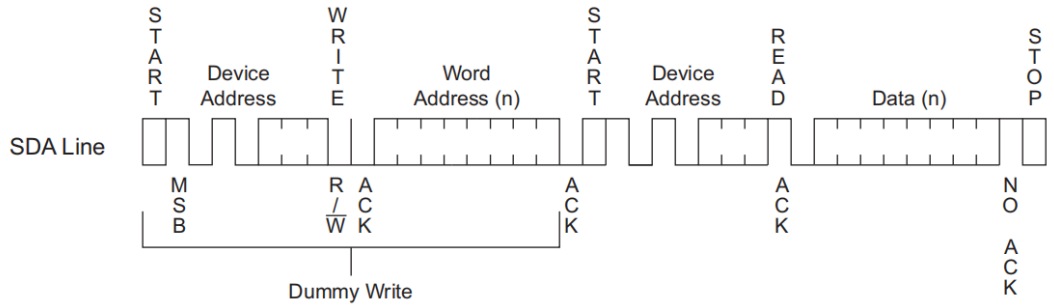
添加用户代码到工程，



➢ void AT24C16_ByteRead(unsigned char* ptr_read,unsigned int address,unsigned char byte)；

实现随机地址读数据，实现 EEPROM 以下读时序：

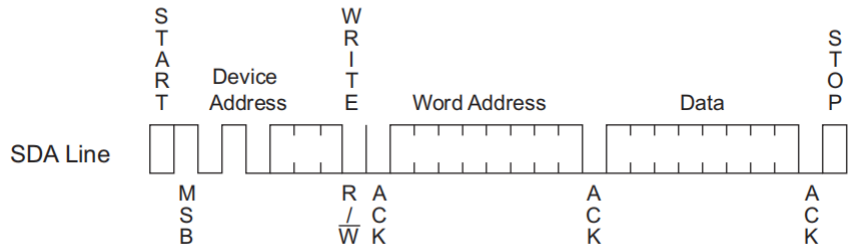
Figure 9-2. Random Read



➢ void AT24C16_ByteWrite(uint8_t* ptr_read,unsigned int address,uint8_t byte) ;

实现随机地址写数据，实现 EEPROM 以下写时序：

Figure 8-1. Byte Write

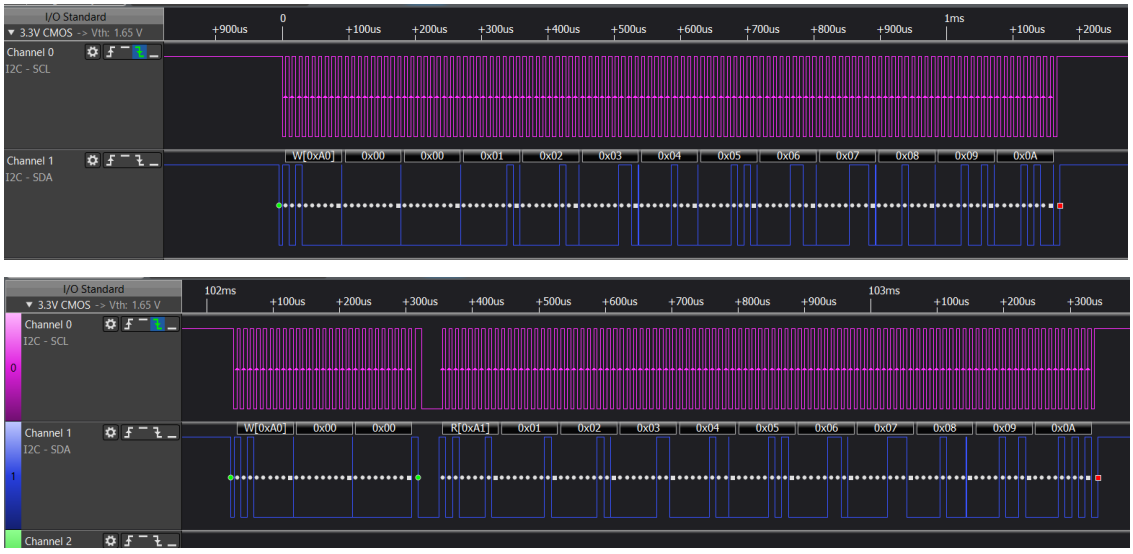


3.3

● 下载代码到开发板

编译代码，无报错。

E2studio 在线仿真下载，全速运行

3.4	● 全速运行代码，以下是逻辑分析仪抓到的写数据和读数据时序。 读到的数据和写入一致。 

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