



IDENTIVE

Firmware Upgrade Manual

Multi-ISO Reader/ Multi-Slot V2 Reader

Document history

Revision	Date	Author	Description
1.0	April 2013	Timo Baur Thillai Elayaraja	Initial version
1.1	April 2013	Timo Baur Thillai Elayaraja	Added CCID driver info (sec. 7) Added 32 or 64bit determination (sec. 14)
1.2	September 2013	Timo Baur	Removed note for DFU driver (sec. 2) Removed 64bit determination (sec. 14) Added DFU driver installation info (sec. 9) Added PC/SC driver installation info (sec. 11) Updated text of step 4 (sec. 9) Added admin rights info (sec. 9.1 & 11.1)

Contents

1. Abstract	4
2. System requirements	4
3. Determining the microcontroller number.....	4
4. Firmware variants.....	5
5. Folder structure of the extracted “Multi-ISO_Firmware_Package”:	5
6. Components used for PC/SC & ePC/SC firmware upgrade	6
7. Components used for CCID & CCID+HID firmware upgrade	7
8. Upgrade PC/SC firmware.....	8
9. Upgrade PC/SC firmware to CCID or CCID+HID firmware	8
10. Upgrade CCID or CCID+HID firmware.....	14
11. Upgrade CCID or CCID+HID firmware to PC/SC firmware	14
12. VID & PID	18
13. Sending escape commands with CCID based readers.....	18
14. Terms & Abbreviations.....	19

1. Abstract

This document explains how to upgrade the firmware for the following reader models with the Identive “CardRdrSuite” application:

Part Number	Reader Description
AMIX2US00	Multi-ISO Reader – USB
AMIX23205	Multi-ISO Reader – RS232
AMID2US00-KBD	Multi-ISO Reader – USB with Keyboard Emulation
AMSC-XX	Multi-Slot Core Reader V2 – USB

2. System requirements

Microsoft Windows XP, Vista, 7. Both 32 and 64 bit platforms are supported.

To run the “Firmware Upgrade” sub-application from “CardRdrSuite”, the user needs to have admin rights on the respective machine.

3. Determining the microcontroller number

Some firmware upgrades are only available with a specific onboard microcontroller. To determine the microcontroller number assembled on the Multi-ISO reader (necessary for CCID upgrade), please check the marked component on the reader board.

In the following picture, the text printed on the IC component surface pointed by the RED arrow gives the microcontroller number:

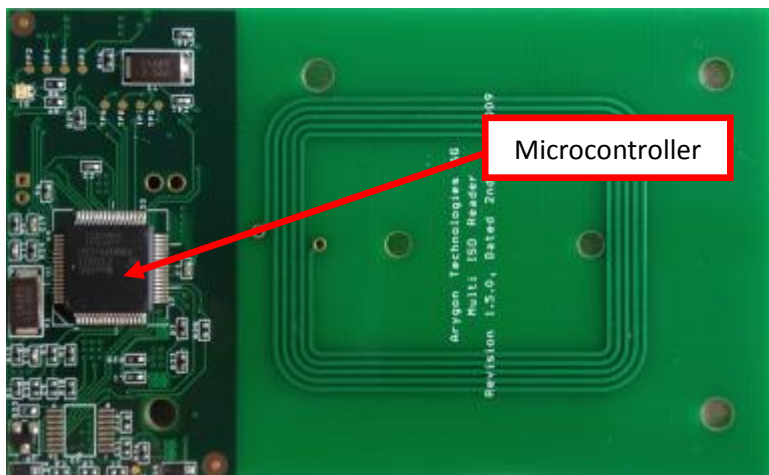


Figure 1 - Multi-ISO reader board

LPC2142FBD64 ➤ LPC2142

LPC2144FBD64 ➤ LPC2144

4. Firmware variants

The following are the available firmware variants of the “various” reader models:

<i>Firmware Variant</i>	<i>Description</i>
PC/SC	PC/SC compliant firmware including feature to use escape commands. Proprietary Identive PC/SC driver is required.
CCID	PC/SC compliant firmware with CCID interface that uses the standard CCID drivers provided by the OS.
CCID+HID	Same functionality as CCID firmware but with additional keyboard emulation feature which uses the HID device class drivers provided by the OS ¹⁾ . HID feature can be turned on/off via command.
ePC/SC	Proprietary PC/SC stack (similar to standard PC/SC) embedded inside the reader firmware.

