Debugging APM32 With GCC + Eclipse

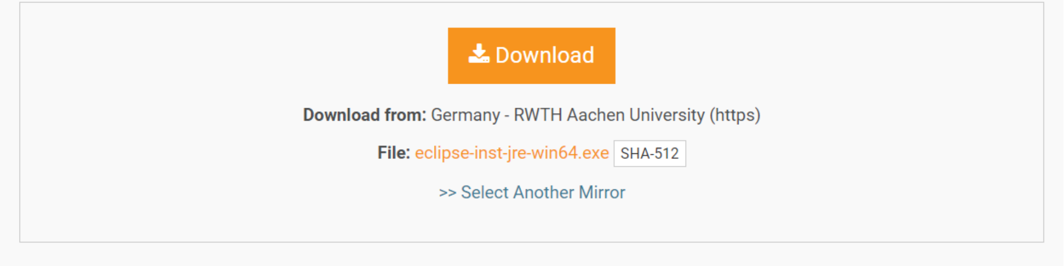
Use two environments:

1. Geehy Link/CMSIS-DAP link hardware +openocd software +arm-none-eabi-gdb
2. J-Link hardware +jlink_gdb_server software +arm-none-eabi-gdb

Download Essential Files

1. Eclipse

https://www.eclipse.org/downloads/



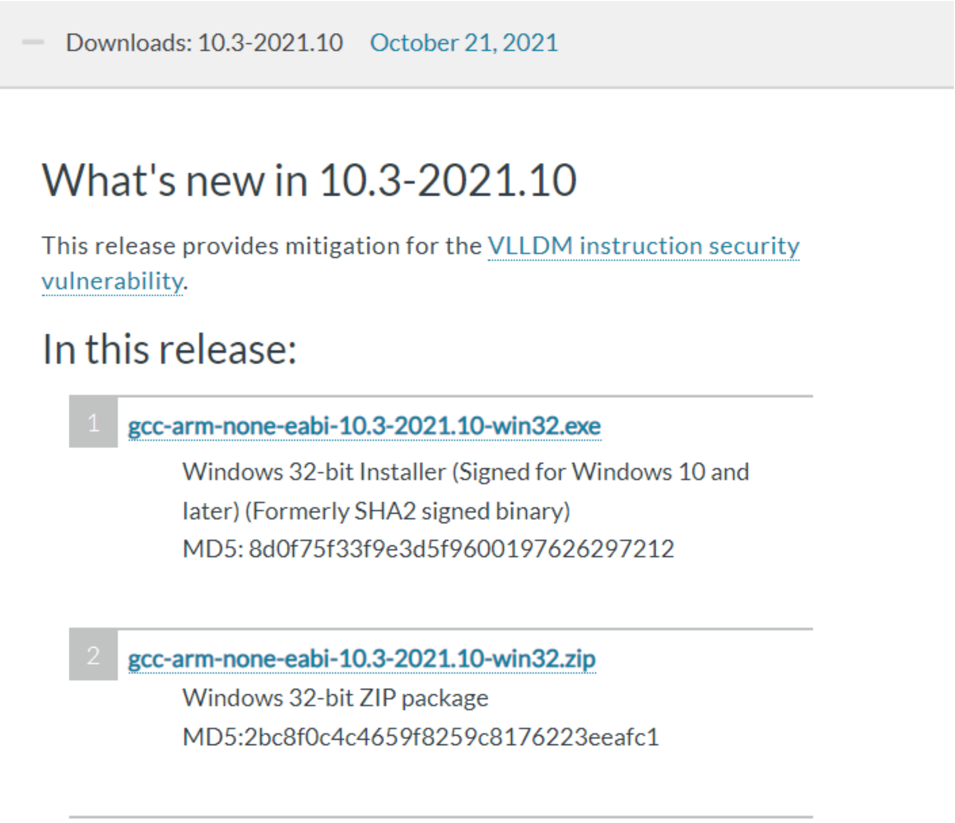
Download from: Germany - RWTH Aachen University (https)

File: eclipse-inst-jre-win64.exe SHA-512

>> Select Another Mirror

2. Gcc-arm-none-eabi -- gcc arm tool chain.

https://developer.arm.com/downloads/-/gnu-rm



Downloads: 10.3-2021.10 October 21, 2021

What's new in 10.3-2021.10

This release provides mitigation for the VLLDM instruction security vulnerability.

