

AN01519

RCFG tool usage

V1.1

Document information

Info	Content
Keywords	<i>RisingHF, RCFG, Configuration Tool</i>
Abstract	This document describe usage of RisingHF rcfg tool

Content

Content..... 2

Figures 4

Tables..... 4

1 Introduction..... 1

 1.1 Enable Configuration Mode 1

 1.1.1 RHF1S001 1

 1.1.2 RHF1S002 2

2 Start to Use..... 3

 2.1 Windows 3

 2.2 Linux 5

 2.3 Option Details..... 5

 2.3.1 Factory Default Reset 5

 2.3.2 Read Configuration from Device 5

 2.3.3 Write Configuration to Device 6

 2.3.4 Check Configuration File..... 7

 2.3.5 Help 8

 2.4 Version..... 8

3 Configure File Options 9

 3.1 datarate_scheme..... 9

 3.2 dr..... 9

 3.3 mode 9

 3.4 period 9

 3.5 period_offset 9

 3.6 id 9

 3.6.1 devaddr..... 9

 3.6.2 deveui 9

 3.6.3 appeui..... 9

 3.7 key 10

 3.7.1 nwkskey..... 10

 3.7.2 appskey 10

 3.7.3 appkey 10

 3.8 rxwin2..... 10

3.9 adr.....	10
3.10 power	10
3.11 rept.....	10
3.12 retry.....	10
3.13 port.....	11
3.14 class.....	11
3.15 channels.....	11
3.15.1 freq	11
3.15.2 dr_min & dr_max.....	11
4 About json.....	12
4.1 comma	12
4.2 Details	12
Revision.....	13

Figures

Figure 1 USB connection for Configuration mode and Bootloader mode	1
Figure 2-1 Shift + Righ Click show "Open command window here"	3
Figure 2-2 Start command line	3
Figure 2-3 RCFG help	4
Figure 2-4 Factory default reset	5
Figure 4-1 json file comma explanation	12

Tables

Table 1-1 Supported device list	1
---------------------------------------	---

1 Introduction

RCFG is a command line tool, which could be used to configure RisingHF wireless products. The tool is named as rcfg.exe (Windows) or rcfg (Linux). With RCFG tool, user could configure the devices easily. What user needs to do is just edit json (JavaScript Object Notation) format configuration file, fill necessary items like channel definition, data rate and other available options and run “rcfg.exe -c lwui-config.json”, then rcfg will search connected RisingHF device automatically, and write these new configuration to the available connected device.

Part Number	Version
RHF1S001	2.0.0
RHF1S002	1.0.5

Table 1-1 Supported device list

1.1 Enable Configuration Mode

Before execute rcfg tool, device should be enabled to work in configuration mode and must be connected with PC.

1.1.1 RHF1S001

a) Hardware connection

There is a 4 pin DIP connector back up for USB connection. Refer to Figure 1 for detailed information for USB connection.



Figure 1 USB connection for Configuration mode and Bootloader mode

b) Step of access into Configuration mode

- **Disconnect USB**; (Very important step, must be sure RHF1S001 is disconnected)
- Power on;
- Press reset button;
- Wait at least 2 second;
- Keep device power on and connect RHF1S001 with PC through USB cable;
- At this time, PC will find a new COM port or serial device;
- RHF1S001 now is in configuration mode.

1.1.2 RHF1S002

Same as RHF1S001.

2 Start to Use

2.1 Windows

Get rcfg tools from RisingHF website or support@risinghf.com. Open windows file explorer, find rcfg.exe, use Windows "Open command window here" option to open command line terminal.

