



## **Firmware Reprogramming Guide**

8 July, 2016

# 1 UART Connection Hardware Setup

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Modules and adaptors may be reprogrammed using the procedure detailed in this document. Normally, our platforms will be delivered with the final firmware already pre-loaded, so this should not need to be part of a product's normal production. But, it is strongly suggested to incorporate a re-flashing mechanism into your final product, due to rapidly changing standards and target device Bluetooth stacks.

Typically, the following tools and equipment are necessary:

1. New flash image from Amp'ed RF Technology.
2. Serial cable to PC.
3. TTL to RS232 level shifter; when programming modules.

NOTE: Over the air, OTA, reprogramming is not covered in this guide.

## 1.1 UART Connections

The new firmware must be loaded using the UART interface. Access to this interface depends on the product type.

The minimum UART pins that are needed are the Rx and Tx pins. The RTS and CTS flow control pins are not used when programming devices, and should always remain floating during this procedure.

## 1.2 Modules

Amp'ed RF Bluetooth modules support TTL level UART communications, but a PC requires RS232 voltage levels. Therefore, a TTL to RS232 level shifter is required.

## 2 Terminal Configuration

To use the Flash Loader, the user must have a PC running HyperTerminal (or similar) with the following configuration in Figure 1.

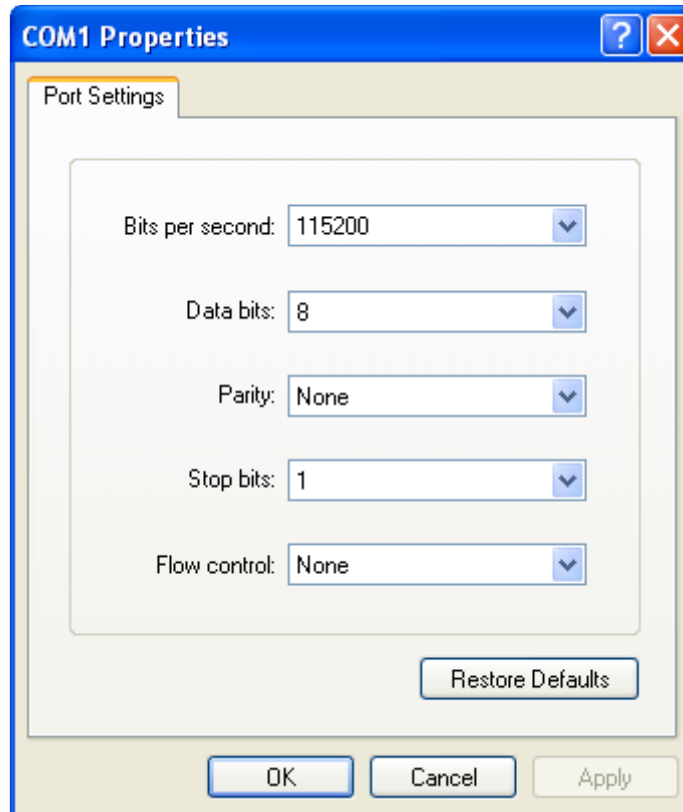


Figure 1. COM port properties

The default serial port setup for the flash loader is 115K bps, 1 stop bit, no party, 8 data bits, and HW flow control must be disabled.

## 2.1 Executing the Flash Loader

### 2.1.1 GPIO[2]

GPIO [2] of the module is used to select the flash loader option in NVM, in order to re-flash the application firmware. When the device is reset, the GPIO [2] state is read to determine the program execution section:

High (default): executes the application firmware.

Low: executes from the flash loader.

NOTE: The flash loader will only remain active for 2 seconds following a reset. After this time, the normal application will execute, and re-flashing will not be able to proceed.

The flash loader requires a y-modem protocol, and uses the main UART running at 115200 baud.

### 2.1.2 AT Command

There is also an AT command which will erase the current application, and launch the flash loader. This command is:

For BT modules: `AT+AB InvalidateApplication`

For wifi modules: `AT+WF InvalidateApplication`

Once entered, the previous application FW is erased. With this option, there is no longer a 2 second timeout of the flash loader, since no application exists.

