Reference Manual

Aperio Technology

Document: AAWL-135
Revision: PE7
Date: 2010-10-27

ASSA ABLOY

Contents

Revision history

Rev	Date	Changes
A	2009-09-29	First official version (for Aperio SW release 1.2.2).
B	2009-11-16	Updated for Aperio SW release 1.2.4. • Added notes on customer key handling. • Added “card read” and “error in lock” to “Lock LED indications”. • Added lock maintenance and POST LED indications. • “Change the battery of the lock” shall be covered by product manuals, contents replaced by some Aperio general hints. • “Advanced lock settings” / “Battery power alarm” updated. • Release artifact names changed. Project names Victor and Breughel replaced by product names C100 and E100 respectively.
C	2009-12-17	Updated for Aperio SW release 1.2.5. • Added Card Read Indication configuration. • Added Export/Import configuration from/to file – the old “export” is now called “save to local storage”. • Added battery low/critical to “Lock LED indications”, also changed color of programming blink to yellow, removed FW upgrade blinks, added error indication for battery not accepted as new.
D	2010-03-18	Updated for Aperio SW release 2.0.0 (Programming Application 1.3.8717). • Description of RS-485 address selection by use of DIP switch in the Communication Hub is improved. • Updated for new Security Mode handling. • Corrections after review by Stefan Widing
PE1	2010-04-28	• Updated with new firmware download handling. • Override Credentials changed to be done using saved configuration. • New Java installation procedure.
PE2	2010-04-30	• Updated after review
PE3	2010-05-04	• Updated with information in ATN-001
PE4	2010-05-26	• Changed name to Reference Manual. Addressed feedback from Market Regions
PE5	2010-10-05	Added Wiegand interface description for the Communication Hub. Modified figure Aperio technology overview. Hub voltage is TBD.
PE6	2010-10-07	Fixed TBDs about Hub voltage.
PE7	2010-10-27	Added regulatory information

Regulatory information regarding the Aperio USB Radio dongle

Compliance

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.

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.

Changes or modifications made to this equipment not expressly approved by Tritech Technology AB may void the FCC authorization to operate this equipment.

According to FCC15.105 (b) Information to the user

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

According to FCC15.247:

To comply with RF exposure compliance requirements, the device must not be co-located or operating in conjunction with any other antenna or transmitter.

Introduction

Purpose and intended user of this manual

The main purpose of this manual is to act as a reference manual for people working with Aperio-based products. The manual is intended for installation personnel, project managers and people with similar responsibilities.

This manual is applicable to version 1.3.0, 2.0.0 and later releases of Aperio Technology.

1. System overview

1.1 System description

The Aperio system

The Aperio system is used in the following way: The user holds a Mifare card to the lock. The lock sends Mifare card credentials wirelessly to the Communication Hub and the Communication Hub (wired through RS-485 or Wiegand) then communicates with an EAC (Electronic Access Control) system. The EAC system then makes the access decision. The decision is sent via the Communication Hub to the lock and access is granted or denied.

The Aperio programming application

The programming application is used for the configuration of a door installation. It is installed on a laptop. The laptop has an Aperio USB radio device connected to one of its USB ports. The USB radio device enables the application to connect to a Communication Hub and via the Communication Hub to the door lock. The lock communicates via the Communication Hub either with the EAC or with the programming application.

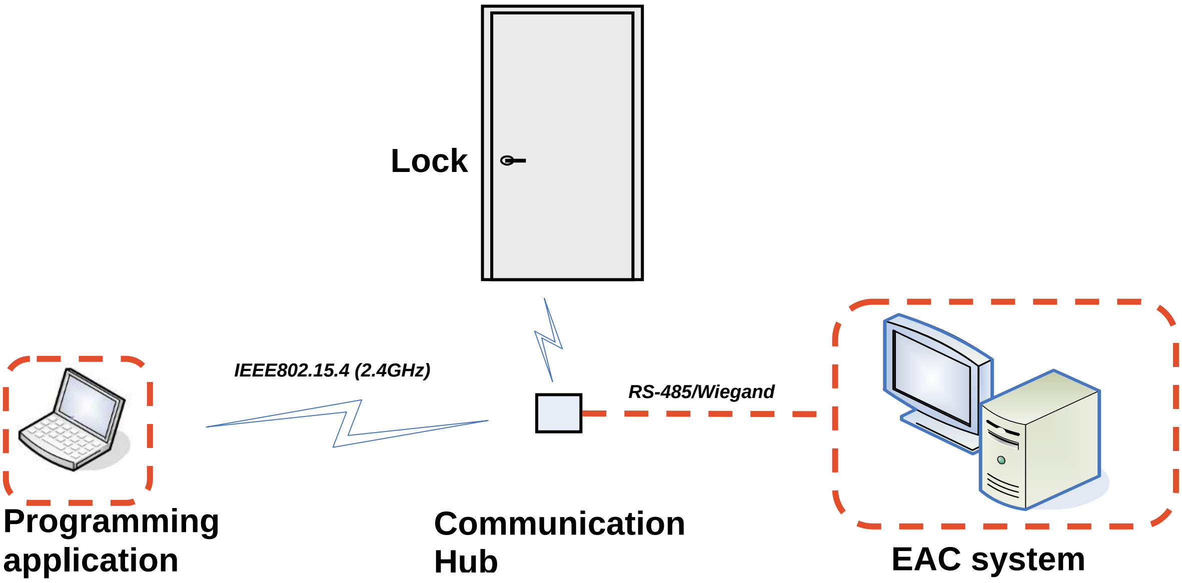


Figure 1, Aperio technology overview

1.2 System components

The main components of the Aperio system are:

- Lock:
  - IEEE 802.15.4 UHF interface.
  - Mifare or iCLASS technology. (Depending on Lock type)
  - AES 128 bit encryption.
  - Battery pack (product dependent).
- Communication Hub:
  - IEEE 802.15.4 UHF interface.
  - AES 128 bit encryption.
  - RS-485 interface or Wiegand interface to EAC system.
  - 8-24V DC.
- Mifare card:
  - Mifare classic, 13.56 MHz
  - 1K or 4K memory.
  - ISO 14443 standard, type A.
- iCLASS card
- USB radio device:
  - IEEE 802.15.4 UHF interface.
  - Aperio, USB Plug and play.
- Programming application:
  - Software running under 32-bit versions of Windows XP, Vista or Windows 7.
  - Multi-language installation management tool.
  - Encrypted installation database.

2. Install the Communication Hub

2.1 EAC interface variants

The Communication Hub hardware offers two physical interfaces towards the EAC system:

- RS-485
- Wiegand (available from HW version 1.5 and higher)

The firmware variant loaded into the Communication Hub controls what interface to use.

Installation procedure and Communication Hub placement that are common to the interface variants are here described first. Differences between the interface variants are described in the end of this chapter.

2.2 Installation procedure

Follow these steps to install the Communication Hub:

1. Place the Communication Hub within 5 meters of the lock to which it will be paired. See section 2.3 Placement of the Communication Hub.
2. Connect the Communication Hub according to the steps below:
    a. Set configuration options on the DIP switch. **Note!** The EAC address at use of an RS-485 interface to the EAC system can also be set using the programming application.
    b. Connect to the EAC system. Via RS-485 bus or via Wiegand signals.
    c. Connect to the supply voltage. Connect the wires to 8-24V (positive voltage) and GND (ground). **Note!** The Communication Hub must be powered with a voltage between 8V DC and 24V DC. Minimum current for robust operation is 120mA@8V, 110mA@9V, 80mA@12V, 40mA@24V.
3. If all communication is working, the LED now has a steady green light.

See more detailed information in the sections below.

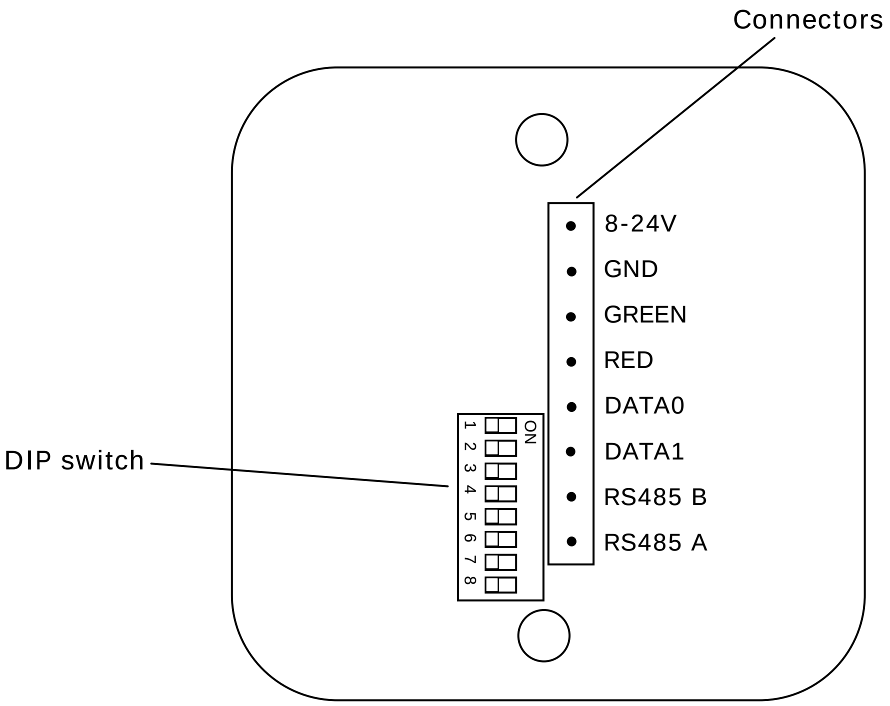


Figure 2, DIP switch and connectors

2.3 Placement of the Communication Hub

The link quality is acceptable for almost all positions and orientations of the Communication Hub if it is placed within 2 meters of the lock. It is also acceptable for most Communication Hub positions 2–5 meters from the lock and in this case the recommended placement of the Communication Hub is

- within clear view of the lock
- oriented so that a line between its screw holes (A in the figure below) is in parallel with an axis through the lock (B in the figure below)
- out of reach of any person.

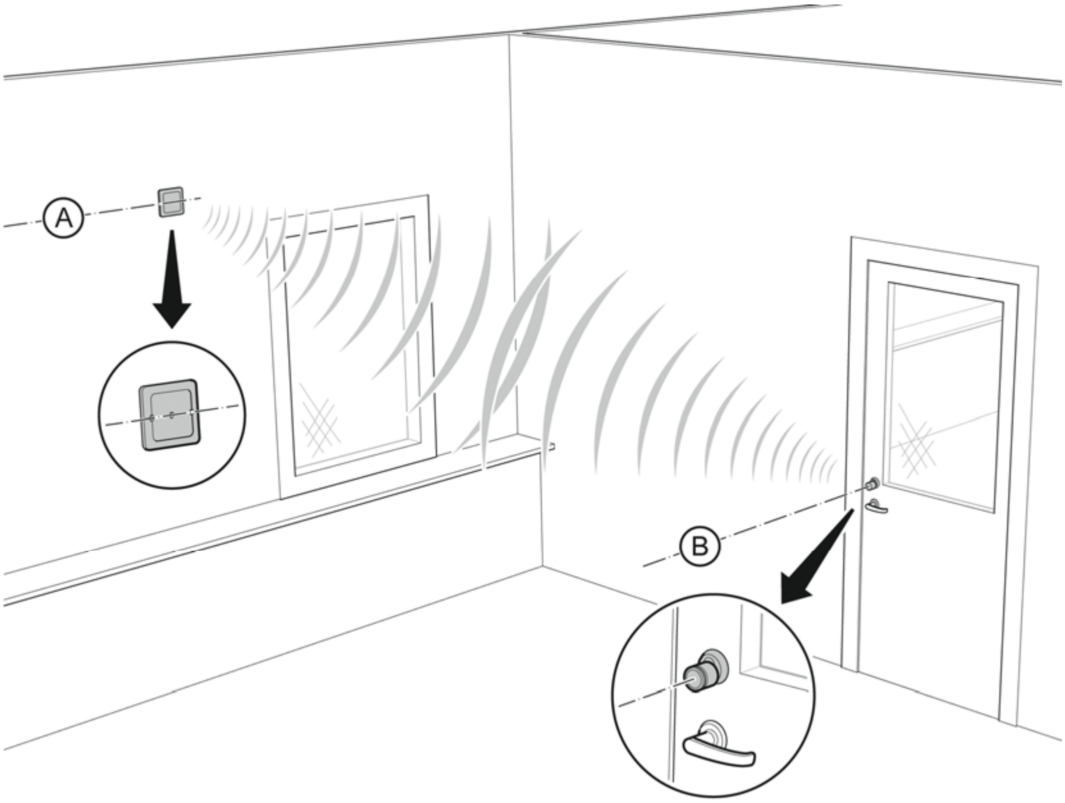


Figure 3, Recommended placement of the Communication Hub

2.4 RS-485 interface to EAC system

This subchapter describes the Communication Hub DIP switch and how to connect the Communication Hub to the EAC system at use of an RS-485 interface.

2.4.1 RS-485 DIP switch description

The meaning of each individual DIP switch is summarized in the table below.

DIP Switch number	**Description**
1	RS-485 address, bit 0. ON = address bit set.
2	RS-485 address, bit 1. ON = address bit set.
3	RS-485 address, bit 2. ON = address bit set.
4	RS-485 address, bit 3. ON = address bit set.
5	RS-485 address, bit 4. ON = address bit set.
6	Controls use of an RS485 B pull down-resistor. ON = 620 Ohm pull down connected.
7	Controls use of an RS485 A pull up-resistor. ON = 620 Ohm pull up connected.
8	Controls use of a termination resistor between RS485 A and RS485 B. ON = 100 Ohm termination connected.

2.4.2 Two ways of selecting the EAC address

The EAC address of the Communication Hub can be set in either of two ways:

- By configuration from the programming application.
- By use of the DIP switch.

By selecting “RS-485 address from DIP switch” in the programming application, use of the DIP switch address selection is enabled. This is also factory default in the Communication Hub. If any other address is configured from the programming application the DIP switch RS-485 address setting is irrelevant.

The switches allow selection of RS-485 address 0 to 31, where address 1 to 31 is free for use in the Communication Hub. Selection of address 0 means that the EAC interface of the Communication Hub is disabled. The address bits of the DIP switch are read once at start of the program in the Communication Hub. This means that the Communication Hub must be restarted for changes in address from DIP switch to take effect. **Note!** If more than one Communication Hub is connected to the same RS-485 bus, each Communication Hub must have a unique RS-485 address.

2.4.3 Connection of the RS-485 bus

The RS-485 bus should be made up of a twisted-pair cable with characteristic impedance between 90 Ohm and 120 Ohm. Maximum bus length is about 1000m. Depending on the EAC system, a maximum of 32 units (EAC system included) can be connected to the same bus.

If there is more than one Communication Hub to connect they should be connected in a daisy chain (not as a star – see the first example below) on the RS-485 bus so that all RS485 A connectors are connected together and all RS485 B connectors are connected together. Both ends of the RS-485 bus must be terminated. A Communication Hub at the end of the bus must have switch 8 of the DIP switch in position ON. All other Communication Hubs must have switch 8 of the DIP switch in position OFF. See the EAC documentation for proper termination of the bus on the EAC side.

Pull up and pull down-resistors should be enabled once per bus. This means that one Communication Hub on the bus should have switches 6 and 7 of the DIP switch in position ON, if pull up and pull down from the EAC system is not used. See the EAC documentation for use of pull up or pull down on the EAC side.

Two examples of connection of multiple Communication Hubs to a single RS-485 bus of an EAC system:

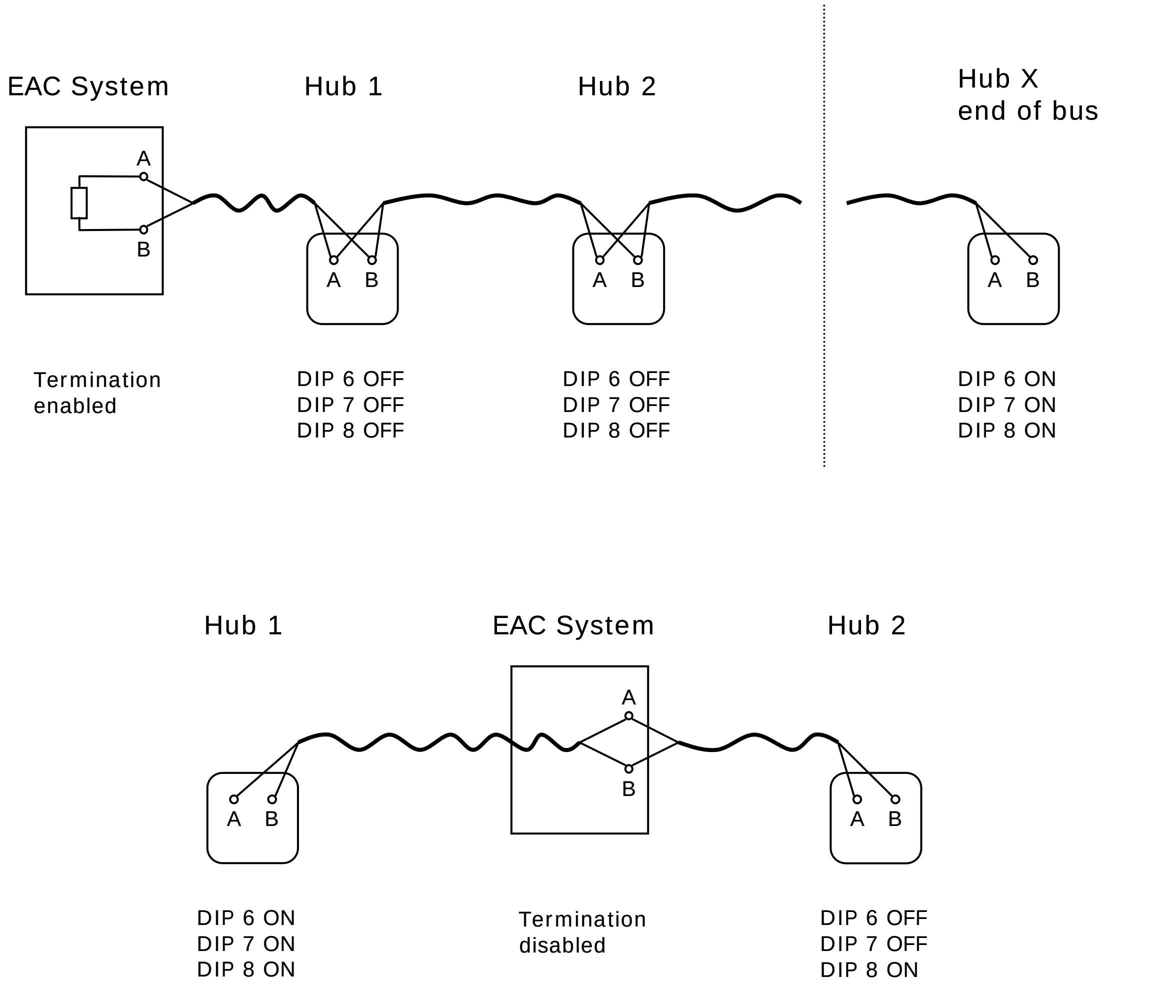


Figure 4, Examples of Communication Hub connection

2.5 Wiegand interface to EAC system

This subchapter describes the Communication Hub DIP switch and how to connect the Communication Hub to the EAC system at use of a Wiegand interface.

2.5.1 Wiegand DIP switch description

How the Wiegand interface signals are used in detail is controlled by DIP switches on the Communication Hub. See table below.

DIP Switch number	**Description**

1	Controls use of input signal LED Red to deduce an access decision.
	OFF => LED Red is ignored.
	ON => LED Red is used.
	See also flow diagrams in chapter nedan.

2	Controls timing of Data 0 and Data 1 out signals. OFF => Pulse width 80us, pulse interval 2000us.

	ON => Pulse width 40us, pulse interval 1000us.
3	Controls addition of parity bits on transmitted credentials. One even parity bit before and one odd parity bit after the actual credentials. OFF => Addition of parity is disabled. Credentials are transmitted as received. ON => Addition of parity bits is enabled. Note Transmitted credentials may include parity also if addition of parity is disabled in the Hub Wiegand EAC interface component. This since parity bits, if used, typically are included already on the card.
4	Controls byte order of transmitted credentials. OFF => The byte order is left as is. ON => The byte order is reversed compared to what is received as input to the Hub Wiegand EAC interface component. Note 1 This setting is ignored if the credential length does not make up complete bytes. Note 2 The byte order received as input to the Hub Wiegand EAC interface component in the case of a 32 bit MIFARE UID credential is UID[3], UID[2], UID[1], UID[0]. This means that the byte order is already reversed earlier in the chain compared to the order specified in RFID interface standard ISO 14443-3.
5	Reserved for future use. Set to OFF.
6	Not applicable for Wiegand. Set to OFF.
7	Not applicable for Wiegand. Set to OFF.
8	Not applicable for Wiegand. Set to OFF.

2.5.2 LED input signals and access decision

The flowcharts below show how the LED input signals are used to derive an access decision. Two variants are depicted. Which variant that is used is selected by DIP switch 1.

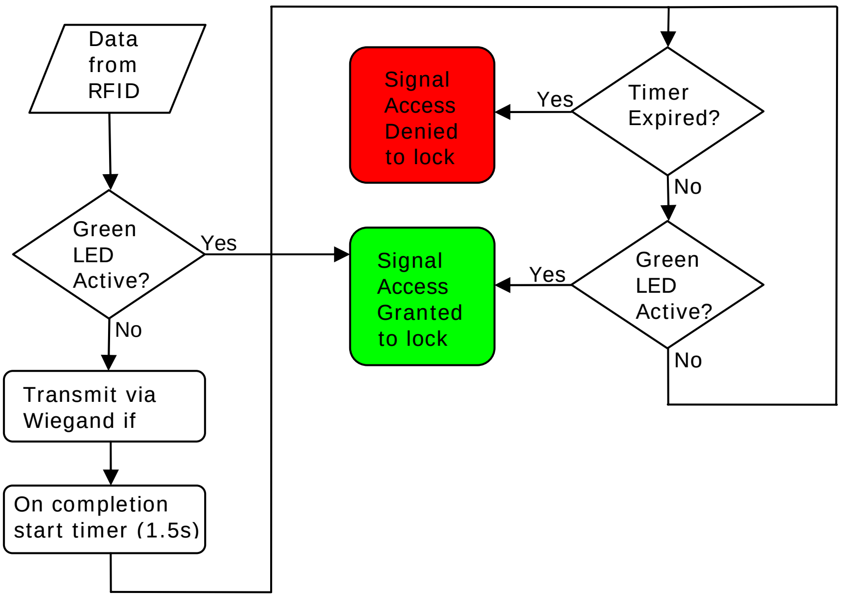
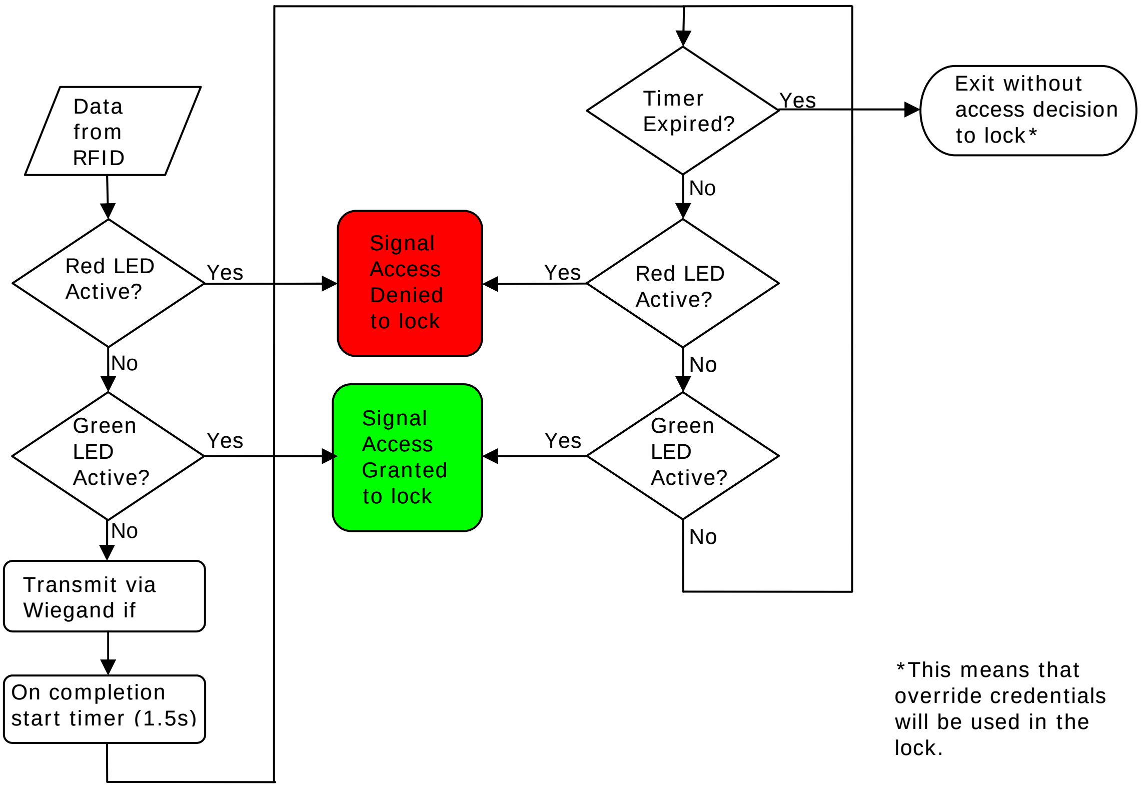


Figure 5, Access decision logic with single LED signal



*This means that override credentials will be used in the lock.

Figure 6, Access decision logic with two LED signals

2.5.3 Connection of Wiegand signals

Communication Hub hardware version 1.5 has four Wiegand signals plus ground. Purpose and connection of these signals are described in the table below.

Hub connector designation	**Description**	**Connection**
DATA0	Wiegand Data 0 signal. Output from Communication Hub. Used to transmit credentials.	Connect to Wiegand Data 0 on EAC system.
DATA1	Wiegand Data 1 signal. Output from Communication Hub. Used to transmit credentials.	Connect to Wiegand Data 1 on EAC system.
GREEN	Wiegand LED Green signal. Input to Communication Hub. Used to deduce an access decision.	Connect to Wiegand LED Green output on EAC system. Alternatively, connect to a lock control relay output on EAC system.
RED	Wiegand LED Red signal. Input to Communication Hub. Used to deduce an access decision.	Connect to Wiegand LED Red output on EAC system. Alternatively, leave unconnected if signal is selected not to be used by DIP switch 1.
GND	Ground	Connect to EAC system ground.

2.5.4 Configuration considerations

All DIP switches in position OFF on the Communication Hub give a default Wiegand configuration that will fit most EAC systems. But better performance and more functionality can result from a customized configuration.

DIP 1

If a signal from the EAC system is available that actively asserts an "access denied" decision:

- Connect the EAC signal that asserts "access denied" to Communication Hub signal LED Red.
- Set DIP switch 1 to ON.

This will give:

- Shorter response time at a denied access.
- Possibility to use override credentials in the lock.

DIP2

If the EAC system works with short Wiegand data pulse width, then set DIP switch 2 to ON. This will give shorter response times, most notably at use of long credentials.

