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This document is intended to desribe how to create and debug a new project within the Eclipse IDE using gnu-mcu-eclipse-arm-none-eabi-gcc toolchain.

Author	Date	Version	Description
g.reuillard	21/06/18	1.0	First attempt

1. Tools versions :

Windows 7 x64

Eclipse: Oxygen.3a Release (4.7.3a), Build id: 20180405-1200

gnu-mcu-eclipse-arm-none-eabi-gcc-7.2.1-1.1-20180401-0515-win64

gnu-mcu-eclipse-build-tools-2.11-20180428-1604-win64

SEGGER J-Link ARM V10.10 host and emulator firmware updated (2018 april 20).

custom LPC1788 board with SWD/JTAG connections

SEGGER J-Link Configu	ration V6.32c									• 💌
	Emulators connected	d via USB:						R	efresh rate: Normal	•
11	# ^	Product		Nickname	SN	USB Identification	Host Firmware	Emulator Firmwar	e	
	⊠ ● 0	SEGGER J-Link ARM V10	.10		600105684	SN 600105684	2018 Apr 20 16	:47 2018 Apr 20 16:4	17	
a a .	Emulators connected	d via TCP/IP:							<u>Select all</u>	ect none
j-link -	# ^	Product	Nickname	SN	IP Address	MAC Address	Host Firmware	Emulator Firmware	React.Time	Connec
<u>()</u> += ⁺ • +										
φ.	•									· · ·
	Log:								Select all Select	act none
	SEGGER J-Link Co Logging started ERROR: No emulat	onfiguration V6.32c @ 2018-06-21 09:36 ors selected to update								^
	Updating firmwar Updating firmwar	re of 1 emulator: re of emulator 1 of 1 vi	a USB (SN: 6	00105684)	Not updated, emu	lator firmware is a	lready up to date.			-
							Update	e firmware of selected er	mulators Cle	DSE
Ready				Searching	for emulators: Rea	idy			1 emulator found	

2. Project creation

C Project	
C Project Project name must be specified	
Project name:	
Vse default location	
Location: C:\WORK 3\Electronics\EclipseWork	space Browse
Choose file system: default v	
Project type:	Toolchains:
GNU Autotools Executable Empty Project Hello World ANSI C Project Hello World ARM C Project ADuCM36x C/C++ Project Hello World ARM Cortex-M C/C++ Project Freescale Kinetis KLxx C/C++ Project Freescale Processor Expert C/C++ Project SiFive RISC-V C/C++ Project STM32F0xx C/C++ Project STM32F10x C/C++ Project STM32F2xx C/C++ Project STM32F3xx C/C++ Project STM32F3xx C/C++ Project STM32F3xx C/C++ Project STM32F7xx C/C++ Project STM32F7xx C/C++ Project Makefile project Show project types and toolchains only if the	ARM Cross GCC
	Nevt > Finich Cancel

Target processor sett	ings
Select the target proces	sor family and define flash and RAM sizes.
Processor core:	Cortex-M3
Clock (Hz):	12000000
Flash size (kB):	512
RAM size (kB):	96
Use system calls:	Semihosting (POSIX system calls via host)
Trace output:	Semihosting DEBUG channel
Check some warnings	
Check most warnings	
Enable -Werror	
Use -Og on debug	
Use newlib nano	
Use link optimizations	
(?)	< Back Next > Finish Cancel

🖨 C Project	
Folders Define the project fold	ers.
Include folder:	include
Source folder:	src
System folder:	system
CMSIS library folder:	cmsis
C library folder:	newlib
Linker scripts folder:	Idscripts
Vendor CMSIS name:	DEVICE
?	< <u>B</u> ack <u>N</u> ext > <u>F</u> inish Cancel

