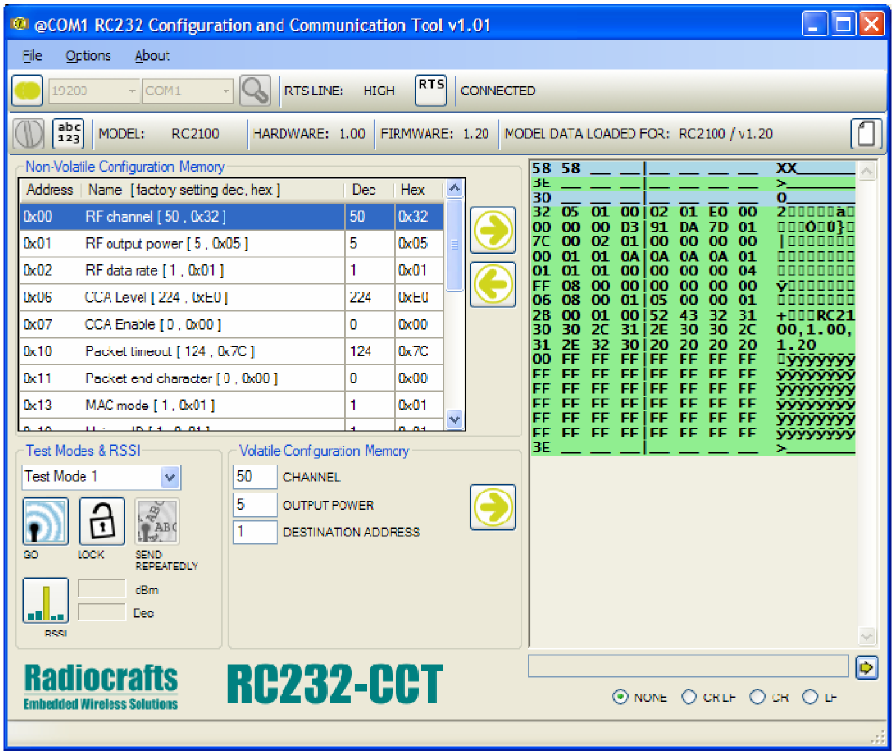
Radiocrafts
Embedded Wireless Solutions

RC232-CCT

RC232 Configuration and Communication Tool (CCT) User Manual



19200 | COM1 | RTS LINE: HIGH | CONNECTED

MODEL: RC2100 | HARDWARE: 1.00 | FIRMWARE: 1.20 | MODEL DATA LOADED FOR: RC2100 / v1.20

Non-Volatile Configuration Memory

Address	Name [factory setting dec, hex]	Dec	Hex
0x00	RF channel [50 , 0x32]	50	0x32
0x01	RF output power [5 , 0x05]	5	0x05
0x02	RF data rate [1 , 0x01]	1	0x01
0x06	CCA Level [224 , 0xE0]	224	0xE0
0x07	CCA Enable [0 , 0x00]	0	0x00
0x10	Packet timeout [124 , 0x7C]	124	0x7C
0x11	Packet end character [0 , 0x00]	0	0x00
0x13	MAC mode [1 , 0x01]	1	0x01

