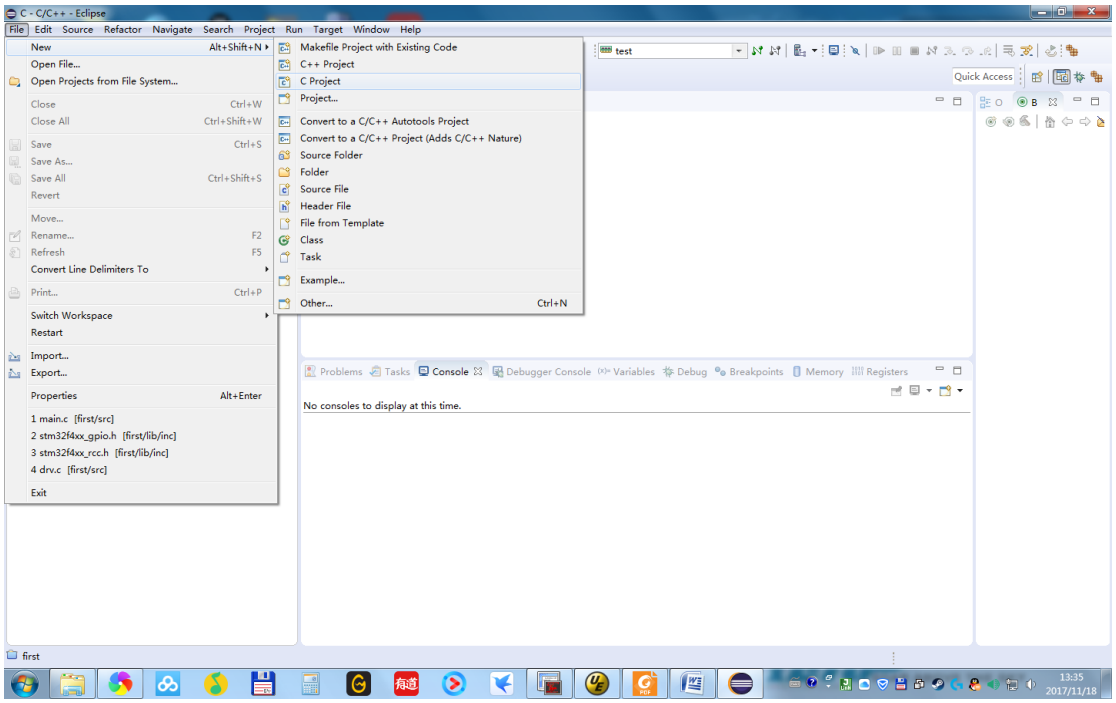
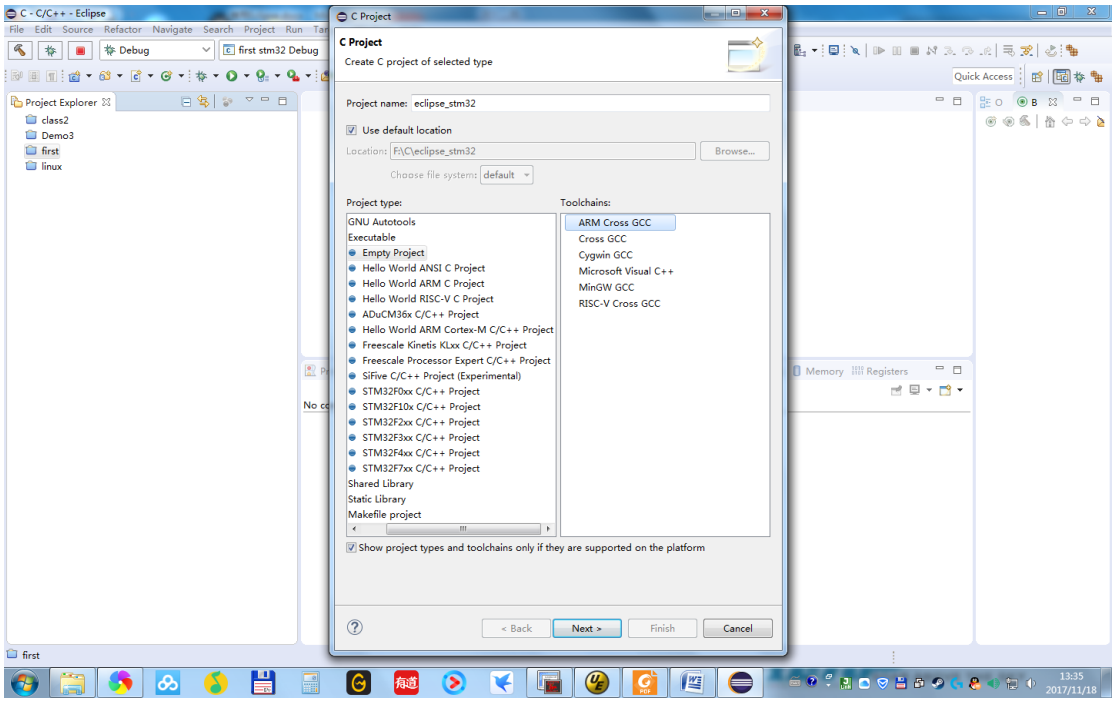
使用 Eclipse+JLINK 调试 STM32

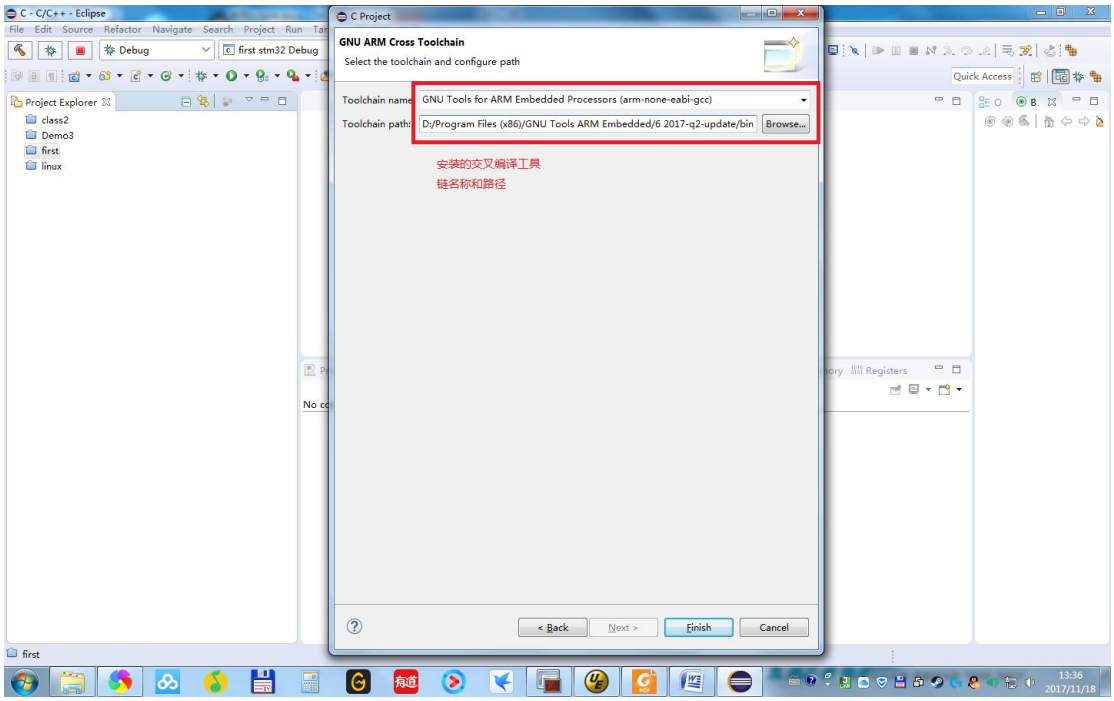
一、 准备工作

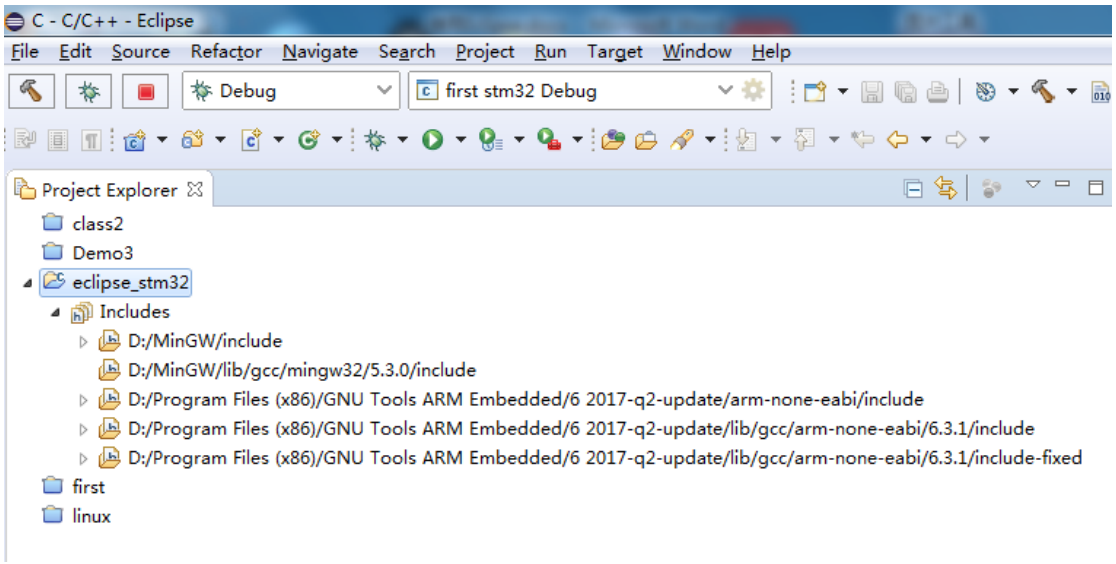
1. 安装 eclipse + CDT。
2. 安装交叉编译工具（工具链 ARM CROSS GCC，之后安装器件库,自动下载安装较慢，可获取下载地址后使用下载工具（迅雷速度还不错）下载，放在 eclipse 的下载路径下手动安装）和 make 工具（gcc-arm-none-eabi-6-2017-q2-update-win32.exe）
3. STM32F4 官方固件库（我直接使用的开发板资料里提供的 STM32F4xx_DSP_StdPeriph_Lib_V1.5.1.zip，也可以到官网自行下载）

