

C-router
CDMA/CDMA1x to RS-232 and Ethernet Gateway
Quick Installation Guide



Author
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Covering Product code

RFI Support Team
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C-router, RE.41.CDMA

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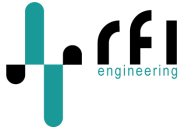
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Revision History

| Revision | Reason | Author | Date |
|----------|----------------------------------|--------|------------|
| 00010 | First version | FRK | 01-03-2011 |
| 00011 | Update to finalize first version | FRK | 22-04-2011 |
| 00012 | - | | |

References

| Reference | Description | Code |
|-----------|-------------|------|
| | | |



1 Introduction

The general purpose CDMA/CDMA1x C-router is designed as an intelligent global wireless data transmitter, which can be effectively deployed in sensor networks, smart monitoring and monitoring applications. Data can be transmitted in "Push" or "Pull" mode, stored and aggregated along preset criteria. Intelligent monitoring can be used e.g. in "Managed Services": to monitor modems, installed on corporate customer premises, providing a redundant link for maintenance and support purposes. The CDMA Dual Band 800/1900MHz technology will bring immediate benefits such as online connections plus cost efficient, high-speed data transmission. The optional remote power switch can be used for an effective reboot of the connected equipment.

The C-router can be customized to optimally suit customer requirements to provide a reliable and global solution for wireless M2M projects. The CDMA/CDMA1x unit can be used in combination with the entry-level D-controller (Remote Access Console Controller), M-controller (Remote Access Management Controller), smart P-controller (Remote Access Device Controller) or high-end port controller Q-controller (Quad Remote Port Controller). The C-router comes with all software and hardware components needed to transfer data encrypted over wireless networks.

Features:

- 10/100 Base-T Ethernet port and RS-232 serial interface
- Relay contact for remote power cycling of equipment
- CDMA Dual Band 800/1900 MHz - Data Capabilities: 1x/QNC/HSPD
- Support of RUIM (Removable User Identity Module) cards
enables compatibility with CDMA carriers worldwide
- Remotely configurable and software upgradeable
- Event monitoring and reporting from monitored equipment
- L2TP VPN client
- Access rights to the configuration parameters per unique UID
- Default "customer" configuration during production
- Complies With EMI/RFI Regulations
- Black, Flame retardant ABS plastic enclosure

This document provides information on the following topics:

- C-router installation.
- C-router login.

1.1 Check Your Package Contents

These are the items included with your C-router purchase:



1x C-router CDMA/CDMA1x unit



1x PoE Power Supply unit

Mains Power cable (**optional**):

Dependent on the territory different power supplies will have to be used. An 110V/AC power cable can be supplied as optional.



USA/Canadian 110V/AC cable

2 Connectors and status LEDs on the C-router Unit

This section provides an overview of the connectors and status LEDs on the C-router unit.

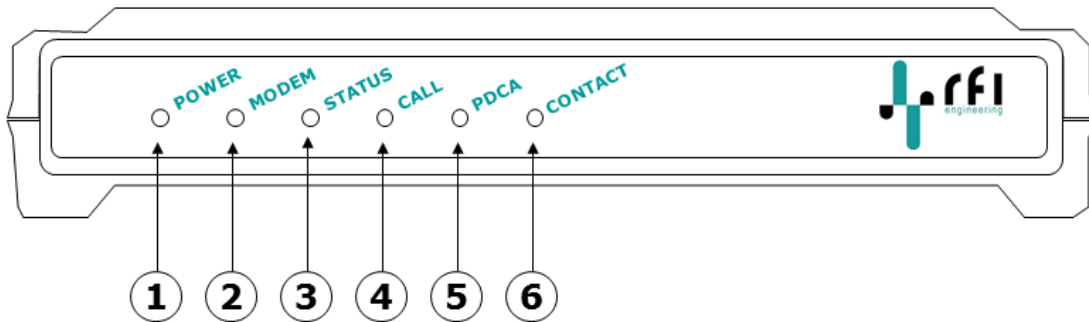


Figure 1: C-router front view

| | |
|---|---|
| 1 | Blue, Power LED |
| 2 | Green, Modem |
| 3 | Green, Status. Flashing when unit is booting |
| 4 | Green, Call. On when CDMA connection is active |
| 5 | Green, PCDA. On when CDMA connection is established to the network. |
| 6 | Green, Contact/Relay status |

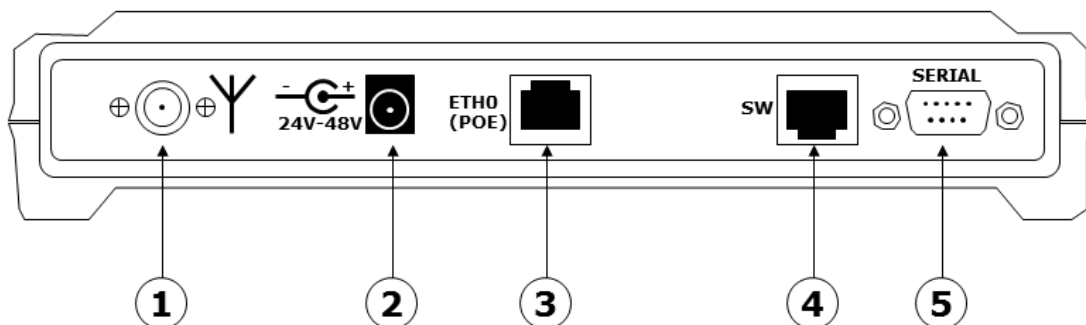
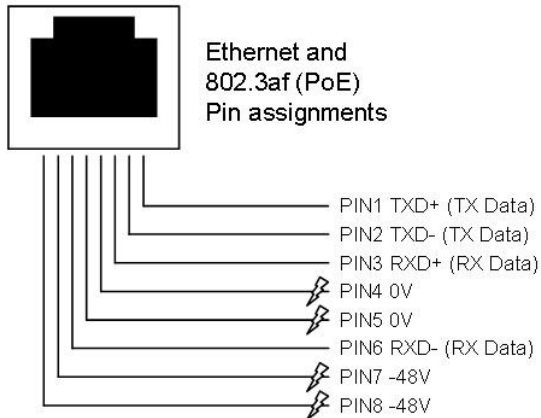


