DIEBOLD NIXDORF

BA9x RFID/NFC

Reader

Firmware version 1.00

Installation Manual

We would like to know your opinion on this publication.

Please send us a copy of this page if you have any constructive criticism.
We would like to thank you in advance for your comments.
With kind regards.

Your Opinion:

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BA9x RFID/NFC

Reader

Installation Manual

Edition June 2018

Contents

Manufacturer´s Certification

CE

The device complies with the requirements of the EEC directive 2004/108/EC with regard to 'Electro-magnetic compatibility" and 2006/95/EC "Low Voltage Directive" and RoHS directive 2011/65/EU.

Europe-EU Declaration of Conformity

Hereby, Diebold Nixdorf declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Cěky [Czech]:	Diebold Nixdorf tímto prohlašuje, že tento zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Dansk [Danish]:	Undertegnede Diebold Nixdorf erklærer herved, at følgende udstyr Enhed overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]:	Hiermit erklärt Diebold Nixdorf, dass sich das Gerät in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richt-linie 1999/5/EG befindet.
Eesti [Estonian]:	Käesolevaga kinnitab Diebold Nixdorf seadme vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud dire ktiivist tulenevatele teistele asjakohastele sätetele.
English:	Hereby, Diebold Nixdorf declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]:	Por medio de la presente declara que el dispositivo cumple con los requisitos esenciales y cualesquiera otras disposi-ciones aplicables o exigibles de la Directiva 1999/5/CE.
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Français [French]:	Par la présente Diebold Nixdorf déclare que l'appareil est conforme aux exigences essentielles et aux autres disposi-tions pertinentes de la directive 1999/5/CE.

Italiano [Italian]:	Con la presente Diebold Nixdorf dichiara che questo dispositivo è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]:	Ar šo Wioncor Nixdorf deklarē, ka ierīce atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]:	Šiuo Diebold Nixdorf deklaruoja, kad šis prietaisas atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Nederlands [Dutch]:	Hierbij verklaart Diebold Nixdorf dat het toestel apparaat in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese]:	Hawnhekk, Diebold Nixdorf jiddikjara li dan apparat jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
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Polski [Polish]:	Niniejszym Diebold Nioxdorf oświadcza, że urządzenie jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]:	Diebold Nixdorf declara que este dispositivo está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]:	Diebold Nixdorf izjavlja, da je ta Naprava v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]:	Diebold Nixdorf týmto vyhlasuje, že zariadenie spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]:	Diebold Nixdorf vakuuttaa täten että laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden eh tojen mukainen.
Svenska [Swedish]:	Härmed intygar Diebold Nixdorf att denna enhet står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Íslenska [Icelandic]:	Hér með lýsir Diebold Nixdorf yfir því að tæki er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norsk [Norwegian]:	Diebold Nixdorf erklærer herved at utstyret enhet er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

The declaration of conformity may be consulted at
http://www.Dieboldnixdorf.com.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or trasmitter.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC-Class A Declaration

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications not authorized by the manufacturer may void users authority to operate this device.
This class A digital apparatus complies with Canadian ICES-003.
Cet appareil numerique de la classe A est conforme à la norme NMB-003 du Canada.

About This Manual

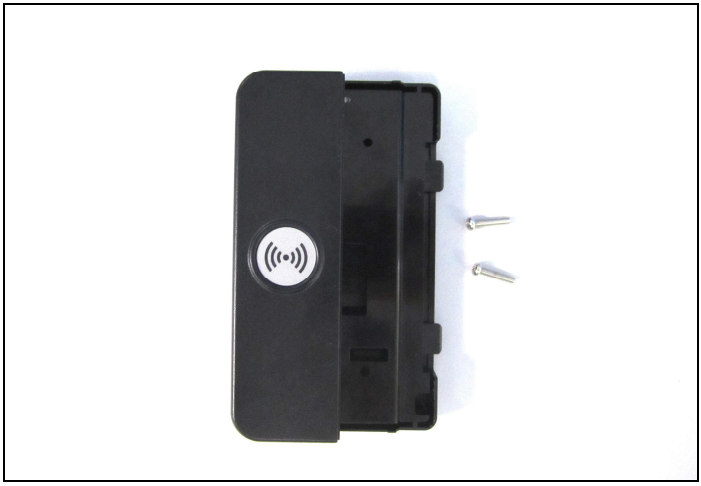
This manual informs you about everything you might need to know for the installation of your BA9x RFID/NFC Reader for the BA9x displays family and iPOS plus Advanced.

Notes in the manual are marked by this symbol.

This symbol is used for warnings.

The parts in a kit

The kit contains the BA9x RFID/NFC Reader with holder and two screws.



About the Device

The BA9x RFID/NFC Reader is a short-range two-way communication contactless card reader. Operating in the unlicensed radio frequency ISM band of 13.560MHz, the reader generates a near-field that can power passive tags/cards that are within the operating range and perform read/write operation. The maximum reading range is 10 cm but typically it is shorter depends on the types and the number of tags/cards within the reading range.

The BA9x RFID/NFC can be attached on either side of the BA9x series of touch monitors and also the BEETLE/ iPOS plus Advanced. It supports read/write of tags that are fully compliant to ISO/IEC14443 Type A & B and ISO/IEC15693. For cards that are not fully compliant support is limited to only reading of UID. In any case, user should pick from the list of validated tags/cards shown in Table 1 in section “Operating the BA9x RFID/NFC Reader”. On a request basis, user may submit preferred tags/cards to Diebold Nixdorf Pte Ltd for validation.

The physical interface is USB, and as it belongs to the HID class there is no need to install device driver for normal cards operation. However, for firmware update, it is necessary to install both the DFU-mode as well as the Runtime-mode device drivers.

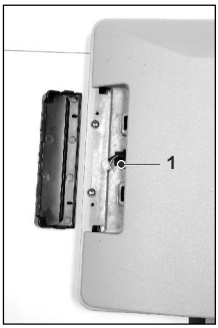
For ease of developing software application Diebold Nixdorf Pte Ltd provides JavaPOS 1.13 middleware, alternatively, customer can also develop application that directly calls the API at the HID interface.

Hardware installation

Unpack the parts and check whether the delivery matches the details of the delivery note.

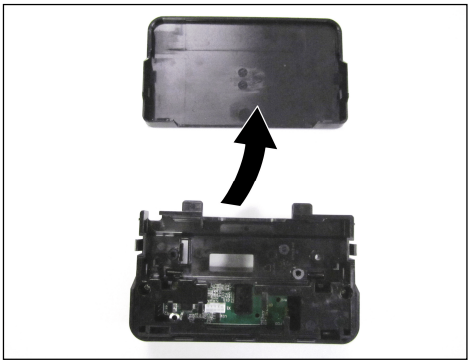
The BA9x RFID/NFC Reader can be installed on either the right or the left side of the screen. You will find a flap at the rear side of the display at the position for the peripherals.

Follow the steps below to install the reader to the display.

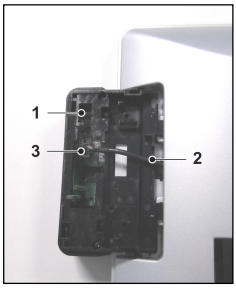


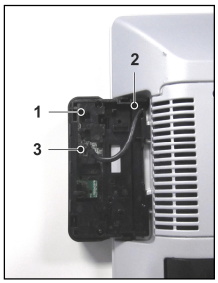
1. Remove the flap using a screw driver, exposing one end of a connecting cable (1).

2. Release the catch on one side of the holder.



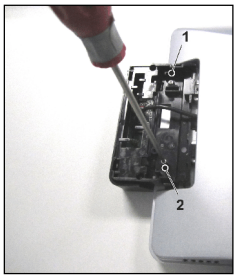
3. Remove the back cover of the holder.