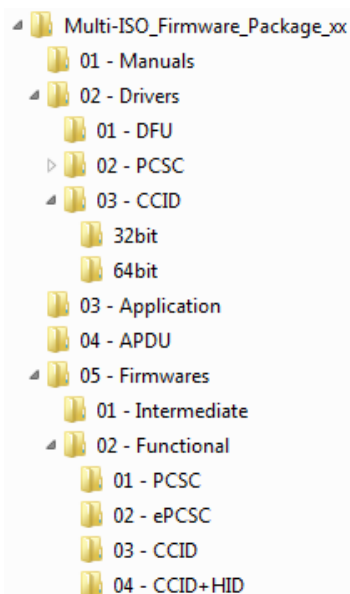
The following are the possible firmware variants of the “respective” reader models:

<i>Part Number</i>	<i>Supported firmwares</i>
AMIx2US00	PC/SC ²⁾ , CCID and CCID+HID
AMIx23205	ePC/SC ²⁾
AMID2US00-KBD	CCID+HID ²⁾
AMSC-xx	PC/SC ²⁾

Note:

- 1) The CCID+HID firmware enumerates to the host as a composite device having a CCID interface and a HID interface.
- 2) **default** firmware of the respective model.

5. Folder structure of the extracted “Multi-ISO_Firmware_Package”:



6. Components used for PC/SC & ePC/SC firmware upgrade

- **CardRdrSuite¹⁾** v1.14 or higher
- **Firmware:**
 - ➔ **Multi-ISO**
 - **USB (AMIX2US00)**
LPC2142²⁾:
 - *_MISO_HF_USB_BASE_FW_REL_VERx.xx.bin
 - *_MISO_HF_USB_MFPLUS_FW_REL_VERx.xx.bin
 - *_MISO_HF_USB_DESFIRE_FW_REL_VERx.xx.bin
 - LPC2144²⁾:
 - *_MISO_HF_USB_COMPLETE_FW_REL_VERx.xx.bin
 - **RS232 (AMIX23205)**
LPC2142:
 - *_MISO_HF_SERIAL_BASE_FW_REL_ERx.xx.bin
 - *_MISO_HF_SERIAL_MFPLUS_FW_REL_VERx.xx.bin
 - *_MISO_HF_SERIAL_DESFIRE_FW_REL_VERx.xx.bin
 - LPC2144:
 - *_MISO_HF_SERIAL_COMPLETE_FW_REL_VERx.xx.bin
 - ➔ **Multi-Slot v2 (AMSC-xx):** **MSLOTv2_FNCFW_REL_VERx_xx.bin**

Note:

- 1) For details on using the “CardRdrSuite” software, please refer the *CardRdrSuiteHelp.chm* file (it is accessible in the same directory as *CardRdrSuite.exe* or by clicking the Help button in the software).
- 2) Multi-ISO reader with LPC2142 based microcontrollers come with one among the 3 flavors: **BASE**, **MFPLUS** or **DESFIRE**. Whereas the LPC2144 based devices, come with a flavor called **COMPLETE** which supports all types of cards covered by **BASE**, **MIFARE_PLUS** and **DESFIRE** flavors.

BASE	Support for MIFARE (Classic, Ultralight C & DESFire), Infineon my-d move,ICODE SLI, tag ICs compliant to ISO14443A, ISO14443B and ISO15693
MFPLUS	BASE + support for MIFARE Plus
DESFIRE	BASE + support for DESFire EV1
COMPLETE	BASE + MFPLUS + DESFIRE

The **BASE**, **MFPLUS** and **DESFIRE** flavors are neither produced nor supported right now and are just mentioned here for the sake of completeness.

7. Components used for CCID & CCID+HID firmware upgrade

- **CardRdrSuite** v1.14 or higher
- **Intermediate firmware:**
LPC2142: **MISO2CCID_FNCFW_BASE_REL_VERx_xx.bin**
LPC2144: **MISO2CCID_FNCFW_COMPLETE_REL_VERx_xx.bin**
- **APDU_DFU.apdu**¹⁾
- **ARYGDFU v1_04 driver**
- **Windows CCID driver 5.2.3790.2724**²⁾
- **CCID firmware:**
LPC2142: **MISO_FNCFW_BASE_CCID_REL_VERx.xx.bin**
LPC2144: **MISO_FNCFW_COMPLETE_CCID_REL_VERx.xx.bin**

Or

CCID+HID firmware:
LPC2144: **MISO_FNCFW_COMPLETE_CCID_HIDUID_REL_VERx.xx.bin**

Note:

- 1) By sending the **APDU_DFU.apdu**, the configuration sectors inside the reader would get invalidated and hence the reader would be enumerating as a DFU device during the next power-on (after un-plug and re-plug).
- 2) The CCID drivers are needed only for Windows versions prior to Windows 7. Use them in case Windows can not find them automatically.

8. Upgrade PC/SC firmware

Please choose a suitable USB firmware file (see [chapter 5](#) & [chapter 6](#)) and follow the upgrade procedure description shown in *CardRdrSuiteHelp.chm* located in the “CardRdrSuite” application folder. Firmware files for PC/SC readers (USB) are located in “\05 - Firmwares\02 - Functional\01 – PCSC\” and the ones for ePC/SC readers (RS232) in “\05 - Firmwares\02 - Functional\02 – ePCSC\”.

