

# Upgrading BL653 Firmware via UART

BL653 Development Kit: Part # 453-00039-K1 and 453-00041-K1

BL653 Modules: Part # 453-00039 and 453-00041

BL653 $\mu$  Modules: Part # 453-00059 and 453-00060

*Application Note*

*v1.0*

## 1 INTRODUCTION

The goals of this document include the following:

- To detail the setup procedure for interfacing with the BL653 development kit, part # 453-00039-K1 and part # 453-00041-K1
- To explain the method of upgrading the firmware for the following parts over the UART interface instead of over the JTAG interface:
  - BL653 development kit, part # 453-00039-K1 and 453-00041-K1
  - BL653 modules, part # 453-00039 and 453-00041
  - BL653 $\mu$  modules, part # 453-00059 and 453-00060

## 2 REQUIREMENTS

- Laird Connectivity BL653 development kit, (or equivalent RS-232 to serial connection to the BL653 or BL653 $\mu$  modules)
- FTDI USB to Serial drivers for BL653 development kit (found at <http://www.ftdichip.com/FTDrivers.htm>)
- USB-A to USB-Micro cable
- PC with Windows/MacOS/Linux running UwTerminalX and UwFlashX , provided by Laird Connectivity at <https://github.com/LairdCP/UwTerminalX/releases> and <https://github.com/LairdCP/UwFlashX/releases>
- Desired firmware package, found in the Software Downloads tab of the [BL653 Product Page](#)

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**Note:** BL653 and BL653 $\mu$  use the same firmware image

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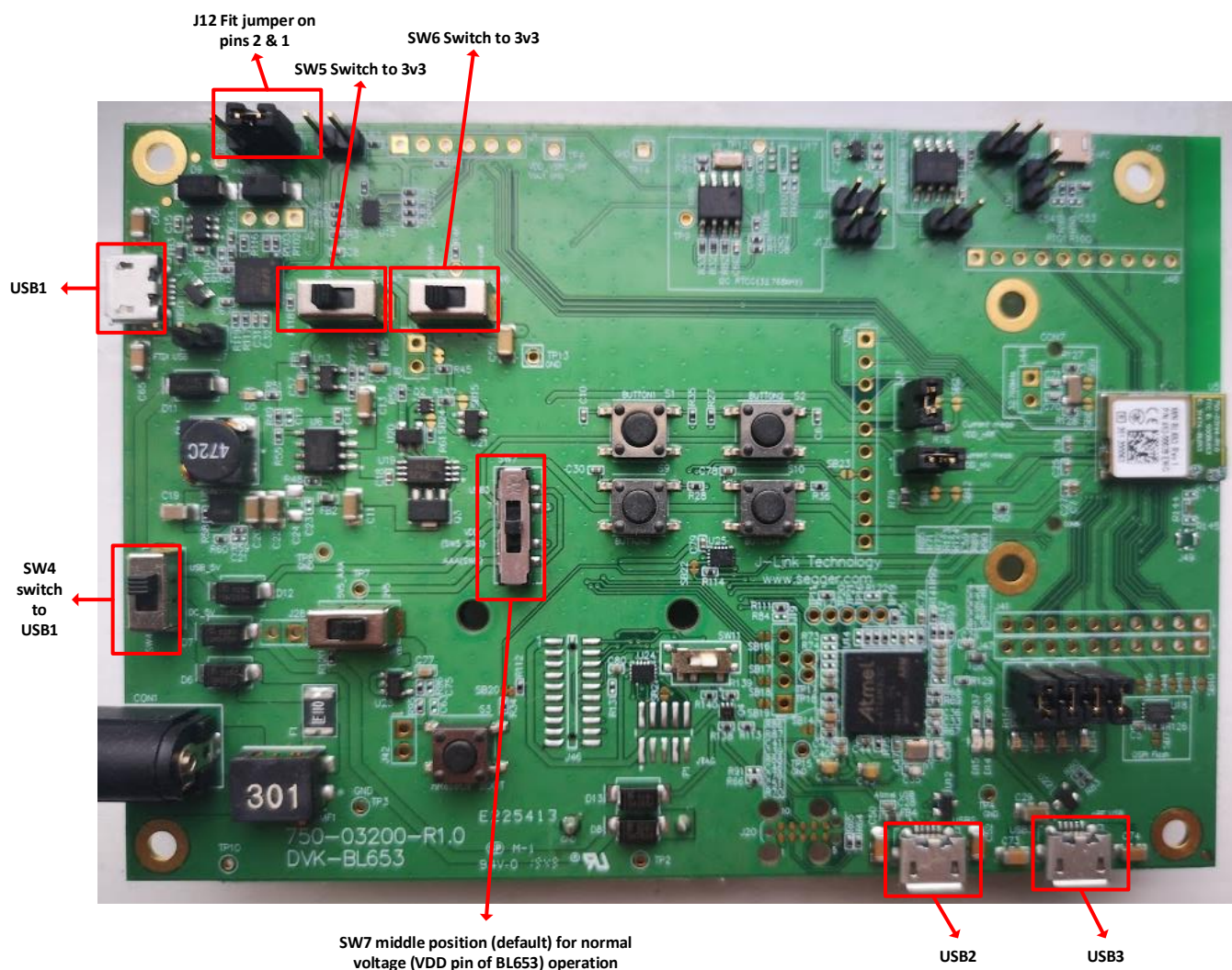
## 3 OVERVIEW