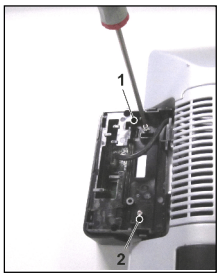




4. Locate the holder (1) to the side of the display uncovered in step 1.

   Route the connecting cable (2) mentioned in step 1, into the holder and connect to the connector (3).





5. Use the two screws supplied to secure the holder to the display, in locations (1) and (2).

6. Place in the back cover of the holder.

   The installation is complete.

DFU Driver installation

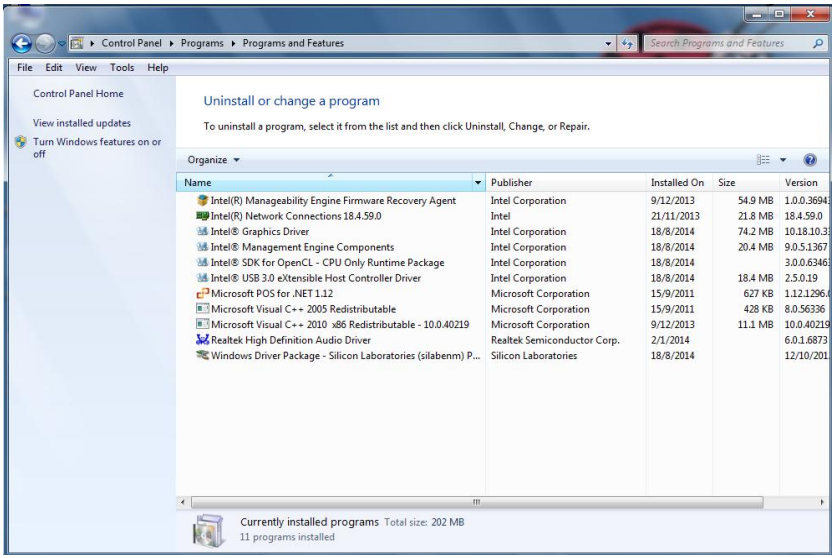
System requirement

In order to use “dfuprog” DFU tools with the Window operating system, The Microsoft Visual C++ 2010 Redistributable Package must be installed on the PC.

To verify if the package is installed on the PC, follow below steps:

1. Open Programs and Features by clicking the Start button –> Control Panel–>Programs and Features.
2. To check if the Microsoft Visual C++ 2010 Redistributable Package is listed from Programs and Features as shown in the example in Figure 1 below.
3. If the package was not installed, go to the Microsoft Visual C++ 2010 Redistributable Package download site for the corresponding system type (x86 or x64).
4. Download the package to your local folder.
5. Double-click the package and follow the package installation instructions.
6. Once the package is installed successfully on the PC, it should be listed.

Figure 1: the Microsoft Visual C++ 2010 Redistributable Package is installed



DFU Driver Installers folder contents

The following folders are included in DFU Driver Installers folder:

dfuprog folder : this folder consists of the following files

- BA9xRFID.bin: the latest application firmware binary file.
- dfuprog.exe: DFU firmware upgrading executable file.
- wndfu.dll, wndfu.lib, wndfu_rt.dll, wndfu_rt.lib, wnusbdll.dll, wnusbdll.lib: library files for dfuprog.exe.

wnDFU folder : this folder consists of the driver files for DFU mode.
wnDFU_RT folder: this folder consists of the driver files for DFU runtime mode.

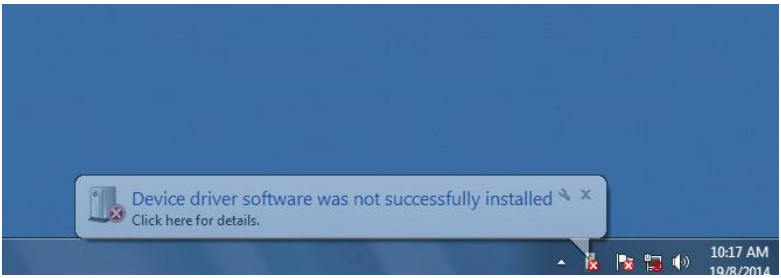
DFU drivers installation

In order to use DFU tools for upgrading application firmware for the BA9x RFID/NFC reader module, you need to install Diebold DFU drivers when the module is in DFU runtime mode and DFU mode.

DFU driver installation for DFU runtime mode

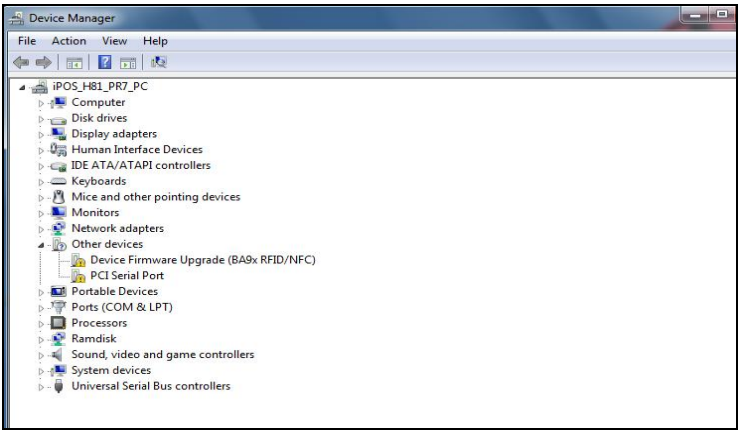
- Connect the BA9x RFID/NFC reader module to a spare USB port on the PC.
- If this is the first time you connect the module to the PC, it will appears “Device driver software was not successfully installed” in the notification area on the PC as shown in figure 2 below.

Figure 2: Device drive software was not successfully installed



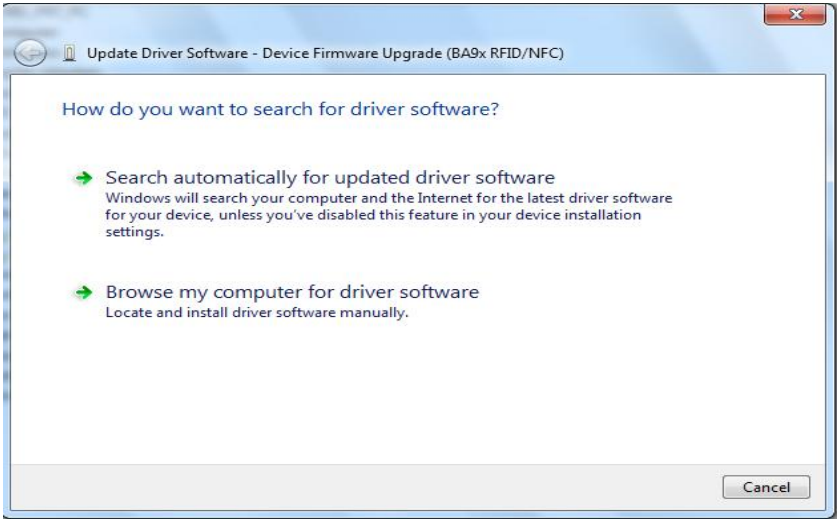
- Then you will need to update driver manually. To do this, open the Device Manager. Select “System and Security” –> “System” – >“Device Manager” locate in “Control Panel”. The Device Manager should show one device with "Device Firmware Upgrade (BA9x RFID/NFC)" as shown figure 3 below.

