Upgrading RM1xx/RM1xx_PE Firmware

RM1xx/RM1xx_PE

Application Note   *v2.1*

INTRODUCTION

The goal of this document is to describe the method of upgrading the application firmware over an RS-232 connection on either an RM1xx or an RM1xx_PE module.

IMPORTANT DIFFERENCES BETWEEN THE RM1XX AND THE RM1XX_PE

It is very important that the correct procedure is followed for each of these module types – if the process is not carried out correctly, it's possible to render a module unusable, unless the module is re-flashed over the JTAG interface.

Note: Firmware upgrades between Central and Peripheral firmware must be performed via JTAG. UART upgrading is NOT supported. Please reference the Application Note for Upgrading via JTAG.

Although the LoRa section of the application code is identical in both module types, the Bluetooth code is different. The RM1xx is a BLE Central device and the RM1xx_PE is a BLE peripheral device. This different functionality is provided by the Nordic-supplied libraries and they are mutually exclusive in the library versions that we are using. The central code does not work with the peripheral libraries and vice versa.

Because it is not possible to upgrade the earlier Nordic libraries over an RS-232 connection, there is no method, other than a complete re-flash, to reassign the module from an RM1xx to an RM1xx_PE and vice versa.   Should the need arise to switch between the central and peripheral roles, please refer to the "Upgrading Firmware via JTAG and QPK-nRF5x (Required for Central to Peripheral)" document on the Laird RM1xx product page under the documentation tab, available at:

https://www.lairdtech.com/products/rm1xx-lora-modules

** To try to reduce the chance for errors, two versions of the upgrade utility (v5.10) have been created – the RM1xxUartFwUpgrade (as before) and the RM1xxPeUartFwUpgrade. These utilities are basically identical, with the exception that one has been configured for the central device and the other one for the peripheral. The Firmware Upgrade launch screen (Figure 3) shows the Platform drop-down is configured with the correct module type and cannot be changed.**

By using these two configured versions of the upgrade utility, it should be impossible to download the wrong version of application code. If attempted, the upgrade utility synchronizes with the module but delivers a FRM_PLATFORM_MISMATCH error message when running the utility.

Figure 1: Utility/module error message

If you use an earlier version of the upgrade utility, it may be possible to download the wrong application code onto a module. Because of this, it is important that you use only v5.10 of the utility. This version is available in the software packages.

The download procedure is identical for both module types so, in the example below, it only shows the process for upgrading of an RM1xx module. For the RM1xx_PE, simply open the peripheral version of the download utility and follow the instructions.

OVERVIEW

To upgrade the module, you must use Laird's development board or your own equivalent implementation to provide an RS-232 connection to the module's serial port.

Using Laird's development board, connect a micro USB connector to CON4 on the development board and follow the Upgrading the Firmware procedure.

To upgrade a loose module, the following connections are required.

Note: Both the RM1xxUartFwUpgrade and RM1xxPeUartFwUpgrade utilities use RTS/CTS flow control. If these signals are not connected, there is no guarantee of a successful upgrade.

Remote Signal	RM1xx Signal	Pin Number
Rx	Uart_Tx	2
Tx	Uart_Rx	3
CTS	Uart_RTS	4
RTS	Uart_CTS	5
3.3V	VCC_BLE	12
3.3V	VCC_LORA	13
Gnd	Gnd	1, 8, 11, 14, 21, 24

Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

2

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600

© Copyright 2017 Laird. All Rights Reserved

For further information on connections to the RM1xx or RM1xx_PE module, refer to the *RM1xx Hardware Integration Guide* available from the RM1xx product page on Laird website.

CHECKING FIRMWARE VERSION

To check the firmware version, connect the module to a serial port on your PC and run UwTerminalX. Once the module is running and the connection is opened, type **AT I 3** in the terminal to display the firmware version (Figure 2).
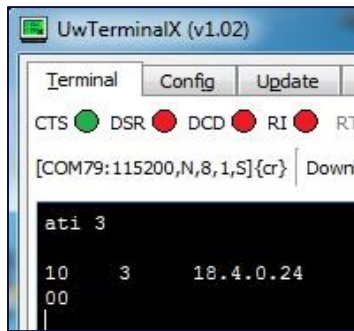

Figure 2: AT I 3 command returning the firmware version number

UPGRADING THE FIRMWARE

To upgrade the firmware, follow these steps:

1. Extract the following files (located in the Firmware directory of the firmware upgrade .zip file) to a directory on your PC:
   - RM1xxUartFwUpgrade.exe (The firmware upgrade utility)
   - XXXX.uwf   (The firmware image)

   The firmware upgrade process runs from this directory.

2. If using Laird's development kit, attach the module to your PC's serial port using the micro USB cable. If using your own board, attach as appropriate.

