FG23-DK2600A 开发板初体验

1 主题

基于 SS5 环境开箱体验 FG23-DK2600A 开发套件。

2 摘要

本次测试基于 Silicon Labs 公司的 FG23-DK2600A 开发套件，搭建相应的 IDE 环境，使用工程向导生成闪灯测试代码并编译下载运行，体验和验证整个开发环境。

FG23-DK2600A 是一款紧凑、功能丰富的开发平台，内含一颗带段式液晶控制器、LEESE、脉冲计数器等实用功能的基于 xG23 512kB 闪存的 SoC——EFR32FG23B010F512IM48，板上集成了调试和数据包追踪、虚拟 COM 端口、SEGGER J-Link 调试器、SMC 连接器（套件内附一根 868MHz 天线和一根 915MHz）、5 位 7 段数码液晶显示屏、Si7021 温湿度传感器、LC 传感器、LED 灯、按键、纽扣电池座等资源。

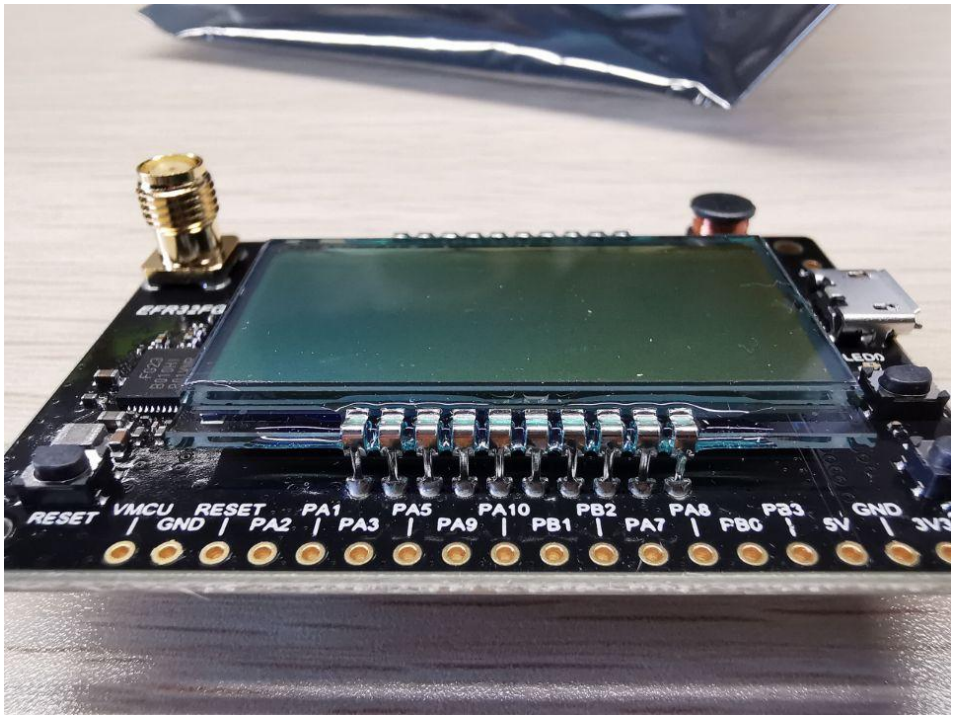
因为只有一个开发板，暂时无法进行无线通信的测试，本次体验将重点放在硬件和软件环境的搭建，为后续的开发测试打基础。

3 试验过程

3.1 开箱

该套件外包装盒标签上打印的版本号是 A01，实际上开发板上激光打印的是 A02。总的印象是小巧玲珑，功能强大，不足之处是无线测试本该至少两块板子，但该套件只配备了一块。

915MHz
868MHz


RESET
VMCU
GND
RESET
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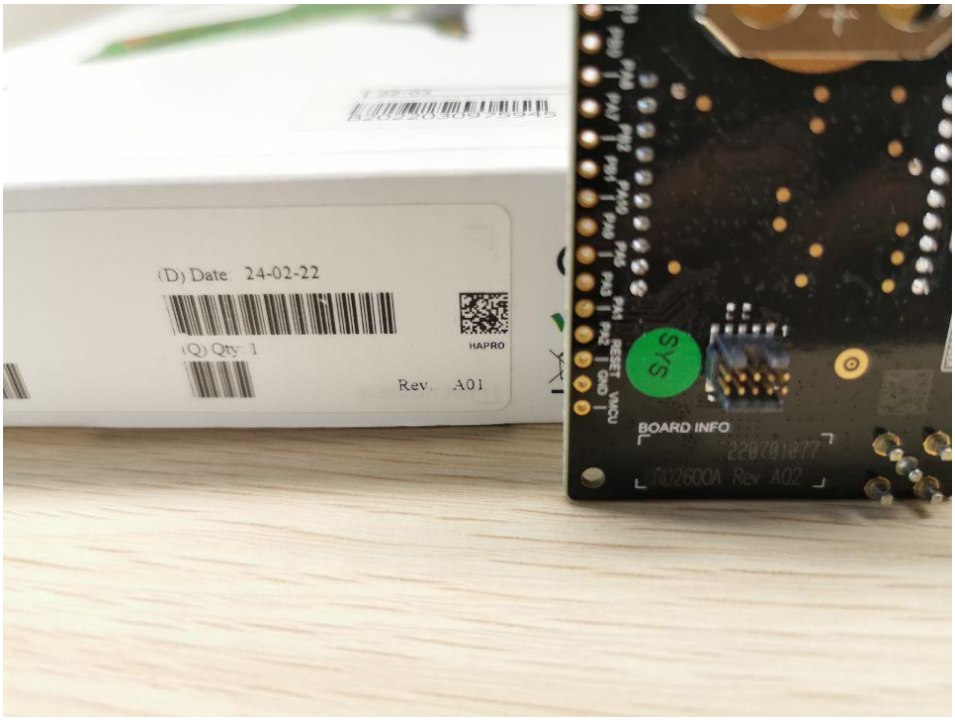
PA5
PA9
PA10
PB1
PB2
PA7
PA8
PB0
PB3
5V
GND

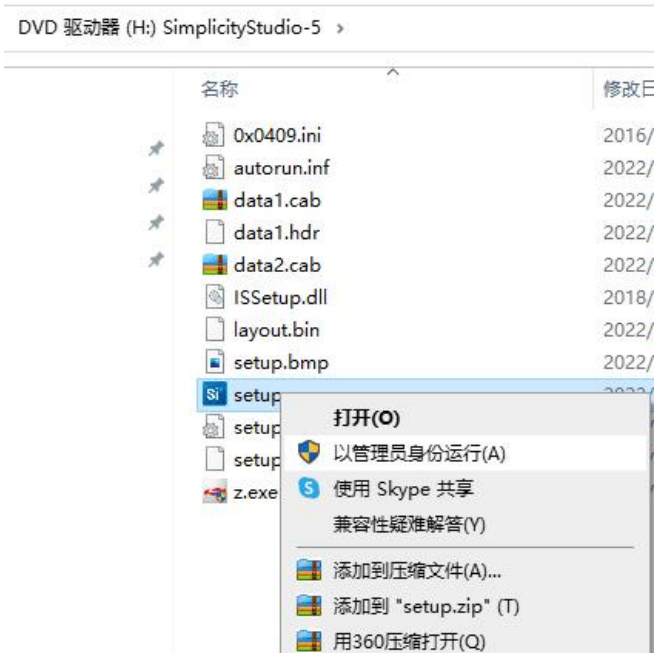


3.2 安装 Simplicity Studio v5

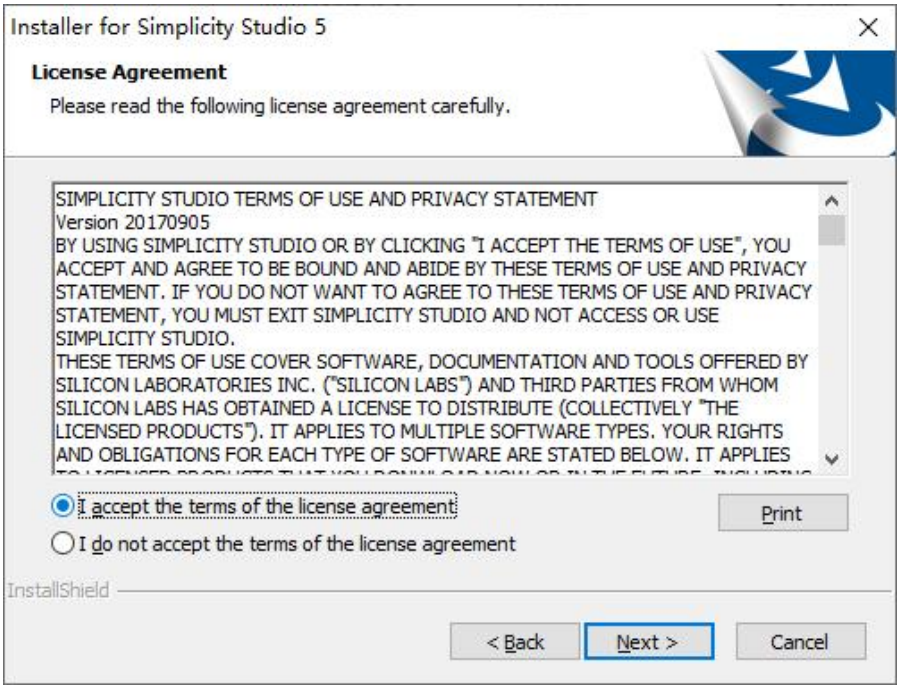
Simplicity Studio 是集成所有 Silicon Labs 技术、SoC 和模块的统一开发环境，提供对特定目标设备的 Web 和 SDK 资源的访问；软件和硬件配置工具；具有行业标准代码编辑器、编译器和调试器的集成开发环境(IDE)。借助 Simplicity Studio，用户可获得全套高级增值工具，用于网络分析和代码相关能耗分析。目前最新的版本是 SS 5，可适用 Windows、Mac、Linux 等操作系统。

