一、 软件安装

网上教程多数为 MATLAB2017 和 CCSv6 以下版本的配置教程，步骤复杂需配置各种路径而且容易出错。其实 MATLAB2018 之后的配置已经很简化了，方便了许多。查看 MATLAB 支持的 CCS 版本列表 http://software-dl.ti.com/ccs/esd/documents/ccs_matlab.html，可以看到 MATLAB2018a 最高支持 CCSv7，并且无需 idelink_ert.tlc 目标文件了。

MATLAB 9.2 (R2017a)	CCSv3 -> CCSv6	CCS project (CCSv5, CCSv6) generated when using TI C2000 Support Package Support for TI C2000 with CCSv3 discontinued (**idelink_ert.tlc**)
MATLAB 9.3 (R2017b) MATLAB 9.4 (R2018a)	CCSv3 -> CCSv7	Started support for C2000Ware (R2017b)
MATLAB 9.5 (R2018b)	CCSv3 -> CCSv8	

首先准备好软件开发包（资源在文章末附件中）

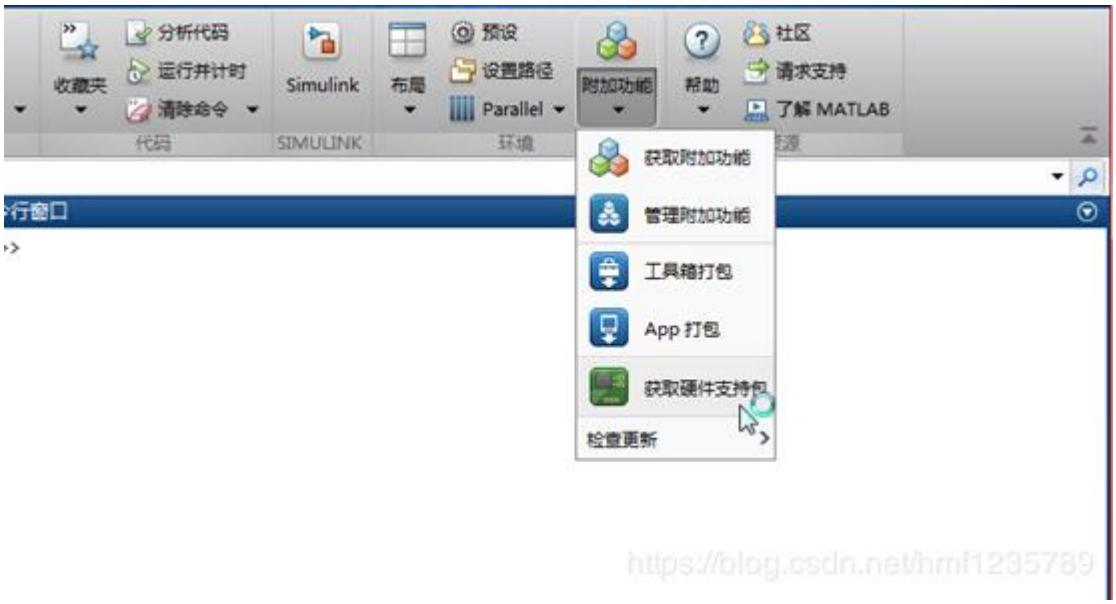
MATLAB R2018a(9.4.0.813654)

TI Code Composer Studio 7.2.0.00013

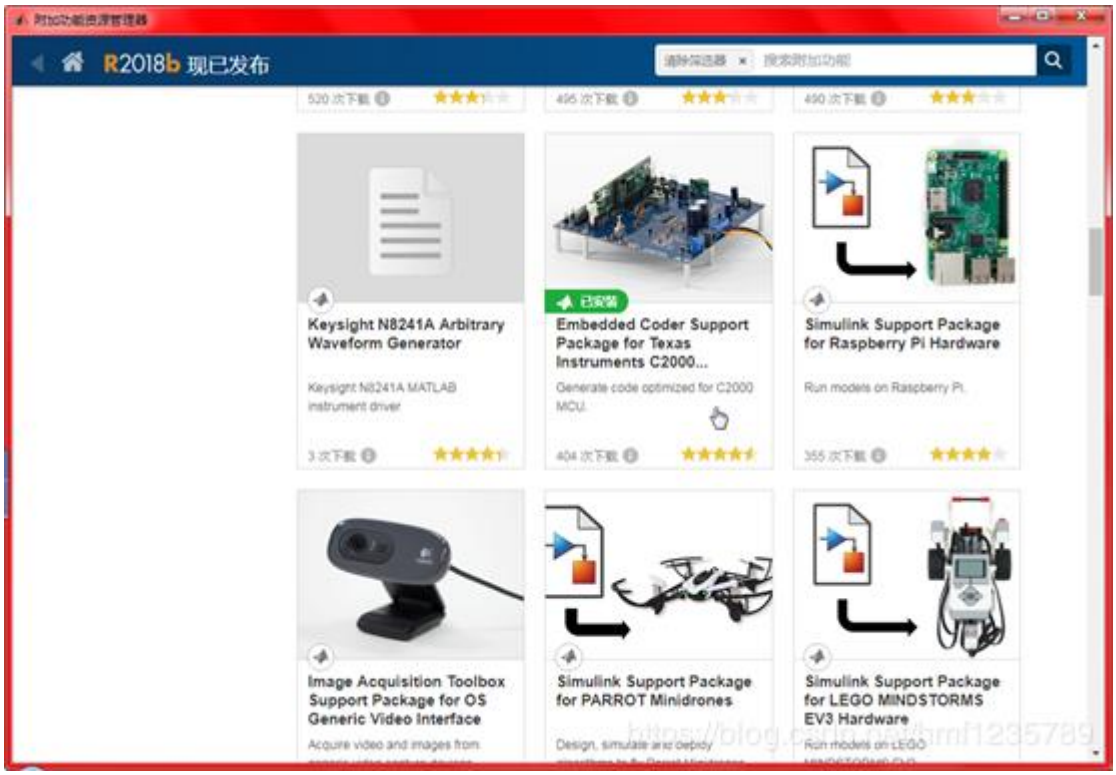
TI controlSUITE 3.4.9

TI C2000Ware 1_00_03_00

安装步骤省略，所有软件安装路径默认即可。将以上 4 个软件安装完成后开始安装 MATLAB 所支持的 DSP 硬件包，在 MALAB 下选择附加功能->获取硬件支持包

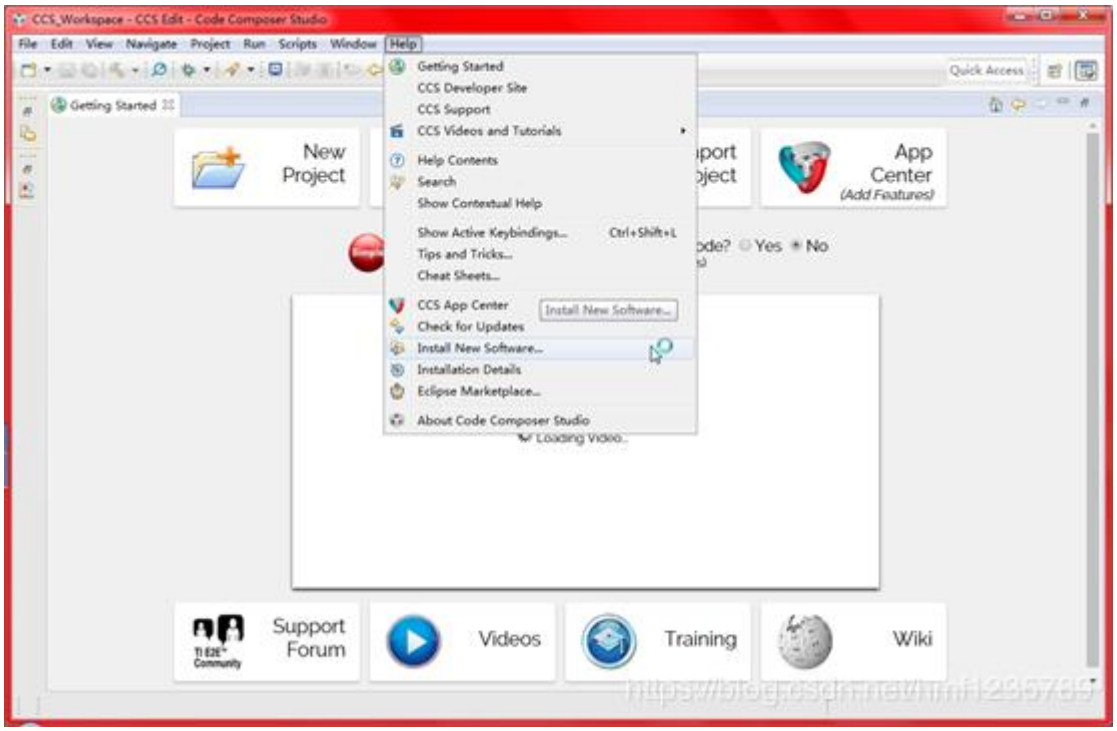


找到 Embedded Coder Support Package for Texas Instruments C2000 Processors

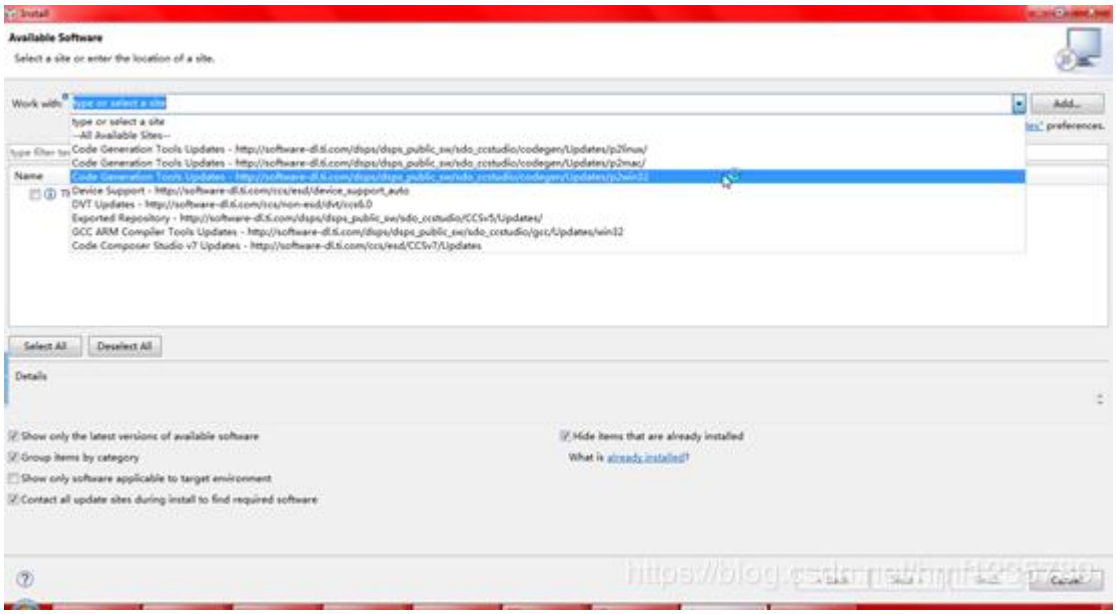


打开界面，选择安装，等待安装完成。

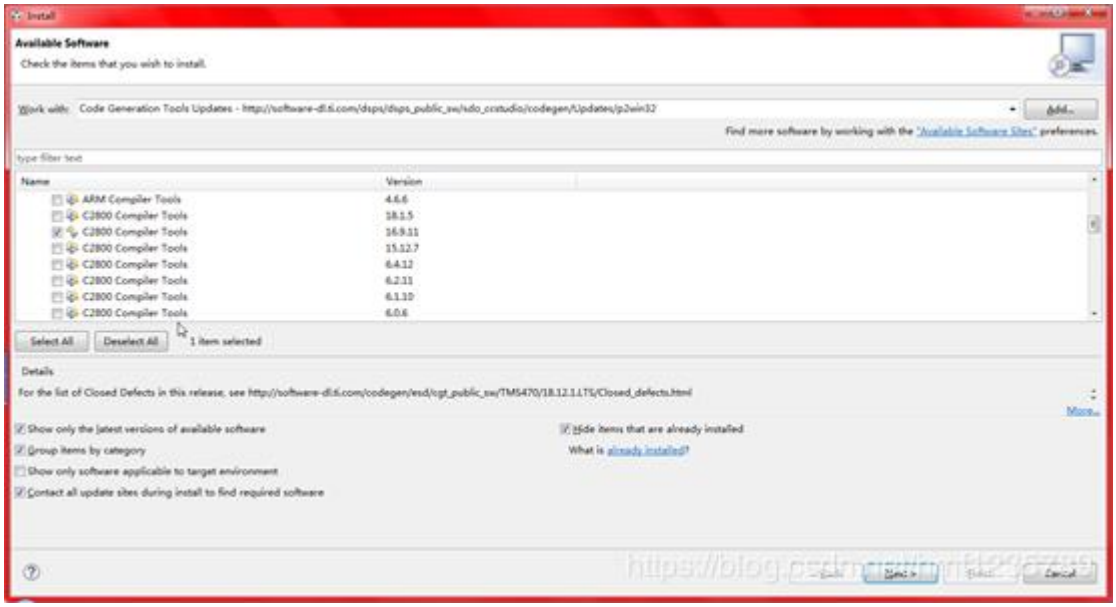
安装完成后将自动进入设置界面，先退出不着急设置。打开 CCS7 进行其他编译器版本安装，选择 Install New Software…