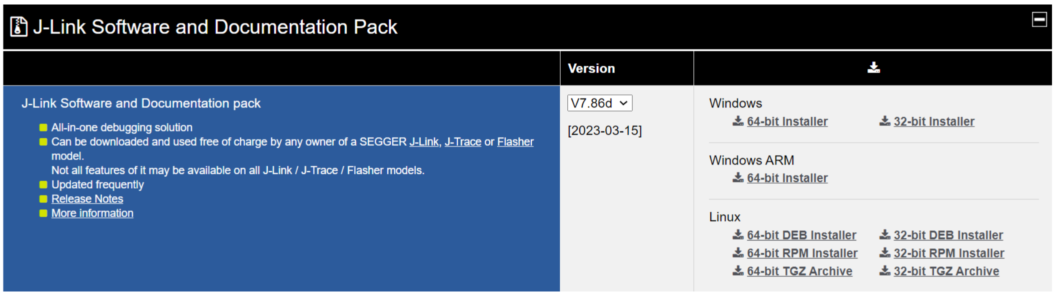
In this release:

1 gcc-arm-none-eabi-10.3-2021.10-win32.exe
Windows 32-bit Installer (Signed for Windows 10 and later) (Formerly SHA2 signed binary)
MD5: 8d0f75f33f9e3d5f9600197626297212

2 gcc-arm-none-eabi-10.3-2021.10-win32.zip
Windows 32-bit ZIP package
MD5:2bc8f0c4c4659f8259c8176223eeafc1

3. J-Link(Optional, Geehy Link is driver-free) -- You need to use 7.70 or later version.

https://www.segger.com/downloads/jlink/

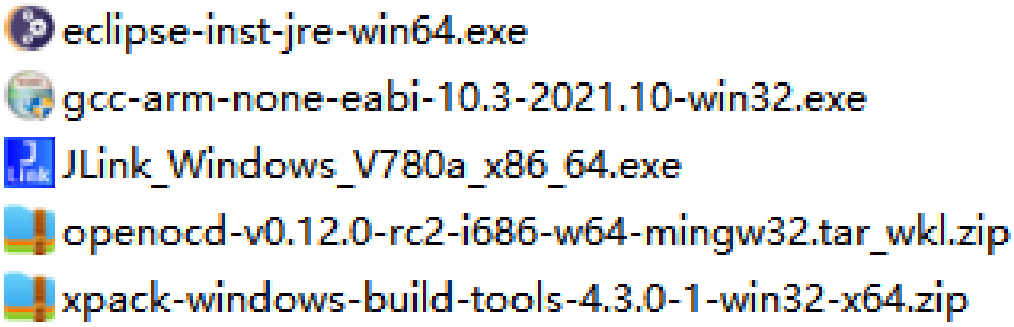


J-Link Software and Documentation Pack

	Version	⬇
J-Link Software and Documentation pack - All-in-one debugging solution - Can be downloaded and used free of charge by any owner of a SEGGER J-Link, J-Trace or Flasher model. Not all features of it may be available on all J-Link / J-Trace / Flasher models. - Updated frequently - Release Notes - More information	V7.86d [2023-03-15]	Windows 64-bit Installer 32-bit Installer Windows ARM 64-bit Installer Linux 64-bit DEB Installer 32-bit DEB Installer 64-bit RPM Installer 32-bit RPM Installer 64-bit TGZ Archive 32-bit TGZ Archive

4. Openocd - Open source debugging software (please make sure that this openpcd has APM32 part number)
   https://github.com/GeehySemi/Openocd/

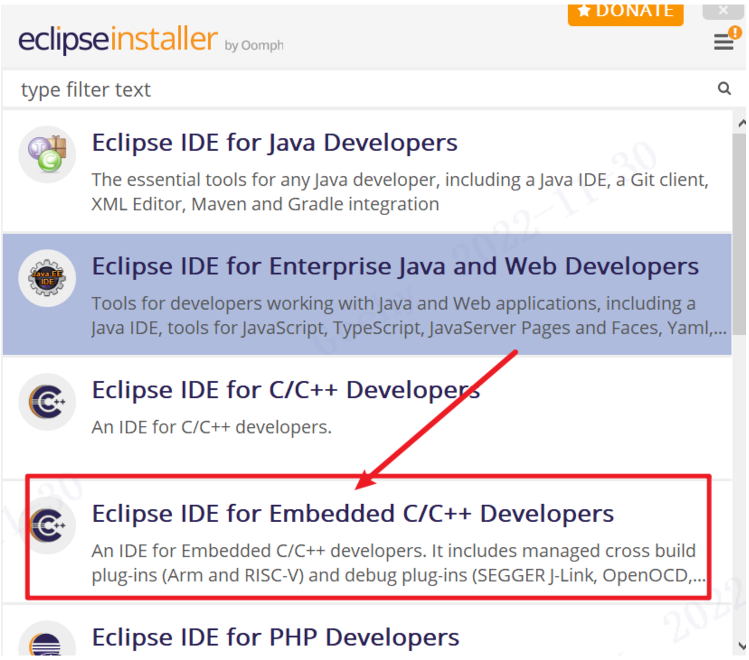
5. xpack-windows-build-tools -- make for windows.



