

### RC16xxxx-SIG-DK Demonstration Kit Quick Start

#### Introduction

The SIGFOX Ready™ Demonstration Kit from Radiocrafts is designed to make it easy for the user to evaluate the module, develop an application and build prototypes. Bundled with the Demonstration Kit is the RCTools-SIG PC software, to be used together with the Demo Boards.

Each demonstration board represents a node within the cellular based SIGFOX network. In order to enable packet reception, it has to be used in areas where SIGFOX service is available. In case there is no reliable coverage, the SIGFOX Network Emulator Kit can be used to ease the product development. More details about the SIGFOX network can be found in the RC16xxxx-SIG User Manual.

#### How to get started

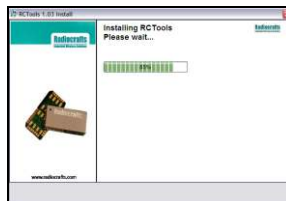
Please follow this guideline to ensure that the USB driver is properly installed on your computer **before** you connect the Demo Board to the PC.

**Step 1. Download the latest version of RCTools-SIG from [www.radiocrafts.com](http://www.radiocrafts.com)**



**Step 2. Install the RCTools as described in the RCTools Installation Guide.**

- The USB Driver is automatically installed together with RCTools.



**Step 3. Connect the Demo Boards to the PC after installing the RCTools-SIG PC software.**

- Connect the antenna or connect to your test equipment.



**Step 4. You are now ready to use the Demo Board.**

- Radiocrafts offer a powerful RCTools-SIG PC suite, but any terminal program using COM ports can also be used. Visit [www.radiocrafts.com](http://www.radiocrafts.com) to download relevant documents.

### How to register the device in the SIGFOX back-end system

Each Demonstration Kit is delivered with Platinum level SIGFOX subscription, which allows up to 140 uplink messages, and up to 4 downlink messages per day, for 1 year after the activation date. Roaming is also included so that the Radiocrafts Demonstration Kits can be used in every country within the same SIGFOX Zone.

To be able to register the Demonstration Kit in the back-end system of SIGFOX, the ID and PAC number have to be available. Each Demonstration Kit has the ID and PAC stored in configuration memory; and this information is also available on the label on each Demonstration Board.

Procedure to register and use the SIGFOX Platinum subscription:

#### Step 1. Read ID and PAC numbers.

- Read it from the label of the Demonstration Board:
  - The format is the following:
    - ID: [ID1\_LSB, ID2, ID3, ID4\_MSB]
    - PAC: [PAC8\_MSB, PAC7, ..., PAC1\_LSB]

Example	
ID:	01020304
PAC:	0F0E0D0C0B0A0908

- Or read the configuration memory:
  - Go to configuration mode.
  - Use command '9' to read the ID and PAC codes:
    - Enter configuration mode. Verify the prompt sent by the module.
    - Send 0x39 (ASCII '9' character).
    - The reply of 13 bytes (4 bytes ID, 8 bytes PAC, 1 byte Prompt) will have the following format:  
[ID1\_LSB, ID2, ID3, ID4\_MSB,  
PAC8\_MSB, PAC7, ..., PAC1\_LSB, '>']
    - The last '>' prompt confirms that the module is ready to receive the next command.

Example	
Request:	39
Reply:	01 02 03 04 0F 0E 0D 0C 0B 0A 09 08 '>'

#### Step 2. Request an account in the SIGFOX backend system.

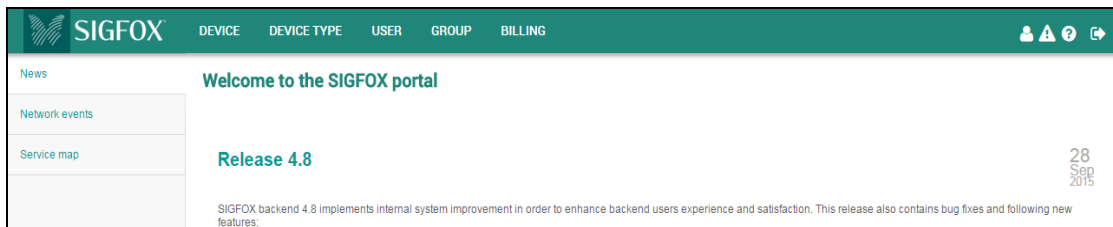
- Contact SIGFOX for activation of subscription via [subscribe@sigfox.com](mailto:subscribe@sigfox.com) with
  - Name of the company,
  - Contact person's name and email address to create the account onto SIGFOX back-end,
  - ID and PAC numbers of the Demonstration Kit to be activated with the format of:
    - ID: [ID4\_MSB, ID3, ID2, ID1\_LSB]
    - PAC: [PAC8\_MSB, PAC7, ..., PAC1\_LSB]
    - NOTE: The ID is sent with MSB first.