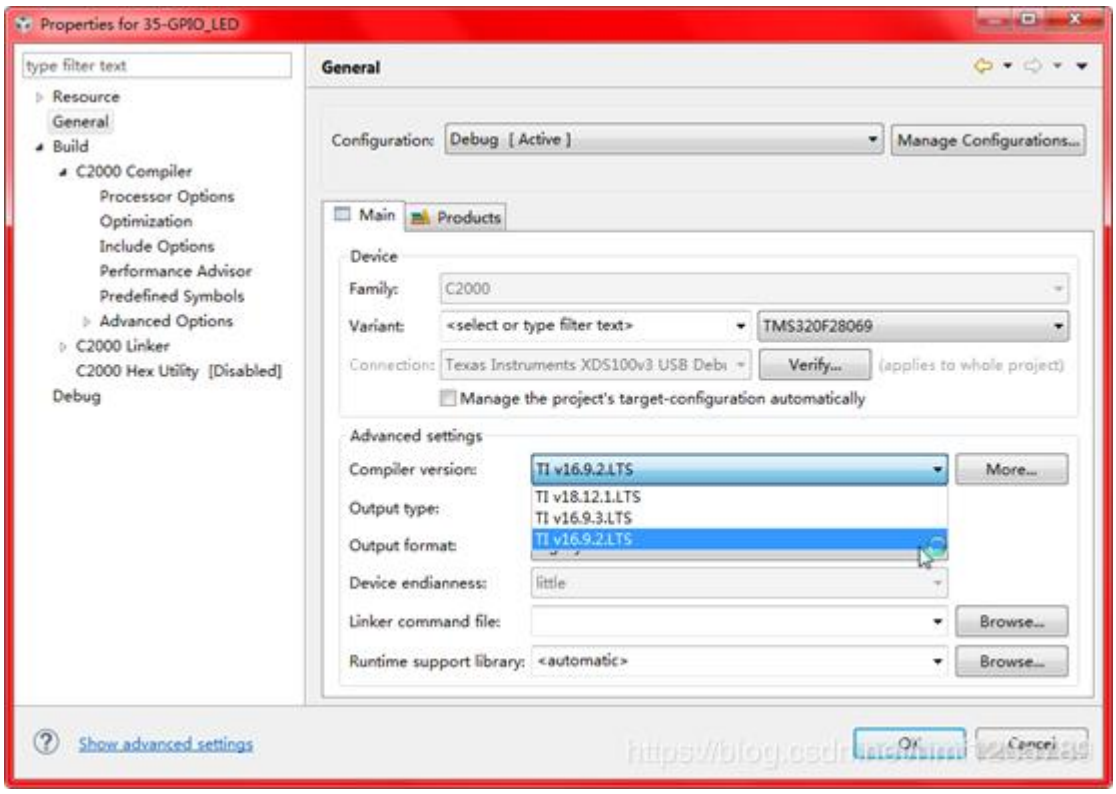
选择 Code Generation Tools Updates - http ?/software-dl.ti.com/dsps/dsps_public_sw/sdo_ccstudio/codegen/Updates/p2win32



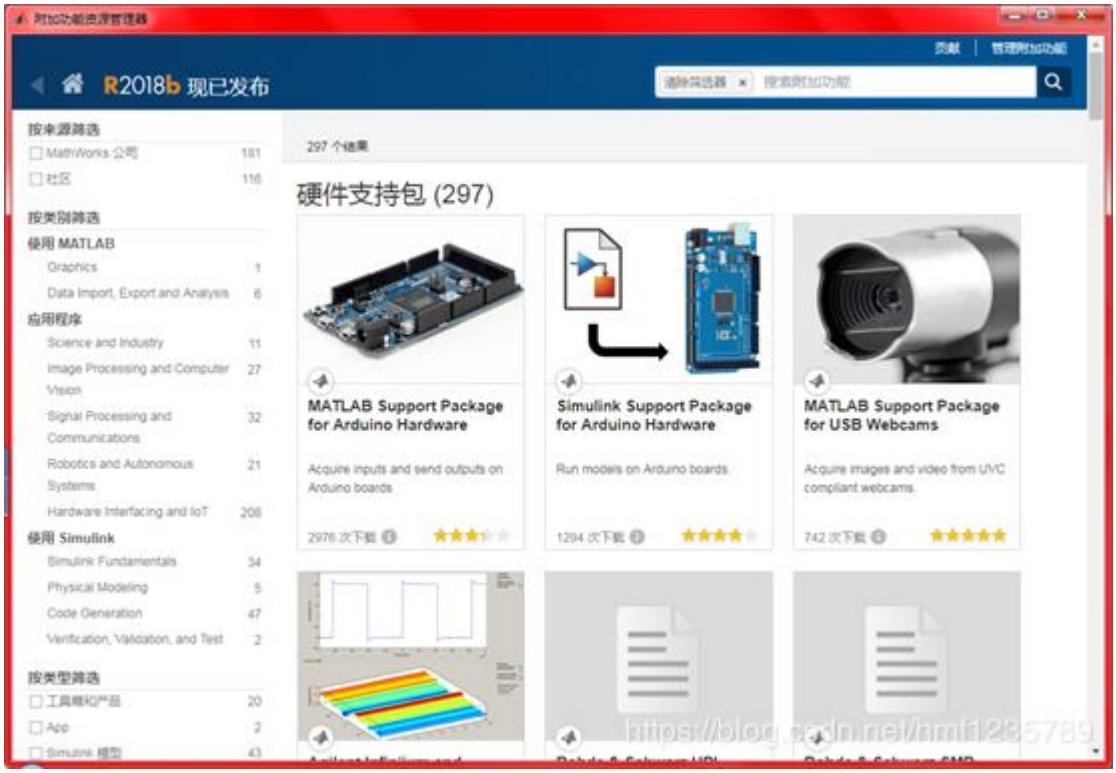
选择 Compiler Updates 下的 ti-cgt-c2000_18.12.1.LTS 编译器进行安装，CCS7 软件安装时已有自身的 ti-cgt-c2000_18.12.1.LTS 的编译器了，但是为了更好的匹配 MATLAB 设置，所以在此安装个低版本的编译器。



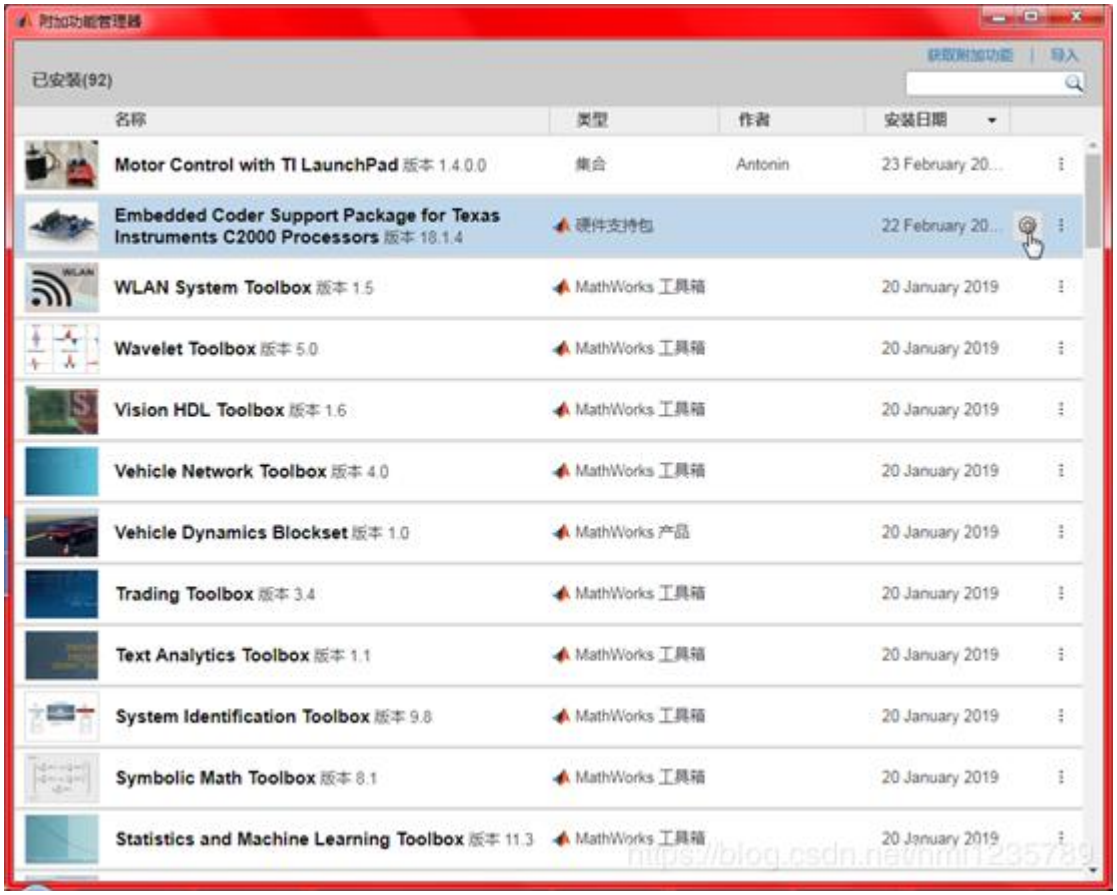
安装完成后，自动重启 CCS，可以在工程 properties 下查看编译器是否安装成功



