



FINGERPRINTS

# FPC-EMD

## Embedded Module

## Development Kit

Manual

Revision B

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## 1 Overview

The Fingerprint Cards (FPC)-Embedded Module Development (EMD) kit is a plug'n'play system for demonstrating, exploring, and testing the FPC-Biometric Module (BM) module in conjunction with the FPC1020AM touch fingerprint sensor, or the FPC1011F3 area fingerprint sensor.

The FPC-BM module included in the FPC-EMD kit is configured in standalone mode by default. For information about the FPC-BM module, see document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*.

To start using the FPC-EMD kit hands-on, see the demo instructions in section 3.

### 1.1 Development Kit Contents

The FPC-EMD kit contains:

- A USB flash drive that contains the FPC-EMD kit demo software and documentation.
- A development board with a soldered FPC-BM module and a mounted FPC1011F3 or FPC1020AM module.
- A micro-USB connector cable.

### 1.2 Prerequisites

Microsoft .NET Framework 4.0 or later is required to run the FPC SerialCom Windows application. This framework is included in Windows 8 and above but may be missing in earlier operating systems. Visit <http://www.microsoft.com> for more information. The FPC-EMD kit supports Windows 7 and above. The FPC-EMD kit does not support UNIX and OS X operating systems.

### 1.3 Development Board

The development board outline and components are shown in Figure 1. The development board components are described in Table 1.

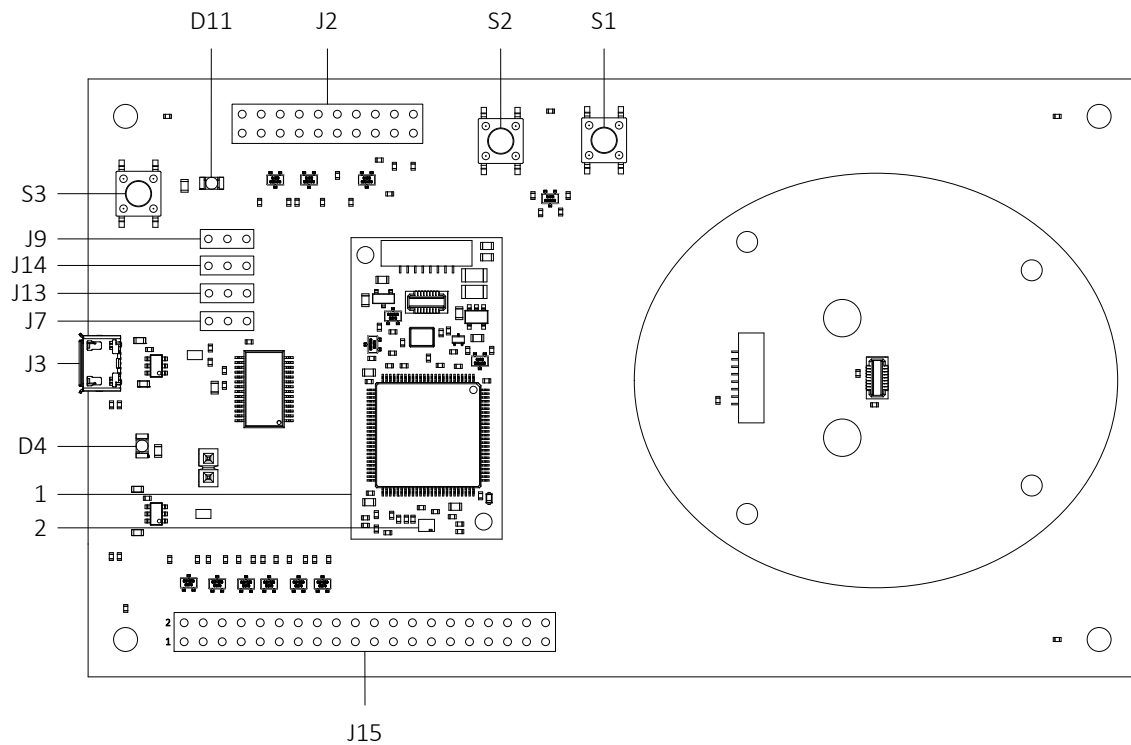


Figure 1 Development board outline and components

RD/№	Component	Description
S1	WAKE UP switch	Pushing the WAKE UP switch puts the FPC-BM in active mode.  Pushing and holding the WAKE UP switch and ENROL switch simultaneously for approximately 2 seconds in standalone mode deletes all templates in the FPC-BM module flash memory.
S2	ENROL switch	Pushing the ENROLL switch in standalone mode initiates the Enrol sequence. Pushing the ENROLL switch a second time cancels the Enrol sequence.  Pushing and holding the ENROL switch and WAKE UP switch simultaneously for approximately 2 seconds in standalone mode deletes all templates in the FPC-BM module flash memory.
J2	JTAG header	This header is FPC internal and should not be used.
D11	3V3 EMBEDDED HOST power LED	This LED is solid green when the FPC-module is powered via the EMBEDDED HOST header.
S3	RESET switch	Pushing the RESET switch reboots the FPC-BM module and clears the FPC-BM module RAM.

RD/№	Component	Description
J9	3V3 power supply selection header	This header is used to select if the FPC-BM module is powered via the USB HOST connector or via the EMBEDDED HOST header. See section 1.4 for more information.
J14	UART RX source selection header	This header is used to select if the FPC-BM module sends serial UART output data via the USB HOST connector or via the EMBEDDED HOST header. See section 1.4 for more information.
J13	UART TX source selection header	This header is used to select if the FPC-BM module receives serial UART output data via the USB HOST connector or via the EMBEDDED HOST header. See section 1.4 for more information.
J7	RESET source selection for FTDI chip header	This header is used to enable the FPC-BM module to reset the FTDI chip. This header is also used to control the 5 V USB power LED behaviour. See section 1.4 for more information.
J3	USB HOST connector	This connector is used to provide power to and communicate (over UART) with the FPC-BM module.
D4	5 V USB power LED	The LED is solid green when the FPC-module is powered via the USB HOST connector.
1	FPC-BM module	See document reference <i>FPC-BM Biometric Module - Product Specification, 710-FPC-BM</i> for a description of the FPC-BM module.
2	FPC-BM module LED	This LED indicates the current state of the FPC-BM module. See section 1.5 for more information.
J15	EMBEDDED HOST header	This header is used to provide power to and communicate (over SPI or UART) with the FPC-BM module.

Table 1 Development board component descriptions

## 1.4 Power and Signalling Setup

Power and signalling is provided to the FPC-BM module either via the USB HOST connector or the EMBEDDED HOST header on the development board.

### Jumper Configuration for USB HOST Connector

When providing power and signalling (over UART) via the USB HOST connector, the jumpers on the J9, J14, J13, and J7 headers must be positioned as shown in Figure 2.

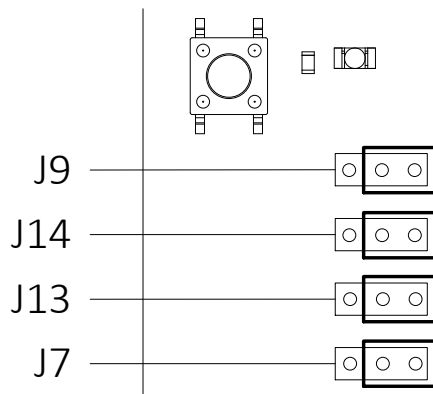


Figure 2 Jumper positions when using the USB HOST connector

#### Jumper Configuration for EMBEDDED HOST Header

When providing power and signalling (over UART or SPI) via the EMBEDDED HOST header, the jumpers on the J9, J14, J13, and J7 headers must be positioned as shown in Figure 3.