## 2.2 Flash Loader Menu

Running the Flash Loader displays the following menu in the HyperTerminal window.

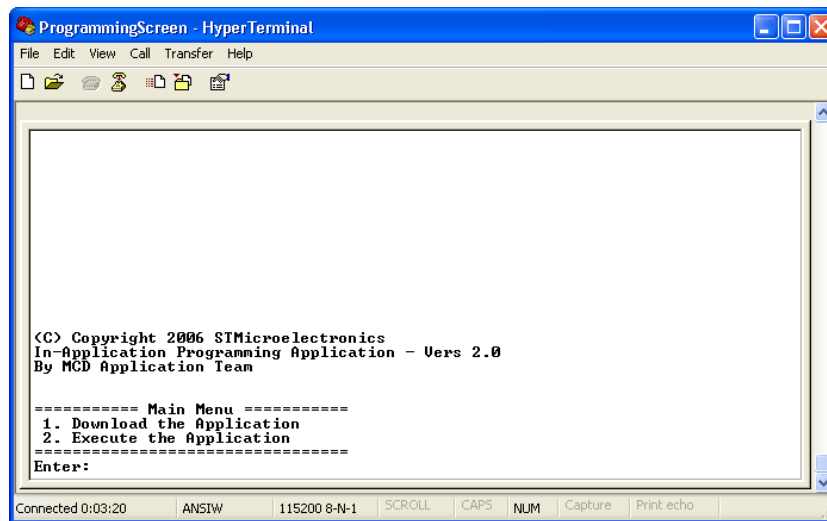


Figure 2. Flash Loader Menu

## 2.3 Download Image to the Internal Flash Memory

To download a binary file via HyperTerminal to the internal Flash memory:

1. If the binary image size is **<256K** bytes, press 1 on the keyboard to select **Download the Application** menu.

**Or**

1. If the binary image size is **>256K** bytes, press 4 on the keyboard to select **Download the Application** menu.
2. Select **Transfer** and then **Send File**
3. In the **Filename** field, type the name and path of the binary file you want to download
4. From the protocol list, select the **Ymodem** protocol
5. Click on the **Send** button

## 2.4 Execute the New Program

Once the new program has been loaded, the device will automatically execute the new program.

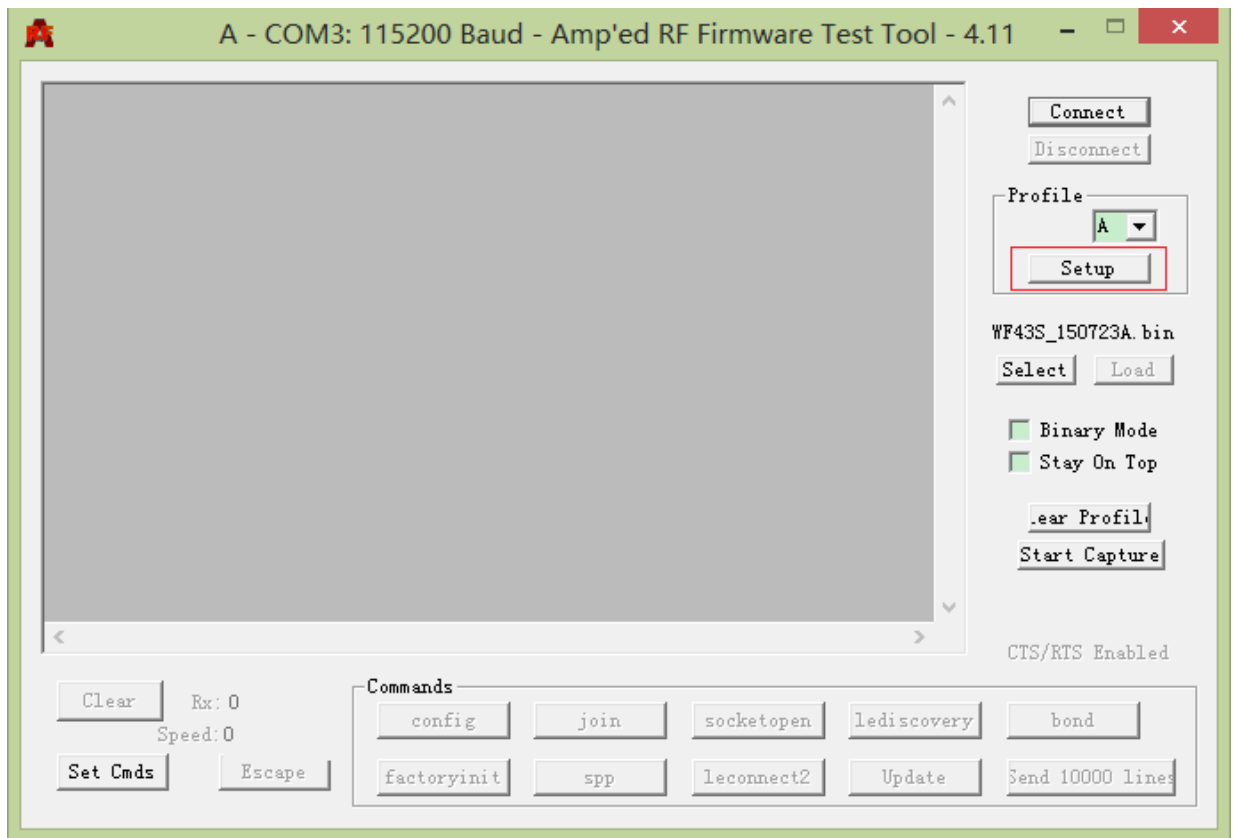
NOTE: After the new application is running, an additional power cycle or reset is needed to initialize the configuration variables within the FW.

