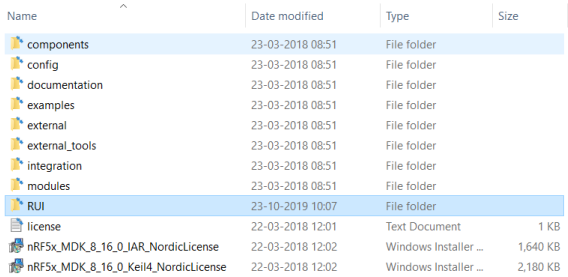
How to run RAK 8211 using RUI and nRFConnect

Installations

1) ---Install Cygwin from this link https://cygwin.com/install.html
   ---Add the make plugins during installation . Follow the steps from here https://www.ics.uci.edu/~pattis/common/handouts/cygwinclion/cygwin.html
   ---Edit system environment variables and add this path : C:\cygwin64\bin or the equivalent path to the Cygwin bin file in your system
2) ---Install GNU ARM Eclipse Tools for windows fromhttps://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm
   ---Follow the instructions from this https://gnu-mcu-eclipse.github.io/
   ---Add the path to the environment C:\Program Files (x86)\GNU Tools Arm Embedded\8 2019-q3-update\bin
   ---Open Cygwin Terminal, type *arm-none-eabi-gcc –version* . If the path is successfully added, it should display the version.
3) Install Nrf52830 (sdk version 15.0.0, RUI works only for this version) https://developer.nordicsemi.com/nRF5_SDK/
4) ----Set the toolchain path in C:\Users\nRF5_SDK_15.0.0_a53641\components\toolchain\gcc\Makefile.posix
   ---Update the following according to the version in the pc
   GNU_INSTALL_ROOT ?= /usr/local/gcc-arm-none-eabi-7-2018-q2-update/bin/
   GNU_VERSION ?= 7.3.1
   GNU_PREFIX ?= arm-none-eabi
5) ----Download nRF5 connect for desktop https://www.nordicsemi.com/Software-and-tools/Development-Tools/nRF-Connect-for-desktop/Download#infotabs
   ---Download Nrf5go Studio https://www.nordicsemi.com/Software-and-tools/Development-Tools/nRFgo-Studio/Download#infotabs
   ---Download Nrf-Command-Line-tools https://www.nordicsemi.com/Software-and-tools/Development-Tools/nRF-Command-Line-Tools/Download#infotabs
6) Setup Segger J-link Driver https://www.segger.com/products/debug-probes/j-link/
   This should download Jlink RTT viewer tool too.
7) Download/clone the RUI modules from the GIT : https://github.com/RAKWireless/RUI_Platform_Firmware_GCC in the root directory of SDK



Name	Date modified	Type	Size
components	23-03-2018 08:51	File folder	
config	23-03-2018 08:51	File folder	
documentation	23-03-2018 08:51	File folder	
examples	23-03-2018 08:51	File folder	
external	23-03-2018 08:51	File folder	
external_tools	23-03-2018 08:51	File folder	
integration	23-03-2018 08:51	File folder	
modules	23-03-2018 08:51	File folder	
RUI	23-10-2019 10:07	File folder	
license	22-03-2018 12:01	Text Document	1 KB
nRF5x_MDK_8_16_0_IAR_NordicLicense	22-03-2018 12:02	Windows Installer ...	1,640 KB
nRF5x_MDK_8_16_0_Keil4_NordicLicense	22-03-2018 12:02	Windows Installer ...	2,180 KB

Compilation

1) Connect the RAK8211 to the J-link module

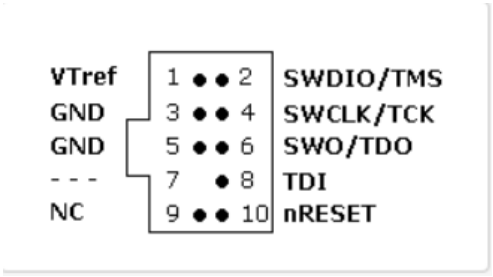


Fig: Pin-out for J-link segger mini programmer

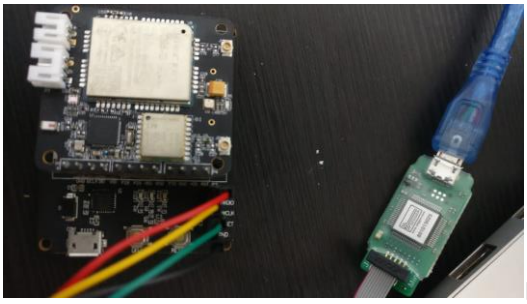


Fig: Connection with RAK8211

2) RUI has included the itracker board and the pin configuration. The files can be altered from *../RUI/Source/board*