**Note:** When using the EMBEDDED HOST header, make sure that UART GND is always connected. For example, in case that the power supply and UART signalling originate from different sources.

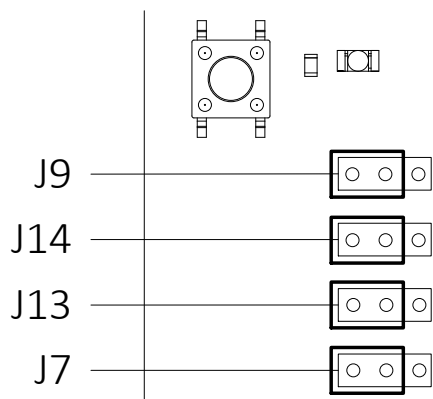


Figure 3 Jumper positions when using the EMBEDDED HOST header

## 1.5 FPC-BM LED Indicators

An LED indicates the current state of the FPC-BM module. An overview of the LED behaviour, including colour and LED state (solid or blinking), during biometric procedures is shown in Table 2.

Function	Procedure	Colour	LED State
Power On	-	Blue	Solid
Identify (Few)	Waiting for finger	Yellow	Blinking
	Processing captured image	Yellow	Solid
	Identify (Few) successful	Green	Solid
	Identify (Few) failed	Red	Solid
Enrol	Waiting for finger	Yellow	Blinking
	Processing captured image	Yellow	Solid
	Enrol successful	Green	Solid
	Enrol failed	Red	Solid
Delete All Templates in FLASH	Processing	Red	Blinking
	Done	Green	Solid

Table 2 FPC-BM LED behaviour

## 1.6 EMBEDDED HOST Header

The EMBEDDED HOST header pins are described in Table 3.

Pin	Signal Name	Description
J15:1	RXD_HOST	Serial UART output data from FPC-BM
J15:2	TXD_HOST	Serial UART input data to FPC-BM
J15:3	GND	Ground
J15:4	3V3_HOST	3.3 V power supply input to FPC-BM
J15:5	GPIO1	Connected to FPC-BM for future use
J15:6	GPIO2	Connected to FPC-BM for future use
J15:7	GPIO3	Connected to FPC-BM for future use
J15:8	MOSI_HOST	SPI input data to FPC-BM
J15:9	CS_N_HOST	Chip select input to FPC-BM
J15:10	MISO_HOST	SPI output data from FPC-BM



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Pin	Signal Name	Description
J15:11	GND	Ground
J15:12	SCLK_HOST	SPI clock input to FPC-BM
J15:13	Verified OK	Output from FPC-BM. The signal logic is high when FPC-BM indicates successful verification.
J15:14	GND	Ground
J15:15-40	N/A	These pins are FPC internal and should not be used.

Table 3      *EMBEDDED HOST header pins*





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## 2 FPC SerialCom Windows Application

The FPC SerialCom application illustrates how a simple Windows application on a PC can be used to demonstrate the FPC-BM module functionality together with a fingerprint sensor. The use of FPC SerialCom is helpful for software developers when interfacing towards the FPC-BM module and when writing their own application on their own platform, such as a PC, a micro controller, or any other environment with serial capability. All source code (written in C++) for FPC SerialCom is open and available. The source code is made with focus on showing different FPC-BM serial commands and the FPC-BM module capabilities.

FPC SerialCom communicates with the FPC-BM module over UART via the USB HOST connector. Most of the FPC-BM commands have their own designated button in the FPC SerialCom user interface. Clicking a button in the Basic Commands, Template Handling, and Additional Commands menu equals a serial command sent to the FPC-BM module. The button names are the same as, or very similar to, the actual serial command names. The available buttons and corresponding commands in FPC SerialCom are listed in section 2.1. For a complete list and descriptions of all FPC-BM commands, see document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*.

FPC SerialCom includes a text output window in which all communication between the FPC-BM module and the PC is printed out.

### 2.1 User Interface Description

This section provides descriptions of the FPC SerialCom menus, input fields, buttons, and the text output window.

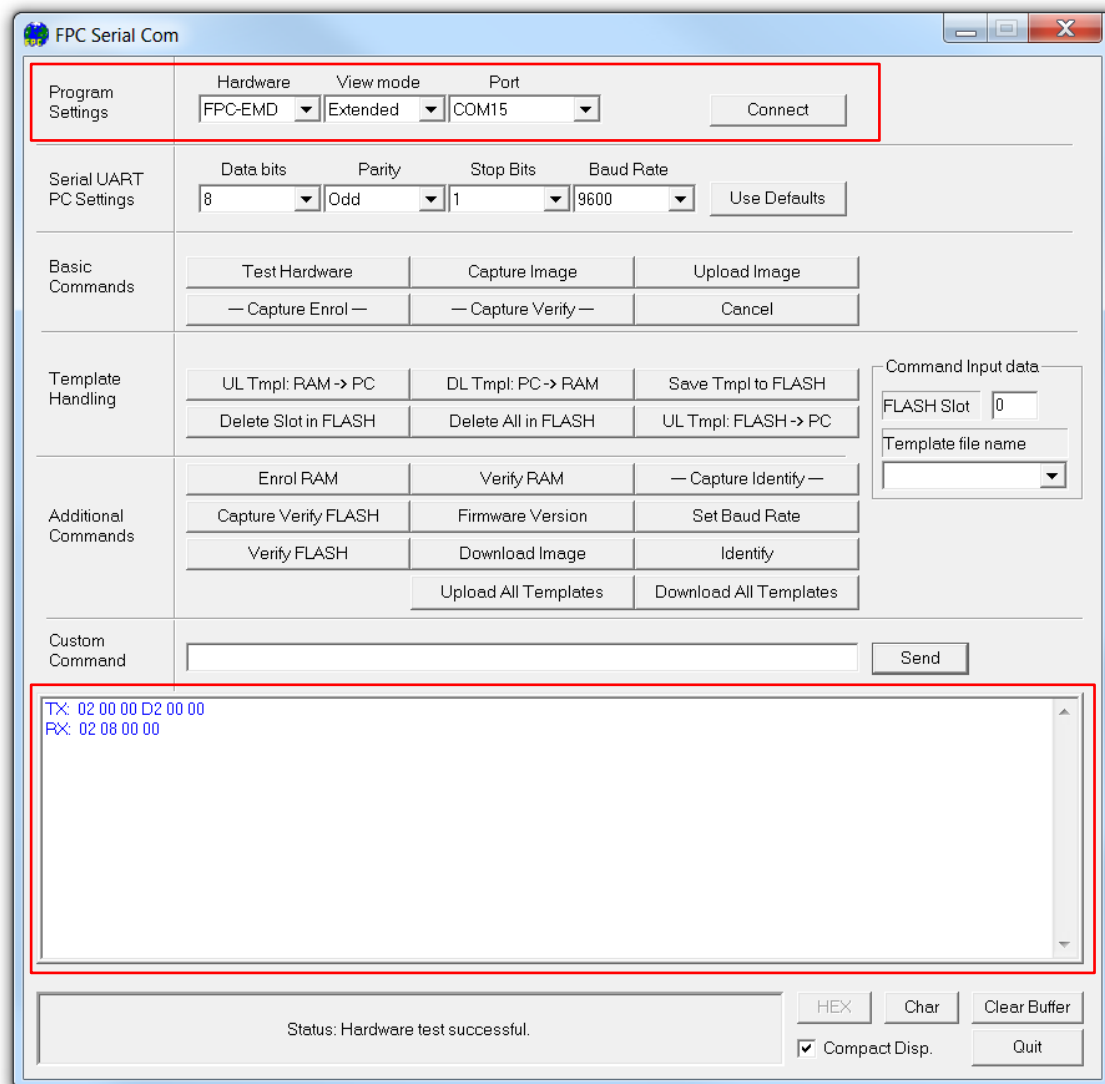


Figure 4 Program Settings menu and text output window in the FPC SerialCom user interface

### 2.1.1 Program Settings Menu

This section describes the items in the Program Settings menu.

