R-Idge

6LoWPAN USB router

Firmware Configuration

Manual

ROSAND
TECHNOLOGIES

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1. Introduction

CFGTOOL - Configuration Tool - is a program for configuring the ROSAND Technologies products. It can configure the product parameters, by using the serial programming protocol.

CFGTOOL can be used effectively via the command line to read, write or delete the ROSAND Technologies product parameters.

CFGTOOL supports the following basic programmer type: serial. New configurators will be added in the future to make CFGTOOL work with different programmers.

1.1 History and Credits

CFGTOOL is derived from the program AVRDUDE written by Brian S. Dean. The texi formatting was modeled after that of the Simulavr documentation by Ted Roth.

2. Command Line Options

2.1 Option Descriptions

CFGTOOL is a command line tool, used as follows:

```
cfgtool -p prodno options …
```

Command line options are used to control CFGTOOL's behaviour. The following options are recognized:

`-p` *`prodno`*

This is the only mandatory option and it tells CFGTOOL what type of product is connected to the configuration tool. The *prodno* parameter is the product's id listed in the configuration file. Specify -p ? to list all products in the configuration file. If a product you have purchased is unknown to CFGTOOL, it means that the version of CFGTOOL is outdated. You need to upgrade CFGTOOL with a newer version. For CFGTOOL version 1.00, the following products are supported:

`ridge`	R-Idge USB Router - IEEE 802.15.4/6LowPAN Router
`rmote`	R-Mote Device - IEEE 802.15.4 Development Board

`-c` *`programmer-id`*

Specify the programmer to be used. The ***programmer-id*** parameter is the programmer's id listed in the configuration file. Specify -c ? to list all programmers in the configuration file. You can use the 'default_programmer' keyword in your `~/.cfgtoolrc` file to assign a default programmer to keep from having to specify this option on every invocation. For CFGTOOL version 1.00, the following programmer ids are supported:

`serial`	ROSAND Technologies Serial Line Configurator

`-C` *`config-file`*

Use the specified config file for configuration data. This file contains all programmer and product definitions that CFGTOOL knows about. If not specified, CFGTOOL reads the configuration file from `/etc/cfgtool.conf` (for Linux).

`-n`

No-write - disables actually writing data to the product (useful for understanding CFGTOOL details).

`-P` *`port`*
Use port to identify the serial port to which the product is attached. Normally, the default serial port is used. On Linux operating system, the default port is */dev/ttyACM0*.

If you need to use a different serial port, use this option to specify the alternate port name.

`-U` *`param`*`:`*`op`*`:[[`*`index:`*`][`*`value:`*`]]`
Perform a parameter operation. Multiple '`-U`' options can be specified in order to operate on multiple parameters on the same command-line invocation. The *param* field specifies the parameter to operate on. Typically, a product configuration at least contains the parameters **`channel`** , **`power`** and **`panid`**. For CFGTOOL version 1.00, the following parameters are supported:

`channel`
The 802.15.4 channel number. The parameter *channel* is a 8-bit field. Its factory-default value is 26.

`power`
The RF output power value. The parameter *power* is a 8-bit field. Its factory-default value is 37 (-18dBm).

`panid`
The 802.15.4 PAN ID (Personal Area Network Identifier). The parameter *panid* is a 16-bit field. Its factory-default value is 0xABCD.

`prefix`
The number of 6LoWPAN Header Compression (LOWPAN-IPHC) contexts. The parameter *prefix* is a 8-bit field. Its factory-default value is 0, no LOWPAN-IPHC context defined.

`context`
The LOWPAN-IPHC Prefix value. Each *context* can be read or deleted by indicating its index (index <= prefix). A new *context* is written at the end of the list. Up to five (5) Contexts can be configured. The parameter *context* is a 16-byte (128-bit) field. There is no factory-default defined *context*.

The *op* field specifies what operation to perform:

`r`
read the specified parameter and write the result to the standard output. To read a context, its index must be indicated

`w`
write parameter value. Value can be in decimal or hexadecimal format (preceeded by 0x).

`a`
add value to a parameter list. It is used to add a new parameer to the list (e.g. context). Index must be indicated and equal to the next available item.

`d`
delete value from a parameter list. To remove a parameter from the list (e.g context), its index must be indicated.

`-v`
Enable verbose output.

2.2 Example Command Line Invocations

Read the configured channel number of a R-Idge USB router connected to the default port:

```
% cfgtool -p ridge -c serial -U channel:r:
        channel = 26
%
```

Change the PAN ID value of a R-Mote device connected to the port `/dev/ttyACM1`:

```
% cfgtool -p rmote -c serial -P /dev/ttyACM1 -U panid:w:0xBEEF:
cfgtool: 2 bytes of panid written
cfgtool: verifying panid memory:
cfgtool: reading on-chip panid data:
cfgtool: verifying ...
cfgtool: 2 bytes of panid verified
%
```

Using the default programmer and the default port, read the context Prefix number 3 of a R-Idge USB router:

```
% cfgtool -p ridge -U context:r:3:
        context 3 = 2001:db08:1:0:0:0:0:0:
%
```

Using the default programmer and the default port, add context Prefix on a R-Idge USB router which has 4 prefixes configured:

```
% cfgtool -p ridge -U context:a:5:1234:abcd:01ef:
cfgtool: 16 bytes of context written
cfgtool: verifying context memory:
cfgtool: reading on-chip context data:
cfgtool: verifying ...
cfgtool: 16 bytes of context verified
%
```

Using the default programmer and the default port, delete context Prefix number 2 of a R-Mote device:

```
% cfgtool -p rmote -U context:d:2:
%
```

3. Configuration File

CFGTOOL reads a configuration file upon startup which describes all of the parts and programmers that it knows about.