二、 新建工程

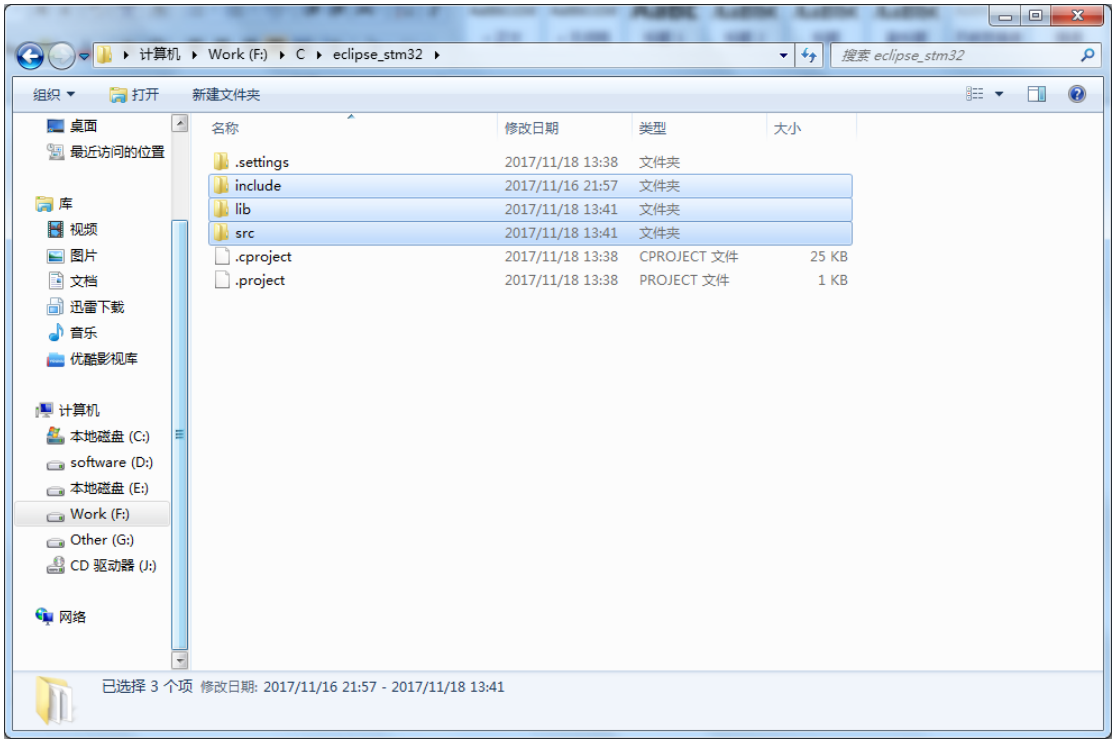




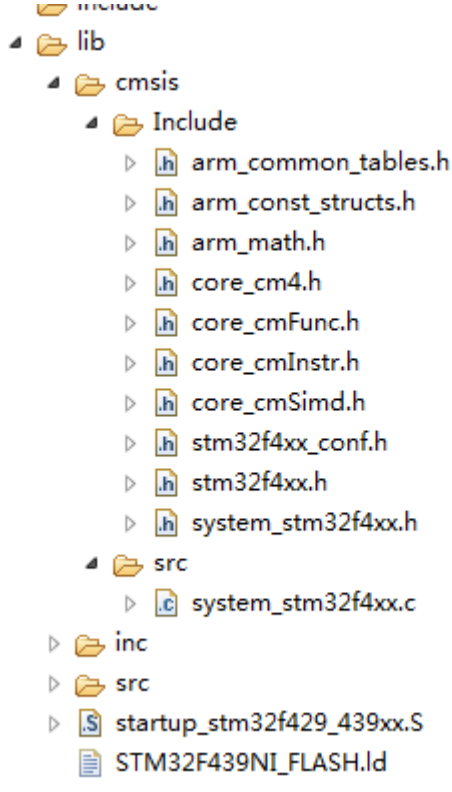




将固件库中所需的文件拷贝到工程目录:



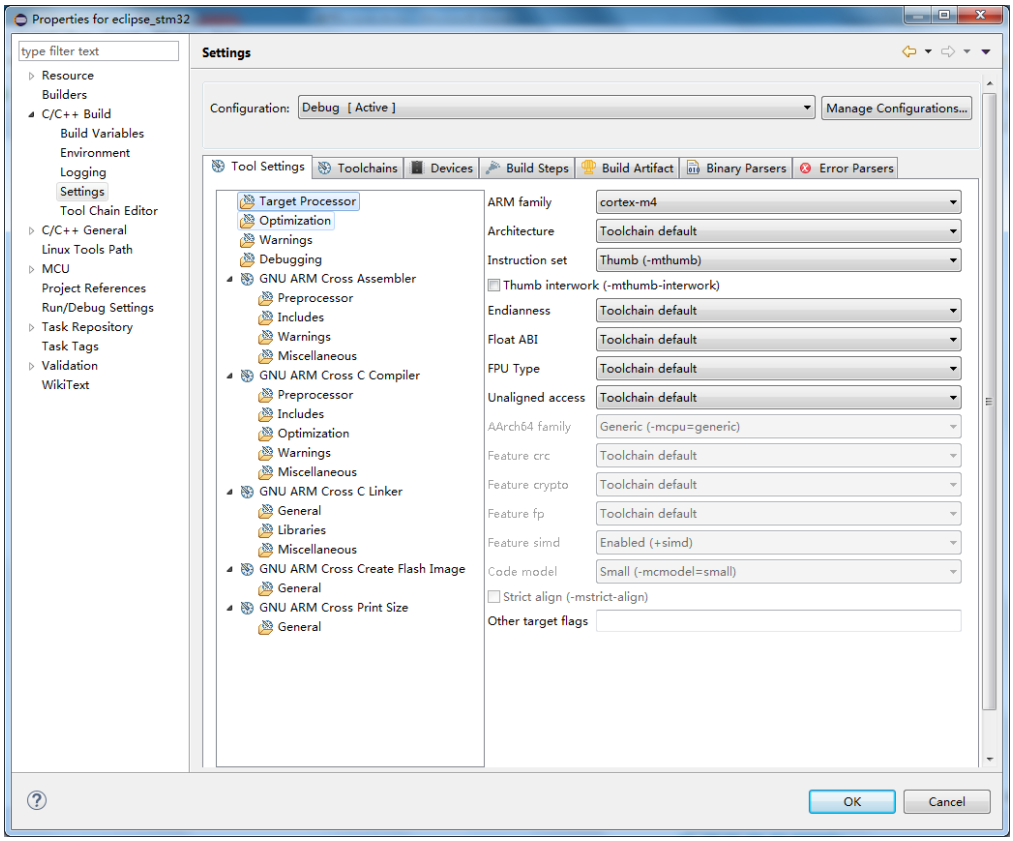
其中“lib”文件夹下是从固件库中拷贝出的官方文件，我设置的文件树如下

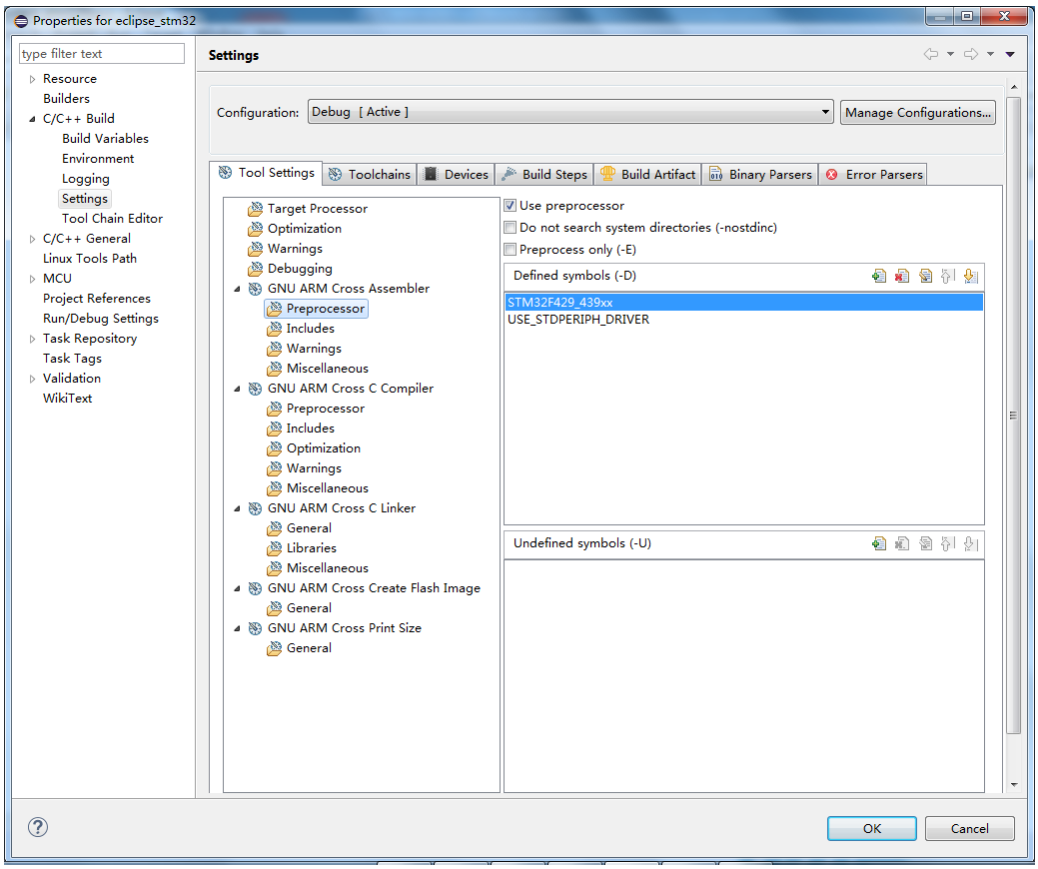


“lib”文件夹下的“inc”和“src”是官方驱动库文件，其余的文件均可在官方库文件中找到，添加进工程即可。（注意“.S”文件后缀改为大写）；

与“lib”同级的 src 和 include 文件夹用来放自己开发的源文件和头文件。

三、 配置工程环境


Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
Environment
Logging
Settings
Tool Chain Editor
C/C++ General
Linux Tools Path
MCU
Project References
Run/Debug Settings
Task Repository
Task Tags
Validation
WikiText
Settings
Configuration: Debug [Active]
Manage Configurations...
Tool Settings
Toolchains
Devices
Build Steps
Build Artifact
Binary Parsers
Error Parsers
Target Processor
Optimization
Warnings
Debugging
GNU ARM Cross Assembler
Preprocessor
Includes
Warnings
Miscellaneous
GNU ARM Cross C Compiler
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
ARM family
cortex-m4
Architecture
Toolchain default
Instruction set
Thumb (-mthumb)
Thumb interwork (-mthumb-interwork)
Endianness
Toolchain default
Float ABI
Toolchain default
FPU Type
Toolchain default
Unaligned access
Toolchain default
AArch64 family
Generic (-mcpu=generic)
Feature crc
Toolchain default
Feature crypto
Toolchain default
Feature fp
Toolchain default
Feature simd
Enabled (+simd)
Code model
Small (-mcmodel=small)
Strict align (-mstrict-align)
Other target flags
OK
Cancel


Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
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Tool Chain Editor
C/C++ General
Linux Tools Path
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WikiText
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Configuration: Debug [Active]
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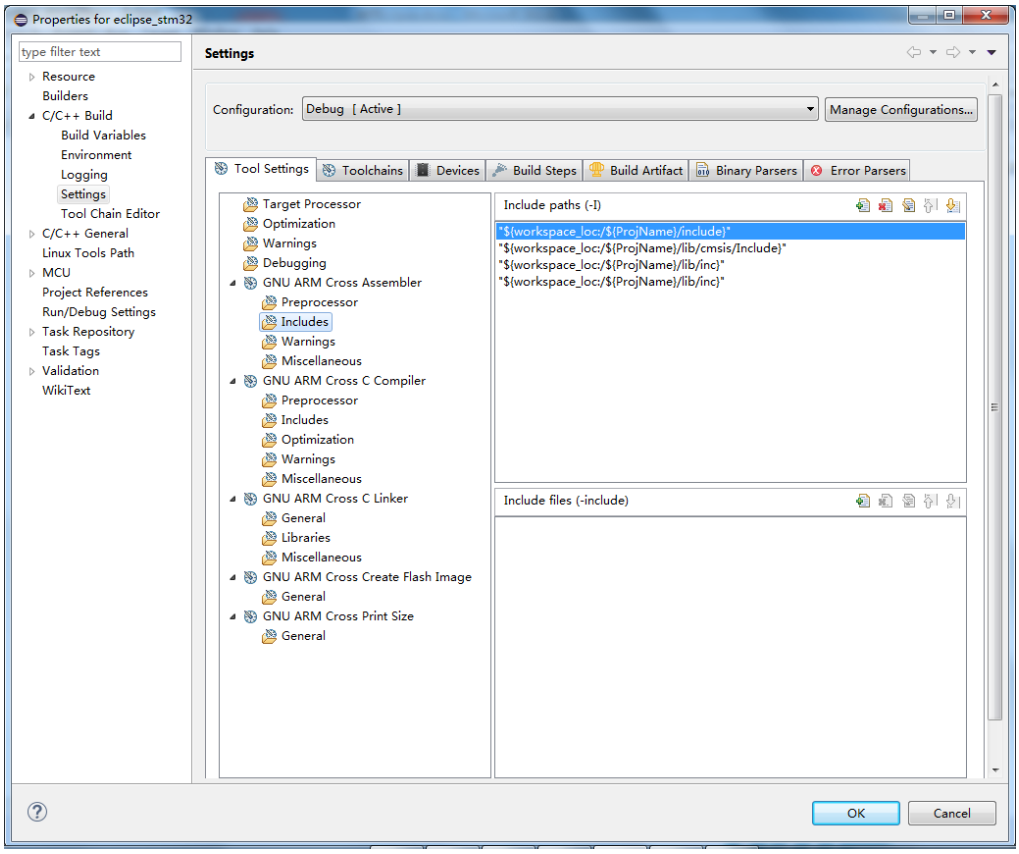
GNU ARM Cross Assembler
Preprocessor
Includes
Warnings
Miscellaneous
GNU ARM Cross C Compiler
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Use preprocessor
Do not search system directories (-nostdinc)
Preprocess only (-E)
Defined symbols (-D)
STM32F429_439xx
USE_STDPERIPH_DRIVER
Undefined symbols (-U)
OK
Cancel


Properties for eclipse_stm32
type filter text
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Builders
C/C++ Build
Build Variables
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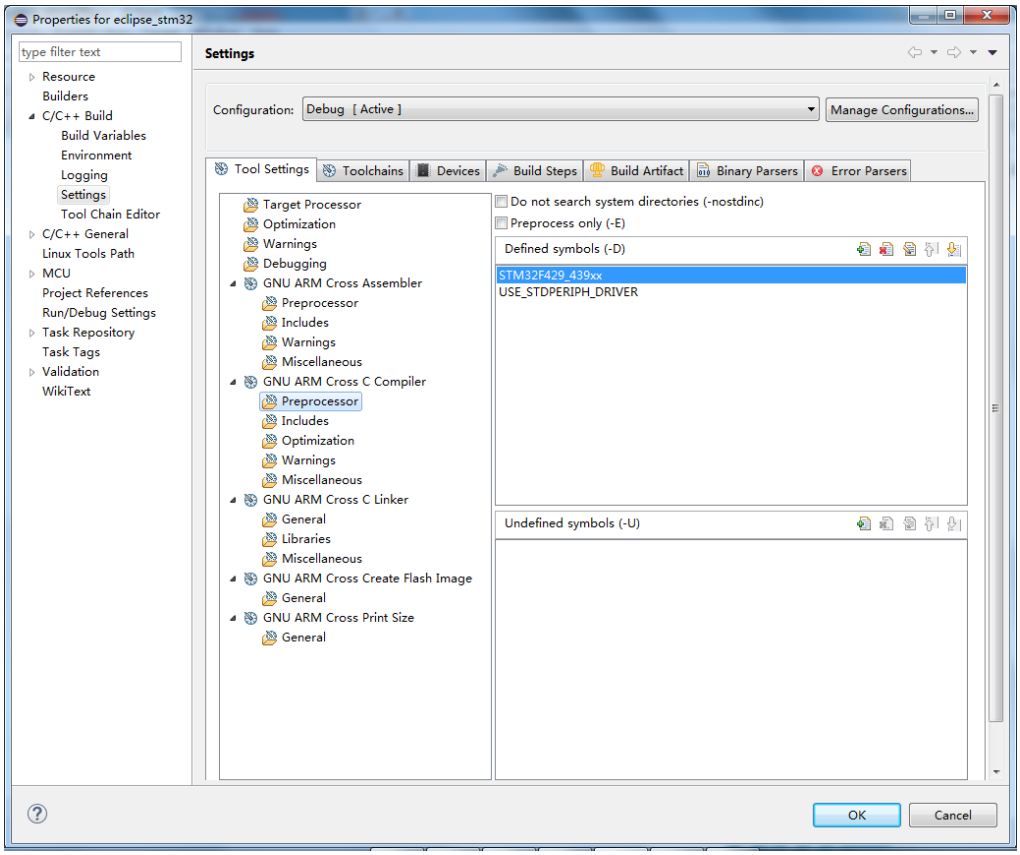
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Include paths (-I)
"${workspace_loc:/${ProjName}/include}"
"${workspace_loc:/${ProjName}/lib/cmsis/Include}"
"${workspace_loc:/${ProjName}/lib/inc}"
"${workspace_loc:/${ProjName}/lib/inc}"
Include files (-include)
OK
Cancel


