

#### **APPLICATION NOTE**

## **Eclipse Environment Setup**

A-SOCAP3-ANGA03EN v1.2



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#### **Revision History**

Revision	Date	Description
1.0	2019	Released with AmbiqSuite SDK
1.1	April 11, 2022	Updated template
1.2	December 1, 2022	Processed branding updates

#### **Reference Documents**

Document ID	Description

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## Introduction

The open source Eclipse IDE is not formally supported in AmbiqSuite SDK and only limited tests are performed. AmbiqSuite does support GCC makefiles and all examples compiled and tested in the environment. This application note provides a step-by-step procedure to setup Eclipse development and debugging environment on machines running Windows operating systems. In this document, Windows 10 64-bit is used an example. It outlines the open source tools that need to be downloaded, but the user should keep in mind that these tools change quite rapidly and some research may be required to get the latest versions.



## Installation

Use the following procedure to install:

- 1. Java Runtime Environment (JRE) or Java Development Kit (JDK)
  - JRE is sufficient for our usage.
  - https://www.oracle.com/technetwork/java/javase/downloads/jre8-downloads-2133155.html
  - Make sure JRE is in Windows environment variable Path.
- 2. GNU MCU Eclipse Arm Embedded GCC
  - Download from https://github.com/gnu-mcu-eclipse/arm-none-eabi-gcc/releases/
  - Extract and place it to a proper location and add this path to Windows environment variable Path.
- 3. GNU MCU Eclipse Windows Build Tools
  - Download from https://github.com/gnu-mcu-eclipse/windows-build-tools/releases
  - Extract and place it to a proper location.

For example:

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File Home Share	View
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- 4. GNU MCU Eclipse IDE for C/C++ Developers
  - Download from https://github.com/gnu-mcu-eclipse/org.eclipse.epp.packages/ releases. Make sure the version matches the installed JRE, both 32-bit version or 64-bit.
  - Extract and place it to a proper location.
- 5. J-Link Software and Documentation pack for Windows
  - Download from https://www.segger.com/downloads/jlink/#J-LinkSoftwareAndDocumentationPack and install it.



## **Eclipse Setup**

Use the following procedure to setup Eclipse:

- 1. Launch Eclipse and you will be asked to setup a workspace which can be anywhere.
- 2. In Eclipse, navigate to **Window** > **Preferences**. In the left panel, unfold MCU and configure Global Arm Toolchains Paths, Global Build Tools Path and Global SEGGER J-Link Path.

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type filter text	Global ARM To	olchains Paths		< ◄	⇒ • •
✓ MCU Global ARM Toolchains Paths Global Build Tools Path	specifically, they a	ations where various GNU ARM toolchains are installed. The values are stored re used for all projects in all workspaces. GNU MCU Edipse ARM Embedded GCC	within Eclipse. Unless i	edefined m	nore
Global Jumper Path Global OpenOCD Path	Toolchain name:	GNU MCU Edipse ARM Embedded GCC			
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Oomph		
Remote Development		
▶ RPM		
Run/Debug		Restore Defaults Apply

Preferences				
type filter text	Global SE	GGER J-Link Path		↓ ↓ ↓ ▼ .
<ul> <li>MCU</li> <li>Global ARM Toolchains Paths</li> <li>Global Build Tools Path</li> <li>Global Jumper Path</li> <li>Global OpenOCD Path</li> </ul>	used for all	he location where SEGGER J-Link is installed. The values are stored within Eclipse. Unle projects in all workspaces. ing SEGGER updates, restart Eclipse for the defaults to be re-evaluated and use the R n.		
Global pyOCD Path	Executable:	JLinkGDBServerCL.exe		
Global QEMU Path Global RISC-V Toolchains Paths	Folder:	C:/Program Files (x86)/SEGGER/JLink_V640/	<u>B</u> rowse	xPack
Global SEGGER J-Link Path Workspace ARM Toolchains Paths Workspace Build Tools Path Workspace Jumper Path Workspace OpenOCD Path Workspace QEMU Path Workspace QEMU Path Workspace RISC-V Toolchains Paths Workspace SEGGER J-Link Path > Mylyn > Oomph > Remote Development > RPM > Run/Debug			Restore Defaults	Apple
> Team	~		Restore <u>D</u> efaults	<u>A</u> pply
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# Project Import and Compilation

Use the following procedure to import and compile projects:

 In Eclipse, navigate to File >Import. Select C/C++>Existing Code as Makefile Project. Click Next. For projects which are to be imported for the first time use this option. For those projects which have previously been imported to Eclipse (check if the files, .project and .cproject, and the folder .settings exist in <project>/gcc,) select General >Existing Projects into Workspace.