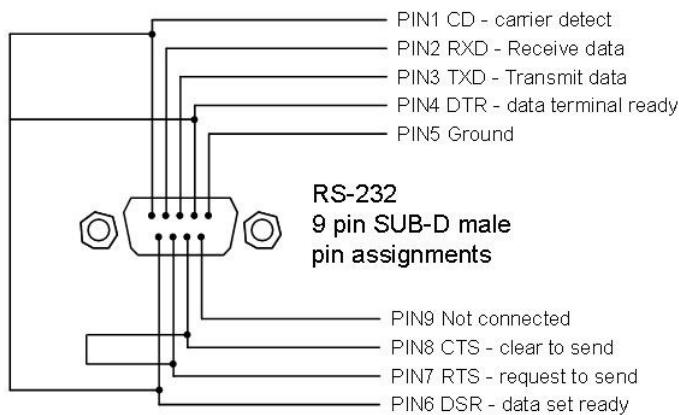
Figure 2: C-router rear view

| | |
|---|--|
| 1 | RP-TNC CDMA antenna connector |
| 2 | DC Power jack 2.1mm |
| 3 | Ethernet port, including 802.3af PoE |
| 4 | Low power relay contact for remote control |
| 5 | RS-232, 9 pin male SUB-D |

2.1 Ethernet and 802.3af (Power over Ethernet) Pin Assignments



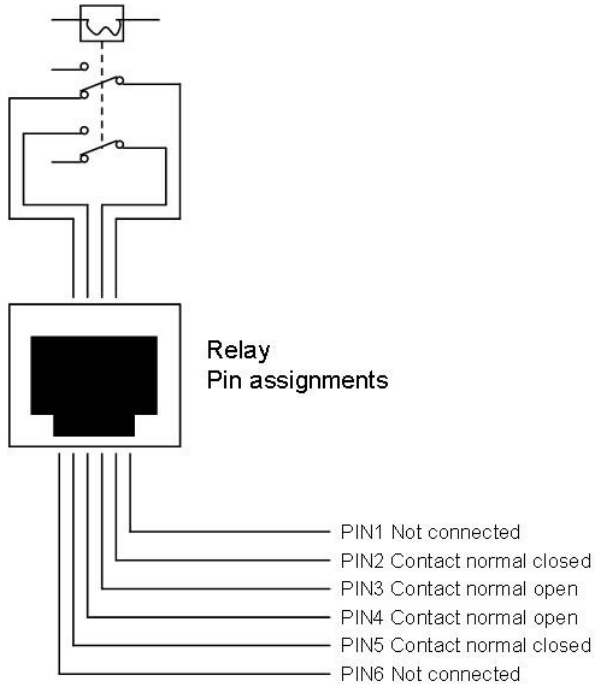
2.2 RS-232 Pin Assignments



The following signals are internally connected in the RS-232 port on the C-router unit:

- Carrier Detect (pin 1), Data Terminal Ready (pin 4) and Data Set Ready (pin 6)
- Request to Send (pin 7) and Clear to Send (pin 8)

2.3 Relay connections



The C-router has a low power relay contact that can be used for remote controlling low power devices. In order to connect the relay contact to the low power device you can use a cable with an RJ-11 connector. The two middle pins (pin 3 and 4) of the RJ-11 connector are connected to the relay, whereby the relay is normally open. This contact is closed as soon as the relay is activated. Pins 2 and 5 of the RJ-11 connector are connected to the relay in a normally closed configuration. When the relay is activated this contact opens.



Please note: This relay is specified for low power devices only. This means that the maximum ratings are 100V @ 500mA for switching purposes maximum. In case you want to switch higher voltages and/or higher currents you need to use an external relay, such as RFI Engineering's single port remote power switch; RE.99.R1NC.

3 Installation Overview

The C-router is a radio device capable of transmitting and receiving in the dual 800/1900 MHz CDMA band. Because the C-router unit operates in the radio frequency bands it can be susceptible to interference that can reduce range. Install the C-router in such a way that adequate CDMA reception is obtained. You can see the CDMA signal levels in the configuration menu of the C-router. Please see paragraph 5.4 for retrieving the CDMA status.

3.1 Connecting the C-router Unit to your network

- A. Connect an Ethernet cable to the port labeled "Eth0(POE)" on the C-router.
- B. Connect the other end of the Ethernet cable to the port labeled "J1 Data & PWR" on the Power-over-Ethernet (PoE) power supply.
- C. Connect the port labeled "SERIAL" to the WAN router you want to monitor.
- D. Connect the power cable to the back of Power-over-Ethernet (PoE) and power the unit on.

When you have completed the above steps the connected network should look like this:

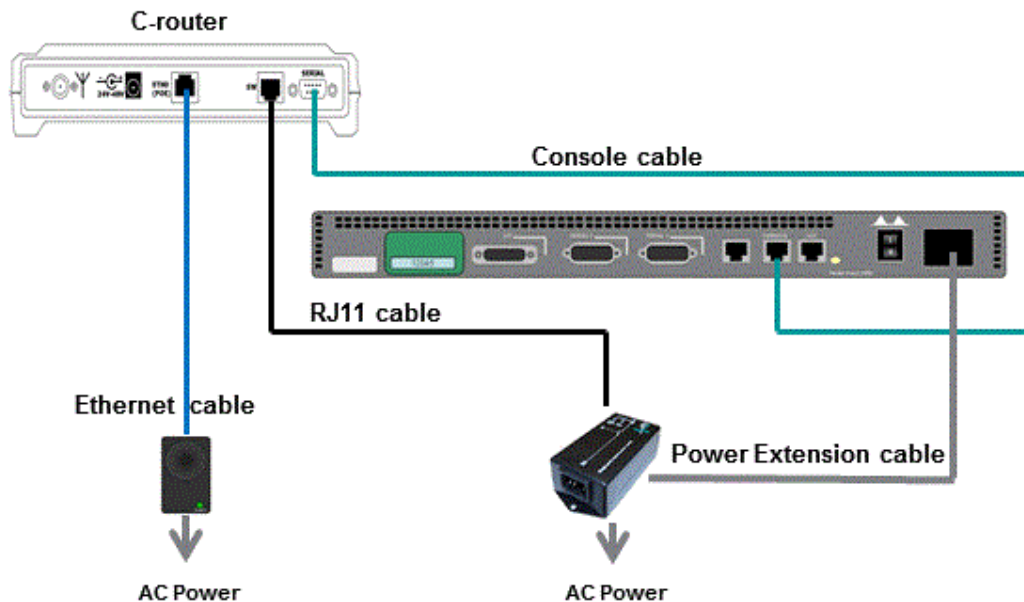


Figure 3: C-router Connections

4 Accessing the C-router configuration, user 'admin'

All configuration of the C-router is done through the command line interface (CLI) or the web interface of the unit. To start configuring the unit you have to log into the C-router using a username and password. The default user on the C-router is called 'admin' and has password 'rfi123'. The command line interface can either be accessed through the Ethernet port of the unit, or through the CDMA interface.