我的 PC 是 Windows10（64 位）环境，安装过程如下：

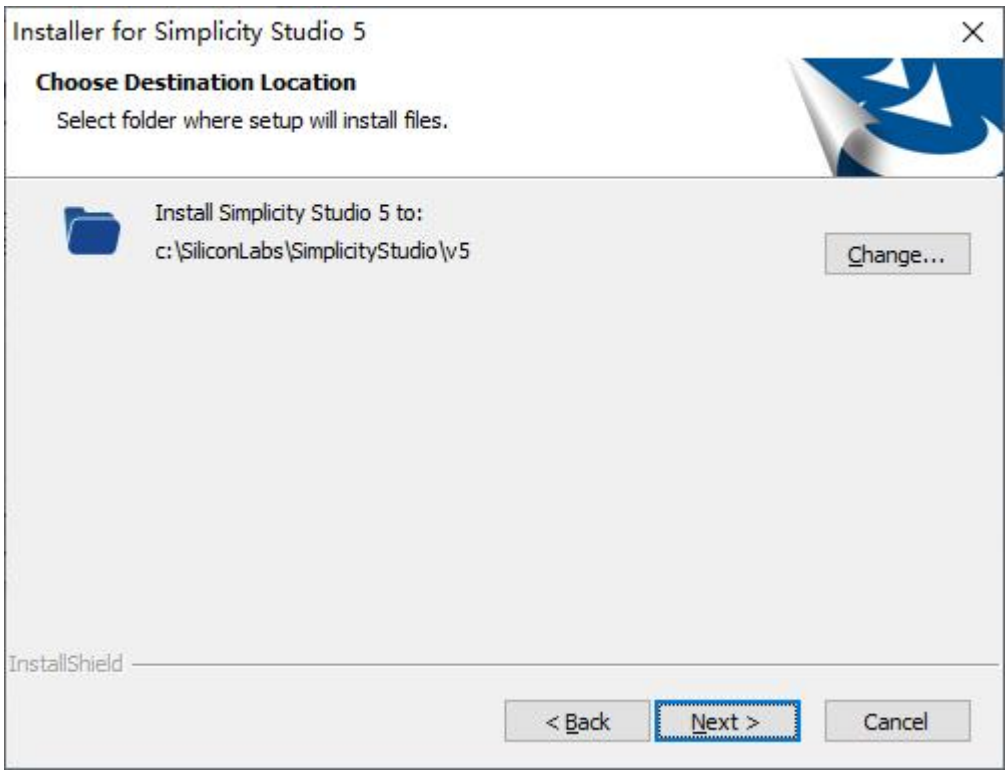
1）下载 iso 包，直接进入或者解压 iso 包，运行 setup 程序；



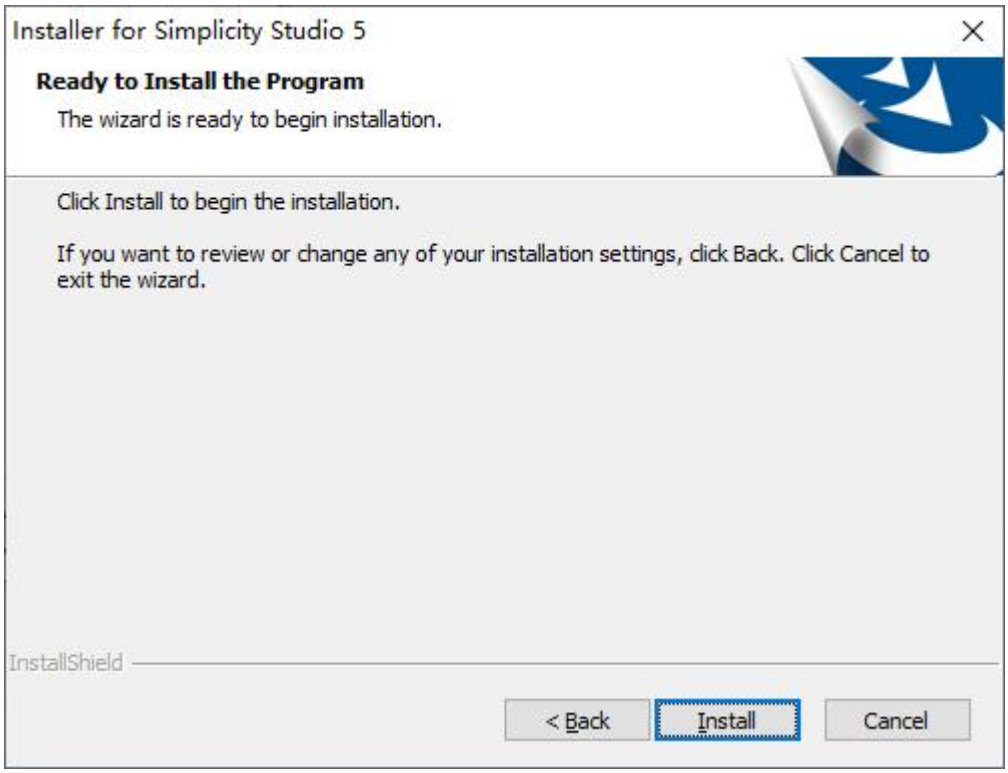
2）同意协议；

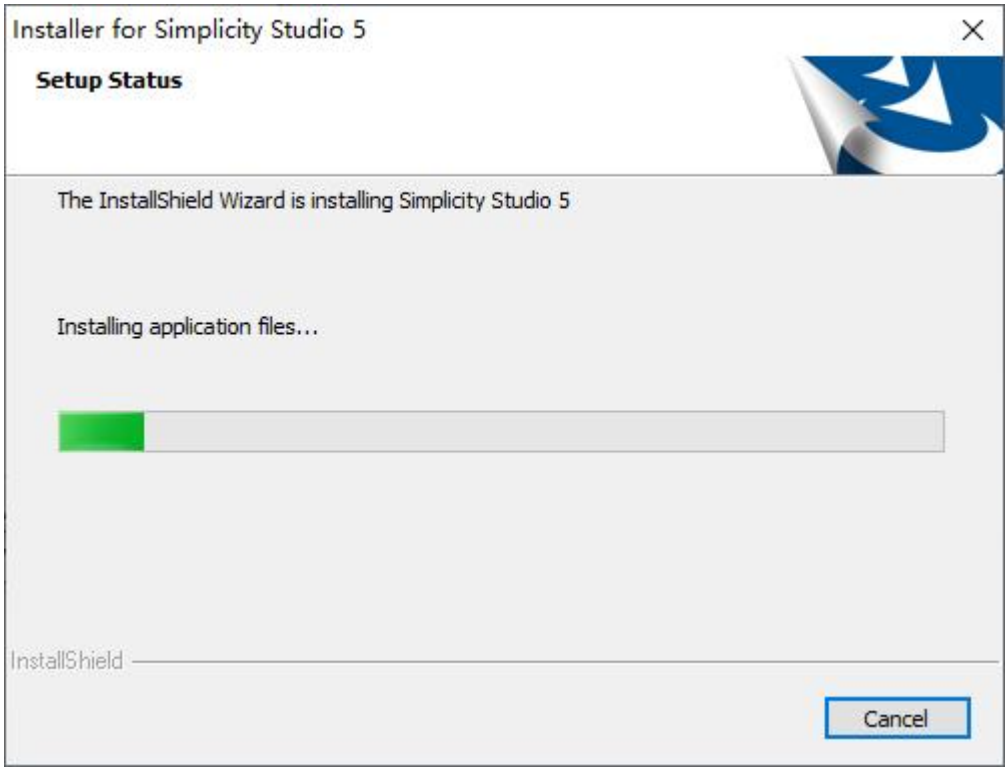


3）选择安装路径；



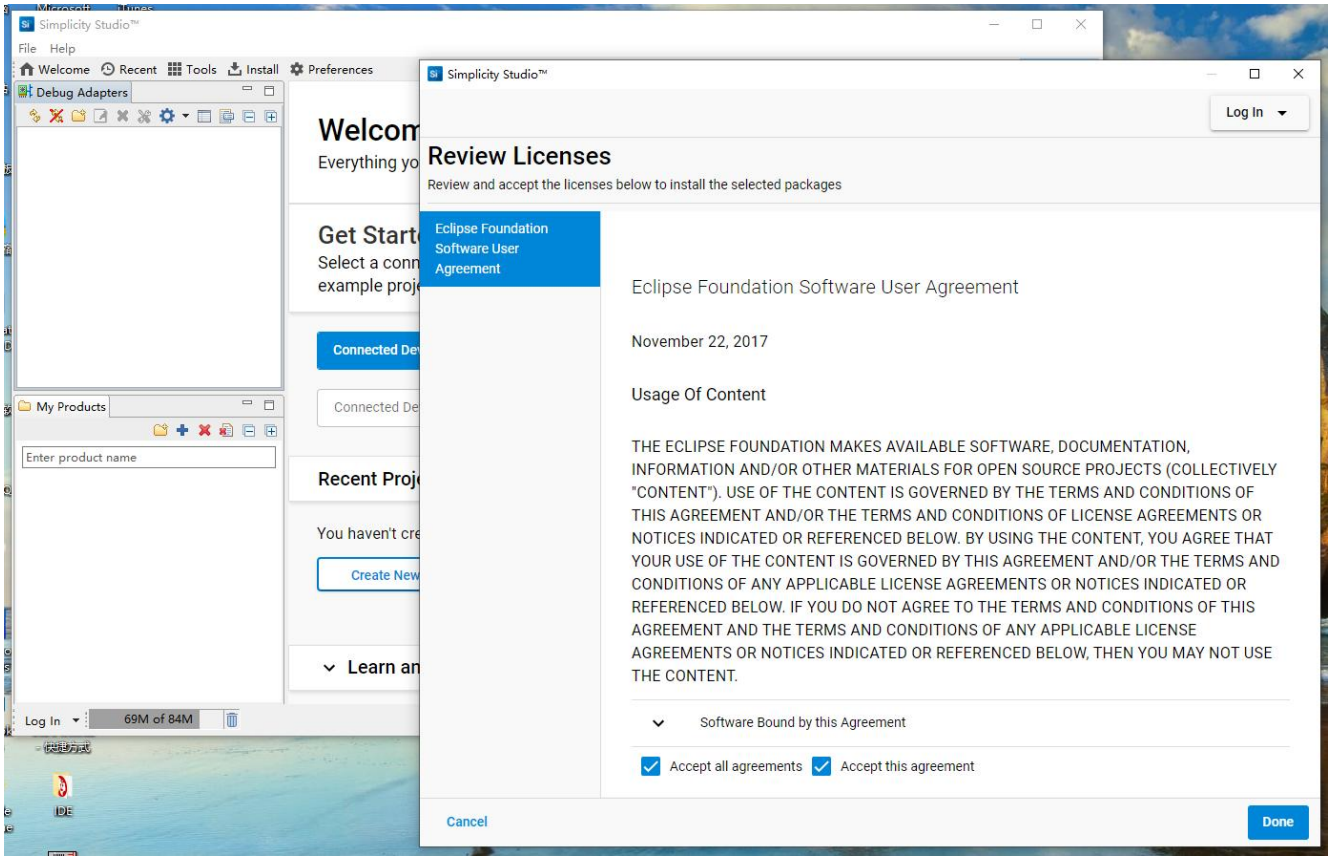
4）开始安装；


Installer for Simplicity Studio 5
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

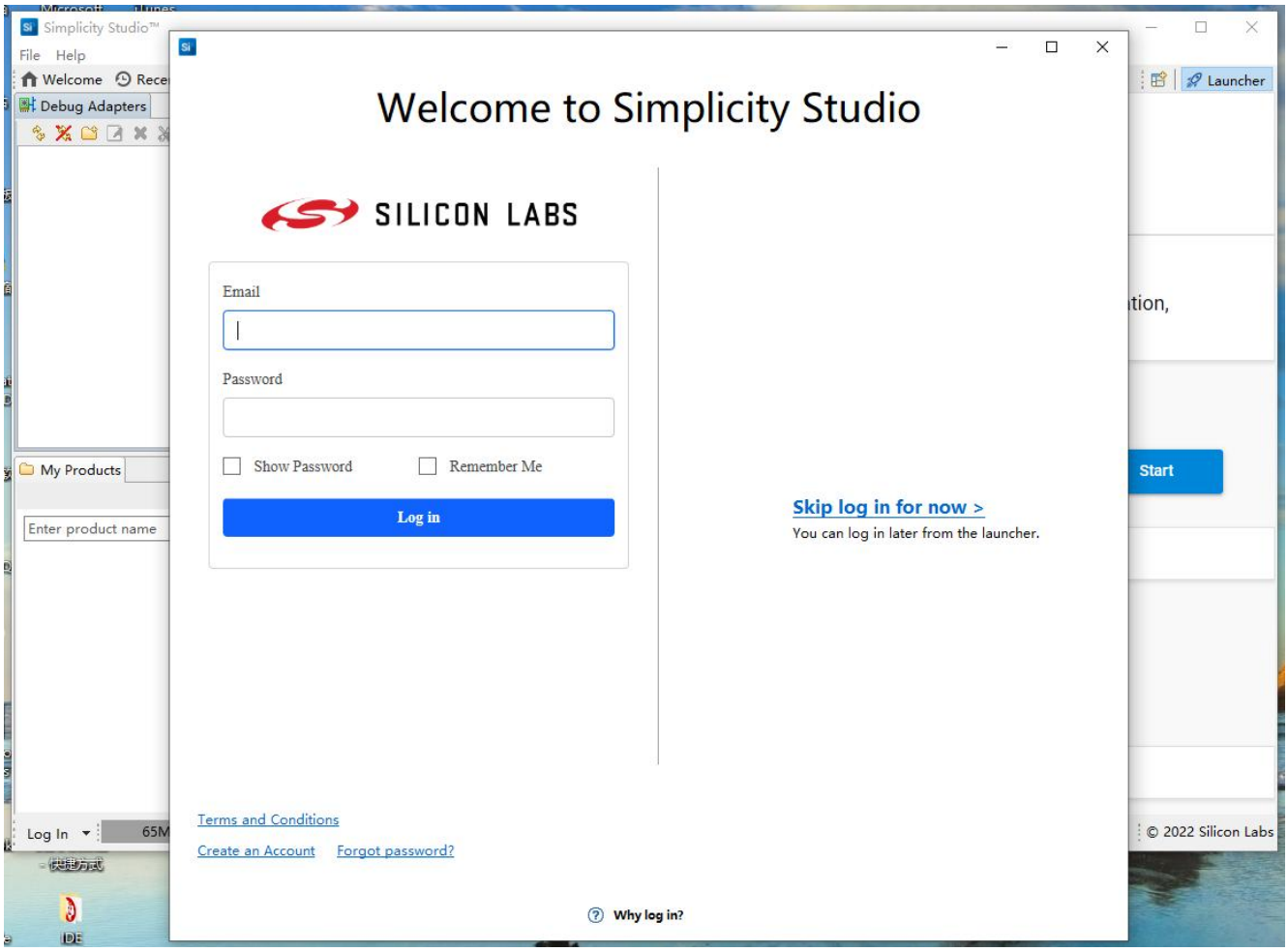

Installer for Simplicity Studio 5
Setup Status
The InstallShield Wizard is installing Simplicity Studio 5
Installing application files...
InstallShield
Cancel

5）安装完成，运行；

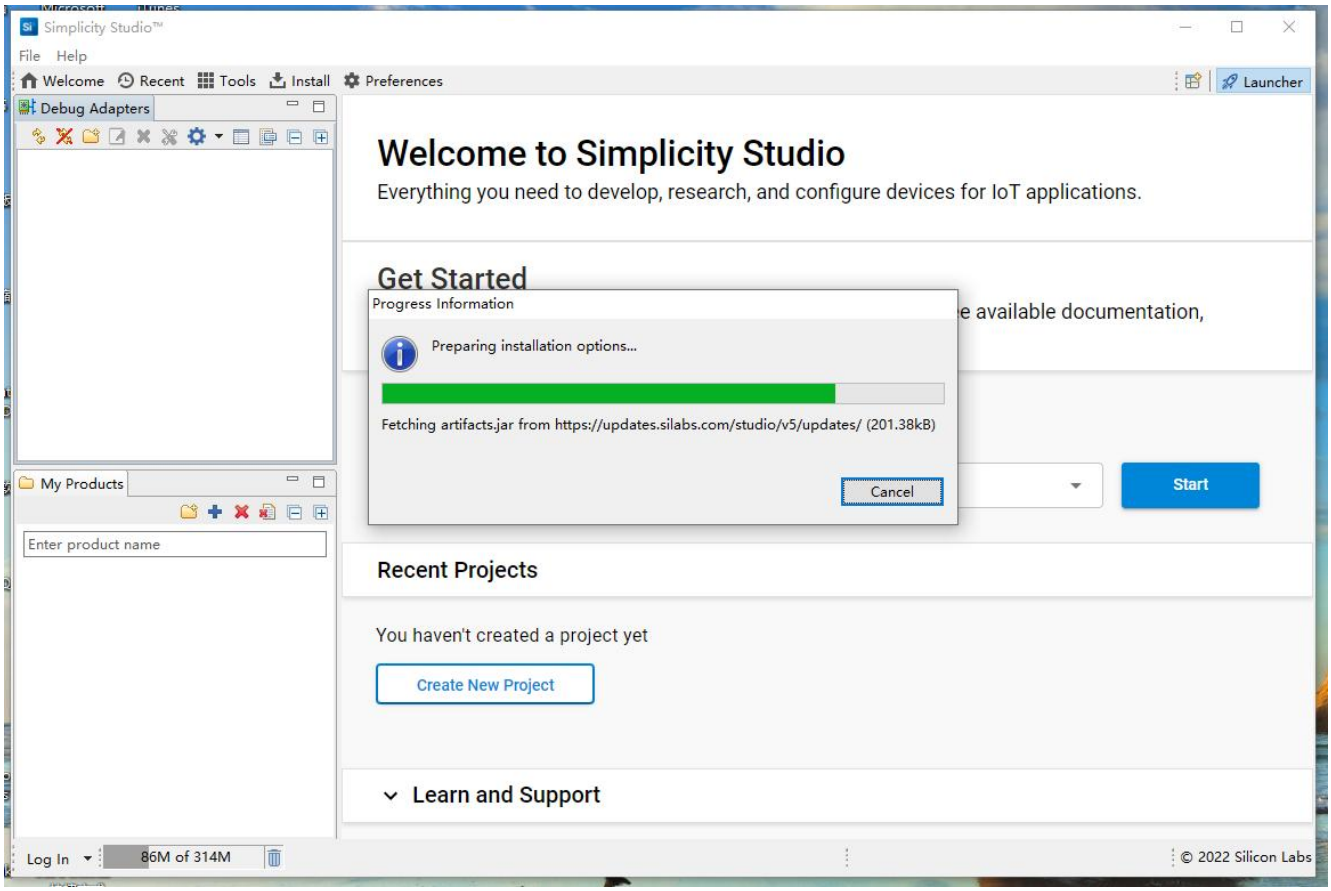
6）同意协议，江湖规矩；

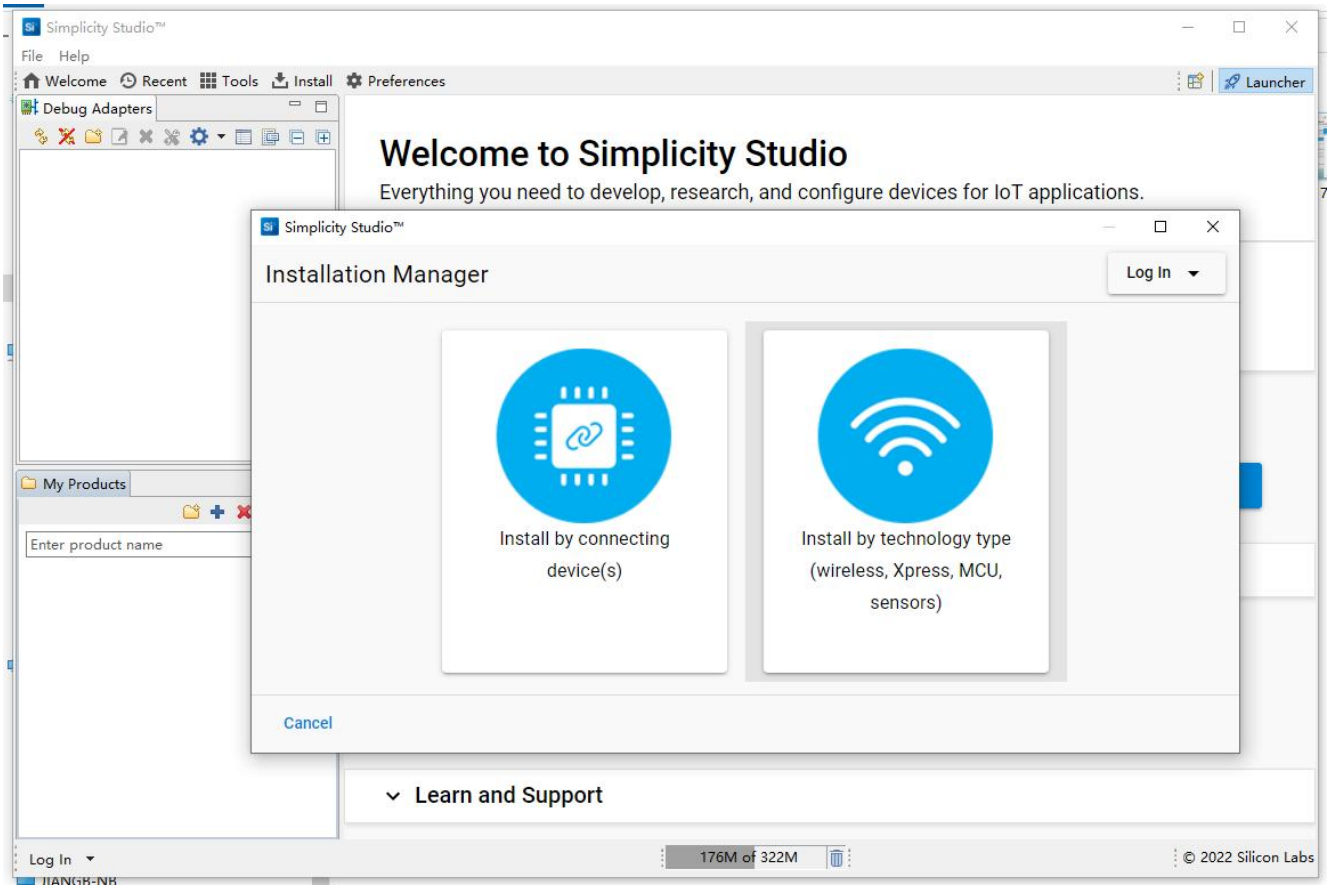


7）接下来会出现 Silicon Labs 账户登录的界面，如果已经在该网站注册账户，可以直接用已有账户登录，如果没有可以注册一个，方便一些资料和工具的下载，也便于在技术社区进行交流，因为 Simplicity Studio 是一个整合的平台，资源比较多。当然，也可以先跳过这一步。建议还是登录一下或者注册一下。