2.6 Communication Hub LED indication

The Communication Hub has a single LED. It supports an optical scheme with red, green and yellow. The indication scheme is described by the two figures below:

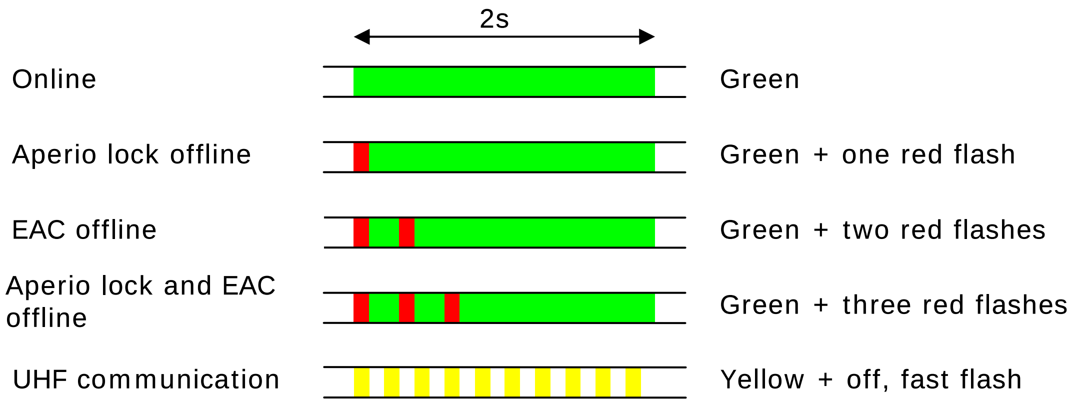


Figure 7, Communication Hub normal operation LED indication

Some special LED indication schemes are used during lock maintenance actions:

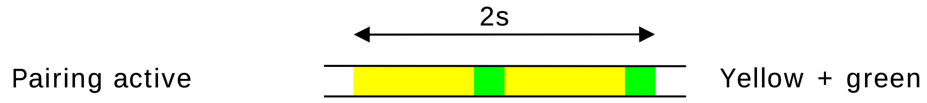


Figure 8, Communication Hub maintenance LED indication

2.7 Lock normal operation LED indication

The lock has three LEDs. They support an optical scheme with red, yellow and green. The indication scheme is described by the figures below:

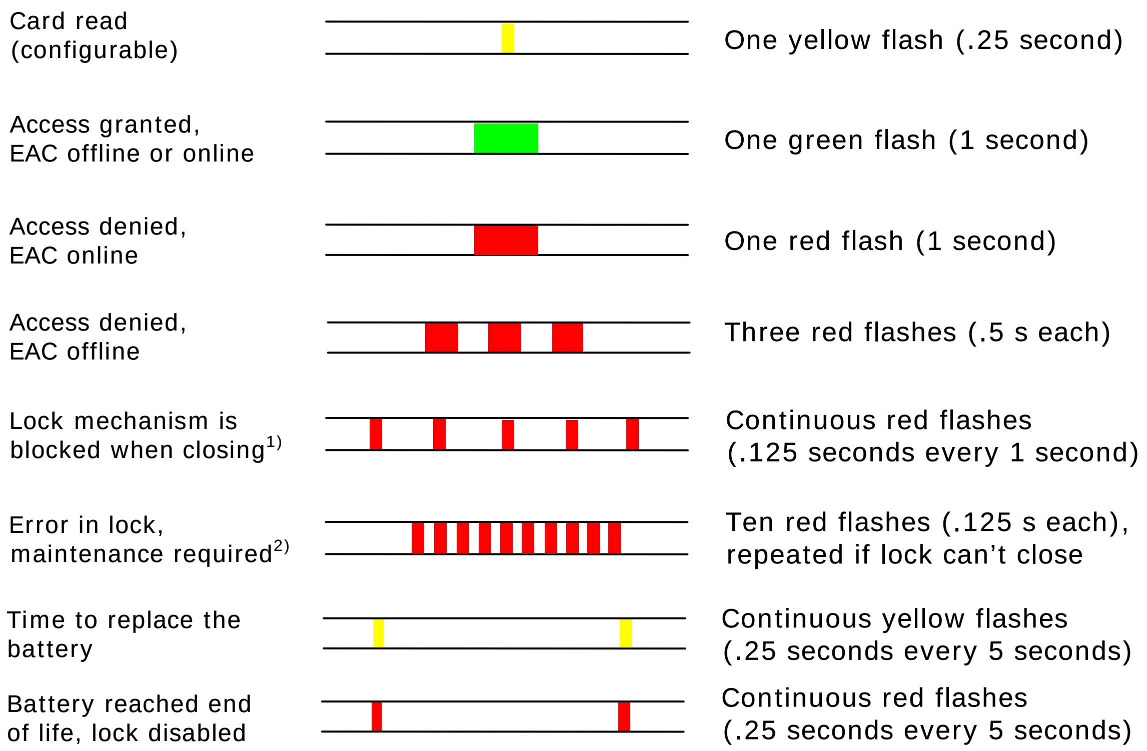

Card read (configurable)
One yellow flash (.25 second)
Access granted, EAC offline or online
One green flash (1 second)
Access denied, EAC online
One red flash (1 second)
Access denied, EAC offline
Three red flashes (.5 s each)
Lock mechanism is blocked when closing1)
Continuous red flashes (.125 seconds every 1 second)
Error in lock, maintenance required2)
Ten red flashes (.125 s each), repeated if lock can't close
Time to replace the battery
Continuous yellow flashes (.25 seconds every 5 seconds)
Battery reached end of life, lock disabled
Continuous red flashes (.25 seconds every 5 seconds)

Figure 9, Lock normal operation LED indication

NOTE 1: When the lock mechanism is blocked (lock jammed) the knob must be turned to release it.

NOTE 2: The "Error in lock" indication is also shown instead of the POST flashes if the battery is not accepted as new after a power-on-reset.

2.8 Lock maintenance LED indication

Some special LED indication schemes are used during lock maintenance actions:

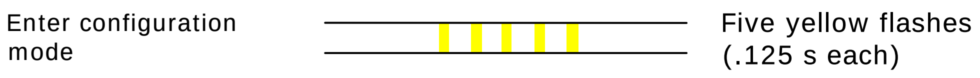


Figure 10, Lock maintenance LED indication

2.9 Lock self test LED indication

After replacing the battery, a Power On Self Test (POST) is performed. The result is indicated using a series of red and green LED flashes as is described by the figure below:

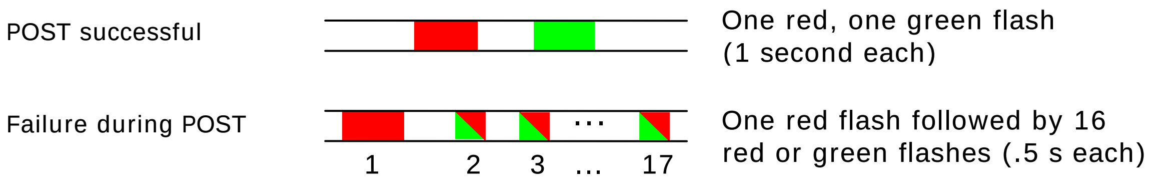


Figure 11, Lock POST LED indication

The first flash is always red. If the POST fail, the color of the 16 trailing flashes indicate the status of each individual test as described by the following table:

Blink	Meaning if red	Code in event log
2	Main board firmware corrupt	0x0001
3	Override list corrupt	0x0002
4	Production data corrupt	0x0004
5	Security data corrupt	0x0008
6	Configuration data corrupt	0x0010
7	Battery power low	0x0020
8	RFID reader circuit error	0x0040
9	Voltage regulator error	0x0080
10	Card detection circuit error	0x0100
11	Secure area communication error	0x0200
12	Secure area memory corrupt	0x0400
13	Secure area sensor or motor error	0x0800
14	Radio modem communication error	0x1000
15	Radio modem memory corrupt	0x2000
16	Radio modem configuration error	0x4000
17	Radio modem RF circuit error	0x8000

NOTE: If the battery is not accepted as new after a power on reset, no POST is performed, instead the 10 quick red flashes used to indicate “Error in lock” is shown.

3. Install the programming application

3.1 Computer specifications

The Aperio Programming Application should be installed on a computer with the following specifications:

- Laptop
- 32-bit version of Windows XP, Vista or Windows 7
- USB 2.0

3.2 Files needed for the installation

To be able to install the programming application, the following files are also needed:

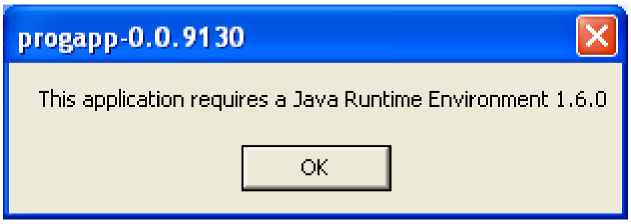
- License file
- Encryption key file

These files should be delivered together with the Aperio software from your lock distributor. To be able to install the programming application the Aperio software must be available or saved in the appropriate folders on your laptop.

3.5 Install the programming application

Follow these steps to install the programming application:

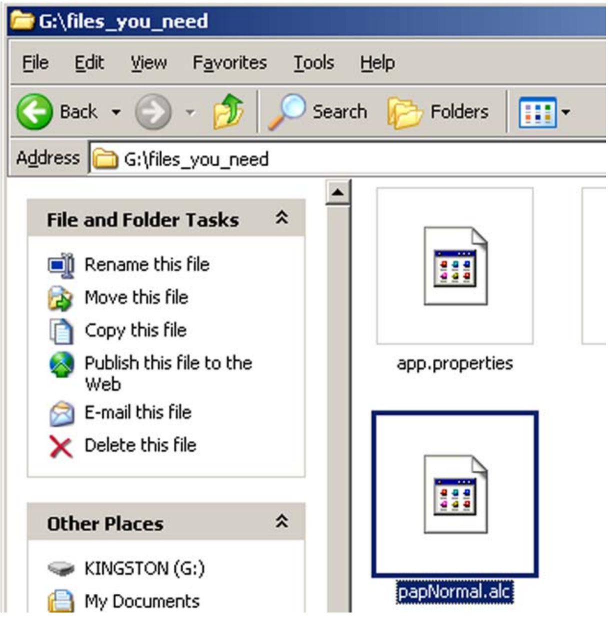
1. Unpack the Aperio distribution file (ex. progapp-x.y.z.zip), including the setup.exe file, in a temporary folder.
2. Run the setup.exe file. **Result:** The Aperio programming application is installed.
3. Click Start–All Programs–Aperio Programming Application–Start.
4. At startup the Aperio Programming Application checks that the correct java version is installed. If the correct version is not installed the following will occur:
   a) A warning will be shown. Click OK to close the window.

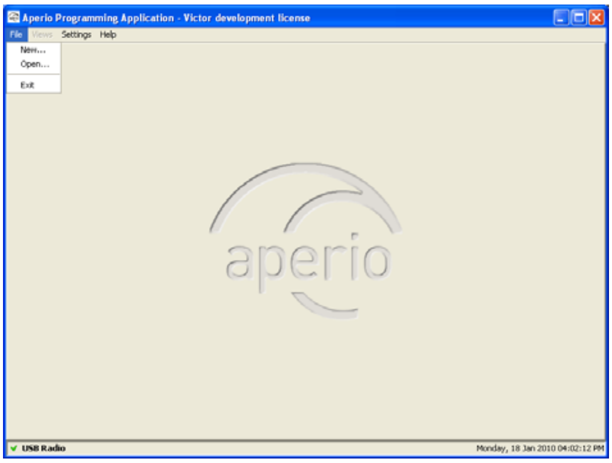


progapp-0.0.9130

This application requires a Java Runtime Environment 1.6.0

   b) You are redirected to a page from where you can download the required Java version. Install the required version and restart the Aperio Programming Application according to **Fel! Hittar inte referenskälla.** above.
5. Browse for the license file (.alc), select it and click OK. **Result:** The Aperio Programming Application starts. **Note!** The license file should be delivered in a separate e-mail or on a USB memory stick.
6. If this is the first time you install the Aperio Programming Application, you need to follow the steps in chapter 3.6 Install the USB radio driver before you can start the program.



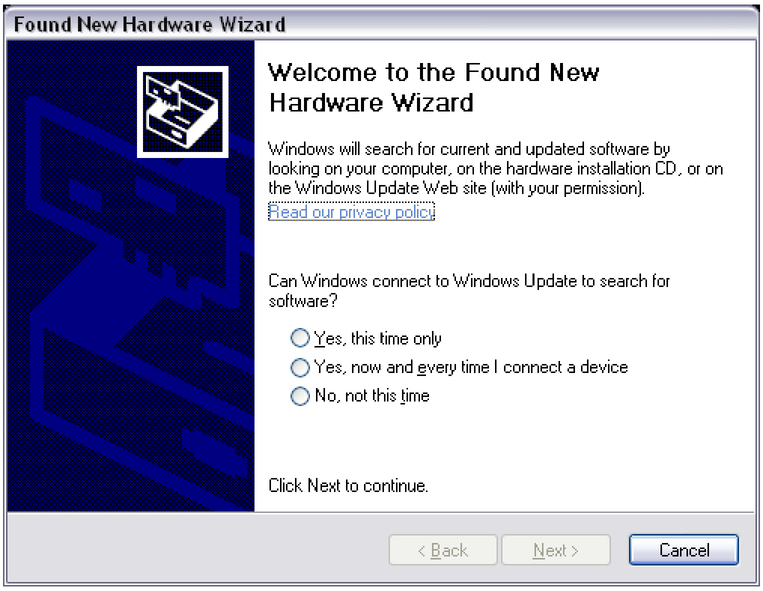

Aperio Programming Application - Victor development license
File Views Settings Help
New...
Open...
Exit
aperio
USB Radio
Monday, 18 Jan 2010 04:02:12 PM

3.6 Install the USB radio driver

3.6.1 New Installation of Aperio Programming Application

Follow these steps to install the USB radio driver:

1. Connect the Aperio USB radio device to a USB port on your laptop.
   Result: The Found New Hardware Wizard is opened.



Welcome to the Found New Hardware Wizard

Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission).

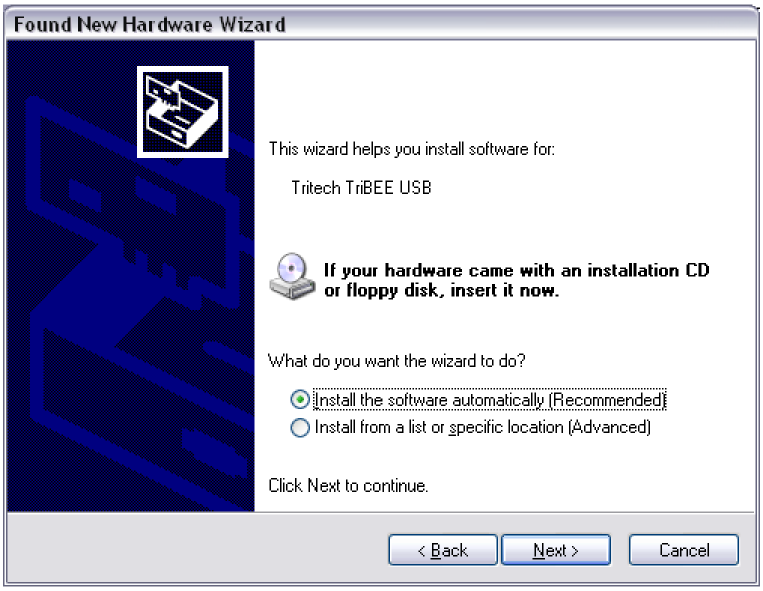
Read our privacy policy

Can Windows connect to Windows Update to search for software?

○ Yes, this time only
○ Yes, now and every time I connect a device
○ No, not this time

Click Next to continue.

2. Select *No, not this time* (do not use Windows Update to search for software) and click Next.



This wizard helps you install software for:

Tritech TriBEE USB

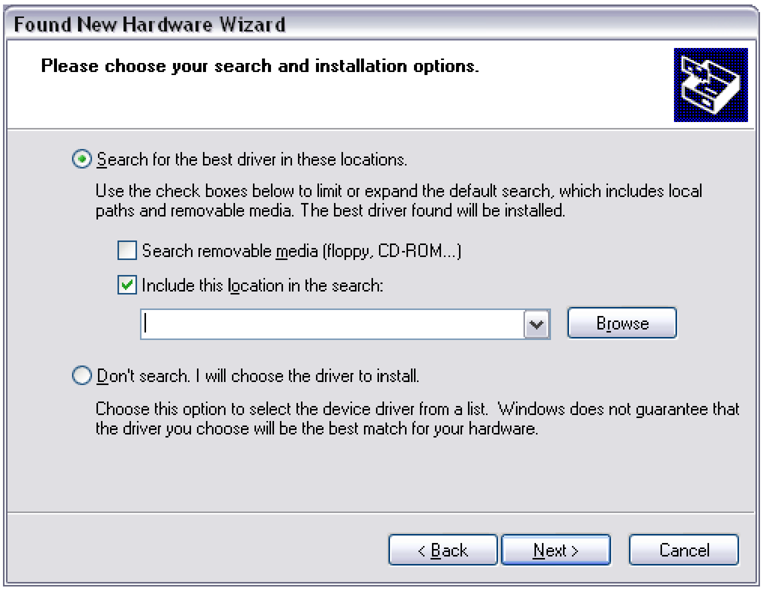
If your hardware came with an installation CD or floppy disk, insert it now.

What do you want the wizard to do?

● Install the software automatically (Recommended)
○ Install from a list or specific location (Advanced)

Click Next to continue.

3. Select *Install from a list or specific location (Advanced)* and click Next.



Found New Hardware Wizard

Please choose your search and installation options.

● Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

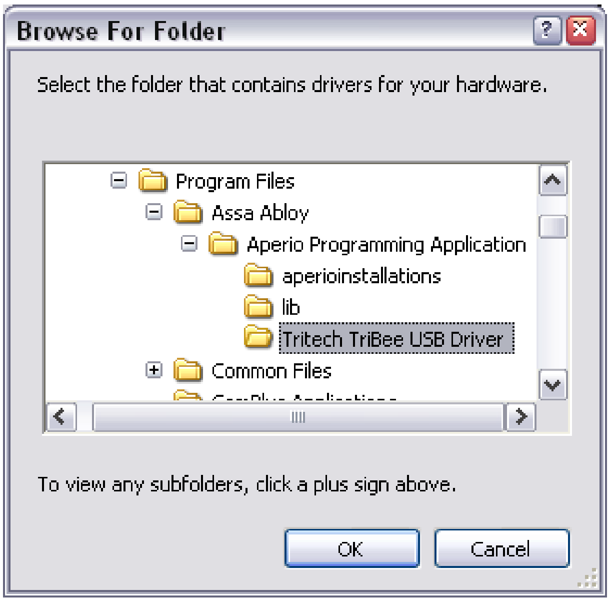
□ Search removable media (floppy, CD-ROM...)

☑ Include this location in the search:

○ Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

4. Select *Search for the best driver in these locations*. Unselect *Search removable media*, select *Include this location in the search* and click Browse.

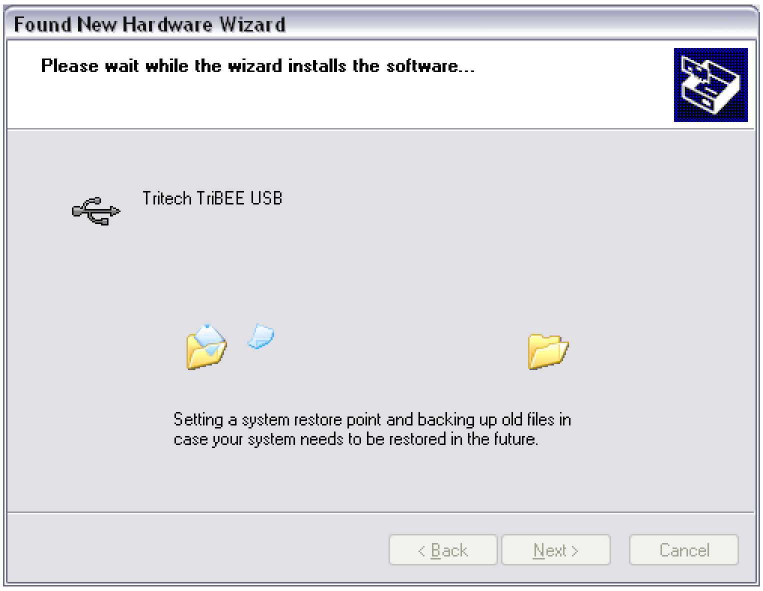


Browse For Folder

Select the folder that contains drivers for your hardware.

To view any subfolders, click a plus sign above.

5. Select the Tritech TriBee USB Driver folder located in the Aperio Programming Application main folder. Click OK and then Next (in the Found New Hardware Wizard). **Result:** A confirmation dialog shows that the driver is being installed.

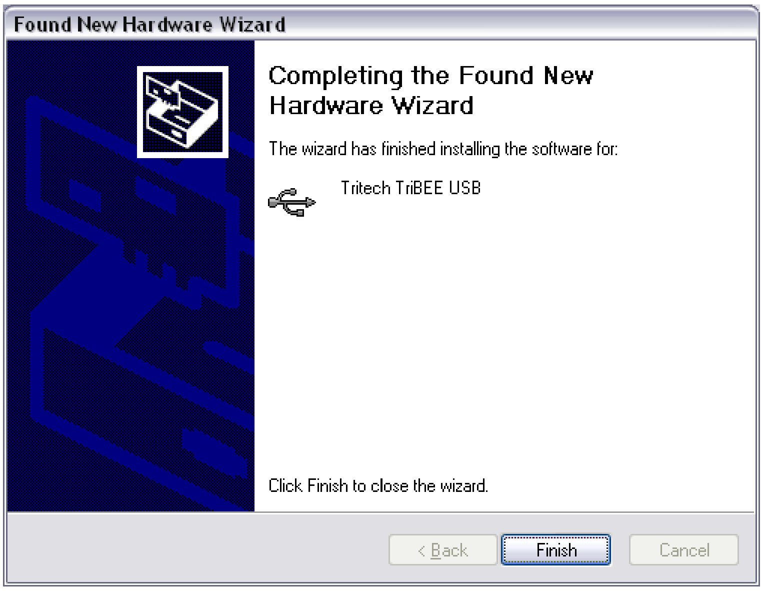


Found New Hardware Wizard

Please wait while the wizard installs the software...

Tritech TriBEE USB

Setting a system restore point and backing up old files in case your system needs to be restored in the future.



Found New Hardware Wizard

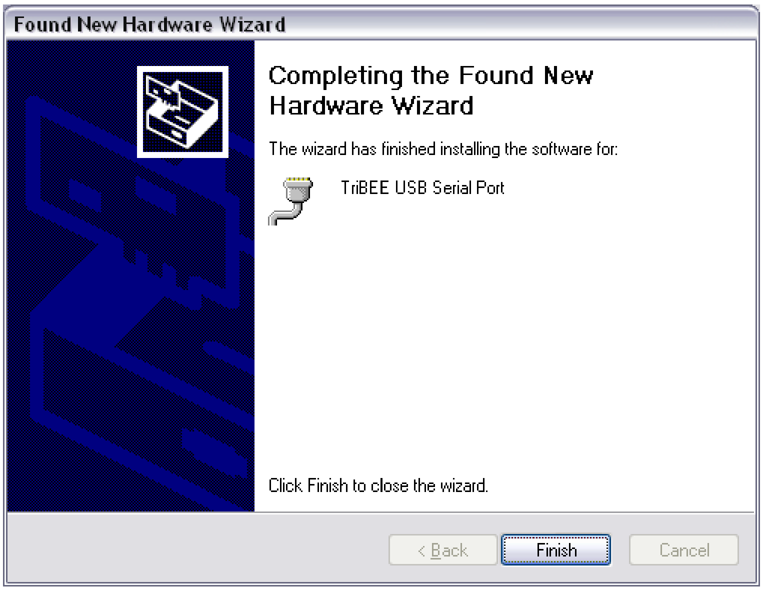
Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

Tritech TriBEE USB

Click Finish to close the wizard.

6. Click Finish. **Result:** The system will now find a new hardware, TriBee USB Serial Port.
7. Repeat steps 2–6 of the procedure above for the serial port driver. When done, click Finish. **Result:** Windows has installed the drivers and the hardware is ready to use. Windows shows a pop-up message indicating if the driver installation was successful.



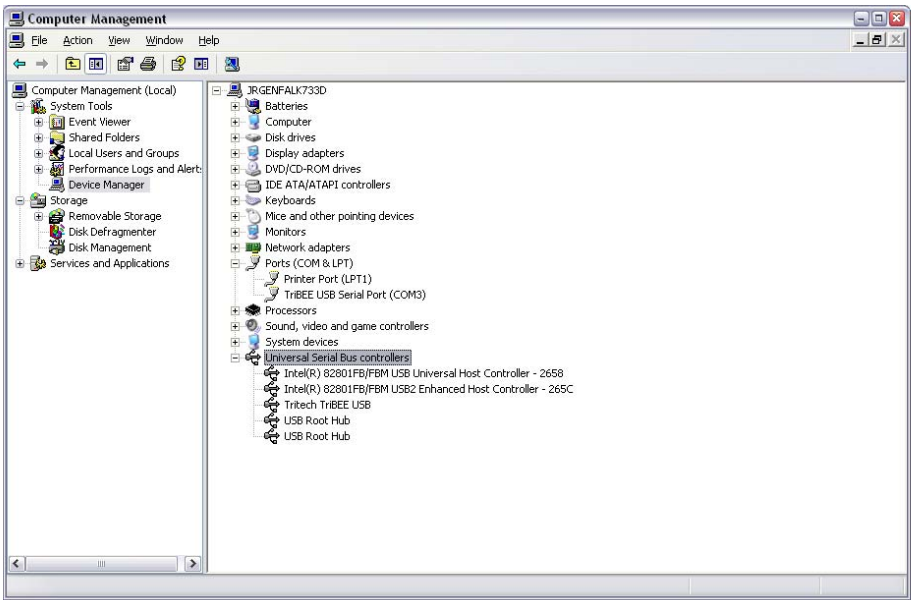
Completing the Found New Hardware Wizard

The wizard has finished installing the software for:

TriBEE USB Serial Port

Click Finish to close the wizard.

8. Verify that the drivers are working by opening the Computer Management Control Panel:
    a. Verify that there is a TriTech TriBee USB under the USB Controller section and that there is a TriBee USB Serial Port under the Ports (COM & LPT) section and that there are no warnings or error indications.

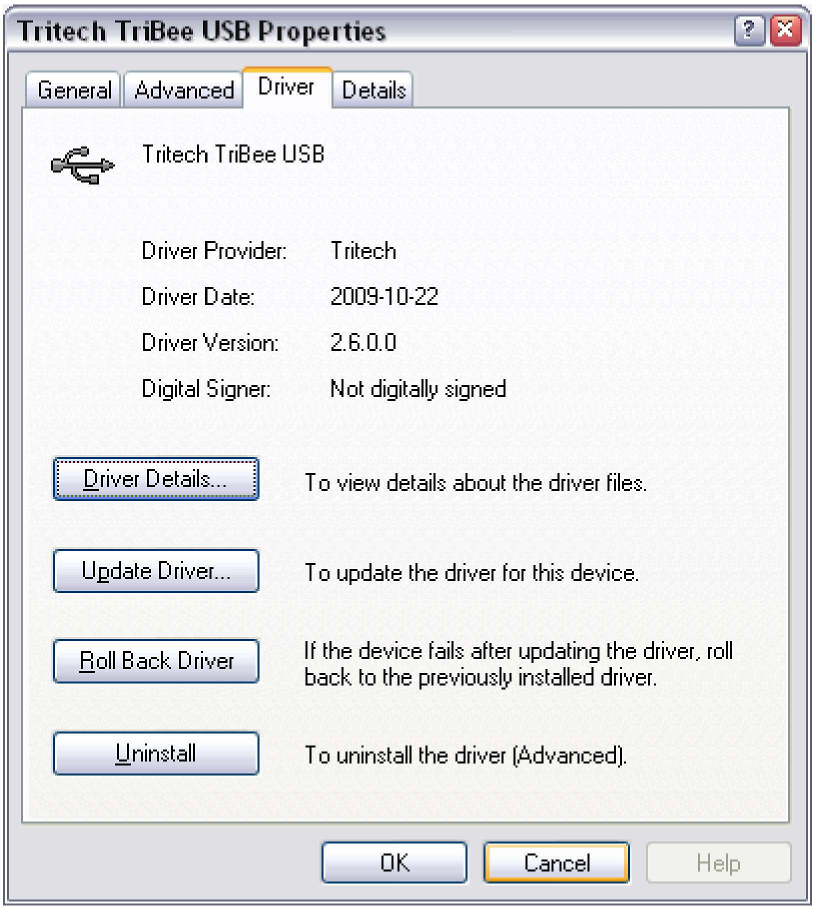


- Computer Management (Local)
    - System Tools
        - Event Viewer
        - Shared Folders
        - Local Users and Groups
        - Performance Logs and Alert:
        - Device Manager
    - Storage
        - Removable Storage
        - Disk Defragmenter
        - Disk Management
    - Services and Applications

- JRGENFALK733D
    - Batteries
    - Computer
    - Disk drives
    - Display adapters
    - DVD/CD-ROM drives
    - IDE ATA/ATAPI controllers
    - Keyboards
    - Mice and other pointing devices
    - Monitors
    - Network adapters
    - Ports (COM & LPT)
        - Printer Port (LPT1)
        - TriBEE USB Serial Port (COM3)
    - Processors
    - Sound, video and game controllers
    - System devices
    - Universal Serial Bus controllers
        - Intel(R) 82801FB/FBM USB Universal Host Controller - 2658
        - Intel(R) 82801FB/FBM USB2 Enhanced Host Controller - 265C
        - Tritech TriBEE USB
        - USB Root Hub
        - USB Root Hub

3.6.2 Update the driver in an existing Aperio Programming Application

To update an existing Tritech TriBee USB Driver you need to manually add the driver. First check your current version by opening the Computer Management Control Panel. Double click on the Tritech TriBee USB Serial Bus driver under Universal Serial Bus controllers and open the Driver tab. Latest version is 2.6.0.



Driver Provider: Tritech
Driver Date: 2009-10-22
Driver Version: 2.6.0.0
Digital Signer: Not digitally signed

To view details about the driver files.

To update the driver for this device.

If the device fails after updating the driver, roll back to the previously installed driver.

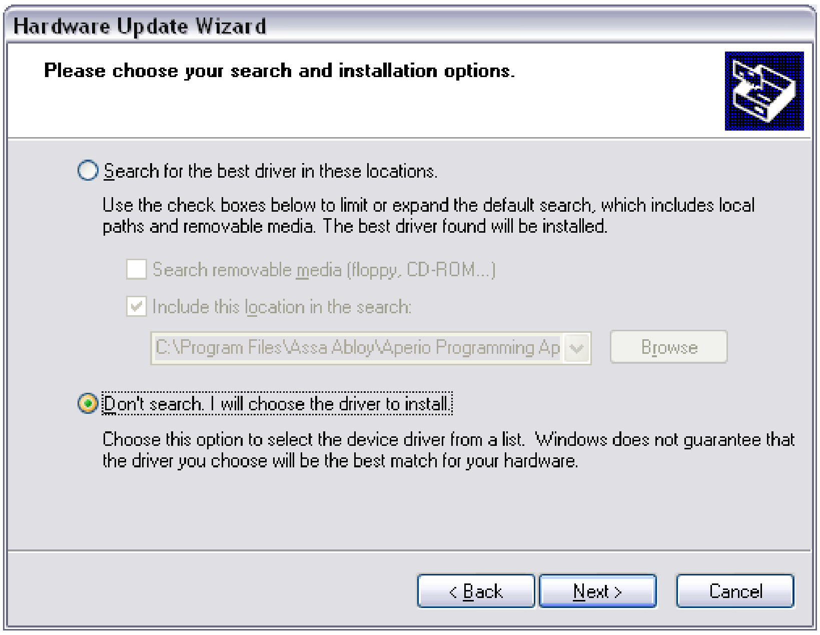
To uninstall the driver (Advanced).

If you have an older driver that works fine, you don't need to upgrade, but if you experience problems with the driver or if you are running the Aperio Programming Application on Windows Vista, you are encouraged to ensure that you are using the latest driver.

You need to update both the TriTech TriBee USB bus driver and the Tritech TriBee USB port driver.

NOTE: Please follow the instruction below exactly step-by-step. It is very important *not* to let Windows find the driver automatically, since it will always fail and pick the wrong version.

1. Open the Windows Hardware Update Wizard for the Tritech TriBee USB bus driver by clicking on the “Update Driver” button in the Tritech TriBee USB properties window (see above).



Hardware Update Wizard

Please choose your search and installation options.

○ Search for the best driver in these locations.

Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.

□ Search removable media (floppy, CD-ROM...)