4.1 Console login via SSH and the Ethernet port (CLI)

Connecting via SSH is usually a simple procedure, but requires some knowledge of how to configure the network settings of your desktop or laptop PC. When the C-router ships, the unit has been configured with a fixed IP address. In order to login to the C-router you can connect a PC (laptop or desktop) to the Ethernet port of the unit. In case you connect a PC directly to the C-router please make sure you use a **cross** Ethernet cable.

The default IP address of the C-router is set to 192.168.168.1

After configuring your PC to be able to contact the C-router, you can login using your favorite SSH client. SSH clients can be downloaded from for example <http://www.ssh.com> (OpenSSH) or <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html> (PuTTY). In our examples the PuTTY client will be used. Consult your SSH client documentation if you use a different SSH client.

SSH is used as the default network shell login protocol because it is a secure protocol, unlike the more commonly used Telnet. All communication between a client and server is encrypted before being sent over the network, thus packet **sniffers** are unable to extract usernames, passwords, and other potentially sensitive data. If you don't have an SSH client, a number of good free or low-cost options are available. For Unix, Linux, and Cygwin Windows environments, check out OpenSSH. For Windows consider PuTTY, an excellent free SSH client for all Win32 platforms.

To connect to your C-router for the first time using the PuTTY client, start the client from the Windows START menu. Enter the IP address, User Name (**admin**) and port number (**22**) for the C-router in the dialogue box:

```
Host Name: 192.168.168.1
User Name: admin
Port Number: 22
```

Then click the **Open** button

When connected the unit prompts you to enter a username and a password:

```
login as: admin
root@192.168.168.1's password:
```

The default password of the unit is set to 'rfi123'.

When connected to the C-router the user admin enters the menu based configuration screen. The following is an example of the starting page for the C-router CLI:

```

|+General
| | -Status
| | -Open Console
| | -Console Log
| | -Linux Shell
| | -Toggle Relay
| | -Reboot
| | ^-Restore Defaults
|+Users
|+Configuration
|^+Status
Hostname :
System Uptime : 4 minutes
Mobile Device : cdma
Cellular Chann :
Cellular PN : 336
Cellular Syste :
Cellular Netwo :
R-UIM Status : No R-UIM card detected
Calling : No
Registration S : Service Available
Roaming : No
Signal Level : excellent
Signal Strengt : -85 dBm
Packet Data Se : Service Available
MAC Eth0 : 00:00:24:C5:6D:38
IP Eth0 : 10.1.10.82
Netmask Eth0 : 255.255.255.0
MAC Eth1 : 00:00:24:C5:6D:39
IP Eth1 : 192.168.1.1
Netmask Eth1 : 255.255.255.0
Tunnel : ERROR getting information

Use up and down arrow to select objects
Use enter or space to fold open
Use right arrow to change focus

|| press '?' for help ||

```

Figure 4: C-router CLI for user 'admin'

You can navigate the various configuration elements by using the arrow keys:

- Use up and down arrow to select objects
- Use enter or space to fold open
- Use right arrow to change focus

4.2 Logging out (CLI)

Before going further you should know how to log out of the system. By pressing 'q' in the C-router CLI you are automatically logged out.

4.3 Changing your password (CLI)

The C-router ships with the default password `rfi123`. It is advisable to change this password when the system is installed. The password for the various users can be changed through the 'Users' tab on the main menu bar on the left of the CLI.

Go down to the Users -> Groups -> Administrator Users -> Users -> 1 with your arrow keys. Press the right arrow to navigate to the **Password** field. Here you can change the password. After making configuration settings to the unit you have to reboot to activate the changes.

Go down to General -> Reboot and press [ENTER] to reboot the C-router.