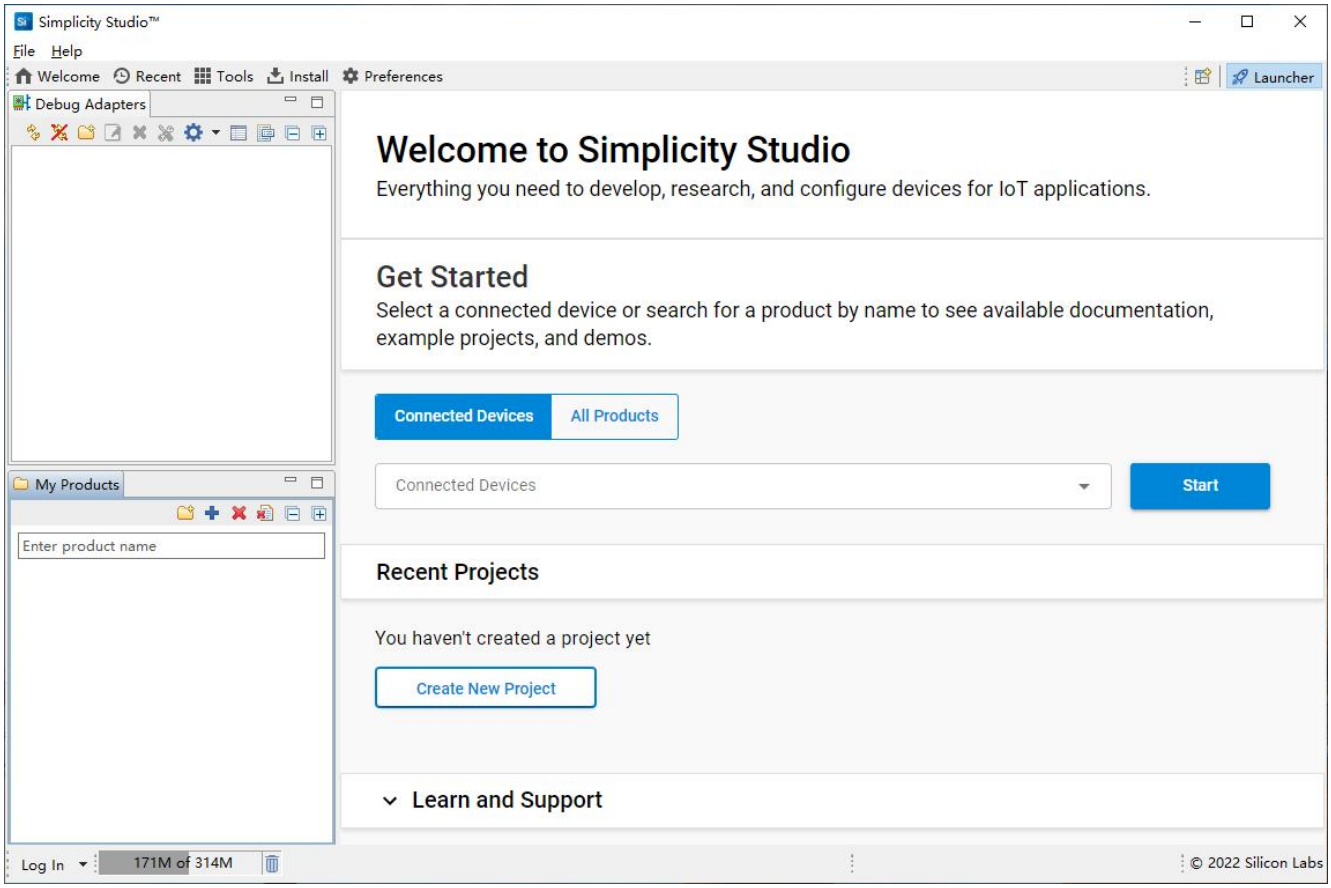


8）随后将开始一些组件、SDK、驱动等资源的下载和安装；

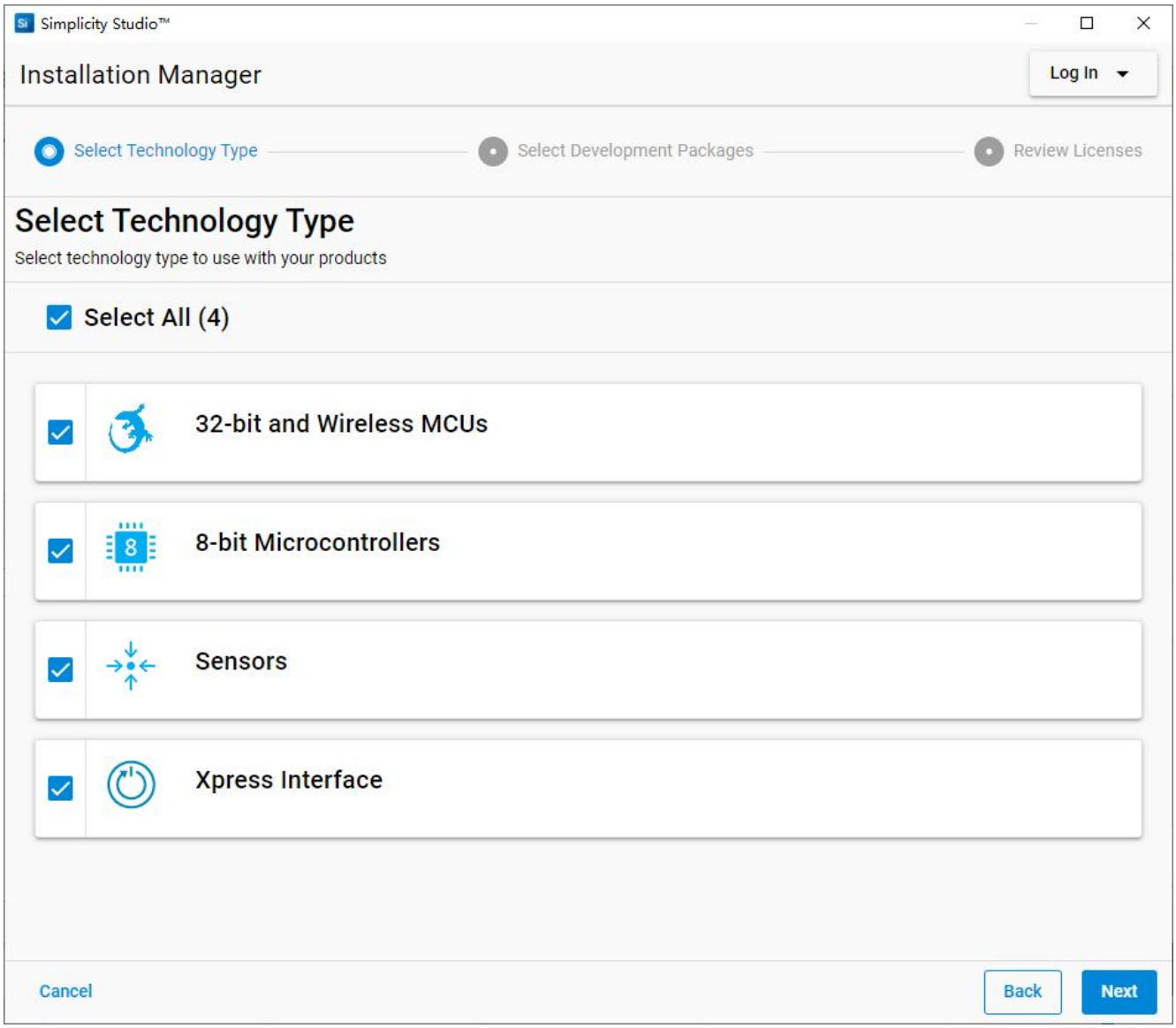


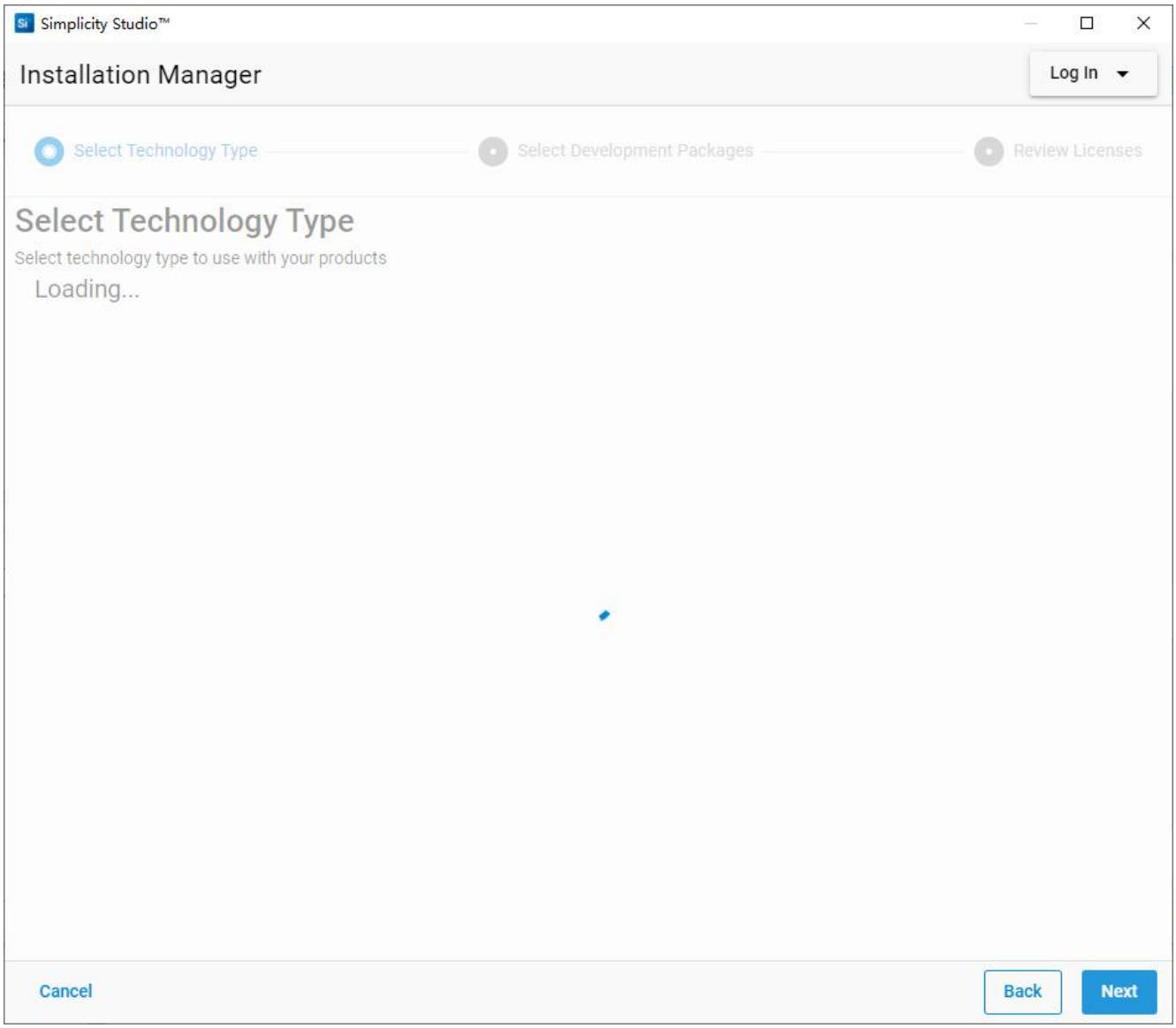


因为没有连接任何设备，所以还看不到任何连接信息，如下图，

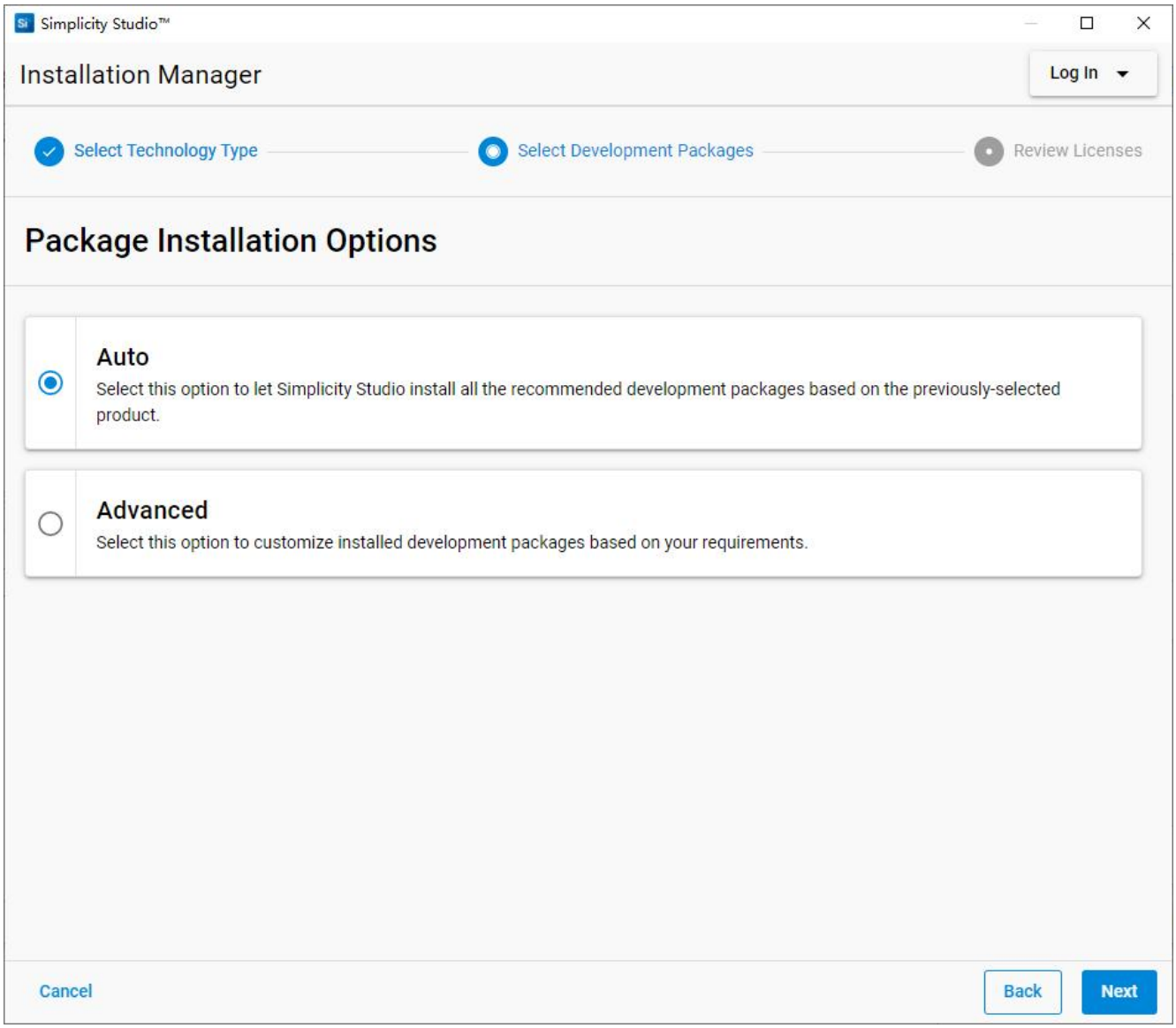


9）下面要选择技术安装选项了，也就是对应不同的产品线，如果硬盘空间不紧张，都选上吧，如果要勤俭持家，那就先选第一项，随后点击“Next”进入安装过程；

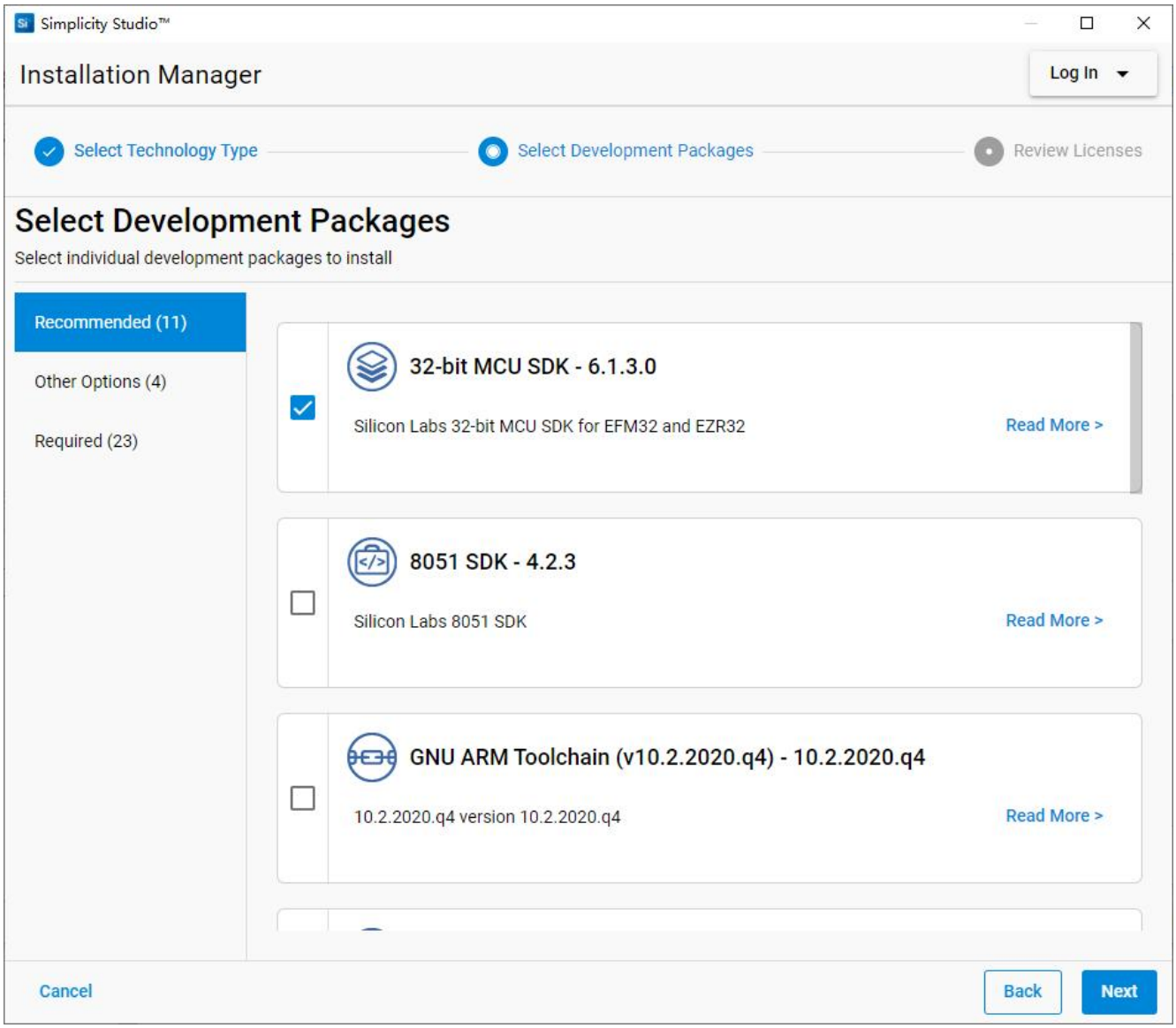

Simplicity Studio™
Installation Manager
Log In
Select Technology Type
Select Development Packages
Review Licenses
Select Technology Type
Select technology type to use with your products
Select All (4)
32-bit and Wireless MCUs
8-bit Microcontrollers
Sensors
Xpress Interface
Cancel
Back
Next