#### Hardware

FPC-EMD must always be selected.

#### View Mode

The FPC SerialCom user interface can be viewed in two modes, Basic and Extended. The Basic mode shows a limited view of the user interface while the Extended mode shows all menus and buttons in the

user interface. It is recommended to operate FPC SerialCom in Extended mode and thereby get access to all FPC SerialCom capabilities.

### Port

The Port drop down lists the active COM ports on your PC. The COM port that the development board is connected to must be selected.

### Connect

The Connect button is used to connect FPC SerialCom with the FPC-BM module. When connected, the previously shaded buttons in the user interface become active. The Connect button should also be used after any changes in the serial UART PC settings.

## 2.1.2 Serial UART PC Settings Menu

These settings only apply to the PC side of the UART connection. They do not change any settings in the FPC-BM module.

### Data Bits

8 data bits must always be selected.

### Parity

Odd must always be selected.

### Stop Bits

1 must always be selected.

### Baud Rate

The Baud Rate drop down is used to set the baud rate on the PC side of the UART connection.

**Note:** The baud rate on the PC side must match the FPC-BM module baud rate. The FPC-BM module baud rate is set to 9600 by default. The FPC-BM module baud rate can be changed by clicking the Set Baud Rate button in the Additional Commands menu. When clicking the Set Baud Rate button and selecting a new baud rate value for the FPC-BM module, the baud rate setting in the Serial UART PC Settings Menu is automatically changed to the same value.

### Use Defaults

The Use Defaults button is used to set the serial UART PC settings to their default values.

## 2.1.3 Basic Commands Menu

Table 4 lists the buttons in the Basic Commands menu and the corresponding commands that are sent to the FPC-BM module when a button is clicked. For a complete list and descriptions of all FPC-BM commands, see document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*.

Button	Command
Test hardware	API_TEST_HARDWARE
Capture Image	API_CAPTURE_IMAGE
Upload image	API_UPLOAD_IMAGE
- Capture Enrol -	API_CAPTURE_AND_ENROL_RAM
- Capture Verify -	API_CAPTURE_AND_VERIFY_RAM
Cancel	API_CANCEL

Table 4 Basic Commands menu buttons and their corresponding commands

### 2.1.4 Template Handling Menu

Table 5 lists the buttons in the Template Handling menu and the corresponding commands that are sent to the FPC-BM module when a button is clicked. For a complete list and descriptions of all FPC-BM commands, see document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*.

Button	Command
UL Tmpl: RAM -> PC	API_UPLOAD_TEMPLATE
DL Tmpl: PC -> RAM	API_DOWNLOAD_TEMPLATE
Save Tmpl to FLASH	API_COPY_TEMPLATE_RAM_TO_FLASH
Delete Slot in FLASH	API_DELETE_SLOT_IN_FLASH
Delete ALL in FLASH	API_DELETE_ALL_IN_FLASH
UL Tmpl: FLASH -> PC	API_UPLOAD_TEMPLATE_FROM_FLASH

Table 5 Template Handling menu buttons and their corresponding commands

### 2.1.5 Additional Commands Menu

Table 6 lists the buttons in the Additional Commands menu and the corresponding commands that are sent to the FPC-BM module when a button is clicked. For a complete list and descriptions of all FPC-BM commands, see document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*.

Button	Command
Enrol RAM	API_ENROL_RAM
Verify RAM	API_VERIFY_RAM
- Capture Identify -	API_CAPTURE_AND_IDENTIFY_FLASH
Capture Verify FLASH	API_CAPTURE_AND_VERIFY_FLASH
Firmware Version	API_FIRMWARE_VERSION

Button	Command
Set Baud Rate	API_SET_BAUD_RATE_RAM
Verify FLASH	API_VERIFY_FLASH
Download Image	API_DOWNLOAD_IMAGE
Identify	API_IDENTIFY_FLASH
Upload ALL Templates	No corresponding FPC-BM command exists for this function.  When the Upload All Templates button is clicked, FPC SerialCom uploads all templates in the FPC-MB module to the PC, starting with template in slot 0, and ending with the slot number stated in the FLASH Slot field. All templates are uploaded and saved in the same folder where the FPC SerialCom.exe file is located on the PC.
Download ALL Templates	No corresponding FPC-BM command exists for this function.  When the Download All Templates button is clicked, FPC SerialCom downloads all templates that are located in the same folder where the FPC SerialCom.exe file is located on the PC.

Table 6 Additional Command menu buttons and their corresponding commands

## 2.1.6 Command Input Data

This section describes the items in the Command Input data menu.

### FLASH Slot

All the buttons that have the word FLASH in their button name use the number that is entered in the FLASH Slot field as input for the corresponding command that is sent to the FPC-BM module. For example, clicking the Delete Slot in FLASH button deletes the template that is saved in the slot number specified by the FLASH Slot field.

### Template File Name

The file name entered in the Template file name field is used when uploading and downloading templates to and from the PC. Uploaded files are saved in the FPC SerialCom working directory.

The file extension .tpl is added automatically to uploaded template files. The TPL file format is proprietary and therefore not a readable format.

## 2.1.7 Custom Command

This section describes the items in the Custom Command menu.

### Send

The Send button and field are used to send commands in hexadecimal format to the FPC-BM module. The commands follow the command send structure specified in document reference *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*. For example, the API\_TEST\_HARDWARE command can be sent by entering 0x02 0x00 0x00 0xD2 0x00 0x00 in the field and clicking the Send button.

### 2.1.8 Text Output Window

All communication between the PC and the FPC-BM module, that is, all sent commands to and received responses from the FPC-BM module, is printed out in the text output window.

#### HEX

When the HEX button is clicked, the content in the text output window is shown in hexadecimal format. This is useful for viewing and analysing the serial communication on byte level.

#### Char

When the Char button is clicked, the content in the text output window is shown in character format. This is useful when sending the command for checking the firmware version, since the response from that command is a string containing the firmware name and version.

#### Clear Buffer

The Clear Buffer button is used to clear all content in the text output window.

### 2.1.9 Compact Display Checkbox

The Compact Disp. checkbox is used to limit the length of the (often very large) payload request and response strings that are printed out to a single line in the text output window. When the Compact Disp. checkbox is selected, it is easier to get an overview of the communication with the FPC-BM module. The Compact Disp. checkbox is selected by default.

## 2.2 Source Code

The FPC SerialCom source code structure is designed to be easy to understand, rather than optimized for high performance. The goal is that a programmer reading the source code should be able to extract the interesting parts, and reuse it in their own projects.

### 2.2.1 Build Environment

This project is built using Visual Studio 2015, and uses the C++ language together with the MFC package.

### 2.2.2 Important Files

#### ComDlg.h/.cpp

These files include most of the dialog handling, and the pushbutton functions. To change the look of the FPC SerialCom Windows application, this is where to do it. The ComDlg.cpp file is not that useful for implementation in an embedded environment.

#### SerialCommands.h/.cpp

This is where all the UART serial commands are sent and received. Look here to understand exactly how a command is utilized. The commands are independent of each other, so any favourites can be picked for implementation in a custom platform.