Figure 3: Device Manager shows one device with “Device Firmware Upgrade (BA9x RFID/NFC)”



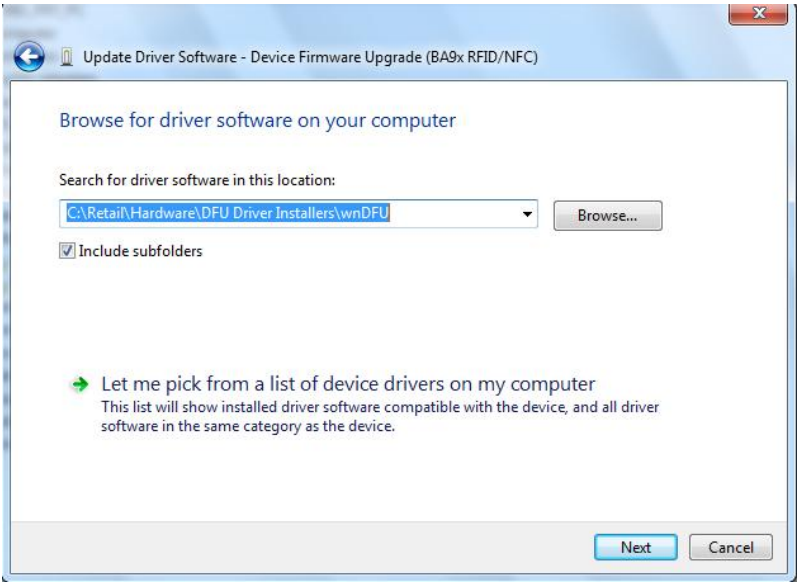
- Right-click on the device, and choose “Update Driver Software” from the context menu. This will open the “Update Driver Software -> Device Firmware Upgrade (BA9x RFID/NFC)” dialog box shown as figure 4 below. In the dialog box, choose “Browse my computer for driver software”.

Figure 4: “Update Driver Software - Device Firmware Upgrade (BA9x RFID/NFC)” dialog box



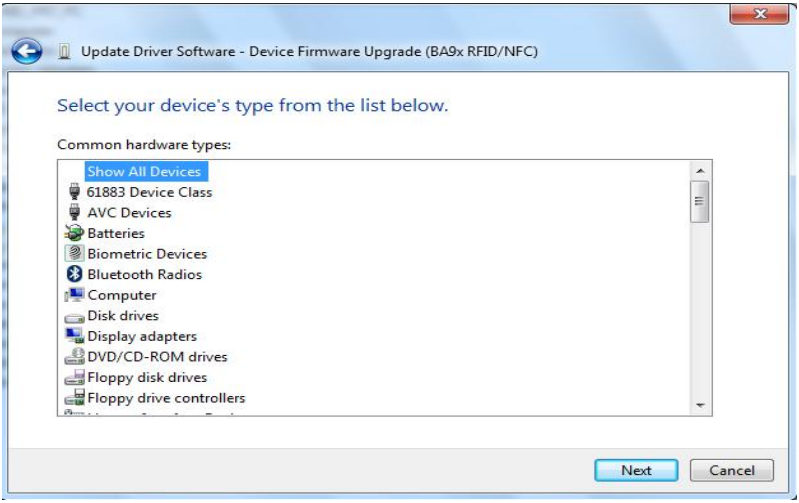
- In the dialog box that follows as shown figure 5 below, choose “Let me pick from a list of device drivers on my computer”, Click “Next” to proceed to next step.

Figure 5: “Browse for driver software on your computer” dialog box



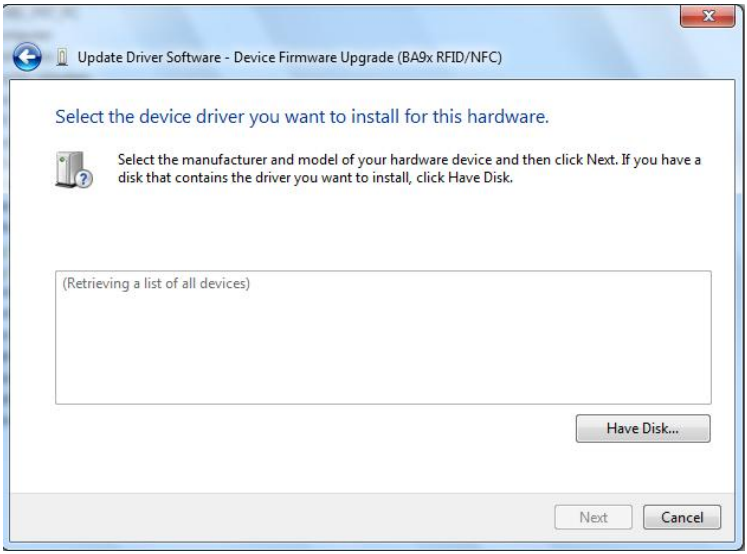
- In the dialog box that follows as shown figure 6 below, to select “Show All Devices” and click the “Next” to next step.

Figure 6: “Select your device’s type from the list below” dialog box



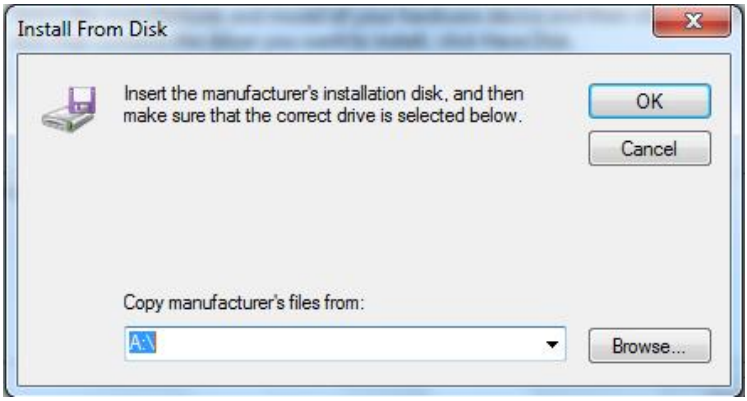
- In the dialog box that follows as shown figure 7 below, choose the “Have Disk” and click “Next” to next step.

Figure 7: “Select the device driver you want to install for this hardware” dialog box



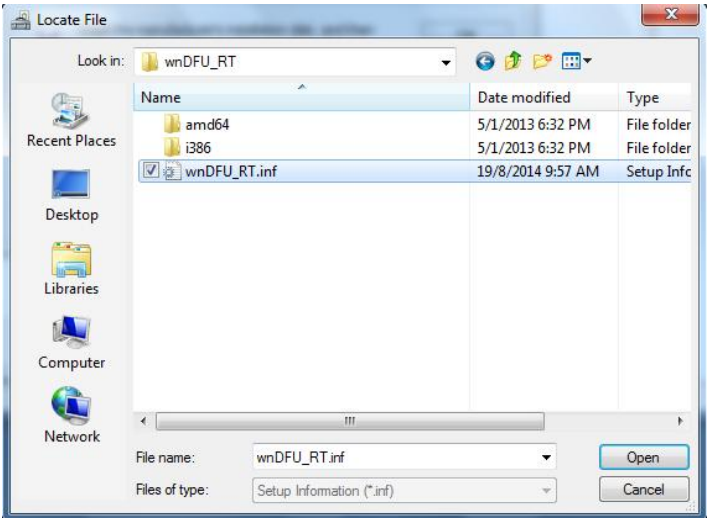
- In the dialog box that follows as shown figure 8 below, Click “Browse” button to locate the driver.

