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Quick Start Guide Sentrius RG1xx

Version 1.2

Quick Start Guide



REVISION HISTORY

Version	Date	Notes	Approver
1.0	20 July 2017	Initial Release	Jonathan Kaye
1.1	28 July 2017	Minor fixes	Dave Drogowski
1.2	3 Aug 2017	Clarified web interface URL in section 4 : Log into the Gateway. Identified separate mDNS address.	Shewan Yitayew

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1 OVERVIEW

This quick start guide describes how to configure the Sentrius gateway to forward LoRaWAN data to a cloud platform. The steps listed in this guide use the RG191 (US version) gateway and an RM191 (US version) module. The steps for using an RG186 and RM186 are similar.

Note: This guide uses the The Things Network (TTN) to show how to register your Gateway and visualize the incoming data on a Network server. If you are working with Stream IOT-X or LORIOT.io server, a similar guide will be available through their page to help you configure your gateway.

For more detailed information on how to use all the features of the Sentrius gateway, please see the Sentrius RG1xx User Manual, available from documentation tab at: www.lairdtech.com/products/rg1xx-lora-gateway.

2 ABOUT THE GATEWAY

2.1 Product Overview

The Sentrius[™] RG1xx LoRa-Enabled Gateway from Laird is the ultimate in secure, scalable, robust LoRa solutions for end-to-end control of your private LoRaWAN network. Leveraging Laird's field-proven and reliable 50 Series "Wireless Bridge" certified module, it also offers enterprise dual-band Wi-Fi, BT v4.0 (BLE and Classic) and wired Ethernet for complete design freedom. Based on the Semtech SX1301/SX1257 chipset designs, it offers a LoRa range up to 10 miles and pre-loaded LoRa Packet Forwarder software, perfect for highly scalable, flexible IoT networks. The Sentrius RG1xx Gateway works with Laird's **Sentrius RM1xx Series** LoRa+BLE certified modules for simple out-of-the-box integration and is compatible with 3rd party Cloud and LoRa partners, as well as any LoRaWAN certified client devices.





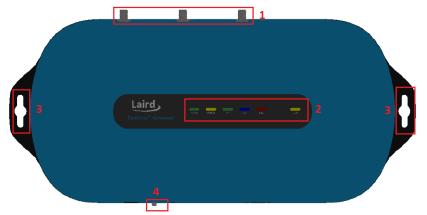


Figure 1: Top of the Sentrius™ RG1xx gateway

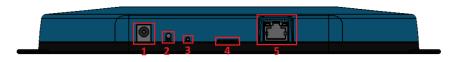


Figure 2: Back panel of the Sentrius™ RG1xx gateway

3 CONNECT THE HARDWARE

3.1 Connect the Gateway

To use the gateway, you must power up the gateway and access the web interface via the Ethernet port. To do this, complete the following steps:

- 1. Follow the label on the box and connect the three antennas. Refer to *Antenna Configuration* for additional information.
- 2. Connect the power supply (see #2 in Figure 3).
- 3. Connect the gateway to your router (#3 in Figure 3) using the Ethernet cable (#1 in Figure 3).

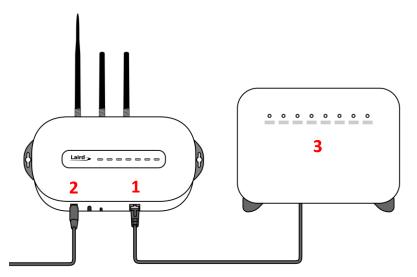


Figure 3: Connecting the gateway

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

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- 1. LoRa and Wi-Fi antennas
- 2. LEDs
- 3. Fixing holes
- 4. User button
- 1. DC power input
- 2. User button
- 3. Reset button
- 4. SD card slot
- 5. Ethernet connector

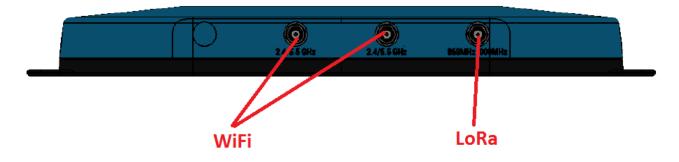
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3.1.1 Antenna Configuration

To configure the antenna properly, complete the following steps:

- 1. Attach the two shorter antennas to the 2.4/5.5 GHz (Wi-Fi) ports.
- 2. Attach the third and longer antenna to the 868 MHz/900 MHz (LoRa) port.