### 3 Term Test Tool

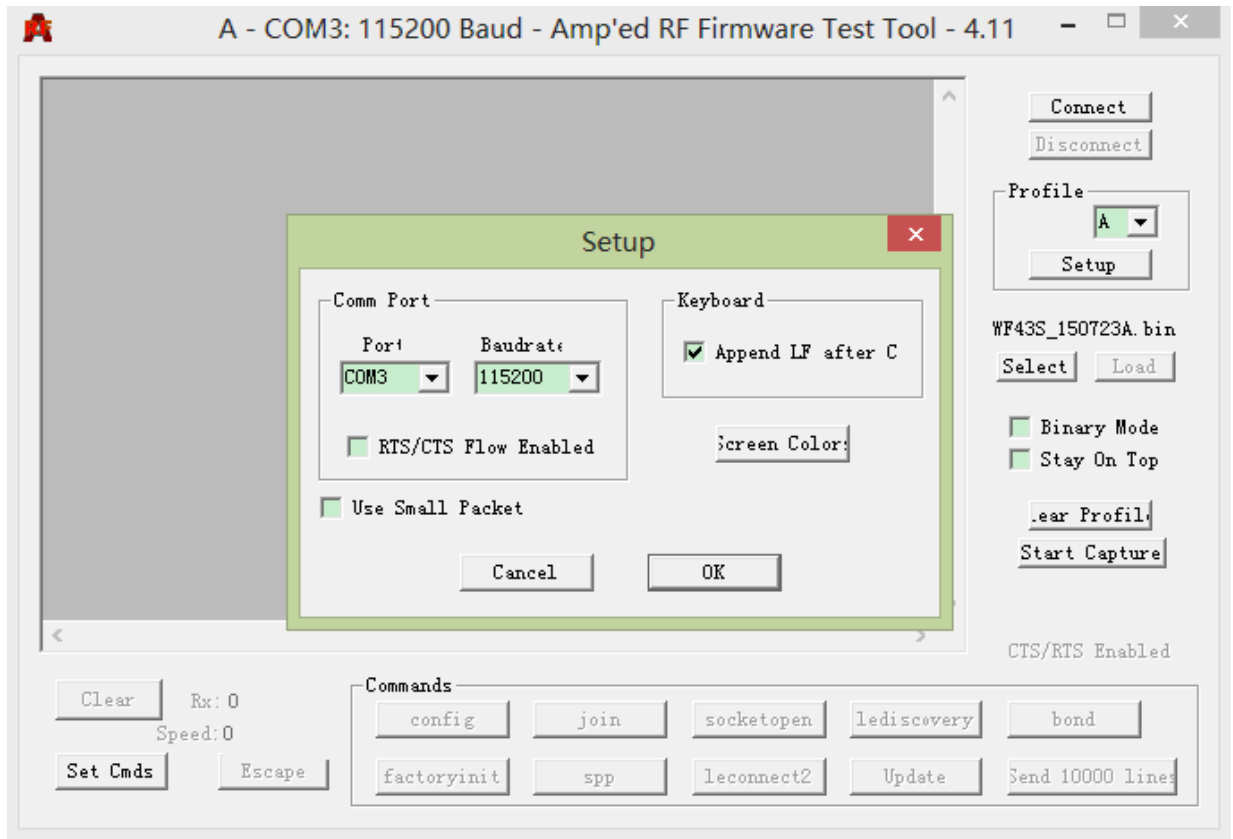
Instead of HyperTerminal we have our own Term Test tool. A user can download this software tool from our website under the development tools tab. Suggest to use this method.