Figure 8: “Install From Disk” dialog box



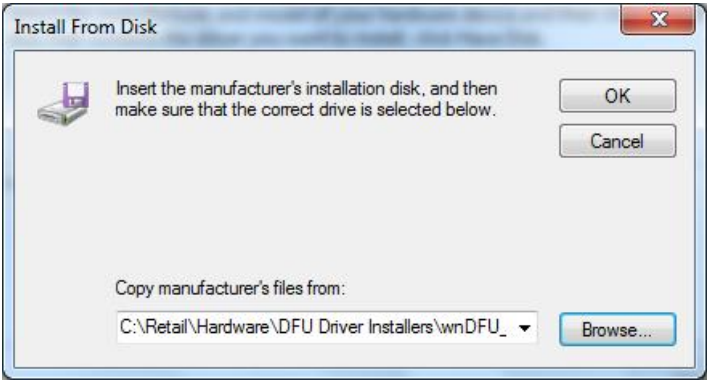
- In the “Locate File” dialog box that follows as shown figure 9 below, locate the “wnDFU_RT.inf” setup information file and click “Open” button. **This is usually located in “C:\Retail\Hardware\DFU Driver Installers\wnDFU_RT”.**

Figure 9: “Locate File” dialog box



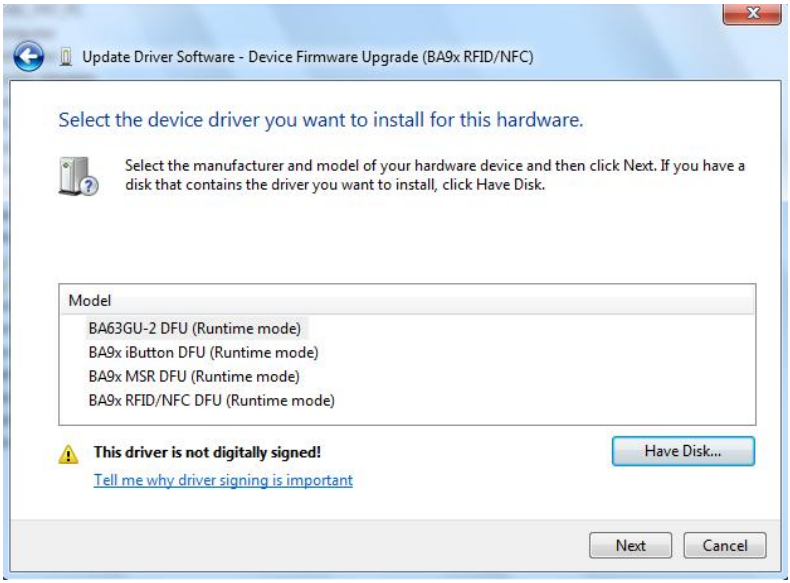
- In the “Install From Disk” dialog box that follows as shown figure 10 below, Click “OK” button to back to the “Select the device driver you want to install for this hardware” dialog box .

Figure 10: “Install From Disk” dialog box



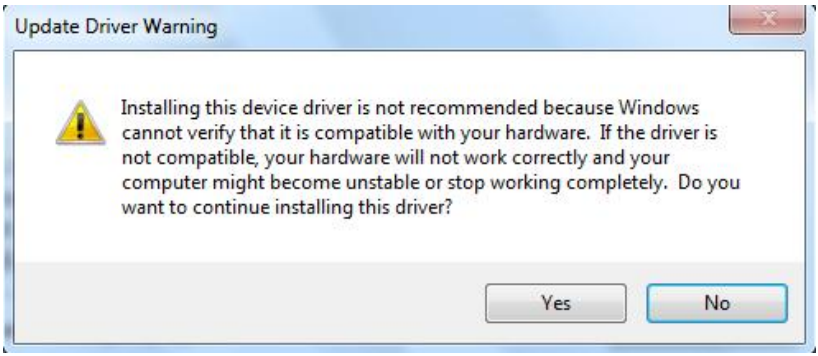
- In the “Select the device driver you want to install for this hardware” dialog box that follows as shown figure 11 below, choose “BA9x RFID/NFC DFU (Runtime mode)” from Model list, Click “Next” button to install the driver.

Figure 11: “Install From Disk” dialog box



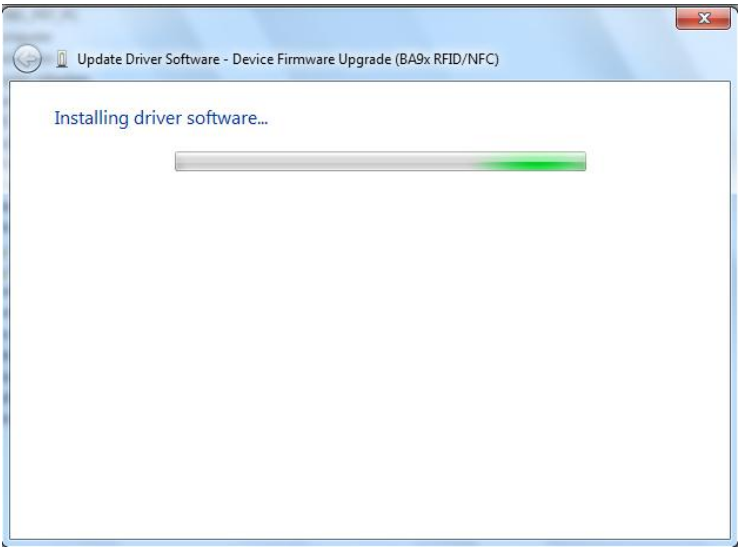
- If an “Update Driver Warning” dialog box opens as shown figure 12 below, click “Yes” button continue.

Figure 12: “Update Driver Warning” dialog box



- “Installing driver software” dialog box opens as shown figure 13 below, wait for the driver installation to complete.

Figure 13: “Installing driver software” dialog box

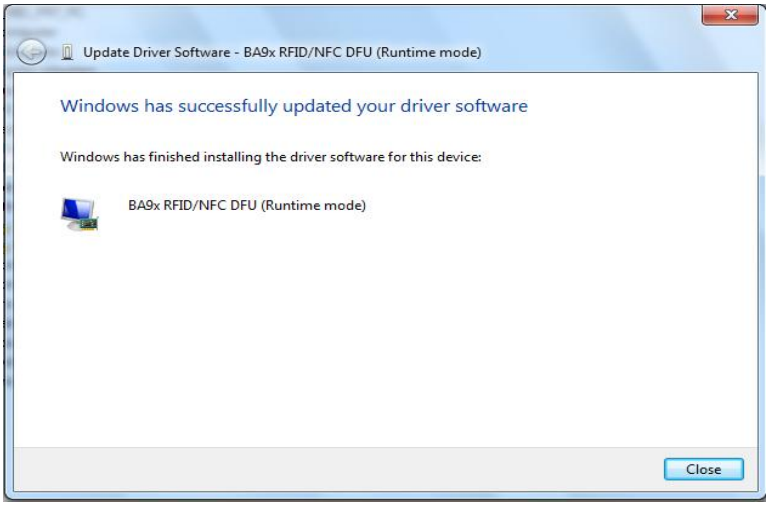


- If Windows displays a “Windows Security” dialog box as shown figure 14 below, choose “Install this driver software anyway” to continue.