Test Modes & RSSI

Test Mode 1

Volatile Configuration Memory

50 CHANNEL
5 OUTPUT POWER
1 DESTINATION ADDRESS

```
58 58 __ __|__ __ __ __  XX______
3E __ __ __|__ __ __ __  >_______
30 __ __ __|__ __ __ __  0_______
32 05 01 00|02 01 E0 00  2□□□□□à□
00 00 00 D3|91 DA 7D 01  □□□Ó□Ú}□
7C 00 02 01|00 00 00 00  |□□□□□□□
00 01 01 0A|0A 0A 0A 01  □□□□□□□□
01 01 01 00|00 00 00 04  □□□□□□□□
FF 08 00 00|00 00 00 00  ÿ□□□□□□□
06 08 00 01|05 00 00 01  □□□□□□□□
2B 00 01 00|52 43 32 31  +□□□RC21
30 30 2C 31|2E 30 30 2C  00,1.00,
31 2E 32 30|20 20 20 20  1.20
00 FF FF FF|FF FF FF FF  □ÿÿÿÿÿÿÿ
FF FF FF FF|FF FF FF FF  ÿÿÿÿÿÿÿÿ
FF FF FF FF|FF FF FF FF  ÿÿÿÿÿÿÿÿ
FF FF FF FF|FF FF FF FF  ÿÿÿÿÿÿÿÿ
FF FF FF FF|FF FF FF FF  ÿÿÿÿÿÿÿÿ
FF FF FF FF|FF FF FF FF  ÿÿÿÿÿÿÿÿ
3E __ __ __|__ __ __ __  >_______
```

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Installation Guide

RC232-CCT Configuration and Communication Tool (CCT) is a part of Radiocrafts' RCTools PC suite tailored for use with Radiocrafts' RF Modules. For full installation procedure please read the RCTools Installation Guide available at www.radiocrafts.com.

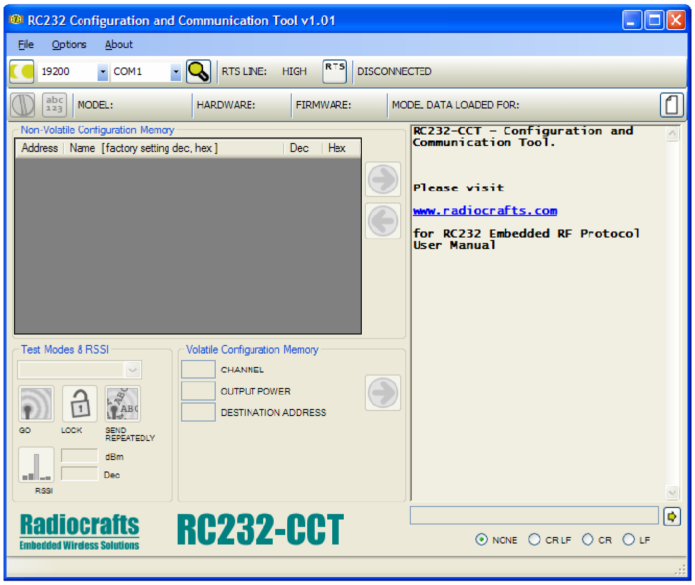
The CCT requires access to the modules UART via an available COM-port together with access to the modules CONFIG-pin. Typically UART-access is obtained via an UART-to-RS232 or UART-to-USB converter. The Demo Boards (DB) from Radiocrafts contains onboard level shifter for direct plug-in to a PC and further access to the related COM-port.

Screen Settings

It is recommended to run the application with screen size at least 1024x768 and font resolution 96dpi.

Introduction

RC232 Configuration and Communication Tool, CCT, helps you to work with your Radiocrafts modules. The program enables you to easily configure the module and can additionally work as a terminal window, where data can be sent or received to / from any serial port.



19200 | COM1 | RTS LINE: HIGH | DISCONNECTED

```
RC232-CCT - Configuration and
Communication Tool.


Please visit

www.radiocrafts.com

for RC232 Embedded RF Protocol
User Manual
```

● NONE ○ CR LF ○ CR ○ LF

Figure 1. Main window

Connect the DB or your own hardware with the Radiocrafts module to the COM-port. Start the program and the programs main window looks similar to what is shown in Figure 1.

Connecting to the Module

Before connecting, select the proper settings for your serial port:

- name of an available communication port (COMx)
- baud rate used to communicate with the module

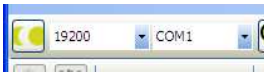


Figure 2. Port settings

To connect to the module you need to press the **connect** button.