4 LOG INTO THE GATEWAY

To log into the gateway web interface, follow these steps:

1. Determine the last three bytes of your gateway's Ethernet MAC address. This can be found on the label on the bottom of the gateway; the last three bytes are highlighted (Figure 4).

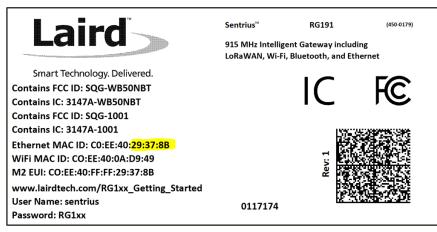


Figure 4: Bottom label – last three bytes of the Ethernet MAC address highlighted

- Enter the applicable URL into the web browser to access the web interface. For example, for the gateway
 used in this guide, the URL is https://rg1xx29378B. Replace the highlighted characters with the characters
 of the last three bytes of your Ethernet MAC ID. If your host understands mDNS such as a Mac, you may
 need to enter the URL as https://rg1xx29378B.local.
- 3. Accept the self-signed security certificate in the browser.
- 4. Click Advanced (Figure 5).



Privacy error ×		
← → C ▲ Not secure bttps://10.16.130.9		
	0	
	×	
	_	
	Your connection is not private	
	Attackers might be trying to steal your information	
	passwords, messages, or credit cards). NET::ERR_CE	ERT_AUTHORITY_INVALID
	ADVANCED	Back to safety

Figure 5: Web interface – first screen

5. Click **Proceed** (Figure 6).

Privacy error x	
← → C ▲ Not secure ₩₩₽\$//10.16.130.9	
	Your connection is not private
	Attackers might be trying to steal your information from 10.16.130.9 (for example, passwords, messages, or credit cards). NET-ERR_CERT_AUTHORITY_INVALID
	HIDE ADVANCED Back to safety
	This server could not prove that it is 10.16.130.9 ; its security certificate is not trusted by your computer's operating system. This may be caused by a misconfiguration or an attacker intercepting your connection. <u>Learn more</u> .
	Proceed to 10(6,130,9 (unsafe)

Figure 6: Web interface – second screen

6. Log on using the following default credentials (Figure 7):

Username: sentrius Password: RG1xx

Laird Dashboard LAN W	FFI LORa Settings
	Login
	Username
	Password
	Login

Figure 7: Gateway interface login screen



5 CONNECTING THE GATEWAY TO THE INTERNET

5.1 Setting Up Ethernet

By default, the Ethernet port is set up for DHCP addressing. Connect the Ethernet cable to a network with internet access. If more advanced Ethernet configuration is needed, please see the Sentrius RG1xx User Manual in the documentation tab of the RG1xx product page at lairdtech.com: www.lairdtech.com/products/rg1xx-lora-gateway.

5.2 Setting Up Wi-Fi

By default, the Wi-Fi in the gateway is not configured to connect to a Wi-Fi network. You must access the web interface on the gateway via the Ethernet interface to setup the Wi-Fi connection.

To set up the Wi-Fi, follow these steps:

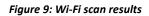
1. Once logged into the web interface, navigate to the Wi-Fi page (Figure 8).

Laird	Dashboard LAN Wi-F	I LoRa Settings	Logout
Scan		Access Point Scan	
Profiles Advanced		Scan	
Status	Connected		
SSID	BestWiFi		
Channel	6		
Bit Rate	54 Mbps		
Client IP	192.168.1.27		
RSSE-60 dBr Disable Wi-Fi			

Figure 8: Wi-Fi page

2. To connect to a Wi-Fi network, click **Scan** to scan for nearby Wi-Fi networks (Figure 9). Scanning continues until you click **Stop** or select one of the scan results in the list.

