Marvelmind modem C library and example.

Version 2017.01.28

1. About the library.

Marvelmind modem C library provides an API and example of communicating with modem via USB interface with the "request-response" protocol described in document *"Protocol of data exchange with modem via USB interface"*. Not all commands described in protocol are supported in current version of library, user can expand the functionality, using the implemented commands as examples. Supported operating systems:
- Microsoft Windows
- GNU/Linux

2. Building the example.

 To build the example on GNU/Linux or another *nix-OS you need to have installed GCC. Then unpack the archive, change directory to unpacked library and run make in console. Then you can execute ./marvelmind_modem_c to watch data from Marvelmind beacons being received.
Prebuilt example for Microsoft Windows is included in the archive. If you want to rebuild it, you may use integrated development environment (such a MS Visual Studio, Code::Blocks etc.): create empty console project and add 3 source files (marvelmind_modem.c, marvelmind_modem.h, modem_example.c) into the project and run build. You may need to change the project settings to successfully build it.

3. Command line options of the example.

You may specify command line parameters to select following options:

Name of parameter	Function	Default
Starting from 'n' following by beacon address, for example 'n48'	Address of beacon to communicate	n2
'wake'	Wakes up selected beacon	
'sleep'	Forces the selected beacon to sleep	
'deepsleep'	Forces the selected beacon to deep sleep	
'state'	Reads state of selected beacon	state
Integer value, for example '5'	Number of repeats of selected command	1
Any other name	Name of serial port	Windows: com3 Linux: /dev/ttyACM0

See examples of using of the command line parameters in appendix.

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4. Using the library.

Example of library usage see in the file **modem_example.c**. You can use the library in your own projects by adding file **marvelmind_modem**.c into build, including **marvelmind_modem.h**:

        #include "marvelmind_modem.h"

and your code may follow the sequence:

4.1. Call **createMarvelmindModem** to allocate memory for library structure (struct MarvelmindModem). You need to call it before any other usage of the library

4.2. Modify some variables in created structure, if needed (for example, serial port name).

4.3. Call **startMarvelmindModem** to tell library to start thread, which will process next requests for modem communications.

4.4. Call functions to initiate requests to modem:

4.4.1. **startGetBeaconState** – read state of selected beacon (voltage level, radio signal level, working time).

4.4.2. **startSendSleepControlCmd**– send command to wake the selected beacon or force it to sleep.

4.5. After the exchange is finished, the library will call the user callback function, which is one of the parameters of functions described in 4.4. The user code can check if the exchange was successful and process incoming data for the exchanges of reading.

4.6. After usage call **stopMarvelmindModem** to stop the thread

4.7. Call **stopMarvelmindModem** to free memory, used by Marvelmind modem library

Appendix. Examples of usage of the example.

The following screenshot shows the sequence of runs of the example, which wakes the beacon, reads the beacon state several times and forces it to sleep.
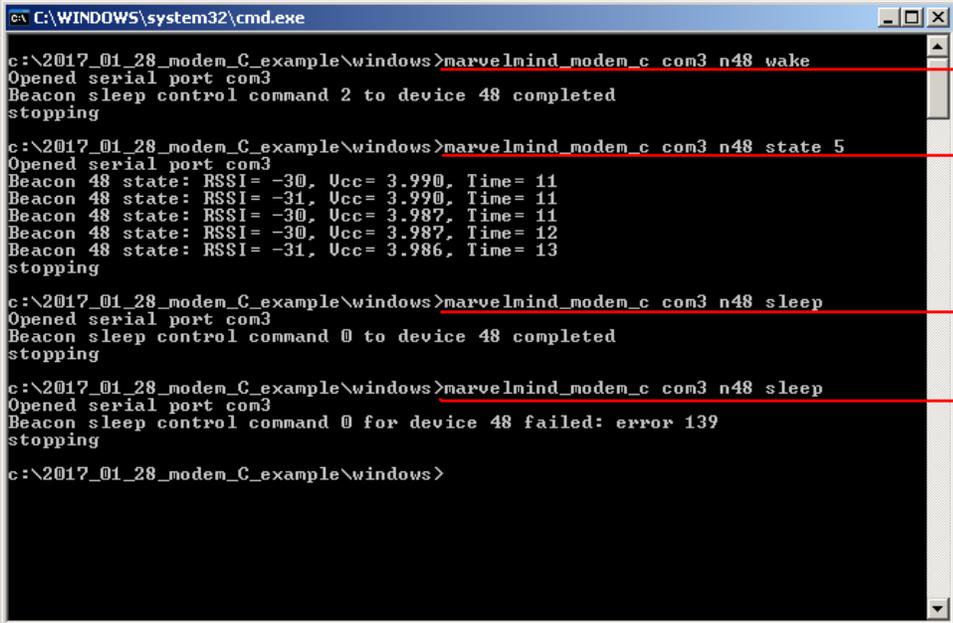
```
C:\WINDOWS\system32\cmd.exe                                      _|_|X|

c:\2017_01_28_modem_C_example\windows>marvelmind_modem_c com3 n48 wake
Opened serial port com3
Beacon sleep control command 2 to device 48 completed
stopping

c:\2017_01_28_modem_C_example\windows>marvelmind_modem_c com3 n48 state 5
Opened serial port com3
Beacon 48 state: RSSI= -30, Ucc= 3.990, Time= 11
Beacon 48 state: RSSI= -31, Ucc= 3.990, Time= 11
Beacon 48 state: RSSI= -30, Ucc= 3.987, Time= 11
Beacon 48 state: RSSI= -30, Ucc= 3.987, Time= 12
Beacon 48 state: RSSI= -31, Ucc= 3.986, Time= 13
stopping

c:\2017_01_28_modem_C_example\windows>marvelmind_modem_c com3 n48 sleep
Opened serial port com3
Beacon sleep control command 0 to device 48 completed
stopping

c:\2017_01_28_modem_C_example\windows>marvelmind_modem_c com3 n48 sleep
Opened serial port com3
Beacon sleep control command 0 for device 48 failed: error 139
stopping

c:\2017_01_28_modem_C_example\windows>
```

Connects to modem on COM3 port and wake up beacon 48

Reads state of beacon 48 five times (with 0.5 sec interval)

Forces beacon 48 to sleep

Forces beacon 48 to sleep. Because beacon is already sleeping, it was not reply and the call returns an error

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