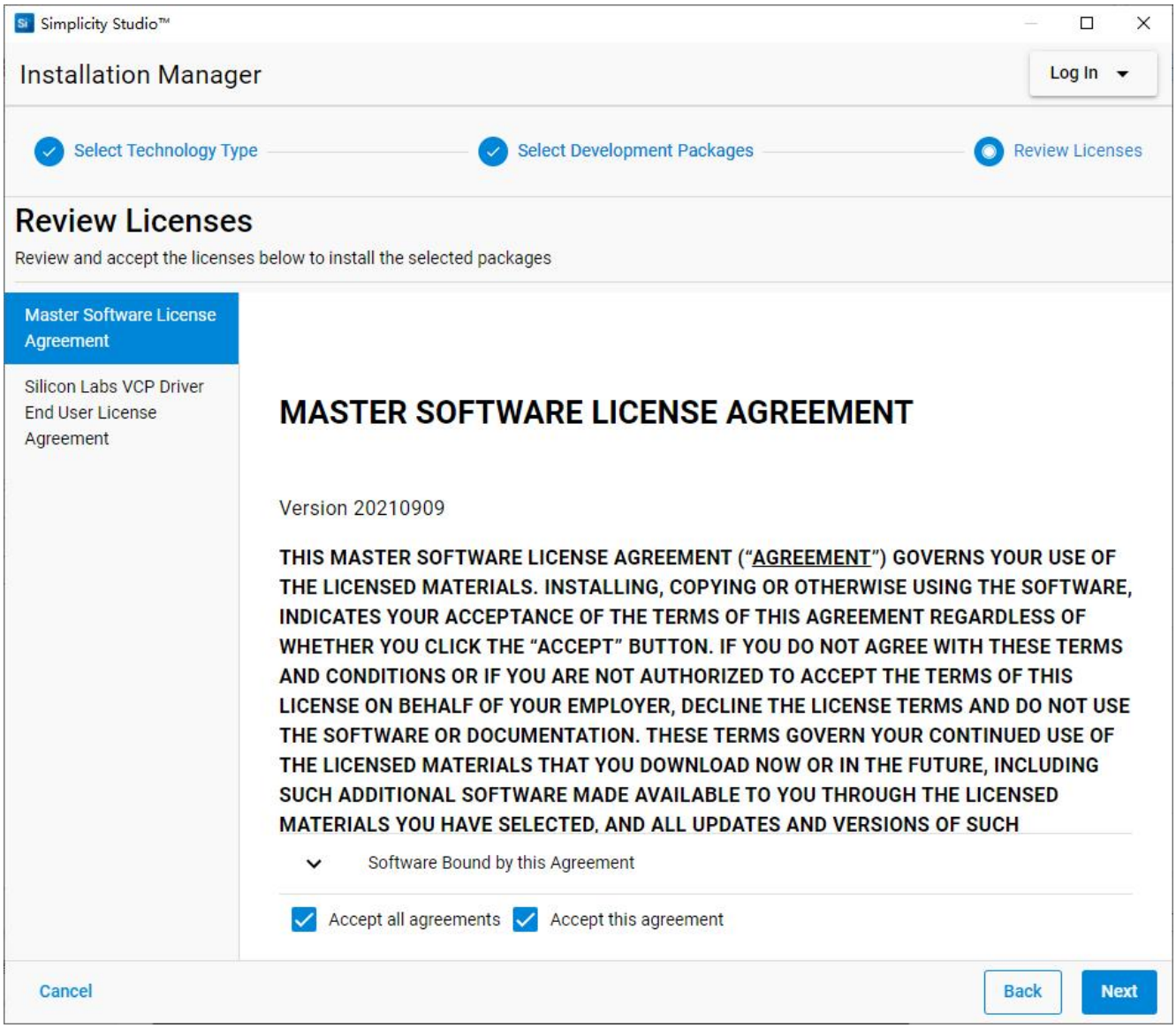
10）来到安装包选项，对该环境不熟悉的，建议还是“Auto”，简单省事，



如果嫌“Auto”太 easy，可以进入“Advanced”自由放飞自己，



还是江湖规矩，同意一下，就可以顺利进入安装；


Simplicity Studio™
Installation Manager
Log In
Select Technology Type
Select Development Packages
Review Licenses
Review Licenses
Review and accept the licenses below to install the selected packages
Master Software License Agreement
Silicon Labs VCP Driver End User License Agreement
MASTER SOFTWARE LICENSE AGREEMENT
Version 20210909
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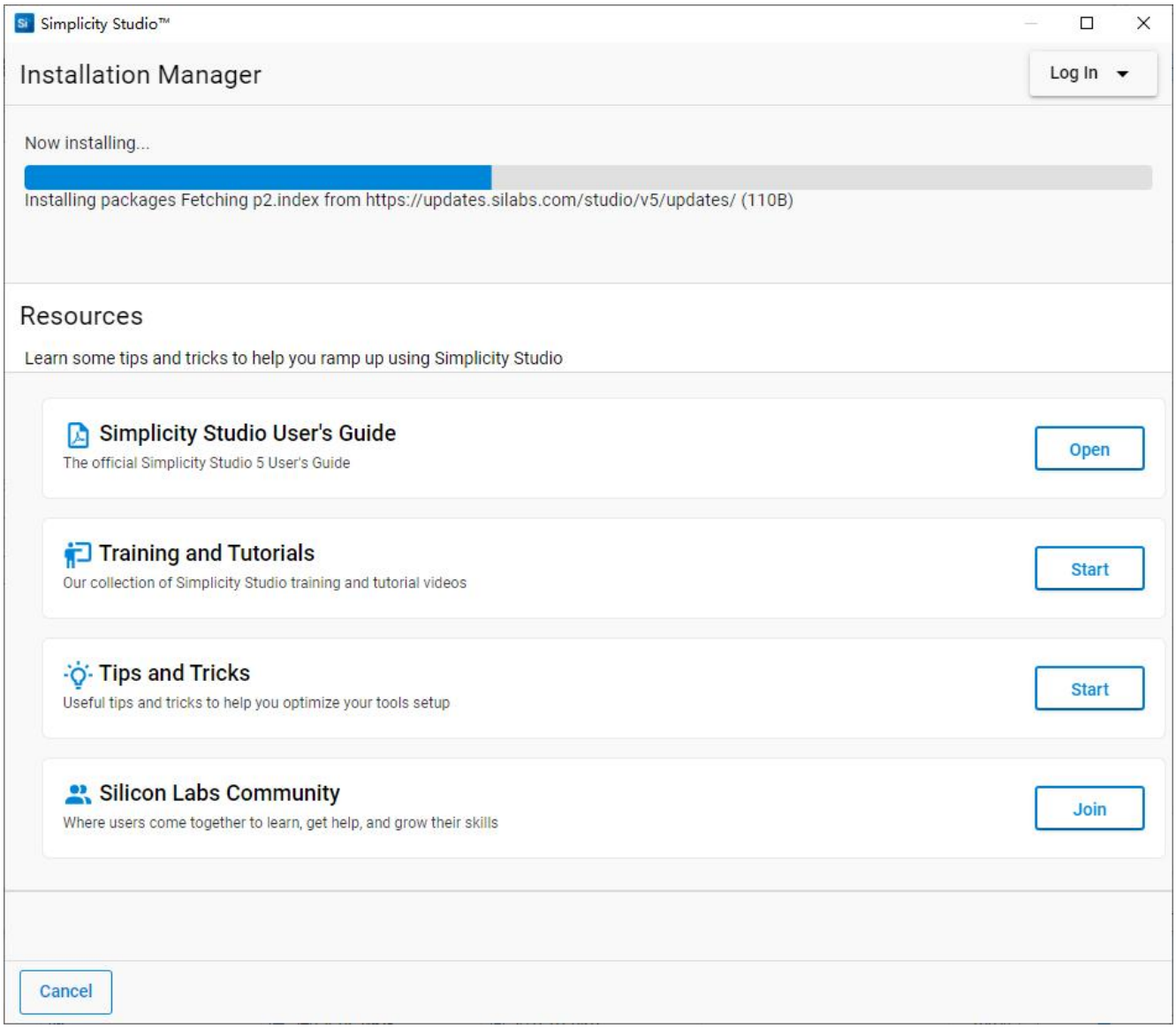
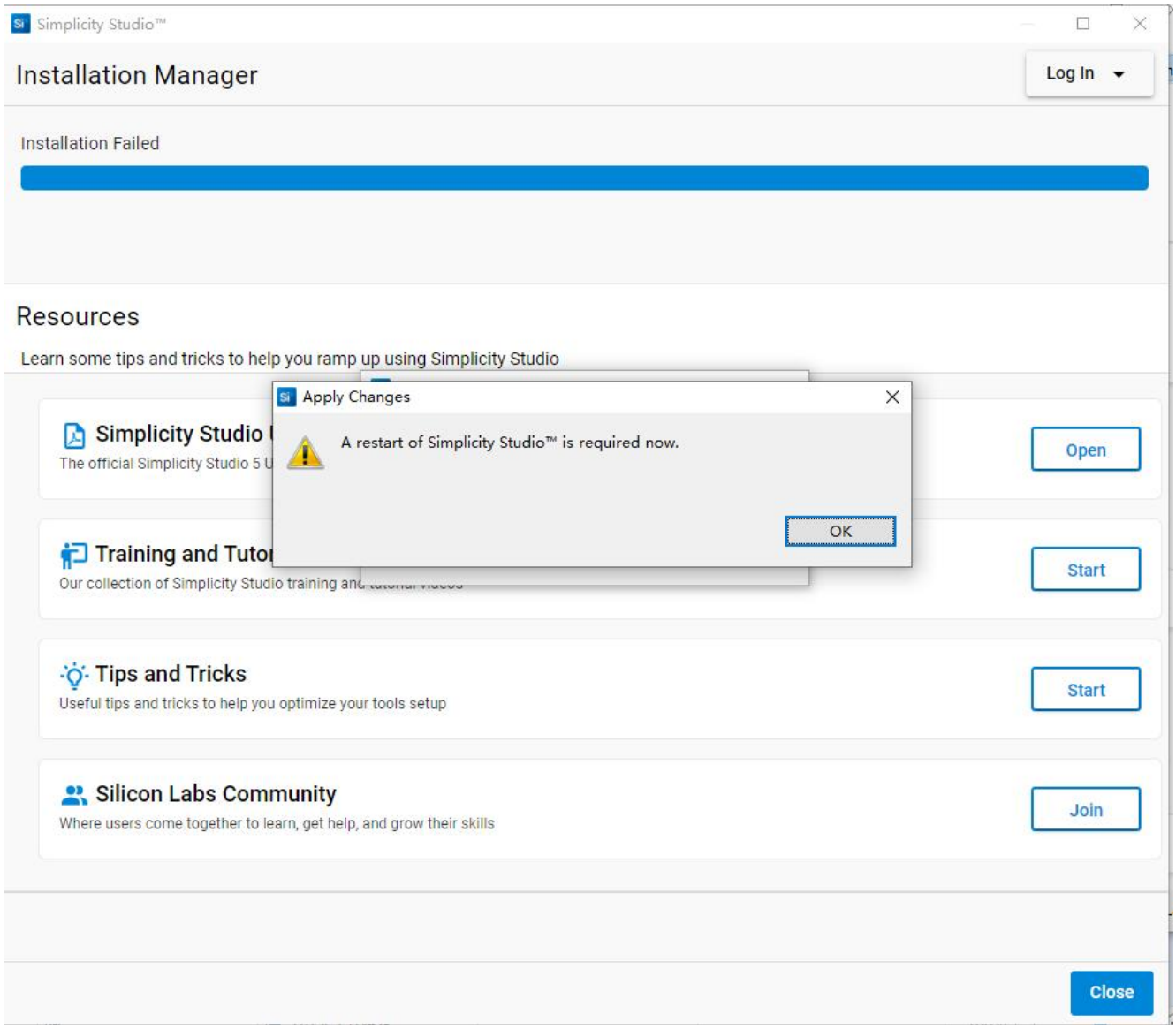
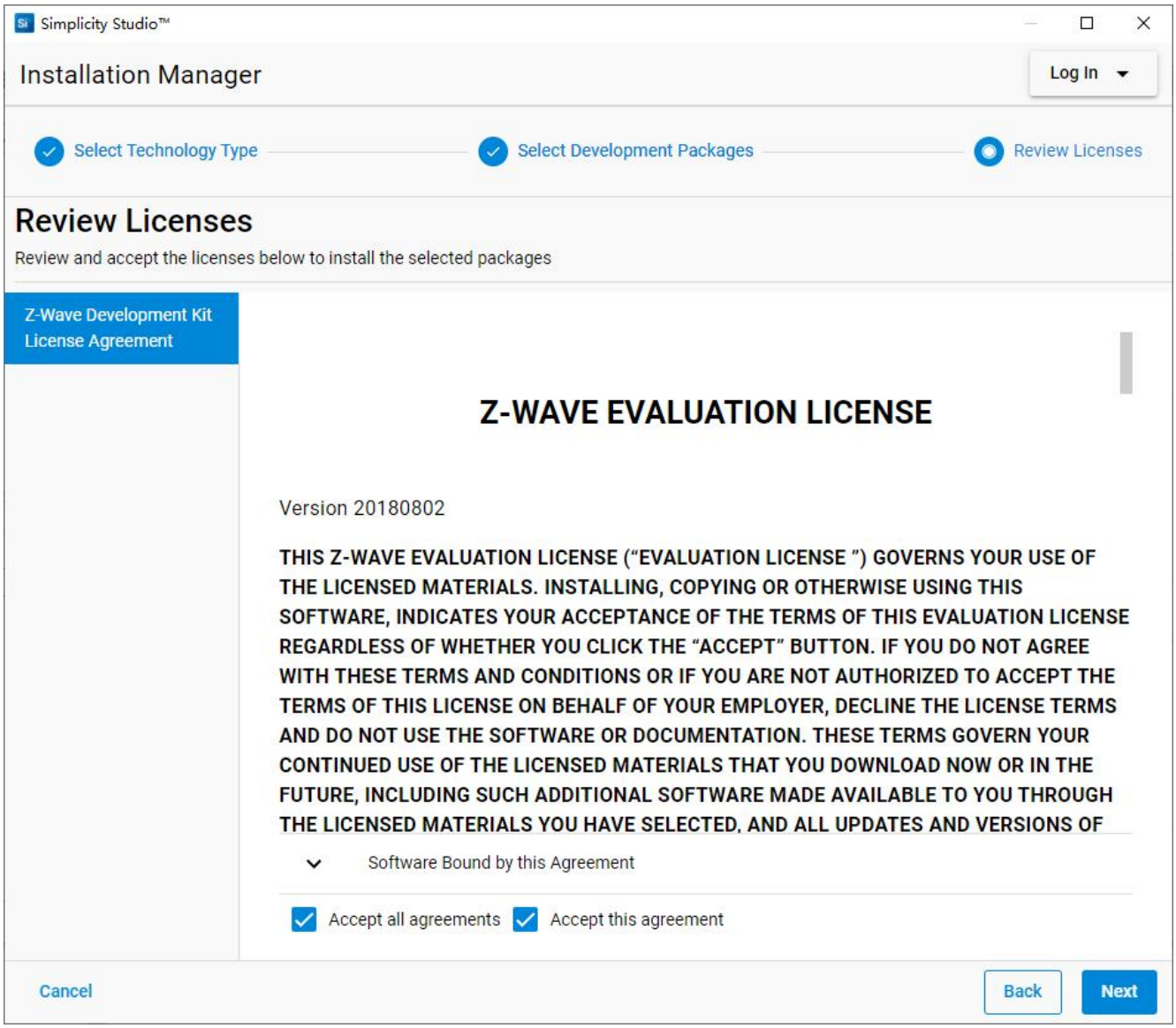
Software Bound by this Agreement
Accept all agreements
Accept this agreement
Cancel
Back
Next