eclipse-inst-jre-win64.exe
gcc-arm-none-eabi-10.3-2021.10-win32.exe
JLink_Windows_V780a_x86_64.exe
openocd-v0.12.0-rc2-i686-w64-mingw32.tar_wkl.zip
xpack-windows-build-tools-4.3.0-1-win32-x64.zip

Installation

1. Open Eclipse installer file and choose Eclipse IDE for Embedded C/C++ Developers



type filter text

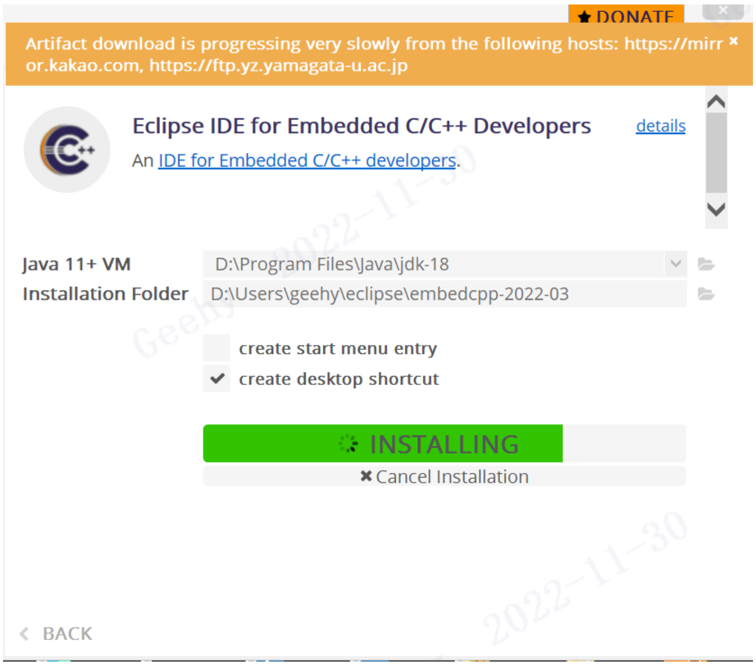
Eclipse IDE for Java Developers
The essential tools for any Java developer, including a Java IDE, a Git client, XML Editor, Maven and Gradle integration

Eclipse IDE for Enterprise Java and Web Developers
Tools for developers working with Java and Web applications, including a Java IDE, tools for JavaScript, TypeScript, JavaServer Pages and Faces, Yaml,...

Eclipse IDE for C/C++ Developers
An IDE for C/C++ developers.

Eclipse IDE for Embedded C/C++ Developers
An IDE for Embedded C/C++ developers. It includes managed cross build plug-ins (Arm and RISC-V) and debug plug-ins (SEGGER J-Link, OpenOCD,...

Eclipse IDE for PHP Developers



Artifact download is progressing very slowly from the following hosts: https://mirror.kakao.com, https://ftp.yz.yamagata-u.ac.jp

Eclipse IDE for Embedded C/C++ Developers

An IDE for Embedded C/C++ developers.

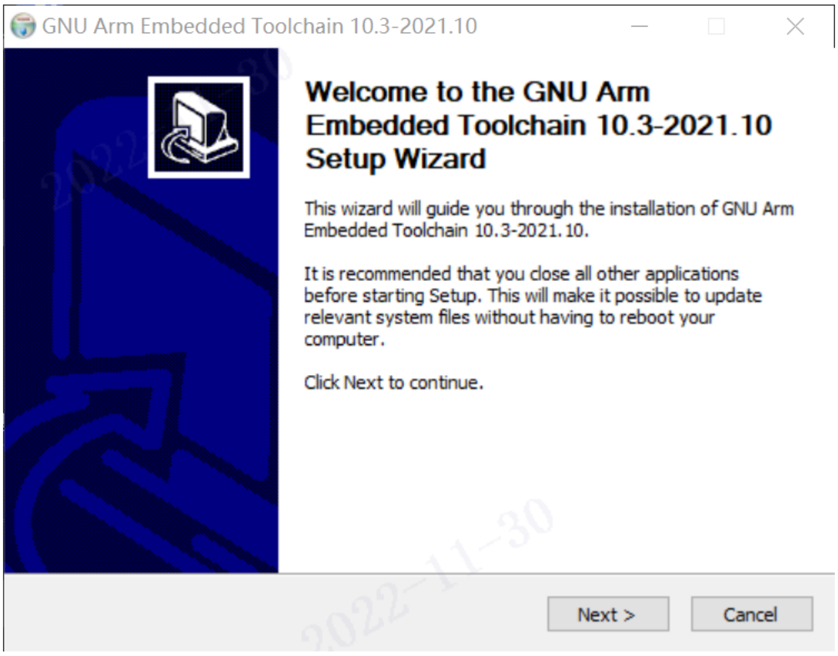
Java 11+ VM: D:\Program Files\Java\jdk-18

