Release Notes: GCC 4.8.4.201902-SP1-GNURX

27th of May, 2019

CyberThor Studios Ltd. is releasing the GCC 4.8.4.201902-SP1-GNURX, a cross compiler tool for Renesas RX micro-controllers.

SALIENT FEATURES

The GCC 4.8.4.201902-SP1-GNURX toolchain is based on:

- GCC 4.8.4 [released]
- Binutils 2.24 [released]
- Newlib 3.1.0 [released]
- GDB 7.8.2 [released]

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

ABOUT GCC 4.8.4.201902-SP1-GNURX

Release Version:	GCC 4.8.4.201902-SP1-GNURX
Release Date:	27th of May, 2019
Platforms Supported:	Red Hat GNU/Linux v8.0 or later (or compatible distribution) Windows XP, Windows 7, Windows 8, Windows 10
Language:	C, C99, C++
Targets:	RX100 RX200 RX600 RX64M RX700
Object File Format:	ELF

CHANGES IN THE GCC 4.8.4.201902-SP1-GNURX

This section describes the fixes made in the GCC 4.8.4.201902-SP1-GNURX release.

BINUTILS:
1. *[Bug Fix]* Fixed the *objdump* code generation for *MOV, POP, PUSH*
2. *[Bug Fix]* Fixed the disassembly generation of *NOP* instructions
3. *[Improvement]* Improved the opcode decoding for *RXv3* instructions.

GCC:
1. *[Bug Fix]* Fixed the detection of *SSTR* string opcode
2. *[Improvement]* The *rmpa* builtin function can now accept byte/word/long access size and parameters.
3. *[Improvement]* Implemented *save* and *rstr* as attributes for *RXv3*

The *save* and *rstr* built-in instructions may be used as function attributes when the *-misa=v3* option is enabled. For example, the *test()* function has the same behavior as the *test2()* function.

```
void test(int x, int a, int b) __attribute((interrupt_bank (7)));
void test(int x, int a, int b)
{
	//code
}

void test2(int x, int a, int b)
{
	__builtin_rx_save (6);
	//code
	__builtin_rx_rstr (6);
}
```

4. *[Improvement]* The *-mtfu* option is now supported. TFU builtin functions are now available.

The *-mtfu* option can be use only in conjunction with the *-misa=v3* option. It receives the following arguments: 'intrinsic' or 'intrinsic, mathlib' respectively.

For example:

```
$ rx-elf-gcc test.c -misa=v3 -mtfu=intrinsic,mathlib $(OTHER_OPTIONS)
$ rx-elf-gcc test.c -misa=v3 -mtfu=intrinsic $(OTHER_OPTIONS)
```

5. *[Improvement]* The *-mdfpu* option is now supported for *RXv3*.

The *-mdfpu* option can be use only in conjunction with the *-misa=v3* and *-m64bit-doubles* options. It's used for generating double-floating point instructions.

For example:

```
$ rx-elf-gcc test.c -misa=v3 -mdfpu -m64bit-doubles $(OTHER_OPTIONS)
```

6. *[Improvement]* A warning is now generated when *mvtipl* is used with *-mcpu=rx610*
7. *[Bug Fix]* Fixed the *bit set* builtin fuctions atomic access
8. *[Bug Fix]* Fixed the *isinf_sign* and *isnan* builtin functions bug generated due to the newlib update.
9. *[Improvement]* Optimized the *xchg* builtin function

GDB:
1. *[Bug Fix]* Fixed the simulation of some *RXv3* instructions

OPTLIB:
1. *[Bug Fix]* Implemented the *stdbool.h* header

NEWLIB:
1. *[Improvement]* Updated to *newlib* version 3.1.0
2. *[Improvement]* Nano libraries are now available
3. *[Improvement]* Optimized string library functions
4. *[Improvement]* Optimized the *sqrt* function

INSTALLER and RPM:

1. The GCC 4.8.4.201902-SP1-GNURX 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 4.8.4.201902-SP1-GNURX" and the user's username and activation key are silently accepted if cached in the registry.
2. The GNURX 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 GNURX toolchain with e2 studio, as the e2 studio IDE will automatically detect the GNURX 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 4.8.4.201902-SP1-GNURX

This section describes all known issues for this particular release:

1. In certain cases the program will time out while executing with following options:

Note: Both flags need to be accompanied by "-fno-diagnostics-show-caret -w -O1 -DSTACK_SIZE=4096 -msim -lm" for the problem to be observed.
a) -funroll-loops
b) -fpeel-loops

2. An incomplete type error can be observed ocasionally when using the -fpack-struct option in C++.

The combination of the flags that reproduce this problem is "-fpack-struct -fno-diagnostics-show-caret -nostdinc++ -fmessagelength=0 -std=c++11 -pedantic-errors -Wno-long-long -S -msim"

3. Optlib is not fully compliant with the ANSI/ISO standards.

FREE SUPPORT FOR GCC 4.8.4.201902-SP1-GNURX

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/