Installing Bootloader Firmware

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Overview

This Technical Brief describes how to upload the "Bootloader" firmware into a Raveon M7 series product. A Bootloader firmware program is an additional small program that runs in the product when it is first turned on. It enables the product's main firmware program to be updated in the field.

Beginning with version D50 firmware, M7 data radio modems from Raveon have the Bootloader firmware pre-installed in them. If a person wishes to update the main firmware in these radios, they can do so using Raveon's *RadioManager* software and without having to open up the product's enclosure.

Phillips Flash Utility

Without the Bootloader, updating the main firmware in the product is more difficult, because the enclosure must be opened to access the config button, and a special software program from Phillips must be used to send new firmware to the product. To avoid opening the product, and using the Phillips program, Raveon developed the Bootloader firmware which simplifies the firmware update process.

The RV-M7 series transceivers utilize a Phillips ARM-based Microprocessor with internal FLASH memory. All RV-M7-GX series transceiver use an LPC2136 processor, which has 256kB of flash memory.

Phillips Semiconductor provides two different utilities to upload firmware into the microprocessor. Their Windows XP/Vista program is called "*LPC2000 Flash Utility*" Their Windows 7 utility is called FlashMagic. These utilities may be used in the field to upload the Bootloader firmware into the RV-M7 series transceivers.

The Phillips programs to download Bootloader firmware are available on Raveon's website at http://www.raveon.com/firmwareupdate.html

Procedure

The Bootloader firmware file name for the various Raveon products is listed below:

Product	Bootloader File Name	Web Link
RV-M7-Ux	2F700-2-BL-A06.hex	raveon.com/Firmware/bootloader/2F700-1-BL-A06.hex
RV-M7-Vx	2F787-1-BL-A06.hex	raveon.com/Firmware/bootloader/2F787-1-BL-A06.hex
RV-M7-Ux-GX	2F700-2-BL-A06.hex	raveon.com/Firmware/bootloader/2F700-2-BL-A06.hex
RV-PT-Ux	2F900-1-BL-A06.hex	raveon.com/Firmware/bootloader/2F787-1-BL-A06.hex

The Bootloader firmware may be downloaded from the Raveon web site by clicking on the above link, or going to http://www.raveon.com/firmwareupdate.html.

IMPORTANT!   **Make certain you put the correct Bootloader firmware in your product!**

If your Raveon product does not have the Bootloader installed, and you wish to do so, you will have to use the Phillips Flash Utility to put the Bootloader onto

M7 Series: Uploading Bootloader Firmware: Windows XP and Vista

Phillips has two versions of their flash utility, one for Windows XP and Vista, and the other for Windows 7/8. The V2.2.3 is for XP and Vista. It may or may not work on Windows 7/8.

1. Extract the .zip files if the firmware if the update was supplied in .zip format.

2. Open the Philips Flash Utility Installation.exe file inside the LPC21xx folder. The version must be V2.2.3 or higher. Walk through the installation steps to install the Philips Flash Utility program. The Utility program should open when the installation is complete. The Utility program window is shown below.
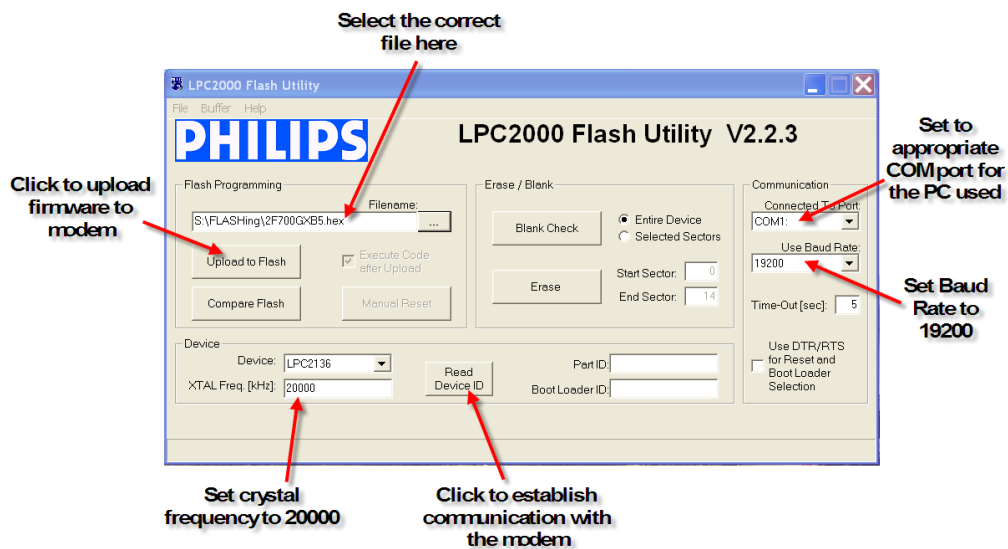
3. Select the appropriate COM port from the Connected To Port pull-down menu.