Installation Folder: D:\Users\geehy\eclipse\embedcpp-2022-03

□ create start menu entry

☑ create desktop shortcut

2. GNU Arm Embedded Toolchain


GNU Arm Embedded Toolchain 10.3-2021.10

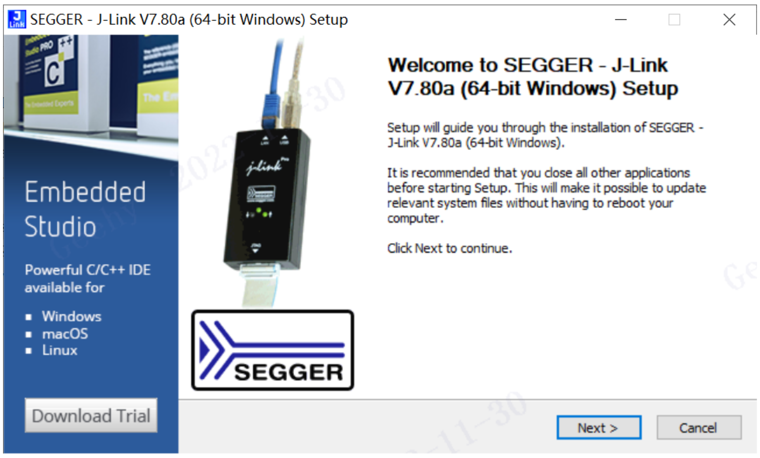
Welcome to the GNU Arm Embedded Toolchain 10.3-2021.10 Setup Wizard

This wizard will guide you through the installation of GNU Arm Embedded Toolchain 10.3-2021.10.

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

Click Next to continue.

3. Jlink


SEGGER - J-Link V7.80a (64-bit Windows) Setup

Welcome to SEGGER - J-Link V7.80a (64-bit Windows) Setup

Setup will guide you through the installation of SEGGER - J-Link V7.80a (64-bit Windows).

It is recommended that you close all other applications before starting Setup. This will make it possible to update relevant system files without having to reboot your computer.

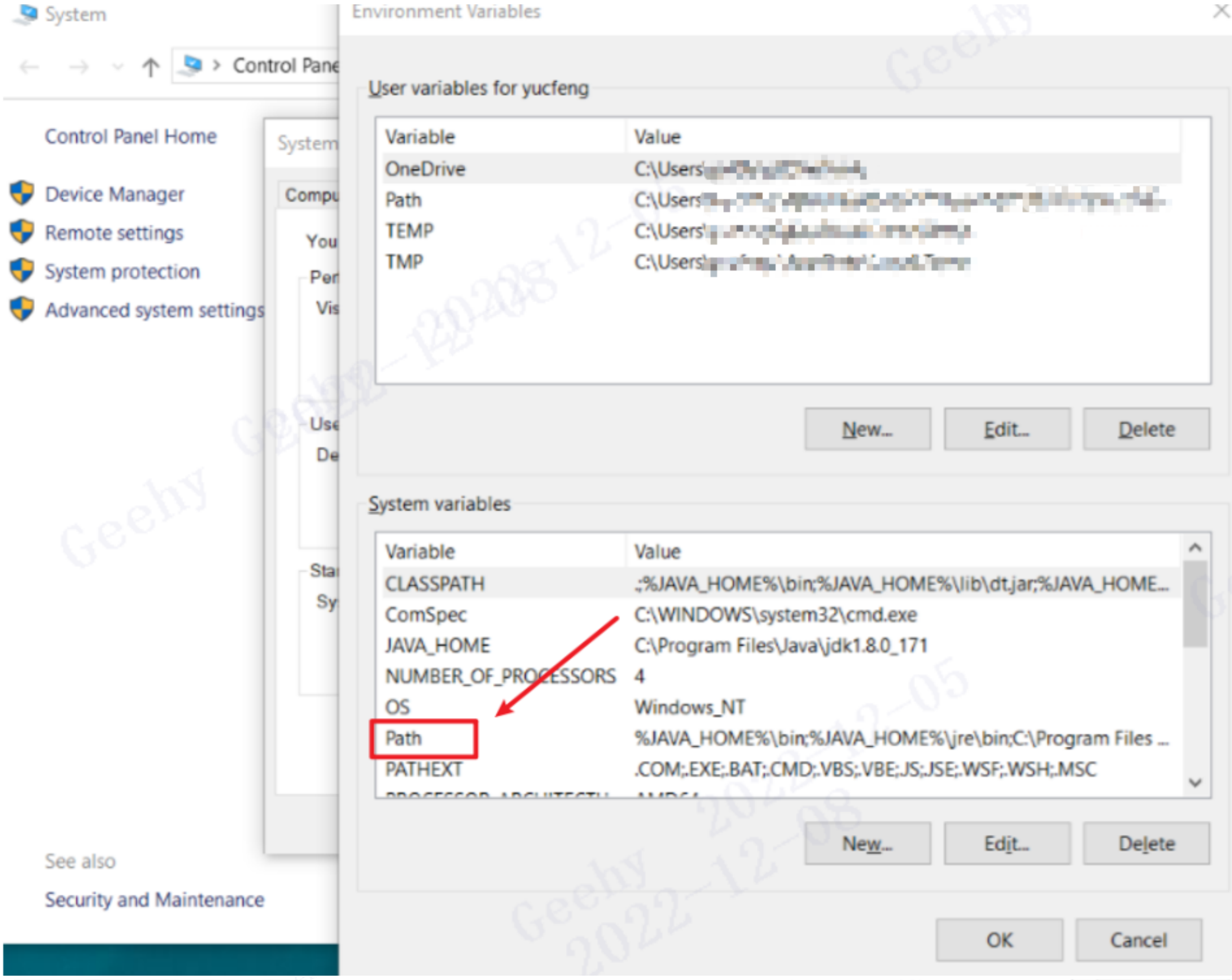
Click Next to continue.