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### SPICommands.h/.cpp

This class is very similar to the SerialCommands.h/.cpp UART class, but instead it implements the handling of the SPI commands. This class uses the spi\_interface.h/cpp helper class to manage the details of sending and receiving the actual data.

### Definitions.h

This file contains the command byte values for the FPC-BM module.

### CRC.cpp / CRC.h

This is how the CRC-32 checksum function is implemented in the FPC-BM module. This must be done in the same way when sending data to the FPC-BM module. These files can be used as reference code in a custom CRC function. This file can be used freely as long as the disclaimer at the head of CRC.cpp is complied with.

## 3 Demo Instructions

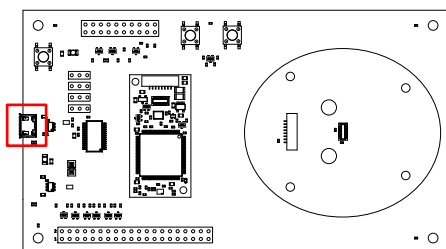
This section gives an introduction to the FPC-BM module capabilities by using the FPC-EMD kit. It provides step-by-step instructions for how to connect the development board and demo basic biometric functions, such as Enrol and Identify (Few), on an FPC fingerprint sensor by issuing serial commands in the FPC SerialCom Windows application, or in standalone mode using the switches on the board. Demo instructions for template upload, download, deletion, and fingerprint image download and upload are also covered.

For information about all available buttons and corresponding commands in the FPC SerialCom application, see section 2.1. For information about the switches on the development board that are used in standalone mode, see section 1.3.

### 3.1 Starting the Demo Application and Connecting the Board

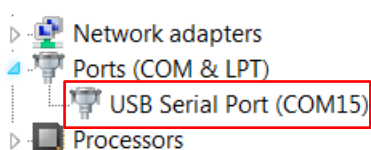
Follow these instructions to set up the development kit:

1. Insert the flash drive in a USB port on your PC and open using a file explorer.
2. Open the **Fingerprints.exe** file. The FPC-EMD kit menu starts.
3. Select **Setup >Start FPC SerialCom Software** in the FPC-EMD kit menu. The FPC-EMD kit demo application starts.
4. Connect the development board (via the USB HOST connector shown in the figure below) to a USB port on your PC using the included micro-USB connector cable.



USB drivers install automatically when the development board is connected the first time. A green power LED is lit on the development board and a blue LED is lit on the FPC-BM module.

5. Select **FPC-EMD** in the **Hardware** drop down in the FPC SerialCom application **Program Settings** menu, select **Extended** in the **View Mode** drop down, and select the COM port that the development board is connected to in the **Port** drop down. If you are unsure which COM port to select, open Windows Device Manager and check the applicable USB Serial Port number (as shown in the figure below).





6. Click the **Connect** button in the **Program Settings** menu. A **Status: Connected** message is shown in the FPC SerialCom status message window.
7. Click the **Test Hardware** button in the **Basic Commands** menu. A **Status: Hardware test successful** message is shown in the FPC SerialCom status message window.

Figure 5 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

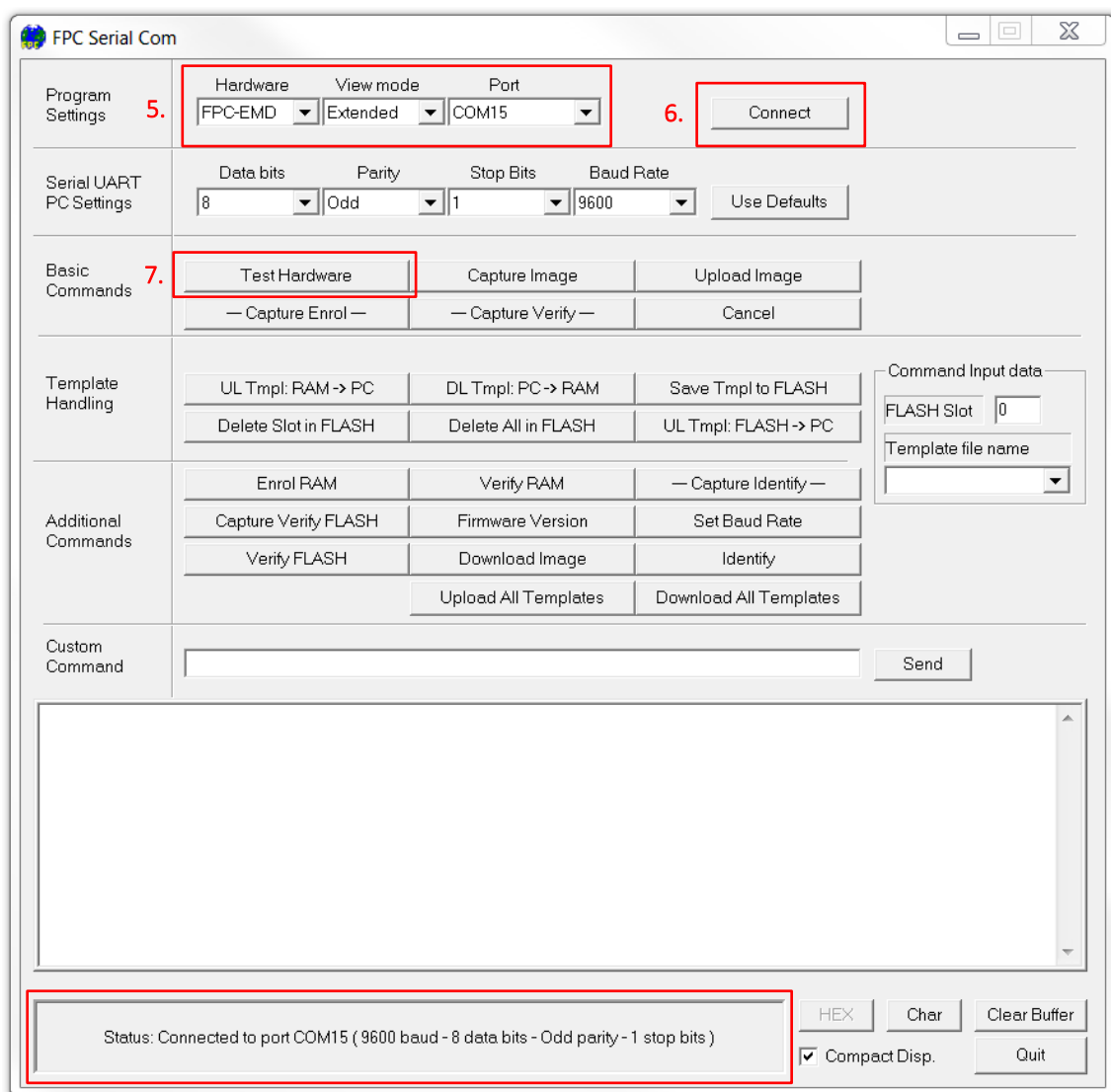


Figure 5 Program Settings drop downs, Connect and Test Hardware button, and status message window



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## 3.2 Enrolling

Follow these instructions to demo the Enrol procedure:

1. Click the - **Capture Enrol** - button in the **Basic Commands** menu. The Enrol sequence is initiated and the FPC-BM module LED starts to blink yellow.
2. Place your finger on the sensor and remove it when the LED turns solid yellow. Repeat this step 7 times if the FPC1020 sensor is used. For the FPC1011 sensor, only one capture is needed. The Enrol procedure is completed when the LED turns green and a **Status: Enrol successful** message is shown in the status message window. The captured fingerprint image is stored in the FPC-BM module RAM.
3. Click the **Save Tmpl to FLASH** button in the **Template Handling** menu. The captured fingerprint image is saved as a template in the FPC-BM module flash memory, slot 0.
4. Repeat steps 1-3 using another finger, but before clicking the **Save Tmpl to FLASH** button, enter 1 in the **FLASH Slot** field in the **Command Input data** menu. The new capture is saved as a template in the FPC-BM module flash memory, slot 1.