Example	
ID:	04030201
PAC:	0F0E0D0C0B0A0908

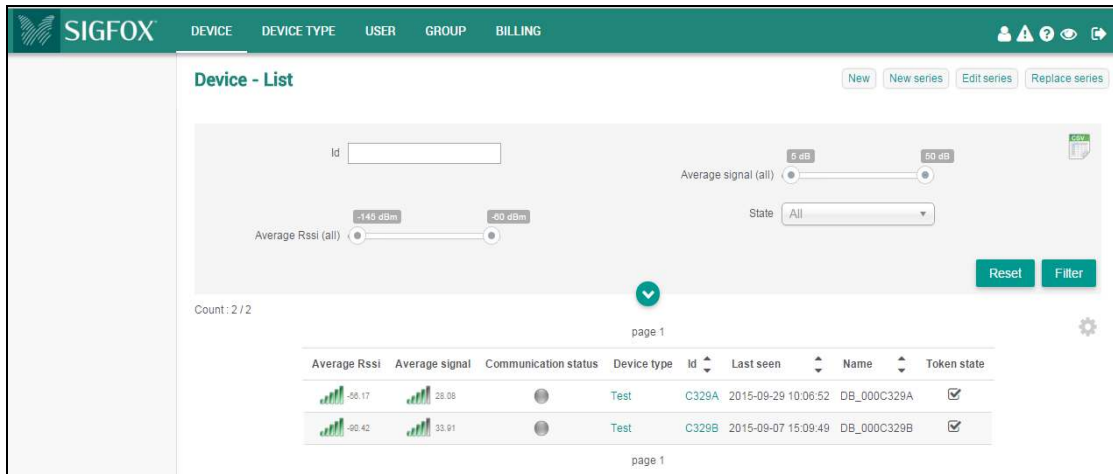
- The SIGFOX sales team will acknowledge receipt of the activation request and will explain what the next step is.
  - SIGFOX will set up your account within 48 hours following the subscription request.

### Step 3. Register the device in the backend system.

- Go to the SIGFOX back-end system: <http://backend.sigfox.com>.
- Sign in with your account.



### Step 4. Select DEVICE page in the menu bar.



**Step 5. Click on 'New' button in the top-right corner.**

- Select your group.

**Step 6. Edit the given fields.**

- Name, Identifier, PAC and Product Certificate fields are mandatory.
  - The Name can be selected by the customer to identify the device.
  - The Identifier is unique and delivered with the Demonstration Kit.
    - Format: [ID4\_MSB, ID3, ID2, ID1\_LSB]
    - *NOTE: The bytes are in opposite order than they are stored in the memory/displayed on the label.*

*Example*

*Identifier: 04030201*

- PAC is unique and delivered with the Demonstration Kit.
  - Format: [PAC8\_MSB, PAC7, ... , PAC1\_LSB]
  - *NOTE: The bytes are in the same order as they are stored in the memory/displayed on the label.*

*Example*

*PAC: 0F0E0D0C0B0A0908*

- The Product Certificate belongs to the revision of product:

Product Name	Rev.	Product Description	SIGFOX Zone	Product Certificate	Date of certification
RC1682-SIG	1.00	Radio module.	RCZ1	M_0013_B3F9_01	2015-08-24
RC1682-SIG-DK	1.00	Demonstration kit based on RC1682-SIG module.	RCZ1	P_002D_8803_01	2015-10-19
RC1692HP-SIG	1.00	Radio module.	RCZ2 RCZ4	M_0013_42AE_01	2016-05-26

RC1692HP-SIG-DK	1.00	Demonstration kit based on RC1692HP-SIG module.	RCZ2 RCZ4	P_002D_3915_01	2016-07-13
-----------------	------	---	--------------	----------------	------------

- Click OK. The device is now added to your account.

The screenshot shows the 'Device - New' configuration page in the SIGFOX web interface. The page has a green header with the SIGFOX logo and navigation tabs for DEVICE, DEVICE TYPE, USER, GROUP, and BILLING. The main content area is titled 'Device - New' and contains a 'Device information' section with the following fields:

- Identifier (hex): 04030201
- Name: Test\_Device
- PAC: 0F0E0D0C0B0A0908
- Product certificate: P\_xxxx\_xxxx\_x
- Type: Test (dropdown menu)
- Lat (-90° to +90°): 0.0
- Lng (-180° to +180°): 0.0
- Map: Locate on map (button)
- Prevent token renewal?:

At the bottom of the form are 'Ok' and 'Cancel' buttons.