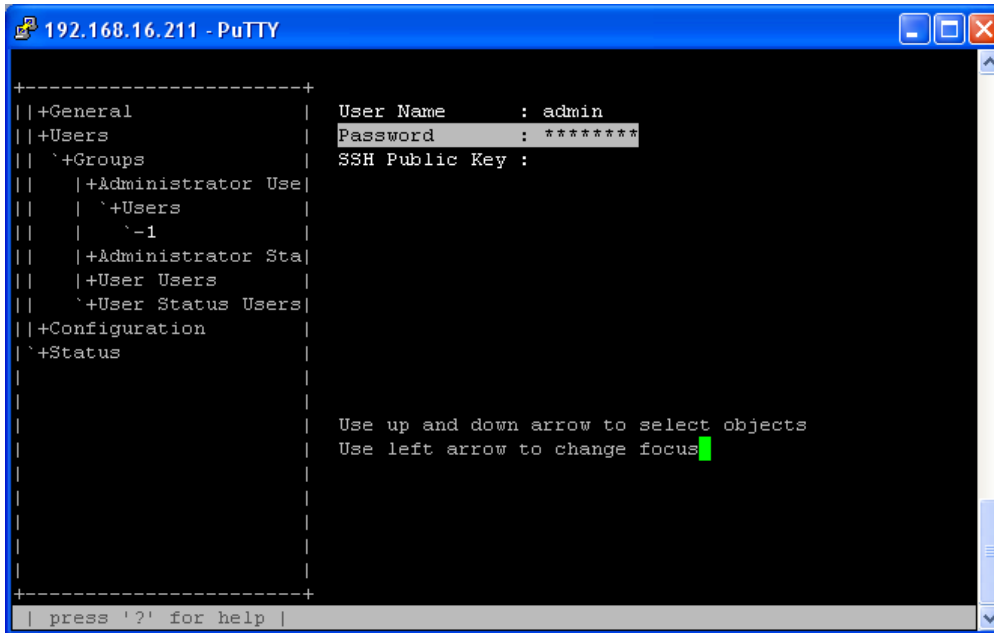
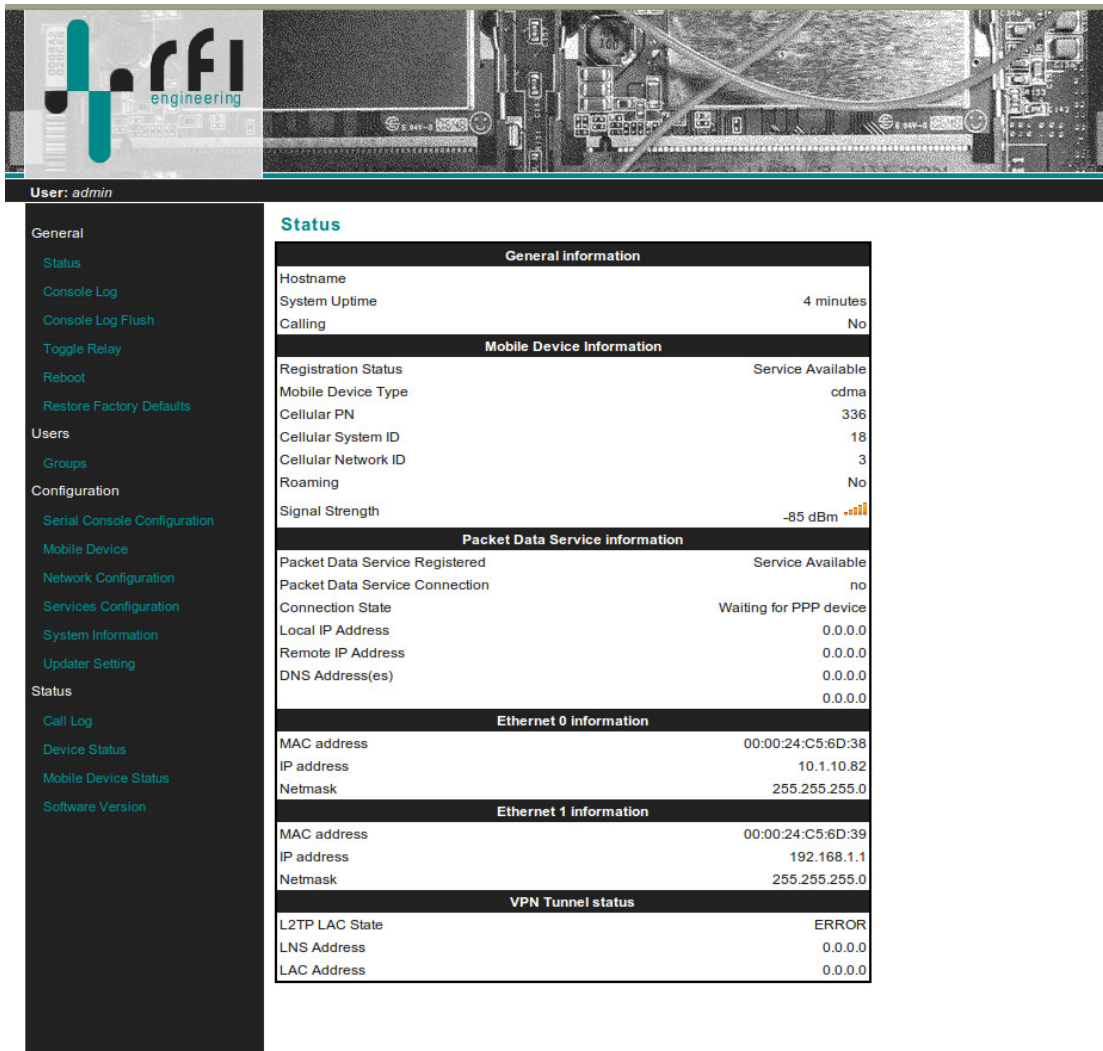


Figure 5: changing the password for user: admin through the CLI

4.4 Console login via browser and the Ethernet port (web)

To connect to your C-router using a standard web browser, start the web browser and enter the IP address of the C-router in the address bar. The C-router will ask for a user name and password. Enter user: **'admin'** and password: **'rfi123'**. Once logged in the C-router presents the following status page:



User: admin

General

- Status
- Console Log
- Console Log Flush
- Toggle Relay
- Reboot
- Restore Factory Defaults

Users

- Groups

Configuration

- Serial Console Configuration
- Mobile Device
- Network Configuration
- Services Configuration
- System Information
- Updater Setting

Status

- Call Log
- Device Status
- Mobile Device Status
- Software Version

Status

| General information | |
|---------------------------------|---|
| Hostname | |
| System Uptime | 4 minutes |
| Calling | No |
| Mobile Device Information | |
| Registration Status | Service Available |
| Mobile Device Type | cdma |
| Cellular PN | 336 |
| Cellular System ID | 18 |
| Cellular Network ID | 3 |
| Roaming | No |
| Signal Strength | -85 dBm  |
| Packet Data Service information | |
| Packet Data Service Registered | Service Available |
| Packet Data Service Connection | no |
| Connection State | Waiting for PPP device |
| Local IP Address | 0.0.0.0 |
| Remote IP Address | 0.0.0.0 |
| DNS Address(es) | 0.0.0.0 |
| | 0.0.0.0 |
| Ethernet 0 information | |
| MAC address | 00:00:24:C5:6D:38 |
| IP address | 10.1.10.82 |
| Netmask | 255.255.255.0 |
| Ethernet 1 information | |
| MAC address | 00:00:24:C5:6D:39 |
| IP address | 192.168.1.1 |
| Netmask | 255.255.255.0 |
| VPN Tunnel status | |
| L2TP LAC State | ERROR |
| LNS Address | 0.0.0.0 |
| LAC Address | 0.0.0.0 |

Figure 6: web browser login for user 'admin' on the C-router

From the web user interface all day-to-day operations can be performed.

4.5 Console login via CDMA dial-in

During normal operation the C-router connects the CDMA modem directly to the RS-232 port on the back of the C-router unit. For this example we assume that the C-router is connected to the console port of the (Cisco) WAN router as shown in Figure 3. Dialing in to the unit connects the dial-in session directly to the console port of the Cisco router. When you use a dialer to connect to the C-router typing the dial string should get you connected to the unit.