Figure 6 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

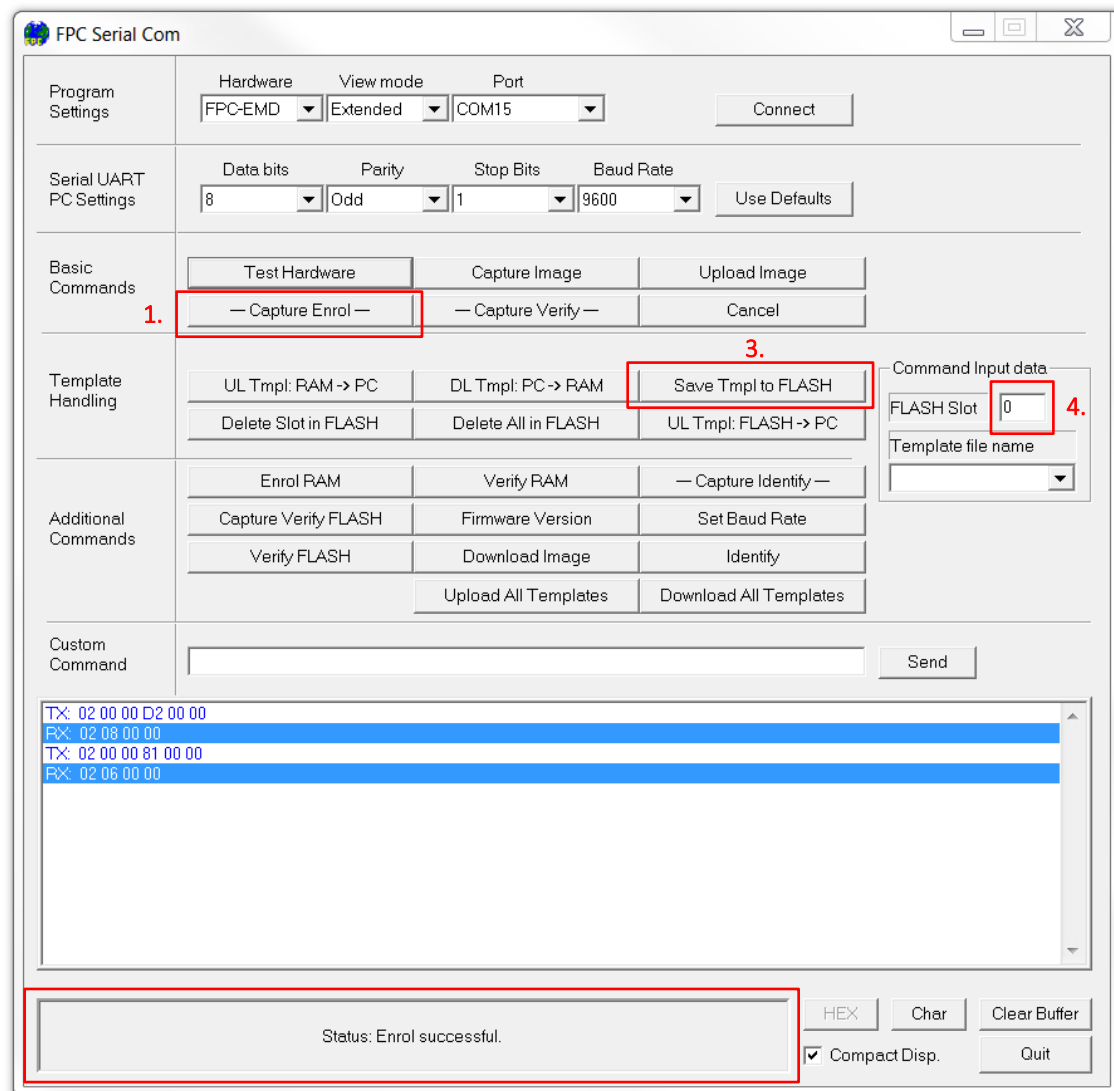


Figure 6 -Capture Enrol- and Save Tmpl to FLASH button, FLASH Slot field, and status message window

### 3.3 Identifying

Follow these instructions to demo the Identify (Few) procedure:

1. Click the - **Capture Identify** - button in the **Additional Commands** menu. The Identify (Few) sequence is initiated and the FPC-BM module LED starts to blink yellow.
2. Place your finger on the sensor. The verify sequence is completed when the LED turns green (a **Status: Identification successful** message is shown in the status message window), or when the LED turns red (a **Status: Identification failed** message is shown in the status message window).

**Note:** The FPC-BM module included in the FPC-EMD kit is configured in standalone mode by default. This means that you can also initiate and complete the Identify (Few) sequence by just placing your finger on the sensor. No message is shown in the status message window when performing the Identify (Few) procedure in standalone mode, but the LED behaviour is the same as described in step 1 and 2 above.