3) ---Open Cygwin terminal , enter to *../RUI/build*

$ cd cygdrive/c/Users/Desktop/nRF5_SDK_15.0.0_a53641a/RUI/build/

--- Execute *make help*

```
$ make help
*******************************************************************************
*        *****   *   *   *                                                    *
*        *   *   *   *   *                                                    *
*        *****   *   *   *                                                    *
*        * *     *   *   *   Rakwirelss Unified Interface                     *
*        *  *    *   *   *           Expanding Customization !!               *
*        *   *   *****   *                              ---From 2018          *
*******************************************************************************
*  1. Overview                                                                *
*  RUI is an open platform based on nordic low power chip, including          *
*  source code and compiler with gcc, designed by Rakwirelss. Besides,        *
*  platform not only provides corresponding code suit for Rakwireless         *
*  hardware board, but also supports user-defined board, which is the         *
*  most attractive feature. A sensor drivers libraries is supplied and        *
*  user just chooses the sensor they need and change the hardware pin         *
*  parameter in header file. Now RUI just includes nRF52832, more chip        *
*  will be added gradually. RUI support gcc compile in windows,linux,         *
*  OS X, based SDK 15.0.0. So it is important to install toolchain and        *
*  more details in README.                                                    *
*                                                                             *
*  2. How to use                                                              *
*  Download SDK, put RUI in the root directory of sdk, then enter to          *
*   ../RUI/build/ and choose chip and sensor supplied below                   *
*                                                                             *
*  Computing      * Connectivity    * Sensor                                  *
*                 *                 *                                         *
*  1. nRF52832    * 1. bc95-g       * 1. bme280   2. L_70_R                   *
*  2. nRF52840    * 2. bg96         * 3. lis2mdl  4. lis3dh                   *
*                 * 3. m35          * 5. opt3001  6. sht31                    *
*                 * 4. sx1276(81x)  * 7. ublox-max7  8. shtc3                 *
*                 * 5. sx1276(4600) * 9. lps22hb                              *
*                                                                             *
*  3. Compile command                                                         *
*                                                                             *
*  -- make clean  -- clean all targets                                        *
*                                                                             *
*  -- make P="1 2 3 5"  -- mcu(1) commu(2) sensor(3 5 ...)                    *
*  eg Rak_8212 compile cmd make P="1 2 1 3 4 5"                               *
*  choose the corresponding sensor and remember to change pin number          *
*  in RUI/Source/config/XXXX_board/pin_define.h                               *
*                                                                             *
*  -- make help -- show RUI description                                       *
*                                                                             *
*  4. Custome                                                                 *
*  LoRaWAN and sleep mode for all products have been added in RUI.            *
*  More features will be added further, so users can change in the            *
*  Makefile_Custome according to need. More details in RUI\doc\               *
*******************************************************************************
```

Fig: RUI help view from

4) For RAK8211 , Computing : nrf52832 , Connectivity : bc95-g , Sensors: *user choice* Here I have chosen bme280, lis3dh . Execute
   make clean
   make P=" 1 1 1 3"
5) After compiling without errors, *application hex* file will be created in *SDK/RUI/build/_build/nrf52_xxaa.hex*
6) Open nRFgo Studio , choose nrf5X programming –
   Under Program Softdevice , add .. \..*RUI**build**hex*\ *s132_nrf52_6.0.0_softdevice.hex*
   Under Program Application, add application hex path as saved in the previous step-4
   Verify and program.
7) Open nRF Connect
   --Launch Programmer tab
   ---choose device (00 and under *Add hex files* , add the sdk hex and app hex files (same files as previous step (6)