3. Start **RM1xxUartFwUpgrade.exe** to display the launch window. There may be several information screens shown at launch. Select the option that allows you to continue to the screen shown in Figure 3.
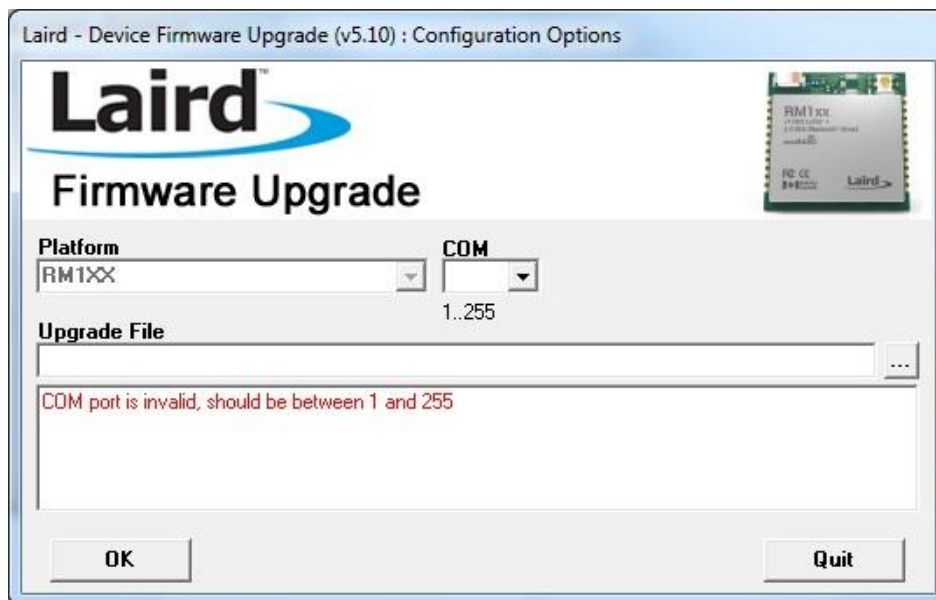
Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

3

© Copyright 2017 Laird. All Rights Reserved

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600

Figure 3: RM1xxUartFwUpgrade launch screen

4. Ensure that the selected platform is **RM1XX**. (RM1xx_PE for the peripheral module.)
5. If the **COM** field is empty, select the applicable COM port number from the drop-down menu.
6. If the Upgrade File field is empty, click **...** to select the applicable **xxx.uwf** file. This field is automatically populated if there is a single .uwf file in the same directory as the upgrade application.

   When the settings are correct, the message field below the Upgrade File box disappears as shown in Figure 4.
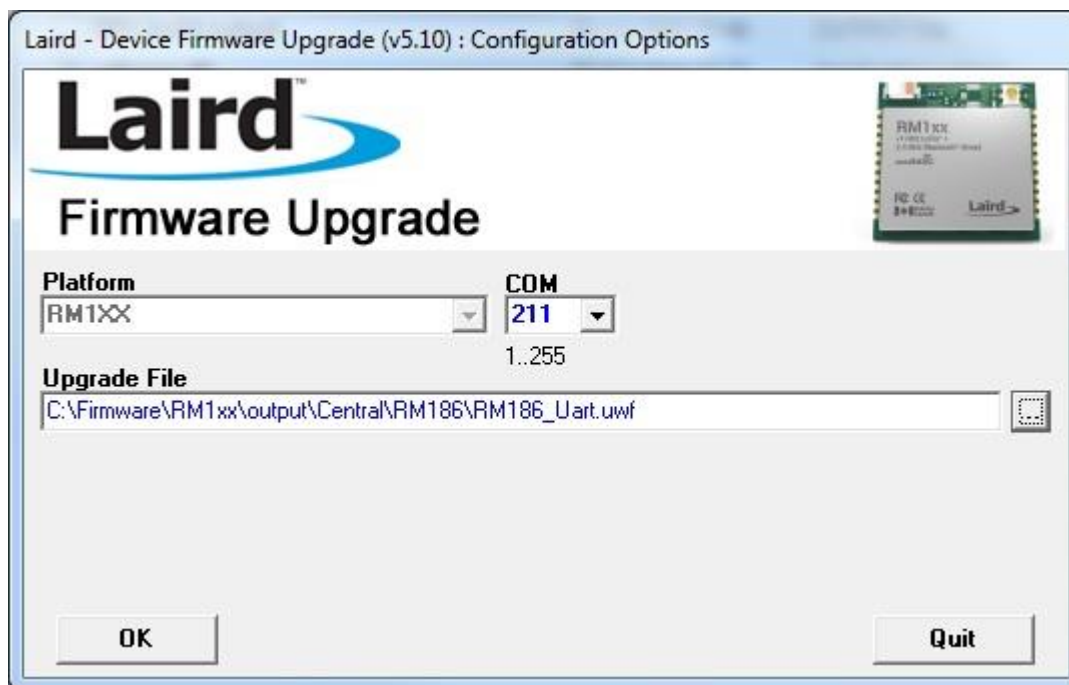
Figure 4: RM1xxUartFwUpgrade launch screen

7. Click **OK**.

Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

4

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600

© Copyright 2017 Laird. All Rights Reserved

The following screen confirms the firmware upgrade file (Figure 5).