Figure 7 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

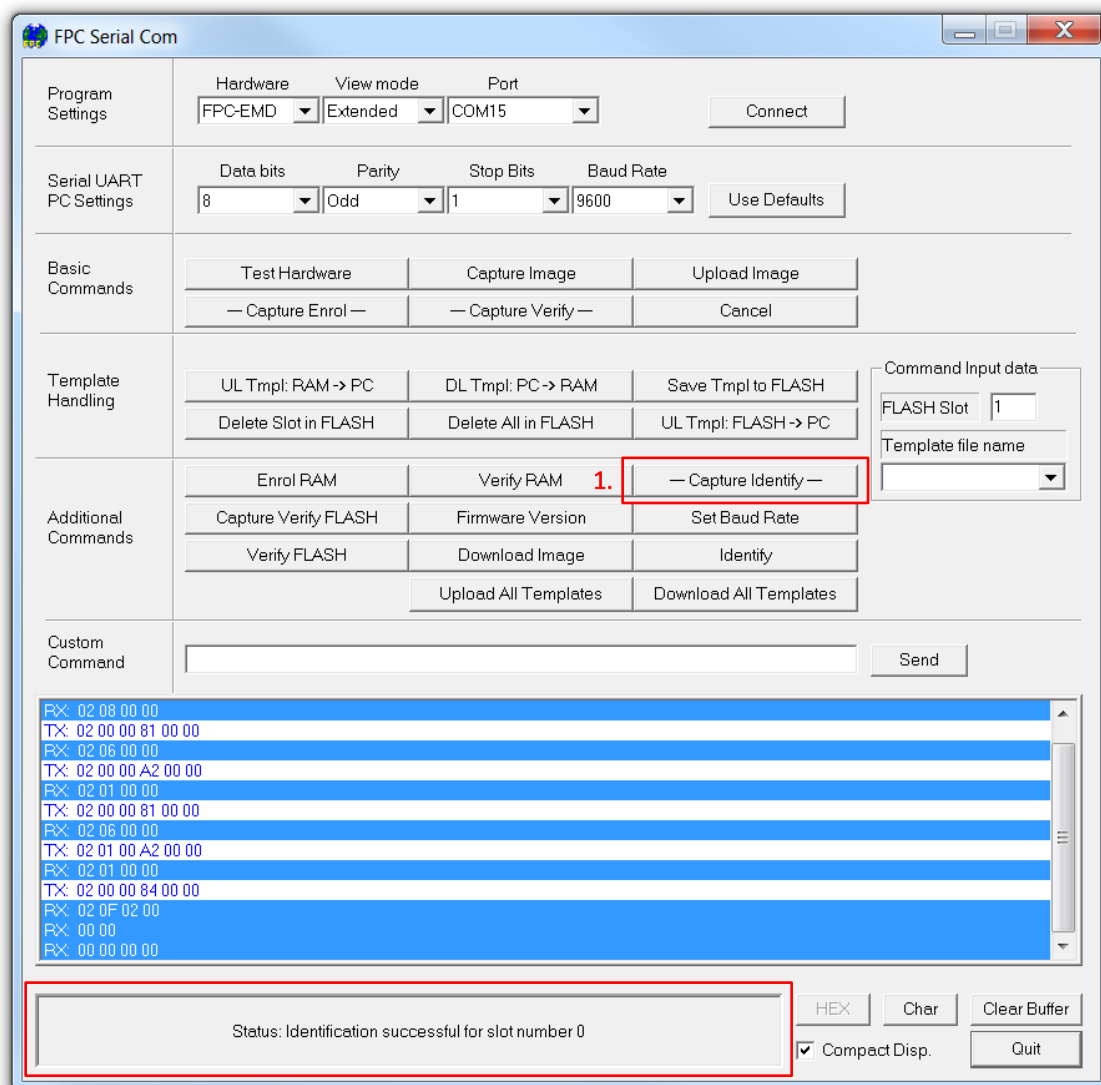


Figure 7 -Capture Identify- button and status message window

### 3.4 Uploading and Downloading Templates

Templates that are saved in the FPC-BM module flash memory can be uploaded to the PC and vice versa.

Follow these instructions to demo the Upload Template procedure:

1. Enter 0 in the **FLASH Slot** field and enter a file name in the **Template file name** field in the **Command Input data** menu.
2. Click the **UL Tmpl: FLASH -> PC** button in the **Template Handling** menu. The template in flash slot 0 is uploaded and saved in the same folder where the **FPC SerialCom.exe** file is located on the PC. The file extension .tpl is added automatically to uploaded template files. The TPL file format is proprietary and therefore not a readable format.
3. Repeat steps 1-2 for the template in flash slot 1 using a different file name.

Figure 8 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

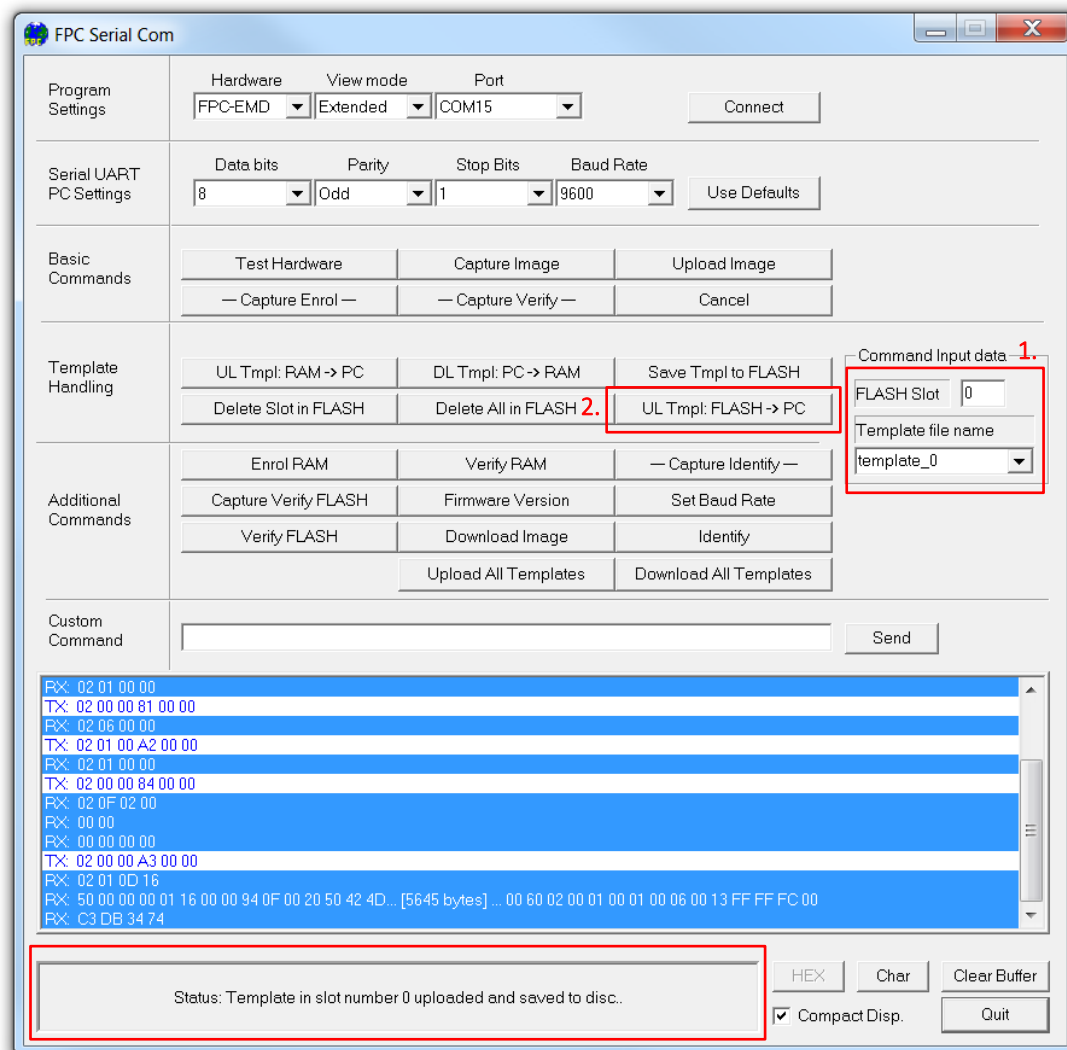


Figure 8 FLASH Slot and Template file name fields, UL Tmpl:FLASH-> PC button, and status message window

Follow these instructions to demo the Download Template procedure:

1. Click the **Delete All in FLASH** button in the **Template Handling** menu. All templates in all flash slots are deleted.
2. Check that no templates exist in the FPC-BM module flash memory by performing the Identify (Few) procedure in section 3.3. A **Status: No template is present in memory** message is shown in the status message window.
3. Enter the file name of one of the template files that was uploaded in the Upload Template procedure in the **Template file name** field in the **Command Input data** menu. The template file that is downloaded must be located in the same folder where the **FPC SerialCom.exe** file is located on the PC.



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4. Click the **DL Tmpl: PC -> RAM** button in the **Template Handling** menu. The template is downloaded to the FPC-BM module RAM.
5. Enter a number between 0-49 in the **FLASH Slot** field in the **Command Input data** menu.
6. Click the **Save Tmpl to FLASH** button in the **Template Handling** menu. The template in the FPC-BM module RAM is saved in the flash slot selected in step 5.
7. Repeat steps 3-6 for the second template file that was uploaded in the Upload Template procedure and save it in a different flash slot.
8. Perform the Identify (Few) procedure in section 3.3 to check that the downloaded templates are functioning properly.