D Import			$\times$
<b>Select</b> Creates a new Makefile project in a directory containing existing code	2		Ľ
Select an import wizard:			
type filter text			
<ul> <li>&gt; General</li> <li>&gt; C/C++</li> <li>C/C++ Executable</li> <li>C/C++ Project Settings</li> <li>Existing code as Autotools project</li> <li>Existing Code as Makefile Project</li> <li>&gt; Git</li> <li>&gt; Install</li> <li>&gt; Oomph</li> <li>&gt; RPM</li> <li>&gt; Run/Debug</li> <li>&gt; Tasks</li> <li>&gt; Team</li> <li>&gt; TextMate</li> <li>&gt; Tracing</li> <li>&gt; XML</li> </ul>			
? < Back Next > Finish		Cance	el

- 2. Select the targeting project. Take the project clkout of R2.0 for Apollo3 as an example.
  - Change the project name (optional).
  - Select ARM Cross GCC in Toolchain for Indexer Settings.

New Project			$\times$
Import Existing Code			
Create a new Makefile project from existing code in that same directory			
Project Name			
clkout_eclipse_gcc			
Existing Code Location			
pace\ambiqsuite-rel1.2.12\boards\apollo2_evb\examples	clkout\	gcd Bro	wse
Languages ✓ C ✓ C++			
Toolchain for Indexer Settings			
<none></none>			
ARM Cross GCC			
Cross GCC			
Cygwin GCC			
GNU Autotools Toolchain RISC-V Cross GCC			
KISC-V CIOSS GCC			
Show only available toolchains that support this platform			
? < Back Next > Finish		Cancel	

3. After the project is imported, the project explorer shows the project like the following screenshot.



4. Right click on the project and go to **Properties** > **C/C++ Builds** > **Build Variables**. Add two variables as highlighted in below. Click **Apply** and **Close**.

type filter text	Build Variable	es				$(\neg \bullet \circ \circ \bullet \bullet$
<ul> <li>Resource</li> <li>Builders</li> <li>C/C++ Build</li> <li>Build Variables</li> </ul>	Configuration:	Default	[Active]		<ul> <li>✓ Manage €</li> </ul>	Configurations
Environment Logging Settings Tool Chain Editor > C/C++ General Git Linux Tools Path > MCU Project Natures Project Natures Project References Run/Debug Settings > Task Repository Task Tags	Name cross_make cross_prefix	String	Value make arm-none-eabi-			Add., Edit Delete
> Validation WikiText				used for string substitution when definir e parameter in form of \${VAR}, internal I R	5	

5. Right click on the project and select **Clean Project**.

6. Right click on the project and select **Build Project**.

```
Problems @ Tasks □ Console ≅ □ Properties

CDT Build Console [clout_eclipse_gcc]

17:22:10 **** Build of configuration Default for project clout_eclipse_gcc ****
make all

Compiling gcc ../src/clkout.c

Compiling gcc ../../../../utils/am_util_delay.c
Compiling gcc ../../../../utils/am_util_faultisr.c

Compiling gcc ../../../../utils/am_util_stdio.c

Compiling gcc ../../../../devices/am_devices_led.c

Compiling gcc bin/clkout.axf
Copying gcc bin/clkout.bin...

17:22:11 Build Finished. 0 errors, 0 warnings. (took 1s.376ms)
```



## **Project Debugging**

Use the following procedure to debug a project:

1. Navigate to **Run** > **Debug** Configurations.

Debug Configurations	-		$\times$
Create, manage, and run configur	manage, and run configurations         Image, and run configuration button to create a configuration prototype of the selected type.         Image, and run configuration button to copy the selected configuration.         Image, Post the 'Duplicate' button to copy the selected configuration.         Image, Post the 'Duplicate' button to copy the selected configuration.         Image, Post the 'Filter' button to configuration by selecting it.         Image, Post the 'Debugging         Image, Post the 'Duplication's and then select' 'Unlink Prototype' menu item to unlink a prototype.         Image, Post the 'Duplication's) and then select' 'Unlink Pr		Ś
Image: Second Secon	<ul> <li>Press the 'New Configuration' button to create a configuration of the selected type.</li> <li>Press the 'New Prototype' button to create a launch configuration prototype of the selected type.</li> <li>Press the 'Export' button to export the selected configurations.</li> <li>Press the 'Duplicate' button to copy the selected configuration.</li> <li>Press the 'Delete' button to remove the selected configuration.</li> <li>Press the 'Filter' button to configure filtering options.</li> <li>Edit or view an existing configuration by selecting it.</li> <li>Select launch configuration(s) and then select 'Link Prototype' menu item to link a prototype.</li> <li>Select launch configuration(s) and then select 'Reset with Prototype Values' menu item to reset with prototype values</li> </ul>		
Filter matched 14 of 14 items			
(?)	Debug	Clos	e