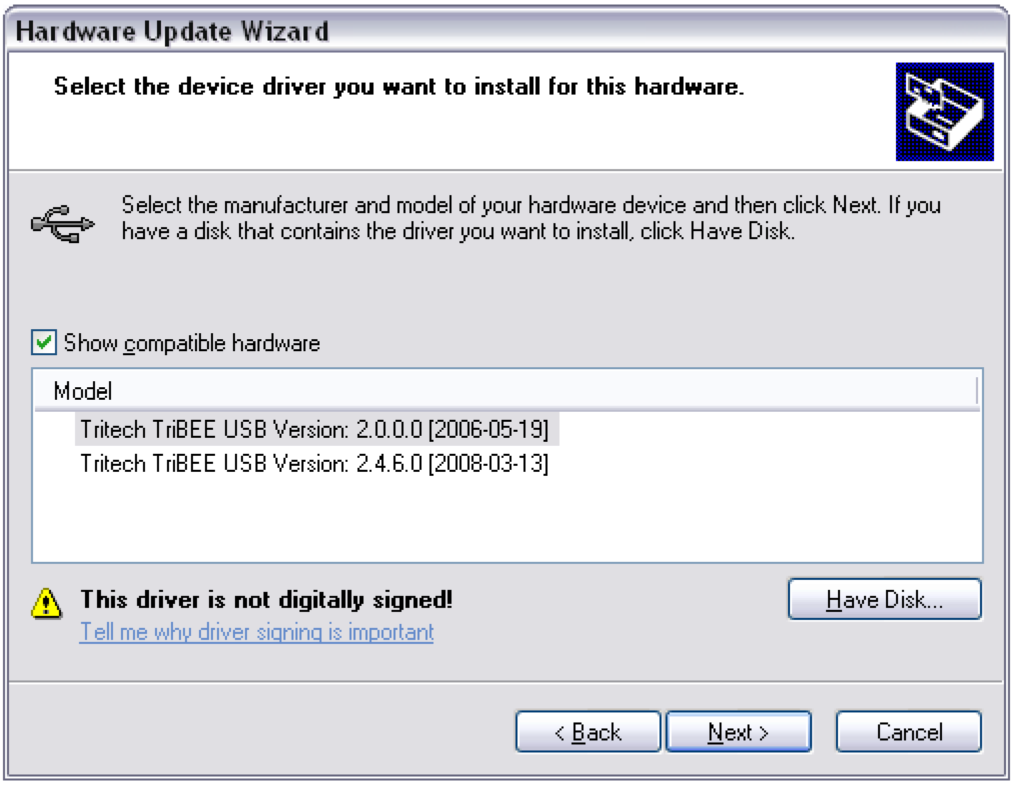
☑ Include this location in the search:

C:\Program Files\Assa Abloy\Aperio Programming Ap

● Don't search. I will choose the driver to install.

Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.

2. Make sure that the “Don’t search. I will choose the driver to install” option is selected and then click “Next>”. Click on the “Have Disk…” button and Windows will guide you in three steps to select the Tritech USB driver folder located in the Aperio Programming Application program files folder. Note that the content of this window can vary depending on what version of Aperio Programming Application you have installed.



Hardware Update Wizard

Select the device driver you want to install for this hardware.

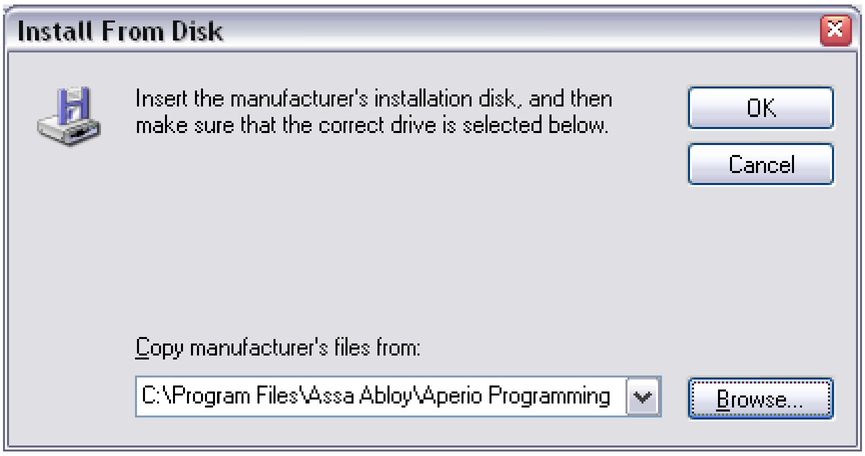
Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver you want to install, click Have Disk.

☑ Show compatible hardware

Model
Tritech TriBEE USB Version: 2.0.0.0 [2006-05-19]
Tritech TriBEE USB Version: 2.4.6.0 [2008-03-13]

This driver is not digitally signed!
Tell me why driver signing is important

3. After clicking on “Have Disk…”, in the Install From Disk window, click on “Browse…” and navigate to the Aperio Programming Application and select the Tritech TriBee USB Driver folder.

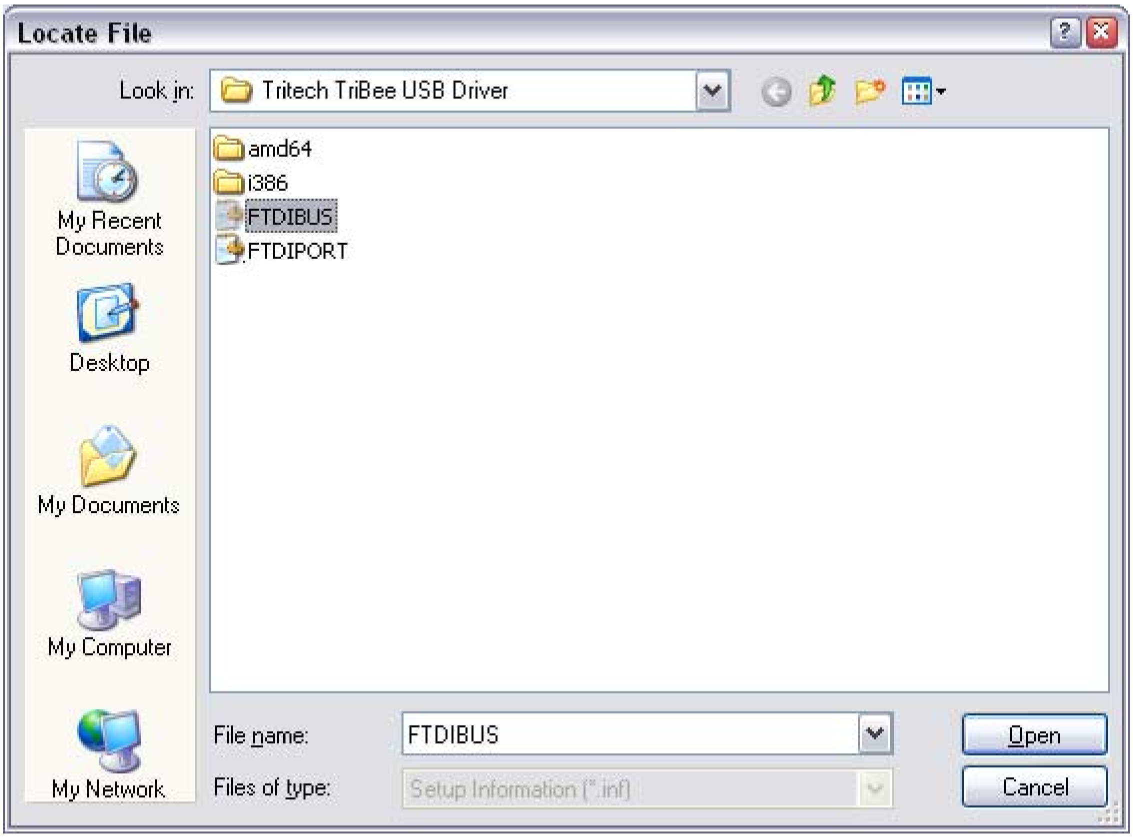


Install From Disk

Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.

Copy manufacturer's files from: C:\Program Files\Assa Abloy\Aperio Programming

4. Select the FTDIBUS setup information file when upgrading the Tritech TriBee USB bus driver and select the FTDIPORT when upgrading the Tritech TriBee USB port driver. Please make sure that you select the correct inf-file for the driver you are updating.



Locate File

Look in: Tritech TriBee USB Driver

amd64
i386
FTDIBUS
FTDIPORT

File name: FTDIBUS

Files of type: Setup Information (*.inf)

5. Click “Open” and wait for Windows to install the new driver. If not already done, repeat step 1-5 for the Tritech TriBee USB port driver.

6. Reboot Windows and open the properties dialog in the Computer Management Control panel again for the two TriTech TriBee USB drivers and verify that they are using the latest driver version 2.6.0.

4. Make a new door installation

Proper handling of encryption keys is essential to lock security!

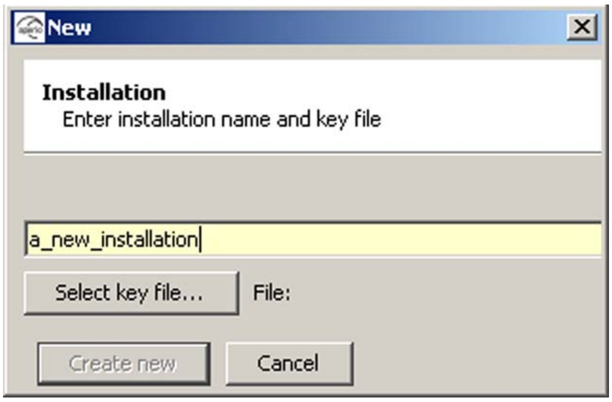
It is absolutely necessary to use the customer encryption key to ensure a secure and encrypted communication with the lock.

The Customer Key should be handled with the same care as the Master Key in a traditional MKS. A person with access to the Customer Key can gain unauthorized access to any Aperio door in the system. Once loaded into the Programming Application, it will be stored encrypted in a local database and should be erased from the hard drive. A copy should be stored safely.

4.1 Instruction

Follow these steps to make a new door installation:

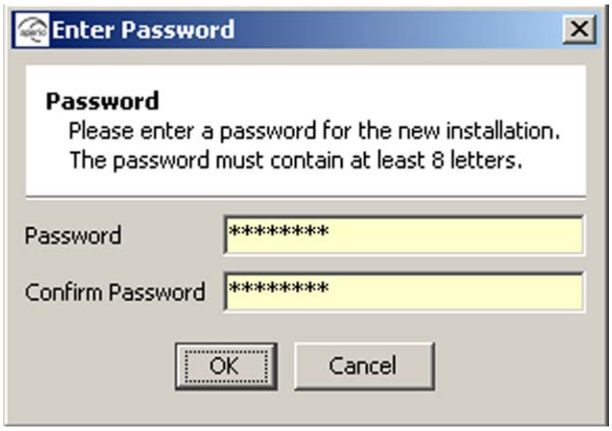
1. Select File–New in the Aperio Programming Application.
2. Enter a name for the installation and click Select key file.


New

Installation
Enter installation name and key file

a_new_installation

3. Select the key file and click Select. **Note!** The xml-file (key file) containing the encryption keys should be delivered via encrypted e-mail or on a USB memory stick.
4. Click Create new.
5. Enter a password of at least 8 characters for the door installation and confirm it. Click OK.


Enter Password

Password
Please enter a password for the new installation.
The password must contain at least 8 letters.

Password ********
Confirm Password ********

5. Make the first configuration of a door installation

5.1 Purpose of the first configuration

The purpose of the first configuration of a door installation is to

- ensure that the Aperio system is in normal operation mode.
- verify a stable and secure operation of the lock.

Making a first configuration of a door installation includes

- switching security mode
- integration with an EAC.
- setting of override credentials.

For some installations it could also include

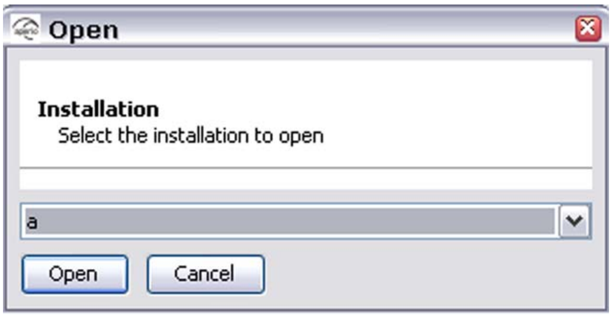
- card reading configuration.
- configuration of status and alarm messages.
- configuration of the radio communication.

⚠ **Proper handling of encryption keys is essential to lock security!** If the installation and first configuration is not performed properly the radio communication will not be secure and the lock will therefore be vulnerable to intrusion attempts.

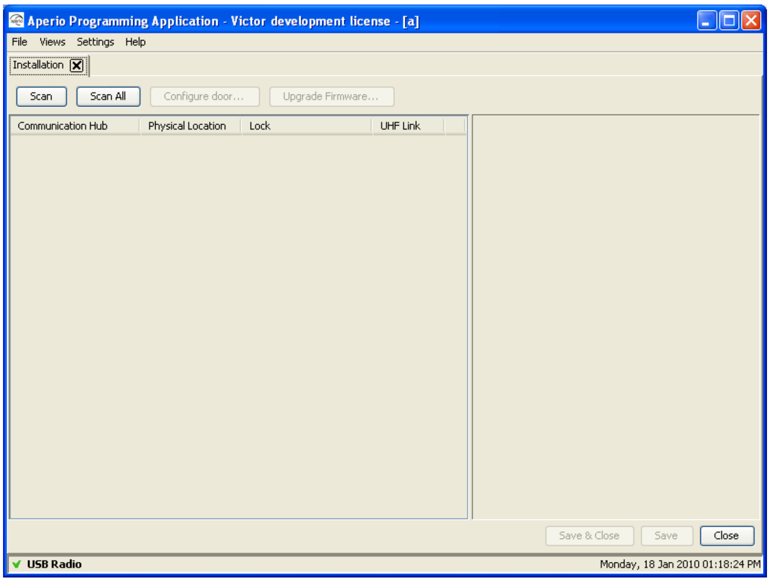
5.2 Scan for Aperio locks

Follow these steps to scan for doors:

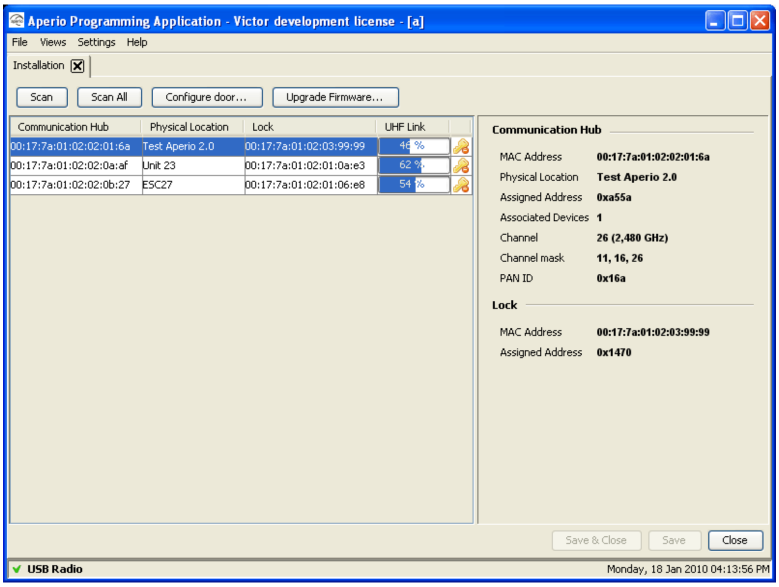
1. Open the Aperio Programming Application by clicking Start–All Programs–Aperio Programming Application–Start.
2. Select File–Open, select the installation to scan and click Open.



3. Enter the password and click OK. **Result:** The Installation view is opened.



4. Click Scan. The Scanning progress bar is shown during the scan. **Result:** All Communication Hubs within reach of the USB Radio device of your computer are displayed in the scan result table.



Communication Hub	Physical Location	Lock	UHF Link
00:17:7a:01:02:02:01:6a	Test Aperio 2.0	00:17:7a:01:02:03:99:99	46 %
00:17:7a:01:02:02:0a:af	Unit 23	00:17:7a:01:02:01:0a:e3	62 %
00:17:7a:01:02:02:0b:27	ESC27	00:17:7a:01:02:01:06:e8	54 %

Communication Hub

MAC Address	**00:17:7a:01:02:02:01:6a**
Physical Location	**Test Aperio 2.0**
Assigned Address	**0xa55a**
Associated Devices	**1**
Channel	**26 (2,480 GHz)**
Channel mask	**11, 16, 26**
PAN ID	**0x16a**

Lock

MAC Address	**00:17:7a:01:02:03:99:99**
Assigned Address	**0x1470**

5. Click Scan again if none or not all of the Communication Hubs are found. **Note!** If scanning fails several times you may need to perform Scan all.

6. Select a door in the table if you want to view detailed information of its Communication Hub and lock. The following information is shown:

- Communication Hub. The MAC address of the Communication Hub.
- Physical Location. The physical location specified by the user. This is a description that may be 20 characters long.
- Lock. Indicates if there is a lock paired with the Communication Hub. If there is a paired lock the MAC address of the lock is shown. If not, *n/a* is shown.

- UHF Link. Indicates the strength of the UHF wireless link (through the USB Radio device) between the Communication Hub and the Aperio Programming Application.
- Security Mode. Indicates the security mode of the Communication Hub.

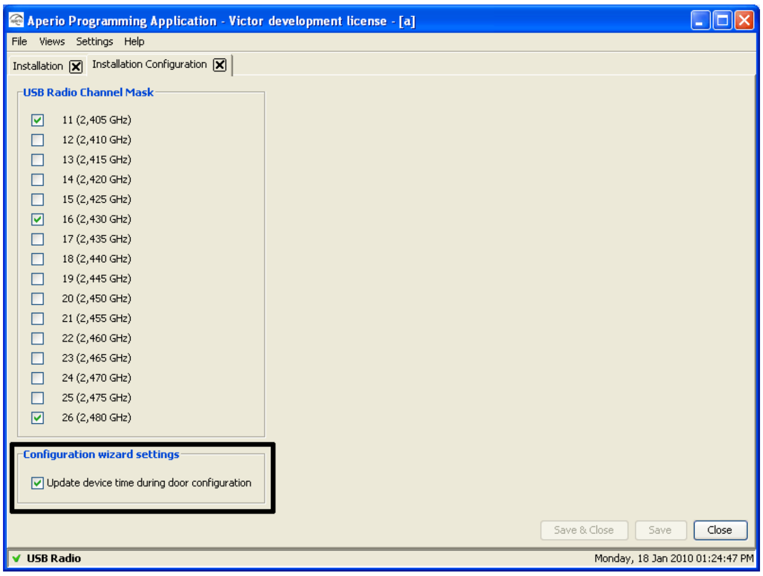
Customer mode	Door is using secure radio communication with the customer encryption key.
Manufacturing mode	Door is using unsecure radio communication with the default encryption key.

7. Locate a door by checking the last three bytes of the Communication Hub MAC address (ex. 02:01:3e) in the scan result table. The same characters should be on a label on the cover of the Communication Hub.

5.3 Update the door configuration

Follow the steps below to update the door configuration. **Note!** The changes you make during the update of the door configuration are not carried out until you perform the device update.

1. Open Views–Installation Configuration.
2. Check *Update device time during door configuration* and click Save & Close.


Aperio Programming Application - Victor development license - [a]
File
Views
Settings
Help
Installation ☒
Installation Configuration ☒
Save & Close
Save
Close
USB Radio
Monday, 18 Jan 2010 01:24:47 PM

USB Radio Channel Mask

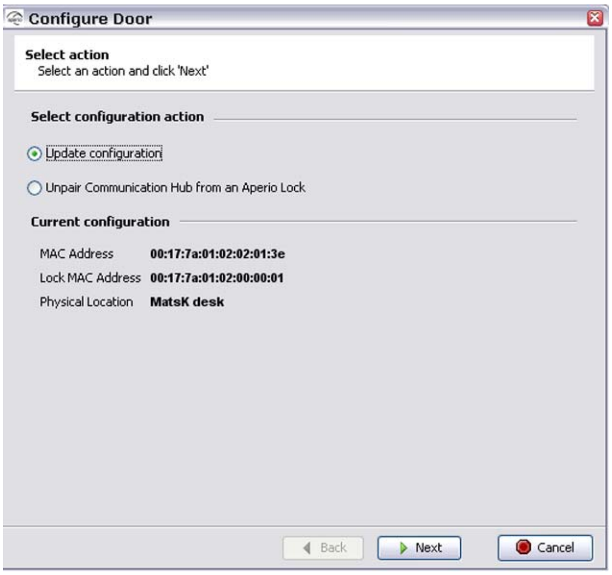
☑ 11 (2,405 GHz)
□ 12 (2,410 GHz)
□ 13 (2,415 GHz)
□ 14 (2,420 GHz)
□ 15 (2,425 GHz)
☑ 16 (2,430 GHz)
□ 17 (2,435 GHz)
□ 18 (2,440 GHz)
□ 19 (2,445 GHz)
□ 20 (2,450 GHz)
□ 21 (2,455 GHz)
□ 22 (2,460 GHz)
□ 23 (2,465 GHz)
□ 24 (2,470 GHz)
□ 25 (2,475 GHz)
☑ 26 (2,480 GHz)

Configuration wizard settings

☑ Update device time during door configuration

3. Open Settings–User Settings.
4. Check *Show advanced settings* and click Save & Close.
5. Select a door in the scan result table and click Configure door.

6. Select *Update configuration* in the Select configuration action field and click Next.



Configure Door

Select action
Select an action and click 'Next'

Select configuration action

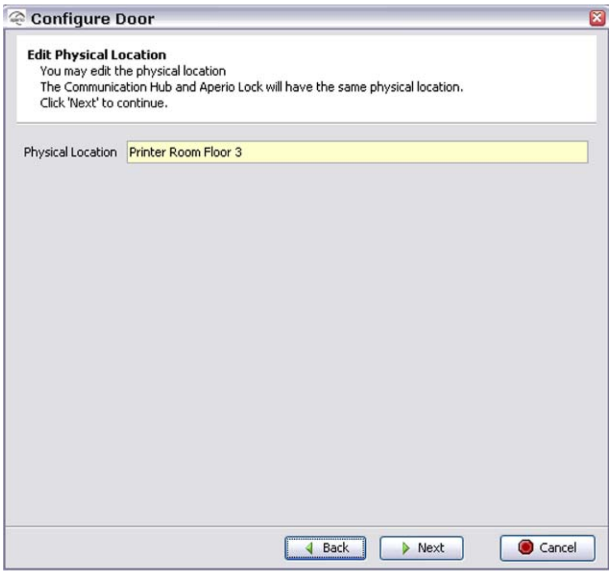
● Update configuration

○ Unpair Communication Hub from an Aperio Lock

Current configuration

MAC Address	**00:17:7a:01:02:02:01:3e**
Lock MAC Address	**00:17:7a:01:02:00:00:01**
Physical Location	**MatsK desk**

7. Edit the Physical location of the door if necessary. Use a description that clearly describes the physical location of the door. When you scan for doors the physical location will be shown in the scan result table. Click Next.

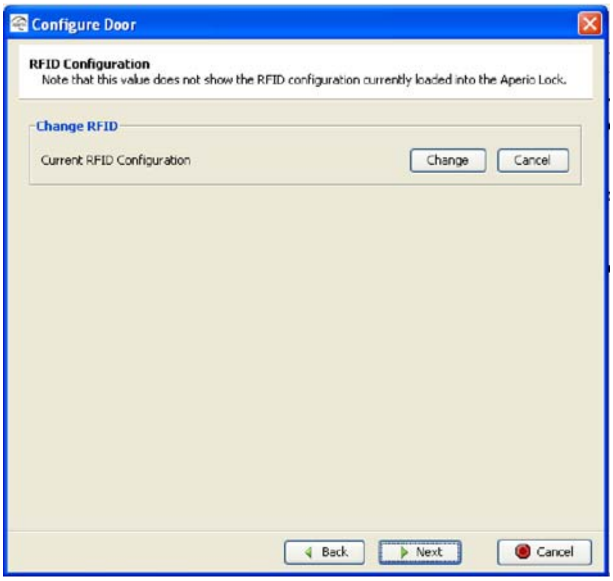


Configure Door

Edit Physical Location
You may edit the physical location
The Communication Hub and Aperio Lock will have the same physical location.
Click 'Next' to continue.

Physical Location: Printer Room Floor 3

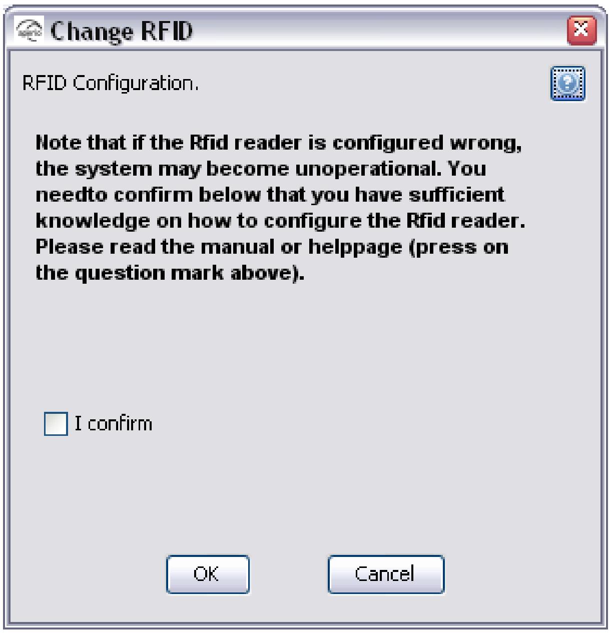
8. Click Change in the Mifare RFID Configuration dialog box if you need to change the RFID configuration, or click Next.



RFID Configuration
Note that this value does not show the RFID configuration currently loaded into the Aperio Lock.

Change RFID
Current RFID Configuration

9. Select *I confirm* to confirm that you have the proper knowledge of Mifare configuration and that you are aware that a faulty configuration could lead to non-functional locks. Click OK. **Note!** You have to confirm this every time.

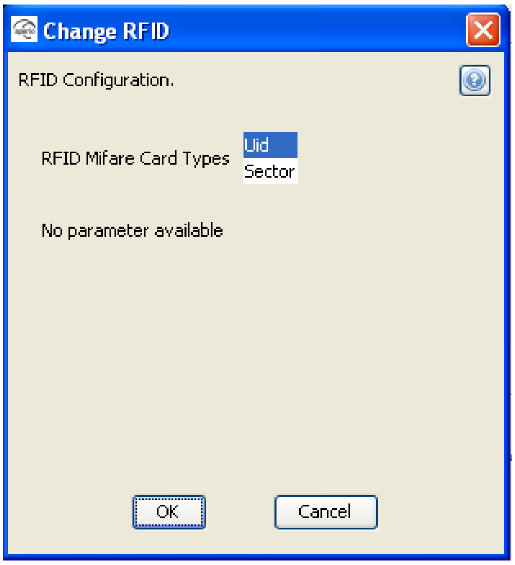


RFID Configuration.

Note that if the Rfid reader is configured wrong, the system may become unoperational. You needto confirm below that you have sufficient knowledge on how to configure the Rfid reader. Please read the manual or helppage (press on the question mark above).

□ I confirm

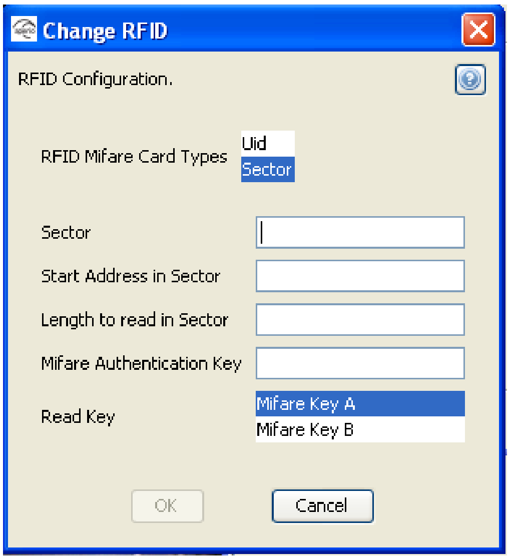
10. Select the Mifare card type. Currently UID and Sector reading is supported. See an example of a sector reading layout in Appendix A, Mifare RFID Configuration Online Help.



RFID Configuration.

RFID Mifare Card Types: Uid (selected), Sector

No parameter available



RFID Configuration.

RFID Mifare Card Types: Uid, Sector (selected)

Sector

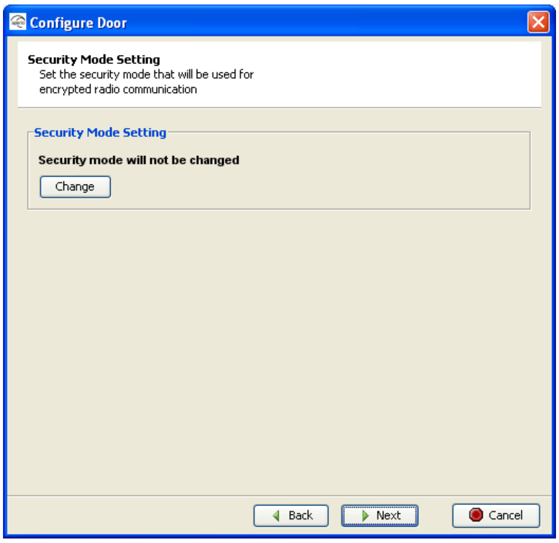
Start Address in Sector

Length to read in Sector

Mifare Authentication Key

Read Key: Mifare Key A (selected), Mifare Key B

11. Set the parameters for the selected card type and click OK. If you select UID configuration, no parameters need to be set. If you need help during the RFID configuration, click the question mark in the upper right corner of any of the dialog boxes to open the online help (or read Appendix A, Mifare RFID Configuration Online Help).
Note! All parameters are mandatory and you can't click OK until a valid combination of parameters is entered.