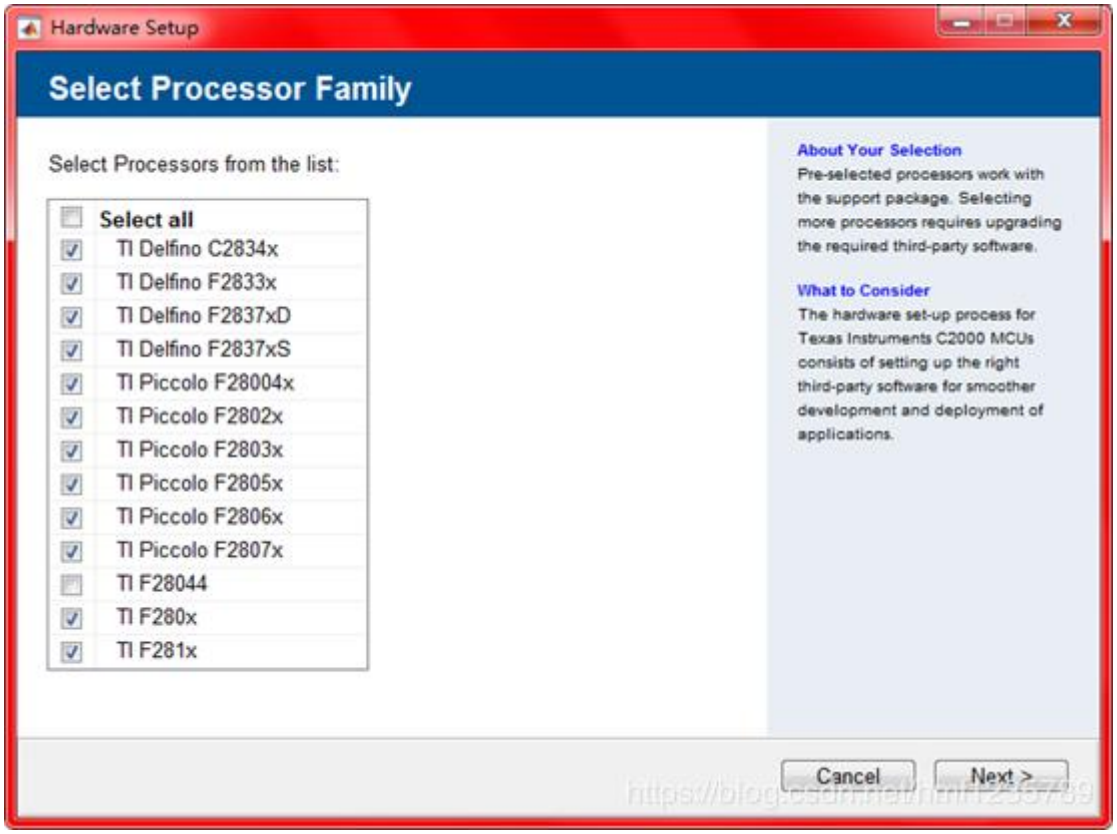
回到 MATLAB，选择管理附加功能



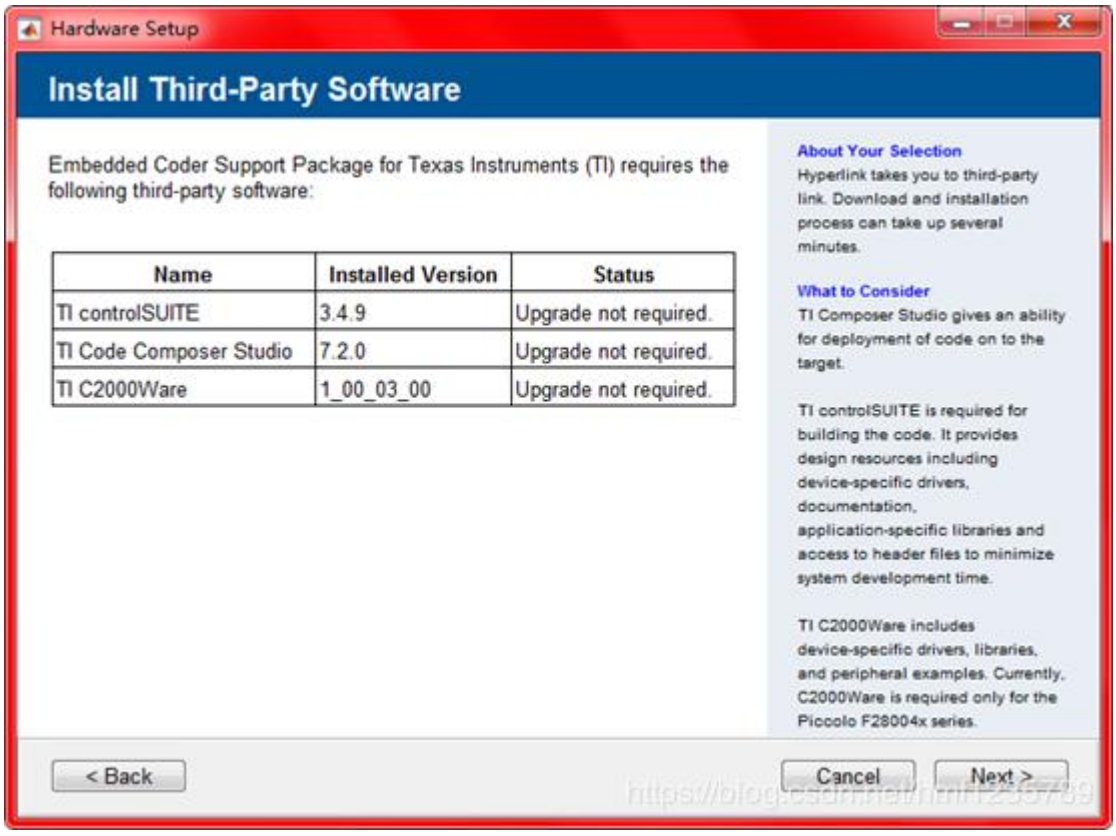
选择设置，回到之前未完成的设置界面


附加功能管理器
已安装(92)
获取附加功能 | 导入
名称
类型
作者
安装日期
Motor Control with TI LaunchPad 版本 1.4.0.0
集合
Antonin
23 February 20...
Embedded Coder Support Package for Texas Instruments C2000 Processors 版本 18.1.4
硬件支持包
22 February 20...
WLAN System Toolbox 版本 1.5
MathWorks 工具箱
20 January 2019
Wavelet Toolbox 版本 5.0
MathWorks 工具箱
20 January 2019
Vision HDL Toolbox 版本 1.6
MathWorks 工具箱
20 January 2019
Vehicle Network Toolbox 版本 4.0
MathWorks 工具箱
20 January 2019
Vehicle Dynamics Blockset 版本 1.0
MathWorks 产品
20 January 2019
Trading Toolbox 版本 3.4
MathWorks 工具箱
20 January 2019
Text Analytics Toolbox 版本 1.1
MathWorks 工具箱
20 January 2019
System Identification Toolbox 版本 9.8
MathWorks 工具箱
20 January 2019
Symbolic Math Toolbox 版本 8.1
MathWorks 工具箱
20 January 2019
Statistics and Machine Learning Toolbox 版本 11.3
MathWorks 工具箱
20 January 2019

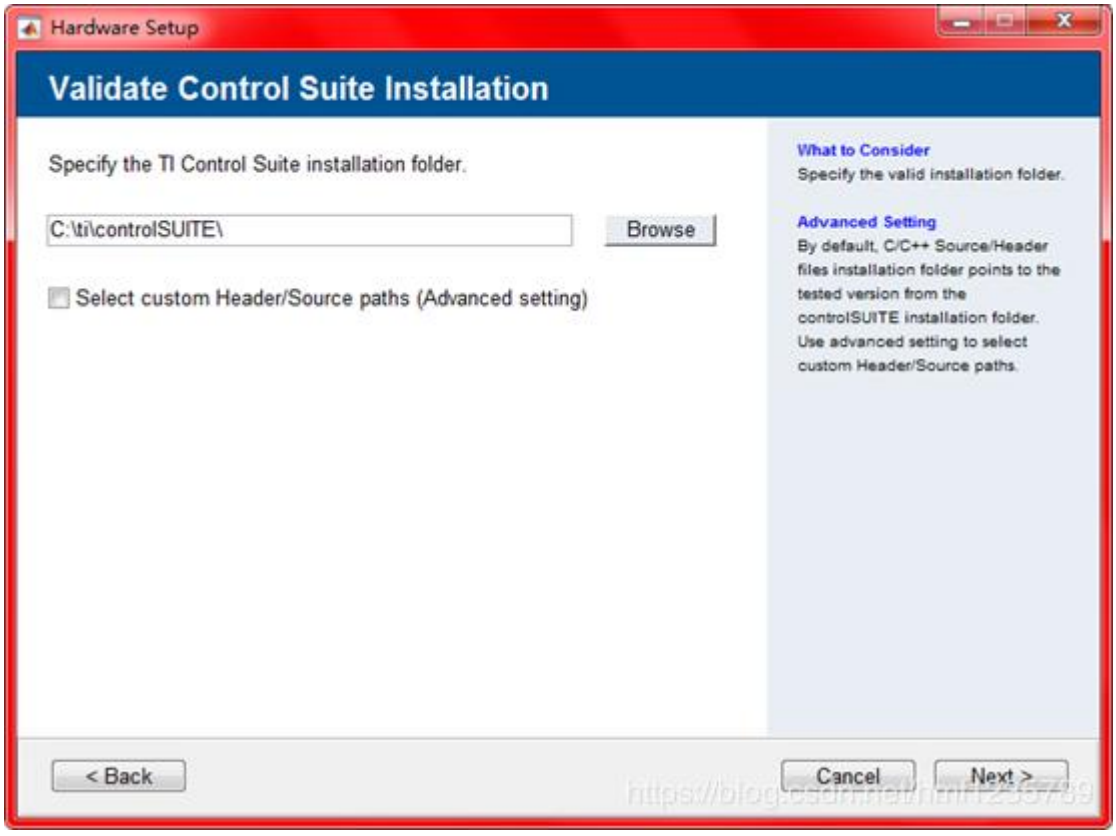
选择支持器件


Hardware Setup
Select Processor Family
Select Processors from the list:
Select all
TI Delfino C2834x
TI Delfino F2833x
TI Delfino F2837xD
TI Delfino F2837xS
TI Piccolo F28004x
TI Piccolo F2802x
TI Piccolo F2803x
TI Piccolo F2805x
TI Piccolo F2806x
TI Piccolo F2807x
TI F28044
TI F280x
TI F281x
About Your Selection
Pre-selected processors work with the support package. Selecting more processors requires upgrading the required third-party software.
What to Consider
The hardware set-up process for Texas Instruments C2000 MCUs consists of setting up the right third-party software for smoother development and deployment of applications.
Cancel
Next >