9. Upgrade PC/SC firmware to CCID or CCID+HID firmware

1. Launch **CardRdrSuite** v1.14 or higher with admin rights

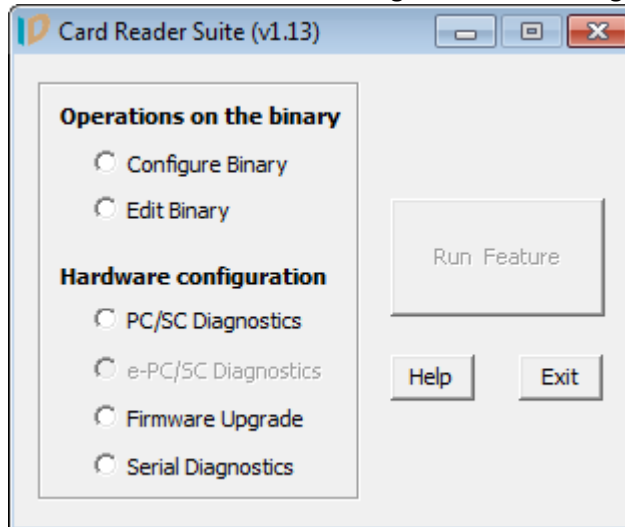


Figure 2 - Screenshot showing the GUI of the CardRdrSuite application

2. If your reader does not yet have a CCID firmware loaded, launch the “Firmware Upgrade” sub-application and download the suitable intermediate firmware (see [chapter 5](#) & [chapter 7](#)) located in the folder “\05 - Firmwares\01 – Intermediate” to the reader. Once it is successfully loaded, close the sub-application and relaunch “CardRdrSuite”.

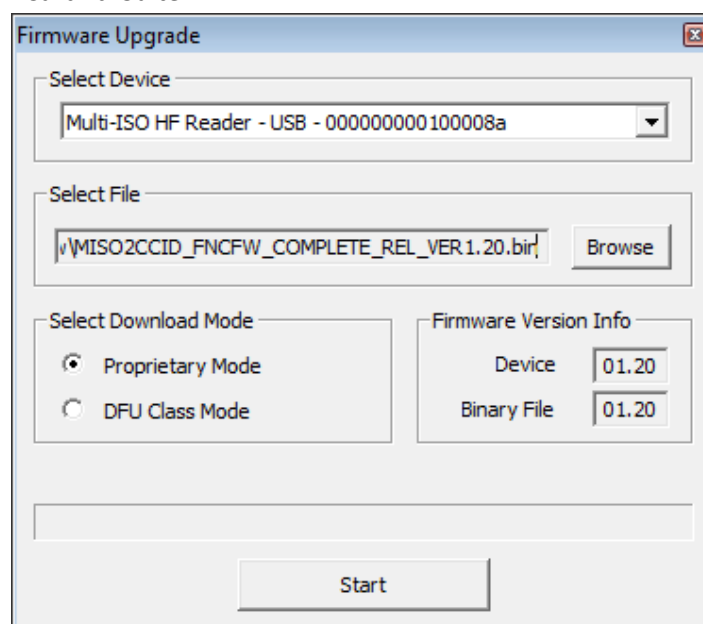


Figure 3 - Screenshot showing Intermediate firmware loaded into the Multi-ISO reader

3. Choose the PC/SC Diagnostics sub-application & click “Run Feature”
4. Place a RFID tag on the reader and click on “Connect Card”. Then browse to “\04 - APDU\” and select **APDU_DFU.apdu** using “SCARD_SHARE_SHARED” as “Connection Mode”. Now click on “Run Command” button.

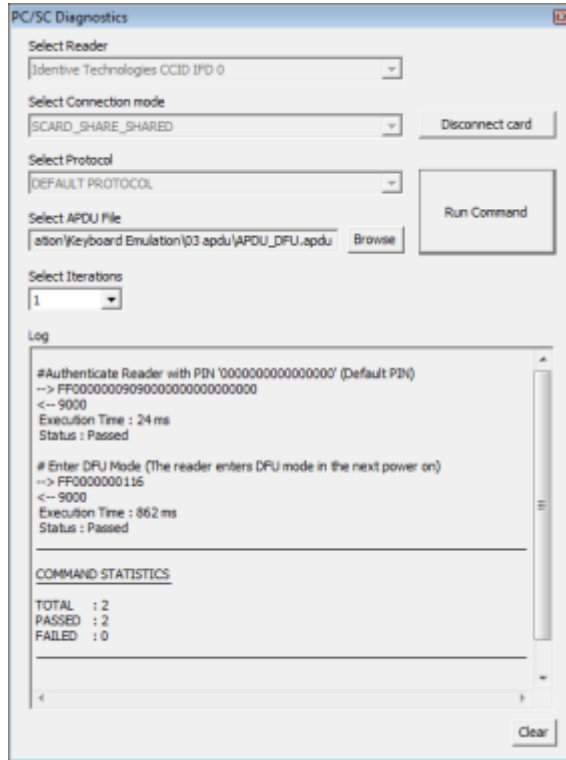


Figure 4 - Screenshot showing sending of APDU_DFU.apdu via PC/SC Diagnostics

5. Unplug the reader and wait 5s before you replug it
6. If DFU driver was not installed before, driver software installation message pops up