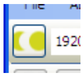


Figure 3. Connect button

If you do not know what baud the module is configured for, there is a possibility to detect your baud rate automatically by pressing the autobaud detection button:

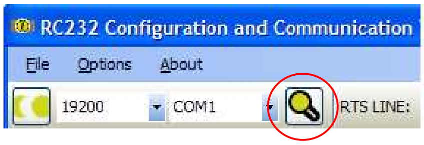


Figure 4. Autobaud button

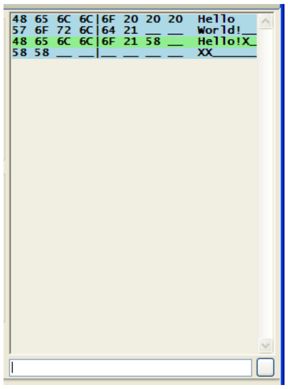
To perform baud auto detection the module will have to enter configuration mode. To do so, you will be asked either to press configuration button on the board or to use a strap connecting RTS line (at UART voltage level) with CONFIG pin on the module. After pressing auto detect button you will be asked to indicate if you are using the strap or if you use configuration button. In the second case, you need to press it **before** continuing auto detection.

When baud rate is detected successfully the program will automatically connect to the board and go into terminal mode.

If the correct baud is not detected properly at first approach, retry the autobaud process.

Terminal Mode

After pressing the connect button, the program opens a port and enters **terminal mode**. You now have the possibility to send and receive data to / from the selected serial port.



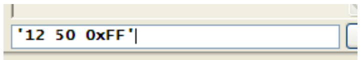
```
48 65 6C 6C|6F 20 20 20  Hello
57 6F 72 6C|64 21 __ __  World!__
48 65 6C 6C|6F 21 58 __  Hello!X_
58 58 __ __|__ __ __ __  XX______
```

Figure 5. Terminal part of window

Everything written in the bottom line of the terminal part (right side) of the window will be sent to the serial port when <enter> or the arrow-button to the right is pressed. All data sent into the serial port is highlighted blue, and all the data that have been received is highlighted green in the upper part of the window.

Important: *when blue data appears, it doesn't guarantee that this data has been sent over RF, it has been sent into the serial port only*.

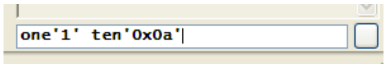
To send ASCII characters, type them in and hit *enter* key. To send bytes, you need to use apostrophes. For example, to send three bytes with values: 12, 50, 0xFF you need to write:



```
'12 50 0xFF'
```

Figure 6. Terminal line with numbers

Both decimal and hexadecimal values are proper values. You can mix ASCII, decimal and hexadecimal values in one sting like:



```
one'1' ten'0x0a'
```

Figure 7. Terminal line with ASCII and numbers

To send an apostrophe, type double apostrophe.
To clear the terminal window, click the small white paper-icon at top-right.
To save the content of the terminal window perform; *File->Save Terminal Window*, or Ctrl-T.

Drag-and-drop; By drag-and-drop a proper formatted file into the programs terminal window while being in terminal mode, the contents of the file will be sent to the serial port. You will be asked if it should be parsed. By pressing "no", it will be sent as a normal text file as it is written in the file. By pressing "yes" the program will treat every line of the file as a single line entry into the terminal window.

You can select a lines termination sign: none, CR, LF or CF + LF. Line is added to every line sent with a terminal line.

Cyclical text sending

A selectable text-string can be sent at regular intervals (every second) from terminal mode.

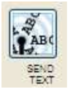


Figure 8. Send text cyclically

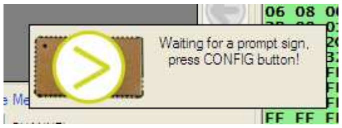
The sent text is taken from the terminal line at the moment of pressing the button.

Configuration Mode

To enter configuration mode, press the **configure** button;

Figure 9. Configuration mode entry button

Program will wait 15 seconds for a prompt sign, which is sent from the module when configuration mode is entered**.**



Waiting for a prompt sign,
press CONFIG button!