### How to receive packets in the SIGFOX back-end system

#### Step 1. Go to the SIGFOX back-end web interface.

- Go to the SIGFOX back-end system: <http://backend.sigfox.com>.
- Sign in with your account.

#### Step 2. Select 'DEVICE' page. All the registered devices will be listed here.

Average Rssi	Average signal	Communication status	Device type	Id	Last seen	Name	Token state
-56.17	28.08	●	Test	C329A	2015-09-29 10:06:52	DB_000C329A	✓
-60.42	33.91	●	Test	C329B	2015-09-07 15:09:49	DB_000C329B	✓

#### Step 3. Select the device of interest

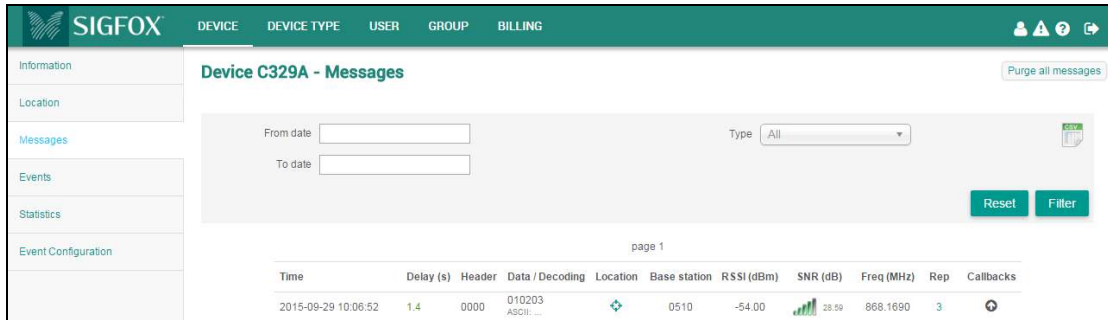
- Click on the 'ID' of the device of interest. A new menu will open.
- Disengage sequence number by pressing the button in the top-right corner.

**Device C329A - Information**

Name: DB\_000C329A  
Protocol: V1  
Sequence number: 9 (2015-09-29 10:06:52)  
Trash sequence number: N/A (N/A)  
Last seen: 2015-09-29 10:06:52  
Last purge: 2015-09-29 10:03:05  
PAC: 1DC3E06A84B0D646  
Product certificate:  
Latitude: 59.942 (degrees)  
Longitude: 10.770 (degrees)  
Device type: Test  
Average SNR: 28.08 dB  
Average RSSI: -56.17 dBm  
Communication status: ●  
Contract: Radiocrafts test contract

### Step 4. Open the messages window.

- Click on 'MESSAGES' option. A new window will open.
- Press the 'Purge all messages' button in the top-right corner if you want to clear the window.



### Step 5. Send a packet through UART to the Demonstration Board.

- Open a terminal window with the default 19200 bps, 8N1 settings.
- Send a packet to the module through UART. It must start with a length byte and can be followed by up to 12 bytes of payload.
- The following example shows a test packet where length={0x03} and payload={0x01 0x02 0x03} and sent as raw data.

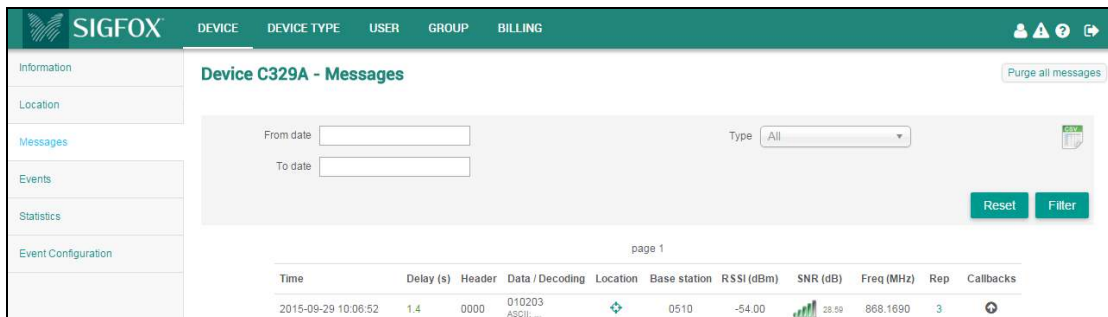
*Example*

```
>> 0x03 0x01 0x02 0x03
```

- Tip: Enable the LEDs on the demonstration kit to see if the test packet is sent in the correct format.
  - Send ['M', 0x3A, 0x01, 0xFF] to enable the LED control.
  - The LED marked as D2 will blink upon RF transmission.
  - The LED marked as D1 will be active when the module is in reception mode.
  - Send ['M', 0x3A, 0x00, 0xFF] to disable the LED control.