For example:

```

atd 06158xxxxx
CONNECT 115200
Online 00:00
=====
+ Welcome RFI Engineering RFIos (Rose)...
+ Hostname       : C-router-0080485324FA
+ System Name    : unknown
+ System Location : unknown
+ System Contact : unknown
=====
+ Version       : C-router (buildnr:0400)
+ Buildtag      : DEVELOPMENT
+ Flavour       : VZ0
+ Build on      : 02/16/2011 15:07:41
=====

Escape usage: <ESC> character is <CTRL>\ or 0x1c
-----
<ESC><ESC> -> Send escape sequence
<ESC>.     -> Disconnect
<ESC>l     -> Login to CDMA device
<ESC>h     -> Show this usage
<ESC>b     -> Send BREAK command to console

```

Before the CDMA modem is connected to the console port of the WAN router the C-router displays a menu with options. These options can be accessed during the dial in session by giving an escape sequence. For example to show the menu again you can type "<CTRL>\\" followed by "h".

Pressing RETURN connects you directly to the console port of the connected WAN router. You will see the output of the WAN router scroll by followed by the router prompt.

For example:

```

*Mar  1 00:00:11.051: %LINK-3-UPDOWN: Interface Ethernet0, changed state to up
*Mar  1 00:00:11.055: %LINK-3-UPDOWN: Interface Serial0, changed state to down
*Mar  1 00:00:11.423: %LINK-3-UPDOWN: Interface Serial1, changed state to down
*Mar  1 00:00:29.663: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0,
changed state to down
*Mar  1 00:00:31.687: %LINK-5-CHANGED: Interface BRI0,  changed state to
administratively down
*Mar  1 00:00:32.723: %SYS-5-CONFIG_I: Configured from memory by console
*Mar  1 00:00:32.731: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0,  changed
state to down
*Mar  1 00:00:33.271: %LINK-5-CHANGED: Interface Serial0,  changed state to
administratively down
*Mar  1 00:00:33.275: %LINK-5-CHANGED: Interface Serial1,  changed state to
administratively down
*Mar  1 00:00:35.955: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0,
changed state to down
*Mar  1 00:00:35.959: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
changed
Router>

```



By pressing "<CTRL>\\" followed by "l" (Lower case L) escapes you out of the connection with the WAN router and gives a login prompt of the C-router router itself. By logging in (analog to the examples in paragraph 4.1) you get access to the configuration of the unit.

When connected the unit prompts you to enter a username and a password:

```
login as: root
password:

=====
+ Welcome RFI Engineering RFIos (Rose)...
+ Version  : C-router (buildnr:0235)
+ Build on : 02/16/2011 15:51:05
=====

root@C-router-00804855565C:~$
```

The default password for the unit is set to: **rfi123**

At the shell prompt use the command `exit` to log out. This returns you to the logging function and returns you to the WAN router prompt.

As an example,

```
root@C-router-00804855565C:~$ exit
Router>
```

to logout.

4.6 Disconnect the CDMA dial-in connection

You can disconnect the dial-in connection by giving the escape sequence: "<CTRL>\\" followed by "." (dot). As an example:

```
Router>
Going to hangup now, Good Bye

NO CARRIER
```

5 Advanced configuration, user 'root'

All configuration of the C-router is stored in and retrieved from the Hierarchical Information Base (HIB). The HIB is a database for storing configuration and run-time information for (embedded) RFI products. All manipulation of configuration elements of the unit is done through the command line interface tool called the HIB client (hibc). Only user 'root' has access through all configuration settings of the C-router. Normal day-to-day operation should always be performed by the user 'admin' or any of its sub-users. Root access is only applicable in case you want to make upgrades to the software.

The HIB uses a tree-shaped hierarchical data structure for storing objects. A schema defines the hierarchical relations of the objects in the tree, and describes the properties of each object.

The schema-tree is built from the following node types:

- **Group:** A group is a container for holding other 'child' nodes.
- **Object:** An object is the 'leaf' of the tree, which contains the actual data.
- **Array:** An array is a container which can hold zero or more copies of its sub-tree.

Every entry in an array is identified by an integer index, starting from 0. The following diagram is an example of a simple schema:

```
-- config (group)
|-- network (group)
| |-- interface (array)
| | |-- ifname (object)
| | |-- ip_address (object)
| | `-- netmask (object)
|-- `-- hostname (object)
```

To retrieve a configuration setting you have to give the HIB client "**hibc ls**" command followed by the group, object or array identifier. For example to retrieve the current IP address configuration of the C-router you would give the following command:

```
hibc ls -r1 /config/network/eth0/

Srwp  47 Jan  1 02:09  |- ip_method "static"
Or--  48 Jan  1 00:00  |  |- static
-rwp  49 Jan  1 02:09  |  |  |- ip_address "192.168.168.1"
-rwp  50 Jan  1 00:00  |  |  |- netmask "255.255.255.0"
-rwp  51 Jan  1 00:00  |  |  |- gateway "192.168.168.254"
Lrwp  52 Jan  1 00:00  |  |  `-- dns
Or--  53 Jan  1 00:00  |  `-- dhcp
Lrwp  54 Jan  1 00:00  |- route
Lrwp  55 Jan  1 00:00  `-- alias
```

The setting of configuration elements is done through the HIB client by giving the command "**hibc set**". For example to set the IP address of the C-router you would give the following command:

```
hibc set config/network/eth0/ip_method/static/ip_address "192.168.168.1"
```


The following paragraphs describe a number of examples for getting and setting information in the C-router.