Figure 10. Waiting for a prompt

If you use an RTS line to control the CONFIG line into a module, the program asserts RTS low automatically. If you use RTS line for some other purpose, you can disable this feature with the small button next to RTS lines state indicator.

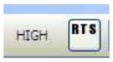
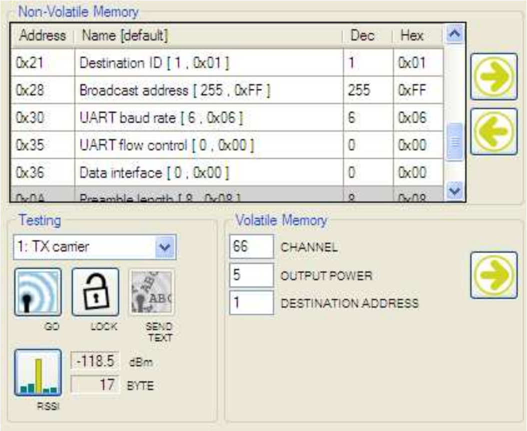


Figure 11. RTS lines state indicator



Non-Volatile Memory

Address	Name [default]	Dec	Hex
0x21	Destination ID [1 , 0x01]	1	0x01
0x28	Broadcast address [255 , 0xFF]	255	0xFF
0x30	UART baud rate [6 , 0x06]	6	0x06
0x35	UART flow control [0 , 0x00]	0	0x00
0x36	Data interface [0 , 0x00]	0	0x00
0x0A	Preamble length [8 , 0x08]	8	0x08

Testing

1: TX carrier

-118.5 dBm
17 BYTE

Volatile Memory

66 CHANNEL
5 OUTPUT POWER
1 DESTINATION ADDRESS

Figure 12. Configuration mode

In configuration mode there is easy access to all of the modules parameters. First thing to do after entering communication mode is loading a configuration from the module by pressing the arrow indicating left in “Non-Volatile Configuration Memory” section.

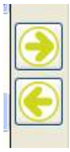
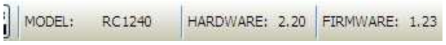


Figure 13. Loading and sending configuration

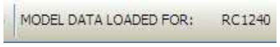
When the configuration is loaded, you can see all the settings of the module. You can also see the modules name and hardware and firmware revisions.



MODEL: RC1240 | HARDWARE: 2.20 | FIRMWARE: 1.23

Figure 14. Modules name and hardware and firmware revisions

When you load configuration from module, the modules name is identified and a proper data file (*.rcc) is loaded.



MODEL DATA LOADED FOR: RC1240

Figure 15. Model data loaded for RC1240 (example)

Your device model and model which the data file is designed for should always match!

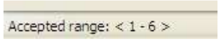
As can be seen from the window, parameters are divided into sections. In volatile memory section there are a total of three parameters that are not stored in a permanent memory, thus they are erased after resetting the module (or power lost). There is no way to check the values of the parameters in volatile memory, so there is only a button for sending entered parameters into the module.

In non-volatile configuration memory section the parameters stored in the permanent memory are found. The parameters having a gray background means they should **not be changed** as this might cause reduced performance.

Changing a Modules Parameters

To change a parameter, type a value in a "Dec" or "Hex" column in the data grid for decimal or hexadecimal values respectively. To download the settings into the CONFIG memory, press the "send to module" button (right arrow) to send. Only the differences between previously loaded and new typed configurations are sent, as can be seen from the hexadecimal communication towards the module in the terminal window.

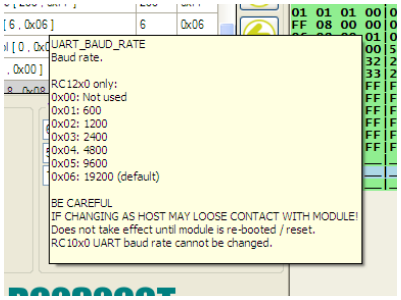
When you load a configuration from the module during the communication, the program also loads constraints on all values that you may enter. You can see the constraint in a status bar, when moving the cursor over any row.