Figure 5 - Installing device driver software

If DFU driver was not found from a previous installation you get this error message



Figure 6 – DFU driver not successfully installed

If DFU driver was already installed the process will be completed. After the pop up below is shown, the reader is ready to use. Please continue with step 7, else with steps below.



Figure 7 – DFU driver successfully installed

Now run the setup.exe located in the folder “\02 - Drivers\01 – DFU\”

In the device driver installation wizard click on “Next”



Figure 8 – Device driver installation wizard

The DFU driver will now be installed

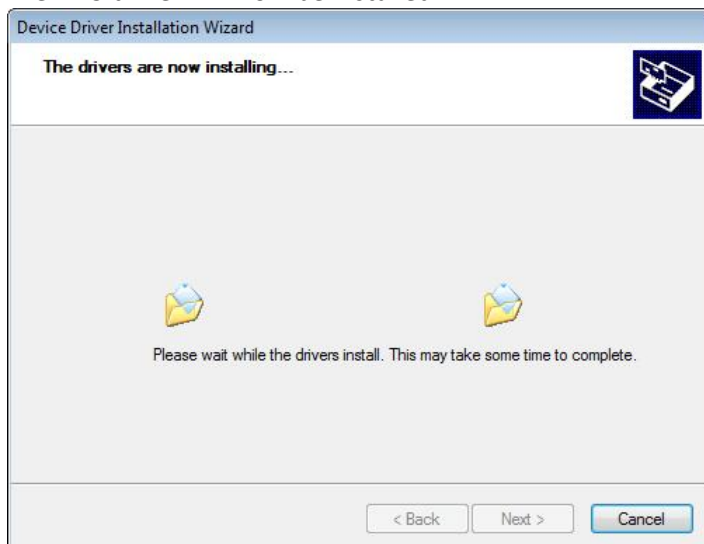


Figure 9 - DFU driver is installing

If driver installation was successful the following screen will be shown



Figure 10 - DFU driver successfully installed

The reader is now ready to use without any further user interaction.

Note: In case the setup process fails please use the manual driver update functionality from the Windows device manager and point the driver installation wizard to the folder "\\02 - Drivers\\01 - DFU\\driver\\".

The reader should now enumerate as "Multi-ISO HF Reader – DFU" in the Windows device manager, section "Universal Serial Bus controllers"