4. Unzip the Openocd and Xpack files to your computer.

Environment Variables Configuration(Important)

Add the bin folder of the openocd, xpack-windows-build-tools, and arm-none-eabi-gcc install their directories to the path environment, or the global settings of your Eclipse.

（This PC） → （Advanced system settings） → （Environment Variables）

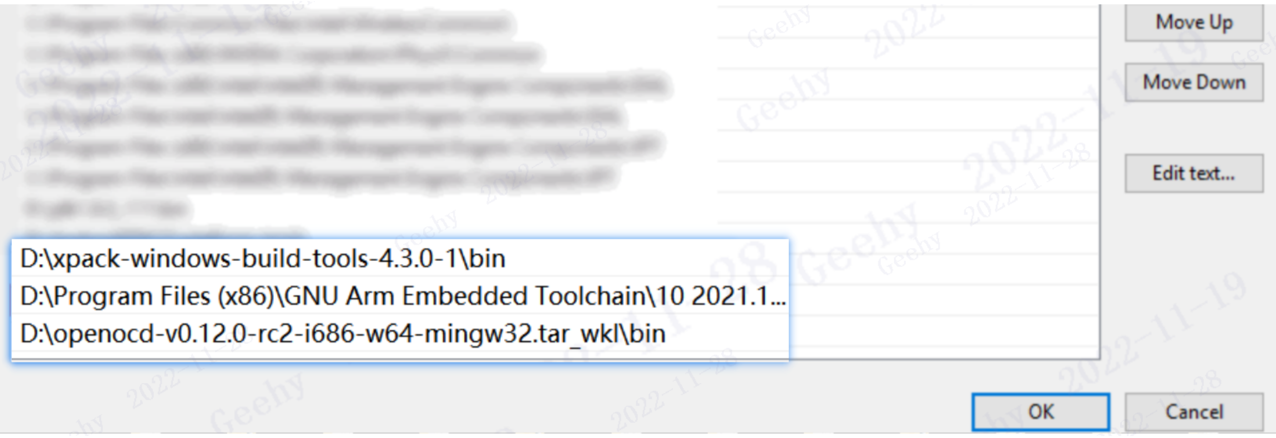


User variables for yucfeng

Variable	Value
OneDrive	C:\Users[redacted]
Path	C:\Users[redacted]
TEMP	C:\Users[redacted]
TMP	C:\Users[redacted]

System variables

Variable	Value
CLASSPATH	.;%JAVA_HOME%\bin;%JAVA_HOME%\lib\dt.jar;%JAVA_HOME...
ComSpec	C:\WINDOWS\system32\cmd.exe
JAVA_HOME	C:\Program Files\Java\jdk1.8.0_171
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	%JAVA_HOME%\bin;%JAVA_HOME%\jre\bin;C:\Program Files ...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC



[redacted]

D:\xpack-windows-build-tools-4.3.0-1\bin
D:\Program Files (x86)\GNU Arm Embedded Toolchain\10 2021.1...
D:\openocd-v0.12.0-rc2-i686-w64-mingw32.tar_wkl\bin