Figure 14: “Windows Security” dialog box

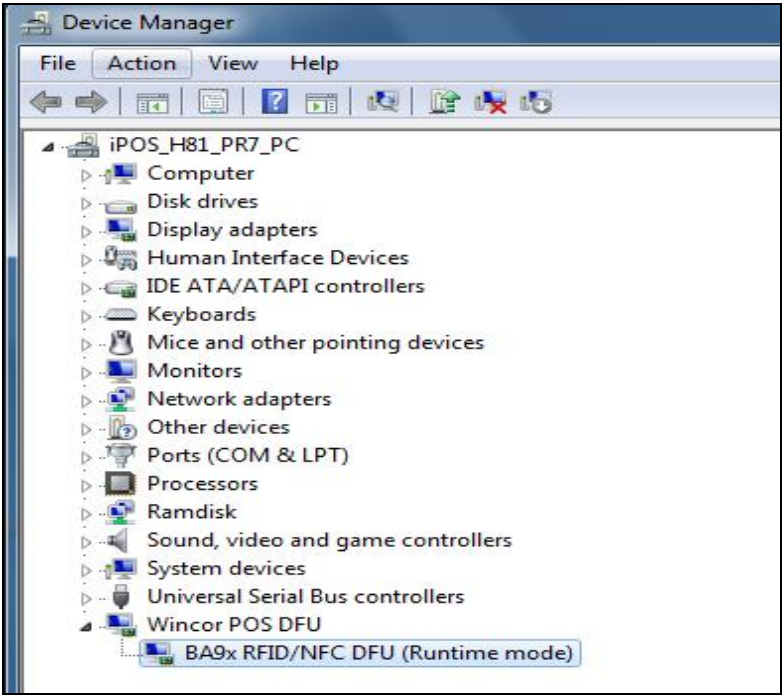
- Windows displays a “Windows has successfully updated your driver software” dialog box as shown figure 15 below when the DFU driver installation completed. Click “Close” button to close dialog box.

Figure 15: “Windows has successfully updated your driver software” dialog box



- When windows successfully updated the DFU driver for the BA9x RFID/NFC reader module. The Device Manager should show one device with "BA9x RFID/NFC DFU (Runtime mode)" as shown figure 16 below.

Figure 16: Device Manager shown the device with " BA9x RFID/NFC DFU (Runtime mode)"

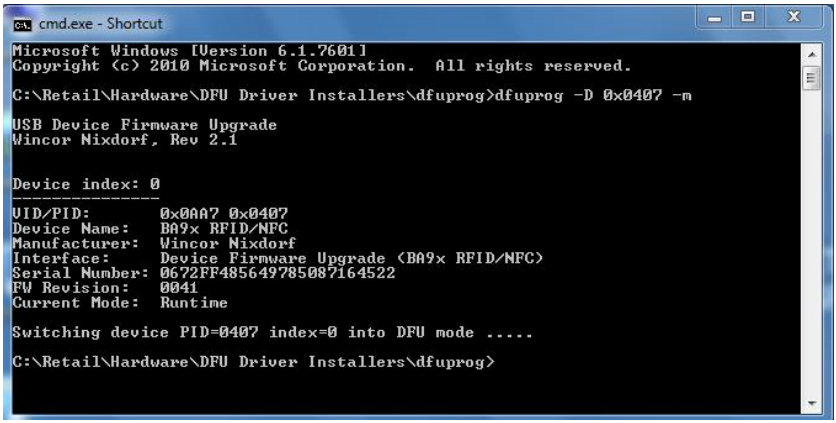


DFU driver installation for DFU mode

After DFU driver for DFU runtime mode installation completed, you need to install DFU drivers for DFU mode by following below steps.

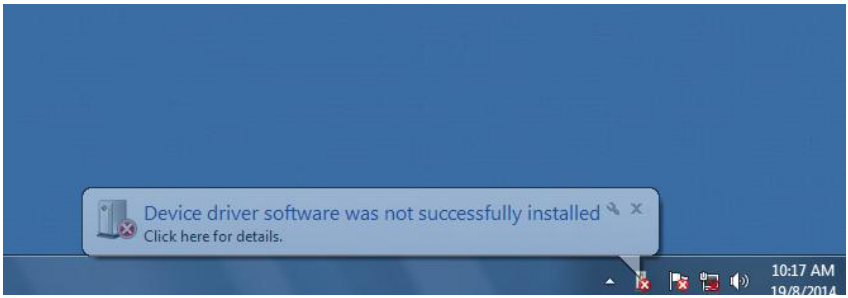
- To open Command Prompt, Click the Start button. In the Search box, type Command Prompt, and then, in the list of results, double-click Command Prompt.
- Change the path to the location where the dfuprog.exe is. **This is usually located in "C:\Retail\Hardware\DFU Driver Installers\dfuprog".**
- Execute the **dfuprog -D 0x0407 –m** as shown Figure 17 below to switch the device to DFU mode.

Figure 17: switch the device to DFU mode



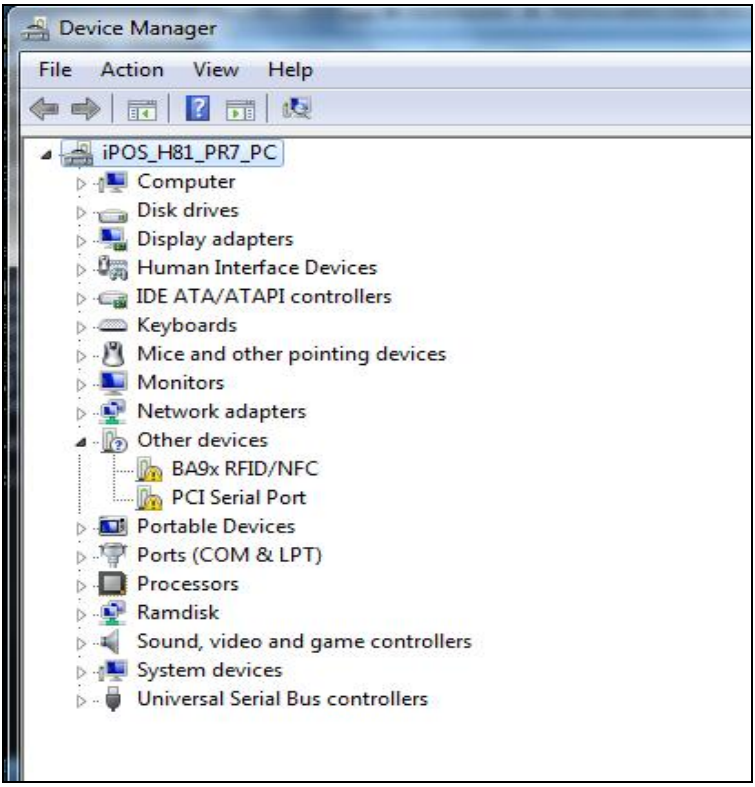
- If this is the first time you switch the BA9x RFID/NFC reader module to DFU mode, it will appears “Device driver software was not successfully installed” in the notification area on the PC as shown figure 18 below.

Figure 18: Device drive software was not successfully installed



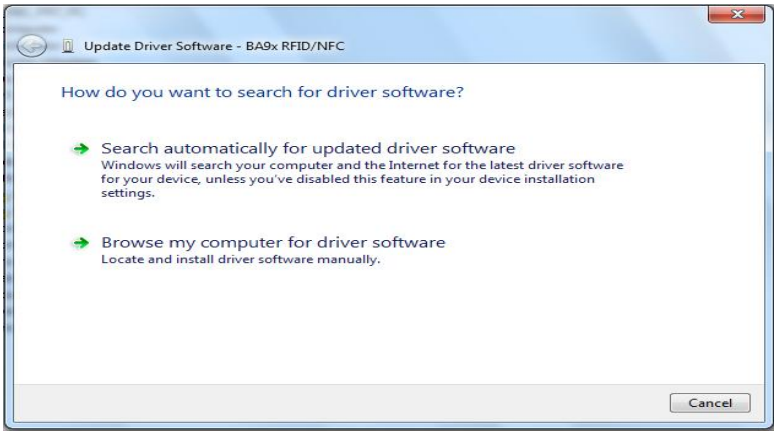
- Then you will need to update driver manually. To do this, to open the Device Manager, Select “System and Security” – “System” – “Device Manager” locate in “Control Panel”. The Device Manager should show one device with "BA9x RFID/NFC" as shown figure 19 below.