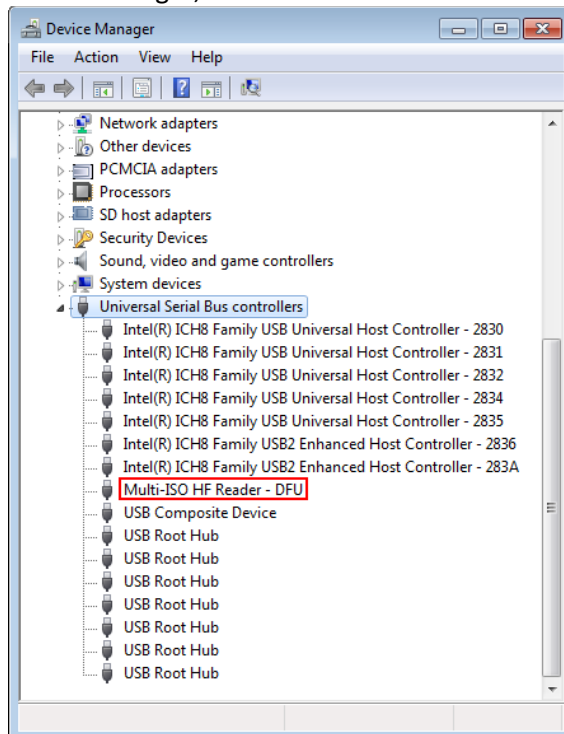


Figure 11 - Screenshot showing Multi-ISO reader enumerating as a DFU device

7. Close only the "PC/SC Diagnostics" sub-application

8. Choose the “Firmware Upgrade” sub-application & click “Run Feature”

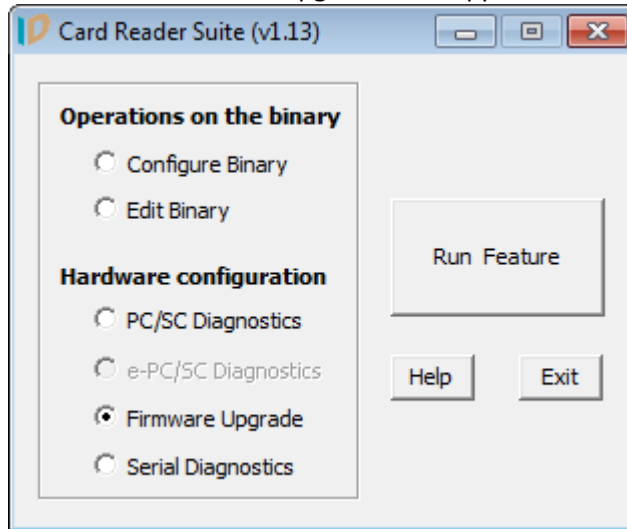


Figure 12 - Screenshot showing Firmware Upgrade

9. Select the suitable CCID firmware file (see [chapter 5](#) & [chapter 7](#)) located in the folder “\05 - Firmwares\02 – Functional\” and perform download

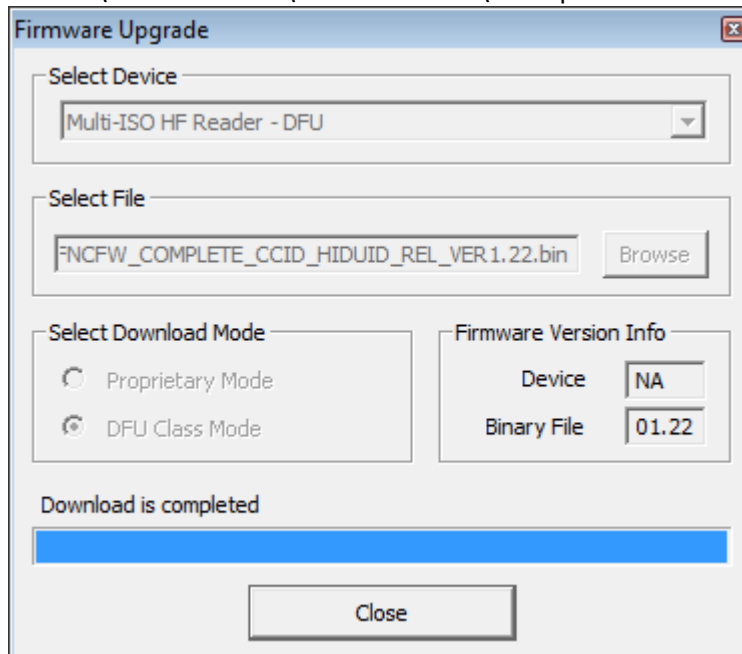


Figure 13 - Screenshot showing CCID firmware loaded into the Multi-ISO DFU device

10. On completing the above steps, the reader will be enumerated as CCID device (for devices with CCID firmware) or as CCID+HID composite device (for devices with CCID+HID firmware):

CCID device:

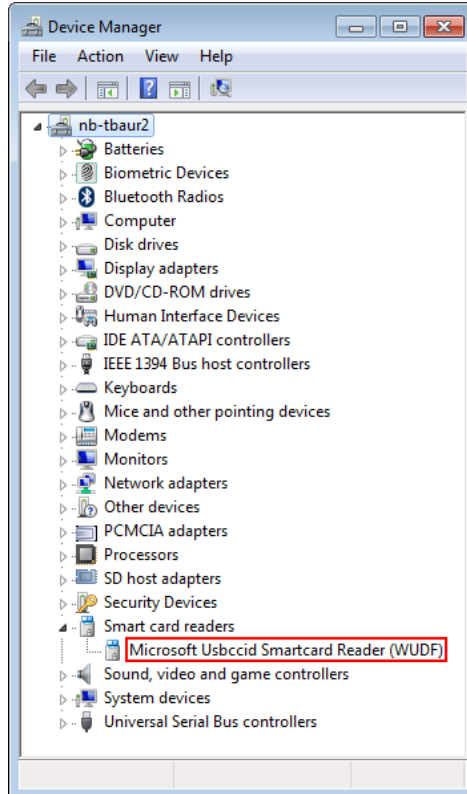


Figure 14 - Screenshot showing Multi-ISO Reader getting enumerated as a CCID device

CCID+HID composite device:

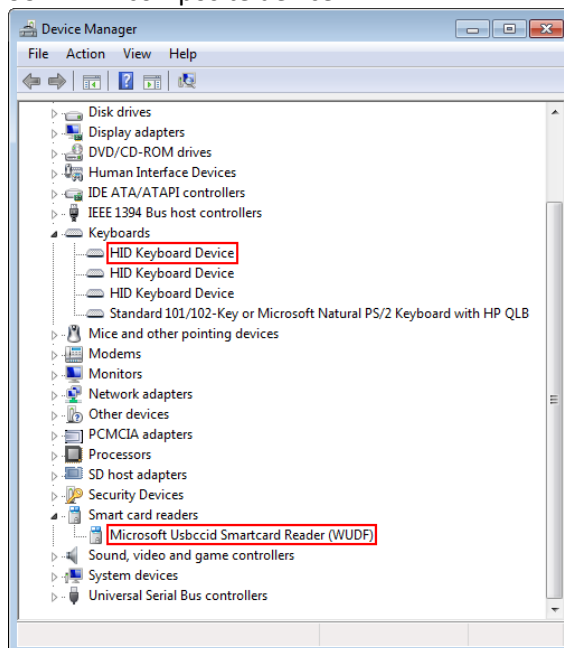


Figure 15 - Screenshot showing Multi-ISO Reader getting enumerated as a composite device

10. Upgrade CCID or CCID+HID firmware

Follow the same steps as described in [chapter 9](#) but start from step 3)

11. Upgrade CCID or CCID+HID firmware to PC/SC firmware

1. Launch **CardRdrSuite** v1.14 or higher with admin rights

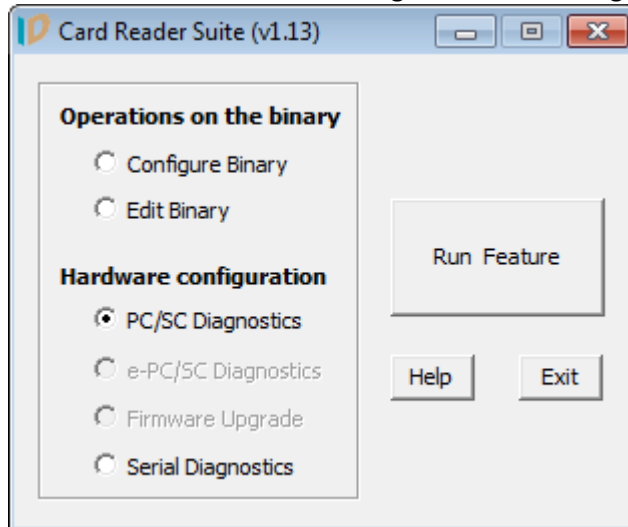


Figure 16 - Screenshot showing the GUI of the CardRdrSuite application

2. Choose the “PC/SC Diagnostics” sub-application & click “Run Feature”

Place a RFID tag on the reader and click on “Connect Card”. Then browse to “\04 - APDU\” and select **APDU_DFU.apdu** using “SCARD_SHARE_SHARED” as “Connection Mode”. Now click on “Run Command” button.

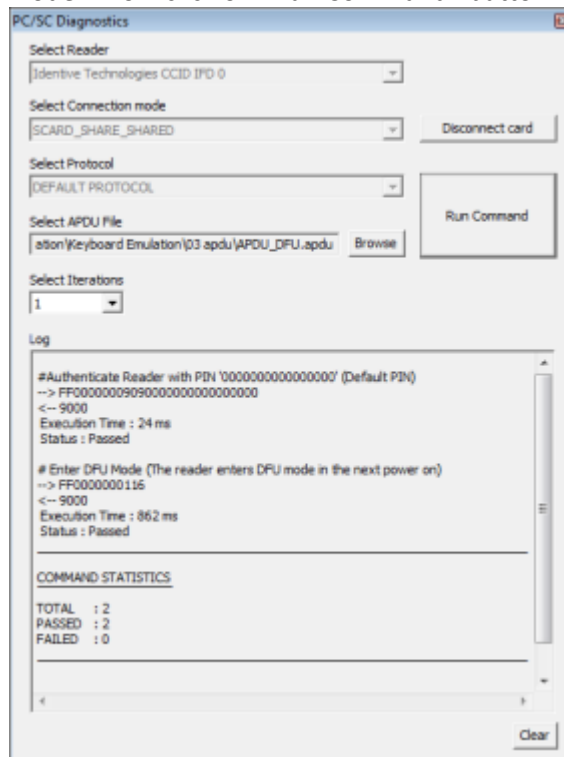


Figure 17 - Screenshot showing sending of APDU_DFU.apdu via PC/SC Diagnostics

3. Unplug the reader and wait 5s before you replug it. If you get any new hardware found message and did not install the DFU driver yet please follow the steps shown in section 9.6); else proceed with 4) shown below.
4. Close only the “PC/SC Diagnostics” sub-application
5. Choose the “Firmware Upgrade” sub-application & click “Run Feature”