5.1 Retrieving the CDMA configuration

```
rfiembedded:~# hibi ls -l -r config/mobile
-r-p 50 May 4 13:57 |- name "ttyS1"
-rwp 51 Dec 29 19:02 |- baudrate "115200"
Srwp 52 May 4 13:58 |- type "cdma"
Orw- 53 Apr 21 17:00 | |- unknown
Orw- 54 Apr 21 17:00 | |- gsm
-rwp 55 May 4 13:57 | | |- sim_pin "0000"
-rwp 56 May 4 13:57 | | |- sim_pin2 "0000"
-rwp 57 May 4 13:57 | | |- sim_puk "00000000"
-rwp 58 May 4 13:57 | | |- sim_puk2 "00000000"
Srwp 59 May 4 13:57 | | `-- gprs "disabled"
Orwp 60 Apr 21 17:00 | | |- enabled
-rwp 61 May 4 13:57 | | | |- username "username"
-rwp 62 May 4 13:57 | | | |- password "password"
-rwp 63 May 4 13:57 | | | |- apn "internet"
-rwp 64 May 4 13:57 | | | `-- idle_timeout "0"
Orwp 65 Apr 21 17:00 | | `-- disabled
Orw- 66 Apr 21 17:00 | `-- cdma
Srwp 67 Jun 18 12:28 | | |- activate_module "no"
Orwp 68 Apr 21 17:00 | | | |- yes
Orwp 69 Apr 21 17:00 | | | `-- no
Srwp 70 Oct 21 06:59 | | `-- cdmalx "enabled"
Orwp 71 Apr 21 17:00 | | |- enabled
-rwp 72 Jan 2 18:06 | | | |- username "xxxx"
-rwp 73 Oct 21 06:59 | | | |- password ""
-rwp 74 May 4 14:01 | | | `-- idle_timeout "180"
Orwp 75 Apr 21 17:00 | | `-- disabled
Grw- 76 Apr 21 17:00 |- call/
-rwp 77 May 4 13:57 | | |- call_idle_time "300"
-rwp 78 May 4 13:57 | | |- call_connect_idle_time "60"
Srwp 79 May 4 13:57 | | |- allow_dialin "yes"
Orwp 80 Apr 21 17:00 | | | |- yes
```

5.2 Setting the CDMA PIN

```
hibi set config/gsm/gsm_device/sim_pin "5678"
```

When the SIM card has been configured to accept access without needing a PIN code the C-router will simply ignore the PIN code settings. Only when the SIM card has the PIN code option enabled will the C-router attempt to enter the PIN code. The unit will only attempt once to log in with the PIN code to prevent accidentally blocking the SIM card when a wrong PIN code has been entered.

5.3 Getting the CDMA PIN

```
hibi get config/gsm/gsm_device/sim_pin
```

Returns:
5678

5.4 Retrieving the CDMA status:

```
rfiembedded:~# hibi ls -l -r status
Grw- 168 Apr 21 17:00 |- call_log/
Lrw- 169 Apr 21 17:00 | `-- records
```

```

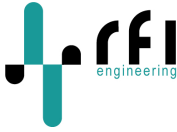
Grw- 170 Apr 21 17:00 |- dev_status/
-rw- 171 Apr 21 17:00 | |- uptime "19 minutes"
-rw- 172 Apr 21 17:00 | |- total_memory "126568 Kb"
-rw- 173 Apr 21 17:00 | |- free_memory "73680 Kb"
-rw- 174 Apr 21 17:00 | |- buffered_memory "5416 Kb"
-rw- 175 Apr 21 17:00 | |- cached_memory "30428 Kb"
-rw- 176 Apr 21 17:00 | |- total_free_memory "109524 Kb"
-rw- 177 Apr 21 17:00 | `-- temp ""
Gr-- 178 Apr 21 17:00 |- mobile/
Grwp 179 Apr 21 17:00 | |- information/
-rw- 180 Apr 21 17:02 | | |- vendor "Motorola"
-rw- 181 Apr 21 17:02 | | |- software "C243R23.26"
-rw- 182 Apr 21 17:02 | | |- cfsn "408HKU00L9"
Sr-- 183 Apr 21 17:00 | | |- type "cdma"
Orw- 184 Apr 21 17:00 | | | |- unknown
Orw- 185 Apr 21 17:00 | | | |- gsm
-rw- 186 Apr 21 17:00 | | | | `-- imei ""
Orw- 187 Apr 21 17:00 | | | `-- cdma
-rw- 188 Apr 21 17:02 | | | | |- meid "A0000002FF790D"
-rw- 189 Apr 21 17:00 | | | | `-- network ""
-rw- 190 Apr 21 17:02 | | | |- imsi "R-UIM not available"
-rw- 191 Apr 21 17:02 | | | `-- capability "CDMA800 CDMA1900 C24 "
Grw- 192 Apr 21 17:00 | |- device/
-rw- 193 Apr 21 17:02 | | |- network_available "Service Available"
-rw- 194 Apr 21 17:02 | | |- network_signal "excellent"
-rw- 195 Apr 21 17:19 | | |- network_signal_level "-81 dBm"
-rw- 196 Apr 21 17:02 | | |- network_roam "Camped on a home network"
-rw- 197 Apr 21 17:00 | | |- call_active "No"
Sr-- 198 Apr 21 17:00 | | `-- type "cdma"
Orw- 199 Apr 21 17:00 | | | |- unknown
Orw- 200 Apr 21 17:00 | | | |- gsm
-rw- 201 Apr 21 17:00 | | | | |- network_name ""
-rw- 202 Apr 21 17:00 | | | | |- sim_available ""
-rw- 203 Apr 21 17:00 | | | | |- sim_unlocked ""
-rw- 204 Apr 21 17:02 | | | | |- gprs_network_available "Service Unavailable"
Lrw- 205 Apr 21 17:00 | | | `-- networks_available
Orw- 206 Apr 21 17:00 | | `-- cdma
-rw- 207 Apr 21 17:02 | | | |- cellular_sid "18"
-rw- 208 Apr 21 17:02 | | | |- cellular_nid "3"
-rw- 209 Apr 21 17:02 | | | |- pn "336"
-rw- 210 Apr 21 17:19 | | | |- ecio "-5.0 dBm"
-rw- 211 Apr 21 17:19 | | | |- rssi "-81 dBm"
-rw- 212 Apr 21 17:10 | | | |- txpower "-92 dBm"
-rw- 213 Apr 21 17:10 | | | |- txgain "0.0 dBm"
-rw- 214 Apr 21 17:02 | | | |- ruim_available "R-UIM Unavailable"
-rw- 215 Apr 21 17:02 | | | |- ruim_unlocked "R-UIM Unavailable"
-rw- 216 Apr 21 17:02 | | | |- cdmalx_network_available "Service Available"
Lrw- 217 Apr 21 17:00 | | `-- neighbors
Rrw- 312 Apr 21 17:19 | | | |- 1
-rw- 313 Apr 21 17:19 | | | | |- pn "152"
-rw- 314 Apr 21 17:19 | | | | |- ecio "-31.5 dBm"
-rw- 315 Apr 21 17:19 | | | | `-- status "neighbor"
Rrw- 380 Apr 21 17:19 | | | |- 2
-rw- 383 Apr 21 17:19 | | | | |- pn "176"
-rw- 382 Apr 21 17:19 | | | | |- ecio "-31.5 dBm"
-rw- 381 Apr 21 17:19 | | | | `-- status "neighbor"
Rrw- 376 Apr 21 17:19 | | | |- 3
-rw- 379 Apr 21 17:19 | | | | |- pn "16"
-rw- 378 Apr 21 17:19 | | | | |- ecio "-31.5 dBm"
-rw- 377 Apr 21 17:19 | | | | `-- status "neighbor"
Rrw- 372 Apr 21 17:19 | | | |- 4
-rw- 375 Apr 21 17:19 | | | | |- pn "472"
-rw- 374 Apr 21 17:19 | | | | |- ecio "-31.5 dBm"
-rw- 373 Apr 21 17:19 | | | | `-- status "neighbor"
Rrw- 368 Apr 21 17:19 | | | |- 5
-rw- 371 Apr 21 17:19 | | | | |- pn "208"
-rw- 370 Apr 21 17:19 | | | | |- ecio "-31.5 dBm"
-rw- 369 Apr 21 17:19 | | | | `-- status "neighbor"
Rrw- 364 Apr 21 17:19 | | | |- 6
-rw- 367 Apr 21 17:19 | | | | |- pn "368"

