Connecting RG1xx to Loriot Network Server
Sentrius RG1xx Gateway

Application Note v1.0

INTRODUCTION
The purpose of this application note is to demonstrate how to connect the Sentrius RG1xx gateway to the Loriot network server and add devices to transmit data from RM1xx to Loriot.

REQUIREMENTS

- Sentrius RG1xx Gateway
- DVK-RM1xx
  - FW v1xx.6.1.0 was used in this app note
- UWTerminalX v1.08p or later (https://github.com/LairdCP/UwTerminalX/releases)
- smartBASIC application that allows Joining the LoRa network and transmitting data
  - lora.app.us.sb
  - lora.app.eu.sb
  - cmd.loramac.rm1xx.sb
  - https://github.com/LairdCP/RM1xx-Applications

Note: This document does not cover initial setup of the Sentrius RG1xx Gateway. Please see Quick Start Guide – Sentrius RG1xx for setup information. This guide is available from the Documentation section of the RG1xx Gateway product page on the Laird website.

This document does not cover the initial setup of the DVK-RM1xx, please see Interfacing with LoRaWAN – RM186 or Interfacing with LoRaWAN – RM191 for setup information. These application notes are available from the Documentation section of the RM1xx product page on the Laird website.
SETTING UP A LORIOT ACCOUNT

To begin, you must create an account at https://www.loriot.co. To do so, complete the following steps:

2. Select Log In from the main page.

3. Select the server for your geographic location (Figure 2).

![Figure 1: Log in at loriot.io](image1)

![Figure 2: Choose Loriot server](image2)
4. Click **Register** on the Login screen to register a new account (**Figure 3**).

![Registration button](image)

*Figure 3: Registration button*

5. Fill in the relevant fields and select **Create a Free Account**.

6. An activation email will be sent to the email address you used during signup. Follow the instructions to activate your account.

7. Once your account is activated you can navigate back to [https://us1.loriot.io/home/login.html](https://us1.loriot.io/home/login.html) and log in to view the main Loriot dashboard.

![Main Loriot dashboard](image)

*Figure 4: Main Loriot dashboard*
CONFIGURING THE SENTRIUS RG1XX FOR LORIOT NETWORK SERVER

1. Login to your Sentrius RG1xx Gateway.
2. Select LoRa from the selections along the top of the page.

![LoRa tab in RG1xx configuration](image)

3. In the select preset drop-down menu select LORIOT.io – US.
4. Click Apply.

![Choose "LORIOT.io - US" in preset selector](image)

The Sentrius RG1xx is now ready to communicate as a Packet Forwarder to the Loriot Network Server.
CONNECTING THE SENTRIUS RG1XX GATEWAY TO LORIOT

Note: Each free account with Loriot allows you to register a single gateway.

To connect the gateway via the Loriot gateway management panel, complete the following steps.

1. Select **registering your gateway** from the main dashboard screen.

![Figure 7: “Registering your gateway” link](image)

2. Select the Laird RG1 from the selection of Gateways on the next page.

![Figure 8: Laird RG1 in the gateways panel](image)

3. The MAC address for the Ethernet port is located on the bottom of the Sentrius RG1xx. Note this value as it is required to register the gateway.

4. Enter the Ethernet Address in the **eth0 MAC address** field on the Gateway Registration page.
5. Fill in the Country, Address, Zip Code, and City information for your Gateway.
6. Click **Register Laird RG1 Gateway** at the bottom of the page.
7. Once registered, click the link to visit the Gateway Detail page. It appears at the bottom of the page once the Gateway is registered, as shown in **Figure 9**.

![Figure 9: Link to the gateway detail page](image)

There is no need to install any binaries or other software on the Sentrius RG1xx; it automatically connects to Loriot after a few minutes. You should eventually see the **Connected** message on the Gateway page as shown in **Figure 10**. You may need to refresh the page or click **Ping Gateway** to refresh and show the connected status.

![Figure 10: Connected status](image)
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**Application Note**

**ADDING DEVICES TO THE EXISTING SAMPLE APPLICATION IN LORIOT**

**Note:** Each Loriot Community Tier Network account is allowed one application. On start, it is already set up for you and is called SampleApp.

To add devices to the sample application, complete the following steps:

1. Return to the Dashboard screen in Loriot and click **Applications** along the left-hand menu.

   ![Figure 11: Applications menu in Loriot dashboard](image1)

   On the Applications page, you’ll see that there are 0 of 10 maximum devices registered for this application.

2. Click **SampleApp** to start adding devices.

   ![Figure 12: SampleApp in Loriot](image2)
3. Click **Manage devices** on the Application/SampleApp screen.