11）安装完成，需要重新启动一下开发环境；



12）如果后续补充安装其他 package，过程是类似的。


Simplicity Studio™
Installation Manager
Log In
Select Technology Type
Select Development Packages
Review Licenses
Review Licenses
Review and accept the licenses below to install the selected packages
Z-Wave Development Kit License Agreement
Z-WAVE EVALUATION LICENSE
Version 20180802
THIS Z-WAVE EVALUATION LICENSE ("EVALUATION LICENSE ") GOVERNS YOUR USE OF THE LICENSED MATERIALS. INSTALLING, COPYING OR OTHERWISE USING THIS SOFTWARE, INDICATES YOUR ACCEPTANCE OF THE TERMS OF THIS EVALUATION LICENSE REGARDLESS OF WHETHER YOU CLICK THE "ACCEPT" BUTTON. IF YOU DO NOT AGREE WITH THESE TERMS AND CONDITIONS OR IF YOU ARE NOT AUTHORIZED TO ACCEPT THE TERMS OF THIS LICENSE ON BEHALF OF YOUR EMPLOYER, DECLINE THE LICENSE TERMS AND DO NOT USE THE SOFTWARE OR DOCUMENTATION. THESE TERMS GOVERN YOUR CONTINUED USE OF THE LICENSED MATERIALS THAT YOU DOWNLOAD NOW OR IN THE FUTURE, INCLUDING SUCH ADDITIONAL SOFTWARE MADE AVAILABLE TO YOU THROUGH THE LICENSED MATERIALS YOU HAVE SELECTED. AND ALL UPDATES AND VERSIONS OF
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Accept all agreements
Accept this agreement
Cancel
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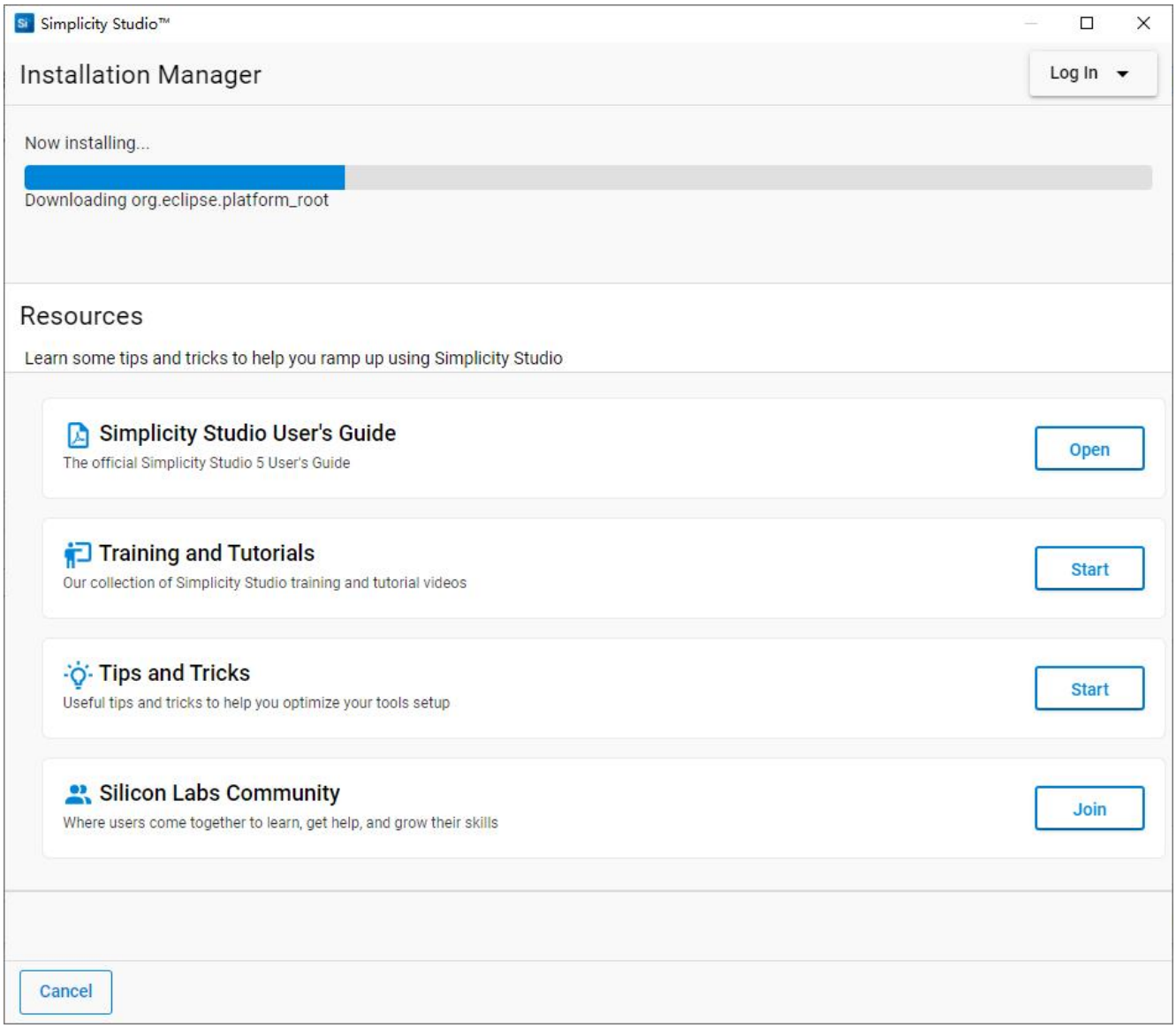
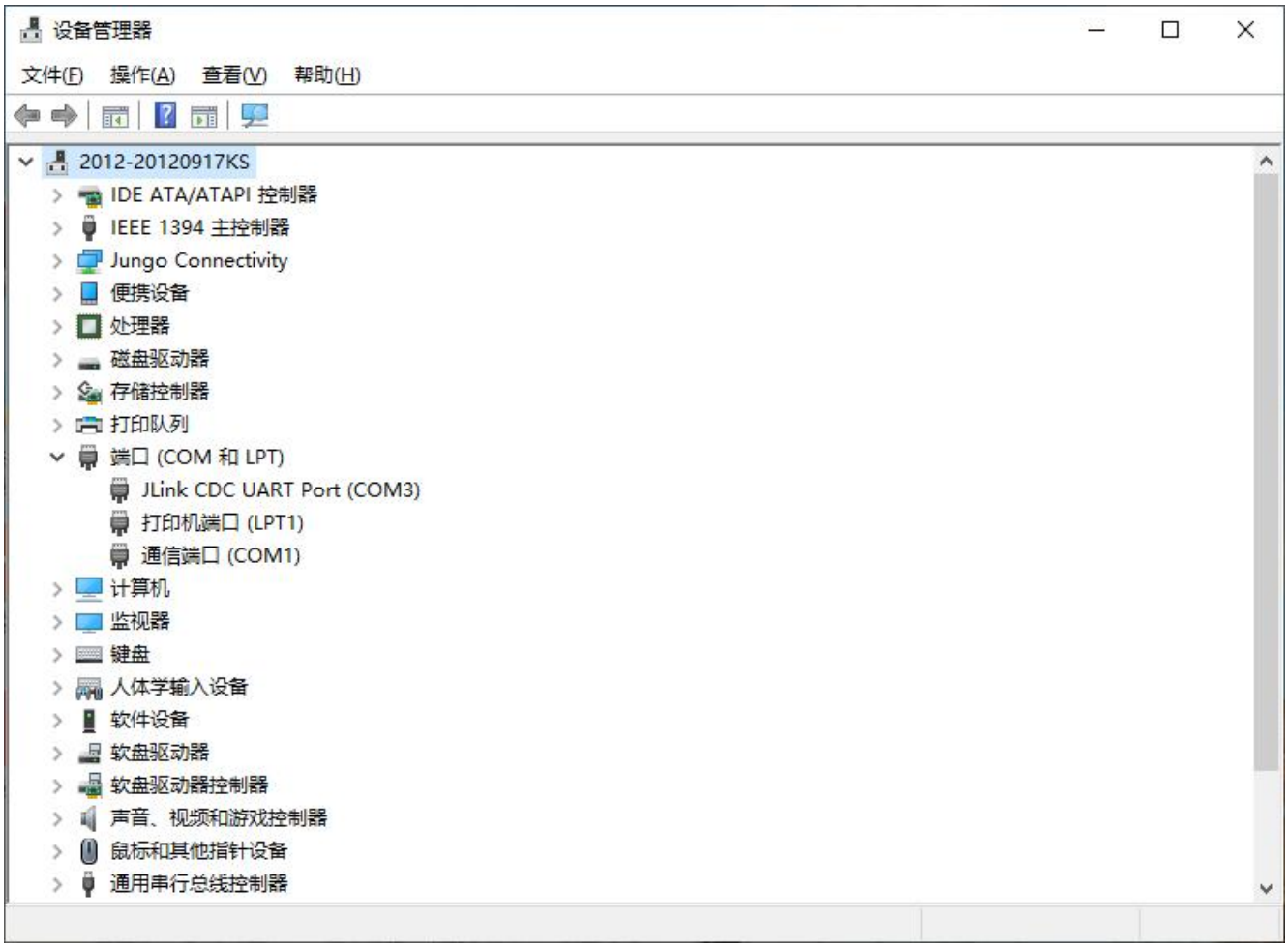
Next

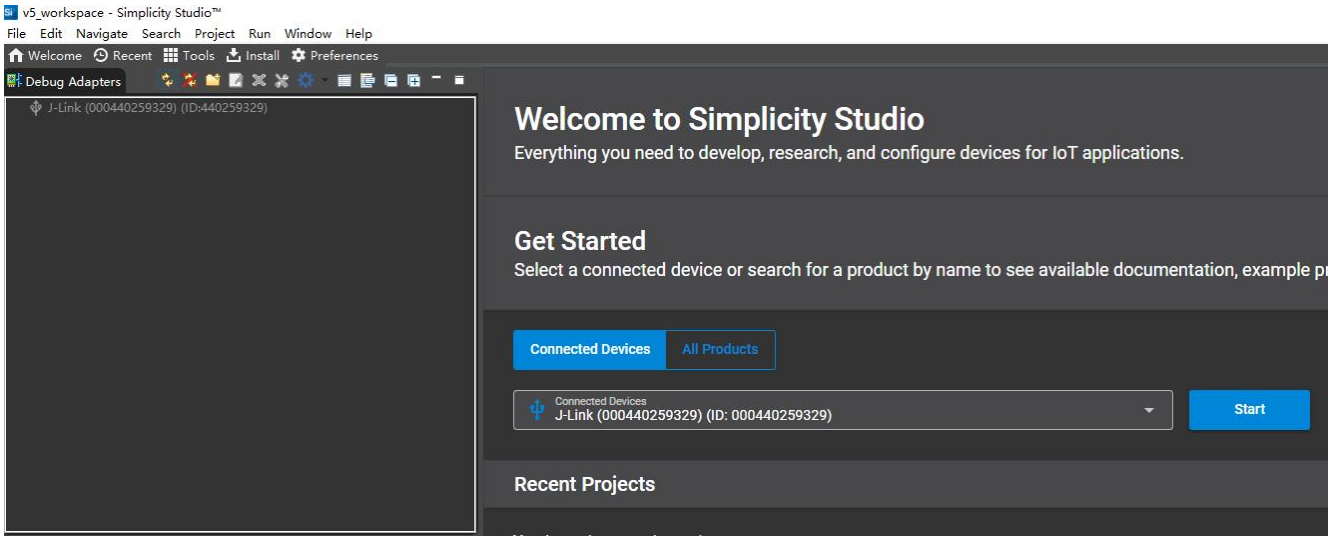


3.3 安装 J-Link 驱动

如果我们的电脑上之前没有安装过 J-Link 的驱动，单单安装 Simplicity Studio 并没有将 FG23-DK2600A 板载的 J-Link 调试器驱动安装进去，至少我的电脑是这种情况。检查 J-Link 的驱动是否安装成功，可以打开操作系统的设备管理器，看看端口那一组是否有如下图所示的设备，即 JLink CDC 串口，如果没有，说明需要手动安装驱动。驱动可以从网络上下载通用的版本，我这次体验使用的是 JLink_Windows_V616i。



安装成功以后，将 FG23-DK2600A 使用套件中提供的 USB 连接线连接到电脑，运行 Simplicity Studio v5 就可以看到相关设备信息，如下图。

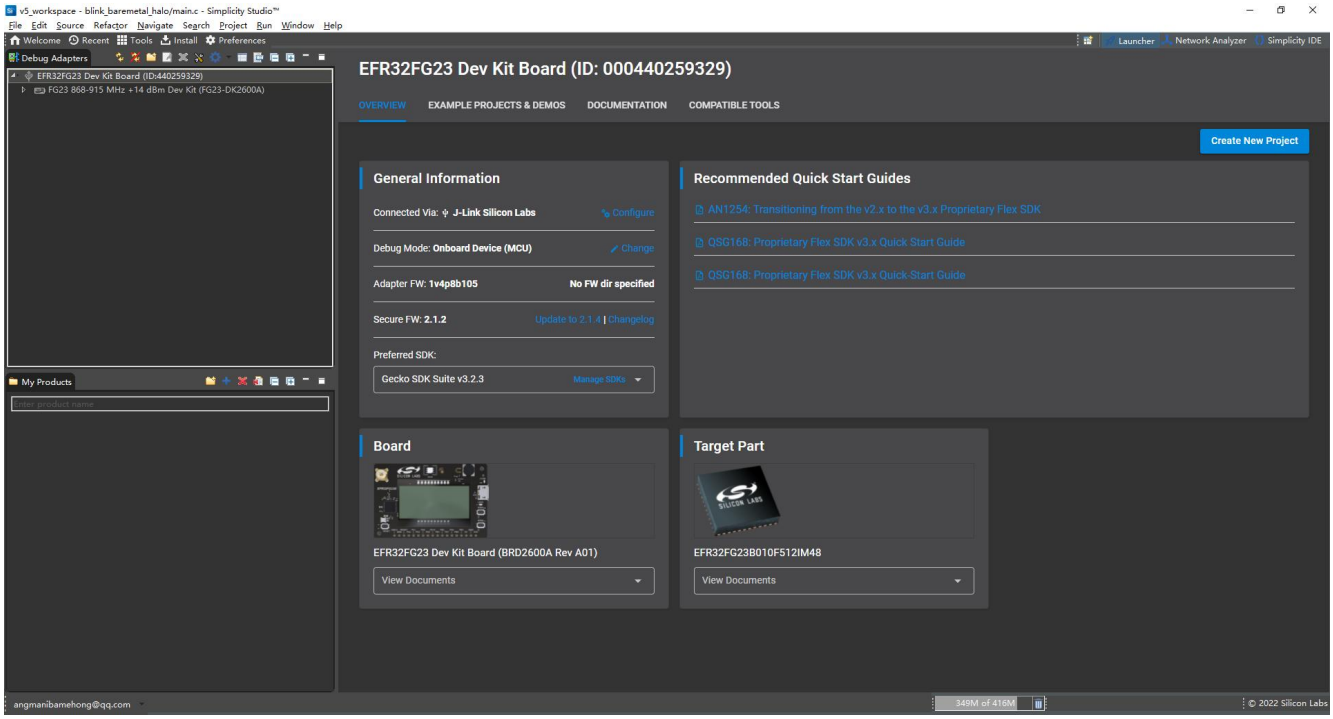


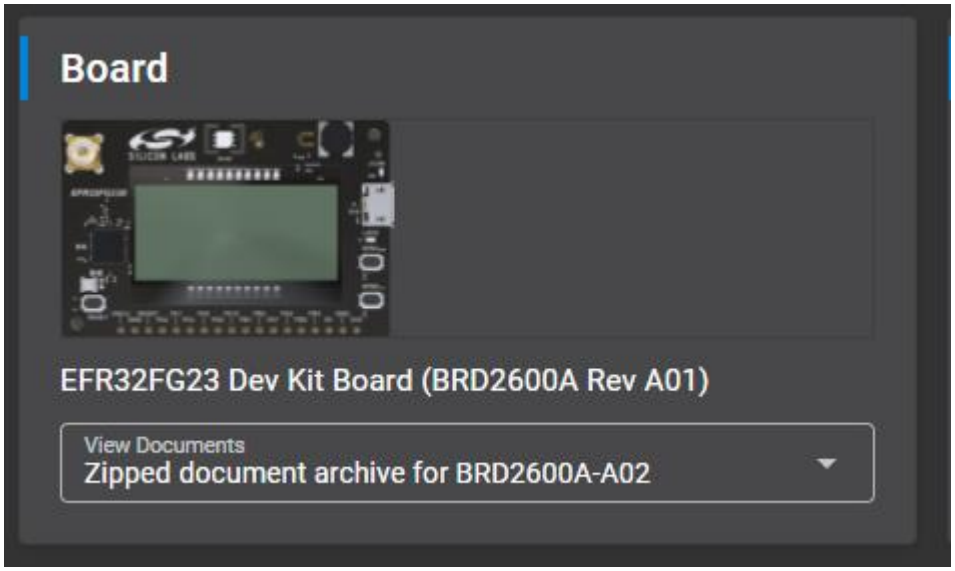
3.4 闪烁板载 LED

开箱体验最简单的就是闪灯了，这是满世界都喜欢做的事，我也不例外，何况该板子上面已经预留有 LED。

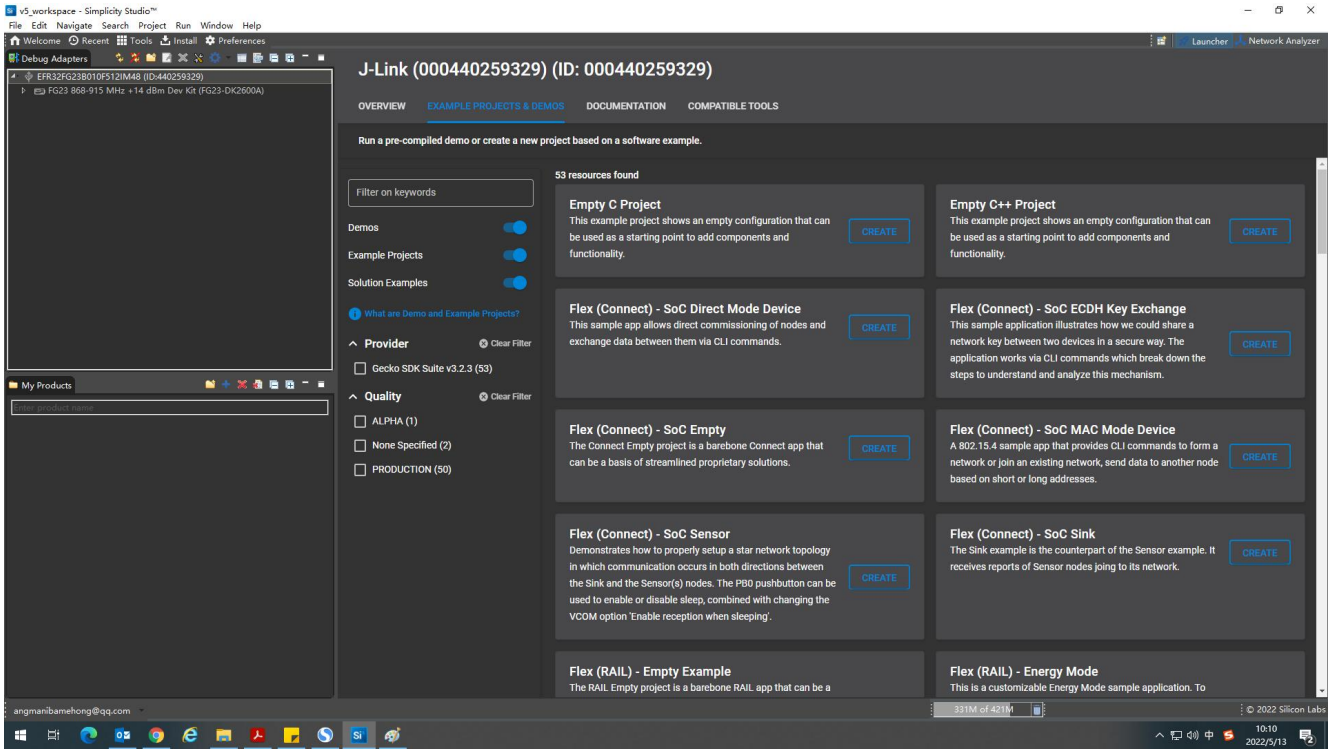
在 Debug Adapters 栏中，点击选中该设备，即“EFR32FG23 Dev Kit Board（ID:.....）”，在右侧窗口将显示相关的资源，比如概览、样例工程和演示、文档等等。这里很想吐槽的是，这个线路板的原理图在网站上的产品页面中没有单独给出原理图链接，只给了一个简单的操作说明手册，它的原理图需要从下面这个设备信