Laird Dashboard LAN W	FI LoRa Settings				Log
Scan	Access Point Scan				
Profiles Advanced	Stop	Stop ScanningO			
	SSID	BSSID	Channel	RSSI	Security
Status Connected	CATS_CATS_CATSSS	CA:10:39:39:29:CA	6	-22	WPA_PSK
SSID BestWIFI	Ezurio WPA	90.72.40.17.26.28	11	-52	WPA2_PSK.WPA2_PSK_TKIP,WPA_PSK
Channel 6	ssid1	11:22:33:33:22:11	1	-54	WPA2_PSK
Bit Rate 54 Mbps	Ezurio WPA	90.72.40.17.26.29	36	-66	WPA2_PSK,WPA2_PSK_TKIP,WPA_PSK
Client IP 192.168.1.27	ssid2	19:29:39:39:29:19	6	-73	WPA2_AES
RSS: 40 den	ssid4	11:22:33:33:22:15	1	-82	WPA2_AES.CCKM_AES
Disable WI-FI					



- 3. Click on the applicable scan result.
- 4. Enter the information for the applicable Wi-Fi network (Figure 10).



Laird Dashboard LAN Wi-		
	WI-FI Profile: ssid1	
Scan	Ac	
Profiles	Profile Name	
Advanced	ssid1	
	SSID	
	SSI ssid1	lecurity
Status Connected	CAT	VPA_PSK
SSID BestWiFi	Ezu	VPA2_PSK,WPA2_PSK_TKIP,WPA_PSK
Channel 6	WPA2_PSK	
Bit Rate 54 Mbps	PSK	VPA2_PSK
	Ezu	VPA2_PSK.WPA2_PSK_TKIP.WPA_PSK
Client IP 192.168.1.27	ssid	VPA2 AES
RSSI: -50 dBm	PSK required, needs to be at least 8 characters.	VPA2_AES,CCKM_AES
	550	WA2_AES,CONM_AES
Disable Wi-Fi	Connect Cancel	
Disable WIFT	Connect	

Figure 10: Wi-Fi profile dialog

5. Click **Connect**.

6 LORA PACKET FORWARDING SET UP

To set up LoRa packet forwarding on the gateway, follow these steps:

- 1. Click the **LoRa** tab in the main menu (Figure 11).
- 2. In the dropdown labeled *Select Preset*, select the preset for **The Things Network (TTN)**.
- 3. Click **Apply**.

Laird	Dashboard LAN WI-Fi	LoRa Settings	Logout
Presets Forwarder Radios Advanced		select preset The Things Network - US Applying a Preset will modify radio and channel settingsi	
Gateway Connected Gateway ID	false C0EE40FFFF2935F2		HE THINGS e t w o r k
Region Code	US	https://w	ww.thethingsnetwork.org/
Mode	forwarder	route	eset Router Address: r.us.thethings.network ostream / Downstream Ports:
			1700 / 1700

Figure 11: LoRa page – TTN preset

Note: In addition to the TTN, Laird currently supports presets for Stream IOT-X and LORIOT.io Network servers.



Laird	Dashboard	LAN	Wi-Fi	LoRa	Settings
Presets Forwarder Radios			no pr The Strea	reset select reset select Things Net am IOT-X -	ted work - US US
Advanced			LOR	IOT.io - US	
Gateway Connected Gateway ID	false C0EE40FFFF2935F2				
Region Code	US				
Mode	forwarder				

Figure 12: Select the preset for The Things Network

Note: If operating with a network server that is not available as a preset, you may also manually configure the forwarder in the **Forwarder** page, available in the left menu. More information on this is available in the RG1xx User Guide, available in the documentation tab of the RG1xx product page at lairdtech.com: www.lairdtech.com/products/rg1xx-lora-gateway

The network server must be compatible with the reference Semtech packet forwarder and can be configured on the forwarder page.

If the LoRa network operated on a different channel plan it is also necessary to program this into the gateway on the radios page.

7 CONFIGURATION WITH THE THINGS NETWORK

7.1 Set up your account with The Things Network

To set up your account with The Things Network, follow these steps:

- 1. Go to https://www.thethingsnetwork.org/.
- 2. Create an account or log in to your existing account (Figure 13).



THETHINGS	HOME CONSOLE
	THE THINGS N E T W O R K
	Please log in to see this page
	EMAIL OR USERNAME
	PASSWORD
	Login
	Forgot your password? Create an account



- 3. Click Console.
- 4. Register your gateway:
 - a. From the console screen, click **Gateways** (Figure 14).