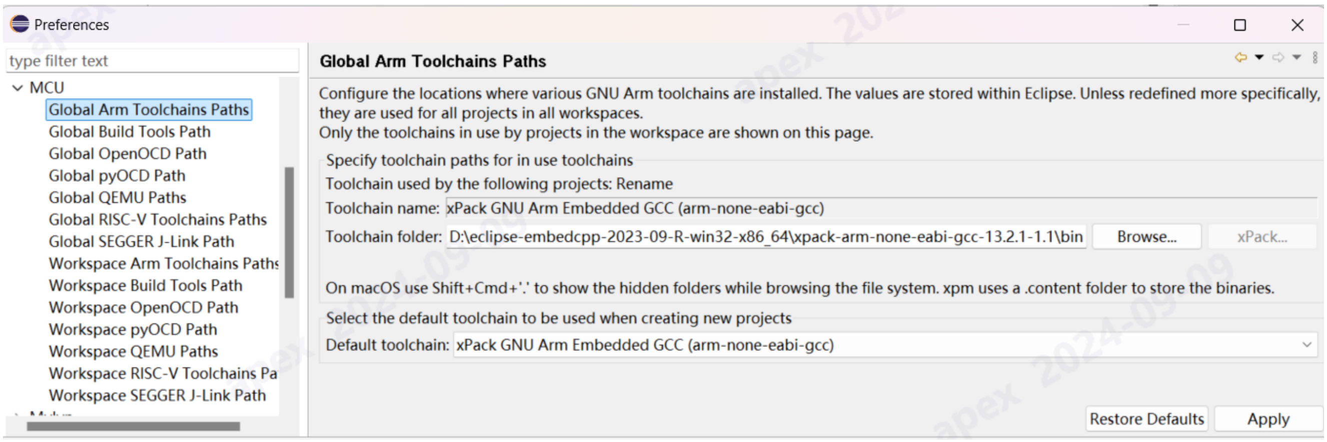
After adding system environment variables, you can open cmd and enter **arm-none-eabi-gcc -v**, **make -v**, and **openocd-v** to check whether the variables are added successfully.

Or, import Geehy SDK -> Examples -> xxx -> Eclipse folder into Eclipse Workspace, and configure the Tool Chain with following steps.

Open eclipse's Settings Window and select Window -> Preference.

Switch to the MCU list and modify the configuration item with the Global attribute.

Switch to Global Arm Toolchains Paths, where fill in the bin folder of the ARM-gcc installation directory.



Global Arm Toolchains Paths

Configure the locations where various GNU Arm toolchains are installed. The values are stored within Eclipse. Unless redefined more specifically, they are used for all projects in all workspaces.
Only the toolchains in use by projects in the workspace are shown on this page.

Specify toolchain paths for in use toolchains

Toolchain used by the following projects: Rename

Toolchain name: xPack GNU Arm Embedded GCC (arm-none-eabi-gcc)

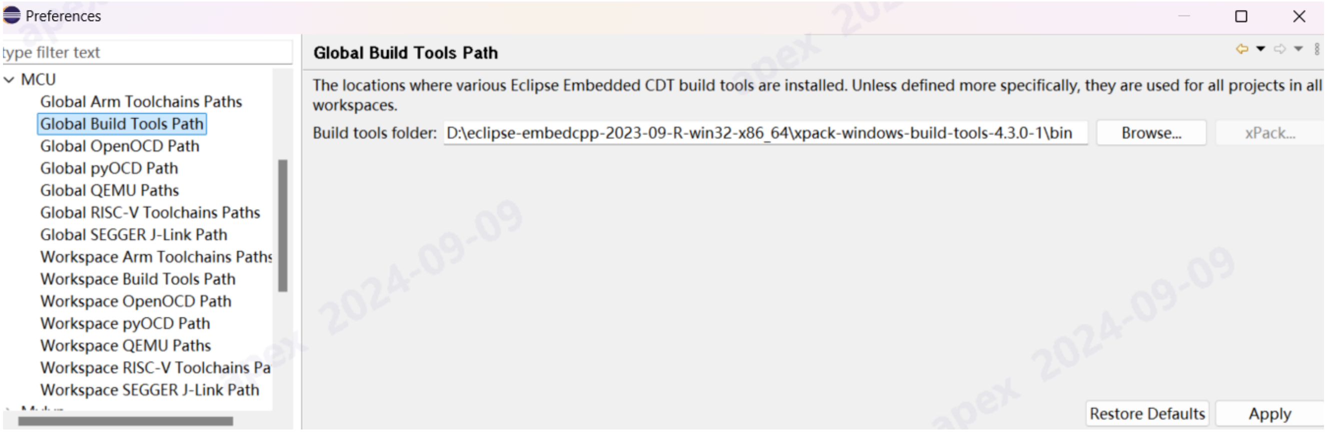
Toolchain folder: D:\eclipse-embedcpp-2023-09-R-win32-x86_64\xpack-arm-none-eabi-gcc-13.2.1-1.1\bin

On macOS use Shift+Cmd+'.' to show the hidden folders while browsing the file system. xpm uses a .content folder to store the binaries.

Select the default toolchain to be used when creating new projects

Default toolchain: xPack GNU Arm Embedded GCC (arm-none-eabi-gcc)

Switch to the Global Build Tools Path, where you can enter the bin folder in the make tool installation path.

