

# Acoustic Communications Group

Woods Hole Oceanographic Institution

Micro-Modem Firmware Update Tool

Documentation and How-To Guide, June 2016, Version 1.1



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## **Introduction**

### *What's New:*

New features for the WHOI ACOMMS Micro-Modem Firmware Update Tool include an optional Graphic User Interface (GUI) for inexperienced users, as well as the ability to generate a log file for the modem update. In addition, the new version includes changes to eliminate a bug with switching baud rates on the modem during the update, and also provides the option to restart the modem after completion.

### *The Software:*

The WHOI ACOMMS Micro-Modem Firmware Update Tool provides a convenient and expedient way to install and flash the latest firmware for modems. There are now two options for the same tool: the `.py` file, which uses the traditional command-line interface (CLI) from older versions of the update script, and the `.exe` file, which runs the new Graphic User Interface (GUI). The purpose is to provide a more user-friendly option to run the Tool without installing the Python Interpreter, or for users who are unfamiliar with the modem or the command line. File formats supported for updates include `.ldr` for the modems and `.hex` for the coprocessors. The Tool is originally written in Python 2.7.

## **Setup**

### *The Serial Ports:*

To run the Firmware Update Tool, users must connect the modem to their computer via a working Serial connection and have it be discovered by their computer. Options include using a Serial-to-USB adapter, or a Serial-Port-to-Ethernet hub. To verify the Serial connections on a Windows computer, go to Control Panel > Device Manager > Ports. Generally speaking, users should refrain from connecting their modem to COM1, as some operating systems typically take that by default.

### *The .exe file:*

In order to use the .exe file, the user must be running Windows 7 x64bit. For other operating systems, refer to the .py option. Users do not need to have Python on their computer to use the .exe file. In fact, no additional programs are required to run the Tool as .exe. However, a serial port monitoring application such as RealTerm is recommended to verify the working status of the modem following use of the Firmware Update Tool.

### *The .py file:*

In order to use the .py file, users must first download and install Python 2.7 from <https://www.python.org/downloads/> . Users must then install the pySerial and Progressbar modules. Open cmd.exe (Terminal for Linux), and run the following commands:

- *pip install pyserial*
- *pip install progressbar*

Other modules required for the .py version of the Tool include *sys, os, time, hashlib, binascii, argparse, tempfile, tkinter, ttk, threading, and Queue*. All these modules should come included with the installation of Python 2.7.

Note: To run the .py file with the GUI, save it as with the extension .pyw and run it with no arguments from the command line.

## **Usage of the .exe file**

Before starting, ensure that the modem is booted to the correct slot for the update in question. For most cases, this should be the Recovery slot; for Coprocessor updates it is likely Slot 1. To begin the firmware update, click on the executable file to start. A welcome window should appear once the program opens and prompt to continue.

On the next screen, configure the parameters for your update. They are as follows:

- *Serial Port* - Select the port at which the modem is connected in the drop-down menu. The menu contains a list of all available ports on your computer.
- *Current Baud Rate* - Select the Baud Rate at which the modem is currently operating.
- *Firmware Slot* - Select the slot to which the update should be applied. Note that this slot should not be booted at the time of update.
- *UART* - Select the modem's current UART
- *Reboot* - Selecting yes reboots the modem following the update. This option will reboot to the newly updated slot.
- *"Fast" Option* - Selecting yes will transmit the firmware update to the modem at a faster baud rate (921600 bps) than the default (115200 bps).

- *Verbose* - Selecting yes will run the update in verbose mode, displaying a live feed of all received modem messages. (Note that a complete update record is still available in the log file even if verbose mode is not selected)

A file window will then appear and prompt the user to select the firmware update file. Navigate to the update file and select *Open*.

**Insert Update Parameters**

Please enter the name or path of your serial port:  
(e.g. COM1 on Windows or /dev/ttyS1 on Linux)

COM2

Please enter the current baud rate of the serial port:

19200

Please select the firmware slot to which the update will flash:

Slot-1  
 Slot-2  
 Recovery  
 Bootloader  
 Coprocessor

Please select the current UART connected to the modem:

1

Would you like the modem to reboot to the \*updated\* slot upon completion?

Yes  
 No

Would you like to upload firmware at 921600 bps?  
(This requires capable serial port and modem already running firmware newer than 2.0.16000)

Yes  
 No

Would you like a verbose display of all modem messages?

Yes  
 No

Choose Firmware File

The update will then begin. A progress bar will be displayed at the top of the screen, and the Update Tool will play a notification sound once the update is complete. The log file directory will appear on-screen upon completion.

## Usage of the .py file

Before starting, ensure that the modem is booted to the correct slot for the update in question. For most cases, this should be the Recovery slot; for Coprocessor updates it is likely Slot 1. To begin the firmware update, open the Terminal and navigate to the Tool's directory.

To run the program, enter the command as follows: `python update_fw.py [serial port] [baud rate] [file name] [optional tags]`

- Example: `python update_fw.py COM2 19200 C:\foo\bar.ldr -s Slot-1 -u 1 -r -f -v`

The following command line arguments are used to run the program.

Name	Status/Tags	Usage
Serial Port	Mandatory	On Windows enter as COM1, on Linux enter as /dev/ttyS1
Baud Rate	Mandatory	Specify the modem's current baud rate.
File Name	Mandatory	Path to the firmware update file.
Slot	Optional, "-s" "--slot"	Specify which slot to flash. Options are "Slot-1", "Slot-2", "Recovery", "Bootloader", and "Coproc". Default is Slot 1.
UART	Optional, "-u" "--uart"	Specify UART with a digit 1-4 following the tag. Default is 1.
Reboot	Optional, "-r" "--reboot"	Reboots the modem on completion. Default is no reboot.
Fast Mode	Optional, "-f" "--fast"	Transmits packets at 921600 bpm. Requires firmware at or above 2.0.16000. Default is slow mode (115200).
Verbose Mode	Optional "-v" "--verbose"	Switches to verbose mode. Default is a non-verbose output.

## **Common Error Messages**

Most error messages that may appear will come up on the screen in GUI mode, and simply require that the user try the update again. All error messages will be available in the log file, stored in the user's system directory for temporary files as *.txt* with the prefix "WHOI\_Firmware\_Update\_".

*Too few arguments* - Occurs when one or more of the mandatory arguments is missing while trying to start the update in the command line. See "Usage of the .py File" for more information.

*Trying to flash from current booted slot* - Occurs when the modem is booted from the slot the program is attempting to update. Reboot with *\$CCRST* and reattempt.

*Invalid Erase Attempt* - Occurs when the modem is booted from an incorrect slot for the update at hand, typically while trying to update the Coprocessor from the Recovery Slot. Reboot with *\$CCRST* and reattempt.

*Freezes/Crashes in GUI Verbose Mode* - Known to happen on some computers. Switch to non-verbose mode and check the log file afterwards to get the verbose information.

*ValueError: I/O Operation on closed file* - Occurs when the program tries to write to the log file after it has already been closed, usually as the result of a different error. This error can be disregarded; the log file remains intact.

*UnicodeDecodeError* - Occurs when the modem's baud rate doesn't match up with the program's baud rate. *This error may not appear on the GUI version of the program outside of the window freezing.* The error only requires a reattempt at the update. This error is highly unlikely with the new version of the Firmware Update Tool.

Note that if the Firmware Update Tool terminates unsuccessfully during an update, then the modem will be left at the baud rate it ran for the update (either 115200 or 921600). The user will have to reset the baud rate manually before use or another update attempt.