Figure 19: Device Manager shows one device with “BA9x RFID/NFC”



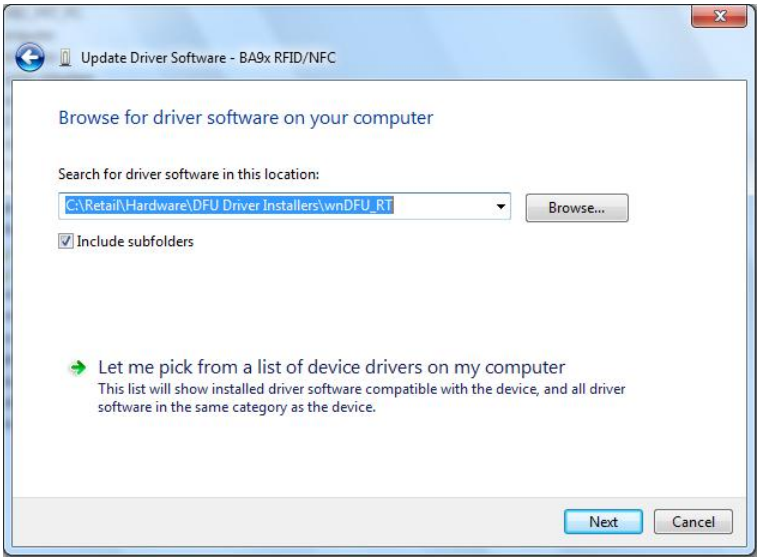
- Right-click on the device, and choose “Update Driver Software” from the context menu. This will open the “Update Driver Software - BA9x RFID/NFC” dialog box shown as figure 20 below. In the dialog box, choose “Browse my computer for driver software”.

Figure 20: “Update Driver Software - BA9x RFID/NFC” dialog box



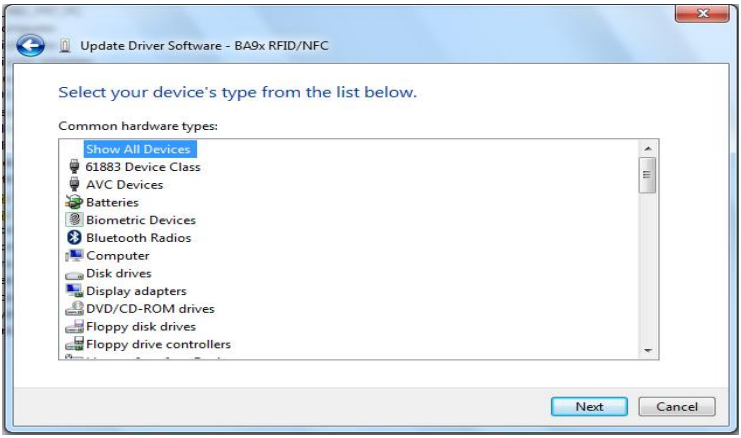
- In the dialog box that follows as shown figure 21 below, choose “Let me pick from a list of device drivers on my computer”, Click “Next” to proceed to next step.

Figure 21: “Browse for driver software on your computer” dialog box



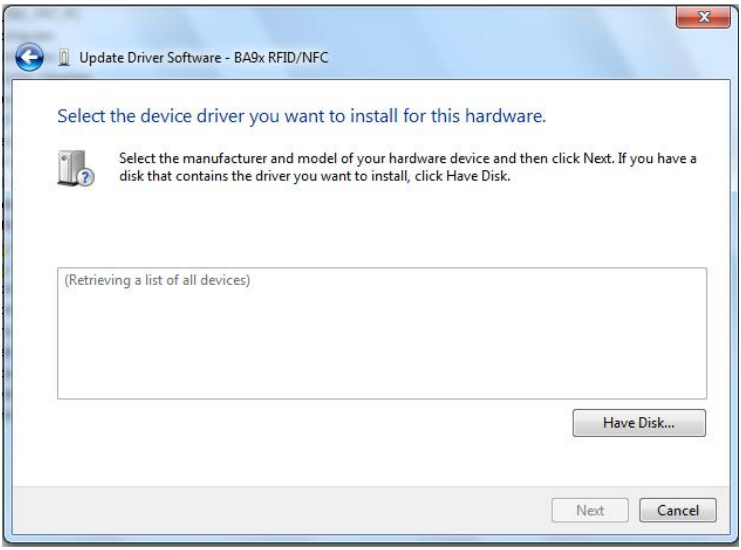
- In the dialog box that follows as shown figure 22 below, to select “Show All Devices” and click the “Next” to next step.

Figure 22: “Select your device’s type from the list below” dialog box



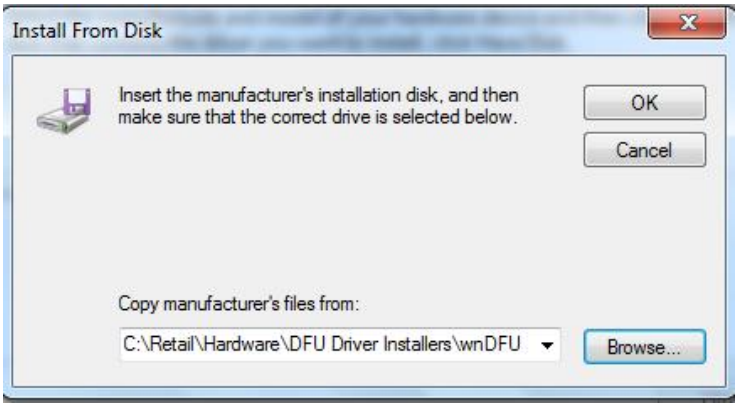
- In the dialog box that follows as shown figure 23 below, choose the “Have Disk” and click “Next” to next step.

Figure 23: “Select the device driver you want to install for this hardware” dialog box



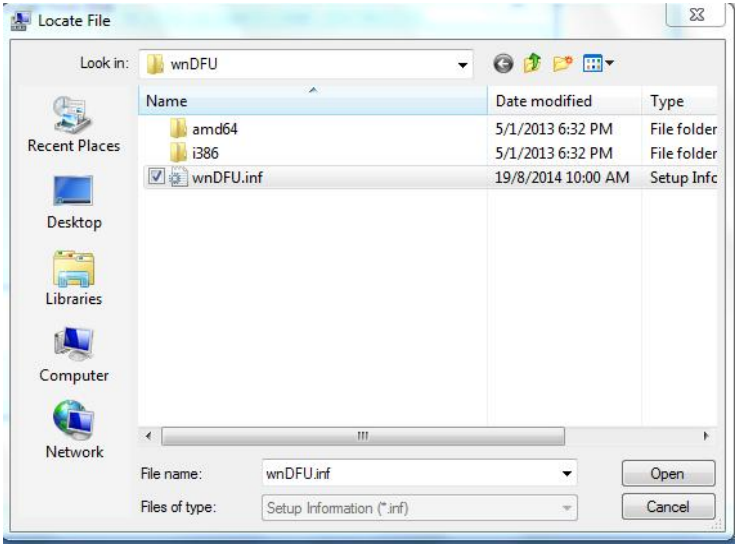
- In the dialog box that follows as shown figure 24 below, Click “Browse” button to locate the driver.