#### 3.1 How to use

Step 1: Click "Setup"



Step 2: Change the setup configuration



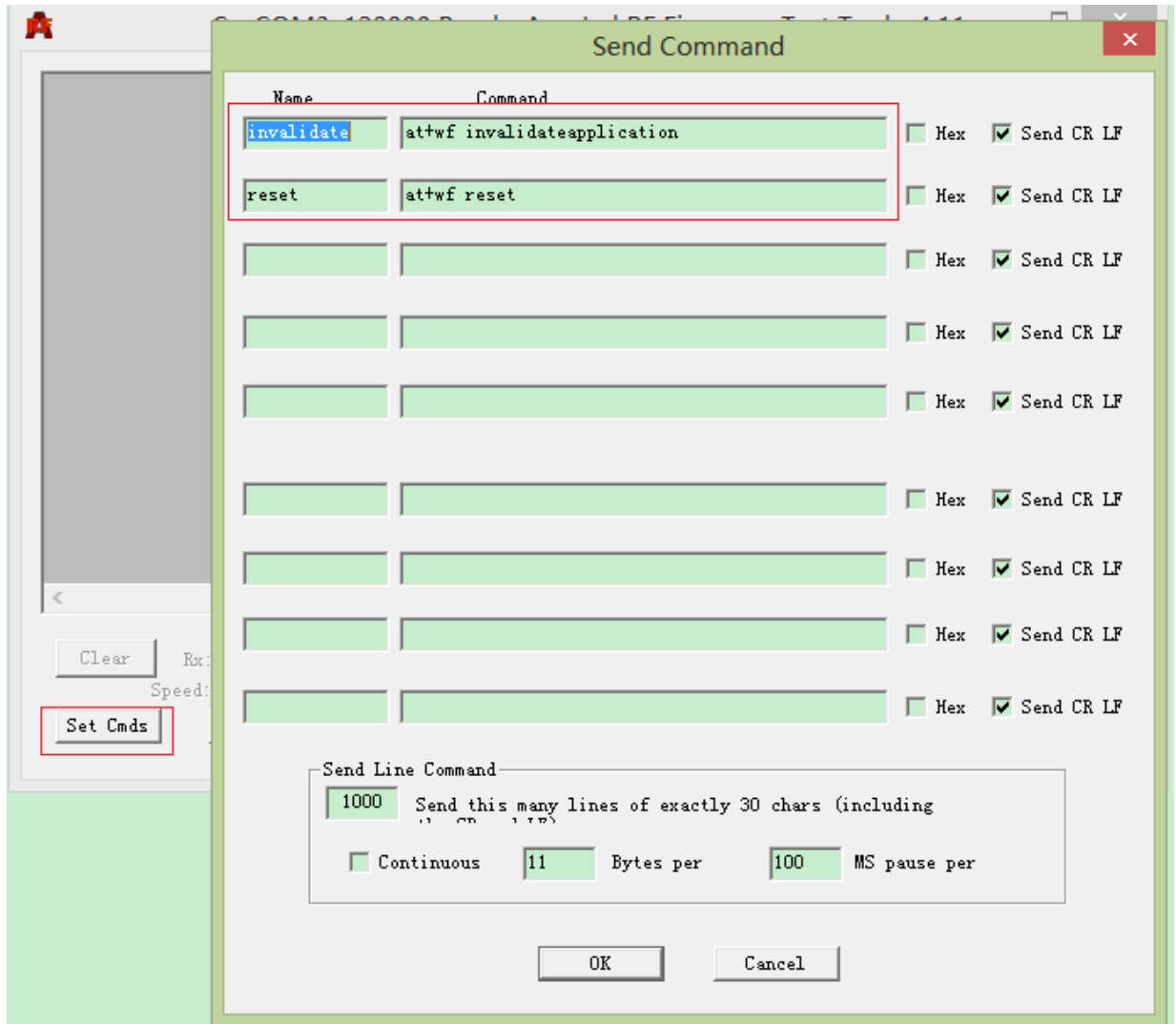
Change the “Port” and “Baudrate” (default is 115200 in Boot mode). Do not select “RTS/CTS Flow Enabled” or “Use Small Packets” when re-flashing.