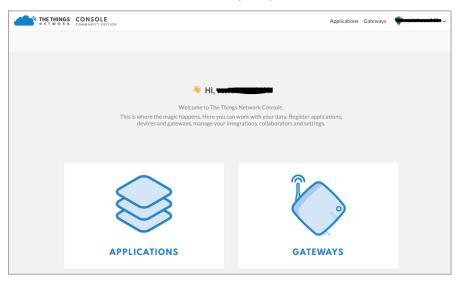


Figure 14: TTN console screen

b. Click register gateway (Figure 15).



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THE THINGS CONSOLE COMMUNITY EDITION	Applications Gateways	~
Gateways		
GATEWAYS		register gateway
You do not have any gateways		
Get started by registering one!		

Figure 15: Click register gateway.

c. Obtain the gateway ID from the Sentrius RG1xx web interface (Figure 16) or from the bottom label (Figure 17) on the Gateway.

Laird	Dashboard LAN	Wi-Fi	LoRa
Presets			sele
Forwarder			Т
Radios			
Advanced			
Gateway Connected	true		
Gateway ID	C0EE40FFFF2935F2		
Region Code	US		
Mode	forwarder		

Figure 16: Gateway ID

Laird		RG191 nt Gateway includ Bluetooth, and Etł	
Smart Technology. Delivered. Contains FCC ID: SQG-WB50NBT Contains IC: 3147A-WB50NBT Contains FCC ID: SQG-1001		IC	FC
Contains FCC ID: 52(3-1001 Contains IC: 3147A-1001 Ethernet MAC ID: C0:EE:40:29:37:88 WiFi MAC ID: C0:EE:40:0A:D9:49 M2 EUI: C0:EE:40:FF:FF:29:37:88		lev: 1	
www.lairdtech.com/RG1xx_Getting_Started User Name: sentrius Password: RG1xx	0117174		

Figure 17: Gateway ID on bottom label

d. Fill in the information to register the gateway as shown in Figure 18.





The gateway uses the legacy Semtech packet forwarder so be sure to check *I'm using the legacy packet forwarder*.

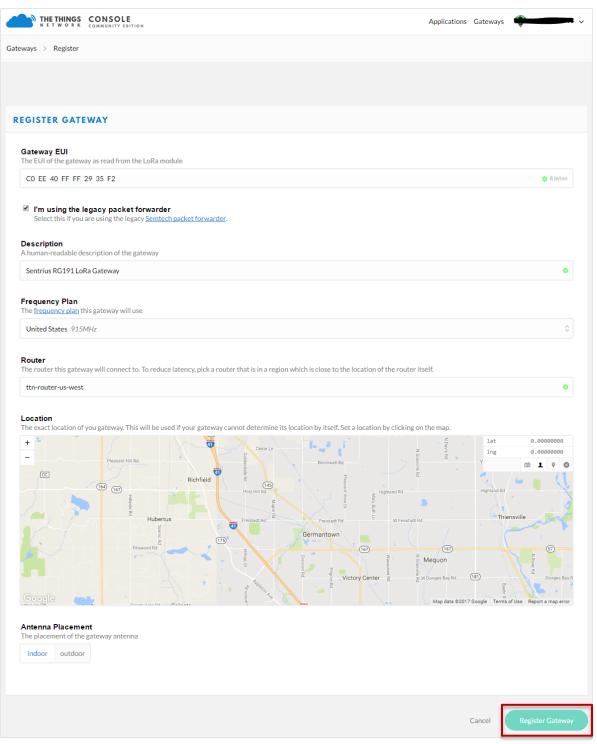


Figure 18: Gateway registration

e. Click Register Gateway.



Note: If using an RG186 gateway, be sure to select an EU router.

Once the gateway is registered, and if the gateway is communicating to The Things network, the status should display as *connected* (Figure 19).

	LE	Applications	Gateways	¥	
Gateways > 🏷 eui-c0ee40ffff29	35f2				
			Overview	Traffic	Settings
GATEWAY OVERVIEW					o settings
Description Owner Status Frequency Plan Router Gateway Key	14 seconds ago 251164			base64	۲.

Figure 19: Registered gateway

7.2 Create an Application with TTN

To create an application that can receive data from your LoRa-enabled gateway, complete the following steps:

- 1. At The Things Network's website, click **Applications** in the top right of the menu.
- 2. Click Add Application
- 3. Complete the field as shown in Figure 20. Note that application ID should be in lower case and used to uniquely identify your application on the network.
- 4. Once you've created your application, click Add application to save it.