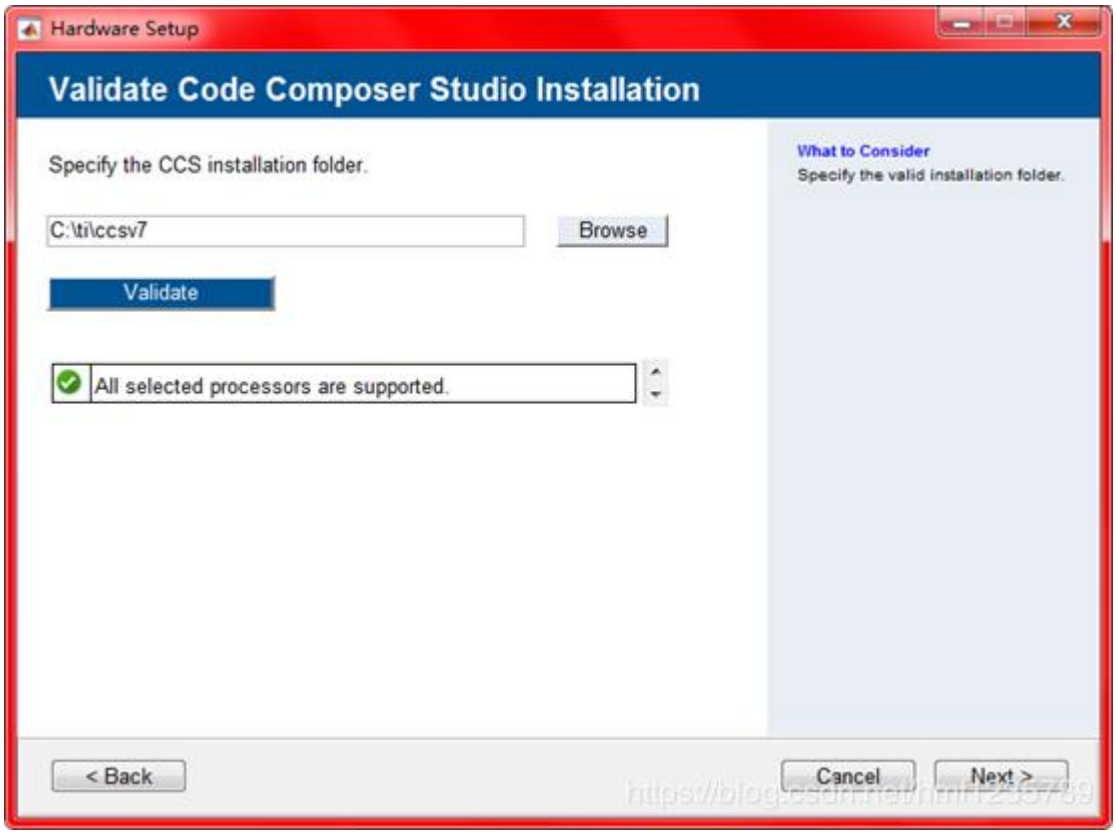
自动列出需要的第三方软件，如果版本不是以下会有 Status 升级提示



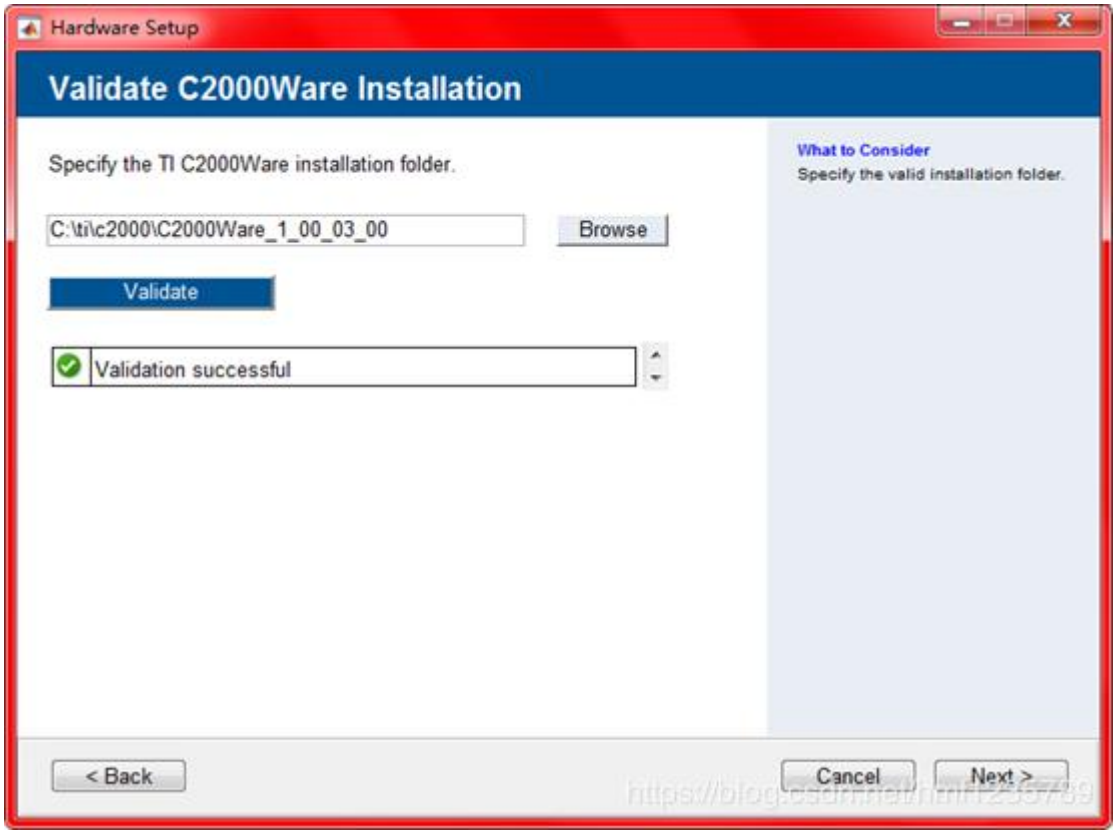
自动识别 controlSUITE 路径



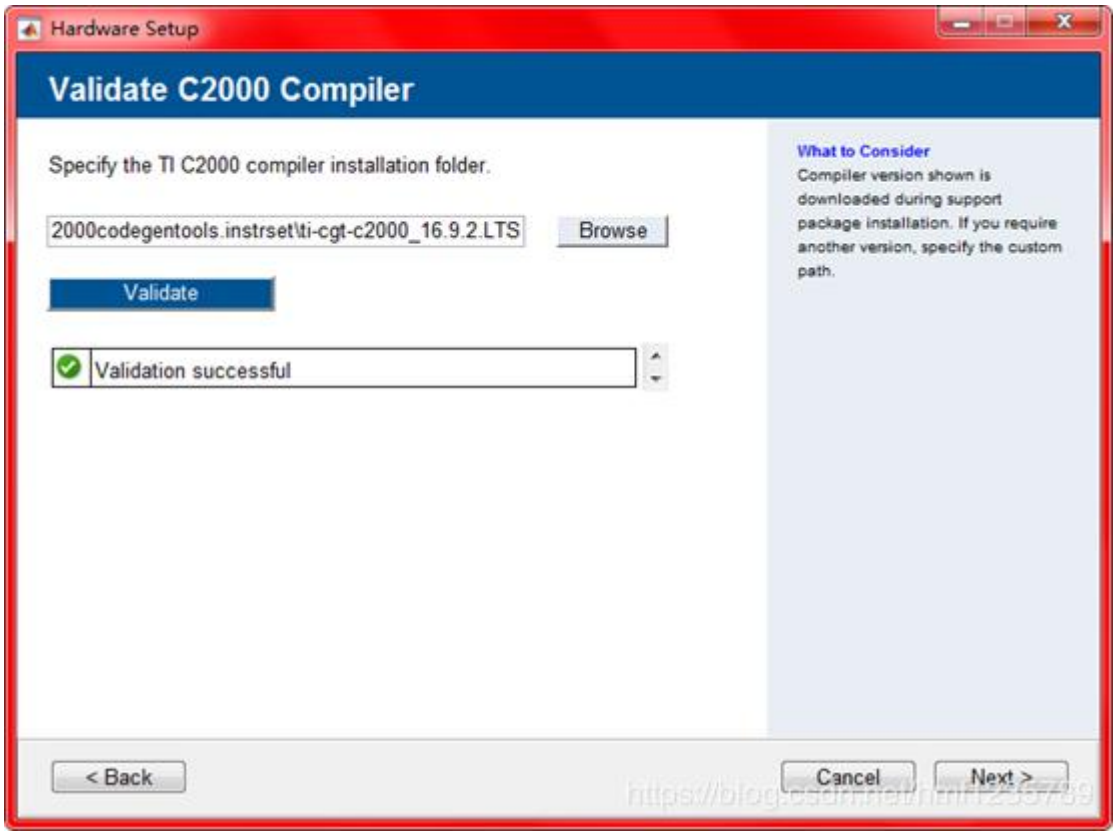
选择 Validate，自动识别 CCS 路径



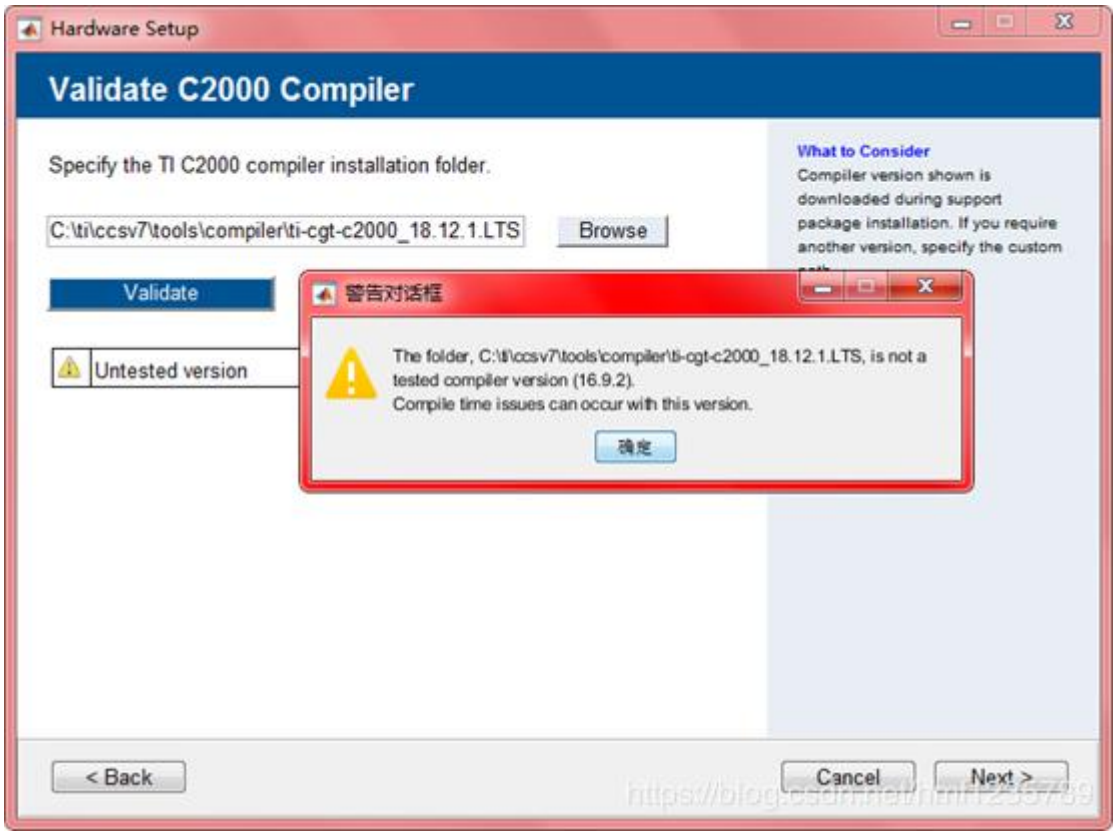
选择 Validate，自动识别 C2000Ware 路径



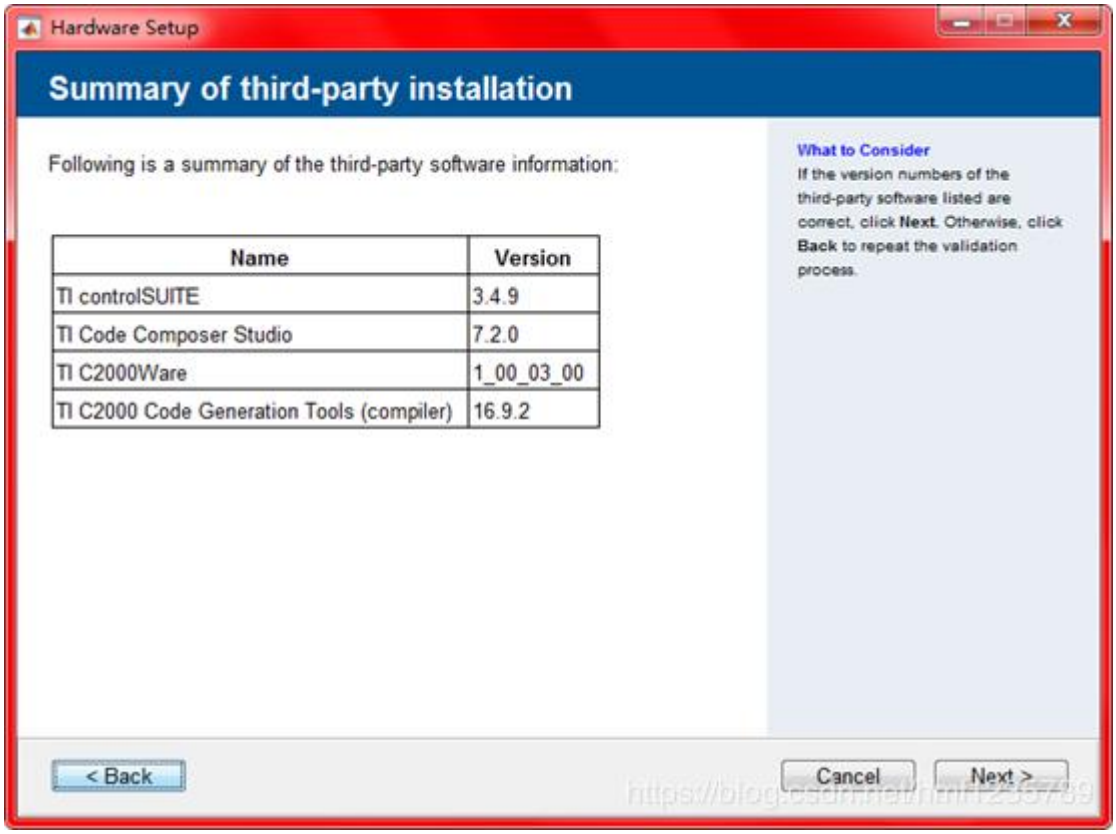
选择编译器，默认路径为 C:\ProgramData\MATLAB\SupportPackages\R2018a\3P.instrset\tic2000codegentools.instrset\ti-cgt-c2000_16.9.2.LTS 也可以选择 CCS 软件路径下自己安装的 C:\ti\ccsv7\tools\compiler\ti-cgt-c2000_16.9.2.LTS