C Project	
Select Configurations Select platforms and configurations you wish to deploy on	Ż
Project type: Executable Toolchains: ARM Cross GCC Configurations:	
☑ ŠS Debug ☑ ŠS Release	Select all Deselect all
Use "Advanced settings" button to edit project's properties. Additional configurations can be added after project creation.	Advanced settings
Additional configurations can be added after project creation. Use "Manage configurations" buttons either on toolbar or on property	pages. sh Cancel

type filter text	Settings				<	╞╺╶╤╴╸
 Resource Builders C/C++ Build Build Variables 	Configuration: (Debug [Active]				•
Environment Logging Settings Tool Chain Editor C/C++ General Linux Tools Path MCU Project References Run/Debug Settings Task Repository	Vertice selection	 Toolchains Used by debug LPC175x LPC176x LPC177x LPC178x LPC178x LPC178x 	Not yet used du Details Subfamily Subfamily Subfamily Device (1)	Build Steps / Iring build!) / / / / 20 MHz, 80 kB RA	P Build Artifact 📄 Bin	ary Parser
Task Tags ⊳ Validation WikiText		LPC1786 LPC1787 LPC1788	Device (1) Device (1) Device (1)	20 MHz, 80 kB RA 20 MHz, 96 kB RA 20 MHz, 96 kB RA	M, 256 kB ROM) M, 512 kB ROM) M, 512 kB ROM)	E
	Device core: C Memory map LPC1788	Cortex-M3 (Warning: Not yet	used to generate	the linker scripts	!)	
	Section IRAM1	Start 0x1000000	Size 0x10000	Startup 0		
	IROM1	0x0000000	0x8000	1		~
					Restore <u>D</u> efaults	<u>A</u> pply

🖨 C Project		- • •
GNU ARM Cross	i Toolchain ain and configure path	Ď
Toolchain name: Toolchain path:	GNU MCU Eclipse ARM Embedded GCC (arm-none-eabi-gcc) C:\Users\greg\AppData\Roaming\GNU MCU Eclipse\GNU MCU Eclipse\ARM Embedded GCC\7.2.1-1.1-20180401-0515	▼ \bin Browse
?	< Back Next > Einish	Cancel

3. Debug configuration

Debug Configurations	
Create, manage, and run configurat	ions
Image: Second Secon	Name: HelloWorld3 Debug Image: Startup Source Common Project: Image: Startup Browse C/C++ Application: Browse Debug/HelloWorld3.elf Browse Wariables Search Project Build (if required) before launching Browse Build Configuration: Search Project Build Configuration: Select Automatically Image: Disable auto build Disable auto build Image: Use workspace settings Configure Workspace Settings
Filter matched 13 of 17 items	Revert Apply
?	Debug Close

• • • • • • •							45 .	
Create, manage, and run configurati	ions						The second	
🗋 🖹 🗧 🋸 🔹	Name: HelloWorld3 Debug							
type filter text	📄 Main 🕸 Debug	ger 🕞 🕨 St	artup) 🦆 Sourc	e 🔲 <u>C</u> omn	non 🛃 SVD Path			
C/C++ Application	J-Link GDB Server Setup							
C/C++ Attach to Application	Start the J-Link	GDB server l	ocally		Connect to running	target		
C/C++ Remote Application	Executable path:	C:\Program	n Files (x86)\SEG	GER\JLink_V	632c\JLinkGDBServerCL.exe	Browse	Variables	
GDB Hardware Debugging	Actual executable:	C:\Program	n Files (x86)\SEG	GER\JLink_V	632c\JLinkGDBServerCL.exe			
GDB OpenOCD Debugging		(to change	it use the <u>global</u>	or workspace	e preferences pages or the	project properties	page)	
GDB PyOCD Debugging	Device name:	LPC1788				Supported	device names	
GDB QEMU Debugging	Endianness:	Little	🔘 Big					
a UD SEGGER J-LINK DEbugging	Connection:	USB	© IP		(USB se	rial or IP name/ad	dress)	
🛱 Launch Group	Interface:	SWD	○ JTAG					
Launch Group (Deprecated)	Initial speed:	O Auto	O Adaptive	Fixed	1000 kHz			
	GDB port:	2331				_		
	SWO port:	2332			Verify download	ls 🛛 Initialize reg	isters on start	
	Telnet port:	2333			Local host only	Silent		
	Log file:						Browse	
	Other options:	-singlerun	-strict -timeout	0 -halt				
	Allocate consol	Allocate console for the GDB server						
	GDB Client Setup							
	Executable name:	arm-none-	eabi-gdb			Browse	Variables	
	Actual executable:	arm-none-	-eabi-gdb					
	Other options:							
	Commands:	set mem ir	naccessible-by-d	efault off			A	
							~	
	Remote Target							
	Host name or IP ac	ddress: loca	Ihost					
	Port number:	233	L					
	Force thread list u	pdate on sus	pend					
							Restore defaults	
						Revert	Apply	
Filter matched 13 of 17 items						Neven	Арра	
2						Debug	Close	
\odot						Denna	Close	