2. Right click on GDB SEGGER J-Link Debugging and select New Configuration.

3. In Main page, make sure Project has the name identical to the one set in project import and **C/C++ Application** pointed to the corresponding **.axf** file.

reate, manage, and run configurations       Win     Name     Cout_eclipse.gcc     Cout_eclipse.gcc       C/C++     Application     Project:     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     C/C++     Application     Project:     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     C/C++     Application     Project:     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     C++     Application     Ioott_eclipse.gcc     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     Application     Ioott_eclipse.gcc     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     Application     Ioott_eclipse.gcc     Ioott_eclipse.gcc     Ioott_eclipse.gcc       C/C++     Application     Ioott_eclipse.gcc     Build Configuration: Select Automatically     Ioott_eclipse.gcc Debugging       In COB     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging       In COB     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging       In CoB     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc Debugging       Ioott_eclipse.gcc Debugging     Ioott_eclipse.gcc     Ioott_eclipse.gcc     Ioott_eclipse.gcc       Ioott_eclipse.gcc     Ioott_eclipse.gcc </th <th>Debug Configurations</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>	Debug Configurations						
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4. In Debugger page, make sure Actual executable is correctly interpreted and Device name is added.

Debug Configurations reate, manage, and run configurations	gurations					
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	Actual executable: C:/Program Files (x86)/SEGGER/JLink_V640//JLinkGDBServerCL.exe (to change it use the <u>global</u> or <u>workspace</u> preferences pages or the <u>project</u> properties page)					
	Device name:	AMAPH1KK-KBR	<u>Si</u>	upported d	levice name	
	Endianness: Connection: Interface: Initial speed: GDB port: SWO port: Telnet port:	tion:  USB IP (USB serial or IP name/address)  ex:  SWD JTAG  peed:  Auto Adap Fixed 1000 kHz  rt:  2331  ort:  2332  Verify downloads I Initialize registers of				
	Log file:				Browse	
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	Allocate console for the GDB server					
	GDB Client Setup					
	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 a	ddress: localhost				
	Port number:	2331				
	Force thread list	update on suspend		R	estore defa	
er matched 15 of 15 items			Revert		Apply	
ter matched 15 OF 15 items						
0			Debug		Close	

5. In SVD page, add the path to the targeting board SVD file located in **<SDK**>/pack. Click **Apply** and **Debug**.

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B 💀 🖹 🗶 🖻 🔆 🗸	Name:	clout_eclipse_gcc Default			
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C/C++ Application C/C++ Attach to Application C/C++ Container Launcher	SVD file (used by the peripheral registers viewer)				
				Variables.	
<ul> <li>C/C++ Postmorter Debuggr</li> <li>C/C++ Remote Application</li> <li>C/C++ Unit</li> <li>GDB Hardware Debugging</li> <li>GDB OpenOCD Debugging</li> <li>GDB OpenOCD Debugging</li> <li>GDB QEMU Debugging</li> <li>GDB SEGGER J-Link Debugging</li> <li>C dout_eclipse_gcc Default</li> <li>Launch Group</li> <li>Launch Group (Deprecated)</li> </ul>					
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2		Debug		Close	

6. After the debugger is launched, the program stops at the main function. Click the run icon highlighted in the red frame below. The LEDs on EVB shall start to blink.

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<pre>C Debug C Debug C</pre>	eclipse_workspace_ambiqsuite-rel1.2.12 - C:\Users\LTi	$n\cuments\workspace\ambigsuite-rel1.2.12\boards\apollo2\_evb\examples\clkout\src\clkout.c-\Edipse\IDE$	>
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<pre>boll blewclkout; boldclkout; // bead #15705(Suppended: Breakpoint) # BinkcDBSeverCLewe # BinkcDBSeverCLewe # BinkcDBSeverCLewe # am-non=exbi-gdb # Semihosing and SWV // Set the clock frequency. // Set the default cache configuration // Set the board for low power operation. // Initialize the printf interface for ITM/SWO output. // Set im Registers # Problems O Esecutables @DebuggerConsole @ Memory Ocorsole # Registers # Problems O Esecutables @DebuggerConsole @ Memory OCONSOL # Registers # Problems O Esecutables @DebuggerConsole @ Memory ONU MCU Edipse Packs console 2013-11-23 17:31:95 Paring SVO 2014-11-23 17:31:95 Paring SVO 2015-11-23 17:31:95 Paring SVO Paring SVO Paring</pre>		The cloute at the second secon	👓 Variables 🗣 Breakpoints 😤 Expressions 🛎 Modules 🔂 Peripherals 😫 👘
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## Troubleshooting

- Make sure Windows Environment variable Path is configured correctly. For Windows 10, right click on This PC and navigate to Properties > Advanced system settings > Environment Variables, and check the variable Path.
- 2. Contact regional Ambiq Field Application Engineers if you encounter further questions.



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