```

```

-rw- 366 Apr 21 17:19 | | | | - ecio "-31.5 dBm"
-rw- 365 Apr 21 17:19 | | | | ` status "neighbor"
Rrw- 360 Apr 21 17:19 | | | | - 7
-rw- 363 Apr 21 17:19 | | | | | - pn "48"
-rw- 362 Apr 21 17:19 | | | | | - ecio "-31.5 dBm"
-rw- 361 Apr 21 17:19 | | | | | ` status "neighbor"
Rrw- 356 Apr 21 17:19 | | | | | - 8
-rw- 359 Apr 21 17:19 | | | | | | - pn "428"
-rw- 358 Apr 21 17:19 | | | | | | - ecio "-31.5 dBm"
-rw- 357 Apr 21 17:19 | | | | | | ` status "neighbor"
Rrw- 352 Apr 21 17:19 | | | | | | - 9
-rw- 355 Apr 21 17:19 | | | | | | | - pn "190"
-rw- 354 Apr 21 17:19 | | | | | | | - ecio "-31.5 dBm"
-rw- 353 Apr 21 17:19 | | | | | | | ` status "neighbor"
Rrw- 348 Apr 21 17:19 | | | | | | | - 10
-rw- 351 Apr 21 17:19 | | | | | | | | - pn "350"
-rw- 350 Apr 21 17:19 | | | | | | | | - ecio "-31.5 dBm"
-rw- 349 Apr 21 17:19 | | | | | | | | ` status "neighbor"
Rrw- 344 Apr 21 17:19 | | | | | | | | - 11
-rw- 347 Apr 21 17:19 | | | | | | | | | - pn "64"
-rw- 346 Apr 21 17:19 | | | | | | | | | - ecio "-31.5 dBm"
-rw- 345 Apr 21 17:19 | | | | | | | | | ` status "neighbor"
Rrw- 340 Apr 21 17:19 | | | | | | | | | - 12
-rw- 343 Apr 21 17:19 | | | | | | | | | | - pn "200"
-rw- 342 Apr 21 17:19 | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 341 Apr 21 17:19 | | | | | | | | | | ` status "neighbor"
Rrw- 336 Apr 21 17:19 | | | | | | | | | | - 13
-rw- 339 Apr 21 17:19 | | | | | | | | | | | - pn "312"
-rw- 338 Apr 21 17:19 | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 337 Apr 21 17:19 | | | | | | | | | | | ` status "neighbor"
Rrw- 332 Apr 21 17:19 | | | | | | | | | | | - 14
-rw- 335 Apr 21 17:19 | | | | | | | | | | | | - pn "316"
-rw- 334 Apr 21 17:19 | | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 333 Apr 21 17:19 | | | | | | | | | | | | ` status "neighbor"
Rrw- 328 Apr 21 17:19 | | | | | | | | | | | | - 15
-rw- 331 Apr 21 17:19 | | | | | | | | | | | | | - pn "224"
-rw- 330 Apr 21 17:19 | | | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 329 Apr 21 17:19 | | | | | | | | | | | | | ` status "neighbor"
Rrw- 324 Apr 21 17:19 | | | | | | | | | | | | | - 16
-rw- 327 Apr 21 17:19 | | | | | | | | | | | | | | - pn "40"
-rw- 326 Apr 21 17:19 | | | | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 325 Apr 21 17:19 | | | | | | | | | | | | | | ` status "neighbor"
Rrw- 320 Apr 21 17:19 | | | | | | | | | | | | | | - 17
-rw- 323 Apr 21 17:19 | | | | | | | | | | | | | | | - pn "244"
-rw- 322 Apr 21 17:19 | | | | | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 321 Apr 21 17:19 | | | | | | | | | | | | | | | ` status "neighbor"
Rrw- 316 Apr 21 17:19 | | | | | | | | | | | | | | | - 18
-rw- 319 Apr 21 17:19 | | | | | | | | | | | | | | | | - pn "0"
-rw- 318 Apr 21 17:19 | | | | | | | | | | | | | | | | - ecio "-31.5 dBm"
-rw- 317 Apr 21 17:19 | | | | | | | | | | | | | | | | ` status "neighbor"
Grw- 218 Apr 21 17:00 | | ` packet/
-rw- 219 Apr 21 17:00 | | | | - connected "no"
-rw- 220 Apr 21 17:15 | | | | - state "Waiting for PPP device"
-rw- 221 Apr 21 17:15 | | | | | - device ""
-rw- 222 Apr 21 17:00 | | | | | - local_ip "0.0.0.0"
-rw- 223 Apr 21 17:00 | | | | | - remote_ip "0.0.0.0"
-rw- 224 Apr 21 17:00 | | | | | - dns1 "0.0.0.0"
-rw- 225 Apr 21 17:00 | | | | | - dns2 "0.0.0.0"
-rw- 226 Apr 21 17:00 | | | | | - in_count "0"
-rw- 227 Apr 21 17:00 | | | | | - in_error_count "0"
-rw- 228 Apr 21 17:00 | | | | | - in_bytes "0"
-rw- 229 Apr 21 17:00 | | | | | - out_count "0"
-rw- 230 Apr 21 17:00 | | | | | - out_error_count "0"
-rw- 231 Apr 21 17:00 | | | | | ` out_bytes "0"
Gr-- 232 Apr 21 17:00 ` versions/
-r-- 233 Apr 21 17:00 | - rfios "Rose"
-r-- 234 Apr 21 17:00 | - target "C-router"
-r-- 235 Apr 21 17:00 | - buildnr "0777"
-r-- 236 Apr 21 17:00 | - buildtag "DEVELOPMENT"
-r-- 237 Apr 21 17:00 | - builddate "05/04/2010 11:53:10"
-r-- 238 Apr 21 17:00 | - flavour "RFI0"
-r-- 239 Apr 21 17:00 | ` version "1.2.0"