4. Set the baud rate to 19200 from the Use Baud Rate pull-down menu.

5. Set the XTAL Freq (kHz) to 20000.

6. Select the appropriate file to upload to the modem. The file name will end in a .hex extension.

7. Remove the four Phillips panhead screws securing the modem's rear panel to the housing. You don't need to disconnect the SMA GPS cable from the rear panel.

8. Carefully remove the rear panel from the modem housing. The internal SMA GPS cable has a 2" service loop to allow access to the modem's CONFIG button. The CONFIG button location is shown below.

9. Set a DC power supply for +12VDC. Set the power supply output OFF.

10. Connect the PC serial port to the modem's DB9 front panel connector.

11. Connect the modem's green 2-pin power connector to the power supply.

12. Press and hold the modem CONFIG button. Set the power supply output to ON, wait approximately 2 seconds, and release the CONFIG button. If these steps were performed correctly the modem's current draw should be approximately 30mA.

13. Press the Read Device ID button on the Philips Utility program window to establish communication with the modem. A reset message saying "Please reset your LPC2000 board now and then press OK!" will appear. DO NOT RESET POWER TO THE MODEM. Press the OK button. A "Read Part ID Successfully" message will appear in the lower left corner of the Flash Utility program window.

   Note: When the Read Device ID button is pressed the Utility program may display a "Cannot communicate with test board!" message. Disregard this message. Press the OK button and press the Read Device ID button again to establish communications with the modem.

14. Press the "Upload to Flash" button on the Philips Utility program window to upload the .hex file to the flash memory. For standard M7 radio modems, the Bootloader file name is 2F700-1-BL-A06.hex.

15. The Utility program will display a "File Upload Successfully Completed" in the lower left corner when the file upload is completed.

16. Repeat steps 7 through 14 for any additional modems.

M7 Series: Uploading Bootloader Firmware: Windows 7

The Phillips *FlashMagic* utility is a Windows 7 application for updating firmware in Phillips processors. It may or may not work on Windows XP and Vista.