Properties for eclipse_stm32
type filter text
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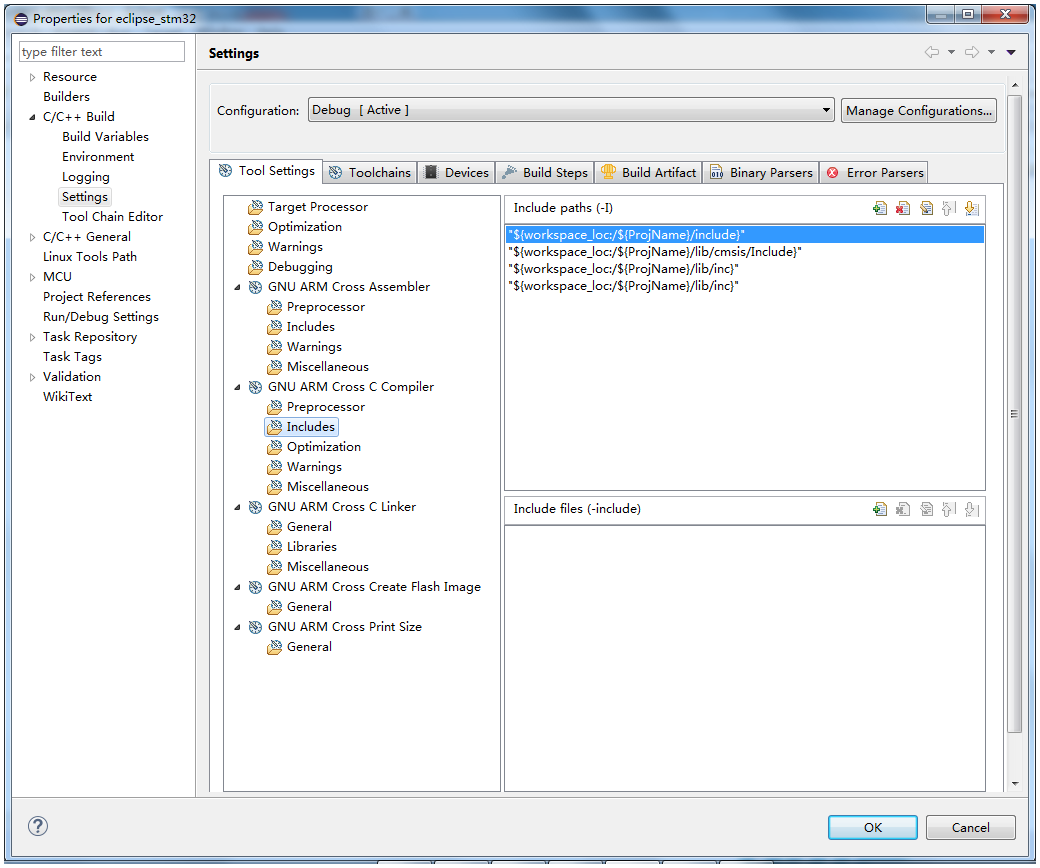
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Do not search system directories (-nostdinc)
Preprocess only (-E)
Defined symbols (-D)
STM32F429_439xx
USE_STDPERIPH_DRIVER
Undefined symbols (-U)
OK
Cancel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type filter text
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C/C++ General
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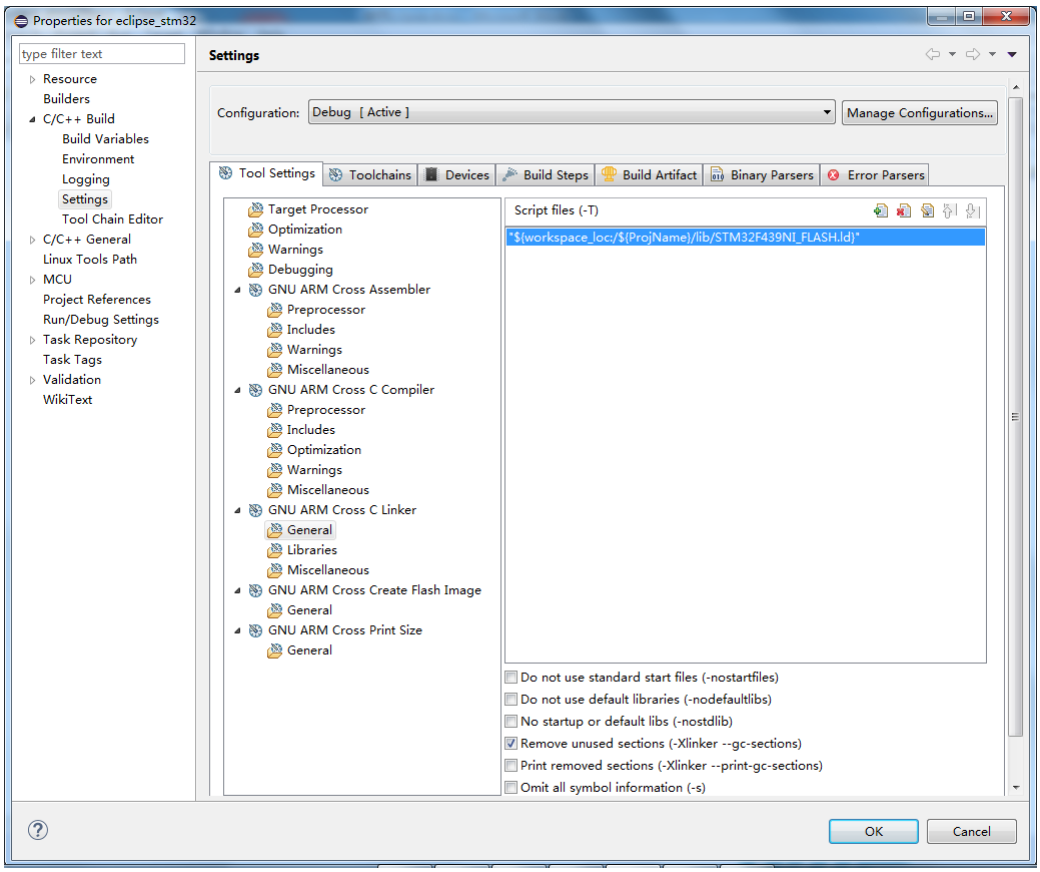
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Include paths (-I)
"${workspace_loc:/${ProjName}/include}"
"${workspace_loc:/${ProjName}/lib/cmsis/Include}"
"${workspace_loc:/${ProjName}/lib/inc}"
"${workspace_loc:/${ProjName}/lib/inc}"
Include files (-include)
OK
Cancel


Properties for eclipse_stm32
type filter text
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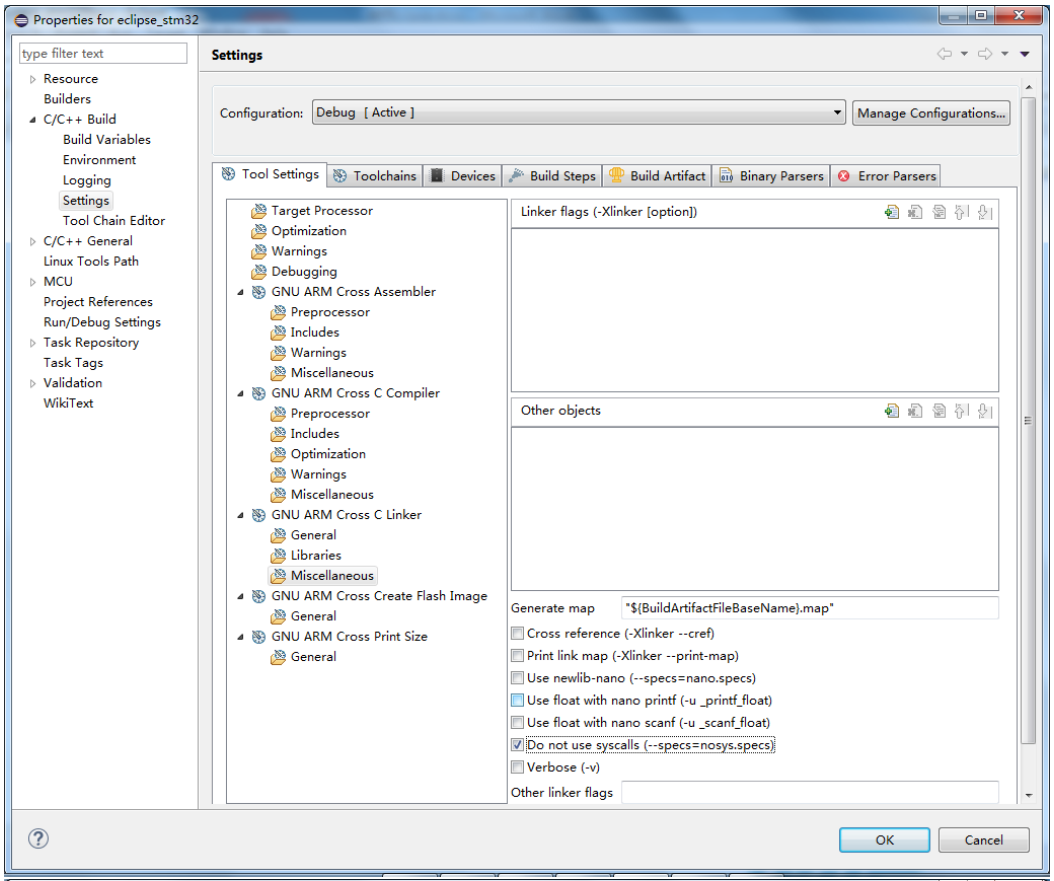
GNU ARM Cross C Compiler
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Script files (-T)
"${workspace_loc:/${ProjName}/lib/STM32F439NI_FLASH.ld}"
Do not use standard start files (-nostartfiles)
Do not use default libraries (-nodefaultlibs)
No startup or default libs (-nostdlib)
Remove unused sections (-Xlinker --gc-sections)
Print removed sections (-Xlinker --print-gc-sections)
Omit all symbol information (-s)
OK
Cancel


Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
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Tool Chain Editor
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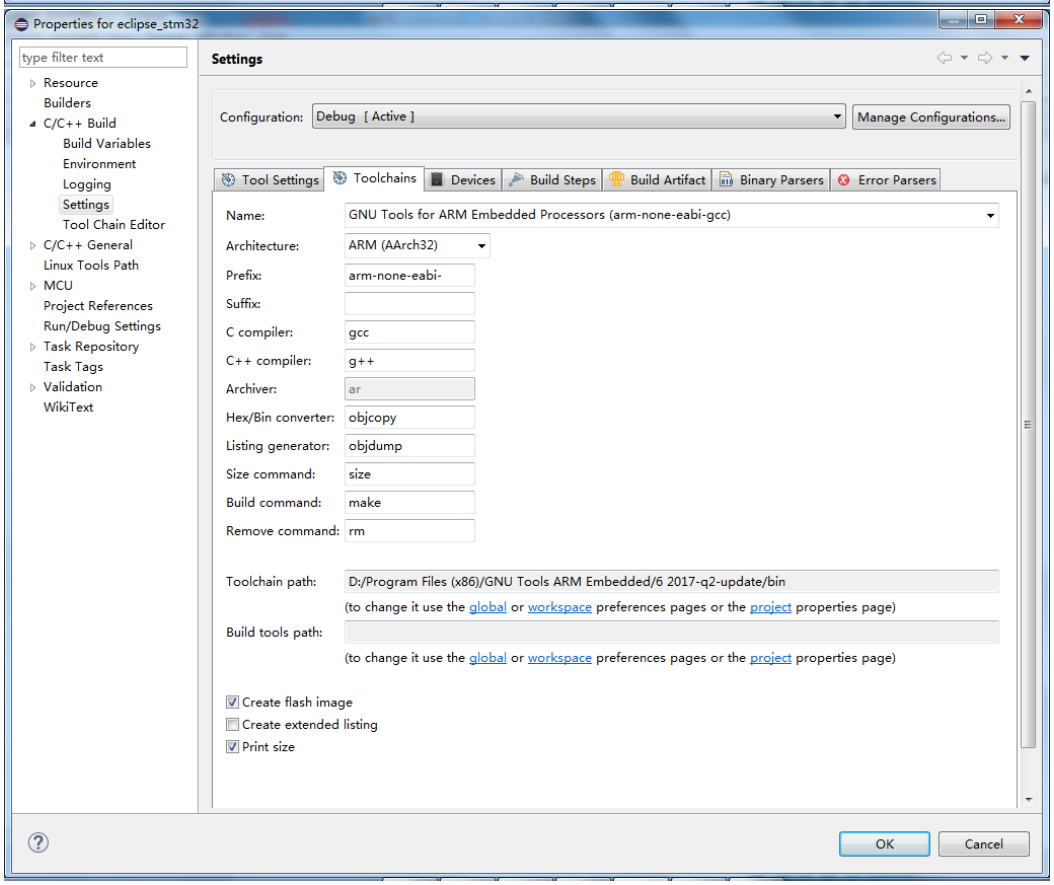
Miscellaneous
GNU ARM Cross C Compiler
Preprocessor
Includes
Optimization
Warnings
Miscellaneous
GNU ARM Cross C Linker
General
Libraries
Miscellaneous
GNU ARM Cross Create Flash Image
General
GNU ARM Cross Print Size
General
Linker flags (-Xlinker [option])
Other objects
Generate map
"${BuildArtifactFileBaseName}.map"
Cross reference (-Xlinker --cref)
Print link map (-Xlinker --print-map)
Use newlib-nano (--specs=nano.specs)
Use float with nano printf (-u _printf_float)
Use float with nano scanf (-u _scanf_float)
Do not use syscalls (--specs=nosys.specs)
Verbose (-v)
Other linker flags
OK
Cancel


Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
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Tool Chain Editor
C/C++ General
Linux Tools Path
MCU
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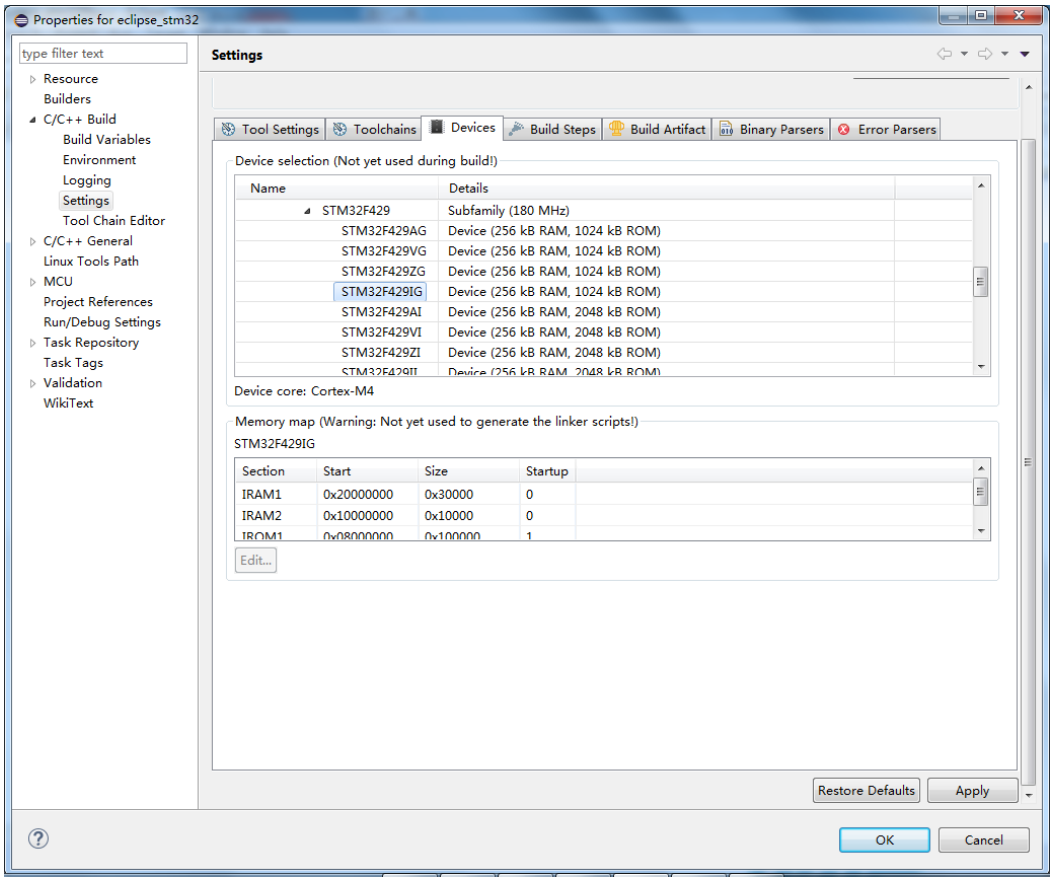
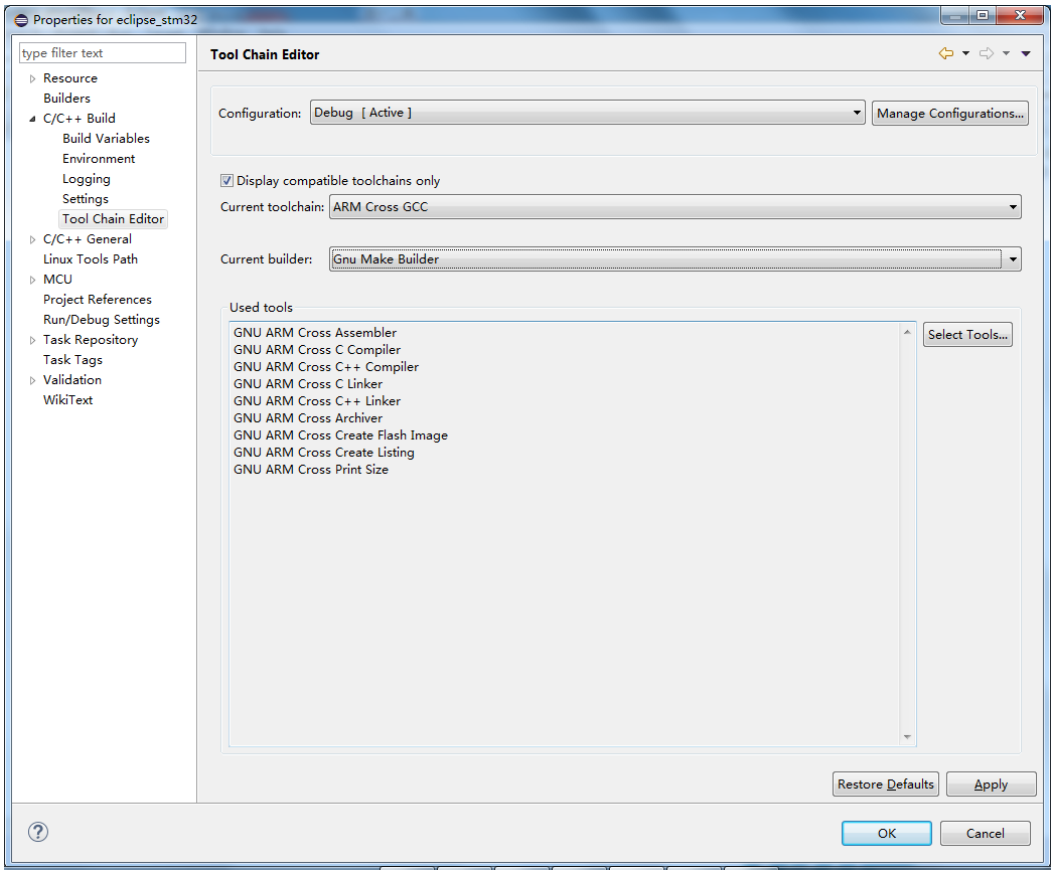
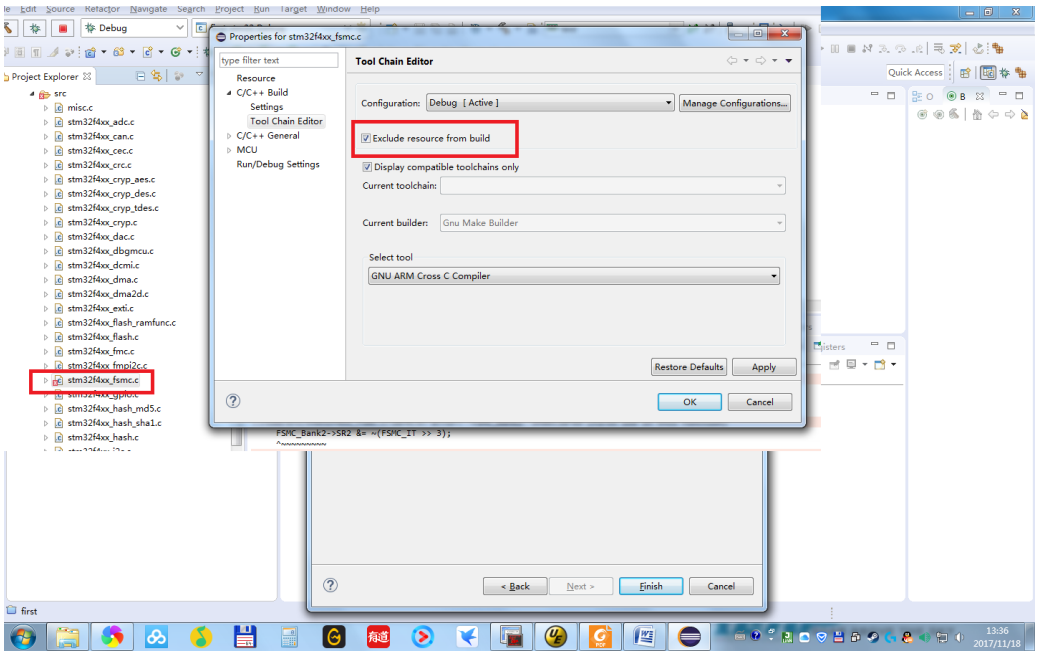
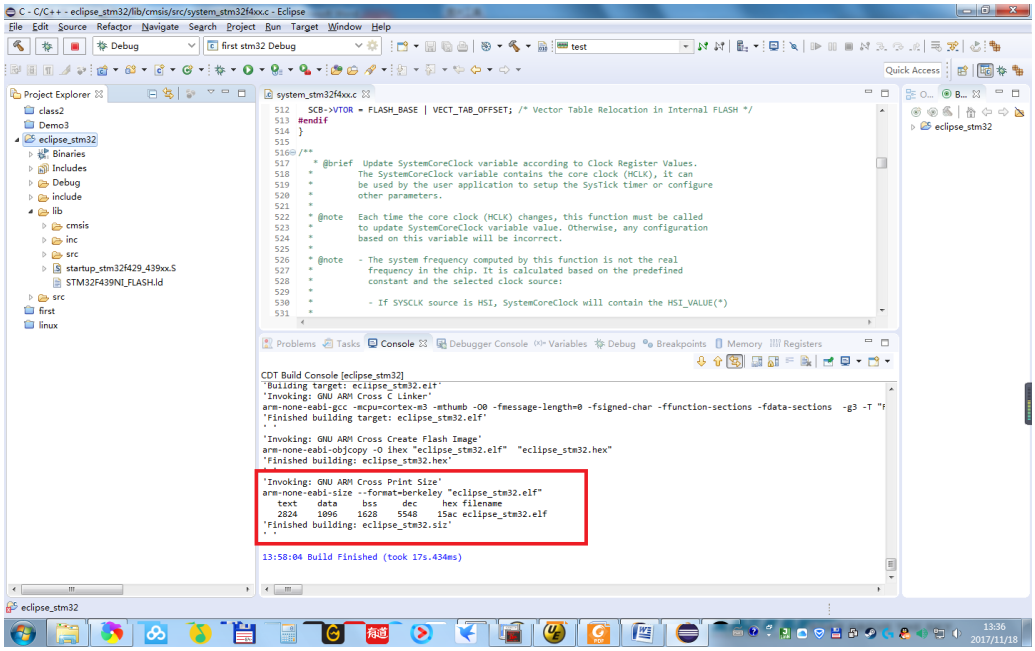
Run/Debug Settings
Task Repository
Task Tags
Validation
WikiText
Settings
Configuration: Debug [Active]
Manage Configurations...
Tool Settings
Toolchains
Devices
Build Steps
Build Artifact
Binary Parsers
Error Parsers
Name: GNU Tools for ARM Embedded Processors (arm-none-eabi-gcc)
Architecture: ARM (AArch32)
Prefix: arm-none-eabi-
Suffix:
C compiler: gcc
C++ compiler: g++
Archiver: ar
Hex/Bin converter: objcopy
Listing generator: objdump
Size command: size
Build command: make
Remove command: rm
Toolchain path: D:/Program Files (x86)/GNU Tools ARM Embedded/6 2017-q2-update/bin
(to change it use the global or workspace preferences pages or the project properties page)
Build tools path:
(to change it use the global or workspace preferences pages or the project properties page)
Create flash image
Create extended listing
Print size
OK
Cancel


Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
Environment
Logging
Settings
Tool Chain Editor
C/C++ General
Linux Tools Path
MCU
Project References
Run/Debug Settings
Task Repository
Task Tags
Validation
WikiText
Settings
Tool Settings
Toolchains
Devices
Build Steps
Build Artifact
Binary Parsers
Error Parsers
Device selection (Not yet used during build!)
Name
Details
STM32F429
Subfamily (180 MHz)
STM32F429AG
Device (256 kB RAM, 1024 kB ROM)
STM32F429VG
Device (256 kB RAM, 1024 kB ROM)
STM32F429ZG
Device (256 kB RAM, 1024 kB ROM)
STM32F429IG
Device (256 kB RAM, 1024 kB ROM)
STM32F429AI
Device (256 kB RAM, 2048 kB ROM)
STM32F429VI
Device (256 kB RAM, 2048 kB ROM)
STM32F429ZI
Device (256 kB RAM, 2048 kB ROM)
Device core: Cortex-M4
Memory map (Warning: Not yet used to generate the linker scripts!)
STM32F429IG
Section
Start
Size
Startup
IRAM1
0x20000000
0x30000
0
IRAM2
0x10000000
0x10000
0
Edit...
Restore Defaults
Apply
OK
Cancel

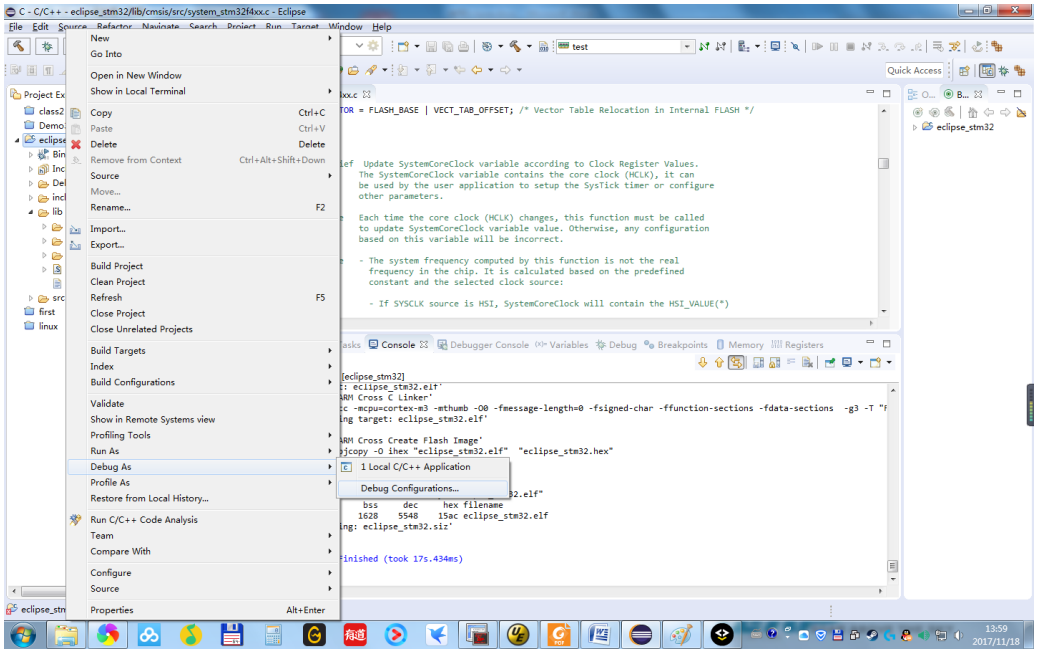

Properties for eclipse_stm32
type filter text
Resource
Builders
C/C++ Build
Build Variables
Environment
Logging
Settings
Tool Chain Editor
C/C++ General
Linux Tools Path
MCU
Project References
Run/Debug Settings
Task Repository
Task Tags
Validation
WikiText
Tool Chain Editor
Configuration:
Debug [Active]
Manage Configurations...
Display compatible toolchains only
Current toolchain:
ARM Cross GCC
Current builder:
Gnu Make Builder
Used tools
GNU ARM Cross Assembler
GNU ARM Cross C Compiler
GNU ARM Cross C++ Compiler
GNU ARM Cross C Linker
GNU ARM Cross C++ Linker
GNU ARM Cross Archiver
GNU ARM Cross Create Flash Image
GNU ARM Cross Create Listing
GNU ARM Cross Print Size
Select Tools...
Restore Defaults
Apply
OK
Cancel