Figure 9 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

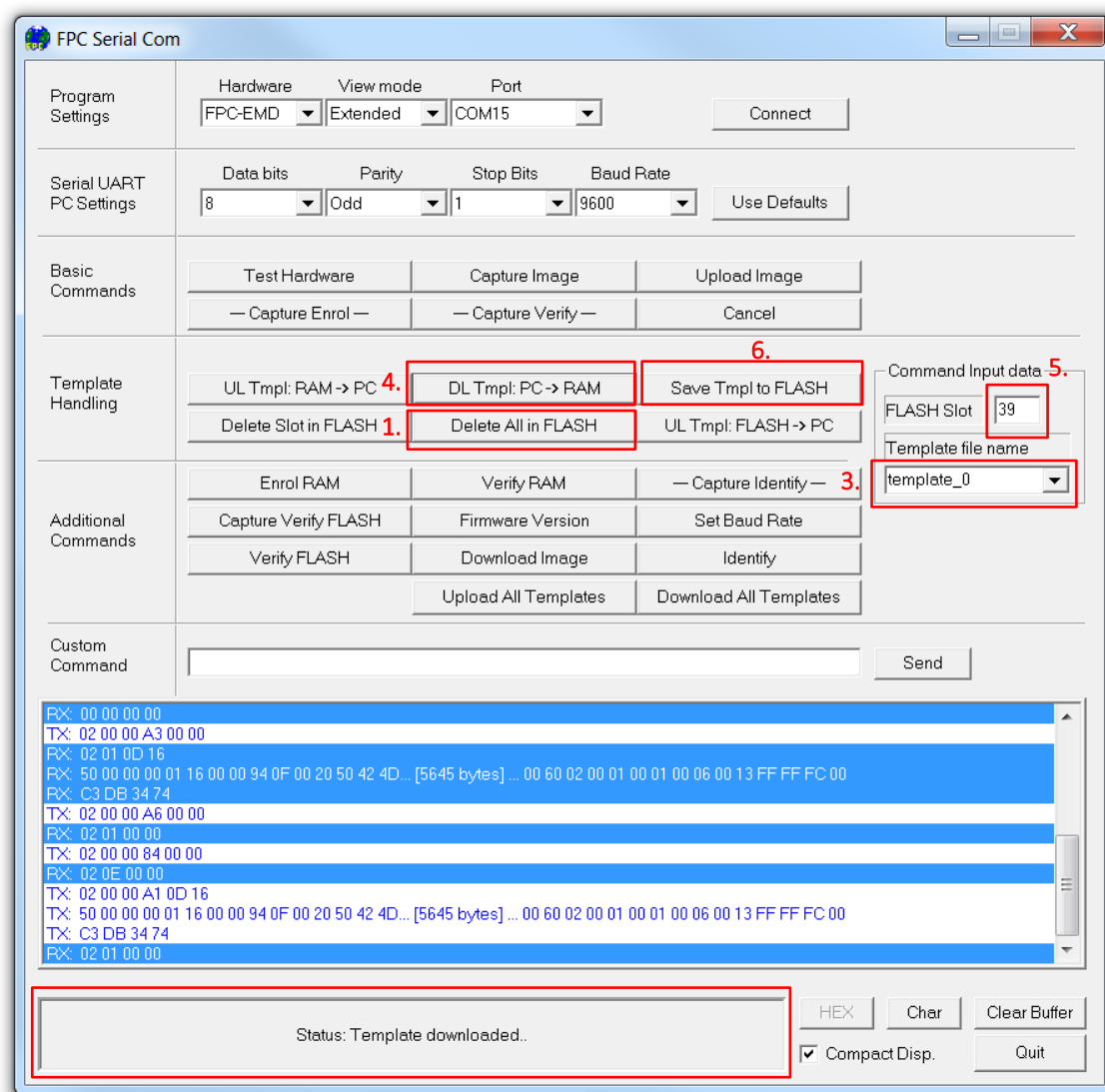


Figure 9 Template Handling menu buttons, Command Input data fields, and status message window

### 3.5 Uploading and Downloading Fingerprint Images

The fingerprint image that is stored in the FPC-BM RAM can be uploaded to the PC, and a fingerprint image on the PC can be downloaded to the FPC-BM module RAM. With the default 9600 baud rate setting in the FBC-BM module, the image upload takes approximately 30 seconds. To increase the image upload speed, you can change the FBC-BM module baud rate by clicking the **Set Baud Rate** button in the **Additional Commands** menu and select **115200**.

Follow these instructions to demo the Upload Image procedure:



1. Click the **Upload Image** button in the **Basic Commands** menu. The image that is currently stored in the FPC-BM module RAM is uploaded. The image is shown on screen and the image file is saved in the same folder where the **FPC SerialCom.exe** file is located on the PC.

Figure 10 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

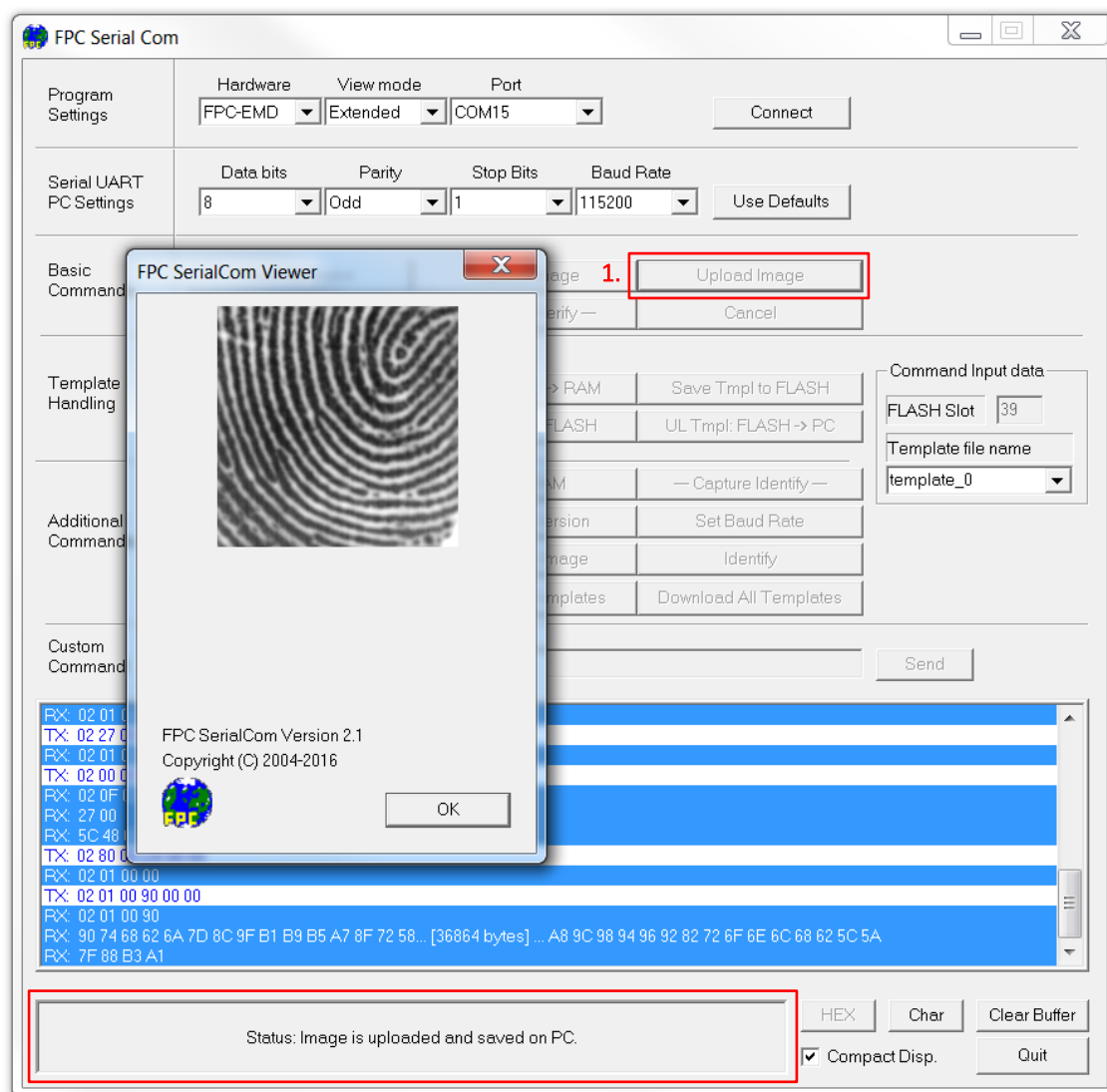


Figure 10 Upload Image button, fingerprint image, and status message window

Follow these instructions to demo the Download Image procedure:

1. Click the **Download Image** button in the **Additional Commands** menu and select a fingerprint image file on the PC. The image file must be located in the same folder where the **FPC SerialCom.exe** file is located on the PC. The image is stored in the FPC-BM module RAM.