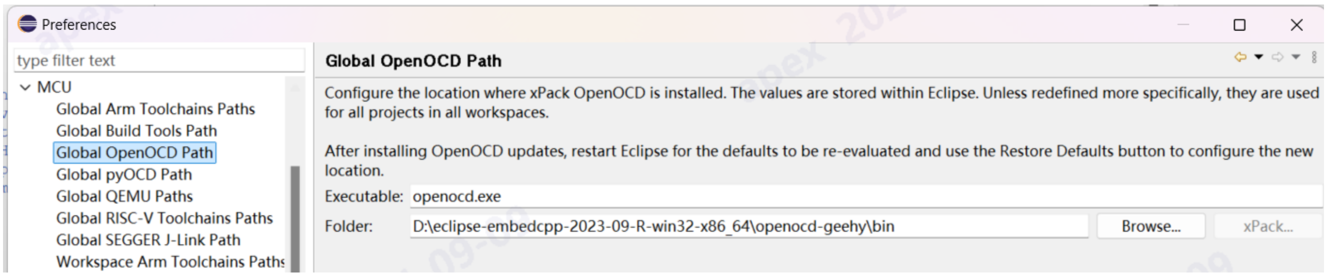


Global Build Tools Path

The locations where various Eclipse Embedded CDT build tools are installed. Unless defined more specifically, they are used for all projects in all workspaces.

Build tools folder: D:\eclipse-embedcpp-2023-09-R-win32-x86_64\xpack-windows-build-tools-4.3.0-1\bin

Switch to the Global OpenOCD Path, insert Openocd. exe into the Executable, and insert the bin Folder from your openocd tool installation path into the Folder.



Global OpenOCD Path

Configure the location where xPack OpenOCD is installed. The values are stored within Eclipse. Unless redefined more specifically, they are used for all projects in all workspaces.

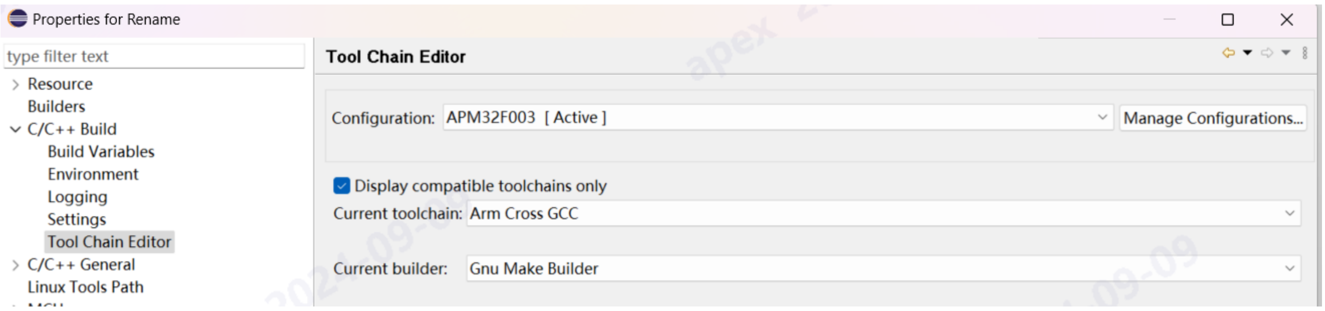
After installing OpenOCD updates, restart Eclipse for the defaults to be re-evaluated and use the Restore Defaults button to configure the new location.

Executable: openocd.exe

Folder: D:\eclipse-embedcpp-2023-09-R-win32-x86_64\openocd-geehy\bin

Or, switch to the Global SEGGER J-Link Path, insert JLinkGDBServerCL.exe into the Executable, and insert your jlink installation path into the Folder.

Place the APM32 project into the eclipse-workspace folder and open the APM32 project.



Properties for Rename

type filter text

- Resource
- Builders
- C/C++ Build
  - Build Variables
  - Environment
  - Logging
  - Settings
  - Tool Chain Editor
- C/C++ General
- Linux Tools Path

Tool Chain Editor

Configuration: APM32F003 [Active] | Manage Configurations...

☑ Display compatible toolchains only

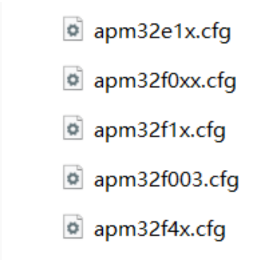
Current toolchain: Arm Cross GCC

Current builder: Gnu Make Builder

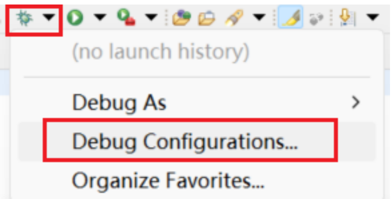
Debug Configurations: select and double-click GDB SEGGER J-Link or GDB OpenOCD