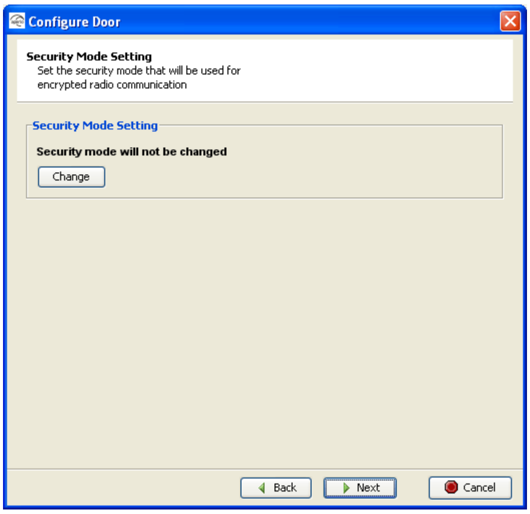
Security Mode Setting
Set the security mode that will be used for encrypted radio communication

Security Mode Setting

Security mode will not be changed

12. Click Change in the Security Mode Setting dialog box if you want to change the security mode, or click Next.
When you want to change to Customer mode do as described in step 14-15 below.

Note: The Default mode is Manufacturing mode, you should always change it to Customer mode.



Configure Door

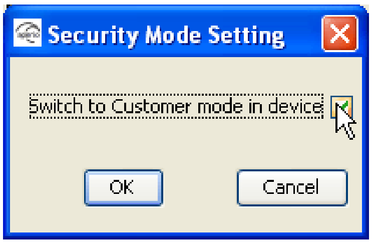
Security Mode Setting
Set the security mode that will be used for encrypted radio communication

Security Mode Setting
Security mode will not be changed

If the door is set in Customer mode you should not change to Manufacturing mode in this step in the wizard!

If you change to Manufacturing mode key the lock will no longer be using secure radio communication.

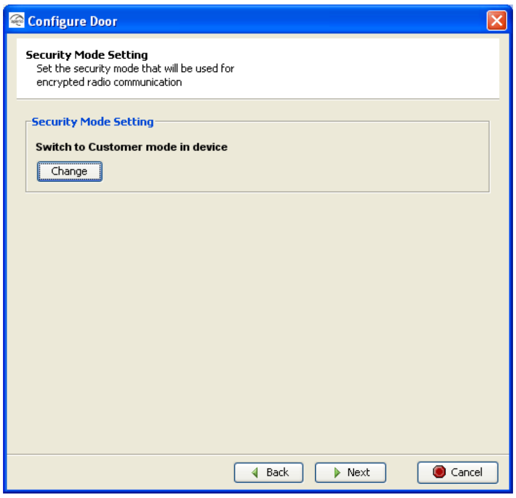
13. Select *Switch to Customer mode in device* and click OK.



Security Mode Setting

Switch to Customer mode in device ☑

14. Click Next



Configure Door

Security Mode Setting
Set the security mode that will be used for encrypted radio communication

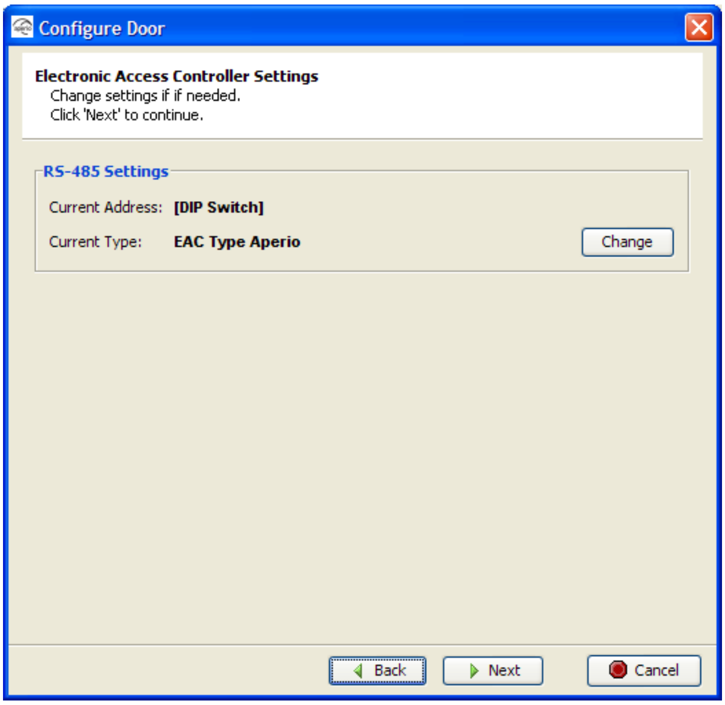
Security Mode Setting
Switch to Customer mode in device

15. Click Change if you need to change the EAC address and/or type.
    Note! You can also set the EAC address during the installation of the Communication Hub using the DIP switch. See section 2.2 In, 2.4 RS-485 interface to EAC system

This subchapter describes the Communication Hub DIP switch and how to connect the Communication Hub to the EAC system at use of an RS-485 interface.

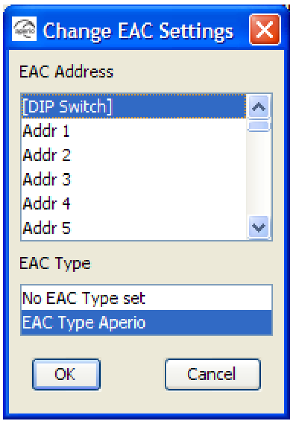
16. and 2.4.2 Two ways of selecting the EAC address above.

17. Select address and/or type and click OK. Click Next.



Electronic Access Controller Settings
Change settings if if needed.
Click 'Next' to continue.

RS-485 Settings
Current Address: **[DIP Switch]**
Current Type: **EAC Type Aperio**



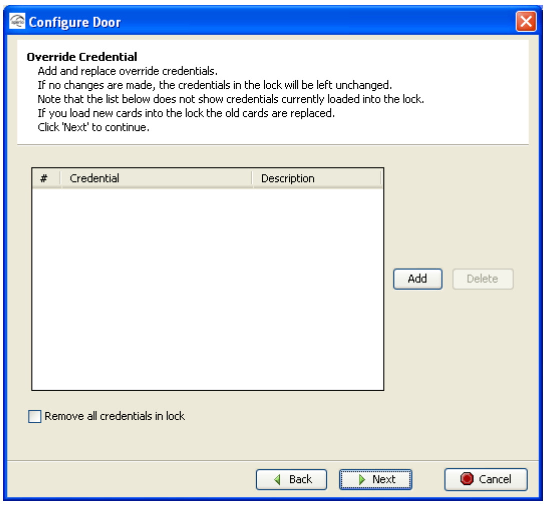
5.4 Set the override credentials

The override credentials are used to gain access to the area when the EAC is offline. Only the credential cards from the override list will be granted access when the system is offline. You may add 10 override credentials to a door.

Note that you do not have to enter the override credential data manually for every door to be configured. An easy and efficient way of storing the same override credentials in all the locks when configuring the door is to save the override credential configuration to local storage. This is described in section *5.6 Save the configuration to local storage*.

Follow these steps to set the override credentials:

1. Click Add to add a new override credential.

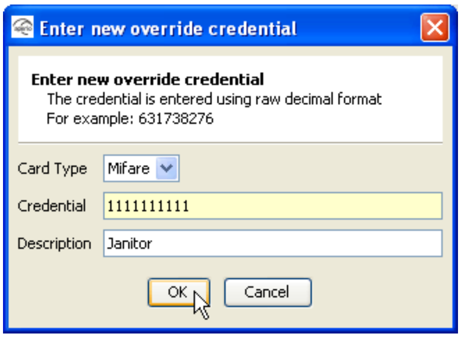


Override Credential
Add and replace override credentials.
If no changes are made, the credentials in the lock will be left unchanged.
Note that the list below does not show credentials currently loaded into the lock.
If you load new cards into the lock the old cards are replaced.
Click 'Next' to continue.

#	Credential	Description

□ Remove all credentials in lock

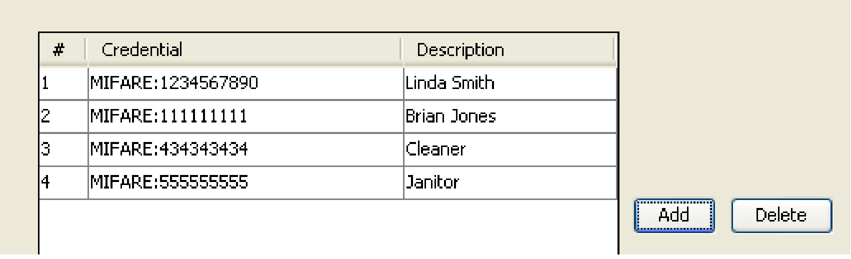
2. Select the Card Type, enter the UID (Unique Identification Number) for the override card in the Credential field. You may also enter a description of the credential. Click OK.



Enter new override credential
The credential is entered using raw decimal format
For example: 631738276

Card Type: Mifare
Credential: 1111111111
Description: Janitor

3. Enter all credentials to be sent to lock.



#	Credential	Description
1	MIFARE:1234567890	Linda Smith
2	MIFARE:111111111	Brian Jones
3	MIFARE:434343434	Cleaner
4	MIFARE:555555555	Janitor

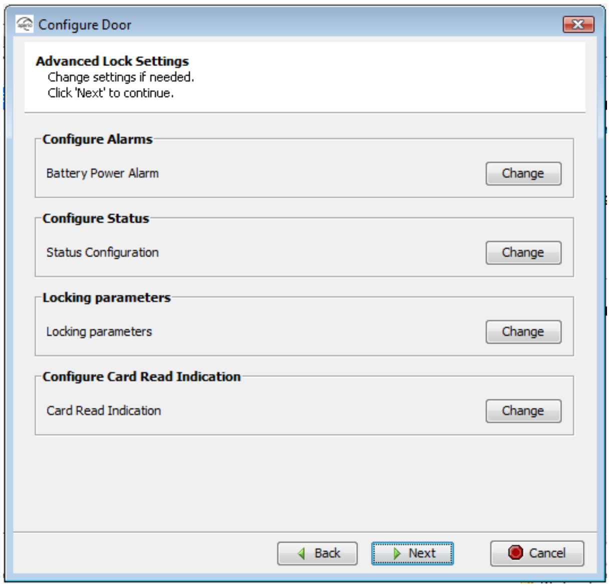
4. Select an override credential and click Delete if you want to delete a credential from the list.
5. Check *Remove all credentials in Aperio Lock* if you want to remove all the credentials in the lock.
6. Click Next after setting the override credentials.

5.5 Set the advanced settings

NOTE: To see this panel, you must have the “Show advanced settings” check-box checked on the “User Settings” page.

Follow these steps to set the advanced settings:

1. Click Change if you want to change the channel mask. See instruction in section 8.2 Change the channel mask. Click Next.



Configure Door

Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

Configure Alarms
Battery Power Alarm

Configure Status
Status Configuration

Locking parameters
Locking parameters

Configure Card Read Indication
Card Read Indication

2. Click Change in the applicable field of the Advanced Lock Settings dialog box if you want to change the
    a. **battery power alarm** – configuration of the voltage level and with what interval in minutes the battery in the lock should be checked.
    b. **status messages and report intervals** – configuration of which statuses the message should contain and with what interval the message should be sent.
    c. **locking time parameters** – configuration of the time the lock should be open, try to open, and after what time a close alarm should be sent to the event log.
    d. **card read indication** – Configure the audio-visual card reading indication. This could typically be: *None*, *LED* or in some hardware *Buzzer*.

    For more information look in section 8.4 Advanced Lock Settings and subchapters for each configuration.

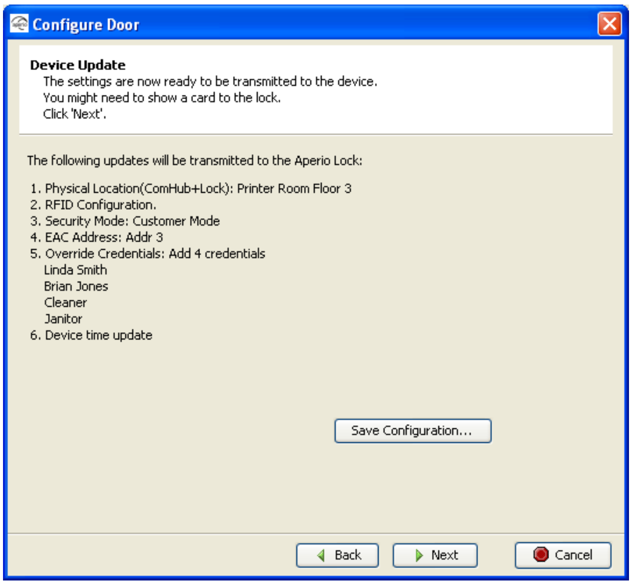
3. Click Next.

5.6 Save the configuration to local storage

Just before the last step (when you download the configuration to the device) you have the option to save the configuration you just did, or parts of it, in the local storage.
The configuration may be used later to configure other devices with the same information.

Follow these steps to save the configuration:

1. The Device Update dialog box shows a summary of the configuration tasks that normally would be sent to the Lock when continue to the next step in the wizard. Instead of choosing the next step, click on the button "Save Configuration..."



Configure Door

Device Update
The settings are now ready to be transmitted to the device.
You might need to show a card to the lock.
Click 'Next'.

The following updates will be transmitted to the Aperio Lock:

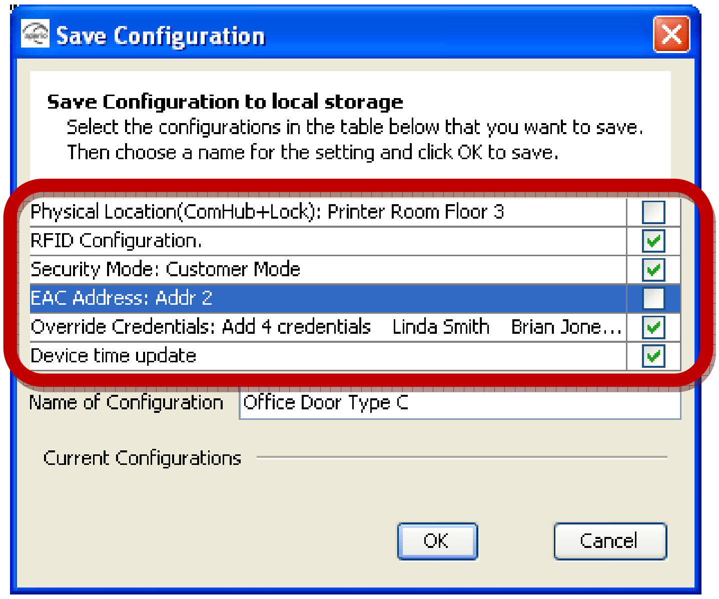
1. Physical Location(ComHub+Lock): Printer Room Floor 3
2. RFID Configuration.
3. Security Mode: Customer Mode
4. EAC Address: Addr 3
5. Override Credentials: Add 4 credentials
   Linda Smith
   Brian Jones
   Cleaner
   Janitor
6. Device time update

2. The Save Configuration dialog box shows a summary of the configuration tasks that have been collected during the different steps in the Configuration Wizard. You can exclude some tasks by simply tick the check box, as show in the screenshot above.

   Recommended tasks to save could be:

   - RFID configuration
   - Change security mode
   - Override credential
   - Device time update
   - And optionally some advanced features like Battery Alarm, Status configuration and Locking parameters).

   If you choose to save a configuration like the one above, enabling you to later apply that configuration on other doors, you have to keep in mind that some configuration tasks, like physical location and EAC address, need to be configured on a per door basis using the Configuration Wizard since they are different for each door.



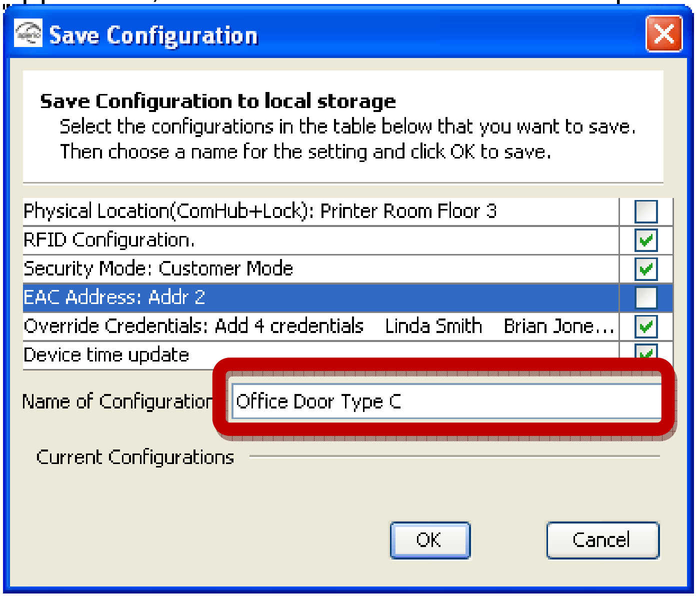
Save Configuration to local storage
Select the configurations in the table below that you want to save.
Then choose a name for the setting and click OK to save.

Physical Location(ComHub+Lock): Printer Room Floor 3	□
RFID Configuration.	☑
Security Mode: Customer Mode	☑
EAC Address: Addr 2	□
Override Credentials: Add 4 credentials Linda Smith Brian Jone…	☑
Device time update	☑

Name of Configuration: Office Door Type C

Current Configurations

3. Enter a unique and suitable name for this configuration in the Name of Configuration field. Please choose this name wisely, since it later should be clear what settings this configuration changes in the door. You could, for instance, name it according to the different configuration tasks or, if applicable, use a name that reflects the specific door type.



Save Configuration

Save Configuration to local storage
Select the configurations in the table below that you want to save.
Then choose a name for the setting and click OK to save.

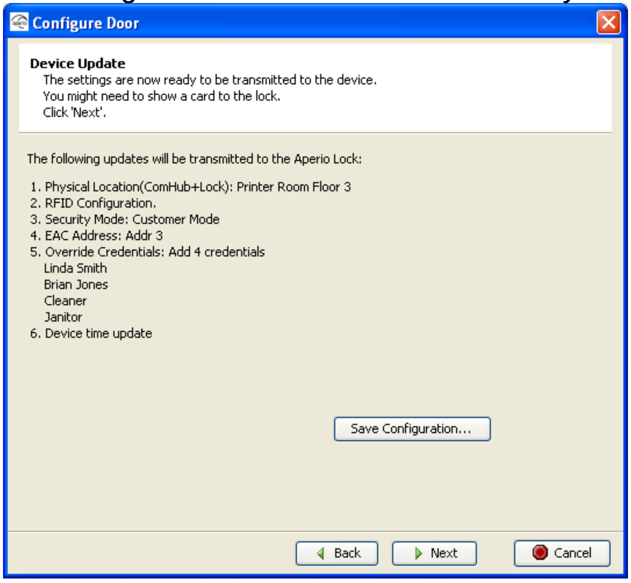
Physical Location(ComHub+Lock): Printer Room Floor 3	□
RFID Configuration.	☑
Security Mode: Customer Mode	☑
EAC Address: Addr 2	□
Override Credentials: Add 4 credentials Linda Smith Brian Jone...	☑
Device time update	☑

Name of Configuration: Office Door Type C

Current Configurations

4. Click OK.

5. Now the configuration is saved in the local storage, and you are back in the Configuration Wizard. You can choose to update this door with this configuration or you can choose to cancel the Configure Door operation. Choosing Cancel does affect the locally stored configuration.



Configure Door

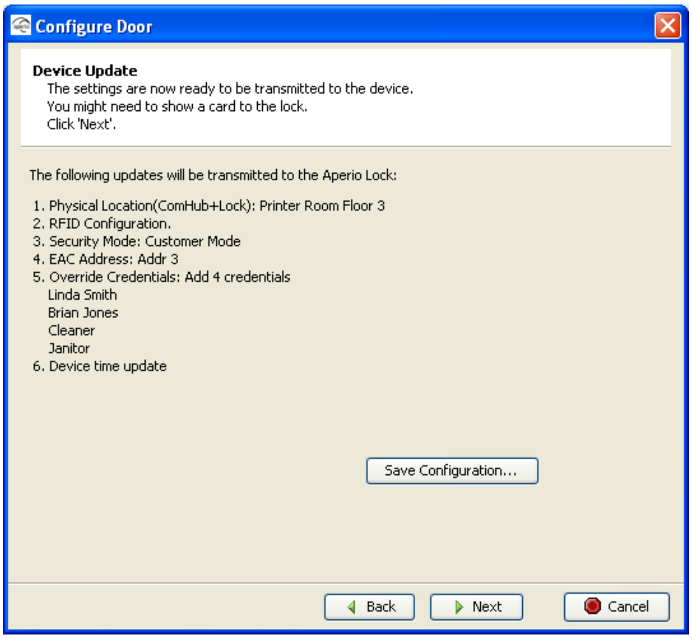
Device Update
The settings are now ready to be transmitted to the device.
You might need to show a card to the lock.
Click 'Next'.

The following updates will be transmitted to the Aperio Lock:

1. Physical Location(ComHub+Lock): Printer Room Floor 3
2. RFID Configuration.
3. Security Mode: Customer Mode
4. EAC Address: Addr 3
5. Override Credentials: Add 4 credentials
   Linda Smith
   Brian Jones
   Cleaner
   Janitor
6. Device time update

5.7 Perform the device update

For this step you must have an access card available.



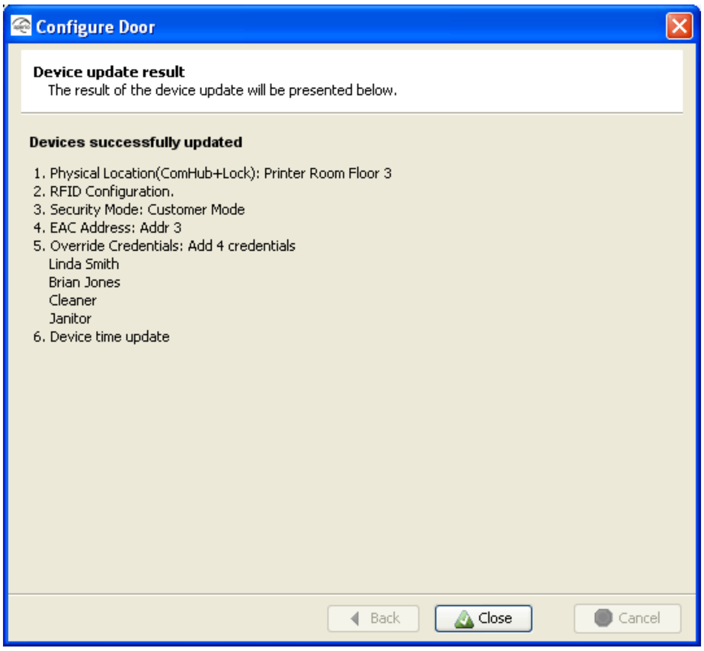
Device Update
The settings are now ready to be transmitted to the device.
You might need to show a card to the lock.
Click 'Next'.

The following updates will be transmitted to the Aperio Lock:

1. Physical Location(ComHub+Lock): Printer Room Floor 3
2. RFID Configuration.
3. Security Mode: Customer Mode
4. EAC Address: Addr 3
5. Override Credentials: Add 4 credentials
   Linda Smith
   Brian Jones
   Cleaner
   Janitor
6. Device time update

Follow these steps to perform the device update:

1. The Device Update dialog box shows a summary of the update tasks that will be performed.
2. Click Next and show a card to the lock to perform the update. You must show the card within 30 seconds, otherwise the update process will time out. **Note!** The time of the lock is automatically set each time you configure and update the device.
   Result: A progress bar shows that the update is being performed. The Device update result dialog box shows the result of the update when it has been performed.



Device update result
The result of the device update will be presented below.

Devices successfully updated

1. Physical Location(ComHub+Lock): Printer Room Floor 3
2. RFID Configuration.
3. Security Mode: Customer Mode
4. EAC Address: Addr 3
5. Override Credentials: Add 4 credentials
   Linda Smith
   Brian Jones
   Cleaner
   Janitor
6. Device time update

3. Click Close.

5.8 Changing the Security Mode

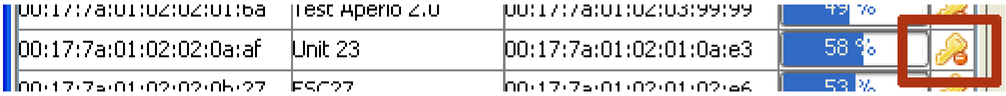
Proper handling of encryption keys is essential to lock security!

If you don’t set the lock in Customer mode, the radio communication will not be secure and the lock will therefore be vulnerable to intrusion attempts.

Setting of Security mode may either be done as described in chapter 5.3 Update the door configuration, or separately as described below:

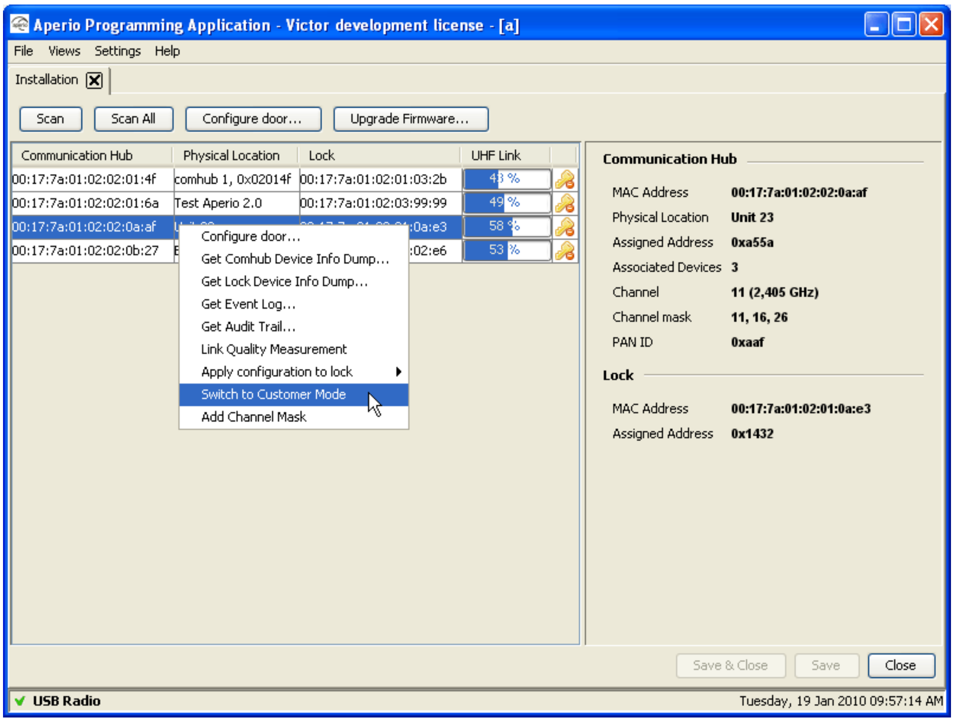
Follow these steps to set the Security mode in another way than via the configuration wizard:

1. In the Installation view, click Scan to perform a scan.



00:17:7a:01:02:02:0a:af	Unit 23	00:17:7a:01:02:01:0a:e3	58 %

2. Verify that the door is in Manufacturing mode by checking that the key symbol at the right side of the door in the list has a prohibition sign attached to it.



Communication Hub	Physical Location	Lock	UHF Link
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	43 %
00:17:7a:01:02:02:01:6a	Test Aperio 2.0	00:17:7a:01:02:03:99:99	49 %
00:17:7a:01:02:02:0a:af	U	:0a:e3	58 %
00:17:7a:01:02:02:0b:27	E	:02:e6	53 %

Communication Hub

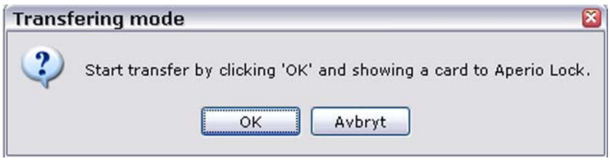
MAC Address	00:17:7a:01:02:02:0a:af
Physical Location	Unit 23
Assigned Address	0xa55a
Associated Devices	3
Channel	11 (2,405 GHz)
Channel mask	11, 16, 26
PAN ID	0xaaf

Lock

MAC Address	00:17:7a:01:02:01:0a:e3
Assigned Address	0x1432

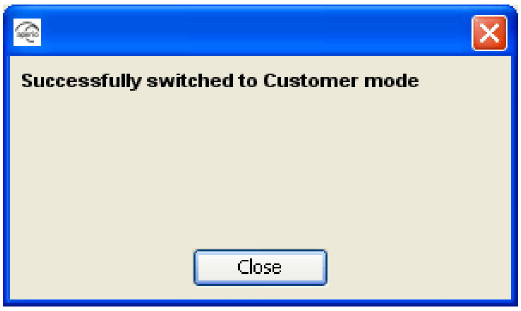
Tuesday, 19 Jan 2010 09:57:14 AM

3. Right-click the door and select *Switch to Customer Mode*.



Start transfer by clicking 'OK' and showing a card to Aperio Lock.

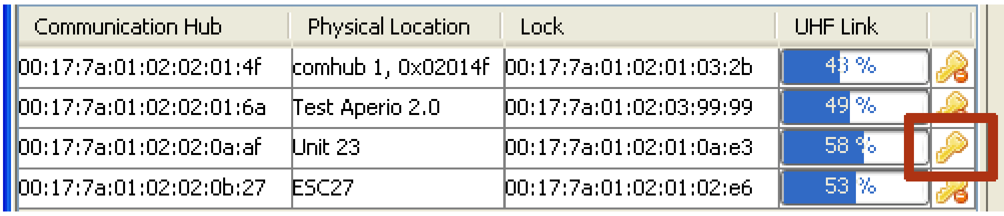
4. Click OK and show an access card to the lock. A progress bar shows that the transfer is being performed.



Successfully switched to Customer mode

5. If the encryption keys is successfully loaded you get a message that states “Successfully switched to Customer mode”. End with click on Close.
6. Click Scan to perform a new scan.
7. Select the door.

Result: Check the key symbol at the right side of the door to see that the door has been set to Customer mode.