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-					
	CONSOLE Ap	olications	Gateways		
lications > Add Ap	olication				
DD APPLICAT	ON				
Application ID The unique identifier	of your application on the network				
rg1xx_quickstart					à (
Quickstart applicat	scription of your new app on for the Sentrius RG1xx Gateway II be issued for The Things Network block for convenience, you can add your own in the application settings page.				
	EUI issued by The Things Network				
Handler registrat Select the handler yo	on J want to register this application to				
ttn-handler-us-we	t				
			Cancel	Add a	opplicat
	plication screen				-

Note: If using an RG186 gateway, be sure to select an EU Handler registration.

7.3 Register your RG1xx Gateway with TTN

To register your gateway as the device that will send data to TTN, follow these steps:

- 1. From the applications screen, select the application that you added in the previous section.
- 2. Click register device (Figure 21).

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THE THINGS CONSOLE NET WORK COMMUNITY TOITION			Applications	Gateways		
Applications > 🥪 rg1xx_quickstart						
	Overview	Devices	Payload Formats	Integrations	Data	Settings
APPLICATION OVERVIEW						
Application ID rg1xx_quickstart Description Quickstart application for the Sentrius RG1xx Gateway Created 3 hours ago Handler ttn-handler-us-west (current handler)					<u>dc</u>	ocumentation
APPLICATION EUIS ↔ ∓ 70 83 D5 7E F0 00 57 AE III					0	manage euis
DEVICES				register device	<u>e</u> mar	nage devices
و <u>با</u> ٥	registered devices					
COLLABORATORS				o	manage c	ollaborators
				collaborators del	ete device	es settings
ACCESS KEYS					0.	manage keys
default key devices messages	•				→ 🗘 bas	e64

Figure 21: Application screen

3. Choose and enter a Device ID and an eight-byte Device EUI (Figure 22).

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NETWORK COMMUNITY EDITION			Applications	Gateways		
olications > 🤤 rg1xx_quickstart > Devices						
	Overview	Devices	Payload Formats	Integrations	Data	Settings
EGISTER DEVICE					<u>bulk im</u>	port devices
Device ID This is the unique identifier for the device in this app. The device ID will be immutable. rm1xx_dev_board_01						0
Device EUI The device EUI is the unique identifier for this device on the network. You can change the E	UI later.				0	8 bytes
· · · · · · · · · · · · · · · · · · ·						
	rk.					
The App Key will be used to secure the communication between you device and the network	rk. II be generated					
The App Key will be used to secure the communication between you device and the network						
✔ this field will						0
The App Key will be used to secure the communication between you device and the networ						\$

Figure 22: Enter a Device EUI

- 4. Click Register.
- 5. Make note of the Device EUI, Application EUI, and the App Key. These keys are needed later to set up the DVK- RM1xx (Figure 23).

THETHINGS CONSOLE	Applications	Gateways		
Applications > 🎯 rg1xx_quickstart > Devices > 📰 rm1xx_dev_board_01				
		Overview	Data	Settings
DEVICE OVERVIEW				
Application ID rg1xx_quickstart Device ID rm1xx_dev_board_01 Activation Method OTAA				
Device EUI ↔ ≒ 12 34 56 78 90 AB CD EF II Application EUI ↔ ≒ 70 83 D5 7E F0 00 57 AE III				
App Key () = () = () = () = () = () = () = ()				
Status • neverseen Frames up 0 reset frame counters Frames down 0				

Figure 23: Device EUI, application EUI, and app keys



8 SENDING DATA TO THE CLOUD - SETUP

To set up the DVK-RM1xx to send data to the cloud, follow these steps:

1. Connect the DVK-RM1xx to a PC via the USB connector on the board (Figure 24).

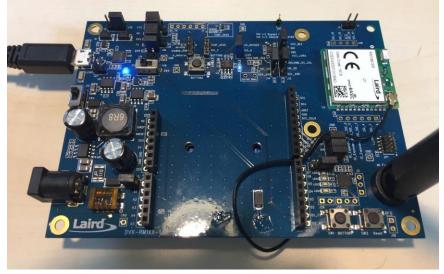


Figure 24: Connect the DVK-RM1xx to the PC

- 2. Download UwTerminalX (version 1.06) from the following site: https://github.com/LairdCP/UwTerminalX/releases/tag/v1.06
- 3. Download *RM1xx-defs.h* and *lora.app.us.sb* (or *lora.app.eu.sb*) from https://github.com/LairdCP/RM1xx-Applications. Place them in the same directory on your PC.
- 4. Use UwTerminalX to configure the RM1xx by doing the following:
 - a. Open UwTerminalX.
 - b. Click Accept (Figure 25).