Create, manage, and run configurat	ions descent and the second seco
	1
	Name: HelloWorld3 Debug
type filter text	📄 Main 🕸 Debugger 🕨 Startup 🛛 🍹 Source 🔲 Common 🚼 SVD Path
C/C++ Application	Initialization Commands
C/C++ Attach to Application	Initial Reset and Halt Type: 0 Low speed: 1000 kHz
C/C++ Remote Application	JTAG/SWD Speed: Auto Adaptive Fixed kHz
GDB Hardware Debugging	Enable flash breakpoints
GDB OpenOCD Debugging	Enable semihosting Console routed to: Telnet GDB client
GDB PyOCD Debugging	Enable SWO CPU freq: 12000000 Hz. SWO freq: 0 Hz. Port mask: 0x1
C GDB QEMU Debugging ▲ C GDB SEGGER J-Link Debugging	
C HelloWorld3 Debug	
Launch Group	
admen oroup (Deprecated)	Load symbols and Executable
	Use project binary:
	© Use file: Workspace File System
	Symbols offset (hex):
	✓ Load executable
	Use project binary:
	O Use file: Workspace File System
	Executable offset (hex):
	Runtime Options
	RAM application (reload after each reset/restart)
	Run/Restart Commands
	Pre-run/Restart reset Type: (always executed at Restart)
	A
	Cet base program counter at (nex):
	Continue
	Restore defaults
	Report Apple
Filter matched 13 of 17 items	nevert Apply
2	
()	Debug

4. Debug results

Console output when trying to debug :

```
SEGGER J-Link GDB Server V6.32c Command Line Version
JLinkARM.dll V6.32c (DLL compiled May 11 2018 16:30:26)
Command line: -if swd -device LPC1788 -endian little -speed 1000 -port 2331
-swoport 2332 -telnetport 2333 -vd -ir -localhostonly 1 -singlerun -strict
-timeout 0 -halt
-----GDB Server start settings-----
GDBInit file:
                               none
GDB Server Listening port:
                             2331
SWO raw output listening port: 2332
Terminal I/O port:
                               2333
Accept remote connection:
                               localhost only
Generate logfile:
                               off
Verify download:
                               on
Init regs on start:
                               on
```

off Silent mode: Single run mode: on Target connection timeout: 0 ms -----J-Link related settings-----J-Link Host interface: USB J-Link script: none J-Link settings file: none -----Target related settings-----Target device: LPC1788 Target interface: SWD Target interface speed: 1000kHz Target endian: little Connecting to J-Link... J-Link is connected. Firmware: J-Link V10 compiled Apr 20 2018 16:47:09 Hardware: V10.10 S/N: 600105684 Feature(s): RDI, FlashBP, FlashDL, JFlash, GDB Checking target voltage... Target voltage: 3.32 V Listening on TCP/IP port 2331 Connecting to target...Connected to target Waiting for GDB connection...Connected to 127.0.0.1 Reading all registers Read 4 bytes @ address 0x00000000 (Data = 0x10001FFC) Read 2 bytes @ address 0x00000000 (Data = 0x1FFC) Received monitor command: speed 1000 Target interface speed set to 1000 kHz Received monitor command: clrbp Received monitor command: reset 0 Resets core & peripherals via SYSRESETREQ & VECTRESET bit. Received monitor command: halt Halting target CPU... ... Target halted (PC = 0x1FFF0D92) Received monitor command: regs R0 = 00000000, R1 = 00000001, R2 = FFFFFFFF, R3 = 00000000 R4 = FFFFFFF, R5 = 400FC000, R6 = 00010004, R7 = 20098000 R8 = 40008000, R9 = 00000000, R10= 00000000, R11= 00000000 R12= 00000490, R13= 1000FFC8, MSP= 1000FFC8, PSP= 3B59B578 R14(LR) = 1FFF0EA5, R15(PC) = 1FFF0D92XPSR 81000000, APSR 80000000, EPSR 01000000, IPSR 00000000 CFBP 00000000, CONTROL 00, FAULTMASK 00, BASEPRI 00, PRIMASK 00 Reading all registers Received monitor command: speed auto Select auto target interface speed (2000 kHz) Received monitor command: flash breakpoints 1 Flash breakpoints enabled Received monitor command: semihosting enable Semi-hosting enabled (Handle on BKPT) Received monitor command: semihosting IOClient 1 Semihosting I/O set to TELNET Client Received monitor command: SWO DisableTarget 0xFFFFFFF SWO disabled successfully. Received monitor command: SWO EnableTarget 12000000 0 0x1 0 SWO enabled successfully. Read 4 bytes @ address 0x1FFF0D92 (Data = 0x44221C49) Read 2 bytes @ address 0x1FFF0D92 (Data = 0x1C49) Downloading 646 bytes @ address 0x00000000 - Verified OK