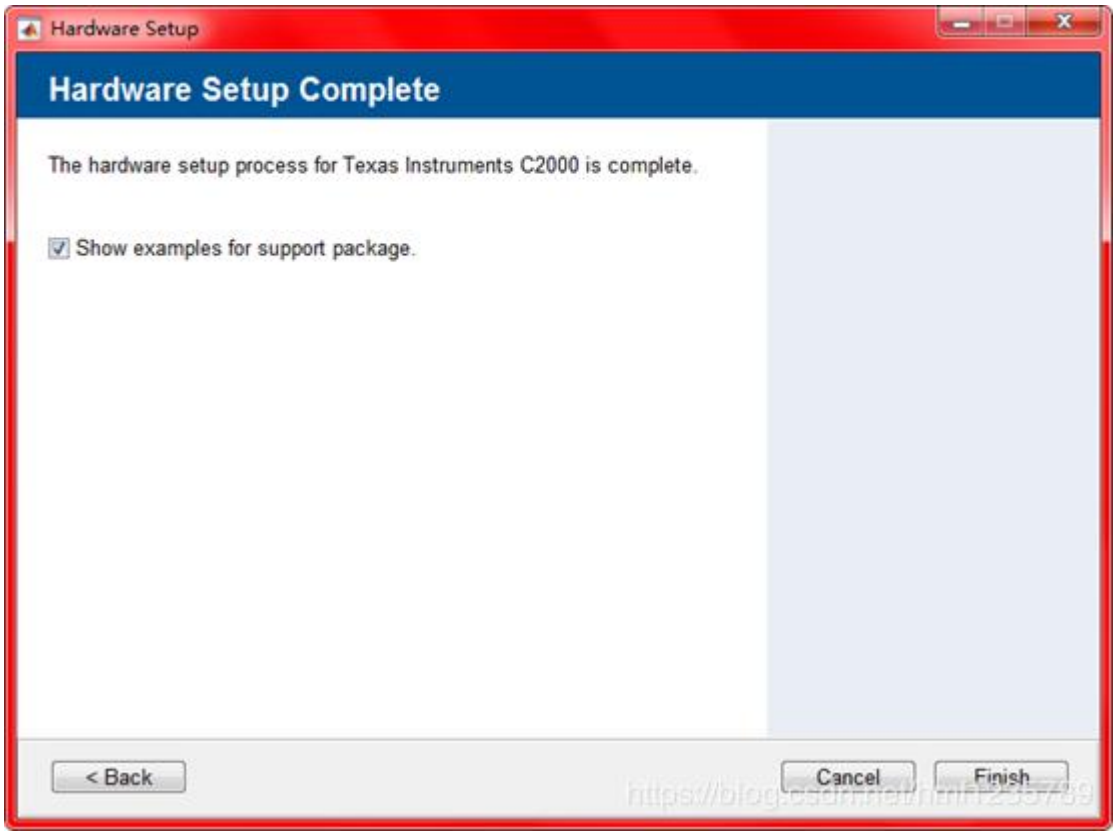
如果现在的版本不一样会出现版本未验证提示，为避免出现错误，所有步骤选择默认版本



查看配置摘要

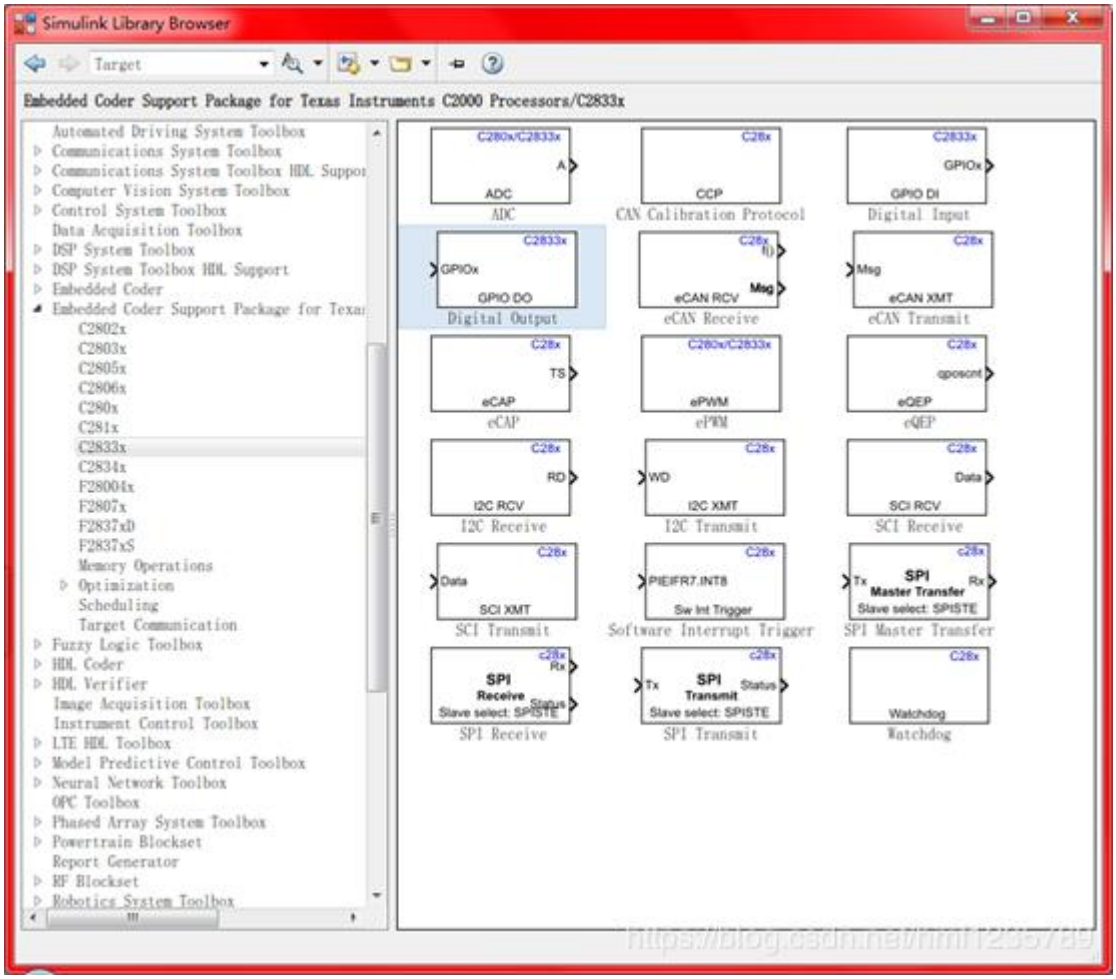


完成所有配置

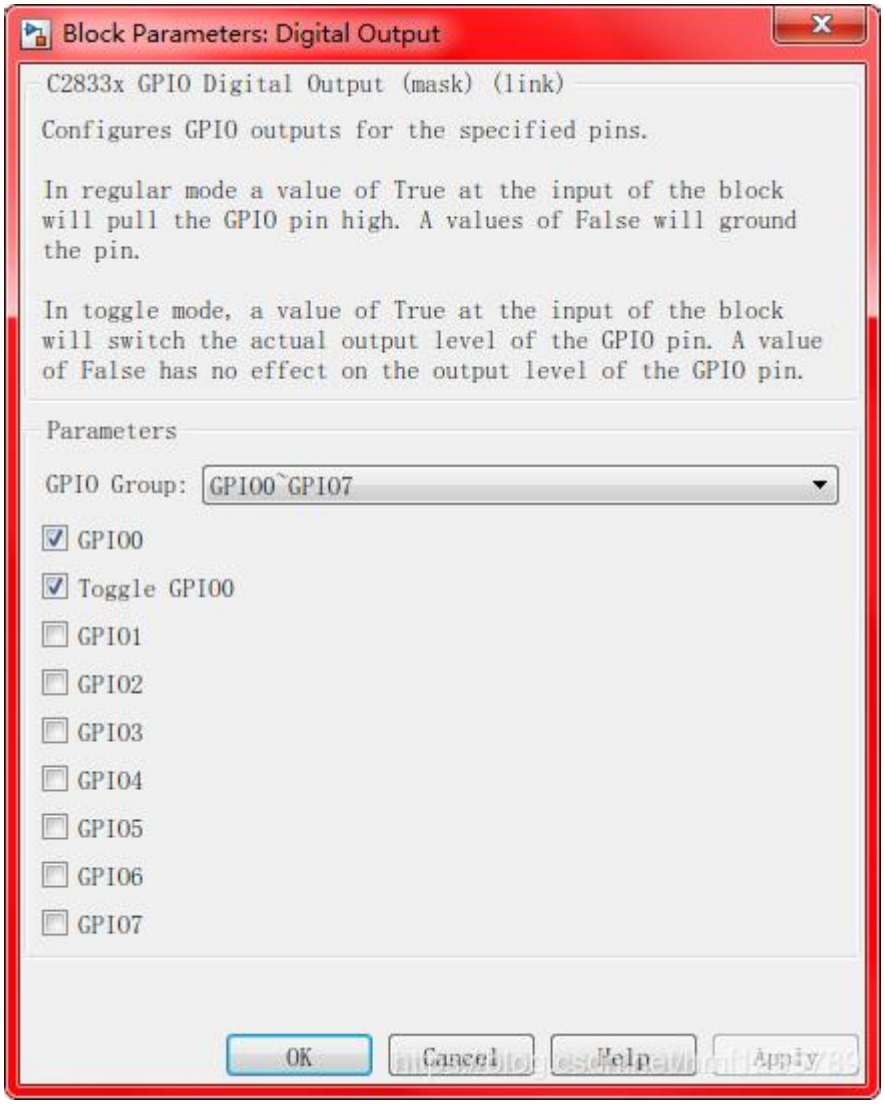


二、 新建 Siumlink 工程

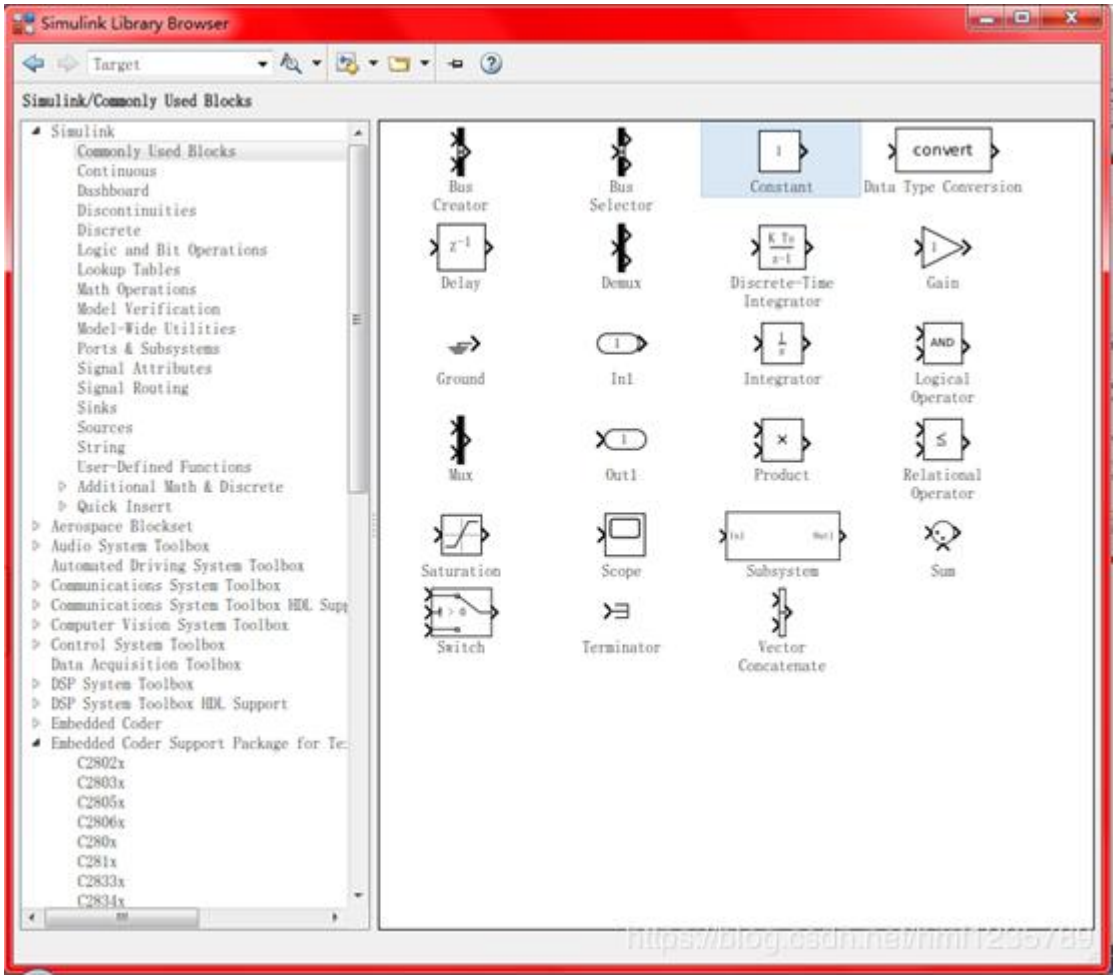
所有软件配置完成后我们以 DSP28335 开发板一个 LED 灯闪烁程序进行测试，新建 Simulink 文件，在库 Embedded Coder Support Package for Texas Instruments C2000 Processors 中放置 Digital Output



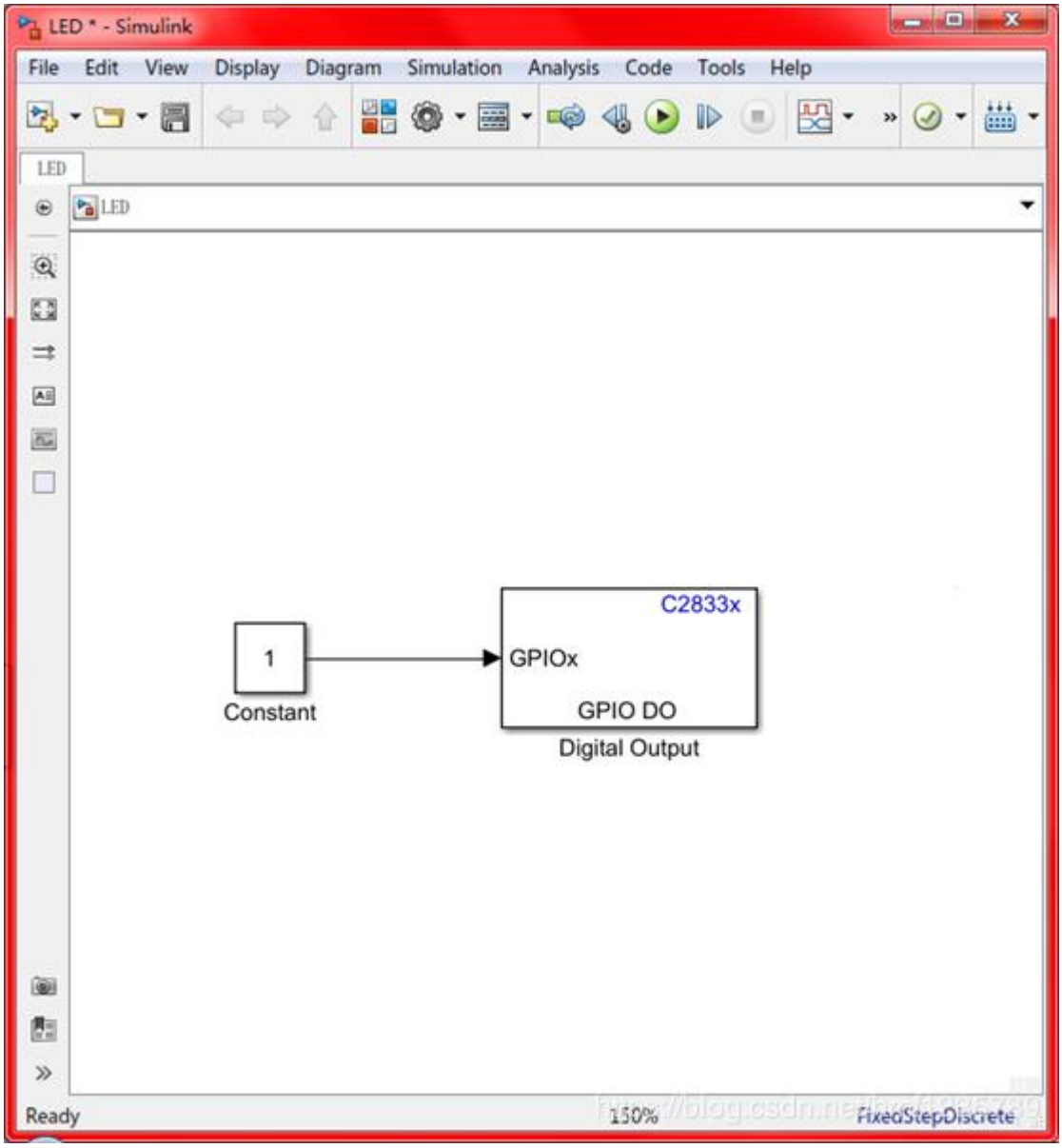
我的开发板 LED 控制引脚为 GPIO0，控件设置如下



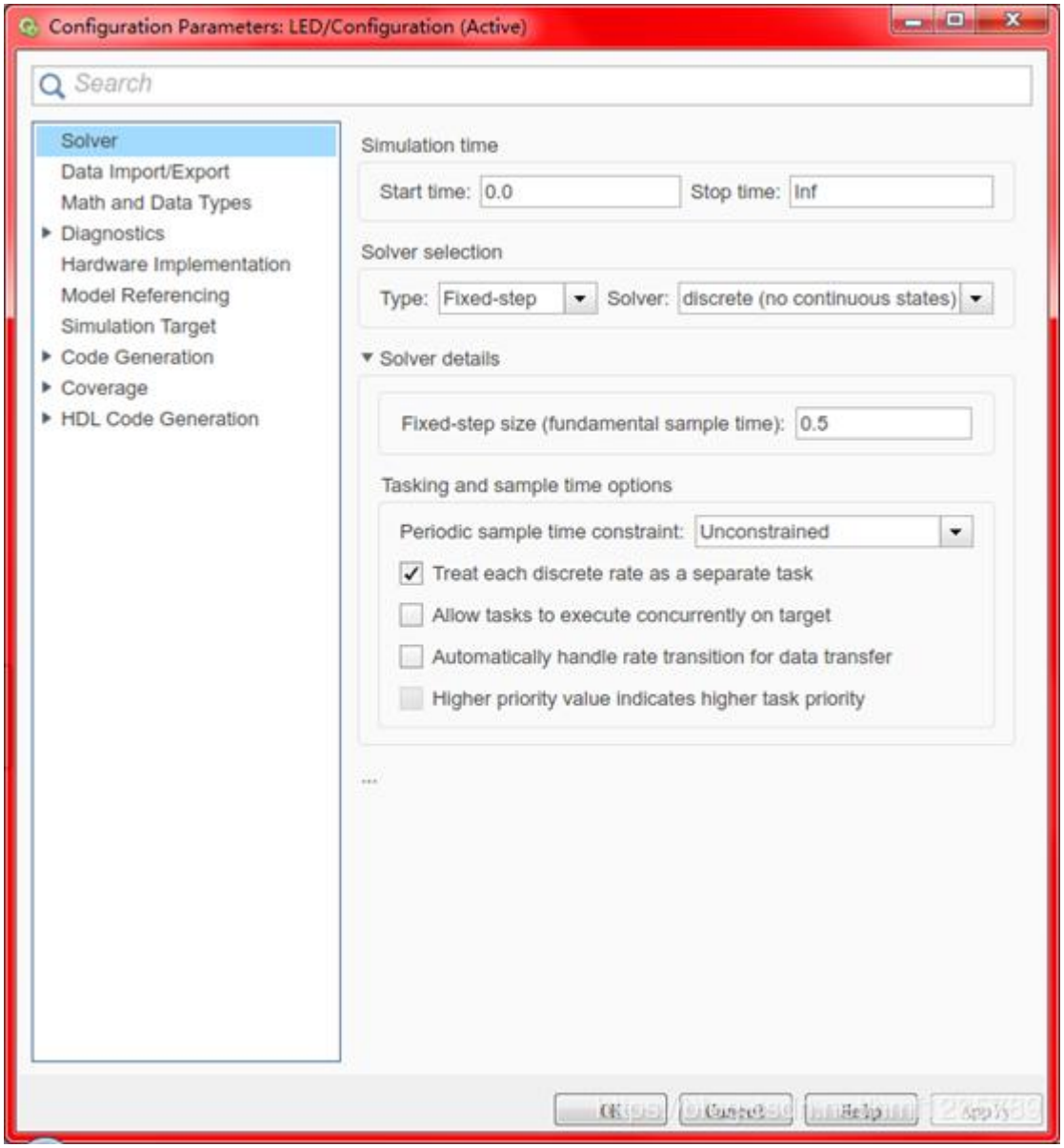
再放置一个 Constant


Simulink Library Browser
Target
Simulink/Commonly Used Blocks
Simulink
Commonly Used Blocks
Continuous
Dashboard
Discontinuities
Discrete
Logic and Bit Operations
Lookup Tables
Math Operations
Model Verification
Model-Wide Utilities
Ports & Subsystems
Signal Attributes
Signal Routing
Sinks
Sources
String
User-Defined Functions
Additional Math & Discrete
Quick Insert
Aerospace Blockset
Audio System Toolbox
Automated Driving System Toolbox
Communications System Toolbox
Communications System Toolbox HDL Supp
Computer Vision System Toolbox
Control System Toolbox
Data Acquisition Toolbox
DSP System Toolbox
DSP System Toolbox HDL Support
Embedded Coder
Embedded Coder Support Package for Te
C2802x
C2803x
C2805x
C2806x
C280x
C281x
C2833x
C2834x
Bus Creator
Bus Selector
Constant
convert
Data Type Conversion
Delay
Demux
Discrete-Time Integrator
Gain
Ground
In1
Integrator
AND
Logical Operator
Mux
Out1
Product
Relational Operator
Saturation
Scope
Subsystem
Sum
Switch
Terminator
Vector Concatenate