Communication Hub	Physical Location	Lock	UHF Link	
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	43 %	🔑
00:17:7a:01:02:02:01:6a	Test Aperio 2.0	00:17:7a:01:02:03:99:99	49 %	🔑
00:17:7a:01:02:02:0a:af	Unit 23	00:17:7a:01:02:01:0a:e3	58 %	🔑
00:17:7a:01:02:02:0b:27	ESC27	00:17:7a:01:02:01:02:e6	53 %	🔑

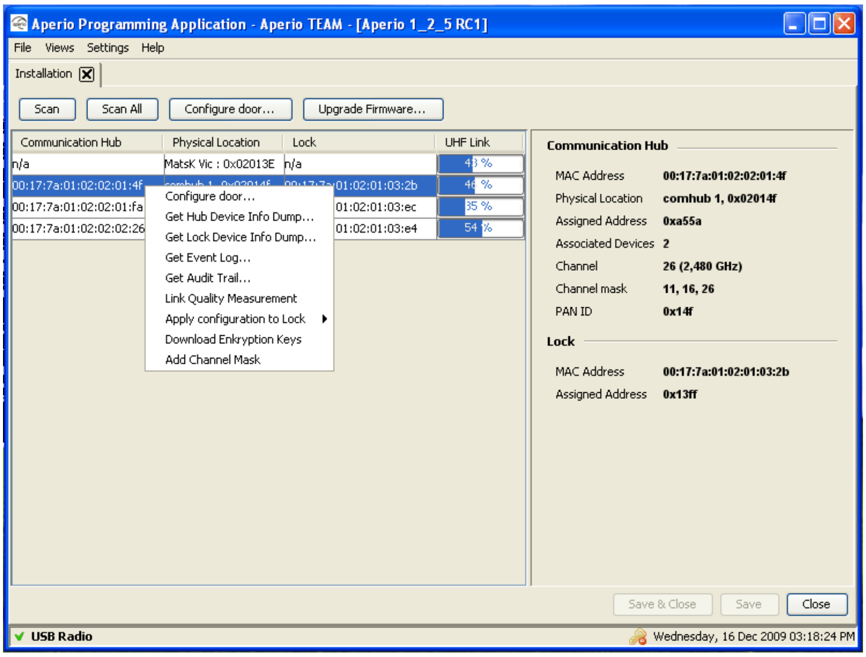
8. Repeat the steps above for all the doors in the installations you want to configure.
Alternatively you may use an export file created as described in “5.6 Save the configuration to local storage”.
How to use the export is described in “5.9 How to apply a stored configuration to a Door”.

5.9 How to apply a stored configuration to a Door

If you performed the steps in “5.6 Save the configuration”, then you may use the configuration to configure more doors with the same saved settings.

Follow these steps to load a saved configuration to a door:

1. In the Installation view, click Scan to perform a scan.



Communication Hub	Physical Location	Lock	UHF Link
n/a	MatsK Vic : 0x02013E	n/a	43 %
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	46 %
00:17:7a:01:02:02:01:fa		01:02:01:03:ec	35 %
00:17:7a:01:02:02:02:26		01:02:01:03:e4	54 %

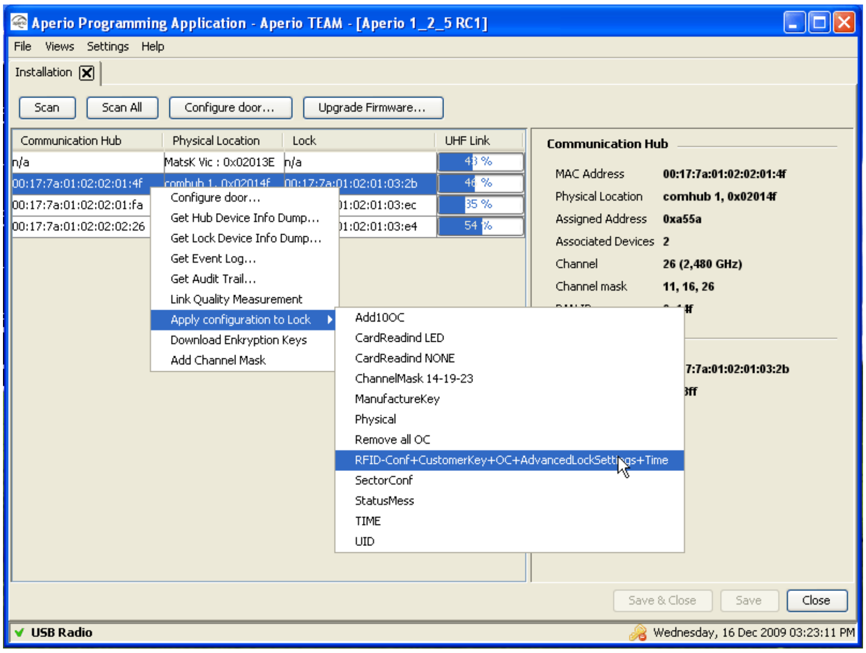
Communication Hub

MAC Address	**00:17:7a:01:02:02:01:4f**
Physical Location	**comhub 1, 0x02014f**
Assigned Address	**0xa55a**
Associated Devices	**2**
Channel	**26 (2,480 GHz)**
Channel mask	**11, 16, 26**
PAN ID	**0x14f**

Lock

MAC Address	**00:17:7a:01:02:01:03:2b**
Assigned Address	**0x13ff**

2. Right-click the door and select Apply configuration to Lock

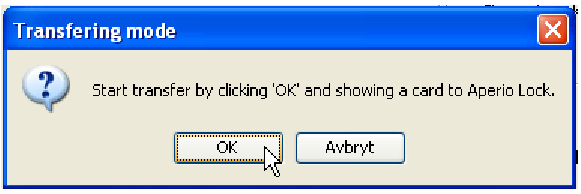


Communication Hub	Physical Location	Lock	UHF Link
n/a	MatsK Vic : 0x02013E	n/a	43 %
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	46 %
00:17:7a:01:02:02:01:fa		01:02:01:03:ec	35 %
00:17:7a:01:02:02:02:26		01:02:01:03:e4	54 %

Communication Hub

MAC Address	**00:17:7a:01:02:02:01:4f**
Physical Location	**comhub 1, 0x02014f**
Assigned Address	**0xa55a**
Associated Devices	**2**
Channel	**26 (2,480 GHz)**
Channel mask	**11, 16, 26**

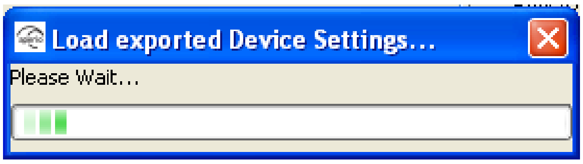
3. Choose the configuration you want to apply to the door.



Transfering mode

Start transfer by clicking 'OK' and showing a card to Aperio Lock.

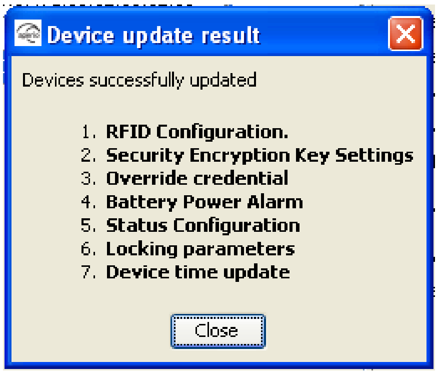
4. Click OK to start the transfer



Load exported Device Settings...

Please Wait...

5. Wait for the transfer to finish.



Device update result

Devices successfully updated

1. RFID Configuration.
2. Security Encryption Key Settings
3. Override credential
4. Battery Power Alarm
5. Status Configuration
6. Locking parameters
7. Device time update

6. The result is shown.
   Click Close to end.

7. Repeat all the steps from beginning in this chapter for every door you want to configure with a saved configuration

8. Keep in mind that you might have to configure some settings such as Physical location and EAC address separately as described in 5.3 Update the door configuration.

5.10 Test after the first configuration

Follow these steps to test that the installation and first configuration of the door have been performed correctly and that the lock is working:

1. Check that the Communication Hub LED has a steady green light. This indicates that the installation and configuration have been performed correctly.
2. Show a card that is configured in the EAC to deny access to the lock. **Result:** Access is denied and the lock LED flashes red once.
3. Show a card that is configured in the EAC to grant access to the lock. **Result:** Access is granted and the lock LED flashes green once.

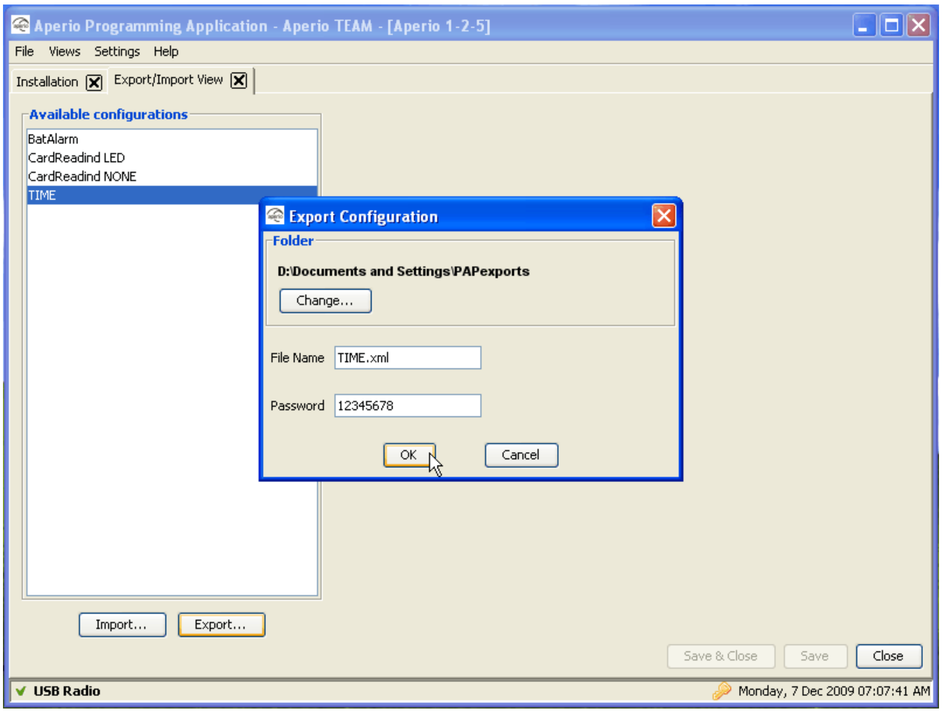
5.11 Import and export configurations

The stored configurations discussed in chapter 5.6 and 5.9 can also be exported to a file so that more than one Aperio Programming Application can share the same configuration information. When you import an exported configuration you add it to the local configuration storage and then you can apply that configuration to a lock as described in chapter 5.9.

Note: When you export a configuration, you can not change the name of the configuration, only the file name holding the configuration information. Since configurations can be shared between different Aperio Programming Applications, it’s preferable that a shared configuration (identified by its unique name) also has the same meaning on all Aperio Programming Applications. It is therefore advisable that you choose the name of the configuration wisely when you store the configuration (as described in chapter 5.6)

5.11.1 Export Configuration

Open the Export/Import View under the Views menu. The main window lists the existing stored configurations. Select the configuration that should be exported to file and click “Export..”.



D:\Documents and Settings\PAPexports

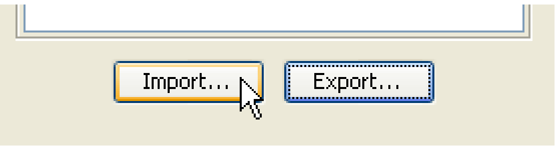
File Name TIME.xml

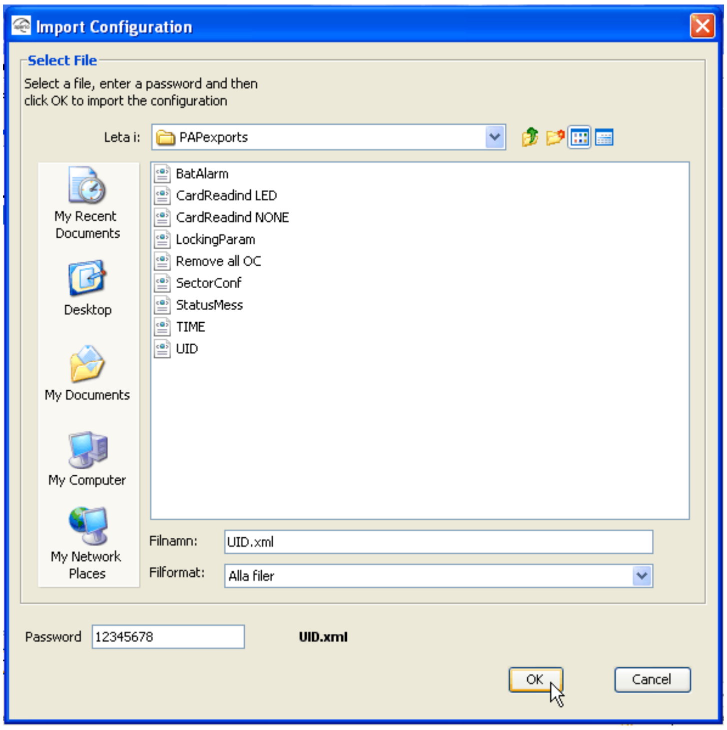
Password 12345678

You need to supply a folder where the exported configuration file will be created, a file name ending with .xml and a password with at least 8 characters used to encrypt the information. When the export dialog opens, the export file will be named after the configuration name and the folder is pointing the current users home folder, and if that is ok, you only need to supply a valid password. Please write down the password in a safe place so that you can remember it when you or someone else would like to import the configuration.

5.11.2 Import Configuration

Importing a configuration takes a previously exported configuration and adds it to the local configuration storage. Click on the "Import..." button





Import Configuration

Select File

Select a file, enter a password and then click OK to import the configuration

Leta i: PAPexports

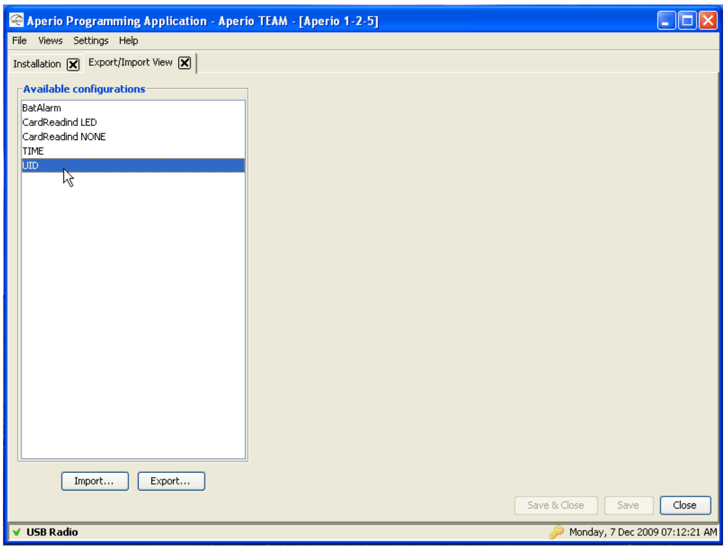
Filnamn: UID.xml

Filformat: Alla filer

Password 12345678

UID.xml

Open the folder that holds the exported configuration. Select one (should normally end with .xml). Supply a valid password and click “OK”. The exported configuration is now added to your local configuration storage.



Aperio Programming Application - Aperio TEAM - [Aperio 1-2-5]

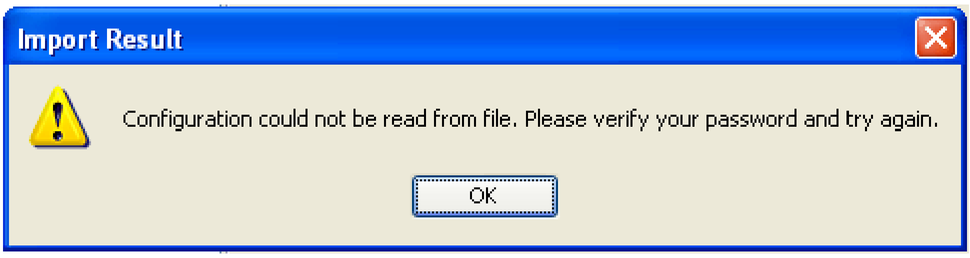
Available configurations

BatAlarm
CardReadind LED
CardReadind NONE
TIME
UID

USB Radio

Monday, 7 Dec 2009 07:12:21 AM

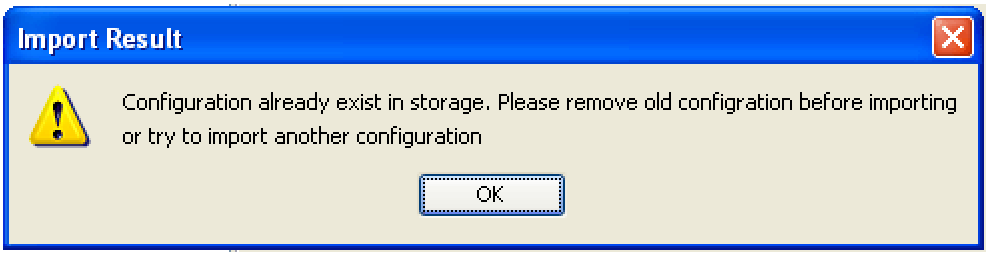
If you supply an invalid password, the content of the exported configuration file can not be interpreted correctly and the Aperio Programming Application displays an error message:



Configuration could not be read from file. Please verify your password and try again.

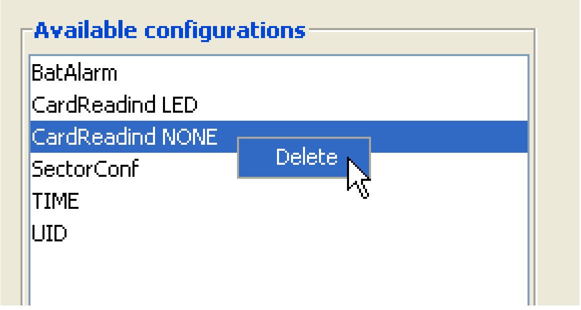
Please verify that you have typed in the correct password for this exported configuration and that you have selected the correct file and try again.

The Aperio Programming Application will not let you import a configuration if it already exists in the local storage. Note that the configuration is identified by its name, not the name of the export file.



Configuration already exist in storage. Please remove old configration before importing or try to import another configuration

To be able to import a configuration that already exists in the local storage; you first need to remove the local configuration. Select the conflicting configuration and right click and select “Delete” from the popup menu. Now it should be possible to import the exported configuration.



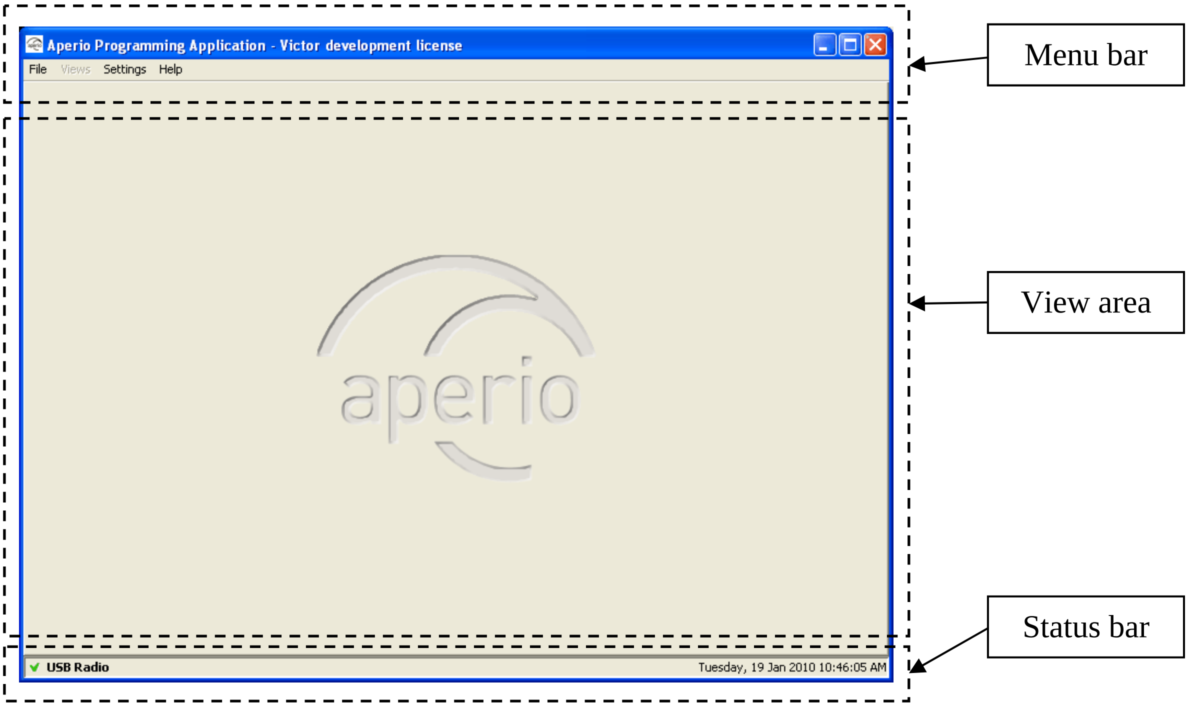
6. Menus and views

6.1 Main view

The main view of the programming application consists of three areas:

- Menu bar
- View area
- Status bar

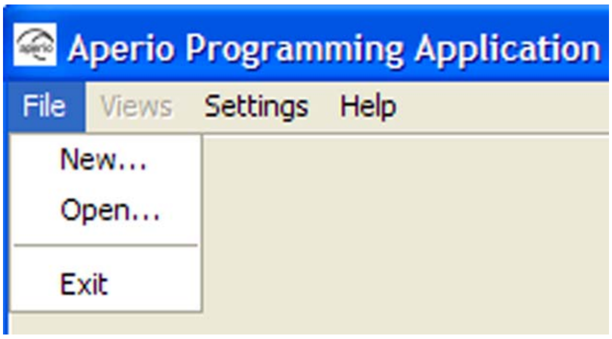
See further description of the areas in the sections below.


Aperio Programming Application - Victor development license
File
Views
Settings
Help
aperio
USB Radio
Tuesday, 19 Jan 2010 10:46:05 AM
Menu bar
View area
Status bar

6.2 File menu

The File menu contains three options:

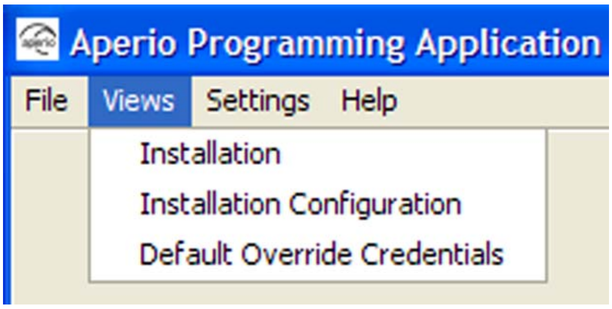
- New. Create a new installation.
- Open. Open an existing installation.
- Exit. Exit the programming application.



6.3 Views menu

The Views menu contains 3 views:

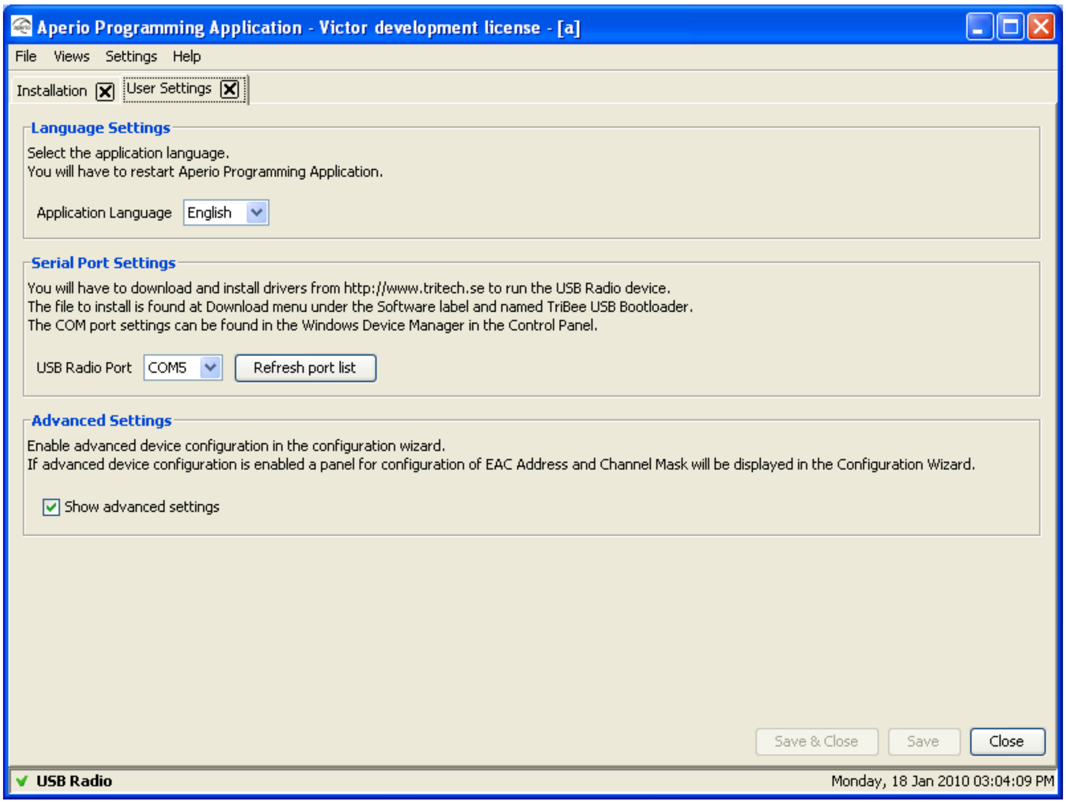
- Installation. Scan for doors and manage door installations. See further description in section 6.8 Installation View.
- Installation Configuration. Manage the USB radio channel mask and the updating of device time.
- Default Override Credentials. Manage the default override credentials.


Aperio Programming Application
File
Views
Settings
Help
Installation
Installation Configuration
Default Override Credentials

6.4 Settings menu

The User Settings view (in the Settings menu) contains settings that are applicable to all the installations:

- Language settings
- Serial port settings
- Advanced settings


Aperio Programming Application - Victor development license - [a]
File
Views
Settings
Help
Installation ☒
User Settings ☒

Language Settings

Select the application language.
You will have to restart Aperio Programming Application.

Application Language: English

Serial Port Settings

You will have to download and install drivers from http://www.tritech.se to run the USB Radio device.
The file to install is found at Download menu under the Software label and named TriBee USB Bootloader.
The COM port settings can be found in the Windows Device Manager in the Control Panel.

USB Radio Port: COM5

Advanced Settings

Enable advanced device configuration in the configuration wizard.
If advanced device configuration is enabled a panel for configuration of EAC Address and Channel Mask will be displayed in the Configuration Wizard.

☑ Show advanced settings

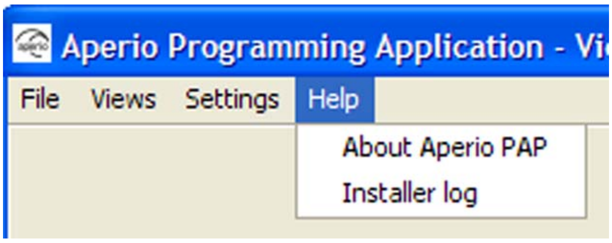
✓ USB Radio

Monday, 18 Jan 2010 03:04:09 PM

6.5 Help menu

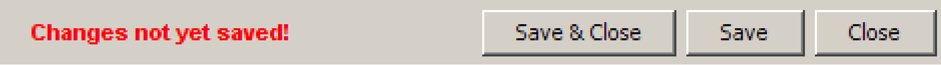
The Help menu contains two options:

- About Aperio Programming Application. Shows license, copyright and version information.
- Installer log. Shows the actual data transmitted and received from the application.



6.6 Save and close buttons

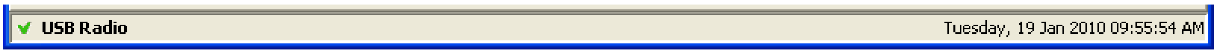
If you have unsaved data in any of the views described above this will be displayed both via a red text and enabled Save and Save & Close buttons. The data in a view is not saved until you click Save or Save & Close.



6.7 Status bar

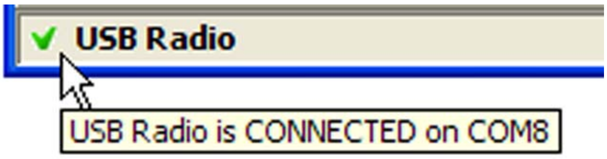
The status bar contains the following information:

- USB Radio indication
- Date label.

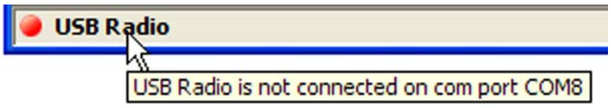


USB radio indication

USB Radio together with a green check mark indicates that the serial port is ok and the radio device is ready to transmit data. When you hold the mouse pointer above this indication you will get information on which com port the radio device is connected to.