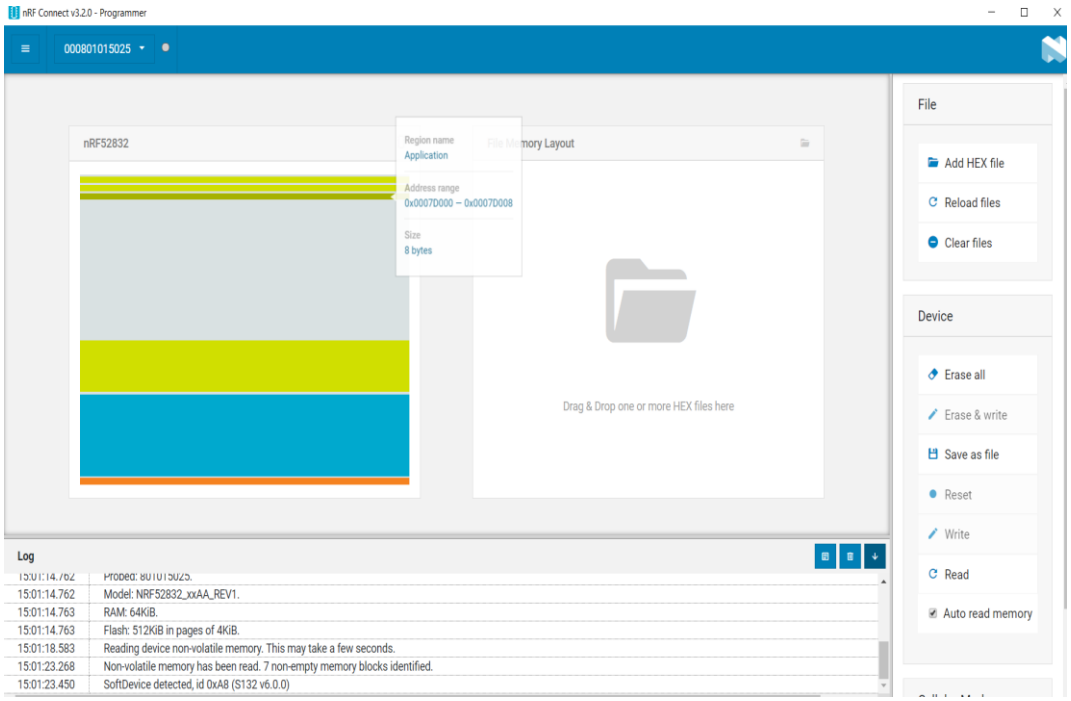
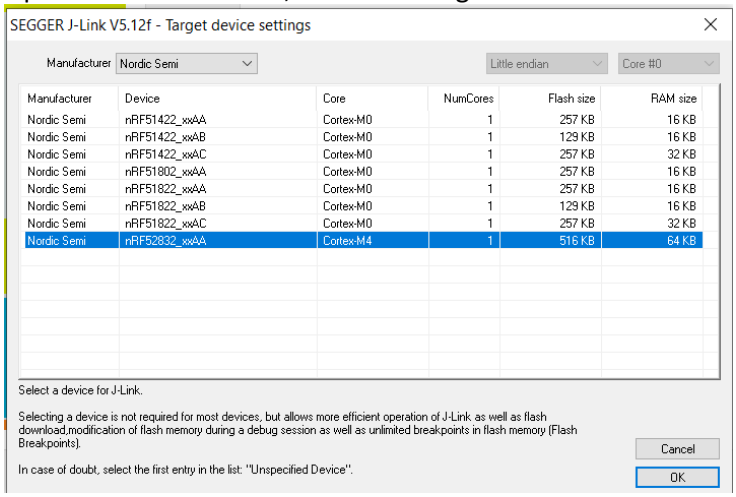
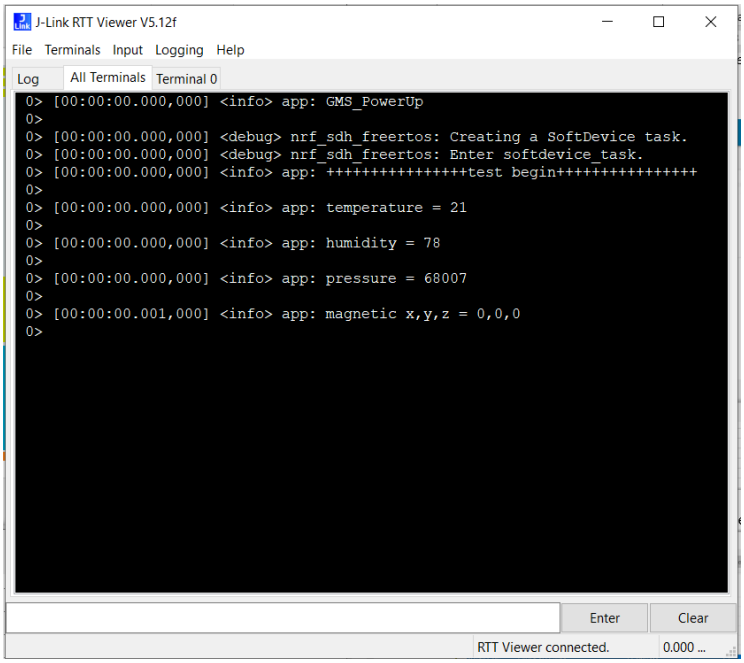


fig: nrf connect programmer

8) Open J-link RTT Viewer , select the target device




J-Link RTT Viewer V5.12f
File Terminals Input Logging Help
Log
All Terminals
Terminal 0
0> [00:00:00.000,000] <info> app: GMS_PowerUp
0>
0> [00:00:00.000,000] <debug> nrf_sdh_freertos: Creating a SoftDevice task.
0> [00:00:00.000,000] <debug> nrf_sdh_freertos: Enter softdevice_task.
0> [00:00:00.000,000] <info> app: ++++++++++++++++test begin++++++++++++++++
0>
0> [00:00:00.000,000] <info> app: temperature = 21
0>
0> [00:00:00.000,000] <info> app: humidity = 78
0>
0> [00:00:00.000,000] <info> app: pressure = 68007
0>
0> [00:00:00.001,000] <info> app: magnetic x,y,z = 0,0,0
0>
Enter
Clear
RTT Viewer connected.
0.000 ...