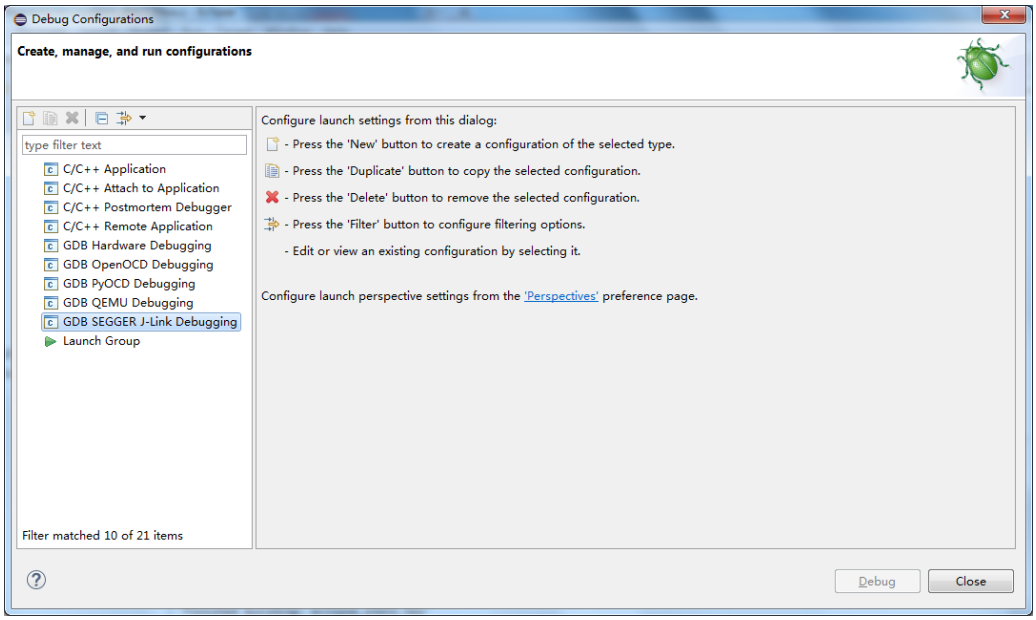


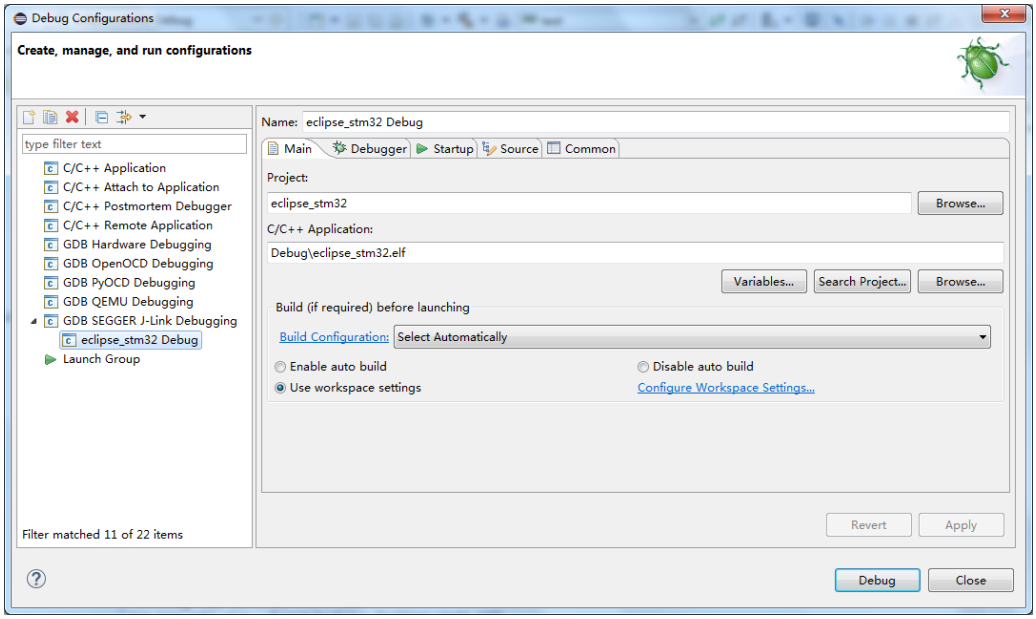
编译工程

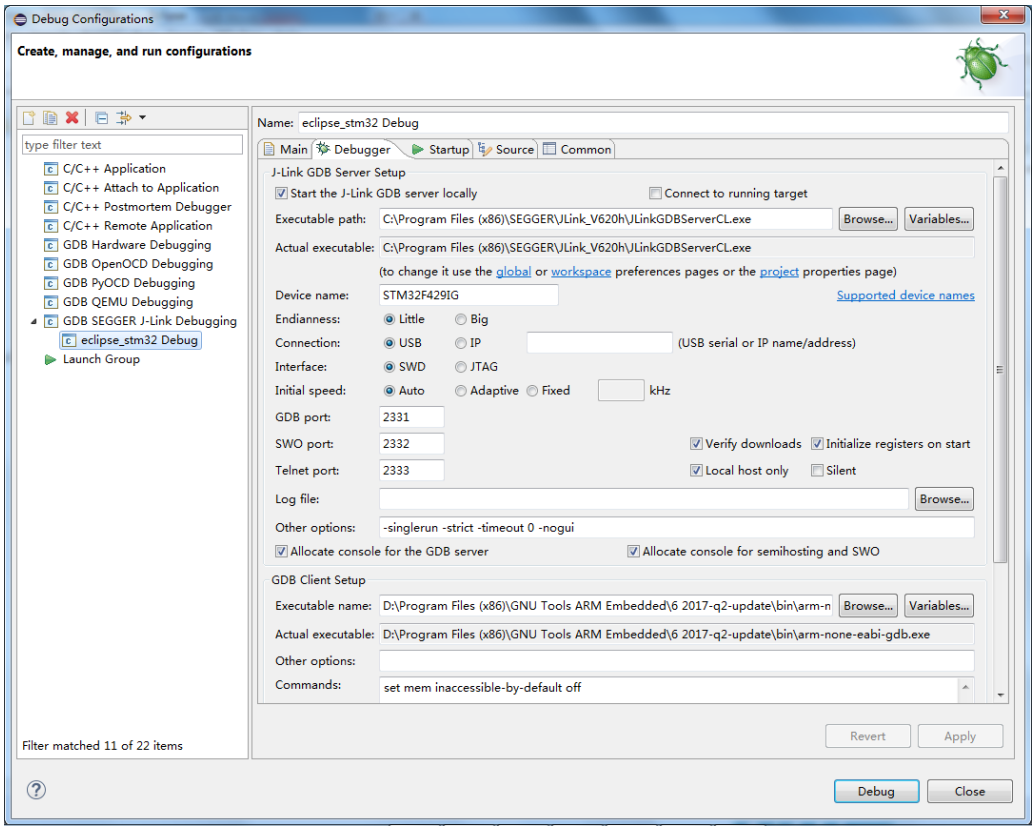


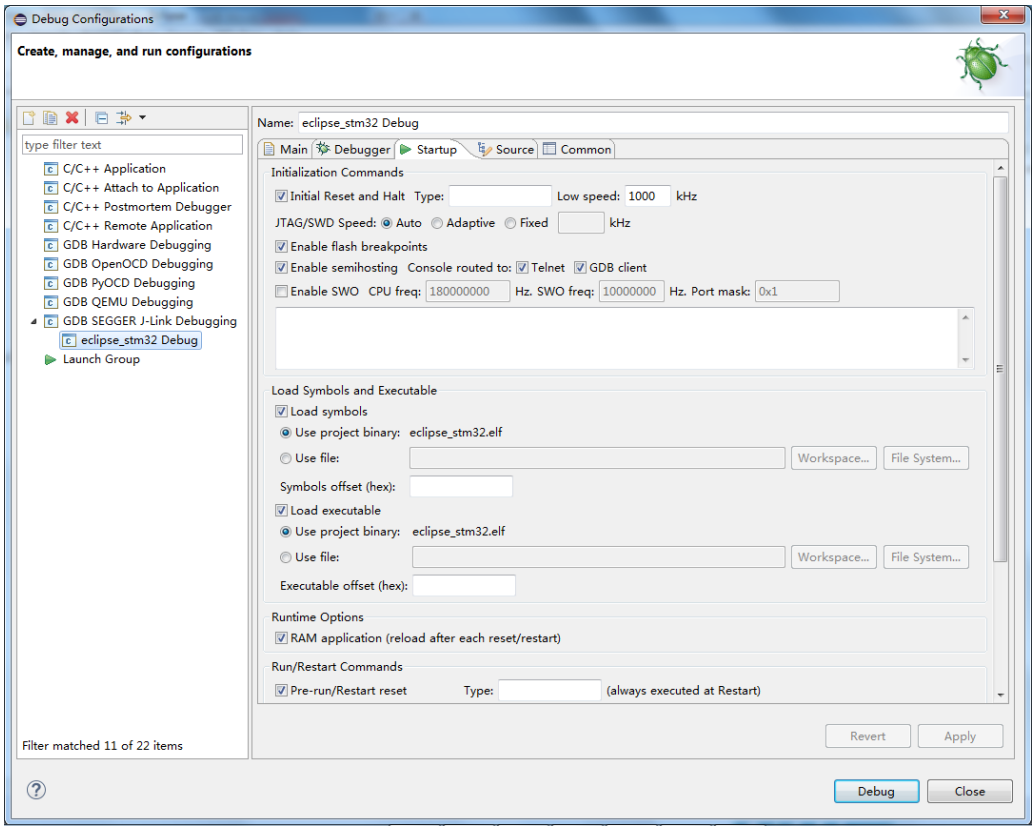
四、 配置 jlink

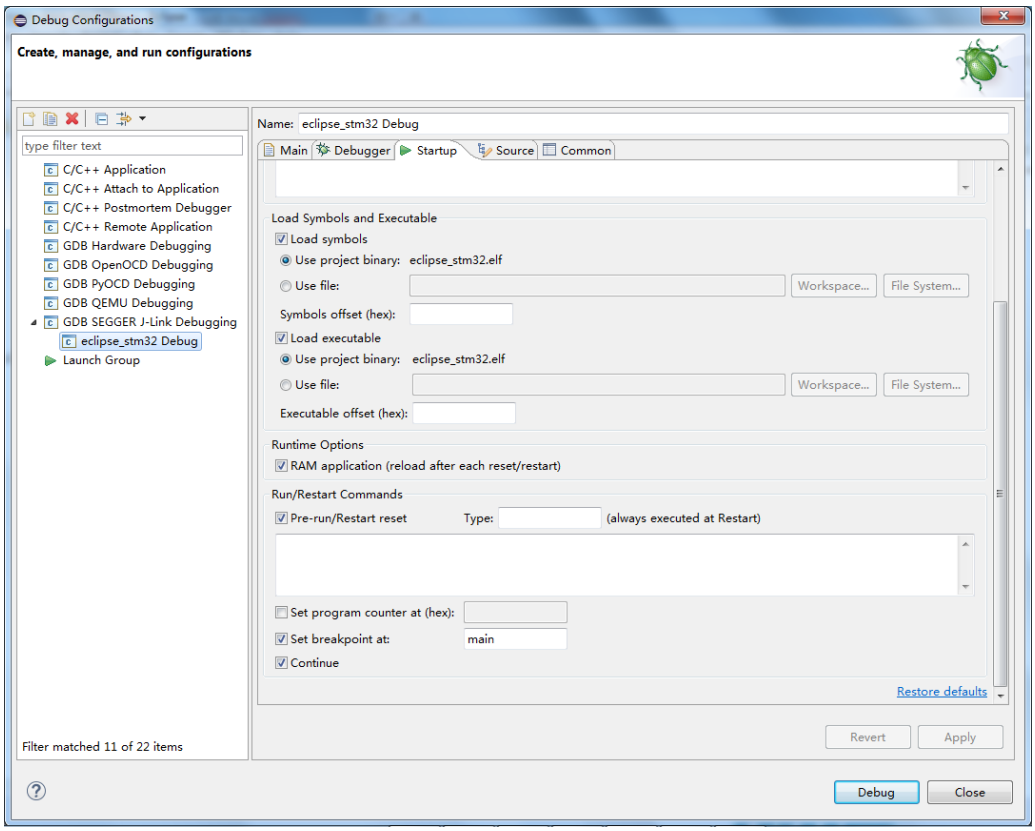

C - C/C++ - eclipse_stm32/lib/cmsis/src/system_stm32f4xx.c - Eclipse
File Edit Source Refactor Navigate Search Project Run Target Window Help
New
Go Into
Open in New Window
Show in Local Terminal
Copy Ctrl+C
Paste Ctrl+V
Delete Delete
Remove from Context Ctrl+Alt+Shift+Down
Source
Move...
Rename... F2
Import...
Export...
Build Project
Clean Project
Refresh F5
Close Project
Close Unrelated Projects
Build Targets
Index
Build Configurations
Validate
Show in Remote Systems view
Profiling Tools
Run As
Debug As
Profile As
Restore from Local History...
Run C/C++ Code Analysis
Team
Compare With
Configure
Source
Properties Alt+Enter
1 Local C/C++ Application
Debug Configurations...
Quick Access
eclipse_stm32
Console
Debugger Console
Variables
Debug
Breakpoints
Memory
Registers
[eclipse_stm32]
Finished (took 17s.434ms)


Debug Configurations
Create, manage, and run configurations
type filter text
C/C++ Application
C/C++ Attach to Application
C/C++ Postmortem Debugger
C/C++ Remote Application
GDB Hardware Debugging
GDB OpenOCD Debugging
GDB PyOCD Debugging
GDB QEMU Debugging
GDB SEGGER J-Link Debugging
Launch Group
Filter matched 10 of 21 items
Configure launch settings from this dialog:
- Press the 'New' button to create a configuration of the selected type.
- Press the 'Duplicate' button to copy the selected configuration.
- Press the 'Delete' button to remove the selected configuration.
- Press the 'Filter' button to configure filtering options.
- Edit or view an existing configuration by selecting it.
Configure launch perspective settings from the 'Perspectives' preference page.
Debug
Close

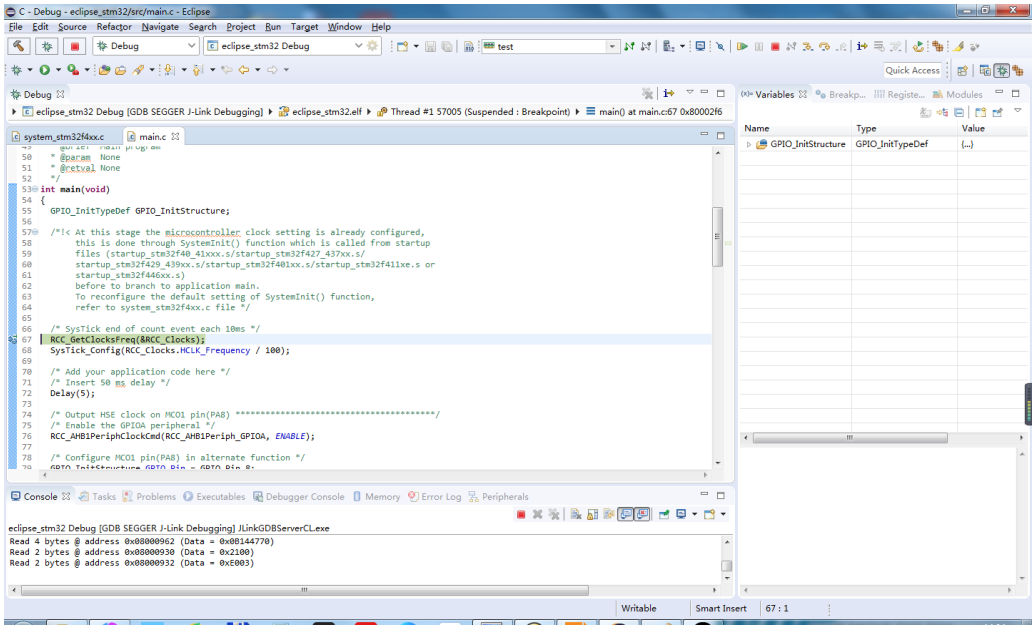

Debug Configurations
Create, manage, and run configurations
type filter text
C/C++ Application
C/C++ Attach to Application
C/C++ Postmortem Debugger
C/C++ Remote Application
GDB Hardware Debugging
GDB OpenOCD Debugging
GDB PyOCD Debugging
GDB QEMU Debugging
GDB SEGGER J-Link Debugging
eclipse_stm32 Debug
Launch Group
Filter matched 11 of 22 items
Name: eclipse_stm32 Debug
Main
Debugger
Startup
Source
Common
Project:
eclipse_stm32
Browse...
C/C++ Application:
Debug\eclipse_stm32.elf
Variables...
Search Project...
Browse...
Build (if required) before launching
Build Configuration:
Select Automatically
Enable auto build
Disable auto build
Use workspace settings
Configure Workspace Settings...
Revert
Apply
Debug
Close


Debug Configurations
Create, manage, and run configurations
type filter text
C/C++ Application
C/C++ Attach to Application
C/C++ Postmortem Debugger
C/C++ Remote Application
GDB Hardware Debugging
GDB OpenOCD Debugging
GDB PyOCD Debugging
GDB QEMU Debugging
GDB SEGGER J-Link Debugging
eclipse_stm32 Debug
Launch Group
Filter matched 11 of 22 items