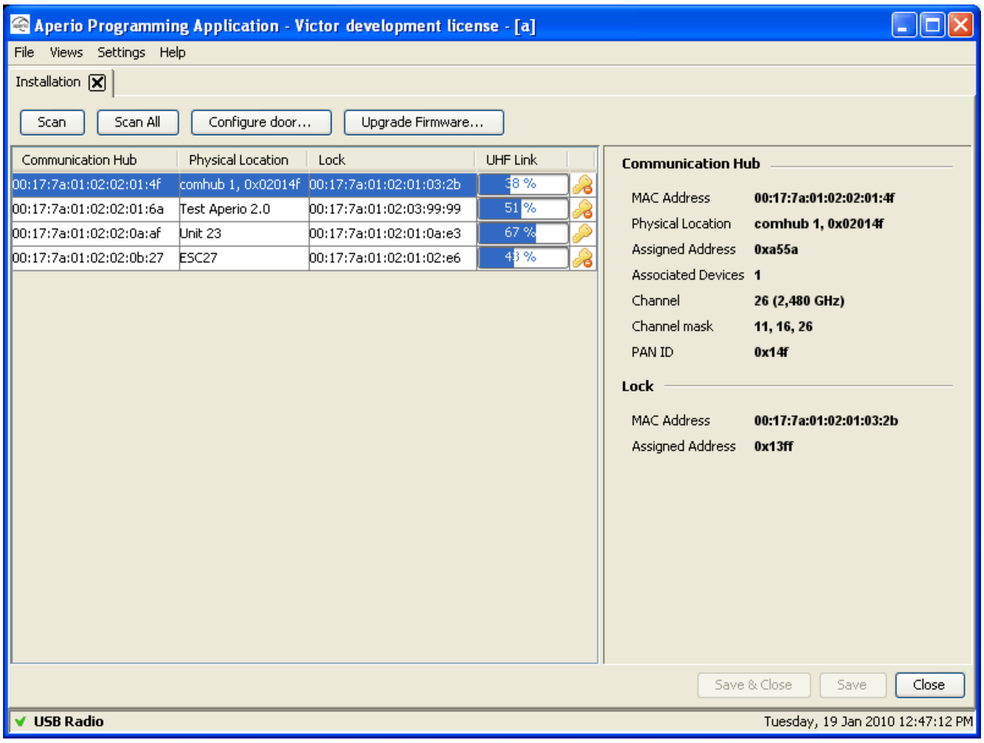
USB Radio together with a red dot indicates that the serial port or the USB radio device is not ok. When you hold the mouse pointer above this indication you will get confirmation that the radio device is not connected.



USB Radio is not connected on com port COM8

6.8 Installation View

In the Installation View, the installer scans and receives a list of Communication Hubs that are in reach of the USB radio device.



Communication Hub	Physical Location	Lock	UHF Link	
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	38 %	
00:17:7a:01:02:02:01:6a	Test Aperio 2.0	00:17:7a:01:02:03:99:99	51 %	
00:17:7a:01:02:02:0a:af	Unit 23	00:17:7a:01:02:01:0a:e3	67 %	
00:17:7a:01:02:02:0b:27	ESC27	00:17:7a:01:02:01:02:e6	43 %	

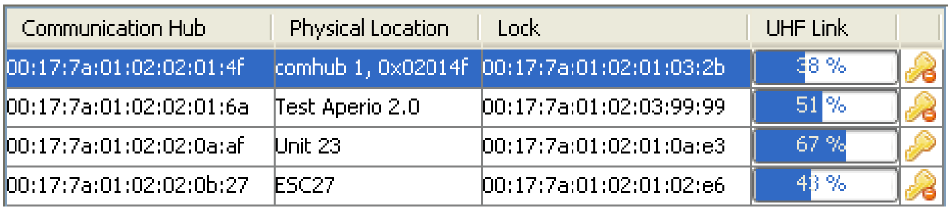
Communication Hub

MAC Address	00:17:7a:01:02:02:01:4f
Physical Location	comhub 1, 0x02014f
Assigned Address	0xa55a
Associated Devices	1
Channel	26 (2,480 GHz)
Channel mask	11, 16, 26
PAN ID	0x14f

Lock

MAC Address	00:17:7a:01:02:01:03:2b
Assigned Address	0x13ff

Tuesday, 19 Jan 2010 12:47:12 PM



Communication Hub	Physical Location	Lock	UHF Link	
00:17:7a:01:02:02:01:4f	comhub 1, 0x02014f	00:17:7a:01:02:01:03:2b	38 %	
00:17:7a:01:02:02:01:6a	Test Aperio 2.0	00:17:7a:01:02:03:99:99	51 %	
00:17:7a:01:02:02:0a:af	Unit 23	00:17:7a:01:02:01:0a:e3	67 %	
00:17:7a:01:02:02:0b:27	ESC27	00:17:7a:01:02:01:02:e6	43 %	

The found devices are displayed in the list and the following information is shown:

- Communication Hub. The MAC address of the Communication Hub.
- Physical Location. The physical location specified by the user. This is a description that may be 20 characters long.
- Lock. Indicates if there is a lock paired with the Communication Hub. If there is a paired lock the MAC address of the lock is shown. If not, n/a is shown.
- UHF Link. Indicates the strength of the UHF wireless link (through the USB Radio device) between the Communication Hub and the Aperio Programming Application.
- Security Mode. Key symbol and prohibition sign that indicate the security mode of the device. The security modes are defined according to below.

🔑	*Customer mode*	Door is using secure radio communication with the customer encryption key.
🔑	*Manufacturing mode*	Door is using unsecure radio communication with the default encryption key.

7. Maintenance

7.1 Change the battery of the lock

The exact procedure for changing the battery of the lock is described by the manual for the respective product. The following are some general issues to consider when changing the battery of an Aperio lock:

1) Always replace the battery with a fresh one. The battery alarm detection algorithm is dependent on that the battery has full capacity when the lock is powered up.

2) After removing the old battery, show any card to the lock to make sure that all energy is drained from the internal storage capacitors thus ensuring a proper power up.

3) Prepare yourself for the battery replacement operation. If the lock is left without battery for too many seconds, the time is lost and it is required to use the Aperio Programming Application to set it right again (see 7.2 Set the time of the lock).

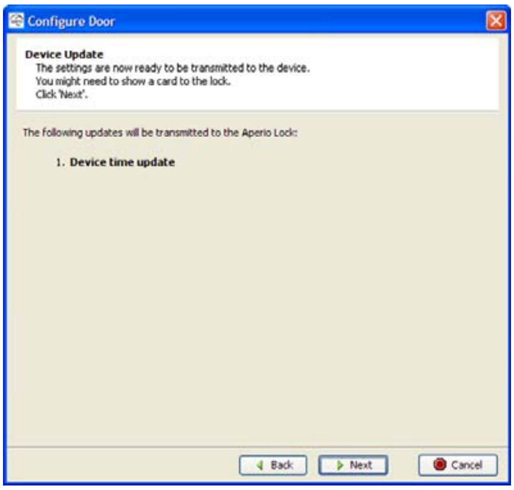
4) After inserting the new battery, check the LED flashing for a successful POST (see 2.9 Lock self test LED indication). If the battery is not accepted as new, there will be an error indication instead of the POST flashes.

Remember:	Remove old battery	_	Show a card	_	Insert new battery	_	Check POST

7.2 Set the time of the lock

Follow these steps to set the time of the lock:

1. Open the installation for the lock in the Aperio programming application and click Scan.
2. Select the door in the scan result table.
3. Open Views–Installation Configuration and check that *Update device time during door configuration* is checked. Close the Installation Configuration view.
4. Click Configure door. Click Next several times and go through the configuration wizard without making any changes. **Result:** The Device Update dialog box is opened.



Device Update
The settings are now ready to be transmitted to the device.
You might need to show a card to the lock.
Click 'Next'.

The following updates will be transmitted to the Aperio Lock:

1. **Device time update**

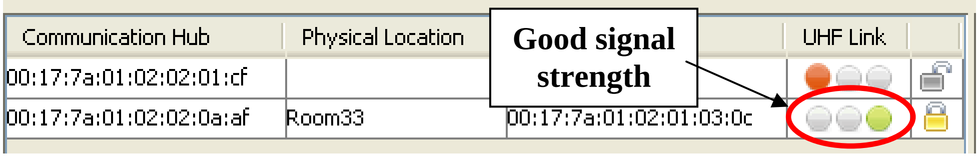
5. Click Next and show a card to the lock to update the time of the lock. You must show the card within 30 seconds, otherwise the update process will time out. **Note!** The time of the lock will now be automatically set each time you configure and update the device.
   Result: A progress bar shows that the update is being performed. The Device update result dialog box shows the result of the update when it has been performed.
6. Click Close.

7.3 Firmware upgrade

This chapter describes how to upgrade the system to a new release.

7.3.1 Preconditions

1. Ensure that you are using the latest version of the Aperio Programming Application. If not – install the latest Aperio Programming Application according to ***Fel! Hittar inte referenskälla.***.
2. Check communication. Check on the UHF Link indicator that the signal strength indicator is good enough to be able to perform an upgrade. If you have bad signal strength you will not be able to perform the upgrade.

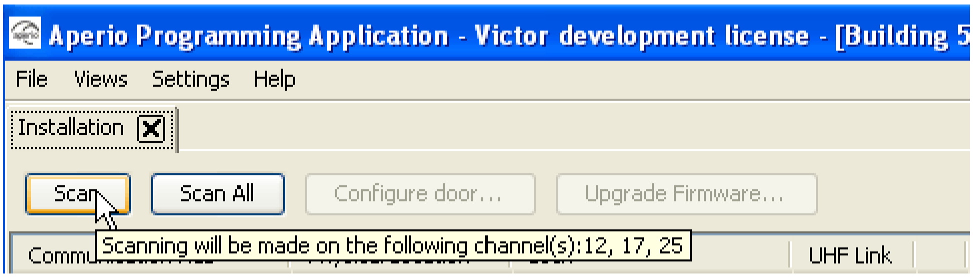


Communication Hub	Physical Location		UHF Link	
00:17:7a:01:02:02:01:cf			● ○ ○	
00:17:7a:01:02:02:0a:af	Room33	00:17:7a:01:02:01:03:0c	○ ○ ●	

3. Ensure that you have an afw file with firmware that is compatible with the units to be upgraded. **Downloading of wrong firmware may make the unit unusable.**

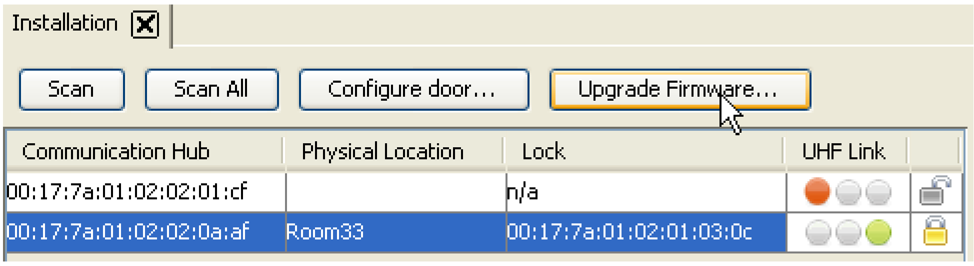
7.3.2 Upgrading

4. Perform a scan in the Aperio Programming Application.



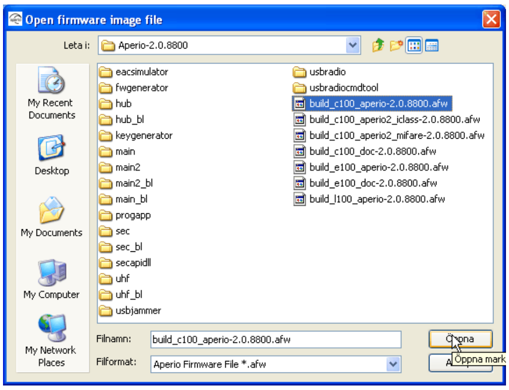
Scanning will be made on the following channel(s):12, 17, 25

5. Select the door to upgrade and click on Upgrade Firmware...



Communication Hub	Physical Location	Lock	UHF Link	
00:17:7a:01:02:02:01:cf		n/a	● ○ ○	
00:17:7a:01:02:02:0a:af	Room33	00:17:7a:01:02:01:03:0c	○ ○ ●	

6. Select the .afw file and click open.



Open firmware image file

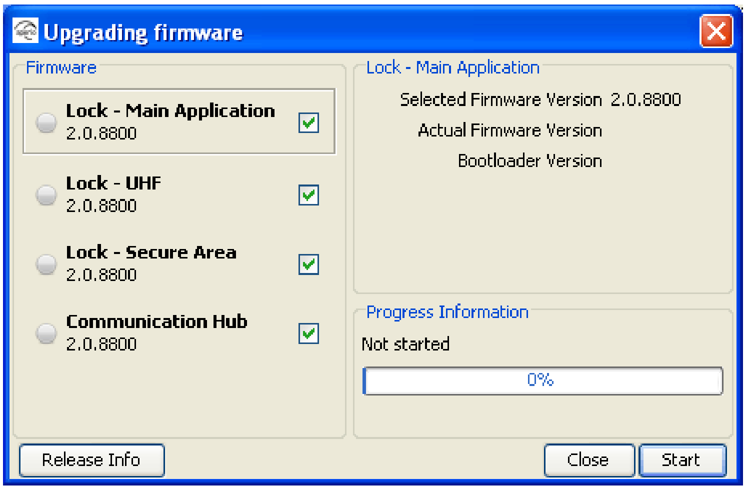
Leta i: Aperio-2.0.8800

eacsimulator
fwgenerator
hub
hub_bl
keygenerator
main
main2
main2_bl
main_bl
progapp
sec
sec_bl
secapidll
uhf
uhf_bl
usbjammer
usbradio
usbradiocmdtool
build_c100_aperio-2.0.8800.afw
build_c100_aperio2_iclass-2.0.8800.afw
build_c100_aperio2_mifare-2.0.8800.afw
build_c100_doc-2.0.8800.afw
build_e100_aperio-2.0.8800.afw
build_e100_doc-2.0.8800.afw
build_l100_aperio-2.0.8800.afw

Filnamn: build_c100_aperio-2.0.8800.afw

Filformat: Aperio Firmware File *.afw

7. The firmware upgrade window with a list of the units that may be upgraded is shown.



Upgrading firmware

Firmware

○ **Lock - Main Application** 2.0.8800 ☑
○ **Lock - UHF** 2.0.8800 ☑
○ **Lock - Secure Area** 2.0.8800 ☑
○ **Communication Hub** 2.0.8800 ☑

Lock - Main Application

Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Progress Information

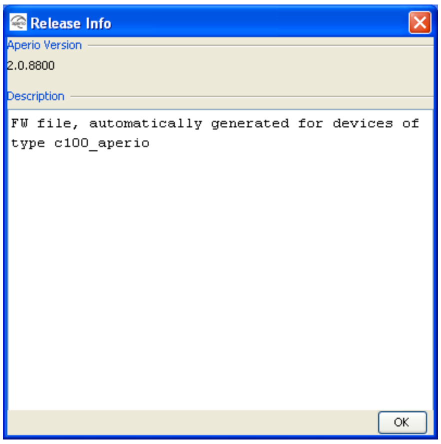
Not started

0%

8. Click on Release Info to get more information about the selected .afw file.

Important: Check in the release info window that the .afw file used at upgrade is consistent with the lock/cylinder type. A C100 .afw file must be used with cylinder locks. An E100 .afw file must be used with escutcheon locks.

No sanity check is done by the Aperio Programming Application before the firmware download starts.

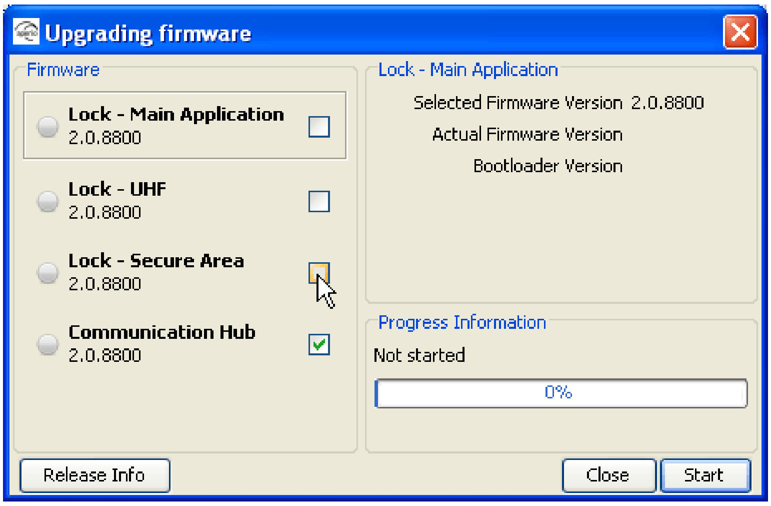

Release Info

Aperio Version
2.0.8800

Description
FW file, automatically generated for devices of type c100_aperio

9. Close the release Info window by pressing the OK button.

10. All firmware is selected to be downloaded by default. Uncheck firmware that you do not wish to download.

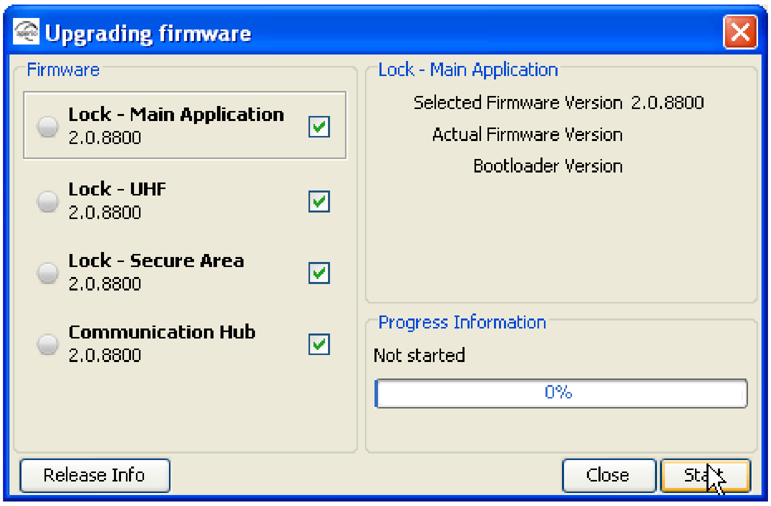

Upgrading firmware

Firmware
- Lock - Main Application 2.0.8800 ☐
- Lock - UHF 2.0.8800 ☐
- Lock - Secure Area 2.0.8800 ☐
- Communication Hub 2.0.8800 ☑

Lock - Main Application
Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Progress Information
Not started
0%

11. Click on Start to begin the upgrade.

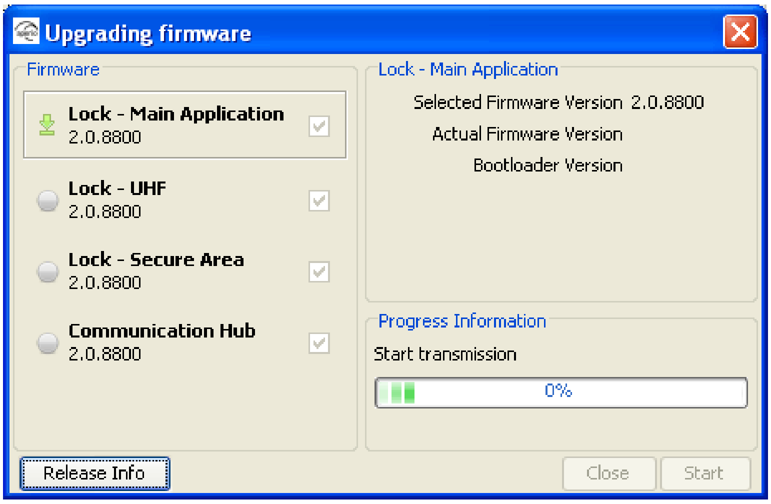

Upgrading firmware

Firmware
- Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- Lock - Secure Area 2.0.8800 ☑
- Communication Hub 2.0.8800 ☑

Lock - Main Application
Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Progress Information
Not started
0%

12. The upgrade will start with the first selected firmware in the list. A green arrow will indicate the firmware being upgraded.



Upgrading firmware

Firmware

- Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- Lock - Secure Area 2.0.8800 ☑
- Communication Hub 2.0.8800 ☑

Lock - Main Application

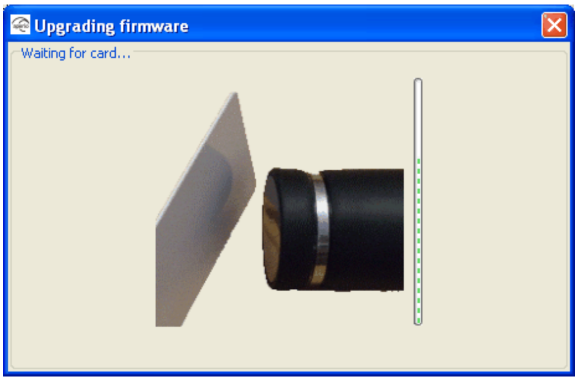
Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Progress Information

Start transmission

0%

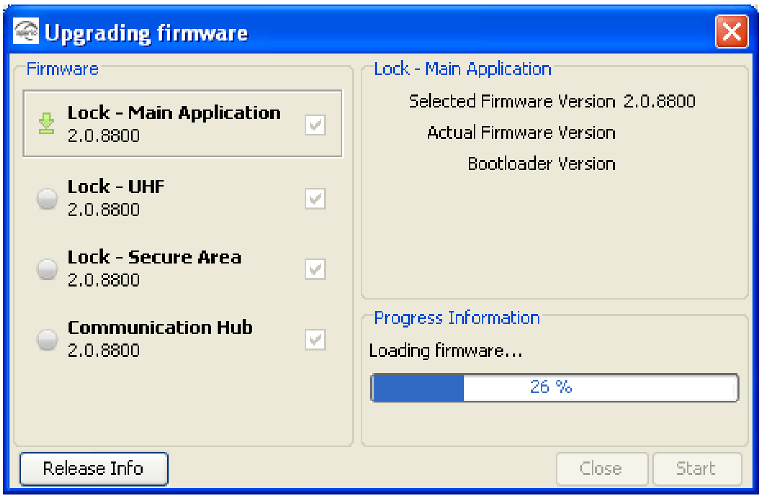
13. If you are upgrading a lock you will be prompted to show a card to the lock before the download starts.



Upgrading firmware

Waiting for card…

14. The Aperio Programming Application starts downloading the firmware to the device.



Upgrading firmware

Firmware

- Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- Lock - Secure Area 2.0.8800 ☑
- Communication Hub 2.0.8800 ☑

Lock - Main Application

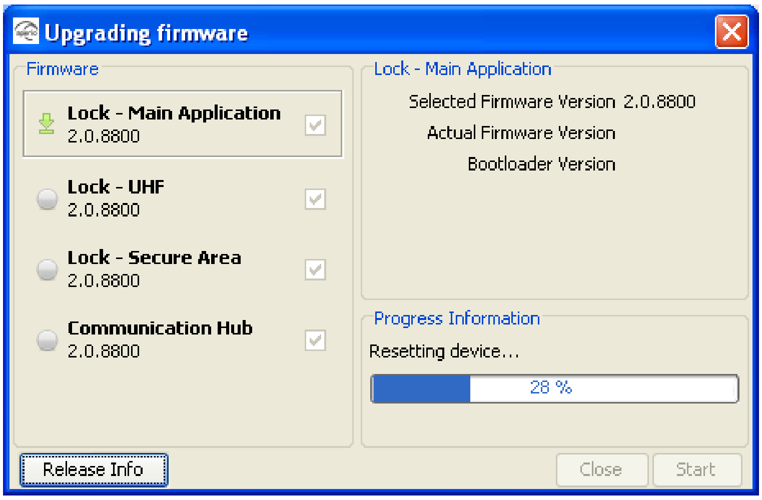
Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Progress Information

Loading firmware…

26 %

15. After that the device is resetting.
When the device starts again Aperio Programming Application is standby waiting to collect version information.



Upgrading firmware

Firmware

Lock - Main Application 2.0.8800 ☑

Lock - UHF 2.0.8800 ☑

Lock - Secure Area 2.0.8800 ☑

Communication Hub 2.0.8800 ☑

Lock - Main Application

Selected Firmware Version 2.0.8800

Actual Firmware Version

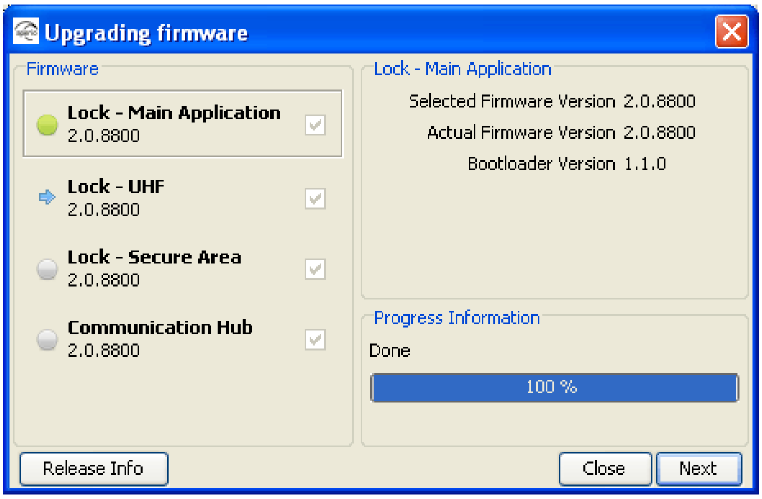
Bootloader Version

Progress Information

Resetting device...

28 %

16. The version information of the device is shown.



Upgrading firmware

Firmware

- ● Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- ○ Lock - Secure Area 2.0.8800 ☑
- ○ Communication Hub 2.0.8800 ☑

Lock - Main Application

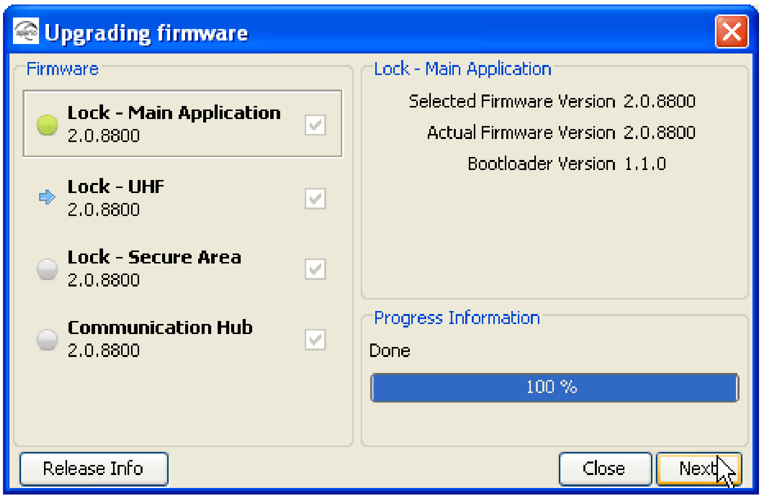
Selected Firmware Version 2.0.8800
Actual Firmware Version 2.0.8800
Bootloader Version 1.1.0

Progress Information

Done

100 %

17. Click the Next button to continue with the next firmware in the list. Click the Close button if you do not wish to continue the firmware download.



Upgrading firmware

Firmware

- ● Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- ○ Lock - Secure Area 2.0.8800 ☑
- ○ Communication Hub 2.0.8800 ☑

Lock - Main Application

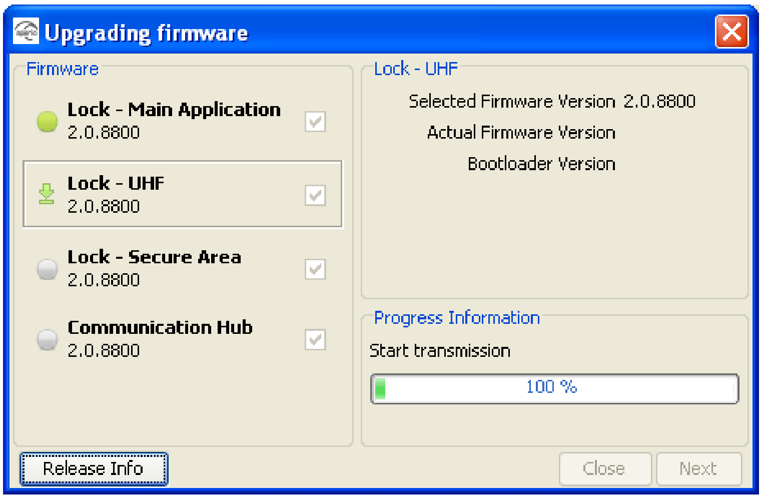
Selected Firmware Version 2.0.8800
Actual Firmware Version 2.0.8800
Bootloader Version 1.1.0

Progress Information

Done

100 %

18. The download starts for the next firmware.



Upgrading firmware

Firmware

- ● Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- ○ Lock - Secure Area 2.0.8800 ☑
- ○ Communication Hub 2.0.8800 ☑

Lock - UHF

Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

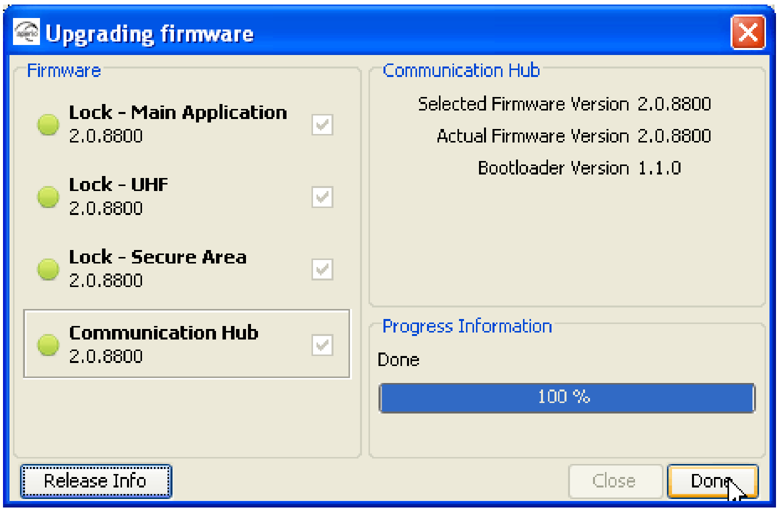
Progress Information

Start transmission

100 %

19. Continue downloading the other firmware in the same way as above until all firmware is downloaded.

20. Click the Done button to close the window.



Upgrading firmware

Firmware

- Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- Lock - Secure Area 2.0.8800 ☑
- Communication Hub 2.0.8800 ☑

Communication Hub

Selected Firmware Version 2.0.8800
Actual Firmware Version 2.0.8800
Bootloader Version 1.1.0

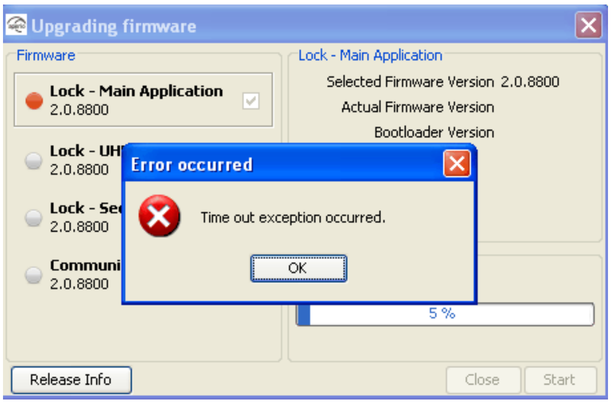
Progress Information

Done

100 %

7.3.2 Update failure

1. A failed update is typically due to bad radio conditions. The work around is to move the USB Radio closer to the Communication Hub and try update again. See 7.4 Establish communication procedure Close the error message window by clicking OK.