```



The **network_signal** "5" means this unit has excellent reception. The possible values for this field are:

```
0: C-router has no service.
1: C-router has 1 bar of signal strength.
2: C-router has 2 bars of signal strength.
3: C-router has 3 bars of signal strength.
4: C-router has 4 bars of signal strength.
5: C-router has 5 bars of signal strength.
```

The **network_roam** "Camped on a home network" means that this unit sits within its home network, i.e. it is not roaming. The possible values for this field are:

```
camped on a home network.
roaming on home network.
roaming on other network.
```

5.5 Setting idle-timer timeout

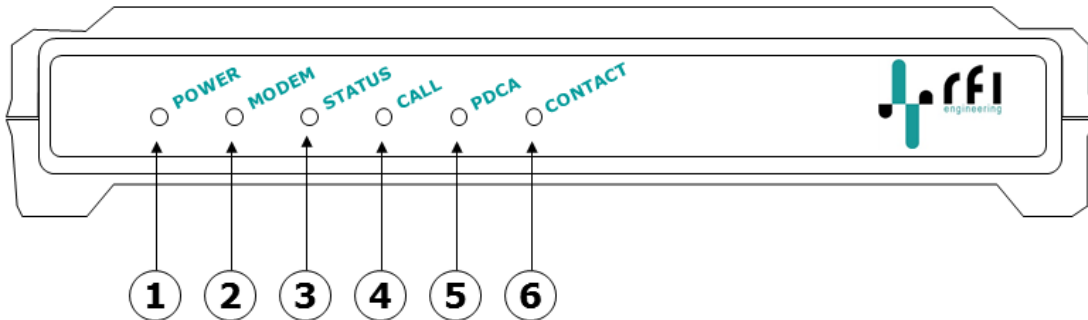
The C-router is equipped with a configurable idle timer. This idle timer disconnects the CDMA call when there is no data being received from the remote (dialer) end. The factory default setting for this timer is 300 seconds (5 minutes). Every time you type a command from the dialer end the idle timer will be reset to 5 minutes.

If you want to change the idle timer to another value, for example 600 seconds (10 minutes), you would give the following command:

```
rfiembedded:~# hibc get /config/mobile/call/call_idle_time 300
rfiembedded:~# hibc set /config/mobile/call/call_idle_time "600"
rfiembedded:~# hibc get /config/mobile/call/call_idle_time 600
```

6 LED status and patterns of the C-router

The LED patterns used in the C-router can be helpful for troubleshooting. If you are troubleshooting from a remote location, ask the customer or support engineer to carefully observe the LED patterns and supply this information to you.



| | |
|---|-----------------------------|
| 1 | Blue, Power LED |
| 2 | Green, modem Status |
| 3 | Green, CDMA Status |
| 4 | Green, Call Status |
| 5 | Green, CDMA1x status |
| 6 | Green, Contact/Relay status |

6.1 Power LED

The blue power LED is hardwired to the power supply of the C-router and should always be lit when the unit is in operation.

6.2 Modem status LED

The green modem status LED indicates the current status of the C24 Motorola modem which is part of the C-router.

6.3 Status LED

The green status LED indicates the current status of the CDMA subsystem of the router.

STARTUP

During the startup process, the green status LED should blink; the blue power LED should always be ON.

Status LED Patterns

The green status LED blinks according to specific patterns during operation of the unit. The patterns indicate different statuses of the CDMA subsystem.

| | |
|---|---|
| Steady Flashing (100ms on/100ms off) | Booting, searching for network |
| Short Flash (50ms on/2s off) | Successful connected to the CDMA network, idle. |
| Long Flash (2s on/50ms off) | Incoming call to C-router |

| | |
|---|---|
| Steady ON | The C-router answered the incoming call, call in progress |
| Hyper Active Flashing (50ms on/50ms off) | Error connecting to CDMA network, network cannot be found or no network coverage. |

! **Please note:** When the unit is being upgraded with new software the Status LED is steady flashing. Do not unplug the unit whilst upgrading.

6.4 Call status LED

The green call status LED indicates if there is a CDMA call ongoing. When there is no call the LED will be off. Once a CDMA call is in progress, i.e. someone has contact with the modem over the CDMA network the LED will be lit.

6.5 PDCA status LED

The green PDCA status LED indicates when the C-router has successfully connected to the CDMA1x network of the CDMA operator. When there is no CDMA1x coverage possible the LED will be off.

6.6 Relay status LED

The C-router already has a relay status LED but NO relay contact is present in the current hardware. Please note that the relay itself will be placed upon the following release of the hardware. This relay can be used to reset the remote WAN by disconnecting the mains power supply. In other words, the WAN router can be remotely power cycled.

The relay is activated from the command line using the `toggle_relay` command. The command itself gives helpful information when you type `toggle_relay -h`.

As an example:

```
root@C-router-00804855565C:~$ toggle_relay -h
usage: toggle_relay

-t <timeout> Toggle delay
-c           Close contact (device off)
-f           Open contact (device on)
-h           Show this help
```

To toggle the relay to initiate a power cycle you give the following command:

```
root@C-router-00804855565C:~$ toggle_relay
```

In which case the relay is activated for 5 seconds. Other timeout values can be specified on the command line by specifying a timeout value (in seconds) behind the command

Permanently activating the relay is done as follows:

```
root@C-router-00804855565C:~$ toggle_relay -c
```

Permanently de-activating the relay is done as follows:

```
root@C-router-00804855565C:~$ toggle_relay -f
```