Figure 5: Screen confirming firmware version

8. If the firmware version is correct, click **Proceed**.

    The download process begins with the screen showing the progress and describing the status (Figure 6).
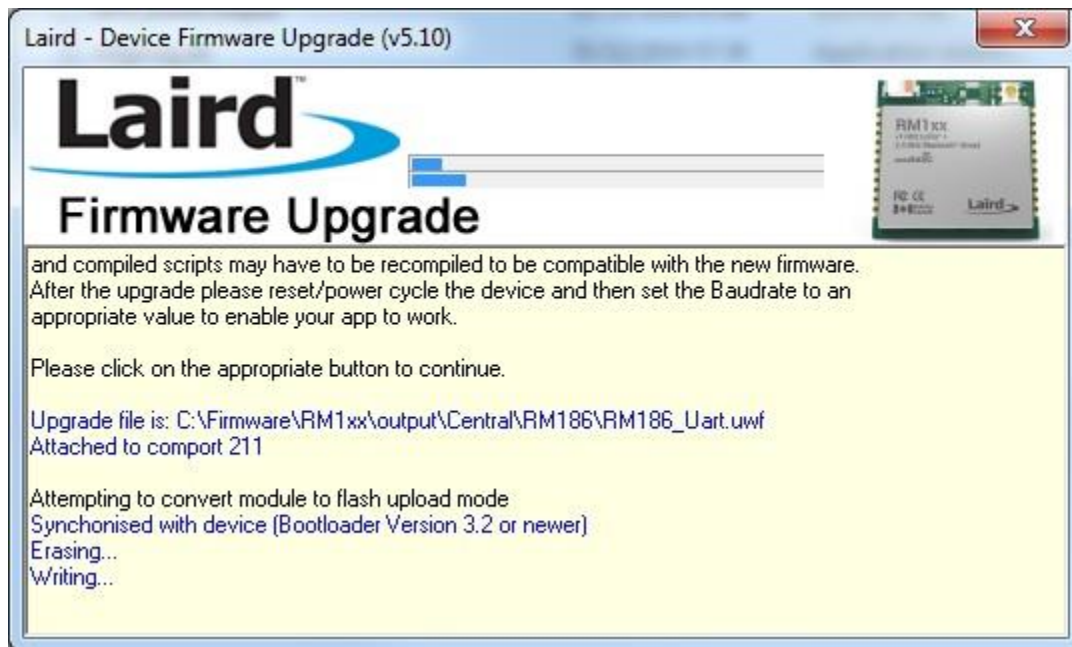

Figure 6: Firmware upgrade in progress

When the upgrade is complete, the screen indicates completion and requests that you power cycle the module (Figure 7).

Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

5

© Copyright 2017 Laird. All Rights Reserved

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600

Figure 7: Upgrade complete, requesting power cycle

9. Cycle power to the module.

10. Click **Quit**.

The module is now upgraded and is ready for operation. Confirm the upgrade by running UWTerminalX, connecting to the module, and checking the version using AT I 3 (Figure 8). The value that returns should be the same that contained in the filename. If not, please contact Laird support.
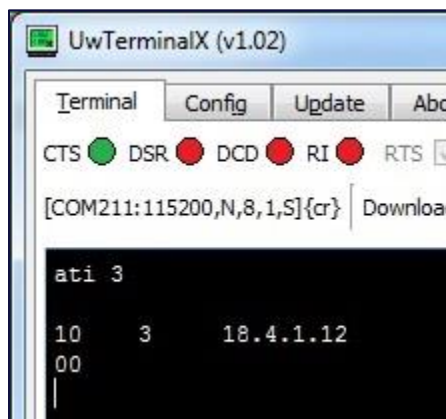

Figure 8: Confirming the new firmware with AT I 3 in UWTerminalX

FURTHER INFORMATION

Further information relating to firmware and the use of UWTerminalX is available from the Laird Support Site: https://laird-ews-support.desk.com/?b_id=5609

Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

6

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600

REVISION HISTORY

Version	Date	Notes	Approver
1.0	18 May 2016	Initial Release	Jonathan Kaye
2.0	04 Jan 2017	Added RM1xx_PE information	Jonathan Kaye
2.1	17 October 2017	Added note about JTAG required to upgrade between central/peripheral firmware	Raj Khatri

Embedded Wireless Solutions Support Center:
http://ews-support.lairdtech.com

www.lairdtech.com/ramp

7

© Copyright 2017 Laird. All Rights Reserved

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0600