1. Download the PhillipsFlashMagic.zip file from Phillips or the Raveon website.

2. Extract the .zip files if the firmware if the update was supplied in .zip format.

3. Open the Philips *FlashMagic* utility and w alk through the installation steps to install the Philips Flash Utility program. The Utility program should open when the installation is complete. The Utility program window is shown below.
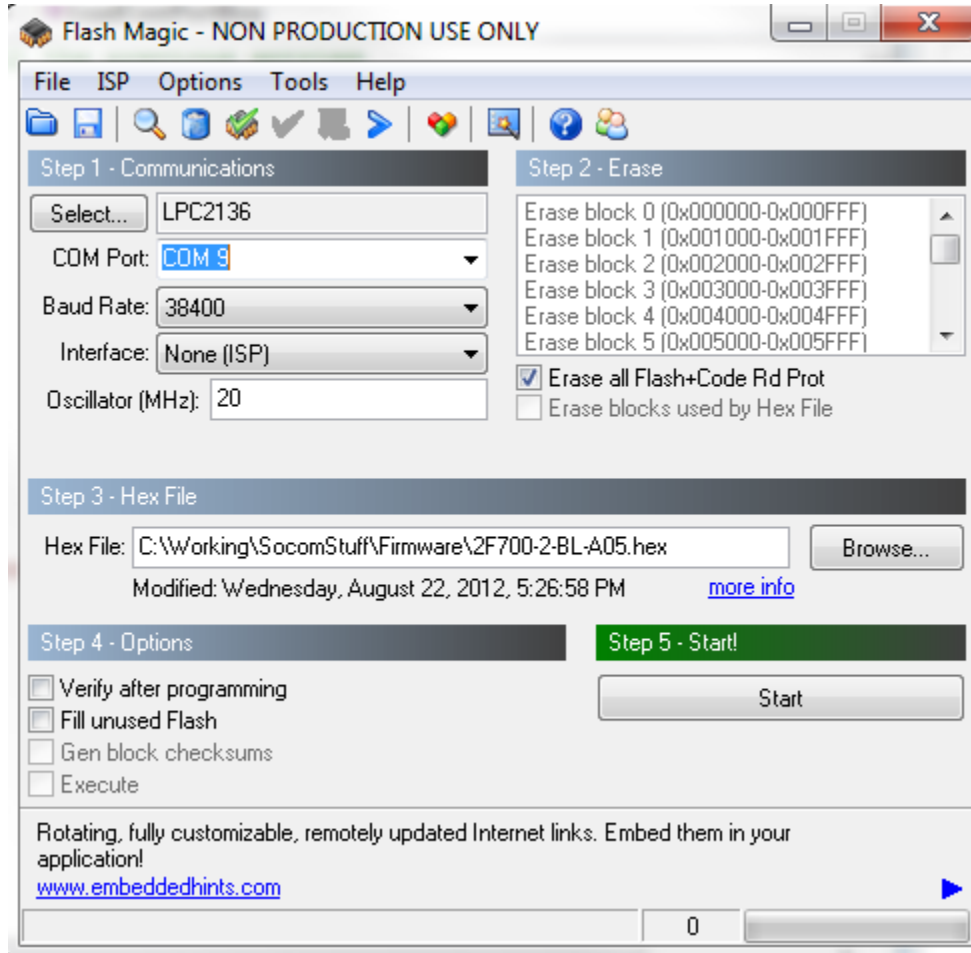
4. Select the appropriate COM port from the Connected To Port pull-down menu.

5. Set the baud rate to 38400 from the Use Baud Rate pull-down menu.

6. Set the Oscillator Freq (MHz) to 20.

7. Select the appropriate file to upload to the modem. The file name will end in a .hex extension.

8. Remove the four pan-head screws securing the modem's rear panel to the housing. You won't need to disconnect the SMA GPS cable from the rear panel.

9. Carefully remove the rear panel from the modem housing. The internal SMA GPS cable has a 2" service loop to allow access to the modem's CONFIG button. The CONFIG button location is shown below.

Config Button

10. Set a DC power supply for +12VDC. Set the power supply output OFF.

11. Connect the PC serial port to the modem's DB9 front panel connector.

12. Connect the modem's green 2-pin power connector to the power supply.

13. Press and hold the modem CONFIG button. Set the power supply output to ON, wait approximately 2 seconds, and release the CONFIG button. If these steps were performed correctly the modem's current draw should be approximately 30mA.

14. Press the "Start" button on the *FlashMagic* program.

15. Press the "Upload to Flash" button on the Philips Utility program window to upload the .hex file to the flash memory. For standard M7 radio modems, the Bootloader file name is 2F700-2-BL-A06.hex.

16. The FlashMagic program will display a "Finished" in the lower left corner when the file upload is completed.

17. Repeat steps 7 through 14 for any additional modems.

Uploading the Application Firmware

Now that you have a Bootloader in the product, you can upload the product's application using Raveon's *RadioManager* program. Current and future Raveon products use RadioManger to update firmware because:

1. The product does not have to be opened to update firmware.

2. RadioManger can validate firmware versions and board compatibility.

3. The process is easier.

Please see Technical Brief AN181 for information on how to use *RadioManager* to update firmware.