UwTerminalX (v1.06)	↔	—		×
Terminal Config Update About Logs Editor				
Accept Decline Help Licenses				
This application is provided by Laird without warranty. You are welcome to check our website This version is UTF-8 compliant. This message is displayed EITHER because "accept" is not specified in the command line OR a line option has been specified with an invalid parameter. You can launch this application and bypass this window by creating a shortcut link and passin command line option. Other command line options are:- ACCEPT Bypass About screen on startup COM=n Windows: COM[1255] specifies a comport number GNU/Linux: /dev/tty[device] specifies a TTY device Mac: /dev/[device] specifies a TTY device BAUD=n [1200921600] Could be limited to 115200 depending on PC hardware (limited to 230400 of STOP=n	at least one co	ommand a	*	○ N/A ● Busy ● Clear
UwTerminalX version 1.06 (Win), Built Sep 5 2016 Using QT 5.7.0			·	

Figure 25: UwTerminalX

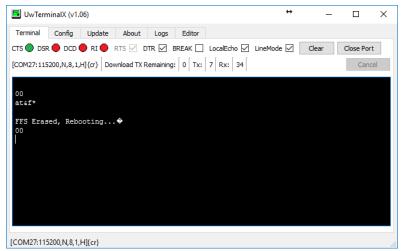


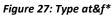
- c. On the Config tab, select **RM186/RM191** from the Device drop-down menu.
- d. Select the virtual COM port that corresponds to your RM186/RM191 development board (Figure 26).
- e. Click **OK** (Figure 26).

📕 UwTerminalX (v1.06)		↔ – □ ×
Terminal Config Update	About Logs Editor	
OK Quit	Duplicate Error Codes	
Port Settings Device RM186/RM191 V + - Refresh Auto Port COM27 V Baudrate 115200 V Parity None V Stop Bits 1 V Data Bits 8 V Handshaking CTS/RTS V Save Device Configuration	Terminal CR CR CR CR LF CR LF CR LF Confirm module clearing Skip download display Skip download display Show Application filesize Escape CR/LF/Tab Shift +enter line seperator Enable SSL	Misc Run program Before After XCompile This allows you to run a program/batch/bash file before/after a smartBASIC file is XCompiled/ downloaded. %1 will be replaced with the sb/uwc file when the execution takes place. Run program even if XCompile fails Pre/Post-XCompile Execution Online XCompile Supported Devices By enabling Online XCompilation support, if a local XCompiler is not found the source code will be uploaded and compiled remotely on a Laird cloud server. Uploaded data is not stored by Laird.
Log file: UwTerminalX.log		Enable Logging Append to Log
USB Serial Port (FTDI) [A502GV8PA]		
UwTerminalX version 1.06 (Win), B	uilt Sep 5 2016 Using QT 5.7.0	

Figure 26: Select the applicable virtual COM port

- f. Press Enter on the keyboard. The module should respond with 00.
- g. Type *at&f** to completely reset the module and clear the program flash.





h. Load the *lora.app.us* (or *lora.app.eu.sb*) script by right-clicking in the window, clicking **Xcompile +** Load, and then selecting *lora.app.us* or *lora.app.eu.sb* (Figure 28 and Figure 29).

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📕 UwTerminalX (v1.06)	÷	- C	I X
Terminal Config Update About Lo	gs Editor		
cts 🔵 dsr 🔴 dcd 🔴 ri 🔴 rts 🗹 dtr 🛽	BREAK 🗌 LocalEcho 🗹 LineMode 🗹	Clear Close	Port
[COM27: 115200,N,8, 1,H] {cr} Download TX Remai	ning: 0 Ty: 7 Ry: 34		Cancel
	ing. 0 1X. 7 10. 51		Gancer
00			
atef*			
FFS Erased, Rebooting			
	XCompile		
	XCompile + Load		
	XCompile + Load + Run		
	Load		
	Load + Run		
	Lookup Selected Error-Code (Hex)		
	Lookup Selected Error-Code (Int)		
COM27:115200,N,8,1,H]{cr}	Enable Loopback (Rx->Tx)		
	Download •		100
	Font		
	Run	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	Automation	-	
	Batch	Sec. as	
	Clear module		
	Clear Display	· · · · · ·	
	Clear RX/TX count		
A	Сору		
Nu Alexandre Alexandre	Copy All	100	
	Paste		
	Select All		