To upgrade the module, you must use Laird Connectivity's development board or your own equivalent implementation to provide an UART connection to the module's serial port.

### 3.1 Initial Setup using BL653 Development Kit

To set up, complete the following steps.

1. Configure the BL653 development kit to the following settings:
  - DC/USB power source switch (SW4) to USB\_5V
  - Switches SW6 and SW5 to 3V3
  - Set SW7 in the middle position as shown on the [Figure 1](#)
2. Connect USB1 on the development kit to your PC via the included USB-A to USB Micro cable.

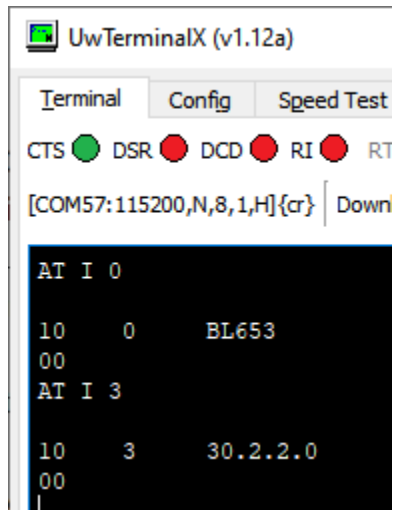


**Figure 1: BL653 development board**

3. Install the FTDI USB to Serial driver (found at <http://www.ftdichip.com/FTDrivers.htm>).
4. Ensure that the Windows Device Manager displays a new virtual COM port for the USB to Serial adapter.
5. Launch UwTerminalX (available at <https://github.com/LairdCP/UwTerminalX>)
6. From the Update tab in UwTerminalX, click **Check for Updates** to ensure you're using the latest version of UwTerminalX with support for the BL653.
7. From the Config tab in Device drop-down menu, select **BL65x** to populate the baud, parity, stop bits, data bits, and handshaking settings. If "BL65x" is not a selectable device, set the following:
  - Baudrate: 115200
  - Parity: None
  - Stop Bits: 1
  - Data Bits: 8
  - Handshaking: CTS/RTS
8. In the Port dropdown, select the COM port associated with your development kit.
9. At the top of the screen, click **OK**.

## 4 CHECKING FIRMWARE VERSION

Once the module has been connected, type **AT I 3** to display the firmware version ([Figure 2](#)).



**Figure 2: AT I 3 command returning the firmware version number**

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**Warning:** Upgrading the firmware clears any programs, configuration keys or data stored on the module.

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### 4.1 Upgrading the Firmware

To upgrade the firmware, follow these steps:

1. Download your desired firmware from the software downloads tab of the [BL653 Product Page](#).
2. Extract the desired update file (a .uwf file located in the Firmware directory of the firmware upgrade .zip file) to a directory on your PC.
3. If not already connected, attach the module to your PC's serial port. If you are using the BL653 Development Kit, ensure that you are connected to the board's USB1 connection (see [Figure 1](#)).