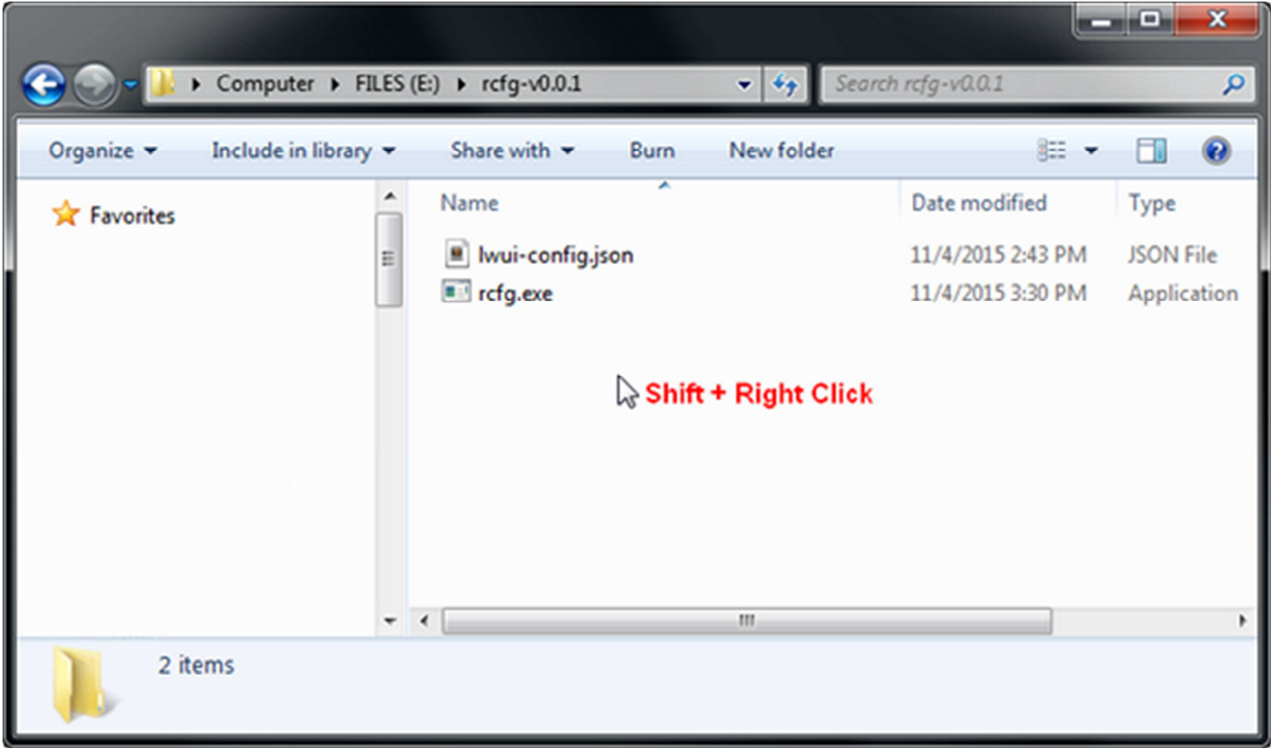


Figure 2-1 Shift + Right Click show "Open command window here"

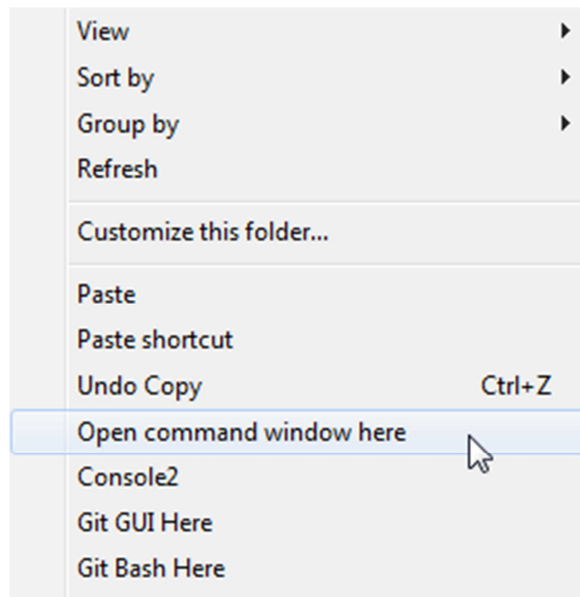


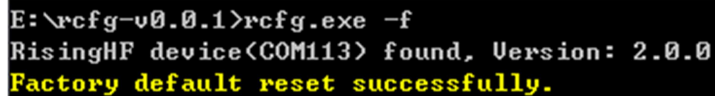
Figure 2-2 Start command line

2.2 Linux

2.3 Option Details

2.3.1 Factory Default Reset

```
E:\rcfg-v0.0.1>rcfg.exe -f
```



```
E:\rcfg-v0.0.1>rcfg.exe -f
RisingHF device(COM113) found, Version: 2.0.0
Factory default reset successfully.
```

Figure 2-4 Factory default reset

2.3.2 Read Configuration from Device

Run rcfg with “-r” option could get all related options from RisingHF device. This command is very useful when user need to check current configuration. Please note that all keys which are defined by LoRaWAN like NWKSKEY is unreadable, this feature enhances RisingHF devices security.

```
E:\rcfg-v0.0.1>rcfg.exe -r
RisingHF device(COM113) found, Version: 2.0.0
    Mode: OTAA
    Class: A
    DEVADDR: 01 99 C5 12
    DEVEUI: 86 00 00 00 00 00 00 02
    APPEUI: 86 73 65 6D 74 65 63 68
    Period: 20s
    Period Offset: ±1s
    ADR: ON
    Data Rate Scheme: EU868
    Default Data Rate: DR0
    ADR Data Rate: DR0
    REPT: 1
    POWER: 14dBm
    PORT: 8
    RXWIN2: 869525000, DR3
    CH0: 868100000, DR0, DR5
    CH1: 868300000, DR0, DR5
    CH2: 868500000, DR0, DR5
```