Figure 28: Right-click and select XCompile+Load

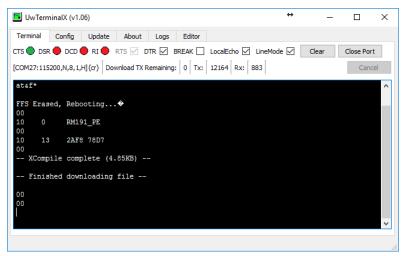


Figure 29: File downloaded

i. The command **at+dir** provides the content of the flash file system, which shows the loaded LoRa app (Figure 30).

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UwTerminalX (v1.06)	↔		-		×
Terminal Config Update About Logs Editor					
CTS 🌑 DSR 🛑 DCD 🛑 RI 🛑 RTS 🗹 DTR 🗹 BREAK 🗌 LocalEcho 🗹 LineMod	e 🗹	Clear		Close Port	t
[COM27:115200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12171 Rx: 896				Cano	el
10 0 RM191_PE 00 10 13 2AF8 78D7 00 XCompile complete (4.85KB) Finished downloading file 00 00 at+dir 06 lora 00 0					~

Figure 30: Loaded LoRa app

5. Right-click the Terminal window and select Automation. The automation window appears (Figure 31)

Automation	×
Send	
Load Save Un-Escape Strings 🗹 On Top (0/190) TOP Up Down BOTTOM Clear Close	
itatus]	

Figure 31: Automation window

a. Enter the security data to configure the module. The data from the TTN website, in our example, is as follows (yours will vary):

Application EUI: 70B3D57EF00057AE Device EUI: 1234567890ABCDEF App Key: CE9FB3010C14A5ED6558CD60D89BA21F

To enter this data using the automation window, enter the following in the first three fields of the automation window (replacing the hex strings with your App EUI, Device EUI, and App Key):

```
at+cfgex 1010 "70B3D57EF00057AE"
at+cfgex 1011 "1234567890ABCDEF"
at+cfgex 1012 "CE9FB3010C14A5ED6558CD60D89BA21F"
```

In the fourth line, you may set the proper channels for the RM191 by entering the following command:

at+cfgex 1009 "0002000000000000ff00

Note: This command does not apply to the RM186.

Americas: +1-800-492-2320 Europe: +44-1628-858-940 Hong Kong: +852 2923 0610



Enter the commands as shown in Figure 32.

🛄 UwTe	minalX (v1.06)	↔	_		×	-
Terminal	Config Update About Logs Editor				1	
CTS 🔵 D:	SR 🗣 DCD 🗣 RI 🗣 RTS 🗹 DTR 🗹 BREAK 🗌 LocalEcho 🗹 LineMod	e 🗹 🛛	Clear	Close Port		
	15200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12171 Rx: 896			Cance		
10 (00	RM191_PE				<u>^</u>	
	.3 2AF8 78D7					
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Fini	shed downloading file					
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🖪 Autor	nation					×
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Send	at+cfgex 1011 "1234567890ABCDEF"					
Send	at+cfgex 1012 "CE9FB3010C14A5ED6558CD60D89BA21F"					
Send	at+cfgex 1009 "0002000000000000ff00"					
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Load	Save Un-Escape Strings On Top (0/190) TOP Up	Dow		DM Clea	ar Close	:
C:/Users/	ryan.erickson/Desktop/UwTerminalX_v1.06_Windows/ttn_quickstart.txt: 5 li	nes sav	/ed.			:

Figure 32: TTN website data entered



b. Send the commands to the module by clicking **Send** next to each command.