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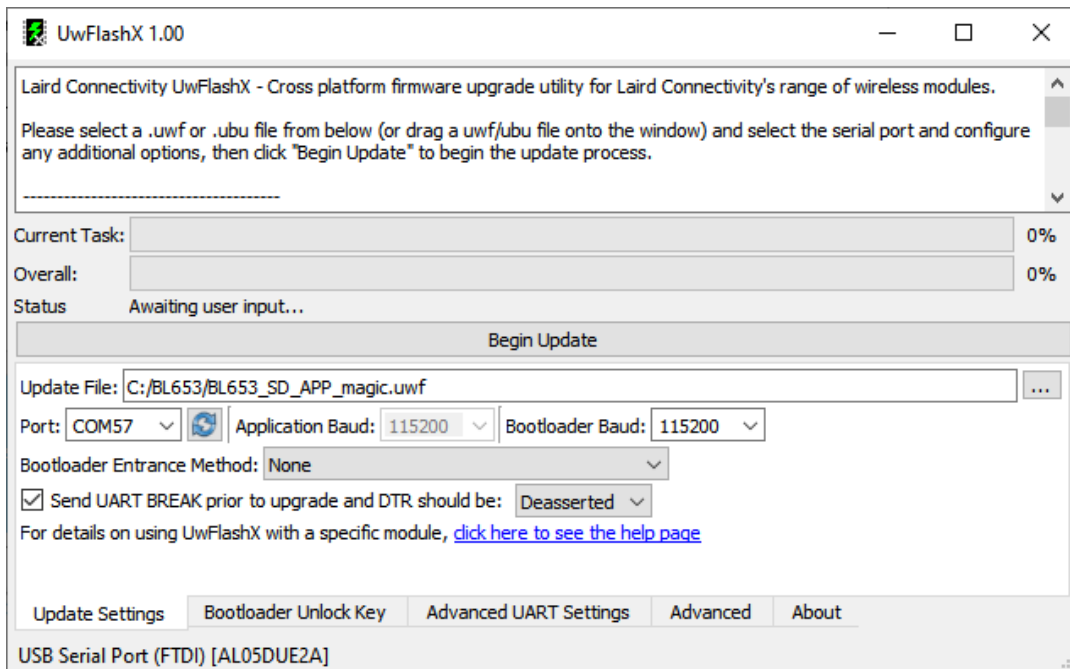
**Warning for customers using VSP:**

If you have enabled out-of-the-box Virtual Serial Port Service operation by pulling SIO2 to VCC or changing config register 100 (using AT+SET 100="0xhhhh"), then you must do one of the following before starting the upgrade:

- Ensure SIO2 is at 0v  
OR
- Submit the command AT+CFG 100 0x0000 and ensure you get a successful 00 response.

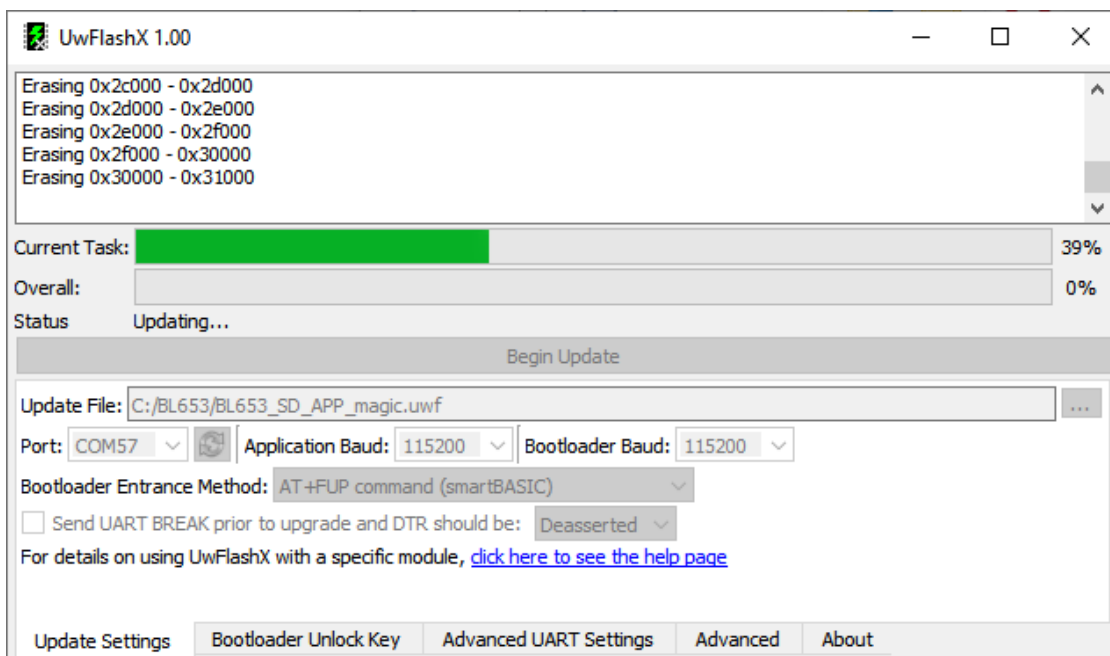
You may also submit the command AT&F\* to put the module into factory default mode to ensure that the upgrade starts from a known state and ensure SIO2 is at 0v.

