

# **Firmware Reprogramming Guide**

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# **1 UART Connection Hardware Setup**

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.

### **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.

COM1 Properties		<b>?</b> ×
Port Settings		
Bits per second:	115200	
Data bits:	8	
Parity:	None	
Stop bits:	1 💌	
Flow control:	None	
Restore Defaults		
	K Cancel A	pply

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:

AT+AB 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.



ProgrammingScreen - Hyper Lerminal	
File Edit View Call Transfer Help	
	<u>^</u>
<pre>(C&gt; Copyright 2006 SIMicroelectronics In-Application Programming Application - Vers 2.0 By MCD Application Team </pre>	
Connected 0:03:20 ANSTW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo	.;;

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. Press 1 on the keyboard to select the 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, press **2** on the keyboard to select the **Execute the Application** menu and execute the code. Resetting the device should also automatically load 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.

### 3.1 How to use

Step 1: First Click on SetUp button.

🍂 A - COM4: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.3	
	Connect Disconnect
	Profile A 💌 Setup
	bt11MU_101223_Procom Select Load
	☐ Binary Mode ☐ Stay On Top
	Clear Profiles
	CTS/BTS Enabled
Clear Rx: 0 build Reset	
Set Cmds Escape	Send 1000 lines



🙀 A - COM4: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.3	
Setup Comm Port Port Baudrate COM4 115200 Keyboard Append LF after CR RTS/CTS Flow Enabled Screen Colors Use Small Packets Cancel OK	Connect Disconnect Profile Setup bt11MU_101223_Procom Select Load Binary Mode Stay On Top Clear Profiles
	CTS/RTS Enabled
Clear     Rx: 0     Commands       Set Cmds     Escape	Send 1000 lines

Step 2: Change the setup configuration as per your requirements.

Change the COM Port, Baud Rate, or Screen Color as needed. RTS/CTS flow control must remain disabled when re-flashing and also same for small packets. Please confirm your changes by pressing the "OK" button



Step 3: Click on Connect then SetUp Cmds, and add the AT+AB InvalidateApplication command to one of these buttons. When finished, press the OK button to add it.

🍂 A - COM4: 1152	200 Baud - Amp'	ed RF Firmware Test Tool - 4.3	
			Connect Disconnect
	Send Command		
	Name	Command	1
	Invalidate	at+ab invalidateapplication	🔲 Hex 🔽 Send CR LF
Reset	at+ab reset	🖵 Hex 🔽 Send CR LF	
			🔲 Hex 🔲 Send CR LF
		🗖 Hex 🧮 Send CR LF	
			🗖 Hex 🔲 Send CR LF
Clear			Hex Send CR LF
			F Hex F Send CR LF
Set Cinds Cases			F Hex F Send CR LF
			🗖 Hex 🔲 Send CR LF
	Send Lii 1000	ne Command Send this many lines of exactly 30 chars (including the CR a Continuous 2000 Bytes per block 100 MS	ind LF) pause per block
		OK Cancel	



🙀 A - COM4: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.3	
Chases File to Deveale ad	Connect Disconnect Profile
	Setup
Look in:       Itobian         A bt11L_110613H.bin         A bt11LU_110613H.bin         A bt11MU_110613H.bin         A bt11MU_110613H.bin         A bt12_110613H.bin         A bt12_110613H.bin         A bt12_110613H.bin         A bt11MU_110613H.bin         A bt12_110613H.bin         A bt22_110613H.bin	t11MU_110613H.bin Select Load Binary Mode Stay On Top
	Clear Profiles
File name: bt11MU_110613H.bin Open	
Files of type: bin Files (*.bin)	
Clear Rx: 0 Commands Invalidate Reset	CTS/RTS Enabled
	Sena Tuuu Iines

Step 4: Please click on the "Select" button to add the desired FW image.



Step 5: Now press user defined button for invalidate application, and the "Load" button to load application.

🍂 A - COM4: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.3	
at+ab invalidateapplication	Connect
Bootloader - Version 091204 (C) COPYRIGHT 2009 Amped RF Technology, Inc.	Disconnect
Note: Application has not been downloaded.	Profile A V Setup
1 Download application image 2 Execute application	6/11MU 110613H bin
b Change baudrate	Select Load
Enter: 1 Waiting for the file to be sent (press 'a' to abort) C	Elinary Mode
	Clear Profiles
<ul> <li>×</li> </ul>	CTC/RTC Enabled
Clear     Rx: 383     Commands       Set Cmds     Escape	Send 1000 lines

	Connect
Loader         Image:       bt11MU_110613H.bin         Abort         Packet:       102         Bytes Sent:       104448	Profile Setup bt11MU_110613H. Select
Loading Image Send Only 128 byte packets OK	Einary Mode Stay On Top Clear Profiles
<	CTS/RTS Enabl
Clear     Rx: 0     Commands       Invalidate     Reset	Send 1000 line



Step 6: After finishing the loading process, a second reset must be performed to configure the NVM settings.

🛊 A - COM4: 115200 Baud - Amp'ed RF Firmware Test Tool - 4.3	
Programming Completed Successfully!	Connect Disconnect
Name: btllMU_110613H.bin Size: 185358 Bytes  Enter:	Profile
AT-AB -Commandnode- AT-AB BDAddress 00043e213fb0 at+ab reset AT-AB ResetPending AT-AB -CommandMode-	bt11MU_110613H.bin Select Load
AT-AB BDAddress 00043e213fb0	🦳 Binary Mode 🥅 Stay On Top
	<u>Clear Profiles</u>
Commands	CTS/RTS Enabled
Liear Hx: 292 Invalidate Reset	
Set Cmds Escape	Send 1000 lines