2.3.3 Write Configuration to Device

Check below information about what items should be included in configuration json file. Every item of json configuration file is optional; no one is mandatory; user should only keep the items which really need to change. rcfg has features to only update items which is defined in the configuration file.

lwui-config.json content:

```
{
  // ABP, OTAA, abp, otaa
  "mode": "ABP",

  // final_period = period ± period_offset
  // Transmit period, unit: s
  "period": 10,
  // Transmit period random offset, unit: s
  "period_offset": 2,

  // EU868, US915, RHF01
  "datarate_scheme": "EU868",

  "id":{
    "devaddr":"00 00 00 0F",
    "deveui":"0x86, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x02",
    "appeui":"0x86, 0x73, 0x65, 0x6D, 0x74, 0x65, 0x63, 0x68"
  },

  /* nwkskey, appskey, appkey */
  "key":{
    "nwkskey":"2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3c",
    "appskey":"2B7E151628AED2A6ABF7158809CF4F3C",
    "appkey":"0x86, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x86, 0x00, 0x00, 0x00, 0x00, 0x00,
0x00, 0x00"
  },

  "rxwin2":{
    "freq":869.525000,
    "dr": 3
  },

  // adaptive datarate option, true: enable, false: disable
  "adr":true,

  "dr": 0,           // start datarate DR0~DR15
  "power": 20,      // dBm
  "rept": 1,        // unconfirmed message repetition
  "retry": 3,       // confirmed message retry
  "port": 8,        // retry
  "class": "A",     // Class A, C. B is not supported.

  /* Oder of the sections decides */
  "channels":[
    {
      "freq": 868.1,
      "dr_min": 0,
      "dr_max": 5
    },
    {
      "freq": 868.3,
      "dr_min": 0,
      "dr_max": 5
    },
    {
      "freq": 868.5,
      "dr_min": 0,
      "dr_max": 5
    }
  ]
}
```

```
E:\rcfg-v0.0.1>rcfg.exe -c lwui-config.json
RisingHF configuration tool
Version 0.0.1
```

```
-----
RisingHF device (COM113) found, Version: 2.0.0
Set MODE successfully
Set DR and DATA RATE SCHEME successfully
Set ID (DEVADDR/DEVEUI/APPEUI) successfully
Set KEY (NWKSKEY/APPSKEY/APPKEY) successfully
Set RXWIN2 successfully
Set ADR successfully
Set POWER successfully
Set REPT successfully
Set PORT successfully
Set CLASS successfully
Set PERIOD successfully
Set CH successfully
```

2.3.4 Check Configuration File

“-l” option could be used to load configuration file and print all items in it.

```
E:\rcfg-v0.0.1>rcfg.exe -l lwui-config.json
lwui-config.json:
```

```

    MODE: ABP
    DATARATE SCHEME: EU868
    DEVADDR: 00 00 00 0F
    DEVEUI: 86 00 00 00 00 00 02
    APPEUI: 86 73 65 6D 74 65 63 68
    NWKSKEY: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
    APPSKEY: 2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C
    APPKEY: 86 00 00 00 00 00 00 00 86 00 00 00 00 00 00
    RXWIN2: 869525000, DR3
    ADR: ON
    DR: 0
    POWER: 20dBm
    REPITITION: 1
    RETRY: 3
    PORT: 8
    CLASS: A
    PERIOD: 10s
    PERIOD OFFSET: ±2s
    CH0: 868100000, DR0, DR5
    CH1: 868300000, DR0, DR5
    CH2: 868500000, DR0, DR5
```

2.3.5 Help

Use -h to quick check usage of rcfg

```
E:\rcfg-v0.0.1>rcfg.exe -h
```

```
Usage: rcfg.exe [OPTIONS]... [JSON FILE]
Configure RisingHF LoRaWAN devices
```

- h Help
- c Get configuration from json format file
and set to these new configuration to connected device
- l Load and print configuration, do not write to device
- f Set device to factory default
- r Read all configuration from the device
- v Version 0.0.1 [major.minor.patch]

2.4 Version

```
E:\rcfg-v0.0.1>rcfg.exe -v
0.0.1
```

3 Configure File Options

3.1 datarate_scheme

LoRaWAN standard data rate scheme, valid value "EU868", "US915".

```
"datarate_scheme": "EU868"
"datarate_scheme": "US915"
```