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4. Start *UwFlashX* to display the launch window ([Figure 3](#)).



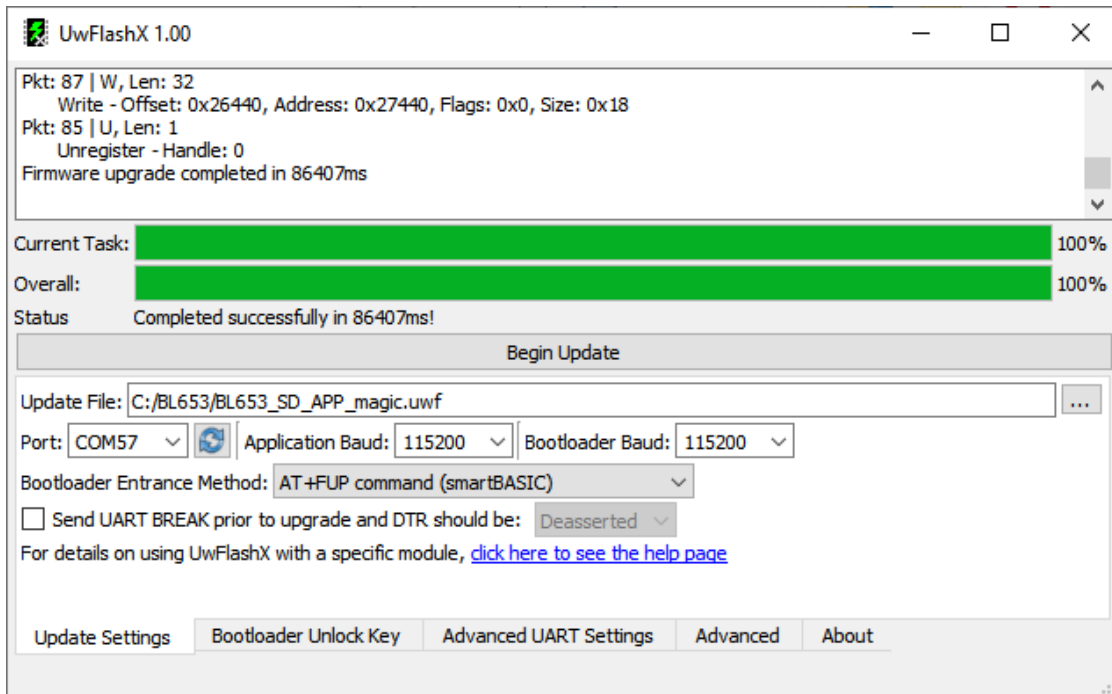
**Figure 3: UwFlashX launch screen with options configured**

5. If the upgrade field is empty, click ... to select the applicable **xxx.uwf** file.
6. Select the applicable COM port number from the drop-down menu.
7. Select "AT+FUP command (smartBASIC)" as the Bootloader Entrance Method (Figure 3)
8. To update while an app is already running, set "Send UART BREAK prior to upgrade and DTR should be Deasserted" (Figure 3)
9. Click "Begin Update"
10. The download process starts, with the screen showing the progress and describing the status (Figure 4).



**Figure 4: Firmware upgrade in progress**

11. When the upgrade is complete, the screen indicates completion. You should then power cycle the module (Figure 5).



**Figure 5: Upgrade complete, requesting power cycle**

12. Cycle power to the module.  
13. Exit UwFlashX

The module is upgraded and ready for operation. Confirm the upgrade by running UwTerminalX and checking the version using AT I 3. You should see the new firmware version displayed.

## 5 FURTHER INFORMATION

Further information relating to the BL653 module is available from the Laird Connectivity BL653 product page at <https://www.lairdconnect.com/wireless-modules/bluetooth-modules/bluetooth-5-modules/bl653-series-bluetooth-51-802154-nfc-module>.

## 6 REVISION HISTORY

Version	Date	Notes	Contributor(s)	Approver
1.0	11 Jan 2021	Initial Release	Kieran Mackey	Jonathan Kaye