Name: eclipse_stm32 Debug
Main
Debugger
Startup
Source
Common
J-Link GDB Server Setup
Start the J-Link GDB server locally
Connect to running target
Executable path: C:\Program Files (x86)\SEGGER\JLink_V620h\JLinkGDBServerCL.exe
Browse...
Variables...
Actual executable: C:\Program Files (x86)\SEGGER\JLink_V620h\JLinkGDBServerCL.exe
(to change it use the global or workspace preferences pages or the project properties page)
Device name: STM32F429IG
Supported device names
Endianness: Little Big
Connection: USB IP (USB serial or IP name/address)
Interface: SWD JTAG
Initial speed: Auto Adaptive Fixed kHz
GDB port: 2331
SWO port: 2332
Telnet port: 2333
Verify downloads
Initialize registers on start
Local host only
Silent
Log file:
Browse...
Other options: -singlerun -strict -timeout 0 -nogui
Allocate console for the GDB server
Allocate console for semihosting and SWO
GDB Client Setup
Executable name: D:\Program Files (x86)\GNU Tools ARM Embedded\6 2017-q2-update\bin\arm-n
Browse...
Variables...
Actual executable: D:\Program Files (x86)\GNU Tools ARM Embedded\6 2017-q2-update\bin\arm-none-eabi-gdb.exe
Other options:
Commands: set mem inaccessible-by-default off
Revert
Apply
Debug
Close





点击 Debug,即可进行在线调试。


C - Debug - eclipse_stm32/src/main.c - Eclipse
File Edit Source Refactor Navigate Search Project Run Target Window Help
Debug
eclipse_stm32 Debug
test
Quick Access
Debug
eclipse_stm32 Debug [GDB SEGGER J-Link Debugging]
eclipse_stm32.elf
Thread #1 57005 (Suspended : Breakpoint)
main() at main.c:67 0x80002f6
system_stm32f4xx.c
main.c
50 * @param None
51 * @retval None
52 */
53 int main(void)
54 {
55 GPIO_InitTypeDef GPIO_InitStructure;
56
57 /*!< At this stage the microcontroller clock setting is already configured,
58 this is done through SystemInit() function which is called from startup
59 files (startup_stm32f40_41xxx.s/startup_stm32f427_437xx.s/
60 startup_stm32f429_439xx.s/startup_stm32f401xx.s/startup_stm32f411xe.s or
61 startup_stm32f446xx.s)
62 before to branch to application main.
63 To reconfigure the default setting of SystemInit() function,
64 refer to system_stm32f4xx.c file */
65
66 /* SysTick end of count event each 10ms */
67 RCC_GetClocksFreq(&RCC_Clocks);
68 SysTick_Config(RCC_Clocks.HCLK_Frequency / 100);
69
70 /* Add your application code here */
71 /* Insert 50 ms delay */
72 Delay(5);
73
74 /* Output HSE clock on MCO1 pin(PA8) **/
75 /* Enable the GPIOA peripheral */
76 RCC_AHB1PeriphClockCmd(RCC_AHB1Periph_GPIOA, ENABLE);
77
78 /* Configure MCO1 pin(PA8) in alternate function */
Variables
Breakp...
Registe...
Modules
Name
Type
Value
GPIO_InitStructure
GPIO_InitTypeDef
{...}
Console
Tasks
Problems
Executables
Debugger Console
Memory
Error Log
Peripherals
eclipse_stm32 Debug [GDB SEGGER J-Link Debugging] JLinkGDBServerCL.exe
Read 4 bytes @ address 0x08000962 (Data = 0x08144770)
Read 2 bytes @ address 0x08000930 (Data = 0x2100)
Read 2 bytes @ address 0x08000932 (Data = 0xE003)
Writable
Smart Insert
67 : 1