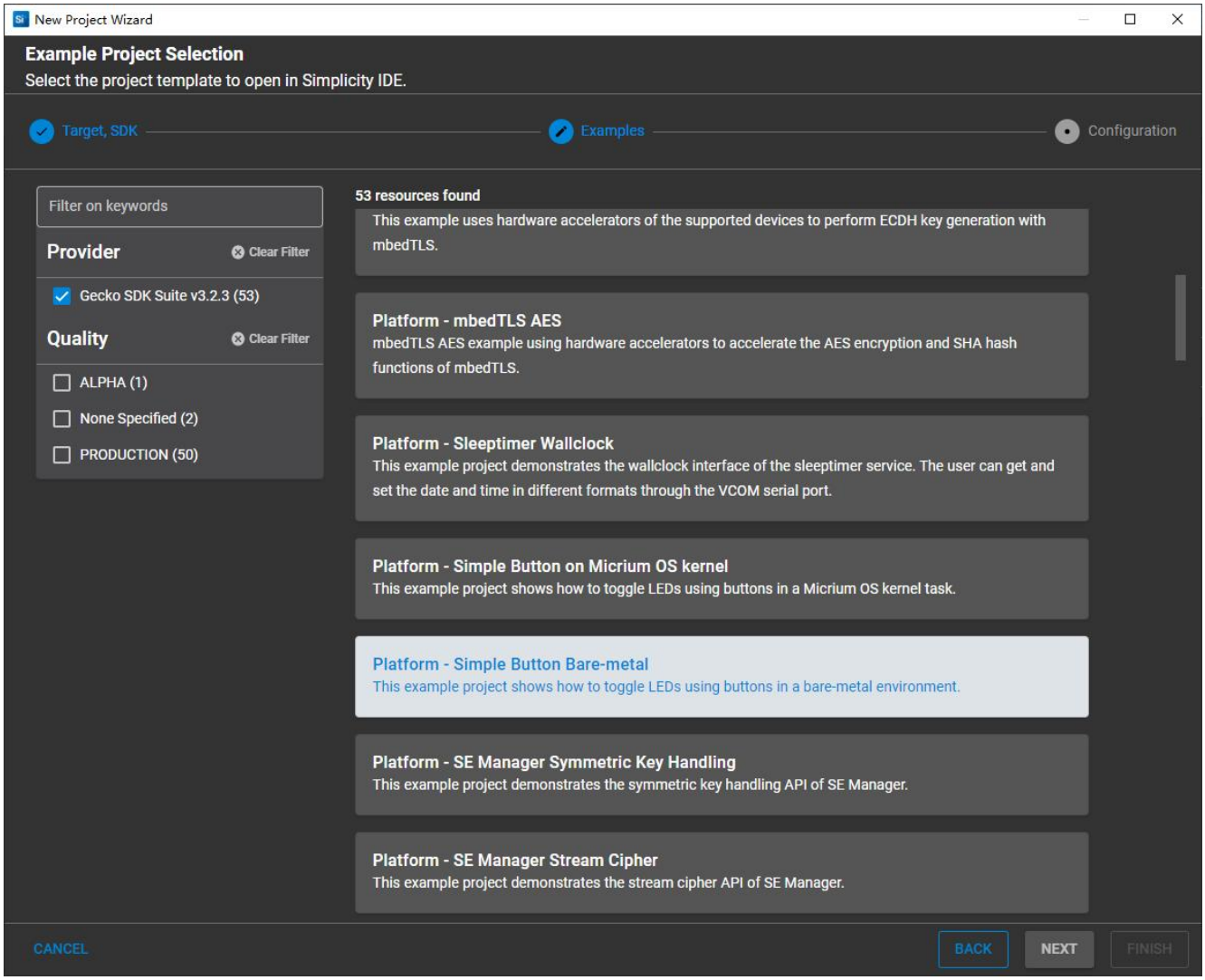
息页面的 Board 栏 View Documents 下拉框中去选择获取，而且是藏在一个 zip 包中，比较意外。。。



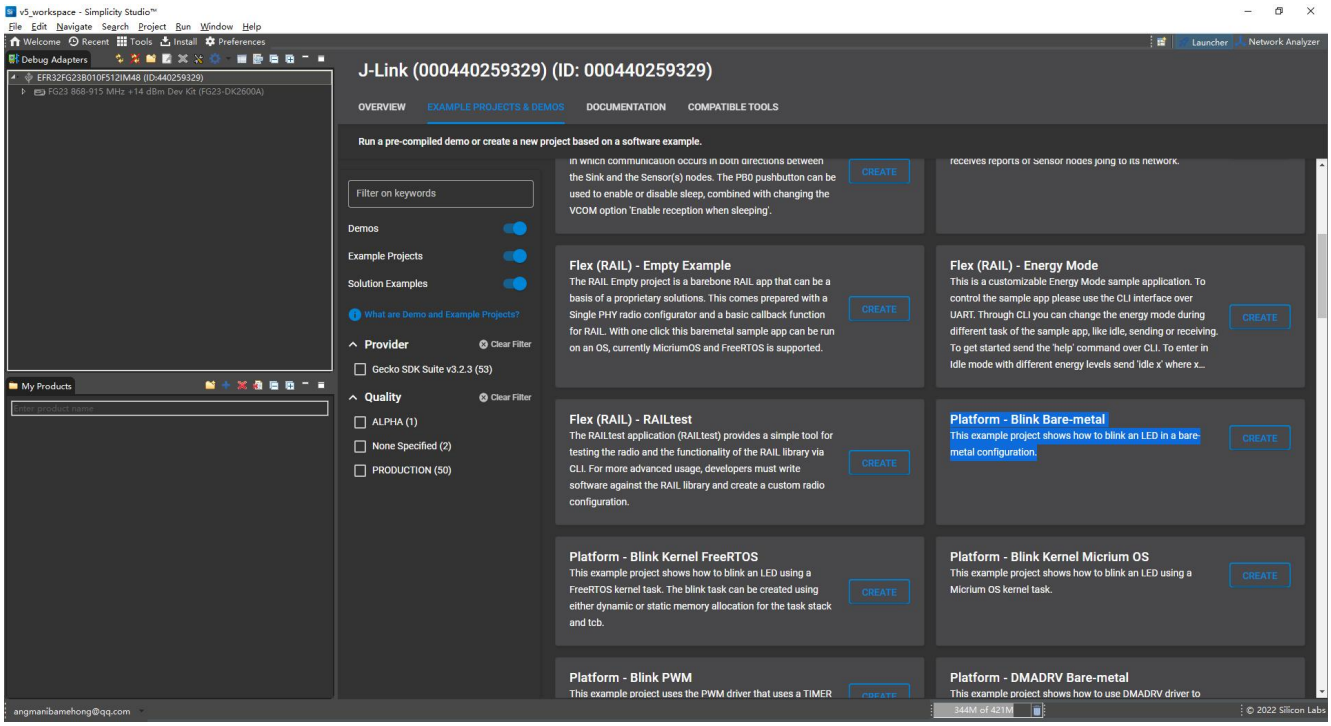


接下来，将使用很方便的项目向导功能，创建一个闪灯的示例工程。切换到“example projects & demos”页面，可以看到目前所提供的所有样例工程，可能以下面两种页面形式展示，