Upgrading firmware

Firmware

- Lock - Main Application 2.0.8800 ☑
- Lock - UH 2.0.8800
- Lock - Se 2.0.8800
- Communi 2.0.8800

Lock - Main Application

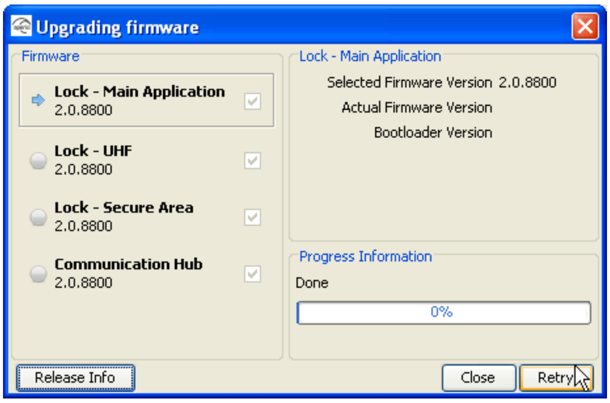
Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

Error occurred

Time out exception occurred.

5 %

2. Click Retry to try the upgrade again.



Upgrading firmware

Firmware

- Lock - Main Application 2.0.8800 ☑
- Lock - UHF 2.0.8800 ☑
- Lock - Secure Area 2.0.8800 ☑
- Communication Hub 2.0.8800 ☑

Lock - Main Application

Selected Firmware Version 2.0.8800
Actual Firmware Version
Bootloader Version

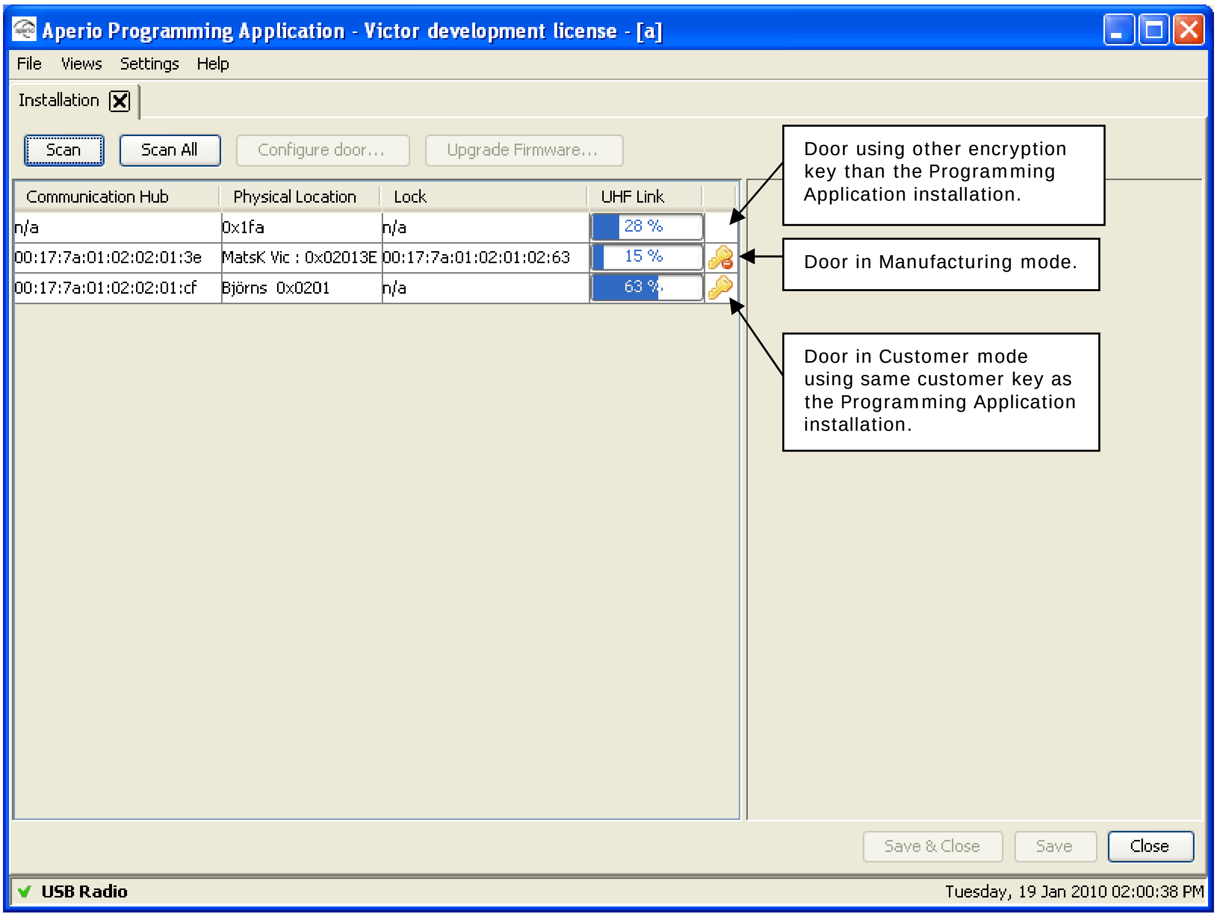
Progress Information

Done

0%

7.4 Establish communication procedure

This describes a procedure for how to establish communication with a door.



Communication Hub	Physical Location	Lock	UHF Link
n/a	0x1fa	n/a	28 %
00:17:7a:01:02:02:01:3e	MatsK Vic : 0x02013E	00:17:7a:01:02:01:02:63	15 %
00:17:7a:01:02:02:01:cf	Björns 0x0201	n/a	63 %

Door using other encryption key than the Programming Application installation.

Door in Manufacturing mode.

Door in Customer mode using same customer key as the Programming Application installation.

a. **Check encryption keys.** If at repeated scan the physical location is displayed while MAC addresses and security mode are not, there is an encryption key mismatch. The door is using other encryption key than the one used in the Aperio Programming Application installation.

   Verify that you are using a Programming Application installation with the correct encryption key. If not open or create an installation with the correct encryption key and try to scan for locks. If you are using the correct encryption keys try *Check radio link* below.

b. **Check radio link**. If the communication between Programming Application/USB Radio and Communication Hub or lock/cylinder works poorly also when the MAC address of this Communication Hub is sometimes displayed at scan, the problem is not related to encryption keys. A probable cause is bad radio conditions or limited radio range.

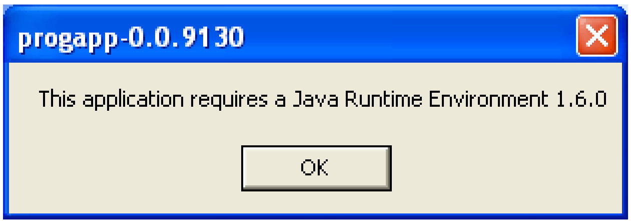
   Try moving the USB radio closer to the Communication Hub or moving the USB radio to a higher location. This can be done by moving the entire

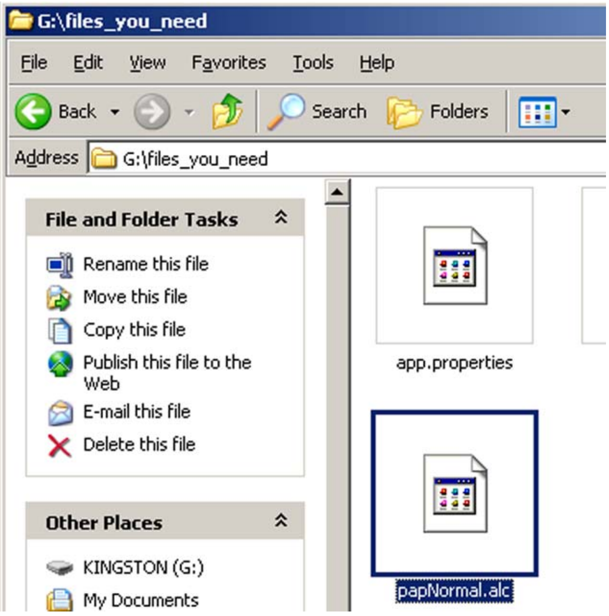
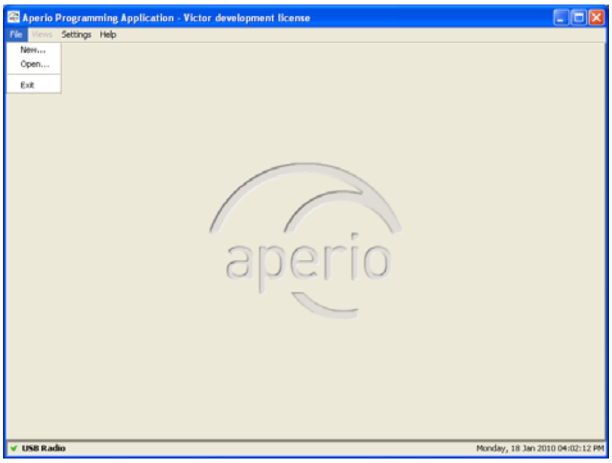
Programming Application PC or by use of an A-A USB extension cable to distance the USB radio from the Programming Application PC.

8. Troubleshooting

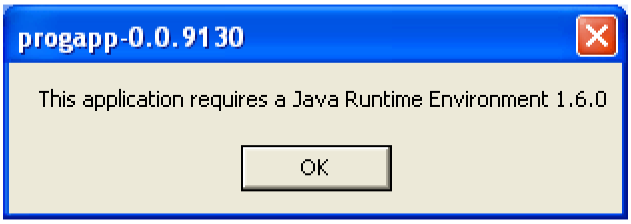
8.1 Problems and solutions

The table below shows possible problems when using the Aperio technology, and how to solve them:

Problem indication	**Cause**	**Action**
During installation of the programming application		
Not possible to install the Aperio Programming Application	The Tritech USB driver and the Aperio software are not available or saved in the appropriate folders on your laptop.	• Download the Tritech USB driver from http://www.tritech.se. • Save the Tritech USB driver and the Aperio software in the appropriate folders of your laptop. See section 3.5 Install the programming application Follow these steps to install the programming application: 7. Unpack the Aperio distribution file (ex. progapp-x.y.z.zip), including the setup.exe file, in a temporary folder. 8. Run the setup.exe file. **Result:** The Aperio programming application is installed. 9. Click Start–All Programs–Aperio Programming Application–Start. 10. At startup the Aperio Programming Application checks that the correct java version is installed. If the correct version is not installed the following will occur: c) A warning will be shown. Click OK to close the window.  This application requires a Java Runtime Environment 1.6.0 d) You are redirected to a page from where you can download the required Java version. Install the required version and restart the Aperio Programming Application according to Fel! Hittar **inte referenskälla. above**. e) Browse for the license file (.alc), select it and click OK. **Result:** The Aperio Programming Application starts. **Note!** The license file should be delivered in a

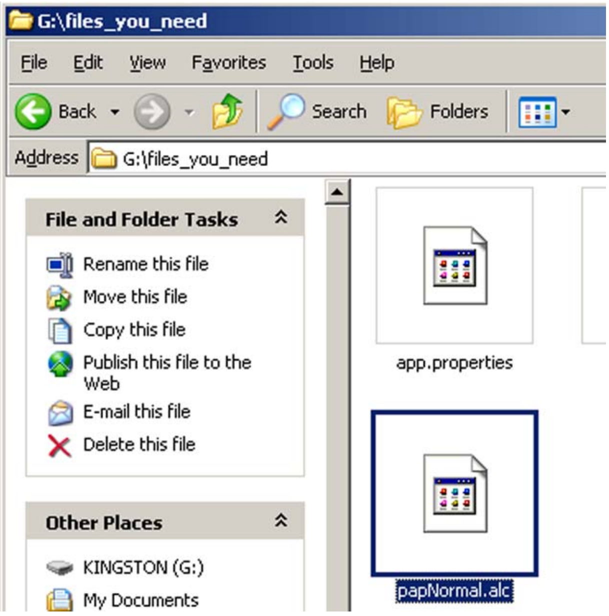
		separate e-mail or on a USB memory stick. 11. If this is the first time you install the Aperio Programming Application, you **need to** follow the steps in chapter **3.6** Install the USB radio driver before you can start the program. 12.  G:\files_you_need File Edit View Favorites Tools Help Back Search Folders Address G:\files_you_need File and Folder Tasks Rename this file Move this file Copy this file Publish this file to the Web E-mail this file Delete this file Other Places KINGSTON (G:) My Documents app.properties papNormal.alc 13. 14. 15.  Aperio Programming Application - Victor development license File Views Settings Help New... Open... Exit aperio USB Radio Monday, 18 Jan 2010 04:02:12 PM 16. 17. - 3.6 Install the USB radio driver and **Fel! Hittar inte referenskälla.**.
Communication between the USB radio device and the programming application fails	The wrong USB port is configured.	Update the port list. See section 3.5 Install the programming application Follow these steps to install the programming application: 18. Unpack the Aperio distribution file (ex. progapp-x.y.z.zip), including the setup.exe file, in a temporary folder. 19. Run the setup.exe file. **Result:** The Aperio programming application is installed. 20. Click Start–All Programs–Aperio Programming Application–Start.

21. At startup the Aperio Programming Application checks that the correct java version is installed. If the correct version is not installed the following will occur:
    f) A warning will be shown. Click OK to close the window.

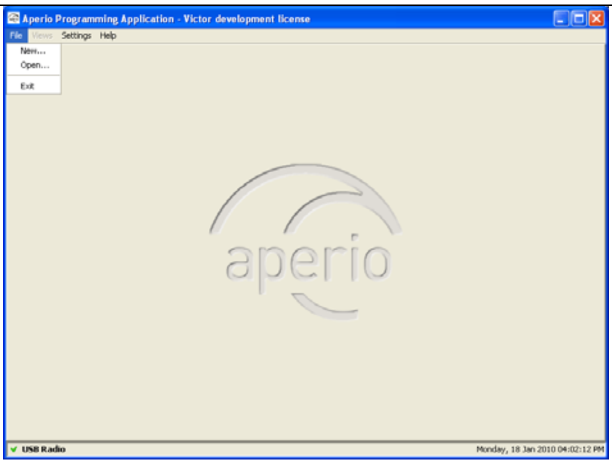
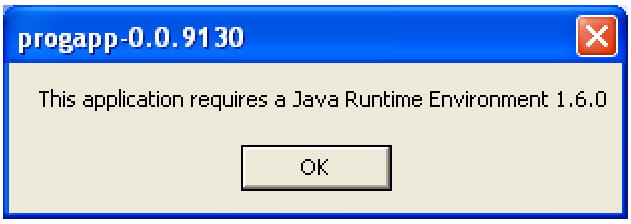


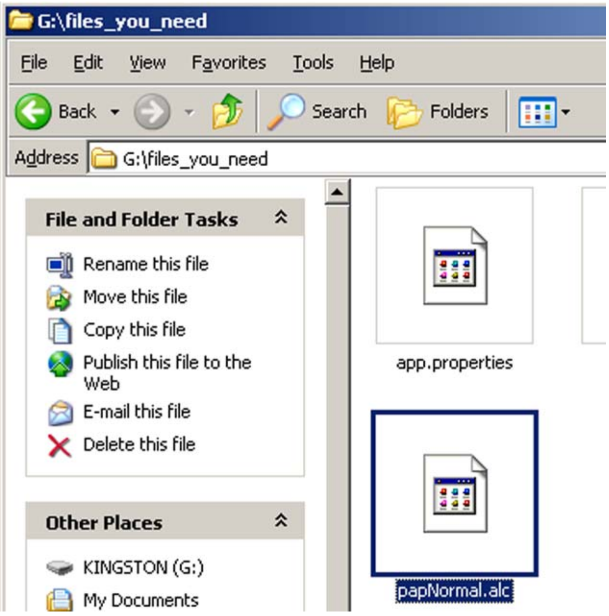
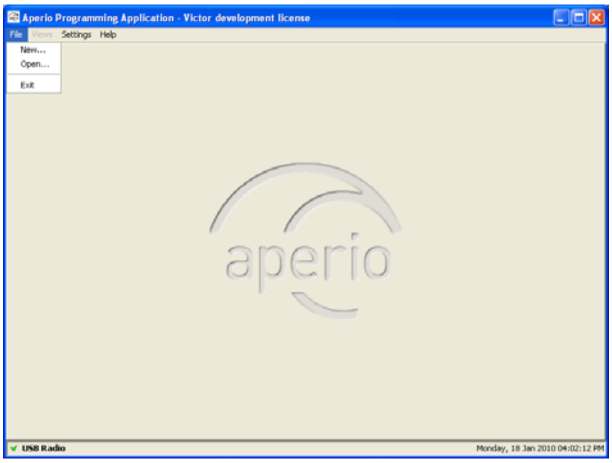
This application requires a Java Runtime Environment 1.6.0

    g) You are redirected to a page from where you can download the required Java version. Install the required version and restart the Aperio Programming Application according to Fel! Hittar **inte referenskälla. above**.
    h) Browse for the license file (.alc), select it and click OK. **Result:** The Aperio Programming Application starts. **Note!** The license file should be delivered in a separate e-mail or on a USB memory stick.
22. If this is the first time you install the Aperio Programming Application, you **need to** follow the steps in chapter **3.6** Install the USB radio driver before you can start the program.
23.



24.
25.
26.

		 Aperio Programming Application - Victor development license File Views Settings Help New... Open... Exit USB Radio Monday, 18 Jan 2010 04:02:12 PM 27. 28. 3.6 Install the USB radio driver, step 8.
The New hardware found dialog box is opened (in Windows) when inserting the USB radio device	Missing driver.	Install the driver of the USB radio device. See section 3.5 Install the programming application Follow these steps to install the programming application: 29.Unpack the Aperio distribution file (ex. progapp-x.y.z.zip), including the setup.exe file, in a temporary folder. 30.Run the setup.exe file. **Result:** The Aperio programming application is installed. 31.Click Start–All Programs–Aperio Programming Application–Start. 32.At startup the Aperio Programming Application checks that the correct java version is installed. If the correct version is not installed the following will occur: i) A warning will be shown. Click OK to close the window.  progapp-0.0.9130 This application requires a Java Runtime Environment 1.6.0 j) You are redirected to a page from where you can download the required Java version. Install the required version and restart the Aperio Programming Application according to Fel! Hittar **inte referenskälla. above**. k) Browse for the license file (.alc), select it and click OK. **Result:** The Aperio Programming Application starts. **Note!** The license file should be delivered in a separate e-mail or on a USB memory stick. 33.If this is the first time you install the Aperio Programming Application, you **need to** follow

		the steps in chapter **3.6** Install the USB radio driver before you can start the program. 34.  G:\files_you_need File Edit View Favorites Tools Help Back Search Folders Address G:\files_you_need File and Folder Tasks Rename this file Move this file Copy this file Publish this file to the Web E-mail this file Delete this file Other Places KINGSTON (G:) My Documents app.properties papNormal.alc 35. 36. 37.  Aperio Programming Application - Victor development license File Views Settings Help New... Open... Exit aperio USB Radio Monday, 18 Jan 2010 04:02:12 PM 38. 39. 3.6 Install the USB radio driver.
During door installation and update		
Not possible to pair Communication Hub and lock	You are using a card configured as an override credential.	Use a card that is not on the override credentials list.
Not possible to add default override credentials	No default override credentials are configured for the installation.	Add the credentials one by one in the door configuration wizard.
The device update fails	You have not shown the card to	Perform device update again and show the card to the lock within 30 seconds.

	the lock within 30 seconds.	
Not possible to open a version 1.0 installation in version 1.1	It is not possible to upgrade the Aperio programming application.	Create a new installation with the same encryption key and create the default override credentials list.
The Communication Hub has only one channel in its channel mask	Link measurement has failed.	Reconfigure the channel mask via the advanced door configuration. See section 8.2 Change the channel mask.

Problem indication	Cause	Action
During scanning		
The Communication Hub and lock are not found when scanning = no connection between the programming application/laptop and the Communication Hub	• All channels are busy. • The programming application and the Communication Hub have different channel masks. • The Communication Hub is not working. • The Communication Hub is not powered.	1. Click Scan again. 2. Click Scan all. 3. Change the channel mask. See section 8.2 Change the channel mask.
None or not all of the Communication Hubs are found when scanning	• The Communication Hub(s) are out of range. • The Communication Hub(s) are operating with a different channel mask. • The Communication Hub(s) are not powered. • Too many Communication Hubs are using the same channel. See footnote 1	1. Click Scan again. 2. Click Scan all. • Change the channel mask in the installation configuration view of the Aperio programming application. See section 8.2 Change the channel mask. • Change the channel mask in the devices (done by advanced door configuration). See section 8.2 Change the channel mask. • Temporary reduce the number of powered up Hubs within radio range during configuration.

[1]

[1] Aperio Hubs is default configured to select the best channel out of three possible, if the selected channel is disturbed a new channel selection will be done automatically. An Aperio system with many Hubs normally distribute themselves on different channels but a synchronized power up of all Hubs may cause all Hubs to initially choose the same channel.
(Note that this problem do not affect performance of already installed and paired lock/cylinders and Hubs, only Programming Application scan functionality is affected)

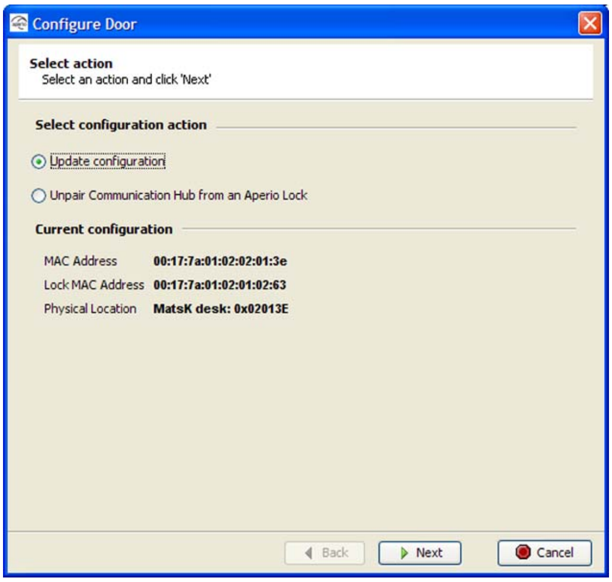
Problem indication	**Cause**	**Action**
n/a is shown for the installation in the Communication Hub field and in the Lock field of the scan result table	• The Communication Hub and/or Communication Hub paired with a lock belongs to another installation and has another encryption key. • The lock is not paired with the Communication Hub.	• Switch installation or create a new installation with the correct encryption key. • Pair the lock and Communication Hub in the Configure door wizard of the programming application.
	During normal operation	
The Communication Hub LED is flashing red once = no connection between the lock and the Communication Hub	• The lock and Communication Hub are not paired. • The lock and the Communication Hub have different channel masks. • The battery of the lock has run out.	• Click Scan again. • Pair the lock and Communication Hub in the Configure door wizard of the programming application. • Change the channel mask. See section 8.2 Change the channel mask. • Change the battery of the lock. See section 7.1 Change the battery of the lock.
The Communication Hub LED is flashing red twice = no connection between the EAC system and the Communication Hub	• The EAC address is not properly configured in the Communication Hub. • The EAC system is not properly configured.	Configure the EAC address using the programming application. See section 5.3 Update the door configuration, step 16-17.

Problem indication	Cause	Action
Unstable radio communication between lock and Communication Hub	• Poor radio link quality. • The lock and the Communication Hub have different channel masks.	• Measure the radio link. See section 8.3 Measure the radio link. • Change the channel mask. See section 8.2 Change the channel mask.

8.2 Change the channel mask

Follow these steps to change the channel mask for the Communication Hub and lock:

1. Open the applicable installation in the Aperio programming application and click Scan.
2. Select the door in the scan result table and click Configure door.



Configure Door

Select action
Select an action and click 'Next'

Select configuration action

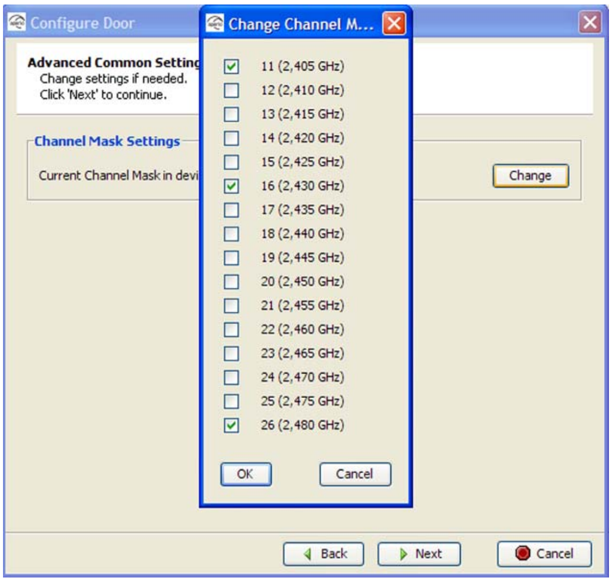
● Update configuration

○ Unpair Communication Hub from an Aperio Lock

Current configuration

MAC Address	**00:17:7a:01:02:02:01:3e**
Lock MAC Address	**00:17:7a:01:02:01:02:63**
Physical Location	**MatsK desk: 0x02013E**

3. Click Next five times to go to the Advanced Common Settings dialog box. Click Change.



Configure Door

Advanced Common Setting
Change settings if needed.
Click 'Next' to continue.

Channel Mask Settings

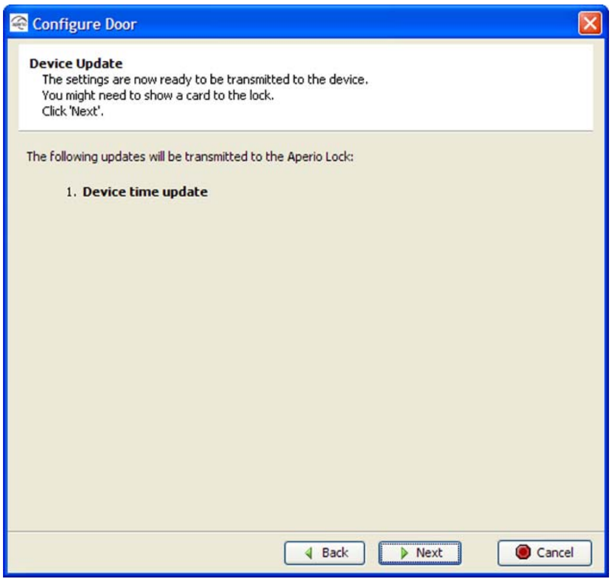
Current Channel Mask in devi

Change Channel M...

☑ 11 (2,405 GHz)
☐ 12 (2,410 GHz)
☐ 13 (2,415 GHz)
☐ 14 (2,420 GHz)
☐ 15 (2,425 GHz)
☑ 16 (2,430 GHz)
☐ 17 (2,435 GHz)
☐ 18 (2,440 GHz)
☐ 19 (2,445 GHz)
☐ 20 (2,450 GHz)
☐ 21 (2,455 GHz)
☐ 22 (2,460 GHz)
☐ 23 (2,465 GHz)
☐ 24 (2,470 GHz)
☐ 25 (2,475 GHz)
☑ 26 (2,480 GHz)

4. Change the channel mask and click OK. **Note!** Three channels are recommended.

5. Click Next two times. **Result:** The Device Update dialog box is opened.

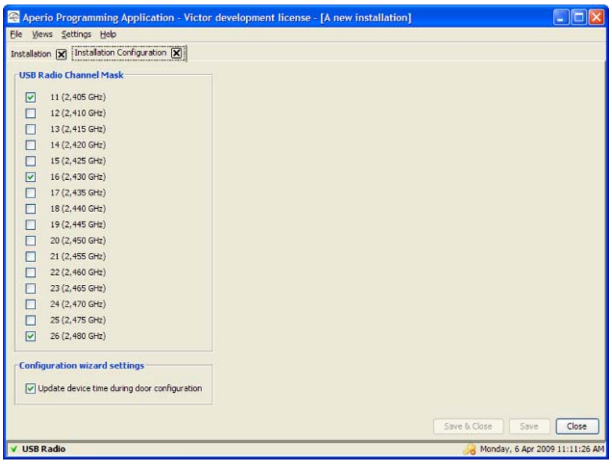


Device Update
The settings are now ready to be transmitted to the device.
You might need to show a card to the lock.
Click 'Next'.

The following updates will be transmitted to the Aperio Lock:

1. **Device time update**

6. Click Next and show a card to the lock to perform the update. You must show the card within 30 seconds, otherwise the update process will time out. **Result:** A progress bar shows that the update is being performed. The Device update result dialog box shows the result of the update when it has been performed.
7. Click Close.
8. Open Views–Installation Configuration.