CFGTOOL first looks for a system wide configuration file in a platform dependent location. On Linux, this is usually `/etc/cfgtool.conf`. The name of this file can be changed using the ‘`-C`’ command line option. After the system wide configuration file is parsed, CFGTOOL looks for a per-user configuration file to augment or override the system wide defaults. On Linux, the per-user file is `.cfgtoolrc` within the user’s home directory.

3.1 CFGTOOL Defaults

default_serial = "*default-serial-device*";
Assign the default serial port device. Can be overridden using the ‘`-P`’ option.

default_programmer = "*default-programmer-id*";
Assign the default programmer id. Can be overridden using the ‘`-c`’ option.

3.2 Programmer Definitions

The format of the programmer definition is as follows:

```
programmer
    id       = <id1> [, <id2> [, <id3>] ...];  # <idN> are quoted strings
    desc     = <description> ;                 # quoted string
    type     = <programmer type>;              # programmer type
  ;
```

3.3 Products Definitions

The format of the programmer definition is as follows:

```
product
    id               = <id> ;                 # quoted string
    desc             = <description> ;        # quoted string
    parameter <param>
        index           = <num> ;             # numeric
        size            = <num> ;             # numeric
        format          = <num> ;             # numeric
      ;
  ;
```

3.4 Other Notes

Not all *parameter* types will implement all instructions.

- Example *parameter* types are: `channel`, `power`, `panid`, `prefix`, `context`, `key`.
- The *parameter* type specified on the CFGTOOL command line must match one of the *parameter* types defined for the specified *product*.

A. Platform Dependent Information

A.1 Linux

A.1.1 Linux Installation

A.1.1.1 Installation from source files

You can download the source tarball from http://www.rosand-tech.com/downloads. To build and install from the source tarball on Linux systems:

```
$ gunzip -c cfgtool-1.00.tar.gz | tar xf -
$ cd cfgtool-1.00
$ ./configure
$ make
$ su root -c 'make install'
```

The default location of the install is into `/usr/local` so you will need to be sure that `/usr/local/bin` is in your `PATH` environment variable.

If you do not have root access to your system, you can do the the following instead:

```
$ gunzip -c cfgtool-1.00.tar.gz | tar xf -
$ cd cfgtool-1.00
$ ./configure --prefix=$HOME/local
$ make
$ make install
```

A.1.1.2 RPM Package

On rpm based Linux systems (such as RedHat, Fedora, SUSE, etc), you can download the rpm binaries from http://www.rosand-tech.com/downloads.

```
$ su - root
# rpm cfgtool-1.00-001.i686.rpm
```

You can also build and install the rpm binaries directly from the tarball:

```
$ su - root
# rpmbuild -tb cfgtool-1.00.tar.gz
# rpm -Uvh /root/rpmbuild/RPMS/i686/cfgtool-1.00-001.i686.rpm
```

Note that the path to the resulting rpm package, differs from system to system. The above example is specific to Fedora.

A.1.1.3 DEB Package

On deb based Linux systems (such as Debian, Ubuntu, etc), you can download the deb package from http://www.rosand-tech.com/downloads.

```
$ su - root
# dpkg -i cfgtool_1.00-001_i386.deb
```

A.1.2 Linux Configuration Files

When CFGTOOL is build from the source tarball using the default '`--prefix`' configure option, the system configuration file for a Linux system is located at `/usr/local/etc/cfgtool.conf`.

When CFGTOOL is installed using from an rpm package, the system configuration file will be always be `/etc/cfgtool.conf`.

When CFGTOOL is installed using from a deb package, the system configuration file will be always be `/etc/cfgtool.conf`.

The system default configuration file can be overridden by using the '`-C`' command line option. Additionally, the user's home directory is searched for a file named `.cfgtoolrc`, and if found, is used to augment the system default configuration file.

A.1.3 Linux Port Names

On Linux, the default serial port device is `/dev/ttyACM0`. CFGTOOL uses the tty driver for serial port access.

A.1.4 Linux Documentation

CFGTOOL installs a manual page as well as info, HTML and PDF documentation. The manual page is installed in `/usr/local/man/man1` area, while the HTML and PDF documentation is installed in `/usr/local/share/doc/cfgtool` directory. The info manual is installed in `/usr/local/info/cfgtool.info`.

Note that these locations can be altered by various configure options such as '`--prefix`'.

There are also rpm and deb documentation packages. They can be found at http://www.rosand-tech.com/downloads.

B. Troubleshooting

Please report any bugs encountered to mailto:tech-support@rosand-tech.com.