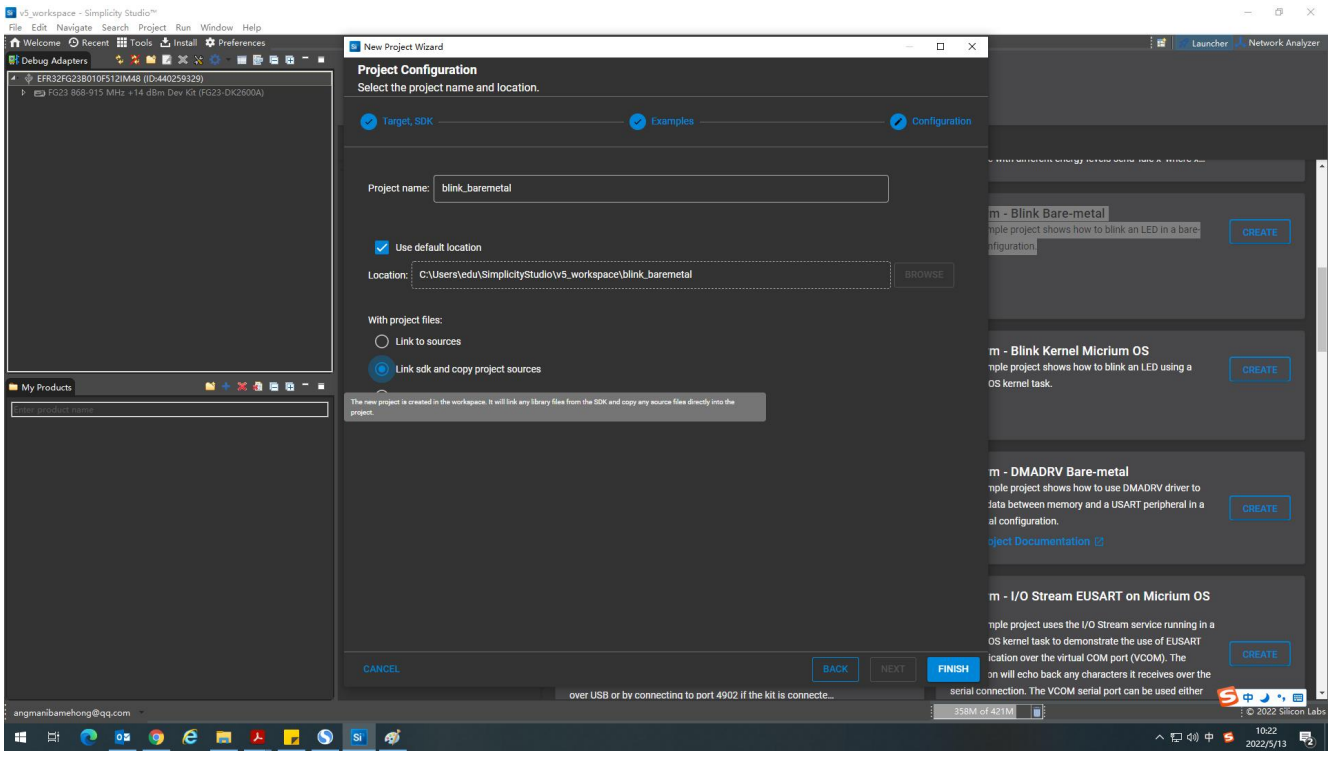




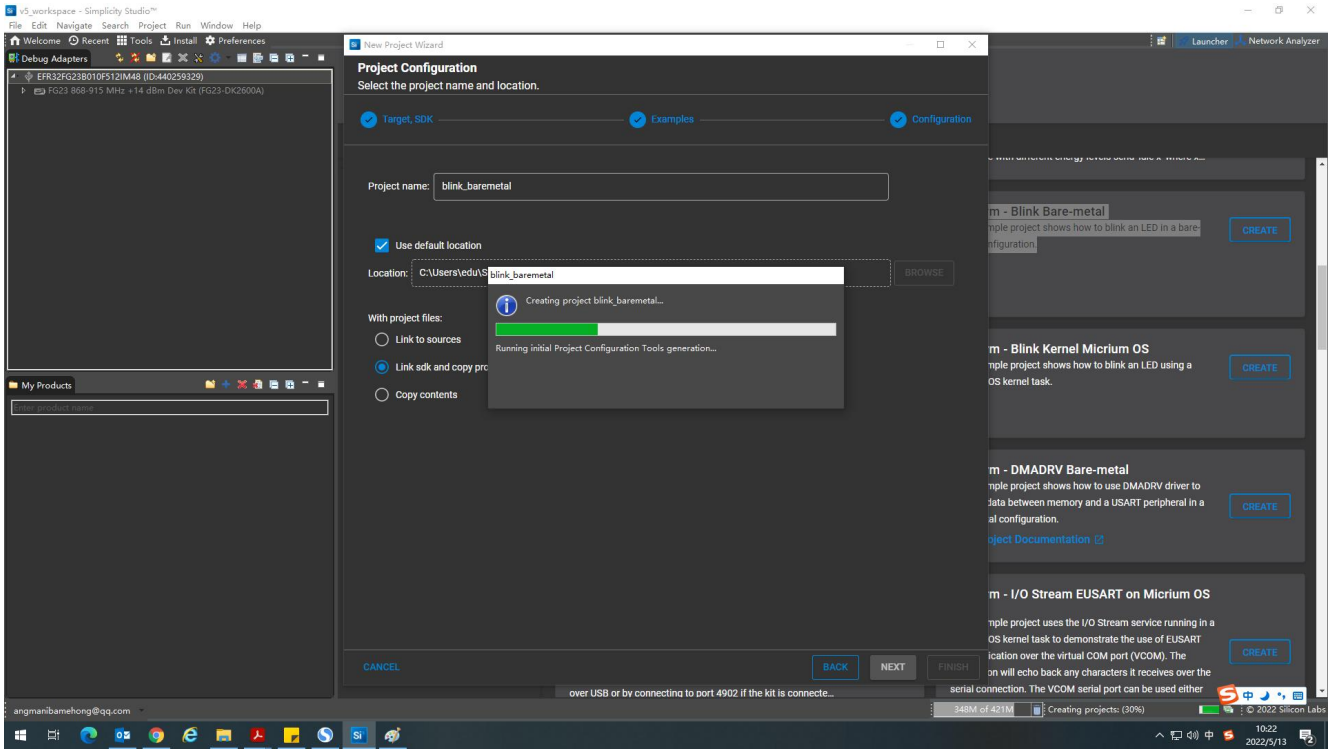
选择裸跑的闪灯例程，CREATE，



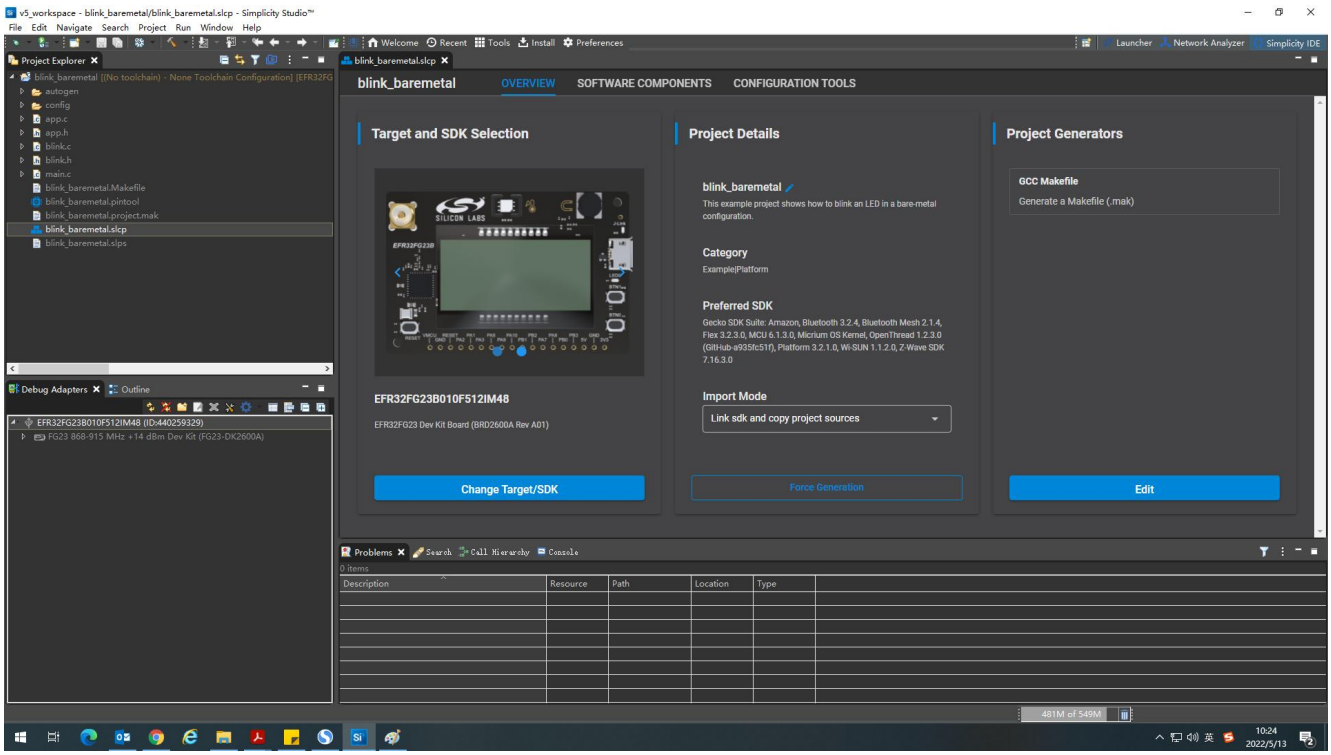
可以选择导出项目保存的磁盘路径，



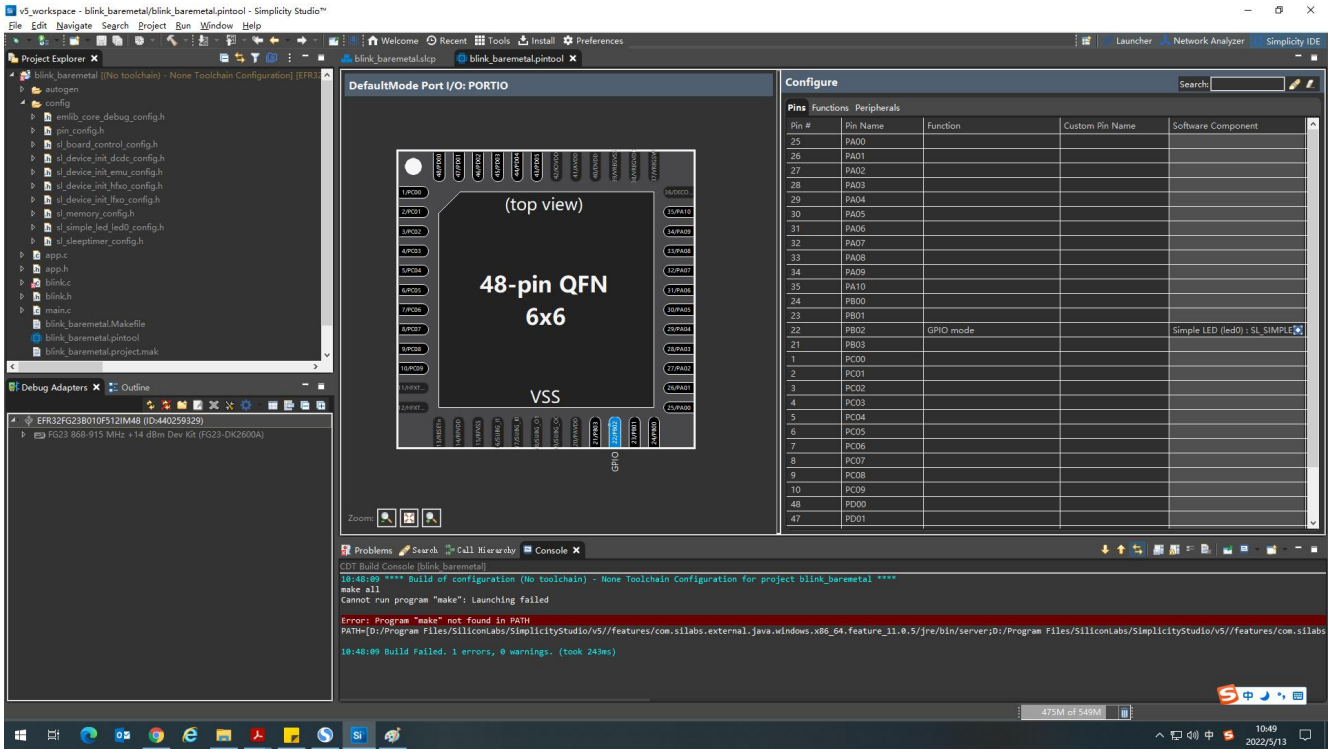
选择资源文件的链接方式，比如拷贝所有的源文件，或者直接链接到文件源，



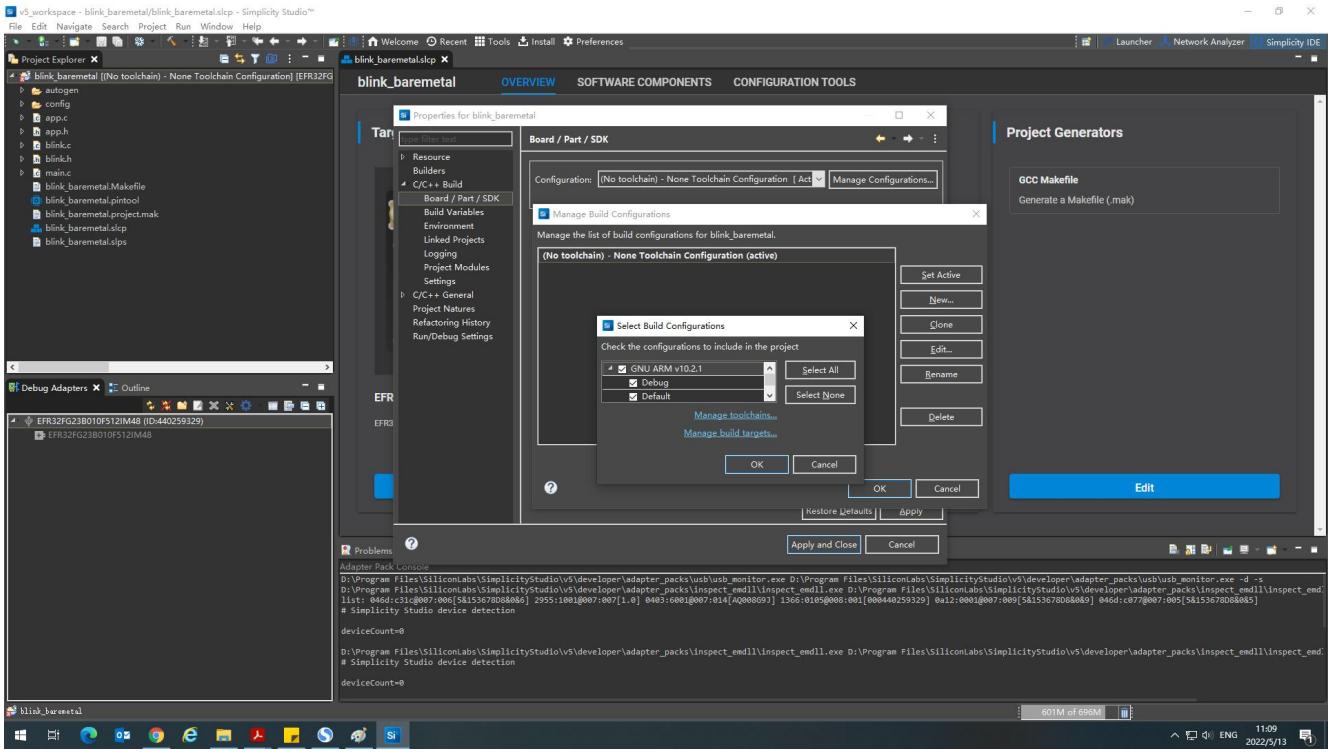
生成后展开该工程项目，就看到下面这个样子，



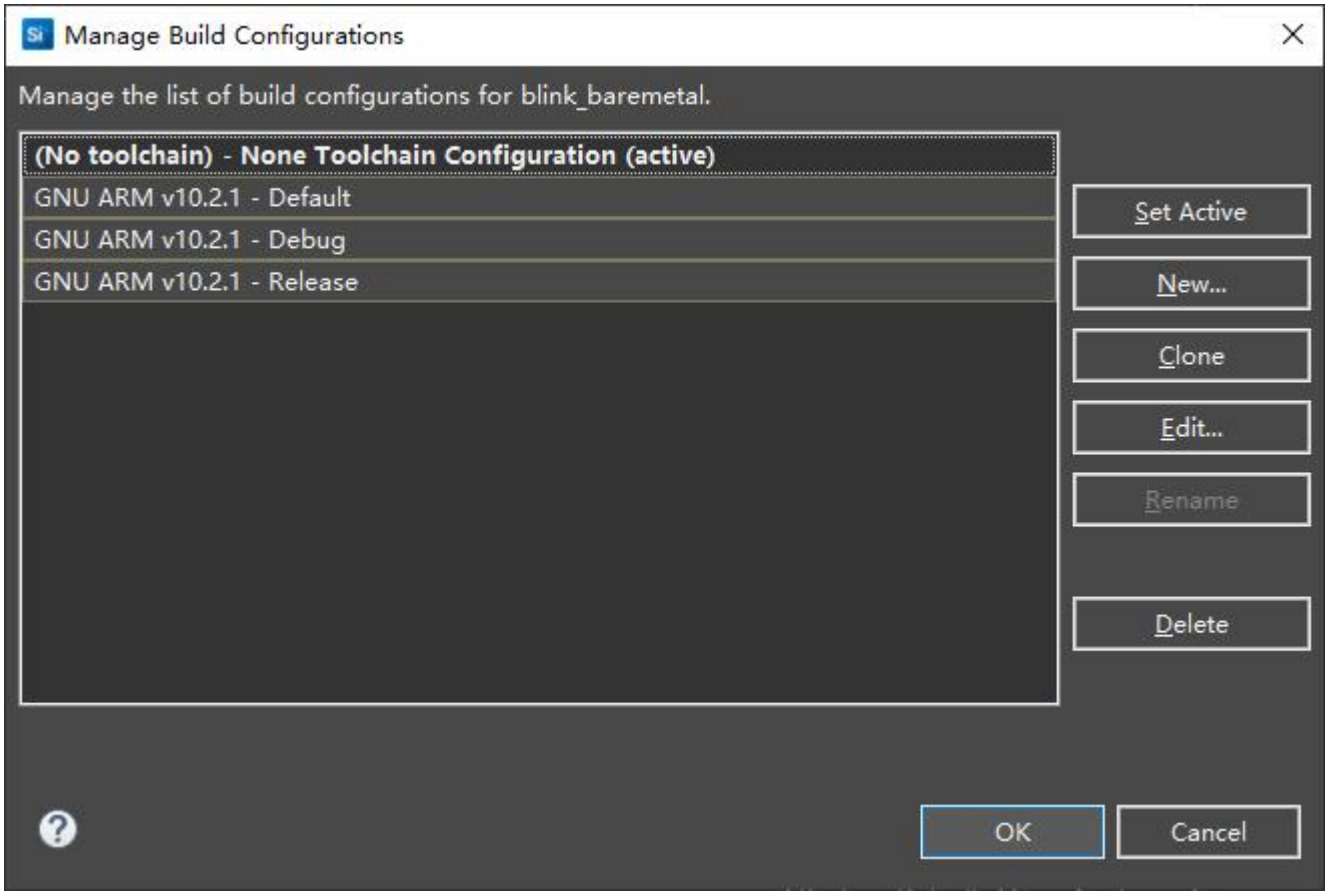
它也有图形化的引脚配置工具，

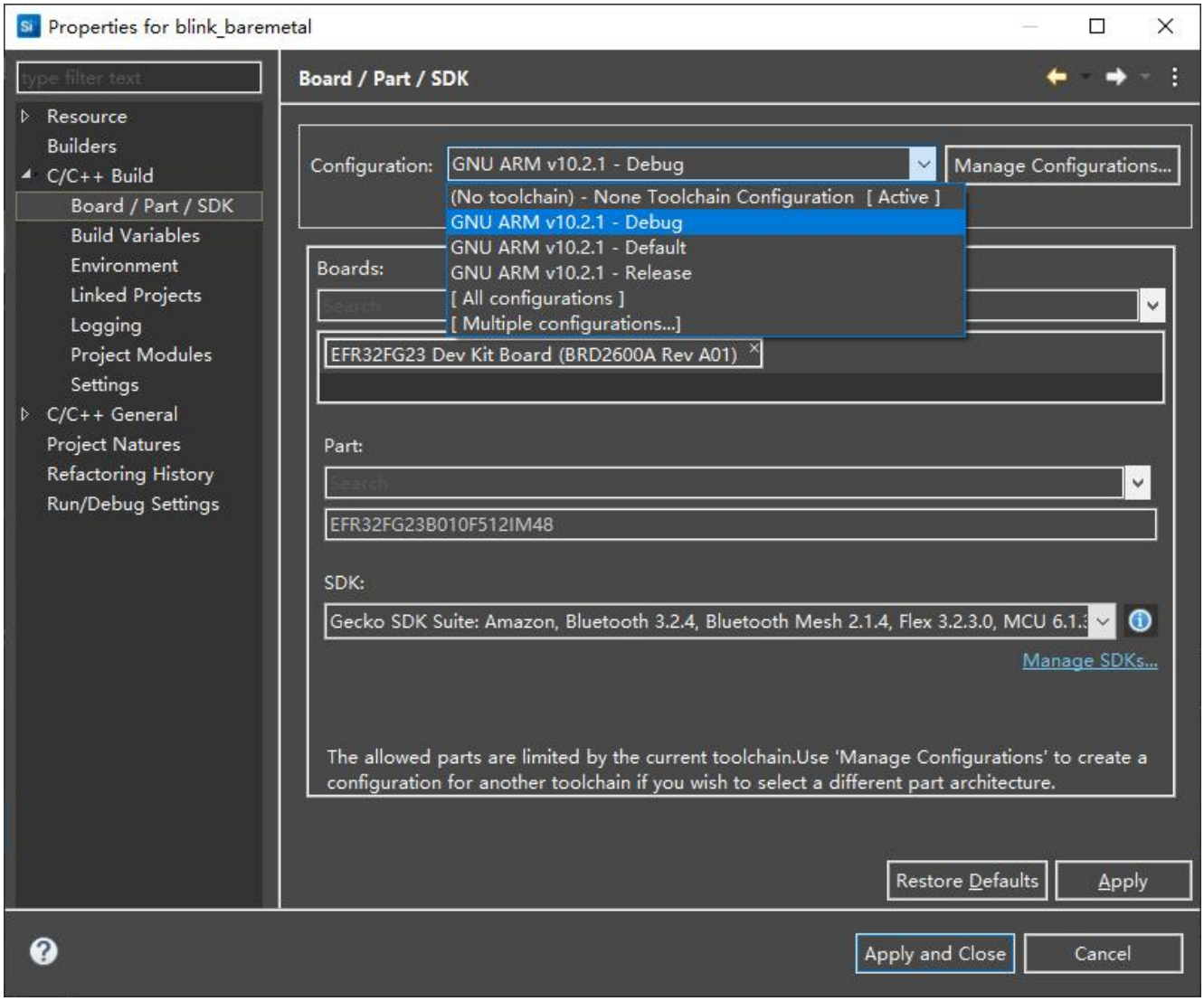


在项目选项里，还可以配置编译工具，这个比较有专业性，需要对相关 ARM 工具链有一定了解，实在不知道只能搜索，

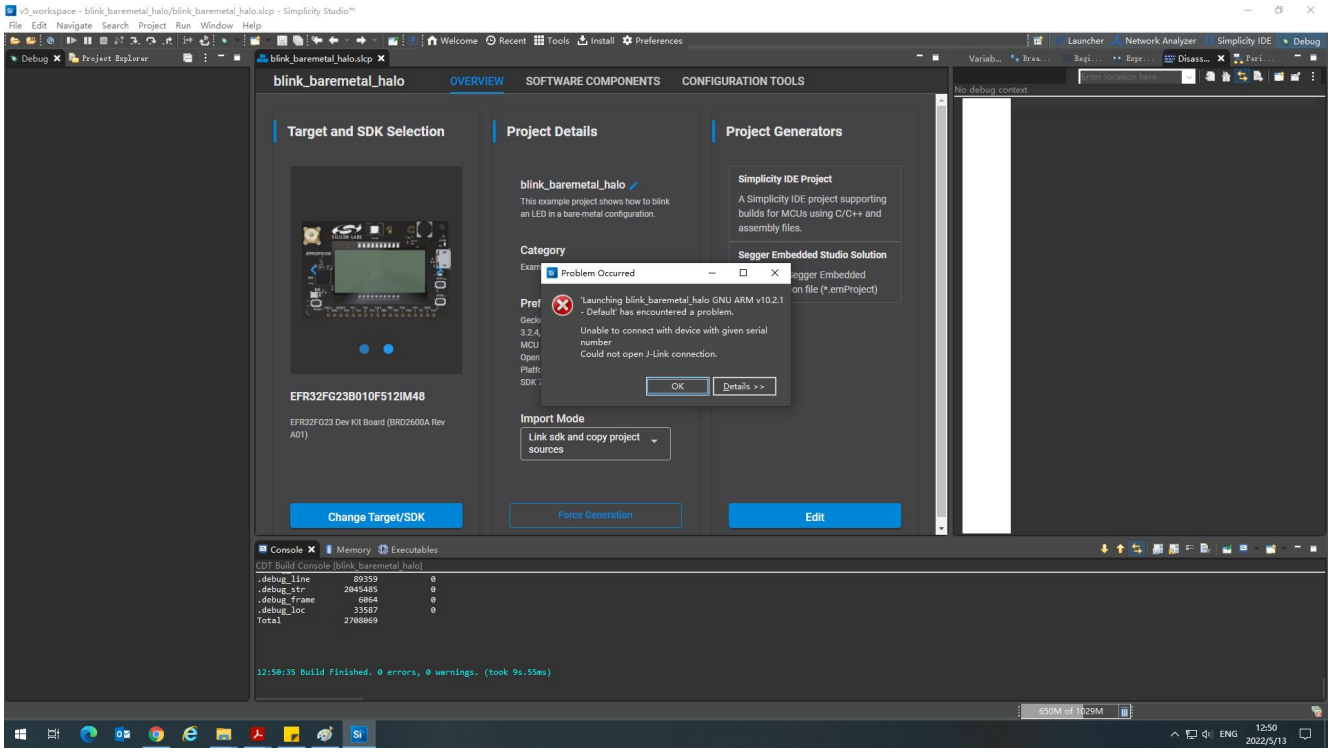


我使用的是这个工具链，

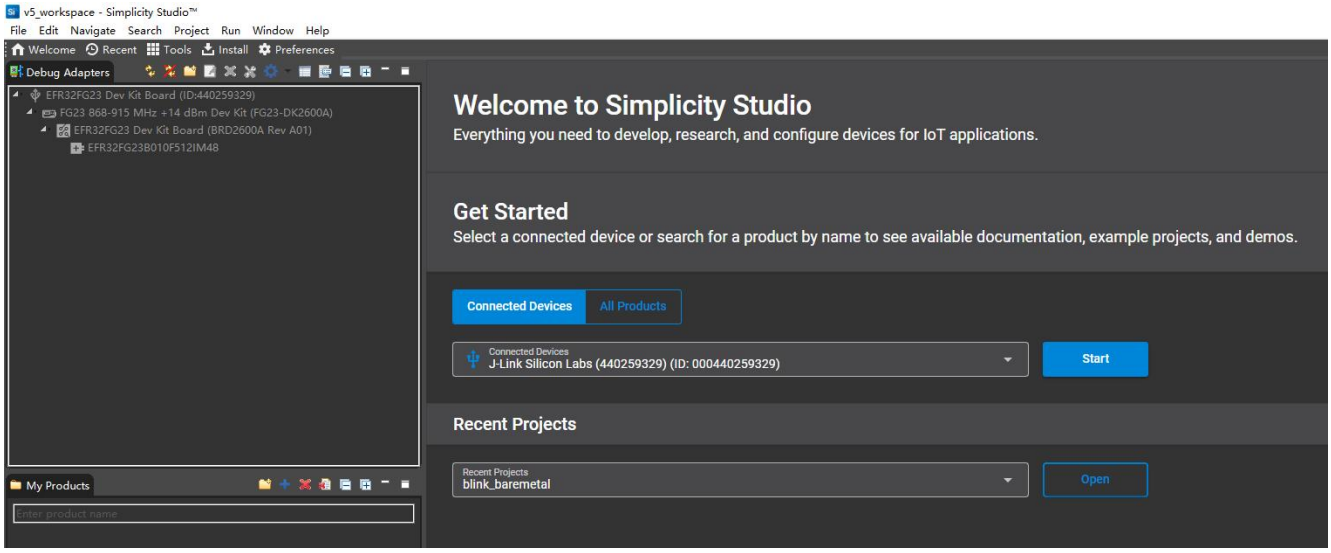

Manage Build Configurations
Manage the list of build configurations for blink_baremetal.
(No toolchain) - None Toolchain Configuration (active)
GNU ARM v10.2.1 - Default
GNU ARM v10.2.1 - Debug
GNU ARM v10.2.1 - Release