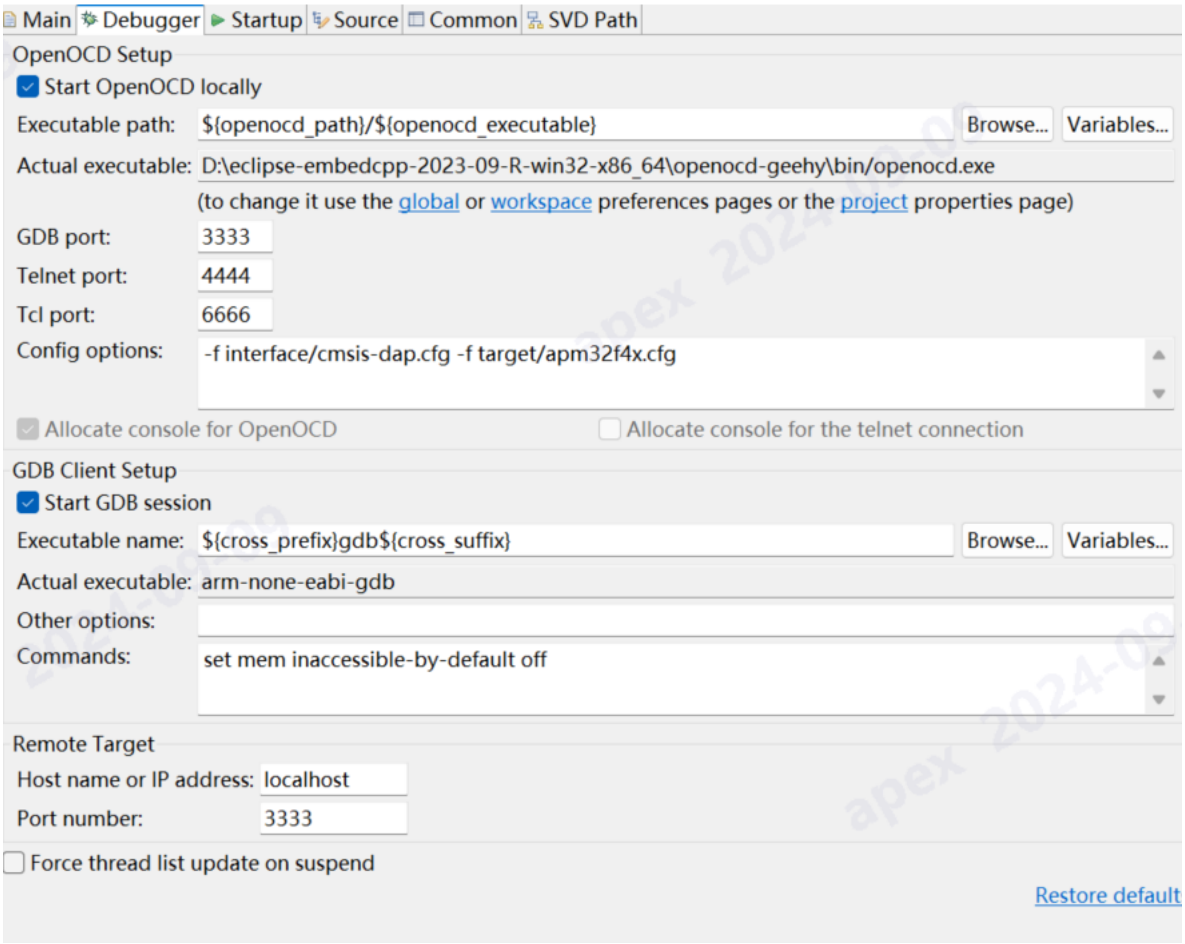
Geehylink /Daplink:-f interface/**cmsis-dap.cfg** -f target/apm32f0xx.cfg

Stlink:-f interface/**stlink.cfg** -f target/apm32f0xx.cfg (choose .cfg file according to your MCU Series)



- apm32e1x.cfg
- apm32f0xx.cfg
- apm32f1x.cfg
- apm32f003.cfg
- apm32f4x.cfg





Main | Debugger | Startup | Source | Common | SVD Path

OpenOCD Setup

☑ Start OpenOCD locally

Executable path: ${openocd_path}/${openocd_executable} | Browse... | Variables...

Actual executable: D:\eclipse-embedcpp-2023-09-R-win32-x86_64\openocd-geehy\bin/openocd.exe

(to change it use the global or workspace preferences pages or the project properties page)

GDB port: 3333

Telnet port: 4444

Tcl port: 6666

Config options: -f interface/cmsis-dap.cfg -f target/apm32f4x.cfg

☑ Allocate console for OpenOCD □ Allocate console for the telnet connection

GDB Client Setup

☑ Start GDB session

Executable name: ${cross_prefix}gdb${cross_suffix} | Browse... | Variables...

Actual executable: arm-none-eabi-gdb

Other options:

Commands: set mem inaccessible-by-default off

Remote Target

Host name or IP address: localhost

Port number: 3333

□ Force thread list update on suspend

Restore default