Accepted range: < 1 - 6 >

Figure 16. Hint in a status bar

There is pop-up help on every parameter, just move and hold the cursor over it. There are hints and help for most parameters and parts of the interface.



UART_BAUD_RATE
Baud rate.

RC12x0 only:
0x00: Not used
0x01: 600
0x02: 1200
0x03: 2400
0x04. 4800
0x05: 9600
0x06: 19200 (default)

BE CAREFUL
IF CHANGING AS HOST MAY LOOSE CONTACT WITH MODULE!
Does not take effect until module is re-booted / reset.
RC10x0 UART baud rate cannot be changed.

Figure 17. Pop-up hint

When leaving the configuration mode, do so either by pressing the disconnect button or by pressing the terminal mode button.

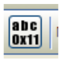


Figure 18. Terminal mode button

Important notes:

1. *It is strongly recommended to leave the configuration mode as described above to avoid situations where you start to use the module in your application while the module is still in configuration mode.*
2. *After entering some values into non-volatile memory you have to reset the module to make them active. Parameters entered into the volatile memory section works immediately after sending.*
3. *After changing baud rate you have to reconnect at proper baud rate.*

Configuration Files

Configurations can be stored in .rcc files. After loading a configuration from a module, it can be stored by selecting *File->Save configuration* (Ctrl + S). You can also load a configuration from file. These files are a reflection of all 128 bytes of the configuration memory.

You can load a default configuration by selecting *File->Load defaults->This model* . To do so, you need to be in configuration mode. When you load defaults, all 128 configuration memory bytes are reset to defaults.

The wanted .rcc-file can also be dragged and dropped into the Non-Volatile Configuration Memory window. Always ensure that you are loading a proper configuration file. After dropping the file a prompt will ask if the contents shall be sent to the module or the settings just entered as data in the window.

It may happen that configuration memory is changed in a way so the application cannot resolve what model it is connected to. If so, you should manually select the model that you are using in *File->Load defaults* .

Be aware that loading defaults or configuration (.rcc) for a different model than you are actually using can cause module malfunction.

Test Modes

For most modules there are available test modes, which can be entered in a dedicated part of the program window.

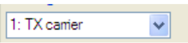


Figure 19. Test modes

Next to this box there are two buttons to use with test modes:

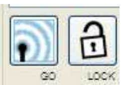


Figure 20. Buttons for test modes

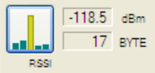
The left button enables the selected test mode. You can see the sent hex-sequence in the terminal window.

Every time configuration data is sent to the module the CCT-program automatically exits test mode. If you want to change current channel or power and still remain in a test mode, use the right button with a lock. With this enabled, every time you send data to the volatile memory the selected test mode will be turned on again.

RC1280HP (High Power long range module) special comment:
To meet the maximum time spent in TX-mode (Testmode 1 or 2) according to the modules Data Sheet, a timer exits Testmode 1 and 2 automatically after a predefined period. It is not possible to configure this period. The timer is active only when maximum output power is configured and disabled when the module is configured for any lower power settings. Thus, for continuous operation in Testmode 1 or 2 without time limitations, first configure the module for a lower output power (see RC1280HP Data Sheet and RC232 User Manual).

RSSI Reading

RSSI signal strength is displayed both as the decimal value of the byte received from the module and the calculated dBm-value.



-118.5 dBm
17 BYTE

Figure 21. RSSI reading

When the module is placed in a Testmode the RSSI reading might not be correct. Leave testmode to display the correct RSSI value.

Document Revision History

Document Revision	Changes
1.0	New Revision
1.1	Changed chapter “Installation Guide” to match new installation procedure

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