3.2 dr

Default data rate, device start first transmission with this data rate, valid value - 0~15, some value may be invalid according to the exact selected datarate_shceme.

```
"dr": 0
```

3.3 mode

Device work mode, valid value - "ABP", "OTAA".

```
"mode": "ABP"
"mode": "OTAA"
```

3.4 period

Transmit period, unit: s. Valid value >5 s.

```
"period": 10
```

3.5 period_offset

Transmit period offset, unit: s. Valid value <period/2 s.

```
"period_offset": 2,
```

3.6 id

```
"id":{
  "devaddr":"00 00 00 0F",
  "deveui":"0x86, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x02",
  "appeui":"0x86, 0x73, 0x65, 0x6D, 0x74, 0x65, 0x63, 0x68"
}
```

3.6.1 devaddr

DevAddr must contain 32bits long big endian hex code string.

3.6.2 deveui

DevEui must contain 96bits long big endian hex code string.

3.6.3 appeui

AppEui must contain 96bits long big endian hex code string.

3.7 key

```
"key":{
    "nwkskey":"2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3c",
    "appskey":"2B7E151628AED2A6ABF7158809CF4F3C",
    "appkey":"0x86, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x86, 0x00, 0x00,
0x00, 0x00, 0x00, 0x00, 0x00"
},
```

3.7.1 nwkskey

nwkskey is 16bytes long hex string.

3.7.2 appskey

appskey is 16bytes long hex string.

3.7.3 appkey

appkey is 16bytes long hex string.

3.8 rxwin2

Set RXWIN2 configuration, both frequency and data rate, these 2 items need set together to make sure rxwin2 item valid.

```
"rxwin2":{
    "freq":869.525000,
    "dr": 3
},
```

3.9 adr

LoRaWAN adaptive data rate option. Set true to enable ADR feature, false to disable.

```
"adr":true,
```

3.10 power

Output power control, maximum 20, unit dBm.

```
"power": 20, // dBm
```

3.11 rept

Unconfirmed message repetition, valid value 1~15;

```
"rept": 1
```

3.12 retry

Confirmed message repetition, valid value 1~15;

```
"retry": 1
```

3.13 port

Port number which is used to send LoRaWAN frame, valid value 1~255.

```
"port": 8
```

3.14 class

LoRaWAN classes definition, both class A or class C are supported,

```
"class": "A"
```

3.15 channels

channels object contains an array, each member of the array contains necessary information to configure a channel, the sequence of the member decides the channel number.

```
"channels": [
  {
    "freq": 868.1,
    "dr_min": 0,
    "dr_max": 5
  },
  {
    "freq": 868.3,
    "dr_min": 0,
    "dr_max": 5
  },
  {
    "freq": 868.5,
    "dr_min": 0,
    "dr_max": 5
  }
]
```

3.15.1 freq

Channel frequency, in MHz.

3.15.2 dr_min & dr_max

Channel maximum and minimum data rate, 0~15.

4 About json

4.1 comma

json specification does not allow a trailing comma. That means if there is no other json value after current one, then this json value should end with nothing, no comma should be appended at the end of the value.

```

{id":{
  "devaddr":"00 00 00 0F",
  "deveui":"0x86, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x02",
  "appeui":"0x86, 0x73, 0x65, 0x6D, 0x74, 0x65, 0x63, 0x68"
},
/* nwkskey, appskey, appkey */
"key":{
  "nwkskey":"2B 7E 15 16 28 AE D2 A6 AB F7 15 88 09 CF 4F 3C",

```

Figure 4-1 json file comma explanation

4.2 Details

Check json format official website <http://www.json.org/>

Revision

V1.1 2015-12-08

+ Update with hardware connection for configuration mode

V1.0 2015-11-04

+ Initial

Please Read Carefully:

Information in this document is provided solely in connection with RisingHF products. RisingHF reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All RisingHF products are sold pursuant to RisingHF's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the RisingHF products and services described herein, and RisingHF assumes no liability whatsoever relating to the choice, selection or use of the RisingHF products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by RisingHF for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN RISINGHF'S TERMS AND CONDITIONS OF SALE RisingHF DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF RisingHF PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

RISINGHF PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE RISINGHF PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF RISINGHF HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY RISINGHF AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO RISINGHF PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of RisingHF products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by RisingHF for the RisingHF product or service described herein and shall not create or extend in any manner whatsoever, any liability of RisingHF.

RisingHF and the RisingHF logo are trademarks or registered trademarks of RisingHF in various countries.

Information in this document supersedes and replaces all information previously supplied.

The RisingHF logo is a registered trademark of RisingHF. All other names are the property of their respective owners.

© 2015 RISINGHF - All rights reserved

<http://www.risinghf.com>