# Release Notes: GCC 4.9.2.201701-GNURL78

1st of April, 2017

CyberThor Studios Ltd. is releasing the GCC 4.9.2.201701-GNURL78, a cross compiler tool for Renesas RL78 micro-controllers.

## SALIENT FEATURES

The GCC 4.9.2.201701-GNURL78 toolchain is based on:

- GCC 4.9.2 [released]
- Binutils 2.24 [released]
- Newlib 2.1.0 [released]
- GDB 7.8.2 [released]

The latest patches are applied to GCC, Binutils and Newlib sources.

## ABOUT GCC 4.9.2.201701-GNURL78

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|---|---|
| Release Version: | GCC 4.9.2.201701-GNURL78 |
| Release Date: | 1st of April, 2017 |
| Platforms Supported: | Red Hat GNU/Linux v8.0 or later (or compatible distribution)<br><br>Windows XP, Windows 7, Windows 8, Windows 10 |
| Language: | C, C99, C++ |
| Targets: | G1X, I1X, D1X, LIN MCP, F1X, and L1X |
| Object File Format: | ELF |

## CHANGES IN GCC 4.9.2.201701-GNURL78

This section describes the fixes made in the GCC 4.9.2.201701-GNURL78 release.

### GCC/Binutils:

1. *[Improvement]* New peephole optimization: use 16-bit moves instead of certain pairs of 8-bit moves (code size and speed improvement)

2. *[Improvement]* New RTL patterns for logical operations ("cstoreqi4" and "cstorehi4"), bit manipulation ("insvmisalign_qi"), switch statements ("casesi"), 8-bit arithmetic operations ("udivqi3" and "umodqi3")

3. *[Improvement]* Improved SFR addressing (code size reduction)

4. *[Improvement]* Linker relaxation enabled by default when optimizing for size (-Os) lead to improved section discarding (sensible code & data size reduction for some executables)

5. *[Improvement]* Smaller memory footprint of the libgcc library

6. *[Improvement]* Removed limitation requiring the use of the obsolete 8.3 naming convention for files in libgen

7. *[Improvement]* Added snprintf support for Optlib

8. *[Bug-Fix]* Fixed a rare case when a function argument was overwritten on the stack when optimizing for size (-Os)

9. *[Bug-Fix]* Fixed an internal error happening when performing a 32-bit right shift on a __far function Argument

10. *[Bug-Fix]* Fixed a couple of multiplication-related primitives that returned incorrect results on G13 MCUs

### INSTALLER and RPM:

1. The GCC 4.9.2.201701-GNURL78 Installer onwards supports the 'Custom Installation' and 'Default Installation' modes. The 'Default Installation' mode is set by default where the tools are installed into the default location at "C:\Program Files\GCC 4.9.2.201701-GNURL78" and the user's username and activation key are silently accepted if cached in the registry.
2. The GNURL78 ABI (Application Binary Interface) is made available on our GNU Tools support website (https://gcc-renesas.com) and also provided along with Linux RPM and Windows installer.

### Notes:

This installer does not provide an option to integrate the GNURL78 toolchain with e2 studio, as the e2 studio IDE will automatically detect the GNURL78 toolchain installation on start-up for integration. Alternatively, you may use the 'Toolchain Management' feature in e2 studio to achieve this.

For details on e2 studio please visit the following link below:
http://www.renesas.com/products/tools/ide/ide_e2studio/index.jsp

There is no support in this installer to integrate toolchain with the HEW IDE.

## KNOWN ISSUES IN GCC 4.9.2.201701-GNURL78

This section describes the known issues in the GCC 4.9.2.201701-GNURL78 release.

### 1. Following is a list of options and their combinations which can cause the Linker to fail:

a) -the-fsignaling-nans (with -fno-inline -fno-trapping-math)
b) -fno-tree-pre option (with -O2)
c) -fno-tree-forwprop (with -O1)
d) -fno-tree-dominator-opts (with -O2 -ffast-math)
e) -fno-strict-aliasing option
f) -fno-signed-zeros
g) -fno-inline (with -fno-cse-follow-jumps)

All these options need adddition of the -DSTACK_SIZE=4096 flag.

### Other known problems that may occur:

1. Linker error is observed when generating a program for RL78/G13 (S2 core), respectively RL78/G14 (S3 code), without using the specific G13/G14 multiply operations.
    a) The above described behavior can be recreated by compiling a C source files with the following option: "-Os -mcpu=g14 -mmul=none"
    b) Note: the test file should attempt multiplying using a volatile variable.

## FREE SUPPORT FOR GCC 4.9.2.201701-GNURL78

For free technical support, please register at
https://gcc-renesas.com

For your feedback and suggestions, please visit
https://gcc-renesas.com/help/contact-us/