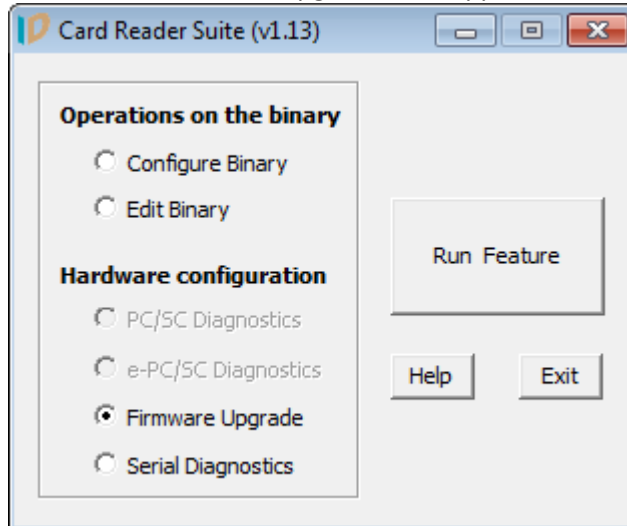


Figure 18 - Screenshot showing Firmware Upgrade

6. Select the suitable PC/SC firmware file (see [chapter 6](#)) located in the folder “\05 - Firmwares\02 – Functional\” and perform download

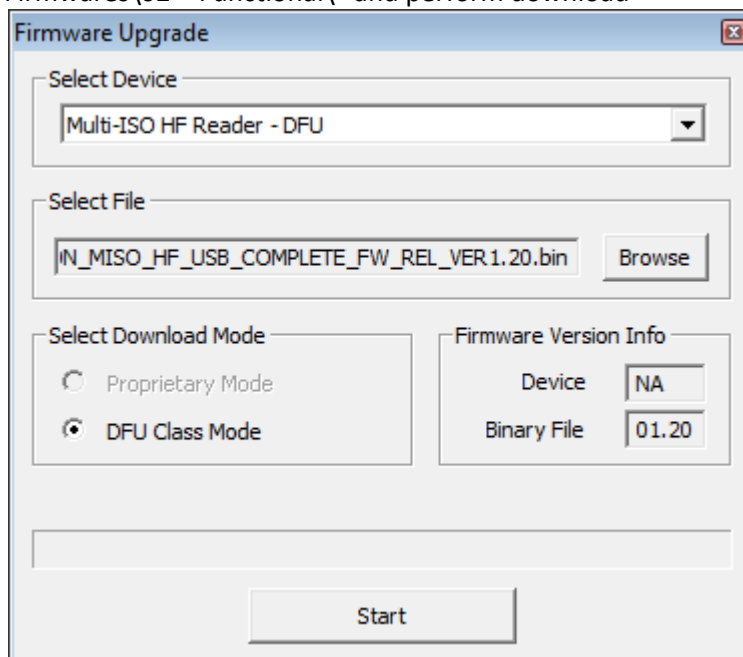


Figure 19 - Screenshot showing PC/SC firmware loaded into the Multi-ISO DFU device

7. If the reader was connected for the first time you will get a driver installation message

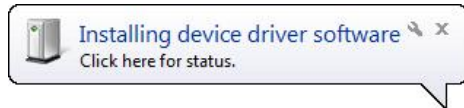


Figure 20 - Installing device driver software

If PC/SC driver was not found from a previous installation you get this error message



Figure 21 – PC/SC driver not successfully installed

If PC/SC driver was already installed the process will be completed. After the pop up below is shown, the reader is ready to use. Else proceed with steps below.



Figure 22 - PC/SC driver successfully installed

Now run the setup.exe located in the folder “\02 - Drivers\01 – PCSC”

In the device driver installation wizard click on “Next”



Figure 23 – Device driver installation wizard

The PC/SC driver will now be installed

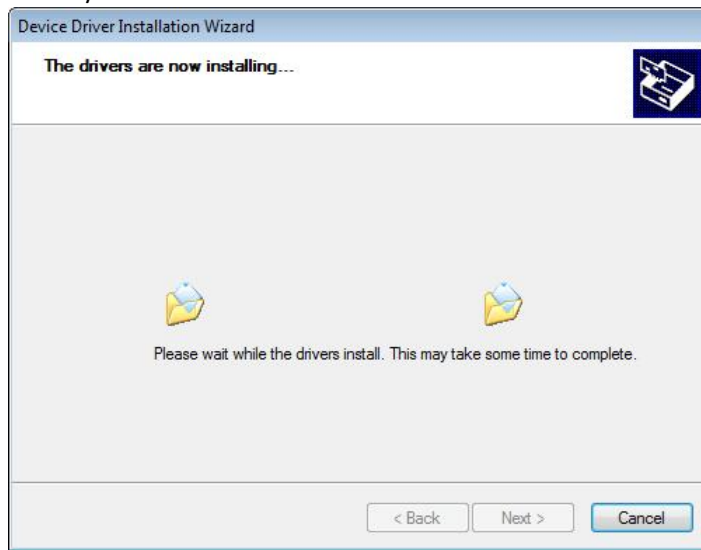


Figure 24 - PC/SC driver is installing

If driver installation was successful the following screen will be shown



Figure 25 - PC/SC driver successfully installed

The reader is now ready to use without any further user interaction.