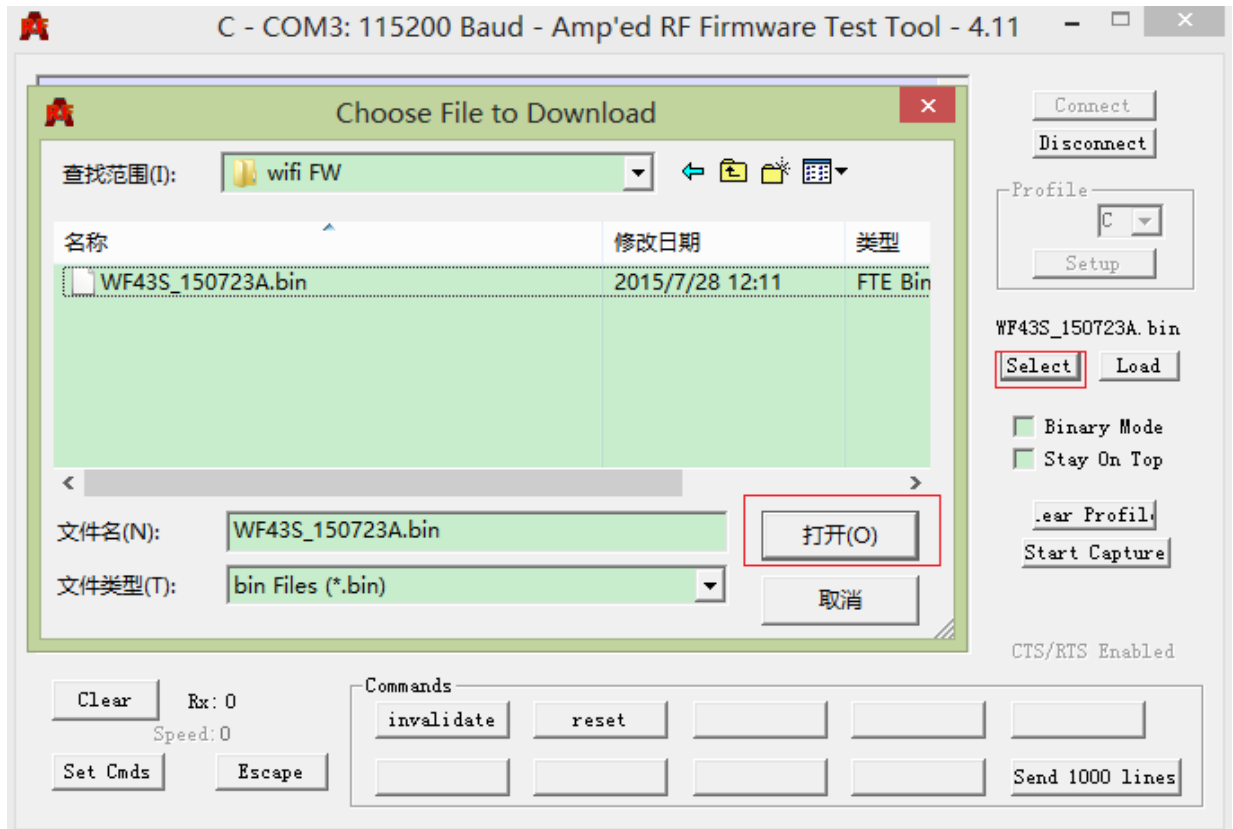
**Step 3: Add the command**

Click “SetUp Cmds”, add the “AT+WF InvalidateApplication” command (for BT modules, the command is “AT+AB InvalidateApplication”) to one of these buttons and name it. Press “OK”.