Figure 24: “Install From Disk” dialog box



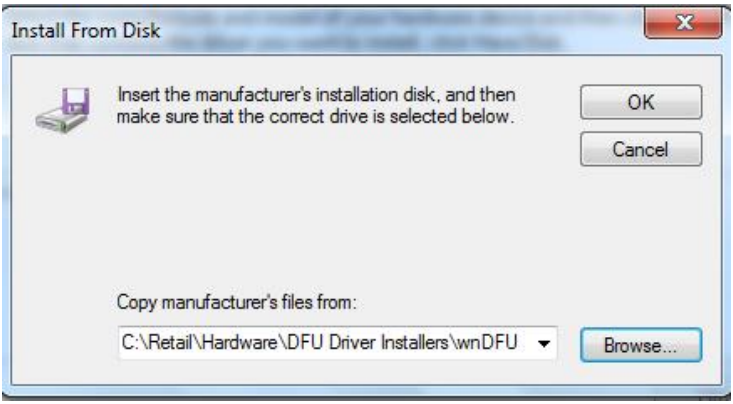
- In the “Locate File” dialog box that follows as shown figure 25 below, locate the “wnDFU.inf” setup information file and click “Open” button. **This is usually located in “C:\Retail\Hardware\DFU Driver Installers\wnDFU”.**

Figure 25: “Locate File” dialog box



- In the “Install From Disk” dialog box that follows as shown figure 26 below, Click “OK” button to back to the “Select the device driver you want to install for this hardware” dialog box .

Figure 26: “Install From Disk” dialog box

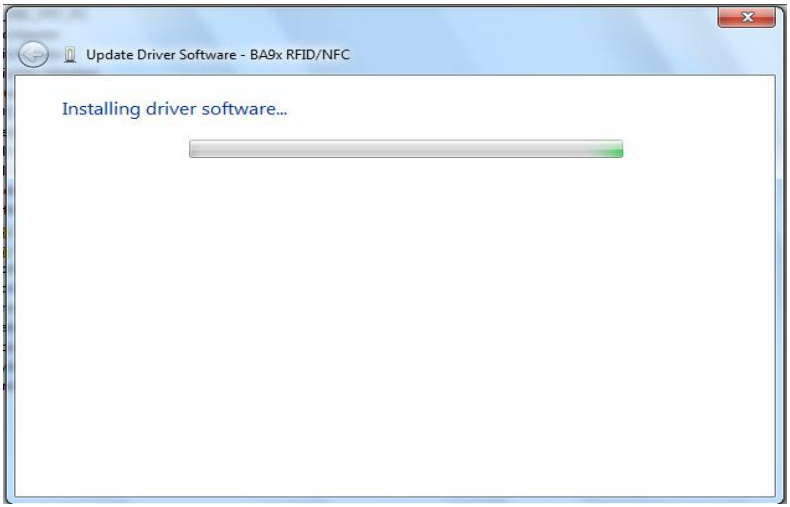


- In the “Select the device driver you want to install for this hardware” dialog box that follows as shown figure 27 below, choose “BA9x RFID/NFC DFU (DFU mode)” from Model list, click “Next” button to install the driver.

Figure 27: “Install From Disk” dialog box

- “Installing driver software” dialog box opens as shown figure 28 below, wait for the driver installation to complete.

Figure 28: “Installing driver software” dialog box

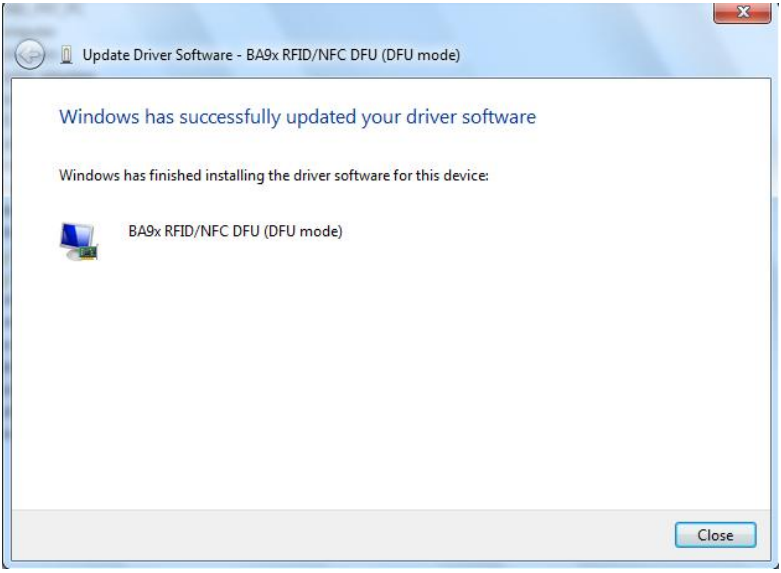


- If Windows displays a “Windows Security” dialog box as shown figure 29 below, choose “Install this driver software anyway” to continue.

Figure 29: “Windows Security” dialog box

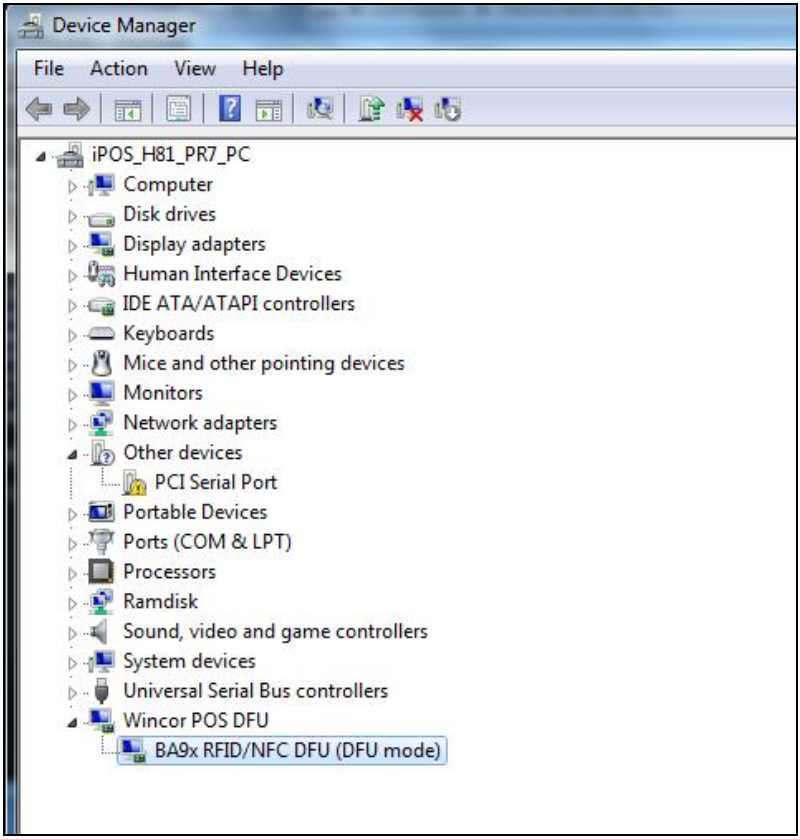
- Windows displays a “Windows has successfully updated your driver software” dialog box as shown figure 30 below when the DFU driver installation completed. Click “Close” button to close dialog box.

Figure 30: “Windows has successfully updated your driver software” dialog box



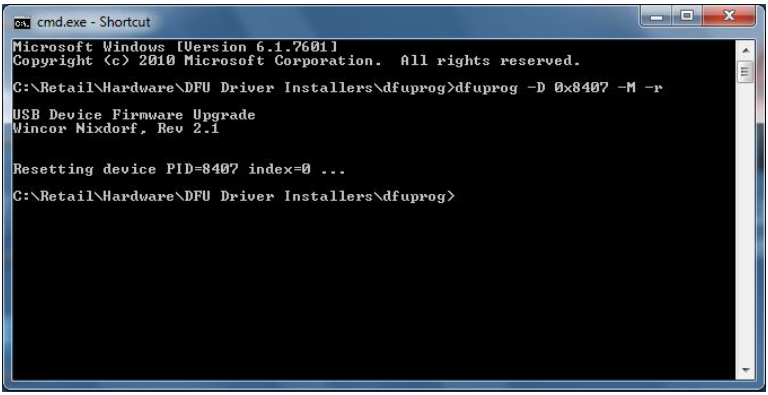
- When windows successfully updated the DFU driver for the BA9x RFID/NFC reader module. The Device Manager should show one device with "BA9x RFID/NFC DFU (DFU mode)" as shown figure 31 below.