![Figure 13: Choosing Manage Devices to add devices to application](image)

4. On the Devices screen, you may either generate a new device or enroll a new device. If you want Loriot to generate a DEV_EUI for you, click **Generate new device**. If you have a DEV_EUI you would like to specifically add, click **Enroll new device**.

5. Once added, it displays in the *Devices in this application* section of the page.

![Figure 14: Devices in this application list](image)

For OTAA activation for any device, you need the Application EUI, the Device EUI, and the AppKey. The first two are shown on the Devices page (*Figure 14)*.

6. To get the AppKey, click the Device EUI to access the Device Details screen.
7. Scroll down the Device Details screen until you get to the *Device <EUI>* box, which lists the DevEUI, AppEUI, and DevAddr.
8. Copy the DevEUI (big endian) and AppEUI (big endian); you need these to configure the DVK-RM1xx.
9. Directly below is the LoRaWAN AES128 Keys section. Click Show application key and copy the AppKey as you need it to configure the DVK-RM1xx.

![Figure 15: Device Details screen](image)

### SETTING UP THE DVK-RM1XX TO JOIN AND SEND DATA TO LORIOT

To set up the DVK-RM1xx to join and send data to Loriot, follow these steps:

1. Clear the file system and memory of the DVK-RM1xx by issuing the following command:
   ```
   AT&F*
   ```

2. Enter the AppEUI, DevEUI, and AppKey from the previous section into the DVK-RM1xx as follows (Table 1).

<table>
<thead>
<tr>
<th>Command</th>
<th>In place of ######, enter:</th>
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<tbody>
<tr>
<td><code>at+cfgex 1010 &quot;######&quot;</code></td>
<td>Your DevEUI</td>
</tr>
<tr>
<td><code>at+cfgex 1011 &quot;######&quot;</code></td>
<td>Your AppEUI</td>
</tr>
<tr>
<td><code>at+cfgex 1012 &quot;######&quot;</code></td>
<td>Your AppKey</td>
</tr>
</tbody>
</table>

**Note:** Don't forget to issue a soft reset using ATZ after entering the keys so that they take effect.

![Figure 16: Configuring the DVK-RM1xx with keys](image)
3. If you have not already, connect the RG1xx and connect with UwTerminalX.

4. Configure the gateway for sub-band 1 (to work with Loriot) using the AT+CFG 1001 and AT+CFG 1002 commands (if using FW v1xx.5.0.7 or later) or with the command AT+CFGEX 1009 (for FW prior to v1xx.5.0.7).

**Note:** Don’t forget to issue a soft reset using ATZ after entering the keys so that they take effect.

```
00
atz
00
at+cfg 1001 1
00
at+cfg 1002 1
00
atz
00
```

*Figure 17: Configuring the RG1xx for sub-band 1*

5. Load your smartBASIC application to the DVK-RM1xx (lora.app.us.sb, lora.app.eu.sb, cmd.loramac.rm1xx.sb, or any app that joins the LoRa network and transmits data).

6. Run the application.

   The application may join automatically on startup. If not, you may need to join manually (such as with cmd.loramac.rm1xx.sb). You should first see a *Successfully Joined Network* message of some sort before the device begins transmitting data, as shown in *Figure 18* and *Figure 19*.

*Figure 18: lora.app.us.sb example of Joining LoRa Network*
7. If the application you loaded does not send packets automatically to the server (such as lora.app.us.sb and lora.app.eu.sb), send some packets now that you have joined. In the case of cmd.loramac.rm1xx.sb, you may use the command `lora send <data$> <nPort> <nConf>` as shown in (Figure 20).

![Figure 19: cmd.lormac.rm1xx.sb example of Joining LoRa Network](image)

Figure 19: cmd.lormac.rm1xx.sb example of Joining LoRa Network

![Figure 20: Sending data with cmd.loramac.rm1xx.sb](image)

Figure 20: Sending data with cmd.loramac.rm1xx.sb
VIEWING DATA PACKETS ON LORIOT NETWORK SERVER

To view the data your devices have sent to the Loriot application, complete the following:

1. From the Loriot Dashboards menu, click Applications.
2. On the Applications page, click Sample App. This is the only application available, the one configured in the section Adding Devices to the Existing Sample Application in Loriot.

![Figure 21: Manage Devices in the Loriot Sample App](image)

4. Select the Device EUI that you used to set up your DVK-RM1xx board.

![Figure 22: Selecting the device associated with the DVK-RM1xx](image)

5. You are now on the Device details page where you can view the last ten packets received by the Loriot Network Server from this device.

**Note:** The packets are not real time; you must reload the page to see the updated packets.
Connecting RG1xx to Loriot Network Server

Application Note

REVISION HISTORY

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Notes</th>
<th>Approver</th>
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<tr>
<td>1.0</td>
<td>19 Dec 2017</td>
<td>Initial Release</td>
<td>Jonathan Kaye</td>
</tr>
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