Note: In case the setup process fails please use the manual driver update functionality from the Windows device manager and point the driver installation wizard to the folder "\\02 - Drivers\\01 – PCSC\\driver\\".

After completing the above steps, the reader will be enumerated under “Smart card readers”, as follows:

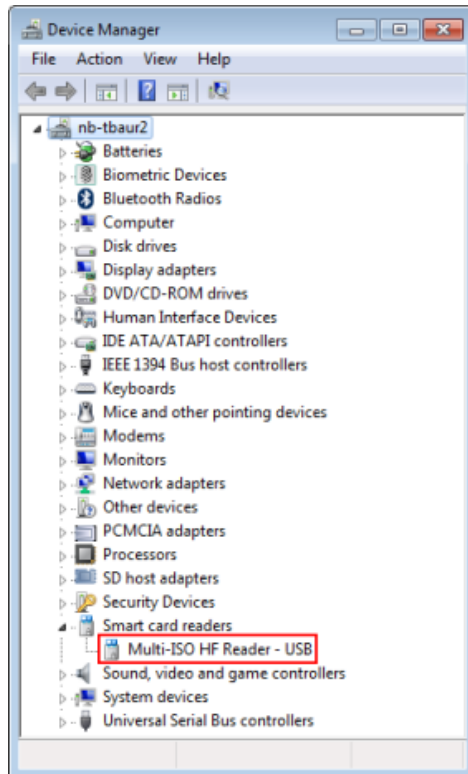


Figure 26 - Multi-ISO reader enumerated as PC/SC reader

12. VID & PID

The vendor ID (VID) and product ID (PID) of the various USB readers:

Device firmware	VID	PID
AMIX2US00 with PC/SC firmware	1FFAh	0001h
AMIX2US00 with CCID firmware	1FFAh	000Bh
AMID2US00-KBD	1FFAh	000Ch
AMSC-xx	1FFAh	0002h

13. Sending escape commands with CCID based readers

For sending the escape-commands to a CCID based reader in Windows, refer to the Microsoft link <http://msdn.microsoft.com/en-us/windows/hardware/gg487509>.

Note:

For enabling escape commands in Windows 7, one has to remember that a non-zero `EscapeCommandEnable` DWORD value has to be created under the `.\DeviceParameters\WUDFUsbccidDriver\` key in the registry. The following is the screenshot of the same:

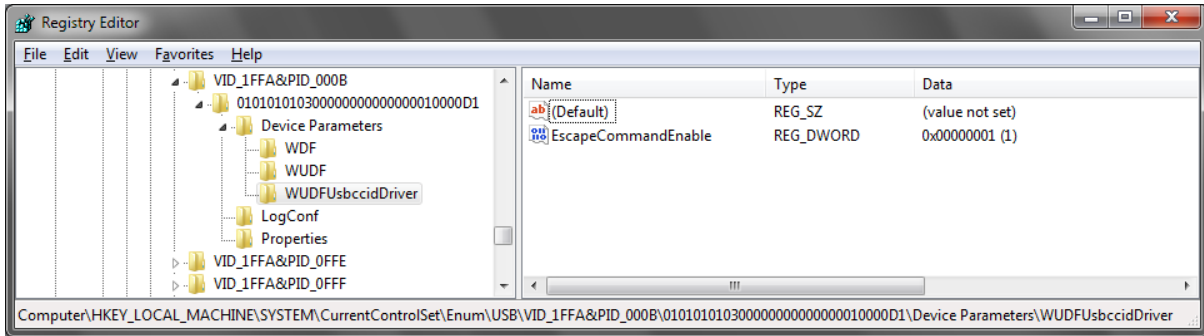


Figure 27 - Showing the registry key for creating “EscapeCommandEnable” value

The following is the registry path of the same:

```
HKLM\SYSTEM\CurrentControlSet\Enum\USB\VID_1FFA&PID_000B\x\DeviceParameters\WUDFUsb  
CcidDriver\
```

Where **x** is the serial number of the device.

14. Terms & Abbreviations

<i>Terms / Abbreviations</i>	<i>Description</i>
APDU	Application Protocol Data Unit
CCID	Chip Card Interface Device
DFU	Device Firmware Upgrade
HID	Human Interface Device
IC	Integrated Circuit
ISO	International Standard Organization
PC/SC	Personal Computer/Smart Card
RS232	Recommended Standard 232 (Serial communication standard)
USB	Universal Serial Bus