Downloading 40 bytes @ address 0x00000288 - Verified OK Downloading 7846 bytes @ address 0x000002B0 - Verified OK Downloading 476 bytes @ address 0x00002158 - Verified OK Writing register (PC = 0×00000044) Read 4 bytes @ address 0x00000044 (Data = 0xB083B500) Read 2 bytes @ address 0x00000B18 (Data = 0xB538) Received monitor command: clrbp Received monitor command: reset Resetting target Received monitor command: halt Halting target CPU... ... Target halted (PC = 0×00000158) Read 2 bytes @ address 0x00000B18 (Data = 0xB538) Received monitor command: regs R0 = 00000000, R1 = 00000159, R2 = 00000000, R3 = 00000000 R4 = 3456ABCD, R5 = 3456ABCD, R6 = 12345678, R7 = 20098000 R8 = 40008000, R9 = 00000000, R10= 00000000, R11= 00000000 R12= 100005E0, R13= 20018000, MSP= 20018000, PSP= 3B59B578 R14(LR) = 1FFF0EA5, R15(PC) = 00000158 XPSR 61000000, APSR 60000000, EPSR 01000000, IPSR 00000000 CFBP 00000000, CONTROL 00, FAULTMASK 00, BASEPRI 00, PRIMASK 00 Reading all registers Setting breakpoint @ address 0x00000B18, Size = 2, BPHandle = 0x0001 Starting target CPU... ERROR: Can not read register 15 (R15) while CPU is running Reading all registers ERROR: Can not read register 0 (R0) while CPU is running ERROR: Can not read register 1 (R1) while CPU is running ERROR: Can not read register 2 (R2) while CPU is running ERROR: Can not read register 3 (R3) while CPU is running ERROR: Can not read register 4 (R4) while CPU is running ERROR: Can not read register 5 (R5) while CPU is running ERROR: Can not read register 6 (R6) while CPU is running ERROR: Can not read register 7 (R7) while CPU is running ERROR: Can not read register 8 (R8) while CPU is running ERROR: Can not read register 9 (R9) while CPU is running ERROR: Can not read register 10 (R10) while CPU is running ERROR: Can not read register 11 (R11) while CPU is running ERROR: Can not read register 12 (R12) while CPU is running ERROR: Can not read register 13 (R13) while CPU is running ERROR: Can not read register 14 (R14) while CPU is running ERROR: Can not read register 15 (R15) while CPU is running ERROR: Can not read register 16 (XPSR) while CPU is running ERROR: Can not read register 17 (MSP) while CPU is running ERROR: Can not read register 18 (PSP) while CPU is running ERROR: Can not read register 24 (PRIMASK) while CPU is running ERROR: Can not read register 25 (BASEPRI) while CPU is running ERROR: Can not read register 26 (FAULTMASK) while CPU is running ERROR: Can not read register 27 (CONTROL) while CPU is running Removing breakpoint @ address 0x00000B18, Size = 2 WARNING: Failed to read memory @ address 0x00000000 WARNING: Failed to read memory @ address 0x00000000