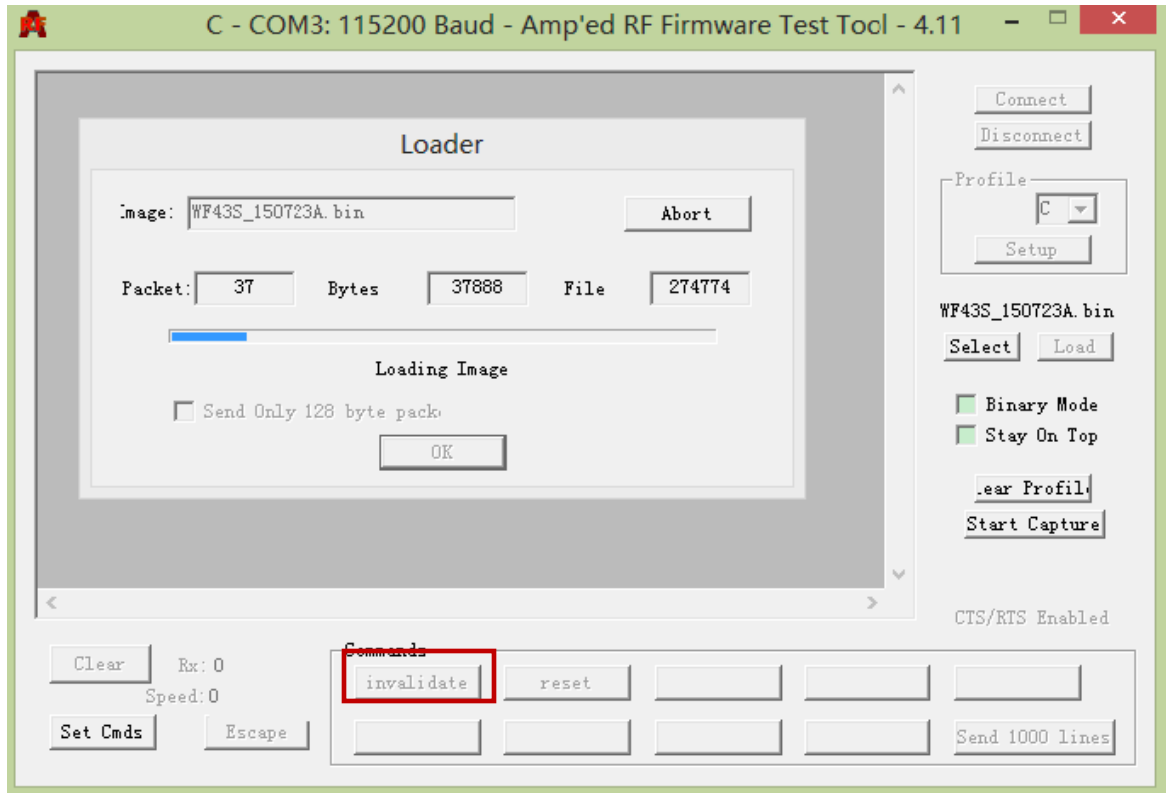
Note: AT+AB reset for BT modules;  
AT+WF reset for wifi modules



Step 4: Click "Select" to add the new FW image (bin file).



Step 5: Click “Invalidate” to go into bootloader mode, and then click “Load” to update the new FW.



Step 6: Once in the bootloader menu

If the binary image size is **<256K** bytes, press 1 on the keyboard.

**Or**

If the binary image size is **>256K** bytes, press 4 on the keyboard.

Click Load to upload the new FW file.

Step 6: After finishing the loading process, make a reset by “at+wf reset” command (for BT modules, the command is “at+ab reset”) to config the NVM settings.