■ UwTerminalX (v1.06) ↔			\times
Terminal Config Update About Logs Editor			
CTS 🔵 DSR 🛑 DCD 🛑 RI 🛑 RTS 🗹 DTR 🗹 BREAK 🗌 LocalEcho 🗹 LineMode 🗹	Clear	Close Port	
[COM27:115200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12328 Rx: 916		Cance	el
at+dir			^
06 lora 00 at+cfgex 1010 "70B3D57EF00057AE" 00 at+cfgex 1011 "1234567890ABCDEF" 00 at+cfgex 1012 "CE9FB3010C14A5ED6558CD60D89BA21F" 00 at+cfgex 1009 "00020000000000ff00" 00 atz 00			>
			.:

Figure 33: Commands sent

c. Run the LoRa app by typing *lora* into UwTerminalX and pressing **Enter**. The module should join the network (Figure 34).

Terminal Config Update About Logs Editor CTS DSR DCD RI TIS ZITR BREAK LocalEcho LineMode Clear Close Port [COM27:115200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12333 Rx: 1313 atz 00 lora Joining TxDone event received - JoinRequest transmitted to the gateway Successfully Joined network 	UwTerminalX (v1.06)	↔	_		×
[COM27:115200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12333 Rx: 1313 Cancel atz 00	Terminal Config Update About Logs Editor				
<pre>atz 00 lora Joining TxDone event received - JoinRequest transmitted to the gateway Successfully Joined network TxDone event received - "hello world" sent to gateway TxComplete event received - next packet can be loaded TxDone event received - "hello world" sent to gateway</pre>	CTS 🔵 DSR 🛑 DCD 🛑 RI 🛑 RTS 🗹 DTR 🗹 BREAK 🗌 LocalEcho 🗹 LineMode	\checkmark	Clear	Close Port	t
00 lora Joining TxDone event received - JoinRequest transmitted to the gateway Successfully Joined network TxDone event received - "hello world" sent to gateway TxComplete event received - next packet can be loaded TxDone event received - "hello world" sent to gateway	[COM27:115200,N,8,1,H]{cr} Download TX Remaining: 0 Tx: 12333 Rx: 1313			Cano	el
	00 lora Joining TxDone event received - JoinRequest transmitted to the gateway Successfully Joined network TxDone event received - "hello world" sent to gateway TxComplete event received - next packet can be loaded TxDone event received - "hello world" sent to gateway				~

Figure 34: Run the LoRa app



9 VIEW DVK-RM1XX DATA IN THE CLOUD

To view DVK-RM1xx data in the cloud, do the following:

1. Navigate to the device page on the TTN website; the device should display as connected (Figure 35).

	E Applications G	ateways
Applications > 🥪 rg1xx_quickstar	t > Devices > 📰 rm1xx_dev_board_01	
		Overview Data Settings
DEVICE OVERVIEW		
	rg1xx_quickstart	
	rm1xx_dev_board_01	
Activation Method	ΟΤΑΑ	
Device EUI	↔ ≒ 12 34 56 78 90 AB CD EF	
Application EUI	マン キャップ 70 B3 D5 7E F0 00 57 AE ()	
Арр Кеу		
Device Address	↔ ≒ 26 02 2B 1D (f)	
Network Session Key	· · · · · · · · · · · · · · · · · · ·	
App Session Key		
	7 seconds ago S reset frame counters	
Frames up Frames down		

Figure 35: TTN device page

Quick Start Guide



2. Click on the Data tab to view the data sent by the RM1xx (Figure 36).

N	ETWORK	COMMUNITY		Applications Gateways
lications	> 🤤 rg	g1xx_quicksta	> Devices > 📰 rm1xx_dev_board_01 > Data	
				Overview Data Setting
PPLIC	ATION	DATA		Ⅱ <u>pause</u> 🛱 <u>clear1</u>
Filters	uplink	downlink	activation ack error	
	time	counter	port	
▼ 13	:31:01		0	
^ 13	:31:01	8	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:30:35		0	
1 3	:30:35	7	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:30:09		0	
1 3	:30:09	6	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:29:43		0	
1 3	:29:42	5	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:29:17		0	
1 3	:29:16	4	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:28:51		0	
1 3	:28:50	3	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:28:24		0	
1 3	:28:24	2	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
• 13	:27:58		0	
1 3	:27:58	1	2 confirmed payload: 68 65 6C 6C 6F 20 77 6F 72 6C 64	
+ 13	:27:43		dev addr: 26 02 2B 1D app eui: 70 B3 D5 7E F0 00 57 AE dev eui: 1;	2 34 56 78 90 ABCDEE

Figure 36: RM1xx data