Set Active
New...
Clone
Edit...
Rename
Delete
OK
Cancel



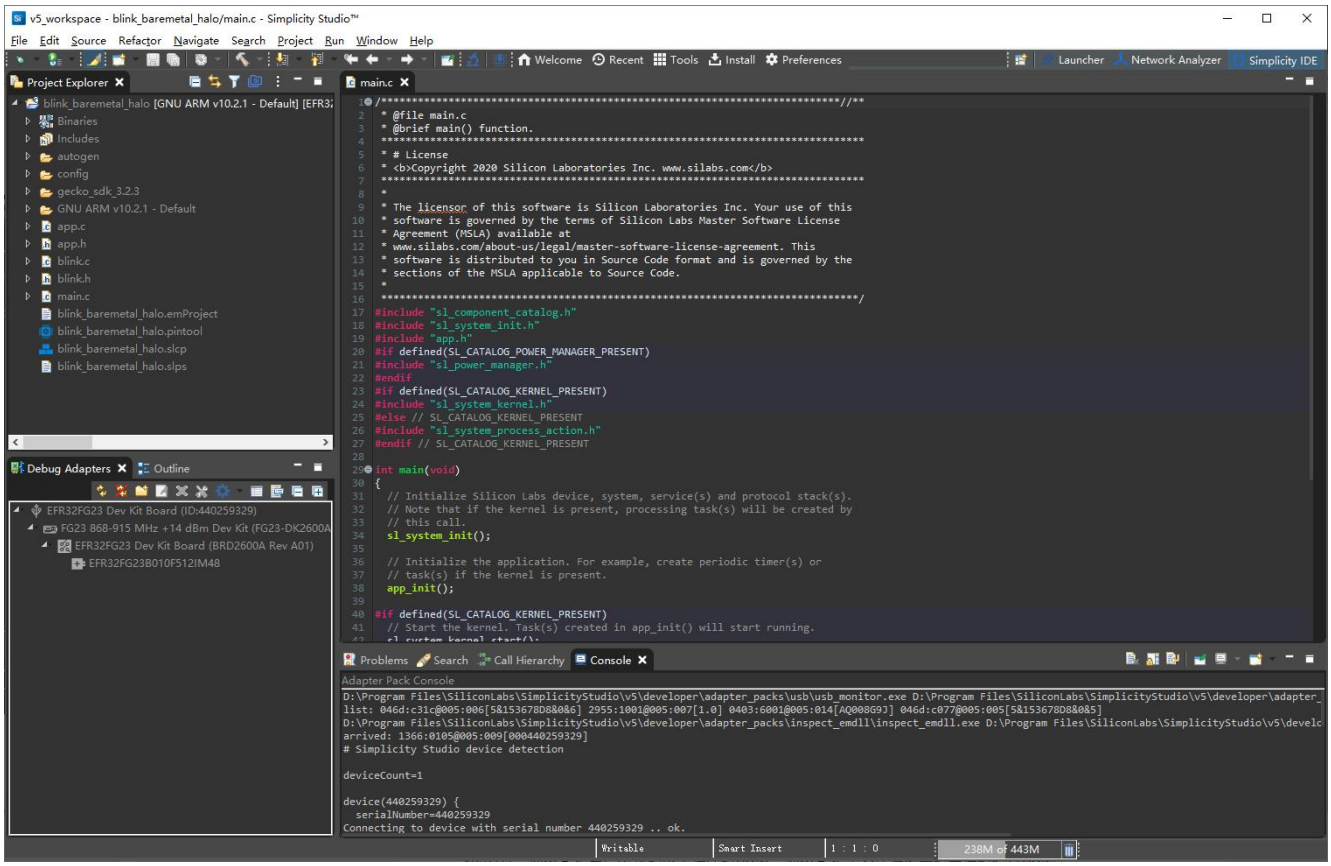
之前体验中，总是卡在这个画面无法进入 debug，其实就是因为 J-Link 驱动没有正确安装，



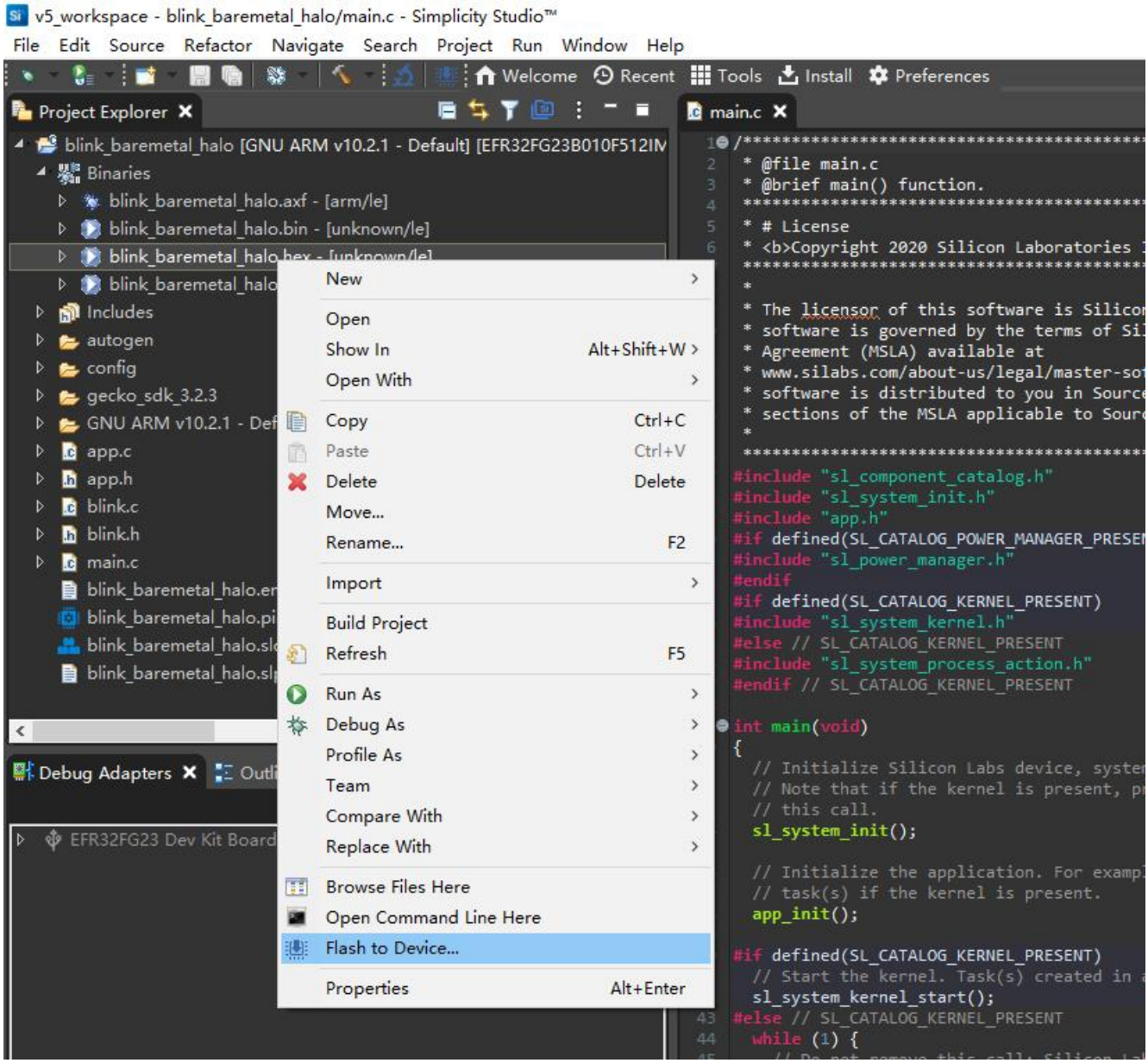
正确安装后看到的是下面这样子的，



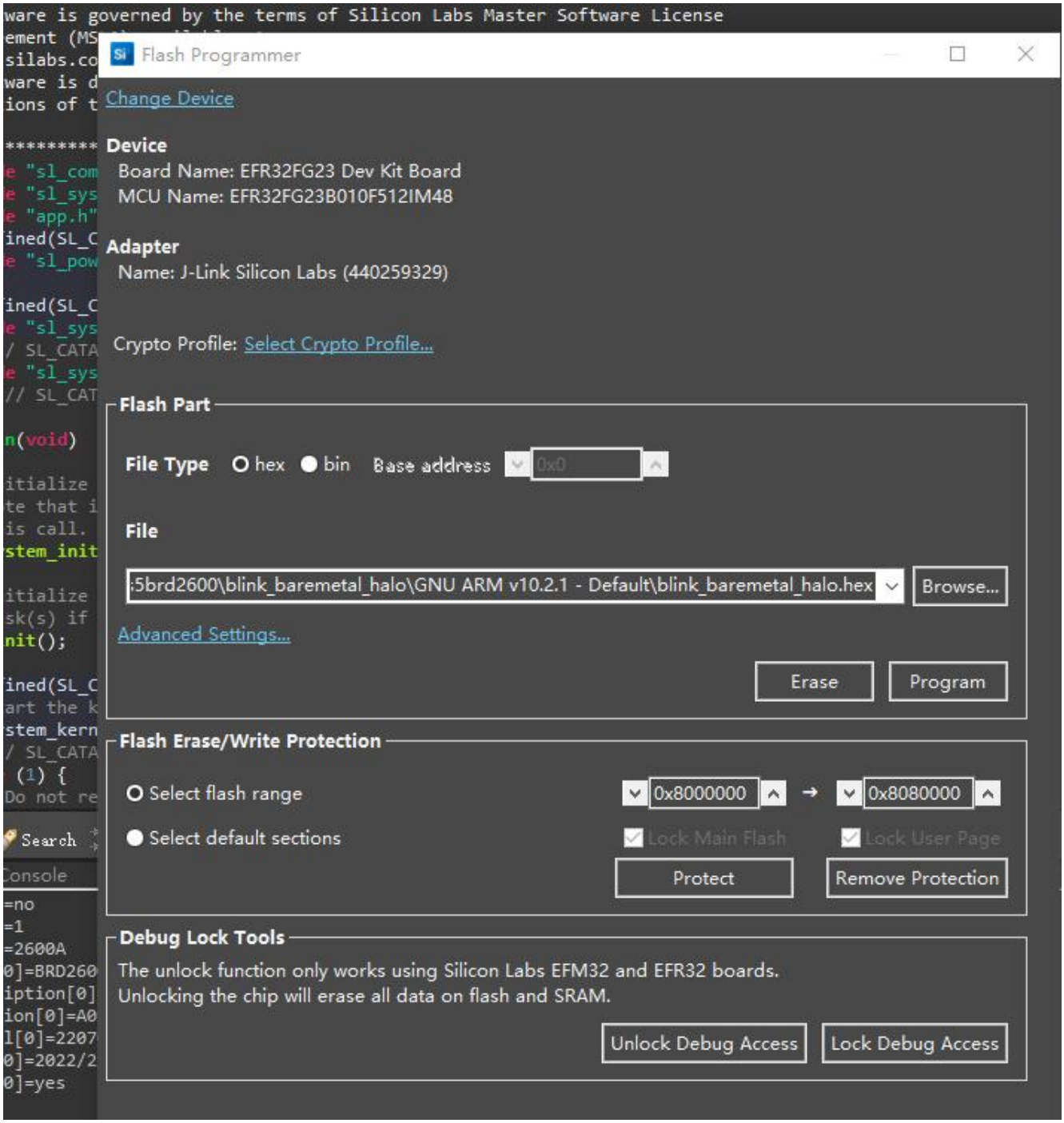
然后看看闪灯的主程序吧，很规范的代码风格，



编译不用说了，比较简单的事情，跟很多开发环境类似，编译成功后，可以直接将 hex 文件下载到器件上，先在 hex 文件上右键打开菜单，选择 Flash to Device，



打开了烧录窗口，直接 program 即可，



然后，就可以看到运行结果了。

4 分析

总体来说，开箱体验还是比较容易上手的。问题容易出现在 J-Link 驱动的安装、Simplicity Studio 组件及补丁包的自定义选择，需要对工具比较熟悉才建议进行高级选项，否则还是建议自动安装。另外，可能因为网络的原因，有时候相关资源信息的载入和下载比较缓慢。个人感觉针对该套件或者说针对该器件相关资源还是不够丰富，比如器件的各种外设的例程、无线通信的例程等。

卸载 Simplicity Studio v5 后如果在原先的路径下重新安装，需先将原有的整个文件夹卸载并删除后才能进行，否则安装程序无法进行，也不能覆盖，尤其是后期安装了比较多的 package 后。这个其实应该改进。

5 视频

见附件压缩包，“视频 1”是出厂所带的演示程序的效果，“视频 2”是本次体验建立的工程的运行效果。