完成连接



下面进行参数设置，仿真设置如下



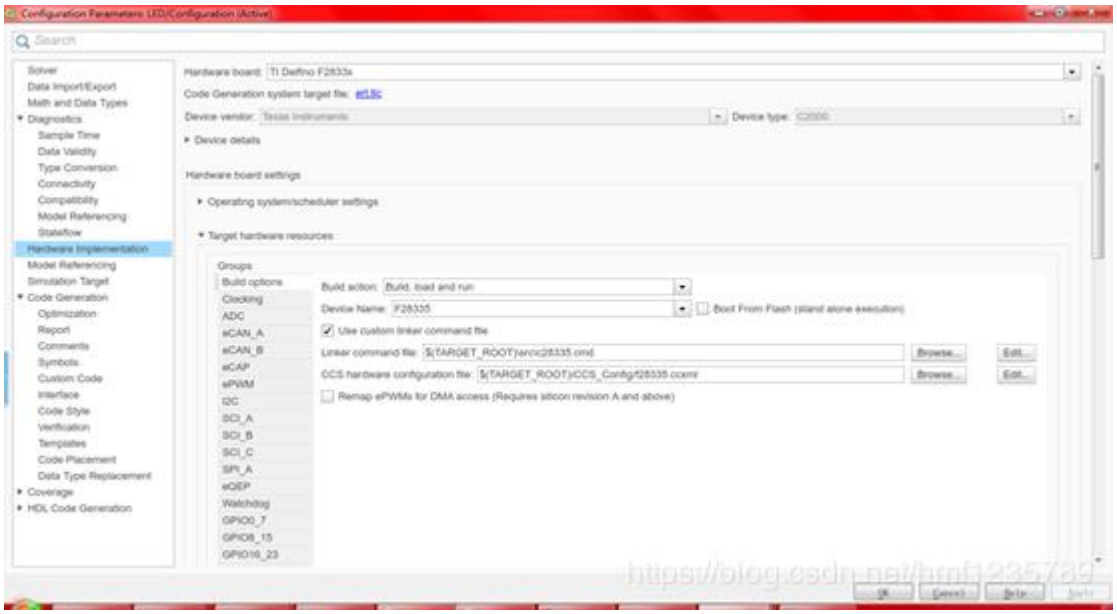
在 Hardware Implementation 中选择 Hardware board 为 TI Defino F2833x，这时 simulink 会自动选定 TI c2000 系列。

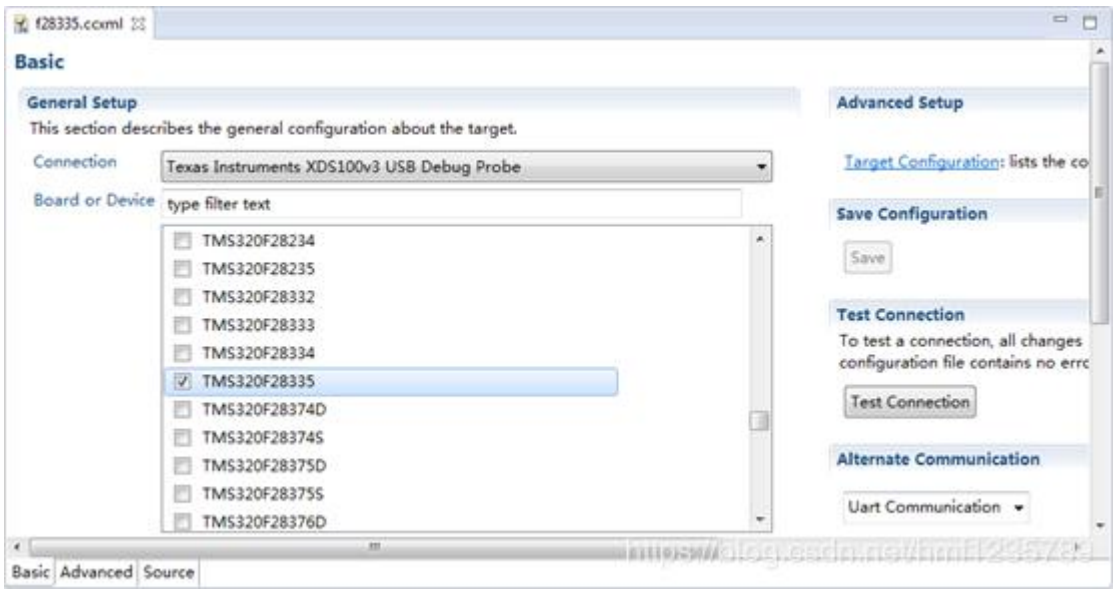
然后配置 Target hardware resources 下 Build options 为 Build,load and run，工程将在编译后自动下载到开发板中，并且运行。

Device name 为 F28335。并勾选 Use custom linker command。

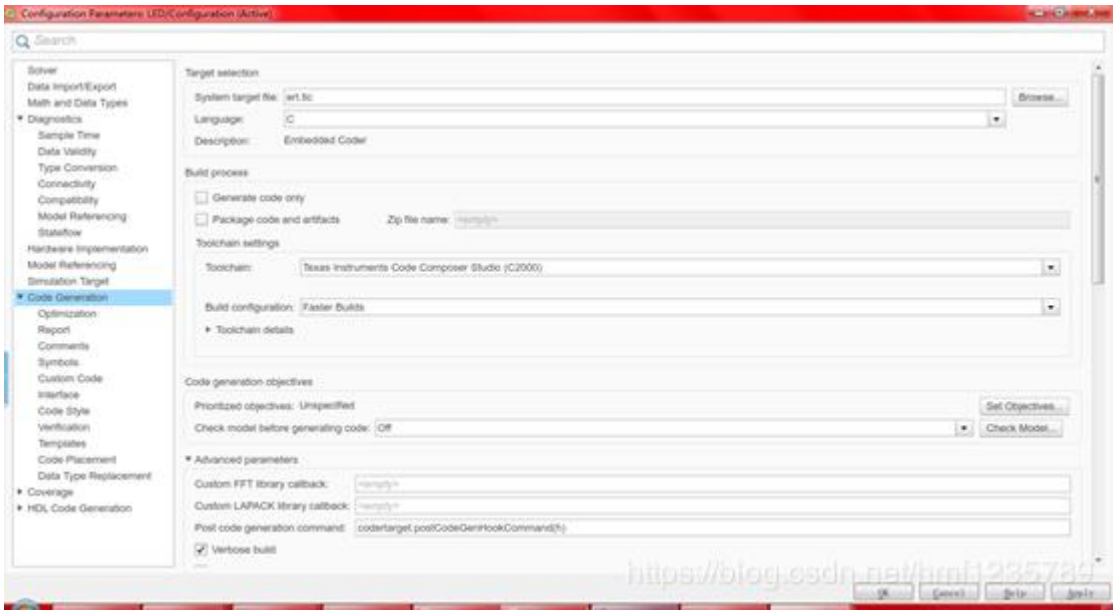
Linker command file 为程序运行模式，选择 c28335.cmd 为 RAM 运行方式，在 Browse 中选择 c28335_flash.cmd 为 Flash 运行方式，这与 CCS 中是一致的。

打开 CCS hardware configuration file 的 Browse 找到 f28335.ccxml 文件，默认路径为 C:\ProgramData\MATLAB\SupportPackages\R2018a\toolbox\target\supportpackages\tic2000\CCS_Config，用 CCS 打开 f28335.ccxml 文件，并修改为自己仿真器型号保存。

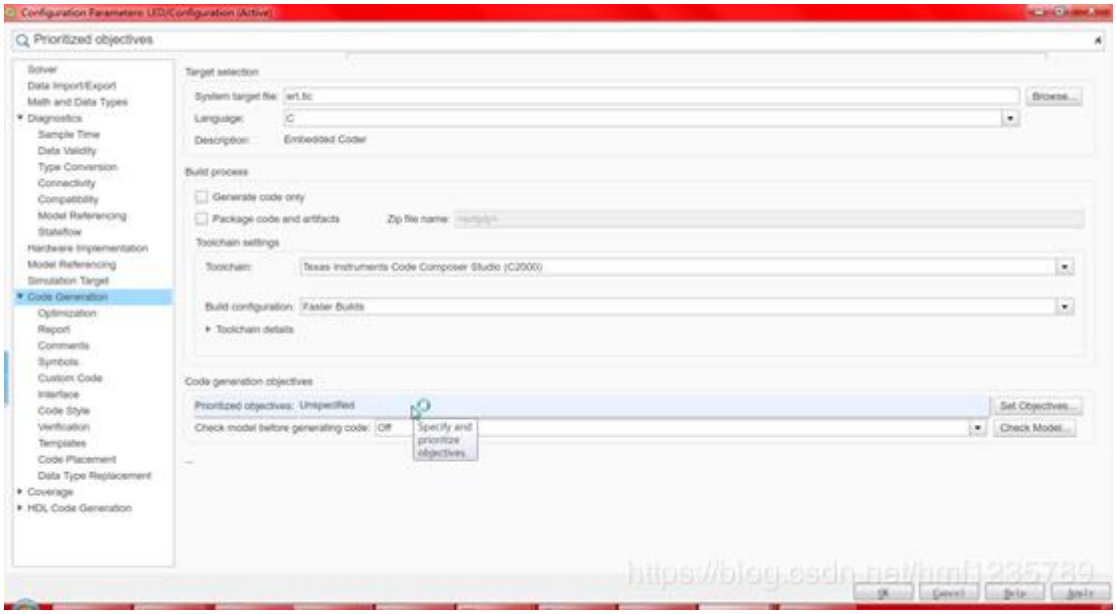




在 Code generation 选项卡中不用修改 System target file 文件，MATLAB 已经不需要 idelink_ert.tlc 了，选择 Toolchain 为 Texas Instruments Code Composer Studio(C2000)



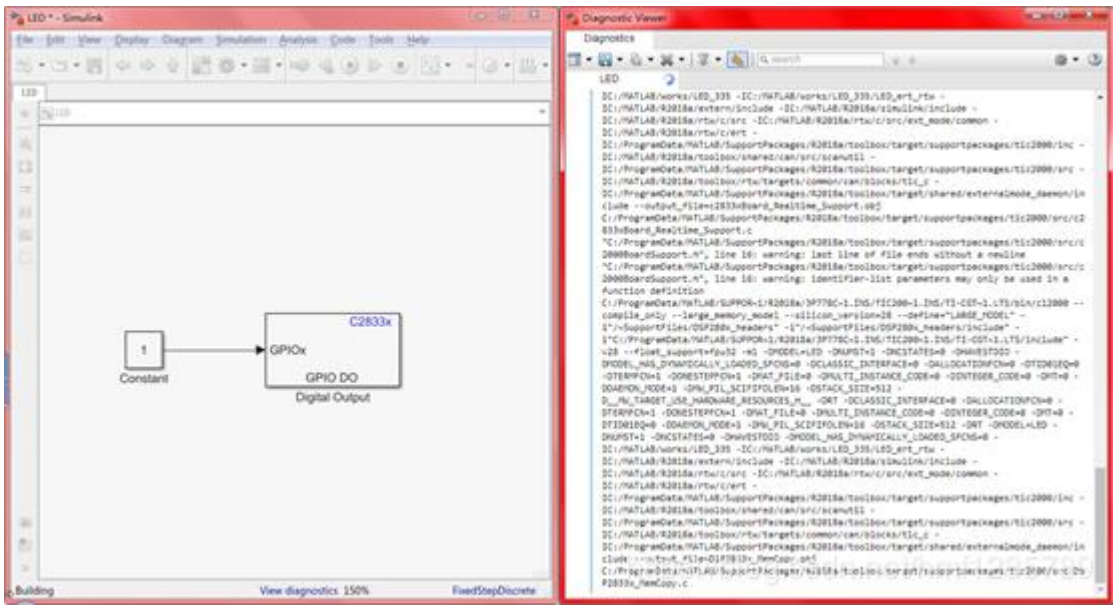
在 Code generation objectives 的 Prioritized objectives 中将执行效率、ROM 效率、RAM 效率设置为优先的代码生成目标，这一步也可不用设置