### 3.6 Deleting the Flash Memory

Templates that are stored in the FPC-BM module flash memory can be deleted.

Follow these instructions to demo the Delete Slot in Flash procedure:

1. Enter the flash slot number that should be deleted in the **FLASH Slot** field in the **Command Input data** menu.
2. Click the **Delete Slot in FLASH** button in the **Template Handling** menu. The template in the currently selected flash slot is deleted.

Figure 11 shows user interface elements in FPC SerialCom that are associated with steps in the instructions.

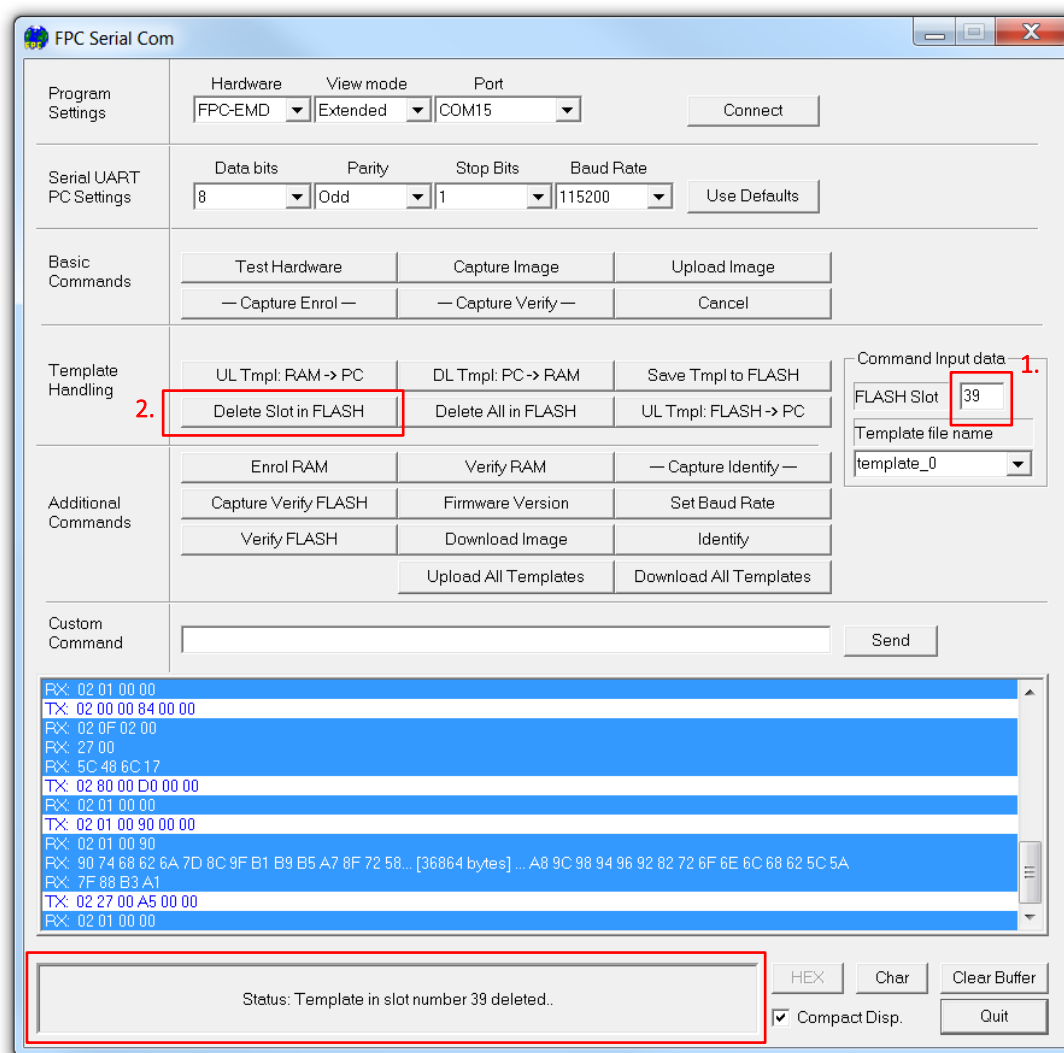


Figure 11 Delete Slot in FLASH button, FLASH Slot field, and status message window



## FINGERPRINTS

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Follow these instructions to demo the Delete All in Flash procedure:

1. Click the **Delete All in FLASH** button in the **Template Handling** menu. The FPC-BM module LED starts to blink red and then turns solid green when the Delete All in Flash procedure is completed. All templates in all flash slots are deleted.

**Note:** The FPC-BM module included in the FPC-EMD kit is configured in standalone mode by default. This means that you can also delete all templates in the FPC-BM module flash memory by pushing and holding the WAKE UP switch and ENROL switch simultaneously for approximately 2 seconds. No message is shown in the status message window when performing the Delete All in Flash procedure in standalone mode using the switches, but the LED behaviour is the same as described in step 1 above.

## 4 Troubleshooting and Support

Table 7 lists troubleshooting tips that can be helpful if problems with the FPC-EMD kit occur.

Problem	Tip
Cannot connect to or communicate with the FPC-BM module via FPC SerialCom.	<p>Detach and reattach the micro-USB connector cable and make sure it is properly connected.</p> <p>Check that the correct COM port (USB Serial Port on the PC) is selected in the FPC SerialCom user interface.</p> <p>Check that the 4 jumpers are in the correction position for power and signalling via USB, see section 1.4.</p>
FPC SerialCom hangs or is unresponsive.	Close FPC SerialCom and then restart it.

Table 7 FPC-EMD kit troubleshooting tips

If you cannot solve a problem on your own and need to contact FPC for support, always include the FPC-EMD kit version number in you support request. The version number is found in the lower left corner in the FPC-EMD kit menu screen, as shown in Figure 12.

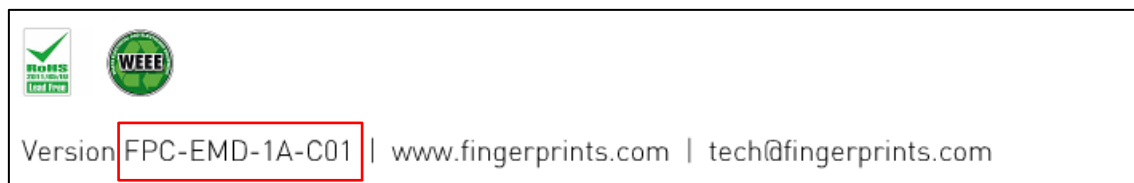


Figure 12 FPC-EMD kit version number



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## References

This document refers to, or is related to, the following documents:

1. *FPC-BM Biometric Module - Product Specification, 710-FPC-BM*



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## Document History

Table 8 describes changes made to this document.

Revision	Date	Description
A	2016-06-16	New document.
B	2016-07-01	Updated for the FPC-BM CS release.

Table 8 Document history