### Step 6. Receive a packet.

- The received packets will appear with a couple of second delay in the 'MESSAGES' window in the back-end system.



### How to configure two way communication

#### Step 1. Configure your module to use Uplink & Downlink mode.

- Step into configuration mode
  - Use F command to configure the mode in volatile memory
    - Send ['F', 0x01] to enable Uplink & Downlink mode.
    - Send ['F', 0x00] to enable Only uplink mode.
  - Use the M command to change the mode in non-volatile memory.
    - Send ['M', 0x3B, 0x01, 0xFF] to enable Uplink & Downlink mode.
    - Send ['M', 0x3B, 0x00, 0xFF] to enable Only uplink mode.

#### Step 2. Configure the downlink message content.

- Go to device type window

The screenshot shows the 'Device type - List' page in the Sigfox management interface. The page has a green header with the Sigfox logo and navigation tabs for DEVICE, DEVICE TYPE, USER, GROUP, and BILLING. On the left, there is a sidebar with options like 'List', 'Devices being transferred', 'Geolocation payload', and 'Bulk creations'. The main content area shows a search and filter section with input fields for Name, Group (with a 'Select a group' dropdown), and Display type (set to 'All'). Below this is a table with one row of data:

Description	Display type	Group	Keep alive	Name
This is a test unit.	Test	RADIOCRAFTS	N/A	Test

#### Step 3. Click on the Name of the selected device type.

- Last column in the example called 'Test'.

The screenshot shows the 'Device type 'Test' - Information' page. The page has a green header with the Sigfox logo and navigation tabs. On the left, there is a sidebar with options like 'Information', 'Location', 'Associated devices', 'Devices being transferred', 'Statistics', 'Event Configuration', 'Callbacks', and 'Bulk creations'. The main content area displays the following information:

**Device type 'Test' - Information**

Id: 551d46799336852c00be2959  
Name: Test  
Description: This is a test unit.  
Keep alive: N/A  
Long polling: false  
Group: RADIOCRAFTS  
Type: Test  
Contract: Radiocrafts test contract  
Alert Email:  
Downlink data hexa: deadbeedcafebab  
Creation date: 2015-04-02 15:39:05  
Created by: N/A  
Last edition date: N/A  
Last edited by: N/A



Step 4. Click on the Edit button in the top-right corner.

The screenshot shows the 'Device type Test - Edition' page in the SIGFOX web interface. The page has a green header with the SIGFOX logo and navigation tabs for DEVICE, DEVICE TYPE, USER, GROUP, and BILLING. On the left, there is a sidebar with menu items: Information, Location, Associated devices, Devices being transferred, Statistics, Event Configuration, Callbacks, and Bulk creations. The main content area is titled 'Device type Test - Edition' and contains several sections:

- Device type information:** Includes a 'Name' field with the value 'Test', a 'Description' field with the value 'This is a test unit.', a 'Keep-alive (in minutes)' field with the value '0', and an 'Alert email' field. A note below states: 'If we fail to call one of your callbacks, an email will be sent to the address below so that you can take action to fix the problem.'
- Downlink data:** Includes a 'Downlink mode' dropdown menu set to 'DIRECT', a note stating 'Expression must either include hexadecimal encoded bytes (ex: deadbeefcafefabbe) either the following variables: - (time) 4 bytes - (tpld) 4 bytes - (rssj) 2 bytes', and a 'Downlink data in hexa' field with the value 'deadbeedc:afefabbe'.
- Display type:** Includes a 'Type' dropdown menu set to 'Test'.

At the bottom of the form, there are 'Ok' and 'Cancel' buttons.

Step 5. Edit the Downlink data in hexadecimal entry as the payload of reply.

Step 6. Send any packet in Uplink & Downlink mode from the module.

- The network will automatically recognise the mode and will reply to the packet with the predefined reply.
- The payload of reply will be sent on UART after reception.

### Related Documents on [www.radiocrafts.com](http://www.radiocrafts.com)

On the Radiocrafts website you will find more documentation on the product:

- Module Data Sheet / User Manual (Module RF and embedded firmware description)
- RCxxxxDK-USB User Manual (Description of your Demonstration Board hardware)
- RCTools installation guide (Install/uninstall description)
- RCTools User Manuals (Description of the RCTools PC applications for your module)

Please visit the product page for the selected module to download all relevant documents.

### Contact Information

**Radiocrafts AS**  
Sandakerveien 64  
NO-0484 OSLO  
NORWAY

[www.radiocrafts.com](http://www.radiocrafts.com)  
[sales@radiocrafts.com](mailto:sales@radiocrafts.com)  
[support@radiocrafts.com](mailto:support@radiocrafts.com)

Tel: +47 40 00 51 95  
Fax: +47 22 71 29 15