在 report 中勾选 Generate model web view 使生成的代码可以进行模型与代码之间相互的跟踪。

在 Code Placement 中配置 Code Packaging 为 Modular，至此工程设置完毕。

选择 Deploy to Hardware Ctrl+B 编译，并在 View diagnostics 中查看编译下载过程是否有错误，并选择 Open project in Code Composer Studio 即可直接打开 CCS 查看编译后的工程，也手动用 CCS 导入编译目录下产生的工程



可以看到如下信息，开始调试、连接目标、加载目标、运行、断开连接，完成模型构建过程

*** Starting debug session…

*** Debug Session Name: Texas Instruments XDS100v3 USB Debug Probe_0/C28xx

*** Board Name: Texas Instruments XDS100v3 USB Debug Probe_0

*** CPU Name: C28xx

*** Connecting to target…

*** Loading the program to the target…

*** Program is running.

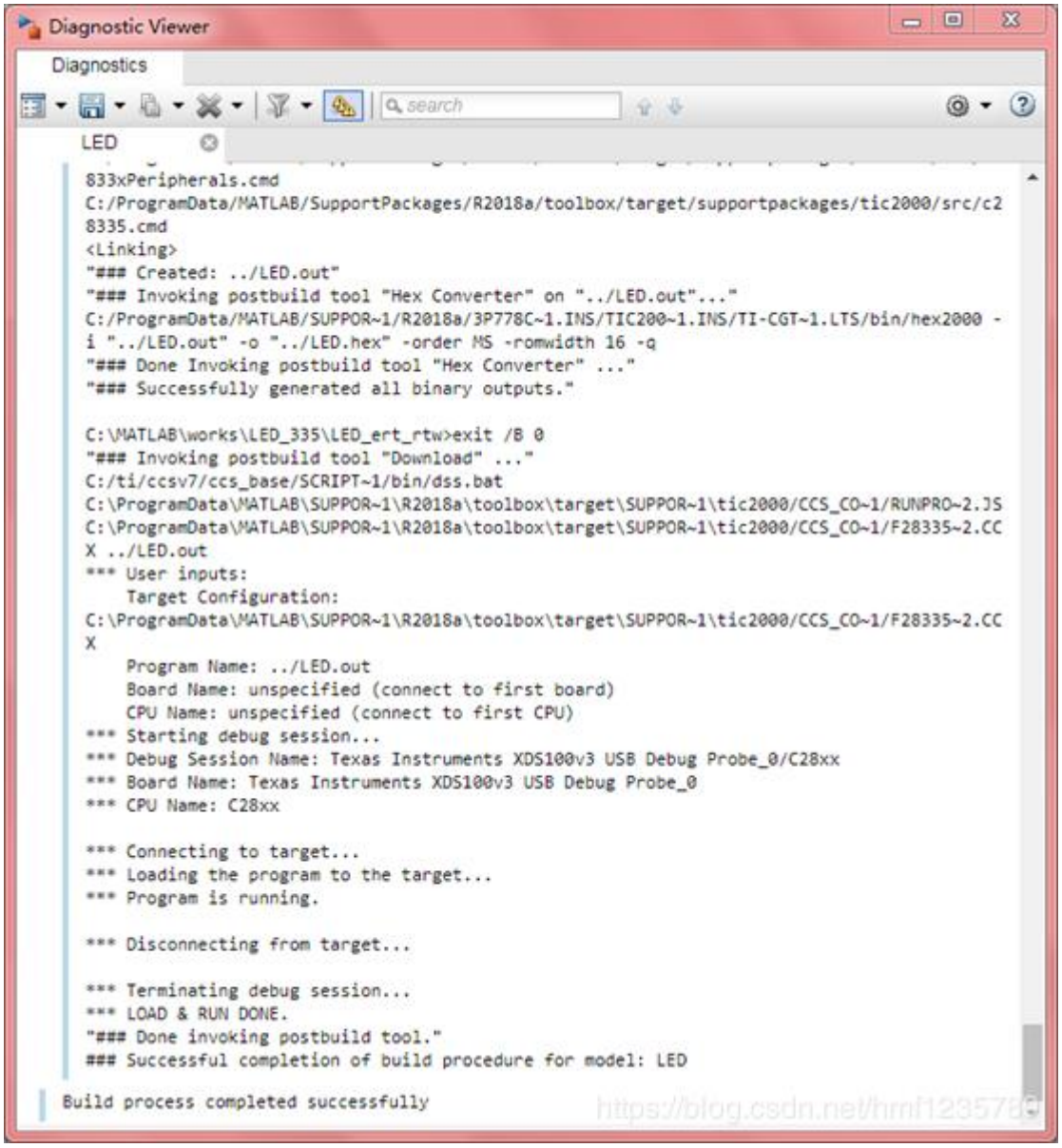
*** Disconnecting from target…

*** Terminating debug session…

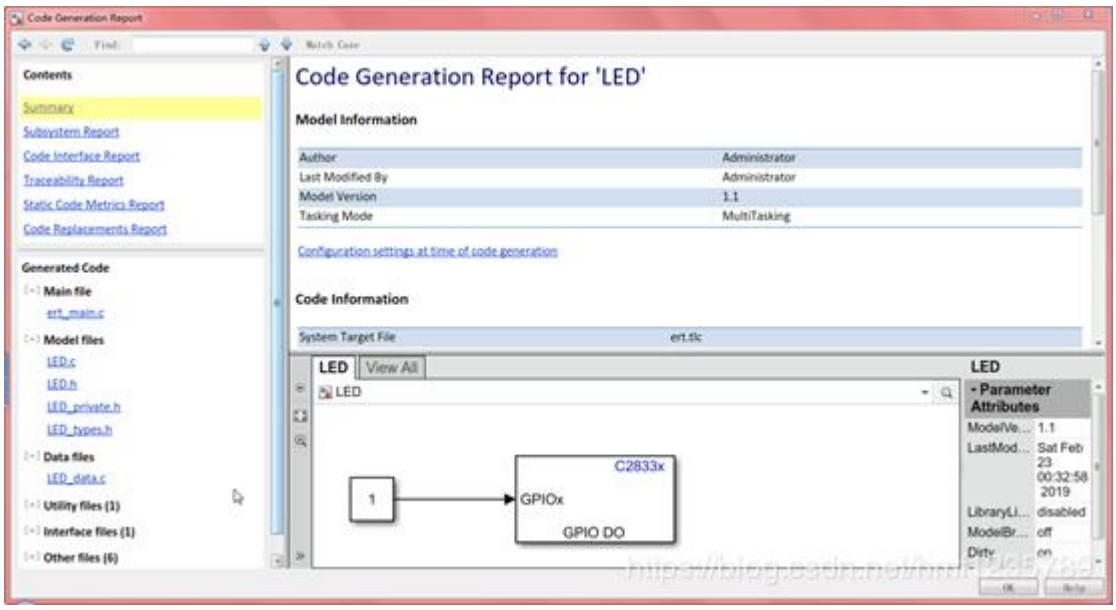
*** LOAD & RUN DONE.

“### Done invoking postbuild tool.”

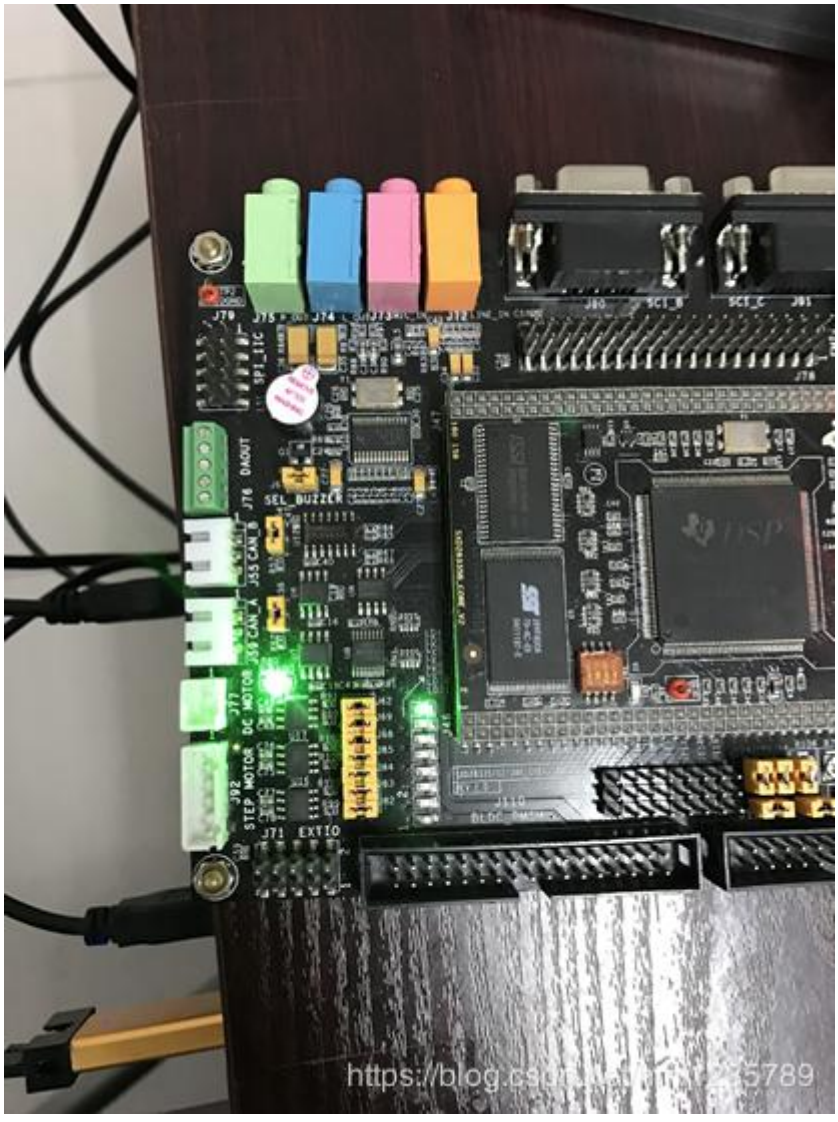
“### Successful completion of build procedure for model: LED



完成后将自动打开 Code Generation Report，可以直接查看信息和程序


Code Generation Report
Contents
Summary
Subsystem Report
Code Interface Report
Traceability Report
Static Code Metrics Report
Code Replacements Report
Generated Code
Main file
ert_main.c
Model files
LED.c
LED.h
LED_private.h
LED_types.h
Data files
LED_data.c
Utility files (1)
Interface files (1)
Other files (6)
Code Generation Report for 'LED'
Model Information
Author
Administrator
Last Modified By
Administrator
Model Version
1.1
Tasking Mode
MultiTasking
Configuration settings at time of code generation
Code Information
System Target File
ert.tlc
LED
View All
LED
C2833x
1
GPIOx
GPIO DO
LED
Parameter Attributes
ModelVe...
1.1
LastMod...
Sat Feb 23 00:32:58 2019
LibraryLi...
disabled
ModelBr...
off
Dirty
on

开发板 LED 开始闪烁


J79
J75
J74
J80
SCI_B
SCI_C
J81
J78
SPI_I2C
DAOUT
J76
SEL_BUZZER
J55 CAN_B
J56 CAN_A
J77
DC MOTOR
J92
STEP MOTOR
J71
EXTIO