Figure 31: Device Manager shown the device with "BA9x RFID/NFC DFU (DFU mode)"



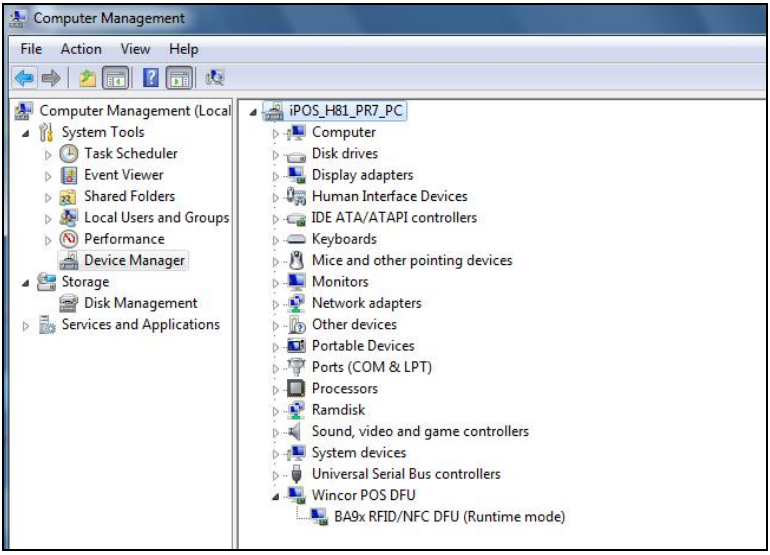
- Start a CMD box and change to the directory containing the dfuprog.exe. Execute the **dfuprog -D 0x8407 –M -r** as shown Figure 32 to reset the device to DFU runtime mode.

Figure 32*:* reset the BA9x RFID/NFC reader module to DFU runtime mode



- When windows successfully updated the DFU driver for the BA9x RFID/NFC reader module and reset to DFU runtime mode. The Device Manager should show one device with "BA9x RFID/NFC DFU (Runtime mode)" as shown figure 33 below.

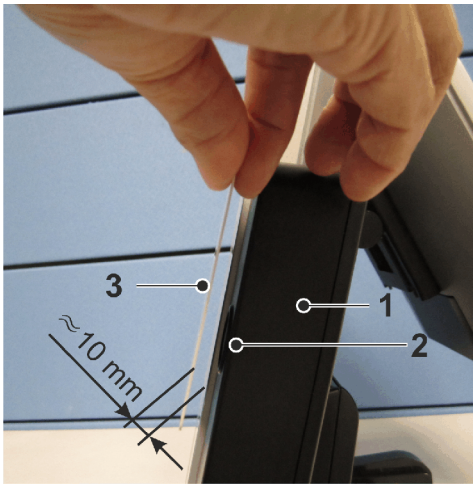
Figure 33: Device Manager shown the device with "BA9x RFID/NFC DFU (Runtime mode)"



Operating the BA9x RFID/NFC Reader

A set of application software running on a PC will control this device through USB connectivity. This connectivity also supplies operating power to the device.

For effective detection, place the card (tag) over the sensor of the reader and approximately 10 mm away.



1. RFID/NFC reader
2. Sensor
3. Card (Tag)

Supported tags

The BA9x RFID/NFC Reader supports a broad range of tags compliant with ISO/IEC 14443 type A and B standards, including SR series tags from STMicroelectronics, tags which belong to the Philips MIFARE® family, ISO/IEC 15693 tags.

Table 1 below is a list of identified cards that are or will be validated. The list will expand when other card types are acquired. The user should be advised to select from this list when deciding the card to use.

Table 1: BA9x RFID/NFC reader module capability

Cards/Tags	Manufac-turer	Protocol	Supported function		
			UID	Read Block	Write Block
ISO/IEC 15693					
LRI1K	STM	ISO 15693 part 3	✓	○	○
LRI2K	STM	ISO 15693 part 3	✓	✓	✓
LRIS2K	STM	ISO 15693 part 3	✓	✓	✓
LRIS64K	STM	ISO 15693 part 3	✓	○	○
M24LR-04	STM	ISO 15693 part 3	✓	✓	✓
Tag-it HF-I Standard Chip/Inlays	TI	ISO 15693 part 3	✓	○	○
Tag-it HF-I Pro Chip/Inlays	TI	ISO 15693 part 3	✓	✓	✓
Tag-it HF-I Plus Chip/Inlays	TI	ISO 15693 part 3	✓	○	○
ICODE SLIX SL2S20/21	NXP	ISO 15693 part 3	✓	✓	✓
ICODE SLI SL2 S20/21	NXP	ISO 15693 part 3	✓	✓	✓
ICODE SLI SL2 S50/51	NXP	ISO 15693 part 3	✓	○	○
ISO/IEC 14443 type A compliant					
Mifare Classic 1K	NXP	ISO 14443-A part 3	✓	×	×
Mifare Ultralight	NXP	ISO 14443-A part 3	✓	×	×
Mifare Ultralight C	NXP	ISO 14443-A part 3	✓	×	×
Desfire 4K	NXP	ISO 14443-A part 3	✓	×	×
Mifare Classic 1K	INFINEON	ISO 14443-A part 3	✓	×	×
QR2213	Fudan	ISO 14443-A	✓	×	×
FM11RF08	Fudan	ISO 14443-A part 3	✓	×	×

Cards/Tags	Manufac-turer	Protocol	Supported function		
			UID	Read Block	Write Block
ISO/IEC 14443 type A NFC forum type2 tags					
NTag 203	NXP	ISO 14443-A Part 3	✓	×	×
ISO 14443 type B					
SRI2K	STM	ISO 14443-B part 2,3	✓	○	○
SRI4K	STM	ISO 14443-B part 2,3	✓	○	○
SRIX4K	STM	ISO 14443-B part 2,3	✓	✓	✓
SRI512	STM	ISO 14443-B part 2,3	✓	○	○
SRT512	STM	ISO 14443-B part 2,3	✓	○	○
Max66040E-000AA+	MAXIM	ISO 14443-B part 3	✓	×	×

Note:
✓ : Supported
×: Not supported
○: Supported but not validated

Technical Data

Supported Standards	ISO/IEC 15693 ISO/IEC 14443 Type A ISO/IEC 14443 Type B
RF Operating Frequency	13.56 MHz
Host Interface	USB 2.0 Full speed
	HID 1.11 Usage Page: 0xFF45, Usage: 0X2200
Rated Voltage	5.0 V
Rated Current	250 mA
Operating Temperature	0 ° C to 40 ° C
Device Firmware Upgrade	Firmware upgradable via DFU interface
Middleware support	JavaPOS 1.13
Operating Sytems	Windows 7, Linux
Certification	CE & FCC
Height x Width x Depth	125 mm x 72.8 mm x 34.2 mm
Weight	Approx. 102 g

Abbreviations

API	Application Programming Interface
CE	European symbol of Comformity
DFU	Device Firmware Upgrade
EC	European Community
EEC	European Economic Community
FCC	Federal Communications Commission
HID	Human Interface Device
ICES	Inteference-Causing Equipment Standard
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
NFC	Near Field Communication
PC	Personal Computer
POS	Point-Of-Sales
RF	Radio Frequency
RFID	Radio-frequency Identification
RoHS	Restriction of Hazardous Substances
UID	Unique Identifier
USB	Universal Serial Bus

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