Aperio Programming Application - Victor development license - [A new installation]
File Views Settings Help
Installation ☒ Installation Configuration ☒

USB Radio Channel Mask
☑ 11 (2,405 GHz)
☐ 12 (2,410 GHz)
☐ 13 (2,415 GHz)
☐ 14 (2,420 GHz)
☐ 15 (2,425 GHz)
☑ 16 (2,430 GHz)
☐ 17 (2,435 GHz)
☐ 18 (2,440 GHz)
☐ 19 (2,445 GHz)
☐ 20 (2,450 GHz)
☐ 21 (2,455 GHz)
☐ 22 (2,460 GHz)
☐ 23 (2,465 GHz)
☐ 24 (2,470 GHz)
☐ 25 (2,475 GHz)
☑ 26 (2,480 GHz)

Configuration wizard settings
☑ Update device time during door configuration

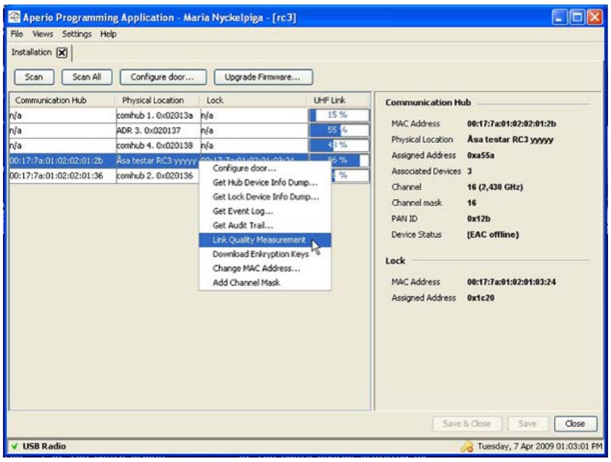
Save & Close
Save
Close
✓ USB Radio
Monday, 6 Apr 2009 11:11:26 AM

9. In the USB Radio Channel Mask field, select the same channels for the USB radio device as in step 4 above.
10. Click Save & Close.

8.3 Measure the radio link

Follow these steps to measure the radio link:

1. Open the applicable installation in the Aperio programming application and click Scan.



Aperio Programming Application - Maria Nyckelpiga - [rc3]

Communication Hub	Physical Location	Lock	UHF Link
n/a	comhub 1. 0x02013a	n/a	15 %
n/a	ADR 3. 0x020137	n/a	55 %
n/a	comhub 4. 0x020138	n/a	4[illegible] %
00:17:7a:01:02:02:01:2b	Åsa testar RC3 yyyyy	[illegible]	[illegible]6 %
00:17:7a:01:02:02:01:36	comhub 2. 0x020136	[illegible]	[illegible] %

Communication Hub

MAC Address	00:17:7a:01:02:02:01:2b
Physical Location	Åsa testar RC3 yyyyy
Assigned Address	0xa55a
Associated Devices	3
Channel	16 (2,430 GHz)
Channel mask	16
PAN ID	0x12b
Device Status	{EAC offline}

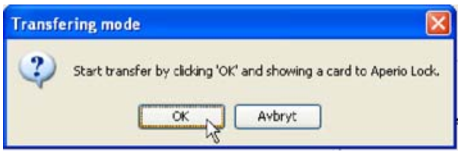
Lock

MAC Address	00:17:7a:01:02:01:03:24
Assigned Address	0x1c20

USB Radio

Tuesday, 7 Apr 2009 01:03:01 PM

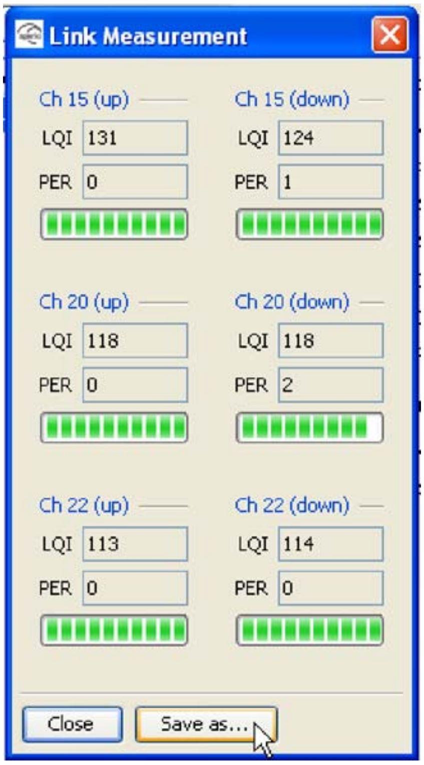
2. Select a door in the scan result table, right-click it and select Link Quality Measurement.



Transfering mode

Start transfer by clicking 'OK' and showing a card to Aperio Lock.

3. Click OK and show an access card to the lock. The Measure Link Quality progress bar shows that the measurement is being performed. **Result:** The result of the measurement is shown.



Link Measurement

Ch 15 (up)		Ch 15 (down)	
LQI	131	LQI	124
PER	0	PER	1

Ch 20 (up)		Ch 20 (down)	
LQI	118	LQI	118
PER	0	PER	2

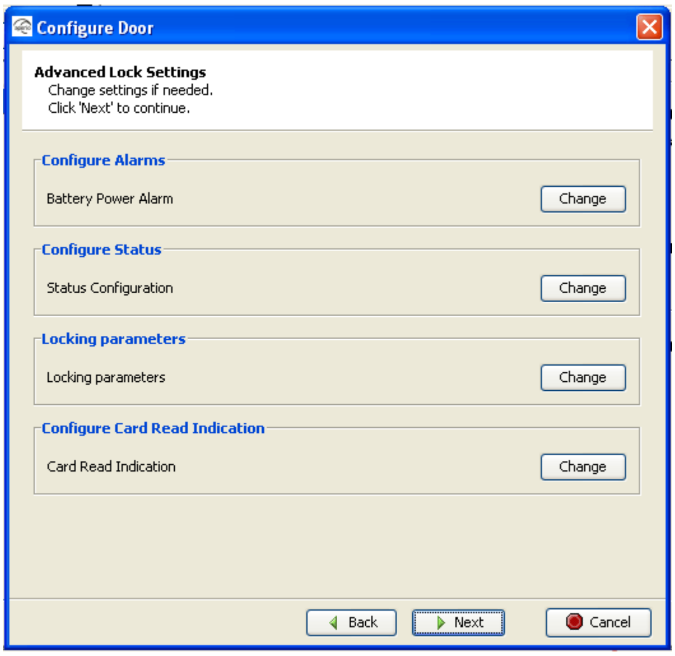
Ch 22 (up)		Ch 22 (down)	
LQI	113	LQI	114
PER	0	PER	0

4. Click Close or click Save as to save the link measurement data to a file.

8.4 Advanced Lock Settings

When configuring a door you have the option to configure advanced lock settings.
These are

- **battery power alarm** – configuration of the battery level that triggers an alarm and with what interval the battery in the lock should be checked.
- **status messages and report intervals** – configuration of which statuses the message should contain and with what interval the message should be sent.
- **locking time parameters** – configuration of the time the lock should be open, try to open, and after what time a close alarm should be sent to the event log.
- **card read indication** – Configure the audio-visual card reading indication. This could typically be: *None*, *LED* or in some hardware *Buzzer*.



Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

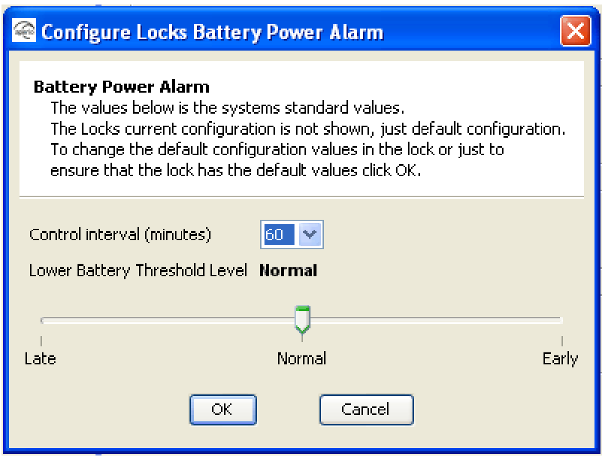
8.4.1 Battery Power Alarm

The battery power alarm is sent from the lock to the EAC system and is used to indicate when it is time to replace the battery. It may be necessary to configure the alarm triggering depending on the type of battery used and the surrounding temperature, e.g. in cold surroundings the battery runs out faster.
The alarm trigger can be configured to either of Early, Normal or Late and the check interval between 5 – 255 minutes.

Default values are Normal and 60 minutes interval.

Follow these steps to configure the battery alarm in the configuration wizard:

1. Click Change



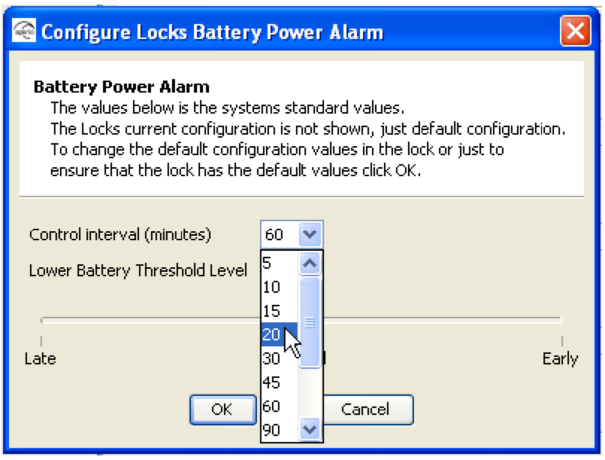
Configure Locks Battery Power Alarm

Battery Power Alarm
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to ensure that the lock has the default values click OK.

Control interval (minutes) 60

Lower Battery Threshold Level **Normal**

2. The default configuration is shown, if you want to keep it just click OK. If you want to change to something else follow the next steps...



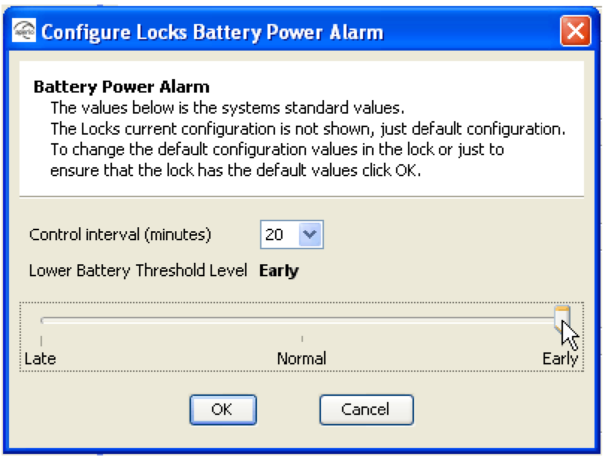
Configure Locks Battery Power Alarm

Battery Power Alarm
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to ensure that the lock has the default values click OK.

Control interval (minutes) 60

Lower Battery Threshold Level

3. To change the control interval use the drop down and choose the appropriate time.



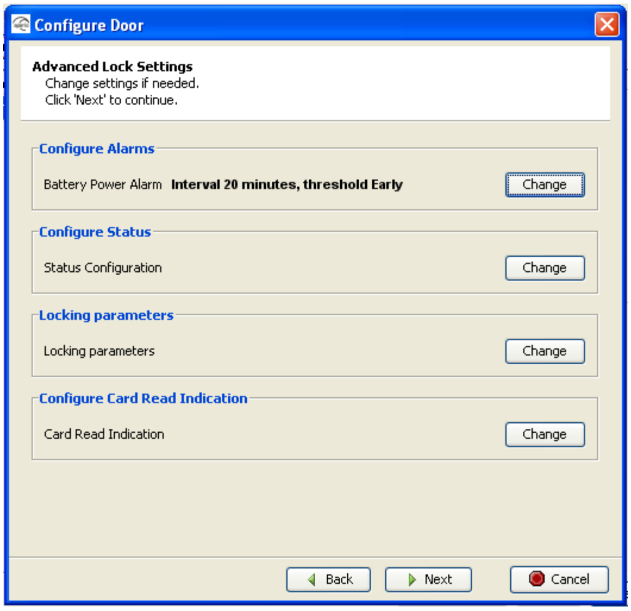
Configure Locks Battery Power Alarm

Battery Power Alarm
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to ensure that the lock has the default values click OK.

Control interval (minutes) 20

Lower Battery Threshold Level **Early**

4. To change alarm trigger threshold level use the slider.
5. Confirm with OK



Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

Configure Alarms
Battery Power Alarm **Interval 20 minutes, threshold Early**

Configure Status
Status Configuration

Locking parameters
Locking parameters

Configure Card Read Indication
Card Read Indication

You will see selected values in the configuration wizard.

8.4.2 Status configuration

You can configure if you want the lock to send status messages.
The message can include one or more of the following types of statuses:

Low power – if the battery has reached the level when battery power alarm is triggered.

Real time clock failure – not used.

Serious failure – not used.

ComHub offline – not used.

EAC offline – if the EAC has gone offline from the Hub, e.g. the EAC HW is turned off, or the Hub is physically disconnected from the loop and doesn’t detect the EAC.

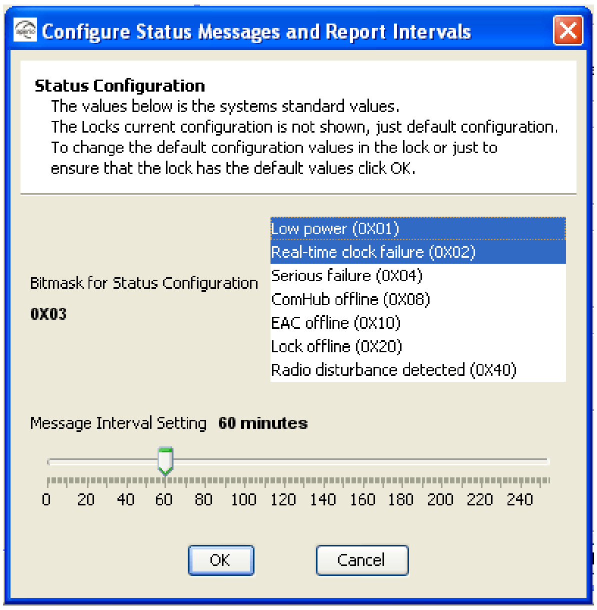
Lock offline – if the lock has gone offline from the Hub.

Radio disturbance detected – if radio disturbances is detected.

Default setting for status message is 60 minutes interval for “Low power” and “Real-time clock failure”.

Follow these steps to configure the status messages in the configuration wizard:

1. Click Change



Configure Status Messages and Report Intervals

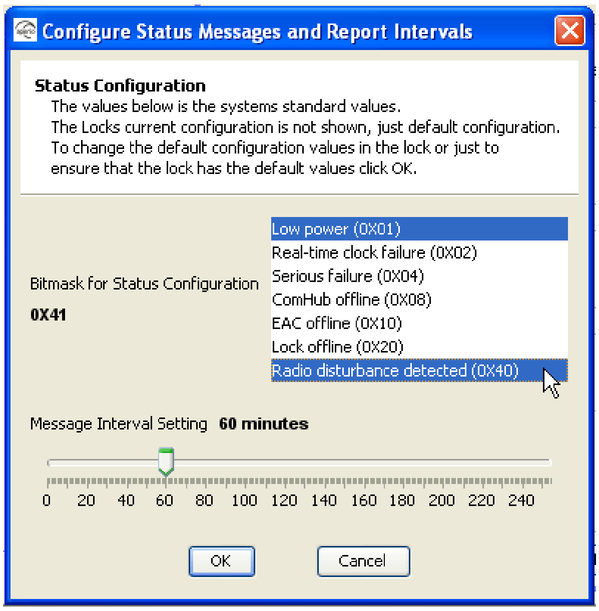
Status Configuration
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to ensure that the lock has the default values click OK.

Bitmask for Status Configuration
0X03

Selected: Low power (0X01), Real-time clock failure (0X02)

Message Interval Setting **60 minutes**

2. The default configuration is shown, if you want to keep it just click OK. If you want to change to something else follow the next steps…



Configure Status Messages and Report Intervals

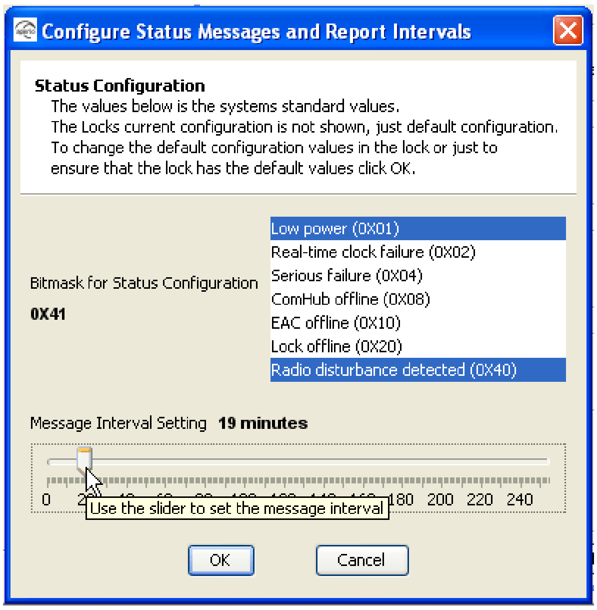
Status Configuration
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to ensure that the lock has the default values click OK.

Bitmask for Status Configuration
0X41

Selected: Low power (0X01), Radio disturbance detected (0X40)

Message Interval Setting **60 minutes**

3. To change the status the message should contain keep <Ctrl> down and choose from the list as shown.
   In the parenthesis, to the right of the status, you see the bit mask (in hexadecimal notation) that will be created for the status message.



Configure Status Messages and Report Intervals

Status Configuration
The values below is the systems standard values.
The Locks current configuration is not shown, just default configuration.
To change the default configuration values in the lock or just to
ensure that the lock has the default values click OK.

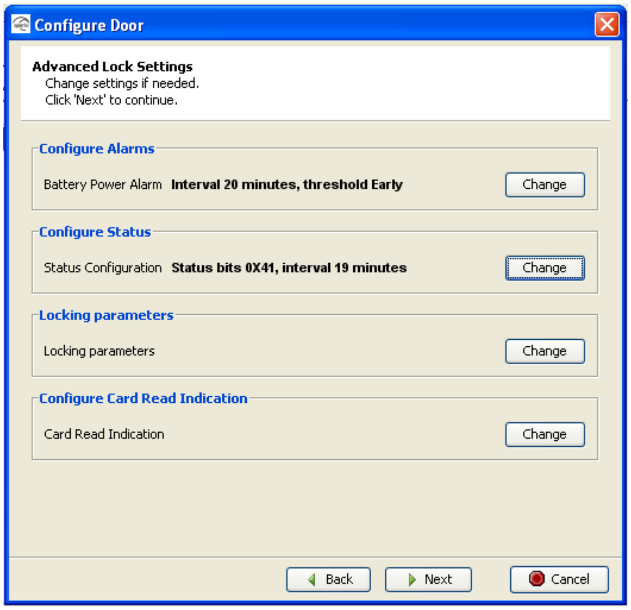
Bitmask for Status Configuration
0X41

- Low power (0X01)
- Real-time clock failure (0X02)
- Serious failure (0X04)
- ComHub offline (0X08)
- EAC offline (0X10)
- Lock offline (0X20)
- Radio disturbance detected (0X40)

Message Interval Setting **19 minutes**

Use the slider to set the message interval

4. To change the message interval use the slide bar and choose the time for how often the status message should be sent.
5. Confirm with OK



Configure Door

Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

Configure Alarms
Battery Power Alarm **Interval 20 minutes, threshold Early**

Configure Status
Status Configuration **Status bits 0X41, interval 19 minutes**

Locking parameters
Locking parameters

Configure Card Read Indication
Card Read Indication

You will see the selected bit mask in the configuration wizard.

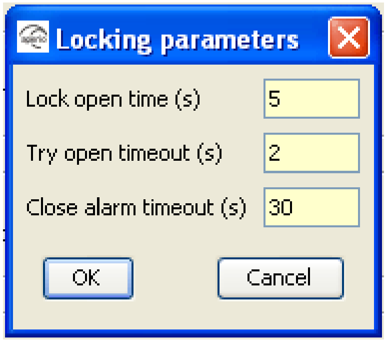
8.4.3 Locking parameters

You can configure time for different operations in the lock.
These are:
How long the lock should be **open** in seconds.
How long the lock should **try to open** in seconds.
After how long time in seconds a **close alarm** should be generated and sent to the event log.

Default values are 5 seconds for “Lock open time”, 2 seconds for “Try open timeout” and 30 seconds for “Close alarm timeout”.

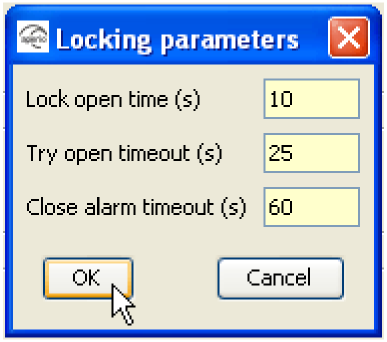
Follow these steps to configure the status messages in the configuration wizard:

1. Click Change



Lock open time (s): 5
Try open timeout (s): 2
Close alarm timeout (s): 30

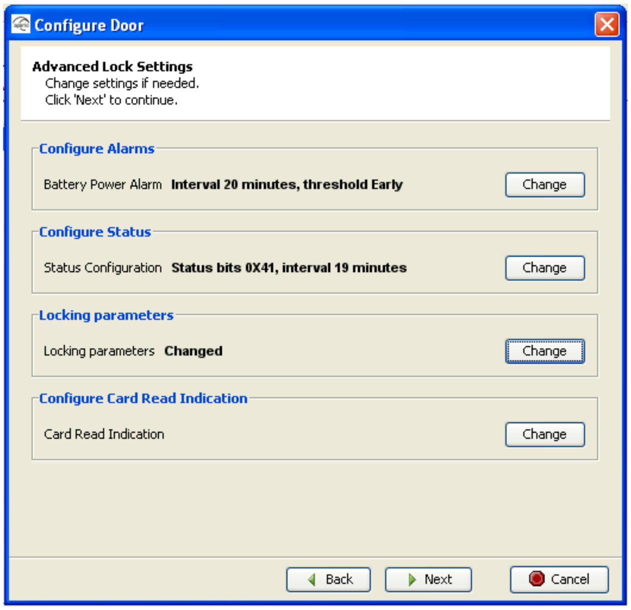
2. The default configuration is shown, if you want to keep it just click OK. If you want to change to something else follow the next steps...



Lock open time (s): 10
Try open timeout (s): 25
Close alarm timeout (s): 60

3. To change the times fill in valid values in seconds in the field for wanted parameter.
   Valid values are
   for “Lock open time” - between 1 to 65 seconds
   for “Try open time” – 1 to 15 seconds
   for “Close alarm timeout” – 30 to 255 seconds

4. Confirm with OK



Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

Configure Alarms
Battery Power Alarm **Interval 20 minutes, threshold Early**

Configure Status
Status Configuration **Status bits 0X41, interval 19 minutes**

Locking parameters
Locking parameters **Changed**

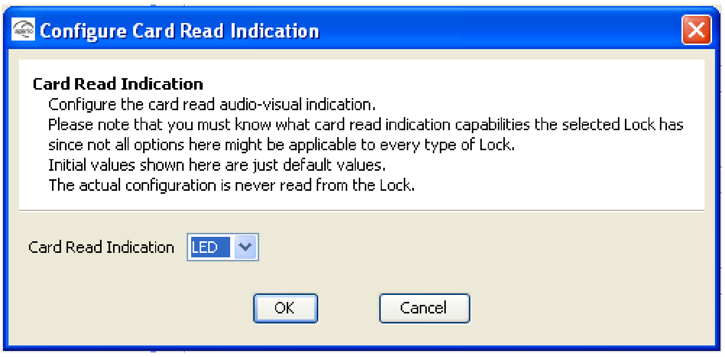
Configure Card Read Indication
Card Read Indication

You will see that one or more parameters have been changed in the configuration wizard.

5. Click Next and continue through the configuration wizard… 5.6 Save the configuration

8.4.4 Card Read Indication

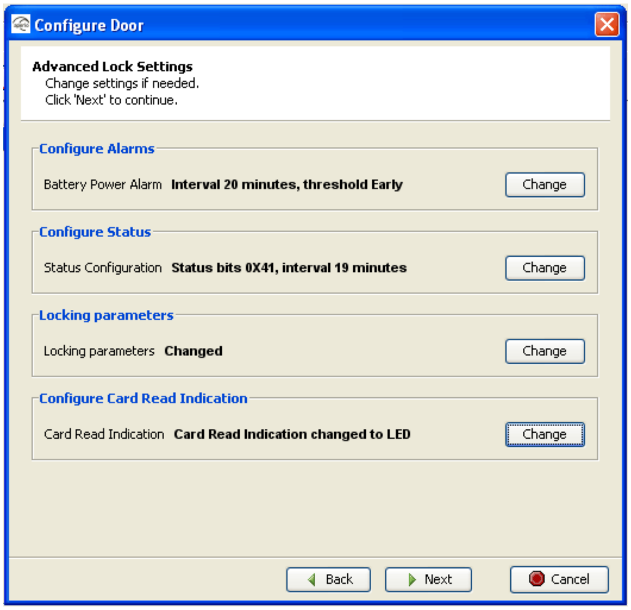
Different locks can have different mechanism for audio-visual indication of successful card reading. Here it is possible to disable card read indication or to set it to LED. Future Aperio locks might have support for other mechanisms such as buzzers.



Card Read Indication
Configure the card read audio-visual indication.
Please note that you must know what card read indication capabilities the selected Lock has since not all options here might be applicable to every type of Lock.
Initial values shown here are just default values.
The actual configuration is never read from the Lock.

Card Read Indication LED

1. Choose *none* to disable card read indication or choose *LED* to use yellow LED blink to indicate successful card reading. See chapter 2.7 Lock normal operation LED indication for more information on LED indication.
2. Click *OK* to confirm or *Cancel* to ignore any changes in Card Read Indication.



Advanced Lock Settings
Change settings if needed.
Click 'Next' to continue.

Configure Alarms

Battery Power Alarm **Interval 20 minutes, threshold Early**

Configure Status

Status Configuration **Status bits 0X41, interval 19 minutes**

Locking parameters

Locking parameters **Changed**

Configure Card Read Indication

Card Read Indication **Card Read Indication changed to LED**

The result of the card read indication configuration change is displayed in the wizard panel, as shown above. Click next to continue to the next step in the configuration wizard.

Appendix A, Mifare RFID Configuration Online Help

Mifare RFID Configuration

UID Configuration

No parameters are needed when simple UID reading is configured.

Sector Configuration

❗If sector configuration is done wrong, the lock may become inoperable. Make sure you know what you are doing before changing these values.

Sector
To configure the lock for sector card reading, you need to set from what sector on the card you would like to read card credential data. Sectors range from 0 to 15 for Mifare 1K Classic cards and from 0 to 39 for Mifare 4K Classic cards.

Start Address
It is possible to use parts of blocks within a sector as credential data. The data can even span multiple blocks. To configure this you need to set the start address byte within the sector. You also need to supply the length in bytes for the credential.
The start address can range from 0 to 47 when used with 1K Classic cards and for 4K Classic cards for sectors 0 to 31. For sectors above 31 (only 4K Classic cards), the start address can be within the range 0 - 239.

Data Length
The length of the credential data can be 1 - 48 (you are not allowed to set 0 length). Note that for sectors above 31 we can not use a credential larger than 48 bytes even though that we have more blocks available in these sectors.

Mifare Key
To be able to read the credential data a valid Mifare key must be supplied. The key is 6 bytes long and is entered using hexadecimal values. For example: A70E190AB34C

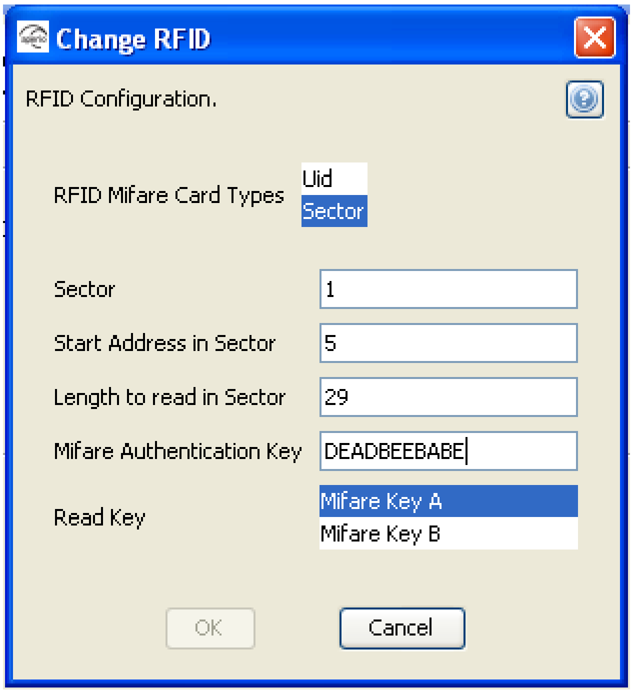
Key Type
The card has two keys, Key A and Key B. Depending on the access configuration of the card, Key A or Key B is given the right to read from a sector. To be able to authorize to a sector the lock needs to know if read access is given to Key A or Key B.
❗Note: If key B is selected as sector data read key, make sure that the access bits on the card prevent read of key B. If key B is readable on the card, key B can not be used to read the card data.
All values are mandatory.

Example

Below is an example where the card has the credential data in sector 1 starting at byte 5 with length 29.

Sector	Block	Data															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0	0	UID				Manufacturer Data											
	1																
	2																
	3	Mifare Key A						Access bits				Mifare Key B					
1	0						🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧
	1	Credential Data	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧
	2	🟧	🟧														
	3	Mifare Key A						Access bits				Mifare Key B					
...																	
		Mifare Key A						Access bits				Mifare Key B					
15	0																
	1																
	2																
	3	Mifare Key A						Access bits				Mifare Key B					

The card is configured to use Key A as the read key. Below is a screen shot from the sector configuration dialog for the card in this example.



Change RFID

RFID Configuration.

RFID Mifare Card Types: Uid / Sector (selected: Sector)

Sector: 1

Start Address in Sector: 5

Length to read in Sector: 29

Mifare Authentication Key: DEADBEEBABE

Read Key: Mifare Key A (selected) / Mifare Key B

Appendix B, Security Statement

The security of Aperio is according to the following:

- Authentication: 3-pass mutual authentication (challenge-response protocol) based on AES128. Standard Aperio authentication scheme.
- Confidentiality in communication: The communication is encrypted by a unique session key.
- Confidentiality of information in the lock: Secret information such as encryption keys is never visible outside the protected flash of the microcontroller.
- Unique encryption key seed for each installation.
- Encrypted database in Programming Application is password protected. The computer must also be physically protected.
- AES and RNG tested according to (National Institute of Standards and Technology) NIST test vectors.
  - http://csrc.nist.gov/groups/STM/cavp/documents/rng/RNGVS.pdf
  - http://csrc.nist.gov/publications/fips/fips197/fips-197.pdf